Installation and Operational Instructions for ROBA®-DX Couplings Type 931.3 _ _ (B.9.5.GB)

Please read these Operational Instructions carefully and follow them accordingly!
Ignoring these Instructions may lead to malfunctions or to coupling failure, resulting in damage to other parts.

Contents:

Manufacturer's Declaration

This product is intended for installation in a machine or system, based on the machine directive 2006/42/EG.

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

These Installation and Operational Instructions (I + O) are part of the coupling delivery.
Please keep them handy and near to the coupling at all times.

Danger!

This warning applies if:

- ❒ the shaft couplings are modified.
- ❒ the relevant standards for safety and / or installation conditions are ignored.

User-implemented Protective Measures

- ❒ Cover all moving parts to protect against seizure, dust or foreign body impact.

To prevent injury or damage, only professionals and specialists should work on the devices, following the relevant standards and directives. Please read the Installation and Operational Instructions carefully before installation and initial operation of the device.

These Safety Regulations are user hints only and may not be complete!

Warning:
Without a conformity inspection, this product is not suitable for use in areas where there is a high danger of explosion. This statement is based on directive 2014/34/EU (ATEX directive).

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Parts List

Only use mayr® original parts

1 Metal bellows with hubs for cone bushing
2 Cone bushing
3 Hexagon head screw
4 Metal bellows with clamping hubs
4.1 Clamping hub
5 Cap screw
6 Metal bellows with Fanuc hub and clamping hub
6.1 Fanuc hub

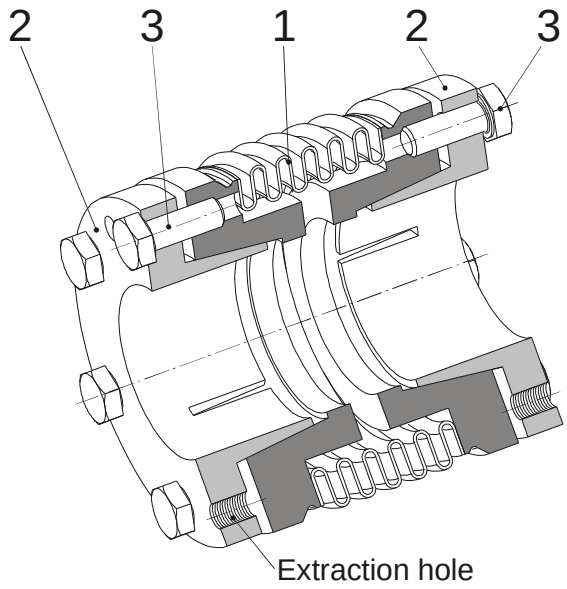

Fig. 1: Type 931.311

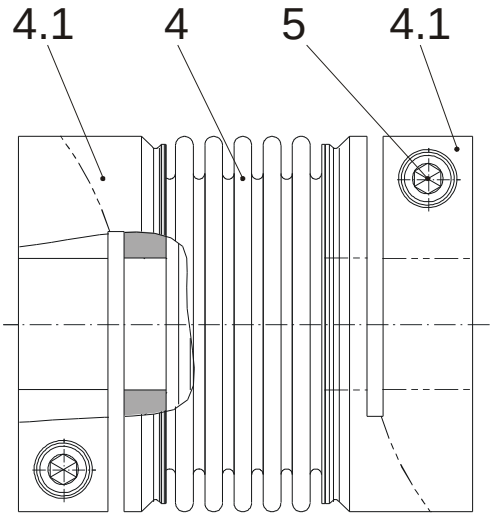

Fig. 2: Type 931.333

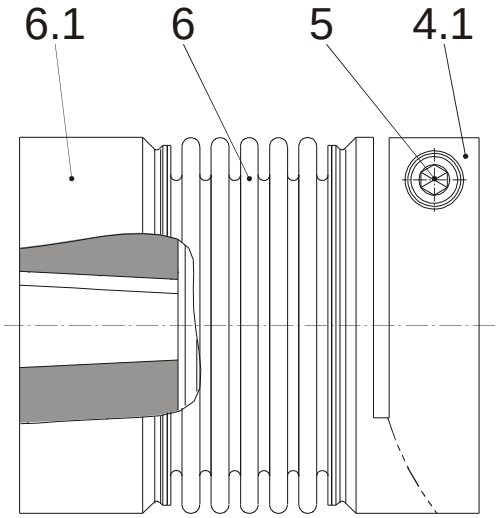

Fig. 3: Type 931.343 (only on size 3)

