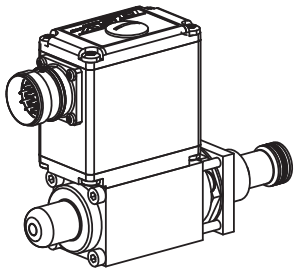
Proportional pressure relief valve inverse
Screw-in cartridge
- **Integrated electronics**
- **Direct operated**
- **Q_{max} = 20 l/min**
- **Q_N = 400 bar**
- **p_{max} = 315 bar**

M22x1,5
ISO 7789



DESCRIPTION

Direct operated proportional pressure relief valve with integrated electronics and inverse function. Thread M22x1,5 for cavity according to ISO 7789. These plug & play valves are factory set and adjusted. High valve-to-valve reproducibility. Housing for electronics with protection class IP67 for harsh environment. As standard versions, 7 pressure ranges are available: 20, 40, 63, 100, 160, 200, 315 bar. Good flow performance due to the differential area principle. Small leakage along the poppet guide. Adjustment by a Wandfluh (VDE-Norm 0580) proportional solenoid. The cartridge and the solenoid made of steel are zinc coated and therefore rust-protected.

FUNCTION

The valve limits the pressure in the port P (1) and reliefs the volume flow to tank port T (2). The back pressure in T (2) influences the pressure in P (1). The reliefed pressure drops with rising solenoid current (inverse function), and the with deenergised solenoid, a maximum pressure is present. The control connection is provided by an analog interface or a fieldbus interface (CANopen or Profibus DP). Parameter setting and diagnosis with the free-of-charge software «PASO» or via fieldbus interface. After taking off the cover of the electronic housing, the serial interface to adjust the settings is accessible. The menu controlled Windows program «PASO» allows easy adjustment of all variable settings. Data are stored in a non-volatile memory. Even after an electric power failure settings can easily be reproduced and transmitted.

APPLICATION

Proportional pressure relief valves with inte-grated electronics are well suited for demanding applications, in which the pressure frequently has to be changed. They are implemented in systems calling for good valve-to-valve reproducibility, easy installation, comfortable operation and high precision in industrial hydraulics as well as in mobile hydraulics. The proportional pressure relief catridge is very suitable for mounting in control blocks, flange bodies and sandwich plates size NG4-Mini and NG6. (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.

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TYPE CODE

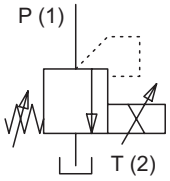
B D W PM22 - ☐ - ☐ ☐ # ☐

Pressure relief valve					
Direct operated					
Proportional inverse valve with integrated electronics					
Screw-in cartridge M22x1,5					
Standard nominal pressure ranges p_N:	20 bar	20	160 bar	160	
	40 bar	40	200 bar	200	
	63 bar	63	315 bar	315	
	100 bar	100			
Standard nominal voltage U_N:	12 VDC			12	
	24 VDC			24	
Hardware configuration:					
With analog signal (0…+10 V factory set)				A1	
With CANopen acc. to DSP-408				P1	
With Profibus DP in accordance with Fluid Power Technology				C1	
With CAN J1939 (on request)				J1	
Design-Index (Subject to change)					

GENERAL SPECIFICATIONS

Description	Direct operated proportional pressure relief valve with inverse function
Construction	Screw-in cartridge for cavity acc. to ISO 7789
Operations	Proportional solenoid with spring
Mounting	Screw-in thread M22x1,5
Ambient temperature	-20…+65°C (typical) (The upper temperature limit is a guideline value for typical applications, in individual cases it may also be higher or lower. The electronics of the valve limit the power in case of a too high electronics temperature. More detailed information can be obtained from the operating instructions «DSV».)
Mounting position	any
Fastening torque	M_D = 50 Nm for screw-in cartridge M_D = 2,6 Nm (qual. 8.8) for solenoid screws
Weight	m = 0,9 kg

SYMBOL



HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination	ISO 4406:1999, class 18/16/13
efficiency	(Required filtration grade ß 6...10 ≥ 75) see data sheet 1.0-50/2
Viscosity range	12 mm²/s…320 mm²/s
Fluid temperature	-20…+70 °C
Peak pressure	p_{max} = 400 bar
Nominal pressure ranges	see type code
Min. volume flow	Q_{min} = 0,2 l/min
Max. volume flow	Q_{max} = 20 l/min for p_N = 20/40/100/160/200 bar Q_{max} = 15 l/min for p_N = 63/315 bar
Leakage volume flow	see characteristics
Repeatability	≤ 3 %
Hysteresis	≤ 5 %

