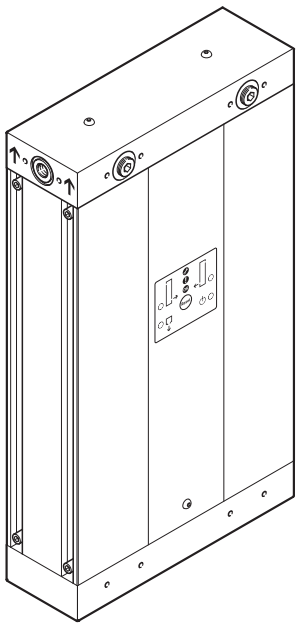
FESTO

Repair instructions (en)



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Foreword

These repair instructions are valid for the adsorption dryers listed on the title page, excluding any liability claims.

There may be deviations from the descriptions in these repair instructions depending on the version and/or modification status of the adsorption dryer. 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.

Further information on this can be found in Chapter 9 „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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Table of contents

1 Important information

1.1 About these repair instructions

This document contains important information on how to carry out proper repairs of adsorption dryers of type PDAD in sizes 09, 13, 22, 51, 73 and 100.

The adsorption dryer PDAD-... is fully repairable. However, in the case of major faults, the cost-effectiveness of a repair should be examined.

When carrying out a repair, the relevant chapter of these instructions should be read thoroughly and complied with in full.

For the sake of clarity, these repair instructions do not provide detailed information. The following documents should therefore also be available during a repair of an adsorption dryer:

- **Operating instructions**
  Contains information on function, installation, configuration, power supply, commissioning, care and maintenance etc. It is available for download from the Festo website (www.Festo.com).
- **Spare parts documentation**
  Contains an overview of spare and wearing parts as well as information on their installation. It is available for download in the online spare parts catalogue on the Festo website (spareparts.Festo.com).
- **Assembly aids**
  Contains an overview of available assembly aids such as lubricating greases, screw locking agents, maintenance tools etc. (aids for installation and maintenance). It is available for download 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 context-related accessories and attachments.

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

1.3 General safety information

Warning

The adsorption dryer 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 PDAD is a cold-regenerating adsorption dryer with defined pressure dew point and high flow rate for decentralised compressed air drying. The utilisation of adsorption dryers is always required when pressure dew points of less than –20 °C need to be achieved reliably.

The air stream is passed through the supplied prefilter, a micro filter with grade of filtration 0.01 µm. It protects the drying agents from contaminating dirt and oil particles (oil significantly reduces the service life of the drying agent).

The adsorption dryer consists of two cartridges (four in the case of the PDAD-100) filled with drying agent.

During the operation cycle (see Chapter 2.1.1 „Operation diagram“), the first drying agent cartridge is fully pressurised and the air flowing through the drying agent cartridge is directed upwards to remove moisture in order to achieve the specified pressure dew point.

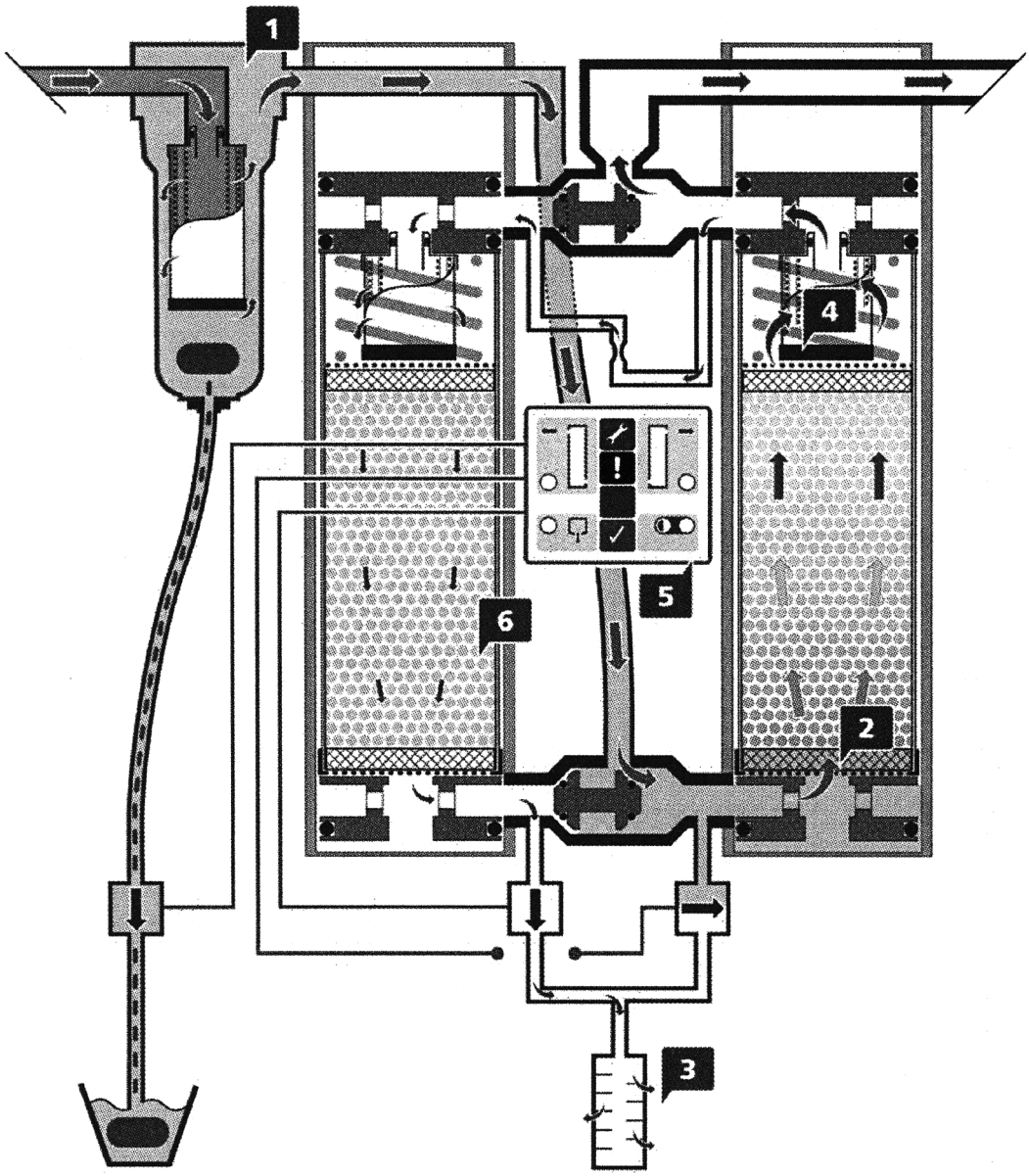
During the drying cycle, a small quantity of dry air (purge air) is routed to the other drying agent cartridge. This purge air flows through the drying agent cartridge in a downwards direction and then escapes into the atmosphere via an air silencer, thus regenerating the drying agent.

After 120 seconds, the drying agent cartridge currently being regenerated is closed by the exhaust valve and subjected to full system pressure by the purge air.

After 170 seconds, the pressure in the first drying agent cartridge is exhausted into the atmosphere via the corresponding exhaust valve and the drying agent cartridge enters regeneration mode. The main flow of air and the dryer function then switch to the drying agent cartridge that was already regenerated.

The operation cycle continues in this pattern, whereby the cartridges alternate between drying and regeneration.

2.1.1 Operation diagram



1 The micro filter MS6-LFM with electronic condensate drain protects the drying agent against contaminated compressed air. Moist compressed air enters the lower valve manifold through the prefilter.

2 During the operation cycle, the first drying agent cartridge (in the example above this is the drying agent cartridge on the right) is fully pressurised and the air flowing through the drying agent cartridge is directed upwards to remove moisture.

3 Purge air escapes into the atmosphere via an air silencer, which is mounted on the lower valve manifold.

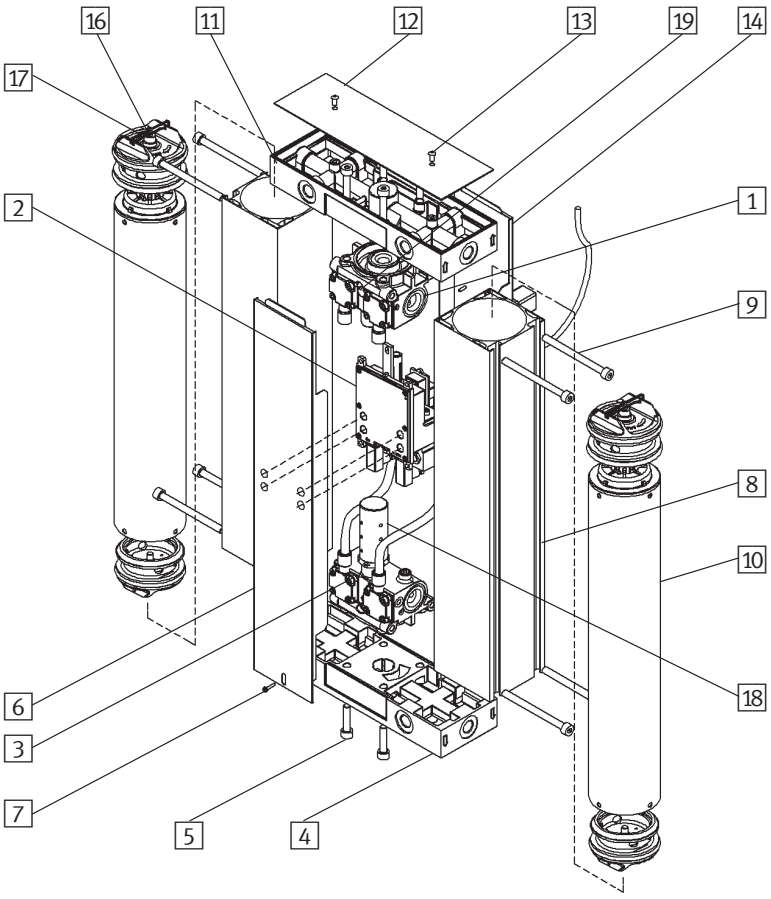
4 The compressed air is cleaned of drying agent particles in a micro filter before exiting the drying agent cartridge.

