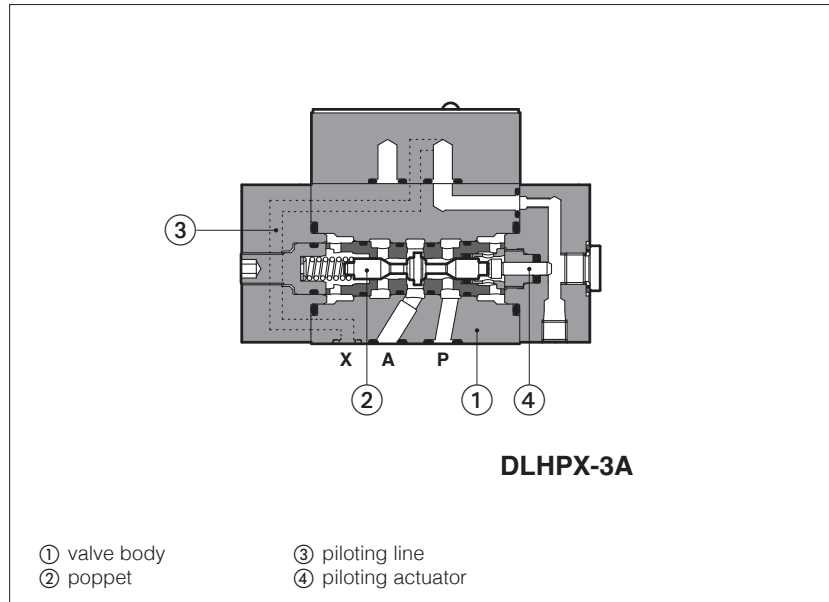


# Stainless steel hydraulic operated directional valves

on-off, poppet type leak free



## DLHPX, DLHPXS DLPX, DLPXS

Poppet type, hydraulic operated directional valves made in two different stainless steel executions for corrosive environments:

- **X** stainless steel for external and internal parts, to withstand extreme and corrosive environmental conditions, and to ensure full compatibility also with water base and special fluids.
- **XS** stainless steel for external parts to withstand extreme and corrosive environmental conditions.

DLPX and DLPXS are **SIL** compliance with IEC 61508 (TÜV certified)

### DLHPX(S):

Size: **06** - ISO 4401

3/2 way

Max flow: **40 l/min**

Max pressure: **315 bar**

### DLPX(S):

Size: **16** - not ISO

3/2 way

Max flow: **220 l/min**

Max pressure: **315 bar**

## 1 MODEL CODE

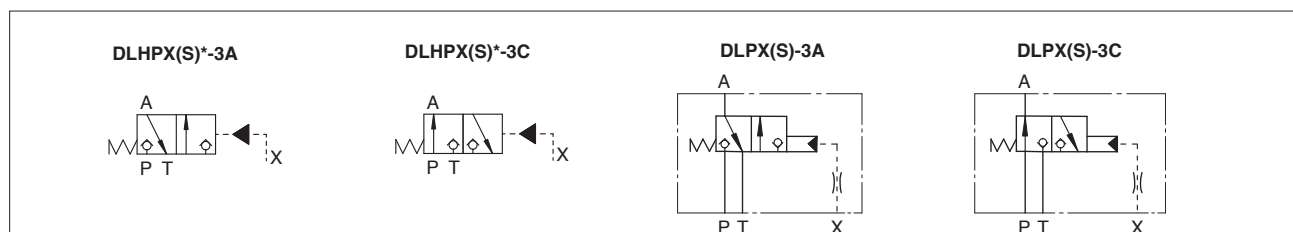
DLHP	X	-	3	A	*	/	*	/	*
<p>Hydraulic operated directional valves</p> <p><b>DLHP</b> = ISO size 06, max flow 40 l/min</p> <p><b>DLP</b> = Size 16 not ISO, max flow 220 l/min</p> <p>Stainless steel executions (1):</p> <p><b>X</b> = full stainless steel</p> <p><b>XS</b> = stainless steel only external parts</p> <p><b>3</b> = three way</p> <p><b>Valve configuration</b> - see section 2:</p> <p><b>A</b> = A to T in rest position</p> <p><b>C</b> = P to A in rest position</p>									<p><b>Test fluid,</b> only for X execution (2):</p> <p><b>H</b> = mineral oil</p> <p><b>W</b> = pure water</p> <p><b>Seals material,</b> see section 5:</p> <p>- = NBR low temp. -40°C</p> <p><b>PE</b> = FKM</p> <p><b>BBT</b> = FVMQ fluorosilicon -60°C (3)</p>
									Series number

(1) See section 5 for materials specifications:

(2) The "X" valves in full stainless steel execution are factory tested by Atos with mineral oil or pure water in order to avoid the contamination of the end user system. At the end of each valve model code must be specified the type of fluid to be used in the valve's testing: "H" for hydraulic oil or "W" for pure water.

