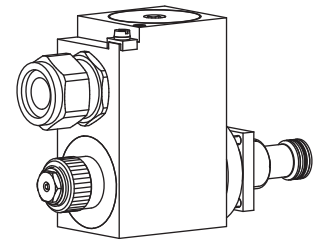


**Proportional pressure relief valve
Screw-in cartridge**

- Direct operated
- $Q_{max} = 25 \text{ l/min}$
- $p_{max} = 350 \text{ bar}$
- $p_{Nmax} = 315 \text{ bar}$

M22x1,5
 ISO 7789

II 2 G Ex d II C
II 2 D Ex tD A21 IP65

DESCRIPTION

Direct operated proportional pressure relief valve as a screw-in cartridge with a thread M22x1,5 for cavity according to ISO 7789. Activated with Wandfluh-explosion-proof-solenoid. The cartridge body made of steel is zinc coated for corrosion protection.

The solenoid spool is zinc-/ nickel- coated.

Solenoid coil in accordance with directive 94/9/EC (ATEX) for explosion-hazard zones.

Ex: In accordance with European standards EN 60079-0, EN 60079-1 (gas) EN 61241-0, EN 61241-1 (dust)

d: Flameproof enclosures

tD: Protection by enclosure

Device group II: For all explosion-hazard zones, except mining

Gas group IIC: Gas groups IIA + IIB included

Device category 2G: For zones 1 and 2 (gas)

Device category 2D: For zones 21 and 22 (dust)

Zones: 1/21 and 2/22

EC-type examination certificate:

PTB 07 ATEX 1023

FUNCTION

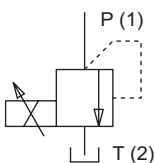
The valve limits the pressure in port P (1) and relieves the volume flow to tank port T (2). The back pressure in T (2) influences the pressure in P (1). When the operating pressure set by the proportional solenoid is reached, the poppet spool opens and connects the protected line to the tank T (2). These pressure relief valves are built according to the differential spool principle and are therefore very sensitive adjustable over the whole pressure range and also suitable for systems with extremely low minimum pressures. Wandfluh proportional amplifiers are available to control the proportional pressure relief valve (register 1.13).

APPLICATION

The valve has its application in hydraulic systems, in which the pressure frequently has to be changed. The facility for remote control and signal processing from process control systems enable elegant, comfortable solutions to problems. Installation of the screw-in cartridge in control blocks as well as in the Wandfluh sandwich plates (vertical stacked systems) and flange valves of the NG4-Mini and NG6 types. (Please note the separate data sheets in register 2.3). Cavity tools are available for machining the cavities in steel and aluminium (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

	B	D	B	PM22	-		-		-		#	
Pressure relief valve												
Direct operated												
Proportional explosion proof, execution Ex d II C												
Screw-in cartridge M22x1,5												
Execution:	L12/L15		L6									
Nominal pressure range p_N [bar]	20	100	200	315	16	80	160	250				
Standard nominal voltage U_N :	12 VDC		24 VDC		G12		G24					
Execution:	15W	12W	6W			L15	L12	L6	Ambient temp. by:			
									70 °C			
									70 °C			
									40 °C or 90 °C			
Design-Index (Subject to change)												

SYMBOLS

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Required filtration grade $\beta_{6...10} \geq 75$) see data sheet 1.0-50/2
Viscosity range	12 mm ² /s...320 mm ² /s
Admissible fluid temp.	Execution L12/L15 -20...+70 °C (operation as T1...T4/T130 °C) Execution L6 -20...+40 °C (operation as T1...T6/T80 °C) -20...+70 °C (operation as T1...T4/T130 °C)
Peak pressure	$p_{max} = 350 \text{ bar}$
Nominal pressure ranges	Execution L12/L15: $p_N = 20 \text{ bar}, 100 \text{ bar}, 200 \text{ bar}, 315 \text{ bar}$ Execution L6: $p_N = 16 \text{ bar}, 80 \text{ bar}, 160 \text{ bar}, 250 \text{ bar}$ With the version L6 for ambient temperatures up to 90 °C (L6/90 °C) p_N is not reached (see characteristics)
Min. volume flow	$Q_{min} = 0,1 \text{ l/min}$
Max. volume flow	$Q_{max} = 25 \text{ l/min}$ für $p_N \leq 200 \text{ bar}$ $Q_{max} = 20 \text{ l/min}$ für $p_N > 200 \text{ bar}$
Leakage volume flow	see characteristics
Hysteresis	L12, L15/70 °C: $\leq 5\% *$ L6/40 °C: $\leq 6\% *$ L6/90 °C: $\leq 7\% *$ * at optimal dither signal

