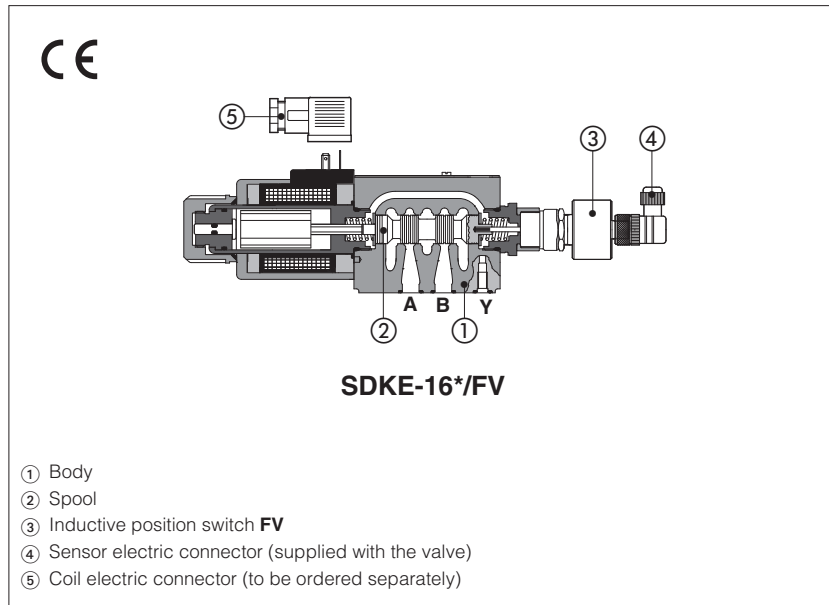


Safety directional valves with spool position monitoring

On-off, direct operated



Direct operated safety directional valves with spool position monitoring, single solenoid, 4/2, 3/2 versions.

SDHE, size 06, high performances, for AC and DC supply with cURus certified solenoids

SDKE, size 10, for AC and DC supply with cURus certified solenoids

The valves are equipped with **FV** inductive position switch for the spool position monitoring, see section 8 for sensors availability and technical characteristics.

