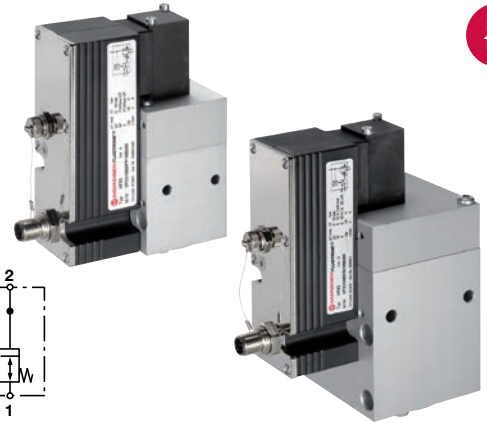


- > Port size: G1/4 ... G3/4
- > All-digital control electronics
- > Variable pressure control
- > Optional: serial interface with VP-Tool Software
- > Optional actuation via fieldbus (separate datasheet on request)
- > Free of lacquer affecting substances



Technical features

Medium:

Filtered (50 μ m), unlubricated or lubricated condensate-free compressed air or neutral gases
 Due to the lubricants and their additives, use of lubricated compressed air can affect the dynamics and service life

Operation:

Proportional solenoid

Pressure range:

Operating pressure P1 max:
 7 bar (101 psi), 12 bar (174 psi),
 17 bar (246 psi)

Operating pressure P2:

0 (0,02) ... 2 bar (0 ... 29 psi)
 0 (0,1) ... 10 bar (0 ... 145 psi)
 0 (0,16) ... 16 bar (0 ... 232 psi)

Flowrate:

See flow characteristics

Flow direction:

1 \rightarrow 2, 2 \rightarrow 3

Service life:

> 10 Million operations,
 max. stroke

Linearity:

< \pm 1,0 % (p2 max.)

Control accuracy:

< \pm 1,0 % (p2 max.)

Response accuracy:

< \pm 0,2 % (p2 max.)

Hysteresis:

< \pm 0,5 % (p2 max.)

Repeat accuracy:

< \pm 0,5 % (p2 max.)
 values related to 20°C and
 24 V d.c. power supply

Ambient:

Valve series is designed for
 indoor use at normal industrial
 ambient

Ambient/Media temperature:

Media
 -5 ... +50°C (+23 ... +122°F)
 (no condensation permitted)
 Ambient
 -5 ... +60°C (+23 ... +140°F)
 Air supply must be dry enough
 to avoid ice formation at
 temperatures below +2°C (+35°F).

Materials:

Valve housing: Aluminium
 Electronic housing: PAA
 Seals: NBR, HNBR on request
 Internal parts : PBT
 Springs : Steel

Option selector

VP23★★B★★★1★★★

Pressure range	Substitute
0 ... 2 bar	02
0 ... 10 bar	10
0 ... 16 bar	16
Nominal size	Substitute
8 mm	D
16 mm	E
Set point	Substitute
4 ... 20 mA	4
0 ... 10 V/Diff.	7
Profibus DP	P

Option	Substitute
Serial interface	B200
Serial interface + LED-display *	B201
Connector	Substitute
M12/8 pin	M
Fieldbus spec. (on request)	N
Actual value	Substitute
0 ... 10 V/4 ... 20 mA	6
Profibus DP	P

* LED-display for bus version not available

Function

The electronic pressure controller is used in conjunction with an electric set-point (control signal) to quickly and precisely set a pressure at the pressure connection (2). Even with consumption of the medium (compressed air or neutral gases) the output pressure is controlled (see flow rate characteristics)

Proportional valves are used in many different applications across all sectors of industry. They are used anywhere where precise and fast direct or indirect control of pressure, force, rotational speed etc. is required.

Application example: Contact pressure control of welding electrodes in automotive manufacture

Assembly

The electronic pressure controller consists of:

- Proportional solenoid
- An integrated pressure sensor
- μ P-driven control electronics
- Serial interface
- A pneumatic control plunger
- Optional:
 - Fieldbus interface
 - Configuration software VP-Tool (please order separately)
 - LED display for the size of the output pressure

Electrical parameters

Endurance limit in relation to oscillations to DIN EN 60068-2-6:
 10g at 12-500Hz in switched-off-status

Supply

Supply voltage	UB	18 ... 32 V d.c.
Residual ripple max.	[%]	10
Current consumption at 16 bar	NG 8,16 max. [A]	approx. 1,8 A at 24 V d.c.
	NG 8,16 static at 25°C (corrected) [A]	approx. 1,4 A at 24 V d.c.
Current consumption at 10 bar	NG 8,16 max. [A]	approx. 1,8 A at 24 V d.c.
	NG 8,16 static at 25°C (corrected) [A]	approx. 1,2 A at 24 V d.c.
Current consumption at 2 bar	NG 8,16 max. [A]	approx. 1,8 A at 24 V d.c.
	NG 8,16 static at 25°C (corrected) [A]	approx. 1,2 A at 24 V d.c.

