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RINGFEDER

Steel Disc Couplings

RINGFEDER® TND

EN 05.2022 | **Product Paper & Tech Paper**

Welcome


Machine Building


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RINGFEDER
POWER TRANSMISSION

Your system supplier for every aspect of power transmission

We say what we mean and mean what we say.

We see things from our customers‘ perspective.

We are considerate of our employees and their families as well as of our environment and society.

RINGFEDER POWER TRANSMISSION is the global market leader in the niche markets of drive technology and is well regarded for its customer-specific, application-oriented solutions that ensure excellent and failure-free operation for its clients. We offer locking devices, damping technology and couplings for OEMs but also for the final customer under our strong brand name RINGFEDER®.

We do not only provide competent advice to our customers on the basis of our 90 years of experience but also develop innovative ideas in cooperation with them. This is part of our aspiration to be a **Partner for Performance**.

Around the power transmission we promise

- Excellent know-how for our challenging customers
- Best cost-benefit ratio
- Short reaction times and a high product availability


Know-how
Over 90 years of expertise.
Your expert partner
From development to the finished product.
Online calculation program
Always find the right solution.
On-site worldwide
We are there for you. Anytime, anywhere.
Customer
Value

RINGFEDER
POWER TRANSMISSION

Your projects are our drive

Know-how: Over 90 years of expertise.

Rely on decades of engineering expertise from the inventor of the friction spring. As an expert in drive and damping technology, we are your reliable partner wherever forces are at work. Be it the permanent transfer of very high torques due to non-positive or positive connections or the absorption and trapping of extreme energies to protect expensive constructions.

Your expert partner:
From development to the finished product.

We accompany you through to the successful completion of your project. Beginning with the development phase of your project, we offer our know-how and professional solutions. By working together with global market leaders and as an international supplier of outstanding products and special solutions, we are a reliable partner for you.

Online calculation program:
Always find the right solution.

In response to the complex requirements involved in the correct selection and design of the required products under practical conditions, we have developed our online calculation program. Engineers and experts are able to calculate transferable torques and other important values, taking into account various parameters. Visit our website **www.ringfeder.com!**

On-site worldwide:
We are there for you. Anytime, anywhere.

With our locations in Germany, the Czech Republic, the USA, Brazil, China and India as well as a worldwide service and partner network, we are there for you around the clock. This ensures our support for the successful completion of your projects at any time.

Steel Disc Couplings
RINGFEDER® TND

Torsionally rigid, absolutely backlash-free **RINGFEDER® TND** Steel Disc Couplings are suitable for the most diverse applications and particularly ideal for all drive tasks requiring freedom from wear and maintenance as well as excellent misalignment compensation and positioning accuracy. The core component of these powerful couplings are disc packs developed on the basis of in-depth FEM analysis. They consist of multiple circular, torsionally flexible single discs made of stainless spring steel which are connected by means of high-precision sleeves to form a compact unit. High-strength fitting screws alternately connect the disc packs, if necessary via mounted spacers, with the input-side and output-side coupling hub, so that the required torque is transmitted reliably, precisely and safely by the steel discs which are loaded by tension and compression. The high-precision sleeves with their specifically produced relief grooves decisively contribute to minimizing load peaks that mainly affect the outer discs when shaft misalignments occur.

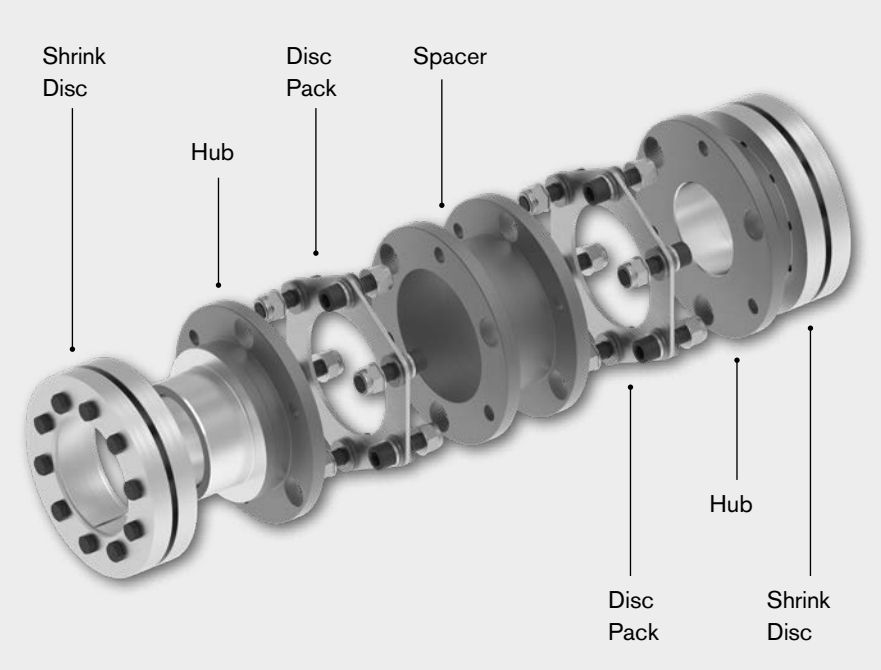
Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) for increased compensation capability at occuring shaft misalignments, and the type HT (High Torque) with larger power density for higher requirements on transmissible torque. Thanks to the unitized design of this series and the extensive, highly flexible modular system, including various hub types, mounting options as well as spacer variants and lengths, there is always one coupling version available that is optimally suited for the individual application of our users. Moreover, customized special solutions can also be realized at short delivery times in specific case of need.

TND Type	TND HSH	TND HDH	TND XSX	TND XDX	TND HDV	TND VDV	TND OCO	TND QCQ
Available Sizes	11		7		9		4	2
Transmissible Torque								
HD disc pack	170-130,000 Nm		750-36,000 Nm		170-36,000 Nm		170-1,350 Nm	750-1,350 Nm
HT disc pack	230-44,000 Nm		1,050-44,000 Nm		230-44,000 Nm		230-1,750 Nm	1,050-1,750 Nm
Compensation of Shaft Misalignment								
Angular	●		●		●		●	
Axial	●		●		●		●	
Radial		●		●	●		●	
Hub Type								
Standard hubs with keyway	●				◐		●	
Inverted hubs with keyway					◐	●		
Hubs with shrink discs			●					●
Spacer Variant								
Without	●		●					
Compact							●	
Standard lengths		●		●	●			
Custom lengths up to 3 meters		●		●	●			

● Yes ◐ Partly

Disc packs of the HT type are not equally available for all coupling sizes.

One Coupling Series, Numerous Advantages



Zero Backlash
RINGFEDER® Steel Disc Couplings transmit the required torque in both directions with zero backlash – an indispensable precondition for their use in machines and plants with synchronous operation, frequent starts and stops or reversing operation. They are also the perfect choice for applications requiring the highest positioning accuracies and for variable-speed drives.

Torsional Stiffness
The premium-quality all-steel construction and the optimal design of the disc packs, made of corrosion-resistant spring steel, ensure an outstanding torsional stiffness. This makes RINGFEDER® Steel Disc Couplings particularly designated for use in drive lines running at very high speeds and accelerations.

Misalignment Compensation
The FEM-optimized high-strength steel disc packs as well as their reliable attachment to the coupling hubs and possible spacers not only ensure extremely precise torque transmission by means of a combination of frictional and positive locking. They also effectively compensate for angular, axial, and, depending on the coupling type, radial shaft misalignment with minimum restoring forces.

Running Accuracy
First-class material quality combined with advanced machining processes at very tight production tolerances and a compact design, ensure the highest concentricity accuracies resulting in a particularly smooth and quiet running behavior at low vibration levels – even in drive applications involving enormous rotational speeds or irregular rotational forces.

Freedom from Wear and Maintenance
Provided that the stated selection and operation criteria are adhered to, RINGFEDER® Steel Disc Couplings are not subject to wear and do not require cleaning or lubrication. When properly installed, they are expected to have a virtually infinite service life. Their superior operational reliability precludes cost-intensive repairs and plant downtimes.

Temperature Resistance
Thanks to their all-steel construction and the resulting resilience, RINGFEDER® Steel Disc Couplings impress with maximum performance and reliability, even under extreme thermal loads. They can be installed in temperatures ranging from -20 °C to 240 °C and are, therefore, also suitable for use in high-temperature pump systems.

Maximum Safety in Explosion-Endangered Areas

RINGFEDER® Steel Disc Couplings can of course be supplied in compliance with ATEX according to Product Directive 2014/34/EU and DIN EN ISO 80079-36:2016 if required.

Coupling Configuration

From the outset, the RINGFEDER® TND series has been designed as a highly flexible modular system so that customers will always benefit from a coupling solution that is optimally suited to their specific application requirements. Customized special designs made-to-order which go beyond the individualization and selection options of the standard coupling types offered can thus be realized efficiently upon request. Generally, every coupling type is composed of an input-side and output-side coupling hub as well as a connecting element that is either embodied by a single disc pack or by a spacer with two disc packs attached on both sides. The modular design principle and the resulting combination possibilities are also reflected in the denomination of the different coupling types: The three-letter name of a specific coupling type is derived from the respective manifestation of both the hubs and the connecting elements.

Coupling Hubs

RINGFEDER® Steel Disc Couplings comprise an input-side and output-side coupling hub of various construction types. Depending on the type, the hubs are mounted onto the shafts by either using keyways or RINGFEDER® Shrink Discs. The conventionally and thus typically used hub type is the standard hub designated by the letter H. If the hub diameter is reduced such that the hub is inverted when mounted and is hence hidden in the spacer, this hub type is designated with the letter V. The shaft-hub connection is established by a keyway for both H-Hubs and V-Hubs..

As shafts with very smooth surfaces are increasingly being used in today's compact gear units, a higher contact pressure of the hub onto the shaft is required to ensure safe and reliable torque transmission by frictional locking. To this end, the back side of the H-Hubs is specifically prepared by suitable machining to be equipped with high-quality RINGFEDER® Shrink Discs. The resulting hub type is designated with the letter X. The specific assignment of three-part shrink discs of the RfN 4061 series to the individual coupling sizes allows for quick and easy selection of a suitable shrink disc.

In the case of couplings with a short length and a compact-spacer, two disc packs are fastened to the spacer by means of longer fitting screws that pass through the spacer. For geometrical reasons, this special kind of screw connection necessitates an opening of the hub flanges. Depending on the type of the shaft-hub connection, these hubs are either designated with the letter O (connection by keyway) or with the letter Q (connection by RINGFEDER® Shrink Disc).

Hub H
Standard Hub

Hub V
Inverted Hub

Hub O
Standard Hub with Open Flange

Hub X
Hub with Shrink Disc

Hub Q
Hub with Open Flange and Shrink Disc

Connecting Elements

Depending on the coupling type, either a single disc pack or spacers of different variants with two disc packs screwed to them on both sides serve as connecting elements between the hubs. Single disc packs are designated with the letter S. Spacers with the double number of disc packs are designated with the letters D or C respectively.

Coupling types with a single disc pack have single-jointed designs and are only capable of compensating angular and axial shaft misalignments between the connected aggregates, whereas double-jointed designs with two disc packs can also accommodate radial misalignments. Spacers with the designation D are available in various standard lengths as well as customized special lengths of up to 3 meters which allow for the adaptation to prevailing site conditions and provide for the ability to bridge even very long shaft distances. The designation D describes a particularly short, compact-spacer that can be mounted and dismounted radially.

In coupling types equipped with either a spacer D or C, one disc pack each is alternately connected to the spacer and one coupling hub, thus achieving the function of a double-cardanic system.

Disc Packs

The FEM-optimized disc packs are the characteristic and functional key element of the RINGFEDER® Steel Disc Couplings. The packs are comprised of multiple circular single discs of the same thickness made of corrosion resistant spring steel. These discs are firmly connected to form a compact unit by means of precision sleeves. To reduce stress peaks that are mainly applied to the outer discs when shaft misalignments occur, the precision sleeves are equipped with specially produced relief grooves. High-strength fitting screws alternately connect the disc packs with the coupling hubs and any mounted spacers. The bolt circle, the number of screwing points and the width of the disc packs determine the level of torque that can be transmitted, whereas the distance of the disc packs to each other and the thickness of the single discs define the capability to compensate for shaft misalignments. Depending on the preference and application-specific requirements, customers may choose from two different disc pack types as a function of the coupling size:

The type HD (High Deflection) with thin single discs for increased compensation capability at occuring shaft misalignment. Up to and including the coupling size 169, this type allows for continuous operation at an angular misalignment of up to 1.0 degrees under consideration of the coupling dimensioning details.

The type HT (High Torque) is used if higher requirements are placed on the torque that can be transmitted. By virtue of thicker single discs, the torque capacity is increased by up to 30 % and a higher power density is hence obtained. With due consideration of the coupling dimensioning details, continuous operation at an angular misalignment of maximal 0.7 degrees is possible for coupling sizes up to and including 169.

6 Screwing Points
Size 47-169

8 Screwing Points
Size 205-316

Spacer D with 2 Disc Packs

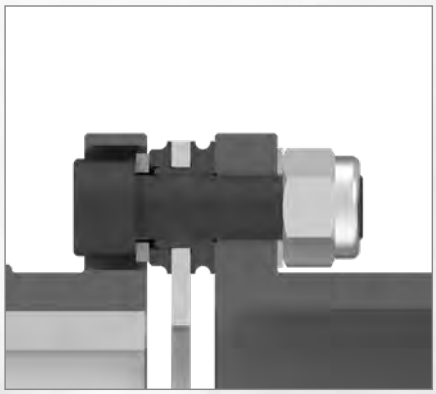
Compact-Spacer C with 2 Disc Packs

Screwing

The disc packs are typically connected by means of high-strength special screws. Depending on the coupling size, hexagon socket screws or hexagon head screws are used.

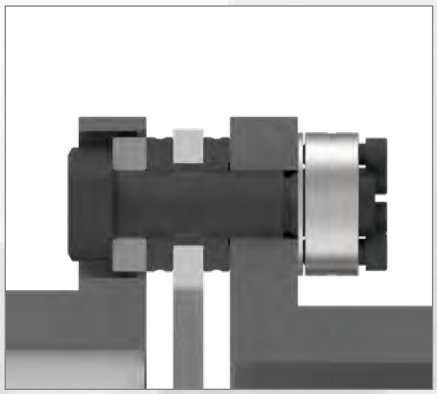
The contact pressure of the disc pack on the other coupling components, which is generated by the screw tightening torque, provides for friction-locked transmission of the required torque. It is therefore necessary that the contact surfaces are dry and free from any matter like preservative agents or paint. Up to and including the coupling size 98, hardened washers are fitted below the screw heads. From size 118 up, such washers are also used underneath the self-locking nuts.

In ambient temperatures above 80°C, the typically used self-locking nuts with plastic insert have to be replaced by all-steel nuts.



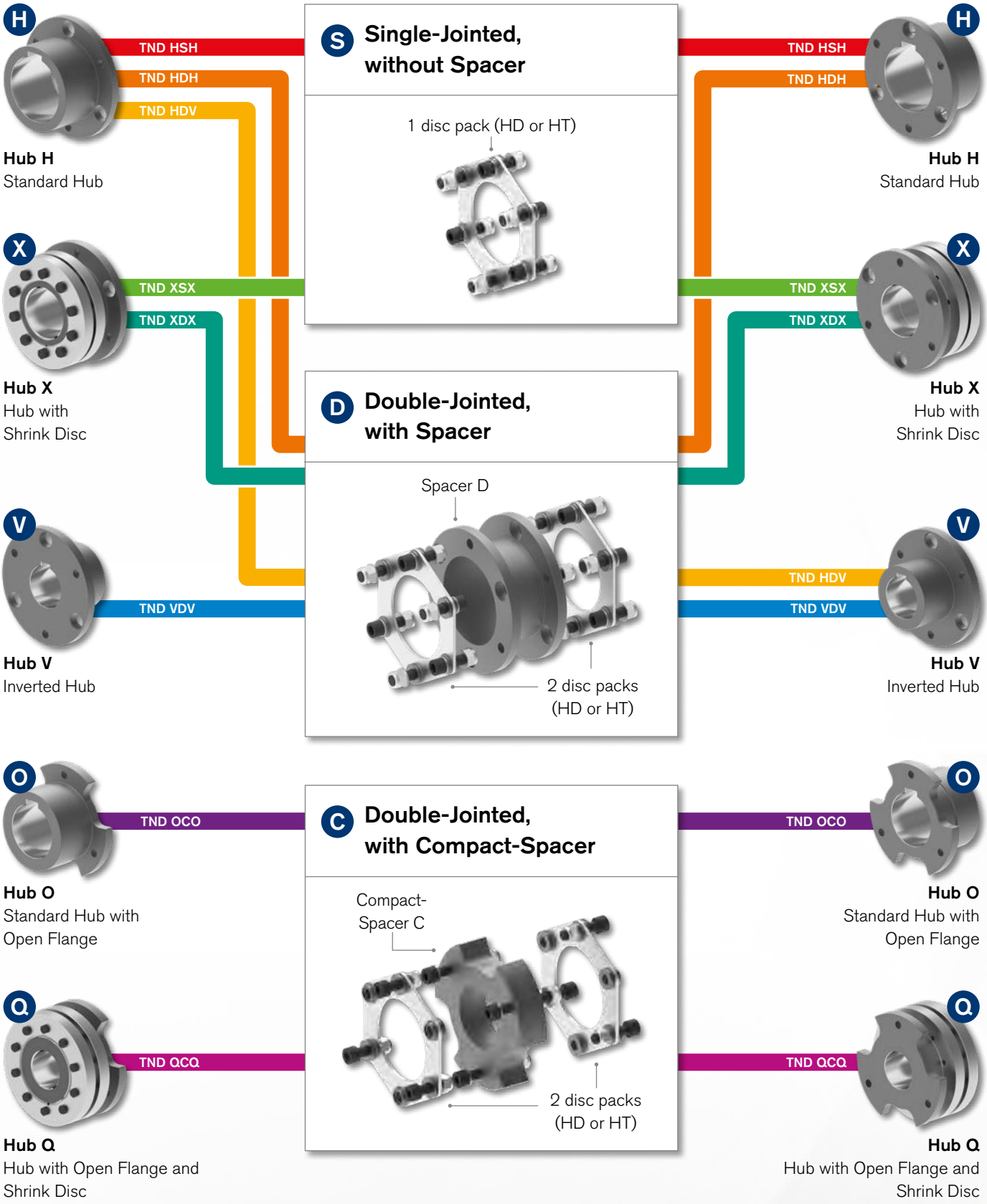
Hexagon Socket Screws
Size 47-141

Hexagon Head Screws
Size 169-254



Hexagon Socket Screws with Special Nut
Size 262-316

Modular System



The smart modular system of the RINGFEDER® TND series guarantees users maximum flexibility and customizability to fulfil the specific requirements of their individual drive task. By virtue of the various combination possibilities and multiple extension options, further coupling types are realizable in addition to those depicted above. These include other hub combinations, the replacement of hubs by connecting flanges or functional supplements like brake discs or brake drums as well as anti-flail devices. Furthermore, the couplings can also be installed vertically by using simple supports.

