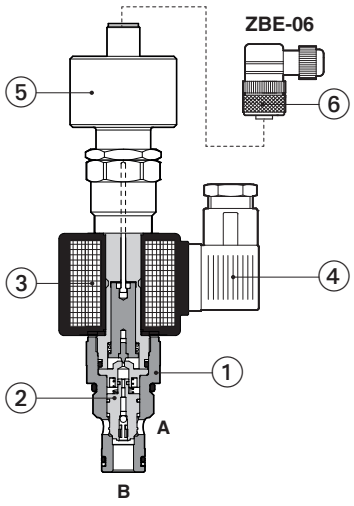
Safety cartridge valves with poppet position monitoring

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

CE

SAFETY CERTIFIED



① cartridge body
② poppet
③ coil
④ coil connectors
⑤ inductive position switch
⑥ sensor connector (to be ordered separately)

JO-DL-4-2/FV-X 24DC

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 configuration.

They are provided with /**FV** inductive position switch (double contact NC/NO) ⑤ wich supplies the output electrical on-off signal indicating the poppet ② 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.

Max flow: **300 l/min**
Max pressure: **350 bar**

1 MODEL CODE

JO	-	D	L	-	4	-	2	/	FV	-	X	24 DC	**	/	*

JO — Cartridge valve screw-in type UNF

D = Directional control

L = Poppet type

Size:
4 = 3/4”-16UNF-2A
6 = 7/8”-14UNF-2A
10 = 1 5/16”-12UNF-2A

2 = Two-way

FV — **Version**:
FV = normally closed in rest position, with inductive position switch (double contact)

X = Without connector, see section 5 for available connector

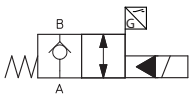
24 DC — **Voltage code**:
12DC = 12 VDC
24DC = 24 VDC

****** — Series number

***** — Seals material, see section 4:
- = NBR
PE = FKM

2 HYDRAULIC CHARACTERISTICS

Hydraulic symbol



Model		JO-DL-4-2/FV	JO-DL-6-2/FV	JO-DL-10-2/FV
Operating pressure	[bar]	Ports A and B **350**		
Max flow	[l/min]	40	75	300
Response time: energizing	[ms]	35	30	35
de-energizing	[ms]	50	60	70
Internal leakage		less than 5 drops/min (≤ 0,36 cm³/min) max at 350 bar		

3 GENERAL CHARACTERISTICS

Installation position	Any position
Cavity	JO-DL-4 = SAE-08-2N; JO-DL-6 = SAE-10-2N; JO-DL-10 = SAE-16-2N
MTTFd values according to EN ISO 13849	150 years, for further details see technical table P007
Compliance	CE to Machine Directive 2006/42/EC. -EC type-examination certificate for safety components **(1)** -ISO 13849 category 1, PLC in high demand mode CE to Low Voltage Directive 2014/35/EU and Machine Directive 2006/42/EC.
Ambient temperature	**Standard** execution = -20°C ÷ +50°C **/PE** option = -20°C ÷ +50°C

(1) The type-examination certificate can be download from www.atos.com

4 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult Atos Technical Office

Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +80°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s		
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm ($\beta 10 \geq 75$ 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	

5 ELECTRIC CHARACTERISTICS

Relative duty factor	100%	
Supply voltage	See model code at section 1	
Supply voltage tolerance	±10%	
Max power	20 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)	

6 INSTALLATION NOTES

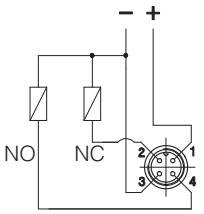
1) The assembling of cartridges inside manifolds must be done tightening the valve exagonal ring (for tightening torque, see section 10).
   Excessive values can cause anomalous deformation and poppet sticking.
   For the /FV versions avoid to tighten through the position sensor.
2) The CE certification 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.

