sft 017

BONDIOLI & PAVESI

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Compiled by Eng. Riccardo Mosconi in collaboration with Mr. Edi Bondioli, Cavaliere Ordine al Merito del Lavoro.

Catalog

sft

017

BONDIOLI & PAVESI

Safety First

What is the highest priority
in the design of SFT driveshafts?
The safety of the operator.
Nothing contributes to safety more than an experienced and cautious operator, but a quality driveshaft, designed with safety in mind, can sometimes make the difference.
Not only does the SFT range comply with existing international safety standards, it is also designed to go beyond those criteria to
create a new bench mark for safety.

Work, work, work

What is required from a driveshaft during
those times when one cannot afford downtime?
It is expected to work, continuously.
SFT driveshafts are designed, tested and
manufactured to be easy to use,
robust and reliable in all conditions and applications.

Simply technological

The best technology provides
advantages without complications.
Years of research and experience, along with
many reliable and innovative technical solutions
has been summed up in the range of SFT driveshafts.

The catalog is a salesman

That is to say that a catalog should be considered useful to clients and sales force, only when it conveys all necessary information in a clear and direct manner, just like a good salesman would.

The information in this catalog is intended to help in the selection of the most suitable driveline components for each application, and how to safely use drivelines.
The catalog has been arranged into chapters according to a logical process of selecting the technical features of a driveline. An exception to this order is the first chapter “Safety and Working Conditions”, because safety of the operator is always the first priority of Bondioli & Pavesi.

The chapter entitled “SFT Drivelines and Accessories” is an introduction to the SFT range of drivelines. All the latest technical innovations of the SFT project and innovative features of SFT drivelines are explained in this section.

In the chapter “Driveline Applications” all essential information concerning the selection of a driveline according to a specific type of application is explained. “Codes and Dimensions” introduces the complete range of available drivelines and basic information as to how the codes are structured.

The following chapters include more detailed information regarding the technical features of specific components such as cross kits, yokes, telescoping members, safety labels, guards, torque limiters and clutches. These chapters also provide information about the codes for the components, both as an element of a complete driveline code and as an individual spare part.

Specifications for each cardan joint are shown in their respective chapter (S1 through S0). Within each section you will find in-depth information for each joint size and the options available.

A driveline may be specified with this catalog in either of two ways: on the basis of general features shown in the chapters dedicated to components, or by choosing from the available choices given for each size in their respective chapter.

The chapter titled “Lubrication” addresses general recommendations for lubrication, as well as some technical features available with SFT drivelines.

The chapter “Input Connection Shields” introduces an important accessory component that may be used with SFT drivelines - shields that help protect the user from inadvertent contact with the power input connection of the implement.
The chapter “Combination Friction + Overrunning Torque Limiters for Flywheels” introduces devices that are frequently supplied for implements with high power and inertia.

The final chapter is a glossary providing definitions for the terms used in this catalog, a summary of international standards for PTO dimensions, and a Product Plan to guide the selection of a SFT driveshaft.

Foreword

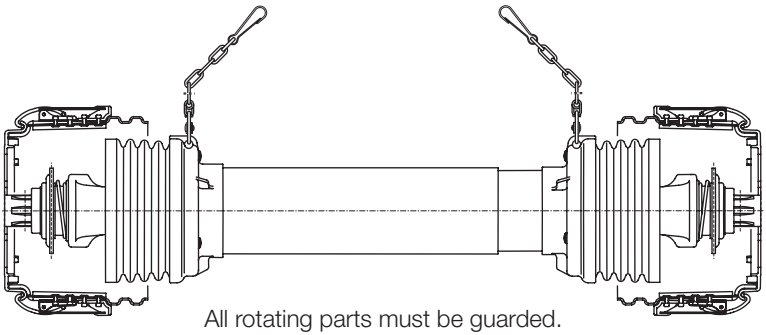
Index

Index

Index

Index

Index



All rotating parts must be guarded.
Contact with a rotating driveline can cause death or serious injury.
The tractor master shield, the driveline guards, and the implement input connection shields form an interactive guarding system

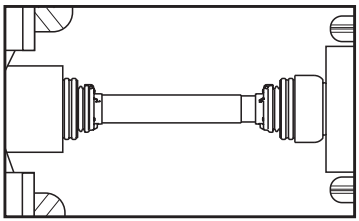
Proper use and maintenance of the driveline and shielding is of primary importance for operator safety.
A high percentage of driveline accidents occur when safety shielding is missing or does not function properly.
Bondioli & Pavesi recommends the use of proper shields and guards for the driveline, tractor, and implement. Damaged or missing components must be replaced with original equipment spare parts, correctly installed, before using the driveline.
Use the implement only with the original driveline. The implement input connection shield must be compatible with the driveline and the application.
To comply with international safety standards, the implement manufacturer shall provide safety sign(s) and instructions stating that guards must be kept in place and the machine should not be operated with guards opened or removed. These sign(s) should be used to draw attention to the possible risks when the guard is unlocked, opened, or removed.

In addition it is recommended that the implement manufacturer provide a list of the guards, their corresponding warnings, their positions, and spare parts codes in the instruction manual.
Basic information for safe and correct use of the driveline and shielding are shown in our catalogs and in the instruction sheet provided with Bondioli & Pavesi drivelines.
Safety labels and user's manuals in alternative languages are available to meet local requirements.

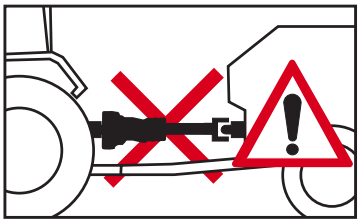
THE ABOVE INFORMATION CONCERNS YOUR SAFETY.

Safety and working conditions

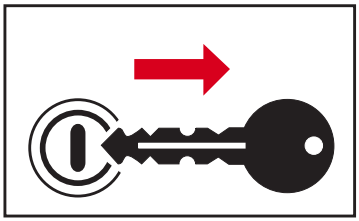
Use the implement only with the original driveline, which is compatible in length, power capacity, torque limiters, overrunning clutches, and shielding. The driveline and safety devices are designed specifically for the implement, and should be used exclusively for this purpose.
Do not exceed the speed and power limits given by the operator's manual. Drivelines, torque limiters, and overrunning clutches in this catalog are designed to be used at speeds that do not exceed 1000 min^{-1}.
Do not overload the implement or suddenly engage the PTO clutch. Any torque limiter or clutch should be installed on the implement end of the driveline. Use the driveline, torque limiters, and overrunning clutches only for their intended purpose.



All rotating parts must be guarded. Contact with a rotating driveline can cause death or serious injury. The tractor master shield, the driveline guards, and the implement input connection shield form an interactive guarding system.

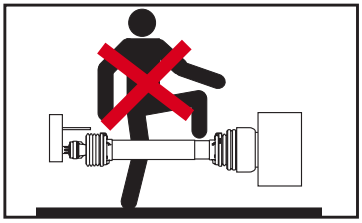


Ensure that all driveline, tractor, and implement shields are functional and in place before operation. Damaged or missing parts must be replaced with the original equipment spare parts, correctly installed, before using the driveline.

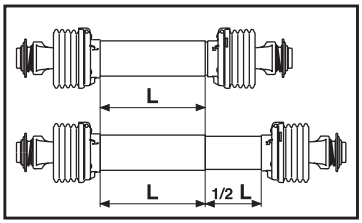


Disengage the PTO, turn off the tractor engine, remove the key, and check that all rotating parts have come to a standstill before approaching the implement or performing maintenance work.

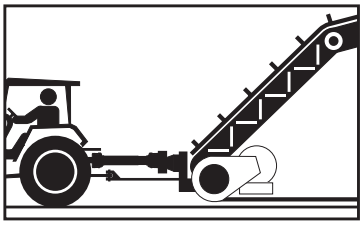
Do not approach, nor allow bystanders to come near the work zone or rotating parts. Do not wear loose clothing, jewelry, hair, or anything which could get caught in the machine.
Contact with rotating parts could cause serious injury or death.



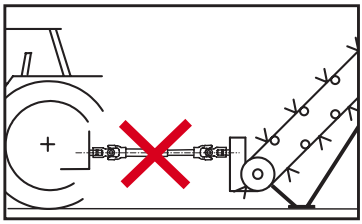
Do not stand, lean, or otherwise come in contact with the driveline. Do not step over or go under the driveline.



Keep the profile tubes overlapped as much as possible during transport and operation. Do not exceed the values given in this catalog for permissible length extension. If greater telescoping ability is required, contact Bondioli & Pavesi engineering.

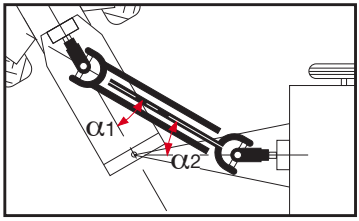


Always hitch the tractor to STATIONARY MACHINERY (pumps, hoists, generators, dryers, etc.). Check the tractor wheels to prevent rolling and check that joint angles are small and as equal as possible.



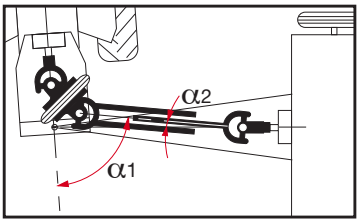
Always hitch the tractor to STATIONARY MACHINERY (pumps, hoists, generators, dryers, etc.) so that the profile tubes are not overextended.
Under all working conditions, extension of the driveline should not exceed the values reported in this catalog. All rotating parts must be guarded.

Safety and working conditions



SINGLE CARDAN J0INTS

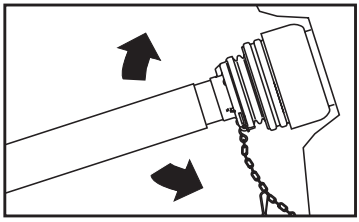
When operating, ensure that angles α_1 and α_2 are small and as equal as possible. The joint angles may vary widely during turns, but must never exceed 35° under power or 45° while rotating. Disengage the PTO when the joint angles become excessive or too unequal. See “Driveline Applications” for more information.



CONSTANT VELOCITY JOINTS

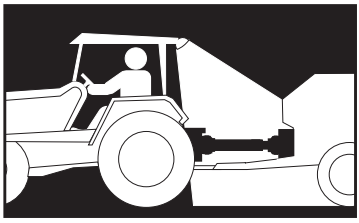
Constant velocity joint can allow large joint angles -up to 50° or 80° depending upon the type. These joint angles should only be allowed for brief periods, for example during turning.

For drivelines with a constant velocity joint on the tractor side and a single cardan joint on the implement side, the maximum recommended angles of the single joint are 16° at 540 min^{-1} and 9° at 1000 min^{-1} to prevent irregular motion. See “Driveline Applications” for more information.

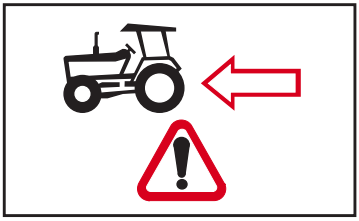


Attach the shield restraint chains, allowing sufficient slack for the driveline to move during turns and operation.

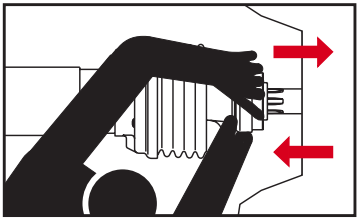
Best results are achieved when the chains are attached nearly perpendicular to the driveline guard. Adjust the length to allow articulation of the driveline in working or transport positions, but avoid excessive slack that may wrap around the driveline.



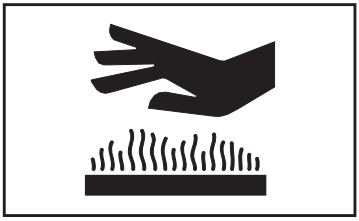
When used at night or in poor visibility, illuminate the driveline operating area.



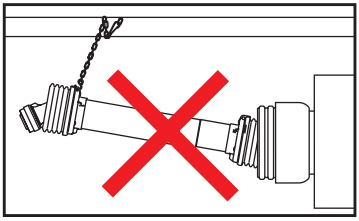
The tractor printed on the shield indicates the tractor end of the driveline.
Any torque limiter or overrunning clutch must be installed on the implement end of the driveline.



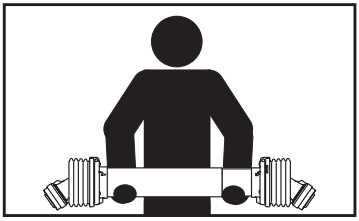
Ensure that the driveline is securely attached to the tractor and the implement before operating.
Check that all bolts or nuts are properly torqued.



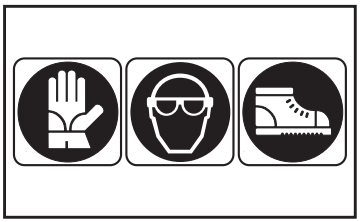
Friction clutches may become hot during use.
Do not touch!
Keep the area around the friction clutch clear of any material which could catch fire and avoid prolonged slipping.



Never use the shield restraint chains to support the driveline for storage. Always use the support on the implement.



Keep the driveline horizontal during handling to prevent the halves from sliding apart, which could cause injury or damage the shielding. Use suitable means to transport the driveline, depending on the weight.



Always wear adequate safety equipment when performing any maintenance or repair work.
Clean and grease the PTO of the tractor and the implement input connection to facilitate installation of the driveline.
Replace worn or damaged components with the original Bondioli & Pavesi spare parts. Do not alter or tamper with any driveline component. Contact an authorized Bondioli & Pavesi dealer concerning any operations not described in the instruction manual.

Farming is undergoing a period of tremendous change, comparable in importance to early mechanization when tractors and machines replaced draft animals and manual labor.

Market globalization has intensified competition, demanding increased productivity, which in turn requires more powerful, efficient, and reliable machinery.
The traditional farmer is also changing, assuming the role of a business manager, leaving the machines to be operated by employees or hired hands. For these reasons, machines must be inherently safe and easy to use, and they must require little maintenance.

Using their understanding of modern market demands and decades of experience in the field of power transmission as it relates to agricultural mechanization, Bondioli & Pavesi developed the SFT range of drivelines and accessories, with every component designed and built according to the principles of safety, function and technology

Safety

International safety standards and regulations provide important guidelines and are continually updated. The wealth of expertise accumulated by Bondioli & Pavesi in regards to driveline safety is at the basis of SFT drivelines and accessories.
SFT drivelines comply with existing standards and regulations, as well as those under development.

Function

SFT drivelines are designed to respond to the user's needs: reliability, low weight (with equal performance), easy installation and simplified, long-lasting lubrication.

Technology

Improvements in farm productivity have occurred with the application of appropriate technologies.
SFT drivelines are based on the experience Bondioli & Pavesi has gained in the design and manufacture of drivelines and accessories since 1950.
Constant research and exclusive production techniques, combined with stringent testing and quality control, have enabled Bondioli & Pavesi to obtain high levels of performance in a compact driveline.

Cross kits: designed and built for farming applications

SFT drivelines are born of the expertise acquired by Bondioli & Pavesi through years of designing and manufacturing universal joint crosses and needle bearings. This expertise has allowed us to create technically advanced cross kits that are perfectly suited for their intended use on agricultural equipment.

Most of the cross kits available today were designed for industrial applications, where the volume is much larger than the farming sector. Industrial and agricultural drivelines both utilize universal joints and may look somewhat similar, but the applications are quite different. Agricultural drivelines are subjected to high and fluctuating torque loads and require heavy-duty components. Working angles tend to be large and variable, unlike industrial settings where joint angles are generally small and almost never change.

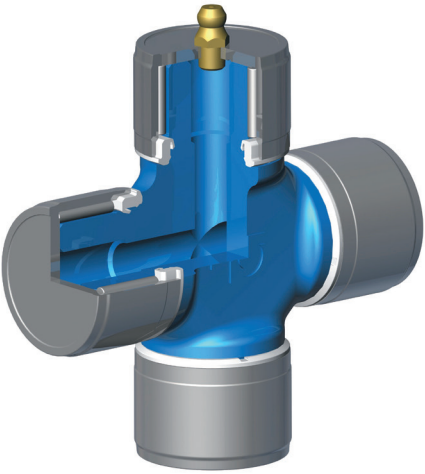
Different working conditions produce different stresses on the cross kit; that's why components specifically designed for farming applications achieve the best results.

The chief design objectives for SFT cross kits are: higher strength trunnions on the cross, increased needle bearing life, and longer lubrication intervals.

Bondioli & Pavesi's experience provided the technical background for the design of the cross kit and how to test them properly.

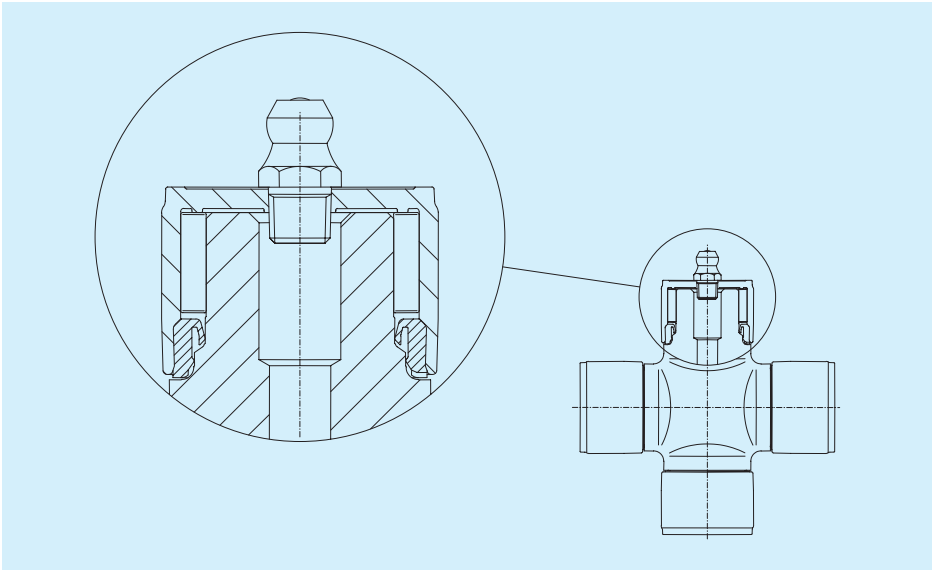
Production quality is constantly monitored and maintained with state-of-the-art manufacturing processes and heat treatment methods.

Maintaining direct control in every stage of production, from design to finished cross kit, ensures products that provide extraordinary performance in a compact size, thereby improving driveline function.



Agricultural machines are often employed in harsh working environments - dust, dirt, and dampness can shorten a driveline's life. Effective sealing is essential: to retain lubricants and protect from contamination by foreign elements.
SFT cross kits have needle bearings with double-lip seals designed to prevent contamination of the lubricant in severe working conditions, typical of farming applications. The seals allow excess grease to purge without damage during re-lubrication.
Bondioli & Pavesi analyzes cross kits using specially designed test fixtures. Data provided by these tests is used to optimize the shape, material, and heat treatment used for all the cross kit components - needles, cups, seals, and crosses.

Designed and manufactured in this manner, SFT cross kits may allow extended lubrication intervals of 8 to 50 working hours, for most applications.
Lubrication can be done on a weekly basis instead of every day, thereby resolving one of the most demanding user requirements.
In certain working conditions drivelines may be lubricated only once for an entire season.
To take full advantage of SFT crosses, other components of the driveline assembly have been redesigned, starting with the yokes.



SFT yokes: optimized universal joint performance

Torque applied to universal joints exerts a flexural force Mf on the yokes. This stress reaches its maximum value where the yoke ears connect to the hub.

SFT yokes are designed to minimize deflections under applied loads.

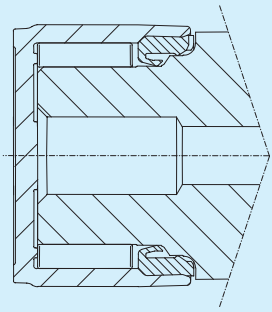
The cross section of the yoke ears becomes larger nearer the hub, to withstand increasing stress.

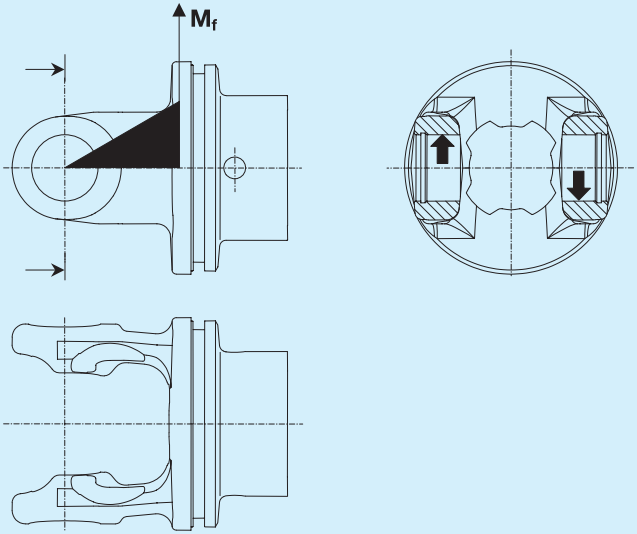
The hub connection area, where stresses are at a maximum, is very robust.

The stiffness of the yokes is essential for proper performance of universal joints.

Needle bearings can reach their full potential only when the yokes are able to maintain accurate alignment with the cross trunnions.

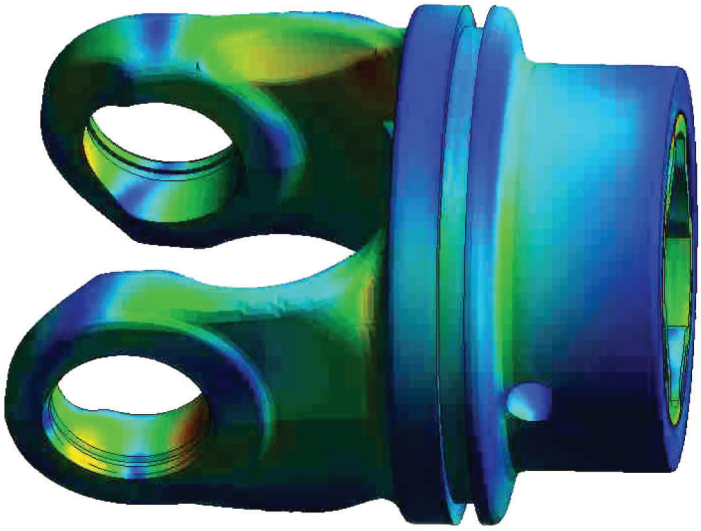
Precise alignment enables the pressure exerted by an applied torque to be evenly distributed along the entire length of the needles and cross trunnions, crucial for achieving high performance and life.





SFT yokes are designed using finite-element analysis. Each yoke is designed as a 3-D model, which is virtually tested by applying different loads and visualizing the resulting stresses on the computer screen. Yoke geometry can then be modified to eliminate weak spots and reduce deformation to acceptable limits to produce the desired needle bearing performance.
These methods of design require extremely advanced software. However, these efforts would be of no benefit without the experience Bondioli & Pavesi has accumulated through decades of involvement in farm implement applications.

Final prototypes are thoroughly tested on specifically designed and constructed test fixtures.
Experience and testing are the premises that make it possible to define applicable loads and to determine the acceptable values of strain.
The entire process from design to production is planned to optimize joint shapes and sizes for optimum performance.



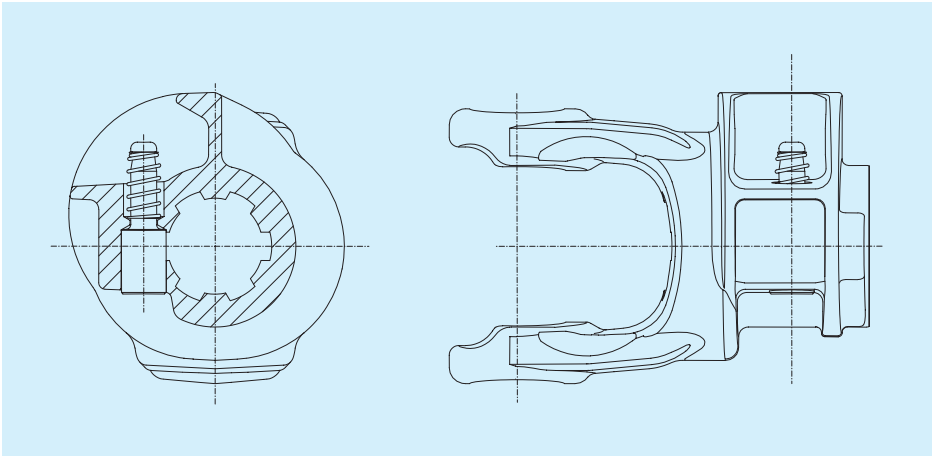
End yokes

Safety and practicality were main objectives in designing SFT end yokes and the means to couple them to power take-off (PTO) shafts – sturdy, user friendly, and consistent with international safety regulations.

Push-pin yokes

The push-pin yokes provide sturdy and reliable coupling to PTO or implement shafts. The push-pin mechanism is easy to understand, easy to use and no tools are necessary.

The pin is encircled by the hub's rounded profile, eliminating protrusions as recommended by international safety standards, but remains easy to access.



RT

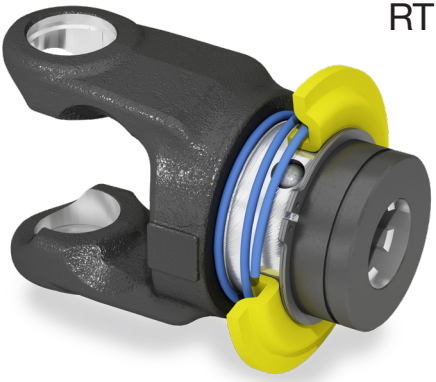
Ball collar yokes

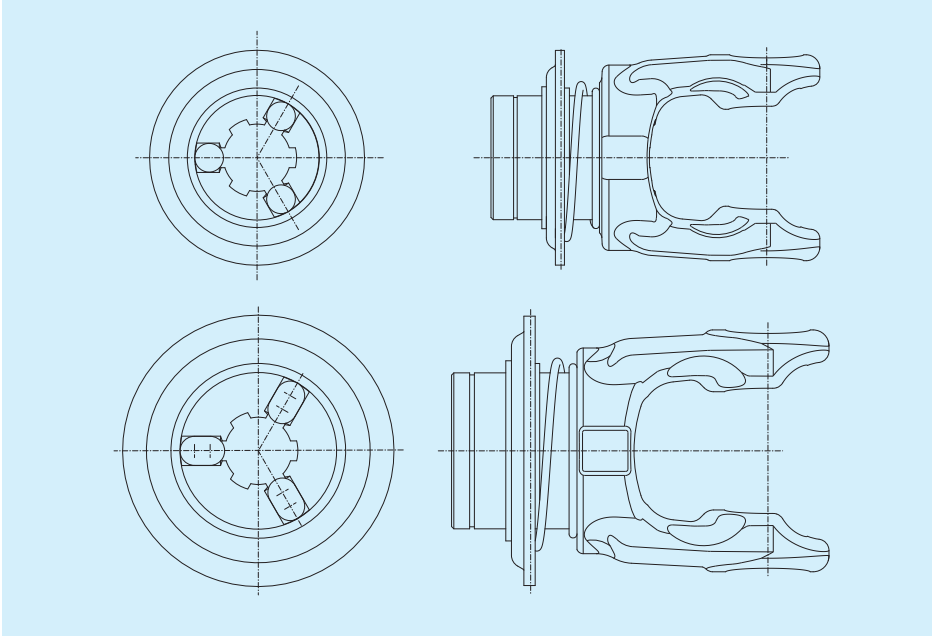
Ball collar yokes make it easy to connect (or disconnect) the yoke to the PTO or implement, quickly and without the use of tools.

Coupling is secured by hardened balls or spherical pins that engage the annular groove in the splined shaft. A spring-loaded collar controls the radial movement of the balls or pins.

The coupling elements are arranged symmetrically to uniformly distribute thrust forces generated by a telescoping driveline.

Yokes can be converted from conventional (RT) to automatic (RTA) ball collar connections with the appropriate kit.





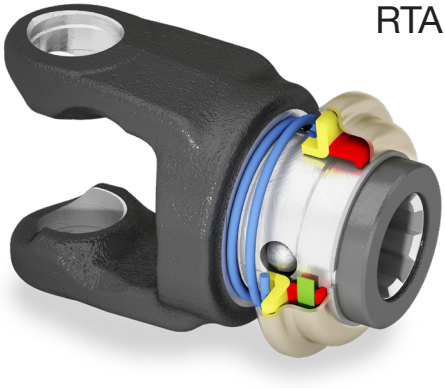
RTA

Automatic ball collar yokes

A special device in the collar makes it easy to connect and disconnect the yokes, automatically retaining or releasing the collar when the balls are in the correct position.

This leaves both hands free to hold the driveline and align the yoke to the splines when connecting or disconnecting the driveline to the PTO.

Standard RT ball collar yokes may be converted to automatic RTA yokes by replacing the collar kit.

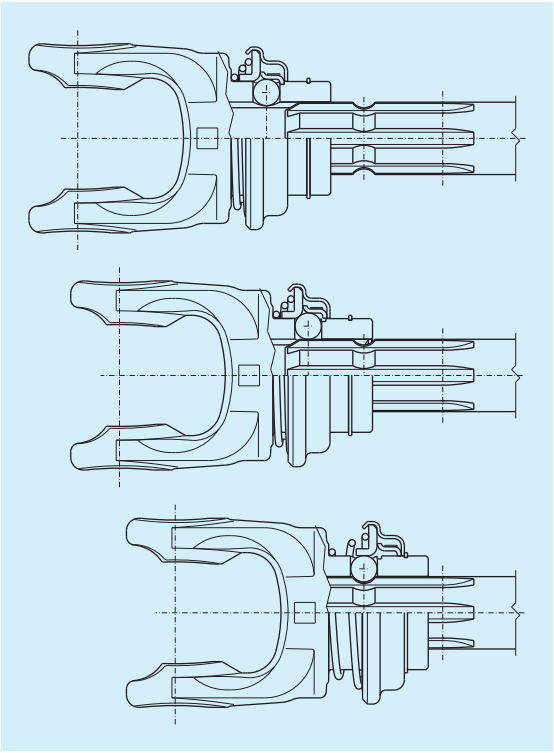


Before slipping the yoke onto the implement shaft, the collar is pulled into the open position until it engages and is held in position by the automatic mechanism.

Now both hands are free to maneuver the yoke into position on the PTO and support the driveline.

Once the balls contact the splines of the PTO, the mechanism is released and the collar will return to its locked position when the balls engage the annular groove.

The automatic mechanism also holds the collar open when disconnecting the driveline from the PTO, again enabling use of both hands to hold the driveline when uncoupling.



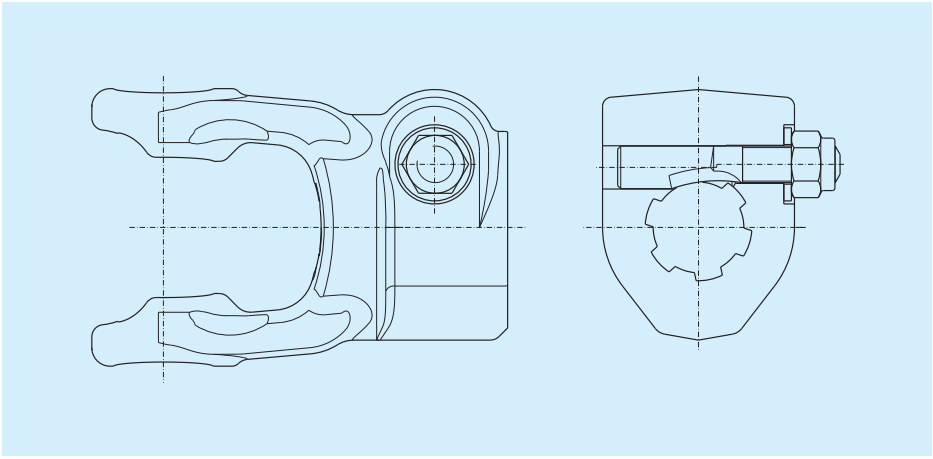
Taper pin yokes

Farm implements are supplied with a driveline designed and built for the specific application. For this reason, yokes are commonly coupled to the implement shaft with a semi-permanent type of connection. These types of connections usually require the use of tools to install or disconnect.

Tapered pins provide a fixed coupling between yoke and PTO.

Tapered pin yokes are intended for use on the implement end of primary drivelines (those that connect the tractor PTO to the first implement input shaft), or may be used on either, or both ends of drivelines internal to the machine.

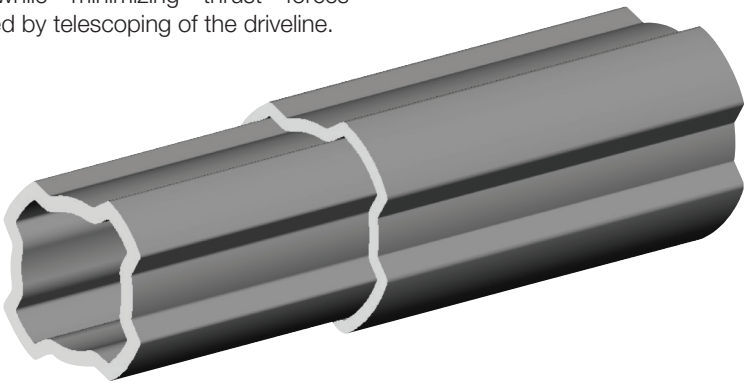
The tapered shape of the pin fits snugly into the annular groove of a splined shaft, reducing play between the splines to a minimum.



Four-tooth profile tubes:
High strength and low thrust

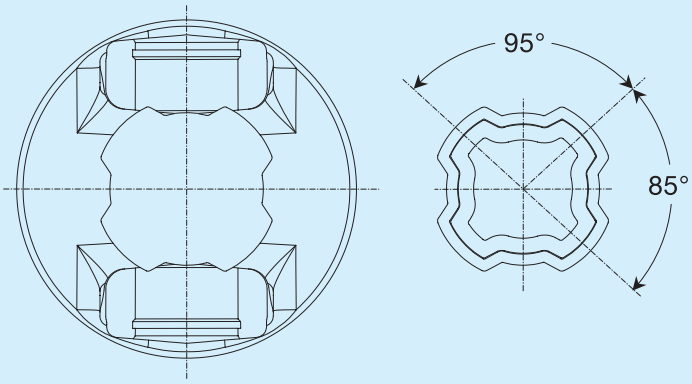
The performance of SFT universal joints demands an equally high performance telescoping connecting member.
SFT "Four-Tooth" telescoping tubes provide maximum resistance to torsional stress while minimizing thrust forces generated by telescoping of the driveline.

The contact surfaces of the tube are at the maximum possible distance from the axis of rotation for minimal pressure.
This design results in a telescoping member with high strength, minimal thrust force, and low weight, which adds up to a stronger, more functional driveline.



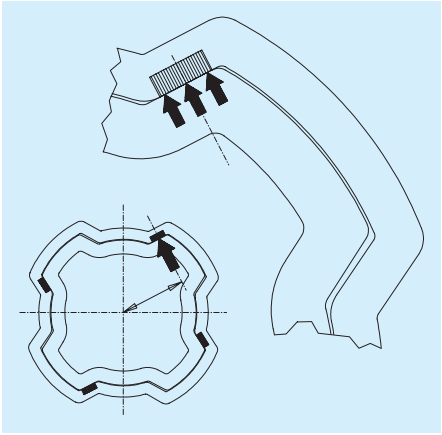
The dimensions of the "Four-Tooth" profile are the largest possible within the space available between the ears of the yoke.

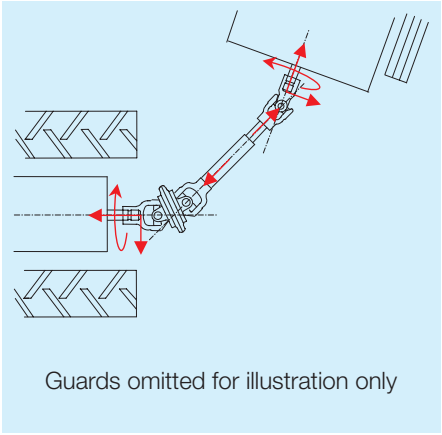
The teeth of the profiles are placed at 95° and 85°, so the tubes can be coupled only in either of two orientations, corresponding to correct phasing of the universal joints.



The teeth of the Four-Tooth profile tube mesh along their full height under load. The stress applied to the tubes by a torque on the driveline is distributed over large contact areas positioned as far as possible from the axis of rotation. This large surface area and position results in lower contact pressure and reduced wear.
Lower contact pressure also means better operating parameters for the grease, so **lubrication intervals can be extended to 50 hours.**
Four-Tooth profile tubes can transmit high torque while keeping telescopic thrust to a minimum.

Their capacity to slide with low axial thrust helps extend the life of both the universal joints and the implement / PTO shaft and bearings, especially in applications requiring long extensions under load.
When towed implements go through a turn, for example, the tubes slide under torque, producing thrust. It is important to keep thrust as low as possible, especially with constant-velocity (CV) joints.
80° and 50° CV joints are fitted with Rilsan® coated profile tubes, that reduce thrust forces by approximately 50%. Rilsan® coated tubes are available upon request for all SFT drivelines.





Guards omitted for illustration only

Free rotation tubes:
Simplified driveline installation

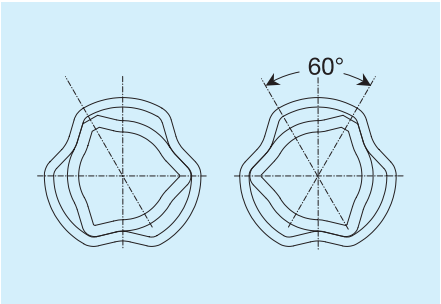
To connect a yoke to a PTO shaft the splines must be aligned. This can prove difficult if the PTO shaft is not free to rotate due to the nature of the implement.

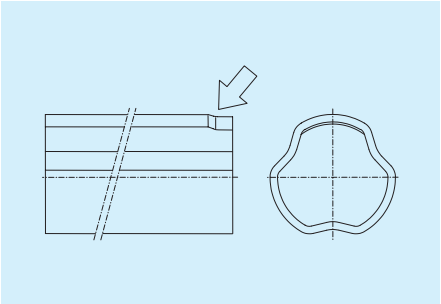
To overcome this difficulty the shaft can be equipped with Free Rotation profile tubes. While allowing telescoping movement between the universal joints and transmitting the required torque and motion, these tubes allow the end yokes to rotate with respect to each other by angles up to 60°. This free rotation will permit the alignment with any standard PTO shaft: 13/8”-Z6, 1 3/8”-Z21, 1 3/4”-Z6 and 1 3/4”-Z20.

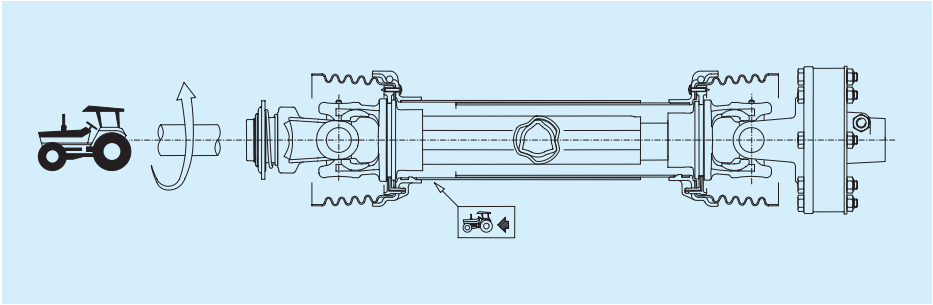
The outer profile tube has an indentation; consequently the inner tube can be inserted only in a pre-determined position to maintain correct phasing of the universal joints and optimum power transmission.

The orientation of the Free Rotation tubes depends upon the direction of rotation and on the direction from which torque is applied. For primary drivelines (those which connect the tractor PTO to the implement input shaft), Free Rotation profile tubes are provided in their standard orientation (tractor PTO rotation clockwise as shown in the figure below).

On request, Free Rotation tubes can also be supplied for rotating in the opposite direction.





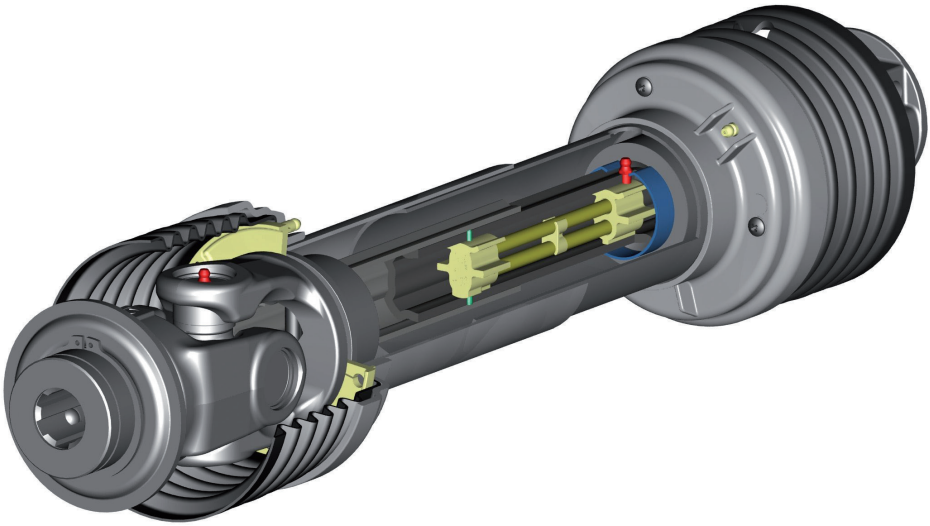


Greasing system:
quick and easy profile tube lubrication

SFT drivelines require minimal maintenance and can be equipped with options that make installation and lubrication even more convenient.

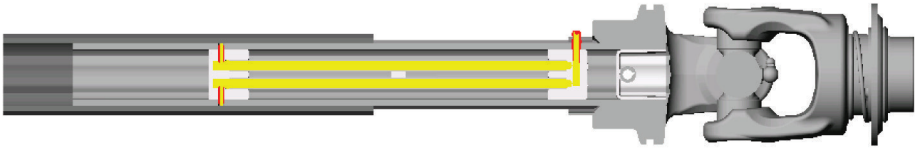
SFT drivelines have a lubrication interval of 50 hours, including the profile tubes. An optional Greasing System allows lubrication of the profile tubes with the driveline in either the working or transport position, or any driveline extension the user finds convenient.

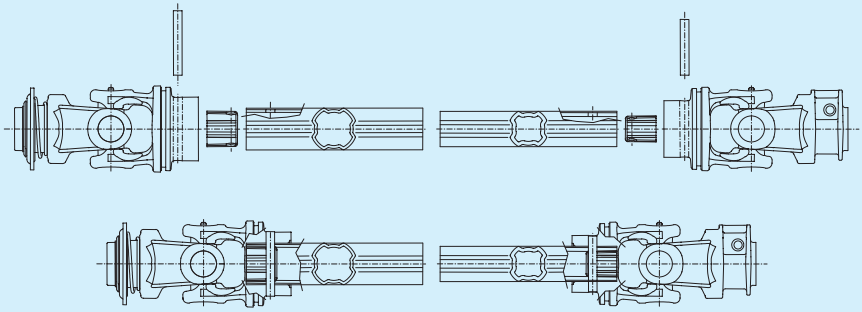
Grease is pumped into a fitting located next to the inner yoke, easily accessible through the shielding. The grease flows from this fitting into two independent ducts located within the inner profile tube. Eventually the grease is ejected from two ports, where it spreads out to cover the contact surfaces. The Greasing System is available for both Four-Tooth and Free Rotation profile tubes.



The grease ejection ports are placed at the center of the overlap between the two profile tubes, when the driveline is at its maximum working position (as defined by L_w in the section on Driveline Lengths).
A spacer is placed around the grease fitting, preventing damage when the driveline is fully collapsed.

Sealing caps can be supplied in the ends of the profile tubes to reduce contamination of the lubricant in the profile tubes, thereby extending their service life.
The sealing caps are shaped to match the tube's profile, but will allow air to exit during telescoping. They are held in place by the same roll pin that connects the inner yokes to their respective profile tubes.
Sealing caps are standard for drivelines with Greasing System.

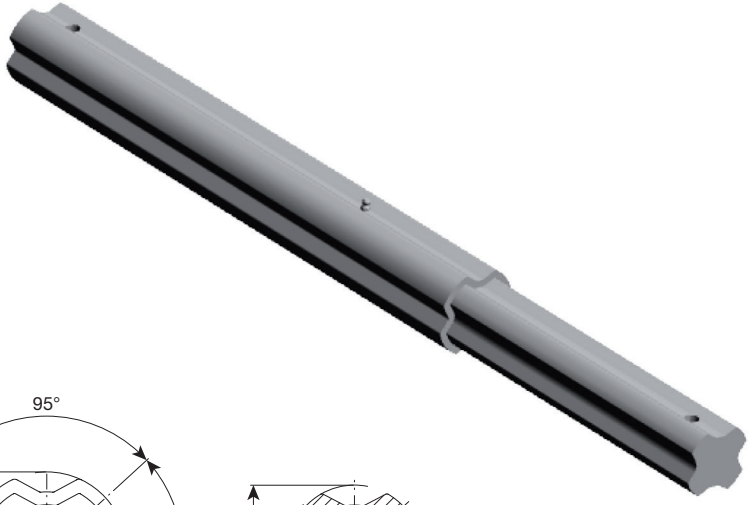


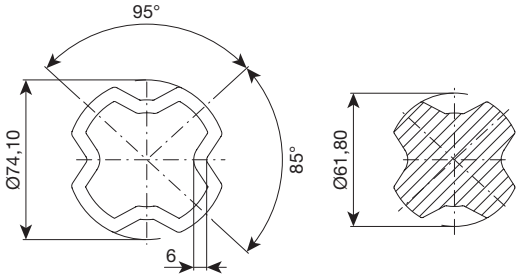


Advanced Four-Tooth Profile Heat-Treated

The high performance SFT SK requires suitable telescoping members. “Advanced four-tooth profile” has maximum torque resistance and expanded contact surfaces for long life of the telescoping members.
SK telescoping members are made of a thick outer profile tube and a solid inner bar to transmit torque up to 11,000 Nm.

The profile teeth are placed at 95° and 85°, so the tubes can be coupled only in two orientations, corresponding to correct phasing of the universal joints.
SK telescoping members are heat-treated to reduce the risk of seizure during sliding movements.





Splined telescoping members: extended length extensions

Splined telescopic members (see the sections on “Telescoping Members” and “Driveline Length”) are used for applications with high torque, frequent sliding under load, and length extensions beyond the capability of profile tubes.

Examples of these applications are some three-point hitch mounted implements, and certain towed implements with “equal angle” drawbars. These implements often have splined telescoping members to accommodate the differences between transport and working positions, or to allow sharp turns.

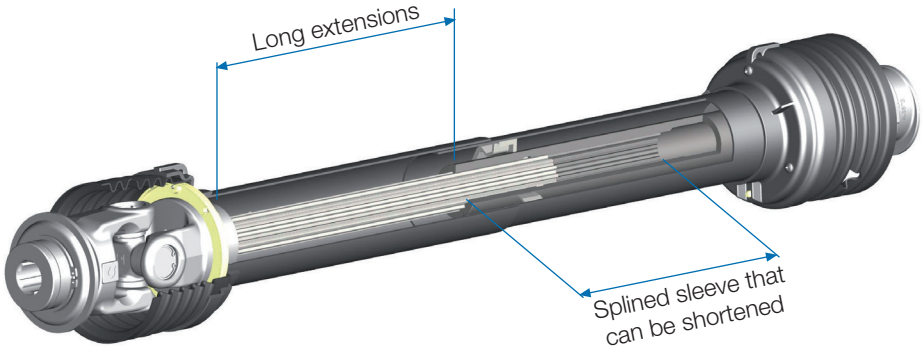
SFT splined telescopic members have involute profiles according to CUNA standards. They have a splined sleeve of considerable length: 300 mm.

Stress is distributed over several spline teeth, and the length of the spline results in reduced contact pressure and wear, giving a longer working life.

The length of the sleeve gives SFT driveshafts with splined telescoping members an innovative feature: the ability to shorten the driveshaft to fit it to a particular tractor - implement combination. Shortening should be no more than 50 mm and profiles should overlap properly throughout the operating range.

Splined telescoping members are fitted with the Direct Greasing system (see page 2.16 and the section on “Lubrication”).

Shafts over 610 mm in length with splined telescoping members may be fitted with a Single Chain system (see page 2.20 and the section on “Safety Shields”).



Direct greasing: easy lubrication for splined telescoping members

Lubrication of telescoping members is essential to reduce wear and maximize the life of joints and PTO bearings. SFT splined telescopic members have a Direct Greasing system - the splined members may be lubricated without separating the two halves of the driveshaft.

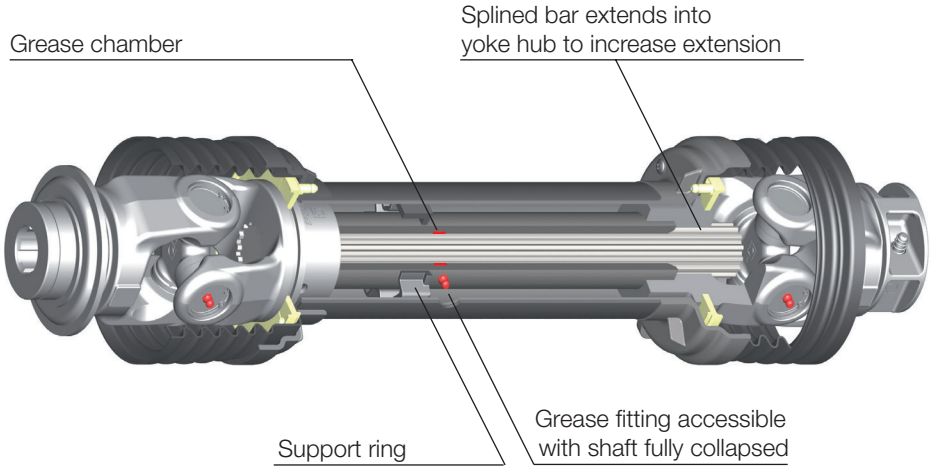
The grease fitting is located on the splined sleeve, 100 mm from the end. A groove acts as grease chamber.

Shield tubes have holes which line up when the driveshaft is fully collapsed (may require rotation of the two half shields) to allow access to the grease fitting.

A support ring is fitted to the internal tube to support the guard during telescoping and to prevent contact with the grease fitting. The grease fitting and support ring do not interfere with telescoping of the driveline.

Do not shorten the driveshaft by more than 50 mm.

For short driveshafts (less than 610 mm in length) the splined sleeve is welded directly to the inner yoke. The splined bar extends through a hole in the hub of the inner yoke, allowing greater extensions.



Safety shields:
a basic part of sft drivelines

Safety is fundamental when using universal joint drivelines. Safety is also fundamental in the basic design of SFT drivelines and their components.

SFT drivelines meet their safety objectives through simple and sturdy components, structured to produce a functional and durable assembly. Among the basic components are the shield bearings, which are placed near the center of the joints, close to the point where external forces are normally applied.

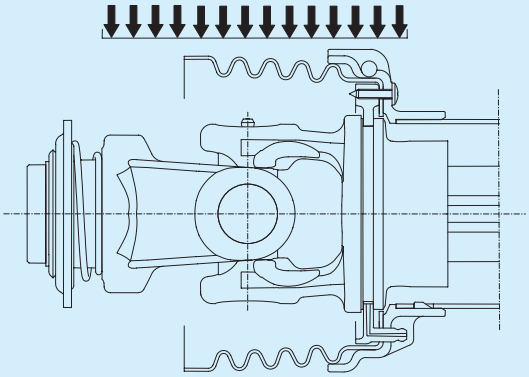
SFT shield bearings are predominantly subject to compressive forces, due to their location close to the center of the universal joint.

Traditional shield bearings are located farther from the joint center, and therefore must withstand both compressive and bending stress.

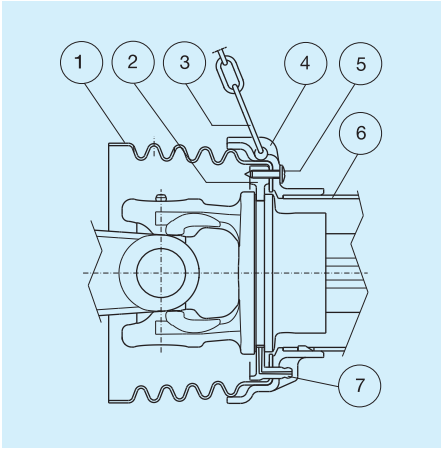
Because of these more favorable working conditions, SFT shield bearings offer improved strength and last longer than traditional shield bearings.

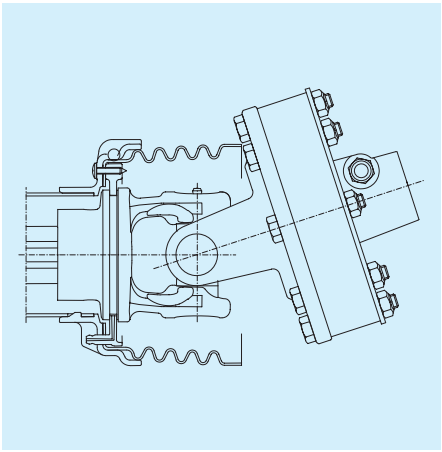
The position of the shield bearings defines the shape of the inner yokes. The juncture between yoke and hub is robust; to provide a groove for the shield bearings close to the center of the joint.

Moreover, this feature makes the yoke more rigid and sturdy.



The outer shield cone (1) has a corrugated shape, which gives the cone its elasticity. The shield bearing (2) allows the driveline to freely rotate inside the guard, which may be held stationary by the use of chains (3) attached to the tractor or implement.
The shield bearing is located near the center of the joint, directly under the base cone, virtually on the same plane where external forces are normally applied. The result is that applied forces tend to produce compressive strain in the shield bearing, rather than flexural strain, resulting in improved strength and longer life.
The base cone (4) acts as a rigid connection for the other guard components.
The outer cone (1) and the shield bearing (2) are fixed to the base cone by means of self-tapping screws (5).
The shield tube (6) is locked to the base cone.
The shield bearing grease fittings (7) are easily accessible, and are protected by ribs molded into the base cone.
Installing and removing the guard is a simple operation and can be done using commonly available tools.
In compliance with the European Community's Machinery Directive (2006/42/CE), the cones of SFT driveline guards extend to cover the inner yokes, except for FFV and FFNV clutches (which are only available without the CE mark).
SFT drivelines and guards are designed to allow a sufficient range of working angles before the guard contacts the end yoke or clutch.

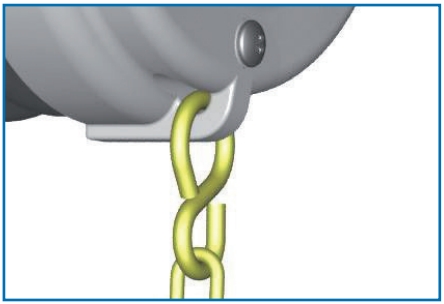




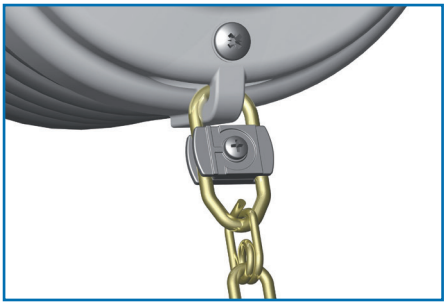
Spring link: easy repair of improperly attached shield restraint chains

UNI EN ISO 5674 and ANSI/ASABE AD5674 standards state that the chain must withstand a load of 400 N, and must detach at the shield connection when subjected to a load less than 800 N.
SFT shield restraint chains meet these load and detachment requirements.
Chains are fitted to shields by S-hooks for shafts up to S5 in size.

For shafts lager than S5, chains are supplied with the Spring Link device, including connection that can be opened and closed by screwdriver, and a spring hook which opens when subjected excessive loads.
Both S-hook and Spring Link connections detach from the shield in compliance with UNI EN ISO 5674 and ANSI/ASABE AD5674 standards.
If a shield chain with S-hook pulls free, the chain needs to be replaced. The Spring Link can be re-attached using a screwdriver.



If the chain length has not been properly adjusted and becomes too tight when the driveline changes position, the S-hook opens and the chain falls from the shield.
If this happens, the chain has to be replaced.
The S-hook of the new chain should be fastened to the eyelet on the cone. The S-hook must be closed around the eyelet to prevent it from coming off.

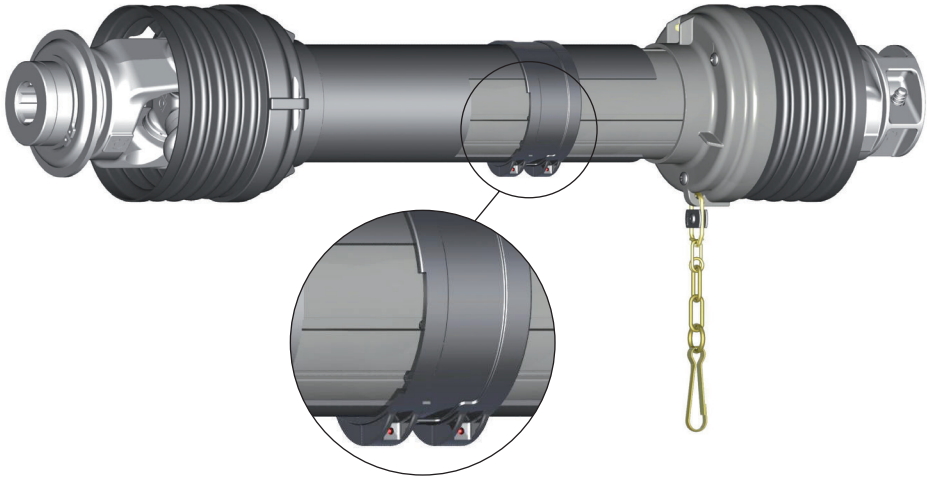


See the section on Safety Shields for further details.
The chain with Spring Link is available as an option for sizes S1 - S5. The Spring Link is standard for sizes S6 - S0.
A clip is used at the other end of the chain to allow attaching and disconnection from the tractor and implement as required.

Single chain:
the easiest method to restrain driveline shielding

The Machinery Directive requires driveline shields to remain stationary (non-rotating).
The most commonly used method to restrain driveline shields from rotating is short lengths of chains attached to the independent driveline shield components, and in turn attached to a stationary point on either the tractor or implement.
The shaft is normally designed and supplied with the implement, so a proper location for securing the chain on that end should be provided. However, it is not always easy to find a suitable attachment point on the tractor. Improper attachment of shield chains may cause damage to the shield.
To solve this problem, SFT shafts can be supplied with the “Single Chain” system, enabling a single chain to restrain the entire driveline guard.

The Single Chain System consists of a splined inner shield tube, and an outer shield tube with matching splined collar. These splines allow the two halves of the guard to move lengthwise, but prevents rotation of the two halves relative to each other.
Consequently, a single chain attached properly on the implement side of the driveline can restrain guard rotation. The splined shield tubes do not interfere with the normal movement of the driveline in working or transport conditions.
The user can therefore attach the implement to the tractor without having to worry about hooking up the chain and without the risk of mistakes that could damage the shield.



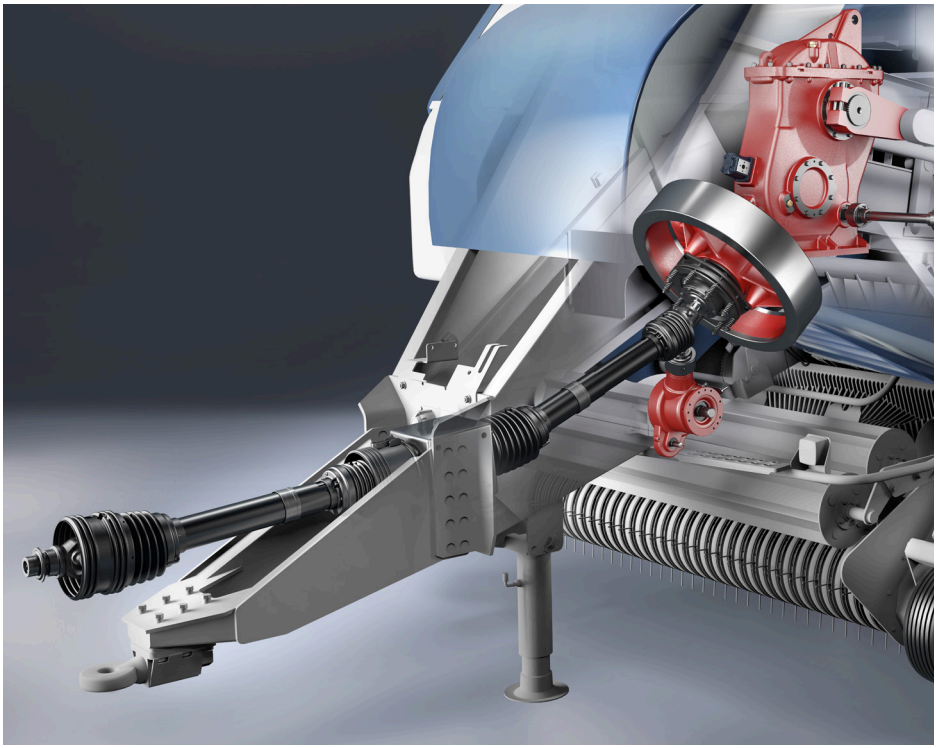
Constant velocity joints: high efficiency, low maintenance

Constant Velocity (CV) joints were first widely used for agricultural applications during the 70's. CV joints increased the efficiency of towed implements by reducing or eliminating the problems associated with high and/or unequal joint angles during turns.

The requirement for tight turns with the implement has dictated a wide range of motion for the centering disc inside the CV joint. This required large apertures in the CV joint body, which risks contamination of the lubricating grease.

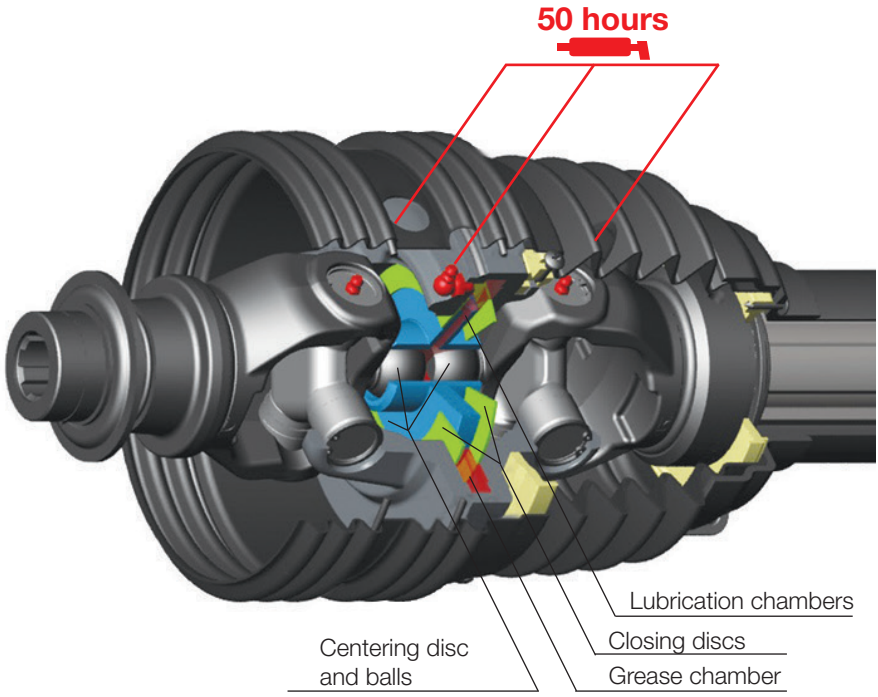
Until now, CV joints have allowed better maneuverability in the field compared to "equal angle" drivelines, but required frequent lubrication with copious amounts of grease.

The new SFT EL CV joint overcome these problems and **requires regreasing only once a week** (or every 50 hours, but sometimes this may be extended to 100 hours: see the section on "Lubrication"). In addition, SFT EL CV joints do not require nearly as much grease as conventional CV joints. The same cross kits are used for 80° and 50° SFT EL CV joints, with double-lip seal caps, and have the same lubrication interval of 50 hours.



The SFT EL 80° CV joints achieve this by introducing two closing discs which follow the movement of the centering disc.
These discs are not simple floating discs but are specifically designed springs which press against the sides of the housing and the centering disc in order to retain grease and limit contamination.
When the CV joint changes angle, the centering disc moves inside the housing. This movement displaces the grease inside the housing. Due to the sealing action of the closing discs against the centering disc and housing, the displaced grease is pushed through radial ducts in the disc to the centering ball and socket area.
Grease is therefore distributed to the centering members of the 80° CV joint by the angular motion of the joint itself.

80° CV joint drivelines function properly when they work mainly in the straight position, but frequently make sharp turns, as illustrated in the section on “Driveline Applications”.
The motion of the centering disc also pushes grease into a hole directed toward the shield bearing groove. The movements of the 80° CV therefore automatically lubricates its own shield bearing.



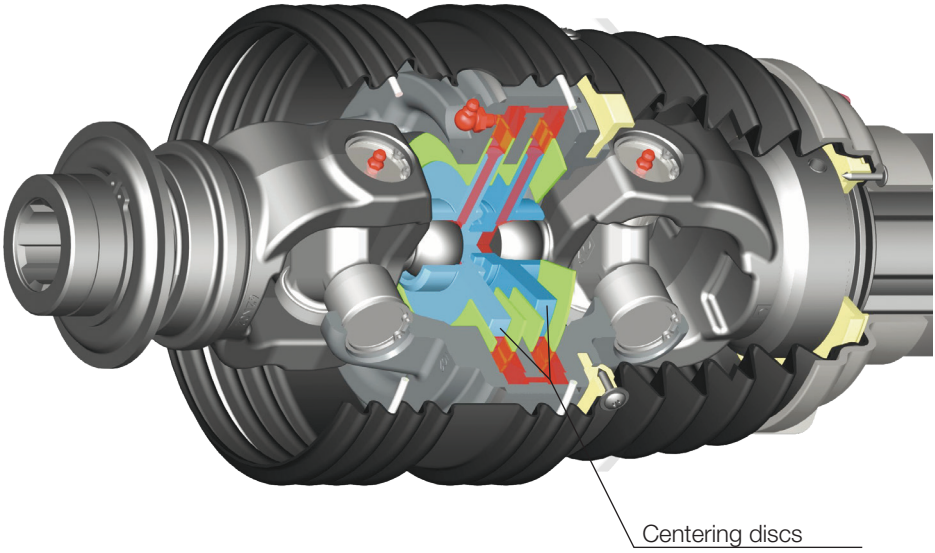
SH CV joints: designed for power

Developments in farming mean that tractors are increasingly powerful. Farm implements are being made to utilize this power. Therefore, drivelines need to be able to transmit higher power.

In the case of drivelines with CV joints, the SFT SH CV joint is the ideal solution for tractors with power over 200 Hp at 1000 rpm.

The new feature of this wide-angle CV joint is the presence of two centering discs in the central housing, to guide the input and output yokes.

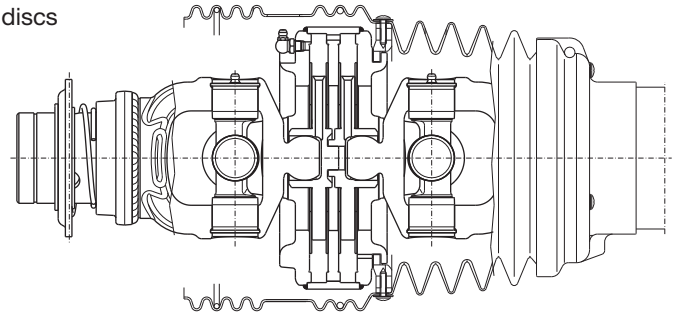
The discs are inter-connected, but work in separate chambers, distributing the loads and enabling the SH CV to handle much higher torques than a conventional CV joint with only a single centering disc.



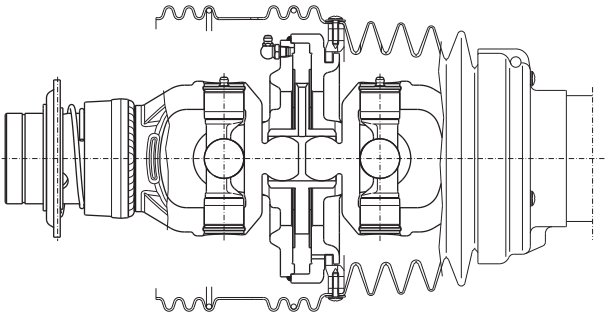
Needle bearings and yokes have been designed for these higher power demands. Wide-angled joints CV joint shielding is designed so that it may be installed on tractors with master shields in compliance with ISO 500 and ANSI/ASABE AD500 standards.

Grease pumped into the grease fitting on the central housing is distributed to the entire joint, including the centering ball and socket, and the CV shield bearing. Lubrication is required on a weekly basis, or in some instances may be extended to every 100 hours.

The new wide-angled SFT SH CV joint with two centering discs

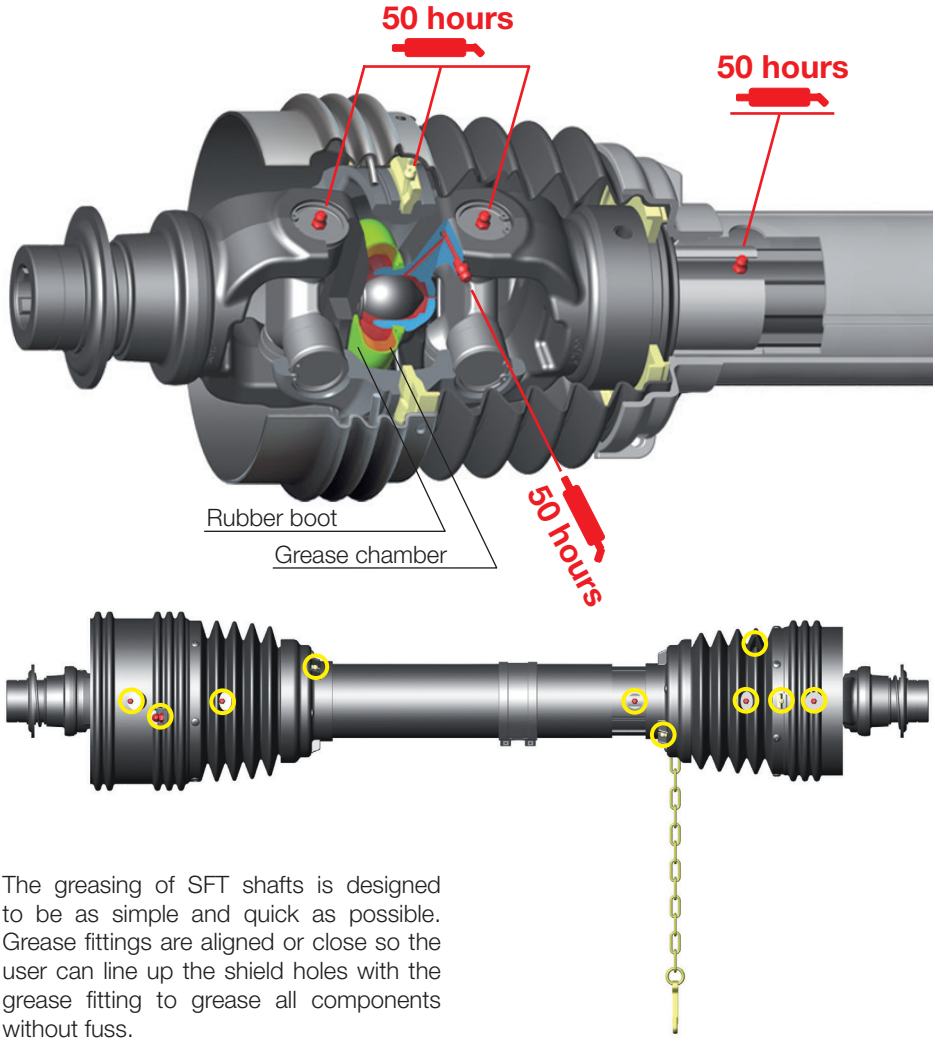


A conventional CV joint with one centering disc



Centering discs of 50° CV joints are fitted with a rubber boot able to hold grease in and exclude contaminants. This permits the lubrication frequency to be extended to 50 hours.

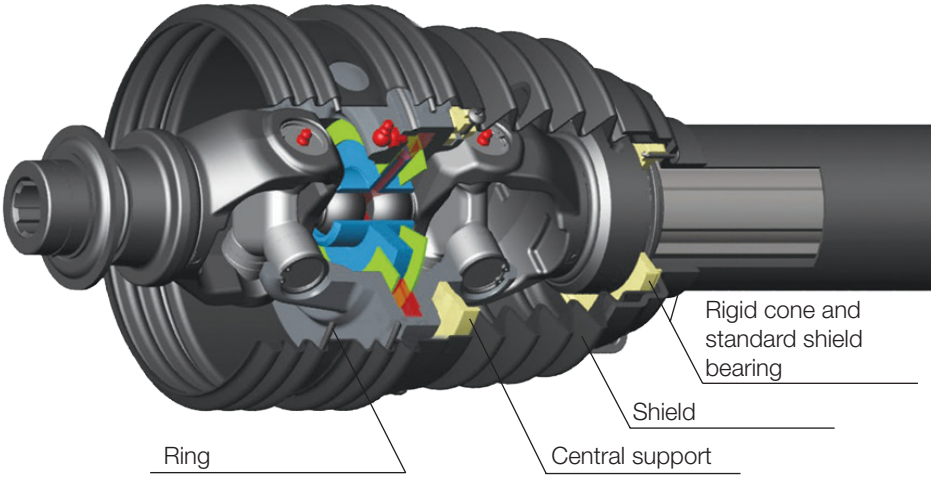
These innovations **allow increased lubrication intervals for all SFT driveline components and CV joints - once every 50 hours. The difference means the driveline needs to be greased once every week, instead of every day.**



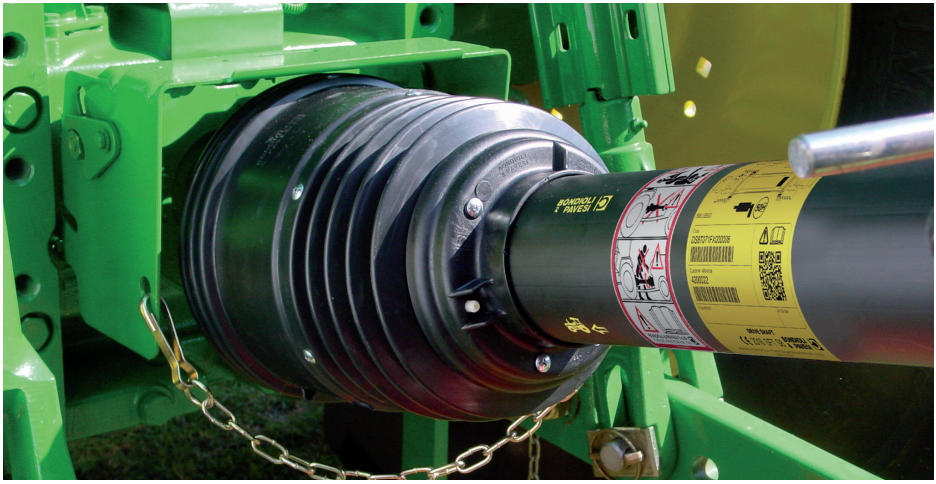
The greasing of SFT shafts is designed to be as simple and quick as possible. Grease fittings are aligned or close so the user can line up the shield holes with the grease fitting to grease all components without fuss.

SFT CV joints are guarded in compliance with recent developments in international safety standards.
The shield over the CV is connected to the rigid base cone and standard shield bearing.

A second shield bearing supports the shield over the central housing of the CV joint.
A metal ring helps stiffen the end of the shield cone.



SFT guards are designed to integrate with the tractor's master shield, as required by Directive 89/297/EC, international standard ISO 500, and US standard ANSI/ASABE AD500.



Permanently lubricated torque limiters and overrunning clutches: less maintenance for higher efficiency

SFT drivelines are designed to respond to the user's needs: reliability, high performance, low weight, easy installation, and less maintenance.

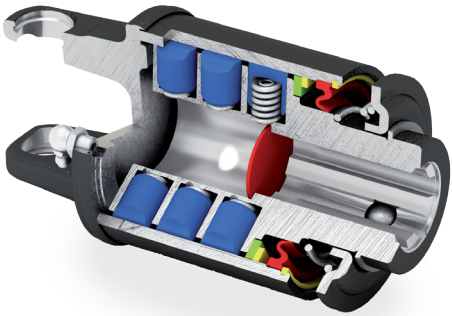
These same goals were met with the design of the devices that control torque.

The extended 50-hour lubrication interval represents a significant step forward in reduced maintenance requirements.

In addition, ratchet torque limiters LC and LT, and shear bolt torque limiter LB, require lubrication only once a season.

All torque limiters and overrunning clutches, either standard 50 hour interval or seasonal lubrication frequency, may be lubricated with NLGI 2 grease.

Torque limiters are normally mounted on the implement end of the driveline, where they are protected by the driveline guard and an overlapping shield. UNI EN ISO 4254-1 and ANSI/ASABE S604.1 standards specify at least a 50 mm overlap.

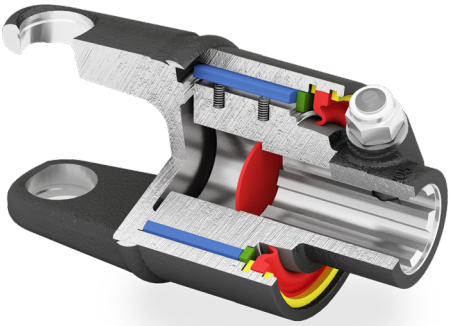


LT Torque Limiter
Seasonal Lubrication

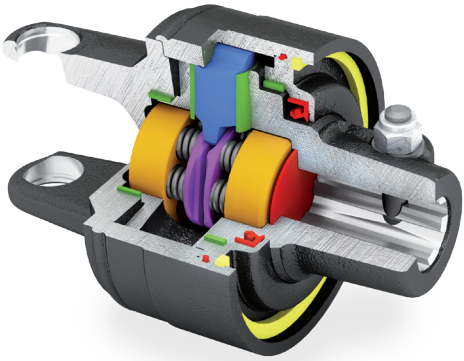
LB Torque Limiter
Seasonal Lubrication

The SFT range includes permanently lubricated RL overrunning clutches and LR automatic torque limiters.

During assembly, these devices are lubricated with NLGI 2 grease and sealed. No further lubrication is required for their entire service life - they are not provided with grease fittings.



RL Overrunning Clutch
Permanently Lubricated



LR Torque Limiter
Permanently Lubricated

SFT shields

The SFT range includes safety shields for the implement input connection.

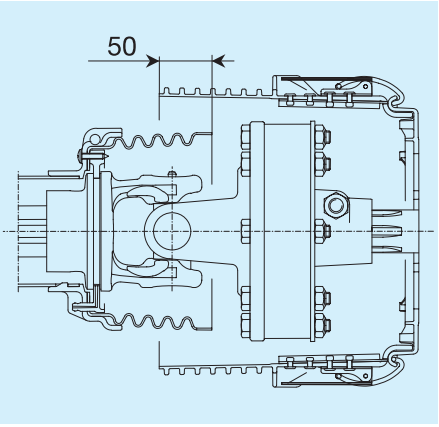
These shields are designed to integrate with the driveline guard, and accommodate drivelines equipped with CV joints, torque limiters, or overrunning clutches.

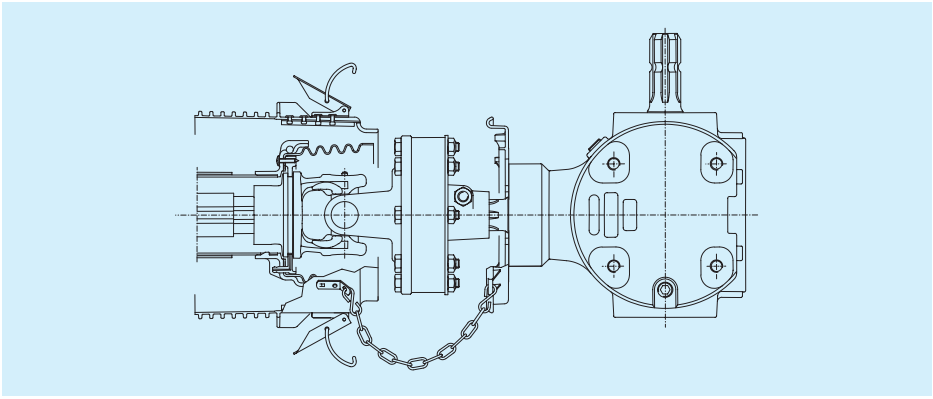
SFT shields are supported by a sturdy metal plate, which in turn is bolted to the implement.

The cylindrical guard is attached to the plate by means of two lever clamps.

Properly specified SFT shields conform to applicable standards (ANSI/ASABE S604.1 and UNI EN ISO 4254-1), which require an overlap of at least 50 mm between the shield and the driveline when they are in the straight ahead position.

Attachment of the driveline and maintenance are made easier by simply detaching the outer guard from the metal plate and moving it out of the way along the shaft. When the shield is open, the guard remains attached to the plate by means of a chain, as required by ANSI/ASAE S493.





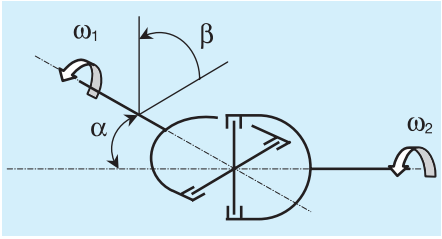
The cardan joint

The cardan joint is an ancient mechanism. In the 16th century, Gerolamo Cardano, an Italian mathematician, described this mechanism, used to hold a compass so that it was no longer affected by the rolling motion of a ship.

Robert Hooke was the next to undertake research into the specifics of universal joint motion and discovered that two joints operating in series with the same joint angle eliminated the uneven motion generated by a single joint.

A cardan joint consists of two yokes connected to a cross by four bearings.

A cardan joint transmits motion in an uneven manner when operated at an angle. If the rotational speed of the driving yoke is constant, the speed of the driven yoke varies with the angle of rotation.

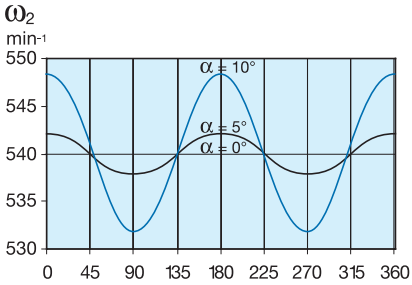


α: joint angle
β: rotation angle of driving yoke
ω_1: driving yoke speed
ω_2: driven yoke speed

The output speed is a function of the input speed and joint angle, and varies as the joint rotates.

$$\omega_2 = \frac{\omega_1 \cdot \cos\alpha}{1 - \sin^2\alpha \cdot \cos^2\beta}$$

The following diagram illustrates the variation in driven yoke speed during a complete revolution of the joint when the driving yoke speed is constant ω_1 = 540 min^{-1} and joint angle is 5° or 10°.



For α = 0°, the instantaneous speed of the driven yoke remains constant so $\omega_2 = \omega_1$ = 540 min^{-1}.

When the joint works at an angle, the instantaneous speed of the driven yoke varies continuously, undergoing two complete cycles for each revolution of the joint. For example, for α = 5°, the instantaneous speed of the driven yoke varies between ω_2 = 538 min^{-1} and ω_2 = 542 min^{-1}. For α = 10°, the instantaneous speed of the driven yoke varies between ω_2 = 532 min^{-1} and ω_2 = 548 min^{-1}.

Driveline applications

The angle of the cardan joint generates variations in speed; consequently producing accelerations and oscillating torque depending upon the inertia of the driveline and the torque transmitted. These stresses act on the driveline and are transmitted to its supports.

In normal working conditions, the angle of the cardan joint must be limited to prevent excessive vibration and stress that can reduce component life. Through experience, we can determine practical limits to the angular acceleration of the driven yoke and from this we can determine the recommended maximum joint angle.

We can use one of Hooke's equations to approximate the maximum angular acceleration of the driven yoke, which is generally acceptable for any practical problems concerning cardan joints. According to this equation, the maximum angular acceleration A_{max} depends upon the speed of the driving yoke ω_1 and the angle of the joint α.

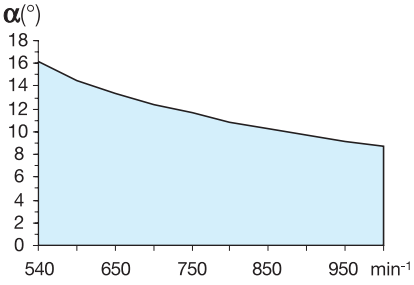
$$A_{max}=\alpha^2 \cdot \omega_1^2$$

After estimating the largest acceptable angular acceleration, the maximum joint angle can be calculated as a function of the rotation speed.

The recommended maximum joint angles, based on Bondioli & Pavesi's experience, are listed in the table and diagram below.

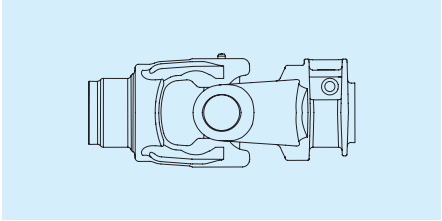
These values are generally acceptable for agricultural implements, but the final determination of allowable torsional oscillation and accompanying vibration depends upon the specific construction of the implement and its intended use.

The angular acceleration generated by a single cardan joint or by more than one joint with different joint angles requires special attention and must be verified for each specific case.



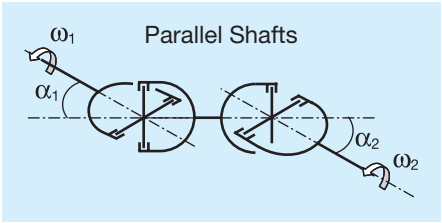
α_{max} (°)	n min^{-1}
16.1	540
14.5	600
13.4	650
12.4	700
11.6	750
10.9	800
10.2	850
9.7	900
9.2	950
8.7	1000

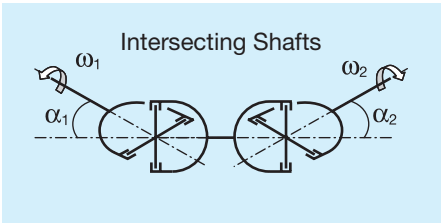
A single cardan joint is suitable for transmitting power between two shafts with axes that intersect in the center of the joint. They are often used to connect internal shafts within an implement. More often, a cardan joint is used as part of a double joint or driveline.
Installation of a single cardan joint is normally made by locking one of the yokes onto the shaft, and allowing the other yoke to move freely in the axial direction to compensate for small amounts of movement between the shafts or deflection of the structure.



A double cardan joint must be used when the axes of the connected shafts do not intersect with the center of the joint.

Double cardan joint
The variations in speed generated by a cardan joint operated at an angle can be eliminated by using a second joint, with the condition that the inner yokes are parallel and that the joint angles are equal and in the same plane. This is the situation found with parallel or intersecting shafts.





In both cases, the output shaft speed is the same as that of the input shaft at all times. Therefore, motion is transmitted at a constant velocity.
The central double yoke is subject to stresses generated by the cardan joints operating at an angle.
When the connected shafts and the central double yoke of the double joint are in the same plane, but the joint angles are different, there is a variation in output speed.

In this condition it is possible to define the equivalent joint angle α_{eq} as the joint angle that generates a variation in speed equal to that generated by two or more joints connected in phase.
In the normal arrangement of double joints and cardan shafts, the driving yoke of the second joint is in the same plane as the driven yoke of the first joint. The equivalent joint angle may be calculated as:

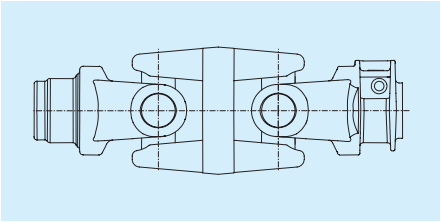
$$\alpha_{eq} = \sqrt{\alpha_1^2 - \alpha_2^2}$$

Example: $\alpha_{eq} = 10°$, $\alpha_2 = 6°$

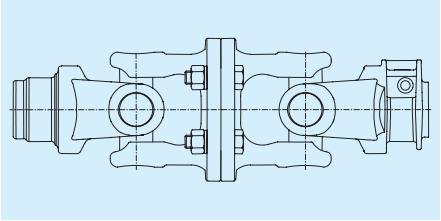
$$\alpha_{eq} = \sqrt{10^2 - 6^2} = 8°$$

If the driven yoke of the first joint is in the same plane as the driven yoke of the second joint, the joint angles must be squared and added together to calculate the equivalent angle.
Naturally when the joint angles are equal and the driving yoke of the second joint is in the same plane as the driven yoke of the first joint, $\alpha_{eq} = 0°$.
The recommended limits on page 3.2 apply for the equivalent angle α_{eq} as a function of the rotational speed.

The double cardan joint is normally used for connecting internal shafts on agricultural implements.
Installation of a double cardan joint is normally made by locking one of the yokes onto the shaft, and allowing the other yoke to move freely in the axial direction to compensate for small amounts of movement between the shafts or deflection of the structure. The central part of a double



joint can be a one-piece double yoke:
or two flange yokes:



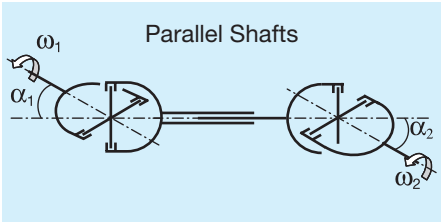
The flanged double joint is easier to install than a one-piece double joint. The selection of a one-piece or flanged double joint depends upon the particulars of the application and the installation requirements.

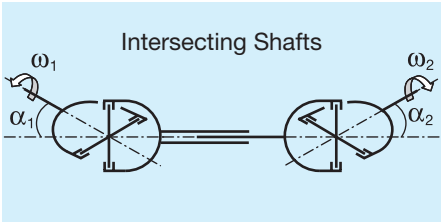
Cardan joint driveline

The cardan joint driveline consists of two cardan joints connected by telescoping members.

Variations in speed generated by the joint angle of the first cardan joint can be eliminated by the second cardan joint on condition that the inner yokes are parallel and the joint angles are equal and in the same plane. These conditions are satisfied in the arrangement of parallel shafts or intersecting shafts.

In each of these situations, the output speed is transmitted at a constant velocity. The telescoping members are still subject to stress generated by the cardan joints working at an angle. For this reason, we recommend using drivelines with joint angles as small as possible.





The previous definition of equivalent joint angle α_{eq} is also valid for cardan joint drivelines.

The following tables give the values for the joint angle of the second joint, α_2 max and α_2 min, which would generate acceptable total speed variation as a function of the joint angle of the first joint α_1 and the rotational speed.

For example, considering a rotational speed of 750 min^{-1} and the first joint angle $\alpha_1 = 12°$, the second joint angle should be between $\alpha_2 = 3°$ e $\alpha_2 = 16°$.

α_2 max acceptable

α_1 (°)	540 min^{-1}	650 min^{-1}	750 min^{-1}	850 min^{-1}	1000 min^{-1}
5°	16°	14°	12°	11°	10°
7°	17°	15°	13°	12°	11°
10°	19°	16°	15°	14°	13°
12°	20°	18°	16°	15°	14°
15°	22°	20°	19°	18°	17°
17°	23°	21°	20°	19°	19°
20°	25°	24°	23°	22°	21°
22°	25°	25°	24°	24°	23°
25°	25°	25°	25°	25°	25°

α_2 min acceptable

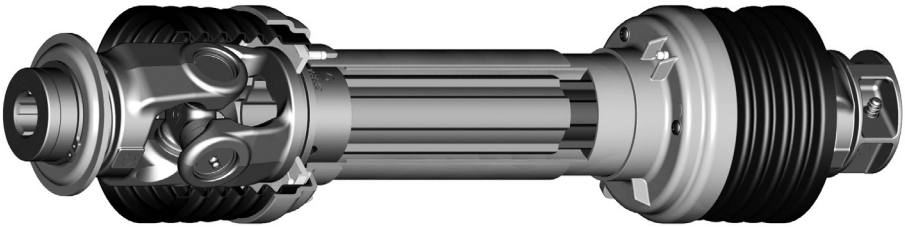
α_1 (°)	540 min^{-1}	650 min^{-1}	750 min^{-1}	850 min^{-1}	1000 min^{-1}
5°	0°	0°	0°	0°	0°
7°	0°	0°	0°	0°	0°
10°	0°	0°	0°	1°	5°
12°	0°	0°	3°	7°	9°
15°	0°	7°	10°	11°	13°
17°	6°	11°	13°	14°	15°
20°	12°	15°	16°	17°	18°
22°	15°	18°	19°	20°	21°
25°	20°	21°	22°	23°	24°

Driveline applications

The cardan joint driveline is the most commonly used method for transmitting power from a tractor PTO (Power Take Off) to agricultural implement PIC (Power Input Connection). Cardan joint drivelines carry out a very complex function: efficient transmission of power between two shafts that are continually changing their relative positions.

PTO's have standardized dimensions:
- Type 1: 1 3/8"-Z6 (540 min^{-1})
- Type 2: 1 3/8"-Z21 (1000 min^{-1})
- Type 3: 1 3/4"-Z20 (1000 min^{-1})
- Type 4: 2 1/4"-Z20 (1300 min^{-1})

in compliance with ISO 500, DIN 9611 and ANSI/ASABE AD500 standards.
Specifications for the driveline are based on the requirements of the implement to which it is connected.
Since the driveline normally stays connected to the implement, the implement connection is often semi-permanent, requiring tools for assembly or disassembly.
The taper pin is the most stable connection for implement yokes and torque limiters.
Torque limiters or overrunning clutches should be installed on the implement end of a primary driveline (i.e. the driveline that connects the tractor PTO to the PIC).
Suitable torque limiters protect the implement, the driveline, and the tractor from torque overloads, and allows balanced sizing of driveline components.
Connection of the driveline to the tractor PTO must be done quickly and easily, since tractors are normally used with more than one implement. The tractor end of the driveline is usually supplied with a "quick coupling" which can be a pushpin, ball collar, or an automatic ball collar connection.
The mechanism of the automatic ball collar holds the collar open and automatically releases it when the balls are in the proper position on the PTO. Both hands can be used to hold the driveline making installation much easier.
The driveline must be selected according to the requirements of each specific implement. However, it is possible to define some basic types of implements:
- mounted implements
- towed implements
- stationary implements



Mounted implements

Mounted implements are connected to the three- point hitch of the tractor. The three point hitch supports the weight of the implement., and allows adjustment of the vertical position of the implement to suit working conditions. The three- point hitch also permits the implement to be raised for turning and transport.

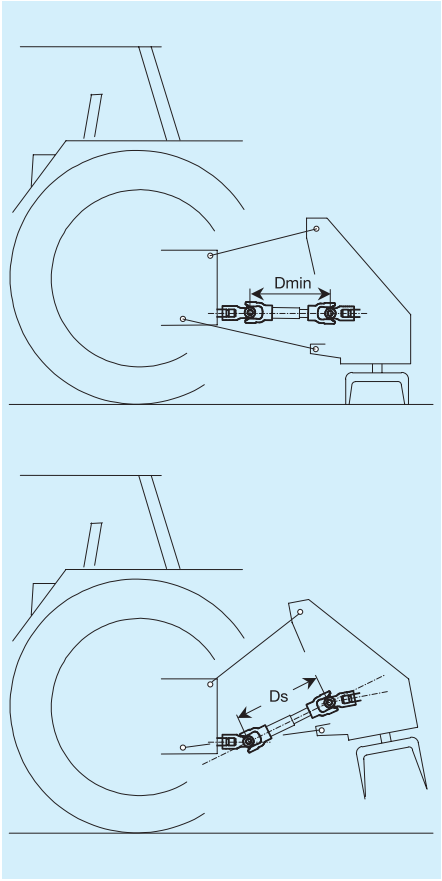
In working conditions, the PTO shaft and implement PIC should be parallel and aligned so joint angles are minimized and equal. If this cannot be achieved, joint angles should not exceed the values given in the table on page 3.5 to prevent vibrations and undue stress.

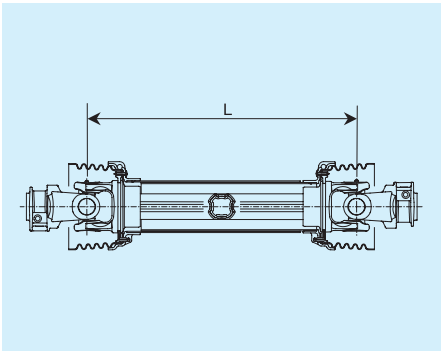
The magnitude of the joint angles influences the life of the cardan joint. As the joint angle increases, the life of the cardan joint is reduced, as explained in chapter 5 -“Size, Torque and Power”. Sometimes larger than normal drivelines are specified to compensate for large joint angles.

Raising the implement during maneuvers can lead to large unequal joint angles, and cause vibrations and noise. In extreme situations, it may be necessary to reduce speed or interrupt tractor PTO rotation.

Three-point mounted implements are hooked up close to the tractor, to reduce cantilevered weight, therefore requiring short drivelines. The telescoping members and the length of the driveline must be selected according to the distance between the PTO and PIC in the working and transport positions.

Length L of the driveline is defined as the distance between the centers of the joints with the driveline fully collapsed.





Length L of the driveline must be selected so that the telescoping members never close completely, or “bottom out”, and maintain proper overlap while in use.
For mounted implements, the driveline will reach its minimum length Dmin at some point between the fully raised or lowered position. The driveline length L must be less than Dmin:

$$L < Dmin$$

The driveline will telescope as the hitch is raised or lowered. While the implement is under power, the working length Lw of the driveline must provide for sufficient overlap of the telescoping members.
If the implement is raised for transport, and the driveline is not rotating, the stationary length Ds of the driveline must be less than the maximum permitted length Ls.

$$Ds < Ls$$

Maximum Extension feature or splined telescoping members are available if Four-tooth profile tubes do not allow sufficient extensions Lw or Ls.
The values for L, Lw, and Ls may by found in the specifications for each size of driveline.
Lubrication of the telescoping members is essential to limit wear and reduce axial thrust loads, which also reduce the life of cardan joints and PTO or PIC bearings.
Users sometimes skip this important maintenance step, especially if the driveline must be removed from the PTO and partially disassembled to lubricate the telescoping members.
Lubrication of telescoping tubes is greatly simplified by the optional Greasing System. This system is installed in the inner tube, and uses a grease fitting that is easily accessible through the shield at any driveline extension. Removal of the driveline from the PTO or disassembly is not required.
Correct use of the driveline and the integrity of the safety shield are essential for the user’s safety. One of the main causes of damage to driveline shielding is incorrect attachment of the retaining chain.
When fixing the chain to the implement (in compliance with EN standard 1553), ensure that the chain:
- is positioned perpendicular to the driveline in the working position.
- permits articulation of the shaft while working, transporting, or turning.
- does not wrap excessively around the shield.

The risk of damaging the shield when fixing the chain to the implement can be eliminated by the Single Chain system. See chapter 10 - Safety Shields.
In compliance with the UNI EN ISO 4254-1, shield chains cannot be used to support the driveline when the implement is not connected to the tractor. The implement must provide a proper support for the driveline when it is not in use.
To avoid damaging the shield, it is important to check that other implement or tractor components do not interfere during turns or maneuvers.

Towed implements

Towed implements have wheels to support all or part of the weight of the implement (some of the weight may be supported by the tractor drawbar hitch).

The implement is hooked to the tractor by a pin that provides articulating movements. The position of the pin with respect to the PTO is standardized in compliance with ISO 5673 and ANSI/ASABE AD5673 standards.

It is recommend to use the drawbar hitch as intended by the manufacturer of the implement (per labels, instruction manuals, or other documents). The use of inappropriate extensions or hitch hooks may damage the driveline and create hazards to the operator.

Towed implements change position with respect to the tractor during turning or when traveling over bumps and holes.

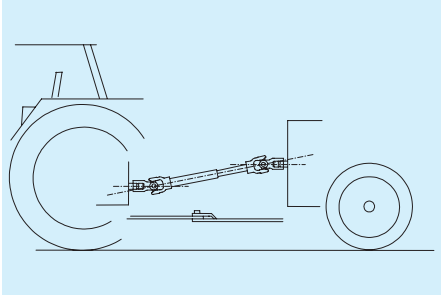
In the working position, the implement proceeds in alignment with the tractor and the joint angles depend on the relative position of the PTO and PIC.

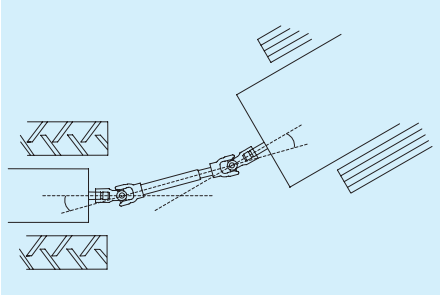
We recommend limiting differences between the joints angles to the values given in the tables on page 3.5.

When turning, the joint angles also depend upon the turning angle and the position of the hitch pin with respect to the PIC and PTO.

The PTO and PIC are often both horizontal and located in-line with the hitch pin. If the hitch pin is at the same distance from the PTO as it is from the PIC, the turning angle is divided into equal parts between the two joints. This is called an “Equal Angle” hitch, the cardan joint angles are equal, and the total speed variation generated by the driveline is negligible both in the working position and during turns. The joint angles during turning but should not exceed 45° even when both joint angles are equal.

When the PTO and PIC are at unequal distances from the hitch pin, turns will produce different cardan joint angles in each end of the driveline. The cardan joint nearest the hitch pin will be allotted the larger joint angle.





Driveline applications

In situations where the difference between the joint angles generates excessive vibrations and noise, it may be necessary to reduce speed or interrupt rotation of the PTO before turning.
In towed implements, the telescoping members of the driveline may retract or extend under load during turns or when the tractor and implement cross over rough terrain. Telescoping while transmitting torque generates axial thrust forces, which act upon joints, PTO's, and PIC's. These forces can reduce the life of these components.
The ratio of thrust T generated for a given torque M (T/M) is an important factor that must be considered when selecting telescoping members. The values of T/M (N/Nm) are approximate and refer to properly greased telescoping members (lower values are better):

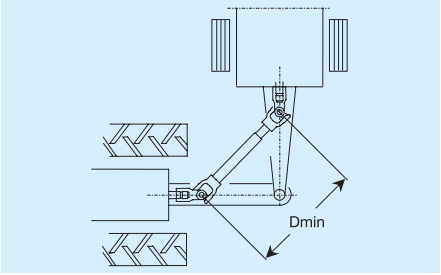
	T/M
4-Tooth profile tubes	5-6
4-Tooth Rilsan® coated tubes	2-3
4-Tooth Heat Treated tubes	9-10
Advanced Four-Tooth Profile Heat-Treated (SK)	9-10
Free Rotation tubes	6-8
Free Rotation Rilsan® tubes	3-4
Splined telescoping members	7-9

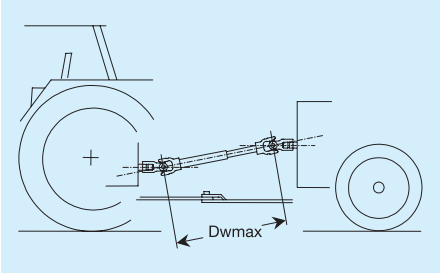
Rilsan® coated profile tubes generate minimum thrust under load and are particularly suited for primary drivelines of towed implements.
The telescoping members and the shaft length must be selected based on the distance between the PTO and PIC during working and transport maneuvers.
In towed implements, the cardan shaft is at its minimum length when turning.
Length L of the driveline must be selected so that the telescoping members never close completely, or "bottom out" when at the maximum turning angle and the tractor is pitched upwards (an inclination of 20° is considered as the maximum for most implements):

$$L < Dmin$$

The driveline is at its maximum working length when the tractor is aligned with the implement. The telescoping members must be selected so that the maximum length of the shaft at work Dwmax is less than the permissible maximum working length Lw:

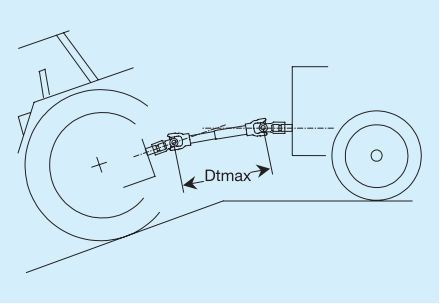
$$Dwmax < Lw$$





Maximum extension of the driveline is obtained when the tractor is pitched downwards, such as when entering a hole or climbing over a bump. The driveline length in this condition Dtmax must be less than the length Lt allowed for temporary use:

$$Dtmax < Lt$$



If four-tooth tubes do not allow for sufficient extension Lw and Lt, the maximum extension feature or splined telescoping members may be used.

The values for L, Lw, and Lt may by found in the specifications for each size of driveline.

Lubrication of the telescoping members is essential to limit wear and reduce axial thrust loads, which also reduce the life of cardan joints and PTO or PIC bearings.

Users sometimes skip this important maintenance step, especially when the driveline must be removed from the PTO or partially disassembled to lubricate the telescoping members.

Lubrication of telescoping tubes is greatly simplified by the optional Greasing System.

This system is installed in the inner tube, and uses a grease fitting that is easily accessible through the shield at any driveline extension. Removal of the driveline from the PTO or disassembly is not required.

Correct use of the driveline and the integrity of the safety shield are essential for the user's safety. One of the main causes of damage to driveline shielding is incorrect attachment of the retaining chain.

When fixing the chain to the implement (in compliance with UNI EN ISO 4254-1), ensure that the chain:

- is positioned perpendicular to the driveline in the working position
- permits articulation of the shaft while working, transporting, or turning
- does not wrap excessively around the shield.

The risk of damaging the shield due to improper attachment of restraining chains can be greatly reduced by the Single Chain system. See chapter 10 - Safety Shields.

In compliance with the UNI EN ISO 4254-1, shield chains cannot be used to support the driveline when the implement is not connected to the tractor. The implement must provide a proper support for the driveline when it is not in use.

To avoid damaging the shield, it is important to check that other implement or tractor components do not interfere during turns or maneuvers.

Driveline applications

Driveline with three cardan joints

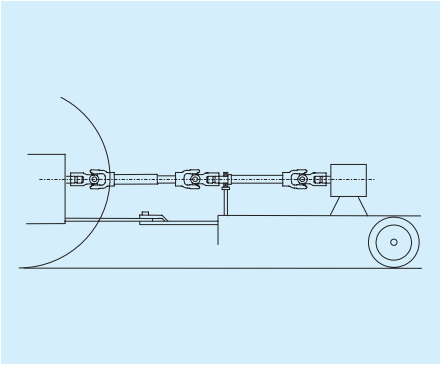
On towed implements with a long hitch, the hitch pin is much closer to the tractor PTO than the implement PIC. To prevent excessive difference between the joint angles, towed implements with long hitches may be driven by drivelines composed of three joints in series.

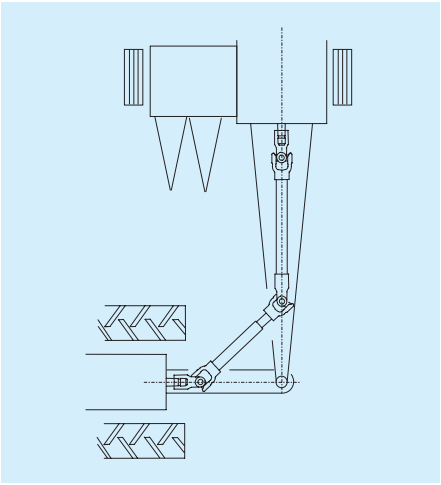
The first two joints (primary driveline) may operate as an Equal Angle driveline, or operate with joint angles that are nearly equal.

The secondary driveline has a single cardan joint, and a splined stub shaft supported by an intermediate bearing attached to the implement hitch. The intermediate bearing may move back and forth, with a fixed length primary driveline and a telescoping secondary driveline.

More common is a fixed intermediate bearing, so the primary driveline telescopes and the secondary driveline is of a fixed length.

In either case, to facilitate installation and to compensate for structural flexing, telescoping tubes may be supplied for the secondary driveline.



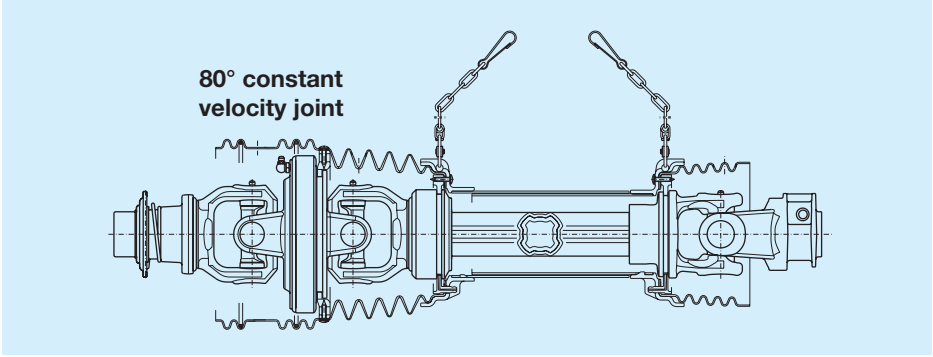


The tractor end of the secondary driveline has a splined shaft that is fixed to the implement yoke of the primary driveline.
The dimensions of the splined shaft are illustrated in specifications for each size of driveline.
By calculating the equivalent angle of the three cardan joints one can determine the correct phasing to produce minimal variation of total speed. If the third joint is in the same plane as the first two, the equation for calculating the equivalent angle can be extended to cover all three joints:

$$\alpha_{eq} = \sqrt{\alpha_1^2 \pm \alpha_2^2 \pm \alpha_3^2}$$

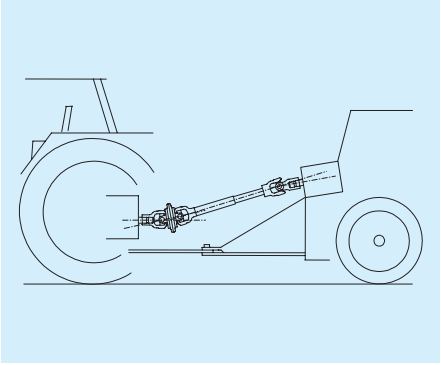
The angles of the second and/or third joint are added if their driven yokes are parallel to the first joint. The angles of the second and/or third joint are subtracted if their driven yokes are at right angles to the first joint.
The recommended maximum values for the equivalent angle are given in the table and the diagram on page 3.2.

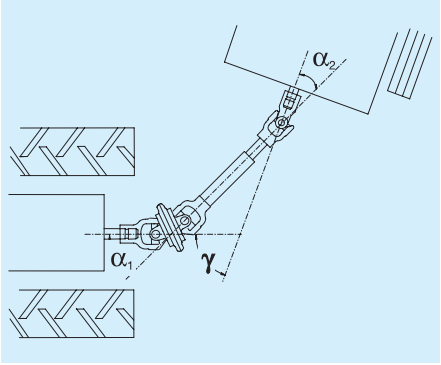
Driveline with 80° constant velocity joint
Drivelines with constant velocity (CV) joints are normally used as primary drivelines for implements with long drawbar hitches.
Use of an 80° CV joint simplifies hitch construction and often eliminates the need for an intermediate bearing and secondary driveline.
An 80° CV joint can accommodate wide joint angles for shorts periods (for example during turning) without generating variations in velocity.
New EL CV joints require relubrication only once every 50 hours, or once per week. (see Chapter 30 - *Lubrication*).
Movement of the 80° CV joint improves lubrication as grease is distributed over the surfaces of the centering components and the shield bearing surface. For this reason, it is recommended to use 80° CV joints for applications with frequent turning, and where the normal working position of the CV does not exceed 25°. 80° CV joints are not recommended for stationary or three point hitch applications.



Driveline applications

The most common configuration for CV drivelines is an 80° CV joint on one end (nearest the hitch pin) and a single cardan joint on the other end. Transmission of power through the driveline is influenced by the angle of the cardan joint and speed.
The angle of the single cardan joint depends, in the vertical plane, on the height and inclination of the implement input shaft.
The working angle of the cardan joint should be limited to the recommended values shown on page 3.2 (16° at 540 min^{-1} and 9° at 1000 min^{-1}) as it generates a speed variation not compensated for by other joints. To reduce the angle of the single cardan joint, the implement input shaft is often tilted toward the tractor PTO.
The hitch pin of a towed implement with long hitch is nearer the tractor PTO than the implement PIC. The turning angle γ is therefore mainly allotted to the constant velocity joint (joint angle α_1) with respect to the cardan joint (joint angle α_2).
The angle of the CV joint must be less than 80°, including both the horizontal and vertical planes. Therefore, turning angles under 70° are generally recommended.
The angle is largest during turning when the tractor is pitched upwards. A pitch of 20° is normally considered as the maximum value.
When the hitch pin is located on a common axis with the center of the constant velocity joint, the turning angle is seen only by the constant velocity joint, and the angle of the single cardan joint does not change during turning.
If the hitch pin is in an intermediate position between the two joints, the single cardan joint is at an angle during turning and thus generates speed variations and vibrations depending upon the angle (see page 3.2).
The telescoping members of drivelines with 80° constant velocity joints must slide under load due to irregular terrain or during turns.
The thrust generated during these movements is transferred to the joints and bearings, reducing their working life.
During turns, the direction of thrust also generates an oscillating bending stress on the tractor PTO and implement PIC.





To minimize thrust forces, drivelines with 80° constant velocity joints are supplied with Rilsan® tubes as standard.
Length L of the driveline must be selected so that the telescoping members never close completely, or “bottom out” when the driveline is at its minimum length Dmin. This occurs when the turning angle is at a maximum and the tractor is pitched upwards (an inclination of 20° is considered as the maximum for most implements:

$$L < Dmin$$

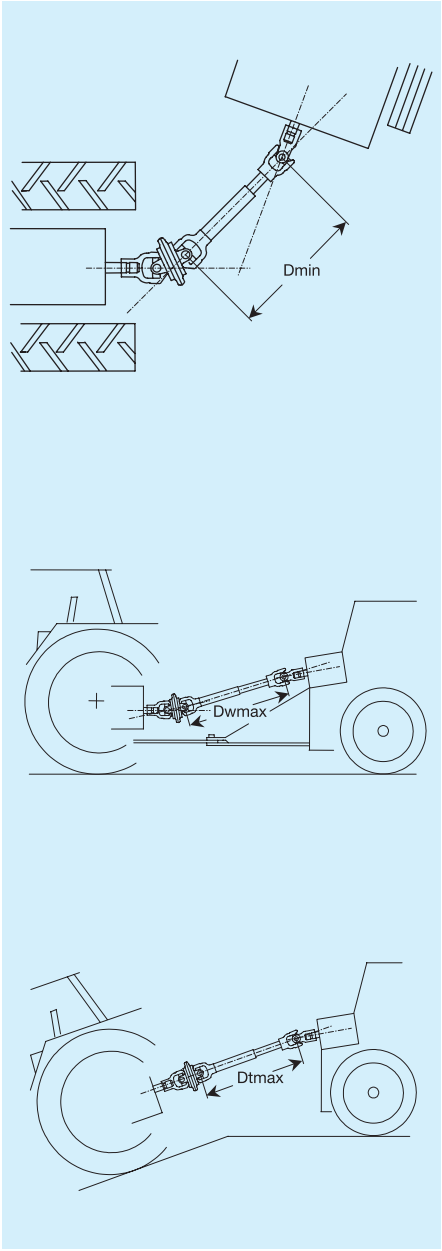
The driveline is at its maximum working length when the tractor is aligned with the implement. The telescoping members must have adequate overlap while transmitting power. The maximum length of the shaft at work Dwmax must be less than the permissible maximum working length Lw:

$$Dwmax < Lw$$

Maximum extension of the driveline is obtained when the tractor is pitched downwards, such as when entering a ditch or cresting a hill. Normally a tilt of 20° is considered. The driveline length in this condition Dtmax must be less than the length allowed in temporary working conditions Lt:

$$Dtmax < Lt$$

The values for L, Lw, and Lt may by found in the specifications for each size of CV driveline.



Driveline applications

It can be difficult to align the splines of a yoke with the tractor PTO when the PTO or implement PIC is not free to rotate due to safety requirements or inertia conditions. Optional Free Rotation Tubes allow 60° of relative rotation between the end yokes and facilitate installation of the shaft onto the PTO.

Connection of the driveline to the tractor PTO must be done quickly and easily, since tractors are normally used with more than one implement. The yoke on the tractor end of the driveline is usually supplied with a “quick coupling” which may be a pushpin, ball collar, or an automatic ball collar connection.

The mechanism of the automatic ball collar holds the collar open and automatically releases it when the balls are in the proper position on the PTO. Both hands can be used to hold the driveline making installation much easier.

Lubrication of the telescoping members is essential to limit wear and reduce axial thrust loads, which also reduce the life of cardan joints and PTO or PIC bearings.

Users sometimes skip this important maintenance step, especially when the driveline must be removed from the PTO or partially disassembled to lubricate the telescoping members.

Lubrication of telescoping tubes is greatly simplified by the optional Greasing System. This system is installed in the inner tube, and uses a grease fitting that is easily accessible through the shield at any driveline extension. Removal of the driveline from the PTO or disassembly is not required.

Correct use of the driveline and the integrity of the safety shield are essential for the user’s safety. One of the main causes of damage to driveline shielding is incorrect attachment of the retaining chain.

When attaching the chain to the implement (in compliance with UNI EN ISO 4254-1), ensure that the chain:

- is positioned perpendicular to the driveline in the working position
- permits articulation of the shaft while working, transporting, or turning
- does not wrap excessively around the shield.

The risk of damaging the shield by improper attachment of restraining chains can be greatly reduced by the Single Chain system. See chapter 10 - Safety Shields.

In compliance with the UNI EN ISO 4254-1, shield chains cannot be used to support the driveline when the implement is not connected to the tractor. The implement must provide a proper support for the driveline when it is not in use.

To avoid damaging the shield, it is important to check that other implement or tractor components do not interfere during turns or maneuvers.

Drivelines with 80° and 50° CV joints

Shafts with 80° and 50° constant velocity joints do not generate speed variations, regardless of the working angle. Normally 80°-50° CV joint drivelines are used to operate towed implements with a short hitch when the position of the PTO and PIC would lead to excessive angles for single cardan joints.

With an 80°-50° CV, the implement is unaffected by the position of the tractor PTO with respect to the hitch point and the implement PIC.

New EL CV joints require **relubrication only once every 50 hours, or once per week.** (see Chapter 30 - *Lubrication*).

Movement of the 80° CV joint improves lubrication as grease is distributed over the surfaces of the centering components and the shield bearing surface. For this reason, it is recommended to use 80° CV joints for applications with frequent turning, and where the normal working position of the CV does not exceed 25°. 80° CV joints are not recommended for stationary or three point hitch applications.

The turning angle of a towed implement with a short hitch is mainly allotted to the tractor side joint, where the 80° CV joint is located. The joint angle on the implement side is smaller, accommodated by the 50° CV joint.

The telescoping members of drivelines with 80° constant velocity joints must slide under load due to irregular terrain or during turns.

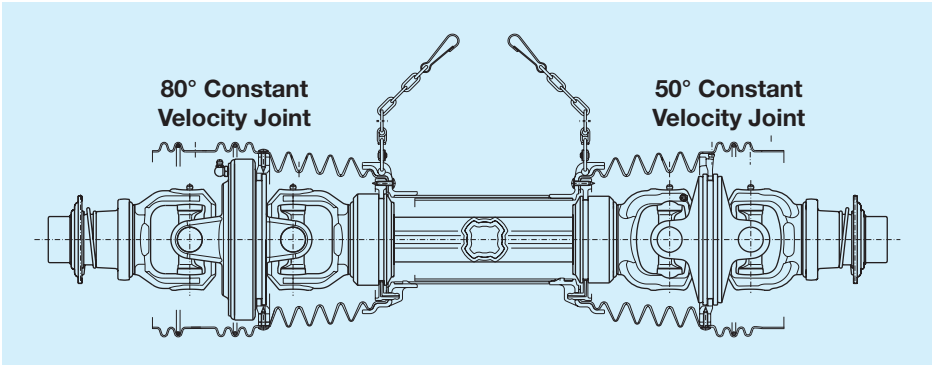
The thrust generated during these movements is transferred to the joints and bearings, reducing their working life.

During turns, the direction of thrust also generates an oscillating bending stress on the tractor PTO and implement PIC.

To minimize thrust forces, drivelines with 80° CV joints are supplied with Rilsan® tubes as standard.

Drivelines with 80° and 50° constant velocity joints can also be supplied with:

- Free Rotation tubes
- Automatic Ball Collar Yokes
- Greasing System
- Single Chain System



Driveline applications

Length L of the driveline must be selected so that the telescoping members never close completely, or “bottom out” when the driveline is at its minimum length Dmin. This occurs when the turning angle is at a maximum and the tractor is pitched upwards (an inclination of 20° is considered as the maximum for most implements)

$$L < Dmin$$

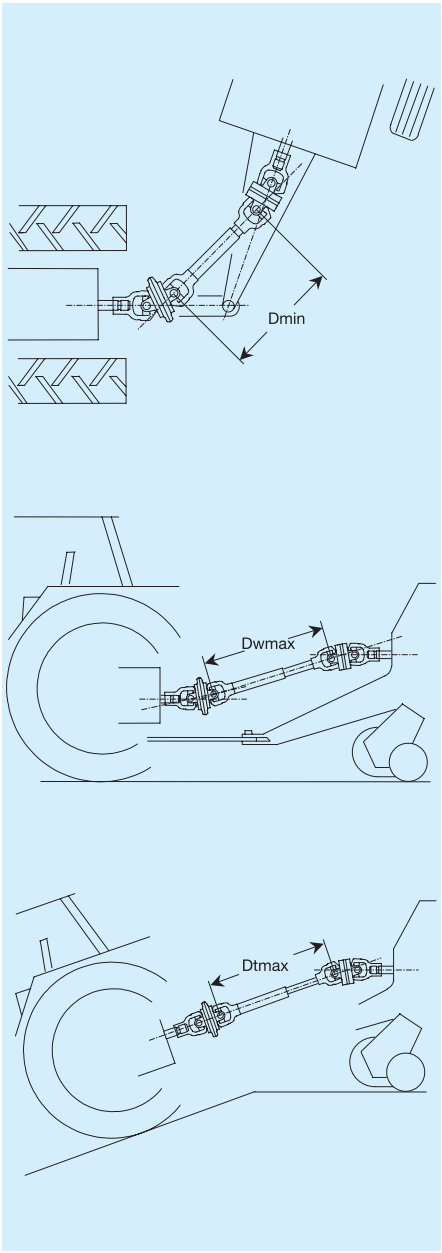
The driveline is at its maximum working length when the tractor is aligned with the implement. The telescoping members must have adequate overlap while transmitting power. The maximum length of the shaft at work Dwmax must be less than the permissible maximum working length Lw:

$$Dwmax < Lw$$

Maximum extension of the driveline is obtained when the tractor is pitched downwards, such as when entering a ditch or cresting a hill. Normally a tilt of 20° is considered. The driveline length in this condition Dtmax must be less than the length allowed in temporary working conditions Lt:

$$Dtmax < Lt$$

The values for L, Lw and Lt may by found in the specifications for each size of CV driveline.



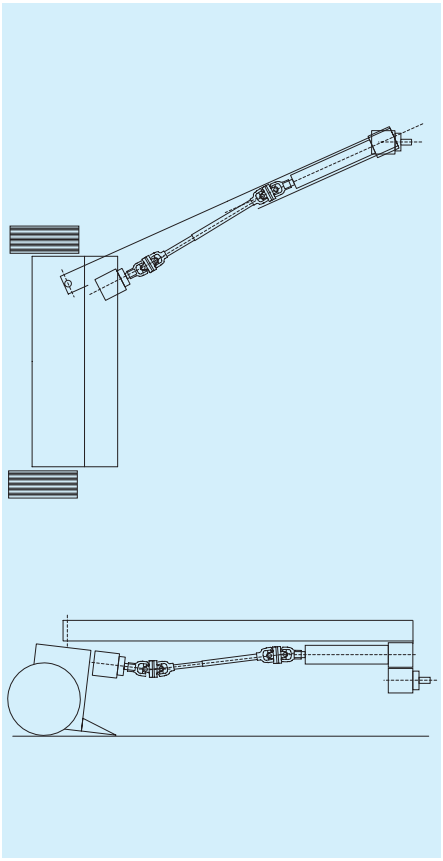
Drivelines with 50° constant velocity joints

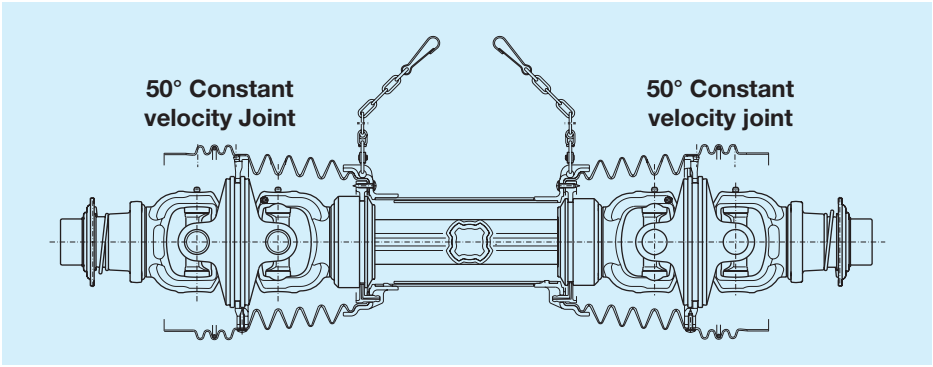
A driveline with 50° CV joints on both ends transmits power without generating speed variations.

This type of driveline is normally used as a secondary driveline for complex implements (for example mower-conditioners or harvesting equipment) where the connected shafts may have widely variable locations with different implement positions.

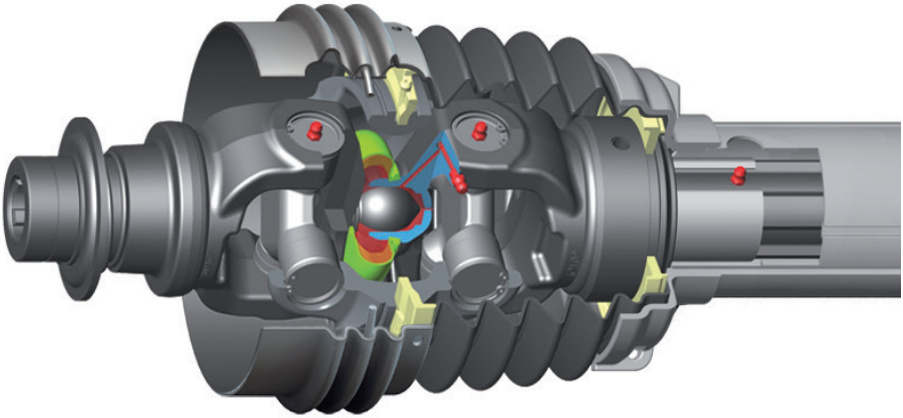
Even minimal variations in velocity can provoke vibrations and extra stress in implements with significant inertia or those operated at high speed. This can compromise the performance and life of the implement.

The 50° constant velocity joint offers a simple and reliable solution in situations where it is not possible to find an acceptable compromise with single cardan joints.





Driveline applications



The self-centering elements of the 50° joint are supplied with a rubber boot to contain the lubricating grease and protect it from contamination. The compact design and rubber boot make the 50° CV joint preferable to the 80°CV joint in applications involving high speed and small joint angles.

Angle variations of the CV joint improves lubrication as grease is distributed over the surfaces of the centering components.
For this reason, it is recommended to have joint angles that are not constant and do not exceed 25° in normal working condition (except when turning or other short duration maneuvers).

Drivelines with 50° constant velocity joints are supplied with regular “Four-Tooth” profile tubes. If the application involves in frequent sliding under load (for example during turning or traveling over uneven terrain) we recommend using Rilsan® coated telescoping tubes (optional with 50° CV drivelines). Free Rotation tubes are also available to allow relative rotation of 60° between the end yokes, facilitating installation of the driveline on the PTO.

The driveline can be supplied with a Greasing System for rapid greasing of the telescoping members while the shaft is installed on the tractor and implement.

Length **L** of the driveline must be selected so that the telescoping members do not completely close and maintain adequate overlap in all working positions (see lengths **Lw, Lt, Ls**).

The values for **L**, **Lw**, and **Lt** may by found in the specifications for each size of driveline.

Correct use of the driveline and the integrity of the safety shield are essential for the user’s safety. We recommend checking that other parts of the implement or tractor do not interfere with the driveline shield in any condition of use and that the restraint chains are attached correctly.

Stationary Implements

Stationary implements are operated from a fixed position. Stationary implements include pumps, hoists, generators, dryers, etc. Stationary implements should only be used when directly coupled to the tractor by a three point or drawbar hitch.

If necessary, prevent the tractor from moving by placing chocks on the wheels.

The position of the implement with respect to the tractor is essential for safe and efficient operation of the driveline.

The tractor must be coupled to the implement and positioned so the joint angles are small and equal. Any difference between the joint angles creates vibrations and stress that can compromise implement performance. See page 3.5. Joint life is also influenced by the joint angle, in particular in applications where the joint angle is fixed.

Telescoping members must be adequately overlapped for the power transmitted. The distance between the centers of the joints during work must be less than the recommended maximum length Lw, listed in the specifications for each size of driveline.

Correct use of the driveline and the integrity of the safety shield are essential for user safety.

Agriculture implements are often operated by tractors with more power than required by the implement, so it is a good idea to outfit the driveline with a torque limiter to prevent damage caused by overloading.

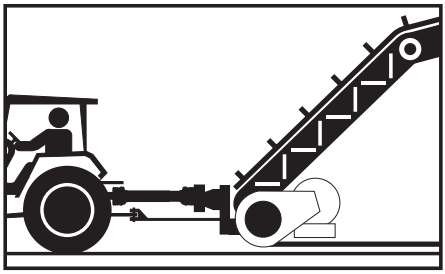
If necessary, prevent the tractor from moving by placing chocks on the wheels.

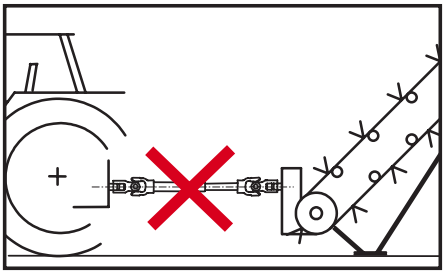
Only use the implement with its original driveline that is specifically designed for the required length, size, torque limiters or clutches, and shield.

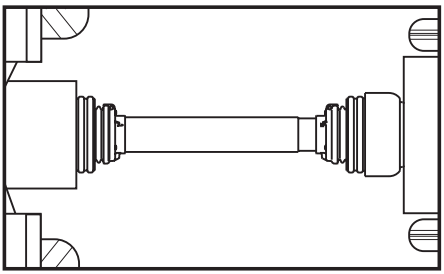
When using the implement and its driveline, do not exceed the speed and power requirements stated in the implement manual.

Standard catalog drivelines, torque limiters, and overrunning clutches are designed for speeds not to exceed 1000 min^{-1}.

All rotating parts must be guarded.







The tractor master shield, the driveline guard(s), and the implement input connection shield form an integrated guarding system.
One of the main causes of damage to driveline shielding is incorrect attachment of restraint chains, and interference with tractor and/or other implement components.
The risk of damage due to improper restraint chain hook-up may be reduced by using the Single Chain system. See chapter 10 - Safety Shields, for more information.
When attaching the chain to the implement (in compliance with UNI EN ISO 4254-1), ensure that the chain:

- is positioned perpendicular to the driveline in the working position
- permits articulation of the shaft while working, transporting, or turning
- does not wrap excessively around the shield.

In compliance with the EN standard 1553, shield chains cannot be used to support the driveline when the implement is not connected to the tractor. The implement must provide a proper support for the driveline when it is not in use.

To avoid damaging the shield, it is important to check that other implement or tractor components do not interfere during turns or maneuvers.

A basic Bondioli & Pavesi driveline is specified by a fifteen position alphanumeric code. Three additional positions may be used for special features.
The fifteen essential positions of the code are used to list the following specifications:
- Standard Shaft (position 1)
- Dimensions (positions 2-3)
- Type of telescoping members (pos. 4)
- Length (positions 5-6-7)
- Labels and instruction manuals (pos. 8)
- Retaining chains (position 9)
- Tractor end yokes (pos.10-11-12)
- Implement end yokes (pos 13-14-15).

The three additional positions are used to specify optional outer cones, Spring Link chains for sizes S1 - S5 (see chapter 10 - *Safety Shields*), Greasing System (see chapter 30 - *Lubrication*).
Drive shafts running at 1000 min^{-1} are identified by an "X" letter in a final additional position.
Charts for the main types of drivelines and their codes are given on the following pages.
Each end of the driveline is defined by three-digit codes that identify the yoke or torque limiter, and consequently, the type of joint: single cardan, 50° CV, or 80° CV joint.
For example, code R07 identifies a yoke with ball collar for a single cardan joint. The code WR7 identifies a yoke with ball collar for 80° constant velocity joints.
We can therefore use R07 in positions 10-11-12 of the shaft code to define a single cardan joint with a ball collar yoke on the tractor end.

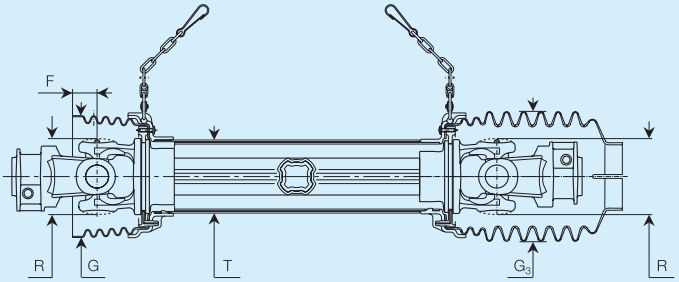
It is important to enter the three digit codes for the yokes and torque limiters in the correct positions in the shaft code. These positions specify whether the yokes and joints are to be fitted on the tractor or implement end. Positions 10-11-12 of the code are used for the tractor end of primary drivelines (or the driver end for internal drivelines). Positions 13-14-15 are used for the implement end (or driven end for internal drivelines).
For example, if an 80° constant velocity joint is required with a ball collar on the tractor end, enter code WR7 in positions 10-11-12 of the shaft code. If an RA2 1 3/8" Z6) overrunning clutch is required on the implement end, enter code A50 in positions 13-14-15 of the shaft code.

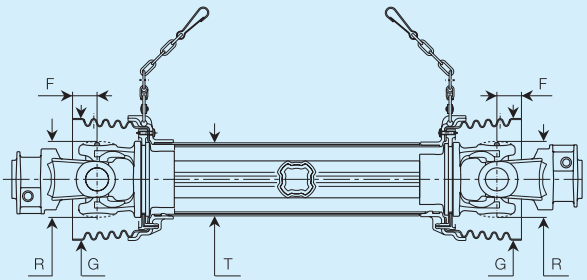
For primary shafts, any torque limiter or overrunning clutch must be fitted on the implement side. All rotating parts must be guarded.

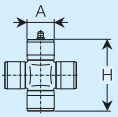
The three-digit codes for yokes and torque limiters are shown in their respective chapters of this catalog and on the SFT dimensional charts.
The codes for joints and double joints consist of eleven positions, that summarize the dimensions, type of joint, and type of yoke fitted to each end.

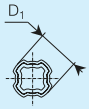
Codes and dimensions

SFT cardan joint driveline

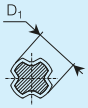








4 Tooth Profile tubes



Advanced 4 Tooth Profile

	A mm	H mm	R mm	G mm	T mm	D_1 mm	D_1 mm	F mm	G_3 mm
S1	22.0	54.0	67	129	67	35.2	- -	23	170
S2	23.8	61.3	76	146	81	45.6	- -	42	170
S4	27.0	74.6	89	146	81	50.2	- -	37	170
S5	30.2	79.4	98	146	81	50.2	- -	33	170
S6	30.2	79.4	98	160	96	53.9	- -	32	170
H7	30.2	91.5	108	160	96	58.2	- -	29	170
S8	34.9	93.5	113	160	96	58.2	- -	42	200
H8	34.9	93.5	113	160	96	66.0	- -	42	200
S9	34.9	106.0	124	180	108	66.0	- -	49	200
SH	42.0	107.5	130	201	108	70.2	- -	50	- -
S0	42.0	130.0	151	201	108	70.2	- -	46	- -
SK	50.0	140.0	165	201	108	- -	74.1	42	- -

Codes for SFT cardan joint driveline

1

C

C: SFT standard cardan joint driveline

2 3

Size
S1 - S2 - S4 - S5 - S6 - H7 - S8 - H8 - S9 - SH - S0 - SK.
See chapter 5 - *Size, Torque and Power*

4

Telescoping members
See chapter 7 - *Telescoping Members*, or the specifications for the selected driveline size.

5 6 7

Minimum collapsed length L of driveshaft
The measurement (in cm.) of the distance between the cross centers with shaft fully closed. See chapter 8 - *Driveline Lengths.*

8

Warning labels and instruction manuals
Select labels and manuals according to the country where the driveline will be used. See chapter - 9 - *Safety Labels and Operator's Manuals.*

9

Shield restraint chains
Specify whether the driveline will have chains or the Single Chain Restraint System. *See chapter 10 - Safety Shields.*

10 11 12

Tractor (or Driver) end yoke
Specify the three-digit code for the yoke, which will also denote the type of joint. See specifications for the selected driveline size.

13 14 15

Implement (or Driven) end yoke, torque limiter, or clutch
Specify the three-digit code for the yoke, torque limiter, or clutch, which will also denote the type of joint. See the specifications for each selected size.

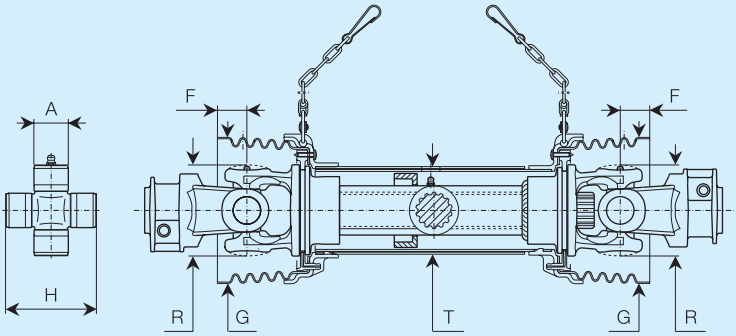
16 17 18

Use these positions only if requesting optional outer cones for single cardan joints, Spring Link System for sizes S1-S5 (see chapter 10 - *Safety Shields*), Greasing System (see chapter 30 - *Lubrication*).
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine work with the integral driveline guard to form an interactive guarding system.
For primary drivelines (i.e. the driveline connecting the tractor PTO to the initial power input connection on the implement), torque limiters or overrunning clutches must be fitted on the implement end of the driveline.

Codes and dimensions

SFT driveline with splined telescoping members



	A mm	H mm	R mm	G mm	T mm	F mm	
S1	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -
S4	- -	- -	- -	- -	- -	- -	- -
S5	- -	- -	- -	- -	- -	- -	- -
S6	30.2	79.4	98	160	96	32	40 CUNA
H7	30.2	91.5	108	160	96	29	40 CUNA
S8	34.9	93.5	113	160	96	42	40 CUNA
H8	- -	- -	- -	- -	- -	- -	- -
S9	34.9	106.0	124	180	108	49	45 CUNA
SH	42.0	107.5	130	201	108	50	45 CUNA
S0	42.0	130.0	151	201	108	46	45 CUNA
SK	- -	- -	- -	- -	- -	- -	- -

Codes for SFT cardan joint driveline with splined telescoping members

1 **C**

C: SFT standard cardan joint driveline

2 3

Size
S6 - H7 - S8 - S9 - SH - S0.
See chapter 5 - *Size, Torque and Power*

4 **S**

Telescoping members
S: Splined Telescoping Members

5 6 7

Minimum collapsed length L of driveshaft
The measurement (in cm) of the distance between the cross centers with shaft fully closed. See chapter 8 - *Driveline Lengths*.

8

Warning labels and instruction manuals
Select labels and manuals according to the country where the driveline will be used. See chapter - 9 - *Safety Labels and Operator's Manuals.*

9

Shield restraint chains
Specify whether the driveline will have chains or the Single Chain Restraint System. See chapter 10 - *Safety Shields.*

10 11 12

Tractor (or Driver) end yoke
Specify the three-digit code for the yoke, which will also denote the type of joint. See specifications for the selected driveline size.

13 14 15

Implement (or Driven) end yoke, torque limiter, or clutch
Specify the three-digit code for the yoke, torque limiter, or clutch, which will also denote the type of joint. See the specifications for each selected size.

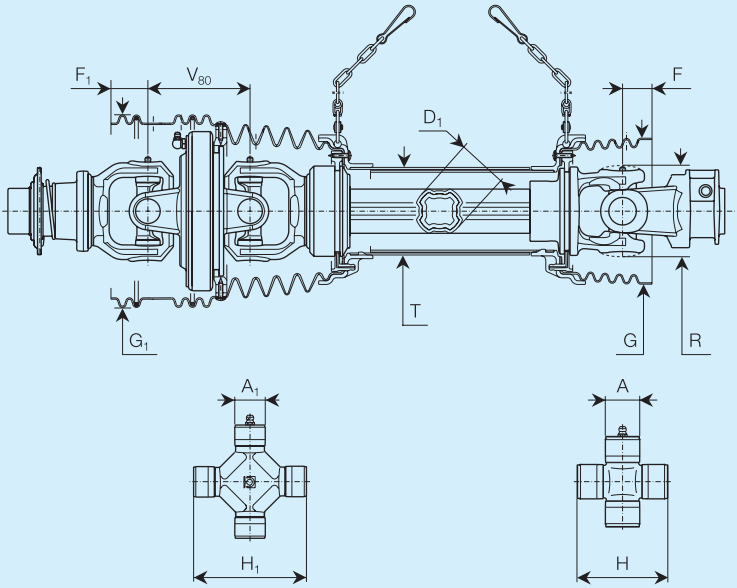
16 17

Use these positions only if requesting optional shield cones.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine work with the integral driveline guard to form an interactive guarding system.
For primary drivelines (i.e. the driveline connecting the tractor PTO to the initial power input connection on the implement), torque limiters or overrunning clutches must be fitted on the implement end of the driveline.

Codes and dimensions

SFT driveline with 80° constant velocity joint



	A_1	H_1	F_1	V_{80}	G_1	T	D_1	G	F	R	A	H
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	36	85	181	81	45.6	146	41	76	23.8	61.3
S4	22.0	86.0	31	93	181	81	50.2	146	37	89	27.0	74.6
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	41	112	211	96	53.9	160	32	98	30.2	79.4
H7	27.0	100.0	41	112	211	96	58.2	160	29	108	30.2	91.5
S8	30.2	106.0	52	119	233	96	58.2	160	42	113	34.9	93.5
H8	30.2	106.0	52	119	233	96	66.0	180	42	113	34.9	93.5
S9	30.2	122.0	50	140	233	108	66.0	- -	49	124	34.9	106.0
SH [2]	34.9	112.0	39	150	233	108	70.2	201	50	130	42.0	107.5
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Dimensions of the H7 80° CV joint are the same as the S6 80° CV joint, but the material specifications are different to allow higher torques.

2) 75° is the max. permitted angle for the SH size CV joint.

Codes for SFT driveline with 80° constant velocity joint

1

C

C: Standard SFT 80° CV driveline

2 3

Size
S2 - S4 - S6 - H7 - S8 - H8 - S9 - SH
See chapter 5 - *Size, Torque and Power.*

4

Telescoping members
"R" specifies Rilsan® Four-tooth profile tubes, and "G" specifies Rilsan® Free rotation profile tubes. See chapter 7 - *Telescoping Members.*

5 6 7

Minimum collapsed length "L" of driveshaft
The measurement (in cm) of the distance between the centers of inner crosses with shaft fully closed. See chapter 8 - *Driveline Lengths.*

8

Warning labels and instruction manuals
Select labels and manuals according to the country where the driveline will be used. See chapter - 9 - *Safety Labels and Operator's Manuals.*

9

Shield restraint chains
Specify whether the driveline will have chains or the Single Chain Restraint System. See chapter 10 - *Safety Shields.*

10 11 12

Tractor (or Driver) end yoke
Specify the three-digit code for the yoke, which will also denote the type of joint. See specifications for the selected driveline size.

13 14 15

Implement (or Driven) end yoke, torque limiter, or clutch
Specify the three-digit code for the yoke, torque limiter, or clutch, which will also denote the type of joint. See the specifications for each selected size.

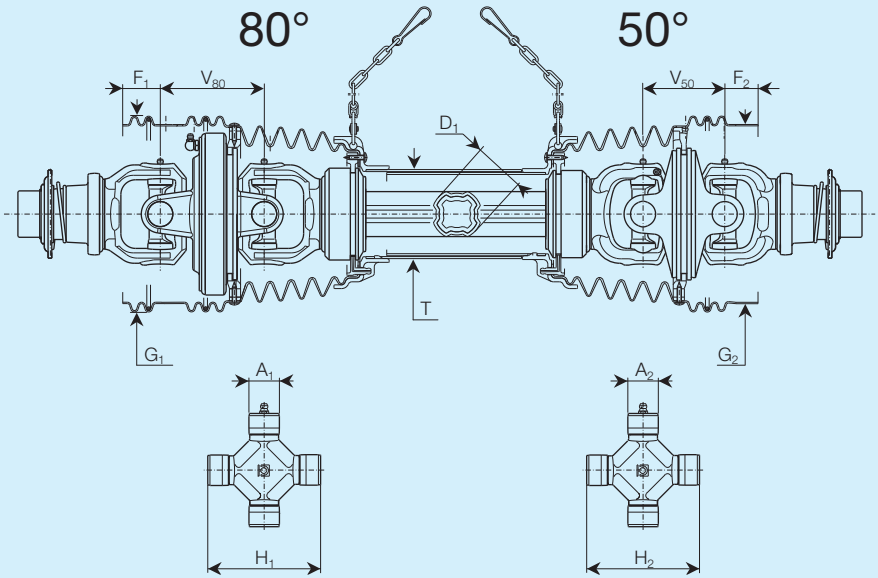
16 17 18

Use these positions only if requesting optional outer cones for single cardan joints, Spring Link System for sizes S2 or S4 (see chapter 10 - *Safety Shields*), Greasing System (see chapter 30 - *Lubrication*).
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine work with the integral driveline guard to form an interactive guarding system.
For primary drivelines (i.e. the driveline connecting the tractor PTO to the initial power input connection on the implement), torque limiters or overrunning clutches must be fitted on the implement end of the driveline.

Codes and dimensions

SFT driveline with 80° and 50° constant velocity joints



	A_1 mm	H_1 mm	F_1 mm	V_{80} mm	G_1 mm	T mm	D_1 mm	G_2 mm	V_{50} mm	F_2 mm	A_2 mm	H_2 mm
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	31	93	181	81	50.2	165	76	35	22.0	86.0
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	41	112	211	96	53.9	193	88	36	27.0	100.0
H7	27.0	100.0	41	112	211	96	58.2	193	88	36	27.0	100.0
S8	30.2	106.0	52	119	233	96	58.2	193	88	36	30.2	106.0
H8	30.2	106.0	52	119	233	96	66.0	193	88	36	30.2	106.0
S9	30.2	122.0	50	140	233	108	66.0	219	95	36	34.9	112.0
SH [2]	34.9	112.0	39	150	233	108	70.2	219	95	36	34.9	112.0
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Dimensions of the H7 80° CV joint are the same as the S6 80° CV joint, but the material specifications are different to allow higher torques.

2) 75° is the max. permitted angle for the SH size CV joint.

Codes for SFT drivelines with 80° and 50° constant velocity joints

1
C

C: Standard SFT 80°-50° CV driveline

2 3

Size
S4 - S6 - H7 - S8 - H8 - S9 - SH
See chapter 5 - *Size, Torque and Power.*

4

Telescoping members
"R" specifies Rilsan® Four-tooth profile tubes, and "G" specifies Rilsan® Free rotation profile tubes. See chapter 7 - *Telescoping Members.*

5 6 7

Minimum collapsed length "L" of driveshaft
The measurement (in cm) of the distance between the centers of inner crosses with shaft fully closed. See chapter 8 - *Driveline Lengths.*

8

Warning labels and instruction manuals
Select labels and manuals according to the country where the driveline will be used. See chapter - 9 - *Safety Labels and Operator's Manuals.*

9

Shield restraint chains
Specify whether the driveline will have chains or the Single Chain Restraint System. See chapter 10 - *Safety Shields.*

10 11 12

Tractor (or Driver) end yoke
Specify the three-digit code for the yoke, which will also denote the type of joint. See specifications for the selected driveline size.

13 14 15

Implement (or Driven) end yoke, torque limiter, or clutch
Specify the three-digit code for the yoke, torque limiter, or clutch, which will also denote the type of joint. See the specifications for each selected size.

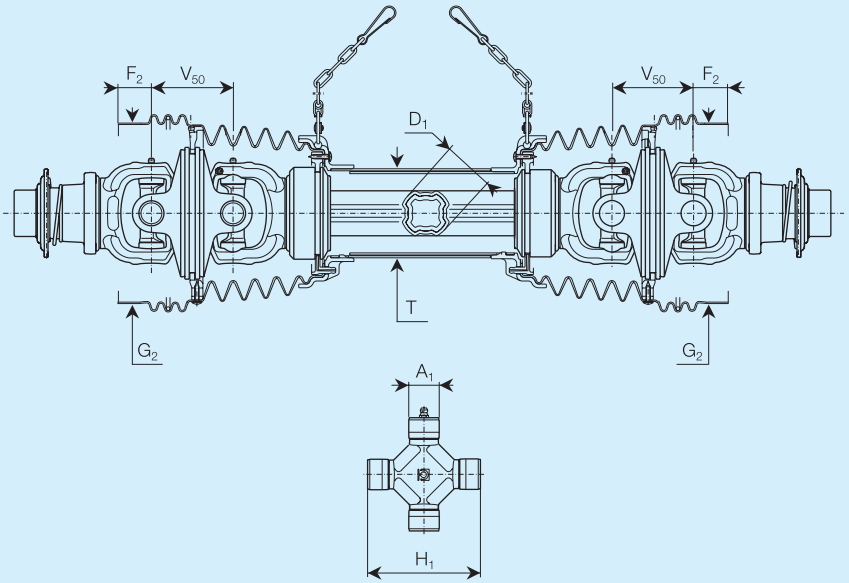
16 17

Use these positions only if requesting optional outer cones for single cardan joints, Spring Link System for size S4 (see chapter 10 - *Safety Shields*), Greasing System (see chapter 30 - *Lubrication*).
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine work with the integral driveline guard to form an interactive guarding system.
For primary drivelines (i.e. the driveline connecting the tractor PTO to the initial power input connection on the implement), torque limiters or overrunning clutches must be fitted on the implement end of the driveline.

Codes and dimensions

SFT driveline with 50° constant velocity joints



	A_1 mm	H_1 mm	V_{50} mm	G_2 mm	T mm	D_1 mm	F_2 mm
S1	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86	76	165	81	50.2	35
S5	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100	88	193	96	53.9	36
H7	27.0	100	88	193	96	58.2	36
S8	30.2	106	88	193	96	58.2	36
H8	30.2	106	88	193	96	66.0	36
S9	34,9	112	95	219	108	66.0	36
SH	34.9	112	95	219	108	70.2	36
S0	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -

Codes for SFT Driveline with 50° constant velocity joints

1
C

C: Standard SFT 50° CV driveline

2 3

Size
S4 - S6 - H7 - S8 - H8 - S9 - SH
See chapter 5 - *Size, Torque and Power.*

4

Telescoping members.
See chapter 7 - *Telescoping Members*, or the specifications for the selected driveline size.

5 6 7

Minimum collapsed length “L” of driveshaft
The measurement (in cm) of the distance between the centers of inner crosses with shaft fully closed. See chapter 8 - *Driveline Lengths.*

8

Warning labels and instruction manuals
Select labels and manuals according to the country where the driveline will be used. See chapter - 9 - *Safety Labels and Operator’s Manuals.*

9

Shield restraint chains
Specify whether the driveline will have chains or the Single Chain Restraint System. See chapter 10 - *Safety Shields.*

10 11 12

Tractor (or Driver) end yoke
Specify the three-digit code for the yoke, which will also denote the type of joint. See specifications for the selected driveline size.

13 14 15

Implement (or Driven) end yoke, torque limiter, or clutch
Specify the three-digit code for the yoke, torque limiter, or clutch, which will also denote the type of joint. See the specifications for each selected size.

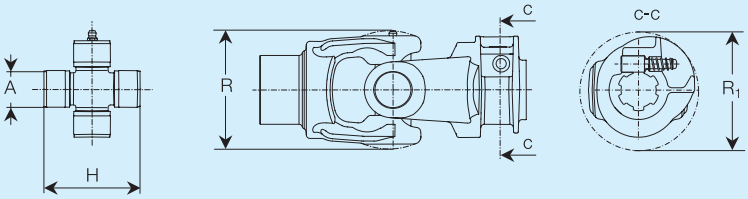
16 17

Use these positions only if requesting optional outer cones for single cardan joints, Spring Link System for size S4 (see chapter 10 - Safety Shields), Greasing System (see chapter 30 - Lubrication).
Add an “X“ letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine work with the integral driveline guard to form an interactive guarding system.
For primary drivelines (i.e. the driveline connecting the tractor PTO to the initial power input connection on the implement), torque limiters or overrunning clutches must be fitted on the implement end of the driveline.

Codes and dimensions

SFT single cardan joint



	A mm	H mm	R mm	R_1 mm
S1	22.0	54.0	67	85
S2	23.8	61.3	76	85
S4	27.0	74.6	89	100
S6	30.2	79.4	98	100
H7	30.2	91.5	108	100
S8	34.9	93.5	113	108

Codes for SFT single cardan joints

1 **C**

C: Standard SFT single cardan joint

2 3

Size of joint. S1 - S2 - S4 - S6 - H7 - S8.
See chapter 5 - Size, Torque and Power.

4 **G** 5 **C**

Type of joint.
Specify "GC" for single cardan joint.
See chapter 3 - *Driveline Applications.*

6 7 8

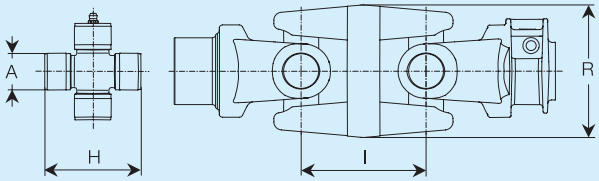
Driver end yoke
Specify the three-digit code for the yoke, torque limiter, or clutch. One of the yokes is usually sliding - see page 12.7 and the specifications for the selected driveline size

9 10 11

Driven end yoke Specify the three-digit code for the yoke, torque limiter, or clutch. One of the yokes is usually sliding -see page 12.7 and the specifications for the selected size.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded.

SFT double joints



	A mm	H mm	I mm	R mm
S1	22.0	54.0	68	72
S2	23.8	61.3	78	82
S4	27.0	74.6	90	95
S6	30.2	79.4	106	106
H7	30.2	91.5	108	115
S8	34.9	93.5	118	116

Codes for SFT cardan joints

1 **C**

C: Standard SFT cardan joint

2 3

Size of joint. S1 - S2 - S4 - S6 - H7 - S8.
See chapter 5 - *Size, Torque and Power.*

4 **D** 5 **G**

Type of joint.
Specify **"DG"** for double cardan joint.
See chapter 3 - *Driveline Applications.*

6 7 8

Driver end yoke
Specify the three-digit code for the yoke, torque limiter, or clutch. One of the yokes is usually sliding - see page 12.7 and the specifications for the selected driveline size

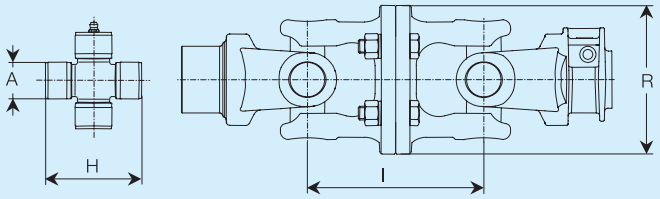
9 10 11

Driven end yoke. Specify the three-digit code for the yoke, torque limiter, or clutch. One of the yokes is usually sliding -see page 12.7 and the specifications for the selected size.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded.

Codes and dimensions

SFT double flanged joint



	A mm	H mm	I mm	R mm
S1	22.0	54.0	98	89
S2	23.8	61.3	108	89
S4	27.0	74.6	128	100
S6	30.2	79.4	136	110
H7	30.2	91.5	154	130
S8	34.9	93.5	158	148

Codes for SFT cardan joints

1 **C**

C: Standard SFT cardan joint

2 3

Size of joint. S1 - S2 - S4 - S6 - H7 - S8.
See chapter 5 - *Size, Torque and Power.*

4 **G** 5 **F**

Type of joint.
Specify **"GF"** for flange double cardan joint.
See chapter 3 - *Driveline Applications.*

6 7 8

Driver end yoke
Specify the three-digit code for the yoke, torque limiter, or clutch. One of the yokes is usually sliding - see page 12.7 and the specifications for the selected driveline size

9 10 11

Driven end yoke
Specify the three-digit code for the yoke, torque limiter, or clutch. One of the yokes is usually sliding -see page 12.7 and the specifications for the selected size.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded.

Codes for cardan joint driveline

1 **C**

C: Standard SFT cardan joint driveline — C

2 3

Size

S1 - S2 - S4 - S5 - S6 - H7 - S8 - H8 - S9 - SH - S0 - SK

4

Telescoping members	Standard	Rilsan® Coated	Heat Treated
Four-Tooth Profile Tubes	N	R	T
Maximum extension Four-Tooth profile tubes	L	V	U
Advanced Four-Tooth profile (SK)	-	-	P
Maximum extension Four-Tooth profile (SK)	-	-	Q
Free Rotation Profile Tubes	F	G	-
Splined Profile Tubes	S	-	-

5 6 7

Length L

036 - 041 - 046 - 051 - 056 - 061 - 066 - 071 - 076 - 081 - 086 - 091 - 101 - 111 - 121

8 9

Safety Labels and Instruction Manuals

Country of Destination	With Restraint System	With Single Chain System	No Restraints
CEE – EFTA countries CE marked	CE	C1	-
USA and Canada	U2	U1	US
Japan	JP	J1	-
Other CEE – EFTA countries without CE mark	FX	F1	-

10 11 12

Driver end yoke.

Specify the three-digit code which will also denote the type of joint.

13 14 15

Implement end yoke.

Specify the three-digit code which will also denote the type of joint

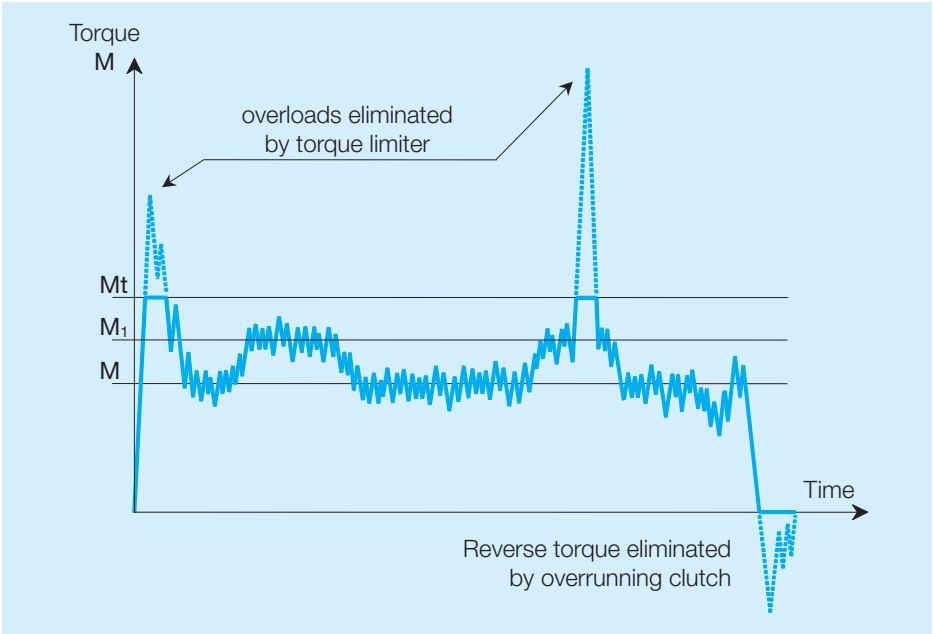
16 17 18

Options

Optional shield cones	Driver end	Implement end
Medium extended cone, must be supported	P	M
Long extended cone, must be supported	N	L
Short cone	F	H
Medium cone	R	T
Long cone	V	Y
Chains with Spring Link System (optional only for S1, S2, S4 and S5)		Z
Greasing System		G
Drive shaft rotating at 1000 min^{-1}		X

The size of the driveline must be selected according to the functional requirements of the application. The strength must be sufficient to transmit the required torque under all working conditions.
The needle bearings of the cross kit must operate for the desired lifetime, according to the dictates of torque, speed, joint angle, and lubrication frequency.
Drivelines for agricultural use are subjected to torque that varies according to the machinery and the duty conditions.
For some types of implements (e.g. soil preparation machinery), the torque alternates with respect to a median value. For other implements, (e.g. irrigation pumps) the torque is nearly constant.

Some machines are equipped with heavy components (i.e. flywheels or rotors) that will produce peak torques while starting and stopping the inertial load.
The diagram of the torque vs. time will vary according to the material being worked and to the speed of the implement through the field or the velocity of the material through the machine.
Consequently, it is necessary to determine the size of driveline required by examination of the particular duty cycle involved. The driveline size is determined by the median torque levels and the life required, in combination with the parameters of rotational speed, joint angle, and lubrication.



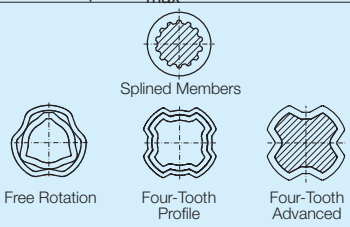
Size, torque, and power

Maximum torque M_{max}

The driveline strength must be sufficient to transmit the desired torque under all foreseeable working conditions.

Therefore the driveline must be sized so the maximum torque required by the application will always be lower than the maximum torque of the driveline M_{max}, even in case of accidental torque peaks.

