

# Proportional solenoid valves and pressure compensated directly operated Series CP

Function: 2/2-way NC  
 Sizes: 16 and 20 mm



- » High flow and great precision
- » Low hysteresis
- » Cartridge body
- » Pressure compensated version available
- » Suitable to work also with oxygen

Series CP directly operated proportional solenoid valves can be used where an open loop flow control is required, with gas mixtures or to control flows. Their cartridge design makes them particularly compact, thus they can be mounted directly near the workstation.

Series CP valves have been designed to optimize dimensions and reduce friction and stick-slip effects. The output flow is proportional to the control signal. Apart from the pressure compensated version, these valves can work also in vacuum. A minimum working pressure is thus not required.

## GENERAL DATA

TECHNICAL FEATURES	Size 16mm, 2/2 NC	Size 16mm, 2/2 NC pressure compensated	Size 20mm, 2/2 NC	Size 20mm, 2/2 NC pressure compensated
<b>Operation</b>	proportional directly operated	proportional pressure compensated	proportional directly operated	proportional pressure compensated
<b>Pneumatic connections</b>	cartridge	cartridge	cartridge	cartridge
<b>Nominal diameters</b>	1 mm - 1.5 mm - 2 mm	4.4 mm	3 mm - 3.5 mm	4.4 mm
<b>Free flow capacity</b>	70 Nl/min - 80 Nl/min - 90 Nl/min	120 l/min	130 Nl/min - 150 Nl/min	200 l/min
<b>Operating pressure</b>	3 bar - 5 bar - 8 bar	2 bar (Max press. 7 bar)	2.8 bar - 2 bar	2.8 bar (Max. press 6 bar)
<b>Max overpressure</b>	16 bar	10 bar	16 bar	16 bar
<b>Linearity (5-95%)</b>	3% FS	<7% FS	5% FS	2% FS
<b>Hysteresis</b>	10% FS	<20% FS	15% FS	15% FS
<b>Repeatability</b>	5% FS	<5% FS	5% FS	5% FS
<b>Operating temperature</b>	10°C ÷ 50°C	10°C ÷ 50°C	10°C ÷ 50°C	10°C ÷ 50°C
<b>Media</b>	filtered compressed air, unlubricated, according to ISO 8573-1 class 7.4.4, inert gas. and oxygen in any position	filtered compressed air, unlubricated, according to ISO 8573-1 class 7.4.4, inert gas. and oxygen in any position	filtered compressed air, unlubricated, according to ISO 8573-1 class 7.4.4, inert gas. and oxygen in any position	filtered compressed air, unlubricated, according to ISO 8573-1 class 7.4.4, inert gas. and oxygen in any position
<b>Installation</b>				
<b>MATERIALS IN CONTACT WITH THE MEDIUM</b>				
<b>Body</b>	stainless steel AISI 304/EN, PPS FKM	stainless steel AISI 304/EN, PPS FKM (FDA, BAM)	stainless steel AISI 304/EN, PPS FKM	stainless steel AISI 304/EN, PPS FKM
<b>Seals</b>				
<b>ELECTRICAL FEATURES</b>				
<b>Operation</b>	PWM > 1000 Hz or current control	PWM > 1000 Hz or current control	PWM > 500 Hz or current control	PWM > 1000 Hz or current control
<b>Operation voltage</b>	6 V DC, 12 V DC, 24 V DC	6 V DC, 12 V DC, 24 V DC	6 V DC, 12 V DC, 24 V DC	6 V DC, 12 V DC, 24 V DC
<b>Max power consumption</b>	3.1 W	3 W (Nominal power 2 W)	3.7 W	4.2 W
<b>Nominal resistance</b>	11.8 Ohm - 37.6 Ohm - 184.7 Ohm	11.8 Ohm - 47.7 Ohm - 184.7 Ohm	6.4 Ohm - 25.1 Ohm - 102.1 Ohm	6.4 Ohm - 25.1 Ohm - 102.1 Ohm
<b>Rated current</b>	410 mA, 238 mA, 103 mA	410 mA, 205 mA, 103 mA	615 mA, 313 mA, 154 mA	700 mA, 350 mA, 175 mA
<b>Duty cycle</b>	100% with air flow	100% with air flow	100% with air flow	100% with air flow
<b>Electrical connection</b>	cable 300mm AWG24	cable 300 mm AWG 24	cable 300mm AWG24	cable 300mm AWG24
<b>Protection class</b>	IP00 / IP40	IP00 / IP40	IP00 / IP40	IP00 / IP40
<b>Average lifecycles</b>	50000000	50000000	50000000	50000000
<b>Command signal</b>	recommended PWM: 1000 Hz	recommended PWM: 1000 Hz	recommended PWM: 500 Hz	recommended PWM: 1000 Hz

