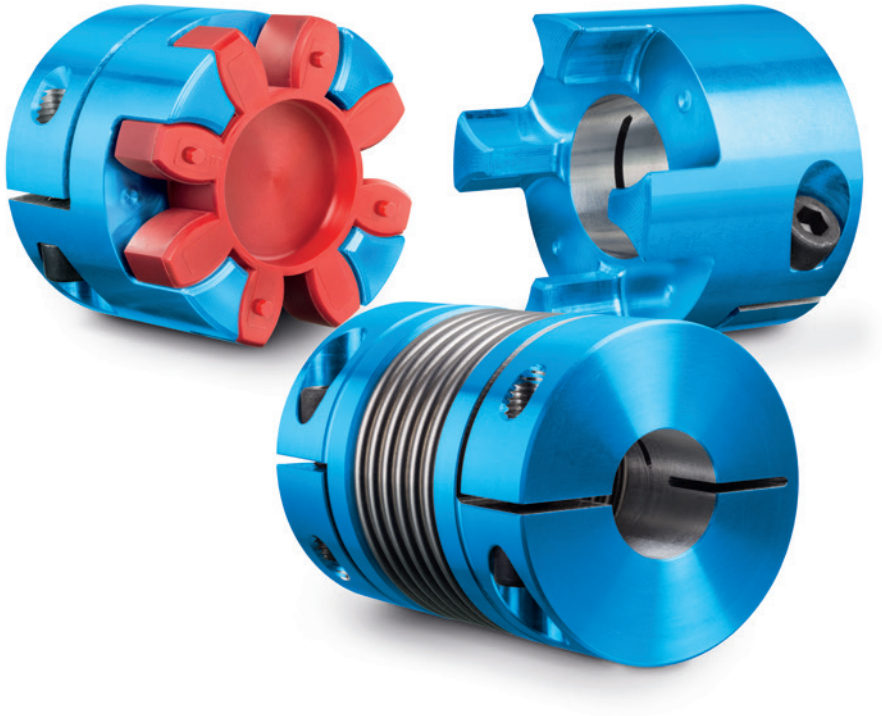
FLENDER COUPLINGS
CATALOG **FLE 10.6**
EDITION 2023 EN



BACKLASH-FREE COUPLINGS SIPEX AND BIPEX-S

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BACKLASH-FREE COUPLINGS

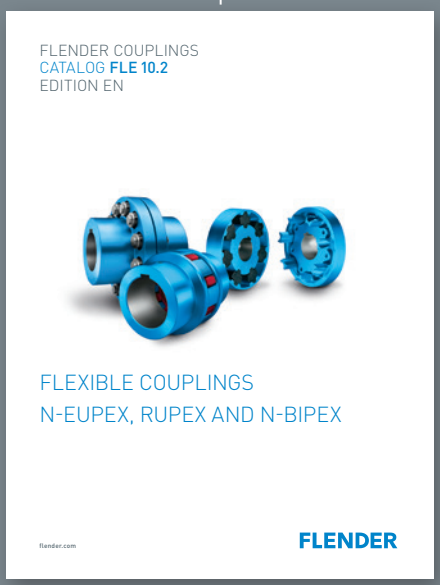
Catalog FLE 10.6 Edition 2023 EN

The products and systems described in this catalog are manufactured/distributed under application of a certified quality management system in accordance with EN ISO 9001 (Certified Registration No. 01 100 000708). The certificate is recognized by all IQNet countries.

FLE 10 CATALOG GROUP

Product catalog FLE 10.1
FLEX-C10001-00-7600
Torsionally Rigid Couplings

Product catalog FLE 10.3
FLEX-C10003-00-7600
Highly Flexible Couplings



Product catalog FLE 10.2
FLEX-C10001-00-7600
Flexible Couplings

Product catalog FLE 10.4
FLEX-C10004-00-7600
Fluid Couplings

For further coupling catalogs, see page A/6

Product catalog FLE 10.5
FLEX-C10120-00-7600
High Performance Couplings

Product catalog FLE 10.7
FLEX-C10122-00-7600
Safety couplings

Product catalog FLE 10.6
FLEX-C10121-00-7600
Backlash-free couplings

Product catalog FLE 10.8
FLEX-C10152-00
Clamping elements

INTRODUCTION

The mechanical drive train comprises individual units such as motor, gear unit and driven machine. The coupling connects these component assemblies.
As well as the transmission of rotary motion and torque, other requirements may be made of the coupling.

- Compensation for shaft misalignment with low restorative forces
- Control of characteristic angular vibration frequency and damping
- Interruption or limitation of torque
- Noise insulation, electrical insulation

Couplings are frequently chosen after the machines to be connected have already been selected. Thanks to a large number of different coupling assembly options, specified marginal conditions for clearance and connection geometry can be met from the standard range. The coupling also performs secondary functions, e.g. providing a brake disk or brake drum for operating or blocking brakes, devices to record speed or the attachment of sprockets or pulleys.

Couplings are divided into two main groups, couplings and clutches.

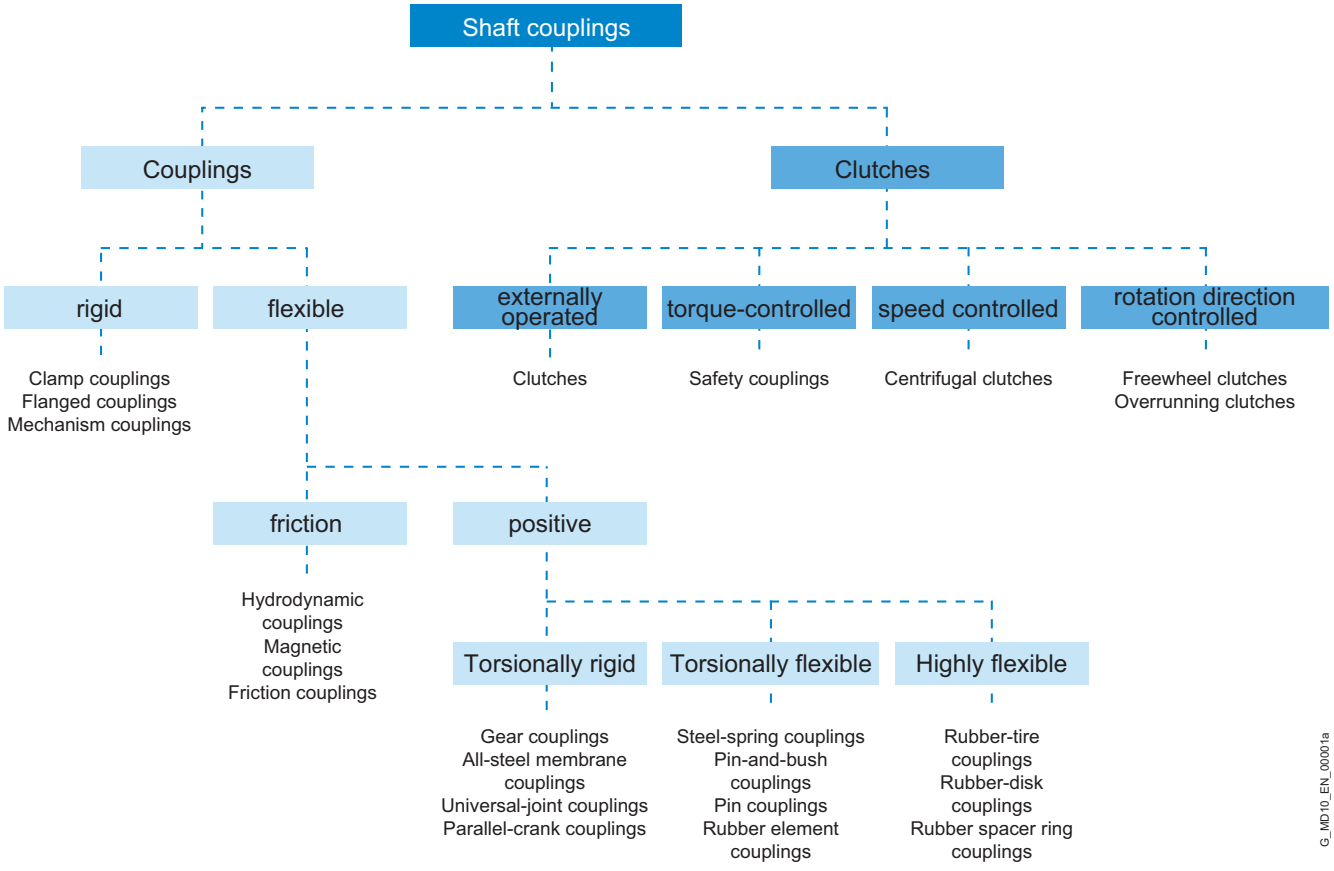
Clutches interrupt or limited the transmissible torque. The engaging and disengaging forces on externally operated clutches are introduced via a mechanically, electrically, hydraulically or pneumatically operating mechanism. Overload, centrifugal or freewheel clutches draw their engaging energy from the transmitted output.

Rigid couplings, designed as clamp, flanged or mechanism couplings, connect machines which must not undergo any shaft misalignment. Hydrodynamic couplings, often also called fluid or Föttinger couplings, are used as starting couplings in drives with high mass moments of inertia of the driven machine. In drive technology very often flexible, positive couplings, which may be designed to be torsionally rigid, torsionally flexible or highly flexible, are used.

Torsionally rigid couplings are designed to be rigid in a peripheral direction and flexible in radial and axial directions. The angle of rotation and torque are conducted through the coupling without a phase shift.

Torsionally flexible couplings have resilient elements usually manufactured from elastomer materials. Using an elastomer material with a suitable ShoreA hardness provides the most advantageous torsional stiffness and damping for the application. Shaft misalignment causes the resilient elements to deform.

Highly flexible couplings have large-volume (elastomer) resilient elements of low stiffness. The angle of rotation and torque are conducted through the coupling with a considerable phase shift.

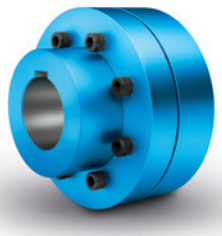

Shaft couplings
Couplings
Clutches
rigid
flexible
externally operated
torque-controlled
speed controlled
rotation direction controlled
Clamp couplings
Flanged couplings
Mechanism couplings
Clutches
Safety couplings
Centrifugal clutches
Freewheel clutches
Overrunning clutches
friction
positive
Hydrodynamic couplings
Magnetic couplings
Friction couplings
Torsionally rigid
Torsionally flexible
Highly flexible
Gear couplings
All-steel membrane couplings
Universal-joint couplings
Parallel-crank couplings
Steel-spring couplings
Pin-and-bush couplings
Pin couplings
Rubber element couplings
Rubber-tire couplings
Rubber-disk couplings
Rubber spacer ring couplings
G_MD10_EN_0001a

OUR COUPLING GROUPS AT A GLANCE

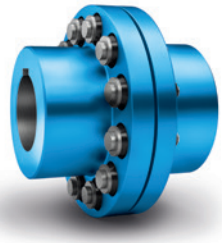
N-EUPEX, RUPEX and N-BIPEX

Flexible Couplings

Flexible Flender couplings have a wide range of possible applications. A broad standard modular system as well as specially designed application-specific couplings are available.



N-EUPEX
cam couplings
Rated torque:
19 Nm ... 85,000 Nm



RUPEX
pin-and-bush couplings
Rated torque:
200 Nm ... 1,690,000 Nm

N-BIPEX
cam couplings
Rated torque:
12 Nm ... 4,650 Nm

ELPEX, ELPEX-B and ELPEX-S

Highly Flexible Couplings

ELPEX® couplings are free of circumferential back-lash. Their damping capacity and low torsional stiff-ness make them especially well-suited for coupling machines with strongly non-uniform torque characteristics or large shaft misalignment.

ELPEX
elastic ring couplings
Rated torque:
1,600 Nm ... 90,000 Nm

ELPEX-B
elastic tire couplings
Rated torque:
24 Nm ... 14,500 Nm

ELPEX-S
rubber disk couplings
Rated torque:
330 Nm ... 63,000 Nm

ZAPEX gear couplings and ARPEX all-steel couplings

Torsionally rigid couplings

For transmission of high torques, we offer both ARPEX all-steel couplings and ZAPEX gear couplings in a range of versions. Their purposes of application vary according to specific requirements with respect to shaft misalignment, temperature and torque.

ZAPEX
gear couplings
Rated torque:
1,300 Nm ... 7,200,000 Nm

ARPEX
high Performance Couplings
Rated torque:
1,000 Nm ... 588,500 Nm

N-ARPEX and ARPEX
all-steel couplings
Rated torque:
92 Nm ... 2,000,000 Nm

BIPEX-S and SIPEX

Backlash-free couplings

The vibration-damping, electrically insulating plug-in BIPEX-S elastomer couplings and SIPEX metal bellows couplings with very high torsional stiffness deliver especially isogonal torque transmission.

BIPEX-S and SIPEX
Rated torque:
0.1 Nm ... 5,000 Nm

FLUDEX

Hydrodynamic couplings

The FLUDEX hydrodynamic fluid coupling works according to the Föttinger principle. It functions entirely free of wear.

FLUDEX
fluid Couplings
Power:
1.2 kW ... 2,500 kW

Application-specific couplings

Couplings for rail vehicles must meet high demands. Due to their high degree of standardization and wide variety, they can be used in the most diverse vehicle types.

Railway coupling
Rated torque:
1,000 Nm ... 9,500 Nm

Each wind turbine coupling is designed to optimally meet the requirements of the respective wind turbine. The coupling connects the fast-running gear shaft with the generator shaft and is available for wind turbines with a capacity of up to 12 MW.

Wind turbine couplings
Rated torque:
10,000 Nm ... 60,000 Nm

TECHNICAL INFORMATION AND COUPLING SELECTION

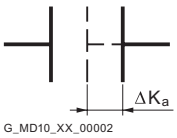
TECHNICAL INFORMATION

Shaft misalignment

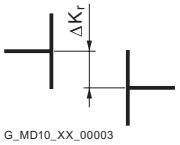
Shaft misalignment is the result of displacement during assembly and operation and, where machines constructed with two radial bearings each are rigidly coupled, will cause high loads being placed on the bearings. Elastic deformation of base frame, foundation and machine housing will lead to shaft misalignment which cannot be prevented, even by precise alignment.

Furthermore, because individual components of the drive train heat up differently during operation, heat expansion of the machine housings causes shaft misalignment. Poorly aligned drives are often the cause of seal, rolling bearing or coupling failure. Alignment should be carried out by specialist personnel in accordance with operating instructions.

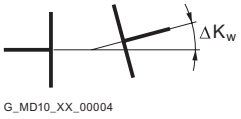
Depending on the direction of the effective shaft misalignment a distinction is made between:



Axial misalignment



Radial misalignment



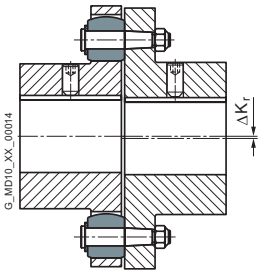
Angular misalignment

Couplings can be categorized into one of the following groups:

Single-joint couplings

Couplings with flexible elements mainly made of elastomer materials. Shaft misalignment results in deformation of the elastomer elements. The elastomer elements can absorb shaft misalignment as deformations in an axial, radial and angular direction. The degree of permissible misalignment depends on the coupling size, the speed and the type of elastomer element.
Single-joint couplings do not require an adapter and are therefore short versions.

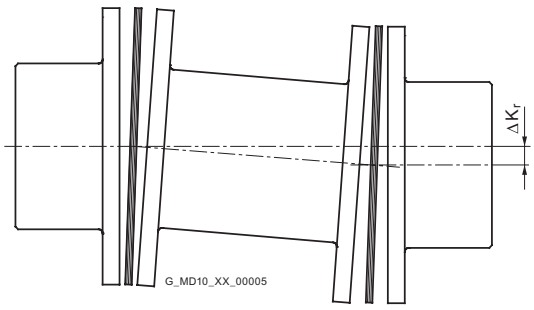
Example:
In the case of a RUPEX RWN 198 coupling with an outer diameter of 198 mm and a speed of 1500 rpm, the permitted radial misalignment is Δ_{Kr} = 0.3 mm.



Two-joint couplings

Two-joint couplings are always designed with an adapter. The two joint levels are able to absorb axial and angular misalignment. Radial misalignment occurs via the gap between the two joint levels and the angular displacement of the joint levels. The permitted angular misalignment per joint level is frequently about 0.5°. The permitted shaft misalignment of the coupling can be adjusted via the length of the adapter. If there are more than two joint levels, it is not possible to define the position of the coupling parts relative to the axis of rotation. (The less frequently used parallel-crank couplings are an exception).

Example:
N-ARPEX ARN-6 NEN 217-6 with a shaft distance of 140 mm with a permitted radial misalignment of ΔK_r = 2.2 mm (angle per joint level 1.0°).



Balancing

Balance quality levels
The so-called quality level G to DIN ISO 21940 indicates a range of permitted residual imbalance from zero up to an upper limit. Applications can be grouped on the basis of similarity analysis. For many applications a coupling balance quality of G 16 is sufficient. On drives susceptible to vibration the balance quality should be G 6.3. Only in special cases is a better balance quality required.

Balancing standard in accordance with DIN ISO 21940-32
Besides the required balance quality, it is necessary to set standards which define how the mass of the parallel key is to be taken into consideration when balancing. In the past, motor rotors have frequently been balanced in accordance with the full parallel key standard. The "appropriate" balance condition of the coupling hub was described as "balancing with open keyway" or "balancing after keyseating". Today it is usual for the motor rotor, as well as the gear unit and driven machine shaft, to be balanced in accordance with the half parallel key standard.

Full parallel key standard

The parallel key is inserted in the shaft keyway, then balancing is carried out. The coupling hub must be balanced without parallel key after keyseating.

Marking of shaft and hub with "F" (for "full").

Half parallel key standard

The balancing standard normally applied today. Before balancing, a half parallel key is inserted in the shaft and another in the coupling hub. Alternatively, balancing can be carried out before cutting the keyway.

The balanced parts must be marked with an "H". This marking can be dispensed with if it is absolutely clear which parallel key standard has been applied.

No parallel key standard

Balancing of shaft and coupling hub after keyseating, but without parallel key. Not used in practice. Marking of shaft and hub with "N" (for "no").
The length of the parallel key is determined by the shaft keyway. Coupling hubs may be designed considerably shorter than the shaft.

To prevent imbalance forces caused by projecting parallel key factors when balancing in accordance with the half parallel key standard in the case of applications with high balancing quality requirements, grooved spacer rings can be fitted or stepped parallel keys used.

Flender Balancing Standard

The balancing quality level, together with the operating speed, results in the maximum permissible eccentricity of the center of gravity of the coupling or the coupling subassembly. In the Flender article number the balancing quality can be preset with the help of the order code. Additionally, also the balance quality level to DIN ISO 21940 can be preset together with the operating speed belonging to it, which then be taken as priority.

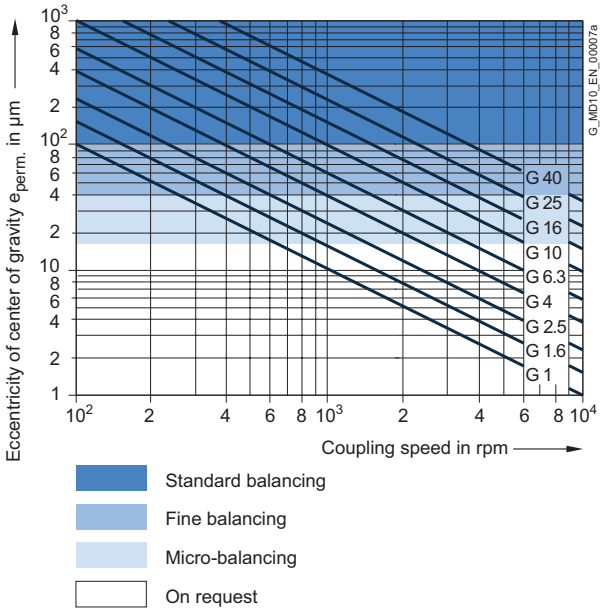
$$e_{perm} = 9550 \cdot \frac{G}{n}$$

$$e_{coupl} \leqslant e_{perm}$$

Permitted eccentricity of center of gravity	e_{perm}	in µm
Eccentricity of center of gravity of coupling	e_{coupl}	in µm
Balancing quality level	G	in mm/s
Coupling speed	n	in rpm

Eccentricity of center of gravity of coupling e_{coupl}	Flender balancing quality	Order code
maximum 100 µm	standard balancing	without specification
maximum 40 µm	fine balancing	W02
maximum 16 µm	micro-balancing	W03
better than 16 µm	special balancing	on request

TECHNICAL INFORMATION



Example:
Coupling speed = 1450 rpm
required balancing quality level G 6.3

$$e_{perm} = 9550 \cdot \frac{G}{n} = 9550 \cdot \frac{6.3}{1450}\ \mu m$$

Thus, the required eccentricity of center of gravity is 41.5 µm. The fine balancing with a maximum eccentricity of center of gravity of 40 mm fulfills this requirement; therefore, the order code W02 has to be specified when ordering.

For many applications the following balancing quality recommendation applies:

Coupling	standard balancing $v = DA \cdot n/19100$	fine balancing
short version with LG ≤ 3 × DA	$v \leq 30$ m/s	$v > 30$ m/s
long version with LG > 3 × DA	$v \leq 15$ m/s	$v > 15$ m/s

Peripheral speed	v	in mm/s
Coupling outer diameter	DA	in mm
Coupling speed	n	in rpm
Coupling length	LG	in mm

The following standards on balancing must be observed:

- couplings are balanced in subassemblies.
- hub parts without finished bore are unbalanced.
- the number of balancing levels (one- or two-level balancing) is specified by Flender.
- without special specification balancing is done in accordance with the half-parallel-key standard. Balancing in accordance with the full-parallel-key standard must be specified in the order number.
- For FLUDEX couplings special balancing standards specified in Section 13 apply.
- ARPEX couplings in standard balancing quality are unbalanced. Thanks to steel components machined all over and precisely guided adapters the balancing quality of standard balancing is nearly always adhered to.

Shaft-hub connections

The bore and the shaft-hub connection of the coupling are determined by the design of the machine shaft. In the case of IEC standard motors, the shaft diameters and parallel key connections are specified in accordance with DIN EN 50347. For diesel motors, the flywheel connections are frequently specified in accordance with SAE J620d or DIN 6288. Besides the very widely used connection of shaft and hub with parallel keys to DIN 6885 and cylindrically bored hubs, couplings with Taper clamping bushes, clamping sets, shrink-fit connections and splines to DIN 5480 are common.

The form stability of the shaft/hub connection can only be demonstrated when shaft dimensions and details of the connection are available. The coupling torques specified in the tables of power ratings of the coupling series do not apply to the shaft-hub connection unrestrictedly.

In the case of the shaft-hub connection with parallel key, the coupling hub must be axially secured, e.g. with a set screw or end washer. The parallel key must be secured against axial displacement in the machine shaft.

All Flender couplings with a finished bore and parallel keyway are designed with a set screw. Exceptions are some couplings of the FLUDEX series, in which end washers are used. During assembly, Taper clamping bushes are frictionally connected to the machine shaft.

