

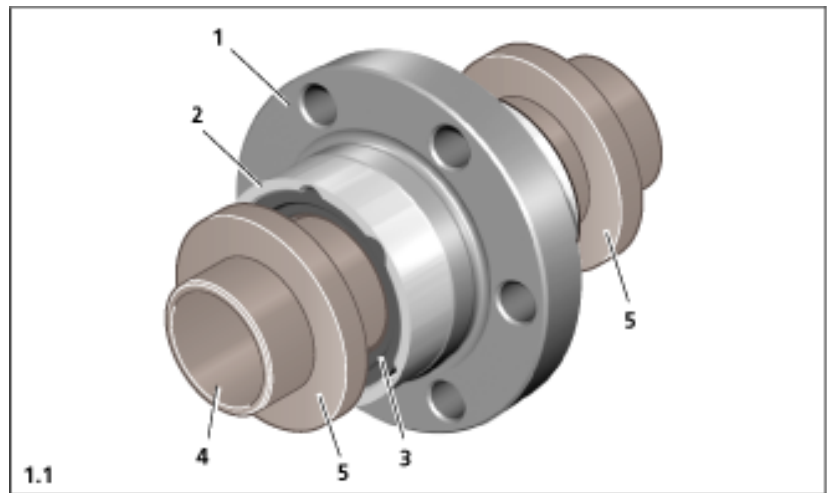
## Instructions for Ball Screw Drives

### Flanged single nut with recirculation caps FSZ-E-S

#### 1. Components and supply condition

The nut is supplied on a mounting arbor with seals ready-mounted. It comes with anti-corrosion oil and basic greasing.

- 1 Single nut (metal body)
- 2 Plastic recirculation caps
- 3 Seals
- 4 Mounting arbor
- 5 Retaining rings (rubber)

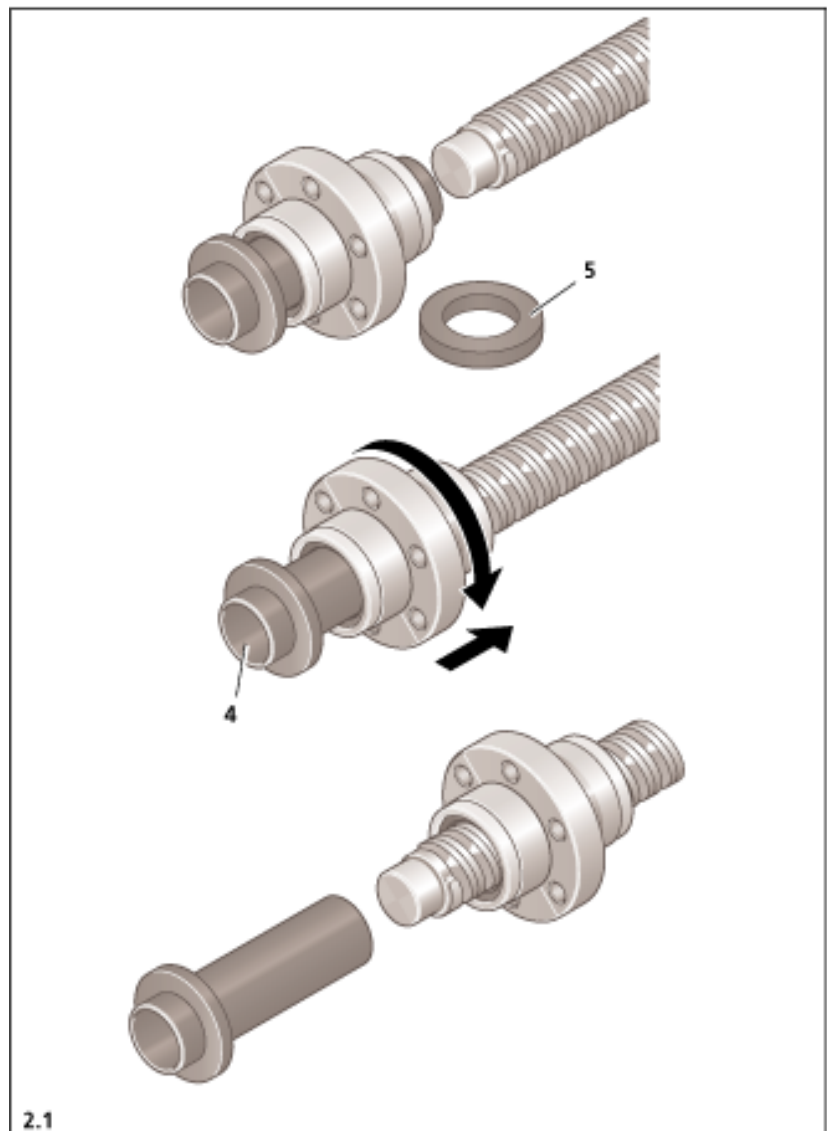


#### 2. Mounting/removing the nut from the screw

**⚠** The nut must always be mounted and removed using the mounting arbor! Never take the nut off the mounting arbor or the screw, otherwise balls may be lost!


