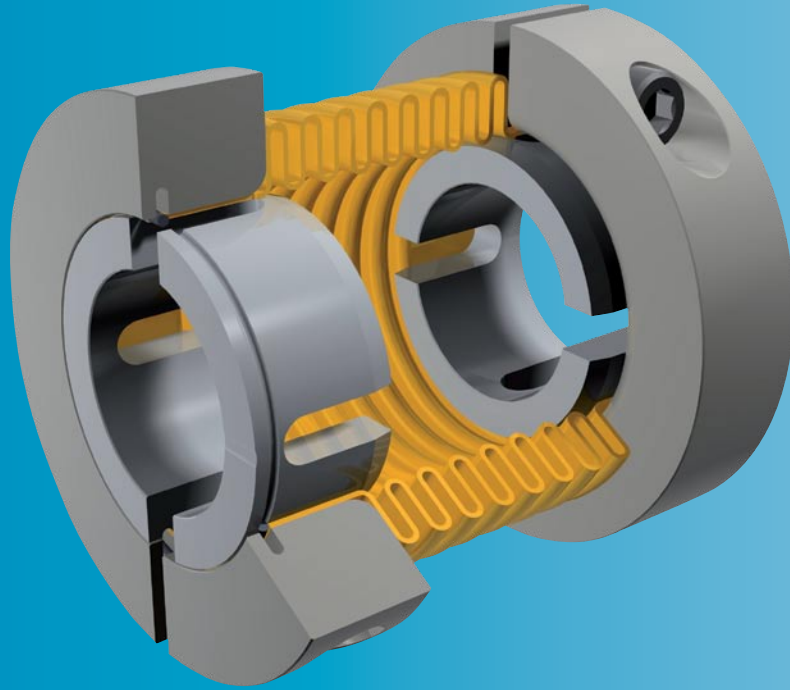


smartflex[®]

The perfect servo coupling



www.mayr.de

- **Low cost**
- **Plug-in type, variable bore diameters**
- **Larger shaft misalignment compensation capability**
- **Minimal mass moment of inertia**

K.932.V07.GB

mayr[®]
your reliable partner

Manufacturer's Declaration

This product is intended for installation in a machine or system, based on the machine directive 98/37/EC. It is forbidden to start use of the product until the machine or system into which it should be built is operating in accordance with the EC directives.

Safety Regulations

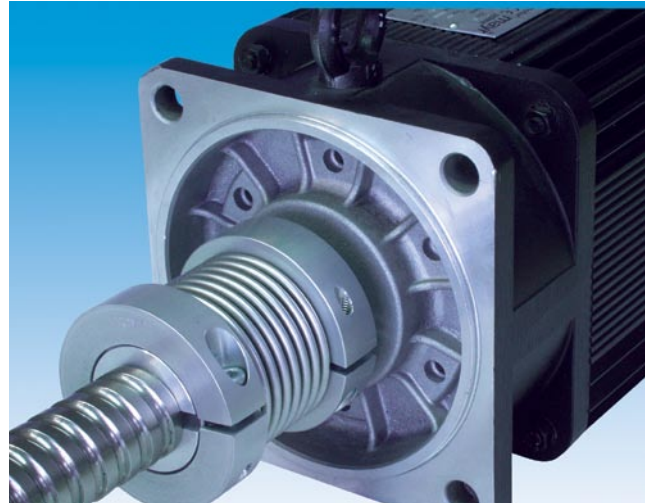
In the interests of safety: please read the Installation and Operational Instructions for the necessary user-implemented protective measures, standards and directives and device conditions.

**Superior technology
at a lower cost**

smartflex®

**the perfect
servo coupling**

**Backlash-free, torsionally rigid steel bellows
coupling for flexible compensation of
shaft misalignment**



Your advantages when using the new smartflex® coupling

Lower costs

- Extremely low-cost price/value ratio due to the ingeniously simple construction
- Time-saving installation due to simple and fast shaft securement

Higher precision

- Backlash-free shaft securement
- Backlash-free torque transmission
- High torsional rigidity

Faster availability

- Modular concept ensures fastest possible delivery
- Delivery of standard stock items within 24 hours

**Compensation of much larger
shaft misalignments**

- Up to three times higher misalignment compensation capability for radial shaft compensation than on standard steel bellows couplings
- Low restoring forces on the shaft bearings

