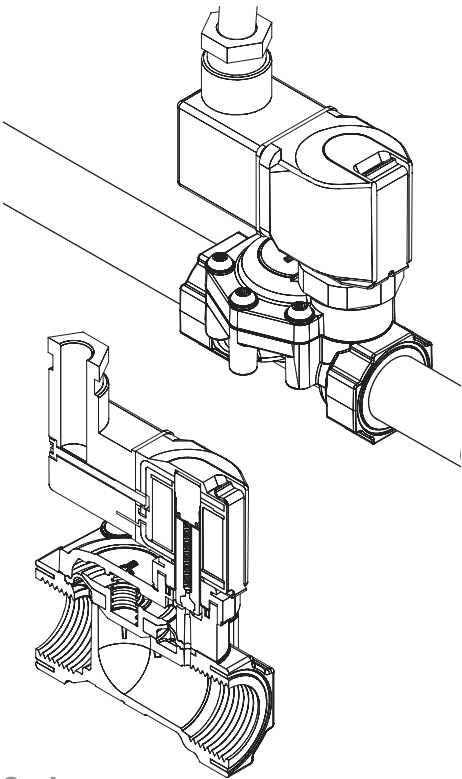


Maintenance manual for pre-controlled diaphragm valves

Document No. EN1377027WA Revision: 4

Keep documentation for future use!



Series

84070 **84080** ^N ^N NPT thread

1 About this documentation

This maintenance manual guides you to check, clean and dismantle pre-controlled diaphragm valves and to replace spare parts.

- Carefully read this maintenance manual prior to maintain the valve.
- Store the this maintenance manual ensuring easy access for all involved parties.

1.1 Documentation validity

These mounting instructions applies to pre-controlled diaphragm valves of series

- 84070 (G thread)
- 84080 (NPT thread)

These mounting instructions are intended for: plant operators, installers, maintenance and service technicians.

Applicable documentation

Mounting instructions EN1377027M0

1.2 Structure of safety instructions

Safety instructions warn against dangerous situations and must be observed in particular. Safety instructions are structured as follows:

SIGNAL WORD

Type of hazard

Consequences of non-observance

- Precautions necessary to avoid the hazard

1.3 Hazard classes (ANSI Z535.6)

⚠ DANGER

Safety information indicates a hazardous situation with high risk which, if not avoided, will certainly result in death or (serious) injury.

⚠ WARNING

Safety information indicates a hazardous situation with moderate risk which, if not avoided, can cause death or severe injury.

⚠ CAUTION

Safety information indicates a hazardous situation on which, if not avoided, could result in minor or moderate injury.

NOTICE

Information indicates a hazardous situation which, if not avoided, could result damage to property.

1.4 Styles and symbols

This documentation uses the following styles and symbols:




| | |
|----------|---------------------------------|
| • | list |
| → | instruction |
| 1. | preset order of instructions |
| 1 | constant part number (document) |
| 1 | flexible part number (section) |
| X | replace spare part |

⚠ + **DANGER** / **WARNING** / **CAUTION**;
NOTICE: embedded safety message

given limits or fixed value

1.5 Personal protection equipment

- Wear appropriate protection equipment. Observe the personal protection equipment as requested in “residual risks” (refer to chapter **2**).

| | |
|---|--|
|  | Protective eye glasses to protect from escaping fluids or exhausting compressed air |
|  | Protective gloves Resistance to cutting to protect from sharp edges or ridges; resistance to acids to protect from hazardous fluids |
|  | Protective footwear to protect from parts or tools falling down |

2 General safety instructions

These safety instructions are only related to the single valve. In combination with other plant components there may be other potential dangers, which must be taken into account by carrying out a risk analysis for the system.

- Compare the details on the rating plate and data sheet to the operating data. The particular application must not exceed the given limits (e.g. pressure, temperature).
- Only perform mounting works when the pipe system is in depressurized state.
- Prime the valve slowly when commissioning. Fast pressurizing will cause the valve to open briefly.
- Strength tests with the valve seat open are permitted maximum up to 1.5 times of the nominal pressure rating (PN) at room temperature. Do not operate valve during test.

⚠ DANGER



Hazardous electrical voltage (>25V AC; >60V DC)

There are risks from electrical voltage during assembly and dismantling.

- The electrical connection of the solenoid must be carried out only by a qualified electrician.
- You may only plug the device socket in de-energized state.
- Disconnect the power supply off the solenoid prior to assembly or dismantling.

⚠ WARNING



Danger from pressurized pipelines

Pressurized pipelines may burst resulting in injuries.

- Depressurize pipe system and block the fluid stream prior to opening or dismantling the valve.

