

**Proportional 3-way flow control valve  
Screw-in cartridge**

- Direct operated, pressure compensated
- $Q_{\max} = 40 \text{ l/min}$ ,  $p_{\max} = 350 \text{ bar}$
- $Q_{N\max} = 25 \text{ l/min}$

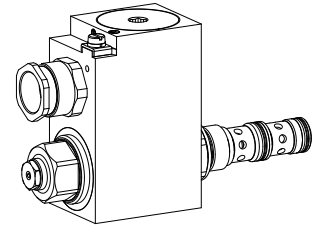
**M22x1,5**

ISO 7789

 II 2 G Ex db IIC T6, T4

 II 2 D Ex tb III C T80 °C, T130 °C

 I M2 Ex db I Mb

**Class I Division 1**
**Class I Zone 1**

**DESCRIPTION**
**For explosion-hazard zones**

Direct operated, pressure compensated proportional flow control valve, as a screw-in cartridge with a thread M22x1,5 for cavity acc. to ISO 7789. A special surface treatment guarantees a good protection against corrosion and wear as well as very good low-friction characteristics of the pressure compensating- and throttle spool. The solenoid coil is zinc-/nickel-coated.

The flameproof enclosure prevents an explosion in the interior from getting outside.

The design prevents a surface temperature capable of igniting.

**FUNCTION**

The 3-way flow control valve serves for maintaining the speed of a consumer constant independent of the load. Superfluous pump output flow is fed into the return flow system in a cost saving manner, and as a result, prevents an overheating of the hydraulic system. The power controlled, proportional solenoid running in oil acts directly on the throttle spool, which opens the throttle segments in the cartridge body. Proportional to the current demand of the proportional solenoid, the throttle aperture changes, and with this the volume flow. In case of a current-free solenoid, the throttle spool is held in closed position by a spring. For driving the valve, Wandfluh proportional amplifiers are available (see Register 1.13).1.13).

**APPLICATION**

Proportional flow control valves are suitable for feed control systems, where the consumer flow has to be maintained constant with a changing load. These valves are suitable for applications in explosion-hazard zones, open cast and also in mines. The facility for electric remote controlling of the valve in conjunction with process control systems enables economic problem solutions with repeatable sequences. Installation of the screw-in cartridge in control blocks.

**TYPE CODE**

 Q D B PM22 -  -  / L15 /  -  # 

Flow control valve

3-way

Proportional, Explosion proof execution Ex d

Screw-in cartridge M22x1,5

Nominal volume flow rate $Q_N$	8 l/min	<input type="text" value="8"/>
	16 l/min	<input type="text" value="16"/>
	25 l/min	<input type="text" value="25"/>

Nominal voltage $U_N$	12 VDC	<input type="text" value="G12"/>
	24 VDC	<input type="text" value="G24"/>

Nominal power $P_N$	15W	Ambient temp. by: 70 °C
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Certificate	ATEX, IECEx, CCC, EAC	<input type="text" value="AU"/>	UL/CSA	<input type="text" value="UL"/>	MA	<input type="text" value="MA"/>
	Australia					

Sealing material	NBR	<input type="text" value="D1"/>
	FKM (Viton)	

Design-Index (Subject to change)

**GENERAL SPECIFICATIONS**

Description	3-way proportional flow control valve
Construction	Screw-in cartridge for cavity acc. ISO 7789
Operations	Proportional solenoid
Mounting	Screw-in thread M22x1,5
Ambient temperature	-25...70 °C (operation as T1...T4/T130 °C)
Mounting position	any
Fastening torque	$M_D = 50 \text{ Nm}$ for screw-in cartridge $M_D = 9 \text{ Nm}$ for knurled nut
Weight	$m = 1,9 \text{ kg}$
Flow direction	see symbol

**CERTIFICATES**

	Surface	Mining	Standard -25 °C to...	M248 Electronic
ATEX	x	x	x	x
IECEx	x	x	x	x
CCC	x	x	x	x
EAC	x	x	x	x
Australia	x	x	x	
MA		x	x	x
UL/CSA	x		x	

 The certificates can be found on [www.wandfluh.com](http://www.wandfluh.com)

