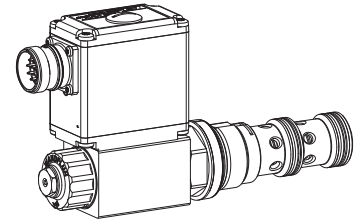


**Proportional pressure reducing valve
 Screw-in cartridge construction**

- Integrated amplifier or controller electronics
- Pilot operated
- $Q_{max} = 160 \text{ l/min}$
- $p_{max} = 400 \text{ bar}$
- $p_{N \text{ red max}} = 350 \text{ bar}$

M33x2
 ISO 7789

DESCRIPTION

Pilot operated proportional pressure reducing valve with integrated electronics as screw-in cartridge. Thread M22x1,5 for cavity according to ISO 7789. The Plug & Play valves are factory set and adjusted and have a high valve-to-valve reproducibility. With protection IP67 for the electronics, these valves are suitable for harsh environmental conditions. As standard, 4 pressure ranges are available. The adjustment takes place by a Wandfluh proportional solenoid (VDE standard 0580). The cartridge body as well as the solenoid made of steel are zinc coated and therefore rust protected. The electronics housing is made of aluminium. 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 proportional pressure reducing valve controls the pressure in port A (1). Proportionally to the solenoid current, the solenoid force and the pressure in port A (1) rise. The valve functions practically independently of the pressure in port P (2). The control takes place via an analog interface or a fieldbus interface (CANopen, J1939 or Profibus DP). The parameterisation takes place by means of the free of cost parameterisation and diagnostics software «PASO» or via Feldbus 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 adjustment 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 reducing valves with integrated electronics are perfectly suitable for demanding applications in which the pressure frequently has to be changed. They are used in applications where high valve-to-valve reproducibility, easy installation, comfortable operation and high precision are very important. The applications are in the industrial as well as in the mobile hydraulics. The proportional pressure reducing cartridge is perfectly suitable for installation in control blocks as well as in flange and sandwich valves of the size NG10 (please refer to separate data sheets in register 2.3). For machining the cartridge cavity in steel and aluminum blocks, cavity tools are available (hire or purchase). Please refer to the data sheets in register 2.13.

TYPE CODE

		M	V	P	PM33	-		-		/	M	E			-		HB4.5	#		
Pressure reducing valve																				
Pilot operated																				
Proportional																				
Screw-in thread M33x2																				
Nominal pressure range $p_{N \text{ red}}$																				
	100 bar																			
	200 bar																			
	275 bar																			
	350 bar																			
Nominal voltage U_N	12 VDC																			
	24 VDC																			
Slip-on coil	Metal housing, square																			
Connection execution	Integrated electronics																			
Hardware configuration																				
With analog command value signal (0...+10V preset)																				
With CANopen according to DSP-408																				
With Profibus DP in accordance with Fluid Power Technology																				
With CAN J1939 (on request)																				
Function																				
Amplifier																				
Controller with current feedback value signal (0...20 mA / 4...20 mA)																				
Controller with voltage feedback value signal (0...10 V)																				
Dichtwerkstoff	NBR																			
	FKM (Vitron)																			
Manual override																				
Design-Index (Subject to change)																				

GENERAL SPECIFICATIONS

Description	Pilot operated proportional pressure reducing 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 M33x2
Ambient temperature	-20...+65 °C (typical) <small>(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».)</small>
Mounting position	any, preferably horizontal
Fastening torque	$M_D = 80 \text{ Nm}$ for screw-in cartridge $M_D = 5 \text{ Nm}$ for knurled nut
Weight	$m = 1,35 \text{ kg}$

HYDRAULIC SPECIFICATIONS

Fluid	Mineral oil, other fluids on request
Contamination efficiency	ISO 4406:1999, class 18/16/13 (Required filtration grade $\beta_{3 \dots 10} \geq 75$) refer to data sheet 1.0-50/2
Viscosity range	12 mm ² /s...320 mm ² /s
Fluid temperature	-20...+70 °C
Peak pressure	$p_{\max} = 400 \text{ bar}$
Nominal pressure ranges	$p_{N \text{ red}} = 100 \text{ bar}$, $p_{N \text{ red}} = 200 \text{ bar}$, $p_{N \text{ red}} = 350 \text{ bar}$
Volume flow range	$Q = 0 \dots 160 \text{ l/min}$
Pilot- and leakage volume flow	see characteristics
Repeatability	$\leq 2\% *$
Hysteresis	$\leq 4\% *$ * at optimal dither signal

