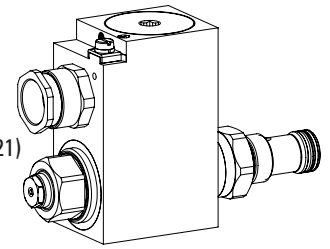


**Proportional throttle cartridge**

- ◆ direct operated
- ◆  $Q_{max} = 45 \text{ l/min}$
- ◆  $Q_{Nmax} = 25 \text{ l/min}$
- ◆  $p_{max} = 350 \text{ bar}$

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

Ex db IIC T6, T4 Gb (Zone 1)  
 Ex tb III C T80 °C, T130 °C Db (Zone 21)  
 Ex db I Mb  
 ⓧ II 2 G Ex db IIC T6, T4  
 ⓧ II 2 D Ex tb III C T80 °C, T130 °C  
 ⓧ I M2 Ex db I Mb  
 Class I, Division 1, Group A, B, C, D T4  
 Class II & III, Division I, Group E, F, G T4


**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). The pressure tight encapsulated Ex-protection solenoid coil prevents an explosion on the inside penetrating to the outside as well as an ignitable surface temperature.

**APPLICATION**

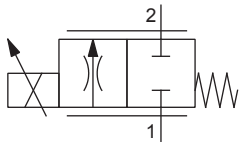
Proportional throttle valves are suitable for smooth control of movements in stationary or mobile systems. These valves are suitable for applications in explosion-hazard areas, open cast and also in mines. The screw-in cartridge is perfectly suitable for installation in control blocks. For machining 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**

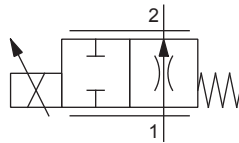
|  |                                   |   |  |
|--|-----------------------------------|---|--|
| Throttle valve                             |                                   | D <input type="checkbox"/> B PM22 - <input type="checkbox"/> - <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/> - <input type="checkbox"/> # <input type="checkbox"/> |  |
| Normally closed                            | <input type="checkbox"/> N        |   |  |
| Normally open                              | <input type="checkbox"/> O        |   |  |
| Proportional, ex-protection execution Ex d |                                   |   |  |
| Screw-in cartridge M22 x 1,5               |                                   |   |  |
| Nominal volume flow rate $Q_N$             | 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  |  |
| Nominal power $P_N$                        | 9 W                               | <input type="checkbox"/> L9   | Ambient temperature up to:<br>40 °C or 90 °C |
|  | 15 W                              | <input type="checkbox"/> L15  |  |
|  |                                   |   |  |
| Certification                              | ATEX, UKEX, IECEx, EAC, CCC, PESO | <input type="checkbox"/>  | USA / Canada                                 |
|  | Australia                         | <input type="checkbox"/> AU   | India  |
|  |                                   |   | <input type="checkbox"/> UC-M187             |
|  |                                   |   | <input type="checkbox"/> PE                  |
|  |                                   |   | MA   |
|  |                                   |   | <input type="checkbox"/> MA                  |
| Sealing material                           | NBR                               | <input type="checkbox"/>  |  |
|  | FKM (Viton)                       | <input type="checkbox"/> D1   |  |
| Design index (subject to change)           |                                   |   |  |
| 2.6-535                                    |                                   |   |  |

**SYMBOL**

„normally closed“ DN



„normally open“ DO


**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           | Ex-protection proportional solenoid  |
| Ambient temperature | <b>Operation as T6</b><br>-25...+40 °C (L9)<br><b>Operation as T4</b><br>-25...+90 °C (L9)<br>-25...+70 °C (L15) |
| Weight              | 1,95 kg  |
| MTTFd               | 150 years  |

**HYDRAULIC SPECIFICATIONS**

|                           |  |
|---------------------------|--|
| Working pressure          | $p_{max} = 350 \text{ bar}$  |
| Maximum volume flow       | $Q_{max} = 45 \text{ l/min}$   |
| Volume flow direction     | 1 → 2  |
| Leakage oil               | On request   |
| Nominal volume flow range | $Q_N = 6,3; 10; 25 \text{ l/min}$<br>at 10 bar valve pressure drop   |
| Hysteresis                | ≤ 8 % 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   | <b>Operation as T6</b><br>NBR -25...+40 °C (L9)<br>FKM -20...+40 °C (L9)<br><b>Operation as T4</b><br>NBR -25...+70 °C (L9 or L15)<br>FKM -20...+70 °C (L9 or L15) |
| Contamination efficiency  | Class 18 / 16 / 13   |
| Filtration                | Required filtration grade $\beta_{6...10} \geq 75$ , see data sheet 1.0-50   |

**CERTIFICATES**

|              | Surface | Mining | Standard<br>-25 °C to... | M248<br>Electronic |
|--------------|---------|--------|--------------------------|--------------------|
| ATEX / UKEX  | x       | x      | x                        | x                  |
| IECEX        | x       | x      | x                        | x                  |
| CCC          | x       | x      | x                        | x                  |
| EAC          | x       | x      | x                        | x                  |
| Australia    | x       | x      | x                        |                    |
| MA           |         | x      | x                        | x                  |
| USA / Canada | x       |        | x                        | x                  |
| PESO         | x       |        | x                        | x                  |

