

**3 Way Proportional Pressure
Control Valve
Nominal diameter 2
Direct operated poppet valve with
integrated electronic pressure control**

- Free of lacquer affecting substances
- Combined valve and electronic control unit
- Minimal Hysteresis
- Good Linearity
- Good response sensitivity
- Fast response time
- Adjustable amplification control
- Adjustable pressure range
- Signal output „Pressure reached“
- Valve conforms to CE



Technical Data

Medium:

Filtered compressed air, lubricated or unlubricated
filter 50 µm

Fluid temperature:

-5 to +50°C

Operation:

Proportional solenoid

Connection:

Hose OD 6mm

Mounting position:

Any, preferably vertical (solenoid upwards)

Flow direction:

Fixed

Ambient temperature:

0 to +50°C

Material:

Body PA6 (polyamide reinforced)
Seals NBR (Perbunan)

Degree of protection:

IP 55

Operating pressure p₁:

12 bar max.

Pressure settings p₂:

0,15 to 8 bar, 0,03 to 2 bar

Hysteresis:

< 0.5 [% p₂ max]

Repeatability:

< 0.5 [% p₂ max]

Linearity:

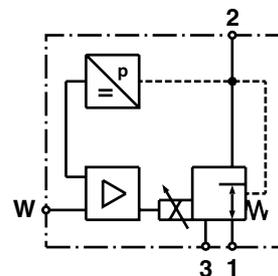
< 1 [% p₂ max]

Response sensitivity:

< 0.2 [% p₂ max]

Ordering Information

3 way proportional pressure control valve,
nominal diameter 2, operating pressure
0,15 to 8 bar, setpoint input 0 to 8 V
Type: 4094710.9000.024.00



Electromagnetic Compatibility

The valve conforms to the EC requirements EN50081-2 (emission) and EN50082-2 (disturbance noise). For this specification shielded cables have to be used.



General Information

Type	Pressure setting p ₂ (bar)	Max. operating pressure p ₁ (bar)	Setpoint input w	Actual value output x	Pressure range adjustment	Signal output „pressure reached“ x = w	Dimensional drawing No.	Connection diagram No.	Connector *) Variant
4094700.9000.024.00	0 ... 2	7	0 ... 10 V	0 ... 10 V	x	x	01	1	A + B
4094701.9000.024.00			0 ... 20 mA		x	x	01	1	A + B
4094702.9000.024.00			4 ... 20 mA		x	x	01	1	A + B
4094703.9000.024.00			8 bit parallel		x	x	03	3	A + D
4094710.9000.024.00	0 ... 8	12	0 ... 8 V	0 ... 8 V	x	x	01	1	A + B
4094711.9000.024.00			0 ... 16 mA		x	x	01	1	A + B
4094712.9000.024.00			4 ... 16,8 mA		x	x	01	1	A + B
4094713.9000.024.00			8 bit parallel		x	x	03	3	A + D
4095700.9000.024.00	0 ... 2	7	0 ... 10 V	0 ... 10 V	x		02	2	C
4095701.9000.024.00			0 ... 20 mA		x		02	2	C
4095702.9000.024.00			4 ... 20 mA		x		02	2	C
4095710.9000.024.00	0 ... 8	12	0 ... 8 V	0 ... 8 V	x		02	2	C
4095711.9000.024.00			0 ... 16 mA		x		02	2	C
4095712.9000.024.00			4 ... 16,8 mA		x		02	2	C

*) Connectors see Accessories

Electrical Information

Supply

Supply voltage	U _B (VDC)	18 to 32
Residual ripple max	(%)	10
Current consumption		
8 bar valve	I _B (A)	0,8
2 bar valve	I _B (A)	0,5
Standby mode	I _B (A)	< 0,05

Inputs (signal)

Analogue setpoints¹⁾ (W)

Voltage signal	U _E (V)	0 to 10
Input resistance	R _E (kΩ)	< 500
Current signal	I _E (mA)	0 to 20 / 4 to 20
Load independence	(Ω)	≤ 135

Digital setpoints¹⁾ (W)

