

up to 200 l/min
up to 350 bar

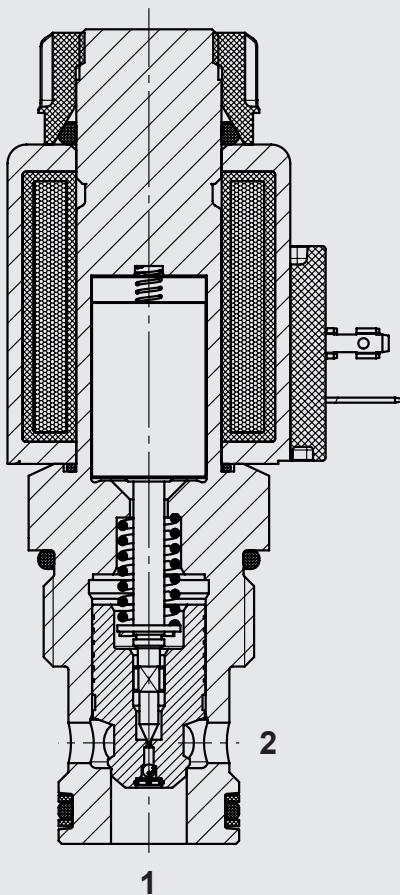
Proportional flow throttle valve

PWS16ZR-01/-03

Poppet type, pilot-operated,
normally closed

Screw-in cartridge valve UNF – 350 bar

FUNCTION



PRODUCT ADVANTAGE

- Continuous adjustment of the flow rate, depending on the coil current
- Excellent stability over the entire flow range
- Very good dynamic performance
- Optional: mechanical adjustment of a point on the performance curve (cannot be combined with emergency manual function)
- Optional: Softshift function with longer switching times possible
- External surfaces with advanced corrosion protection thanks to ZnNi coating (1,000 h salt spray test)

DESCRIPTION OF FUNCTION

The proportional flow throttle valve is a pilot-operated, spring-loaded throttle valve in poppet design – normally closed position.

It provides smooth and pressure-dependent throttling of flow from port 2 to port 1. The pilot stage opens depending on the current fed through the coil and oil flows to the rear side of the main spool through a combination of orifices.

This creates a differential pressure and the main piston follows the pilot stage. The valve acts as a check valve when de-energised.

Once a spring preload has been overcome, flow can pass freely through the valve from 1 to 2 and the valve closes leaktight in the opposite direction from 2 to 1.

TECHNICAL CHARACTERISTICS¹⁾

Operating pressure	max. 350 bar	
Flow rate	max. 200 l/min	
Internal leakage	max. 10 drops/min (0.5 cm ³ /min) at nominal pressure, $v = 34 \text{ mm}^2/\text{s}$	
Pressure fluid	Hydraulic oil to DIN 51524 Part 1, 2 and 3	
Ambient temperature range	min. -20 °C to max. +60 °C	
Temperature range of pressurised fluid	NBR: min. -30 °C to max. +100 °C FKM: min. -20 °C to max. +120 °C	
Viscosity range	min. 10 mm ² /s to max. 420 mm ² /s	
Filtration	Permitted contamination level of the pressure fluid in acc. with ISO 4406 Class 19/17/14 or better	
MTTF _D	150 - 1200 years, assessment according to DIN EN ISO 13849-1:2016; Table C.1, Confirmation of ISO 13849-2:2013; Tables C.1 and C.2	
Installation position	user-definable	
Material	Valve body:	Steel
	Spools:	Steel, hardened and polished
	Seals:	NBR (standard) FKM (optional)
	Support rings:	PTFE
	Coil:	Steel / polyamide
Cavity	FC16-2	
Weight	0.9 kg (with coil)	
Electric system		
Control current range	800 mA, 19.2 ohm (24 V) 1600 mA, 5.0 ohm (12 V)	
Dither frequency	120 Hz - 250 Hz (120 Hz recommended)	
Hysteresis with dither	4 - 6 % of I _{nom}	
Repeatability	≤1.5 % of I _{nom}	
Reversal error	≤2 % of I _{nom}	
Sensitivity of response	≤1 % of I _{nom}	
Coil design	Coil 12P...-50-2345 or 24P...-50-2345	

