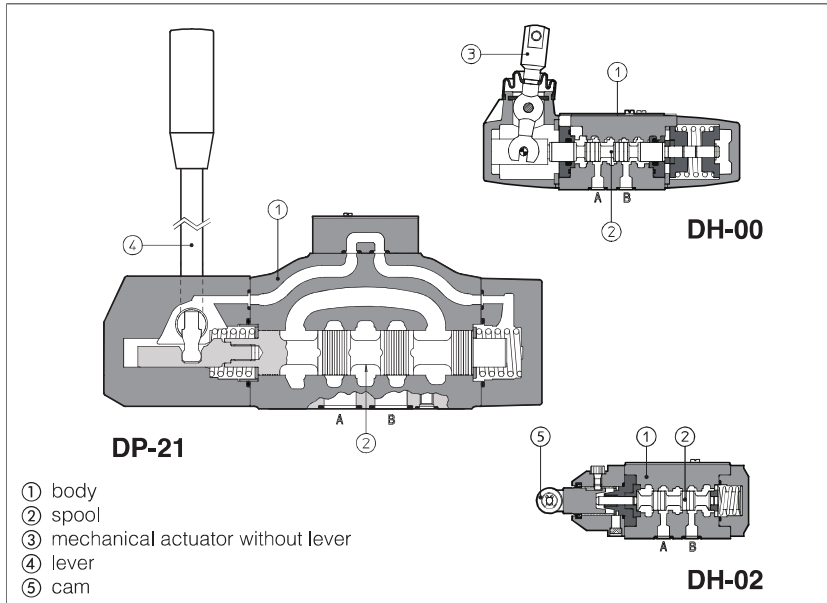


## Hand & mechanical directional valves

ISO 4401 sizes 06, 10, 16 and 25

Table E150-13/E



Hand & mechanical operated directional valves are spool type, three or four way, two or three position valves, available with following actuator types:

- mechanical actuator: general purpose execution for connection to customer device for the valve's remote operation
- hand-lever
- cam (only for DH and DK).

Valve sizes and max flow:

- DH-0** = size 06, flow up to 50 l/min
- DK-10 (11)** = size 10, flow up to 100 l/min
- DK-12** = size 10, flow up to 140 l/min
- DP-2** = size 16, flow up to 300 l/min
- DP-4** = size 25, flow up to 700 l/min

Max pressure:

- 350 bar** for DH-0, DP-2, DP-4
- 315 bar** for DK-1\*

### 1 MODEL CODE

<b>DH-0</b>	<b>1</b>	<b>1</b>	<b>3</b>	/	<b>C</b>	/	<b>A</b>	<b>**</b>	/	<b>*</b>
Directional control valve, size: <b>DH-0</b> = 06 <b>DK-1</b> = 10 <b>DP-2</b> = 16 <b>DP-4</b> = 25										Seals material: - = NBR <b>PE</b> = FKM
Type of actuator: <b>0</b> = mechanical, without lever <b>1</b> = hand-lever <b>2</b> = cam (only for DH-0 and DK-1)										Series number
Valve configuration, <b>see sections 2 and 3</b> <b>0</b> = free, without springs <b>1</b> = spring centered, without detent <b>2</b> = return to internal position <b>3</b> = return to external position <b>4</b> = 3 position, with detent <b>5</b> = 2 external positions, with detent <b>6</b> = centre plus external positions, with detent <b>7</b> = return to external position from the centre position <b>8</b> = return to the centre position from the external position										Options: <b>/A</b> = actuator device mounted on side of port B Lever position to be specified for DH-00, DH-01 and DK-00, DK-01 with configuration 6, 7, 8, see section 3 for hydraulic connections: <b>/I</b> = in rest position the lever is inclined towards the valve body <b>/E</b> = in rest position the lever is inclined in opposite side Only for DK-1: <b>/Y</b> = external drain
										Only for DH-01 hand-lever valves: <b>/C</b> = short hand - lever and reduced actuation force
										Spool type, see section 3