ELECTRICAL SPECIFICATIONS

Protection class	IP 67 acc. to EN 60 529 with suitable connector and closed electronic housing
Supply voltage	12 VDC or 24 VDC
Ramps	adjustable
Parameterisation	via Fieldbus or USB
Interface	USB (Mini B for parameterisation with «PASO» (under the closing screw of the housing cover, factory set parameters)
Analog interface:	
Device receptacle (male)	M23, 12-poles
Mating connector	Plug (female), M23, 12-poles (not incl. in delivery)
Preset value signal	Voltage / Current
Fieldbus interface:	
Device receptacle supply (male)	M12, 4-poles
Mating connector	Plug (female), M12, 4-poles (not incl. in delivery)
Device receptacle CANopen (male)	M12, 5-poles (acc. to DRP 303-1)
Mating connector	Plug (female), M12, 5-poles (not incl. in delivery)
Device receptacle Profibus (female)	M12, 5-poles B-coded (acc. to IEC 947-5-2)
Mating connector	Plug (male), M12, 5-poles, B-coded (not incl. in delivery)
Preset value signal	Fieldbus

NOTE!
Detailed electrical characteristics and description of «**DSV**» electronics are shown on data sheet **1.13-75**.

START-UP

Normally there is no need to adjust settings by the customer. The connector has to be wired according to the chapter «Connector wiring diagram».

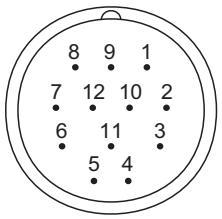
Additional information can be found on our website:
«www.wandfluh.com»

Free-of-charge download of the «PASO»-software and the instruction manual for the «**DSV**» hydraulic valves as well as the operation instruction **CANopen** eg. **Profibus DP** protocol with device profile DSP-408 for «**DSV**».

CONNECTOR WIRING DIAGRAM

Analog interface:

Device receptacle (male) X1

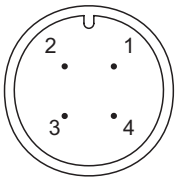


1 = Supply voltage +
2 = Supply voltage 0 VDC
3 = Stabilised output voltage
4 = Preset value voltage +
5 = Preset value voltage -
6 = Preset value current +
7 = Preset value current -
8 = Reserved for extensions
9 = Reserved for extensions
10 = Enable control (Digital input)
11 = Error signal (Digital output)
12 = Chassis

Preset value voltage (PIN 4/5) resp. current (PIN 6/7) are selected with set-up and diagnosis software.
Factory setting: Voltage (0…+10 V), (PIN 4/5)

Fieldbus interface:

Device receptacle supply (male) X1



MAIN
1 = Supply voltage +
2 = Reserved for extensions
3 = Supply voltage 0 VDC
4 = Chassis

Device receptacle CANopen (male) X3

CAN
1 = not connected
2 = not connected
3 = CAN Gnd
4 = CAN High
5 = CAN Low

Device receptacle Profibus (female) X3

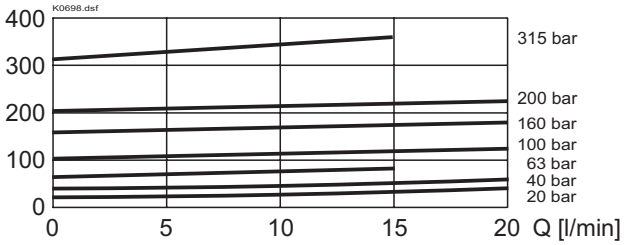
Profibus
1 = VP
2 = RxD / TxD - N
3 = DGND
4 = RxD / TxD - P
5 = Shield

Parameterisation interface (USB, Mini B) X2
Under the closing screw of the housing cover

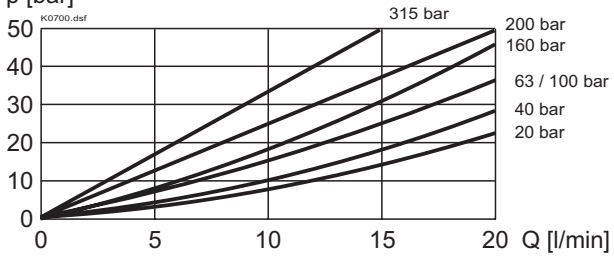
NOTE!
The mating connectors and the cable to adjust the settings are not part of the delivery. To order the cable, look up the article no. in the chapter «Accessories».

