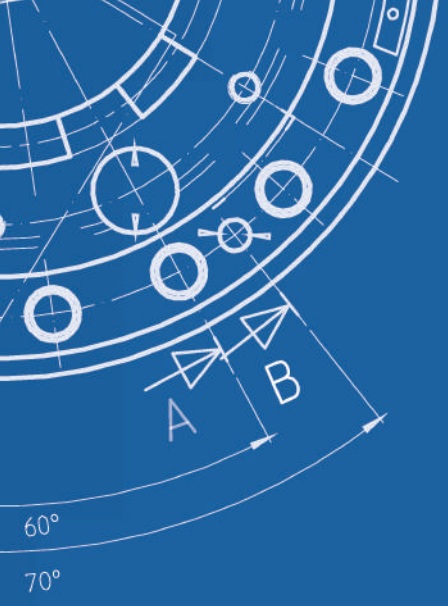
# ESCOGEAR
## S series

**EXPERTISE** DRIVEN | **CUSTOMER** FOCUSED | **SUSTAINABLE** THINKERS




## INDEX

# We connect the world

We are more than a 75 years old family-owned company specialized in designing and manufacturing high-quality custom-made power transmission products.

Because we believe each transmission challenge is different, we create much more than off-the shelf products: we work hand in hand with our customers to develop the coupling solutions that best fit their specific needs.

Superior product quality is what guarantees our customer's success, it is what enables us to cherish long term partnerships with them. The ESCO quality has been worldly renown for decades and we work tirelessly to raise these standards even further.

We strive to be a significant contributor to the development of effective and clean industrial, transportation and energy supply applications. We want our couplings to power a more sustainable world.
We strongly believe that both the future of our economy and the best guarantee for long term return lie in sustainable development. And we want to do our part.

**Once we get involved into a specific sector, we make sure to embrace the quality standards that the market requires. This is why, we are ISO 9001 certified.**

CERTIFIED ISO 9001:2015 COMPANY

# A global footprint, with a family of 9 companies located all across the world

**9** offices across the world

**3** manufacturing sites


ESCO Couplings SRL
*Saintes, Belgium*
Tel. +32 (0) 2 715 65 60
info@esco-couplings.be

ESCO Couplings & Transmissions Pvt. Ltd.
*Bengaluru, India*
Tel. +91 80 7100 1800
info@esco-couplings.co.in

ESCO Power SRL
*Saintes, Belgium*
Tel. +32 (0) 2 717 64 90
info@escopower.be

EFECO Services Pvt. LTd
*Bengaluru, India*
Tel. +91 80 4977 7088

ESCO Couplings Ltd.
*Jinan, China*
Tel. 86 (531) 827 625 65
info@esco-couplings.com

- Head-office & Manufacturing site
- Manufacturing sites
- Sales offices & Service centres


**ESCO Aandrijvingen B.V.**
*Alphen A/D Rijn, The Netherlands*
Tel. +31 (0) 172 42 33 33
info@esco-aandrijvingen.nl

**esco antriebstechnik gmbh**
*Troisdorf, Germany*
Tel. +49 (0) 2241 48 07 0
info@esco-antriebstechnik.com

**ESCO Drives SRL**
*Saintes, Belgium*
Tel. +32 (0) 2 717 64 60
sales@esco.be

**ESCO Transmissions SAS.**
*Saint Witz, France*
Tel. +33 (1) 34 31 95 95
info@esco-transmissions.fr


We work with you to design the right
solution for your application

Versatility, robustness, efficiency and long life, these are only a few of the many high demands on the gear couplings. These properties are the reason why gear couplings are that popular in multiple industries as they can get along with all different harsh conditions.

Since the competitiveness of the technical and economic aspects of the production needs to be more and more effective in the long-term, the machines used in the applications need to be able to run continuously, without failure. Furthermore, maintenance operations should be as short and seamless as possible to minimize costly production down time.

Minimizing the life cycle cost of the iinstallation requires careful attention when selecting the elements of the driveline. A high-quality coupling will make a difference between an efficient, cost effective transmission, and a poorly optimizez one.

This is where ESCO can help you. We have been helping our customers by designing high-quality tailor-made couplings for more than 40 years:

**Quality is our moto, our core competency:** ESCO products are amongst the most reliable in the market; so much so that the main hurdle in our capacity to innovate is the lack of market feedback: our couplings just keep running without issues.

**Low lifecycle cost might well be the biggest challenge for ESCO to tackle, but we do work tirelessly to optimize the life time value of our couplings:** fair initial price, smaller footprint (space and weight), longer design life, lubrification-free alternatives, extended maintenance steps...

**Service is an important part of our business:** to best serve your needs, you can count on our experienced team and advanced testing capability. We are more than happy to assist in performing field interventions, maintenance and repair.

Our relationship with customers does not stop once couplings are delivered. We have a team of experienced people ready to perform service on the field, repair, inspections, testing... We can also do the maintenance on our couplings for you. This guarantees proper execution of the maintenance instructions and contributes to improving the lifetime of your application.

