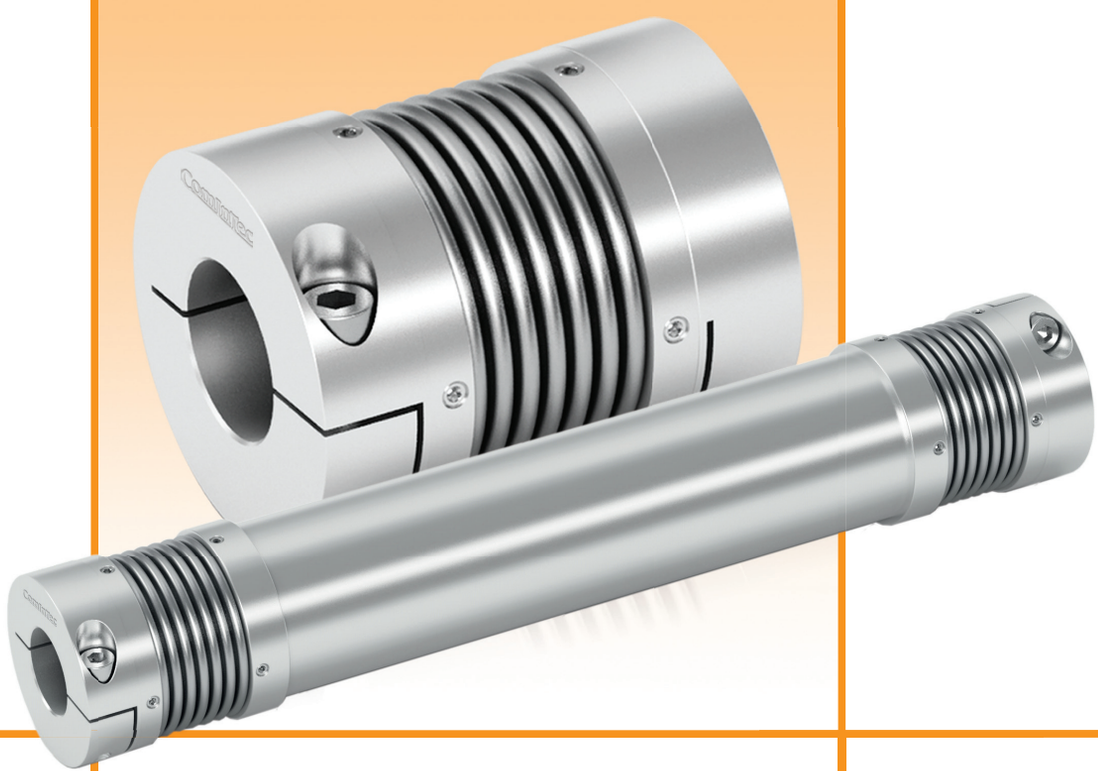
BELLOW COUPLING

Up to 300 Nm of torque and 45 mm bore

GSF



ComInTec®
Technology for Safety

10-2018

GSF - bellow coupling: introduction

- Hubs made in aluminum fully turned and bellow in stainless steel.
- Suitable for applications with high temperatures (> 300 °C).
- High torsional rigidity and low inertia.
- Wear and maintenance free.
- Backlash free for precision and high speeds.
- Single split clamp hub (type B) and finished bore in ISO H8 tollerance and low roughness.

ON REQUEST

- Single split clamp hub with H7 bore and keyway (type B1).
- Two piece clamp hub with H7 bore and keyway (type C1) or without keyway (type C).
- Connection to the Torque limiter's (safety coupling) range possible.
- Customized manufacturing for specific requirements.

The GSF bellow couplings have been designed and manufactured for all applications requiring excellent dynamic characteristics, necessary for high speeds, fast reversing and, at the same time, torsional rigidity with low inertia without compromising the high reliability.
The coupling is made in three different and modular elements, in order to obtain high flexibility in assembling and availability. The two shafts are connected to the bellow exploiting a simple mechanic system, easy and safe, by properly sized radial screws and without using bonding agents. In this way the coupling is able to operate and withstand high temperatures, up to 300 °C.
The coupling allows the compensation of all possible misalignments between the two shafts, to be connected in accordance to the values indicated in the table, assuring an infinite number of working cycles.

