

SENTRONIC^D Digital Electronic Pressure Regulator Series 608/609 with Display and Keypad



Installation manual

MS-P302-1-GB.R7
(383 47 48)



ASCO numatics™

GB

INSTALLATION

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CAUTION

OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC SENSITIVE
DEVICES

This product contains electronic components sensitive to electrostatic discharge. An electrostatic discharge generated by a person or object coming in contact with the electrical components can damage or destroy the product.

To avoid the risk of electrostatic discharge, please observe the handling precautions and recommendations contained in standard EN 100015-1. Do not connect or disconnect the device while it is energised.



CAUTION! Dangerous operating conditions may occur when using the programming interface on the valve as the valve may possibly not react to the analog setpoint any more. Provide for protection against uncontrolled movement of equipment when putting the valve into operation and before making any modifications to the valve settings.

DECLARATION OF INCORPORATION

according to Machinery Directive 89/392/EEC, Annex II B

We herewith declare that the version of the product described in this installation manual is intended to be incorporated into or assembled with other machinery and that it must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of Council Directive 89/392/EEC, Annex IIB.

Handling, assembly and putting into service and all settings and adjustments must be done by qualified, authorised personnel only.



This product complies with the essential requirements of the EMC Directive 89/336/EEC and its amendments. It is CE-approved. A separate Declaration of Conformity is available on request. A separate Declaration of Incorporation relating to the EU Directive 89/392/EEC Annex II B is available on request. Please provide ordering code and serial numbers of products concerned.

NOTICE

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INSTALLATION



1. DESCRIPTION

SENTRONIC^D is a new generation of electronic pressure regulators designed on the basis of an enhanced digital control.

SENTRONIC^D stands for:
 Digital communication and control
 Display (incorporated)
 Direct operated valve
 Dynamic behaviour (high speed)

Digital control offers many advantages during installation and start-up of the **SENTRONIC^D** valve and extended possibilities to adapt it to various applications.

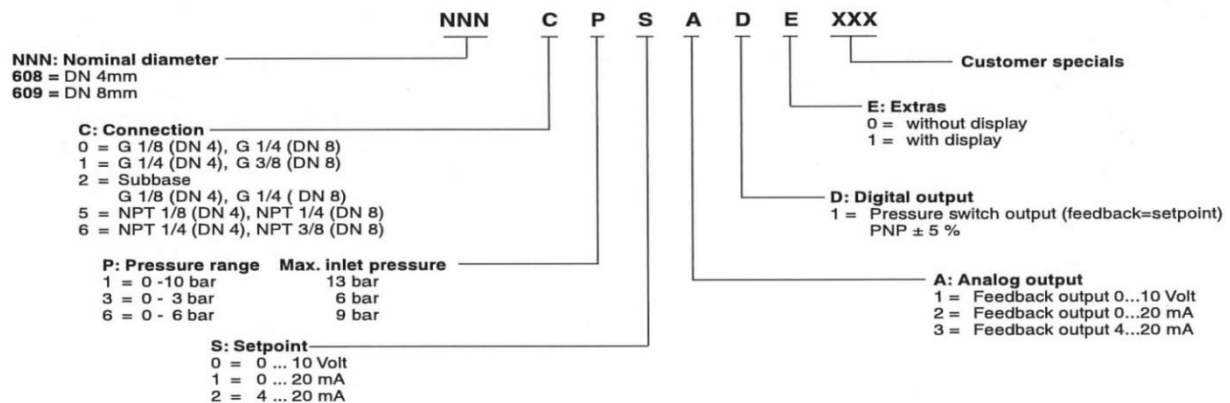
The four following standard versions are available:

- With display and pushbuttons : Pressure display, manual pressure setting and diagnostic LEDs.
- Without display and pushbuttons : The economic solution.
- Nominal diameter DN 4mm : with a flow rate of 470 l/min (SRA).
- Nominal diameter DN 8mm : with a flow rate of 1300 l/min (SRA).

Various pneumatic connections: integral connections, back panel connection and subbase mount.