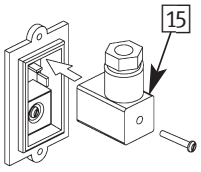
5 The controller regulates the flow of air between the two drying agent cartridges.

6 While water is removed from the compressed air in one drying agent cartridge, a small quantity of dry air (purge air) flows to the other drying agent cartridge. This purge air flows through the drying agent cartridge in a downwards direction and escapes into the atmosphere via an air silencer. The drying agent is thus regenerated before the next drying cycle.

2.2 Designation of components

2.2.1 Main components of an adsorption dryer of type PDAD

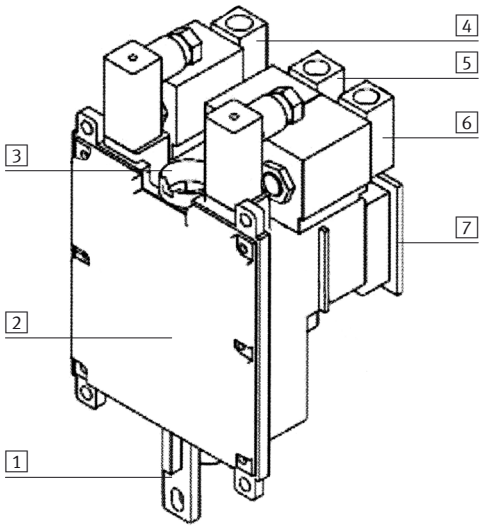




On the rear of the dryer

1 Upper valve manifold
2 Controller
3 Lower valve manifold
4 Base plate
5 Mounting screw for lower valve manifold
6 Front cover
7 Mounting screw for front cover
8 Profile
9 Spacer bolt
10 Drying agent cartridge with integrated dust filter
11 Distributor housing
12 Cover
13 Screw for cover
14 Rear cover
15 Power supply socket
16 Screw for gasket
17 Gasket
18 Silencer
19 Air nozzle

2.2.2 Components of the controller



1 Controller mounting
2 Transparent cover for controller with LEDs
3 PC connection
4 Condensate drain valve
5 Solenoid valve 1
6 Solenoid valve 2
7 Power supply socket

2.3 Types and part numbers

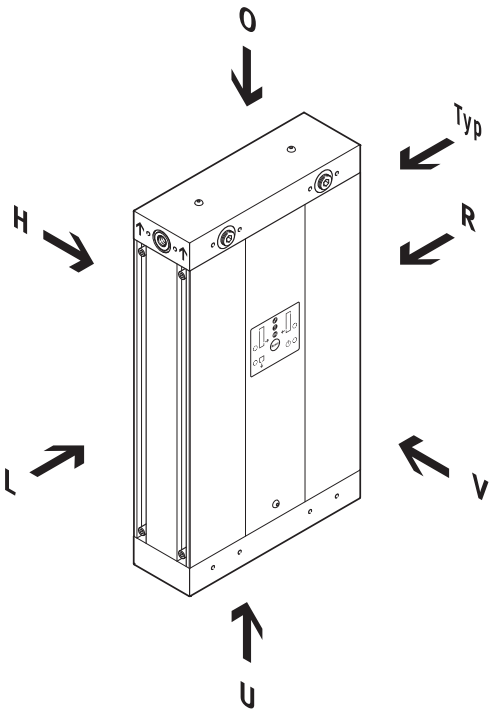
Type	Part number
PDAD-09	552170
PDAD-13	552171
PDAD-22	552172
PDAD-51	552173
PDAD-73	552174
PDAD-100	552175

A complete overview of features, accessories, type codes, technical data and dimensions of the adsorption dryer PDAD can be found in the product catalogue or on the Festo website (www.Festo.com).

Note
The PDAD-100 is equipped with four drying agent cartridges and is twice the depth of the other models.

2.4 Overview of variants and mounting directions

This diagram provides an overview of the mounting directions.



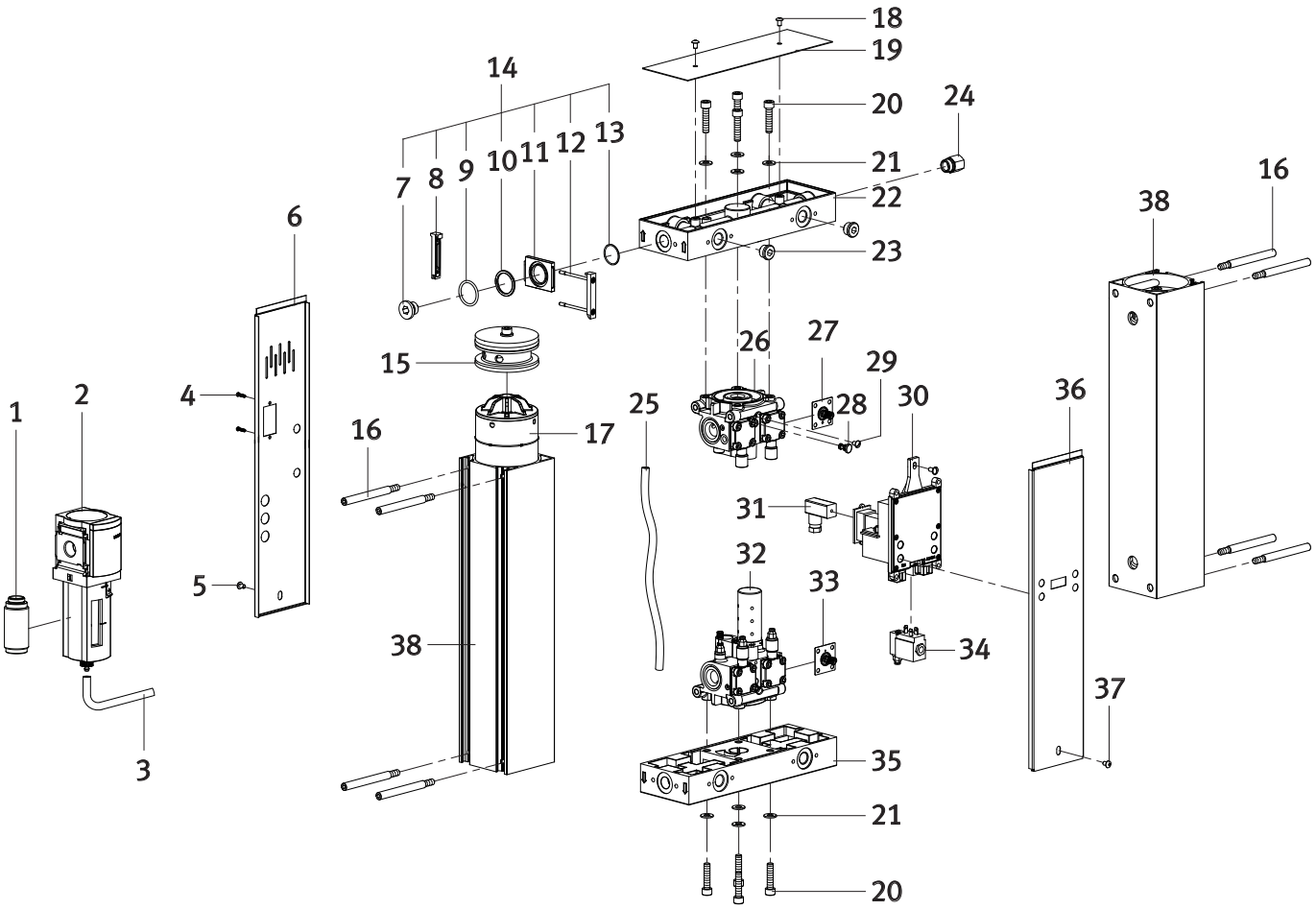
Orientation:

O = Top
U = Bottom
R = Right
L = Left
V = Front
H = Rear

Type = Product designation (name plate)

3 Component overview

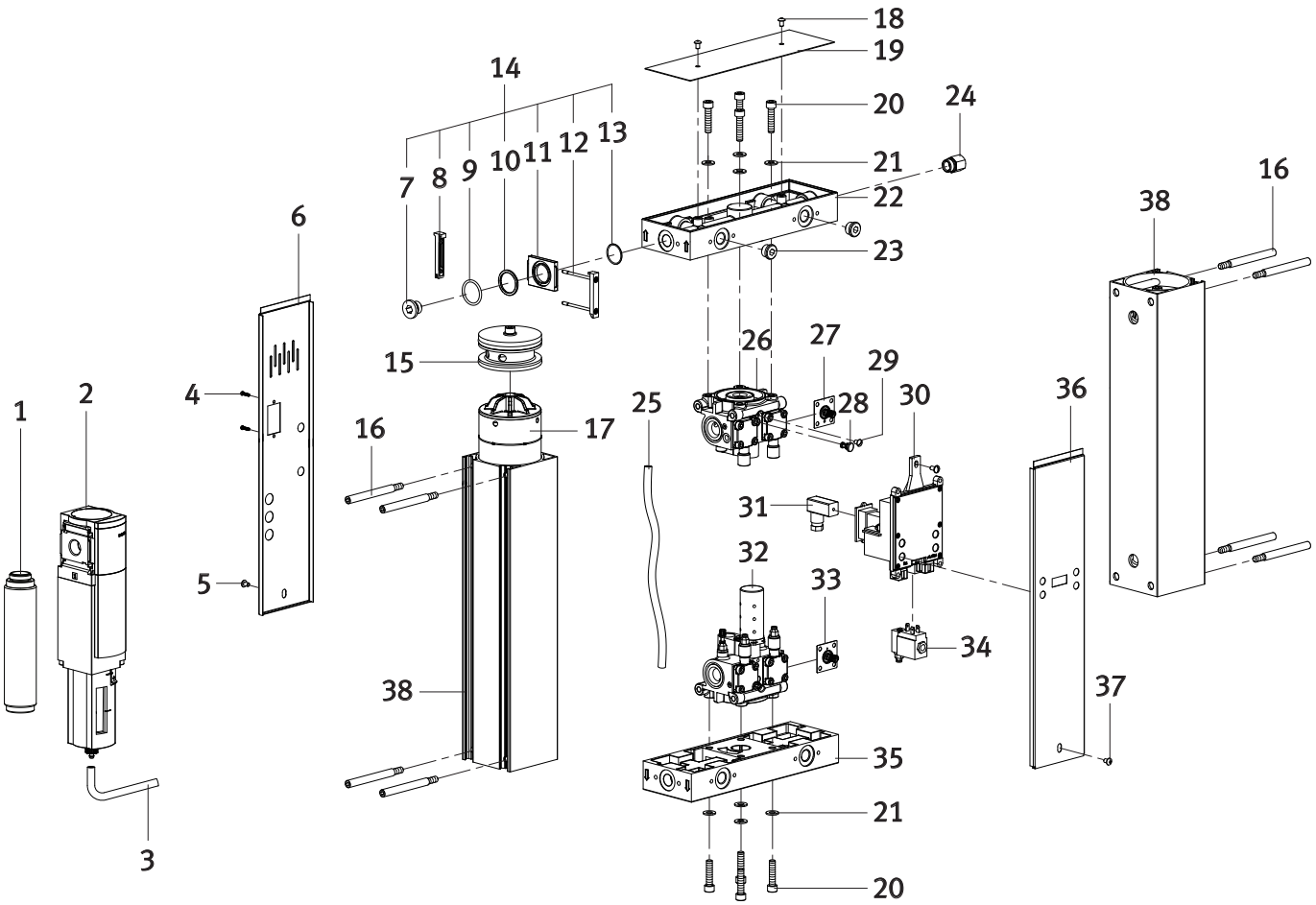
3.1 PDAD-09, PDAD-13, PDAD-22 and PDAD-51