GENERAL SPECIFICATIONS

Description	Direct operated proportional pressure relief valve
Construction	Screw-in cartridge for cavity according to ISO 7789
Operations	Proportional solenoid
Mounting	Screw-in thread M22x1,5
Admissible ambient temp.	Execution L12/L15 -20...+70 °C (operation as T1...T4/T130 °C) Execution L6 -20...+40 °C (operation as T1...T6/T80 °C) -20...+90 °C (operation as T1...T4/T130 °C)
Mounting position	any, preferably horizontal
Fastening torque	$M_D = 50 \text{ Nm}$ for screw-in cartridge
Weight	$m = 2,2 \text{ kg}$

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	L15/70 °C	$I_G = 825\text{ mA}^*$	385 mA*
	L12/70 °C	$I_G = 710\text{ mA}$	355 mA
	L6/40 °C	$I_G = 410\text{ mA}$	202 mA
	L6/90 °C	$I_G = 355\text{ mA}$	175 mA
Voltage tolerance	+ 10% of rated voltage		
Relative duty factor	100% ED/DF		
Protection class	IP65/IP67 acc. to EN60529		
Connection/Power supply	Through cable gland for cable $\varnothing 11 \dots 14\text{ mm}$		
Temperature class:	(acc. to EN 60079-0)		
Execution L12/L15:	T1...T4		
Execution L6:	T1...T6		
Performance limit	$U_N \cdot I_G$		
For further electrical characteristics, refer to the data sheet of the solenoid coil: 1.1-183			

* reduced limiting current

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

Tightening torque of the coil fixing nut $M_D = 15\text{ Nm}$. For stack assembly please observe the remarks in the operating instructions.

DESIGNATION

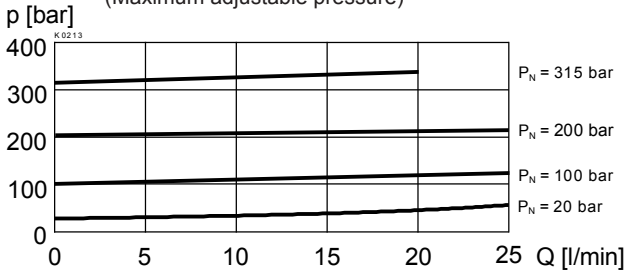
Execution L6:	II 2 G Ex d IIC T6	$T_a = -25 \dots 40\text{ °C}$
	II 2 D Ex tD A21 IP65 T80 °C	
	II 2 G Ex d IIC T4	$T_a = -25 \dots 90\text{ °C}$
Execution L12/L15:	II 2 D Ex tD A21 IP65 T130 °C	
	II 2 G Ex d IIC T4	$T_a = -25 \dots 70\text{ °C}$
	II 2 D Ex tD A21 IP65 T130 °C	

CHARACTERISTICS

oil viscosity $\nu = 30\text{ mm}^2/\text{s}$

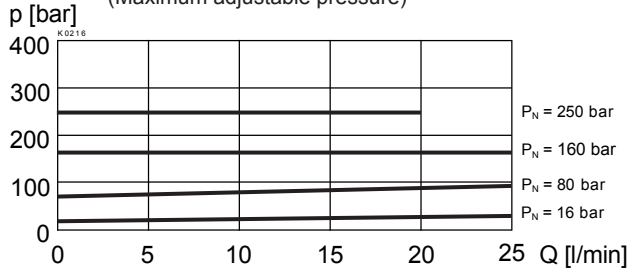
Execution L12/70 °C (measured at 70 °C)
L15/70 °C

$p = f(Q)$ Pressure volume flow characteristics
 (Maximum adjustable pressure)

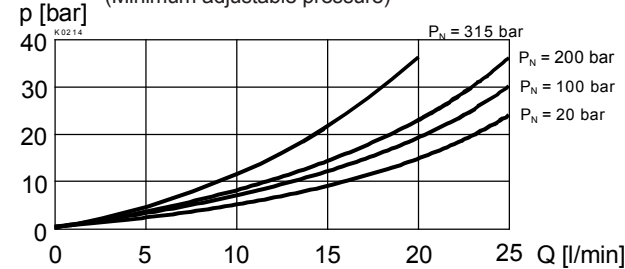


Execution L6/40 °C (measured at 40 °C)
L6/90 °C (measured at 90 °C)

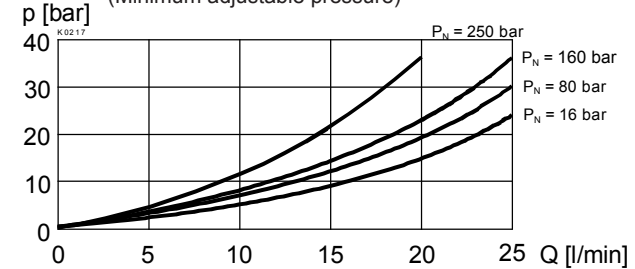
$p = f(Q)$ Pressure volume flow characteristics
 (Maximum adjustable pressure)