Inputs (signal)

Set point W (+/-U d) analogue differential

Voltage signal UE (V)	0 ... 10
Input resistance RI (kΩ)	170
Set point W(I) analogue:	
Current signal UE (mA)	4 ... 20
Burden (Ω)	500
Max. input voltage (V)	-10 ... 40

Outputs (signal)

Output pressure actual value X(U)

Voltage signal of pneumatic output pressure UA (V)	0 ... 10 V = 0 ... max. p2
Output current max. IA (mA)	1

Operating principle

The valve has a closed loop controller, meaning that the output pressure is constantly being measured by the internal pressure sensor and compared to the specified set-point.

If the output pressure is lower than the set pressure or if a higher pressure is desired, the pneumatic control plunger is actuated by the electric proportional solenoid. A connection is then established between connection 1 (input pressure) and 2 (output pressure) until the pressure is the same as the specified set-point.

If the output pressure is higher than the set pressure or if a lower pressure is desired, the pneumatic control plunger is actuated by the electric proportional solenoid. A connection is then established between connection 1 (input pressure) and 3 (ventilation connection) until the pressure is the same as the specified set-point.

In addition, after the supply voltage is switched off, the output pressure set last is vented down to 0 bar.

Durability under shock effect to DIN EN 68-2-67: 30 g/10 shocks
 Valves should not be used in safety systems that require blocking or exhaust valves

Without power the pneumatic connection 2 -> 3 is open

Output pressure actual value X(I)

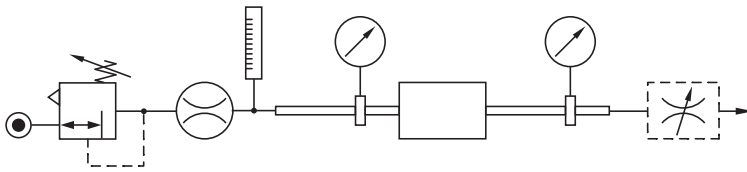
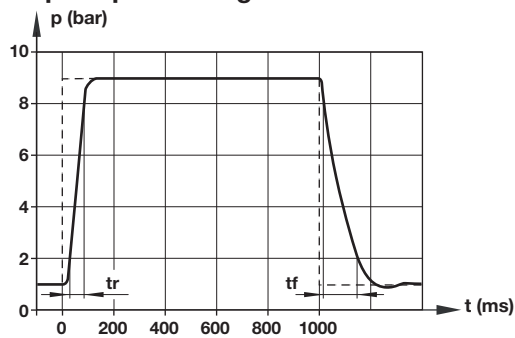
Current signal of pneumatic output pressure IA (mA)	0 (4) ... 20 mA = 0 ... max. p2
Load resistance RL (Ω)	500 recommended

Output »pressure reached« X (comp)

Switching range (% max. p2)	+/-2%
Digital output signal	PLC-Level
Control pressure outside of switching range (X\neqW)	Low
Pressure reached (X = W) (V)	High
Output current max. (mA)	10

Pneumatic parameters
Recommended application area by nominal value:
NG8: Volume (closed) from 100 ... 1500 cm³
NG16: Volume (closed) from 1000 ... 8000 cm³