CHARACTERISTICS Oil viscosity υ = 30 mm²/s

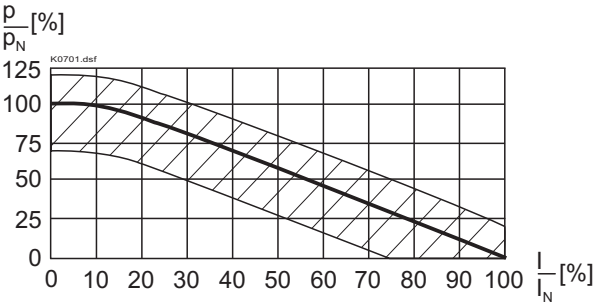
p = f (Q) Pressure volume flow characteristics
(Maximum adjustable pressure)



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

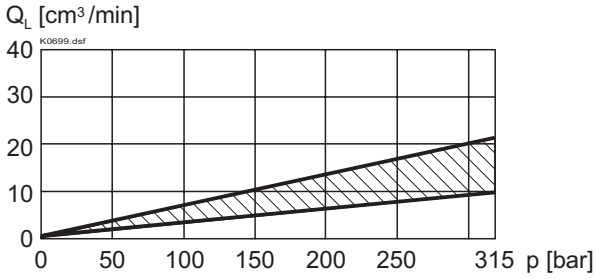


p = f (I) Adjustment of nominal pressure (schematic)

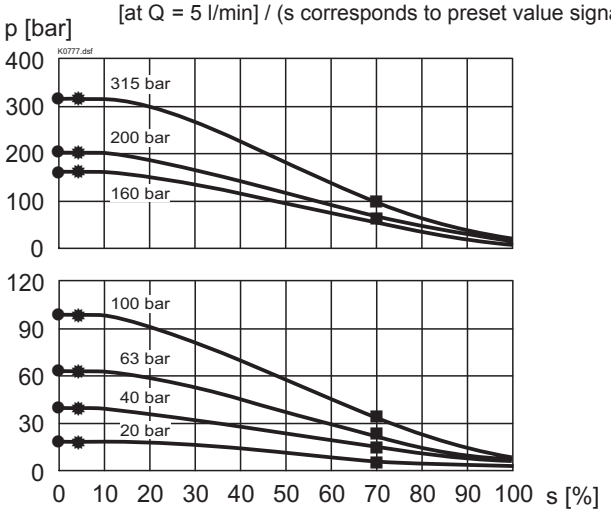


Adjustable range of nomial pressure, adjusted with set screw under the clamp cap.

Q_L = f (p) Leakage volume flow characteristics



p = f (I) Pressure adjustment characteristics
[at Q = 5 l/min] / (s corresponds to preset value signal)