### 2 RANGE OF VALVE'S MODELS

VALVE TYPE	SIZE	VALVE CONFIGURATION									
		0	1	2	3	4	5	6	7	8	
DH-00	06	•	•	•	•	•	•	•	•	•	
DH-01		•	•	•	•	•	•	•	•	•	
DH-02		•	•	•	•	•	•	•	•	•	
DK-10	10	•	•	•	•	•	•	•	•	•	
DK-11		•	•	•	•	•	•	•	•	•	
DK-12		•	•	•	•	•	•	•	•	•	
DP-20	16	•	•	•	•	•	•	•	•	•	
DP-21		•	•	•	•	•	•	•	•	•	
DP-40		•	•	•	•	•	•	•	•	•	
DP-41	25	•	•	•	•	•	•	•	•	•	

**3 CONFIGURATIONS and SPOOLS** - for intermediate passages, see tab. E001

**DH-00\*, DH-01\* and DK-10\*, DK-11\*** - mechanical and hand lever actuator

Configurations						Spools		
<b>DH-000* DK-100*</b> <b>DH-010* DK-110*</b>		<b>DH-000*/A DK-100*/A</b> <b>DH-010*/A DK-110*/A</b>		<b>DH-006*/E DK-106*/E</b> <b>DH-016*/E DK-116*/E</b>		<b>DH-006*/EA DK-106*/EA</b> <b>DH-016*/EA DK-116*/EA</b>		
<b>DH-001* DK-101*</b> <b>DH-011* DK-111*</b>		<b>DH-001*/A DK-101*/A</b> <b>DH-011*/A DK-111*/A</b>		<b>DH-006*/I DK-106*/I</b> <b>DH-016*/I DK-116*/I</b>		<b>DH-006*/IA DK-106*/IA</b> <b>DH-016*/IA DK-116*/IA</b>		
<b>DH-002* DK-102*</b> <b>DH-012* DK-112*</b>		<b>DH-002*/A DK-102*/A</b> <b>DH-012*/A DK-112*/A</b>		<b>DH-007*/E DK-107*/E</b> <b>DH-017*/E DK-117*/E</b>		<b>DH-007*/EA DK-107*/EA</b> <b>DH-017*/EA DK-117*/EA</b>		
<b>DH-003* DK-103*</b> <b>DH-013* DK-113*</b>		<b>DH-003*/A DK-103*/A</b> <b>DH-013*/A DK-113*/A</b>		<b>DH-007*/I DK-107*/I</b> <b>DH-017*/I DK-117*/I</b>		<b>DH-007*/IA DK-107*/IA</b> <b>DH-017*/IA DK-117*/IA</b>		
<b>DH-004* DK-104*</b> <b>DH-014* DK-114*</b>		<b>DH-004*/A DK-104*/A</b> <b>DH-014*/A DK-114*/A</b>		<b>DH-008*/E DK-108*/E</b> <b>DH-018*/E DK-118*/E</b>		<b>DH-008*/EA DK-108*/EA</b> <b>DH-018*/EA DK-118*/EA</b>		
<b>DH-005* DK-105*</b> <b>DH-015* DK-115*</b>		<b>DH-005*/A DK-105*/A</b> <b>DH-015*/A DK-115*/A</b>		<b>DH-008*/I DK-108*/I</b> <b>DH-018*/I DK-118*/I</b>		<b>DH-008*/IA DK-108*/IA</b> <b>DH-018*/IA DK-118*/IA</b>		
<b>DH-005* DK-105*</b> <b>DH-015* DK-115*</b>		<b>DH-005*/A DK-105*/A</b> <b>DH-015*/A DK-115*/A</b>		<b>DH-008*/I DK-108*/I</b> <b>DH-018*/I DK-118*/I</b>		<b>DH-008*/IA DK-108*/IA</b> <b>DH-018*/IA DK-118*/IA</b>		
<b>DH-005* DK-105*</b> <b>DH-015* DK-115*</b>		<b>DH-005*/A DK-105*/A</b> <b>DH-015*/A DK-115*/A</b>		<b>DH-008*/I DK-108*/I</b> <b>DH-018*/I DK-118*/I</b>		<b>DH-008*/IA DK-108*/IA</b> <b>DH-018*/IA DK-118*/IA</b>		
<b>DH-005* DK-105*</b> <b>DH-015* DK-115*</b>		<b>DH-005*/A DK-105*/A</b> <b>DH-015*/A DK-115*/A</b>		<b>DH-008*/I DK-108*/I</b> <b>DH-018*/I DK-118*/I</b>		<b>DH-008*/IA DK-108*/IA</b> <b>DH-018*/IA DK-118*/IA</b>		
<b>DH-005* DK-105*</b> <b>DH-015* DK-115*</b>		<b>DH-005*/A DK-105*/A</b> <b>DH-015*/A DK-115*/A</b>		<b>DH-008*/I DK-108*/I</b> <b>DH-018*/I DK-118*/I</b>		<b>DH-008*/IA DK-108*/IA</b> <b>DH-018*/IA DK-118*/IA</b>		