Maximum Torque M_{max}



	Free Rotation		Four-Tooth Profile		Four-Tooth Advanced	
	Nm	in.lb.	Nm	in.lb.	Nm	in.lb.
S1	- -	- -	850	7520	- -	- -
S2	1040	9200	1500	13280	- -	- -
S4	2000	17700	2200	19470	- -	- -
S5	- -	- -	2500	22130	- -	- -
S6	2900	25670	3000	26550	- -	- -
H7	- -	- -	4000	35400	- -	- -
S8	- -	- -	4000	35400	- -	- -
H8	- -	- -	5000	44250	- -	- -
S9	- -	- -	5000	44250	- -	- -
SH	- -	- -	6750	59740	- -	- -
S0	- -	- -	6750	59740	- -	- -
SK	- -	- -	- -	- -	11000	97360

Agricultural implements are often subject to overloads and torque peaks that are difficult to quantify. Torque limiters are available to help prevent possible failure of the driveline or other components. The setting of the torque limiter may also be used as a reference in proper sizing of the driveline.

A suitable type of torque limiter must be selected according to the duty cycle; the setting must be selected according to the median torque transmitted M and the peak torque (M_{max} for the driveline). Briefly, the following conditions apply for the different types of torque limiters.

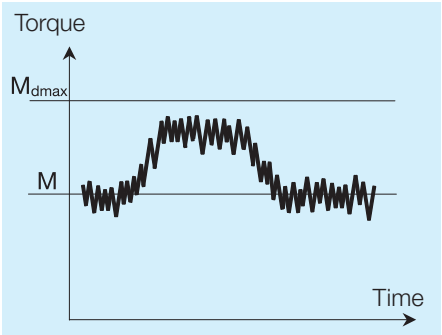
Ratchet torque limiters, shear bolt torque limiters and automatic torque limiters are used on implements whose duty cycle is constant or alternating with possible overloads or torque peaks. The setting of these torque limiters is generally 2 to 3 times the median torque M.

Friction torque limiters are used on implements whose duty cycle is alternating with frequent overloads. A friction torque limiter allows these frequent overloads to be surmounted without stopping the driveline. The setting of friction torque limiters is normally about twice the median torque M.

Combination friction clutch torque limiters with incorporated overrunning clutches are used on implements with high inertial loads (e.g. rotors or flywheels). These types of implements are subject to torque peaks during start up. Overloads during operation can be overcome without interrupting the transmission. The setting of friction clutch torque limiters is normally about twice the median torque M.

When choosing a setting for a torque limiter, it is recommended to consider proper coefficients of safety in regards to the strength of all components in the power transmission system.

Maximum dynamic torque M_{dmax}
Cardan joints must operate for the desired lifetime under normal working conditions. For this to occur, the transmitted torque must be lower than the maximum dynamic torque M_{dmax}.



The maximum dynamic torque M_{dmax} is defined as the maximum working torque for the joint, and it is considered as the upper limit when determining the lifetime of a cardan joint. Each torque value considered in a load cycle and used to calculate working life must be less than the maximum dynamic torque M_{dmax} for the given size.

Maximum dynamic torque M_{dmax}

	Nm	in.lb.
S1	482	4266
S2	685	6062
S4	939	8310
S5	1334	11806
S6	1334	11806
H7	1603	14187
S8	2083	18435
H8	2083	18435
S9	2447	21656
SH	2928	25913
S0	3729	33002
SK	5424	48002

Lifetime of single cardan joints
The lifetime **Lh** of a single cardan joint can be calculated. The accuracy of such calculations depends upon how well the working conditions are defined.
Since drivelines for agricultural use are normally subject to loads that vary according to the crop conditions or the particular function being performed, it is necessary to examine a specific duty cycle where each working condition or function is associated with a portion of the desired lifetime. The parameters necessary to determine the lifetime are:

- **M** transmitted torque (Nm) or **P** power transmitted (kW)
- Velocity of rotation **n**
- Joint angle **α**
- Lubrication frequency

Torque and power are related by the following formulas:

$$P\ [kW] \bullet 9553 = M\ [Nm] \bullet n\ [min^{-1}]$$

Power can be expressed in (HP) by the formula:

$$P\ [kW] \bullet 1{,}36 = P\ (CV)$$

The torque is expressed in (kgm) or (in-lb) by the formula:

$$M\ [Nm] \bullet 0{,}102 = M\ (kgm)$$

$$M\ [Nm] \bullet 8{,}85 = M\ (in.lb.)$$

Size, torque, and power

The lifetime of the needle bearings in the cross kit is inversely proportion to the transmitted torque:

$$L_h = \left(\frac{M_{d\,cal}}{M}\right)^3 \cdot \frac{K_n \; K_\alpha}{K_L}$$

L_h.....: life [hours
Mdcal ...: rated dynamic torque [Nm]
M.....: transmitted torque Nm
K_n .....: coefficient of velocity
K_α .....: coefficient of angle
K_L .....: coefficient of lubrication

Coefficient of velocity K_n

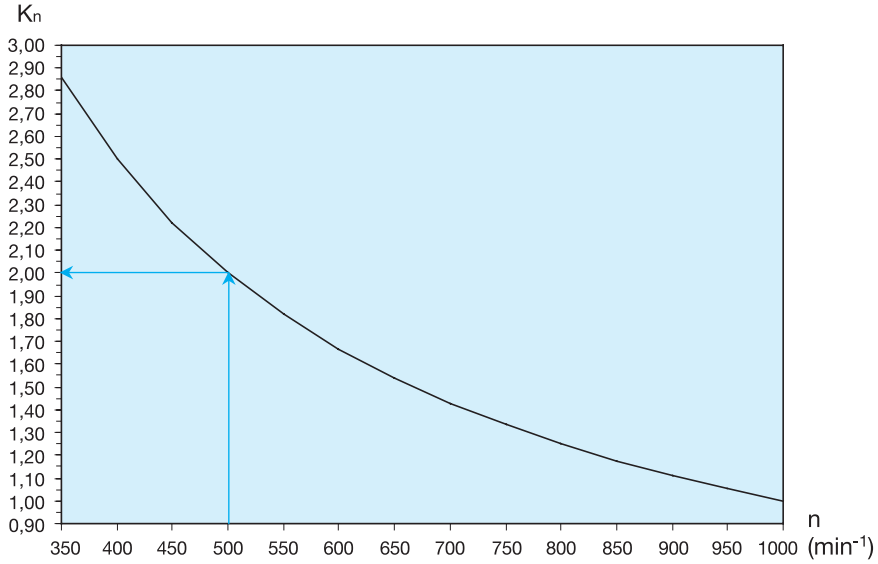
The speed affects the lifetime of the bearings according to an inverse ratio. When determining the lifetime, this effect is considered by the coefficient of velocity K_n.

Coefficient of velocity K_n

N (min^{-1})	K_n
300	3,33
400	2,50
500	2,00
540	1,85
600	1,67
700	1,43
800	1,25
900	1,11
1000	1,00

Example: K_n = 2 is the coefficient associated to a rotational speed of 500 min^{-1}.

Representative values for K_n may be read from the diagram below or the chart above.



Coefficient of angle K_α

The lifetime of a cardan joint diminishes appreciably with larger joint angles.

The needle bearings oscillate four times per revolution on the cross trunnion with a radius equal to the joint angle. The wear of the bearings is influenced by the load transmitted and by their oscillation, thus by the joint angle.

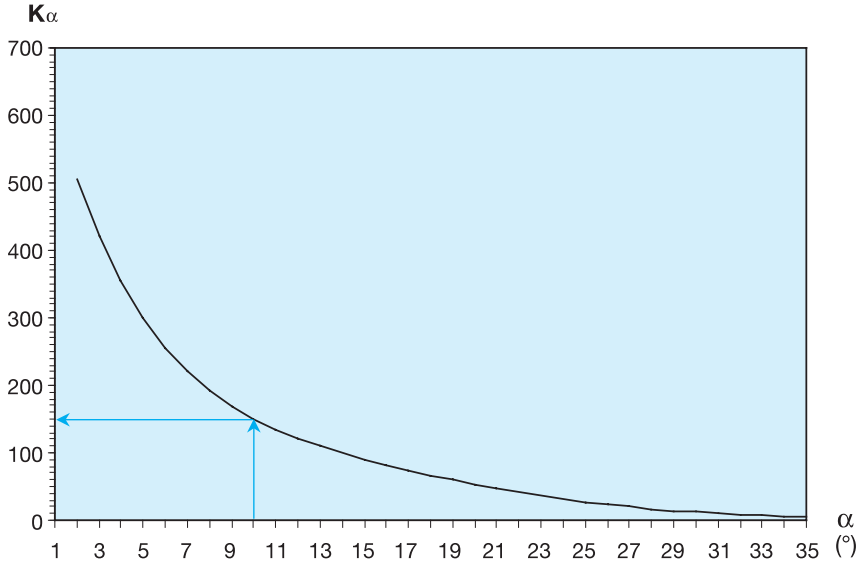
The joint can operate at high angularity (e.g. during turning) for brief periods. Regardless, proper application should not require a joint angle above 25° under normal working conditions.

The influence of the joint angle on the lifetime of a cardan joint is accounted for by the coefficient of angle K_α.

Coefficient of angle K_α

α (°)	K_α
3°	422
5°	300
7°	221
10°	150
12°	121
15°	90
17°	74
20°	53
22°	41
25°	27

The coefficient K_α, and consequently cardan joint lifetime, diminishes with larger joint angles. For example: K_α=150 is the coefficient associated with a 10° joint angle. Representative values for K_α may be read from the diagram below or the chart above.



Coefficient of lubrication K_L

Insufficient lubrication is one of the leading and most frequent causes of the failure in cardan joints. Consequently the frequency of re-lubrication and type of grease used are highly important to the lifetime of a cardan joint.

NLGI 2 grease is recommended for the lubrication of SFT cross kits.

Grease is comparable to a “sponge.”
It retains lubricating oils and gradually releases them. Its efficiency diminishes with longer periods of working and with increasing loads applied. Lubrication frequency is fundamental to the lifetime of a cardan joint.

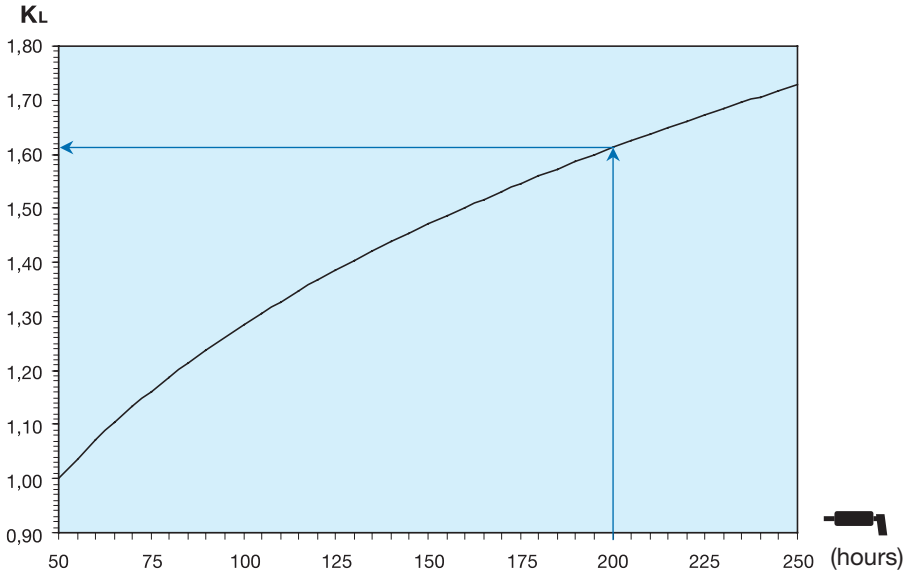
The lubrication frequency is considered by the coefficient of lubrication K_L.

The standard lubrication frequency for SFT cardan and CV joints is every 50 hours. Heavy duty applications in aggressive environments may require more frequent lubrication.

Coefficient of lubrication K_L

Lubrication Frequency (hours)	K_L
50	1.00
100	1.28
150	1.47
200	1.61
250	1.73

Example: K_L = 1,61 is the coefficient associated with a 200 hour lubrication frequency. Representative values for K_L may be read from the diagram below or the chart above.



Dynamic torque rating Mdcal

The dynamic torque capacity of a single cardan joint (used to determine joint lifetime) is expressed by the dynamic torque rating M_{dcal}.

Dynamic torque rating Mdcal

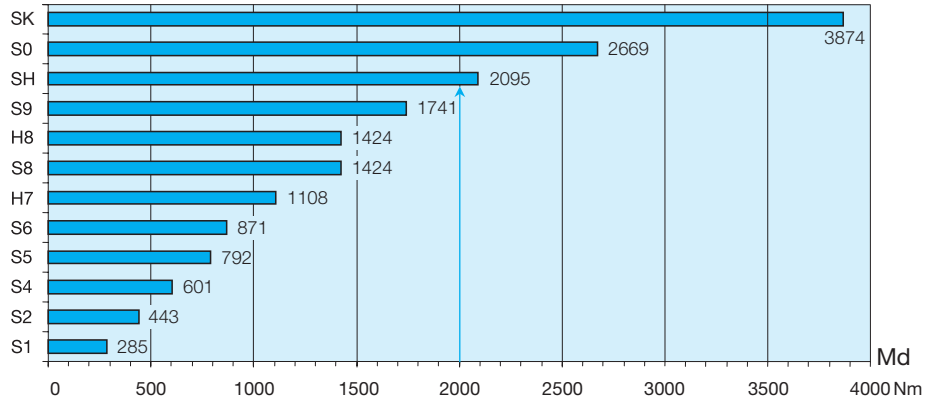
	Nm	in.lb.
S1	285	2522
S2	443	3921
S4	601	5319
S5	792	7009
S6	871	7709
H7	1108	9806
S8	1424	12602
H8	1424	12602
S9	1741	15408
SH	2095	18543
S0	2669	23623
SK	3874	34285

Given the size of the joint and operating parameters, its lifetime can be calculated by the formula on page 5.4.
This same formula can express the dynamic torque M_d that satisfies the desired lifetime under the conditions indicated.

$$M_d = M \cdot \sqrt[3]{\frac{K_L \cdot L_h}{K_n \cdot K_\alpha}}$$

Positioning the calculated value for the dynamic torque M_d on the horizontal axis of the following diagram, it is possible to select the size of cardan joint necessary to satisfy the parameters for the application.

For example, M_d = 2000 Nm, the joint that meets the requirements would be size SH.



Duty cycles

Drivelines for agricultural use are subject to torque that varies with different working conditions. Therefore, the lifetime can be calculated with more accuracy by examination of a duty cycle that represents the various operating conditions.

For a given duty cycle, joint lifetime is divided into percentages of use for each condition. Specific working conditions (torque, rotational velocity, lubrication frequency, and joint angle) are set for each segment of the duty cycle.
Together, these percentages form the total life.

The total lifetime of can be calculated as follows:

$$L_{tot} \quad \frac{1}{\sum_{i=1}^{m} \frac{X_i}{L_i}}$$

where:

- X_i = percentage of total lifetime corresponding to segment i of duty cycle
- L_i = lifetime defined according to the working conditions of segment i of duty cycle.
- **m** = total number of segments.

Example: Determine the lifetime of a size S6 driveline with the duty cycle shown in the table below, with a 100 hour lubrication frequency.

	Torque	Velocity	Angle	%
i	Nm	min^{-1}	(°)	
1	400	540	15	10
2	500	540	10	70
3	650	540	10	15
4	800	540	10	5

K_n = 1,85 is the coefficient of velocity associated with 540 min^{-1}.
K_α = 150 150 is the coefficient of angle for a 10° joint angle, and K = 90 for a 15° joint angle.
K_L = 1,28 1.28 is the coefficient of lubrication for a 100 hour lubrication frequency.
The lifetime for each segment can be calculated with the formula on page 5.4

$$L_1 = \left(\frac{871}{400}\right)^3 \cdot \frac{1.85 \cdot 90}{1.28} = 1343$$

$$L_2 = \left(\frac{871}{500}\right)^3 \cdot \frac{1.85 \cdot 150}{1.28} = 1146$$

$$L_3 = \left(\frac{871}{650}\right)^3 \cdot \frac{1.85 \cdot 150}{1.28} = 521$$

$$L_4 = \left(\frac{871}{800}\right)^3 \cdot \frac{1.85 \cdot 150}{1.28} = 228$$

Lifetime is:

$$L_{tot} = \frac{1}{\frac{0.10}{1343} + \frac{0.70}{1146} + \frac{0.15}{521} + \frac{0.05}{280}} = 868 \text{ hours}$$

Nominal power and torque

The nominal torque M_n of a driveline can be defined as the torque associated with a 1000 hour lifetime of a joint operating with joint angle $\alpha = 5°$, rotational velocity n = 540 min^{-1} (or 1000 min^{-1}), and a 50 hour lubrication frequency.

The nominal power P_n is the power corresponding to the nominal torque M_n.

	540 min^{-1}			
	Pn		Mn	
50 hours	kW	CV	Nm	in.lb
S1	13	18	234	2073
S2	21	28	364	3224
S4	28	38	494	4376
S5	37	50	651	5758
S6	40	55	716	6334
H7	51	70	911	8061
S8	66	90	1171	10364
H8	66	90	1171	10364
S9	81	110	1431	12668
SH	97	132	1717	15201
S0	124	169	2199	19462
SK	181	246	3200	28323

	1000 min^{-1}			
	Pn		Mn	
50 hours	kW	CV	Nm	in.lb
S1	20	27	190	1679
S2	31	42	295	2612
S4	42	57	400	3545
S5	55	75	527	4664
S6	61	83	583	5161
H7	78	106	745	6592
S8	100	136	956	8457
H8	100	136	956	8457
S9	122	166	1166	10323
SH	147	200	1405	12437
S0	187	254	1785	15795
SK	272	370	2600	23013

Categories ASAE

In the U.S., drivelines are often bracketed into one of the categories defined by ANSI/ASAE S331.5. This standard classifies drivelines on the basis of dynamic and static strength.

The standard also recognizes two duty levels: Regular Duty and Heavy Duty. These duty levels pertain to the static strength of the telescoping members.

SFT drivelines can be classified in compliance with ANSI/ASAE S331.5 according to the chart below, for each size:

ASAE classes		
	Regular Duty	Heavy Duty
S1	1	1
S2	2	1
S4	4	3
S5	4	3
S6	5	4
H7	6	4
S8	6	5
H8	6	5
S9	7	5
SH	8	7
S0	8	7
SK	8	8

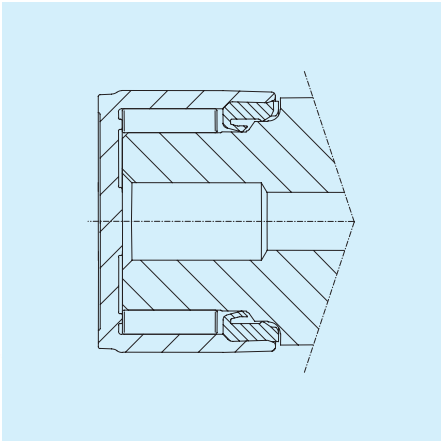
Agricultural machines are often employed in harsh working environments – dust and dampness can shorten a driveline's life span. Sealing elements of the cross kits are very important: they retain lubricants, protect the needles and lubricants from contamination by foreign substances, and allow excess grease to purge without damage.

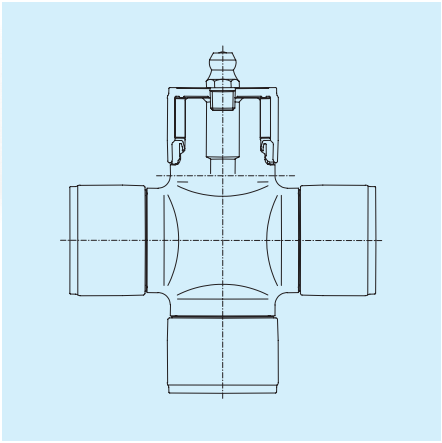
The needle bearings in SFT cross kits are equipped with double-lip seals designed to prevent contamination of the lubricant in the severe working conditions typical of farming applications.

Trials carried out on specially designed test fixtures provided data for optimizing the shape, materials, and the required heat treatment for all components – needles, caps, seals, and crosses.

Proper design and manufacturing allow SFT universal joints to be lubricated at extended intervals of 50 working hours, for most applications.

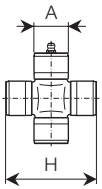
Lubrication can be done on a weekly basis instead of every day, reducing one of the most burdensome maintenance requirements. Under certain working conditions, drivelines may be lubricated only once for an entire season.





Cross kits

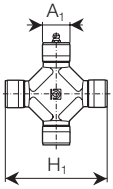
Cross kits for single cardan joints



The codes below refer to the cross kit as a spare part – complete with the four snap rings required for assembly. They are supplied in single-item or multiple-item packs. The pack quantity is indicate by the numbers following the “R” in the code.

	A mm	H mm	Cross kit code	Multiple-item pack code
S1	22.0	54.0	4120B0012	4120B0012R50
S2	23.8	61.3	4120C0012	4120C0012R30
S4	27.0	74.6	4120E0012	4120E0012R25
S5	30.2	79.4	4120G0012	4120G0012R40
S6	30.2	79.4	4120G0012	4120G0012R40
H7	30.2	91.5	4120H0012	4120H0012R30
S8	34.9	93.5	4120L0012	4120L0012R24
H8	34.9	93.5	4120L0012	4120L0012R24
S9	34.9	106.0	4120M0012	4120M0012R20
SH	42.0	107.5	4120N0012	4120N0012R10
S0	42.0	130.0	4120S0012	4120S0012R10
SK	50.0	140.0	4120K0001	- -

Cross kits for constant velocity joints



	A_1 mm	H_1 mm	Cross kit code	Multiple-item pack code	
S2	22.0	76.0	4120C0051	4120C0051R25	
S4	22.0	86.0	4120E0051	4120E0051R40	
S6	27.0	100.0	4120G0051	4120G0051R24	
H7	27.0	100.0	4120G0051	4120G0051R24	
S8	30.2	106.0	4120L0051	4120L0051R20	
H8	30.2	106.0	4120L0051	4120L0051R20	
S9	30.2	122.0	4120M0052	4120M0052R10	Cross for 80° CV Joint
	34.9	112.0	4120N0051	4120N0051R10	Cross for 50° CV Joint
SH	34.9	112.0	4120N0051	4120N0051R10	

The telescoping profile tubes used in SFT drivelines ca be provided with different shapes and surface treatments to meet specific application requirements. Among the chief characteristics of a shaft is its torsional strength, i.e. its resistance to twisting forces. The torsional strength should be large enough to withstand the torque transmitted under all predictable operating conditions. A driveline's torsional strength is expressed by the maximum torque Mmax determined by the properties of the telescoping profile tubes. The size of driveline must be chosen so the maximum torque exerted during all predicted operations is less than the telescoping member's torsional strength Mmax. The following tables give the torsional strength Mmax of each size of telescoping profile member. Machines used in agriculture are often subjected to loads and torque peaks that are not easy to quantify. Torque limiters are useful in many applications. Torque limiters help prevent damage, as well as provide a benchmark for choosing the proper size of driveline. The setting of the torque limiter Mt must be less than the maximum torque Mmax, and is determined by the type of torque limiter and the requirements of the application. Another important property of telescoping members is their capacity to slide under load while producing low telescopic thrust forces. Thrust forces create axial and bending loads that are transmitted to the universal joints, the Power Take Off (PTO) and the Power Input Connection (PIC) shafts and their bearings, reducing their life.

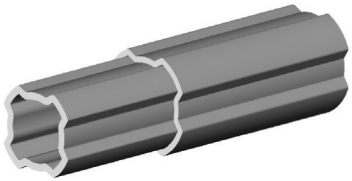
The capacity to slide under load while producing low thrust force is expressed by the ratio thrust (T) over torque (M); an important factor to consider when choosing telescoping members. The following indicative values of the T/M ratio refer to adequately lubricated telescoping members. The smaller the T/M ratio, the lower the thrust forces acting on the joints, shafts, and bearings

T / M (thrust/torque) ratio	N/Nm
Four-tooth profile tubes	
Regular	5 - 6
Rilsan®-coated inner tube	2 - 3
Heat-treated inner tube	9 -10
Advanced four-tooth profile	
heat-treated (SK)	9 -10
Free Rotation profile tubes	
Regular	6 - 8
Rilsan®-coated inner tube	3 - 4
Splined telescopic members	7 - 9

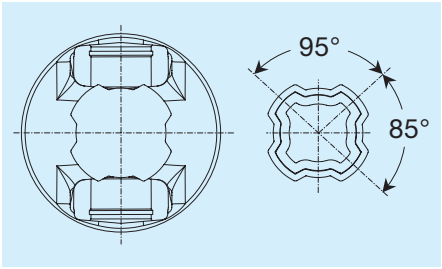
Another important consideration is the telescoping capability of the drive tubes. Drivelines must vary their length to accommodate relative movement between the connected shafts, but their telescoping members have to maintain sufficient overlap under load to avoid excessive wear. This is extremely important in shorter drivelines. The SFT range provides a maximum extension feature or splined profile members for applications that require longer extensions.
Lubrication of telescoping members is an extremely important factor to reduce thrust forces and help prevent wear. The Greasing System for SFT profile tubes or Direct Greasing for splined tubes telescoping members and advanced four-tooth profiles (SK) makes proper lubrication easier - see chapter 30 - *Lubrication* for more details.

Telescoping members

Four-tooth profile tubes
Four-Tooth profile tubes are designed to provide maximum resistance and optimal telescoping within the space available between the yoke ears.



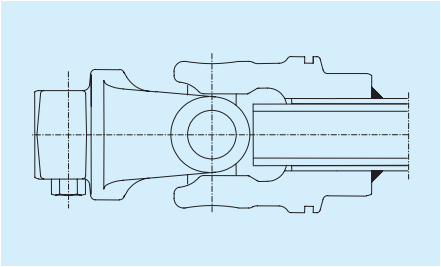
The profile will only couple so the joints are properly in phase with respect to each other. For more information see chapter 2 - *SFT Drivelines and Accessories.*



Rilsan®-coated four-tooth profile tubes
The Rilsan® coating on the inner tube helps reduce telescopic thrust. These tubes are recommended for shafts that have to slide for long lengths under loads, e.g. primary drivelines of towed implements when going around turns.
Rilsan® coated Four-Tooth profile tubes are standard on drivelines fitted with 80° constant velocity(CV) joints. The thickness of the Rilsan® coating is compensated for by a thinner outer tube. The outer dimensions of the tubes are the same, so they will fit into standard tube yokes.

Heat-treated four-tooth profile tubes
Applying heat treatment to the inner profile tube increases the surface hardness. Heat treated tubes are usually chosen for short drivelines that work in aggressive environments (abrasive particles) and are subject to frequent short sliding, e.g. the primary driveline of three-point mounted implements.
Heat treatment does not effect the thickness of the tube. The outer tube is not heat treated (regular four-tooth profile tube).

Maximum extension four-tooth profile tubes
Telescoping tubes are normally pressed into the tube yokes and fastened by a roll pin. “Maximum Extension” means that the outer tube is welded to the yoke, eliminating the roll pin.
This allows the inner tube to extend into the yoke, allowing more telescoping length than regular tubes. The maximum extension feature can be provided for regular, Rilsan® coated, or heat treated four-tooth profile tubes.



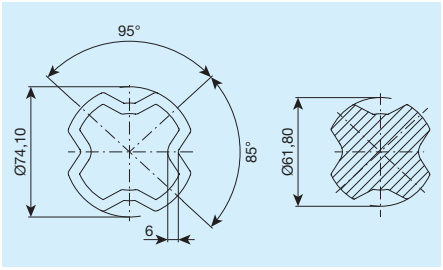
Advanced Four Tooth Profile Heat-Treated

The high performance SFT SK requires suitable telescoping members. Advanced Four-Tooth Profile has maximum torque resistance and expanded contact surfaces for long life of the telescoping members.

SK telescoping members are made of a thick outer profile tube and a solid inner bar to transmit torque up to 11,000 Nm.

The profile teeth are placed at 95° and 85°, so the tubes can be coupled only in two orientations, corresponding to correct phasing of the universal joints.

SK telescoping members are heat-treated to reduce the risk of seizure during sliding movements.

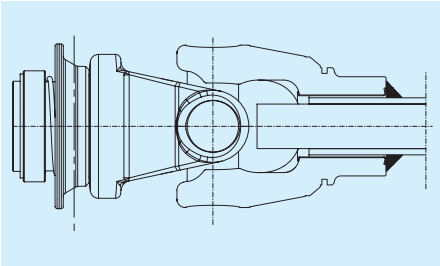


Maximum Extension Advanced Four-Tooth profile (SK)

Profile tubes are normally pressed into tube yokes and secured with a roll pin.

"Maximum extension" involves welding the outer tube to the yoke to eliminate the roll pin. The inner tube can then protrude into the yoke and this longer length allows greater extension than that of the normal tube.

Maximum extension is produced on request and therefore carries a surcharge on the price of the driveshaft.



Telescoping members

Free Rotation profile tubes

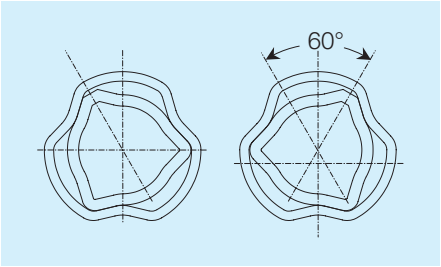
Free Rotation tubes allow the ends of the driveline to rotate with respect to each other up to 60°, thereby facilitating the alignment of the splined yokes to the PTO. The outer tube has a small depression formed in one of the lobes so that the inner tube can be inserted only with the universal joint properly “in phase” for proper power transmission.

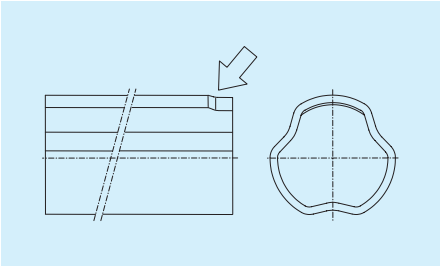
Free Rotation tubes must be specified according to the direction in which power is applied to assure proper joint phasing. In the standard version, Free Rotation tubes are to be used with primary drivelines that connect the tractor’s rear PTO (clockwise rotation when facing the PTO) to the implement PIC (counter-clockwise rotation when facing the PTO), as shown in the figure below. On request, Free Rotation tubes can be supplied for rotation in the opposite direction.

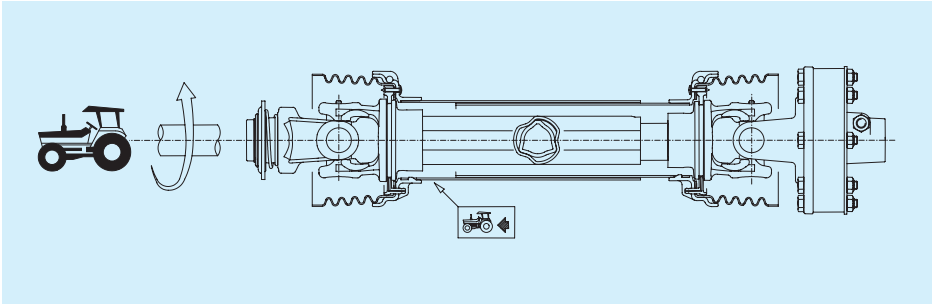
Rilsan® coated Free Rotation tubes

To reduce telescopic thrust, Free Rotation tubes can also be provided in a Rilsan® coated version.

In either version, Free Rotation tubes may be fitted with the optional Greasing System, to permit rapid lubrication of the telescoping members while the driveline is installed on the tractor and implement.







Splined telescoping members

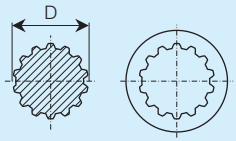
Splined telescoping members can satisfy the requirements of applications with high torques, frequent sliding under load and extensions longer than those permitted by regular telescoping tubes or maximum extension tubes. See chapter 8 - *Driveline Lengths.*

SFT profile tubes have a CUNA involute profile. The splined sleeve is 300 mm in length.

Thrust forces generated by the transmitted torque is divided among the spline teeth, which are engaged over a relatively long length. This creates lower contact pressure and reduces wear of sliding surfaces resulting in extended life.

The long splined sleeve on SFT splined telescoping members represents an important innovation. A SFT driveline with splined telescoping members can be adjusted in length according to the tractor and implement requirements.

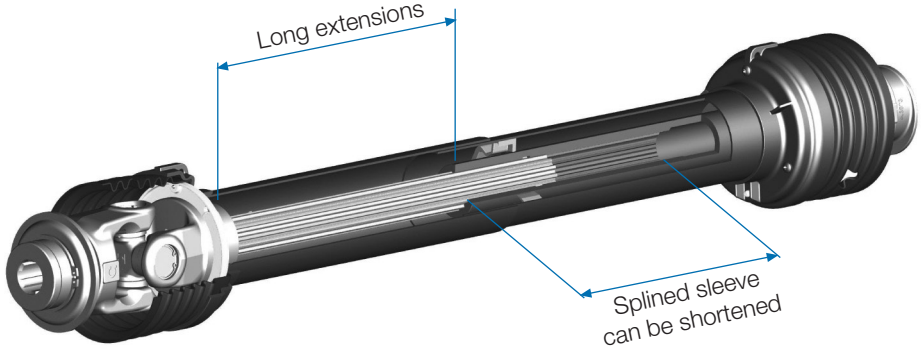
Splined Members CUNA involute profile



	D mm	N° of teeth z
S1	- -	- -
S2	- -	- -
S4	- -	- -
S5	- -	- -
S6	40	14
H7	40	14
S8	40	14
H8	- -	- -
S9	45	16
SH	45	16
S0	45	16
SK	- -	- -

Never to shorten SFT splined telescoping members by more than 50 mm, and ensure proper overlap for all conditions.

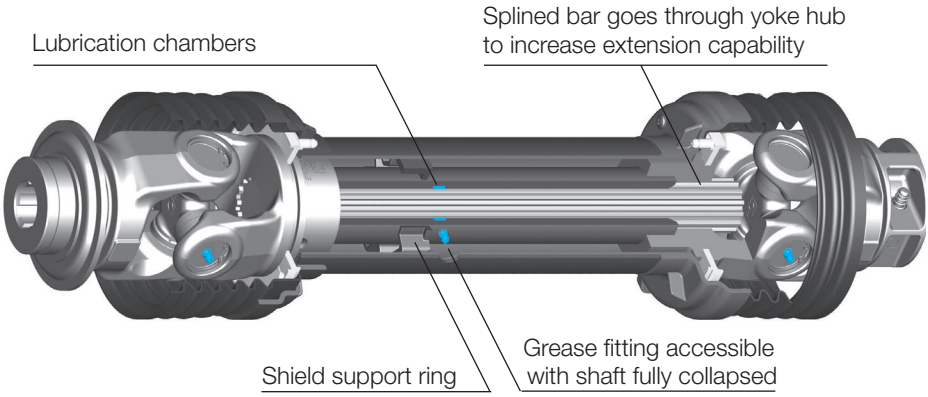
Shafts with splined telescoping members can be equipped with Single Chain System (see chapter 10 - *Safety Shields*) for lengths of 610 mm or longer.



Telescoping members

Shorter drivelines (up to L = 610 mm) are equipped with a splined sleeve welded to the inner yoke. The hub of the yoke has a hole to permit the splined bar to pass through when the driveline is fully collapsed. This permits longer driveline extensions while maintaining proper overlap of the splines.

SFT splined profile tubes are equipped with a Direct Greasing System. Lubrication is carried out through a fitting, easily accessible with the shaft fully collapsed and without requiring disassembly.



Ordering instructions

SFT telescoping members are designated by the fourth position in the shaft code. Types of telescoping members and their corresponding code (letter) are listed below. Shafts with 80° CV joints are equipped with Rilsan® coated telescoping tubes.

For shafts with telescoping tubes, add letter G to shaft code to have your shaft equipped with Greasing System.
See chapter 4 - *Codes and Dimensions.*

Telescoping member	Regular	Rilsan®	Heat treated Inner tube
Four tooth tubes	N	R	T
Four tooth tubes, maximum extension	L	V	U
Four tooth Advanced	-	-	P
Maximum extension advanced four-tooth (SK)	-	-	Q
Free Rotation tubes	F	G	-
Splined bar telescoping members	S	-	-

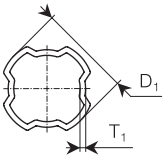
Four-tooth profile tubes

The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter **N** specifies regular Four-Tooth profile tubes.

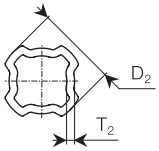
Tubes for spare parts are supplied either in 3-meter sections, 1-meter sections, or 1-meter length and drilled for the roll pin.

Add "3000" or "1000" to the code of the selected profile to order 3-meter tubes or 1-meter tubes respectively.

Drilled tube codes are shown on the table.



Outer tube



Inner tube

	D_1 mm	T_1 mm	Profile Code	Drilled Tube Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	35.2	2.00	12232	2253B1000R	30.8	3.00	12216	2254A1000R	850
S2	45.6	2.75	12205	2253E1000R	39.6	3.00	12219	2254L1000R	1500
S4	50.2	2.75	12242	2253H1000R	44.2	3.50	12241	2253G1000R	2200
S5	50.2	2.75	12242	2254C1000R	44.2	4.20	12252	2254B1000R	2500
S6	53.9	3.25	12245	2253P1000R	46.9	4.50	12244	2253N1000R	3000
H7	58.2	3.25	12209	2253S1000R	51.2	5.00	12251	2254D1000R	4000
S8	58.2	3.25	12209	2253S1000R	51.2	5.00	12251	2254D1000R	4000
H8	66.0	3.50	12211	2253Z1000R	58.5	4.50	12238	2253V1000R	5000
S9	66.0	3.50	12211	2253Z1000R	58.5	4.50	12238	2253V1000R	5000
SH	70.2	4.00	12213	2253K1000R	61.7	5.75	12255	2254E1000R	6750
S0	70.2	4.00	12213	2253K1000R	61.7	5.75	12255	2254E1000R	6750
SK	--	--	--	--	--	--	--	--	--

Telescoping members

Maximum extension four-tooth profile tubes

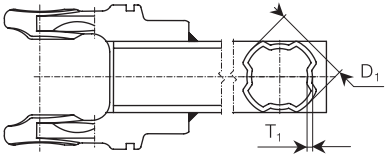
The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter L specifies maximum extension four-tooth profile tubes.

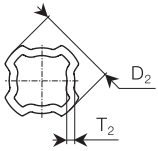
Yoke and welded outer tube assemblies for spare parts are shown on the table.

Tubes for spare parts are supplied either in 3-meter sections, 1-meter sections or 1-meter lengths drilled for roll pin.

Add “3000” or “1000” to the selected profile code to order 3-meter tubes or 1-meter tubes, respectively.

Drilled tube codes are shown on the table.





Outer tube + yoke

Inner tube

	D_1 mm	T_1 mm	Profile Code	Welded Tube + Yoke Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	35.2	2.00	12232	50CS11000R	30.8	3.00	12216	2254A1000R	850
S2	45.6	2.75	12205	50CS21000R	39.6	3.00	12219	2254L1000R	1500
S4	50.2	2.75	12242	50CS41000R	44.2	3.50	12241	2253G1000R	2200
S5	50.2	2.75	12242	50CS51000R	44.2	4.20	12252	2254B1000R	2500
S6	53.9	3.25	12245	50CS61000R	46.9	4.50	12244	2253N1000R	3000
H7	58.2	3.25	12209	50CH71000R	51.2	5.00	12251	2254D1000R	4000
S8	58.2	3.25	12209	50CS81000R	51.2	5.00	12251	2254D1000R	4000
H8	66.0	3.50	12211	50CH81000R	58.5	4.50	12238	2253V1000R	5000
S9	66.0	3.50	12211	50CS91000R	58.5	4.50	12238	2253V1000R	5000
SH	70.2	4.00	12213	50CSH1000R	61.7	5.75	12255	2254E1000R	6750
S0	70.2	4.00	12213	50CS01000R	61.7	5.75	12255	2254E1000R	6750
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

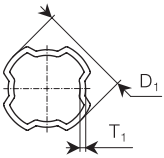
Rilsan®-coated four-tooth profile tubes

The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter R specifies Rilsan®-coated Four-Tooth profile tubes.

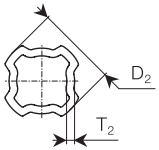
Outer Rilsan® tubes for spare parts are supplied either in 3-meter sections, 1-meter sections or 1-meter lengths drilled for roll pin. Add “3000” or “1000” to the selected profile code to order 3-meter section or 1-meter section tubes respectively.

Outer drilled tube codes are shown on the table.

For the inner Rilsan® coated tubes, add “1500” or “1000” to the code of drilled for roll pin tube to have a 1,5-meter lengths or 1-meter lengths respectively.



Outer tube



Rilsan® coated inner tube

	D_1 mm	T_1 mm	Profile Code	Drilled Tube Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	45.6	2.50	12222	2253F1000R	40.1	3.25	- -	2454L....R	1500
S4	50.2	2.50	12243	2253L1000R	44.7	3.75	- -	2453G....R	2200
S5	50.2	2.50	12243	2254F1000R	44.7	4.45	- -	2454B....R	2500
S6	53.9	3.00	12246	2253Q1000R	47.4	4.75	- -	2453N....R	3000
H7	58.2	3.00	12225	2253T1000R	51.7	5.25	- -	2454D....R	4000
S8	58.2	3.00	12225	2253T1000R	51.7	5.25	- -	2454D....R	4000
H8	66.0	3.25	12227	2253X1000R	59.0	4.75	- -	2453V....R	5000
S9	66.0	3.25	12227	2253X1000R	59.0	4.75	- -	2453V....R	5000
SH	70.2	3.75	12228	2253W1000R	62.2	6.00	- -	2454E....R	6750
S0	70.2	3.75	12228	2253W1000R	62.2	6.00	- -	2454E....R	6750
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

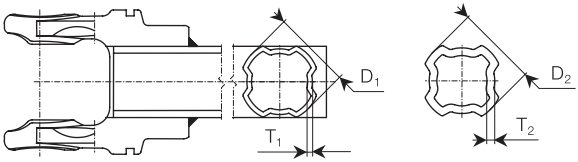
Telescoping members

Maximum extension Rilsan®-coated four-tooth profile tubes

The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter V specifies maximum extension Rilsan®-coated four-tooth profile tubes.

Yoke and welded maximum extension outer tube assemblies for spare parts are shown on the table.

For the inner Rilsan® coated tubes, add "1500" or "1000" to the code of drilled for roll pin tube to have a 1,5-meter lengths or 1-meter lengths respectively.



Outer tube + yoke — Rilsan® coated inner tube

	D_1 mm	T_1 mm	Profile Code	Welded Tube + Yoke Code	D_2 mm	T_2 mm	Profile Code	Cut/Drilled Tube Code	Mmax Nm
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	45.6	2.50	12222	50DS21000R	40.1	3.25	- -	2454L....R	1500
S4	50.2	2.50	12243	50DS41000R	44.7	3.75	- -	2453G....R	2200
S5	50.2	2.50	12243	50DS51000R	44.7	4.45	- -	2454B....R	2500
S6	53.9	3.00	12246	50DS61000R	47.4	4.75	- -	2453N....R	3000
H7	58.2	3.00	12225	50DH71000R	51.7	5.25	- -	2454D....R	4000
S8	58.2	3.00	12225	50DS81000R	51.7	5.25	- -	2454D....R	4000
H8	66.0	3.25	12227	50DH81000R	59.0	4.75	- -	2453V....R	5000
S9	66.0	3.25	12227	50DS91000R	59.0	4.75	- -	2453V....R	5000
SH	70.2	3.75	12228	50DSH1000R	62.2	6.00	- -	2454E....R	6750
S0	70.2	3.75	12228	50DS01000R	62.2	6.00	- -	2454E....R	6750
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

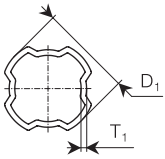
Four-tooth profile tubes with heat-treated inner tube

The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter T specifies Four-Tooth profile tubes with Heat-Treated inner tube.

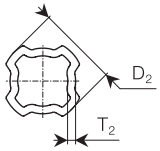
Outer tubes are supplied either in 3-meter sections, 1-meter sections or 1-meter lengths drilled for the roll pin. Add “3000” or “1000” to the code of the selected profile to order 3-meter tubes or 1-meter tubes respectively.

Drilled tube codes are shown on the table.

Heat-treated inner tubes are supplied 1-meter lengths and drilled to accept the roll pin. Heat-treated drilled tube codes are shown on the table.



Outer tube



Inner tube

	D_1 mm	T_1 mm	Profile Code	Drilled Tube Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	35.2	2.00	12232	2253B1000R	30.8	3.00	- -	2704A1000R	850
S2	45.6	2.75	12205	2253E1000R	39.6	3.00	- -	2704L1000R	1500
S4	50.2	2.75	12242	2253H1000R	44.2	3.50	- -	2703G1000R	2200
S5	50.2	2.75	12242	2254C1000R	44.2	4.20	- -	2704B1000R	2500
S6	53.9	3.25	12245	2253P1000R	46.9	4.50	- -	2703N1000R	3000
H7	58.2	3.25	12209	2253S1000R	51.2	5.00	- -	2704D1000R	4000
S8	58.2	3.25	12209	2253S1000R	51.2	5.00	- -	2704D1000R	4000
H8	66.0	3.50	12211	2253Z1000R	58.5	4.50	- -	2703V1000R	5000
S9	66.0	3.50	12211	2253Z1000R	58.5	4.50	- -	2703V1000R	5000
SH	70.2	4.00	12213	2253K1000R	61.7	5.75	- -	2704E1000R	6750
S0	70.2	4.00	12213	2253K1000R	61.7	5.75	- -	2704E1000R	6750
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

Telescoping members

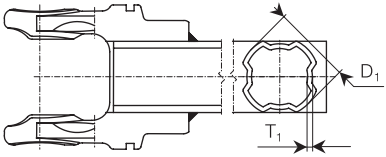
Maximum extension four-tooth profile tubes with heat-treated inner tube

The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter U specifies maximum extension Four-Tooth profile tubes with heat treated inner tube.

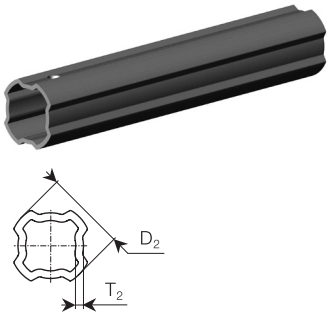
Yoke and welded maximum extension outer tube assemblies for spare parts are shown on the table.

Heat-treated inner tubes are supplied 1-meter lengths and drilled to accept the roll pin.

Heat-treated inner drilled tube codes are shown on the table.



Outer tube + yoke



Heat-treated inner tube

	D_1 mm	T_1 mm	Profile Code	Welded Tube + Yoke Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	35.2	2.00	12232	50CS11000R	30.8	3.00	- -	2704A1000R	850
S2	45.6	2.75	12205	50CS21000R	39.6	3.00	- -	2704L1000R	1500
S4	50.2	2.75	12242	50CS41000R	44.2	3.50	- -	2703G1000R	2200
S5	50.2	2.75	12242	50CS51000R	44.2	4.20	- -	2704B1000R	2500
S6	53.9	3.25	12245	50CS61000R	46.9	4.50	- -	2703N1000R	3000
H7	58.2	3.25	12209	50CH71000R	51.2	5.00	- -	2704D1000R	4000
S8	58.2	3.25	12209	50CS81000R	51.2	5.00	- -	2704D1000R	4000
H8	66.0	3.50	12211	50CH81000R	58.5	4.50	- -	2703V1000R	5000
S9	66.0	3.50	12211	50CS91000R	58.5	4.50	- -	2703V1000R	5000
SH	70.2	4.00	12213	50CSH1000R	61.7	5.75	- -	2704E1000R	6750
S0	70.2	4.00	12213	50CS01000R	61.7	5.75	- -	2704E1000R	6750
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

Free Rotation profile tubes

The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter **F** specifies Free Rotation profile tubes.

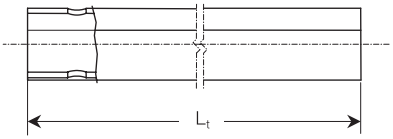
Outer tubes for spare parts are supplied cut-to-length with lowering and drilled for the roll pin.

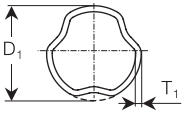
To select cut-to-length outer tubes, with lowering and drilled for the roll pin, add the required length L_t in mm to the codes listed below.

Example:
Outer tube S6, L_t = 960 mm.
Code of spare tube = 2255F0960R

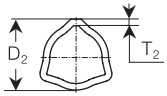
Inner tubes as spare parts are supplied either in three meter lengths, one meter lengths or one meter lengths drilled for roll pin.

Add "3000" or "1000" to the selected profile code to order 3-meter tubes or 1-meter tubes respectively.





Outer tube



Inner tube

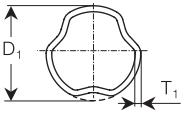
	D_1 mm	T_1 mm	Profile Code	Drilled Tube Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	40.4	3.10	- -	2255B....R	29.0	4.00	12504	225041000R	1040
S4	48.0	3.35	- -	2255D....R	36.0	4.00	12507	225101000R	2000
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	58.5	3.60	- -	2255F....R	45.0	4.20	12509	225161000R	2900
H7	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

Telescoping members

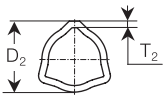
Rilsan® coated Free Rotation tubes
The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter G specifies Rilsan® coated Free Rotation profile tubes. To select cut-to-length outer tubes, with lowering and drilled for the roll pin, add the required length L_t in mm.

Example:
Outer tube S6, L_t = 855 mm.
Code of spare tube = 2255T0855R

For the inner Rilsan® coated tubes, add "1500" or "1000" to the code of drilled for roll pin tube to have a 1,5-meter lengths or 1-meter lengths respectively.



Outer tube



Rilsan® coated inner tube

	D_1 mm	T_1 mm	Profile Code	Drilled Tube Code	D_2 mm	T_2 mm	Profile Code	Drilled Tube Code	Mmax Nm
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	40.4	2.85	- -	2255P....R	29.6	4.25	- -	24504....R	1040
S4	48.0	3.10	- -	2255R....R	36.6	4.25	- -	24510....R	2000
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	58.5	3.35	- -	2255T....R	45.6	4.45	- -	24516....R	2900
H7	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

Splined telescoping members

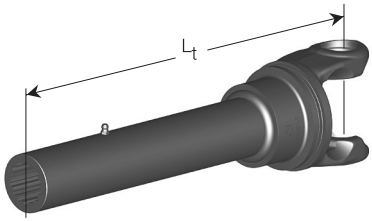
The letter in the fourth position of the driveline code identifies the type of telescoping member. The letter S specifies splined telescoping members.

Yoke and welded splined sleeves are supplied for drivelines less than L=610 mm. For longer lengths, a tube of the appropriate length is welded between the sleeve and yoke.

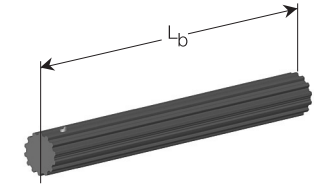
Add length L_t in mm to the codes below to order yokes with splined sleeves as spare parts.

Splined bars are supplied cut-to-length and drilled to accept roll pin. Add length L_b in mm to the codes below to order splined bars as spare parts.

Example:
Splined tube S6, L_b = 600 mm.
Code of spare tube= 249270600R



Yoke + splined sleeve



Splined bar

	D mm	z	Yoke + Splined Sleeve Code	D mm	z	Splined Bar Code	Mmax mm
S1	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -
S4	- -	- -	- -	- -	- -	- -	- -
S5	- -	- -	- -	- -	- -	- -	- -
S6	40	14	52AS6....R	40	14	24927....R	3000
H7	40	14	52AH7....R	40	14	24927....R	3700
S8	40	14	52AS8....R	40	14	24927....R	4000
H8	- -	- -	- -	- -	- -	- -	- -
S9	45	16	52AS9....R	45	16	24928....R	5000
SH	45	16	52ASH....R	45	16	24928....R	6750
S0	45	16	52AS0....R	45	16	24928....R	6750
SK	- -	- -	- -	- -	- -	- -	- -

Telescoping members

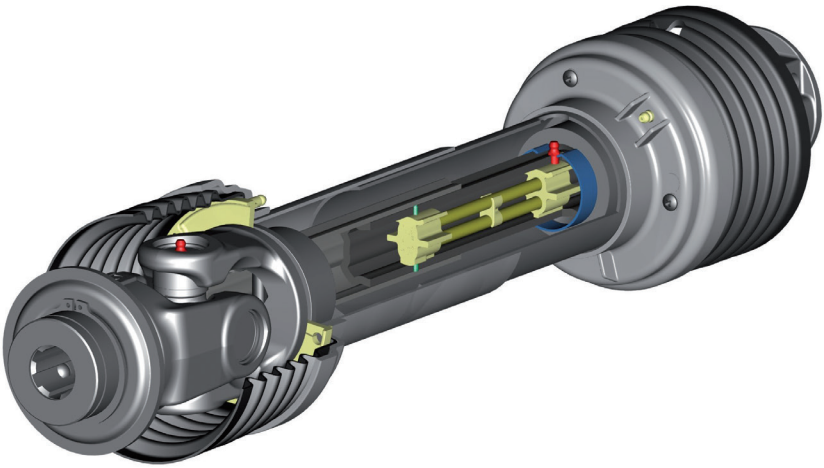
Greasing System

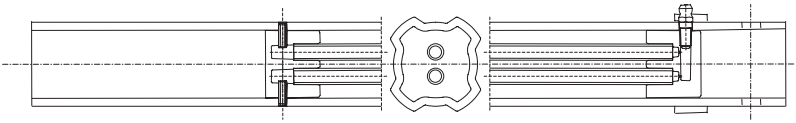
Lubrication of telescoping members is extremely important to limit wear and thrust loads, which in turn shorten the life of joints, bearings, and PTO's. For more details on lubrication frequency see chapter 30 - *Lubrication*.

SFT driveshafts can be fitted with the Greasing System. It allows lubrication of the telescoping profile tubes with the driveline installed on the tractor PTO and implement PIC. The lube fitting is easily accessible at any extension of the driveline.

he Greasing System is supplied for all types of telescoping profile tubes, and is specified with the letter "G" in the shaft code.

Refer to the following page to order Greasing System as a spare part (as an assembly with the inner tube). For more details on the Greasing System see chapter 30 - *Lubrication*.





Codes for inner profile tube with grease system assembly

1 2 3 — Tube with Greasing System

5 2 8

4 5 — Size: S2 - S4 - S5 - S6 - H7 - S8 - H8 - S9 - SH - S0.

6

Type of telescoping tube	Regular	Rilsan®-coated	Heat Treated
Four-tooth:	N	R	T
Maximum extension four-tooth:	L	V	U
Free rotation:	F	G	

7 8 9 — Driveline length code.
The length L of the driveline, in cm.

Optional positions: complete only if the driveline is fitted with one or two constant velocity joint(s).

10 — Type of joint at driver (tractor) end
- Single cardan joint: N
- 80°Constant velocity Joint: W
- 50°Constant velocity Joint: K

11 — Type of joint at driven (implement) end
- Single cardan joint: N
- 80°Constant velocity joint: W
- 50°Constant velocity joint: K

12

R

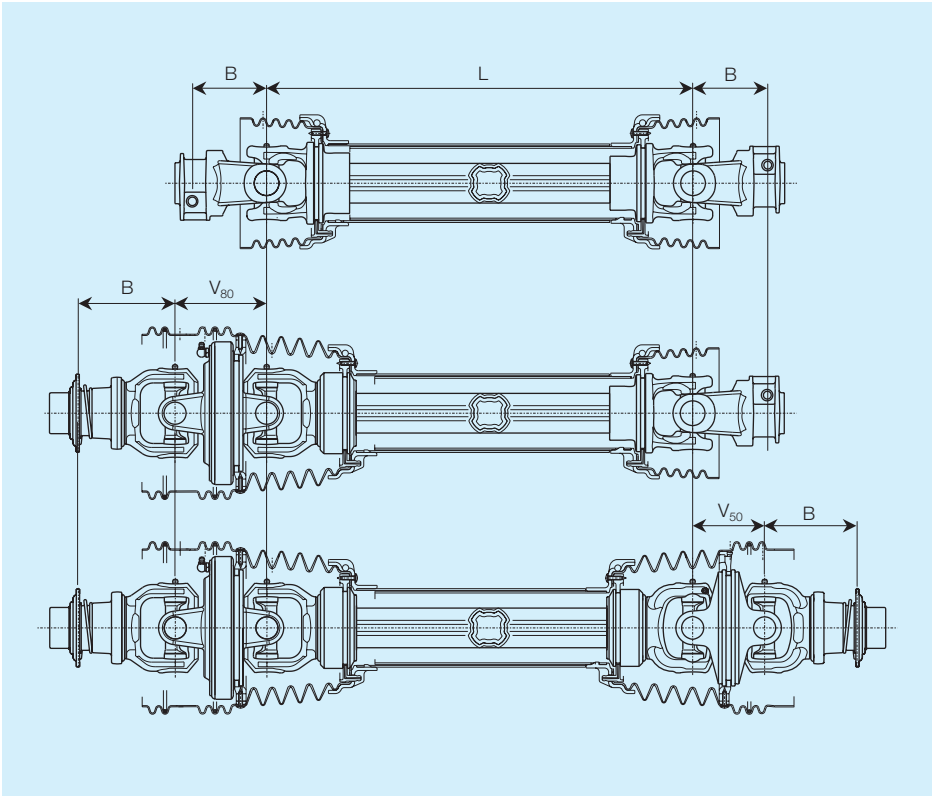
Examples

Greasing System for SFT driveline S6 fitted with regular four-tooth profile tubes (N), length L = 910 mm (091), single cardan joints on both ends.
Code of assembly: 528 S6 N 091 R.

Greasing System for SFT driveline S4 Rilsan® coated four-tooth tubes (R), length L = 860 mm (086), 80° CV joint on tractor end, cardan joint on implement end (N).
Code of assembly: 528 S4 R 086 W N R.

The cardan joint driveline is the most commonly used method for transmitting power from a tractor PTO (Power Take Off) to the PIC (Power Input Connection) of an agricultural implement. The distance between the PTO and PIC are constantly changing as the implement moves through the field. The variable extension of drivelines makes them easy to install and compensates for this relative motion between shafts, both in working conditions and when transporting the implement.

Driveline length **L** is defined as the distance between the centers of the crosses, with the driveline fully collapsed. On drivelines fitted with constant velocity (CV) joints, the reference points are the centers of the inboard crosses.
Driveline length is represented in the code by the length **L** in centimeters.



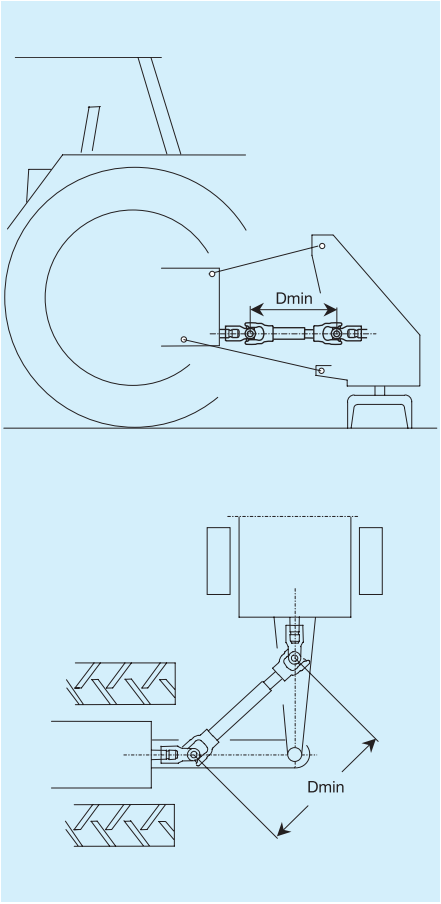
Code	041	046	051	056	061	066	071	076	081	086	091	101	111	121
Length **L** (mm)	410	460	510	560	610	660	710	760	810	860	910	1010	1110	1210

Driveline length

Choosing the length of the driveline must account for the dimensions B, V_{80}, and V_{50} at either end of the driveline, as required by the PTO, PIC, and application requirements. The values for B, V_{80}, and V_{50} can be found in the sections describing yokes and torque limiters.
Length L of the driveline must be selected so that the telescoping members never close completely, or “bottom out” when in use. The driveline length L should therefore never be smaller than the minimum distance between the joints.

$$L < Dmin$$

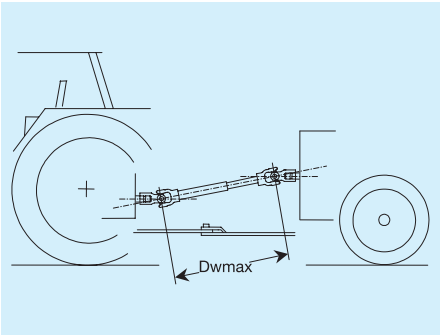
For mounted implements, the driveline will reach its minimum length Dmin at some point at or between the fully raised or fully lowered position of the hitch.
With towed implements, the cardan shaft is at its minimum length when turning and the tractor is pitched up relative to the implement (an inclination of 20° is considered as the maximum for most implements).



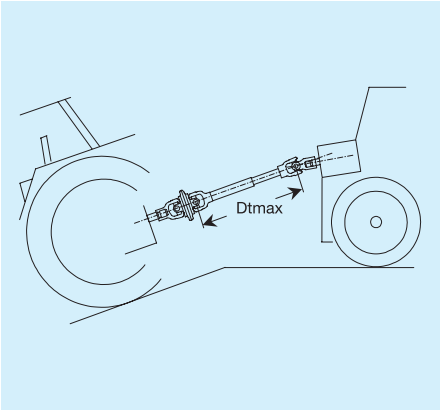
When working (i.e. under load), the telescoping tubes should maintain sufficient overlap at all times. This is achieved when the distance between joints is smaller than the maximum allowable working length, Lw.

$$Dwmax < Lw$$

The tables below show values of Lw for the different types and sizes of telescoping profile tubes.

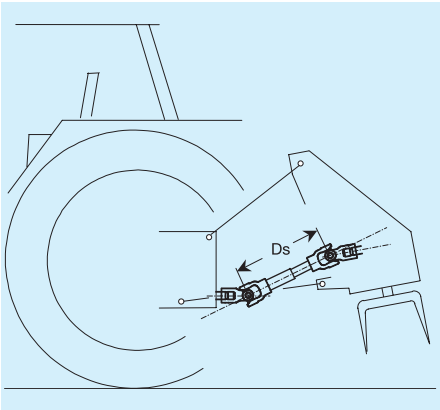


When working, situations may arise that cause the telescoping tubes to extend, briefly, more than normal. For example, when an implement is being towed and the tractor enters a depression or ditch, causing the tractor to slope downwards, the driveline will extend. Most implement manufacturers consider a tilt of 20° as the maximum.
The distance between the joints, D_{tmax}, may be allowed to exceed the maximum working length L_w for a few seconds, but it should not exceed the maximum temporary length, Lt.



$$Dtmax < Lt$$

Some drivelines may be attached to implements that move from a working position to a transport position (e.g. mower-conditioners). During this operation, the telescoping tubes must still maintain sufficient overlap.
Sufficient overlap will be maintained if the maximum distance between joints Ds is smaller than the maximum allowable distance for non-rotating shafts, L_s.

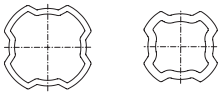


$$Ds < Ls$$

For applications where the minimum and maximum length extensions are not met by conventional profile tubes, maximum extension feature or splined telescoping members may be used for extra extension.

Driveline length

Four-tooth profile tubes



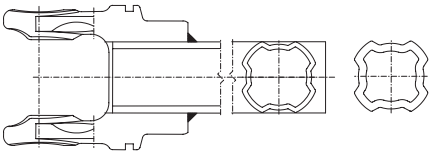
The lengths shown refer to cardan joints. Drivelines with CV joints may differ - refer to the specifications for the particular joint size.

Lw and **Lt** refer to drivelines rotating at a maximum speed of 1000 min^{-1}, except for items marked * which refer to a maximum speed of 540 min^{-1}. For shaft lengths longer than those shown, or for speeds higher than 1000 min^{-1}, please contact Bondioli & Pavesi's Engineering Department.

Code		041	046	051	056	061	066	071	076	081	086	091	101	111	121
Length L (mm)		410	460	510	560	610	660	710	760	810	860	910	1010	1110	1210
S1	Lw	530	620	695	770	845	920	995	1070	1145	1220	1295	*1445	*1595	*1745
	Lt	580	673	756	840	923	1006	1090	1173	1256	1340	1423	*1590	*1756	*1923
	Ls	612	700	787	875	962	1050	1137	1225	1312	1400	1487	1662	1837	2012
S2	Lw	516	613	688	763	838	913	988	1063	1138	1213	1288	1438	*1588	*1738
	Lt	566	664	747	830	914	997	1080	1164	1247	1330	1414	1580	*1747	*1914
	Ls	593	689	777	864	952	1039	1127	1214	1302	1389	1477	1652	1827	2002
S4	Lw	495	595	677	752	827	902	977	1052	1127	1202	1277	1427	1577	1727
	Lt	545	645	733	816	900	986	1066	1150	1233	1316	1400	1566	1733	1900
	Ls	581	673	761	848	936	1023	1111	1198	1286	1373	1461	1636	1811	1986
S5 - S6	Lw	- -	553	653	746	821	896	971	1046	1121	1196	1271	1421	1571	1721
	Lt	- -	613	713	808	892	975	1058	1142	1225	1308	1392	1558	1725	1892
	Ls	- -	664	752	839	927	1014	1102	1189	1277	1364	1452	1627	1802	1977
H7	Lw	- -	- -	595	695	795	890	965	1040	1115	1190	1265	1415	1565	1715
	Lt	- -	- -	670	770	870	966	1050	1133	1216	1300	1383	1550	1716	1883
	Ls	- -	- -	742	830	917	1005	1092	1180	1267	1355	1442	1617	1792	1967
S8 - H8	Lw	- -	- -	- -	685	785	885	960	1035	1110	1185	1260	1410	1560	1710
	Lt	- -	- -	- -	760	860	960	1043	1126	1210	1293	1376	1543	1710	1876
	Ls	- -	- -	- -	822	910	997	1085	1172	1260	1347	1435	1610	1785	1960
S9	Lw	- -	- -	- -	676	776	876	955	1030	1105	1180	1255	1405	1555	1705
	Lt	- -	- -	- -	751	851	951	1037	1120	1204	1287	1370	1537	1704	1870
	Ls	- -	- -	- -	815	903	990	1078	1165	1253	1340	1428	1603	1778	1953
SH	Lw	- -	- -	- -	- -	735	835	935	1022	1097	1172	1247	1397	1547	1697
	Lt	- -	- -	- -	- -	815	915	1015	1110	1193	1276	1360	1526	1693	1860
	Ls	- -	- -	- -	- -	891	978	1066	1153	1241	1328	1416	1591	1766	1941
S0	Lw	- -	- -	- -	- -	- -	763	863	963	1063	1161	1236	1386	1536	1686
	Lt	- -	- -	- -	- -	- -	863	963	1063	1163	1262	1345	1512	1678	1845
	Ls	- -	- -	- -	- -	- -	962	1049	1137	1224	1312	1399	1574	1749	1924
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Maximum extension four-tooth profile tube

The lengths shown refer to cardan joints. Drivelines with CV joints may differ - refer to the specifications for the particular joint size.

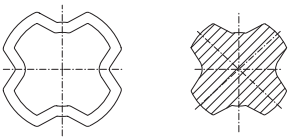


Lw and **Lt** refer to drivelines rotating at a maximum speed of 1000 min^{-1}, except for items marked * which refer to a maximum speed of 540 min^{-1}. For shaft lengths longer than those shown, or for speeds higher than 1000 min^{-1}, please contact Bondioli & Pavesi's Engineering Department.

Code		036	041	046	051	056	061	066	071	076	081	086	091	101	111
Length L (mm)		360	410	460	510	560	610	660	710	760	810	860	910	1010	1110
S1	Lw	480	580	670	745	820	895	- -	- -	- -	- -	- -	- -	- -	- -
	Lt	515	615	715	806	890	973	- -	- -	- -	- -	- -	- -	- -	- -
	Ls	515	615	715	815	915	1012	- -	- -	- -	- -	- -	- -	- -	- -
S2	Lw	471	571	668	743	818	893	- -	- -	- -	- -	- -	- -	- -	- -
	Lt	493	593	693	793	885	969	- -	- -	- -	- -	- -	- -	- -	- -
	Ls	493	593	693	793	893	993	- -	- -	- -	- -	- -	- -	- -	- -
S4	Lw	- -	555	655	737	812	887	962	- -	- -	- -	- -	- -	- -	- -
	Lt	- -	581	681	781	876	960	1043	- -	- -	- -	- -	- -	- -	- -
	Ls	- -	581	681	781	881	981	1081	- -	- -	- -	- -	- -	- -	- -
S5 - S6	Lw	- -	518	618	718	811	886	961	- -	- -	- -	- -	- -	- -	- -
	Lt	- -	573	673	773	873	957	1040	- -	- -	- -	- -	- -	- -	- -
	Ls	- -	573	673	773	873	973	1073	- -	- -	- -	- -	- -	- -	- -
H7	Lw	- -	- -	565	665	765	865	960	1035	- -	- -	- -	- -	- -	- -
	Lt	- -	- -	640	740	840	940	1036	1120	- -	- -	- -	- -	- -	- -
	Ls	- -	- -	663	763	863	963	1063	1162	- -	- -	- -	- -	- -	- -
S8 - H8	Lw	- -	- -	- -	660	760	860	960	1035	1110	- -	- -	- -	- -	- -
	Lt	- -	- -	- -	735	835	935	1035	1118	1201	- -	- -	- -	- -	- -
	Ls	- -	- -	- -	747	847	947	1047	1147	1247	- -	- -	- -	- -	- -
S9	Lw	- -	- -	- -	656	756	856	956	1035	1110	- -	- -	- -	- -	- -
	Lt	- -	- -	- -	731	831	931	1031	1117	1200	- -	- -	- -	- -	- -
	Ls	- -	- -	- -	731	831	931	1031	1131	1231	- -	- -	- -	- -	- -
SH	Lw	- -	- -	- -	- -	715	815	915	1015	1102	1177	- -	- -	- -	- -
	Lt	- -	- -	- -	- -	795	895	995	1095	1190	1273	- -	- -	- -	- -
	Ls	- -	- -	- -	- -	803	903	1003	1103	1203	1303	- -	- -	- -	- -
S0	Lw	- -	- -	- -	- -	- -	758	858	958	1058	1158	1256	- -	- -	- -
	Lt	- -	- -	- -	- -	- -	858	958	1058	1158	1258	1357	- -	- -	- -
	Ls	- -	- -	- -	- -	- -	891	991	1091	1191	1291	1391	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Driveline length

Advanced Four Tooth profile

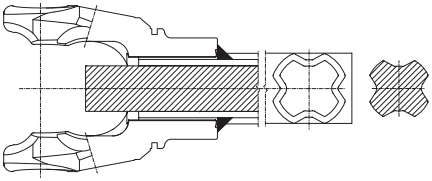


The lengths shown refer to cardan joints.

Lw and **Lt** refer to drivelines rotating at a maximum speed of 1000 min^{-1}, except for items marked * which refer to a maximum speed of 540 min^{-1}. For shaft lengths longer than those shown, or for speeds higher than 1000 min^{-1}, please contact Bondioli & Pavesi's Engineering Department.

Code		041	046	051	056	061	066	071	076	081	086	091	101	111	121
Length L (mm)		410	460	510	560	610	660	710	760	810	860	910	1010	1110	1210
SK	Lw	- -	- -	- -	- -	- -	- -	817	917	1017	1117	1213	1363	1413	1663
	Lt	- -	- -	- -	- -	- -	- -	917	1017	1117	1217	1314	1481	1648	1714
	Ls	- -	- -	- -	- -	- -	- -	1015	1102	1127	1277	1365	1540	1715	1890

Maximum Extension Advanced Four-Tooth Profile

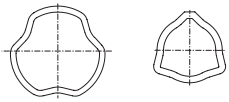


The lengths shown refer to cardan joints.

Lw and **Lt** refer to drivelines rotating at a maximum speed of 1000 min^{-1}, except for items marked * which refer to a maximum speed of 540 min^{-1}. For shaft lengths longer than those shown, or for speeds higher than 1000 min^{-1}, please contact Bondioli & Pavesi's Engineering Department.

Code		036	041	046	051	056	061	066	071	076	081	086	091	101	111
Length L (mm)		360	410	460	510	560	610	660	710	760	810	860	910	1010	1110
SK	Lw	- -	- -	- -	- -	- -	727	827	927	1027	1127	1227	1323	- -	- -
	Lt	- -	- -	- -	- -	- -	812	912	1012	1112	1212	1312	1412	- -	- -
	Ls	- -	- -	- -	- -	- -	812	912	1012	1112	1212	1312	1412	- -	- -

Free rotation profile tubes



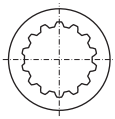
The lengths shown refer to cardan joints. Drivelines with CV joints may differ - refer to the specifications for the particular joint size.

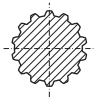
Lw and Lt refer to drivelines rotating at a maximum speed of 1000 min^{-1}, except for items marked * which refer to a maximum speed of 540 min^{-1}. For shaft lengths longer than those shown, or for speeds higher than 1000 min^{-1}, please contact Bondioli & Pavesi's Engineering Department.

Code		041	046	051	056	061	066	071	076	081	086	091	101	111	121
Length L (mm)		410	460	510	560	610	660	710	760	810	860	910	1010	1110	1210
S1	Lw	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-	- -
	Lt	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-	- -
	Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-	- -
S2	Lw	468	568	668	765	840	914	990	1065	1140	1215	1290	1440	1590	*1740
	Lt	538	638	738	832	946	999	1082	1166	1249	1332	1416	1582	*1749	*1916
	Ls	595	691	779	866	954	1041	1129	1216	1304	1391	1479	1654	1829	2004
S4	Lw	449	549	649	749	831	906	981	1056	1131	1206	1281	1431	1581	1731
	Lt	519	619	719	819	903	987	1070	1153	1237	1320	1403	1570	1737	*1903
	Ls	579	677	765	852	940	1027	1115	1202	1290	1377	1465	1640	1815	1990
S5	Lw	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-	- -
	Lt	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-	- -
	Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	-	- -
S6	Lw	- -	496	596	696	796	898	973	1048	1123	1198	1273	1423	1573	1723
	Lt	- -	574	674	724	874	974	1060	1143	1226	1310	1393	1560	1726	1893
	Ls	- -	654	753	841	928	1016	1103	1191	1278	1366	1453	1628	1803	1978

Driveline length

Splined telescoping members





Lw and Lt refer to drivelines rotating at a maximum speed of 1000 min^{-1}.
For shaft lengths longer than those shown, or for speeds higher than 1000 min^{-1}, please contact Bondioli & Pavesi's Engineering Department.

Code	041	046	051	056	061	066	071	076	081	086	091	101
Length L (mm)	410	460	510	560	610	660	710	760	810	860	910	1010
S1 Lw = Lt = Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2 Lw = Lt = Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4 Lw = Lt = Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S5 Lw = Lt = Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6 Lw = Lt = Ls	590	690	790	890	990	1030	1130	1230	1330	- -	- -	- -
H7 Lw = Lt = Ls	581	681	781	881	981	1016	1116	1216	1316	- -	- -	- -
S8 Lw = Lt = Ls	575	675	775	875	975	1010	1110	1210	1310	- -	- -	- -
H8 Lw = Lt = Ls	- -	- -	- -	- -	- -	-	- -	- -	- -	- -	- -	- -
S9 Lw = Lt = Ls	558	658	758	858	958	993	1093	1193	1293	- -	- -	- -
SH Lw = Lt = Ls	- -	643	743	843	943	988	1088	1188	1288	- -	- -	- -
S0 Lw = Lt = Ls	- -	632	732	832	932	962	1062	1162	1262	- -	- -	- -
SK Lw = Lt = Ls	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Critical speed

Drivelines rotating at high speed can become dynamically unstable, generating vibrations that may lead to mechanical failure. This occurs when the drivelines are not balanced properly for the operating speed. The speed at which occurs is called critical speed because it coincides with the driveline's flexural resonance frequency.

The center of gravity of a rotating shaft seldom falls precisely on its axis of rotation, and this eccentricity generates centrifugal forces that cause vibrations. Drivelines are made with elastic materials and therefore have a certain degree of flexibility. The centrifugal forces cause the shaft to bend, so that its center of mass moves away from the neutral axis. Under normal conditions, the driveline's elasticity will balance the effects of centrifugal forces and dampen the vibrations.

However, when the vibrations reach the system's flexural resonance frequency, instead of dampening, the distortion increases until catastrophic failure.

In order to work safely, the driveline's speed of rotation must be prudently lower than its critical speed.

If we consider a steel tube that has constant cross section and is connected to rigid supports, its critical speed nc is given by the following equation:

$$n_C = 1{,}2 \cdot 10^8 \cdot \frac{\sqrt{D_e^2 + D_i^2}}{L^2}$$

where D_e is the tube's outside diameter, D_i is the inside diameter and L is the length, all expressed in millimeters.

As the formula shows, the critical speed increases for larger tube diameters and shorter lengths.

Excessive lengths and speeds of rotation can be dangerous, causing vibrations and shaft breakdown.

In applications requiring power transmission over long lengths, the drivetrain should be divided among multiple drivelines connected through intermediate supports. This solution is particularly suitable for implements that require long drivelines rotating at high speeds (1000 min^{-1}) , e.g. mower-conditioners.

Drivelines and the implements they drive make up a complex dynamic system having not one, but many resonance frequencies. Determining the system's critical speed is complicated. It not only depends on the driveline's length and speed of rotation, but critical speed is also affected by the rigidity of the supports, the amount of play or looseness in the mechanical parts, and the elasticity and balancing of all the system's components.

Furthermore, farming applications typically feature very large working angles that cause a secondary couple, which influences the functioning of the shafts supports.

Secondary couples tend to bend the central parts of the driveline, and is proportionally greater for larger working angles and higher transmitted torques.

Since secondary couple has a frequency that is double the speed of rotation, it can generate vibrations when the speed of rotation is equal to half the shaft's critical speed.

Driveline length

For these reasons, critical speed of a system is often determined by testing, and the implement must always be tested in the most severe operating conditions with regards to speed, length, and working angles.
SFT drivelines can be used with torque limiters and overrunning clutches in the operating conditions and lengths described in the catalog, at speeds no higher than 1000 min^{-1} .
For applications requiring shaft lengths longer than those shown, or speeds higher than 1000 min-1, please contact Bondioli & Pavesi's Engineering Department.

Implement manufacturers are recommended to test the driveline at the maximum expected speeds and lengths, and to indicate these limits in the implement's operating manual.

Maximum driveline speed and lengths should be determined and stated in every implement's operating manual, especially when the driveline drives a stationary implement and may possibly be extended to excessive lengths if improperly coupled to the tractor.

Global driveshafts are provided with safety labels and operator's manual as prescribed by international safety standards and regulations.

Outer labels

The outer label displays basic safety information for using the driveline, presented according to the rules existing in the country of destination.

In Europe, the Machinery Directive requires that information shown on the outer label must be understood in the language of the country of destination, which in practice means all EEC languages. For this reason, label no. 399CEE051 provides information by means of illustrations. This label is used for all CE marked drivelines, as well as other countries.

Outer label
399CEE051

In North America (United States, Canada, Mexico) standard ANSI/ASABE AD11684 details the requirements for labels and text. Drivelines for sale into North America are provided with the outer label no. 399141000.

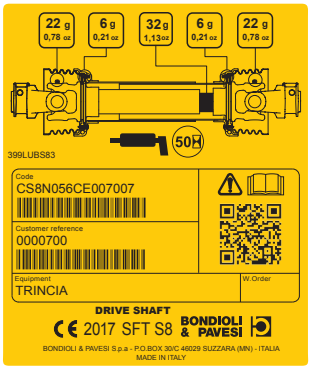
Outer label
399141000

Drivelines bound for Japan are provided with the outer label no. 399JAP001.

Outer label
399JAP001

Safety labels and operator’s manual

The outer label 399LUB... displays the following information:
- The lubrication frequency;
- The driveshaft lubrication points;
- The grease quantity, in grams and ounce, to be applied to each component;
- Driveshaft code;
- Customer reference;
- Type of implement;
- Batch of prodaction;
- A QR code, that allows to access to the opearator’s manuals on internet by a mobile device, containing explanations on the labels, information on safe and correct driveline use, and instructions for proper maintenance;
- Tractor side;
- CE mark when needed, year of production and driveshaft size;
- The mark and adress of the manufacturer.



Outer label 399LUB...

Inner label

This safety label draws the operators’ attention to the fact that the protective guard is missing and therefore the driveline is hazardous to operate. This is shown by the pictorial of a person entangled by a rotating shaft.

In addition, the signal word “DANGER” is used, which is understood throughout the world.

Inner label no. 399143000 is applied on the outer profile tube, under the protective guard, and provided on drivelines for all countries.

Inner label 399143000

Operator's manual

Operator's manual contains explanations on the labels, information on safe and correct driveline use, and instructions for proper maintenance.

Machinery Directive 2006/42/CE specifies that drivelines between self-powered vehicles (or tractors) and implements, marketed in EU and EFTA countries, should be CE marked.

The manual 399UNI001 is provided with all drivelines and includes a Declaration of Compliance with Machinery Directive 2006/42/CE.

Operator's manual 399UNI001

The destination of the driveline, and consequently its labels and operator's manual, is indicated by a destination code, i.e. the character in the eighth position in the driveline code number.

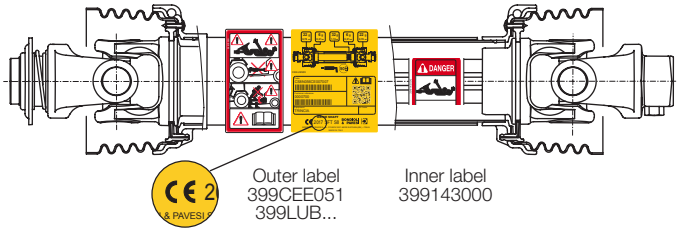
The table below shows the codes assigned to the labels and operator's manual provided with Series Global drivelines, according to their destination codes.

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Safety labels and operator's manual

Drivelines bearing CE mark

Operator's manual
399UNI001

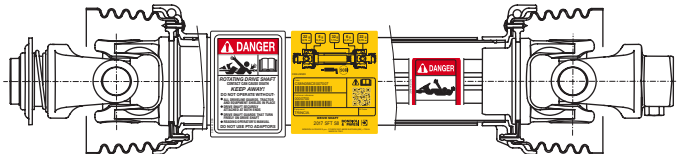


Outer label
399CEE051
399LUB...

Inner label
399143000

Drivelines made for USA and Canada

Operator's manual
399UNI001

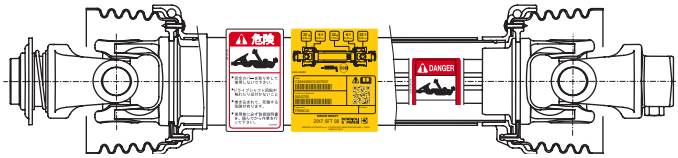


Outer label
399141000
399LUB...

Inner label
399143000

Drivelines made for Japan

Operator's manual
399UNI001

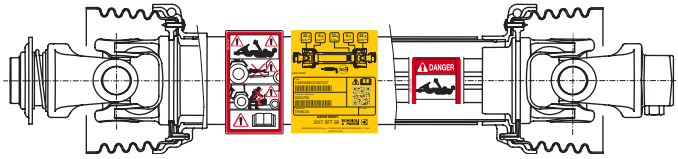


Outer label
399JAP001
399LUB...

Inner label
399143000

Drivelines made for other countries and CEE - EFTA countries not bearing CE mark.

Operator's manual
399UNI001



Outer label
399CEE051
399LUB...

Inner label
399143000

Safety is always important when operating an agricultural driveline. SFT shields are designed and manufactured to meet or exceed international safety standards and regulations. Safety objectives are achieved through simple and sturdy components, structured to produce a functional and durable assembly.

Among the basic elements are the shield bearings, which are positioned near the center of the joints, closer to the area where external forces are normally applied.

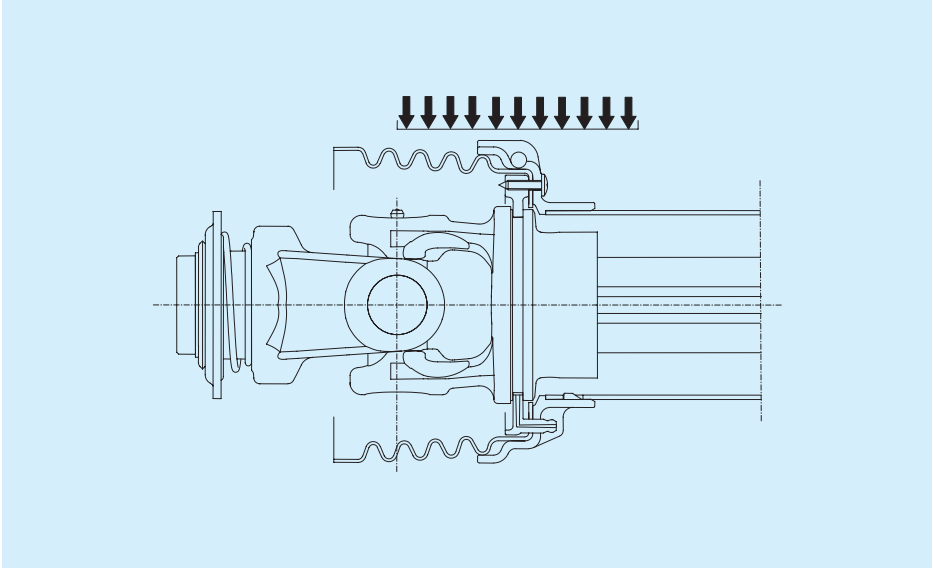
Traditional shield bearings are located farther from the center of the joint, and therefore must withstand both compressive and flexural stress.

SFT shield bearings are positioned to reduce the effects of flexural stress.

SFT shield bearings offer improved strength and last longer than traditional shield bearings.

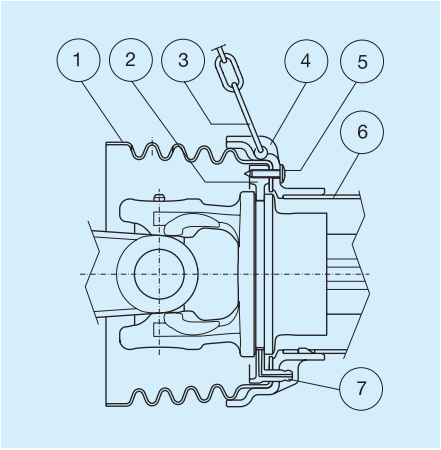
The location of the shield bearings means longer shield tubes can be used, with greater length extensions.

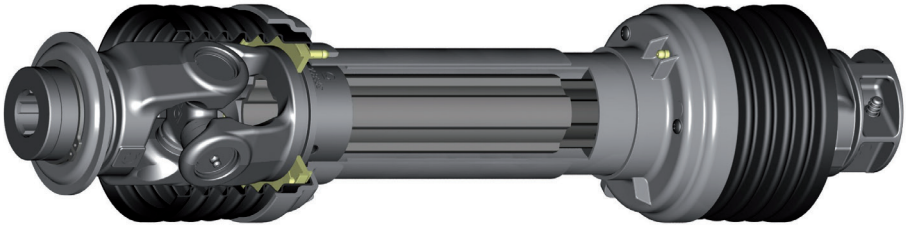
The position of the shield bearings defines the shape of the inner yokes. The juncture between yoke and hub is robust, to provide a shield bearing groove close to the center of the joint. This shape also makes the yoke more rigid and sturdy.



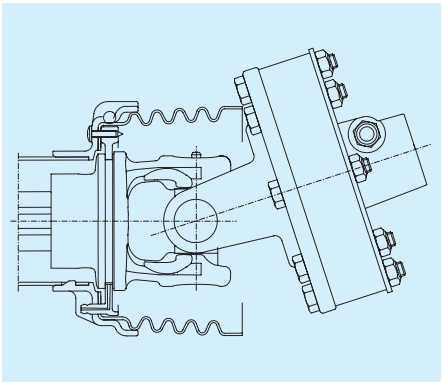
Safety shields

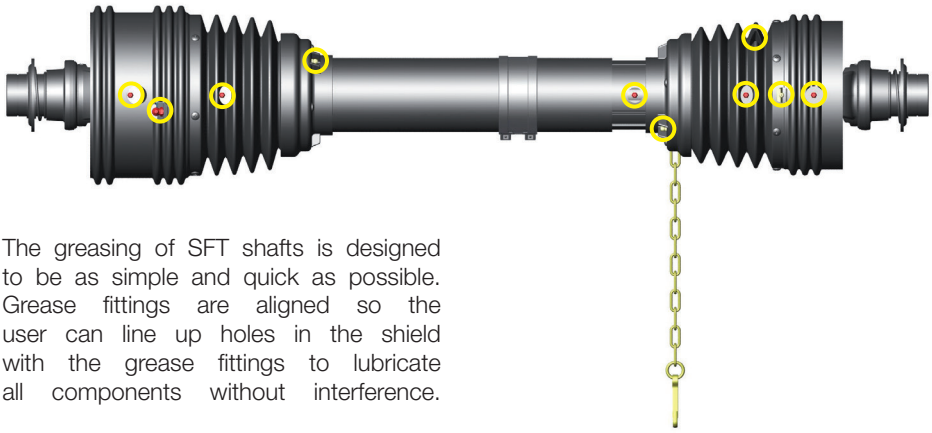
The outer cones (1) are corrugated, for more flexibility. A shield bearing (2) allows the shield to rotate around the driveline. The shield may be held stationary by chains (3). The shield bearing is located near the center of the joint, under the base cone's (4) major diameter, virtually on the same plane with forces applied to the cone. In this position, external forces tend to produce compressive stress on the bearing rather than flexural stress, resulting in improved strength and longer life.
The base cone (4) acts as a sturdy connection for the outer cone (1) and the shield bearing (2). These components are attached to the base cone by self-tapping screws (5). The shield tube (6) is locked to the base cone. The grease fittings (7) for the shield bearings are easily accessible. They are protected from damage by fins molded into the base cone.
Installing and removing SFT driveline shields is a simple operation that can be done with commonly available tools.





In compliance with the European Community's Machinery Directive (2006/42/CE), the outer cones of SFT shields cover the inner (tube) yokes, except for FFV clutches (which are available only for drivelines without EC marking). SFT drivelines and shields are designed to allow sufficient range of working angles before the shield contacts the joint.



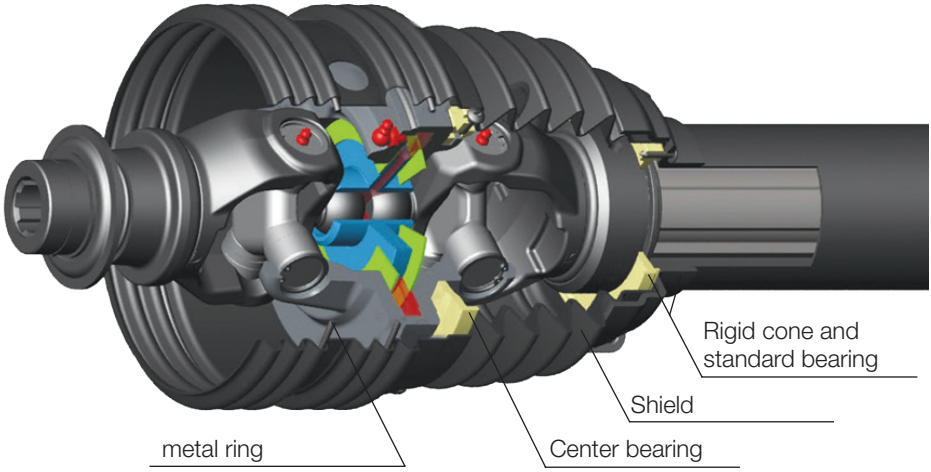


The greasing of SFT shafts is designed to be as simple and quick as possible. Grease fittings are aligned so the user can line up holes in the shield with the grease fittings to lubricate all components without interference.

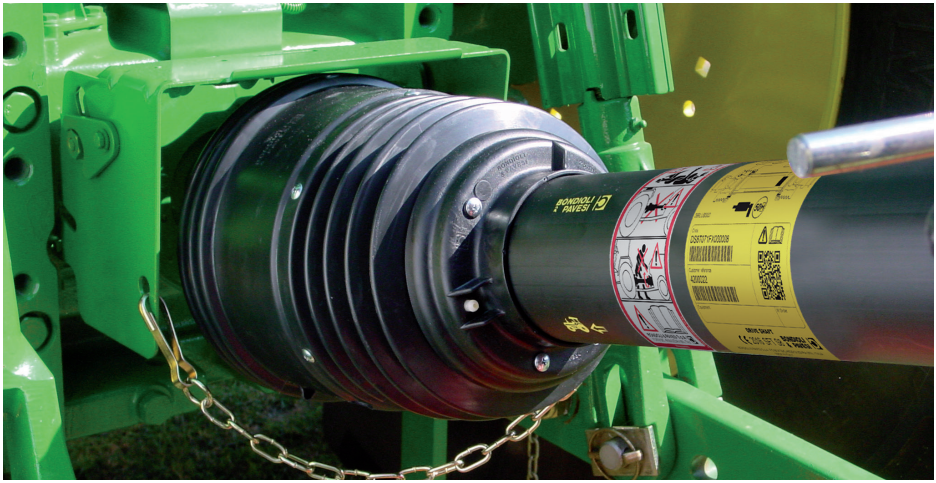
Safety shields

In compliance with international safety regulations, the outer cones of SFT shields cover CV joints mounted on the driveline. The shield is connected to the rigid cone and the standard shield bearing.

Another bearing is fitted to the center housing of the CV joint. The metal ring stiffens the end of the shield in case of 80° CV joints.



SFT shields are designed to integrate with the tractor's master shield, as required by standards ISO 500 and ANSI/ASABE AD500, and regulation 86/297/EC.



Optional extended outer cones

SFT shields can be provided with extended outer cones that cover the joint completely. The ends of these extended cones must be supported by the implement by means of a clamp, and the shield must be properly restrained.

Extended outer cones are normally used on internal drivelines that handle the flow of processed material such as fodder or forage.

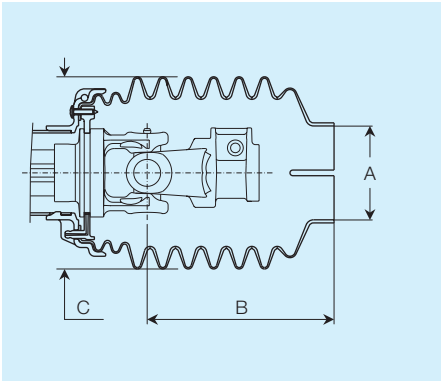
Extended outer cones are available in various lengths and diameters, depending on the size of the driveline.

To have your driveline fitted with one, or two extended outer cones, add the appropriate letter (shown below) in the additional positions of the driveline code.

The letter indicates the type of cone, and which end of the driveline it will be positioned.

Optional extended cone, medium length, narrow diameter

- Tractor end..... P
- Implement end .....M



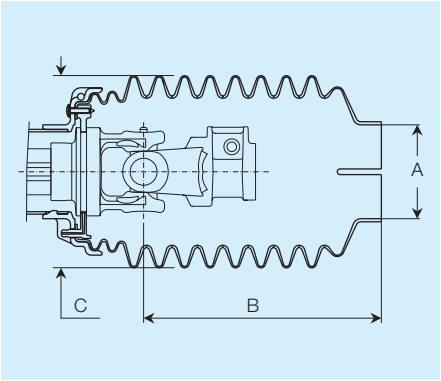
	A	B	C
S1	83	180	170
S2	83	165	170
S4	83	160	170
S5	83	157	170
S6	83	164	170
H7	83	160	170
S8	115	167	200
H8	115	167	200
S9	145	169	200
SH	- -	- -	- -
S0	- -	- -	- -
SK	- -	- -	- -

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection (IIC) shields, tractor master shields, or other appropriate guarding.

Spare parts code for optional extended cones and plates are shown in the following pages.

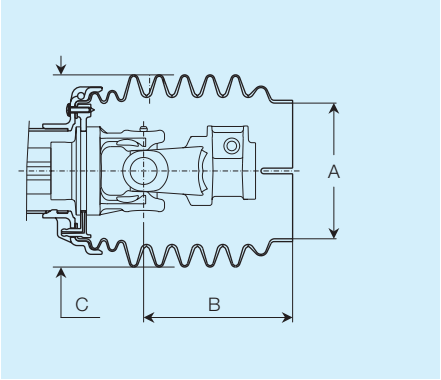
Safety shields

Optional extended cone, long length, narrow diameter
- Tractor end..... N
- Implement end..... L



	A	B	C
S1	83	225	170
S2	83	210	170
S4	83	205	170
S5	83	202	170
S6	83	209	170
H7	83	205	170
S8	115	212	200
H8	115	212	200
S9	145	214	200
SH	- -	- -	- -
S0	- -	- -	- -
SK	- -	- -	- -

Optional extended cone, short length, wide diameter
- Tractor end..... F
- Implement end..... H

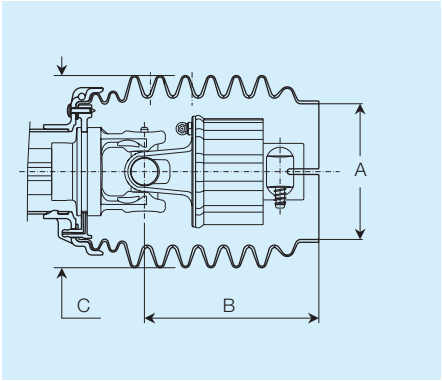


	A	B	C
S1	125	146	170
S2	125	132	170
S4	125	127	170
S5	- -	- -	- -
S6	- -	- -	- -
H7	- -	- -	- -
S8	- -	- -	- -
H8	- -	- -	- -
S9	- -	- -	- -
SH	- -	- -	- -
S0	- -	- -	- -
SK	- -	- -	- -

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection (IIC) shields, tractor master shields, or other appropriate guarding.

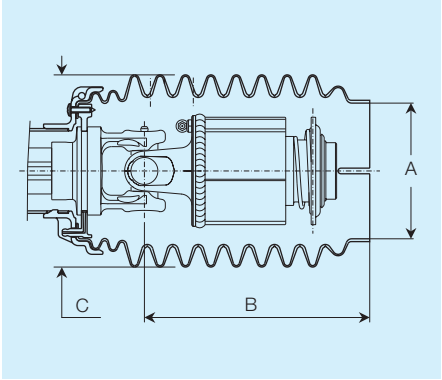
Spare parts code for optional extended cones and plates are shown in the following pages.

Optional extended cone, medium length, wide diameter.
- Tractor end.....R
- Implement end.....T



	A	B	C
S1	125	169	170
S2	125	154	170
S4	125	149	170
S5	125	146	170
S6	125	153	170
H7	125	149	170
S8	145	149	200
H8	145	149	200
S9	145	150	200
SH	- -	- -	- -
S0	- -	- -	- -
SK	- -	- -	- -

Optional extended cone, long length, wide diameter.
- Tractor end.....V
- Implement end.....Y



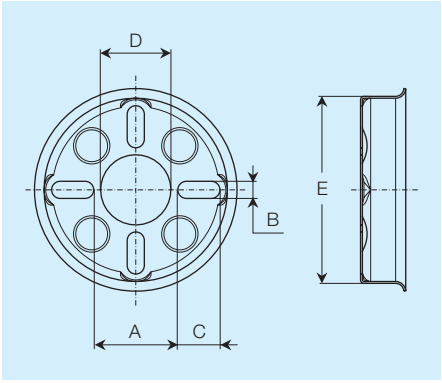
	A	B	C
S1	- -	- -	- -
S2	125	199	170
S4	125	194	170
S5	125	191	170
S6	125	198	170
H7	- -	- -	- -
S8	- -	- -	- -
H8	- -	- -	- -
S9	- -	- -	- -
SH	- -	- -	- -
S0	- -	- -	- -
SK	- -	- -	- -

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection (IIC) shields, tractor master shields, or other appropriate guarding.

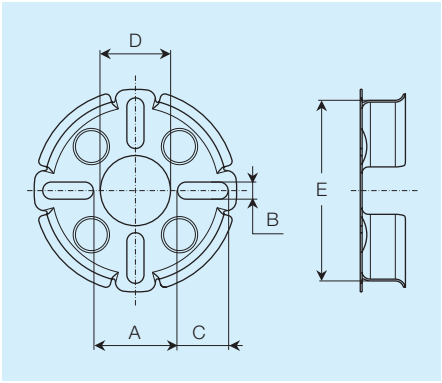
Spare parts code for optional extended cones and plates are shown in the following pages.

Safety shields

Extended cones with diameters of 125 or 145 may be attached to the implement with the slotted plates shown below. These plates should be bolted to the implement, and the extended cone clamped around their circumference. Spare parts code for optional extended cones and plates are shown in the following pages.



E mm	A mm	B x C mm	D mm
125	54	11 x 27	46
145	66	11 x 34	52



E mm	A mm	B x C mm	D mm
125	84	11 x 20	52

Restraint chains

Section 3.4.7 of Annex 1 to the Machinery Directive (2006/42/CE) states for primary drivelines “the outside parts of the shield must be so designed, constructed and arranged that they cannot turn with the transmission shaft.” EN 12965 regulations specify that drivelines connecting tractors to implements (primary drivelines) must be fitted with a restraining system to prevent the shield from rotating with the driveline.

The most common way of restraining the shields is to use chains to fasten the two halves of the shield to the tractor and to the implement. Drivelines are normally supplied with the implement, which should provide a proper attachment point for the shield restraint chains.

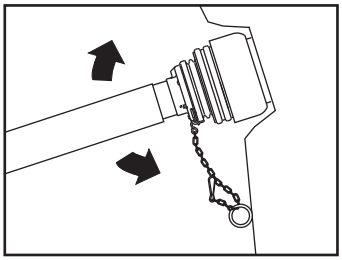
Attaching the chain to the tractor can be more difficult, since tractors are normally used to drive more than one implement and driveline. Modern tractors are provided with a hole in the master shield for attaching the shield restraint chain. Incorrect attachment of shield restraint chains may cause damage to the shields.

To solve this problem, SFT drivelines may be supplied with the optional Single Chain system, whereby one chain can be used to secure the entire driveline shield.

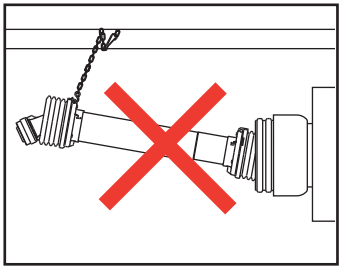
A few simple recommendations can help avoid damaging the shields and exposing the user to potential hazards.

Bondioli & Pavesi recommends that implement manufacturers provide a suitable fastening point for the chain on the implement. In addition, the following recommendations should be included in the operator’s manual:

- Attach the shield restraint chain properly. The best method is to attach the chain so that it is perpendicular with respect to the driveline.
- Adjust the length of the chain length so the driveline can move freely under any condition when working, traveling, or maneuvering.
- Adjust the length of the chains so they do not wrap excessively around the driveline.



- Do not use the chains to support or suspend the driveline when the implement is not in use.



Safety shields

Restraint standards and regulations

UNI EN ISO 5674 and ANSI/ASABE AD5674 standards state that restraints must withstand a load of 400 N, and must detach at the end attached to the shield at loads of under 800 N.

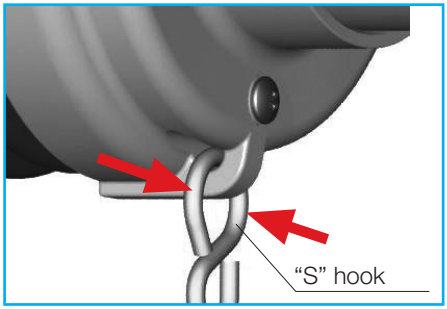
SFT driveline chains meet these detachment requirements. Chains are attached to shields by S-hooks for drivelines sizes S1 - S5.

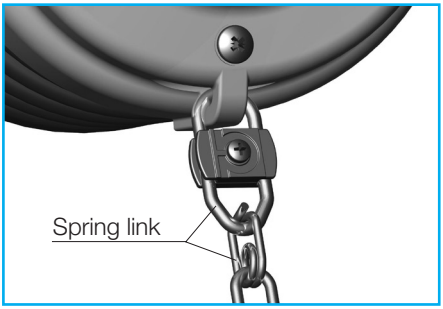
Spring link

For drivelines sizes S6 - SK, chains are supplied with the Spring Link device. This device includes a clip which can be opened and closed by screwdriver, and a spring hook which detaches from the shield when subjected to the loads described in the standards.

Both S-hook and Spring Link connections separate the chain from the shield in compliance with UNI EN ISO 5674 and ANSI/ASABE AD5674 standards.

If the chain detaches, a chain with S-hook needs to be replaced, while the Spring Link can be put back as shown below.





If the chain length has not been properly adjusted and is too tight, during turning maneuvers the S-hook opens and the chain falls from the shield. If this happens, the chain has to be replaced.

The S-hook of the new chain is fastened to an eyelet on the cone and must be closed and round to prevent unintended detachment.

The chain with Spring Link is available as an option for SFT drivelines S1-S5.

To request the chain, add the letter "Z" to the driveline code number as shown in chapter 4 - *Codes and Dimensions*.

If the chain length has not been properly adjusted and is too tight, during turning maneuvers, the Spring Link will detach and the chain falls from the shield.

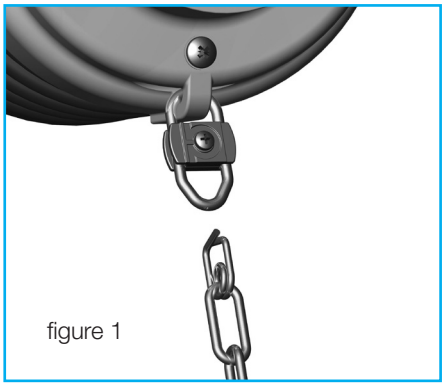


figure 1

If this happens (figure 1), the chain can be re-fitted as follows:.

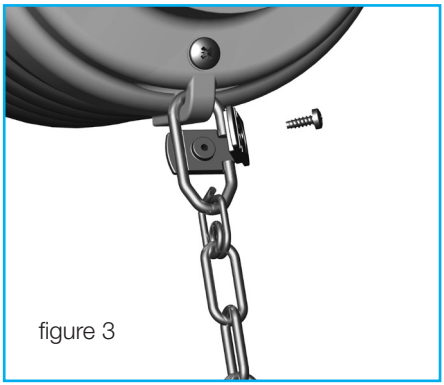


figure 3

Fit the chain and reposition the clip (figure 3).

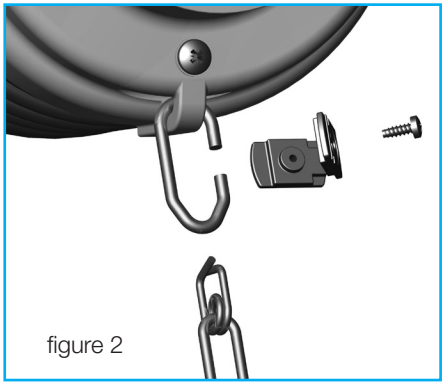


figure 2

Remove the screw and open the clip (figure 2).

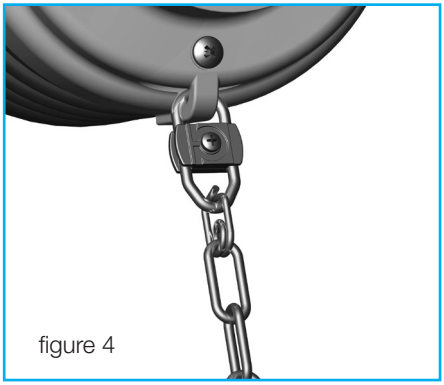


figure 4

Close clip (figure 4) and replace the screw.

Safety shields

Single chain system

The Single Chain system helps prevent shields from being damaged due to incorrect chain connections. With this system, the inner shield tube is splined and connected to the outer tube by a splined band. The splined band is positioned 100 mm from the end of the outer tube, so the driveline may be shortened if necessary.

The Single Chain system allows the shield tubes to telescope as the driveline retracts and extends, but prevents them from rotating with respect to each other.
Therefore, a single chain positioned on the implement end of the driveline is sufficient to prevent the shield from rotating, as required by the Machinery Directive.
As recommended by standard UNI EN ISO 4254-1, an appropriate fastening point should be provided for on the implement, located so the chain is perpendicular to the driveline, is not overly long that it wraps excessively around the shield, but allows the driveline to move freely as required.

The implement and driveline can therefore be attached without worry about the chain, and without the risk of improper attachment of the chain(s) on the tractor end damaging the shield.
The Single Chain system is available for drivelines with splined telescoping members of length 610 mm and above.
To specify the Single Chain System on a driveline, use the number “1”, as shown in the table on the following page.

Ordering complete shield kits
Drivelines are equipped with shield restraints for all markets except the USA and Canada where they are optional.
The type of shield restraint is specified by the ninth character in the driveline code.

The table below shows the characters used to specify the type of shield restraint, or to delete the shield restraints, if desired, for USA or Canada.

Country of destination	With Restraints	Single Chain System	Without Restraints
Drivelines with CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines for other countries or CEE – EFTA countries not bearing CE mark	X	1	-

Drivelines sizes S6 - SK are supplied with the Spring Link device as standard. For sizes S1 - S5, the Spring Link device may be specified by adding the letter "Z" to the driveline code, as shown in chapter 4 - Codes and Dimensions.
Both Spring Link and S-hook connections separate the chain from the shield in compliance with UNI EN ISO 5674 and ANSI/ASABE AD5674 standards.
If the shield chain detaches, a chain with S-hook needs to be replaced, while the Spring Link can be reattached with a screwdriver.

Safety shields

Complete shield kits

Complete shield kits for spare parts are sized to fit the drivelines on which they will be used.

The code for the shield kit length is the same code used for the driveline length.

Shield tubes can be cut to fit a specific driveline length, but the shield tubes should maintain sufficient overlap for all operating and transport conditions.

Safety labels and operator's manuals are included according to the standards and regulations of the country of destination.
Shield kits are supplied with chains or with the Single Chain system, except for North America, where shields restraints are optional.
The type of shield cone depends upon the type of joint to be protected, and is specified by the code for each particular cone, as illustrated on the following pages.

Drivelines with splined telescoping members have a longer inner tube (up to L= 610 mm), and an additional access hole for the grease fitting on the splined sleeve (Direct Greasing). Shield kits for splined drivelines should end with the letter "S" as illustrated on the following page.
The shield kit may need to provide access to the Greasing System for the telescoping profile tubes, if such a system is present on the driveline. Refer to chapter 30 - *Lubrication* for more details on the Greasing System. To request a shield kit with access for the Greasing System, add the letter "G" to the end of the shield kit code.
Standard chains with S-hooks are fitted to shields for sizes S1 - S5. Shields for sizes S6 - SK have chains with the Spring Link device, illustrated on page 10.10. Spring Link chains may also be specified for drivelines sizes S1 - S5, by adding the letter "Z" to the shield kit code.
SFT drivelines and shields are tested to comply with UNI EN ISO 5674, UNI EN ISO 12965 standards and are EC certified. Complete shields are supplied as spare parts and therefore, in compliance with the Machinery Directive, do not require CE marking. However, shield kits may be EC marked on request.

Regulations UNI EN ISO 4254-1 and ANSI/ASABE S604.1 prescribe a 50 mm overlap of the driveline shield with the implement input connection shield.

Code for complete shield kit as spare part

1 **5** — Shield kit

2 **C** — Complete shield C

3 4 — Size:
S1 - S2 - S4 - S5 - S6 - H7 - S8 - H8 - S9 - SH - S0 - SK.
See chapter 5 - *Size, Torque and Power*

5 6 7 — Length: 041 - 046 - 051 - 056 - 061 - 066 - 071 - 076 - 081
086 - 091 - 101 - 111 - 121. See page 10.16.

8 — Labels and operator's manuals

	Destination Code
CEE – EFTA countries bearing CE mark	C
North America (USA and Canada)	U
Japan	J
Other CEE – EFTA countries not bearing CE mark	F

9 — Shield Restraint system

	2 chains	Single chain	Without chains
CEE – EFTA countries bearing CE mark	E	1	-
North America (USA and Canada)	2	1	S
Japan	P	1	-
Other CEE – EFTA countries not bearing CE mark	X	1	-

10 — Tractor end shield cone
End type: S, W, K, E, P, N, F, R, V.
See pages 10.17 and 10.18

11 — Implement end shield cone
End type: S, W, K, E, M, L, H, T, Y.
See pages 10.17 and 10.18

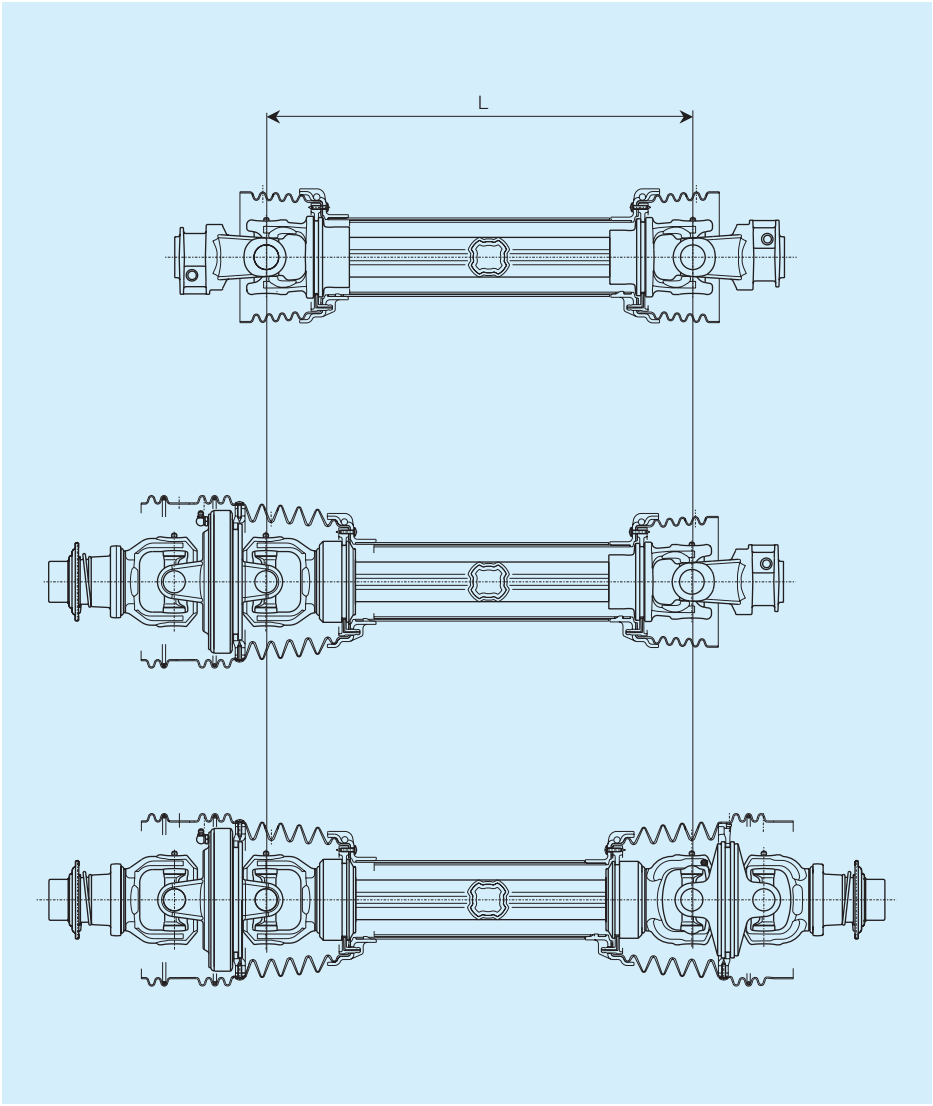
12 13 — Optional features (if required):
- S: Shields for splined telescoping member drivelines.
- *P: Shields for SK driveshafts with Advanced Four-Tooth Profile telescoping members
- *Q: Shields for SK driveshafts with maximum extension.
- G: Greasing System.
- Z: Spring Link chains (optional for sizes S1 to S5).

*Replacement SK shield tubes feature slots and holes for access to the drive tube grease fittings.
Any alterations or reductions in length must be performed in such a way as to maintain accessibility to the grease fittings.

All rotating parts must be guarded. The shields on the tractor and on the implement, together with the driveline guard, form an integrated guarding system.

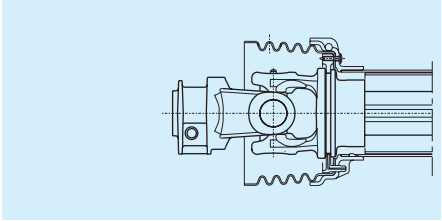
Safety shields

Shield length

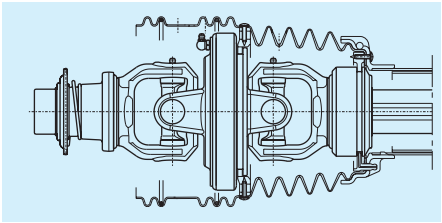


Length L (mm)	410	460	510	560	610	660	710	760	810	860	910	1010	1110	1210
Code	041	046	051	056	061	066	071	076	081	086	091	101	111	121

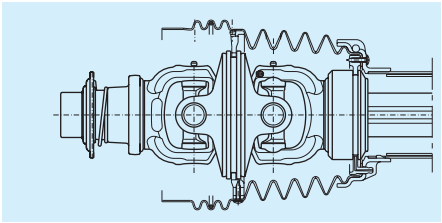
Shield cone configurations



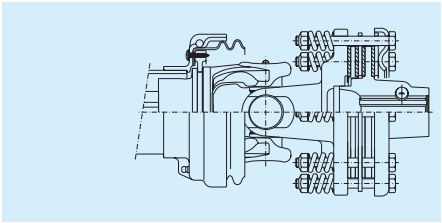
Standard shield cones for yokes, torque limiters and overruning clutches.
Code: S.



Shield for 80° CV joint.
Code: W.



Shield for 50° CV joint.
Code: K.

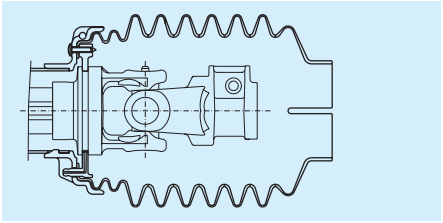


Shields for FFV and FFNV clutches.
Drivelines with FFV clutches are not EC marked since the shield cone does not entirely cover the inboard yoke, as specified by Machinery Directive 2006/42/CE.
Code: E.

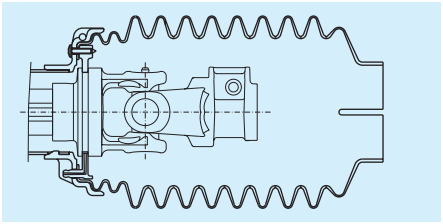
Driveline shield cones can cover the joint partially or completely, but they are not intended to replace proper implement input connection (IIC) shields, tractor master shields, or other appropriate guarding.

Safety shields

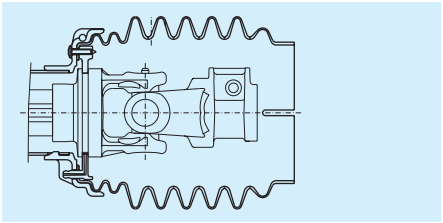
Shield cone configurations



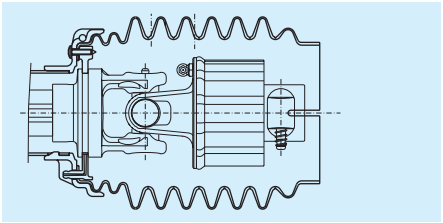
Extended cone, medium length,
narrow diameter
- Tractor end..... P
- Implement end .....M



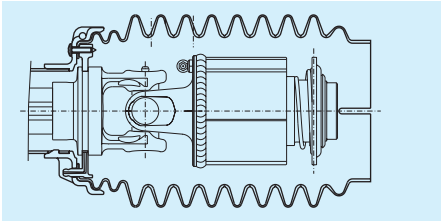
Extended cone, long length,
narrow diameter
- Tractor end..... N
- Implement end L



Extended cone, short length,
wide diameter
- Tractor end.....F
- Implement end ..... H



Extended cone, medium length,
wide diameter
- Tractor end..... R
- Implement end .....T



Extended cone, long length,
wide diameter
- Tractor end..... V
- Implement end ..... Y

Extended outer cones must be properly secured to the implement for support.

Driveline shield cones can cover the joint partially or completely, but they are not intended to replace proper implement input connection (IIC) shields, tractor master shields, or other appropriate guarding.

Spare parts for shields

SFT shields include outer shield cones for either end of the driveline. Optional cones are available for any type of joint or torque limiter mounted on the driveline.

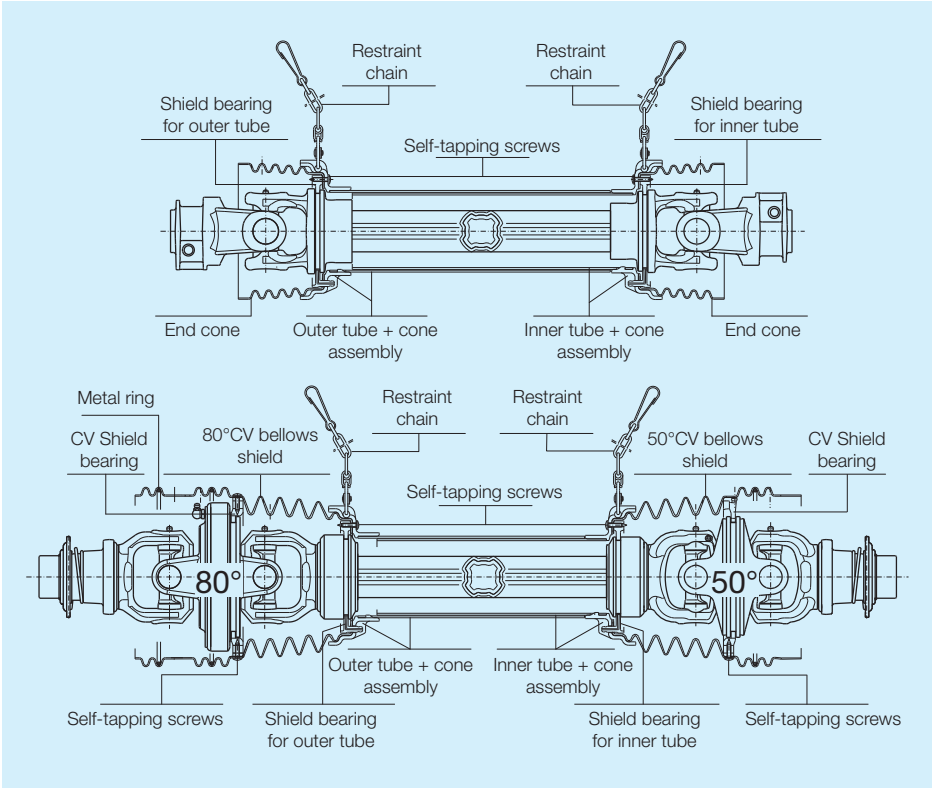
Shield bearings are different sizes, for either the inner or outer. The shield tubes are pressed into the base cones, and are available either as an outer tube+ cone assembly or and inner tube+cone assembly.

Self-tapping screws hold the base cones and end cones to the shield bearings.

Restraint chains are mandatory on all shields bearing the CE mark.

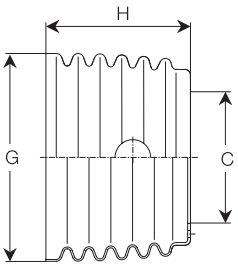
Shields for CV joints are protected by a single cone in compliance with the most recent international safety standards. Shields for 80° CV joints include a bellows shield (screwed to the base cone), a metal ring, shield bearings for the inner yoke and the CV joint, a rigid shield, and fastening screws.

Code for components supplied in packaged quantities ends with the letter "R" followed by the number of pieces in each package.



Safety shields

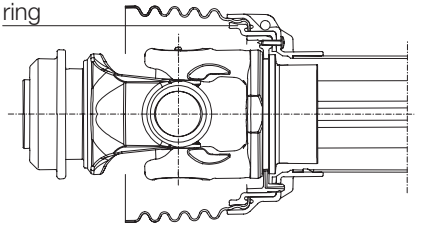
End cones for single cardan joints



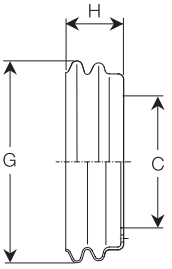
	G mm	H mm	C mm	Spare part code
S1	129	75	72	2191C0101R
S2	146	102	93	2190E0201R
S4	146	102	93	2190E0201R
S5	146	102	93	2190E0201R
S6	160	101	100	2190G0201R
H7	160	101	100	2190G0201R
S8	160	120	100	2190L0201R
H8	160	120	100	2190L0201R
S9	180	130	114	2190M0210R
SH	201	116	155	2190S0208R
S0	201	116	155	2190S0208R
SK	201	136	155	2190S0203R

Shield cones for sizes SH and SO include an intermediate ring, shown in the figure at right. The ring is supplied with the cone+tube assembly codes shown in the following tables

Intermediate ring

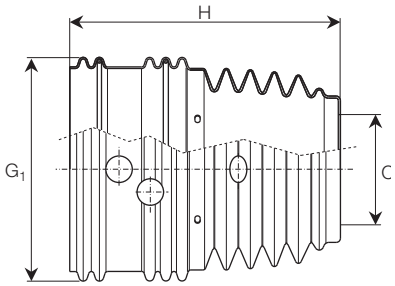


End cones for FFV and FFNV clutches (drivelines without EC mark)



	G mm	H mm	C mm	Spare part code
S1	124	44	72	2191C0022R
S2	142	41	93	2190E0202R
S4	142	41	93	2190E0202R
S5	142	41	93	2190E0202R
S6	156	50	100	2190G0202R
H7	156	50	100	2190G0202R
S8	156	56	100	2190L0202R
H8	156	56	100	2190L0202R
S9	178	74	114	2190M0203R
SH	199	61	155	2190S0202R
S0	199	61	155	2190S0202R
SK	- -	- -	- -	- -

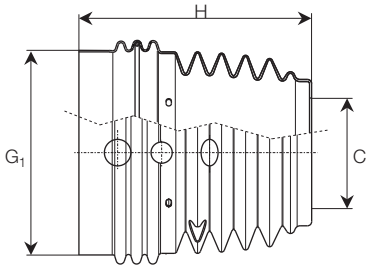
End cones for 80° CV joints



*75° is the maximum permitted angle for CV joint size SH

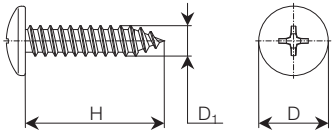
	G_1 mm	H mm	C mm	Spare part code
S1	- -	- -	- -	- -
S2	181	222	93	2190E0121R
S4	181	222	93	2190E0121R
S5	- -	- -	- -	- -
S6	211	255	103	2190G0141R
H7	211	255	103	2190G0141R
S8	233	283	103	2190L0121R
H8	233	283	103	2190L0121R
S9	233	306	114	2190N0122R
SH	233	306	114	2190N0122R
S0	- -	- -	- -	- -
SK	- -	- -	- -	- -

End cones for 50° CV joints



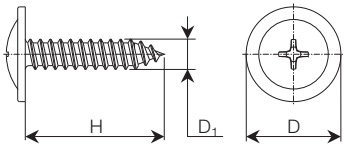
	G mm	H mm	C mm	Spare part code
S1	- -	- -	- -	- -
S2	- -	- -	- -	- -
S4	165	202	93	2190E0124R
S5	- -	- -	- -	- -
S6	193	220	103	2190G0143R
H7	193	220	103	2190G0143R
S8	193	220	103	2190G0143R
H8	193	220	103	2190G0143R
S9	219	242	114	2190N0121R
SH	219	242	114	2190N0121R
S0	- -	- -	- -	- -
SK	- -	- -	- -	- -

Self-tapping screws



	D_1 mm	H mm	D mm	Spare part code
S1 to S9	4.8	19	11	310001427R30
SH to SK	4.8	22	11	310001431R30

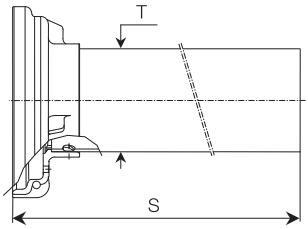
Self-tapping flanged screws



	D_1 mm	H mm	D mm	Spare part code
All sizes (CV joints)	5.3	22	15	310001428R30

Safety shields

Outer tube + cone assembly

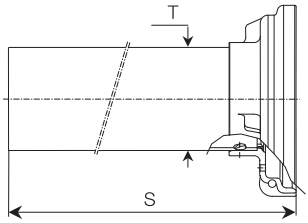


Codes refer to the tube + cone assemblies for drivelines of length L=1210 mm.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	S mm	Spare part code
S1	67	1090	5TNN1S1121FR
S2	81	1083	5TNN1S2121FR
S4	81	1072	5TNN1S4121FR
S5	81	1065	5TNN1S5121FR
S6	96	1069	5TNN1S6121FR
H7	96	1060	5TNN1H7121FR
S8	96	1055	5TNN1S8121FR
H8	96	1055	5TNN1H8121FR
S9	108	1043	5TNN1S9121FR
SH	108	1036	5TNN1SH121FR
	108	993	5TWN1SH121FR*
S0	108	1026	5TNN1S0121FR
SK	- -	- -	- -

For constant velocity joints *

Inner tube + cone assembly

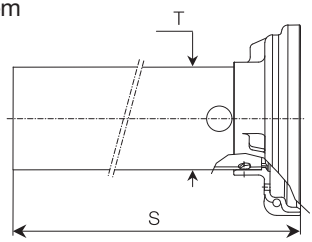


Codes refer to the tube + cone assemblies for drivelines of length L=1210 mm.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	S mm	Spare part code
S1	61	1090	5MNN1S1121FR
S2	75	1083	5MNN1S2121FR
S4	75	1072	5MNN1S4121FR
S5	75	1065	5MNN1S5121FR
S6	90	1069	5MNN1S6121FR
H7	90	1060	5MNN1H7121FR
S8	90	1055	5MNN1S8121FR
H8	90	1055	5MNN1H8121FR
S9	102	1043	5MNN1S9121FR
SH	102	1036	5MNN1SH121FR
	102	993	5MNW1SH121FR*
S0	102	1026	5MNN1S0121FR
SK	- -	- -	- -

For constant velocity joints *

Inner tube + cone assembly for Greasing System

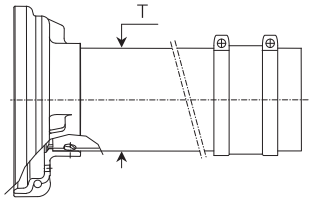


Codes refer to the tube + cone assemblies for drivelines of length L=1210 mm.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	S mm	Spare part code
S1	-	-	-
S2	75	1063	5MNN3S2121FR
S4	75	1052	5MNN3S4121FR
S5	75	1045	5MNN3S5121FR
S6	90	1049	5MNN3S6121FR
H7	90	1040	5MNN3H7121FR
S8	90	1035	5MNN3S8121FR
H8	90	1035	5MNN3H8121FR
S9	102	1023	5MNN3S9121FR
SH	102	1016	5MNN3SH121FR
	102	973	5MNW3SH121FR*
S0	102	1006	5MNN3S0121FR
SK	- -	- -	- -

For constant velocity joints *

Outer tube + cone assembly for Single Chain

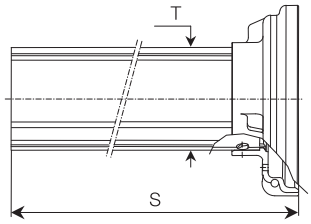


Complete the code with the driveline length code.
See page 10.16.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	Spare part code
S1	67	5TNN2S1...FR
S2	81	5TNN2S2...FR
S4	81	5TNN2S4...FR
S5	81	5TNN2S5...FR
S6	96	5TNN2S6...FR
H7	96	5TNN2H7...FR
S8	96	5TNN2S8...FR
H8	96	5TNN2H8...FR
S9	108	5TNN2S9...FR
SH	108	5TNN2SH...FR
	108	5TWN2SH...FR*
S0	108	5TNN2S0...FR
SK	- -	- -

For constant velocity joints *

Inner tube + cone assembly for Single Chain

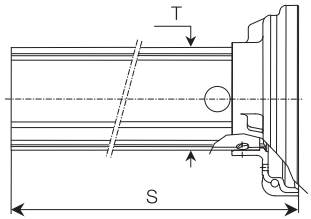


Codes refer to the tube + cone assemblies for drivelines of length L=1210 mm.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	S mm	Spare part code
S1	61	1090	5MNN2S1121FR
S2	75	1083	5MNN2S2121FR
S4	75	1072	5MNN2S4121FR
S5	75	1065	5MNN2S5121FR
S6	90	1069	5MNN2S6121FR
H7	90	1060	5MNN2H7121FR
S8	90	1055	5MNN2S8121FR
H8	90	1055	5MNN2H8121FR
S9	102	1043	5MNN2S9121FR
SH	102	1036	5MNN2SH121FR
	102	993	5MNW2S121FR*
S0	102	1026	5MNN2S0121FR
SK	- -	- -	- -

For constant velocity joints *

Inner tube + cone assembly for Greasing System and Single Chain



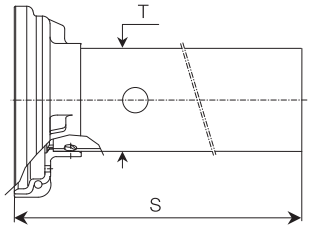
Codes refer to the tube + cone assemblies for drivelines of length L=1210 mm.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	S mm	Spare part code
S1	- -	- -	- -
S2	75	1063	5MNN4S2121FR
S4	75	1052	5MNN4S4121FR
S5	75	1045	5MNN4S5121FR
S6	90	1049	5MNN4S6121FR
H7	90	1040	5MNN4H7121FR
S8	90	1035	5MNN4S8121FR
H8	90	1035	5MNN4H8121FR
S9	102	1023	5MNN4S9121FR
SH	102	1016	5MNN4SH121FR
	102	973	5MNW4S121FR*
S0	102	1006	5MNN4S0121FR
SK	- -	- -	- -

For constant velocity joints *

Safety shields

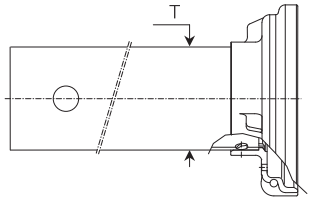
Outer tube + cone assembly for splined bar drivelines



Codes refer to the tube + cone assemblies for drivelines of length L=810 mm.
Replace the letter "F" with "U" for North America, or "J" for Japan.

	T mm	S mm	Spare part code
S1	- -	- -	- -
S2	- -	- -	- -
S4	- -	- -	- -
S5	- -	- -	- -
S6	96	669	5TNN5S6081FR
H7	96	660	5TNN5H7081FR
S8	96	655	5TNN5S8081FR
H8	- -	- -	- -
S9	108	643	5TNN5S9081FR
SH	108	636	5TNN5SH081FR
S0	108	626	5TNN5S0081FR
SK	- -	- -	- -

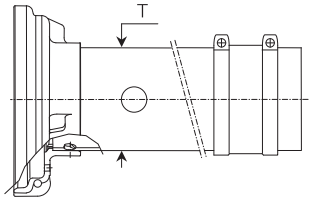
Inner tube + cone assembly for splined bar drivelines



Complete the code with the driveline length code. See page 10.16.
Replace the letter "F" with "U" for North America, or "J" for Japan.

	T mm	Spare part code
S1	- -	- -
S2	- -	- -
S4	- -	- -
S5	- -	- -
S6	90	5MNN5S6...FR
H7	90	5MNN5H7...FR
S8	90	5MNN5S8...FR
H8	- -	- -
S9	102	5MNN5S9...FR
SH	102	5MNN5SH...FR
S0	102	5MNN5S0...FR
SK	- -	- -

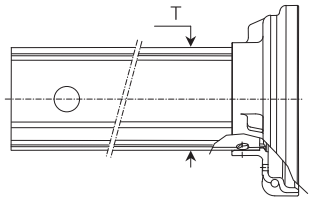
Outer tube + cone assembly for splined bar drivelines with Single Chain



Complete the code with the driveline length code. See page 10.16.
The “Single Chain” systems for grooved drivelines is available for lengths L = 610 mm or longer.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	Spare part code
S1	- -	- -
S2	- -	- -
S4	- -	- -
S5	- -	- -
S6	96	5TNN6S6...FR
H7	96	5TNN6H7...FR
S8	96	5TNN6S8...FR
H8	- -	- -
S9	108	5TNN6S9...FR
SH	108	5TNN6SH...FR
S0	108	5TNN6S0...FR
SK	- -	- -

Inner tube + cone assembly for splined bar drivelines with Single Chain

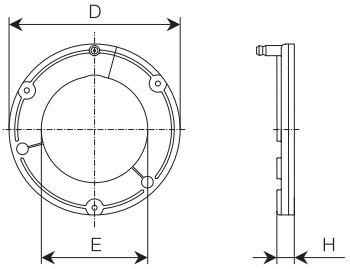


Complete the code with the driveline length code. See page 10.16.
The “Single Chain” systems for grooved drivelines is available for lengths L = 610 mm or longer.
Replace the letter “F” with “U” for North America, or “J” for Japan.

	T mm	Spare part code
S1	- -	- -
S2	- -	- -
S4	- -	- -
S5	- -	- -
S6	90	5MNN6S6...FR
H7	90	5MNN6H7...FR
S8	90	5MNN6S8...FR
H8	- -	5MNN6H8...FR
S9	102	5MNN6S9...FR
SH	102	5MNN6SH...FR
S0	102	5MNN6S0...FR
SK	- -	- -

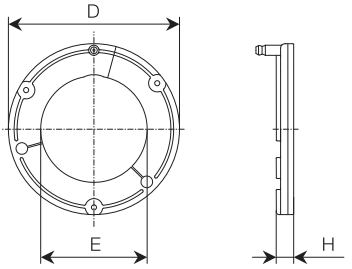
Safety shields

Shield bearings for outer tube



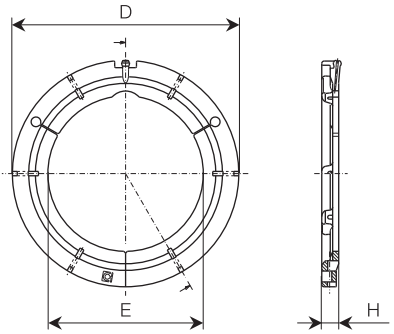
	D mm	E mm	H mm	Spare part code
S1	100	59	12	2550A0001R02
S2	118	73	12	2550C0001R02
S4	118	73	12	2550C0001R02
S5	118	73	12	2550C0001R02
S6	132	89	12	2550G0001R02
H7	132	89	12	2550G0001R02
S8	132	89	12	2550G0001R02
H8	132	89	12	2550G0001R02
S9	144	99	12	2550L0001R02
SH	146	103	24	2550M0001R02
S0	146	103	24	2550M0001R02
SK	146	103	24	2550M0001R02

Shield bearings for inner tube



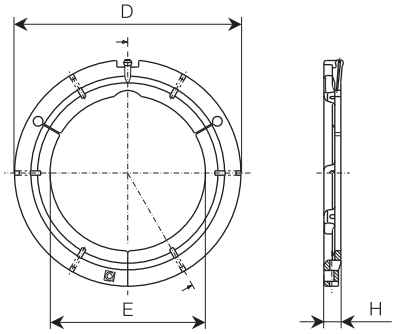
	D mm	E mm	H mm	Spare part code
S1	100	56	12	2550A0002R02
S2	118	70	12	2550C0002R02
S4	118	70	12	2550C0002R02
S5	118	70	12	2550C0002R02
S6	132	86	12	2550G0002R02
H7	132	86	12	2550G0002R02
S8	132	86	12	2550G0002R02
H8	132	86	12	2550G0002R02
S9	144	96	12	2550L0002R02
SH	146	100	24	2550M0002R02
S0	146	100	24	2550M0002R02
SK	146	103	24	2550M0002R02

CV shield bearings for 80° CV joint



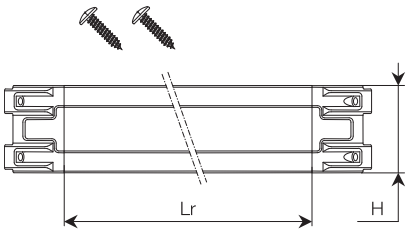
	D mm	E mm	H mm	Spare part code
S1	- -	- -	- -	- -
S2	160	101	11	2550E0005R02
S4	160	101	11	2550E0005R02
S5	- -	- -	- -	- -
S6	187	128	13	2550G0024R02
H7	187	128	13	2550G0024R02
S8	206	147	13	2550L0023R02
H8	206	147	13	2550L0023R02
S9	206	147	13	2550L0023R02
SH	206	147	13	2550L0023R02
S0	- -	- -	- -	- -
SK	- -	- -	- -	- -

CV shield bearings for 50° CV joint



	D mm	E mm	H mm	Spare part code
S1	- -	- -	- -	- -
S2	- -	- -	- -	- -
S4	160	101	11	2550E0005R02
S5	- -	- -	- -	- -
S6	187	128	13	2550G0024R02
H7	187	128	13	2550G0024R02
S8	187	128	13	2550G0024R02
H8	187	128	13	2550G0024R02
S9	206	147	13	2550L0023R02
SH	206	147	13	2550L0023R02
S0	- -	- -	- -	- -
SK	- -	- -	- -	- -

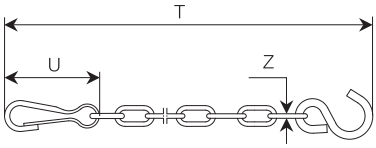
Splined band for Single Chain tubes



The kit includes the cone and two self-tapping screws.
The code for the screws separately is 310001429R02.

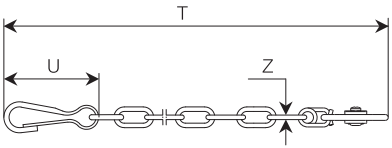
	Lr mm	H mm	Spare part code
S1	174	50	2550A0073R
S2	206	50	2550C0073R
S4	206	50	2550C0073R
S5	206	50	2550C0073R
S6	248	50	2550G0073R
H7	248	50	2550G0073R
S8	248	50	2550G0073R
H8	248	50	2550G0073R
S9	281	50	2550M0073R
SH	281	50	2550M0073R
S0	281	50	2550M0073R
SK	281	50	2550M0073R

Chains with S-hook



	T mm	U mm	Z mm	Spare part code
Standard S1 to S5	500 $^{\pm 10}$	60	2.6	252000050R02

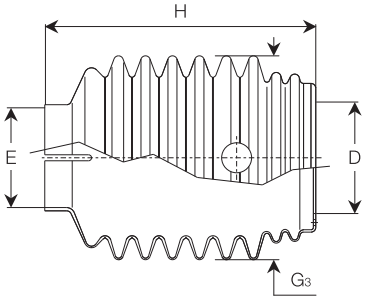
Spring Link chains



	T mm	U mm	Z mm	Spare part code
Standard S6 to SK (optional for sizes S1 to S5)	500 $^{\pm 10}$	70	3.4	252000101R02

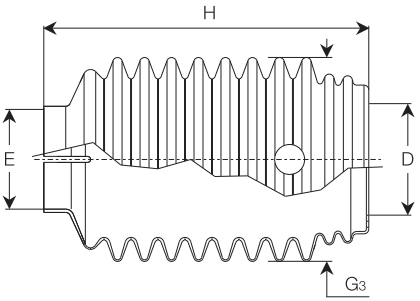
Safety shields

Extended cone, medium length, narrow diameter



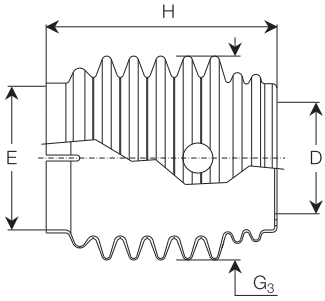
	E mm	H mm	G_3 mm	D mm	Spare part code
S1	83	232	170	72	2191C2011R
S2	83	226	170	93	2191D2016R
S4	83	226	170	93	2191D2016R
S5	83	226	170	93	2191D2016R
S6	83	233	170	99	2191G2016R
H7	83	233	170	99	2191G2016R
S8	115	245	200	103	2190G0128R
H8	115	245	200	103	2190G0128R
S9	145	250	200	114	2190M0126R
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

Extended cone, long length, narrow diameter



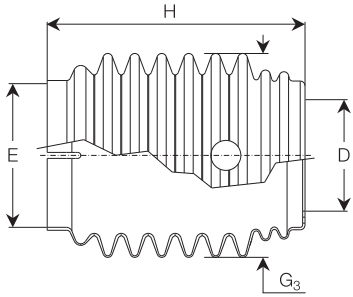
	E mm	H mm	G_3 mm	D mm	Spare part code
S1	83	277	170	72	2191C2012R
S2	83	271	170	93	2191D2017R
S4	83	271	170	93	2191D2017R
S5	83	271	170	93	2191D2017R
S6	83	278	170	99	2191G2017R
H7	83	278	170	99	2191G2017R
S8	115	290	200	103	2190G0132R
H8	115	290	200	103	2190G0132R
S9	145	295	200	114	2190M0125R
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

Extended cone, short length, wide diameter



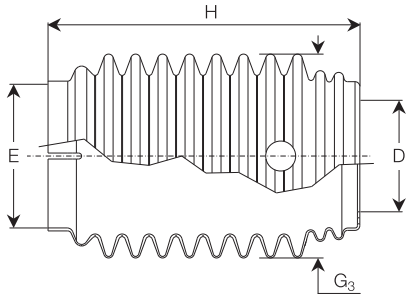
	E mm	H mm	G_3 mm	D mm	Spare part code
S1	125	199	170	72	2191C2016R
S2	125	193	170	93	2191D2056R
S4	125	193	170	93	2191D2056R
S5	- -	- -	- -	- -	- -
S6	- -	- -	- -	- -	- -
H7	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

Extended cone, medium length, wide diameter



	E mm	H mm	G_3 mm	D mm	Spare part code
S1	125	221	170	72	2191C2014R
S2	125	215	170	93	2191D2054R
S4	125	215	170	93	2191D2054R
S5	125	215	170	93	2191D2054R
S6	125	222	170	103	2191G2024R
H7	125	222	170	103	2191G2024R
S8	145	227	200	103	2190G0146R
H8	145	227	200	103	2190G0146R
S9	145	232	200	114	2190M0129R
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

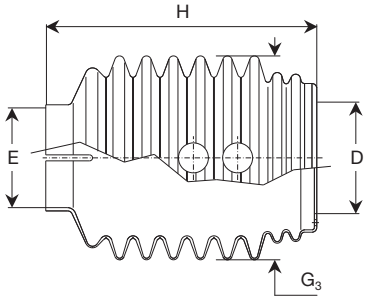
Extended cone, long length, wide diameter



	E mm	H mm	G_3 mm	D mm	Spare part code
S1	- -	- -	- -	- -	- -
S2	125	260	170	93	2191D2055R
S4	125	260	170	93	2191D2055R
S5	125	260	170	93	2191D2055R
S6	125	267	170	99	2191G2025R
H7	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

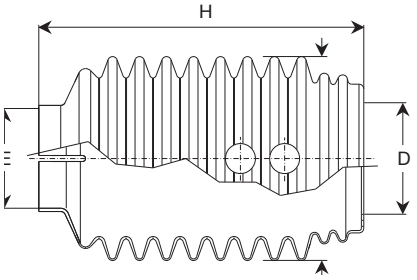
Safety shields

Extended cone, medium length, narrow diameter
for RA overrunning clutches and ratchet torque limiters.



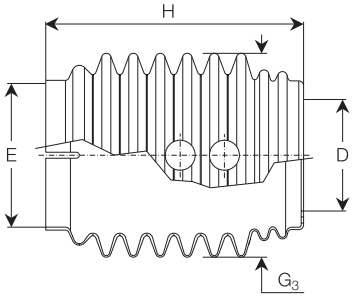
	E mm	H mm	G_3 mm	D mm	Spare part code
S1	83	232	170	72	2191C2018R
S2	83	226	170	93	2191D2048R
S4	83	226	170	93	2191D2048R
S5	83	226	170	93	2191D2048R
S6	- -	- -	- -	- -	- -
H7	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

Extended cone, long length, wide diameter
for RA overrunning clutches and ratchet torque limiters.



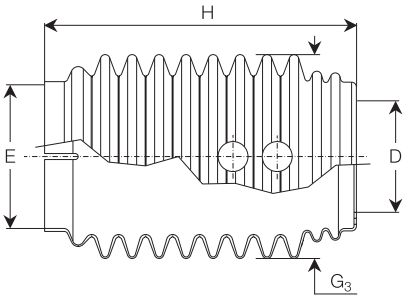
	E mm	H mm	G_3 mm	D mm	Spare part code
S1	83	277	170	72	2191C2020R
S2	83	271	170	93	2191D2025R
S4	83	271	170	93	2191D2025R
S5	83	271	170	93	2191D2025R
S6	83	278	170	99	2191G2015R
H7	83	278	170	99	2191G2015R
S8	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

Extended cone, medium length, wide diameter
for RA overrunning clutches and ratchet torque limiters.



	E mm	H mm	G_3 mm	D mm	Spare part code
S1	125	221	170	72	2191C2021R
S2	125	215	170	93	2191D2058R
S4	125	215	170	93	2191D2058R
S5	125	215	170	93	2191D2058R
S6	- -	- -	- -	- -	- -
H7	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

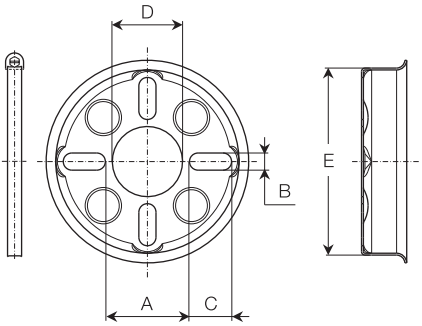
Extended cone, long length, wide diameter
for RA overrunning clutches and ratchet torque limiters.



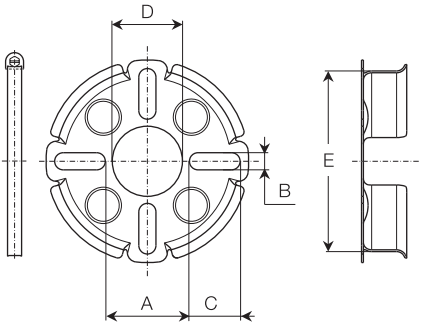
	E mm	H mm	G_3 mm	D mm	Spare part code
S1	- -	- -	- -	- -	- -
S2	125	260	170	93	2191D2059R
S4	125	260	170	93	2191D2059R
S5	125	260	170	93	2191D2059R
S6	125	267	170	99	2191G2026R
H7	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -

Safety shields

Slotted plates with clamps for optional extended cones.



E mm	A mm	B x C mm	D mm	Spare part code
125	54	11 x 27	46	395011211R
145	66	11 x 34	52	395011411R



E mm	A mm	B x C mm	D mm	Spare part code
125	84	11 x 20	52	395011261R

Yoke - shaft connections

In farming, the most common way to transmit power from a tractor to an implement is by a driveline, connected to the PTO (Power Take Off) of the tractor to the IIC (Implement Input Connection). Drivelines are also commonly connected to shafts within the implement to transmit power to various mechanisms.

Standards ISO 500, DIN 9611 and ANSI/ ASABE AD500 specify the dimensions of the common PTO types:

- Type 1 : 1 3/8" Z6 (540 min^{-1})
- Type 2 : 1 3/8" Z21 (1000 min^{-1})
- Type 3 : 1 3/4" Z20 (1000 min^{-1})

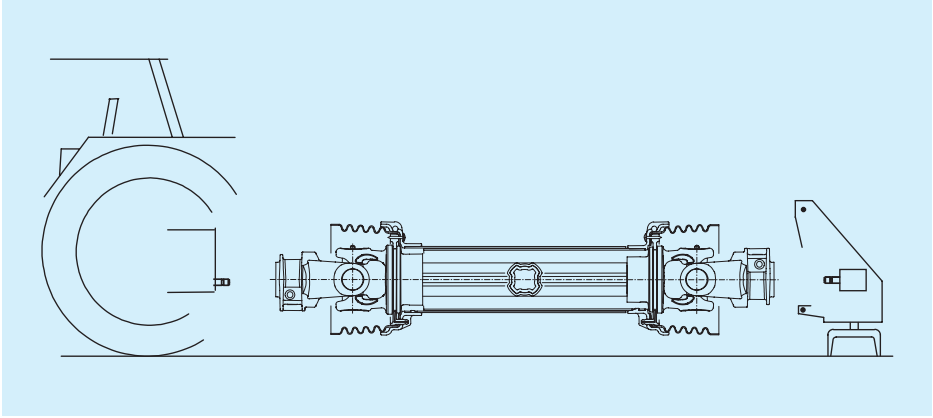
Coupling a driveline to a PTO should be quick and simple, because in normal use tractors must operate a number of different implements. Consequently, yokes on the tractor-end of the driveline are fitted with a quick-disconnect system, such as push-pin, ball collar, or automatic ball collar.

Specifications for a driveline, including the way it is coupled to a PTO, depends upon the implement.

Yokes on the IIC side are rarely disconnected and may be fastened by quick-lock couplings (push-pin or ball collar) or semi-permanent couplings that can only be removed using tools.

Taper pins are the most stable connection for splined shafts, and are commonly used in yokes and torque limiters. Taper pins are also often used to connect internal drive shafts on drivelines that are not frequently disconnected.

Torque limiters and clutches must always be installed on the implement side of the primary driveline.



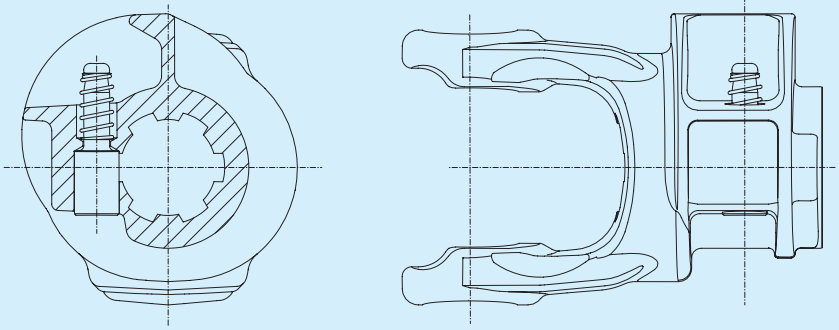
Yoke - shaft connections

Push-pin yokes

Push-pin yokes provide a quick and reliable connection to the PTO. The push-pin is simple and easy to use – no special tools are required.

The pin is encased by the rounded profile of the hub to eliminate protrusions, as required by international safety standards

Make sure the pin snaps back to its original position after connection to the PTO.



Ball collar yokes

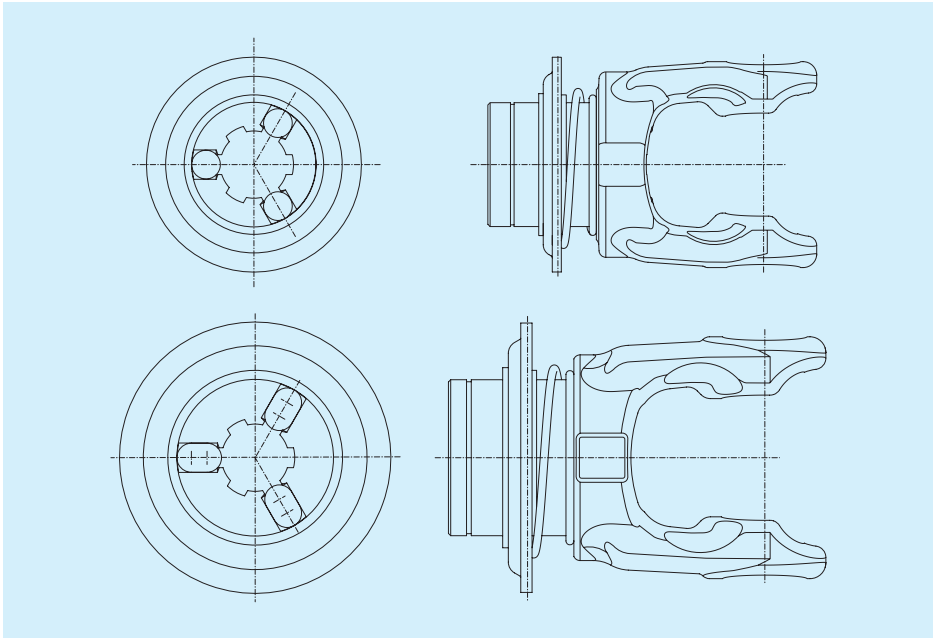
Ball collar yokes provide easy and fast connection (or disconnection) of the yoke to the PTO, with no tools required.

Connection is secured by hardened steel balls or rounded pins that engage the annular groove of a splined shaft, such as a tractor's PTO.

The balls or pins are arranged symmetrically so thrust forces generated by the telescoping driveline are uniformly distributed to the splined shaft.

Yokes are designed to enable field conversion from a standard ball collar to an automatic ball collar. Only the collar needs to be changed, without changing the entire yoke.

Make sure the collar snaps back to its original position after connecting to the PTO.



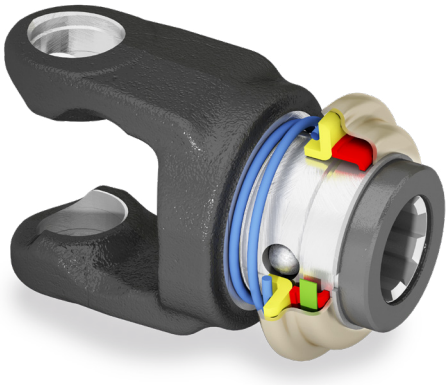
Yoke - shaft connections

Automatic ball collar yokes

A special device in the collar makes it easy to connect and disconnect the yokes, automatically retaining or releasing the collar when the balls are in the correct position

This leaves both hands free to hold the driveline and align the yoke to the splines when connecting or disconnecting the driveline to the PTO.

Yokes are designed to enable field conversion from a standard ball collar to an automatic ball collar. Only the collar needs to be changed, without changing the entire yoke.



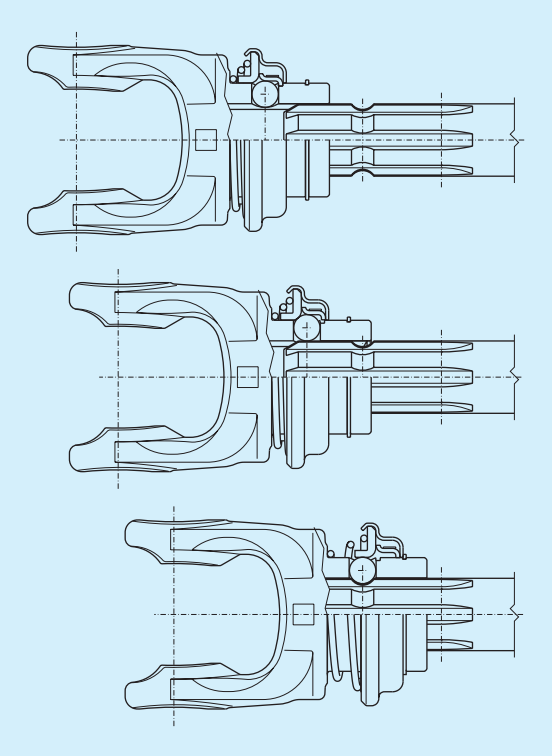
Make sure the collar snaps back to its original position after connecting to the PTO.

Before slipping the yoke onto the implement shaft, the collar is pulled into the open position until it engages and is held in position by the automatic mechanism.

Now both hands are free to maneuver the yoke into position on the PTO and support the driveline.

Once the balls contact the splines of the PTO, the mechanism is released and the collar will return to its locked position when the balls engage the annular groove.

The automatic mechanism also holds the collar open when disconnecting the driveline from the PTO, again enabling the use of both hands to hold the driveline while uncoupling.



Taper pin yokes

Drivelines are rarely removed from the implement to which they are attached. For this reason, yokes are commonly coupled to the implement shaft with a semi-permanent type of connection. These types of connections usually require the use of tools to install or disconnect.

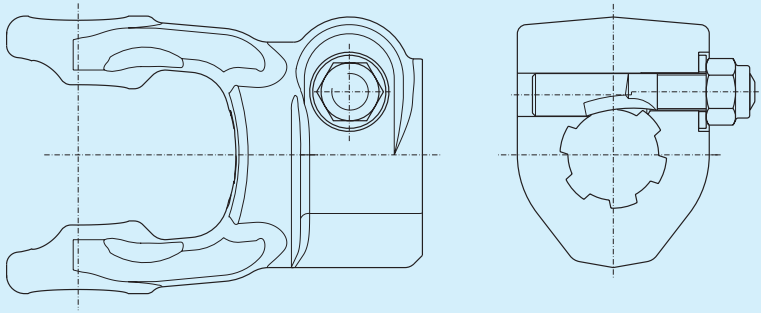
Tapered pins provide a fixed coupling between yoke and PTO. Tapered pin yokes are intended for use on the implement end of primary driveline (those that connect the tractor PTO to the first implement input shaft), or may be used on either or both ends of drivelines internal to the machine.

The tapered shape of the pin fits snugly into the annular groove of a splined shaft, reducing play between the splines to a minimum.

Profile	Taper pin nut torque
1 3/8" Z6	150 Nm - 1330 inlbs
1 3/8" Z21	150 Nm - 1330 inlbs
1 3/4" Z6	220 Nm - 1950 inlbs
1 3/4" Z20	220 Nm - 1950 inlbs

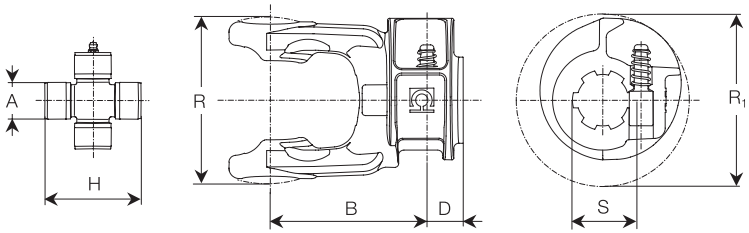
Do not replace the taper pin with standard bolts - ask for the correct tapered pins from Bondioli & Pavesi.

Torque the nut to the recommended value shown in the table above before using the implement. Ensure the nut is tight before each use.