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	Type	Note
1	Micro-filter cartridge		
2	Micro filter		
3	Tubing		Not available as a spare part.
4	Self-tapping screw		Tightening torque 1 Nm / Not available as a spare part.
5	Screw		Tightening torque 1 Nm / Not available as a spare part.
6	Cover		Not available as a spare part.
7	Hollow bolt		Tightening torque 15 Nm / Not available as a spare part.
8	Module connector		
9	O-ring	DIN 3771-29×3-N-NBR75	
10	Flat seal		
11	Module connector		
12	Module connector		Tightening torque 1.2 Nm
13	O-ring	DIN 3771-22,4×2,65-N-NBR70	
14	Connecting plate, sub-assembly		
15	Ring fitting		Not available as a spare part.
16	Spacer bolt		Tightening torque 20 Nm / Not available as a spare part.
17	Service kit		
18	Screw		Tightening torque 1 Nm / Not available as a spare part.
19	Cover		Not available as a spare part.
20	Screw		Tightening torque 20 Nm / Not available as a spare part.
21	Washer		Not available as a spare part.
22	Distributor housing		Not available as a spare part.
23	Blanking plug		Tightening torque 15 Nm / Not available as a spare part.
24	Blanking plug		Tightening torque 15 Nm / Not available as a spare part.
25	Tubing		Not available as a spare part.
26	Valve manifold, top		
27	Diaphragm module, top		
28	Air nozzle		
29	Screw		Tightening torque 3 Nm / Not available as a spare part.
30	Controller		
31	Plug		Not available as a spare part.
32	Valve manifold, bottom		
33	Diaphragm module, bottom		
34	Solenoid valve		
35	Distributor housing		Not available as a spare part.
36	Cover		Not available as a spare part.
37	Screw		Tightening torque 1 Nm / Not available as a spare part.
38	Profile		Not available as a spare part.

3.2 PDAD-73 and PDAD-100



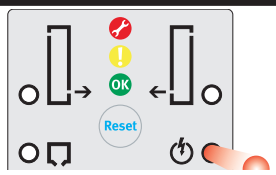
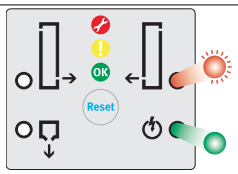
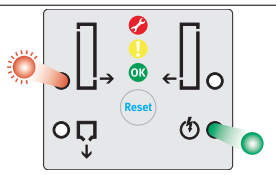
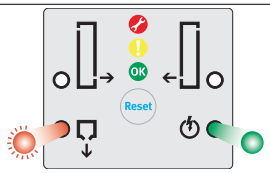
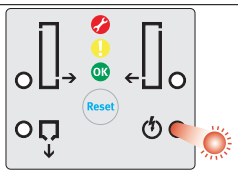
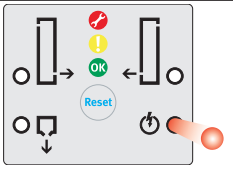
This diagram is intended only to provide an overview of the individual components. To order spare and wearing parts, please use the online spare parts catalogue on the Festo website (spareparts.Festo.com).

Item	Designation	Type	Note
1	Micro-filter cartridge		
2	Micro filter		
3	Tubing		Not available as a spare part.
4	Self-tapping screw		Tightening torque 1 Nm / Not available as a spare part.
5	Screw		Tightening torque 1 Nm / Not available as a spare part.
6	Cover		Not available as a spare part.
7	Hollow bolt		Tightening torque 18 Nm / Not available as a spare part.
8	Module connector		
9	O-ring	DIN 3771-29×3-N-NBR75	
10	Flat seal		
11	Module connector		
12	Module connector		Tightening torque 1.2 Nm
13	O-ring	DIN 3771-22,4×2,65-N-NBR70	
14	Connecting plate, sub-assembly		
15	Ring fitting		Not available as a spare part.
16	Spacer bolt		Tightening torque 20 Nm / Not available as a spare part.
17	Service kit		
18	Screw		Tightening torque 1 Nm / Not available as a spare part.
19	Cover		Not available as a spare part.
20	Screw		Tightening torque 20 Nm / Not available as a spare part.
21	Washer		Not available as a spare part.
22	Distributor housing		Not available as a spare part.
23	Blanking plug		Tightening torque 15 Nm / Not available as a spare part.
24	Blanking plug		Tightening torque 18 Nm / Not available as a spare part.
25	Tubing		Not available as a spare part.
26	Valve manifold, top		
27	Diaphragm module, top		
28	Air nozzle		
29	Screw		Tightening torque 3 Nm / Not available as a spare part.
30	Controller		
31	Plug		Not available as a spare part.
32	Valve manifold, bottom		
33	Diaphragm module, bottom		
34	Solenoid valve		
35	Distributor housing		Not available as a spare part.
36	Cover		Not available as a spare part.
37	Screw		Tightening torque 1 Nm / Not available as a spare part.
38	Profile		Not available as a spare part.

4 LED displays

The various LEDs on the display panel light up continuously or flash to indicate maintenance work or malfunctioning adsorption dryer components.

LED symbol meaning					
	Green LED lights up continuously.		Red LED lights up continuously.		Red LED flashes.

LED colours and signals	Description	Action
	Maintenance interval after 12,000 hours of operation	Replace drying agent cartridge **Documents** see Chapter 6.1 „Replacing the drying agent cartridges“
	Fault in right solenoid valve	Replace right solenoid valve **Documents** see Chapter 5.4.1 „Removing the solenoid valves for the pilot air from the controller“
	Fault in left solenoid valve	Replace left solenoid valve **Documents** see Chapter 5.4.1 „Removing the solenoid valves for the pilot air from the controller“
	Fault in condensate drain valve	Replace condensate drain valve **Documents** see Chapter 5.4.2 „Removing the condensate drain valve from the controller“
	Fault in controller	Replace controller **Documents** see Chapter 5.3 „Removing the controller“
	Fault in power supply	Check power supply **Documents** see “Operating instructions for adsorption dryer”

5 Repair steps

This chapter describes how to dismantle, repair and assemble adsorption dryers of type PDAD. The adsorption dryer does not have to be completely dismantled for the purposes of replacing defective components every time there is a fault. The complete dismantling procedure described here is intended only to provide an overview of the components and how to access them when they need to be replaced. The cause of a defect must therefore always be determined before starting a repair.

The repair steps in these repair instructions are explained using an adsorption dryer of type PDAD 13 as an example. Differences in the repair steps for other PDAD types are indicated in writing where applicable.

Documents

The maintenance work is described in Chapter 6 „Maintenance“.

Note

In these repair instructions the adsorption dryer is always shown without a prefilter.

Warning

A shutdown must be performed before carrying out any maintenance or repair work.

Documents

The necessary work instructions for shutdown can be found in the operating instructions for the respective adsorption dryer.

Note

The repair should preferably be carried out on a stable and flat work surface with storage for small parts.

5.1 Removing the front and rear cover

5.1.1 Removing the front cover

- Loosen the screw in the front cover and unscrew it completely.

- Pull the front cover outwards.
- Remove the front cover by pulling it downwards.

Documents

The following maintenance work can be carried out when the front cover is removed:

- Replacement or cleaning of the air nozzle, see Chapter 6.2 “Replacing or cleaning the air nozzle”.
- Replacement of the diaphragms, see Chapter 6.4 “Replacing the diaphragms in the upper and lower valve manifold”.

Note (PDAD-100 only)

The PDAD-100 is equipped with four drying agent cartridges, i.e. there are two upper and two lower valve manifolds.

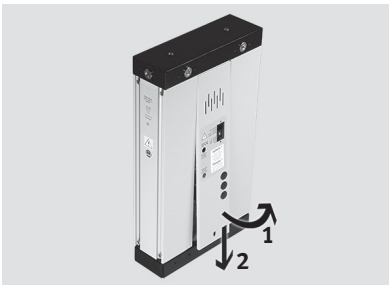
When replacing or cleaning the air nozzles or diaphragms of the PDAD-100, the front and rear cover must always be removed.

5.1.2 Removing the rear cover

- Loosen the two self-tapping screws on the power supply socket and unscrew them completely.

- Loosen the screw in the rear cover and unscrew it completely.

- Pull the rear cover outwards.
- Remove the rear cover by pulling it downwards.



5.2 Removing the distributor housing

Note

The distributor housing can be rotated by 180° to adapt the compressed air inlet and outlet ports to the adsorption dryer installation.