**ESCO specializes in the design of custom made couplings. If you cannot find a solution that fits your needs, please contact us: we will work hard to engineer the coupling that fits your application specifications.**

# Why ESCOGEAR Spindle Coupling ?

## Improves

### New design concepts - new gear spindles

In the context of rolling mills modernization and the revamping of legacy systems, there is a significant push towards new machine design concepts, enhanced metallurgical practices, and the integration of latest advancement in automation and thorough process control. As a result, mechanical transmission components such as gear spindles have emerged as vital elements within the drive train.

### High torques across considerable misalignments

To accommodate the demands of transmitting high torques across considerable misalignments, spindle gear couplings are designed with fewer teeth compared to conventional gear couplings. They utilize high-strength alloy steels and advanced surface hardening techniques, among which nitridings. This design approach is particularly advantageous in applications such as hot and cold rolling mills, continuous casting installations, straightening presses, and rotary furnaces.

### Minimal stress on gear mesh

Each ESCO spindle coupling is meticulously tailored to meet specific application requirements. During the design phase, torque amplification factors are carefully analysed to minimize stresses on the gear mesh. The gear tooth profile is uniquely engineered to enhance load-bearing capacity for each application.

## Maximum life time and reliability

### Advanced customization and quality

Our application analysis process involves a thorough review of optimal design features and custom modifications, ensuring maximum service life and minimizing downtime. Given the high contact pressures and sliding velocities present between the teeth, our lubricants are formulated with a substantial concentration of anti-wear additives. Additionally, a specialized sealing system effectively prevents lubricant overflow and protects the grease chamber from contamination. Significant attention is dedicated to the selection of materials and heat treatment processes tailored to each application, thereby maximizing spindle life and reliability. Furthermore, ESCO employs state-of-the-art CNC manufacturing techniques to guarantee precision and uniform load distribution.