ELECTRICAL SPECIFICATIONS

Protection class	IP 67 acc. to EN 60 529 with suitable mating connector and closed housing cover
Supply voltage	12 VDC or 24 VDC
Ramps (amplifier only)	adjustable separately up and down per each solenoid
Command value generator (controller only)	Command value speed 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

Analog interface:

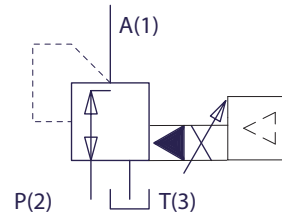
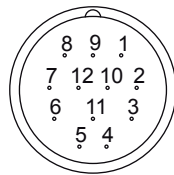
Device receptacle (male)	M23, 12-poles
Mating connector	Plug (female), M23, 12-pole (not incl. in delivery)
Preset value signal	Input voltage / current as well as signal range can be set by software

Fieldbus interface:

Device receptacle supply (male)	M12, 4-pole
Mating connector	Plug (female), M12, 4-pole (not incl. in delivery)
Device receptacle CANopen (male)	M12, 5-pole (acc. to DRP 303-1)
Mating connector	Plug (female), M12, 5-pole (not incl. in delivery)
Device receptacle Profibus (female)	M12, 5-pole, B-coded (acc. to IEC 947-5-2)
Mating connector	Cable plug (male), M12, 5-pole, B-coded (not incl. in delivery)
Command value signal	Fieldbus

Feedback value interface (sensor) (controller only)

Device receptacle (female)	M12, 5-pole
Mating connector	Cable plug (male). M12, 5-pole (not included in the delivery)
Feedback value	Voltage / current to indicate when ordering

SYMBOL

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

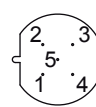
MAIN

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

Device receptacle CANopen (male) X3

CAN

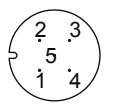
- 1 = not connected
- 2 = not connected
- 3 = CAN Gnd
- 4 = CAN High
- 5 = CAN Low

Device receptacle Profibus (female) X3

PROFIBUS

- 1 = VP
- 2 = Rx/D/TxD - N
- 3 = DGND
- 4 = Rx/D/TxD - P
- 5 = Shield

Parameterisation interface (USB, Mini B) X2

Under the closing screw of the housing cover

Feedback value interface (sensor)
Device receptacle (female) X4 (controller only)


- 1 = Supply voltage (output) +
- 2 = Feedback value signal +
- 3 = Supply voltage 0 VDC
- 4 = Not connected
- 5 = Stabilised output voltage


NOTE!

The mating connector and the parameterisation cable are not included in the delivery. See chapter "Accessories".



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

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».

START-UP

For DSV amplifiers as a rule no parameter settings by the customer are required. The plugs have to be connected in accordance with the chapter «Pin assignment».

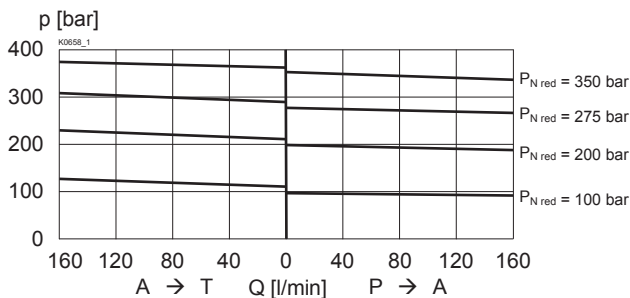
Controllers are delivered configured as amplifiers. Setting the controller mode and adjustment of the controller are carried out by the customer by means of the software adjustment (USB interface, Mini B).



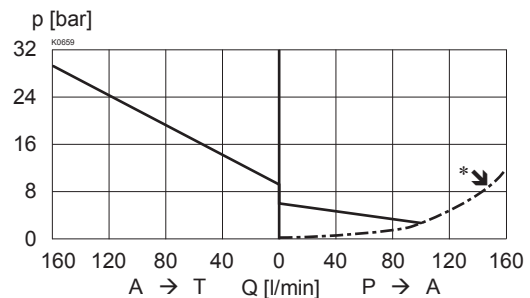
NOTE!
 The mating connectors and the cable to adjust the settings are not part of the delivery. Refer to chapter «Accessories».