(1) Spool type 2 available only for DH

**DP-20\*, DP-21\*, DP-40\*, DP-41\*** - hand lever actuator

Configurations						Spools		
<b>DP-201* DP-401*</b> <b>DP-211* DP-411*</b>		<b>DP-201*/A DP-401*/A</b> <b>DP-211*/A DP-411*/A</b>		<b>DP-203* DP-403*</b> <b>DP-213* DP-413*</b>		<b>DP-203*/A DP-403*/A</b> <b>DP-213*/A DP-413*/A</b>		
<b>DP-204* DP-404*</b> <b>DP-214* DP-414*</b>		<b>DP-204*/A DP-404*/A</b> <b>DP-214*/A DP-414*/A</b>		<b>DP-205* DP-405*</b> <b>DP-215* DP-415*</b>		<b>DP-205*/A DP-405*/A</b> <b>DP-215*/A DP-415*/A</b>		
<b>DP-204* DP-404*</b> <b>DP-214* DP-414*</b>		<b>DP-204*/A DP-404*/A</b> <b>DP-214*/A DP-414*/A</b>		<b>DP-205* DP-405*</b> <b>DP-215* DP-415*</b>		<b>DP-205*/A DP-405*/A</b> <b>DP-215*/A DP-415*/A</b>		
<b>DP-204* DP-404*</b> <b>DP-214* DP-414*</b>		<b>DP-204*/A DP-404*/A</b> <b>DP-214*/A DP-414*/A</b>		<b>DP-205* DP-405*</b> <b>DP-215* DP-415*</b>		<b>DP-205*/A DP-405*/A</b> <b>DP-215*/A DP-415*/A</b>		
<b>DP-204* DP-404*</b> <b>DP-214* DP-414*</b>		<b>DP-204*/A DP-404*/A</b> <b>DP-214*/A DP-414*/A</b>		<b>DP-205* DP-405*</b> <b>DP-215* DP-415*</b>		<b>DP-205*/A DP-405*/A</b> <b>DP-215*/A DP-415*/A</b>		
<b>DP-204* DP-404*</b> <b>DP-214* DP-414*</b>		<b>DP-204*/A DP-404*/A</b> <b>DP-214*/A DP-414*/A</b>		<b>DP-205* DP-405*</b> <b>DP-215* DP-415*</b>		<b>DP-205*/A DP-405*/A</b> <b>DP-215*/A DP-415*/A</b>		

**DH-02\*, DK-12\*** - cam actuator

Configurations				Spools	
<b>DH-023* DK-123*</b>		<b>DH-023*/A DK-123*/A</b>			
<b>DH-027* DK-127*</b>		<b>DH-027*/A DK-127*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			
<b>DH-028* DK-128*</b>		<b>DH-028*/A DK-128*/A</b>			