More drive dynamics

- Minimal mass moment of inertia
- Safe torque transmission even at high speeds

Higher operational safety

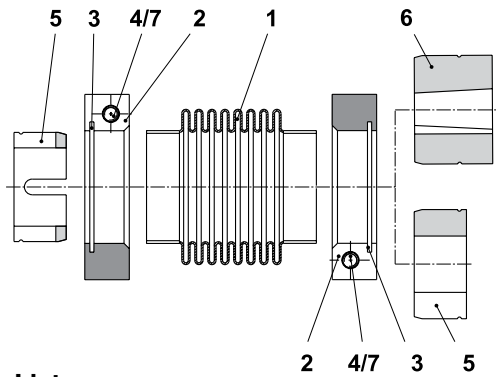
- High misalignment compensation capability eliminates the most common failure causes suffered by previous steel bellows

High availability due to flexible modular system



smartflex® coupling steel bellows and clamping rings are the same for each design in an installation size. They are adapted via reducing bushings to the required shaft diameter. These bushings can be engaged easily and quickly into the clamping rings. This concept guarantees you the lowest possible storage numbers and high availability.

Technical Description and Coupling Dimensioning



Parts List

- 1 Steel bellows
- 2 Clamping ring
- 3 Holding spring
- 4 Cap screw
- 5 Reducing bushing
- 6 Fanuc hub
- 7 Washer

State of Delivery

- Packed individually in folding boxes, or
- Plugged together and secured with cable ties
- Bores in the reducing bushings (5) and Fanuc hubs (6) have H7 tolerances

Adapting to the Shaft Diameter

The reducing bushing (5) can be pressed out of the clamping ring (2) using axial pressure (manually or with a small hand press) and replaced.

Shaft Requirements

- Surface quality: 1,6 µm
- Run-out accuracy: 0,01 mm
- Minimum tensile strength: 500 N/mm²
- Tolerance: h6

For all other tolerances, please contact the manufacturer.

Function

smartflex®-couplings transmit the torque backlash-free and compensate for radial, axial and angular shaft misalignments.

Temperature Resistance

Resistant against permanent temperatures of up to 120 °C (devices resistant to higher temperatures available on request)

Installation Position

Can be defined by the user.

Temperature Factors

Temperature (°C)	50	80	100	120
Temperature factor (-)	1	1,1	1,2	1,3

Table 1

Service Factors fB:

fB = 1,5	with even load
fB = 2	with uneven load
fB = 2,5 - 4	with impact load

Table 2 (For drives in machine tools (servo motors), we recommend fB values of 1,5).

Coupling Dimensioning

Please carry out dimensioning using Diagram 1 (Sizes 0 – 2) or Diagram 2 (Sizes 3 – 5) with “torque M (Nm)” and “misalignment (%)”.

Determining the co-ordinates “torque M”:

- Find the maximum operating torque.
- Multiply the operating torque with the values from Table 1 (temperature factor) and Table 2 (service factor) (interpolate the interim values).

Determining the co-ordinates “misalignment”:

- Determine the individual shaft misalignments in %, measured using the “permitted shaft misalignments” for the intended coupling size (see Technical Data).
Example for size 2: 0,2 mm axial displacement is 25 % of the permitted value 0,8 mm.
- Add together the individual percent values. The sum total must be below 100 %.

Write both the defined co-ordinate values into the respective diagram.

The point of intersection must lie below the characteristic curve of the intended coupling size.

If the point of intersection lies above the characteristic curve,

- choose a larger coupling,
- reduce the shaft misalignments or
- contact the manufacturers.

Diagram 1 (Sizes 0 – 2)