Mounting surface: **ISO 4401**, size **06** and **10**

Max flow: **SDHE 80 l/min**

SDKE 150 l/min

Max pressure: **350 bar**

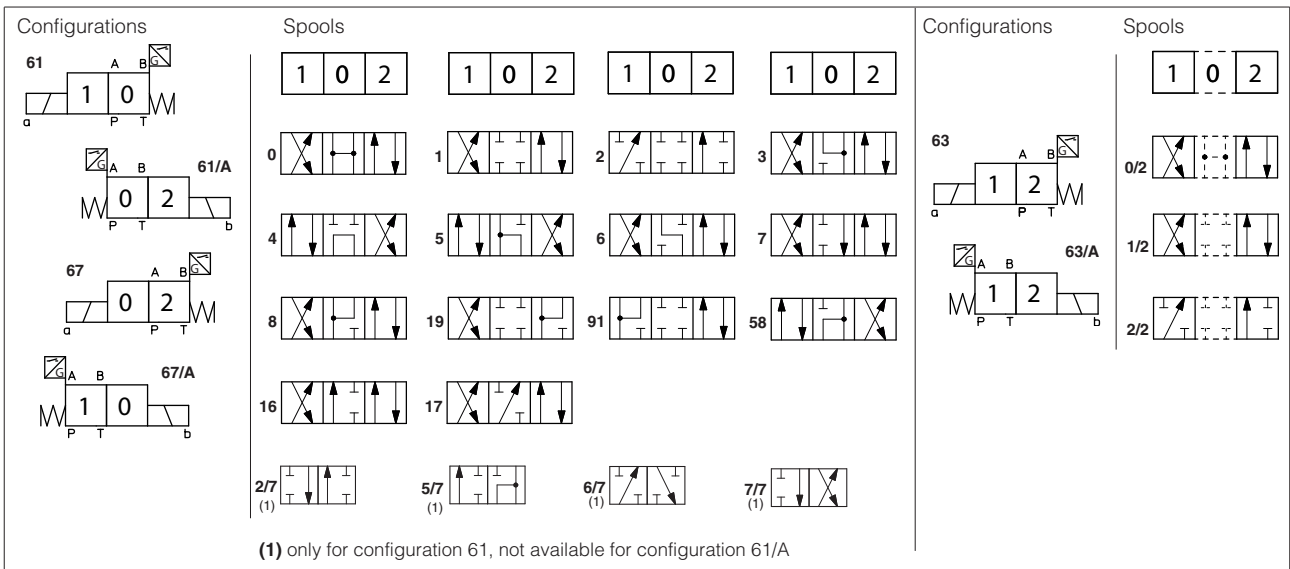
1 MODEL CODE

SDHE	-	0	63	1/2	/	A	/	FV	-	X	24DC	**	/	*
Directional control valve SDHE = max flow 80 l/min SDKE = max flow 150 l/min Size ISO 4401 0 = size 06 for DHE 1 = size 10 for DKE Valve configuration , see section 2 and 3 61 = single solenoid, central plus external position, spring centered 63 = single solenoid, 2 external positions, spring offset 67 = single solenoid, external plus central position, spring offset Spool type , see section 2 and 3 Options , see section 6														
Seals material see sect. 4,5 - = NBR PE = FKM Series number Voltage code , see section 7 X = without connector, see section 8 for available connectors, to be ordered separately Spool position monitor: FV = inductive position switch (double contact) (1)														

SDKE/FV are always provided with Y drain port

(1) the **FV** inductive position switch provides both NC and NO contacts to be wired to the electric connector

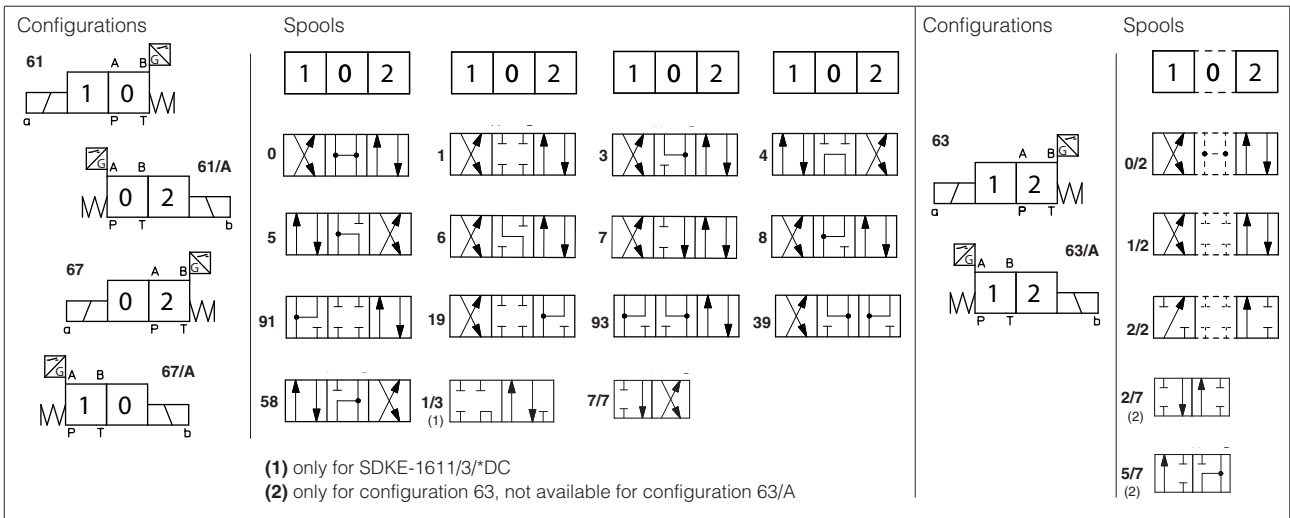
2 CONFIGURATIONS AND SPOOLS for SDHE (representation according to ISO 1219-1)



2.1 Special shaped spoos for SDHE

- spoos type **0** and **3** are also available as **0/1** and **3/1** with restricted oil passages in central position, from user ports to tank.
- spoos type **1**, **4**, **5** and **58** are also available as **1/1**, **4/8**, **5/1** and **58/1**. They are properly shaped to reduce water-hammer shocks during the swiching.
- spoos type **1**, **1/2**, **3**, **8** are available as **1P**, **1/2P**, **3P**, **8P** to limit valve internal leakages.
- Other types of spoos can be supplied on request.

3 CONFIGURATIONS AND SPOOLS for SDKE (representation according to ISO 1219-1)



3.1 Special shaped spoos for SDKE

- spoos type **0** and **3** are also available as **0/1** and **3/1** with restricted oil passages in central position, from user ports to tank.
- spoos type **1** is also available as **1/1**, properly shaped to reduce the water-hammer shocks during the switching.
- other types of spoos can be supplied on request.