(1) Spool type 2 available only for DH

**NOTE**  
 - Spools type 0/2, 1/2, 2/2 are only used for valves type DH-023\*/2 and DK 123\*/2;

**4 MAIN CHARACTERISTICS**

Assembly position		Any position except for configuration 7 (without spring) that must be installed with horizontal axis
Subplate surface finishing		Roughness index Ra 0,4 - flatness ratio 0,01/100 (ISO 1101)
Ambient temperature		from -30°C to +70°C (standard seals) -20°C to +70°C (/PE seals)
Flow direction		As shown in the symbols of tables 3
<b>Operating pressure</b>	<b>DH</b>	P, A, B = <b>350 bar</b> T = <b>160 bar</b>
	<b>DK</b>	P, A, B = <b>315 bar</b> T = <b>160 bar</b>
	<b>DP</b>	P, A, B, X = <b>350 bar</b> T = <b>250 bar</b> for external drain (standard) Ports Y = 0 bar
<b>Maximum flow</b>	<b>DH</b>	<b>50 l/min</b>
	<b>DK-10, DK-11 DK-12</b>	<b>100 l/min</b> <b>140 l/min</b>
	<b>DP-2</b>	<b>300 l/min</b>
	<b>DP-4</b>	<b>700 l/min</b>

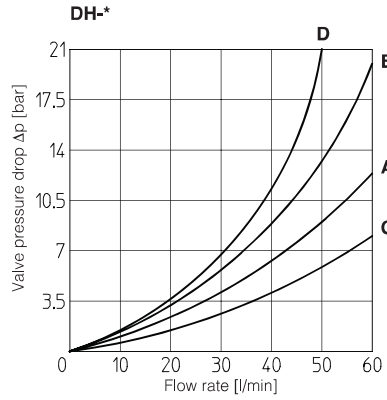
**5 SEALS AND HYDRAULIC FLUIDS** - For other fluids not included in above table, consult our technical office

Seals, recommended fluid temperature	NBR seals = (standard) -30°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals = (/PE option) -20°C ÷ +80°C		
Recommended viscosity	15 ÷ 100 mm <sup>2</sup> /s - max allowed range 15 ÷ 380 mm <sup>2</sup> /s		
Fluid contamination class	ISO 4406 class 21/19/16 NAS 1638 class 10, in line filters of 25 µm (β <sub>25</sub> ≥ 75 recommended)		
<b>Hydraulic fluid</b>	<b>Suitable seals type</b>	<b>Classification</b>	<b>Ref. Standard</b>
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	

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

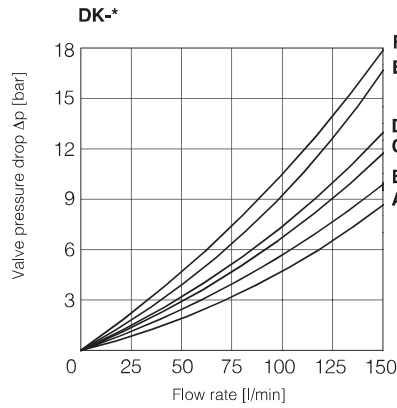
DH-\*

Spool type \ Flow direction	P→A	P→B	A→T	B→T	P→T
	0, 0/1, 0/2	C	C	C	C
1, 1/1, 1/2	A	A	A	A	
2, 2/2, 3, 3/1	A	A	C	C	
4, 5	D	D	D	D	A
6, 7	A	A	C	A	
8	C	C	B	B	



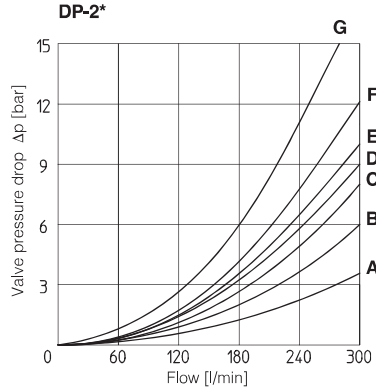
DK-\*

Spool type \ Flow direction	P→A	P→B	A→T	B→T	P→T
	0, 0/1, 0/2	A	A	B	B
1, 1/1, 1/2, 6, 8	A	A	D	C	
3, 3/1, 7	A	A	C	D	
4	B	B	B	B	E
5	A	B	C	C	F