TECHNICAL INFORMATION

Standards

Machines

2006/42/EG	EC Machinery Directive
2014/34/EU	ATEX Directive – Manufacturer
1999/92/EG	ATEX Directive – Operator – and ATEX Guideline to Directive 1999/92/EC
DIN EN 80079-36	Non-electrical equipment for use in potentially explosive atmospheres
DIN EN 1127	Explosive atmospheres, explosion prevention and protection
DIN EN 50347	General-purpose three-phase induction motors having standard dimensions and outputs

Couplings

DIN 740	Flexible shaft couplings Part 1 and Part 2
VDI Guideline 2240	Shaft couplings - Systematic subdivision according to their properties VDI Technical Group Engineering Design 1971
API 610	Centrifugal Pumps for Petroleum, Chemical and Gas Industry Services
API 671	Special Purpose Couplings for Petroleum, Chemical and Gas Industry Services
ISO 10441	Petroleum, petrochemical and natural gas industries – Flexible couplings for mechanical power transmission-special-purpose applications
ISO 13709	Centrifugal pumps for petroleum, petrochemical and natural gas industries

Balancing

DIN ISO 21940	Requirements for the balancing quality of rigid rotors
DIN ISO 21940-32	Mechanical vibrations; standard governing the type of parallel key during balancing of shafts and composite parts

Shaft-hub connections

DIN 6885	Driver connections without taper action – parallel keys – keyways
SAE J620d	Flywheels for industrial engines ...
DIN 6288	Reciprocating internal combustion engines Dimensions and requirements for flywheels and flexible couplings
ASME B17.1	Keys and keyseats
DIN EN 50347	General-purpose three-phase induction motors with standard dimensions and output data
BS 46-1:1958	Keys and keyways and taper pins Specification

Key to symbols

Name	Symbols	Unit	Explanation
Torsional stiffness, dynamic	C_{Tdyn}	Nm/rad	For calculating torsional vibration
Excitation frequency	f_{err}	Hz	Excitation frequency of motor or driven machine
Moment of inertia	J	kgm^2	Moment of inertia of coupling sides 1 and 2
Axial misalignment	ΔK_a	mm	Axial misalignment of the coupling halves
Radial misalignment	ΔK_r	mm	Radial misalignment of the coupling halves
Angular misalignment	ΔK_w	°	Angular misalignment of the coupling halves
Service factor	FB		Factor expressing the real coupling load as a ratio of the nominal coupling load
Frequency factor	FF		Factor expressing the frequency dependence of the fatigue torque load
Temperature factor	FT		Factor taking into account the reduction in strength of flexible rubber materials at a higher temperature
Weight	m	kg	Weight of the coupling
Rated speed	n_N	rpm	Coupling speed
Maximum coupling speed	n_{Kmax}	rpm	Maximum permissible coupling speed
Rated power	P_N	kW	Rated output on the coupling, usually the output of the driven machine
Rated torque	T_N	Nm	Rated torque as nominal load on the coupling
Fatigue torque	T_W	Nm	Amplitude of the dynamic coupling load
Maximum torque	T_{max}	Nm	More frequently occurring maximum load, e.g. during starting
Overload torque	T_{OL}	Nm	Very infrequently occurring maximum load, e.g. during short circuit or blocking conditions
Rated coupling torque	T_{KN}	Nm	Torque which can be transmitted as static torque by the coupling over the period of use.
Maximum coupling torque	T_{Kmax}	Nm	Torque which can be frequently transmitted (up to 25 times an hour) as maximum torque by the coupling.
Coupling overload torque	T_{KOL}	Nm	Torque which can very infrequently be transmitted as maximum torque by the coupling.
Fatigue coupling torque	T_{KW}	Nm	Torque amplitude which can be transmitted by the coupling as dynamic torque at a frequency of 10 Hz over the period of use.
Resonance factor	V_R		Factor specifying the torque increase at resonance
Temperature	T_a	°C	Ambient temperature of the coupling in operation
Damping coefficient	Ψ	psi	Damping parameter

SELECTION OF THE COUPLING SERIES

The coupling series is frequently determined by the driven machine and the design of the drive train. Common selection criteria are listed below and assigned to coupling properties, which are used to select the coupling series. Additionally, the price of the coupling and availability are important criteria for determining the coupling series to be used.

The FLUDEX series operates positively and transmits the torque with the aid of a flowing oil or water filling.

FLUDEX couplings are used to reduce starting and/or overload torques. During starting, the motor may, for example, run up within a very short time; because of the FLUDEX coupling, the drive train with the driven machine may accelerate after a delay and without increased torque load.

The FLUDEX coupling cannot compensate for shaft misalignment and is therefore designed in combination with a displacement coupling, a cardan shaft or a belt drive. The displacement coupling may be selected in accordance with the criteria described below.

Selection criteria	Torque range Rated coupling torque T_{KN}	Speed range Peripheral speed $v_{max} = DA \cdot n_{max}/19100$	Torsional stiffness torsionally rigid	 torsionally flexible	 Highly flexible	Operating temperature range
ZAPEX	850 ... 7200000 Nm	60 m/s	■	–	–	-20 ... +80 °C
N-ARPEX	350 ... 2000000 Nm	110 m/s	■	–	–	-50 ... +280 °C
ARPEX	92 ... 2000000 Nm	100 m/s	■	–	–	-40 ... +280 °C
N-EUPEX	12 ... 93500 Nm	36 m/s	–	■	–	-50 ... +100 °C
N-EUPEX DS	19 ... 21200 Nm	36 m/s	–	■	–	-30 ... +80 °C
RUPEX	200 ... 1300000 Nm	60 m/s	–	■	–	-50 ... +100 °C
N-BIPEX	12 ... 4650 Nm	45 m/s	–	■	–	-50 ... +100 °C
ELPEX-B	24 ... 14500 Nm	35 m/s	–	–	■	-50 ... +70 °C
ELPEX-S	330 ... 63000 Nm	66 m/s	–	–	■	-40 ... +120 °C
ELPEX	1600 ... 90000 Nm	60 m/s	–	–	■	-40 ... +80 °C

Typical coupling solutions for different example applications

The specified application factors are recommendations; regulations, rules and practical experience take priority as assessment criteria.
No application factor need be taken into account with FLUDEX couplings.

In the case of highly flexible couplings of the ELPEX, ELPEX-S and ELPEX-B series, deviating application factors are stated in the product descriptions.
FLUDEX couplings are mostly mounted on the high-speed gear shaft.

Example applications	Application factor FB
Electric motor without gear unit	
Centrifugal pumps	1.0
Piston pumps	1.5
Vacuum pumps	1.5
Fans with T_N less than 75 Nm	1.5
Fans with T_N from 75 to 750 Nm	1.75
Fans with T_N larger than 750 Nm	1.75
Blowers	1.5
Frequency converters / generators	1.25
Reciprocating compressors	1.75
Screw-type compressors	1.5
Internal-combustion engine without gear unit	
Generators	1.75
Pumps	1.5
Fans	1.75
Hydraulic pumps, excavators, construction machines	1.5
Compressors / screw-type compressors	1.5
Agricultural machinery	1.75
Other	
Turbine gear units	1.5
Hydraulic motor - gear unit	1.25
Electric motor with gear unit	
Chemical industry	
Extruders	1.5
Pumps - centrifugal pumps	1.0
Pumps - piston pumps	1.75
Pumps - plunger pumps	1.5
Reciprocating compressors	1.75
Calenders	1.5
Kneaders	1.75
Cooling drums	1.25
Mixers	1.25
Stirrers	1.25
Toasters	1.25
Drying drums	1.25
Centrifuges	1.25
Crushers	1.5
Power generation and conversion	
Compressed air, reciprocating compressors	1.75
Compressed air, screw-type compressors	1.25
Air - Blowers	1.5
Air - Cooling tower fans	1.5
Air - Turbine blowers	1.5
Generators, converters	1.25
Welding generators	1.25
Metal production, iron and steel works	
Plate tilters	1.5
Ingot pushers	1.75
Slabbing mill	1.75
Coiling machines	1.5
Roller straightening machines	1.5
Roller tables	1.75
Shears	1.75
Rollers	1.75
Metal working machines	
Plate bending machines	1.5
Plate straightening machines	1.5
Hammers	1.75
Planing machines	1.75
Presses, forging presses	1.75
Shears	1.5
Grinding machines	1.25
Punches	1.5
Machine tools: Main drives	1.5
Machine tools: Auxiliary drives	1.25
Food industry	
Filling machines	1.25
Kneading machines	1.5
Mashers	1.5
Sugar cane production	1.5
Production machines	
Construction machines, hydraulic pumps	1.25
Construction machines, traversing gears	1.5
Construction machines, suction pumps	1.5
Construction machines, concrete mixers	1.5
Printing machines	1.25
Woodworking - barking drums	1.5
Woodworking - planing machines	1.5
Woodworking - reciprocating saws	1.5
Grinding machines	1.5
Textile machines - winders	1.5
Textile machines - printing machines	1.5
Textile machines - tanning vats	1.5
Textile machines - shredders	1.5
Textile machines - looms	1.5
Packaging machines	1.5
Brick molding machines	1.75
Transport and logistics	
Passenger transport - elevators	1.5
Passenger transport - escalators	1.5
Conveyor systems - bucket elevators	1.5
Conveyor systems - hauling winches	1.5
Conveyor systems - belt conveyors	1.5
Conveyor systems - endless-chain conveyors	1.5
Conveyor systems - circular conveyors	1.5
Conveyor systems - screw conveyors	1.5
Conveyor systems - inclined hoists	1.5
Crane traversing gear	1.5
Hoisting gear	1.5
Crane lifting gear	2.0
Crane traveling gear	1.5
Crane slewing gear	1.5
Crane fly jib hoists	1.5
Cable railways	1.5
Drag lifts	1.5
Winches	1.5
Cellulose and paper	
Paper-making machines, all	1.5
Pulper drives	1.5
Cement industry	
Crushers	1.75
Rotary furnaces	1.5
Hammer mills	1.75
Ball mills	1.75
Pug mills	1.75
Mixers	1.5
Pipe mills	1.5
Beater mills	1.75
Separators	1.5
Roller presses	1.75

SELECTION OF THE COUPLING SIZE

The torque load of the coupling must be determined from the output of the driven machine and the coupling speed.

Rated coupling load $T_N = 9550 \times P_N / n_N$
(T_N in Nm; P_N in kW; n_N in rpm)

The rated coupling load obtained in this way must be multiplied by factors and compared with the rated coupling torque. An ideal but expensive method is to measure the torque characteristic on the coupling. For this, Flender offers special adapters fitted with torque measuring devices.

The rated coupling torque T_{KN} is the torque which can be transmitted by the coupling over an appropriate period of use if the load is applied to the coupling purely statically at room temperature.

Application factors are to express the deviation of the real coupling load from the "ideal" load condition.

Coupling load in continuous operation

The operating principles of the driving and driven machines are divided into categories and the application factor FB derived from these in accordance with DIN 3990-1.

Application factor for N-EUPEX, N-EUPEX-DS, RUPEX, N-BIPEX, ELPEX-B, N-ARPEX, ARPEX, ZAPEX and FLUDEX

Application factor FB				
	Torque characteristic of the driven machine			
Torque characteristic of the driving machine	uniform	uniform with moderate shock loads	non uniform	very rough
uniform	1.0	1.25	1.5	1.75
uniform with moderate shock loads	1.25	1.5	1.75	2.0
non uniform	1.5	1.75	2.0	2.5

Examples of torque characteristic of driving machines:

- uniform: Electric motors with soft starting, steam turbines
- uniform with moderate shock loads: Electric motors without soft starting, hydraulic motors, gas and water turbines
- non uniform: Internal-combustion engines

Examples of torque characteristic in driven machines:

- uniform: Generators, centrifugal pumps for light fluids
- uniform with moderate shock loads: Centrifugal pumps for viscous fluids, elevators, machine tool drives, centrifuges, extruders, blowers, crane drives
- non uniform: Excavators, kneaders, conveyor systems, presses, mills
- very rough: Crushers, excavators, shredders, iron/smelting machinery

Temperature factor FT

Coupling	Elastomer material	Low temperature °C	Temperature T_a on the coupling under -30 °C	-30 °C up to 50 °C	up to 60 °C	up to 70 °C	up to 80 °C	up to 90 °C	up to 100 °C	up to 110 °C	up to 120 °C
N-EUPEX	NBR	-30	–	1.0	1.0	1.0	1.0	–	–	–	–
N-EUPEX	NR	-50	1.1 [1]	1.0	–	–	–	–	–	–	–
N-EUPEX	HNBR	-10	–	1.0	1.0	1.0	1.0	1.25	1.25	–	–
N-EUPEX	TPU	-50	1.0	1.0	1.05	1.10	1.15	–	–	–	–
N-EUPEX DS	NBR	-30	–	1.0	1.0	1.0	1.0	–	–	–	–
RUPEX	NBR	-30	–	1.0	1.0	1.0	1.0	–	–	–	–
RUPEX	NR	-50	1.1	1.0	–	–	–	–	–	–	–
RUPEX	HNBR	-10	–	1.0	1.0	1.0	1.0	1.25	1.25	–	–
N-BIPEX	TPU	-50	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3	1.5
ELPEX	NR	-40	1.1	1.0	1.25	1.40	1.60	–	–	–	–
ELPEX-B	NR	-50	1.1	1.0	–	–	–	–	–	–	–
ELPEX-B	CR	-15	–	1.0	1.0	1.0	–	–	–	–	–
ELPEX-S SN, NN, WN	NR	-40	1.1	1.0	1.25	1.40	1.60	–	–	–	–
ELPEX-S NX	VMQ	-40	1.1	1.0	1.0	1.0	1.0	1.1	1.25	1.4	1.6

NR = natural rubber, natural-synthetic rubber mixture
NBR = nitril-butadiene-rubber (Perbunan)
HNBR = hydrated acrylonitrile butadiene rubber
CR = chloroprene rubber (FRAS fire-resistant and anti-static)
VMQ = silicone
TPU = polyurethane

[1] The N-EUPEX coupling is not suitable for shock loads when used at low temperatures.

Coupling size $T_{KN} \geq T_N \cdot FB \cdot FT$

In the case of ARPEX and ZAPEX coupling types, no temperature factor (FT = 1.0) need be taken into account.

Coupling load at maximum and overload conditions

The maximum torque is the highest load acting on the coupling in normal operation.
Maximum torques at a frequency of up to 25 times an hour are permitted and must be lower than the maximum coupling torque. Examples of maximum torque conditions are: Starting operations, stopping operations or usual operating conditions with maximum load.

$T_{Kmax} \geq T_{Max} \cdot FT$

Overload torques are maximum loads which occur only in combination with special, infrequent operating conditions. Examples of overload torque conditions are: Motor short circuit, emergency stop or blocking because of component breakage. Overload torques at a frequency of once a month are permitted and must be lower than the maximum overload torque of the coupling. The overload condition may last only a short while, i.e. fractions of a second.

$T_{KOL} \geq T_{OL} \cdot FT$

Coupling load due to dynamic torque load

Applying the frequency factor FF, the dynamic torque load must be lower than the coupling fatigue torque.

Dynamic torque load

$T_{KW} \geq T_W \cdot FF$

Frequency of the dynamic torque load
$f_{err} \leq 10$ Hz frequency factor FF = 1.0

Frequency of the dynamic torque load
$f_{err} > 10$ Hz frequency factor $FF = \sqrt{(f_{err}/10\ Hz)}$

For the ZAPEX and ARPEX series, the frequency factor is always FF = 1.0.

SELECTION OF THE COUPLING SIZE

Checking the maximum speed

For all load situations $n_{Kmax} \geqslant n_{max}$

Checking permitted shaft misalignment

For all load situations, the actual shaft misalignment must be less than the permitted shaft misalignment.

Checking bore diameter, mounting geometry and coupling design

The check must be made on the basis of the dimension tables. The maximum bore diameter applies to parallel keyways to DIN 6885. For other keyway geometries, the maximum bore diameter can be reduced.

On request, couplings with adapted geometry can be provided.

Coupling behavior under overload conditions

The ZAPEX, N-ARPEX, ARPEX, N-EUPEX, RUPEX and N-BIPEX coupling series can withstand overloads until the breakage of metal parts. These coupling series are designated as fail-safe.
The N-EUPEX DS, ELPEX-B, ELPEX-S and ELPEX coupling series throw overload. The elastomer element of these couplings is irreparably damaged without damage to metal parts when subjected to excessive overload.

These coupling series are designated as non-fail-safe. These types that fail can be fitted with a so-called fail-safe device. This additional component enables emergency operation, even after the rubber element of the coupling has been irreparably damaged.

Checking shaft-hub connection

The torques specified in the tables of power ratings data of the coupling series do not necessarily apply to the shaft-hub connection. Depending on the shaft-hub connection, proof of form stability is required. Flender recommends obtaining proof of form strength by using calculation methods in accordance with the current state of the art.

Shaft-hub connection	Suggestion for calculation method
Keyway connection to DIN 6885-1	DIN 6892
Shrink fit	DIN 7190
Spline to DIN 5480	
Bolted flange connection	VDI 2230
Flange connection with close-fitting bolts	

Fitting recommendations for the shaft-hub connection are given in the **Appendix**.

The coupling hub is frequently fitted flush with the shaft end face. If the shaft projects, the risk of collision with other coupling parts must be checked. If the shaft is set back, in addition to the load-bearing capacity of the shaft-hub connection, the correct positioning of the hub must be ensured as well. If the bearing hub length is insufficient, restorative forces may cause tilting movements and so wear to and impairment of the axial retention. Also, the position of the set screw to be positioned on sufficient shaft or parallel key material must be noted.

Checking low temperature and chemically aggressive environment

The minimum permitted coupling temperature is specified in the Temperature factor FT table. In the case of chemically aggressive environments, please consult the manufacturer.

FEATURES OF THE STANDARD TYPE

Couplings	Features of the standard type
All coupling series except ARPEX clamping hubs and FLUDEX with keyway to ASME B17.1	Bore tolerance H7
N-ARPEX and ARPEX clamping hubs	Bore tolerance G6 (suitable for shaft tolerance h6)
FLUDEX couplings with keyway to ASME B17.1	Hollow shafts: bore tolerance K7
	other parts: bore tolerance M7
All coupling series with bore diameter - imperial	Parallel keyway to ASME B17.1
Bore diameter metric in the case of ZAPEX, N-ARPEX and ARPEX coupling series as well as coupling hubs with applied brake disks or brake drums of the N-EUPEX and RUPEX series	Parallel keyway to DIN 6885-1 keyway width P9
Bore diameter metric in the case of the N-EUPEX, RUPEX, N-BIPEX, ELPEX-S, ELPEX-B, ELPEX, FLUDEX coupling series	Parallel keyway to DIN 6885-1 keyway width JS9
All coupling series except FLUDEX	Axial locking by means of set screw
FLUDEX coupling series	Axial lock by means of set screw or end washer
All coupling series	Balancing in accordance with half parallel key standard
ZAPEX, N-ARPEX, ARPEX, N-EUPEX, RUPEX, N-BIPEX, ELPEX-S, ELPEX-B and ELPEX coupling series	Balancing quality G16
FLUDEX coupling series	Balancing quality G6.3
SIPEX and BIPEX-S coupling series	Balancing quality G6.3 for 3600 rpm
All series	Unpainted
All series	Preservation with cleaning emulsion
FLUDEX couplings	Fuse 140 °C

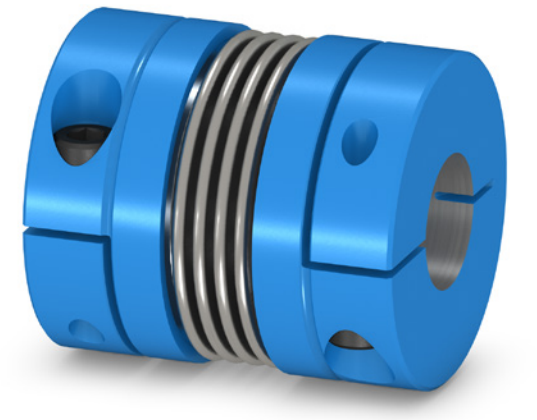
Configurator

The article number can be obtained with the help of the Configurator. The coupling can be selected in a product configurator and specified using selection menus.

The Configurator is available under **flender.com**.

The coupling can be selected via "Technical selection" (technical selection) or via "Direct selection" (via article-no.).

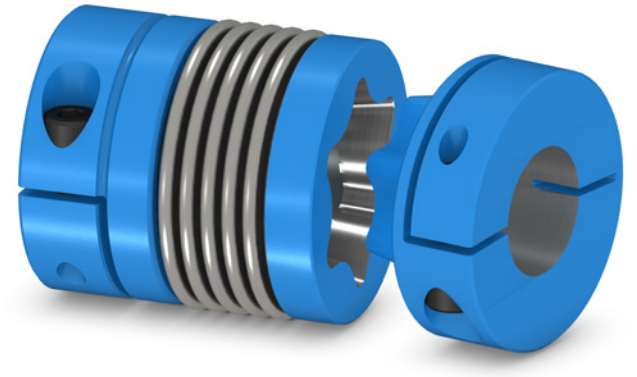
BACKLASH-FREE COUPLINGS SIPEX SERIES



GENERAL

SIPEX couplings are torsionally rigid and backlash-free. They are characterized by their compact design and high power density. SIPEX couplings connect machine shafts and compensate for shaft misalignment that can occur during assembly or operation.

SIPEX couplings are suitable for all drive applications which require a coupling that offers positioning accuracy as well as a reliable, wear- and maintenance-free torque transmission.



Benefits

SIPEX couplings are suitable for mounting horizontally, vertically or in any desired position. The coupling parts can be arranged as required on the shaft ends to be connected.

The metal bellows are very torsional-resistant and combined with different clamping connections they ensure an absolutely angle-preserving torque transmission between the connected shafts. The moment of inertia is low.

SIPEX couplings compensate axial, radial and angular shaft misalignment with only low restoring forces. SIPEX couplings are wear-free within their technical limits and therefore offer an unlimited service life.

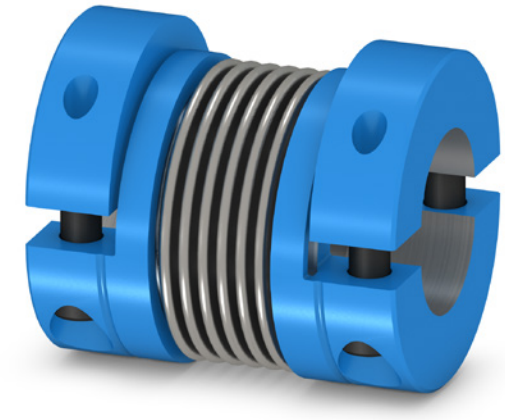
Application

SIPEX couplings are available in 19 sizes within the standard catalog range, 7 of which are miniature versions and the other 12 standard designs. Rated torques range from 0.1 to 5000 Nm. The coupling is suitable for ambient temperatures of between -30 °C to +120 °C.

Couplings manufactured by alternative methods are available for higher ambient temperatures up to +250 °C.

SIPEX couplings from the standard range are especially suitable for application in highly dynamic drives such as, for example, linear axes in machine tools, packaging machines or printing presses, or generally for automation technology.

SIPEX couplings from the miniature range are designed for use in combination with rotary encoders, stepper motors or tachometers.



Design and configurations

SIPEX couplings consist of two hub parts that are connected by means of bellows made of high-strength stainless steel.

The hubs can be coupled to the shafts by many different methods including set screws, key joint, slotted clamping hubs, halfshell hubs, clamping hubs or expanding hubs.

Thanks to their metal bellows, SIPEX couplings are torsionally rigid, but flexible. Misalignment between the connected shafts deforms the metal bellows.

Coupling materials

Depending on the coupling version, hubs are made of aluminum (N, G, H) or steel (K, I), but stainless-steel variants are also optionally available.

All the metal bellows are made of stainless steel and are available as single-wall or multiple-wall devices depending on size and application. Metal bellows come in various standard lengths.

Metal bellows can be combined with different hub versions to create a complete unit. Once the hubs have been joined to metal bellows, they cannot be dismantled again.

Hub versions

Hub	Description
N	Hub with set screws
G	Slotted clamping hub
H	Half-shell clamping hub
K	Clamping hub with external taper
I	Clamping hub with internal taper
S	Expanding hub

Hubs are supplied as standard with bore tolerance H7 and **without** keyway.

Versions N, G and H are optionally available with keyway in accordance with DIN 6885-1.

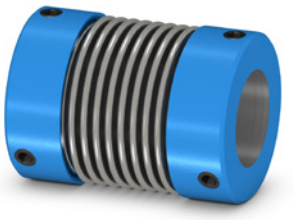
The fitting tolerance of the coupled shaft ends should be g6 or h7.

