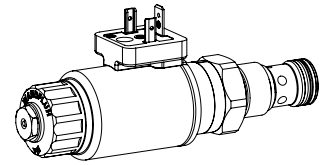


**Proportional throttle cartridge**

- ◆ direct operated
- ◆  $Q_{max} = 32 \text{ l/min}$
- ◆  $Q_{Nmax} = 25 \text{ l/min}$
- ◆  $p_{max} = 350 \text{ bar}$

**M22 x 1,5**  
**ISO 7789**

**DESCRIPTION**

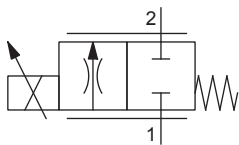
Direct operated proportional throttle valve in screw-in cartridge construction for cavity according to ISO 7789. With the solenoid deenergised, the control spool is held in the closed position (DN) or open position (DO) by a spring. The change of the electric current is followed by a proportional volume flow change. Very sensitive opening and closing characteristics and low hysteresis are characteristics of these valves. For the control, Wandfluh proportional amplifiers are available (see register 1.13).

**APPLICATION**

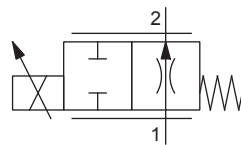
Proportional throttle valves are suitable for smooth control of movements in stationary or mobile systems. The screw-in cartridge is perfectly suitable for installation in control blocks and is installed in sandwich- (vertical stacked systems) and in flange plates (corresponding data sheets in this register). 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.

**SYMBOL**

„normally closed“ DN



„normally open“ DO


**TYPE CODE**

		D <input type="checkbox"/> P PM22 - <input type="checkbox"/> - <input type="checkbox"/> / <input type="checkbox"/> <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> # <input type="checkbox"/>									
Throttle valve											
Normally closed		<input type="checkbox"/> N									
Normally open		<input type="checkbox"/> O									
Proportional											
Screw-in cartridge M22 x 1,5											
Nominal volume flow rate $Q_N$	3,5 l/min	<input type="checkbox"/> 3,5									
	6,3 l/min	<input type="checkbox"/> 6,3									
	10 l/min	<input type="checkbox"/> 10									
	25 l/min	<input type="checkbox"/> 25									
Nominal voltage $U_N$	12 VDC	<input type="checkbox"/> G12									
	24 VDC	<input type="checkbox"/> G24									
	without coil	<input type="checkbox"/> X5									
Slip-on coil	Metal housing round	<input type="checkbox"/> W									
	Metal housing square	<input type="checkbox"/> M									
Connection execution	Connector socket EN 175301-803/ISO 4400	<input type="checkbox"/> D									
	Connector socket AMP Junior - Timer	<input type="checkbox"/> J									
	Connector Deutsch DT04-2P	<input type="checkbox"/> G									
Sealing material	NBR	<input type="checkbox"/>									
	FKM (Viton)	<input type="checkbox"/> D1									
Armature tube	with screw plug HB0	<input type="checkbox"/>									
	with manual override	<input type="checkbox"/> HB4,5									
Design index (subject to change)											

2.6-531

**GENERAL SPECIFICATIONS**

Designation	Proportional throttle valve
Construction	Direct operated
Mounting	Screw-in cartridge construction
Nominal size	M22 x 1,5 according to ISO 7789
Actuation	Proportional solenoid
Ambient temperature	-25...+70 °C
Weight	0,57 kg
MTTFd	150 years

**ELECTRICAL SPECIFICATIONS**

Protection class	Connection execution D: IP65 Connection execution J: IP66 Connection execution G: IP67 and IP69K
Relative duty factor	100 % DF
Standard nominal voltage	12 VDC, 24 VDC
Limiting current at 50 °C	$I_G = 1320 \text{ mA}$ ( $U_N = 12\text{VDC}$ ) $I_G = 660 \text{ mA}$ ( $U_N = 24\text{VDC}$ )

