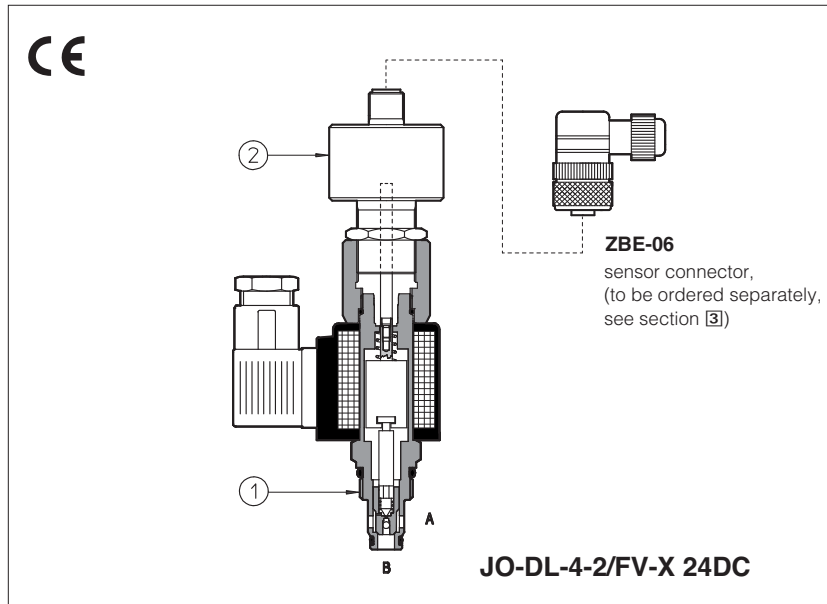


Safety cartridge valves with optional poppet position monitoring

screw-in, 2-way, poppet type, leak free, conforming to Machine Directive 2006/42/CE - certified by



JO-DL are leak free, poppet type solenoid cartridges in screw-in execution normally used to cut off the hydraulic power supply line. They are available in normally closed NC, or normally open one NO configurations.

The **/FV** version integrates an inductive position switch (double contact NC/NO) ② which supplies the output electrical on-off signal indicating the poppet ① position (open/closed), and therefore they can be used as safety valves for emergency conditions.

They are **CE** marked and certified by **TÜV** in accordance with safety requirements of Machine Directive 2006/42/CE.

Certification

The **TÜV** certificate can be downloaded from www.atos.com, catalog on line, technical information section.

Cavity: **ISO 17209**

Max flow: **150 l/min**

Max pressure: **350 bar**

1 MODEL CODE

JO	-	D		L	-	4	-	2	/	NC	-	X		24 DC		**	/	*	
Cartridge valve screw-in type UNF		D = Directional control		L = Poppet type		Size: 4 = 3/4"-16UNF-2B 6 = 7/8"-14UNF-2B 10 = 1 5/16"-12UNF-2B												Seals material, see section 4: - = NBR PE = FKM BT = HNBR (1)	
Series number																			
Voltage code: 12DC = 12 VDC 24DC = 24 VDC																			
X = Without connector, see section 3 for available connector																			

2 = Two-way

Note (1): not for version /FV

Version:

NC = normally closed in rest position

NO = normally open in rest position

FV = normally closed in rest position, with inductive position switch (double contact)

2 HYDRAULIC CHARACTERISTICS

Hydraulic symbols							
		/NO	/NC	/FV			
Model		JO-DL-4-2/NC JO-DL-4-2/FV	JO-DL-4-2/NO	JO-DL-6-2/NC JO-DL-6-2/FV	JO-DL-6-2/NO	JO-DL-10-2/NC JO-DL-10-2/FV	JO-DL-10-2/NO
Pressure limits [bar]		350					
Nominal flow [l/min]		40		75		150	
Response time: energizing [ms]		35	50	30	50	35	150
	de-energizing [ms]	50	35	60	35	70	35
Internal leakage		less than 5 drops/min (≤ 0,36 cm³/min) max at 350 bar					