GENERAL

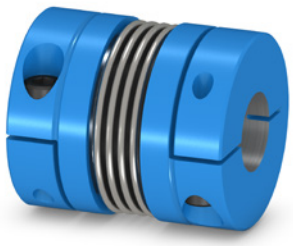
Versions of SIPEX couplings

Type	Description
SNN	Hub with set screw on both sides
SGG	Slotted clamping hub on both sides
SGG-A	Slotted clamping hub - for axial plug-in
SHH	Half-shell clamping hub on both sides
SKK	Clamping hub with external taper on both sides
SHH-W	Drive shaft with half-shell clamping hubs
SII	Clamping hubs with internal taper on both sides
SGS	Hub 1: Slotted, Hub 2: Expanding hub

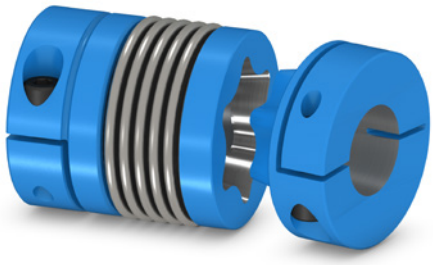
Hub variants



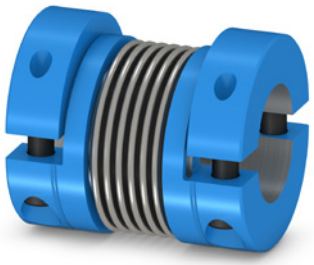
Set screw



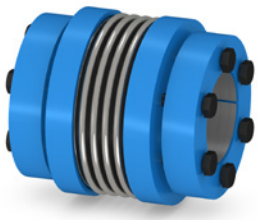
Clamping hub



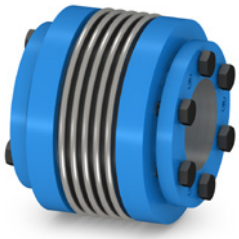
Axial plug-in



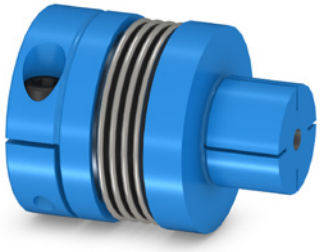
Half-shell clamping hub



External taper



Internal taper



Expanding hub

Coupling dimensioning

Dimensioning according to torque

It must be ensured that the coupling is capable of safely transferring peak torques that regularly occur at the drive or load end. The service factor is provided in order to describe the deviation between the real coupling load and ideal load conditions:

$T_{KN} \geq T_{AS} \cdot FB$ or $T_{LS} \cdot FB$

Torque characteristic of drive	Service factor FB
Uniform	1.5
Non Uniform	2
Rough	2.5 - 4
Servomotors (machine tools)	1.5 - 2

Dimensioning according to acceleration torques

The correct coupling size can be calculated more accurately on the basis of acceleration or deceleration torques because the peak torque at the coupling is reduced by the ratio between the moments of inertia on the drive and load ends:

$T_{KN} \geq T_S \cdot FB$

$$T_S = T_{AS} \cdot \frac{J_L}{J_A + J_L} \quad \text{or} \quad T_S = T_{LS} \cdot \frac{J_A}{J_A + J_L}$$

Checking the maximum torsion angle

If the application requires a maximum torsion angle of the coupling, the selected coupling size must be checked to ensure that it is sufficiently torsionally rigid for the application in question:

$$\varphi = \frac{180}{\pi} \cdot \frac{T_S}{C_{Tdyn}}$$

Checking the maximum speed

For all load situations $n_{K\,max} > n_{max}$

Checking the permitted shaft misalignment

The actual shaft misalignment must be less than the permitted shaft misalignment for all load situations.

Checking the shaft-hub connection

In the case of clamping connections without feather key, it must be ensured that the transmissible torque of the hub connection is greater than the peak torque at the coupling.

GENERAL

Key to formula symbols

Name	Formula symbol	Unit	Explanation
Rated coupling torque	T_{KN}	Nm	Torque which can be transmitted as static torque by the coupling over the period of use.
Coupling overload torque	T_{K0L}	Nm	Torque which can be transmitted very rarely as maximum torque by the coupling.
Peak torque at drive end	T_{AS}	Nm	Peak torque during non-periodic torque surges at drive end
Peak torque at load end	T_{LS}	Nm	Peak torque during non-periodic torque surges at load end
Peak torque	T_S	Nm	Peak torque at the coupling
Service factor	FB		Factor that expresses the real coupling load as a ratio of the nominal coupling load
Moment of inertia of drive end	J_A	kgm^2	Sum of the moments of inertia at the drive end referred to the coupling speed
Moment of inertia of load end	J_L	kgm^2	Sum of the moments of inertia at the load end referred to the coupling speed
Torsion angle	φ	°	Torsion angle of the coupling under torsional load
Torsional stiffness, dynamic	C_{Tdyn}	Nm/rad	Dynamic torsional stiffness of the coupling
Axial stiffness	C_a	N/mm	Axial stiffness of the coupling
Radial stiffness	C_r	N/mm	Radial stiffness of the coupling
Rated speed	n_N	rpm	Coupling speed
Maximum coupling speed	$n_{K\,max}$	rpm	Maximum permissible coupling speed
Axial misalignment	ΔK_a	mm	Axial misalignment of the coupling halves
Radial misalignment	ΔK_r	mm	Radial misalignment of the coupling halves
Angular misalignment	ΔK_w	°	Angular misalignment of the coupling halves

Technical information

Power ratings of miniature series

Size	Rated torque	Maximum torque	Maximum speed	Torsional stiffness	Stiffness radial	Stiffness axial	Permitted shaft misalignment		
	T_{KN} Nm	T_{KOL} Nm	n_{Kmax} rpm	C_{Tdyn} Nm/rad	C_r N/mm	C_a N/mm	ΔK_a mm	ΔK_r mm	ΔK_w °
1	0,1	0,15	15000	65	10	14	0,2	0,1	1,5
5	0,5	0,75	15000	258	128	18	0,2	0,1	1,5
				195	54	13	0,3	0,2	1,5
				160	26	11	0,4	0,2	2,0
10	1	1,5	15000	510	187	36	0,2	0,1	1,5
				380	82	27	0,3	0,2	1,5
				308	42	22	0,4	0,2	2,0
15	1,5	2,25	15000	750	139	23	0,3	0,1	1,5
				700	81	12	0,4	0,2	2,0
20	2	3	15000	1510	147	18	0,3	0,2	1,5
				1300	96	14	0,4	0,2	1,5
				1040	46	9	0,5	0,3	2,0
45	4,5	6,75	15000	6480	444	47	0,3	0,1	1,5
				4100	108	29	0,5	0,2	2,0
100	10	15	15000	8080	361	46	0,4	0,2	1,5
				6750	193	34	0,6	0,3	2,0

Power ratings of standard series

Size	Rated torque	Maximum torque	Maximum speed	Torsional stiffness	Stiffness radial	Stiffness axial	Permitted shaft misalignment		
	T_{KN} Nm	T_{KOL} Nm	n_{Kmax} rpm	C_{Tdyn} Nm/rad	C_r N/mm	C_a N/mm	ΔK_a mm	ΔK_r mm	ΔK_w °
18	18	27	12800	19	200	50	0,5	0,2	1,5
				17	85	40	0,5	0,2	2,0
30	30	45	10300	36	720	50	0,5	0,2	1,5
				26	220	30	0,8	0,2	2,0
60	60	90	8700	75	1100	90	0,5	0,2	1,5
				50	330	55	0,8	0,2	2,0
80	80	120	6900	128	1200	80	0,5	0,2	1,5
				75	400	55	0,7	0,2	2,0
150	150	225	6900	155	2000	150	0,5	0,2	1,5
				102	600	85	0,6	0,2	2,0
200	200	300	6400	175	2500	150	0,5	0,2	1,5
				120	450	85	0,7	0,2	2,0
300	300	450	6000	502	6300	280	0,5	0,2	1,5
				282	1500	85	0,7	0,2	2,0
500	500	750	5000	690	8800	100	0,5	0,2	1,5
				315	1000	85	0,8	0,2	2,0
800	800	1200	3700	760	510	190	0,8	0,2	1,8
1400	1400	2100	3700	1300	710	280	0,8	0,2	1,8
3000	3000	4500	2800	2800	8060	880	0,8	0,2	1,5
5000	5000	7500	2800	4800	9190	740	0,8	0,2	1,5

GENERAL

Permitted shaft misalignment

The permitted shaft misalignments ΔK_a, ΔK_r und ΔK_w are maximum values and must not occur simultaneously. The following formula can be used to roughly calculate whether combinations of misalignments are permissible:

$$\frac{\Delta K_{r\ act}}{\Delta K_r} + \frac{\Delta K_{a\ act}}{\Delta K_a} + \frac{\Delta K_{w\ act}}{\Delta K_w} < 1$$

The different torsional stiffness values apply to the various lengths of metal bellows of the relevant SIPEX type.

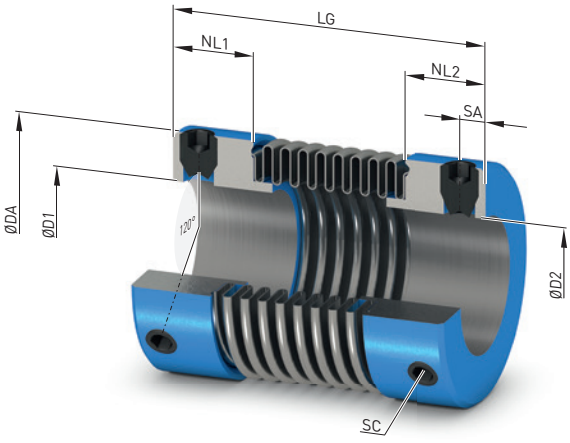
Transmissible torques of the different clamping connections

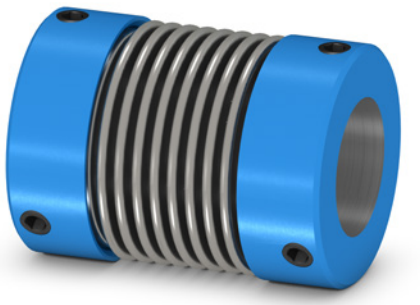
Size	Transmissible torque of clamping connection in Nm as a function of hub design and shaft diameter Bore diameter D1/D2 in mm																									
	2	3	4	6	8	10	12	14	16	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	55	60
Clamping hub (G hub)																										
5	–	1.1	1.2	1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	–	1.1	1.2	1.4	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	–	2.4	2.5	2.8	3.1	3.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	–	4.4	4.6	5.1	5.5	5.9	6.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
45	–	–	–	8.1	8.6	9.2	9.7	10.3	10.8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
100	–	–	–	10.3	10.8	11.4	11.9	12.5	13.1	13.8	14.2	14.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	–	–	–	–	25.7	26.9	28.1	29.3	30.5	32.3	33	34	35.3	36	–	–	–	–	–	–	–	–	–	–	–	–
30	–	–	–	–	–	42.2	44	45.6	47.3	50	50.7	52.4	54	55	57.4	59	–	–	–	–	–	–	–	–	–	–
60	–	–	–	–	–	–	93	96	99	104	105	108	112	113	118	121	124	129	–	–	–	–	–	–	–	–
80	–	–	–	–	–	–	–	173	178	185	188	193	198	200	207	212	217	225	232	237	242	–	–	–	–	–
150	–	–	–	–	–	–	–	172	178	185	188	193	198	200	207	212	217	225	232	237	242	–	–	–	–	–
200	–	–	–	–	–	–	–	–	–	–	300	306	313	317	328	335	342	353	364	371	378	389	–	–	–	–
300	–	–	–	–	–	–	–	–	–	–	–	–	367	371	382	389	396	407	418	425	432	443	454	461	479	497
500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	588	603	613	623	638	658	662	687	712
Half-shell (H hub)																										
5	–	0.6	0.8	1.3	1.7	2.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	–	0.6	0.8	1.3	1.7	2.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
15	–	1.1	1.4	2.1	2.8	3.5	4.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	–	1.6	2.2	3.2	4.3	5.4	6.5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
45	–	–	–	5.5	7.4	9.2	11	12.9	14.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
100	–	–	–	5.5	7.4	9.2	11	12.9	14.7	16.6	18.4	20.2	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	–	–	–	–	12.2	15.2	18.3	21.3	24.4	29	30.5	33.5	36.6	38	–	–	–	–	–	–	–	–	–	–	–	–
30	–	–	–	–	–	21.5	25.8	30.1	34.4	40.9	43	47.3	51.6	53.9	60.2	64.5	–	–	–	–	–	–	–	–	–	–
60	–	–	–	–	–	–	47.4	55.3	63.2	75	79	87	95	99	111	119	126	138	–	–	–	–	–	–	–	–
80	–	–	–	–	–	–	–	88	100	120	126	138	151	157	176	189	201	220	239	251	264	–	–	–	–	–
150	–	–	–	–	–	–	–	88	100	120	126	138	151	157	176	189	201	220	239	251	264	–	–	–	–	–
200	–	–	–	–	–	–	–	–	–	–	183	202	220	229	257	275	293	321	348	367	385	413	–	–	–	–
300	–	–	–	–	–	–	–	–	–	–	–	–	220	229	257	275	293	321	348	367	385	413	440	458	504	550
500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	441	478	504	529	567	604	630	692	755
Internal taper (I hub)																										
18	–	–	–	–	17	27	39	53	69	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
30	–	–	–	–	–	–	33	44	58	82	90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
60	–	–	–	–	–	–	63	86	112	158	175	211	251	273	–	–	–	–	–	–	–	–	–	–	–	–
80	–	–	–	–	–	–	–	–	–	–	147	178	212	230	289	331	330	394	–	–	–	–	–	–	–	–
150	–	–	–	–	–	–	–	–	–	–	147	178	212	230	289	331	330	394	–	–	–	–	–	–	–	–
200	–	–	–	–	–	–	–	–	–	–	147	178	212	230	289	331	330	394	395	438	483	–	–	–	–	–
300	–	–	–	–	–	–	–	–	–	–	–	–	–	314	394	452	515	616	726	804	744	854	972	1055	–	–
500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	373	425	508	599	664	732	840	884	959	1160	–
External taper (K hub)																										
18	–	–	–	–	22	35	50	68	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
30	–	–	–	–	–	–	39	53	69	97	108	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
60	–	–	–	–	–	–	–	–	65	92	102	123	147	159	200	229	261	–	–	–	–	–	–	–	–	–
80	–	–	–	–	–	–	–	–	–	–	131	159	189	205	257	295	336	402	–	–	–	–	–	–	–	–
150	–	–	–	–	–	–	–	–	–	–	131	159	189	205	257	295	336	402	–	–	–	–	–	–	–	–
200	–	–	–	–	–	–	–	–	–	–	151	182	217	235	295	339	285	341	402	446	491	–	–	–	–	–
300	–	–	–	–	–	–	–	–	–	–	–	–	–	328	412	472	538	643	758	687	757	869	1073	1126	–	–
500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	477	562	623	686	788	897	973	1177	–
800	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1773	2146	2553
1400	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1773	2146	2553

Miniature series Standard series

TYPE SNN

Miniature series with set screws





Size	Rated torque T_{KN} Nm	Maximum speed n_{Kmax} rpm	Dimensions in mm DA	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	LG	SA	Screw DIN EN ISO 4027 SC	Screw DIN EN ISO 4027 T_A Nm	Moment of inertia J gcm²	↗ Article No. [1]	Weight m g
Hub material aluminum													
1	**0,1**	15000	10	2	**5**	4,2	22	2	M3	0,5	0,5	**2LC0590-1AA99-0AA0**	3
5	**0,5**	15000	15	3	**8**	6	19	2,2	M3	0,5	2	**2LC0590-2AA99-0AA0**	5,6
							23				2,1	**2LC0590-2AA99-0AB0**	6
							27				2,3	**2LC0590-2AA99-0AC0**	6,5
10	**1**	15000	15	3	**8**	6	21	2,2	M3	0,5	2,5	**2LC0590-3AA99-0AA0**	7
							25				2,7	**2LC0590-3AA99-0AB0**	7,5
							29				2,9	**2LC0590-3AA99-0AC0**	8
15	**1,5**	15000	20,5	3	**12**	8	26	3	M4	1,5	8,7	**2LC0590-4AA99-0AA0**	13
							30				9,2	**2LC0590-4AA99-0AB0**	13,9
20	**2**	15000	24,5	3	**14**	8,5	27	2,7	M4	1,5	19,2	**2LC0590-5AA99-0AA0**	20,3
							33				23	**2LC0590-5AA99-0AB0**	23,8
							37				26	**2LC0590-5AA99-0AC0**	26,5
45	**4,5**	15000	32	6	**18**	12,3	40	4,5	M6	3	80	**2LC0590-6AA99-0AA0**	51
							48				110	**2LC0590-6AB99-0AB0**	68
100	**10**	15000	40	6	**24**	12,5	45	4,5	M6	3	188	**2LC0590-7AA99-0AA0**	74
							55				292	**2LC0590-7AA99-0AB0**	109

Notes

- Shaft connected to hub by means of set screws according to EN ISO 4027. A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SNN coupling, size 45
  Total length LG = 40 mm
- Bore ØD1 14 H7
- Bore ØD2 18 H7

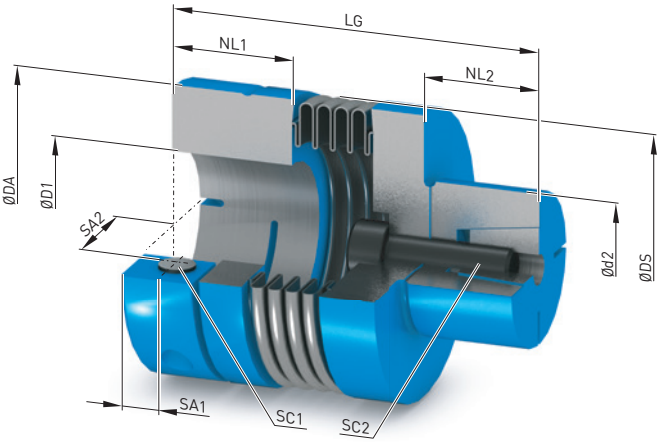
Article No.: 2LC0590-6AA99-0AA0-Z L0H+M0K

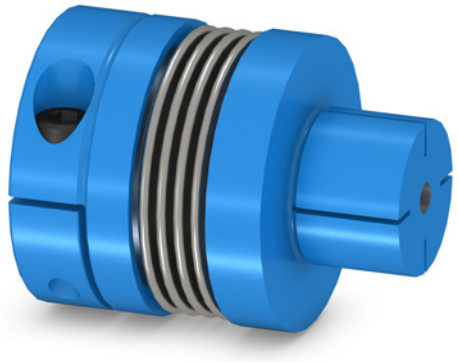
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SGS

Miniature series with expanding hub





Size	Rated torque T_{KN} Nm	Maximum speed n_{Kmax} rpm	Dimensions in mm DA	DS	D1 H7 min.	D1 H7 max.	d2 h7	NL1	NL2	LG	SA1	SA2	Screw DIN EN ISO 4762 SC1	T_A Nm	SC2	T_A Nm	Moment of inertia J gcm²	↗ Article No. [1]	Weight m g
Hub material aluminum																			
5	0.5	15000	15.5	17.5	3	7	8	6.8	8	28	2.4	5.2	M2	0.43	M3	1	2.5	2LC0590-2AD99-0AA0	9.3
										32							2.6	2LC0590-2AD99-0AB0	9.7
										36							2.8	2LC0590-2AD99-0AC0	10.1
10	1	15000	15.5	17.5	3	7	8	6.8	8	30	2.4	5.2	M2	0.43	M3	1	3	2LC0590-3AD99-0AA0	10.6
										34							3.2	2LC0590-3AD99-0AB0	11
										38							3.4	2LC0590-3AD99-0AC0	11.8
15	1.5	15000	20.5	21	3	10	10	8.5	12	37	3	7	M2.5	0.85	M4	3	7.8	2LC0590-4AD99-0AA0	18.5
										41							8.4	2LC0590-4AD99-0AB0	19.3
20	2	15000	25.5	27	3	12.5	10	11	12	41	3.5	9	M3	2	M4	3	20.6	2LC0590-5AD99-0AA0	27.8
										46							24.2	2LC0590-5AD99-0AB0	31.3
										50							27.7	2LC0590-5AD99-0AC0	34.8
45	4.5	15000	32.5	34	6	16	14	13	16	52	4.5	11.5	M4	3.5	M5	5.9	68	2LC0590-6AD99-0AA0	57
										60							99	2LC0590-6AD99-0AB0	74
100	10	15000	40.5	41.5	6	22	16	14	20	61	4.7	15.5	M4	3.5	M6	10	153	2LC0590-7AD99-0AA0	81
										71							257	2LC0590-7AD99-0AB0	117

Notes

- A hollow shaft can be connected to the expanding hub.
- The bore for connecting the expanding hub must have tolerance H7.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SGS coupling, size 45
  Total length LG = 52 mm
- Bore ØD1 14 H7
- Shaft Ød2 14 h7

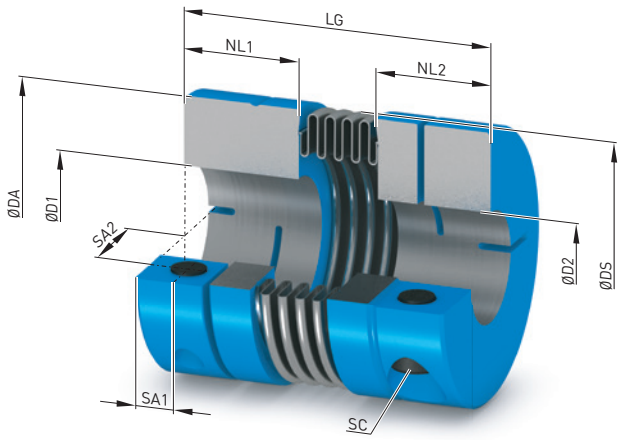
Article No.: 2LC0590-6AD99-0AA0-Z L0H

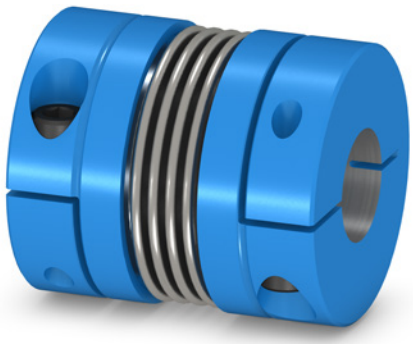
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SGG

Miniature series with clamping hub, slotted





Size	Rated torque T_{KN}	Maximum speed n_{Kmax}	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	Screw DIN EN ISO 4762 T_A	Moment of inertia J	↗ Article No. [1]	Weight m
	Nm	rpm										Nm	gcm²		g
Hub material aluminum															
5	**0.5**	15000	15.5	17.5	3	**7**	6.8	21	2.5	5.3	M2	0.3	2.4	**2LC0590-2AB99-0AA0**	6.6
								25					2.5	**2LC0590-2AB99-0AB0**	7
								28					2.7	**2LC0590-2AB99-0AC0**	7.5
10	**1**	15000	15.5	17.5	3	**7**	6.8	23	2.5	5.3	M2	0.3	2.9	**2LC0590-3AB99-0AA0**	7.9
								27					3.1	**2LC0590-3AB99-0AB0**	8.5
								31					3.3	**2LC0590-3AB99-0AC0**	9
15	**1.5**	15000	20	21	3	**10**	8.5	27	3	7	M2.5	0.8	7.7	**2LC0590-4AB99-0AA0**	12.5
								31					8.3	**2LC0590-4AB99-0AB0**	13.3
20	**2**	15000	25	27	3	**12.5**	11	32	3.5	9	M3	1.5	24	**2LC0590-5AB99-0AA0**	25
								38					28	**2LC0590-5AB99-0AB0**	28
								42					31	**2LC0590-5AB99-0AC0**	31
45	**4.5**	15000	32.5	34	6	**16**	13	42	4.5	12	M4	3	80	**2LC0590-6AB99-0AA0**	49
								50					110	**2LC0590-6AB99-0AB0**	66
100	**10**	15000	40	41.5	6	**22**	14	48	4.7	15.5	M4	3	193	**2LC0590-7AB99-0AA0**	74
								57					298	**2LC0590-7AB99-0AB0**	110

Notes

- The slotted clamping hub allows a frictionally engaged connection to the input and output shaft.
- A single tightening screw per hub ensures easy assembly.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SGG coupling, size 45, Total length LG = 42 mm
- Bore ØD1 12 H7
- Bore ØD2 16 H7