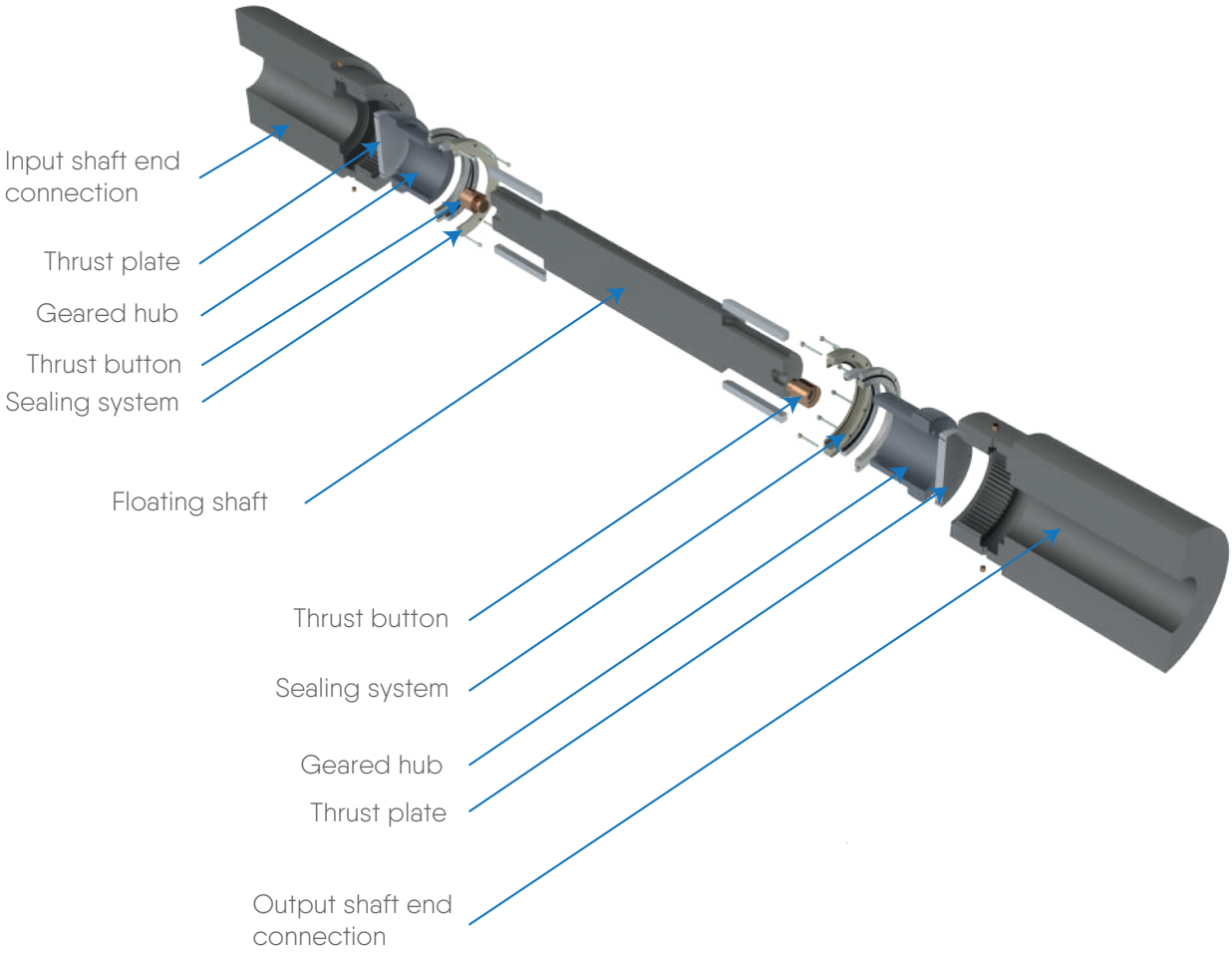
### Mechanical flexibility

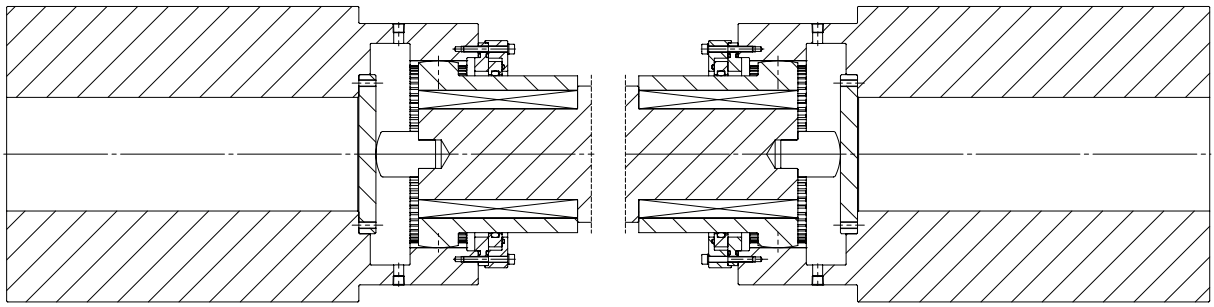
This shaft connection offers a torsionally rigid yet flexible solution in all directions, making it an ideal form-lock fixing without the need for flexible transmission elements. The mechanical flexibility of the ESCO gear spindle is derived from the innovative design of its curved teeth, which effectively compensates for axial, angular, and radial shaft misalignments. This design allows the tooth flanks to withstand full load, contributing to an exceptionally high-performance level.

### Maintenance facilitation

Operators benefit from increased availability and the ease of exchanging components, ensuring efficient maintenance and operation. Our custom-made gear coupling and spindle solutions are designed to meet the specific requirements of various hot mills, including Steckel mills, plate mills, and long product rolling mills (such as bar, wire, billet, beams, and tubes) across the globe.

# SMD


Input shaft end connection
Thrust plate
Geared hub
Thrust button
Sealing system
Floating shaft
Thrust button
Sealing system
Geared hub
Thrust plate
Output shaft end connection



## Esco Multicrown tooth form design: Technical features

### Lower stresses

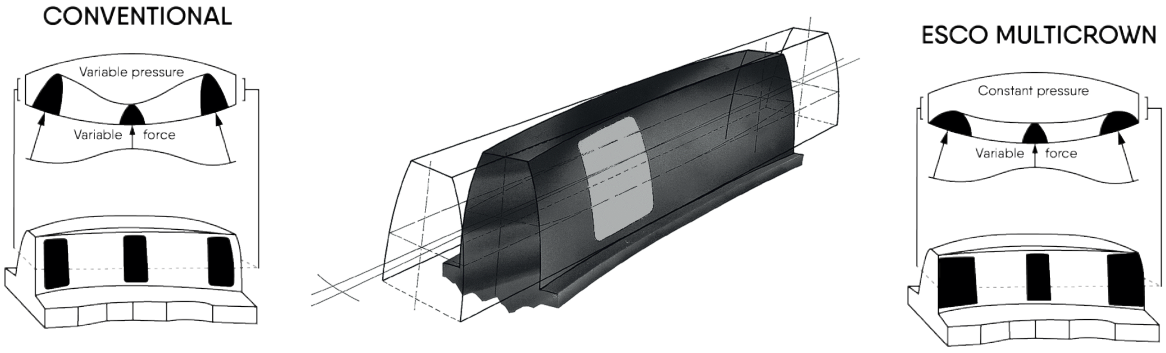
In applications where spindle couplings operate under load at specified misalignment angles, we engineer specialized ESCO Multicrown tooth forms. The ESCO Multicrown tooth form is a curve with constantly changing radii of curvature. The tooth contact area under misaligned conditions has a much larger radius of curvature than conventional crowning for optimal performance. The contact area therefore is larger thus reducing the surface stresses. Furthermore, under no-load conditions, the design of the tooth ends is optimized to prevent edge loading and ensure proper tangential contact.

### Constant velocity power transmission

ESCO generates the ESCO Multicrown tooth in such a way that the necessary characteristics for homokinetic conjugate tooth action are perfectly achived.