3 MAIN CHARACTERISTICS OF VALVES TYPE JO-DL

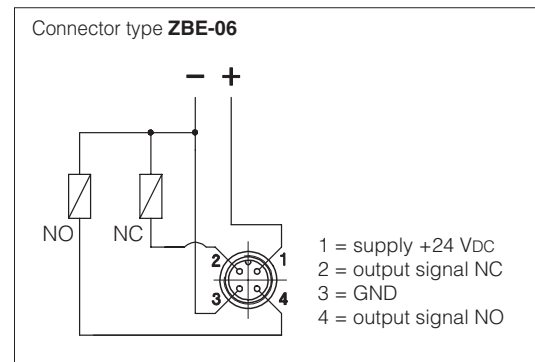
Installation position	Any position		
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)		
MTTFd values according to EN ISO 13849	150 years, for further details see technical table P007		
Ambient temperature	Standard execution = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C /BT option = -40°C ÷ +70°C - not for version /FV		
Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C HNBR seals (/BT option) = -40°C ÷ +60°C, with HFC hydraulic fluids = -40°C ÷ +50°C		
Recommended viscosity	15 ÷ 100 mm ² /s - max allowed range 2.8 ÷ 500 mm ² /s		
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm (β10 ≥75 recommended)		
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR	HFC	
Flow direction	As shown in the symbols of table 2		
Operating pressure	Ports A, B: 350 bar		
Rated flow	See diagrams Q/Δp at section 7		
Maximum flow	40 l/min for JO-DL-4; 75 l/min for JO-DL-6, 150 l/min for JO-DL-10		
Relative duty factor	100%		
Supply voltage	See model code at section 1		
Supply voltage tolerance	±10%		
Max power	19 Watt		
Power connector	666 (plastic - black); 3 pins, cable clamp PG11, cable max ø 11 mm		to be ordered separately
Type of connector for /FV version	Type ZBE-06 (plastic); 4 pins, cable clamp PG9, cable max ø 8 mm		
Connectors features	666: DIN 43650 - ISO 4400; IP65 (DIN 40050); VDE 0110C		
	ZBE-06: M12 - IEC60947-5-2; IP67 (DIN 40050)		

4 INSTALLATION NOTES

- The assembling of cartridges inside manifolds must be done tightening the valve exagonal ring (for tightening torque, see section 8). Excessive values can cause anomalous deformation and poppet sticking. For the /FV versions avoid to tighten through the position sensor.
- The CE certification is valid only with shielded electric cables and connector. Consult also tab. P004. These safety valves must be supplied only and always as one complete component, proximity sensor is factory adjusted. The supply of subcomponents invalidates the certification.

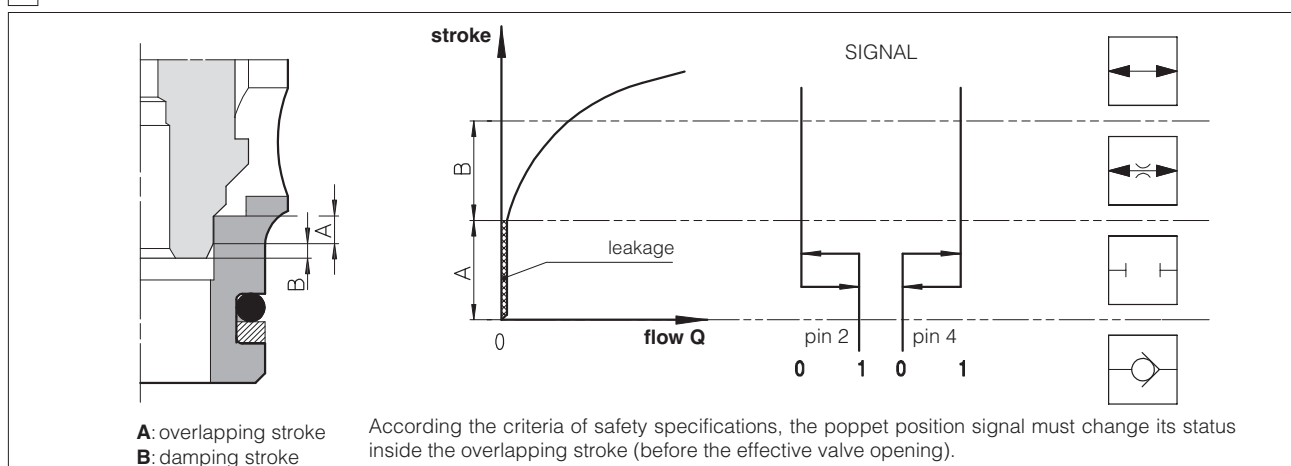
5 TECHNICAL CHARACTERISTICS AND CONNECTING SCHEME OF INDUCTIVE POSITION SWITCH /FV