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

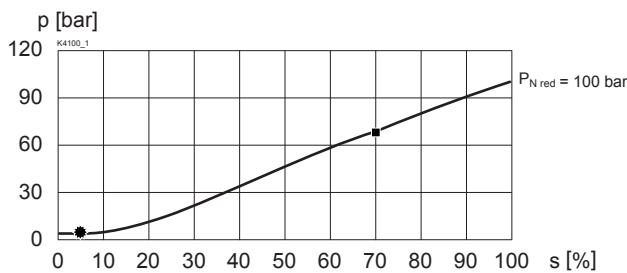
$p_{\text{red}} = f(Q)$ Pressure volume flow characteristics
 (Maximal adjustable pressure)



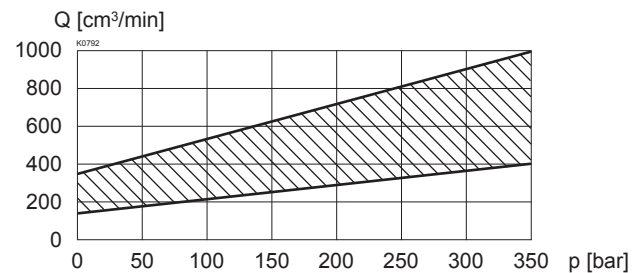
$p_{\text{red}} = f(Q)$ Pressure volume flow characteristics
 (Minimal adjustable pressure)
 * Consumption resistance dependent on system



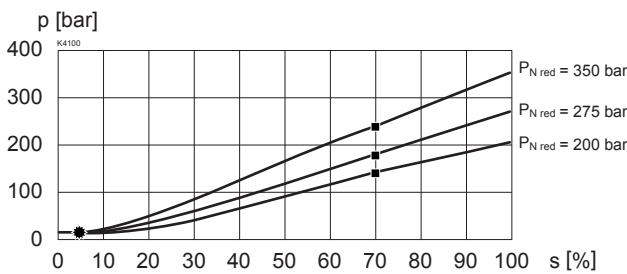
$p_{\text{red}} = f(s)$ Pressure adjustment characteristics
 [at $Q = 0 \text{ l/min}$] (s corresponds to preset value signal)



$Q_{\text{st+L}} = f(p_{\text{red}})$ Pilot- and leakage volume flow characteristic [A (1) → T (3)]



$p_{\text{red}} = f(s)$ Pressure adjustment characteristics
 [at $Q = 0 \text{ l/min}$] / (s corresponds to preset value signal)

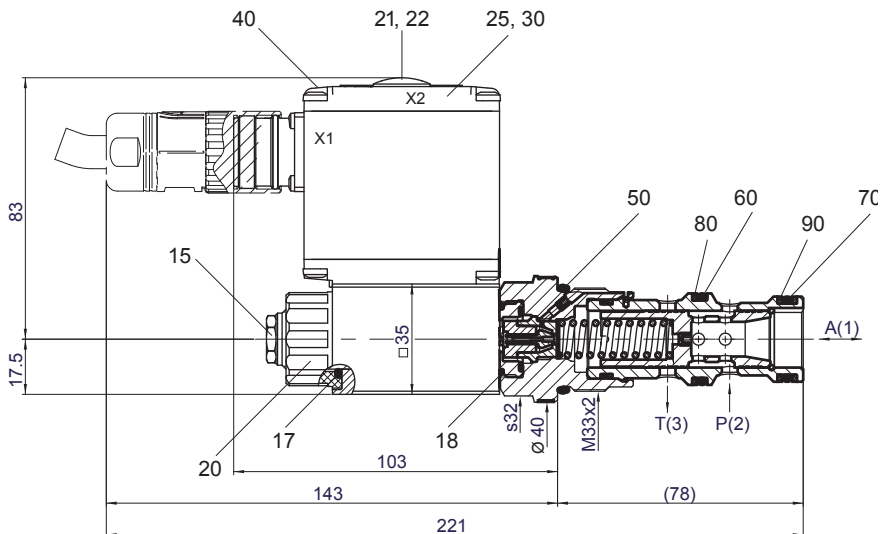
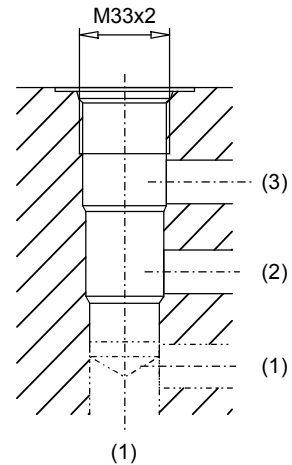