- Remove the retaining ring (5) or cable binder on one side of the mounting arbor. Make sure that the mounting arbor remains completely inside the nut!
- Push the mounting arbor (4) with the nut onto the end of the screw up to the beginning of the thread. The arbor must directly contact the thread.
- Now carefully turn the nut onto the screw thread exerting slight axial pressure.
- Turn the nut completely onto the screw thread. Only then pull the mounting arbor off the screw end.

To remove the nut follow the same procedure in the reverse order.




### 3. Mounting the nut (with screw) to the adjoining structure

#### 3.1 General notes

 These instructions describe only the specific procedure for mounting the nut. For mounting options with screw, various connection options, end bearings, etc., see separate instructions.


Mounting options for nut to carriage / adjoining housing:

**A** Centered installation using ground locating diameter  $D_1$  (1)  **3.1.1**

**B** "Floating" installation without centering  **3.1.2**

The following applies to both cases:

- The nut is fastened with screws through the six holes in the flange (2).
- Use the ground flange face on the  $D_1$  side as a mating surface (3).
- The anti-corrosion oil does not need to be removed for mounting.

 When installing the nut, make sure that it can be lubricated through the lube hole in the flange (4)!


Do not apply pressure to the recirculation caps (5)!

#### 3.2 Mounting the nut using locating feature $D_1$ – A

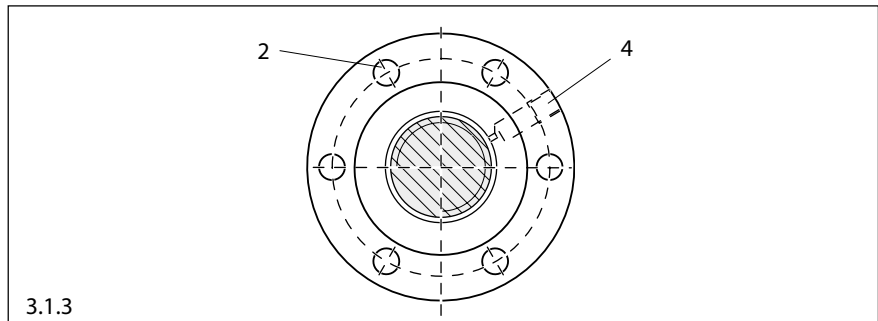
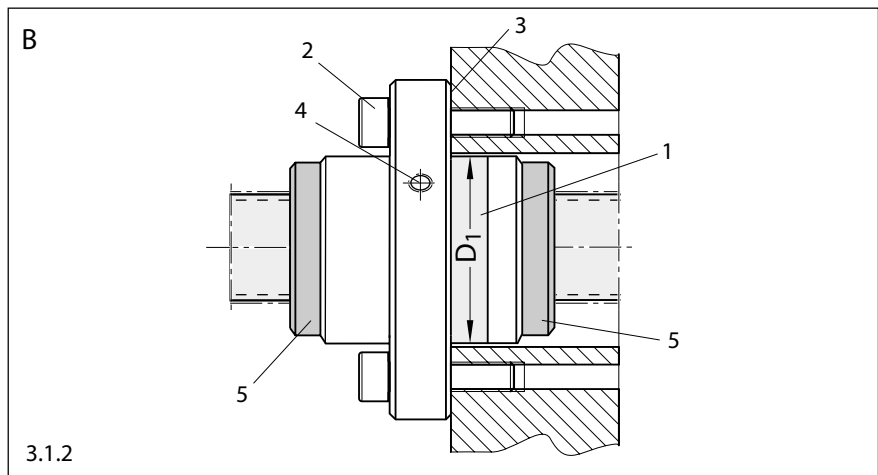
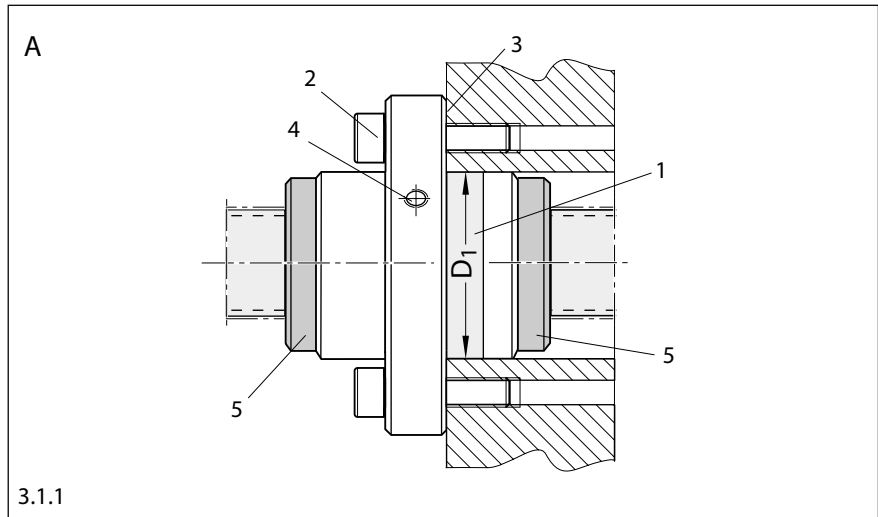
- Insert the nut into the receiving bore as straight as possible and avoiding impacts.
- Tighten the mounting screws manually.
- Check that the nut is fully inserted and properly aligned.
- Tighten the fixing screws with the tightening torque specified in the tables (3.2, 3.3).