 The certificates can be found on [www.wandfluh.com](http://www.wandfluh.com)
**ACTUATION**

|            |  |
|------------|--|
| Actuation  | Proportional solenoid, wet pin push type, pressure tight |
| Execution  | MKY45 / 18x60 (Data sheet 1.1-183)                       |
| Connection | Cable gland for cable Ø 6,5...14 mm                      |

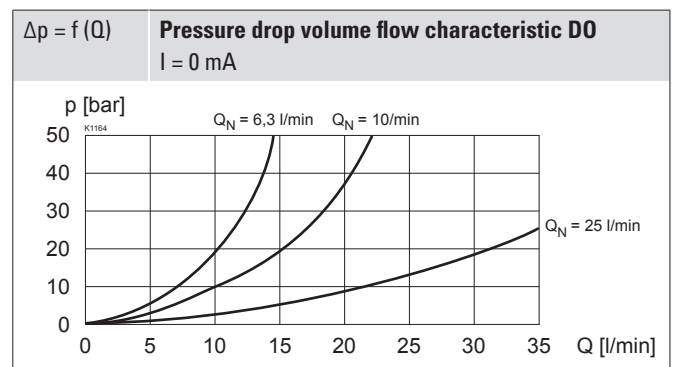
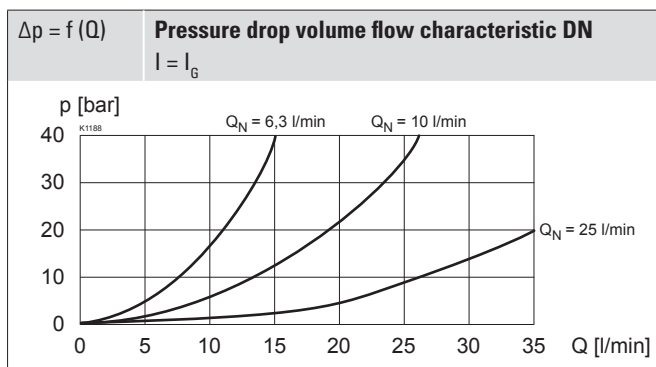
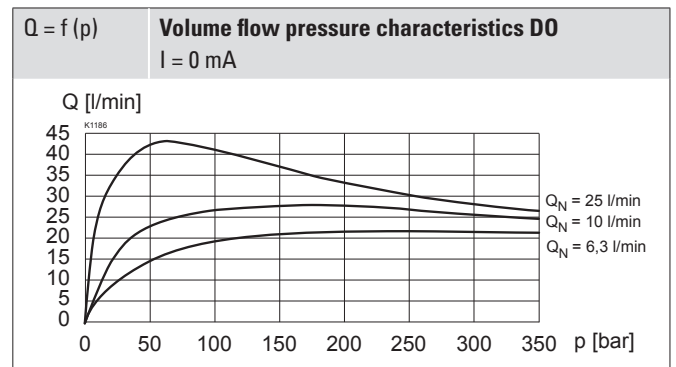
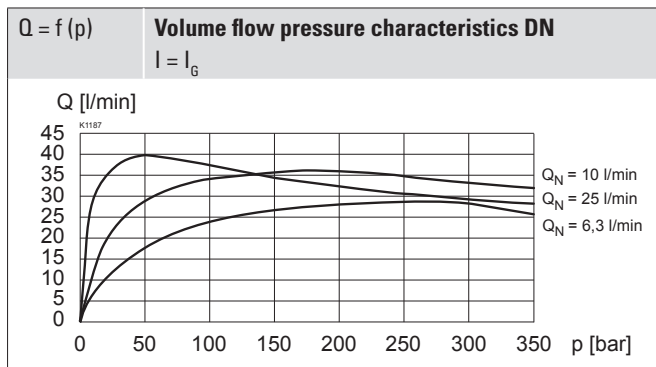
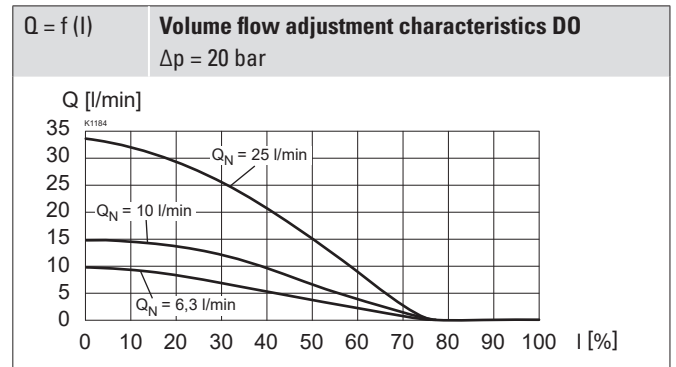
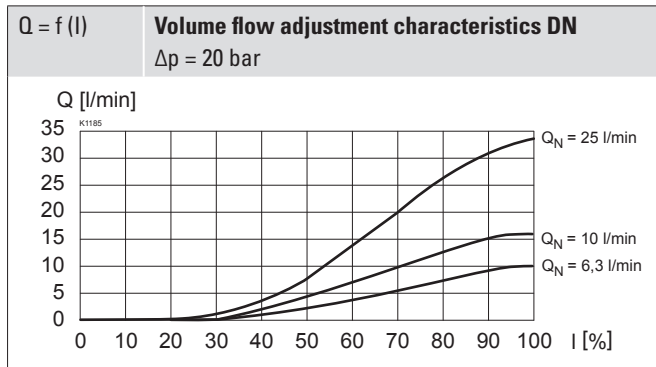
**Attention!** The UC execution is always supplied without cable gland