**CODING EXAMPLE**

<b>CP</b>	<b>-</b>	<b>C</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>-</b>	<b>G</b>	<b>W</b>	<b>X</b>	<b>-</b>	<b>0</b>	<b>P</b>	<b>3</b>
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<b>CP</b>	SERIES		
<b>C</b>	PORTS: C = cartridge S = subbase		
<b>6</b>	BODY SIZE: 6 = size 16mm 7 = size 20mm	8 = size 16 pressure compensated 9 = size 20 pressure compensated	
<b>2</b>	NUMBER OF PORTS: 2 = 2-way		
<b>1</b>	FUNCTION: 1 = NC		
<b>G</b>	ORIFICE DIAMETRES: F = 1mm (size 16mm only) G = 1.5mm (size 16mm only)	N = 2mm (size 16mm only) M = $\varnothing$ 3 mm (size 20 mm only)	P = $\varnothing$ 3.5 mm (size 20 mm only) T = $\varnothing$ 4.4 mm (pressure compensated only)
<b>W</b>	SEAL MATERIAL: W = FKM		
<b>X</b>	BODY MATERIAL: x = Stainless steel AISI 304/EN		
<b>0</b>	OVERMOULDING MATERIAL OF COIL: 0 = cartridge		
<b>P</b>	COIL DIMENSIONS: P = $\varnothing$ 16 7 = $\varnothing$ 20		
<b>3</b>	VOLTAGE: 1 = 6 V DC 3.1 W (size 16 mm only) 2 = 12 V DC 4.3 W (size 20 mm only) 3 = 24 V DC 3.1 W (size 16 mm only) 4 = 24 V DC 4.3 W (size 20 mm only)	5 = 12 V DC 3.1 W (size 16 mm only) 6 = 6 V DC 4.3 W (size 20 mm only) 10 = 6 V DC 4.2 W (size 20 mm only, pressure compensated) 11 = 24 V DC 4.2 W (size 20 mm only, pressure compensated)	12 = 12 V DC 4.2 W (size 20 mm only, pressure compensated) 13 = 6 V DC 3 W (size 16 mm only, pressure compensated) 14 = 12 V DC 3 W (size 16 mm only, pressure compensated) 15 = 24 V DC 3 W (size 16 mm only, pressure compensated)