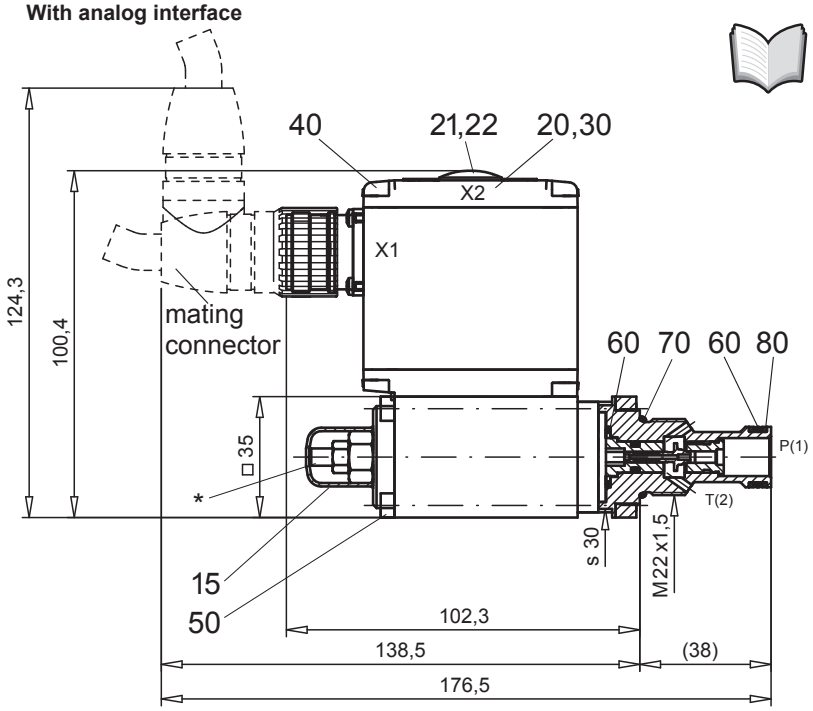


Factory settings:
Dither set for optimal hysteresis

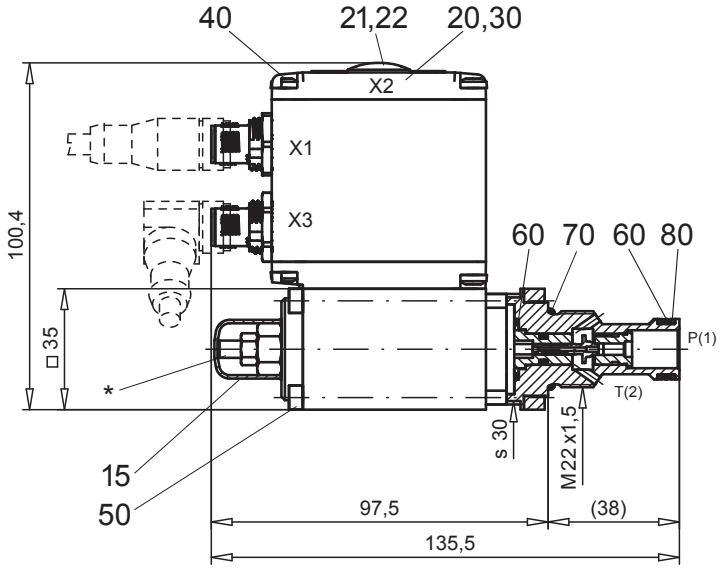
- ✹ = Deadband: Solenoid switched off with command preset value signal <5 %
- ● = p_N mechanicallly pre-set at Q = 5 l/min
- ■ = Limited pressure in port P (1) at 70 % of preset value signal:
  95 bar with pressure range 315 bar
  65 bar with pressure range 200 bar
  56 bar with pressure range 160 bar
  32 bar with pressure range 100 bar
  22 bar with pressure range 63 bar
  14,5 bar with pressure range 40 bar
  6,5 bar with pressure range 20 bar

DIMENSIONS / SECTIONAL DRAWINGS

With analog interface

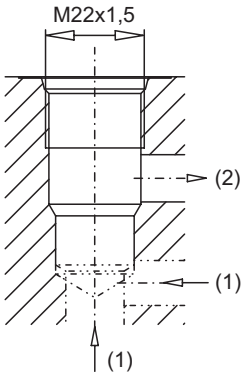


With fieldbus interface



NOTE!
The cable connector is not part of the delivery. Regarding the dimensions see also the connector in the chapter «Accessories».

Cavity drawing according to ISO 7789–22–02–0–98



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

* Adjustment screw to set the nominal pressure (+20 % / -30 %)

PARTS LIST

Position	Article	Description
15	253.8012	Plug with integrated manual override HB4,5-H44
20	062.0102	Cover
21	223.1317	Dummy plug M16 x 1,5
22	160.6131	O-ring ID 13,00 x 1,5
30	072.0021	Gasket 33 x 2 x 59,9 x 2
40	208.0100	Socket head cap screw M4 x 10
50	246.1171	Socket head cap screw M4 x 70 DIN 912
60	160.2140	O-ring ID 14,00 x 1,78
70	160.2188	O-ring ID 18,77 x 1,78
80	049.3177	Back-up ring RD 14,6 x 17,5 x 1,4

Technical explanation see data sheet 1.0-100E

ACCESSORIES

- Cartridge built in:
  flange and sandwich bodies — see register 2.3
- Set-up software — see start-up
- Cable to adjust the settings through interface USB
  (from plug type A to Mini B, 3 m) — article no. 219.2896
- Cable connector for analog interface:
  – straight, soldering contact — article no. 219.2330
  – 90°, soldering contact — article no. 219.2331
  Recommended cable size:
  – Outer diameter 9…10,5 mm
  – Single wire max. 1 mm²
  – Recommended wire size:
  0…25 m = 0,75 mm² (AWG18)
  25…50 m = 1 mm² (AWG17)