4 MAIN 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 further details see technical table P007		
Compliance	CE to Low Voltage Directive 2014/35/EU and Machine Directive 2006/42/EC. RoHS Directive 2011/65/EU as last update by 2015/863/EU REACH Regulation (EC) n°1907/2006		
Ambient temperature	Standard = -30°C ÷ +70°C /PE option = -20°C ÷ +70°C		
Flow direction	As shown in the symbols of table 2 and 3		
Operating pressure	SDHE	P, A, B = 350 bar T = 210 bar (DC solenoid); 160 bar (AC solenoid)	
	SDKE	P, A, B = 350 bar T = (with Y port not connected to tank); 210 bar (DC solenoid); 120 bar (AC solenoid) T = (with Y port drained to tank) 250 bar	
Rated flow	see diagrams Q/Δp at section 12		
Maximum flow	SDHE	80 l/min see section 13	
	SDKE	150 l/min see section 13	

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

4.1 Coils characteristics

Insulation class	H (180°C) for DC coils F (155°C) for AC coils Due to the occurring surface temperatures of the solenoid coils, the European standards EN ISO 13732-1 and EN ISO 4413 must be taken into account
Protection degree to DIN EN 60529	IP 65 (with connectors correctly assembled)
Relative duty factor	100%
Supply voltage and frequency	See electric features 9
Supply voltage tolerance	± 10%
Certification	cURus North American standard

5 SEALS AND HYDRAULIC FLUID - for other fluids not included in below table, consult our 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 mm ² /s - max allowed range 2,8 ÷ 500 mm ² /s		
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, FKM	HL, HLP, HLPD, HVLP, HVLDP	DIN 51524
Flame resistant without water	FKM	HFDU, HFDR	ISO 12922
Flame resistant with water	NBR	HFC	

6 OPTIONS

A = Solenoid mounted at side of port B. In standard versions the solenoid is mounted at side of port A.

WARNING: the manual operation is not permitted for safety valves, than the valve is provided with solenoid blind rings to prevent the access to the manual override. The manual override protected by rubber cup (option /WP) is not available



WARNING: the inobservance of following prescriptions may represent a risk for personnel injury
Safety valves must be installed and commissioned only by qualified personnel



Safety valves must not be disassembled
The inductive position switch FV can be adjusted only by the valve's manufacturer or Atos authorized service centers
Valve's components cannot be interchanged
The valves must operate without switching shocks and spool vibrations

7 ELECTRIC FEATURES

7.1 COILS FOR SDHE VALVES

External supply nominal voltage $\pm 10\%$	Voltage code	Type of connector	Power consumption (2)	Code of spare coil	
12 DC	12 DC	666 or 667	30 W	COE-12DC	
14 DC	14 DC			COE-14DC	
24 DC	24 DC			COE-24DC	
28 DC	28 DC			COE-28DC	
48 DC	48 DC			COE-48DC	
110 DC	110 DC			COE-110DC	
125 DC	125 DC			COE-125DC	
220 DC	220 DC			COE-220DC	
110/50 AC	110/50/60 AC			58 VA (3)	COE-110/50/60AC
115/60 AC	115/60 AC			80 VA (3)	COE-115/60AC
230/50 AC	230/50/60 AC	58 VA (3)	COE-230/50/60AC		
230/60 AC	230/60 AC	80 VA (3)	COE-230/60AC		
110/50 AC	110RC	669	30 W	COE-110RC	
120/60 AC				230RC	COE-230RC
230/50 AC					
230/60 AC					

(1) In case of 60 Hz voltage frequency the performances are reduced by 10÷15% and the power consumption is 58 VA

(2) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.

(3) When solenoid is energized, the inrush current is approx 3 times the holding current.

7.2 COILS FOR SDKE VALVE

External supply nominal voltage $\pm 10\%$	Voltage code	Type of connector	Power consumption (2)	Code of spare coil	
12 DC	12 DC	666 or 667	36 W	CAE-12DC	
14 DC	14 DC			CAE-14DC	
24 DC	24 DC			CAE-24DC	
28 DC	28 DC			CAE-28DC	
110 DC	110 DC			CAE-110DC	
125 DC	125 DC			CAE-125 DC	
220 DC	220 DC			CAE-220DC	
110/50/60 AC	110/50/60 AC			100 VA (3)	CAE-110/50/60AC (1)
230/50/60 AC	230/50/60 AC				CAE-230/50/60AC (1)
115/60 AC	115/60 AC			130 VA (3)	CAE-115/60AC
230/60 AC	230/60 AC	CAE-230/60AC			
110/50/60 AC	110 DC	669	36 W	CAE-110DC	
230/50/60 AC	220 DC			CAE-220DC	

(1) In case of 60 Hz voltage frequency the performances are reduced by 10÷15% and the power consumption is 90 VA

(2) Average values based on tests performed at nominal hydraulic condition and ambient/coil temperature of 20°C.