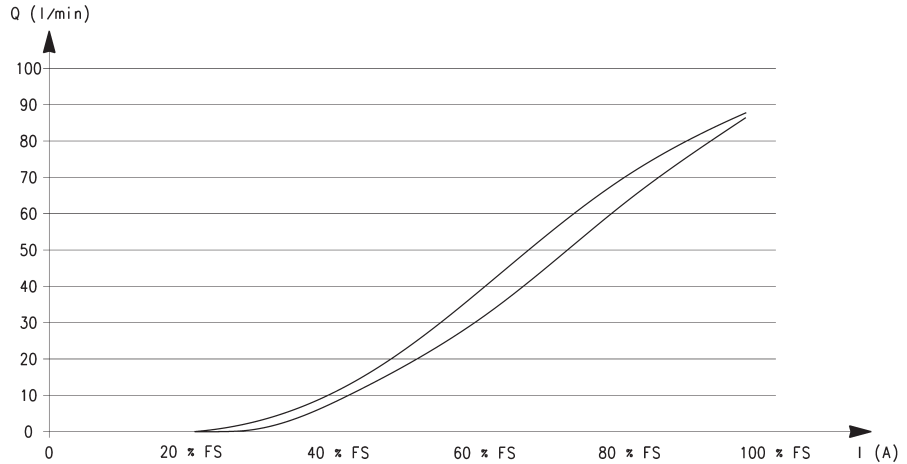
SERIES CP PROPORTIONAL SOLENOID VALVES

**HYSTERESIS AND RESPONSE TIMES**

**DIAGRAM LEGEND:**

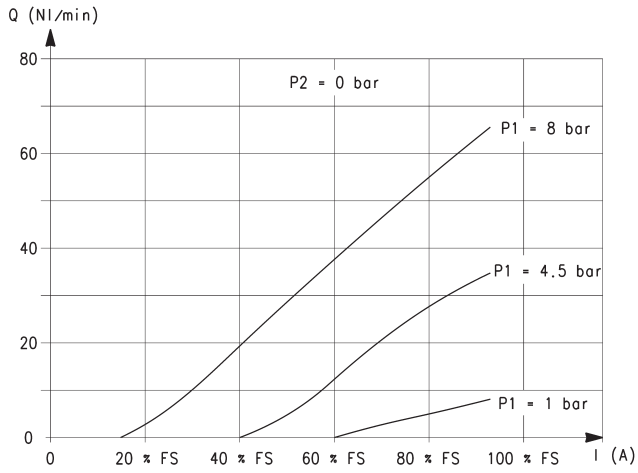
Q = flow (l/min)  
I = current (A)  
FS = full scale

**NOTE TO THE TABLE:**  
\* in the pressure compensated version the counter pressure at the valve outlet must be always lower than 15-20% of the inlet pressure.



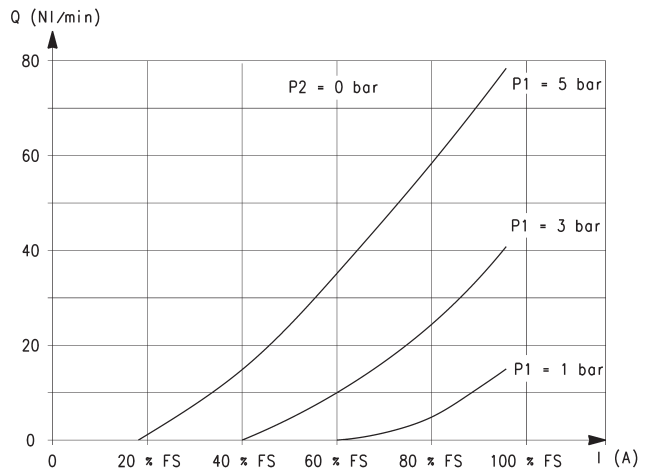
RESPONSE TIMES calculated according to the maximum flow at each operating pressure. [ Electromechanical response time: 10 ms ]							
$\varnothing$	Inlet pressure (bar)	Load response time (ms)			Exhaust response time (ms)		
		0% - 10%	0% - 90%	10% - 90%	100% - 90%	100% - 10%	90% - 10%
1 mm	8	12	42	30	9	33	24
1.5 mm	5	12	39	27	9	33	24
2 mm	3	11	39	28	9	33	26
3 mm	2.8	13	29	16	14	28.5	14.5
3.5 mm	2	15	31	16	12.5	27.5	15
4.4 mm *	2.8	13	52	49	10	37	27

**FLOW DIAGRAMS - Size 16mm**



Nominal diameter 1mm

Q = flow (l/min)  
 I = current (A)  
 P1 = pressure in load (bar)  
 P2 = 0 [ free flow pressure ] (bar)  
 FS = full scale of the command signal