Data inputs (parallel)	(bit)	8 bit + memory
Level for logic „L“ ²⁾	(V)	0 to 2
Level for logic „H“	(V)	12 to 32
Memory function *		Low active
Input current	(mA)	1

* see electrical connection diagrams

Electromagnetic compatibility (EMV)

Noise immunity	According to DIN EN 50082, Part 2
Noise transmission	According to DIN EN 50081, Part 1

Outputs (signal)

Actual value (X)

Voltage signal for pneumatic outlet pressure	U _A (V)	0 ... 2 bar 1 V = 0,2 bar 0 ... 8 bar 1 V = 1,0 bar
Output current	I _A (mA)	1

Signal output

„Pressure reached“ (x = w)

Switching range	(%p ₂ max)	± 2
Voltage signal for pressure outside switching range x ≠ w	(V)	0
Pressure reached (x = w)	(V)	U _B - 1,5
Output current max.	(mA)	10

Accessories

Designation	Specification	Version	Type
Subplate			0250162
Tool	Disassembly of subplate		0799915
Material for fixation	Threaded bolt M6		0681641³⁾
	Plug-in termination G 1/8		102150618
Connectors	M 12 x 1; 3pin; 2 m 3 x 0,34 mm ²	A	0799843
	M 12 x 1; 4pin; 2 m 4 x 0,34 mm ²	B	0799844
	M 12 x 1; 5pin; 2 m 5 x 0,34 mm ²	C	0799845
	M 12 x 1; 3pin; 5 m 3 x 0,34 mm ²	A	0250079
	M 12 x 1; 4pin; 5 m 4 x 0,34 mm ²	B	0250080
	M 12 x 1; 5pin; 5 m 5 x 0,34 mm ²	C	0250081
	M 12 x 1; 3pin; 10 m 3 x 0,34 mm ²	A	0250470
	M 12 x 1; 4pin; 10 m 4 x 0,34 mm ²	B	0250471
	M 12 x 1; 5pin; 10 m 5 x 0,34 mm ²	C	0250472
	14pin; Pg 9	D	0799847
	14pin; 2 m 14 x 0,25 mm ²	D	0799857
	14pin; 5 m 14 x 0,25 mm ²	D	0250082

¹⁾ Valve function is activated as soon as the setpoint is ≥ 1.5%. If the setpoint is < 1.5%, the set pressure = 0, and the valve is standby mode.