- All pressure and exhaust ports are the same size, which allows for short response times when the pressure is increased or decreased.
- Digital pressure control in a closed loop: An internal pressure sensor compares the setpoint at the inlet to the outlet pressure. The outlet pressure is adjusted in real time.
- The control parameters can be changed with the additional software called *DaS*. The **DaS program** (Data Acquisition Software) ensures that all parameters used by the valve can be changed. This flexibility allows the valve to be adapted to the most various applications and enables the optimisation of its response time, overshoot and precision.
- After having set the optimum parameters you can save them in a project file for your personal use or send them to our Product Support for future serial production.

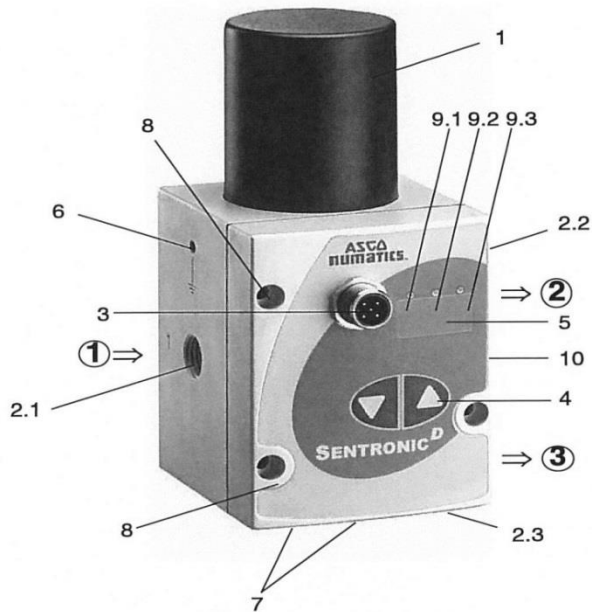
1.1 CATALOGUE NUMBER



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1.2 OPERATING ELEMENTS



- 1 Proportional solenoid coil
- 2.1 Pressure supply
- 2.2 Pressure outlet
- 2.3 Exhaust
- 3 Power supply, M12 connector
- 4 Operator buttons
- 5 3-digit display of outlet pressure
- 6 Ground connection, M4
- 7 Threaded mounting holes M4/6 mm
- 8 Mounting holes for M4 screws
- 9.1 Green LED
 - OFF: Setpoint ≠ feedback
 - ON: Setpoint = feedback
 - Flashing: Overtemperature
- 9.2 Yellow LED
 - OFF: Normal
 - ON: Manual operation
 - Flashing: AUTOSAFE enabled
- 9.3 Red LED
 - OFF: Normal
 - ON: Low voltage
 - Flashing: Overvoltage
- 10 Serial communication (PC connection)

1.3 MANUAL PRESSURE REGULATION (HAND)

After an interruption in the power supply, press both arrow buttons located beneath the display during power up to switch to the manual mode. The operating mode is indicated by the letters "H n d" in the display. The "H n d" display disappears when the arrow buttons are released. Press the left arrow button or DOWN arrow to reduce the outlet pressure, press the right arrow button or UP arrow to increase the outlet pressure. The yellow LED is on permanently during manual mode. Exit this operating mode by pressing both arrow buttons simultaneously or by turning off the power supply for a short time.

1.4 OPERATING MODES

Shut-off:

If the setpoint falls below 0.5 %, the coil current is switched off and the valve is fully exhausted.

Overtemperature:

If the temperature of the internal control electronics exceeds 100°C, the operating mode is switched to AUTOSAFE and the green LED starts to flash.

Undervoltage / overvoltage:

If the supply voltage is less than 20 V or more than 30 V, the coil current is switched off and the valve is fully exhausted. The red LED lights up constantly to indicate undervoltage or flashes to indicate overvoltage.

