

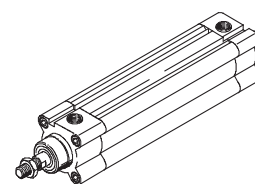
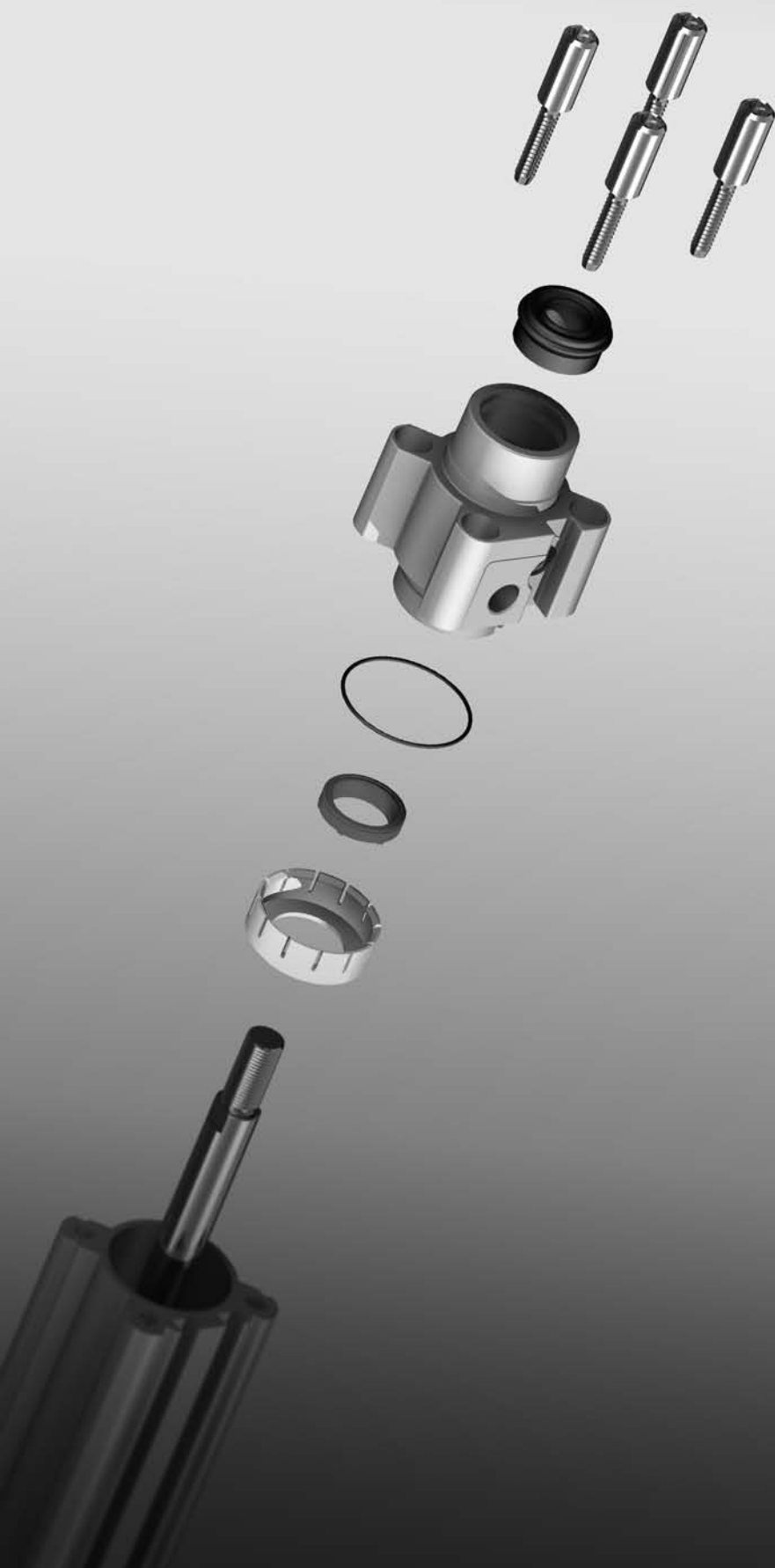
Cylinder with piston rod

Standard cylinder to ISO 15552

DNCB

FESTO

Repair
instructions (en)



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Foreword

These repair instructions are valid for the cylinders with piston rod listed on the title page to the exclusion of any liability claims.