⚠ CAUTION





Risk of burns at the solenoid

Solenoid is heating up during operation. Touching the solenoid leads to risk of burns.

- Leave the solenoid to cool down before working at the valve.

Residual risks

| | |
|---|--|
|  | Weight of the valve Phases: transport, storage, assembly, maintenance, disposal Risk: falling off, tipping over Personal protection equipment (PPE): Protective footwear |
|  | Hazardous fluids Phases: assembly, operation, maintenance, disposal Risk: skin contact, eye contact, breathing vapors PPE: protective gloves, protective eye glasses, breathing protection |
|  | Potentially explosive atmosphere Risk: danger of explosion ⚠ WARNING: Use solenoids and device sockets with Ex-protection. |
|  | Sharp threads and edges Phases: transport, assembly, maintenance, disposal Risk: risk of cuts PPE: protective gloves |

3 Avoid damage to property

NOTICE

Deposits and dirt lead to malfunctions

If the control bores are clogged or the core is blocked by soil the valve no longer closes or opens.

- Install a strainer (mesh size ≤ 0,25 mm) in front of the valve inlet if necessary.

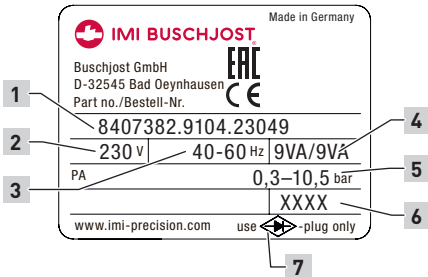
Damages through accumulation of heat

The solenoid will overheat during continuous duty if the heat can not be radiated. This may shorten the solenoid coil's product life cycle.

- You must not cover the solenoid with paint.
- You must not encase the solenoid in a tight housing or in a thermal insulation.

4 Identifying the valve

The rating plate is situated on the solenoid body.



Rating plate (example)

- 1 Order number
- 2 Operating voltage
- 3 Frequency of voltage
- 4 Power consumption inrush/hold
- 5 Operating pressure range
- 6 Date of manufacture (week/year)
- 7 If this marking is shown on the rating plate: use device socket with bridge rectifier

5 Operating conditions

- Ensure that all operating limits of the valve are considered during the configuration of the overall system.

Operating limits of series 84070/84080 ^N

| | | |
|--------------------|----------------|----------------------|
| Operating pressure | P _B | from 0.3 to 10.5 bar |
| Fluid temperature | T _M | +5 °C to +50 °C |
| Fluid temperature | T _U | from 0 °C to +50 °C |

for neutral gaseous and liquid fluids

6 Commissioning

- Ensure compliance with the operating conditions specified in chapter **9**.

6.1 Checking the switching function

- Check the switching function of the valve without fluid prior to flooding the valve and exposing valve to the operating pressure. The metallic clicking sound must be heard during the electrical actuation of the valve.

6.2 Flooding the valve

1. Check whether all connections to pipe lines are firmly sealed.
2. Slowly increase the pressure to flood the valve. Thus to prevent pressure hammers. ⚠ **WARNING** To fast flooding of the valve may lead fluid to escape. **NOTICE** Do not exceed the maximum operating pressure.

7 Maintenance

Maintenance work must only be carried out by qualified personnel (refer to section **1.8** of mounting instructions EN1377027M0).

info Deposits of the medium, dirt particles, aged or worn out seals may lead to malfunctions.

- Individually determine as the operator application specific maintenance intervals.

12.1 Cleaning and visual inspection

- Periodically clean the valve and perform a visual inspection at the same time.

1. ⚠ **DANGER** Disconnect the solenoid from power supply.
2. ⚠ **CAUTION** Leave the solenoid to cool down.
3. Clean the outside of the valve and check for:
 - tightness of cover screws
 - firmly sealing of cable gland,
 - Damages and leakages.

7.2 Checking for tightness and strength

NOTICE

Risk of damaging the valve

Invalid test conditions may lead to damage of the valve.

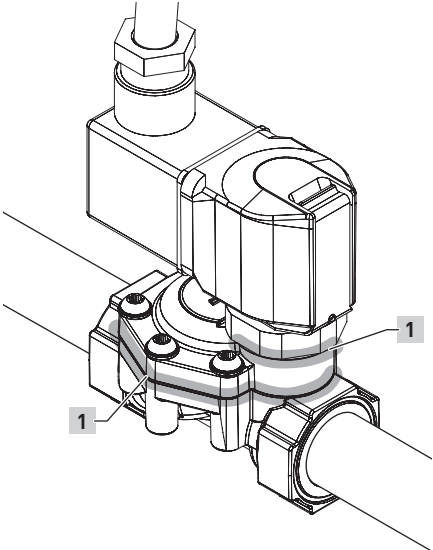
- Do not exceed the maximum operating pressure during the test for internal tightness (valve seat closed).
- The test for strength and external leakage (valve seat opened) according to EN12266 is permitted with maximum 1.5 times of the nominal pressure rating (PN) at room temperature.
- The valve must not be operated during these tests.
- Ensure to increase the pressure slowly.
- After each test, depressurize the valve outlet first.