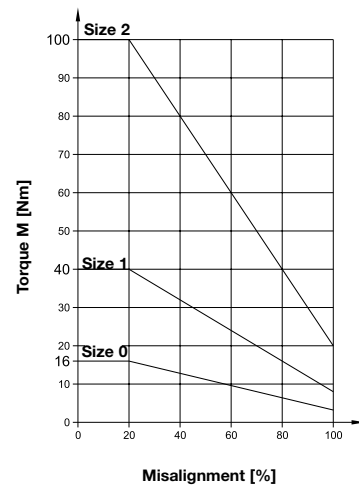
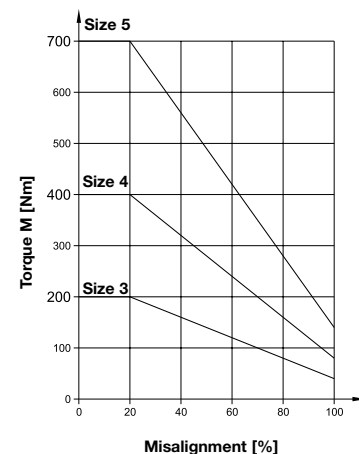
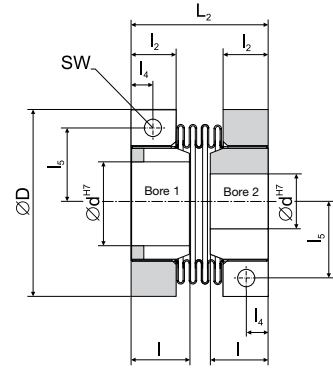
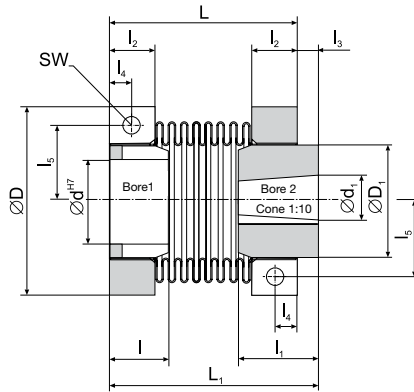
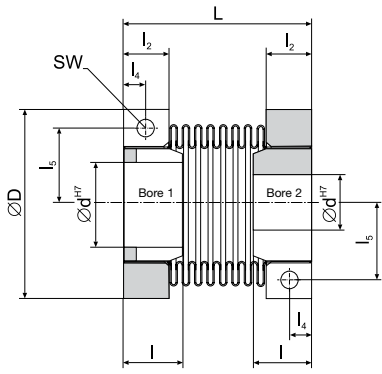


Diagram 2 (Sizes 3 – 5)



Standard Design

Short Construction Length



Type 932.333

Type 932.343
(only sizes 1 and 2)

Type 932.433
(only sizes 1- 5)
(Fanuc hub on request)

Technical Data and Dimensions

Size	Nom. torque T_{KN} (Nm)	Max. speed n_{max} (rpm)	Torsional rigidity C_T Type 932.3_3 (Nm/rad)	Axial rigidity C_{ax} Type 932.3_3 (N/mm)	Torsional rigidity C_T Type 932.433 (Nm/rad)	Axial rigidity C_{ax} Type 932.433 (N/mm)	Permitted misalignments*					
							Type 932.3_3			Type 932.433		
							radial ΔK_r (mm)	axial ΔK_a (mm)	angular ΔK_w (°)	radial ΔK_r (mm)	axial ΔK_a (mm)	angular ΔK_w (°)
0	16	10000	4000	50	—	—	0,3	0,4	3	—	—	—
1	40	8000	9000	70	18000	140	0,4	0,6	3	0,1	0,3	1,5
2	100	6000	22000	90	44000	180	0,5	0,8	3	0,1	0,4	1,5
3	200	4000	50000	120	100000	240	0,5	0,8	3	0,1	0,4	1,5
4	400	3000	125000	172	168000	175	0,5	0,8	1,5	0,1	0,6	1,2
5	700	2500	305000	156	380000	187	0,5	0,6	1,0	0,1	0,6	1,0

* The permitted misalignments must not simultaneously reach the max. values.

Size	Mass moment of inertia Type 932.333 (kgm ²)	Weight Type 932.333 (kg)	Mass moment of inertia Type 932.343 (kgm ²)	Weight Type 932.343 (kg)	Mass moment of inertia Type 932.433 (kgm ²)	Weight Type 932.433 (kg)	Screw tightening torque SW (Nm)	Wrench opening SW (mm)	Bores	
									$\varnothing d^{H7\ 1)}$ from – to	$\varnothing d_1$
0	0,0000360	0,132	—	—	—	—	10	4	8 – 19	—
1	0,000104	0,245	0,000107	0,265	0,000094	0,217	14	5	11 – 25	16
2	0,000330	0,467	0,000340	0,521	0,000290	0,400	17	5	16 – 36	16
3	0,00121	1,00	—	—	0,00106	0,876	41	6	18 – 50	—
4	0,00342	1,80	—	—	0,00329	1,70	77	8	30 – 62	—
5	0,00845	2,80	—	—	0,00840	2,73	133	10	40 – 85	—

1) Observe transmittable torques and preferred bores according to Tables 3 and 4 on page 5.