(3) When solenoid is energized, the inrush current is approx 3 times the holding current.

8 COILS ELECTRIC CONNECTORS - according to din 43650 (to be ordered separately)

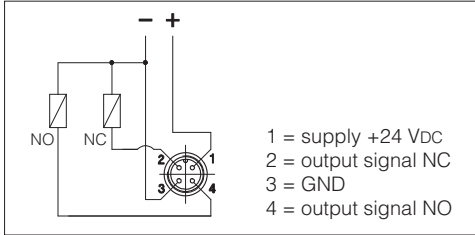
666, 667 (for AC or DC supply)	669 (for AC supply)	CONNECTOR WIRING		
		666, 667 1 = Positive ⊕ 2 = Negative ⊖ ⊕ = Coil ground		669 1,2= Supply voltage VAC 3 = Coil ground
		SUPPLY VOLTAGES		
666 All voltages	667 24 AC or DC 110 AC or DC 220 AC or DC	669 110/50 AC 110/60 AC 230/50 AC 230/60 AC		

9 TECHNICAL CHARACTERISTICS OF INDUCTIVE POSITION SWITCH

Type of switch	/FV position switch		
Supply voltage [V]	20÷32		
Ripple max [%]	≤ 10		
Max current [mA]	400		
Max peak pressure [bar]	400		
Mechanical life	virtually infinite		
Switch logic	PNP		<p>1 supply +24 Vdc</p> <p>2 output signal</p> <p>3 GND</p> <p>4 output signal</p>

10 CONNECTING SCHEMES OF POSITION SWITCHES

ZBE-06 IP65 connector is always supplied with the valve



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

11 STATUS OF OUTPUT SIGNAL

Signal status for FV versions

Hydraulic configuration	Configuration 61	Configuration 63	Configuration 67
spool position	1	0	2
pin 2	ON	OFF	ON
pin 2	OFF	ON	OFF
pin 4	ON	OFF	ON
pin 4	OFF	ON	OFF

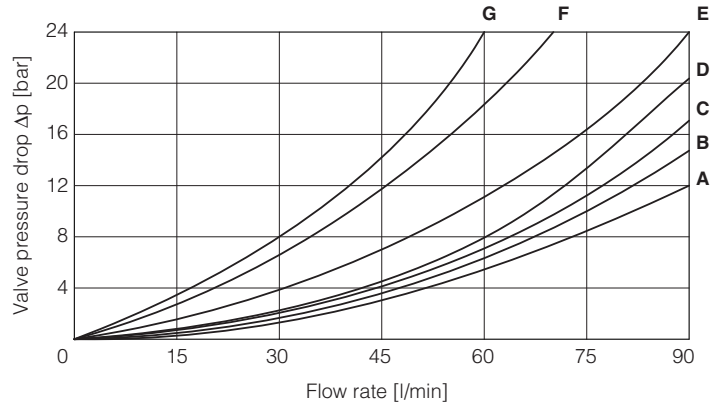
intermediate spool position corresponding to the hydraulic configuration change

Note: FV position switch can be electrically wired by the customer as NO or NC and then the status of the output signal will be in accordance to the selected configuration

12 Q/ΔP DIAGRAMS based on mineral oil ISO VG 46 at 50°C

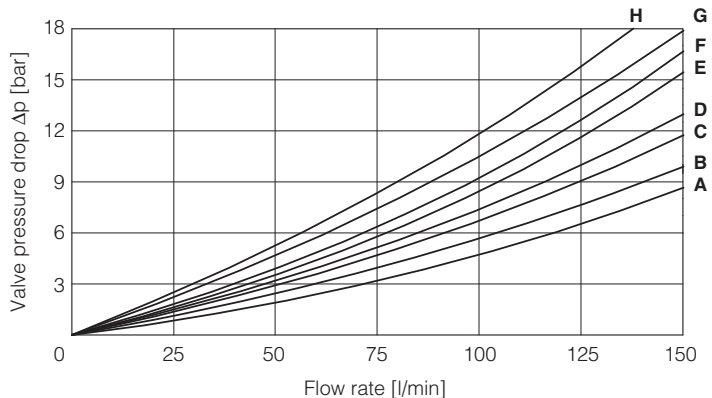
SDHE

Flow direction	Spool type				
	P→A	P→B	A→T	B→T	P→T
0, 0/1	A	A	C	C	D
1, 1/1	D	C	C	C	
3, 3/1	D	D	A	A	
4, 4/8, 5, 5/1, 58, 58/1	F	F	G	C	E
1/2, 0/2	D	D	D	D	
6, 7, 16, 17	D	D	D	D	
8	A	A	E	E	
2	D	D			
2/2	F	F			
19, 91	E	E	D	D	



