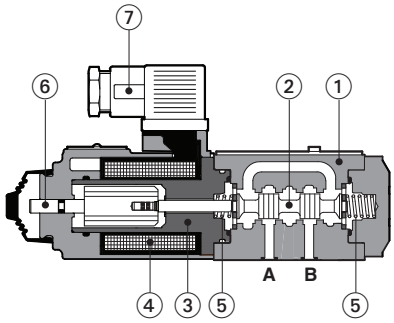
Stainless steel solenoid directional valves for water base fluids

on-off, direct or pilot operated, spool type or poppet type leak free

Availability and price only on request



DHOXW-06*

1. Valve body
2. Spool
3. Solenoid tube
4. Solenoid coil
5. Spring
6. Manual override pin
7. Electric connector - to be ordered separately

Solenoid directional valves with stainless steel internal parts for application with water base fluids.

Features:

- These valves are made by selected inoxidizable materials for internal parts to withstand applications with water base fluids or just pure water. External components are derived from standard valves.
- Two basic versions are available, poppet type, 3-way leak free (suitable for accumulator systems) or spool type, 4-way on-off valves.

Common Applications:
Steel plants, die casting, foundry.

1 SUMMARY OF AVAILABLE MODELS

Code	Description	ISO 4401 size	Voltages	Power consumption	Max flow l/min	Max pressure bar
DHOXW	direct, 4 way, spool type	06	24 DC	32 W	70	350
DLOHXW	direct, 3 way, poppet type	06			12	350
DLOHMXW	direct, 3 way, poppet type	06			25	315
DLOPXW	direct, 3 way, spool type	-			220	315

2 SPOOL TYPE VALVES: MODEL CODE

DHO	XW	-	0	63	1/2	/	A	24DC	**	/*

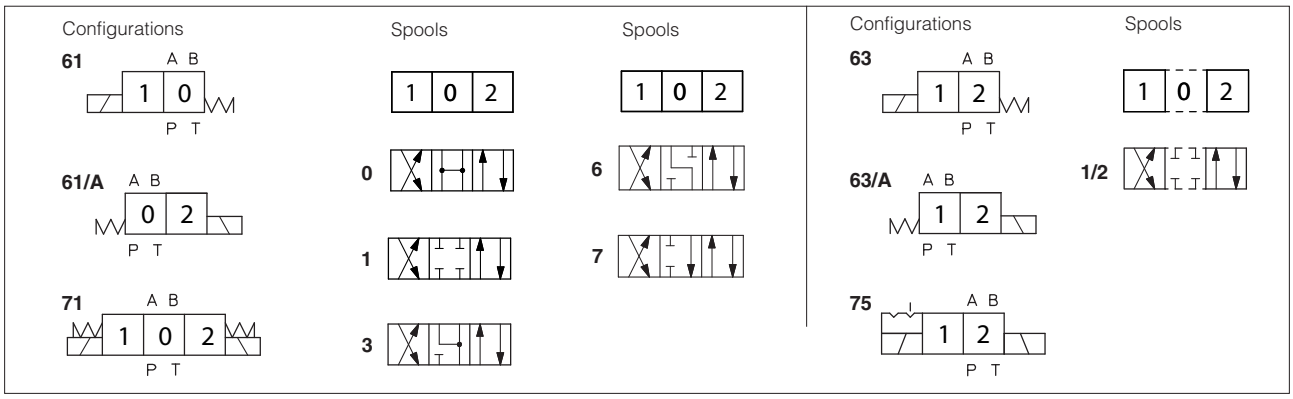
- **DHO**: Spool type - direct
- **XW**: Stainless steel execution for internal parts
- **0**: Size: **0** = 06
- **63**: Valve configuration, see section 4. **61, 63, 71, 75** (configurations 63 and 75 are available only with spool type 1/2)
- **1/2**: Spool type, see section 4
- **A**: Options: **A** = solenoid at side of port B
- **24DC**: Voltage code - see section 8
- ******: Series number
- **/***: Seals material, see section 9: **-** = NBR low temp. -40°C; **PE** = FKM