Type of switch	position switch /FV	
Supply voltage [V]	20 ÷ 32	
Ripple max [%]	≤ 10	
Max current [mA]	400	
Power consumption [mA]	-	
Voltage drop [V]	-	
Max switching frequency [Hz]	-	
Max peak pressure [bar]	400	
Mechanical life	virtually infinite	
Switch logic	PNP	



NOTE: the /FV position switch are not provided with a protective earth connection

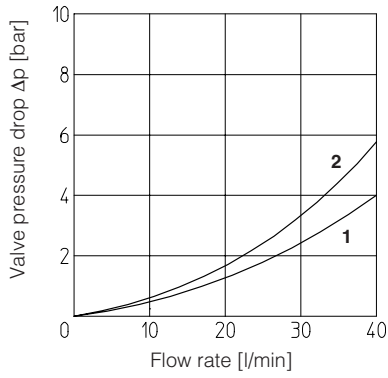
6 SIGNAL STATUS - VERSIONS /FV



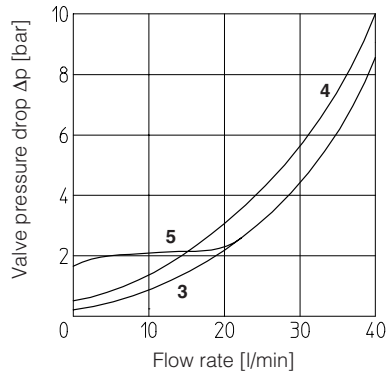
7 DIAGRAMS based on mineral oil ISO VG 46 at 50°C

7.1 JO-DL-4

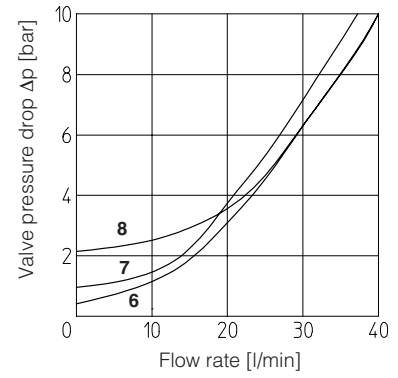
Valve pressure drop - NO version
1 = flow B → A
2 = flow A → B



Valve pressure drop - NC version
3 = flow B → A energized
4 = flow A → B
5 = flow B → A de-energized

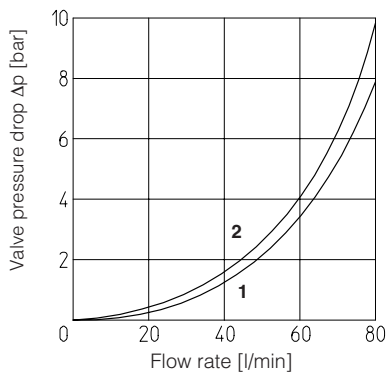


Valve pressure drop - FV version
6 = flow B → A energized
7 = flow A → B
8 = flow B → A de-energized