Selection Guide

The selection of the correct coupling size is based on the torque to be transmitted and the given shaft dimensions. In addition, other conditions of the specific application situation have to be considered, e.g. operating speed, shaft misalignments and the need for spacers to accommodate larger shaft distances.

Always make sure that the specified limit values are never exceeded at any operating condition. Should you have questions or need technical support, please contact our experts in Engineering and Sales.

The nominal torque T_{KN} of the RINGFEDER® TND Steel Disc Couplings can be transmitted continuously if the specified selection and operating criteria are met. Coupling dimensioning is based on the nominal torque T_N and the maximum torque T_{max} of the machinery.

1. Calculate the nominal torque of the machine to be transmitted T_N

Equation 1)

$$T_N = 9{,}550 \cdot P_N / n_N$$

T_N	= Nominal torque of machine	[Nm]	
P_N	= Machine power	[kW]	
n_N	= Operating speed	[1/min]	

2. Determine the required nominal torque for the coupling T_{KN}

Equation 2)

$$T_{KN} \geq T_N \cdot S_\vartheta \cdot S_f$$

T_{KN}	= Nominal torque of coupling	[Nm]	acc. to data in the Tech Paper
T_N	= Nominal torque of machine	[Nm]	acc. to Equation 1)
S_ϑ	= Temperature factor	[-]	acc. to Table 1)
S_f	= Service factor	[-]	$S_A \cdot S_L$
S_A	= Load factor on drive side		
S_L	= Load factor of output side		

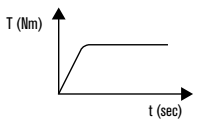
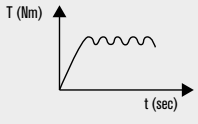
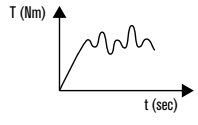
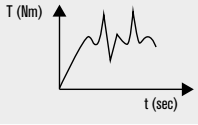
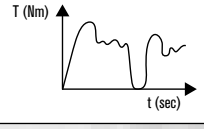
To prevent damage to the self-locking nuts of the screwing of the disc pack, ambient temperatures above 80 °C have to be communicated to RINGFEDER POWER TRANSMISSION beforehand. Specifically designed coupling versions are available for temperatures below -20 °C and above 240 °C.

Table 1: Temperature Factor S_ϑ

Ambient Temperature Range ϑ [°C]	Temperature Factor S_ϑ
-20 °C < ϑ < 160 °C	1.0
160 °C < ϑ < 190 °C	1.1
190 °C < ϑ < 240 °C	1.3

S_A is the load factor for the input side. It defaults to S_A = 1 for electric motor drives. S_A >1 applies to drives by combustion engines and it is recommended to check the selection of the coupling size by means of a detailed torsional vibration analysis. Please contact the expert team of RINGFEDER POWER TRANSMISSION for further guidance.

Table 2: Load Factor Output Side

Torque Characteristics at Operating Point on Output Side	Torque Curve	Min. Load Factor S_L
Constant, uniform torque load, without torque variations		1.1
Uniform with little torque variations; slight shocks		1.5
Non-uniform, also API 671, API 610 moderate shocks		1.75
Non-uniform, fluctuating, heavy shocks		2
Other torque patterns and reversing operation		2.5

3. Check the impact of short-term torque peaks acting on the coupling

Equation 3)

$$1.75 \cdot T_{KN} = T_{Kmax} > T_{max} \cdot S_{\vartheta} \cdot S_Z$$

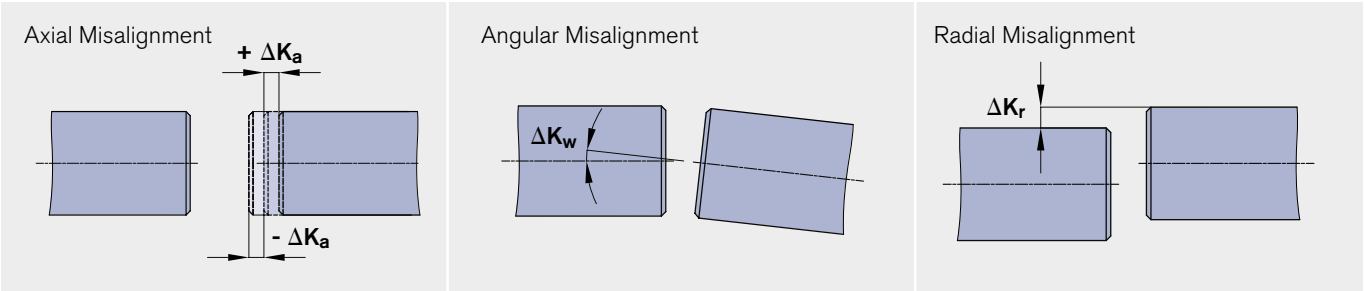
T_{KN}	=	Nominal torque of coupling	[Nm]	acc. to data in the Tech Paper
T_{max}	=	Max. torque of machine*	[Nm]	

* e.g. at the start of an electric motor: $T_{max} = T_{Kipp}$
T_{Kipp} =Tipping torque by starting with directly engaged asynchronous motor, e.g. $T_{Kipp} \sim 2 \cdot T_N$; please observe the specific details provided by the motor supplier.

S_Z = 1.5 is applicable for reversing torque; otherwise: $S_Z = 1$

4. Make certain that the coupling is capable of handling the occurring shaft misalignments

Existing or expected angular, axial and radial shaft misalignments shall not exceed the maximum values as specified in the Tech Papers of the individual coupling types. Coupling types with one single disc pack are capable of compensating angular and axial shaft misalignments. Couplings equipped with two disc packs can also compensate radial shaft misalignment. The individual misalignment values are interdependent; to ensure safe and continuous transmission of the required torque, the maximum misalignment values may not occur simultaneously. If one of the misalignment values is close to the permissible limit value, this will have an effect on the misalignment values in other directions and on the torque that can be transmitted. The selection of a coupling with larger misalignment capacities is therefore recommended.



4.1 Couplings with one disc pack (e.g. coupling type TND HSH)

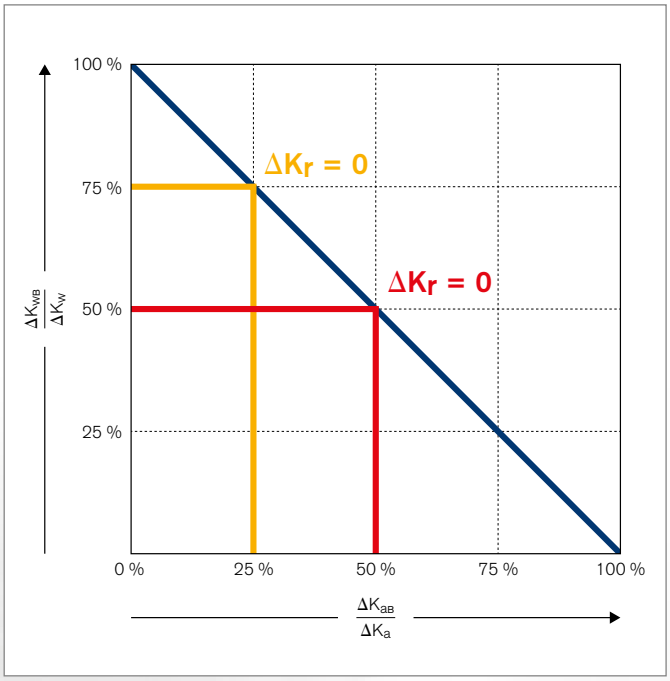
Couplings with one single disc pack are capable of accommodating axial and angular misalignment, but not radial shaft misalignment. Accordingly, the following equation applies:

Equation 4)

$$\frac{\Delta K_{aB}}{\Delta K_a} + \frac{\Delta K_{wB}}{\Delta K_w} \leq 1 \text{ und } \Delta K_{rB} = 0$$

ΔK_a	=	Max. axial misalignment	[mm]	acc. to data in the Tech Paper
ΔK_w	=	Max. angular misalignment	[deg.]	acc. to data in the Tech Paper
ΔK_r	=	Max. radial misalignment	[mm]	
Index **B**	=	Value in state of operation		

Diagram 1: Miasalignment Chart for Couplings with one Disc Pack (Single-Jointed Design)



4.2 Couplings with two disk packs (e.g. coupling type TND HDH)

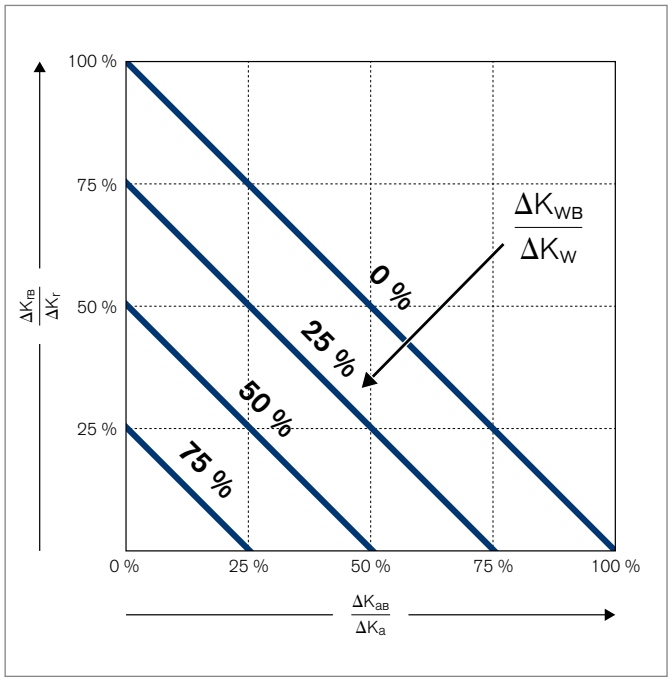
Couplings with two disc packs are able to compensate for axial, angular and radial shaft misalignment. Accordingly, the following equation applies:

Equation 5)

$$\frac{\Delta K_{aB}}{\Delta K_a} + \frac{\Delta K_{WB}}{\Delta K_W} + \frac{\Delta K_{rB}}{\Delta K_r} \leq 1$$

ΔK_a	=	Max. axial misalignment	[mm]	acc. to data in the Tech Paper
ΔK_W	=	Max. angular misalignment	[deg.]	acc. to data in the Tech Paper
ΔK_r	=	Max. radial misalignment as a function of the angle	[mm]	acc. to data in the Tech Paper
Index **B**	=	Value in state of operation		

Diagram 2: Miasalignment Chart for Couplings with two Disc Packs (Double-Jointed Design)



The following equation applies per disc pack:

Equation 6)

$$\Delta K_{WRB} \leq 1/2 \cdot \Delta K_W - \Delta K_{WB}$$

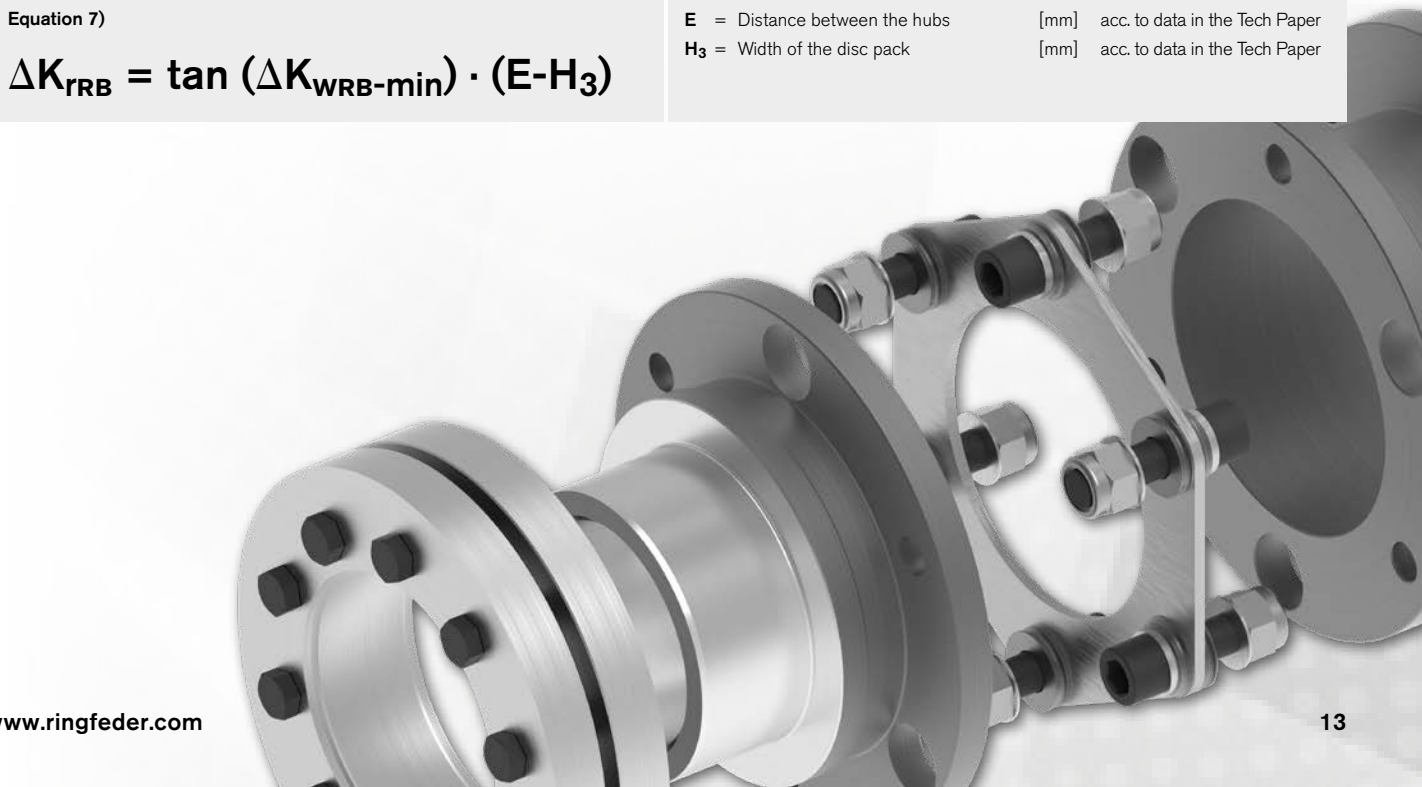
ΔK_W	=	Max. angular misalignment	[deg.]	acc. to data in the Tech Paper
ΔK_{WB}	=	Machine-related angular misalignment in state of operation	[deg.]	
ΔK_{WRB}	=	Angle due to radial misalignment	[deg.]	

To calculate the maximum radial misalignment which can be continuously transmitted by the coupling, the lowest value of $\Delta K_{WRB\text{-}min}$ is used to determine ΔK_{rB}.

Equation 7)

$$\Delta K_{rRB} = \tan(\Delta K_{WRB\text{-}min}) \cdot (E\text{-}H_3)$$

E	=	Distance between the hubs	[mm]	acc. to data in the Tech Paper
H_3	=	Width of the disc pack	[mm]	acc. to data in the Tech Paper



5. Check the hub bores and operating speeds to prevent exceeding permissible maximum values

Arrangement of the coupling components

The coupling hubs have to be mounted onto the shafts to be connected in accordance with the respective coupling type. It is recommended to mount the coupling hubs flush with the shaft ends to establish the most solid shaft-hub connection.

