

**INSTALLATION AND MAINTENANCE INSTRUCTIONS**  
Series 209



**GB**

**ABOUT THIS MANUAL**

- This manual is valid for the ASCO Series 209.
- Read this manual completely before starting to install and operate the valves.
- This manual must be made accessible to all users of the valves.

**FUNCTION**

The ASCO Series 209 are direct operated, normally closed, 2-way solenoid valves for proportional flow control.

**INTENDED USE**

- The valves may only be used within the specifications given on the nameplates and the associated data sheets<sup>1)</sup>.
- The valves can be operated with liquid or gaseous media. The suitability of the valve materials and valve functions for the respective medium must be checked by the customer before putting into operation.
- The valves are intended exclusively for use as components within machines or systems.
- The valves are intended for professional use only.
- The valves are intended exclusively for industrial applications.
- The valves may only be used indoors.
- The valves must not be used in explosive atmospheres.
- The valves must not be used as safety components.
- The valves must be in good working condition.
- The valves must not be modified.

**SAFETY**

There is a risk of injury during installation and operation.

- **WARNING** It is therefore essential to observe the following information:
  - Installation may only be carried out by suitably qualified personnel.
  - Personal protective equipment must be worn during installation.
  - Before starting work, ensure that all system components are depressurised and completely drained.
  - Before starting work, make sure that all electrical lines and power supply units are disconnected from the power supply.
  - To avoid damage due to electrostatic discharge, the handling instructions and recommendations according to EN 61340-5-1 and 5-2 must be observed.
  - The surfaces of the valves can become hot during continuous operation. The valves must therefore not be touched during operation. Appropriate protective measures against contact must be provided. Before working on the system, a waiting time must be observed, if necessary, to allow the valves to cool down before touching them.
  - Seals must be checked for correct fit and tightness before commissioning.
  - All terminals must be tightened as prescribed in accordance with the applicable standards after completion of the work.
  - The system must be protected against unintentional operation.
  - The start-up and shut-down of the system must be controlled.
  - In the event of faults in the system that could lead to a hazard, it must be switched off, taking into account any other applicable safety measures.

**INSTALLATION**

**Connection to the pressure line system:**

The valves can be installed in any position. Depending on the position, however, the flow rate may vary slightly with an identical control signal. When operating with liquid media, a non-upright installation position facilitates the venting of the valves. The flow direction of the valves is marked by arrows or numbers ("1" for inlet, "2" for outlet).

The connection should be carried out according to the size specifications on the nameplates with suitable screw connections.

**ATTENTION:**

- Reducing the connection size can lead to a reduction in performance and function.
- Before putting the valves into operation, the inside of the piping system must be free of loose particles.
- To protect the valves, suitable strainers or filters should be integrated as closely as possible upstream of the valve inlet.
- When sealing the connections, no sealing material may get into the lines or the valves.
- Only suitable tools may be used for installation, which should be applied as close as possible to the connection point, or to the intended spanner flats (See Figures).
- The solenoid coils must not be used as a counter support or spanner flat.
- The connections should be aligned and must not transfer any mechanical stress to the valves.
- To avoid damage, do not overtighten the connections.

**Fastening:**

On the bottom side of the valve bodies with screw connection there are threaded holes for fastening the valves (See Figures).

The valve housing of the pad-mount version is fastened using the screws supplied

(See Figure 2). The maximum tightening torque for the pad-mount version is 0.5Nm. It is recommended to secure the screws with threadlocker.

**Electrical connection:**

The electrical connection must be performed by qualified personnel in accordance with the applicable VDE and CEE regulations.

**WARNING** If there is no electrical isolation from the operating voltage on the primary side, conductive parts of the valves can carry dangerous voltages. This can result in a life-threatening electric shock.



- Operate the valves exclusively on a PELV (Protective Extra Low Voltage) power source that safely isolates it from the primary-side operating voltage of the system.
- Observe the requirements for PELV circuits in IEC/DIN EN 60204-1 chapter 6.4.
- Connecting the valves to protective earth is not necessary when the PELV power source is used as intended.
- The solenoid coils of the valves are designed in accordance with UL 429. To ensure protection, they must be operated with an NEC Class 2 power source with less than 100VA power.

Depending on their design, the solenoid coils can have the following electrical connections:

- Plug connections according to DIN EN 175301-803 form A (18mm)
- Plug connections according to industry standard form B (11mm)
- Moulded cable ends

Protection class IP-65 is guaranteed if suitable connectors are properly installed.

**COMMISSIONING**

Before pressurising the valves, a function test should be carried out. To do this, switch the operating voltage on and off several times and check the valves for proper function. When operating with liquid media, the valves should be vented before commissioning.

**OPERATION**

By varying the coil current, the flow through the valves can be controlled. When the pressure difference is reduced, a higher current is needed to open the valves. (See Flow Chart Figure 5).