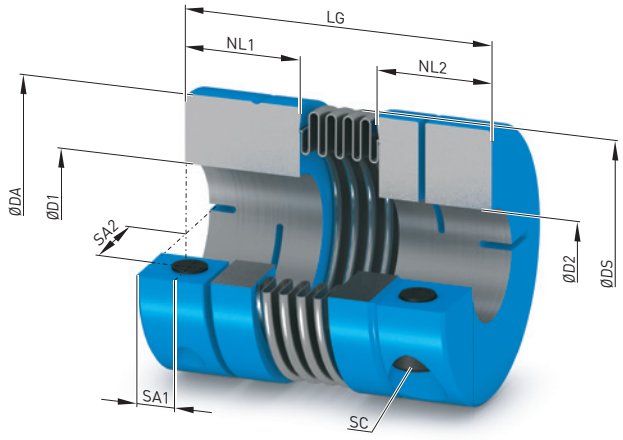
Article No.: 2LC0590-6AB99-0AA0 L0G+M0J

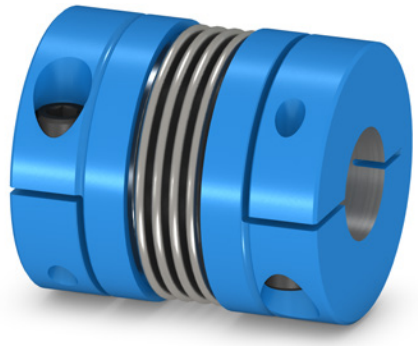
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SGG

Standard series with clamping hub, slotted





Size	Rated torque T_{KN}	Maximum speed n_{Kmax}	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	T_A	Moment of inertia J	↗ Article No. [1]	Weight m
	Nm	rpm										Nm	10^{-3}·kgm²		kg
Hub material aluminum															
18	**18**	12800	45	47	8	**25**	20,5	63	5,7	17,5	M5	8	0,05	**2LC0590-8AB99-0AA0**	0,14
								72					0,06	**2LC0590-8AB99-0AB0**	0,15
30	**30**	10300	54	56	10	**30**	24,5	65	7,5	20	M6	15	0,11	**2LC0591-0AB99-0AA0**	0,23
								74					0,12	**2LC0591-0AB99-0AB0**	0,25
60	**60**	8700	65	67	12	**35**	29	79	10	24	M8	40	0,31	**2LC0591-1AB99-0AA0**	0,44
								89					0,32	**2LC0591-1AB99-0AB0**	0,45
80	**80**	6900	79	84	14	**42**	34	92	11,8	28	M10	72	0,76	**2LC0591-2AB99-0AA0**	0,74
								103					0,82	**2LC0591-2AB99-0AB0**	0,79
150	**150**	6900	79	84	14	**42**	34	92	11,8	28	M10	84	0,76	**2LC0591-3AB99-0AA0**	0,74
								103					0,82	**2LC0591-3AB99-0AB0**	0,79
200	**200**	6400	90	93	20	**43**	38	101	12,5	31,5	M12	125	1,41	**2LC0591-4AB99-0AA0**	1,1
								113					1,5	**2LC0591-4AB99-0AB0**	1,17
300	**300**	6000	109	110	24	**50**	38	103	13	35	M12	145	3	**2LC0591-5AB99-0AA0**	1,7
								116					3,2	**2LC0591-5AB99-0AB0**	1,75
500	**500**	5000	119	122	35	**60**	41,5	111	15	42	M14	190	4,5	**2LC0591-6AB99-0AA0**	1,99
								123					4,7	**2LC0591-6AB99-0AB0**	2,05

Notes

- The slotted clamping hub allows a frictionally engaged connection to the input and output shaft.
- A single tightening screw per hub ensures easy assembly.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page page 14/9**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SGG coupling, size 80,
  Total length LG = 103 mm
- Bore ØD1 30 H7
- Bore ØD2 38 H7

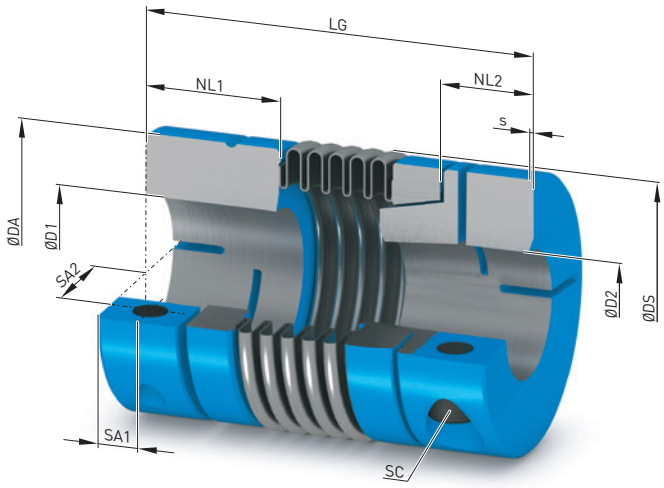
Article No.: 2LC0591-2AB99-0AB0 L0S+M0V

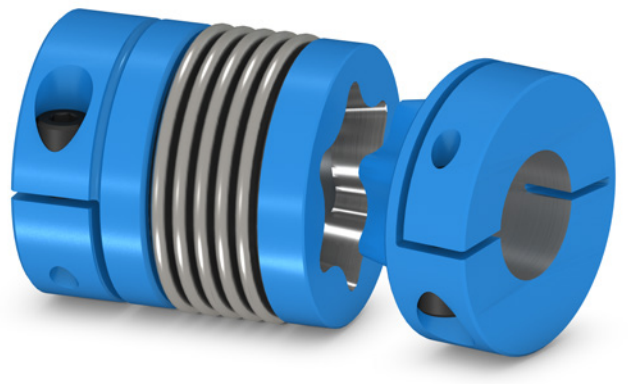
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SGG-A

Miniature series with axially plug-in clamping hub





Size	Rated torque	Maximum speed	Dimensions in mm											Screw DIN EN ISO 4762		Moment of inertia	↗ Article No. [1]	Weight
	T_{KN}	n_{Kmax}	DA	DS	D1, D2 H7	D1	D2	NL1	NL2	LG	s Preten.	SA1	SA2	SC	T_A	J		m
	Nm	rpm			min.	max.	max.								Nm	gcm²		g
Hub material aluminum																		
45	**4,5**	15000	32,5	34	5	**16**	**14**	13	13	48	0,7	4,5	12	M4	3,5	88	**2LC0590-6AE99-0AA0**	58
										56						95	**2LC0590-6AB0**	68
100	**10**	15000	40	41,5	6	**22**	**18**	14	13	54	1	4,7	15,5	M4	4,5	230	**2LC0590-7AE99-0AA0**	90
										64						260	**2LC0590-7AB0**	120

Notes

- The variant with axially plug-in clamping hub is designed for simple blind or bell housing assembly.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SGG-A coupling, size 45
  Total length LG = 48 mm
- Bore ØD1 14 H7
- Bore ØD2 12 H7

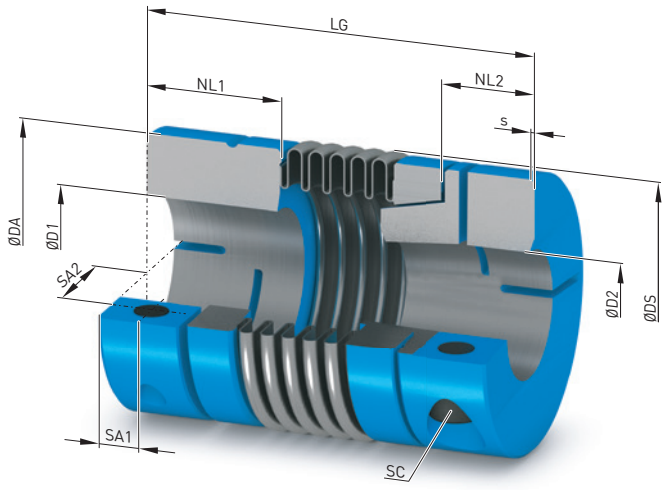
Article No.: 2LC0590-6AE99-0AA0 L0H+M0G

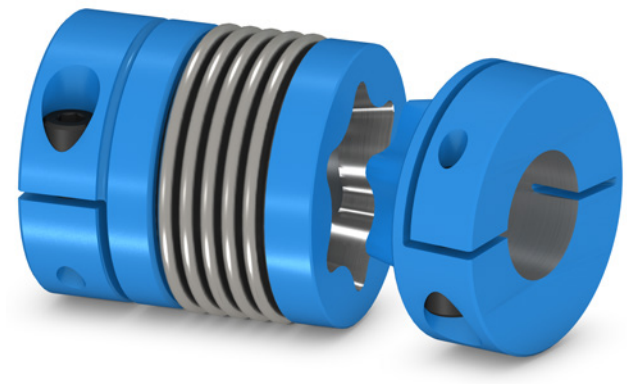
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SGG-A

Standard series with axially plug-in clamping hub





Size	Rated torque	Maximum speed	Dimensions in mm											Screw DIN EN ISO 4762		Moment of inertia	↗ Article No. [1]	Weight
	T_{KN}	n_{Kmax}	DA	DS	D1, D2 H7	D1	D2	NL1	NL2	LG	s Preten.	SA1	SA2	SC	T_A	J		m
	Nm	rpm			min.	max.	max.								Nm	$10^{-3} \cdot kgm^2$		kg
Hub material aluminum																		
18	**18**	12800	45	47	8	**25**	**21**	20,5	13	62	0,5-1,0	5,7	17,5	M5	8	0,04	**2LC0590-8AE99-0AA0**	0,12
										69						0,05	**2LC0590-8AE99-0AB0**	0,15
30	**30**	10300	54	56	10	**30**	**23**	24,5	19,5	70	0,5-1,0	7,5	20	M6	15	0,12	**2LC0591-0AE99-0AA0**	0,27
										78						0,13	**2LC0591-0AE99-0AB0**	0,28
60	**60**	8700	65	67	12	**35**	**30**	29	25,5	84	0,5-1,5	10	24	M8	40	0,33	**2LC0591-1AE99-0AA0**	0,5
										94						0,34	**2LC0591-1AE99-0AB0**	0,52
80	**80**	6900	79	84	14	**42**	**38**	34	26	95	0,5-1,5	11,8	28	M10	72	0,78	**2LC0591-2AE99-0AA0**	0,79
										105						0,84	**2LC0591-2AE99-0AB0**	0,83
150	**150**	6900	79	84	14	**42**	**38**	34	24	95	0,5-1,5	11,8	28	M10	84	0,78	**2LC0591-3AE99-0AA0**	0,79
										105						1,05	**2LC0591-3AE99-0AB0**	0,96
200	**200**	6400	90	93	20	**45**	**40**	38	31,5	105	0,5-1,5	12,5	31,5	M12	125	1,47	**2LC0591-4AE99-0AA0**	1,16
										117						1,58	**2LC0591-4AE99-0AB0**	1,25
300	**300**	6000	109	110	24	**50**	**45**	38	32	110	0,5-1,5	13	35	M12	145	3,2	**2LC0591-5AE99-0AA0**	1,8
										121						3,3	**2LC0591-5AE99-0AB0**	1,85
500	**500**	5000	119	122	35	**60**	**60**	41,5	39	126	0,5-2,0	15	42	M14	190	5	**2LC0591-6AE99-0AA0**	2,25
										137						5,2	**2LC0591-6AE99-0AB0**	2,3

Notes

- The variant with axially plug-in clamping hub is designed for simple blind or bell housing assembly.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SGG-A coupling, size 80
  Total length LG = 95 mm
- Bore ØD1 30 H7
- Bore ØD2 38 H7

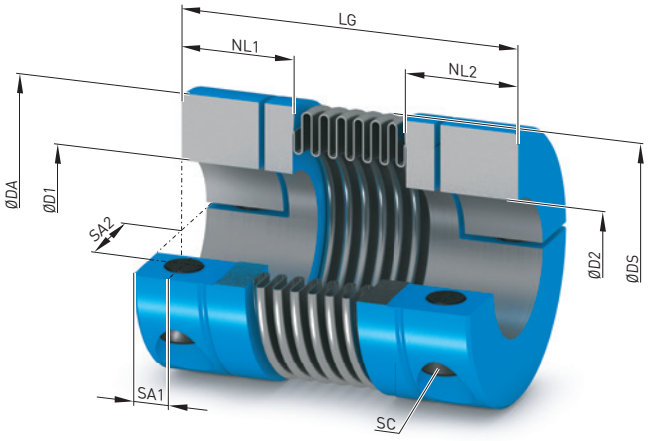
Article No.: 2LC0591-2AE99-0AA0 L0S+M0V

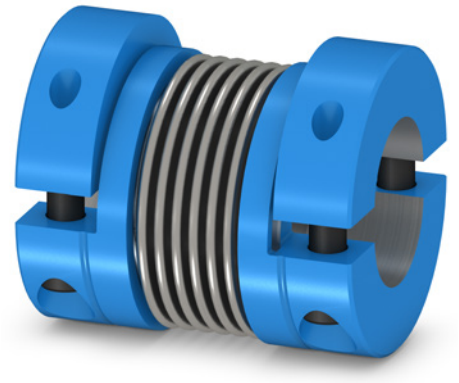
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SHH

Miniature series with half-shell clamping hub





Size	Rated torque T_{KN}	Maximum speed n_{Kmax}	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	Screw DIN EN ISO 4762 T_A	Moment of inertia J	↗ Article No. [1]	Weight m
	Nm	rpm										Nm	gcm²		g
Hub material aluminum															
5	**0,5**	15000	15,5	17,5	3	**7**	6,8	21	2,4	5,2	M2	0,5	1,4	**2LC0590-2AC99-0AA0**	4
								25					2,6	**2LC0590-2AC99-0AB0**	7,3
								28					2,8	**2LC0590-2AC99-0AC0**	7,7
10	**1**	15000	15,5	17,5	3	**7**	6,8	23	2,4	5,2	M2	0,5	3	**2LC0590-3AC99-0AA0**	8,2
								27					3,2	**2LC0590-3AC99-0AB0**	8,8
								31					3,4	**2LC0590-3AC99-0AC0**	9,3
15	**1,5**	15000	20	21	3	**10**	8,5	27	3	7	M2,5	0,9	8,4	**2LC0590-4AC99-0AA0**	13,7
								31					8,5	**2LC0590-4AC99-0AB0**	13,8
20	**2**	15000	25	27	3	**12,5**	11	32	3,5	9	M3	2	25	**2LC0590-5AC99-0AA0**	25
								38					28	**2LC0590-5AC99-0AB0**	29
								42					32	**2LC0590-5AC99-0AC0**	32
45	**4,5**	15000	32,5	34	6	**16**	13	42	4,5	11,5	M4	3,5	82	**2LC0590-6AC99-0AA0**	50
								50					113	**2LC0590-6AC99-0AB0**	68
100	**10**	15000	40	41,5	6	**22**	14	48	4,7	15,5	M4	4,5	196	**2LC0590-7AC99-0AA0**	75
								57					300	**2LC0590-7AC99-0AB0**	111

Notes

- It is possible to radially assemble and dismantle the hub version with half-shells without moving the connected units.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SHH coupling, size 45
  Total length LG = 42 mm
- Bore ØD1 12 H7
- Bore ØD2 16 H7

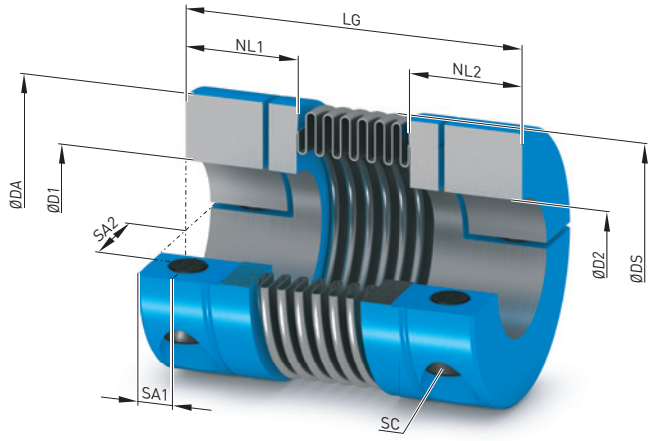
Article No.: 2LC0590-6AC99-0AA0 L0G+M0J

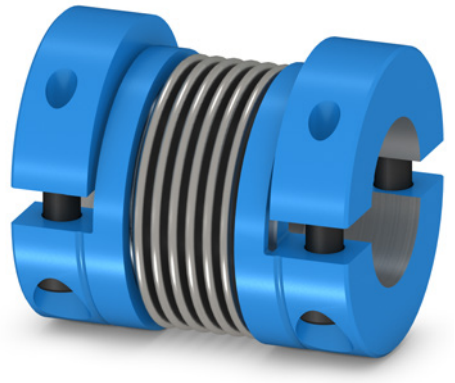
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SHH

Standard series with half-shell clamping hub





Size	Rated torque T_{KN}	Maximum speed n_{Kmax}	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	T_A	Moment of inertia J	↗ Article No. [1]	Weight m
	Nm	rpm										Nm	10^{-3}·kgm²		kg
Hub material aluminum															
18	**18**	12800	45	48	8	**25**	20,5	63	5,7	17,5	M5	8	0,05	**2LC0590-8AC99-0AA0**	0,15
								72					0,05	**2LC0590-8AC99-0AB0**	0,16
30	**30**	10300	54	56	10	**30**	24,5	65	7,5	20	M6	15	0,11	**2LC0591-0AC99-0AA0**	0,23
								74					0,12	**2LC0591-0AC99-0AB0**	0,25
60	**60**	8700	65	67	12	**35**	29	79	10	24	M8	40	0,32	**2LC0591-1AC99-0AA0**	0,46
								89					0,33	**2LC0591-1AC99-0AB0**	0,49
80	**80**	6900	79	84	14	**42**	34	91	11,8	28	M10	72	0,83	**2LC0591-2AC99-0AA0**	0,81
								102					0,89	**2LC0591-2AC99-0AB0**	0,85
150	**150**	6900	79	84	14	**42**	34	91	11,8	28	M10	84	0,83	**2LC0591-3AC99-0AA0**	0,81
								102					0,89	**2LC0591-3AC99-0AB0**	0,85
200	**200**	6400	90	93	20	**45**	38	101	12,5	31,5	M12	125	1,45	**2LC0591-4AC99-0AA0**	1,14
								113					1,55	**2LC0591-4AC99-0AB0**	1,21
300	**300**	6000	109	110	24	**50**	38	103	13	35	M12	145	3,04	**2LC0591-5AC99-0AA0**	1,69
								116					3,15	**2LC0591-5AC99-0AB0**	1,73
500	**500**	5000	119	122	35	**60**	41,5	111	14	42	M14	190	4,59	**2LC0591-6AC99-0AA0**	2,05
								123					4,77	**2LC0591-6AC99-0AB0**	2,11

Notes

- It is possible to radially assemble and dismantle the hub version with half-shells without moving the connected units.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SHH coupling, size 80
  Total length LG = 91 mm
- Bore ØD1 30 H7
- Bore ØD2 38 H7

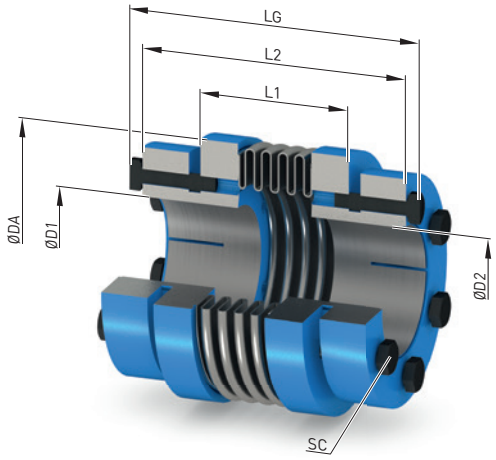
Article No.: 2LC0591-2AC99-0AA0-Z L0S+M0V

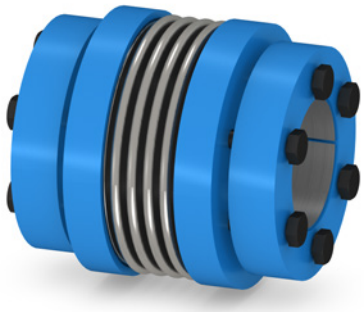
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SKK

Miniature series with external taper





Size	Rated torque T_{KN} Nm	Maximum speed n_{Kmax} rpm	Dimensions in mm DA	D1, D2 H7 min.	D1, D2 H7 max.	L1	L2	LG	Screw DIN EN ISO 4017 SC	Screw DIN EN ISO 4017 T_A Nm	Moment of inertia J gcm²	↗ Article No. [1]	Weight m g
Hub material steel													
45	**4,5**	15000	32	6	**10**	25	37	42	M3	1,3	64	**2LC0590-6AF99-0AA0**	49
						33	45	50			95	**2LC0590-6AB99-0AB0**	65
100	**10**	15000	40	8	**14**	33	45	48	M3	1,3	166	**2LC0590-7AF99-0AA0**	77
						38	52	57			270	**2LC0590-7AB99-0AB0**	113

Notes

- The clamping hubs with external taper are the ideal solution for high-speed and highly dynamic applications.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SKK coupling, size 45
  Total length LG = 42 mm
- Bore ØD1 10 H7
- Bore ØD2 8 H7

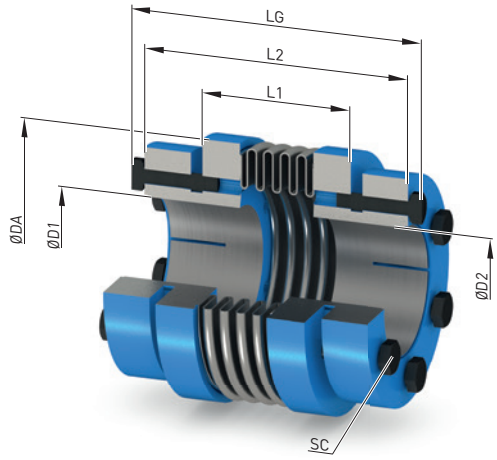
Article No.: 2LC0590-6AF99-0AA0 L0E+M0C

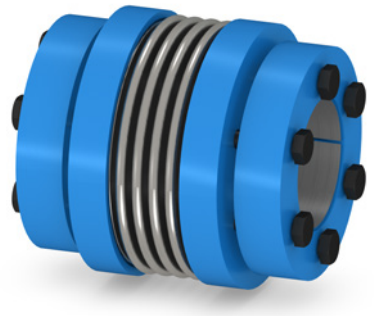
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SKK

Standard series with external taper





Size	Rated torque T_{KN}	Maximum speed n_{Kmax}	Dimensions in mm DA	D1, D2 H7 min.	D1, D2 H7 max.	L1	L2	LG	Screw DIN EN ISO 4017 SC	T_A	Moment of inertia J	↗ Article No. [1]	Weight m
	Nm	rpm								Nm	$10^{-3} \cdot kgm^2$		kg
Hub material steel													
18	**18**	12800	47	8	**15**	37	57	65	M5	5,9	0,07	**2LC0590-8AF99-0AA0**	0,3
						45	65	73			0,08	**2LC0590-8AF99-0AB0**	0,31
30	**30**	10300	56	12	**20**	30	52	60	M5	5,9	0,12	**2LC0591-0AF99-0AA0**	0,43
						38	60	68			0,17	**2LC0591-0AF99-0AB0**	0,44
60	**60**	8700	64	15	**32**	34	70	79	M6	8,7	0,57	**2LC0591-1AF99-0AA0**	0,89
						44	80	89			0,57	**2LC0591-1AF99-0AB0**	0,9
80	**80**	6900	82	20	**35**	48	88	97	M6	15	1,42	**2LC0591-2AF99-0AA0**	1,63
						60	100	109			1,44	**2LC0591-2AF99-0AB0**	1,66
150	**150**	6900	82	20	**35**	48	88	97	M6	15	1,42	**2LC0591-3AF99-0AA0**	1,63
						60	100	109			1,44	**2LC0591-3AF99-0AB0**	1,66
200	**200**	6400	90	20	**42**	50	89	98	M6	15	1,5	**2LC0591-4AF99-0AA0**	1,8
						62	101	110			1,6	**2LC0591-4AF99-0AB0**	1,85
300	**300**	6000	110	25	**50**	55	99	110	M8	25	4,9	**2LC0591-5AF99-0AA0**	3,05
						65	109	120			5	**2LC0591-5AF99-0AB0**	3,09
500	**500**	5000	122	35	**55**	60	113	125	M8	36	8,3	**2LC0591-6AF99-0AA0**	4,39
						70	123	135			8,5	**2LC0591-6AF99-0AB0**	4,45
800	**800**	3700	157	50	**70**	92	166	182	M12	85	36	**2LC0591-7AF99-0AA0**	10,9
1400	**1400**	3700	157	50	**70**	92	166	182	M12	115	36	**2LC0591-8AF99-0AA0**	10,9
3000	**3000**	2800	157	55	**75**	92	166	182	M12	125	36	**2LC0592-0AF99-0AA0**	10,9
5000	**5000**	2800	210	60	**90**	140	219	240	M16	210	165	**2LC0592-1AF99-0AA0**	30,4