### Less backlash

The ESCO Multicrown tooth design requires less backlash for a given angle of misalignment than the converntional crowning, thus reducing shocks in reversing application.

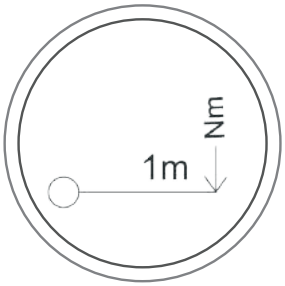



## ESCOGEAR spindle coupling material

ESCO utilizes a carefully selected combination of steel and heat treatment in the production of gear spindle components, tailored to the stress levels and desired operating life. The optimal heat treatment for coupling gear teeth ensures the right balance between core hardness and case depth, providing the necessary hardness for effective performance.

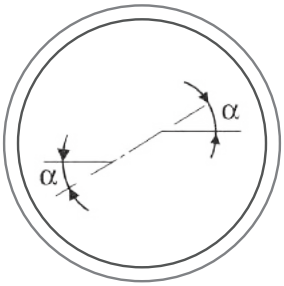
There are several heat treatment methods available for case hardening gear tooth components, including nitriding. We typically utilize heat-treated, nitrided, high-strength alloy steel materials.

# Advantages



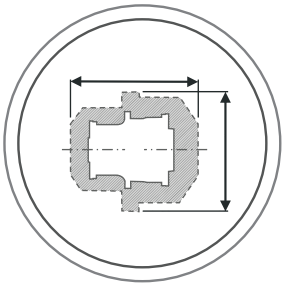

## High torque transmission

Capable of transmitting significant torque, ensuring optimal performance in demanding applications.



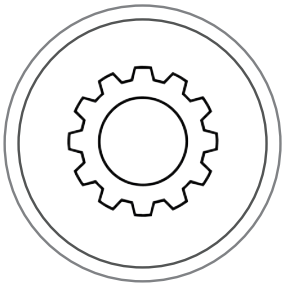

## Large angular misalignment

Supports misalignment values of ± 3 degrees, specifically applicable for gear spindle configurations.



## Compact design

Features a space-saving design that facilitates integration into various machinery layouts without compromising functionality.



## Hardened toothing

Incorporates hardened toothing for enhanced durability and resistance to wear.

## Flexible lubrification options

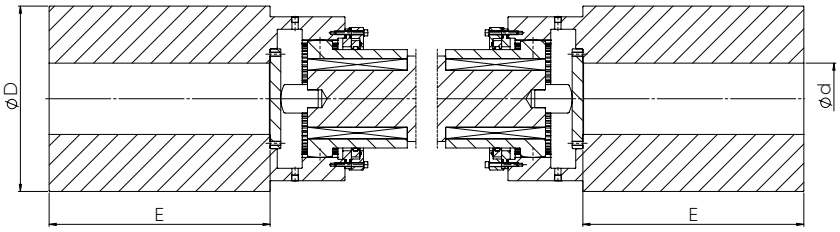
Offers the choice of grease or oil lubrication for gear spindles, allowing for tailored maintenance strategies to suit operational requirements.

## Durability

Engineered for longevity, these couplings withstand harsh conditions, contributing to reduced maintenance needs and extended service life.

## Custom Solutions

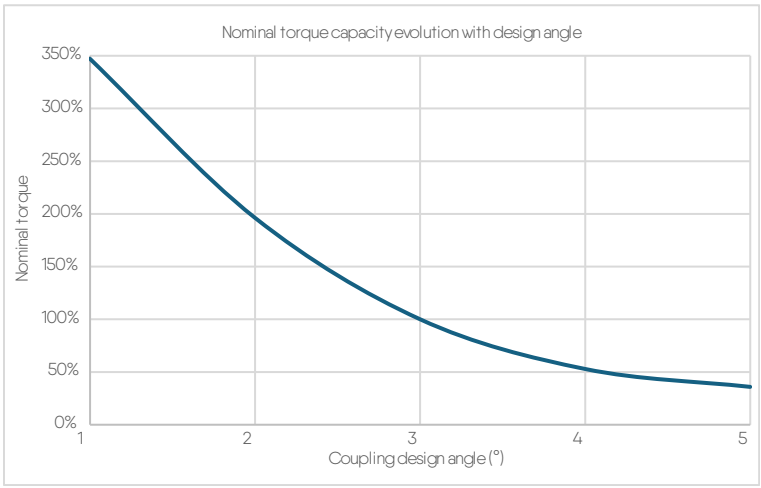
Offers additional customized solutions to meet specific application needs.