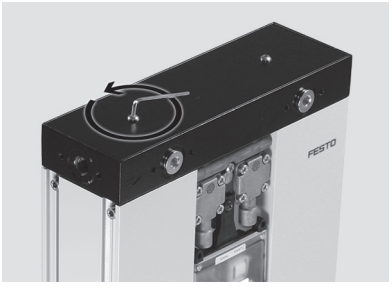
Documents

See Chapter “Installation” in the operating instructions.

Note

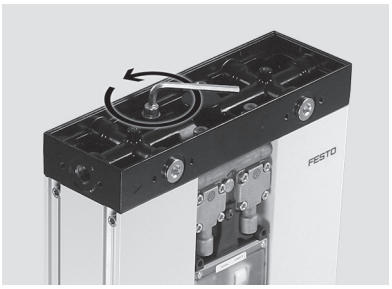
The distributor housing can also be installed or removed with the front and rear cover in place.

- Loosen the two screws in the cover and unscrew them completely.

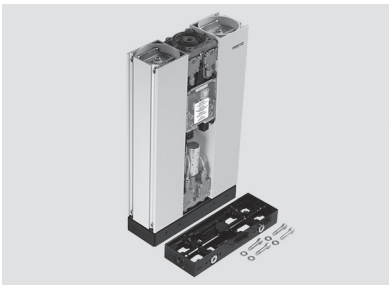


- Remove the cover.

- Loosen the four screws in the distributor housing and unscrew them completely.



- Remove the distributor housing.



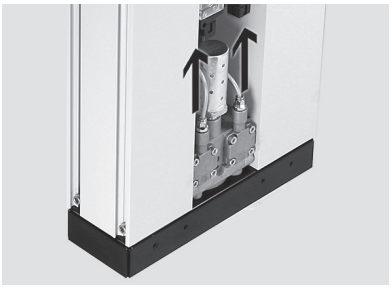
5.3 Removing the controller

The controller must be completely replaced in the event of a fault. The solenoid valves attached to the controller can be removed individually and replaced when the controller is removed.

Documents

See Chapter 5.4 “Removing solenoid valves from the controller”.

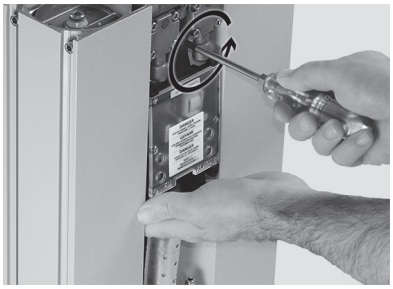
- Remove the two pilot air tubes from the push-in fittings QS, Quick Star on the lower valve manifold.



Note (PDAD-100 only)

The PDAD-100 is equipped with four pilot air tubes, i.e. also remove the two pilot air tubes from the push-in fittings QS, Quick Star on the second lower valve manifold.

- Loosen the screw on the controller support on the upper valve manifold and unscrew it completely.
- Hold the controller securely with the other hand.

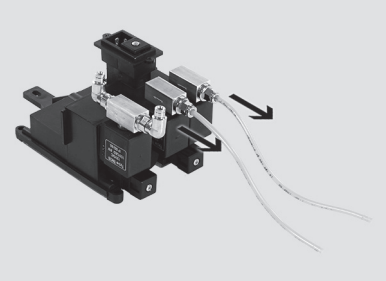


- Remove the controller.

5.4 Removing solenoid valves from the controller

5.4.1 Removing the solenoid valves for the pilot air from the controller

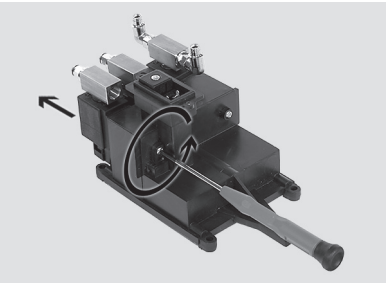
- Remove the two pilot air tubes from the push-in fittings QS, Quick Star on the solenoid valves.



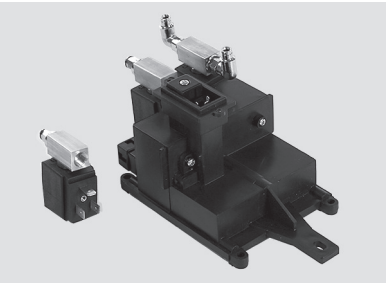
Note (PDAD-100 only)

The PDAD-100 is equipped with four pilot air tubes, i.e. the two solenoid valves for controlling the valve manifolds each have two pilot air tubes.

- Loosen the mounting screw of the first solenoid valve and unscrew it until the solenoid valve can be removed.
- Remove the solenoid valve from the controller.



- The second solenoid valve is removed in the same way as the first.



Documents

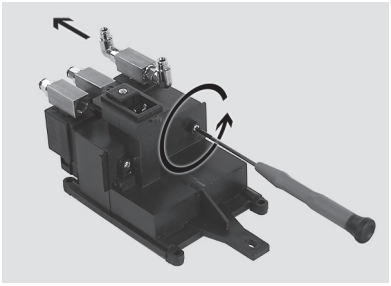
Installation of the solenoid valves is described in Chapter 5.9.1 “Installing the solenoid valves for the pilot air on the controller”.

5.4.2 Removing the condensate drain valve from the controller

Note

The construction of the condensate drain valve is identical to that of the solenoid valve.

- Loosen the mounting screw of the condensate drain valve and unscrew it until the condensate drain valve can be removed.
- Remove the condensate drain valve from the controller.



Documents

Installation of the condensate drain valve is described in Chapter 5.9.2 „Installing the condensate valve on the controller“.

5.5 Removing the profiles with the drying agent cartridges

Documents

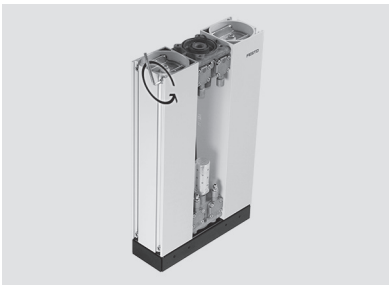
Removal of the profile for regular changing of the drying agent cartridges is described in Chapter 6.1 “Replacing the drying agent cartridges”.

Note (PDAD-100 only)

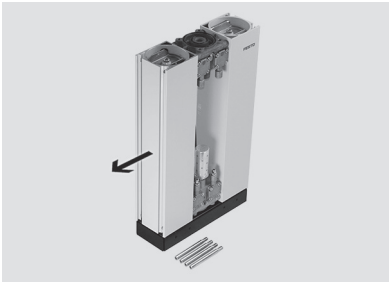
The PDAD-100 is equipped with four drying agent cartridges.

Removing the left profile

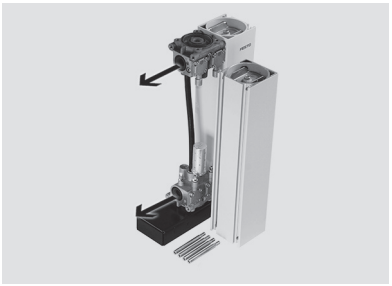
- Loosen the four spacer bolts of the left profile and unscrew them completely.



- Remove the left profile with the drying agent cartridge from the adsorption dryer.



- Remove the two O-rings between the left profile and the upper and lower valve manifold.
- Dispose of the O-rings.



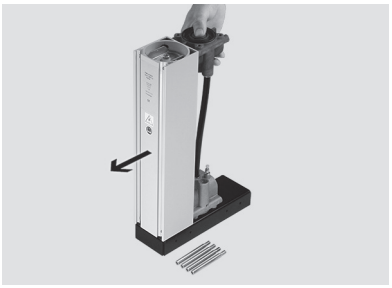
Removing the right profile

Note

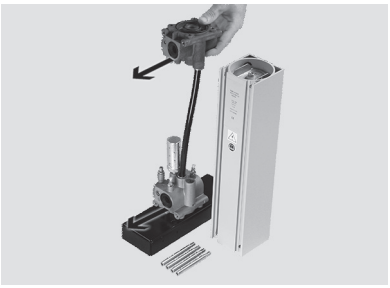
The adsorption dryer is shown here from the rear.

- Loosen the four spacer bolts of the right profile and unscrew them completely.

- Hold the upper valve manifold securely.
- Remove the right profile with the drying agent cartridge from the adsorption dryer.



- Remove the two O-rings between the right profile and the upper and lower valve manifold.
- Dispose of the O-rings.



5.6 Removing the valve manifolds

Warning

With the exception of the work described in these repair instructions, **no** repairs or modifications may be carried out on the valve manifolds.

Note (PDAD-100 only)

The PDAD-100 is equipped with two upper and two lower valve manifolds.

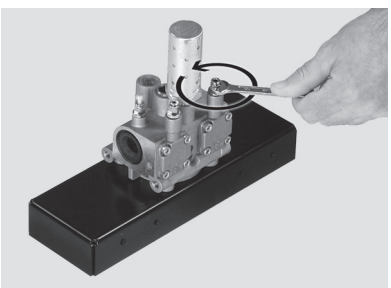
5.6.1 Removing the upper valve manifold

- Disconnect the upper valve manifold from the tube. Use an open-jawed spanner (SW 15) to push in the push-in fitting QS, Quick Star coupling and remove the upper valve manifold.

5.6.2 Removing the silencer

- Disconnect the tube from the push-in fitting QS, Quick Star on the lower valve manifold. Use an open-jawed spanner (SW 15) to push in the push-in fitting QS, Quick Star coupling and remove the upper valve manifold.

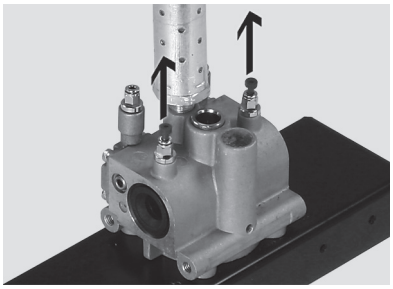
- Unscrew the two free push-in fittings QS, Quick Star on the lower valve manifold.



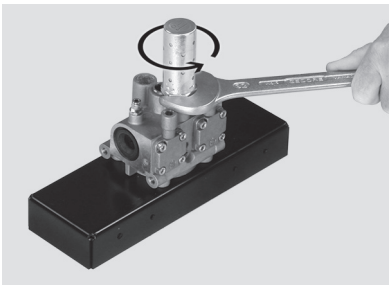
Note

The lower valve manifold is shown here from the rear.