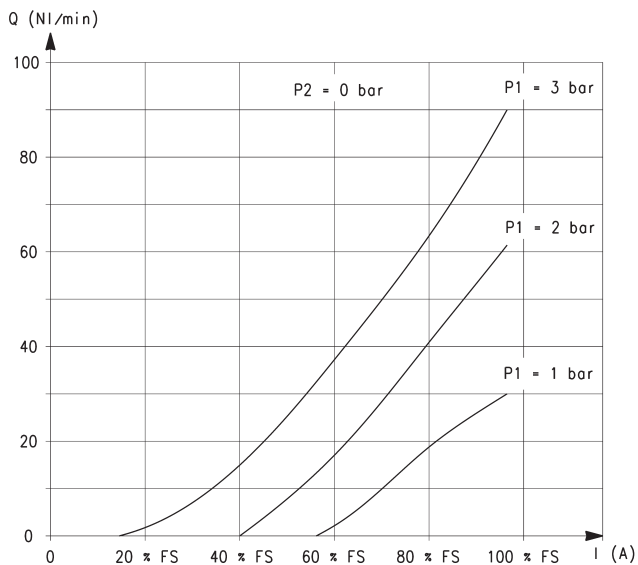


Nominal diameter 1.5mm

Q = flow (l/min)  
 I = current (A)  
 P1 = pressure in load (bar)  
 P2 = 0 [ free flow pressure ] (bar)  
 FS = full scale of the command signal

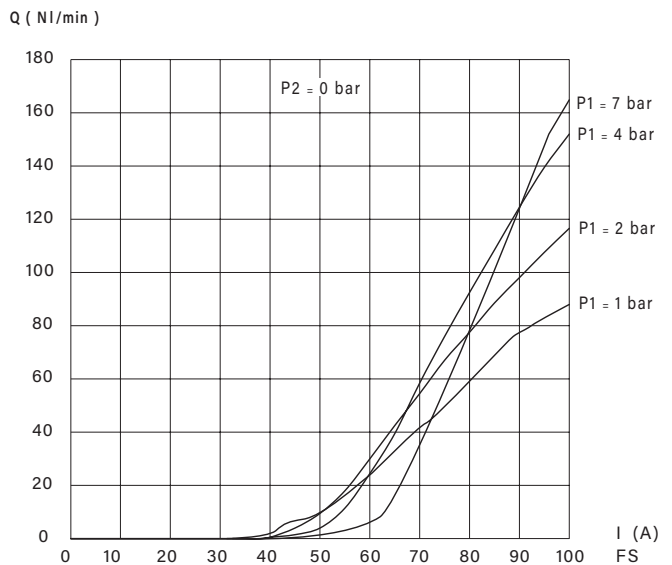
SERIES CP PROPORTIONAL SOLENOID VALVES

**FLOW DIAGRAMS - Size 16 mm pressure compensated**



Nominal diameter 2mm

Q = flow (l/min)  
 I = current (A)  
 P1 = pressure in load (bar)  
 P2 = 0 [ free flow pressure ] (bar)  
 FS = full scale of the command signal

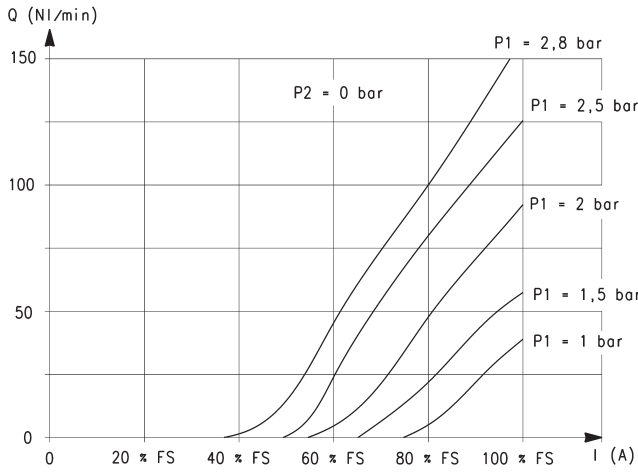


Nominal diameter 4.4mm

Q = flow (l/min)  
 I = current (A)  
 P1 = pressure in load (bar)  
 P2 = 0 [ free flow pressure ] (bar)  
 FS = full scale of the command signal

