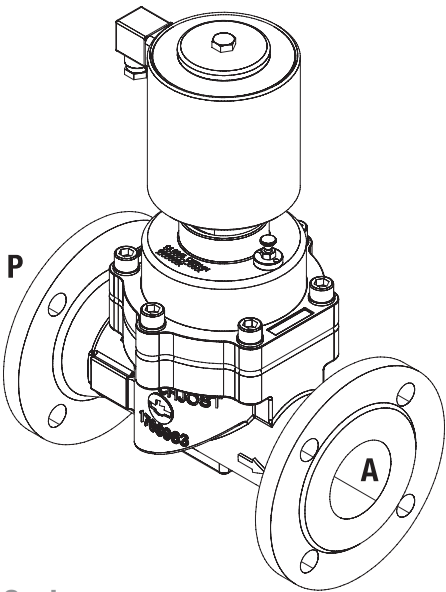


Mounting instructions for force-controlled piston valves

Document-No. EN1377080M0 Revision: 2

Keep documentation for future use!



Series

86488 86508 86548

1 About this documentation

These mounting instructions guides you to mount force-controlled piston valves safely and to put them into operation.

1.1 Documentation validity

These mounting instructions applies to the following force-controlled piston valves **ND 65**:

Valve number	Pressure rating	Kv value
86488xx	PN 16	72 m³/h
86508xx	PN 40	72 m³/h
86548xx	PN 40	72 m³/h


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


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	flexible part number (section)

 + DANGER / WARNING / CAUTION ; NOTICE : embedded safety message
given limits or fixed value

1.5 Intended use

The valve is solely intended to control or stop a fluid flow within approved operating limits. The fluid must only flow through the valve in the determined flow direction.

You may only operate the valve with fluids that will not cause any chemical reaction with the valve' materials or lead to abrasive effects.

1.6 Improper use

Only operate the valve within approved operating limits.

In the following cases it is prohibited to operate the valve:

- The valve is not used for the designated purpose.
- The valve is used beyond the permitted operating limits. The permitted temperature and pressure ranges are exceeded.
- Damages to the valve – e.g. cracks, deformation – were detected but the valve remains in operation.
- Malfunctions were detected but the valve remains in operation.

We do not accept any liability for damages caused by improper use.

Our guarantee expires in the following cases:

- Undue intervention and altering are done to the valve.
- This documentation or the operating limits as shown in the datasheet are not observed.

1.7 Obligations of operator

Product

- Over the entire life cycle of the valve all applicable regulations must be observed. The instructions of this operation manual must be observed and followed.
- Initiate a risk assessment of the overall installation, to detect potential dangers that may occur in combination of the valve with other components.

Persons

- Initiate the instruction of each person who is working with the valve. Applicable regulations about occupational safety ad safety engineering must be known and applied.

Documentation

- This documentation must be fully read and understood.
- The instructions given in this operation manual must be put into practice.
- This documentation must be available at any time.

1.8 Personnel qualification

- Ensure as operator that persons who work on or with the valve are sufficient qualified for this job.
- Comprehensively train the operating personnel in terms of safety.
- Only allow trained specialists to perform electric connections, commissioning, maintenance and trouble shooting

Demands

Operating personnel must be instructed on operational sequences and procedures.

Operating personnel must know its responsibilities regarding the work to be performed.




Trained specialists must possess profound knowledge in mechanical engineering, electrical engineering, hydraulic und pneumatic.

Trained specialists must be authorized to commission, ground and designate devices, systems and power circuits according to the standards of safety technology.

Trained specialists must possess profound knowledge about design and principle of operation of the valves and the plant.

1.9 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




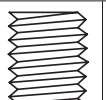
These safety instructions are only related to the single valve. In combination with other plant components there may be other potential dangers, which must be taken into account by carrying out a risk analysis for the system.

- Compare the details on the rating plate and the operating limits as shown in the data sheet to the operating data. The limits for the particular application must not be exceeded.
- Only perform mounting works when the pipe system is in depressurized state and the solenoid is de-energized.
- Prime the valve slowly when commissioning. Fast pressurizing will cause the valve to open briefly.
- Leak and strength tests with the valve open or closed are permitted at up to 1.5 times the maximum working pressure. The valve must not be operated during these tests.