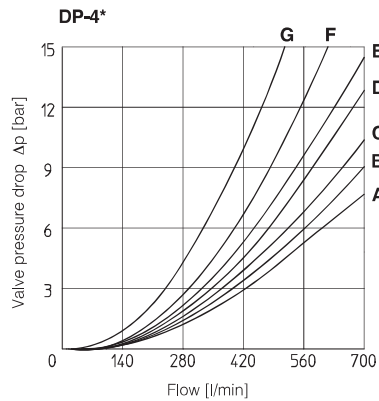
DP-2\*

Spool type \ Flow direction	P→A	P→B	A→T	B→T	P→T
	1, 3	A	A	C	A
0	A	A	C	D	B
2	A	A	-	-	-
4	B	B	F	G	E



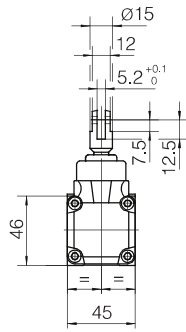
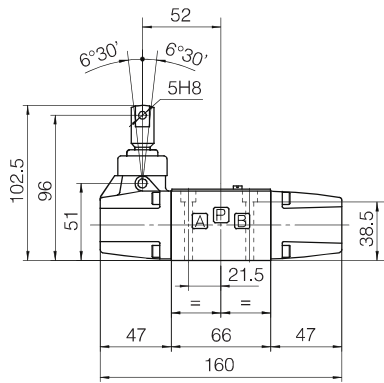
DP-4\*

Spool type \ Flow direction	P→A	P→B	A→T	B→T	P→T
	1	A	A	A	C
0	C	B	C	D	E
2	A	A	-	-	-
3	A	A	C	E	-
4	B	B	F	G	G



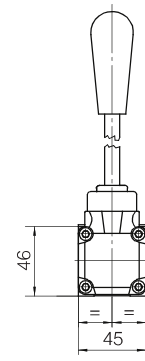
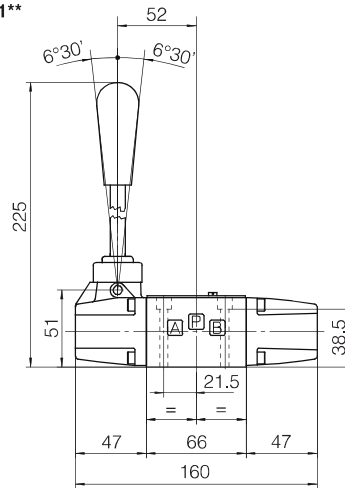
**7 DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 06 [mm]**

**DH-00\*\***



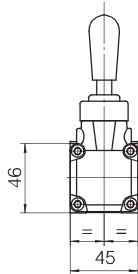
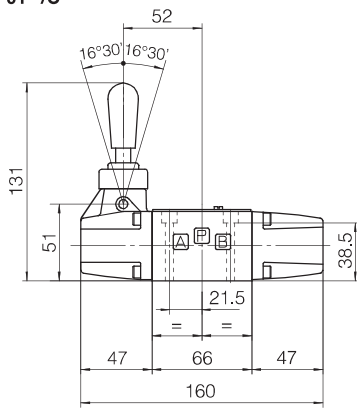
Mass: 1,2 Kg

**DH-01\*\***

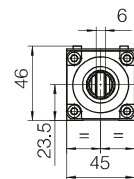
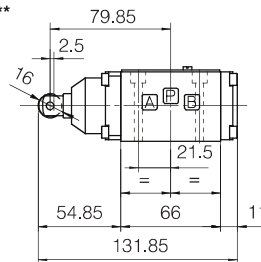


Mass: 1,6 Kg

**DH-01\*\*/C**



**DH-02\*\***



Mass: 1,2 Kg

Working stroke: 2,5 mm; extra-stroke: 0,5 mm max.