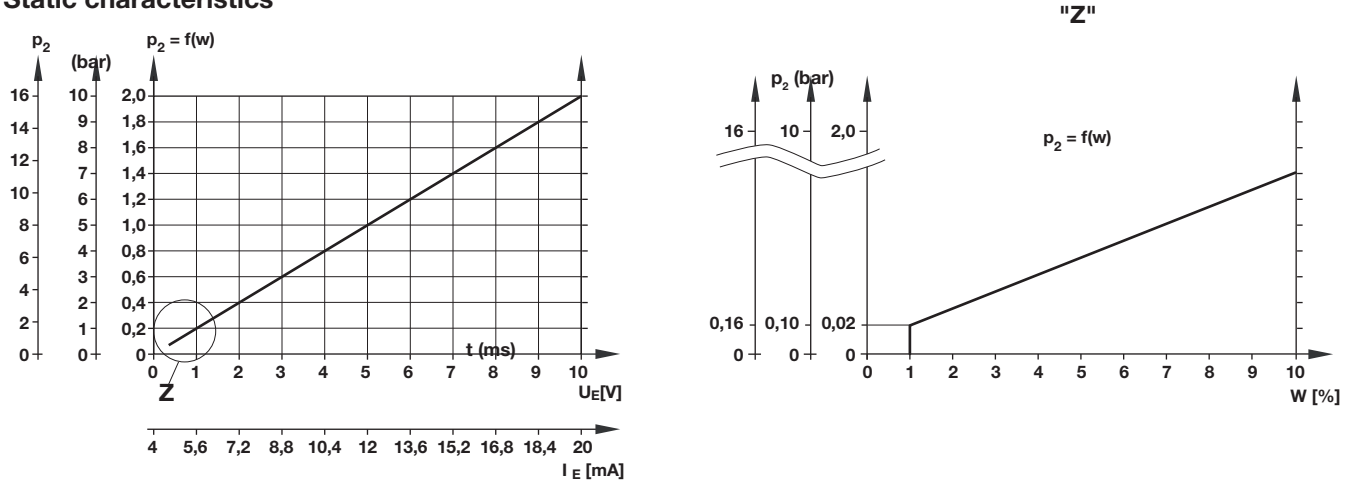
Residual ripple max.	[%]	10
Input pressure p1 max.	[bar]	17/12/7
Output pressure p2 max.	[bar]	0-16 / 0-10 / 0-2
Flow quantity NG 8	[l/min]	see diagram
Flow quantity NG16	[l/min]	see diagram
Switching times (10%-90%) nominal size 8 at volume 400 cm³		
Typical values for P1=12 bar		
Pressure build-up (tr) 1 bar ... 9 bar		100 [ms]
Pressure build-up (tf) 4 bar ... 5 bar		50 [ms]
Pressure drop (tr) 9 bar ... 1 bar		250 [ms]
Pressure drop (tf) 5 bar ... 4 bar		50 [ms]
Switching times (10%-90%), nominal size 16 at volume 1000 cm³		
Typical values for P1=12 bar		
Pressure build-up (tr) 1 bar ... 9 bar		100 [ms]
Pressure build-up (tf) 4 bar ... 5 bar		50 [ms]
Pressure drop (tr) 9 bar ... 1 bar		100 [ms]
Pressure drop (tf) 5 bar ... 4 bar		50 [ms]

Test assembly flow
CETOP RP 84 P.: flow characteristic of pneumatic devices

Step-response diagram


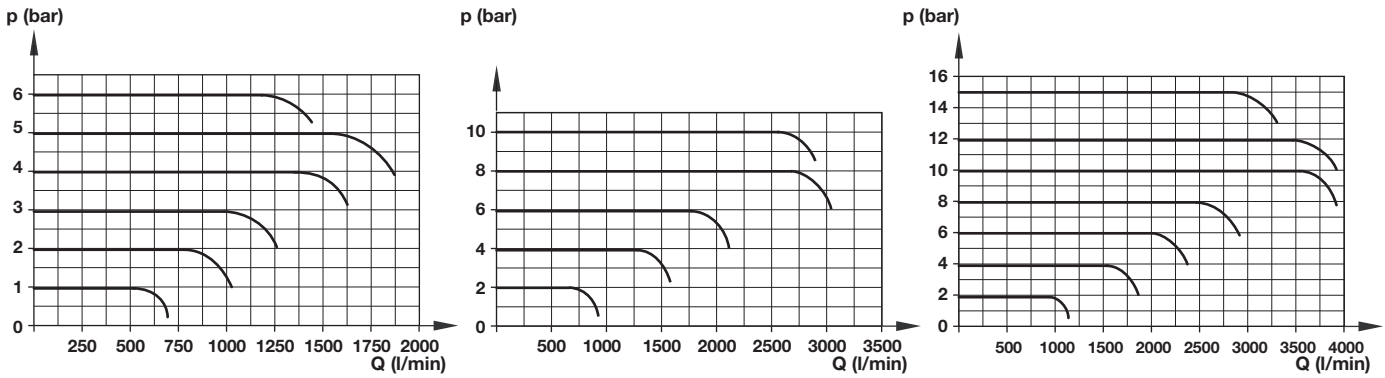
Pneumatic characteristics curves

Flow rate characteristic as a function of the set-point (voltage/current) and input pressure 7 bar, 12 bar, 17 bar for nominal value 8 and 16