7 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
Max peak pressure	[bar]	400
Mechanical life		virtually infinite
Switch logic		PNP

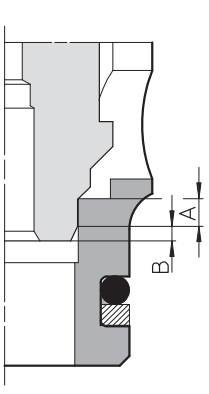
Note: the /FV position switch are not provided with a protective earth connection

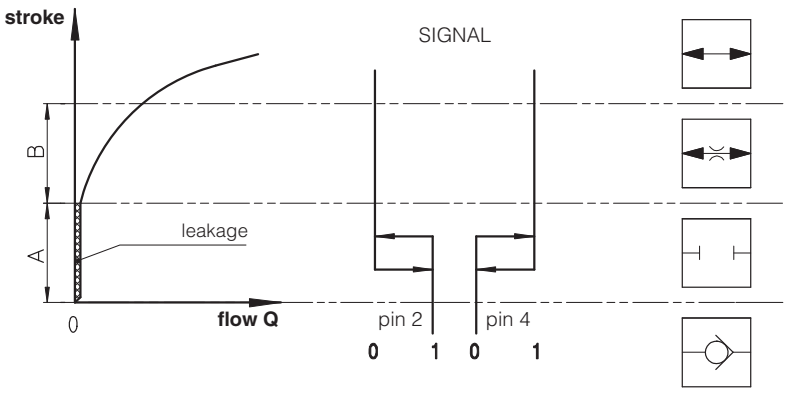
Connector type **ZBE-06**



1 = supply +24 VDC
2 = output signal NC
3 = GND
4 = output signal NO

8 SIGNAL STATUS - VERSIONS /FV





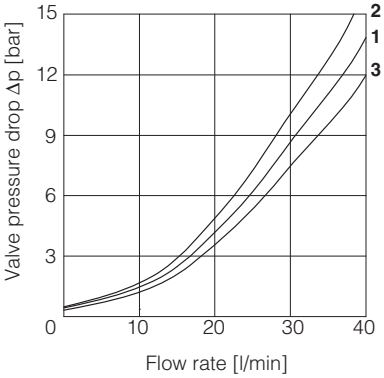
A: overlapping stroke
B: damping stroke

According the criteria of safety specifications, the poppet position signal must change its status inside the overlapping stroke (before the effective valve opening).

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

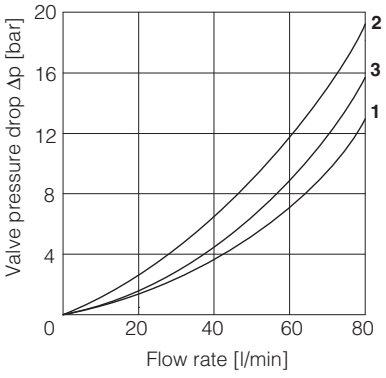
9.1 JO-DL-4

Valve pressure drop - FV version
1= A → B energized
2= B → A de-energized
3= B → A energized



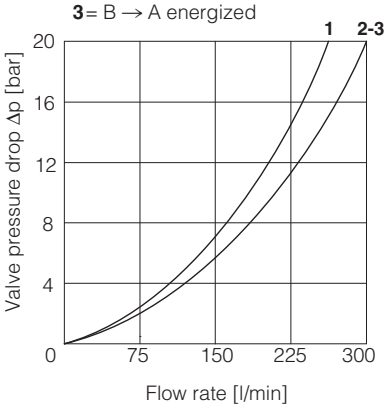
9.2 JO-DL-6

Valve pressure drop - FV version
1= A → B energized
2= B → A de-energized
3= B → A energized