Table 1: Technical Data

ROBA®-DX Size		0	1	2	3	4	5
Bore for design with cone bushing (2) from – to Min. transmittable nominal torque 70 % of T_{KN} from bore Transmittable nominal torque 100 % T_{KN} from bore	[mm]	9 – 16 9 13	12 – 20 12 15	15 – 25 15 19	24 – 35 24 28	30 – 42 30 35	35 – 50 35 41
Bore for design with clamping hub (4.1) from – to Min. transmittable nominal torque 70 % of T_{KN} from bore Transmittable torque 100 % T_{KN} from bore	[mm]	9 – 20 9 13	12 – 25 12 16	15 – 32 15 19	25 – 42 25 37	30 – 45 30 35	35 – 55 35 38
Bore for Fanuc hub (Item 6.1 / cone 1:10)	[mm]	- - -	- - -	- - -	16	- - -	- - -
Coupling nominal torque T_{KN}	[Nm]	30	60	100	200	350	600
Max. speed $n_{max.}$	[rpm]	13000	11000	9500	9000	7500	6300
Tightening torque hexagon head screw (3)	[Nm]	2.9	2.9	5.5	9.5	17	15
Tightening torque cap screw (5)	[Nm]	5	10	18	18	43	87
Axial misalignment ΔK_a	[mm]	±0.4	±0.5	±0.6	±0.8	±1.0	±1.2
Radial displacement ΔK_r	[mm]	0.1	0.1	0.15	0.2	0.25	0.3
Angular misalignment ΔK_w	[°]	1.5	2	2	2	2	2

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Safety and Guideline Signs

Warning!
Danger of injury to personnel and damage to machines.

Please Observe!
Guidelines on important points.

Design

ROBA®-DX couplings are designed as metal bellows couplings to connect two shafts.

Function

ROBA®-DX couplings transmit the torque backlash-free and compensate for radial, axial and angular shaft misalignment.

State of Delivery

ROBA®-DX couplings are delivered manufacturer-assembled. The surfaces of the cone bushings (2), the clamping hubs (4.1) and the hubs are phosphated and the metal bellows is made of stainless steel.
The bores on the cone bushings. (2) and the clamping hubs (4.1) are blank; however, they are covered with a conserving layer.

Demands on the Shaft

- ❑ Surface quality: $R_a = 1.6$
- ❑ Please keep to the tolerances shown in Fig. 4.
- ❑ Minimum tensile strength: 500 N/mm²
- ❑ Tolerance Ø d: h6 (from Ø 38 h8)

For other tolerances, please contact the manufacturers.

Temperature Resistance:

Continuous temperature resistance for -20 °C up to +250 °C (For higher or lower operating temperatures, please contact the manufacturers).