**ELECTRICAL SPECIFICATIONS**

Construction	Proportional solenoid, wet pin push type, pressure tight	
Standard nominal voltage	$U_N = 12\text{VDC}, 24\text{VDC}$	
	12VDC	24VDC
Limiting current	L15/50 °C	$I_G = 950\text{ mA}$ 450 mA
	L15/70 °C	$I_G = 910\text{ mA}$ 420 mA
Voltage tolerance	+ 10% of rated voltage	
Relative duty factor	100% ED	
Protection class	IP67 acc. to EN 60529	
Connection/Power supply	Through cable gland for cable $\varnothing 6,5 \dots 14\text{ mm}$	
Temperature class:	T1...T4 (acc. to EN 60079-0)	
Nominal power:	15W	

For further electrical characteristics, refer to the data sheet of the solenoid coil: 1.1-183

**HYDRAULIC SPECIFICATIONS**

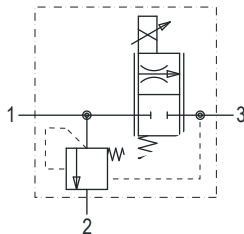
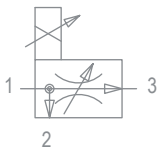
Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Recommended filtration grade $\beta_{6 \dots 10} \geq 75$ ) see data sheet 1.0-50/2
Viscosity range	12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s
Fluid temperature	-25...+70 °C (operation as T1...T4/T130 °C)
Peak pressure	$p_{\max} = 350\text{ bar}$
Nominal volume flow	$Q_N = 8/16/25\text{ l/min}$
Max. Volume flow	$Q_{\max} = 40\text{ l/min}$ (1 → 2)
Min. Volume flow	$Q_{\min} = 0,1\text{ l/min}$
Leakage volume flow	see characteristics
Repeatability	$\leq 3\%*$
Hysteresis	$\leq 7\%*$

\* at optimal dither signal

**SYMBOLS**

simplified

detailed

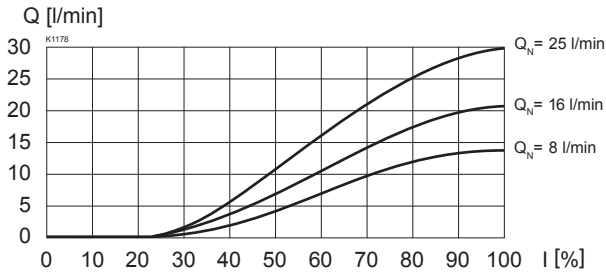
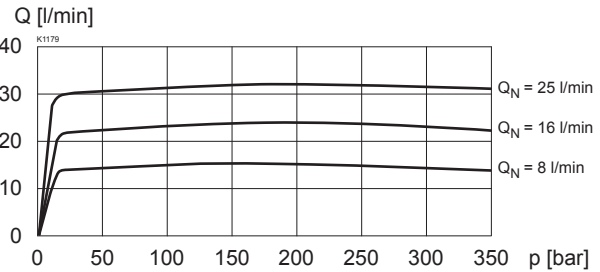
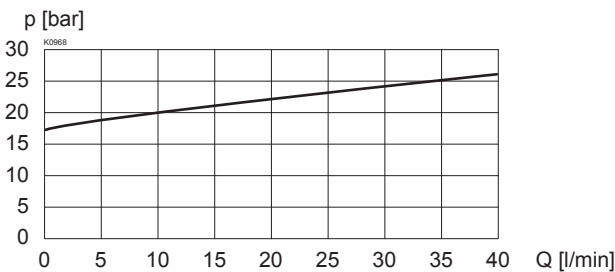
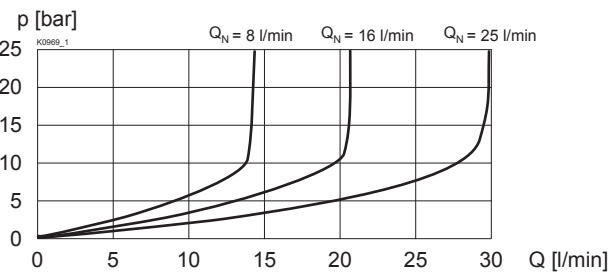

**SECURITY OPERATED**


The solenoid coil must only be put into operation, if the requirements of the operating instructions supplied are observed to their full extent.