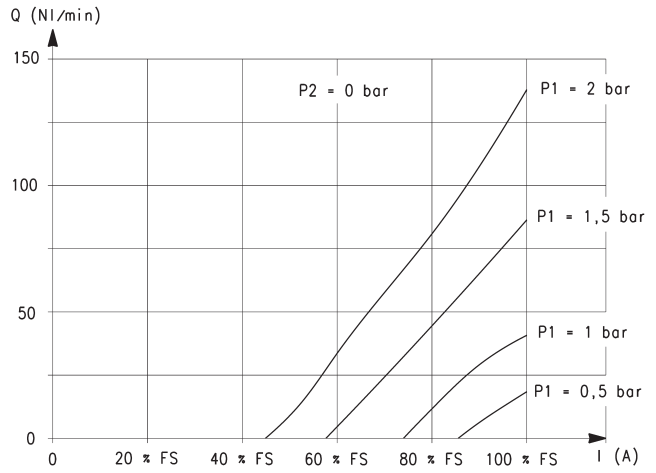
**FLOW DIAGRAMS - Size 20mm**

SERIES CP PROPORTIONAL SOLENOID VALVES



Nominal diameter 3mm

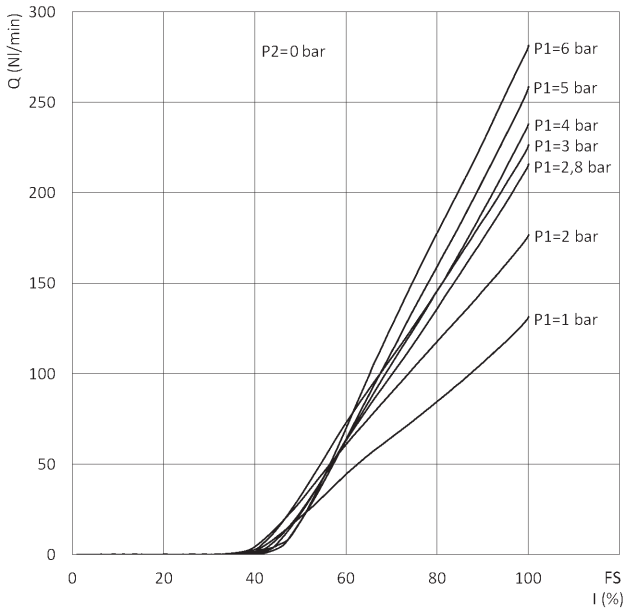
Q = flow (l/min)  
I = current (A)  
P1 = pressure in load (bar)  
P2 = 0 [ free flow pressure ] (bar)  
FS = full scale of the command signal



Nominal diameter 3.5mm

Q = flow (l/min)  
I = current (A)  
P1 = pressure in load (bar)  
P2 = 0 [ free flow pressure ] (bar)  
FS = full scale of the command signal

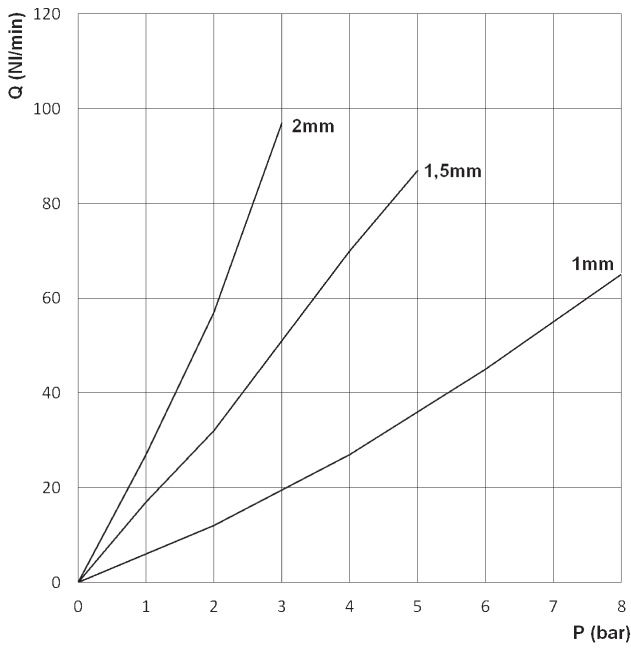
**FLOW DIAGRAMS - Size 20mm pressure compensated**