Installation Position: User-defined

Installation Guidelines for Shaft Ends

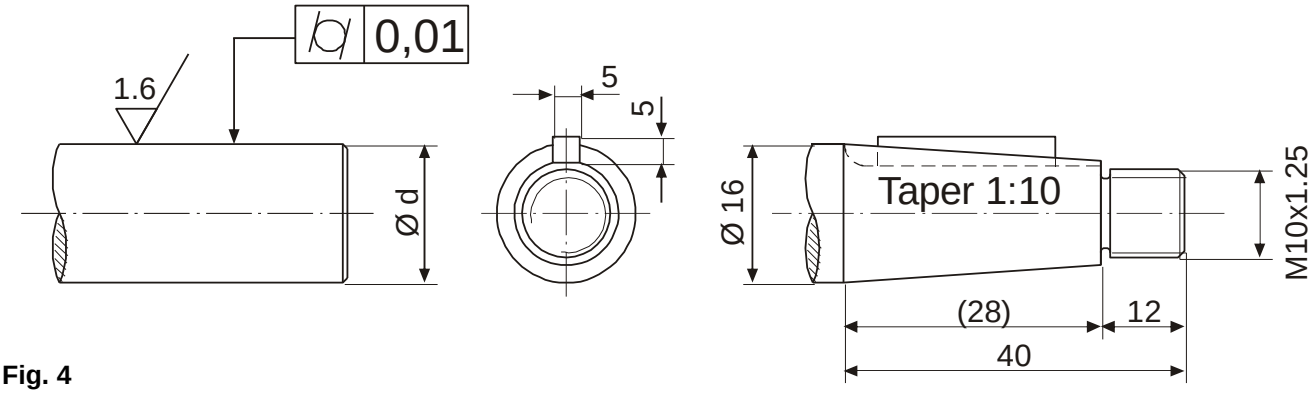

Fig. 4

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Important Installation Guidelines

- ❑ Please wash off the conserving layer in the bores using petrol, petroleum spirits or cleaner solvent etc.
- ❑ The bores and the shafts must be oil and grease-free.
- ❑ Do not under any circumstances exceed the permitted shaft misalignments (see Table 1).
- ❑ Avoid damage to the metal bellows (1/6) before and during installation!

Coupling Installation Type 931.311 (Fig. 1)

1. Please check whether the coupling can be easily pushed onto both shafts.
2. Push the coupling assembly over the entire length of the cone bushing (2) on one shaft.
3. Pull the cone bushing (2) hexagon head screw (3) stepwise (in 3 to max. 6 tightening turns) using a torque wrench evenly to the tightening torque according to Table 1.
   Please Observe!
   When the cone bushing (2) is tightened, the metal bellows with hub (1) performs an axial movement in the direction of the cone bushing. Because of this, please make sure that first one cone bushing (2) is tightened completely, before beginning to tighten the second cone bushing (2). This avoids unpermitted axial metal bellows (1) distortion.
4. Push the second shaft over the entire length of the second cone bushing (2) into the coupling.
5. Tighten the second cone bushing (2) hexagon head screws (3) step-wise (in 3 to max. 6 tightening turns) using a torque wrench evenly to the tightening torque according to Table 1.

Coupling Installation Type 931.333 (Fig. 2)

1. Please check whether the coupling can easily be pushed onto both shafts.
2. Push the coupling assembly over the entire length of the clamping hub (4.1) onto one shaft.
3. Tighten the clamping hub (4.1) cap screw (5) using a torque wrench to the tightening torque according to Table 1. While tightening the cap screw (5), the clamping hub (4.1) should be compressed. The torque is transmitted via frictional locking.
4. Push the second shaft over the entire length of the second clamping hub (4.1) into the coupling.
5. Tighten the second clamping hub (4.1) cap screw (5) using a torque wrench to the tightening torque according to Table 1.

Disassembly

For disassembly, two (on size 5, four) extraction holes (Fig.1) are to be found in the cone bushings (2) (Fig. 1). After all the hexagon head screws (3) have been loosened, the cone bushings (2) can be pushed out using the hexagon head screws (3) from the metal bellows (1) hub.
For clamping hub (4.1) disassembly, only the cap screws (5) must be loosened.
Before the input and output sides are pulled apart to take out the coupling, please make sure that the shaft-hub connections have been loosened, in order to avoid damage to the metal bellows.