Yokes for single cardan joints

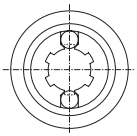
Push pin yokes



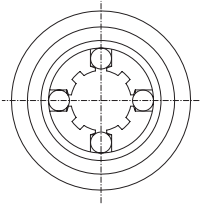
	A mm	H mm	S	D mm	B mm	R mm	R_1 mm	Yoke code	Spare part code	
S1	22.0	54.0	1 3/8" Z6	18	75	67	85	007	5070B0355	403000021R10
			1 3/8" Z21	26	67	67	85	008	5070B3755	403000021R10
			D8x32x38	18	75	67	85	093	5070B2151	403000021R10
S2	23.8	61.3	1 3/8" Z6	21	78	76	85	007	5070C0355	403000021R10
			1 3/8" Z21	29	70	76	85	008	5070C3755	403000021R10
			D8x32x38	21	78	76	85	093	5070C2151	403000021R10
S4	27.0	74.6	1 3/8" Z6	21	85	89	100	007	5070E0355	403000001R10
			1 3/8" Z21	29	77	89	100	008	5070E3755	403000001R10
			D8x32x38	21	85	89	100	093	5070E2151	403000001R10
S5 - S6	30.2	79.4	1 3/8" Z6	21	91	98	100	007	5070G0355	403000001R10
			1 3/8" Z21	29	83	98	100	008	5070G3755	403000001R10
			D8x32x38	21	91	98	100	093	5070G2151	403000001R10
H7	30.2	91.5	1 3/8" Z6	24	95	108	100	007	5070H0355	403000001R10
			1 3/8" Z21	32	87	108	100	008	5070H3755	403000001R10
			D8x32x38	24	95	108	100	093	5070H2151	403000001R10
S8 - H8	34.9	93.5	1 3/8" Z6	24	98	113	108	007	5070L0355	403000032R10
			1 3/8" Z21	32	90	113	108	008	5070L3755	403000032R10
			D8x32x38	24	98	113	108	093	5070L2151	403000032R10
S9	34.9	106.0	1 3/8" Z6	24	103	124	107	007	5070M0355	403000032R10
			1 3/8" Z21	32	95	124	107	008	5070M3755	403000032R10
			D8x32x38	24	103	124	107	093	5070M2151	403000032R10
SH	42.0	107.5	- -	- -	- -	- -	- -	- -	- -	- -
S0	42.0	130.0	- -	- -	- -	- -	- -	- -	- -	- -
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

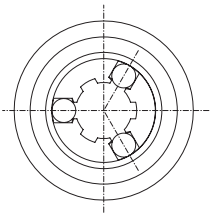
Ball collar yokes RT



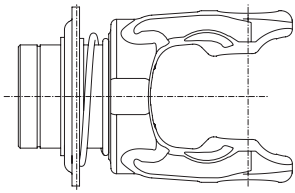
Collar type: A2

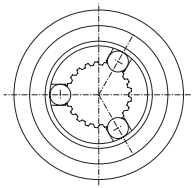


Collar type: A1

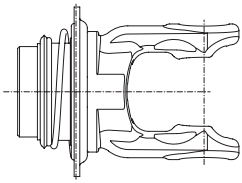


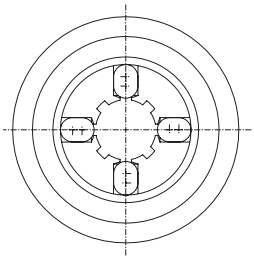
Collar type: A



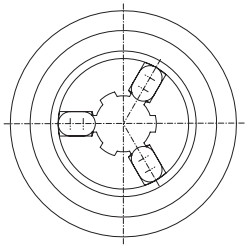


Collar type: B

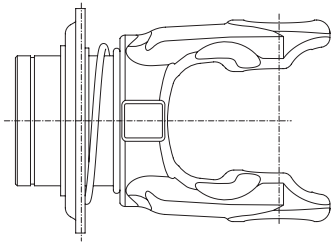


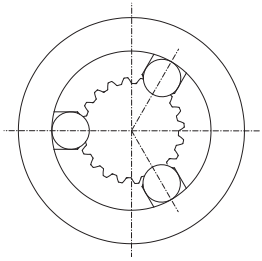


Collar type: C1

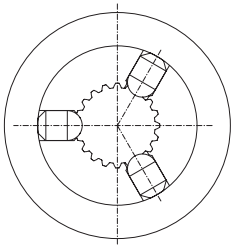


Collar type: C

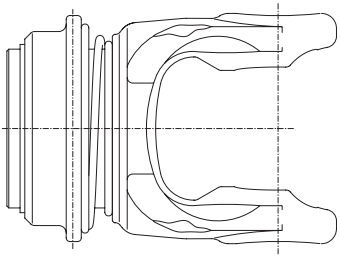




Collar type: D1



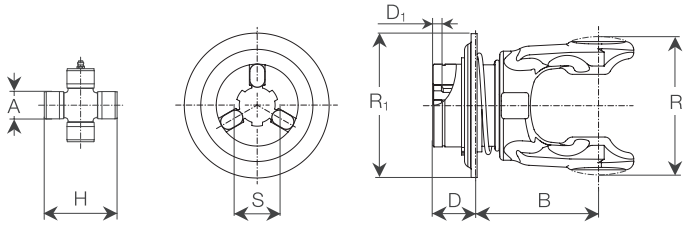
Collar type: D



Yokes for single cardan joints

Ball collar yokes

RT

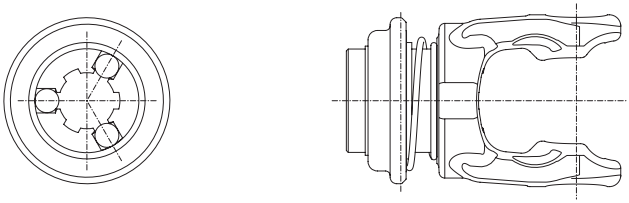


	A mm	H mm	S	D mm	D_1 mm	B mm	R_1 mm	R mm	Type p. 12.2	Yoke code	Spare part code	
S1	22.0	54.0	1 3/8" Z6	18	2	75	90	67	A	R07	5720B0355	435000320R
			1 3/8" Z21	28	2	65	90	67	B	R08	5720B3776	435000300R
			21 UNI 221	14	0	64	58	67	A2	R01	5050B0951	435000901R
S2	23.8	61.3	1 3/8" Z6	21	2	78	90	76	A	R07	5720C0355	435000320R
			1 3/8" Z21	31	2	68	90	76	B	R08	5720C3776	435000300R
			21 UNI 221	16	0	71	58	76	A2	R01	5050C0951	435000901R
S4	27.0	74.6	1 3/8" Z6	31	2	85	95	89	A	R07	5720E0355	435000321R
			1 3/8" Z21	31	2	85	95	89	A	R08	5720E3755	435000321R
			D8x32x38	31	2	85	95	89	A1	R93	5720E2151	435002115R
S5 - S6	30.2	79.4	1 3/8" Z6	31	2	91	95	98	A	R07	5720G0355	435000321R
			1 3/8" Z21	31	2	91	95	98	A	R08	5720G3755	435000321R
			D8x32x38	31	2	91	95	98	A1	R93	5720G2151	435002115R
			1 3/4" Z6	31	2	95	120	98	A	R09	5720G0455	435000418R
			1 3/4" Z20	31	2	95	120	98	A	R10	5720G3855	435000418R
H7	30.2	91.5	1 3/8" Z6	31	2	98	95	108	A	R07	5720H0355	435000321R
			1 3/8" Z21	31	2	98	95	108	A	R08	5720H3755	435000321R
			D8x32x38	31	2	98	95	108	A1	R93	5720H2151	435002115R
			1 3/4" Z6	31	2	100	120	108	A	R09	5720H0455	435000418R
			1 3/4" Z20	31	2	100	120	108	A	R10	5720H3855	435000418R
S8 - H8	34.9	93.5	1 3/8" Z6	35	7	105	120	113	C	R07	5720L0355	435000322R
			1 3/8" Z21	35	2	105	120	113	C	R08	5720L3755	435000322R
			D8x32x38	35	2	105	120	113	C1	R93	5720L2151	435002116R
			1 3/4" Z6	35	2	105	120	113	A	R09	5720L0455	435000419R
			1 3/4" Z20	35	2	105	120	113	A	R10	5720L3855	435000419R
S9	34.9	106.0	1 3/8" Z6	35	7	109	105	124	D	R07	5720M0351	435000332R
			1 3/8" Z21	35	2	109	105	124	D	R08	5720M3751	435000332R
			D8x32x38	35	2	109	105	124	D	R93	5720M2153	435002118R
			1 3/4" Z6	35	2	109	105	124	D1	R09	5720M0451	435000425R
			1 3/4" Z20	35	2	109	105	124	D1	R10	5720M3851	435000425R
SH	42.0	107.5	1 3/8" Z6	35	7	109	120	130	D	R07	5720N0351	435000328R
			1 3/8 Z21	35	2	109	120	130	D	R08	5720N3751	435000328R
			1 3/4" Z6	35	2	109	120	130	D	R09	5720N0451	435000423R
			1 3/4" Z20	35	2	109	120	130	D	R10	5720N3851	435000423R
S0	42.0	130.0	1 3/8" Z6	35	6,5	111	120	151	D	R07	5720S0351	435000328R
			1 3/8 Z21	35	2	111	120	151	D	R08	5720S3751	435000328R
			1 3/4" Z6	35	2	111	120	151	D	R09	5720S0451	435000423R
			1 3/4" Z20	35	2	111	120	151	D	R10	5720S3851	435000423R
SK	50.0	140.0	1 3/4" Z6	50	13	132	160	165	D	R09	5720K0451	*435000429R
			1 3/4" Z20	50	2	132	160	165	D	R10	5720K3851	*435000429R
			2 1/4" Z22	60	10	135	160	165	D1	R94	5720K8051	435008002R

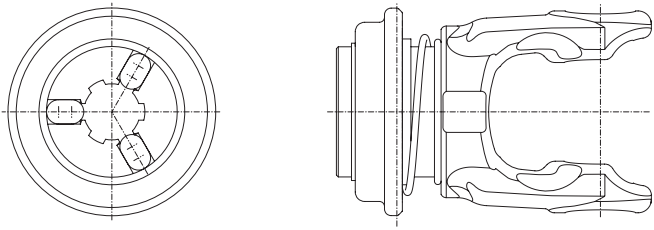
* For D=60 mm hubs order the RT ball collar code 435000427R or the yoke complete with RT ball collar

Yokes for single cardan joints

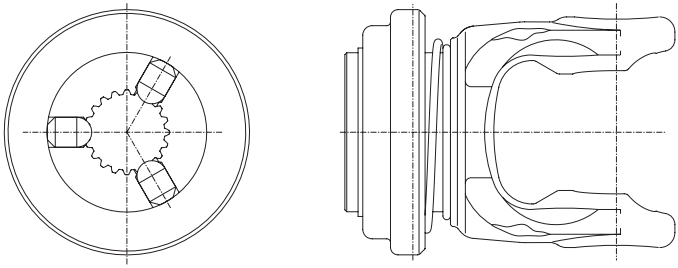
Automatic ball collar yokes RTA



Collar type: A



Collar type: B

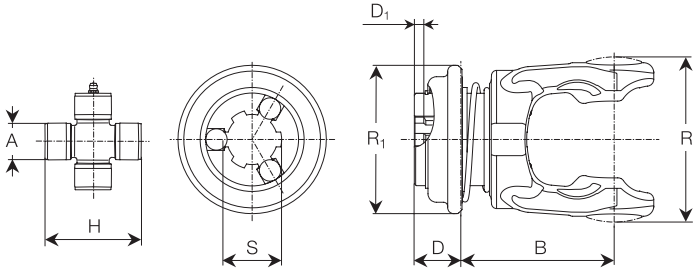


Collar type: C

Yokes for single cardan joints

Automatic ball collar yokes

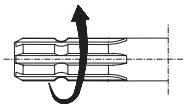
RTA

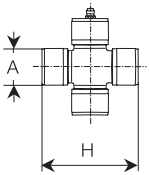


	A mm	H mm	S	D mm	D_1 mm	B mm	R_1 mm	R mm	Type p. 12.4	Yoke code	Spare part code	
S1	22.0	54.0	- -	- -	- -	- -	- -	- -	-	- -	- -	- -
S2	23.8	61.3	- -	- -	- -	- -	- -	- -	-	- -	- -	- -
S4	27.0	74.6	1 3/8" Z6	31	2	85	88	89	A	0Q7	5720E0361	435000311R
			1 3/8" Z21	31	2	85	88	89	A	0Q8	5720E3761	435000311R
S5 - S6	30.2	79.4	1 3/8" Z6	31	2	91	88	98	A	0Q7	5720G0361	435000311R
			1 3/8" Z21	31	2	91	88	98	A	0Q8	5720G3761	435000311R
			1 3/4" Z6	31	2	95	110	98	A	0Q9	5720G0461	435000411R
			1 3/4" Z20	31	2	95	110	98	A	0Q0	5720G3861	435000411R
H7	30.2	91.5	1 3/8" Z6	31	2	98	88	108	A	0Q7	5720H0361	435000311R
			1 3/8" Z21	31	2	98	88	108	A	0Q8	5720H3761	435000311R
			1 3/4" Z6	31	2	100	110	108	A	0Q9	5720H0461	435000411R
			1 3/4" Z20	31	2	100	110	108	A	0Q0	5720H3861	435000411R
S8 - H8	34.9	93.5	1 3/8" Z6	35	7	105	110	113	B	0Q7	5720L0361	435000312R
			1 3/8" Z21	35	2	105	110	113	B	0Q8	5720L3761	435000312R
			1 3/4" Z6	35	2	105	110	113	A	0Q9	5720L0461	435000411R
			1 3/4" Z20	35	2	105	110	113	A	0Q0	5720L3861	435000411R
S9	34.9	106.0	1 3/8" Z6	35	7	109	110	124	B	0Q7	5720M0361	435000312R
			1 3/8" Z21	35	2	109	110	124	B	0Q8	5720M3761	435000312R
			1 3/4" Z6	35	2	109	110	124	A	0Q9	5720M0461	435000411R
			1 3/4" Z20	35	2	109	110	124	A	0Q0	5720M3861	435000411R
SH	42.0	107.5	1 3/8" Z6	35	7	109	130	130	C	0Q7	5720N0352	435000329R
			1 3/8" Z21	35	2	109	130	130	C	0Q8	5720N3752	435000329R
			1 3/4" Z6	35	2	109	130	130	C	0Q9	5720N0452	435000424R
			1 3/4" Z20	35	2	109	130	130	C	0Q0	5720N3852	435000424R
S0	42.0	130.0	1 3/8" Z6	35	7	111	130	151	C	0Q7	5720S0352	435000329R
			1 3/8" Z21	35	2	111	130	151	C	0Q8	5720S3752	435000329R
			1 3/4" Z6	35	2	111	130	151	C	0Q9	5720S0452	435000424R
			1 3/4" Z20	35	2	111	130	151	C	0Q0	5720S3852	435000424R
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

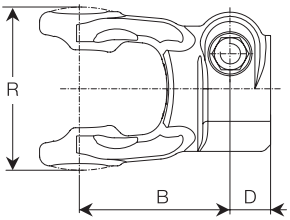
Taper pin yokes for drivelines with counter-clockwise rotation

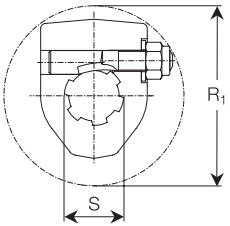




Do not use on tractor's PTO

Recommended tightening torque:
150 Nm for 1 3/8" Z6 – Z21
220 Nm for 1 3/4" Z6 – Z20

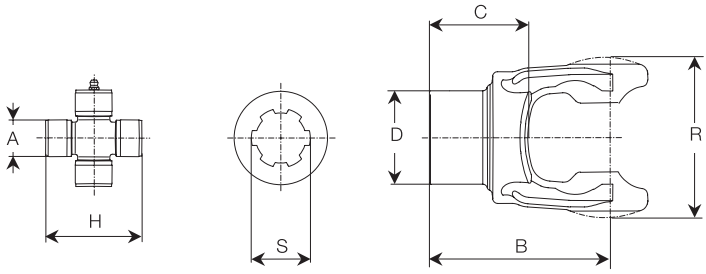




	A mm	H mm	S	D mm	B mm	R mm	R_1 mm	Yoke code	Spare part code	
S1	22.0	54.0	- -	- -	- -	- -	- -	- -	- -	- -
S2	23.8	61.3	- -	- -	- -	- -	- -	- -	- -	- -
S4	27.0	74.6	1 3/8" Z6	24	85	89	105	014	5090E0360	408000075R
			1 3/8" Z21	24	85	89	105	015	5090E3760	408000075R
S5 - S6	30.2	79.4	1 3/8" Z6	24	89	97	106	014	5090G0360	408000075R
			1 3/8" Z21	24	89	97	106	015	5090G3760	408000075R
			1 3/4" Z6	24	89	97	124	016	5090G0460	408000076R
			1 3/4" Z20	24	89	97	124	017	5090G3860	408000076R
H7	30.2	91.5	1 3/8" Z6	24	94	108	106	014	5090H0360	408000075R
			1 3/8" Z21	24	94	108	106	015	5090H3760	408000075R
			1 3/4" Z6	24	94	108	124	016	5090H0460	408000076R
			1 3/4" Z20	24	94	108	124	017	5090H3860	408000076R
S8 - H8	34.9	93.5	1 3/8" Z6	31	97	113	107	014	5090L0360	408000075R
			1 3/8" Z21	31	97	113	107	015	5090L3760	408000075R
			1 3/4" Z6	31	97	113	124	016	5090L0460	408000076R
			1 3/4" Z20	31	97	113	124	017	5090L3860	408000076R
S9	34.9	106.0	1 3/8" Z6	31	103	124	107	014	5090M0360	408000075R
			1 3/8" Z21	31	103	124	107	015	5090M3760	408000075R
			1 3/4" Z6	31	103	124	124	016	5090M0460	408000076R
			1 3/4" Z20	31	103	124	124	017	5090M3860	408000076R
SH	42.0	107.5	1 3/4" Z6	35	107	130	124	016	5090N0460	408000076R
			1 3/4" Z20	35	107	130	124	017	5090N3860	408000076R
S0	42.0	130.0	1 3/4" Z6	31	115	151	124	016	5090S0460	408000076R
			1 3/4" Z20	31	115	151	124	017	5090S3860	408000076R
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

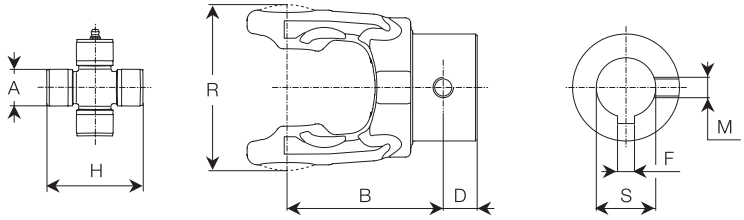
Splined yokes



	A mm	H mm	S	D mm	B mm	C mm	R mm	Yoke code	Spare part code
S1	22.0	54.0	1 3/8" Z6	55	93	56	67	027	2030B0352
			1 3/8" Z21	55	93	56	67	028	2030B3752
S2	23.8	61.3	1 3/8" Z6	55	99	58	76	027	2030C0352
			1 3/8" Z21	55	99	58	76	028	2030C3752
S4	27.0	74.6	1 3/8" Z6	58	116	68	89	027	2030E0352
			1 3/8" Z21	58	116	68	89	028	2030E3752
S6	30.2	79.4	1 3/8" Z6	58	122	70	98	027	2030G0352
			1 3/8" Z21	58	122	70	98	028	2030G3752
			1 3/4" Z6	72	125	73	98	029	2030G0452
			1 3/4" Z20	72	125	73	98	030	2030G3852
H7	30.2	91.5	1 3/8" Z6	57	129	72	108	027	2030H0352
			1 3/8" Z21	57	129	72	108	028	2030H3752
			1 3/4" Z6	72	130	73	108	029	2030H0452
			1 3/4" Z20	72	130	73	108	030	2030H3852
S8	34.9	93.5	1 3/8" Z6	72	140	80	114	027	2030L0352
			1 3/8" Z21	72	140	80	114	028	2030L3752
			1 3/4" Z6	72	140	80	114	029	2030L0452
			1 3/4" Z20	72	140	80	114	030	2030L3853
S9	34.9	106.0	1 3/8" Z6	72	144	81	124	027	2030M0352
			1 3/8" Z21	72	144	81	124	028	2030M3752
			1 3/4" Z6	72	144	81	124	029	2030M0452
			1 3/4" Z20	72	144	81	124	030	2030M3852
SH	42.0	107.5	1 3/8" Z6	86	144	79	130	027	2030N0351
			1 3/8" Z21	86	144	79	130	028	2030N3751
			1 3/4" Z6	86	144	79	130	029	2030N0451
			1 3/4" Z20	86	144	79	130	030	2030N3851
S0	42.0	130.0	1 3/8" Z6	86	146	77	151	027	2030S0351
			1 3/8" Z21	86	146	77	151	028	2030S3751
			1 3/4" Z6	86	146	77	151	029	2030S0451
			1 3/4" Z20	86	146	77	151	030	2030S3851
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

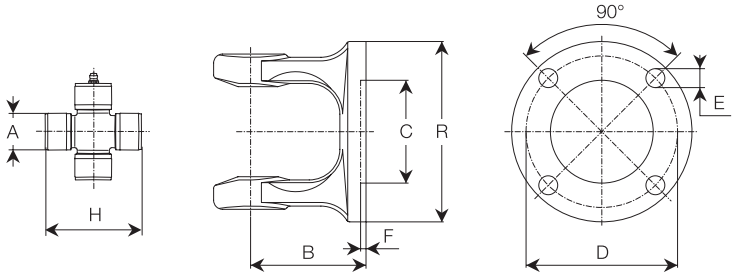
Yokes with keyway and tapped holes



	A	H	S^{H8}	R	B	D	F^{Js9}	M	Yoke	Spare part
	mm	mm	mm	mm	mm	mm	mm		code	code
S1	22.0	54.0	20	67	66	20	6	M8	051	2120B6755
			25	67	66	20	8	M10	053	2120B6155
			30	67	66	20	8	M10	054	2120B6255
S2	23.8	61.3	25	76	70	20	8	M10	053	2120C6155
			30	76	70	20	8	M10	054	2120C6255
S4	27.0	74.6	30	90	80	20	8	M12	054	2120E6255
			35	90	70	20	10	M12	055	212046351
S5 - S6	30.2	79.4	- -	- -	- -	- -	- -	- -	- -	- -
H7	30.2	91.5	- -	- -	- -	- -	- -	- -	- -	- -
S8 - H8	34.9	93.5	- -	- -	- -	- -	- -	- -	- -	- -
S9	34.9	106.0	- -	- -	- -	- -	- -	- -	- -	- -
SH	42.0	107.5	- -	- -	- -	- -	- -	- -	- -	- -
S0	42.0	130.0	- -	- -	- -	- -	- -	- -	- -	- -
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

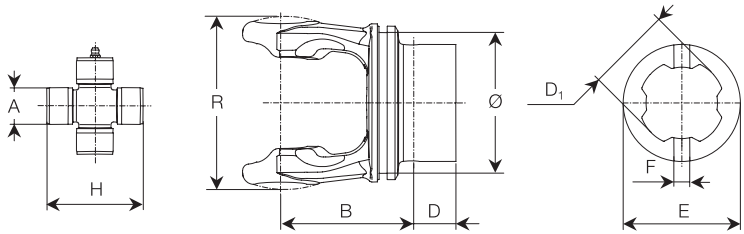
Flanged yokes



	A mm	H mm	B mm	F mm	C^{H8} mm	R mm	D mm	E mm	Yoke code	Spare part code
S1	22.0	54.0	49	2.5	47	89	74.5	8.5	090	221017153
S2	23.8	61.3	54	2.5	47	89	74.5	8.5	090	221027153
S4	27.0	74.6	64	2.5	57	100	84.0	10.5	090	221047153
S5 - S6	30.2	79.4	68	2.5	57	110	94.0	10.5	090	221057153
H7	30.2	91.5	77	2.5	75	130	101.5	12.5	090	221067153
S8 - H8	34.9	93.5	79	3.0	85	148	120.0	15	090	221177151
S9	34.9	106.0	79	3.0	85	148	120.0	15	090	221087153
SH	42.0	107.5	- -	- -	- -	- -	- -	- -	- -	- -
S0	42.0	130.0	- -	- -	- -	- -	- -	- -	- -	- -
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

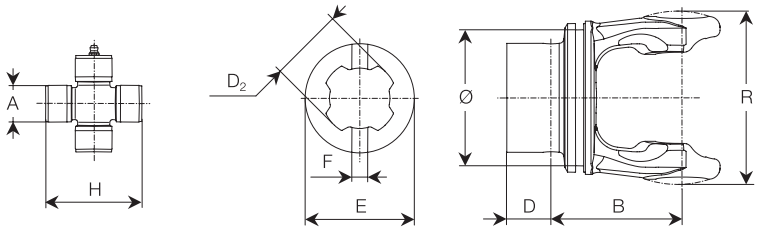
Tube yokes for Four-tooth outer profile tube
Same yoke is used for regular, Rilsan® coated and heat-treated profile tubes.



	A mm	H mm	D_1 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	22.0	54.0	35.2	8	47	59	17	58	67	204S16853	341036000R10
S2	23.8	61.3	45.6	8	57	73	17	65	76	204S26854	341048000R10
S4	27.0	74.6	50.2	8	62	73	22	73	89	204S46854	341038000R10
S5	30.2	79.4	50.2	10	64	73	22	77	98	204S56858	341043000R10
S6	30.2	79.4	53.9	10	74	89	24	77	98	204S66853	341053000R10
H7	30.2	91.5	58.2	10	74	89	28	82	108	2040H6862	341053000R10
S8	34.9	93.5	58.2	10	76	89	29	86	113	204S86853	341042000R10
H8	34.9	93.5	66.0	10	88	89	29	86	113	2040L6869	341046000R10
S9	34.9	106.0	66.0	10	88	99	31	91	124	204S96855	341046000R10
SH	42.0	107.5	70.2	10	92	103	33	97	130	2040N6853	341093000R10
S0	42.0	130.0	70.2	10	95	103	33	108	151	2040S6855	341103000R10
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

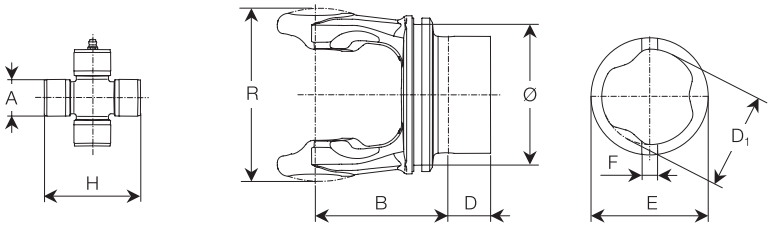
Tube yokes for four-tooth inner profile tube
Same yoke is used for regular,
Rilsan® coated and heat-treated profile tubes.



	A mm	H mm	D_2 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	22.0	54.0	30.8	8	43	56	17	58	67	204S16854	341037000R10
S2	23.8	61.3	39.6	8	51	70	17	65	76	204S26853	341047000R10
S4	27.0	74.6	44.2	8	58	70	22	73	89	204S46853	341048000R10
S5	30.2	79.4	44.2	10	58	70	22	77	98	204S56859	341096000R10
S6	30.2	79.4	46.9	10	66	86	24	77	98	204S66854	341043000R10
H7	30.2	91.5	51.2	10	69	86	28	82	108	2040H6863	341043000R10
S8	34.9	93.5	51.2	10	72	86	29	86	113	204S86854	341053000R10
H8	34.9	93.5	58.5	10	76	86	29	86	113	2040L6865	341042000R10
S9	34.9	106.0	58.5	10	81	96	31	91	124	204S96856	341081000R10
SH	42.0	107.5	61.7	10	85	100	33	97	130	2040N6854	341046000R10
S0	42.0	130.0	61.7	10	86	100	33	108	151	2040S6856	341046000R10
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

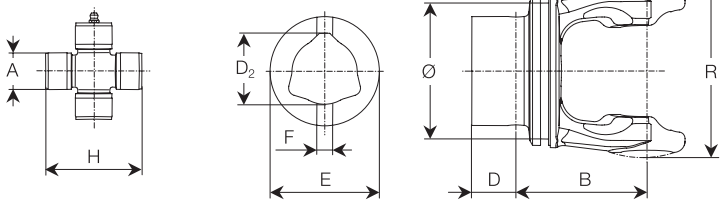
Tube yokes for Free Rotation outer profile tube
Same yoke is used for regular and
Rilsan® coated profile tube.



	A mm	H mm	D_1 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	22.0	54.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	23.8	61.3	40.4	8	57	73	17	65	81	204S26855	341048000R10
S4	27.0	74.6	48.0	8	62	73	22	73	89	204S46856	341038000R10
S5	30.2	79.4	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	30.2	79.4	58.5	10	74	89	24	77	100	204S66856	341042000R10
H7	30.2	91.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	34.9	93.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	34.9	93.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	34.9	106.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	42.0	107.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	42.0	130.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for single cardan joints

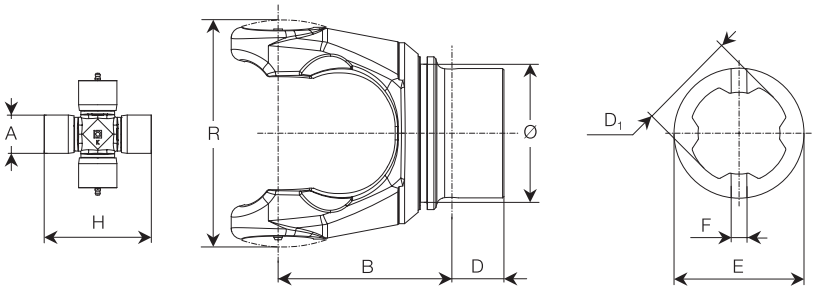
Tube yokes for Free Rotation inner profile tube
Same type of yoke is used for regular and Rilsan® coated profile tube.



	A mm	H mm	D_2 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	22.0	54.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	23.8	61.3	29.8	8	57	70	22	63	76	2040C6856	341048000R10
S4	27.0	74.6	36.7	8	58	70	22	73	89	204S46855	341048000R10
S5	30.2	79.4	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	30.2	79.4	45.2	10	66	86	24	77	98	204S66855	341043000R10
H7	30.2	91.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	34.9	93.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	34.9	93.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	34.9	106.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	42.0	107.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	42.0	130.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -	- -

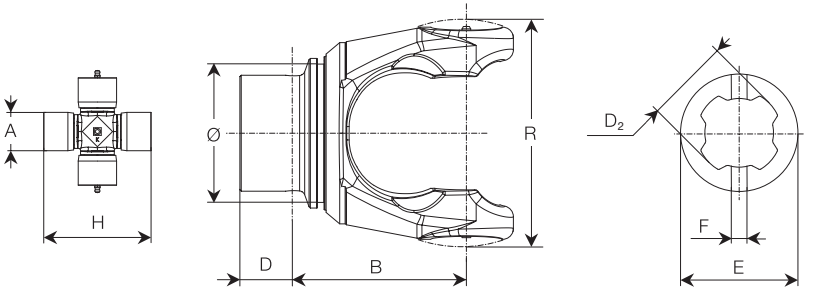
Yokes for single cardan joints

Tube yokes for Advanced Four-Tooth profile outer tube



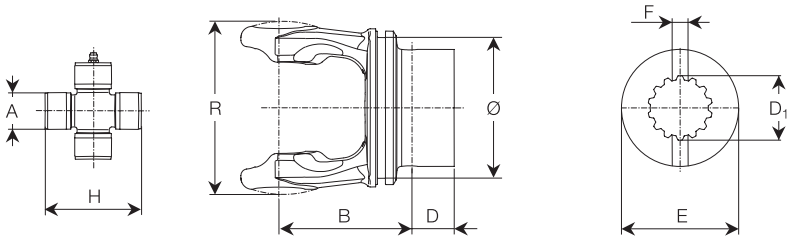
	A	H	D_1	F	E	Ø	D	B	R	Spare part code	
	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SK	50.0	140.0	74.0	12	97	103	40	129	168	2040K6851	341044000R10

Tube yokes for Advanced Four-Tooth profile inner tube



	A	H	D_2	F	E	Ø	D	B	R	Spare part code	
	mm	mm	mm	mm	mm	mm	mm	mm	mm		
SK	50.0	140.0	61.7	12	86	100	40	129	168	2040K6852	341045000R10

Yokes for splined bar telescoping members

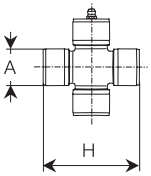


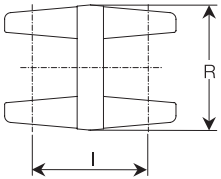
	A mm	H mm	D_1 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	22.0	54.0	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	23.8	61.3	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	27.0	74.6	- -	- -	- -	- -	- -	- -	- -	- -	- -
S5	30.2	79.4	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	30.2	79.4	40	10	74	89	24	78	98	2040G3452	345002000R10
H7	30.2	91.5	40	10	72	89	28	83	108	2040H3453	345029000R10
S8	34.9	93.5	40	10	76	89	29	87	113	2040L3453	345002000R10
H8	34.9	93.5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	34.9	106.0	45	10	88	99	31	92	124	2040M8152	345034000R10
SH	42.0	107.5	45	10	85	103	33	97	130	2040N8152	345034000R10
S0	42.0	130.0	45	10	85	103	33	109	151	2040S8151	345034000R10
SK	50.0	140.0	- -	- -	- -	- -	- -	- -	- -	- -	- -

Spare part codes for yokes welded to the outer telescoping tube are set out in the section on “Telescoping Members”.

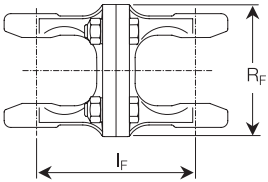
Yokes for single cardan joints

Central H-yokes for double cardan joints





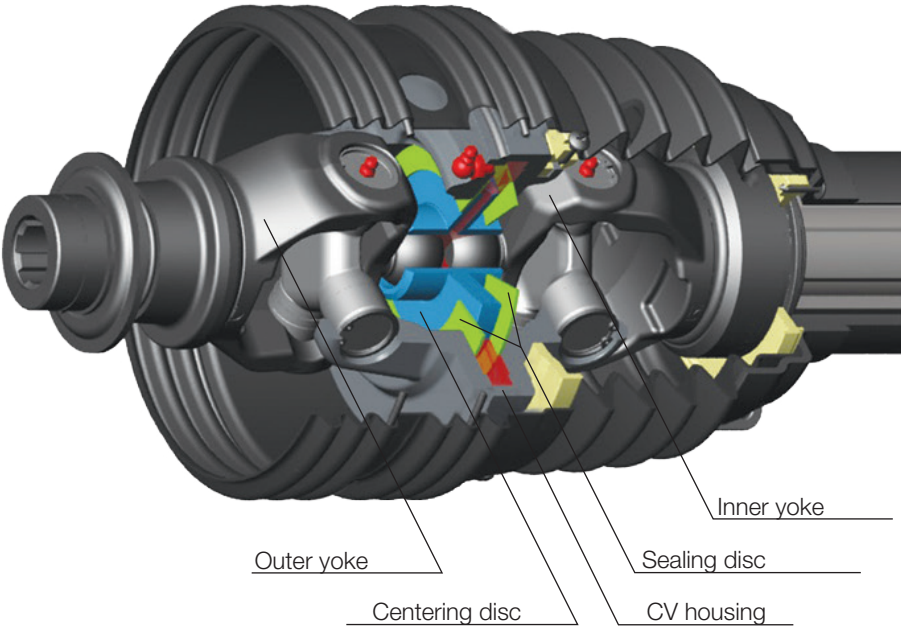
Standard double joint



Flanged double joint

	A mm	H mm	I mm	R mm	Spare part code	I_F mm	R_F mm	Spare part code
S1	22.0	54.0	68	69	213010053	98	90	518010051
S2	23.8	61.3	78	79	213020053	108	90	518020051
S4	27.0	74.6	90	95	213040068	128	100	518040051
S5	30.2	79.4	- -	- -	- -	- -	- -	- -
S6	30.2	79.4	106	106	213050089	136	110	518050051
H7	30.2	91.5	108	115	213060053	154	130	518060051
S8	34.9	93.5	118	116	2130L0052	158	148	518170051
S9	34.9	106.0	- -	- -	- -	- -	- -	- -
SH	42.0	107.5	- -	- -	- -	- -	- -	- -
S0	42.0	130.0	- -	- -	- -	- -	- -	- -
SK	50.0	140.0	- -	- -	- -	- -	- -	- -

Yokes for 80° constant velocity joints



Yokes for 80° CV joints include a centering ball which engages the centering disc in the CV housing.
The outer yoke is welded to the splined hub. The connection to a splined shaft may incorporate a ball collar, automatic ball collar, or taper pin (the latter only for the implement side of drivelines or drivelines internal to the implement).
The inner (tube) yoke is welded to a hub that is broached according to the profile of the telescoping members.

This section includes dimensions and 3-digit (driveline) codes to use when specifying the outer yoke for the driveline, spare part codes for outer yokes, inner yokes, and center housings for 80° CV joints.
The center housing illustrated on page 13.7 includes the centering disc, sealing discs, and a grease fitting.
The H7 80° CV joint is the same size as S6, but uses upgraded materials to transmit increased power.

Yokes for 80° constant velocity joints

SH CV joint: designed for power

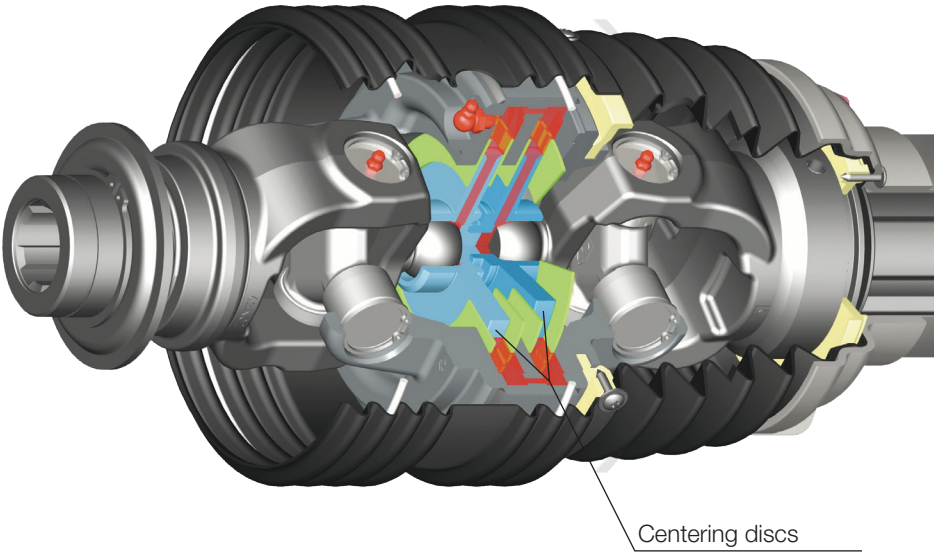
Developments in farming mean that tractors, implements, and drivelines need to be increasingly powerful.

In the case of drivelines with CV joints, the SFT SH CV joint is the ideal solution for tractors over 200 Hp at 1000 rpm.

The new feature of this wide-angled joint is the presence of two centering discs in the central housing, to guide the input and output yokes.

The discs are inter-connected but work in separate chambers, sharing loads and enabling the SH CV to handle much higher torques than a conventional CV joint with only one centering disc.

The maximum joint angle for SH CV joints is 75° during turns and maneuvers.

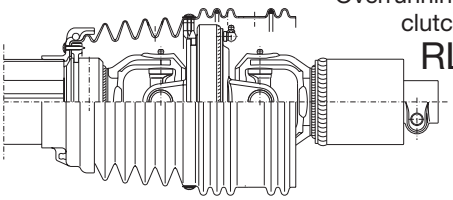


Yokes for 80° constant velocity joints

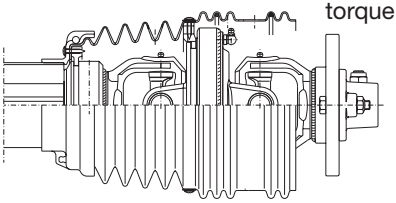
CV joints may be fitted, on request, with torque limiters or overrunning clutches integrated with the outer yoke, as shown opposite.

Torque limiters and clutches must always be installed on the implement side of the primary driveline. All rotating parts must be guarded.

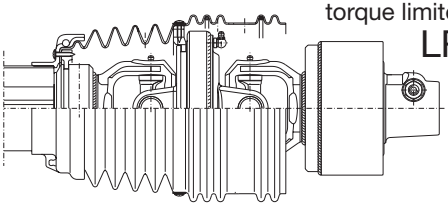
Overrunning clutch
RL



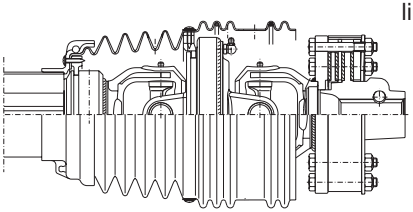
Shear bolt torque limiter
LB



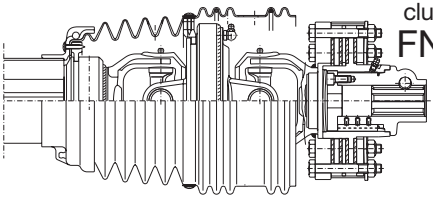
Automatic torque limiter
LR



Friction torque limiter
FV
FT
FK

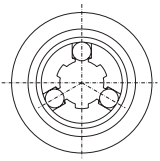


Friction torque limiter and overrunning clutch
FNT

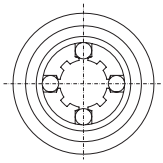


Yokes for 80° constant velocity joints

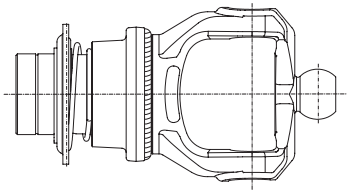
Ball collar yokes RT TRACTOR SIDE

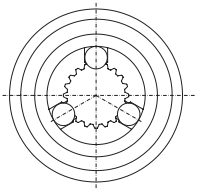


Collar type: A

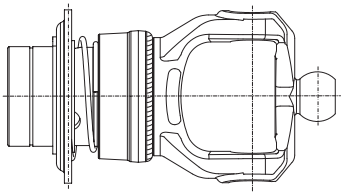


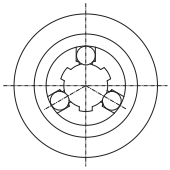
Collar type: A1



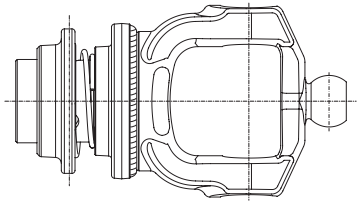


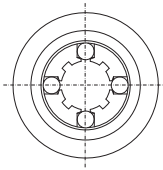
Collar type: B



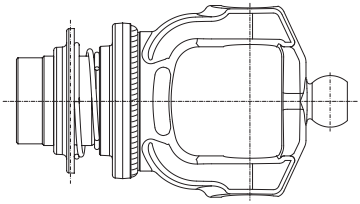


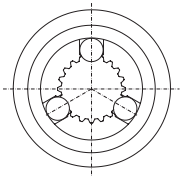
Collar type: C



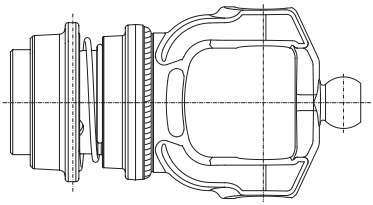


Collar type: C1





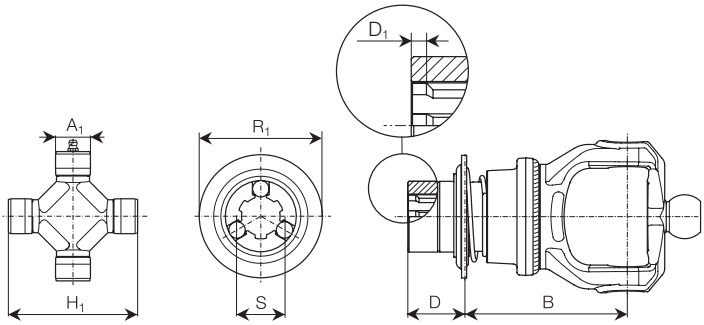
Collar type: D



Yokes for 80° constant velocity joints

Ball collar yokes TRACTOR SIDE

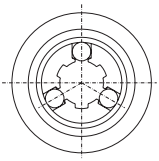
RT



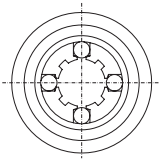
	A_1 mm	H_1 mm	S	R_1 mm	D mm	D_1 mm	B mm	Type p. 13.4	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	1 3/8" Z6	95	31	2	87	A	WR7	5730C0377	435000323R
			1 3/8" Z21	95	31	2	87	A	WR8	5730C3789	435000323R
			D8x32x38	95	31	2	89	A1	WR6	5730C2175	435002115R
S4	22.0	86.0	1 3/8" Z6	95	29	2	103	A	WR7	5730E0384	435000323R
			1 3/8" Z21	95	40	2	91	A	WR8	5730E3784	435000323R
			D8x32x38	95	29	2	103	A1	WR6	5730E2184	435002115R
			1 3/4" Z6	120	40	2	109	B	WR9	5730E0484	435000420R
			1 3/4" Z20	120	40	2	109	B	WR0	5730E3884	435000420R
S5	- -	- -	- -	- -	- -		- -		- -	- -	- -
S6 - H7	27.0	100.0	1 3/8" Z6	95	35	7	119	A	WR7	5730G0384	435000323R
			1 3/8" Z21	95	40	2	106	A	WR8	5730G3784	435000323R
			D8x32x38	95	35	2	119	C1	WR6	5730G2184	435002117R
			1 3/4" Z6	120	40	2	120	B	WR9	5730G0484	435000420R
			1 3/4" Z20	120	40	2	120	B	WR0	5730G3884	435000420R
S8 - H8	30.2	106.0	1 3/8" Z6	95	38	2	123	A	WS7	5730L0387	435000323R
			1 3/8" Z21	95	40	2	114	A	WR8	5730L3784	435000323R
			D8x32x38	95	38	2	123	C1	WR6	5730L2184	435002117R
			1 3/4" Z6	120	40	2	127	B	WR9	5730L0484	435000420R
			1 3/4" Z20	120	50	2	127	B	WS0	5730L3887	435000420R
S9	30.2	122.0	1 3/8" Z6	95	38	2	115	C	WS7	5730M0387	435000314R
			1 3/8" Z21	95	40	2	108	C	WR8	5730M3776	435000314R
			D8x32x38	95	38	2	115	C1	WR6	5730M2175	435002117R
			1 3/4" Z6	105	40	2	126	D	WR9	5730M0476	435000425R
			1 3/4" Z20	105	50	2	126	D	WS0	5730M3887	435000425R
SH	34.9	112.0	1 3/8" Z6	95	38	2	116	C	WS7	5730N0387	435000314R
			1 3/8" Z21	95	40	2	109	C	WR8	5730N3776	435000314R
			D8x32x38	95	38	2	116	C1	WR6	5730N2151	435002117R
			1 3/4" Z6	105	40	2	127	D	WR9	5730N0476	435000425R
			1 3/4" Z20	105	50	2	127	D	WS0	5730N3887	435000425R
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 80° constant velocity joints

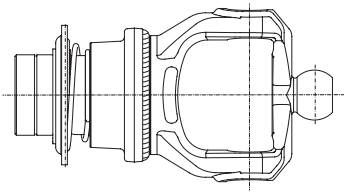
Ball collar yokes RT IMPLEMENT SIDE

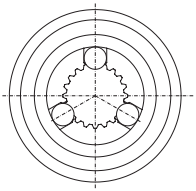


Collar type: A

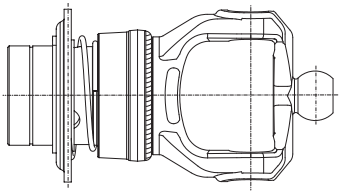


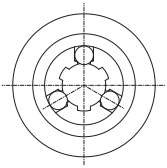
Collar type: A1



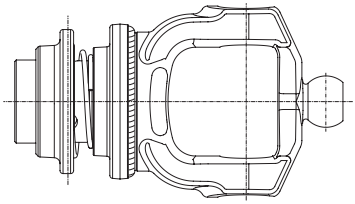


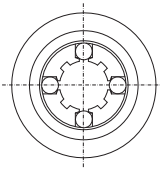
Collar type: B



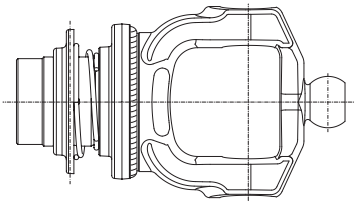


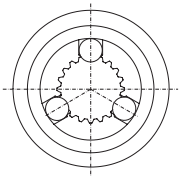
Collar type: C



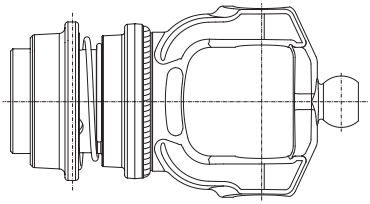


Collar type: C1





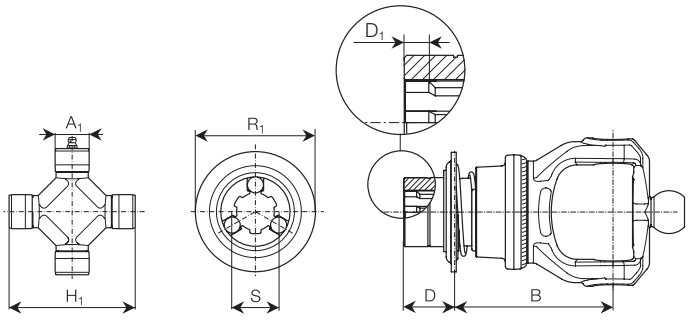
Collar type: D



Yokes for 80° constant velocity joints

Ball collar yokes IMPLEMENT SIDE

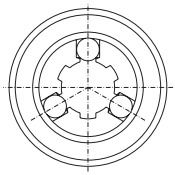
RT

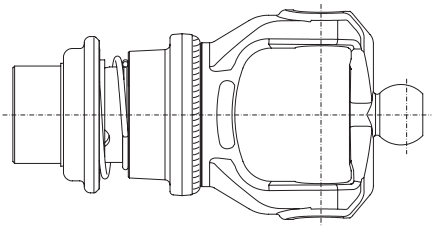


	A_1 mm	H_1 mm	S	R_1 mm	D mm	D_1 mm	B mm	Type p. 13.6	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	1 3/8" Z6	95	31	2	87	A	WR7	5730C0377	435000323R
			1 3/8" Z21	95	31	2	87	A	WR8	5730C3789	435000323R
			D8x32x38	95	31	2	89	A1	WR6	5730C2175	435002115R
S4	22.0	86.0	1 3/8" Z6	95	29	2	103	A	WR7	5730E0384	435000323R
			1 3/8" Z21	95	40	2	91	A	WR8	5730E3784	435000323R
			D8x32x38	95	29	2	103	A1	WR6	5730E2184	435002115R
			1 3/4" Z6	120	40	2	109	B	WR9	5730E0484	435000420R
			1 3/4" Z20	120	40	2	109	B	WR0	5730E3884	435000420R
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6 - H7	27.0	100.0	1 3/8" Z6	95	35	7	119	A	WR7	5730G0384	435000323R
			1 3/8" Z21	95	40	2	106	A	WR8	5730G3784	435000323R
			D8x32x38	95	35	2	119	C1	WR6	5730G2184	435002117R
			1 3/4" Z6	120	40	2	120	B	WR9	5730G0484	435000420R
			1 3/4" Z20	120	40	2	120	B	WR0	5730G3884	435000420R
S8 - H8	30.2	106.0	1 3/8" Z6	95	38	10	123	A	WR7	5730L0384	435000323R
			1 3/8" Z21	95	40	2	114	A	WR8	5730L3784	435000323R
			D8x32x38	95	38	2	123	C1	WR6	5730L2184	435002117R
			1 3/4" Z6	120	40	2	127	B	WR9	5730L0484	435000420R
			1 3/4" Z20	120	50	14	127	B	WR0	5730L3884	435000420R
S9	30.2	122.0	1 3/8" Z6	95	38	10	115	C	WR7	5730M0376	435000314R
			1 3/8" Z21	95	40	2	108	C	WR8	5730M3776	435000314R
			D8x32x38	95	38	2	115	C1	WR6	5730M2175	435002117R
			1 3/4" Z6	105	40	2	126	D	WR9	5730M0476	435000425R
			1 3/4" Z20	105	50	14	126	D	WR0	5730M3876	435000425R
SH	34.9	112.0	1 3/8" Z6	95	38	10	116	C	WR7	5730N0376	435000314R
			1 3/8" Z21	95	40	2	109	C	WR8	5730N3776	435000314R
			D8x32x38	95	38	2	116	C1	WR6	5730N2151	435002117R
			1 3/4" Z6	105	40	2	127	D	WR9	5730N0476	435000425R
			1 3/4" Z20	105	50	14	127	D	WR0	5730N3876	435000425R
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

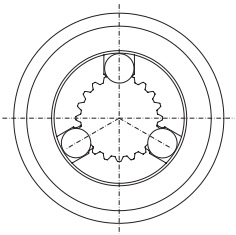
Yokes for 80° constant velocity joints

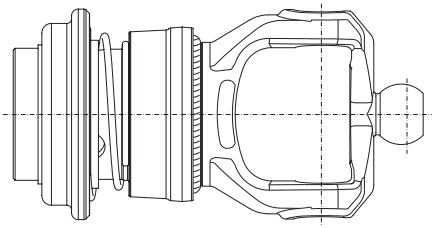
Ball collar yokes RTA TRACTOR SIDE





Collar type: A



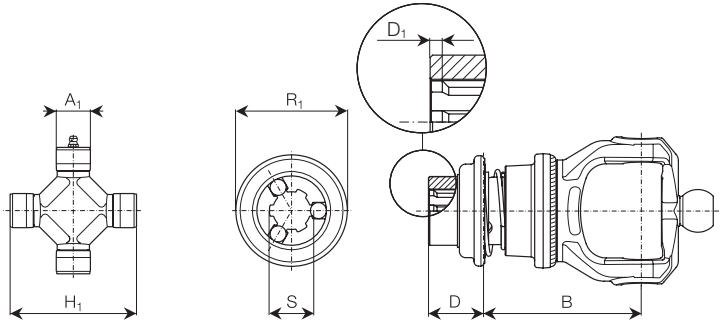


Collar type: B

Yokes for 80° constant velocity joints

Automatic ball collar yokes TRACTOR SIDE

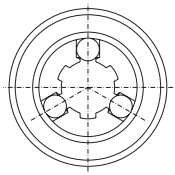
RTA

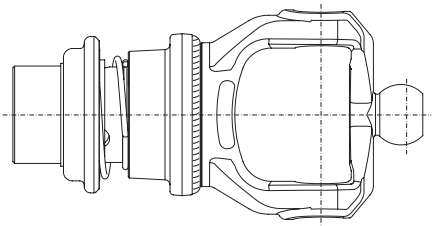


	A_1 mm	H_1 mm	S	R_1 mm	D mm	D_1 mm	B mm	Type p. 13.8	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
S4	22.0	86.0	1 3/8" Z6	88	29	2	103	A	WQ7	5730E0391	435000311R
			1 3/8" Z21	88	40	2	91	A	WQ8	5730E3791	435000311R
			1 3/4" Z6	110	40	2	109	B	WQ9	5730E0491	435000411R
			1 3/4" Z20	110	40	2	109	B	WQ0	5730E3891	435000411R
S5	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
S6 - H7	27.0	100.0	1 3/8" Z6	88	35	7	119	A	WQ7	5730G0391	435000311R
			1 3/8" Z21	88	40	2	106	A	WQ8	5730G3791	435000311R
			1 3/4" Z6	110	40	2	120	B	WQ9	5730G0491	435000411R
			1 3/4" Z20	110	40	2	120	B	WQ0	5730G3891	435000411R
S8 - H8	30.2	106.0	1 3/8" Z6	88	38	2	123	A	WP7	5730L0392	435000311R
			1 3/8" Z21	88	40	2	114	A	WQ8	5730L3791	435000311R
			1 3/4" Z6	110	40	2	127	B	WQ9	5730L0491	435000411R
			1 3/4" Z20	110	50	2	127	B	WP0	5730L3892	435000411R
S9	30.2	122.0	1 3/8" Z6	88	38	2	115	A	WP7	5730M0392	435000311R
			1 3/8" Z21	88	40	2	108	A	WQ8	5730M3791	435000311R
			1 3/4" Z6	110	40	2	126	B	WQ9	5730M0491	435000411R
			1 3/4" Z20	110	50	2	126	B	WP0	5730M3892	435000411R
SH	34.9	112.0	1 3/8" Z6	88	38	2	116	A	WP7	5730N0392	435000311R
			1 3/8" Z21	88	40	2	109	A	WQ8	5730N3791	435000311R
			1 3/4" Z6	110	40	2	127	B	WQ9	5730N0491	435000411R
			1 3/4" Z20	110	50	2	127	B	WP0	5730N3892	435000411R
S0	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -

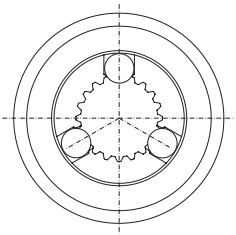
Yokes for 80° constant velocity joints

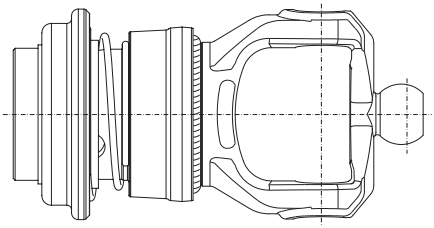
Ball collar yokes RTA IMPLEMENT SIDE





Collar type: A



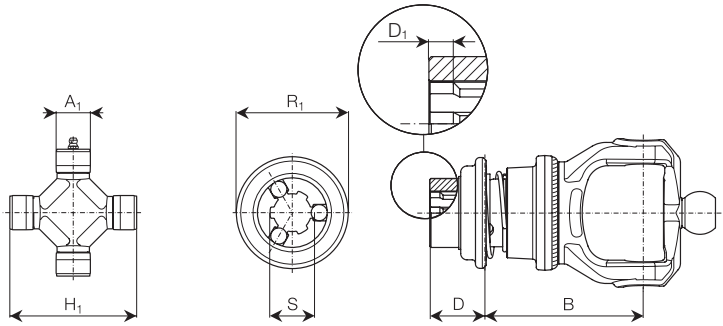


Collar type: B

Yokes for 80° constant velocity joints

Automatic ball collar yokes IMPLEMENT SIDE

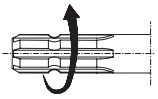
RTA



	A_1 mm	H_1 mm	S	R_1 mm	D mm	D_1 mm	B mm	Type p. 13.10	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
S4	22.0	86.0	1 3/8" Z6	88	29	2	103	A	WQ7	5730E0391	435000311R
			1 3/8" Z21	88	40	2	91	A	WQ8	5730E3791	435000311R
			1 3/4" Z6	110	40	2	109	B	WQ9	5730E0491	435000411R
			1 3/4" Z20	110	40	2	109	B	WQ0	5730E3891	435000411R
S5	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
S6 - H7	27.0	100.0	1 3/8" Z6	88	35	7	119	A	WQ7	5730G0391	435000311R
			1 3/8" Z21	88	40	2	106	A	WQ8	5730G3791	435000311R
			1 3/4" Z6	110	40	2	120	B	WQ9	5730G0491	435000411R
			1 3/4" Z20	110	40	2	120	B	WQ0	5730G3891	435000411R
S8 - H8	30.2	106.0	1 3/8" Z6	88	38	10	123	A	WQ7	5730L0391	435000311R
			1 3/8" Z21	88	40	2	114	A	WQ8	5730L3791	435000311R
			1 3/4" Z6	110	40	2	127	B	WQ9	5730L0491	435000411R
			1 3/4" Z20	110	50	14	127	B	WQ0	5730L3891	435000411R
S9	30.2	122.0	1 3/8" Z6	88	38	10	115	A	WQ7	5730M0391	435000311R
			1 3/8" Z21	88	40	2	108	A	WQ8	5730M3791	435000311R
			1 3/4" Z6	110	40	2	126	B	WQ9	5730M0491	435000411R
			1 3/4" Z20	110	50	14	126	B	WQ0	5730M3891	435000411R
SH	34.9	112.0	1 3/8" Z6	88	38	10	116	A	WQ7	5730N0391	435000311R
			1 3/8" Z21	88	40	2	109	A	WQ8	5730N3791	435000311R
			1 3/4" Z6	110	40	2	127	B	WQ9	5730N0491	435000411R
			1 3/4" Z20	110	50	14	127	B	WQ0	5730N3891	435000411R
S0	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -		- -	- -	- -	- -	- -

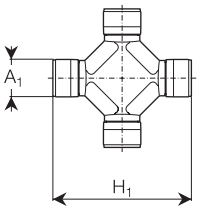
Yokes for 80° constant velocity joints

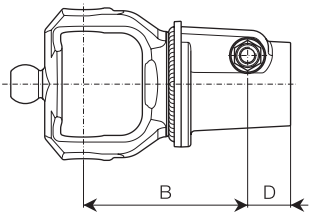
Taper pin yokes for counter-clockwise rotating drivelines

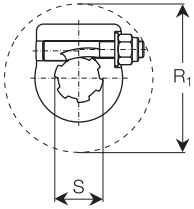


Do not use on tractor's PTO

Recommended tightening torque:
150 Nm for 1 3/8" Z6 – Z21
220 Nm for 1 3/4" Z6 – Z20



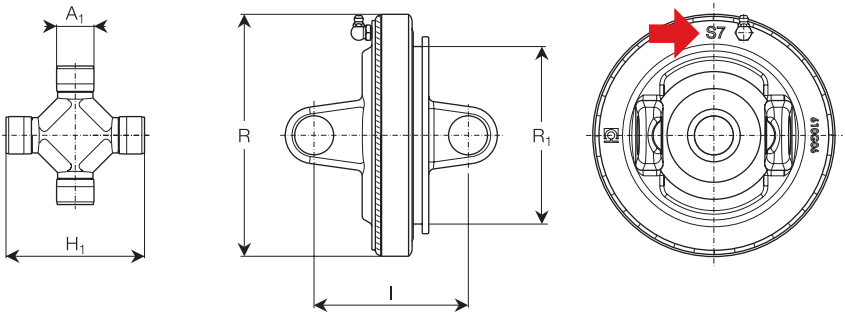




	A_1 mm	H_1 mm	S	B mm	D mm	R_1 mm	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	1 3/8" Z6	103	31	106	W14	5110E0361	408000075R
			1 3/8" Z21	91	31	106	W15	5110E3761	408000075R
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6 - H7	27.0	100.0	1 3/8" Z6	119	31	106	W14	5110G0361	408000075R
			1 3/8" Z21	106	31	106	W15	5110G3761	408000075R
			1 3/4" Z6	120	31	126	W16	5110G0461	408000076R
			1 3/4" Z20	120	31	126	W17	5110G3861	408000076R
S8 - H8	30.2	106.0	1 3/8" Z6	126	31	106	W14	5110L0361	408000075R
			1 3/8" Z21	114	31	106	W15	5110L3761	408000075R
			1 3/4" Z6	127	31	126	W16	5110L0461	408000076R
			1 3/4" Z20	127	31	126	W17	5110L3861	408000076R
S9	30.2	122.0	1 3/8" Z6	126	31	106	W14	5110M0351	408000075R
			1 3/8" Z21	126	31	106	W15	5110M3751	408000075R
			1 3/4" Z6	126	31	126	W16	5110M0451	408000076R
			1 3/4" Z20	126	31	126	W17	5110M3851	408000076R
SH	34.9	112.0	1 3/8" Z6	127	31	106	W14	5110N0351	408000075R
			1 3/8" Z21	127	31	106	W15	5110N3751	408000075R
			1 3/4" Z6	127	31	126	W16	5110N0451	408000076R
			1 3/4" Z20	127	31	126	W17	5110N3851	408000076R
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 80° constant velocity joints

CV housings

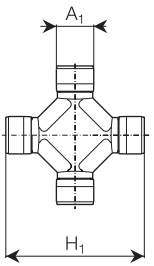


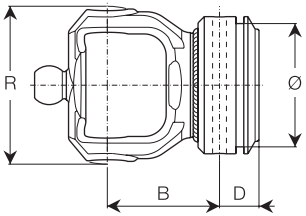
	A_1 mm	H_1 mm	l mm	R mm	R_1 mm	Spare part code
S1	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	85	127	101	5110C0053
S4	22.0	86.0	93	140	101	5110E0052
S5	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	112	175	128	5110G0061
H7 [1)]	27.0	100.0	112	175	128	5110H0051
S8	30.2	106.0	119	190	146	5110L0063
H8	30.2	106.0	119	190	146	5110L0063
S9	30.2	122.0	140	202	146	5110M0051
SH	34.9	112.0	150	202	146	5110N0051
S0	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -

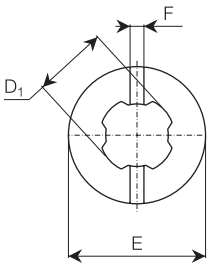
[1)] The H7 80° CV joint is the same size as S6 but uses upgraded materials to transmit increased power. It is marked “S7” on the CV housing.

Yokes for 80° constant velocity joints

Tube yokes for outer Four-tooth profile tube



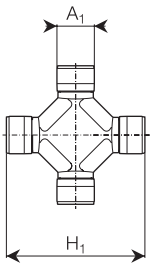


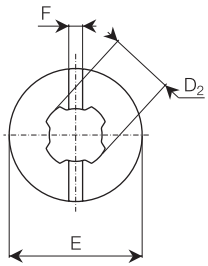


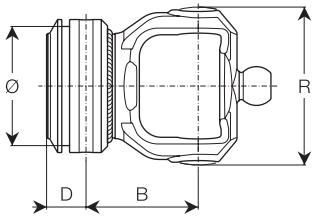
	A_1 mm	H_1 mm	R mm	B mm	D mm	Ø mm	D_1 mm	F mm	E mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	88	75	25	73	45.6	8	61	2150C6871	341038000R10
S4	22.0	86.0	96	76	22	73	50.2	8	83	2150E6871	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	106	81	29	89	53.9	10	99	2150G6871	341103000R10
H7	27.0	100.0	106	81	29	89	58.2	10	99	2150G6882	341103000R10
S8	30.2	106.0	123	89	29	89	58.2	10	99	2150L6871	341103000R10
H8	30.2	106.0	123	89	29	89	66.0	10	99	2150L6867	341103000R10
S9	30.2	122.0	140	93	33	99	66.0	10	109	2150M6851	341113000R10
SH	34.9	112.0	130	93	33	99	70.2	10	109	2150N6851	341113000R10
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 80° constant velocity joints

Tube yokes for inner Four-tooth profile tube



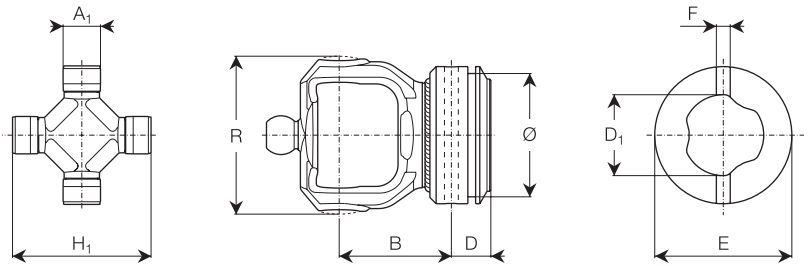




	A_1 mm	H_1 mm	D_2 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	39.6	8	61	70	25	75	88	2150C6872	341038000R10
S4	22.0	86.0	44.2	8	80	70	22	76	96	2150E6872	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	46.9	10	96	86	29	81	106	2150G6872	341103000R10
H7	27.0	100.0	51.2	10	96	86	29	81	106	2150G6895	341103000R10
S8	30.2	106.0	51.2	10	96	86	29	89	123	2150L6872	341103000R10
H8	30.2	106.0	58.5	10	96	86	29	89	123	2150L6868	341103000R10
S9	30.2	122.0	58.5	10	106	96	33	93	140	2150M6852	341113000R10
SH	34.9	112.0	61.7	10	106	96	33	93	130	2150N6852	341113000R10
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 80° constant velocity joints

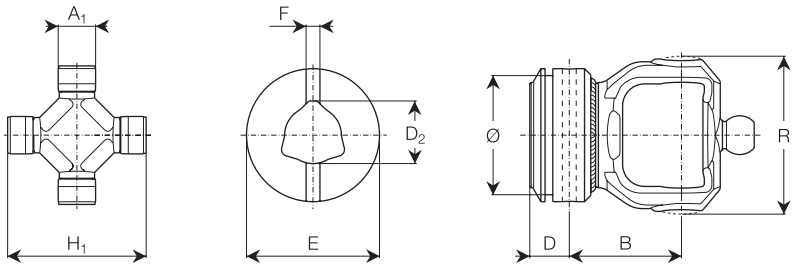
Tube yokes for outer Free Rotation profile tube



	A_1 mm	H_1 mm	R mm	B mm	D mm	Ø mm	D_1 mm	E mm	F mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	88	75.0	25.0	73	40.4	61	8	2150C6873	341038000R10
S4	22.0	86.0	96	75.5	21.5	73	48.0	83	8	2150E6883	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	106	81.0	28.5	89	58.5	99	10	2150G6883	341103000R10
H7	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

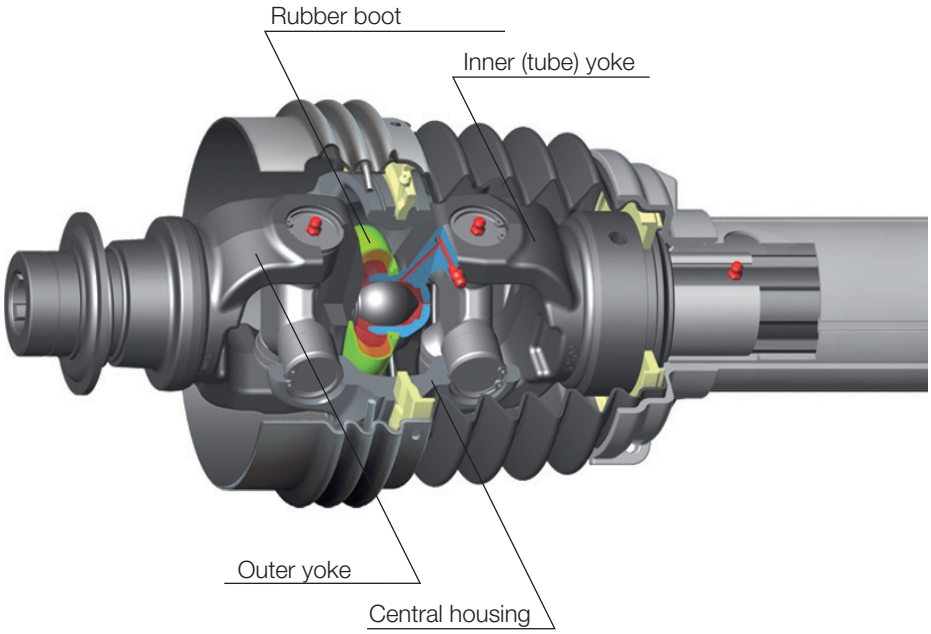
Yokes for 80° constant velocity joints

Tube yokes for inner Free Rotation profile tube



	A_1 mm	H_1 mm	D_2 mm	F mm	E mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	22.0	76.0	29.8	8	61	70	25.0	74.5	88	2150C6874	341038000R10
S4	22.0	86.0	36.7	8	80	70	21.5	75.5	96	2150E6884	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	45.2	10	96	86	28.5	81.0	106	2150G6884	341103000R10
H7	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 50° constant velocity joints



Unlike 80° CV joints, 50° CV joints do not have a centering disc. Centering is achieved by components that are part of each yoke. Centering components include a ball on the outer yoke, which is contained within a socket on the inner yoke.
The outer yoke is welded to a splined hub. This hub may incorporate a ball collar, automatic ball or taper pin (the latter only for implement side drivelines or inner drivelines) for connection to the splined shaft.

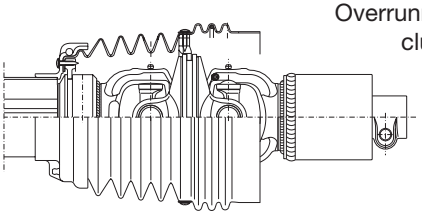
The inner yoke is welded to a hub that is broached according to the profile of the telescoping members.
This section includes dimensions and 3-digit (driveline) code numbers to use when specifying a complete driveline, as well as spare part codes for outer yokes, inner yokes, center housings and rubber boots.

Yokes for 50° constant velocity joints

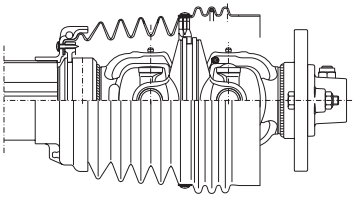
CV joints may incorporate, upon request, torque limiters or overrunning clutches as part of the outer yoke, as shown opposite.

Torque limiters and clutches must always be installed on the implement side of a primary driveline. All rotating parts must be guarded.

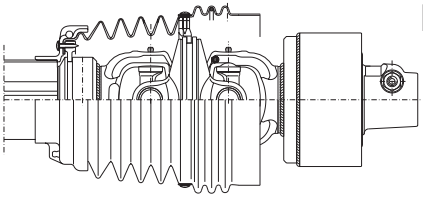
Overrunning clutch
RL



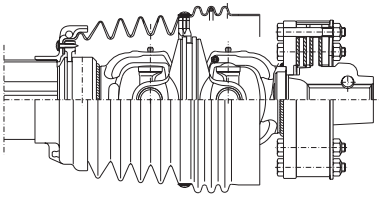
Shear bolt torque limiter
LB



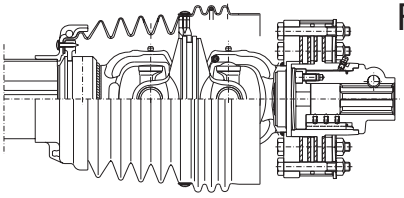
Automatic torque limiter
LR



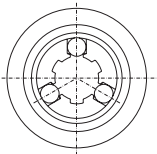
Friction clutch torque limiter
FV
FT
FK



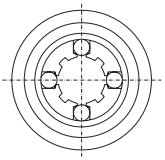
Friction torque limiter and overrunning
FNT



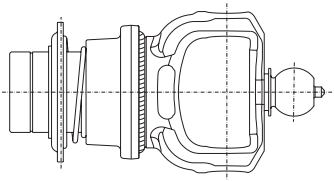
Ball collar yokes RT

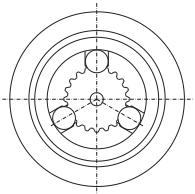


Collar type: A

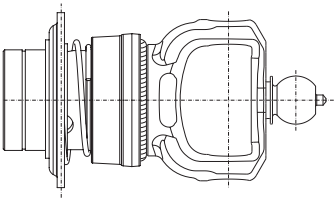


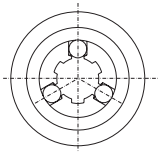
Collar type: A1



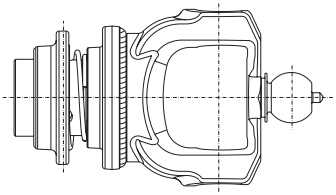


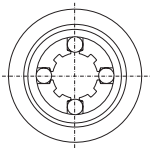
Collar type: B



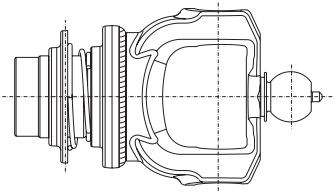


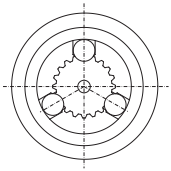
Collar type: C



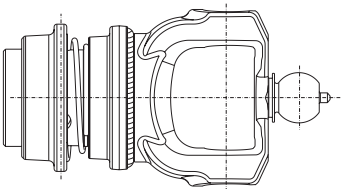


Collar type: C1



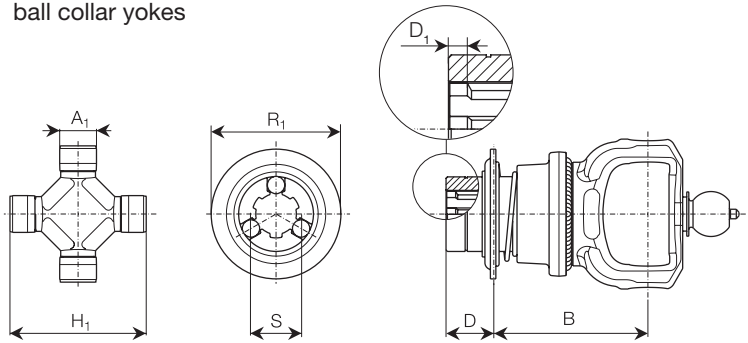


Collar type: D



Yokes for 50° constant velocity joints

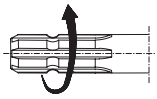
RT ball collar yokes



	A_1 mm	H_1 mm	S	R_1 mm	D mm	D_1 mm	B mm	Type p. 14.3	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	1 3/8" Z6	95	29	2	95	A	KR7	5730E0353	435000323R
			1 3/8" Z21	95	40	2	82	A	KR8	5730E3753	435000323R
			D8x32x38	95	29	2	95	A1	KR6	5730E2153	435002115R
			1 3/4" Z6	120	40	2	100	B	KR9	5730E0453	435000420R
			1 3/4" Z20	120	40	2	100	B	KR0	5730E3853	435000420R
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6 -H7	27.0	100.0	1 3/8" Z6	95	35	7	114	A	KR7	5730G0353	435000323R
			1 3/8" Z21	95	40	2	102	A	KR8	5730G3753	435000323R
			D8x32x38	95	35	2	114	C1	KR6	5730G2153	435002117R
			1 3/4" Z6	120	40	2	115	B	KR9	5730G0453	435000420R
			1 3/4" Z20	120	40	2	115	B	KR0	5730G3853	435000420R
S8 -H8	30.2	106.0	1 3/8" Z6	95	35	7	114	A	KR7	5730L0353	435000323R
			1 3/8" Z21	95	40	2	102	A	KR8	5730L3753	435000323R
			D8x32x38	95	35	2	114	C1	KR6	5730L2153	435002117R
			1 3/4" Z6	120	40	2	115	B	KR9	5730L0453	435000420R
			1 3/4" Z20	120	40	2	115	B	KR0	5730L3853	435000420R
S9 -SH	34.9	112.0	1 3/8" Z6	95	35	7	113	C	KR7	5730N0355	435000314R
			1 3/8" Z21	95	40	2	103	C	KR8	5730N3755	435000314R
			D8x32x38	95	35	2	113	C1	KR6	5730N2153	435002117R
			1 3/4" Z6	105	40	2	121	D	KR9	5730N0455	435000425R
			1 3/4" Z20	105	40	2	121	D	KR0	5730N3855	435000425R
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

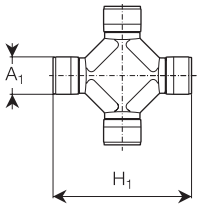
Yokes for 50° constant velocity joints

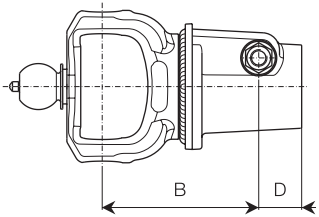
Taper pin yokes for drivelines with counter-clockwise rotation

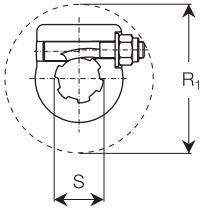


Do not use
on tractor's PTO

Recommended tightening torque:
150 Nm for 1 3/8" Z6 – Z21
220 Nm for 1 3/4" Z6 – Z20



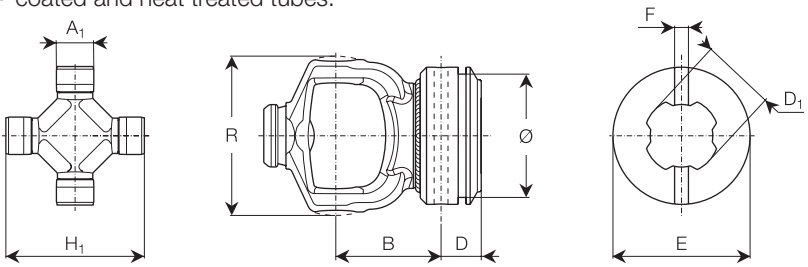




	A_1 mm	H_1 mm	S	B mm	D mm	R_1 mm	Yoke code	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	1 3/8" Z6	95	31	106	K14	5190E0352	408000075R
			1 3/8" Z21	82	31	106	K15	5190E3752	408000075R
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6 - H7	27.0	100.0	1 3/8" Z6	114	31	106	K14	5190G0352	408000075R
			1 3/8" Z21	102	31	106	K15	5190G3752	408000075R
			1 3/4" Z6	115	31	126	K16	5190G0452	408000076R
			1 3/4" Z20	115	31	126	K17	5190G3852	408000076R
S8 - H8	30.2	106.0	1 3/8" Z6	114	31	106	K14	5190L0352	408000075R
			1 3/8" Z21	102	31	106	K15	5190L3752	408000075R
			1 3/4" Z6	115	31	126	K16	5190L0452	408000076R
			1 3/4" Z20	115	31	126	K17	5190L3852	408000076R
S9 - SH	34.9	112.0	1 3/8" Z6	121	31	106	K14	5190N0351	408000075R
			1 3/8" Z21	121	31	106	K15	5190N3751	408000075R
			1 3/4" Z6	121	31	126	K16	5190N0451	408000076R
			1 3/4" Z20	121	31	126	K17	5190N3851	408000076R
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 50° constant velocity joints

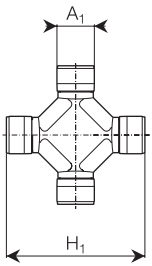
Tube yokes for outer Four-tooth profile tube
Same type of yoke is used on regular,
Rilsan® coated and heat treated tubes.

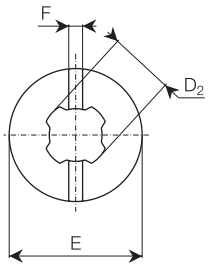


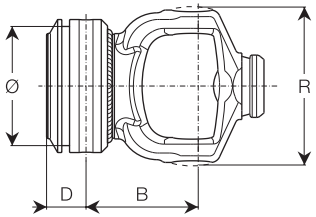
	A_1 mm	H_1 mm	R mm	B mm	D mm	Ø mm	E mm	F mm	D_1 mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	97	67	22	73	83	8	50.2	2080E6863	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	115	77	29	89	99	10	53.9	2080G6869	341103000R10
H7	27.0	100.0	115	77	29	89	99	10	58.2	2080G6873	341103000R10
S8	30.2	106.0	123	77	29	89	99	10	58.2	2080L6861	341103000R10
H8	30.2	106.0	123	77	29	89	99	10	66.0	2080L6866	341103000R10
S9	34.9	112.0	130	89	32	99	109	10	66.0	2080N6853	341103000R10
SH	34.9	112.0	130	92	29	99	109	10	70.2	2080N6851	341103000R10
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 50° constant velocity joints

Tube yokes for inner Four-tooth profile tube
Same type of yoke is used on regular, Rilsan® coated and heat treated tubes.



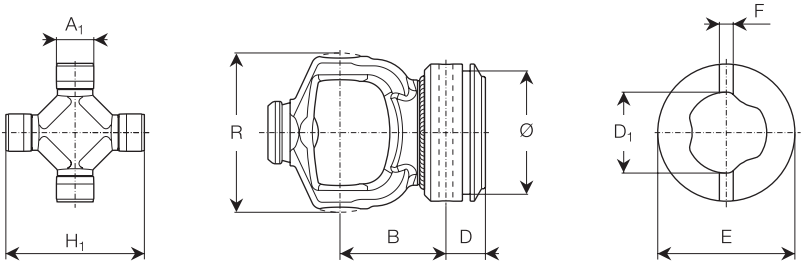




	A_1 mm	H_1 mm	F mm	E mm	D_2 mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	8	80	44.2	70	22	67	97	2080E6864	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	10	96	46.9	86	29	77	115	2080G6870	341103000R10
H7	27.0	100.0	10	96	51.2	86	29	77	115	2080G6874	341103000R10
S8	30.2	106.0	10	96	51.2	86	29	77	123	2080L6862	341103000R10
H8	30.2	106.0	10	96	58.5	86	29	77	123	2080L6867	341103000R10
S9	34.9	112.0	10	106	58.5	96	32	89	130	2080N6854	341103000R10
SH	34.9	112.0	10	106	61.7	96	29	92	130	2080N6852	341103000R10
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 50° constant velocity joints

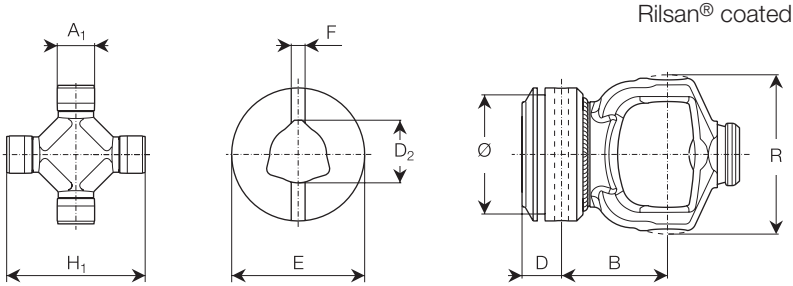
Tube yokes for outer Free Rotation profile tube
Same type of yoke is used on regular and Rilsan® coated tubes.



	A_1 mm	H_1 mm	R mm	B mm	D mm	Ø mm	D_1 mm	F mm	E mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	97	67	22	73	48.0	8	83	2080E6873	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	115	77	29	89	58.5	10	99	2080G6880	341103000R10
H7	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 50° constant velocity joints

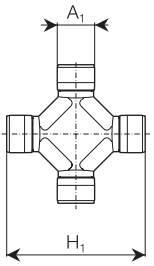
Tube yokes for inner Free Rotation tube
Same type of yoke is used on regular and Rilsan® coated tubes.

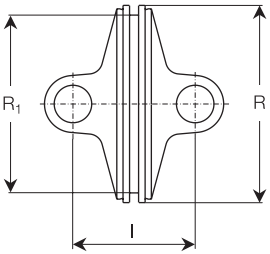


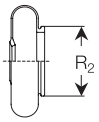
	A_1 mm	H_1 mm	F mm	E mm	D_2 mm	Ø mm	D mm	B mm	R mm	Spare part code	
S1	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	8	80	36.7	70	22	67	97	2080E6874	341078000R10
S5	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100	10	96	45.2	86	29	77	115	2080G6881	341103000R10
H7	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
H8	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S9	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SH	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

Yokes for 50° constant velocity joints

Central housing







Rubber shield

	A_1 mm	H_1 mm	R_1 mm	I mm	R mm	Spare part code	R_2 mm	Spare part code
S1	- -	- -	- -	- -	- -	- -	- -	- -
S2	- -	- -	- -	- -	- -	- -	- -	- -
S4	22.0	86.0	101	76	116	2080E0055	47.0	246000101
S5	- -	- -	- -	- -	- -	- -	- -	- -
S6	27.0	100.0	128	88	142	2080G0064	51.5	*246000116
H7	27.0	100.0	128	88	142	2080G0064	51.5	*246000116
S8	30.2	106.0	128	88	142	2080L0076	51.5	*246000116
H8	30.2	106.0	128	88	142	2080L0076	51.5	*246000116
S9	34.9	112.0	146	95	158	2080N0051	55.5	246000118
SH	34.9	112.0	146	95	158	2080N0051	55.5	246000118
S0	- -	- -	- -	- -	- -	- -	- -	- -
SK	- -	- -	- -	- -	- -	- -	- -	- -

*Note: The rubber shield 246000116 is attached using ring 339001046R20

Torque limiters and overrunning clutches

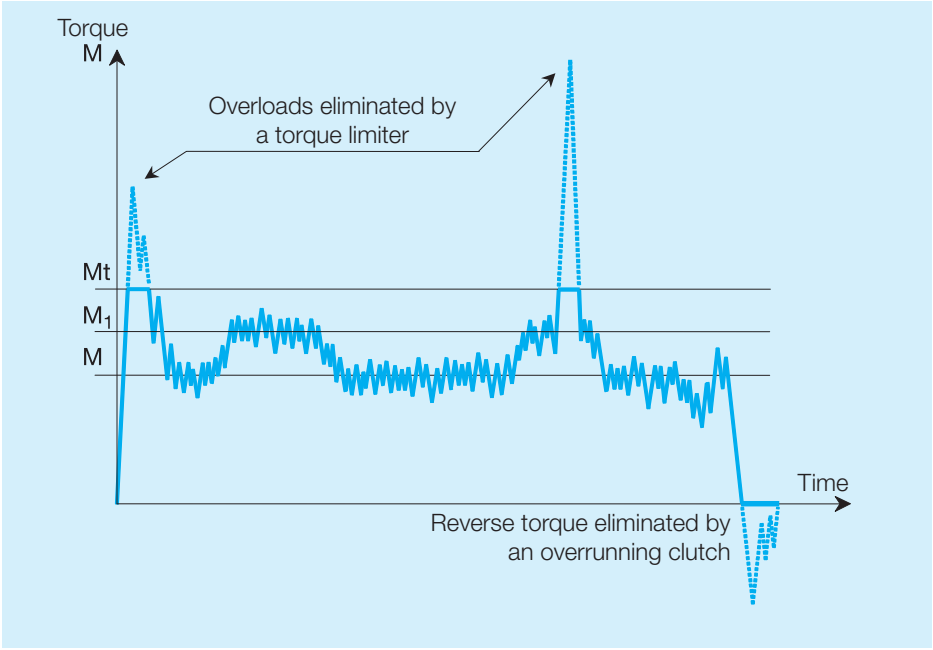
Implements are designed to work for a certain lifetime, determined by a specific duty cycle associated with the application. Due to accidental overloads or unusual working conditions, loads may exceed what is considered normal. When this happens, the implement must absorb whatever power is available from the tractor. Generally, the tractor can supply more power than the implement can reliably absorb.

Extremely high torque peaks can be generated by overloads, blockages, or sudden starts and stops of the implement. Eventually, these torque peaks may cause premature wear of the driveline and other implement components. Protection against overloads is achieved by installing a torque limiter or clutch on the driveline to help prevent damage and allow more rational sizing of power transmission components.

Different types of torque limiters and clutches are available. They should be selected according to the specific features of each implement and the particular duty cycle involved.

The torque absorbed by a farm implement usually varies, such as shown in the following diagram. Along with normal working conditions (torque M), variations occur (torque M_1), and overloads (shown eliminated by a torque limiter Mt) are possible as well.

For implements with high inertia (flywheels, heavy rotors), torque peaks are possible during startup and stopping. The reverse loads caused by stopping these types of implements are eliminated by an overrunning clutch.



Torque limiters and overrunning clutches

SFT drivelines include many different torque limiters, able to meet the requirements of any agricultural implement. The type of torque limiter must be selected according to the type of loads transmitted to the implement.

The setting (Mt) is made according to the median torque transmitted (M) and to the torque limit of the system (Mmax for the driveline). When determining the setting, it is recommended to consider a tolerance of at least ±10% with respect to the nominal value. It is also suggested to consider factors of safety with respect to the strength of the entire power transmission system.

Overrunning clutches are used to eliminate reverse torques generated by the inertial load of implements with large rotating masses such as flywheels. These reverse loads occur during deceleration or stopping the implement.

The torsionally resilient joints are able to limit torque peaks by temporarily absorbing them. This smoothes vibrations and alternating loads that generate fatigue stresses in the driveline.

Ratchet torque limiters, shear bolt limiters and automatic torque limiters are used with implements with constant or alternating torque cycles, with possible overloads or torque peaks. The setting (Mt) of these torque limiters is usually 2 to 3 times the median torque M.

In respect to torque limiter settings and the nominal torque Mn of the driveline, adequate settings for LR automatic torque limiter (used at 1000 min^{-1}) are defined. These settings are marked with (*) in the charts on the following pages.

It is suggested to use ratchet torque limiters for drivelines operating at a speed of 700 min^{-1} or less.

Friction clutch torque limiters are used on implements with alternating torque cycles and frequent overloads. They are able to protect the drive system from overloads, but allow work to continue without stopping.
Friction torque limiters with incorporated overrunning clutches are used on implements with high inertia (flywheels, rotors), subject to torque peaks (especially during start up) and overloads.

The setting of friction torque limiters (Mt) is usually 2 times the median torque M.
Standard settings for friction clutch torque limiters have been defined considering the pressure on the linings and the slipping velocity. As a consequence, maximum suggested settings have been defined for each friction torque limiter model and size, for drivelines operating at 1000 min^{-1}. These settings are marked with (*) and shown on the following pages.

Torque limiters and overrunning clutches

Standard Settings

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
Mmax (Nm):	850	1500	2200	2500	3000	3700	4000	5000	5000	6750	6750	11000
Ratchet torque limiters, uni-directional, weekly lubrication **(SA)** and seasonal lubrication **(LC)**												
SA1 - LC1	400											
SA2 - LC2	650	650										
		800										
SA3 - LC3		900										
		1000	1000									
		1200	1200	1200	1200							
SA4 - LC4			1400	1400	1400							
			1600	1600	1600							
Ratchet torque limiters, bi-directional, weekly lubrication **(LN)** and seasonal lubrication **(LT)**												
LN1 - LT1	300											
LN2 - LT2	460											
	600	600										
LN3 - LT3		800										
		900										
LN4 - LT4		1000	1000									
		1200	1200	1200	1200							
Shear bolt torque limiters												
LB	650											
	700											
	780											
		950^										
		1050										
		1250										
			1400									
			1700^									
			2000									
				2100								
				2400	2400^							
					2500							
					2700	2700	2700	2700				
						3100	3200	3200	3000			
							3600	3600	3500			
								4200	4200	4000		
										4500		
										5200		
												*7000
												9000
Automatic torque limiters												
LR23			*1200									
			1500	*1500								
			1700	1700	*1700							
				1900	1900							
				2100	2100	*2100						
LR24					2500	2600	*2500	*2500				
						2900	3000	3000	*3000			
LR35							3500	3500	3500	*3500		
								4100	4100	4100	*4100	
										4500	4500	

Mmax: maximum torque allowed with Four-Tooth and Four-Tooth Advanced. Free Rotation profile tubes see page 5.2.
Settings for LB limiters marked with (^) represent maximum suggested settings for Free Rotation tubes.
Setting for LR limiters marked with (*) are suggested for use at 1000 min^{-1}.

Torque limiters and overrunning clutches

Standard settings for Friction torque limiters

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
Mmax (Nm):	850	1500	2200	2500	3000	3700	4000	5000	5000	6750	6750	11000
Adjustable friction torque limiters												
FV22 -FFV22	*400											
	500	500										
		*600										
		800										
FV32 -FFV32			*900	900	900							
			1000	1000	1000							
			1100	*1100	*1100							
FV42 -FFV42			*1200	*1200	*1200	1200						
			1350	1350	1350	1350	1350	1350				
				1450	1450	*1450	*1450	*1450				
				1600	1600	1600	1600	1600				
						1800	1800	1800				
FV34 -FFV34			*1200	*1200	*1200	1200						
			1350	1350	1350	1350	1350	1350				
				1450	1450	*1450	1450	1450				
				1600	1600	1600	1600	1600				
						1800	*1800	*1800	*1800			
							2000	2000	2000			
FV44 -FFV44							*1800	*1800	1800			
							2000	2000	2000			
							2200	2200	*2200	2200	2200	
							2400	2400	2400	*2400	2400	
								2600	2600	2600	*2600	
										2800	2800	
											3000	
Non-adjustable friction torque limiters												
FT22 - FK22	*400											
	500	500										
		*600										
		800										
FT32 - FK32			*900	900	900							
			1000	1000	1000							
			1100	*1100	*1100							
FT42 - FK42				1200	*1200	1200						
					1450	*1450	*1450	*1450				
						1800	1800	1800				
FT34 - FK34					*1200	1200						
					1450	*1450	1450	1450				
						1800	*1800	*1800	*1800			
FT44- FK44							*1800	*1800	1800			
							2200	2200	*2200	2200	2200	
								2400	2400	*2400	2400	
								2600	2600	2600	*2600	

* Maximum suggested settings for 1000 min^{-1} velocity.

Standard settings for
Friction torque limiters with overrunning clutches

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
Mmax (Nm):	850	1500	2200	2500	3000	3700	4000	5000	5000	6750	6750	11000
Adjustable friction torque limiters with overrunning clutch												
FNV34 - FFNV34					*1200	1200						
					1350	1350	1350	1350				
					1450	*1450	1450	1450				
					1600	1600	1600	1600				
						1800	*1800	*1800	*1800			
							2000	2000	2000			
FNV44 - FFNV44							*1800	*1800	1800			
							2000	2000	2000			
							2200	2200	*2200	2200	2200	
							2400	2400	2400	*2400	2400	
								2600	2600	2600	*2600	
										2800	2800	
Non-adjustable friction torque limiters with overrunning clutch												
FNT34					*1200	1200						
					1450	*1450	1450	1450				
						1800	*1800	*1800	*1800			
FNT44							*1800	*1800	1800			
							2200	2200	*2200	2200	2200	
								2400	2400	*2400	2400	
								2600	2600	2600	*2600	

* Maximum suggested settings for 1000 min^{-1} velocity.

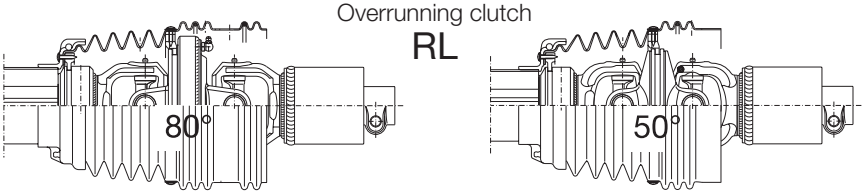
Torque limiters and overrunning clutches

Torque limiters and overrunning clutches can be incorporated, upon request, on drivelines with CV joints, as shown.

Torque limiters and overrunning clutches must always be installed on the implement side of a primary driveline. All rotating parts must be guarded.

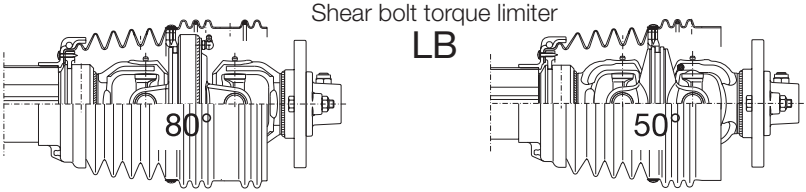
Overrunning clutch

RL



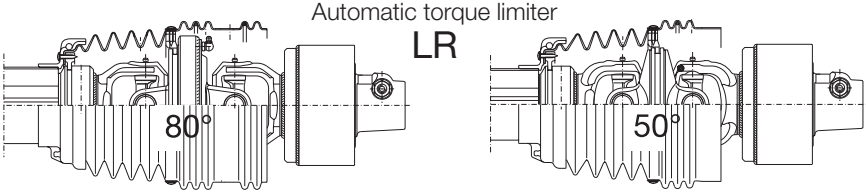
Shear bolt torque limiter

LB



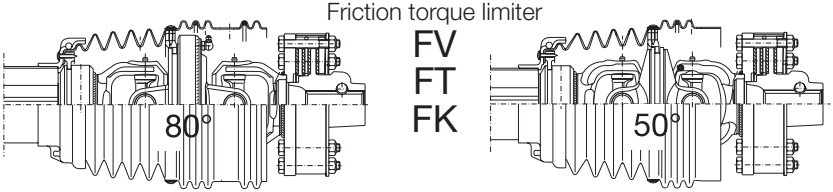
Automatic torque limiter

LR



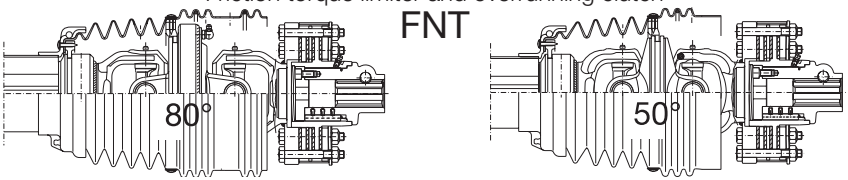
Friction torque limiter

FV
FT
FK

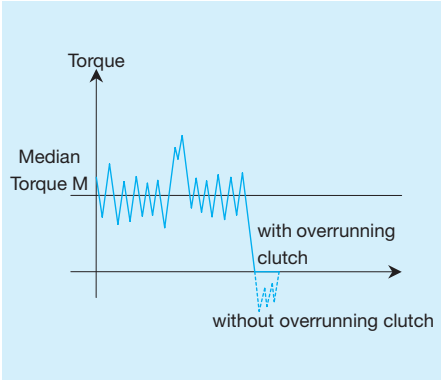


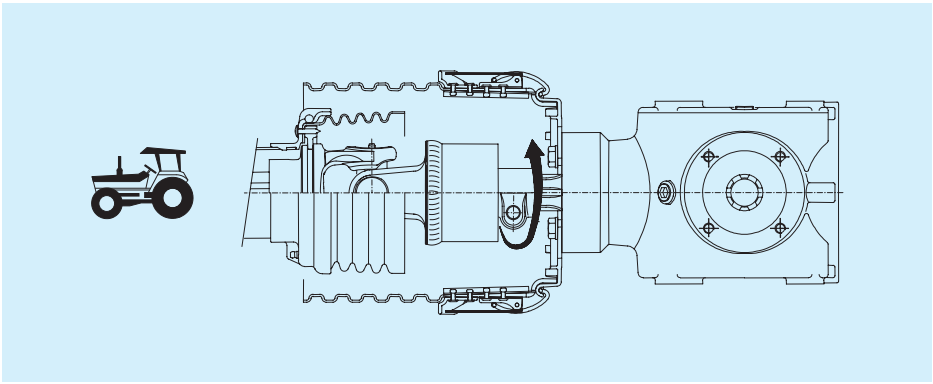
Friction torque limiter and overrunning clutch

FNT



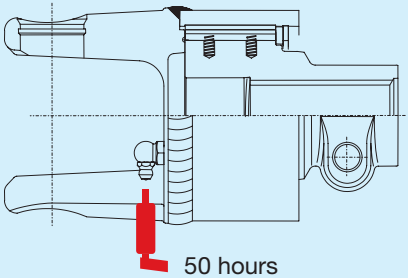
An overrunning clutch transmits rotary motion only in one direction. It is used to eliminate torque peaks generated by the inertia of implements with heavy rotating masses, such as rotors or flywheels during deceleration or stopping.
Combination friction clutches with overrunning clutches are usually mounted on implements with high rotary inertia (square balers or mower conditioners) in order to guard the driveline from possible torque peaks generated during both starting and stopping.
A standard overrunning clutch is designed to operate with counter-clockwise rotation of the driveline on which it is installed. This is the typical rotation of an overrunning clutch installed on the implement side of a driveline connecting a tractor's rear-mounted PTO (clockwise rotation viewed into the shaft) to the implement PIC (counter-clockwise rotation viewed into the shaft), as shown below.



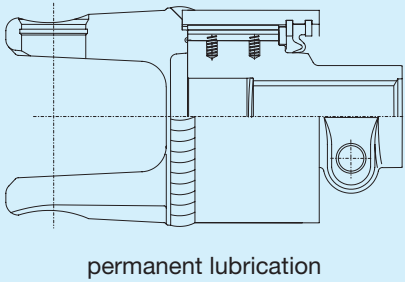


Overrunning clutches

Overrunning clutch RA



Overrunning clutch RL

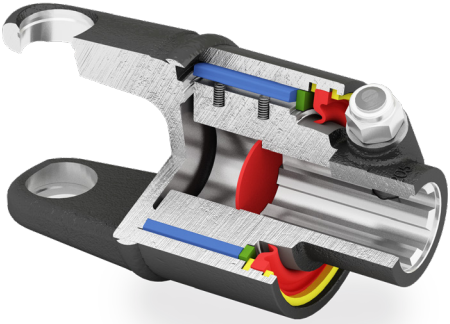


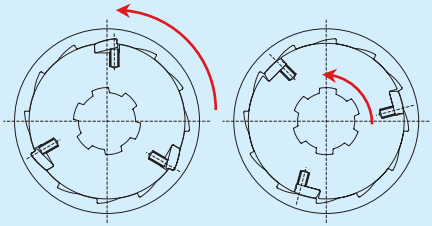
Two versions of overrunning clutches are available: RA and RL.

The RA version is equipped with a grease fitting and lubrication is recommended every 50 hours of use with NLGI grade 2 grease.

RL overrunning clutches are lubricated during assembly. No further lubrication is required and therefore no grease fitting is provided.

During normal operation (tractor driving implement), the pawls (either three, four or eight pawls per clutch, depending on model) transmit motion from the housing to the hub. During sudden deceleration or stopping, the driveline is driven by the inertia of the implement, which is connected to the hub of the overrunning clutch.
The pawls are depressed into grooves machined into the hub, and consequently motion is not transmitted to the housing or other driveline components.
The pawls, under pressure from the underlying springs, automatically reengage the grooves in the housing when transmission of motion is restored in the normal direction.





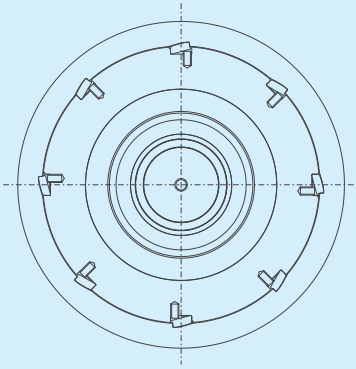
The torque transmitted creates compressive stress in the pawls of the RA and RL overrunning clutches, for smoother and more reliable operation.
The pressure applied to the pawls is a function of the power transmitted. The length and number of pawls increase with larger driveline sizes. Four sizes of overrunning clutches are available, with different length of pawls and attachment to PTO.

- RA1 and RL1
  Push-pin attachment for RA1
  Ball collar attachment for RL1

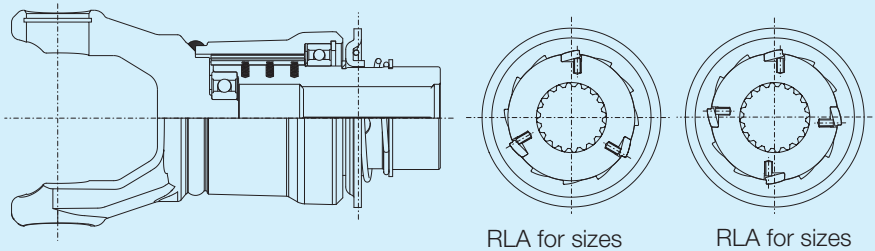
- RA2 and RL2
  Taper pin attachment
- RLA
  Ball collar attachment

- RL for size SK
  Ball collar attachment

For sizes SH and S0, the RLA overrunning clutches are equipped with four pawls (instead of three as found in other models). For size SK, the RL overrunning clutch is equipped with eight pawls.



RL for size SK

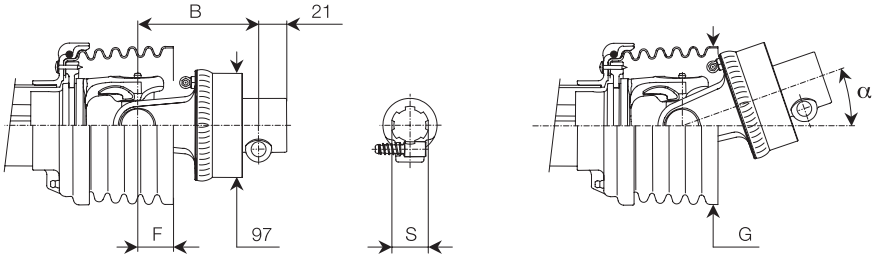


RLA for sizes H8 - S9

RLA for sizes SH - S0

Overrunning clutches

RA1



Maximum Torque 2400 Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	94	94	- -	- -	23	129	22°
S2	100	100	- -	- -	42	146	20°
S4	109	109	- -	- -	37	146	24°
S5	112	112	- -	- -	33	146	24°

Driveline Codes RA1

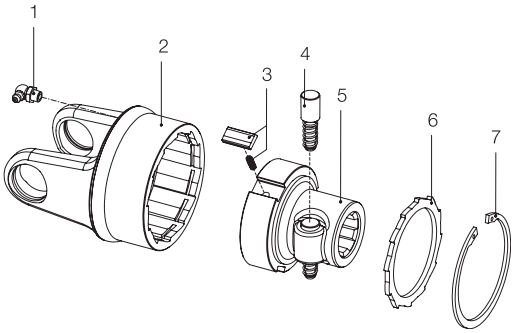
	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	096	631	- -	- -

Spare Parts Codes RA1

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S1	601101701R	601101702R	- -	- -
S2	601102701R	601102702R	- -	- -
S4	601104701R	601104702R	- -	- -
S5	601105704R	601105702R	- -	- -

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

RA1

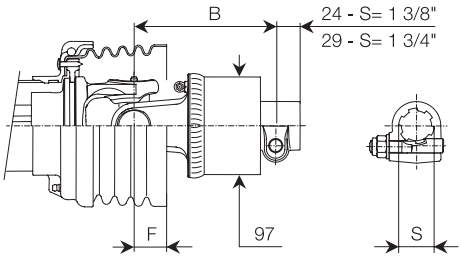


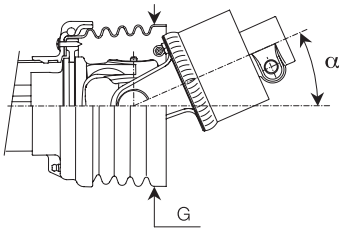
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease Fitting	
2	S1 S2 S4 S5	418011201R 418021201R 418041203R 418051201R	Outer Housing + Yoke	
3		4210C0001R03	Pawl + spring kit	
4		403000001R10	Push-pin kit	
5		5130C0301R 5130C3701R	Hub with push-pin	1 3/8" Z6 1 3/8" Z21
6		246000132R02	Locking plate	
7		338005000R20	Snap ring	82 x 2.5 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Overrunning clutches

RA2





Maximum Torque 3800 Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	140	140	142	142	32	160	32°
H7	147	147	149	149	29	160	29°
S8	160	160	162	162	42	160	28°

Driveline Codes RA2

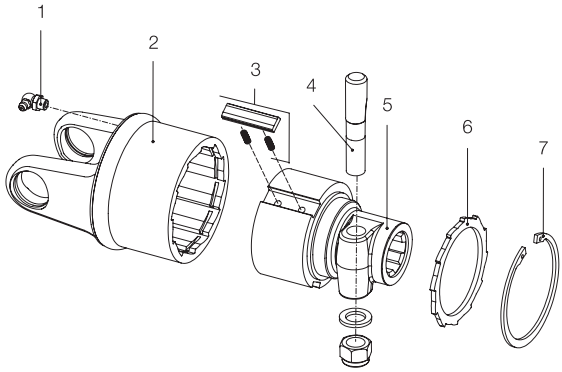
	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	A50	A51	A52	A53

Spare Parts Codes RA2

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	601205601R	601205602R	601205603R	601205604R
H7	601206601R	601206602R	601206603R	601206604R
S8	601217601R	601217602R	601217603R	601217604R

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

RA2

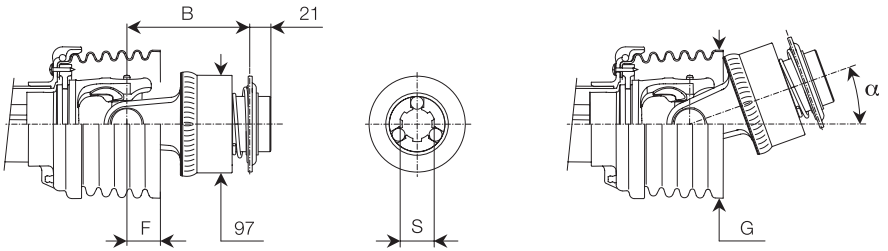


Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease Fitting	
2	S6 H7 S8	418052203R 418062203R 418172203R	Outer Housing + Yoke	
3		4210E0001R03	Pawl + spring kit	
4		408000047R02 408000046R02	Taper pin + washer + nut	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
5		5150E0301R 5150E3701R 5150E0401R 5150E3801R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
6		246000132R02 246000134R02	Locking plate Split locking plate	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
7		338005000R20	Snap ring	82 x 2.5 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Overrunning clutches

RL1 (permanent lubrication)



Maximum Torque 2400 Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	103	103	- -	- -	23	129	22°
S2	109	109	- -	- -	42	146	20°
S4	118	118	- -	- -	37	146	24°
S5	121	121	- -	- -	33	146	24°

Driveline Codes RL1

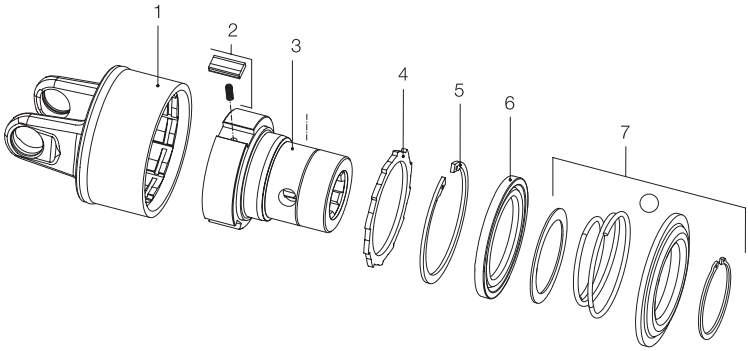
	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	0A0	0A1	- -	- -

RL1 Spare Parts Codes

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S1	60150B401R	60150B402R	- -	- -
S2	60150C401R	60150C402R	- -	- -
S4	60150E401R	60150E402R	- -	- -
S5	60150G401R	60150G402R	- -	- -

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

RL1

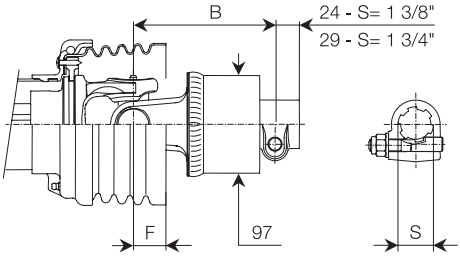


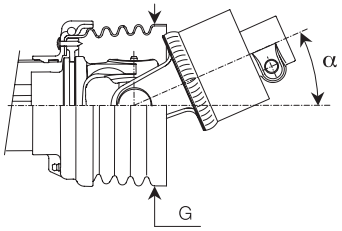
Ref.	Size	Spare part code	Description	Technical data
1	S1 S2 S4 S5	4180B5001R 4180C5001R 4180E5001R 4180G5001R	Outer Housing + Yoke	
2		4210C0001R03	Pawl + spring kit	
3		2270C0303R 2270C3703R	Hub	1 3/8” Z6 1 3/8” Z21
4		246000132R02	Locking plate	
5		338005000R20	Snap ring	82 x 2.5 DIN 472/1
6		359005901R02	Retaining ring	
7		435000331R	RT ball collar kit	1 3/8” Z6 - Z21

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Overrunning clutches

RL2 (permanent lubrication)





Maximum Torque 3800 Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	140	140	142	142	32	160	32°
H7	147	147	149	149	29	160	29°
S8	160	160	162	162	42	160	28°

Driveline Codes RL2

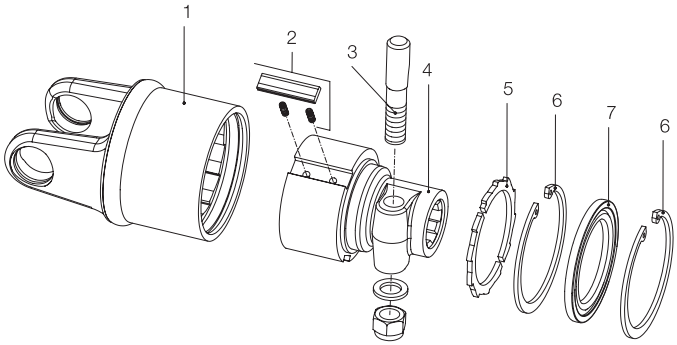
S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
0A2	0A3	0A4	0A5

RL2 Spare Parts Codes

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	60160G601R	60160G602R	60160G603R	60160G604R
H7	60160H601R	60160H602R	60160H603R	60160H604R
S8	60160L601R	60160L602R	60160L603R	60160L604R

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

RL2

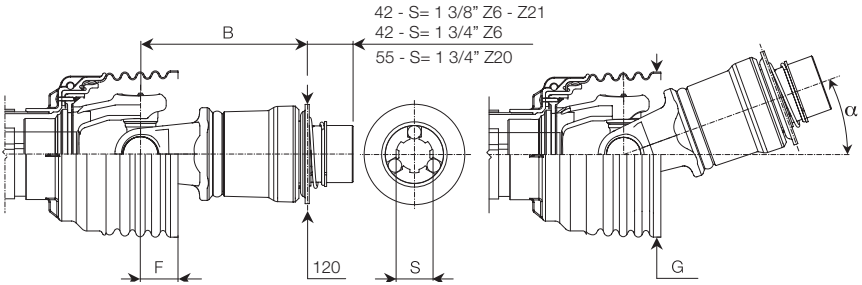


Ref.	Size	Spare part code	Description	Technical data
1	S6 H7 S8	4180G6001R 4180H6001R 4180L6001R	Outer Housing + Yoke	
2		4210E0001R03	Pawl + spring kit	
3		408000047R02 408000046R02	Taper pin + washer + nut	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
4		5150E0301R 5150E3701R 5150E0401R 5150E3801R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
5		246000132R02 246000134R02	Locking plate Split locking plate	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
6		338046000R20	Snap ring	88 x 3 DIN 472/1
7		359005900R02	Retaining ring	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Overrunning clutches

RLA (permanent lubrication)



Maximum Torque 6200 Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
H8	182	182	182	182	42	160	28°
S9	193	193	193	193	49	180	26°
SH	192	192	192	192	50	201	35°
S0	202	202	202	202	46	201	36°

Driveline Codes RLA

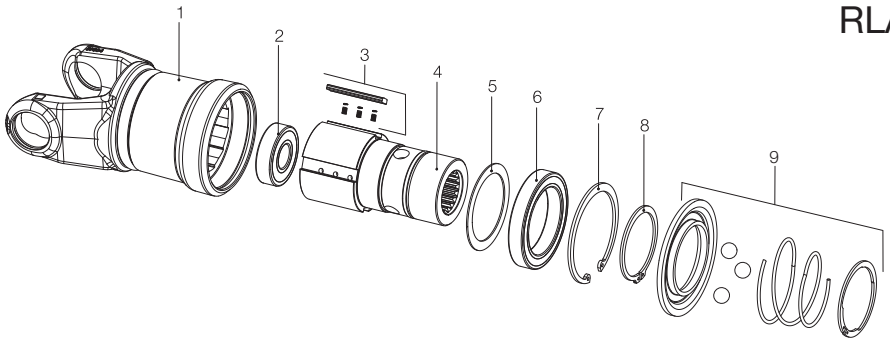
S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
A33	A34	A36	A37

RL3 Spare Parts Codes

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
H8	60170L101R	60170L102R	60170L103R	60170L104R
S9	60170M101R	60170M102R	60170M103R	60170M104R
SH	60170N101R	60170N102R	60170N103R	60170N104R
S0	60170S101R	60170S102R	60170S103R	60170S104R

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

RLA



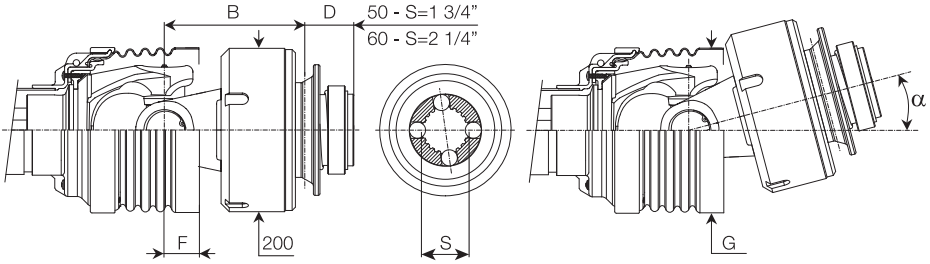
Ref.	Size	Spare part code	Description	Technical data
1	H8	4180L7010R	Outer housing	
	S9	4180M7010R		
	SH	4180N7010R		
	S0	4180S7010R		
2		354108025R	Bearing	6305 (25x62x17)
3	H8 - S9	4210G0001R03	Pawl + spring kit	
	SH - S0	4210G0001R04		
4	H8 - S9	2270G0306R	Hub	1 3/8" Z6
		2270G3706R		1 3/8" Z21
		2270G0406R		1 3/4" Z6
		2270G3806R		1 3/4" Z20
	SH - S0	2270G0307R		1 3/8" Z6
		2270G3707R		1 3/8" Z21
		2270G0407R		1 3/4" Z6
		2270G3807R		1 3/4" Z20
5		340070014R	Spacer	
6		354114070R	Bearing	61914 (70x100x16)
7		338000100R20	O-ring	100 x 3,0 DIN 472/1
8		337001070R20	O-ring	70 x 2,5 DIN 471/1
9		435000341R	Ball collar	
		435000440R		

* For sizes SH and S0, the RLA overrunning clutches are equipped with four pawls (instead of three as found on other models).

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Overrunning clutches

RL for size SK (permanent lubrication)



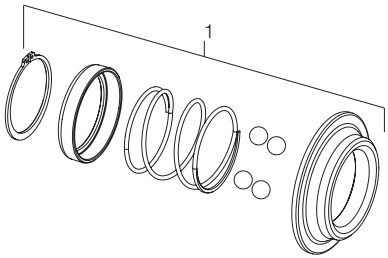
Maximum Torque 10000 Nm	B (mm) S = 1 3/4” Z20	B (mm) 2 1/4” Z22	F mm	G mm	α °
SK	170	172	42	201	36°

Driveline Codes RL for size SK

	S = 1 3/4” Z20	2 1/4” Z22
	A39	A40

RL3 Spare Parts Codes

	S = 1 3/4” Z20	2 1/4” Z22
SK	601A0K404R	601A0K405R



	Size	Spare part code	Description	Technical data
1	SK	435000429R 435008002R	Bar collar kit	1 3/4" Z20 2 1/4" Z22

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

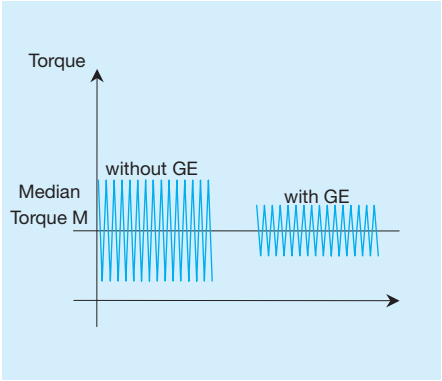
The GE torsionally resilient joint is used on drivelines for different functions depending upon the specific application

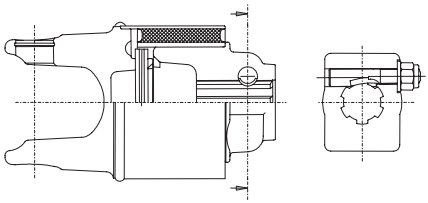
- The GE can reduce torque peaks generated by the inertia of machines with heavy flywheels or rotors during abrupt starts or deceleration.
- The GE can smooth alternating or pulsating loads that may shorten the life of power transmission components.
- The GE can modify the natural frequency of a system, to avoid resonance events that could cause failures.
- The GE can smooth torsional vibrations generated by unequal working angles on drivelines with more than one joint.

A rubber ring within the GE operates like a torsional spring. This rubber ring connects the yoke / housing to the hub. The rubber is vulcanized to both the inner and outer metal surfaces to prevent the hub from slipping and to maintain phasing of the yokes.

The GE torsionally resilient joint has an internal limit pin that constrains flexure to ± 20°. This avoids excessive deformations that could create failure of the components. GE torsionally resilient joints can be supplied without the 20° limit pin upon request.

In case of high torque peaks, it is sometimes recommended to install a torque limiter (e.g. automatic torque limiter or shear bolt torque limiter).





GE torsionally resilient joints are installed at the end of the driveline, outboard the inner yokes. Consequently the joints maintain proper phasing even when the hub is deformed to its flexural limit.

Torsionally resilient joints

GE torsionally resilient joint is supplied in three models:
- **GE4** for sizes S4 and S5
- **GE6** for sizes S6 and H7
- **GE8** for sizes S8, H8 and S9

The typical operating features of the torsionally resilient joint are expressed by torsional rigidity (**R**) and torque at maximum deformation ($M_{20°}$). Beyond the latter value, torque will be transmitted without resiliency.

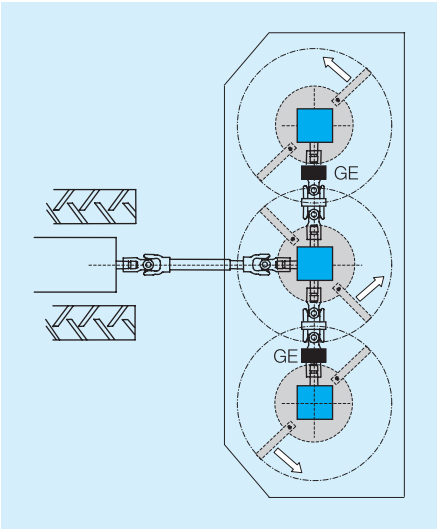
It is recommended to consider these parameters when selecting the proper joint and to use a torque limiter (e.g. shear bolt) able to eliminate torque peaks exceeding torque at maximum deformation $M_{20°}$.

Torsional rigidity is defined as the torque that creates 1° angular deformation of the torsionally resilient joint. This is an indicative value; in fact, deformation of rubber parts is linear only with small deformations.

The torque at maximum deformation ($M_{20°}$) and the torsional rigidity (**R**) of the GE varies according to the Shore hardness of the rubber (see chart below). GE6 torsionally resilient joints can be supplied with rubber in either 55 or 65 Shore hardness.

	Shore hardness	R Nm/(°)	M20° Nm
GE4	65 Sh	50	1700
GE6	55 Sh	50	1700
	65 Sh	100	3000
GE8	65 Sh	250	5000

Cardan shafts with torsionally resilient joints are often used on multi-spindle rotary cutters, whose blades have overlapping cutting edges.



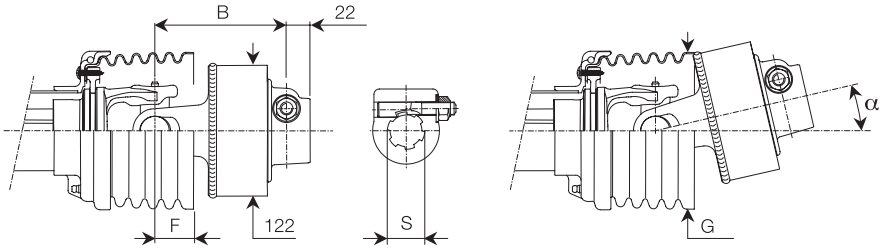
When an overload slows a rotor, the GE joint can absorb the inertia of the rotor as a deformation of the elastic member.

The amplitude of this deformation varies with respect to the torsional rigidity of the elastic member and the 20° limit pin.

The torsionally resilient joint can reduce overloads but still maintain proper phasing of the rotors. Unlike other torque limiters (e.g. friction clutch), this avoids collision and damage to the blades.

Torsionally resilient joints can also smooth vibrations, alternating, and / or pulsating loads that could generate fatigue stress in the driveline.

GE4



	B (mm)				F	G	α
	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	mm	mm	°
S4	125	125	- -	- -	37	146	13°
S5	134	134	- -	- -	33	146	20°

Codes GE4

Max. Torque	Shore Hardness	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1700 Nm	65 Sh	0D4	0D5	- -	- -

GE4 Spare Parts Codes

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	608E46501R	608E46502R	- -	- -
S5	608G46501R	608G46502R	- -	- -

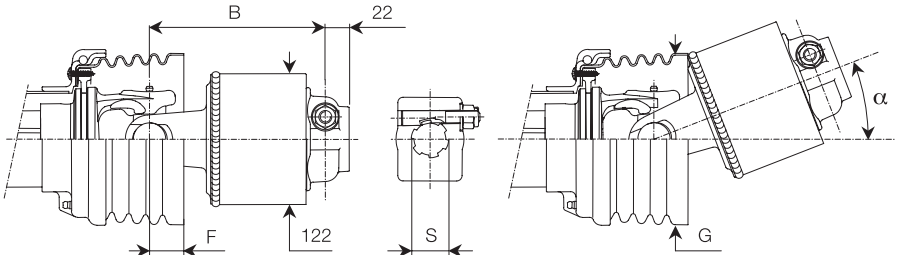
Codes for taper pins

S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
408000047R02	408000047R02	- -	- -

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Torsionally resilient joints

GE6



	B (mm)				F	G	α
	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	mm	mm	°
S6	164	164	164	164	32	160	21°
H7	170	170	170	170	29	160	27°

Driveline Codes GE6

Max. Torque	Shore hardness	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1700 Nm	55 Sh	0D0	0D1	0D2	0D3
3000 Nm	65 Sh	0D4	0D5	0D6	0D7

GE6 Spare Parts Codes

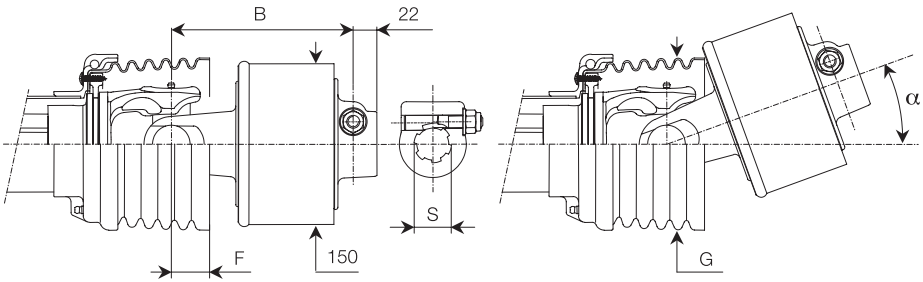
		S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	55 Sh	608G65501R	608G65502R	608G65503R	608G65504R
	65 Sh	608G66501R	608G66502R	608G66503R	608G66504R
H7	55 Sh	608H65501R	608H65502R	608H65503R	608H65504R
	65 Sh	608H66501R	608H66502R	608H66503R	608H66504R

Codes for taper pins

S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
408000047R02	408000047R02	408000046R02	408000046R02

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

GE8



	B (mm)				F	G	α
	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	mm	mm	°
S8	170	170	170	170	42	160	15°
H8	170	170	170	170	42	160	15°
S9	170	170	170	170	49	180	11°

Driveline Codes GE8

Max. Torque	Shore Hardness	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
5000 Nm	65 Sh	0D4	0D5	0D6	0D7

GE8 Spare Parts Codes

	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8 - H8	608L86501R	608L86502R	608L86503R	608L86504R
S9	608M86501R	608M86502R	608M86503R	608M86504R

Codes for taper pins

S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
408000047R02	408000047R02	408000046R02	408000046R02

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

A ratchet torque limiter is a device able to interrupt the transmission of power in the event of a torque peak or overload that exceeds the setting. The torque limiter is automatically re-engaged after the cause of the overload is removed. Ratchet torque limiters are generally employed to protect implements subject to constant or alternating torques from overloads. The setting is normally two to three times the median torque to be transmitted.

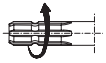
During operation of the device, the spring loaded ratchets try to reengage the grooves in the housing. This generates small torque peaks and noise. This noise warns the operator that the device is engaged. Once the device is slipping, the user should promptly stop the PTO to avoid excessive wear.

Ratchet torque limiters should be used only on drivelines operating at speeds less than 700 min^{-1}.

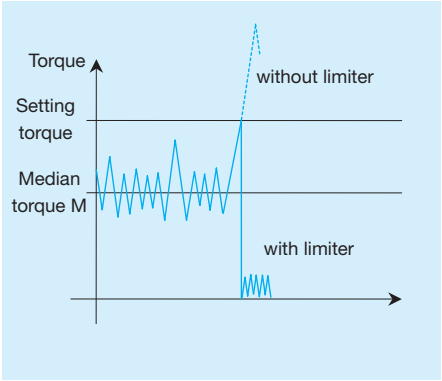
Ratchet torque limiters may be supplied in either symmetrical or one-way types.

One-way ratchet torque limiters permit higher settings compared to symmetrical units with an equal number of ratchets. When rotated opposite the normal working direction, one-way ratchet torque limiters transmit only 15% of the torque setting.

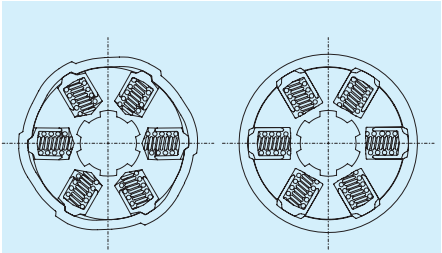
Standard one-way ratchet torque limiters are designed to operate on a driveline with counter-clockwise rotation.



This is the typical rotation of a ratchet torque limiter installed on the implement side of a primary driveline connecting a tractors' rear-mounted PTO (clockwise rotation viewed into the shaft) to the implement PIC (counter-clockwise rotation).



Symmetrical units transmit the same torque values in both directions of rotation.



One-way ratchet torque limiter

Symmetrical ratchet torque limiter

Ratchet torque limiters

Symmetrical and one-way ratchet torque limiters are supplied in different versions, with different lubrication frequencies (either 50 hours or seasonal lubrication).
Version **SA** (one-way) and version **LN** (symmetrical) have a 50 hour lubrication interval (NLGI 2 grease).
SA1, SA2, LN1 and LN2 have a push-pin type connection to the splined shaft. SA3, SA4, LN3 and LN4 have a ball collar type connection.

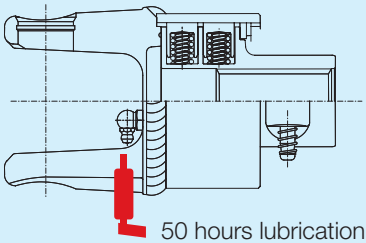
Standard settings (Nm)

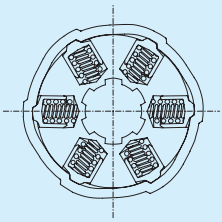
	SA1	SA2	SA3	SA4
S1	400	650	-	-
S2	-	650 800	900 1000 1200	-
S4	-	-	1000 1200	1400 1600
S5	-	-	1200	1400 1600
S6	-	-	1200	1400 1600

Standard settings (Nm)

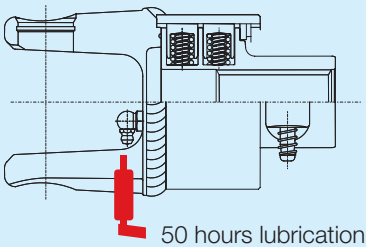
	LN1	LN2	LN3	LN4
S1	300	460 600	-	-
S2	-	600	800 900	1000 1200
S4	-	-	-	1000 1200
S5	-	-	-	1200
S6	-	-	-	1200

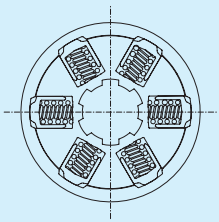
SA one way ratchet torque limiter





LN symmetrical ratchet torque limiter





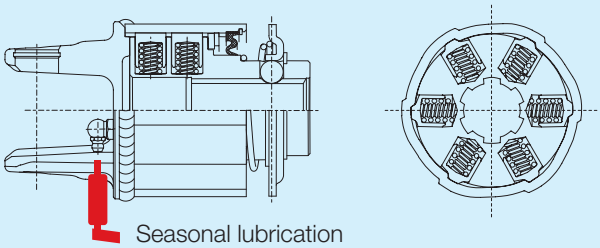
BONDIOLI & PAVESI

LT (symmetrical) and LC (one-way) ratchet torque limiters are fitted with a special sealing ring and a locking plate located in the housing to help prevent loss and contamination of the grease.
LT and LC ratchet clutches require lubrication only once in a season (with NLGI 2 grease). They have a ball collar connection to the splined shaft.

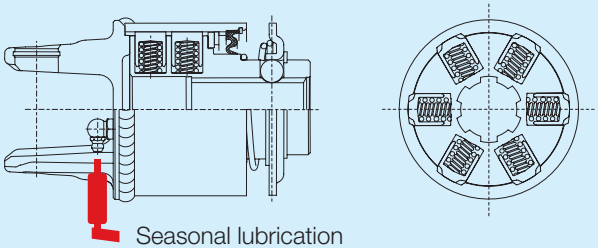
Standard settings (Nm)				
	LC1	LC2	LC3	LC4
S1	400	650	-	-
S2	-	650 800	900 1000 1200	-
S4	-	-	1000 1200	1400 1600
S5	-	-	1200	1400 1600
S6	-	-	1200	1400 1600

Standard settings (Nm)				
	LT1	LT2	LT3	LT4
S1	300	460 600	-	-
S2	-	600	800 900	1000 1200
S4	-	-	-	1000 1200
S5	-	-	-	1200
S6	-	-	-	1200

LC one-way ratchet torque limiter

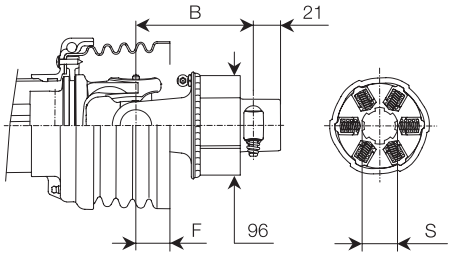


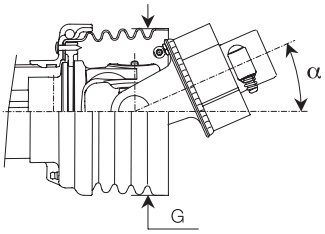
LT symmetrical ratchet torque limiter



Ratchet torque limiters

SA1 (one-way)





	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	400	94	- -	- -	- -	23	129	21°

Driveline Codes SA1

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	400	117	- -	- -	- -

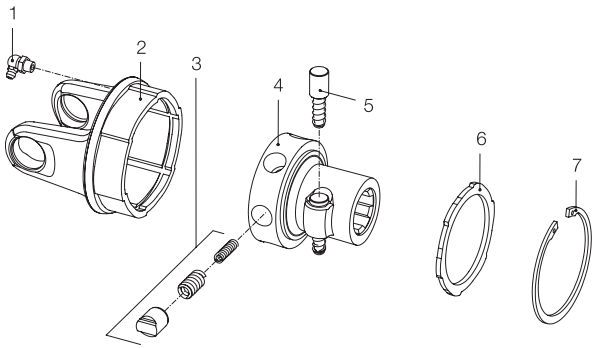
SA1 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	400	610124001R	- -	- -	- -	6	6

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

SA1

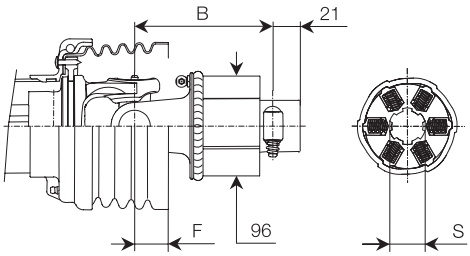


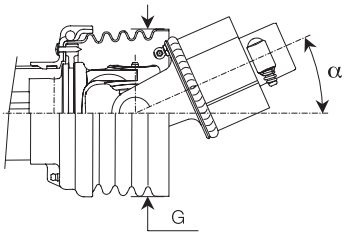
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1	422011020R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		513340302R	Hub with push pin	1 3/8” Z6
5		403000001R10	Push pin kit	
6		240000033R02	Locking plate	
7		338005000R20	Snap ring	82 x 2.5 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

SA2 (one-way)





	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	650	114	- -	- -	- -	23	129	21°
S2	650 800	120	- -	- -	- -	42	146	19°

Driveline Codes SA2

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
650	128	- -	- -	- -
800	136	- -	- -	- -

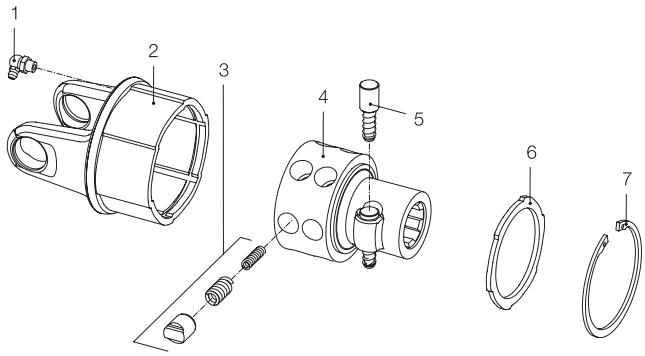
SA2 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	650	610234001R	- -	- -	- -	12	3
S2	650	611234005R	- -	- -	- -	12	3
	800	611239001R	- -	- -	- -	12	6

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

SA2

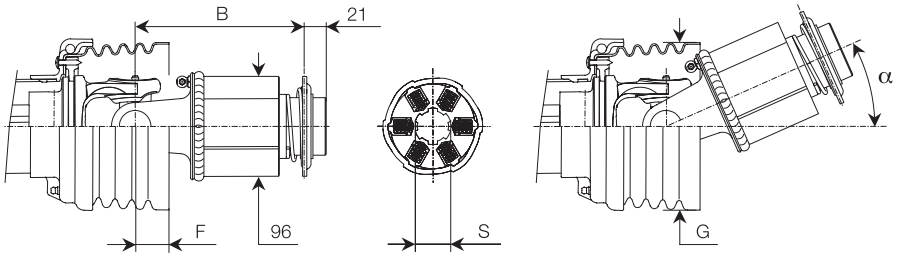


Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1 S2	422012020R 422022020R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		513350302R	Hub with push-pin	1 3/8” Z6
5		403000001R10	Push-pin kit	
6		240000033R02	Locking plate	
7		338005000R20	Snap ring	82 x 2.5 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

SA3 (one-way)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S2	900 1000 1200	149	- -	- -	- -	42	146	19°
S4	1000 1200	158	- -	- -	- -	37	146	25°
S5	1200	161	- -	- -	- -	33	146	24°
S6	1200	161	- -	- -	- -	32	160	33°

Driveline Codes SA3

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
900 1000 1200	153 156 159	- -	- -	- -

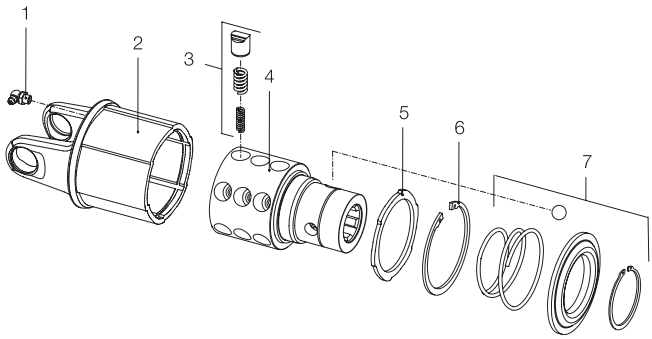
To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

SA3 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S2	900	611341501R	- -	- -	- -	18	0
	1000	611344501R	- -	- -	- -	18	6
	1200	611348501R	- -	- -	- -	18	18
S4	1000	613344501R	- -	- -	- -	18	6
	1200	613348501R	- -	- -	- -	18	18
S5	1200	614348501R	- -	- -	- -	18	18
S6	1200	614348501R	- -	- -	- -	18	18

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

SA3

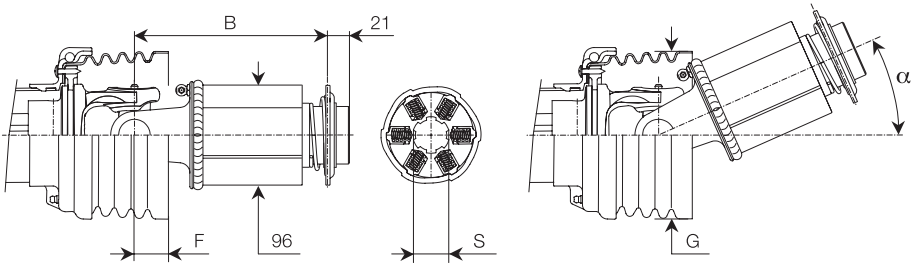


Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S2 S4 S5 S6	422023020R 422043020R 422053020R 422053020R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		2270Q0303R	Hub	1 3/8" Z6
5		240000033R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

SA4 (one-way)



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	1400 1600	178	- -	- -	- -	37	146	25°
S5	1400 1600	181	- -	- -	- -	33	146	24°
S6	1400 1600	181	- -	- -	- -	32	160	33°

Driveline Codes SA4

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	1400	168	- -	- -	- -
	1600	170	- -	- -	- -

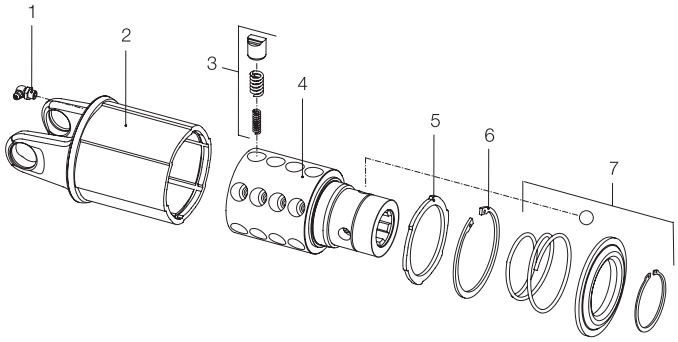
To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

SA4 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S4	1400	613452501R	- -	- -	- -	24	11
	1600	613456501R	- -	- -	- -	24	24
S5	1400	614452501R	- -	- -	- -	24	11
	1600	614456501R	- -	- -	- -	24	24
S6	1400	614452501R	- -	- -	- -	24	11
	1600	614456501R	- -	- -	- -	24	24

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

SA4

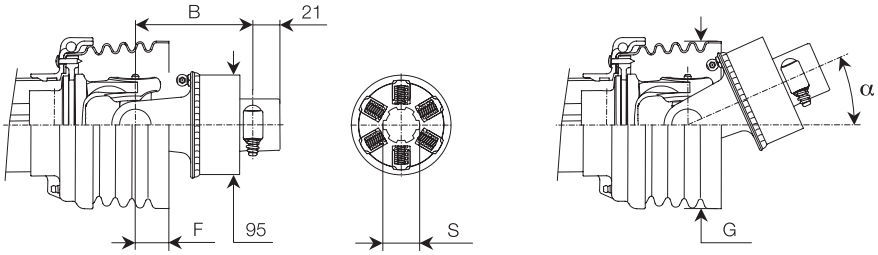


Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S4 S5 S6	422044020R 422054020R 422054020R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		2270R0302R	Hub	1 3/8” Z6
5		240000033R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LN1 (symmetrical)



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	300	94	- -	- -	- -	23	129	21°

Driveline Codes LN1

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	300	0E4	- -	- -	- -

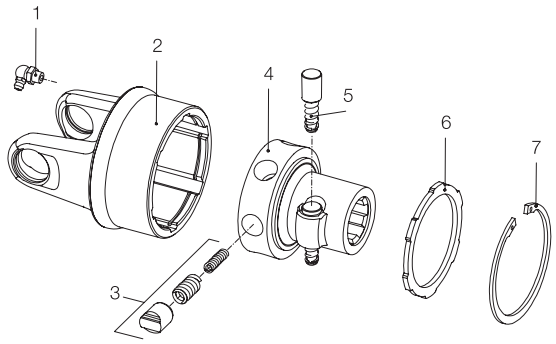
LN1 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	300	60A1B1903R	- -	- -	- -	6	6

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LN1

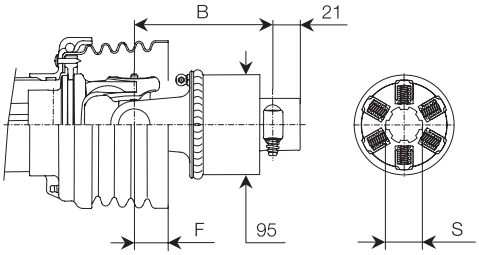


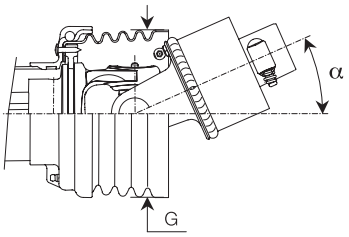
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1	422B0S301R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		513340302R	Hub with push-pin	1 3/8” Z6
5		403000001R10	Push-pin kit	
6		240000294R02	Locking plate	
7		338005000R20	Snap ring	82 x 2.5 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LN2 (symmetrical)





	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	460	114	- -	- -	- -	23	129	21°
	600							
S2	600	120	- -	- -	- -	42	146	19°

Driveline Codes LN2

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
460	0E7	- -	- -	- -
600	0E9	- -	- -	- -

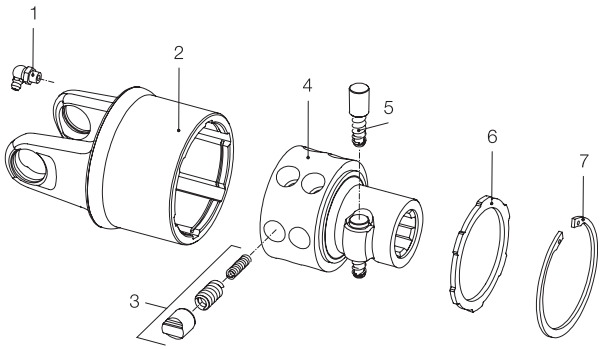
LN2 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	460	60A2B2603R	- -	- -	- -	12	0
	600	60A2B3203R	- -	- -	- -	12	12
S2	600	60A2C3203R	- -	- -	- -	12	12

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LN2

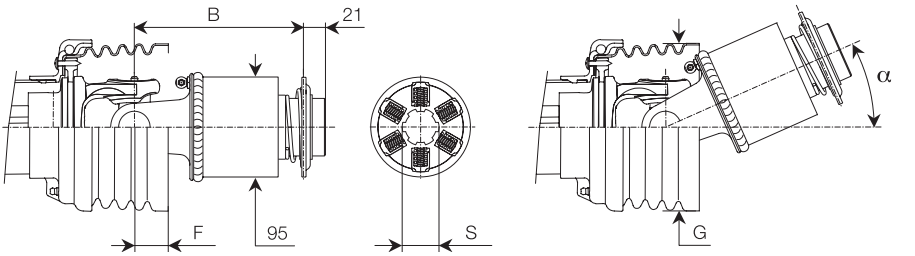


Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1 S2	422B0T301R 422C0T301R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		513350302R	Hub with push-pin	1 3/8” Z6
5		403000001R10	Push-pin kit	
6		240000294R02	Locking plate	
7		338005000R20	Snap ring	82 x 2.5 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LN3 (symmetrical)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S2	800 900	149	- -	- -	- -	42	146	19°

Driveline Codes LN3

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	800	0F3	- -	- -	- -
	900	0F4	- -	- -	- -

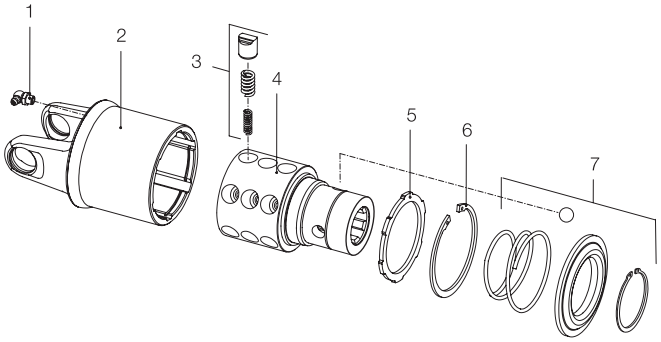
LN3 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S2	800	60B3C3903R	- -	- -	- -	18	10
	900	60B3C4103R	- -	- -	- -	18	18

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LN3

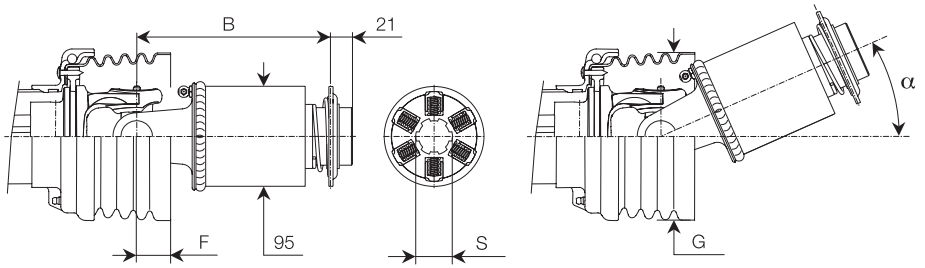


Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S2	422C0U301R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		2270Q0303R	Hub with push-pin	1 3/8” Z6
5		240000294R02	Push-pin kit	
6		338005000R20	Locking plate	82 x 2.5 DIN 472/1
7		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LN4 (symmetrical)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S2	1000 1200	169	- -	- -	- -	42	146	19°
S4	1000 1200	178	- -	- -	- -	37	146	25°
S5	1200	181	- -	- -	- -	33	146	24°
S6	1200	181	- -	- -	- -	32	160	33°

Driveline Codes LN4

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1000	0F7	- -	- -	- -
1200	0F9	- -	- -	- -

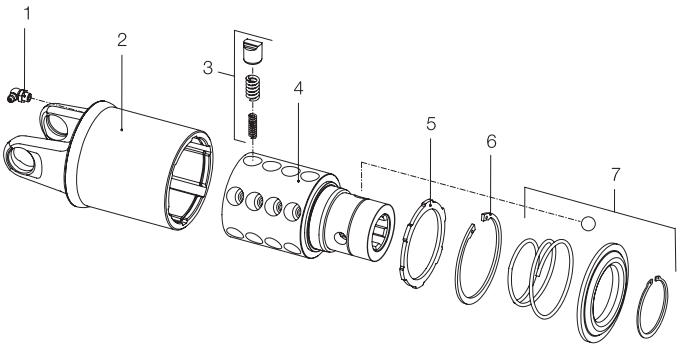
To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

LN4 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S2	1000	60B4C4403R	- -	- -	- -	24	9
	1200	60B4C4803R	- -	- -	- -	24	24
S4	1000	60B4E4403R	- -	- -	- -	24	9
	1200	60B4E4803R	- -	- -	- -	24	24
S5	1200	60B4G4803R	- -	- -	- -	24	24
S6	1200	60B4G4803R	- -	- -	- -	24	24

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LN4



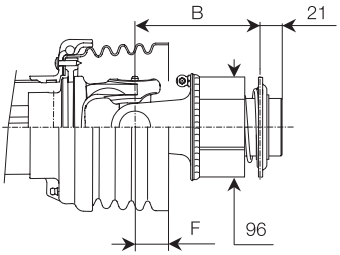
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S2 S4 S5 S6	422C0V301R 422E0V301R 422G0V301R 422G0V301R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		2270R0302R	Hub	1 3/8” Z6
5		240000294R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		435000321R	Ball collar kit	

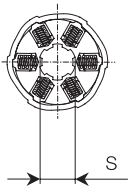
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

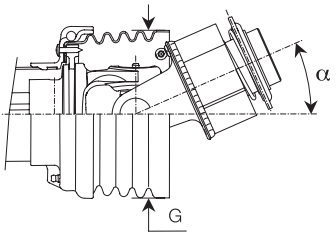
Ratchet torque limiters

LC1

(one-way, seasonal lubrication)







	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	400	103	- -	- -	- -	23	129	21°

Driveline Codes LC1

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
400	0G4	- -	- -	- -

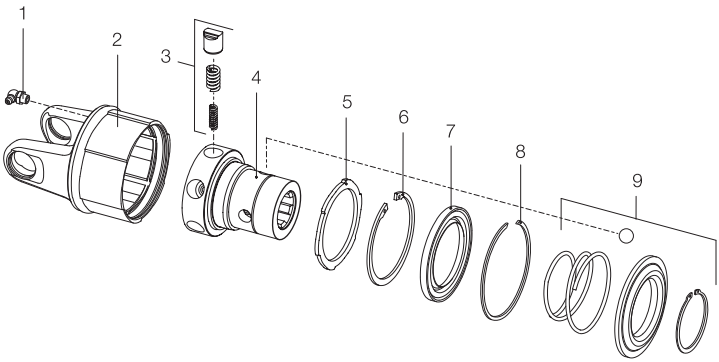
LC1 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	400	60D1B2403R	- -	- -	- -	6	6

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LC1



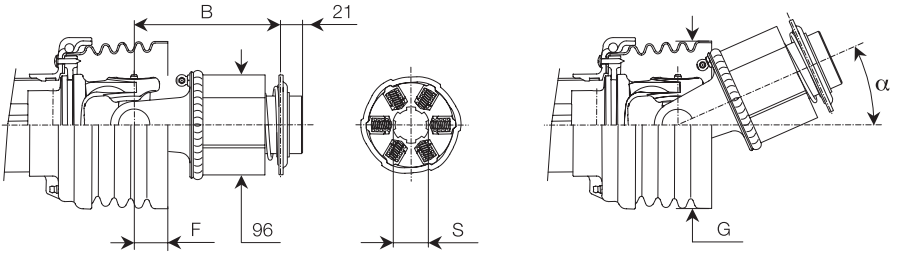
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1	422B0N105R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		2270N0302R	Hub	1 3/8” Z6
5		240000033R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LC2

(one-way, seasonal lubrication)



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	650	123	- -	- -	- -	23	129	21°
S2	650	129	- -	- -	- -	42	146	19°
	800							

Driveline Codes LC2

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	650	0G7	- -	- -	- -
	800	0G9	- -	- -	- -

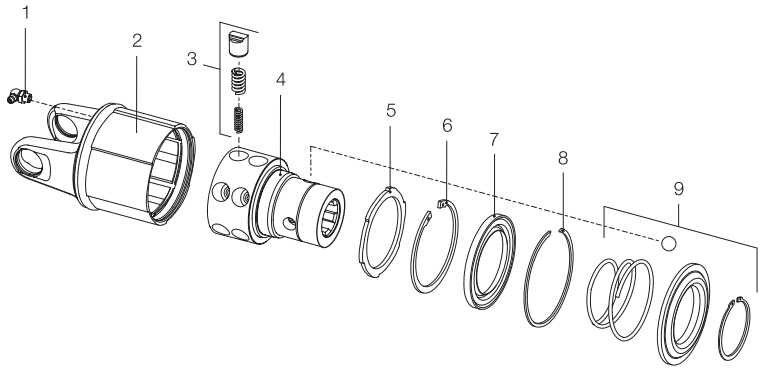
LC2 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	650	60D2B3403R	- -	- -	- -	12	3
S2	650	60D2C3403R	- -	- -	- -	12	3
	800	60D2C3903R	- -	- -	- -	12	12

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

LC2



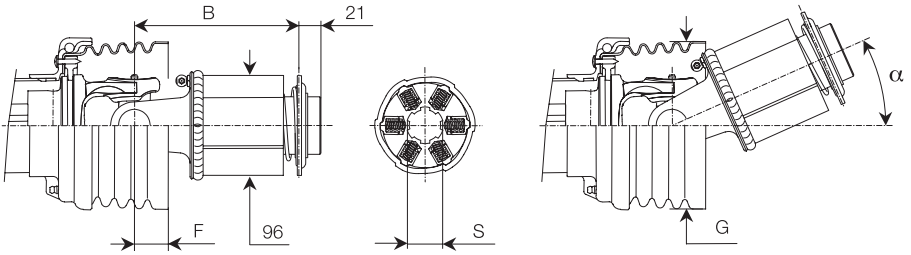
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1 S2	422B0P105R 422C0P105R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		2270P0303R	Hub	1 3/8” Z6
5		240000033R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LC3

(one-way, seasonal lubrication)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S2	900 1000 1200	149	- -	- -	- -	42	146	19°
S4	1000 1200	158	- -	- -	- -	37	146	25°
S5	1200	161	- -	- -	- -	33	146	24°
S6	1200	161	- -	- -	- -	32	160	33°

Driveline Codes LC3

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
900	0H1	- -	- -	- -
1000	0H2	- -	- -	- -
1200	0H4	- -	- -	- -

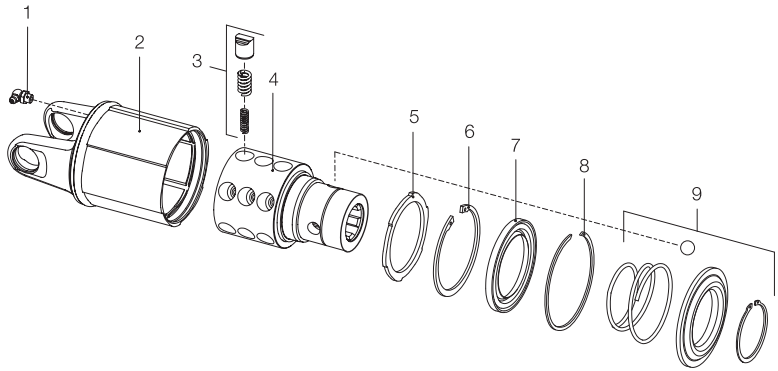
To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

LC3 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S2	900	60D3C4103R	- -	- -	- -	18	0
	1000	60D3C4403R	- -	- -	- -	18	6
	1200	60D3C4803R	- -	- -	- -	18	18
S4	1000	60D3E4403R	- -	- -	- -	18	6
	1200	60D3E4803R	- -	- -	- -	18	18
S5	1200	60D3G4803R	- -	- -	- -	18	18
S6	1200	60D3G4803R	- -	- -	- -	18	18

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LC3



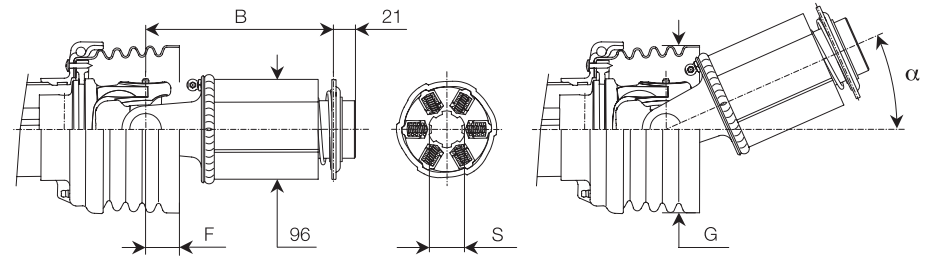
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S2 S4 S5 S6	422C0Q105R 422E0Q105R 422G0Q105R 422G0Q105R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		2270Q0303R	Hub	1 3/8" Z6
5		240000033R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LC4

(one-way, seasonal lubrication)



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	1400 1600	178	- -	- -	- -	37	146	25°
S5	1400 1600	181	- -	- -	- -	33	146	24°
S6	1400 1600	181	- -	- -	- -	32	160	33°

Driveline Codes LC4

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1400	0H7	- -	- -	- -
1600	0H9	- -	- -	- -

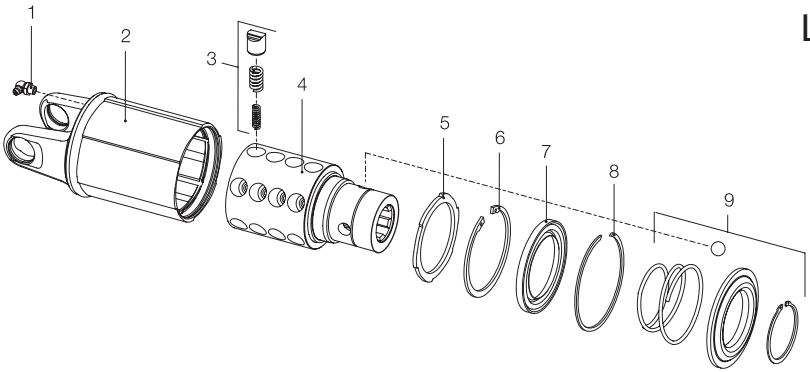
To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

LC4 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S4	1400	60D4E5203R	- -	- -	- -	24	11
	1600	60D4E5603R	- -	- -	- -	24	24
S5	1400	60D4G5203R	- -	- -	- -	24	11
	1600	60D4G5603R	- -	- -	- -	24	24
S6	1400	60D4G5203R	- -	- -	- -	24	11
	1600	60D4G5603R	- -	- -	- -	24	24

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LC4



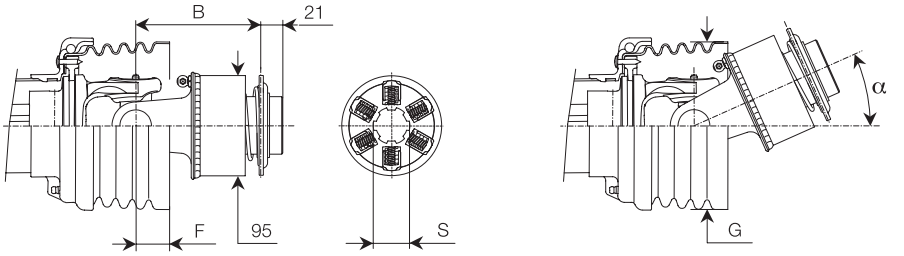
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S4 S5 S6	422E0R105R 422G0R105R 422G0R105R	Outer housing + yoke	
3		421340001R06	Ratchet + spring kit	
4		2270R0302R	Hub	1 3/8" Z6
5		240000033R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar ring	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LT1

(symmetrical, seasonal lubrication)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	300	103	- -	- -	- -	23	129	21°

Driveline Codes LT1

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	300	0L4	- -	- -	- -

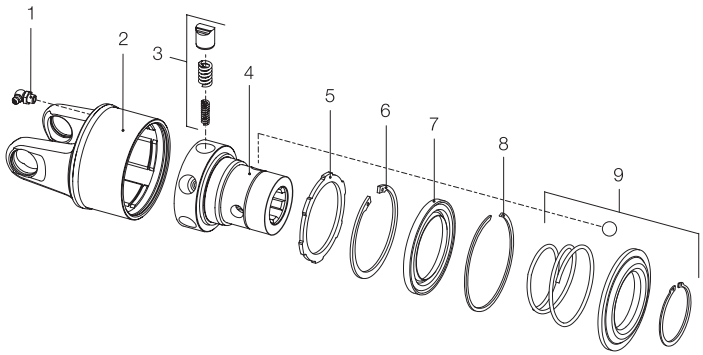
LT1 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	300	60F1B1903R	- -	- -	- -	6	6

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LT1



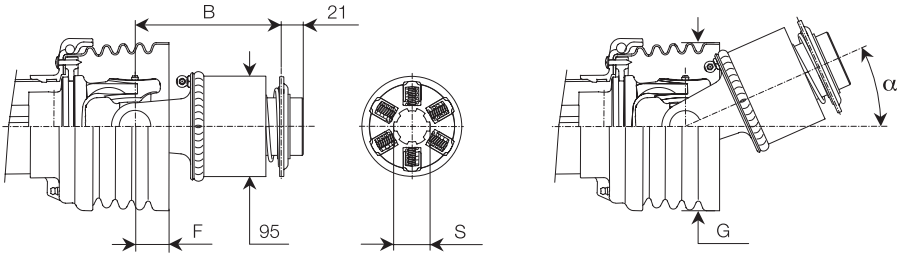
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1	422B0Z305R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		2270N0302R	Hub	1 3/8" Z6
5		240000294R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LT2

(symmetrical, seasonal lubrication)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	460 600	123	- -	- -	- -	23	129	21°
S2	600	129	- -	- -	- -	42	146	19°

Driveline Codes LT2

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
460	0L7	- -	- -	- -
600	0L9	- -	- -	- -

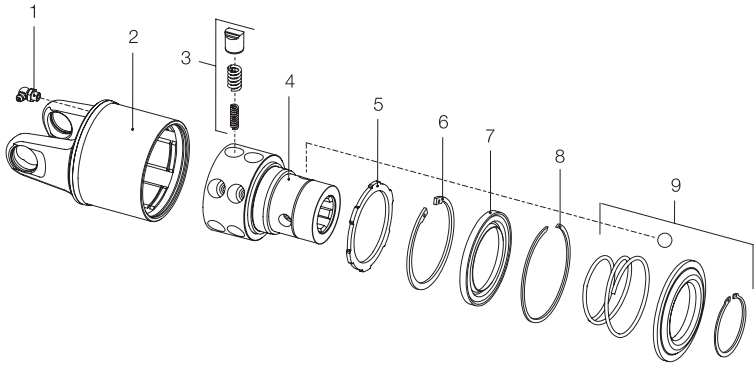
LT2 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S1	460	60F2B2603R	- -	- -	- -	12	0
	600	60F2B3203R	- -	- -	- -	12	12
S2	600	60F2C3203R	- -	- -	- -	12	12

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LT2



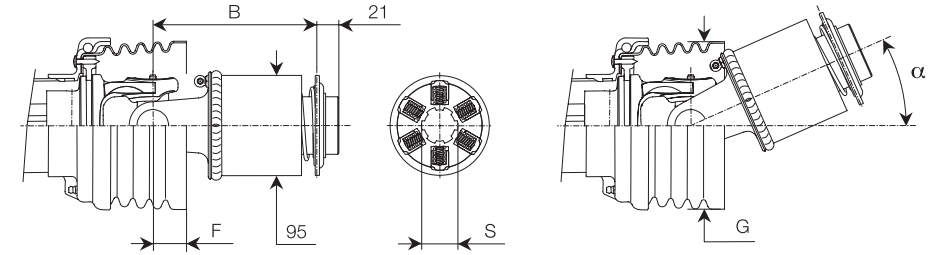
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S1 S2	422B0X305R 422C0X305R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		2270P0303R	Hub	1 3/8" Z6
5		240000294R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LT3

(symmetrical, seasonal lubrication)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S2	800 900	149	- -	- -	- -	42	146	19°

Driveline Codes LT3

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	800	0M3	- -	- -	- -
	900	0M4	- -	- -	- -

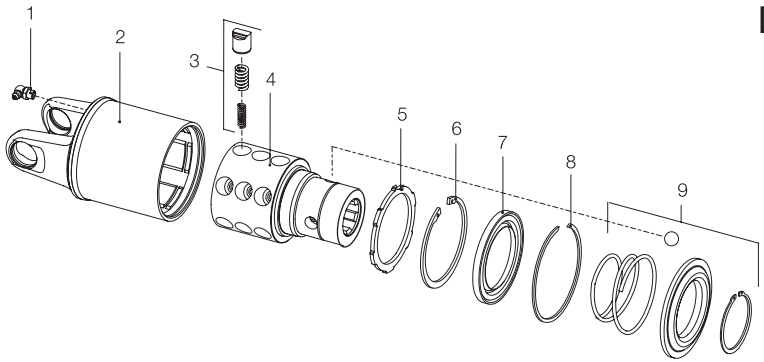
LT3 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S2	800	60F3C3903R	- -	- -	- -	18	10
	900	60F3C4103R	- -	- -	- -	18	18

To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

LT3



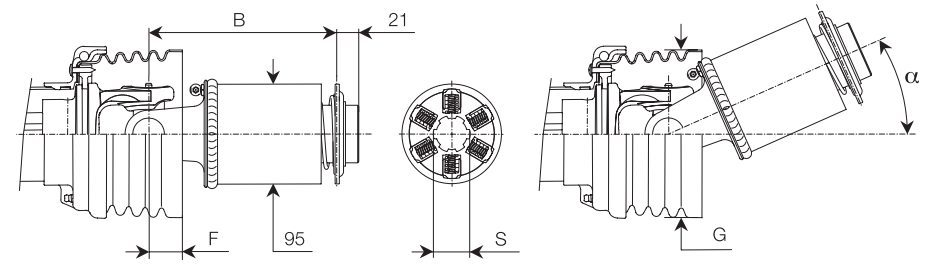
Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S2	422C0Y305R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		2270Q0303R	Hub	1 3/8" Z6
5		240000294R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Ratchet torque limiters

LT4

(symmetrical, seasonal lubrication)



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S2	1000 1200	169	- -	- -	- -	42	146	19°
S4	1000 1200	178	- -	- -	- -	37	146	25°
S5	1200	181	- -	- -	- -	33	146	24°
S6	1200	181	- -	- -	- -	32	160	33°

Driveline Codes LT4

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	1000	0M7	- -	- -	- -
	1200	0M9	- -	- -	- -

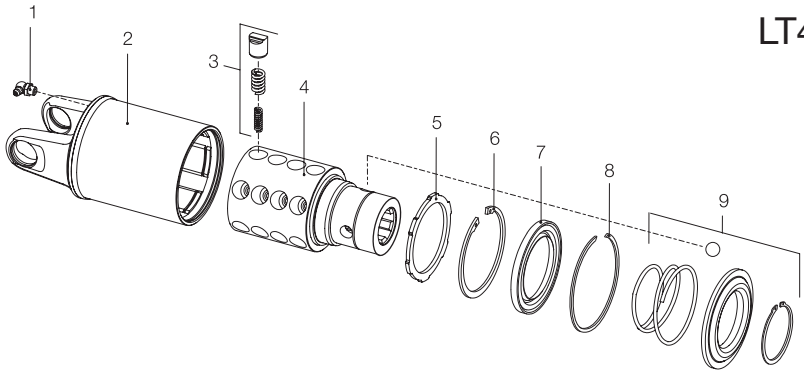
To establish more accurate torque settings, a clutch may contain a different number of springs than what is listed in these tables.