(3) Only for full stainless steel "X" execution

## 2 CONFIGURATIONS AND HYDRAULIC SYMBOLS (representation according to ISO 1219-1)



### 3 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	150 years for direct operated; for further details see technical table P007
Ambient temperature	<b>Standard</b> = -40°C ÷ +70°C <b>/PE</b> option = -20°C ÷ +70°C <b>/BBT</b> option = -60°C ÷ +70°C
Storage temperature range	<b>Standard</b> = -40°C ÷ +80°C <b>/PE</b> option = -20°C ÷ +80°C <b>/BBT</b> option = -60°C ÷ +80°C
Compliance	SIL to IEC 61508: 2010, see section 7 (only for DLPX and DLPXS) RoHs Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006

### 4 HYDRAULIC CHARACTERISTICS

Valve type	DLHPX DLHPXS	DLPX DLPXS
Valve size	06	not ISO standard
Max operating pressure: ports P, A, X [bar]	315	
port T [bar]	110	
Pilot pressure max [bar]	315	315
min [bar]	90	see diagram at section 9
Max flow [l/min]	40	220
Internal leakage [cm³/min]	Less than 5 drops/min (0,36 cm³/min) at max pressure	

### 5 MATERIALS SPECIFICATION

Valve code	Solenoid housing	Valve body	Internal parts	Spring	std	Seals /PE	/BBT
<b>DLHPX</b>	AISI 630	AISI 630	AISI 316L, 420B, 440C, 430F	AISI 302	NBR 70 Sh low temp	FKM (viton)	FMVQ (fluorosilicon)
<b>DLHPXS</b>	AISI 630	AISI 630	Carbon steel	AISI 302	NBR 70 Sh low temp	FKM (viton)	-
<b>DLPX</b>	AISI 630	AISI 630	AISI 316L, 420B, 440C, 430F	AISI 302	NBR 70 Sh low temp	FKM (viton)	FMVQ (fluorosilicon)
<b>DLPXS</b>	AISI 630	AISI 630	Carbon steel	AISI 302	NBR 70 Sh low temp	FKM (viton)	-

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

Seals, recommended fluid temperature (1)	NBR seals (standard) = -40°C ÷ +60°C FKM seals (/PE option) = -20°C ÷ +80°C FVMQ seals (/BBT option) = -60°C ÷ +60°C		
Recommended viscosity	15 ÷ 100 mm²/s - max allowed range 2.8 ÷ 500 mm²/s min = 0,9 mm²/s for X full stainless steel execution 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, FVMQ	HL, HLP, HLPD, HVLP, HVLPD	DIN 51524
Flame resistant without water	FKM, FVMQ	HFDR, 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

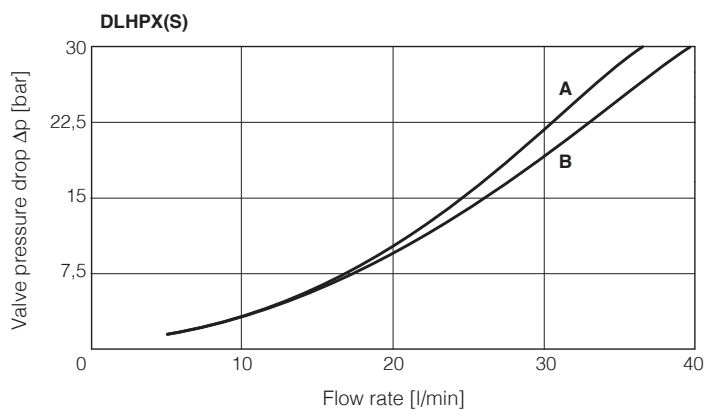
### 7 SIL compliance with IEC 61508: 2010 - only DLPX and DLPXS

DLPX and DLPXS meet the requirements of:

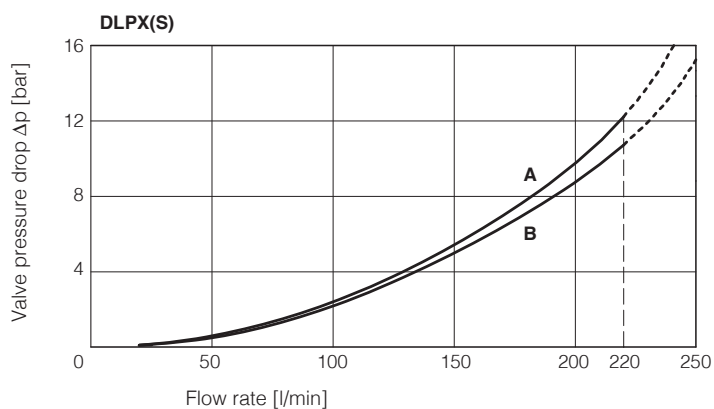
- **SC3** (systematic capability)
- max **SIL 3** (HFT = 1 if the hydraulic system provides the redundancy for the specific safety function where the component is applied)