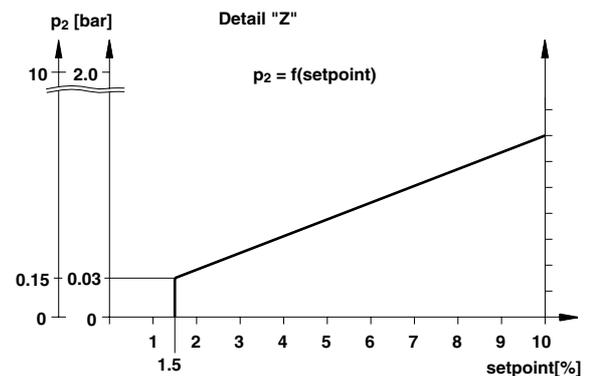
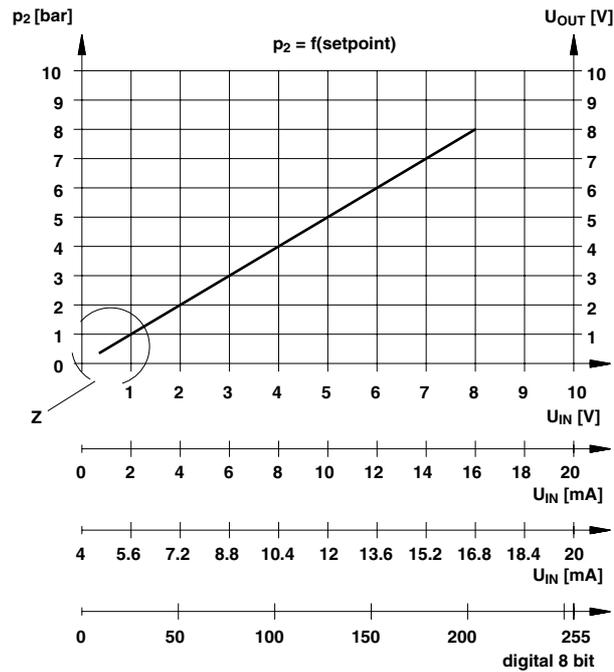
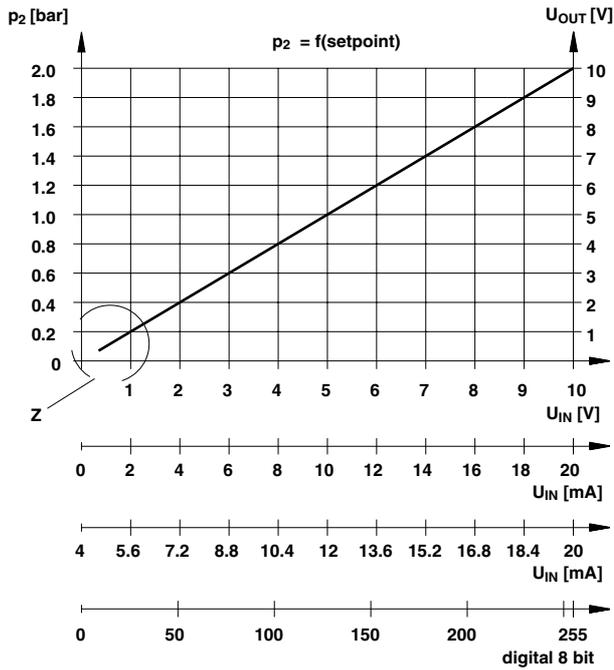
²⁾ Input open = Logic L

³⁾ 2 pieces are required per valve



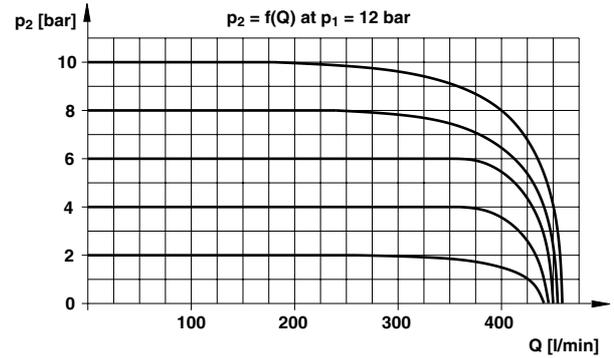
Characteristic Curves

Static characteristic curve

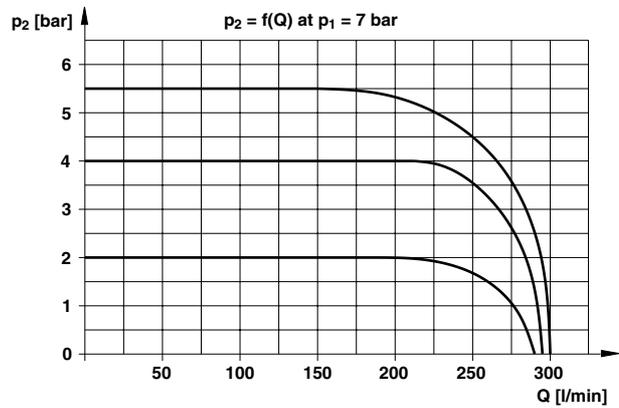


The valve function is activated as soon as the setpoint is $\geq 1,5\%$

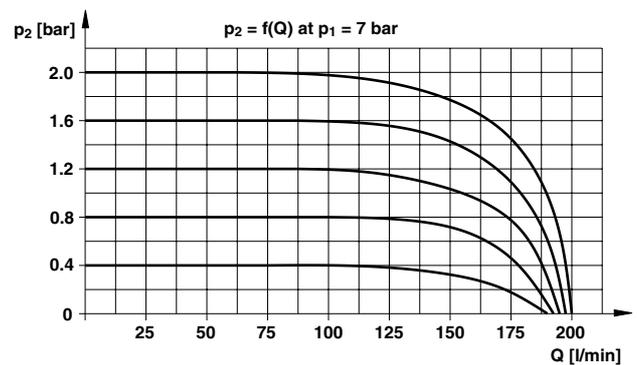
Flow characteristic with 12 bar operating pressure