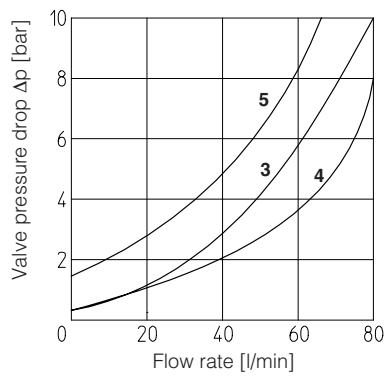


7.2 JO-DL-6

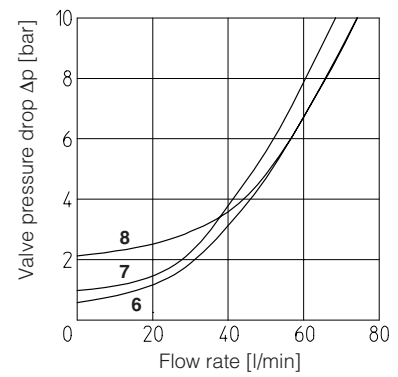
Valve pressure drop - NO version
1 = flow B → A
2 = flow A → B



Valve pressure drop - NC version
3 = flow B → A energized
4 = flow A → B
5 = flow B → A de-energized

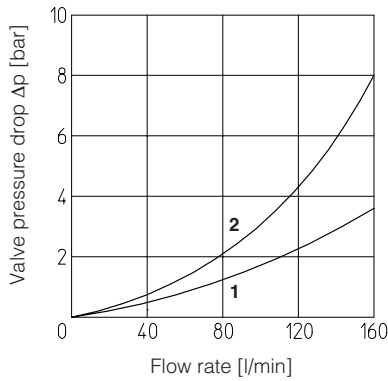


Valve pressure drop - FV version
6 = flow B → A energized
7 = flow A → B
8 = flow B → A de-energized

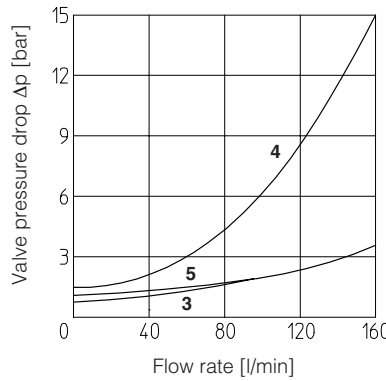


7.3 JO-DL-10

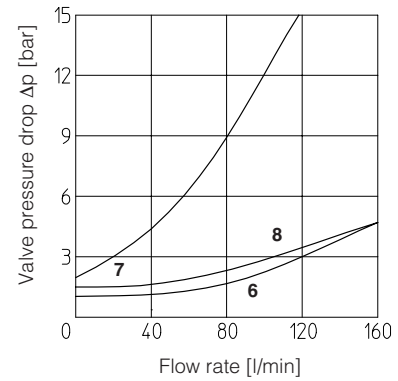
Valve pressure drop - NO version
1 = flow B → A
2 = flow A → B



Valve pressure drop - NC version
3 = flow B → A energized
4 = flow A → B
5 = flow B → A de-energized

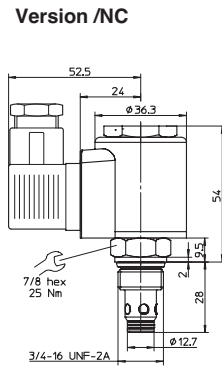
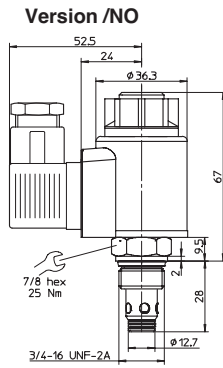
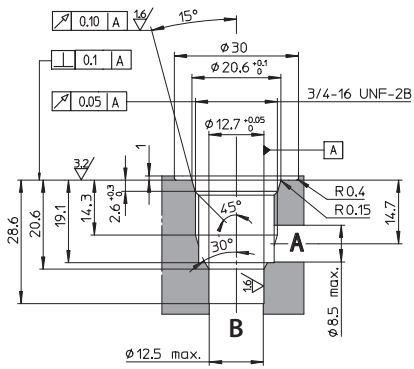