S series couplings gears are designed for optimal performance and will be tailor made for your application characteristics. The following table can be used to narrow down selection for a working angle value of 3° to a few sizes based on shaft diameter and torque to transmit.

| size | torque SMD nominal Tn | Ød max. (1) | ØD | E |
|---|---|---|---|---|
| SMD | kNm | dimensions mm | | |
| 62 | 0.5 | 48 | 62 | 40 |
| 68 | 0.6 | 53 | 68 | 45 |
| 86 | 1.2 | 69 | 86 | 60 |
| 102 | 2.0 | 84 | 102 | 90 |
| 110 | 2.5 | 90 | 110 | 100 |
| 120 | 3.3 | 98 | 120 | 110 |
| 136 | 4.7 | 111 | 136 | 120 |
| 152 | 6.5 | 127 | 152 | 135 |
| 175 | 10 | 146 | 175 | 145 |
| 178 | 10.5 | 149 | 178 | 165 |
| 185 | 11.5 | 154 | 185 | 175 |
| 195 | 13.5 | 162 | 195 | 190 |
| 200 | 14.5 | 167 | 200 | 205 |
| 225 | 20.5 | 190 | 225 | 210 |
| 245 | 26.5 | 207 | 245 | 230 |
| 250 | 28 | 212 | 250 | 240 |
| 265 | 33 | 226 | 265 | 255 |
| 272 | 36 | 230 | 272 | 260 |
| 280 | 39 | 235 | 280 | 275 |
| 300 | 48 | 257 | 300 | 290 |
| 325 | 60 | 278 | 325 | 310 |
| 335 | 66 | 287 | 335 | 290 |
| 380 | 95 | 325 | 380 | 310 |
| 395 | 106.5 | 337 | 395 | 340 |
| 450 | 156 | 385 | 450 | 400 |
| 457 | 163 | 392 | 457 | 410 |
| 475 | 182 | 410 | 475 | 420 |

(1) Max. bore diameter with one keyway acc. DIN 6885/1




The curve indicates the gain/loss in gear torque capacity relative to 3° misalignment capacity.

- Coupling can be supplied with several options and features, see pages 16-20 of this catalogue. Please contact us for further details.
- For the correct coupling selection, please contact us.
- Technical modifications reserved and given values without engagement.

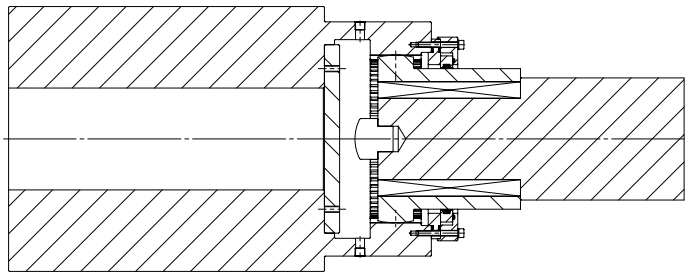
## Notes:

# Features & possible combinations of S coupling

## Buttons - Floating mass movement limitations

The feature enables coupling to accommodate axial movement on both sides or on a single side, depending on the customer's requirements.
The space between the hub plate and the button facilitates both angular and axial movement.

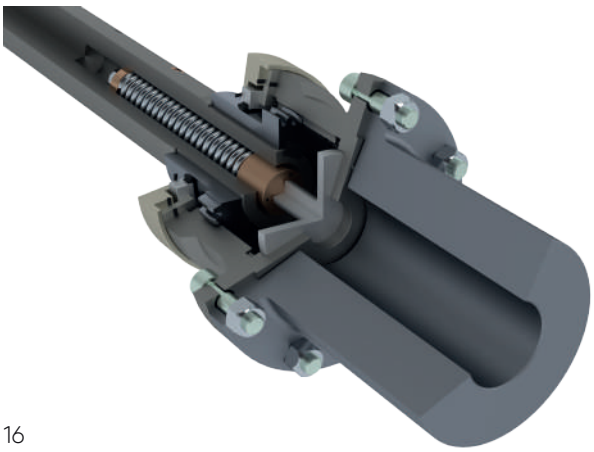
- Custom made on single or both side
- Keep in check floating mass
- Controlled angular & axial movement

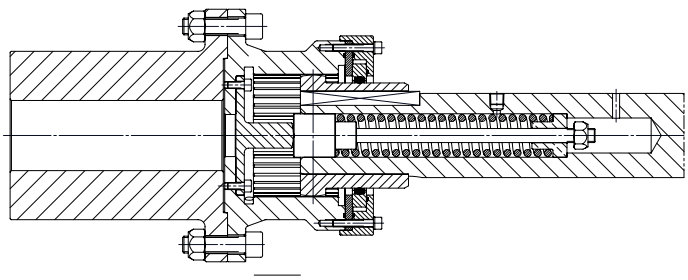


## Spring - Constant axial force

A significant issue arises with drooping roll sleeves when the spindle support is positioned beneath the shaft, leading to roll entry problems. This can be effectively addressed by implementing a spring-loaded sleeve aligning device. This device keeps the roll sleeve aligned with the spindle shaft when the roll is removed, ensuring it remains properly positioned for the re-entry of a new roll.
Continuous axial movement is maintained through a spring mechanism that ensures consistent contact between the buttons, allowing for proper angular movement and uniform distribution of additional stress.