Flow characteristic with 7 bar operating pressure



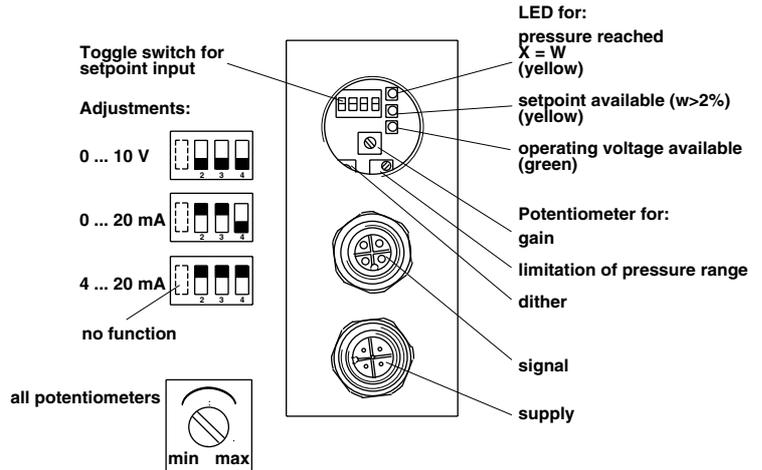
Flow characteristic with 7 bar operating pressure





Functions/Adjustment facilities

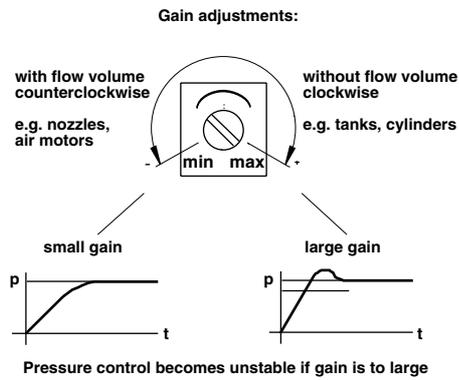
The setpoint input is factory pre-adjusted according to type no. In case of later change-over the accuracy will be reduced to $\pm 1,5\%$.



Setting the controller gain

The gain of the integrated controller is set in the factory to a value which allows universal use of the valve. If necessary, the controller gain can be varied to suit a specific pneumatic application of the valve. The controller gain can be changed by turning the potentiometer (under the screw plug in the electronics cover).

Factory setting: Volume 100 cm³.



Pressure control becomes unstable if gain is too large

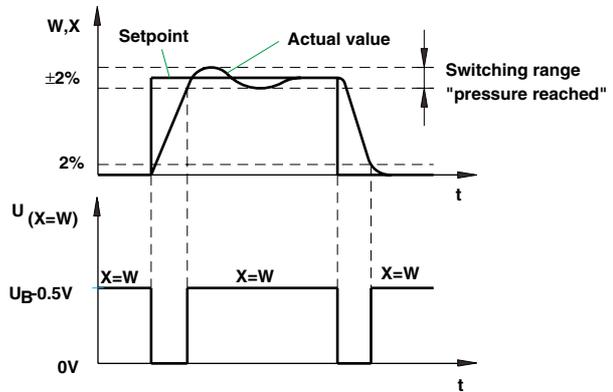
Signal output

„pressure reached“ (x = w)

Description: The function „Pressure reached“ enables the monitoring of the pressure control function.

The actual value is compared with the desired value (x = w). Identical values (selected pressure lying within the switching range) will cause a status signal at the output (x = w).

Switching range $\pm 2\%$ of p_2 max.