SDKE

Flow direction	Spool type					
	P→A	P→B	A→T	B→T	P→T	B→A
0, 0/1, 0/2, 2/2	A	A	B	B		
1, 1/1, 6, 8	A	A	D	C		
3, 3/1, 7	A	A	C	D		
4	B	B	B	B	F	
5, 58	A	B	C	C	G	
1/2	B	C	C	B		
19, 91	E	E	G	G		H
39, 93	F	F	G	G		H



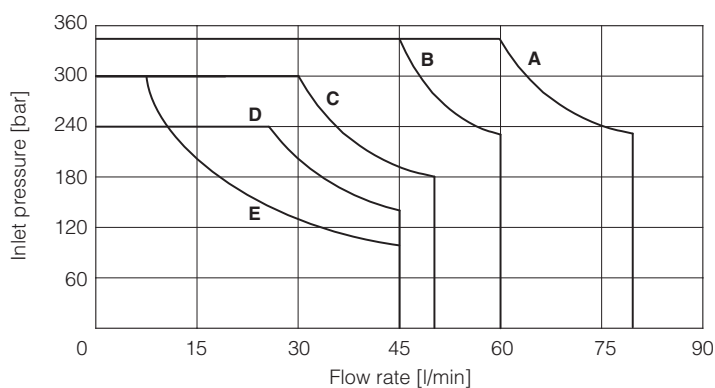
13 OPERATING LIMITS based on mineral oil ISO VG 46 at 50°C

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

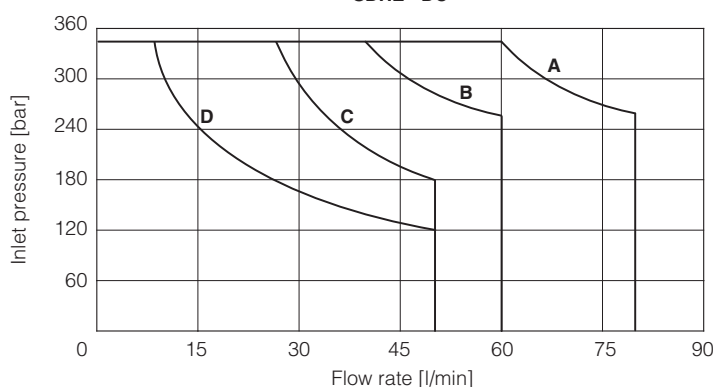
SDHE

Curve	Spool type	
	AC	DC
A	1, 1/2, 8	0, 0/1, 1, 1/2, 3, 8
B	0, 0/1, 0/2, 1/1, 1/9, 3	0/2, 1/1, 6, 7, 1/9, 19
C	3, 3/1, 6, 7	3/1, 4, 4/8, 5, 5/1, 16, 17, 19, 58, 58/1, 91
D	4, 4/8, 5, 5/1, 16, 17, 19, 58, 58/1, 91	2, 2/2
E	2, 2/2	-