3 POPPET TYPE LEAK FREE VALVES: MODEL CODE

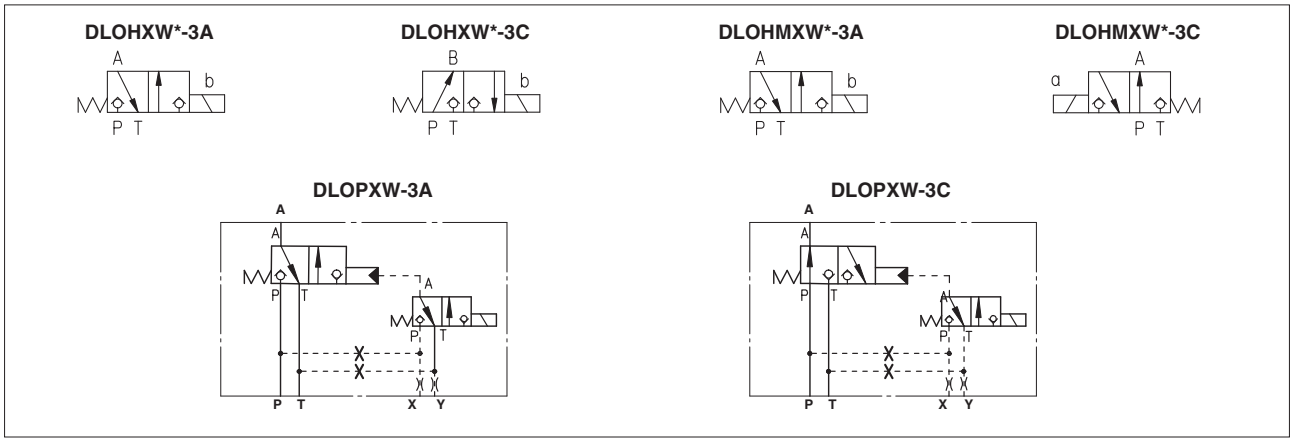
DLOH	XW	-	3	A	/	D	24DC	**	/*

- **DLOH**: **DLOH** = direct (12 l/min); **DLOHM** = direct (25 l/min); **DLOP** = electro-hydraulically piloted
- **XW**: Stainless steel execution for internal parts
- **3**: **3** = three way
- **A**: Valve configuration, see section 4. **A** = A to T in rest position; **C** = P to B in rest position (DLOHXW); P to A in rest position (DLOHMXW and DLOPXW)
- **D**: Options only for **DLOP**: **D** = internal drain; **E** = external pilot pressure
- **24DC**: Voltage code - see section 8
- ******: Series number
- **/***: Seals material, see section 9: **-** = NBR low temp. -40°C; **PE** = FKM

4 CONFIGURATIONS and SPOOLS of spool type valves



5 CONFIGURATIONS of POPPET TYPE leak free valves



6 GENERAL CHARACTERISTICS

Assembly position / location	Any position
Subplate surface finishing	Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
MTTFd values according to EN ISO 13849	75 years (DLOPXW), 150 years (DLOHXW, DLOHMXW), for further details see technical table P007
Ambient temperature	**Standard** = -40°C ÷ +70°C **/PE** option = -20°C ÷ +70°C
Storage temperature range	**Standard** = -40°C ÷ +80°C **/PE** option = -20°C ÷ +80°C
Compliance	CE to Low Voltage Directive 2014/35/EU RoHs Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

7 HYDRAULIC CHARACTERISTICS

Max operating pressure	DHOXW, DLOHXW Ports P,A,B = **350** bar; Port T = **110** bar DLOHMXW Ports P,A,B = **315** bar; Ports T = **110** bar DLOPXW Ports P,A,B, X = **315** bar; Ports T, Y = **110** bar
Piloting pressure	Only for DLOPXW - max **315** bar; min: see diagram at section 14
Rated flow	See diagrams Q/Δp at section 12
Max flow	DHOXW = **70 l/min** DLOHXW = **12 l/min** DLOHMXW = **25 l/min** DLOPXW = **220 l/min** See operating limits at section 13
Internal leakages	Only for DLOHXW, DLOHMXW, DLOPXW: ⩽ 0,36 cm^3/min (less than 5 drops/min)