Pressure range adjustment

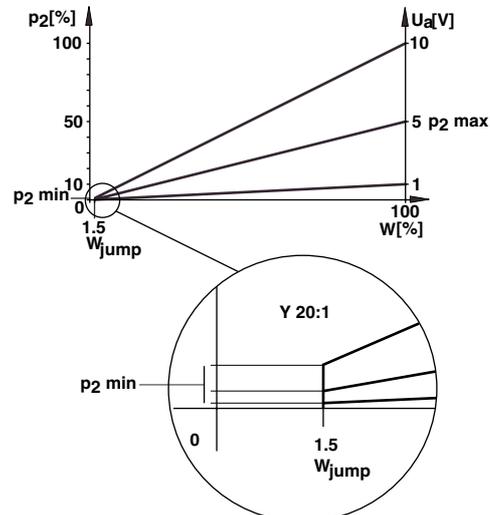
Description: When delivered the relation between the setpoint pressure and the output pressure is adjusted to the prevailing pressure range of 2 bar or 8 bar:

Setpoint	100%
corresponding to output pressure	100%

The potentiometer „pressure range adjustment“ offers the possibility to change the pressure range. Meanwhile it is possible to decrease the setpoint pressure down to 10% (see characteristic curve 10%).

The valve always starts to respond at p_2 min.

This means	0,03 bar at a pressure range up to 2 bar
	0,15 bar at a pressure range up to 8 bar

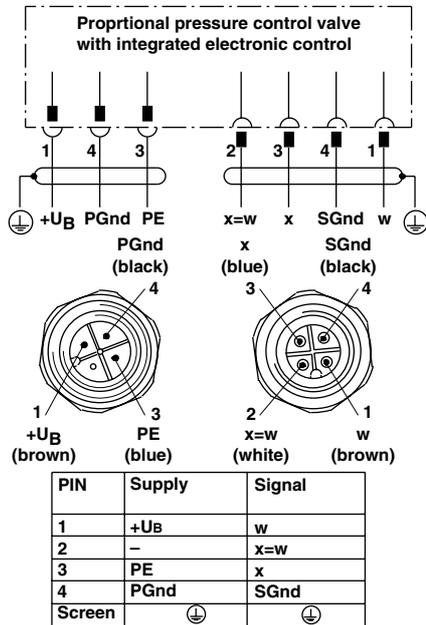




Electrical Connection Diagrams

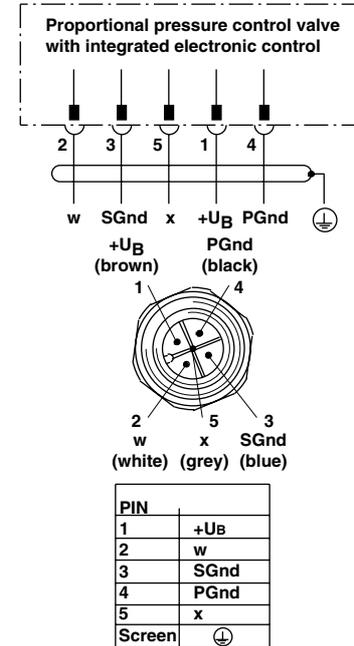
Connection diagram 1

Valves with analogue setpoint input
2 connectors



Connection diagram 2

Valves with analogue setpoint input
1 connector

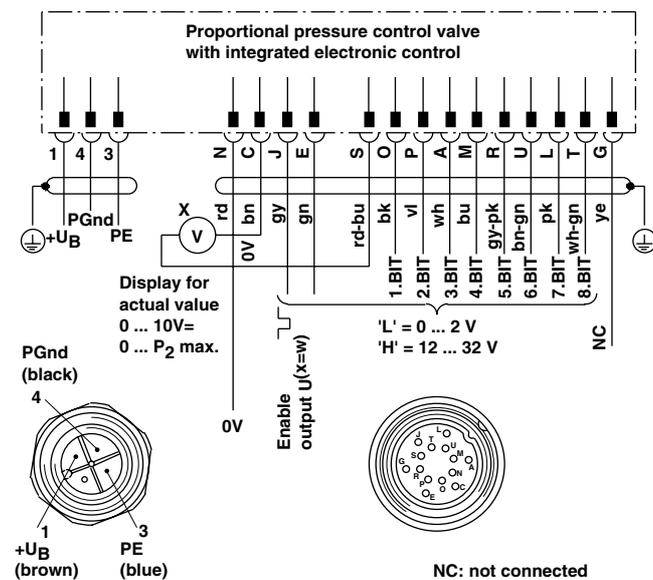


Explanation of the connections

+U _B	Supply voltage	w	Setpoint input
PGnd	Zero potential supply	x	Actual value output
SGnd	Zero potential signal	x = w	Comparator output
		PE	Protective ground