DIMENSIONING

The coupling's nominal torque must be higher than the maximum torque of the motor shaft, according to the generic formula on page 4.
For further checks it is useful to verify: inertia on acceleration / deceleration, incorrect positioning in case of application when high precision is required, the natural frequency of the application (simplified system with two masses) according to formulas:

$$C_{nom} = C_{ad} \cdot K \cdot \frac{J_{uti}}{J_{mot} + J_{uti}}$$

$$\beta = \frac{180 \cdot C_{mot}}{\pi \cdot R_T}$$

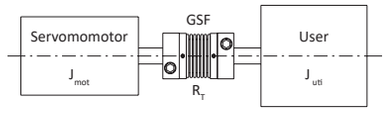
$$F_e = \frac{1}{\pi} \sqrt{R_T \cdot \frac{J_{uti} + J_{mot}}{J_{uti} \cdot J_{mot}}} > 2 \cdot f_{mot}$$

Where:

C_{nom} = nominal torque of the coupling *[Nm]*
C_{ad} = max value between acceleration torque on the motor side and deceleration torque on the user side *[Nm]*
C_{mot} = maximum torque on the motor side *[Nm]*
F_e = system frequency with two masses *[Hz]*
f_{mot} = frequency on the motor side *[Hz]*
J_{mot} = inertia on the motor side *[Kgm²]*
J_{uti} = inertia on the user side *[Kgm²]*
K = load factor
R_t = torsional rigidity of the coupling *[Nm/rad]*
β = rotation angle *[°]*

Load factor (K)

1,5	= continuos load
2	= discontinuous load
2÷3	= machine tools
2,5÷4	= shock load



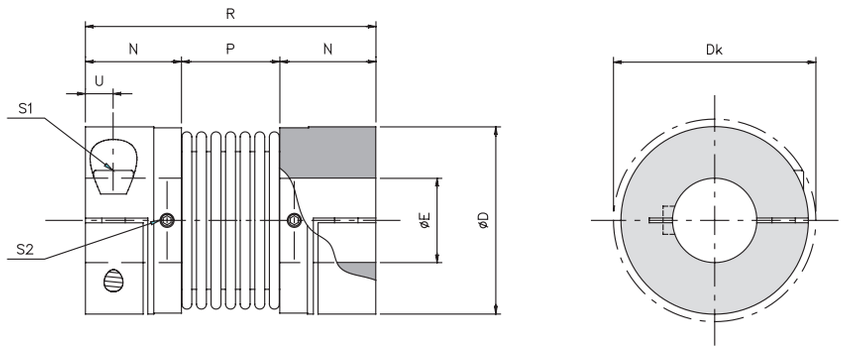
Symplified system with two masses.

FITTING

It is advised to machine the connection's shafts with:

- Surface finish with Ra=1.6 µm.
- Coaxial precision 0.01 mm.
- Nominal tolerance h6.

At first, assemble the coupling by inserting the bellow into the relevant hubs and tighten the screws "S2" in sequence, respecting a cross sequence, continuously until you obtain the tightening torque indicated in the catalogue. Insert one hub on the first shaft along the N length and tighten the clamp locking screw "S1" with a torque wrench, respecting the tightening torque indicated on the catalogue. Leave the second shaft slides on the opposite hub along the whole N length and tighten the clamp locking screw with a torque wrench, respecting the tightening torque indicated on the catalogue.
It is important to consider that misalignments, axial, angular and parallel, must be considered paired together, as inversely proportional (one reduces when the other increases). If all types of misalignments occur, it is necessary that the sum in percentage respect to the maximum value doesn't exceed 100%. If the metallic bellow is damaged, the whole coupling becomes unusable, so it is advised to be very careful in assembling and disassembling the individual components.