⚠ The pressure at T port makes difficult the manual override operation that can be possible only if its value is lower than 50 bar

8 ELECTRICAL CHARACTERISTICS

Voltage code	**24DC**
Supply voltage VDC ±10%	24DC
Power consumption at 20°C	32W
Coil insulation	class H
Protection degree	IP65 to DIN EN60529
Duty factor	100%

9 MATERIALS SPECIFICATION

Valve type	solenoid housing ①	valve body ②	internal parts ③ + ④	spring ⑤	seals	
					std	/PE
DHOXW	Cast iron	AISI 316L	AISI 316L, 420B, 440C, 430F	AISI 302	NBR 70Sh low temp	FKM (viton)
DLOHXW DLOHMXW	Cast iron	AISI 316L	AISI 316L, 420B, 440C, 430F	AISI 302	NBR 70Sh low temp	FKM (viton)
DLOPXW	Cast iron	AISI 630	AISI 316L, 420B, 440C, 430F	AISI 302	NBR 70Sh low temp	FKM (viton)

10 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature **(1)**	NBR low temp. seals (standard) = -40°C ÷ +60°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15÷100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s min = 0,9 mm²/s with pure water		
Max fluid contamination level	ISO4406 class 20/18/15 NAS1638 class 9, see also filter section at www.atos.com or KTF catalog		
Hydraulic fluid	**Suitable seals type**	**Classification**	**Ref. Standard**
Mineral oils	NBR low temp., FKM	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water **(2)**	NBR low temp.	HFA-E, HFA-S, HFB, HFC	

(1) The operating temperature of the fluid must be compatible with the maximum viscosity range allowed for the valve

(2) Performance limitations in case of flame resistant fluids with water:
-max operating pressure = 210 bar -max fluid temperature = 50°C

⚠ The ignition temperature of the hydraulic fluid must be 50°C higher than the max solenoid surface temperature

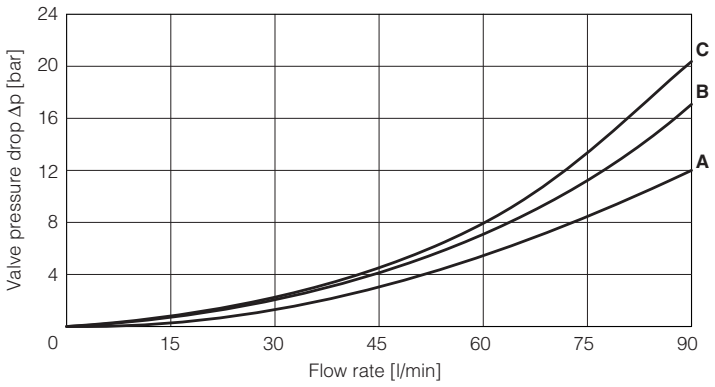
11 ELECTRIC CONNECTORS ACCORDING TO DIN 43650 (to be ordered separately, see tech table K500)

666 = standard connector IP-65, suitable for direct connection to electric supply source
667 = as 666, but with built-in signal led.

12 Q/Δp DIAGRAMS (based on mineral oil ISO VG 46 at 50°C)

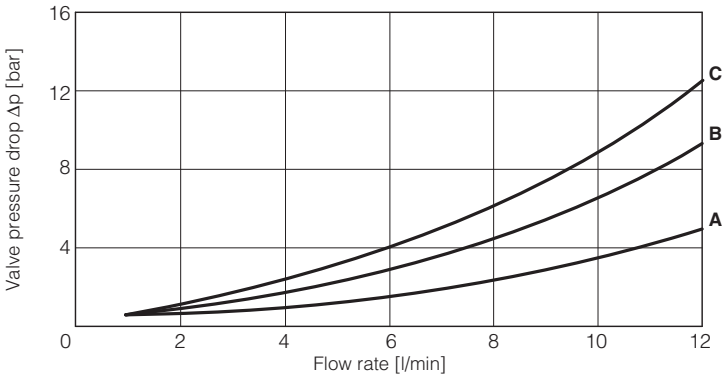
DHOXW

Flow direction / Spool type	P→A	P→B	A→T	B→T	P→T
0	A	A	B	B	C
1	C	B	B	B	
3	C	C	A	A	
1/2	C	C	C	C	
6, 7	C	C	C	C	