Connection diagram 3

Valves with digital setpoint input
2 connectors



Notes on memory ¹⁾

Logic table

T	L	U	R	M	A	P	O	J	Output signal
								L	As triggered at pins 0 to T
X	X	X	X	X	X	X	X	H	The previously-set value is stored; the triggering signals at pins 0 to T are ignored

¹⁾ If the memory function is not required, pin C can be ignored. In case of an interrupt of the valve function U_B the memory information is lost.

Conversion table for digital input signal

Signal at pin									Value z (decimal)	Valve version for pressure range p ₂ (bar)	
T	L	U	R	M	A	P	O	J		0 ... 2	0 ... 10
L	L	L	L	L	L	L	L	L	0	0,000	0,000
L	L	L	L	L	L	L	L	H	1	0,008	0,039
L	L	L	L	L	L	L	H	L	2	0,016	0,078
L	L	L	L	L	L	H	L	L	4	0,031	0,156
L	L	L	L	H	L	L	L	L	8	0,063	0,314
L	L	L	H	L	L	L	L	L	16	0,126	0,627
L	L	H	L	L	L	L	L	L	32	0,251	1,255
L	H	L	L	L	L	L	L	L	64	0,502	2,510
H	L	L	L	L	L	L	L	L	128	1,004	5,020
H	H	H	H	H	H	H	H	H	255	2,000	10,00

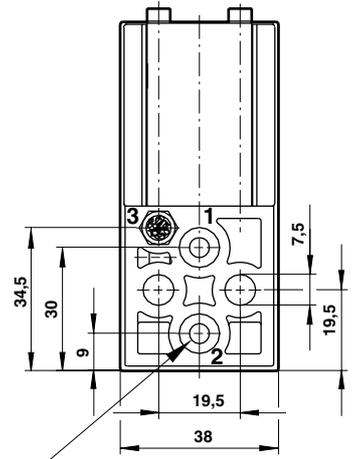
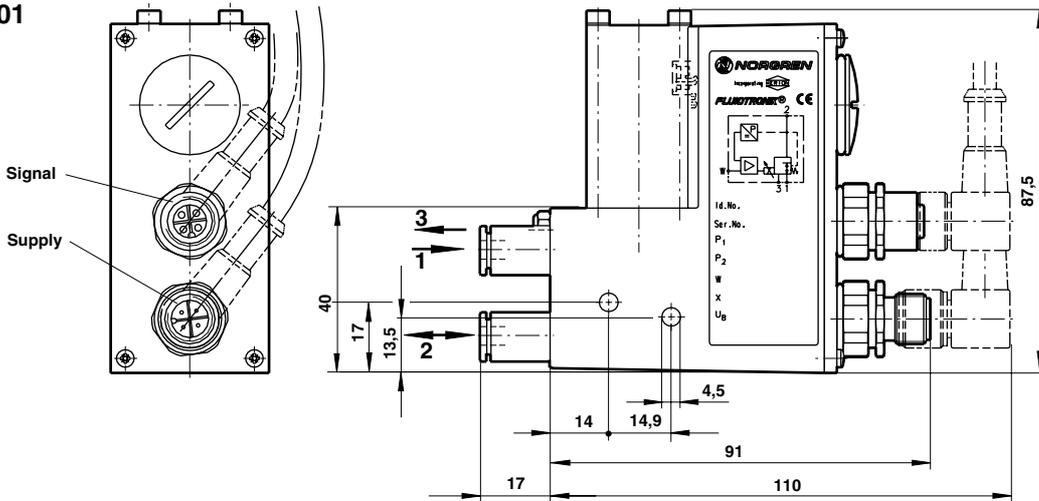
$$p_2 \text{ (bar)} = \frac{2}{255} \times z \quad \frac{10}{255} \times z$$