Size	D	D ₁	L	L ₁	L ₂	l	l ₁	l ₂	l ₃	l ₄	l ₅
0	46	—	49,5	—	—	15	—	13	—	6,5	15,2
1	57	29,9	59,3	71,5	43,7	18	30	15	12	7,5	20
2	72	42,2	72	82	52,5	20	30	17	10	9	27
3	94	—	90,3	—	65,6	26	—	22	—	11,5	34,5
4	118	—	115	—	87	32	—	28	—	14	44
5	146	—	124	—	98	36	—	31	—	15,5	56

We reserve the right to make dimensional and design alterations.

Clamping Connection Bores and Corresponding Transmittable Torques TR [Nm]

Size	ø 8	ø 9	ø 11	ø 12	ø 14	ø 16	ø 18	ø 19	ø 20	ø 22	ø 25	ø 28	ø 30	ø 32	ø 35	ø 36	ø 38	ø 40	ø 42	ø 45	ø 48	ø 50	ø 55	ø 60	ø 62	ø 65	ø 70	ø 75	ø 80	ø 85
0	9,6	11	14	16	16	16	16	16																						
1			24	26	31	35	39	40	40	40																				
2						60	68	72	75	84	100	100	100	100	100	100														
3							120	127	133	147	167	187	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
4													240	256	280	290	305	320	340	360	390	400	400	400	400	400	400	400	400	400
5																		420	440	475	510	530	580	640	660	690	700	700	700	700

Table 3

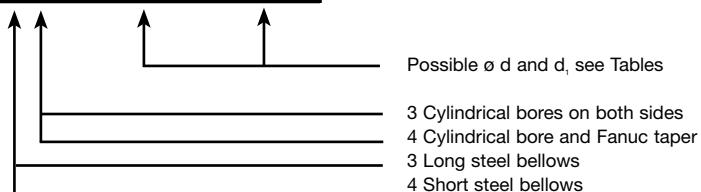
Preferred bores

Size	Preferred bores ø d ^{H7}
0	8, 9, 10, 11, 12, 14, 15, 16, 18, 19
1	11, 12, 13, 14, 15, 16, 18, 19, 20, 22, 24, 25
2	16, 17, 18, 19, 20, 22, 24, 25, 26, 27, 28, 30, 32, 35
3	18, 19, 20, 22, 24, 25, 28, 30, 32, 35, 38, 40, 42, 45, 48, 50
4	30, 32, 35, 38, 40, 42, 45, 48, 50, 55, 60
5	40, 42, 45, 48, 50, 55, 60, 65, 70, 75, 80, 85

Table 4

Order Example:

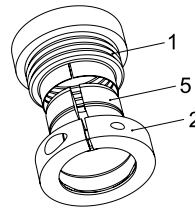
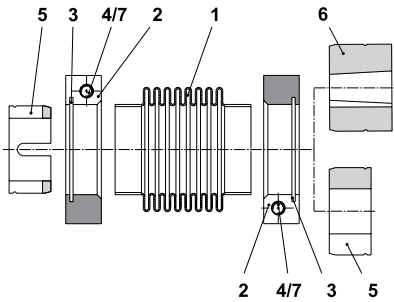
To be stated on order:	Size	Type	Bore 1	Bore 2
Order number:		932._3		



Please Observe:

According to German notation, decimal points in this catalogue are represented with a comma (e.g. 0,5 instead of 0.5). We reserve the right to make dimensional and constructional alterations.

Coupling Installation



Parts List

- 1 Steel bellows
- 2 Clamping ring
- 3 Holding spring
- 4 Cap screw
- 5 Reducing bushing
- 6 Fanuc-hub
- 7 Washer



The slots in the steel bellows (1), clamping ring (2) and reducing bushing (5) must be aligned.