The flow valves may drift over the valve's lifetime depending on conditions and duration of storage and usage.

To compensate for temperature-related fluctuations in coil resistance and other influencing variables, the use of a closed loop control is recommended.

The temperature ranges specified in the data sheet<sup>1)</sup> must not be exceeded. To counteract heating of the valves, sufficient heat dissipation must be ensured. In addition, limiting the coil current to the values specified in the data sheet<sup>1)</sup> is recommended.

The valves are typically operated with a rectangular pulse width modulated voltage (PWM). Under some installation conditions, undesirable oscillations may occur. To avoid such operating conditions, the PWM frequency can be adjusted. Higher frequencies help to reduce noise and the tendency to vibrate. However, this increases the flow hysteresis. Lower frequencies reduce the flow hysteresis, but in turn lead to higher noise and vibration. In general, it is recommended to use a frequency of at least 800Hz (20mm coil width) or at least 500Hz (32mm coil width). For controlling liquids, higher PWM frequencies are recommended than for gases (factor 10 higher). To maximise damping, the valves can also be operated with direct current.

To avoid oscillations, changes in the coil current should not be made abruptly, but continuously via a ramp function. Longer ramp times are preferable to ensure smooth operation.

High differential pressures can lead to unstable flow conditions. Depending on the medium and differential pressure, discontinuities in the control behaviour can therefore occur in some applications. It is therefore generally recommended to keep the differential pressure low. The maximum differential pressures specified on the name plate or in the respective data sheet<sup>1)</sup> therefore only refer to the fully closed valve.

The valve function must be checked in the respective target application before permanent use.

**MAINTENANCE**

The valves are maintenance-free under normal conditions.

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**STORAGE**

The valves should be stored in their packaging in a cool, dry place, protected from shocks, sunlight and other sources of radiation until they are used.

**DISPOSAL**

The valves must be disposed of in accordance with the applicable national regulations.

**ACCESSORIES**

The article numbers of the available accessories can be found in the following table:

Description	Coil width 20mm with cable ends	Coil width 20mm with plug connection	Coil width 32mm with plug connection
Connector <sup>2)</sup>	-	88122404	88122602
Control module CONTROL <sup>3)</sup>	60300117 60300118	60300117 60300118	60300117 60300118
Digital Plug amplifier <sup>4)</sup>	-	X90850164500100 X90850164500200 + Adapter 833-064154	X90850164500100 X90850164500200
Electronic Plug amplifier <sup>4)</sup>	-	E908A003	E908A001

- <sup>1)</sup> Catalogue data sheets are available on our website. Data sheets for customer special versions to be provided according to prior agreements.
- <sup>2)</sup> The connectors can alternatively be ordered directly per option number.
- <sup>3)</sup> Enables the use of external sensors in the closed control loop.
- <sup>4)</sup> The proportional controllers with pulse-width modulation enable the use of the control signals 0-10 V DC, 0-20 mA or 4-20 mA.

The valves comply with the applicable CE as well as UKCA directives. A declaration of conformity is available on request.

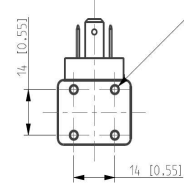


Figure 1. Dimensions 1/8" Inline, Coil Width 20mm

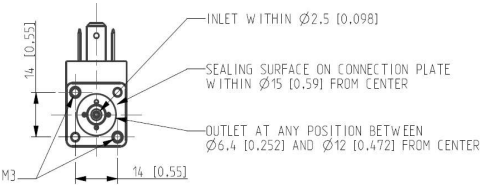


Figure 2. Dimensions Pad-Mount, Coil Width 20mm

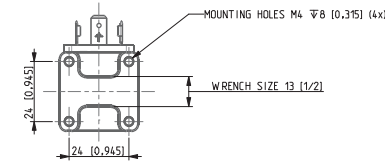


Figure 3. Dimensions 1/8" Inline, Coil Width 32mm

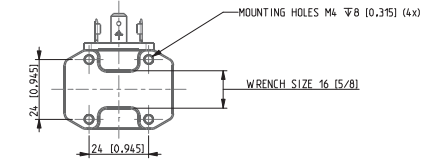


Figure 4. Dimensions 1/4" Inline, Coil Width 32mm

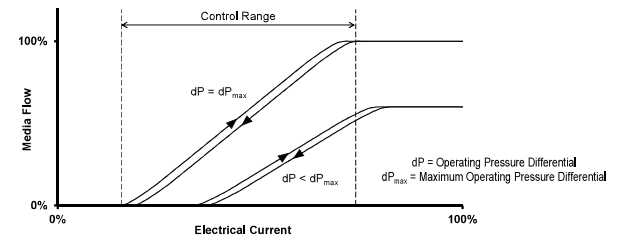


Figure 5. Schematic Flow Chart

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