Bores

The values for d_{1kmax}/d_{2kmax} (max. bore diameter) indicated in the Tech Papers for the individual coupling types apply to keyed connections according to DIN 6885-1. These values may only be exceeded upon prior review and approval by RINGFEDER POWER TRANSMISSION. The maximum possible bore diameters for connections with square keys according to ANSI B17.1 are to be reduced upon consultation with RINGFEDER POWER TRANSMISSION.

In order to achieve sufficient concentricity, the bore fit must be selected so that the shaft tolerance pairing results in a tight fit or interference fit (e.g. H7/m6) or tighter. Detailed data needs to be provided for hydraulically fitted shaft-hub connections.

Fastening on the shafts

RINGFEDER® Steel Disc Couplings with standard or inverted hubs come with keyways according to DIN 6885-1 and a keyway width tolerance P9 as standard (tolerance JS9 upon customer specification). In addition, axial securing, e.g. via set screws or distance rings, needs to be provided for use with longer shaft ends. Keyways according to ANSI B17.1, keyways with special dimensions or other keyway tolerances can also be realized upon request.

For couplings with hubs of the designation X and Q, the hub is fastened by RINGFEDER® Shrink Discs of the three-part series RfN 4061 which are placed on the back of the hubs. By tightening the high-strength locking screws, the tapered thrust rings of the shrink disc are axially clamped against each other on an inner ring, so that pressure is applied from outside via the hub onto the joint between shaft and hub. This provides for backlash-free transmission of the torque by frictional locking. The transmissible torque of these coupling types can be obtained from their corresponding Tech Papers.

6. Check whether dynamic effects need to be considered

Bearing of shaft ends

Bearings are required for the shafts ends to be connected directly in front of and behind the coupling.

Balancing

On account of the extremely high manufacturing precision of the coupling components, balancing of the coupling is only required for applications involving very high operating speeds or because of sensitivity of the driving and driven units. From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.

Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced half key (before grooving) and spacers are balanced without screwed-on disc packs.

Critical operating speed

On account of the coupling construction, the fastening of a spacer between two disc packs will result in a system susceptible to dynamic excitation. In order to prevent the operating accuracy from being adversely affected by axial vibrations, the bending critical speed has to be verified in the case of operating speeds of 3,500 1/min and higher, and spacer lengths of 1.2 meters and longer.

Important!

It is mandatory to observe the stated selection and operation criteria as well as the instructions contained in the respective assembly and operation manuals. Should you have any questions or need technical support, please consult our experts in Sales and Engineering.

Dimensioning Examples

Example 1

A RINGFEDER® Steel Disc Coupling is required for an agitator operating in an ambient temperature of 180 °C. An electric motor type 315M with an input shaft diameter of 80 mm drives the output shaft, diameter 85 mm, with a power of 132 kW and a speed of 1,460 1/min. The distance between the shaft ends is 100 mm and the load should be transmitted via a keyed connection.

Desired coupling type:
RINGFEDER® TND HDH

Machine power P_N =	132 kW for the el. motor type 315 M	
Operating speed n_N =	1,460 1/min	
Nominal torque of machine T_N =	$9{,}550 \cdot P_N / n_N = 9{,}550 \cdot 132 / 1{,}460 = 864$ Nm	acc. to Equation 1)
Ambient temperature ϑ =	180 °C	acc. to Table 1)
→ Temperature factor S_ϑ =	1.1	acc. to Table 1)
→ Load factor S_L =	non-uniform torque curve, moderate shocks = 1.75	acc. to Table 2)
Required nominal torque of coupling T_{KN} =	$T_N \cdot S_\vartheta \cdot S_f = 846$ Nm $\cdot$ 1.1 $\cdot$ 1.75 = 1,629 Nm	acc. to Equation 2)

For non-reversing torque S_Z	1	
Ambient temperature ϑ =	180 °C	acc. to Table 1)
→ Temperature factor S_ϑ =	1,1	acc. to Table 1)
Max. torque of machine T_{max} =	$T_{Kipp} = 2.5 \cdot T_N = 2.5 \cdot 864$ Nm = 2,115 Nm	
Max. torque T_{Kmax} =	2,115 Nm $\cdot$ 1 $\cdot$ 1.1 = 2,330 Nm	acc. to Equation 3)

Since a keyed connection is requested and because the shaft distance has to be bridged by a spacer, the steel disc coupling type TND HDH is selected. To match the shaft distance of 100 mm, a spacer length of 100 mm (E = 100 mm) is required.

Coupling Selection: TND HDH, Size 118, Spacer Length E = 100 mm	
T_{KN} Drive = 1,629 Nm ≤ 2,400 Nm = T_{KN} Coupling	
T_{Kmax} 2,330 Nm ≤ 1.75 $\cdot$ 2,400 Nm = 4,200 Nm	acc. to Equation 3)
n_N 1,460 1/min ≤ 5,250 1/min	

The shafts are aligned according to the below mentioned misalignment values which are expected to occur during operation. On this basis, the utilization of the maximum possible misalignment compensation capacity is verified. The operating speed of 1,460 1/min corresponds to a peripheral speed of 12.7 m/s. Therefore, no balancing will be necessary.

Misalignment values in state of operation	ΔK_{aB} = 0.5 mm ΔK_{wB} = 0.5° ΔK_{rB} = 0.7 mm	
Verification of the misalignment values	0.5 mm / 2.4 mm + 0.5° / 2° + 0.7 mm / 1.4 mm = 0.95 ≤ 1	acc. to Equation 5)

Verification of the dimensioning result

	Machine Data	Coupling Data
Nominal torque	1,629 Nm (incl. safety factor)	2,400 Nm
Maximum torque	2,330 Nm (incl. safety factor)	4,200 Nm
Speed	1,460 1/min	max. 5,250 1/min
Shaft diameter, motor	80 mm	max. 85 mm
Shaft diameter, agitator	85 mm	max. 85 mm

Example 2

A RINGFEDER® Steel Disc Coupling is intended to be used for the drive of a kneading machine. The gear unit provides a nominal torque of 12,000 Nm at a speed of 120 1/min. The input shaft has a diameter of 150 mm and the output shaft has a diameter of 135 mm. The shaft tolerance is g6 each. The distance between the shaft ends amounts to 300 mm. The maximum torque of the machine is 30,000 Nm. Further requirements are reversing operation and an ambient temperature of 110 °C. Shrink discs are to be used for the shaft-hub connection on both sides.

Desired coupling type:
RINGFEDER® TND XDX

	Operating speed $\mathbf{n_N}$ =	120 1/min	
	Nominal torque of machine $\mathbf{T_N}$ =	12,000 Nm	
	Ambient temperature ϑ =	110 °C	acc. to Table 1)
→	Temperature factor $\mathbf{S_\vartheta}$ =	1	acc. to Table 1)
→	Load factor $\mathbf{S_L}$ =	for reversing operation = 2.5	acc. to Table 2)
	Required nominal torque of coupling $\mathbf{T_{KN}}$ =	$T_N \cdot S_\vartheta \cdot S_f$ = 12.000 Nm · 1 · 2,5 = 30.000 Nm	acc. to Equation 2)

	For reversing torque $\mathbf{S_Z}$	1.5	
	Ambient temperature ϑ =	110 °C	acc. to Table 1)
→	Temperature factor $\mathbf{S_\vartheta}$ =	1	acc. to Table 1)
	Max. torque of machine $\mathbf{T_{max}}$ =	30,000 Nm	
	Max. torque $\mathbf{T_{Kmax}}$ =	30,000 Nm · 1 · 1.5 = 45,000 Nm	acc. to Equation 3)

On account of the required shrink disc connection and use of a spacer to bridge the shaft distance, the steel disc coupling type TND XDX size 254 with HD disc pack is selected. To match the shaft distance of 300 mm, a spacer length of 300 mm (E = 300 mm) is chosen.

Coupling Selection: TND XDX, Size 254, Spacer Length E = 300 mm	
T_{KN} drive = 30,000 Nm <= 36,000 Nm = T_{KN} coupling	
T_{Kmax} 45,000 ≤ 1.75 · 36,000 = 63,000 Nm	acc. to equation 3)
n_N 120 1/min ≤ 2,100 1/min	

The shafts will be aligned according to the below mentioned misalignment values which are assumed to occur during operation. On this basis, the utilization of the maximum possible misalignment compensation capacity is verified.

Misalignment values in state of operation	ΔK_{aB} = 0.3 mm ΔK_{WB} = 0.3° ΔK_{rB} = 1.0 mm	
Verification of the misalignment values	0.3 mm / 2.2 mm + 0.3° / 1° + 1 mm / 2.2 mm = 0.89 ≤ 1	acc. to equation 5)

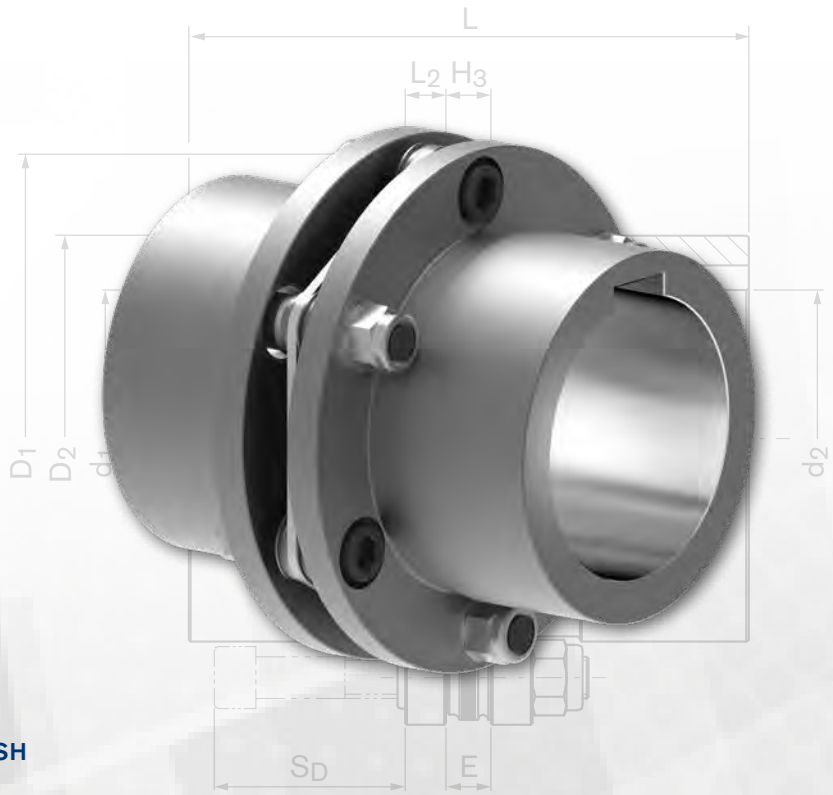
The sizes of the RINGFEDER® RfN 4061 Shrink Discs that match the respective coupling hubs are listed in the Tech Paper for the coupling type TND XDX. In this example, the size 200 x 350 is selected for the input shaft (diameter 150 mm), and the size 185 x 330 mm for the output shaft (diameter 135 mm).

Transmissible torque T RfN 4061 185 x 330 with d = 135 mm	52,500 Nm
Transmissible torque T RfN 4061 200 x 350 with d = 150 mm	75,000 Nm

Verification of the dimensioning result

	Machine Data	Coupling Data
Nominal torque	12,000 Nm	36,000 Nm
Maximum torque	30,000 Nm	63,000 Nm
Speed	120 1/min	max. 2,100 1/min
Shaft diameter, motor	150 mm	max. 160 mm
Shaft diameter, kneader	135 mm	max. 160 mm
Shrink disc connection, motor	45,000 Nm	75,000 Nm
Shrink disc connection, kneader	45,000 Nm	52,000 Nm

In this case, the maximum torque T_{kmax} of the complete system is limited by the lower torque that can be transmitted by the shaft-hub-connection, and therefore is set to 52,500 Nm.



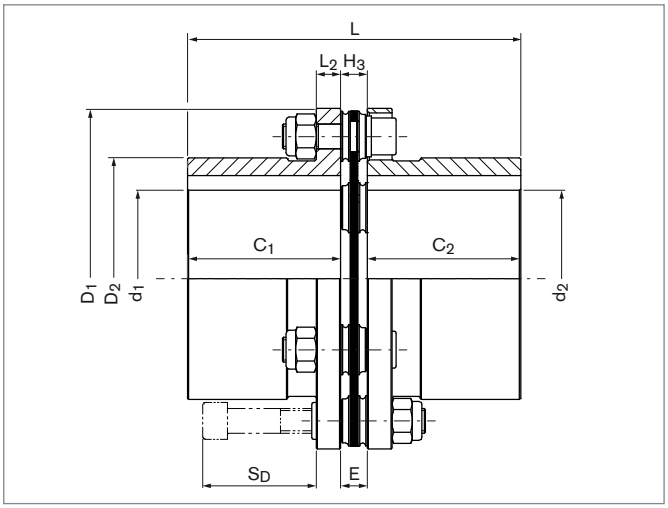
TND HSH

Further information on
RINGFEDER® TND HSH
on **www.ringfeder.com**

Standard Hubs, Single-Jointed, without Spacer

The type **RINGFEDER® TND HSH** is a torsionally stiff, backlash-free steel disc coupling consisting of two standard hubs H and one disc pack S alternately connected to the hubs by high-strength screws.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The single-jointed design with single disc pack compensates for angular and axial shaft misalignments.



Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular and axial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Quick and easy realization of a double-cardanic setup by means of two couplings and one spacer
- Bore diameter $d_{1/2}$ up to 215 mm
- Transmissible torque T_{KN} up to 130,000 Nm / T_{kmax} up to 220,000 Nm
- Rotational speeds n_{max} up to 12,200 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design

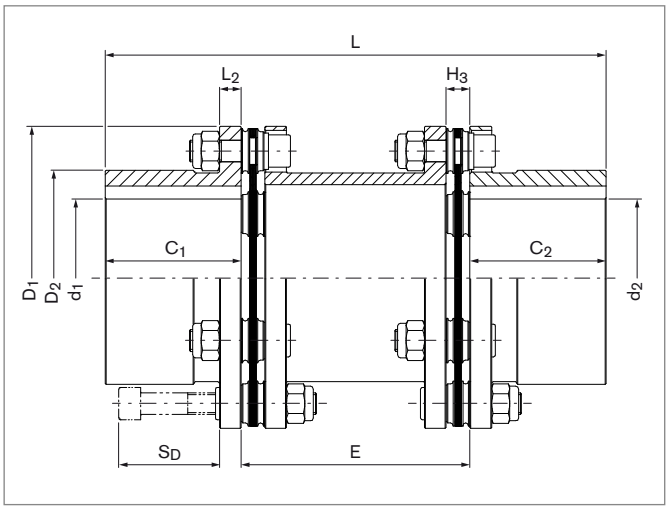
TND HDH

Further information on
RINGFEDER® TND HDH
on **www.ringfeder.com**

Standard Hubs, Double-Jointed, with Spacer

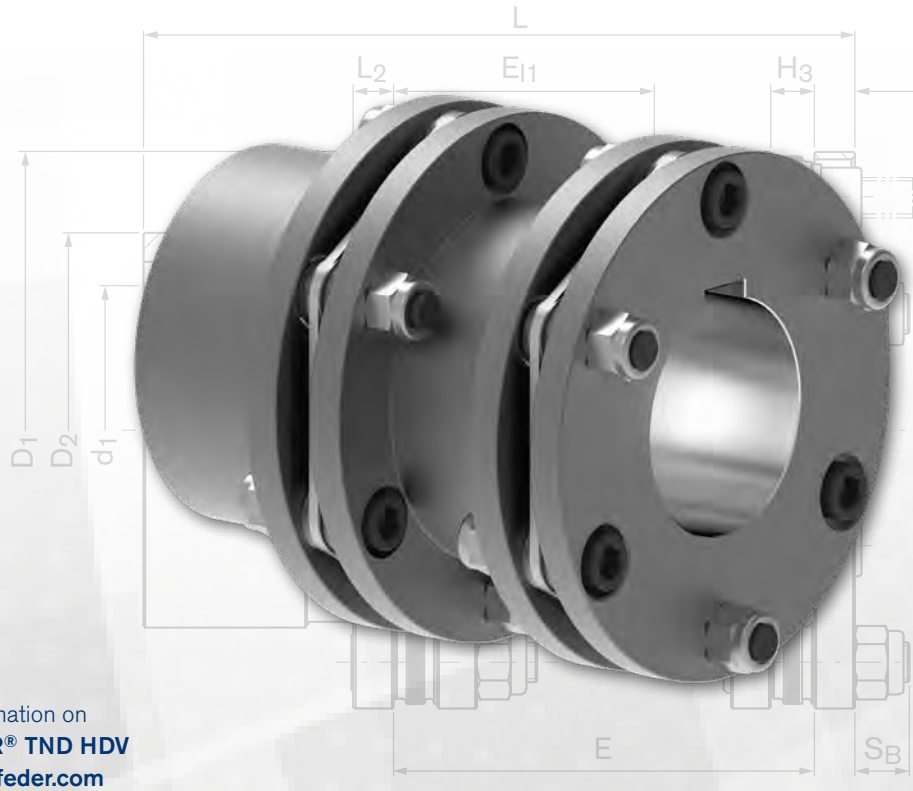
The type **RINGFEDER® TND HDH** is a torsionally stiff, backlash-free steel disc coupling consisting of two standard hubs H as well as a spacer D in standardized or individually customized length. Using high-strength screws, one disc pack each is connected to the spacer and one hub, thus achieving the function of a double-cardanic system.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The double-jointed design with two disc packs compensates for radial (adjustable via the spacer length), angular and axial shaft misalignments.



Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular, axial and radial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Bridging of large shaft distances by means of spacers in various standard and freely customizable special lengths
- Bore diameter $d_{1/2}$ up to 215 mm
- Transmissible torque T_{KN} up to 130,000 Nm / T_{kmax} up to 220,000 Nm
- Rotational speeds depending on spacer length n_{max} up to 12,200 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design



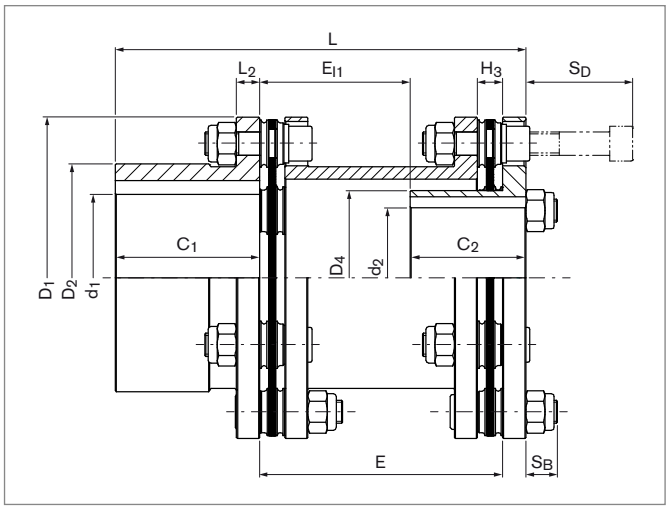
TND HDV

Further information on
RINGFEDER® TND HDV
on **www.ringfeder.com**

Combination of Standard Hub and Inverted Hub, Double-Jointed, with Spacer

The type **RINGFEDER® TND HDV** is a torsionally stiff, backlash-free steel disc coupling consisting of a standard hub H and an inverted hub V, connected by a spacer D in standardized or individually customized length. Using high-strength screws, one disc pack each is connected to the spacer and one hub, thus achieving the function of a double-cardanic system.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The double-jointed design with two disc packs compensates for radial (adjustable via the spacer length), angular and axial shaft misalignments.



Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular, axial and radial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Bridging of large shaft distances by means of spacers in various standard and freely customizable special lengths
- Bore diameter in standard hub H d_1 up to 175 mm, in inverted hub V d_2 up to 120 mm
- Transmissible torque T_{KN} up to 44,000 Nm / T_{kmax} up to 77,000 Nm
- Rotational speeds depending on spacer length n_{max} up to 12,200 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design

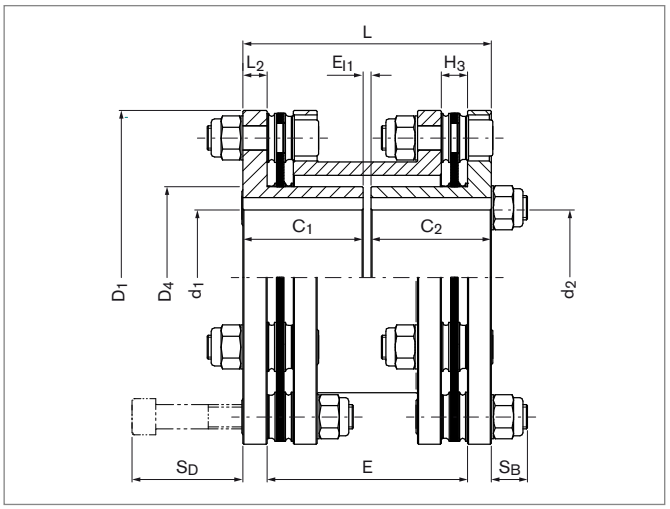
TND VDV

Further information on
RINGFEDER® TND VDV
on **www.ringfeder.com**

Inverted Hubs, Double-Jointed, with Spacer

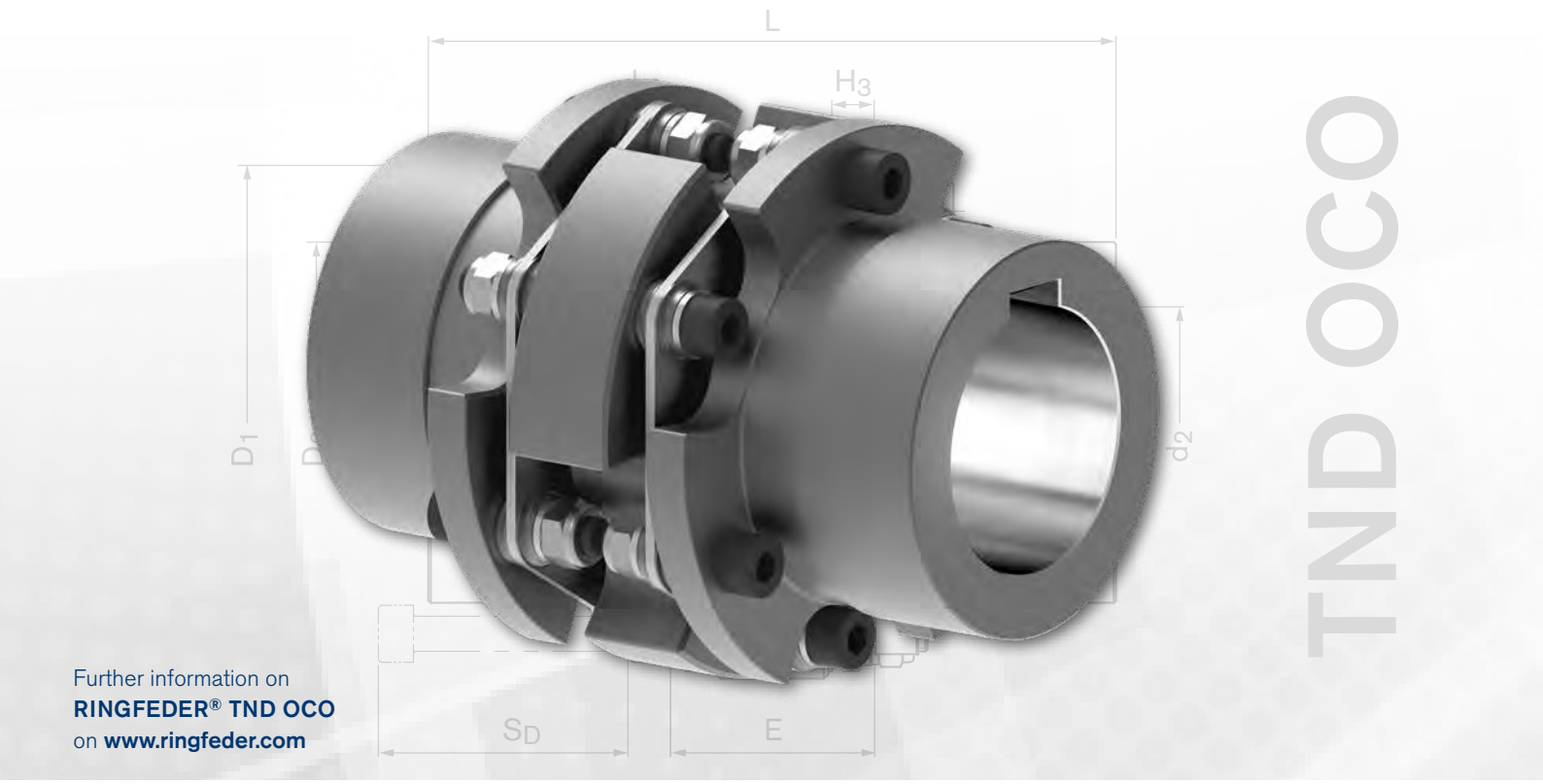
The type **RINGFEDER® TND VDV** is a torsionally stiff, backlash-free steel disc coupling consisting of two inverted hubs V, connected by a spacer D in standardized length. Using high-strength screws, one disc pack each is connected to the spacer and one hub, thus achieving the function of a double-cardanic system.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The double-jointed design with two disc packs compensates for radial (adjustable via the spacer length), angular and axial shaft misalignments. By utilizing the standard spacers, the largest possible disc pack distance and thus the largest possible radial misalignment is realized at minimum distance of the shafts to be connected.



Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular, axial and radial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Bridging of large shaft distances by means of spacers in various standard lengths
- Maximum radial misalignment at minimum shaft distance
- Bore diameter $d_{1/2}$ up to 120 mm
- Transmissible torque T_{KN} up to 44,000 Nm / T_{kmax} up to 77,000 Nm
- Rotational speeds depending on spacer length n_{max} up to 12,200 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design

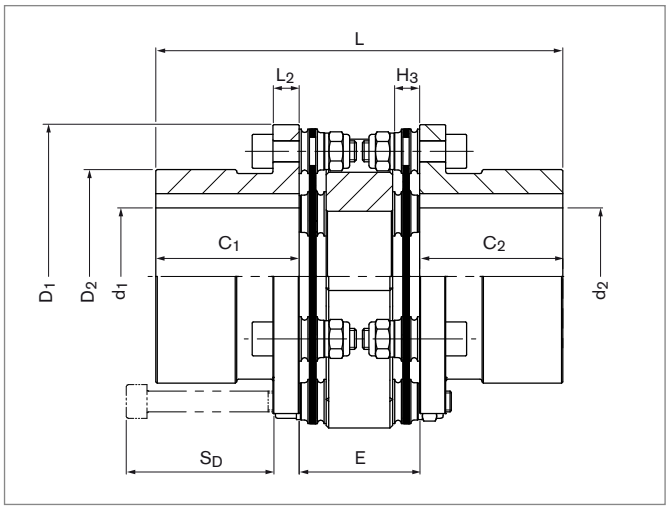


Further information on
RINGFEDER® TND OCO
on **www.ringfeder.com**

Standard Hubs with Open Flange, Double-Jointed, with Compact-Spacer

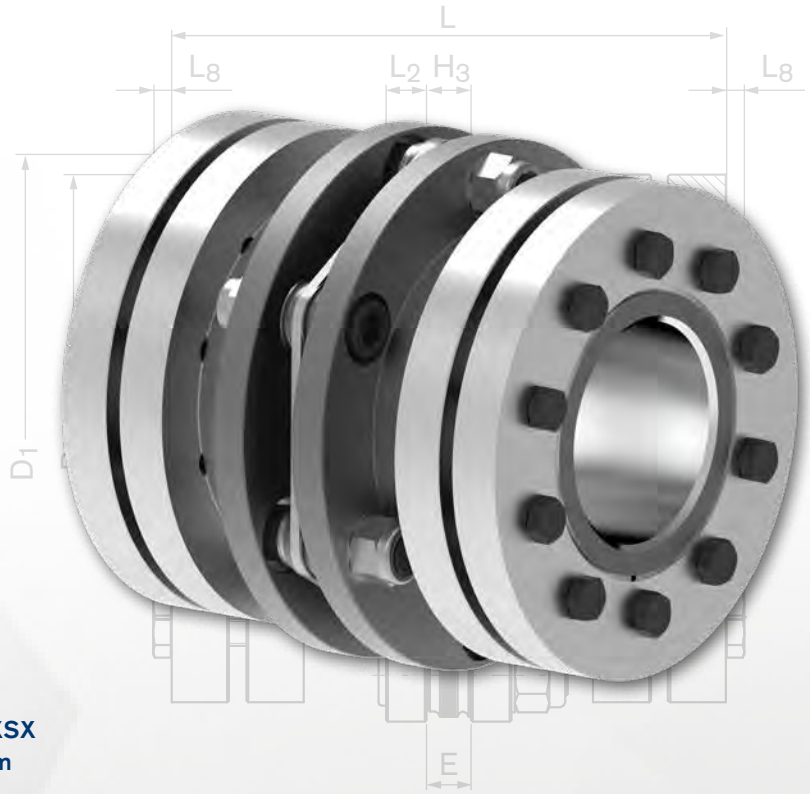
The type **RINGFEDER® TND OCO** is a torsionally stiff, backlash-free steel disc coupling consisting of two standard hubs with open flange O and a compact-spacer C that can be installed and removed radially. Using high-strength screws, one disc pack each is connected to the spacer and one hub, thus achieving the function of a double-cardanic system.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The double-jointed design with two disc packs compensates for angular, axial and radial shaft misalignments with minimum axial space requirement.



Characteristics

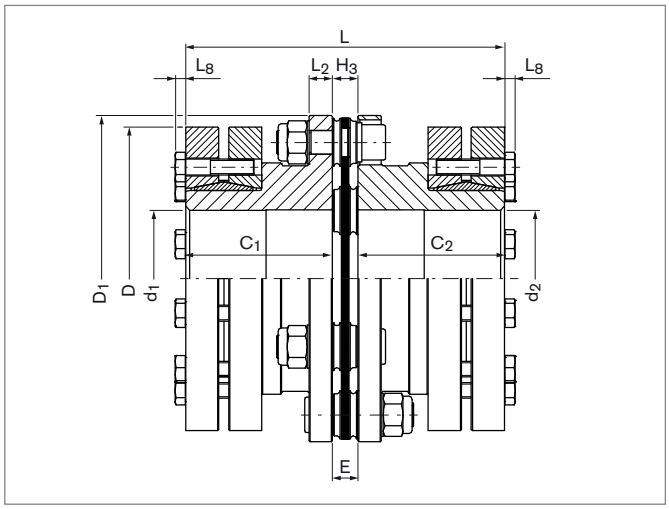
- Completely backlash- and maintenance-free
- Highly effective compensation of angular, axial and radial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Minimum shaft distance for standard hubs
- Radially install- and removeable compact-spacer
- Bore diameter $d_{1/2}$ up to 65 mm
- Transmissible torque T_{KN} up to 1,750 Nm / T_{kmax} up to 3,000 Nm
- Rotational speeds depending on spacer length n_{max} up to 8,400 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design



TND XSX

Further information on
RINGFEDER® TND XSX
on **www.ringfeder.com**

Hubs with RINGFEDER® Shrink Discs, Single-Jointed, without Spacer



The type **RINGFEDER® TND XSX** is a torsionally stiff, backlash-free steel disc coupling consisting of two hubs X prepared to be equipped with shrink discs of the series RINGFEDER® RfN 4061 and one disc pack S alternately connected to the hubs by high-strength screws.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The single-jointed design with single disc pack compensates for angular and axial shaft misalignments.

A permanently backlash-free fixation of the coupling hubs on the shafts to be connected is realized by means of high-quality RINGFEDER® Shrink Discs.

Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular and axial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Quick and easy realization of a double-cardanic setup by means of two couplings and one spacer
- Simplified shrink disc selection thanks to RINGFEDER® Shrink Discs specifically assigned per coupling size
- Bore diameter $d_{1/2}$ up to 160 mm
- Transmissible torque T_{KN} up to 44,000 Nm / T_{kmax} up to 77,000 Nm
- Rotational speeds n_{max} up to 3,600 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design

TND XDX

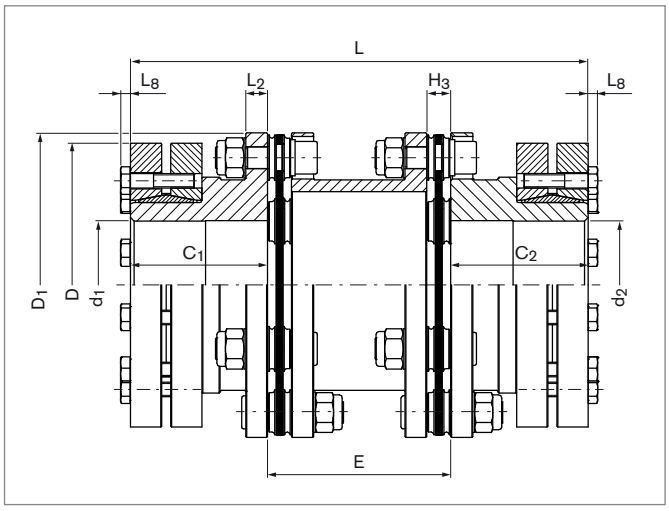
Further information on
RINGFEDER® TND XDX
on **www.ringfeder.com**

Hubs with RINGFEDER® Shrink Discs, Double-Jointed, with Spacer

The type **RINGFEDER® TND XDX** is a torsionally stiff, backlash-free steel disc coupling consisting of two hubs X prepared to be equipped with shrink discs of the series RINGFEDER® RfN 4061 and a spacer D in standardized or individually customized length. Using high-strength screws, one disc pack each is connected to the spacer and one hub, thus achieving the function of a double-cardanic system.