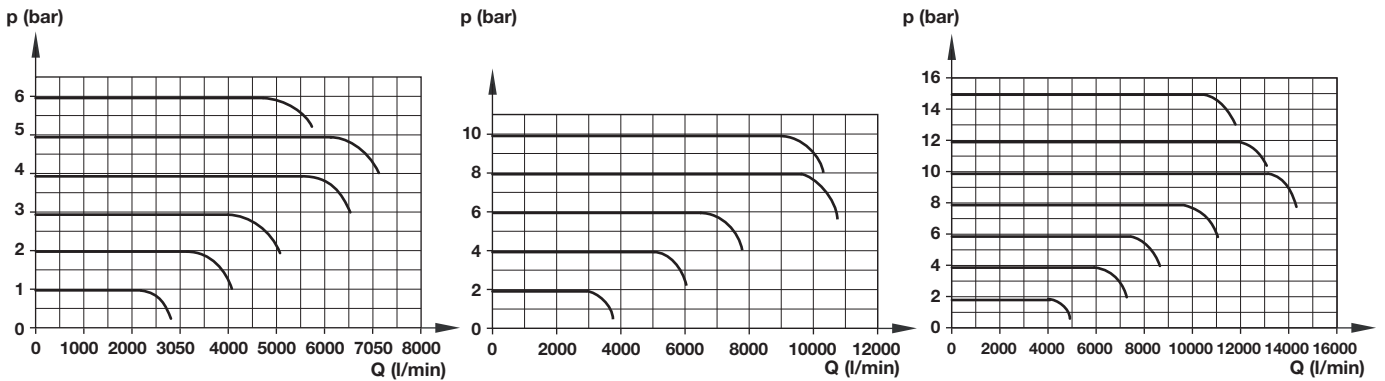
Static characteristics



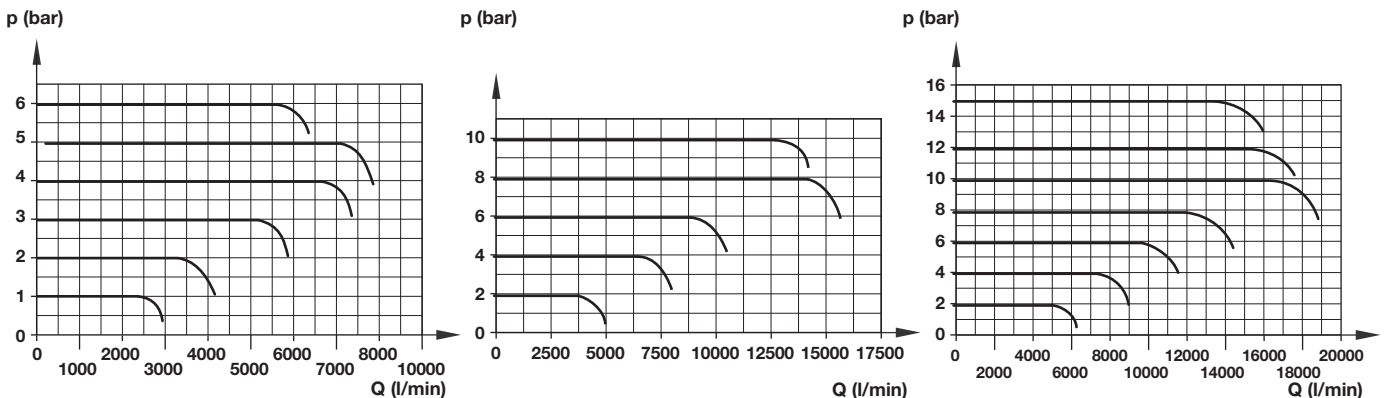
Flow rate characteristics NG 8/P1=7 bar, 12 bar, 17 bar



Flow rate characteristics NG 16/connection plat ae 1/2" (NG12); P1=7 bar, 12 bar, 17 bar



Flow rate characteristics NG 16/connection plate 3/4" (NG20); P1=7 bar, 12 bar, 17 bar



