

VP60, 5/3

Proportional flow and directional control spool valve

- Nominal size: 8 mm
- High flow rate - low pressure loss
- Calibrated, linear flow characteristic with zero crossover
- Variety of setpoint input: 4 to 20 mA, 0 to 10 V, ± 5 V, IO-Link
- Instant dynamic response



Technical features

Medium:

Air acc. to ISO8573-1
Grouping: 2-3-1, filtered (recommended < 3 μ m), dried, non lubricated.
The dynamic performance and service life of the valve may be significantly reduced if using unfiltered air containing water and oil!

Operating pressure on all ports:
-1 ... 16 bar (-14 ... 232 psi)

Pneumatical flow coeff.:
C = 290 NI/(min bar)

Critical pressure ratio:
b = 0,1 ... 0,4

Calibrated flow rate (Qmax.):
1200 NI/min at P1 = 6 bar (87 psi),
P2, P4 = 5 bar (72 psi)
Imperial vals. for 8 NI/min -> 0.0081 Cv

Leakage:
Typical value: 8 NI/min at (P1 = 10 bar (145 psi), P2/P4 = 0 bar)

Port size:
G1/4, 1/4 NPT or flange mounted according ISO 1

Spool deadtime:
3 ms max

Risetime 10 ... 90%:
5 ms

Threshold frequency -3dB:
105 Hz

Service life:
> 250 million full stroke operations with recommended air quality

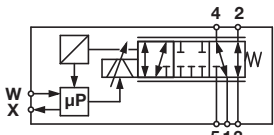
Ambient/Media temperature:
Ambient:
0 ... +60°C (+32 ... +140°F)
Media:
+5 ... +60°C (+41 ... +140°F)

Storage temperature:
-20 ... +80°C (-4 ... +176°F)
Condensation not permitted!
Air supply must be dry enough to avoid ice formation at temperatures below +5°C (+41°F).

Materials:

Electronic enclosure: PAA
Valve housing and internal parts: anodised aluminium
Other static seals: NBR
Actuator magnet: Fe, surface refined

Technical data, standard model

Symbol	Pneumatic Port	Flow (l/min)	Set point (input)	Actual value (output)	Weight (kg)	Model
	G1/4	1200	4 ... 20 mA	0 ... 10 V, 4 ... 20 mA	1,25	VP6010LJ461MB200
	G1/4	1200	-5 ... +5 V	0 ... 10 V, 4 ... 20 mA	1,25	VP6010LJ661MB200
	G1/4	1200	0 ... 10 V	0 ... 10 V, 4 ... 20 mA	1,25	VP6010LJ761MB200
	G1/4	1200	IO-Link	IO-Link	1,25	VP6010LJLL1MB200
	1/4 NPT	1200	IO-Link	IO-Link	1,25	VP6010LKL1MB200

Option selector

VP6010L★ ★ ★ 1 ★ B200

Pneumatic port	Substitute	Electrical connection	Substitute
G1/4	J	M12	M
1/4 NPT	K	8 pin analogue Version	
ISO 1	T	5 pin IO-Link Version	
Set point	Substitute	Output	Substitute
4 ... 20 mA	4	0 ... 10 V/4 ... 20 mA	6
-5 V ... +5 V differential	6	IO-Link	L
0 ... 10 V differential	7		
IO-Link	L		

Note: Analogue configurations not applicable to IO-Link variant.

Construction data:

Vibration resistance:
DIN EN 60068-2-6, 10 g at
12-500 Hz switched off.
When working more than > 1 g
function interference.

Shock resistance:
DIN EN 60068-2-67,
30g /18 schocks.

Weight:
1,25 kg

Electrical parameters

Supply voltage (Ub):
21 ... 32 V d.c.