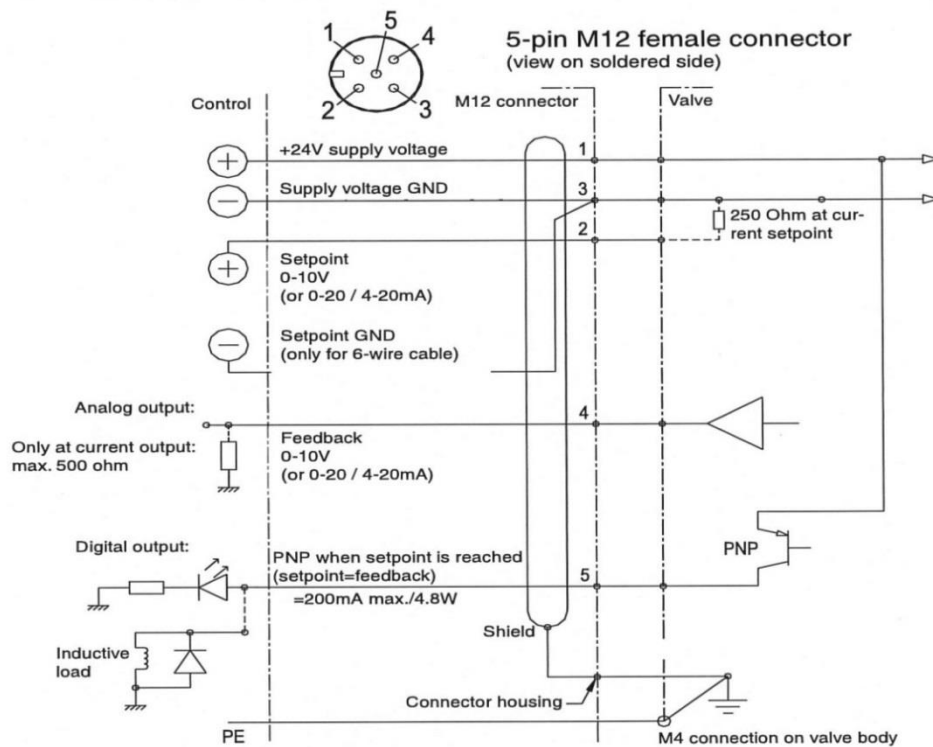
Autosafe:

If the coil current exceeds 1000 mA (DN8) or 560 mA (DN4) for more than 20 seconds, the output current is limited to max. 70% every 4 seconds to prevent the valve from overheating. The yellow LED flashes.

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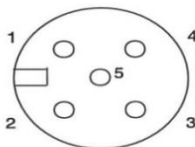
2. ELECTRICAL CONNECTION



- 1) The valve must only be supplied with 24V DC at a tolerance of +15%/-10% and a max. ripple of 10% (no supply via diode bridge). Overvoltage or a ripple rate exceeding these tolerances can damage the electronics.
- 2) The max. current at the digital output is 200 mA/4.8W (PNP output). The output is protected against short circuit and overload.
- 3) If a relay (inductive load) is connected to the digital output, a freewheel diode or a varistor must be used.
- 4) A shielded cable must be used for protection against interference and EMC.
- 5) The valve body must be grounded with the earthing terminal PE (dia. M4)

CONNECTOR PINNING / CABLE WIRING

Analog setpoint: View on soldered side of female connector



Pin	Description	5-wire cable	6-wire cable
1	24V voltage supply	brown	brown
2	Analog setpoint input	white	white
3	Supply ground	blue	green
	Analog ground *		yellow
4	Analog output (feedback)	black	pink
5	Digital output (pressure switch)	grey	grey
Body	EMC shield	shield	shield

* A 6-wire cable with separate analog ground is used for cable lengths over 2 m to set off the voltage drop for the setpoint.

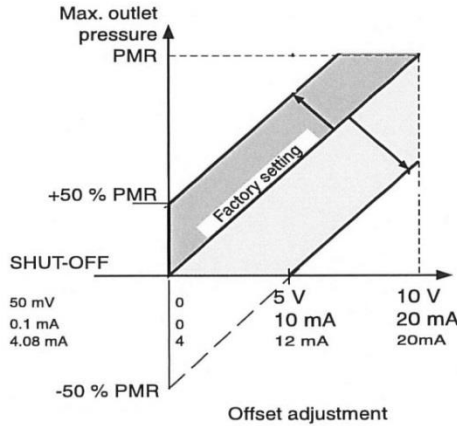


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3. ANALOG SETPOINT - OUTLET PRESSURE

Setpoint offset

The pressure setpoint zero can be changed via the *DaS* program. Switch to "Custom" in the "Setpoint setting" section. The zero range is max. ±50 %.