z = Sum of values triggered by „H“



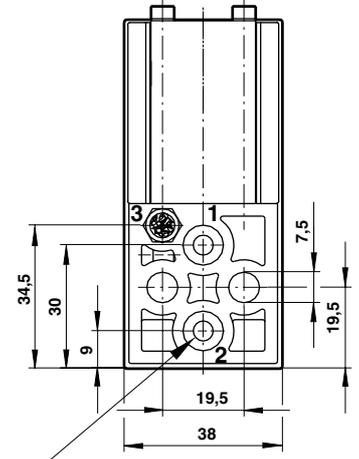
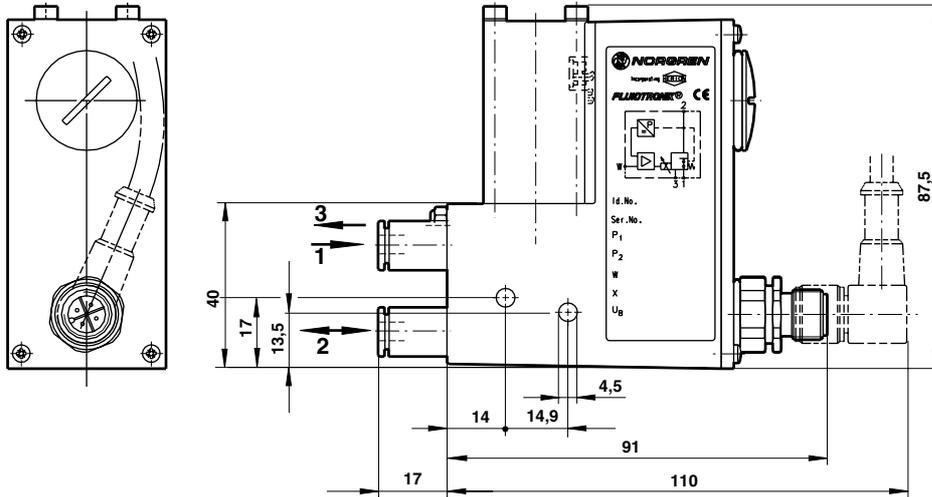
General Dimensions

01



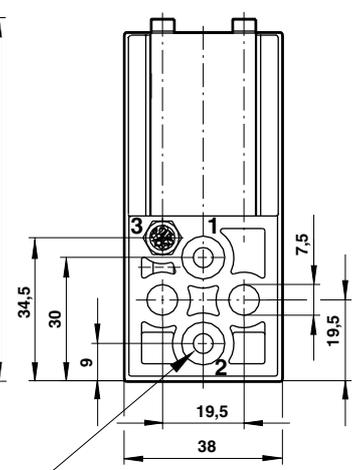
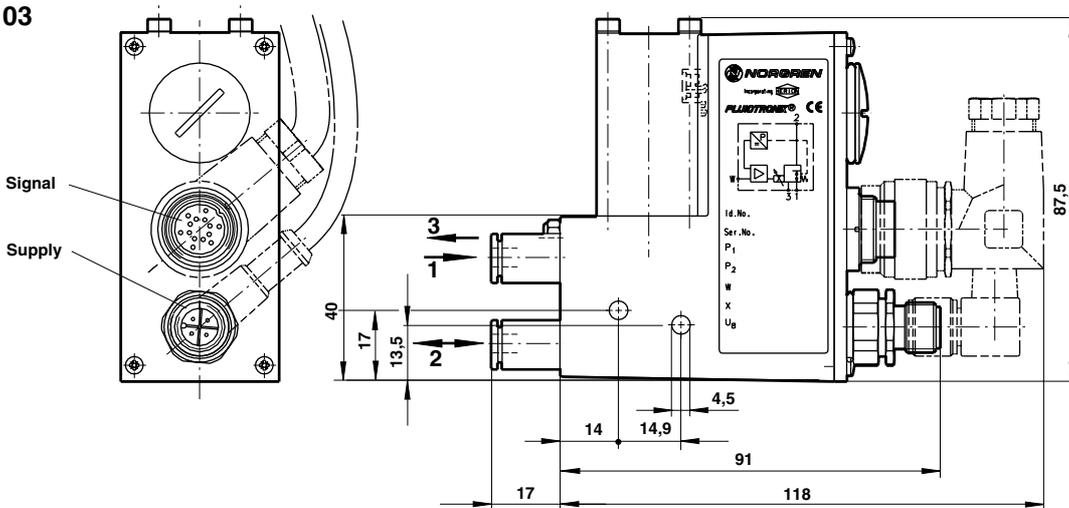
Plug-in termination for pipe OD = 6 mm