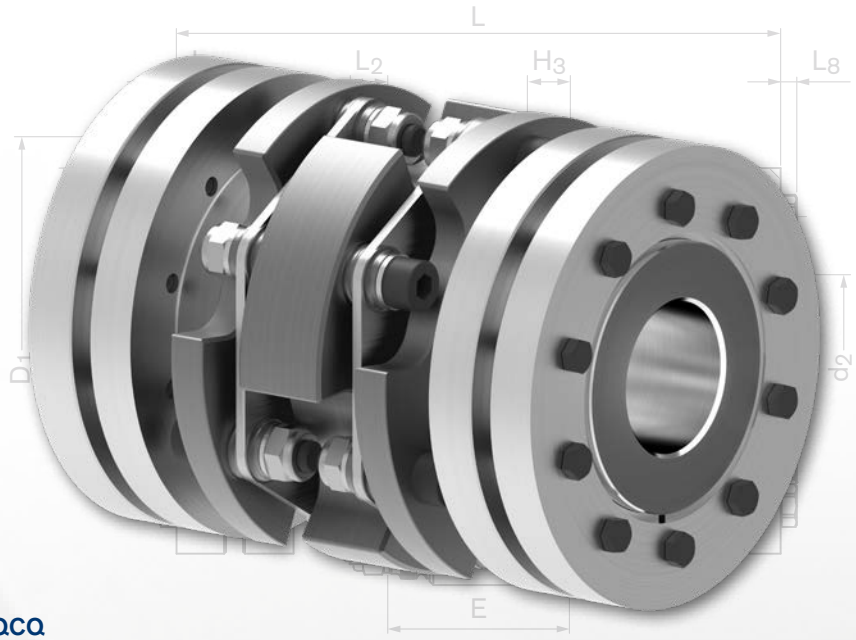
Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The double-jointed design with two disc packs compensates for radial (adjustable via the spacer length), angular and axial shaft misalignments.

A permanently backlash-free fixation of the coupling hubs on the shafts to be connected is realized by means of high-quality RINGFEDER® Shrink Discs.



Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular, axial and radial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Bridging of large shaft distances by means of spacers in various standard and freely customizable special lengths
- Simplified shrink disc selection thanks to RINGFEDER® Shrink Discs specifically assigned per coupling size
- Bore diameter $d_{1/2}$ up to 160 mm
- Transmissible torque T_{KN} up to 44,000 Nm / T_{kmax} up to 77,000 Nm
- Rotational speeds depending on spacer length n_{max} up to 3,600 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design



TND QCQ

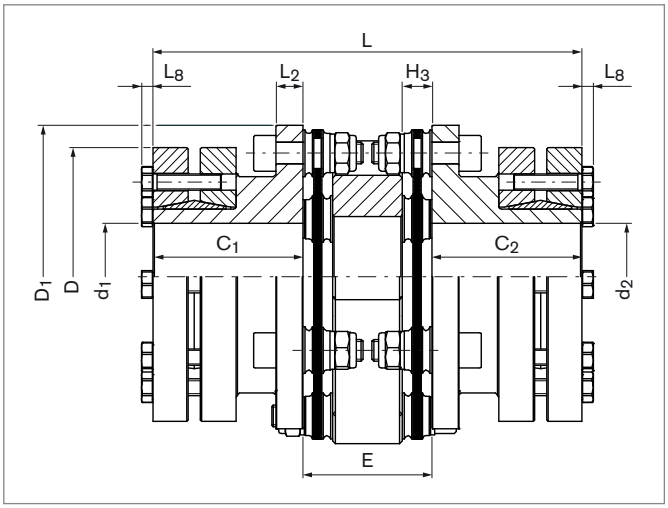
Further information on
RINGFEDER® TND QCQ
on **www.ringfeder.com**

Hubs with Open Flange and RINGFEDER® Shrink Discs, Double-Jointed, with Compact-Spacer

The type **RINGFEDER® TND QCQ** is a torsionally stiff, backlash-free steel disc coupling consisting of two hubs with open flange Q prepared to be equipped with shrink discs of the series RINGFEDER® RfN 4061 and a compact-spacer C that can be installed and removed radially. Using high-strength screws, one disc pack each is connected to the spacer and one hub, thus achieving the function of a double-cardanic system.

Depending on the coupling size, two different disc packs are available: The type HD (High Deflection) as well as the type HT (High Torque). The double-jointed design with two disc packs compensates for angular, axial and radial shaft misalignments with minimum axial space requirement.

A permanently backlash-free fixation of the coupling hubs on the shafts to be connected is realized by means of high-quality RINGFEDER® Shrink Discs.



Characteristics

- Completely backlash- and maintenance-free
- Highly effective compensation of angular, axial and radial shaft misalignment
- Torsionally rigid with high torsional stiffness
- Low restoring forces in case of shaft misalignment due to optimum disc pack design
- Minimum shaft distance for standard hubs
- Radially install- and removeable compact-spacer
- Simplified shrink disc selection thanks to RINGFEDER® Shrink Discs specifically assigned per coupling size
- Bore diameter $d_{1/2}$ up to 70 mm
- Transmissible torque T_{KN} up to 1,750 Nm / T_{kmax} up to 3,000 Nm
- Rotational speeds depending on spacer length n_{max} up to 3,600 1/min
- Efficient realization of customer-specific solutions at short delivery times thanks to modular design

RINGFEDER

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Steel Disc Couplings
RINGFEDER® TND

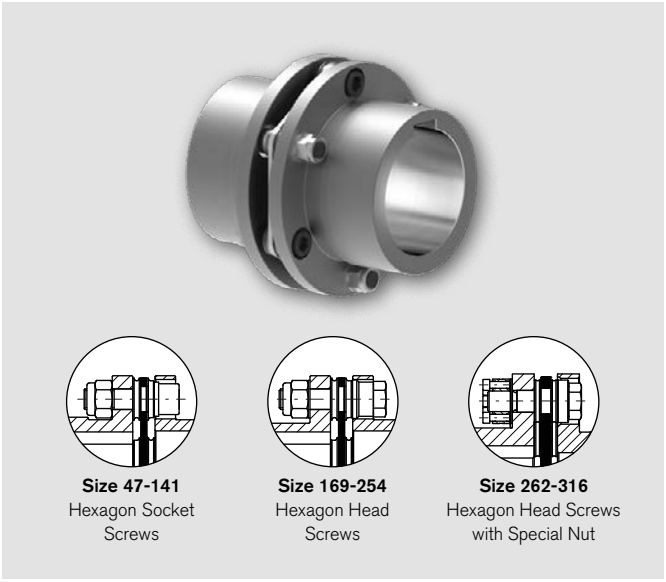
Tables & Values

For the correct selection of a suitable coupling type and size, it is essential to observe the explanations in the chapter “Coupling Dimensioning”.

Steel Disc Couplings

RINGFEDER® TND HSH

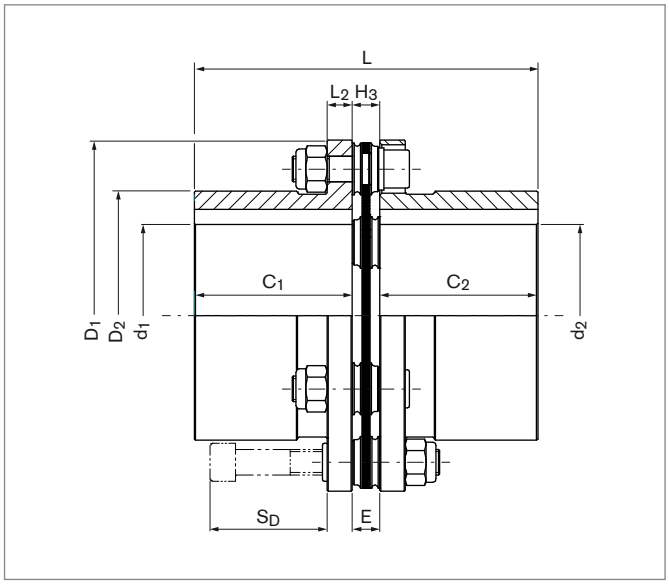
Standard Hubs, Single-Jointed, without Spacer, Shaft-Hub Connection by Keyway



Size 47-141
Hexagon Socket Screws

Size 169-254
Hexagon Head Screws

Size 262-316
Hexagon Head Screws with Special Nut



Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max}	d_{pre} [3]	$d_{1k};d_{2k}$ max [4]	C_1 / C_2	E	H_3	D_1	D_2	L_2	L	S_D	n_{Sc}
HSH	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
47	170	230	12200	10	32	39,5	7,5	7,5	70,5	47	5	86,5	24	6
63	320	420	9900	14	42	45	9	9	88	62,5	8	99	32	6
82	750	1050	7500	15	55	55	10,5	10,5	116	82	10	120,5	40	6
98	1350	1750	6200	19	65	60	12	12	140,5	98	11	132	47	6
118	2400	3000	5250	25	85	75	13	13	166,5	118	12	163	55	6
141	4000	5200	4400	30	95	90	15	15	198,5	141	14	195	64	6
169	6500	8500	3650	39	115	125	21	21	238	169	16	271	81	6
205	21000	26000	2950	59	140	160	28	28	295	205	22	348	112	8
254	36000	44000	2500	79	175	200	32,5	32,5	345	254	26	432,5	133	8
262	74000	---	2050	90	180	210	34	34	420	262	32	454	137	8
316	130000	---	1700	100	215	240	47	47	510	316	38	527	172	8

To continue see next page

Steel Disc Couplings RINGFEDER® TND HSH

					Max. Permissible Misalignment 7)					
					axial		angular		radial	
Size	Gw_{SB} 6)	J_{SB} 6)	C_{TdynHD}	C_{TdynHT}	ΔK_aHD	ΔK_aHT	ΔK_wHD	ΔK_wHT	ΔK_rHD	ΔK_rHT
HSH	kg	$10^{-3}kgm^2$	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
47	1,3	0,5	0,173	0,184	0,5	0,3	1	0,7	---	---
63	2,6	1,6	0,281	0,312	0,5	0,4	1	0,7	---	---
82	5,6	5,9	0,637	0,743	0,7	0,4	1	0,7	---	---
98	8,8	14	1,173	1,251	1	0,6	1	0,7	---	---
118	15,4	35	2	2,082	1,2	0,8	1	0,7	---	---
141	25,9	84	2,992	3,142	1,4	0,8	1	0,7	---	---
169	50	230	5,269	6,586	1,5	1,2	1	0,7	---	---
205	97,8	700	21,848	22,285	1,1	0,6	0,5	0,4	---	---
254	171,2	1750	37,204	37,868	1,1	0,8	0,5	0,4	---	---
262	223,2	3260	46,192	---	1,6	---	0,5	---	---	---
316	384,4	8650	87,706	---	1,8	---	0,5	---	---	---

1) When selecting the size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN}.

3) Pre-bore has free tolerance.

4) Maximum finished bore with keyways according to DIN 6885-1.

6) Weight and mass moments of inertia for pre-bored hubs.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{pre} = Diamater pre-bore

d_{1kmax} = Max. bore diameter d_1 with keyway acc. to DIN 6885-1

d_{2kmax} = Max. bore diameter d_2 with keyway acc. to DIN 6885-1

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

D_2 = Outer diameter hub

L_2 = Hub flange thickness

L = Total length

S_D = Disassembly space

n_{Sc} = Quantity of screws

Gw_{SB} = Weight at smallest bore diameter

J_{SB} = Moment of inertia at smallest bore diameter.

C_{TdynHD} = Dynamic torsional stiffness with disc pack HD

C_{TdynHT} = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Ordering example

Type	Size	Disc pack	Bore diameter d_1	Bore diameter d_2
TND HSH	118	HD	60	80

Further information on
RINGFEDER® TND HSH
on **www.ringfeder.com**

Technical Information

- Without further specifications, we deliver as standard: Bore tolerance H7; Keyway acc. to DIN 6885-1; Keyway width tolerance P9; Set screw per hub.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced half key (before grooving).

RINGFEDER POWER TRANSMISSION

Steel Disc Couplings

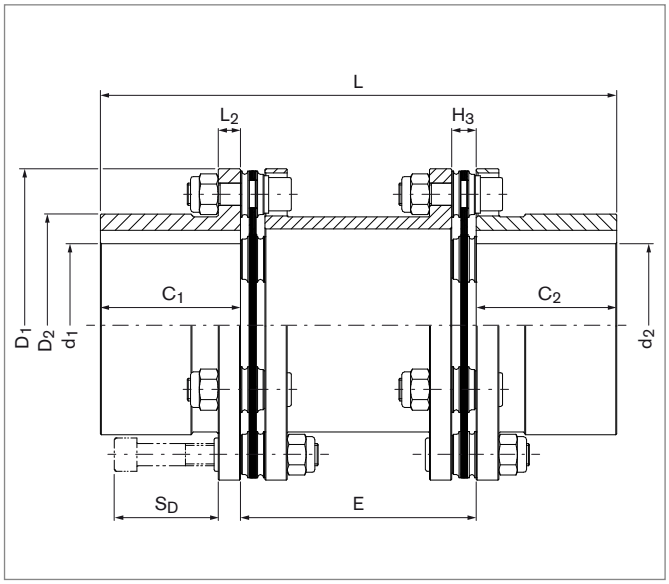
RINGFEDER® TND HDH

Standard Hubs, Double-Jointed, with Spacer, Shaft-Hub Connection by Keyway

Size 47-141
Hexagon Socket Screws

Size 169-254
Hexagon Head Screws

Size 262-316
Hexagon Head Screws with Special Nut



Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max} [2]	d_{pre} [3]	$d_{1k};d_{2k}$ max [4]	C_1 / C_2	E [5]	H_3	D_1	D_2	L_2	L	S_D	n_{Sc}
HDH	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
47	170	230	12200	10	32	39,5	60 100 140	7,5	70,5	47	5	139 179 219	24	6
63	320	420	9900	14	42	45	70 80 100 140	9	88	62,5	8	160 170 190 230	32	6
82	750	1050	7500	15	55	55	100 140 180	10,5	116	82	10	210 250 290	40	6
98	1350	1750	6200	19	65	60	100 140 180	12	140,5	98	11	220 260 300	47	6
118	2400	3000	5250	25	85	75	100 140 180	13	166,5	118	12	250 290 330	55	6
141	4000	5200	4400	30	95	90	140 180	15	198,5	141	14	320 360	64	6
169	6500	8500	3650	39	115	125	140 180 250	21	238	169	16	390 430 500	81	6

To continue see next page

Steel Disc Couplings RINGFEDER® TND HDH

Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max} [2]	d_{pre} [3]	$d_{1k};d_{2k}$ max [4]	C_1 / C_2	E [5]	H_3	D_1	D_2	L_2	L	S_D	n_{Sc}
HDH	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
205	21000	26000	2950	59	140	160	200 250	28	295	205	22	520 570	112	8
254	36000	44000	2500	79	175	200	224 250 300	32,2	345	254	26	624 650 700	133	8
262	74000	---	2050	90	180	210	280	34	420	262	32	700	137	8
316	130000	---	1700	100	215	240	350	47	510	316	38	830	172	8

						Max. Permissible Misalignment [7]					
						axial		angular		radial	
Size	E [5]	Gw_{SB} [6]	J_{SB} [6]	$C_{Tdyn}HD$	$C_{Tdyn}HT$	ΔK_aHD	ΔK_aHT	ΔK_wHD	ΔK_wHT	ΔK_rHD	ΔK_rHT
HDH	mm	kg	$10^{-3}kgm^2$	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
47	60	1,7	0,76	0,071	0,075	1,0	0,6	2	1,4	0,8	0,6
	100	1,8	0,76	0,059	0,062					1,5	1,1
	140	1,9	0,76	0,071	0,075					2,2	1,5
	Δ per 100 mm	*0,31*	*0,14*	*0,14*							
63	70	3,3	2,5	0,126	0,139	1,0	0,8	2	1,4	1	0,7
	80	3,3	2,6	0,123	0,134					1,1	0,8
	100	3,5	2,7	0,116	0,127					1,5	1,1
	140	3,7	2,8	0,105	0,114					2,1	1,6
	Δ per 100 mm	*0,55*	*0,44*	*0,44*							
82	100	7,1	9,1	0,271	0,308	1,4	0,8	2	1,4	1,4	1,1
	140	7,4	9,5	0,246	0,277					2,1	1,5
	180	7,7	9,9	0,226	0,251					2,8	2,1
	Δ per 100 mm	*0,74*	*0,10*	*1,06*							
98	100	11,1	21	0,513	0,543	2,0	1,2	2	1,4	1,5	1
	140	11,5	22	0,469	0,494					2,1	1,5
	180	12	23	0,433	0,454					2,8	2
	Δ per 100 mm	*1,09*	*1,04*	*2,18*							
118	100	18,9	52	0,914	0,948	2,4	1,6	2	1,4	1,4	1
	140	19,6	54	0,855	0,884					2,1	1,5
	180	20,3	56	0,803	0,829					2,8	2
	Δ per 100 mm	*1,74*	*5,14*	*5,24*							
141	140	31,7	120	1,306	1,362	2,8	1,6	2	1,4	2	1,5
	180	32,5	130	1,229	1,279					2,7	2
	Δ per 100 mm	*1,92*	*8,14*	*8,3*							
169	140	60,2	340	2,467	3,035	3	2,4	2	1,4	2	1,4
	180	61,8	350	2,375	2,898					2,6	1,9
	250	64,5	360	2,231	2,686					3,8	2,7
	Δ per 100 mm	*3,92*	*24,88*	*25,36*							
205	200	119,6	1070	8,995	9,142	2,2	1,2	1	0,8	1,4	1,2
	250	122,4	1100	8,265	8,389					1,8	1,5
	Δ per 100 mm	*5,56*	*49,36*	*50,3*							

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Steel Disc Couplings RINGFEDER® TND HDH

Size	E [5]	Gw_{SB} [6]	J_{SB} [6]	C_{TdynHD}	C_{TdynHT}	Max. Permissible Misalignment [7] axial ΔK_aHD	axial ΔK_aHT	angular ΔK_wHD	angular ΔK_wHT	radial ΔK_rHD	radial ΔK_rHT
HDH	mm	kg	$10^{-3}kgm^2$	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
	224	207,5	2620	14,975	15,19					1,6	1,3
254	250	209,5	2640	14,302	14,497	2,2	1,6	1	0,8	1,8	1,5
	300	213,3	2680	13,163	13,328					2,2	1,8
	Δ per 100 mm	*7,58*	*80,10*	*81,63*							
262	280	261,9	5350	18,116	---	3,2	---	1	---	2,5	---
	Δ per 100 mm	*8,75*	*121,28*	*122,81*							
316	350	450,1	14430	36,134	---	3,8	---	1	---	3	---
	Δ per 100 mm	*11,05*	*221,59*	*224,4*							

1) When selecting the size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN}.

