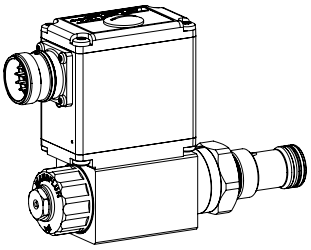
Proportional throttle cartridge with integrated electronics

- direct operated
- Q_{max} = 32 l/min
- $Q_{N\,max}$ = 25 l/min
- p_{max} = 350 bar

M22 x 1,5
ISO 7789

DSV DIGITAL VALVE SMART



DESCRIPTION

Direct operated proportional throttle valve with integrated electronics as screw-in cartridge for cavity according to ISO 7789. With the solenoid deenergised, the control spool is held in the closed position (DN) or open position (DO) by a spring. The change of the electric current is followed by a proportional volume flow change. Progressive increase and decrease of volume flow and reduced hysteresis are characteristics of this valve. The Plug & Play valves are factory set and adjusted and have therefore a high valve-to-valve reproducibility. The control takes place via an analogue 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 fieldbus interface. The USB parameterisation interface is accessible through a screw plug. As an option, these valves are available with integrated controller. As feedback value generators sensors with voltage or current output can be connected directly. The available controller structures are optimised for applications with hydraulic actuations.

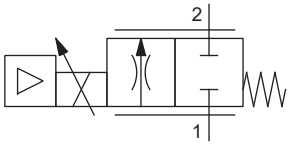
APPLICATION

Proportional throttle valves with integrated electronics are perfectly suitable for demanding applications in which the volume flow 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 integrated controller reliefs the machine control and operates the volume flow control in a closed loop circuit. The applications are in the industrial as well as in the mobile hydraulics for the smooth control of hydraulic actuations. The screw-in cartridge is perfectly suitable for installation in control blocks and is installed in sandwich- (vertical stacked systems) and in flange plates (corresponding data sheets in this register). 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.

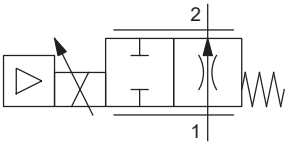
Note! „PASO" is a Windows programm in the flow diagram style, which enables the intuitive adjustment and storing of all variable parameters. The data remain saved in case of a power failure and can also be reproduced and transferred to other DSV.

SYMBOL

„normally closed" DN



„normally open" DO



ACTUATION

Actuation	Proportional solenoid, wet pin push type, pressure tight
Connection	Via device receptacle

MANUAL OVERRIDE

HB4,5 as standard

ELECTRICAL SPECIFICATIONS

Protection class	IP67 with suitable mating connector and closed housing cover
Ramps	Adjustable
Parameterisation	Via fieldbus or USB
Supply voltage	12 VDC, 24 VDC

Note! Exact electrical specifications and detailed description of «DSV» electronics can be found on data sheet 1.13-76.

TYPE CODE

D ☐ P PM22 - ☐ - ☐ / M E ☐ ☐ - ☐ HB4,5 # ☐

Throttle valve					
Normally closed		N			
Normally open		O			
Proportional					
Screw-in cartridge M22 x 1,5					
Nominal volume flow rate Q_N	6,3 l/min	6,3			
	10 l/min	10			
	25 l/min	25			
Nominal voltage U_N	12 VDC	G12			
	24 VDC	G24			
Slip-on coil	Metal housing square				
Connection execution	Integrated electronics				
Hardware configuration					
Analog command value signal	12 pole	A1	7 pole	D1	(0…10 V preset)
Analog command value signal	12 pole	A4	7 pole	D4	(4 … 20 mA preset)
CANopen according to DSP-408		C1			
Profibus DP according to Fluid Power Technology		P1			
CAN J1939 (on request)		J1			
Function					
Amplifier					
Controller with current feedback value signal (0…20 mA / 4… 20 mA)				R1	
Controller with voltage feedback value signal (0 … 10 V)				R2	
Sealing material	NBR				
	FKM (Viton)	D1			
Manual override					
Design index (subject to change)					

2.6-541

GENERAL SPECIFICATIONS

Designation	Proportional throttle valve with integrated electronics
Construction	Direct operated
Mounting	Screw-in cartridge construction
Nominal size	M22 x 1,5 according to ISO 7789
Actuation	Proportional solenoid
Ambient temperature	-20…+65 °C The upper temperature limit is a guideline 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".
Weight	1,0 kg
MTTFd	150 years