Deviations compared to the descriptions in these repair instructions may arise depending on the design and/or modification status of the cylinder with piston rod. The user must check this prior to carrying out the repair and take the deviations into consideration if necessary.

These repair instructions have been prepared with care.

Festo AG & Co. KG does not, however, accept liability for any errors in these repair instructions or their consequences. Likewise no liability is accepted for direct or consequential damage resulting from improper use of the products.

More detailed information on this can be found in chapter [8 “Liability”](#).

The relevant regulations on occupational safety, safety engineering and interference suppression as well as the stipulations contained in these repair instructions must be observed when working on the products.

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1 Important information

1.1 About these repair instructions

This document contains important information about the professional repair of the cylinder with piston rod of the type DNCB.

The cylinder with piston rod DNCB is fully repairable in the event of damage due to normal wear. The complete cylinder must be repaired in the event of damage to the cylinder barrel.

Before carrying out a repair, the relevant chapter in these instructions must be read in full and followed consistently.

For reasons of clarity, these repair instructions do not contain complete detailed information. The following documents should therefore also be available when repairing the cylinder with piston rod:

- **Operating instructions for the respective cylinder with piston rod**

Contain information about the control sections and connections of the cylinder with piston rod as well as the function, structure, application, installation, commissioning, maintenance and care, etc. Can be found on the Festo website (www.festo.com).

- **Spare parts documentation**

Contains an overview of the spare and wearing parts as well as information on their installation. Can be found in the online spare parts catalogue on the Festo website (spareparts.festo.com).

- **Assembly aids**

Contain an overview of available assembly aids such as lubricating greases, screw locking agents, maintenance tools, etc. (aids for assembly and maintenance). Can be found in the online spare parts catalogue on the Festo website (www.festo.com).

1.2 Pictograms used in these repair instructions



Warning

This sign indicates a dangerous situation for persons and/or the product. Failure to observe this warning can result in injury to persons and/or damage to the device.



Note

This sign provides important tips and information that can make your work easier.



Environment

This sign provides information on the steps required for environmentally friendly use of materials and equipment, as well as the guidelines and regulations that may need to be observed.



Accessories

This sign contains information on accessories and attachments relevant to the context.



Documents

This sign contains references to other chapters or documents containing additional information.

1.3 General safety information



Warning

The cylinder with piston rod must only be repaired by authorised and trained persons in accordance with the specifications in the technical documentation and using genuine spare parts.

Installation and repair by unauthorised and untrained persons, repairs using non-genuine spare parts as well as without the technical documentation required for installation and/or repair are dangerous and therefore not permitted.

Repairs must only be carried out in conjunction with these repair instructions as well as the respective operating instructions for the device.



Note

Instead of carrying out the repair yourself, your local Festo sales office offers the option of having the repair carried out by Festo.