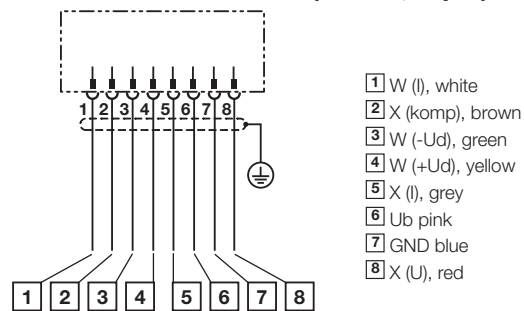
Functional descriptions, status LED and amplification degree setting
General Status LED indicator)

Status	Status-LED
Device off	off
Device running	single-colour green
Valve fault*	red*
Outout current max. (mA)	10

* Potential error sources:
 - Current supply or internal references outside the permitted range
 - Valve not adjustable (X \neq W Time out)
 - Program cycle interrupted

Setting controller gain via PC with VP-Tool

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. When the screw plug is opened the interface connector can be connected and via VP-Tool the controller gain can be adjusted. Adjustment by VP-Tool via serial interface

Connection diagrams
1. Standard connection (M12x1; 8-pin)

Assignment
Supply:

Pin	Description	Colour of connection cable
6	Ub power supply 18 ... 32 V d.c.	Pink
7	GND power ground/PGND	Blue

Input
Set point:

Pin	Description	Colour of connection cable
3	-W Analogue GND/set point input voltage 0 ... 10 V	Green
4	+W Signal/set point input voltage 0 ... 10V	Yellow
1	W(I) Set point input current 4 ... 20 mA	White

Depending on the order number, both outputs (U/I) but only the ordered input will be active.
 Voltage input 0 ... 10 V between pins 4 and 3 Current input between pins 1 and 7

Comparator output/pressure switch*
Pressure reached:

Pin	Description	Colour of connection cable
2	X (comp) Digital output signal PLC level (I max) =3,3 mA High : pressure reached deviation $ w-x < \pm 2\%$ Low: pressure not reached deviation $ w-x > \pm 2\%$	Brown

The output relates to Gnd Pin 7

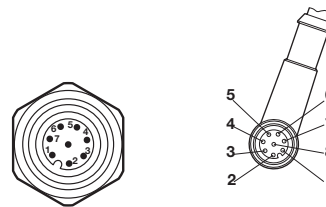
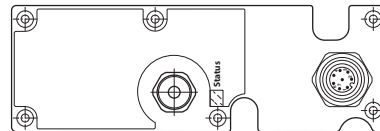
* selectable via VP-Tool

Function
Option LED indicator

Pressure range	Display values
0 ... 2 bar	0,00 ... 2,00
0 ... 10 bar	00,0 ... 10,0
0 ... 16 bar	00,0 ... 16,0

2 coloured LED-display

LED indicator green	pressure deviation from setpoint $< +/- 2\%$
LED indicator red	pressure deviation from setpoint $> +/- 2\%$


Output

Pin	Description	Colour of connection cable
5	X(I) Actual value current 4 ... 20 mA	Grey
8	X(U) Actual value voltage 0 ... 10V	Red

Voltage output refers to Gnd Pin 7.

Due to the voltage drop on the ground wire you should consider an accuracy loss of the voltage output.

Both outputs are active as standard.

3. Serial interface connection


Connection of serial interface

Remove fitting, plug in the interface cable, establish communication with VP-Tool.

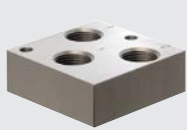
Connecting plugs



Description	Specification	Model
Connecting plug	M12x1; 8-pin; 5 m, 8 x 0,25 mm ² , straight	0250811
Connecting plug	M12x1; 8-pin; 5 m, 8 x 0,25 mm ² , 90°	0250813
Connecting plug	M12x1; 8-pin; screw terminals, 90°	0252383
Connector (Bus only)	M12x1, 5-pin, 5 m, 90°, A-Coded, open (power)	0252086
Connector (Bus only)	M12x1, 5-pin, 5 m, straight, A-Coded, open (power)	0252087
Connector (Bus only)	M12x1, 5-pin, 5 m, 90°, A-Coded, open (power)	0252088
Connector (Bus only)	M12x1, 5-pin, 5 m, 90°, B-Coded, open (Bus in)	0251310
Connector (Bus only)	M12x1, 5-pin, 5 m, 90°, B-Coded, open (Bus out)	0251312
Connector (Bus only)	M12x1, 5-pin, convertible, 90°, B-Coded (Bus in)	0252089
Connector (Bus only)	M12x1, 5-pin, convertible, 90°, B-Coded (Bus out)	0252090
Connector with cable (Bus only)	Plug M12x1, 5-pin, 5m, 90°, B-Coded, (Bus in/out)	0252091

