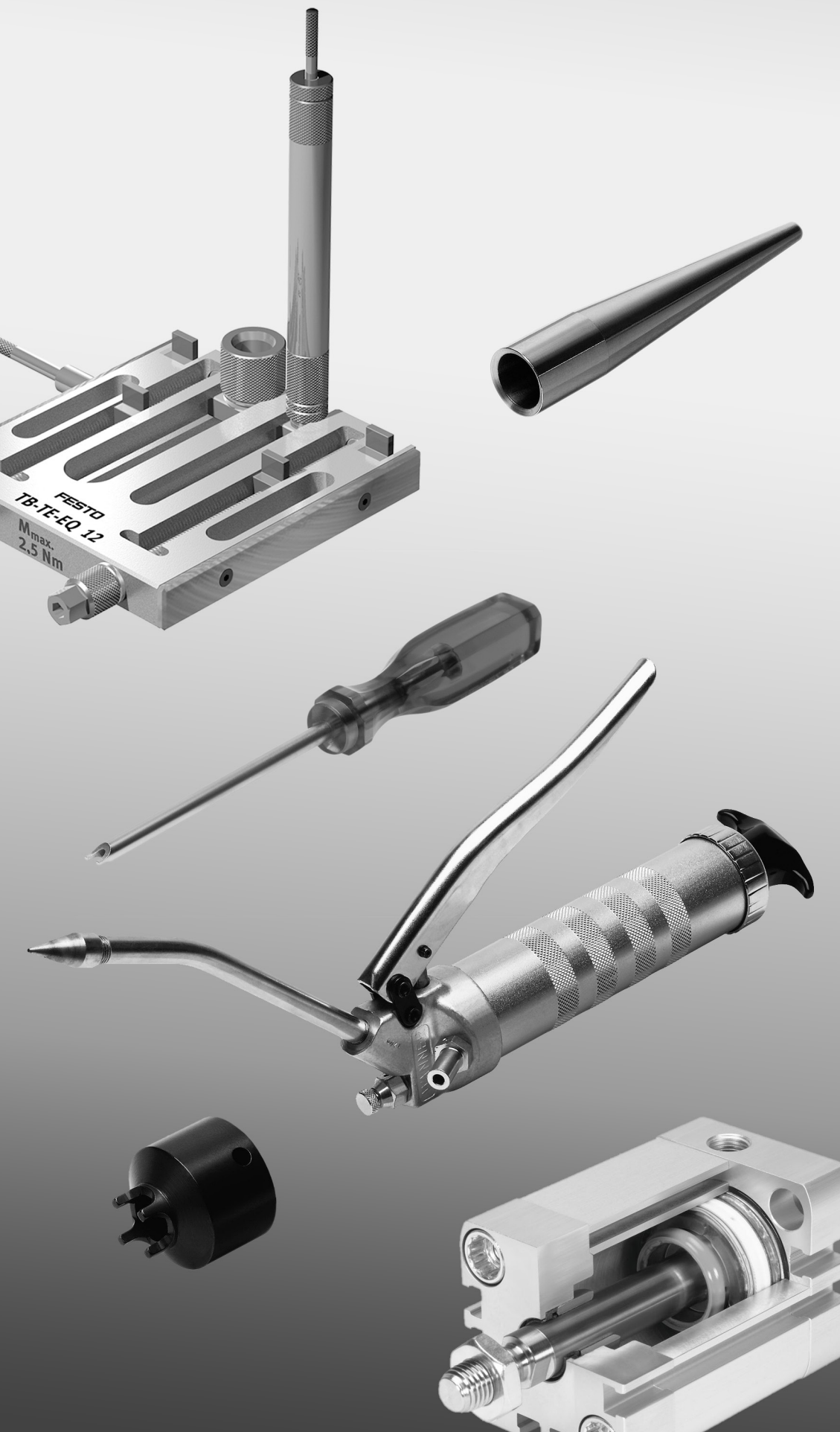
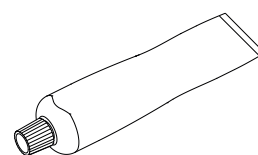


Tools and repair equipment



FESTO

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All technical data are subject to change according to technical updates.

Foreword

This information brochure describes the tools and repair accessories required to assemble, maintain and repair Festo products.

This information brochure has been prepared with care.

Festo SE & Co. KG does not, however, accept liability for any errors in this information brochure or their consequences. Likewise, no liability is accepted for direct or consequential damage resulting from improper use of the tools and repair accessories named in this information brochure.

More detailed information on this can be found in → [Chapter 18 on page 38](#).

To find out which tools and repair accessories to use for which product and for which assembly, maintenance and repair steps, please refer to the spare parts documentation, operating instructions and repair instructions for the product.

The relevant regulations on occupational safety, safety engineering, environmental protection and interference suppression as well as the stipulations contained in this information brochure must be observed when using the tools and repair accessories.

This information brochure is valid to the exclusion of any liability claims.

Table of contents

1	Important information	6
1.1	About this information brochure	6
1.2	Pictograms used in this information brochure	6
1.3	Text designations used in this information brochure	7
1.4	General safety information	7
2	Lubricating greases and grease gun	8
2.1	Lubricating greases	8
2.2	Grease gun	9
2.2.1	One-hand grease gun LUB-1	9
2.2.1.1	Lubricating grease ELKALUB VP 922	10
2.2.2	Accessories for one-hand grease gun LUB-1	10
2.2.2.1	Lubrication adapter LUB-1-KU	10
2.2.2.2	Lubrication adapter LUB-1-KE	10
2.2.2.3	Lubrication adapter LUB-1-TR-I	11
2.2.2.4	Lubrication adapter LUB-1-TR-L	11
2.2.2.5	Lubrication adapter LUB-1-TR-W	11
3	Screw locking agent	12
4	Special oils and oil guns	13
4.1	Special oils	13
4.1.1	Special oil OFSW-32	13
4.1.2	Special oil OFSB-1	13
4.2	Oil guns	14
4.2.1	Oil gun and cartridges for manual relubricating	14
4.2.1.1	Oil gun for manual relubrication with AZLO-H1-C-10 type cartridges	14
4.2.1.2	AZLO-H1-C-10 cartridge for AZTP-S-L oil gun	14
4.2.1.3	AZLG-H1-C-10 cartridge for AZTP-S-L oil gun	14
4.2.1.4	Dosing needle set AZTN-DS	15
4.2.1.5	Dosing needle set AZTN-DSG	15
5	Box spanners for slotted nut on twin-piston cylinder DPZ / DPZJ	16
5.1	Box spanner for slotted nuts DPZ-10-...	16
5.2	Box spanner for slotted nuts DPZ-16/20/25-...	16
5.3	Box spanner for slotted nuts DPZ-32-...	17
6	Mounting sleeve for solenoid valves	17
7	Mounting sleeve for piston rods on cylinder CRDSNU	18
8	Mounting sleeve and pressure piece for scraper ring on the CRDSNU	19
8.1	Mounting sleeve and pressure piece for scraper ring on the CRDSNU-12 / 16 / 20 / 25	19
8.2	Mounting sleeve and pressure piece for scraper ring on the CRDSNU-32 / 40 / 50 / 63 / 80 / 100	20
9	Mounting sleeve for piston rod with male thread on the cylinder DNC / DSBx / DFPI / CRDNG / CRHD / ADVU / AEVU	21
9.1	Mounting sleeve for piston rod with female thread on the cylinder DNC / DSBx / CRDNG / ADVU / AEVU	23
9.2	Mandrel for piston rod with female thread on the cylinder DNC / DSBx / CRDNG / ADVU / AEVU	23

10	Mounting sleeve and pressure piece for scraper ring on the DNC / DSBx / DFPI / DFPI-NB3P / CRDNG	24
10.1	Mounting sleeve and pressure piece for scraper ring on the DNC / DSBx / DFPI-NB3P / CRDNG	25
10.2	Mounting sleeve and pressure piece for scraper ring on the DFPI	27
11	Centring tool and tubular box spanner for mounting the cushioning bosses on cylinders of the type ADN-...-PPS and ADNGF-...-PPS	28
11.1	Centring tool for the cushioning bosses on cylinders of the type ADN-...-PPS and ADNGF-...-PPS	28
11.2	Tubular box spanner for dismounting and mounting the cushioning bosses on cylinders of the type ADN-...-PPS and ADNGF-...-PPS	29
12	Distance piece and distance plates for referencing the parallel kinematic system	30
12.1	Distance piece	30
12.2	Distance plate for parallel kinematic system EXPT-45 / 70	31
12.3	Distance plate for parallel kinematic system EXPT-95 / 120	32
13	Setting piece for referencing and determining the feed constant of the Linear gantry EXCT	32
13.1	Setting piece	32
14	Setting pieces for setting the toothed belt pretension and software end position of the planar surface gantry EXCH	33
14.1	Set with setting pieces	33
15	Devices for checking the toothed belt pretension	33
15.1	Test device V2 / TB-TE-EQ12	33
15.2	Accessories for devices	35
15.2.1	Acoustic frequency meter TB-TE-EQ13	35
15.2.2	Spare O-ring 10×1	36
16	Clamping elements	36
17	Cleaning and greasing	37
17.1	Cleaning	37
17.2	Greasing	37
17.2.1	Extremely thin grease film	37
17.2.2	Thin grease film	37
17.2.3	Grease reservoir	37
17.2.4	Assembly greasing	37
18	Liability	38

1 Important information

1.1 About this information brochure

This document contains important information about the correct way of using the tools and repair accessories required to assemble, operate, maintain and repair Festo products. Before using the respective tools and repair accessories you should read the relevant section in this information brochure.

To find out which tools and repair accessories to use for which product and for which assembly, maintenance and repair steps, please refer to the spare parts documentation and operating instructions for the product and, if available, the repair instructions. There you will also find precise indications for e.g. relubrication intervals, greasing instructions, application, etc.

1.2 Pictograms used in this information brochure

Danger categories

The following symbols identify text passages which draw attention to specific hazards.



Warning

Marking special information

The following symbols identify text passages which contain special information.



Note



Information



Environment



Cleaning



Extremely thin grease film



Thin grease film



Grease reservoir

1.3 Text designations used in this information brochure

- Activities that can be carried out in any order.
- 1. Activities which should be carried out in the specified order.
- General lists.
- ➔ Reference to further information.

Underlined, blue text indicates a cross-reference or hyperlink that you can click on in the PDF.

1.4 General safety information



Warning

The tools and repair accessories must only be used by authorised and trained persons in accordance with the specifications in this information brochure and the respective product documentation such as spare parts documentation, operating instructions and repair instructions.

Use of the tools and repair accessories by unauthorised and untrained persons is dangerous and therefore not permitted.

