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

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 II B.

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

The information in this manual is subject to change without notice.

In no event shall Numatics be liable for technical or editorial errors or omissions. Neither is any liability assumed for accidental or consequential damages arising out of or in connection with the supply or use of the information contained herein.

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1. Description

**Sentronic** is a new generation of electronic pressure regulators designed on the basis of an enhanced digital control. **Sentronic** 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** 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 application and enables the optimization 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 production.

1.1 How to Order

<table>
<thead>
<tr>
<th>Nominal diameter</th>
<th>Options</th>
<th>Display</th>
<th>Digital output</th>
<th>Feedback</th>
<th>Command signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>608 = DN 4mm</td>
<td>A00 =  Dual loop control</td>
<td>0 = without display</td>
<td>1 = Pressure switch output PNP ± 5 %</td>
<td>1 = Feedback output 0 - 10 V</td>
<td>0 = 0 - 10 V</td>
</tr>
<tr>
<td>609 = DN 8mm</td>
<td>211 = Oxygen clean</td>
<td>1 = with display</td>
<td>1 = Feedback output 0 - 20 mA</td>
<td>2 = Feedback output 4 - 20 mA</td>
<td>1 = 0 - 20 mA</td>
</tr>
</tbody>
</table>

Notes:

1. See Accessories section for required manifold sub-base
2. Feedback input is needed for dual loop units

**Notes:**

1. See Accessories section for required manifold sub-base
2. Feedback input is needed for dual loop units
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 command signal 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.
2. Electrical Connection

Numatics 6 Wire Cable Color Code

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+24 VDC Supply</td>
</tr>
<tr>
<td>2</td>
<td>Command Signal</td>
</tr>
<tr>
<td>3</td>
<td>+0 VDC Common (Supply)</td>
</tr>
<tr>
<td>4</td>
<td>Analog output (feedback)</td>
</tr>
<tr>
<td>5</td>
<td>Digital output (pressure switch)</td>
</tr>
</tbody>
</table>

**Connector Pin Out**
Command signal: View on soldered side of female connector

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)
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%.

![Offset adjustment diagram]

**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 defined above** (see table).

<table>
<thead>
<tr>
<th>Max. Outlet Pressure PMR</th>
<th>Max. Inlet Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 psi</td>
<td>90 psi</td>
</tr>
<tr>
<td>100 psi</td>
<td>140 psi</td>
</tr>
<tr>
<td>150 psi</td>
<td>190 psi</td>
</tr>
<tr>
<td>1 bar</td>
<td>4 bar</td>
</tr>
<tr>
<td>3 bar</td>
<td>6 bar</td>
</tr>
<tr>
<td>6 bar</td>
<td>9 bar</td>
</tr>
<tr>
<td>10 bar</td>
<td>13 bar</td>
</tr>
<tr>
<td>12 bar</td>
<td>15 bar</td>
</tr>
<tr>
<td>15 bar</td>
<td>18 bar</td>
</tr>
</tbody>
</table>

Setpoint span

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

![Span adjustment diagram]

The span can be set to max. 100% of the maximum outlet pressure (PMR). It can only be decreased.
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 psi outlet pressure at a setpoint of 0 V / 0 mA / 4 mA.
- Span: 50 psi device: = 50 psi at 10 V / 20 mA  
  100 psi device: = 100 psi at 10 V / 20 mA  
  150 psi device: = 150 psi at 10 V / 20 mA  
  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
Offset: 0 %  
Span: 100 %  
Ramp: no ramp  
Shut-off: ON; the valve is exhausted at a command signal below 0.5%  
Controller structure: PID  
Proportional gain: 4.0  
Integration time: 0.1 sec  
Derivation time: 8 msec
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.

Push Buttons
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: NBR (nitrile), FPM (fluoroelastomer)

Installation
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: 1/8-1/4-3/8 NPT or GTap, see section 3
Max. Inlet Pressure: see section 3
Temperature / Fluid: 32°F - 140°F (0°C - 60°C)
Temperature / Ambient: 32°F - 122°F (0°C - 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

<table>
<thead>
<tr>
<th>Nominal diameter dn (mm)</th>
<th>Supply voltage (stabilised)*</th>
<th>Max. Power (W)</th>
<th>Max. Current (mA)</th>
<th>Insulation Class</th>
<th>Degree of Protection</th>
<th>Flow</th>
<th>Electrical Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>24 V = +15%/−10%</td>
<td>21</td>
<td>850</td>
<td>H</td>
<td>IP 65</td>
<td>0.25</td>
<td>470 5-pin female M12 connector</td>
</tr>
<tr>
<td>8</td>
<td>24 V = +15%/−10%</td>
<td>40</td>
<td>1650</td>
<td>H</td>
<td>IP 65</td>
<td>0.7</td>
<td>1300 5-pin female M12 connector</td>
</tr>
</tbody>
</table>