 DANGER
 Hazardous electrical voltage (>25V AC; >60V DC) There are risks from electrical voltage during assembly and maintenance.
→ 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 of 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 unmounting 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.

 Weight of the valve Phases: transport, storage, assembly, maintenance, disposal Risk : falling off, tipping over Personal protection equipment (PPE) : protective footwear
 Potentially explosive atmosphere Risk : danger of explosion  WARNING : You must not use valve solenoid 9501 and 9504 in areas with potentially explosive atmosphere.
 Sharp threads and edges Phases: transport, assembly, maintenance, disposal Risk : risk of cuts PPE : protective gloves

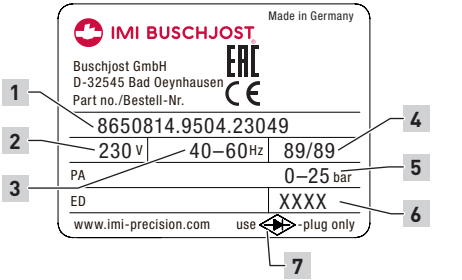
3 Avoid damage to property

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 P 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.

 Pressure against valve outlet Valve only firmly closes in flow direction.
 Fluid freezing The valve is not designed to with-stand the fluid freezing.

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: only use device socket with varistor

5 Transport and storage

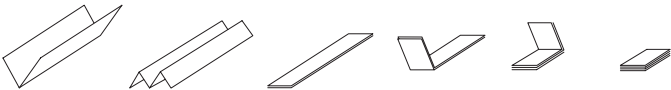
NOTICE
Damage of the valve Valve may be damaged if foreign particles get into the valve.
→ Only transport and store valve in its delivery packaging.
→ Take valve out of the packaging immediately prior to assembly.

Prolonged storage at 0 °C to +60 °C

Avoid during transport:
mechanical loads: falling off, tipping over
damages to the electrical terminal elements

Avoid during storage:
thermal stress : permanently increased storage temperatures; distance to heating devices < 1 m
chemical load : at the storing site through solvents, chemicals, acids, fuels and similar
weather conditions : at construction sites strong, watertight containers are necessary

Unfavourable storing conditions may reduce the service life of the sealing materials



7 Mounting

NOTICE

Damage of the valve

The valve may be damaged through inappropriate installation.

- Only trained and authorized specialists may install the valve.
- Only use appropriate tools and suitable sealing materials.
- Make sure that the valve is mounted in flow direction.
- Make sure not to distort the valve body, particularly in case of a misaligned pipe-work.

There must be no mechanical loads applied to the solenoid.

- Do not use solenoid as a lever during mounting.
- Do not put down the valve on the solenoid body.

Valve only firmly closes in flow direction. Inflow against the valve's flow direction may lead to the destruction of components.

- Implement adequate measures if back flow is to expect; for example by adding check valves to the pipe system.

The valve subassembly may get damaged by external loads at the operating site.

- Protect the mounted valve from possible impact load.
- Protect the mounted valve from direct impact of weather conditions.

7.1 Conditions of installation

Compliance with operating limits

Ensure to comply with the operating limits prior to mounting the valve. Observe the valve's data sheet.

Planning of the pipe system

Buschjost recommends to include manual stop valves and drain valves in the plant so that the pipe system may be depressurized and drained prior to working on the valve.

Mandatory mounting position vertical on top

- You must mount the valve with the solenoid vertical on top.

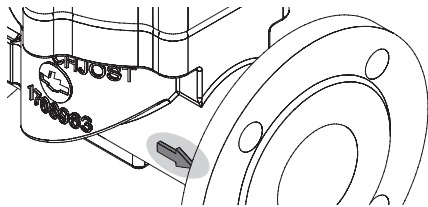


7.2 Preparation

- Check the valve for externally visible damages.
- Make sure that there is enough free space for dismantling the valve in case of maintenance.
- ⚠ WARNING Depressurize the pipe system.
- NOTICE Clean the pipe system prior to mounting the valve.