LT4 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20		
S2	1000	60F4C4403R	- -	- -	- -	24	9
	1200	60F4C4803R	- -	- -	- -	24	24
S4	1000	60F4E4403R	- -	- -	- -	24	9
	1200	60F4E4803R	- -	- -	- -	24	24
S5	1200	60F4G4803R	- -	- -	- -	24	24
S6	1200	60F4G4803R	- -	- -	- -	24	24

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

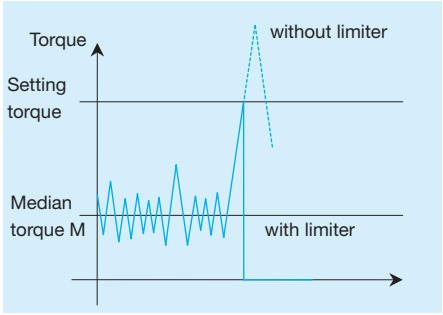
LT4



Ref.	Size	Spare part code	Description	Technical data
1		348014000R20	Grease fitting	
2	S2 S4 S5 S6	422C0J305R 422E0J305R 422G0J305R 422G0J305R	Outer housing + yoke	
3		421340007R06	Ratchet + spring kit	
4		2270R0302R	Hub	1 3/8" Z6
5		240000294R02	Locking plate	
6		338005000R20	Snap ring	82 x 2.5 DIN 472/1
7		359005901R02	Retaining ring	
8		339000088R20	Snap ring	
9		435000321R	Ball collar kit	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Shear bolt torque limiters type LB are devices able to interrupt power transmission when the torque transmitted exceeds the setting. This interruption in power is caused by the shearing of a bolt. This bolt must be replaced before power can be restored.
Use of shear bolt torque limiters is recommended to avoid damage to drivelines mounted on implements subject to accidental overloads or torque peaks.



The torque setting for shear bolt torque limiters is usually two or three times the median torque M and must never exceed maximum torque of the driveline (Mmax). Standard settings for each size of SFT driveline in the table to the left.

LB torque limiters are connected to the PTO by means of a push-pin up to size S4, by means of a taper pin for sizes from S5 to SH, and by means of a ball collar for size SK.

For the safety of the operator and reliable function of the driveline, replace the bolt only with one equal in length, diameter, and grade as the original.

Maximum settings LB

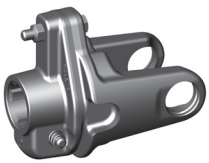

Splined Members

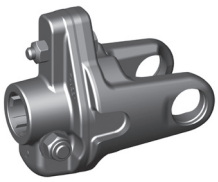

Free Rotation

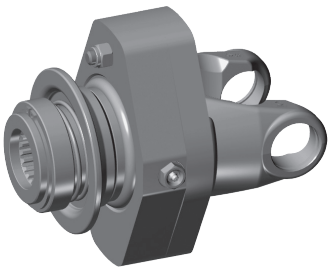

Four-Tooth Profile


Four-Tooth Advanced

	Nm	in.lb.	Nm	in.lb.	Nm	in.lb.
S1	-	-	780	6900	-	-
S2	950	8400	1250	11060	-	-
S4	1700	15050	2000	17700	-	-
S5	-	-	2400	21240	-	-
S6	2400	21200	2700	23900	-	-
H7	-	-	3100	27440	-	-
S8	-	-	3600	31860	-	-
H8	-	-	4200	31860	-	-
S9	-	-	4200	37170	-	-
SH	-	-	5200	46030	-	-
S0	-	-	-	-	-	-
SK	-	-	-	-	9000	79660

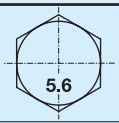
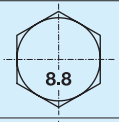
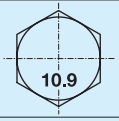
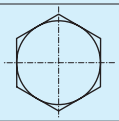
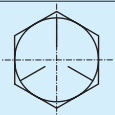
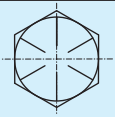

LB limiters with push pin attachment (sizes S1 to S4)


LB limiters with taper-pin attachment (sizes S5 to SH)


LB limiters with ball collar attachment (size SK)

Shear bolt torque limiters LB

Bolts used on standard LB shear bolt limiters are metric class 8.8, steel, with a minimum strength (R_m) equal to 800 N/mm^2. ISO standards and SAE standards (for USA) for shear bolts with corresponding strengths (R_m) are tabulated to the right.
The setting is increased by approximately 20% when replacing the standard class 8.8 bolt with one of the same diameter but class 10.9.
Standard bolts are partially threaded, and the nominal settings usually are referenced to shearing on the un-threaded shank of the bolt. The nominal setting is reduced approximately 20% when replacing the standard bolt with another of the same class, but will shear on the threaded portion of the bolt.

ISO Standard	Class	R_m minimum
	**5.6**	500 N/mm^2
	**8.8**	800 N/mm^2
	**10.9**	1000 N/mm^2
SAE Standard	Grade	R_m minimum
	**2**	74000 psi 510 N/mm^2
	**5**	120000 psi 827 N/mm^2
	**8**	150000 psi 1034 N/mm^2

For the safety of the operator and reliable function of the driveline, replace the bolt only with one equal in length, diameter, and grade as the original.

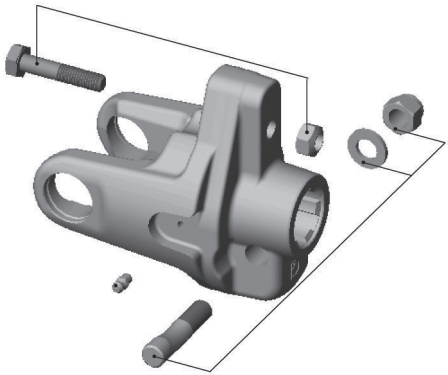
Recommended tightening torques for standard bolts.

Recommended tightening torque		
	Nm	in·lb
M6	10.4	92
M8	25.0	221
M10	50.0	443
M12	86.0	761
M14	137.0	1213

LB shear bolt limiters are designed to more evenly distribute their mass with respect to the axis of rotation, thereby helping to decrease vibrations.
Size S1 and S2 shear bolt LB torque limiters are lubricated during assembly, and no additional lubrication is required (no grease fitting).
For other sizes it is recommended to lubricate every 100 hours of use.
The grease is necessary to lubricate the surfaces of the hub and yoke that rotate independently after the bolt has sheared.

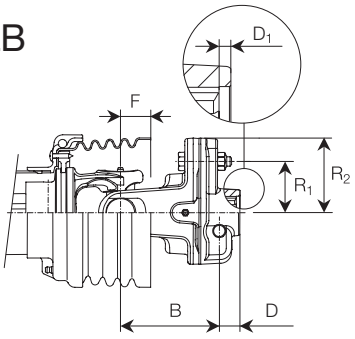
LB shear bolt limiters are integrated devices that cannot be separated after assembly. Components supplied as spare parts include the complete torque limiter, shear bolts (packaged in quantities of five pieces, including the nuts), push-pins or taper pins, and grease fittings.
LB shear bolt limiters, either supplied as a component of a complete driveline or as an individual spare part, are equipped with a five spare shear bolts.

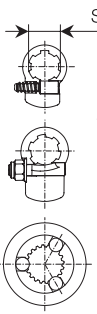
The spare part components for the LB torque limiter for size SK are the shear bolt (supplied in kit containing 5 parts), and the Ball collar kit.



Shear bolt torque limiters LB

LB

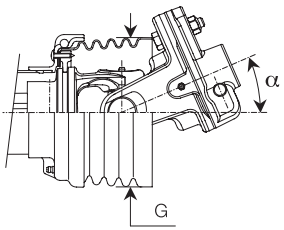




Push-pin for sizes
S1, S2, S4

Taper pin for sizes
S5, S6, H7,
S8, S9, SH

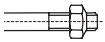
Ball collar for size
SK



	Setting	B	D	D_1	Code					R_1	R_2	F	G	α
	Nm	mm	mm	mm	1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	2 1/4" Z22	mm	mm	mm	mm	°
S1	650	80	22	2	1R0	1S0	- -	- -	- -	37	68	23	129	24°
	700				098	161	- -	- -	- -	40				
	780				1R2	1S2	- -	- -	- -	45				
S2	950 ^	87	22	2	098	161	- -	- -	- -	55	68	42	146	15°
	1050				1R1	1S1	- -	- -	- -	60				
	1250				1R2	1S2	- -	- -	- -	40				
S4	1400	93	22	2	1R0	1S0	- -	- -	- -	45	68	37	146	20°
	1700 ^				098	161	- -	- -	- -	55				
	2000				1R2	1S2	- -	- -	- -	43				
S5	2100	106	22	2	1R0	1S0	1R4	1S4	- -	67	80	33	146	24°
	2400				1R1	1S1	1R5	1S5	- -	50				
S6	2400 ^	106	22	2	1R1	1S1	1R5	1S5	- -	50	80	32	160	24°
	2500				1R2	1S2	1R6	1S6	- -	52				
	2700				1R3	1S3	1R7	1S7	- -	55				
H7	2700	112	22	2	098	161	099	162	- -	55	80	29	160	29°
	3100				1R2	1S2	1R6	1S6	- -	65				
S8	2700	115	22	2	1R0	1S0	1R4	1S4	- -	55	80	42	160	19°
	3200				1R1	1S1	1R5	1S5	- -	66				
	3600				1R2	1S2	1R6	1S6	- -	52				
H8	2700	115	22	2	1R0	1S0	1R4	1S4	- -	55	80	42	160	19°
	3200				1R1	1S1	1R5	1S5	- -	66				
	3600				1R2	1S2	1R6	1S6	- -	52				
	4200				1R3	1S3	1R7	1S7	- -	60				
S9	3000	121	22	2	1R0	1S0	1R4	1S4	- -	62	80	49	180	19°
	3500				1R1	1S1	1R5	1S5	- -	50				
	4200				1R2	1S2	1R6	1S6	- -	60				
SH	4000	120	22	2	1R0	1S0	1R4	1S4	- -	57	80	50	201	17°
	4500				1R1	1S1	1R5	1S5	- -	65				
	5200				098	161	099	162	- -	55				
S0	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
SK	7000	180	50	2	- -	- -	- -	1S4	- -	100	122	42	201	30°
	9000	190	60	10	- -	- -	- -	- -	1U5	94				

The torque setting, assigned according to type and size of telescoping members, must never exceed the maximum torque of the driveline Mmax.
For S2, S4 and S6 drivelines, that maybe equipped with either the Four-Tooth tubes or Free Rotation tubes, settings marked with (^) are maximum recommended settings for Free Rotation profile tubes

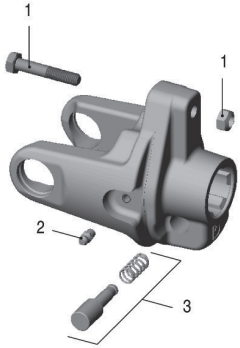
Codes as Spare Parts

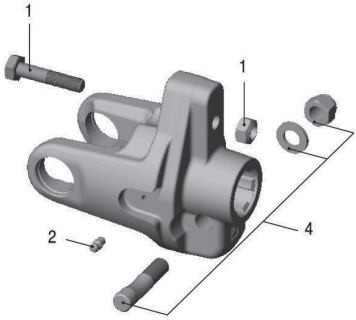
	Setting Nm		1 3/8" Z6	1 3/8" Z21	S 1 3/4" Z6	1 3/4" Z20	2 1/4" Z22	
S1	650		6060B0304R	6060B3703R	- -	- -	- -	M6x40 Cl. 8.8
	700		6060B0302R	6060B3702R	- -	- -	- -	M6x40 Cl. 8.8
	780		6060B0301R	6060B3701R	- -	- -	- -	M6x40 Cl. 8.8
S2	950	^	6060C0302R	6060C3702R	- -	- -	- -	M6x40 Cl. 8.8
	1050		6060C0308R	6060C3704R	- -	- -	- -	M6x40 Cl. 8.8
	1250		6060C0301R	6060C3701R	- -	- -	- -	M8x45 Cl. 8.8
S4	1400		6060E0303R	6060E3704R	- -	- -	- -	M8x45 Cl. 8.8
	1700	^	6060E0302R	6060E3702R	- -	- -	- -	M8x45 Cl. 8.8
	2000		6060E0309R	6060E3711R	- -	- -	- -	M10x50 Cl. 8.8
S5	2100		6060G0319R	6060G3710R	6060G0408R	6060G3803R	- -	M8x45 Cl. 8.8
	2400		6060G0304R	6060G3704R	6060G0404R	6060G3804R	- -	M10x50 Cl. 8.8
S6	2400	^	6060G0304R	6060G3704R	6060G0404R	6060G3804R	- -	M10x50 Cl. 8.8
	2500		6060G0320R	6060G3711R	6060G0409R	6060G3809R	- -	M10x50 Cl. 8.8
	2700		6060G0301R	6060G3701R	6060G0401R	6060G3801R	- -	M10x50 Cl. 8.8
H7	2700		6060H0302R	6060H3702R	6060H0402R	6060H3802R	- -	M10x50 Cl. 8.8
	3100		6060H0301R	6060H3701R	6060H0401R	6060H3801R	- -	M10x50 Cl. 8.8
S8	2700		6060L0303R	6060L3703R	6060L0404R	6060L3807R	- -	M10x50 Cl. 8.8
	3200		6060L0305R	6060L3704R	6060L0407R	6060L3808R	- -	M10x50 Cl. 8.8
	3600		6060L0306R	6060L3705R	6060L0408R	6060L3809R	- -	M12x55 Cl. 8.8
H8	2700		6060L0303R	6060L3703R	6060L0404R	6060L3807R	- -	M10x50 Cl. 8.8
	3200		6060L0305R	6060L3704R	6060L0407R	6060L3808R	- -	M10x50 Cl. 8.8
	3600		6060L0306R	6060L3705R	6060L0408R	6060L3809R	- -	M12x55 Cl. 8.8
	4200		6060L0308R	6060L3706R	6060L0410R	6060L3810R	- -	M12x55 Cl. 8.8
S9	3000		6060M0306R	6060M3705R	6060M0405R	6060M3811R	- -	M10x50 Cl. 8.8
	3500		6060M0307R	6060M3703R	6060M0407R	6060M3809R	- -	M12x55 Cl. 8.8
	4200		6060M0301R	6060M3701R	6060M0401R	6060M3801R	- -	M12x55 Cl. 8.8
SH	4000		6060N0302R	6060N3701R	6060N0402R	6060N3802R	- -	M12x70 Cl. 8.8
	4500		6060N0301R	6060N3702R	6060N0403R	6060N3803R	- -	M12x70 Cl. 8.8
	5200		6060N0303R	6060N3703R	6060N0401R	6060N3801R	- -	M14x70 Cl. 8.8
S0	- -		- -	- -	- -	- -	- -	--
SK	7000		- -	- -	- -	6060K3803R	- -	M12x90 Cl. 8.8
	9000		- -	- -	- -	- -	6060K8001R	M14x95 Cl. 8.8

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Shear bolt torque limiters LB

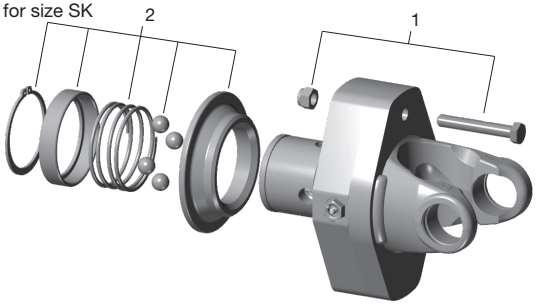
LB codes as spare parts for sizes S1 to SH





Ref.	Size	Spare part code	Description	Technical data
1		432000002R05 432000047R05 432000053R05 432000124R05 432000030R05 432000055R05	Bolt	M6x40 Cl. 8.8 M8x45 Cl. 8.8 M10x50 Cl. 8.8 M12x55 Cl. 8.8 M12x70 Cl. 8.8 M14x70 Cl. 8.8
2		348017000R20	Grease fitting	
3		403000001R10	Push-pin kit	1 3/8” Z6 - Z21
4		408000048R02 408000052R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20

LB codes as spare parts for size SK



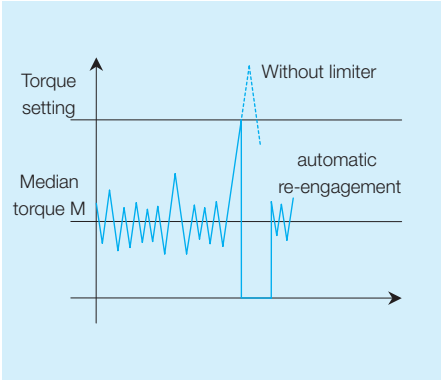
Ref.	Size	Spare part code	Description	Technical data
1		432000126R05 432000139R05	Bolt	M12x90 Cl. 8.8 M14x95 Cl. 8.8
2		*435000429R 435008002R	Ball collar kit Ball collar kit	1 3/4” Z20 2 1/4” Z22

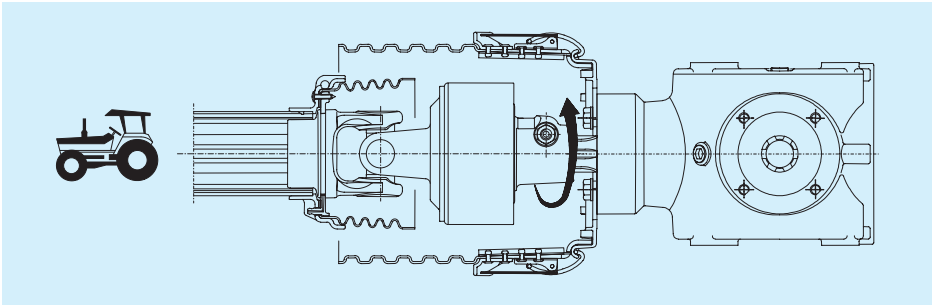
* Bar collar kit for 1 3/4” Z20 LB with hub having D=60 mm (see figure page 19.4) is code 435000427R.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Automatic torque limiter LR

LR automatic torque limiters interrupt transmission of power in the event of torque peaks that exceed the setting.
The LR will automatically re-engaged after removing the cause of the overload and allowing the driveline to a slow to a lower speed.
LR torque limiters apply to implements subject to accidental overloads or torque peaks, such as tillers, square balers, and feed mixers.
The torque setting is generally two or three times the median torque M.
LR torque limiters are designed to operate in one direction. Standard versions are suitable for drivelines operated by the rear-mounted PTO of a tractor, in the direction of rotation shown below. Special versions with the opposite direction of rotation can be supplied upon request.





For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Automatic torque limiter LR

LR torque limiters have taper pin attachment to a splined shaft.

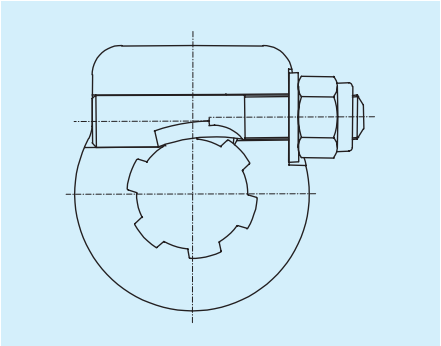
Ensure the device is properly attached and the taper pin is properly tightened before operating the implement.

Recommended tightening torques:
- For profiles 1 3/8”-Z6 e 1 3/8”-Z2: 150 Nm for versions without incorporate overrunning clutch and 85 Nm for versions with incorporated overrunning clutch
- For profiles 1 3/4”-Z6 e 1 3/4”-Z20”: 220 Nm.

Model LR23 can be supplied with an incorporated overrunning clutch. This version is generally used on implements subject to overloads and high inertia, such as round balers equipped with pre-cutters.
LR23: outer diameter =151 mm, 3 cams
LR24: outer diameter =151 mm, 4 cams
LR35: outer diameter =176 mm, 5 cams

Standard LR24 and LR35 models re-engage only once per revolution.

Special models LR24 and LR35 are available that re-engage either in four positions (LR24) or five positions (LR35). These have been developed especially for operation at



1000 min^{-1}, but can also be used at lower speeds.
Special LR24 and LR35 for use at 1000 min^{-1} are identified by the letter “L” stamped on the flange fork, next to the value of the nominal torque setting.
Settings marked with (*) are recommended for a 1000 min^{-1} velocity.

Maximum torque setting are:
- LR23: 2100 Nm
- LR24: 3000 Nm
- LR35: 4500 Nm.

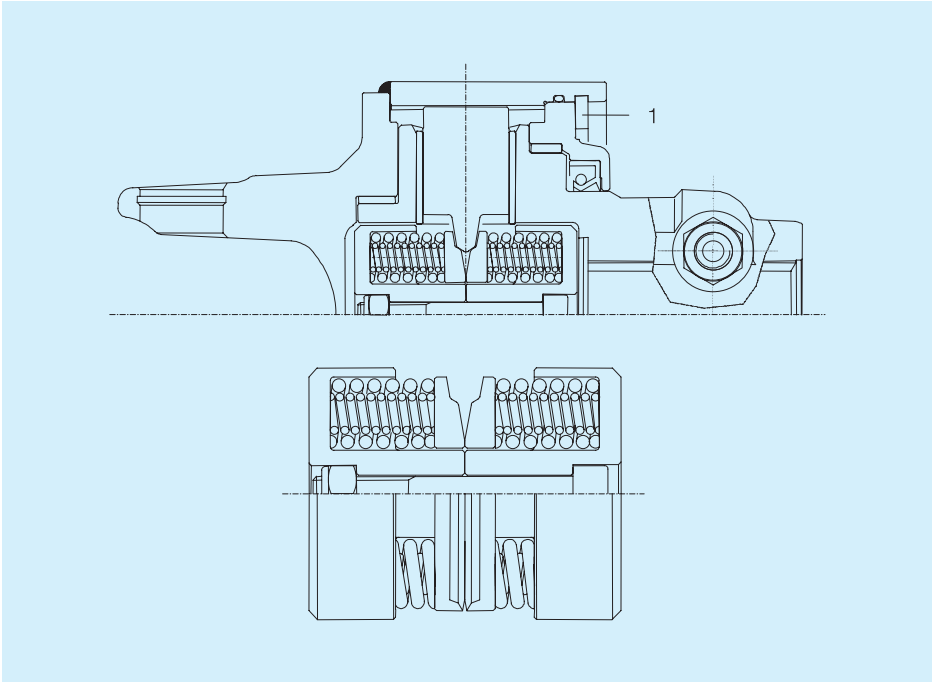
The recommended standard setting for each size of driveline is shown in the chart below. Settings marked with (*) are recommended for a 1000 min^{-1} velocity.

Standard Settings (Nm)

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
LR23			*1200									
			1500	*1500								
			1700	1700	*1700							
				1900	1900							
				2100	2100	*2100						
LR24					2500	2600	*2500	*2500				
						2900	3000	3000	*3000			
LR35							3500	3500	3500	*3500		
								4100	4100	4100	*4100	
										4500	4500	

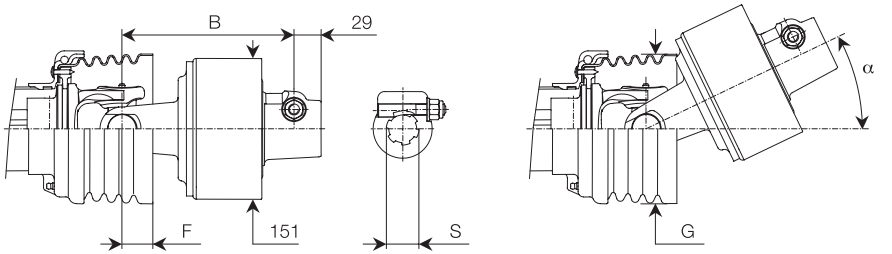
The torque setting can be easily reset by substitution of different spring pack.
The spring pack can be easily installed with common hand tools. The snap ring must be disassembled from housing (1), then the locking ring,hub and cams can be removed. The spring pack slides out of the hub when the cams are removed. The torque setting (in Nm) is stamped on the spring pack (as well as the flange yoke of the LR torque limiter).

LR torque limiters are lubricated with NLGI #2 molybdenum disulphide grease during assembly. No additional lubrication is required for the service life of the unit. Consequently no grease fitting is supplied on the torque limiter.



Automatic torque limiter LR

LR23



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*1200 1500 1700	172	172	172	172	37	146	19°
S5	*1500 1700 1900 2100	177	177	177	177	33	146	21°
S6	*1700 1900 2100	177	177	177	177	32	160	24°
H7	*2100	184	184	184	184	29	160	28°

* Recommended settings for a 1000 min^{-1} velocity

Driveline Codes LR23 for use at 540 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	00B	06B	70B	80B
1500	02B	08B	72B	82B
1700	17A	22A	73B	83B
1900	03B	09B	74B	84B
2100	19A	24A	76B	86B

Driveline Codes LR23 for use at 1000 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	00C	05C	10C	15C
1500	01C	06C	11C	16C
1700	02C	07C	12C	17C
1900	03C	08C	13C	18C
2100	04C	09C	14C	19C

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

LR23 Codes as Spare Parts for use at 540 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	1200	6WE148003R	6WE148037R	6WE148004R	6WE148038R
	1500	6WE154003R	6WE154037R	6WE154004R	6WE154038R
	1700	6WE157003R	6WE157037R	6WE157004R	6WE157038R
S5	1500	6WG154003R	6WG154037R	6WG154004R	6WG154038R
	1700	6WG157003R	6WG157037R	6WG157004R	6WG157038R
	1900	6WG159003R	6WG159037R	6WG159004R	6WG159038R
	2100	6WG161003R	6WG161037R	6WG161004R	6WG161038R
S6	1700	6WG157003R	6WG157037R	6WG157004R	6WG157038R
	1900	6WG159003R	6WG159037R	6WG159004R	6WG159038R
	2100	6WG161003R	6WG161037R	6WG161004R	6WG161038R
H7	2100	6WH161003R	6WH161037R	6WH161004R	6WH161038R

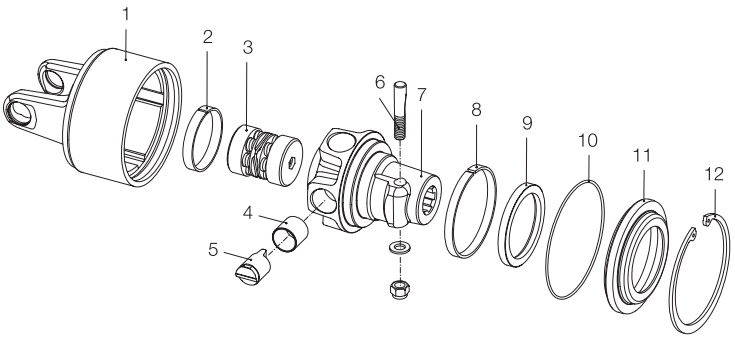
LR23 Codes as Spare Parts for use at 1000 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	*1200	6WEA48003R	6WEA48037R	6WEA48004R	6WEA48038R
	1500	6WEA54003R	6WEA54037R	6WEA54004R	6WEA54038R
	1700	6WEA57003R	6WEA57037R	6WEA57004R	6WEA57038R
S5	*1500	6WGA54003R	6WGA54037R	6WGA54004R	6WGA54038R
	1700	6WGA57003R	6WGA57037R	6WGA57004R	6WGA57038R
	1900	6WGA59003R	6WGA59037R	6WGA59004R	6WGA59038R
	2100	6WGA61003R	6WGA61037R	6WGA61004R	6WGA61038R
S6	*1700	6WGA57003R	6WGA57037R	6WGA57004R	6WGA57038R
	1900	6WGA59003R	6WGA59037R	6WGA59004R	6WGA59038R
	2100	6WGA61003R	6WGA61037R	6WGA61004R	6WGA61038R
H7	*2100	6WHA61003R	6WHA61037R	6WHA61004R	6WHA61038R

* Recommended settings for a 1000 min^{-1} velocity

Automatic torque limiter LR

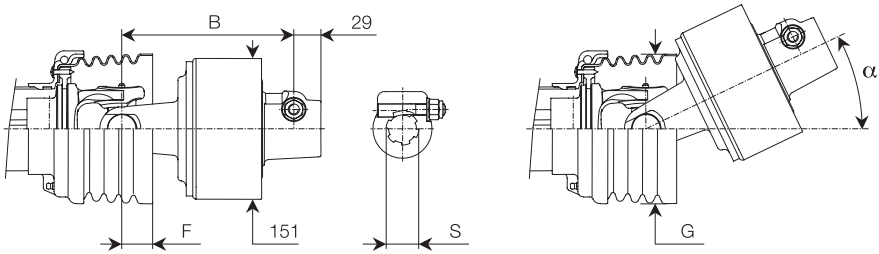
LR23



Ref.	Size	Spare part code	Description	Technical data
1	S4 S5 S6 H7	4310E1151R 4310G1151R 4310G1151R 431061151R	LR23 Outer housing + yoke for use at 540 min^{-1}	
	S4 S5 S6 H7	4310E1152R 4310G1158R 4310G1158R 4310H1151R	LR23 Outer housing + yoke for use at 1000 min^{-1}	
2		240000205R02	Bushing	
3		421154801R 421155401R 421155701R 421155901R 421156101R	Spring pack LR23	1200 Nm 1500 Nm 1700 Nm 1900 Nm 2100 Nm
4		258000100R05	Sleeve	
5		250000101R05	Cam	
6		408000047R02 408000052R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
7		515150301R 515153701R 515150401R 515153801R	Hub with taper pin and bushing	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		240000201R02	Bushing	
9		355006080R02	Sealing ring	80 x 100 x 10 mm
10		358000006R02	O-ring	139 x 2.6 mm
11		240000202R02	Locking plate	
12		338000138R20	Snap ring	138 x 4 DIN 472/1

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

LR23 with overrunning clutch



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*1200	176	176	- -	- -	37	146	19°
	1500							
	1700							
S5	*1500	181	181	- -	- -	33	146	21°
	1700							
	1900							
	2100							
S6	*1700	181	181	- -	- -	32	160	24°
	1900							
	2100							
H7	*2100	188	188	- -	- -	29	160	28°

* Recommended settings for a 1000 min^{-1} velocity

Driveline Codes LR23 with Overrunning Clutch for use at 540 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	50B	60B	- -	- -
1500	52B	62B	- -	- -
1700	53B	63A	- -	- -
1900	54B	64B	- -	- -
2100	56B	66B	- -	- -

Driveline Codes LR23 with Overrunning Clutch for use at 1000 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	25C	30C	- -	- -
1500	26C	31C	- -	- -
1700	27C	32C	- -	- -
1900	28C	33C	- -	- -
2100	29C	34C	- -	- -

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Automatic torque limiter LR

LR23 with overrunning clutch

LR23 with Overrunning Clutch Codes as Spare Parts for use at 540 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	1200	6WE848003R	6WE848037R	- -	- -
	1500	6WE854003R	6WE854037R	- -	- -
	1700	6WE857003R	6WE857037R	- -	- -
S5	1500	6WG854003R	6WG854037R	- -	- -
	1700	6WG857003R	6WG857037R	- -	- -
	1900	6WG859003R	6WG859037R	- -	- -
	2100	6WG861003R	6WG861037R	- -	- -
S6	1700	6WG857003R	6WG857037R	- -	- -
	1900	6WG859003R	6WG859037R	- -	- -
	2100	6WG861003R	6WG861037R	- -	- -
H7	2100	6WH861003R	6WH861037R	- -	- -

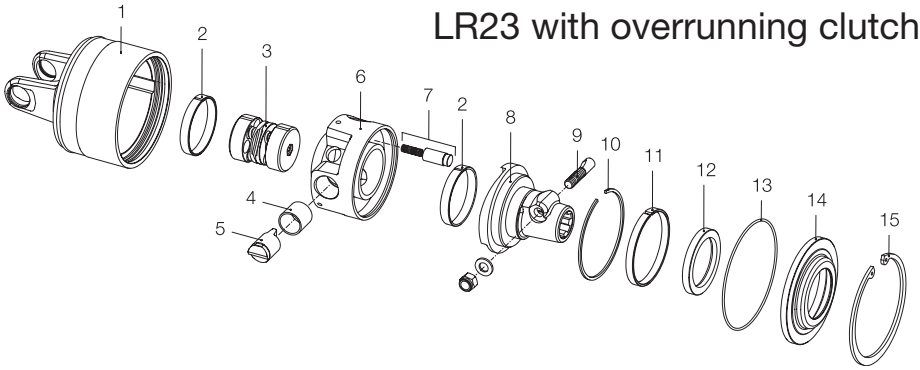
LR23 with Overrunning Clutch Codes as Spare Parts for use at 1000 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	*1200	6WEC48003R	6WEC48037R	- -	- -
	1500	6WEC54003R	6WEC54037R	- -	- -
	1700	6WEC57003R	6WEC57037R	- -	- -
S5	*1500	6WGC54003R	6WGC54037R	- -	- -
	1700	6WGC57003R	6WGC57037R	- -	- -
	1900	6WGC59003R	6WGC59037R	- -	- -
	2100	6WGC61003R	6WGC61037R	- -	- -
S6	*1700	6WGC57003R	6WGC57037R	- -	- -
	1900	6WGC59003R	6WGC59037R	- -	- -
	2100	6WGC61003R	6WGC61037R	- -	- -
H7	*2100	6WHC61003R	6WHC61037R	- -	- -

* Recommended settings for a 1000 min^{-1} velocity

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

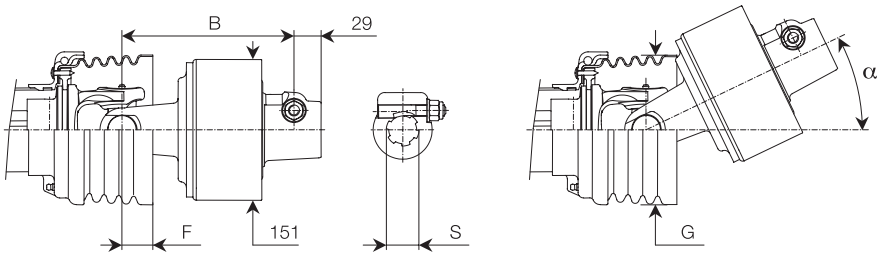
LR23 with overrunning clutch



Ref	Size	Spare part code	Description	Technical data
1	S4 S5 S6 H7	4310E8151R 4310G1152R 4310G1152R 431061106R	LR23 Outer housing + yoke with overrunning clutch for use at 540 min^{-1}	
	S4 S5 S6 H7	4310EC151R 4310GC151R 4310GC151R 431061107R	LR23 Outer housing + yoke with overrunning clutch for use at 1000 min^{-1}	
2		240000205R02	Bushing	
3		421154801R 421155401R 421155701R 421155901R 421156101R	LR23 Spring kit with overrunning clutch	1200 Nm 1500 Nm 1700 Nm 1900 Nm 2100 Nm
4		258000100R05	Sleeve	
5		250000101R05	Cam	
6		234150003R	Cam Hub	
7		421004601R03	Ratchet + spring kit for overrunning clutch	
8		515150303R 515153703R	Hub with taper pin for LR23 with overrunning clutch	1 3/8” Z6 1 3/8” Z21
9		408000048R02	Taper pin	1 3/8” Z6 - Z21
10		339115000R20	Snap ring	
11		240000207R02	Bushing	
12		355008065R02	Sealing ring	65 x 85 x 10 mm
13		358000006R02	O-ring	139 x 2.6 mm
14		240000206R02	Locking plate	
15		338000138R20	Snap ring	138 x 4 DIN 472/1

Automatic torque limiter LR

LR24



	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	2500	176	176	176	176	32	160	24°
H7	2600 2900	184	184	184	184	29	160	28°
S8	*2500 3000	184	184	184	184	42	160	19°
H8	*2500 3000	184	184	184	184	42	160	19°
S9	*3000	192	192	192	192	49	180	18°

* Recommended settings for a 1000 min^{-1} velocity

Driveline Codes LR24 for use at 540 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
2500	26A	30A	34A	38A
2600	27A	31A	35A	39A
2900	28A	32A	36A	40A
3000	29A	33A	37A	41A

Driveline Codes LR24 for use at 1000 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
2500	50C	54C	58C	62C
2600	51C	55C	59C	63C
2900	52C	56C	60C	64C
3000	53C	57C	61C	65C

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

LR24 Codes as Spare Parts for use at 540 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	2500	6WG265003R	6WG265037R	6WG265004R	6WG265038R
H7	2600	6WH266003R	6WH266037R	6WH266004R	6WH266038R
	2900	6WH269003R	6WH269037R	6WH269004R	6WH269038R
S8	2500	6WL265003R	6WL265037R	6WL265004R	6WL265038R
	3000	6WL270003R	6WL270037R	6WL270004R	6WL270038R
H8	2500	6WL265003R	6WL265037R	6WL265004R	6WL265038R
	3000	6WL270003R	6WL270037R	6WL270004R	6WL270038R
S9	3000	6WM270003R	6WM270037R	6WM270004R	6WM270038R

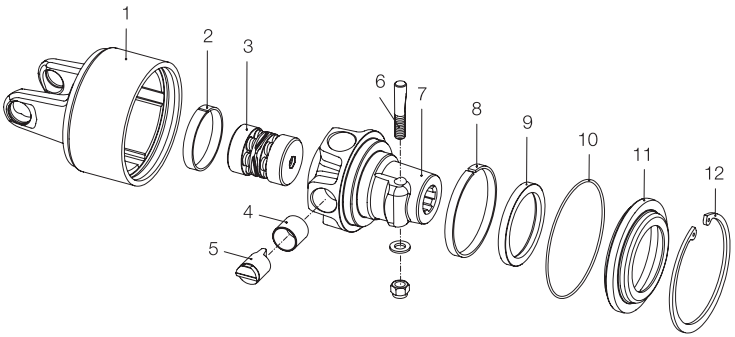
LR24 Codes as Spare Parts for use at 1000 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	2500	6WGE65003R	6WGE65037R	6WGE65004R	6WGE65038R
H7	2600	6WHE66003R	6WHE66037R	6WHE66004R	6WHE66038R
	2900	6WHE69003R	6WHE69037R	6WHE69004R	6WHE69038R
S8	*2500	6WLE65003R	6WLE65037R	6WLE65004R	6WLE65038R
	3000	6WLE70003R	6WLE70037R	6WLE70004R	6WLE70038R
H8	*2500	6WLE65003R	6WLE65037R	6WLE65004R	6WLE65038R
	3000	6WLE70003R	6WLE70037R	6WLE70004R	6WLE70038R
S9	*3000	6WME70003R	6WME70037R	6WME70004R	6WME70038R

* Recommended settings for a 1000 min^{-1} velocity

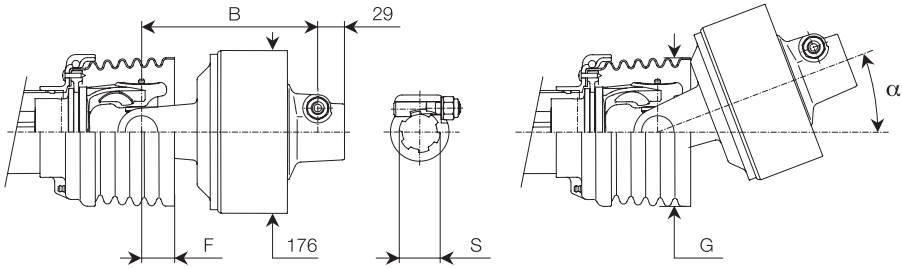
Automatic torque limiter LR

LR24



Ref	Size	Spare part code	Description	Technical data
1	S6 H7 S8 - H8 S9	4310G2152R 431062152R 4310L2152R 431082152R	LR24 Outer housing for use at 540 **min**$^{-1}$	
	S6 H7 S8 - H8 S9	4310GE151R 4310HE151R 4310LE151R 4310ME151R	LR24 Outer housing for use at 1000 min^{-1}	
2		240000205R02	Bushing	
3		421166502R 421166601R 421166902R 421167001R	Spring kit LR24 for use at 540 **min**$^{-1}$	2500 Nm 2600 Nm 2900 Nm 3000 Nm
		421166505R 421166605R 421166905R 421167005R	Spring kit LR24 for use at 1000 min^{-1}	2500 Nm 2600 Nm 2900 Nm 3000 Nm
4		258000100R05	Sleeve	
5		250000108R05 250000101R05	Cam LR24 for use at 540 **min**$^{-1}$ Cam LR24 for use at 1000 min^{-1}	
6		408000047R02 408000052R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
7		515160301R 515163701R 515160401R 515163801R	Hub with taper pin and bushings for LR24 for use at 540 **min**$^{-1}$	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
		515160305R 515163705R 515160405R 515163805R	Hub with taper pin and bushings for LR24 for use at 1000 min^{-1}	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		240000201R02	Bushing	
9		355006080R02	Sealing ring	80 x 100 x 10 mm
10		358000006R02	O-ring	139 x 2.6 mm
11		240000202R02	Locking plate	
12		338000138R20	Snap ring	138 x 4 DIN 472/1

LR35



	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	3500	190	190	190	190	42	160	17°
H8	3500 4100	190	190	190	190	42	160	17°
S9	3500 4100	192	192	192	192	49	180	18°
SH	*3500 4100 4500	199	199	199	199	50	201	16°
S0	*4100 4500	217	217	217	217	46	201	28°

* Recommended settings for a 1000 min^{-1} velocity

Driveline Codes LR35 for use at 540 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
3500	43A	48A	53A	58A
4100	24B	30B	36B	42B
4500	46A	51A	56A	61A

Driveline Codes LR35 for use at 1000 min^{-1}

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
3500	70C	73C	76C	79C
4100	71C	74C	77C	80C
4500	72C	75C	78C	81C

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Automatic torque limiter LR

LR35

LR35 Codes as Spare Parts for use at 540 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8	3500	6WL481003R	6WL481037R	6WL481004R	6WL481038R
H8	3500	6WL481003R	6WL481037R	6WL481004R	6WL481038R
	4100	6WL488003R	6WL488037R	6WL488004R	6WL488038R
S9	3500	6WM481003R	6WM481037R	6WM481004R	6WM481038R
	4100	6WM488003R	6WM488037R	6WM488004R	6WM488038R
SH	3500	6WN481003R	6WN481037R	6WN481004R	6WN481038R
	4100	6WN488003R	6WN488037R	6WN488004R	6WN488038R
	4500	6WN480003R	6WN480037R	6WN480004R	6WN480038R
S0	4100	6WS488003R	6WS488037R	6WS488004R	6WS488038R
	4500	6WS480003R	6WS480037R	6WS480004R	6WS480038R

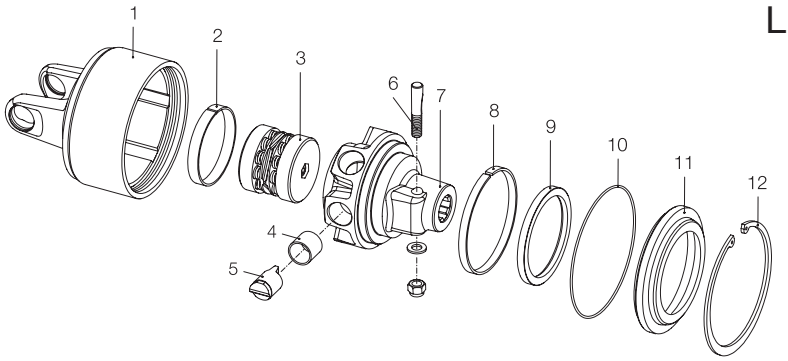
LR35 Codes as Spare Parts for use at 1000 min^{-1}

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8	3500	6WLF81003R	6WLF81037R	6WLF81004R	6WLF81038R
H8	3500	6WLF81003R	6WLF81037R	6WLF81004R	6WLF81038R
	4100	6WLF88003R	6WLF88037R	6WLF88004R	6WLF88038R
S9	3500	6WMF81003R	6WMF81037R	6WMF81004R	6WMF81038R
	4100	6WMF88003R	6WMF88037R	6WMF88004R	6WMF88038R
SH	*3500	6WNF81003R	6WNF81037R	6WNF81004R	6WNF81038R
	4100	6WNF88003R	6WNF88037R	6WNF88004R	6WNF88038R
	4500	6WNF80003R	6WNF80037R	6WNF80004R	6WNF80038R
S0	*4100	6WSF88003R	6WSF88037R	6WSF88004R	6WSF88038R
	4500	6WSF80003R	6WSF80037R	6WSF80004R	6WSF80038R

* Recommended settings for a 1000 min^{-1} velocity

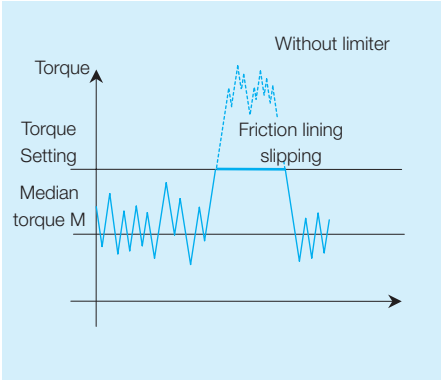
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

LR35



Ref.	Size	Spare part code	Description	Technical data
1	S8 - H8 S9 SH S0	4310L4152R 431084151R 4310N4152R 4310S4151R	LR35 Outer housing + yoke for use at 540 min^{-1}	
	S8 - H8 S9 SH S0	4310LF151R 4310MF151R 4310NF151R 4310SF151R	LR35 Outer housing + yoke for use at 1000 min^{-1}	
2		240000711R02	Bushing	
3		421188101R 421188801R 421188001R	LR35 Spring kit for use at 540 min^{-1}	3500 Nm 4100 Nm 4500 Nm
		421188105R 421188805R 421188005R	LR35 Spring kit for use at 1000 min^{-1}	3500 Nm 4100 Nm 4500 Nm
4		258000100R05	Sleeve	
5		250000101R05	Cam	
6		408000047R02 408000052R02	LR35 Taper pin for use at 540 min^{-1}	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
		408000047R02 408000046R02	LR35 Taper pin for use at 1000 min^{-1}	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
7		515180301R 515183701R 515180401R 515183801R	LR 35 Hub with taper pin and bushings for use at 540 min^{-1}	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
		515180305R 515183705R 515180405R 515183805R	Hub with taper pin and bushings for LR 35 for use at 1000 min^{-1}	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		240000712R02	Bushing	
9		355000105R02	Sealing ring	105 x 125 x 10 mm
10		358000007R02	O-ring	64.7 x 2.6 mm
11		240000710R02	Locking plate	
12		338000162R20	Snap ring	162 x 4 DIN 472/1

Friction torque limiters, commonly referred to as friction clutches, are devices used to limit torque during overloads. During operation, the plates of the torque limiter slip against friction linings, transmitting torque at the clutch setting.
The friction clutch is effective in limiting possible overloads and torque peaks generated during start-up by implements with high inertia (i.e. those equipped with flywheels or heavy rotating masses).
On these implements, a friction clutch is normally used with an overrunning clutch, able to eliminate reverse torque peaks during deceleration or stopping.
The torque setting of friction clutches is generally 1.5 to 2 times that of the median torque M.
Friction clutches are supplied as two types: torque limiters with an adjustable setting (FV, FFV) or torque limiters with a non-adjustable setting (FT, FK).
All versions have metal surfaces that are specially treated to help prevent sticking and corrosion of the friction linings.
FT models can be supplied with the Spring Release System. This system permits the spring pressure to be reduced during storage, without requiring disassembly of the torque limiter.



Friction torque limiter **FV** with adjustable setting

Friction torque limiter **FFV** with adjustable setting (only for shafts not bearing CE mark)

Friction torque limiter **FT** with non-adjustable setting

Friction torque limiter **FK** with non-adjustable setting

Friction torque limiters

pv Factor

The reliable function of a friction clutch is highly dependent on many different parameters. Temperature, for instance, is important. When slipped frequently and for long periods, friction clutches may become hot. This can impair the condition of the clutch, and alter the torque setting drastically.

Temperature increases rapidly with longer slipping cycles. It is recommended to select a setting suitable for each specific application, allowing only occasional and brief slipping (only a few seconds per cycle should be permitted).

After the setting has been chosen in accordance with the conditions of the application (median torque M, torque limit of driveline), one must select the proper type of friction clutch in regards to diameter and number of plates or friction linings.

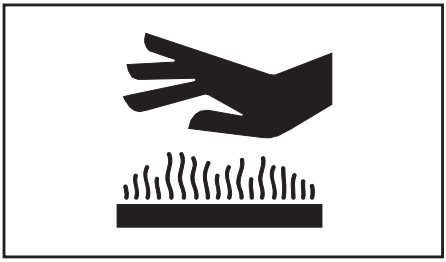
When selecting a suitable type of friction clutch, pressure **p** and slipping velocity **v** must also be taken into account.

The pressure on the friction linings is determined by the force exerted from the springs, and their surface area.

Slipping velocity is influenced by overloads (starting, stopping or blockages of the implement) and is related to the speed of rotation for the driveline.

The influence of pressure **p** and velocity **v** on the clutch is considered by factor **p·v**, equal to their product. The maximum value of factor **p·v**, suggested for reliable function of a friction clutch, is usually determined by experimentation.

Maximum recommended torque settings for 1000 min^{-1} speed are determined in accordance with this limiting value and shown on the opposite page (marked with *).



Friction clutches may become hot. **Do not touch!**

Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

Standard settings

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
Mmax (Nm):	850	1500	2200	2500	3000	3700	4000	5000	5000	6750	6750	11000
Friction torque limiters, adjustable setting												
FV22 -FFV22	*400											
	500	500										
		*600										
		800										
FV32 -FFV 32			*900	900	900							
			1000	1000	1000							
			1100	*1100	*1100							
FV42 -FFV42			*1200	*1200	*1200	1200						
			1350	1350	1350	1350	1350	1350				
				1450	1450	*1450	*1450	*1450				
				1600	1600	1600	1600	1600				
						1800	1800	1800				
FV34 -FFV34			*1200	*1200	*1200	1200						
			1350	1350	1350	1350	1350	1350				
				1450	1450	*1450	1450	1450				
				1600	1600	1600	1600	1600				
						1800	*1800	*1800	*1800			
							2000	2000	2000			
FV44 -FFV44							*1800	*1800	1800			
							2000	2000	2000			
							2200	2200	*2200	2200	2200	
							2400	2400	2400	*2400	2400	
								2600	2600	2600	*2600	
										2800	2800	
											3000	
Friction torque limiters, non-adjustable setting												
FT22 - FK22	*400											
	500	500										
		*600										
		800										
FT32 - FK32			*900	900	900							
			1000	1000	1000							
			1100	*1100	*1100							
FT42 - FK42				1200	*1200	1200						
					1450	*1450	*1450	*1450				
						1800	1800	1800				
FT34 - FK34					*1200	1200						
					1450	*1450	1450	1450				
						1800	*1800	*1800	*1800			
FT44 - FK44							*1800	*1800	1800			
							2200	2200	*2200	2200	2200	
								2400	2400	*2400	2400	
								2600	2600	2600	*2600	

* Maximum recommended settings for a 1000 min^{-1} velocity.

Friction torque limiters

Release System

The materials used in friction linings can react with the metal surfaces of the clutch, and over time this can cause adhesion phenomena, or seizure of the clutch. Several parameters that are difficult to quantify influence this reaction, but high pressure and humid environments help cause adhesion over time.

Certain metal surfaces of the FV and FT clutches are specially treated to reduce chances of seizure. Nevertheless, reducing the pressure on the linings during storage, and storing the clutch in a dry environment are recommended for any friction clutch.

The Release System permits reduction of the pressure on the linings during storage without disassembly of the clutch. The system also permits verification of proper operation after storage.

Pressure on the linings is reduced to a minimum by turning four socket headed screws (located on the flange yoke) completely into the flange yoke.

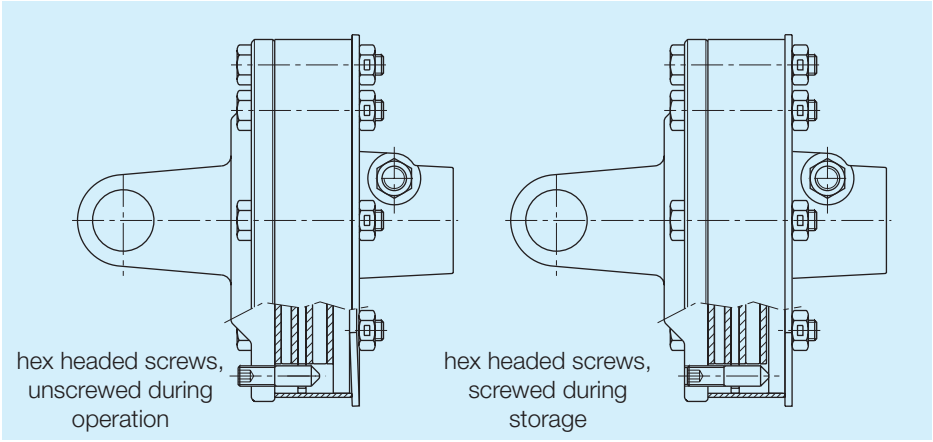
When turned completely out, the original pressure and torque setting of the clutch is restored.

The screws are only threaded on a portion of their body, so they are captured in the clutch and can be removed only upon disassembly of the clutch.

All friction clutches with the Release System are equipped with a hex wrench (code 399000030) to adjust the screws, and an operator's manual (code 399FRR001) to explain the proper use of the system.

To check proper function of a friction clutch with the Release System, the four socket screws are turned all the way in. Start the PTO at low sped so the clutch will slip for two or three seconds (longer slipping may cause damage). If the clutch will not slip after two or three attempts, disassemble the clutch and clean the contact surfaces, and replace any damaged parts.

Before operating a clutch with the Release System, pressure on the linings must be restored by turning the four set screws completely out.

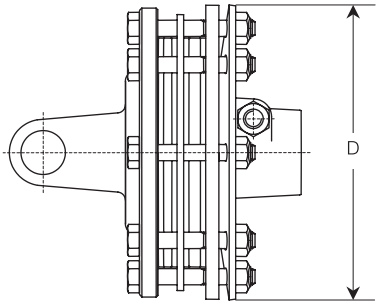


Adjustable FV Friction Clutches

FV friction clutches are equipped with special Belleville springs, designed to apply pressure that varies with the amount of compression.

Five models of FV friction clutches are available, with different diameters and number of friction linings. All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.

The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).



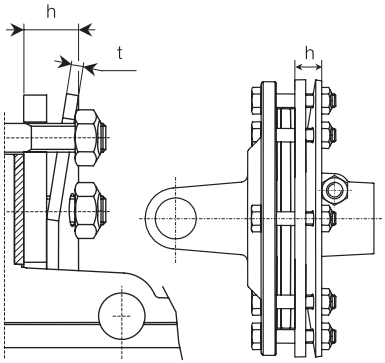
Standard settings (Nm)

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
FV22 D = 155 mm 2 plates	*400 500	500 *600 800										
FV32 D = 180 mm 2 plates			*900 1000 1100	900 1000 *1100	900 1000 *1100							
FV42 D = 202 mm 2 plates			*1200 1350	*1200 1350 1450 1600	*1200 1350 1450 1600	1200 1350 *1450 1600 1800	1350 *1450 1600 1800	1350 *1450 1600 1800				
FV34 D = 180 mm 4 plates			*1200 1350	*1200 1350 1450 1600	*1200 1350 1450 1600	1200 1350 *1450 1600 1800	1350 1450 1600 *1800 2000	1350 1450 1600 *1800 2000	*1800 2000			
FV44 D = 202 mm 4 plates							*1800 2000 2200 2400	*1800 2000 2200 2400 2600	1800 2000 *2200 2400 2600	2200 *2400 2600 2800	2200 2400 *2600 2800 3000	

* maximum recommended settings for a 1000 min^{-1} velocity

Friction torque limiters FV

FV friction torque limiters have an adjustable torque setting. The torque setting of FV friction clutches varies with different compression (h) of the Belleville spring.



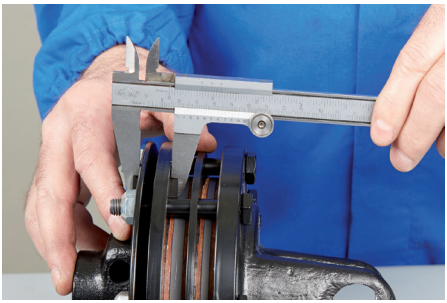
The tables below set out spring codes, thicknesses and compression "h" measured as shown in the figure for standard settings.
The height of the spring is measured next to each bolt and may be ± 0.2 mm of the listed value.
The tables also show the amount of rotation of each bolt required to achieve the next higher or lower setting, relative to the nominal setting (listed with no rotation noted on the bolt).
In addition to the listed settings, intermediate settings may be obtained by tightening or loosening the bolts proportionately.

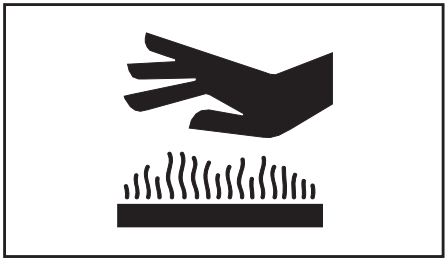
The compression of the Belleville springs used on FV friction clutches must be adjusted to compensate for wear of the friction linings and to maintain the desired setting.

Do not over-tighten the bolts; this may endanger the function of the clutch.

To avoid excessive wear to the implement, driveline, or tractor, Bondioli & Pavesi recommends that the defined setting not be altered.

Friction clutches may become hot. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.





FV22 Friction clutches
2 plates, diameter 155 mm

Spring code	t mm	Setting Nm	h mm	
367005850R	3.75	400	13.5	
		600	13.0	
		800	12.5	

FV32 Friction clutches
2 plates, diameter 180 mm

Spring code	t mm	Setting Nm	h mm	
367008860R	3.75	900	17.5	
		1000	17.0	
		1100	16.5	

FV34 Friction clutches
4 plates, diameter 180 mm

Spring code	t mm	Setting Nm	h mm	
367008860R	3.75	1200	18.0	
		1600	17.5	
		2000	16.5	

FV42 Friction clutches
2 plates, diameter 202 mm

Spring code	t mm	Setting Nm	h mm	
367009870R	4.25	1200	18.5	
		1450	18.0	
		1800	17.0	

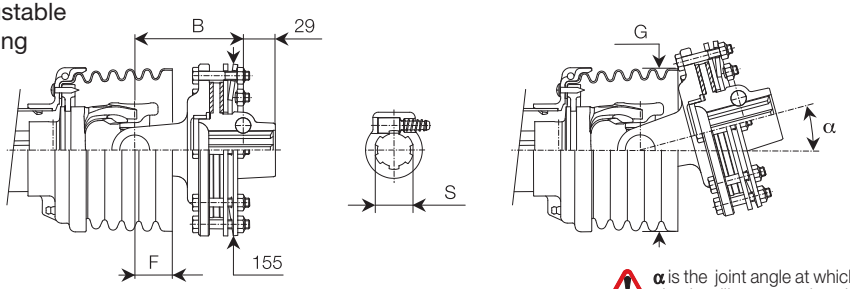
FV44 Friction clutches
4 plates, diameter 202 mm

Spring code	t mm	Setting Nm	h mm	
367009870R	4.25	1800	19.0	
		2400	18.5	
		3000	17.5	

Friction torque limiters FV

FV22

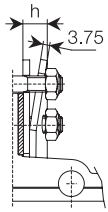
adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	*400	92	92	- -	- -	23	129	22°
	500							
S2	500	100	100	- -	- -	42	146	6°
	*600							
	800							

* Maximum recommended settings for 1000 min^{-1} velocity

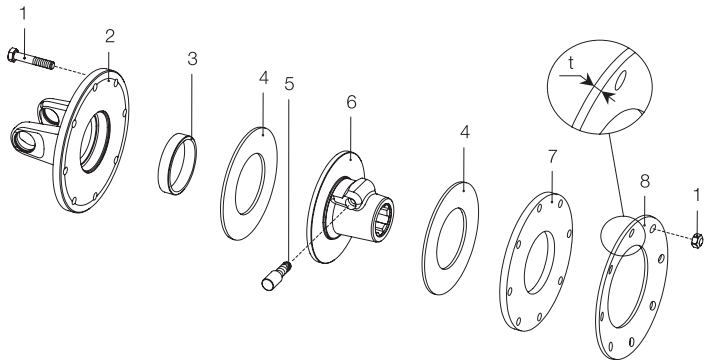


Driveline Codes FV22

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
400	N06	N09	- -	- -
500	N00	N03	- -	- -
600	N07	N10	- -	- -
800	N08	N11	- -	- -

FV22 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S1	*400	661B24103R	661B24137R	- -	- -	13.5
	500	661B28103R	661B28137R	- -	- -	
S2	500	661C28103R	661C28137R	- -	- -	
	*600	661C32103R	661C32137R	- -	- -	13.0
	800	661C39103R	661C39137R	- -	- -	12.5



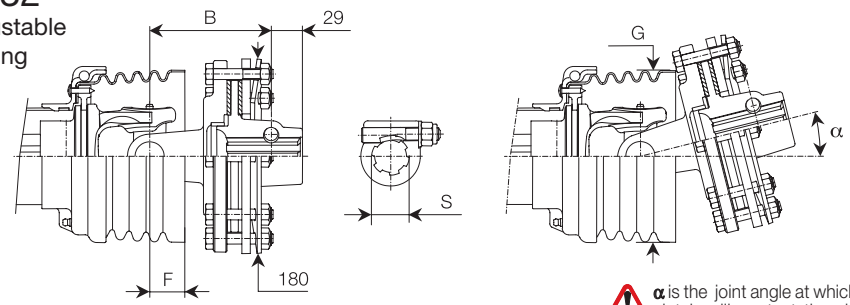
FV22
adjustable setting

Ref.	Size	Spare part code	Description	Technical data
1		432000003R08	Bolt	M8 x 50 mm
2	S1 S2	2530B8503R 2530C8503R	Flange yoke	
3		258005320R02	Bushing	
4		247006151R08	Friction lining	D = 124 ; d = 67 mm
5		403000001R10	Push-pin kit	1 3/8" Z6 - Z21
6		513850307R 513853707R	Hub with push pin	1 3/8" Z6 1 3/8" Z21
7		2481A0001R02	Pressure plate	Thickness = 4 mm
8		367005850R	Belleville spring	t = 3.75 mm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FV

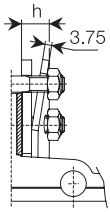
FV32
adjustable
setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*900	113	113	- -	- -	37	146	19°
	1000							
	1100							
S5	900	117	117	- -	- -	33	146	21°
	1000							
	*1100							
S6	900	117	117	- -	- -	33	160	24°
	1000							
	*1100							

* Maximum recommended settings for 1000 min^{-1} velocity



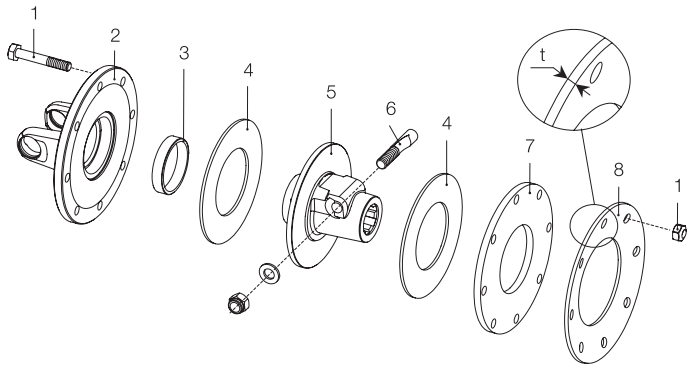
Driveline Codes FV32

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
900	N14	N17	- -	- -
1000	N31	N33	- -	- -
1100	N12	N15	- -	- -

FV32 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S4	*900	661E41203R	661E41237R	- -	- -	17.5
	1000	661E44203R	661E44237R	- -	- -	17.0
	1100	661E46203R	661E46237R	- -	- -	16.5
S5	900	661G41203R	661G41237R	- -	- -	17.5
	1000	661G44203R	661G44237R	- -	- -	17.0
	*1100	661G46203R	661G46237R	- -	- -	16.5
S6	900	661G41203R	661G41237R	- -	- -	17.5
	1000	661G44203R	661G44237R	- -	- -	17.0
	*1100	661G46203R	661G46237R	- -	- -	16.5

FV32
adjustable setting



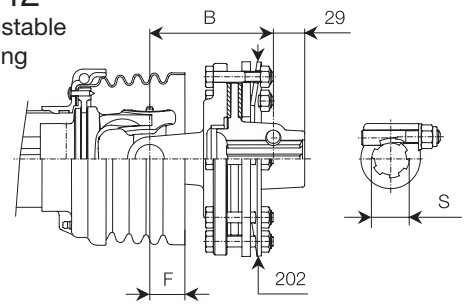
Ref.	Size	Spare part code	Description	Technical data
1		432000054R08	Bolt	M10 x 55 mm
2	S4 S5 - S6	253048602R 253058901R	Flange yoke	
3		258005320R02	Bushing	
4		247006251R08	Friction linings	D = 141 ; d = 77 mm
5		515860305R 515863705R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
6		408000047R02	Taper pin	1 3/8” Z6 - Z21
7		248860007R02	Pressure plate	Thickness = 8 mm
8		367008860R	Belleville spring	t = 3.75 mm

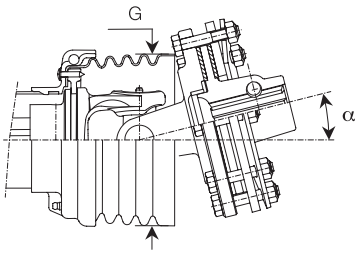
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FV

FV42

adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*1200 1350	113	113	118	118	37	146	19°
S5	*1200 1350 1450 1600	117	117	122	122	33	146	21°
S6	*1200 1350 1450 1600	117	117	122	122	32	160	24°
H7	1200 1350 *1450 1600 1800	125	125	130	130	29	160	26°
S8	1350 1450 1600 *1800	131	131	136	136	42	160	17°
H8	1350 1450 1600 *1800	131	131	136	136	42	160	17°

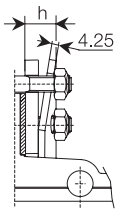
* Maximum recommended settings for 1000 min^{-1} velocity

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FV42
adjustable
setting

Driveline Codes FV42

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	N20	N23	N26	N29
1350	N35	N37	N0A	N0D
1450	N18	N21	N24	N27
1600	N36	N38	N0C	N0E
1800	N19	N22	N25	N28



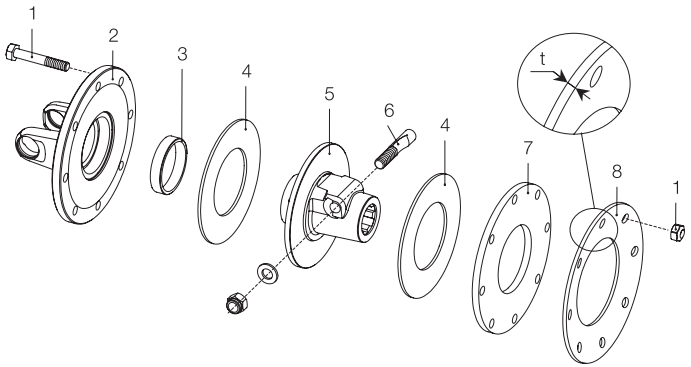
FV42 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S4	*1200	661E48403R	661E48437R	661E48404R	661E48438R	18.5
	1350	661E51403R	661E51437R	661E51404R	661E51438R	
S5 -S6	*1200	661G48403R	661G48437R	661G48404R	661G48438R	18.5
	1350	661G51403R	661G51437R	661G51404R	661G51438R	
	1450	661G53403R	661G53437R	661G53404R	661G53438R	18.0
	1600	661G56403R	661G56437R	661G56404R	661G56438R	
H7	1200	661H48403R	661H48437R	661H48404R	661H48438R	18.5
	1350	661H51403R	661H51437R	661H51404R	661H51438R	
	*1450	661H53403R	661H53437R	661H53404R	661H53438R	18.0
	1600	661H56403R	661H56437R	661H56404R	661H56438R	
	1800	661H58403R	661H58437R	661H58404R	661H58438R	17.0
S8 -H8	1350	661L51403R	661L51437R	661L51404R	661L51438R	
	1450	661L53403R	661L53437R	661L53404R	661L53438R	18.0
	1600	661L56403R	661L56437R	661L56404R	661L56438R	
	*1800	661L58403R	661L58437R	661L58404R	661L58438R	17.0

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FV

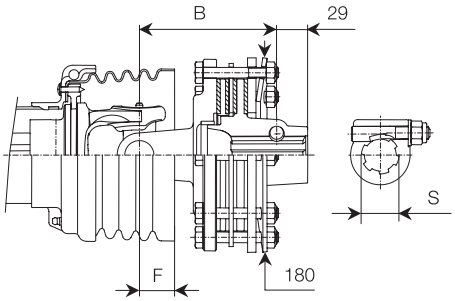
FV42
adjustable setting

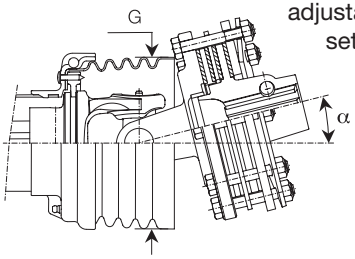


Ref.	Size	Spare part code	Description	Technical data
1		432000008R08	Bolt	M10 x 60 mm
2	S4 S5 - S6 H7 S8 - H8	2530D8701R 253058701R 253069001R 253078702R	Flange yoke	
3		258005320R02	Bushing	
4		247006351R08	Friction linings	D = 162 ; d = 85 mm
5		515870305R 515873705R 515870405R 515873805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
6		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
7		248870007R	Pressure plate	Thickness = 8 mm
8		367FT420D	Belleville spring	t = 4.25 mm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FV34
adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*1200 1350	129	129	134	134	37	146	19°
S5	*1200 1350 1450 1600	133	133	138	138	33	146	21°
S6	*1200 1350 1450 1600	133	133	138	138	32	160	24°
H7	1200 1350 *1450 1600 1800	140	140	145	145	29	160	28°
S8	1350 1450 1600 *1800 2000	146	146	151	151	42	160	18°
H8	1350 1450 1600 *1800 2000	146	146	151	151	42	160	18°
S9	*1800 2000	148	148	153	153	49	180	13°

* Maximum recommended settings for 1000 min^{-1} velocity

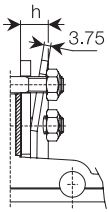
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FV

FV34
adjustable
setting

Driveline Codes FV34

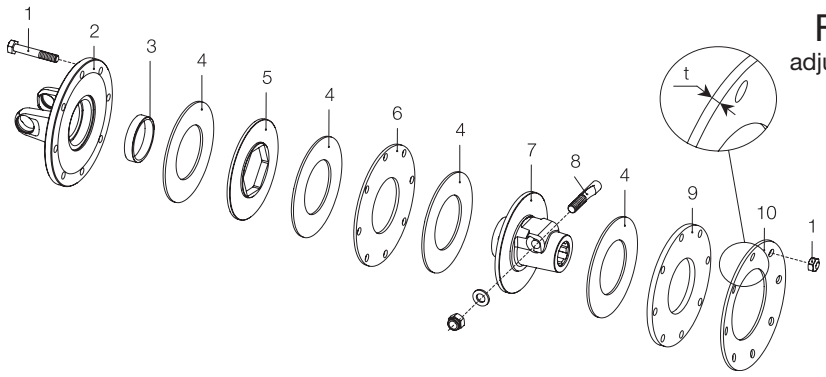
Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	N45	N51	N57	N63
1350	N46	N52	N58	N64
1450	N47	N53	N59	N65
1600	N0F	N0H	N0K	N0M
1800	N43	N49	N55	N61
2000	N0G	N0J	N0L	N0N



FV34 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S4	*1200	661E48303R	661E48337R	661E48304R	661E48338R	18.0
	1350	661E51303R	661E51337R	661E51304R	661E51338R	
S5 - S6	*1200	661G48303R	661G48337R	661G48304R	661G48338R	18.0
	1350	661G51303R	661G51337R	661G51304R	661G51338R	
	1450	661G53303R	661G53337R	661G53304R	661G53338R	
	1600	661G56303R	661G56337R	661G56304R	661G56338R	17.5
H7	1200	661H48303R	661H48337R	661H48304R	661H48338R	18.0
	1350	661H51303R	661H51337R	661H51304R	661H51338R	
	*1450	661H53303R	661H53337R	661H53304R	661H53338R	
	1600	661H56303R	661H56337R	661H56304R	661H56338R	17.5
	1800	661H58303R	661H58337R	661H58304R	661H58338R	
S8 - H8	1350	661L51303R	661L51337R	661L51304R	661L51338R	
	1450	661L53303R	661L53337R	661L53304R	661L53338R	
	1600	661L56303R	661L56337R	661L56304R	661L56338R	17.5
	*1800	661L58303R	661L58337R	661L58304R	661L58338R	
	2000	661L60303R	661L60337R	661L60304R	661L60338R	16.5
S9	*1800	661M58303R	661M58337R	661M58304R	661M58338R	
	2000	661M60303R	661M60337R	661M60304R	661M60338R	16.5

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.



FV34
adjustable setting

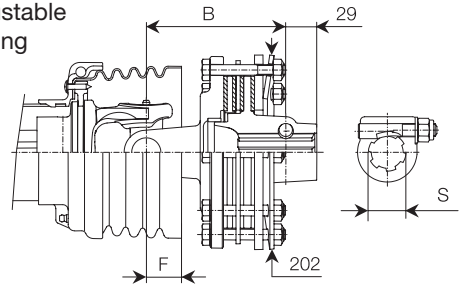
Ref.	Size	Spare part code	Description	Technical data
1		432000114R08	Bolt	M10 x 75 mm
2	S4 S5 - S6 H7 S8 - H8 S9	253048602R 253058901R 253068903R 253078601R 253088903R	Flange yoke	
3		258005320R02	Bushing	
4		247006251R08	Friction linings	D = 141 ; d = 77 mm
5		248727702R02	Driving plate	
6		248860001R02	Inner plate	Thickness = 4 mm
7		515890305R 515893705R 515890405R 515893805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		408000047R02 408000049R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
9		248860007R02	Pressure plate	Thickness = 8 mm
10		367008860R	Belleville spring	t = 3.75 mm

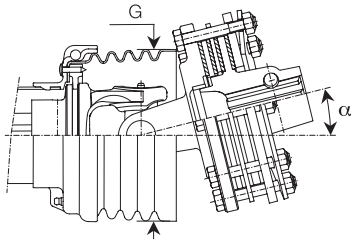
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FV

FV44

adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	* 1800 2000 2200 2400	147	147	152	152	42	160	17°
H8	1800 2000 *2200 2400 2600	147	147	152	152	42	160	17°
S9	1800 2000 *2200 2400 2600	149	149	154	154	49	180	18°
SH	2200 *2400 2600 2800	150	150	155	155	50	201	12°
S0	2200 2400 *2600 2800 3000	163	163	168	168	46	201	21°

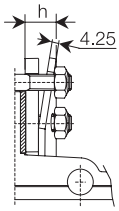
* Maximum recommended settings for 1000 min^{-1} velocity

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FV44
adjustable
setting

Driveline Codes FV44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	N39	N72	N77	N82
2000	N71	N76	N81	N86
2200	N40	N73	N78	N83
2400	N41	N87	N91	N95
2600	N42	N88	N92	N96
2800	N0P	N0S	N0T	N99
3000	N67	N89	N93	N97



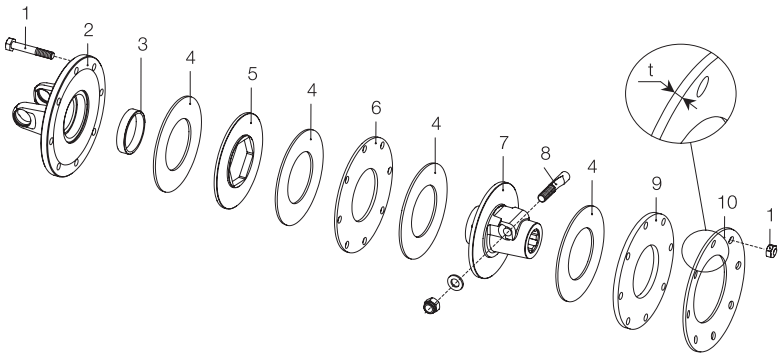
FV44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S8 - H8	*1800	661L58503R	661L58537R	661L58504R	661L58538R	19.0
	2000	661L60503R	661L60537R	661L60504R	661L60538R	
	2200	661L62503R	661L62537R	661L62504R	661L62538R	
	2400	661L64503R	661L64537R	661L64504R	661L64538R	18.5
H8	2600	661L66503R	661L66537R	661L66504R	661L66538R	
S9	1800	661M58503R	661M58537R	661M58504R	661M58538R	19.0
	2000	661M60503R	661M60537R	661M60504R	661M60538R	
	*2200	661M62503R	661M62537R	661M62504R	661M62538R	
	2400	661M64503R	661M64537R	661M64504R	661M64538R	18.5
	2600	661M66503R	661M66537R	661M66504R	661M66538R	
SH	2200	661N62503R	661N62537R	661N62504R	661N62538R	
	*2400	661N64503R	661N64537R	661N64504R	661N64538R	18.5
	2600	661N66503R	661N66537R	661N66504R	661N66538R	
	2800	661N68503R	661N68537R	661N68504R	661N68538R	
S0	2200	661S62503R	661S62537R	661S62504R	661S62538R	
	2400	661S64503R	661S64537R	661S64504R	661S64538R	18.5
	*2600	661S66503R	661S66537R	661S66504R	661S66538R	
	2800	661S68503R	661S68537R	661S68504R	661S68538R	
	3000	661S70503R	661S70537R	661S70504R	661S70538R	17.5

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FV

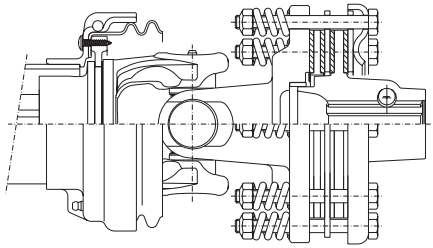
FV44
adjustable setting



Ref.	Size	Spare part code	Description	Technical data
1		432000114R08	Bolt	M10 x 75 mm
2	S8 - H8 S9 SH S0	253078702R 253089001R 2530N9001R 2530S1F01R	Flange yoke	
3		258005320R02	Bushing	
4		247006351R08	Friction lining	D = 162 ; d = 85 mm
5		248737702R02	Driving plate	
6		248870011R02	Inner plate	Thickness = 4 mm
7		515900305R 515903705R 515900405R 515903805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
9		248870007R	Pressure plate	Thickness = 8 mm
10		367FT420D	Belleville spring	t = 4.25 mm

FFV friction clutches are equipped with helical (coil) springs, that apply pressure in proportion to the amount of compression.
Five models of FFV friction clutches are available, with different diameters and number of friction linings.
All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.
The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.
An implement with an FFV clutch on the primary driveline must have a shield that overlaps the driveline guard by at least 50 mm overlap as specified by UNI EN ISO 4254-1 and ANSI/ASABE S604.1 standards.

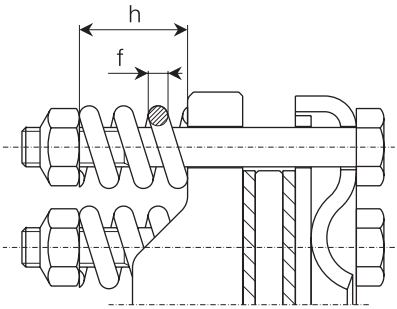


Standard Settings (Nm)	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
FFV22 D = 159 mm 2 plates	*400 500	500 *600 800										
FFV32 D = 180 mm 2 plates			*900 1000 1100	900 1000 *1100	900 1000 *1100							
FFV42 D = 202 mm 2 plates			*1200 1350	*1200 1350 1450 1600	*1200 1350 1450 1600	1200 1350 *1450 1600 1800	1350 *1450 1600 1800	1350 *1450 1600 1800				
FFV34 D = 180 mm 4 plates			*1200 1350	*1200 1350 1450 1600	*1200 1350 1450 1600	1200 1350 *1450 1600 1800	1350 1450 1600 *1800 2000	1350 1450 1600 *1800 2000	*1800 2000			
FFV44 D = 202 mm 4 plates							*1800 2000 2200 2400	*1800 2000 2200 2400 2600	1800 2000 *2200 2400 2600	2200 *2400 2600 2800	2200 2400 *2600 2800 3000	

* Maximum recommended settings for a 1000 min^{-1} velocity .

Friction torque limiters FFV

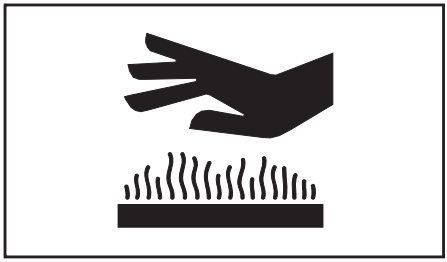
FFV friction clutches have an adjustable torque setting. The torque setting varies with different thickness (t) and compression (h) of the springs.



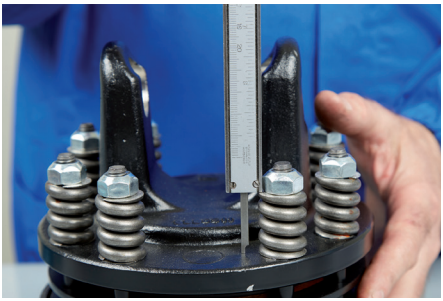
The compression of the springs must be adjusted to compensate for wear of the friction linings and to maintain the desired torque setting.

To avoid excessive wear to the implement, driveline, or tractor, Bondioli & Pavesi recommends that the defined setting not be altered.

Do not over-tighten the bolts; this may impair the function of friction clutches.



The tables below show the spring code, diameter “f” and compression height “h” for standard settings.
Check the compression of each spring using a sliding caliper as shown below.
The height of the spring may be ± 0.2 mm of the “h” value shown



The tables also show the amount of rotation of each bolt required to achieve the next higher or lower setting, relative to the nominal setting (listed with no rotation noted on the bolt).
In addition to the listed settings, intermediate settings may be obtained by tightening or loosening the bolts proportionately.

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

FFV22 Friction clutches
2 plates, diameter 159 mm

Spring code	f mm	Setting Nm	h mm	
351015001	6	400	30.0	
		600	29.5	
		800	29.0	

FFV32 Friction clutches
2 plates, diameter 180 mma

Spring code	f mm	Setting Nm	h mm	
351022370	6	900	28.8	
		1000	28.5	
		1100	28.2	

FFV34 Friction clutches
4 plates, diameter 180 mma

Spring code	f mm	Setting Nm	h mm	
351022370	6	1200	29.5	
		1450	29.0	
		1800	28.5	

FFV42 Friction clutches
2 plates, diameter 202 mma

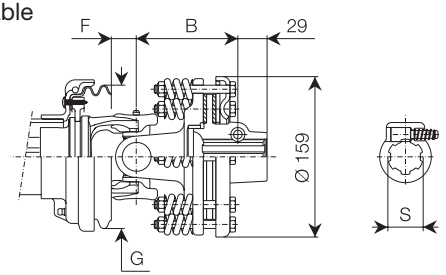
Spring code	f mm	Setting Nm	h mm	
351013370	7	1200	29.5	
		1450	29.2	
		1800	28.8	

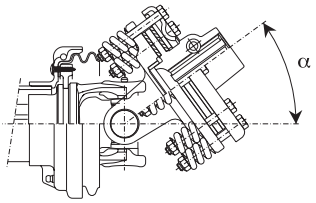
FFV44 Friction clutches
4 plates, diameter 202 mma

Spring code	f mm	Setting Nm	h mm	
351013370	7	1800	30.0	
		2400	29.5	
		3000	29.0	

Friction torque limiters FFV

FFV22
adjustable setting





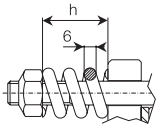
α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	*400	92	92	- -	- -	9	124	22°
	500							
S2	500	100	100	- -	- -	20	142	31°
	*600							
	800							

* Maximum recommended settings for 1000 min^{-1} velocity

Driveline Codes FFV22

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
400	0R1	0R6	- -	- -
500	0R2	0R7	- -	- -
600	0R3	0R8	- -	- -
800	0R4	0R9	- -	- -

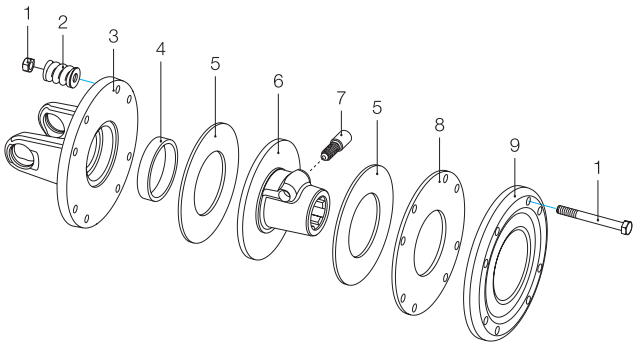


FFV22 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S1	*400	635B24103R	635B24137R	- -	- -	30.0
	500	635B28103R	635B28137R	- -	- -	
S2	500	635C28103R	635C28137R	- -	- -	
	*600	635C32103R	635C32137R	- -	- -	29.5
	800	635C39103R	635C39137R	- -	- -	29.0

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FFV22
adjustable setting



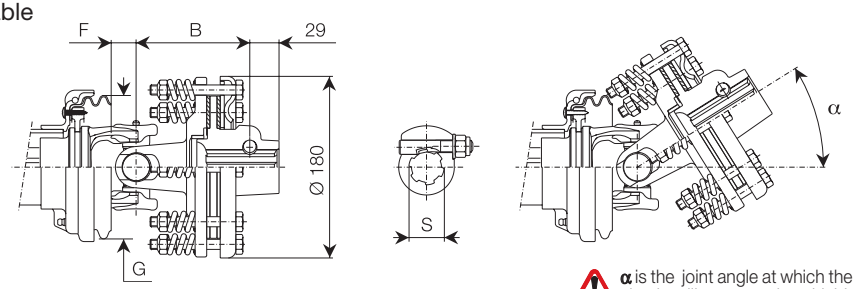
Ref.	Size	Spare part code	Description	Technical data
1		432000031R08	Bolt	M8 x 75 mm
2		351015001R08	Coil springs	f = 6 mm
3	S1 S2	2530B1A05R 2530C1A05R	Flange yoke	
4		258005320R02	Bushing	
5		247006151R08	Friction linings	D = 124 ; d = 67 mm
6		513850307R 513853707R	Hub with push pin	1 3/8” Z6 1 3/8” Z21
7		403000001R10	Push-pin kit	1 3/8” Z6 - Z21
8		2481A0007R02	Inner plate	Thickness = 4 mm
9		2481A0006R02	Pressure plate	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FFV

FFV32

adjustable setting



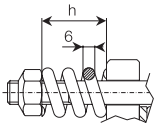
α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*900	113	113	- -	- -	25	142	32°
	1000							
	1100							
S5	900	117	117	- -	- -	28	142	38°
	1000							
	*1100							
S6	900	117	117	- -	- -	19	156	30°
	1000							
	*1100							

* Maximum recommended settings for 1000 min^{-1} velocity

Driveline Codes FFV32

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	900	0S1	0S6	- -	- -
	1000	0S2	0S7	- -	- -
	1100	0S3	0S8	- -	- -

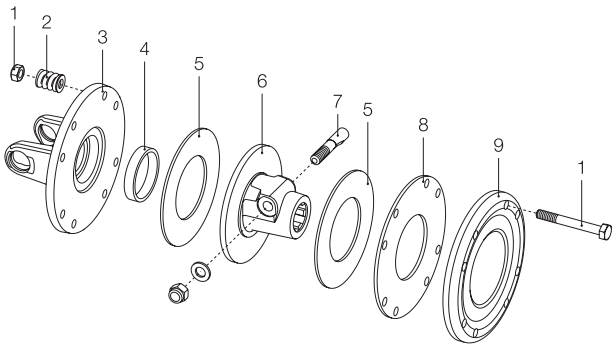


FFV32 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S4	*900	635E41203R	635E41237R	- -	- -	28.8
	1000	635E44203R	635E44237R	- -	- -	28.5
	1100	635E46203R	635E46237R	- -	- -	28.2
S5 - S6	900	635G41203R	635G41237R	- -	- -	28.8
	1000	635G44203R	635G44237R	- -	- -	28.5
	*1100	635G46203R	635G46237R	- -	- -	28.2

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FFV32
adjustable setting



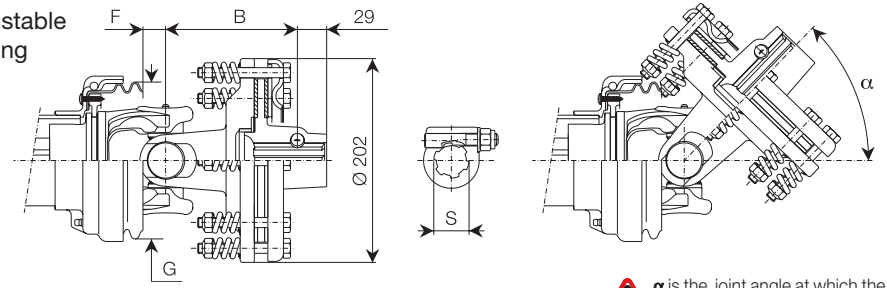
Ref.	Size	Spare part code	Description	Technical data
1		432000006R08	Bolt	M10 x 85 mm
2		351022370R08	Coil springs	f = 6 mm
3	S4 S5 - S6	2530E1C05R 2530G1C05R	Flange yoke	
4		258005320R02	Bushing	
5		247006251R08	Friction lining	D = 141 ; d = 77 mm
6		515860305R 515863705R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
7		408000047R02	Taper pin	1 3/8” Z6 - Z21
8		2481C0007R02	Inner plate	Thickness = 4 mm
9		248220007R02	Pressure plate	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FFV

FFV42

adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*1200 1350	113	113	118	118	25	142	38°
S5	*1200 1350 1450 1600	117	117	122	122	28	142	42°
S6	*1200 1350 1450 1600	117	117	122	122	19	156	37°
H7	1200 1350 *1450 1600 1800	125	125	130	130	23	156	43°
S8	1350 *1450 1600 1800	131	131	136	136	22	156	46°
H8	1350 *1450 1600 1800	131	131	136	136	22	156	46°

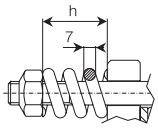
* Maximum recommended settings for 1000 min^{-1} velocity

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FFV42
adjustable
setting

Driveline Codes FFV42

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	0Z1	0Z6	0Y1	0Y6
1350	0Z2	0Z7	0Y2	0Y7
1450	0Z3	0Z8	0Y3	0Y8
1600	0Z4	0Z9	0Y4	0Y9
1800	0Z5	0Z0	0Y5	0Y0



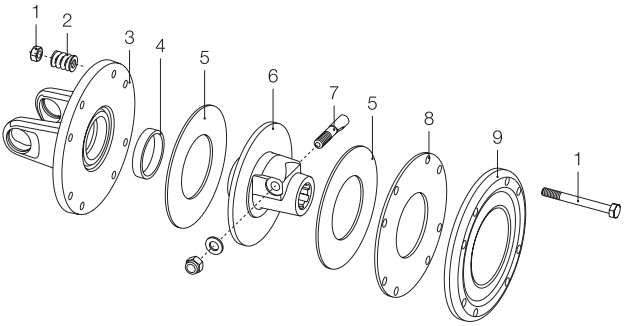
FFV42 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S4	*1200	635E48403R	635E48437R	635E48404R	635E48438R	29.5
	1350	635E51403R	635E51437R	635E51404R	635E51438R	
S5 - S6	*1200	635G48403R	635G48437R	635G48404R	635G48438R	29.5
	1350	635G51403R	635G51437R	635G51404R	635G51438R	
	1450	635G53403R	635G53437R	635G53404R	635G53438R	29.2
	1600	635G56403R	635G56437R	635G56404R	635G56438R	
H7	1200	635H48403R	635H48437R	635H48404R	635H48438R	29.5
	1350	635H51403R	635H51437R	635H51404R	635H51438R	
	*1450	635H53403R	635H53437R	635H53404R	635H53438R	29.2
	1600	635H56403R	635H56437R	635H56404R	635H56438R	
	1800	635H58403R	635H58437R	635H58404R	635H58438R	28.8
S8 - H8	1350	635L51403R	635L51437R	635L51404R	635L51438R	
	*1450	635L53403R	635L53437R	635L53404R	635L53438R	29.2
	1600	635L56403R	635L56437R	635L56404R	635L56438R	
	1800	635L58403R	635L58437R	635L58404R	635L58438R	28.8

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FFV

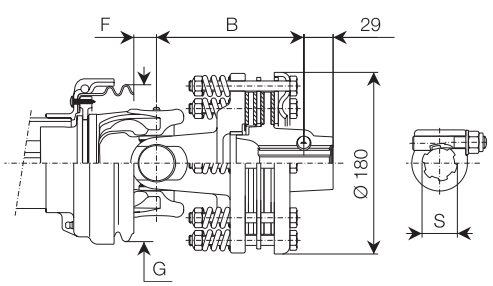
FFV42
adjustable
setting

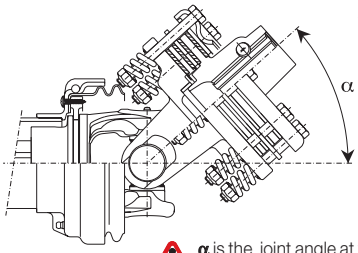


Ref.	Size	Spare part code	Description	Technical data
1		432000006R08	Bolt	M10 x 85 mm
2		351013370R08	Coil springs	f = 7 mm
3	S4 S5 - S6 H7 S8 - H8	2530E1E05R 2530G1E05R 2530H1E05R 2530L1E05R	Flange yoke	
4		258005320R02	Bushing	
5		247006351R08	Friction lining	D = 162 ; d = 85 mm
6		515870305R 515873705R 515870405R 515873805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
7		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
8		2481E0007R02	Inner plate	Thickness = 4 mm
9		248230006R02	Pressure plate	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FFV34
adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*1200 1350	129	129	134	134	25	142	32°
S5	*1200 1350 1450 1600	133	133	138	138	28	142	38°
S6	*1200 1350 1450 1600	133	133	138	138	19	156	30°
H7	1200 1350 *1450 1600 1800	140	140	145	145	23	156	38°
S8	1350 1450 1600 *1800 2000	146	146	151	151	22	156	42°
H8	1350 1450 1600 *1800 2000	146	146	151	151	22	156	42°
S9	*1800 2000	148	148	153	153	7	178	29°

* Maximum recommended settings for 1000 min^{-1} velocity

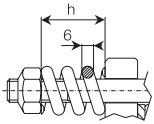
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FFV

FFV34
adjustable
setting

Driveline Codes FFV34

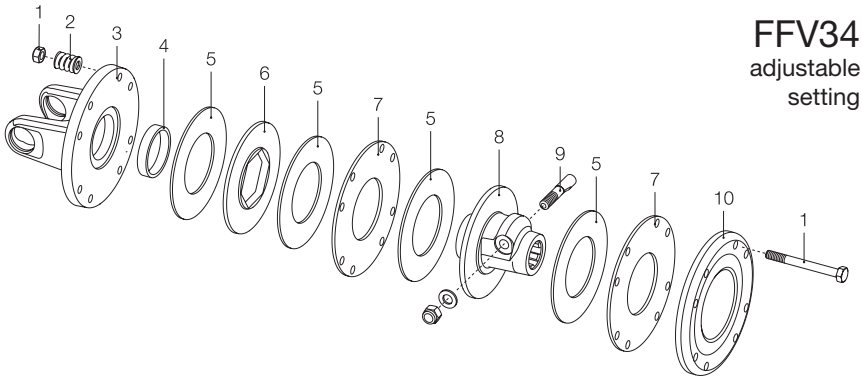
Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	0T1	0T8	0U5	0V2
1350	0T2	0T9	0U6	0V3
1450	0T3	0T0	0U7	0V4
1600	0T4	0U1	0U8	0V5
1800	0T5	0U2	0U9	0V6
2000	0T6	0U3	0U0	0V7



FFV34 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S4	*1200	635E48303R	635E48337R	635E48304R	635E48338R	29.5
	1350	635E51303R	635E51337R	635E51304R	635E51338R	
S5 - S6	*1200	635G48303R	635G48337R	635G48304R	635G48338R	29.5
	1350	635G51303R	635G51337R	635G51304R	635G51338R	
	1450	635G53303R	635G53337R	635G53304R	635G53338R	29.0
	1600	635G56303R	635G56337R	635G56304R	635G56338R	
H7	1200	635H48303R	635H48337R	635H48304R	635H48338R	29.5
	1350	635H51303R	635H51337R	635H51304R	635H51338R	
	*1450	635H53303R	635H53337R	635H53304R	635H53338R	29.0
	1600	635H56303R	635H56337R	635H56304R	635H56338R	
	1800	635H58303R	635H58337R	635H58304R	635H58338R	28.5
S8 -H8	1350	635L51303R	635L51337R	635L51304R	635L51338R	
	1450	635L53303R	635L53337R	635L53304R	635L53338R	29.0
	1600	635L56303R	635L56337R	635L56304R	635L56338R	
	*1800	635L58303R	635L58337R	635L58304R	635L58338R	28.5
	2000	635L60303R	635L60337R	635L60304R	635L60338R	
S9	*1800	635M58303R	635M58337R	635M58304R	635M58338R	28.5
	2000	635M60303R	635M60337R	635M60304R	635M60338R	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.



FFV34
adjustable setting

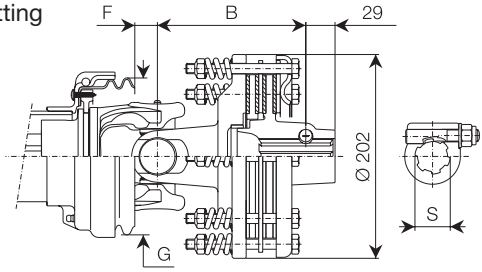
Ref.	Size	Spare part code	Description	Technical data
1		432000007R08	Bolt	M10 x 100 mm
2		351022370R08	Coil springs	f = 6 mm
3	S4 S5 - S6 H7 S8 - H8 S9	2530E1C05R 2530G1C05R 2530H1C05R 2530L1C05R 2530M1C05R	Flange yoke	
4		258005320R02	Bushing	
5		247006251R08	Friction lining	D = 141 ; d = 77 mm
6		248727702R02	Driving disc	
7		2481C0007R02	Inner Plate	Thickness = 4 mm
8		515890305R 515893705R 515890405R 515893805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
9		408000047R02 408000049R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
10		248220007R02	Pressure plate	

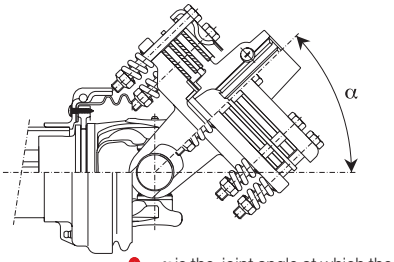
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FFV

FFV44

adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2000 2200 2400	147	147	152	152	22	156	44°
H8	1800 2000 *2200 2400 2600	147	147	152	152	22	156	44°
S9	1800 2000 *2200 2400 2600	149	149	154	154	7	178	27°
SH	2200 *2400 2600 2800	150	150	155	155	6	199	23°
S0	2200 2400 *2600 2800 3000	163	163	168	168	10	199	32°

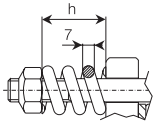
* Maximum recommended settings for 1000 min^{-1} velocity

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FFV44
adjustable
setting

Driveline Codes FFV44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	0J1	0J9	0K7	0W5
2000	0J2	0J0	0K8	0W6
2200	0J3	0K1	0K9	0W7
2400	0J4	0K2	0K0	0W8
2600	0J5	0K3	0W1	0W9
2800	0J6	0K4	0W2	0W0
3000	0J7	0K5	0W3	0X1



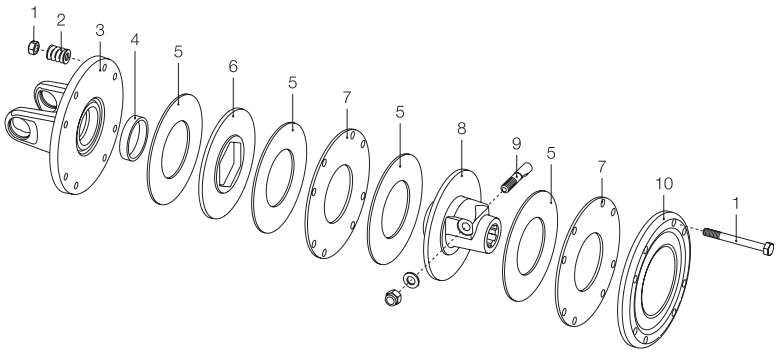
FFV44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S8 - H8	*1800	635L58503R	635L58537R	635L58504R	635L58538R	30.0
	2000	635L60503R	635L60537R	635L60504R	635L60538R	
	2200	635L62503R	635L62537R	635L62504R	635L62538R	
	2400	635L64503R	635L64537R	635L64504R	635L64538R	29.5
H8	2600	635L66503R	635L66537R	635L66504R	635L66538R	
S9	1800	635M58503R	635M58537R	635M58504R	635M58538R	30.0
	2000	635M60503R	635M60537R	635M60504R	635M60538R	
	*2200	635M62503R	635M62537R	635M62504R	635M62538R	
	2400	635M64503R	635M64537R	635M64504R	635M64538R	29.5
	2600	635M66503R	635M66537R	635M66504R	635M66538R	
SH	2200	635N62503R	635N62537R	635N62504R	635N62538R	
	*2400	635N64503R	635N64537R	635N64504R	635N64538R	29.5
	2600	635N66503R	635N66537R	635N66504R	635N66538R	
	2800	635N68503R	635N68537R	635N68504R	635N68538R	
S0	2200	635S62503R	635S62537R	635S62504R	635S62538R	
	2400	635S64503R	635S64537R	635S64504R	635S64538R	29.5
	*2600	635S66503R	635S66537R	635S66504R	635S66538R	
	2800	635S68503R	635S68537R	635S68504R	635S68538R	
	3000	635S70503R	635S70537R	635S70504R	635S70538R	29.0

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

Friction torque limiters FFV

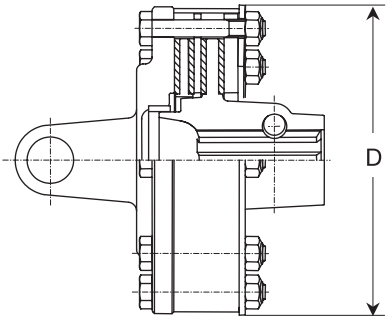
FFV44
adjustable
setting



Ref.	Size	Spare part code	Description	Technical data
1		432000122R08	Bolt	M10 x 105 mm
2		351013370R08	Coil springs	f = 7 mm
3	S8 -H8 S9 SH S0	2530L1E05R 2530M1E05R 2530N1E05R 2530S1E05R	Flange yoke	
4		258005320R02	Bushing	
5		247006351R08	Friction lining	D = 162 ; d = 85 mm
6		248737702R02	Driving disc	
7		2481E0007R02	Inner plate	Thickness = 4 mm
8		515900305R 515903705R 515900405R 515903805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
9		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
10		248230006R02	Pressure plate	

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side. All rotating parts must be guarded.

FT friction clutches are equipped with Belleville springs, designed to apply nearly constant pressure, self-compensating for friction lining wear. Therefore the setting is maintained without adjustment over the life of the linings.
FT friction clutches are non-adjustable. Torque is determined by the thickness of the Belleville spring.
Five models of FV friction clutches are available, with different diameters and number of friction linings. All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure. All versions are available with Release System.
The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).



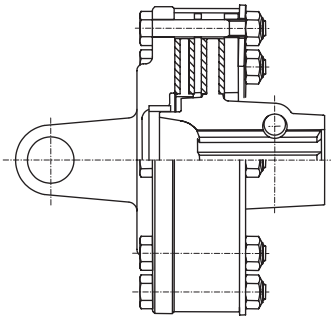
Standard Settings (Nm)

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
FT22 D = 155 mm 2 plates	*400 500	500 *600 800										
FT32 D = 180 mm 2 plates			*900 1000 1100	900 1000 *1100	900 1000 *1100							
FT42 D = 202 mm 2 plates				1200	*1200 1450	1200 *1450 1800	*1450 1800	*1450 1800				
FT34 D = 180 mm 4 plates					*1200 1450	1200 *1450 1800	1450 *1800	1450 *1800	*1800			
FT44 D = 202 mm 4 plates							*1800 2200	*1800 2200 2400 2600	1800 *2200 2400 2600	2200 *2400 2600	2200 2400 *2600	

* Maximum recommended settings for 1000 min^{-1}

Friction torque limiters FT

The torque setting of FT friction clutches is determined by the Belleville spring. The tables below show the spring codes for each friction clutch and standard setting.



FT22 - FT22R Friction clutches

Setting Nm	Spring code
400	367FT220A
500	367FT220C
600	367FT220D
800	367FT220E

FT32 - FT32R Friction clutches

Setting Nm	Spring code
900	367FT320A
1000	367FT320C
1100	367FT320D

FT42 - FT42R Friction clutches

Setting Nm	Spring code
1200	367FT420A
1450	367FT420C
1800	367FT420D

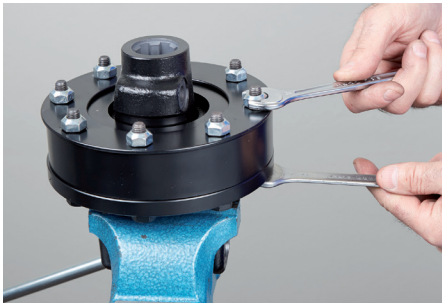
FT34 - FT34R Friction clutches

Setting Nm	Spring code
1200	367FT340A
1450	367FT340C
1800	367FT340D

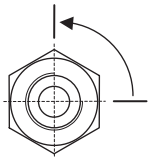
FT44 - FT44R Friction clutches

Setting Nm	Spring code
1800	367FT440A
2200	367FT440C
2400	367FT440D
2600	367FT440E

FT clutches are equipped with a metal band to be used as reference to properly compress the Belleville spring.



Proper compression occurs when the Belleville spring is evenly compressed to the height of the metal band.

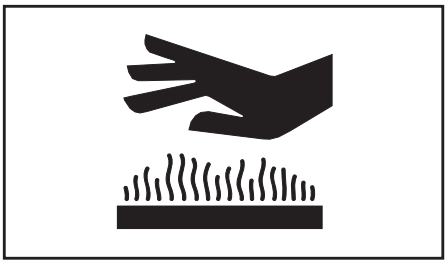


To do this properly, tighten the bolts until the Belleville spring contacts the metal band. Then back off each nut 1/4 turn.

Do not over-tighten bolts; this may endanger the function of friction clutches.

To avoid excessive wear to the implement, driveline or tractor Bondioli & Pavesi recommends that the setting not be changed.

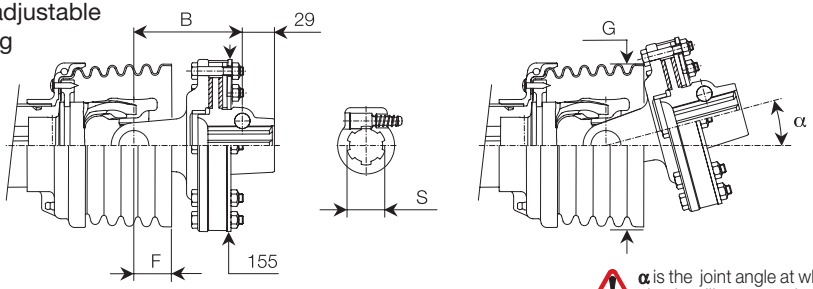
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.



Friction torque limiters FT

FT22

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	*400	92	92	- -	- -	23	129	22°
	500							
S2	500	100	100	- -	- -	42	146	6°
	*600							
	800							

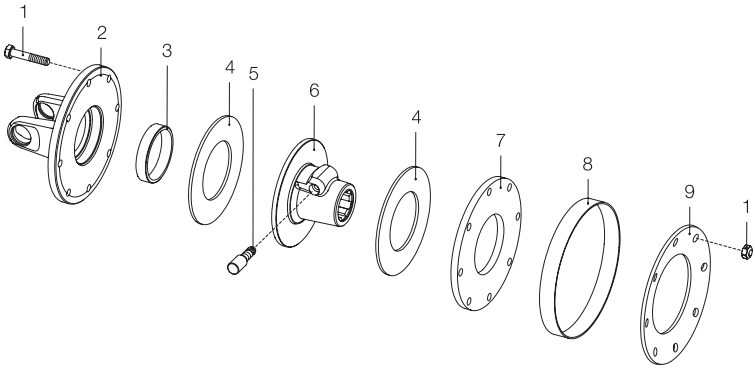
*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FT22

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
400	Q05	Q08	- -	- -
500	Q00	Q02	- -	- -
600	Q06	Q09	- -	- -
800	Q07	Q10	- -	- -

FT22 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S1	*400	663B24103R	663B24137R	- -	- -
	500	663B28103R	663B28137R	- -	- -
S2	500	663C28103R	663C28137R	- -	- -
	*600	663C32103R	663C32137R	- -	- -
	800	663C39103R	663C39137R	- -	- -



FT22
non-adjustable setting

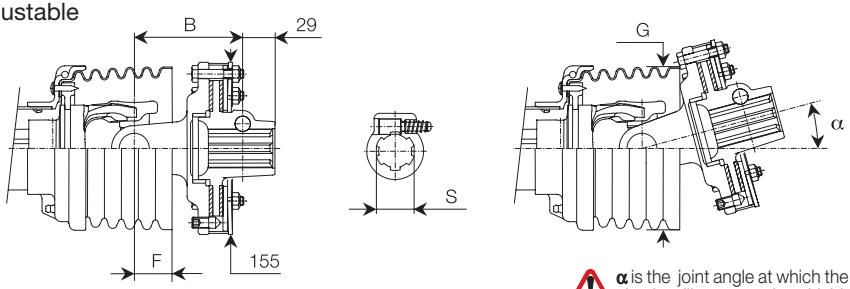
Ref.	Size	Spare part code	Description	Technical data
1		432000047R08	Bolt	M8 x 45 mm
2	S1 S2	2530B8503R 2530C8503R	Flange yoke	
3		258005320R02	Bushing	
4		247006151R08	Friction lining	D = 124 ; d = 67 mm
5		403000001R10	Push-pin kit	1 3/8" Z6 - Z21
6		513850307R 513853707R	Hub with push-pin	1 3/8" Z6 1 3/8" Z21
7		2481A0002R02	Pressure plate	Thickness = 4 mm
8		240001059R02	Adjustment band	
9		367FT220A 367FT220C 367FT220D 367FT220E	Belleville spring	400 Nm 500 Nm 600 Nm 800 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT22R

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	* 400	92	92	- -	- -	23	129	22°
	500							
S2	500	100	100	- -	- -	42	146	6°
	*600							
	800							

*Maximum recommended settings for 1000 min^{-1} velocity.

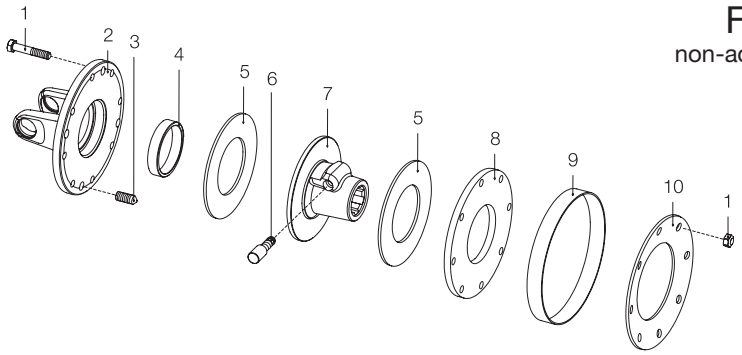
Driveline Codes FT22R

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	400	H05	H08	- -	- -
	500	H00	H02	- -	- -
	600	H06	H09	- -	- -
	800	H07	H10	- -	- -

FT22R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S1	*400	663B24A03R	663B24A37R	- -	- -
	500	663B28A03R	663B28A37R	- -	- -
S2	500	663C28A03R	663C28A37R	- -	- -
	*600	663C32A03R	663C32A37R	- -	- -
	800	663C39A03R	663C39A37R	- -	- -

FT22R
non-adjustable setting



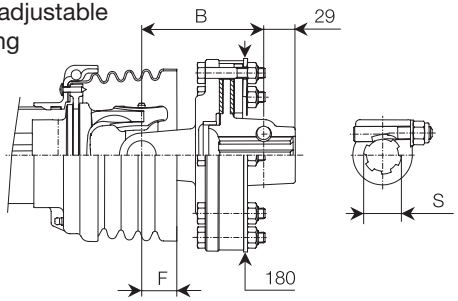
Ref.	Size	Spare part code	Description	Technical data
1		432000047R08	Bolt	M8 x 45 mm
2	S1 S2	2530B8504R 2530C8504R	Flange yoke	
3		310001300R04	Special socket head set screw	M10 x 25 mm
4		258005320R02	Bushing	
5		247006151R08	Friction lining	D = 124 ; d = 67 mm
6		403000001R10	Push-pin kit	1 3/8" Z6 - Z21
7		513850307R 513853707R	Hub with push pin	1 3/8" Z6 1 3/8" Z21
8		2481A0002R02	Pressure plate	Thickness = 4 mm
9		240001059R02	Adjustment band	
10		367FT220A 367FT220C 367FT220D 367FT220E	Belleville spring	400 Nm 500 Nm 600 Nm 800 Nm

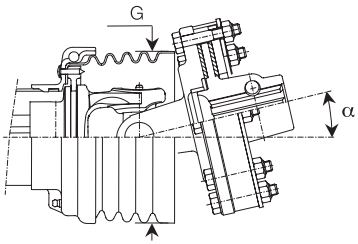
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT32

non-adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*900	113	113	- -	- -	37	146	19°
	1000							
	1100							
S5	900	117	117	- -	- -	33	146	21°
	1000							
	*1100							
S6	900	117	117	- -	- -	32	160	24°
	1000							
	*1100							

*Maximum recommended settings for 1000 min^{-1} velocity.

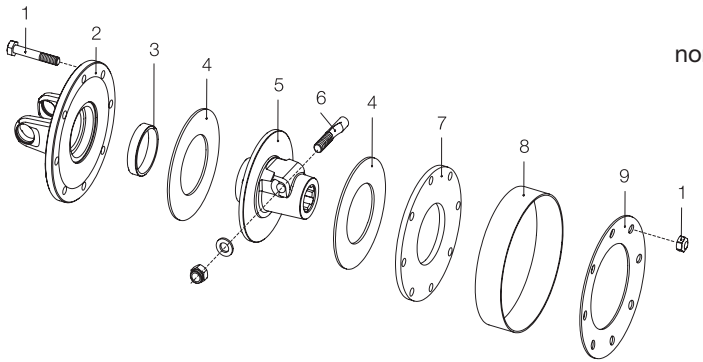
Driveline Codes FT32

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	900	Q11	Q16	- -	- -
	1000	Q14	Q19	- -	- -
	1100	Q15	Q20	- -	- -

FT32 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	*900	663E41203R	663E41237R	- -	- -
	1000	663E44203R	663E44237R	- -	- -
	1100	663E46203R	663E46237R	- -	- -
S5 - S6	900	663G41203R	663G41237R	- -	- -
	1000	663G44203R	663G44237R	- -	- -
	*1100	663G46203R	663G46237R		

FT32
non-adjustable setting



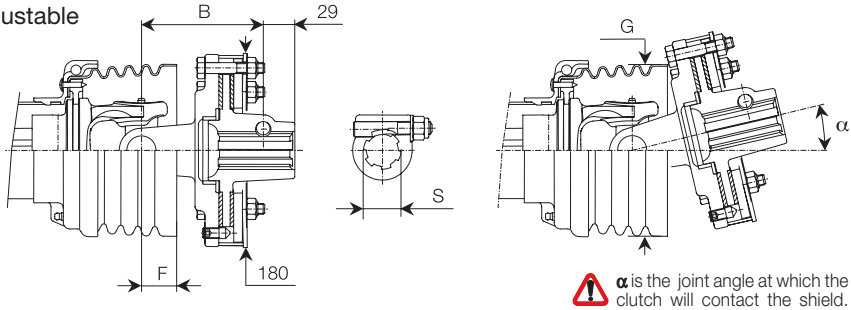
Ref.	Size	Spare part code	Description	Technical data
1		432000054R08	Bolt	M10 x 55 mm
2	S4 S5 - S6	253048602R 253058901R	Flange yoke	
3		258005320R02	Bushing	
4		247006251R08	Friction lining	D = 141 ; d = 77 mm
5		515860305R 515863705R	Hub with taper pin	1 3/8" Z6 1 3/8" Z21
6		408000047R02	Taper pin	1 3/8" Z6 - Z21
7		248860005R02	Pressure plate	Thickness = 8 mm
8		240000213R02	Adjustment band	
9		367FT320A 367FT320C 367FT320D	Belleville spring	900 Nm 1000 Nm 1100 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT32R

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*900	113	113	- -	- -	37	146	19°
	1000							
	1100							
S5	900	117	117	- -	- -	33	146	21°
	1000							
	*1100							
S6	900	117	117	- -	- -	32	160	24°
	1000							
	*1100							

*Maximum recommended settings for 1000 min^{-1} velocity.

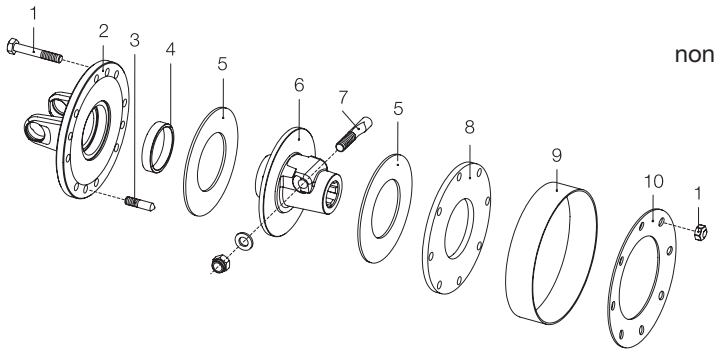
Driveline Codes FT32R

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	900	H11	H16	- -	- -
	1000	H14	H19	- -	- -
	1100	H15	H20	- -	- -

FT32R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S4	*900	663E41C03R	663E41C37R	- -	- -
	1000	663E44C03R	663E44C37R	- -	- -
	1100	663E46C03R	663E46C37R	- -	- -
S5 - S6	900	663G41C03R	663G41C37R	- -	- -
	1000	663G44C03R	663G44C37R	- -	- -
	*1100	663G46C03R	663G46C37R		

FT32R
non-adjustable setting



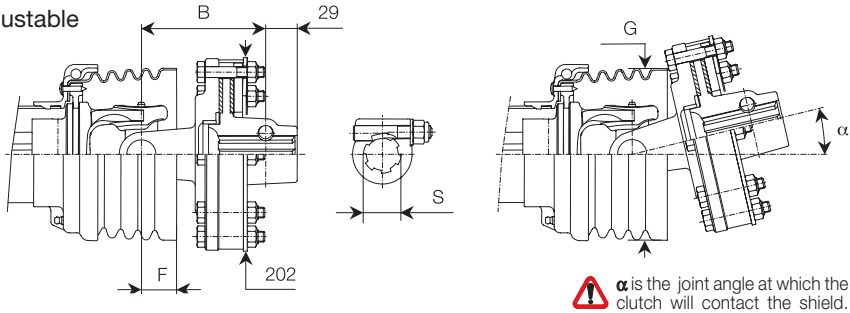
Ref.	Size	Spare part code	Description	Technical data
1		432000054R08	Bolt	M10 x 55 mm
2	S4 S5 - S6	2530E8605R 2530G8605R	Flange yoke	
3		310001300R04	Special socket head set screw	M10 x 25 mm
4		258005320R02	Bushing	
5		247006251R08	Friction linings	D = 141 ; d = 77 mm
6		515860305R 515863705R	Hub with taper pin	1 3/8" Z6 1 3/8" Z21
7		408000047R02	Taper pin	1 3/8" Z6 - Z21
8		248860005R02	Pressure plate	Thickness = 8 mm
9		240000213R02	Adjustment band	
10		367FT320A 367FT320C 367FT320D	Belleville spring	900 Nm 1000 Nm 1100 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT42

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S5	1200	117	117	122	122	33	146	21°
S6	*1200 1450	117	117	122	122	32	160	24°
H7	1200 *1450 1800	125	125	130	130	29	160	26°
S8	*1450 1800	131	131	136	136	42	160	17°
H8	*1450 1800	131	131	136	136	42	160	17°

*Maximum recommended settings for 1000 min^{-1} velocity.

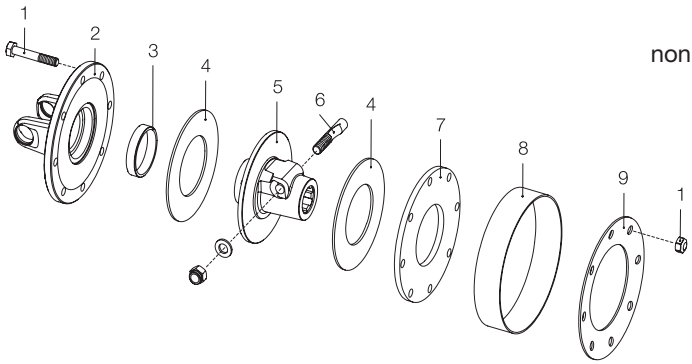
Driveline Codes FT42

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	Q22	Q26	Q30	Q34
1450	Q23	Q27	Q31	Q35
1800	Q21	Q25	Q29	Q33

FT42 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S5	1200	663G48403R	663G48437R	663G48404R	663G48438R
S6	*1200	663G48403R	663G48437R	663G48404R	663G48438R
	1450	663G53403R	663G53437R	663G53404R	663G53438R
H7	1200	663H48403R	663H48437R	663H48404R	663H48438R
	*1450	663H53403R	663H53437R	663H53404R	663H53438R
	1800	663H58403R	663H58437R	663H58404R	663H58438R
S8 - H8	*1450	663L53403R	663L53437R	663L53404R	663L53438R
	1800	663L58403R	663L58437R	663L58404R	663L58438R

FT42
non-adjustable setting



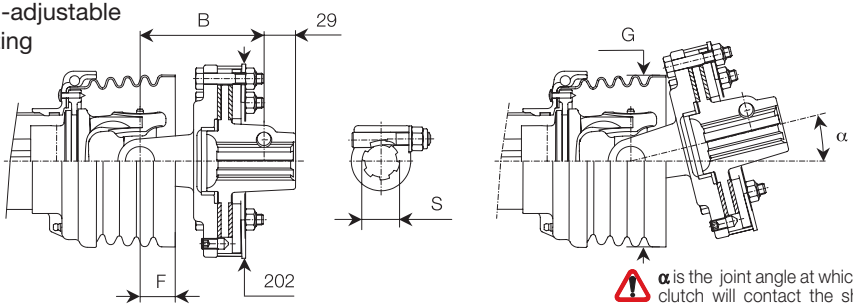
Ref.	Size	Spare part code	Description	Technical data
1		432000054R08	Bolt	M10 x 55 mm
2	S5 - S6 H7 S8 - H8	253058701R 253069001R 253078702R	Flange yoke	
3		258005320R02	Bushing	
4		247006351R08	Friction lining	D = 162 ; d = 85 mm
5		515870305R 515873705R 515870405R 515873805R	Hub with taper pin	1 3/8" Z6 1 3/8" Z21 1 3/4" Z6 1 3/4" Z20
6		408000047R02 408000046R02	Taper pin	1 3/8" Z6 - Z21 1 3/4" Z6 - Z20
7		248870005R	Pressure plate	Thickness = 8 mm
8		240000214R02	Adjustment band	
9		367FT420A 367FT420C 367FT420D	Belleville spring	1200 Nm 1450 Nm 1800 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT42R

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S5	1200	117	117	122	122	33	146	21°
S6	*1200 1450	117	117	122	122	32	160	24°
H7	1200 *1450 1800	125	125	130	130	29	160	26°
S8	*1450 1800	131	131	136	136	42	160	17°
H8	*1450 1800	131	131	136	136	42	160	17°

*Maximum recommended settings for 1000 min^{-1} velocity.

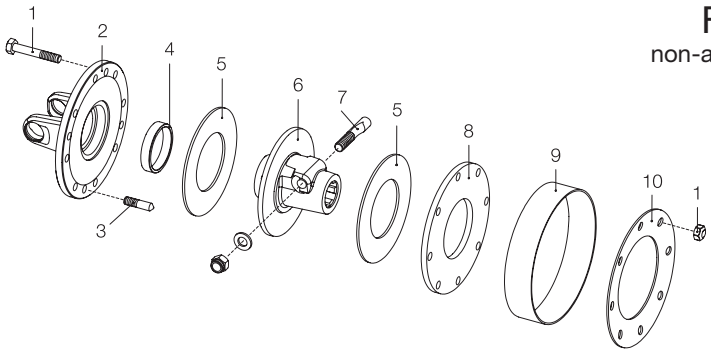
Driveline Codes FT42R

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	H22	H26	H30	H34
1450	H23	H27	H31	H35
1800	H21	H25	H29	H33

FT42R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S5	1200	663G48F03R	663G48F37R	663G48F04R	663G48F38R
S6	*1200	663G48F03R	663G48F37R	663G48F04R	663G48F38R
	1450	663G53F03R	663G53F37R	663G53F04R	663G53F38R
H7	1200	663H48F03R	663H48F37R	663H48F04R	663H48F38R
	*1450	663H53F03R	663H53F37R	663H53F04R	663H53F38R
	1800	663H58F03R	663H58F37R	663H58F04R	663H58F38R
S8 - H8	*1450	663L53F03R	663L53F37R	663L53F04R	663L53F38R
	1800	663L58F03R	663L58F37R	663L58F04R	663L58F38R

FT42R
non-adjustable setting



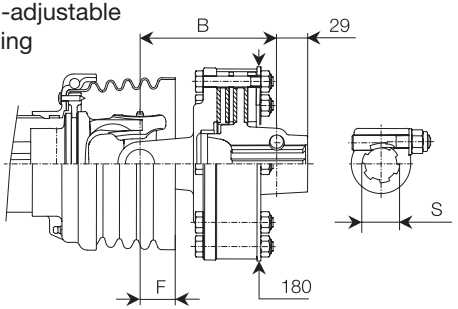
Ref.	Size	Spare part code	Description	Technical data
1		432000054R08	Bolt	M10 x 55 mm
2	S5 - S6 H7 S8 - H8	2530G8705R 2530H8705R 2530L8705R	Flange yoke	
3		310001300R04	Special socket head set screw	M10 x 25 mm
4		258005320R02	Bushing	
5		247006351R08	Friction lining	D = 162 ; d = 85 mm
6		515870305R 515873705R 515870405R 515873805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
7		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
8		248870005R	Pressure plate	Thickness = 8 mm
9		240000214R02	Adjustment band	
10		367FT420A 367FT420C 367FT420D	Belleville spring	1200 Nm 1450 Nm 1800 Nm

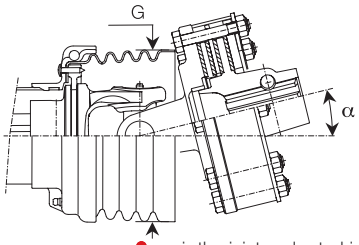
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT34

non-adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	*1200 1450	133	133	138	138	32	160	24°
H7	1200 *1450 1800	140	140	145	145	29	160	28°
S8	1450 *1800	146	146	151	151	42	160	18°
H8	1450 *1800	146	146	151	151	42	160	18°
S9	*1800	148	148	153	153	49	180	13°

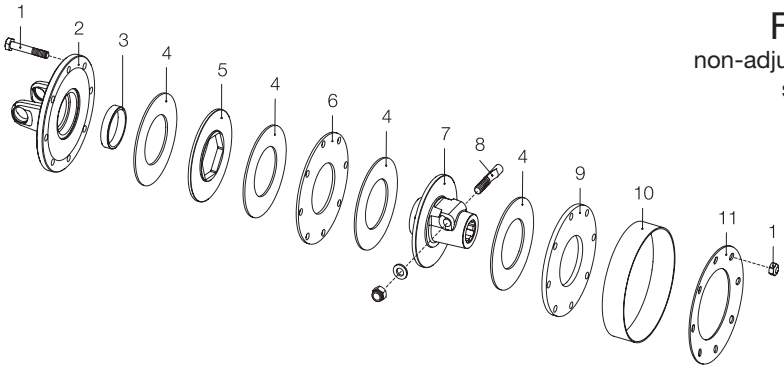
*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FT34

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	Q51	Q58	Q65	Q72
1450	Q52	Q59	Q66	Q73
1800	Q54	Q61	Q68	Q75

FT34 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	*1200	663G48303R	663G48337R	663G48304R	663G48338R
	1450	663G53303R	663G53337R	663G53304R	663G53338R
H7	1200	663H48303R	663H48337R	663H48304R	663H48338R
	*1450	663H53303R	663H53337R	663H53304R	663H53338R
	1800	663H58303R	663H58337R	663H58304R	663H58338R
S8 - H8	1450	663L53303R	663L53337R	663L53304R	663L53338R
	*1800	663L58303R	663L58337R	663L58304R	663L58338R
S9	*1800	663M58303R	663M58337R	663M58304R	663M58338R



FT34
non-adjustable setting

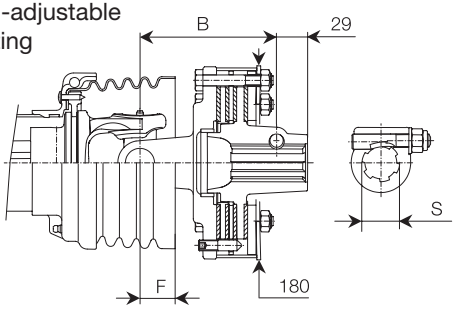
Ref.	Size	Spare part code	Description	Technical data
1		432000045R08	Bolt	M10 x 65 mm
2	S6 H7 S8 - H8 S9	253058901R 253068903R 253078601R 253088903R	Flange yoke	
3		258005320R02	Bushing	
4		247006251R08	Friction lining	D = 141 ; d = 77 mm
5		248727702R02	Driving disc	
6		248860001R02	Inner disc	Thickness = 4 mm
7		515890305R 515893705R 515890405R 515893805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		408000047R02 408000049R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
9		248860005R02	Pressure plate	Thickness = 8 mm
10		240000218R02	Adjustment band	
11		367FT340A 367FT340C 367FT340D	Belleville spring	1200 Nm 1450 Nm 1800 Nm

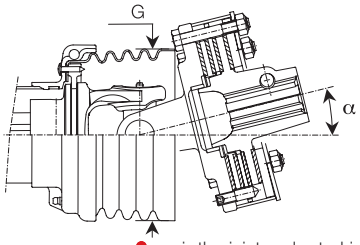
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT34R

non-adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	*1200	133	133	138	138	32	160	24°
	1450							
H7	1200	140	140	145	145	29	160	28°
	*1450							
	1800							
S8	1450	146	146	151	151	42	160	18°
	*1800							
H8	1450	146	146	151	151	42	160	18°
	*1800							
S9	*1800	148	148	153	153	49	180	13°

*Maximum recommended settings for 1000 min^{-1} velocity.

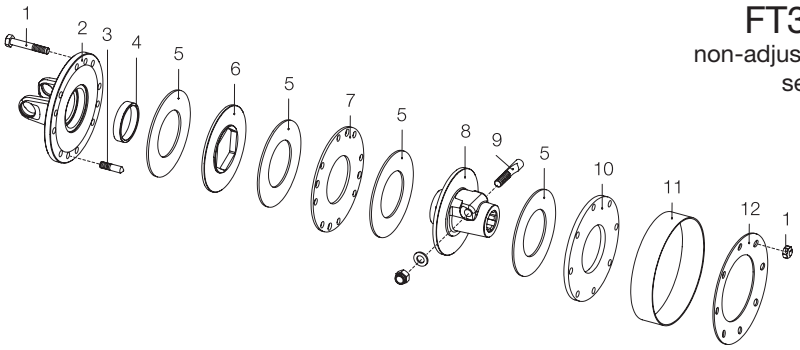
Driveline Codes FT34R

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
	1200	H51	H58	H65	H72
	1450	H52	H59	H66	H73
	1800	H54	H61	H68	H75

FT34R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	*1200	663G48E03R	663G48E37R	663G48E04R	663G48E38R
	1450	663G53E03R	663G53E37R	663G53E04R	663G53E38R
H7	1200	663H48E03R	663H48E37R	663H48E04R	663H48E38R
	*1450	663H53E03R	663H53E37R	663H53E04R	663H53E38R
	1800	663H58E03R	663H58E37R	663H58E04R	663H58E38R
S8 - H8	1450	663L53E03R	663L53E37R	663L53E04R	663L53E38R
	*1800	663L58E03R	663L58E37R	663L58E04R	663L58E38R
S9	*1800	663M58E03R	663M58E37R	663M58E04R	663M58E38R

FT34R
non-adjustable setting



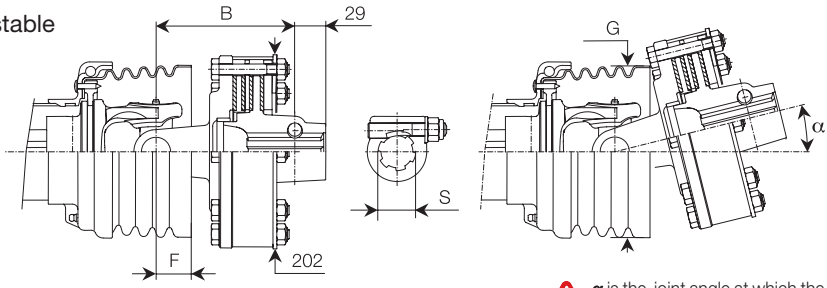
Ref.	Size	Spare part code	Description	Technical data
1		432000045R08	Bolt	M10 x 65 mm
2	S6 H7 S8 - H8 S9	2530G8605R 2530H8605R 2530L8605R 2530M8605R	Flange yoke	
3		310001301R04	Special socket head set screw	M10 x 40 mm
4		258005320R02	Bushing	
5		247006251R08	Friction lining	D = 141 ; d = 77 mm
6		248727702R02	Driving disc	
7		248860006R02	Inner disc	Thickness = 4 mm
8		515890305R 515893705R 515890405R 515893805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
9		408000047R02 408000049R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
10		248860005R02	Pressure plate	Thickness = 8 mm
11		240000218R02	Adjustment band	
12		367FT340A 367FT340C 367FT340D	Belleville spring	1200 Nm 1450 Nm 1800 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT44

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2200	147	147	152	152	42	160	17°
H8	*1800 2200 2400 2600	147	147	152	152	42	160	17°
S9	1800 *2200 2400 2600	149	149	154	154	49	180	18°
SH	2200 *2400 2600	150	150	155	155	50	201	12°
S0	2200 2400 *2600	163	163	168	168	46	201	21°

*Maximum recommended settings for 1000 min^{-1} velocity.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

FT44
non-adjustable
setting

Driveline Codes FT44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	Q37	Q39	Q41	Q43
2200	Q38	Q40	Q42	Q44
2400	Q80	Q86	Q92	Q98
2600	Q76	Q82	Q88	Q94

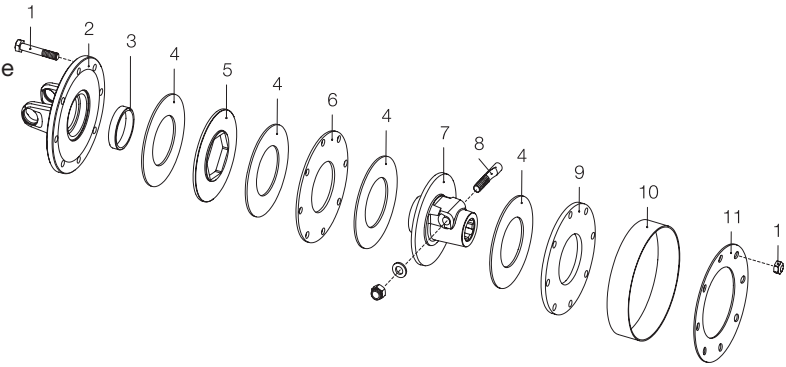
FT44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8 - H8	*1800	663L58503R	663L58537R	663L58504R	663L58538R
	2200	663L62503R	663L62537R	663L62504R	663L62538R
H8	2400	663L64503R	663L64537R	663L64504R	663L64538R
	2600	663L66503R	663L66537R	663L66504R	663L66538R
S9	1800	663M58503R	663M58537R	663M58504R	663M58538R
	*2200	663M62503R	663M62537R	663M62504R	663M62538R
	2400	663M64503R	663M64537R	663M64504R	663M64538R
	2600	663M66503R	663M66537R	663M66504R	663M66538R
SH	2200	663N62503R	663N62537R	663N62504R	663N62538R
	*2400	663N64503R	663N64537R	663N64504R	663N64538R
	2600	663N66503R	663N66537R	663N66504R	663N66538R
S0	2200	663S62503R	663S62537R	663S62504R	663S62538R
	2400	663S64503R	663S64537R	663S64504R	663S64538R
	*2600	663S66503R	663S66537R	663S66504R	663S66538R

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT44
non-adjustable setting

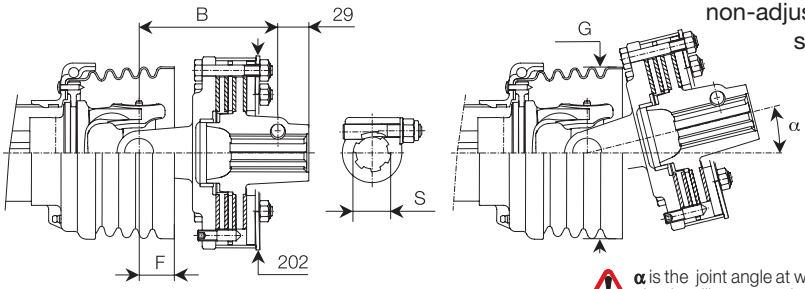


Ref.	Size	Spare part code	Description	Technical data
1		432000100R08	Bolt	M10 x 55 mm
2	S8 - H8 S9 SH S0	253078702R 253089001R 2530N9001R 2530S1F01R	Flange yoke	
3		258005320R02	Bushing	
4		247006351R08	Friction lining	D = 162 ; d = 85 mm
5		248737702R02	Driving disc	
6		248870011R02	Inner disc	Thickness = 4 mm
7		515900305R 515903705R 515900405R 515903805R	Hub with taper pin	1 3/8" Z6 1 3/8" Z21 1 3/4" Z6 1 3/4" Z20
8		408000047R02 408000046R02	Taper pin	1 3/8" Z6 - Z21 1 3/4" Z6 - 21
9		248870005R	Pressure plate	Thickness = 8 mm
10		240000219R02	Adjustment band	
11		367FT440A 367FT440C 367FT440D 367FT440E	Belleville spring	1800 Nm 2200 Nm 2400 Nm 2600 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

FT44R

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2200	147	147	152	152	42	160	17°
H8	*1800 2200 2400 2600	147	147	152	152	42	160	17°
S9	1800 *2200 2400 2600	149	149	154	154	49	180	18°
SH	2200 *2400 2600	150	150	155	155	50	201	12°
S0	2200 2400 *2600	163	163	168	168	46	201	21°

*Maximum recommended settings for 1000 min^{-1} velocity.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FT

FT44R
non-adjustable
setting

Driveline Codes FT44R

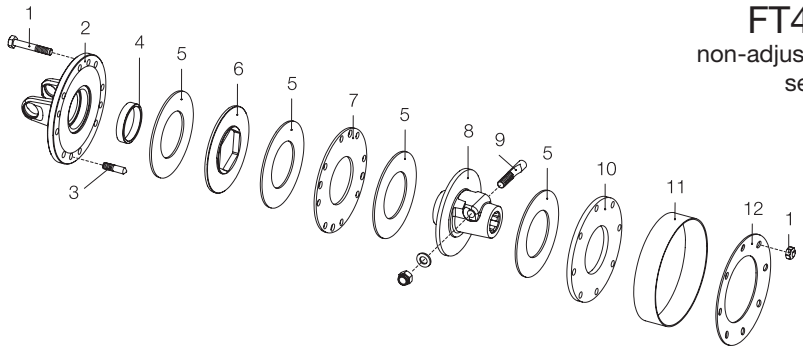
Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	H37	H39	H41	H43
2200	H38	H40	H42	H44
2400	H80	H86	H92	H98
2600	H76	H82	H88	H94

FT44R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8 -H8	* 1800	663L58G03R	663L58G37R	663L58G04R	663L58G38R
	2200	663L62G03R	663L62G37R	663L62G04R	663L62G38R
H8	2400	663L64G03R	663L64G37R	663L64G04R	663L64G38R
	2600	663L66G03R	663L66G37R	663L66G04R	663L66G38R
S9	1800	663M58G03R	663M58G37R	663M58G04R	663M58G38R
	*2200	663M62G03R	663M62G37R	663M62G04R	663M62G38R
	2400	663M64G03R	663M64G37R	663M64G04R	663M64G38R
	2600	663M66G03R	663M66G37R	663M66G04R	663M66G38R
SH	2200	663N62G03R	663N62G37R	663N62G04R	663N62G38R
	*2400	663N64G03R	663N64G37R	663N64G04R	663N64G38R
	2600	663N66G03R	663N66G37R	663N66G04R	663N66G38R
S0	2200	663S62G03R	663S62G37R	663S62G04R	663S62G38R
	2400	663S64G03R	663S64G37R	663S64G04R	663S64G38R
	*2600	663S66G03R	663S66G37R	663S66G04R	663S66G38R

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

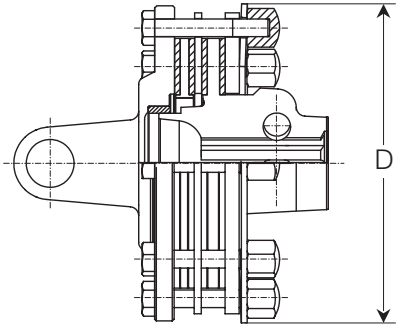
FT44R
non-adjustable setting



Ref.	Size	Spare part code	Description	Technical data
1		432000100R08	Bolt	M10 x 70 mm
2	S8 - H8 S9 SH S0	2530L8705R 2530M8705R 2530N8705R 2530S8705R	Flange yoke	
3		310001301R04	Special socket head set screw	M10 x 40 mm
4		258005320R02	Bushing	
5		247006351R08	Friction lining	D = 162 ; d = 85 mm
6		248737702R02	Driving plate	
7		248870013R02	Inner plate	Thickness = 4 mm
8		515900305R 515903705R 515900405R 515903805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
9		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
10		248870005R	Pressure plate	Thickness = 8 mm
11		240000219R02	Adjustment band	
12		367FT440A 367FT440C 367FT440D 367FT440E	Belleville spring	1800 Nm 2200 Nm 2400 Nm 2600 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

FK friction clutches are equipped with Belleville springs, designed to apply nearly constant pressure, self-compensating for friction lining wear. Therefore the setting is maintained without adjustment over the life of the linings.
FK friction clutches are non-adjustable. Torque is determined by the thickness of the Belleville spring. The calibrated screws and cap nuts prevent over-compression of the spring.
Five models of FK friction clutches are available, with different diameters and number of friction linings. All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.
The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).



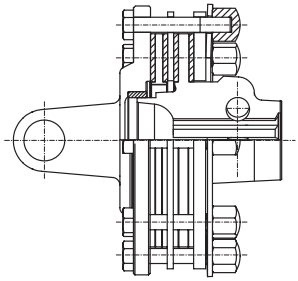
Standard Settings (Nm)

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
FK22 D = 155 mm 2 plates	*400 500	500 *600 800										
FK32 D = 180 mm 2 plates			*900 1000 1100	900 1000 *1100	900 1000 *1100							
FK42 D = 202 mm 2 plates				1200	*1200 1450	1200 *1450 1800	*1450 1800	*1450 1800				
FK34 D = 180 mm 4 plates					*1200 1450	1200 *1450 1800	1450 *1800	1450 *1800	*1800			
FK44 D = 202 mm 4 plates							*1800 2200	*1800 2200 2400 2600	1800 *2200 2400 2600	2200 *2400 2600	2200 2400 *2600	

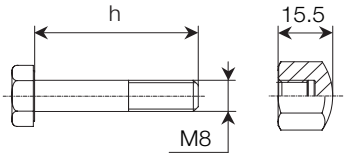
* Maximum recommended settings for 1000 min^{-1}

Friction torque limiters FK

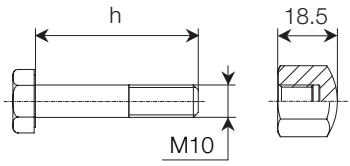
Calibration of FK friction clutches is determined by the characteristics of the spring, the correct compression of which is assured by the use of special bolts and cap nuts.
The adjacent tables show the codes for the spring and special bolt for each clutch model, setting and shaft size.
The spring code is stamped on each spring for identification purposes.



For clutch: **FK22**



For clutches: **FK32 - FK42 - FK34 - FK44**



FK22 Friction clutches

Setting Nm	Spring Code		Bolt Code	h mm
400	367FT220A	S1	432000148R08	40.7
500	367FT220C	S1	432000149R08	41.0
		S2	432000149R08	41.0
600	367FT220D	S2	432000149R08	41.0
800	367FT220E	S2	432000150R08	41.2

FK32 Friction clutches

Setting Nm	Spring Code		Bolt Code	h mm
900	367FT320A	S4	432000154R08	49.5
		S5	432000154R08	49.5
		S6	432000154R08	49.5
1000	367FT320C	S4	432000140R08	50.5
		S5	432000140R08	50.5
		S6	432000140R08	50.5
1100	367FT320D	S4	432000155R08	49.8
		S5	432000155R08	49.8
		S6	432000155R08	49.8

FK42 Friction clutches

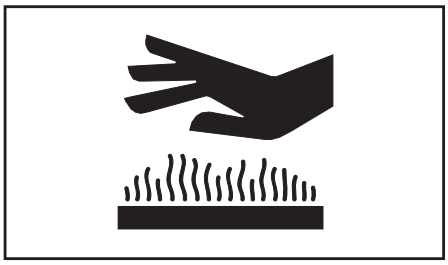
Setting Nm	Spring Code		Bolt Code	h mm
1200	367FT420A	S5	432000140R08	50.5
		S6	432000140R08	50.5
		H7	432000144R08	52.5
1450	367FT420C	S6	432000140R08	50.5
		H7	432000144R08	52.5
		S8	432000147R08	53.0
		H8	432000147R08	53.0
1800	367FT420D	H7	432000144R08	52.5
		S8	432000147R08	53.0
		H8	432000147R08	53.0

FK34 Friction clutches

Setting Nm	Spring Code		Bolt Code	h mm
1200	367FT340A	S6	432000143R08	65.0
		H7	432000142R08	66.5
1450	367FT340C	S6	432000143R08	65.0
		H7	432000142R08	66.5
		S8	432000156R08	68.5
		H8	432000156R08	68.5
1800	367FT340D	H7	432000153R08	67.0
		S8	432000157R08	69.0
		H8	432000157R08	69.0
		S9	432000157R08	69.0

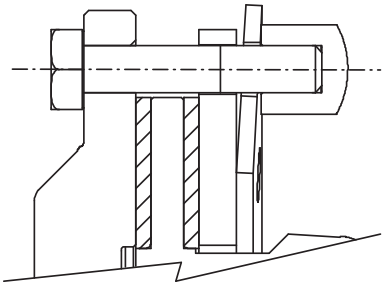
FK44 Friction clutches

Setting Nm	Spring Code		Bolt Code	h mm
1800	367FT440A	S8	432000157R08	69.0
		H8	432000157R08	69.0
		S9	432000158R08	69.5
2200	367FT440C	S8	432000157R08	69.0
		H8	432000157R08	69.0
		S9	432000158R08	69.5
		SH	432000158R08	69.5
		S0	432000160R08	71.0
2400	367FT440D	H8	432000157R08	69.0
		S9	432000158R08	69.5
		SH	432000158R08	69.5
		S0	432000160R08	71.0
2600	367FT440E	H8	432000162R08	69.3
		S9	432000159R08	69.8
		SH	432000159R08	69.8
		S0	432000161R08	71.3



FK friction clutches are equipped with special screws and cap nuts.
Spring compression is correct when the screws are fully tightened.

Recommended tightening torques:
- 25 Nm for FK22
- 50 Nm for FK32, FK42, FK34 and FK44.



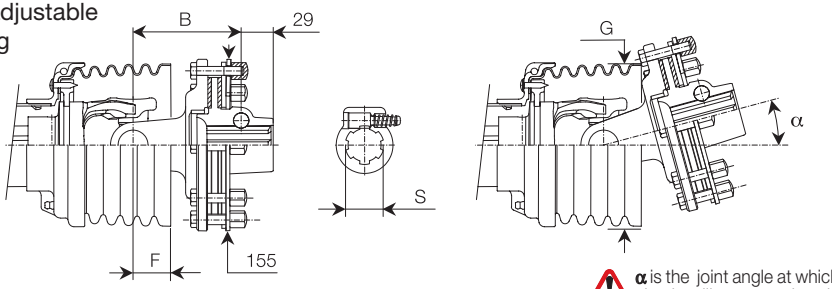
To avoid excessive wear to the implement, driveline or tractor Bondioli & Pavesi recommends that the setting not be changed.

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

Friction torque limiters FK

FK22

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S1	*400	92	92	- -	- -	23	129	22°
	500							
S2	500	100	100	- -	- -	42	146	6°
	*600							
	800							

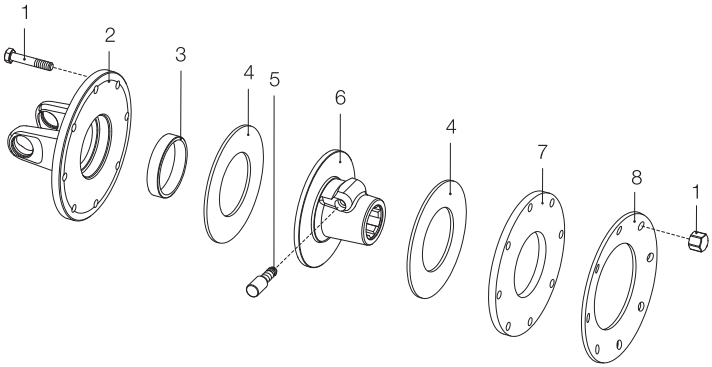
*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FK22

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
400	7A0	7A4	- -	- -
500	7A1	7A5	- -	- -
600	7A2	7A6	- -	- -
800	7A3	7A7	- -	- -

FK22 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	Bolt Code
S1	*400	60KB24103R	60KB24137R	- -	- -	432000148R08
	500	60KB28103R	60KB28137R	- -	- -	432000149R08
S2	500	60KC28103R	60KC28137R	- -	- -	432000149R08
	*600	60KC32103R	60KC32137R	- -	- -	432000149R08
	800	60KC39103R	60KC39137R	- -	- -	432000150R08



FK22
non-adjustable setting

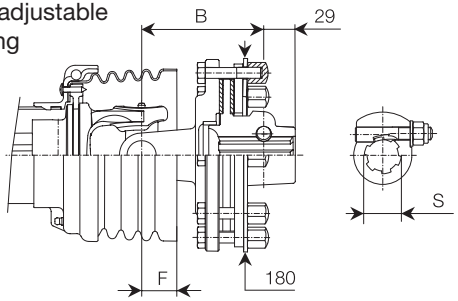
Ref.	Size	Spare part code	Description	Technical data
1		432000148R08 432000149R08 432000150R08	Bolt	M8 x 40.7 mm M8 x 41.0 mm M8 x 41.2 mm
2	S1 S2	2530B8510R 2530C8510R	Flange yoke	
3		258005320R02	Bushing	
4		247006151R08	Friction lining	D = 124 ; d = 67 mm
5		403000001R10	Push-pin kit	1 3/8" Z6 - Z21
6		513850307R 513853707R	Hub with push-pin	1 3/8" Z6 1 3/8" Z21
7		2481A0002R02	Pressure plate	Thickness = 4 mm
8		367FT220A 367FT220C 367FT220D 367FT220E	Belleville spring	400 Nm 500 Nm 600 Nm 800 Nm

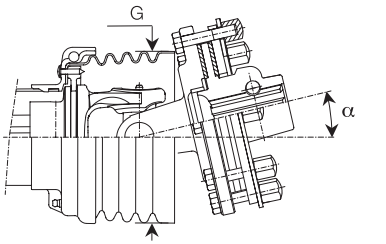
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FK

FK32

non-adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S4	*900	113	113	- -	- -	37	146	19°
	1000							
	1100							
S5	900	117	117	- -	- -	33	146	21°
	1000							
	*1100							
S6	900	117	117	- -	- -	32	160	24°
	1000							
	*1100							

*Maximum recommended settings for 1000 min^{-1} velocity.