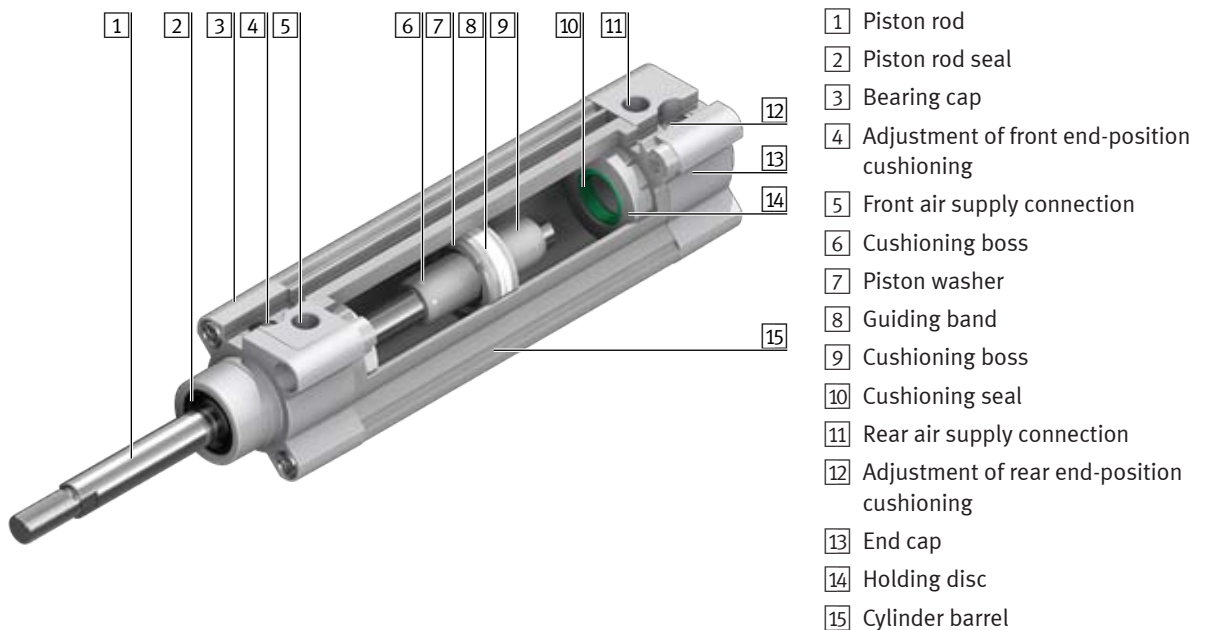
Environment

Components and equipment replaced as part of a repair must be disposed of in accordance with the locally valid environmental protection regulations.

2 General product description

2.1 Functional description

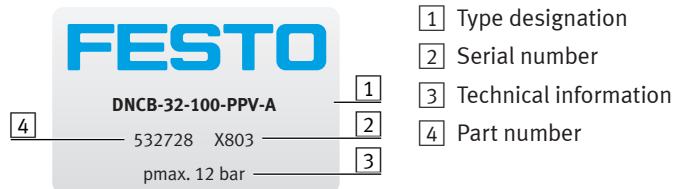
The piston moves in the cylinder barrel when the cylinder chamber is pressurised. The piston rod transmits the movement to the outside. The advanced piston rod is retracted again when the other cylinder chamber is pressurised.



2.2 Type codes (ascertaining the features of a cylinder)

The precise features of a cylinder with piston rod can be ascertained with the help of the rating plate on the cylinder. The type designation is directly beneath the Festo logo and describes the cylinder's features separated by a hyphen (-).

Example:



The type designation on this rating plate provides the following information:

DNCB Cylinder of the type DNCB

100 Piston diameter 100 mm

100 Stroke 100 mm

PPV Adjustable end-position cushioning

A Sensing option (magnetic piston)



Note

A list and description of all possible equipment features of the cylinder with piston rod can be found in the data sheet. It is available on the Festo website (www.festo.com).

2.3 Retrofitting the cylinder with piston rod with other features

The cylinder with piston rod of the type DNCB-... is only available in the standard design. It can be retrofitted with a number of other features (e.g. dust protection "R8") by installing a piston rod seal from the appropriate wearing parts kits.



Warning

All other components of the original DNCB wearing parts kit should also always be used.

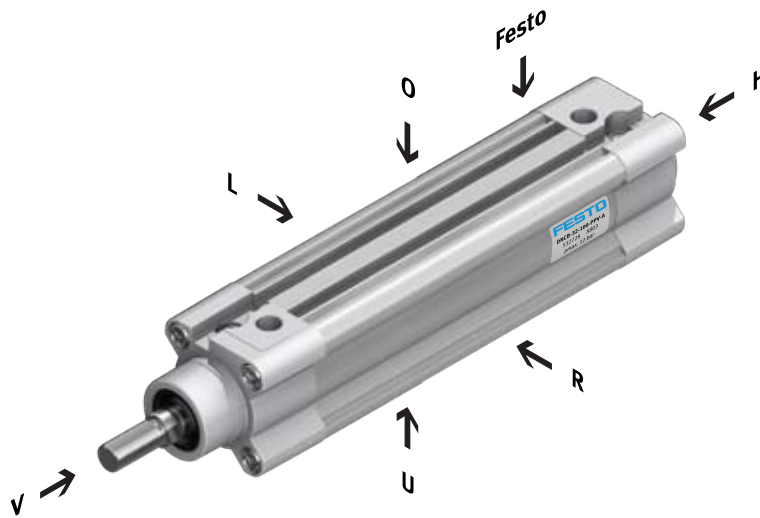
The following features can be retrofitted in this way:

Feature	Description	Wearing parts kit with piston rod seal
R8	Protected against dust	DNC-...-R8
A3	Unlubricated operation	CDN-...-A3
CT	Free of copper/PTFE	DNC-...-CT

Please note that the removal and installation of alternative wearing parts kits are not described in these repair instructions. For information on how to do this, please refer to the repair instructions for cylinders with piston rod of the type DNC-.... The relevant instructions, as well as a list of all compatible wearing parts kits, can be found on the Festo website (www.festo.com).

2.4 Mounting directions

This diagram provides an overview of the orientation designations for the cylinder with piston rod.



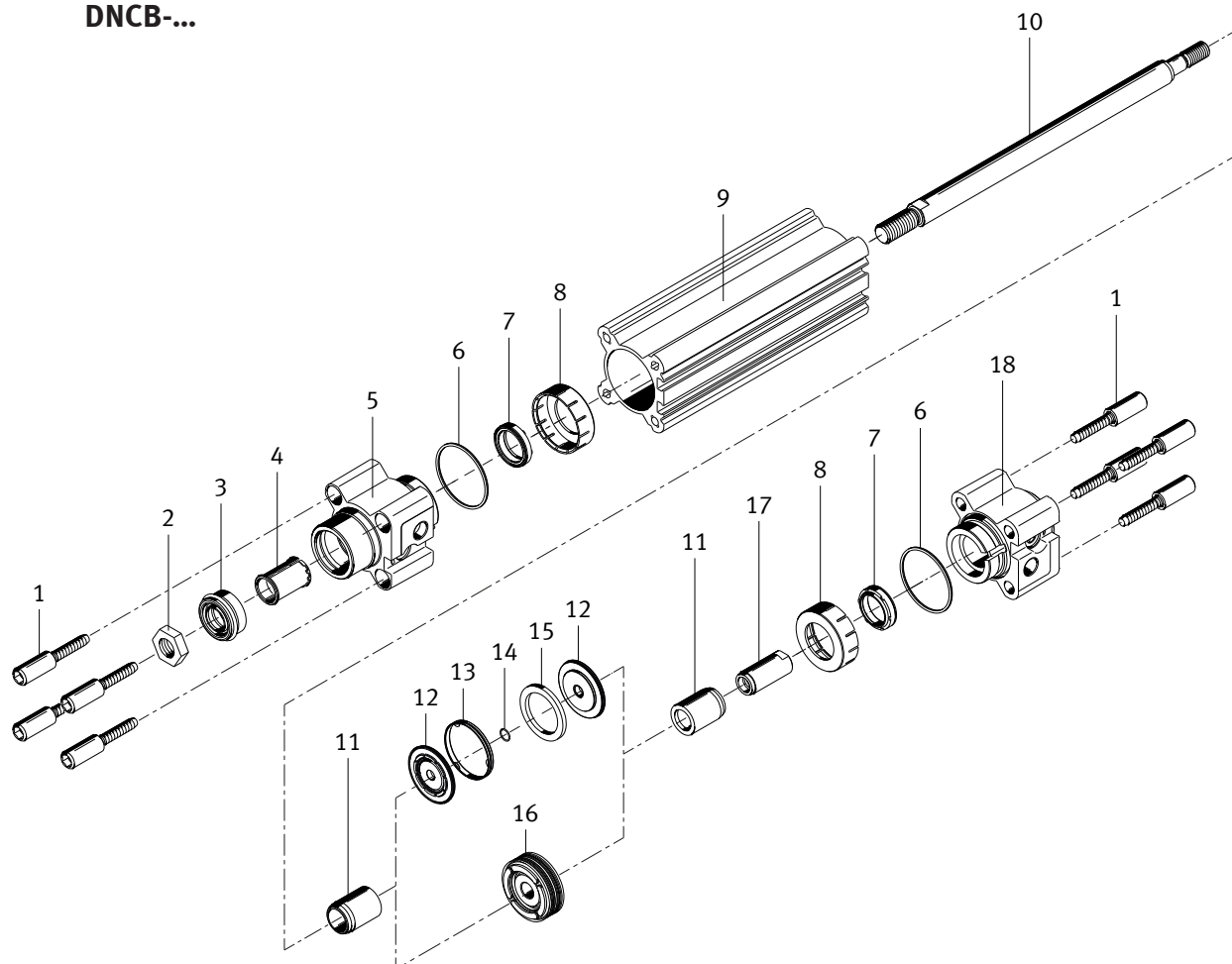
Orientation:

Festo= product identification (rating plate) as reference point

- O = top
- U = underneath
- R = right
- L = left
- V = front
- H = rear

3 Component overview

3.1 DNCB-...



This diagram is intended only to provide an overview of the individual components. To order spare and wearing parts, please use the online spare parts catalogue on the Festo website (spareparts.festo.com).

Item	Designation	Note
1	Flange screws	Use screw locking agent (wearing parts kit)
2	Hexagon head screws	
3	Piston rod seal	
4	Bearing	
5	Bearing cap	
6	O-ring	
7	Cushioning seal	
8	Holding disc	Only with DNCB-32/40/50/63-...
9	Cylinder barrel	
10	Piston rod	
11	Cushioning boss	
12	Piston washer	Only with DNCB-40/50/63/80/100-...
13	Guiding band	Only with DNCB-40/50/63/80/100-...
14	O-ring	Only with DNCB-40/50/63/80/100-...
15	Magnet	Only with DNCB-40/50/63/80/100-...
16	Piston module	Only with DNCB-32-...
17	Threaded coupling	Use screw locking agent (wearing parts kit)
18	End cap	

4 Repair steps

4.1 Preparation

- Before starting the repair, remove any attachments on the cylinder barrel, the bearing and end caps or the piston rod (clamping device, end-position lock, etc) in accordance with the instructions in the accompanying operating instructions.
- Keep your working environment tidy.
- Only use the spare parts and assembly aids (grease, screw locking agent, etc.) provided in the wearing parts kit.



Warning

Make sure that the bearing cap cannot suddenly come flying off.

- Remove the non-return valves and tubing connection from the cylinder and depressurise the cylinder completely so that any pressure present is not suddenly released when the cylinder is opened.

To prevent damage to sealing rims or guide surfaces, do not use pointed or sharp-edged assembly aids.

4.2 Visual inspection

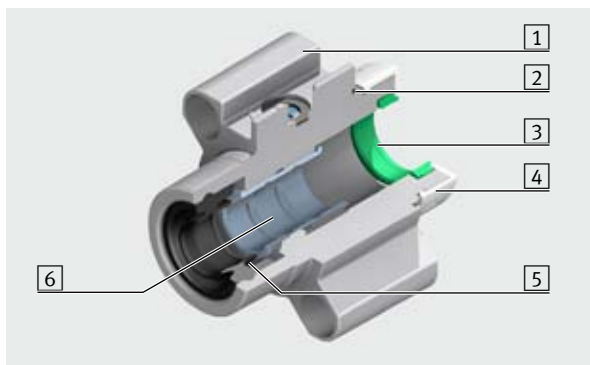
Check the cylinder for visible damage that might impair its function (e.g. warping of the piston rod) as well as deposits and scoring. The entire cylinder must be replaced if the cylinder barrel is showing significant damage.