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

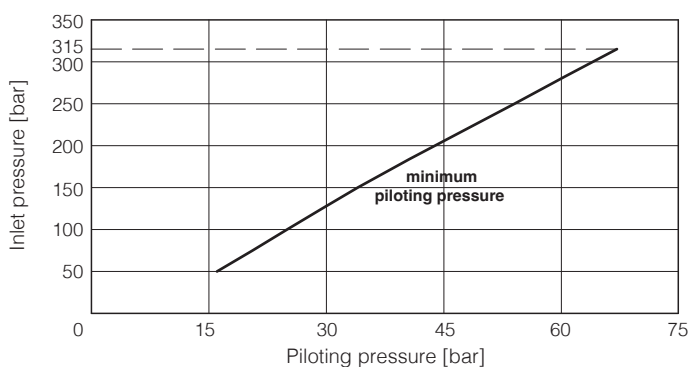
Valve type	Curve	Flow direction
DLHPX	A	P-A, P-B
DLHPXS	B	A-T, B-T



Valve type	Curve	Flow direction
DLPX	A	A-T
DLPXS	B	P-A



## 9 MINIMUM PILOT PRESSURE FOR DLPX(S)



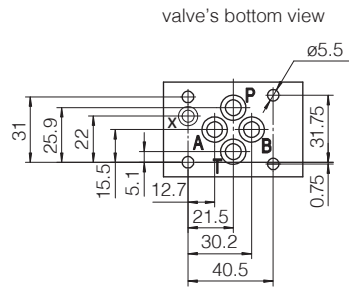
## 10 FASTENING BOLTS AND SEALS

Type	Size	Fastening bolts	Seals
DLHPX(S)	06	4 socket head screws M5x75-A4-70 Tightening torque = 5,5 Nm	4 OR 108; Diameter of ports P, A, B, T: Ø 7,5 mm (max)
DLPX(S)	no ISO standards	4 socket head screws M10x70-A4-70 Tightening torque = 40 Nm	3 OR 3081; Diameter of ports P, A, T: Ø 16 mm (max) 2 OR 108; Diameter of ports X, Y: Ø 7 mm (max)

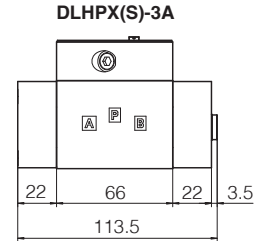
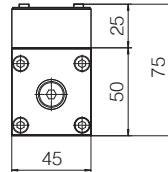
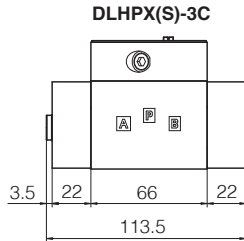
## 11 INSTALLATION DIMENSIONS OF DLHPX(S) [mm]

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

Mass [kg]	
DLHPX(S)	5



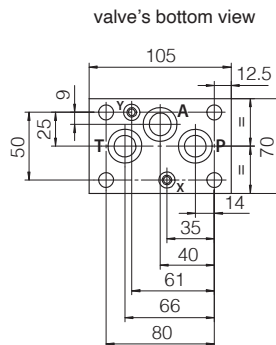
**P** = PRESSURE PORT  
**A** = USE PORT  
**B** = not present  
**T** = TANK PORT  
**X** = PILOT PORT



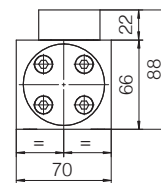
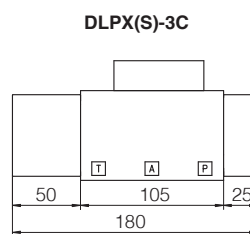
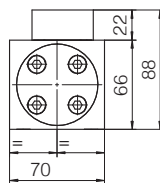
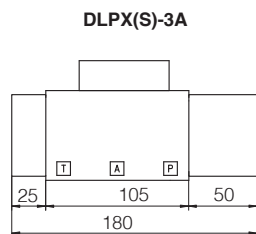
## 12 INSTALLATION DIMENSIONS OF DLPX(S) [mm]

Mounting surface not ISO standard

Mass [kg]	
DLPX(S)	6



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



## 13 RELATED DOCUMENTATION

- W010** Basics for electrohydraulics in corrosive environments
- W020** Summary of Atos stainless steel components
- EW900** Operating and maintenance information for stainless steel on-off valves