- Consistent contact & continuous movement
- Keep sleeve aligned in position (for example for roll change operation)
- Angular movement facilitation & uniform stress distribution

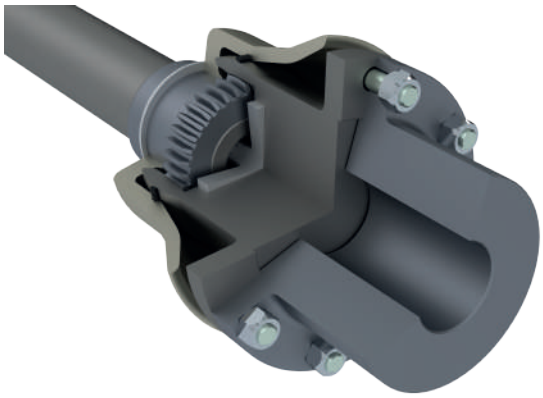


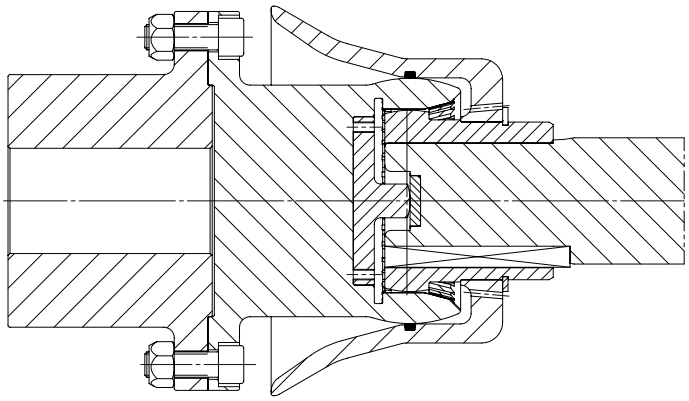


## Tulip- easy engagement / disengagement

In terms of maintenance, the Esco Spindle coupling tulip design allows for quick disconnection or connection of either side of the spindle coupling simply by sliding, eliminating the need to remove any components. This design also ensures proper lubrication sealing simultaneously, enhancing overall efficiency and ease of use.

- Simple and fast engagement/disengagement through axial sliding
- Reduced maintenance duration
- Efficient lubricant sealing at high misalignments

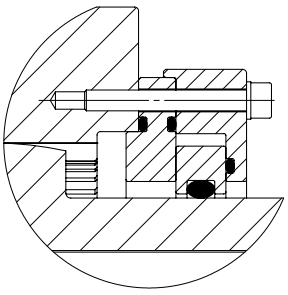


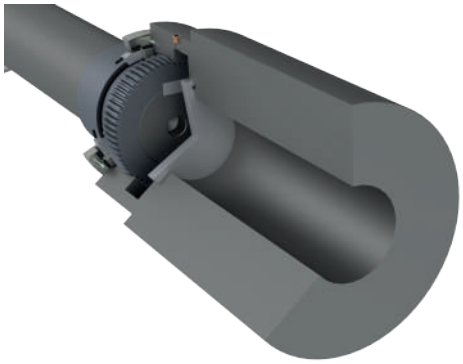


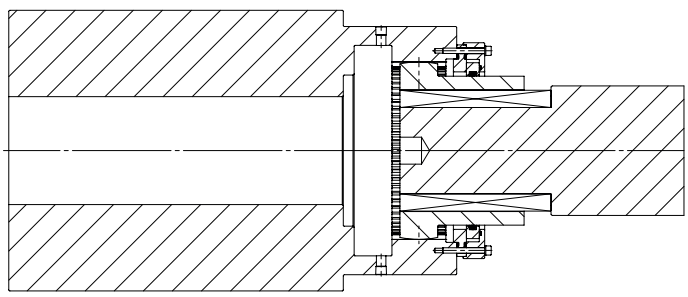
## Drawer – For continuous sealing at high misalignment

The drawer sealing arrangement is designed to ensure complete grease retention, effectively preventing leakage even under the most challenging working conditions.

- Continuous and resilient sealing,
- Taylor made for high misalignment
- Designed for challenging working conditions