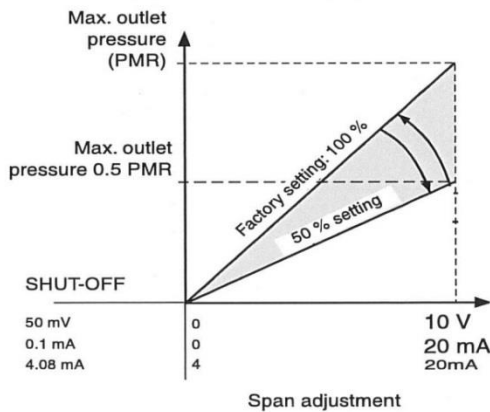


Max. outlet pressure PMR (bar)	Max. inlet pressure MAP (bar)
3 bar	6
6 bar	9
10 bar	13

CAUTION: Outlet pressures above the maximum outlet pressure (PMR) are not controlled by the valve, i.e. the max. outlet pressure is limited to the PMR. In order to avoid damaging the sensor, the supply pressure must always be less than the maximum inlet pressure (MAP) defined above (see table).

Setpoint span

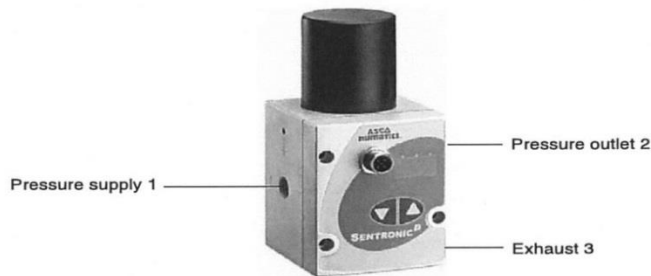
The pressure span of the setpoint can be changed via the *DaS* program. Switch to "Custom" in the "Setpoint setting" section. The span is between 10 and 100%.



The span can be set to max. 100% of the maximum outlet pressure (PMR). It can only be decreased.

INSTALLATION**GB****4. PNEUMATIC CONNECTION**

The air flow is from port 1 to port 2.



Inch screw connections (pipe threads) must be used.
Each screw connections must be lined with a fitting synthetic sealing disc.
Do not use Teflon sealing tape or hemp as they may get inside the valve and damage it.
Use an appropriate silencer at port (3). The exhaust time may vary depending on the type of silencer used.
The diameter of the pneumatic lines must be adjusted to the nominal diameter of the valve. The diameter of outlet line (2) must be larger or equal to that of inlet line (1).
The supply pressure must always be less than the value given in the table in section 3 and must always be above the desired outlet pressure.

5. FACTORY SETTINGS FOR A STANDARD VALVE

- 0 bar outlet pressure at a setpoint of 0 V / 0 mA / 4 mA.
- Span: 3 bar device: = 3 bar at 10 V / 20 mA
6 bar device: = 6 bar at 10 V / 20 mA
10 bar device: = 10 bar at 10 V / 20 mA
- Minimum hysteresis.
- The control parameters, setpoint offset, setpoint span and window size of the digital output (pressure switch) are factory-programmed.

Parameter set: factory settings

Setpoint offset: 0 %
Setpoint span: 100 %
Setpoint ramp: no ramp
Shut-off: ON; the valve is exhausted at a setpoint below 0.5%
Controller structure: PID
Proportional gain: 4,0
Integration time: 0.1 sec
Derivation time: 8 msec



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6. FIELD-PROGRAMMABLE SETTINGS

DISPLAY/PRESSURE READINGS

The actual outlet pressure is displayed during normal operation. See „Parameters/Display“ section.

Other displays:

- Hnd indicates that the Manual mode has been selected.
- SOF Internal error of pressure control. Replace valve or contact our Product Support.
- Err Internal overflow.
- AEr Autozero overflow. Contact our Product Support.