HYDRAULIC SPECIFICATIONS

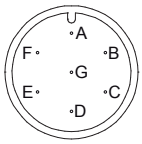
Working pressure	p_{max} = 350 bar
Maximum volume flow	Q_{max} = 32 l/min
Volume flow direction	1 → 2
Leakage oil	max. 50 cm³/min at 350 bar
Nominal volume flow range	Q_N = 6,3; 10; 25 l/min at 10 bar valve pressure drop
Hysteresis	≤ 8 %
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm²/s…320 mm²/s
Temperature range fluid	-25…+70 °C (NBR) -20…+70 °C (FKM)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade ß 6…10 ≥ 75, see data sheet 1.0-50

ELECTRICAL CONNECTION

X1	Analog interface (Main)
Device receptacle 	M23, 12 pole male 1 = Supply voltage + 2 = Supply voltage 0 VDC 3 = Stabilised output voltage 4 = Command value signal voltage + 5 = Command value signal voltage - 6 = Command value signal current + 7 = Command value signal current - 8 = Reserved for extentions 9 = Reserved for extentions 10 = Enable signal (Digital input) 11 = Error signal (Digital output) 12 = Chassis
Command value signal voltage (PIN 4/5) resp. current (PIN 6/7) are selected with parameterisation and diagnostics software PASO.	

X1	Fieldbus interface (Main)
Device receptacle 	M12, 4 pole male 1 = Supply voltage + 2 = Reserved for extentions 3 = Supply voltage 0 VDC 4 = Chassis

X2	Parameterisation interface
USB, Mini B	Under the screw plug of the housing cover Factory set

X1	Analog interface (Main) Connector DIN EN 175201 - 804
Device receptacle 	7 pole male A = Supply voltage + B = Supply voltage 0 VDC C = Not connected D = Command value signal + E = Command value signal - F = Not connected G = Chassis
Command value signal: current (D4) or voltage (D2) to specify when placing the order	

X3	Profibus interface according to IEC 947-5-2
Device receptacle 	M12, 5 pole female B-coded 1 = VP 2 = RxD / TxD - N 3 = DGND 4 = RxD / TxD - P 5 = Shield

X3	CANopen interface according to DRP 303-1
Device receptacle 	M12, 5 pole male 1 = Not connected 2 = Not connected 3 = CAN Gnd 4 = CAN High 5 = CAN Low

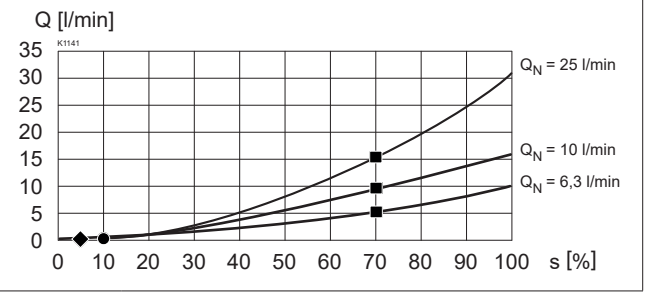
X4 (controller only)	Feedback value interface (sensor)
Device receptacle 	M12, 5 pole female 1 = Supply voltage (output) + 2 = Feedback value signal + 3 = Supply voltage 0 VDC 4 = Not connected 5 = Stabilised output voltage
Feedback value signal: current (R1) or voltage (R2) to specify when placing the order	

Note! The mating connector is not included in the delivery

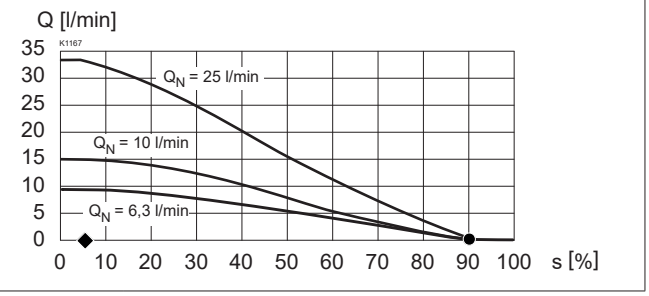
PERFORMANCE SPECIFICATIONS

Oil viscosity υ = 30 mm²/s

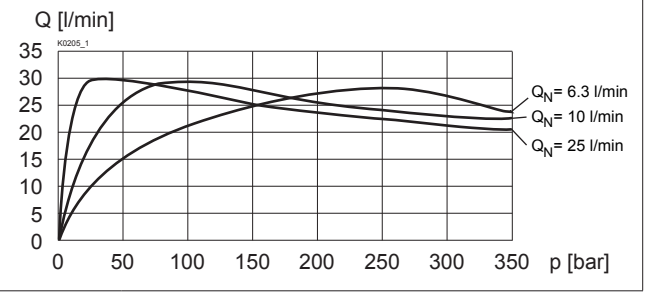
Q = f (I) **Volume flow adjustment characteristics DN**
p1 - p2 = 20 bar / s corresponds to command value signal