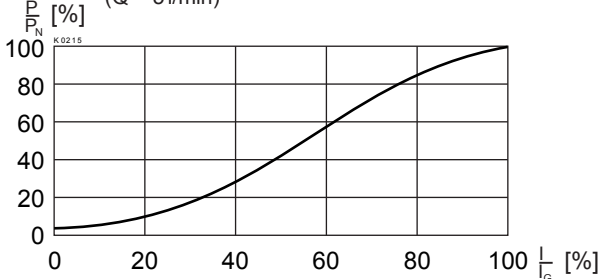
$p = f(Q)$ Pressure volume flow characteristics
 (Minimum adjustable pressure)



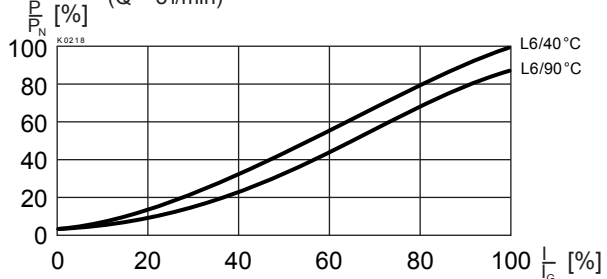
$p = f(Q)$ Pressure volume flow characteristics
 (Minimum adjustable pressure)



$p = f(I)$ Pressure signal characteristics
 ($Q = 5\text{ l/min}$)



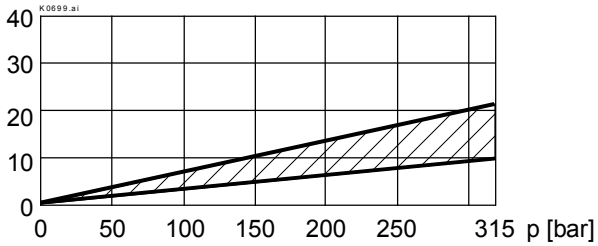
$p = f(I)$ Pressure signal characteristics
 ($Q = 5\text{ l/min}$)



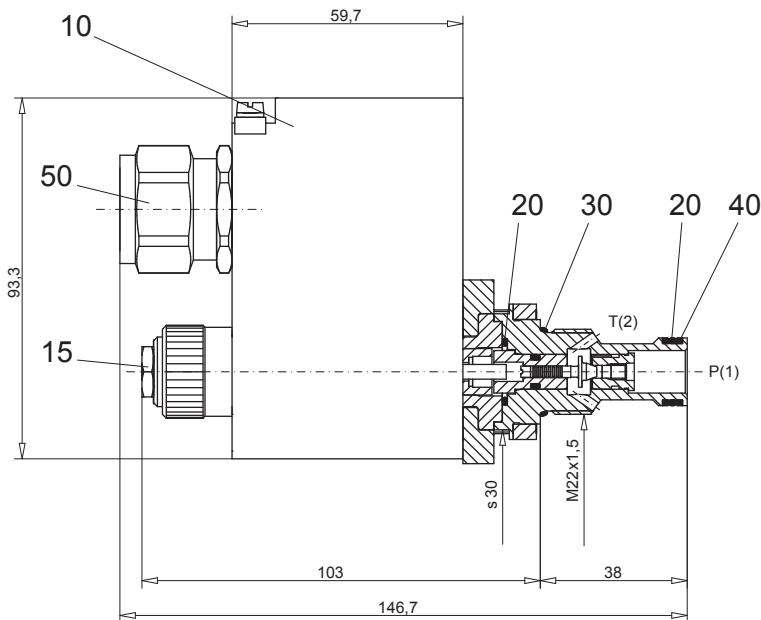
Execution L12/L15/70 °C
L6/40 °C
L6/90 °C

$Q_L = f(p)$ Leakage volume flow characteristics

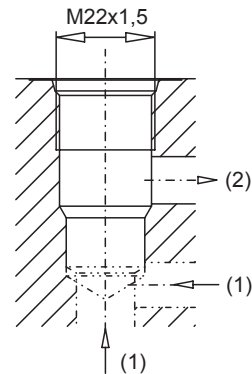
Q [cm³/min]



DIMENSIONS/SECTIONAL DRAWING



Cavity drawing acc. to
ISO 7789-22-02-0-98



For detailed cavity drawing and
cavity tools see data sheet 2.13-1003

Dimensions of the solenoid coil,
refer to data sheet 1.1-183

PARTS LIST

Position	Article	Description
10	263.6...	Slip-on coil MKY45/18 x 60-...
15	253.8000	Plug with integrated manual override HB4,5
20	160.2140	O-ring ID 14,00 x 1,78
30	160.2188	O-ring ID 18,77 x 1,78
40	049.3177	Back-up ring RD 14,6 x 17,5 x 1,4
50	111.1080	Cable gland brass M20

ACCESSORIES

Cartridge built into flange- or sandwich body

Flange- /sandwich plate

Proportional amplifier

register 2.3

register 1.13

Technical explanation see data sheet 1.0-100