Important Installation Guidelines

- Wash off the conserving layer in the bores with paraffin, white spirit, cleaner solvent or similar.
- The bores and the shafts must be grease and oil-free.
- The permitted shaft misalignments must not be exceeded.
- Avoid damage to the steel bellows (1) before and during installation.
- The clamping ring (2) with the holding spring (3) must be engaged in the reducing bushing (5) or the Fanuc hub (6).
- If a reducing bushing is dismantled or re-installed more than 5 times, the snap ring groove may deform, making it unpermitted for use.
- In order to transfer the defined torques in Table 3 (page 5) correctly, the slots in the steel bellows (1), clamping ring (2) and reducing bushing (5) must be aligned.

4

Coupling Installation Type 932.333

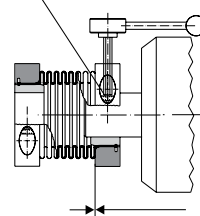
1. Please ensure that the coupling can be easily pushed onto both shafts.
2. Push the entire coupling over the whole length of the reducing bushing (5) onto a shaft.
3. Make sure that the steel bellows (1) is pushed between the clamping ring (2) and the reducing bushing (5) up to its limit, and that the slots in the steel bellows, clamping ring (2) and reducing bushing (5) are aligned.
4. Tighten the cap screw (4). The screw tightening torques (see Technical Data) must be observed.
5. Push the second shaft over the entire length of the reducing bushing (5) into the coupling.
6. Make sure that the steel bellows (1) is pushed between the clamping ring (2) and the reducing bushing (5) up to its limit, and that the slots in the steel bellows (1), clamping ring (2) and reducing bushing (5) are aligned.
7. Tighten the cap screw (4). The screw tightening torques (see Technical Data) must be observed.

Coupling Installation Type 932.343

1. Remove the clamping ring (2) with the protruding Fanuc hub (6) from the coupling.
2. If necessary, insert the key into the conical shaft.
3. Push the Fanuc hub (6) onto the conical shaft.
4. Secure the hub against axial displacement.
5. Push the rest of the coupling with the open steel bellows side up to its limit between the clamping ring (2) and Fanuc hub (6).
6. Tighten the cap screw (4). The screw tightening torque (see Technical Data) must be observed.
7. Push the second shaft over the entire length of the reducing bushing (5) into the coupling.
8. Make sure that the steel bellows (1) is pushed between the clamping ring (2) and the reducing bushing (5) up to its limit, and that the slots in the steel bellows (1), clamping ring (2) and reducing bushing (5) are aligned.
9. Tighten the cap screws (4). The screw tightening torques (see Technical Data) must be observed.

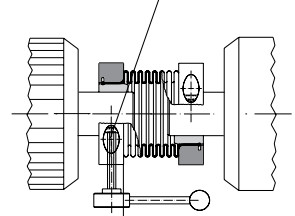
Coupling Installation onto Cylindrical Shaft

Cap screw (4)
Observe tightening torque!
(see Technical Data)



Steel bellows (1) and clamping ring (2) up to limit

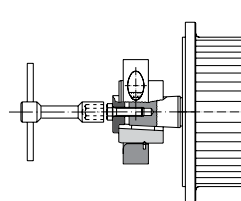
Cap screw (4)
Observe tightening torque!
(see Technical Data)



Steel bellows (1) and clamping ring (2) up to limit

Coupling Installation onto Conical Shaft

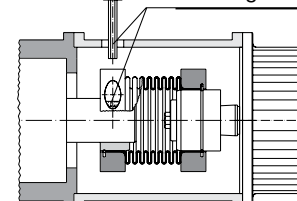
Cap screw (4)
Observe tightening torque!
(see Technical Data)



Steel bellows (1) and clamping ring (2) up to limit

Coupling Installation into a Bell-Type Housing

Apply the tools carefully.
The clamping ring (2) is not secured against turning



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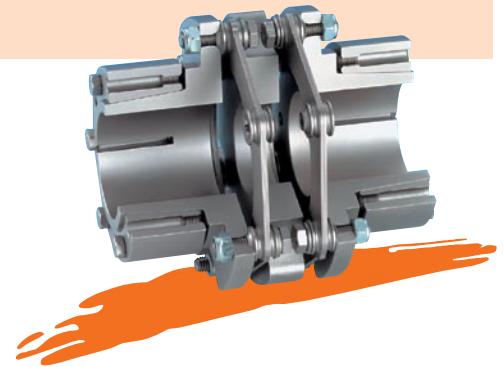
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