The current safety data sheets for the lubricating greases, screw locking agents and special oils can be viewed at ➔ www.festo.com/msds.



When using lubricating grease, oil, screw locking agent, cleaning agents and other chemicals, the locally applicable environmental protection regulations must be followed.

All environmental information about the lubricating greases, screw locking agents and special oils can be found in the current safety data sheets (➔ www.festo.com/msds).

2 Lubricating greases and grease gun

2.1 Lubricating greases



Warning

The possible dangers of the product (in this case lubricating greases) to people and how to protect against these dangers as well as information on first-aid measures can be found in the current safety data sheets for the lubricating greases.

The safety data sheets in accordance with Regulation (EC) No. 1907/2006 can be viewed at
 → www.festo.com/msds.



When using lubricating greases, the locally applicable environmental protection regulations must be followed.

All environmental information about lubricating greases can be found in the current safety data sheets.

The safety data sheets in accordance with Regulation (EC) No. 1907/2006 can be viewed at
 → www.festo.com/msds.

Lubricating greases with different characteristics are used for assembly, repair and maintenance.



To find out which lubricating grease to use for which product and for the assembly, maintenance and repair steps in question, please refer to the spare parts documentation and operating instructions for the product and, if available, the repair instructions. There you will also find precise indications for e.g. relubrication intervals, application, etc.

The lubrication instructions for pneumatic cylinders can be found in → [Chapter 17 on page 37](#).

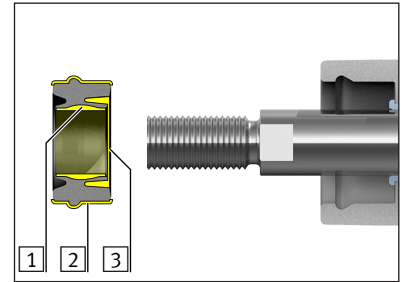
Type	Designation	Characteristic	Quantity	Order No.
Assembly grease for pneumatic and electromechanical drives (standard)				
Festo special grease	LUB-KC1	Silicone-free	20 ml	684474
Assembly grease for pneumatic drives and grippers				
Festo special grease	LUB-KB1	Silicone-free	20 ml	665354
Assembly grease for pneumatic drives				
Festo special grease	LUB-KB2	Silicone-free	20 ml	397446
Assembly grease for variant S6 (heat resistant seals to 120 °C)				
Festo special grease	LUB-MS6	Silicone-free	20 ml	329555
Assembly grease for drives with variant S10 (slow speed), S11 (low friction), S61 (heat resistant seals to 150 °C)				
Festo special grease	LUB-KL5	Silicone-free	10 ml	397399
Assembly grease (suitable for use with foodstuffs to USDA H1)				
Festo special grease	LUB-E1	Silicone-free	20 ml	394819
Assembly grease (suitable for use with foodstuffs to NSF H1)				
Festo special grease	ELKALUB VP 922	Silicone-free	250 g	8117071
Assembly grease for valves				
Festo special grease	LUB-KU6	Contains silicone	8 g	255267
Assembly grease for grippers				
Festo special grease	LUB-M1	Silicone-free	10 ml	397394
Assembly grease for TT variant (low temperature)				
Festo special grease	LUB-AL2	Silicone-free	20 ml	711822

Range of applications:

Greasing components during assembly, repair and maintenance.



The different components and seals require different levels of greasing depending on a number of factors. Information on this can be found in the spare parts documentation, operating instructions and, if available, repair instructions for the product (→ [Chapter 17.2 on page 37](#)).



Sample application

Sample application:

Greasing a new piston rod seal before assembly:

- 1 Grease reservoir¹⁾ for piston rod: Fill 2/3 with grease
- 2 External surface for bearing cap: Apply a thin film²⁾
- 3 Grease reservoir¹⁾ for bearing: Fill 2/3 with grease

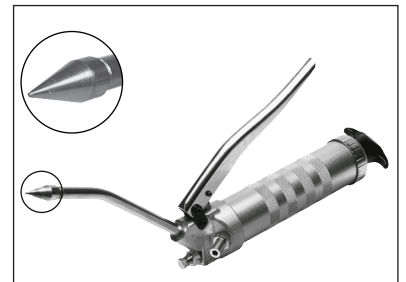
¹⁾ → [Chapter 17.2.3 on page 37](#) / ²⁾ → [Chapter 17.2.2 on page 37](#)

2.2 Grease gun

2.2.1 One-hand grease gun LUB-1

Sturdy and ergonomic design for manual lubrication. Used for lubricating greases and mineral oils.

Grease and mineral oil are **not** included in the scope of delivery.



Technical specifications	Values
Capacity	120 cm ³
Delivery rate	0.5 cm ³ /stroke
Operating pressure	400 bar
Empty weight	660 g
Length without nozzle pipe	230 mm
Container diameter × length	40×140 mm
Nozzle connecting thread	M10×1
Nozzle pipe connecting thread	G1/8"

Handling:

- Filling is done manually or using the filler neck with a filling device.
- Venting is done through the air vent.

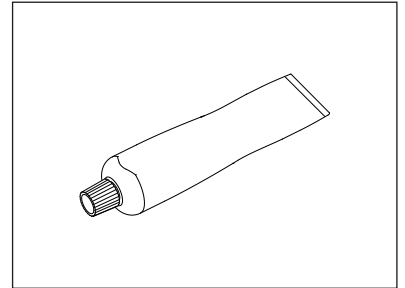
Type	Quantity	Order No.
One-hand high-pressure grease gun LUB-1 with pinpoint nozzle LUB-1-TR	1 piece	647958

Range of applications:

The pinpoint nozzle LUB-1-TR is suitable for **funnel-shaped lubrication nipples to DIN 3405, miniature funnel-shaped lubrication nipples** and also **lubricating holes**, e.g. for lubricating recirculating ball bearing guides and lead screws.

2.2.1.1 Lubricating grease ELKALUB VP 922

Lubricating grease ELKALUB VP 922 for one-hand grease gun LUB-1 (→ [Chapter 2.2.1 on page 9](#)).



Type	Designation	Quantity	Order No.
Festo special grease	ELKALUB VP 922	250 g	8117071

Range of applications:

ELKALUB VP 922 lubricating grease is used, among other things, in electric and pneumatic cylinders, as well as in linear drives.

2.2.2 Accessories for one-hand grease gun LUB-1

2.2.2.1 Lubrication adapter LUB-1-KU

The lubrication adapter LUB-1-KU (female thread M10×1) can be fitted on the one-hand grease gun LUB-1 instead of the pinpoint nozzle LUB-1-TR (→ [Chapter 2.2.1 on page 9](#)).



Type	Quantity	Order No.
Lubrication adapter LUB-1-KU for the electric slide EGSK-20/-26/-33, EGC-HD-125	1 piece	744166

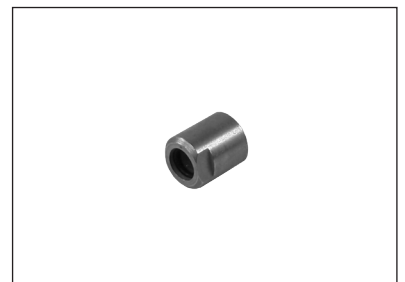
Range of applications:

The lubrication adapter LUB-1-KU is suitable for **ball-type lubricating nipples similar to those specified in DIN 3402**.

Alternatively, the LUB-1-KU lubrication adapter is also suitable for **funnel-type grease nipples to DIN 3405** with a **maximum outer diameter of 4 mm**. The **nozzle tube** is pushed **completely over the grease nipple**.

2.2.2.2 Lubrication adapter LUB-1-KE

The lubrication adapter LUB-1-KE (female thread M10×1) can be fitted on the one-hand grease gun LUB-1 instead of the pinpoint nozzle LUB-1-TR (→ [Chapter 2.2.1 on page 9](#)).



Type	Quantity	Order No.
Lubrication adapter LUB-1-KE for the electric slide EGSK-46	1 piece	744167

Range of applications:

The lubrication adapter LUB-1-KE is suitable for **ball-type lubricating nipples similar to those specified in DIN 71412**.

2.2.2.3 Lubrication adapter LUB-1-TR-I

The nozzle pipe LUB-1-TR-I can be screwed onto the one-hand grease gun LUB-1 instead of the pinpoint nozzle LUB-1-TR and is ideal for lubricating components in locations that are very difficult to access (→ [Chapter 2.2.1 on page 9](#)).



Type	Quantity	Order No.
Lubrication adapter LUB-1-TR-I (nozzle pipe Ø 6×200 axial)	1 piece	647959

Range of applications:

The lubrication adapter LUB-1-TR-I is ideal for **lubricating components in locations that are very difficult to access**.

2.2.2.4 Lubrication adapter LUB-1-TR-L

The nozzle pipe LUB-1-TR-L can be screwed onto the one-hand grease gun LUB-1 instead of the pinpoint nozzle LUB-1-TR (→ [Chapter 2.2.1 on page 9](#)).



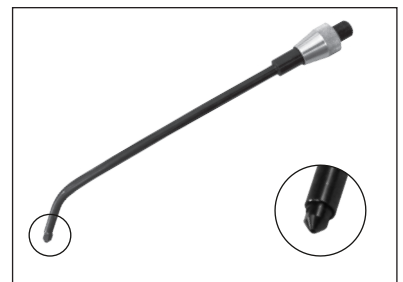
Type	Quantity	Order No.
Lubrication adapter LUB-1-TR-L (nozzle pipe Ø 6×200 lateral)	1 piece	647960

Range of applications:

The lubrication adapter LUB-1-TR-L is ideal for **lubricating components in locations that are very difficult to access**.

2.2.2.5 Lubrication adapter LUB-1-TR-W

The nozzle pipe LUB-1-TR-W can be screwed onto the one-hand grease gun LUB-1 instead of the pinpoint nozzle LUB-1-TR (→ [Chapter 2.2.1 on page 9](#)).



Type	Quantity	Order No.
Lubrication adapter LUB-1-TR-W (nozzle pipe Ø 6×200, 45° angled)	1 piece	8073388

Range of applications:

The lubrication adapter LUB-1-TR-W is ideal for **lubricating components in locations that are very difficult to access**.

3 Screw locking agent



Warning

The possible dangers of the product (in this case screw locking agent) to people and how to protect against these dangers as well as information on first-aid measures can be found in the current safety data sheets for the screw locking agents.

The safety data sheets in accordance with Regulation (EC) No. 1907/2006 can be viewed at
 → www.festo.com/msds.



When using the screw locking agents, the locally applicable environmental protection regulations must be followed. All environmental information about the screw locking agents can be found in the current safety data sheets.

The safety data sheets in accordance with Regulation (EC) No. 1907/2006 can be viewed at
 → www.festo.com/msds.