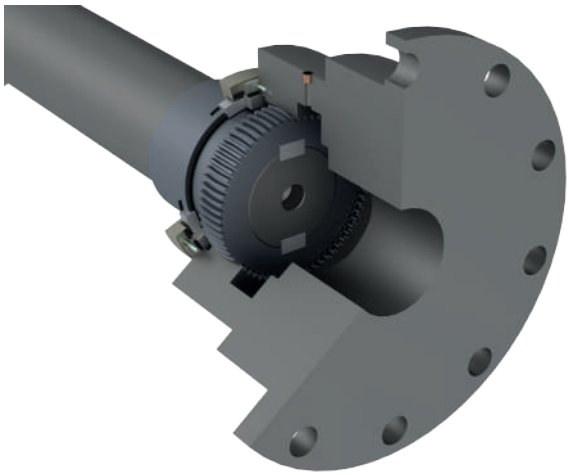


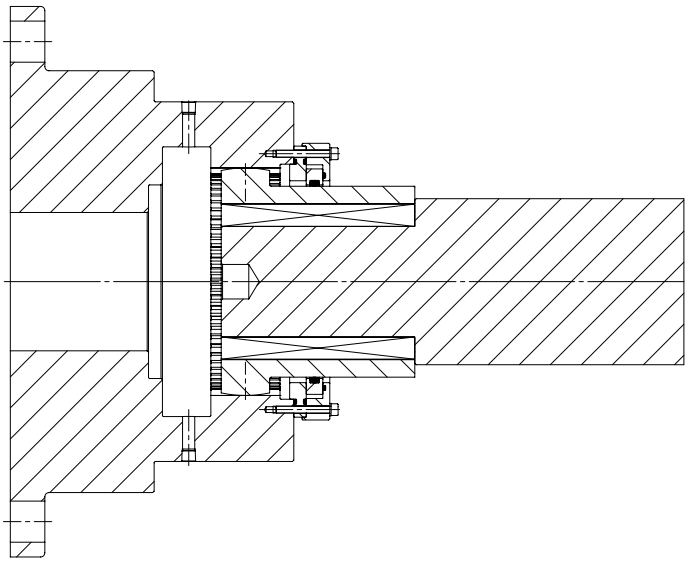


## Flange - Connections

The ESCO spindle coupling offers flexibility for users by accommodating various mounting setups based on shaft design and connection type. One example of this versatility is the flange type configuration.

- Custom made coupling/shaft connection

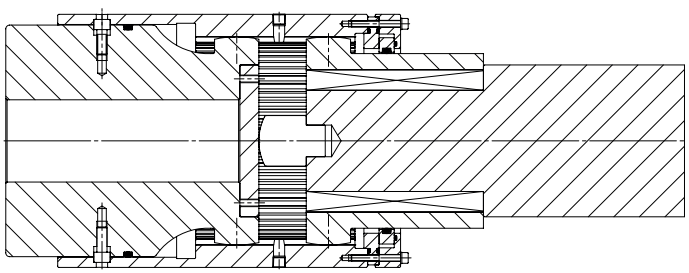




## Set Screw – Quick disconnect

The quick connect/disconnect feature of the ESCO spindle coupling enables users to rapidly mount and dismount the center shaft assembly using set screws, standard screws, or specialized locking pins, facilitating efficient operation and maintenance.

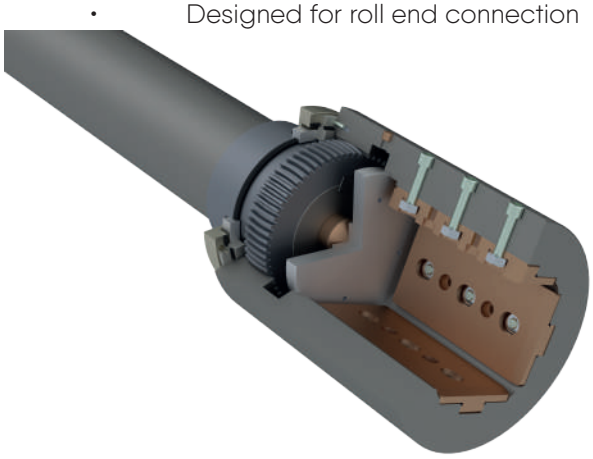
- Simple and quick connection/disconnection
- Versatile and taylor made connectors (set screws, standard screws, lockpins, ...)
- Reduced maintenance duration

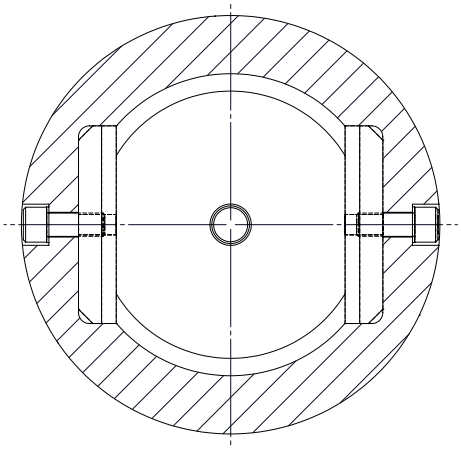


## Flat end – shafts connection

Numerous options are available for roll end connections. The simplest method, designed for base spindles, features a shaped bore in the spindle sleeve that matches the configuration of the roll end, providing minimal clearance for easy roll removal and re-entry.
A more advantageous connection employs flat, round, or piloting ring inserts, which are replaceable to address inevitable wear over time. These keys and piloting rings are constructed from heat-treated alloy steel to ensure maximum durability. The flat journal profile incorporates inserted, hardened, and ground steel jaws, offering high wear resistance even under angular vibrations or thrusts that could otherwise damage the coupling sleeve during roller changes. Additionally, the steel jaws are easy to replace if needed, allowing for cost-effective inventory management.