4.3 Repairing the cylinder DNCB-...

The description in this section can be used to repair cylinders of the type DNCB-... with the following features:

Code	Description
PPV	Adjustable pneumatic cushioning
A	Position sensing
CT	Free of copper, PTFE and silicone

4.3.1 Structure of the bearing cap



- 1 Bearing cap
- 2 O-ring
- 3 Cushioning seal
- 4 Holding disc (only with DNCB-32/40/50/63-...)
- 5 Piston rod seal
- 6 Bearing

4.3.2 Removing the bearing and end caps

- Loosen the screws in the bearing cap and end cap and remove them.
- Remove the bearing and end caps from the cylinder barrel and piston rod.



4.3.3 Replacing the piston components

- Pull the piston rod out of the cylinder barrel.
- Check the cylinder barrel and piston rod for damage.
The entire cylinder must be replaced if the cylinder barrel (particularly the bearing surface) is showing significant damage.



- Unscrew the threaded coupling from the piston rod.
- Remove the piston components from the piston rod, noting the sequence and alignment.
- Remove any residue of the screw locking agent from the threads of the piston rod and threaded coupling.
- Replace the components with those from the wearing parts kit and reassemble the piston components on the piston rod in the correct sequence.
- Apply the screw locking agent contained in the wearing parts kit to the inside of the threaded coupling and screw it onto the piston rod with the corresponding torque (see table).



Type	Torque
DNCB-32	10 Nm
DNCB-40	20 Nm
DNCB-50	30 Nm
DNCB-63	40 Nm
DNCB-80	60 Nm
DNCB-100	60 Nm



4.3.4 Inserting the piston rod into the cylinder barrel

- Clean the inner surface of the cylinder barrel as described in section [5.1 "Cleaning"](#).
- Apply the grease contained in the wearing parts kit to the following parts:

Component	Other cylinders
Inner surface of cylinder barrel	Thin film ¹⁾
Surface of piston rod	Thin film ¹⁾
Piston washer	Thin film ¹⁾ on outside
Piston surface between lips (grease reservoir ²⁾)	Fill 2/3 with grease
Cushioning boss	Thin film ¹⁾ on outside

¹⁾ See section [5.2.2 "Thin grease film"](#)

²⁾ See section [5.2.3 "Grease reservoir"](#)

- Place the piston flat on the front side of the cylinder barrel and insert the lip ring of the piston into the cylinder barrel by tilting and turning it slightly.

The sealing lip must not fold back against the inside of the piston.



Note

If necessary use a flat and blunt-edged object to insert the lip ring into the cylinder barrel.

- Insert the piston fully into the cylinder barrel.
- Push the piston far enough into the cylinder barrel so that the first lip ring protrudes slightly at the other end of the cylinder barrel.
- Pull the piston rod back again until the piston is sitting fully in the cylinder barrel.



Note

This approach ensures that the sealing lips of the two lip rings sit correctly in the cylinder barrel.

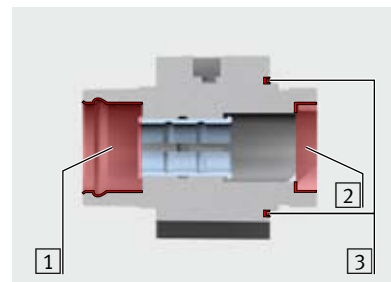


4.3.5 Repairing and attaching the bearing and end caps

- Remove the piston rod seal [1] from the bearing cap [2].
- **Only with DNCB-32/40/50/63-...**
Remove the holding discs [5] from the bearing cap and end cap.
- Remove the cushioning seal [4] from the bearing cap and end cap.
- Remove the O-ring [3] from the groove of the bearing cap and end cap.



- Clean the seat of the piston rod seal [1].
- Clean the seat of the cushioning seal [2].
- Clean the groove for the O-ring [3].

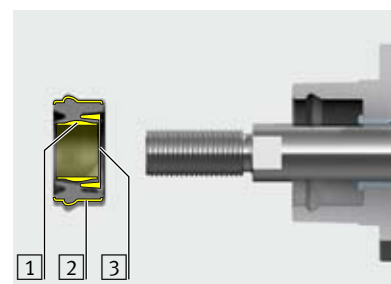


- Grease the new piston rod seal as follows:

Area	Other cylinders
[1] Grease reservoir ¹⁾ for piston rod	Fill 2/3 with grease
[2] External surface for bearing cap	Thin film ²⁾
[3] Grease reservoir ¹⁾ for bearing	Fill 2/3 with grease

¹⁾ See section [5.2.3 "Grease reservoir"](#)

²⁾ See section [5.2.2 "Thin grease film"](#)



- Insert the piston rod seal into the bearing cap using the appropriate insertion tool.