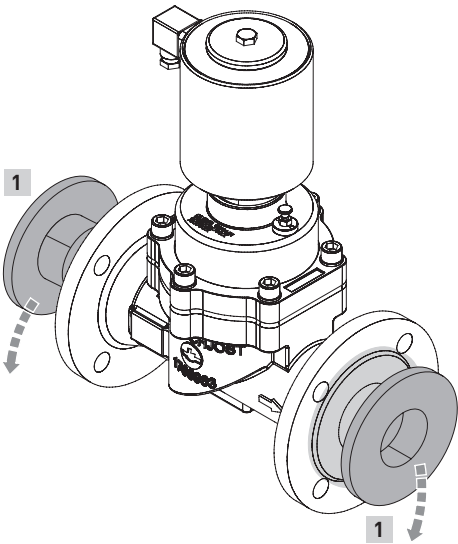
7.3 Mount valve to pipe line

- Mount the valve to the designated pipeline. Comply with existing connections.
- Arrange the valve according to the pipe-line's flow direction. An arrow on the valve body marks the flow direction.



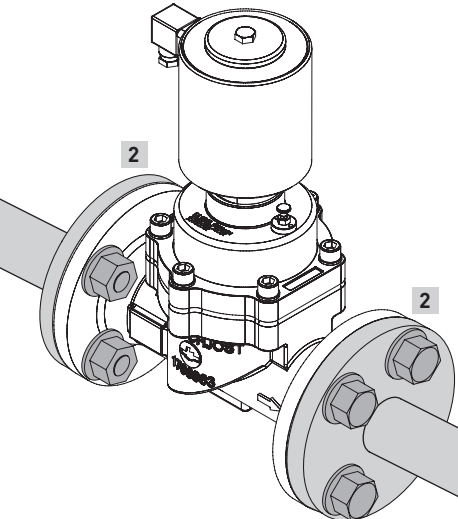
Arrow shows flow direction

1. NOTICE Take valve out of the packaging immediately prior to mounting.
2. Take out the protective collars 1 from valve inlet and valve outlet.



Take out protective collars

3. Install a strainer in front of the valve inlet P if necessary.
4. Connect the flange connections of the valve body with flanges of the pipe line 2. NOTICE Make sure that the flange seal is correctly positioned.
5. NOTICE Make sure that pipes forces coming from the plant may not affect the valve. Prevent valve from possible pipe forces through adequate measures if necessary.



Connect pipe line flanges to flange connections

8 Connect solenoid electrically

- Always connect the device socket which was delivered by Buschjost.

⚠ DANGER



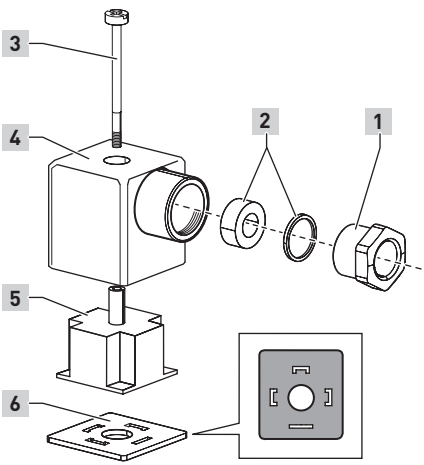
Hazardous electrical voltage (>25V AC; >60V DC)
There are high risks from electrical voltage during assembly works.

- Work on electrical installations may be carried out by a qualified and authorized electrician only (refer to 1.8).
- You must connect the earth wire to the terminal marked with the grounding symbol ⊕.
- You may only plug the device socket in de-energized state.
- Ensure correct polarity while connecting live wires to terminals marked + and -.
- Take care that the insulation is not trapped in the terminals.

Faulty connection causes risks.

- After connecting the solenoid carefully close the terminal compartment to restore protection.
- To secure IP 65 protection after connecting: Carefully close the device socket. Check if the flat seal between solenoid and device socket is properly seated. Check if cable gland is properly sealed.
- Tighten middle screw of the device socket with max. 40 Ncm. The housing must not show signs of deformation.

- Connect solenoid in accordance with the electrical regulations.
- Use a round cable with diameters from 5 mm to 10 mm. The wire cross section must not exceed 1.5 mm².