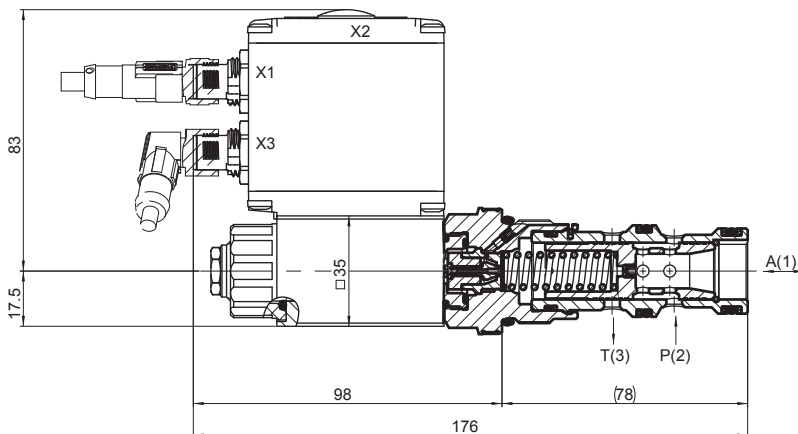
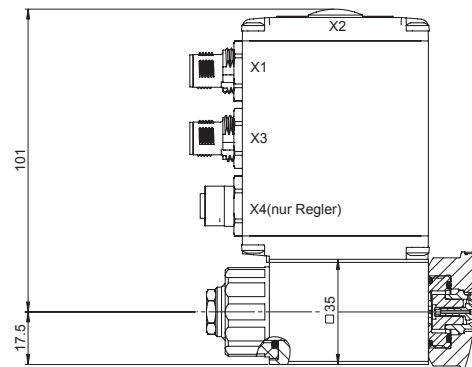
Inlet pressure: $p_N + 10\%$
 Measured with closed port A (static conditions).

Factory settings:

Dither set for optimal hysteresis

- = Deadband: Solenoid switched off with command preset value signal <5%
- = Regulated pressure in port A (1) at 70% of preset value signal:
 250 bar with pressure range 350 bar
 192 bar with pressure range 275 bar
 143 bar with pressure range 200 bar
 72 bar with pressure range 100 bar

DIMENSIONS / SECTIONAL DRAWINGS
With analog interface

 Cavity drawing acc. to
 ISO 7789-33-04-0-98

 For detailed cavity drawing
 see data sheet 2.13-1040

With fieldbus interface

**With fieldbus interface
 Controller**

PARTS LIST

Position	Article	Description
15	253.8000	HB 4,5 Manual override (data sheet 1.1-300)
17	160.2187	O-ring ID 18,72x2,62 (NBR)
18	160.2170	O-ring ID 17,17x1,78 (NBR)
20	154.2700	Knurled nut
21	223.1317	Dummy plug M16x1,5
22	160.6131	O-ring ID 13,00x1,5
25	062.0102	Cover square
30	072.0021	Gasket 33,2x59,9x2
40	208.0100	Socket head cap screw M4x10
50	160.2298 160.6296	O-ring ID 29,82x2,62 (NBR) O-ring ID 29,82x2,62 (FKM)
60	160.2235 160.6235	O-ring ID 23,47x2,62 (NBR) O-ring ID 23,47x2,62 (FKM)
70	160.2219 160.6216	O-ring ID 21,89x2,62 (NBR) O-ring ID 21,89x2,62 (FKM)
80	049.3297	Backup ring RD 24,5x29x1,4
90	049.3277	Backup ring RD 22,5x27x1,4

ACCESSORIES

 Line mount body Data sheet 2.9-210

- Set-up software see start-up
- Cable to adjust the settings through interface USB article no. 219.2896
(from plug type A to Mini B, 3 m)
- Mating connector (plug female) for the analogue interface:
 – straight, soldering contact article no. 219.2330
 – 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