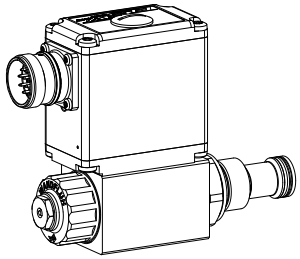
Proportional pressure relief valve
Screw-in cartridge
- **Integrated amplifier or controller electronics**
- **Pilot operated**
- **Q_{max} = 25 l/min**
- **p_{max} = 400 bar**
- **$p_{N\,max}$ = 350 bar**

M22x1,5
ISO 7789



DESCRIPTION

Direct operated proportional pressure relief valve with integrated electronics as a screw-in cartridge. 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. Five standard pressure levels are available: 20, 100, 200, 315 and 350 bar. Adjustment by a Wandfluh proportional solenoid (VDE standard 0580). The cartridge and the solenoid made of steel are zinc coated and therefore rust-protected.

Optionally these valves are available with integrated controller. As feedback value generator sensors with voltage or current output can be directly connected. The available controller structures are optimised for the utilisation with hydraulic drives.

FUNCTION

The valve limits the pressure in 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). When the operating pressure set by is reached, the poppet spool opens and connects the protected line to the tank T (2). The control connection is provided by an analog interface or a fieldbus interface (CANopen, J1939 or Profibus DP). Parameter setting and diagnosis with the free-of-charge software «PASO» or via fieldbus interface. The USB parameterisation interface is accessible through a cover flap.. “PASO” is a Windows program in the flow diagram style, which enables the intuitive setting and storing of all variable parameters. The data remain saved in case of a power failure and can also be reproduced and transferred to other DSVs.

APPLICATION

Proportional pressure relief valves with inte-grated electronics are well suited for demand-ing applications, in which the pressure fre-quently has to be changed. They are imple-mented 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 integrated controller relieves the machine control system and operates the pressure control in a closed control circuit. 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.

TYPE CODE

B D P PM22 - [ ] - [ ] / M E [ ] [ ] - [ ] [ ] # [ ]

Pressure relief valve				
Direct operated				
Proportional				
Screw-in cartridge M22x1,5				
Nominal pressure range p_N	20 bar	20	200 bar	200
	100 bar	100	315 bar	315
			350 bar	350
Nominal voltage U_N	12 VDC		G12	
	24 VDC		G24	
Slip-on coil	Metal housing, square			
Connection execution	Integrated electronics			
Hardware configuration				
With analog signal (0…+10 V factory set)			A1	
With CANopen acc. to DSP-408			C1	
With Profibus DP in accordance with Fluid Power Technology			P1	
With CAN J1939 (on request)			J1	
Function				
Amplifier				
Controller with current feedback signal (0...20 mA / 4...20 mA)			R1	
Controller with voltage feedback signal (0...10 V)			R2	
Sealing material	NBR			
	FKM (Vitron)		D1	
Manual override	Armature tube closed (standard)			
	Screwed sealing plug		HB0	
	Manual emergency actuation		HB4.5	
Design-Index (Subject to change)				

GENERAL SPECIFICATIONS

Description	Direct operated proportional pressure relief valve with integrated electronics
Construction	Screw-in cartridge for cavity acc. to ISO 7789
Operations	Proportional solenoid wet pin push type, pressure tight
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».)
Mountung position	any, preferably horizontal
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

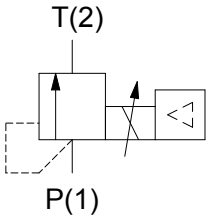
ELECTRICAL SPECIFICATIONS

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, Preset ex-works
Analogue interface:	
Device receptacle (male)	M23, 12-poles
Mating connector	Plug (female), M23, 12-poles (not incl. in delivery)
Preset value signal	Input voltage / current as well as signal range can be set by software.
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 DRP303-1)
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

Feedback signal interface (Sensor):
(controller only)

Device receptacle (female)	M12, 5-poles
Mating connector	Plug (male), M12, 5-poles (not incl. in delivery)
Feedback signal::	Voltage / current state when ordering

SYMBOL



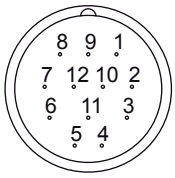
HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluid on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Required filtration grade ß 6…10≥75) refer to 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	p_N = 20 bar, p_N = 100 bar, p_N = 200 bar, p_N = 315 bar
Min. volume flow	Q_{min} = 0,1 l/min
Max. volume flow	Q_{max} = 25 l/min for p_N = 20/100/200 bar Q_{max} = 20 l/min for p_N = 315 bar
Leakage volume flow	see characteristics
Repeatability	≤ 1 %
Hysteresis	≤ 4 %

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 PASO.
Factory setting: Voltage (0…+10 V), (PIN 4/5)

Fieldbus interface:

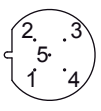
Device receptacle supply (male) X1

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

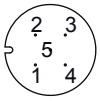


PROFIBUS
1 = VP
2 = RxD / TxD - N
3 = DGND
4 = RxD / TxD - P
5 = Shield

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

Feedback signal interface (Sensor)

Device receptacle (female) X4 (only controller)



1 = Supply voltage (output) +
2 = Feedback signal +
3 = Supply voltage 0 VDC
4 = not connected
5 = stab. output voltage

NOTE!
Detailed electrical characteristics and description of «**DSV**» electronics are shown on data sheet **1.13-76**.