Nominal diameter 4.4mm

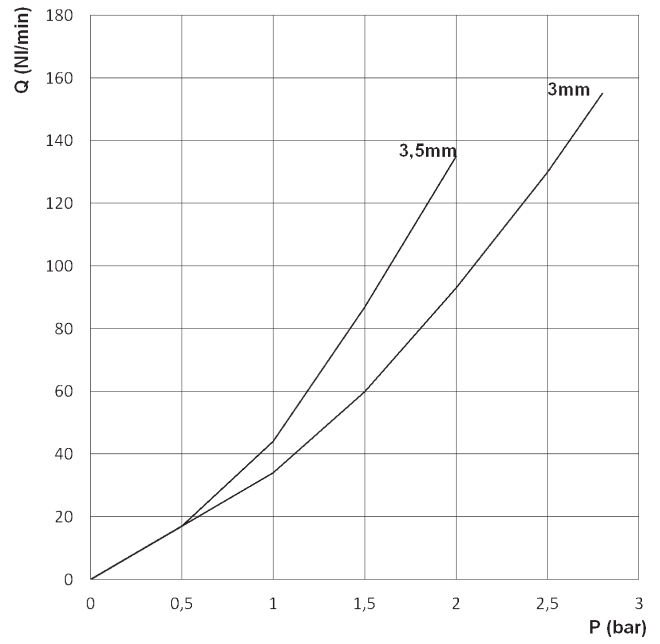
Q = flow (l/min)  
I = current (A)  
P1 = pressure in load (bar)  
P2 = 0 [ free flow pressure ] (bar)  
FS = full scale of the command signal

**MAXIMUM FLOW ACCORDING TO THE INLET PRESSURE**



Size 16 mm

Q = Flow (NL/min)  
P = Inlet pressure (bar)

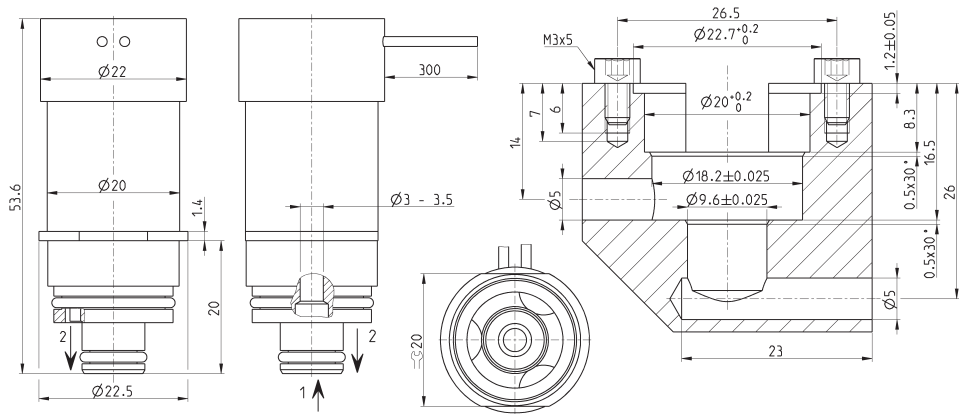


Size 20 mm

Q = Flow (NL/min)  
P = Inlet pressure (bar)