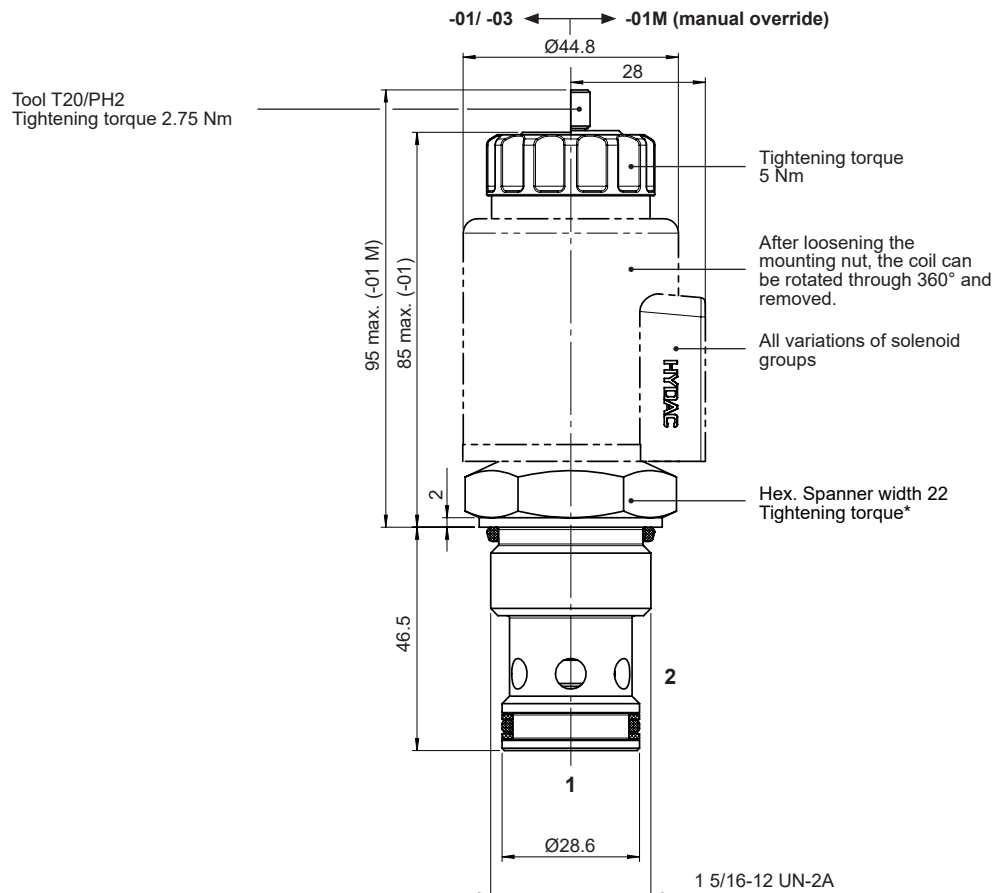
Note:

For optimum efficiency, any trapped air should be vented using the bleed screw on the pole tube.

¹⁾ See "Conditions and Instructions for Valves" in brochure 53.000

DIMENSIONS

Versions:



* Tightening torque:

Steel housing (tensile strength > 360 N/mm²): 160 Nm

Aluminium housing (tensile strength > 330 N/mm²): 120 Nm

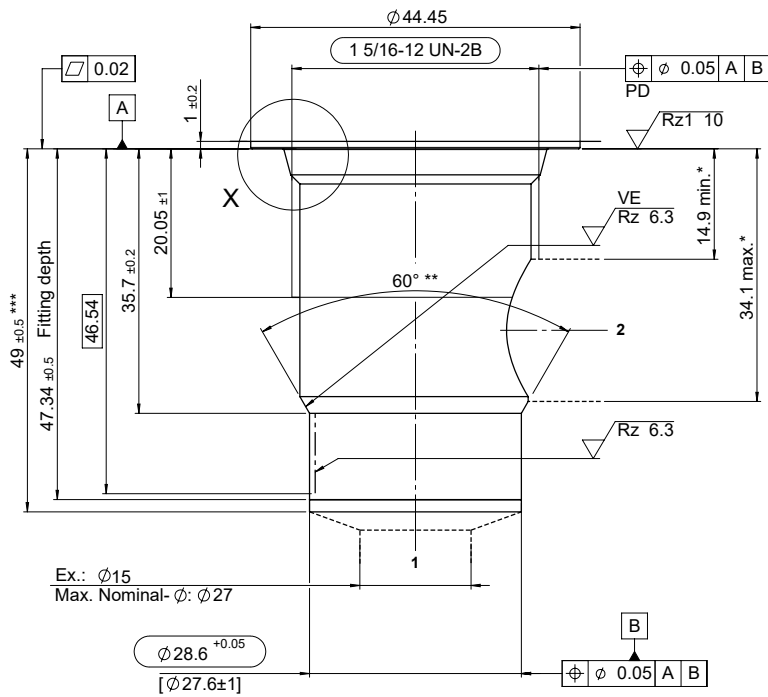
(With torque tool according to DIN EN ISO 6789, tool type II class A or B).

Millimetre

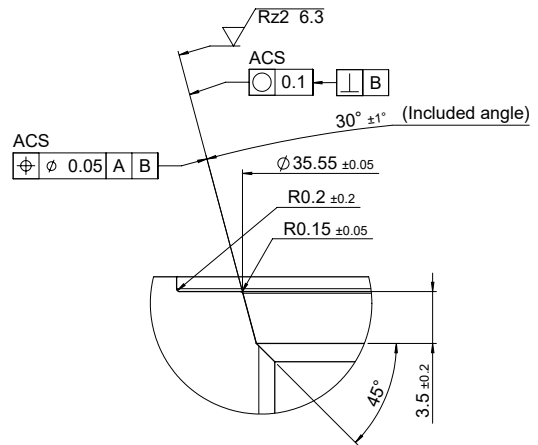
Subject to technical modifications.

CAVITY

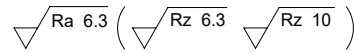
FC16-2



X 4 : 1



VE = Visual Examination



- * Permitted boring zone (for block design)
- ** Sharp edges should be avoided by using a radius of 0.1 mm to 0.2 mm
- *** Largest pre-drilling diameter (nominal tool diameter)

Millimetre
Subject to technical modifications.

MODEL CODE

PWS16ZR - 01M - C - N - 80 - 24 PG 19.2

Designation

Proportional flow throttle valve

Design

- 01 = standard
- 01M = with manual override
- 03 = damped

Body and ports

C = Screw-in cartridge valve

Sealing material

- N = NBR (standard)
- V = FKM

Flow range at Δp = 5 bar

80 = 80 l/min (progressive performance curve))

Further versions on request.

Nominal voltage

DC voltage:

- 12 = 12 V DC
- 24 = 24 V DC

Further versions on request.

Coil design (50-2345)

DC:

- PG = DIN plug connector to EN175301-803
- PT = AMP Junior Timer, 2-pole, radial
- PL = 2 flying leads, 457mm long, 0.75 mm²
- PN = Deutsch plug connector, 2-pole, axial