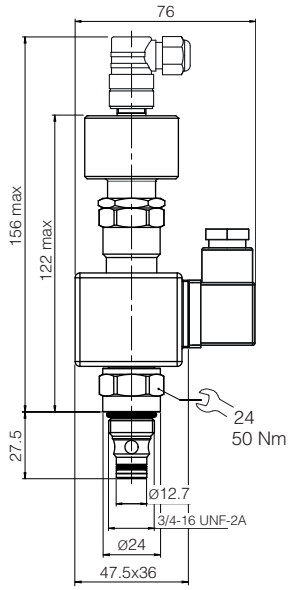
9.3 JO-DL-10

Valve pressure drop - FV version
1= A → B energized
2= B → A de-energized
3= B → A energized

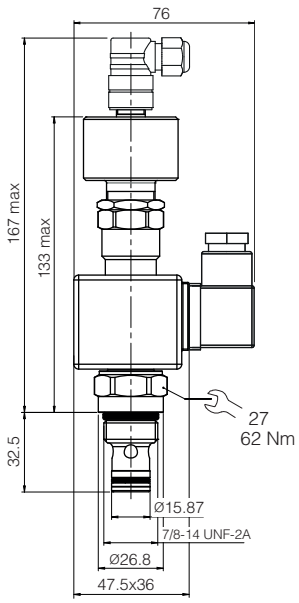


10 DIMENSIONS [mm]

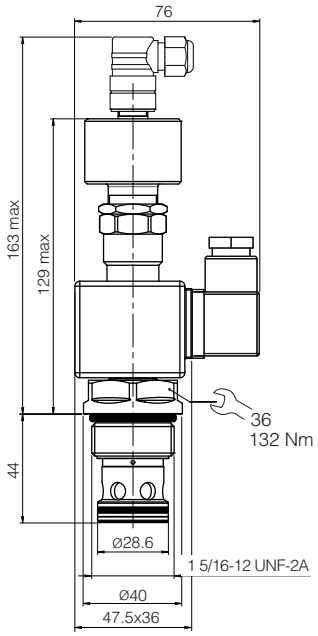
JO-DL-4-2-2/FV
Mass 0.5 Kg



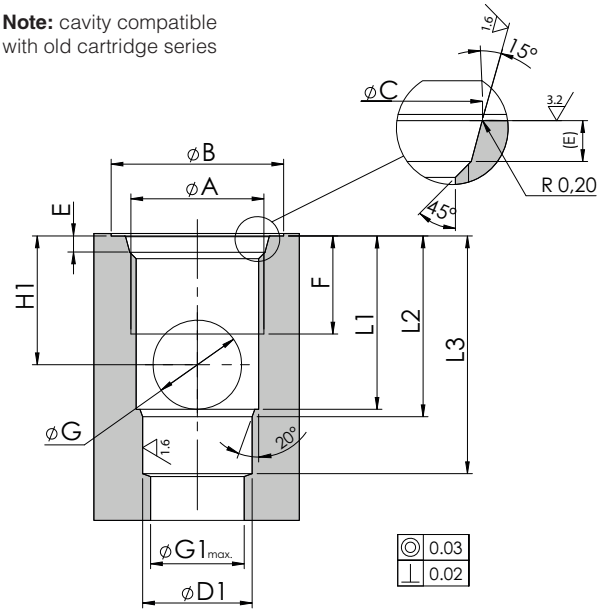
JO-DL-6-2/FV
Mass 0.5 Kg



JO-DL-10-2/FV
Mass 0.7 Kg



Note: cavity compatible with old cartridge series



	JO-DL-4-2	JO-DL-6-2	JO-DL-10-2
A	3/4-16 UNF	7/8-14 UNF	1 5/16-12 UNF
B	26	30	42
C	$20.6^{+0.1}_{0}$	$23.9^{+0.1}_{0}$	$35.5^{+0.1}_{0}$
D1	$12.7^{+0.05}_{0}$	$15.87^{+0.05}_{0}$	$28.60^{+0.05}_{0}$
E	$2.6^{+0.3}_{0}$	$2.6^{+0.3}_{0}$	$3.3^{+0.3}_{0}$
F	13	15	20
G	9	12	19
G1	12	15	24
H1	14	18	25
L1	19.1	24.2	33.5
L2	20.5	25.5	36
L3	29	34.5	49