Note: Cable material PUR shielded

Connection plates



Description	Ports	Model
Connection plate NG 8	G1/4	0542636
Connection plate NG 8	G3/8	0543705
Connection plate NG16	G1/2	0542814
Connection plate NG16	G3/4	0542840

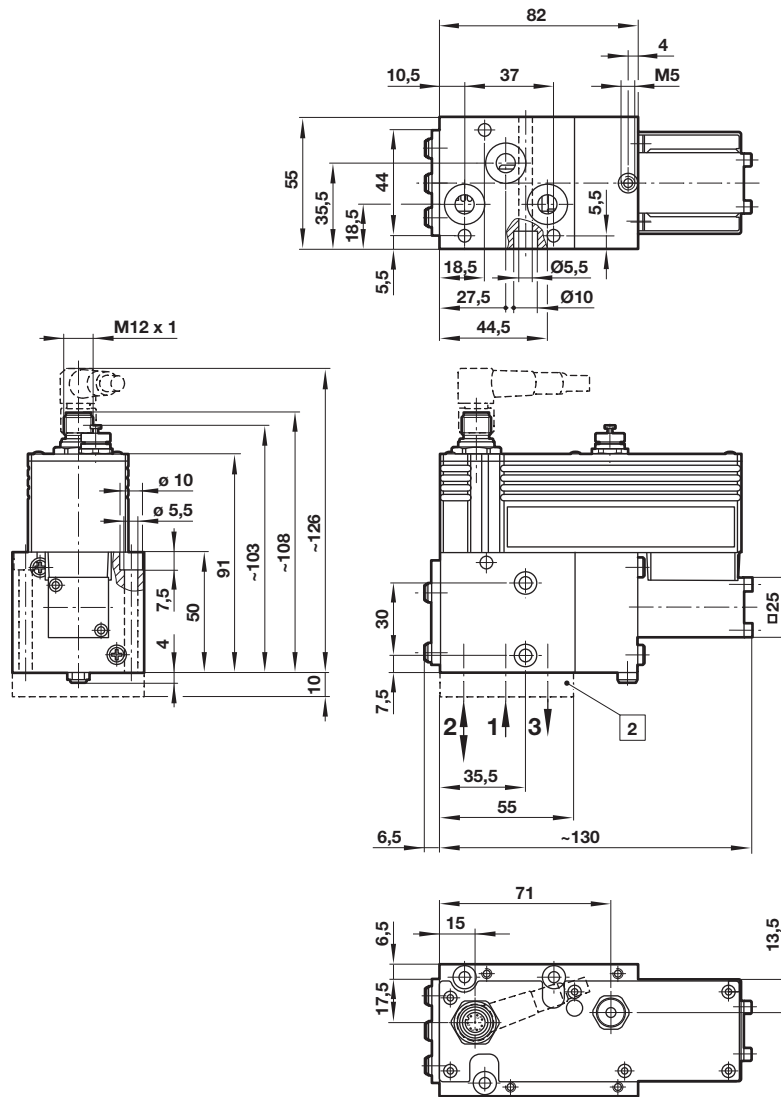