Cyberbond screw locking agents are single-component adhesives in liquid and semi-solid form. They cure to a stable duroplast at room temperature and can be used to join steel, aluminium, brass and most other metals.

Cyberbond screw locking agents are suitable for a variety of applications.



To find out which screw locking agent to use for which product and for which assembly, maintenance and repair work, please refer to the spare parts documentation and operating instructions for the product and, if available, the repair instructions.

Type	Designation	Characteristic	Quantity	Order No.
Screw locking agent	Cyberbond TM11 TB1ML	Low strength	1 ml	8181255
Screw locking agent	Cyberbond TM44 TB1ML	Medium strength	1 ml	8181256
Screw locking agent	Cyberbond TM44 TB3ML	Medium strength	3 ml	8181257
Screw locking agent	Cyberbond TITAN 7680 TB3ML	High strength	3 ml	8181258

Range of applications:

Securing screws and threaded connections

The Cyberbond screw locking agent stops screws and threaded connections loosening as a result of vibration and shock loads.

4 Special oils and oil guns

4.1 Special oils



When using and disposing of the special oils, the locally applicable environmental protection regulations must be followed.

All environmental information about the special oils can be found in the current safety data sheets.

The safety data sheets in accordance with Regulation (EC) No. 1907/2006 can be viewed at
 → www.festo.com/msds.



To find out which special oil to use for which product and for which application, please refer to the spare parts documentation for the product and the operating instructions.

4.1.1 Special oil OFSW-32

Special oil for use in Festo lubricators.



Type	Designation	Quantity	Order No.
Festo special oil	OFSW-32	1000 ml	152811

Range of applications:

Lubricating compressed air using the

- lubricators LOE from the D series and
- lubricators MS-LOE from the MS series.



Lubricator MS9-LOE, MS series

4.1.2 Special oil OFSB-1

Special oil for hydraulic cushioning cylinders, shock absorbers and rotary indexing tables.



Type	Designation	Quantity	Order No.
Festo special oil	OFSB-1	1000 ml	207873

4.2 Oil guns

4.2.1 Oil gun and cartridges for manual relubricating

4.2.1.1 Oil gun for manual relubrication with AZLO-H1-C-10 type cartridges

AZTP-S-L oil gun

Cartridge and dosing needle are **not** included in the scope of delivery



Type	Quantity	Order No.
AZTP-S-L oil gun	1 piece	8041022

Range of applications:

The AZTP-S-L oil gun is suitable for electric and pneumatic axes, linear drives and mini slides.

4.2.1.2 AZLO-H1-C-10 cartridge for AZTP-S-L oil gun

AZLO-H1-C-10 cartridge contains 10 ml Elkalub VP 916 (oil for the food sector).



Type	Quantity	Order No.
AZLO-H1-C-10 cartridge	1 piece	8086576

Range of applications:+

- ELGA-TB-RF-70 / 80 / 120
- ELFA-RF-70 / 80

4.2.1.3 AZLG-H1-C-10 cartridge for AZTP-S-L oil gun

AZLG-H1-C-10 cartridge contains 10 ml Elkalub VP 922 (grease).



Type	Quantity	Order No.
AZLG-H1-C-10 cartridge	1 piece	8073523

Range of applications:

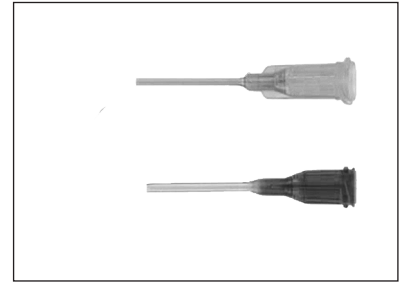
- **DLGF-KF-20 / 25**
- **EGSC-BS-KF-25 / 32 / 45 / 60**

4.2.1.4 Dosing needle set AZTN-DS

Dosing needle set AZTN-DS contains:

- 1× dosing needle size 18, straight (green)
Outside diameter: 1.27 mm
for
 - **ELGA-RF-70**
 - **ELFA-RF-70**

- 1× dosing needle size 15, straight (amber-coloured)
Outside diameter: 1,83 mm
for
 - **ELGA-RF-80 / 120**
 - **ELFA-RF-80**



Type	Quantity	Order No.
Dosing needle set AZTN-DS	1 Set	8086577

4.2.1.5 Dosing needle set AZTN-DSG

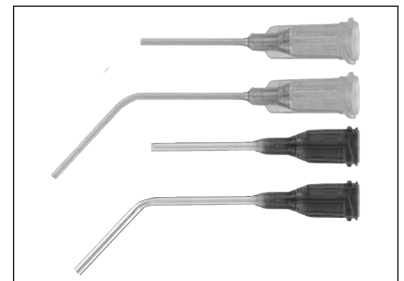
Dosing needle set AZTN-DSG contains

- 1× dosing needle size 18, straight (green)
Outside diameter: 1.27 mm
for
 - **EGSC-BS-KF-32 / -45**

- 1× dosing needle size 18, bent 45° (green)
Outside diameter: 1.27 mm
for
 - **DLGF-20**

- 1× dosing needle size 20, straight (pink)
Outside diameter: 0.91 mm
for
 - **EGSC-BS-KF-25**

- 1× dosing needle size 14, bent 45° (olive)
Outside diameter: 1.83 mm
for
 - **DLGF-25**



Type	Quantity	Order No.
Dosing needle set AZTN-DSG	1 set	8075522

5 Box spanners for slotted nut on twin-piston cylinder DPZ / DPZJ

Box spanners for loosening and tightening slotted nuts.

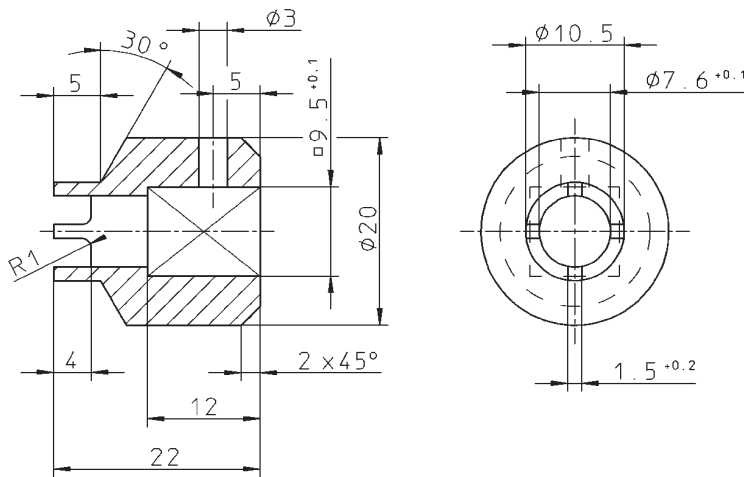


The box spanners for the slotted nuts must be produced by the customer.
The exact dimensions can be found in the schematic diagrams below.



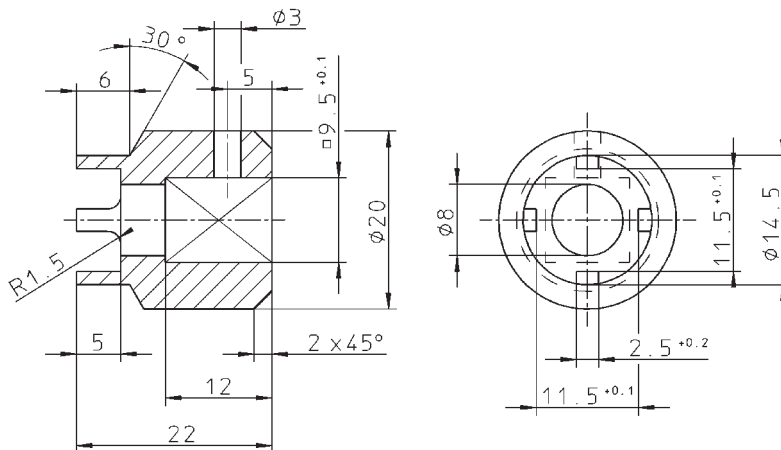
5.1 Box spanner for slotted nuts DPZ-10-...

Schematic diagram:



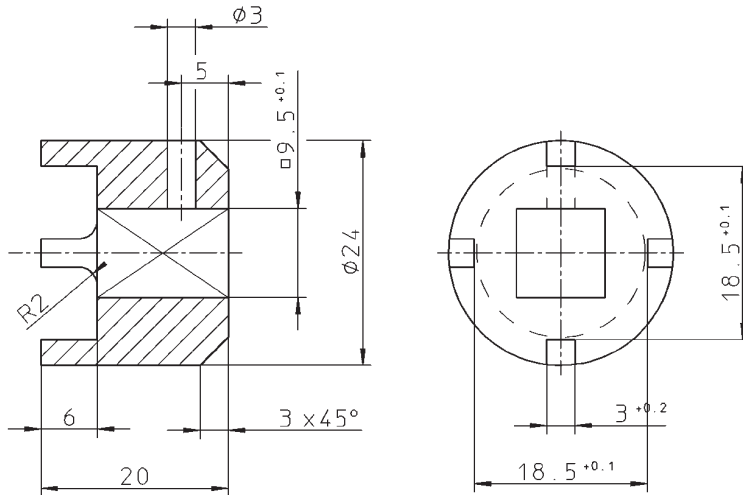
5.2 Box spanner for slotted nuts DPZ-16/20/25-...

Schematic diagram:



5.3 Box spanner for slotted nuts DPZ-32-...

Schematic diagram:

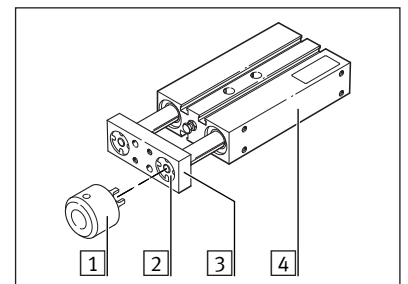


Range of applications:

Twin-piston cylinder DPZ/DPZJ

The box spanner is required to fasten the yoke/end plate [2] to the piston rod [3] using the slotted nut [1].

- [1] Box spanner for slotted nuts
- [2] Slotted nut
- [3] Yoke/end plate
- [4] Twin-piston cylinder DPZ/DPZJ



Sample application

6 Mounting sleeve for solenoid valves

Mounting sleeve for fitting sealing rings.



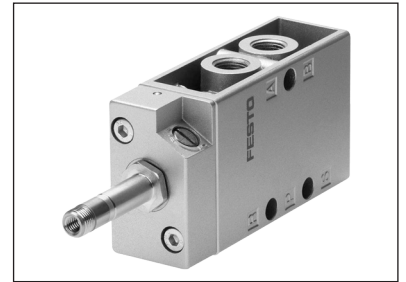
Type	Area of application	Quantity	Order No.
1/8" mounting sleeve	Solenoid valve VL-5-1/8 and MFH-5-1/8	1 piece	228389
1/4" mounting sleeve	Solenoid valve VL-5-1/4 and MFH-5-1/4	1 piece	229363

Range of applications:

Solenoid valves of the type:

- VL-5-1/8
- VL-5-1/4
- MFH-5-1/8
- MFH-5-1/4

The mounting sleeve is used to fit sealing rings on the hand lever valve/stem on the above mentioned solenoid valves.