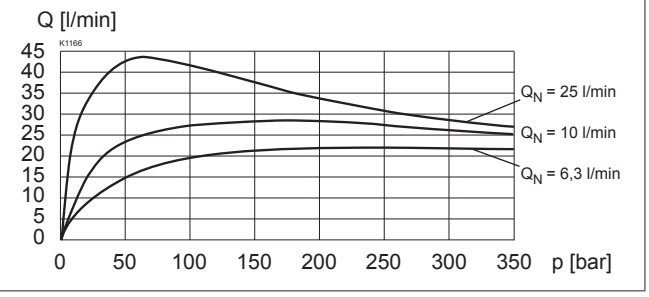
Q = f (I) **Volume flow adjustment characteristics DO**
p1 - p2 = 20 bar / s corresponds to command value signal



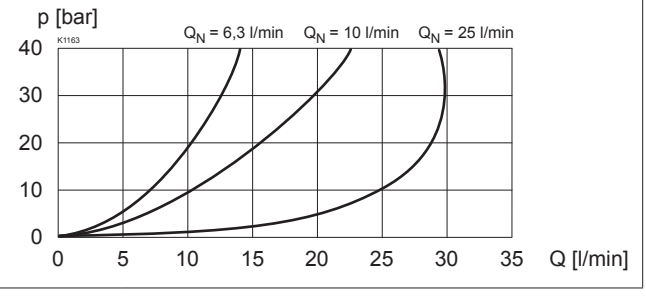
Q = f (p) **Volume flow pressure characteristics DN**
I = I_G



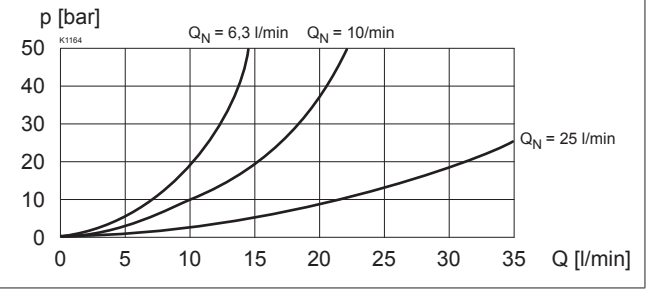
Q = f (p) **Volume flow pressure characteristics DO**
I = I_G



Δp = f (Q) **Pressure drop volume flow characteristic DN**
I = I_G



Δp = f (Q) **Pressure drop volume flow characteristic DO**
I = I_G



FACTORY SETTINGS

Dither set for optimum hysteresis DN

◆ = Deadband: solenoid switched off at command value signal < 5 %

● = Opening pressure at command value signal + 10 %

■ = Flow at Δp = 30 bar at 70% command value signal

15,0 l/min	at nominal volume flow rate Q_N	25 l/min
10,0 l/min	at nominal volume flow rate Q_N	10 l/min
5,2 l/min	at nominal volume flow rate Q_N	6,3 l/min