- Remove the two blanking plugs from the two push-in fittings QS, Quick Star on the lower valve manifold.

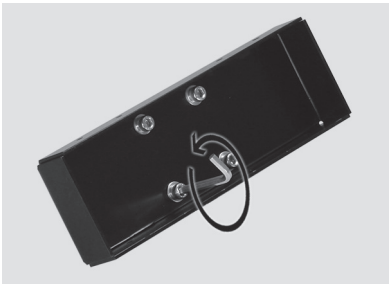


- Unscrew the silencer from the lower valve manifold.

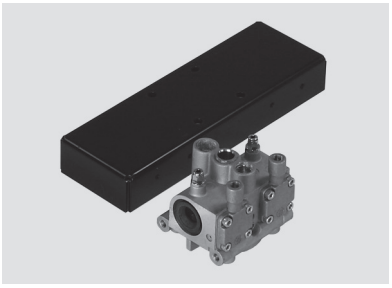


5.6.3 Removing the lower valve manifold

- Loosen the four screws of the lower valve manifold and unscrew them.



- Remove the valve manifold from the base plate.

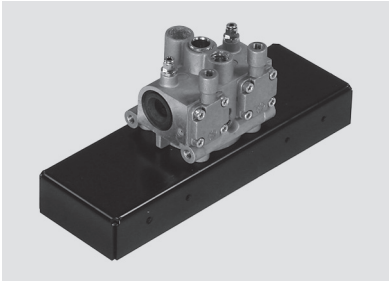


5.7 Installing the valve manifolds

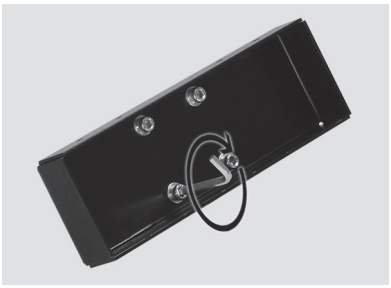
Note (PDAD-100 only)
The PDAD-100 is equipped with two upper and two lower valve manifolds.

5.7.1 Installing the lower valve manifold

- Place the lower valve manifold on the base plate with the diaphragm covers facing forwards.

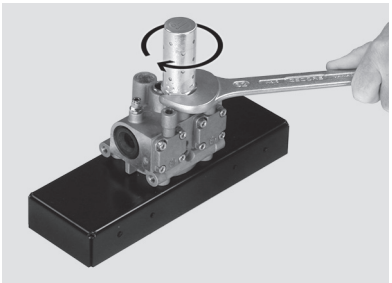


- Screw the lower valve manifold onto the base plate from underneath using four screws and washers. The maximum tightening torque is 20 Nm.



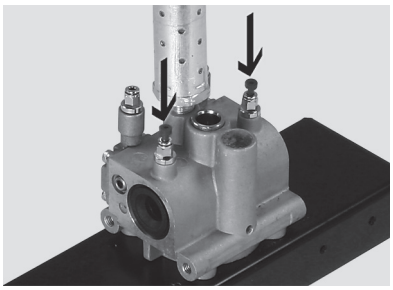
5.7.2 Installing the silencer

- Screw the silencer onto the lower valve manifold. The maximum tightening torque is 5 ±1 Nm.

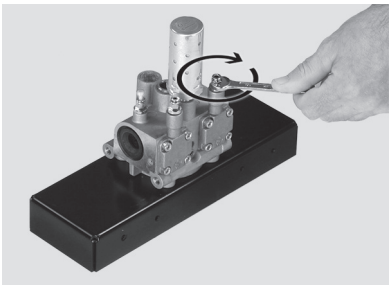


Note
The lower valve manifold is shown here from the rear.

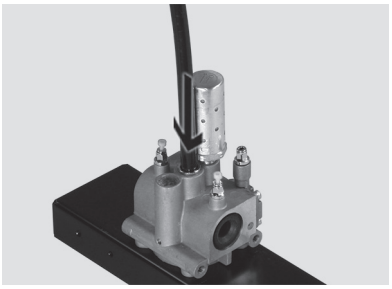
- Insert the two blanking plugs into the two **rear** push-in fittings QS, Quick Star on the lower valve manifold.



- Screw the two push-in fittings QS, Quick Star onto the lower valve manifold. The maximum tightening torque is 10 Nm.



- Insert the tube into the push-in fitting QS, Quick Star on the lower valve manifold.



5.7.3 Installing the upper valve manifold

- Push the upper valve manifold with the push-in fitting QS, Quick Star onto the tube with the diaphragm covers facing the silencer.

5.8 Installing the profiles with the drying agent cartridges

Documents

Installation of the profile with the drying agent cartridges for regular changing of the drying agent cartridges is described in Chapter 6.1 “Replacing the drying agent cartridges”.

Note (PDAD-100 only)

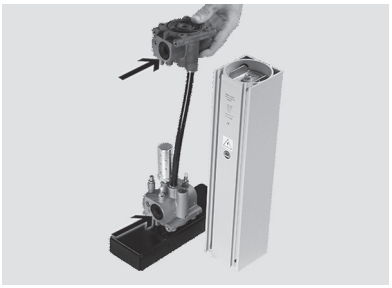
The PDAD-100 is equipped with four drying agent cartridges.

Installing the right profile

Note

The adsorption dryer is shown here from the rear.

- Hold the upper valve manifold securely.
- Insert new O-rings between the right profile and the upper and lower valve manifold.



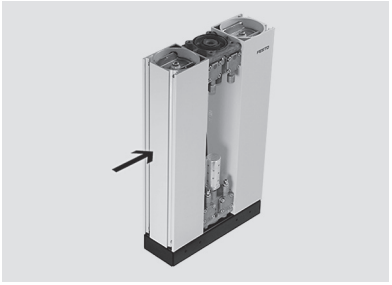
- Place the right profile with the drying agent cartridge on the base plate.

- Screw on the four spacer bolts of the right profile and tighten them.
  The maximum tightening torque is 20 Nm.

Installing the left profile

- Insert new O-rings between the left profile and the upper and lower valve manifold.

- Place the left profile with the drying agent cartridge on the base plate.



- Screw on the four spacer bolts of the left profile and tighten them. The maximum tightening torque is 20 Nm.

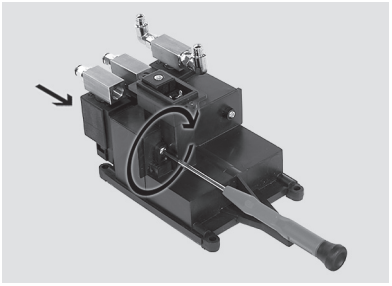
5.9 Installing solenoid valves on the controller

5.9.1 Installing the solenoid valves for the pilot air on the controller

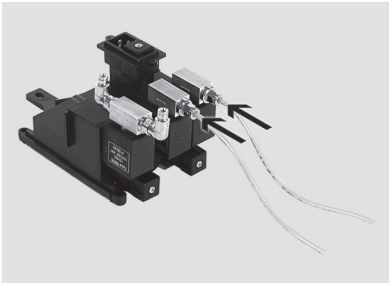
Note (PDAD-100 only)

The PDAD-100 is equipped with four pilot air tubes, i.e. the two solenoid valves for controlling the valve manifolds each have two pilot air tubes.

- Insert the first solenoid valve with the contacts into the sockets of the controller.
- Tighten the mounting screw for the solenoid valve on the controller. The maximum tightening torque is 1 Nm.



- The second solenoid valve is installed in the same way as the first.
- Insert the pilot air tubes into the push-in fittings QS, Quick Star on the solenoid valves.

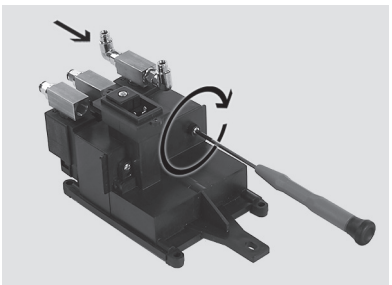


5.9.2 Installing the condensate valve on the controller

Note

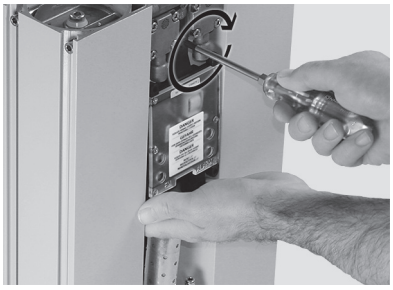
The construction of the condensate drain valve is identical to that of the solenoid valve.

- Insert the condensate drain valve with the contacts into the sockets of the controller.
- Tighten the mounting screw for the condensate drain valve on the controller. The maximum tightening torque is 1 Nm.



5.10 Installing the controller

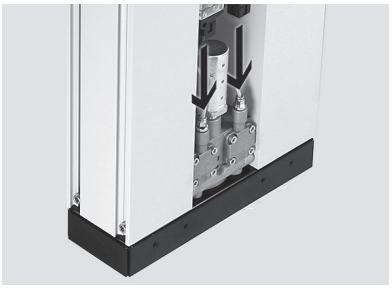
- Tighten the controller support on the upper valve manifold with the screw. The maximum tightening torque is 1 Nm.



Note (PDAD-100 only)

The PDAD-100 is equipped with four pilot air tubes, i.e. also insert the two pilot air tubes from the push-in fittings QS, Quick Star on the second lower valve manifold.

- Insert the two pilot air tubes in the push-in fittings QS, Quick Star on the lower valve manifold.



5.11 Installing the distributor housing

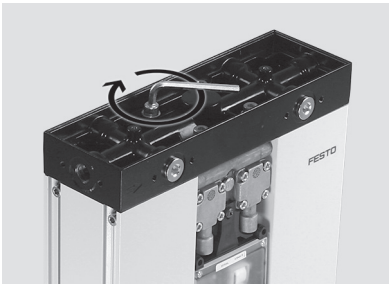
Note

Check the installation position of the adsorption dryer. The distributor housing can be rotated by 180° to adapt the compressed air inlet and outlet ports to the installation.