* Residual ripple: 10 %
Test conditions according to ISO 8778: temperature: 20 °C, relative inlet pressure: 6 bar, relative outlet pressure: 5 bar

Command signal:
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 %).
### 8. Accessories

<table>
<thead>
<tr>
<th>5 Pin 12mm FEMALE Straight Field Attachable Connectors</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>PG 9 Cable Gland</td>
<td>TC05F20000000000</td>
</tr>
<tr>
<td>5 Pin 12mm FEMALE 90 DEGREE Field Attachable Connectors</td>
<td></td>
</tr>
<tr>
<td>PG 9 Cable Gland</td>
<td>TD05F20000000000</td>
</tr>
<tr>
<td>Micro Female 5 Pole Straight 6 Wire 22 AWG, Shielded</td>
<td></td>
</tr>
<tr>
<td>3 Meter</td>
<td>TC0503MMS000671Y</td>
</tr>
<tr>
<td>5 Meter</td>
<td>TC0505MMS000671Y</td>
</tr>
<tr>
<td>Micro Female 5 Pole 90 Degree 6 Wire 22 AWG Euro Color Code, Shielded</td>
<td></td>
</tr>
<tr>
<td>3 Meter</td>
<td>TD0503MMS000671Y</td>
</tr>
<tr>
<td>5 Meter</td>
<td>TD0505MMS000671Y</td>
</tr>
<tr>
<td>Micro F/M 4 Pole Straight 22 AWG Euro Color Code</td>
<td></td>
</tr>
<tr>
<td>Unshielded</td>
<td>Shielded</td>
</tr>
<tr>
<td>2 Meter - TC0403MIETA04000</td>
<td>3 Meter - TC0403MMETA04000</td>
</tr>
<tr>
<td>5 Meter - TC0405MIETA04000</td>
<td>5 Meter - TC0405MMETA04000</td>
</tr>
<tr>
<td>Micro F 90°/M Straight 22 AWG Euro Color Code</td>
<td></td>
</tr>
<tr>
<td>Unshielded</td>
<td>Shielded</td>
</tr>
<tr>
<td>2 Meter - TD0403MIETA04000</td>
<td>3 Meter - TD0403MMETA04000</td>
</tr>
<tr>
<td>5 Meter - TD0405MIETA04000</td>
<td>5 Meter - TD0405MMETA04000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Manifold</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manifold for 608 (DN 4mm) with G3/8; common supply and exhaust</td>
<td>35500558</td>
</tr>
<tr>
<td>Manifold for 609 (DN 8mm) with G1/2; common supply and exhaust</td>
<td>35500559</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PC Software &amp; Cable Connectors</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DaS Light: Data Acquisition Software for SENTRONIC® - basic parameters - free download at Numatics.com</td>
<td>99100110</td>
</tr>
<tr>
<td>DaS Expert: Data Acquisition Software for SENTRONIC® - full parameters - CD-ROM</td>
<td>99100111</td>
</tr>
<tr>
<td>RS 232 cable converter; 2m cable with 9-pin Sub-D (plug connector)</td>
<td>88100732</td>
</tr>
<tr>
<td>RS 232 cable converter; 2m cable with 9-pin Sub-D (screw connector)</td>
<td>833-993708</td>
</tr>
</tbody>
</table>

1) Manifold ships with required hardware and gaskets for connecting manifolds together.

### 9. Maintenance and Care

No special maintenance or care required.
10. Dimensions in inches (mm), Weight in lbs (kg)

Dimensions: Inches (mm), Weight in lbs (kg)

**Inline version: DN 4**

Weight: 1.23 (0.56)

- M4 hole for ground screw
- 1/8, 1/4 NPT or GTap

**Inline version: DN 8**

Weight: 2.49 (1.13)

- M4 hole for ground screw
- 1/4, 3/8 NPT or GTap

Information subject to change without notice. For ordering information or regarding your local sales office visit www.numatics.com.
Manifold version: DN 4
Weight: 1.23 (0.56)

Dimensions: Inches (mm), Weight in lbs (kg)

Manifold: DN 4
Dimensions: Inches (mm), Weight in lbs (kg)

Manifold version: DN 8

Weight: 2.49 (1.13)

Manifold: DN 8