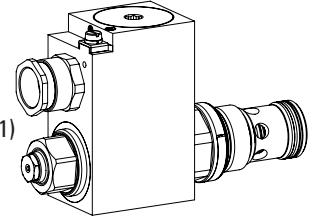


**Proportional 2-way flow control cartridge**

- ◆ direct operated, pressure compensated
- ◆  $Q_{max} = 70$  l/min
- ◆  $Q_{Nmax} = 55$  l/min
- ◆  $p_{max} = 350$  bar

**M33 x 2**  
**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, pressure compensated proportional flow control valve as screw-in cartridge for cavity according to ISO 7789. When the solenoid is deenergised, the control spool closes practically leakage-free. The change of the electric current is followed by a proportional volume flow change. From the input (1), the fluid flows over the control and throttling spool to the controlled output (2). 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 flow control valves are suitable for precise speed control, where the load current has to be maintained constant independent of the input and output pressure. 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 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.

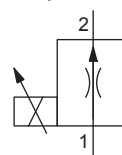
**CERTIFICATES**

|              | 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                  |

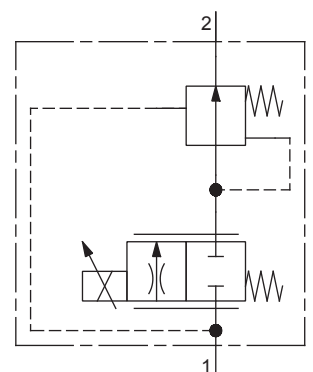
The certificates can be found on [www.wandfluh.com](http://www.wandfluh.com)

**SYMBOL**

Simplified



Detailed QN...



**TYPE CODE**

|                                  |                             |   |   |
|----------------------------------|-----------------------------|---|---|
| Flow control valve               |                             | Q N B PM33 - <input type="checkbox"/> - <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/> - <input type="checkbox"/> <input type="checkbox"/> # <input type="checkbox"/> |   |
| Normally closed                  |                             |   |   |
| Proportional, explosion proof    |                             |   |   |
| Screw-in cartridge M33 x 2       |                             |   |   |
| Nominal volume flow rate $Q_N$   | 55 l/min                    | <input type="checkbox"/> 55   |   |
| Nominal voltage $U_N$            | 12 VDC                      | <input type="checkbox"/> G12  |   |
|                                  | 24 VDC                      | <input type="checkbox"/> G24  |   |
| Nominal power $P_N$              | 15 W                        | <input type="checkbox"/> L15  | Ambient temperature up to:<br>70 °C           |
| Certification                    | ATEX, UKEX, IECEx, EAC, CCC | <input type="checkbox"/>  | USA / Canada <input type="checkbox"/> UC-M187 |
|                                  | Australia                   | <input type="checkbox"/> AU   | India <input type="checkbox"/> PE             |
|                                  | MA                          | <input type="checkbox"/> MA   |   |
|                                  |                             |   |   |
| Sealing material                 | NBR                         | <input type="checkbox"/>  |   |
|                                  | FKM (Viton)                 | <input type="checkbox"/> D1   |   |
| Options                          | without amplifier           | <input type="checkbox"/>  |   |
|                                  |                             | <input type="checkbox"/> M248   |   |
| Design index (subject to change) |                             |   |   |
| 2.6-655                          |                             |   |   |

**GENERAL SPECIFICATIONS**

|                     |  |
|---------------------|--|
| Designation         | Proportional 2-way flow control valve        |
| Construction        | Direct operated                              |
| Mounting            | Screw-in cartridge construction              |
| Nominal size        | M33 x 2 according to ISO 7789                |
| Actuation           | Proportional solenoid                        |
| Ambient temperature | <b>Operation as T4</b><br>-25...+70 °C (L15) |
| Weight              | 2,3 kg                                       |
| MTTFd               | 150 years                                    |

**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>L15, 50 °C</b>                     |
|                           | $I_G = 950$ mA (12 VDC)               |
|                           | $I_G = 450$ mA (24 VDC)               |
|                           | <b>L15, 70 °C</b>                     |
|                           | $I_G = 910$ mA (12 VDC)               |
|                           | $I_G = 420$ mA (24 VDC)               |
| Standard nominal power    | 15 W                                  |
| Temperature class         | Nominal power 15 W: T1...T4           |

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



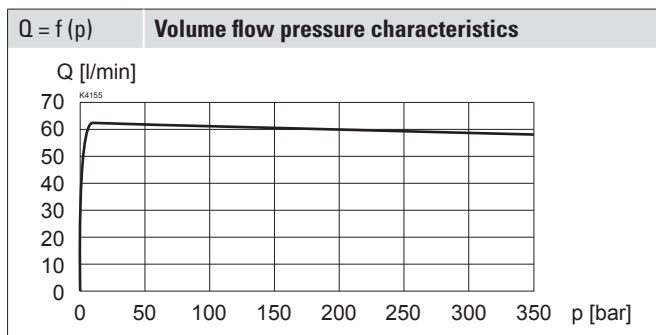
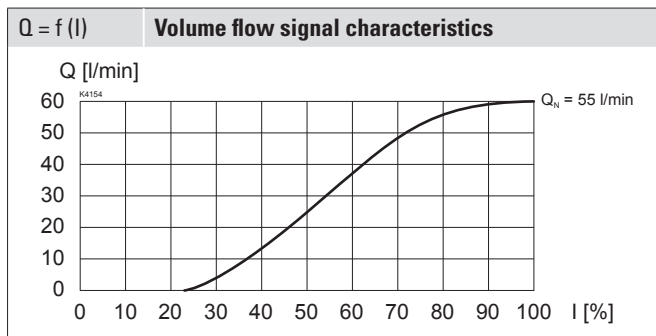
**ACTUATION**

|            |  |
|------------|--|
| 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                      |