**ISO 4401: 2005**

**Mounting surface: 4401-03-02-0-05** (see table P005)

Fastening bolts: 4 socket head screws M5x50 class 12.9

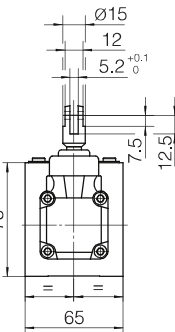
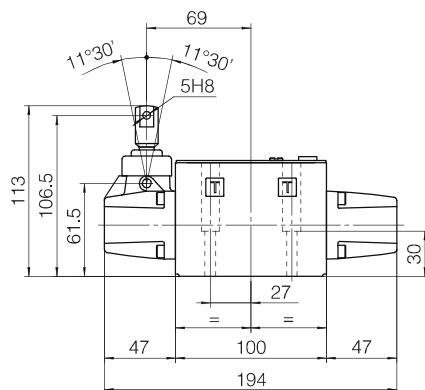
Tightening torque = 8 Nm

Diameter of ports A, B, P, T: Ø = 7,5 mm (max)

Seals: 4 OR 108

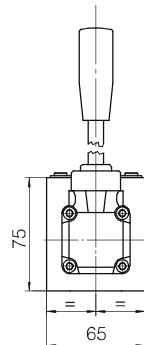
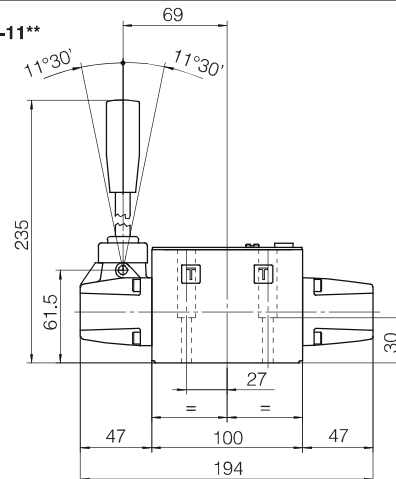
**8 DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 10 [mm]**

**DK-10\*\***



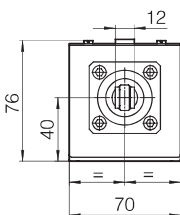
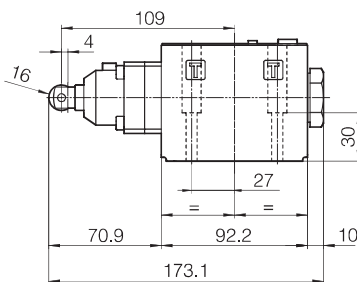
Mass: 2,5 Kg

**DK-11\*\***



Mass: 2,8 Kg

**DK-12\*\***



Mass: 2,5 Kg

**ISO 4401: 2005**

**Mounting surface: 4401-05-05-0-05** (see table P005)

**(Without X port, Y port optional)**

Fastening bolts: 4 socket head screws M6x40 class 12.9

Tightening torque = 15 Nm

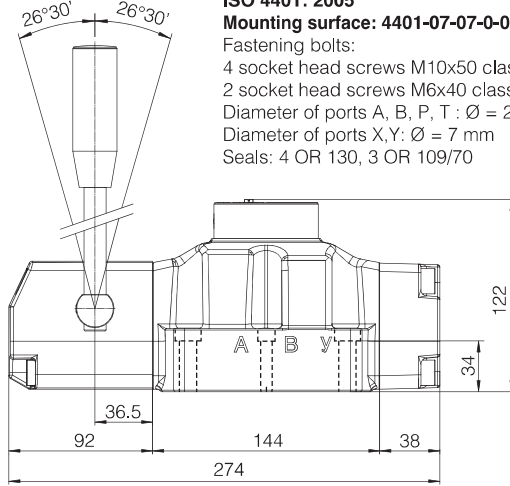
Diameter of ports A, B, P, T: Ø = 11,2 mm (max)

Seals: 5 OR 2050

Working stroke: 4 mm; extra-stroke: 0,5 mm max.

8 DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 16 [mm]

DP-21



ISO 4401: 2005

Mounting surface: 4401-07-07-0-05 (see table P005)

Fastening bolts:

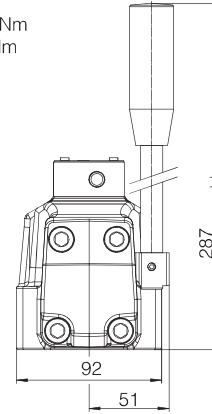
4 socket head screws M10x50 class 12.9, Tightening torque = 70 Nm