Notes

- The clamping hubs with external taper are the ideal solution for high-speed and highly dynamic applications.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SKK coupling, size 80
  Total length LG = 97 mm
- Bore ØD1 30 H7
- Bore ØD2 35 H7

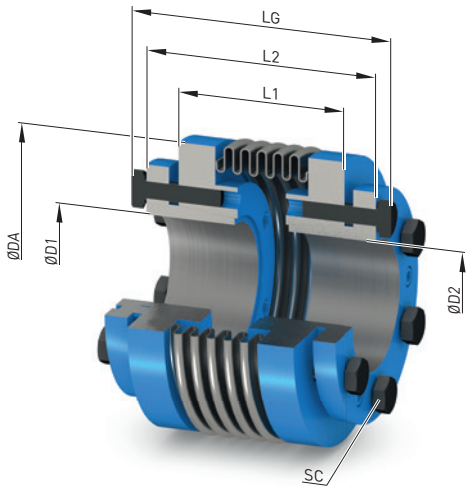
Article No.: 2LC0591-2AF99-0AA0 L0S+M0U

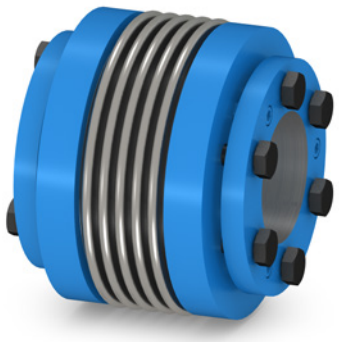
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SII

Standard series with internal taper





Size	Rated torque T_{KN}	Maximum speed n_{Kmax}	Dimensions in mm DA	D1, D2 H7 min.	D1, D2 H7 max.	LG	L1	L2	Screw DIN EN ISO 4017 SC	T_A	Moment of inertia J	↗ Article No. [1]	Weight m
	Nm	rpm								Nm	$10^{-3} \cdot kgm^2$		kg
Hub material steel													
18	**18**	12800	47	10	**17**	62	42	57	M4	4	0,05	**2LC0590-8AG99-0AA0**	0,2
						70	50	64				**2LC0590-8AG99-0AB0**	0,21
30	**30**	10300	56	12	**20**	53	34	47	M4	4,5	0,08	**2LC0591-0AG99-0AA0**	0,24
						61	42	55			0,09	**2LC0591-0AG99-0AB0**	0,27
60	**60**	8700	64	15	**25**	62	34	53	M6	8,5	0,22	**2LC0591-1AG99-0AA0**	0,46
						73	45	64			0,25	**2LC0591-1AG99-0AB0**	0,48
80	**80**	6900	82	20	**35**	79	50	70	M6	10	0,65	**2LC0591-2AG99-0AA0**	0,82
						90	60	81			0,71	**2LC0591-2AG99-0AB0**	0,87
150	**150**	6900	82	20	**35**	79	50	70	M6	15	0,65	**2LC0591-3AG99-0AA0**	0,82
						90	60	81			0,71	**2LC0591-3AG99-0AB0**	0,87
200	**200**	6400	90	20	**40**	79	50	70	M6	15	0,85	**2LC0591-4AG99-0AA0**	0,92
						92	63	84			0,95	**2LC0591-4AG99-0AB0**	0,94
300	**300**	6000	110	25	**50**	90	53	78	M8	17	2,58	**2LC0591-5AG99-0AA0**	1,82
						103	65	91			2,85	**2LC0591-5AG99-0AB0**	1,86
500	**500**	5000	122	35	**55**	103	65	91	M8	25	4,2	**2LC0591-6AG99-0AA0**	2,34
						113	71	101			4,42	**2LC0591-6AG99-0AB0**	2,4
800	**800**	3700	157	50	**70**	170	108	148	M16	45	28,4	**2LC0591-7AG99-0AA0**	9,69
1400	**1400**	3700	157	50	**70**	170	108	148	M16	80	28,4	**2LC0591-8AG99-0AA0**	9,69
3000	**3000**	2800	157	55	**75**	170	108	148	M16	115	32,5	**2LC0592-0AG99-0AA0**	10,2
5000	**5000**	2800	210	60	**90**	202	140	180	M16	210	115	**2LC0592-1AG99-0AA0**	20,9

Notes

- The clamping hubs with internal taper are the ideal solution for high-speed and highly dynamic applications. These couplings require less installation space than type SKK.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 14/9**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- SIPEX SII coupling, size 80
  Total length LG = 79 mm
- Bore ØD1 30 H7
- Bore ØD2 35 H7

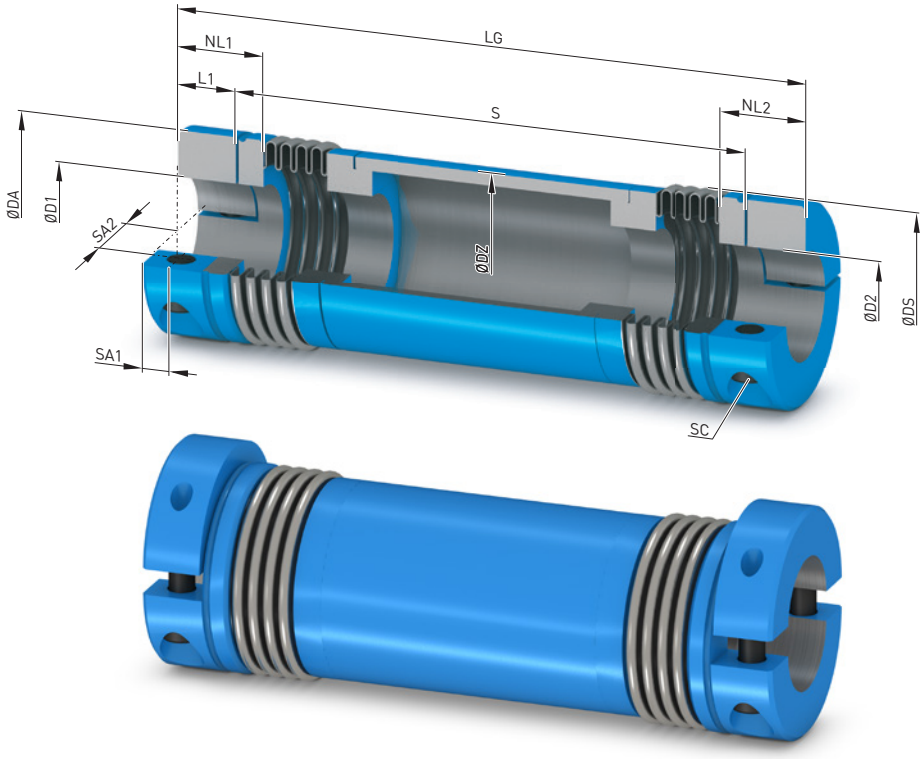
Article No.: 2LC0591-2AG99-0AA0 L0S+M0U

[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE SHH-W

Standard series, drive shaft with half-shell clamping hubs



Size	Rated torque	Maximum speed	Dimensions in mm											Screw DIN EN ISO 4762		Moment of inertia [2]	↗ Article No. [1]	Weight
	T_{KN}	n_{Kmax}	DA	DS	D1, D2 H7		DZ	NL1/ NL2	L1	LG		SA1	SA2	SC	T_A	J		m
	Nm	rpm			min.	max.				min.	max.				Nm	$10^{-3} \cdot kgm^2$		kg
Hub material aluminum																		
18	**18**	1500	45	48	8	**25**	40	20,5	13,5	132	3000	5,7	17,5	M5	10	0,51	**2LC0590-8AH99-0AZ0**	1,63
30	**30**	1500	54	56	10	**30**	50	24,5	17	130	3000	7,5	20	M6	17	1,13	**2LC0591-0AH99-0AZ0**	2,29
60	**60**	1500	65	67	12	**35**	60	29	22	165	3000	10	24	M8	42	2,42	**2LC0591-1AH99-0AZ0**	3,34
150	**150**	1500	79	84	14	**42**	75	34	24	196	3000	11,8	28	M10	83	5,77	**2LC0591-3AH99-0AZ0**	5,1
200	**200**	1500	90	93	20	**45**	90	38	28	218	3000	12,5	31,5	M12	145	9,53	**2LC0591-4AH99-0AZ0**	5,9
300	**300**	1500	109	110	24	**60**	100	38	28	220	3000	13	39	M12	145	14,6	**2LC0591-5AH99-0AZ0**	7,1
500	**500**	1500	119	122	35	**60**	110	41,5	31,5	250	3000	14,3	42	M14	230	18,6	**2LC0591-6AH99-0AZ0**	7,3

Notes

- It is possible to radially assemble and dismantle the hub version with half-shells without moving the connected units. It must be noted that the total length LG is obtained with shaft distance S + 2 × L1.
- The intermediate tubes in the standard version are made of aluminum. Tubes made of carbon-fiber-reinforced plastic (CFRP) are also available as an option.
- Weights and mass moments of inertia apply to maximum bore diameters and a shaft distanced S = 1000 mm.
- Drive shafts with slotted clamping hubs are available as an alternative (type SGG-W).

Ordering example

- SIPEX SHH-W coupling, size 60
  Shaft distance S = 1000 mm
  Total length LG = 1044 mm
- Bore ØD1 24 H7
- Bore ØD2 28 H7

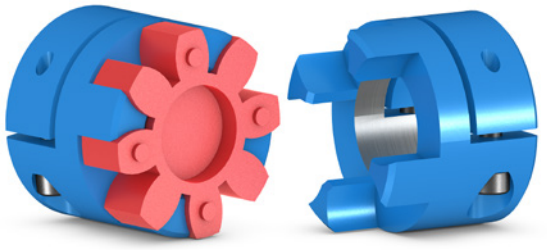
Article No.: 2LC0591-1AH99-0AZ0 L0P+M0R+Q0Y
Plain text for Q3Y: S = 1000 mm

[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

[2] for DBSE = 1000 mm

↗ For online configuration on **flender.com**, click on the item no.

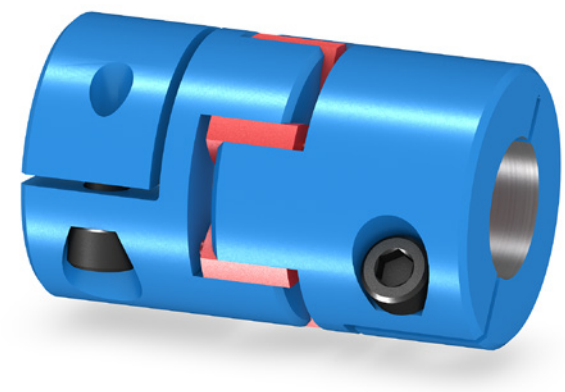
BACKLASH-FREE COUPLINGS BIPEX-S SERIES



GENERAL

BIPEX-S couplings are torsionally flexible and are free of backlash in the pretensioned state. They are characterized by their compact design and high power density. BIPEX-S couplings connect machine shafts and compensate for shaft misalignment that can occur during assembly or operation. The damping properties of the couplings can be varied by the use of cam rings made of elastomer of various degrees of hardness.

BIPEX-S couplings are suitable for all drive applications which require a coupling that offers positioning accuracy and vibration damping.



Benefits

BIPEX-S couplings are suitable for mounting horizontally, vertically or in any desired position. The coupling parts can be arranged as required on the shaft ends to be connected. The coupling can be axially plugged in.

The cam ring is pretensioned and is therefore assembled without backlash. The cams attached to the cam ring allow the coupling to compensate shaft misalignment, and also provide electrical isolation since they prevent contact between the two hub parts.

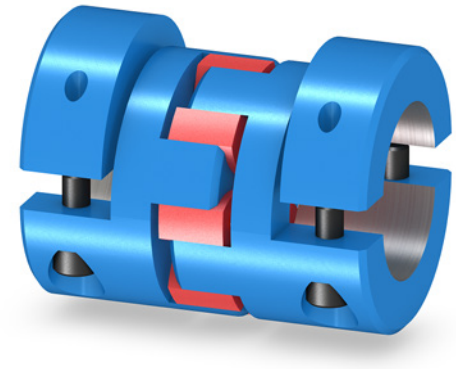
BIPEX-S couplings are fail-safe. When the cam ring is worn, the claws of the coupling hubs provide for fail-safe operation.

Available in 4 different Shore hardness grades, the cam rings allow to select the optimum degree of rigidity for any application.

Application

BIPEX-S couplings within the standard catalog range are available in 10 sizes with torque ratings ranging from 0.5 to 655 Nm. The coupling is suitable for ambient temperatures of between -30 °C and +90 °C. Cam rings with alternative hardness grades can be supplied for ambient temperatures down to -50 °C or up to +120 °C.

BIPEX-S couplings are ideal for use in servo drives, linear axes or rotary encoders of the type typically deployed in machine tools, packaging machines or printing presses.



Design and configurations

BIPEX-S couplings each comprise two hub parts connected by a cam ring made of polyurethane (PU).

The couplings can be axially plugged in during assembly. The hubs can be coupled to the shafts by many different methods including set screws, key joint, slotted clamping hubs, half-shell hubs, clamping hubs or expanding hubs.

BIPEX-S couplings are positive-locking and torsionally flexible thanks to the polyurethane cam ring. Misalignment between the connected shafts deforms the cam ring.

Coupling materials

Hubs	Up to size 38 aluminum Sizes 42 and 48 steel
Cam ring	PU 80 ShoreA -50 °C to +80 °C PU 92 ShoreA -40 °C to +90 °C **PU 98 ShoreA** -30 °C to +90 °C (standard ring) PU 64 ShoreD -50 °C to +120 °C

The coupling types can be combined from the available range of hub versions and different elastomer grades.

Hub versions

Hub	Description
N	Hub with set screw
G	Slotted clamping hub
C	Slotted clamping hub, compact
H	Half-shell clamping hub
K	Clamping hub with external taper
S	Expanding hub

The N version has a keyway as standard. Versions G, C and H are optionally available with keyway.

The fitting tolerance of the coupled shaft ends should be g6 or h7.

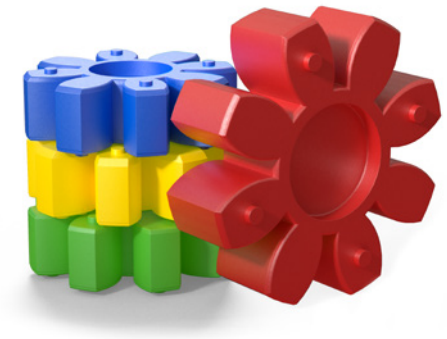
GENERAL

BIPEX-S coupling versions

Type	Description
BNN [1]	Hub with set screw on both sides
BGG [1]	Clamping hub on both sides
BCC [1]	Compact clamping hub on both sides
BHH [1]	Half-shell clamping hubs on both sides
BKK [1]	Clamping hub with external taper on both sides
BHH-W [1]	Drive shaft with half-shell clamping hub

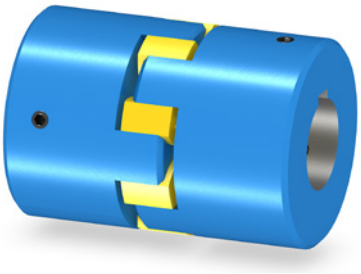
Type	Description	
	Hub 1	Hub 2
BCS [1]	Clamping hub	Expanding hub
BNG	Set screw	Clamping hub
BNC	Set screw	Clamping hub compact
BNH	Set screw	Half-shell clamping hub
BNK	Set screw	External taper
BGC	Clamping hub	Clamping hub compact
BGH	Clamping hub	Half-shell clamping hub
BGK	Clamping hub	External taper
BGS	Clamping hub	Expanding hub
BCH	Clamping hub compact	Half-shell clamping hub
BCK	Clamping hub compact	External taper
BHK	Half-shell clamping hub	External taper
BHS	Expanding hub	External taper
BKS	Expanding hub	External taper

Cam rings

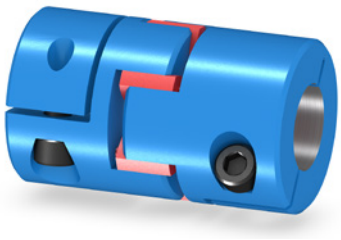


98 ShoreA (red))
92 ShoreA (yellow))
80 ShoreA (blue))
64 ShoreD (green))

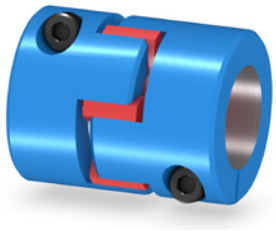
Hub variants



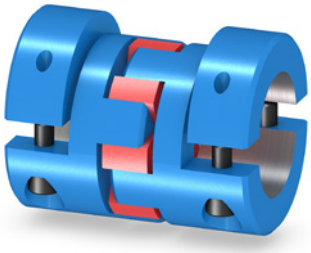
Set screw



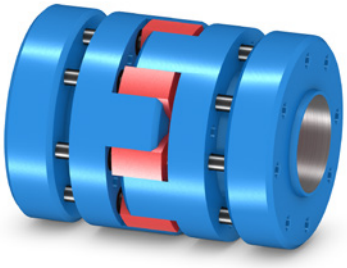
Clamping hub



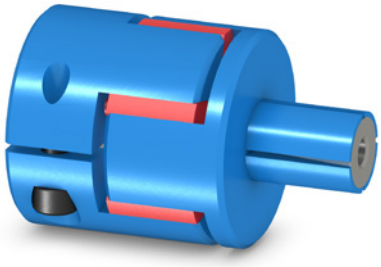
Clamping hub compact



Half-shell clamping hub



External taper



Expanding hub

[1] Standard version

Preliminary dimensioning

Dimensioning according to torque

The coupling must be dimensioned such that the rated torque of the drive including service factors does not exceed the rated torque of the coupling:

$T_{KN} \geq T_N \cdot FB \cdot FT$

Torque characteristic	Service factor FB
Uniform	1.25
Non uniform	1.5
Rough	2

In order to increase the torsional rigidity and therefore minimize the torsional backlash, it is possible to apply significantly higher service factors for main spindle or positioning drives.

Temperature range	Temperature factor FT
-30 °C to +30 °C	1
to +60 °C	1.4
to +80 °C	1.8
to +100 °C	2
to +120 °C	2.8

Note:
Please note the permissible temperature ranges of different cam rings.

Starts per hour	Startup factor FA
< 125	1
125 to 250	1.3
250 to 500	1.6
500 to 1000	1.8
> 1000	2

Checking the peak torques

The coupling size selected during the preliminary dimensioning process must also be suitable with respect to peak torques at the drive and load ends:

$T_{KN} \geq T_S \cdot FB \cdot FT$

$$T_S = T_{AS} \cdot \frac{J_L}{J_A + J_L} \cdot FA \quad \text{or} \quad T_S = T_{LS} \cdot \frac{J_A}{J_A + J_L} \cdot FA$$

Checking the maximum speed

For all load situations $n_{Kmax} > n_{max}$

Checking the permitted shaft misalignment

The actual shaft misalignment must be less than the permitted shaft misalignment for all load situations.

Checking the shaft-hub connection

In the case of clamping connections without feather key, it must be ensured that the transmissible torque of the hub connection is greater than the peak torque at the coupling.

GENERAL

Key to formula symbols

Name	Formula symbol	Unit	Explanation
Rated coupling torque	T_{KN}	Nm	Torque which can be transmitted as static torque by the coupling over the period of use
Coupling overload torque	T_{K0L}	Nm	Torque which can be transmitted very rarely as maximum torque by the coupling.
Peak torque at drive end	T_{AS}	Nm	Peak torque during non-periodic torque surges at drive end
Peak torque at load end	T_{LS}	Nm	Peak torque during non-periodic torque surges at load end
Peak torque	T_S	Nm	Peak torque at the coupling
Service factor	FB		Factor that expresses the real coupling load as a ratio of the nominal coupling load
Temperature factor	FT		Factor that takes into account the reduction in strength of flexible rubber materials at higher temperatures
Startup factor	FA		Factor that takes into account additional loading as a function of starting frequency
Moment of inertia of drive end	J_A	kgm²	Sum of the moments of inertia at the drive end referred to the coupling speed
Moment of inertia of load end	J_L	kgm²	Sum of the moments of inertia at the load end referred to the coupling speed
Torsion angle	φ	°	Torsion angle of the coupling under torsional load
Torsional stiffness, dynamic	C_{Tdyn}	Nm/rad	Dynamic torsional stiffness of the coupling
Axial stiffness	C_a	N/mm	Axial stiffness of the coupling
Radial stiffness	C_r	N/mm	Radial stiffness of the coupling
Rated speed	n_N	rpm	Coupling speed
Maximum coupling speed	$n_{k\,max}$	rpm	Maximum permissible coupling speed
Axial misalignment	ΔK_a	mm	Axial misalignment of the coupling halves
Radial misalignment	ΔK_r	mm	Radial misalignment of the coupling halves
Angular misalignment	ΔK_w	°	Angular misalignment of the coupling halves

Technical information

Torsional stiffness and damping

The values stated in the table apply to a capacity utilization of 50 %, an excitation amplitude of 10 % T_{KN} with a frequency of 10 Hz and an ambient temperature of 20 °C. The dynamic torsional stiffness is load-dependent and increases in proportion to capacity utilization.

The relative damping coefficient is
ψ = 0,8 for 98, 92 and 80 ShoreA
ψ = 0,75 for 64 ShoreD.

T_{K0L} is the torque which can be transmitted very rarely as maximum torque by the coupling.