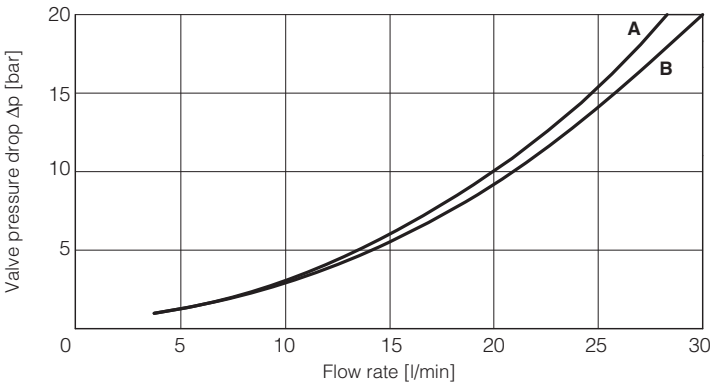
DLOHXW

Valve type	Curve	Flow direction
DLOHXW-3A	C	P-A, P-B
	B	A-T, B-T
DLOHXW-3C	B	P-A, P-B
	A	A-T, B-T



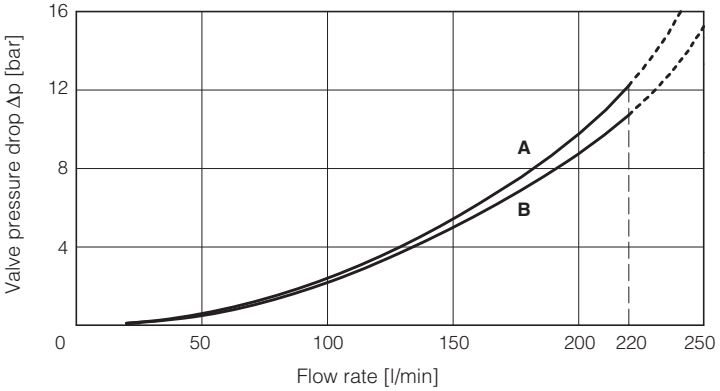
DLOHMXW

Valve type	Curve	Flow direction
DLOHMXW-3A	B	P-A, P-B
	A	A-T, B-T
DLOHMXW-3C	B	P-A, P-B
	A	A-T, B-T



DLOPXW

Valve type	Curve	Flow direction
DLOPXW	A	A-T
	B	P-A

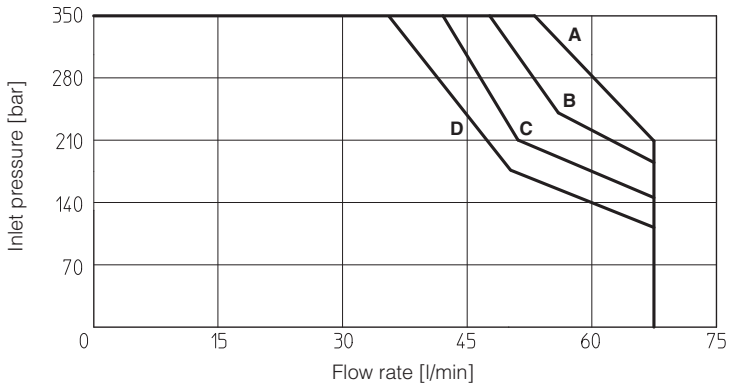


13 OPERATING LIMITS (based on mineral oil ISO VG 46 at 50°C)

The diagram have been obtained with warm solenoids and power supply at lowest value (V_{nom} -10%). For DHOXW valves the curves refer to application with symmetrical flow through the valve (i.e. P → A and B → T). In case of asymmetric flow the operating limits must be reduced.