Note

Note the mounting direction (inscription facing out).



- Grease the new O-ring and insert it into the groove in the bearing cap and end cap.
- Apply a thin film of grease to the new cushioning seals on the front side of the sealing surface and insert them into the bearing cap and end cap.
- **Only with DNCB-32/40/50/63-...**
Place the new holding discs on the bearing cap and end cap.



- To protect the bearing and seals, place the appropriate sleeve on the thread of the piston rod to prevent damage.
- Guide the bearing cap over the sleeve onto the piston rod as far as the cylinder barrel.
- Place the end cap at the other end of the cylinder barrel.



- Apply the screw locking agent contained in the wearing parts kit to the screws.
- Fasten the screws through the bearing and end caps into the cylinder barrel.
- Align the bearing and end caps flush with the cylinder barrel.
- Tighten the screws with the appropriate torque (see table).



Type	Torque
DNCB-32	7 Nm
DNCB-40	7 Nm
DNCB-50	13 Nm
DNCB-63	13 Nm
DNCB-80	25 Nm
DNCB-100	25 Nm

- Perform a functional test as per the operating instructions (enclosed with the cylinder or can be called up on the Festo website (www.festo.com)) and commission the repaired cylinder.

5 Cleaning and greasing

5.1 Cleaning

The seals are designed so that the lubricant film applied to them will be effective for the service life of the seal. In order for this so-called life-time lubrication to be retained, the cylinder must be thoroughly cleaned of all foreign particles, machining residues and old lubricants before it is greased.



Warning

Festo recommends Loctite 7063 and Loctite 7070 for cleaning.

When using other cleaning agents, make sure that they do not corrode the seals of the cylinder with piston rod. In case of doubt, check the resistance of the seals using the data on the Festo website (www.festo.com).

5.2 Greasing

The various components and seals of the cylinder with piston rod require different levels of greasing depending on a number of factors.



Warning

To guarantee the life-time lubrication, the piston rod with assembled piston and piston seals must be moved a number of times across the entire stroke of the cylinder barrel to produce an even lubricant film.

5.2.1 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.

5.2.2 Thin grease film

A film of grease covers the bearing surface so that the grease colour darkens the surface slightly.

Recommendation:

Apply the grease with a soft brush or similar.

5.2.3 Grease reservoir

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

6 Maintenance and care

Clean any dirt from the piston rod using a soft cloth.

All non-abrasive cleaning agents are permitted. The cylinders are also maintenance-free as they have been lubricated for life. Regular removal of the lubricant on the surface of the piston rod reduces its service life.

7 Tools

This section provides an overview of the tools and aids required to repair the cylinder with piston rod.

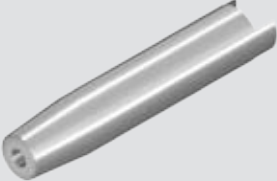
7.1 Standard tools

The following standard tools among others are required to repair the cylinder with piston rod:

- Screwdriver
- Wrench
- Flat pliers
- Torque wrench (see tables in the corresponding repair steps for values)

7.2 Special tools

The following special tools are required to repair and service the cylinder with piston rod:

Designation	Additional information	Available	Photo
Push-in sleeve for piston rod seal	DNCB-32	On request	
	DNCB-40		
	DNCB-50		
	DNCB-53		
	DNCB-80		
	DNCB-100		
Insertion sleeve for piston rod seal (only for cylinders with seals for unlubricated operation (A3))	DNCB-32		
	DNCB-40		
	DNCB-50		
	DNCB-53		
	DNCB-80		
	DNCB-100		
Mounting sleeve for piston rod	DNCB-32		
	DNCB-40		
	DNCB-50		
	DNCB-53		
	DNCB-80		
	DNCB-100		

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