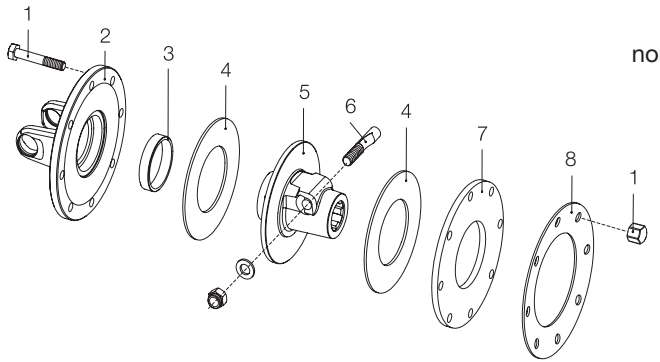
Driveline Codes FK32

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
900	7A8	7C1	- -	- -
1000	7A9	7C2	- -	- -
1100	7C0	7C3	- -	- -

FK32 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	Bolt Code
S4	*900	60KE41203R	60KE41237R	- -	- -	432000154R08
	1000	60KE44203R	60KE44237R	- -	- -	432000140R08
	1100	60KE46203R	60KE46237R	- -	- -	432000155R08
S5 - S6	900	60KG41203R	60KG41237R	- -	- -	432000154R08
	1000	60KG44203R	60KG44237R	- -	- -	432000140R08
	*1100	60KG46203R	60KG46237R	- -	- -	432000155R08

FK32
non-adjustable
setting



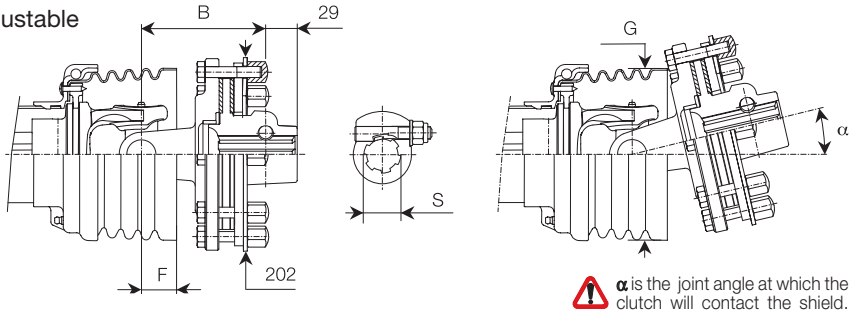
Ref.	Size	Spare part code	Description	Technical data
1		432000154R08 432000140R08 432000155R08	Bolt	M10 x 49.5 mm M10 x 50.5 mm M10 x 49.8 mm
2	S4 S5 - S6	2530E8610R 253058902R	Flange yoke	
3		258005320R02	Bushing	
4		247006251R08	Friction lining	D = 141 ; d = 77 mm
5		515860305R 515863705R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
6		408000047R02	Taper pin	1 3/8” Z6 - Z21
7		248860005R02	Pressure plate	Thickness = 8 mm
8		367FT320A 367FT320C 367FT320D	Belleville spring	900 Nm 1000 Nm 1100 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FK

FK42

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S5	1200	117	117	122	122	33	146	21°
S6	*1200 1450	117	117	122	122	32	160	24°
H7	1200 *1450 1800	125	125	130	130	29	160	26°
S8	*1450 1800	131	131	136	136	42	160	17°
H8	*1450 1800	131	131	136	136	42	160	17°

*Maximum recommended settings for 1000 min^{-1} velocity.

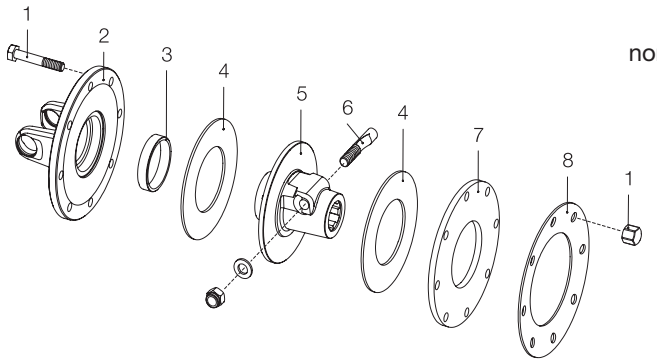
Driveline Codes FK42

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	7C4	7C7	7D0	7D3
1450	7C5	7C8	7D1	7D4
1800	7C6	7C9	7D2	7D5

FK42 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	Bolt Code
S5	1200	60KG48403R	60KG48437R	60KG48404R	60KG48438R	432000140R08
S6	*1200	60KG48403R	60KG48437R	60KG48404R	60KG48438R	432000140R08
	1450	60KG53403R	60KG53437R	60KG53404R	60KG53438R	432000140R08
H7	1200	60KH48403R	60KH48437R	60KH48404R	60KH48438R	432000144R08
	*1450	60KH53403R	60KH53437R	60KH53404R	60KH53438R	432000144R08
	1800	60KH58403R	60KH58437R	60KH58404R	60KH58438R	432000144R08
S8 - H8	*1450	60KL53403R	60KL53437R	60KL53404R	60KL53438R	432000147R08
	1800	60KL58403R	60KL58437R	60KL58404R	60KL58438R	432000147R08

FK42
non-adjustable setting



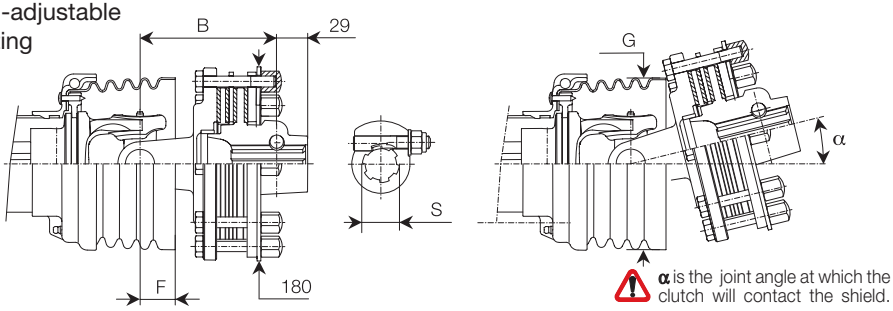
Ref.	Size	Spare part code	Description	Technical data
1		432000140R08 432000144R08 432000147R08	Bolt	M10 x 50.5 mm M10 x 52.5 mm M10 x 53.0 mm
2	S5 - S6 H7 S8 - H8	253058702R 253069002R 2530L8710R	Flange yoke	
3		258005320R02	Bushing	
4		247006351R08	Friction lining	D = 162 ; d = 85 mm
5		515870305R 515873705R 515870405R 515873805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
6		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
7		248870005R	Pressure plate	Thickness = 8 mm
8		367FT420A 367FT420C 367FT420D	Belleville spring	1200 Nm 1450 Nm 1800 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FK

FK34

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	S = 1 3/8" Z6	B (mm) 1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	*1200 1450	133	133	138	138	32	160	24°
H7	1200 *1450 1800	140	140	145	145	29	160	28°
S8	1450 *1800	146	146	151	151	42	160	18°
H8	1450 *1800	146	146	151	151	42	160	18°
S9	*1800	148	148	153	153	49	180	13°

*Maximum recommended settings for 1000 min^{-1} velocity.

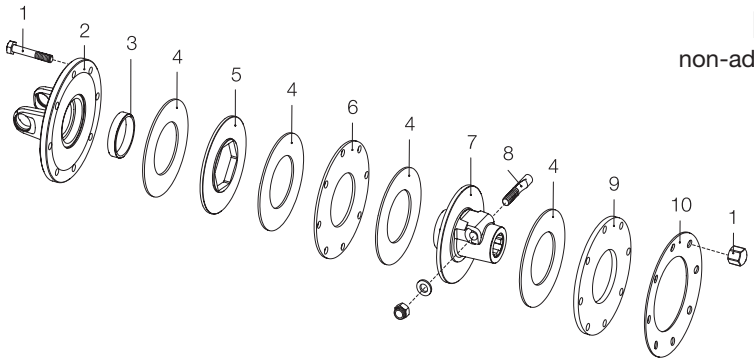
Driveline Codes FK34

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	7D6	7D9	7E2	7E5
1450	7D7	7E0	7E3	7E6
1800	7D8	7E1	7E4	7E7

FK34 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	Bolt Code
S6	*1200	60KG48303R	60KG48337R	60KG48304R	60KG48338R	432000143R08
	1450	60KG53303R	60KG53337R	60KG53304R	60KG53338R	432000143R08
H7	1200	60KH48303R	60KH48337R	60KH48304R	60KH48338R	432000142R08
	*1450	60KH53303R	60KH53337R	60KH53304R	60KH53338R	432000142R08
	1800	60KH58303R	60KH58337R	60KH58304R	60KH58338R	432000153R08
S8 - H8	1450	60KL53303R	60KL53337R	60KL53304R	60KL53338R	432000156R08
	*1800	60KL58303R	60KL58337R	60KL58304R	60KL58338R	432000157R08
S9	*1800	60KM58303R	60KM58337R	60KM58304R	60KM58338R	432000157R08

FK34
non-adjustable setting



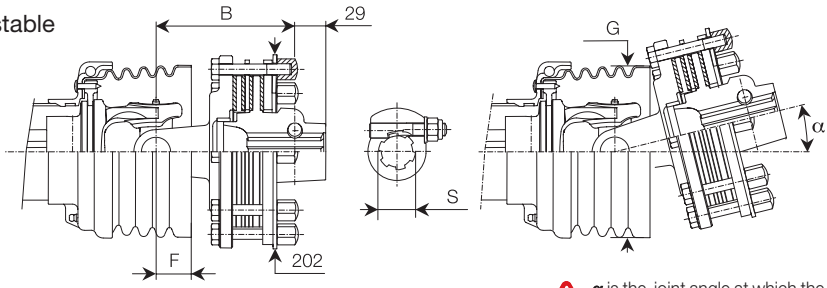
Ref.	Size	Spare part code	Description	Technical data
1		432000142R08 432000143R08 432000153R08 432000156R08 432000157R08	Bolt	M10 x 66.5 mm M10 x 65.0 mm M10 x 67.0 mm M10 x 68.5 mm M10 x 69.0 mm
2	S6 H7 S8 - H8 S9	253058902R 2530H8905R 2530L8910R 253088903R	Flange yoke	
3		258005320R02	Bushing	
4		247006251R08	Friction lining	D = 141 ; d = 77 mm
5		248727702R02	Driving disc	
6		248860001R02	Inner disc	Thickness = 4 mm
7		515890305R 515893705R 515890405R 515893805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		408000047R02 408000049R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
9		248860005R02	Pressure plate	Thickness = 8 mm
10		367FT340A 367FT340C 367FT340D	Belleville spring	1200 Nm 1450 Nm 1800 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FK

FK44

non-adjustable setting



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2200	147	147	152	152	42	160	17°
H8	*1800 2200 2400 2600	147	147	152	152	42	160	17°
S9	1800 *2200 2400 2600	149	149	154	154	49	180	18°
SH	2200 *2400 2600	150	150	155	155	50	201	12°
S0	2200 2400 *2600	163	163	168	168	46	201	21°

*Maximum recommended settings for 1000 min^{-1} velocity.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

FK44
non-adjustable
setting

Driveline Codes FK44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	7E8	7F2	7F6	7G0
2200	7E9	7F3	7F7	7G1
2400	7F0	7F4	7F8	7G2
2600	7F1	7F5	7F9	7G3

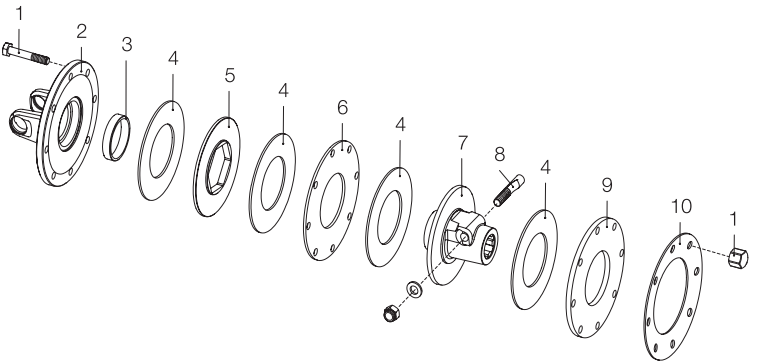
FK44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	Bolt Code
S8 - H8	*1800	60KL58503R	60KL58537R	60KL58504R	60KL58538R	432000157R08
	2200	60KL62503R	60KL62537R	60KL62504R	60KL62538R	432000157R08
H8	2400	60KL64503R	60KL64537R	60KL64504R	60KL64538R	432000157R08
	2600	60KL66503R	60KL66537R	60KL66504R	60KL66538R	432000162R08
S9	1800	60KM58503R	60KM58537R	60KM58504R	60KM58538R	432000158R08
	*2200	60KM62503R	60KM62537R	60KM62504R	60KM62538R	432000158R08
	2400	60KM64503R	60KM64537R	60KM64504R	60KM64538R	432000158R08
	2600	60KM66503R	60KM66537R	60KM66504R	60KM66538R	432000159R08
SH	2200	60KN62503R	60KN62537R	60KN62504R	60KN62538R	432000158R08
	*2400	60KN64503R	60KN64537R	60KN64504R	60KN64538R	432000158R08
	2600	60KN66503R	60KN66537R	60KN66504R	60KN66538R	432000159R08
S0	2200	60KS62503R	60KS62537R	60KS62504R	60KS62538R	432000160R08
	2400	60KS64503R	60KS64537R	60KS64504R	60KS64538R	432000160R08
	*2600	60KS66503R	60KS66537R	60KS66504R	60KS66538R	432000161R08

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Friction torque limiters FK

FK44
non-adjustable setting



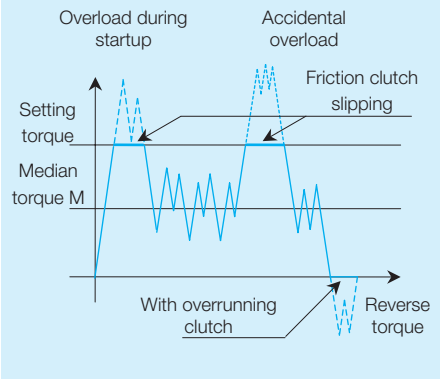
Ref.	Size	Spare part code	Description	Technical data
1		432000157R08 432000158R08 432000160R08 432000159R08 432000161R08 432000162R08	Bolt	M10 x 69.0 mm M10 x 69.5 mm M10 x 71.0 mm M10 x 69.8 mm M10 x 71.3 mm M10 x 69.3 mm
2	S8 - H8 S9 SH S0	2530L8710R 2530M9010R 2530N9010R 2530S1F01R	Flange yoke	
3		258005320R02	Bushing	
4		247006351R08	Friction lining	D = 162 ; d = 85 mm
5		248737702R02	Driving disc	
6		248870011R02	Inner disc	Thickness = 4 mm
7		515900305R 515903705R 515900405R 515903805R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
8		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
9		248870005R	Pressure plate	Thickness = 8 mm
10		367FT440A 367FT440C 367FT440D 367FT440E	Belleville spring	1800 Nm 2200 Nm 2400 Nm 2600 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiters and overrunning clutches

Friction clutches combined with overrunning clutches are generally used on implements with high inertia (i.e. those with flywheels or other heavy rotating masses). These implements include mower conditioners and square balers.
During overloads, due to abrupt starting or blockages, torque transmission can be limited by the slipping of the friction clutch. Possible inverse torques, generated during sudden deceleration or stopping, will be eliminated by the overrunning clutch.
The setting of friction torque limiters is usually 2 times the median torque M.
Three versions of combination friction torque limiter and overrunning clutch are available: **FNV** (adjustable), **FFNV** (adjustable), **FNT** (non-adjustable). They have two different diameters:
- **34** (D = 180 mm),
- **44** (D = 202 mm).

All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.
Drivelines with **FFNV** clutches (with coil springs) are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.
FNT friction clutches are available with Release System. This system permits the spring pressure to be reduced during storage, without requiring disassembly of the torque limiter.



FNV limiter, adjustable

FFNV limiter, adjustable, for non-CE mark drivelines

FNT limiter, non-adjustable

Combination friction torque limiters and overrunning clutches

pv factor

The reliable function of a friction clutch is highly dependent on many different parameters. Temperature, for instance, is important. When slipped frequently and for long periods, friction clutches may become hot. This can impair the condition of the clutch, and alter the torque setting drastically.

Temperature increases rapidly with longer slipping cycles. It is recommended to select a setting suitable for each specific application, allowing only occasional and brief slipping (only a few seconds per cycle should be permitted).

After the setting has been chosen in accordance with the conditions of the application (median torque M, torque limit of driveline), one must select the proper type of friction clutch in regards to diameter and number of plates or friction linings.

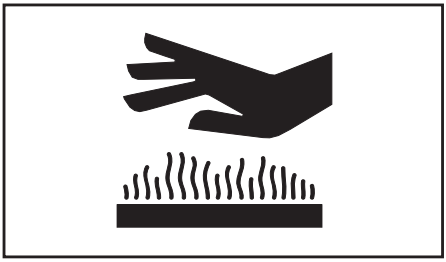
When selecting a suitable type of friction clutch, pressure **p** and slipping velocity **v** must also be taken into account.

The pressure on the friction linings is determined by the force exerted from the springs, and their surface area.

Slipping velocity is influenced by overloads (starting, stopping or blockages of the implement) and is related to the speed of rotation for the driveline.

The influence of pressure **p** and velocity **v** on the clutch is considered by factor **p·v**, equal to their product. The maximum value of factor **p·v**, suggested for reliable function of a friction clutch, is usually determined by experimentation.

Maximum recommended torque settings for 1000 min^{-1} speed are determined in accordance with this limiting value and shown on the opposite page (marked with *).



Friction clutches may become hot during use. **Do not touch!**

Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

Standard Settings

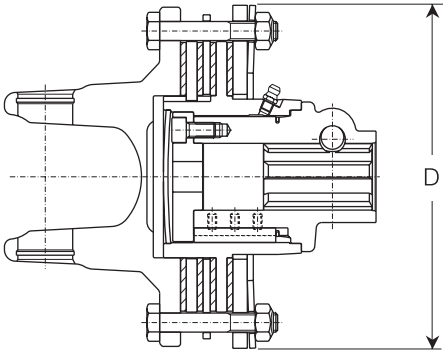
	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
Mmax (Nm):	850	1500	2200	2500	3000	3700	4000	5000	5000	6750	6750	11000
Combination friction torque limiter and overrunning clutch, adjustable setting												
FNV34 - FFNV34					*1200	1200						
					1350	1350	1350	1350				
					1450	*1450	1450	1450				
					1600	1600	1600	1600				
						1800	*1800	*1800	*1800			
							2000	2000	2000			
FNV44 - FFNV44							*1800	*1800	1800			
							2000	2000	2000			
							2200	2200	*2200	2200	2200	
							2400	2400	2400	*2400	2400	
								2600	2600	2600	*2600	
										2800	2800	
Combination friction torque limiter and overrunning clutch, adjustable setting												
FNT34					*1200	1200						
					1450	*1450	1450	1450				
						1800	*1800	*1800	*1800			
FNT44							*1800	*1800	1800			
							2200	2200	*2200	2200	2200	
								2400	2400	*2400	2400	
								2600	2600	2600	*2600	

* Maximum recommended settings for 1000 min^{-1} velocity.

Combination friction torque limiter and overrunning clutch FNV

FNV clutches are equipped with special Belleville springs, designed to apply pressure that varies with the amount of compression.
Two models of FNV friction clutches are available, with different diameters and settings.
- FNV34 diameter D = 180 mm
- FNV44 diameter D = 202 mm

All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.
The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).



FNV34 Combination friction torque limiter and overrunning clutch, adjustable setting

Standard Settings (Nm)

	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
FNV34 D = 180 mm 4 plates					*1200 1350 1450 1600	1200 1350 *1450 1600 1800	1350 1450 1600 *1800 2000	1350 1450 1600 *1800 2000	*1800 2000			
FNV44 D = 202 mm 4 plates							*1800 2000 2200 2400	*1800 2000 2200 2400 2600	1800 2000 *2200 2400 2600	2200 *2400 2600 2800	2200 2400 *2600 2800	

* maximum recommended settings for 1000 min^{-1} velocity.

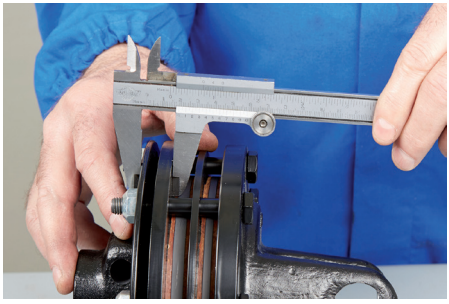
Combination friction torque limiter and overrunning clutch FNV

FNV friction torque limiters have an adjustable torque setting. The torque setting of FNV friction clutches varies with different compression (h) of the Belleville spring. The compression of the Belleville springs used on FNV friction clutches must be adjusted to compensate for wear of the friction linings and to maintain the desired setting.

The tables below set out spring codes, thicknesses and compression "h" measured as shown in the figure for standard settings.

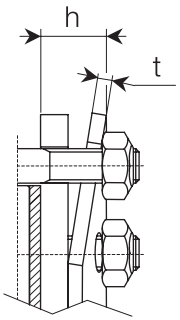
The height of the spring is measured next to each bolt and may be ± 0.2 mm of the listed value.

The tables also show the amount of rotation of each bolt required to achieve the next higher or lower setting, relative to the nominal setting (listed with no rotation noted on the bolt).



In addition to the listed settings, intermediate settings may be obtained by tightening or loosening the bolts proportionately.

⚠ Do not over-tighten the bolts; this may endanger the function of friction clutches.



FNV34 Friction clutches
4 plates, diameter 180 mm

Spring code	t mm	Setting Nm	h mm	
367008860R	3.75	1200	18.0	
		1600	17.5	
		2000	16.5	

FNV44 Friction clutches
4 plates, diameter 202 mm

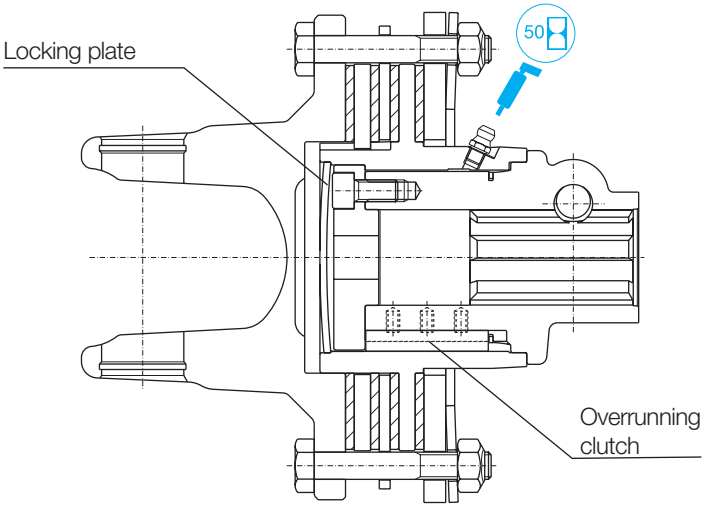
Spring code	t mm	Setting Nm	h mm	
367009870R	4.25	1800	19.0	
		2400	18.5	
		2800	18.0	

⚠ To avoid excessive wear to the implement, driveline, or tractor, Bondioli & Pavesi recommends that the defined setting not be altered.

Combination friction torque limiter and overrunning clutch FNV

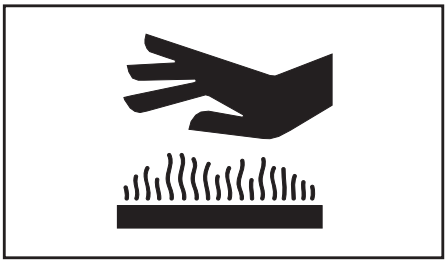
Overrunning clutches mounted on FNV34 and FNV44 versions are incorporated onto the hub. A locking ring separates them from the friction clutch, so that the lubricating grease will not contaminate the friction linings.

Lubricate overrunning clutches every 50 hours and after storage.



Do not approach the implement before all parts have reached a complete stop.

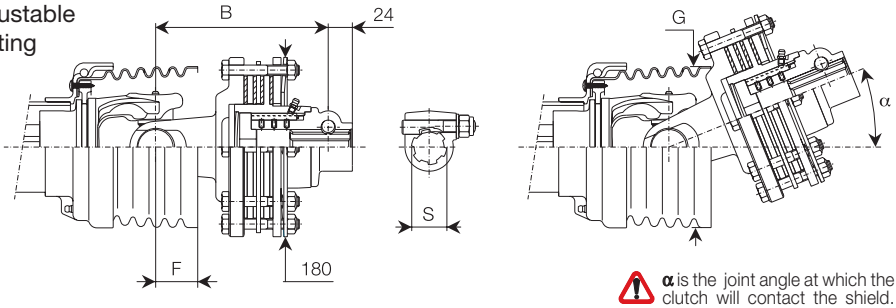
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.



Combination friction torque limiter and overrunning clutch FNV

FNV34

adjustable setting



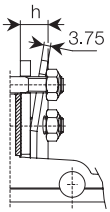
α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	Codes as spare parts 1 3/8" Z6	1 3/8" Z21	F mm	G mm	α °
S6	*1200	158	158	665G48103R	665G48137R	32	160	24°
	1350			665G51103R	665G51137R			
	1450			665G53103R	665G53137R			
	1600			665G56103R	665G56137R			
H7	1200	166	166	665H48103R	665H48137R	29	160	28°
	1350			665H51103R	665H51137R			
	*1450			665H53103R	665H53137R			
	1600			665H56103R	665H56137R			
	1800			665H58103R	665H58137R			
S8 - H8	1350	172	172	665L51103R	665L51137R	42	160	18°
	1450			665L53103R	665L53137R			
	1600			665L56103R	665L56137R			
	*1800			665L58103R	665L58137R			
	2000			665L60103R	665L60137R			
S9	*1800	174	174	665M58103R	665M58137R	49	180	13°
	2000			665M60103R	665M60137R			

*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FNV34

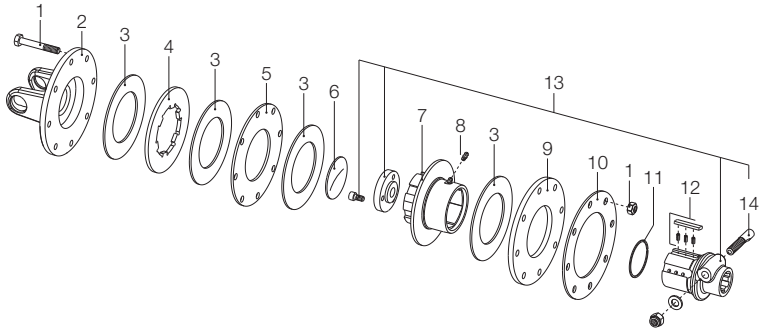
Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	h mm
1200	2A0	2A8	18.0
1350	2A1	2A9	
1450	2A2	2B0	
1600	2A3	2B1	17.5
1800	2A4	2B2	
2000	2A5	2B3	16.5



For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

BONDIOLI & PAVESI

Combination friction torque limiter and overrunning clutch FNV



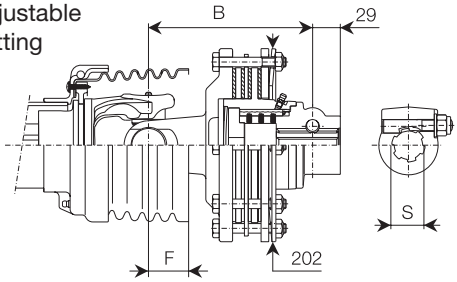
Ref.	Size	Spare part code	Description	Technical data
1		432000114R08	Bolt	M 10 x 75 mm
2	S6 H7 S8 - H8 S9	2530G1L01R 2530H1L01R 2530L1L01R 2530M1L01R	Flange yoke	
3		247000054R08	Friction lining	D = 140 ; d = 85 mm
4		2481L0003R02	Driving plate	
5		2481L0001R02	Inner plate	Thickness = 4 mm
6		240000746R05	Locking plate	
7		4271L0101R	Overrunning clutch housing	
8		348017000R20	Grease fitting	
9		2481L0005R02	Pressure plate	Thickness = 8 mm
10		367008860R	Belleville spring	1200 Nm
11		339002060R20	Snap ring	
12		4211L0001R06	Pawl + springs kit	
13		5151L0351R 5151L3751R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
14		408000047R02	Taper pin	1 3/8” Z6 - Z21

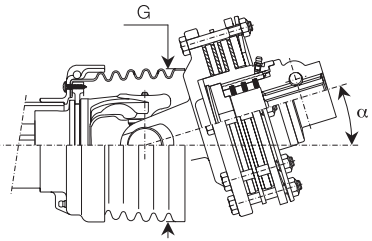
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNV

FNV44

adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2000 2200 2400	175	175	175	175	42	160	17°
H8	*1800 2000 2200 2400 2600	175	175	175	175	42	160	17°
S9	1800 2000 *2200 2400 2600	177	177	177	177	49	180	18°
SH	2200 *2400 2600 2800	178	178	178	178	50	201	12°
S0	2200 2400 *2600 2800	191	191	191	191	46	201	21°

*Maximum recommended settings for 1000 min^{-1} velocity.

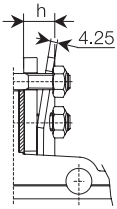
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNV

FNV44
adjustable setting

Driveline Codes FNV44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	2B6	2C4	2D2	2E0
2000	2B7	2C5	2D3	2E1
2200	2B8	2C6	2D4	2E2
2400	2B9	2C7	2D5	2E3
2600	2C0	2C8	2D6	2E4
2800	2C1	2C9	2D7	2E5



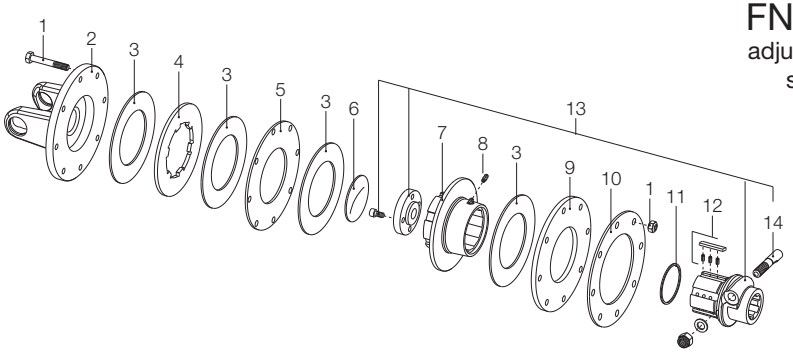
FNV44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S8 - H8	*1800	665L58203R	665L58237R	665L58204R	665L58238R	19.0
	2000	665L60203R	665L60237R	665L60204R	665L60238R	
	2200	665L62203R	665L62237R	665L62204R	665L62238R	
	2400	665L64203R	665L64237R	665L64204R	665L64238R	18.5
H8	2600	665L66203R	665L66237R	665L66204R	665L66238R	
S9	1800	665M58203R	665M58237R	665M58204R	665M58238R	19.0
	2000	665M60203R	665M60237R	665M60204R	665M60238R	
	*2200	665M62203R	665M62237R	665M62204R	665M62238R	
	2400	665M64203R	665M64237R	665M64204R	665M64238R	18.5
	2600	665M66203R	665M66237R	665M66204R	665M66238R	
SH	2200	665N62203R	665N62237R	665N62204R	665N62238R	
	*2400	665N64203R	665N64237R	665N64204R	665N64238R	18.5
	2600	665N66203R	665N66237R	665N66204R	665N66238R	
	2800	665N68203R	665N68237R	665N68204R	665N68238R	18.0
S0	2200	665S62203R	665S62237R	665S62204R	665S62238R	
	2400	665S64203R	665S64237R	665S64204R	665S64238R	18.5
	*2600	665S66203R	665S66237R	665S66204R	665S66238R	
	2800	665S68203R	665S68237R	665S68204R	665S68238R	18.0

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNV

FNV44
adjustable setting

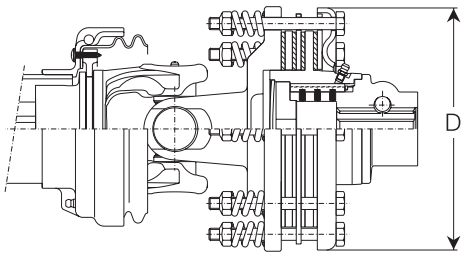


Ref.	Size	Spare part code	Description	Technical data
1		432000114R08	Bolt	M 10 x 75 mm
2	S8 - H8 S9 SH S0	2530L1M01R 2530M1M01R 2530N1M01R 2530S1M01R	Flange yoke	
3		247000061R08	Friction lining	D = 160 ; d = 97 mm
4		2481M0001R02	Driving plate	
5		2481M0002R02	Inner plate	Thickness = 4 mm
6		240000748R05	Locking plate	
7		4271M0101R	Overrunning clutch housing	
8		348017000R20	Grease fitting	
9		2481H0004R02	Pressure plate	Thickness = 8 mm
10		367009870R	Belleville spring	
11		339002068R20	Snap ring	
12		4211L0001R06	Pawl + springs kit	
13		5151M0351R 5151M3751R 5151M0451R 5151M3851R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
14		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20

Combination friction torque limiter and overrunning clutch FFNV

FFNV friction clutches are equipped with helical (coil) springs, that apply pressure in proportion to the amount of compression.
Two models of FFNV friction clutches are available, with different diameters and standard setting.
- **FFNV34** diameter D = 180 mm
- **FFNV44** diameter D = 202 mm.

All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.
The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).
Drivelines with FFNV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.
An implement with an FFNV clutch on the primary driveline must have a shield that overlaps the driveline guard by at least
50 mm overlap as specified by UNI EN ISO 4254-1 and ANSI/ASABE S604.1 standard.



FFNV34 Combination friction torque limiter and overrunning clutch, adjustable setting

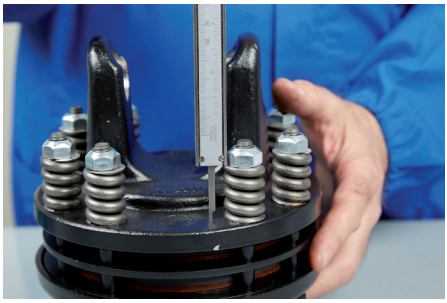
Standard Settings (Nm)

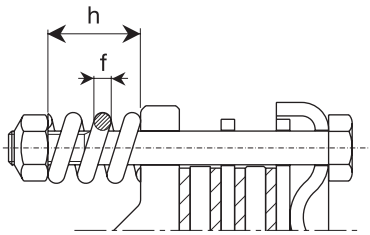
	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
FFNV34 D = 180 mm 4 plates					*1200	1200						
					1350	1350	1350	1350				
					1450	*1450	1450	1450				
					1600	1600	1600	1600				
						1800	*1800	*1800	*1800			
							2000	2000	2000			
FFNV44 D = 202 mm 4 plates							*1800	*1800	1800			
							2000	2000	2000			
							2200	2200	*2200	2200	2200	
							2400	2400	2400	*2400	2400	
								2600	2600	2600	*2600	
										2800	2800	

* maximum recommended settings for 1000 min^{-1} velocity.

Combination friction torque limiter and overrunning clutch FFNV

FFNV friction clutches have an adjustable torque setting. The torque setting varies with different thickness (t) and compression (h) of the springs.
The compression of the springs must be adjusted to compensate for wear of the friction linings and to maintain the desired torque setting.
The tables below show the spring code, diameter “f” and compression height “h” for standard settings.
Check the compression of each spring using a sliding caliper as shown below.
The height of the spring may be ± 0.2 mm of the “h” value shown





FFNV34 Friction clutches
4 plates, diameter 180 mm

Spring code	t mm	Setting Nm	h mm	
351022370	6	1200	29.5	
		1450	29.0	
		1800	28.5	

FFNV44 Friction clutches
4 plates, diameter 202 mm

Spring code	t mm	Setting Nm	h mm	
351013370	7	1800	30.0	
		2400	29.5	
		2800	29.0	

The tables also show the amount of rotation of each bolt required to achieve the next higher or lower setting, relative to the nominal setting (listed with no rotation noted on the bolt).
In addition to the listed settings, intermediate settings may be obtained by tightening or loosening the bolts proportionately.

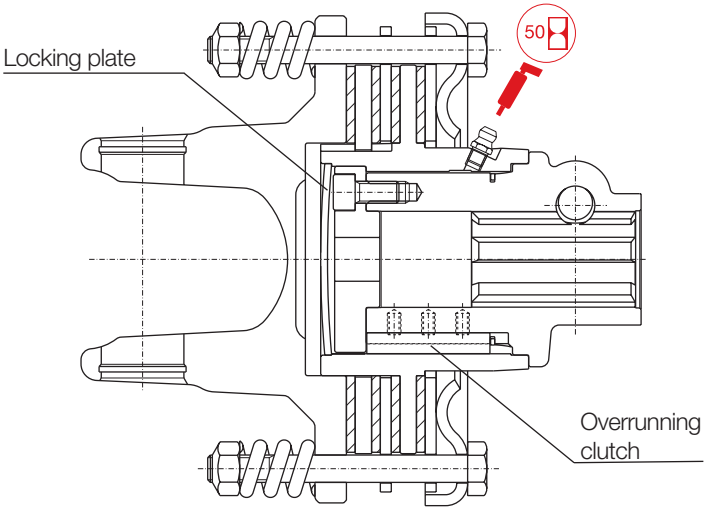
Do not over-tighten the bolts; this may impair the function of friction clutches.

To avoid excessive wear to the implement, driveline, or tractor, Bondioli & Pavesi recommends that the defined setting not be altered.

Combination friction torque limiter and overrunning clutch FFNV

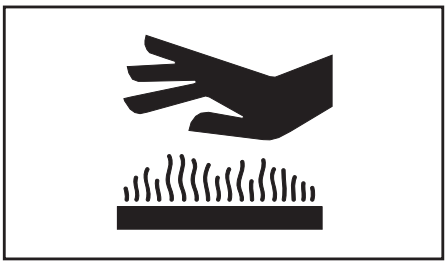
Overrunning clutches mounted on FFNV34 and FFNV44 versions are incorporated onto the hub. A locking ring separates them from the friction clutch, so that the lubricating grease will not contaminate the friction linings.

Lubricate overrunning clutches every 50 hours and after storage.



Do not approach the implement before all parts have reached a complete stop.

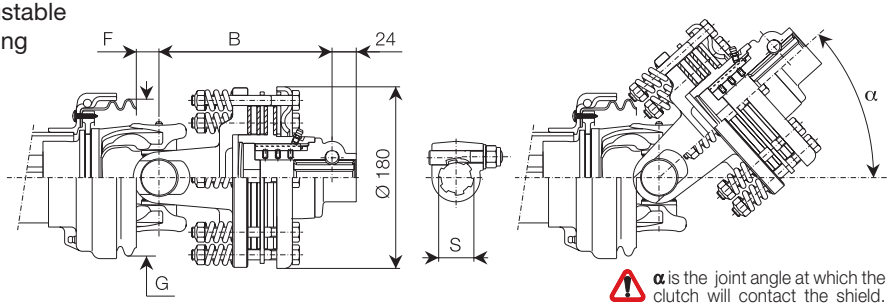
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.



Combination friction torque limiter and overrunning clutch FFNV

FFNV34

adjustable setting



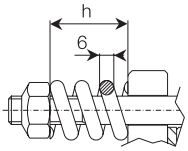
α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	B (mm) 1 3/8" Z21	Codes as spare parts 1 3/8" Z6	Codes as spare parts 1 3/8" Z21	F mm	G mm	α °
S6	*1200	158	158	667G48103R	667G48137R	19	156	30°
	1350			667G51103R	667G51137R			
	1450			667G53103R	667G53137R			
	1600			667G56103R	667G56137R			
H7	1200	166	166	667H48103R	667H48137R	23	156	38°
	1350			667H51103R	667H51137R			
	*1450			667H53103R	667H53137R			
	1600			667H56103R	667H56137R			
	1800			667H58103R	667H58137R			
S8 - H8	1350	172	172	667L51103R	667L51137R	22	156	42°
	1450			667L53103R	667L53137R			
	1600			667L56103R	667L56137R			
	*1800			667L58103R	667L58137R			
	2000			667L60103R	667L60137R			
S9	*1800	174	174	667M58103R	667M58137R	7	178	29°
	2000			667M60103R	667M60137R			

*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FFNV34

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	h mm
1200	2F0	2F8	29.5
1350	2F1	2F9	
1450	2F2	2G0	29.0
1600	2F3	2G1	
1800	2F4	2G2	28.5
2000	2F5	2G3	

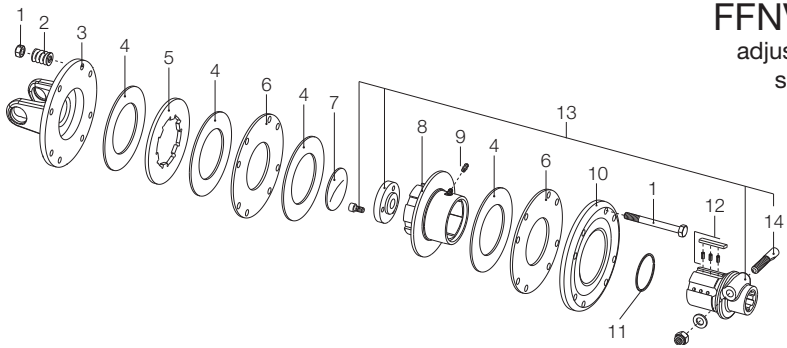


For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

BONDIOLI & PAVESI

Combination friction torque limiter and overrunning clutch FFNV

FFNV34
adjustable setting



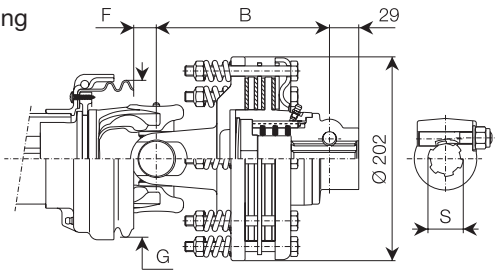
Ref.	Size	Spare part code	Description	Technical data
1		432000007R08	Bolt	M10 x 100 mm
2		351022370R08	Coil spring	f = 6 mm
3	S6 H7 S8-H8 S9	2530G1L05R 2530H1L05R 2530L1L05R 2530M1L05R	Flange yoke	
4		247000054R08	Friction lining	D = 140 ; d = 85 mm
5		2481L0003R02	Driving plate	
6		2481L0007R02	Inner plate	Thickness = 4 mm
7		240000746R05	Locking plate	
8		4271L0101R	Overrunning clutch housing	
9		348017000R20	Grease fitting	
10		248220007R02	Pressure plate	
11		339002060R20	Snap ring	
12		4211L0001R06	Pawl + springs kit	
13		5151L0351R 5151L3751R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
14		408000047R02	Taper pin	1 3/8” Z6 - Z21

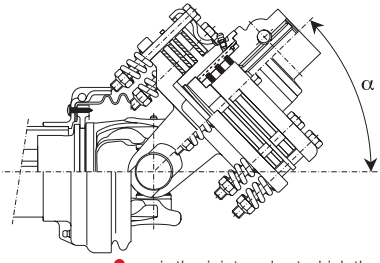
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FFNV

FFNV44

adjustable setting





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2000 2200 2400	175	175	175	175	22	156	44°
H8	*1800 2000 2200 2400 2600	175	175	175	175	22	156	44°
S9	1800 2000 *2200 2400 2600	177	177	177	177	7	178	27°
SH	2200 *2400 2600 2800	178	178	178	178	6	199	23°
S0	2200 2400 *2600 2800	191	191	191	191	10	199	32°

*Maximum recommended settings for 1000 min^{-1} velocity.

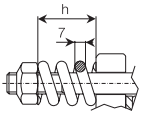
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FFNV

FFNV44
adjustable
setting

Driveline Codes FFNV44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	2G6	2H4	2J2	2K0
2000	2G7	2H5	2J3	2K1
2200	2G8	2H6	2J4	2K2
2400	2G9	2H7	2J5	2K3
2600	2H0	2H8	2J6	2K4
2800	2H1	2H9	2J7	2K5



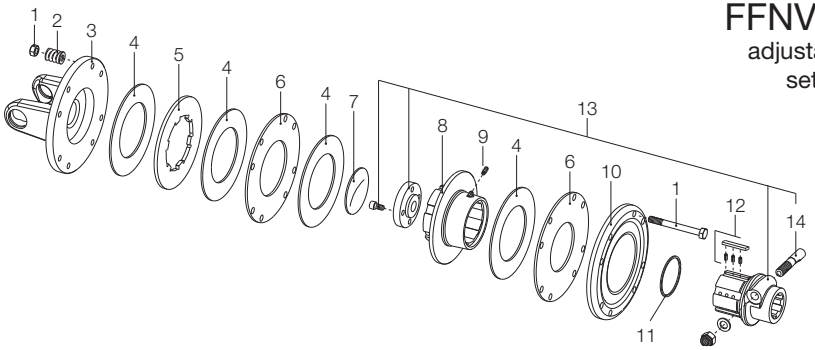
FFNV44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
S8 - H8	*1800	667L58203R	667L58237R	667L58204R	667L58238R	30.0
	2000	667L60203R	667L60237R	667L60204R	667L60238R	
	2200	667L62203R	667L62237R	667L62204R	667L62238R	
	2400	667L64203R	667L64237R	667L64204R	667L64238R	29.5
H8	2600	667L66203R	667L66237R	667L66204R	667L66238R	
S9	1800	667M58203R	667M58237R	667M58204R	667M58238R	30.0
	2000	667M60203R	667M60237R	667M60204R	667M60238R	
	*2200	667M62203R	667M62237R	667M62204R	667M62238R	
	2400	667M64203R	667M64237R	667M64204R	667M64238R	29.5
	2600	667M66203R	667M66237R	667M66204R	667M66238R	
SH	2200	667N62203R	667N62237R	667N62204R	667N62238R	
	*2400	667N64203R	667N64237R	667N64204R	667N64238R	29.5
	2600	667N66203R	667N66237R	667N66204R	667N66238R	
	2800	667N68203R	667N68237R	667N68204R	667N68238R	29.0
S0	2200	667S62203R	667S62237R	667S62204R	667S62238R	
	2400	667S64203R	667S64237R	667S64204R	667S64238R	29.5
	*2600	667S66203R	667S66237R	667S66204R	667S66238R	
	2800	667S68203R	667S68237R	667S68204R	667S68238R	29.0

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FFNV

FFNV44
adjustable setting

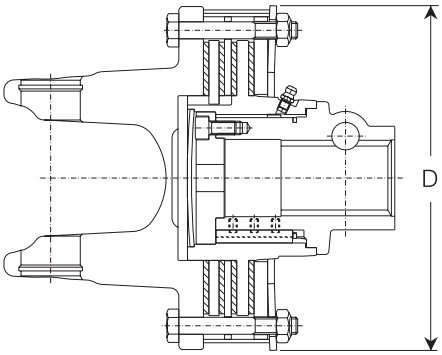


Ref.	Size	Spare part code	Description	Technical data
1		432000122R08	Bolt	M10 x 105 mm
2		351013370R08	Coil spring	f = 7 mm
3	S8 - H8 S9 SH S0	2530L1M05R 2530M1M05R 2530N1M05R 2530S1M05R	Flange yoke	
4		247000061R08	Friction lining	D = 160 ; d = 97 mm
5		2481M0001R02	Driving plate	
6		2481M0007R02	Inner plate	Thickness = 4 mm
7		240000748R05	Locking plate	
8		4271M0101R	Overrunning clutch housing	
9		348017000R20	Grease fitting	
10		248230006R02	Pressure plate	
11		339002068R20	Snap ring	
12		4211L0001R06	Pawl + springs kit	
13		5151M0351R 5151M3751R 5151M0451R 5151M3851R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
14		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20

Combination friction torque limiter and overrunning clutch FNT

FNT friction clutches are equipped with Belleville springs, designed to apply nearly constant pressure, self-compensating for friction lining wear. Therefore the setting is maintained without adjustment over the life of the linings.
FNT friction clutches are non-adjustable. Torque is determined by the thickness of the Belleville spring.
Two models of FNT combination friction torque limiter with overrunning clutch are available, with different outer diameter:
- **FNT34** (D = 180 mm, 4 friction linings)
- **FNT44** (D = 202 mm, 4 friction linings)

All versions are available with treated hubs and driving plates to reduce rust and help prevent seizure.
All versions are available with Release System.
The chart below indicates the diameter D, number of linings, and the standard settings for each model, corresponding to each driveline size. Maximum settings recommended for use at 1000 min^{-1} are marked (*).



FNT34 Combination friction torque limiter and overrunning clutch, non-adjustable setting

Standard settings (Nm)

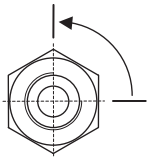
	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0
FNT34 D = 180 mm 4 plates					*1200 1450	1200 *1450 1800	1450 *1800	1450 1800	*1800		
FNT44 D = 202 mm 4 plates							*1800 2200	*1800 2200 2400 2600	1800 *2200 2400 2600	2200 *2400 2600	2200 2400 *2600

* maximum recommended settings for 1000 min^{-1} velocity.

Combination friction torque limiter and overrunning clutch FNT

FNT friction clutches are equipped with Belleville springs, designed to apply nearly constant pressure, self-compensating for friction lining wear. Therefore the setting is maintained without adjustment over the life of the linings.
The torque setting of FNT friction clutches is determined by the Belleville spring. The tables below show the spring codes for each friction clutch and standard setting.

FT clutches are equipped with a metal band to be used as reference to properly compress the Belleville spring.



To do this properly, tighten the bolts until the Belleville spring contacts the metal band. Then back off each nut 1/4 turn.

⚠ Do not over-tighten bolts; this may impair the function of friction clutches

⚠ To avoid excessive wear to the implement, driveline or tractor Bondioli & Pavesi recommends that the setting not be changed.

FNT34 - FNT34R Combination Friction torque limiters and overrunning clutch

setting Nm	spring code
1450	367FT340C
1800	367FT340D

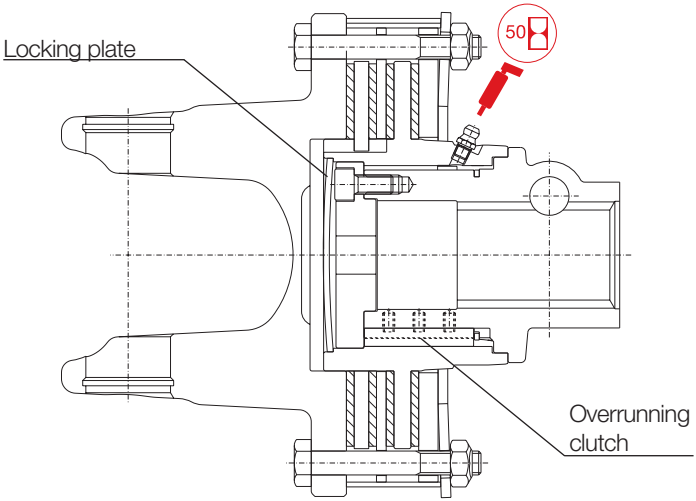
FNT44 - FNT44R Combination friction torque limiters and overrunning clutch

setting Nm	spring code
1800	367FT440A
2200	367FT440C
2400	367FT440D
2600	367FT440E

Combination friction torque limiter and overrunning clutch FNT

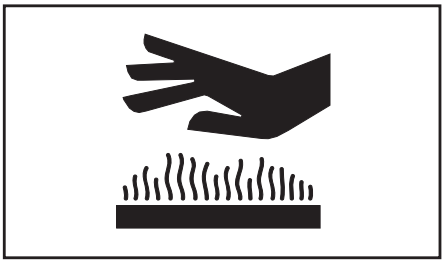
Overrunning clutches mounted on FNT34 and FNT44 versions are incorporated onto the hub. A locking ring separates them from the friction clutch, so that the lubricating grease will not contaminate friction linings.

Lubricate overrunning clutches every 50 hours and after storage.



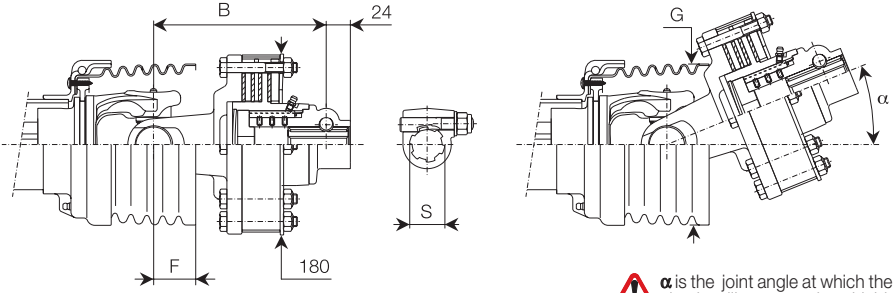
Do not approach the implement before all parts have come to a complete stop.

Friction clutches may become hot during use. Do not touch!
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.



Combination friction torque limiter and overrunning clutch FNT

FNT34



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	*1200 1450	158	158	- -	- -	32	160	24°
H7	1200 *1450 1800	166	166	- -	- -	29	160	28°
S8	1450 *1800	172	172	- -	- -	42	160	18°
H8	1450 *1800	172	172	- -	- -	42	160	18°
S9	*1800	174	174	- -	- -	49	180	13°

*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FNT34

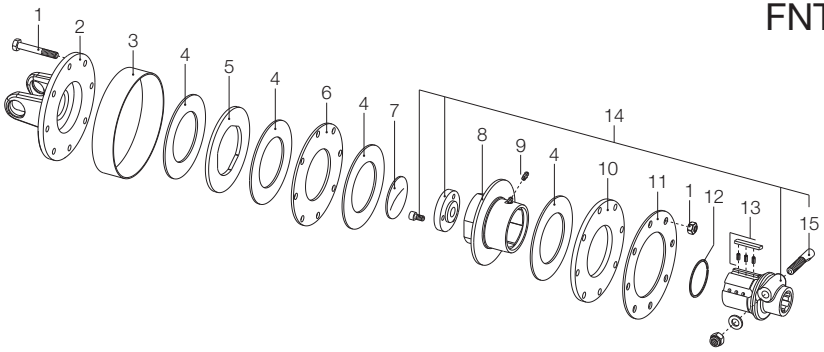
Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	1A1	1A6	- -	- -
1450	1A2	1A7	- -	- -
1800	1A3	1A8	- -	- -

FNT34 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	*1200	658G48103R	658G48137R	- -	- -
	1450	658G53103R	658G53137R	- -	- -
H7	1200	658H48103R	658H48137R	- -	- -
	*1450	658H53103R	658H53137R	- -	- -
	1800	658H58103R	658H58137R	- -	- -
S8 - H8	1450	658L53103R	658L53137R	- -	- -
	*1800	658L58103R	658L58137R	- -	- -
S9	*1800	658M58103R	658M58137R	- -	- -

Combination friction torque limiter and overrunning clutch FNT

FNT34

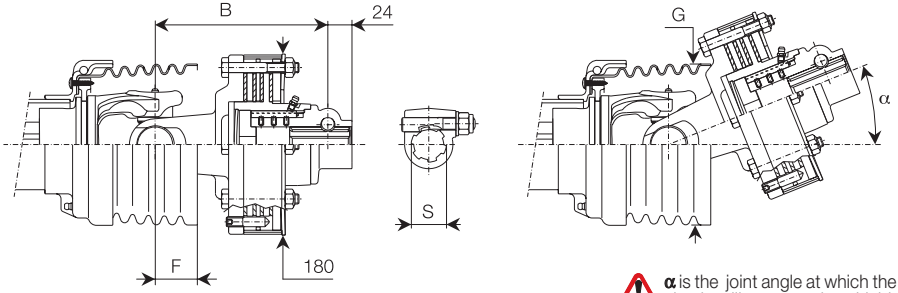


Ref.	Size	Spare part code	Description	Technical data
1		432000045R08	Bolt	M10 x 65 mm
2	S6 H7 S8 S9	2530G1L01R 2530H1L01R 2530L1L01R 2530M1L01R	Flange yoke	
3		240000218R02	Adjustment band	
4		247000054R08	Friction lining	D = 140 ; d = 85 mm
5		2481L0003R02	Driving plate	
6		2481L0001R02	Inner plate	Thickness = 4 mm
7		240000746R05	Locking plate	
8		4271L0101R	Overrunning clutch housing	
9		348017000R20	Grease fitting	
10		2481L0002R02	Pressure plate	Thickness = 8 mm
11		367FT341A 367FT340C 367FT340D	Belleville spring	1200 Nm 1450 Nm 1800 Nm
12		339002060R20	Snap ring	
13		4211L0001R06	Pawl + springs kit	
14		5151L0351R 5151L3751R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
15		408000047R02	Taper pin	1 3/8” Z6 - Z21

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNT

FNT34R



α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S6	*1200	158	158	- -	- -	32	160	24°
	1450			- -	- -			
H7	1200	166	166	- -	- -	29	160	28°
	*1450			- -	- -			
	1800			- -	- -			
S8	1450	172	172	- -	- -	42	160	18°
	*1800			- -	- -			
H8	1450	172	172	- -	- -	42	160	18°
	*1800			- -	- -			
S9	*1800	174	174	- -	- -	49	180	13°

*Maximum recommended settings for 1000 min^{-1} velocity.

Driveline Codes FNT34R

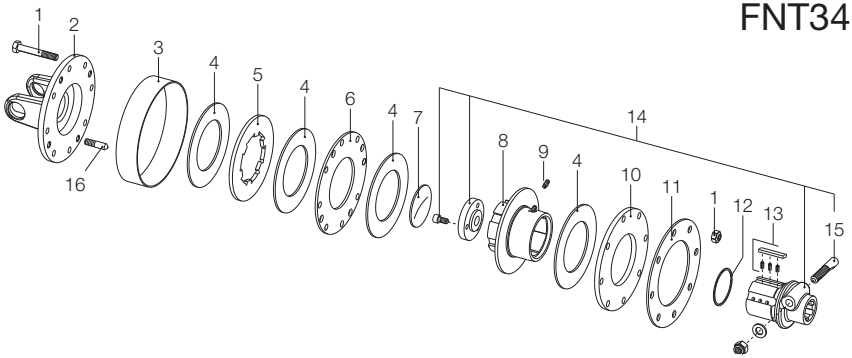
Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1200	1C1	1C6	- -	- -
1450	1C2	1C7	- -	- -
1800	1C3	1C8	- -	- -

FNT34R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S6	*1200	658G48203R	658G48237R	- -	- -
	1450	658G53203R	658G53237R	- -	- -
H7	1200	658H48203R	658H48237R	- -	- -
	*1450	658H53203R	658H53237R	- -	- -
	1800	658H58203R	658H58237R	- -	- -
S8 - H8	1450	658L53203R	658L53237R	- -	- -
	*1800	658L58203R	658L58237R	- -	- -
S9	*1800	658M58203R	658M58237R	- -	- -

Combination friction torque limiter and overrunning clutch FNT

FNT34R

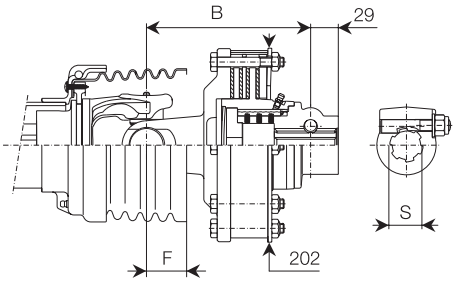


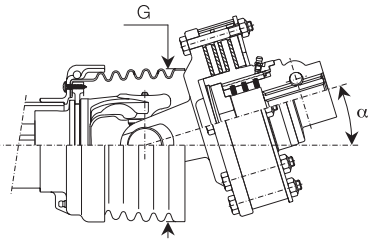
Ref.	Size	Spare part code	Description	Technical data
1		432000045R08	Bolt	M10 x 65 mm
2	S6 H7 S8 - H8 S9	2530G1L02R 2530H1L02R 2530L1L02R 2530M1L02R	Flange yoke	
3		240000218R02	Adjustment band	
4		247000054R08	Friction lining	D = 140 ; d = 85 mm
5		2481L0003R02	Driving plate	
6		2481L0004R02	Inner plate	Thickness = 4 mm
7		240000746R05	Locking plate	
8		4271L0101R	Overrunning clutch housing	
9		348017000R20	Grease fitting	
10		2481L0002R02	Pressure plate	Thickness = 8 mm
11		367FT341A 367FT340C 367FT340D	Belleville spring	1200 Nm 1450 Nm 1800 Nm
12		339002060R20	Snap ring	
13		4211L0001R06	Pawl + spring kit	
14		5151L0351R 5151L3751R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21
15		408000047R02	Taper pin	1 3/8” Z6 - Z21
16		310001301R04	Special socket head set screw	M 10 x 40 mm

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNT

FNT44





α is the joint angle at which the clutch will contact the shield.

	Setting Nm	B (mm) S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	F mm	G mm	α °
S8	*1800 2200	175	175	175	175	42	160	17°
H8	1800 *2200 2400 2600	175	175	175	175	42	160	17°
S9	*1800 2200 2400 2600	177	177	177	177	49	180	18°
SH	2200 *2400 2600	178	178	178	178	50	201	12°
S0	2200 2400 *2600	191	191	191	191	46	201	21°

*Maximum recommended settings for 1000 min^{-1} velocity.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

FNT44

Driveline Codes FNT44

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	1F1	1F7	1G3	1G9
2200	1F2	1F8	1G4	1H0
2400	1F3	1F9	1G5	1H1
2600	1F4	1G0	1G6	1H2

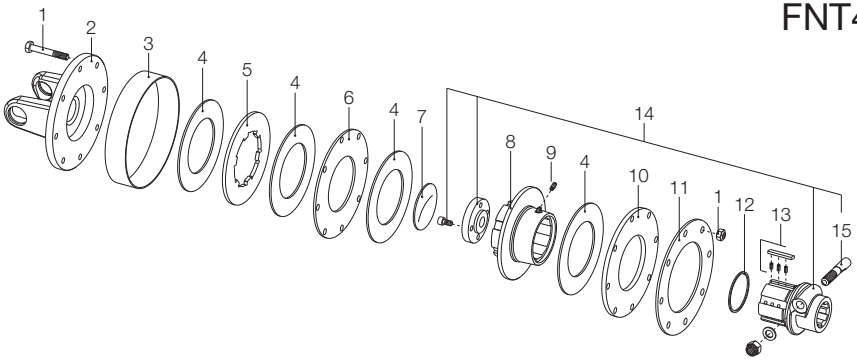
FNT44 Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8 - H8	*1800	658L58303R	658L58337R	658L58304R	658L58338R
	2200	658L62303R	658L62337R	658L62304R	658L62338R
H8	2400	658L64303R	658L64337R	658L64304R	658L64338R
	2600	658L66303R	658L66337R	658L66304R	658L66338R
S9	1800	658M58303R	658M58337R	658M58304R	658M58338R
	*2200	658M62303R	658M62337R	658M62304R	658M62338R
	2400	658M64303R	658M64337R	658M64304R	658M64338R
	2600	658M66303R	658M66337R	658M66304R	658M66338R
SH	2200	658N62303R	658N62337R	658N62304R	658N62338R
	*2400	658N64303R	658N64337R	658N64304R	658N64338R
	2600	658N66303R	658N66337R	658N66304R	658N66338R
S0	2200	658S62303R	658S62337R	658S62304R	658S62338R
	2400	658S64303R	658S64337R	658S64304R	658S64338R
	*2600	658S66303R	658S66337R	658S66304R	658S66338R

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNT

FNT44

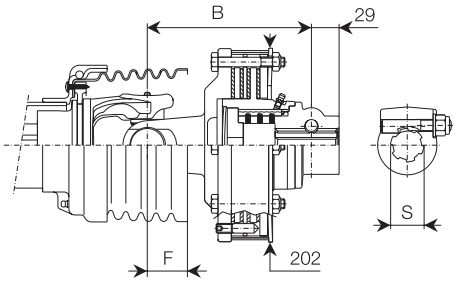


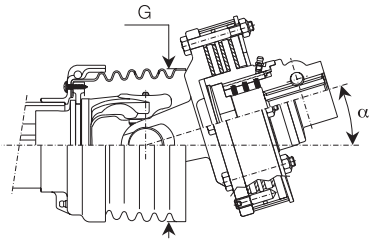
Ref.	Size	Spare part code	Description	Technical data
1		432000100R08	Bolt	M 10 x 70 mm
2	S8 - H8 S9 SH S0	2530L1M01R 2530M1M01R 2530N1M01R 2530S1M01R	Flange yoke	
3		240000219R02	Adjustment band	
4		247000061R08	Friction lining	D = 160 ; d = 97 mm
5		2481M0001R02	Driving plate	
6		2481M0002R02	Inner plate	Thickness = 4 mm
7		240000748R05	Locking plate	
8		4271M0101R	Overrunning clutch plug	
9		348017000R20	Grease fitting	
10		2481H0003R02	Pressure plate	Thickness = 8 mm
11		367FT440A 367FT440C 367FT440D 367FT440E	Belleville spring	1800 Nm 2200 Nm 2400 Nm 2600 Nm
12		339002068R20	Snap ring	
13		4211L0001R06	Pawl + springs kit	
14		5151M0351R 5151M3751R 5151M0451R 5151M3851R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
15		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNT

FNT44R





α is the joint angle at which the clutch will contact the shield.

	Setting	B (mm)				F	G	α
	Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	mm	mm	°
S8	*1800	175	175	175	175	42	160	17°
	2200							
H8	1800	175	175	175	175	42	160	17°
	*2200							
	2400							
	2600							
S9	1800	177	177	177	177	49	180	18°
	*2200							
	2400							
	2600							
SH	2200	178	178	178	178	50	201	12°
	*2400							
	2600							
S0	2200	191	191	191	191	46	201	21°
	2400							
	*2600							

*Maximum recommended settings for 1000 min^{-1} velocity.

For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

Combination friction torque limiter and overrunning clutch FNT

FNT44R

Driveline Codes FNT44R

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
1800	1H5	1J1	1J7	1K4
2200	1H6	1J2	1J8	1K5
2400	1H7	1J3	1J9	1K6
2600	1H8	1J4	1K0	1K7

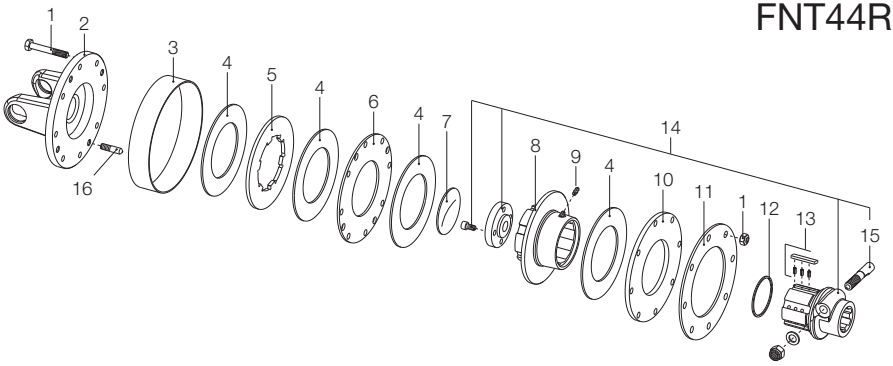
FNT44R Codes as Spare Parts

	Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20
S8 - H8	*1800	658L58403R	658L58437R	658L58404R	658L58438R
	2200	658L62403R	658L62437R	658L62404R	658L62438R
H8	2400	658L64403R	658L64437R	658L64404R	658L64438R
	2600	658L66403R	658L66437R	658L66404R	658L66438R
S9	1800	658M58403R	658M58437R	658M58404R	658M58438R
	*2200	658M62403R	658M62437R	658M62404R	658M62438R
	2400	658M64403R	658M64437R	658M64404R	658M64438R
	2600	658M66403R	658M66437R	658M66404R	658M66438R
SH	2200	658N62403R	658N62437R	658N62404R	658N62438R
	*2400	658N64403R	658N64437R	658N64404R	658N64438R
	2600	658N66403R	658N66437R	658N66404R	658N66438R
S0	2200	658S62403R	658S62437R	658S62404R	658S62438R
	2400	658S64403R	658S64437R	658S64404R	658S64438R
	* 2600	658S66403R	658S66437R	658S66404R	658S66438R

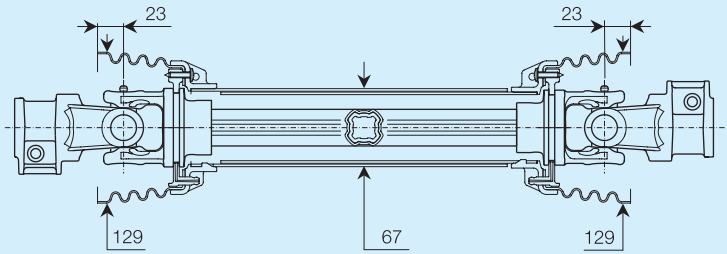
For primary drivelines, always install any torque limiter or overrunning clutch on the implement side.
All rotating parts must be guarded.

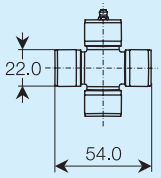
Combination friction torque limiter and overrunning clutch FNT

FNT44R



Ref.	Size	Spare part code	Description	Technical data
1		432000100R08	Bolt	M 10 x 70 mm
2	S8 - H8 S9 SH S0	2530L1M02R 2530M1M02R 2530N1M02R 2530S1M02R	Flange yoke	
3		240000219R02	Adjustment band	
4		247000061R08	Friction lining	D = 160 ; d = 97 mm
5		2481M0001R02	Driving plate	
6		2481M0003R02	Inner plate	Thickness = 4 mm
7		240000748R05	Locking plate	
8		4271M0101R	Overrunning clutch housing	
9		348017000R20	Grease fitting	
10		2481H0003R02	Pressure plate	Thickness = 8 mm
11		367FT440A 367FT440C 367FT440D 367FT440E	Belleville spring	1800 Nm 2200 Nm 2400 Nm 2600 Nm
12		339002068R20	Snap ring	
13		4211L0001R06	Pawl + springs kit	
14		5151M0351R 5151M3751R 5151M0451R 5151M3851R	Hub with taper pin	1 3/8” Z6 1 3/8” Z21 1 3/4” Z6 1 3/4” Z20
15		408000047R02 408000046R02	Taper pin	1 3/8” Z6 - Z21 1 3/4” Z6 - Z20
16		310001301R04	Special socket head set screw	M 10 x 40 mm





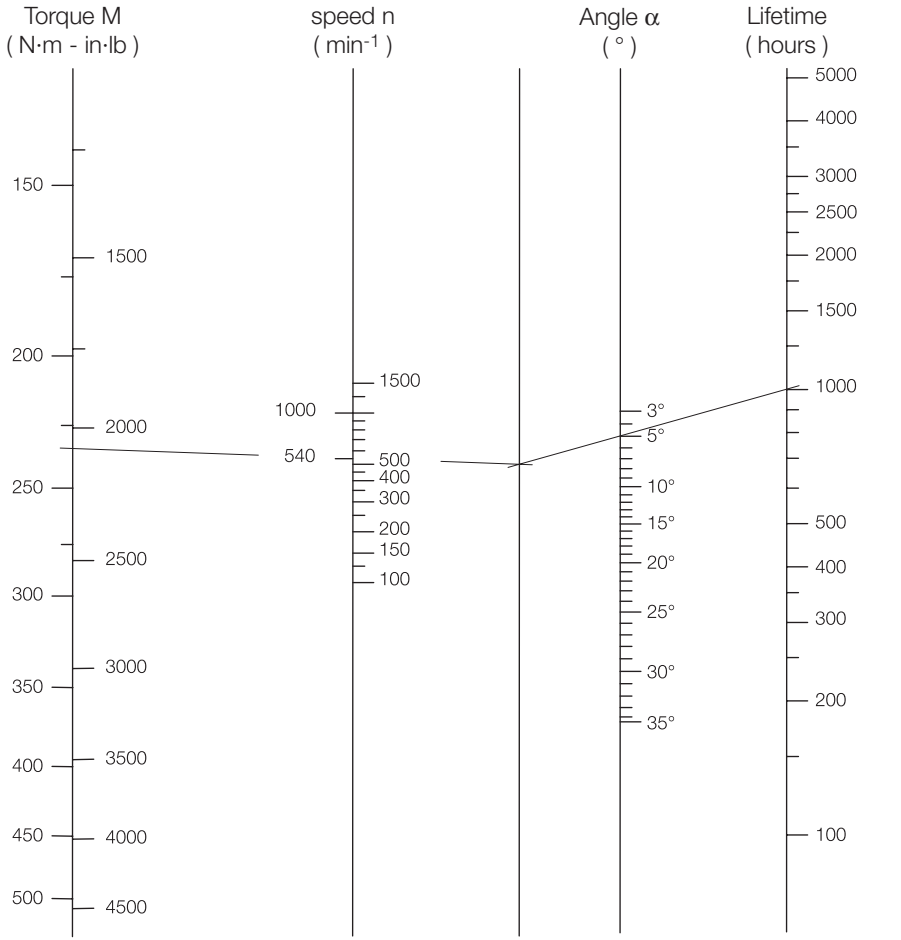
4120B0012

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S1	234	2073	13	18	190	1679	20	27

Mn = nominal torque associated with a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated with nominal torque Mn.

Size S1

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 234 N·m at **n** = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.
The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.
Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.
Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and Lh (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hrs)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a single cardan joint size S1, torque M = 234 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.
If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66, the lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.
The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

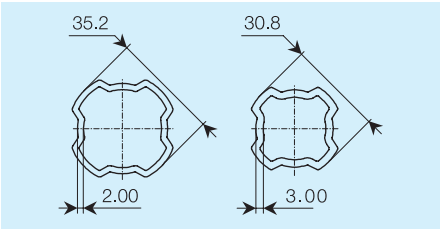
L_{h50}/L_h ratio	Lubrication frequency (hrs)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

Example: M_{50} = 234 Nm is the theoretical transmittable torque for a cardan driveline size S1, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.
For lower transmitted torque, i.e.
M = 200 Nm, the M_{50} / M ratio is 234 / 200 = 1.17. From the chart above, we can see that the lubrication frequency can be extended to 200 hours.

Size S1

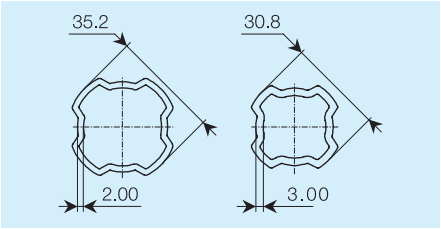
Telescoping Members

Four-Tooth profile tubes



Mmax (Nm)	850
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

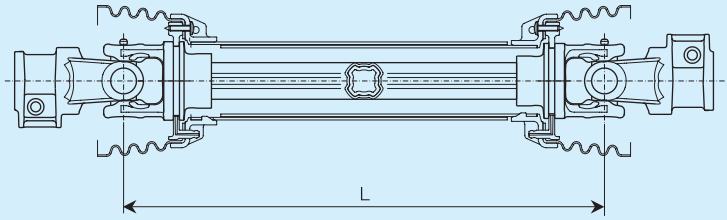
Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	850
T/M (N/Nm)	9 - 10
Heat-treated tube code	T
Maximum extension tube code	U

Mmax : maximum transmitted torque. T/M : thrust (T) to torque (M) ratio

Length



L	Standard Lw	Lt	Ls	Maximum extension Lw	Lt	Ls	Length code
mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	480	515	515	036
410	530	580	612	580	615	615	041
460	620	673	700	670	715	715	046
510	695	756	787	745	806	815	051
560	770	840	875	820	890	915	056
610	845	923	962	895	973	1012	061
660	920	1006	1050	- -	- -	- -	066
710	995	1090	1137	- -	- -	- -	071
760	1070	1173	1225	- -	- -	- -	076
810	1145	1256	1312	- -	- -	- -	081
860	1220	1340	1400	- -	- -	- -	086
910	1295	1423	1487	- -	- -	- -	091
1010	* 1445	* 1590	1662	- -	- -	- -	101
1110	* 1595	* 1756	1837	- -	- -	- -	111
1210	* 1745	* 1923	2012	- -	- -	- -	121

Lw: maximum working length **Lt**: maximum temporary length (short duration temporary maneuvers) **Ls**: maximum length without rotation

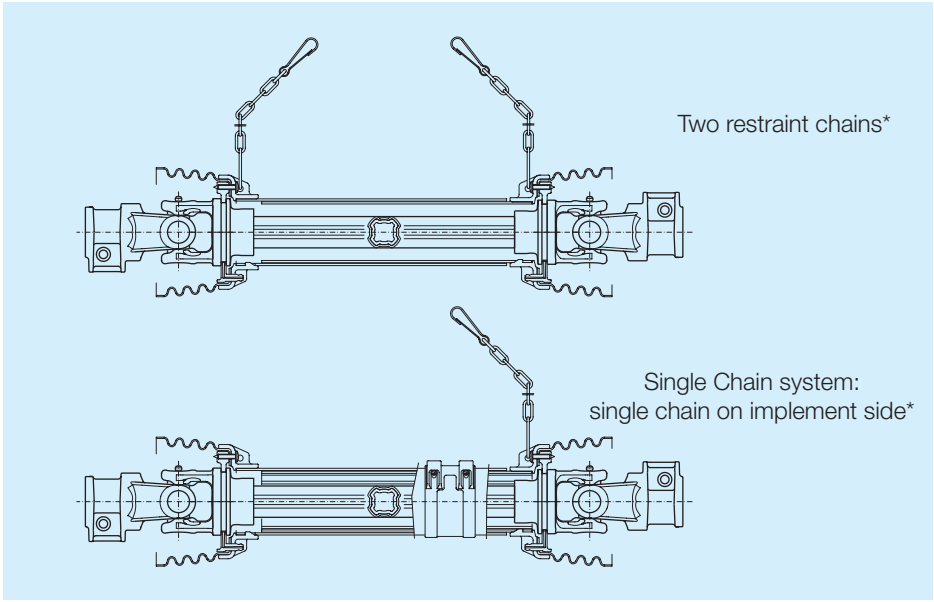
Lw and Lt refer to drivelines with a maximum speed of 1000 min^{-1}, except those marked with *, that refer to a 540 min^{-1} maximum speed. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S1

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

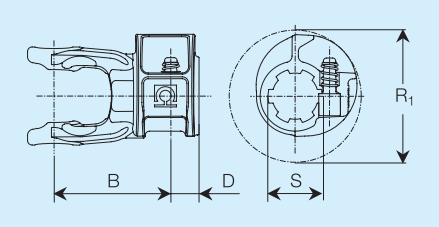


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with "S" hook. To have chain fitted with the Spring Link system, which permits reattachment without replacing complete chain, add letter "Z" to the driveline code (see chapter 10 - *Safety Shields*).

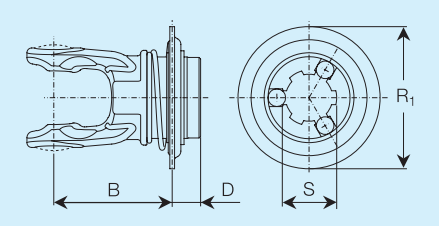
Yokes for single cardan joint

Push-pin yokes

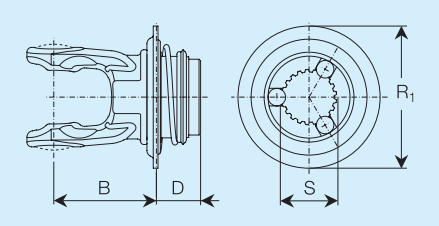


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	75	18	85	007	5070B0355
1 3/8" Z21	67	26	85	008	5070B3755
D8x32x38	75	18	85	093	5070B2151

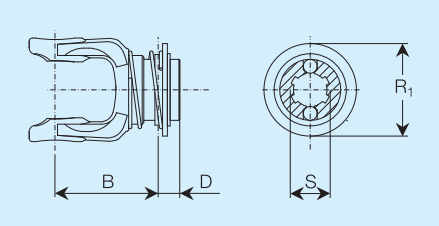
Ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	75	18	90	R07	5720B0355



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z21	65	28	90	R08	5720B3776



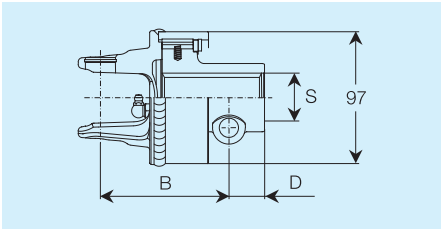
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
21 UNI221	64	14	58	R01	5050B0951

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S1

Overrunning clutches

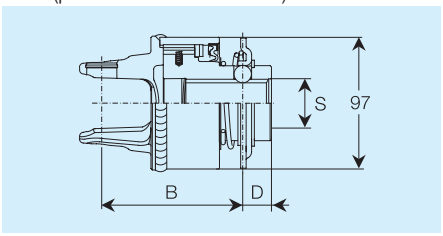
RA1



S	B	D	Code	Spare part
	mm	mm	RA1	code
1 3/8" Z6	94	21	096	601101701R
1 3/8" Z21	94	21	631	601101702R

Maximum recommended torque: 2400 Nm

RL1 (permanent lubrication)



S	B	D	Code	Spare part
	mm	mm	RL1	code
1 3/8" Z6	103	21	0A0	60150B401R
1 3/8" Z21	103	21	0A1	60150B402R

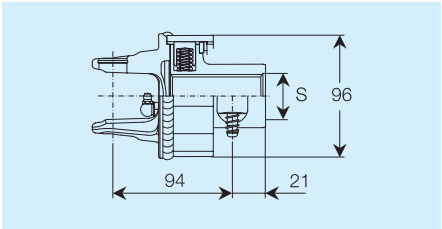
Maximum recommended torque: 2400 Nm

For primary drivelines, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Ratchet torque limiters (one-way)

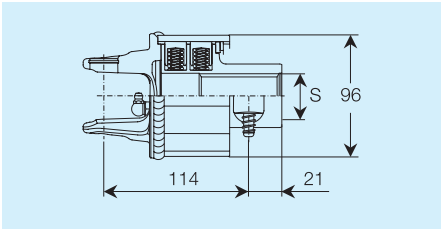
SA1



Setting Nm	S	Code SA1	Spare part code
400	1 3/8" Z6	117	610124001R

Maximum recommended speed 700 min^{-1}

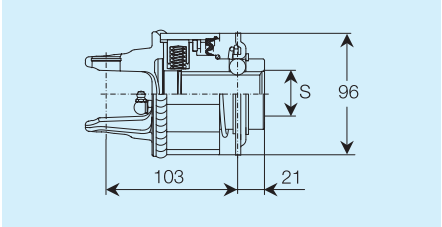
SA2



Setting Nm	S	Code SA2	Spare part code
650	1 3/8" Z6	128	610234001R

Maximum recommended speed 700 min^{-1}

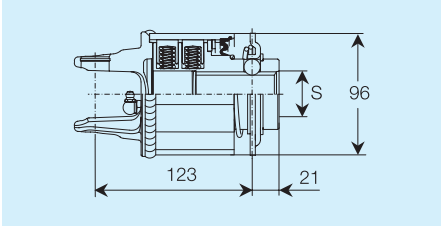
LC1 (Seasonal lubrication)



Setting Nm	S	Code LC1	Spare part code
400	1 3/8" Z6	0G4	60D1B2403R

Maximum recommended speed 700 min^{-1}

LC2 (Seasonal lubrication)



Setting Nm	S	Code LC2	Spare part code
650	1 3/8" Z6	0G7	60D2B3403R

Maximum recommended speed 700 min^{-1}

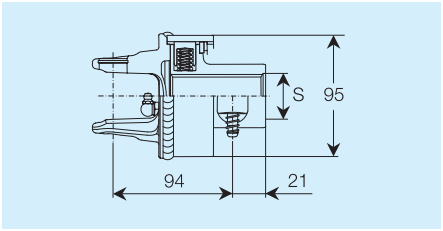
For primary drivelines, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S1

Ratchet torque limiter (symmetrical)

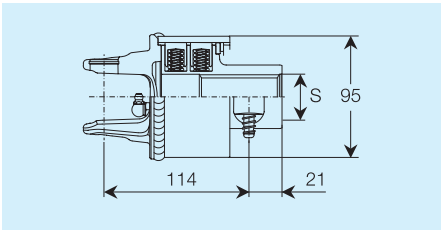
LN1



Setting Nm	S	Code LN1	Spare part code
300	1 3/8" Z6	0E4	60A1B1903R

Maximum recommended speed 700 min^{-1}

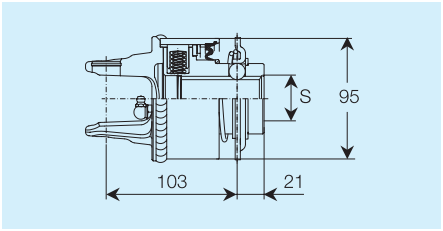
LN2



Setting Nm	S	Code LN2	Spare part code
460	1 3/8" Z6	0E7	60A2B2603R
600	1 3/8" Z6	0E9	60A2B3203R

Maximum recommended speed 700 min^{-1}

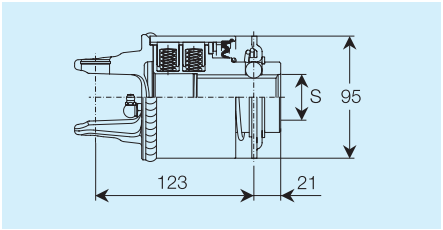
LT1 (Seasonal lubrication)



Setting Nm	S	Code LT1	Spare part code
300	1 3/8" Z6	0L4	60F1B1903R

Maximum recommended speed 700 min^{-1}

LT2 (Seasonal lubrication)



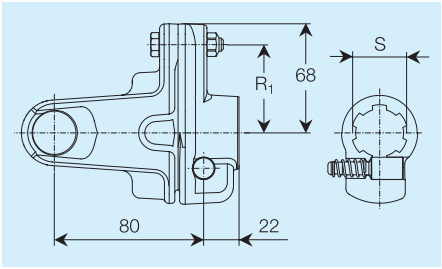
Setting Nm	S	Code LT2	Spare part code
460	1 3/8" Z6	0L7	60F2B2603R
600	1 3/8" Z6	0L9	60F2B3203R

Maximum recommended speed 700 min^{-1}

For primary drivelines, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
650	1 3/8" Z6	37	1R0	6060B0304R
	1 3/8" Z21		1S0	6060B3703R
700	1 3/8" Z6	40	098	6060B0302R
	1 3/8" Z21		161	6060B3702R
780	1 3/8" Z6	45	1R2	6060B0301R
	1 3/8" Z21		1S2	6060B3701R

Bolt M6 x 40 cl 8.8

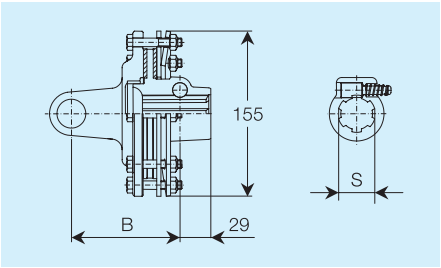
For primary drivelines, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S1

Friction torque limiter, adjustable setting

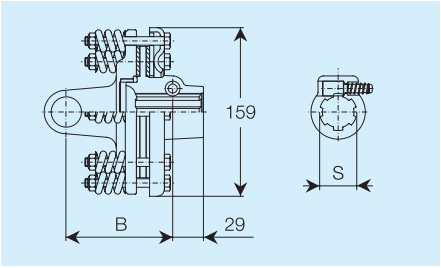
FV22



Setting Nm	B mm	S	Code FV22	Spare part code
*400	92	1 3/8" Z6	N06	661B24103R
	92	1 3/8" Z21	N09	661B24137R
500	92	1 3/8" Z6	N00	661B28103R
	92	1 3/8" Z21	N03	661B28137R

* Maximum recommended setting for 1000 min^{-1}

FFV22



Setting Nm	B mm	S	Code FFV22	Spare part code
*400	92	1 3/8" Z6	0R1	635B24103R
	92	1 3/8" Z21	0R6	635B24137R
500	92	1 3/8" Z6	0R2	635B28103R
	92	1 3/8" Z21	0R7	635B28137R

* Maximum recommended setting for 1000 min^{-1}

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

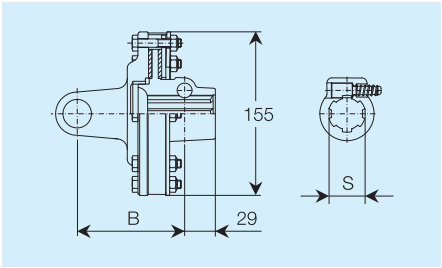
Friction clutches may become hot during use. Do not touch!
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

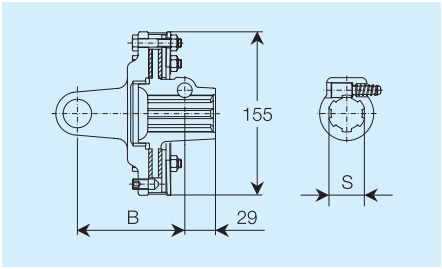
FT22



Setting Nm	B mm	S	Code FT22	Spare part code
*400	92	1 3/8" Z6	Q05	663B24103R
	92	1 3/8" Z21	Q08	663B24137R
500	92	1 3/8" Z6	Q00	663B28103R
	92	1 3/8" Z21	Q02	663B28137R

* Maximum recommended setting for 1000 min^{-1}

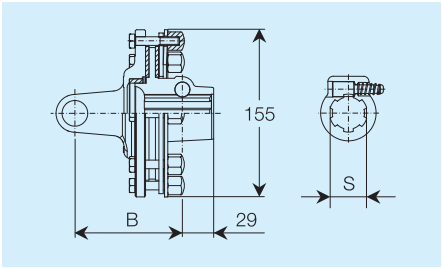
FT22R with Release System



Setting Nm	B mm	S	Code FT22R	Spare part code
*400	92	1 3/8" Z6	H05	663B24A03R
	92	1 3/8" Z21	H08	663B24A37R
500	92	1 3/8" Z6	H00	663B28A03R
	92	1 3/8" Z21	H02	663B28A37R

* Maximum recommended setting for 1000 min^{-1}

FK22



Setting Nm	B mm	S	Code FK22	Spare part code
*400	92	1 3/8" Z6	7A0	60KB24103R
	92	1 3/8" Z21	7A4	60KB24137R
500	92	1 3/8" Z6	7A1	60KB28103R
	92	1 3/8" Z21	7A5	60KB28137R

* Maximum recommended setting for 1000 min^{-1}

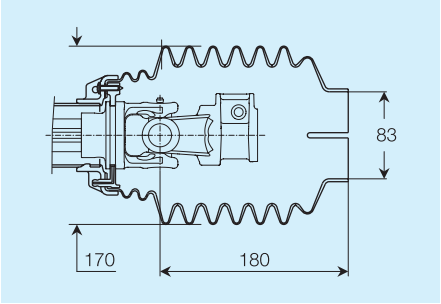
Friction clutches may become hot during use. Do not touch!
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

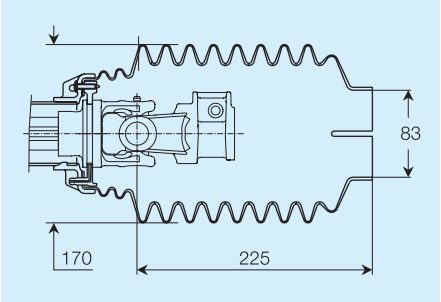
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S1

Optional shield cones



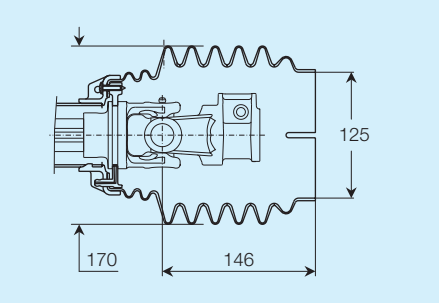
Extended shield cones, medium length, narrow diameter
- Tractor end.....P
- Implement end .....M



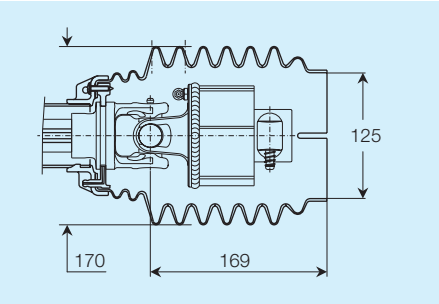
Extended shield cones, long length, narrow diameter
- Tractor end..... N
- Implement end L

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Optional shield cones

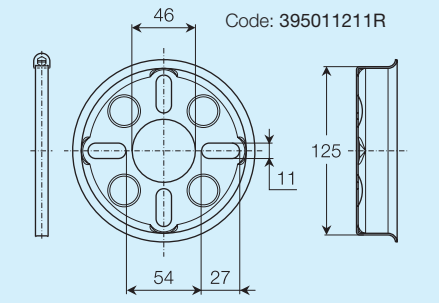


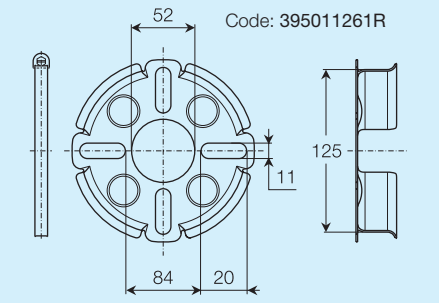
Extended shield cone, short length, wide diameter
- Tractor end..... F
- Implement end ..... H



Extended shield cone, medium length, wide diameter
- Tractor end..... R
- Implement end ..... T

Plates and clamps for optional extended shield cones





Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Size S1

Codes for size S1 drivelines

1 **C**

C: Standard SFT cardan joint driveline

2 3 **S** **1**

Size **S1**

4

Telescoping Members
See page S1.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page S1.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page S1.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S1.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also establishes the associated shields and attachment to PTO.

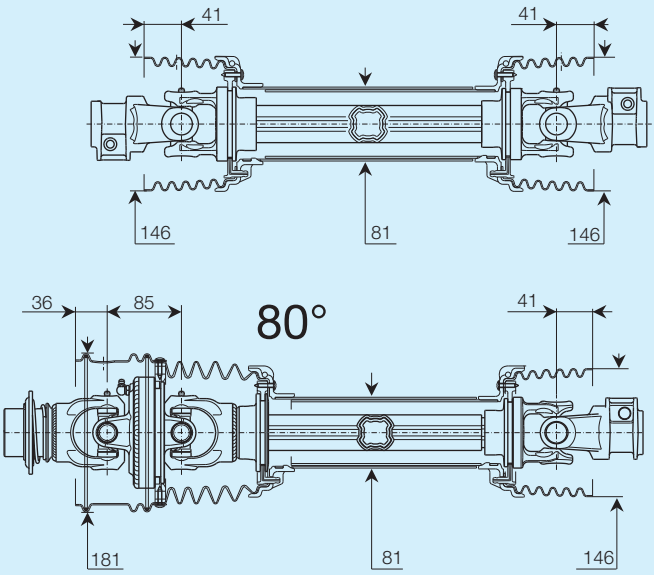
13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline. Also establishes the associated shields and attachment to the implement PIC shaft.

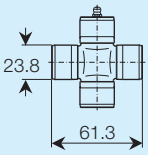
16 17 18

Only use these positions of the code if requesting optional shield cones and/or Spring Link chains (see chapter 10 - Safety Shields). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

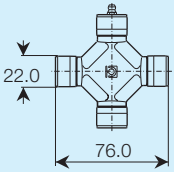


Single Cardan Joint



4120C0012

80° Constant Velocity Joint



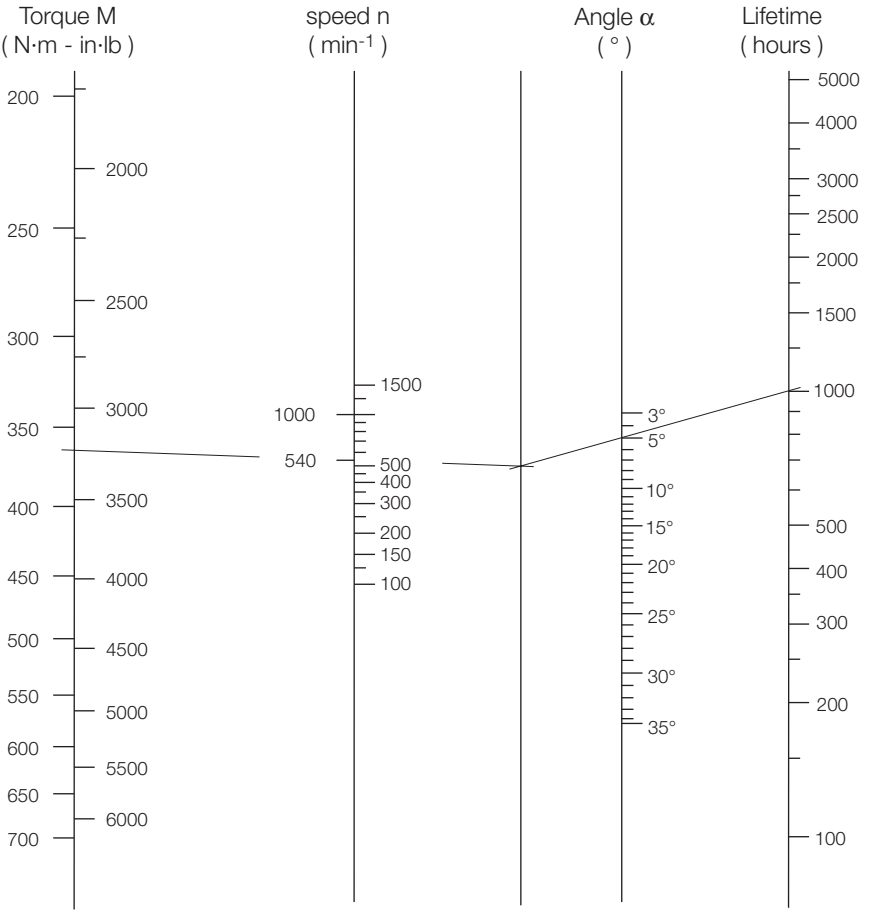
4120E0051

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S2	364	3224	21	28	295	2612	31	42

Mn = nominal torque associated with a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated with nominal torque Mn.

Size S2

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 364 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.
The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.
Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.
Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size S2, torque M = 364 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.
If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.
The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

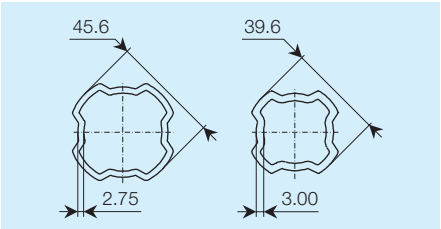
L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

Example: M_{50} = 364 Nm is the theoretical transmittable torque for a cardan driveline size S2, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.
For a lower transmitted torque, i.e. M = 311 Nm, M_{50} / M ratio is 364 / 311 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S2

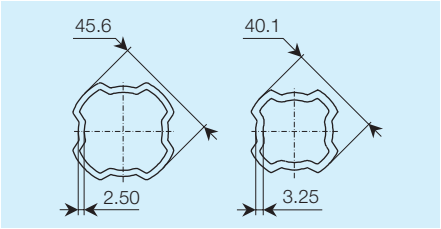
Telescoping Members

Four-Tooth profile tubes



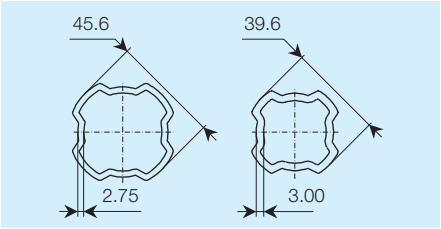
Mmax (Nm)	1500
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



Mmax (Nm)	1500
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube

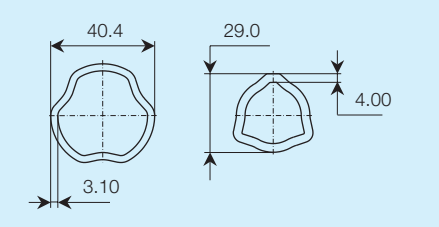


Mmax (Nm)	1500
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (M) ratio

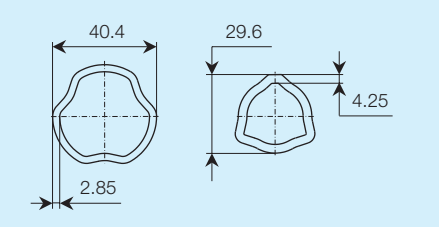
Telescoping Members

Free Rotation profile tubes



Mmax (Nm)	1040
T/M (N/Nm)	6 - 8
Code	F

Free Rotation profile tubes with Rilsan® coated inner tube

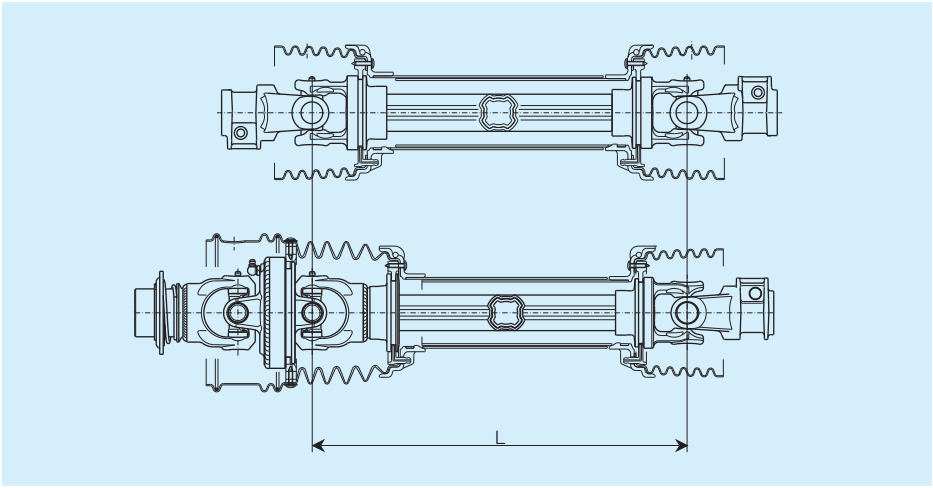


Mmax (Nm)	1040
T/M (N/Nm)	3 - 4
Code	G

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (M) ratio

Size S2

Length



Standard

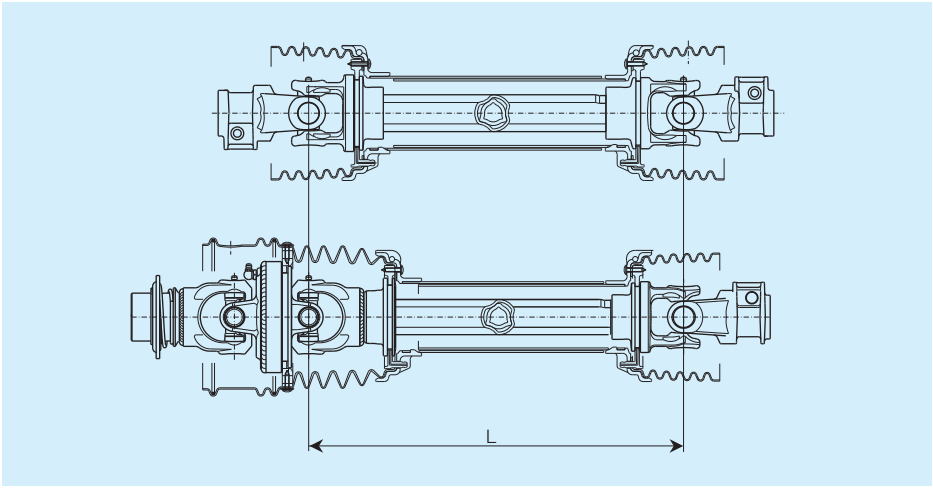
Maximum extension

L	Lw	Lt	Ls	Lw	Lt	Ls	Length code
mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	471	493	493	036
410	516	566	593	571	593	593	041
460	613	664	689	668	693	693	046
510	688	747	777	743	793	793	051
560	763	830	864	818	885	893	056
610	838	914	952	893	969	993	061
660	913	997	1039	- -	- -	- -	066
710	988	1080	1127	- -	- -	- -	071
760	1063	1164	1214	- -	- -	- -	076
810	1138	1247	1302	- -	- -	- -	081
860	1213	1330	1389	- -	- -	- -	086
910	1288	1414	1477	- -	- -	- -	091
1010	1438	1580	1652	- -	- -	- -	101
1110	*1588	*1747	1827	- -	- -	- -	111
1210	*1738	*1914	2002	- -	- -	- -	121

Lw: maximum working length **Lt**: maximum temporary length (short duration temporary maneuvers) **Ls**: maximum length without rotation

Lw and Lt refer to drivelines with a maximum speed of 1000 min^{-1}, except those marked with *, that refer to a 540 min^{-1} maximum speed. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Length



free rotation

L	Lw	Lt	Ls	Length code
mm	mm	mm	mm	
360	- -	- -	- -	036
410	468	538	595	041
460	568	638	691	046
510	668	738	779	051
560	765	832	866	056
610	840	946	954	061
660	914	999	1041	066
710	990	1082	1129	071
760	1065	1166	1216	076
810	1140	1249	1304	081
860	1215	1332	1391	086
910	1290	1416	1479	091
1010	1440	1582	1654	101
1110	1590	* 1749	1829	111
1210	* 1740	* 1916	2004	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

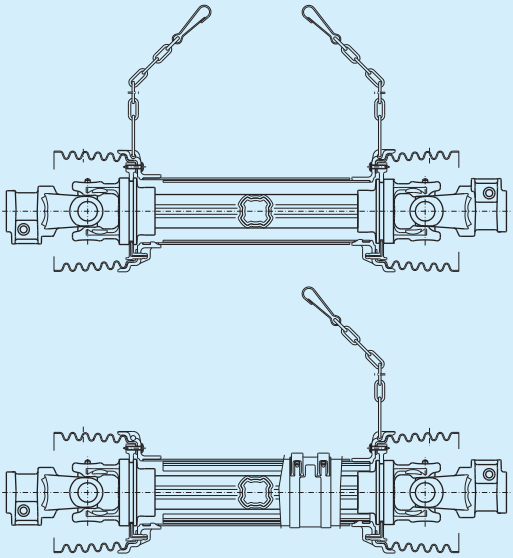
Ls: maximum length without rotation

Lw and Lt refer to drivelines with a maximum speed of 1000 min^{-1}, except those marked with *, that refer to a 540 min^{-1} maximum speed. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains



Two restraint chains*

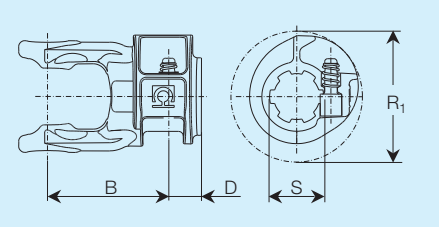
Single Chain system:
single chain on implement side*

Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with "S" hook. To have chain fitted with the Spring Link system, which permits reattachment without replacing complete chain, add letter "Z" to the driveline code (see chapter 10 - *Safety Shields*).

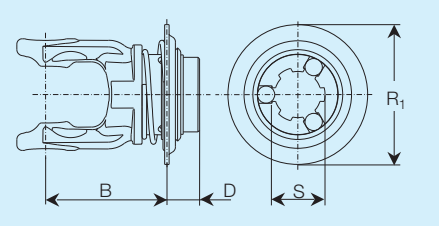
Yokes for single cardan joint

Push-pin yokes

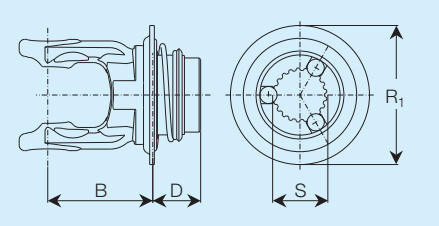


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	78	21	85	007	5070C0355
1 3/8" Z21	70	29	85	008	5070C3755
D8x32x38	78	21	85	093	5070C2151

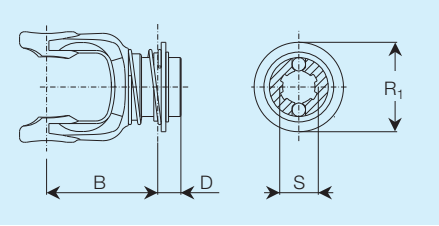
RT Ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	78	21	90	R07	5720C0355



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z21	68	31	90	R08	5720C3776



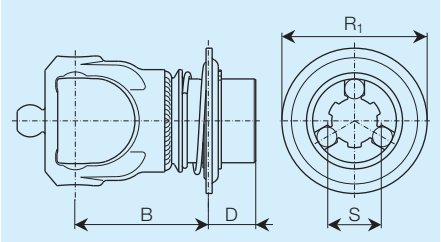
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
21 UNI221	71	16	58	R01	5050C0951

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

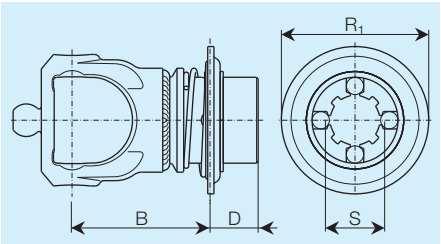
Size S2

Yokes for 80° CV joint

RT ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	87	31	95	WR7	5730C0377
1 3/8" Z21	87	31	95	WR8	5730C3789

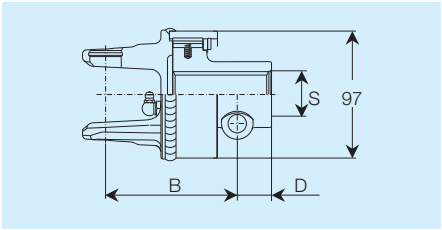


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	89	31	95	WR6	5730C2175

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning clutches

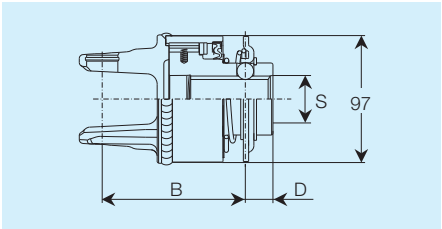
RA1



S	B mm	D mm	Code RA1	Spare part code
1 3/8" Z6	100	21	096	601102701R
1 3/8" Z21	100	21	631	601102702R

Maximum recommended torque: 2400 Nm

RL1 (Permanent lubrication)



S	B mm	D mm	Code RL1	Spare part code
1 3/8" Z6	109	21	0A0	60150C401R
1 3/8" Z21	109	21	0A1	60150C402R

Maximum recommended torque: 2400 Nm

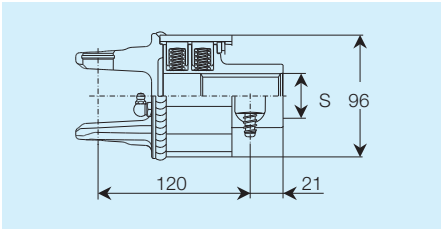
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S2

Ratchet torque limiters (one-way)

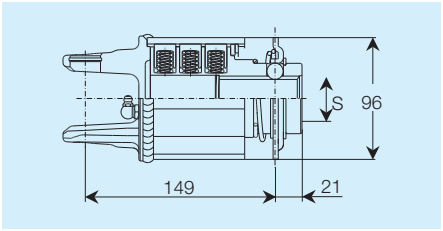
SA2



Setting Nm	S	Code SA2	Spare part code
650	1 3/8" Z6	128	611234005R
800	1 3/8" Z6	136	611239001R

Maximum recommended speed 700 min^{-1}

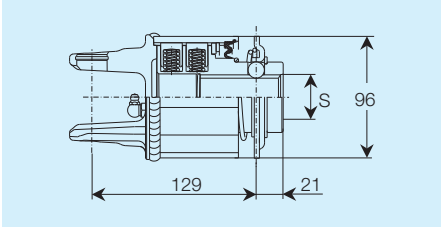
SA3



Setting Nm	S	Code SA3	Spare part code
900	1 3/8" Z6	153	611341501R
1000	1 3/8" Z6	156	611344501R
1200	1 3/8" Z6	159	611348501R

Maximum recommended speed 700 min^{-1}

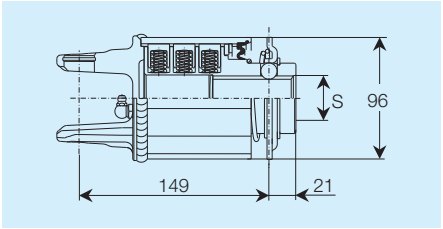
LC2 (Seasonal lubrication)



Setting Nm	S	Code LC2	Spare part code
650	1 3/8" Z6	0G7	60D2C3403R
800	1 3/8" Z6	0G9	60D2C3903R

Maximum recommended speed 7 00 min^{-1}

LC3 (Seasonal lubrication)



Setting Nm	S	Code LC3	Spare part code
900	1 3/8" Z6	0H1	60D3C4103R
1000	1 3/8" Z6	0H2	60D3C4403R
1200	1 3/8" Z6	0H4	60D3C4803R

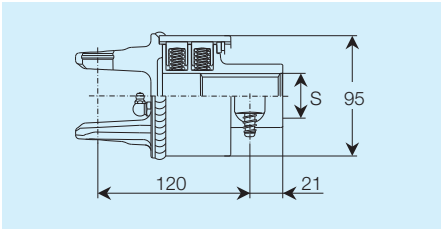
Maximum recommended speed 700 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Ratchet torque limiters (symmetrical)

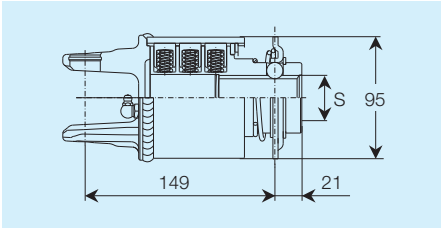
LN2



Setting Nm	S	Code LN2	Spare part code
600	1 3/8" Z6	0E9	60A2C3203R

Maximum recommended speed 700 min^{-1}

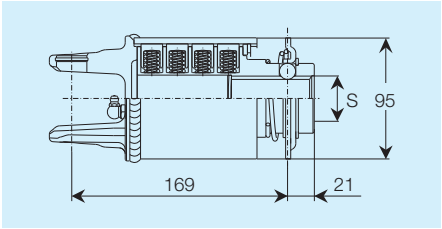
LN3



Setting Nm	S	Code LN3	Spare part code
800	1 3/8" Z6	0F3	60B3C3903R
900	1 3/8" Z6	0F4	60B3C4103R

Maximum recommended speed 700 min^{-1}

LN4



Setting Nm	S	Code LN4	Spare part code
1000	1 3/8" Z6	0F7	60B4C4403R
1200	1 3/8" Z6	0F9	60B4C4803R

Maximum recommended speed 700 min^{-1}

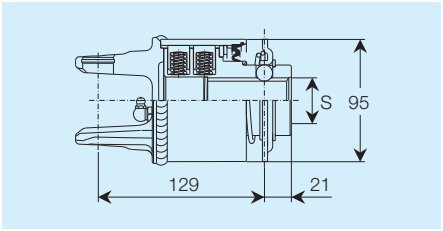
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S2

Ratchet torque limiters, symmetrical

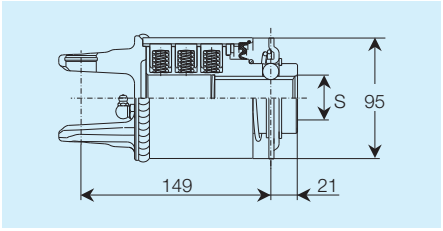
LT2 (Seasonal lubrication)



Setting Nm	S	Code LT2	Spare part code
600	1 3/8" Z6	0L9	60F2C3203R

Maximum recommended speed 700 min^{-1}

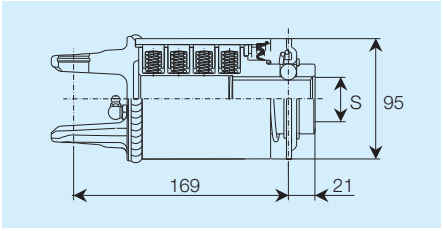
LT3 (Seasonal lubrication)



Setting Nm	S	Code LT3	Spare part code
800	1 3/8" Z6	0M3	60F3C3903R
900	1 3/8" Z6	0M4	60F3C4103R

Maximum recommended speed 700 min^{-1}

LT4 (Seasonal lubrication)



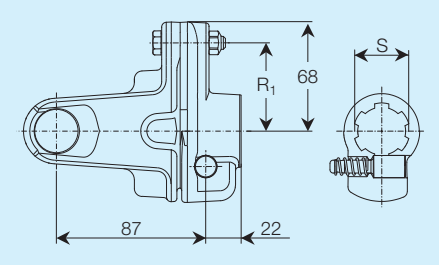
Setting Nm	S	Code LT4	Spare part code
1000	1 3/8" Z6	0M7	60F4C4403R
1200	1 3/8" Z6	0M9	60F4C4803R

Maximum recommended speed 7 00 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
950^	1 3/8" Z6	55	098	6060C0302R
	1 3/8" Z21		161	6060C3702R
1050	1 3/8" Z6	60	1R1	6060C0308R
	1 3/8" Z21		1S1	6060C3704R
			Bolt M6 x 40 cl 8.8.	
1250	1 3/8" Z6	40	1R2	6060C0301R
	1 3/8" Z21		1S2	6060C3701R
			Bolt M8 x 45 cl 8.8.	

^ Maximum recommended setting for Free Rotation profile tubes

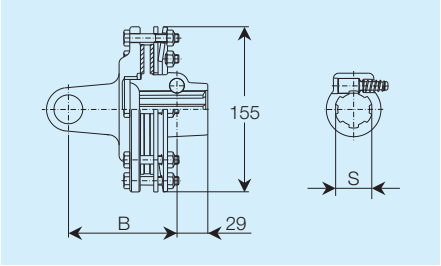
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S2

Friction torque limiter, adjustable setting

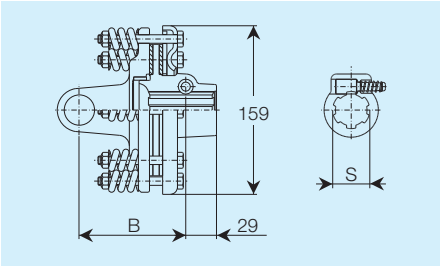
FV22



Setting Nm	B mm	S	Code FV22	Spare part code
500	100	1 3/8" Z6	N00	661C28103R
	100	1 3/8" Z21	N03	661C28137R
*600	100	1 3/8" Z6	N07	661C32103R
	100	1 3/8" Z21	N10	661C32137R
800	100	1 3/8" Z6	N08	661C39103R
	100	1 3/8" Z21	N11	661C39137R

* Maximum recommended speed 1000 min^{-1}

FFV22



Setting Nm	B mm	S	Code FFV22	Spare part code
500	100	1 3/8" Z6	0R2	635C28103R
	100	1 3/8" Z21	0R7	635C28137R
*600	100	1 3/8" Z6	0R3	635C32103R
	100	1 3/8" Z21	0R8	635C32137R
800	100	1 3/8" Z6	0R4	635C39103R
	100	1 3/8" Z21	0R9	635C39137R

* Maximum recommended speed 1000 min^{-1}

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

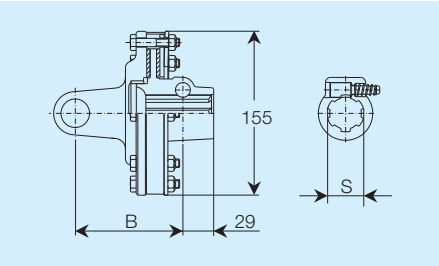
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

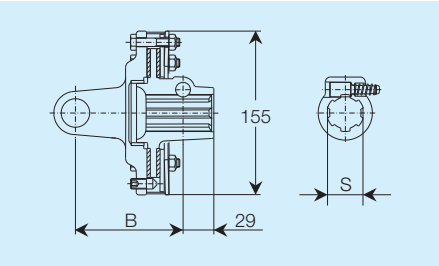
FT22



Setting Nm	B mm	S	Code FT22	Spare part code
500	100	1 3/8" Z6	Q00	663C28103R
	100	1 3/8" Z21	Q02	663C28137R
*600	100	1 3/8" Z6	Q06	663C32103R
	100	1 3/8" Z21	Q09	663C32137R
800	100	1 3/8" Z6	Q07	663C39103R
	100	1 3/8" Z21	Q10	663C39137R

* Maximum recommended speed 1000 min^{-1}

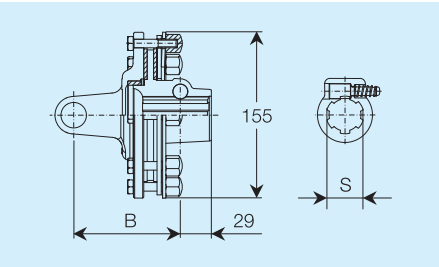
FT22R with Release System



Setting Nm	B mm	S	Code FT22R	Spare part code
500	100	1 3/8" Z6	H00	663C28A03R
	100	1 3/8" Z21	H02	663C28A37R
*600	100	1 3/8" Z6	H06	663C32A03R
	100	1 3/8" Z21	H09	663C32A37R
800	100	1 3/8" Z6	H07	663C39A03R
	100	1 3/8" Z21	H10	663C39A37R

* Maximum recommended speed 1000 min^{-1}

FK22



Setting Nm	B mm	S	Code FK22	Spare part code
500	100	1 3/8" Z6	7A1	60KC28103R
	100	1 3/8" Z21	7A5	60KC28137R
*600	100	1 3/8" Z6	7A2	60KC32103R
	100	1 3/8" Z21	7A6	60KC32137R
800	100	1 3/8" Z6	7A3	60KC39103R
	100	1 3/8" Z21	7A7	60KC39137R

* Maximum recommended speed 1000 min^{-1}

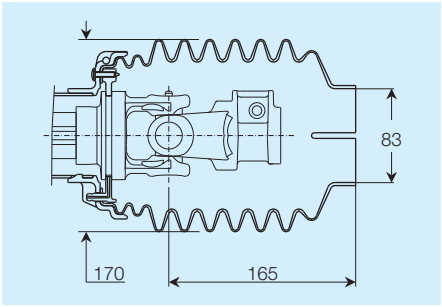
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

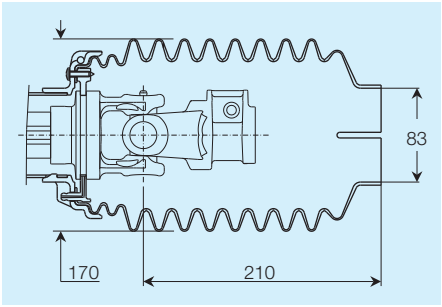
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S2

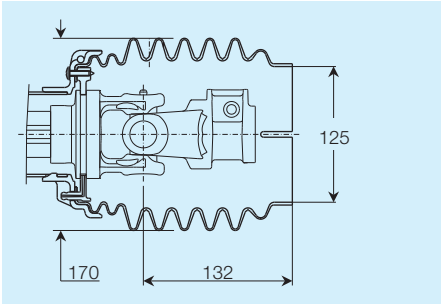
Optional shield cones



Extended shield cone, medium length, wide diameter
- Tractor end.....P
- Implement end.....M



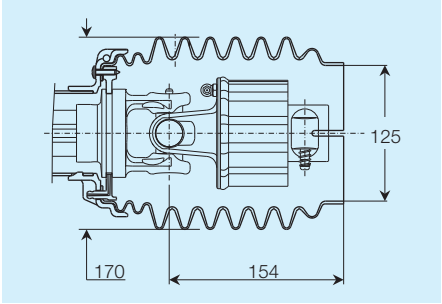
Extended shield cone, long length, narrow diameter
- Tractor end.....N
- Implement end.....L



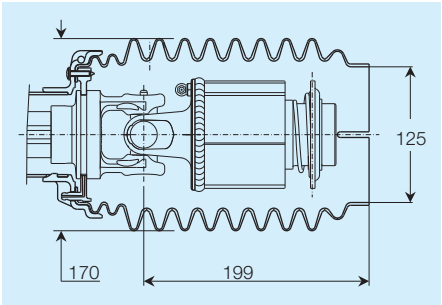
Extended shield cone, short length, wide diameter
- Tractor end.....F
- Implement end.....H

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Optional shield cones

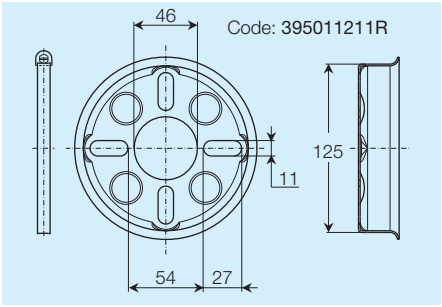


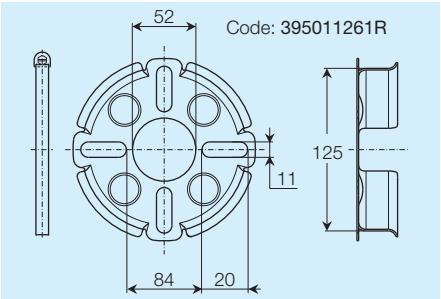
Extended shield cone, medium length, wide diameter
- Tractor end.....R
- Implement end .....T



Extended shield cone, long length, wide diameter
- Tractor end.....V
- Implement end .....Y

Plates and clamps for optional extended shield cones



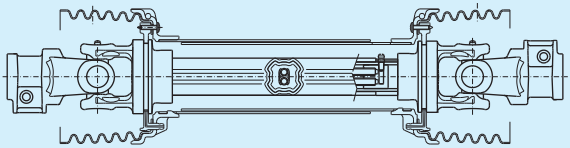


Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System code
G

Codes for size S2 drivelines

1
C

C: Standard SFT cardan joint driveline

2 3
S 2

Size S2

4

Telescoping Members
See page S2.4 - S2.5 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page S2.6 - S2.7 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page S2.8 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S2.8 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint or 80° CV), and establishes the associated shields and attachment to PTO.

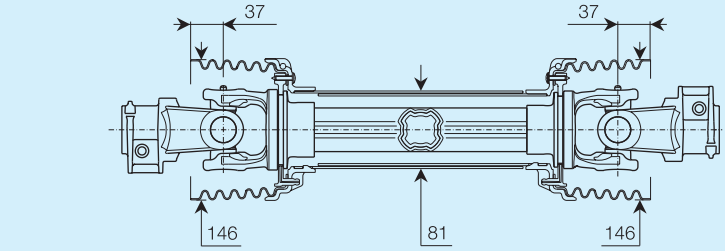
13 14 15

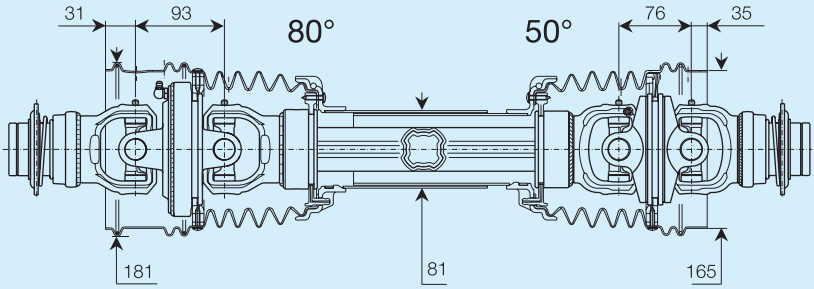
Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft

16 17 18

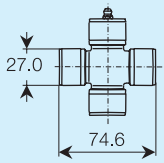
Only use these positions of the code if requesting optional shield cones, Spring Link chains (see chapter 10 - *Safety Shields*), and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.



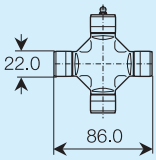


Single Cardan Joint



4120E0012

80° and 50° Constant Velocity Joint



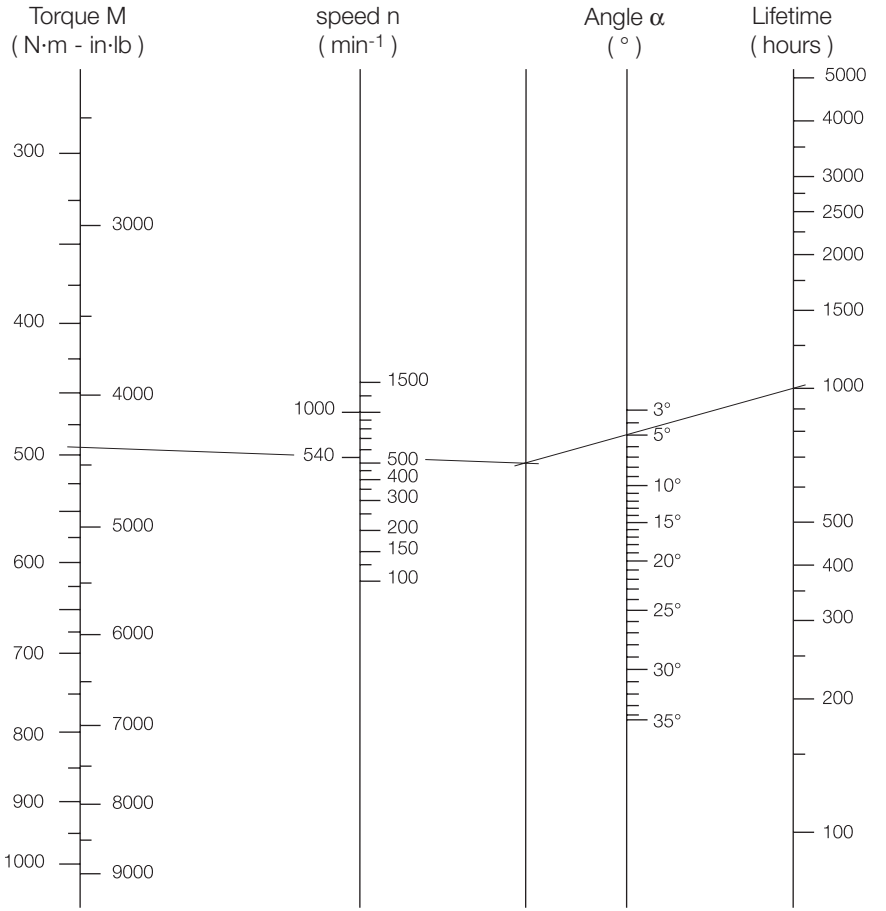
4120E0051

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S4	494	4376	28	38	400	3545	42	57

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size S4

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 494 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.
The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.
Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.
Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size S4, torque M = 494 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.
If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.
The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

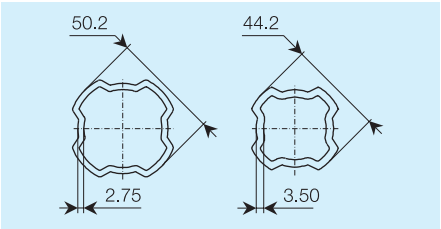
L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

Example: M_{50} = 494 Nm is the theoretical transmittable torque for a cardan driveline size S4, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.
For a lower transmitted torque, i.e. M = 422 Nm, M_{50} / M ratio is 494 / 422 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S4

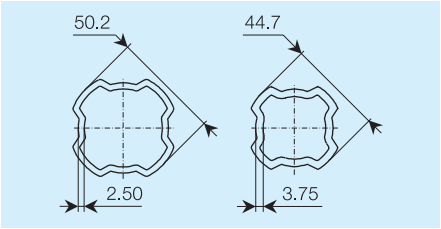
Telescoping Members

Four-Tooth profile tubes



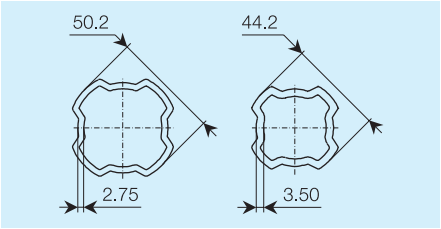
Mmax (Nm)	2200
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



Mmax (Nm)	2200
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube

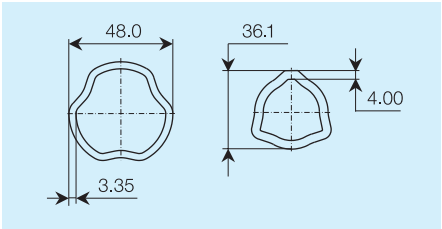


Mmax (Nm)	2200
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (M) ratio

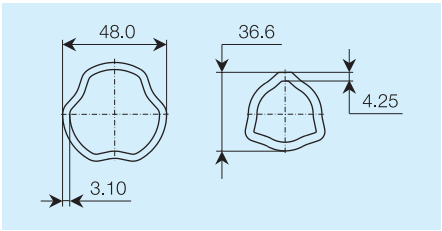
Telescoping Members

Free Rotation profile tubes



Mmax (Nm)	2000
T/M (N/Nm)	6 - 8
Code	F

Free Rotation profile tubes with Rilsan® coated inner tube

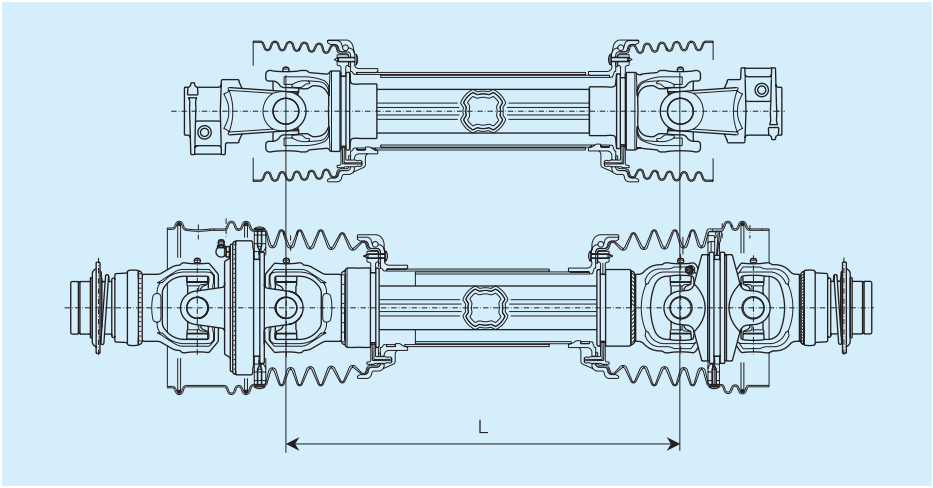


Mmax (Nm)	2000
T/M (N/Nm)	3 - 4
Code	G

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (M) ratio

Size S4

Length



Standard

Maximum Extension

L	Lw	Lt	Ls	Lw	Lt	Ls	Length code
mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	036
410	495	545	581	555	581	581	041
460	595	645	673	655	681	681	046
510	677	733	761	737	781	781	051
560	752	816	848	812	876	881	056
610	827	900	936	887	960	981	061
660	902	986	1023	962	1043	1081	066
710	977	1066	1111	- -	- -	- -	071
760	1052	1150	1198	- -	- -	- -	076
810	1127	1233	1286	- -	- -	- -	081
860	1202	1316	1373	- -	- -	- -	086
910	1277	1400	1461	- -	- -	- -	091
1010	1427	1566	1336	- -	- -	- -	101
1110	1577	1733	1811	- -	- -	- -	111
1210	1727	1900	1986	- -	- -	- -	121

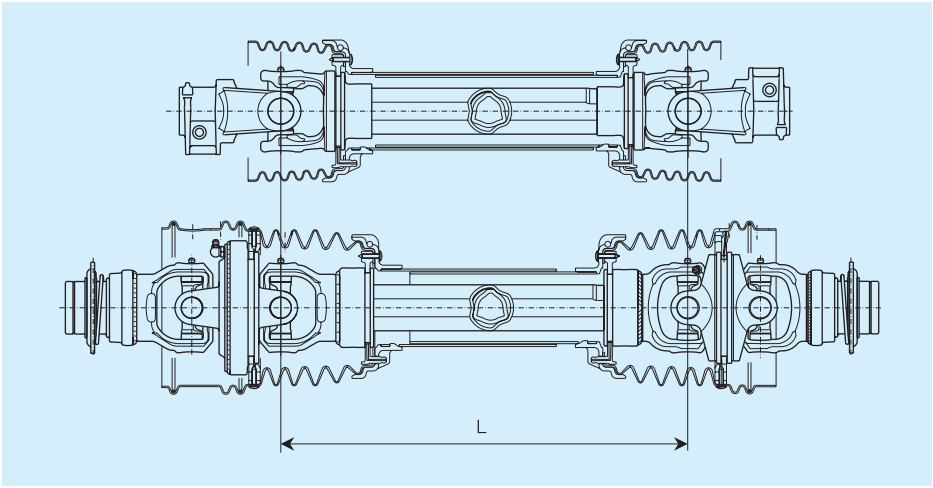
Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

Lw and Lt refer to drivelines with a maximum speed of 1000 min^{-1}.
Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Length



free rotation

L	Lw	Lt	Ls	Length code
mm	mm	mm	mm	
360	- -	- -	- -	036
410	449	519	579	041
460	549	619	677	046
510	649	719	765	051
560	749	819	852	056
610	831	903	940	061
660	906	987	1027	066
710	981	1070	1115	071
760	1056	1153	1202	076
810	1131	1237	1290	081
860	1206	1320	1377	086
910	1281	1403	1465	091
1010	1431	1570	1640	101
1110	1581	1737	1815	111
1210	1731	* 1903	1990	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

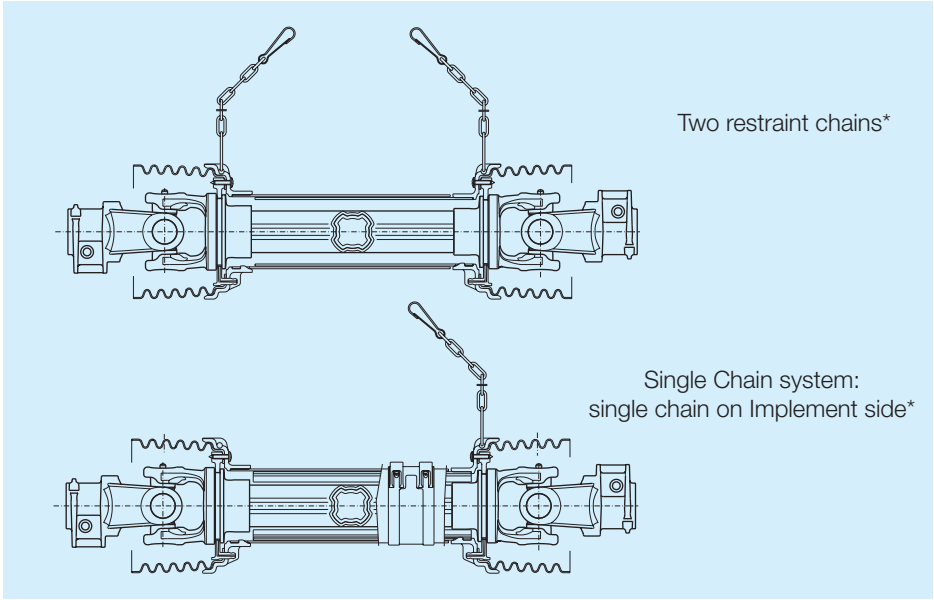
Lw and Lt refer to drivelines with a maximum speed of 1000 min^{-1}, except those marked with *, that refer to a 540 min^{-1} maximum speed. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S4

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

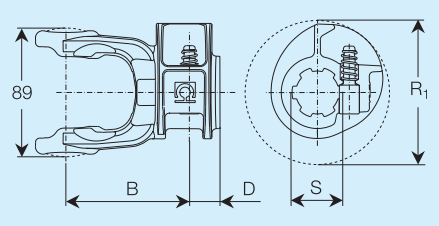


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with "S" hook. To have chain fitted with the Spring Link system, which permits reattachment without replacing complete chain, add letter "Z" to the driveline code (see chapter 10 - *Safety Shields*).

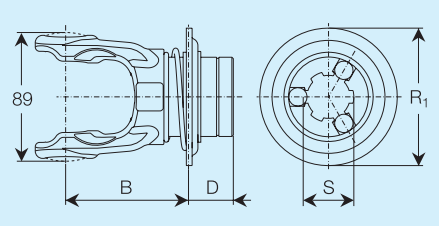
Yokes for single cardan joint

Yokes for single cardan joint

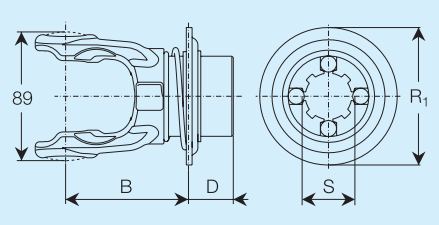


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	85	21	100	007	5070E0355
1 3/8" Z21	77	29	100	008	5070E3755
D8x32x38	85	21	100	093	5070E2151

RT Ball collar yokes

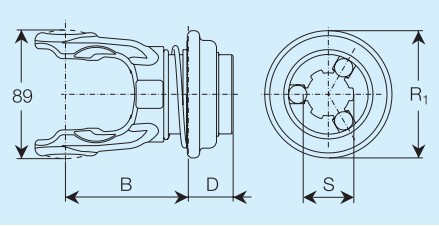


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	85	31	95	R07	5720E0355
1 3/8" Z21	85	31	95	R08	5720E3755



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	85	31	95	R93	5720E2151

RTA Automatic ball collar yokes



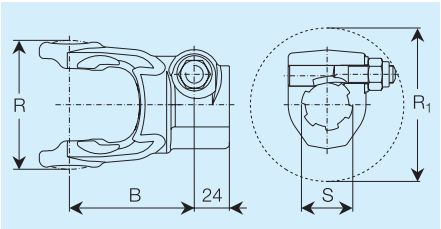
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	85	31	88	0Q7	5720E0361
1 3/8" Z21	85	31	88	0Q8	5720E3761

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S4

Yokes for single cardan joint

Taper-pin yokes for shafts with counter-clockwise rotation



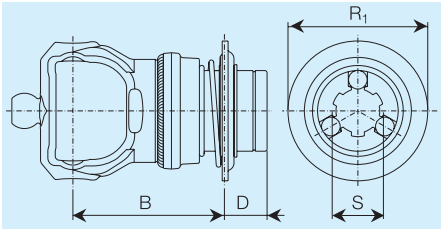
S	R mm	B mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	89	85	105	**014**	**5090E0360**
1 3/8" Z21	89	85	105	**015**	**5090E3760**

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

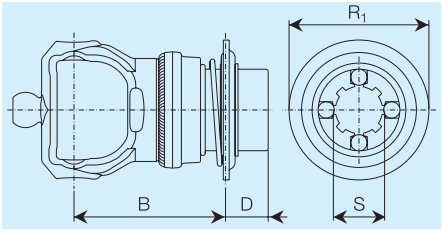
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Yokes for 80° CV joint

RT Ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE

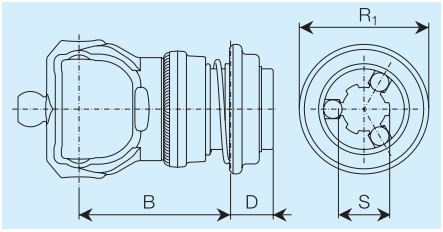


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	103	29	95	WR7	5730E0384
1 3/8" Z21	91	40	95	WR8	5730E3784
1 3/4" Z6	109	40	120	WR9	5730E0484
1 3/4" Z20	109	40	120	WR0	5730E3884



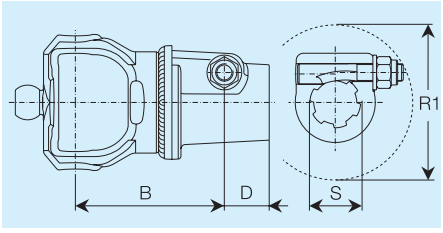
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	103	29	95	WR6	5730E2184

RTA Automatic ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	103	29	88	WQ7	5730E0391
1 3/8" Z21	91	40	88	WQ8	5730E3791
1 3/4" Z6	109	40	110	WQ9	5730E0491
1 3/4" Z20	109	40	110	WQ0	5730E3891

Taper-pin yokes for shafts with counter-clockwise rotation



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	103	31	106	W14	5110E0361
1 3/8" Z21	91	31	106	W15	5110E3761

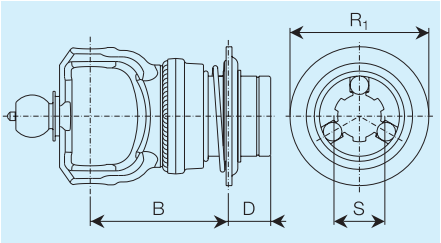
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

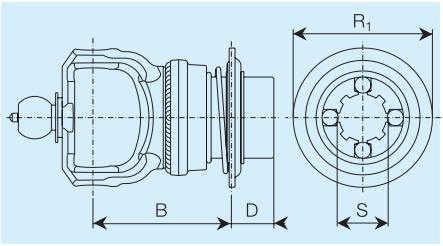
Size S4

Yokes for 50° CV joint

RT Ball collar yokes

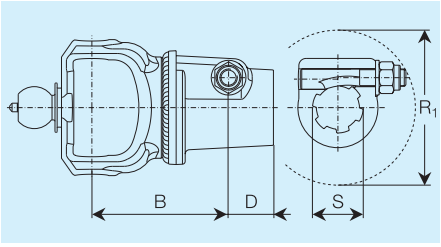


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	95	29	95	KR7	5730E0353
1 3/8" Z21	82	40	95	KR8	5730E3753
1 3/4" Z6	100	40	120	KR9	5730E0453
1 3/4" Z20	100	40	120	KR0	5730E3853



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	95	29	95	KR6	5730E2153

Taper-pin yokes for shafts with counter-clockwise rotation



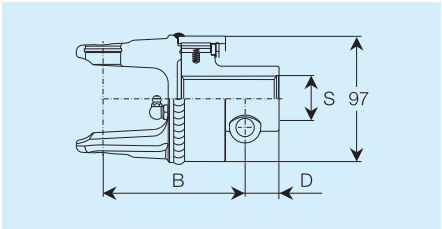
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	95	31	106	K14	5190E0352
1 3/8" Z21	82	31	106	K15	5190E3752

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning clutches

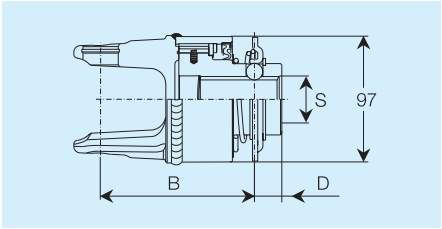
RA1



S	B mm	D mm	Code RA1	Spare part code
1 3/8" Z6	109	21	096	601104701R
1 3/8" Z21	109	21	631	601104702R

Maximum recommended torque: 2400 Nm

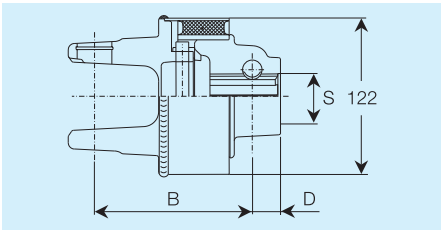
RL1 (Permanent lubrication)



S	B mm	D mm	Code RL1	Spare part code
1 3/8" Z6	118	21	0A0	60150E401R
1 3/8" Z21	118	21	0A1	60150E402R

Maximum recommended torque: 2400 Nm

GE Torsionally resilient joints
GE4



65 Shore S	B mm	D mm	Code GE4	Spare part code
1 3/8" Z6	123	22	0D4	608E46501R
1 3/8" Z21	123	22	0D5	608E46502R

Torque at recommended maximum deformation (±20°)
M20° = 1700 Nm

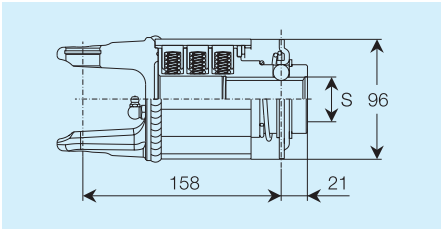
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S4

Ratchet torque limiters, one-way

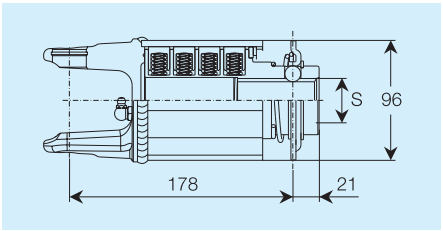
SA3



Setting Nm	S	Code SA3	Spare part code
1000	1 3/8" Z6	156	613344501R
1200	1 3/8" Z6	159	613348501R

Maximum recommended speed 700 min^{-1}.

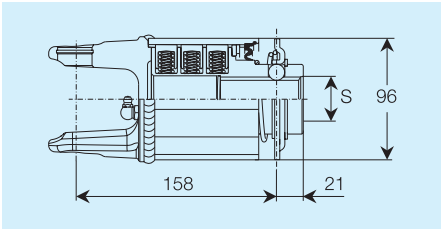
SA4



Setting Nm	S	Code SA4	Spare part code
1400	1 3/8" Z6	168	613452501R
1600	1 3/8" Z6	170	613456501R

Maximum recommended speed 700 min^{-1}.

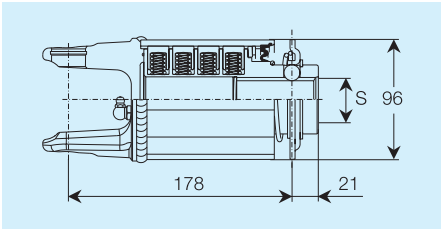
LC3 (Seasonal lubrication)



Setting Nm	S	Code LC3	Spare part code
1000	1 3/8" Z6	0H2	60D3E4403R
1200	1 3/8" Z6	0H4	60D3E4803R

Maximum recommended speed 700 min^{-1}.

LC4 (Seasonal lubrication)



Setting Nm	S	Code LC4	Spare part code
1400	1 3/8" Z6	0H7	60D4E5203R
1600	1 3/8" Z6	0H9	60D4E5603R

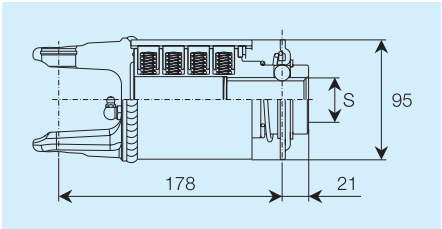
Maximum recommended speed 700 min^{-1}.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Symmetrical ratchet torque limiters

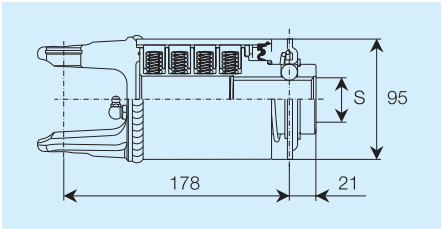
LN4



Setting Nm	S	Code LN4	Spare part code
1000	1 3/8" Z6	0F7	60B4E4403R
1200	1 3/8" Z6	0F9	60B4E4803R

Maximum recommended speed 700 min^{-1}.

LT4 (Seasonal lubrication)



Setting Nm	S	Code LT4	Spare part code
1000	1 3/8" Z6	0M7	60F4E4403R
1200	1 3/8" Z6	0M9	60F4E4803R

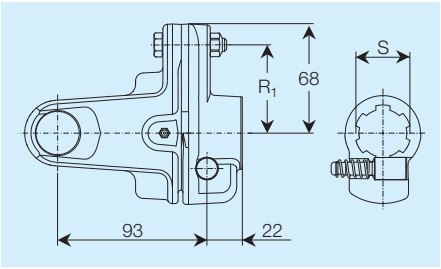
Maximum recommended speed 700 min^{-1}.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S4

LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
1400	1 3/8" Z6	45	1R0	6060E0303R
	1 3/8" Z21		1S0	6060E3704R
1700^	1 3/8" Z6	55	098	6060E0302R
	1 3/8" Z21		161	6060E3702R
				Bolt M8 x 45 cl 8.8.
2000	1 3/8" Z6	43	1R2	6060E0309R
	1 3/8" Z21		1S2	6060E3711R
				Bolt M10 x 50 cl 8.8.

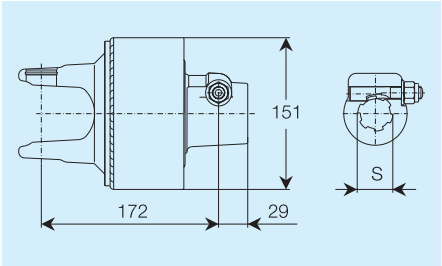
^ Maximum recommended setting for Free Rotation profile tubes

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

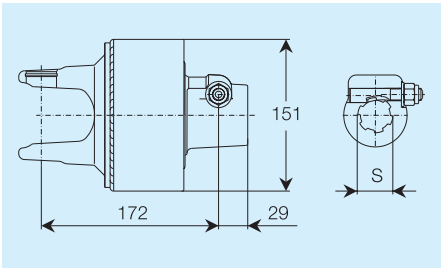
Automatic torque limiters

LR23
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
1200	1 3/8" Z6	00B	6WE148003R
	1 3/8" Z21	06B	6WE148037R
	1 3/4" Z6	70B	6WE148004R
	1 3/4" Z20	80B	6WE148038R
1500	1 3/8" Z6	02B	6WE154003R
	1 3/8" Z21	08B	6WE154037R
	1 3/4" Z6	72B	6WE154004R
	1 3/4" Z20	82B	6WE154038R
1700	1 3/8" Z6	17A	6WE157003R
	1 3/8" Z21	22A	6WE157037R
	1 3/4" Z6	73B	6WE157004R
	1 3/4" Z20	83B	6WE157038R

LR23
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Setting Nm	S	Code LR23	Spare part code
*1200	1 3/8" Z6	00C	6WEA48003R
	1 3/8" Z21	05C	6WEA48037R
	1 3/4" Z6	10C	6WEA48004R
	1 3/4" Z20	15C	6WEA48038R
1500	1 3/8" Z6	01C	6WEA54003R
	1 3/8" Z21	06C	6WEA54037R
	1 3/4" Z6	11C	6WEA54004R
	1 3/4" Z20	16C	6WEA54038R
1700	1 3/8" Z6	02C	6WEA57003R
	1 3/8" Z21	07C	6WEA57037R
	1 3/4" Z6	12C	6WEA57004R
	1 3/4" Z20	17C	6WEA57038R

Maximum recommended speed 1000 min^{-1}

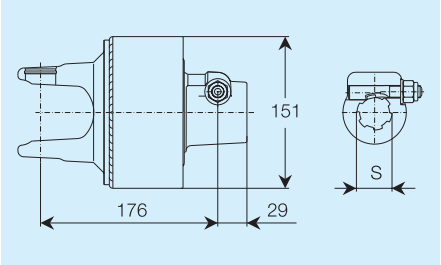
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S4

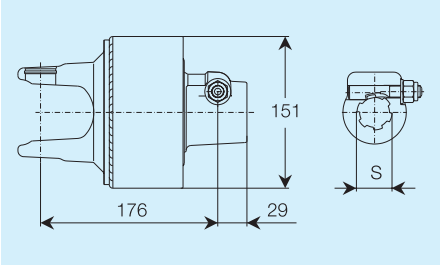
Automatic torque limiters

LR23 with overrunning clutch
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
1200	1 3/8" Z6	50B	6WE848003R
	1 3/8" Z21	60B	6WE848037R
1500	1 3/8" Z6	52B	6WE854003R
	1 3/8" Z21	62B	6WE854037R
1700	1 3/8" Z6	53B	6WE857003R
	1 3/8" Z21	63B	6WE857037R

LR23 with overrunning clutch
* for use at 1000 min^{-1}



Setting Nm	S	Code LR23	Spare part code
*1200	1 3/8" Z6	25C	6WEC48003R
	1 3/8" Z21	30C	6WEC48037R
1500	1 3/8" Z6	26C	6WEC54003R
	1 3/8" Z21	31C	6WEC54037R
1700	1 3/8" Z6	27C	6WEC57003R
	1 3/8" Z21	32C	6WEC57037R

Maximum recommended speed 1000 min^{-1}

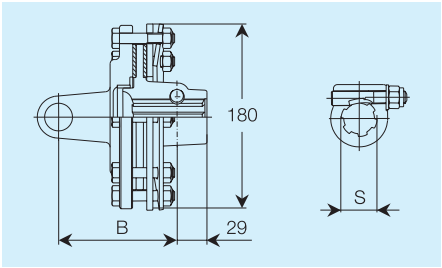
* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, adjustable setting

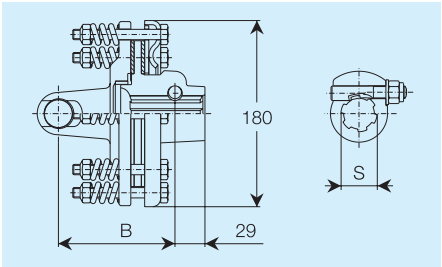
FV32



Setting Nm	B mm	S	Code FV32	Spare part code
*900	113	1 3/8" Z6	N14	661E41203R
	113	1 3/8" Z21	N17	661E41237R
1000	113	1 3/8" Z6	N31	661E44203R
	113	1 3/8" Z21	N33	661E44237R
1100	113	1 3/8" Z6	N12	661E46203R
	113	1 3/8" Z21	N15	661E46237R

*Maximum recommended setting fo 1000 min^{-1}

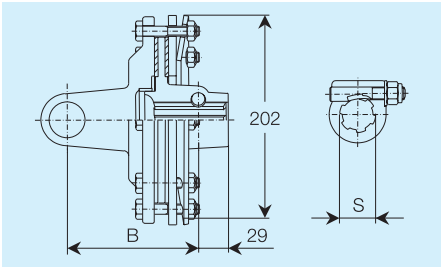
FFV32



Setting Nm	B mm	S	Code FFV32	Spare part code
*900	113	1 3/8" Z6	0S1	635E41203R
	113	1 3/8" Z21	0S6	635E41237R
1000	113	1 3/8" Z6	0S2	635E44203R
	113	1 3/8" Z21	0S7	635E44237R
1100	113	1 3/8" Z6	0S3	635E46203R
	113	1 3/8" Z21	0S8	635E46237R

*Maximum recommended setting fo 1000 min^{-1}

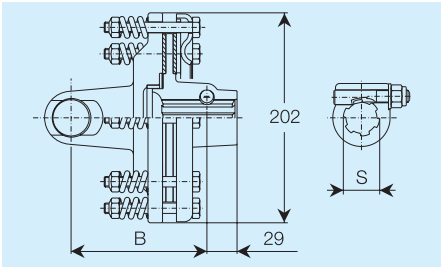
FV42



Setting Nm	B mm	S	Code FV42	Spare part code
*1200	113	1 3/8" Z6	N20	661E48403R
	113	1 3/8" Z21	N23	661E48437R
	118	1 3/4" Z6	N26	661E48404R
	118	1 3/4" Z20	N29	661E48438R
1350	113	1 3/8" Z6	N35	661E51403R
	113	1 3/8" Z21	N37	661E51437R
	118	1 3/4" Z6	N0A	661E51404R
	118	1 3/4" Z20	N0D	661E51438R

*Maximum recommended setting fo 1000 min^{-1}

FFV42



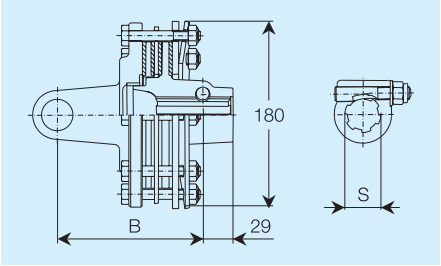
Setting Nm	B mm	S	Code FFV42	Spare part code
*1200	113	1 3/8" Z6	0Z1	635E48403R
	113	1 3/8" Z21	0Z6	635E48437R
	118	1 3/4" Z6	0Y1	635E48404R
	118	1 3/4" Z20	0Y6	635E48438R
1350	113	1 3/8" Z6	0Z2	635E51403R
	113	1 3/8" Z21	0Z7	635E51437R
	118	1 3/4" Z6	0Y2	635E51404R
	118	1 3/4" Z20	0Y7	635E51438R

*Maximum recommended setting fo 1000 min^{-1}

Size S4

Friction torque limiter, adjustable setting

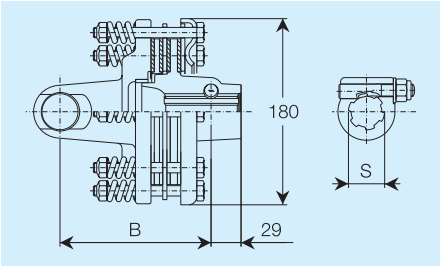
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
*1200	129	1 3/8" Z6	N45	661E48303R
	129	1 3/8" Z21	N51	661E48337R
	134	1 3/4" Z6	N57	661E48304R
	134	1 3/4" Z20	N63	661E48338R
1350	129	1 3/8" Z6	N46	661E51303R
	129	1 3/8" Z21	N52	661E51337R
	134	1 3/4" Z6	N58	661E51304R
	134	1 3/4" Z20	N64	661E51338R

*Maximum recommended setting fo 1000 min^{-1}

FFV34



Setting Nm	B mm	S	Code FFV34	Spare part code
*1200	129	1 3/8" Z6	0T1	635E48303R
	129	1 3/8" Z21	0T8	635E48337R
	134	1 3/4" Z6	0U5	635E48304R
	134	1 3/4" Z20	0V2	635E48338R
1350	129	1 3/8" Z6	0T2	635E51303R
	129	1 3/8" Z21	0T9	635E51337R
	134	1 3/4" Z6	0U6	635E51304R
	134	1 3/4" Z20	0V3	635E51338R

*Maximum recommended setting fo 1000 min^{-1}

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

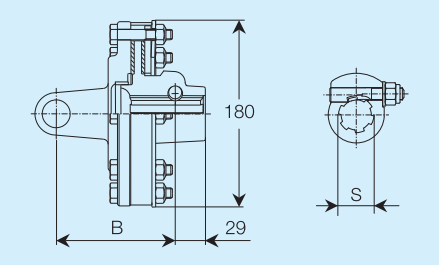
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

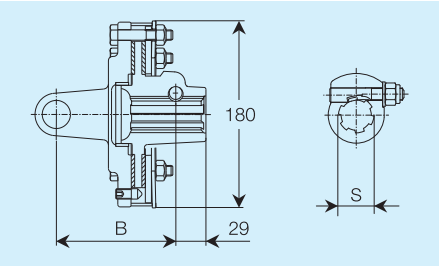
FT32



Setting Nm	B mm	S	Code FT32	Spare part code
*900	113	1 3/8" Z6	Q11	663E41203R
	113	1 3/8" Z21	Q16	663E41237R
1000	113	1 3/8" Z6	Q14	663E44203R
	113	1 3/8" Z21	Q19	663E44237R
1100	113	1 3/8" Z6	Q15	663E46203R
	113	1 3/8" Z21	Q20	663E46237R

*Maximum recommended setting fo 1000 min^{-1}

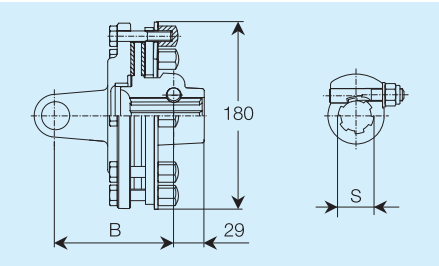
FT32R with Release System



Setting Nm	B mm	S	Code FT32R	Spare part code
*900	113	1 3/8" Z6	H11	663E41C03R
	113	1 3/8" Z21	H16	663E41C37R
1000	113	1 3/8" Z6	H14	663E44C03R
	113	1 3/8" Z21	H19	663E44C37R
1100	113	1 3/8" Z6	H15	663E46C03R
	113	1 3/8" Z21	H20	663E46C37R

*Maximum recommended setting fo 1000 min^{-1}

FK32



Setting Nm	B mm	S	Code FK32	Spare part code
*900	113	1 3/8" Z6	7A8	60KE41203R
	113	1 3/8" Z21	7C1	60KE41237R
1000	113	1 3/8" Z6	7A9	60KE44203R
	113	1 3/8" Z21	7C2	60KE44237R
1100	113	1 3/8" Z6	7C0	60KE46203R
	113	1 3/8" Z21	7C3	60KE46237R

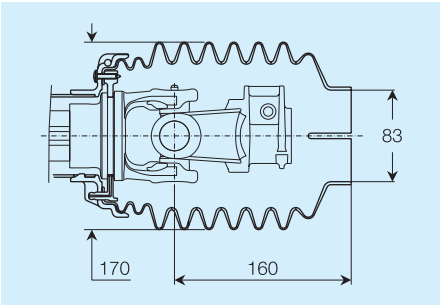
*Maximum recommended setting fo 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

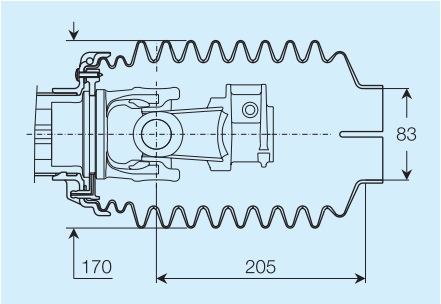
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

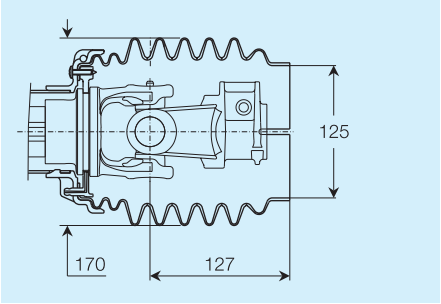
Optional shield cones



Extended shield cone, medium length, narrow diameter
- Tractor end.....P
- Implement end .....M



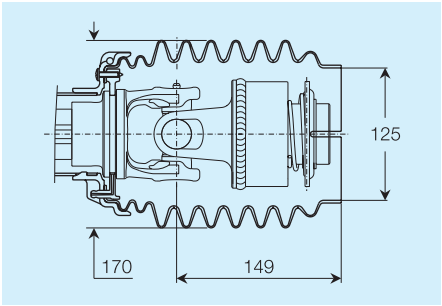
Extended shield cone, long length, narrow diameter
- Tractor end..... N
- Implement end L



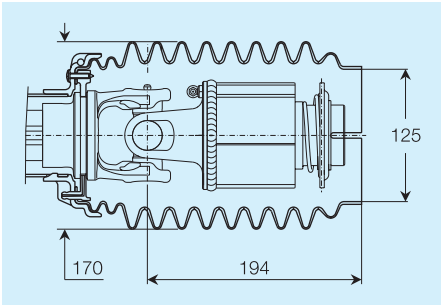
Extended shield cone, short length, wide diameter
- Tractor end.....F
- Implement end ..... H

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Optional Outer Cones

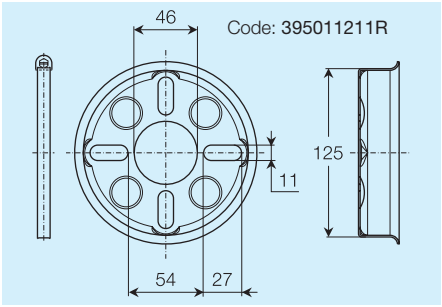


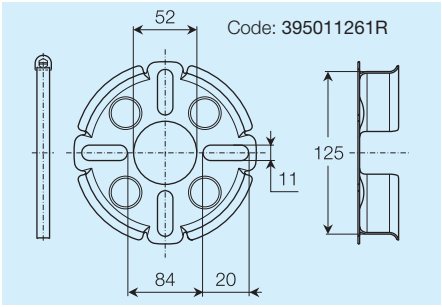
Extended shield cone, medium length wide diameter
- Tractor end .....R
- Implement end .....T



Extended shield cone, long length, wide diameter
- Tractor end.....V
- Implement end .....Y

Plates and clamps for optional extended shield cones



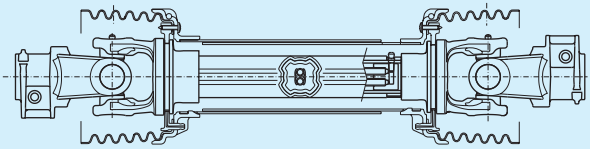


Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System code
G

Code for size S4 drivelines

1 **C**

C: Standard SFT cardan joint driveline

2 3 **S** **4**

Size **S4**

4

Telescoping Members
See pages S4.4 – S4.5 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See pages S4.6 – S4.7 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page S4.8 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S4.8 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint, 80° CV, 50° CV, or splined stub shaft without joint), and establishes the associated shields and attachment to PTO.