#### 3.3 Mounting the nut without locating feature – B



- Insert the nut into the receiving bore, avoiding impacts.
- Tighten the mounting screws manually.
- Check the flange (3) alignment and proper contact.
- Tighten the fixing screws with the tightening torque specified in the tables (3.2, 3.3).

 For operating forces  $> 0.2 C$ , the screws connections must be recalculated!

If the adjoining structure is made of aluminum, the depth to which the screws are driven in should be at least 1.5 times the screw diameter.




#### Tightening torques (Nm) for strength classes to ISO 898

Material pair steel / steel				Material pair steel / aluminum			
	8.8	10.9	12.9		8.8	10.9	12.9
M6	9.5	13	16	M6	8.5	8.5	8.5
M8	23	32	39	M8	20	20	20
$(R_M \geq 370 \text{ N/mm}^2)$				$(R_M \geq 280 \text{ N/mm}^2)$			

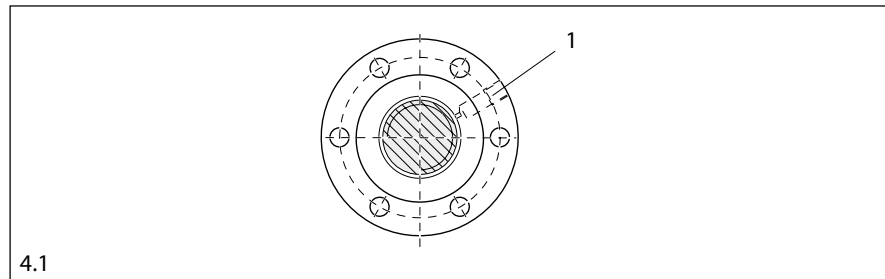
3.2, 3.3

## 4. Lubrication

### 4.1 In-service lubrication


 FSZ-E-S nuts are provided with basic lubrication in-factory. This serves to protect the nut system during mounting and start-up. The grease used allows in-service lubrication with either grease or oil.

For relubrication, use the lube hole in the flange (1).



### 4.2 Lubrication with grease

Use greases of consistency class NLGI 2 as specified in the table.

 Do not use greases containing solids (such as graphite or MoS<sub>2</sub>)!

- When the in-service lubrication interval according to table (4.2.1) has been reached, apply the quantity of lubricant as specified in table (4.2.2).

**In-service lubrication intervals for NLGI 2 greases**

d <sub>0</sub>	Revolutions	Travel (km) at lead P =		
		5	10	20
- 40	50	250	500	1000

d<sub>0</sub> = nominal diameter

4.2.1

Size	Grease relube quantity (g)
d <sub>0</sub> × P × D <sub>w</sub> -i	FSZ-E-S**
20 × 5R × 3 - 4	0.7
25 × 5R × 3 - 4	1.1
25 × 10R × 3 - 4	1.3
32 × 5R × 3.5 - 4	1.6
32 × 10R × 3.969 - 5	2.3
32 × 20R × 3.969 - 2	2.0
40 × 5R × 3.5 - 5	2.2
40 × 10R × 6 - 4	5.2
40 × 20R × 6 - 3	6.7

\*\* With precision rolled screw R

4.2.2

### 4.3 Lubricating with oil

Generally speaking, all commercially available mineral oils are suitable for lubricating anti-friction bearings. The required viscosity will depend on the speed, the temperature and the load (see DIN 51501, 51517, 51519 and GfT Worksheet 3).

In practice, oils from ISO VG 68 to ISO VG 460 are used. Oils of higher viscosity classes (e.g. ISO VG 460) are generally preferred, especially for slow turning screws. With the minimum quantities shown in the table opposite, the in-service lubrication interval will be max. 10 operating hours.

- When the in-service lubrication interval has been reached, apply the quantity as specified in the table (4.3).

**In-service lubrication quantities and intervals for oil lubrication**

d <sub>0</sub>	Initial oil lubrication	Oil relube	Revolutions	Travel (km) at lead P =		
	V <sub>e</sub> (ml)	V <sub>n</sub> (ml)/10h	U (Mio)*	5	10	20
20	0.600	0.060	1,0	5	-	-
25	0.600	0.060	1,0	5	10	-
32	0.600	0.060	1,0	5	10	20
40	2.000	0.400	1,0	5	10	20

4.3