Zulässiger Wellenversatz

The permitted shaft misalignments ΔK_a, ΔK_r and ΔK_w are maximum values and must not occur simultaneously. The following formula can be used to roughly calculate whether combinations of misalignments are permissible:

$$\frac{\Delta K_{r\,act}}{\Delta K_r} + \frac{\Delta K_{a\,act}}{\Delta K_a} + \frac{\Delta K_{w\,act}}{\Delta K_w} < 1$$

Cam rings

Size	Rated torque	Maximum torque	Maximum speed Type			Torsional stiffness	Radial stiffness	Permitted shaft misalignment		
			BNN	BGG, BHH, BCC, BCS	BKK					
	T_{KN} Nm	T_{KOL} Nm	$n_{k\,max}$ rpm	$n_{k\,max}$ rpm	$n_{k\,max}$ rpm	C_{Tdyn} Nm/rad	C_T Nm/mm	ΔK_a mm	ΔK_r mm	ΔK_w °
Polyurethane cam rings 80 ShoreA										
5	**0.3**	0.6	47500	38000	–	10	82	0.4	0.12	1.1
7	**0.7**	1.4	35000	26000	–	26	114	0.6	0.15	1.1
9	**1.8**	3.6	24000	18000	–	52	125	0.8	0.19	1.1
14	**4**	8	16000	12000	25000	180	153	1	0.21	1.1
19	**5**	10	12000	9500	18500	1030	582	1.2	0.15	1.1
Polyurethane cam rings 92 ShoreA										
5	**0.5**	1	47500	38000	–	16	154	0.4	0.06	1
7	**1.2**	2.4	35000	26000	–	43	219	0.6	0.1	1
9	**3**	6	24000	18000	–	95	262	0.8	0.13	1
14	**7.5**	15	16000	12000	25000	344	335	1	0.15	1
19	**10**	20	12000	9500	18500	1720	1125	1.2	0.1	1
24	**35**	70	8700	7000	13900	4300	1490	1.4	0.14	1
28	**95**	190	7400	6000	11800	6880	1785	1.5	0.15	1
38	**190**	380	6000	4700	9600	13750	2350	1.8	0.17	1
42	**265**	530	5000	4000	8000	24300	2440	2	0.19	1
48	**310**	620	4600	3500	7100	18055	2590	2.1	0.23	1
Polyurethane cam rings 98 ShoreA										
5	**0.9**	1.8	47500	38000	–	25	296	0.4	0.04	0.9
7	**2**	4	35000	26000	–	69	421	0.6	0.06	0.9
9	**5**	10	24000	18000	–	155	518	0.8	0.08	0.9
14	**12.5**	25	16000	12000	25000	513	655	1	0.09	0.9
19	**17**	34	12000	9500	18500	2580	2010	1.2	0.06	0.9
24	**60**	120	8700	7000	13900	6190	2550	1.4	0.1	0.9
28	**160**	320	7400	6000	11800	10310	3210	1.5	0.11	0.9
38	**325**	650	6000	4700	9600	21490	4410	1.8	0.12	0.9
42	**450**	900	5000	4000	8000	48000	5575	2	0.14	0.9
48	**525**	1050	4600	3500	7100	55925	5950	2.1	0.16	0.9
Polyurethane cam rings 64 ShoreD										
7	**2.4**	4.8	35000	26000	–	103	630	0.6	0.04	0.8
9	**6**	12	24000	18000	–	224	769	0.8	0.05	0.8
14	**16**	32	16000	12000	25000	702	855	1	0.06	0.8
19	**21**	42	12000	9500	18500	3720	2950	1.2	0.04	0.8
24	**75**	150	8700	7000	13900	8930	3695	1.4	0.07	0.8
28	**200**	400	7400	6000	11800	13050	4350	1.5	0.08	0.8
38	**405**	810	6000	4700	9600	31620	6475	1.8	0.09	0.8
42	**560**	1120	5000	4000	8000	71700	7280	2	0.1	0.8
48	**655**	1310	4600	3500	7100	90500	8280	2.1	0.11	0.8

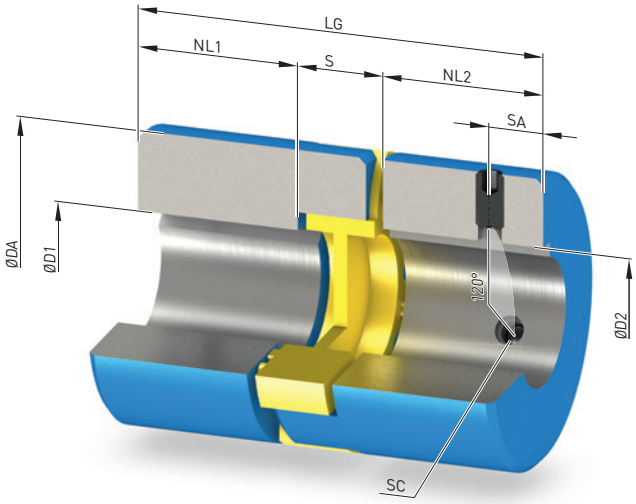
GENERAL

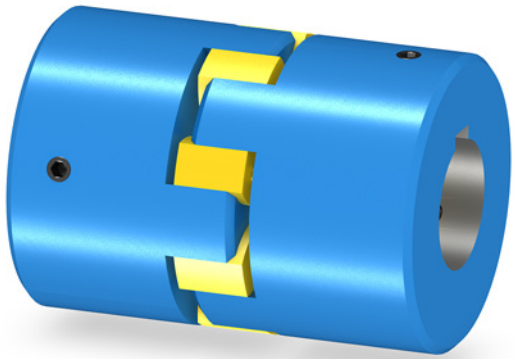
Transmissible torques of the different clamping connections

Size	Transmissible torque by clamping connection in Nm as a function of hub design and shaft diameter Bore diameter D1/D2 in mm																										
	2	3	4	6	8	10	12	14	16	19	20	22	24	25	28	30	32	35	38	40	42	45	48	50	55	60
Clamping hub (G-Hub)																										
5	0.5	0.6	0.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
7	–	1	1.2	1.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	–	–	3.1	3.4	3.7	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
14	–	–	–	5.9	6.3	6.7	7.1	7.8	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	–	–	–	–	26	27.5	28.9	30	31.6	33.7	34.5	35.9	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	–	–	–	–	–	42	44	45.5	47	50	50.5	53	54	55	57	59	–	–	–	–	–	–	–	–	–	–
28	–	–	–	–	–	–	–	–	100	105	107	110	113	115	119	122	125	130	135	–	–	–	–	–	–	–
38	–	–	–	–	–	–	–	–	118	122	124	127	130	131	136	139	142	147	152	155	158	163	167	–	–	–
42	–	–	–	–	–	–	–	–	–	207	210	215	220	222	230	234	239	247	254	259	264	271	279	284	–	–
48	–	–	–	–	–	–	–	–	–	–	–	–	–	345	360	367	374	385	396	403	410	421	432	439	457	–
Clamping hub compact (C-Hub)																										
14	–	–	–	5.9	6.3	6.7	7.1	7.8	8	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	–	–	–	–	23	24	25	26	27.5	29	30	31	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	–	–	–	–	–	42	44	45.5	47	50	50.5	53	54	55	57	59	–	–	–	–	–	–	–	–	–	–
28	–	–	–	–	–	–	–	–	100	105	107	110	113	115	119	122	125	130	135	–	–	–	–	–	–	–
38	–	–	–	–	–	–	–	–	188	195	197	202	207	210	217	222	227	234	242	247	252	259	267	–	–	–
42	–	–	–	–	–	–	–	–	–	–	–	–	–	222	230	234	239	247	254	259	264	271	279	284	–	–
48	–	–	–	–	–	–	–	–	–	–	–	–	–	345	360	367	374	385	396	403	410	421	432	439	457	–
Half-shell clamping hub (H-Hub)																										
14	–	–	–	4	5.3	6.6	8	9.2	10.6	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	–	–	–	–	21	26.5	31.8	37	42	50	53	58	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	–	–	–	–	–	26.5	31.8	37	42	50	53	58	64	66	74	79	–	–	–	–	–	–	–	–	–	–
28	–	–	–	–	–	–	–	–	78	92	97	107	117	121	136	146	156	178	185	–	–	–	–	–	–	–
38	–	–	–	–	–	–	–	–	78	92	97	107	117	121	136	146	156	178	185	195	204	219	233	–	–	–
42	–	–	–	–	–	–	–	–	–	147	155	170	186	193	217	232	248	271	294	309	325	349	372	387	–	–
48	–	–	–	–	–	–	–	–	–	–	–	–	–	283	316	339	361	396	429	452	474	509	542	565	621	–
Clamping hub with external taper (K-Hub)																										
14	–	–	–	13.2	25	25	37	52	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	–	–	–	–	–	29	56	89	74	129	146	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	–	–	–	–	–	48	71	164	132	234	275	249	327	371	–	–	–	–	–	–	–	–	–	–	–	–
28	–	–	–	–	–	–	–	–	171	276	204	268	341	381	423	509	466	593	738	–	–	–	–	–	–	–
38	–	–	–	–	–	–	–	–	–	–	287	374	474	529	589	708	653	827	827	947	863	1036	1227	–	–	–
42	–	–	–	–	–	–	–	–	–	–	–	–	–	–	532	641	588	750	747	858	802	967	1049	1280	–	–
48	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	857	1004	1248	1262	1429	1362	1609	1880	1710	2150	–

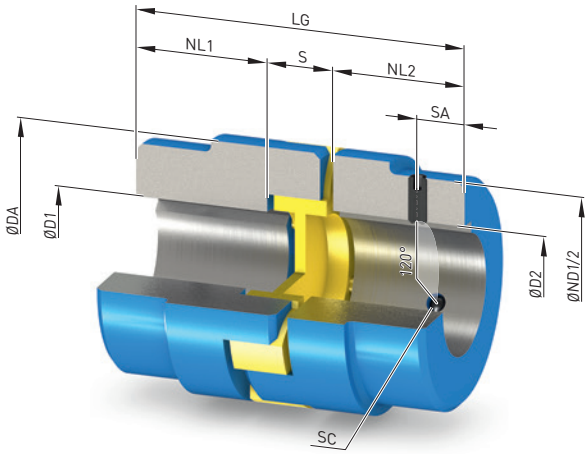
TYPE BNN

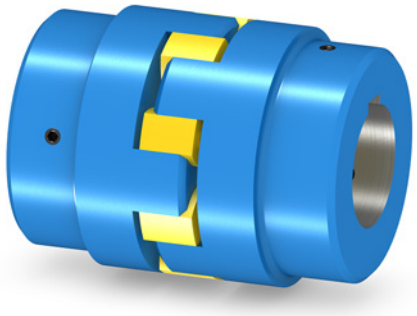
Hubs with set screws





Sizes 5 ... 38





Sizes 42 ... 48

Size	Rated torque T_{KN} 92 ShoreA	Rated torque T_{KN} 98 ShoreA	Maximum speed $n_{k\,max}$	Dimensions in mm DA	D1, D2 H7 min.	D1, D2 H7 max.	ND1/ ND2	NL1/ NL2	S	LG	SA	Screw DIN EN ISO 4027 SC	Screw DIN EN ISO 4027 T_A	Mass moment of inertia J	↗ Article No. [1]	Weight m
	Nm	Nm	rpm										Nm	10^{-6}·kgm²		kg
Hub material aluminum																
5	**0.5**	**0.9**	47500	10	2	**5**	–	5	5	15	2.5	M3	2.5	0.04	**2LC0190-0AA99-0AA0**	0.003
7	**1.2**	**2**	35000	14	3	**7**	–	7	8	22	3.5	M3	2.5	0.2	**2LC0190-1AA99-0AA0**	0.007
9	**3**	**5**	24000	20	4	**10**	–	10	10	30	5	M4	5	1.1	**2LC0190-2AA99-0AA0**	0.018
14	**7.5**	**12.5**	16000	30	5	**16**	–	11	13	35	5	M4	5	6.4	**2LC0190-3AA99-0AA0**	0.045
19	**10**	**17**	12000	40	6	**24**	–	25	16	66	10	M5	10	37	**2LC0190-4AA99-0AA0**	0.14
24	**35**	**60**	8700	55	8	**28**	–	30	18	78	10	M5	10	171	**2LC0190-5AA99-0AA0**	0.36
28	**95**	**160**	7400	65	10	**38**	–	35	20	90	15	M8	15	370	**2LC0190-6AA99-0AA0**	0.53
38	**190**	**325**	6000	80	12	**45**	–	45	24	114	15	M8	15	1100	**2LC0190-7AA99-0AA0**	1.1
Hub material steel																
42	**265**	**450**	5000	95	14	**55**	85	50	26	126	20	M8	20	4960	**2LC0190-8AA99-0AA0**	3.5
48	**310**	**525**	4600	105	15	**65**	95	56	28	140	20	M8	20	9900	**2LC0191-0AA99-0AA0**	5.3

Configurable variants [1]

- Cam ring hardness 80 ShoreA / 92 ShoreA / 98 ShoreA / 64 ShoreD

Notes

- Shaft is connected to hub by means of feather key according to DIN 6885-1. The keyway can be optionally omitted and the shaft connected to the hub solely by means of set screws.
- Cam ring made of polyurethane with Shore hardness 92 ShoreA as standard (yellow cam ring).
- For other hardness grades, see **page 15/7**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- BIPEX-S BNN coupling, size 24
- Part 1: Bore ØD1 20 H7
- Part 2: Bore ØD2 24 H7
- Cam ring with hardness 92 ShoreA

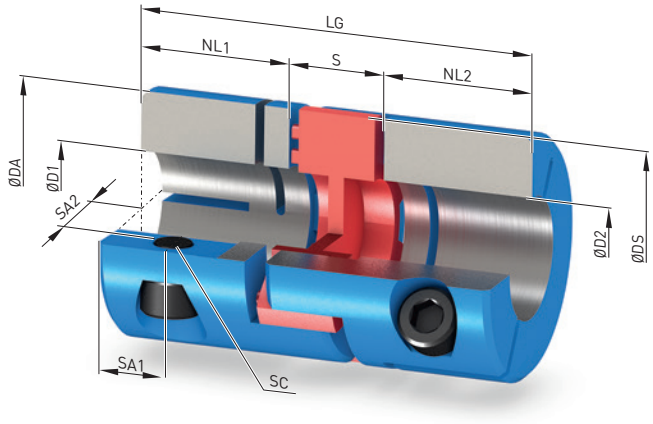
Article No.: 2LC0190-5AA99-0AA0 L0M+M0P

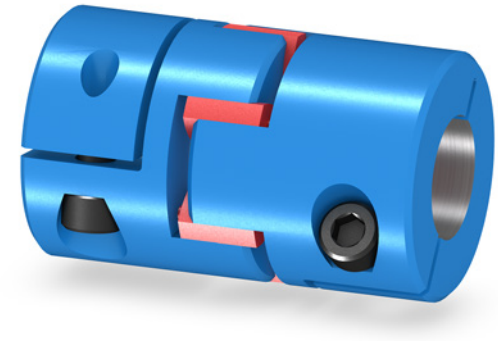
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

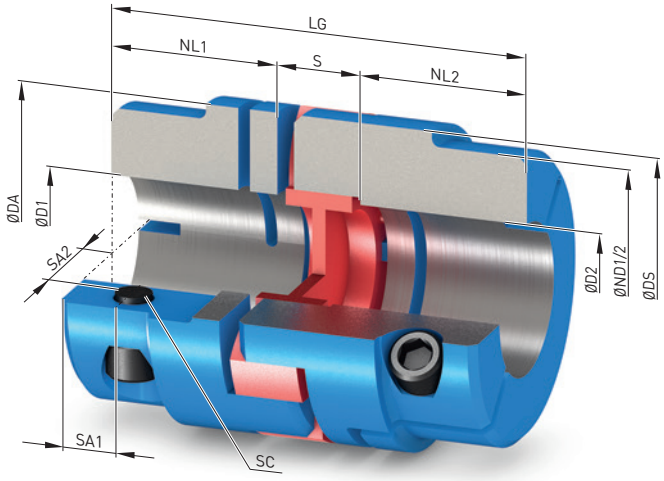
TYPE BGG

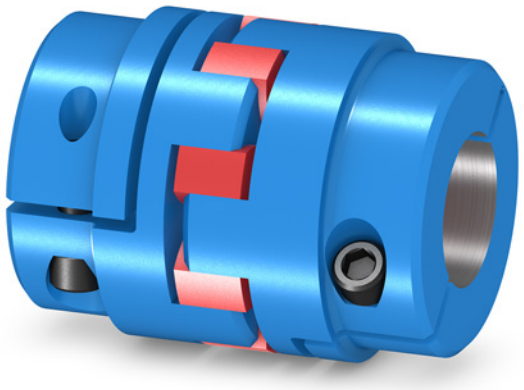
Standard clamping hubs





Sizes 5 ... 38





Sizes 42 ... 48

Size	Rated torque T_{KN} 98 ShoreA	Rated torque T_{KN} 92 ShoreA	Maximum speed $n_{k\,max}$	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	ND1/ ND2	NL1/ NL2	S	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	Screw DIN EN ISO 4762 T_A	Mass moment of inertia J	↗ Article No. [1]	Weight m
	Nm	Nm	rpm												Nm	$10^{-6}\cdot kgm^2$		kg
Hub material aluminum																		
5	**0.9**	**0.5**	38000	10	11.5	2	**4**	–	5	5	15	2.5	3.5	M1.6	0.3	0.04	**2LC0190-0AB99-0AA0**	0.003
7	**2**	**1.2**	26000	14	16.5	3	**7**	–	7	8	22	3.5	5	M2	0.4	0.2	**2LC0190-1AB99-0AA0**	0.007
9	**5**	**3**	18000	20	23.4	5	**9**	–	10	10	30	5	7.3	M2.5	0.8	1.1	**2LC0190-2AB99-0AA0**	0.019
14	**12.5**	**7.5**	12000	30	32.2	6	**16**	–	11	13	35	5	11	M3	2	6.3	**2LC0190-3AB99-0AA0**	0.04
19	**17**	**10**	9500	40	45.7	8	**24**	–	25	16	66	11	14.5	M6	11	37	**2LC0190-4AB99-0AA0**	0.14
24	**60**	**35**	7000	55	57.4	10	**28**	–	30	18	78	10.5	20	M6	15	165	**2LC0190-5AB99-0AA0**	0.35
28	**160**	**95**	6000	65	72.6	15	**38**	–	35	20	90	11	24.5	M8	32	390	**2LC0190-6AB99-0AA0**	0.51
38	**325**	**190**	4700	80	83.3	15	**45**	–	45	24	114	15.5	30	M8	38	1060	**2LC0190-7AB99-0AA0**	1
Hub material steel																		
42	**450**	**265**	4000	95	95	19	**50**	85	50	26	126	18	32.5	M10	84	4800	**2LC0190-8AB99-0AA0**	3.6
48	**525**	**310**	3500	105	105	25	**55**	95	56	28	140	21	36	M12	145	8180	**2LC0191-0AB99-0AA0**	5

Configurable variants [1]

- Cam ring hardness 80 ShoreA / 92 ShoreA / 98 ShoreA / 64 ShoreD

Notes

- The slotted clamping hub allows a frictionally engaged connection to the input and output shaft.
- A single tightening screw per hub ensures easy assembly.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 15/8**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Cam ring made of polyurethane with Shore hardness 98 ShoreA as standard (red cam ring).
- For other hardness grades, see **page 15/7**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- BIPEX-S BGG coupling, size 24
- Part 1: Bore ØD1 20 H7
- Part 2: Bore ØD2 24 H7
- Cam ring with hardness 98 ShoreA

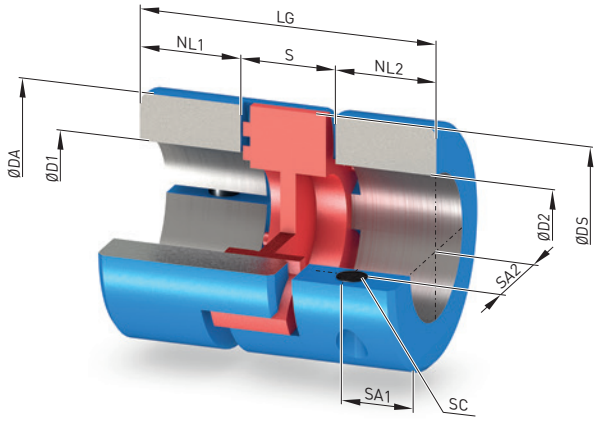
Article No.: 2LC0190-5AB99-0AA0 L0M+M0P

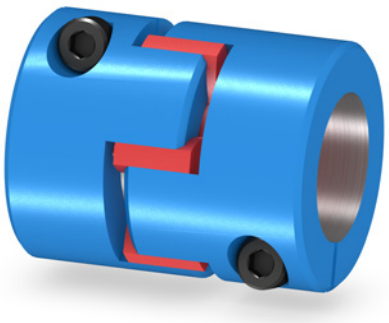
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

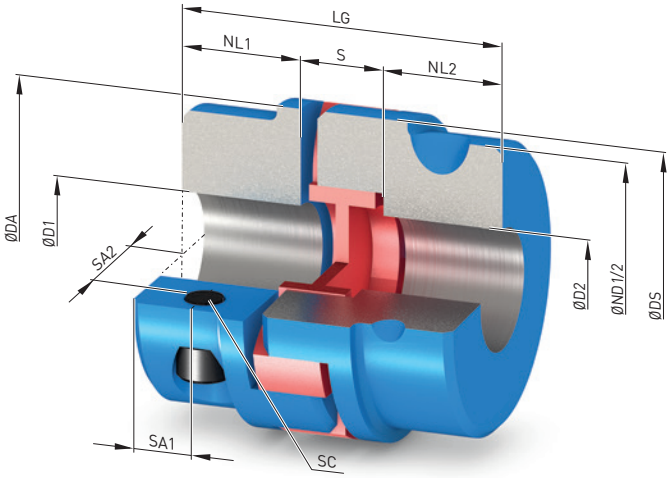
TYPE BCC

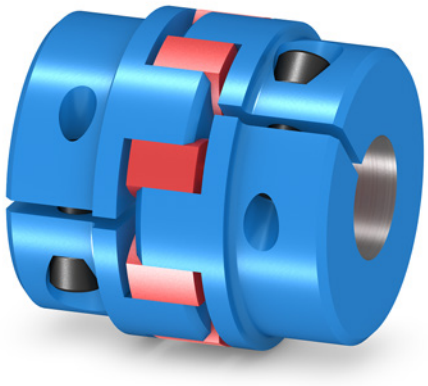
Clamping hubs in compact design





Sizes 5 ... 38





Sizes 42 ... 48

Size	Rated torque T_{KN} 98 ShoreA Nm	Rated torque T_{KN} 92 ShoreA Nm	Maximum speed $n_{k\,max}$ rpm	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	ND1/ ND2	NL1/ NL2	S	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	T_A Nm	Mass moment of inertia J $10^{-6}\cdot kgm^2$	↗ Article No. [1]	Weight m kg
Hub material aluminum																		
14	**12,5**	**7,5**	12000	30	32,2	6	**16**	–	11	13	35	5	11	M3	2	6,3	**2LC0190-3AF99-0AA0**	0,04
19	**17**	**10**	9500	40	45,7	10	**24**	–	17	16	50	8,5	15	M5	10	29	**2LC0190-4AF99-0AA0**	0,11
24	**60**	**35**	7000	55	57,4	12	**28**	–	20	18	58	10	20	M6	18	123	**2LC0190-5AF99-0AA0**	0,26
28	**160**	**95**	6000	65	72,6	15	**35**	–	21	20	62	10,5	24,5	M8	43	253	**2LC0190-6AF99-0AA0**	0,38
38	**325**	**190**	4700	80	83,3	16	**45**	–	31	24	86	15,5	30	M10	84	816	**2LC0190-7AF99-0AA0**	0,79
Hub material steel																		
42	**450**	**265**	4000	95	95	19	**50**	85	34	26	94	18	32,5	M10	84	3290	**2LC0190-8AF99-0AA0**	2,5
48	**525**	**310**	3500	105	105	25	**55**	95	40	28	108	21	36	M12	145	5459	**2LC0191-0AF99-0AA0**	3,3

Configurable variants [1]

- Cam ring hardness 80 ShoreA / 92 ShoreA / 98 ShoreA / 64 ShoreD

Notes

- The slotted clamping hub allows a frictionally engaged connection to the input and output shaft.
- A single tightening screw per hub ensures easy assembly.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 15/8**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Cam ring made of polyurethane with Shore hardness 98 ShoreA as standard (red cam ring).
- For other hardness grades, see **page 15/7**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- BIPEX-S BCC coupling, size 24
- Part 1: Bore ØD1 20 H7
- Part 2: Bore ØD2 24 H7
- Cam ring with hardness 98 ShoreA

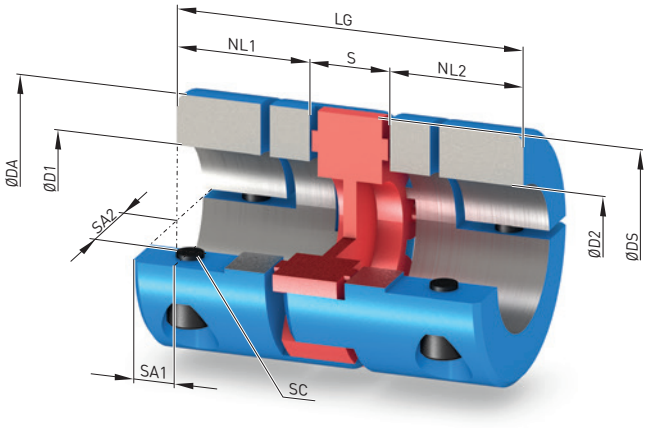
Article No.: 2LC0190-5AF99-0AA0 L0M+M0P

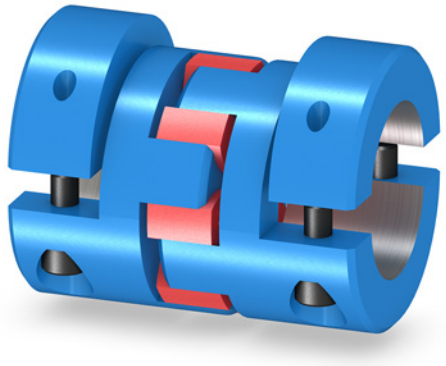
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE BHH