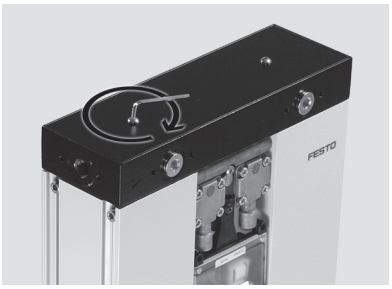
Documents

See Chapter “Installation” in the operating instructions.

- Place the distributor housing on the adsorption dryer.
- Tighten the four screws of the distributor housing. The maximum tightening torque is 20 Nm.



- Place the cover on the distributor housing.
- Tighten the cover on the distributor housing with two screws and washers. The tightening torque is 1 Nm.

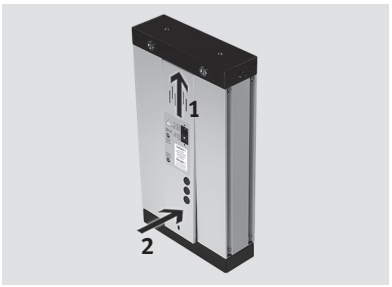


5.12 Installing the rear and front cover

5.12.1 Installing the rear cover

- Insert the rear cover with the contact spring in the slot of the adsorption dryer.

- Push the cover upwards and then inwards.



- Tighten the rear cover with the screw. The maximum tightening torque is 1 Nm.

- Tighten the two self-tapping screws on the power supply socket. The maximum tightening torque is 1 Nm.

5.12.2 Installing the front cover

- Insert the front cover with the contact spring in the slot of the adsorption dryer.

- Push the cover upwards and then inwards.

- Tighten the front cover with the screw. The maximum tightening torque is 1 Nm.

Documents

Installation of the prefilter, commissioning and the reset procedure of the controller are described in the operating instructions.

6 Maintenance

This chapter contains key technical information about how to carry out maintenance work on adsorption dryers of type PDAD.

Documents
A detailed description of the steps for care and maintenance can be found in the operating instructions.

Warning
A shutdown must be performed before carrying out any maintenance or repair work.

Documents
The necessary work instructions for shutdown can be found in the operating instructions for the respective adsorption dryer.

6.1 Replacing the drying agent cartridges

6.1.1 Changing drying agent cartridges

Note
Both drying agent cartridges must be replaced at each maintenance interval.

Note (PDAD-100 only)
In the case of the PDAD-100, all four drying agent cartridges must be replaced at each maintenance interval.

- Loosen the two screws in the cover on the distributor housing and unscrew them completely.

- Remove the cover.

Note

Always remove only **one** profile with the drying agent cartridge from the adsorption dryer.

- Loosen the four spacer bolts of the profile slightly.

- Loosen each of the four screws in the distributor housing with three full rotations.

- Unscrew the four spacer bolts of the profile completely.

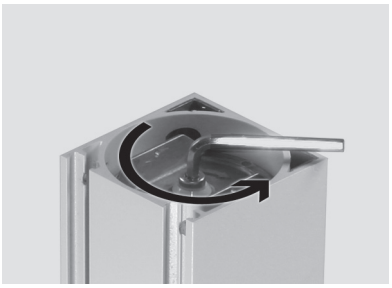
- Remove the profile with the drying agent cartridge from the adsorption dryer.

- Remove the O-rings between the profile and the upper and lower valve manifold.
- Dispose of the O-rings.

Note

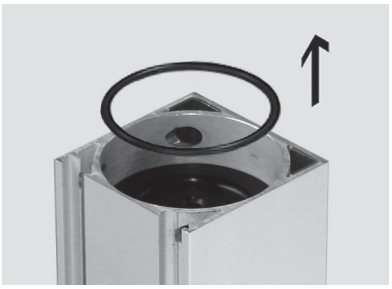
Always remove only **one** gasket, while the other remains in place.

- Loosen the screw of the upper gasket.



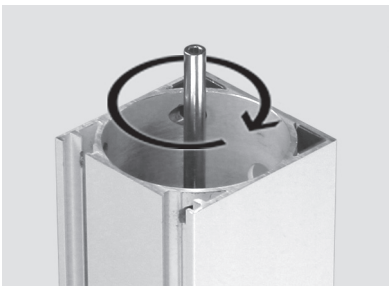
- Pull the upper metal cover with the plastic disc and the screw from the profile.
- Dispose of the plastic disc.

- Remove the O-ring of the ring fitting from the profile.
- Dispose of the O-ring.



- Remove the ring fitting from the profile.

- Screw one of the spacer bolts or another suitable carriage bolt with M8 thread into the drying agent cartridge.



- Using this screw, pull the drying agent cartridge with the remaining O-ring from the profile.
- Dispose of the O-ring.

- Unscrew the screw from the drying agent cartridge completely.
- Dispose of the old drying agent cartridge in accordance with local waste disposal regulations.

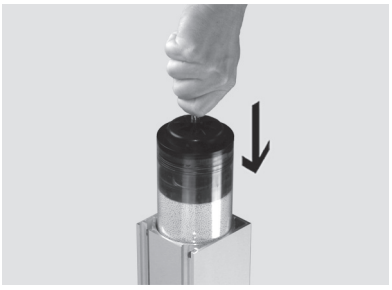
- Lay out the new parts from the service kit for changing the cartridge:
  - Plastic disc
  - Two large O-rings

- Screw one of the spacer bolts or another suitable carriage bolt with M8 thread into the new drying agent cartridge.

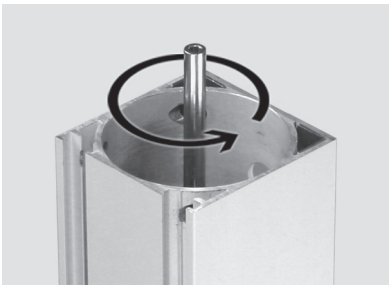
Warning

The new drying agent cartridge must be inserted **carefully** in the profile.
Do **not** allow the drying agent cartridge to fall into the profile.

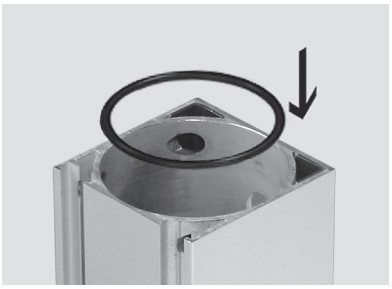
- Using this screw, insert the drying agent cartridge **carefully** in the profile.



- Unscrew the screw from the drying agent cartridge completely.

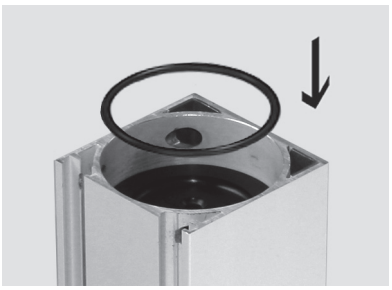


- Place a new large O-ring (included in service kit) on the drying agent cartridge.

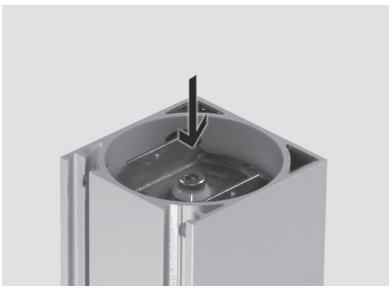


- Insert the ring fitting in the profile.

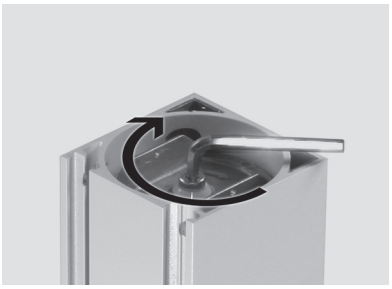
- Place a new large O-ring (included in service kit) on the ring fitting.



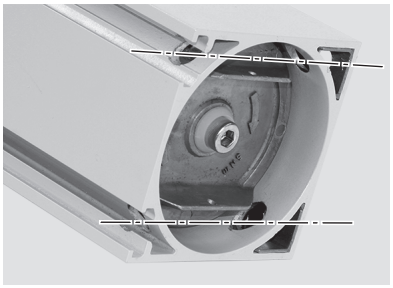
- Insert the upper metal cover with the new plastic disc (included in service kit) and the screw in the profile.



- Rotate the screw in the drying agent cartridge slightly.



- Align the gripping surfaces of the metal cover in parallel with the through axes of the mounting holes for the spacer bolts, as otherwise the spacer bolts cannot be inserted.
- Make sure that the spacer bolts are pushed through the mounting holes.



- Tighten the mounting screw. The maximum tightening torque is 5 Nm.

6.1.2 Replacing the O-ring on the lower gasket

Note
Replacement of the O-ring on the lower gasket must only be carried out if the lower gasket is leaking.

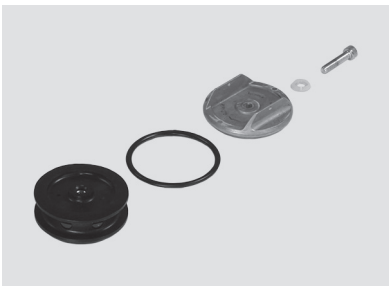
Note
Always remove only **one** gasket, while the other remains in place.

- Loosen the screw of the lower gasket.

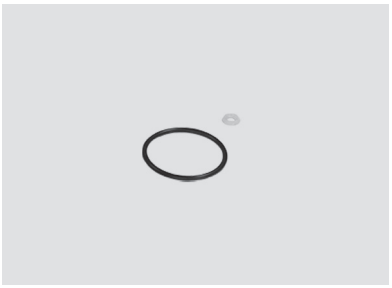
- Remove the lower gasket from the profile.

- Unscrew the screw from the lower gasket completely.