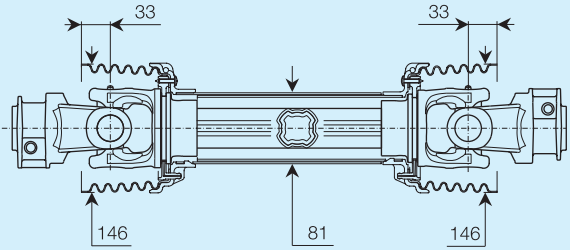
13 14 15

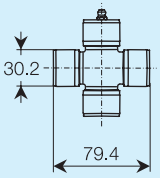
Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft

16 17 18

Only use these positions of the code if requesting optional shield cones, Spring Link chains (see chapter 10 - *Safety Shields*), and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.





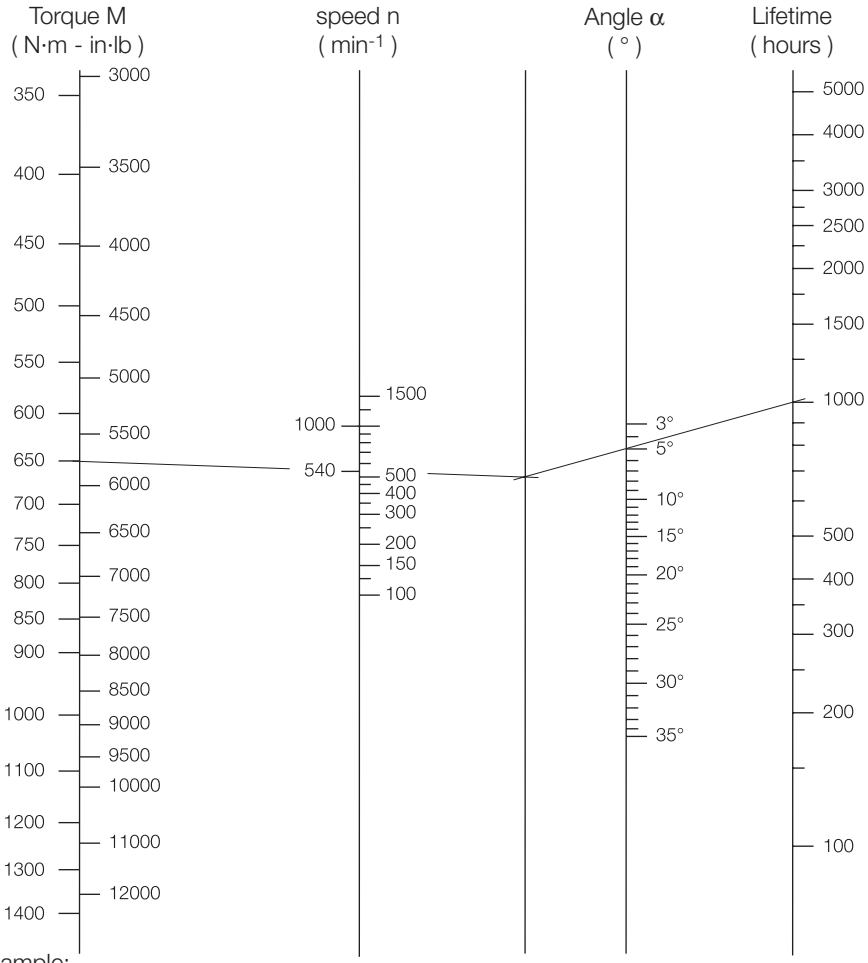
4120G0012

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S5	651	5758	37	50	527	4684	55	75

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size S5

Nomogram to calculate single cardan joint lifetime



Example:

To calculate the life for torque **M** = 651 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed

P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.
The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.
Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.
Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size **S5**, torque M = 651 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.
If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.
The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

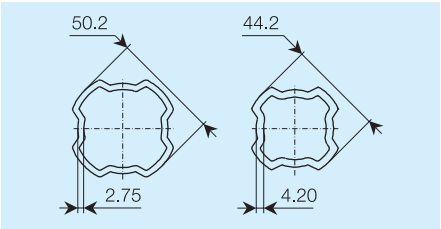
L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

Example: M_{50} = 651 Nm is the theoretical transmittable torque for a cardan driveline size **S5**, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.
For a lower transmitted torque, i.e. M = 556 Nm, M_{50} / M ratio is 651 / 556 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S5

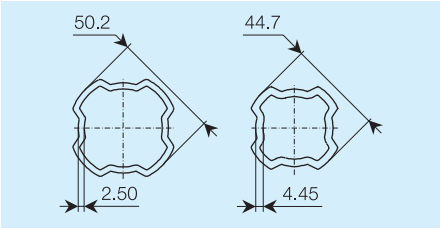
Telescoping Members

Four-Tooth profile tubes



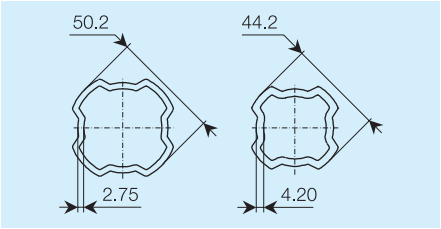
Mmax (Nm)	2500
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



Mmax (Nm)	2500
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

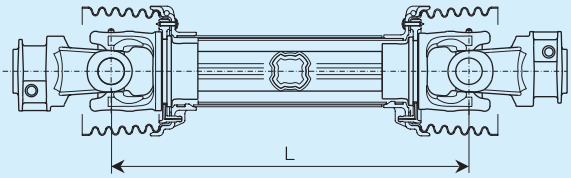
Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	2500
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (M) ratio

Length



Standard

Maximum Extension

L	Lw	Lt	Ls	Lw	Lt	Ls	Length code
mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	518	573	573	041
460	553	613	664	618	673	673	046
510	653	713	752	718	773	773	051
560	746	808	839	811	873	873	056
610	821	892	927	886	957	973	061
660	896	975	1014	961	1040	1073	066
710	971	1058	1102	- -	- -	- -	071
760	1046	1142	1189	- -	- -	- -	076
810	1121	1225	1277	- -	- -	- -	081
860	1196	1308	1364	- -	- -	- -	086
910	1271	1392	1452	- -	- -	- -	091
1010	1421	1558	1627	- -	- -	- -	101
1110	1571	1725	1802	- -	- -	- -	111
1210	1721	1892	1977	- -	- -	- -	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

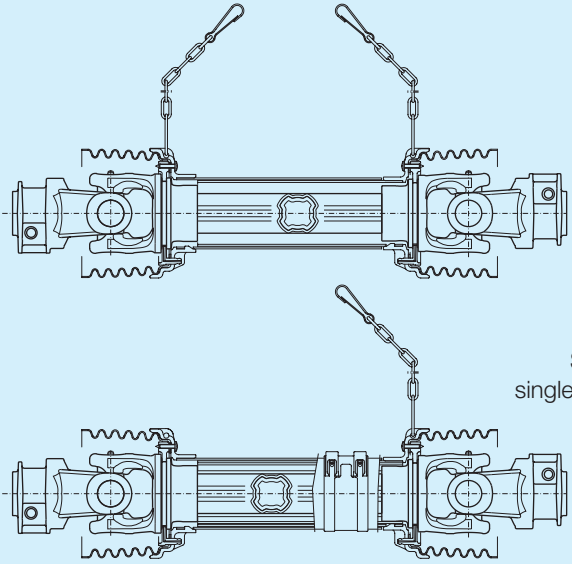
Lw and Lt refer to drivelines with a maximum speed of 1000 min-1, except those marked with *, that refer to a 540 min^{-1} maximum speed. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S5

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains



Two restraint chains*

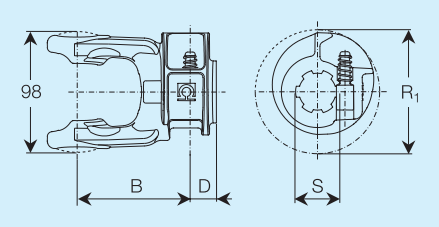
Single Chain system:
single chain on Implement side*

Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with "S" hook. To have chain fitted with the Spring Link system, which permits reattachment without replacing complete chain, add letter "Z" to the driveline code (see *Safety Shields*).

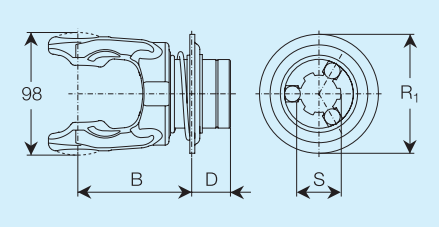
Yokes for single cardan joint

Push-pin yokes

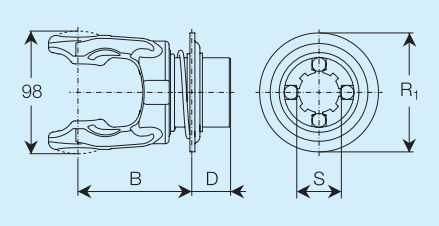


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	91	21	100	007	5070G0355
1 3/8" Z21	83	29	100	008	5070G3755
D8x32x38	91	21	100	093	5070G2151

RT Ball collar yokes

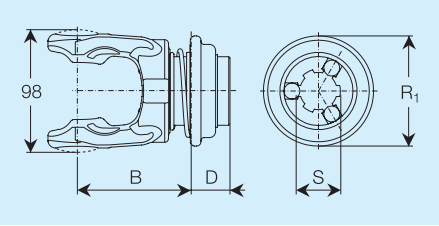


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	91	31	95	R07	5720G0355
1 3/8" Z21	91	31	95	R08	5720G3755
1 3/4" Z6	95	31	120	R09	5720G0455
1 3/4" Z20	95	31	120	R10	5720G3855



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	91	31	95	R93	5720G2151

RTA Automatic ball collar yokes



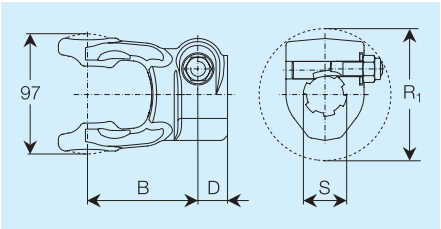
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	91	31	88	0Q7	5720G0361
1 3/8" Z21	91	31	88	0Q8	5720G3761
1 3/4" Z6	95	31	110	0Q9	5720G0461
1 3/4" Z20	95	31	110	0Q0	5720G3861

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S5

Yokes for single cardan joint

Taper-pin yokes for shafts with counter-clockwise rotation



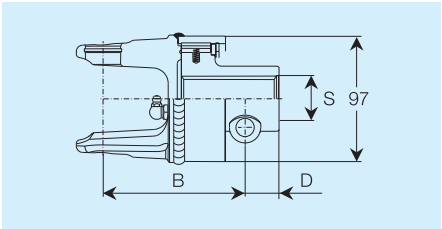
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	89	24	106	**014**	**5090G0360**
1 3/8" Z21	89	24	106	**015**	**5090G3760**
1 3/4" Z6	89	24	124	**016**	**5090G0460**
1 3/4" Z20	89	24	124	**017**	**5090G3860**

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning clutches

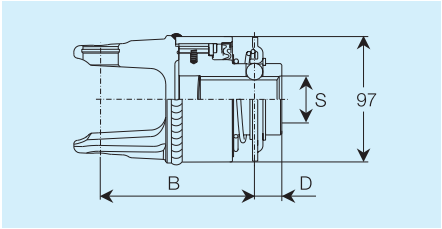
RA1



S	B mm	D mm	Code RA1	Spare part code
1 3/8" Z6	112	21	096	601105704R
1 3/8" Z21	112	21	631	601105702R

Maximum recommended torque: 2400 Nm

RL1 (Permanent lubrication)

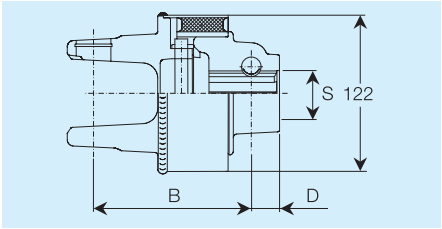


S	B mm	D mm	Code RL1	Spare part code
1 3/8" Z6	121	21	0A0	60150G401R
1 3/8" Z21	121	21	0A1	60150G402R

Maximum recommended torque: 2400 Nm

GE Torsionally resilient joints

GE4



65 Shore S	B mm	D mm	Code GE4	Spare part code
1 3/8" Z6	134	22	0D4	608G46501R
1 3/8" Z21	134	22	0D5	608G46502R

Torque at recommended maximum deformation (±20°)
M20° = 1700 Nm

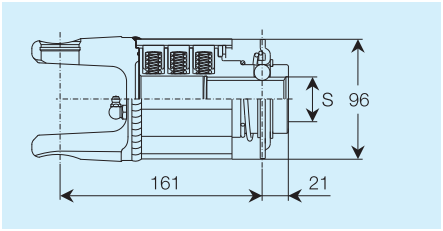
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S5

Ratchet torque limiters, one-way

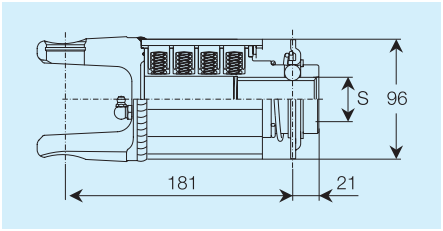
SA3



Setting Nm	S	Code SA3	Spare part code
1200	1 3/8" Z6	159	614348501R

Maximum recommended speed 700 min^{-1}.

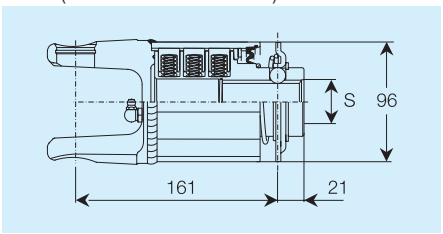
SA4



Setting Nm	S	Code SA4	Spare part code
1400	1 3/8" Z6	168	614452501R
1600	1 3/8" Z6	170	614456501R

Maximum recommended speed 700 min^{-1}.

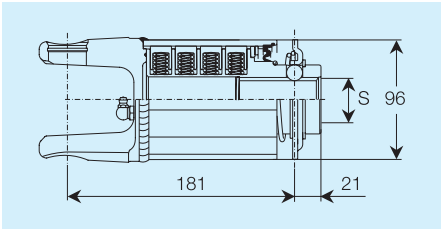
LC3 (Seasonal lubrication)



Setting Nm	S	Code LC3	Spare part code
1200	1 3/8" Z6	0H4	60D3G4803R

Maximum recommended speed 700 min^{-1}.

LC4 (Seasonal lubrication)



Setting Nm	S	Code LC4	Spare part code
1400	1 3/8" Z6	0H7	60D4G5203R
1600	1 3/8" Z6	0H9	60D4G5603R

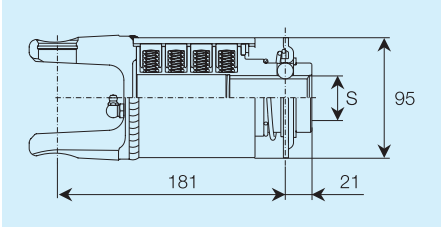
Maximum recommended speed 700 min^{-1}.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Ratchet torque limiters, one-way

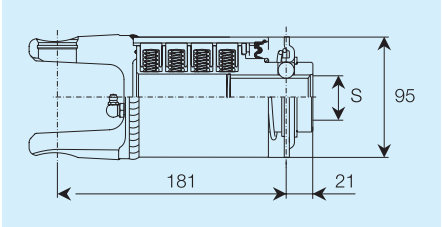
LN4



Setting Nm	S	Code LN4	Spare part code
1200	1 3/8" Z6	0F9	60B4G4803R

Maximum recommended speed 700 min^{-1}.

LT4 (Seasonal lubrication)



Setting Nm	S	Code LT4	Spare part code
1200	1 3/8" Z6	0M9	60F4G4803R

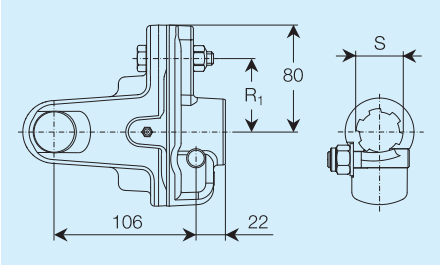
Maximum recommended speed 700 min^{-1}.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S5

LB Shear bolt torque limiter



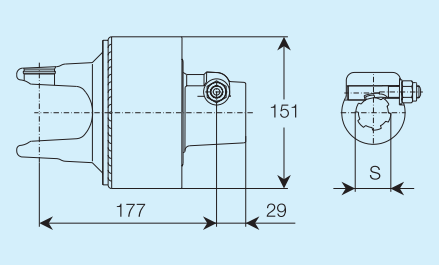
Setting Nm	S	R_1 mm	Code LB	Spare part code
2100	1 3/8" Z6	67	1R0	6060G0319R
	1 3/8" Z21		1S0	6060G3710R
	1 3/4" Z6		1R4	6060G0408R
	1 3/4" Z20		1S4	6060G3803R
				Bolt M8 x 45 cl 8.8.
2400	1 3/8" Z6	50	1R1	6060G0304R
	1 3/8" Z21		1S1	6060G3704R
	1 3/4" Z6		1R5	6060G0404R
	1 3/4" Z20		1S5	6060G3804R
				Bolt M10 x 50 cl 8.8.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

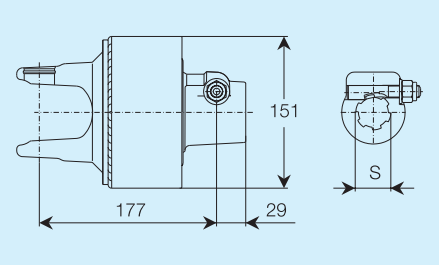
Automatic torque limiters

LR23
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
1500	1 3/8" Z6	02B	6WG154003R
	1 3/8" Z21	08B	6WG154037R
	1 3/4" Z6	72B	6WG154004R
	1 3/4" Z20	82B	6WG154038R
1700	1 3/8" Z6	17A	6WG157003R
	1 3/8" Z21	22A	6WG157037R
	1 3/4" Z6	73B	6WG157004R
	1 3/4" Z20	83B	6WG157038R
1900	1 3/8" Z6	03B	6WG159003R
	1 3/8" Z21	09B	6WG159037R
	1 3/4" Z6	74B	6WG159004R
	1 3/4" Z20	84B	6WG159038R
2100	1 3/8" Z6	19A	6WG161003R
	1 3/8" Z21	24A	6WG161037R
	1 3/4" Z6	76B	6WG161004R
	1 3/4" Z20	85B	6WG161038R

LR23
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Setting Nm	S	Code LR23	Spare part code
*1500	1 3/8" Z6	01C	6WGA54003R
	1 3/8" Z21	06C	6WGA54037R
	1 3/4" Z6	11C	6WGA54004R
	1 3/4" Z20	16C	6WGA54038R
1700	1 3/8" Z6	02C	6WGA57003R
	1 3/8" Z21	07C	6WGA57037R
	1 3/4" Z6	12C	6WGA57004R
	1 3/4" Z20	17C	6WGA57038R
1900	1 3/8" Z6	03C	6WGA59003R
	1 3/8" Z21	08C	6WGA59037R
	1 3/4" Z6	12C	6WGA59004R
	1 3/4" Z20	18C	6WGA59038R
2100	1 3/8" Z6	04C	6WGA61003R
	1 3/8" Z21	09C	6WGA61037R
	1 3/4" Z6	14C	6WGA61004R
	1 3/4" Z20	19C	6WGA61038R

Maximum recommended speed 1000 min^{-1}

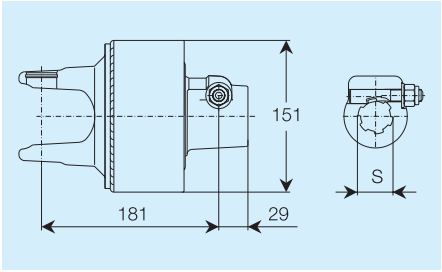
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S5

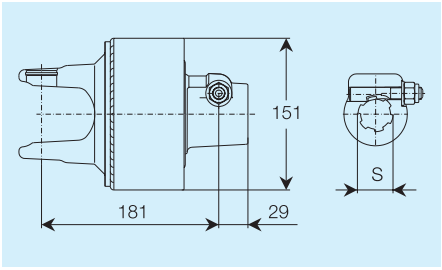
Automatic torque limiters

LR23 with overrunning clutch
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
1500	1 3/8" Z6	52B	6WG854003R
	1 3/8" Z21	62B	6WG854037R
1700	1 3/8" Z6	53B	6WG857003R
	1 3/8" Z21	63B	6WG857037R
1900	1 3/8" Z6	54B	6WG859003R
	1 3/8" Z21	64B	6WG859037R
2100	1 3/8" Z6	56B	6WG861003R
	1 3/8" Z21	66B	6WG861037R

LR23 with overrunning clutch
* for use at 1000 min^{-1}



Setting Nm	S	Code LR23	Spare part code
*1500	1 3/8" Z6	26C	6WGC54003R
	1 3/8" Z21	31C	6WGC54037R
1700	1 3/8" Z6	27C	6WGC57003R
	1 3/8" Z21	32C	6WGC57037R
1900	1 3/8" Z6	28C	6WGC59003R
	1 3/8" Z21	33C	6WGC59037R
2100	1 3/8" Z6	29C	6WGC61003R
	1 3/8" Z21	34C	6WGC61037R

* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

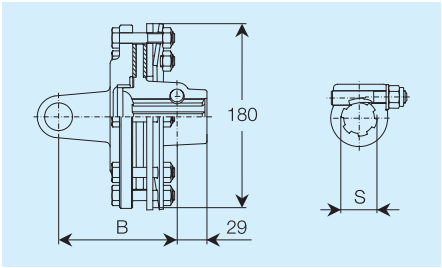
Maximum recommended speed 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, adjustable setting

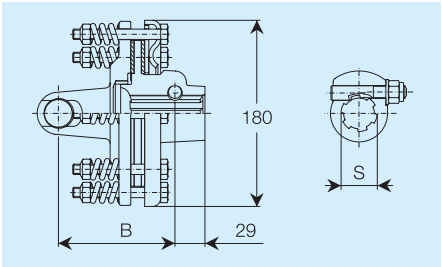
FV32



Setting Nm	B mm	S	Code FV32	Spare part code
900	117	1 3/8" Z6	N14	661G41203R
	117	1 3/8" Z21	N17	661G41237R
1000	117	1 3/8" Z6	N31	661G44203R
	117	1 3/8" Z21	N33	661G44237R
*1100	117	1 3/8" Z6	N12	661G46203R
	117	1 3/8" Z21	N15	661G46237R

Maximum recommended speed 1000 min^{-1}

FFV32



Setting Nm	B mm	S	Code FFV32	Spare part code
900	117	1 3/8" Z6	0S1	635G41203R
	117	1 3/8" Z21	0S6	635G41237R
1000	117	1 3/8" Z6	0S2	635G44203R
	117	1 3/8" Z21	0S7	635G44237R
*1100	117	1 3/8" Z6	0S3	635G46203R
	117	1 3/8" Z21	0S8	635G46237R

Maximum recommended speed 1000 min^{-1}

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

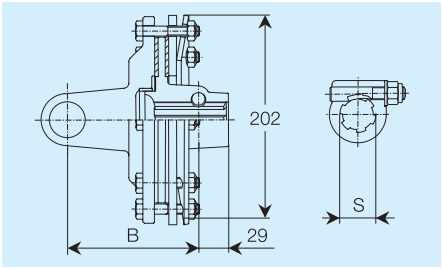
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S5

Friction torque limiter, adjustable setting

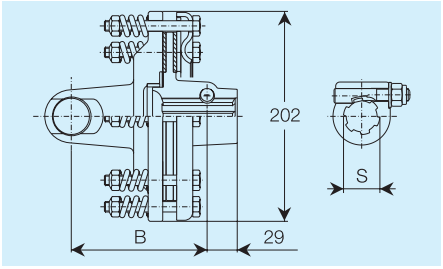
FV42



Setting Nm	B mm	S	Code FV42	Spare part code
*1200	117	1 3/8" Z6	N20	661G48403R
	117	1 3/8" Z21	N23	661G48437R
	122	1 3/4" Z6	N26	661G48404R
	122	1 3/4" Z20	N29	661G48438R
1350	117	1 3/8" Z6	N35	661G51403R
	117	1 3/8" Z21	N37	661G51437R
	122	1 3/4" Z6	N0A	661G51404R
	122	1 3/4" Z20	N0D	661G51438R
1450	117	1 3/8" Z6	N18	661G53403R
	117	1 3/8" Z21	N21	661G53437R
	122	1 3/4" Z6	N24	661G53404R
	122	1 3/4" Z20	N27	661G53438R
1600	117	1 3/8" Z6	N36	661G56403R
	117	1 3/8" Z21	N38	661G56437R
	122	1 3/4" Z6	N0C	661G56404R
	122	1 3/4" Z20	N0E	661G56438R

Maximum recommended speed 1000 min^{-1}

FFV42



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV42	Spare part code
*1200	117	1 3/8" Z6	0Z1	635G48403R
	117	1 3/8" Z21	0Z6	635G48437R
	122	1 3/4" Z6	0Y1	635G48404R
	122	1 3/4" Z20	0Y6	635G48438R
1350	117	1 3/8" Z6	0Z2	635G51403R
	117	1 3/8" Z21	0Z7	635G51437R
	122	1 3/4" Z6	0Y2	635G51404R
	122	1 3/4" Z20	0Y7	635G51438R
1450	117	1 3/8" Z6	0Z3	635G53403R
	117	1 3/8" Z21	0Z8	635G53437R
	122	1 3/4" Z6	0Y3	635G53404R
	122	1 3/4" Z20	0Y8	635G53438R
1600	117	1 3/8" Z6	0Z4	635G56403R
	117	1 3/8" Z21	0Z9	635G56437R
	122	1 3/4" Z6	0Y4	635G56404R
	122	1 3/4" Z20	0Y9	635G56438R

Maximum recommended speed 1000 min^{-1}

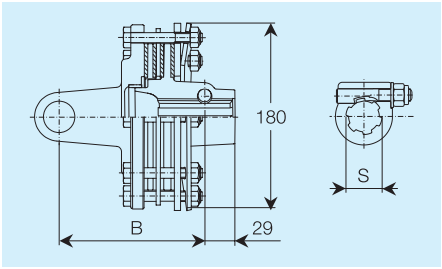
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, adjustable setting

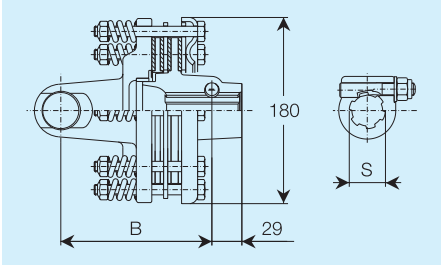
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
*1200	133	1 3/8" Z6	N45	661G48403R
	133	1 3/8" Z21	N51	661G48437R
	138	1 3/4" Z6	N57	661G48404R
	138	1 3/4" Z20	N63	661G48438R
1350	133	1 3/8" Z6	N46	661G51403R
	133	1 3/8" Z21	N52	661G51437R
	138	1 3/4" Z6	N58	661G51404R
	138	1 3/4" Z20	N64	661G51438R
1450	133	1 3/8" Z6	N47	661G53403R
	133	1 3/8" Z21	N53	661G53437R
	138	1 3/4" Z6	N59	661G53404R
	138	1 3/4" Z20	N65	661G53438R
1600	133	1 3/8" Z6	N0F	661G56403R
	133	1 3/8" Z21	N0H	661G56437R
	138	1 3/4" Z6	N0K	661G56404R
	138	1 3/4" Z20	N0M	661G56438R

Maximum recommended speed 1000 min^{-1}

FFV34



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV34	Spare part code
*1200	133	1 3/8" Z6	0T1	635G48403R
	133	1 3/8" Z21	0T8	635G48437R
	138	1 3/4" Z6	0U5	635G48404R
	138	1 3/4" Z20	0V2	635G48438R
1350	133	1 3/8" Z6	0T2	635G51403R
	133	1 3/8" Z21	0T9	635G51437R
	138	1 3/4" Z6	0U6	635G51404R
	138	1 3/4" Z20	0V3	635G51438R
1450	133	1 3/8" Z6	0T3	635G53403R
	133	1 3/8" Z21	0T0	635G53437R
	138	1 3/4" Z6	0U7	635G53404R
	138	1 3/4" Z20	0V4	635G53438R
1600	133	1 3/8" Z6	0T4	635G56403R
	133	1 3/8" Z21	0U1	635G56437R
	138	1 3/4" Z6	0U8	635G56404R
	138	1 3/4" Z20	0V5	635G56438R

Maximum recommended speed 1000 min^{-1}

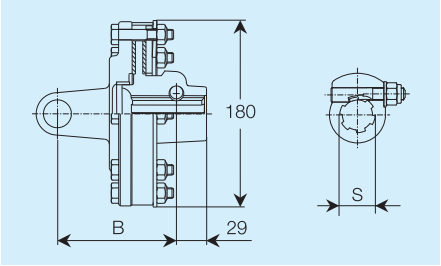
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S5

Friction torque limiter, non-adjustable setting

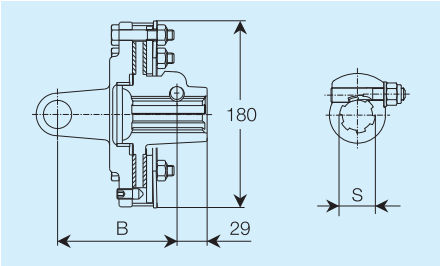
FT32



Setting Nm	B mm	S	Code FT32	Spare part code
900	117	1 3/8" Z6	Q11	663G41203R
	117	1 3/8" Z21	Q16	663G41237R
1000	117	1 3/8" Z6	Q14	663G44203R
	117	1 3/8" Z21	Q19	663G44237R
*1100	117	1 3/8" Z6	Q15	663G46203R
	117	1 3/8" Z21	Q20	663G46237R

Maximum recommended speed 1000 min^{-1}

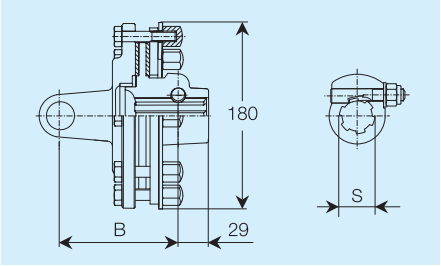
FT32R with Release System



Setting Nm	B mm	S	Code FT32R	Spare part code
900	117	1 3/8" Z6	H11	663G41C03R
	117	1 3/8" Z21	H16	663G41C37R
1000	117	1 3/8" Z6	H14	663G44C03R
	117	1 3/8" Z21	H19	663G44C37R
*1100	117	1 3/8" Z6	H15	663G46C03R
	117	1 3/8" Z21	H20	663G46C37R

Maximum recommended speed 1000 min^{-1}

FK32



Setting Nm	B mm	S	Code FK32	Spare part code
900	117	1 3/8" Z6	7A8	60KG41203R
	117	1 3/8" Z21	7C1	60KG41237R
1000	117	1 3/8" Z6	7A9	60KG44203R
	117	1 3/8" Z21	7C2	60KG44237R
*1100	117	1 3/8" Z6	7C0	60KG46203R
	117	1 3/8" Z21	7C3	60KG46237R

Maximum recommended speed 1000 min^{-1}

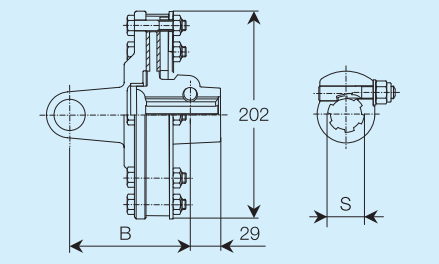
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

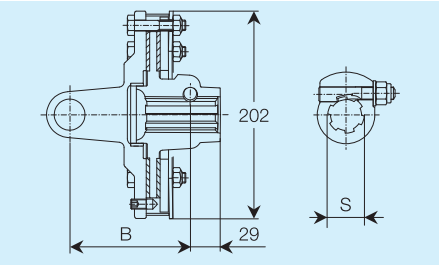
FT42



Setting Nm	B mm	S	Code FT42	Spare part code
1200	117	1 3/8" Z6	Q22	663G48403R
	117	1 3/8" Z21	Q26	663G48437R
	122	1 3/4" Z6	Q30	663G48404R
	122	1 3/4" Z20	Q34	663G48438R

Maximum recommended speed 1000 min^{-1}

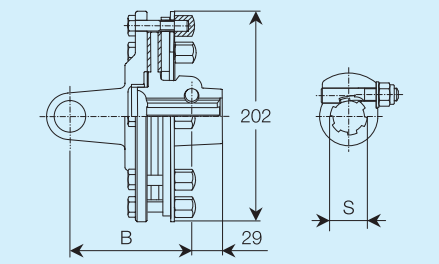
FT42R with Release System



Setting Nm	B mm	S	Code FT42R	Spare part code
1200	117	1 3/8" Z6	H22	663G48F03R
	117	1 3/8" Z21	H26	663G48F37R
	122	1 3/4" Z6	H30	663G48F04R
	122	1 3/4" Z20	H34	663G48F38R

Maximum recommended speed 1000 min^{-1}

FK42



Setting Nm	B mm	S	Code FK42	Spare part code
1200	117	1 3/8" Z6	7C4	60KG48403R
	117	1 3/8" Z21	7C7	60KG48437R
	122	1 3/4" Z6	7D0	60KG48404R
	122	1 3/4" Z20	7D3	60KG48438R

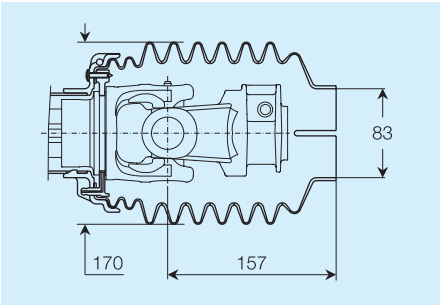
Maximum recommended speed 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

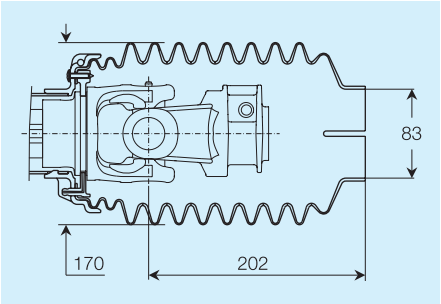
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Optional shield cones



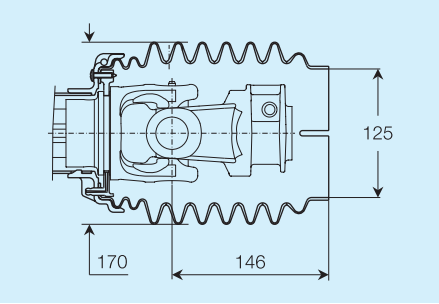
Extended shield cone, medium length, narrow diameter
- Tractor end.....P
- Implement end .....M



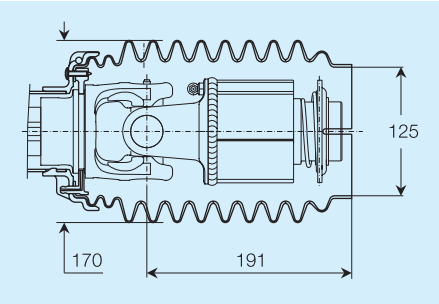
Extended shield cone, long length, narrow diameter
- Tractor end..... N
- Implement end L

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Optional Outer Cones

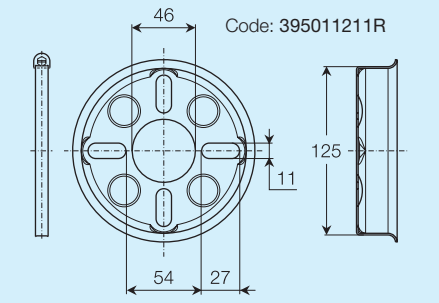


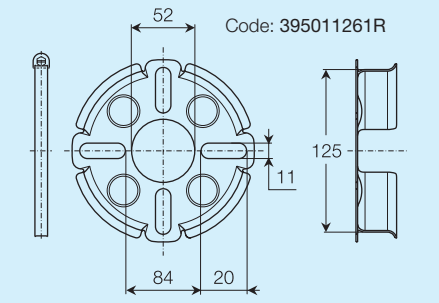
Extended shield cone, medium length wide diameter
- Tractor end.....R
- Implement end .....T



Extended shield cone, long length, wide diameter
- Tractor end.....V
- Implement end .....Y

Plates and clamps for optional extended shield cones



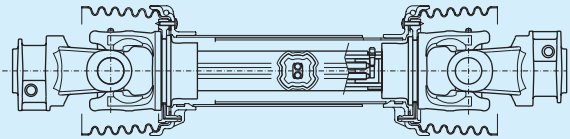


Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - Lubrication.

To have your driveline equipped with the Greasing System, add the letter “G” to the driveline code (16th character of the code, if required).



Greasing System code
G

Code for size S5 drivelines

1
C

C: Standard SFT cardan joint driveline

2 3
S 5

Size S5

4

Telescoping Members
See page S5.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See pages S5.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page S5.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S5.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint or splined stub shaft without joint), and establishes the associated shields and attachment to PTO.

13 14 15

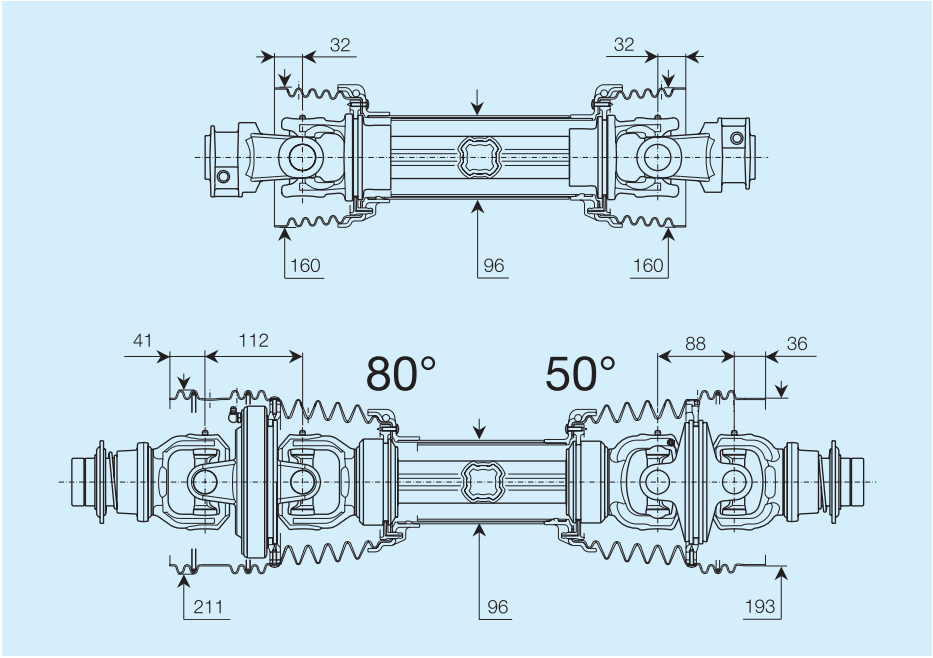
Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft

16 17 18

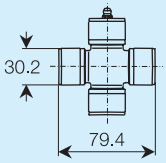
Only use these positions of the code if requesting optional shield cones, Spring Link chains (see chapter 10 - *Safety Shields*), and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

Size S6

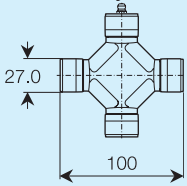


Single Cardan Joint



4120G0012

80° and 50°Constant Velocity Joints



4120G0051

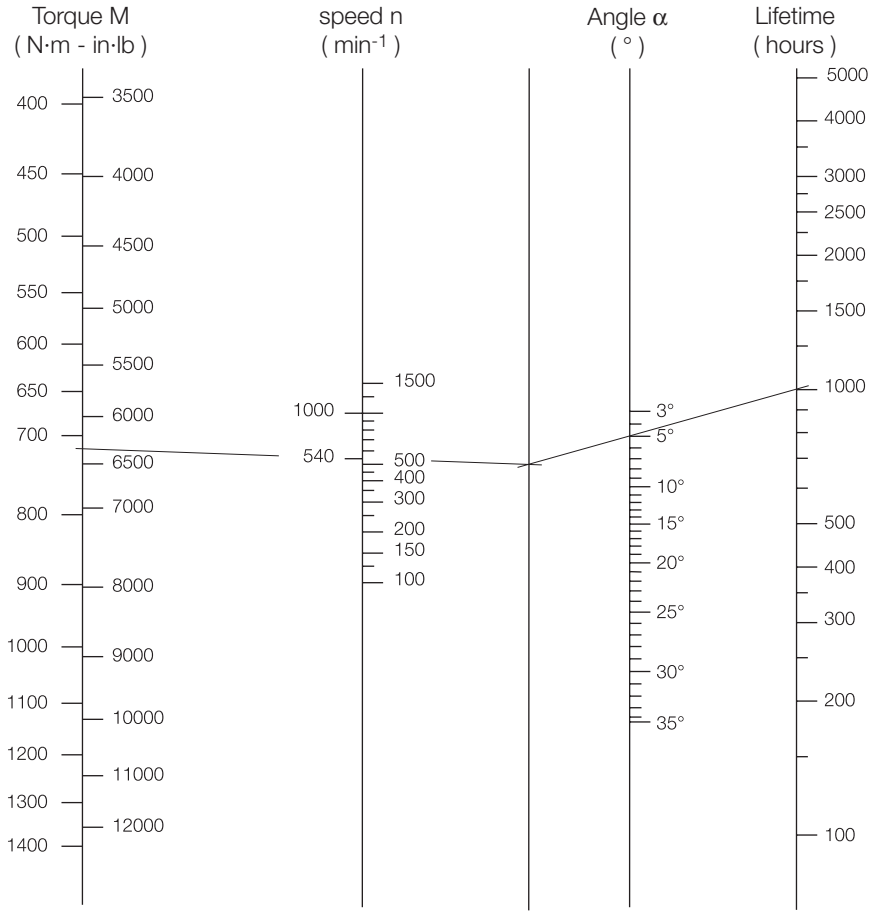
Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S6	716	6334	40	55	583	5161	61	83

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.

Pn = power associated to nominal torque Mn.

Size S6

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 716 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size **S6**, torque M = 716 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

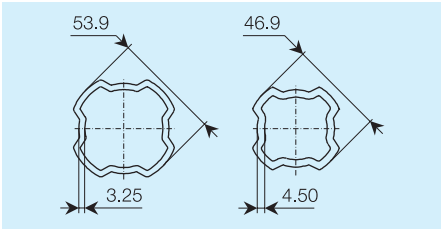
Example: M_{50} = 716 Nm is the theoretical transmittable torque for a cardan driveline size **S6**, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 612 Nm, M_{50} / M ratio is 716 / 612 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S6

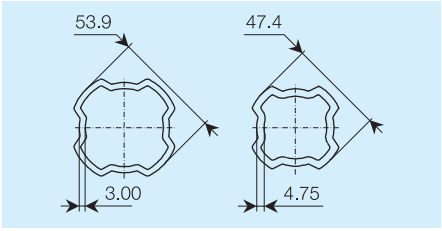
Telescoping Members

Four-Tooth profile tubes



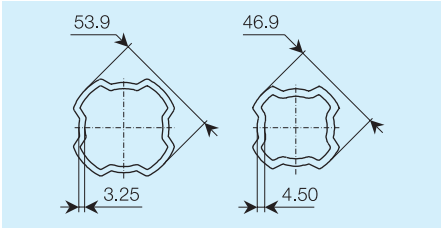
Mmax (Nm)	3000
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



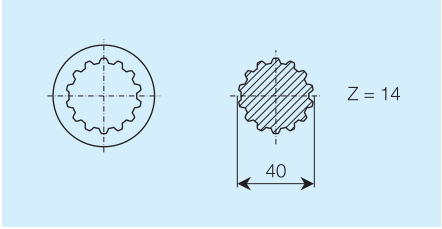
Mmax (Nm)	3000
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	3000
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

Splined shafts

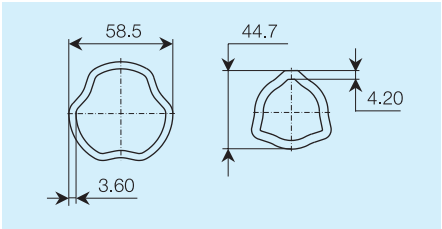


Mmax (Nm)	3000
T/M (N/Nm)	7 - 9
Tube code	S

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

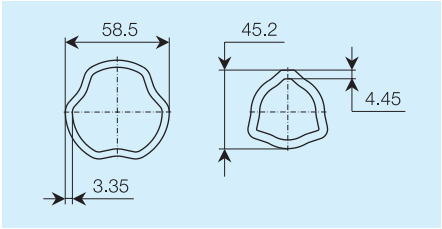
Telescoping Members

Free Rotation profile tubes



Mmax (Nm)	2900
T/M (N/Nm)	6 - 8
Code	F

Free Rotation profile tubes with Rilsan® coated inner tube

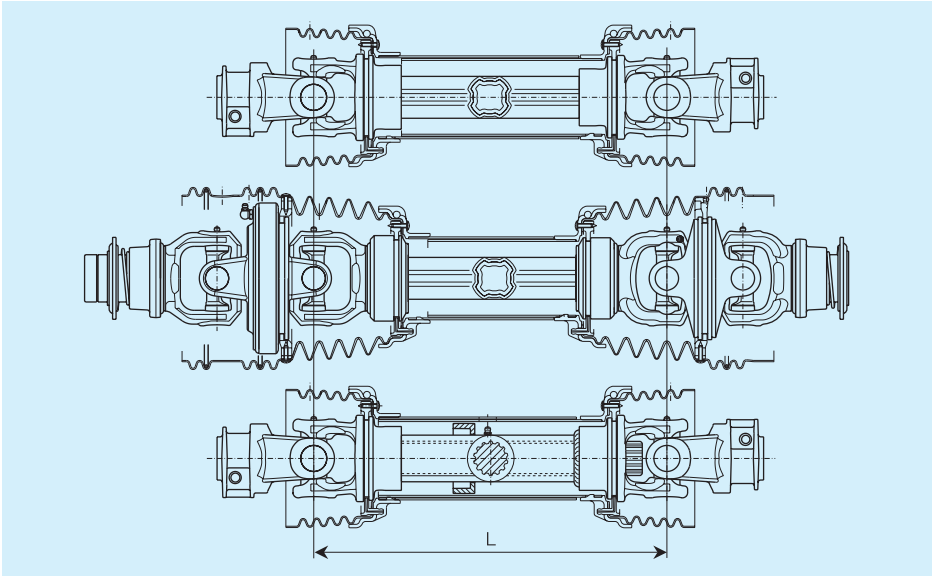


Mmax (Nm)	2900
T/M (N/Nm)	3 - 4
Code	G

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (M) ratio

Size S6

Length



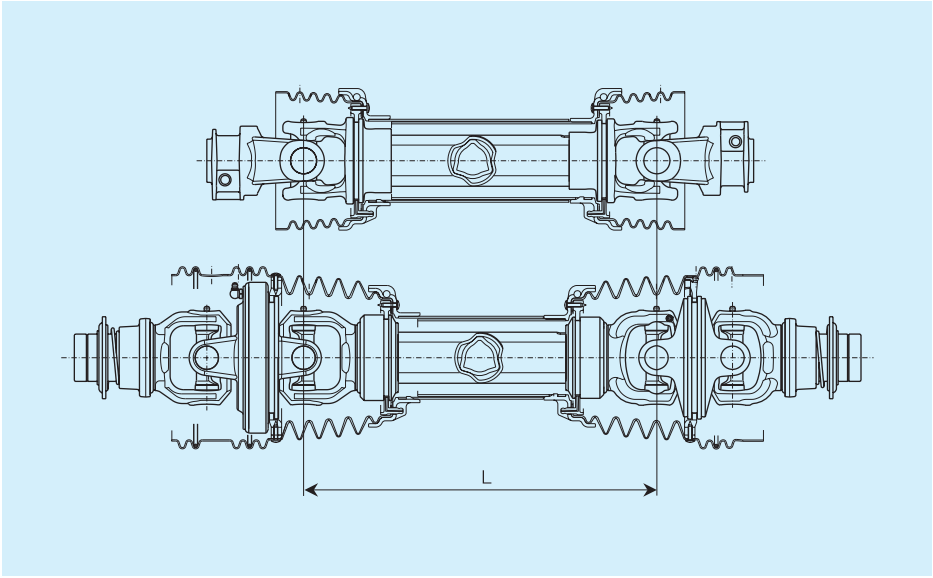


	Standard			Maximum extension			Splined	Length
L	Lw	Lt	Ls	Lw	Lt	Ls	Lw = Lt = Ls	code
mm	mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	518	573	573	590	041
460	553	613	664	618	673	673	690	046
510	653	713	752	718	773	773	790	051
560	746	808	839	811	873	873	890	056
610	821	892	927	886	957	973	990	061
660	896	975	1014	961	1040	1073	1030	066
710	971	1058	1102	- -	- -	- -	1130	071
760	1046	1142	1189	- -	- -	- -	1230	076
810	1121	1225	1277	- -	- -	- -	1330	081
860	1196	1308	1364	- -	- -	- -	- -	086
910	1271	1392	1452	- -	- -	- -	- -	091
1010	1421	1558	1627	- -	- -	- -	- -	101
1110	1571	1725	1802	- -	- -	- -	- -	111
1210	1721	1892	1977	- -	- -	- -	- -	121

Lw: maximum working length **Lt**: maximum temporary length (short duration temporary maneuvers) **Ls**: maximum length without rotation

Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Length



free rotation

L	Lw	Lt	Ls	Length code
mm	mm	mm	mm	
360	- -	- -	- -	036
410	- -	- -	- -	041
460	496	574	654	046
510	596	674	753	051
560	696	724	841	056
610	796	874	928	061
660	898	974	1016	066
710	973	1060	1103	071
760	1048	1143	1191	076
810	1123	1226	1278	081
860	1198	1310	1366	086
910	1273	1393	1453	091
1010	1423	1560	1628	101
1110	1573	1726	1803	111
1210	1723	1893	1978	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

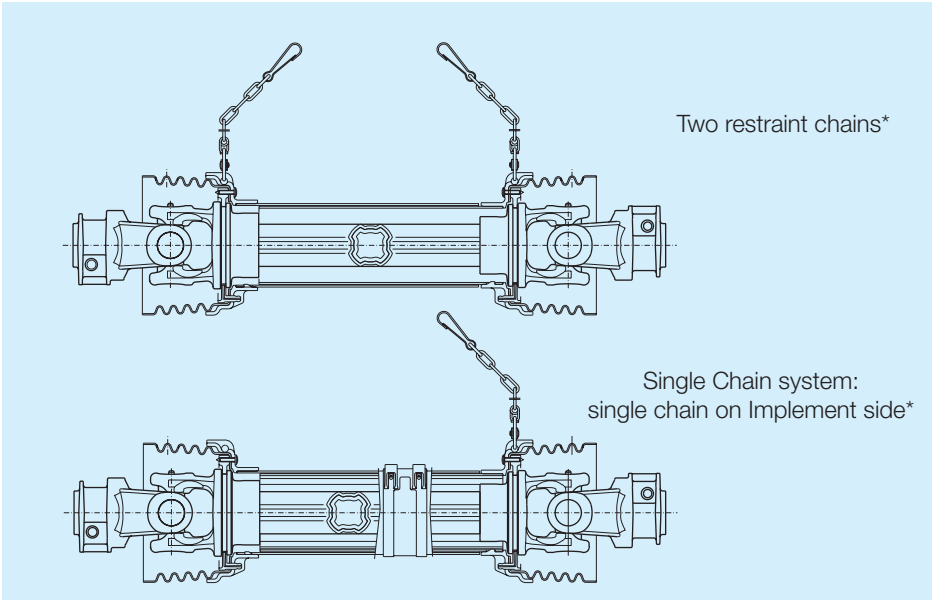
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S6

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

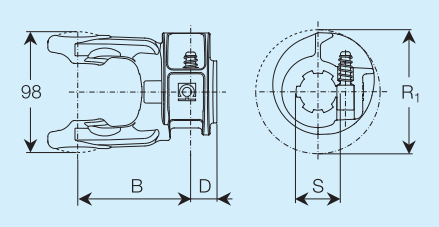


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

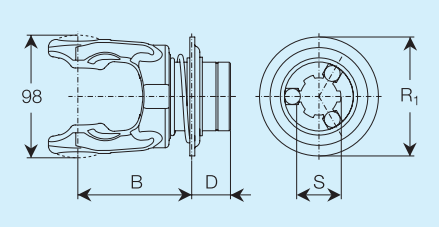
Yokes for single cardan joint

Push-pin yokes

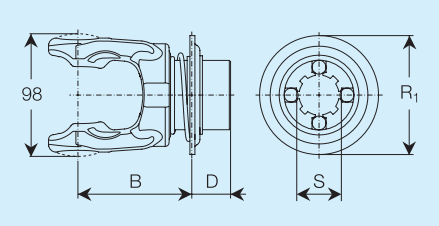


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	91	21	100	007	5070G0355
1 3/8" Z21	83	29	100	008	5070G3755
D8x32x38	91	21	100	093	5070G2151

RT Ball collar yokes

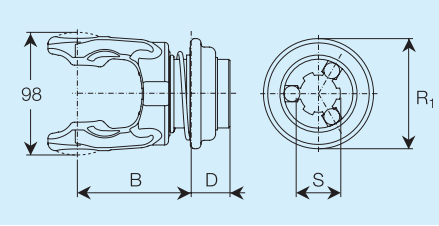


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	91	31	95	R07	5720G0355
1 3/8" Z21	91	31	95	R08	5720G3755
1 3/4" Z6	95	31	120	R09	5720G0455
1 3/4" Z20	95	31	120	R10	5720G3855



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	91	31	95	R93	5720G2151

RTA Automatic ball collar yokes



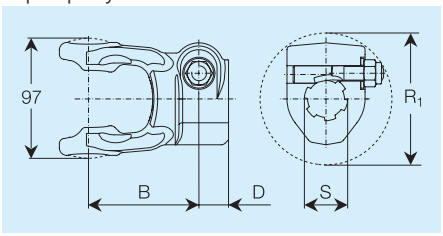
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	91	31	88	0Q7	5720G0361
1 3/8" Z21	91	31	88	0Q8	5720G3761
1 3/4" Z6	95	31	110	0Q9	5720G0461
1 3/4" Z20	95	31	110	0Q0	5720G3861

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

Yokes for single cardan joint

Taper-pin yokes for shafts with counter-clockwise rotation



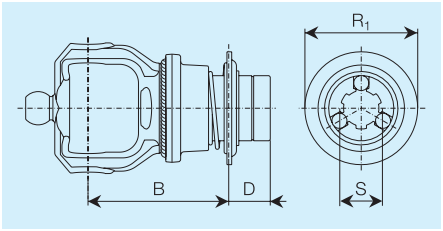
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	89	24	106	014	5090G0360
1 3/8" Z21	89	24	106	015	5090G3760
1 3/4" Z6	89	24	124	016	5090G0460
1 3/4" Z20	89	24	124	017	5090G3860

Maximum recommended torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

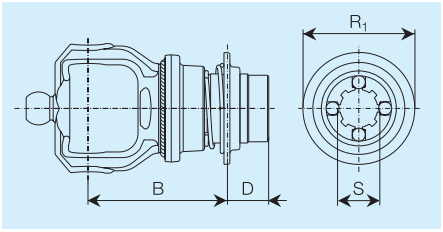
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Yokes for 80° Constant Velocity Joint

RT Ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE

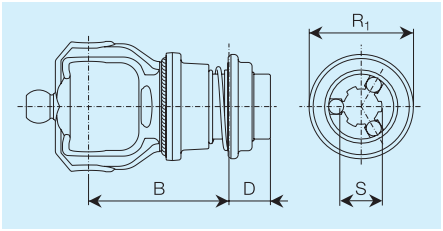


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	119	35	95	WR7	5730G0384
1 3/8" Z21	106	40	95	WR8	5730G3784
1 3/4" Z6	120	40	120	WR9	5730G0484
1 3/4" Z20	120	40	120	WR0	5730G3884



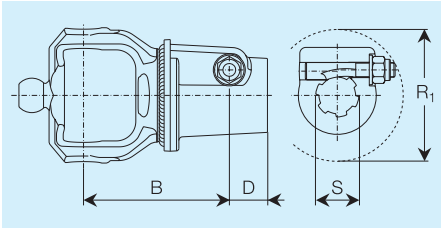
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	119	35	95	WR6	5730G2184

RTA Automatic ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	119	35	88	WQ7	5730G0391
1 3/8" Z21	106	40	88	WQ8	5730G3791
1 3/4" Z6	120	40	110	WQ9	5730G0491
1 3/4" Z20	120	40	110	WQ0	5730G3891

Taper-pin yokes for shafts with counter-clockwise rotation



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	119	31	106	W14	5110G0361
1 3/8" Z21	106	31	106	W15	5110G3761
1 3/4" Z6	120	31	126	W16	5110G0461
1 3/4" Z20	120	31	126	W17	5110G3861

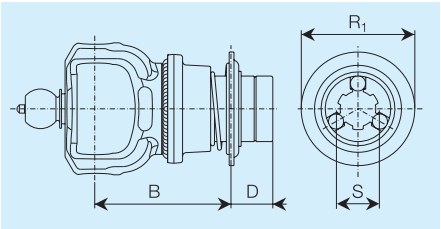
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

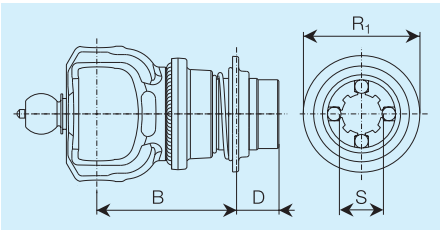
Size S6

Yokes for 50° Constant Velocity Joint

RT Ball collar yokes

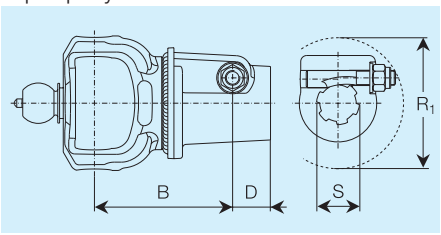


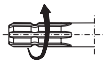
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	35	95	KR7	5730G0353
1 3/8" Z21	102	40	95	KR8	5730G3753
1 3/4" Z6	115	40	120	KR9	5730G0453
1 3/4" Z20	115	40	120	KR0	5730G3853



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	114	35	95	KR6	5730G2153

Taper-pin yokes for shafts with counter-clockwise rotation





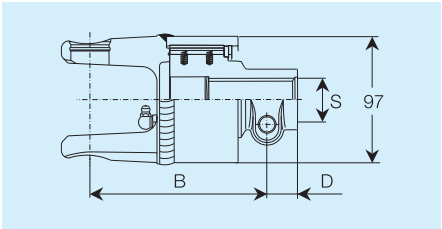
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	31	106	K14	5190G0352
1 3/8" Z21	102	31	106	K15	5190G3752
1 3/4" Z6	115	31	126	K16	5190G0452
1 3/4" Z20	115	31	126	K17	5190G3852

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning Clutches

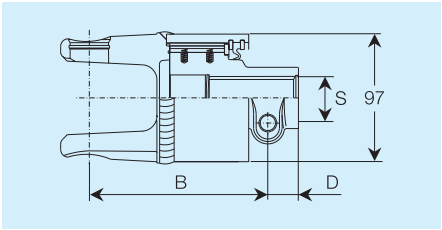
RA2



S	B mm	D mm	Code RA2	Spare part code
1 3/8" Z6	140	24	A50	601205601R
1 3/8" Z21	140	24	A51	601205602R
1 3/4" Z6	142	29	A52	601205603R
1 3/4" Z20	142	29	A53	601205604R

Maximum recommended torque: 3800 Nm

RL2 (Permanent lubrication)

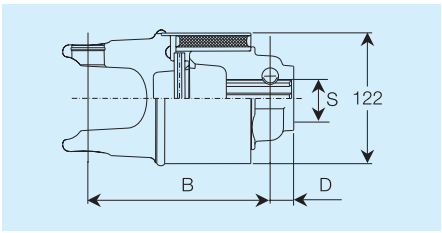


S	B mm	D mm	Code RL2	Spare part code
1 3/8" Z6	140	24	0A2	60160G601R
1 3/8" Z21	140	24	0A3	60160G602R
1 3/4" Z6	142	29	0A4	60160G603R
1 3/4" Z20	142	29	0A5	60160G604R

Maximum recommended torque: 3800 Nm

GE Torsionally resilient joints

GE6



Torque at maximum recommended deformation (±20°): (55 Shore rubber), M20° = 1700 Nm.
Torque at maximum recommended deformation (±20°): (65 Shore rubber), M20° = 3000 Nm.

55 Shore S	B mm	D mm	Code GE6	Spare part code
1 3/8" Z6	164	22	0D0	608G65501R
1 3/8" Z21	164	22	0D1	608G65502R
1 3/4" Z6	164	22	0D2	608G65503R
1 3/4" Z20	164	22	0D3	608G65504R

65 Shore S	B mm	D mm	Code GE6	Spare part code
1 3/8" Z6	164	22	0D4	608G66501R
1 3/8" Z21	164	22	0D5	608G66502R
1 3/4" Z6	164	22	0D6	608G66503R
1 3/4" Z20	164	22	0D7	608G66504R

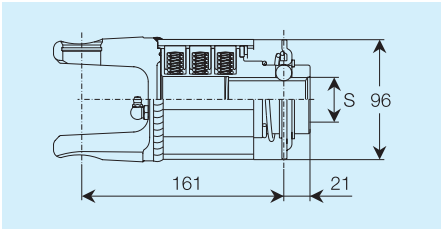
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

Ratchet torque limiters, one-way

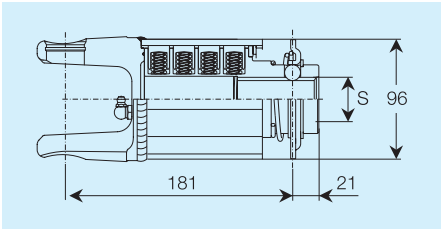
SA3



Setting Nm	S	Code SA3	Spare part code
1200	1 3/8" Z6	159	614348501R

Maximum recommended speed 700 min^{-1}.

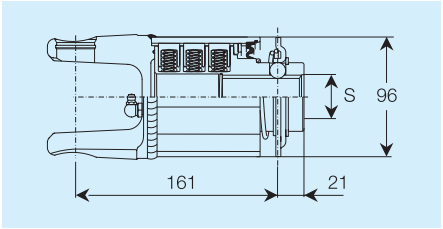
SA4



Setting Nm	S	Code SA4	Spare part code
1400	1 3/8" Z6	168	614452501R
1600	1 3/8" Z6	170	614456501R

Maximum recommended speed 700 min^{-1}.

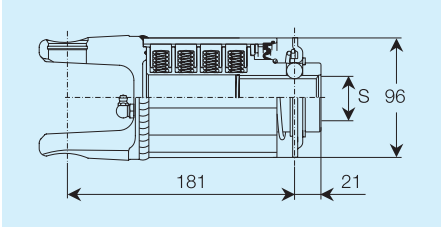
LC3 (Seasonal lubrication)



Setting Nm	S	Code LC3	Spare part code
1200	1 3/8" Z6	0H4	60D3G4803R

Maximum recommended speed 700 min^{-1}.

LC4 (Seasonal lubrication)



Setting Nm	S	Code LC4	Spare part code
1400	1 3/8" Z6	0H7	60D4G5203R
1600	1 3/8" Z6	0H9	60D4G5603R

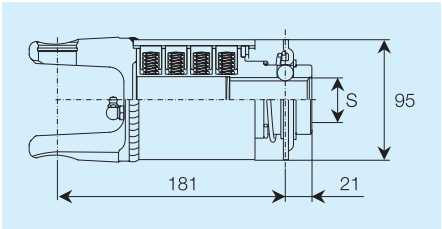
Maximum recommended speed 700 min^{-1}.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Ratchet torque limiters, symmetrical

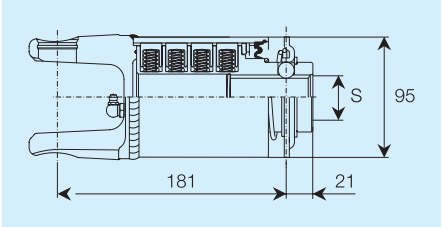
LN4



Setting Nm	S	Code LN4	Spare part code
1200	1 3/8" Z6	0F9	60B4G4803R

Maximum recommended speed 700 min^{-1}.

LT4 (Seasonal lubrication)



Setting Nm	S	Code LT4	Spare part code
1200	1 3/8" Z6	0M9	60F4G4803R

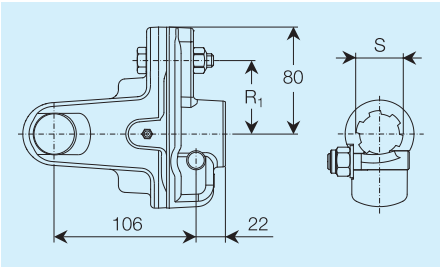
Maximum recommended speed 700 min^{-1}.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
2400^	1 3/8" Z6	50	1R1	6060G0304R
	1 3/8" Z21		1S1	6060G3704R
	1 3/4" Z6		1R5	6060G0404R
	1 3/4" Z20		1S5	6060G3804R
2500	1 3/8" Z6	52	1R2	6060G0320R
	1 3/8" Z21		1S2	6060G3711R
	1 3/4" Z6		1R6	6060G0409R
	1 3/4" Z20		1S6	6060G3809R
2700	1 3/8" Z6	55	1R3	6060G0301R
	1 3/8" Z21		1S3	6060G3701R
	1 3/4" Z6		1R7	6060G0401R
	1 3/4" Z20		1S7	6060G3801R

Bolt M10 x 50 cl 8.8.

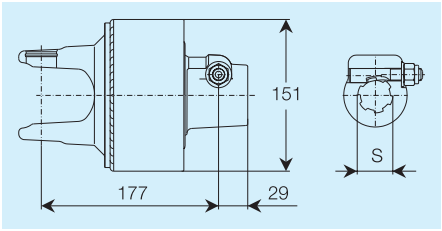
^ Maximum recommended setting for Free Rotation profile tubes

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

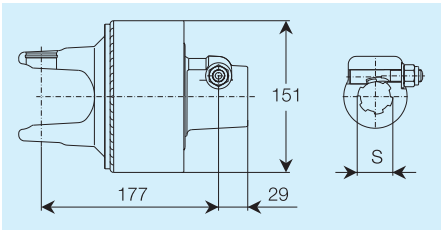
Automatic torque limiters

LR23
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
1700	1 3/8" Z6	17A	6WG157003R
	1 3/8" Z21	22A	6WG157037R
	1 3/4" Z6	73B	6WG157004R
	1 3/4" Z20	83B	6WG157038R
1900	1 3/8" Z6	03B	6WG159003R
	1 3/8" Z21	09B	6WG159037R
	1 3/4" Z6	74B	6WG159004R
	1 3/4" Z20	84B	6WG159038R
2100	1 3/8" Z6	19A	6WG161003R
	1 3/8" Z21	24A	6WG161037R
	1 3/4" Z6	76B	6WG161004R
	1 3/4" Z20	85B	6WG161038R

LR23
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Setting Nm	S	Code LR23	Spare part code
*1700	1 3/8" Z6	02C	6WGA57003R
	1 3/8" Z21	07C	6WGA57037R
	1 3/4" Z6	12C	6WGA57004R
	1 3/4" Z20	17C	6WGA57038R
1900	1 3/8" Z6	03C	6WGA59003R
	1 3/8" Z21	08C	6WGA59037R
	1 3/4" Z6	13C	6WGA59004R
	1 3/4" Z20	18C	6WGA59038R
2100	1 3/8" Z6	04C	6WGA61003R
	1 3/8" Z21	09C	6WGA61037R
	1 3/4" Z6	14C	6WGA61004R
	1 3/4" Z20	19C	6WGA61038R

Maximum recommended speed 1000 min^{-1}

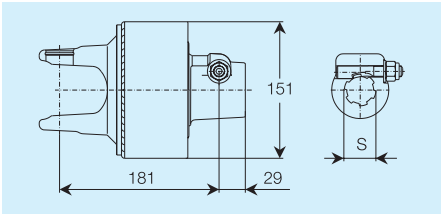
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

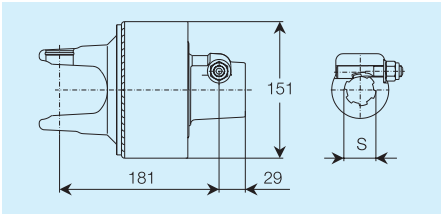
Automatic torque limiters

LR23 with overrunning clutch
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
1700	1 3/8" Z6	53B	6WG857003R
	1 3/8" Z21	63B	6WG857037R
1900	1 3/8" Z6	54B	6WG859003R
	1 3/8" Z21	64B	6WG859037R
2100	1 3/8" Z6	56B	6WG861003R
	1 3/8" Z21	66B	6WG861037R

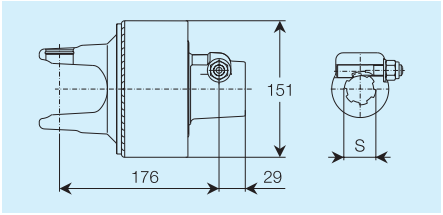
LR23 with overrunning clutch
* for use at 1000 min^{-1}



Setting Nm	S	Code LR23	Spare part code
*1700	1 3/8" Z6	27C	6WGC57003R
	1 3/8" Z21	32C	6WGC57037R
1900	1 3/8" Z6	28C	6WGC59003R
	1 3/8" Z21	33C	6WGC59037R
2100	1 3/8" Z6	29C	6WGC61003R
	1 3/8" Z21	34C	6WGC61037R

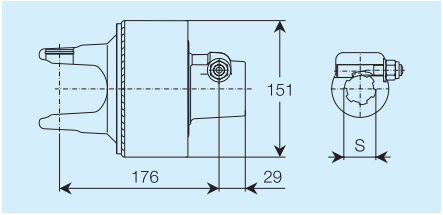
Maximum recommended speed 1000 min^{-1}

LR24
for use at 540 min^{-1}



Setting Nm	S	Code LR24	Spare part code
2500	1 3/8" Z6	26A	6WG265003R
	1 3/8" Z21	30A	6WG265037R
	1 3/4" Z6	34A	6WG265004R
	1 3/4" Z20	38A	6WG265038R

LR24
* for use at 1000 min^{-1}

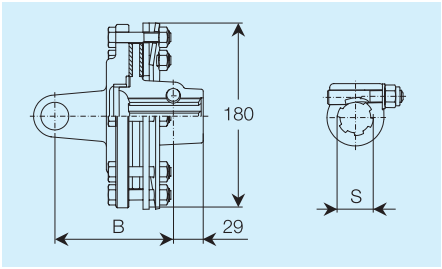


Setting Nm	S	Code LR24	Spare part code
2500	1 3/8" Z6	50C	6WGE65003R
	1 3/8" Z21	54C	6WGE65037R
	1 3/4" Z6	58C	6WGE65004R
	1 3/4" Z20	62C	6WGE65038R

* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Friction torque limiters, adjustable setting

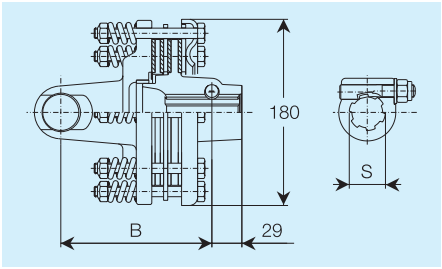
FV32



Setting Nm	B mm	S	Code FV32	Spare part code
900	117	1 3/8" Z6	N14	661G41203R
	117	1 3/8" Z21	N17	661G41237R
1000	117	1 3/8" Z6	N31	661G44203R
	117	1 3/8" Z21	N33	661G44237R
*1100	117	1 3/8" Z6	N12	661G46203R
	117	1 3/8" Z21	N15	661G46237R

* Maximum recommended setting for 1000 min^{-1}

FFV32



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV32	Spare part code
900	117	1 3/8" Z6	0S1	635G41203R
	117	1 3/8" Z21	0S6	635G41237R
1000	117	1 3/8" Z6	0S2	635G44203R
	117	1 3/8" Z21	0S7	635G44237R
*1100	117	1 3/8" Z6	0S3	635G46203R
	117	1 3/8" Z21	0S8	635G46237R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

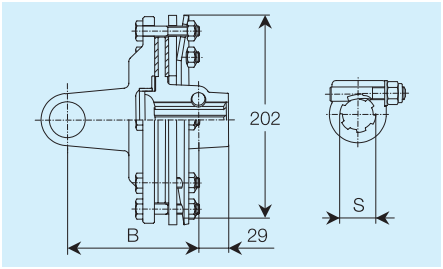
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

Friction torque limiters, adjustable setting

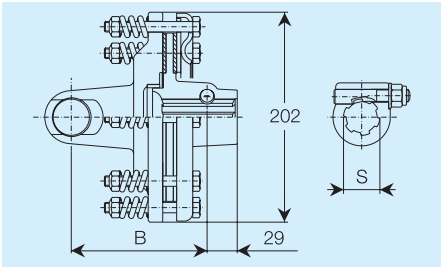
FV42



Setting Nm	B mm	S	Code FV42	Spare part code
*1200	117	1 3/8" Z6	N20	661G48403R
	117	1 3/8" Z21	N23	661G48437R
	122	1 3/4" Z6	N26	661G48404R
	122	1 3/4" Z20	N29	661G48438R
1350	117	1 3/8" Z6	N35	661G51403R
	117	1 3/8" Z21	N37	661G51437R
	122	1 3/4" Z6	N0A	661G51404R
	122	1 3/4" Z20	N0D	661G51438R
1450	117	1 3/8" Z6	N18	661G53403R
	117	1 3/8" Z21	N21	661G53437R
	122	1 3/4" Z6	N24	661G53404R
	122	1 3/4" Z20	N27	661G53438R
1600	117	1 3/8" Z6	N36	661G56403R
	117	1 3/8" Z21	N38	661G56437R
	122	1 3/4" Z6	N0C	661G56404R
	122	1 3/4" Z20	N0E	661G56438R

* Maximum recommended setting for 1000 min^{-1}

FFV42



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV42	Spare part code
*1200	117	1 3/8" Z6	0Z1	635G48403R
	117	1 3/8" Z21	0Z6	635G48437R
	122	1 3/4" Z6	0Y1	635G48404R
	122	1 3/4" Z20	0Y6	635G48438R
1350	117	1 3/8" Z6	0Z2	635G51403R
	117	1 3/8" Z21	0Z7	635G51437R
	122	1 3/4" Z6	0Y2	635G51404R
	122	1 3/4" Z20	0Y7	635G51438R
1450	117	1 3/8" Z6	0Z3	635G53403R
	117	1 3/8" Z21	0Z8	635G53437R
	122	1 3/4" Z6	0Y3	635G53404R
	122	1 3/4" Z20	0Y8	635G53438R
1600	117	1 3/8" Z6	0Z4	635G56403R
	117	1 3/8" Z21	0Z9	635G56437R
	122	1 3/4" Z6	0Y4	635G56404R
	122	1 3/4" Z20	0Y9	635G56438R

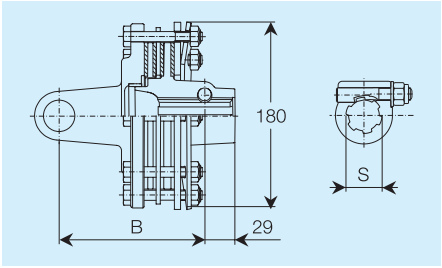
* Maximum recommended setting for 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiters, adjustable setting

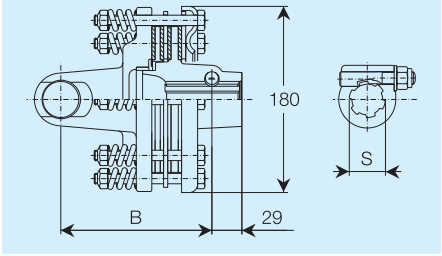
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
*1200	133	1 3/8" Z6	N45	661G48303R
	133	1 3/8" Z21	N51	661G48337R
	138	1 3/4" Z6	N57	661G48304R
	138	1 3/4" Z20	N63	661G48338R
1350	133	1 3/8" Z6	N46	661G51303R
	133	1 3/8" Z21	N52	661G51337R
	138	1 3/4" Z6	N58	661G51304R
	138	1 3/4" Z20	N64	661G51338R
1450	133	1 3/8" Z6	N47	661G53303R
	133	1 3/8" Z21	N53	661G53337R
	138	1 3/4" Z6	N59	661G53304R
	138	1 3/4" Z20	N65	661G53338R
1600	133	1 3/8" Z6	N0F	661G56303R
	133	1 3/8" Z21	N0H	661G56337R
	138	1 3/4" Z6	N0K	661G56304R
	138	1 3/4" Z20	N0M	661G56338R

* Maximum recommended setting for 1000 min^{-1}

FFV34



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV34	Spare part code
*1200	133	1 3/8" Z6	0T1	635G48303R
	133	1 3/8" Z21	0T8	635G48337R
	138	1 3/4" Z6	0U5	635G48304R
	138	1 3/4" Z20	0V2	635G48338R
1350	133	1 3/8" Z6	0T2	635G51303R
	133	1 3/8" Z21	0T9	635G51337R
	138	1 3/4" Z6	0U6	635G51304R
	138	1 3/4" Z20	0V3	635G51338R
1450	133	1 3/8" Z6	0T3	635G53303R
	133	1 3/8" Z21	0T0	635G53337R
	138	1 3/4" Z6	0U7	635G53304R
	138	1 3/4" Z20	0V4	635G53338R
1600	133	1 3/8" Z6	0T4	635G56303R
	133	1 3/8" Z21	0U1	635G56337R
	138	1 3/4" Z6	0U8	635G56304R
	138	1 3/4" Z20	0V5	635G56338R

* Maximum recommended setting for 1000 min^{-1}

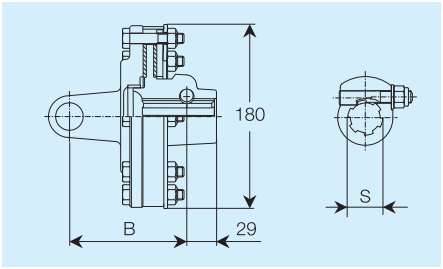
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

Friction torque limiters, non-adjustable setting

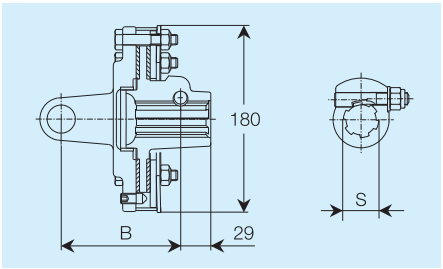
FT32



Setting Nm	B mm	S	Code FT32	Spare part code
900	117	1 3/8" Z6	Q11	663G41203R
	117	1 3/8" Z21	Q16	663G41237R
1000	117	1 3/8" Z6	Q14	663G44203R
	117	1 3/8" Z21	Q19	663G44237R
*1100	117	1 3/8" Z6	Q15	663G46203R
	117	1 3/8" Z21	Q20	663G46237R

* Maximum recommended setting for 1000 min^{-1}

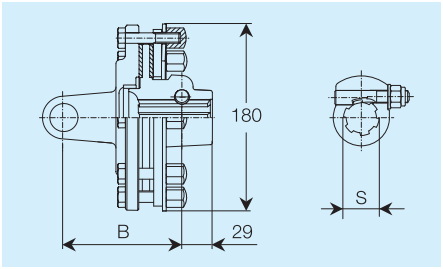
FT32R with Release System



Setting Nm	B mm	S	Code FT32R	Spare part code
900	117	1 3/8" Z6	H11	663G41C03R
	117	1 3/8" Z21	H16	663G41C37R
1000	117	1 3/8" Z6	H14	663G44C03R
	117	1 3/8" Z21	H19	663G44C37R
*1100	117	1 3/8" Z6	H15	663G46C03R
	117	1 3/8" Z21	H20	663G46C37R

* Maximum recommended setting for 1000 min^{-1}

FK32



Setting Nm	B mm	S	Code FK32	Spare part code
900	117	1 3/8" Z6	7A8	60KG41203R
	117	1 3/8" Z21	7C1	60KG41237R
1000	117	1 3/8" Z6	7A9	60KG44203R
	117	1 3/8" Z21	7C2	60KG44237R
*1100	117	1 3/8" Z6	7C0	60KG46203R
	117	1 3/8" Z21	7C3	60KG46237R

* Maximum recommended setting for 1000 min^{-1}

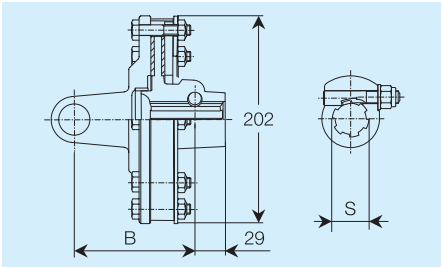
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiters, non-adjustable setting

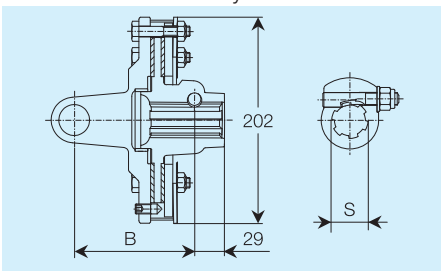
FT42



Setting Nm	B mm	S	Code FT42	Spare part code
*1200	117	1 3/8" Z6	Q22	663G48403R
	117	1 3/8" Z21	Q26	663G48437R
	122	1 3/4" Z6	Q30	663G48404R
	122	1 3/4" Z20	Q34	663G48438R
1450	117	1 3/8" Z6	Q23	663G53403R
	117	1 3/8" Z21	Q27	663G53437R
	122	1 3/4" Z6	Q31	663G53404R
	122	1 3/4" Z20	Q35	663G53438R

* Maximum recommended setting for 1000 min^{-1}

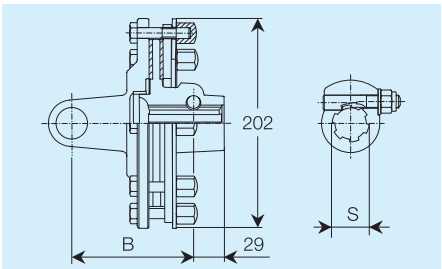
FT42R with Release System



Setting Nm	B mm	S	Code FT42R	Spare part code
*1200	117	1 3/8" Z6	H22	663G48F03R
	117	1 3/8" Z21	H26	663G48F37R
	122	1 3/4" Z6	H30	663G48F04R
	122	1 3/4" Z20	H34	663G48F38R
1450	117	1 3/8" Z6	H23	663G53F03R
	117	1 3/8" Z21	H27	663G53F37R
	122	1 3/4" Z6	H31	663G53F04R
	122	1 3/4" Z20	H35	663G53F38R

* Maximum recommended setting for 1000 min^{-1}

FK42



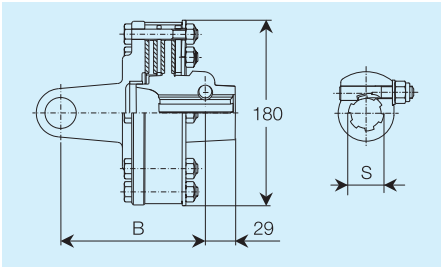
Setting Nm	B mm	S	Code FK42	Spare part code
*1200	117	1 3/8" Z6	7C4	60KG48403R
	117	1 3/8" Z21	7C7	60KG48437R
	122	1 3/4" Z6	7D0	60KG48404R
	122	1 3/4" Z20	7D3	60KG48438R
1450	117	1 3/8" Z6	7C5	60KG53403R
	117	1 3/8" Z21	7C8	60KG53437R
	122	1 3/4" Z6	7D1	60KG53404R
	122	1 3/4" Z20	7D4	60KG53438R

* Maximum recommended setting for 1000 min^{-1}

Size S6

Friction torque limiter, non-adjustable setting

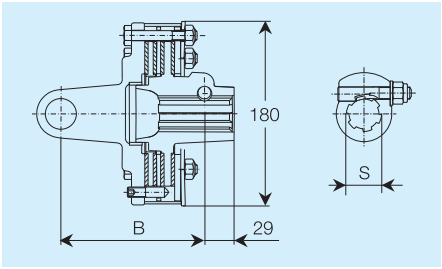
FT34



Setting Nm	B mm	S	Code FT34	Spare part code
*1200	133	1 3/8" Z6	Q51	663G48303R
	133	1 3/8" Z21	Q58	663G48337R
	138	1 3/4" Z6	Q65	663G48304R
	138	1 3/4" Z20	Q72	663G48338R
1450	133	1 3/8" Z6	Q52	663G53303R
	133	1 3/8" Z21	Q59	663G53337R
	138	1 3/4" Z6	Q66	663G53304R
	138	1 3/4" Z20	Q73	663G53338R

* Maximum recommended setting for 1000 min^{-1}

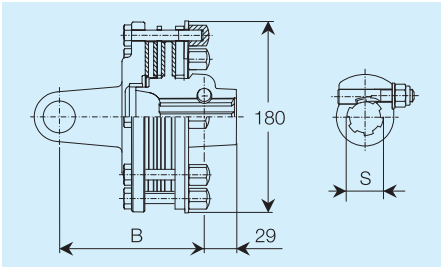
FT34R with Release System



Setting Nm	B mm	S	Code FT34R	Spare part code
*1200	133	1 3/8" Z6	H51	663G48E03R
	133	1 3/8" Z21	H58	663G48E37R
	138	1 3/4" Z6	H65	663G48E04R
	138	1 3/4" Z20	H72	663G48E38R
1450	133	1 3/8" Z6	H52	663G53E03R
	133	1 3/8" Z21	H59	663G53E37R
	138	1 3/4" Z6	H66	663G53E04R
	138	1 3/4" Z20	H73	663G53E38R

* Maximum recommended setting for 1000 min^{-1}

FK34



Setting Nm	B mm	S	Code FK34	Spare part code
*1200	133	1 3/8" Z6	7D6	60KG48303R
	133	1 3/8" Z21	7D9	60KG48337R
	138	1 3/4" Z6	7E2	60KG48304R
	138	1 3/4" Z20	7E5	60KG48338R
1450	133	1 3/8" Z6	7D7	60KG53303R
	133	1 3/8" Z21	7E0	60KG53337R
	138	1 3/4" Z6	7E3	60KG53304R
	138	1 3/4" Z20	7E6	60KG53338R

* Maximum recommended setting for 1000 min^{-1}

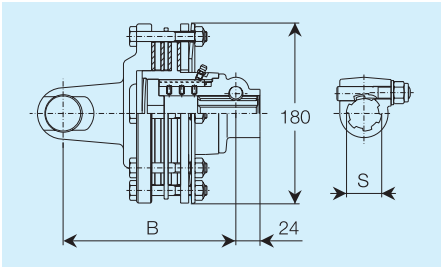
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter and overrunning clutch, adjustable setting

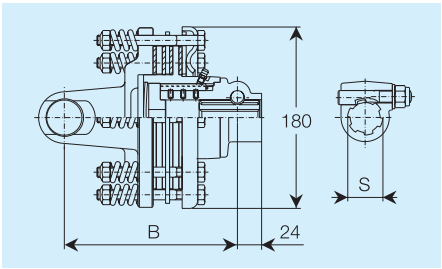
FNV34



Setting Nm	B mm	S	Code FNV34	Spare part code
*1200	158	1 3/8" Z6	2A0	665G48103R
	158	1 3/8" Z21	2A8	665G48137R
1350	158	1 3/8" Z6	2A1	665G51103R
	158	1 3/8" Z21	2A9	665G51137R
1450	158	1 3/8" Z6	2A2	665G53103R
	158	1 3/8" Z21	2B0	665G53137R
1600	158	1 3/8" Z6	2A3	665G56103R
	158	1 3/8" Z21	2B1	665G56137R

* Maximum recommended setting for 1000 min^{-1}

FFNV34



Drivelines with FFNV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFNV34	Spare part code
*1200	158	1 3/8" Z6	2F0	667G48103R
	158	1 3/8" Z21	2F8	667G48137R
1350	158	1 3/8" Z6	2F1	667G51103R
	158	1 3/8" Z21	2F9	667G51137R
1450	158	1 3/8" Z6	2F2	667G53103R
	158	1 3/8" Z21	2G0	667G53137R
1600	158	1 3/8" Z6	2F3	667G56103R
	158	1 3/8" Z21	2G1	667G56137R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

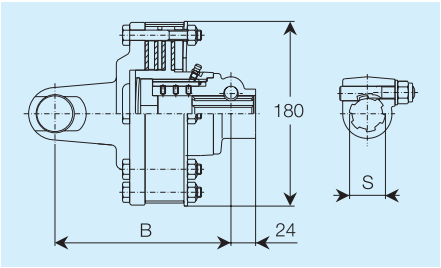
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S6

Friction torque limiter and overrunning clutch, non-adjustable setting

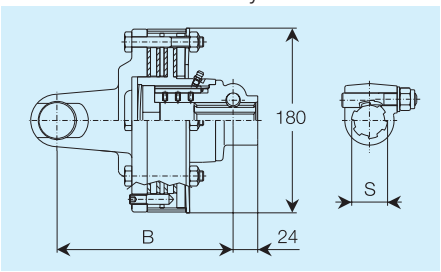
FNT34



Setting Nm	B mm	S	Codice FNT34	Codice ricambio
*1200	158	1 3/8" Z6	1A1	658G48103R
	158	1 3/8" Z21	1A6	658G48137R
1450	158	1 3/8" Z6	1A2	658G53103R
	158	1 3/8" Z21	1A7	658G53137R

* Maximum recommended setting for 1000 min^{-1}

FNT34R with Release System



Setting Nm	B mm	S	Codice FNT34R	Codice ricambio
*1200	158	1 3/8" Z6	1C1	658G48203R
	158	1 3/8" Z21	1C6	658G48237R
1450	158	1 3/8" Z6	1C2	658G53203R
	158	1 3/8" Z21	1C7	658G53237R

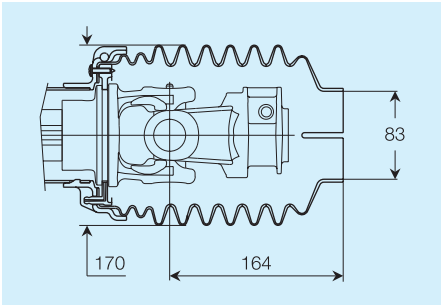
* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

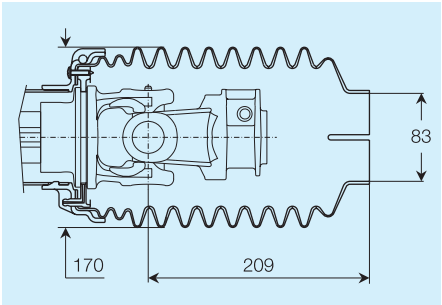
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Optional shield cones



Extended shield cone, medium length, narrow diameter
- Tractor end.....P
- Implement end .....M

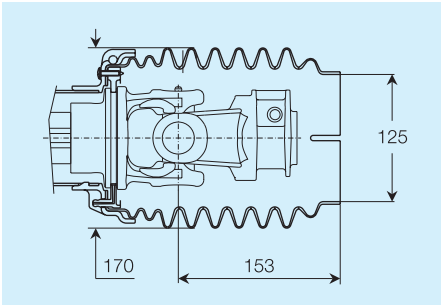


Extended shield cone, long length, narrow diameter
- Tractor end..... N
- Implement end L

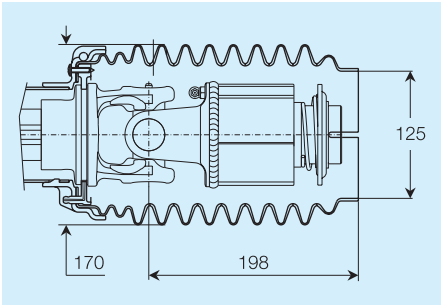
Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Size S6

Optional shield cones

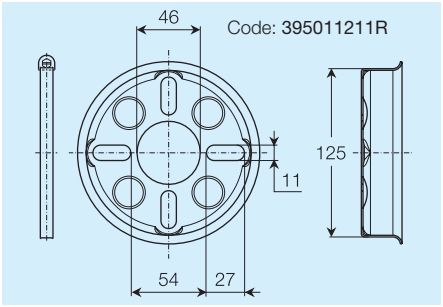


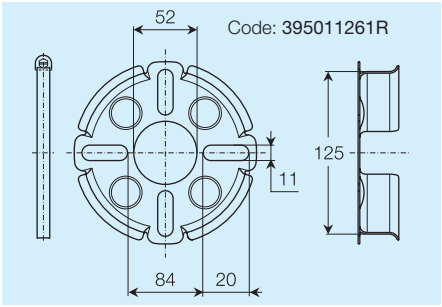
Extended shield cone, medium length, wide diameter
- Tractor end.....R
- Implement end.....T



Extended shield cone, long length, wide diameter
- Tractor end.....V
- Implement end.....Y

Plates with clamps for optional extended shield cones.



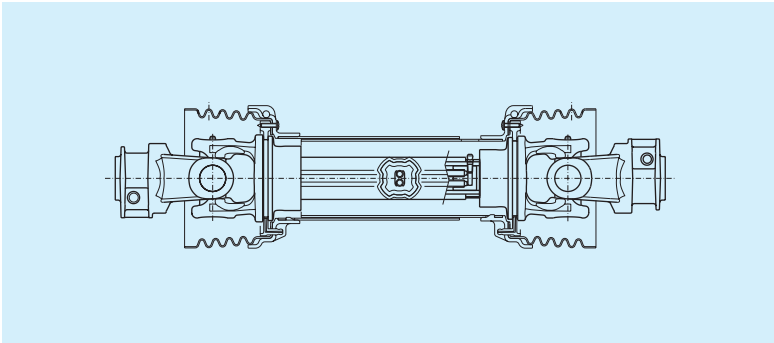


Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - Lubrication.

To have your driveline equipped with the Greasing System, add the letter “G” to the driveline code (16th character of the code, if required).



Greasing System code
G

Size S6

Standard SFT cardan joint driveline

1
C

C: Standard

2 3
S **6**

Size **S6**

4

Telescoping Members
See pages S6.4 and S6.5 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See pages S6.6 -S6.7 and chapter 8 - *Driveline Lengths*

8

Safety Labels and operator's manual
See page S6.8 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S6.8 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint, 80° CV, 50° CV, or splined stub shaft without joint), and establishes the associated shields and attachment to PTO.

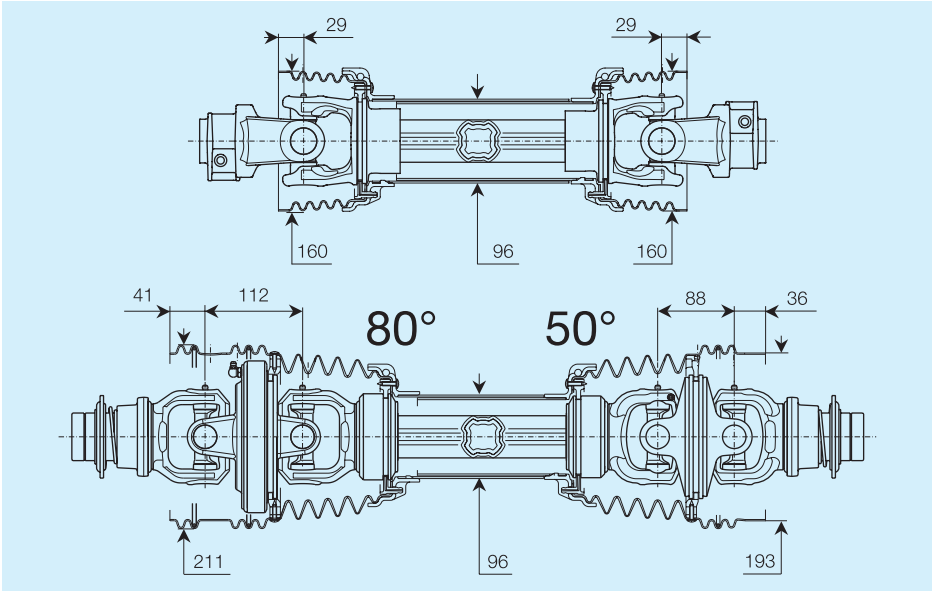
13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft.

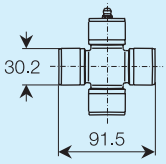
16 17 18

Only use these positions of the code if requesting optional shield cones, and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

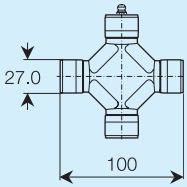


Single Cardan Joint



4120H0012

80° and 50°Constant Velocity Joints



4120G0051

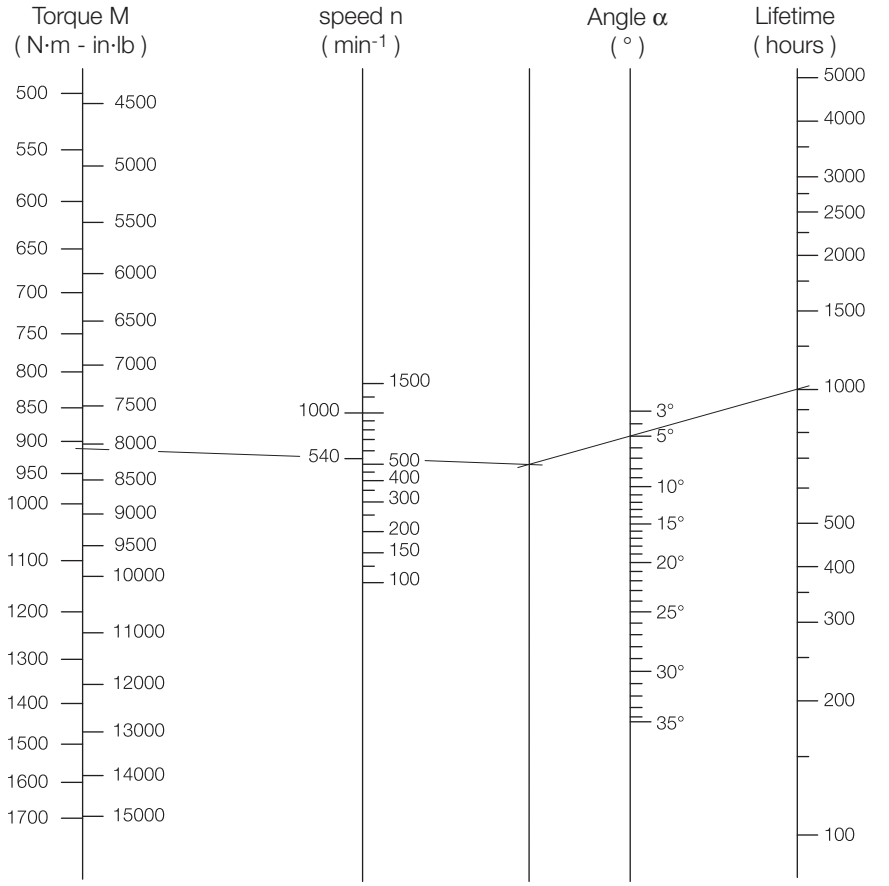
Size	540 min^{-1} Mn		540 min^{-1} Pn		1000 min^{-1} Mn		1000 min^{-1} Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
H7	911	8061	51	70	745	6592	78	106

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

80° CV joint size H7 and size S6 have equal dimensions. Joint size H7 is projected with a different technology to permit higher power transmission. It is marked with S7 on central housing.

Size H7

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 911 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size H7, torque M = 911 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

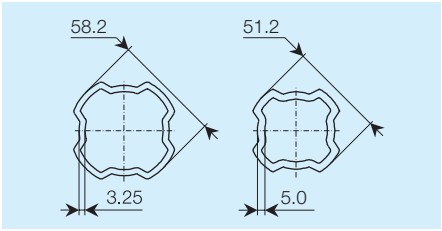
Example: M_{50} = 911 Nm is the theoretical transmittable torque for a cardan driveline size H7, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 779 Nm, M_{50} / M ratio is 911 / 779 = 1.17. The lubrication frequency can be extended to 200 hours.

Size H7

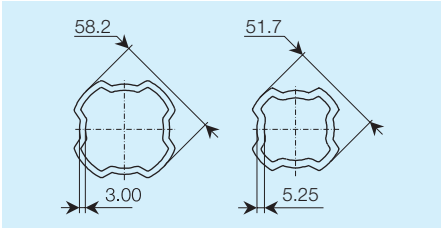
Telescoping Members

Four-Tooth profile tubes



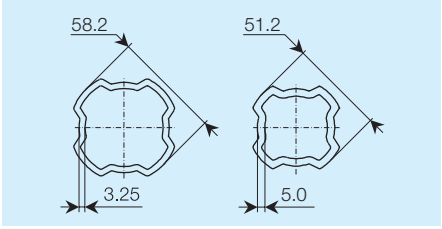
Mmax (Nm)	4000
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



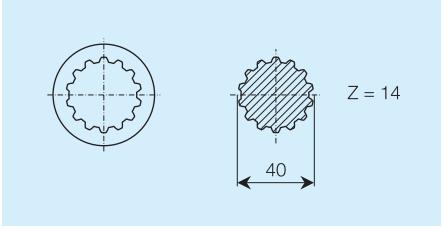
Mmax (Nm)	4000
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	4000
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

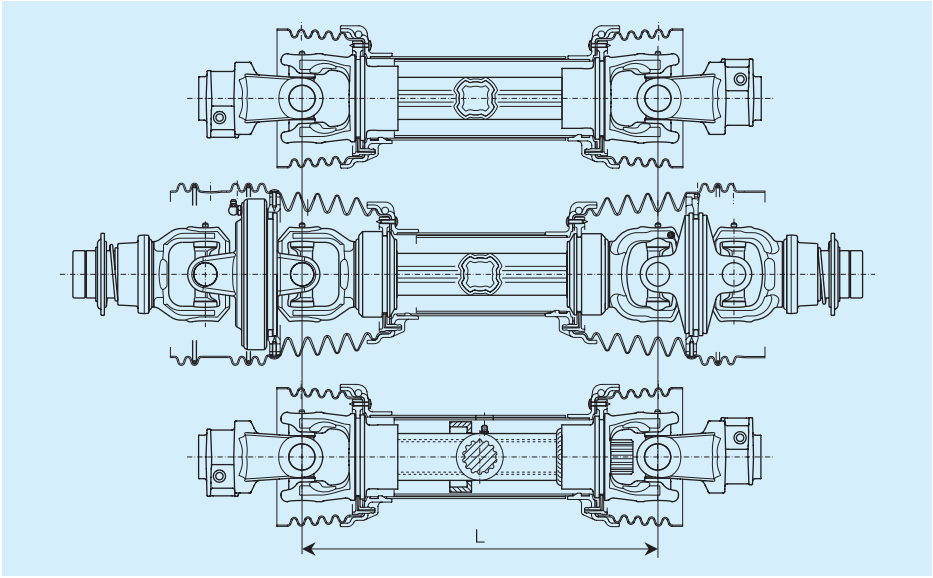
Splined shafts



Mmax (Nm)	4000
T/M (N/Nm)	7 - 9
Tube code	S

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Length





	Standard			Maximum extension			Splined	Length
L	Lw	Lt	Ls	Lw	Lt	Ls	Lw = Lt = Ls	code
mm	mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	- -	- -	- -	581	041
460	- -	- -	- -	565	640	663	681	046
510	595	670	742	665	740	763	781	051
560	695	770	830	765	840	863	881	056
610	795	870	917	865	940	963	981	061
660	890	966	1005	960	1036	1063	1016	066
710	965	1050	1092	1035	1120	1162	1116	071
760	1040	1133	1180	- -	- -	- -	1216	076
810	1115	1216	1267	- -	- -	- -	1316	081
860	1190	1300	1355	- -	- -	- -	- -	086
910	1265	1383	1442	- -	- -	- -	- -	091
1010	1415	1550	1617	- -	- -	- -	- -	101
1110	1565	1716	1792	- -	- -	- -	- -	111
1210	1715	1883	1967	- -	- -	- -	- -	121

Lw: maximum working length **Lt**: maximum temporary length (short duration temporary maneuvers) **Ls**: maximum length without rotation

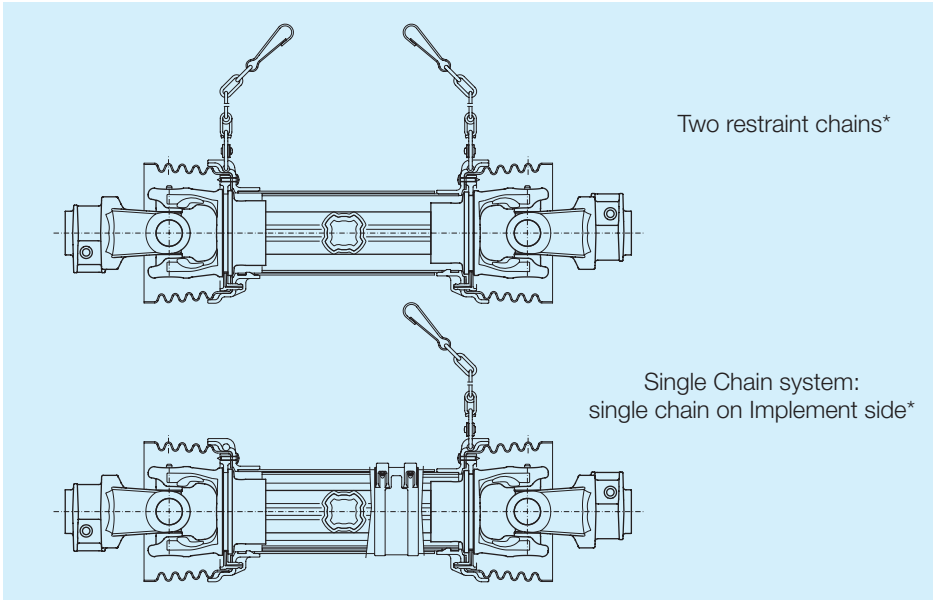
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size H7

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

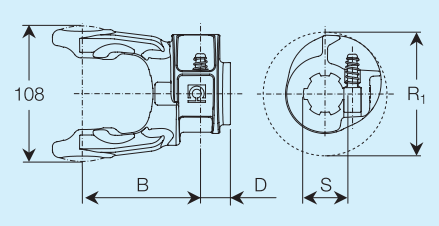


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

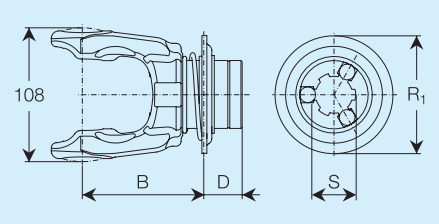
Yokes for single cardan joint

Push-pin yokes

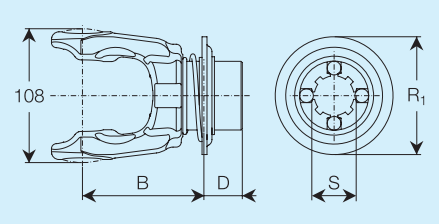


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	95	24	100	007	5070H0355
1 3/8" Z21	87	32	100	008	5070H3755
D8x32x38	95	24	100	093	5070H2151

RT Ball collar yokes

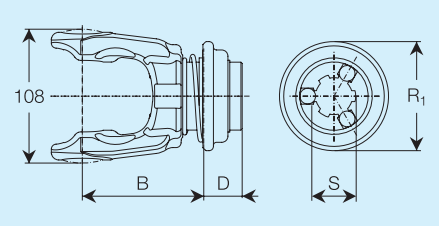


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	98	31	95	R07	5720H0355
1 3/8" Z21	98	31	95	R08	5720H3755
1 3/4" Z6	100	31	120	R09	5720H0455
1 3/4" Z20	100	31	120	R10	5720H3855



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	98	31	95	R93	5720H2151

RTA Automatic ball collar yokes



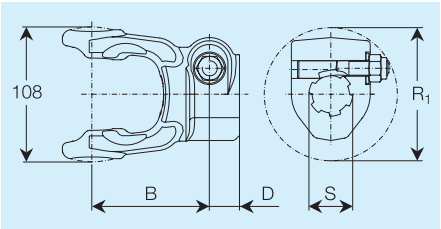
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	98	31	88	0Q7	5720H0361
1 3/8" Z21	98	31	88	0Q8	5720H3761
1 3/4" Z6	100	31	110	0Q9	5720H0461
1 3/4" Z20	100	31	110	0Q0	5720H3861

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H7

Yokes for single cardan joint

Taper-pin yokes for shafts with counter-clockwise rotation



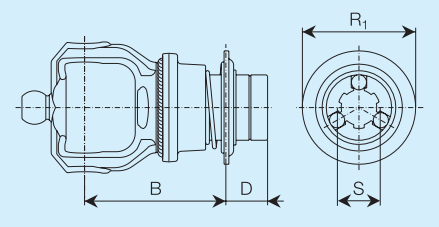
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	94	24	106	**014**	**5090H0360**
1 3/8" Z21	94	24	106	**015**	**5090H3760**
1 3/4" Z6	94	24	124	**016**	**5090H0460**
1 3/4" Z20	94	24	124	**017**	**5090H3860**

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

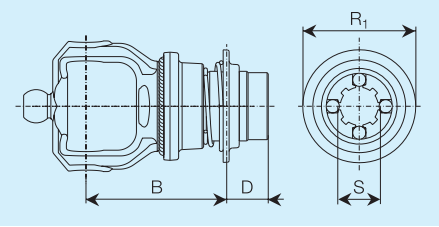
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Yokes for 80° Constant Velocity Joint

RT Ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE

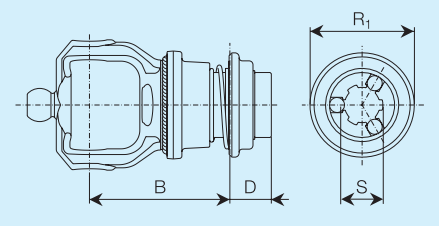


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	119	35	95	WR7	5730G0384
1 3/8" Z21	106	40	95	WR8	5730G3784
1 3/4" Z6	120	40	120	WR9	5730G0484
1 3/4" Z20	120	40	120	WR0	5730G3884



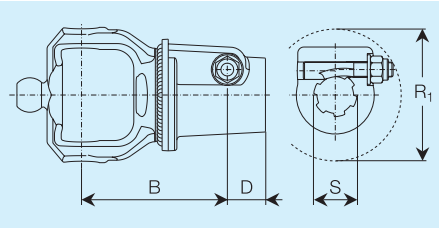
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	119	35	95	WR6	5730G2184

RTA Automatic ball collar yokes
TRACTOR SIDE and IMPLEMENT SIDE



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	119	35	88	WQ7	5730G0391
1 3/8" Z21	106	40	88	WQ8	5730G3791
1 3/4" Z6	120	40	110	WQ9	5730G0491
1 3/4" Z20	120	40	110	WQ0	5730G3891

Taper-pin yokes for shafts with counter-clockwise rotation



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	119	31	106	W14	5110G0361
1 3/8" Z21	106	31	106	W15	5110G3761
1 3/4" Z6	120	31	126	W16	5110G0461
1 3/4" Z20	120	31	126	W17	5110G3861

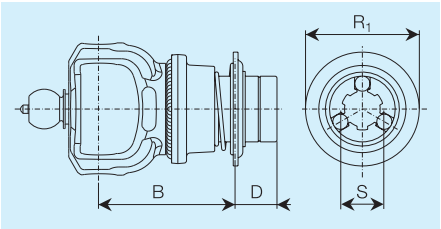
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

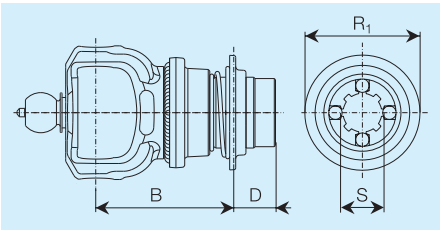
Size H7

Yokes for 50° Constant Velocity Joint

RT Ball collar yokes

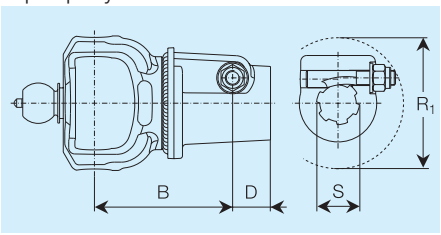


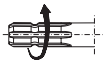
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	35	95	KR7	5730G0353
1 3/8" Z21	102	40	95	KR8	5730G3753
1 3/4" Z6	115	40	120	KR9	5730G0453
1 3/4" Z20	115	40	120	KR0	5730G3853



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	114	35	95	KR8	5730G2153

Taper-pin yokes for shafts with counter-clockwise rotation





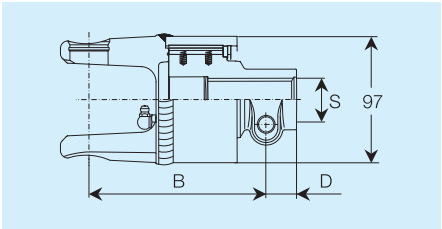
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	31	106	K14	5190G0352
1 3/8" Z21	102	31	106	K15	5190G3752
1 3/4" Z6	115	31	126	K16	5190G0452
1 3/4" Z20	115	31	126	K17	5190G3852

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning Clutches

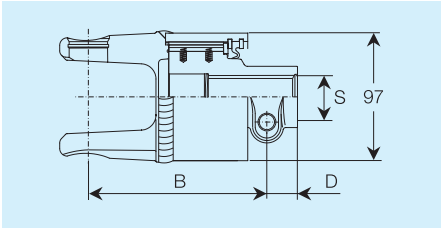
RA2



S	B mm	D mm	Code RA2	Spare part code
1 3/8" Z6	147	24	A50	601206601R
1 3/8" Z21	147	24	A51	601206602R
1 3/4" Z6	149	29	A52	601206603R
1 3/4" Z20	149	29	A53	601206604R

Maximum recommended torque: 3800 Nm

RL2 (Permanent lubrication)

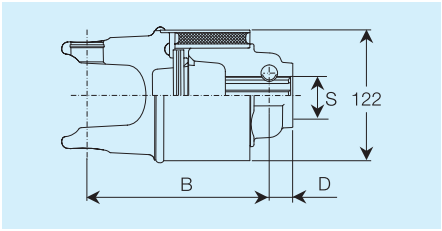


S	B mm	D mm	Code RL2	Spare part code
1 3/8" Z6	147	24	0A2	60160H601R
1 3/8" Z21	147	24	0A3	60160H602R
1 3/4" Z6	149	29	0A4	60160H603R
1 3/4" Z20	149	29	0A5	60160H604R

Maximum recommended torque: 3800 Nm

GE Torsionally resilient joints

GE6



Torque at maximum recommended deformation (±20°): (55 Shore rubber), $M_{20°}$ = 1700 Nm.
Torque at maximum recommended deformation (±20°): (65 Shore rubber), $M_{20°}$ = 3000 Nm.

55 Shore S	B mm	D mm	Code GE6	Spare part code
1 3/8" Z6	170	22	0D0	608H65501R
1 3/8" Z21	170	22	0D1	608H65502R
1 3/4" Z6	170	22	0D2	608H65503R
1 3/4" Z20	170	22	0D3	608H65504R

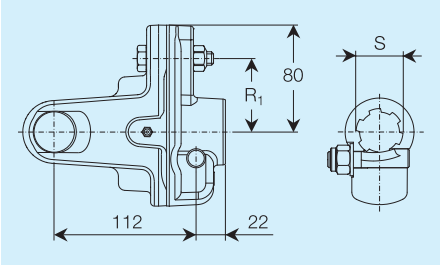
65 Shore S	B mm	D mm	Code GE6	Spare part code
1 3/8" Z6	170	22	0D4	608H66501R
1 3/8" Z21	170	22	0D5	608H66502R
1 3/4" Z6	170	22	0D6	608H66503R
1 3/4" Z20	170	22	0D7	608H66504R

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H7

LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
2700	1 3/8" Z6	55	098	6060H0302R
	1 3/8" Z21		161	6060H3702R
	1 3/4" Z6		099	6060H0402R
	1 3/4" Z20		162	6060H3802R
3100	1 3/8" Z6	65	1R2	6060H0301R
	1 3/8" Z21		1S2	6060H3701R
	1 3/4" Z6		1R6	6060H0401R
	1 3/4" Z20		1S6	6060H3801R

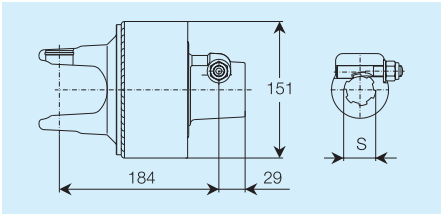
Bolt M10 x 50 cl 8.8.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

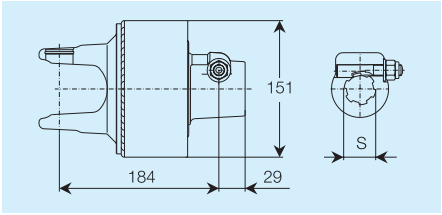
Automatic torque limiters

LR23
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
2100	1 3/8" Z6	19A	6WH161003R
	1 3/8" Z21	24A	6WH161037R
	1 3/4" Z6	76B	6WH161004R
	1 3/4" Z20	85B	6WH161038R

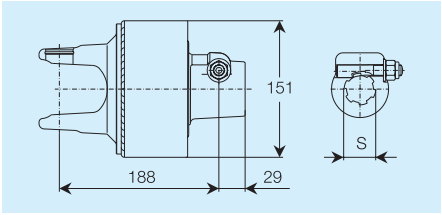
LR23
* for use at 1000 min^{-1}



Setting Nm	S	Code LR23	Spare part code
*2100	1 3/8" Z6	04C	6WHA61003R
	1 3/8" Z21	09C	6WHA61037R
	1 3/4" Z6	14C	6WHA61004R
	1 3/4" Z20	19C	6WHA61038R

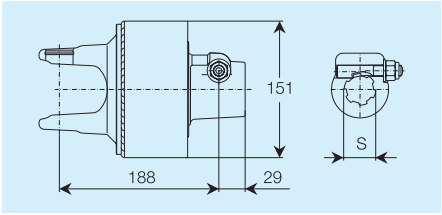
Maximum recommended speed 1000 min^{-1}

LR23 with overrunning clutch
for use at 540 min^{-1}



Setting Nm	S	Code LR23	Spare part code
2100	1 3/8" Z6	56B	6WH861003R
	1 3/8" Z21	66B	6WH861037R

LR23 with overrunning clutch
* for use at 1000 min^{-1}



Setting Nm	S	Code LR23	Spare part code
*2100	1 3/8" Z6	29C	6WHC61003R
	1 3/8" Z21	34C	6WHC61037R

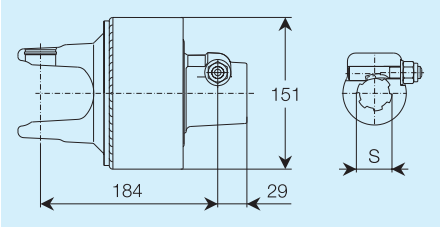
Maximum recommended speed 1000 min^{-1}

* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Size H7

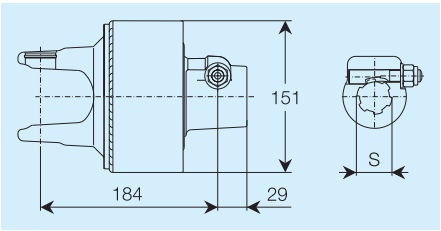
Automatic torque limiters

LR24
for use at 540 min^{-1}



Setting Nm	S	Code LR24	Spare part code
2600	1 3/8" Z6	27A	6WH266003R
	1 3/8" Z21	31A	6WH266037R
	1 3/4" Z6	35A	6WH266004R
	1 3/4" Z20	39A	6WH266038R
2900	1 3/8" Z6	28A	6WH269003R
	1 3/8" Z21	32A	6WH269037R
	1 3/4" Z6	36A	6WH269004R
	1 3/4" Z20	40A	6WH269038R

LR24
* for use at 1000 min^{-1}



Setting Nm	S	Code LR24	Spare part code
2600	1 3/8" Z6	51C	6WHE66003R
	1 3/8" Z21	55C	6WHE66037R
	1 3/4" Z6	59C	6WHE66004R
	1 3/4" Z20	63C	6WHE66038R
2900	1 3/8" Z6	52C	6WHE69003R
	1 3/8" Z21	56C	6WHE69037R
	1 3/4" Z6	60C	6WHE69004R
	1 3/4" Z20	64C	6WHE69038R

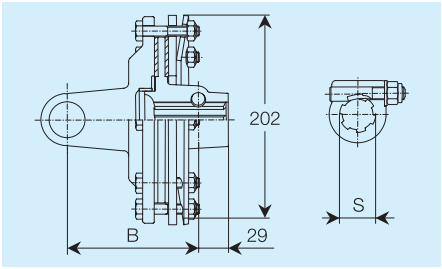
* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiters, adjustable setting

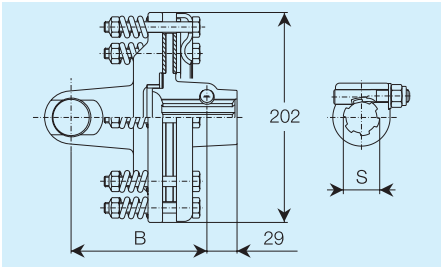
FV42



Setting Nm	B mm	S	Code FV42	Spare part code
1200	125	1 3/8" Z6	N20	661H48403R
	125	1 3/8" Z21	N23	661H48437R
	130	1 3/4" Z6	N26	661H48404R
	130	1 3/4" Z20	N29	661H48438R
1350	125	1 3/8" Z6	N35	661H51403R
	125	1 3/8" Z21	N37	661H51437R
	130	1 3/4" Z6	N0A	661H51404R
	130	1 3/4" Z20	N0D	661H51438R
*1450	125	1 3/8" Z6	N18	661H53403R
	125	1 3/8" Z21	N21	661H53437R
	130	1 3/4" Z6	N24	661H53404R
	130	1 3/4" Z20	N27	661H53438R
1600	125	1 3/8" Z6	N36	661H56403R
	125	1 3/8" Z21	N38	661H56437R
	130	1 3/4" Z6	N0C	661H56404R
	130	1 3/4" Z20	N0E	661H56438R
1800	125	1 3/8" Z6	N19	661H58403R
	125	1 3/8" Z21	N22	661H58437R
	130	1 3/4" Z6	N25	661H58404R
	130	1 3/4" Z20	N28	661H58438R

* Maximum recommended setting for 1000 min^{-1}

FFV42



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

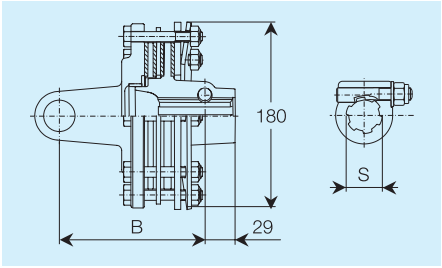
Setting Nm	B mm	S	Codice FFV42	Spare part code
1200	125	1 3/8" Z6	0Z1	635H48403R
	125	1 3/8" Z21	0Z6	635H48437R
	130	1 3/4" Z6	0Y1	635H48404R
	130	1 3/4" Z20	0Y6	635H48438R
1350	125	1 3/8" Z6	0Z2	635H51403R
	125	1 3/8" Z21	0Z7	635H51437R
	130	1 3/4" Z6	0Y2	635H51404R
	130	1 3/4" Z20	0Y7	635H51438R
*1450	125	1 3/8" Z6	0Z3	635H53403R
	125	1 3/8" Z21	0Z8	635H53437R
	130	1 3/4" Z6	0Y3	635H53404R
	130	1 3/4" Z20	0Y8	635H53438R
1600	125	1 3/8" Z6	0Z4	635H56403R
	125	1 3/8" Z21	0Z9	635H56437R
	130	1 3/4" Z6	0Y4	635H56404R
	130	1 3/4" Z20	0Y9	635H56438R
1800	125	1 3/8" Z6	0Z5	635H58403R
	125	1 3/8" Z21	0Z0	635H58437R
	130	1 3/4" Z6	0Y5	635H58404R
	130	1 3/4" Z20	0Y0	635H58438R

* Maximum recommended setting for 1000 min^{-1}

Size H7

Friction torque limiters, adjustable setting

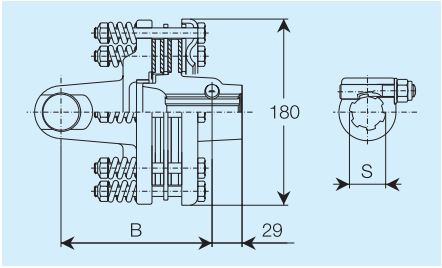
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
1200	140	1 3/8" Z6	N45	661H48303R
	140	1 3/8" Z21	N51	661H48337R
	145	1 3/4" Z6	N57	661H48304R
	145	1 3/4" Z20	N63	661H48338R
1350	140	1 3/8" Z6	N46	661H51303R
	140	1 3/8" Z21	N52	661H51337R
	145	1 3/4" Z6	N58	661H51304R
	145	1 3/4" Z20	N64	661H51338R
*1450	140	1 3/8" Z6	N47	661H53303R
	140	1 3/8" Z21	N53	661H53337R
	145	1 3/4" Z6	N59	661H53304R
	145	1 3/4" Z20	N65	661H53338R
1600	140	1 3/8" Z6	N0F	661H56303R
	140	1 3/8" Z21	N0H	661H56337R
	145	1 3/4" Z6	N0K	661H56304R
	145	1 3/4" Z20	N0M	661H56338R
1800	140	1 3/8" Z6	N43	661H58303R
	140	1 3/8" Z21	N49	661H58337R
	145	1 3/4" Z6	N55	661H58304R
	145	1 3/4" Z20	N61	661H58338R

* Maximum recommended setting for 1000 min^{-1}

FFV34



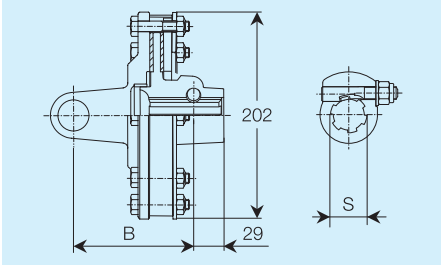
Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV34	Spare part code
1200	140	1 3/8" Z6	0T1	635H48303R
	140	1 3/8" Z21	0T8	635H48337R
	145	1 3/4" Z6	0U5	635H48304R
	145	1 3/4" Z20	0V2	635H48338R
1350	140	1 3/8" Z6	0T2	635H51303R
	140	1 3/8" Z21	0T9	635H51337R
	145	1 3/4" Z6	0U6	635H51304R
	145	1 3/4" Z20	0V3	635H51338R
*1450	140	1 3/8" Z6	0T3	635H53303R
	140	1 3/8" Z21	0T0	635H53337R
	145	1 3/4" Z6	0U7	635H53304R
	145	1 3/4" Z20	0V4	635H53338R
1600	140	1 3/8" Z6	0T4	635H56303R
	140	1 3/8" Z21	0U1	635H56337R
	145	1 3/4" Z6	0U8	635H56304R
	145	1 3/4" Z20	0V5	635H56338R
1800	140	1 3/8" Z6	0T5	635H58303R
	140	1 3/8" Z21	0U2	635H58337R
	145	1 3/4" Z6	0U9	635H58304R
	145	1 3/4" Z20	0V7	635H58338R

* Maximum recommended setting for 1000 min^{-1}

Friction torque limiters, non-adjustable setting

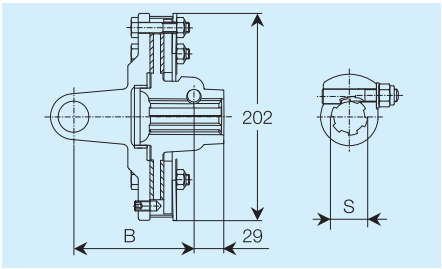
FT42



Setting Nm	B mm	S	Code FT42	Spare part code
1200	125	1 3/8" Z6	Q22	663H48403R
	125	1 3/8" Z21	Q26	663H48437R
	130	1 3/4" Z6	Q30	663H48404R
	130	1 3/4" Z20	Q34	663H48438R
*1450	125	1 3/8" Z6	Q23	663H53403R
	125	1 3/8" Z21	Q27	663H53437R
	130	1 3/4" Z6	Q31	663H53404R
	130	1 3/4" Z20	Q35	663H53438R
1800	125	1 3/8" Z6	Q21	663H58403R
	125	1 3/8" Z21	Q25	663H58437R
	130	1 3/4" Z6	Q29	663H58404R
	130	1 3/4" Z20	Q33	663H58438R

* Maximum recommended setting for 1000 min^{-1}

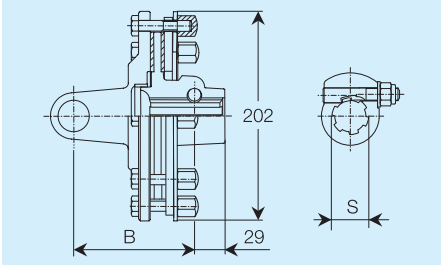
FT42R with Release System



Setting Nm	B mm	S	Code FT42R	Spare part code
1200	125	1 3/8" Z6	H22	663H48F03R
	125	1 3/8" Z21	H26	663H48F37R
	130	1 3/4" Z6	H30	663H48F04R
	130	1 3/4" Z20	H34	663H48F38R
*1450	125	1 3/8" Z6	H23	663H53F03R
	125	1 3/8" Z21	H27	663H53F37R
	130	1 3/4" Z6	H31	663H53F04R
	130	1 3/4" Z20	H35	663H53F38R
1800	125	1 3/8" Z6	H21	663H58F03R
	125	1 3/8" Z21	H25	663H58F37R
	130	1 3/4" Z6	H29	663H58F04R
	130	1 3/4" Z20	H33	663H58F38R

* Maximum recommended setting for 1000 min^{-1}

FK42



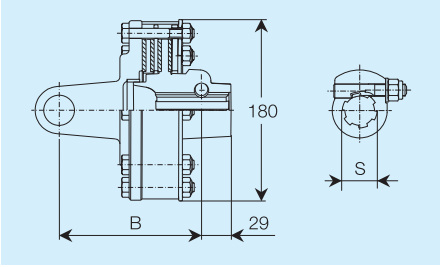
Setting Nm	B mm	S	Code FK42	Spare part code
1200	125	1 3/8" Z6	7C4	60KH48403R
	125	1 3/8" Z21	7C7	60KH48437R
	130	1 3/4" Z6	7D0	60KH48404R
	130	1 3/4" Z20	7D3	60KH48438R
*1450	125	1 3/8" Z6	7C5	60KH53403R
	125	1 3/8" Z21	7C8	60KH53437R
	130	1 3/4" Z6	7D1	60KH53404R
	130	1 3/4" Z20	7D4	60KH53438R
1800	125	1 3/8" Z6	7C6	60KH58403R
	125	1 3/8" Z21	7C9	60KH58437R
	130	1 3/4" Z6	7D2	60KH58404R
	130	1 3/4" Z20	7D5	60KH58438R

* Maximum recommended setting for 1000 min^{-1}

Size H7

Friction torque limiters, non-adjustable setting

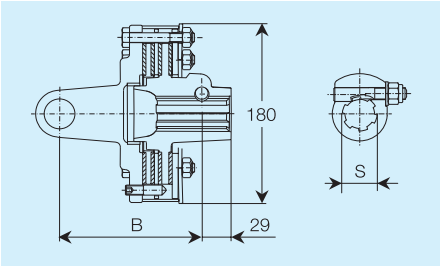
FT34



Setting Nm	B mm	S	Code FT34	Spare part code
1200	140	1 3/8" Z6	Q51	663H48303R
	140	1 3/8" Z21	Q58	663H48337R
	145	1 3/4" Z6	Q65	663H48304R
	145	1 3/4" Z20	Q72	663H48338R
*1450	140	1 3/8" Z6	Q52	663H53303R
	140	1 3/8" Z21	Q59	663H53337R
	145	1 3/4" Z6	Q66	663H53304R
	145	1 3/4" Z20	Q73	663H53338R
1800	140	1 3/8" Z6	Q54	663H58303R
	140	1 3/8" Z21	Q61	663H58337R
	145	1 3/4" Z6	Q68	663H58304R
	145	1 3/4" Z20	Q75	663H58338R

* Maximum recommended setting for 1000 min^{-1}

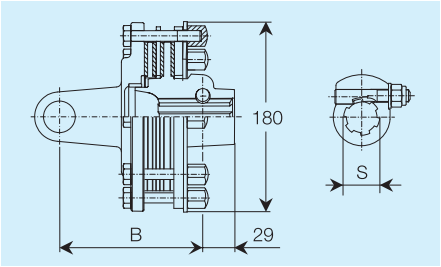
FT34R with Release System



Setting Nm	B mm	S	Code FT34R	Spare part code
1200	140	1 3/8" Z6	H51	663H48E03R
	140	1 3/8" Z21	H58	663H48E37R
	145	1 3/4" Z6	H65	663H48E04R
	145	1 3/4" Z20	H72	663H48E38R
*1450	140	1 3/8" Z6	H52	663H53E03R
	140	1 3/8" Z21	H59	663H53E37R
	145	1 3/4" Z6	H66	663H53E04R
	145	1 3/4" Z20	H73	663H53E38R
1800	140	1 3/8" Z6	H54	663H58E03R
	140	1 3/8" Z21	H61	663H58E37R
	145	1 3/4" Z6	H68	663H58E04R
	145	1 3/4" Z20	H75	663H58E38R

* Maximum recommended setting for 1000 min^{-1}

FK34

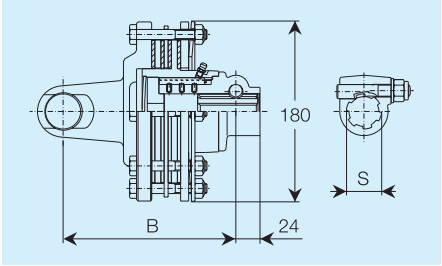


Setting Nm	B mm	S	Code FK34	Spare part code
1200	140	1 3/8" Z6	7D6	60KH48303R
	140	1 3/8" Z21	7D9	60KH48337R
	145	1 3/4" Z6	7E2	60KH48304R
	145	1 3/4" Z20	7E5	60KH48338R
*1450	140	1 3/8" Z6	7D7	60KH53303R
	140	1 3/8" Z21	7E0	60KH53337R
	145	1 3/4" Z6	7E3	60KH53304R
	145	1 3/4" Z20	7E6	60KH53338R
1800	140	1 3/8" Z6	7D8	60KH58303R
	140	1 3/8" Z21	7E1	60KH58337R
	145	1 3/4" Z6	7E4	60KH58304R
	145	1 3/4" Z20	7E7	60KH58338R

* Maximum recommended setting for 1000 min^{-1}

Friction torque limiter and overrunning clutch, adjustable setting

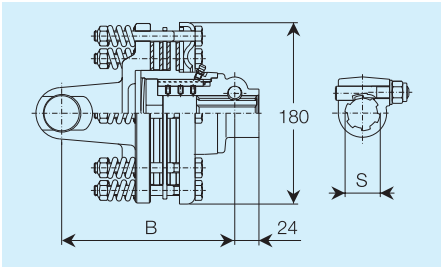
FNV34



Setting Nm	B mm	S	Code FNV34	Spare part code
1200	166	1 3/8" Z6	2A0	665H48103R
	166	1 3/8" Z21	2A8	665H48137R
1350	166	1 3/8" Z6	2A1	665H51103R
	166	1 3/8" Z21	2A9	665H51137R
*1450	166	1 3/8" Z6	2A2	665H53103R
	166	1 3/8" Z21	2B0	665H53137R
1600	166	1 3/8" Z6	2A3	665H56103R
	166	1 3/8" Z21	2B1	665H56137R
1800	166	1 3/8" Z6	2A4	665H58103R
	166	1 3/8" Z21	2B2	665H58137R

* Maximum recommended setting for 1000 min^{-1}

FFNV34



Drivelines with FFNV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFNV34	Spare part code
1200	166	1 3/8" Z6	2F0	667H48103R
	166	1 3/8" Z21	2F8	667H48137R
1350	166	1 3/8" Z6	2F1	667H51103R
	166	1 3/8" Z21	2F9	667H51137R
*1450	166	1 3/8" Z6	2F2	667H53103R
	166	1 3/8" Z21	2G0	667H53137R
1600	166	1 3/8" Z6	2F3	667H56103R
	166	1 3/8" Z21	2G1	667H56137R
1800	166	1 3/8" Z6	2F4	667H58103R
	166	1 3/8" Z21	2G2	667H58137R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

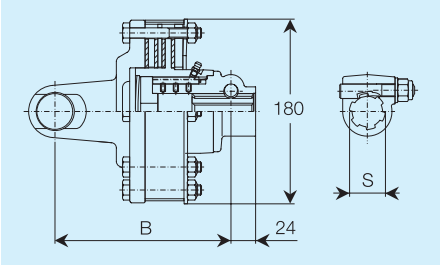
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H7

Friction torque limiter and overrunning clutch, non-adjustable setting

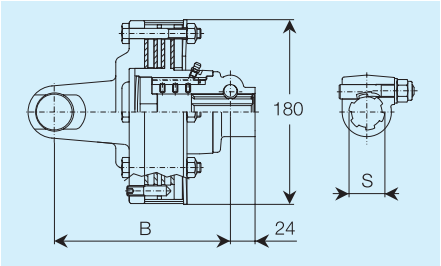
FNT34



Setting Nm	B mm	S	Code FNT34	Spare part code
1200	166	1 3/8" Z6	1A1	658H48103R
	166	1 3/8" Z21	1A6	658H48137R
*1450	166	1 3/8" Z6	1A2	658H53103R
	166	1 3/8" Z21	1A7	658H53137R
1800	166	1 3/8" Z6	1A3	658H58103R
	166	1 3/8" Z21	1A8	658H58137R

* Maximum recommended setting for 1000 min^{-1}

FNT34R with Release System



Setting Nm	B mm	S	Code FNT34R	Spare part code
1200	166	1 3/8" Z6	1C1	658H48203R
	166	1 3/8" Z21	1C6	658H48237R
*1450	166	1 3/8" Z6	1C2	658H53203R
	166	1 3/8" Z21	1C7	658H53237R
1800	166	1 3/8" Z6	1C3	658H58203R
	166	1 3/8" Z21	1C8	658H58237R

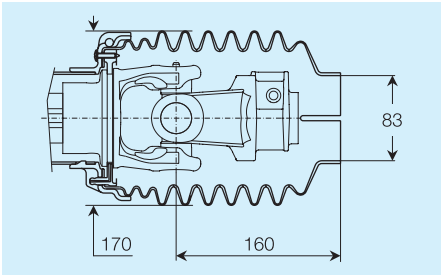
* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

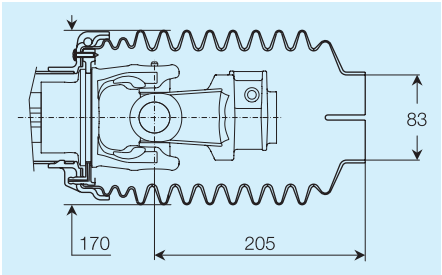
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

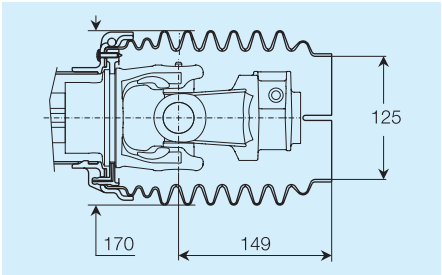
Optional shield cones



Extended shield cone, medium length, narrow diameter
- Tractor end.....P
- Implement end .....M

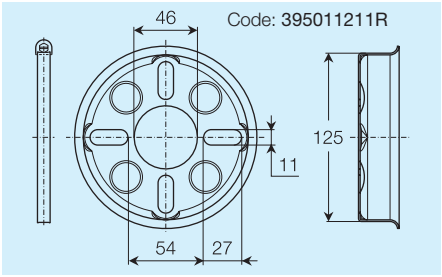


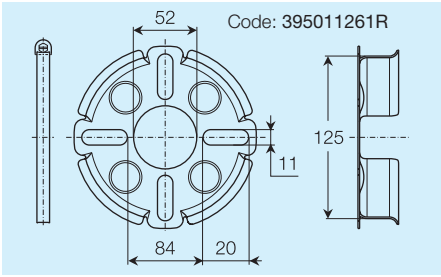
Extended shield cone, long length, narrow diameter
- Tractor end..... N
- Implement end L



Extended shield cone, medium length, wide diameter
- Tractor end.....R
- Implement end .....T

Plates with clamps for optional extended shield cones



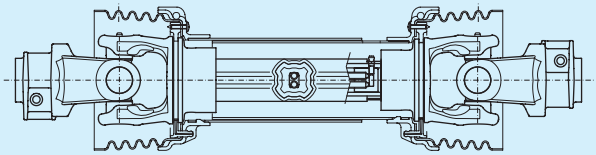


Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System code
G

Code for size H7 drivelines

1
C

C: Standard SFT cardan joint driveline

2 3
H **7**

Size H7

4

Telescoping Members
See page H7.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page H7.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and operator's manual
See page H7.6 and chapter 9 - *Safety Labels and Operator's Manual*

9

Restraint chains
See page H7.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint, 80° CV, 50° CV, or splined stub shaft without joint), and establishes the associated shields and attachment to PTO.

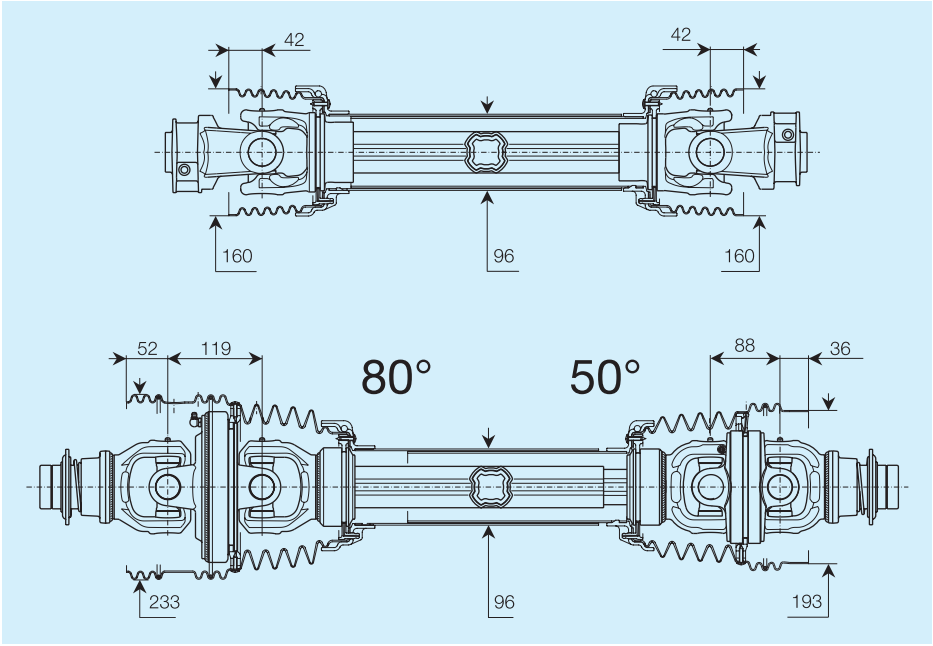
13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft.

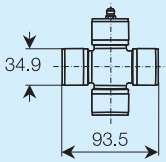
16 17 18

Only use these positions of the code if requesting optional shield cones, and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "X" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

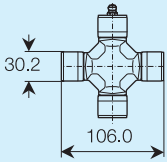


Single Cardan Joint



4120L0012

80° and 50°Constant Velocity Joint



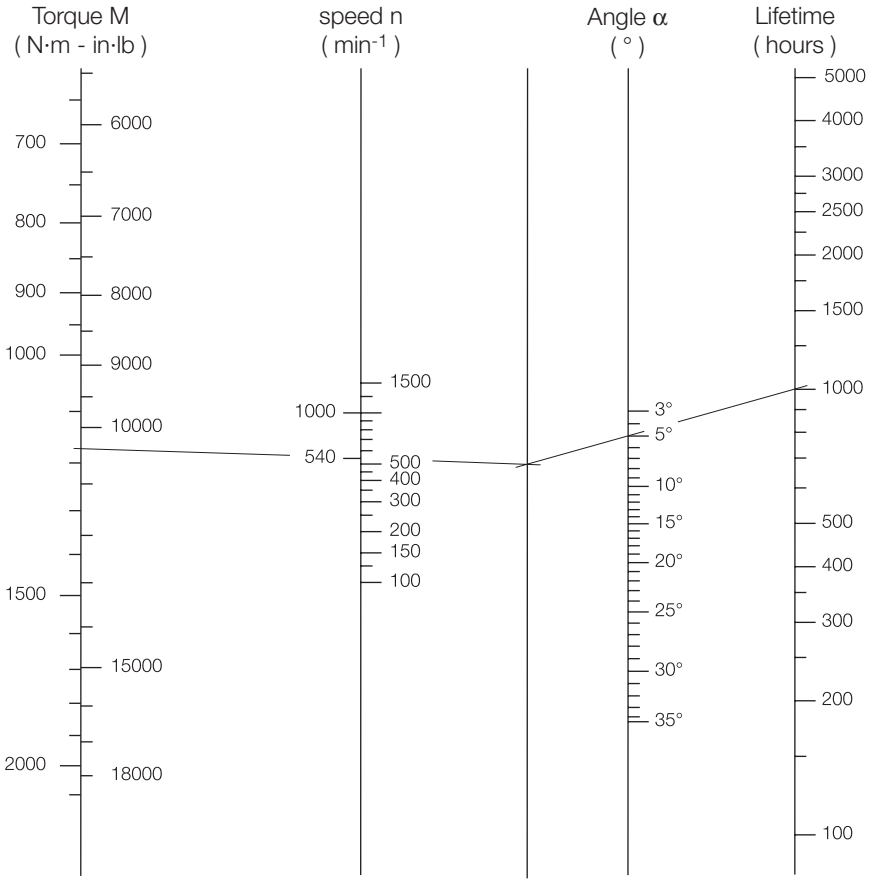
4120L0051

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S8	1171	10364	66	90	956	8457	100	136

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated with nominal torque Mn.

Size S8

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 1171 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size **S8**, torque M = 1171 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

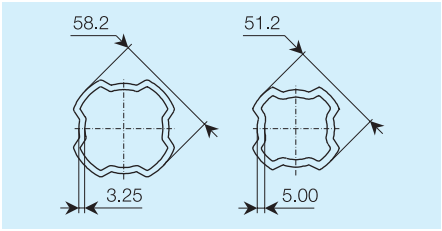
Example: M_{50} = 1171 Nm is the theoretical transmittable torque for a cardan driveline size **S8**, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 1000 Nm, M_{50} / M ratio is 1171 / 1000 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S8

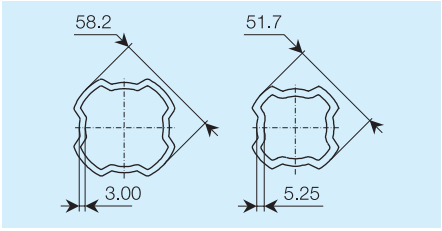
Telescoping Members

Four-Tooth profile tubes



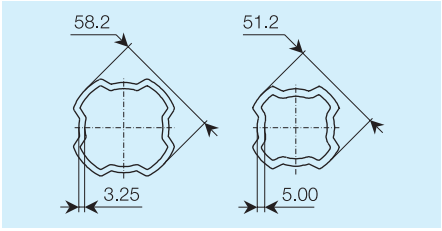
Mmax (Nm)	4000
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



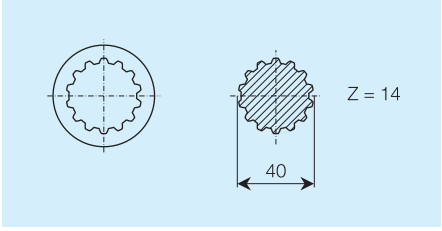
Mmax (Nm)	4000
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	4000
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

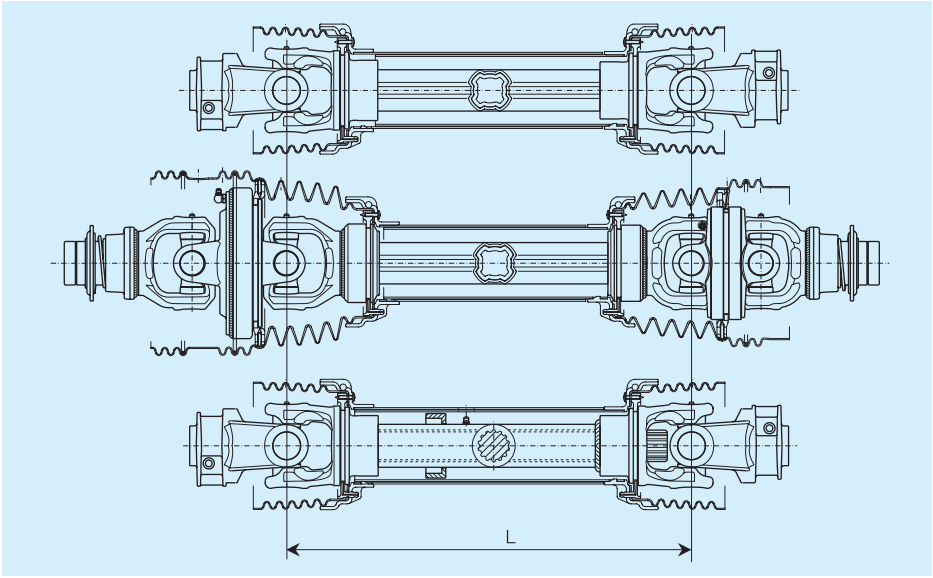
Splined shafts



Mmax (Nm)	4000
T/M (N/Nm)	7 - 9
Tube code	S

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Length




Standard


Maximum extension


Splined

L	Lw	Lt	Ls	Lw	Lt	Ls	Lw = Lt = Ls	Length code
mm	mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	- -	- -	- -	575	041
460	- -	- -	- -	- -	- -	- -	675	046
510	- -	- -	- -	660	735	747	775	051
560	685	760	822	760	835	847	875	056
610	785	860	910	860	935	947	975	061
660	885	960	997	960	1035	1047	1010	066
710	960	1043	1085	1035	1118	1147	1110	071
760	1035	1126	1172	1110	1201	1247	1210	076
810	1110	1210	1260	- -	- -	- -	1310	081
860	1185	1293	1347	- -	- -	- -	- -	086
910	1260	1376	1435	- -	- -	- -	- -	091
1010	1410	1543	1610	- -	- -	- -	- -	101
1110	1560	1710	1785	- -	- -	- -	- -	111
1210	1710	1876	1960	- -	- -	- -	- -	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

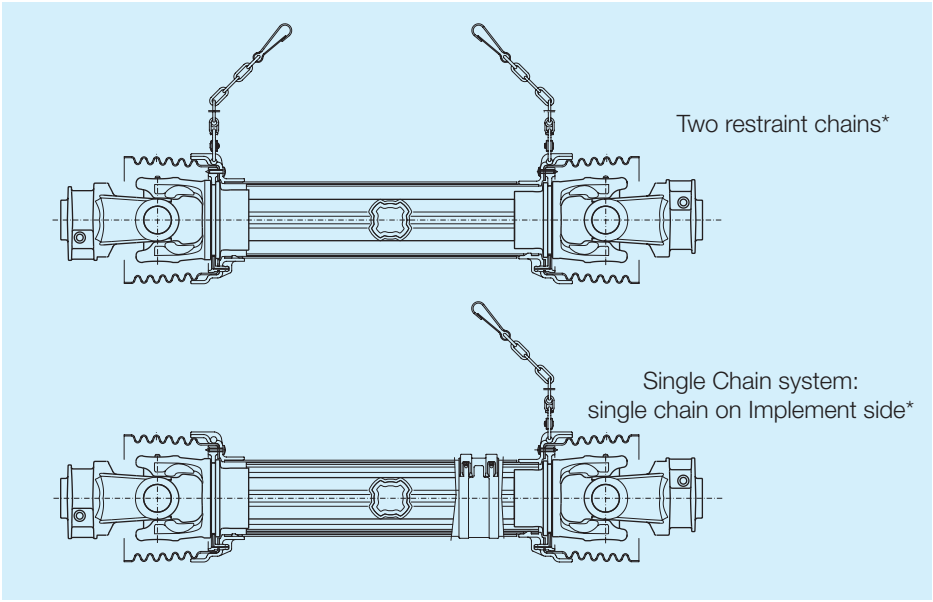
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S8

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

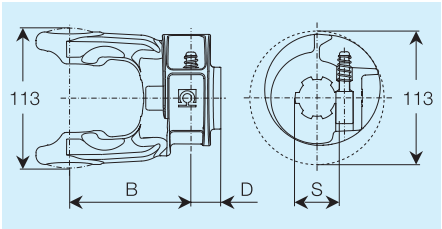


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

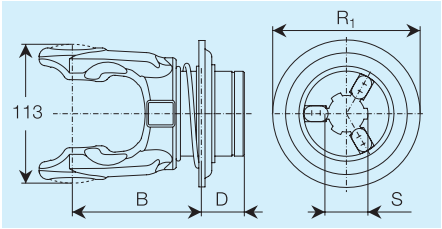
Yokes for single cardan joint

Push-pin yokes

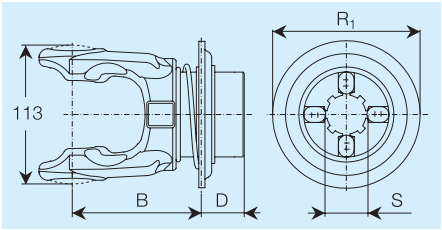


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	98	24	108	007	5070L0355
1 3/8" Z21	90	32	108	008	5070L3755
D8x32x38	98	24	108	093	5070L2151

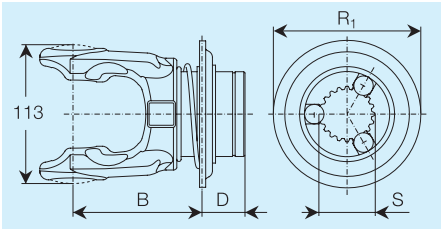
RT Ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	105	35	120	R07	5720L0355
1 3/8" Z21	105	35	120	R08	5720L3755



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	105	35	120	R93	5720L2151



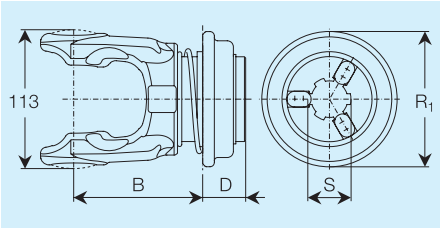
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/4" Z6	105	35	120	R09	5720L0455
1 3/4" Z20	105	35	120	R10	5720L3855

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

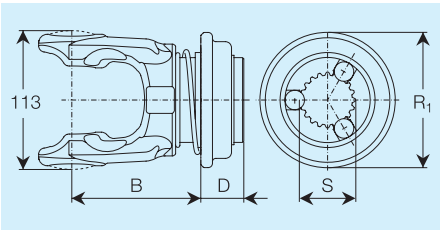
Size S8

Yokes for single cardan joint

RTA Automatic ball collar yoke

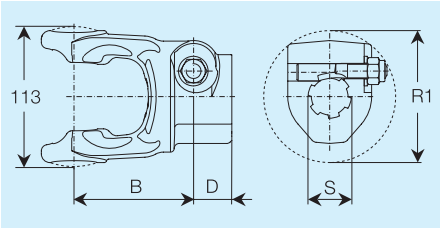


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	105	35	110	0Q7	5720L0361
1 3/8" Z21	105	35	110	0Q8	5720L3761



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/4" Z6	105	35	110	0Q9	5720L0461
1 3/4" Z20	105	35	110	0Q0	5720L3861

Taper-pin yokes for shafts with counter-clockwise rotation

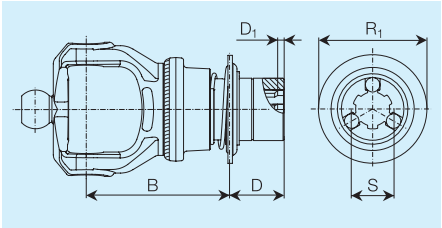


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	97	31	107	014	5090L0360
1 3/8" Z21	97	31	107	015	5090L3760
1 3/4" Z6	97	31	124	016	5090L0460
1 3/4" Z20	97	31	124	017	5090L3860

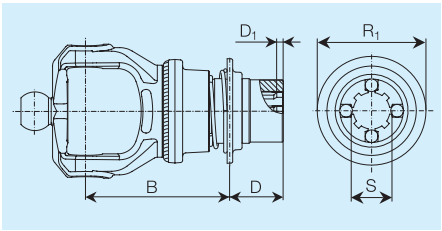
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Yokes for 80° Constant Velocity Joint

RT Ball collar yokes
TRACTOR SIDE

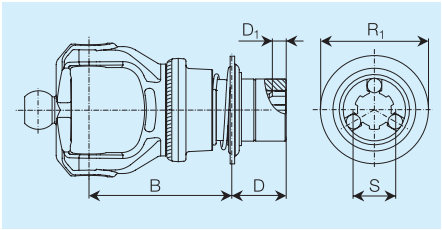


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	123	38	2	95	WS7	5730L0387
1 3/8" Z21	114	40	2	95	WR8	5730L3784
1 3/4" Z6	127	40	2	120	WR9	5730L0484
1 3/4" Z20	127	50	2	120	WS0	5730L3887

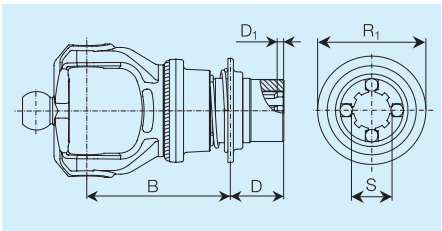


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
D8x32x38	123	38	2	95	WR6	5730L2184

RT Ball collar yokes
IMPLEMENT SIDE



S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	123	38	10	95	WR7	5730L0384
1 3/8" Z21	114	40	2	95	WR8	5730L3784
1 3/4" Z6	127	40	2	120	WR9	5730L0484
1 3/4" Z20	127	50	14	120	WR0	5730L3884



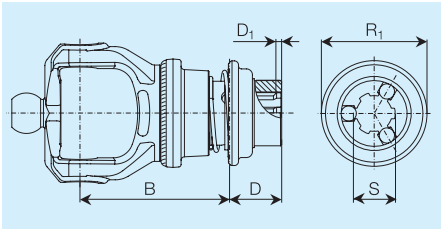
S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
D8x32x38	123	38	2	95	WR6	5730L2184

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S8

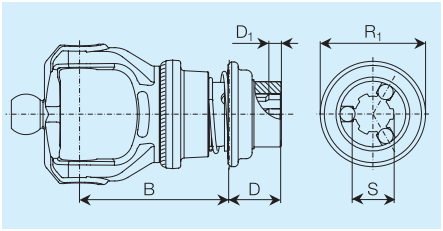
Yokes for 80° Constant Velocity Joint

RTA Automatic ball collar yokes
TRACTOR SIDE



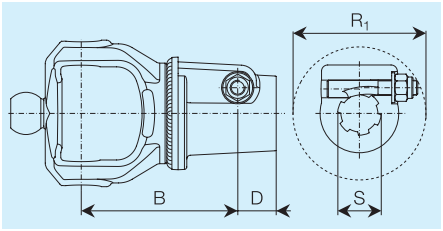
S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	123	38	2	88	WP7	5730L0392
1 3/8" Z21	114	40	2	88	WQ8	5730L3791
1 3/4" Z6	127	40	2	110	WQ9	5730L0491
1 3/4" Z20	127	50	2	110	WP0	5730L3892

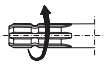
RTA Automatic ball collar yokes
IMPLEMENT SIDE



S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	123	38	10	88	WQ7	5730L0391
1 3/8" Z21	114	40	2	88	WQ8	5730L3791
1 3/4" Z6	127	40	2	110	WQ9	5730L0491
1 3/4" Z20	127	50	14	110	WQ0	5730L3891

Taper-pin yokes for shafts with counter-clockwise rotation





S	B	D	R_1	Yoke	Spare part
	mm	mm	mm	code	code
1 3/8" Z6	126	31	106	W14	5110L0361
1 3/8" Z21	114	31	106	W15	5110L3761
1 3/4" Z6	127	31	126	W16	5110L0461
1 3/4" Z20	127	31	126	W17	5110L3861

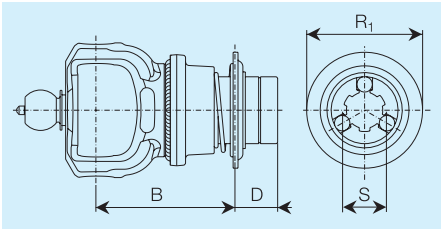
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

S	B	D	R_1	Yoke	Spare part
	mm	mm	mm	code	code
1 3/8" Z6	126	35	88	WQ7	5730L0391
1 3/8" Z21	114	40	88	WQ8	5730L3791
1 3/4" Z6	127	40	110	WQ9	5730L0491
1 3/4" Z20	127	40	110	WQ0	5730L3891

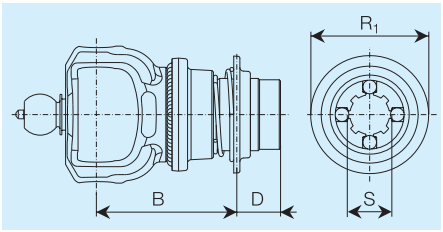
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Yokes for 50° Constant Velocity Joint

RT Ball collar yokes

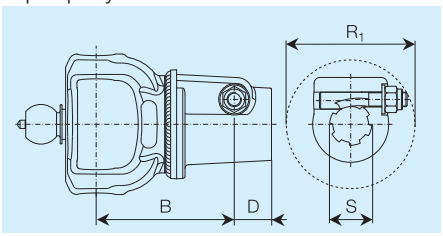


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	35	95	KR7	5730L0353
1 3/8" Z21	102	40	95	KR8	5730L3753
1 3/4" Z6	115	40	120	KR9	5730L0453
1 3/4" Z20	115	40	120	KR0	5730L3853



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	114	35	95	KR6	5730L2153

Taper-pin yokes for shafts with counter-clockwise rotation



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	31	106	K14	5190L0352
1 3/8" Z21	102	31	106	K15	5190L3752
1 3/4" Z6	115	31	126	K16	5190L0452
1 3/4" Z20	115	31	126	K17	5190L3852

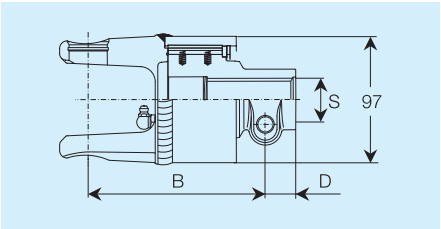
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 - Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S8

Overrunning Clutches

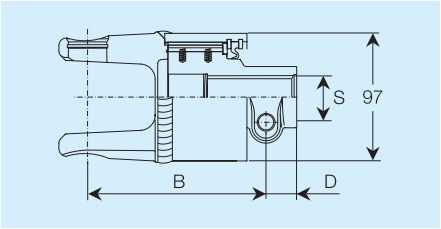
RA2



S	B	D	Yoke	Spare part
	mm	mm	code	code
1 3/8" Z6	160	24	A50	601217601R
1 3/8" Z21	160	24	A51	601217602R
1 3/4" Z6	162	29	A52	601217603R
1 3/4" Z20	162	29	A53	601217604R

Maximum recommended torque: 3800 Nm

RL2 (Permanent lubrication)

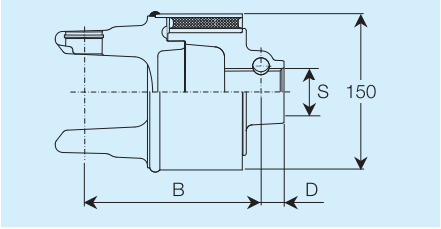


S	B	D	Yoke	Spare part
	mm	mm	code	code
1 3/8" Z6	160	24	0A2	60160L601R
1 3/8" Z21	160	24	0A3	60160L602R
1 3/4" Z6	162	29	0A4	60160L603R
1 3/4" Z20	162	29	0A5	60160L604R

Maximum recommended torque: 3800 Nm

GE Torsionally resilient joints

GE8



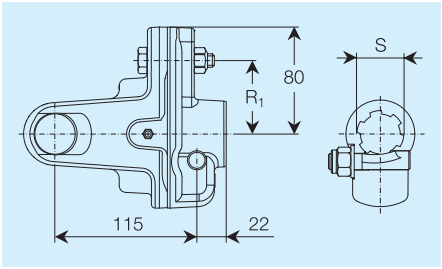
Torque at maximum recommended deformation (±20°): (65 Shore rubber), $M_{20°}$ = 5000 Nm.