02



Plug-in termination for pipe OD = 6 mm

03



Plug-in termination for pipe OD = 6 mm



Instructions for pneumatic installation and commissioning

1. Operating pressure p1

The operating pressure must be higher than the max. required set pressure at the valve outlet.

Recommended: ≥ 1 bar.

When switching off the operating pressure, the operating voltage should be disconnected as well.

2. Line cross section

Cross section of supply line to 1 (P) should be larger than the nominal width of the valve.

Cross section of the working line to 2 (A) should be of the same size but at all events larger than the nominal width of the valve.

Air at the exhaust port 3 (R) must be discharged without pressure.

3. Combination with other units

3.1 Units connected upstream

(e.g. pressure sensors) Flow rate must be larger than that of the proportional valve.

3.2 Units connected downstream

(e.g. pilot valves) Same flow rate, but at any rate larger than that of the proportional valve.

4. Mounting place

As close as possible to the consuming device.

5. VERY IMPORTANT !

Before mounting the valve on the connection plate, the pneumatic lines must be blown out and freed from mounting residues.

Instructions for electrical installation

1. Voltage supply

Voltage supply 18 ... 32 V (incl. residual ripple) excess voltage may destroy the electronic system!

2. Avoidance of interferences

2.1 Screening

In order to prevent interferences by electric fields, screened lines must be used. The screen must be connected to PE (see circuit diagram)

2.2 Laying of cables

Supply and signalling lines shall not be laid in parallel to power mains or high-voltage lines.

3. Line cross section

According to VDE 01134.

Zero potentials

For zero potentials (0 V), the supply voltage and the setpoint signal, two separate wires must be used in order to prevent distortion of the setpoints.

Warning

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under 'Technical Data'.

Before using these products with fluids other than those specified, for non-industrial applications, life-support systems, or other applications not within published specifications, consult NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of

General

Repairs and servicing

Do not attempt to repair the product by yourself.

After repair tasks, certain adjustments and test procedures have to be performed, which can only be done by qualified and authorised personnel. Products in need of repair may be sent to the following address:

IMI Norgren Herion Fluidtronic GmbH & Co. KG
Föhrenbachstraße1, D-73630 Remshalden

Tel.: +49 (0) 71 51 / 70 88 -0

Fax: +49 (0) 71 51 / 70 88 -55

Abroad:

Your local representative dealer or agent will forward the product to the manufacturer for repair.

Please indicate a description of the error, malfunction or failure with the product you send in for repair. You should always state the serial number and the purchase date.

For servicing and repairing the products, we can offer experienced and qualified personnel. In case you need our assistance, please contact the following address:

IMI Norgren Herion Fluidtronic GmbH & Co. KG
Föhrenbachstraße1, D-73630 Remshalden

Tel.: +49 (0) 71 51 / 70 88 -0

Fax: +49 (0) 71 51 / 70 88 -55

Abroad:

Your local representative dealer or agent.

Transport, storage, default setting, cleaning

The product can only be transported and stored in the original Norgren Herion packaging which ensures suitable protection against mechanical damage.

The product is shipped in a ready-to-operate-state (default settings). After correct installation, it is ready for use.

In case it is necessary to clean product, we recommend sending it back to the manufacturer. The correct address can be found under repairs and servicing.

all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure.

System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products where applicable.