- Dispose of the following parts:
  - Plastic disc
  - Large O-ring
- Store the following parts, as they will be reused:
  - Metal cover
  - Ring fitting
  - Screw

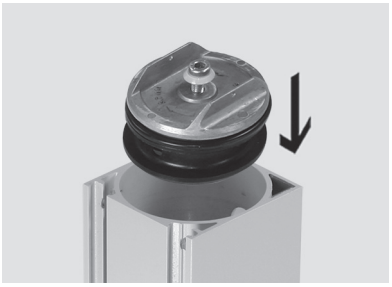


- Lay out the following new parts from the service kit for replacing the O-ring on the lower gasket:
  - Plastic disc
  - Large O-ring

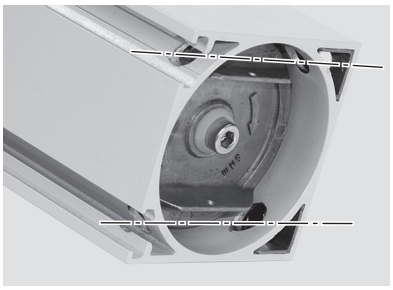


- Assemble the lower gasket, consisting of the new large O-ring, the new plastic disc (included in service kit) and the old ring fitting, the old metal cover and the old screw.
- Turn the screw slightly.

- Insert the lower gasket in the profile.



- Align the gripping surfaces of the metal cover in parallel with the through axes of the mounting holes for the spacer bolts, as otherwise the spacer bolts cannot be inserted.
- Make sure that the spacer bolts are pushed through the mounting holes.



- Tighten the mounting screw. The maximum tightening torque is 5 Nm.

6.1.3 Installing the profile with the drying agent cartridge on the adsorption dryer

- Insert a new O-ring (included in service kit) in the upper and lower valve manifold.

- Place the profile with the drying agent cartridge in the adsorption dryer.

Note

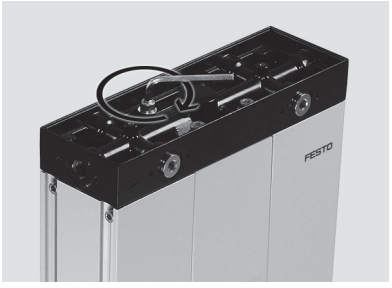
Make sure that the profile is seated correctly – it must make contact with both valve manifolds.

- Screw in the four spacer bolts of the profile until it is fitted securely.

Note

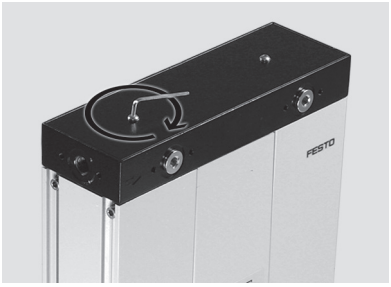
Replace the other drying agent cartridges as described.

- Tighten the four screws of the distributor housing. The maximum tightening torque is 20 Nm.



- Tighten all four spacer bolts of the profile. The maximum tightening torque is 20 Nm.

- Place the cover on the distributor housing.
- Tighten the cover on the distributor housing with two screws and washers. The tightening torque is 1 Nm.



Documents

Installation of the prefilter, commissioning and the reset procedure of the controller are described in the operating instructions.

6.2 Replacing or cleaning the air nozzle

Documents

Information on selecting the right air nozzle for the operating pressure can be found in the operating instructions.

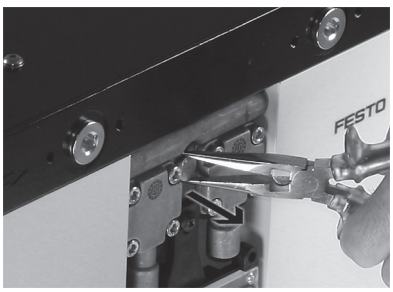
The air nozzle is installed in the upper valve manifold. To clean or replace the air nozzle, the front cover must be removed. In the case of the PDAD-100, the rear cover must also be removed, as there are two upper valve manifolds with an air nozzle each.

Documents

Removal of the front cover is described in Chapter 5.1.1 “Removing the front cover”, while removal of the rear cover is described in Chapter 5.1.2 “Removing the rear cover”.

- Unscrew the mounting screw of the air nozzle on the upper valve manifold.

- Remove the air nozzle from the valve manifold using a pliers.



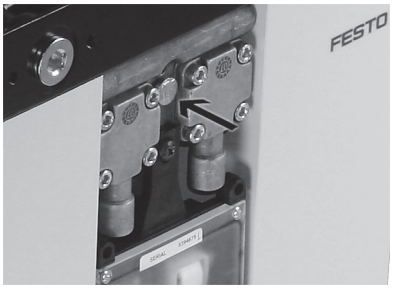
Note

To clean the air nozzle, wash it in warm, soapy water and then allow to dry completely.

Do not use any sharp implements or tools.

- Make sure that the two O-rings are not damaged and are positioned correctly.

- Insert the new or cleaned air nozzle in the upper valve manifold.



- Reinsert the mounting screw of the air nozzle in the upper valve manifold and tighten it. The maximum tightening torque is 3 Nm.

Note (PDAD-100 only)

In the case of the PDAD-100, the second air nozzle in the upper valve manifold behind the rear cover must also be replaced or cleaned as described.

- Install the front cover; in the case of the PDAD-100 the rear cover must also be installed.

Documents

Installation of the front cover is described in Chapter 5.12.2 “Installing the front cover”, while installation of the rear cover is described in Chapter 5.12.1 “Installing the rear cover”.

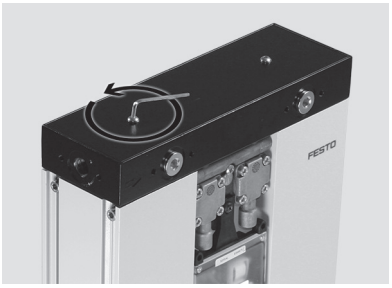
Documents

Installation of the prefilter, commissioning and the reset procedure of the controller are described in the operating instructions.

6.3 Replacing or cleaning the silencer

The silencer is screwed onto the lower valve manifold. To clean or replace the silencer, the front cover must be removed. In the case of the PDAD-100, the rear cover must also be removed, as there are two silencers here.

- Remove the front and rear cover.



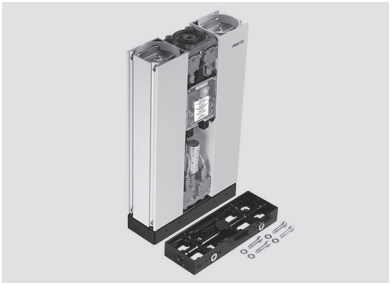
Documents

Removal of the front cover is described in Chapter 5.1.1 “Removing the front cover”, while removal of the rear cover is described in Chapter 5.1.2 “Removing the rear cover”.

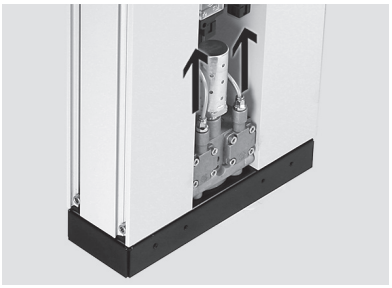
- Loosen the two screws in the cover on the distributor housing and unscrew them.
- Remove the cover.

- Loosen the four screws in the distributor housing and unscrew them.

- Remove the distributor housing.



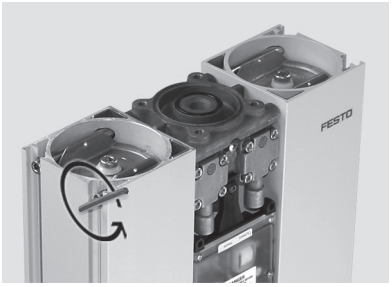
- Remove the two pilot air tubes from the push-in fittings QS, Quick Star on the lower valve manifold.



Note (PDAD-100 only)

The PDAD-100 is equipped with four pilot air tubes, i.e. also remove the two pilot air tubes from the push-in fittings QS, Quick Star on the second lower valve manifold.

- Hold the upper valve manifold securely.
- Unscrew the four upper spacer bolts of both profiles completely.

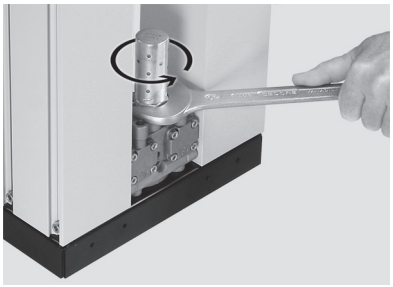


- Disconnect the tube with the upper valve manifold from the push-in fitting QS, Quick Star. Use an open-jawed spanner (SW 15) to push in the push-in fitting QS, Quick Star coupling and remove the upper valve manifold.

- Place the upper valve manifold with the controller and the tube to one side.

- Unscrew the two push-in fittings QS, Quick Star on the lower valve manifold.

- Unscrew the silencer from the lower valve manifold.



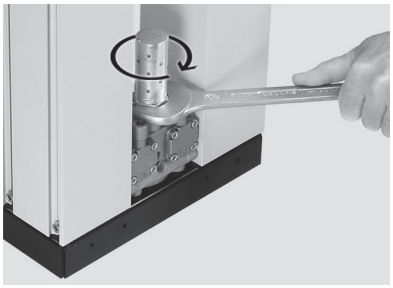
- Clean the silencer thread.

Note

The silencer can be cleaned thoroughly in warm, soapy water and then allowed to dry completely.

Do not use any sharp implements or tools.

- Insert the new or cleaned silencer in the lower valve manifold and tighten it. The maximum tightening torque is 5 ±1 Nm.



Note (PDAD-100 only)

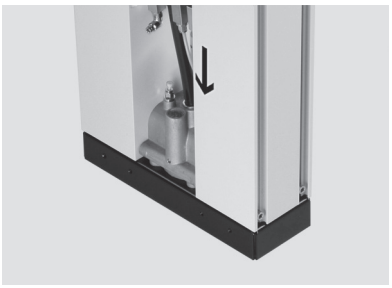
In the case of the PDAD-100, the second silencer in the lower valve manifold behind the rear cover must also be replaced or cleaned as described.

- Screw the two push-in fittings QS, Quick Star onto the lower valve manifold. The maximum tightening torque is 10 Nm.

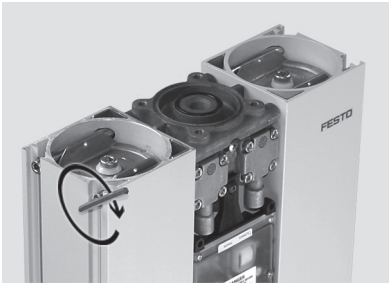
Note

The adsorption dryer is shown here from the rear.