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**».

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».

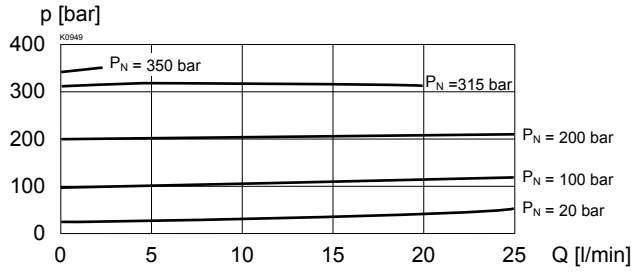
Controllers are supplied configured as amplifiers. The setting of the mode of control and the setting of the controller are done by the customer by software setting (USB interface, Mini B).

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

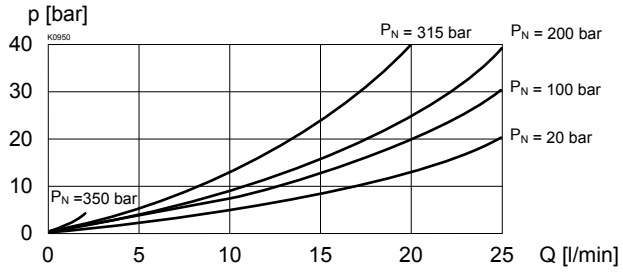
NOTE!
The mating connectors and the cable to adjust the settings are not part of the delivery. Refer to chapter «Accessories».

CHARACTERISTICS Oil viscosity υ = 30 mm²/s

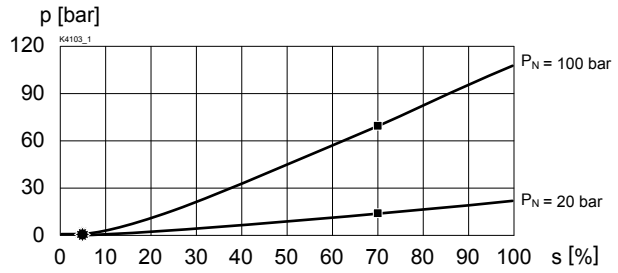
p = f (Q) Pressure volume flow characteristics (Maximum adjustable pressure)



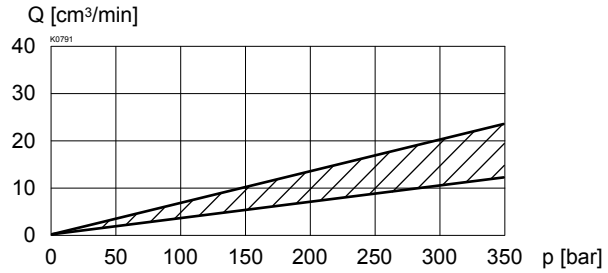
p = f (Q) Pressure volume flow characteristics (Minimum adjustable pressure)



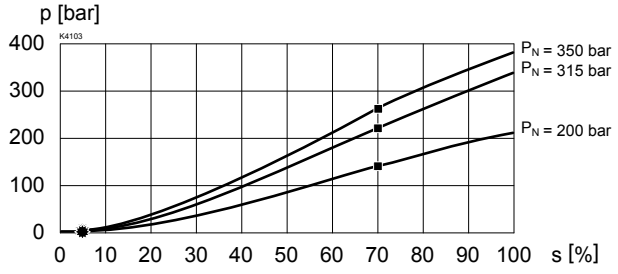
p = f (I) Pressure adjustment characteristics [at Q = 5 l/min] / (s corresponds to preset value signal)



Q_L = f (p) Leakage volume flow characteristics



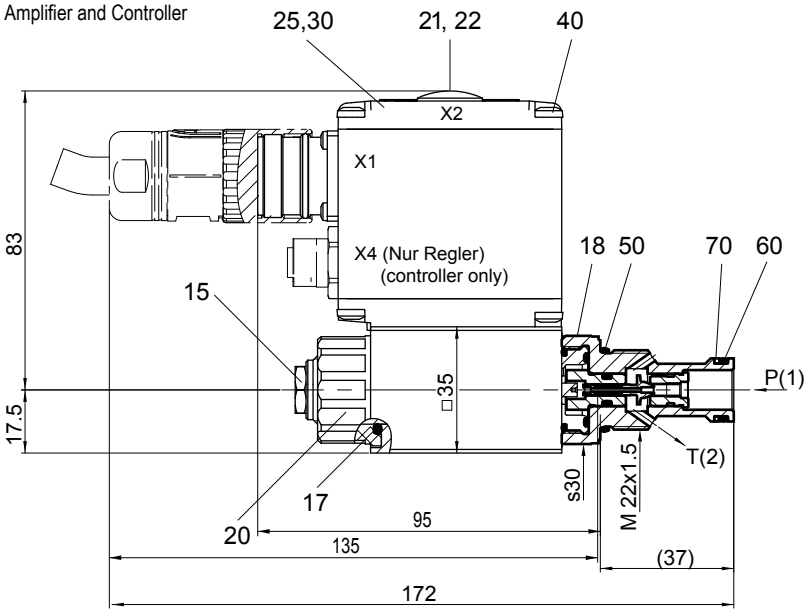
p = f (I) Pressure adjustment characteristics [at Q = 5 l/min] / (s corresponds to preset value signal)