Voltage across diff. inputs:
-10 ... +32 V

Internal impedance:
> 100 kΩ

Setpoint $\pm 100\%$, 50 Hz sinus:
0,4 A

Residual ripple:
10%

Current input:
4 ... 20 mA

Current output:
4 ... 20 mA

abs. max. for 10s:
1,5 A

Switch-on point:
21 V

Working resistance:
500Ω

Voltage output:
0 ... 10 V

IO-Link Port class:
B

Switch-off point:
18 V

Differential voltage input:
 ± 5 V
0 ... 10 V

**Current consumption at 24 V
setpoint, static:**
0,2 A

Accessories

Connection cables - Analogue versions



Description

Model

M12x1, 8 pin, 5 meter long, open end - straight

0250811

M12x1, 8 pin, 5 meter long, open end - 90°

0250813

Note: Cable material PUR shielded

Connection cables - IO-Link versions



Description

Model

Cable 5 Pin A-coded M12 - M12 x 0.6 metre long

NC-125FS-125MS-A

Cable 5 Pin A-coded M12 - M12 x 1 metre long

NC-125FS-125MS-1

Cable 5 Pin A-coded M12 - M12 x 2 metre long

NC-125FS-125MS-2

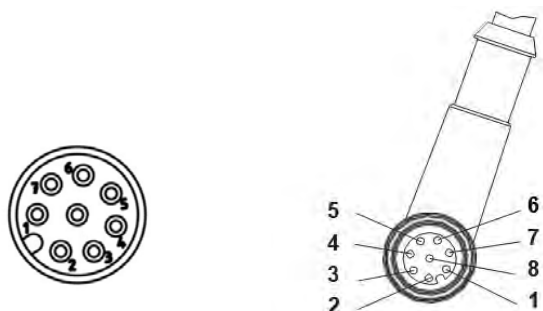
Cable 5 Pin A-coded M12 - M12 x 5 metre long

NC-125FS-125MS-5

Cable 5 Pin A-coded M12 - Open End x 5 metre long

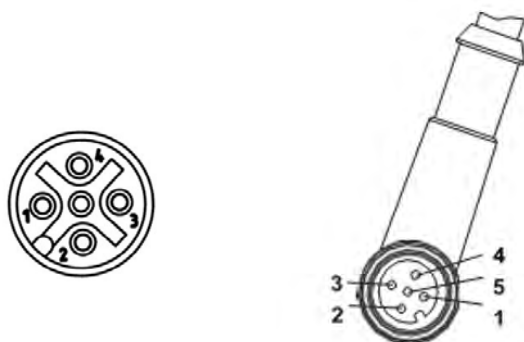
NC-125FS-00000-5

Pin assignment analogue version:



Pin	Colour	Name	Function
1	white	lin	Setpoint input, current 4 ... 20 mA (500 Ω working resistor to GND)
2	brown	Fault	Fault output (current limited to 15 mA from Ub)
3	green	-Ud	Setpoint input, differential voltage, reference potential
4	yellow	+Ud	Setpoint input, differential voltage, 0 ... 10 V / $\pm$ 5 V signal
5	grey	Iout	Current output, actual value, 4 ... 20 mA from Ub
6	pink	Ub	Supply voltage +24 V d.c.
7	blue	GND	Supply ground GND
8	red	Uout	Voltage output, actual value 0 ... 10 V (referenced to GND)

Pin assignment IO-Link version



Pin	Colour (typ.)	Function
1	brown	Supply voltage +24V (Vs)
2	white	Supply voltage 2L+ (VA)
3	blue	Supply ground (Vs GND)
4	black	Signal (C/Q)
5	gr/(gn/ge)	Supply ground 2M (VA GND)

Curve

Maximum flow rates: p_1 in % of $P_{max} \rightarrow p_2/p_4 = 0$ bar
(free flow to atmosphere)

- Horizontal axis: setpoint (V / mA / digit)
- Vertical right axis: pressure p_1 in % of p_{max} in bar (16 bar = 100%)
- Vertical left axis: resulting flow rate in l/min depending on setpoint and p_1