Test for internal tightness

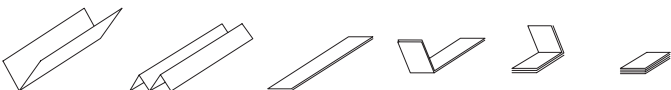
1. Close the valve (solenoid of NC valves de-energized; NO valves energized).
2. Flood the valve.
3. Gradually pressurize up to the maximum operating pressure. There must no fluid escape.

Test for strength and external leakage

1. Open the valve (solenoid of NC valves energized; NO valves de-energized).
2. Flood the valve.
3. Gradually pressurize maximum up to 1.5 times of the nominal pressure rating (PN) at room temperature.
4. Apply soap sud to the outer sealing edges and check for the formation of bubbles. There must no bubbles appear.



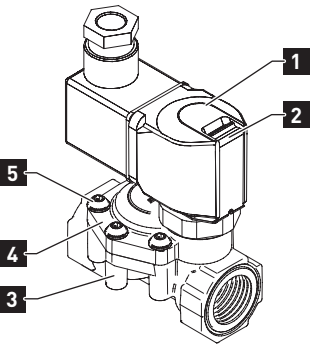
Check sealing edges



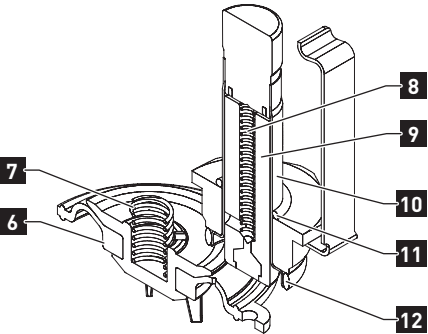
7.3 Preparing maintenance

- 1. ⚠ **DANGER** Disconnect the solenoid from power supply.
- 2. ⚠ **WARNING** Depressurize the pipe system.
- 3. ⚠ **CAUTION** Leave the solenoid to cool down.

Component overview



External components



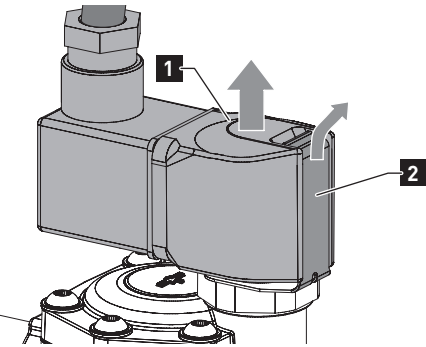
Internal components

- 1 Solenoid with device socket
- 2 Fixing clamp
- 3 Valve cover
- 4 Valve body
- 5 Fixing screws
- 6 Diaphragm*
- 7 Compression spring*
- 8 Compression spring inside core*
- 9 Core*
- 10 Core tube
- 11 O-ring
- 12 O-ring

7.4 Dismantling valve

Unmount solenoid

→ Slightly bend back spring clip **2** and pull Click-on® solenoid **1** upwards.

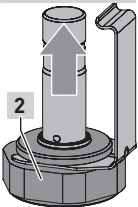


Unmount solenoid 9101

Dismantle core tube

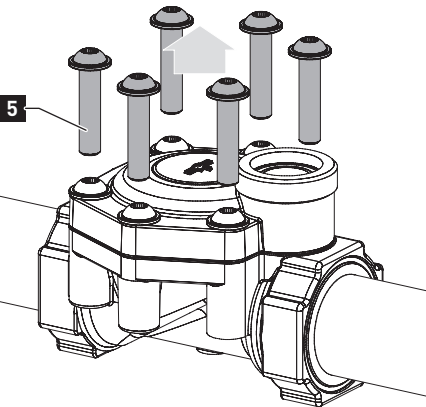
Tool: Wrench size 27 for 1502

- 1. Loosen the core tube at its screw piece **2**.
- 2. Take off core tube together with spring clip. Take care for the loose core **9** and the compression spring **8**.



Dismantle valve cover

- 1. Loosen fixing screws **5** (Torx M4) at the valve cover **4**.