Solenoid valve MFH

7 Mounting sleeve for piston rods on cylinder CRDSNU

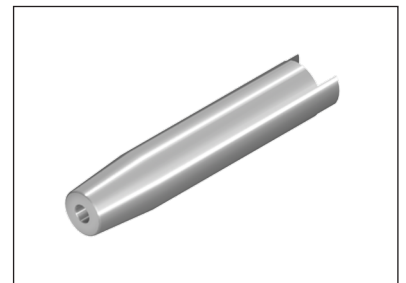
Mounting sleeve for piston rods for protecting the piston rod seal in the sealing seat during repairs.



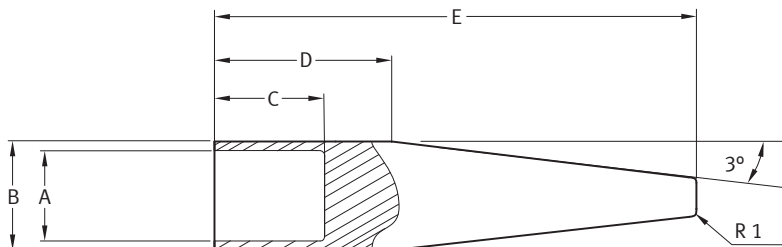
The mounting sleeve for piston rods must be produced by the customer.

The exact dimensions can be found in the schematic diagram below.

The dimensions “C”, “D” and “E” (→ schematic diagram) must be adjusted accordingly when using an **extended piston rod thread** or a piston rod with **female thread**.



Schematic diagram:



A (= piston rod diameter)	B	C	D	E
6	Ø 6.6	26	27	55
8	Ø 8.6	23.5	25	65
10	Ø 10.6	27	28	75
12	Ø 12.6	34	35	85
16	Ø 16.6	35	40	90
20	Ø 20.6	45	50	100
25	Ø 25.6	55	60	100

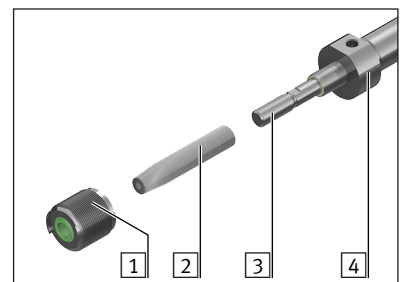
All dimensions in millimetres [mm]

Range of applications:

Pushing the sealing seat onto the piston rod

The appropriate mounting sleeve for piston rods [2] protects the new piston rod seal from damage caused by the piston rod thread [3] when pushing the piston rod through the sealing seat [1].

- [1] Sealing seat
- [2] Mounting sleeve for piston rods
- [3] Piston rod thread
- [4] Cylinder



Sample application



The exact procedure for exchanging the piston rod seal in the sealing seat of cylinders with piston rod can be found in the respective repair instructions.

8 Mounting sleeve and pressure piece for scraper ring on the CRDSNU

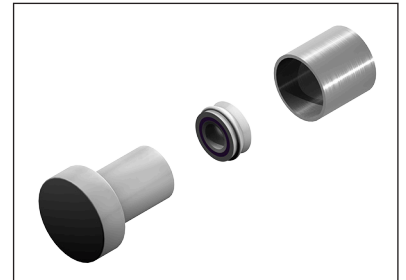
The mounting sleeve and matching pressure piece prevent damage to the scraper ring when inserting it into the sealing seat of the round cylinder CRDSNU.

A sample application of these tools can be found at the end of [Chapter 8.2 on page 20](#).



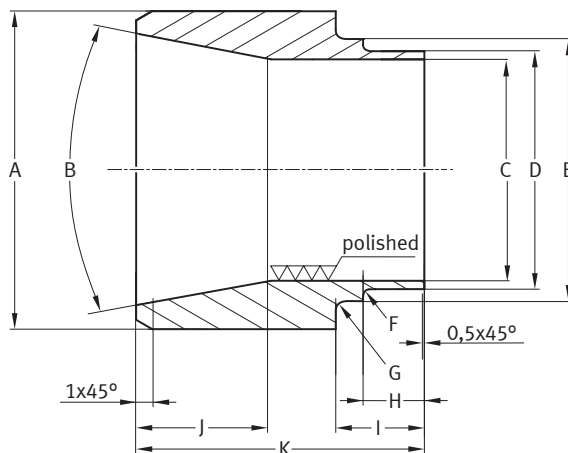
The mounting sleeve and matching pressure piece for inserting the scraper ring into the sealing seat of the round cylinder CRDSNU must be produced by the customer.

The exact dimensions can be found in the schematic diagrams below.



8.1 Mounting sleeve and pressure piece for scraper ring on the CRDSNU-12 / 16 / 20 / 25

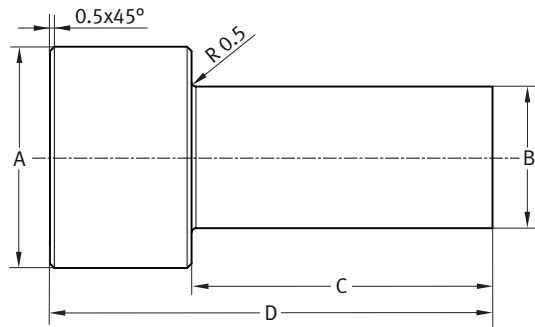
Schematic diagram:



Round cylinder	A	B	C	D	E	F	G	H	I	J	K
CRDSNU-12	Ø 18	12°	Ø 11	Ø 11.5	Ø 14	R 0.4	–	8.2	9.6	6	22.6
CRDSNU-16	Ø 18	12°	Ø 11	Ø 11.5	Ø 14	R 0.4	–	8.2	9.6	6	22.6
CRDSNU-20	Ø 24	12°	Ø 14.2	Ø 16.2	Ø 17.5	R 0.4	R 1	9	12	8	24
CRDSNU-25	Ø 24	12°	Ø 16	Ø 16.4	Ø 17.5	–	R 1	10.3	13.3	8	26

All dimensions in millimetres [mm] unless otherwise specified

Schematic diagram:

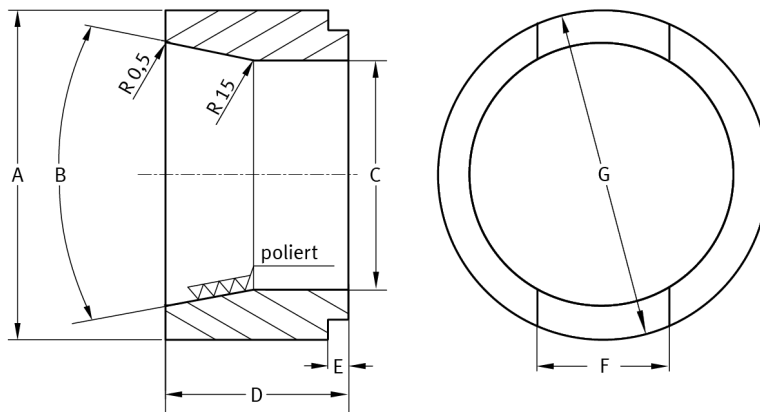


Round cylinder	A	B	C	D
CRDSNU-12	∅ 30	∅ 10.9	40	60
CRDSNU-16	∅ 30	∅ 10.9	40	60
CRDSNU-20	∅ 30	∅ 14.1	40	60
CRDSNU-25	∅ 30	∅ 15.9	40	60

All dimensions in millimetres [mm]

8.2 Mounting sleeve and pressure piece for scraper ring on the CRDSNU-32 / 40 / 50 / 63 / 80 / 100

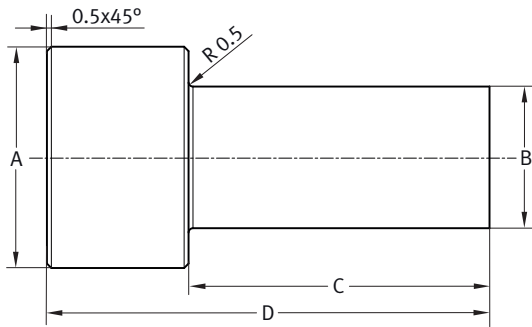
Schematic diagram:



Round cylinder	A	B	C	D	E	F	G
CRDSNU-32	∅ 29,5	30°	∅ 22	16	3,1	13,1	∅ 30
CRDSNU-40	∅ 35,5	30°	∅ 26	16,5	3,6	18,1	∅ 36
CRDSNU-50	∅ 42,5	30°	∅ 30	16,5	3,9	22,1	∅ 43
CRDSNU-63	∅ 42,5	30°	∅ 30	16,5	3,9	22,1	∅ 43
CRDSNU-80	∅ 47,5	30°	∅ 35	16,5	4,8	22,1	∅ 48
CRDSNU-100	∅ 47,5	30°	∅ 35	16,5	4,8	22,1	∅ 48

All dimensions in millimetres [mm] unless otherwise specified

Schematic diagram:



Round cylinder	A	B	C	D
CRDSNU-32	∅ 40	∅ 21.9	40	60
CRDSNU-40	∅ 40	∅ 25.9	40	60
CRDSNU-50	∅ 40	∅ 29.9	40	60
CRDSNU-63	∅ 40	∅ 29.9	40	60
CRDSNU-80	∅ 50	∅ 34,9	40	60
CRDSNU-100	∅ 50	∅ 34,9	40	60

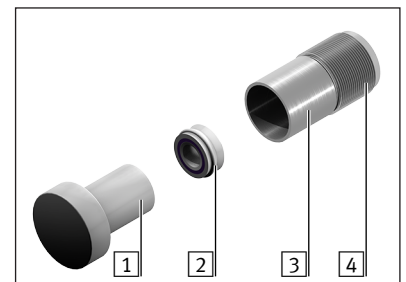
All dimensions in millimetres [mm]

Range of applications:

Inserting the scraper ring into the sealing seat of the round cylinder CRDSNU

Place the appropriate mounting sleeve [3] on the sealing seat [4] to insert the scraper ring [2] without damaging it into the sealing seat [4] using the matching pressure piece [1].