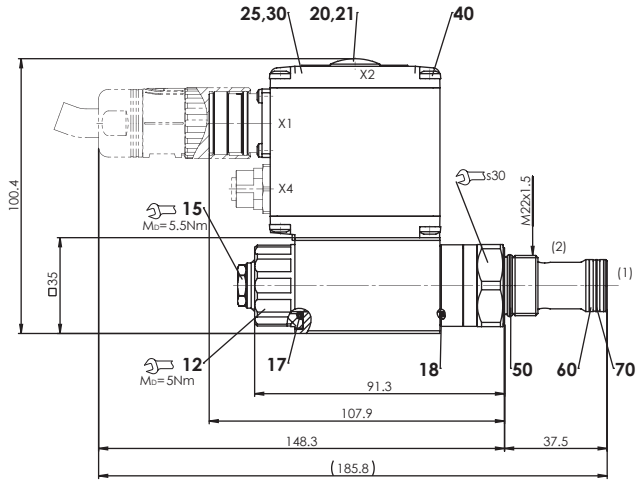
Dither set for optimum hysteresis DO

◆ = Deadband: solenoid switched off at command value signal < 5 %

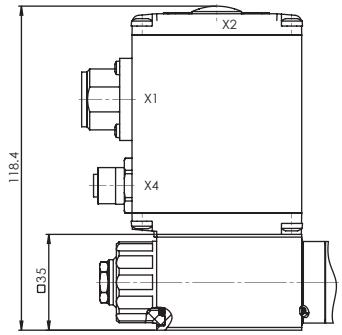
● = Closing point at 90 %

DIMENSIONS

With analog interface, 12 pole connector
Amplifier and controller

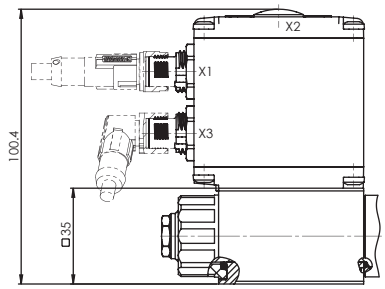


With analog interface, 7 pole connector
Amplifier and controller

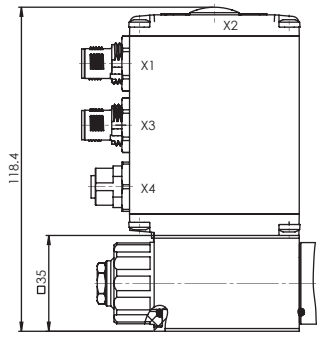


X4 (controller only)

With fieldbus interface
Amplifier

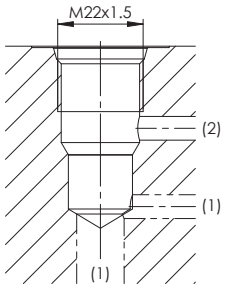


With fieldbus interface
Controller



HYDRAULIC CONNECTION

Cavity drawing according to ISO 7789–22–01–0–98



Note!

For detailed cavity drawing and cavity tools see data sheet 2.13-1008

PARTS LIST

Position	Article	Description
12	154.2700	Knurled nut
15	253.8000	Manual override HB4,5
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	223.1317	Dummy plug M16 x 1,5
21	160.6131	O-ring ID 13,00 x 1,5 (FKM)
25	062.0102	Cover
30	072.0021	Gasket 33,2 x 59,9 x 2
40	208.0100	Socket head screw M4 x 10
50	160.2188	O-ring ID 18,77 x 1,78 (NBR)
	160.6188	O-ring ID 18,77 x 1,78 (FKM)
60	160.2156	O-ring ID 15,60 x 1,78 (NBR)
	160.6156	O-ring ID 15,60 x 1,78 (FKM)
70	049.3196	Backup ring rd 16,1 x 19 x 1,4

SEALING MATERIAL

NBR or FKM (Viton) as standard, choice in the type code

STANDARDS

Cartridge cavity	ISO 7789
CANopen	DRP 303-1
Profibus DP	IEC 947-5-2
Protection class	EN 60 529
Contamination efficiency	ISO 4406

SURFACE TREATMENT

- The cartridge body is gas-nitro-carburised
- The slip-on coil is zinc- / nickel-coated
- The electronics housing / chassis is made of aluminium

INSTALLATION NOTES

Mounting type	Screw-in cartridge M22 x 1,5
Mounting position	Any, preferably horizontal
Tightening torque	M_D = 60 Nm Screw-in cartridge M_D = 5 Nm knurled nut

COMMISSIONING

For DSV amplifiers as a rule no parameter adjustments by the cusotmer are required. The plugs have to be connected in accordance with the chapter «Electrical connection».

Controllers are supplied configured as amplifiers. The adjustment of the mode of control and of the controller are carried out by the customer by means of the software adjustment (USB interface, Mini B).
Further information can be found on: «www.wandfluh.com».
Free- of charge download of the «PASO» software and the operation instructions for «DSV» hydraulic valves as well as the operation instructions CANopen Protocol resp. Profibus DP Protocol, with Device Profile DSP-408 for «DSV».

Note! The mating connectors and the parameterisation cable are not part of the delivery. Refer to chapter «Accessories».

ACCESSORIES

Parameterisation software	See start-up
Parameterisation cable for interface USB (from plug type A on Mini B, 3 m)	Article no. 219.2896
Mating connector (plug female) for analog interface	
straight, soldering contact M23, 12 pole	Article no. 219.2330
straight, soldering contact, 7 pole	Article no. 219.2335
angled, soldering contact M23, 12 pole	Article no. 219.2331

Flange body / sandwich plate NG4-Mini	Data sheet 2.6-720
Flange body / sandwich plate NG6	Data sheet 2.6-740
Threaded body	Data sheet 2.9-205
Technical explanations	Data sheet 1.0-100
Filtration	Data sheet 1.0-50

Attention! Auxiliary conditions for the cable:
– External diameter 12 pol: 3,5…14,7 mm
– External diameter 7 pol: 8…10 mm
– Wire cross section max. 1 mm²
– Recommended wire cross section:
0…25 m = 0,75 mm² (AWG18)
25…50 m = 1 mm² (AWG17)

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