Loosen fixing screws

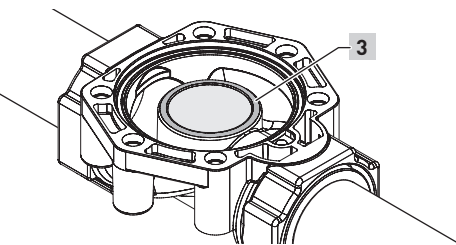
- 2. Take off valve cover **4**.
- 3. Take off compression spring **7** and diaphragm **6** from valve seat.

7.5 Checking dismantled valve parts

- Check dismantled valve parts for damages and ageing phenomena.
- Replace diaphragm in case of cracks or breakings.
- Replace seals if they are brittle, fissured or strongly deformed.

7.6 Cleaning valve and check valve seat

- 1. Clean the diaphragm **6**.
- 2. Clean all surfaces that are in contact to seals or diaphragm.
- 3. Remove dirt inside control bores, control spaces and on threads.
- 4. Clean the core **9**.
- 5. Remove dirt inside control bores, control spaces and on threads.
- 6. Check whether the valve seat **3** is intact. Valve seat must not have any damages.



Valve seat in valve body

- 7. If the valve seat is **damaged** you must replace the valve body.

7.7 Replacing spare parts

⚠ **CAUTION**

Risk of injury caused through the installation of wrong parts

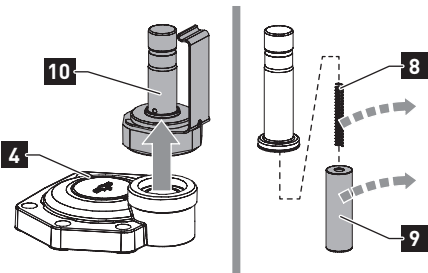
Installation of wrong components may lead to early wear and early failure of the component. This increases the risk of injury.

→ Ensure that only original spare parts are installed.

Buschjost recommends to replace all spare parts included in the kit at the same time.

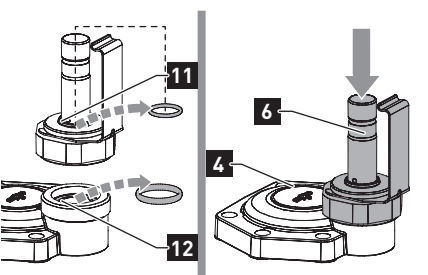
Spare parts related to the core tube assembly

- 1. Replace the used core **8** and the compression spring **9** inside core.



Magnetanker und Druckfeder austauschen

- 2. Replace o-ring **11** that is situated on the core tube **10**. Replace the o-ring **12** that is situated in the valve cover.

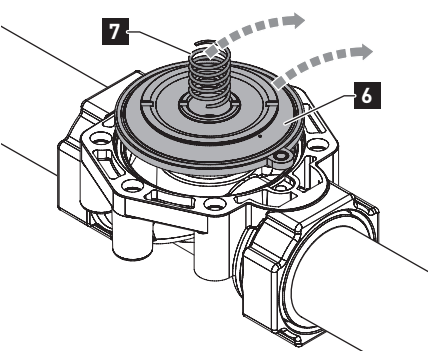


Replace o-rings

- 3. Screw the core tube **10** on valve cover **4** – tighten only hand tight.

Spare parts related to the valve body

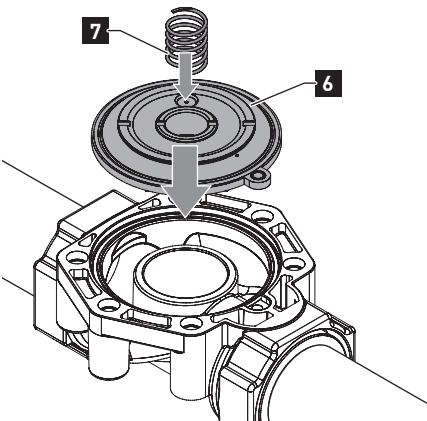
→ Replace the used diaphragm **6** and the compression spring **7** above diaphragm.



Replace diaphragm and compression spring

7.8 Reassembling valve

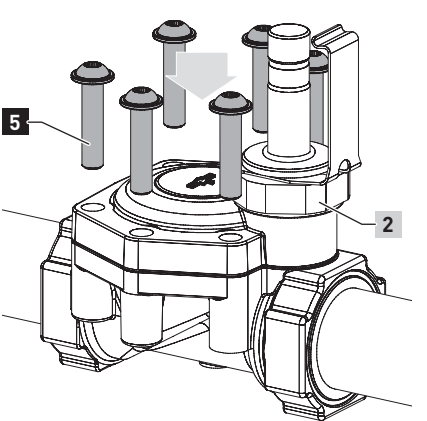
- 1. Put diaphragm **6** centered on the valve seat and fit compression spring **7** into diaphragm.