- [1] Pressure piece for scraper ring
- [2] Scraper ring
- [3] Mounting sleeve for scraper ring
- [4] Sealing seat CRDSNU



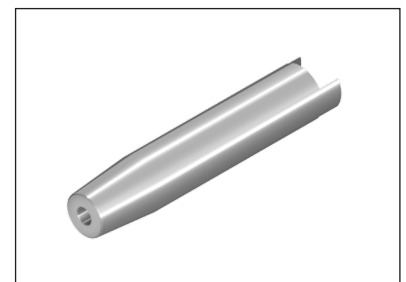
Sample application

9 Mounting sleeve for piston rod with male thread on the cylinder DNC / DSBx / DFPI / CRDNG / CRHD / ADVU / AEUU

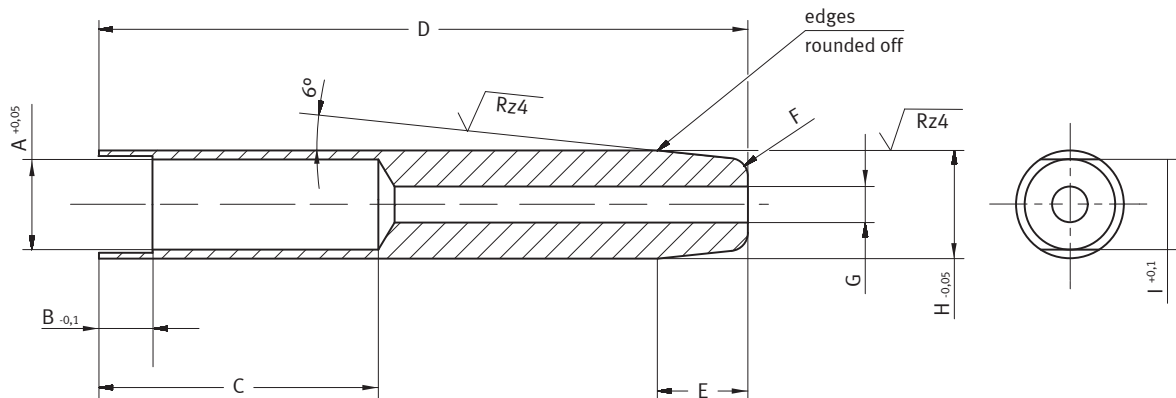
Assembly tools for piston rods **with male thread** for protecting the piston rod seal and the bearing in the bearing cap or sealing seat during repairs.



The assembly tools for piston rods must be produced by the customer.
 The exact dimensions can be found in the schematic diagrams below.
 The dimensions “C” and “D” (→ schematic diagram) must be adjusted accordingly when using an **extended piston rod thread**.



Schematic diagram:



DNC / DSBx / DFPI / CRDNG / CRHD

Piston rod diameter	A	B	C	D	E	F	G	H	I
12	∅ 10	6	31	72	10	R2	∅ 4	∅ 12	10.1
16	∅ 12	6.5	32	84	15	R2	∅ 4	∅ 16	13.1
20	∅ 16	8	42	102	20	R2	∅ 4	∅ 20	17.1
25	∅ 20	9	52	117	25	R4	∅ 4	∅ 25	22.1
32	∅ 27	13	72	139	27	R4	∅ 4	∅ 32	27.1
40	∅ 36	17	94	165	31	R4	∅ 4	∅ 40	36.1
50	∅ 42	17	106	183	37	R4	∅ 4	∅ 50	46.1
63	∅ 48	17	118	207	49	R4	∅ 4	∅ 63	55.1

All dimensions in millimetres [mm]

ADVU / AEVU

Piston rod diameter	A	B	C	D	E	F	G	H	I
12	∅ 10	4.75	30	53	20	R1	∅ 4	∅ 12	10.1
16	∅ 12	6.14	32	55	20	R1	∅ 4	∅ 16	13.1
16	∅ 12	6.14	32	55	20	R1	∅ 4	∅ 16	13.1
20	∅ 16	7.14	42	70	25	R2	∅ 4	∅ 20	17.1
25	∅ 20	9	55	95	34	R2	∅ 8	∅ 25	22.1
32	∅ 27	13.2	60	97	34	R2	∅ 8	∅ 32	27.1

All dimensions in millimetres [mm]

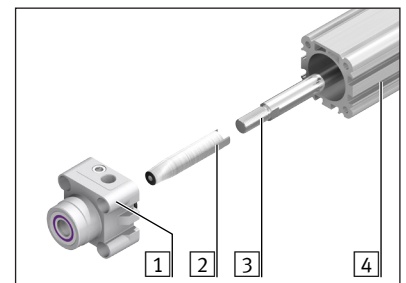
Range of applications:

Pushing the bearing cap onto the piston rod

– Piston rod with male thread for cylinder DNC / DSBx / DFPI / CRDNG / ADVU / AEVU)

The appropriate mounting sleeve for piston rods [2] protects the bearing and the new piston rod seal from damage caused by the piston rod thread [3] when pushing the piston rod through the bearing cap [1].

- [1] Bearing cap
- [2] Mounting sleeve for piston rods
- [3] Piston rod thread
- [4] Cylinder barrel



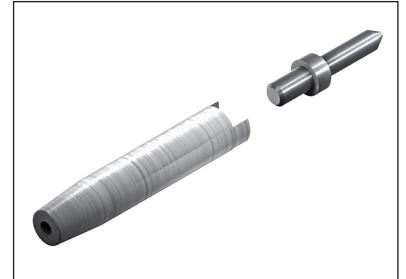
Sample application

9.1 Mounting sleeve for piston rod with female thread on the cylinder DNC / DSBx / CRDNG / ADVU / AEVU

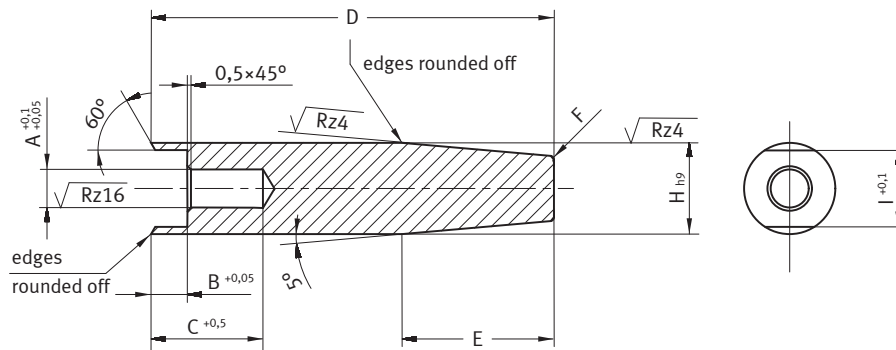
Assembly tools for piston rods **with female thread** for protecting the piston rod seal and the bearing in the bearing cap or sealing seat during repairs.



The assembly tools for piston rods must be produced by the customer.
The exact dimensions can be found in the schematic diagrams below.



Schematic diagram:

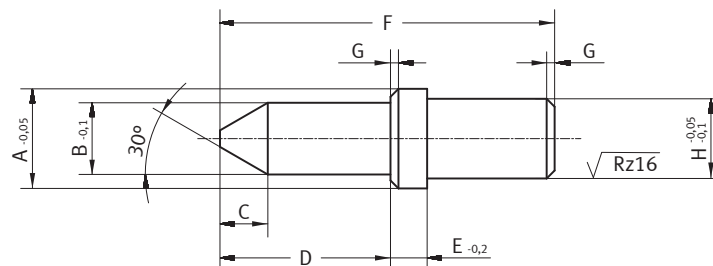


Piston rod diameter	A	B	C	D	E	F	H	I
12	∅ 5	4.75	14.75	54.6	20	R0.5	∅ 12	10.1
16	∅ 5	6.14	10	55	20	R1	∅ 16	13.1
20	∅ 6	7.14	10	66	25	R2	∅ 20	17.1
25	∅ 8	9	55	90	34	R2	∅ 25	22.1
32	∅ 8	13.2	25.2	95	23	R2	∅ 32	27.1

All dimensions in millimetres [mm]

9.2 Mandrel for piston rod with female thread on the cylinder DNC / DSBx / CRDNG / ADVU / AEVU

Schematic diagram:



Piston rod diameter	A	B	C	D	E	F	G	H
12	Ø 6.35	Ø 4.5	3	9.7	2.3	20	0.5 ×45°	Ø 5
16	Ø 8.35	Ø 6.2	4	12.9	3.1	24	0.5 ×45°	Ø 5
20	Ø 10.45	Ø 8	5	17	4.4	29.5	0.5 ×45°	Ø 6
25	Ø 12.95	Ø 9.8	5	19	5.9	36	1 ×45°	Ø 8
32	Ø 16.95	Ø 13.9	10	23.1	6.9	40	1 ×45°	Ø 8

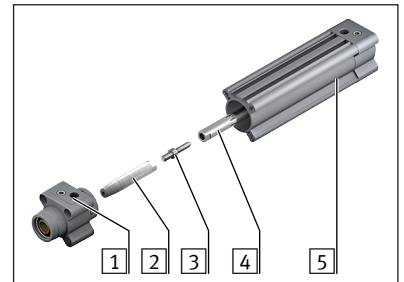
All dimensions in millimetres [mm]

Range of applications:

Pushing the bearing cap onto the piston rod with female thread for cylinder DNC / DSBx / CRDNG / ADVU / AEVU

The appropriate mounting sleeve for piston rods [2] and a mandrel [3] protects the bearing and the new piston rod seal from damage caused by the piston rod [4] when pushing the piston rod with female thread [4] through the bearing cap [1].

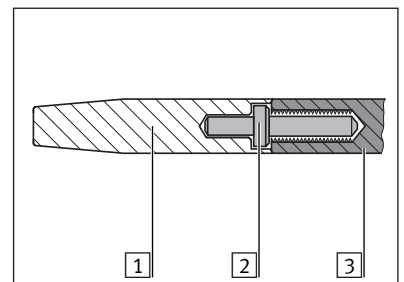
- [1] Bearing cap
- [2] Mounting sleeve for piston rods
- [3] Mandrel
- [4] Piston rod with female thread
- [5] Cylinder barrel



Sample application

A mandrel [2] is additionally inserted into the female thread of the piston rod for piston rods with female thread [3]. The mounting sleeve for piston rods [1] is placed on this mandrel [2].

- [1] Mounting sleeve for piston rods
- [2] Mandrel
- [3] Piston rod with female thread



10

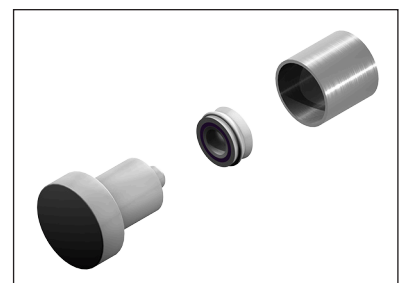
Mounting sleeve and pressure piece for scraper ring on the DNC / DSBx / DFPI / DFPI-NB3P / CRDNG

The mounting sleeve and matching pressure piece prevent damage to the scraper ring when inserting it into the bearing cap.