Serial interface accessories

Adaptor cable

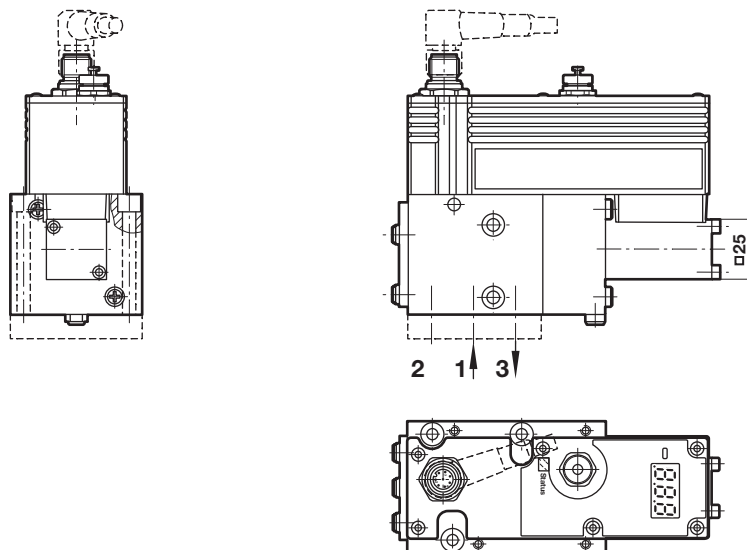


Description	Model
Adaptor cable with software CD VP tool	5988319

Basic dimensions
Standard ND8

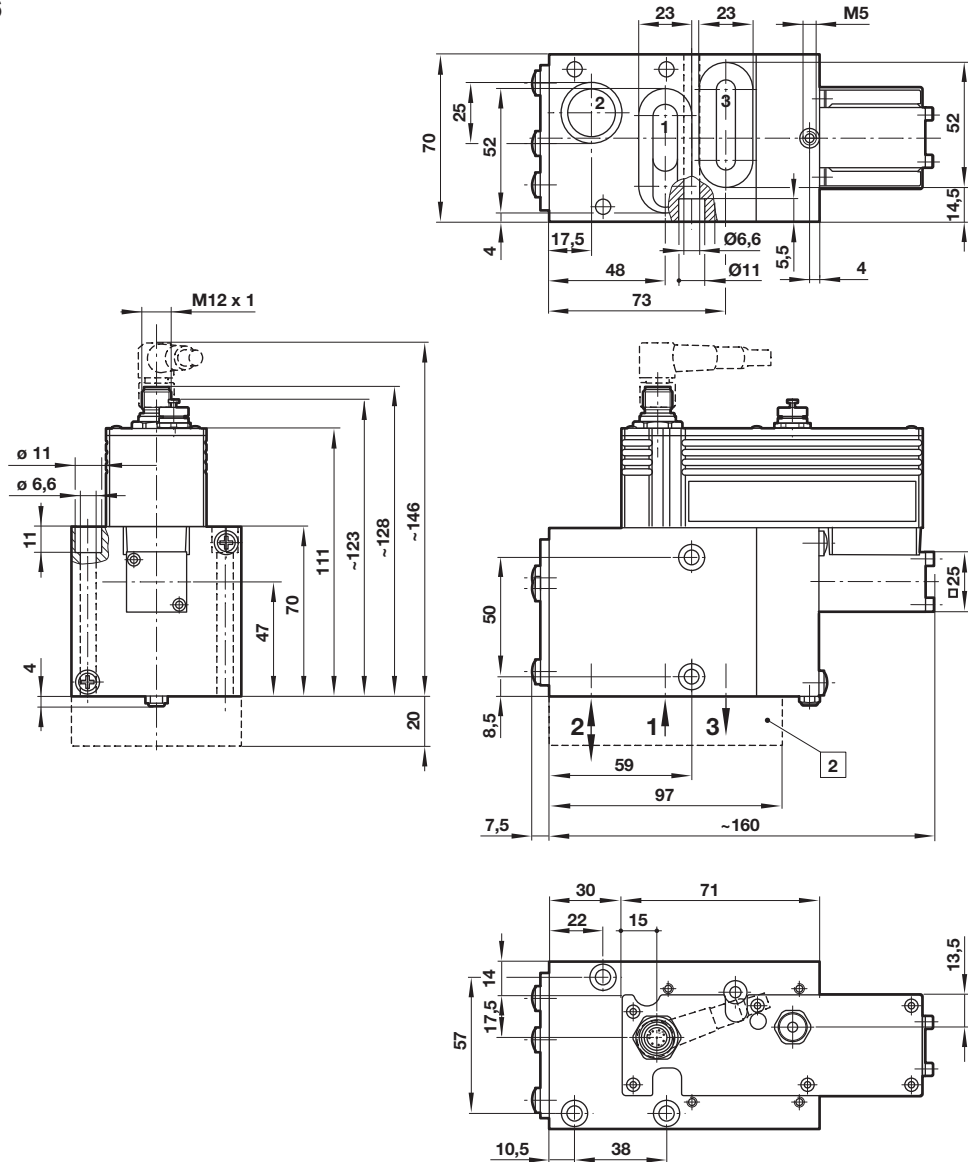
 Dimensions in mm
 Projection/First angle