DIMENSIONS

Size	D	Dk	E H7		N	P	R	U
			min	max				
1	34	36	5	16	17	16,5	50,5	5
2	40	44	8	20	20,5	21	62	6
3	55	58	10	30	22,5	27	72	7
4	65	73	14	38	26	32	84	8
5	83	89	14	45	31	41	103	10

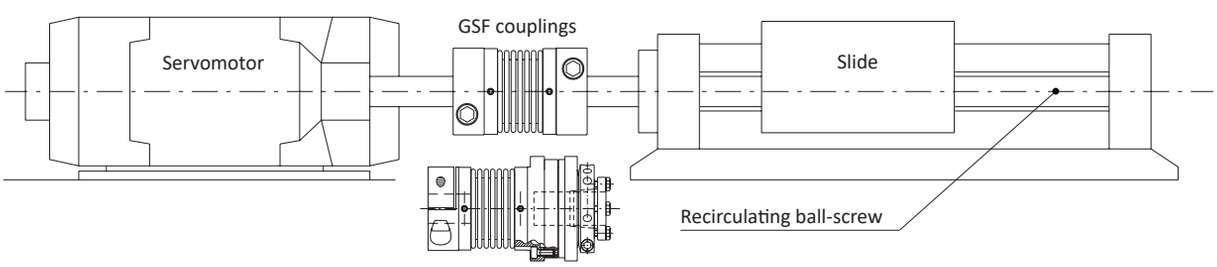
TECHNICAL CHARACTERISTICS

Size	Torque *[Nm]*		Weight *[Kg]*	Inertia *[Kgm²]*	Max speed *[Rpm]*	Screws S1	Grub screw S2	Tightening torque		Misalignments			Rigidity		
	nom	max						Screw (S1) *[Nm]*	Grubscrew (S2) *[Nm]*	Angular *α [°]*	Axial *X [mm]*	Radial *K [mm]*	torsional R_T *[10³ Nm/Rad]*	axial R_A *[N/mm]*	radial R_R *[N/mm]*
1	5	10	0,07	0,000014	14000	M4	M3	3	0,8	1° 30'	± 0,5	0,20	3,050	30	92
2	15	30	0,14	0,000032	12000	M5	M3	6	0,8	1° 30'	± 0,6	0,20	7,000	45	129
3	35	70	0,29	0,000136	8500	M6	M4	10,5	2	2°	± 0,8	0,25	16,300	69	160
4	65	130	0,45	0,000302	7000	M8	M4	25	2	2°	± 0,8	0,25	33,000	74	227
5	150	300	0,93	0,001049	5500	M10	M5	49	3,8	2°	± 1,0	0,30	64,100	87	480

TRASMISSIBLE TORQUE WITH HUB CONNECTION TYPE B

Torque transmitted *[Nm]* according to the ø finished bore *[mm]*																								
Size	5	6	7	8	9	10	11	12	14	15	16	18	19	20	24	25	28	30	32	35	38	40	42	45
1	5	6	7	8	9	10	11	12	14	15	16													
2				13	14	16	18	19	22	24	25	29	30	32										
3						24	25	27	32	34	36	41	43	45	54	57	63	68						
4									58	62	67	75	79	83	100	104	116	124	133	145	158			
5									97	102	107	119	125	132	158	165	183	198	211	231	248	263	277	295