Valve pressure drop - FV version
6 = flow B → A energized
7 = flow A → B
8 = flow B → A de-energized

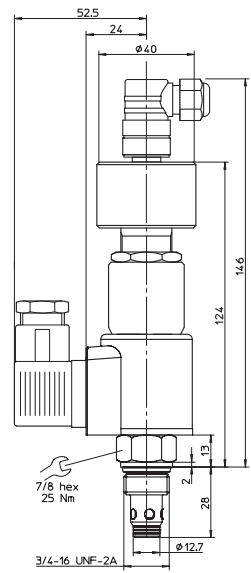


8 DIMENSIONS [mm]

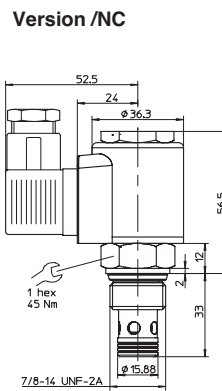
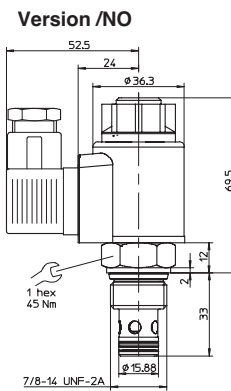
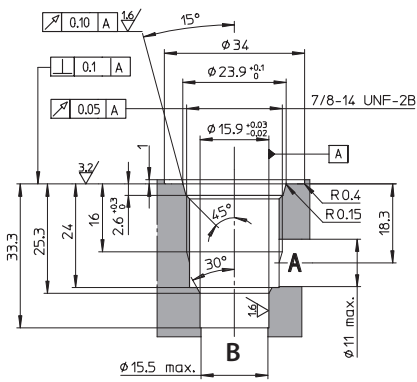
JO-DL-4



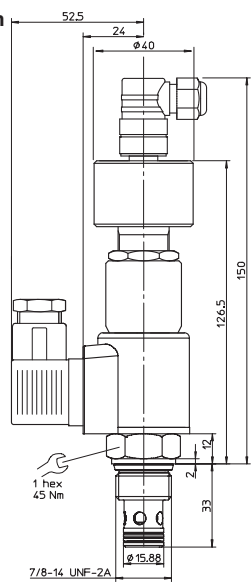
Version /FV



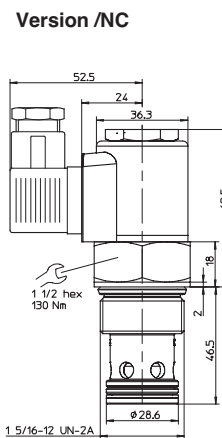
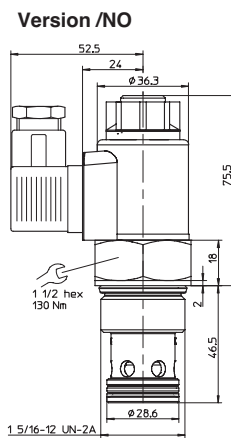
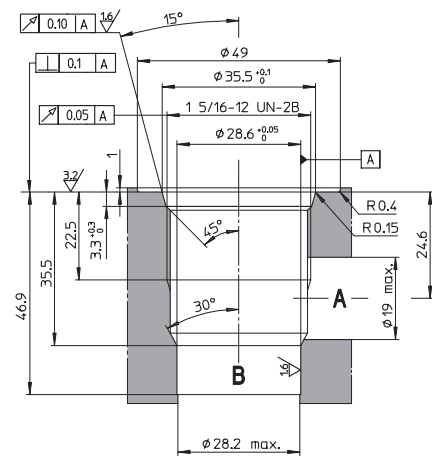
JO-DL-6



Version /FV



JO-DL-10



Version /FV