PUSHBUTTONS

To enter the Manual mode, press and hold both pushbuttons simultaneously during power up. "Hnd" appears in the display.

Use the UP button to increase the outlet pressure and the DOWN button to decrease it. The actual outlet pressure is displayed.

Quick presses on the buttons allow you to make slight changes in the pressure rating.

Longer presses allow you to make quick pressure changes.

Press both pushbuttons simultaneously to exit the manual mode.

7. TECHNICAL CHARACTERISTICS

CONSTRUCTION

Directly operated valve

Body: Aluminium

Internal parts: POM

Seals: Perbunan (NBR), Fluorelastomer (FKM)

Degree of protection: IP65

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Assembly position: any; for optimum performance vertically with solenoid at the top.

Air: filtered at 50 µm, free of condensate

Connections: Hemp or Teflon tape must not be used.

Electrical connection: Select a wire section that will give a voltage drop of less than 2 volts at 2A.

7.1 FLUID CHARACTERISTICS

- FLUIDS : Air or neutral gas, filtered at 50 µm, free of condensate, lubricated or not
- PORTS : G1/8-G1/4-G3/8, see section 3
- MAX. INLET PRESSURE : see section 3
- TEMPERATURE / FLUID : 0...60 °C
- TEMPERATURE / AMBIENT : 0...50 °C
- HYSTERESIS : <1% of span
- LINEARITY : <0.5% of span
- REPEATABILITY : <0.5% of span
- MINIMUM SETPOINT : 100mV (0.2 mA/4.2mA) with shut-off function
- MINIMUM OUTLET PRESSURE : <1% of span

7.2 SPECIFICATIONS

Nominal diameter DN (mm)	Supply voltage (stabilised) *	Max. power (W)	Max. current (mA)	Isolation class	Degree of protection	Flow		Electrical connection
						Kv Nm³/h	l/min (SRA)	
4	24V DC +15%/-10%	21	850	H	IP 65	0.25	470	5-pin female M12 connector
8		40	1650			0.7	1300	

* Residual ripple: 10 %

Test conditions according to ISO 8778: temperature: 20 °C, relative inlet pressure: 6 bar, relative outlet pressure: 5 bar

- Setpoint input : 0 ... 10 V (100 kOhm input resistance)
0 ... 20 mA / 4 ... 20 mA (250 Ohm input resistance)
- Feedback output : 0 ... 10 V (max. 10 mA), short-circuit protected
0 ... 20 mA / 4 ... 20 mA (max. 24 VDC)
- Digital output : pnp; open collector; max. 200 mA/4.8W, short-circuit protected
HIGH (24 VDC) if feedback=setpoint
LOW (open) if feedback≠setpoint
- Overvoltage : Shut-off at a voltage level higher than 30 volts (+10%).
- Low voltage : Shut-off at a voltage level lower than 19,5 volts (-10 %).

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8. ACCESSORIES

description	catalogue number
Straight M12 female connector, 5 pins, with screw terminals	88100256
Right-angle M12 female connector, 5 pins, with screw terminals	88100725
Supply cable 2 m, 2 x 0,25 mm ² , straight connector	88100726
Supply cable 2 m, 2 x 0,25 mm ² , right-angle connector	88100727
Supply cable 5 m, 6 x 0,56 mm ² , straight connector	88100728
Supply cable 5 m, 6 x 0,56 mm ² , right-angle connector	88100729
Supply cable 10 m, 6 x 0,56 mm ² , straight connector	88100730
Supply cable 10 m, 6 x 0,56 mm ² , right-angle connector	88100731
RS 232 cable converter; 2m cable with 9-pin Sub-D (plug connector)	88100732
RS 232 cable converter; 2 m cable with 9-pin Sub-D (screw connector)	88100970
Joinable subbase for 608 (DN 4 mm) with G 3/8", common supply and exhaust	35500558
Joinable subbase for 609 (DN 8 mm) with G 1/2", common supply and exhaust	35500559
DaS Light: Data Acquisition Software for SENTRONIC D - basic parameters - CD-ROM	99100110
DaS Expert: Data Acquisition Software for SENTRONIC D - full parameters - CD-ROM	99100111

9. MAINTENANCE AND CARE

No special maintenance or care required.