APPLICATION EXAMPLE



GSF application + DSS/SG torque limiter

NOTES

On request

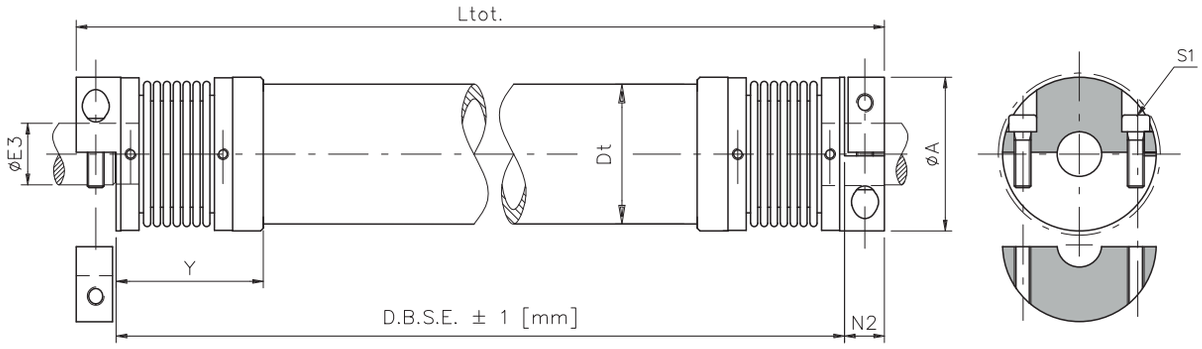
- Product available only with finished bore.
- the weights refer to the coupling with minimum bore; inertias refer to the coupling with maximum bore.
- **Choice and availability of different hub connection type see pages 4 and 5.**

GSF/DBSE - Torsionally rigid spacer shaft coupling with flexible bellow element

- Hubs made in aluminium fully turned and bellow in stainless steel.
- High torsional rigidity.
- Low inertia.
- Customised spacer for specific DBSE.
- Wear and maintenance free.
- Two piece clamp hub dismountable (type C) for easy installation.

A RICHIESTA

- Two piece clamp hub dismountable with keyway (type C1).
- Others types of clamp hub with screw (type B or B1)
- Connection to the Torque Limiter's (safety coupling) range possible.
- Customised manufacturing for specific requirements.



DIMENSION

Size	Torque [Nm]		D	E3 H7		N2	Y	Spacer				Weight tot [Kg]	L_{tot} [mm]	DBSE min [mm]	Rigidity	
	nom	max		min	max			Dt	Weight [Kg/m]	Inertia [10^3 Kg/m]	Rigidity R_t rel [10^3 Nm/rad.m]				Screws S1	Tightening torque [Nm]
1	5	10	34	5	15	14	35	30	1,06	0,162	1552	weight tot = 2 weight: (GSF) spacer weight: (DBSE -2Y)	L_{tot} DBSE + 2 N2	90	M4	3
2	15	30	40	8	18	19	42	35	1,27	0,273	2650			114	M5	6
3	35	70	55	10	28	22	48	50	1,91	0,917	8800			126	M6	10,5
4	65	130	65	14	38	25	55	60	3,34	2,184	21150			146	M8	25
5	150	300	83	14	45	34	67	70	5,09	4,341	42400			184	M10	49

TRASMISSIBLE TORQUE WITH HUB CONNECTION TYPE C

	Torque transmitted [Nm] according to the ø finished bore [mm]																						
Size	5	6	8	10	11	12	14	15	16	18	19	20	22	24	25	28	30	32	35	38	40	42	45
1	5	6	8	9	10	11	13	14															
2			12	15	17	18	21	23	25	28													
3					22	24	28	30	32	36	38	40	44	48	50	57							
4									63	71	75	79	86	94	98	110	118	126	137	149			
5											113	119	131	143	149	166	178	190	208	226	238	250	267

ORDER EXAMPLE

BELLOW COUPLING						
Model	Size	● Bore 1	Locking type bore 1	● Bore 2	Locking type bore 2	DBSE/L tot
GSF	**GR.4**	**foro Ø18 H7**	**B**	**foro Ø24 H7**	**B**	**-**

Size
from 1 to 5

Locking type
See hub connection type list at page 4

Model	
GSF	bellow coupling
GSE/DBSE	bellow coupling with spacer

NOTE

- Model available only with finished bore.
- In case of GSF/DBSE model indicate the length or spacer "DBSE" or total coupling length "Ltot".
  Example DBSE=250mm / Ltot=300mm
- The weights refer to the coupling with minimum bore, inertias refer to the coupling with maximum bore.
- **Choice and availability of different hub connection type see pages 4 and 5.**

ComInTec®