- Long lasting shaft connection through wear pieces easily replaced
- Taylor made shaft connectors (hardened for wear resistance or designed to wear in place of shaft & coupling)
- Designed for roll end connection

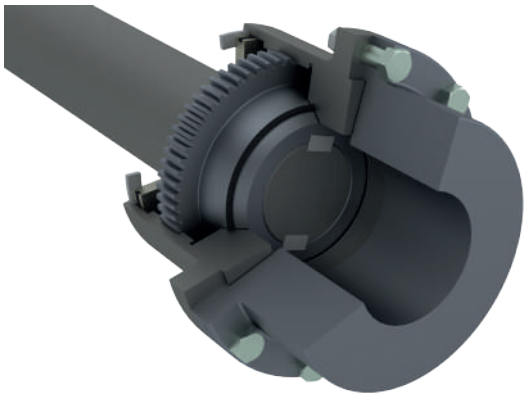


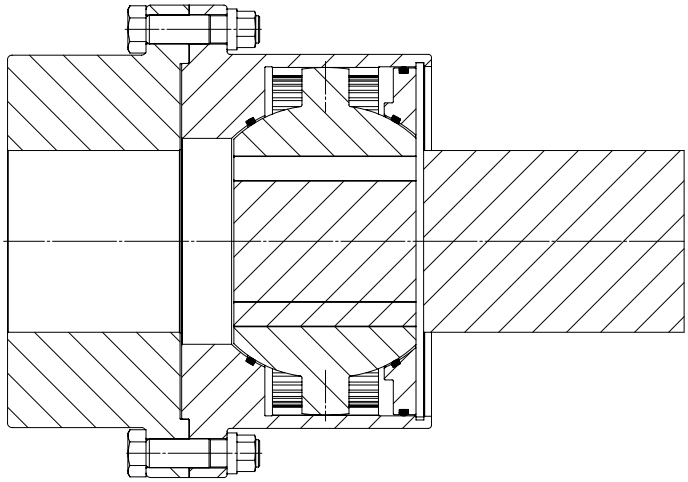


## Ball type – Axial locked

Ball type design is a space savvy solution that will make up for axial misalignment accommodation and complete grease retention all at once. Either done on both sides or on a single side, as well as spring loaded depending on the customer requirements) Only in case of customer clarification request/questions

- Space savvy solution for axial misalignment accommodation
- Efficient grease retention at high misalignments
- Featured on both sides or one side at customer request (possibility to be spring loaded too)

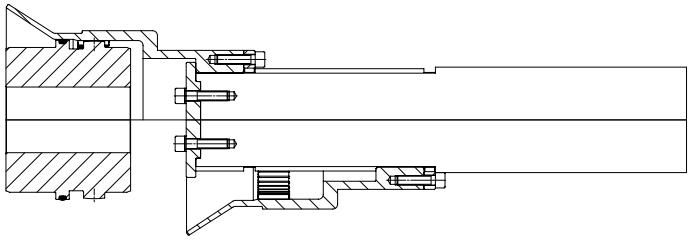




## Telescopic – DBSE configuration change

This option is adapted for peculiar installation requiring change between two fixed DBSE with quick installation/de-coupling.

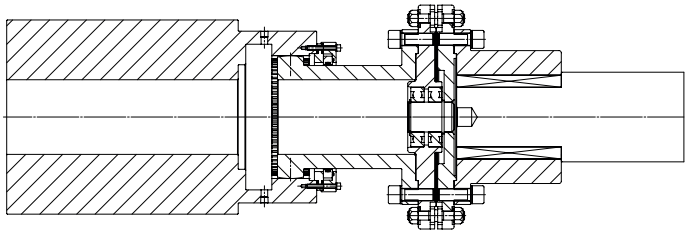
- Taylor made solution for specific machinery with different DBSE configurations on same axle



## Shear pin – Overload

Shear pin overload design ensures a torque overload protection to drivetrain components while being easy to change and storage in advance. It will though be less visible in case of breakage as a spacer overload option and will be more adapted to “short” DBSEs with radial space available.

- Taylor made overload torque for drivetrain components protection
- Space savvy solution convenient for short DBSE applications
- Quick repair in case of breakage due to sudden and/or maintained overload torque



## Notes:

# ESCO worldwide

ESCO Couplings SRL
Avenue Ernest Solvay, 48
B - 1480 Saintes
Belgium
Tel + 32 (0) 2 715 65 60
Fax + 32 (0) 2 720 83 62
e-mail: info@esco-couplings.be
website: www.escogroup.com

ESCO Couplings & Transmissions Pvt. Ltd.
Plot No. 69-D
Bengaluru Aerospace Park
Unachuru Village Jala Hobli
Bengaluru
India
Tel +91 80 7100 1800
e-mail: info@esco-couplings.co.in
website: www.escogroup.com

## Local Contact

Authorised distributor

TYMA CZ, s.r.o.
Na Pískách 731/12
CZ - 40004 Trmice, Czech Republic

Phone: +420 475 655 010
Email: info@tyma.cz
www.tyma.cz

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