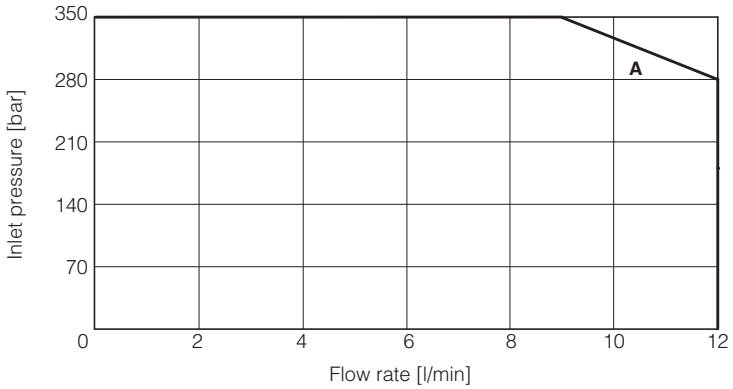
DHOXW

Valve type	Curve	Spool type
DHOXW	A	0 , 1
	B	3
	C	1/2
	D	6, 7



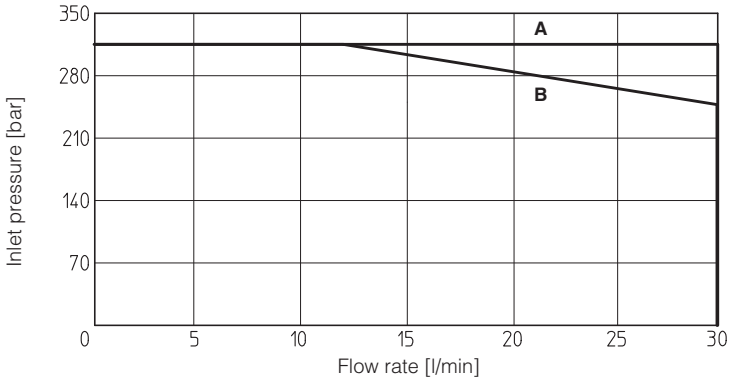
DLOHXW

Valve type	Curve	Configuration
DLOHXW	A	3A, 3C

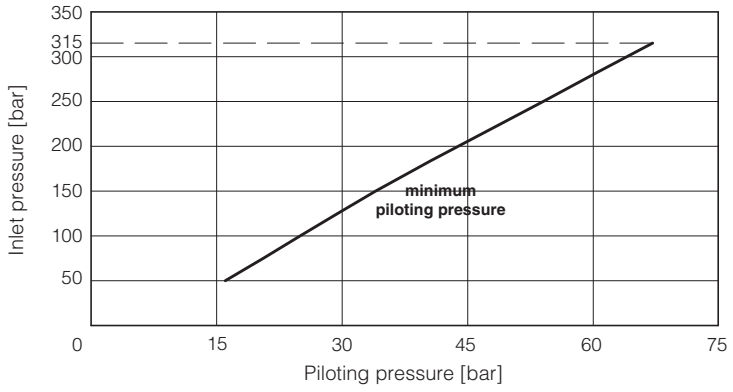


DLOHMXW

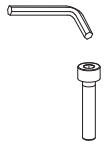
Valve type	Curve	Configuration
DLOHMXW	A	3C
	B	3A



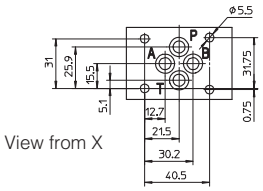
14 MINIMUM PILOT PRESSURE FOR DLOPXW



15 FASTENING BOLTS AND SEALS

	DHOXW, DLOHXW, DLOHMXW	DLOPXW
	**Fastening bolts:** 4 socket head screws M5x50-A4-70 Tightening torque = 5,5 Nm	**Fastening bolts:** 4 socket head screws M10x70-A4-70 Tightening torque = 40 Nm
	**Seals:** 4 OR 108; Diameter of ports P, A, B, T: Ø 7,5 mm (max)	**Seals:** 3 OR 3081; Diameter of ports P, A, B, T: Ø 16 mm (max) 2 OR 108; Diameter of ports P, A, B, T: Ø 7 mm (max)