2) For longer spacers, check bending critical rotational speed.

3) Pre-bore has free tolerance.

4) Maximum finished bore with keyways according to DIN 6885-1.

5) Longer spacers on request. The figures given at "Δ per 100 mm" for Gw_{SB}, J_{SB}, C_{TdynHD} and C_{TdynHT} are approximate values.

6) Weight and mass moments of inertia for pre-bored hubs.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{pre} = Diamater pre-bore

d_{1kmax} = Max. bore diameter d_1 with keyway acc. to DIN 6885-1

d_{2kmax} = Max. bore diameter d_2 with keyway acc. to DIN 6885-1

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

D_2 = Outer diameter hub

L_2 = Hub flange thickness

L = Total length

S_D = Disassembly space

n_{Sc} = Quantity of screws

Gw_{SB} = Weight at smallest bore diameter

J_{SB} = Moment of inertia at smallest bore diameter.

C_{TdynHD} = Dynamic torsional stiffness with disc pack HD

C_{TdynHT} = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Ordering example

Type	Size	Disc pack	Distance between hubs E	Bore diameter d_1	Bore diameter d_2
TND HDH	118	HT	140	60	80

Further information on
RINGFEDER® TND HDH
on **www.ringfeder.com**

Technical Information

- Without further specifications, we deliver as standard: Bore tolerance H7; Keyway acc. to DIN 6885-1; Keyway width tolerance P9; Set screw per hub.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced half key (before grooving), the spacer without screwed-on disc packs.

RINGFEDER POWER TRANSMISSION

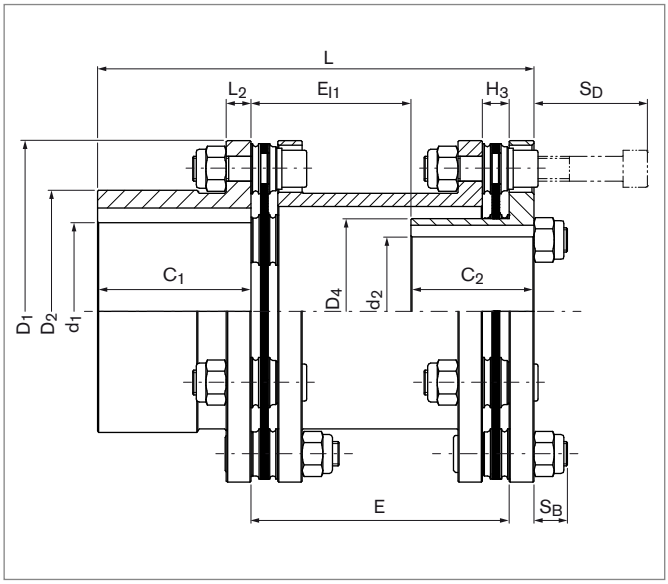
Steel Disc Couplings

RINGFEDER® TND HDV

Combination of Standard Hub and Inverted Hub, Double-Jointed, with Spacer, Shaft-Hub Connection by Keyway

Size 47-141
Hexagon Socket Screws

Size 169-254
Hexagon Head Screws



Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max} [2]	d_{pre} [3]	d_{1kmax} [4]	d_{2kmax} [4]	C_1/C_2	E_{l1}	E [5]	H_3	D_1	D_2	D_4	L_2	L	S_B	S_D	n_{Sc}
HDV	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
47	170	230	12200	10	32	25	39,5	25,5 65,5 105,5	60 100 140	7,5	70,5	47	37	5	105 145 185	7	24	6
63	320	420	9900	14	42	32	45	33 43 63 103	70 80 100 140	9	88	62,5	48	8	123 133 153 193	9	32	6
82	750	1050	7500	15	55	44	55	55 95 135	100 140 180	10,5	116	82	64	10	165 205 245	11	40	6
98	1350	1750	6200	19	65	50	60	51 91 131	100 140 180	12	140,5	98	77	11	171 211 251	15	47	6
118	2400	3000	5250	25	85	60	75	37 77 117	100 140 180	13	166,5	118	90,5	12	187 227 267	17	55	6
141	4000	5200	4400	30	95	75	90	64 104	140 180	15	198,5	141	114	14	244 284	18	64	6
169	6500	8500	3650	39	115	90	125	31 71 141	140 180 250	21	238	169	135	16	281 321 391	24	81	6

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Steel Disc Couplings RINGFEDER® TND HDV

Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max} [2]	d_{pre} [3]	d_{1kmax} [4]	d_{2kmax} [4]	C_1/C_2	E_{l1}	E [5]	H_3	D_1	D_2	D_4	L_2	L	S_B	S_D	n_{Sc}
HDV	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
205	21000	26000	2950	59	140	115	160	62 112	200 250	28	295	205	170	22	382 432	27	112	8
254	36000	44000	2500	79	175	120	200	50 76 126	224 250 300	32,5	345	254	180	26	450 476 526	29	133	8

Size	E [5]	G_{WSB} [6]	J_{SB} [6]	C_{TdynHD}	C_{TdynHT}	Max. Permissible Misalignment [7] axial ΔK_aHD	axial ΔK_aHT	angular ΔK_wHD	angular ΔK_wHT	radial ΔK_rHD	radial ΔK_rHT
HDV	mm	kg	$10^{-3}kgm^2$	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
47	60	1,4	0,69	0,071	0,075	1,0	0,6	2	1,4	0,8	0,6
	100	1,6	0,75	0,059	0,062					1,5	1,1
	140	1,7	0,8	0,051	0,053					2,2	1,5
63	70	2,9	2,33	0,123	0,134	1,0	0,8	2	1,4	1	0,7
	80	2,9	2,37	0,123	0,134					1,1	0,8
	100	3	2,46	0,116	0,127					1,5	1,1
	140	3,2	2,63	0,105	0,114					2,1	1,6
82	100	5,4	8,83	0,271	0,308	1,4	0,8	2	1,4	1,4	1,1
	140	6,7	9,23	0,246	0,277					2,1	1,5
	180	7	9,65	0,226	0,251					2,8	2,1
98	100	9,9	20,35	0,513	0,543	2,0	1,2	2	1,4	1,5	1
	140	10,4	21,21	0,469	0,494					2,1	1,5
	180	10,8	22,07	0,433	0,454					2,8	2
118	100	16	46,28	0,914	0,948	2,4	1,6	2	1,4	1,4	1
	140	16,7	48,34	0,855	0,884					2,1	1,5
	180	17,3	50,39	0,803	0,829					2,8	2
141	140	26,4	98,01	1,306	1,362	2,8	1,6	2	1,4	2	1,5
	180	28,5	105,33	1,229	1,279					2,7	2
169	140	50,7	289,79	2,467	3,035	3	2,4	2	1,4	2	1,4
	180	52,3	299,74	2,375	2,898					2,6	1,9
	250	55	317,15	2,231	2,686					3,8	2,7
205	200	105	951,03	8,995	9,142	2,2	1,2	1	0,8	1,4	1,2
	250	107,8	975,71	8,265	8,389					1,8	1,5
254	224	169,2	2131,73	14,975	15,19	2,2	1,6	1	0,8	1,6	1,3
	250	171,2	2152,56	14,302	14,497					1,8	1,5
	300	175	2192,61	13,163	13,328					2,2	1,8

1) When selecting the size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN}.

2) For longer spacers, check bending critical rotational speed.

3) Pre-bore has free tolerance.

4) Maximum finished bore with keyways according to DIN 6885-1.

5) Longer spacers on request.

6) Weight and mass moments of inertia for pre-bored hubs.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

To continue see next page

Steel Disc Couplings RINGFEDER® TND HDV

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{pre} = Diamater pre-bore

d_{1kmax} = Max. bore diameter d_1 with keyway acc. to DIN 6885-1

d_{2kmax} = Max. bore diameter d_2 with keyway acc. to DIN 6885-1

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E_{l1} = Distance between hubs

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

D_2 = Outer diameter hub

D_4 = Outer diameter of the inverted hub

L_2 = Hub flange thickness

L = Total length

S_B = Protruding of the screw

S_D = Disassembly space

n_{Sc} = Quantity of screws

Gw_{SB} = Weight at smallest bore diameter

J_{SB} = Moment of inertia at smallest bore diameter

$C_{Tdyn}HD$ = Dynamic torsional stiffness with disc pack HD

$C_{Tdyn}HT$ = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Ordering example

Type	Size	Disc pack	Distance between hubs E	Bore diameter d_1	Bore diameter d_2
TND HDV	118	HD	140	85	60

Further information on
RINGFEDER® TND HDV
on **www.ringfeder.com**

Technical Information

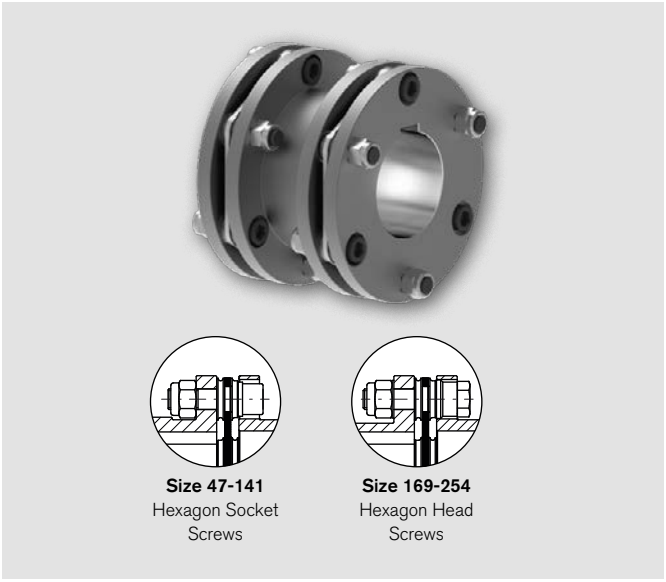
- Without further specifications, we deliver as standard: Bore tolerance H7; Keyway acc. to DIN 6885-1; Keyway width tolerance P9; Set screw per hub.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced half key (before grooving), the spacer without screwed-on disc packs.

RINGFEDER POWER TRANSMISSION

Steel Disc Couplings

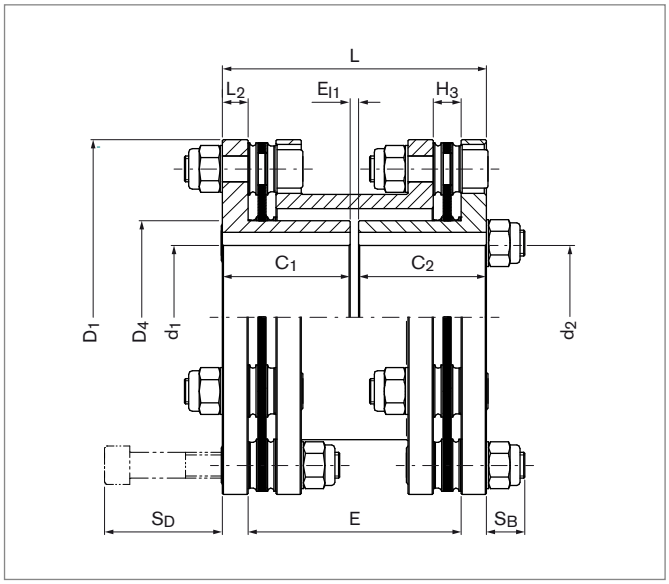
RINGFEDER® TND VDV

Inverted Hubs, Double-Jointed, with Spacer, Shaft-Hub Connection by Keyway



Size 47-141
Hexagon Socket Screws

Size 169-254
Hexagon Head Screws



Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max} [2]	d_{pre} [3]	$d_{1k};d_{2k}$ max [4]	C_1 / C_2	E_{I1}	E [5]	H_3	D_1	D_4	L_2	L	S_B	S_D	n_{Sc}
VDV	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
47	170	230	12200	10	25	33 39,5	4 31	60 100	7,5	70,5	37	5	70 110	7	24	6
63	320	420	9900	14	32	41 45	4 6	70 80	9	88	48	8	86 96	9	32	6
82	750	1050	7500	15	44	55 55	10 50	100 140	10,5	116	64	10	120 160	11	40	6
98	1350	1750	6200	19	50	59 60	4 42	100 140	12	140,5	77	11	122 162	15	47	6
118	2400	3000	5250	25	60	60 75	4 14	100 140	13	166,5	90,5	12	124 164	17	55	6
141	4000	5200	4400	30	75	81 90	6 28	140 180	15	198,5	114	14	168 208	18	64	6
169	6500	8500	3650	39	90	103 125	6 32	180 250	21	238	135	16	212 282	24	81	6
205	21000	26000	2950	59	115	142	10	250	28	295	170	22	294	27	112	8
254	36000	44000	2500	79	120	146 171	10 10	250 300	32,5	345	180	26	302 352	29	133	8

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Steel Disc Couplings RINGFEDER® TND VDV

Size	E [5]	Gw_{SB} [6]	J_{SB} [6]	C_{TdynHD}	C_{TdynHT}	Max. Permissible Misalignment [7]					
						axial		angular		radial	
						ΔK_aHD	ΔK_aHT	ΔK_wHD	ΔK_wHT	ΔK_rHD	ΔK_rHT
VDV	mm	kg	$10^{-3}kgm^2$	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
47	60	1,2	0,6	0,071	0,075	1	0,6	2	1,4	0,8	0,6
	100	1,4	0,66	0,059	0,062					1,5	1,1
63	70	2,4	2,04	0,126	0,139	1	0,8	2	1,4	1	0,7
	80	2,5	2,08	0,126	0,139					1,1	0,8
82	100	5,7	7,90	0,271	0,308	1,4	0,8	2	1,4	1,4	1,1
	140	6	8,32	0,246	0,277					2,1	1,5
98	100	8,8	18,36	0,513	0,543	2	1,2	2	1,4	1,5	1
	140	9,2	19,22	0,469	0,494					2,1	1,5
118	100	13,1	39,38	0,914	0,948	2,4	1,6	2	1,4	1,4	1
	140	13,8	41,44	0,855	0,884					2,1	1,5
141	140	22,6	100,41	1,306	1,362	2,8	1,6	2	1,4	2	1,5
	180	24,7	105,33	1,229	1,279					2,7	2
169	180	43,5	256,20	2,375	2,898	3	2,4	2	1,4	2,6	1,9
	250	46,2	273,61	2,231	2,686					3,8	2,7
205	250	93,4	862,77	8,265	8,389	2,2	1,2	1	0,8	1,8	1,5
254	250	132,8	1734,93	14,302	14,497	2,2	1,6	1	0,8	1,8	1,5
	300	136,6	1774,98	13,163	13,328					2,2	1,8

1) When selecting the size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN}.

2) For longer spacers, check bending critical rotational speed.

3) Pre-bore has free tolerance.

4) Maximum finished bore with keyways according to DIN 6885-1.

5) Longer spacers on request.

6) Weight and mass moments of inertia for pre-bored hubs.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

To continue see next page

Steel Disc Couplings RINGFEDER® TND VDV

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{pre} = Diamater pre-bore

d_{1kmax} = Max. bore diameter d_1 with keyway acc. to DIN 6885-1

d_{2kmax} = Max. bore diameter d_2 with keyway acc. to DIN 6885-1

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E_{l1} = Distance between hubs

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

D_4 = Outer diameter of the inverted hub

L_2 = Hub flange thickness

L = Total length

S_B = Protruding of the screw

S_D = Disassembly space

n_{Sc} = Quantity of screws

Gw_{SB} = Weight at smallest bore diameter

J_{SB} = Moment of inertia at smallest bore diameter

C_{TdynHD} = Dynamic torsional stiffness with disc pack HD

C_{TdynHT} = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Ordering example

Type	Size	Disc pack	Distance between hubs E	Bore diameter d_1	Bore diameter d_2
TND VDV	118	HD	140	60	60

Further information on
RINGFEDER® TND VDV
on **www.ringfeder.com**

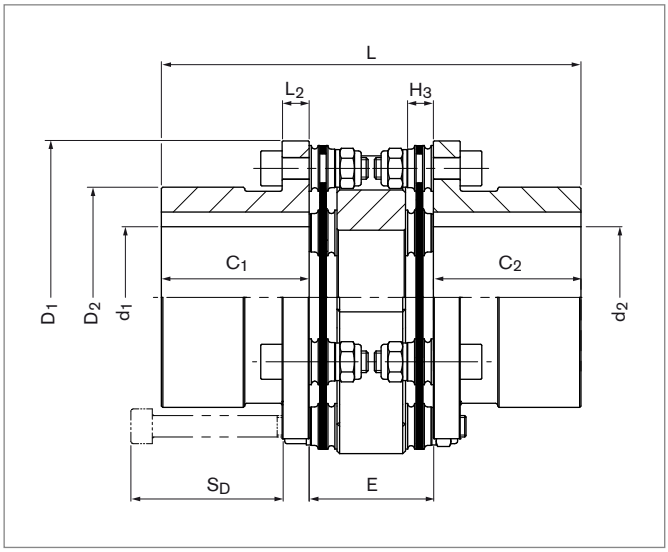
Technical Information

- Without further specifications, we deliver as standard: Bore tolerance H7; Keyway acc. to DIN 6885-1; Keyway width tolerance P9; Set screw per hub.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced half key (before grooving), the spacer without screwed-on disc packs.