Sample applications of these tools can be found at the end of [Chapter 10.1 on page 25](#) and at the end of [Chapter 10.2 on page 27](#).

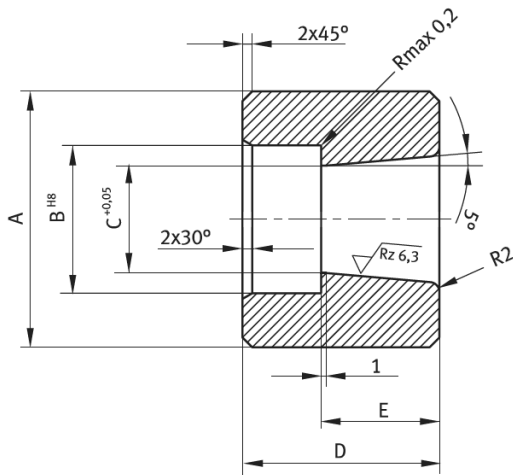


The mounting sleeve and matching pressure piece for inserting the scraper ring into the bearing cap must be produced by the customer. The exact dimensions can be found in the schematic diagrams below.



10.1 Mounting sleeve and pressure piece for scraper ring on the DNC / DSBx / DFPI-NB3P / CRDNG

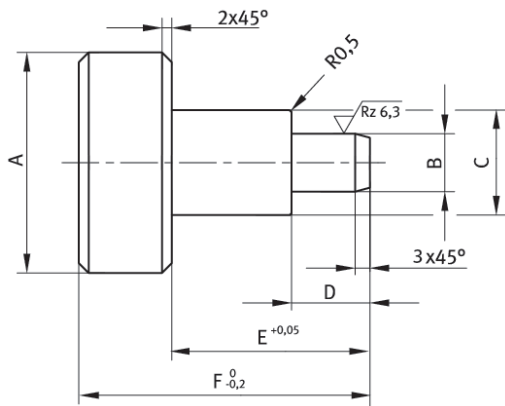
Schematic diagram:



Piston diameter	A	B	C	D	E
32	Ø 52	Ø 30	Ø 21	40	24
40	Ø 52	Ø 35	Ø 25	42	24
50	Ø 53	Ø 40	Ø 29	50	24
63	Ø 53	Ø 45	Ø 29	50	24
80	Ø 53	Ø 45	Ø 34	57	24
100	Ø 61	Ø 55.5	Ø 34	61	24
125	Ø 66	Ø 61.5	Ø 41	68	24
160	Ø 71	Ø 65.5	Ø 49.1	84	24
200	Ø 81	Ø 75.5	Ø 49.1	89	24
250	Ø 96	Ø 90.5	Ø 59.2	103	24
320	Ø 116	Ø 110.5	Ø 74.2	113	24

All dimensions in millimetres [mm]

Schematic diagram:

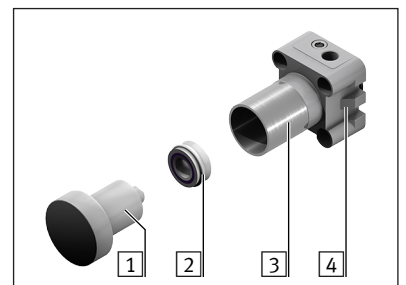


Piston diameter	A	B	C	D	E	F
32	∅ 37	∅ 12	∅ 20.8	16	40.5	56
40	∅ 41	∅ 16	∅ 24.8	16	40.5	56
50	∅ 45	∅ 20	∅ 28.8	16	40.5	56
63	∅ 45	∅ 20	∅ 28.8	16	40.5	56
80	∅ 50	∅ 25	∅ 33.8	17.5	42	70
100	∅ 50	∅ 25	∅ 33.8	17.5	42	70
125	∅ 58	∅ 32	∅ 40.8	17.5	42	70
160	∅ 65	∅ 40	∅ 48.9	17.5	42	70
200	∅ 65	∅ 40	∅ 48.9	17.5	42	70
250	∅ 75	∅ 50	∅ 59	19	45	80
320	∅ 90	∅ 63	∅ 74	20	45	80

All dimensions in millimetres [mm]

Range of applications:

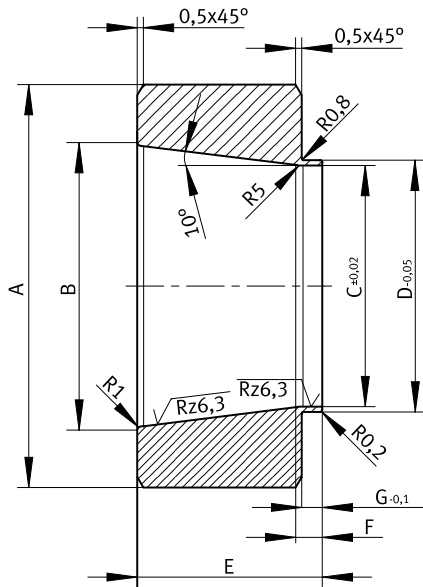
- 1 Pressure piece for scraper ring
- 2 Scraper ring
- 3 Mounting sleeve for scraper ring
- 4 DNC bearing cap



Sample application

10.2 Mounting sleeve and pressure piece for scraper ring on the DFPI

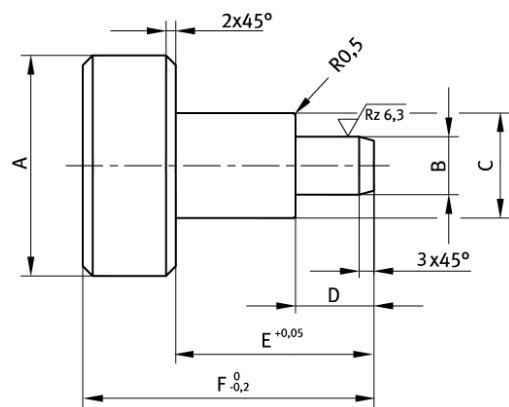
Schematic diagram:



Piston diameter	A	B	C	D	E	F	G
100	∅ 50	∅ 40.7	∅ 34	∅ 35	22.3	3.3	2.3
125	∅ 55	∅ 47.7	∅ 41	∅ 42	22.3	3.3	2.3
160	∅ 55	∅ 47.7	∅ 41	∅ 42	22.3	3.3	2.3
200	∅ 65	∅ 55.8	∅ 49.1	∅ 50.1	22.3	3.3	2.3
250	∅ 65	∅ 55.8	∅ 49.1	∅ 50.1	22.3	3.3	2.3
320	∅ 65	∅ 55.8	∅ 49.1	∅ 50.1	22.3	3.3	2.3

All dimensions in millimetres [mm]

Schematic diagram:

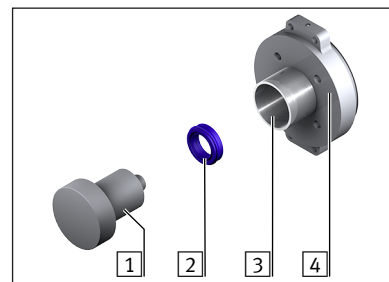


Piston diameter	A	B	C	D	E	F
100	∅ 50	∅ 25	∅ 33.8	17.5	37.7	65
125	∅ 55	∅ 32	∅ 40.8	17.5	37.7	65
160	∅ 55	∅ 40	∅ 40.8	17.5	37.7	65
200	∅ 65	∅ 40	∅ 48.9	17.5	37.7	65
250	∅ 65	∅ 40	∅ 48.9	17.5	37.7	65
320	∅ 65	∅ 40	∅ 48.9	17.5	37.7	65

All dimensions in millimetres [mm]

Range of applications:

- 1 Pressure piece for scraper ring
- 2 Scraper ring
- 3 Mounting sleeve for scraper ring
- 4 DFPI bearing cap

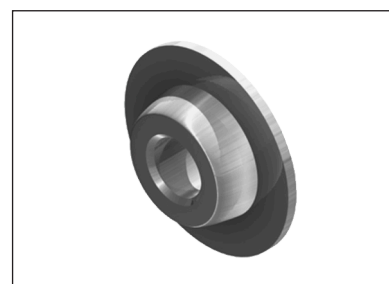


Sample application

11 Centring tool and tubular box spanner for mounting the cushioning bosses on cylinders of the type ADN-...-PPS and ADNGF-...-PPS

11.1 Centring tool for the cushioning bosses on cylinders of the type ADN-...-PPS and ADNGF-...-PPS

The centring tool for the cushioning bosses is used to centre the front cushioning boss on the piston rod on cylinders of the type ADN-...-PPS and ADNGF-...-PPS.



Type	Area of application	Piston diameter [mm]	Quantity	Order No.
Centring tool	Cushioning boss ADN/ADNGF-32-...-PPS	12	1 piece	1356097
Centring tool	Cushioning boss ADN/ADNGF-40-...-PPS	12	1 piece	1437387
Centring tool	Cushioning boss ADN/ADNGF-50-...-PPS	16	1 piece	1437415
Centring tool	Cushioning boss ADN/ADNGF-63-...-PPS	16	1 piece	1437415
Centring tool	Cushioning boss ADN/ADNGF-80-...-PPS	20	1 piece	1441528
Centring tool	Cushioning boss ADN/ADNGF-100-...-PPS	20	1 piece	2585245

Type	Area of application	Piston diameter [mm]	Quantity	Order No.
Cushioning boss	Cushioning boss ADN/ADNGF-32-...-PPS	12	2 piece	1273587
Cushioning boss	Cushioning boss ADN/ADNGF-40-...-PPS	12	2 piece	1280390
Cushioning boss	Cushioning boss ADN/ADNGF-50-...-PPS	16	2 piece	1271128
Cushioning boss	Cushioning boss ADN/ADNGF-63-...-PPS	16	2 piece	1280411
Cushioning boss	Cushioning boss ADN/ADNGF-80-...-PPS	20	2 piece	1273684
Cushioning boss	Cushioning boss ADN/ADNGF-100-...-PPS	20	2 piece	1724489



Further information on spare parts for cylinders of the type ADN / ADNGF-...-PPS can be found in the online spare parts catalogue on the Festo website (→ www.festo.com/spareparts).