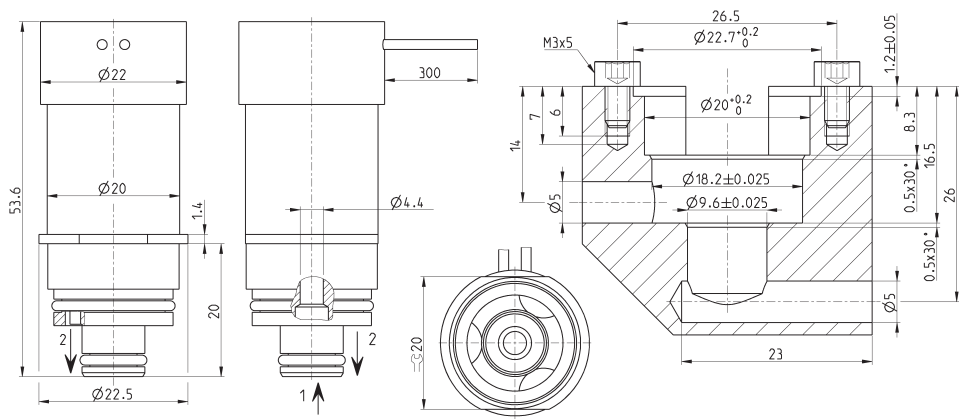
**Solenoid valves, size 20mm**



Mod.	Orifice $\varnothing$ (mm)	Max operating pressure (bar)	Max flow (NL/min)	Max flow kv (l/min)	Operation voltage (V DC)	Max current (mA)
CP-C721-MWX-072	3	2.8	150	2.8	12	313
CP-C721-MWX-074	3	2.8	150	2.8	24	154
CP-C721-MWX-076	3	2.8	150	2.8	6	615
CP-C721-PWX-072	3.5	2	130	3	12	313
CP-C721-PWX-074	3.5	2	130	3	24	154
CP-C721-PWX-076	3.5	2	130	3	6	615

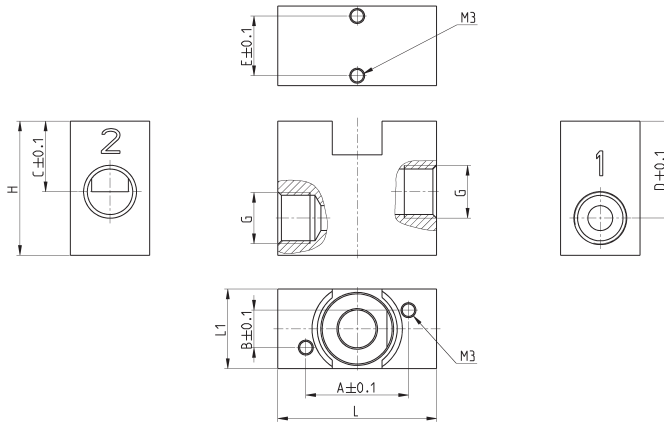
**Solenoid valves, size 20mm pressure compensated**

Working nominal pressure: 2.8 bar



Mod.	Orifice $\varnothing$ (mm)	Max operating pressure (bar)	Max flow (NL/min)	Max flow kv (l/min)	Operation voltage (V DC)	Max current (mA)
CP-C921-TWX-0710	4.4	6	200	4	6	700
CP-C921-TWX-0711	4.4	6	200	4	24	175
CP-C921-TWX-0712	4.4	6	200	4	12	350

**Sub-base**



CP-S6 = for 16 mm versions  
CP-C6... and CPN-C6...  
CP-S8 = only for 16 mm  
versions CP-C8...  
CP-S7 = for 20 mm versions  
CP-C7... and CPN-C9...

SERIES CP PROPORTIONAL SOLENOID VALVES

Mod.	∅	A	B	C	D	E	G	H	L	L1
CP-S6	16	20.7	7.5	14.2	19.5	12	G1/8	27	32	16
CP-S7	20	25.2	8	14	22.5	15	G1/4	31.5	45	22
CP-S8	16	17.75	10.25	13.2	17.5	12	G1/8	27	32	16