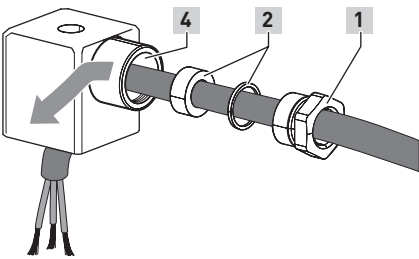


Overview: Device socket

- 1 Pressure screw
- 2 Washers
- 3 Middle screw
- 4 Housing of the device socket
- 5 Socket insert
- 6 Flat gasket

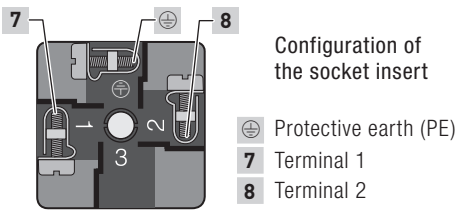
- Make sure that the flat gasket 6 and socket insert 5 are mounted congruently with the connecting lugs of the solenoid.

1. Slide pressure screw 1, washers 2 and device socket's housing 4 on the cable.

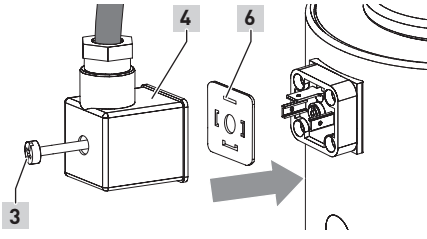


Feed cable through device socket

2. Attach the protective conductor at first (insulation: yellow/green) to the terminal marked with the grounding symbol ⊕.



3. Attach the other wires to the terminals 7 and 8 of the socket insert 5. ⚠ DANGER Ensure correct polarity while connecting live wires to terminals marked + and -.
4. Put the housing of the device socket 4 in the chosen position (9 o'clock, 12 o'clock, 3 o'clock, 6 o'clock) onto socket insert 5.
5. Tighten pressure screw 1 to cable gland. NOTICE Cable gland must firmly seal.
6. Pull protective cap from the plug contacts of the solenoid.
7. Attach flat gasket 6 and housing 4 with socket insert to the solenoid. ⚠ DANGER Make sure that the seal is evenly positioned on the entire surface between solenoid and device socket.



Place mounted device socket

8. Tighten middle screw 3 with 40 Ncm. NOTICE Avoid visible distortion of the housing of the device socket.

Tightening torque: 40 Ncm ±10 Ncm

9 Operating conditions

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

10 Commissioning

Checking switching function

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

Bring throttle in initial position

1. Carefully screw in the knurled screw 306 of the throttle down to the stop.
2. Unscrew the knurled screw 306 four turns. The throttle is now in initial position. NOTICE You must not flood the valve if the throttle is in completely open or completely closed position. Malfunctions may occur.

Flooding the valve and adjusting throttle

1. Check whether all connections to pipelines are firmly sealed.
2. Slowly and gradually 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.
3. At the same adjust the knurled screw 306 and operate the valve until the desired is achieved (depending on operating pressure and medium).

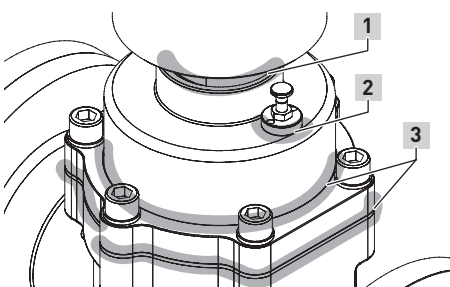
Checking for tightness and strength

- NOTICE The valve must not be operated during these tests (A, B). Ensure to increase the pressure slowly. After each test, depressurize the valve outlet first.

- A / Internal parts: Close the valve (solenoid de-energized). Flood the valve. Pressurize up to the maximum operating pressure. There must no fluid escape.

- B / Valve body: Open the valve (solenoid energized). Flood the valve. Pressurize maximum up to 1.5 times of the nominal pressure rating (PN) at room temperature. Apply soap sud to the outer sealing edges (at screw piece 1, at throttle 2, at clamping ring 3) and check for the formation of bubbles. There must no bubbles appear.

Series	Pressure rating	Housing material
86480	PN 16	spheroidal graphite
86500	PN 40	iron, brass
86540	PN 40	1.4408



Check the edges of seals

11 Operation

Actuate valve periodically

- NOTICE Actuate the valve at least once a month to prevent functional parts getting blocked.



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