Example : — — — —

Setpoint 9 V / $p_1 = 80\% = 12.8$ bar / flow rate = 3000 l/min

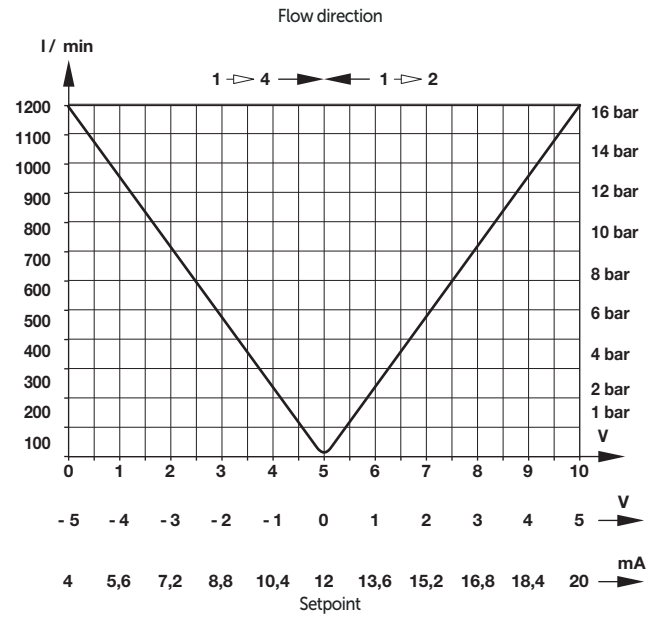
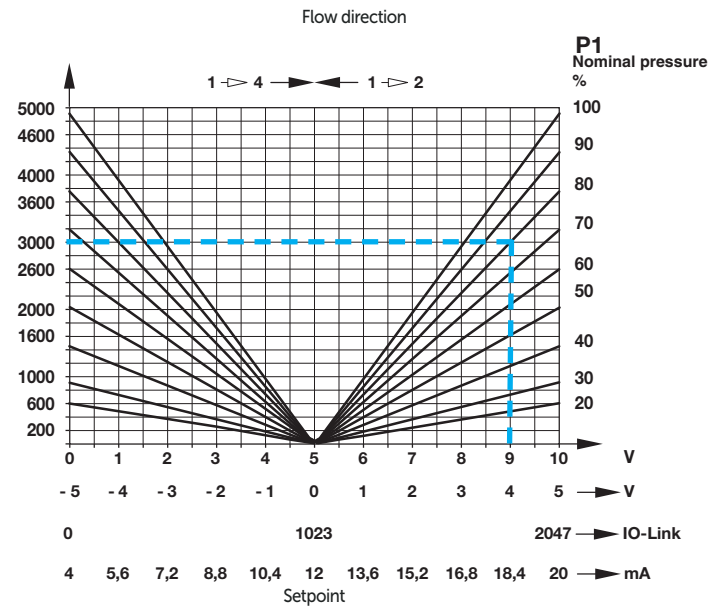
Curve

Calibrated flow: $p_1 = 6$ bar $\rightarrow p_2 / p_4 = 5$ bar
(flow with defined pressure drop)

- Horizontal axis: setpoint (V / mA / numbers)
- Vertical left axis: resulting flow rate in l/min depending on the setpoint at $p_1 = 6$ bar

Example:

Setpoint 7.5 V / $p_1 = 6$ bar / flow rate = 600 l/min



Flow-rate as a function of the pressure ratio
 P_2/P_1 for setpoint values 10, 20, ...100%

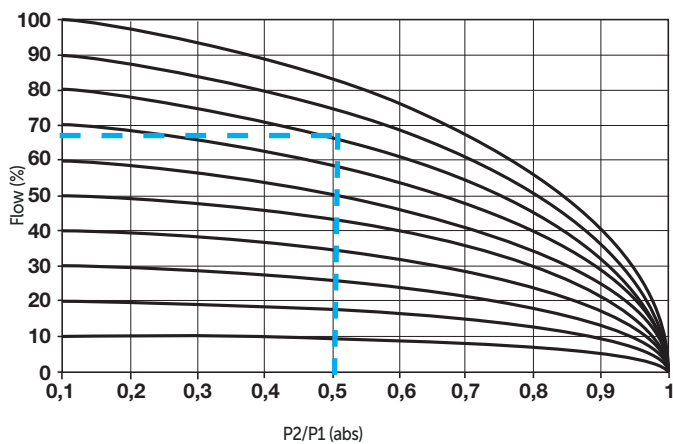
Curve

Flow depending on the pressure ratio P_2/P_1 at setpoints 10, 20, up to 100%

Example:

Input pressure 8 bar (P_1);