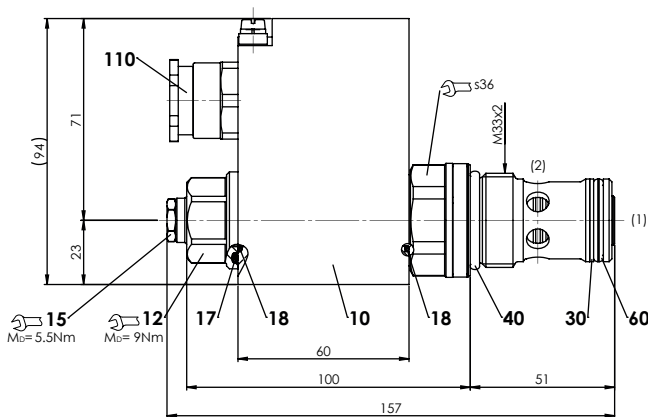
**Attention!** The UC execution is always supplied without cable gland


**PERFORMANCE SPECIFICATIONS**

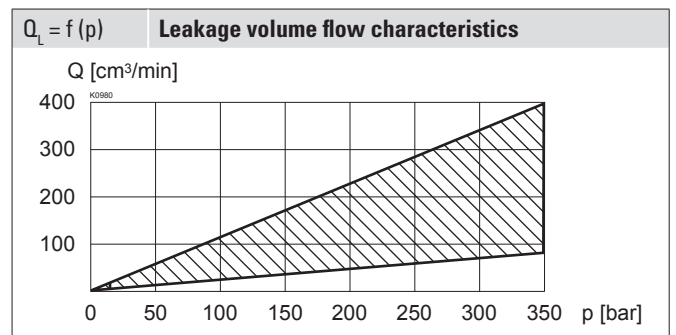
Oil viscosity  $\nu = 30 \text{ mm}^2/\text{s}$



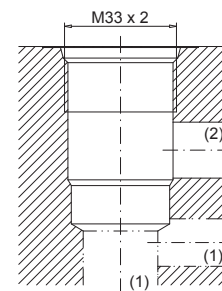
**Note!** With the L15 execution for ambient temperatures up to 70 °C, the performance specifications have been evaluated with an ambient temperature of 50 °C

**DIMENSIONS**

**HYDRAULIC SPECIFICATIONS**

|                           |  |
|---------------------------|--|
| Working pressure          | $p_{\text{max}} = 350 \text{ bar}$   |
| Maximum volume flow       | $Q_{\text{max}} = 70 \text{ l/min}$  |
| Volume flow direction     | 1 → 2  |
| Leakage oil               | See characteristics  |
| Nominal volume flow range | $Q_N = 55 \text{ l/min}$   |
| Hysteresis                | ≤ 8 % at optimal dither signal   |
| Repeatability             | ≤ 3 % 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 T4</b><br>NBR -25...+70 °C (L15)<br>FKM -20...+70 °C (L15) |
| Contamination efficiency  | Class 18 / 16 / 13   |
| Filtration                | Required filtration grade $\beta_{6...10} \geq 75$ , see data sheet 1.0-50 |


**HYDRAULIC CONNECTION**

Cavity drawing according to ISO 7789-33-01-0-98



**Note!** For detailed cavity drawing and cavity tools see data sheet 2.13-1005



## 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         |
| 110                           | 111.1080   | Cable gland M20 x 1,5         |
| <b>Seal kit consisting of</b> |            |                               |
| 17                            | O-ring     | ID 25,07 x 2,62               |
| 18                            | O-ring     | ID 17,17 x 1,78               |
| 30                            | Back. ring | rd 24,5 x 29 x 1,4            |
| 40                            | O-ring     | ID 29,82 x 2,62               |
| 60                            | O-ring     | ID 23,81 x 2,62               |

## 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                        |

## INSTALLATION NOTES

|                   |  |
|-------------------|--|
| Mounting type     | Screw-in cartridge M33 x 2   |
| Mounting position | Any, preferably horizontal   |
| Tightening torque | $M_D = 80 \text{ Nm}$ Screw-in cartridge<br>$M_D = 9 \text{ Nm}$ knurled nut<br>$M_D = 9,5 \text{ Nm}$ HB0<br>$M_D = 5,5 \text{ Nm}$ HB4,5 |

## SURFACE TREATMENT

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

## ACCESSORIES

|                        |                    |
|------------------------|--------------------|
| 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 |

## MANUAL OVERRIDE

HB4,5 as standard  
 Optionally: HN (K)  
 → see data sheet 1.1-311

## SEALING MATERIAL

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