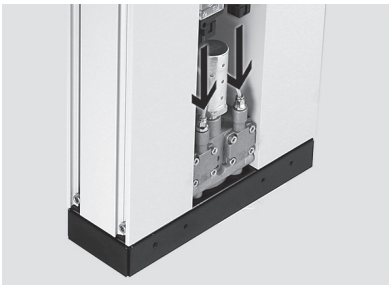
- Insert the tube with the upper valve manifold and the controller into the push-in fitting QS, Quick Star on the lower valve manifold.
- The controller is located on the front of the adsorption dryer.



- Hold the upper valve manifold securely.
- Tighten the upper spacer bolts of both profiles. The maximum tightening torque is 20 Nm.



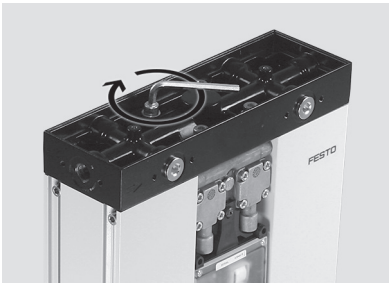
- Insert the two pilot air tubes in the push-in fittings QS, Quick Star on the lower valve manifold.



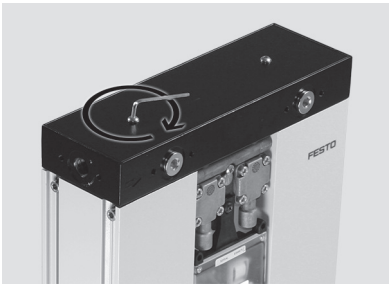
Note (PDAD-100 only)

The PDAD-100 is equipped with four pilot air tubes, i.e. also remove the two pilot air tubes from the push-in fittings QS, Quick Star on the second lower valve manifold.

- Place the distributor housing on the adsorption dryer.
- Tighten the four screws of the distributor housing. The maximum tightening torque is 20 Nm.



- Place the cover on the distributor housing.
- Tighten the cover on the distributor housing with two screws and washers. The tightening torque is 1 Nm.



- Install the front and rear covers.

Documents

Installation of the front cover is described in Chapter 5.12.2 “Installing the front cover”, while installation of the rear cover is described in Chapter 5.12.1 “Installing the rear cover”.

Documents

Installation of the prefilter, commissioning and the reset procedure of the controller are described in the operating instructions.

6.4 Replacing the diaphragms in the upper and lower valve manifold

Each valve manifold is equipped with two diaphragms. To replace the diaphragms, the front cover must be removed. In the case of the PDAD-100, the rear cover must also be removed, as there are four valve manifolds here.

Note

It is recommended that you always replace all four diaphragms (or all eight in the case of the PDAD-100) at the same time in order to minimise adsorption dryer down-time.

Note

The procedure for changing the diaphragm in the upper valve manifold is described below.

The operating sequence for changing the diaphragm on the lower valve manifold is identical apart from the **different mounting position of the diaphragm and the housing cover**. It is also recommended that both pilot air tubes be removed from the push-in fittings QS, Quick Star on the lower valve manifold.

Documents

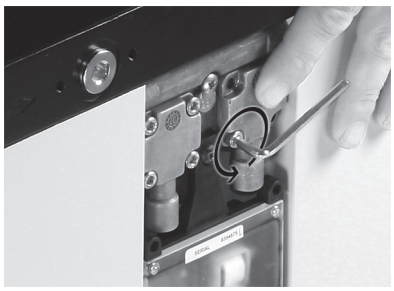
Removal of the front cover is described in Chapter 5.1.1 “Removing the front cover”, while removal of the rear cover is described in Chapter 5.1.2 “Removing the rear cover”.

Documents

Removal and installation of the pilot air tubes on the lower valve manifold is described in Chapter 6.5 “Replacing the pilot air tubes”.

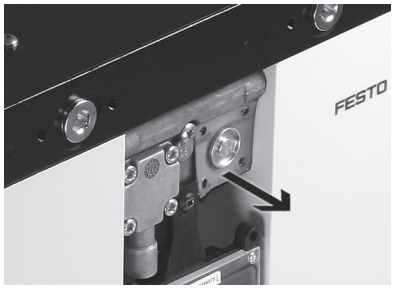
- Loosen the four screws in the housing cover.

- Push the housing cover against the valve manifold.
- Remove the four screws completely.



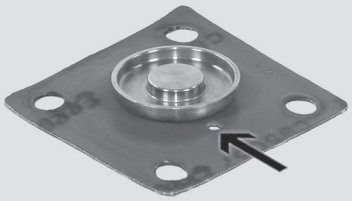
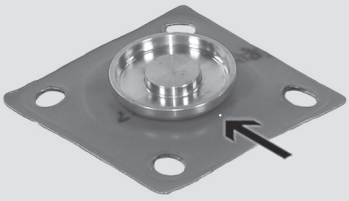
- Remove the housing cover and the tapered spring behind it.
- Dispose of the spring.

- Remove the diaphragm and the spring disc.
- Dispose of the diaphragm and the spring disc.



Warning

The diaphragms themselves and the mounting position of the diaphragms for the upper and lower valve manifolds are different; see the table below.

Mounting location	Diaphragm	Mounting position
Upper valve manifold		**Note** The exhaust port in the diaphragm is larger than that in the diaphragm for the lower valve manifold. The exhaust port in the diaphragm faces the base plate of the adsorption dryer, i.e. downwards.
Lower valve manifold		**Note** The exhaust port in the diaphragm is smaller than that in the diaphragm for the upper valve manifold. The exhaust port in the diaphragm faces the distributor housing of the adsorption dryer, i.e. upwards.

Upper valve manifold

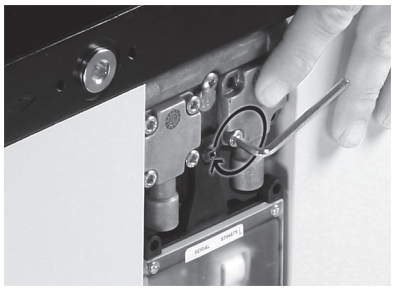
- Position the new diaphragm.
- Check that the exhaust port is positioned correctly – it must face the base plate, i.e. downwards.
- Place the tapered spring with the side that has the smaller diameter on the spring disc of the brass disc of the diaphragm and hold it securely.

Lower valve manifold

- Position the new diaphragm.
- Check that the exhaust port is positioned correctly – it must face the distributor housing, i.e. upwards.
- Place the tapered spring with the side that has the smaller diameter on the spring disc of the brass disc of the diaphragm and hold it securely.

- Centre the housing cover on the tapered spring; the spring must sit in the circular indent in the housing cover.

- Push the housing cover against the valve manifold.
- Tighten the housing cover with the two **diagonally** mounted screws. The tightening torque is 5 ±1 Nm.
- Tighten the other two screws. The tightening torque is 5 ±1 Nm.



Note (PDAD-100 only)

In the case of the PDAD-100, the diaphragms in both valve manifolds behind the rear cover must also be replaced as described.

Documents

Installation of the front cover is described in Chapter 5.12.2 “Installing the front cover”, while installation of the rear cover is described in Chapter 5.12.1 “Installing the rear cover”.

Documents

Installation of the prefilter, commissioning and the reset procedure of the controller are described in the operating instructions.

6.5 Replacing the pilot air tubes

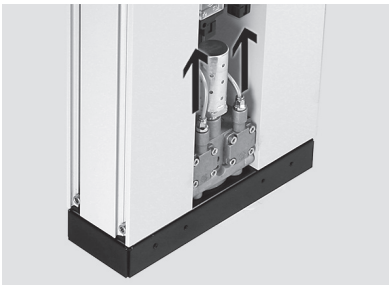
The pilot air tubes connect the controller with the lower valve manifold.
To replace the pilot air tubes, the front and rear cover must be removed.

Note (PDAD-100 only)
In the case of the PDAD-100, four pilot air tubes must be replaced, as there are two lower valve manifolds here.

Documents
Removal of the front cover is described in Chapter 5.1.1 “Removing the front cover”, while removal of the rear cover is described in Chapter 5.1.2 “Removing the rear cover”.

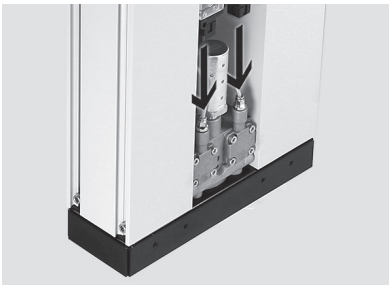
- Remove the two pilot air tubes from the push-in fittings QS, Quick Star on the solenoid valves.

- Remove the two pilot air tubes from the push-in fittings QS, Quick Star on the lower valve manifold.



- Cut the new pilot air tubes to the same length as the removed pilot air tubes.
- Insert the pilot air tubes into the push-in fittings QS, Quick Star on the solenoid valves.

- Insert the pilot air tubes into the push-in fittings QS, Quick Star on the lower valve manifold.



Documents

Installation of the front cover is described in Chapter 5.12.2 “Installing the front cover”, while installation of the rear cover is described in Chapter 5.12.1 “Installing the rear cover”.

Documents

Installation of the prefilter, commissioning and the reset procedure of the controller are described in the operating instructions.

7 Recommissioning the adsorption dryer

7.1 Recommissioning

Documents

The necessary work instructions for commissioning can be found in the operating instructions for the respective adsorption dryer.

7.2 Resetting the controller

The controller must be reset after carrying out commissioning.

Documents

The necessary work instructions for resetting the controller can be found in the operating instructions for the respective adsorption dryer.

8 Tools

This chapter provides an overview of the tools and aids required to repair and maintain adsorption dryers of type PDAD.

8.1 Standard tools

The following standard tools are required for the repair and maintenance of adsorption dryers of type PDAD:

Designation	Additional information
Allen key	3 – 6 mm
Torque wrench	1 – 20 Nm
PZ Phillips screwdriver	PZ1, PZ2
Flat pliers	–
Open-jawed spanner	SW 9, SW 11, (SW 15), SW 32

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