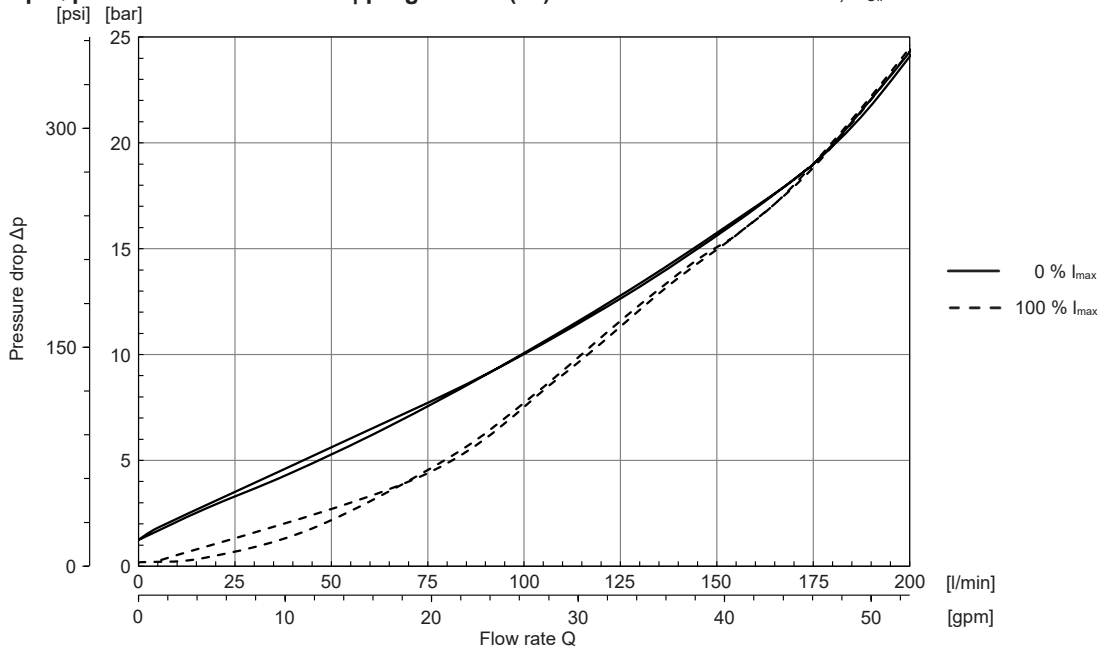
Further versions on request.

Coil resistance

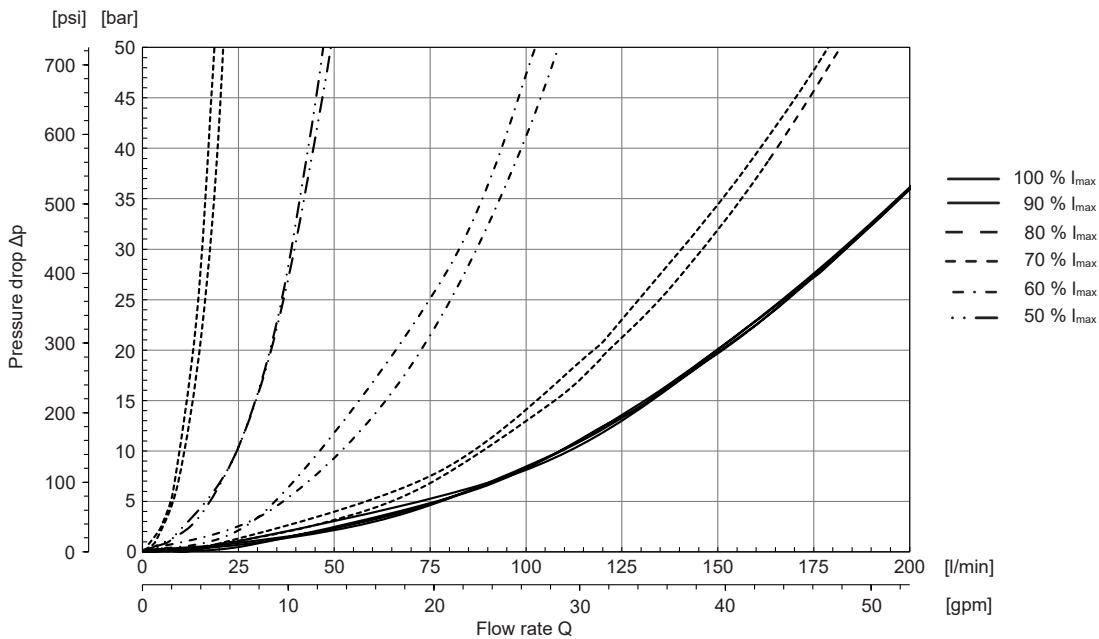
- 5.0 = 5.0 Ω (12 V)
- 19.2 = 19.2 Ω (24 V)