2 socket head screws M6x40 class 12.9, Tightening torque = 15 Nm

Diameter of ports A, B, P, T :  $\varnothing = 20$  mm

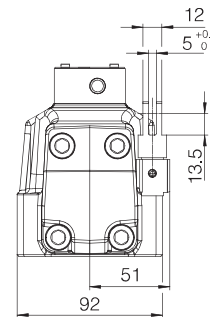
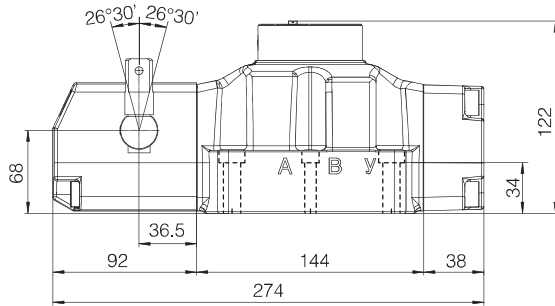
Diameter of ports X, Y:  $\varnothing = 7$  mm

Seals: 4 OR 130, 3 OR 109/70



Mass: 10 Kg

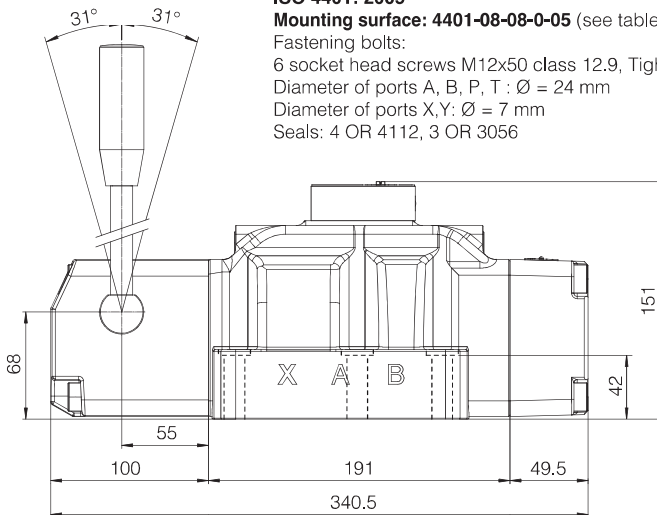
DP-20



Mass: 9,7 Kg

9 DIMENSIONS OF HAND & MECHANICAL OPERATED VALVES ISO 4401 SIZE 25 [mm]

DP-41



ISO 4401: 2005

Mounting surface: 4401-08-08-0-05 (see table P005)

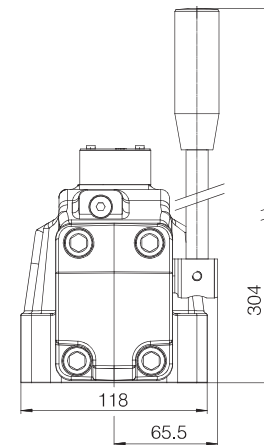
Fastening bolts:

6 socket head screws M12x50 class 12.9, Tightening torque = 125 Nm

Diameter of ports A, B, P, T :  $\varnothing = 24$  mm

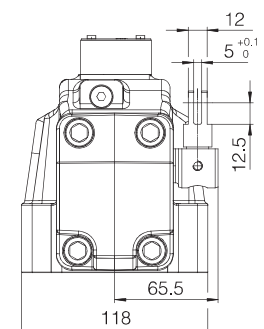
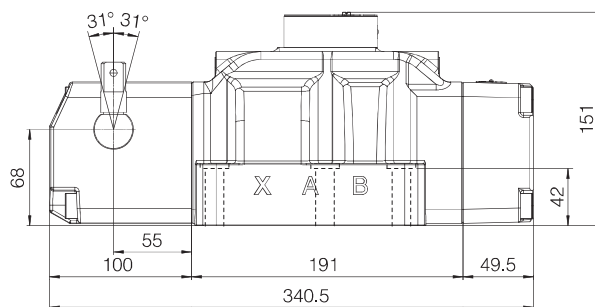
Diameter of ports X, Y:  $\varnothing = 7$  mm

Seals: 4 OR 4112, 3 OR 3056



Mass: 15,5 Kg

DP-40



Mass: 15,2 Kg