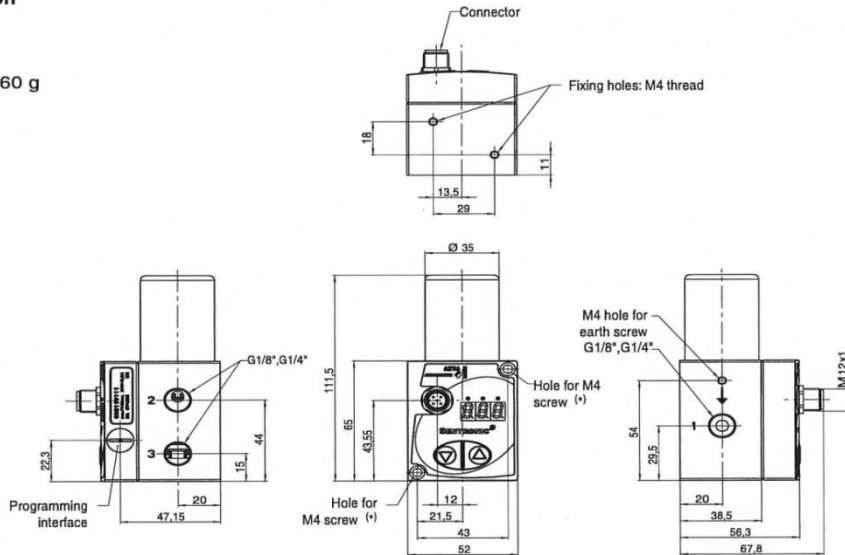
INSTALLATION

10. DIMENSIONS AND WEIGHTS

Inline version

DN 4

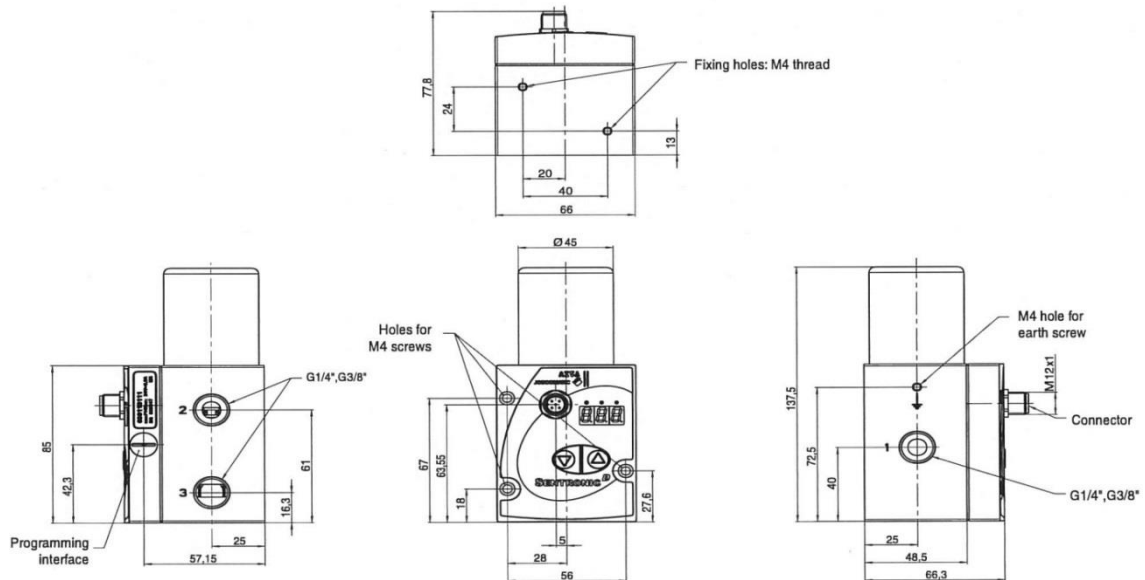
Weight: 560 g



(*) Remove the pre-installed screws to use the through holes to mount the valve.