65 Shore	B	D	Yoke	Spare part
S	mm	mm	code	code
1 3/8" Z6	169	22	0D4	608L86501R
1 3/8" Z21	169	22	0D5	608L86502R
1 3/4" Z6	169	22	0D6	608L86503R
1 3/4" Z20	169	22	0D7	608L86504R

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

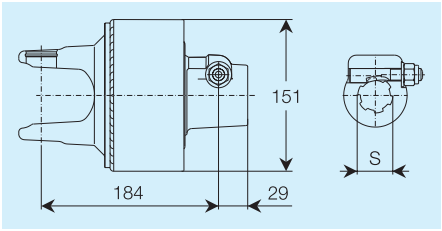
LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
2700	1 3/8" Z6	55	1R0	6060L0303R
	1 3/8" Z21		1S0	6060L3703R
	1 3/4" Z6		1R4	6060L0404R
	1 3/4" Z20		1S4	6060L3807R
3200	1 3/8" Z6	66	1R1	6060L0305R
	1 3/8" Z21		1S1	6060L3704R
	1 3/4" Z6		1R5	6060L0407R
	1 3/4" Z20		1S5	6060L3808R
			Bolt M10 x 50 cl 8.8.	
3600	1 3/8" Z6	52	1R2	6060L0306R
	1 3/8" Z21		1S2	6060L3705R
	1 3/4" Z6		1R6	6060L0408R
	1 3/4" Z20		1S6	6060L3809R
			Bolt M12 x 55 cl 8.8.	

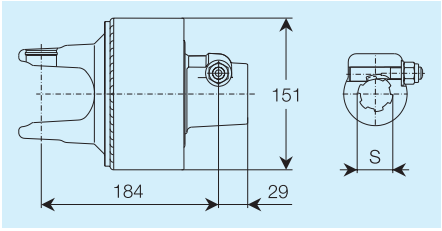
Automatic torque limiters

LR24
for use at 540 min^{-1}



Setting Nm	S	Code LR24	Spare part code
2500	1 3/8" Z6	26A	6WL265003R
	1 3/8" Z21	30A	6WL265037R
	1 3/4" Z6	34A	6WL265004R
	1 3/4" Z20	38A	6WL265038R
3000	1 3/8" Z6	29A	6WL270003R
	1 3/8" Z21	33A	6WL270037R
	1 3/4" Z6	37A	6WL270004R
	1 3/4" Z20	41A	6WL270038R

LR24
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

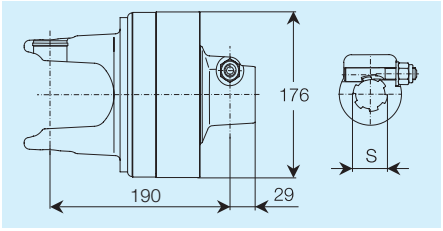
Setting Nm	S	Code LR24	Spare part code
*2500	1 3/8" Z6	50C	6WLE65003R
	1 3/8" Z21	54C	6WLE65037R
	1 3/4" Z6	58C	6WLE65004R
	1 3/4" Z20	62C	6WLE65038R
3000	1 3/8" Z6	53C	6WLE70003R
	1 3/8" Z21	57C	6WLE70037R
	1 3/4" Z6	61C	6WLE70004R
	1 3/4" Z20	65C	6WLE70038R

*Maximum recommended speed 1000 min^{-1}

Size S8

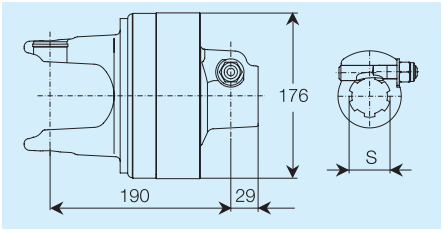
Automatic torque limiters

LR35
for use at 540 min^{-1}



Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	43A	6WL481003R
	1 3/8" Z21	48A	6WL481037R
	1 3/4" Z6	53A	6WL481004R
	1 3/4" Z20	58A	6WL481038R

LR35
* for use at 1000 min^{-1}



Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	70C	6WLF81003R
	1 3/8" Z21	73C	6WLF81037R
	1 3/4" Z6	76C	6WLF81004R
	1 3/4" Z20	79C	6WLF81038R

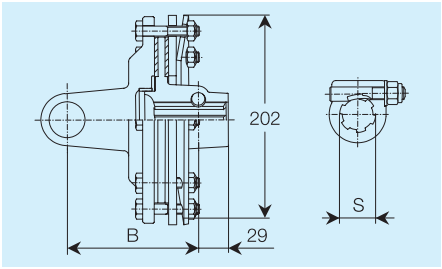
* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiters, adjustable setting

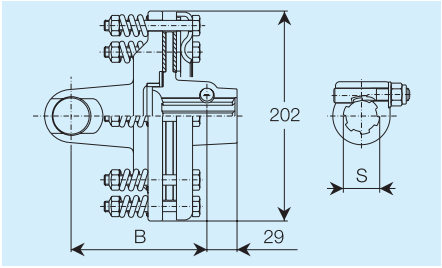
FV42



Setting Nm	B mm	S	Code FV42	Spare part code
1350	131	1 3/8" Z6	N35	661L51403R
	131	1 3/8" Z21	N37	661L51437R
	136	1 3/4" Z6	N0A	661L51404R
	136	1 3/4" Z20	N0D	661L51438R
1450	131	1 3/8" Z6	N18	661L53403R
	131	1 3/8" Z21	N21	661L53437R
	136	1 3/4" Z6	N24	661L53404R
	136	1 3/4" Z20	N27	661L53438R
1600	131	1 3/8" Z6	N36	661L56403R
	131	1 3/8" Z21	N38	661L56437R
	136	1 3/4" Z6	N0C	661L56404R
	136	1 3/4" Z20	N0E	661L56438R
*1800	131	1 3/8" Z6	N19	661L58403R
	131	1 3/8" Z21	N22	661L58437R
	136	1 3/4" Z6	N25	661L58404R
	136	1 3/4" Z20	N28	661L58438R

* Maximum recommended setting for 1000 min^{-1}

FFV42



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

* Maximum recommended setting for 1000 min^{-1}

Setting Nm	B mm	S	Code FFV42	Spare part code
1350	131	1 3/8" Z6	0Z2	635L51403R
	131	1 3/8" Z21	0Z7	635L51437R
	136	1 3/4" Z6	0Y2	635L51404R
	136	1 3/4" Z20	0Y7	635L51438R
1450	131	1 3/8" Z6	0Z3	635L53403R
	131	1 3/8" Z21	0Z8	635L53437R
	136	1 3/4" Z6	0Y3	635L53404R
	136	1 3/4" Z20	0Y8	635L53438R
1600	131	1 3/8" Z6	0Z4	635L56403R
	131	1 3/8" Z21	0Z9	635L56437R
	136	1 3/4" Z6	0Y4	635L56404R
	136	1 3/4" Z20	0Y9	635L56438R
*1800	131	1 3/8" Z6	0Z5	635L58403R
	131	1 3/8" Z21	0Z0	635L58437R
	136	1 3/4" Z6	0Y5	635L58404R
	136	1 3/4" Z20	0Y0	635L58438R

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

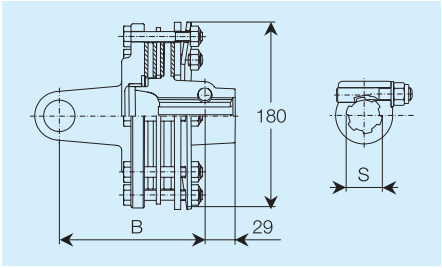
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S8

Friction torque limiters, adjustable setting

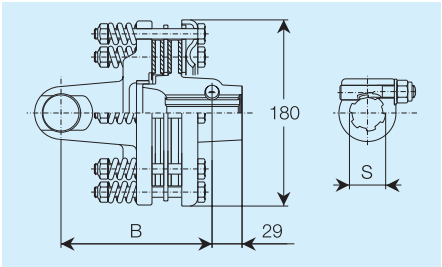
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
1350	146	1 3/8" Z6	N46	661L51303R
	146	1 3/8" Z21	N52	661L51337R
	151	1 3/4" Z6	N58	661L51304R
	151	1 3/4" Z20	N64	661L51338R
1450	146	1 3/8" Z6	N47	661L53303R
	146	1 3/8" Z21	N53	661L53337R
	151	1 3/4" Z6	N59	661L53304R
	151	1 3/4" Z20	N65	661L53338R
1600	146	1 3/8" Z6	N0F	661L56303R
	146	1 3/8" Z21	N0H	661L56337R
	151	1 3/4" Z6	N0K	661L56304R
	151	1 3/4" Z20	N0M	661L56338R
*1800	146	1 3/8" Z6	N43	661L58303R
	146	1 3/8" Z21	N49	661L58337R
	151	1 3/4" Z6	N55	661L58304R
	151	1 3/4" Z20	N61	661L58338R
2000	146	1 3/8" Z6	N0G	661L60303R
	146	1 3/8" Z21	N0J	661L60337R
	151	1 3/4" Z6	N0L	661L60304R
	151	1 3/4" Z20	N0N	661L60338R

* Maximum recommended setting for 1000 min^{-1}

FFV34



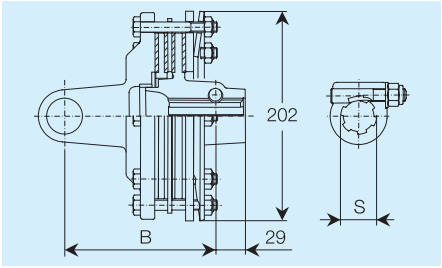
Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV34	Spare part code
1350	146	1 3/8" Z6	0T2	635L51303R
	146	1 3/8" Z21	0T9	635L51337R
	151	1 3/4" Z6	0U6	635L51304R
	151	1 3/4" Z20	0V3	635L51338R
1450	146	1 3/8" Z6	0T3	635L53303R
	146	1 3/8" Z21	0T0	635L53337R
	151	1 3/4" Z6	0U7	635L53304R
	151	1 3/4" Z20	0V4	635L53338R
1600	146	1 3/8" Z6	0T4	635L56303R
	146	1 3/8" Z21	0U1	635L56337R
	151	1 3/4" Z6	0U8	635L56304R
	151	1 3/4" Z20	0V5	635L56338R
*1800	146	1 3/8" Z6	0T5	635L58303R
	146	1 3/8" Z21	0U2	635L58337R
	151	1 3/4" Z6	0U9	635L58304R
	151	1 3/4" Z20	0V6	635L58338R
2000	146	1 3/8" Z6	0T6	635L60303R
	146	1 3/8" Z21	0U3	635L60337R
	151	1 3/4" Z6	0U0	635L60304R
	151	1 3/4" Z20	0V7	635L60338R

* Maximum recommended setting for 1000 min^{-1}

Friction torque limiters, adjustable setting

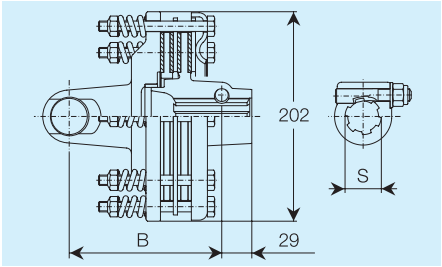
FV44



Setting Nm	B mm	S	Code FV44	Spare part code
*1800	147	1 3/8" Z6	N39	661L58503R
	147	1 3/8" Z21	N72	661L58537R
	152	1 3/4" Z6	N77	661L58504R
	152	1 3/4" Z20	N82	661L58538R
2000	147	1 3/8" Z6	N71	661L60503R
	147	1 3/8" Z21	N76	661L60537R
	152	1 3/4" Z6	N81	661L60504R
	152	1 3/4" Z20	N86	661L60538R
2200	147	1 3/8" Z6	N40	661L62503R
	147	1 3/8" Z21	N73	661L62537R
	152	1 3/4" Z6	N78	661L62504R
	152	1 3/4" Z20	N83	661L62538R
2400	147	1 3/8" Z6	N41	661L64503R
	147	1 3/8" Z21	N87	661L64537R
	152	1 3/4" Z6	N91	661L64504R
	152	1 3/4" Z20	N95	661L64538R

* Maximum recommended setting for 1000 min^{-1}

FFV44



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV44	Spare part code
*1800	147	1 3/8" Z6	0J1	635L58503R
	147	1 3/8" Z21	0J9	635L58537R
	152	1 3/4" Z6	0K7	635L58504R
	152	1 3/4" Z20	0W5	635L58538R
2000	147	1 3/8" Z6	0J2	635L60503R
	147	1 3/8" Z21	0J0	635L60537R
	152	1 3/4" Z6	0K8	635L60504R
	152	1 3/4" Z20	0W6	635L60538R
2200	147	1 3/8" Z6	0J3	635L62503R
	147	1 3/8" Z21	0K1	635L62537R
	152	1 3/4" Z6	0K9	635L62504R
	152	1 3/4" Z20	0W7	635L62538R
2400	147	1 3/8" Z6	0J4	635L64503R
	147	1 3/8" Z21	0K2	635L64537R
	152	1 3/4" Z6	0K0	635L64504R
	152	1 3/4" Z20	0W8	635L64538R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

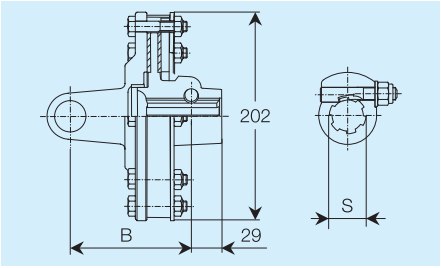
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S8

Friction torque limiters, non-adjustable setting

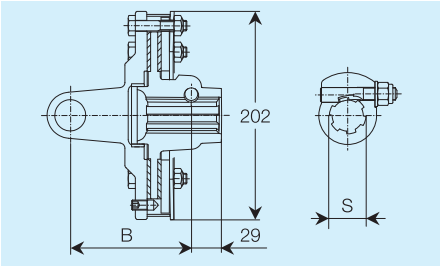
FT42



Setting Nm	B mm	S	Code FT42	Spare part code
*1450	131	1 3/8" Z6	Q23	663L53403R
	131	1 3/8" Z21	Q27	663L53437R
	136	1 3/4" Z6	Q31	663L53404R
	136	1 3/4" Z20	Q35	663L53438R
1800	131	1 3/8" Z6	Q21	663L58403R
	131	1 3/8" Z21	Q25	663L58437R
	136	1 3/4" Z6	Q29	663L58404R
	136	1 3/4" Z20	Q33	663L58438R

* Maximum recommended setting for 1000 min^{-1}

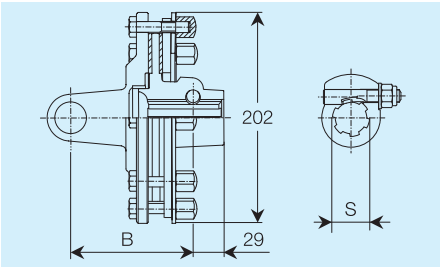
FT42R with Release System



Setting Nm	B mm	S	Code FT42R	Spare part code
*1450	131	1 3/8" Z6	H23	663L53F03R
	131	1 3/8" Z21	H27	663L53F37R
	136	1 3/4" Z6	H31	663L53F04R
	136	1 3/4" Z20	H35	663L53F38R
1800	131	1 3/8" Z6	H21	663L58F03R
	131	1 3/8" Z21	H25	663L58F37R
	136	1 3/4" Z6	H29	663L58F04R
	136	1 3/4" Z20	H33	663L58F38R

* Maximum recommended setting for 1000 min^{-1}

FK42



Setting Nm	B mm	S	Code FK42	Spare part code
*1450	131	1 3/8" Z6	7C5	60KL53403R
	131	1 3/8" Z21	7C8	60KL53437R
	136	1 3/4" Z6	7D1	60KL53404R
	136	1 3/4" Z20	7D4	60KL53438R
1800	131	1 3/8" Z6	7C6	60KL58403R
	131	1 3/8" Z21	7C9	60KL58437R
	136	1 3/4" Z6	7D2	60KL58404R
	136	1 3/4" Z20	7D5	60KL58438R

* Maximum recommended setting for 1000 min^{-1}

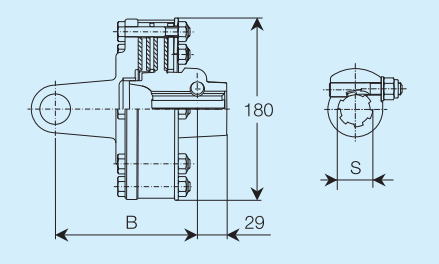
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiters, non-adjustable setting

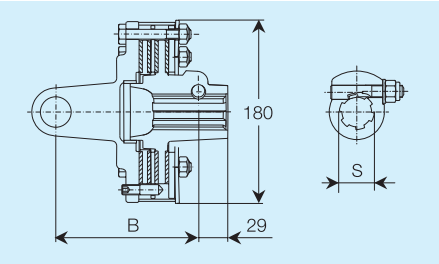
FT34



Setting Nm	B mm	S	Code FT34	Spare part code
1450	146	1 3/8" Z6	Q52	663L53303R
	146	1 3/8" Z21	Q59	663L53337R
	151	1 3/4" Z6	Q66	663L53304R
	151	1 3/4" Z20	Q73	663L53338R
*1800	146	1 3/8" Z6	Q54	663L58303R
	146	1 3/8" Z21	Q61	663L58337R
	151	1 3/4" Z6	Q68	663L58304R
	151	1 3/4" Z20	Q75	663L58338R

* Maximum recommended setting for 1000 min^{-1}

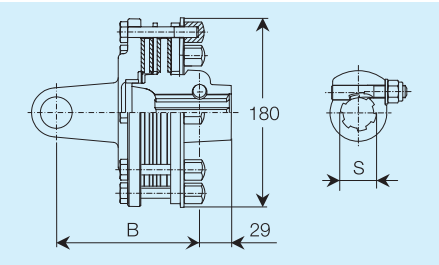
FT34R with Release System



Setting Nm	B mm	S	Code FT34R	Spare part code
1450	146	1 3/8" Z6	H52	663L53E03R
	146	1 3/8" Z21	H59	663L53E37R
	151	1 3/4" Z6	H66	663L53E04R
	151	1 3/4" Z20	H73	663L53E38R
*1800	146	1 3/8" Z6	H54	663L58E03R
	146	1 3/8" Z21	H61	663L58E37R
	151	1 3/4" Z6	H68	663L58E04R
	151	1 3/4" Z20	H75	663L58E38R

* Maximum recommended setting for 1000 min^{-1}

FK34



Setting Nm	B mm	S	Code FK34	Spare part code
1450	146	1 3/8" Z6	7D7	60KL53303R
	146	1 3/8" Z21	7E0	60KL53337R
	151	1 3/4" Z6	7E3	60KL53304R
	151	1 3/4" Z20	7E6	60KL53338R
*1800	146	1 3/8" Z6	7D8	60KL58303R
	146	1 3/8" Z21	7E1	60KL58337R
	151	1 3/4" Z6	7E4	60KL58304R
	151	1 3/4" Z20	7E7	60KL58338R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

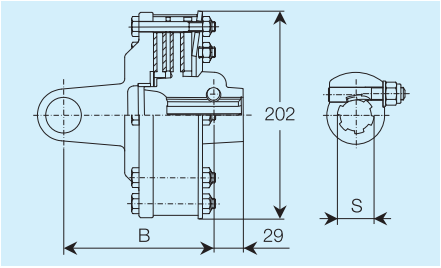
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S8

Friction torque limiters, non-adjustable setting

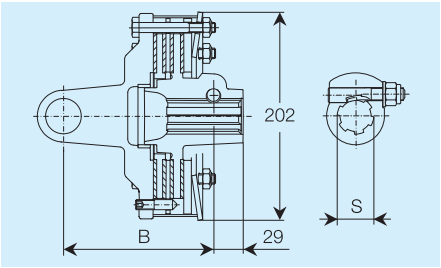
FT44



Setting Nm	B mm	S	Code FT44	Spare part code
*1800	147	1 3/8" Z6	Q37	663L58503R
	147	1 3/8" Z21	Q39	663L58537R
	152	1 3/4" Z6	Q41	663L58504R
	152	1 3/4" Z20	Q43	663L58538R
2200	147	1 3/8" Z6	Q38	663L62503R
	147	1 3/8" Z21	Q40	663L62537R
	152	1 3/4" Z6	Q42	663L62504R
	152	1 3/4" Z20	Q44	663L62538R

* Maximum recommended setting for 1000 min^{-1}

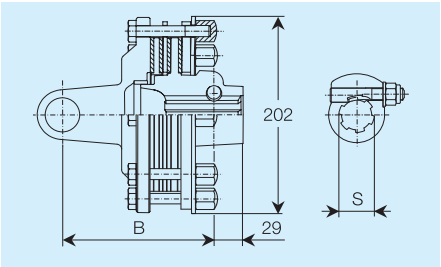
FT44R with Release System



Setting Nm	B mm	S	Code FT44R	Spare part code
*1800	147	1 3/8" Z6	H37	663L58G03R
	147	1 3/8" Z21	H39	663L58G37R
	152	1 3/4" Z6	H41	663L58G04R
	152	1 3/4" Z20	H43	663L58G38R
2200	147	1 3/8" Z6	H38	663L62G03R
	147	1 3/8" Z21	H40	663L62G37R
	152	1 3/4" Z6	H42	663L62G04R
	152	1 3/4" Z20	H44	663L62G38R

* Maximum recommended setting for 1000 min^{-1}

FK44

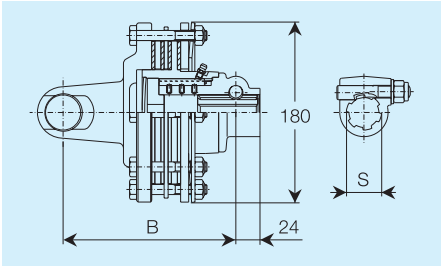


Setting Nm	B mm	S	Code FK44	Spare part code
*1800	147	1 3/8" Z6	7E8	60KL58503R
	147	1 3/8" Z21	7F2	60KL58537R
	152	1 3/4" Z6	7F6	60KL58504R
	152	1 3/4" Z20	7G0	60KL58538R
2200	147	1 3/8" Z6	7E9	60KL62503R
	147	1 3/8" Z21	7F3	60KL62537R
	152	1 3/4" Z6	7F7	60KL62504R
	152	1 3/4" Z20	7G1	60KL62538R

* Maximum recommended setting for 1000 min^{-1}

Friction torque limiter and overrunning clutch, adjustable setting

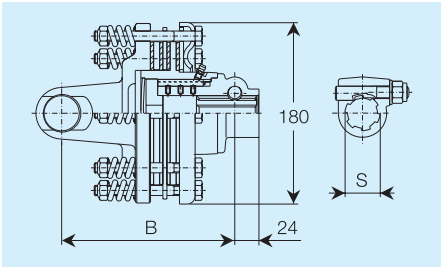
FNV34



Setting Nm	B mm	S	Code FNV34	Spare part code
1350	172	1 3/8" Z6	2A1	665L51103R
	172	1 3/8" Z21	2A9	665L51137R
1450	172	1 3/8" Z6	2A2	665L53103R
	172	1 3/8" Z21	2B0	665L53137R
1600	172	1 3/8" Z6	2A3	665L56103R
	172	1 3/8" Z21	2B1	665L56137R
*1800	172	1 3/8" Z6	2A4	665L58103R
	172	1 3/8" Z21	2B2	665L58137R
2000	172	1 3/8" Z6	2A5	665L60103R
	172	1 3/8" Z21	2B3	665L60137R

* Maximum recommended setting for 1000 min^{-1}

FFNV34



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFNV34	Spare part code
1350	172	1 3/8" Z6	2F1	667L51103R
	172	1 3/8" Z21	2F9	667L51137R
1450	172	1 3/8" Z6	2F2	667L53103R
	172	1 3/8" Z21	2G0	667L53137R
1600	172	1 3/8" Z6	2F3	667L56103R
	172	1 3/8" Z21	2G1	667L56137R
*1800	172	1 3/8" Z6	2F4	667L58103R
	172	1 3/8" Z21	2G2	667L58137R
2000	172	1 3/8" Z6	2F5	667L60103R
	172	1 3/8" Z21	2G3	667L60137R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

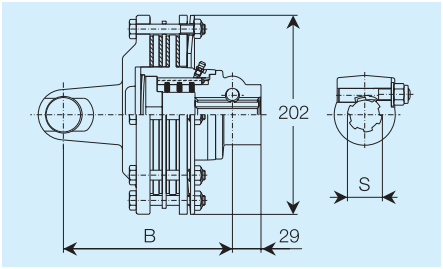
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S8

Friction torque limiter and overrunning clutch, adjustable setting

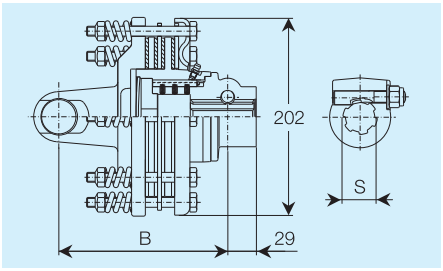
FNV44



Setting Nm	B mm	S	Code FNV44	Spare part code
*1800	175	1 3/8" Z6	2B6	665L58203R
	175	1 3/8" Z21	2C4	665L58237R
	175	1 3/4" Z6	2D2	665L58204R
	175	1 3/4" Z20	2E0	665L58238R
2000	175	1 3/8" Z6	2B7	665L60203R
	175	1 3/8" Z21	2C5	665L60237R
	175	1 3/4" Z6	2D3	665L60204R
	175	1 3/4" Z20	2E1	665L60238R
2200	175	1 3/8" Z6	2B8	665L62203R
	175	1 3/8" Z21	2C6	665L62237R
	175	1 3/4" Z6	2D4	665L62204R
	175	1 3/4" Z20	2E2	665L62238R
2400	175	1 3/8" Z6	2B9	665L64203R
	175	1 3/8" Z21	2C7	665L64237R
	175	1 3/4" Z6	2D5	665L64204R
	175	1 3/4" Z20	2E3	665L64238R

* Maximum recommended setting for 1000 min^{-1}

FFNV44



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFNV44	Spare part code
*1800	175	1 3/8" Z6	2G6	667L58203R
	175	1 3/8" Z21	2H4	667L58237R
	175	1 3/4" Z6	2J2	667L58204R
	175	1 3/4" Z20	2K0	667L58238R
2000	175	1 3/8" Z6	2G7	667L60203R
	175	1 3/8" Z21	2H5	667L60237R
	175	1 3/4" Z6	2J3	667L60204R
	175	1 3/4" Z20	2K1	667L60238R
2200	175	1 3/8" Z6	2G8	667L62203R
	175	1 3/8" Z21	2H6	667L62237R
	175	1 3/4" Z6	2J4	667L62204R
	175	1 3/4" Z20	2K2	667L62238R
2400	175	1 3/8" Z6	2G9	667L64203R
	175	1 3/8" Z21	2H7	667L64237R
	175	1 3/4" Z6	2J5	667L64204R
	175	1 3/4" Z20	2K3	667L64238R

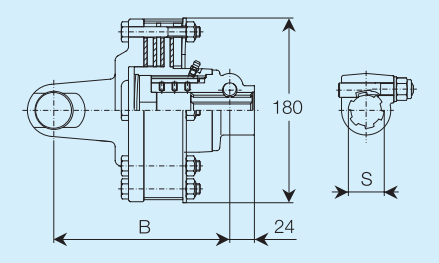
* Maximum recommended setting for 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter and overrunning clutch, non-adjustable setting

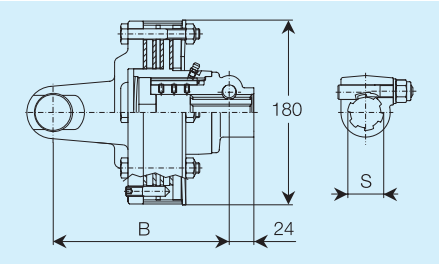
FNT34



Setting Nm	B mm	S	Code FNT34	Spare part code
1450	172	1 3/8" Z6	1A2	658L53103R
	172	1 3/8" Z21	1A7	658L53137R
*1800	172	1 3/8" Z6	1A3	658L58103R
	172	1 3/8" Z21	1A8	658L58137R

* Maximum recommended setting for 1000 min^{-1}

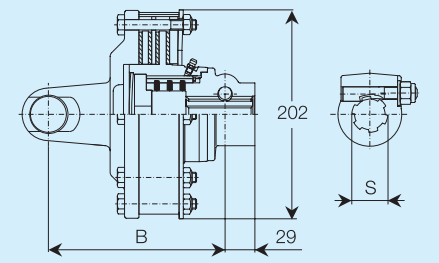
FNT34R with Release System



Setting Nm	B mm	S	Code FNT34R	Spare part code
1450	172	1 3/8" Z6	1C2	658L53203R
	172	1 3/8" Z21	1C7	658L53237R
*1800	172	1 3/8" Z6	1C3	658L58203R
	172	1 3/8" Z21	1C8	658L58237R

* Maximum recommended setting for 1000 min^{-1}

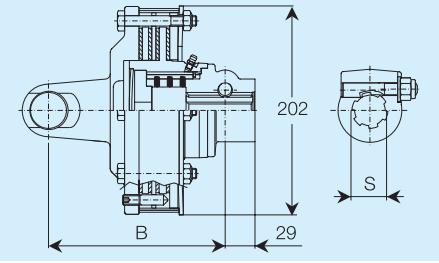
FNT44



Setting Nm	B mm	S	Code FNT44	Spare part code
*1800	175	1 3/8" Z6	1F1	658L58303R
	175	1 3/8" Z21	1F7	658L58337R
	175	1 3/4" Z6	1G3	658L58304R
	175	1 3/4" Z20	1G9	658L58338R
2200	175	1 3/8" Z6	1F2	658L62303R
	175	1 3/8" Z21	1F8	658L62337R
	175	1 3/4" Z6	1G4	658L62304R
	175	1 3/4" Z20	1H0	658L62338R

* Maximum recommended setting for 1000 min^{-1}

FNT44R with Release System

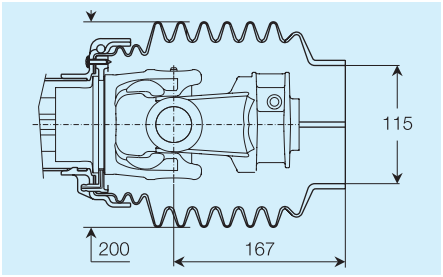


Setting Nm	B mm	S	Code FNT44R	Spare part code
*1800	175	1 3/8" Z6	1H5	658L58403R
	175	1 3/8" Z21	1J1	658L58437R
	175	1 3/4" Z6	1J7	658L58404R
	175	1 3/4" Z20	1K4	658L58438R
2200	175	1 3/8" Z6	1H6	658L62403R
	175	1 3/8" Z21	1J2	658L62437R
	175	1 3/4" Z6	1J8	658L62404R
	175	1 3/4" Z20	1K5	658L62438R

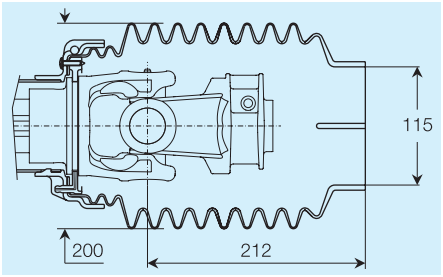
* Maximum recommended setting for 1000 min^{-1}

Size S8

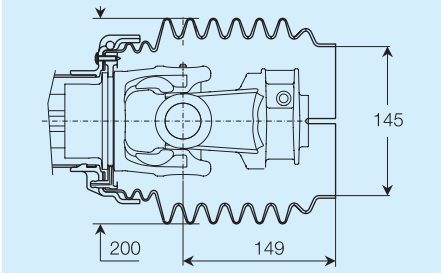
Optional shield cones



Extended shield cone, medium length, narrow diameter.
- Tractor end .....P
- Implement end . .....M



Extended shield cone, long length, narrow diameter
- Tractor end ....N
- Implement end L



Extended shield cone, medium length, wide diameter
- Tractor end .....R
- Implement end ....T

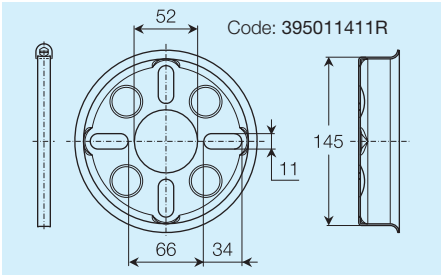


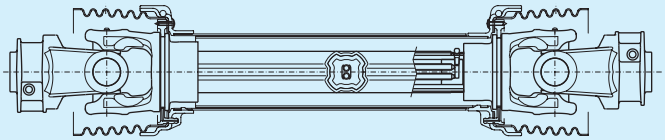
Plate with clamps for optional extended shield cones.

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System code
G

Size S8

Codes for size S8 drivelines

1 **C**

C: Standard SFT cardan joint driveline

2 3 **S** **8**

Size **S8**

4

Telescoping Members
See page S8.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page S8.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's Manual
See page S8.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S8.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint, 80° CV, 50° CV, or splined stub shaft without joint), establishes the associated shields, and attachment to PTO.

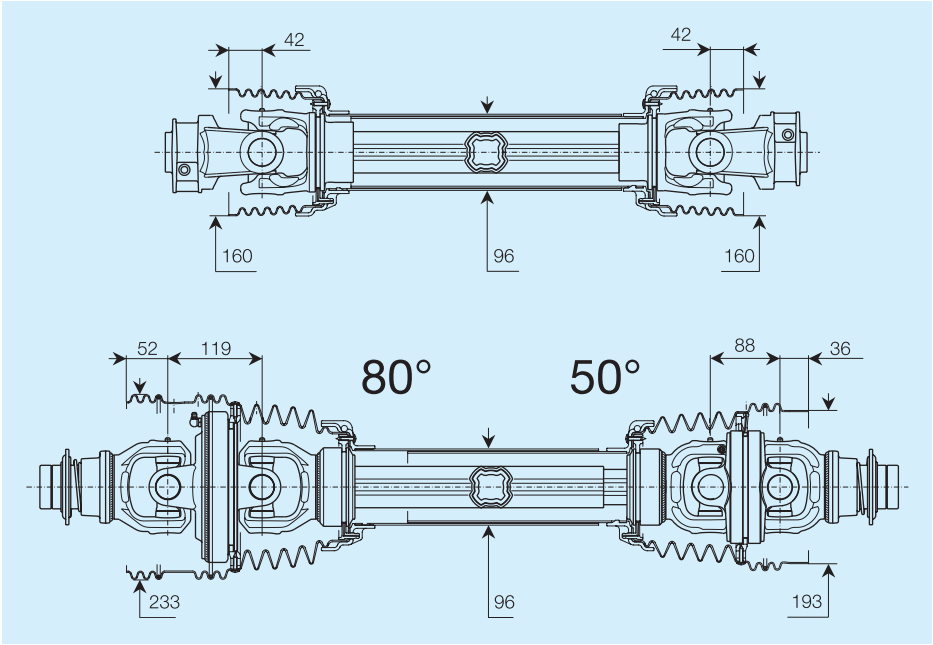
13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft.

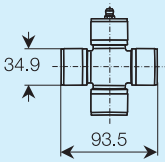
16 17 18

Only use these positions of the code if requesting optional shield cones, and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

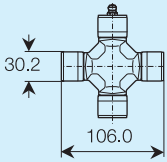


Single Cardan Joint



4120L0012

80° and 50°Constant Velocity Joint



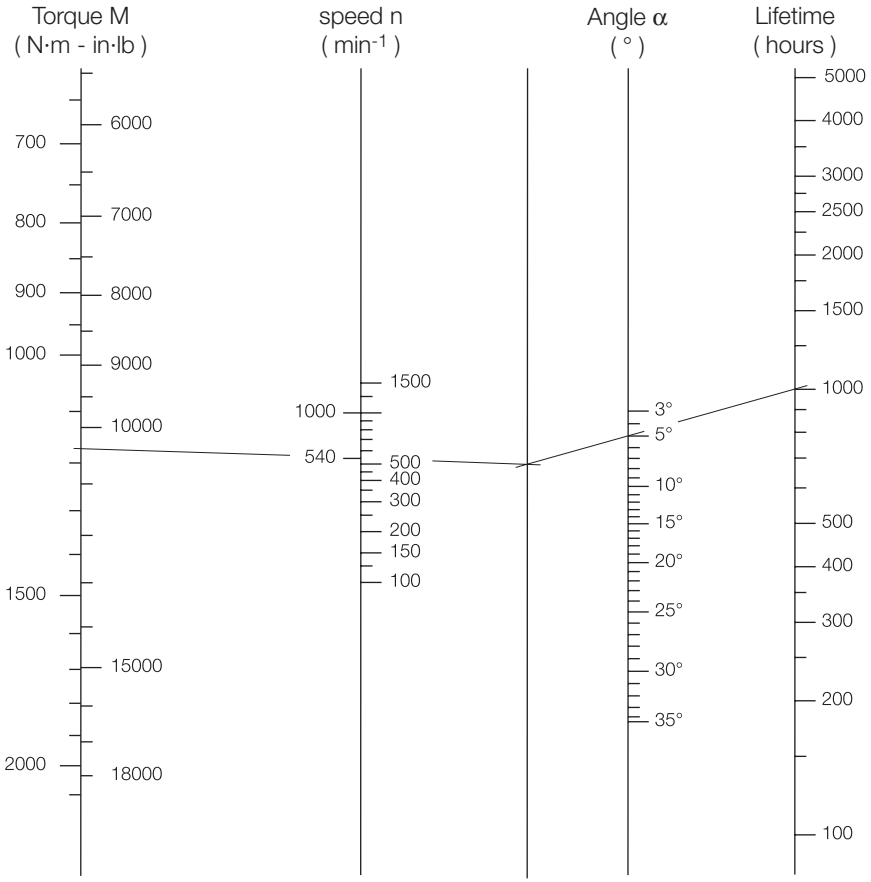
4120L0051

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
H8	1171	10364	66	90	956	8457	100	136

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size H8

Nomogram to calculate single cardan joint lifetime



Example:
To calculate the life for torque **M** = 1171 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size H8, torque M = 1171 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

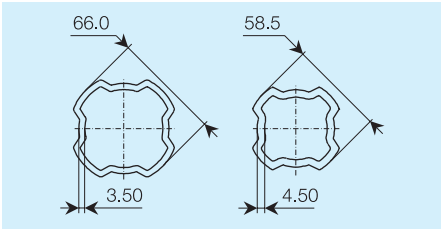
Example: M_{50} = 1171 Nm is the theoretical transmittable torque for a cardan driveline size H8, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 1000 Nm, M_{50} / M ratio is 1171 / 1000 = 1.17. The lubrication frequency can be extended to 200 hours.

Size H8

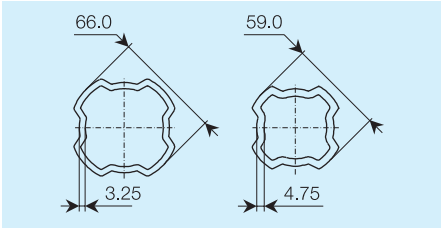
Telescoping Members

Four-Tooth profile tubes



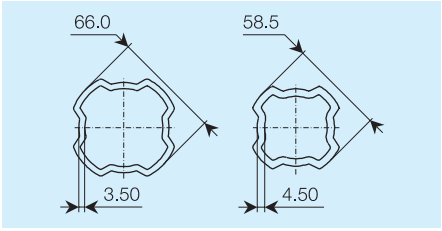
Mmax (Nm)	5000
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



Mmax (Nm)	5000
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

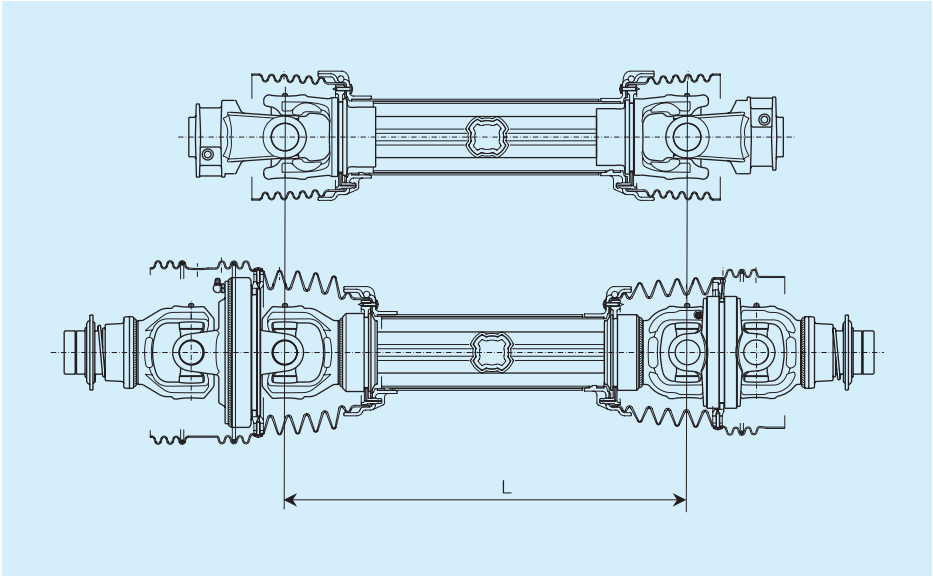
Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	5000
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Length



	Standard			Maximum extension			Length
L	Lw	Lt	Ls	Lw	Lt	Ls	code
mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	- -	- -	- -	041
460	- -	- -	- -	- -	- -	- -	046
510	- -	- -	- -	660	735	747	051
560	685	760	822	760	835	847	056
610	785	860	910	860	935	947	061
660	885	960	997	960	1035	1047	066
710	960	1043	1085	1035	1118	1147	071
760	1035	1126	1172	1110	1201	1247	076
810	1110	1210	1260	- -	- -	- -	081
860	1185	1293	1347	- -	- -	- -	086
910	1260	1376	1435	- -	- -	- -	091
1010	1410	1543	1610	- -	- -	- -	101
1110	1560	1710	1785	- -	- -	- -	111
1210	1710	1876	1960	- -	- -	- -	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

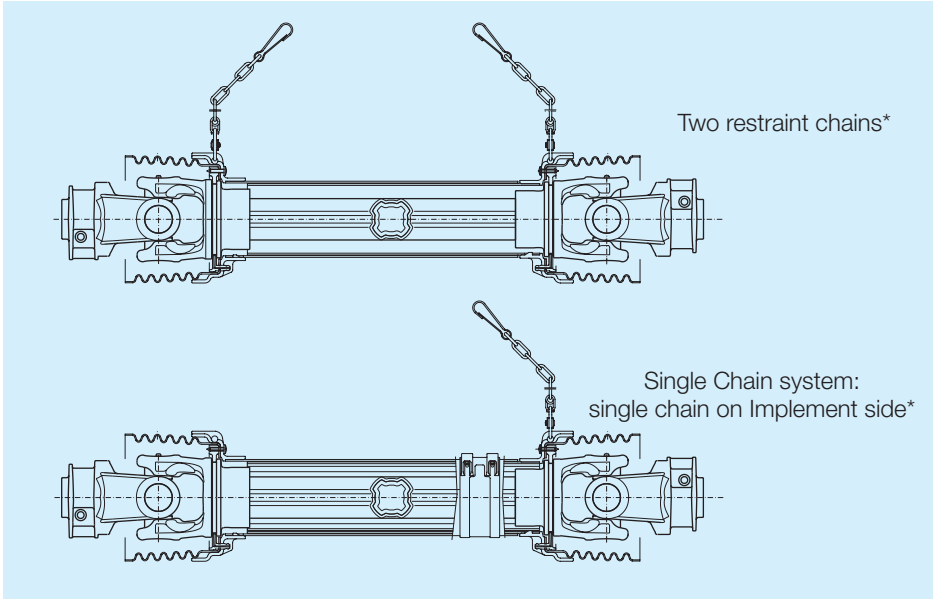
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size H8

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

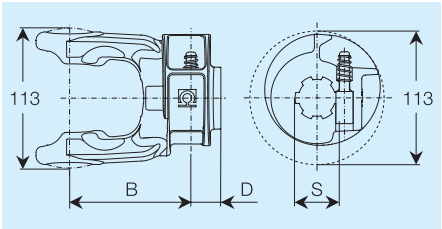


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

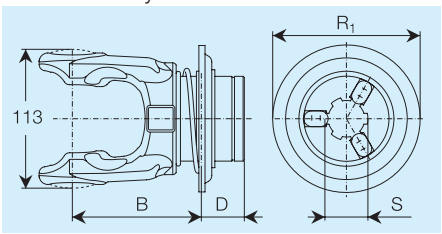
Yokes for single cardan joint

Push-pin yokes

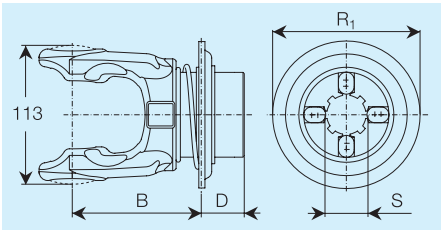


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	98	24	108	007	5070L0355
1 3/8" Z21	90	32	108	008	5070L3755
D8x32x38	98	24	108	093	5070L2151

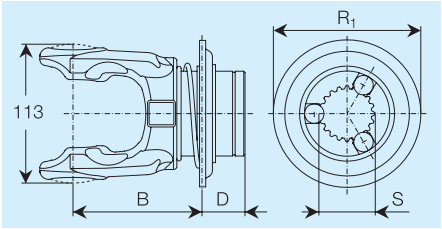
RT Ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	105	35	120	R07	5720L0355
1 3/8" Z21	105	35	120	R08	5720L3755



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	105	35	120	R93	5720L2151



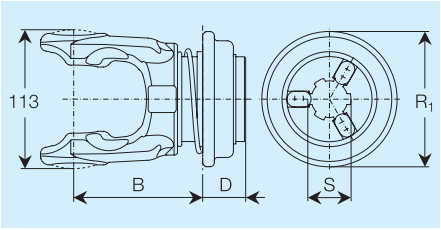
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/4" Z6	105	35	120	R09	5720L0455
1 3/4" Z20	105	35	120	R10	5720L3855

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

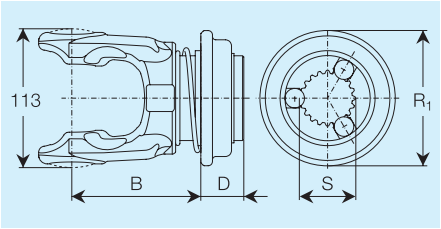
Size H8

Yokes for single cardan joint

RTA Automatic ball collar yoke

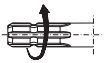


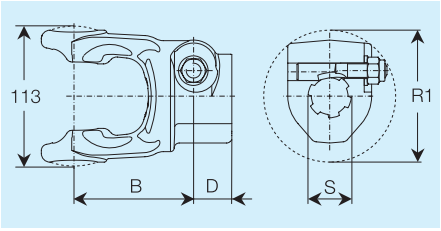
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	105	35	110	0Q7	5720L0361
1 3/8" Z21	105	35	110	0Q8	5720L3761



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/4" Z6	105	35	110	0Q9	5720L0461
1 3/4" Z20	105	35	110	0Q0	5720L3861

Taper-pin yokes for shafts with counter-clockwise rotation



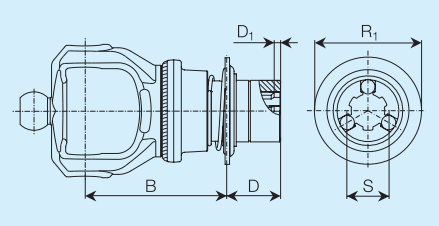


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	97	31	107	014	5090L0360
1 3/8" Z21	97	31	107	015	5090L3760
1 3/4" Z6	97	31	124	016	5090L0460
1 3/4" Z20	97	31	124	017	5090L3860

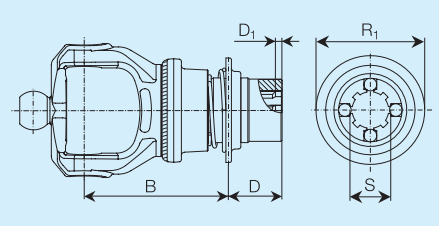
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Yokes for 80° Constant Velocity Joint

RT Ball collar yokes
TRACTOR SIDE

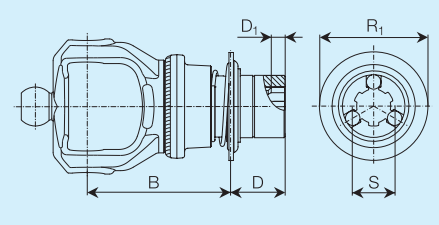


S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	123	38	2	95	WS7	5730L0387
1 3/8" Z21	114	40	2	95	WR8	5730L3784
1 3/4" Z6	127	40	2	120	WR9	5730L0484
1 3/4" Z20	127	50	2	120	WS0	5730L3887

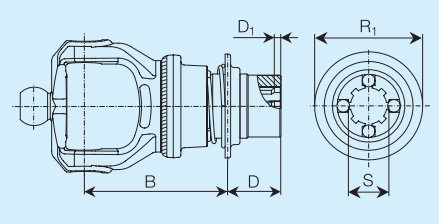


S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
D8x32x38	123	38	2	95	WR6	5730L2184

RT Ball collar yokes
IMPLEMENT SIDE



S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	123	38	10	95	WR7	5730L0384
1 3/8" Z21	114	40	2	95	WR8	5730L3784
1 3/4" Z6	127	40	2	120	WR9	5730L0484
1 3/4" Z20	127	50	14	120	WR0	5730L3884



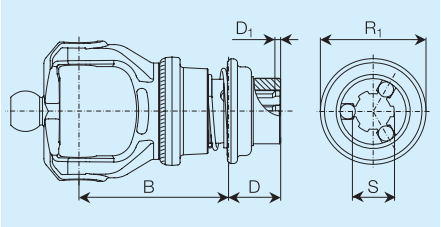
S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
D8x32x38	123	38	2	95	WR6	5730L2184

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H8

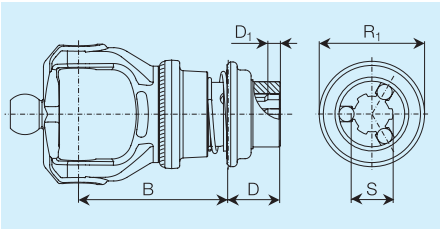
Yokes for 80° Constant Velocity Joint

RTA Automatic ball collar yokes
TRACTOR SIDE



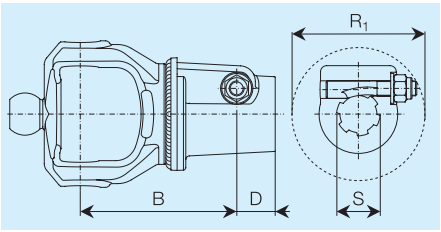
S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	123	38	2	88	WP7	5730L0392
1 3/8" Z21	114	40	2	88	WQ8	5730L3791
1 3/4" Z6	127	40	2	110	WQ9	5730L0491
1 3/4" Z20	127	50	2	110	WP0	5730L3892

RTA Automatic ball collar yokes
IMPLEMENT SIDE



S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	123	38	10	88	WQ7	5730L0391
1 3/8" Z21	114	40	2	88	WQ8	5730L3791
1 3/4" Z6	127	40	2	110	WQ9	5730L0491
1 3/4" Z20	127	50	14	110	WQ0	5730L3891

Taper-pin yokes for shafts with counter-clockwise rotation



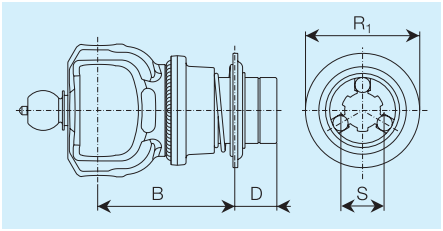
S	B	D	R_1	Yoke	Spare part
	mm	mm	mm	code	code
1 3/8" Z6	126	31	106	W14	5110L0361
1 3/8" Z21	114	31	106	W15	5110L3761
1 3/4" Z6	127	31	126	W16	5110L0461
1 3/4" Z20	127	31	126	W17	5110L3861

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

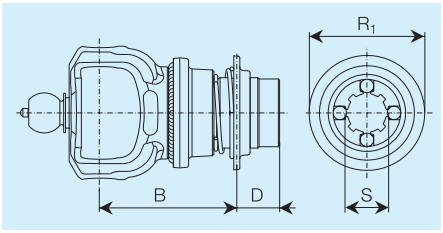
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Yokes for 50° Constant Velocity Joint

RT Ball collar yokes

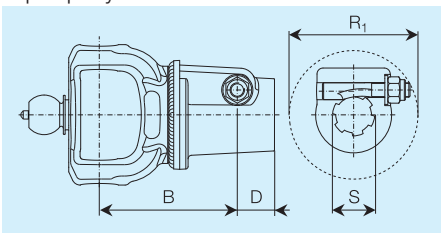


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	35	95	KR7	5730L0353
1 3/8" Z21	102	40	95	KR8	5730L3753
1 3/4" Z6	115	40	120	KR9	5730L0453
1 3/4" Z20	115	40	120	KR0	5730L3853



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	114	35	95	KR6	5730L2153

Taper-pin yokes for shafts with counter-clockwise rotation



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	114	31	106	K14	5190L0352
1 3/8" Z21	102	31	106	K15	5190L3752
1 3/4" Z6	115	31	126	K16	5190L0452
1 3/4" Z20	115	31	126	K17	5190L3852

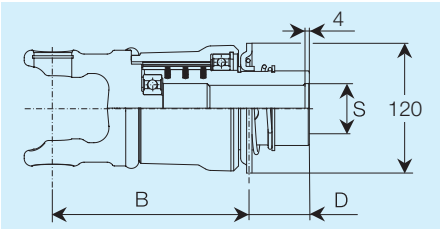
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H8

Overrunning Clutches

RLA (permanent lubrication)

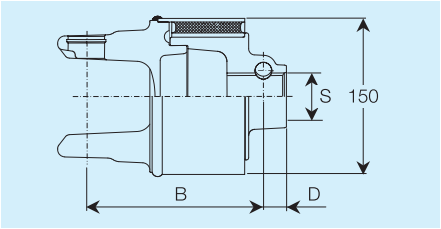


S	B	D	Code	Spare part
	mm	mm	RLA	code
1 3/8" Z6	182	42	A33	60170L101R
1 3/8" Z21	182	42	A34	60170L102R
1 3/4" Z6	182	42	A36	60170L103R
1 3/4" Z20	182	55	A37	60170L104R

Maximum recommended torque: 6200 Nm

GE Torsionally resilient joints

GE8



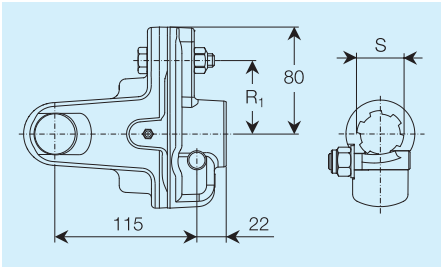
65 Shore	B	D	Code	Spare part
S	mm	mm	GE8	code
1 3/8" Z6	169	22	0D4	608L86501R
1 3/8" Z21	169	22	0D5	608L86502R
1 3/4" Z6	169	22	0D6	608L86503R
1 3/4" Z20	169	22	0D7	608L86504R

Torque at maximum recommended deformation (±20°): (65 Shore rubber), $M_{20°}$ = 5000 Nm.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

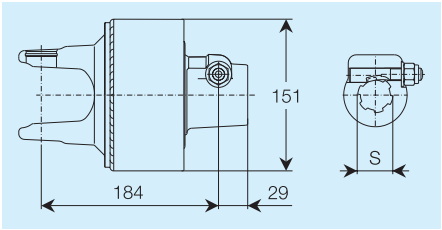
LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
2700	1 3/8" Z6	55	1R0	6060L0303R
	1 3/8" Z21		1S0	6060L3703R
	1 3/4" Z6		1R4	6060L0404R
	1 3/4" Z20		1S4	6060L3807R
3200	1 3/8" Z6	66	1R1	6060L0305R
	1 3/8" Z21		1S1	6060L3704R
	1 3/4" Z6		1R5	6060L0407R
	1 3/4" Z20		1S5	6060L3808R
			Bolt M10 x 50 cl 8.8.	
3600	1 3/8" Z6	52	1R2	6060L0306R
	1 3/8" Z21		1S2	6060L3705R
	1 3/4" Z6		1R6	6060L0408R
	1 3/4" Z20		1S6	6060L3809R
4200	1 3/8" Z6	60	1R3	6060L0308R
	1 3/8" Z21		1S3	6060L3706R
	1 3/4" Z6		1R7	6060L0410R
	1 3/4" Z20		1S7	6060L3810R
			Bolt M12 x 55 cl 8.8.	

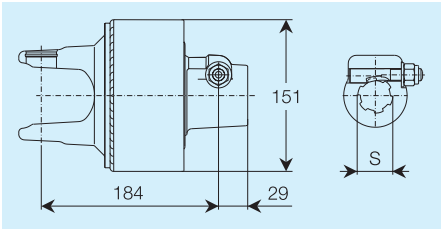
Automatic torque limiters

LR24
for use at 540 min^{-1}



Setting Nm	S	Code LR24	Spare part code
2500	1 3/8" Z6	26A	6WL265003R
	1 3/8" Z21	30A	6WL265037R
	1 3/4" Z6	34A	6WL265004R
	1 3/4" Z20	38A	6WL265038R
3000	1 3/8" Z6	29A	6WL270003R
	1 3/8" Z21	33A	6WL270037R
	1 3/4" Z6	37A	6WL270004R
	1 3/4" Z20	41A	6WL270038R

LR24
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

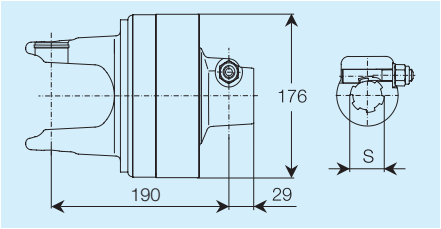
Setting Nm	S	Code LR24	Spare part code
*2500	1 3/8" Z6	50C	6WLE65003R
	1 3/8" Z21	54C	6WLE65037R
	1 3/4" Z6	58C	6WLE65004R
	1 3/4" Z20	62C	6WLE65038R
3000	1 3/8" Z6	53C	6WLE70003R
	1 3/8" Z21	57C	6WLE70037R
	1 3/4" Z6	61C	6WLE70004R
	1 3/4" Z20	65C	6WLE70038R

*Maximum recommended speed 1000 min^{-1}

Size H8

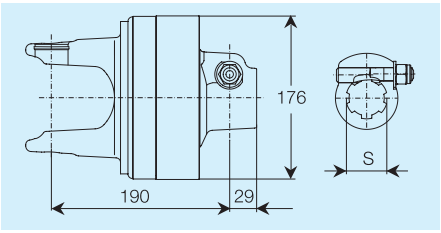
Automatic torque limiters

LR35
for use at 540 min^{-1}



Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	43A	6WL481003R
	1 3/8" Z21	48A	6WL481037R
	1 3/4" Z6	53A	6WL481004R
	1 3/4" Z20	58A	6WL481038R
4100	1 3/8" Z6	24B	6WL488003R
	1 3/8" Z21	30B	6WL488037R
	1 3/4" Z6	36B	6WL488004R
	1 3/4" Z20	42B	6WL488038R

LR35
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

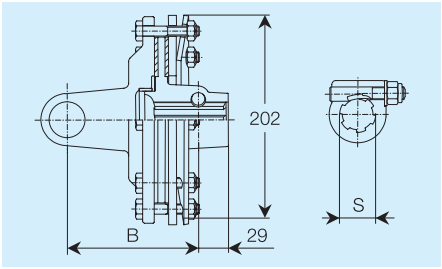
Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	70C	6WLF81003R
	1 3/8" Z21	73C	6WLF81037R
	1 3/4" Z6	76C	6WLF81004R
	1 3/4" Z20	79C	6WLF81038R
4100	1 3/8" Z6	71C	6WLF88003R
	1 3/8" Z21	74C	6WLF88037R
	1 3/4" Z6	77C	6WLF88004R
	1 3/4" Z20	80C	6WLF88038R

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, adjustable setting

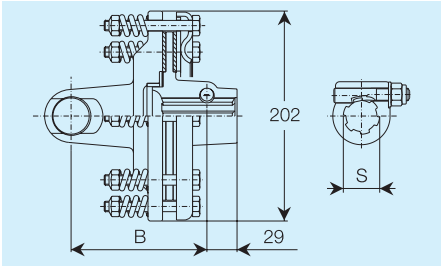
FV42



Setting Nm	B mm	S	Code FV42	Spare part code
1350	131	1 3/8" Z6	N35	661L51403R
	131	1 3/8" Z21	N37	661L51437R
	136	1 3/4" Z6	N0A	661L51404R
	136	1 3/4" Z20	N0D	661L51438R
1450	131	1 3/8" Z6	N18	661L53403R
	131	1 3/8" Z21	N21	661L53437R
	136	1 3/4" Z6	N24	661L53404R
	136	1 3/4" Z20	N27	661L53438R
1600	131	1 3/8" Z6	N36	661L56403R
	131	1 3/8" Z21	N38	661L56437R
	136	1 3/4" Z6	N0C	661L56404R
	136	1 3/4" Z20	N0E	661L56438R
*1800	131	1 3/8" Z6	N19	661L58403R
	131	1 3/8" Z21	N22	661L58437R
	136	1 3/4" Z6	N25	661L58404R
	136	1 3/4" Z20	N28	661L58438R

* Maximum recommended setting for 1000 min^{-1}

FFV42



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV42	Spare part code
1350	131	1 3/8" Z6	0Z2	635L51403R
	131	1 3/8" Z21	0Z7	635L51437R
	136	1 3/4" Z6	0Y2	635L51404R
	136	1 3/4" Z20	0Y7	635L51438R
1450	131	1 3/8" Z6	0Z3	635L53403R
	131	1 3/8" Z21	0Z8	635L53437R
	136	1 3/4" Z6	0Y3	635L53404R
	136	1 3/4" Z20	0Y8	635L53438R
1600	131	1 3/8" Z6	0Z4	635L56403R
	131	1 3/8" Z21	0Z9	635L56437R
	136	1 3/4" Z6	0Y4	635L56404R
	136	1 3/4" Z20	0Y9	635L56438R
*1800	131	1 3/8" Z6	0Z5	635L58403R
	131	1 3/8" Z21	0Z0	635L58437R
	136	1 3/4" Z6	0Y5	635L58404R
	136	1 3/4" Z20	0Y0	635L58438R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

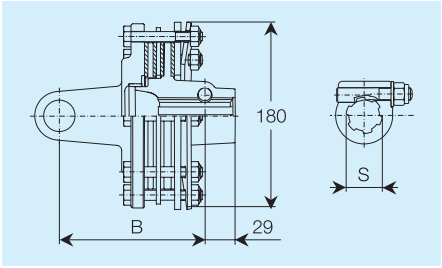
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H8

Friction torque limiter, adjustable setting

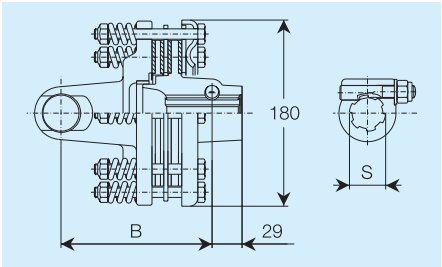
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
1350	146	1 3/8" Z6	N46	661L51303R
	146	1 3/8" Z21	N52	661L51337R
	151	1 3/4" Z6	N58	661L51304R
	151	1 3/4" Z20	N64	661L51338R
1450	146	1 3/8" Z6	N47	661L53303R
	146	1 3/8" Z21	N53	661L53337R
	151	1 3/4" Z6	N59	661L53304R
	151	1 3/4" Z20	N65	661L53338R
1600	146	1 3/8" Z6	N0F	661L56303R
	146	1 3/8" Z21	N0H	661L56337R
	151	1 3/4" Z6	N0K	661L56304R
	151	1 3/4" Z20	N0M	661L56338R
*1800	146	1 3/8" Z6	N43	661L58303R
	146	1 3/8" Z21	N49	661L58337R
	151	1 3/4" Z6	N55	661L58304R
	151	1 3/4" Z20	N61	661L58338R
2000	146	1 3/8" Z6	N0G	661L60303R
	146	1 3/8" Z21	N0J	661L60337R
	151	1 3/4" Z6	N0L	661L60304R
	151	1 3/4" Z20	N0N	661L60338R

* Maximum recommended setting for 1000 min^{-1}

FFV34



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

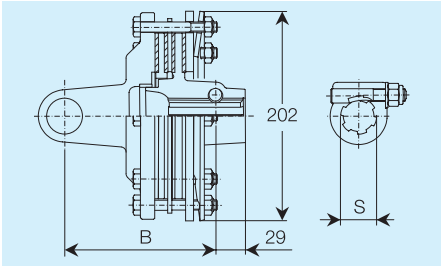
Setting Nm	B mm	S	Code FFV34	Spare part code
1350	146	1 3/8" Z6	0T2	635L51303R
	146	1 3/8" Z21	0T9	635L51337R
	151	1 3/4" Z6	0U6	635L51304R
	151	1 3/4" Z20	0V3	635L51338R
1450	146	1 3/8" Z6	0T3	635L53303R
	146	1 3/8" Z21	0T0	635L53337R
	151	1 3/4" Z6	0U7	635L53304R
	151	1 3/4" Z20	0V4	635L53338R
1600	146	1 3/8" Z6	0T4	635L56303R
	146	1 3/8" Z21	0U1	635L56337R
	151	1 3/4" Z6	0U8	635L56304R
	151	1 3/4" Z20	0V5	635L56338R
*1800	146	1 3/8" Z6	0T5	635L58303R
	146	1 3/8" Z21	0U2	635L58337R
	151	1 3/4" Z6	0U9	635L58304R
	151	1 3/4" Z20	0V6	635L58338R
2000	146	1 3/8" Z6	0T6	635L60303R
	146	1 3/8" Z21	0U3	635L60337R
	151	1 3/4" Z6	0U0	635L60304R
	151	1 3/4" Z20	0V7	635L60338R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

Friction torque limiter, adjustable setting

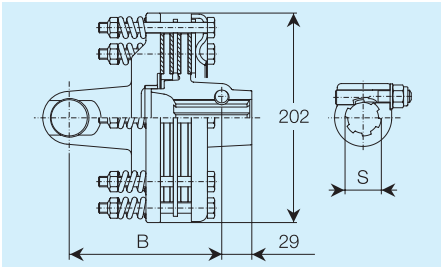
FV44



Setting Nm	B mm	S	Code FV44	Spare part code
*1800	147	1 3/8" Z6	N39	661L58503R
	147	1 3/8" Z21	N72	661L58537R
	152	1 3/4" Z6	N77	661L58504R
	152	1 3/4" Z20	N82	661L58538R
2000	147	1 3/8" Z6	N71	661L60503R
	147	1 3/8" Z21	N76	661L60537R
	152	1 3/4" Z6	N81	661L60504R
	152	1 3/4" Z20	N86	661L60538R
2200	147	1 3/8" Z6	N40	661L62503R
	147	1 3/8" Z21	N73	661L62537R
	152	1 3/4" Z6	N78	661L62504R
	152	1 3/4" Z20	N83	661L62538R
2400	147	1 3/8" Z6	N41	661L64503R
	147	1 3/8" Z21	N87	661L64537R
	152	1 3/4" Z6	N91	661L64504R
	152	1 3/4" Z20	N95	661L64538R
2600	147	1 3/8" Z6	N42	661L66503R
	147	1 3/8" Z21	N88	661L66537R
	152	1 3/4" Z6	N92	661L66504R
	152	1 3/4" Z20	N96	661L66538R

* Maximum recommended setting for 1000 min^{-1}

FFV44



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV44	Spare part code
*1800	147	1 3/8" Z6	0J1	635L58503R
	147	1 3/8" Z21	0J9	635L58537R
	152	1 3/4" Z6	0K7	635L58504R
	152	1 3/4" Z20	0W5	635L58538R
2000	147	1 3/8" Z6	0J2	635L60503R
	147	1 3/8" Z21	0J0	635L60537R
	152	1 3/4" Z6	0K8	635L60504R
	152	1 3/4" Z20	0W6	635L60538R
2200	147	1 3/8" Z6	0J3	635L62503R
	147	1 3/8" Z21	0K1	635L62537R
	152	1 3/4" Z6	0K9	635L62504R
	152	1 3/4" Z20	0W7	635L62538R
2400	147	1 3/8" Z6	0J4	635L64503R
	147	1 3/8" Z21	0K2	635L64537R
	152	1 3/4" Z6	0K0	635L64504R
	152	1 3/4" Z20	0W8	635L64538R
2600	147	1 3/8" Z6	0J5	635L66503R
	147	1 3/8" Z21	0K3	635L66537R
	152	1 3/4" Z6	0W1	635L66504R
	152	1 3/4" Z20	0W9	635L66538R

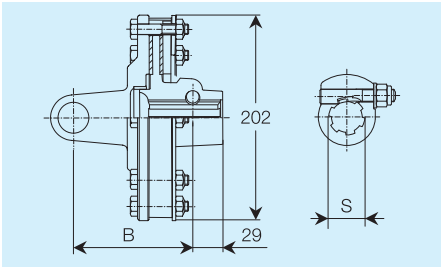
* Maximum recommended setting for 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Size H8

Friction torque limiter, non-adjustable setting

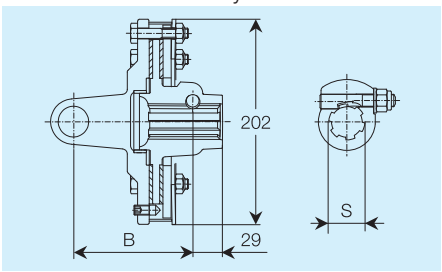
FT42



Setting Nm	B mm	S	Code FT42	Spare part code
*1450	131	1 3/8" Z6	Q23	663L53403R
	131	1 3/8" Z21	Q27	663L53437R
	136	1 3/4" Z6	Q31	663L53404R
	136	1 3/4" Z20	Q35	663L53438R
1800	131	1 3/8" Z6	Q21	663L58403R
	131	1 3/8" Z21	Q25	663L58437R
	136	1 3/4" Z6	Q29	663L58404R
	136	1 3/4" Z20	Q33	663L58438R

* Maximum recommended setting for 1000 min^{-1}

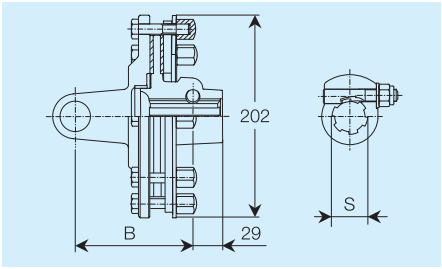
FT42R with Release System



Setting Nm	B mm	S	Code FT42R	Spare part code
*1450	131	1 3/8" Z6	H23	663L53F03R
	131	1 3/8" Z21	H27	663L53F37R
	136	1 3/4" Z6	H31	663L53F04R
	136	1 3/4" Z20	H35	663L53F38R
1800	131	1 3/8" Z6	H21	663L58F03R
	131	1 3/8" Z21	H25	663L58F37R
	136	1 3/4" Z6	H29	663L58F04R
	136	1 3/4" Z20	H33	663L58F38R

* Maximum recommended setting for 1000 min^{-1}

FK42



Setting Nm	B mm	S	Code FK42	Spare part code
*1450	131	1 3/8" Z6	7C5	60KL53403R
	131	1 3/8" Z21	7C8	60KL53437R
	136	1 3/4" Z6	7D1	60KL53404R
	136	1 3/4" Z20	7D4	60KL53438R
1800	131	1 3/8" Z6	7C6	60KL58403R
	131	1 3/8" Z21	7C9	60KL58437R
	136	1 3/4" Z6	7D2	60KL58404R
	136	1 3/4" Z20	7D5	60KL58438R

* Maximum recommended setting for 1000 min^{-1}

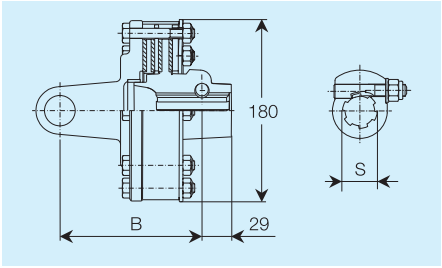
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

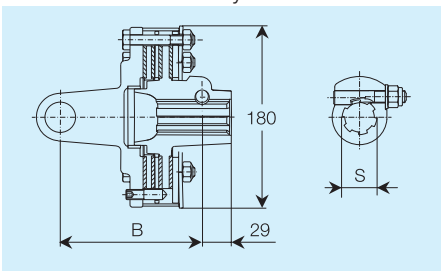
FT34



Setting Nm	B mm	S	Code FT34	Spare part code
1450	146	1 3/8" Z6	Q52	663L53303R
	146	1 3/8" Z21	Q59	663L53337R
	151	1 3/4" Z6	Q66	663L53304R
	151	1 3/4" Z20	Q73	663L53338R
*1800	146	1 3/8" Z6	Q54	663L58303R
	146	1 3/8" Z21	Q61	663L58337R
	151	1 3/4" Z6	Q68	663L58304R
	151	1 3/4" Z20	Q75	663L58338R

* Maximum recommended setting for 1000 min^{-1}

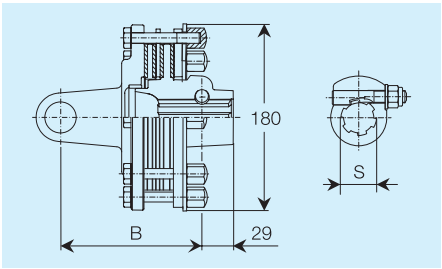
FT34R with Release System



Setting Nm	B mm	S	Code FT34R	Spare part code
1450	146	1 3/8" Z6	H52	663L53E03R
	146	1 3/8" Z21	H59	663L53E37R
	151	1 3/4" Z6	H66	663L53E04R
	151	1 3/4" Z20	H73	663L53E38R
*1800	146	1 3/8" Z6	H54	663L58E03R
	146	1 3/8" Z21	H61	663L58E37R
	151	1 3/4" Z6	H68	663L58E04R
	151	1 3/4" Z20	H75	663L58E38R

* Maximum recommended setting for 1000 min^{-1}

FK34



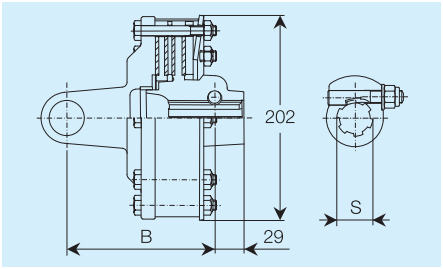
Setting Nm	B mm	S	Code FK34	Spare part code
1450	146	1 3/8" Z6	7D7	60KL53303R
	146	1 3/8" Z21	7E0	60KL53337R
	151	1 3/4" Z6	7E3	60KL53304R
	151	1 3/4" Z20	7E6	60KL53338R
*1800	146	1 3/8" Z6	7D8	60KL58303R
	146	1 3/8" Z21	7E1	60KL58337R
	151	1 3/4" Z6	7E4	60KL58304R
	151	1 3/4" Z20	7E7	60KL58338R

* Maximum recommended setting for 1000 min^{-1}

Size H8

Friction torque limiter, non-adjustable setting

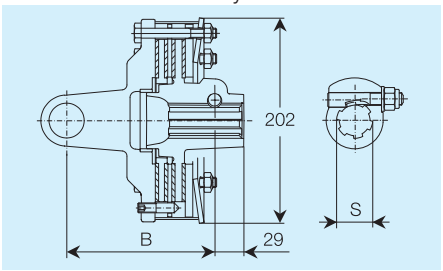
FT44



Setting Nm	B mm	S	Code FT44	Spare part code
*1800	147	1 3/8" Z6	Q37	663L58503R
	147	1 3/8" Z21	Q39	663L58537R
	152	1 3/4" Z6	Q41	663L58504R
	152	1 3/4" Z20	Q43	663L58538R
2200	147	1 3/8" Z6	Q38	663L62503R
	147	1 3/8" Z21	Q40	663L62537R
	152	1 3/4" Z6	Q42	663L62504R
	152	1 3/4" Z20	Q44	663L62538R
2400	147	1 3/8" Z6	Q80	663L64503R
	147	1 3/8" Z21	Q86	663L64537R
	152	1 3/4" Z6	Q92	663L64504R
	152	1 3/4" Z20	Q98	663L64538R
2600	147	1 3/8" Z6	Q76	663L66503R
	147	1 3/8" Z21	Q82	663L66537R
	152	1 3/4" Z6	Q88	663L66504R
	152	1 3/4" Z20	Q94	663L66538R

* Maximum recommended setting for 1000 min^{-1}

FT44R with Release System



Setting Nm	B mm	S	Code FT44R	Spare part code
*1800	147	1 3/8" Z6	H37	663L58G03R
	147	1 3/8" Z21	H39	663L58G37R
	152	1 3/4" Z6	H41	663L58G04R
	152	1 3/4" Z20	H43	663L58G38R
2200	147	1 3/8" Z6	H38	663L62G03R
	147	1 3/8" Z21	H40	663L62G37R
	152	1 3/4" Z6	H42	663L62G04R
	152	1 3/4" Z20	H44	663L62G38R
2400	147	1 3/8" Z6	H80	663L64G03R
	147	1 3/8" Z21	H86	663L64G37R
	152	1 3/4" Z6	H92	663L64G04R
	152	1 3/4" Z20	H98	663L64G38R
2600	147	1 3/8" Z6	H76	663L66G03R
	147	1 3/8" Z21	H82	663L66G37R
	152	1 3/4" Z6	H88	663L66G04R
	152	1 3/4" Z20	H94	663L66G38R

* Maximum recommended setting for 1000 min^{-1}

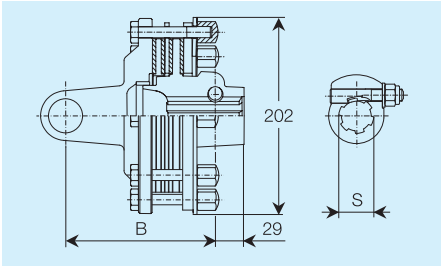
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

FK44



Setting Nm	B mm	S	Code FK44	Spare part code
*1800	147	1 3/8" Z6	7E8	60KL58503R
	147	1 3/8" Z21	7F2	60KL58537R
	152	1 3/4" Z6	7F6	60KL58504R
	152	1 3/4" Z20	7G0	60KL58538R
2200	147	1 3/8" Z6	7E9	60KL62503R
	147	1 3/8" Z21	7F3	60KL62537R
	152	1 3/4" Z6	7F7	60KL62504R
	152	1 3/4" Z20	7G1	60KL62538R
2400	147	1 3/8" Z6	7F0	60KL64503R
	147	1 3/8" Z21	7F4	60KL64537R
	152	1 3/4" Z6	7F8	60KL64504R
	152	1 3/4" Z20	7G2	60KL64538R
2600	147	1 3/8" Z6	7F1	60KL66503R
	147	1 3/8" Z21	7F5	60KL66537R
	152	1 3/4" Z6	7F9	60KL66504R
	152	1 3/4" Z20	7G3	60K L66538R

* Maximum recommended setting for 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

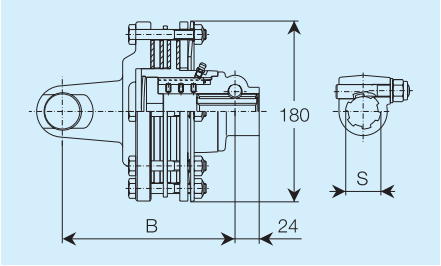
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H8

Friction torque limiter and overrunning clutch, adjustable setting

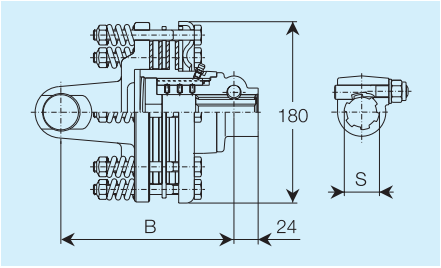
FNV34



Setting Nm	B mm	S	Code FNV34	Spare part code
1350	172	1 3/8" Z6	2A1	665L51103R
	172	1 3/8" Z21	2A9	665L51137R
1450	172	1 3/8" Z6	2A2	665L53103R
	172	1 3/8" Z21	2B0	665L53137R
1600	172	1 3/8" Z6	2A3	665L56103R
	172	1 3/8" Z21	2B1	665L56137R
*1800	172	1 3/8" Z6	2A4	665L58103R
	172	1 3/8" Z21	2B2	665L58137R
2000	172	1 3/8" Z6	2A5	665L60103R
	172	1 3/8" Z21	2B3	665L60137R

* Maximum recommended setting for 1000 min^{-1}

FFNV34



Drivelines with FFNV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFNV34	Spare part code
1350	172	1 3/8" Z6	2F1	667L51103R
	172	1 3/8" Z21	2F9	667L51137R
1450	172	1 3/8" Z6	2F2	667L53103R
	172	1 3/8" Z21	2G0	667L53137R
1600	172	1 3/8" Z6	2F3	667L56103R
	172	1 3/8" Z21	2G1	667L56137R
*1800	172	1 3/8" Z6	2F4	667L58103R
	172	1 3/8" Z21	2G2	667L58137R
2000	172	1 3/8" Z6	2F5	667L60103R
	172	1 3/8" Z21	2G3	667L60137R

* Maximum recommended setting for 1000 min^{-1}

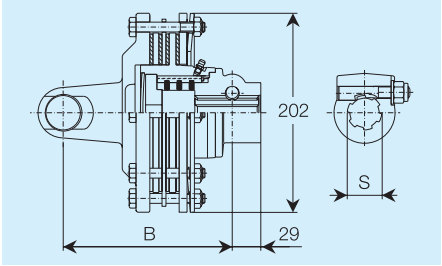
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter and overrunning clutch, adjustable setting

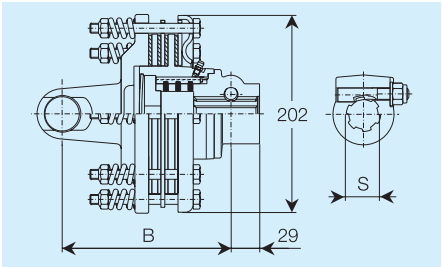
FNV44



Setting Nm	B mm	S	Code FNV44	Spare part code
*1800	175	1 3/8" Z6	2B6	665L58203R
	175	1 3/8" Z21	2C4	665L58237R
	175	1 3/4" Z6	2D2	665L58204R
	175	1 3/4" Z20	2E0	665L58238R
2000	175	1 3/8" Z6	2B7	665L60203R
	175	1 3/8" Z21	2C5	665L60237R
	175	1 3/4" Z6	2D3	665L60204R
	175	1 3/4" Z20	2E1	665L60238R
2200	175	1 3/8" Z6	2B8	665L62203R
	175	1 3/8" Z21	2C6	665L62237R
	175	1 3/4" Z6	2D4	665L62204R
	175	1 3/4" Z20	2E2	665L62238R
2400	175	1 3/8" Z6	2B9	665L64203R
	175	1 3/8" Z21	2C7	665L64237R
	175	1 3/4" Z6	2D5	665L64204R
	175	1 3/4" Z20	2E3	665L64238R
2600	175	1 3/8" Z6	2C0	665L66203R
	175	1 3/8" Z21	2C8	665L66237R
	175	1 3/4" Z6	2D6	665L66204R
	175	1 3/4" Z20	2E4	665L66238R

* Maximum recommended setting for 1000 min^{-1}

FFNV44



Drivelines with FFNV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

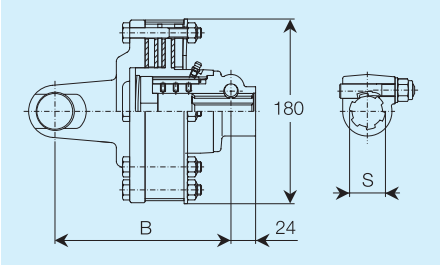
Setting Nm	B mm	S	Code FFNV44	Spare part code
*1800	175	1 3/8" Z6	2G6	667L58203R
	175	1 3/8" Z21	2H4	667L58237R
	175	1 3/4" Z6	2J2	667L58204R
	175	1 3/4" Z20	2K0	667L58238R
2000	175	1 3/8" Z6	2G7	667L60203R
	175	1 3/8" Z21	2H5	667L60237R
	175	1 3/4" Z6	2J3	667L60204R
	175	1 3/4" Z20	2K1	667L60238R
2200	175	1 3/8" Z6	2G8	667L62203R
	175	1 3/8" Z21	2H6	667L62237R
	175	1 3/4" Z6	2J4	667L62204R
	175	1 3/4" Z20	2K2	667L62238R
2400	175	1 3/8" Z6	2G9	667L64203R
	175	1 3/8" Z21	2H7	667L64237R
	175	1 3/4" Z6	2J5	667L64204R
	175	1 3/4" Z20	2K3	667L64238R
2600	175	1 3/8" Z6	2H0	667L66203R
	175	1 3/8" Z21	2H8	667L66237R
	175	1 3/4" Z6	2J6	667L66204R
	175	1 3/4" Z20	2K4	667L66238R

* Maximum recommended setting for 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Size H8

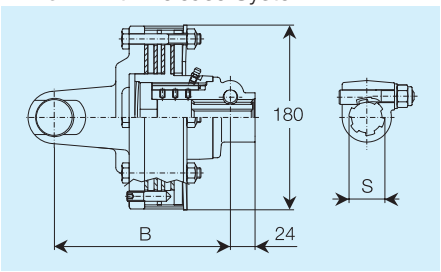
Friction torque limiter and overrunning clutch, non-adjustable setting
FNT34



Setting Nm	B mm	S	Code FNT34	Spare part code
1450	172	1 3/8" Z6	1A2	658L53103R
	172	1 3/8" Z21	1A7	658L53137R
*1800	172	1 3/8" Z6	1A3	658L58103R
	172	1 3/8" Z21	1A8	658L58137R

* Maximum recommended setting for 1000 min^{-1}

FNT34R with Release System



Setting Nm	B mm	S	Code FNT34R	Spare part code
1450	172	1 3/8" Z6	1C2	658L53203R
	172	1 3/8" Z21	1C7	658L53237R
*1800	172	1 3/8" Z6	1C3	658L58203R
	172	1 3/8" Z21	1C8	658L58237R

* Maximum recommended setting for 1000 min^{-1}

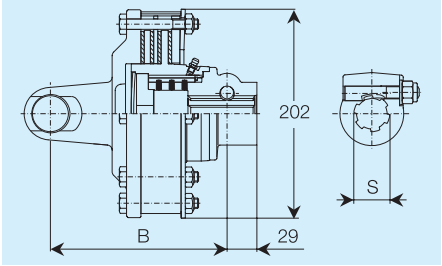
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter and overrunning clutch, non-adjustable setting

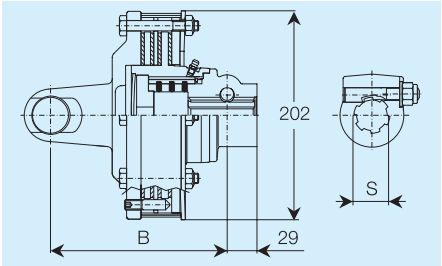
FNT44



Setting Nm	B mm	S	Code FNT44	Spare part code
*1800	175	1 3/8" Z6	1F1	658L58303R
	175	1 3/8" Z21	1F7	658L58337R
	175	1 3/4" Z6	1G3	658L58304R
	175	1 3/4" Z20	1G9	658L58338R
2200	175	1 3/8" Z6	1F2	658L62303R
	175	1 3/8" Z21	1F8	658L62337R
	175	1 3/4" Z6	1G4	658L62304R
	175	1 3/4" Z20	1H0	658L62338R
2400	175	1 3/8" Z6	1F3	658L64303R
	175	1 3/8" Z21	1F9	658L64337R
	175	1 3/4" Z6	1G5	658L64304R
	175	1 3/4" Z20	1H1	658L64338R
2600	175	1 3/8" Z6	1F4	658L66303R
	175	1 3/8" Z21	1G0	658L66337R
	175	1 3/4" Z6	1G6	658L66304R
	175	1 3/4" Z20	1H2	658L66338R

* Maximum recommended setting for 1000 min^{-1}

FNT44R with Release System



Setting Nm	B mm	S	Code FNT44R	Spare part code
*1800	175	1 3/8" Z6	1H5	658L58403R
	175	1 3/8" Z21	1J1	658L58437R
	175	1 3/4" Z6	1J7	658L58404R
	175	1 3/4" Z20	1K4	658L58438R
2200	175	1 3/8" Z6	1H6	658L62403R
	175	1 3/8" Z21	1J2	658L62437R
	175	1 3/4" Z6	1J8	658L62404R
	175	1 3/4" Z20	1K5	658L62438R
2400	175	1 3/8" Z6	1H7	658L64403R
	175	1 3/8" Z21	1J3	658L64437R
	175	1 3/4" Z6	1J9	658L64404R
	175	1 3/4" Z20	1K6	658L64438R
2600	175	1 3/8" Z6	1H8	658L66403R
	175	1 3/8" Z21	1J4	658L66437R
	175	1 3/4" Z6	1K0	658L66404R
	175	1 3/4" Z20	1K7	658L66438R

* Maximum recommended setting for 1000 min^{-1}

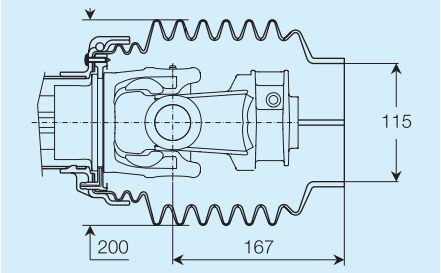
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

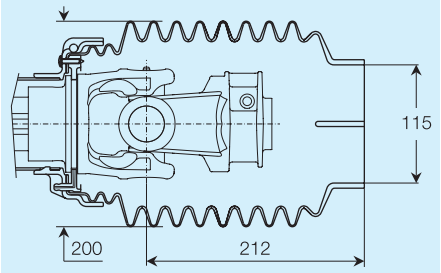
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size H8

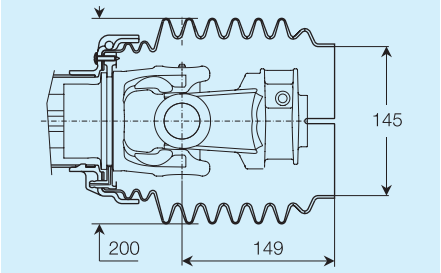
Optional shield cones



Extended shield cone, medium length, narrow diameter
- Tractor end ....P
- Implement end ....M



Extended shield cone, long length, narrow diameter
- Tractor end ....N
- Implement end L



Extended shield cone, medium length, wide diameter
- Tractor end ....R
- Implement end ....T

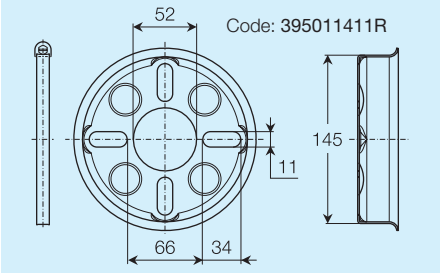


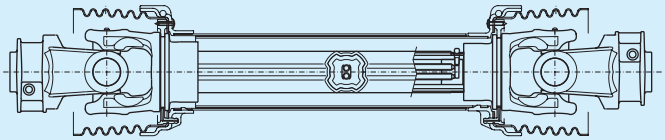
Plate with clamps for optional extended shield cones

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System code
G

Size H8

Codes for size H8 drivelines

1
C

C: Standard SFT cardan joint driveline

2 3
H **8**

Size **H8**

4

Telescoping Members
See page H8.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page H8.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page H8.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page H8.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint, 80° CV, 50° CV, or splined stub shaft without joint), and establishes the associated shields and attachment to PTO.

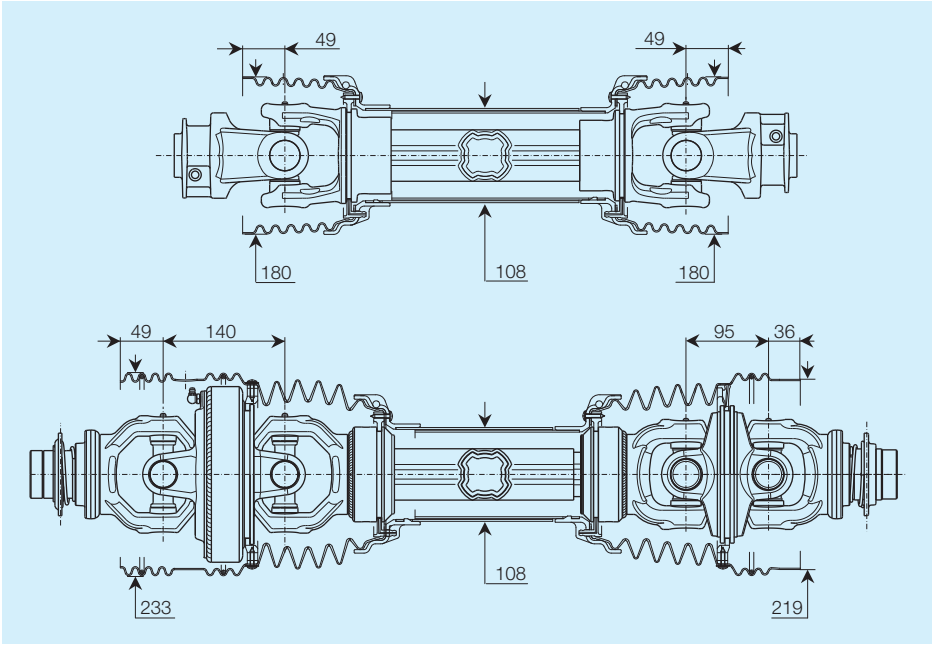
13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft.

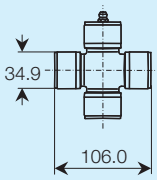
16 17 18

Only use these positions of the code if requesting optional shield cones, and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

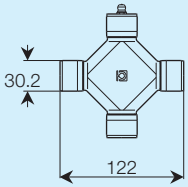


Single Cardan Joint



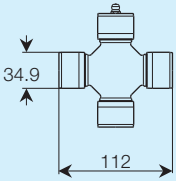
4120M0012

80° Constant Velocity Joint



4120M0052

50° Constant Velocity Joint



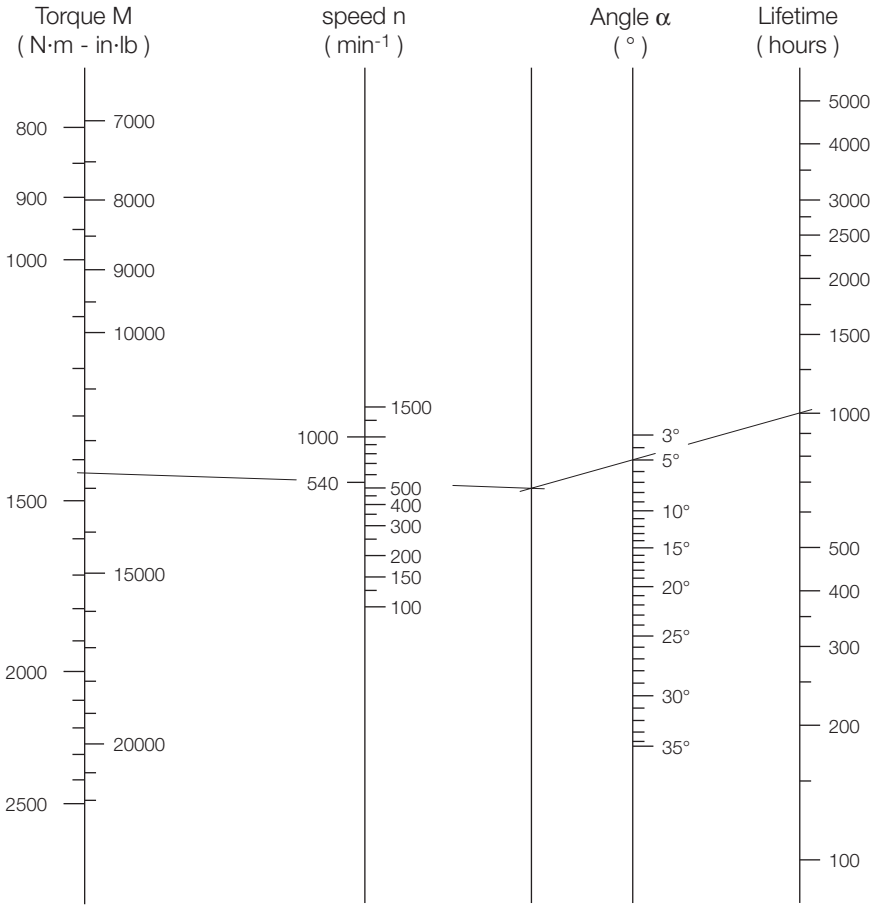
4120N0051

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S9	1431	12668	81	110	1166	10323	122	166

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size S9

Nomogram to calculate a single cardan joint lifetime



Example:

To calculate the life for torque **M** = 1431 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed

P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

Rapporto L_{h50}/L_h	Intervallo di ingrassaggio (ore)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size S9, torque M = 1431 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

Rapporto M_{50}/M	Intervallo di ingrassaggio (ore)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

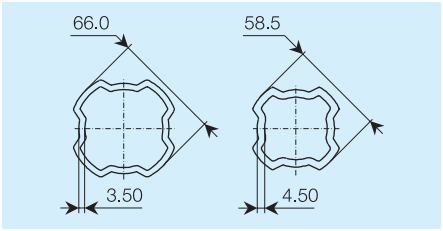
Example: M_{50} = 1431 Nm is the theoretical transmittable torque for a cardan driveshaft size S9, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 1223 Nm, M_{50} / M ratio is 1431 / 1223 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S9

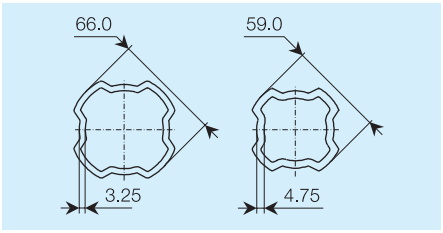
Telescoping Members

Four-Tooth profile tubes



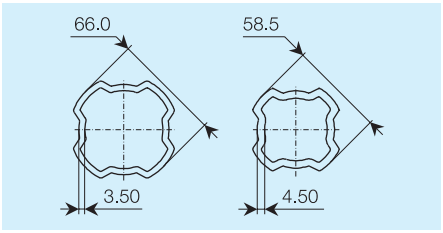
Mmax (Nm)	5000
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



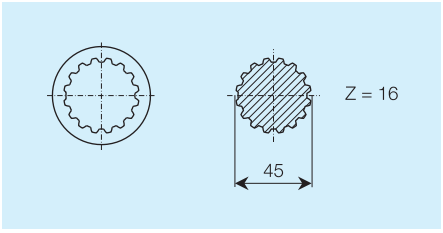
Mmax (Nm)	5000
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	5000
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

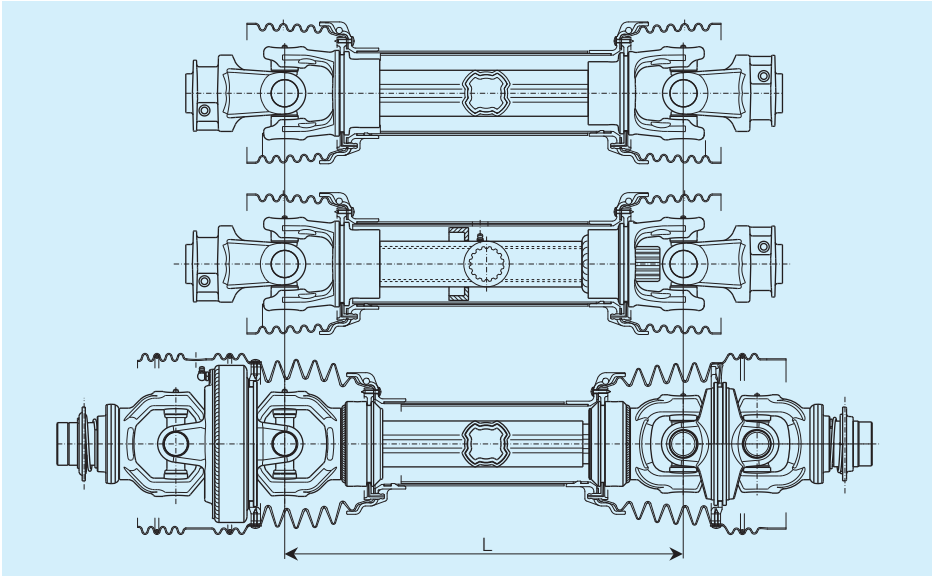
Splined shafts



Mmax (Nm)	5000
T/M (N/Nm)	7 - 9
Tube code	S

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Four-Tooth tubes length





	Standard			Maximum extension			Splined	Length
L	Lw	Lt	Ls	Lw	Lt	Ls	Lw = Lt = Ls	code
mm	mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	- -	- -	- -	558	041
460	- -	- -	- -	- -	- -	- -	658	046
510	- -	- -	- -	656	731	731	758	051
560	676	751	815	756	831	831	858	056
610	776	851	903	856	931	931	958	061
660	876	951	990	956	1031	1031	993	066
710	955	1037	1078	1035	1117	1131	1093	071
760	1030	1120	1165	1110	1200	1231	1193	076
810	1105	1204	1253	- -	- -	- -	1293	081
860	1180	1287	1340	- -	- -	- -	- -	086
910	1255	1370	1428	- -	- -	- -	- -	091
1010	1405	1537	1603	- -	- -	- -	- -	101
1110	1555	1704	1778	- -	- -	- -	- -	111
1210	1705	1870	1953	- -	- -	- -	- -	121

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

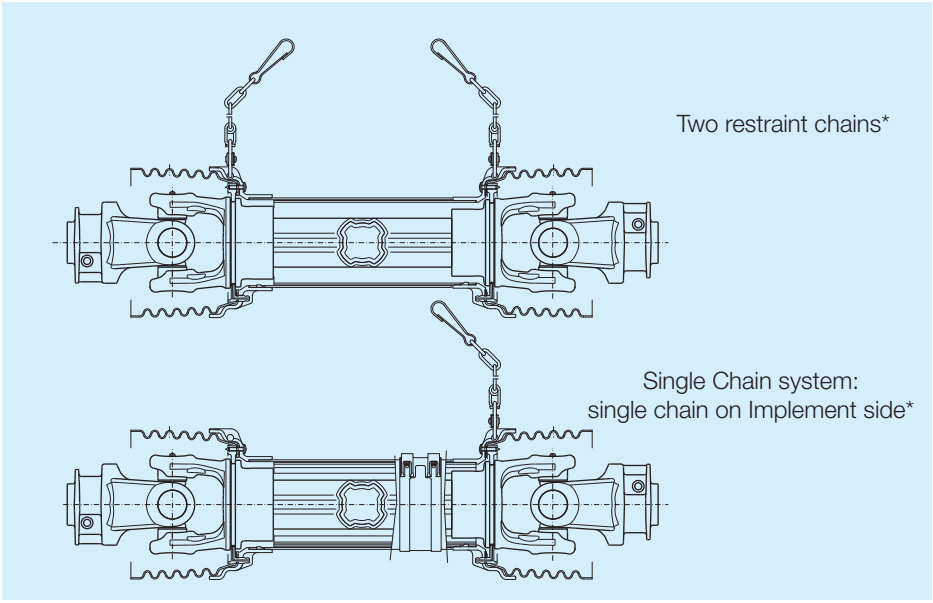
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S9

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

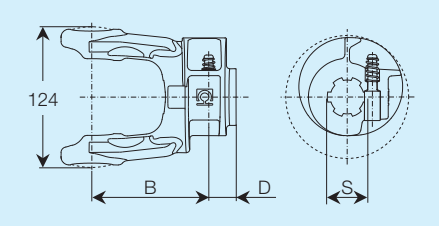


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

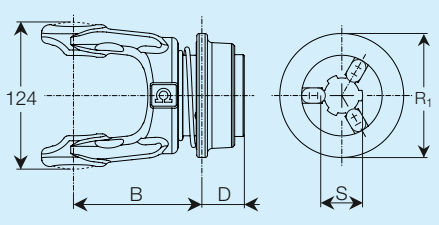
Yokes for single cardan joint

Push-pin yokes

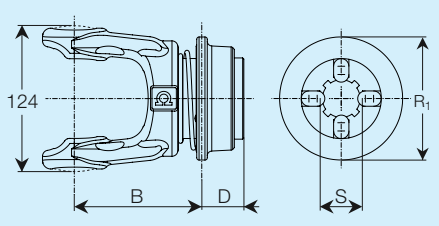


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	103	24	107	007	5070M0355
1 3/8" Z21	95	32	107	008	5070M3755
D8x32x38	103	24	107	093	5070M2151

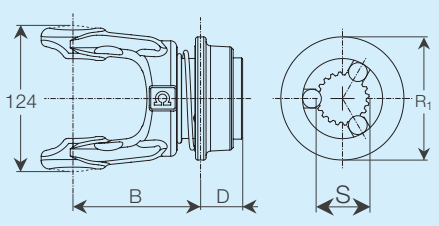
RT Ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	109	35	105	R07	5720M0351
1 3/8" Z21	109	35	105	R08	5720M3751



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	109	35	105	R93	5720M2153



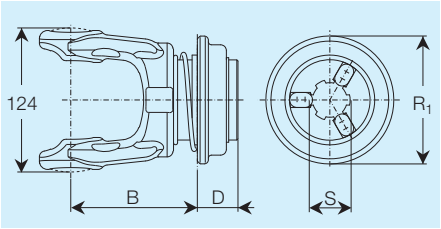
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/4" Z6	109	35	105	R09	5720M0451
1 3/4" Z20	109	35	105	R10	5720M3851

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

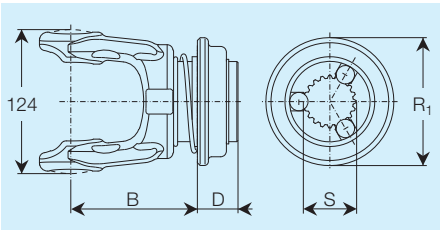
Size S9

Yokes for single cardan joint

RTA Automatic ball collar yoke

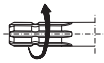


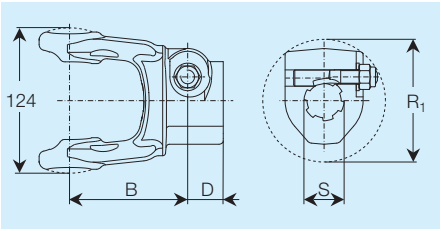
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	109	35	110	0Q7	5720M0361
1 3/8" Z21	109	35	110	0Q8	5720M3761



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/4" Z6	109	35	110	0Q9	5720M0461
1 3/4" Z20	109	35	110	0Q0	5720M3861

Taper-pin yokes for shafts with counter-clockwise rotation



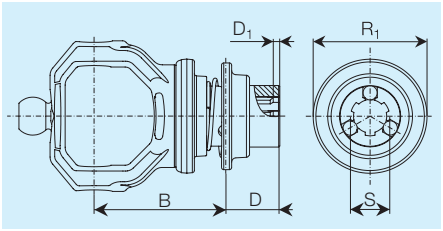


S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	103	31	107	014	5090M0360
1 3/8" Z21	103	31	107	015	5090M3760
1 3/4" Z6	103	31	124	016	5090M0460
1 3/4" Z20	103	31	124	017	5090M3860

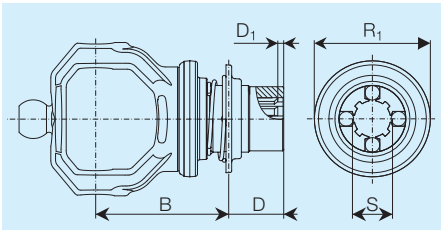
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Yokes for 80° Constant Velocity Joint

RT Ball collar yokes
TRACTOR SIDE

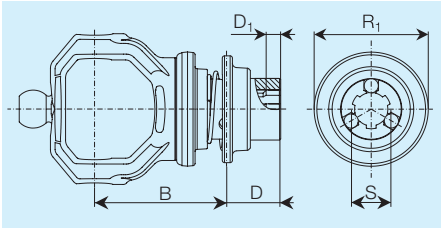


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	115	38	2	95	WS7	5730M0387
1 3/8" Z21	108	40	2	95	WR8	5730M3776
1 3/4" Z6	126	40	2	105	WR9	5730M0476
1 3/4" Z20	126	50	2	105	WS0	5730M3887

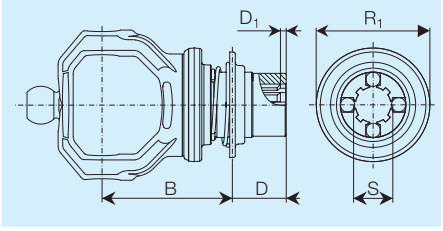


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
D8x32x38	115	38	2	95	WR6	5730M2175

RT Ball collar yokes
IMPLEMENT SIDE



S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	115	38	10	95	WR7	5730M0376
1 3/8" Z21	108	40	2	95	WR8	5730M3776
1 3/4" Z6	126	40	2	105	WR9	5730M0476
1 3/4" Z20	126	50	14	105	WR0	5730M3876



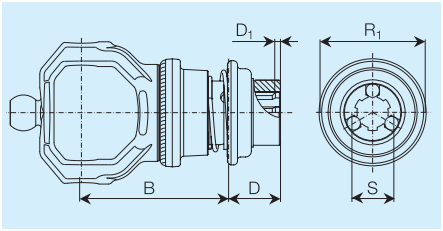
S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
D8x32x38	115	38	2	95	WR6	5730M2175

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S9

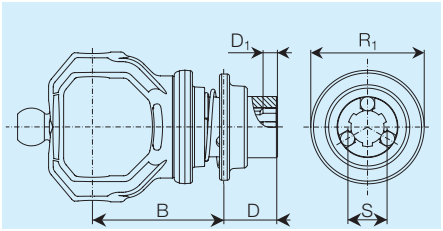
Yokes for 80° Constant Velocity Joint

RTA Automatic ball collar yokes
TRACTOR SIDE



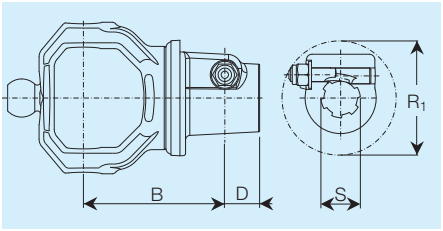
S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	115	38	2	88	WP7	5730M0392
1 3/8" Z21	108	40	2	88	WQ8	5730M3791
1 3/4" Z6	126	40	2	110	WQ9	5730M0491
1 3/4" Z20	126	50	2	110	WP0	5730M3892

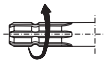
RTA Automatic ball collar yokes
IMPLEMENT SIDE



S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	115	38	10	88	WQ7	5730M0391
1 3/8" Z21	108	40	2	88	WQ8	5730M3791
1 3/4" Z6	126	40	2	110	WQ9	5730M0491
1 3/4" Z20	126	50	14	110	WQ0	5730M3891

Taper-pin yokes for shafts with counter-clockwise rotation





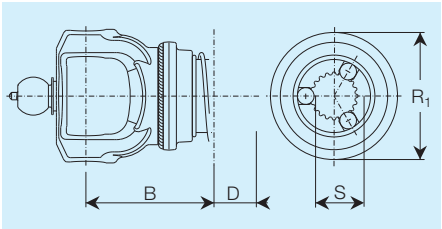
S	R	D	R_1	Yoke	Spare part
	mm	mm	mm	code	code
1 3/8" Z6	126	31	106	W14	5110M0351
1 3/8" Z21	126	31	106	W15	5110M3751
1 3/4" Z6	126	31	126	W16	5110M0451
1 3/4" Z20	126	31	126	W17	5110M3851

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

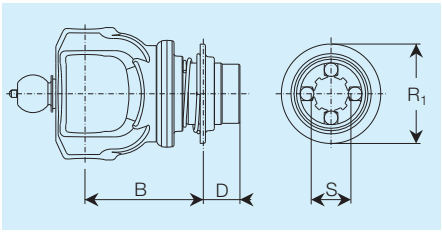
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Yokes for single cardan joint

RT Automatic ball collar yoke

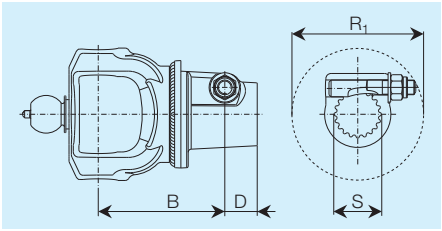


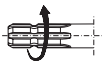
S	R mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	113	35	95	KR7	5730N0355
1 3/8" Z21	103	40	95	KR8	5730N3755
1 3/4" Z6	121	40	105	KR9	5730N0455
1 3/4" Z20	121	40	105	KR0	5730N3855



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	113	35	95	KR6	5730N2153

Taper-pin yokes for shafts with counter-clockwise rotation





S	R mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	121	31	106	K14	5190N0351
1 3/8" Z21	121	31	106	K15	5190N3751
1 3/4" Z6	121	31	126	K16	5190N0451
1 3/4" Z20	121	31	126	K17	5190N3851

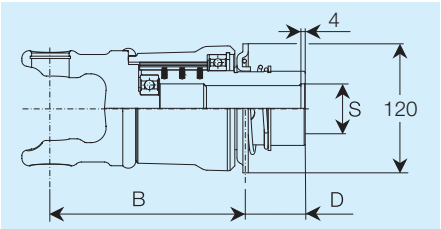
Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S9

Overrunning Clutches

RLA (Permanent lubrication)

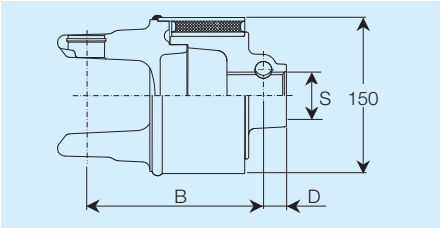


S	B	D	Code	Spare part
	mm	mm	RLA	code
1 3/8" Z6	193	42	A33	60170M101R
1 3/8" Z21	193	42	A34	60170M102R
1 3/4" Z6	193	42	A36	60170M103R
1 3/4" Z20	193	55	A37	60170M104R

Maximum recommended torque: 6200 Nm

GE Torsionally resilient joints

GE8



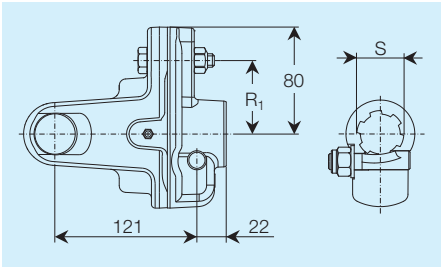
65 Shore	B	D	Code	Spare part
S	mm	mm	GE8	code
1 3/8" Z6	170	22	0D4	608M86501R
1 3/8" Z21	170	22	0D5	608M86502R
1 3/4" Z6	170	22	0D6	608M86503R
1 3/4" Z20	170	22	0D7	608M86504R

Torque at maximum recommended deformation (±20°): (65 Shore rubber), $M_{20°}$ = 5000 Nm.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

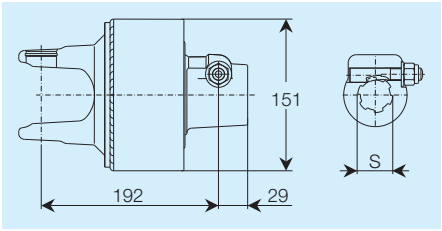
LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
3000	1 3/8" Z6	62	1R0	6060M0306R
	1 3/8" Z21		1S0	6060M3705R
	1 3/4" Z6		1R4	6060M0405R
	1 3/4" Z20		1S4	6060M3811R
			Bolt M10 x 50 cl 8.8.	
3500	1 3/8" Z6	50	1R1	6060M0307R
	1 3/8" Z21		1S1	6060M3703R
	1 3/4" Z6		1R5	6060M0407R
	1 3/4" Z20		1S5	6060M3809R
4200	1 3/8" Z6	60	1R2	6060M0301R
	1 3/8" Z21		1S2	6060M3701R
	1 3/4" Z6		1R6	6060M0401R
	1 3/4" Z20		1S6	6060M3801R
			Bolt M12 x 55 cl 8.8.	

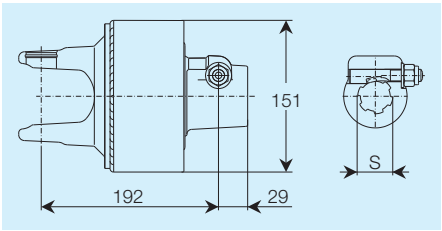
Automatic torque limiters

LR24
for use at 540 min^{-1}



Setting Nm	S	Code LR24	Spare part code
3000	1 3/8" Z6	29A	6WM270003R
	1 3/8" Z21	33A	6WM270037R
	1 3/4" Z6	37A	6WM270004R
	1 3/4" Z20	41A	6WM270038R

LR24
* for use at 1000 min^{-1}



Setting Nm	S	Code LR24	Spare part code
*3000	1 3/8" Z6	53C	6WME70003R
	1 3/8" Z21	57C	6WME70037R
	1 3/4" Z6	61C	6WME70004R
	1 3/4" Z20	65C	6WME70038R

*Maximum recommended speed 1000 min^{-1}

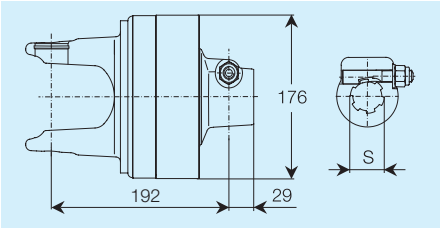
* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Size S9

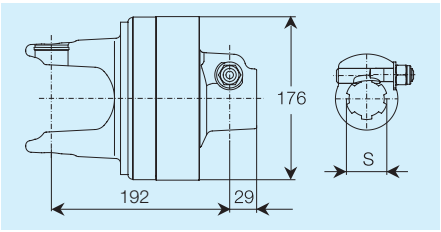
Automatic torque limiters

LR35
for use at 540 min^{-1}



Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	43A	6WM481003R
	1 3/8" Z21	48A	6WM481037R
	1 3/4" Z6	53A	6WM481004R
	1 3/4" Z20	58A	6WM481038R
4100	1 3/8" Z6	24B	6WM488003R
	1 3/8" Z21	30B	6WM488037R
	1 3/4" Z6	36B	6WM488004R
	1 3/4" Z20	42B	6WM488038R

LR35
* for use at 1000 min^{-1}



Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	70C	6WMF81003R
	1 3/8" Z21	73C	6WMF81037R
	1 3/4" Z6	76C	6WMF81004R
	1 3/4" Z20	79C	6WMF81038R
4100	1 3/8" Z6	71C	6WMF88003R
	1 3/8" Z21	74C	6WMF88037R
	1 3/4" Z6	77C	6WMF88004R
	1 3/4" Z20	80C	6WMF88038R

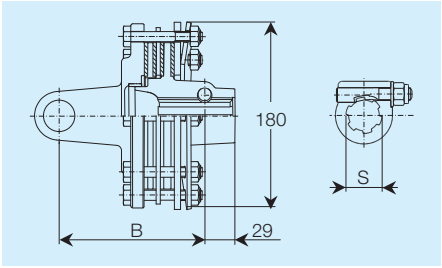
* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, adjustable setting

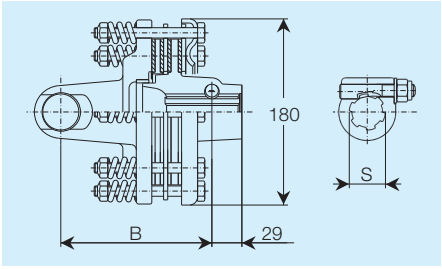
FV34



Setting Nm	B mm	S	Code FV34	Spare part code
*1800	148	1 3/8" Z6	N43	661M58303R
	148	1 3/8" Z21	N49	661M58337R
	153	1 3/4" Z6	N55	661M58304R
	153	1 3/4" Z20	N61	661M58338R
2000	148	1 3/8" Z6	N0G	661M60303R
	148	1 3/8" Z21	N0J	661M60337R
	153	1 3/4" Z6	N0L	661M60304R
	153	1 3/4" Z20	N0N	661M60338R

* Maximum recommended setting fo 1000 min^{-1}

FFV34



Setting Nm	B mm	S	Code FFV34	Spare part code
*1800	148	1 3/8" Z6	0T5	635M58303R
	148	1 3/8" Z21	0U2	635M58337R
	153	1 3/4" Z6	0U9	635M58304R
	153	1 3/4" Z20	0V6	635M58338R
2000	148	1 3/8" Z6	0T6	635M60303R
	148	1 3/8" Z21	0U3	635M60337R
	153	1 3/4" Z6	0U0	635M60304R
	153	1 3/4" Z20	0V7	635M60338R

* Maximum recommended setting fo 1000 min^{-1}

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

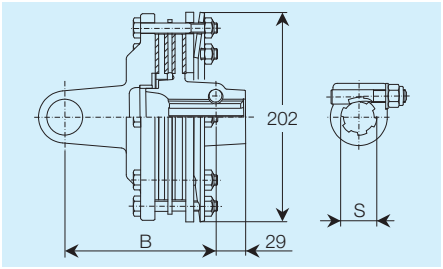
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S9

Friction torque limiter, adjustable setting

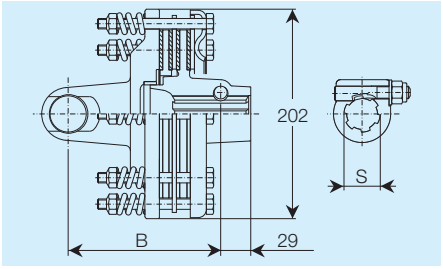
FV44



Setting Nm	S mm	R_1	Code FV44	Spare part code
1800	149	1 3/8" Z6	N39	661M58503R
	149	1 3/8" Z21	N72	661M58537R
	154	1 3/4" Z6	N77	661M58504R
	154	1 3/4" Z20	N82	661M58538R
2000	149	1 3/8" Z6	N71	661M60503R
	149	1 3/8" Z21	N76	661M60537R
	154	1 3/4" Z6	N81	661M60504R
	154	1 3/4" Z20	N86	661M60538R
*2200	149	1 3/8" Z6	N40	661M62503R
	149	1 3/8" Z21	N73	661M62537R
	154	1 3/4" Z6	N78	661M62504R
	154	1 3/4" Z20	N83	661M62538R
2400	149	1 3/8" Z6	N41	661M64503R
	149	1 3/8" Z21	N87	661M64537R
	154	1 3/4" Z6	N91	661M64504R
	154	1 3/4" Z20	N95	661M64538R
2600	149	1 3/8" Z6	N42	661M66503R
	149	1 3/8" Z21	N88	661M66537R
	154	1 3/4" Z6	N92	661M66504R
	154	1 3/4" Z20	N96	661M66538R

* Maximum recommended setting fo 1000 min^{-1}

FFV44



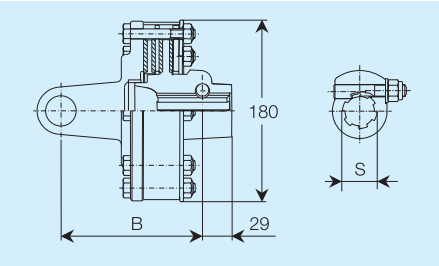
Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	S mm	R_1	Code FFV44	Spare part code
1800	149	1 3/8" Z6	0J1	635M58503R
	149	1 3/8" Z21	0J9	635M58537R
	154	1 3/4" Z6	0K7	635M58504R
	154	1 3/4" Z20	0W5	635M58538R
2000	149	1 3/8" Z6	0J2	635M60503R
	149	1 3/8" Z21	0J0	635M60537R
	154	1 3/4" Z6	0K8	635M60504R
	154	1 3/4" Z20	0W6	635M60538R
*2200	149	1 3/8" Z6	0J3	635M62503R
	149	1 3/8" Z21	0K1	635M62537R
	154	1 3/4" Z6	0K9	635M62504R
	154	1 3/4" Z20	0W7	635M62538R
2400	149	1 3/8" Z6	0J4	635M64503R
	149	1 3/8" Z21	0K2	635M64537R
	154	1 3/4" Z6	0K0	635M64504R
	154	1 3/4" Z20	0W8	635M64538R
2600	149	1 3/8" Z6	0J5	635M66503R
	149	1 3/8" Z21	0K3	635M66537R
	154	1 3/4" Z6	0W1	635M66504R
	154	1 3/4" Z20	0W9	635M66538R

* Maximum recommended setting fo 1000 min^{-1}

Friction torque limiter, non-adjustable setting

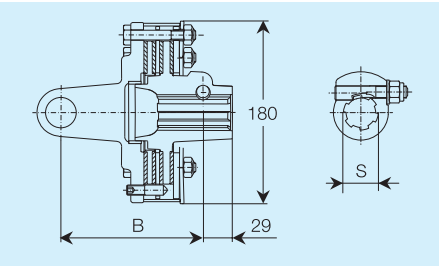
FT34



Setting Nm	S mm	R_1	Code FT34	Spare part code
*1800	148	1 3/8" Z6	Q54	663M58303R
	148	1 3/8" Z21	Q61	663M58337R
	153	1 3/4" Z6	Q68	663M58304R
	153	1 3/4" Z20	Q75	663M58338R

* Maximum recommended setting fo 1000 min^{-1}

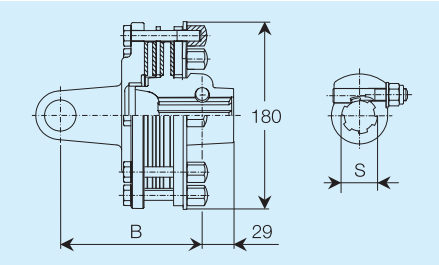
FT34R with Release System



Setting Nm	S mm	R_1	Code FT34R	Spare part code
*1800	148	1 3/8" Z6	H54	663M58E03R
	148	1 3/8" Z21	H61	663M58E37R
	153	1 3/4" Z6	H68	663M58E04R
	153	1 3/4" Z20	H75	663M58E38R

* Maximum recommended setting fo 1000 min^{-1}

FK34



Setting Nm	S mm	R_1	Code FK34	Spare part code
*1800	148	1 3/8" Z6	7D8	60KM58303R
	148	1 3/8" Z21	7E1	60KM58337R
	153	1 3/4" Z6	7E4	60KM58304R
	153	1 3/4" Z20	7E7	60KM58338R

* Maximum recommended setting fo 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

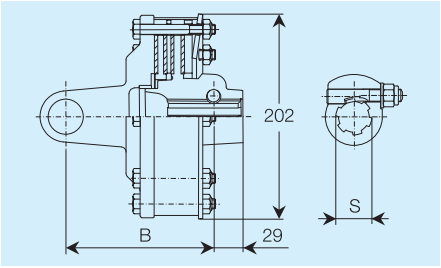
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S9

Friction torque limiter, non-adjustable setting

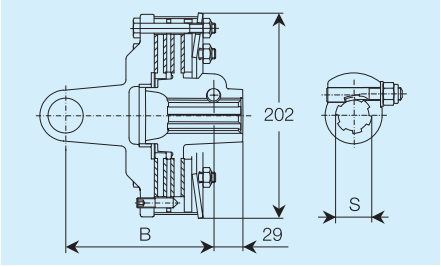
FT44



Setting Nm	B mm	S	Code FT44	Spare part code
1800	149	1 3/8" Z6	Q37	663M58503R
	149	1 3/8" Z21	Q39	663M58537R
	154	1 3/4" Z6	Q41	663M58504R
	154	1 3/4" Z20	Q43	663M58538R
*2200	149	1 3/8" Z6	Q38	663M62503R
	149	1 3/8" Z21	Q40	663M62537R
	154	1 3/4" Z6	Q42	663M62504R
	154	1 3/4" Z20	Q44	663M62538R
2400	149	1 3/8" Z6	Q80	663M64503R
	149	1 3/8" Z21	Q86	663M64537R
	154	1 3/4" Z6	Q92	663M64504R
	154	1 3/4" Z20	Q98	663M64538R
2600	149	1 3/8" Z6	Q76	663M66503R
	149	1 3/8" Z21	Q82	663M66537R
	154	1 3/4" Z6	Q88	663M66504R
	154	1 3/4" Z20	Q94	663M66538R

* Maximum recommended setting fo 1000 min^{-1}

FT44R with Release System



Setting Nm	B mm	S	Code FT44R	Spare part code
1800	149	1 3/8" Z6	H37	663M58G03R
	149	1 3/8" Z21	H39	663M58G37R
	154	1 3/4" Z6	H41	663M58G04R
	154	1 3/4" Z20	H43	663M58G38R
*2200	149	1 3/8" Z6	H38	663M62G03R
	149	1 3/8" Z21	H40	663M62G37R
	154	1 3/4" Z6	H42	663M62G04R
	154	1 3/4" Z20	H44	663M62G38R
2400	149	1 3/8" Z6	H80	663M64G03R
	149	1 3/8" Z21	H86	663M64G37R
	154	1 3/4" Z6	H92	663M64G04R
	154	1 3/4" Z20	H98	663M64G38R
2600	149	1 3/8" Z6	H76	663M66G03R
	149	1 3/8" Z21	H82	663M66G37R
	154	1 3/4" Z6	H88	663M66G04R
	154	1 3/4" Z20	H94	663M66G38R

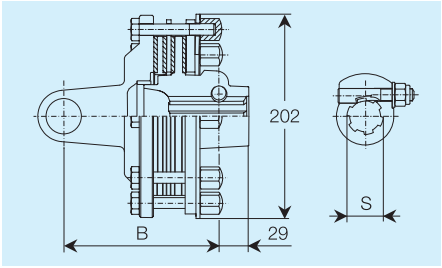
* Maximum recommended setting fo 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, non-adjustable setting

FK44



Setting Nm	B mm	S	Code FK44	Spare part code
1800	149	1 3/8" Z6	7E8	60KM58503R
	149	1 3/8" Z21	7F2	60KM58537R
	154	1 3/4" Z6	7F6	60KM58504R
	154	1 3/4" Z20	7G0	60KM58538R
*2200	149	1 3/8" Z6	7E9	60KM62503R
	149	1 3/8" Z21	7F3	60KM62537R
	154	1 3/4" Z6	7F7	60KM62504R
	154	1 3/4" Z20	7G1	60KM62538R
2400	149	1 3/8" Z6	7F0	60KM64503R
	149	1 3/8" Z21	7F4	60KM64537R
	154	1 3/4" Z6	7F8	60KM64504R
	154	1 3/4" Z20	7G2	60KM64538R
2600	149	1 3/8" Z6	7F1	60KM66503R
	149	1 3/8" Z21	7F5	60KM66537R
	154	1 3/4" Z6	7F9	60KM66504R
	154	1 3/4" Z20	7G3	60KM66538R

* Maximum recommended setting fo 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

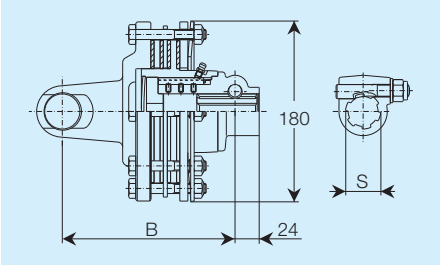
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S9

Friction torque limiter and overrunning clutch, adjustable setting

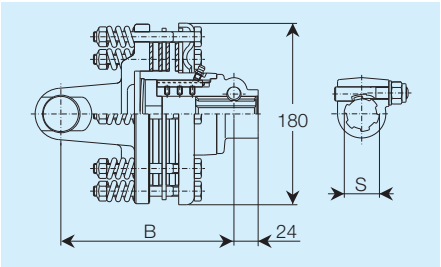
FNV34



Setting Nm	B mm	S	Codice FNV34	Spare part code
*1800	174	1 3/8" Z6	2A4	665M58103R
	174	1 3/8" Z21	2B2	665M58137R
2000	174	1 3/8" Z6	2A5	665M60103R
	174	1 3/8" Z21	2B3	665M60137R

* Maximum recommended setting fo 1000 min^{-1}

FFNV34



Setting Nm	B mm	S	Codice FFNV34	Spare part code
*1800	174	1 3/8" Z6	2F4	667M58103R
	174	1 3/8" Z21	2G2	667M58137R
2000	174	1 3/8" Z6	2F5	667M60103R
	174	1 3/8" Z21	2G3	667M60137R

* Maximum recommended setting fo 1000 min^{-1}

Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

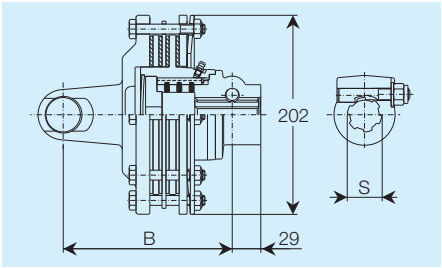
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter and overrunning clutch, adjustable setting

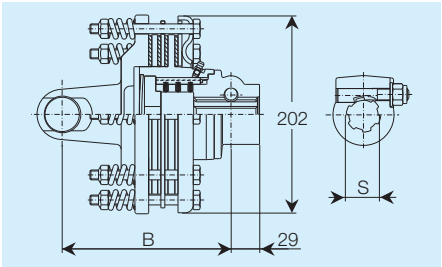
FNV44



Setting Nm	B mm	S	Code FNV44	Spare part code
1800	177	1 3/8" Z6	2B6	665M58203R
	177	1 3/8" Z21	2C4	665M58237R
	177	1 3/4" Z6	2D2	665M58204R
	177	1 3/4" Z20	2E0	665M58238R
2000	177	1 3/8" Z6	2B7	665M60203R
	177	1 3/8" Z21	2C5	665M60237R
	177	1 3/4" Z6	2D3	665M60204R
	177	1 3/4" Z20	2E1	665M60238R
*2200	177	1 3/8" Z6	2B8	665M62203R
	177	1 3/8" Z21	2C6	665M62237R
	177	1 3/4" Z6	2D4	665M62204R
	177	1 3/4" Z20	2E2	665M62238R
2400	177	1 3/8" Z6	2B9	665M64203R
	177	1 3/8" Z21	2C7	665M64237R
	177	1 3/4" Z6	2D5	665M64204R
	177	1 3/4" Z20	2E3	665M64238R
2600	177	1 3/8" Z6	2C0	665M66203R
	177	1 3/8" Z21	2C8	665M66237R
	177	1 3/4" Z6	2D6	665M66204R
	177	1 3/4" Z20	2E4	665M66238R

* Maximum recommended setting fo 1000 min^{-1}

FFNV44 (for non CE drivelines)



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

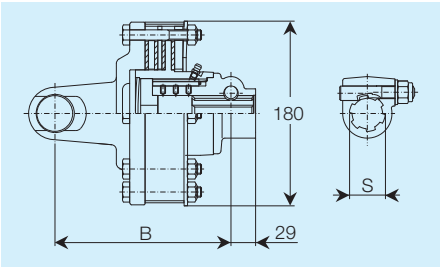
Setting Nm	B mm	S	Code FFNV44	Spare part code
1800	177	1 3/8" Z6	2G6	667M58203R
	177	1 3/8" Z21	2H4	667M58237R
	177	1 3/4" Z6	2J2	667M58204R
	177	1 3/4" Z20	2K0	667M58238R
2000	177	1 3/8" Z6	2G7	667M60203R
	177	1 3/8" Z21	2H5	667M60237R
	177	1 3/4" Z6	2J3	667M60204R
	177	1 3/4" Z20	2K1	667M60238R
*2200	177	1 3/8" Z6	2G8	667M62203R
	177	1 3/8" Z21	2H6	667M62237R
	177	1 3/4" Z6	2J4	667M62204R
	177	1 3/4" Z20	2K2	667M62238R
2400	177	1 3/8" Z6	2G9	667M64203R
	177	1 3/8" Z21	2H7	667M64237R
	177	1 3/4" Z6	2J5	667M64204R
	177	1 3/4" Z20	2K3	667M64238R
2600	177	1 3/8" Z6	2H0	667M66203R
	177	1 3/8" Z21	2H8	667M66237R
	177	1 3/4" Z6	2J6	667M66204R
	177	1 3/4" Z20	2K4	667M66238R

* Maximum recommended setting fo 1000 min^{-1}

Size S9

Friction torque limiter and overrunning clutch, non-adjustable setting

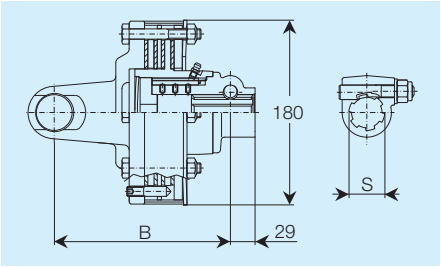
FNT34



Setting Nm	B mm	S	Code FNT34	Spare part code
*1800	174	1 3/8" Z6	1A3	658M58103R
	174	1 3/8" Z21	1A8	658M58137R

* Maximum recommended setting fo 1000 min^{-1}

FNT34R with Release System



Setting Nm	B mm	S	Code FNT34R	Spare part code
*1800	174	1 3/8" Z6	1C3	658M58203R
	174	1 3/8" Z21	1C8	658M58237R

* Maximum recommended setting fo 1000 min^{-1}

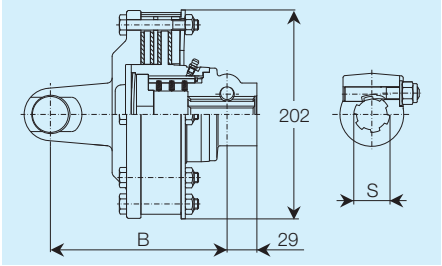
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter and overrunning clutch, non-adjustable setting

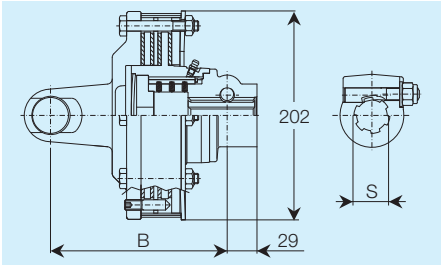
FNT44



Setting Nm	B mm	S	Code FNT44	Spare part code
1800	177	1 3/8" Z6	1F1	658M58303R
	177	1 3/8" Z21	1F7	658M58337R
	177	1 3/4" Z6	1G3	658M58304R
	177	1 3/4" Z20	1G9	658M58338R
*2200	177	1 3/8" Z6	1F2	658M62303R
	177	1 3/8" Z21	1F8	658M62337R
	177	1 3/4" Z6	1G4	658M62304R
	177	1 3/4" Z20	1H0	658M62338R
2400	177	1 3/8" Z6	1F3	658M64303R
	177	1 3/8" Z21	1F9	658M64337R
	177	1 3/4" Z6	1G5	658M64304R
	177	1 3/4" Z20	1H1	658M64338R
2600	177	1 3/8" Z6	1F4	658M66303R
	177	1 3/8" Z21	1G0	658M66337R
	177	1 3/4" Z6	1G6	658M66304R
	177	1 3/4" Z20	1H2	658M66338R

* Maximum recommended setting fo 1000 min^{-1}

FNT44R with Release System



Setting Nm	B mm	S	Code FNT44R	Spare part code
1800	177	1 3/8" Z6	1H5	658M58403R
	177	1 3/8" Z21	1J1	658M58437R
	177	1 3/4" Z6	1J7	658M58404R
	177	1 3/4" Z20	1K4	658M58438R
*2200	177	1 3/8" Z6	1H6	658M62403R
	177	1 3/8" Z21	1J2	658M62437R
	177	1 3/4" Z6	1J8	658M62404R
	177	1 3/4" Z20	1K5	658M62438R
2400	177	1 3/8" Z6	1H7	658M64403R
	177	1 3/8" Z21	1J3	658M64437R
	177	1 3/4" Z6	1J9	658M64404R
	177	1 3/4" Z20	1K6	658M64438R
2600	177	1 3/8" Z6	1H8	658M66403R
	177	1 3/8" Z21	1J4	658M66437R
	177	1 3/4" Z6	1K0	658M66404R
	177	1 3/4" Z20	1K7	658M66438R

* Maximum recommended setting fo 1000 min^{-1}

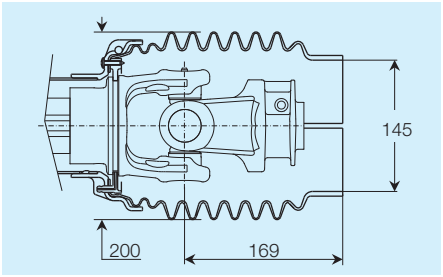
Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

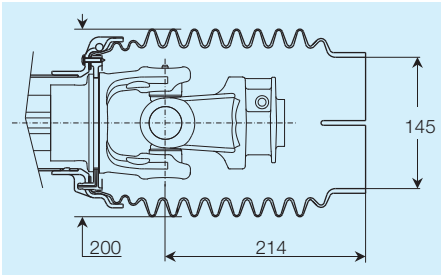
Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S9

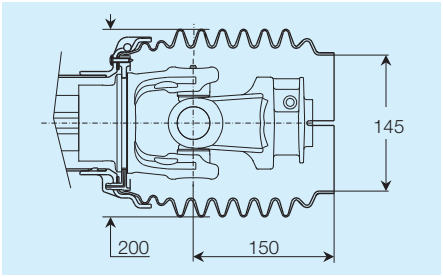
Optional shield cones



Extended shield cone, medium length, narrow diameter
Tractor end .....P
- Implement end .....M



Extended shield cone, long length, narrow diameter
Tractor end .....N
- Implement end L



Extended shield cone, medium length, wide diameter
- Tractor end .....R
- Implement end .....T

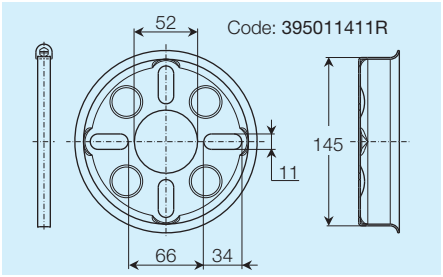


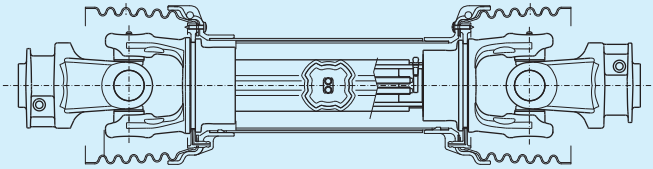
Plate with clamps for optional extended shield cones

Driveline shield cones can cover the joint partially or completely, but, for safety purposes, they are not intended to replace proper implement input connection shields or other types of shields.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System Code
G

Size S9

Codes for size S9 drivelines

1

C

C: Standard SFT cardan joint driveline

2 3

S **9**

Size **S9**

4

Telescoping Members
See page S9.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page S9.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page S9.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S9.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint or splined stub shaft without joint), establishes the associated shields, and attachment to PTO.

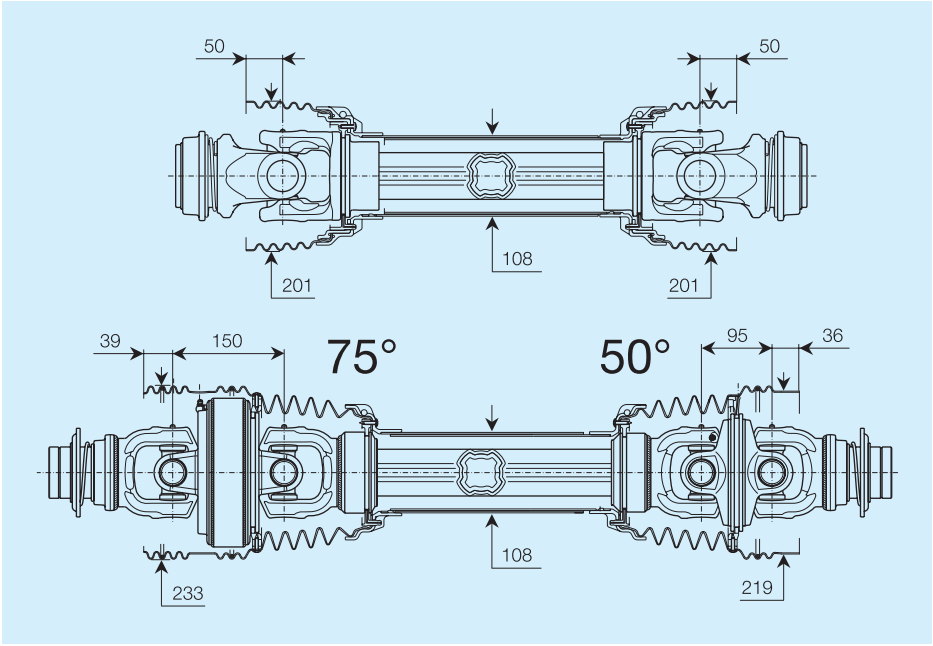
13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft.

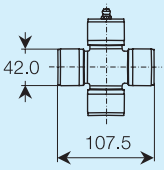
16 17 18

Only use these positions of the code if requesting optional shield cones, and/or Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

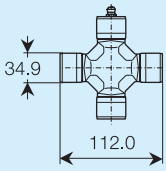


Single cardan joint



4120N0012

75° and 50° Constant Velocity Joint



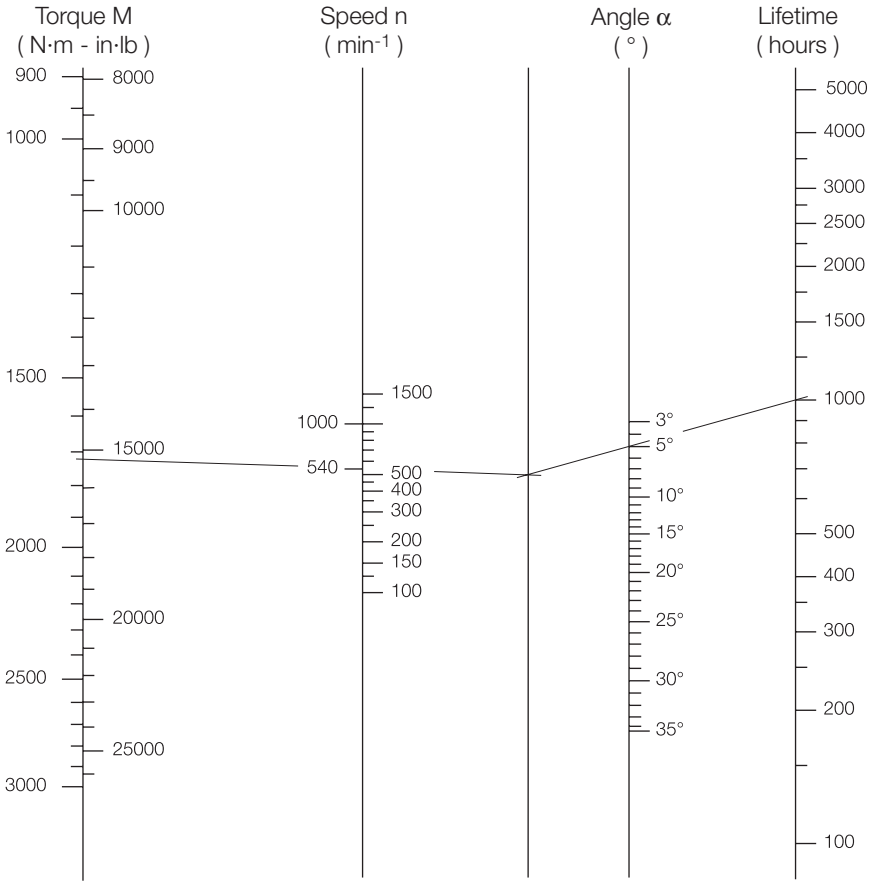
4120N0051

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
SH	1717	15201	97	132	1405	12437	147	200

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle α = 5°, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size SH

Nomogram to calculate a single cardan joint lifetime



Example:
To calculate the life for torque **M** = 1717 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size **SH**, torque M = 1717 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

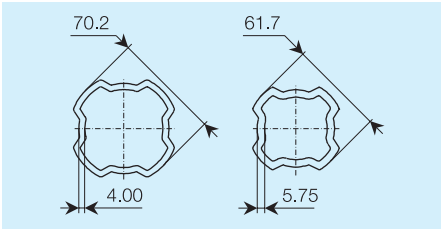
Example: M_{50} = 1717 Nm is the theoretical transmittable torque for a cardan driveshaft size **SH**, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 1467 Nm, M_{50} / M ratio is 1717 / 1467 = 1.17. The lubrication frequency can be extended to 200 hours.