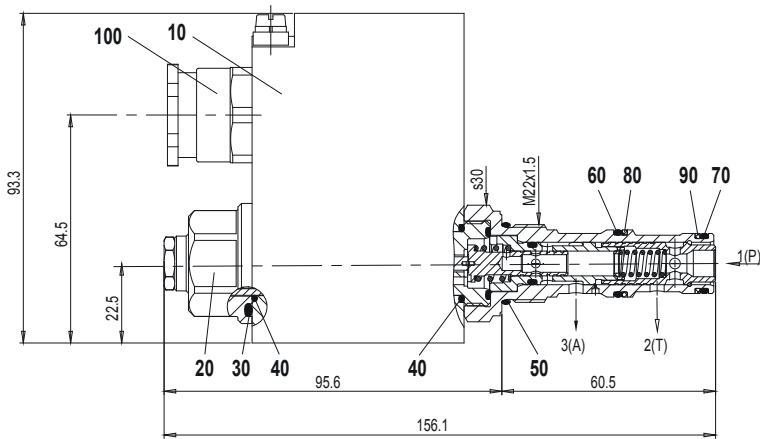
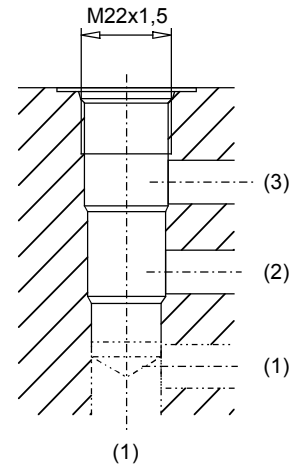
In case of non-observance, no liability can be assumed.

**INSTALLATION**

For stack assembly please observe the remarks in the operating instructions.

**CHARACTERISTICS** Oil viscosity  $\nu = 30\text{ mm}^2/\text{s}$ 
 $Q = f(I)$  Volume flow adjustment characteristics 1 → 3 ( $p_3 = 200\text{ bar}$ )

 $Q = f(p)$  Volume flow pressure characteristics ( $I = I_G$ )

 $\Delta p = f(Q)$  Pressure drop-volume flow characteristics 1 → 2 ( $I = 0\text{ mA}$ )

 $\Delta p = f(Q)$  Pressure drop-volume flow characteristics 1 → 3 ( $I = I_G$ )


## DIMENSIONS / SECTIONAL DRAWINGS


 Cavity drawing acc. to  
 ISO 7789-22-04-0-98

 For detailed cavity drawing and  
 cavity tools see data sheet 2.13-1004

## PARTS LIST

Position	Article	Description
10	263.6...	Slip-on coil MKY45/18x60-...
15	253.8000	Plug with integrated manual override HB4,5
20	154.2603	Knurled nut Ex
30	160.2251	O-ring ID 25,07x2,62 (NBR)
40	160.2170	O-ring ID 17,17x1,78 (NBR)
50	160.2188 160.6188	O-ring ID 18,77x1,78 (NBR) O-ring ID 18,77x1,78 (FKM)
60	160.2156 160.6156	O-ring ID 15,60x1,78 (NBR) O-ring ID 15,60x1,78 (FKM)
70	160.2140 160.6141	O-ring ID 14,00x1,78 (NBR) O-ring ID 14,00x1,78 (FKM)
80	049.3196	Backup ring RD 16,1x19x1,4
90	049.3176	Backup ring RD 14,1x17x1,4
100	111.1080	Cable gland brass M20

## STANDARDS

Cartridge cavity	ISO 7789
Explosion protection	Directive 2014/34/EU (ATEX)
Flameproof enclosure	EN/IEC/UL 60079-1,31
Cable entry	EN 60079-0, 1, 7, 15, 31
Protection class	EN 60529
Contamination efficiency	ISO 4406

## ACCESSORIES

Flange-/sandwich plate NG6	Data sheet 2.6-842
Line mount body	Data sheet 2.9-210
Proportional amplifier	Register 1.13

Technical explanation see data sheet 1.0-100