Half-shell clamping hub





Size	Rated torque T_{KN} 98 ShoreA Nm	Rated torque T_{KN} 92 ShoreA Nm	Maximum speed $n_{k\,max}$ rpm	Dimensions in mm DA	DS	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	S	LG	SA1	SA2	Screw DIN EN ISO 4762 SC	Screw DIN EN ISO 4762 T_A Nm	Mass moment of inertia J $10^{-6}\cdot kgm^2$	↗ Article No. [1]	Weight m kg
Hub material aluminum																	
14	**12,5**	**7,5**	12000	30	33	6	**16**	11	13	35	5	11	M4	1,4	5,6	**2LC0190-3AC99-0AA0**	0,02
19	**17**	**10**	9500	40	45	8	**23**	25	16	66	6	14,5	M5	8	38	**2LC0190-4AC99-0AA0**	0,15
24	**60**	**35**	7000	55	57	10	**30**	30	18	78	10,5	20	M6	10,5	166	**2LC0190-5AC99-0AA0**	0,35
28	**160**	**95**	6000	65	70	15	**38**	35	20	90	11	24,5	M8	25	370	**2LC0190-6AC99-0AA0**	0,53
38	**325**	**190**	4700	80	83	15	**48**	45	24	114	15,5	30	M8	25	1040	**2LC0190-7AC99-0AA0**	0,98
Hub material steel																	
42	**450**	**265**	4000	95	95	19	**50**	50	26	126	18	32,5	M10	69	5970	**2LC0190-8AC99-0AA0**	4,1
48	**525**	**310**	3500	105	105	25	**55**	56	28	140	15	40	M12	120	9830	**2LC0191-0AC99-0AA0**	5,6

Configurable variants [1]

- Cam ring hardness 80 ShoreA / 92 ShoreA / 98 ShoreA / 64 ShoreD

Notes

- It is possible to radially assemble and dismantle the hub version with half-shells without moving the connected units.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 15/8**.
- A keyway according to DIN 6885-1 can be selected additionally as an option.
- Cam ring made of polyurethane with Shore hardness 98 ShoreA as standard (red cam ring).
- For other hardness grades, see **page 15/7**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- BIPEX-S BHH coupling, size 24
- Part 1: Bore ØD1 20 H7
- Part 2: Bore ØD2 24 H7
- Cam ring with hardness 98 ShoreA

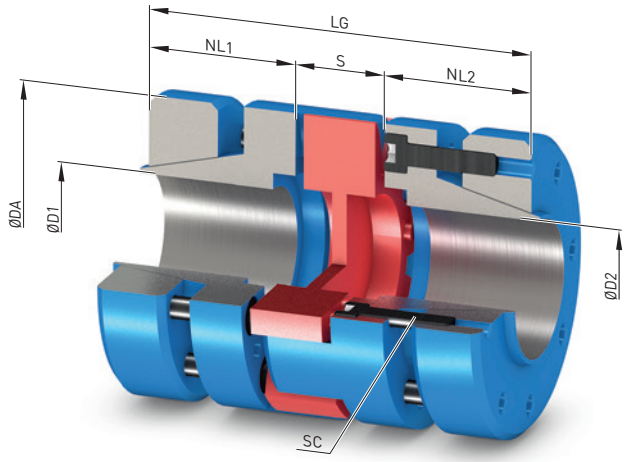
Article No.: 2LC0190-5AC99-0AA0 L0M+M0P

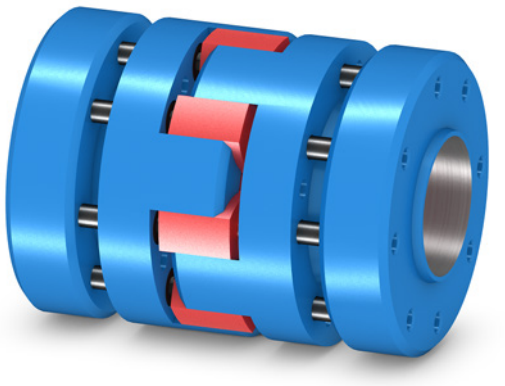
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE BKK

Clamping hubs with external taper





Size	Rated torque T_{KN} 98 ShoreA Nm	Rated torque T_{KN} 92 ShoreA Nm	Maximum speed $n_{k\,max}$ rpm	Dimensions in mm DA	D1, D2 H7 min.	D1, D2 H7 max.	NL1/ NL2	S	LG	Screw DIN EN ISO 4762 SC	Screw DIN EN ISO 4762 T_A Nm	Mass moment of inertia J $10^{-6}\cdot kgm^2$	↗ Article No. [1]	Weight m kg
Hub material aluminum														
14	**12,5**	**7,5**	25000	30	5	**14**	18,5	13	50	M3	1,3	18	**2LC0190-3AD99-0AA0**	0,11
19	**17**	**10**	18500	40	10	**20**	25	15	65	M4	2,9	57	**2LC0190-4AD99-0AA0**	0,23
24	**60**	**35**	13900	55	10	**25**	30	18	78	M5	6	268	**2LC0190-5AD99-0AA0**	0,57
28	**160**	**95**	11800	65	15	**36**	35	20	90	M5	6	610	**2LC0190-6AD99-0AA0**	0,86
38	**325**	**190**	9600	80	20	**48**	45	24	114	M6	10	1690	**2LC0190-7AD99-0AA0**	1,5
Hub material steel														
42	**450**	**265**	8000	95	28	**50**	50	26	126	M8	35	5880	**2LC0190-8AD99-0AA0**	4
48	**525**	**310**	7100	105	30	**55**	56	28	140	M10	69	9600	**2LC0191-0AD99-0AA0**	5,4

Configurable variants [1]

- Cam ring hardness 80 ShoreA / 92 ShoreA / 98 ShoreA / 64 ShoreD

Notes

- The clamping hubs with external taper are the ideal solution for high-speed and highly dynamic applications. The clamping ring is made of steel.
- The maximum torques that can be transmitted by the clamping connection are listed in the table on **page 15/8**.
- Cam ring made of polyurethane with Shore hardness 98 ShoreA as standard (red cam ring).
- For other hardness grades, see **page 15/7**.
- Sizes 14 to 48 are also available on request as a light-weight version with hubs and clamping rings made of aluminum (type designation BKK-L).
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- BIPEX-S BKK coupling, size 24
- Part 1: Bore ØD1 20 H7
- Part 2: Bore ØD2 24 H7
- Cam ring with hardness 98 ShoreA

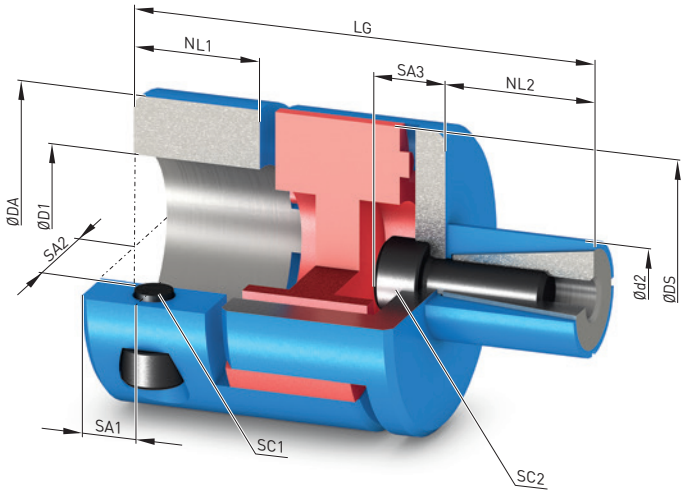
Article No.: 2LC0190-5AD99-0AA0 L0M+M0P

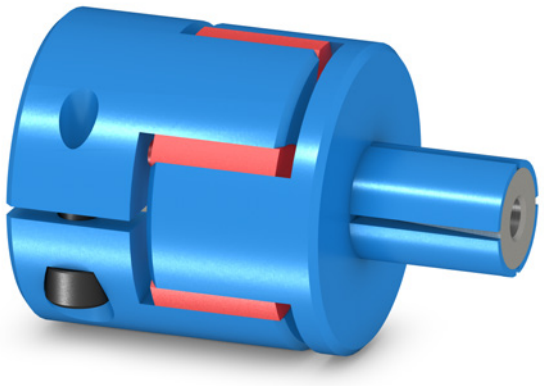
[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE BCS

Compact clamping hubs and expanding hub





Size	Rated torque T_{KN} 98 ShoreA Nm	Rated torque T_{KN} 92 ShoreA Nm	Maximum speed $n_{k\,max}$ min^{-1}	Dimensions in mm DA	DS	D1 H7 min.	D1 H7 max.	d2 h7 min.	d2 h7 max.	NL1	NL2	LG	SA1	SA2	SA3	Screw DIN EN ISO 4762 SC1	Screw DIN EN ISO 4762 T_A Nm	Screw DIN EN ISO 4207 SC2	Screw DIN EN ISO 4207 T_A Nm	Mass moment of inertia J 10^{-6}·kgm^2	↗ Article No. [1]	Weight m kg
Hub material aluminum																						
9	**5**	**3**	18000	20	23,4	5	**9**	10	**16**	10	11	40	5	7,3	9	M2,5	0,75	M4	8	1	**2LC0190-2AE99-0AA0**	0,03
14	**12,5**	**7,5**	12000	30	32,2	6	**16**	13	**25**	11	12,5	42,5	5	11	7	M3	2	M5	9	7	**2LC0190-3AE99-0AA0**	0,06
19	**17**	**10**	9500	40	45,7	10	**24**	14	**30**	17	20	61	8,5	14,5	8	M5	15	M6	15	28	**2LC0190-4AE99-0AA0**	0,13
24	**60**	**35**	7000	55	57,4	12	**28**	23	**38**	20	30	76	10	20	12	M6	15	M8	35	113	**2LC0190-5AE99-0AA0**	0,33
28	**160**	**95**	6000	65	72,6	15	**35**	26	**42**	21	36	85	10,5	24,5	13	M8	35	M10	70	222	**2LC0190-6AE99-0AA0**	0,5
38	**325**	**190**	4700	80	83,3	16	**45**	38	**60**	31	45	113	15,5	30	17	M8	35	M12	120	800	**2LC0190-7AE99-0AA0**	1,1

Configurable variants [1]

- Cam ring hardness 80 ShoreA / 92 ShoreA / 98 ShoreA / 64 ShoreD

Notes

- A hollow shaft can be connected to the expanding hub.
- The bore for connecting the expanding hub must have tolerance H7.
- Cam ring made of polyurethane with Shore hardness 98 ShoreA as standard (red cam ring).
- For other hardness grades, see **page 15/7**.
- Weights and mass moments of inertia apply to maximum bore diameters.

Ordering example

- BIPEX-S BCS coupling, size 24
- Part 1: Bore ØD1 20 H7
- Part 2: Shaft Ød2 24 h7
- Cam ring with hardness 98 ShoreA

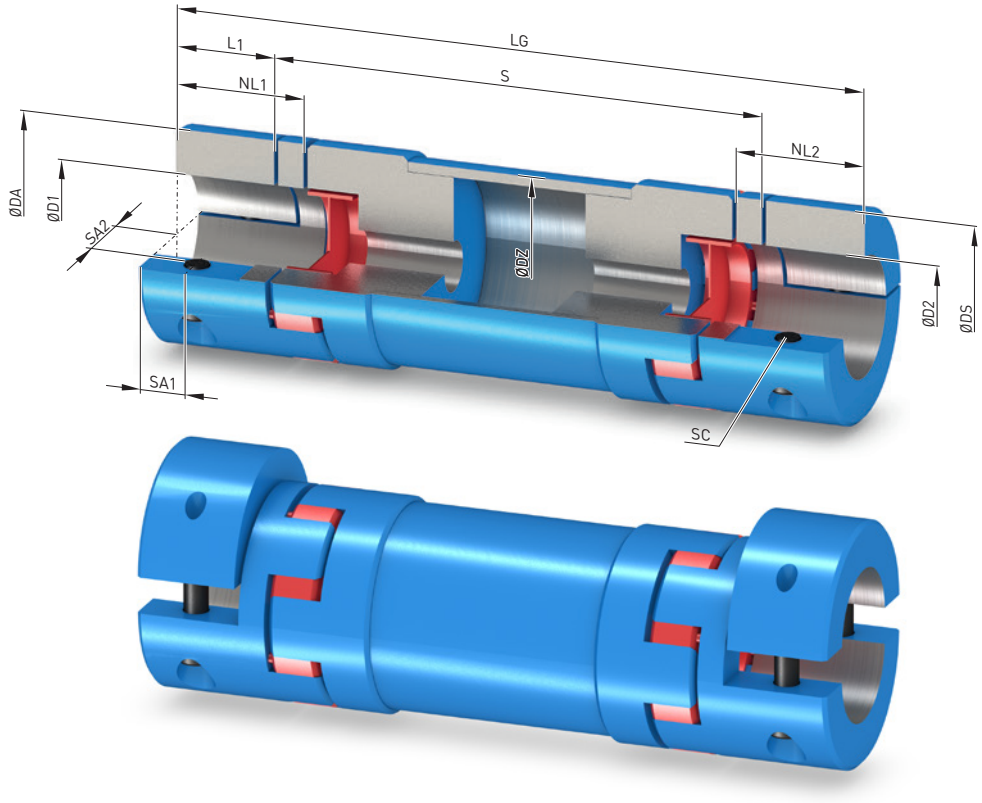
Article No.: 2LC0190-5AE99-0AA0 L0M+M0P

[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

↗ For online configuration on **flender.com**, click on the item no.

TYPE BHH-W

Drive shaft with half-shell clamping hubs



Size	Rated torque	Maximum speed	Dimensions in mm											Screw DIN EN ISO 4762		Mass moment of inertia [2]	Article No. [1]	Weight
	T_{KN} 98 ShoreA	$n_{K\,max}$	DA	DS	D1, D2 H7		DZ	NL1/ NL2	L1	LG		SA1	SA2	SC	T_A	J		m
	Nm	rpm			min.	max.				min.	max.				Nm	$10^{-6}\cdot kgm^2$		kg
Hub material Aluminium																		
14	**12,5**	1500	30	33	6	**16**	30	11	9	85	3000	5	11	M4	3	79	**2LC0190-3AH99-0AZ0**	0,54
19	**17**	1500	40	45	8	**23**	40	25	13,4	135	3000	6	15	M5	5,9	151	**2LC0190-4AH99-0AZ0**	0,58
24	**60**	1500	55	57	10	**30**	50	30	21	165	3000	10,5	20	M6	15	2250	**2LC0190-5AH99-0AZ0**	3,4
28	**160**	1500	65	70	15	**38**	60	35	23,5	205	3000	11	24,5	M8	32	2510	**2LC0190-6AH99-0AZ0**	3,5
38	**325**	1500	80	83	15	**48**	75	45	33	250	3000	15,5	30	M8	38	8360	**2LC0190-7AH99-0AZ0**	7,8
Hub material Stahl																		
42	**450**	1500	95	95	19	**50**	90	50	35	265	3000	18	32,5	M10	84	1780	**2LC0190-8AH99-0AZ0**	11,8
48	**525**	1500	105	105	25	**55**	110	56	32,5	285	3000	15	40	M12	145	21150	**2LC0191-0AH99-0AZ0**	15,3

Configurable variants [1]

- Cam ring hardness 98 ShoreA / 64 ShoreD

Notes

- It is possible to radially assemble and dismantle the hub version with half-shells without moving the connected units. It must be noted that the total length LG is obtained with shaft distance S + 2 × L1.
- The intermediate tubes in the standard version are made of aluminum. Tubes made of carbon-fiber-reinforced plastic (CFRP) are also available as an option.
- Weights and mass moments of inertia apply to maximum bore diameters and a shaft distance S = 1000 mm.

Ordering example

- BIPEX-S BHH-W coupling, size 24
  Shaft distance S = 1000 mm
  Total length LG = 1042 mm
- Part 1: Bore ØD1 20 H7
- Part 2: Bore ØD2 24 H7
- Cam ring with hardness 98 ShoreA

Article No.: 2LC0190-5AH99-0AZ0 L0M+M0P+Q0Y
Plain text for Q0Y: S = 1000 mm

[1] To identify complete item numbers specifying the available finish boring options and – if necessary – further order options, please use our configurators on **flender.com**.

[2] for DBSE = 1000 mm

↗ For online configuration on **flender.com**, click on the item no.

APPENDIX

FITS

Fitting recommendations

For many applications, the fit assignment m6/H7 is especially suitable.

Description	Application	Shaft tolerance	Bore tolerance
Facile sliding fit	For steel or aluminum hubs	g6	H7
	Preferred for SIPEX and BIPEX-S coupling series	h7	H7
		k6	F7
		m6	F7
Sliding fit with parallel key connection not suitable for reversing operation	For steel and cast hubs	j6	H7
		h6	J7
Press fit with parallel key connection not suitable for reversing operation	For steel and cast hubs	h6	K7
		k6	H7
Interference fit with parallel key connection suitable for reversing operation	For steel and cast hubs	m6	H7
		n6	H7
		h6	M7
	Only for steel hubs	h6	P7
	Preferred for ZAPEX and ARPEX coupling series	k6	M7
		m6	K7
		n6	J7
		p6	H7
		s6	F7
Shrink fit connection without parallel key	Only for steel hubs	u6	H6
	The permitted hub tension must be urgently checked.	v6	H6
		x6	H6

Deviation table to DIN ISO 286 for above-mentioned fits for bore diameters from 10 mm to 250 mm

Bore diameter		Deviations in µm											
		Bore						Shaft					
above	up to	F7	H7	J7	K7	M7	P7	h6	j6	k6	m6	n6	p6
10	18	+34	+18	+10	+6	0	-11	0	+8	+12	+18	+23	+29
		+16	0	-8	-12	-18	-29	-11	-3	+1	+7	+12	+18
18	30	+41	+21	+12	+6	0	-14	0	+9	+15	+21	+28	+35
		+20	0	-9	-15	-21	-35	-13	-4	+2	+8	+15	+22
30	50	+50	+25	+14	+7	0	-17	0	+11	+18	+25	+33	+42
		+25	0	-11	-18	-25	-42	-16	-5	+2	+9	+17	+26
50	80	+60	+30	+18	+9	0	-21	0	+12	+21	+30	+39	+51
		+30	0	-12	-21	-30	-51	-19	-7	+2	+11	+20	+32
80	120	+71	+35	+22	+10	0	-24	0	+13	+25	+35	+45	+59
		+36	0	-13	-25	-35	-59	-22	-9	+3	+13	+23	+37
120	180	+83	+40	+26	+12	0	-28	0	+14	+28	+40	+52	+68
		+43	0	-14	-28	-40	-68	-25	-11	+3	+15	+27	+43
180	250	+96	+46	+30	+13	0	-33	0	+16	+33	+46	+60	+79
		+50	0	-16	-33	-46	-79	-29	-13	+4	+17	+31	+50

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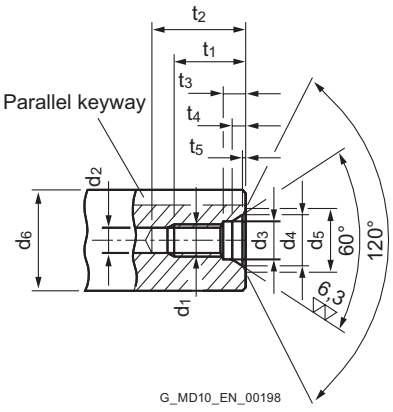
Cylindrical shaft ends, extract from DIN 748 Part 1 (long)

	Diameter in mm																				
	24	25	28	30	32	35	38	40	42	45	48	50	55	60	65	70	75	80	85	90	95	100
ISO tolerance zone	k6												m6									
End length in mm	50	60		80				110						140				170				210

Central holes according to DIN 332 Part 2



Form DS (with thread) DIN 332/2

Recommended diameter ranges d_6 [1]		DS form dimensions									
above	up to	d_1	d_2 [2]	d_3	d_4	d_5	t_1 +2	t_2 min.	t_3 +1	t_4 approx.	t_5 approx.
7	**10**	M3	2.5	3.2	5.3	5.8	9	12	2.6	1.8	0.2
10	**13**	M4	3.3	4.3	6.7	7.4	10	14	3.2	2.1	0.3
13	**16**	M5	4.2	5.3	8.1	8.8	12.5	17	4	2.4	0.3
16	**21**	M6	5	6.4	9.6	10.5	16	21	5	2.8	0.4
21	**24**	M8	6.8	8.4	12.2	13.2	19	25	6	3.3	0.4
24	**30**	M10	8.5	10.5	14.9	16.3	22	30	7.5	3.8	0.6
30	**38**	M12	10.2	13	18.1	19.8	28	37	9.5	4.4	0.7
38	**50**	M16	14	17	23	25.3	36	45	12	5.2	1.0
50	**85**	M20	17.5	21	28.4	31.3	42	53	15	6.4	1.3
85	**130**	M24	21	25	34.2	38	50	63	18	8	1.6
130	**225**	M30 [3]	26.5	31	40.2	44.6	60	77	22	8	1.9
225	**320**	M36 [3]	32	37	49.7	55	74	93	22	11	2.3
320	**500**	M42 [3]	37.5	43	60.3	66.6	84	105	26	15	2.7

[1] Diameter refers to the finished workpiece

[2] Tap hole drill diameter according to DIN 336 Part 1

[3] Dimensions not acc. to DIN 332 Part 2

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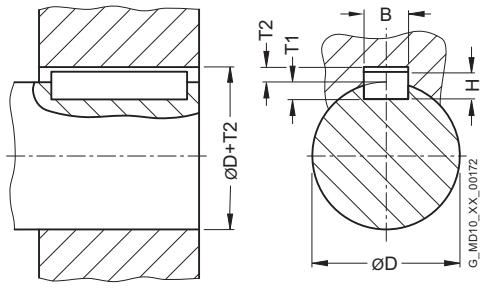
PARALLEL KEY CONNECTIONS TO DIN 6885-1



For moderate operating conditions, the hub keyway tolerance JS9 is recommended.

In harsh operating conditions or during reversing operation, the keyway width tolerance P9 must be preferred.

With two parallel keyways, the keyway width tolerance JS9 should be specified in order to simplify the assembly.

The shaft keyway width has to be specified with the tolerance N9.