Coupling Installation Type 931.343 (Fig. 3)

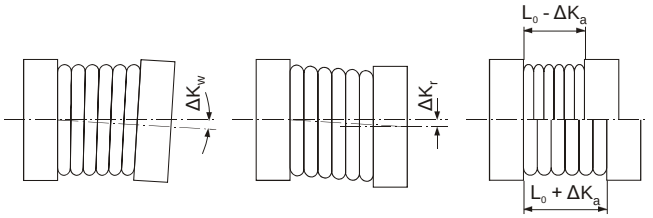
1. If necessary, lay the keyway into the conical shaft.
2. Push the coupling assembly with the Fanuc hub (6.1) onto the conical shaft.
3. Clamp the hub using a nut or screw with a press cover to the cone (Tightening torque 40 Nm for frictionally locking torque transmission).
4. Push the second shaft over the entire length of the clamping hub (4.1) into the coupling.
5. Tighten the cap screw (5) of the clamping hub (4.1) using a torque wrench to the tightening torque according to Table 1.

Permitted Shaft Misalignments

ROBA®-DX couplings compensate for radial, axial and angular shaft misalignment (Fig. 5), without losing their backlash capability. The permitted shaft misalignments shown in Table 1 must not simultaneously reach their maximum value. If more than one kind of misalignment occurs simultaneously, they influence each other: this means that the permitted misalignment values are dependent on each other (Fig. 6). The sum total of the actual misalignments in percent of the maximum value may therefore not exceed 100 %.

Coupling Alignment

Exact coupling alignment greatly increases the coupling lifetime and reduces the load on the shaft bearings. In drives with very high speeds, we recommend alignment using a suitable alignment device (e.g. laser). Normally, however, shaft alignment using a straight edge at two vertical levels next to each other is sufficient.



Angular misalignment Radial misalignment Axial displacement

Fig. 5

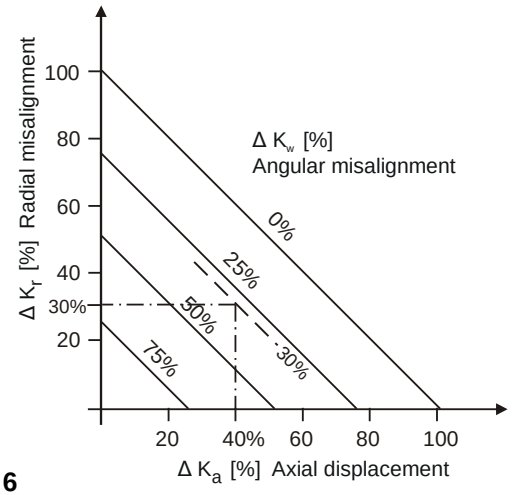


Fig. 6

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Maintenance

ROBA®-DX couplings are maintenance-free.
However, special maintenance is necessary should the device be subject to extreme ambient or operational conditions.
(If this is the case, please contact the manufacturers).

Disposal

All Steel Components:
Steel scrap (Code No. 160117)

Malfunctions / Breakdowns

Malfunction	Possible Causes	Solutions
Broken bellows	Alignment mistake	1) Set the system out of operation 2) Replace the entire coupling 3) Check the alignment
	Previous damage to the bellows caused by transportation or installation	1) Set the system out of operation 2) Replace the entire coupling 3) Check the alignment
	Operational parameters are not compatible with the coupling performance	1) Set the system out of operation 2) Check the operating parameters and choose a suitable coupling (observe the installation space) 3) Install new coupling 4) Check the alignment
	Bellows is excited in natural frequency, resonance	1) Set the system out of operation 2) Check the exciter frequencies and the natural frequencies (see catalogue K.931.V__) 3) The cable characteristics must be re-adjusted 4) Replace entire coupling 5) Check the alignment
Changes in running noise and vibration occurrence	Loose screws, resonances, coupling insufficiently secured	1) Set the system out of operation 2) Check the screw tightening torques 3) Check the cable characteristics 4) Check the coupling parts and replace damaged coupling parts

Warning!

***mayr*® will not accept liability or guarantee if replacement parts and accessories are used which have not been delivered by *mayr*®, or for any damage which may occur as a result.**

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