SDHE - AC



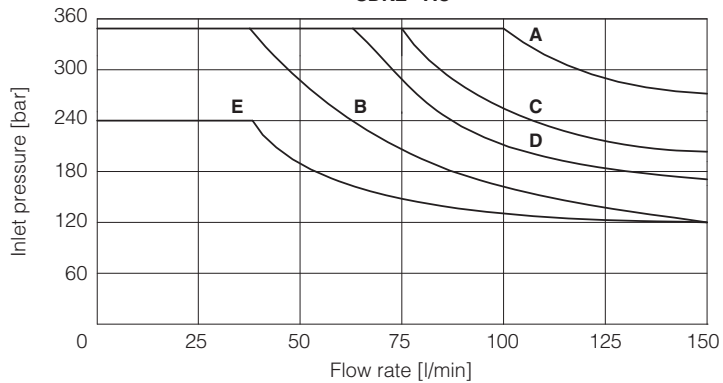
SDHE - DC



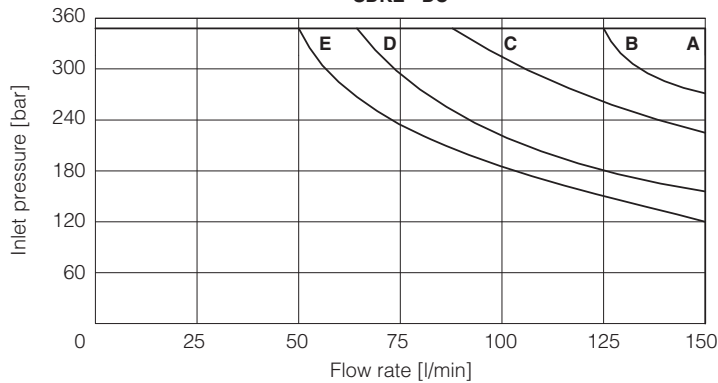
SDKE

Curve	Spool type	
	AC	DC
A	0/1	0, 0/1, 1, 1/1, 3, 3/1, 1/2, 0/2, 8
B	39, 93, 4, 5, 58, 19, 91	6, 7
C	0, 1/1, 3, 3/1	19, 91
D	1, 1/2, 0/2	39, 93, 4, 5, 58
E	6, 7, 8, 2/2	2/2

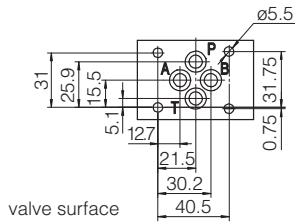
SDKE - AC



SDKE - DC



14 DIMENSIONS FOR SDHE SOLENOID SAFETY VALVES [mm]

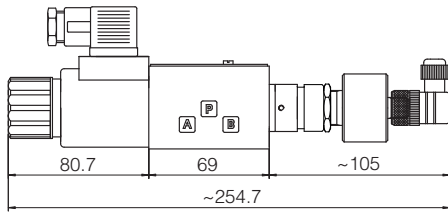


ISO 4401: 2005
Mounting surface: 4401-03-02-0-05
 Fastening bolts:
 4 socket head screws M5x30 class 12.9
 Tightening torque = 8 Nm
 Seals: 4 OR 108
 Ports P,A,B,T: $\varnothing = 7.5$ mm (max)

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

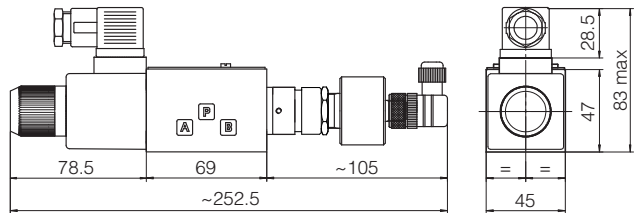
option /A
 solenoid mounted at side of port B.

SDHE-06*/FV (DC)



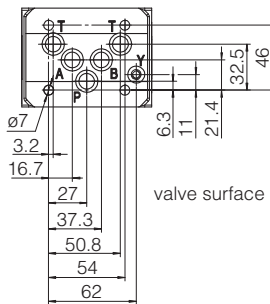
Mass: kg 1,95

SDHE-06*/FV (AC)



Mass: kg 1,8

15 DIMENSIONS OF SDKE SOLENOID SAFETY VALVES [mm]

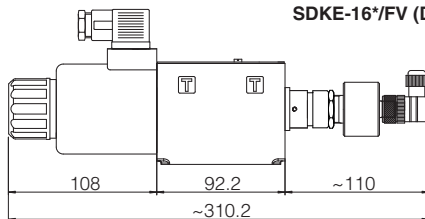


ISO 4401: 2005
Mounting surface: 4401-05-05-0-05 (without port X)
 Fastening bolts:
 4 socket head screws M6x40 class 12.9
 Tightening torque = 15 Nm
 Seals: 5 OR 2050. 1 OR 108
 Ports P,A,B,T: $\varnothing = 11.5$ mm (max)
 Ports Y: $\varnothing = 5$ mm

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

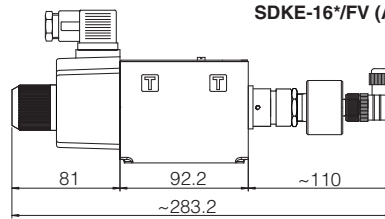
option /A
 solenoid mounted at side of port B.

SDKE-16*/FV (DC)



Mass: kg 4,4

SDKE-16*/FV (AC)



Mass: kg 3,8