Steel Disc Couplings

RINGFEDER® TND OCO

Standard Hubs with Open Flange, Double-Jointed, with Compact-Spacer, Shaft-Hub Connection by Keyway



Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max}	d_{pre} [3]	$d_{1k};d_{2k}$ max [4]	C_1 / C_2	E	H_3	D_1	D_2	L_2	L	S_D	n_{Sc}
OCO	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
47	170	230	8400	10	32	39,5	31,2	7,5	70,5	47	5	110	24	6
63	320	420	6800	14	42	45	38	9	88	62,5	8	128	32	6
82	750	1050	5400	15	55	55	46,5	10,5	116	82	10	156,5	40	6
98	1350	1750	4600	19	65	60	55	12	140,5	98	11	175	47	6

					Max. Permissible Misalignment [7]					
					axial		angular		radial	
Size	G_{WSB} [6]	J_{SB} [6]	$C_{Tdyn}HD$	C_{TdynHT}	ΔK_aHD	ΔK_aHT	ΔK_wHD	ΔK_wHT	ΔK_rHD	ΔK_rHT
OCO	kg	$10^{-3}kgm^2$	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
47	1,6	0,71	0,084	0,089	0,9	0,5	2	1,4	0,3	0,2
63	3,1	2,2	0,136	0,151	0,8	0,7	2	1,4	0,4	0,3
82	6,7	8	0,309	0,360	1,4	0,6	2	1,4	0,5	0,4
98	10,3	18	0,569	0,607	2	1	2	1,4	0,7	0,5

1) When selecting the size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN}.

3) Pre-bore has free tolerance.

4) Maximum finished bore with keyways according to DIN 6885-1.

6) Weight and mass moments of inertia for pre-bored hubs.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

To continue see next page

Steel Disc Couplings RINGFEDER® TND OCO

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{pre} = Diamater pre-bore

d_{1kmax} = Max. bore diameter d_1 with keyway acc. to DIN 6885-1

d_{2kmax} = Max. bore diameter d_2 with keyway acc. to DIN 6885-1

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

D_2 = Outer diameter hub

L_2 = Hub flange thickness

L = Total length

S_D = Disassembly space

n_{Sc} = Quantity of screws

Gw_{SB} = Weight at smallest bore diameter

J_{SB} = Moment of inertia at smallest bore diameter.

C_{TdynHD} = Dynamic torsional stiffness with disc pack HD

C_{TdynHT} = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Ordering example

Type	Size	Disc pack	Bore diameter d_1	Bore diameter d_2
TND OCO	98	HD	50	60

Further information on
RINGFEDER® TND OCO
on **www.ringfeder.com**

Technical Information

- Without further specifications, we deliver as standard: Bore tolerance H7; Keyway acc. to DIN 6885-1; Keyway width tolerance P9; Set screw per hub.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced half key (before grooving), the spacer without screwed-on disc packs.

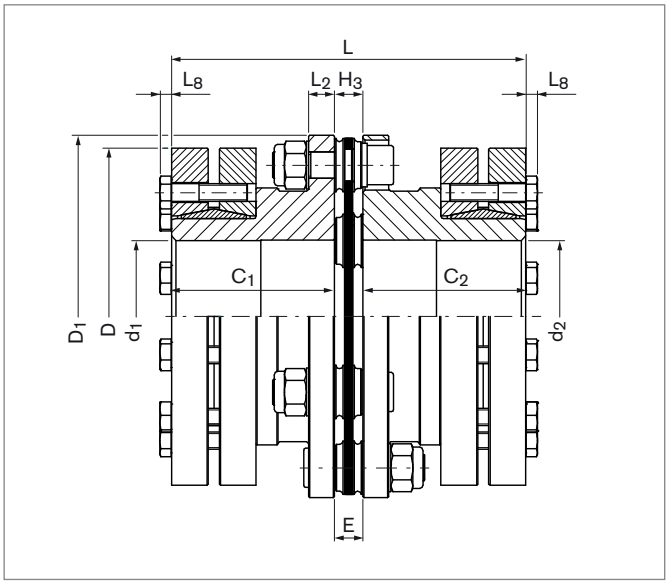
Steel Disc Couplings

RINGFEDER® TND XSX

Hubs with RINGFEDER® Shrink Discs, Single-Jointed, without Spacer, Shaft-Hub Connection by Shrink Disc

Size 82-141
Hexagon Socket Screws

Size 169-254
Hexagon Head Screws



Size	T_{KN}HD [1]	T_{KN}HT [1]	n_{max}	$d_1;d_2$ [3] min	$d_1;d_2$ [3] max	C_1 / C_2	E	H_3	D_1	L_2	L	n_{Sc}
XSX	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	Quantity
82	750	1050	3600	38	60	55	10,5	10,5	116	10	120,5	6
98	1350	1750	3600	50	70	60	12	12	140,5	11	132	6
118	2400	3000	3600	50	75	75	13	13	166,5	12	163	6
141	4000	5200	3400	65	95	90	15	15	198,5	14	195	6
169	6500	8500	3000	65	105	125	21	21	238	16	271	6
205	21000	26000	2500	95	145	160	28	28	295	22	348	8
254	36000	44000	2100	95	160	200	32,5	32,5	345	26	432,5	8

Size	Gw_{sp}	C_{Tdyn}HD	C_{Tdyn}HT	Max. Permissible Misalignment [7] axial ΔK_aHD	axial ΔK_aHT	angular ΔK_wHD	angular ΔK_wHT	radial ΔK_rHD	radial ΔK_rHT
XSX	kg	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
82	0,5	0,637	0,743	0,7	0,4	1	0,7	---	---
98	0,85	1,173	1,251	1	0,6	1	0,7	---	---
118	1,36	2	2,082	1,2	0,8	1	0,7	---	---
141	2,096	2,992	3,142	1,4	0,8	1	0,7	---	---
169	4,032	5,269	6,586	1,5	1,2	1	0,7	---	---
205	10,903	21,848	22,285	1,1	0,6	0,5	0,4	---	---
254	18,135	37,204	37,868	1,1	0,8	0,5	0,4	---	---

1) When selecting the coupling size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN} or by the transmissible torque T of the shrink disc.

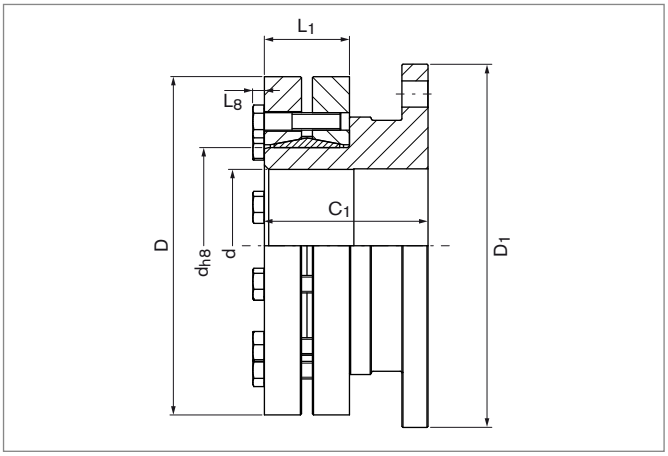
3) Bore tolerance H6 up to diameter 80 mm; Bore tolerance H7 from diameter 80 mm.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

To continue see next page

Steel Disc Couplings RINGFEDER® TND XSX

Shaft-Hub Connection by Shrink Discs RINGFEDER® RfN 4061



Shrink Discs RINGFEDER® RfN 4061							Sizing RINGFEDER® TND XSX						
d_{h8}	x	D	L_1	L_8	d	T	Size	D_1	C_1 / C_2	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max}	Gw_{hs}
mm			mm	mm	mm	Nm	XSX	mm	mm	Nm	Nm	1/min	kg
50	x	90	27,5	4	38	1350	82	116	55	750	1050	3600	2,3
					40	1500							
					42	1700							
55	x	100	30,5	4	42	1300	82	116	55	750	1050	3600	2,4
					45	1550							
					48	1800							
68	x	115	30,5	4	48	1700	82	116	55	750	1050	3600	2,8
					55	2250	98	140,5	60	1350	1750	3600	3,6
					60	2850	118	166,5	75	2400	3000	3600	5,8
75	x	138	32,5	5,3	55	2650	98	140,5	60	1350	1750	3600	4,4
					60	3300	118	166,5	75	2400	3000	3600	6,5
					65	4050							
80	x	145	32,5	5,3	60	3200	98	140,5	60	1350	1750	3600	4,6
					65	3900							
					70	4600							
90	x	155	39	5,5	65	4800	118	166,5	75	2400	3000	3600	7,2
					70	6050	141	198,5	90	4000	5200	3400	10,5
					75	7300	169	238	125	6500	8500	3000	19
115	x	185	56	6,4	75	9100	141	198,5	90	4000	5200	3400	12,6
					90	12100	169	238	125	6500	8500	3000	20
					95	14050							
140	x	230	60,5	7,5	95	15100	169	238	125	6500	8500	3000	24,4
					100	17550	205	295	160	21000	26000	2500	40
					105	20000	254	345	200	36000	44000	2100	60
165	x	290	71	10	105	25000	205	295	160	21000	26000	2500	48,8
					120	35500	254	345	200	36000	44000	2100	69
					125	39400							
185	x	330	86,4	10	125	43500	205	295	160	21000	26000	2500	60,4
					140	57350	254	345	200	36000	44000	2100	80
					145	62400							
200	x	350	86	10	145	69000	254	345	200	36000	44000	2100	77,7
					155	81000							
					160	87200							

The transmissible torque of the coupling is dependent on the selected disc pack as well as the type of the shaft-hub connection.
The lower torque limits the transmissibility and must be taken as a basis for the selection of the coupling.

To continue see next page

Steel Disc Couplings RINGFEDER® TND XSX

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{1min} = Min. bore diameter d_1

d_{2min} = Min. bore diameter d_2

d_{1max} = Max. bore diameter d_1

d_{2max} = Max. bore diameter d_2

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

L_2 = Hub flange thickness

L = Total length

n_{Sc} = Quantity of screws

Gw_{sp} = Weight of spacer

Gw_{hs} = Weight of hub including shrink disc

$C_{Tdyn}HD$ = Dynamic torsional stiffness with disc pack HD

$C_{Tdyn}HT$ = Dynamic torsional stiffness with disc pack HT

$\Delta K_a HD$ = Max. permissible axial misalignment with disc pack HD

$\Delta K_a HT$ = Max. permissible axial misalignment with disc pack HT

$\Delta K_w HD$ = Max. permissible angular misalignment with disc pack HD

$\Delta K_w HT$ = Max. permissible angular misalignment with disc pack HT

$\Delta K_r HD$ = Max. permissible radial misalignment with disc pack HD

$\Delta K_r HT$ = Max. permissible radial misalignment with disc pack HT

Shrink Disc Selection

d_{h8} = Inner diameter

D = Outer diameter

L_1 = Min. installation length (without screws)

L_8 = Overhang length

d = Solid shaft diameter

T = Transmissible torque

Ordering example

Type	Size	Disc pack	Bore diameter d_1	Shrink Disc RfN 4061 for bore diameter d_1	Bore diameter d_2	Shrink Disc RfN 4061 for bore diameter d_2
TND XSX	98	HD	50	68 x 115	60	68 x 115

Further information on
RINGFEDER® TND XSX
on **www.ringfeder.com**

Technical Information

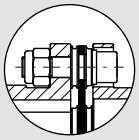
- The specified values for transmissible torques are valid as follows: Shaft tolerance h6 for shaft diameters up to 50 mm; Shaft tolerance g6 for shaft diameters from 50 mm; Surface quality $R_a \leq 3.2$ µm.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs are balanced without screwed-on disc pack.

RINGFEDER POWER TRANSMISSION

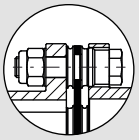
Steel Disc Couplings

RINGFEDER® TND XDX

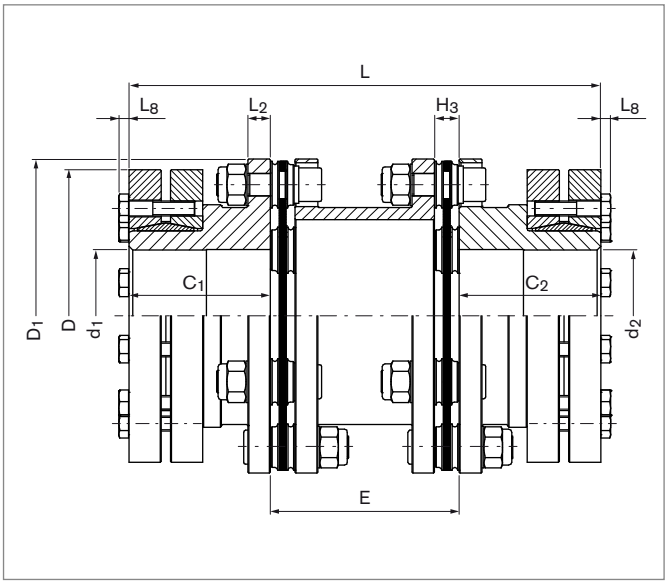
Hubs with RINGFEDER® Shrink Discs, Double-Jointed, with Spacer, Shaft-Hub Connection by Shrink Disc



Size 82-141
Hexagon Socket Screws



Size 169-254
Hexagon Head Screws



Size	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max} [2]	$d_1;d_2$ [3] min	$d_1;d_2$ [3] max	C_1 / C_2	E [5]	H_3	D_1	L_2	L	n_{Sc}	L_8
XDX	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	Quantity	mm
82	750	1050	3600	38	60	55	100 140 180	10,5	116	10	210 250 290	6	4
98	1350	1750	3600	50	70	60	100 140 180	12	140,5	11	220 260 300	6	5,3
118	2400	3000	3600	50	75	75	100 140 180	13	166,5	12	250 290 330	6	5,3
141	4000	5200	3400	65	95	90	140 180	15	198,5	14	320 360	6	7,5
169	6500	8500	3000	65	105	125	140 180 250	21	238	16	390 430 500	6	10
205	21000	26000	2500	95	145	160	200 250	28	295	22	520 570	8	10
254	36000	44000	2100	94	160	200	224 250 300	32,5	345	26	624 650 700	8	10

To continue see next page

Steel Disc Couplings RINGFEDER® TND XDX

Size	E [5]	Gw_{sp}	$C_{Tdyn}HD$	$C_{Tdyn}HT$	Max. Permissible Misalignment [7] axial ΔK_aHD	axial ΔK_aHT	angular ΔK_wHD	angular ΔK_wHT	radial ΔK_rHD	radial ΔK_rHT
XDX	mm	kg	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
82	100	1,991	0,271	0,308	1,4	0,8	2	1,4	1,4	1,1
	140	2,289	0,246	0,277					2,1	1,5
	180	2,586	0,226	0,251					2,8	2,1
	Δ per 100 mm	*0,74*	*1,06*							
98	100	3,188	0,513	0,543	2	1,2	2	1,4	1,5	1
	140	3,627	0,469	0,494					2,1	1,5
	180	4,066	0,433	0,454					2,8	2
	Δ per 100 mm	*1,09*	*2,18*							
118	100	4,874	0,914	0,948	2,4	1,6	2	1,4	1,4	1
	140	5,574	0,855	0,884					2,1	1,5
	180	6,275	0,803	0,829					2,8	2
	Δ per 100 mm	*1,74*	*5,24*							
141	140	7,944	1,306	1,362	2,8	1,6	2	1,4	2	1,5
	180	8,718	1,229	1,279					2,7	2
	Δ per 100 mm	*1,92*	*8,3*							
169	140	14,179	2,467	3,035	3	2,4	2	1,4	2	1,4
	180	15,757	2,375	2,898					2,6	1,9
	250	18,520	2,231	2,686					3,8	2,7
	Δ per 100 mm	*3,92*	*25,36*							
205	200	32,689	8,995	9,142	2,2	1,2	1	0,8	1,4	1,2
	250	35,489	8,265	8,389					1,8	1,5
	Δ per 100 mm	*5,56*	*50,3*							
254	224	54,420	14,975	15,19	2,2	1,6	1	0,8	1,6	1,3
	250	56,404	14,302	14,497					1,8	1,5
	300	60,22	13,163	13,328						1,8
	Δ per 100 mm	*7,58*	*81,63*							

1) When selecting the coupling size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN} or by the transmissible torque T of the shrink disc.