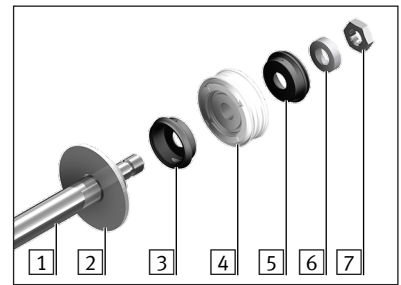
Range of applications:

Compact cylinders of the type:

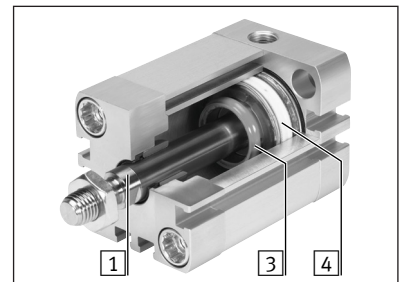
- **ADN-...-PPS**
- **ADNGF-...-PPS**

Place the centring tool [2] on the piston rod [1] to centre the front cushioning boss [3] on the piston rod [1] and secure it until the piston module [4] and the rear cushioning boss [5] are permanently mounted on the piston rod [1] using a hex nut (→ [Chapter 11.2 on page 29](#)) or a second piston rod (with S2 / S20). Then remove the centring tool [2] from the piston rod [1].

- | | |
|---------------------------|--------------------------|
| [1] Piston rod | [5] Rear cushioning boss |
| [2] Centring tool | [6] Washer |
| [3] Front cushioning boss | [7] Hex nut |
| [4] Piston module | |



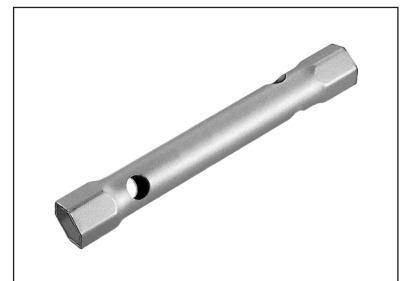
Sample application



ADN-32-...-PPS

11.2 Tubular box spanner for dismounting and mounting the cushioning bosses on cylinders of the type ADN-...-PPS and ADNGF-...-PPS

Tubular box spanner for loosening and tightening the hex nuts on the piston rod on cylinders of the type ADN/ADNGF-...-PPS. This tubular box spanner protects the cushioning boss against damage.



Type	Area of application	Wall thickness
Tubular box spanner, A/F 13	ADN/ADNGF-32-...-PPS	1.6 mm
Tubular box spanner, A/F 17	ADN/ADNGF-40-...-PPS	1.6 mm
Tubular box spanner, A/F 19	ADN/ADNGF-50-...-PPS	2.3 mm
Tubular box spanner, A/F 19	ADN/ADNGF-63-...-PPS	2.3 mm
Tubular box spanner, A/F 22	ADN/ADNGF-80-...-PPS	2.3 mm
Tubular box spanner, A/F 22	ADN/ADNGF-100-...-PPS	2.3 mm



The wall thickness of the tubular box spanner used together with the size of the spanner are key for ensuring that the installation is completed without damaging the cushioning boss.

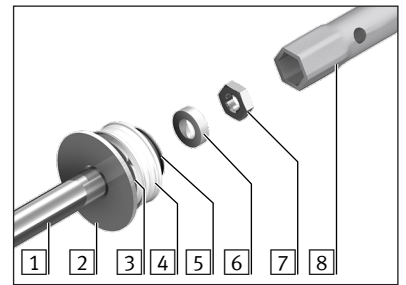
Range of applications:

Exchanging the cushioning bosses on compact cylinders of the type:

- **ADN-...-PPS**
- **ADNGF-...-PPS**

Use the tubular box spanner [8] to loosen or tighten the hex nut [7] on the piston rod [1] without damaging the rear cushioning boss [5].

- | | |
|-------------------------------------|--------------------------|
| [1] Piston rod | [5] Rear cushioning boss |
| [2] Centring tool | [6] Washer |
| [3] Front cushioning boss (covered) | [7] Hex nut |
| [4] Piston module | [8] Box spanner |



Sample application



The exact procedure for exchanging the cushioning bosses can be found in the respective repair instructions. This can be found on the Festo website (→ www.festo.com/spareparts).

12 Distance piece and distance plates for referencing the parallel kinematic system



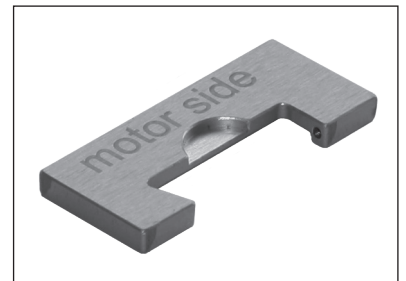
The distance piece and the distance plate are both required for referencing the parallel kinematic system.

12.1 Distance piece

The distance piece is required for referencing the parallel kinematic system. Referencing serves the purpose of setting the control of the parallel kinematic system to the distance plate thickness of 4 mm. The zero point of the axis is defined in this process.



The Distance piece is included in the delivery of the tripods. Alternatively, a 4mm Allen key can be used.

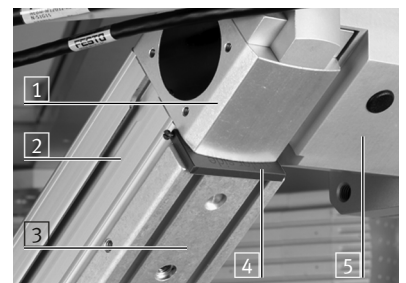


Range of applications:

Referencing the parallel kinematic system of type:

- **EXPT-45 / 70 / 95 / 120-...**

- | |
|-----------------------|
| [1] Drive cover |
| [2] Toothed belt axis |
| [3] Slide |
| [4] Distance piece |
| [5] Axial kit |



Sample application



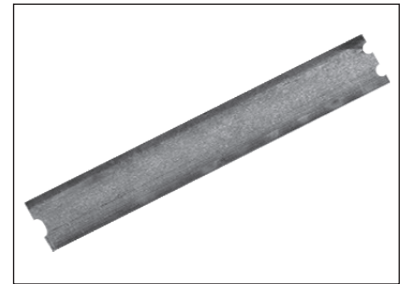
The exact procedure for referencing the parallel kinematic system can be found in the repair instructions. This can be found on the Festo website (→ www.festo.com/spareparts).

12.2 Distance plate for parallel kinematic system EXPT-45 / 70

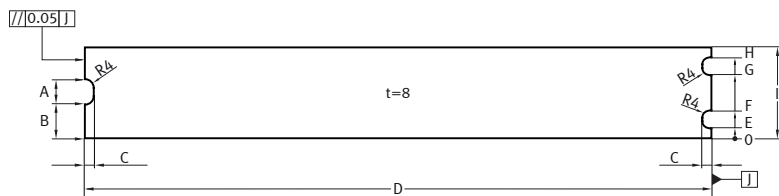
The distance plate is required for referencing the parallel kinematic system.
The parameters of the motor controllers are set correctly to the zero point using the distance plate (nominal dimension of the distance plate 350 mm).



The distance plate must be produced by the customer.
The exact dimensions can be found in the schematic diagram below.



Schematic diagram:



A	B	C	D	E	F	G	H	I
14 ^{+0.2}	18 ^{+0.1}	5 ^{+0.2}	350	5.1 ^{-0.1}	15 ^{+0.1}	35 ^{-0.1}	45 ^{+0.1}	50

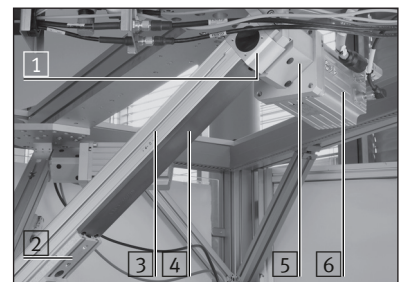
All dimensions in millimetres [mm]

Range of applications:

Referencing the parallel kinematic system of type:

– EXPT-45 / 70-...

- 1 Drive cover
- 2 Slide
- 3 Toothed belt axis
- 4 Distance plate
- 5 Axial kit
- 6 Servomotor



Sample application



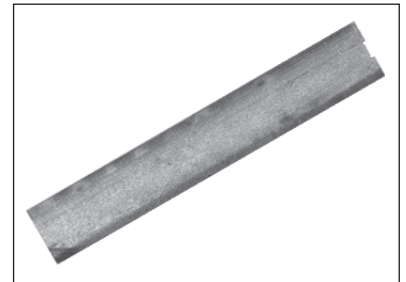
The exact procedure for referencing the parallel kinematic system can be found in the repair instructions. This can be found on the Festo website (→ www.festo.com/spareparts).

12.3 Distance plate for parallel kinematic system EXPT-95 / 120

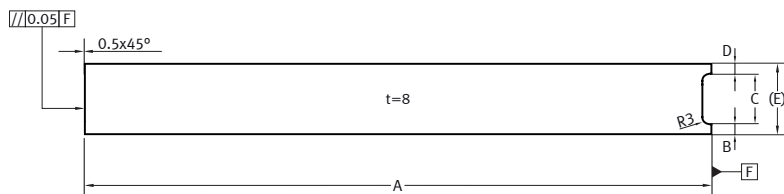
The distance plate is required for referencing the parallel kinematic system. The parameters of the motor controllers are set correctly to the zero point using the distance plate (nominal dimension of the distance plate 600 mm).



The distance plate must be produced by the customer. The exact dimensions can be found in the schematic diagram below.



Schematic diagram:



A	B	C	D	(E)
600	6 ^{+0.1}	34 ^{+0.1}	5 ^{-0.1}	45

All dimensions in millimetres [mm]

Range of applications:

Referencing the parallel kinematic system of type:

- EXPT-95 / 120-...



The exact procedure for referencing the parallel kinematic system can be found in the repair instructions. This can be found on the Festo website (→ www.festo.com/spareparts).

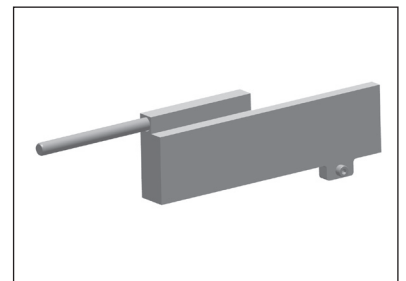
13 Setting piece for referencing and determining the feed constant of the Linear gantry EXCT

13.1 Setting piece

The setting piece is required for referencing and determining the feed constant of the EXCT.

Parts included:

- Cylindrical pin
- Setting piece
- Socket head screw



Included in the scope of delivery of the Linear gantry.

Type	Area of application	Quantity	Order No.
EADT-E17-15	EXCT-15	1 piece	3819753
EADT-E17-30	EXCT-30	1 piece	3820555
EADT-E17-100	EXCT-100	1 piece	3734878

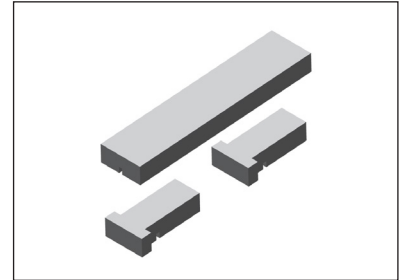
14 Setting pieces for setting the toothed belt pretension and software end position of the planar surface gantry EXCH

14.1 Set with setting pieces

The setting pieces are required for setting the toothed belt tension and software end position.