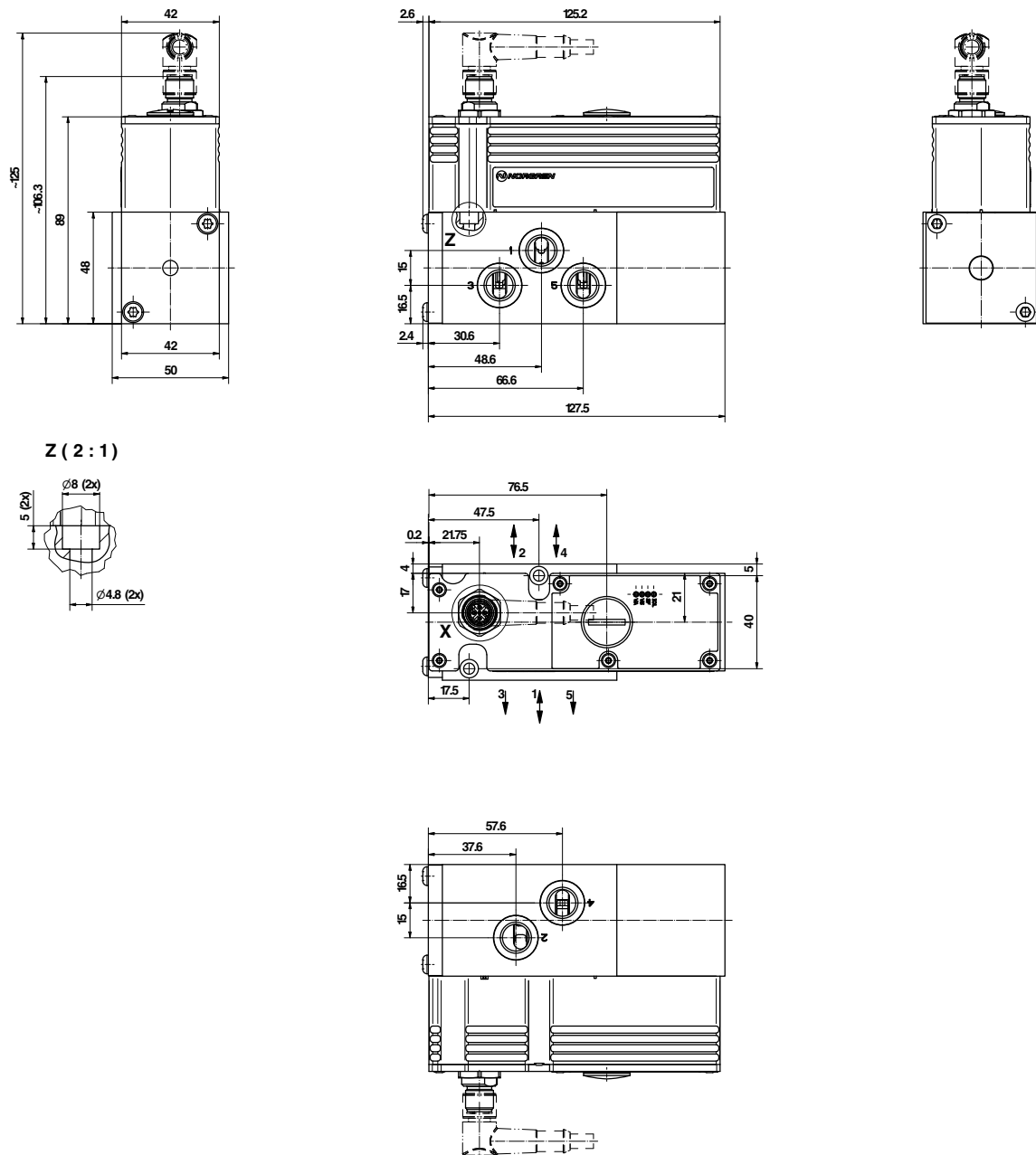
Outlet pressure 4 bar (P_2) = $4/8 = 0.5$ (pressure ratio)



Basic dimensions

Standard model G1/4 and 1/4 NPT

Dimensions in mm
Projection/First angle



1 Valves are delivered with M4 x 50 mounting screws

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 Norgren Ltd.

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.