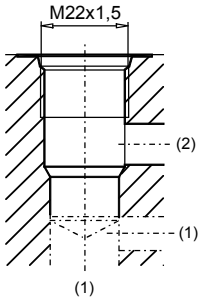
Factory settings:
Dither set for optimal hysteresis
✹ = Deadband: Solenoid switched off with command preset value signal < 5 %
■ = Limited pressure in port P (1) at 70 % of preset value signal:
250 bar with pressure range 350 bar
225 bar with pressure range 315 bar
143 bar with pressure range 200 bar
72 bar with pressure range 100 bar
14,5 bar with pressure range 20 bar

DIMENSIONS / SECTIONAL DRAWINGS

With analog interface
Amplifier and Controller

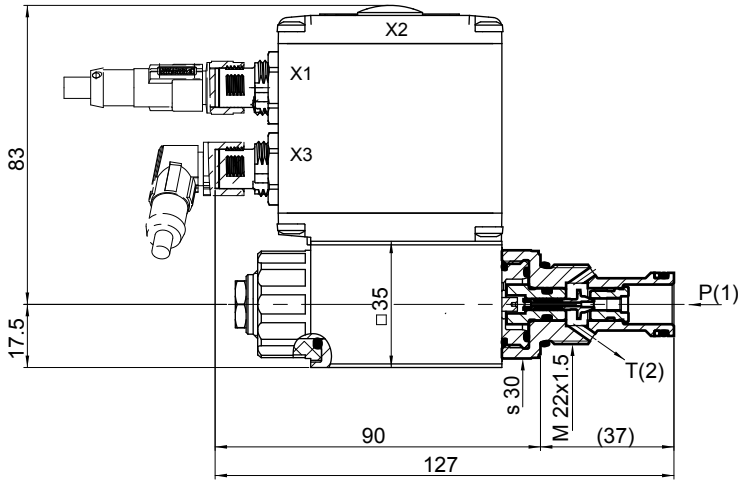


Cavity drawing according to ISO 7789–22–02–0–98

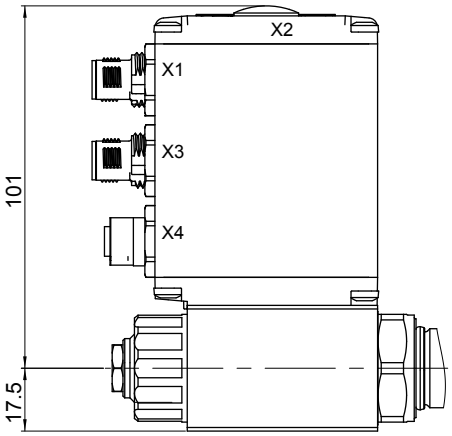


For detailed cavity drawing and cavity tools
see data sheet 2.13-1003

With fieldbus interface
Amplifier



With fieldbus interface
Controller



PARTS LIST

Position	Article	Description
15	253.8000 239.2033	HB 4,5 Manual override (data sheet 1.1-300) HB 0 Plug screw (data sheet 1.1-300)
17	160.2187	O-ring ID 18,72 x 2,62 (NBR)
18	160.2170	O-ring ID 17,17 x 1,78 (NBR)
20	154.2700	Knurled nut
21	223.1317	Dummy plug M16 x 1,5
22	160.6131	O-Ring ID 13,00 x 1,5
25	062.0102	Cover square
30	072.0021	Gasket 33,2 x 59,9 x 2
40	208.0100	Socket head cap screw M4 x 10
50	160.2188 160.6188	O-ring ID 18,77 x 1,78 (NBR) O-ring ID 18,77 x 1,78 (FKM)
60	160.2140 160.6141	O-ring ID 14,00 x 1,78 (NBR) O-ring ID 14,00 x 1,78 (FKM)
70	049.3177	Back-up ring RD 14,6 x 17,5 x 1,4

ACCESSOIRES

Flange-/sandwich plate NG4-Mini	Data sheet 2.3-720
Flange-/sandwich plate NG6	Data sheet 2.3-740
Flange-/sandwich plate NG10	Data sheet 2.3-760
Line mount body	Data sheet 2.9-200

- 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
- Mating connector (plug female) for the analogue 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)

Technical explanation see data sheet 1.0-100