Put diaphragm and compression spring

- 2. Put the valve cover **4** on valve body.
- 3. Fix the valve with six fixing screws **5** (Torx M4 x 16 mm). Tighten screws with 2 Nm.

tightening torque: 2 Nm ±10%



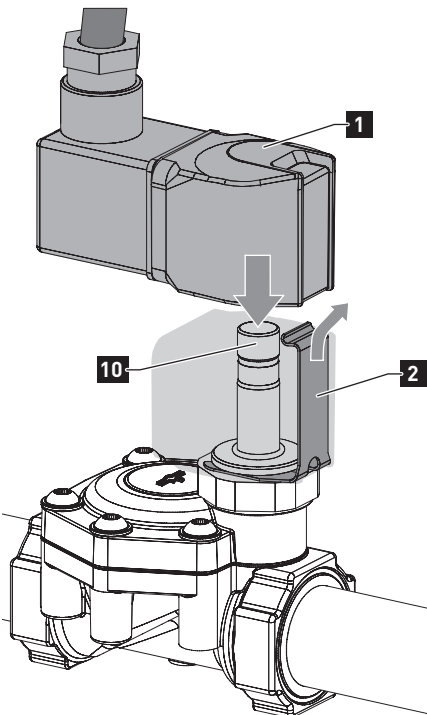
Insert and tighten fixing screws

- 4. Tighten the core tube **10** at its screw piece **2** with 20 Nm.

wrench size 27; tightening torque 20 Nm ±2

7.9 Mounting solenoid

- 1. Push the Click-on® solenoid **1** onto core tube **10**.
- 2. Slightly bend back fixing clamp **2** and snap solenoid to spring fixing clamp.



Mount solenoid 9101

info Solenoid and fixing clamp may be rotated 360°. Choose an appropriate angle.

8 Re-commissioning

- 1. Check valve's switching function without fluid (refer to section 6.1).
- 2. Prime the valve slowly (refer to section 6.2).
- 3. Perform a leak and strength tests (refer to section 7.2).

9 Decommissioning

- 1. ⚠ **DANGER** Disconnect the solenoid from power supply.
- 2. ⚠ **WARNING** Depressurize the pipe system. Completely drain the pipework. Deal with water-endangering fluids according to legal regulations.
- 3. Loosen fixing screws from valve cover.
- 4. Unmount the valve.
- 5. Drain and dry the valve.

10 Replacing complete valve

- 1. Unmount the valve as described in chapter **9** "Decommissioning".
- 2. Mount the new valve as described in chapter "Assembly" of mounting instructions EN1377027MO.
- 3. Connect solenoid as described in chapter "Connect solenoid electrically" of mounting instructions EN1377027MO.

11 Trouble shooting

→ Observe safety information and instructions in chapter **7** "Maintenance".

Error table

| not working |
|--|
| Possible cause: The control voltage must be >90% of its nominal value. Remedy: Measure the control voltage directly in front of the solenoid. If the operating voltage is lower or a long cable is used, a heavier conductor must be chosen to keep the voltage drop small. |
| Possible cause: solenoid coil defective, no continuity Remedy: Replace solenoid |
| impaired function |
| Possible cause: Diaphragm soiled Remedy: control bore in the diaphragm |
| Possible cause: Core jammed Remedy: Clean core and core tube |
| Possible cause: Valve seat leaking Remedy: Clean control bores |
| inadmissible operating conditions |
| Possible cause: Operating pressure excessive Remedy: Check maximumoperating pressure and reduce pressure accordingly. |

12 Return

- 1. Unmount the valve as described in chapter **9** "Decommissioning".
- 2. Save the "goods return declaration" form – PDF file available online at: <http://www.buschjost.com/service/other-documents/goods-returndeclaration/>
- 3. Fill out the goods return declaration and fulfil the requirements.
- 4. ⚠ **CAUTION** Consider the weight of the valve in the choice of packaging.
- 5. Enclose the printed goods return declaration in the parcel.

13 Disposal

- 1. Unmount the valve as described in chapter **9** "Decommissioning".
- 2. Dismantle valve parts to enable reusable materials to be recycled.
- 3. Dispose of valve parts as appropriate for their materials:

| Material | Way of disposal |
|---|--|
| valve body, valve cover, diaphragm, o-rings | similar category to domestic refuse industrial waste |
| solenoid (copper wire) | electrical waste |



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