16 INSTALLATION DIMENSIONS [mm]



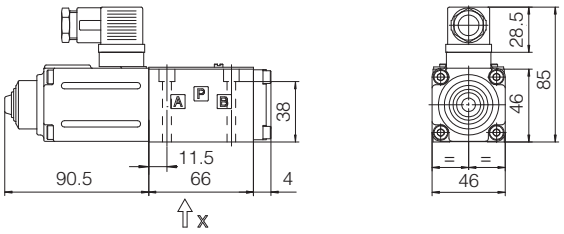
View from X

ISO 4401: 2005
Mounting surface: 4401-03-02-0-05

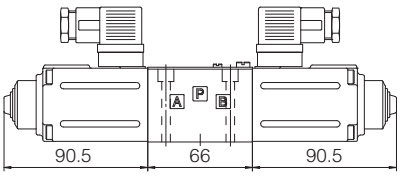
P = PRESSURE PORT
A, B = USE PORT
T = TANK PORT

Mass (Kg)	
DHOXW-06	1,9
DHOXW-07	2,6

DHOXW-06

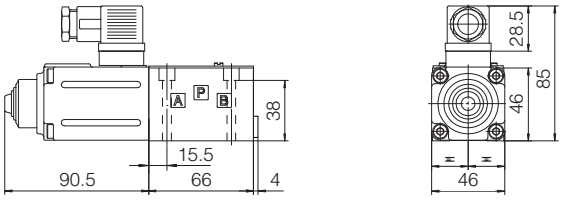


DHOXW-07

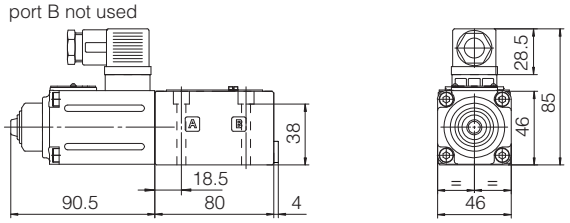


DLOHXW

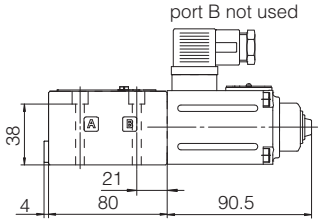
Mass (Kg)	
DLOHXW	1,7



DLOHMXW-3A
port B not used

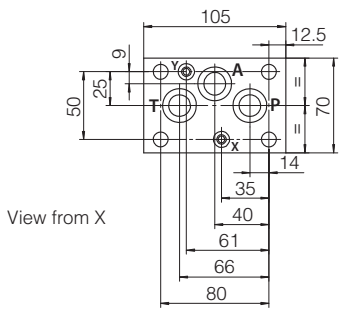


DLOHMXW-3C
port B not used



Mass (Kg)	
DLOHMXW	2

Overall dimensions refer to valves with connectors type 666

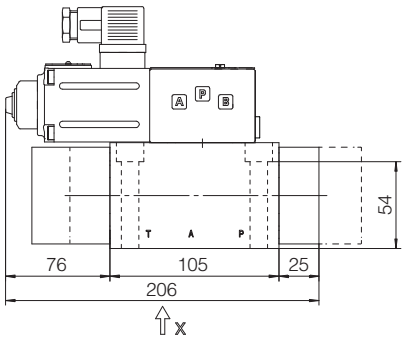


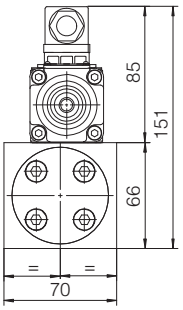
View from X

Mounting surface of DLOPXW is not ISO standard

P = PRESSURE PORT
A = USE POR
T = TANK PORT
X = PILOT PORT
Y = DRAIN PORT

DLOPXW-3C
DLOPXW-3A (dotted line)





Mass (Kg)	
DLOPXW	7

Overall dimensions refer to valves with connectors type 666