**Note!** Other electrical specifications see data sheet 1.1-173 (slip-on coil W) and 1.1-174 (slip-on coil M)

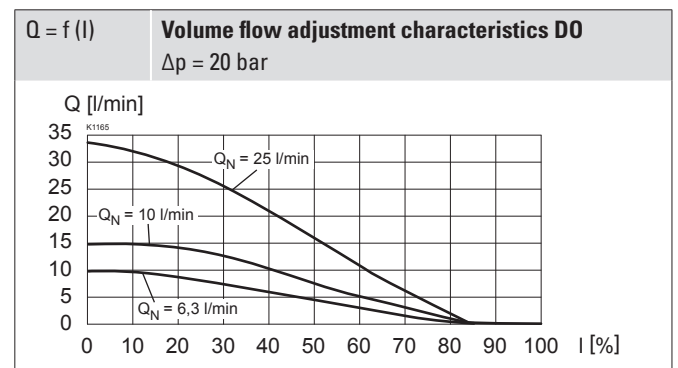
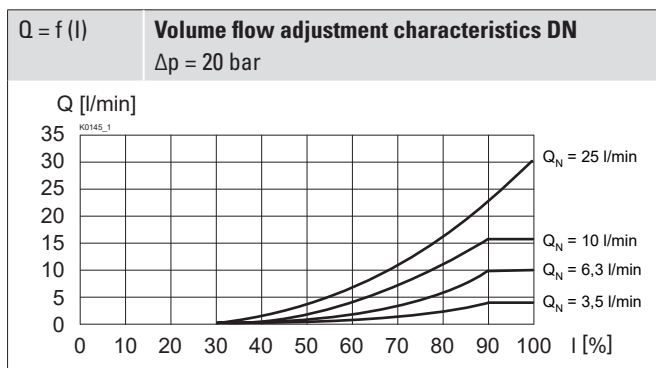

**ACTUATION**

Actuation	Proportional solenoid, wet pin push type, pressure tight
Execution	W.S37 / 19 x 50 (Data sheet 1.1-173) M.S35 / 19 x 50 (Data sheet 1.1-174)
Connection	Connector socket EN 175301 – 803 Connector socket AMP Junior-Timer Connector Deutsch DT04 – 2P

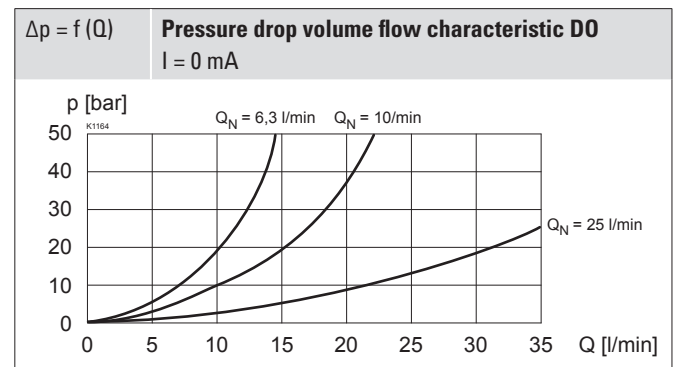
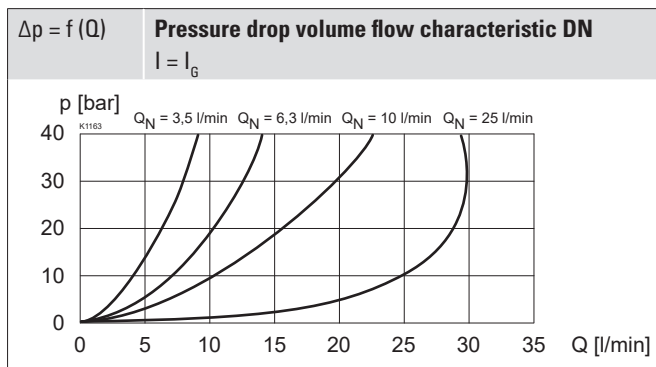
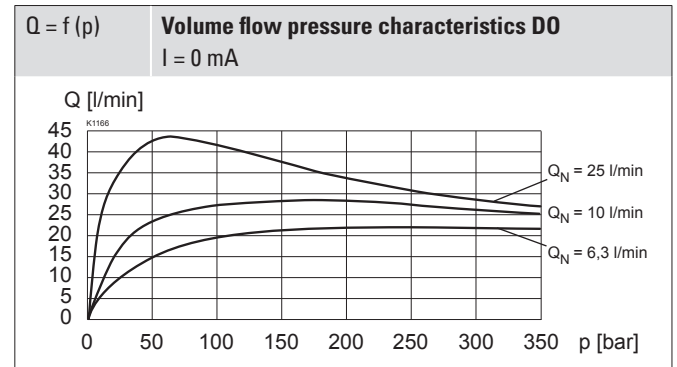
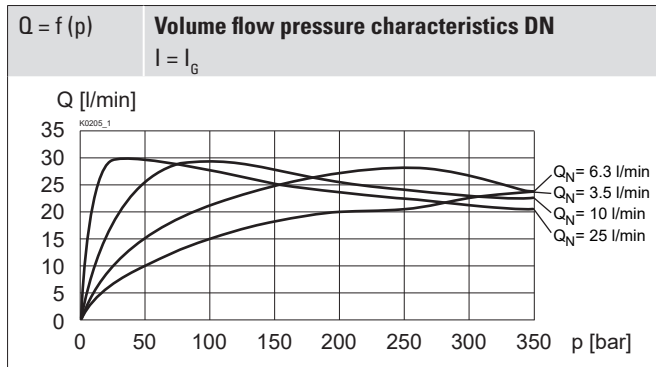
**HYDRAULIC SPECIFICATIONS**