**ELECTRICAL SPECIFICATIONS**

|                           |  |
|---------------------------|--|
| Protection class          | IP65 / 66 / 67   |
| Relative duty factor      | 100 % DF   |
| Voltage tolerance         | ± 10 % with regard to nominal voltage  |
| Standard nominal voltage  | 12 VDC, 24 VDC   |
| Limiting current at... °C | <b>L9, 40 °C</b><br>$I_G = 625 \text{ mA}$ (12 VDC)<br>$I_G = 305 \text{ mA}$ (24 VDC)<br><b>L15, 50 °C</b><br>$I_G = 950 \text{ mA}$ (12 VDC)<br>$I_G = 450 \text{ mA}$ (24 VDC)<br><b>L15, 70 °C</b><br>$I_G = 910 \text{ mA}$ (12 VDC)<br>$I_G = 420 \text{ mA}$ (24 VDC) |
| Standard nominal power    | 9 W, 15 W  |
| Temperature class         | Nominal power 9 W: T1...T6<br>Nominal power 15 W: T1...T4  |

**Note!** Other electrical specifications see data sheet 1.1-183


**PERFORMANCE SPECIFICATIONS**

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

**ACCESSORIES**

|                                       |                    |
|---------------------------------------|--------------------|
| Proportional amplifier                | Register 1.13      |
| 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  |

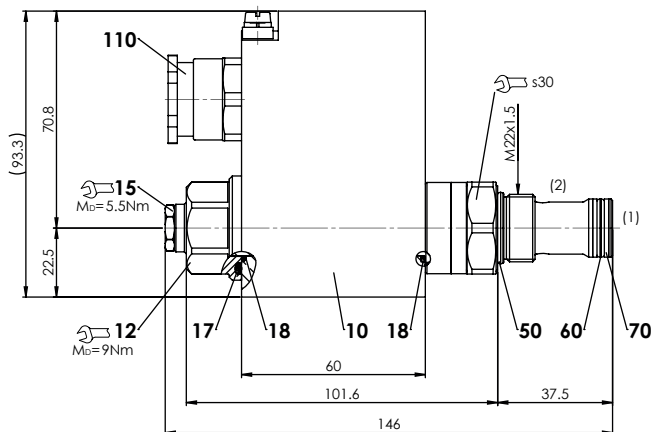
**MANUAL OVERRIDE**

HB4,5 as standard

**SEALING MATERIAL**

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

## DIMENSIONS



Dimensions of the solenoid coil see data sheet 1.1-183

## PARTS LIST

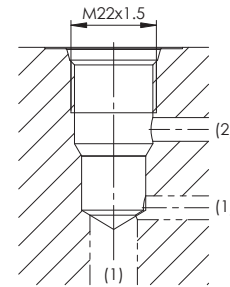
| Position | Article  | Description                    |
|----------|----------|--------------------------------|
| 10       | 263.6... | Solenoid coil MK.45 / 18 x 60  |
| 12       | 154.2603 | Knurled nut Ex M18 x 1,5 x 18  |
| 15       | 253.8000 | Manual override HB4,5          |
| 17       | 160.2251 | O-ring ID 25,07 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 |
| 110      | 111.1080 | Cable gland M20 x 1,5          |

## INSTALLATION NOTES

|                   |  |
|-------------------|--|
| Mounting type     | Screw-in cartridge M22 x 1,5   |
| Mounting position | Any, preferably horizontal   |
| Tightening torque | $M_D = 50 \text{ Nm}$ Screw-in cartridge<br>$M_D = 5 \text{ Nm}$ knurled nut |

## 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

## STANDARDS

|                          |                                 |
|--------------------------|---------------------------------|
| Cartridge cavity         | ISO 7789                        |
| Explosion protection     | Directive 2014 / 34 / EU (ATEX) |
| Flameproof enclosure     | EN / IEC / UL 60079-1, 31       |
| Cable entry              | EN 60079-0, 1, 7, 15, 31        |
| Protection class         | EN 60 529                       |
| Contamination efficiency | ISO 4406                        |

## SURFACE TREATMENT

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

## COMMISSIONING

### Attention!



The solenoid coil must only be put into operation, if the requirements of the operating instructions supplied are observed to their full extent. In case of non-observance, no liability can be assumed.