2) For longer spacers, check bending critical rotational speed.

3) Bore tolerance H6 up to diameter 80 mm; Bore tolerance H7 from diameter 80 mm.

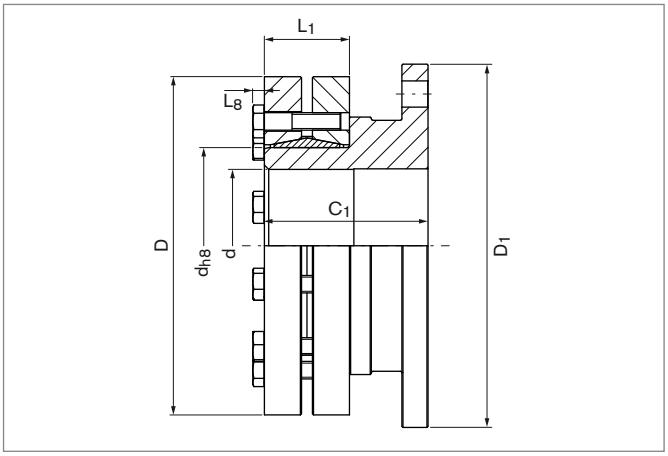
5) Longer spacers on request. The figures given at "Δ per 100 mm" for Gw_{sp}, $C_{Tdyn}HD$ and $C_{Tdyn}HT$ are approximate values.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

To continue see next page

Steel Disc Couplings RINGFEDER® TND XDX

Shaft-Hub Connection by Shrink Discs RINGFEDER® RfN 4061



Shrink Discs RINGFEDER® RfN 4061							Sizing RINGFEDER® TND XDX						
d_{h8}	x	D	L_1	L_8	d	T	Size	D_1	C_1 / C_2	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max}	Gw_{hs}
mm			mm	mm	mm	Nm	XDX	mm	mm	Nm	Nm	1/min	kg
50	x	90	27,5	4	38	1350	82	116	55	750	1050	3600	2,3
					40	1500							
					42	1700							
55	x	100	30,5	4	42	1300	82	116	55	750	1050	3600	2,4
					45	1550							
					48	1800							
68	x	115	30,5	4	48	1700	82	116	55	750	1050	3600	2,8
					55	2250	98	140,5	60	1350	1750	3600	3,6
					60	2850	118	166,5	75	2400	3000	3600	5,8
75	x	138	32,5	5,3	55	2650	98	140,5	60	1350	1750	3600	4,4
					60	3300	118	166,5	75	2400	3000	3600	6,5
					65	4050							
80	x	145	32,5	5,3	60	3200	98	140,5	60	1350	1750	3600	4,6
					65	3900							
					70	4600							
90	x	155	39	5,5	65	4800	118	166,5	75	2400	3000	3600	7,2
					70	6050	141	198,5	90	4000	5200	3400	10,5
					75	7300	169	238	125	6500	8500	3000	19
115	x	185	56	6,4	75	9100	141	198,5	90	4000	5200	3400	12,6
					90	12100	169	238	125	6500	8500	3000	20
					95	14050							
140	x	230	60,5	7,5	95	15100	169	238	125	6500	8500	3000	24,4
					100	17550	205	295	160	21000	26000	2500	40
					105	20000	254	345	200	36000	44000	2100	60
165	x	290	71	10	105	25000	205	295	160	21000	26000	2500	48,8
					120	35500	254	345	200	36000	44000	2100	69
					125	39400							
185	x	330	86,4	10	125	43500	205	295	160	21000	26000	2500	60,4
					140	57350	254	345	200	36000	44000	2100	80
					145	62400							
200	x	350	86	10	145	69000	254	345	200	36000	44000	2100	77,7
					155	81000							
					160	87200							

The transmissible torque of the coupling is dependent on the selected disc pack as well as the type of the shaft-hub connection.
The lower torque limits the transmissibility and must be taken as a basis for the selection of the coupling.

To continue see next page

Steel Disc Couplings RINGFEDER® TND XDX

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{1min} = Min. bore diameter d_1

d_{2min} = Min. bore diameter d_2

d_{1max} = Max. bore diameter d_1

d_{2max} = Max. bore diameter d_2

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

L_2 = Hub flange thickness

L = Total length

n_{Sc} = Quantity of screws

L_8 = Overhang length

Gw_{sp} = Weight of spacer

Gw_{hs} = Weight of hub including shrink disc

$C_{Tdyn}HD$ = Dynamic torsional stiffness with disc pack HD

$C_{Tdyn}HT$ = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Shrink Disc Selection

d_{h8} = Inner diameter

D = Outer diameter

L_1 = Min. installation length (without screws)

L_8 = Overhang length

d = Solid shaft diameter

T = Transmissible torque

Ordering example

Type	Size	Disc pack	Distance between hubs E	Bore diameter d_1	Shrink Disc RfN 4061 for bore diameter d_1	Bore diameter d_2	Shrink Disc RfN 4061 for bore diameter d_2
TND XDX	98	HD	100	50	68 x 115	60	68 x 115

Further information on
RINGFEDER® TND XDX
on **www.ringfeder.com**

Technical Information

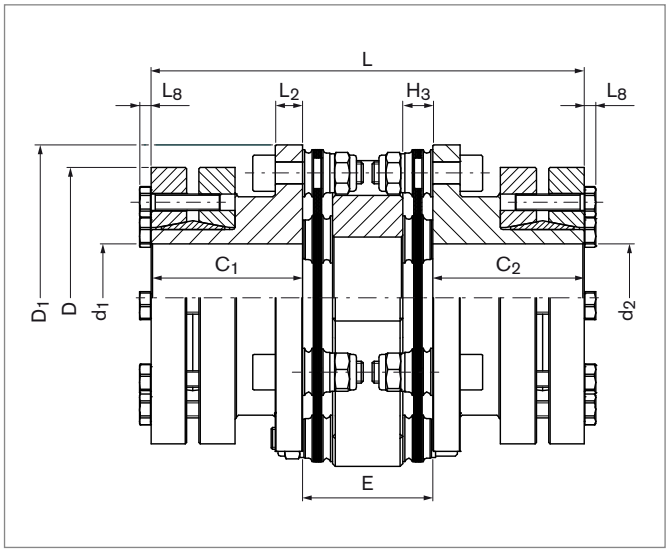
- The specified values for transmissible torques are valid as follows: Shaft tolerance h6 for shaft diameters up to 50 mm; Shaft tolerance g6 for shaft diameters from 50 mm; Surface quality $R_a \leq 3.2$ µm.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs and the spacer are balanced without screwed-on disc packs.

RINGFEDER POWER TRANSMISSION

Steel Disc Couplings

RINGFEDER® TND QCQ

Hubs with Open Flange and RINGFEDER® Shrink Discs, Double-Jointed, with Compact-Spacer, Shaft-Hub Connection by Shrink Disc



Size	$T_{KN}HD$ 1)	$T_{KN}HT$ 1)	n_{max}	$d_1;d_2$ 3) min	$d_1;d_2$ 3) max	C_1 / C_2	E	H_3	D_1	L_2	L	n_{Sc}	L_8
QCQ	Nm	Nm	1/min	mm	mm	mm	mm	mm	mm	mm	mm	Quantity	mm
82	750	1050	3600	38	65	55	46,5	10,5	116	10	156,5	6	5,3
98	1350	1750	3600	50	70	60	55	12	140,5	11	175	6	5,3

Size	Gw_{sp}	$C_{Tdyn}HD$	$C_{Tdyn}HT$	Max. Permissible Misalignment 7) axial ΔK_aHD	axial ΔK_aHT	angular ΔK_wHD	angular ΔK_wHT	radial ΔK_rHD	radial ΔK_rHT
QCQ	kg	10^6 Nm/rad	10^6 Nm/rad	mm	mm	Degrees	Degrees	mm	mm
82	1,8	0,309	0,360	1,4	0,6	2	1,4	0,5	0,4
98	2,9	0,569	0,607	2	1	2	1,4	0,7	0,5

1) When selecting the coupling size, it is essential to observe the instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings". Short-term peak torque T_{kmax} is limited to 1.75 multiples of T_{KN} or by the transmissible torque T of the shrink disc.

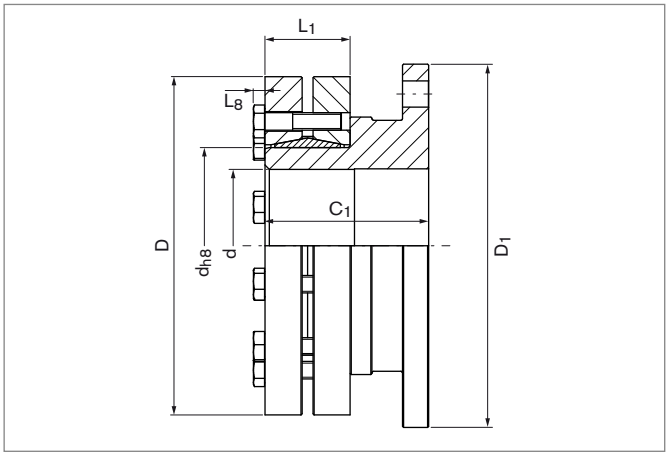
3) Bore tolerance H6 up to diameter 80 mm; Bore tolerance H7 from diameter 80 mm.

7) The maximum misalignment values must not apply simultaneously. The instructions on coupling dimensioning in the document "Product Paper & Tech Paper RINGFEDER® Steel Disc Couplings" are to be observed.

To continue see next page

Steel Disc Couplings RINGFEDER® TND QCQ

Shaft-Hub Connection by Shrink Discs RINGFEDER® RfN 4061



Shrink Discs RINGFEDER® RfN 4061							Sizing RINGFEDER® TND QCQ						
d_{h8}	x	D	L_1	L_8	d	T	Size	D_1	C_1 / C_2	$T_{KN}HD$ [1]	$T_{KN}HT$ [1]	n_{max}	Gw_{hs}
mm			mm	mm	mm	Nm	QCQ	mm	mm	Nm	Nm	1/min	kg
50	x	90	27,5	4	38	1350	82	116	55	750	1050	3600	2,2
					40	1500							
					42	1700							
55	x	100	30,5	4	42	1300	82	116	55	750	1050	3600	2,3
					45	1550							
					48	1800							
68	x	115	30,5	4	48	1700	82	116	55	750	1050	3600	2,7
					55	2250	98	140,5	60	1350	1750	3600	3,4
					60	2850							
75	x	138	32,5	5,3	55	2650	98	140,5	60	1350	1750	3600	4,2
					60	3300							
					65	4050							
80	x	145	32,5	5,3	60	3200	98	140,5	60	1350	1750	3600	4,4
					65	3900							
					70	4600							

The transmissible torque of the coupling is dependent on the selected disc pack as well as the type of the shaft-hub connection.
The lower torque limits the transmissibility and must be taken as a basis for the selection of the coupling.

To continue see next page

Steel Disc Couplings RINGFEDER® TND QCQ

Explanations

$T_{KN}HD$ = Nom. transmissible torque with disc pack HD

$T_{KN}HT$ = Nom. transmissible torque with disc pack HT

n_{max} = Max. rotational speed

d_{1min} = Min. bore diameter d_1

d_{2min} = Min. bore diameter d_2

d_{1max} = Max. bore diameter d_1

d_{2max} = Max. bore diameter d_2

C_1 = Guided length in hub bore

C_2 = Guided length in hub bore

E = Distance between hubs

H_3 = Width of the disc pack

D_1 = Max. outer diameter

L_2 = Hub flange thickness

L = Total length

n_{Sc} = Quantity of screws

L_8 = Overhang length

Gw_{sp} = Weight of spacer

Gw_{hs} = Weight of hub including shrink disc

$C_{Tdyn}HD$ = Dynamic torsional stiffness with disc pack HD

$C_{Tdyn}HT$ = Dynamic torsional stiffness with disc pack HT

ΔK_aHD = Max. permissible axial misalignment with disc pack HD

ΔK_aHT = Max. permissible axial misalignment with disc pack HT

ΔK_wHD = Max. permissible angular misalignment with disc pack HD

ΔK_wHT = Max. permissible angular misalignment with disc pack HT

ΔK_rHD = Max. permissible radial misalignment with disc pack HD

ΔK_rHT = Max. permissible radial misalignment with disc pack HT

Shrink Disc Selection

d_{h8} = Inner diameter

D = Outer diameter

L_1 = Min. installation length (without screws)

L_8 = Overhang length

d = Solid shaft diameter

T = Transmissible torque

Ordering example

Type	Size	Disc pack	Bore diameter d_1	Shrink Disc RfN 4061 for bore diameter d_1	Bore diameter d_2	Shrink Disc RfN 4061 for bore diameter d_2
TND QCQ	98	HD	50	68 x 115	60	68 x 115

Further information on
RINGFEDER® TND QCQ
on **www.ringfeder.com**

Technical Information

- The specified values for transmissible torques are valid as follows: Shaft tolerance h6 for shaft diameters up to 50 mm; Shaft tolerance g6 for shaft diameters from 50 mm; Surface quality $R_a \leq 3.2$ µm.
- From a peripheral speed of 30 m/s, separate balancing of the individual coupling parts is recommended.
- Without further instructions on balancing, the coupling parts are balanced individually according to DIN 21940-11 in quality G 6,3 at 1,500 1/min. The hubs and the spacer are balanced without screwed-on disc packs.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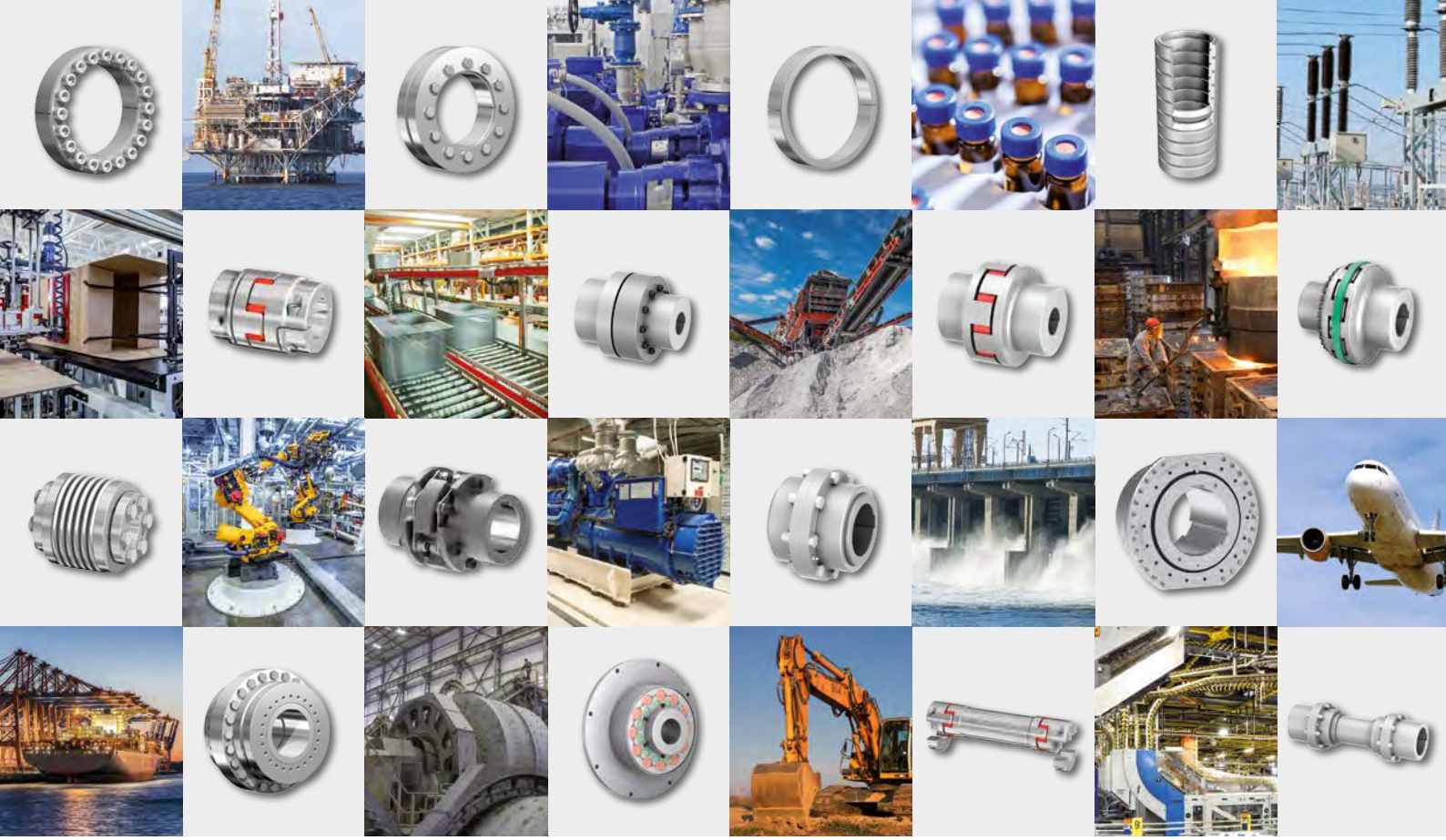

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