DN 8

Weight: 1,130 g



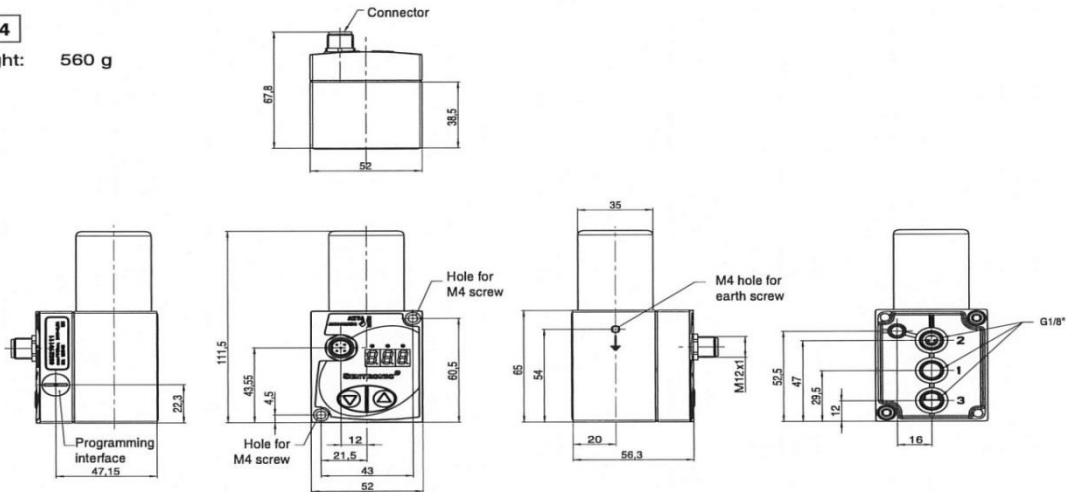
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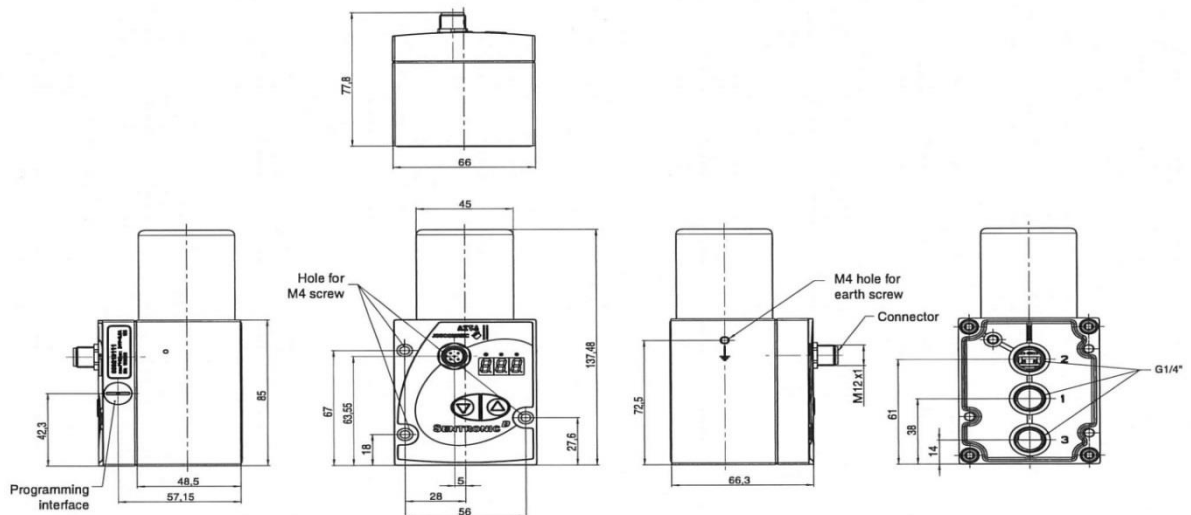
Subbase version

DN 4

Weight: 560 g


DN 8

Weight: 1,130 g


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MS-P302-1-11

Applies to the following articles:

Proportional control valve, digital, 24 V DC

Article No.

Type No.

101631 to 101634

PV 2250 to PV 2261