The Set contains:

- 1x Setting piece for the adjustment of the toothed belt pretensioning
- 2x Setting piece for the adjustment of the software end position



Included in the scope of delivery of the planar surface gantry.

Typ	Einsatzgebiet	Menge	Best. Nr.
Einstellstück	EXCH-40 / 60	1 Stück	3181802

15 Devices for checking the toothed belt pretension

15.1 Test device V2 / TB-TE-EQ12



The exact procedure for checking the toothed belt pretensioning can be found in the operating instructions “Test device for toothed belt pretensioning V2 / TB-TE-EQ12” (→ [TB-TE-EQ12.pdf](#)).

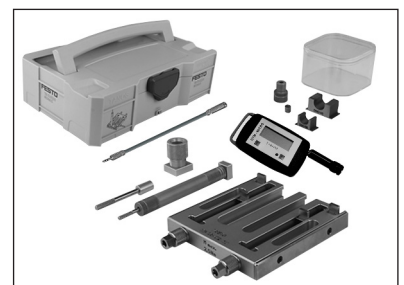


To order the test device, please **contact** your **local support**.

Systainer with test device V2 / TB-TE-EQ10

The Systainer (with foam insert) contains:

- Test device V2 / TB-TE-EQ12
- Acoustic frequency meter TB-TE-EQ13 (→ [Chapter 15.2.1 on page 35](#)).
- Extension cable for acoustic frequency meter TB-TE-EQ13
- Clamping component for DGE-25-ZR-RF
- Clamping component for DGE-40-ZR-RF
- Round magnet (L = 6 mm) for DGE-63
- Plastic box for small parts



Type	Designation
Systainer with test device V2 / TB-TE-EQ10 – with acoustic frequency meter	TB-TE-EQ10

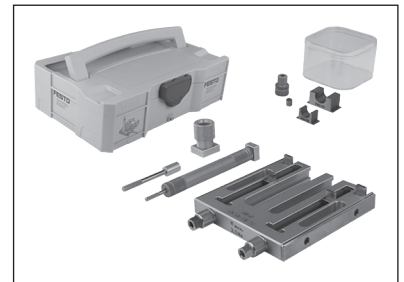
Systainer with test device V2 / TB-TE-EQ12

The Systainer (with foam insert) contains:

- Test device V2 / TB-TE-EQ12
- Clamping component for DGE-25-ZR-RF
- Clamping component for DGE-40-ZR-RF
- Round magnet (L = 6 mm) for DGE-63
- Plastic box for small parts



The acoustic frequency meter TB-TE-EQ13 must be ordered separately (→ [Chapter 15.2.1 on page 35](#)).



Type	Designation
Systainer with test device V2 / TB-TE-EQ12 – without acoustic frequency meter	TB-TE-EQ12

It is possible to excite the natural frequency of the toothed belt in any position by the plunger via a force stimulus thanks to the 2-spring system in the plunger housing and the absence of parts that can fall out. Space permitting, there are no restrictions with respect to the position of the toothed belt axis when using the test device.

Depending on the toothed belt axis, the test device is either clamped or tensioned and self-supporting. The clamping jaws are available in two depths (1 mm and 6 mm).

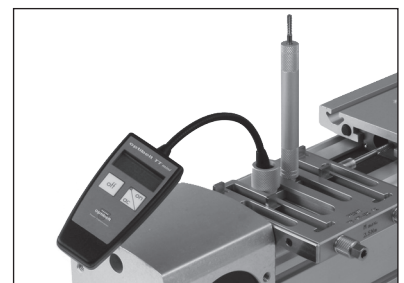
Thanks to its clamping function, the test device is also suitable for testing from below or with the toothed belt axis in an inclined or vertical mounting position. The test device V2 / TB-TE-EQ12 has a holder for the test probe of the acoustic frequency meter type TB-TE-EQ3 or TB-TE-EQ13.



Range of applications:

Checking the toothed belt pretensioning on toothed belt axes type:

- DGE-25 / 40 / 63-ZR-RF
- DGE-25 / 40 / 63-ZR-(KF)
- DGEA-18 / 25 / 40-ZR
- EGC-50 / 70 / 80 / 120 / 185-TB-KF
- EGC-HD-125-TB
- EGC-HD-160 / 220-TB-(GP)
- ELGA-70 / 80 / 120-TB-G
- ELGA-70 / 80 / 120-TB-RF/-KF-...(F1)
- ELGA-150-TB-KF



Sample application

The toothed belt pretensioning of the above-named toothed belt axes can be tested using the **acoustic frequency meter TB-TE-EQ3 or TB-TE-EQ13** connected to the V2 / TB-TE-EQ12 test device.

15.2 Accessories for devices

15.2.1 Acoustic frequency meter TB-TE-EQ13

Acoustic frequency meter for measurements with and without a test device.

An extension cable that can be installed between the measuring device and the test probe, as well as the O-ring 10×1 for mounting the test probe in the respective test device are included in the scope of delivery.



Purchasing spare O-rings 10×1 (→ [Chapter 15.2.2 on page 36](#)).



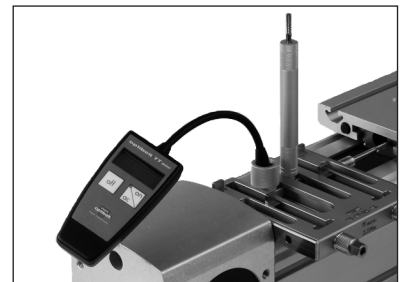
To order the frequency meter, please **contact** your **local support**.

Type	Designation
Acoustic frequency meter	TB-TE-EQ13

Range of applications:

For checking the toothed belt pretensioning of Festo:

- **Toothed belt axes**
- **Cantilever axes**
- **Cartesian systems**
- **Tripod kinematic systems**
- **Parallel kits**
- **Rotary drives**



Sample application

Use with the following test device for measuring the toothed belt pretension:

- **Test device V2 / TB-TE-EQ12**
(→ [Chapter 15.1 on page 33](#))

If the toothed belt is excited by means of a force stimulus, it oscillates with its natural frequency; this dies down reasonably quickly depending on the attenuation. The frequency meter measures the natural frequency generated (transverse oscillation) using the acoustic operating principle.



The exact procedure for checking the toothed belt pretensioning can be found in the following documentation:

- **“Test device for toothed belt pretensioning V2 / TB-TE-EQ12”**
(→ [TB-TE-EQ12.pdf](#))

Phased out devices:

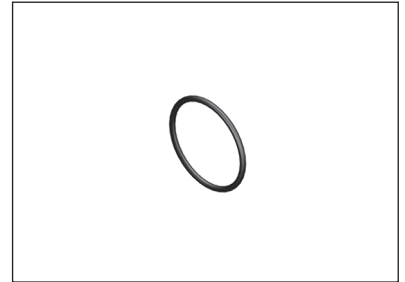
- **“Test device for toothed belt pretensioning V1 / TB-TE-EQ2”**
(→ [TB-TE-EQ02.pdf](#))

- The exact procedure for checking the toothed belt pretensioning on drives **ERMB** and **EHMB** can be found in the respective repair instructions. This can be found on the Festo website (→ www.festo.com/spareparts).

15.2.2 Spare O-ring 10×1

For fixing the test probe of the frequency meter TB TE EQ3 and TB-TE-EQ13 in the respective test device by means of clamping friction.

The O-ring 10×1 is included in the scope of delivery of the frequency meter TB-TE-EQ13 (→ [Chapter 15.2.1 on page 35](#)).



Type	Quantity	Order No.
O-ring 10×1	1 piece	200926

16 Clamping elements

The EADT-S-L5-... clamping elements are used to clamp the cover band of electric axes (→ table). The clamping element assigned to the axis is placed on the cover band, as shown in the sample application. By pressing the clamping element onto the cover band and pushing it towards the actuator end cap at the same time, the cover band is pushed into the slot provided in the actuator end cap and is clamped using the two threaded pins.

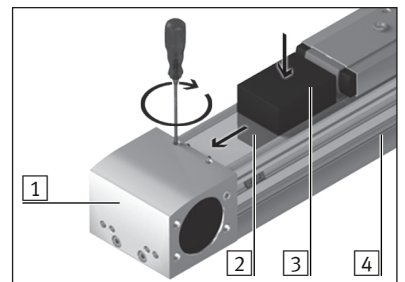


Type	Area of application	Quantity	Order No.
Clamping element EADT-S-L5-32	ELGC-TB / BS-32 / 45	1 piece	8065818
	ELFC-KF-32 / 45		
Clamping element EADT-S-L5-70	ELGA-G / RF / KF-70 / 80	1 piece	8058451
	ELFA-KF / RF-70 / 80		
	ELGC-TB / BS-60 / 80		
	ELFC-KF-60 / 80		
	ELCC-TB-KF-60		
Clamping element EADT-S-L5-90	ELCC-TB-KF-70 / 90	1 piece	8097157
Clamping element EADT-S-L5-120	ELGA-G / RF / KF-120 / 150	1 piece	8058450
	ELFA-KF-120		
	ELCC-TB-KF-110		

Range of applications:

Clamping the cover band

- 1 Drive cover with corner pulley
- 2 Cover band
- 3 Clamping element EADT-S-L5-...
- 4 Toothed belt axis ELGA-TB-KF



Sample application

17 Cleaning and greasing

17.1 Cleaning



The components must be thoroughly cleaned of all foreign particles, machining residues and old lubricants before they are greased.



Note

Clean with a soft, lint-free cloth and non-abrasive cleaning agents.

Check the compatibility of the cleaning agent with the materials to be cleaned.

17.2 Greasing

The different components require different levels of greasing depending on a number of factors.



To find out which lubricating grease to use for which product and for instructions on greasing the individual components, please refer to the spare parts documentation and operating instructions and, if available, the repair instructions for the product. There you will also find precise indications for e.g. relubrication intervals, application, etc.

17.2.1 Extremely thin grease film



A barely continuous film of grease covers the bearing surface. The grease can give a sheen to the surface; however, the colour of the grease must not darken it.

Recommendation:

Apply the grease using a cloth or similar dipped in the grease.

Remove the excess grease from the seal system components (e.g. by drawing the assembled piston with the piston rod once fully through the greased cylinder barrel) and then remove the excess from the seal components by wiping it off.

17.2.2 Thin grease film



A film of grease covers the bearing surface so that a continuous film of grease exists and the grease colour darkens the surface slightly.

Recommendation:

Apply the grease with a soft brush or similar.

17.2.3 Grease reservoir



There is a certain amount of oil enclosed between two sealing rims or in enclosed ring volumes.

17.2.4 Assembly greasing

Thin film of grease on the surface of sealing elements and on installation spaces, mating surfaces and edges, over which the sealing elements must be moved for assembly.

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