Working pressure	$p_{max} = 350 \text{ bar}$
Maximum volume flow	$Q_{max} = 32 \text{ l/min}$
Volume flow direction	1 → 2
Leakage oil	On request
Nominal volume flow range	$Q_N = 3,5; 6,3; 10; 25 \text{ l/min}$ at 10 bar valve pressure drop
Hysteresis	$\leq 8 \%$ (DN); 10-12 % (DO) at optimal dither signal
Fluid	Mineral oil, other fluid on request
Viscosity range	12 mm <sup>2</sup> /s...320 mm <sup>2</sup> /s
Temperature range fluid	-25...+70 °C (NBR) -20...+70 °C (FKM)
Contamination efficiency	Class 18 / 16 / 13
Filtration	Required filtration grade $\beta_{6...10} \geq 75$ , see data sheet 1.0-50

**PERFORMANCE SPECIFICATIONS**

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


**PERFORMANCE SPECIFICATIONS**

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

**SURFACE TREATMENT**

- ◆ The cartridge body is gas-nitro-carburised
- ◆ The armature tube and the slip-on coil are zinc- / nickel-coated

**INSTALLATION NOTES**

Mounting type	Screw-in cartridge M22 x 1,5
Mounting position	Any, preferably horizontal
Tightening torque	$M_D = 60 \text{ Nm}$ Screw-in cartridge $M_D = 5 \text{ Nm}$ knurled nut $M_D = 9,5 \text{ Nm}$ HB0 $M_D = 5,5 \text{ Nm}$ HB4,5

**ACCESSORIES**

Proportional amplifier	Register 1.13
Mating connector black (B)	Article no. 219.2002
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
Relative duty factor	Data sheet 1.1-430

**SEALING MATERIAL**

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

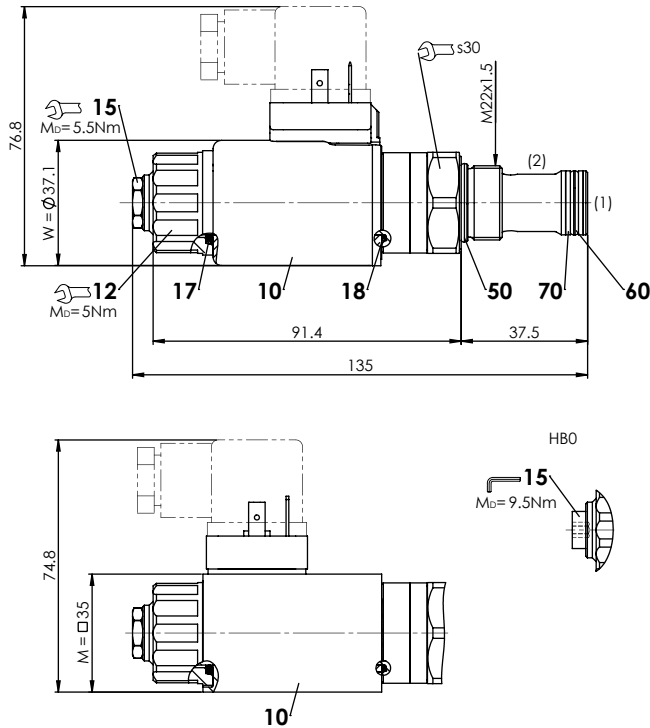
**STANDARDS**

Cartridge cavity	ISO 7789
Solenoids	DIN VDE 0580
Connection execution D	EN 175301 – 803
Protection class	EN 60 529
Contamination efficiency	ISO 4406

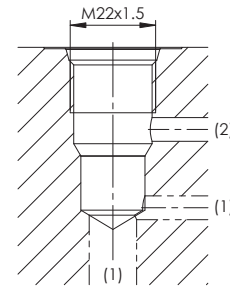
**MANUAL OVERRIDE**

HB4,5

Optionally: Screw plug (HB0), no actuation possible

**DIMENSIONS**

**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
10	206.2...	W.S37 / 19 x 50
	260.5...	M.S35 / 19 x 50
12	154.2700	Knurled nut
15	253.8000	HB4,5 manual override
	239.2033	HB0 Screw plug
17	160.2187	O-ring ID 18,72 x 2,62 (NBR)
18	160.2170	O-ring ID 17,17 x 1,78 (NBR)
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