Size SH

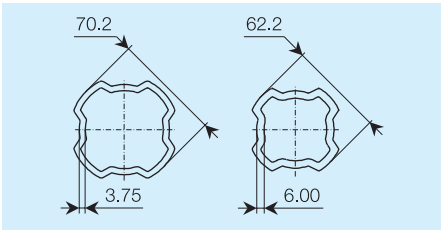
Telescoping Members

Four-Tooth profile tubes



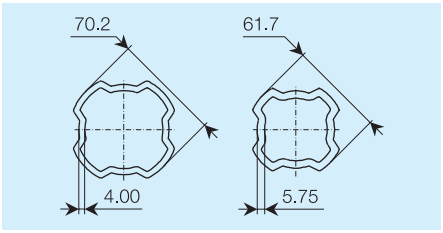
Mmax (Nm)	6750
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth profile tubes with Rilsan® coated inner tube



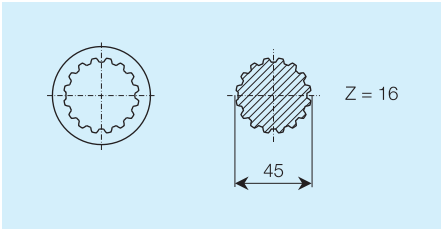
Mmax (Nm)	6750
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth profile tubes with heat-treated inner tube



Mmax (Nm)	6750
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

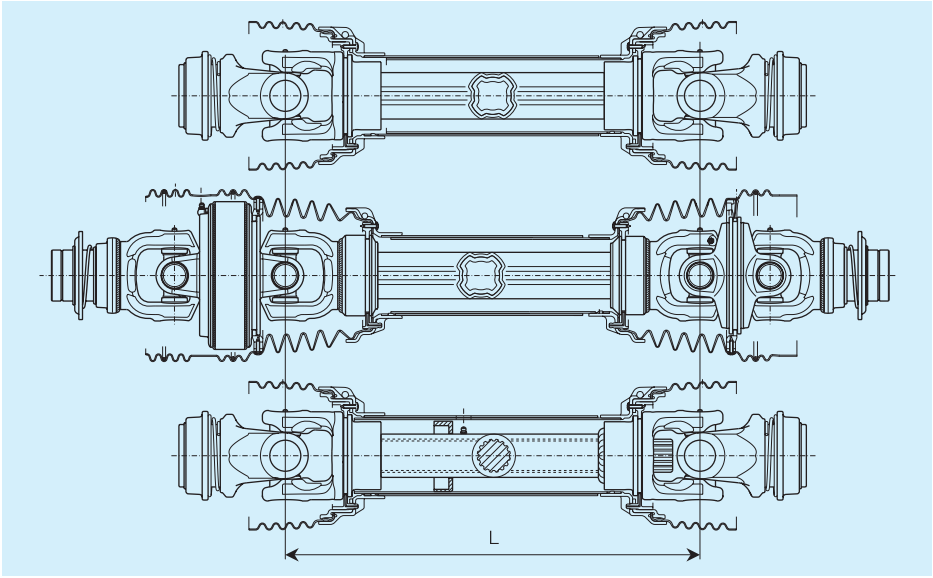
Splined shafts



Mmax (Nm)	6750
T/M (N/Nm)	7 - 9
Tube code	S

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Four-Tooth tubes length





	Standard			Maximum extension			Splined	Length
L	Lw	Lt	Ls	Lw	Lt	Ls	Lw = Lt = Ls	code
mm	mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	- -	- -	- -	- -	041
460	- -	- -	- -	- -	- -	- -	643	046
510	- -	- -	- -	- -	- -	- -	743	051
560	- -	- -	- -	715	795	803	843	056
610	735	815	891	815	895	903	943	061
660	835	915	978	915	995	1003	988	066
710	935	1015	1066	1015	1095	1103	1088	071
760	1022	1110	1153	1102	1190	1203	1188	076
810	1097	1193	1241	1177	1273	1303	1288	081
860	1172	1276	1328	- -	- -	- -	- -	086
910	1247	1360	1416	- -	- -	- -	- -	091
1010	1397	1526	1591	- -	- -	- -	- -	101
1110	1547	1693	1766	- -	- -	- -	- -	111
1210	1697	1860	1941	- -	- -	- -	- -	121

Lw: maximum working length **Lt**: maximum temporary length (short duration temporary maneuvers) **Ls**: maximum length without rotation

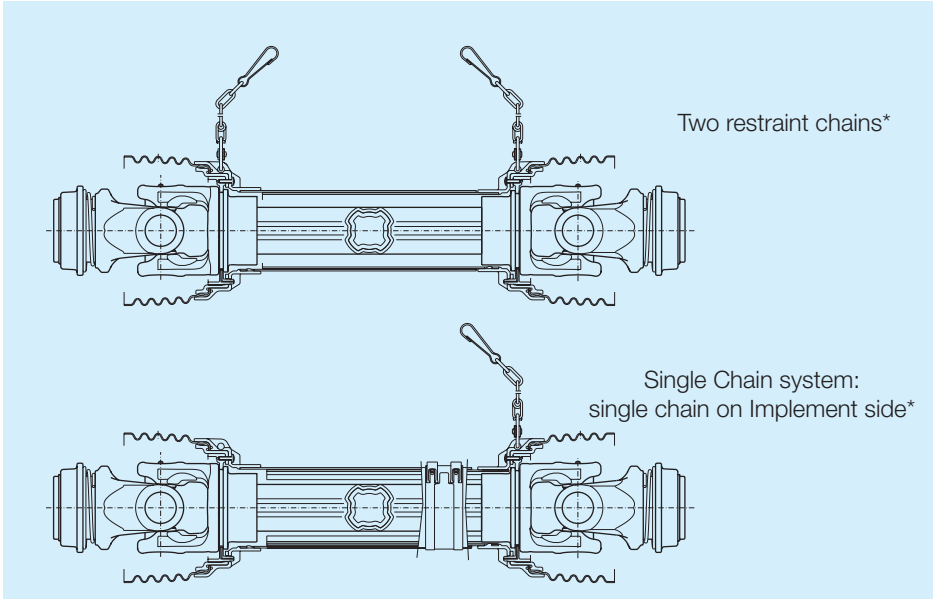
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size SH

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

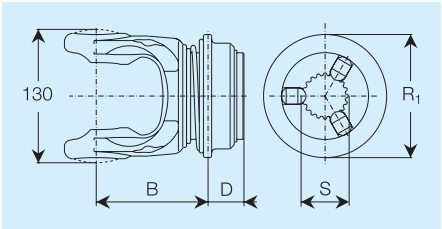


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

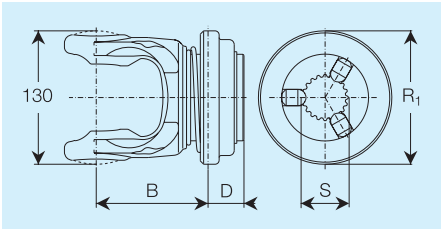
Yokes for single cardan joint

RT Ball collar yokes



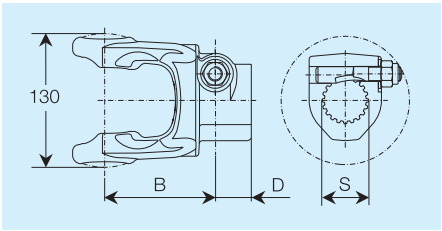
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	109	35	120	R07	5720N0351
1 3/8" Z21	109	35	120	R08	5720N3751
1 3/4" Z6	109	35	120	R09	5720N0451
1 3/4" Z20	109	35	120	R10	5720N3851

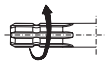
RTA Automatic ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	109	35	130	0Q7	5720N0352
1 3/8" Z21	109	35	130	0Q8	5720N3752
1 3/4" Z6	109	35	130	0Q9	5720N0452
1 3/4" Z20	109	35	130	0Q0	5720N3852

Taper-pin yokes for shafts with counter-clockwise rotation





S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	- -	- -	- -	- -	- -
1 3/8" Z21	- -	- -	- -	- -	- -
1 3/4" Z6	107	35	124	016	5090N0460
1 3/4" Z20	107	35	124	017	5090N3860

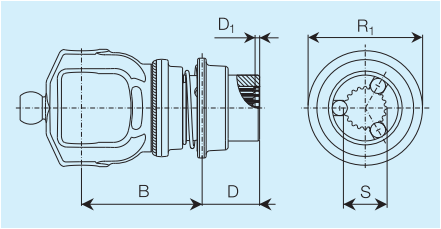
Recommended tightening torque:
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

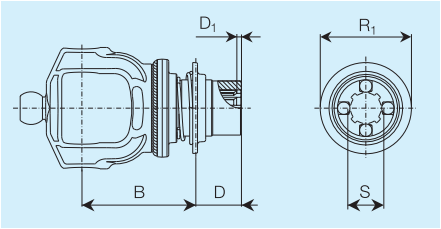
Size SH

Yokes for 75° Constant Velocity joint

RT Ball collar yokes
TRACTOR SIDE

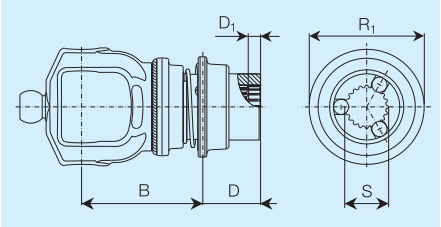


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	116	38	2	95	WS7	5730N0387
1 3/8" Z21	109	40	2	95	WR8	5730N3776
1 3/4" Z6	127	40	2	105	WR9	5730N0476
1 3/4" Z20	127	50	2	105	WS0	5730N3887

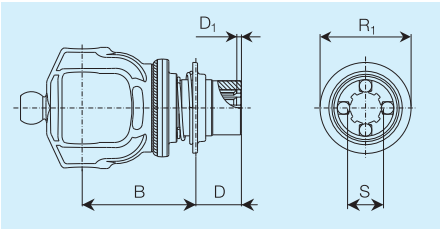


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
D8x32x38	116	38	2	95	WR6	5730N2151

RT Ball collar yokes
IMPLEMENT SIDE



S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	116	38	10	95	WR7	5730N0376
1 3/8" Z21	109	40	2	95	WR8	5730N3776
1 3/4" Z6	127	40	2	105	WR9	5730N0476
1 3/4" Z20	127	50	14	105	WR0	5730N3876

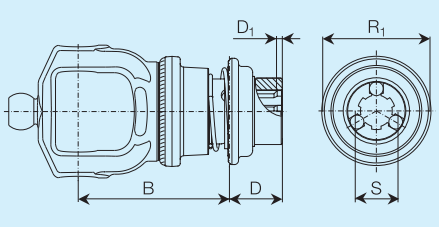


S	B mm	D mm	D_1 mm	R_1 mm	Yoke code	Spare part code
D8x32x38	116	38	2	95	WR6	5730N2151

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

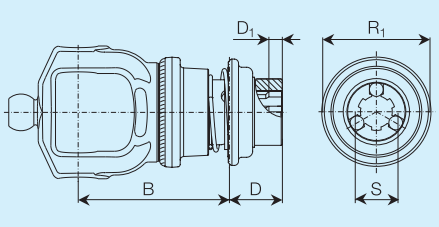
Yokes for 75° Constant Velocity joint

RTA Automatic ball collar yokes
TRACTOR SIDE



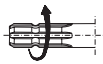
S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	116	38	2	88	WP7	5730N0392
1 3/8" Z21	109	40	2	88	WQ8	5730N3791
1 3/4" Z6	127	40	2	110	WQ9	5730N0491
1 3/4" Z20	127	50	2	110	WP0	5730N3892

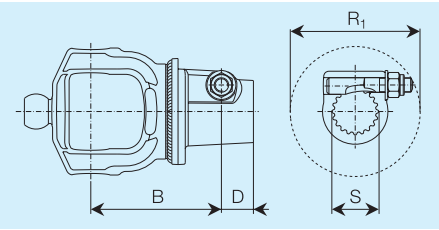
RTA Automatic ball collar yokes
IMPLEMENT SIDE



S	B	D	D_1	R_1	Yoke	Spare part
	mm	mm	mm	mm	code	code
1 3/8" Z6	116	38	10	88	WQ7	5730N0391
1 3/8" Z21	109	40	2	88	WQ8	5730N3791
1 3/4" Z6	127	40	2	110	WQ9	5730N0491
1 3/4" Z20	127	50	14	110	WQ0	5730N3891

Taper-pin yokes for shafts with counter-clockwise rotation





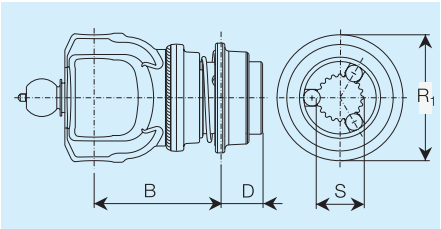
S	B	D	R_1	Yoke	Spare part
	mm	mm	mm	code	code
1 3/8" Z6	127	31	106	W14	5110N0351
1 3/8" Z21	127	31	106	W15	5110N3751
1 3/4" Z6	127	31	126	W16	5110N0451
1 3/4" Z20	127	31	126	W17	5110N3851

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

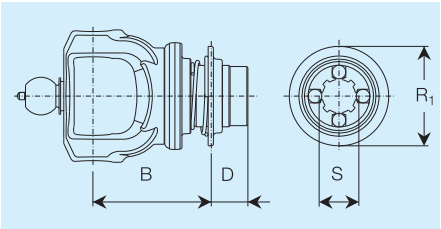
Size SH

Yokes for 50° Constant Velocity joint

RT Ball collar yokes

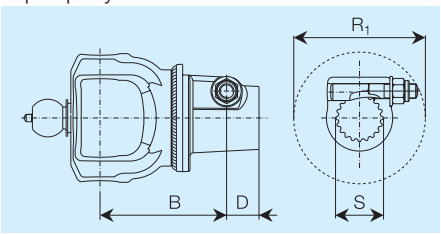


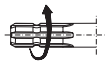
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	113	35	95	KR7	5730N0355
1 3/8" Z21	103	40	95	KR8	5730N3755
1 3/4" Z6	121	40	105	KR9	5730N0455
1 3/4" Z20	121	40	105	KR0	5730N3855



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
D8x32x38	113	35	95	KR6	5730N2153

Taper-pin yokes for shafts with counter-clockwise rotation





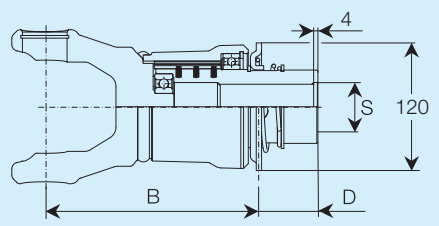
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	121	31	126	K14	5190N0351
1 3/8" Z21	121	31	126	K15	5190N3751
1 3/4" Z6	121	31	126	K16	5190N0451
1 3/4" Z20	121	31	126	K17	5190N3851

Recommended tightening torque:
- 150 Nm for profiles 1 3/8" Z6 – Z21
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning clutches

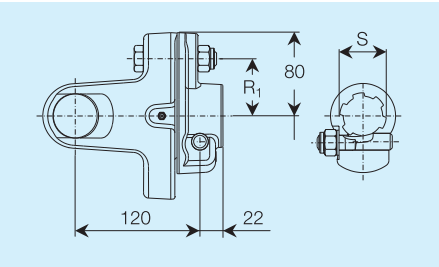
RLA with 4 plates, permanent lubrication



S	B mm	D mm	Code RLA	Spare part code
1 3/8" Z6	192	42	A33	60170N101R
1 3/8" Z21	192	42	A34	60170N102R
1 3/4" Z6	192	42	A36	60170N103R
1 3/4" Z20	192	55	A37	60170N104R

Maximum recommended torque: 6200 Nm

LB Shear bolt torque limiter



Setting Nm	S	R_1 mm	Code LB	Spare part code
4000	1 3/8" Z6	57	1R0	6060N0302R
	1 3/8" Z21		1S0	6060N3701R
	1 3/4" Z6		1R4	6060N0402R
	1 3/4" Z20		1S4	6060N3802R
4500	1 3/8" Z6	65	1R1	6060N0301R
	1 3/8" Z21		1S1	6060N3702R
	1 3/4" Z6		1R5	6060N0403R
	1 3/4" Z20		1S5	6060N3803R
			Bolt M12 x 70 cl 8.8.	
5200	1 3/8" Z6	55	098	6060N0303R
	1 3/8" Z21		161	6060N3703R
	1 3/4" Z6		099	6060N0401R
	1 3/4" Z20		162	6060N3801R
			Bolt M14 x 70 cl 8.8.	

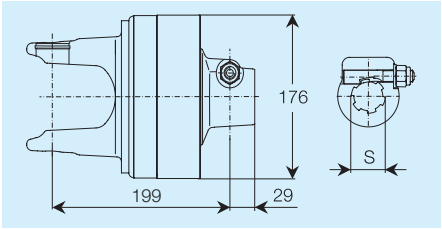
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size SH

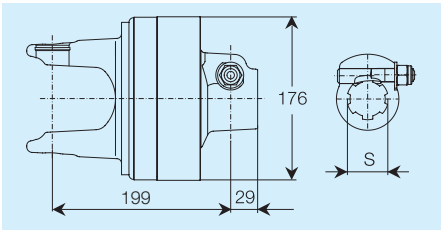
Automatic torque limiters

LR35
for use at 540 min^{-1}



Setting Nm	S	Code LR35	Spare part code
3500	1 3/8" Z6	43A	6WN481003R
	1 3/8" Z21	48A	6WN481037R
	1 3/4" Z6	53A	6WN481004R
	1 3/4" Z20	58A	6WN481038R
4100	1 3/8" Z6	24B	6WN488003R
	1 3/8" Z21	30B	6WN488037R
	1 3/4" Z6	36B	6WN488004R
	1 3/4" Z20	42B	6WN488038R
4500	1 3/8" Z6	46A	6WN480003R
	1 3/8" Z21	51A	6WN480037R
	1 3/4" Z6	56A	6WN480004R
	1 3/4" Z20	61A	6WN480038R

LR35
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Setting Nm	S	Code LR35	Spare part code
*3500	1 3/8" Z6	70C	6WNF81003R
	1 3/8" Z21	73C	6WNF81037R
	1 3/4" Z6	76C	6WNF81004R
	1 3/4" Z20	79C	6WNF81038R
4100	1 3/8" Z6	71C	6WNF88003R
	1 3/8" Z21	74C	6WNF88037R
	1 3/4" Z6	77C	6WNF88004R
	1 3/4" Z20	80C	6WNF88038R
4500	1 3/8" Z6	72C	6WNF80003R
	1 3/8" Z21	75C	6WNF80037R
	1 3/4" Z6	78C	6WNF80004R
	1 3/4" Z20	81C	6WNF80038R

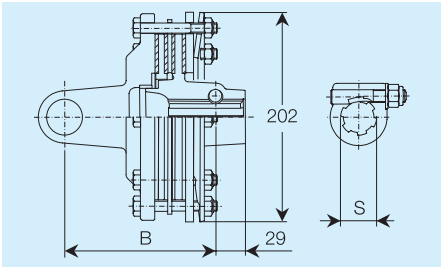
*Maximum recommended speed 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Friction torque limiter, adjustable setting

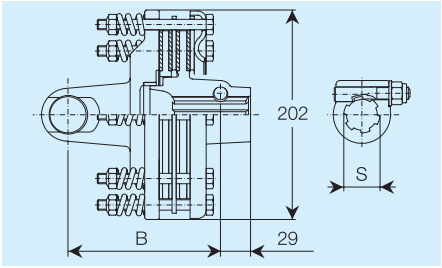
FV44



Setting Nm	B mm	S	Code FV44	Spare part code
2200	150	1 3/8" Z6	N40	661N62503R
	150	1 3/8" Z21	N73	661N62537R
	155	1 3/4" Z6	N78	661N62504R
	155	1 3/4" Z20	N83	661N62538R
*2400	150	1 3/8" Z6	N41	661N64503R
	150	1 3/8" Z21	N87	661N64537R
	155	1 3/4" Z6	N91	661N64504R
	155	1 3/4" Z20	N95	661N64538R
2600	150	1 3/8" Z6	N42	661N66503R
	150	1 3/8" Z21	N88	661N66537R
	155	1 3/4" Z6	N92	661N66504R
	155	1 3/4" Z20	N96	661N66538R
2800	150	1 3/8" Z6	N0P	661N68503R
	150	1 3/8" Z21	N0S	661N68537R
	155	1 3/4" Z6	N0T	661N68504R
	155	1 3/4" Z20	N99	661N68538R

* Recommended setting for use at 1000 min^{-1}

FFV44



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFV44	Spare part code
2200	150	1 3/8" Z6	0J3	635N62503R
	150	1 3/8" Z21	0K1	635N62537R
	155	1 3/4" Z6	0K9	635N62504R
	155	1 3/4" Z20	0W7	635N62538R
*2400	150	1 3/8" Z6	0J4	635N64503R
	150	1 3/8" Z21	0K2	635N64537R
	155	1 3/4" Z6	0K0	635N64504R
	155	1 3/4" Z20	0W8	635N64538R
2600	150	1 3/8" Z6	0J5	635N66503R
	150	1 3/8" Z21	0K3	635N66537R
	155	1 3/4" Z6	0W1	635N66504R
	155	1 3/4" Z20	0W9	635N66538R
2800	150	1 3/8" Z6	0J6	635N68503R
	150	1 3/8" Z21	0K4	635N68537R
	155	1 3/4" Z6	0W1	635N68504R
	155	1 3/4" Z20	0W0	635N68538R

* Recommended setting for use at 1000 min^{-1}

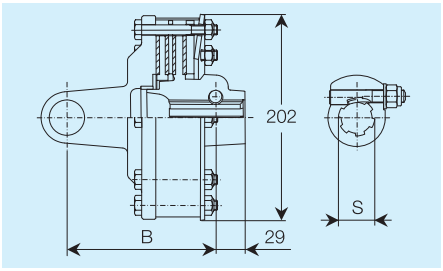
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size SH

Friction torque limiter, non-adjustable setting

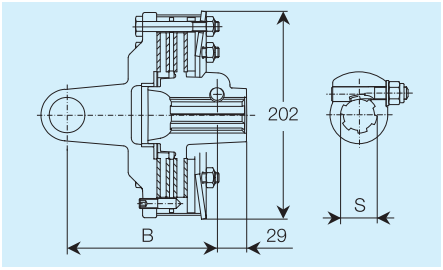
FT44



Setting Nm	B mm	S	Code FT44	Spare part code
2200	150	1 3/8" Z6	Q38	663N62503R
	150	1 3/8" Z21	Q40	663N62537R
	155	1 3/4" Z6	Q42	663N62504R
	155	1 3/4" Z20	Q44	663N62538R
*2400	150	1 3/8" Z6	Q80	663N64503R
	150	1 3/8" Z21	Q86	663N64537R
	155	1 3/4" Z6	Q92	663N64504R
	155	1 3/4" Z20	Q98	663N64538R
2600	150	1 3/8" Z6	Q76	663N66503R
	150	1 3/8" Z21	Q82	663N66537R
	155	1 3/4" Z6	Q88	663N66504R
	155	1 3/4" Z20	Q94	663N66538R

* Recommended setting for use at 1000 min^{-1}

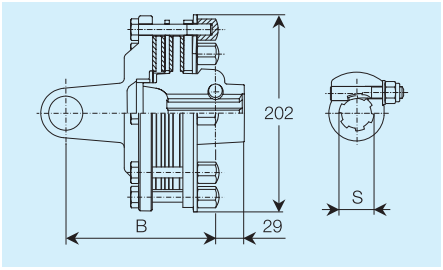
FT44R with Release System



Setting Nm	B mm	S	Code FT44R	Spare part code
2200	150	1 3/8" Z6	H38	663N62G03R
	150	1 3/8" Z21	H40	663N62G37R
	155	1 3/4" Z6	H42	663N62G04R
	155	1 3/4" Z20	H44	663N62G38R
*2400	150	1 3/8" Z6	H80	663N64G03R
	150	1 3/8" Z21	H86	663N64G37R
	155	1 3/4" Z6	H92	663N64G04R
	155	1 3/4" Z20	H98	663N64G38R
2600	150	1 3/8" Z6	H76	663N66G03R
	150	1 3/8" Z21	H82	663N66G37R
	155	1 3/4" Z6	H88	663N66G04R
	155	1 3/4" Z20	H94	663N66G38R

* Recommended setting for use at 1000 min^{-1}

FK44

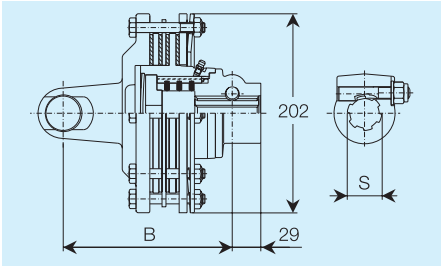


Setting Nm	B mm	S	Code FK44	Spare part code
2200	150	1 3/8" Z6	7E9	60KN62503R
	150	1 3/8" Z21	7F3	60KN62537R
	155	1 3/4" Z6	7F7	60KN62504R
	155	1 3/4" Z20	7G1	60KN62538R
*2400	150	1 3/8" Z6	7F0	60KN64503R
	150	1 3/8" Z21	7F4	60KN64537R
	155	1 3/4" Z6	7F8	60KN64504R
	155	1 3/4" Z20	7G2	60KN64538R
2600	150	1 3/8" Z6	7F1	60KN66503R
	150	1 3/8" Z21	7F5	60KN66537R
	155	1 3/4" Z6	7F9	60KN66504R
	155	1 3/4" Z20	7G3	60KN66538R

* Recommended setting for use at 1000 min^{-1}

Friction torque limiter and overrunning clutch, adjustable setting

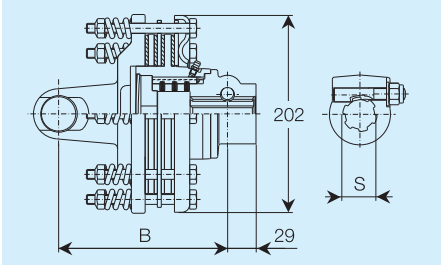
FNV44



Setting Nm	B mm	S	Code FNV44	Spare part code
2200	178	1 3/8" Z6	2B8	665N62203R
	178	1 3/8" Z21	2C6	665N62237R
	178	1 3/4" Z6	2D4	665N62204R
	178	1 3/4" Z20	2E2	665N62238R
*2400	178	1 3/8" Z6	2B9	665N64203R
	178	1 3/8" Z21	2C7	665N64237R
	178	1 3/4" Z6	2D5	665N64204R
	178	1 3/4" Z20	2E3	665N64238R
2600	178	1 3/8" Z6	2C0	665N66203R
	178	1 3/8" Z21	2C8	665N66237R
	178	1 3/4" Z6	2D6	665N66204R
	178	1 3/4" Z20	2E4	665N66238R
2800	178	1 3/8" Z6	2C1	665N68203R
	178	1 3/8" Z21	2C9	665N68237R
	178	1 3/4" Z6	2D7	665N68204R
	178	1 3/4" Z20	2E5	665N68238R

* Recommended setting for use at 1000 min^{-1}

FFNV44



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Code FFNV44	Spare part code
2200	178	1 3/8" Z6	2G8	667N62203R
	178	1 3/8" Z21	2H6	667N62237R
	178	1 3/4" Z6	2J4	667N62204R
	178	1 3/4" Z20	2K2	667N62238R
*2400	178	1 3/8" Z6	2G9	667N64203R
	178	1 3/8" Z21	2H7	667N64237R
	178	1 3/4" Z6	2J5	667N64204R
	178	1 3/4" Z20	2K3	667N64238R
2600	178	1 3/8" Z6	2H0	667N66203R
	178	1 3/8" Z21	2H8	667N66237R
	178	1 3/4" Z6	2J6	667N66204R
	178	1 3/4" Z20	2K4	667N66238R
2800	178	1 3/8" Z6	2H1	667N68203R
	178	1 3/8" Z21	2H9	667N68237R
	178	1 3/4" Z6	2J7	667N68204R
	178	1 3/4" Z20	2K5	667N68238R

* Recommended setting for use at 1000 min^{-1}

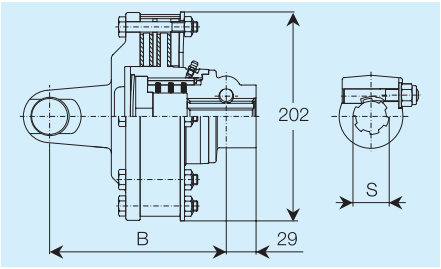
For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size SH

Friction torque limiter and overrunning clutch, adjustable setting

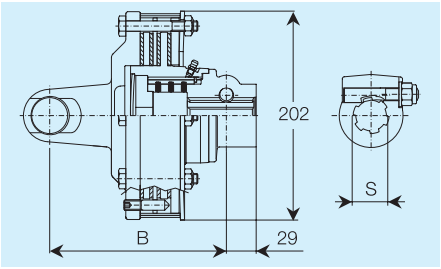
FNT44



Setting Nm	B mm	S	Code FNT44	Spare part code
2200	178	1 3/8" Z6	1F2	658N62303R
	178	1 3/8" Z21	1F8	658N62337R
	178	1 3/4" Z6	1G4	658N62304R
	178	1 3/4" Z20	1H0	658N62338R
*2400	178	1 3/8" Z6	1F3	658N64303R
	178	1 3/8" Z21	1F9	658N64337R
	178	1 3/4" Z6	1G5	658N64304R
	178	1 3/4" Z20	1H1	658N64338R
2600	178	1 3/8" Z6	1F4	658N66303R
	178	1 3/8" Z21	1G0	658N66337R
	178	1 3/4" Z6	1G6	658N66304R
	178	1 3/4" Z20	1H2	658N66338R

* Recommended setting for use at 1000 min^{-1}

FNT44R with Release System



Setting Nm	B mm	S	Code FNT44R	Spare part code
2200	178	1 3/8" Z6	1H6	658N62403R
	178	1 3/8" Z21	1J2	658N62437R
	178	1 3/4" Z6	1J8	658N62404R
	178	1 3/4" Z20	1K5	658N62438R
*2400	178	1 3/8" Z6	1H7	658N64403R
	178	1 3/8" Z21	1J3	658N64437R
	178	1 3/4" Z6	1J9	658N64404R
	178	1 3/4" Z20	1K6	658N64438R
2600	178	1 3/8" Z6	1H8	658N66403R
	178	1 3/8" Z21	1J4	658N66437R
	178	1 3/4" Z6	1K0	658N66404R
	178	1 3/4" Z20	1K7	658N66438R

* Recommended setting for use at 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

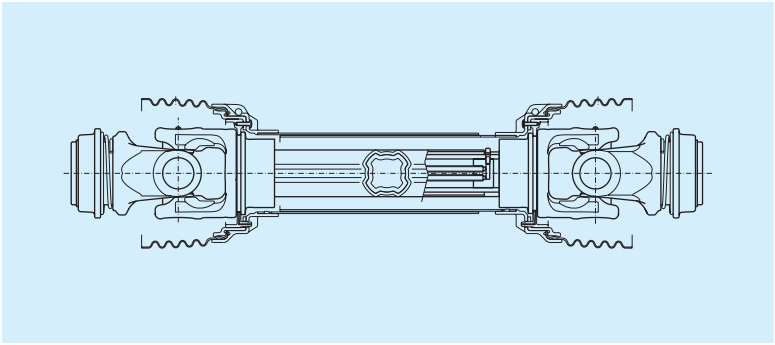
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System Code
G

Size SH

Codes for size SH drivelines

1
C

C: Standard SFT cardan joint driveline

2 3
S **H**

Size **SH**

4

Telescoping Members
See page SH.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline.
See page SH.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page SH.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint Chains
See page SH.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also identifies the type of joint (cardan joint, 75° CV, 50° CV, or splined stub shaft without joint), establishes the associated shields, and attachment to PTO.

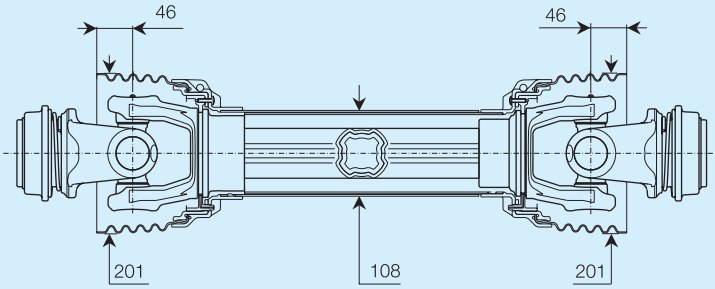
13 14 15

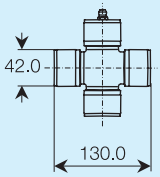
Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline, and the type of joint. Also establishes the associated shields and attachment to the PIC shaft.

16

Only use these positions of the code if requesting optional Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.





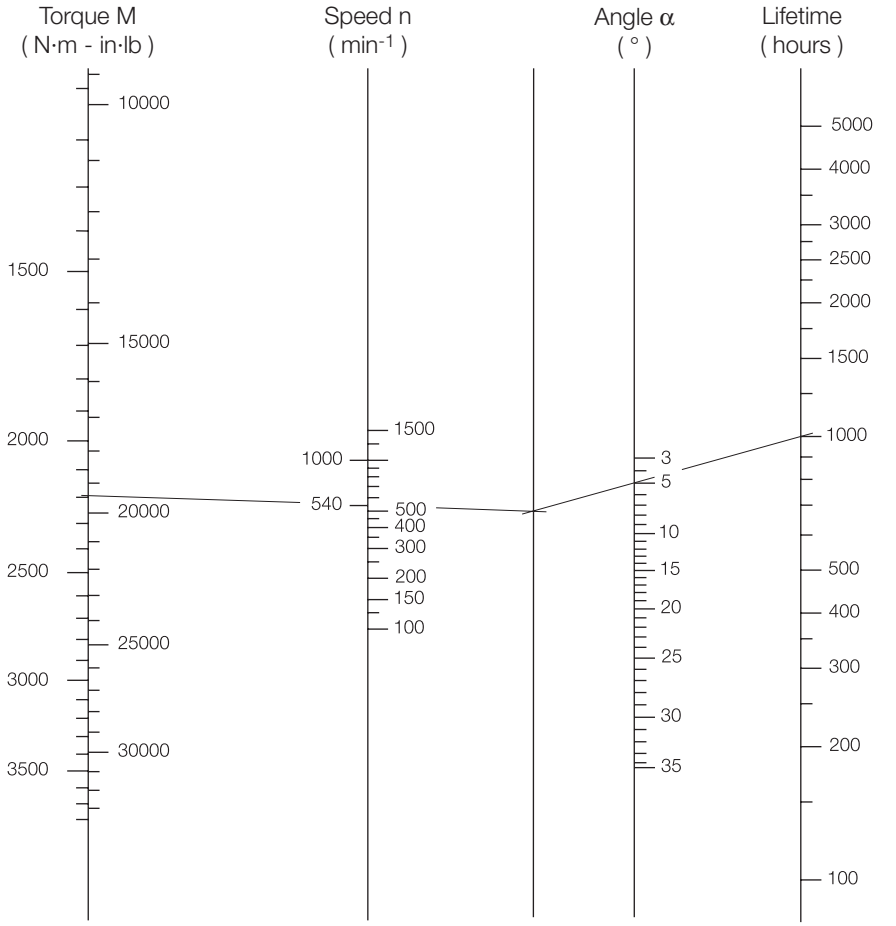
4120S0012

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
S0	2199	19462	124	169	1785	15795	187	254

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size S0

Nomogram to calculate a single cardan joint lifetime



Example:
To calculate the life for torque **M** = 2199 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed
P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size **S0**, torque M = 2199 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

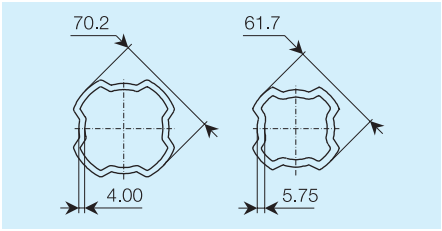
Example: M_{50} = 2199 Nm is the theoretical transmittable torque for a cardan driveshaft size **S0**, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 1879 Nm, M_{50} / M ratio is 2199 / 1879 = 1.17. The lubrication frequency can be extended to 200 hours.

Size S0

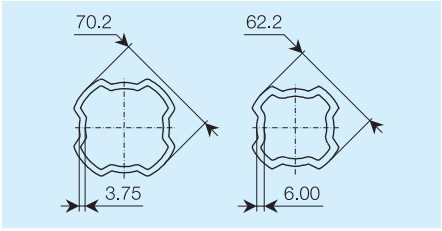
Telescoping Members

Four-Tooth profile tubes



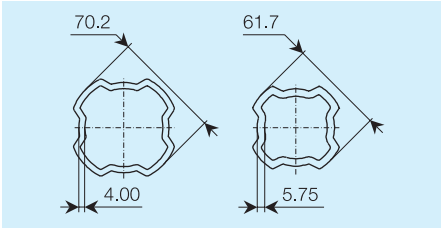
Mmax (Nm)	6750
T/M (N/Nm)	5 - 6
Standard tube code	N
Maximum extension tube code	L

Four-Tooth tubes with Rilsan® coated inner tube



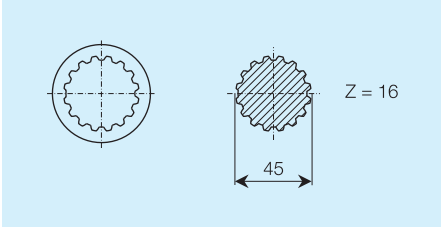
Mmax (Nm)	6750
T/M (N/Nm)	2 - 3
Standard tube code	R
Maximum extension tube code	V

Four-Tooth tubes with heat-treated inner tube



Mmax (Nm)	6750
T/M (N/Nm)	9 - 10
Standard tube code	T
Maximum extension tube code	U

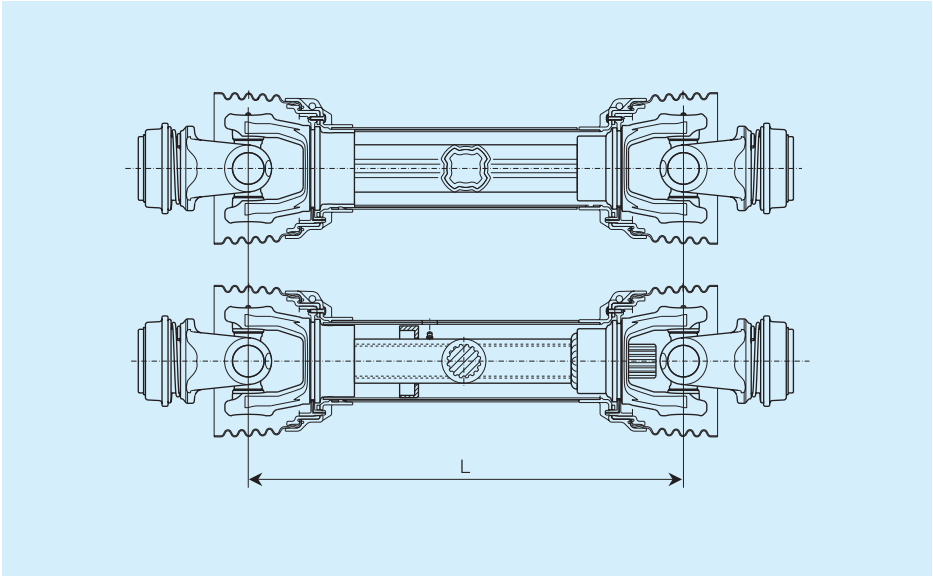
Splined shafts



Mmax (Nm)	6750
T/M (N/Nm)	7 - 9
Tube code	S

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Four-Tooth tubes length





	Standard			Maximum extension			Splined	Length code
L	Lw	Lt	Ls	Lw	Lt	Ls	Lw = Lt = Ls	
mm	mm	mm	mm	mm	mm	mm	mm	
360	- -	- -	- -	- -	- -	- -	- -	036
410	- -	- -	- -	- -	- -	- -	- -	041
460	- -	- -	- -	- -	- -	- -	632	046
510	- -	- -	- -	- -	- -	- -	732	051
560	- -	- -	- -	- -	- -	- -	832	056
610	- -	- -	- -	758	858	891	932	061
660	763	863	962	858	958	991	962	066
710	863	963	1049	958	1058	1091	1062	071
760	963	1063	1137	1058	1158	1191	1162	076
810	1063	1163	1224	1158	1258	1291	1262	081
860	1161	1262	1312	1256	1357	1391	- -	086
910	1236	1345	1399	- -	- -	- -	- -	091
1010	1386	1512	1574	- -	- -	- -	- -	101
1110	1536	1678	1749	- -	- -	- -	- -	111
1210	1686	1845	1924	- -	- -	- -	- -	121

Lw: maximum working length **Lt**: maximum temporary length (short duration temporary maneuvers) **Ls**: maximum length without rotation

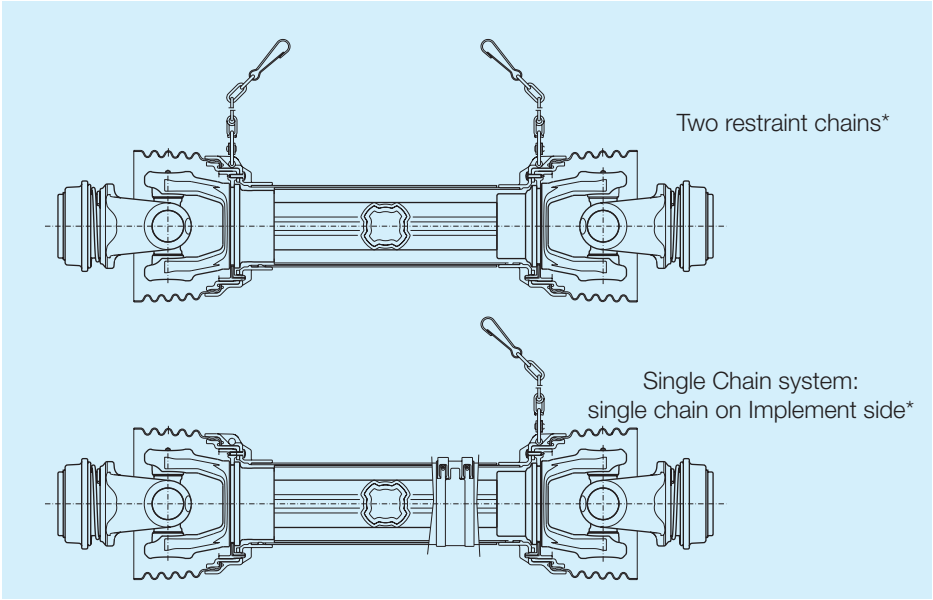
Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size S0

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains

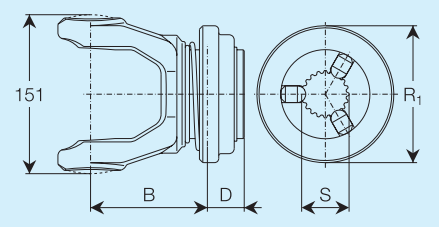


Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

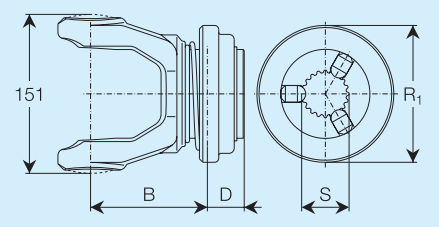
Yokes for single cardan joint

RT ball collar yokes



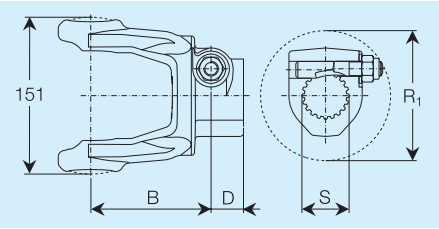
S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	111	35	120	R07	5720S0351
1 3/8" Z21	111	35	120	R08	5720S3751
1 3/4" Z6	111	35	120	R09	5720S0451
1 3/4" Z20	111	35	120	R10	5720S3851

RTA Automatic ball collar yokes



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	111	35	130	0Q7	5720S0352
1 3/8" Z21	111	35	130	0Q8	5720S3752
1 3/4" Z6	111	35	130	0Q9	5720S0452
1 3/4" Z20	111	35	130	0Q0	5720S3852

Taper-pin yokes for shafts with counter-clockwise rotation



S	B mm	D mm	R_1 mm	Yoke code	Spare part code
1 3/8" Z6	- -	- -	- -	- -	- -
1 3/8" Z21	- -	- -	- -	- -	- -
1 3/4" Z6	115	31	124	016	5090S0460
1 3/4" Z20	115	31	124	017	5090S3860

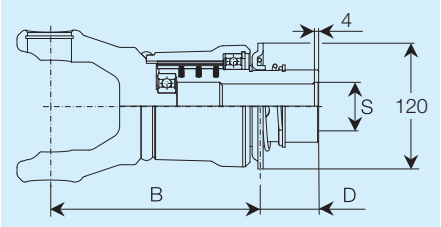
Recommended tightening torque:
- 220 Nm for profiles 1 3/4" Z6 – Z20

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S0

Overrunning Clutches

RLA permanent lubrication with 4 plates

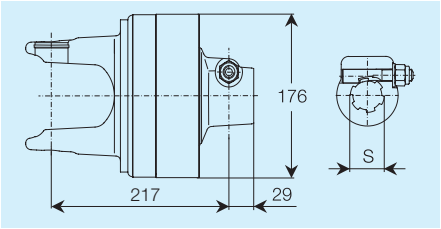


S	B mm	D mm	Code RLA	Spare part code
1 3/8" Z6	202	42	A33	60170S101R
1 3/8" Z21	202	42	A34	60170S102R
1 3/4" Z6	202	42	A36	60170S103R
1 3/4" Z20	202	55	A37	60170S104R

Maximum recommended torque: 6200 Nm

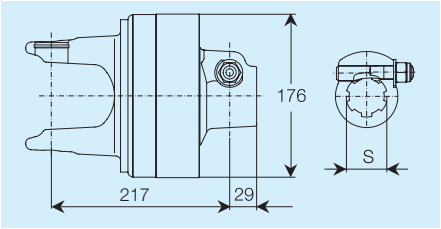
Automatic torque limiters

LR35
for use at 540 min^{-1}



Setting Nm	S	Code LR35	Spare part code
4100	1 3/8" Z6	24B	6WS488003R
	1 3/8" Z21	30B	6WS488037R
	1 3/4" Z6	36B	6WS488004R
	1 3/4" Z20	42B	6WS488038R
4500	1 3/8" Z6	46A	6WS480003R
	1 3/8" Z21	51A	6WS480037R
	1 3/4" Z6	56A	6WS480004R
	1 3/4" Z20	61A	6WS480038R

LR35
* for use at 1000 min^{-1}



* The models for use at 1000 min^{-1} are identified by the letter "L" stamped on the flanged fork, next to the rated calibration value.

Setting Nm	S	Code LR35	Spare part code
*4100	1 3/8" Z6	71C	6WSF88003R
	1 3/8" Z21	74C	6WSF88037R
	1 3/4" Z6	77C	6WSF88004R
	1 3/4" Z20	80C	6WSF88038R
4500	1 3/8" Z6	72C	6WSF80003R
	1 3/8" Z21	75C	6WSF80037R
	1 3/4" Z6	78C	6WSF80004R
	1 3/4" Z20	81C	6WSF80038R

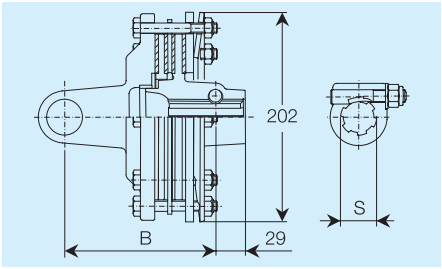
*Maximum recommended speed 1000 min^{-1}

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Adjustable setting Friction torque limiters

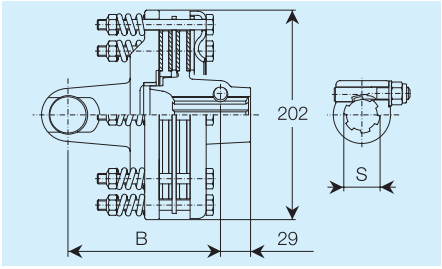
FV44



Setting Nm	B mm	S	Code FV44	Spare part code
2200	163	1 3/8" Z6	N40	661S62503R
	163	1 3/8" Z21	N73	661S62537R
	168	1 3/4" Z6	N78	661S62504R
	168	1 3/4" Z20	N83	661S62538R
2400	163	1 3/8" Z6	N41	661S64503R
	163	1 3/8" Z21	N87	661S64537R
	168	1 3/4" Z6	N91	661S64504R
	168	1 3/4" Z20	N95	661S64538R
*2600	163	1 3/8" Z6	N42	661S66503R
	163	1 3/8" Z21	N88	661S66537R
	168	1 3/4" Z6	N92	661S66504R
	168	1 3/4" Z20	N96	661S66538R
2800	163	1 3/8" Z6	N0P	661S68503R
	163	1 3/8" Z21	N0S	661S68537R
	168	1 3/4" Z6	N0T	661S68504R
	168	1 3/4" Z20	N99	661S68538R
3000	163	1 3/8" Z6	N67	661S70503R
	163	1 3/8" Z21	N89	661S70537R
	168	1 3/4" Z6	N93	661S70504R
	168	1 3/4" Z20	N97	661S70538R

* Maximum recommended setting for 1000 min^{-1}

FFV44



Drivelines with FFV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

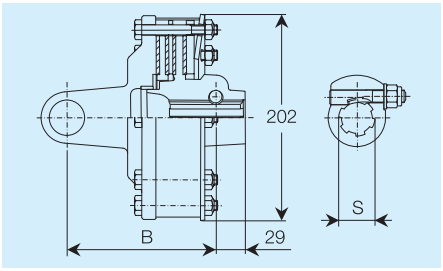
Setting Nm	B mm	S	Code FFV44	Spare part code
2200	163	1 3/8" Z6	0J3	635S62503R
	163	1 3/8" Z21	0K1	635S62537R
	168	1 3/4" Z6	0K9	635S62504R
	168	1 3/4" Z20	0W7	635S62538R
2400	163	1 3/8" Z6	0J4	635S64503R
	163	1 3/8" Z21	0K2	635S64537R
	168	1 3/4" Z6	0K0	635S64504R
	168	1 3/4" Z20	0W8	635S64538R
*2600	163	1 3/8" Z6	0J5	635S66503R
	163	1 3/8" Z21	0K3	635S66537R
	168	1 3/4" Z6	0W1	635S66504R
	168	1 3/4" Z20	0W9	635S66538R
2800	163	1 3/8" Z6	0J6	635S68503R
	163	1 3/8" Z21	0K4	635S68537R
	168	1 3/4" Z6	0W1	635S68504R
	168	1 3/4" Z20	0W0	635S68538R
3000	163	1 3/8" Z6	0J7	635S70503R
	163	1 3/8" Z21	0K5	635S70537R
	168	1 3/4" Z6	0W3	635S70504R
	168	1 3/4" Z20	0X1	635S70538R

* Maximum recommended setting for 1000 min^{-1}

Size S0

Friction torque limiter, non-adjustable setting

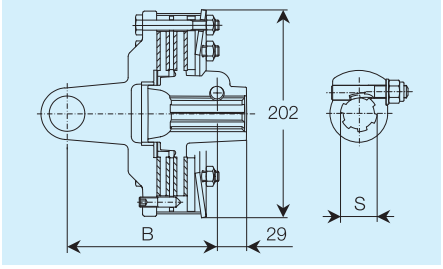
FT44



Setting Nm	B mm	S	Code FT44	Spare part code
2200	163	1 3/8" Z6	Q38	663S62503R
	163	1 3/8" Z21	Q40	663S62537R
	168	1 3/4" Z6	Q42	663S62504R
	168	1 3/4" Z20	Q44	663S62538R
2400	163	1 3/8" Z6	Q80	663S64503R
	163	1 3/8" Z21	Q86	663S64537R
	168	1 3/4" Z6	Q92	663S64504R
	168	1 3/4" Z20	Q98	663S64538R
*2600	163	1 3/8" Z6	Q76	663S66503R
	163	1 3/8" Z21	Q82	663S66537R
	168	1 3/4" Z6	Q88	663S66504R
	168	1 3/4" Z20	Q94	663S66538R

* Recommended setting for use at 1000 min^{-1}

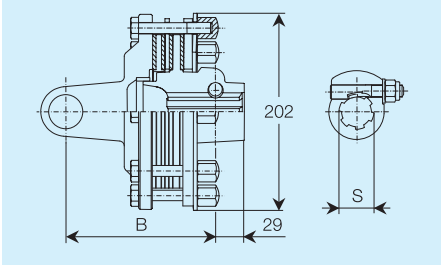
FT44R with Release System



Setting Nm	B mm	S	Code FT44R	Spare part code
2200	163	1 3/8" Z6	H38	663S62G03R
	163	1 3/8" Z21	H40	663S62G37R
	168	1 3/4" Z6	H42	663S62G04R
	168	1 3/4" Z20	H44	663S62G38R
2400	163	1 3/8" Z6	H80	663S64G03R
	163	1 3/8" Z21	H86	663S64G37R
	168	1 3/4" Z6	H92	663S64G04R
	168	1 3/4" Z20	H98	663S64G38R
*2600	163	1 3/8" Z6	H76	663S66G03R
	163	1 3/8" Z21	H82	663S66G37R
	168	1 3/4" Z6	H88	663S66G04R
	168	1 3/4" Z20	H94	663S66G38R

* Recommended setting for use at 1000 min^{-1}

FK44

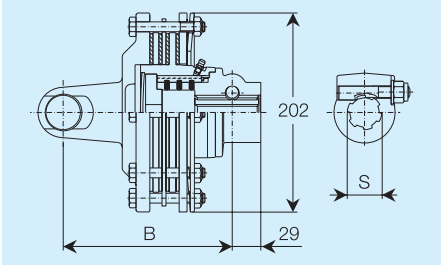


Setting Nm	B mm	S	Code FK44	Spare part code
2200	163	1 3/8" Z6	7E9	60KS62503R
	163	1 3/8" Z21	7F3	60KS62537R
	168	1 3/4" Z6	7F7	60KS62504R
	168	1 3/4" Z20	7G1	60KS62538R
2400	163	1 3/8" Z6	7F0	60KS64503R
	163	1 3/8" Z21	7F4	60KS64537R
	168	1 3/4" Z6	7F8	60KS64504R
	168	1 3/4" Z20	7G2	60KS64538R
*2600	163	1 3/8" Z6	7F1	60KS66503R
	163	1 3/8" Z21	7F5	60KS66537R
	168	1 3/4" Z6	7F9	60KS66504R
	168	1 3/4" Z20	7G3	60KS66538R

* Recommended setting for use at 1000 min^{-1}

Friction torque limiter and overrunning clutch, adjustable setting

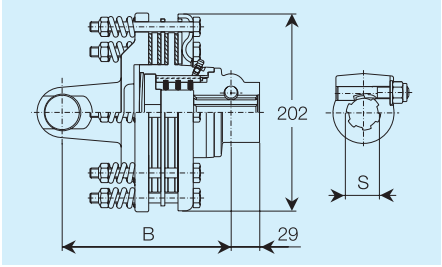
FNV44



Setting Nm	B mm	S	Code FNV44	Spare part code
2200	191	1 3/8" Z6	2B8	665S62203R
	191	1 3/8" Z21	2C6	665S62237R
	191	1 3/4" Z6	2D4	665S62204R
	191	1 3/4" Z20	2E2	665S62238R
2400	191	1 3/8" Z6	2B9	665S64203R
	191	1 3/8" Z21	2C7	665S64237R
	191	1 3/4" Z6	2D5	665S64204R
	191	1 3/4" Z20	2E3	665S64238R
*2600	191	1 3/8" Z6	2C0	665S66203R
	191	1 3/8" Z21	2C8	665S66237R
	191	1 3/4" Z6	2D6	665S66204R
	191	1 3/4" Z20	2E4	665S66238R
2800	191	1 3/8" Z6	2C1	665S68203R
	191	1 3/8" Z21	2C9	665S68237R
	191	1 3/4" Z6	2D7	665S68204R
	191	1 3/4" Z20	2E5	665S68238R

* Recommended setting for use at 1000 min^{-1}

FFNV44



Drivelines with FFNV clutches are not EU marked because the shield does not cover the entire inner yoke as required by Machinery Directive 2006/42/CE.

Setting Nm	B mm	S	Codice FFNV44	Spare part code
2200	191	1 3/8" Z6	2G8	667S62203R
	191	1 3/8" Z21	2H6	667S62237R
	191	1 3/4" Z6	2J4	667S62204R
	191	1 3/4" Z20	2K2	667S62238R
2400	191	1 3/8" Z6	2G9	667S64203R
	191	1 3/8" Z21	2H7	667S64237R
	191	1 3/4" Z6	2J5	667S64204R
	191	1 3/4" Z20	2K3	667S64238R
*2600	191	1 3/8" Z6	2H0	667S66203R
	191	1 3/8" Z21	2H8	667S66237R
	191	1 3/4" Z6	2J6	667S66204R
	191	1 3/4" Z20	2K4	667S66238R
2800	191	1 3/8" Z6	2H1	667S68203R
	191	1 3/8" Z21	2H9	667S68237R
	191	1 3/4" Z6	2J7	667S68204R
	191	1 3/4" Z20	2K5	667S68238R

* Recommended setting for use at 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

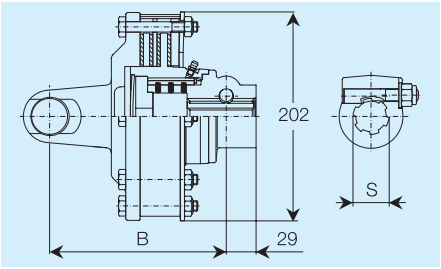
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size S0

Friction torque limiter and overrunning clutch, non-adjustable

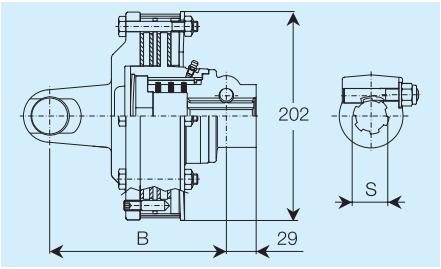
FNT44



Setting Nm	B mm	S	Code FNT44	Spare part code
2200	191	1 3/8" Z6	1F2	658S62303R
	191	1 3/8" Z21	1F8	658S62337R
	191	1 3/4" Z6	1G4	658S62304R
	191	1 3/4" Z20	1H0	658S62338R
2400	191	1 3/8" Z6	1F3	658S64303R
	191	1 3/8" Z21	1F9	658S64337R
	191	1 3/4" Z6	1G5	658S64304R
	191	1 3/4" Z20	1H1	658S64338R
*2600	191	1 3/8" Z6	1F4	658S66303R
	191	1 3/8" Z21	1G0	658S66337R
	191	1 3/4" Z6	1G6	658S66304R
	191	1 3/4" Z20	1H2	658S66338R

* Recommended setting for use at 1000 min^{-1}

FNT44R with Release System



Setting Nm	B mm	S	Code FNT44R	Spare part code
2200	191	1 3/8" Z6	1H6	658S62403R
	191	1 3/8" Z21	1J2	658S62437R
	191	1 3/4" Z6	1J8	658S62404R
	191	1 3/4" Z20	1K5	658S62438R
2400	191	1 3/8" Z6	1H7	658S64403R
	191	1 3/8" Z21	1J3	658S64437R
	191	1 3/4" Z6	1J9	658S64404R
	191	1 3/4" Z20	1K6	658S64438R
*2600	191	1 3/8" Z6	1H8	658S66403R
	191	1 3/8" Z21	1J4	658S66437R
	191	1 3/4" Z6	1K0	658S66404R
	191	1 3/4" Z20	1K7	658S66438R

* Recommended setting for use at 1000 min^{-1}

Friction clutches may become hot during use. **Do not touch!**
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.

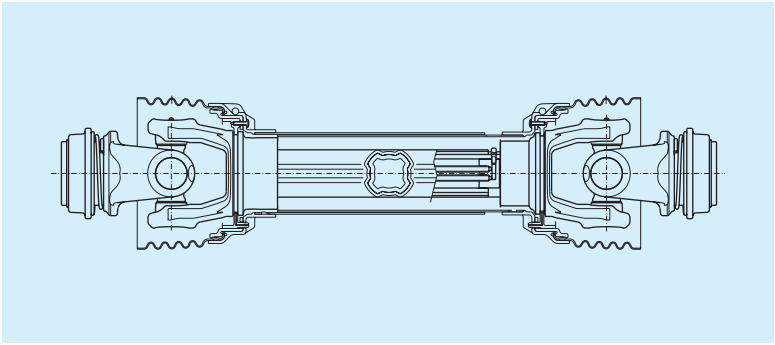
For primary shafts, always install any torque limiter or overrunning clutch on implement side.
All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Greasing System

The Greasing System is a lubricating system incorporated within the inner profile tube. It allows easy lubrication of the telescoping members, with the driveline installed on the tractor and implement, at any extension of the driveline. For further details, see chapter 30 - *Lubrication*.

To have your driveline equipped with the Greasing System, add the letter "G" to the driveline code (16th character of the code, if required).



Greasing System Code
G

Size S0

Codes for size S0 drivelines

1 **C**

C: Standard SFT cardan joint driveline

2 3 **S** **0**

Size **SH**

4

Telescoping Members
See page S0.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page S0.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page S0.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page S0.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also establishes the associated shields and attachment to PTO.

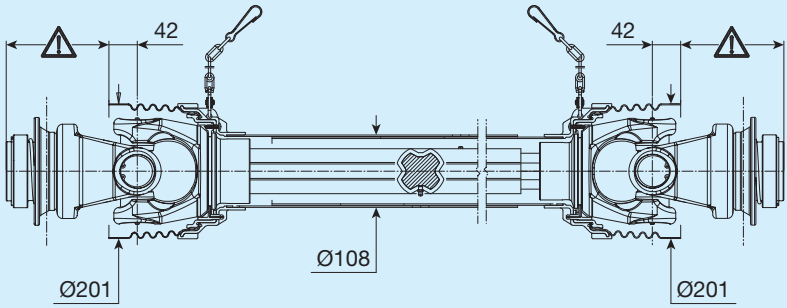
13 14 15

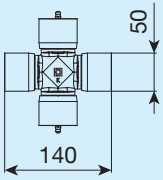
Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline. Also establishes the associated shields and attachment to the PIC shaft.

16

Only use these positions of the code if requesting optional Greasing System (see chapter 30 - *Lubrication*). For more options add letters to the code as shown above.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.





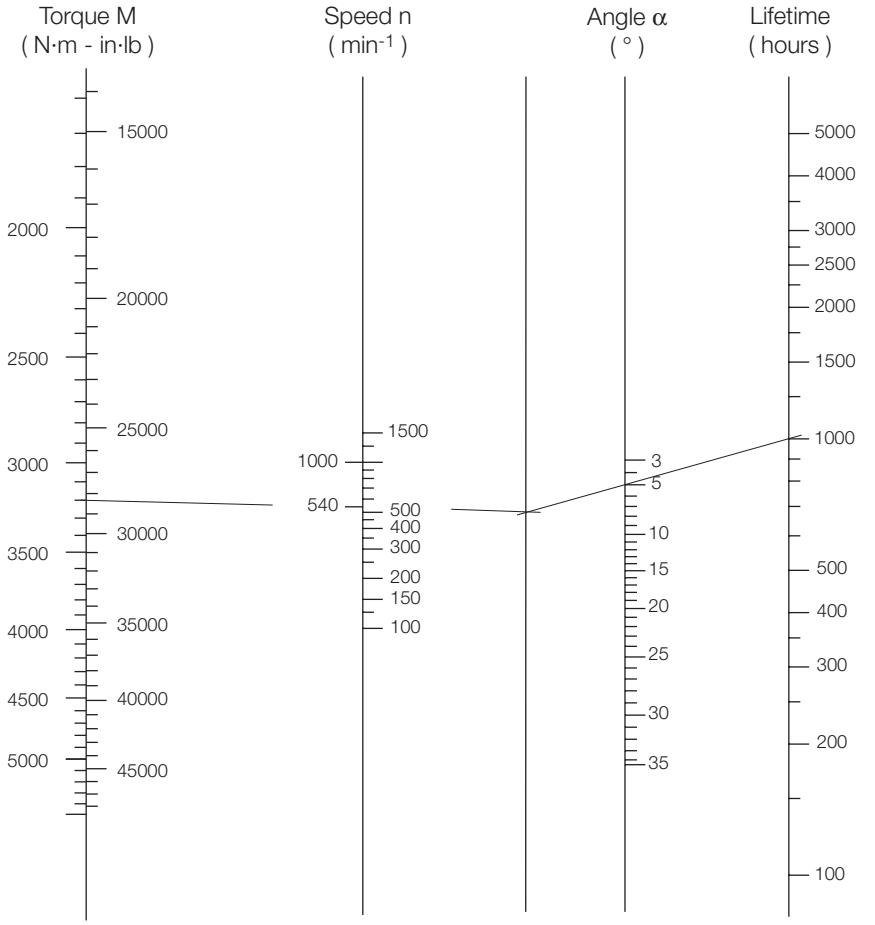
4120K0001

Size	540 min^{-1}				1000 min^{-1}			
	Mn		Pn		Mn		Pn	
	Nm	in·lb	kW	CV	Nm	in·lb	kW	CV
SK	3200	28323	181	246	2600	23013	272	370

Mn = nominal torque associated to a joint lifetime equal to 1000 hours with joint angle $\alpha = 5°$, speed n = 540 or 1000 min^{-1}, and a lubrication frequency of 50 hours.
Pn = power associated to nominal torque Mn.

Size SK

Nomogram to calculate a single cardan joint lifetime



Example:

To calculate the life for torque **M** = 3200 N·m at n = 540 min^{-1} and joint angle **α** = 5°, draw a line from the torque (first axis) to the speed (second axis) and continue it to intersect the third axis. From this intersection, draw another line to the joint angle (fourth axis) and continue it to the life (fifth axis, or 1000 hours for this example).

The following ratios can be used to convert power into torque, given the speed

P [kW] · 9553 = **M** [Nm] · **n** [min^{-1}]
P [CV] · 7026 = **M** [Nm] · **n** [min^{-1}]
P [kW] · 1,36 = **P** [CV]
M [Nm] · 0,102 = **M** [kgm]
M [Nm] · 8,85 = **M** [in·lb.]

Lubrication Frequency

Insufficient lubrication is one of the most frequent causes for failure of cardan joint drivelines. Lubrication frequency and the type of grease used are highly important for a long lasting and reliable driveline.

The lubrication frequency for SFT cardan joints is 50 hours. Under heavy duty applications in aggressive environments, more frequent lubrication may be required. For particular applications, the lubrication frequency may be extended to 250 hour intervals.

Use the nomogram on the previous page to determine the theoretical life L_{h50} of a single cardan joint (referenced to a 50-hour lube interval) considering torque M, speed n and joint angle α.

Shorter required joint can allow longer lubrication frequency by considering L_{h50} (theoretical lifetime) and L_h (required lifetime) ratio, as shown in the table below.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.28	100
1.47	150
1.61	200
1.73	250

Example: L_{h50} = 1000 is the theoretical life for a cardan joint size SK, torque M = 3200 Nm, speed n = 540 min^{-1} and joint angles α = 5° with a 50-hour lubrication interval.

If required life is 600 hours, L_{h50} / L_h ratio is 1000/600 = 1.66. Lubrication frequency can be extended to 200 hours.

The nomogram may also be used in reverse to find the average torque for a given required life.

The resulting torque value M_{50} is referenced to a standard 50-hour lubrication frequency.

As shown below, smaller torques can allow longer lubrication frequency by considering M_{50} (theoretical torque) and M (actual transmitted torque) ratio.

L_{h50}/L_h ratio	Lubrication frequency (hours)
1.00	50
1.09	100
1.14	150
1.17	200
1.20	250

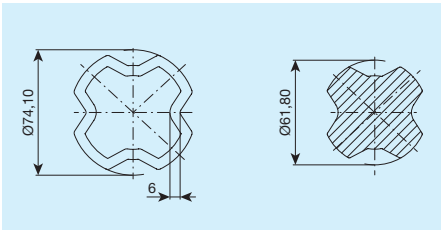
Example: M_{50} = 3200 Nm is the theoretical transmittable torque for a cardan driveshaft size SK, required lifetime 1000 hours, joint angles α = 5°, speed n = 540 min^{-1} with a lubrication frequency of 50 hours.

For a lower transmitted torque, i.e. M = 2730 Nm, M_{50} / M ratio is 3200 / 2730 = 1.17. The lubrication frequency can be extended to 200 hours.

Size SK

Telescoping Members

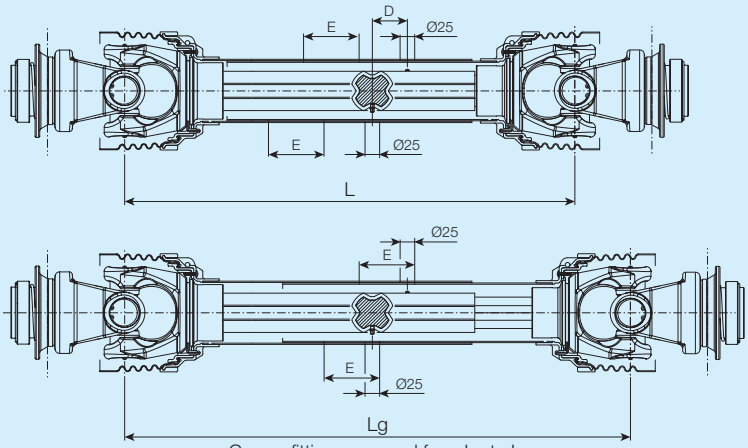
Four-Tooth Advanced tubes with heat-treated inner tube



Mmax (Nm)	11000
T/M (N/Nm)	9 - 10
Standard tube code	P
Maximum extension tube code	Q

Mmax : maximum transmitted torque. **T/M** : thrust (T) to torque (**M**) ratio

Standard telescoping members lenghts



Grease fittings exposed from Lg to Lw

L mm	Lw mm	Lt mm	Ls mm	Lg mm	E mm	D mm	Length code
710	817	917	1015	767	75×25	35	**071**
760	917	1017	1102	867	75×25	35	**076**
810	1017	1117	1127	967	75×25	35	**081**
860	1117	1217	1277	1067	75×25	35	**086**
910	1213	1314	1365	1167	75×25	35	**091**
1010	1363	1481	1540	1293	95×25	60	**101**
1110	1513	1648	1715	1443	95×25	60	**111**
1210	1663	1814	1890	1596	95×25	60	**121**

Lw: maximum working length

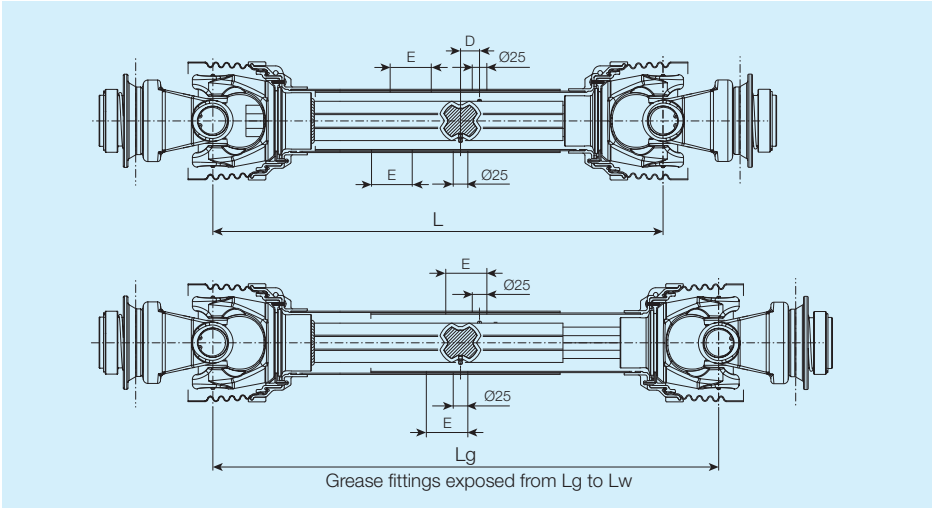
Lt: maximum temporary length (short duration temporary maneuvers)

Ls: maximum length without rotation

Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Size SK

Maximum extension telescoping members lengths



Grease fittings exposed from Lg to Lw

L mm	Lw mm	Lt mm	Ls mm	Lg mm	E mm	D mm	Length code
610	727	812	812	677	75×25	35	**061**
660	827	912	912	777	75×25	35	**066**
710	927	1012	1012	877	75×25	35	**071**
760	1027	1112	1112	977	75×25	35	**076**
810	1127	1212	1212	1077	75×25	35	**081**
860	1227	1312	1312	1177	75×25	35	**086**
910	1323	1412	1412	1277	75×25	35	**091**

Lw: maximum working length

Lt: maximum temporary length (short duration temporary maneuvers)

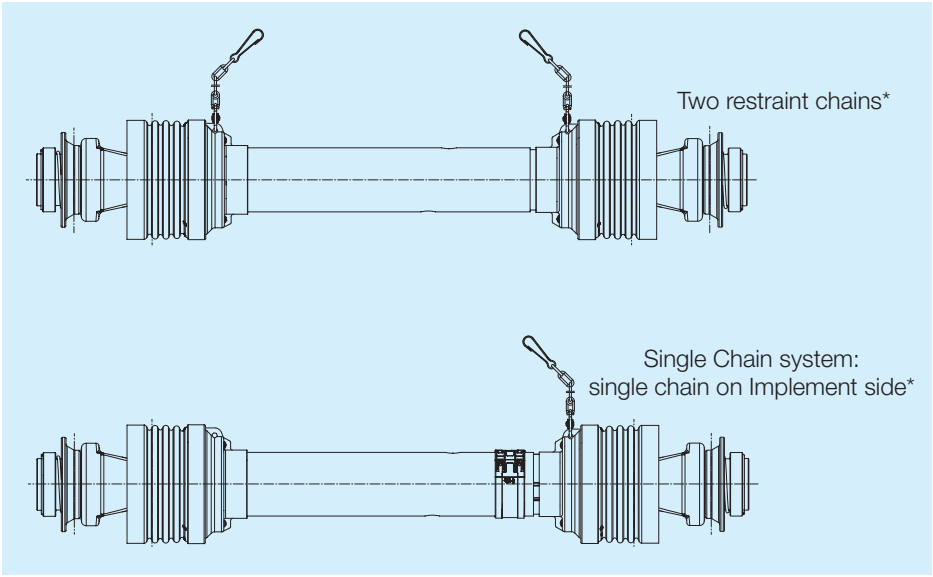
Ls: maximum length without rotation

Lw and **Lw** refer to drivelines with a maximum speed of 1000 min^{-1}. Please contact Bondioli & Pavesi's Engineering Department if speeds higher than 1000 min^{-1} or lengths longer than those specified above are required.

Safety labels and operator's manual

Country of destination	Destination code	Inner label	Outer label	Operator's manual
Drivelines bearing the CE mark	**C**	399143000	399CEE051 399LUB...	399UNI001
Drivelines made for USA and CANADA	**U**	399143000	399141000 399LUB...	399UNI001
Drivelines made for Japan	**J**	399143000	399JAP001 399LUB...	399UNI001
Drivelines made for other countries and for CEE – EFTA countries not bearing CE mark	**F**	399143000	399CEE051 399LUB...	399UNI001

Restraint Chains



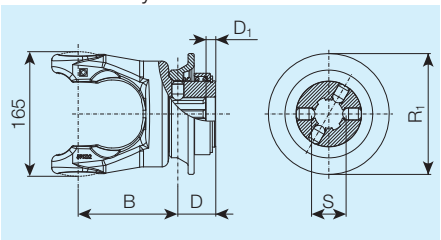
Country of destination	2 chains	Single chain code	Without chains
Drivelines bearing CE mark	E	1	-
Drivelines for USA and Canada	2	1	S
Drivelines for Japan	P	1	-
Drivelines other countries and CEE – EFTA countries not bearing CE mark	X	1	-

*Standard chains are fitted with the Spring Link system, which permits attachment without replacing the chain.

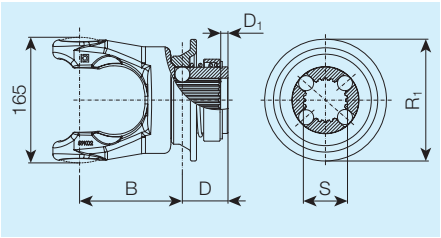
Size SK

Yokes for single cardan joint

RT ball collar yokes



S	B mm	D mm	R_1 mm	D_1 mm	Yoke code	Spare part code
1 3/4" Z6	132	50	160	13	R09	5720K0451
1 3/4" Z20	132	50	160	2	R10	5720K3851

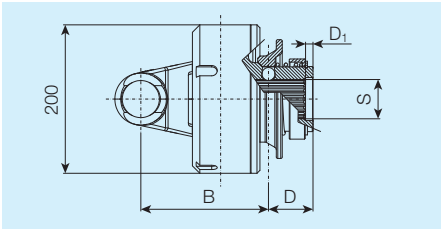


S	B mm	D mm	R_1 mm	D_1 mm	Yoke code	Spare part code
2 1/4" Z22	135	60	160	10	R94	5720K8051

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Overrunning Clutches

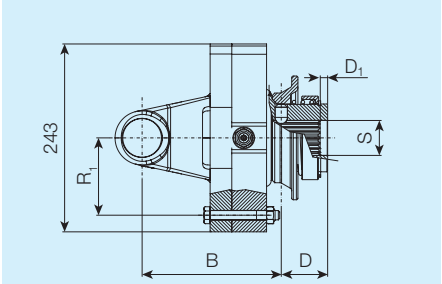
RL permanent lubrication with 8 plates



S	B mm	D mm	D_1 mm	Code RL	Spare part code
1 3/4" Z20	170	50	2	A39	601A0K404R
2 1/4" Z22	172	60	10	A40	601A0K405R

Maximum recommended torque: 10000 Nm

Shear bolt torque limiter LB



S	B mm	D mm	D_1 mm
1 3/4" Z20	180	50	2
2 1/4" Z22	190	60	10

Setting Nm	S	R_1 mm	Code LB	Spare part code
7000	1 3/4" Z20	100	1S4	6060K3803R
				Bolt M12 x 90 cl 8.8.
9000	2 1/4" Z22	94	1U5	6060K8001R
				Bolt M14 x 95 cl 8.8.

For primary shafts, always install any torque limiter or overrunning clutch on implement side. All rotating parts must be guarded.

Ensure that the driveline is securely attached at both ends before operation. Make sure that the ball collar or push-pin snaps back to their initial position after connection. Check that all taper pins, bolts, or setscrews are secure and tight. All rotating parts must be guarded.

Size SK

Codes for size SK drivelines

1
C

C: Standard SFT cardan joint driveline

2 3
S **K**

Size **SK**

4

Telescoping Members
See page SK.4 and chapter 7 - *Telescoping Members*

5 6 7

Length L of driveline
See page SK.5 and chapter 8 - *Driveline Lengths*

8

Safety Labels and Operator's manual
See page SK.6 and chapter 9 - *Safety Labels and Operator's Manuals*

9

Restraint chains
See page SK.6 and chapter 10 - *Safety Shields*

10 11 12

Tractor end yoke
The three-digit code corresponding to the yoke. Also establishes the associated shields and attachment to PTO.

13 14 15

Implement end yoke, torque limiter, or overrunning clutch
The three-digit code corresponding to the yoke or clutch to be fitted to the implement end of the driveline. Also establishes the associated shields and attachment to the PIC shaft.
Add an "**X**" letter at the end of the code for drive shaft running at 1000 min^{-1}.

All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.
For primary shafts, always install any torque limiter or overrunning clutch on implement side.

Proper lubrication of all rotating and sliding parts is essential for proper function, long life, and reliability. Insufficient lubrication, or contamination of the lubricant, is one of the most frequent causes of failure of cardan joint drivelines. The lubrication frequency and the type of grease used are important to the life of the driveline, as well as the shafts and bearings of the components to which they are connected.
Joints, telescoping members, and shields must be lubricated at intervals related to the environment and working conditions.
Grease contains a soap base (lithium, calcium, or sodium based), lubricating oils, and additives (e.g. molybdenum disulphide). These additives are used for corrosion resistance, strength, adhesion at extreme pressures (EP), or other properties. The soap base can be compared to a “sponge”; it retains lubricating oils and gradually releases them to the components. Its efficiency diminishes with longer working periods and with higher pressures.
Greases are classified by the National Lubricating Grease Institute (NLGI) according to their consistency. Bondioli & Pavesi recommends NLGI #2 grease on all crosses, telescoping members and shields.
During assembly, the LR automatic torque limiters are greased with NLGI 2 molybdenum disulphide grease and do not require further lubrication throughout the normal period of use.

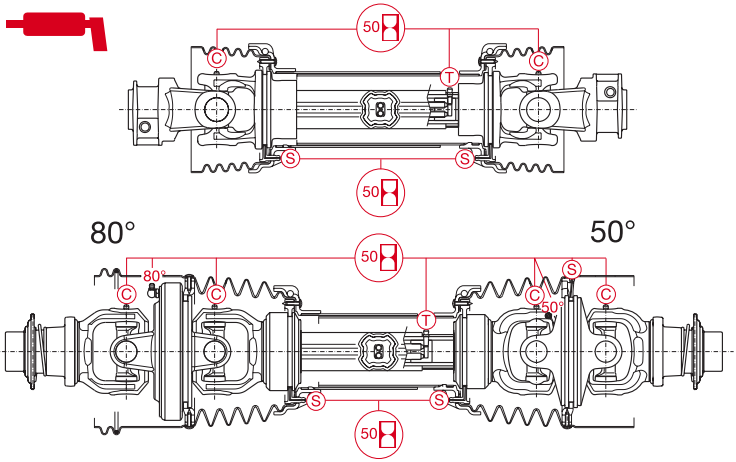
Lubrication frequency is fundamental to long life of a cardan joint. The standard lubrication frequency for SFT cardan joint drivelines is 50 hours. It can be extended to 250-hour interval for single cardan joints for specific applications (see chapter 5 - Size, Torque and Power). SFT CV joints should be re-lubricated every 50 hours. Heavy duty applications in aggressive environments may require more frequent lubrication. Estimated grease volumes are tabulated on following page and refer to a 50-hour lubrication frequency. For extended lubrication intervals, use proportionately more volume (i.e. twice the listed volume for 100 hour intervals).
The following instructions, that are also listed in the operator’s manual of the driveline, should be included in the manual provided by the implement manufacturer.

Disengage the PTO, turn off the tractor engine, remove the key, and check that all rotating parts have come to a standstill before approaching the implement or performing maintenance work.

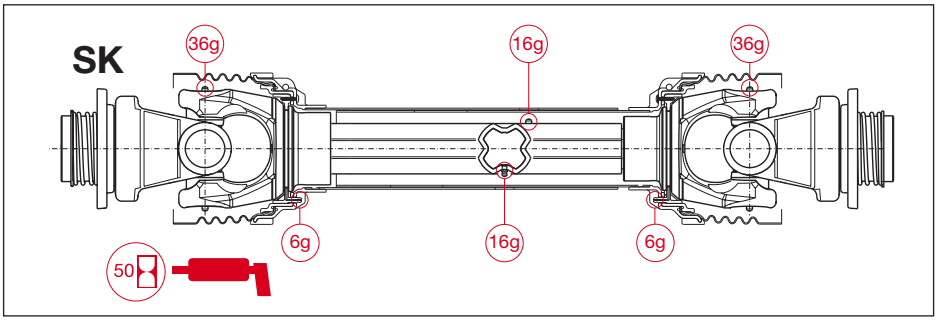
It is recommended to grease the components before the initial use.
Clean and lubricate the driveline before storage, and at the end of the season.
When greasing cross kits, lubricate generously until the grease purges from all four bearing caps. Pump grease gradually. Avoid high pressures, especially those possible from pneumatic equipment.
Clean and lubricate the driveline before storage at the end of the season. It is also recommended to clean out any grease inside the CV joint shields.

Lubrication

Lubrication Frequency (hours) and estimated grease volumes



	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0
Crosses (C)	4 g	7g	10g	13 g		18 g	22 g		26 g	28 g	30 g
Shields (S)	6 g										
Telescoping members (T)	12 g		20 g				32 g				
80° CV joint (80°)		20 g	30 g		40 g		50 g		70 g	100 g	
50° CV joint (50°)			5 g		6 g		7 g		8 g		



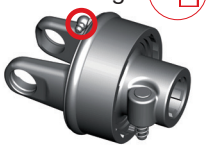
Manually operated grease guns provide approximately 0.8 – 1.0 grams of grease per pump.
One (1) ounce of grease is approximately 28.3 grams

When lubricating cross kits, pump grease until the grease purges from all four bearing caps. Pump the grease gradually. Avoid high pressures, especially those possible from pneumatic equipment.

RA1 Overrunning clutches

3 - 4 g

50



RA2 Overrunning clutches

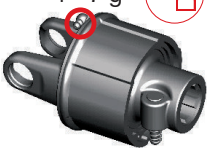
5 - 6 g

50

SA Ratchet torque limiters

4 - 7 g

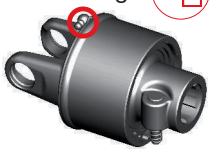
50



LN Ratchet torque limiters

4 - 7 g

50



LC Ratchet torque limiters

4 - 7 g

seasonal lubrication

LT Ratchet torque limiters

4 - 7 g

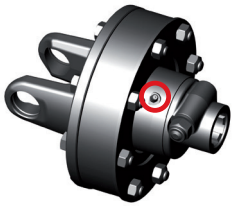
seasonal lubrication

LB Shear bolt torque limiters

S1 to S0: 1 - 2 g
SK: 35 g

seasonal lubrication

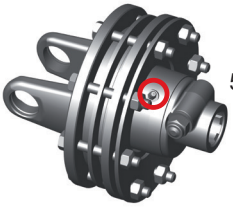
FNT Friction torque limiter and overrunning clutch



50

5 - 7 g

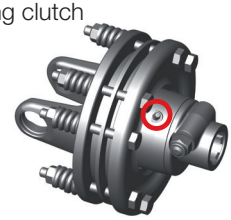
FNV Friction limiter and overrunning clutch



50

5 - 7 g

FFNV Friction torque limiter and overrunning clutch



50

5 - 7 g

Lubrication

Greasing System

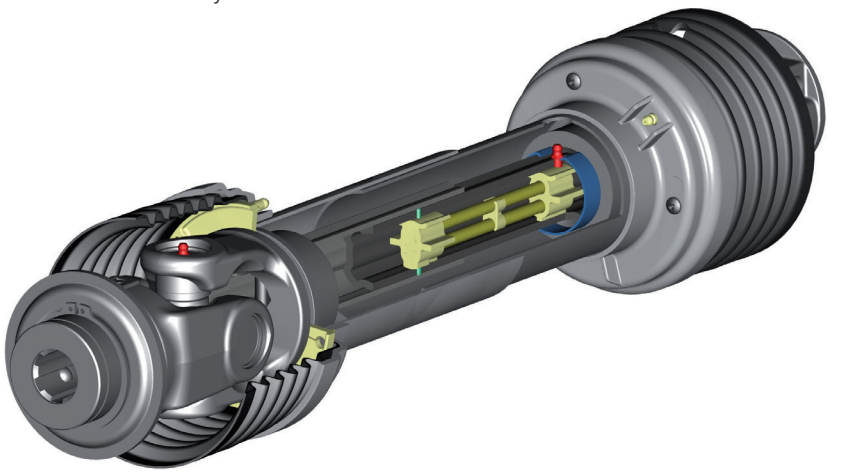
SFT drivelines are designed to simplify maintenance work with less time required. Increasing the lubrication frequency to 50 hours was a positive improvement.

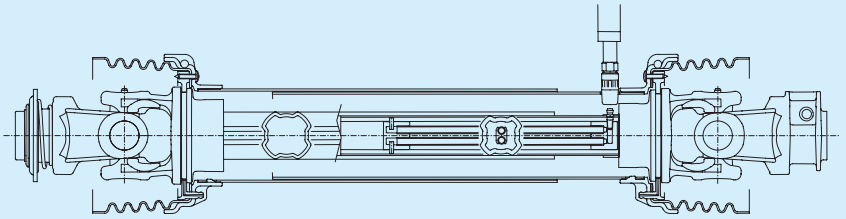
SFT drivelines can be equipped with a lubrication system for the telescoping members, called the Greasing System. This allows rapid lubrication of the profile tubes with the driveline installed on the implement and tractor.

Grease is pumped into a grease fitting located next to the inner yoke.

The grease flows into the distributor and through two separate ducts to outlets on the inner tube. From there it spreads to cover the contact surfaces.

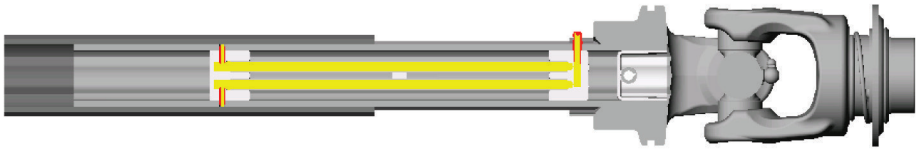
Add the letter "G" to the driveline code to equip your driveline with the Greasing System. The Greasing System is available for Four-Tooth and Free Rotation profile tubes.

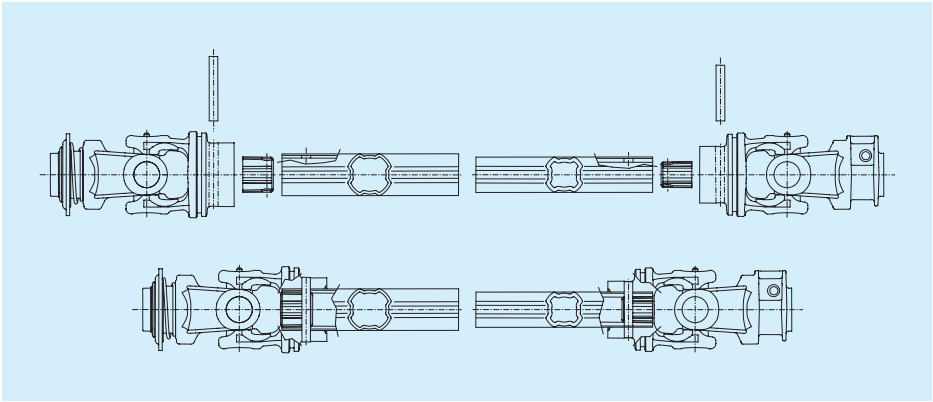




The grease outlets for the Greasing System are located at the center of the overlap of the telescoping tubes when the driveline is at its maximum working length Lw, as tabulated in the lengths chart (see chapter 8 - *Driveline Lengths*).
A spacer on the inner tube surrounds the grease fitting, to prevent damage when the driveline is fully collapsed.

To limit contamination of the grease, and afford a longer life, SFT profile tubes can be equipped with plugs, located within the hubs of inner yokes.
These plugs are shaped to match the profile of the tube. They permit venting of air during telescoping. The plugs are kept in place by the roll pins that connect the profile tubes to the inner yokes.
All drivelines with Greasing System are equipped with plugs as standard.





Lubrication

Greasing System as a Spare Part

The Greasing System can be supplied as a spare part, as an assembly along with the inner tube.

The spacer is included, installed on the tube surrounding the grease fitting, to prevent contact between the grease fitting and the outer tube when the driveline is fully collapsed.

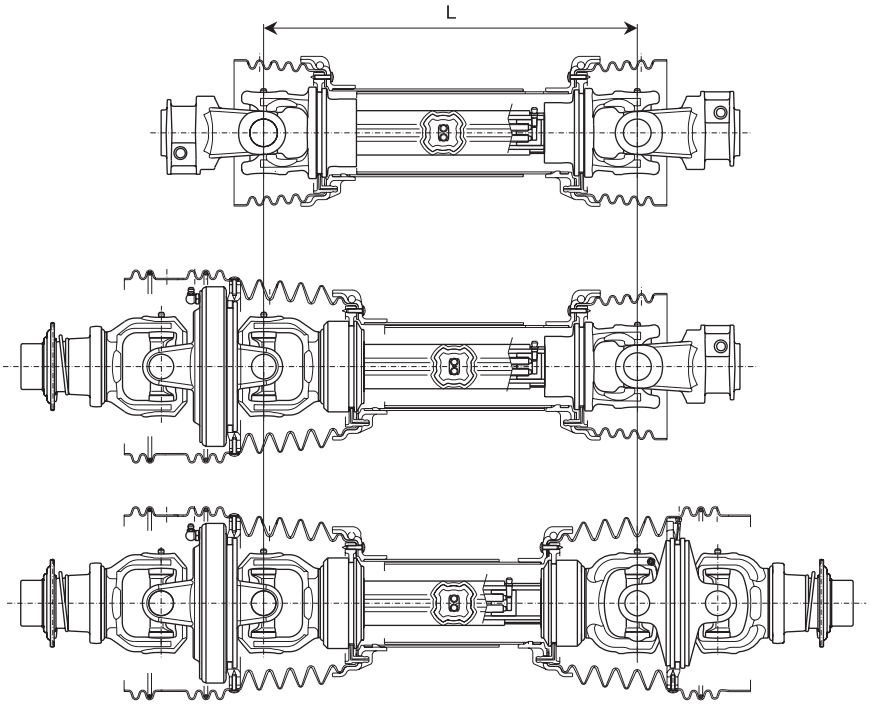
The first three positions in the spare part code identifies the assembly: 528.

Profile tube sizes are defined according to the driveline size (positions four and five).

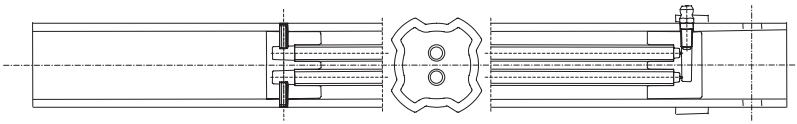
The sixth position in the driveline code indicates the type of telescoping tube.

Tube length and the location of grease outlets are defined according to the length of the shaft L and the type of joints.

For drivelines with one or two CV joints, add two optional characters, which identifies the type of joint, to the spare part code.



Code	041	046	051	056	061	066	071	076	081	086	091	101	111	121
Length L (mm)	410	460	510	560	610	660	710	760	810	860	910	1010	1110	1210



Codes for Grease System / Inner tube assembly as a spare part

1 2 3 — Tube with Greasing System

5 2 8

4 5 — Size: S2 - S4 - S5 - S6 - H7 - S8 - H8 - S9 - SH - S0.

6

Type of telescoping tube	Regular	Rilsan®-coated	Heat Treated
Four-tooth:	N	R	T
Maximum extension four-tooth:	L	V	U
Free rotation:	F	G	

7 8 9 — Length L of driveline.
See Lenght and Code Chart on preceding page..

Optional positions: complete only if the driveline is fitted with one or two constant velocity joint(s).

10 — Type of joint at driver (tractor) end
- Single cardan joint: N
- 80°Constant velocity Joint: W
- 50°Constant velocity Joint: K

11 — Type of joint at driven (implement) end
- Single cardan joint: N
- 80°Constant velocity joint: W
- 50°Constant velocity joint: K

12

R

Examples

Greasing System for SFT driveline S6 fitted with regular four-tooth profile tubes (N), length L = 910 mm (091), single cardan joints on both ends.
Code of assembly: 528 S6 N 091 R.

Greasing System for SFT driveline S4 Rilsan® coated four-tooth tubes (R), length L = 860 mm (086), 80° CV joint on tractor end, cardan joint on implement end (N).
Code of assembly: 528 S4 R 086 W N R.

Direct Greasing for Splined Telescoping Members

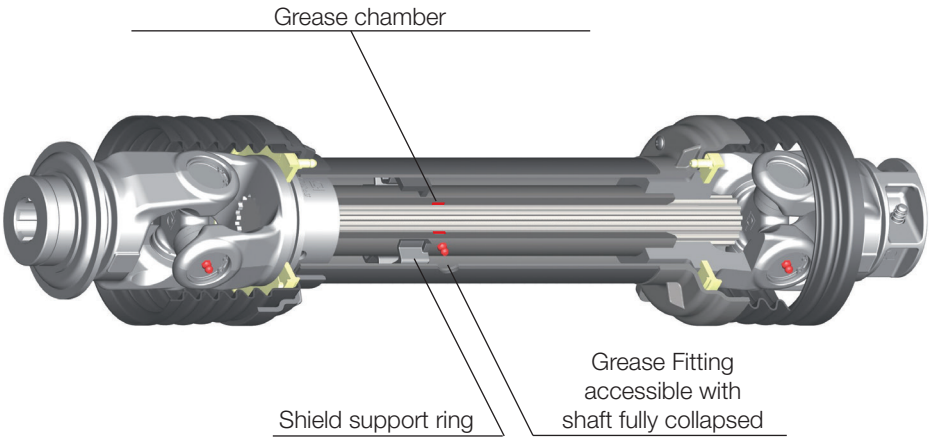
Direct greasing permits easy lubrication of SFT splined telescoping members. A grease fitting is easily accessible through a hole in the shield when the driveline is fully collapsed, and does not require disassembly.

The grease fitting is located in a grooved sleeve, 100 mm from the end of the tube. The groove acts as a grease chamber. It collects grease, than spreads it to cover all contact surfaces.

Shield tubes have two small holes that overlap when the driveline is fully collapsed. A simple rotation of the two half-shields will bring them into alignment.

A support ring is included, installed on the inner tube, to prevent contact between the grease fitting and the shield during operation.

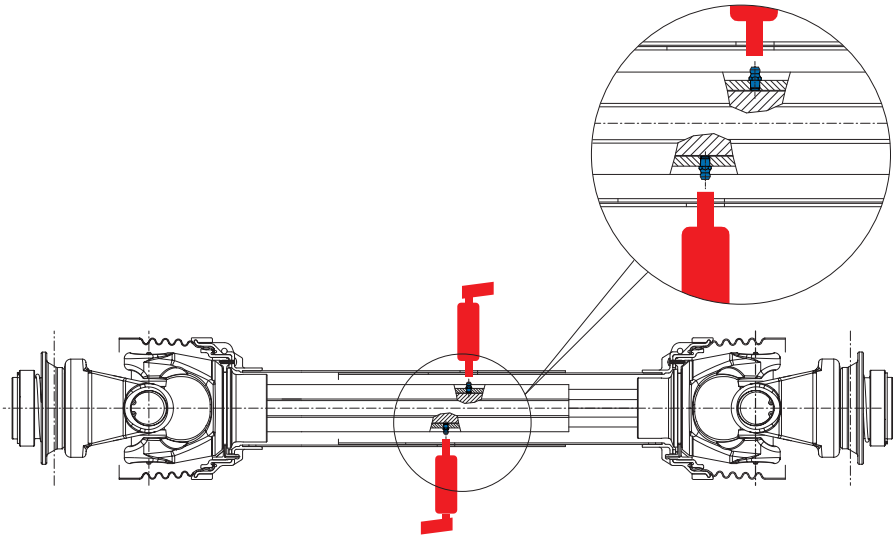
All drivelines with splined telescoping member are supplied with direct greasing as standard (nothing needs to be added to the driveline code).



Direct Greasing for Advanced Four-Tooth profiles

The outer telescoping member is equipped with two grease fittings accessible through holes in the shield tubes to facilitate lubrication. Both of these fittings must be lubed at 50 hour intervals.

The grease fittings are accessible at the driveshaft length specified by the OEM (between the minimum greasing length Lg to working length Lw).



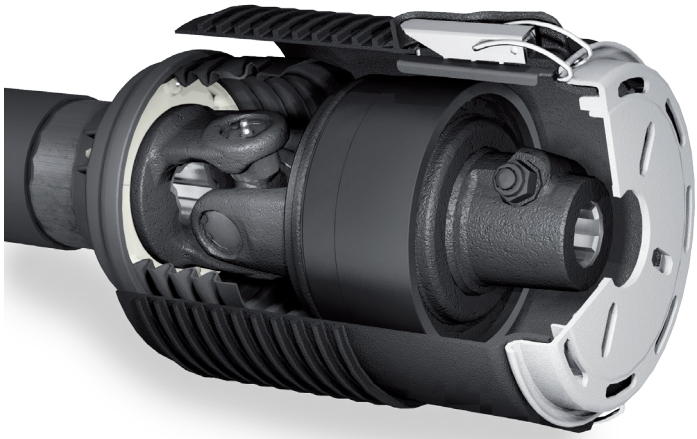
Implement input connection shields

Proper use and maintenance of the driveline and shield is of primary importance for operator safety. Missing or modified safety shields may cause accidents.

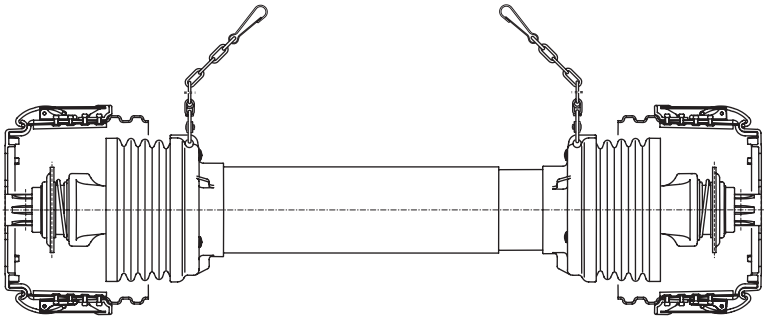
All rotating parts must be guarded.

Shields applied to the Implement Input Connection (IIC) require special attention, because they must integrate with the driveline shields, they should not interfere with other components when operating the implement, and they should not hinder driveline installation and maintenance.
Bondioli & Pavesi offers a complete range of implement input connection shields, designed with the drivelines in compliance with international safety standards.
Due to the broad range of implements and applications, the specifications contained herein should be used as a general guide to the selection of an implement input connection shield.

The implement manufacturer is responsible for selecting suitable IIC shielding according to the application, the size and articulation range of the driveline, the type and size of any torque limiters installed on the driveline, access requirements for assembly or maintenance, and any applicable standards.
Thorough testing of the IIC shield by the implement manufacturer under actual field conditions is necessary and strongly recommended by Bondioli & Pavesi.
SFT implement input connection (IIC) shields comply with international standards and are designed to complete an interactive guarding system along with the driveline guard and tractor master shield, even if the driveline is equipped with a CV joint, torque limiter, or an overrunning clutch.
These shields are practical and can be opened to easily access the joints for installation and maintenance operations.
SFT shields are not designed, nor intended to be used as steps.



Implement input connection shields



All rotating parts must be guarded. Contact with a rotating driveline can cause death or serious injury. The tractor master shield, driveline guards, and the implement input connection shield form an interactive guarding system.

The Machinery Directive (2006/42/CE) requires that the implement be equipped with an implement input connection shield fixed to the implement.
Standard UNI EN ISO 4254-1 requires the implement input connection shield completely encircle the shaft, but allow for installation and articulation of the driveline: Standards UNI EN ISO 4254-1 and ANSI/ASAE 318.15 requires the IIC shield provide at least 50 mm of overlap with the integral driveline guard in the straight position.
The tractor master shield, the integral driveline guard, and the implement input connection shield constitute an interactive guarding system according to ANSI/ASABE S604.1 standard.
Bondioli & Pavesi recommends the use of proper shields and guards for drivelines, tractors, and implements. Damaged or missing components must be replaced with original spare parts, correctly installed, before using the driveline.

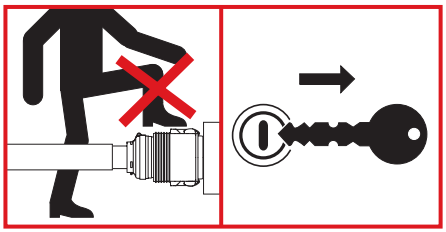
Bondioli & Pavesi recommends the manufacturers of implements apply labels that clearly state the need to keep safety shields in place and in proper working order.
Manufacturers are also recommended to include in their operating manuals a list of the shields and safety labels, as well as their position on the machine and their code numbers for ordering replacements.
In compliance with ANSI/ASAE S493.1 standards, the implement manufacturer shall provide safety sign(s) and instructions stating that guards must be kept in place and the machine should not be operated with guards opened or removed. Standard UNI EN ISO 4254-1 requires a label be used to draw attention to possible risks when the guard is unlocked, opened, or removed.
Basic information for safe and correct use of the driveline and shielding are shown in the catalogs and on the instruction sheet included with the implement input connection shield.

Implement input connection shields

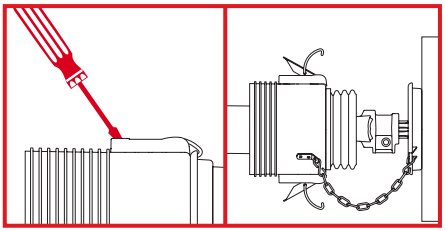
Use the implement only with the original driveline. The implement input connection shield must be compatible with the driveline and the application.

If the IIC shield is damaged by contact with other components of the implement, please consult your dealer.

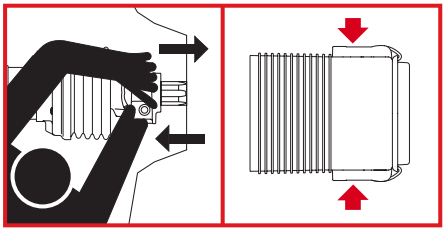
Contact with a rotating driveline can cause serious injury or death. Do not open or remove safety shields while engine is running. Make sure that all driveline, tractor and implement shields are functional and in place before operation. Damaged or missing shields must be replaced with correctly installed original equipment spare parts.



Do not step or stand on the driveline or implement input connection shield. Do not step on, step over, or go under the driveline. Disengage the PTO, turn off the tractor engine, remove the key, and allow all moving parts to come to a complete stop before approaching the implement or doing maintenance work.



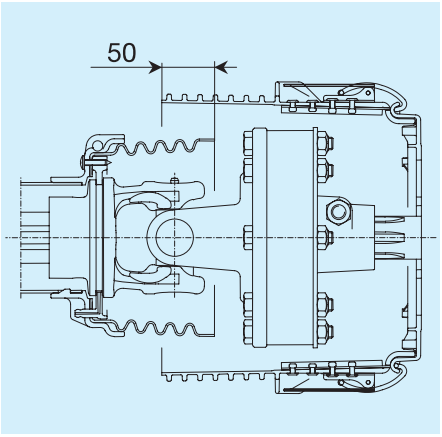
To open the SFT IIC shield, lift the lever with a screwdriver or a similar tool to release the two clips. Slide the implement input connection shield forward along the driveline to gain access to the joint, yoke, or clutch. The chain keeps the plastic shield attached to the metal plate when opened.



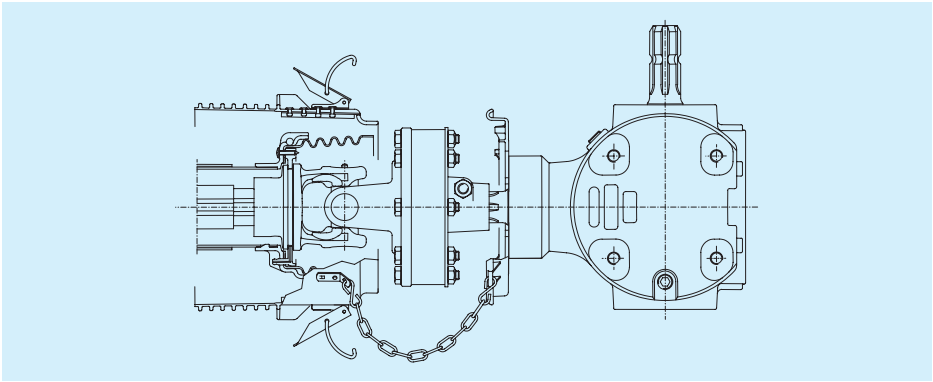
Make sure the driveline and implement input connection shields are securely attached to the implement before operating.
Make sure that the plastic shield is properly seated on the metal plate and the lever clamps are securely closed before operating the driveline.

Implement input connection shields

SFT IIC shields are composed of a metal plate and a circular plastic shield. The function of the metal plate is to support the plastic shield and provide a means for attachment to the implement. It is made of metal to provide a rigid and solid support even if attached to a surface that will become hot (such as a gear box).
The plastic shield completely encircles the implement input shaft as required by standard UNI EN ISO 4254-1, and is connected to the metal plate by two lever clamps.



SFT IIC shields comply with ANSI/ASABE S604.1 and UNI EN ISO 4254-1 standards, which require a minimum overlap of 50 mm between the IIC shield and the driveline shield, in the straight position.
To install or perform maintenance on the driveline, release the shield cone from the bottom plate and slide it along the shaft. The lever clamps are shrouded to prevent unintentional release. The clamps may be disengaged using a screwdriver or similar lever. Opening the clamps allows the plastic shield to slide along the driveline, providing easy and ample access for installation and maintenance of the joint, torque limiter or clutch.
A chain connects the metal plate to the plastic shield when it is released in accordance with standard ANSI/ASABE S604.1 and UNI EN ISO 4254-1.

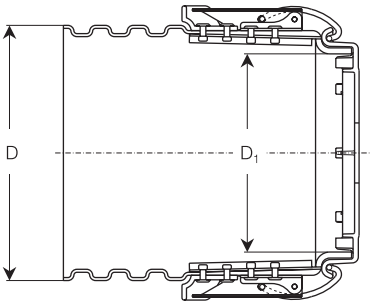


Implement input connection shields

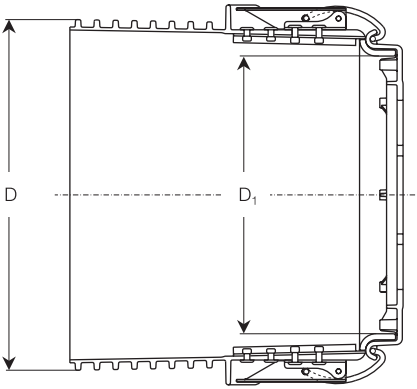
IIC shields should be chosen depending on their intended application, the yoke, torque limiter, or clutch to be covered, their dimensions, and on normal driveline movements during implement operations and maneuvers.
IIC shields, as well as driveline shields, should allow minimal access to revolving parts, but allow unhindered driveline movements. Standard ISO 5673-1 defines a minimum 150 mm access.

SFT IIC shields are available with two types of shield cones, **00** and **10**, which differ in shape, material and diameters and are available in 5 sizes in diameter (**17, 19, 21, 23 and 25**).

Type **00** cones come in five different diameters and can be applied to end yokes, overrunning clutches, torsionally resilient joints, ratchet torque limiters, shear bolt torque limiters, and automatic torque limiters.
Type **10** cones come in three diameters and are made of heat-resistant plastic. They are recommended especially for protecting friction torque limiters, which are often used in heavy-duty applications and can reach high working temperatures.



Diameters **17** and **19**
Type **00** cone



Diameters **21**, **23** and **25**
Type **00** and **10** cones

	Type **00**		Type **10**	
Diameter code	D mm	D_1 mm	D mm	D_1 mm
17	170	132	- -	- -
19	190	152	- -	- -
21	214	165	214	165
23	235	185	235	185
25	259	207	259	207

Implement input connection shields

The size of the IIC shields should be sufficient to allow the cone to pass over the driveline's outer cone. Diameter D_1 must therefore be larger than the diameter of the outer cone, or any type of torque limiter or clutch installed on the driveline.
The table below shows appropriate IIC shield diameter codes (i.e. the diameter D in centimeters) for various driveline attachments.
IIC shields and driveline shields should allow minimal access to revolving parts, while leaving the driveline easy to install and free to articulate.

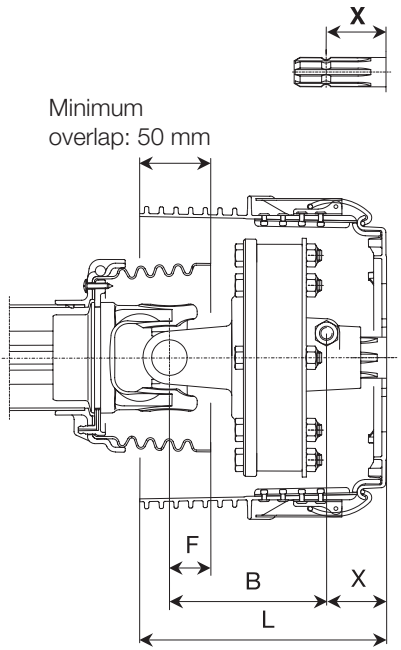
Driveline Attachment	S1	S2	S4	S5	S6	H7	S8	H8	S9	SH	S0	SK
Yokes for single cardan joints	17	19	19	19	21	21	21	21	23	25	25	25
Yokes for 50° CV joints	- -	- -	23	- -	25	- -	25	25	- -	- -	- -	- -
RA - RL	17	19	19	19	21	21	21	21	23	25	25	25
SA - LN - LC - LT	17	19	19	19	21	- -	- -	- -	- -	- -	- -	- -
LB	19	19	19	21	21	21	21	21	23	25	- -	- -
LR23 - LR24	- -	- -	19	19	21	21	21	21	23	- -	- -	- -
LR35	- -	- -	- -	- -	- -	- -	23	23	23	25	25	- -
FV22 - FFV22 - FT22	21	21	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
FV32 - FFV32 - FT32	- -	- -	23	23	23	- -	- -	- -	- -	- -	- -	- -
FT34 - FFV34 - FT34	- -	- -	23	23	23	23	23	23	23	- -	- -	- -
FV42 - FFV42 - FT42	- -	- -	25	25	25	25	25	25	- -	- -	- -	- -
FV44 - FFV44 - FT44	- -	- -	- -	- -	- -	- -	25	25	25	25	25	- -
FNV34 - FFNV34 - FNT34	- -	- -	- -	- -	23	23	23	23	23	- -	- -	- -
FNV44 - FFNV44 - FNT44	- -	- -	- -	- -	25	25	25	25	25	25	25	- -

Implement input connection shields

The IIC shield length L is measured from the face of the metal plate to the end of the plastic shield.
Standard shield lengths are shown in the table below and must be chosen to provide sufficient overlap with the driveline shield, while leaving the necessary space for shaft installation and movement.
The IIC shield length L can be calculated by the following formula, according to the protrusion of the implement shaft (X), in order to achieve an overlap of 50mm as required by standards UNI EN ISO 4254-1 and ANSI/ASABE S604.1).

Length B is measured from the annular groove of the splined shaft to the center of the cross. These dimensions are listed within this catalog for each yoke, torque limiter, or clutch (see section for relevant size driveline).
Length F is measured from the protrusion of the shield to the cross center. This dimension is also listed in the tables related to driveline sizes.
The table below shows the length codes for each IIC shield. Always choose the next longer standard length above the calculated length to maintain a 50 mm overlap with the driveline shield.

$$L = X + B + 50 - F$$

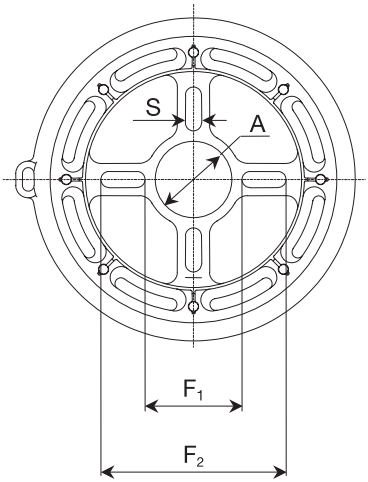


Length code	L (mm) D=170 mm	D=190 mm	D=210 mm	D=230 mm	D=250 mm
05	122	122	122	122	122
10	135	135	135	135	135
15	147	147	147	147	147
20	160	160	160	160	160
25	172	172	172	172	172
30	185	185	185	185	185
35	197	197	197	197	197
40	210	210	210	210	210
45	222	222	222	222	222
50	- -	235	235	235	235
55	- -	247	247	247	247
60	- -	- -	260	260	260
65	- -	- -	- -	272	272
70	- -	- -	- -	285	285
75	- -	- -	- -	- -	300

Implement input connection shields

SFT implement input connection shields can be easily installed on the implement. The metal plate has four slots positioned at 90° to allow attachment with bolts to the implement frame.
Bondioli & Pavesi recommends the implement manufacturer provide a solid and sturdy mounting, and advise the end user to periodically check that the shield is in place, undamaged, and properly secured.

The implement input connection shield is attached to, and becomes a part of the implement. Consequently, the implement manufacturer is responsible for selecting the proper shield according to applicable standards and, if required, obtaining CE certification for the machine.
SFT IIC shields are provided with an instruction sheet (code 399CEE2CF) including the Conformity Statement required by the Machinery Directive. Instruction sheet 399CEE2CF is valid for all countries of destination.



Instruction sheet **399CEE2CF**

Diameter code	A mm	S mm	F_1 mm	F_2 mm
17	40	9	56	98
19	40	9	56	98
21	52	11	66	126
23	52	11	66	126
25	52	11	66	126

Implement input connection shields

Codes for SFT IIC shields

1	2	3	
3	**9**	**5**	SFT IIC shield

4	5	
		IIC shield type **00**: for yokes, ratchet torque limiters, shear bolt limiters, automatic limiters **10**: Zytel® material, recommended for friction torque limiters

6	7	
		IIC shield diameter **17, 19, 21, 23, 25** for type 00 cones **21, 23, 25** for type 10 cones

8	9	
		IIC Shield length **05, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75**

10	11
C	**E**

Example: **395 00 23 30 CE**
is the code for ordering a
SFT IIC Shield with **00** cone,
diameter D = 230 mm (code **23**),
length L = 185 mm (code **30**),
with an instruction sheet valid for all countries of destination.

Bondioli & Pavesi offers a wide range of shields for PTO's, specifically designed for drivelines and fully compliant with international standards.
Due to the broad range of implements and applications, the specifications contained herein should be used as a general guide to the selection of an implement input connection shield.

The implement manufacturer is responsible for selecting suitable IIC shielding according to the application, the size and the articulation range of the driveline, the standards applicable for the country of destination.
Thorough testing of the IIC shield by the implement manufacturer under actual field conditions is necessary and strongly recommended by Bondioli & Pavesi.

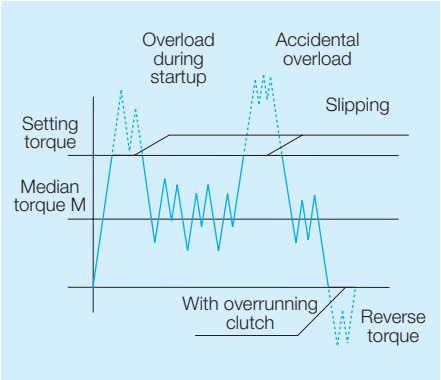
All rotating parts must be guarded. The shields on the tractor and on the implement machine must form an integrated guarding system with the driveline guard.

Combination friction torque limiter with overrunning clutches

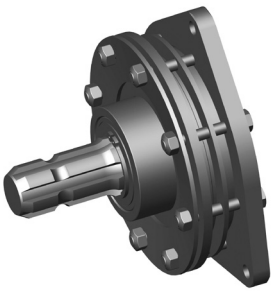
Combination friction torque limiters with incorporated overrunning clutch are generally used on implements with high inertia (i.e. those with flywheels or other heavy rotating masses). These implements include mower conditioners and square balers.
During overloads, due to abrupt starting or blockages, the torque transmitted can be limited by the slipping of friction linings.
Possible inverse torques, generated during sudden deceleration or stopping, will be eliminated by an overrunning clutch. Combination clutches are particularly recommended on square balers, mounted directly onto a flywheel.
In this configuration, the clutch becomes an integrated system with the implement. The torque setting and size can be selected accordingly.
Different models of combination friction torque limiter with overrunning clutch for flywheels are available, with different torque settings:

- FE42 up to 900 Nm torque setting
- FE44 up to 1600 Nm torque setting
- FE46 up to 2400 Nm torque setting
- FE62 up to 1800 Nm torque setting
- FE82 up to 2500 Nm torque setting

All models are lubricated during assembly and fitted with sealed bearings. No further lubrication is required.



FE44

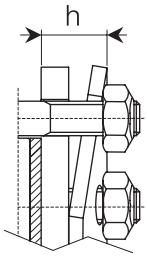


FE82

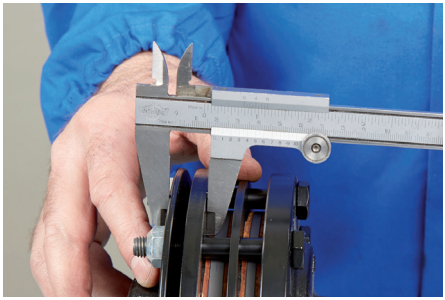
Combination friction torque limiter with overrunning clutches

FE42 - FE44 - FE46

FE42 - FE44 - FE46 combination clutches have an adjustable torque setting. The torque setting varies with different compression (h) of the Belleville spring.



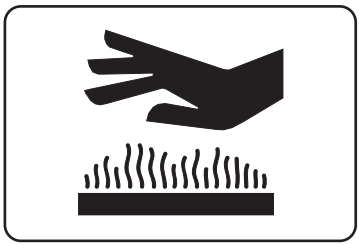
The table shows the variation possible for different spring compressions (h). In addition to the listed settings, intermediate settings may be obtained by tightening or loosening the bolts proportionately. The height of the spring is measured next to each bolt and may be ± 0.2 mm of the nominal value.
The compression of the Belleville springs used on FE friction clutches must be adjusted to compensate for wear of the friction linings and to maintain the defined torque setting.
The tables also show the amount of rotation of each bolt required to achieve the next higher or lower setting, relative to the nominal setting (listed with no rotation noted on the bolt).



	Setting Nm	h mm	
FE42	700	17.0	
	900	16.5	
FE44	1000	17.5	
	1200	17.0	
	1600	16.5	
FE46	1600	17.5	
	2000	17.0	
	2400	16.5	

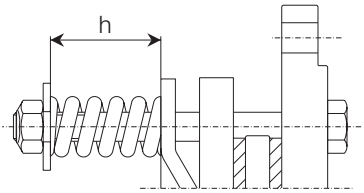
Models FE42, FE44 and FE46 are attached to the flywheel with three screws at 120° on a 240 mm diameter bolt circle.

Friction clutches may become hot.
Do not touch!
Keep the area around the friction clutch clear of any material that could catch fire, and avoid prolonged slipping that will generate excess heat and wear.



FE62 - FE82

FE62 ed FE82 friction clutches are equipped with coil springs, which adjust the slipping torque according to the application requirements by varying spring compression (h).



The table shows the torque settings possible with different spring compression (h) measured as shown in the figure above. The tables also show the amount of rotation of each bolt required to achieve the next higher or lower setting, relative to the nominal setting (listed with no rotation noted on the bolt).
Check the compression of each spring using a sliding caliper. The compression of the springs used must be adjusted to compensate for wear of the friction linings and to maintain the defined setting.

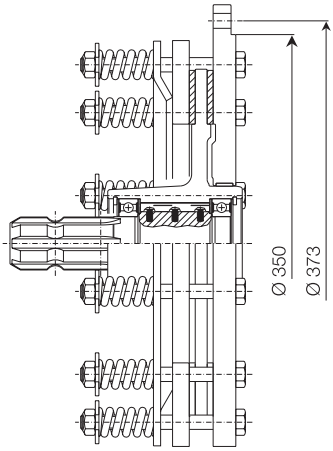
Do not over-tighten the bolts; this may endanger the function of friction torque limiters.

To avoid excessive wear to the implement, driveline, or tractor, Bondioli & Pavesi recommends that the defined setting not be changed.

Do not approach the implement before all its parts have come to a complete stop.

	Setting Nm	h mm	
FE62	1400	43.8	
	1600	42.4	
	1800	41.1	
FE82	2100	44.6	
	2300	43.8	
	2500	43.0	

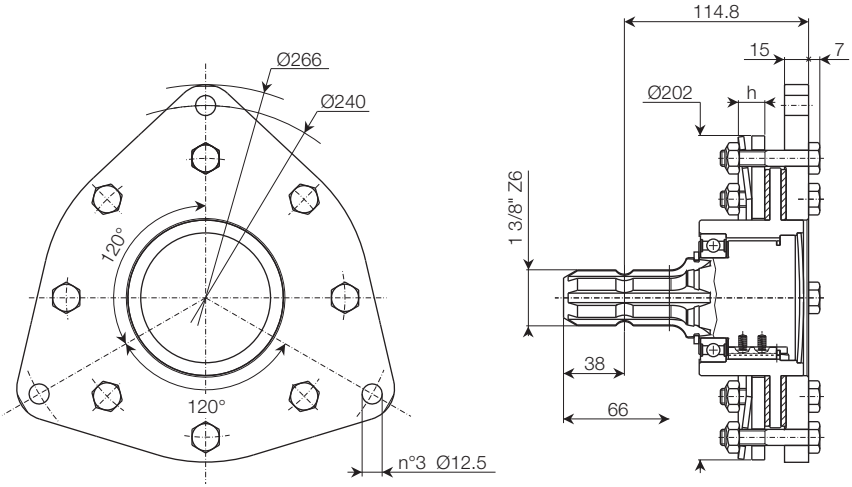
FE82



FE62 and FE82 versions are equipped with 1 3/4" Z6 PTO and are attached to the flywheel (piloted on a 350 mm diameter) with three screws at 120° on a 373 mm diameter bolt circle.

Combination friction torque limiter with overrunning clutches

FE42

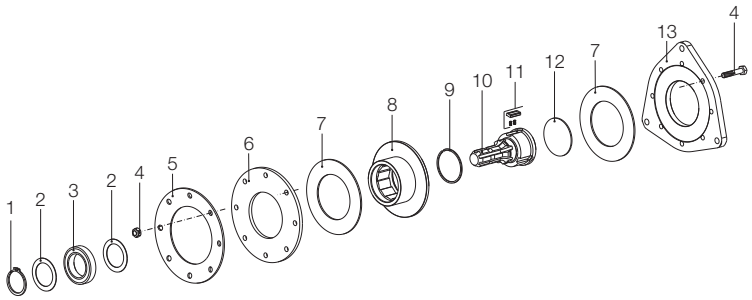


Codes as Spare Parts

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
700	668A36003M	- -	- -	- -	17.0
800	668A39003M	- -	- -	- -	
900	668A41003M	- -	- -	- -	16.5

Combination friction torque limiter with overrunning clutches

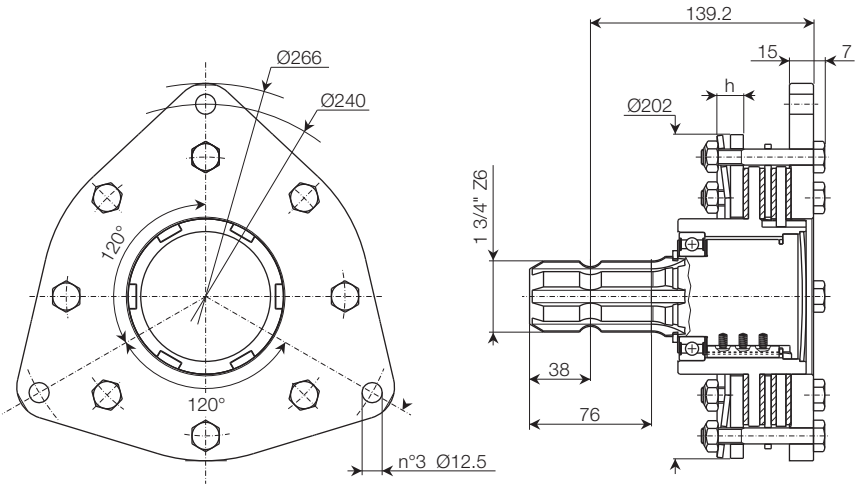
FE42



Ref.	Spare part code	Description	Technical data
1	339000050R20	Snap ring	50 x 3,0 mm
2	340050000R20	Ring	50,3 x 70,3 x 1
3	354108050R	Bearing	6010 - 2RS1
4	432000054R08	Bolt	M10 x 55 mm
5	367003870R	Belleville spring	
6	2481H0004R02	Pressure plate	Thickness = 8 mm
7	247000061R08	Friction lining	D = 160 ; d = 97 mm
8	427260106R	Overrunning clutch housing	
9	339002068R20	Snap ring	68 x 2,0 mm
10	262260306R	Splined shaft / hub	1 3/8” Z6
11	421260001R03	Pawl + springs kit	
12	240000748R05	Locking plate	
13	251007431R	Attachment flange	

Combination friction torque limiter with overrunning clutches

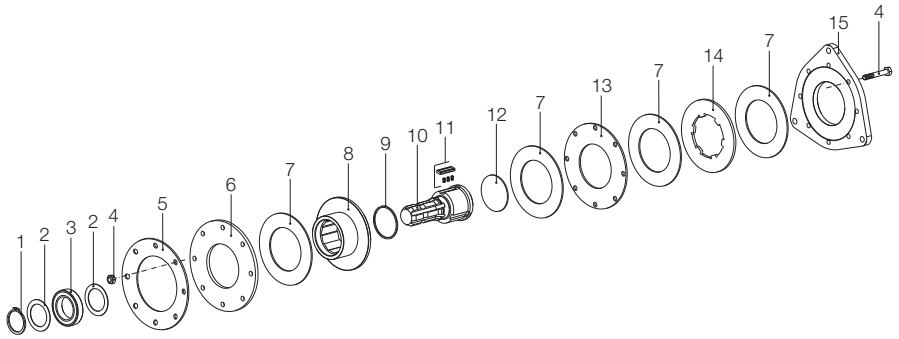
FE44



Codes as Spare Parts

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
1000	- -	- -	668C44004M	- -	17.5
1200	- -	- -	668C48004M	- -	17.0
1400	- -	- -	668C52004M	- -	
1600	- -	- -	668C56004M	- -	16.5

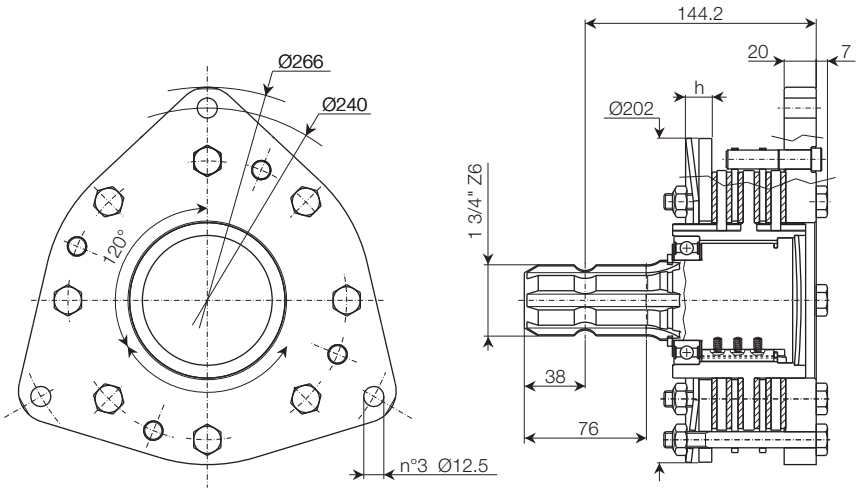
FE44



Ref.	Spare part code	Description	Technical data
1	339000050R20	Snap ring	50 x 3,0 mm
2	340050000R20	Ring	50,3 x 70,3 x 1
3	354108050R	Bearing	6010 - 2RS1
4	432000100R08	Bolt	M10 x 70 mm
5	367003870R	Belleville spring	
6	2481H0004R02	Pressure plate	Thickness = 8 mm
7	247000061R08	Friction lining	D = 160 ; d = 97 mm
8	427260107R	Overrunning clutch housing	
9	339002068R20	Snap ring	68 x 2,0 mm
10	262260412R	Splined shaft / hub	1 3/4” Z6
11	4211L0001R06	Pawl + springs kit	
12	240000748R05	Locking plate	
13	2481M0002R02	Inner plate	Thickness = 4 mm
14	2481M0001R02	Driving plate	
15	251007431R	Attachment flange	

Combination friction torque limiter with overrunning clutches

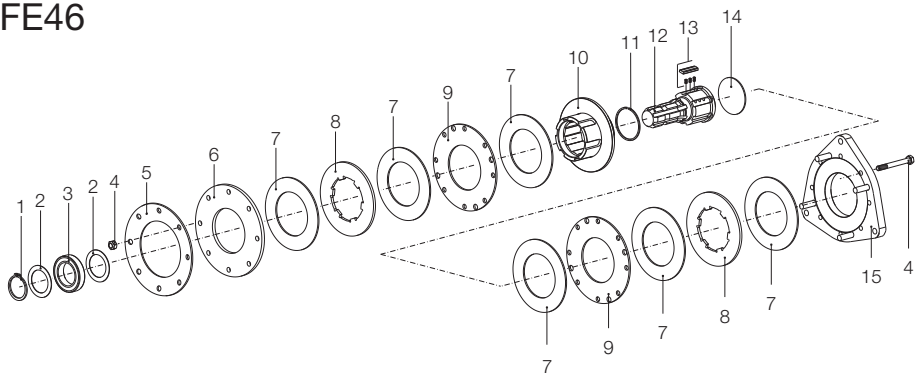
FE46



Codes as Spare Parts

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
1600	- -	- -	668E56004M	- -	17.5
1800	- -	- -	668E58004M	- -	
2000	- -	- -	668E60004M	- -	17.0
2200	- -	- -	668E62004M	- -	
2400	- -	- -	668E64004M	- -	16.5

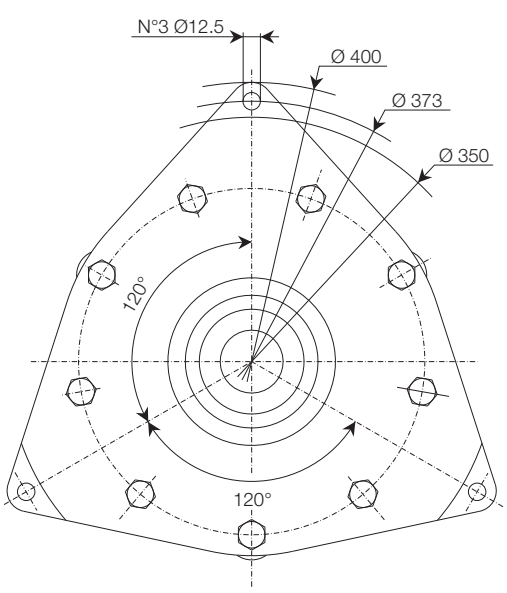
FE46

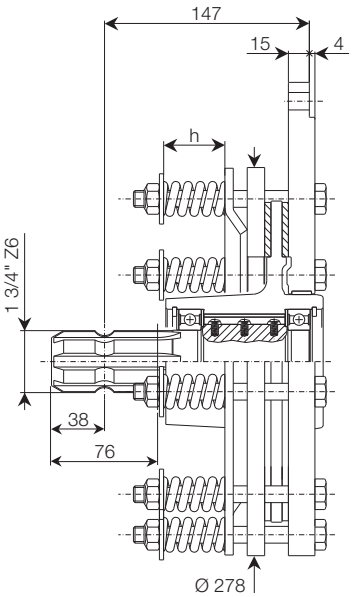


Ref.	Spare part code	Description	Technical data
1	339000050R20	Snap ring	50 x 3,0 mm
2	340050000R20	Ring	50,3 x 70,3 x 1
3	354108050R	Bearing	6010 - 2RS1
4	432000033R08	Bolt	M10 x 95 mm
5	367003870R	Belleville spring	
6	2481H0004R02	Pressure plate	Thickness = 8 mm
7	247000061R08	Friction lining	D = 160 ; d = 97 mm
8	2481M0001R02	Driving plate	
9	248260007R02	Inner plate	Thickness = 4 mm
10	427260108R	Overrunning clutch housing	
11	339002068R20	Snap ring	68 x 2,0 mm
12	262260410R	Splined shaft / hub	1 3/4” Z6
13	4211L0001R06	Pawl + springs kit	
14	240000748R05	Locking plate	
15	415730001R	Attachment flange with pins	

Combination friction torque limiter with overrunning clutches

FE62

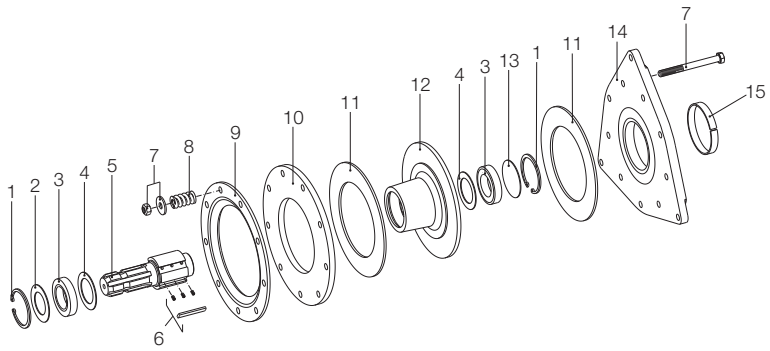




Codes as Spare Parts

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
1400	- -	- -	668652004M	- -	43.6
1600	- -	- -	668656004M	- -	42.4
1800	- -	- -	668658004M	- -	41.1

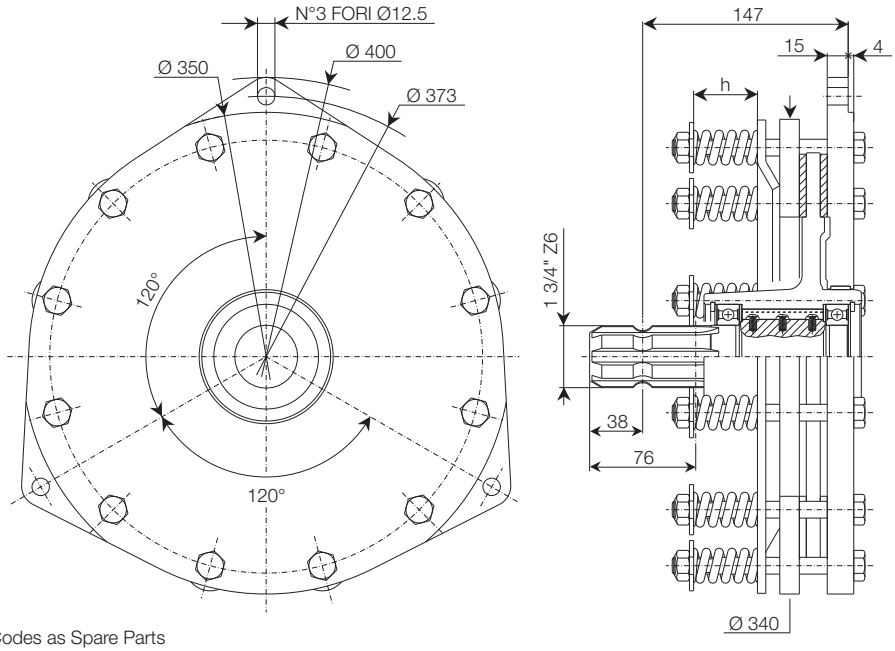
FE62



Ref.	Spare part code	Description	Technical data
1	338001075R20	Snap ring	
2	240020002R02	Locking ring	45.5 x 74.5 x 1.5
3	354110045R	Bearing	6009 2RS
4	240020003R02	Ring	50.5 x 74.5 x 1.5
5	234000403R	Splined shaft / hub	1 3/4"-Z6
6	421260002R06	Ratchet+springs kit	
7	408000074R12	Bolt+washer	M12 x 130 mm
8	351018001R12	Helical spring	
9	248000010R	Pressure plate	
10	248007401R	Pressure disc	
11	247000066R08	Friction lining	D = 228 ; d = 150 mm
12	264000108R	Overrunning clutch housing	
13	240020001R02	Locking plate	
14	251007366R	Attachment flange	
15	240000711R02	Nylon ring	

Combination friction torque limiter with overrunning clutches

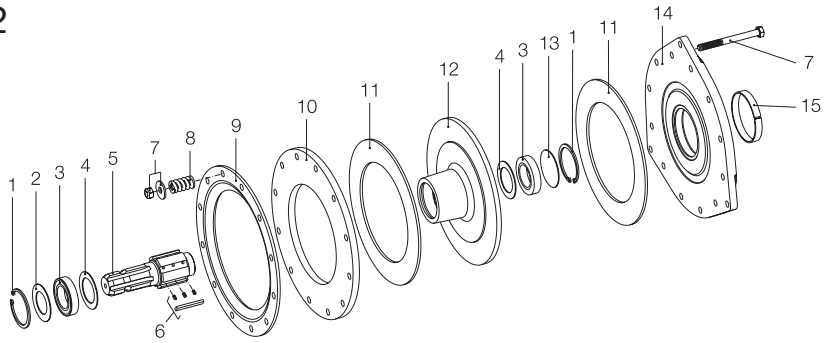
FE82



Codes as Spare Parts

Setting Nm	S = 1 3/8" Z6	1 3/8" Z21	1 3/4" Z6	1 3/4" Z20	h mm
2100	- -	- -	668861004M	- -	44.6
2300	- -	- -	668863004M	- -	43.8
2500	- -	- -	668865004M	- -	43.0

FE82



Ref.	Spare part code	Description	Technical data
1	338001075R20	Snap ring	
2	240020002R02	Locking ring	45.5 x 74.5 x 1.5
3	354110045R	Bearing	6009 2RS
4	240020003R02	Ring	50.5 x 74.5 x 1.5
5	234000404R	Splined shaft / hub	1 3/4"-Z6
6	421260002R06	Ratchet+springs kit	
7	408000074R12	Bolt+washer	M12 x 130 mm
8	351018001R12	Helical spring	
9	248990019R	Pressure plate	
10	248990020R	Pressure disc	
11	247009901R08	Friction lining	D = 290 ; d = 200 mm
12	264000107R	Overrunning clutch housing	
13	240020001R02	Locking plate	
14	251007502R	Attachment flange	
15	240000711R02	Nylon ring	

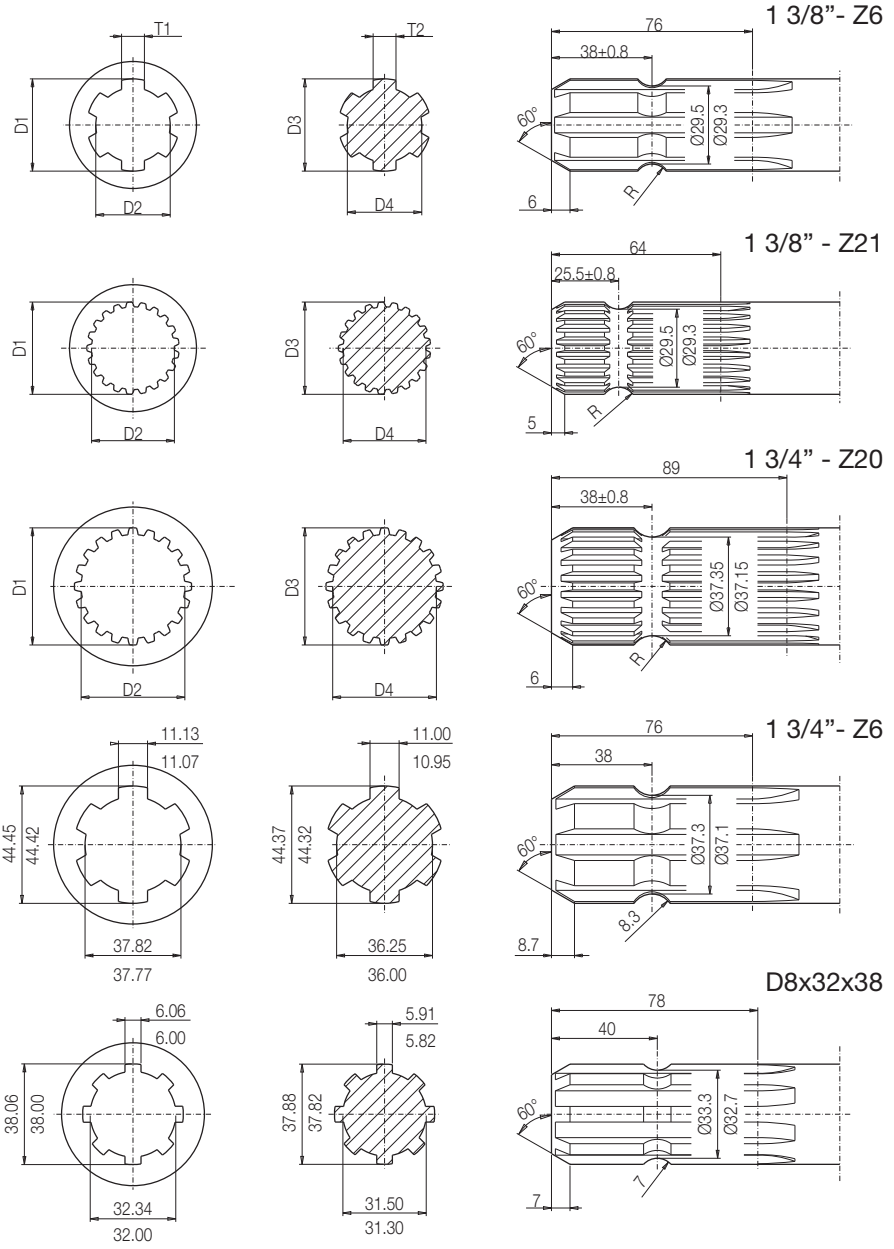
The following symbols (and corresponding definitions) are used in this manual. The pages where each of these terms is defined are shown in parenthesis.

α_1	angle of the cardan joint on the input side (3.3)
α_2	angle of the cardan joint on the output side (3.3)
β	rotation angle of driving yoke (3.1)
γ	turning angle (3.14)
ω_1	driving yoke speed (3.1)
ω_2	driven yoke speed (3.1)
A_{max}	maximum angular acceleration (3.2)
α_{eq}	equivalent joint angle (3.4 - 3.13)
n	velocity of rotation (3.2 - 5.3)
L	driveline length, measured center-to-center (3.7 - 8.1)
Lw	maximum working length of driveline, measured center-to-center (3.10 - 8.2)
Lt	maximum temporary working length for short duration maneuvers, measured center-to-center (3.11)
Ls	maximum length of the driveline when not in rotation, measured center-tocenter (3.8)
Dmin	minimum distance between the joints during working or maneuvering conditions (3.8)
Dwmax	maximum distance between the joints during working conditions (3.10)
Dtmax	maximum temporary distance between the joints during temporary maneuvering conditions (3.11)
Ds	maximum distance between the connected shafts (3.8)
T/M	ratio of thrust (T) to torque (M) of telescoping members (7.1)
P	transmitted power (5.3)
Pn	nominal power (5.9)
M	transmitted torque (5.3)
Mn	nominal torque (5.9)
Md	dynamic torque (5.7)
Mdcal	rated dynamic torque (5.4)
Mdmax	maximum dynamic torque (5.3)
Mmax	maximum torque (5.2)
Mt	torque limiter setting (15.1)
L_h	lifetime (5.4)
K_n	coefficient of velocity (5.4)
K_α	coefficient of angle (5.4 - 5.5)
K_L	coefficient of lubrication (5.4 - 5.6)
R	torsional rigidity of torsionally resilient joints GE (17.2)
$M_{20°}$	maximum torque within deflection range of torsionally resilient joints (17.2)
p	pressure on friction clutches linings (21.2)
v	slipping velocity (21.2)
p·v	pressure and velocity factor (21.2)

This chapter contains data on PTO's used on tractors (these same shaft sizes are commonly found on agricultural implements as well).
This data has been taken from the latest published standards, which are constantly being updated. Thus, this data may not be comprehensive.

Refer to ISO and ASAE standards for more detailed information. Bondioli & Pavesi is not responsible for typographical errors, omissions, or outdated information.

Power take offs (PTO's)



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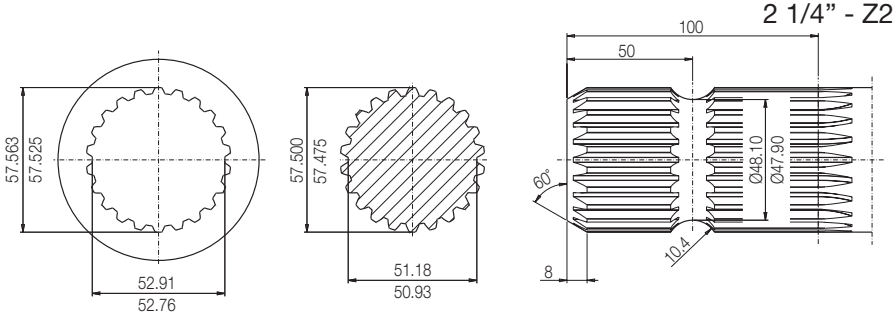
2 1/4" - Z22



1 3/8" – Z6

Standard	D1 mm	D2 mm	T1 mm	D3 mm	D4 mm	T2 mm	R mm
DIN 9611*	34.96 34.90	29.8 29.6	8.74 8.71	34.85 34.73	28.96 28.86	8.60 8.53	6.95 6.45
ISO 500 ANSI/ASABE AD500	34.95 34.90	29.80 29.65	8.76 8.69	34.87 34.75	29.00 28.90	8.64 8.51	7.05 6.55

1 3/8" – Z21

Standard	D1 mm	D2 mm		D3 mm	D4 mm		R mm
DIN 9611*	35.66 35.40	31.900 31.750		34.87 34.47	31.10		7.15 6.65
ISO 500 ANSI/ASABE AD500	34.961 34.925	31.900 31.750		34.874 34.849	31.10 30.85		7.05 6.55

1 3/4" – Z20

Standard	D1 mm	D2 mm		D3 mm	D4 mm		R mm
DIN 9611*	45.26 45.03	40.280 40.130		44.53 44.13	39.21		8.65 8.15
ISO 500 ANSI/ASABE AD500	44.488 44.450	40.350 40.200		44.425 44.400	39.21 38.96		8.65 8.15

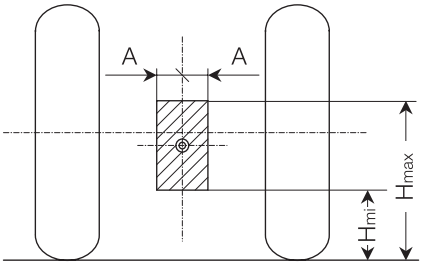
2 1/4" – Z22

Standard	D1 mm	D2 mm		D3 mm	D4 mm		R mm
ISO 500 ANSI/ASABE AD500	57.563 57.525	52.91 52.76		57.500 57.475	51.18 50.93		10.65 10.15

*DIN 9611 standard has been revoked and never replaced.

Power take offs (PTO's)

PTO Position



ISO 500: Agricultural tractors – Rear-mounted power take-off – Types 1,2,3 and 4.

PTO		H_{min}	H_{max}	A
Type		mm	mm	mm
1	1 3/8" - Z6	480[1)]	800	25
2	1 3/8" - Z21	530	900	25
3	1 3/4" - Z20	600	1000	25
4	2 1/4 / Z22	600	1000	25

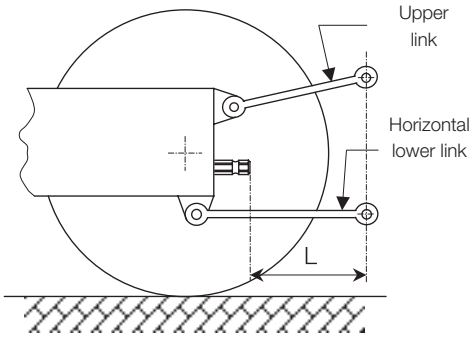
1) Can be reduced to 350 mm on tractors with minimum track equal to 1150 mm or less

ANSI/ASABE AD500: Agricultural tractors – Rear-mounted power take-off – Types 1,2 and 3.

PTO		H_{min}	H_{max}	A
Type		mm	mm	mm
1	1 3/8" - Z6	530[1)]	800	25
2	1 3/8" - Z21	530	820	25
3	1 3/4" - Z20	600	910	25

1) Can be reduced to 350 mm on tractors with minimum track equal to 1150 mm or less

Three-point Hitch Attachment
Distance between PTO and lower hitch points



ISO 730-1: Agricultural wheeler tractors – Rear mounted three-point linkage

ANSI/ASABE AD730: Agricultural wheeler tractors – Rear mounted three-point linkage

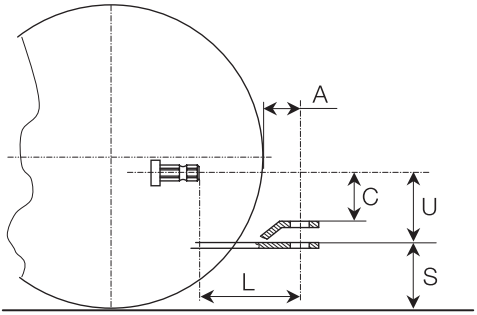
PTO class	Power kW	L[2] mm
1	up to 48	500 to 575
2	up to 92	550 to 625
3	80 to 185	575 to 675
4L[1]	150 to 350	575 to 675
4H[1]		610 to 670

[1] 4L and 4H are PTO located below and above the rear axle of tractor respectively.

[2] Sizes that apply to PTO's with a diameter equal to 35 mm. They can be increased by 100 mm for PTO's with a diameter equal to 45 mm.

Power take offs (PTO's)

Drawbar
Position of PTO with respect to implement



ISO 6489-3: Agricultural vehicles – Mechanical connections on towing vehicles.
ANSI/ASAE AD6489-3: Agricultural vehicles – Mechanical connections on towing vehicles.

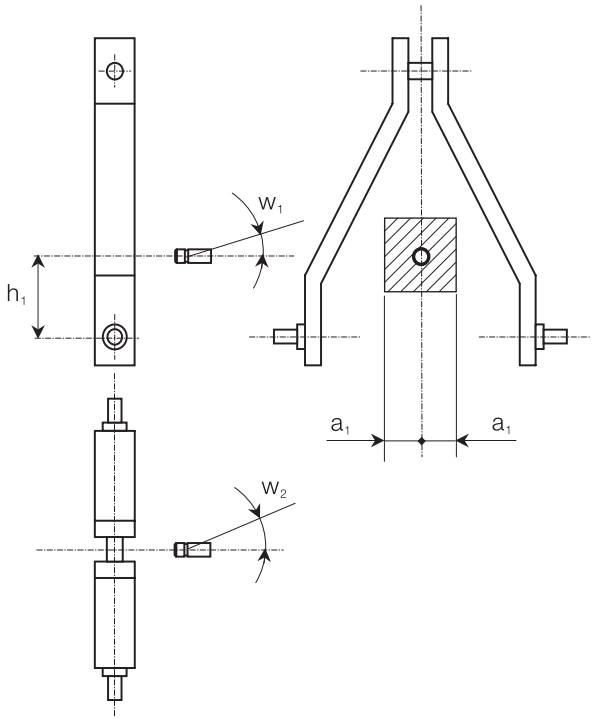
Size [mm]	Drawbar Category [1]					
	0 ≤ 28 kW*	1 ≤ 48 kW*	2 ≤ 115 kW*	3 ≤ 185 kW*	4 ≤ 300 kW*	5 ≤ 500 kW*
S	220 to 420	330 to 500	330 to 500	380 to 560	380 to 560	400 to 600
U	200	220	250	260	280	310
V	100	100	100	110	120	130

[1] In compliance with ISO 789-1.
*) PTO power at rated engine speed.

PTO Class[2]		L ± 10 mm		
		Short drawbar	Regular drawbar	Long drawbar
1	1 3/8" - Z6	250	350	500
2	1 3/8" - Z21	250	400	550
3	1 3/4" - Z20	350	500	650

[2] In compliance with ISO 730-1.

Three-point Hitch Attachment
Position of the PTO with respect to implement



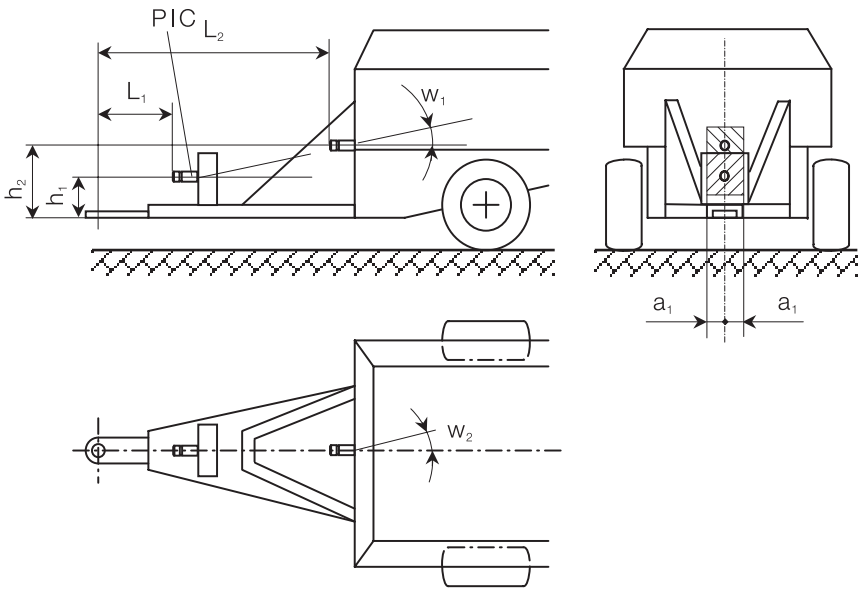
ISO/CD 5673-2: Agricultural tractors and machinery – Power take off drive shafts and power input connection

class[1)]	h_1 (mm)	a_1 (mm)	l_1 (mm)	$w_{1\ max}$ (°)	w_2 (°)
1	100 ± 30	25	180 to 300	5	0
1	100 ± 100	25	250 to 800	5	0
2	130 ± 30	25	280 to 400	5	0
2	130 ± 100	25	350 to 900	5	0
3	130 ± 100	25	300 to 900	5	0
4	150 ± 100	25	400 to 900	5	0

[1)] PTO class according to ISO 730-1.

Power take offs (PTO's)

Drawbar
Position of the PTO with respect to implement

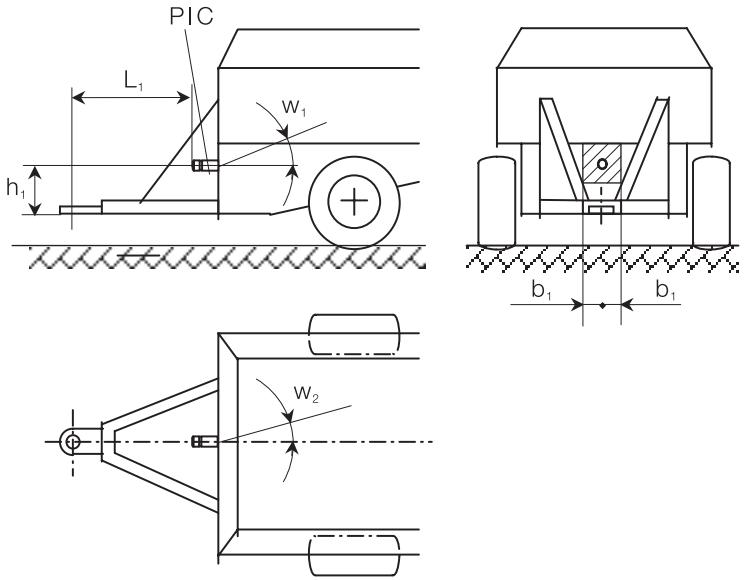


ISO/CD 5673-2: Agricultural tractors and machinery – Power take off drive shafts and power input connection

		"Equal Angle" attachment						Non- "Equal Angle" attachment					
Power requested by PTO [kW]	Cat.[1]	h_1 min (mm)	h_1 max (mm)	a_1 max (mm)	L_1±10 (mm)	w_1 (°)	w_2 (°)	h_2 min (mm)	h_2 max (mm)	a_1 max (mm)	L_2 max[2] (mm)	w_1 (°)	w_2 (°)
up to 28	0	200	250	±25	400	0	0	[2]	700	100	1000	30	5
up to 48	1	220	350	±25	400	0	0						
up to 115	2	250	350	±25	400	0	0						
up to 185	3	260	350	±25	500	0	0						
up to 275	4	280	400	±25	500	0	0						
up to 400	5	310	450	±25	500	0	0						

[1] Class according to ISO 730-1.
[2] To permit the motion of the driveline, when L_2 exceeds L_1, the distance between drawbar and input driveline increases by a minimum 5° angle in respect of L_1 and h1 positions.

Drawbar with Clevis Hook
Position of the PTO with respect to implement



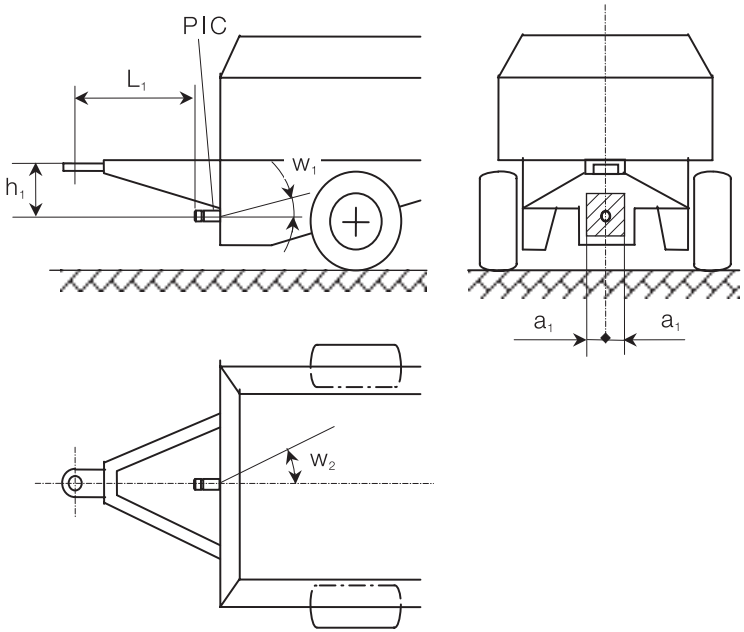
ISO/CD 5673-2: Agricultural tractors and machinery – Power take off drive shafts and power input connection.

Power requested by PTO [kW]	h_1 min (mm)	h_1 max (mm)	b_1 max (mm)	L_1 (mm)	w_1* max (°)	w_2* max (°)
≤ 92	250	700	100	700 to 1500	30	5
80 to 185	260	700	100	800 to 1500	30	5
150 to 350	280	700	100	900 to 1500	30	5

*To avoid excessive vibrations, it is suggested to use a CV joint, or, alternatively, the angle of inlet shaft can be regulated so that its alignment with the cardan shaft is maintained.

Power take offs (PTO's)

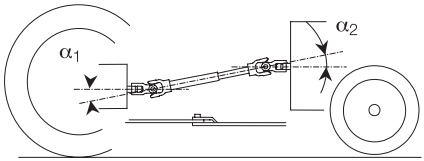
Drawbar with Clevis Hook
Position of the PTO with respect to implement

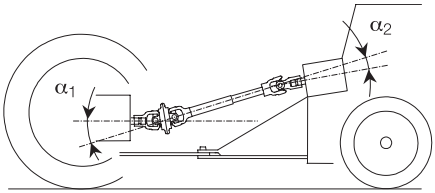


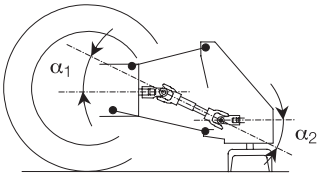
ISO/CD 5673-2: Agricultural tractors and machinery – Power take off drive shafts and power input connection.

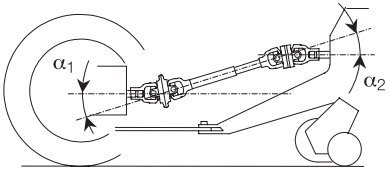
Power requested by PTO [kW]	h_1 min (mm)	h_1 max (mm)	b_1 max (mm)	L_1 (mm)	w_1* max (°)	w_2* max (°)
≤ 92	250	400	100	700 to 1500	5	5
80 to 185	260	500	100	800 to 1500	5	5
150 to 350	280	500	100	900 to 1500	5	5

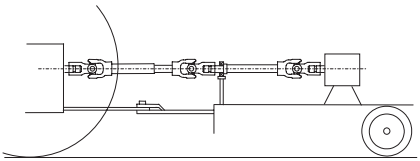
*To avoid excessive vibrations, it is suggested to use a CV joint.

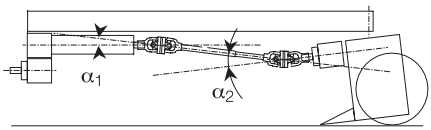

α1
α2


α1
α2

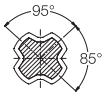

α1
α2


α1
α2

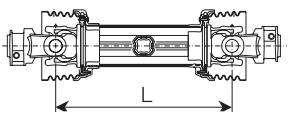



α1
α2


95°
85°


95°
85°


60°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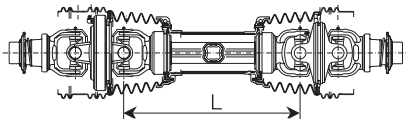
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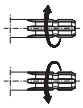

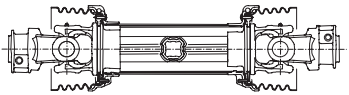

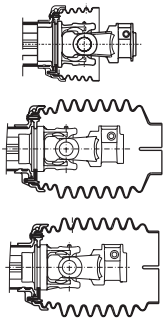

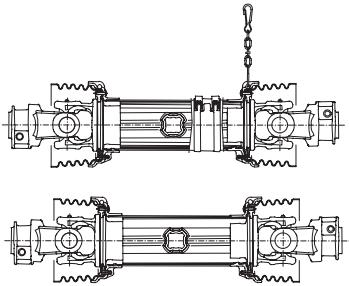

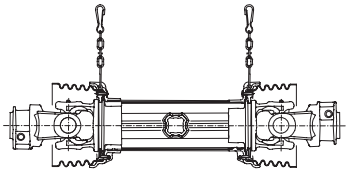

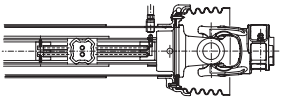

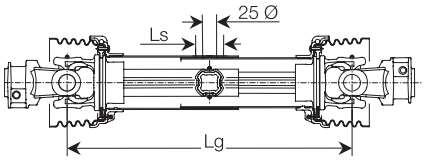
25 Ø
Ls
Lg

Units of measurement

International unit of length	m	metre
Unit of Measurement	*Symbol*	*Conversion*
millimetre	mm	1 mm = 0.001 m
centimetre	cm	1 cm = 0.01 m
inch	in or “	1 in = 0.0254 m = 25.4 mm
foot	ft	1 ft = 0.3048 m = 304.8 mm
yard	yd	1 yd = 0.9144 m

ANGLE

International unit of angle	rad	radiant
Unit of Measurement	*Symbol*	*Conversion*
degree	°	1 ° = 0.017453 rad 1 rad = 57.296 °

AREA

International unit of area	m^2	square metre
Unit of Measurement	*Symbol*	*Conversion*
square millimeter	mm^2	1 mm^2 = 0.000001 m^2
square centimeter	cm^2	1 cm^2 = 0.0001 m^2
hectar	hectar	1 hectar = 10000 m^2
acre	acre	1 acre = 4046.856 m^2

FORCE

International unit of force	N	newton
Unit of Measurement	*Symbol*	*Conversion*
kilogram	kp	1 kp = 9.81 N
gram	g	1 g = 0.001 kp
quintal	q	1 q = 100 kp
ounce	oz	1 oz = 0.2780 N 1 oz = 0.02835 kp
pound	lb	1 lb = 4.4482 N 1 lb = 0.45359 kp

Units of measurement

PRESSURE

International unit of pressure	Pa or N/m^2	Pascal
Unit of Measurement	*Symbol*	*Conversion*
atmosphere	atm	1 atm = 101325 Pa
bar	bar	1 bar = 10^5 Pa
kilogram per square millimeter	kp/mm^2	$1kp/mm^2 = 9.8066\ N/mm^2$
millimeter of mercury- mm Hg	Torr	1 Torr = 133.322 Pa

TORQUE

International unit of torque	N·m	Newton per meter
Unit of Measurement	*Symbol*	*Conversion*
inch x pound	in·lb	1 in · lb = 0.1129 N·m
foot x pound	ft·lb	1 ft · lb = 1.3563 N·m
kilogram-meter	kp·m	1 kp · m = 9.8066 N·m

SPEED

International unit of speed	m/s	meter per second
Unit of Measurement	*Symbol*	*Conversion*
kilometer per hour	km/h	1 km/h = 3.6 m/s
feet per minute	fpm	1 fpm = 0.00508 m/s

ROTATION OR ANGLE SPEED

International unit of rotation speed	ω = rad/s	radiant per second
Unit of Measurement	*Symbol*	*Conversion*
revolutions per minute	rpm or min^{-1}	$1\ min^{-1} = 2 \cdot \pi/60$ rad/s

POWER

International unit of power	W	watt
Unit of Measurement	*Symbol*	*Conversion*
kilowatt	kW	1 kW = 1000 W
cavalli-vapore	CV	1 CV = 0.7355 kW
horsepower	HP	1 HP = 0.7457 kW

BONDIOLI & PAVESI

Professionals in motion