[2] Connection plate

ND8 with serial interface, LED indicator


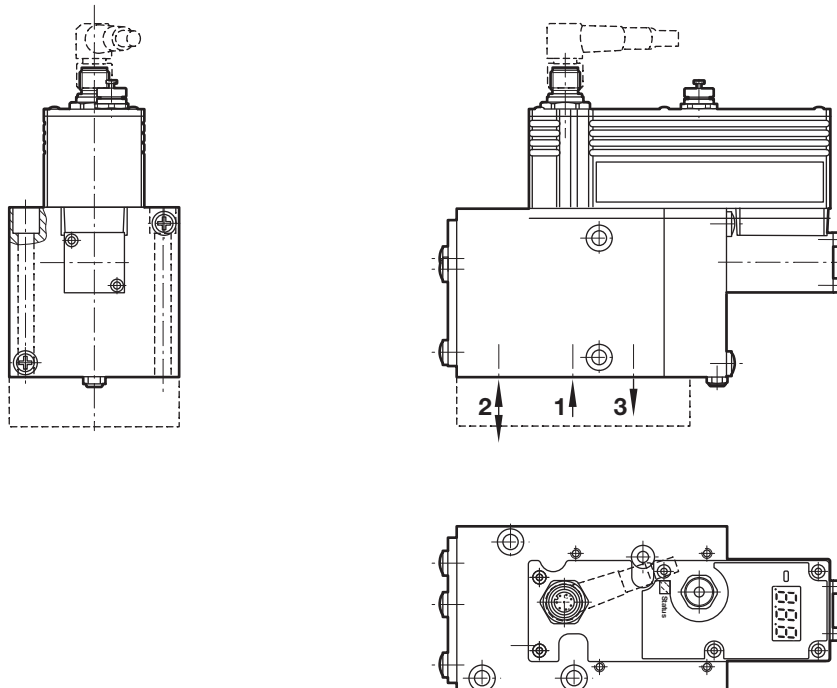
Dimensions ND16

Dimensions in mm
 Projection/First angle



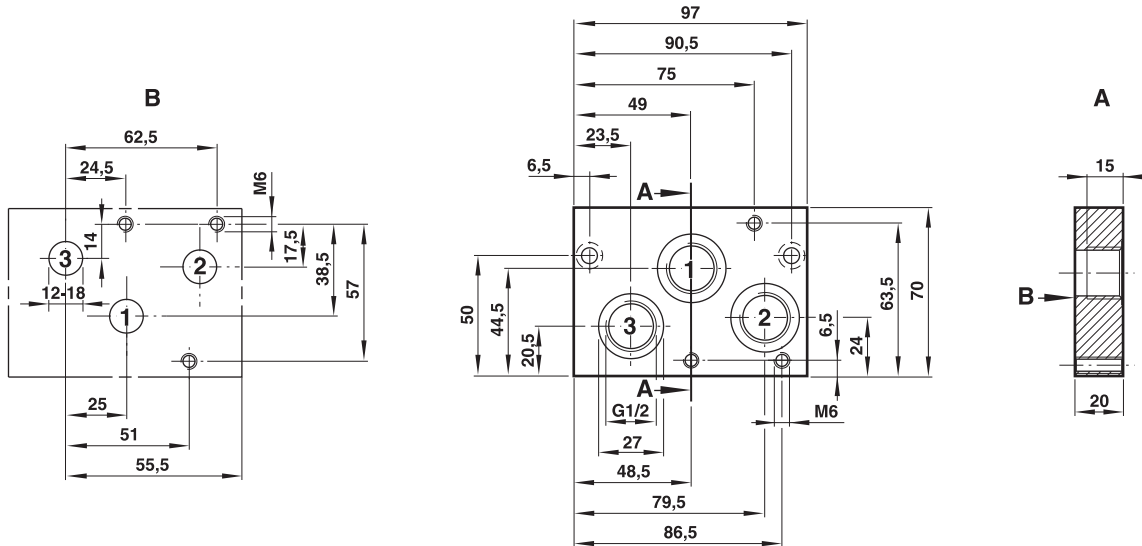
2 Connection plate

Dimensions optional serial interface, LED indicator ND16



Connection plate
 0542814, G1/2 ports optional for VP23xxBExx1xxxxx valve

Dimensions in mm
 Projection/First angle



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 features/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 IMI 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 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.