Diameter		Keyway width	Parallel key height	Shaft keyway depth	Hub keyway depth	Deviation for shaft and hub keyway depth	Deviation table for keyway width B	
above D mm	up to mm	B mm	H mm	T1 mm	T2 mm	mm	JS9 µm	P9 µm
	10	3	3	1.8	1.4	+0.1	+12.5	-6
							-12.5	-31
10	12	4	4	2.5	1.8	+0.1	+15	-12
							-15	-42
12	17	5	5	3	2.3	+0.1	+15	-12
							-15	-42
17	22	6	6	3.5	2.8	+0.1	+15	-12
							-15	-42
22	30	8	7	4	3.3	+0.2	+18	-15
							-18	-51
30	38	10	8	5	3.3	+0.2	+18	-15
							-18	-51
38	44	12	8	5	3.3	+0.2	+21.5	-18
							-21.5	-61
44	50	14	9	5.5	3.8	+0.2	+21.5	-18
							-21.5	-61
50	58	16	10	6	4.3	+0.2	+21.5	-18
							-21.5	-61
58	65	18	11	7	4.4	+0.2	+21.5	-18
							-21.5	-61
65	75	20	12	7.5	4.9	+0.2	+26	-22
							-26	-74
75	85	22	14	9	5.4	+0.2	+26	-22
							-26	-74
85	95	25	14	9	5.4	+0.2	+26	-22
							-26	-74

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Diameter above D mm	Diameter up to mm	Keyway width B mm	Parallel key height H mm	Shaft keyway depth T1 mm	Hub keyway depth T2 mm	Deviation for shaft and hub keyway depth mm	Deviation table for keyway width B JS9 µm	Deviation table for keyway width B P9 µm
95	110	28	16	10	6.4	+0.2	+26	-22
							-26	-74
110	130	32	18	11	7.4	+0.2	+31	-26
							-31	-88
130	150	36	20	12	8.4	+0.3	+31	-26
							-31	-88
150	170	40	22	13	9.4	+0.3	+31	-26
							-31	-88
170	200	45	25	15	10.4	+0.3	+31	-26
							-31	-88
200	230	50	28	17	11.4	+0.3	+31	-26
							-31	-88
230	260	56	32	20	12.4	+0.3	+37	-32
							-37	-106
260	290	63	32	20	12.4	+0.3	+37	-32
							-37	-106
290	330	70	36	22	14.4	+0.3	+37	-32
							-37	-106
330	380	80	40	25	15.4	+0.3	+37	-32
							-37	-106
380	440	90	45	28	17.4	+0.3	+43.5	-37
							-43.5	-124
440	500	100	50	31	19.4	+0.3	+43.5	-37
							-43.5	-124

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RELATED CATALOGS

Torsionally Rigid Couplings

FLE 10.1
FLEX-C10001-00-7600

Flexible Couplings

FLE 10.2
FLEX-C10002-00-7600

Highly Flexible Couplings

FLE 10.3
FLEX-C10003-00-7600

Fluid Couplings

FLE 10.4
FLEX-C10004-00-7600

ARPEX
High Performance Couplings
FLE 10.5
FLEX-C10120-00-7600

SIPEX und BIPEX-S
Backlash-free couplings
FLE 10.6
FLEX-C10121-00-7600

ARPEX
Safety couplings
FLE 10.7
FLEX-C10122-00-7600

FASTEX
Clamping elements
FLE 10.8
FLEX-C10152-00-7600

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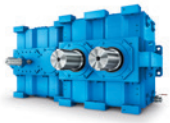
FLENDER SIP
Standard Industrial Planetary Gear Units
MD 31.1
PDMD-C10154-00

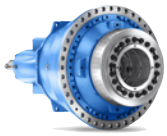
FLENDER CHG
Helical Gear Units
MD 20.10
PDMD-C10155-00



Gear units
Fast Track
MD 20.12
PDMD-C10156-00

Bucket Elevator Drives
MD 20.2
PDMD-C10157-00

PLANUREX 3
Planetary Gear Units
FLE 20.3
FLEX-C10052-00-7600



Paper Machine Drives
MD 20.5
PDMD-C10159-00

Conveyor Belt Drives
MD 20.6
PDMD-C10160-00

Marine Reduction Gearboxes
MD 20.7
PDMD-C10161-00

DUORED 2
Helical Gear Units, Load-sharing
MD 20.8
PDMD-C10162-00

Pinion Drive for Tube Mills
MD 20.9
PDMD-C10163-00

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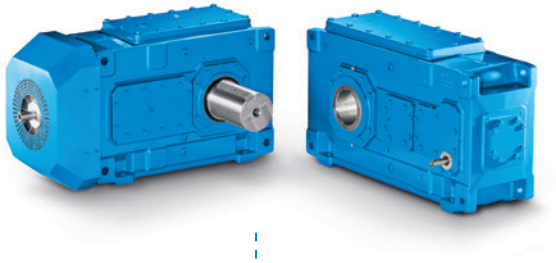
THE RIGHT GEAR UNIT SOLUTION FOR ANY REQUIREMENT

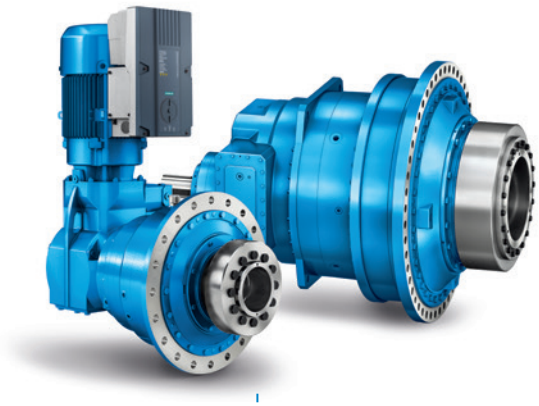
We provide helical and planetary gear units made up of standard modules or as a complete application solution.

Helical and planetary gear units from Flender are modern drive solutions that satisfy the most varying and extreme demands, day after day and year after year. For decades, plant operators have been achieving high system reliability and low lifecycle costs in every conceivable industry with our helical gear units.



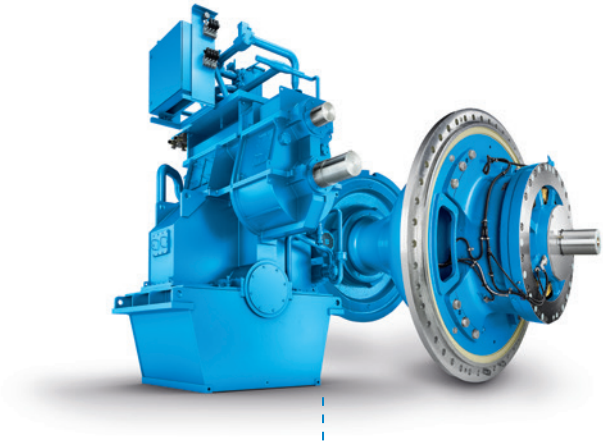
Helical and bevel helical gear units

Flender helical and bevel helical gear units are by far the most comprehensive range of industrial gear units in the world.
It ranges from a multi-faceted universal gear unit portfolio and application-specific gear units to customer-specific solutions.
Rated torque: 3,300 Nm ... 1,400,000 Nm



Planetary Gear Units

With Flender planetary gear units, we provide a range of durable, reliable and finely graduated gear unit solutions. The series wins customers over due to its highly integrated planetary geared motor and maximum conformity with all international motor standards.
It also brings quality and performance in a good ratio of lifecycle costs to price.
Rated torque: 10,000 Nm ... 5,450,000 Nm



Application-specific gear units

With application-specific gear units, Flender provides by far the most application solutions and thus covers nearly every drive-related need from hundreds of applications in industry and the acquisition of raw materials.
Rated torque: up to 10,000,000 Nm

Customer-specific designs

Our experts are available at any time for special requirements during the development of new products. From designing and simulating complex drive solutions to implementing them, we work together with you to resolve multi-layered tasks.

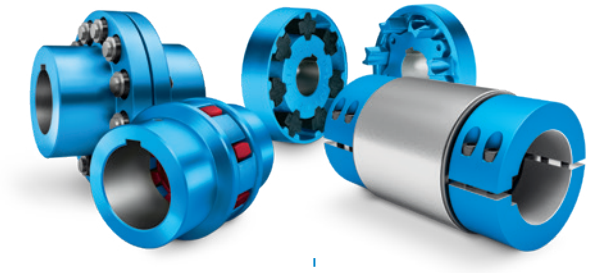
THE PERFECT COUPLING FOR THE PERFECT GEAR UNIT

We provide elastic, highly elastic, rigid and hydrodynamic solutions.

Regardless of which demands are made on the coupling: Low or high performance, demanding operating conditions or high ambient temperatures, dusty or hazardous environments – we have the right portfolio. Our comprehensive range of couplings offers a large number of sizes and designs with a torque range from 0.5 to 10,000,000 Nm.

In over 90 years of development, conception and production, our product portfolio has grown to its current level of diversity. Nearly every matured coupling solution is available as a standard item in our modular system. This saves our customers time and money.

We are a powerful and flexible player in every market in the world – just like our customers. The production of our coupling components aims for maximum quality. As a trio, the setup, material and design result in optimal coupling solutions – rugged, dependable, largely low-maintenance and, above all, available at any time, anywhere. We provide high quality, first class delivery performance, and comprehensive service.



Flexible couplings

Our elastic couplings are pluggable and easy to install. The elastomer element equalizes the shaft offset and absorbs impacts from the motor or driven machine.

Nominal output torque: 12 Nm ... 1,690,000 Nm

Torsionally rigid couplings

Our compact steel couplings provide extremely precise transmission of high torques, especially in harsh operating conditions and extreme temperatures.

Nominal output torque: 92 Nm ... 7,200,000 Nm

Hydrodynamic couplings

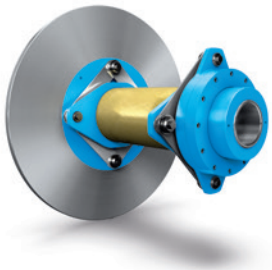
Soft start, overload protection, torsional vibration damping – FLUDEX® fluid couplings allow the torque-limited approach and have very little slippage at rated load.

Power: 1.2 kW ... 2,500 kW

Highly-flexible couplings

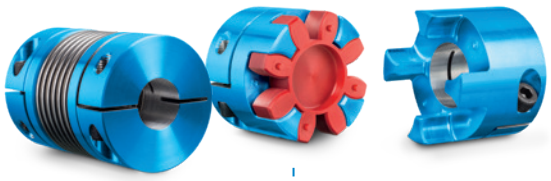
Highly flexible couplings are well-suited for connecting machines that operate asymmetrically. They are preferred for use in systems that are periodically operated.

Nominal output torque: 24 Nm ... 90,000 Nm



Application-specific couplings

Flender offers a variety of application-specific couplings for rail vehicles and use in wind energy generation.



Backlash-free couplings

Our couplings act as a modular interface between the motor and the work machine to ensure reliable, backlash-free power transmission in servodrives and positioning drives.

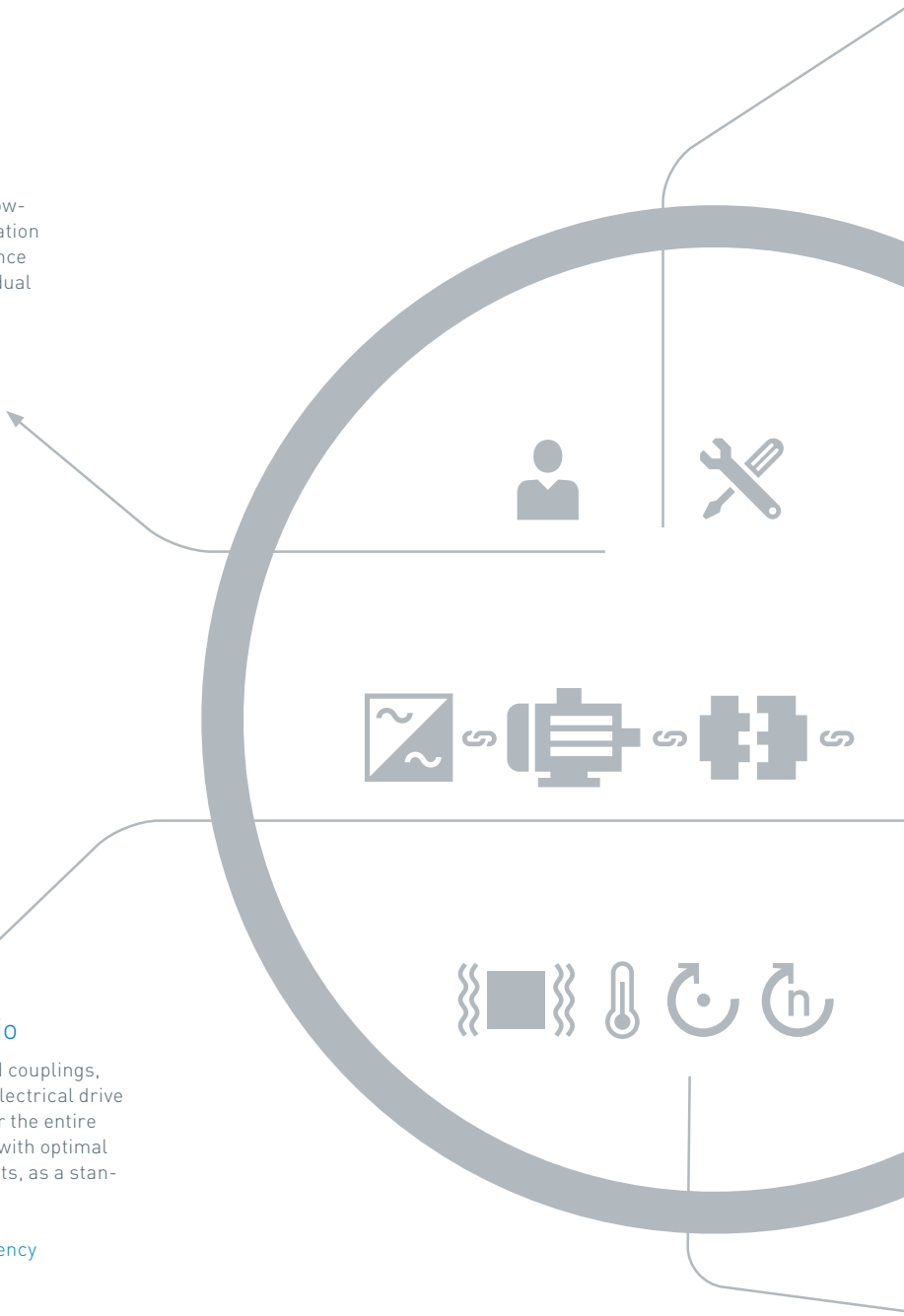
Nominal output torque: 0.1 Nm ... 5,000 Nm

Flender's system competence turns first-class components into systems with tangible added value. Drive systems from Flender ensure maximum productivity, energy efficiency and reliability in any automation environment.

Consultation

Our customers use our interdisciplinary know-how, our application competence, our innovation strength and, last but not least, our experience to find the right drive system for their individual requirements.

Reduced engineering time, lower costs



Integrated drive portfolio

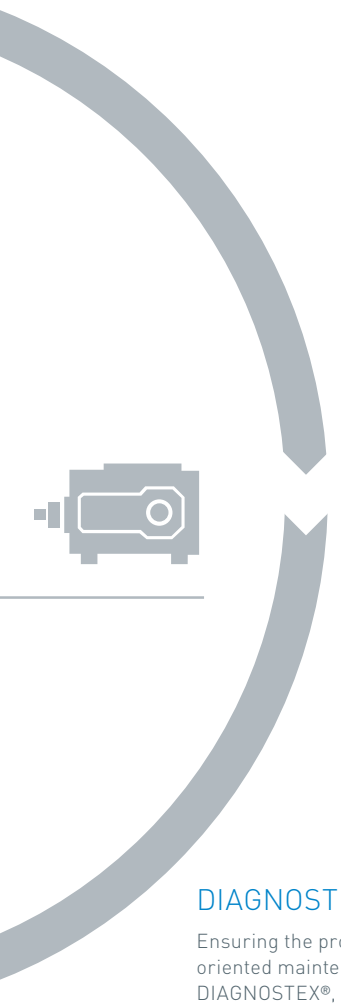
We not only provide gear units and couplings, but also have the competence in electrical drive technology that enables us to offer the entire drive train – perfectly integrated, with optimal interaction between all components, as a standard or individual solution.

Fewer interface risks, more efficiency

Flender service

From diagnostics and support, replacement part and repair services, all the way to maintenance and retrofit services – the Flender service portfolio creates individual solutions, fully and completely tailored to the needs of our customers. In this way, a gear unit remains an original Flender gear unit.

Increased system availability, reduced lifecycle costs



DIAGNOSTEX

Ensuring the process stability requires status-oriented maintenance of the drive train. With DIAGNOSTEX®, sensors measure deviations of our gear units from the target status. These can be analyzed and evaluated in terms of maximized system availability.

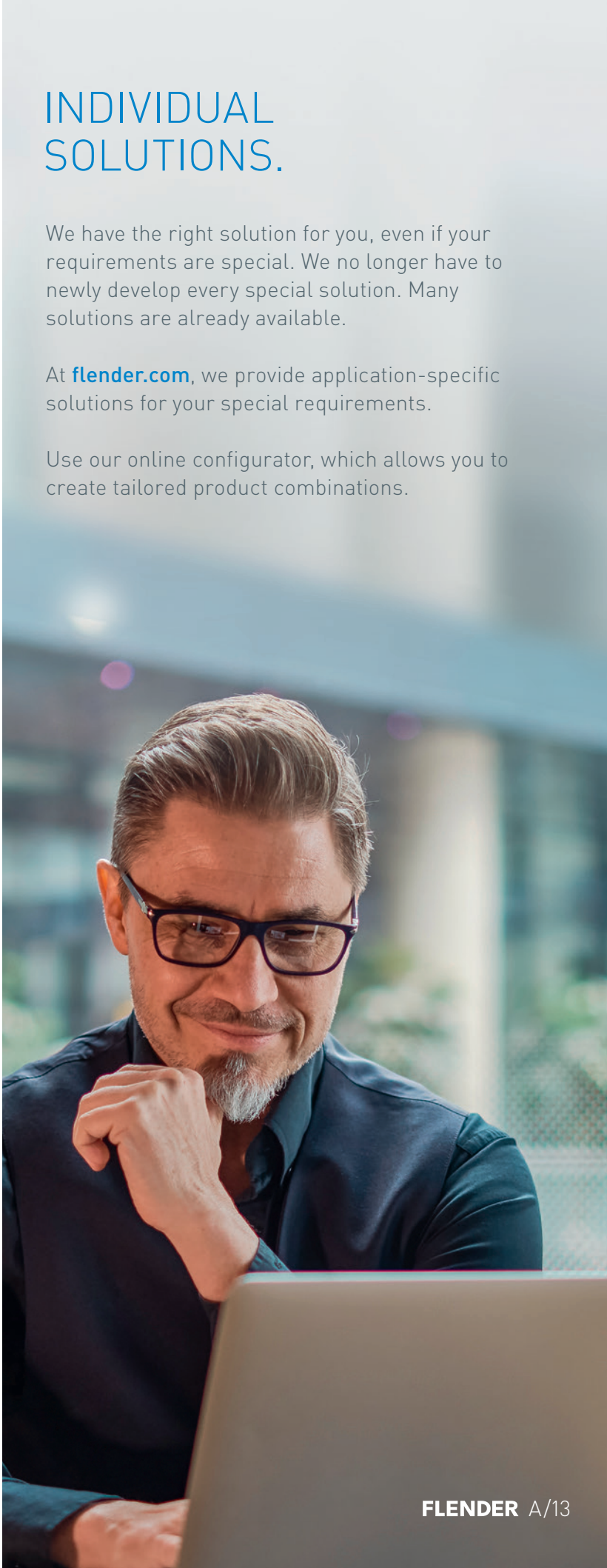
Industrie 4.0, reduced costs

INDIVIDUAL SOLUTIONS.

We have the right solution for you, even if your requirements are special. We no longer have to newly develop every special solution. Many solutions are already available.

At **flender.com**, we provide application-specific solutions for your special requirements.

Use our online configurator, which allows you to create tailored product combinations.



GREAT EXPERTISE IN YOUR INDUSTRY TOO.

Each industry has its own conditions. Every application has its own specific requirements. We are looking forward to meeting your challenges.

We probably already have the right solution at hand. Here are a few examples:

Minerals and mining

Requirement:
Perfectly coordinated drive system

Cement

Requirement:
Low maintenance effort and cost, sealing due to dirt in surroundings

Plastics and rubber

Requirement:
Absorption of high axial forces, suitability for explosion protection

Environmental and recycling

Requirement:
Highest possible reliability, rugged design

Pulp and paper

Requirement:
Suitability for centrally located lubrication

Industrial cranes

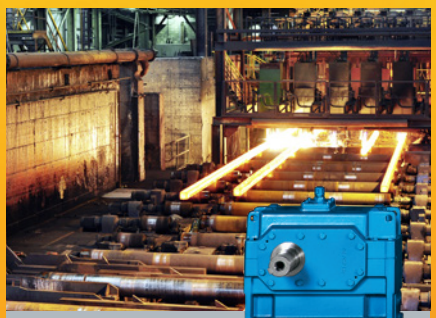
Requirement:
Quick availability, version with double drive shaft

Chemicals

Requirement:
Absorption of forces from the manufacturing process

Power generation

Requirement:
Effective cooling, speed adjustment for motor to fan

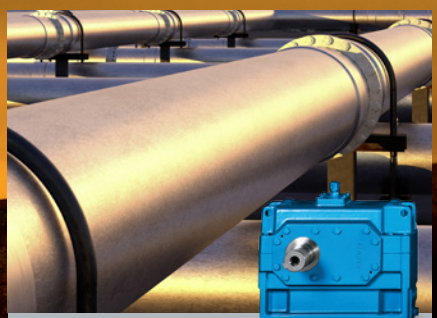


Metals

Requirement:
Harsh working conditions, high peak loads

Harbor cranes

Requirement:
Specific axle clearance, frequent start-up



Oil and gas

Requirement:
Flexible adaptation to speed requirements

Water and wastewater

Requirement:
Absorption of external forces, oil-retaining pipe required

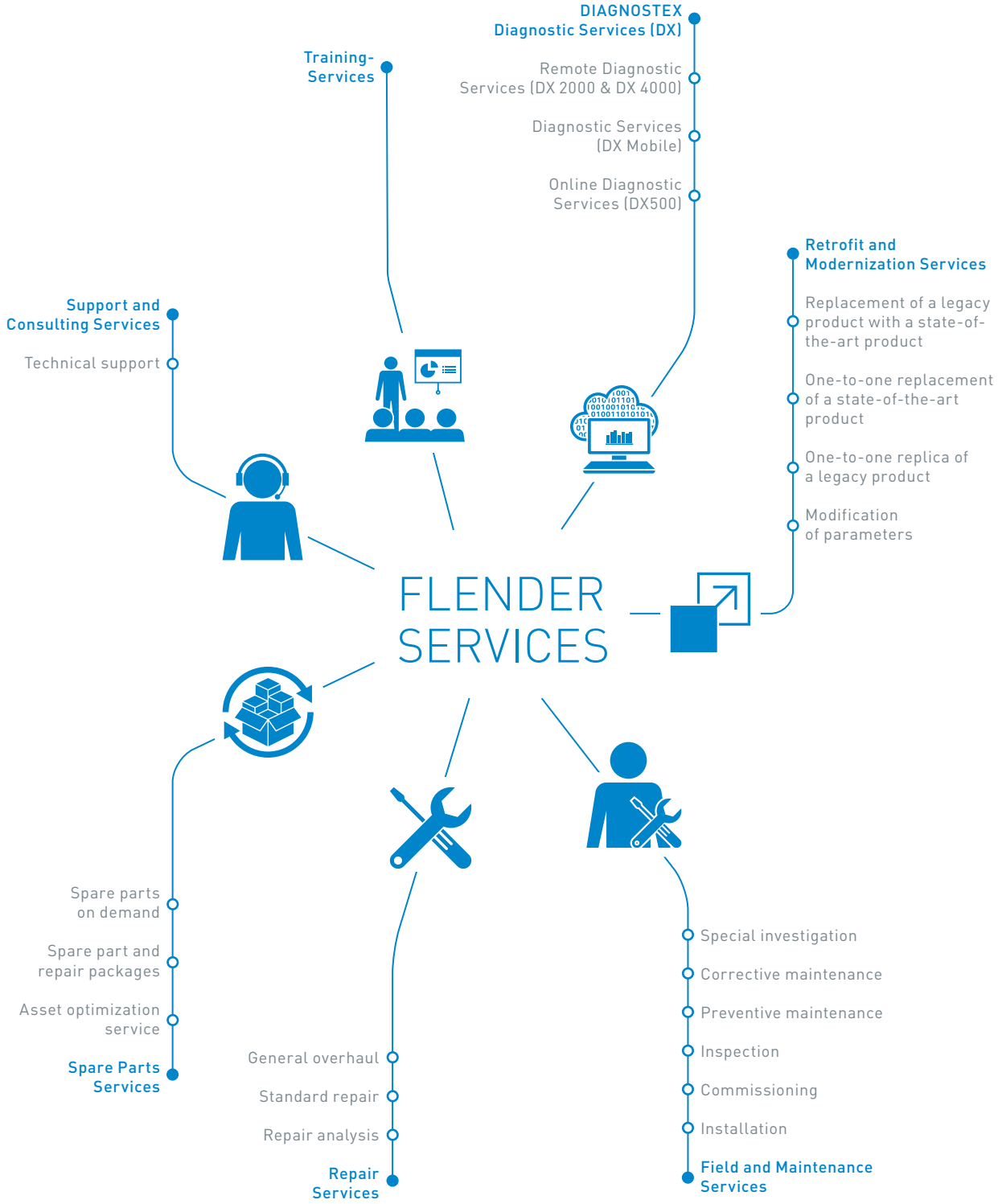
AN ORIGINAL FOR THE LONG TERM WITH ORIGINAL FLENDER SERVICES

Ever increasing requirements make it more and more important for industrial plants to work with maximum productivity and efficiency. Flender Services give companies a decisive advantage over the competition in industry, the acquisition of raw materials and energy production. In view of the high cost pressure, increasing energy prices and stricter and stricter environmental stipulations, our services are becoming a decisive factor to success over the competition.

Enjoy the support of our service experts, from planning, development and operation to the modernization of your plant and benefit from our experience and in-depth know-how of your application – in more than 100 countries, seven days a week, 24 hours a day.

Reduce standstills, minimize downtimes due to failure, and increase the productivity, flexibility and cost efficiency of your plant.

OUR OFFER FOR GEAR UNITS AND COUPLINGS AT A GLANCE.



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Flender GmbH
Alfred-Flender-Straße 77
46395 Bocholt
Germany

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