TYPICAL PERFORMANCE CURVE

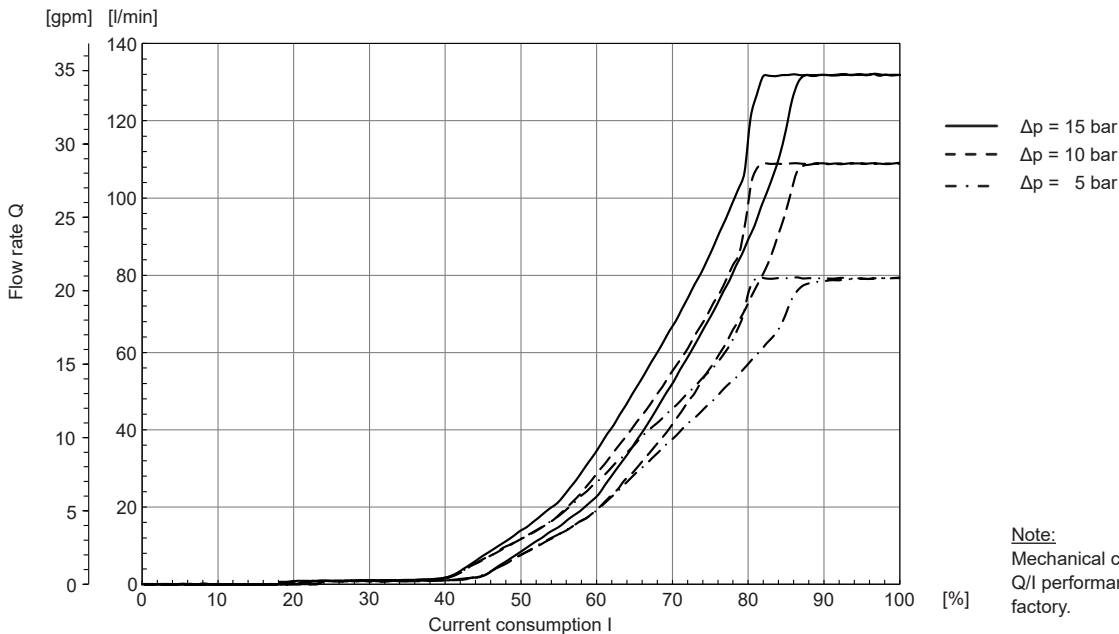
$\Delta p/Q$ performance curve 1→2 | progressive (80) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



$\Delta p/Q$ performance curve 2→1 | progressive (80) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



Q/I performance curve 2→1 | progressive (80) measured at $v = 34 \text{ mm}^2/\text{s}$, $T_{\text{Oil}} = 46 \text{ }^\circ\text{C}$



MATERIAL OVERVIEW

Standard models

Designation	Part no.
PWS16ZR-01-C-N-80-0	3643697
PWS16ZR-03-C-N-80-0	3646714

Further versions on request.

Spare parts, seal kits

Designation	Material	Code	Part no.
Seal kit	NBR	FS UNF16/N	3651395
Seal kit	FKM	FS UNF16/V	3651396

Housing

Designation	Material	Code	Pressure	Connections	Weight	Part no.
Inline connection housing	Steel, zinc-plated	FH162-SB8	350 bar	G1"	1.66 kg	3032496
Inline connection housing	Aluminium, anodised	FH162-AB8	210 bar	G1"	0.61 kg	3037193

Cavity tools

Designation	Part no.
Countersink	176218
Reamer	176219

COMMENT

The information in this brochure relates to the operating conditions and fields of application described. For applications and operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

Documents are only valid if they have been obtained via the website and are up-to-date.

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