Directional Control Valves
3D06

VELJAN model V3DO6 is a direct or pilot operated Directional Control Valves controlled by solenoids, lever, hydraulic operated. Subplate or manifold mounting is standard. The 3DO6 is used for directing fluid flow in hydraulic system. The necessary pilot pressure for pilot operated versions can be obtained from system pressure or from a separate pilot pressure source. Operational life is improved by the use of wet pin solenoids which are immersed in the system fluid and assist heat dissipation the solenoids are available with a built in manual override device, and they are continuously ready for standard AC-or-DC supply.

Valves with manual override on the pilot control can also be operated mechanically in case of power failure. Electrical connection is by a standard plug in connector.

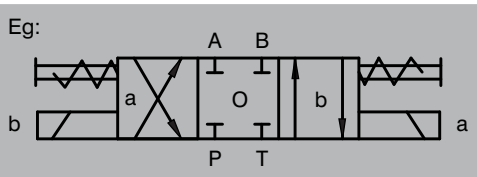
Manual and stem operated valves are available with dents to hold the spool in the selected position. Hydraulically operated valves may be remotely controlled by seperate pilot valves.

A light weight modular design, with a short spool travel, results in a fast response. When used in rapid cycling duties the 3DO6 valve offers outstanding performance. Streamlined interal passages ensure minimum pressure drop at maximum manufacture to close tolerance ensure interchangeability or circuit modification without the necessary for selective assembly. This is also true for spare parts, which can be ordered independently from manufacturing source through the world wide service network.

For special applications, for instance fire resistant fluids or sea water protection special seal kits and solenoids are available.

Main Characteristics
Size : 3/4”
Flow upto 132 gpm (500 l/min)
Pressure 5000 psi (350bar)
Weight 15kg (33 lbs)

Eg:



3D06 - 35 - B03 - 03 - 03

Features:

- Direct or pilot operated directional control valve with solenoid, lever, stem or hydraulic operation.
- Wide range of A.C. and D.C. coil voltages are available both with or without manual override.
- Mounting configuration according to CETOP, ISO and DIN.
- 12 standard spools.
- Spring centering, pressure centering or spring offset for spool return to neutral position, or detent version for mechanical operation.
- Wet pin solenoids for direct or alternating current.
- Leak proof construction up to 140 bar.
- Full interchangeability of spools with close tolerances.
- Electrical connection is by a standard plug-in connector according to DIN 43650
- Solenoid coil can be positioned at 90° intervals with respect to body
- Shifting time adjustment
- Main Valve with adjustable spool stop
- Orifice to reduce the pilot oil flow.
- High shifting performance.
- Smooth shifting - resulting in extended life.
- Easy Assembly - no dynamic seals.
- Each valve tested before despatch

DC

Operation

The solenoid operated 4-way valve 3Do6 consists of a main body with spool and solenoid operated pilot control valve. The solenoid when energised shifts the pilot control spool, thus directing fluid to one end of the main spool, and moving it into the desired position. So fluid can pass from the main port P to the system ports A or B while the opposite port (B or A) is free to take port. De-energising the solenoid allows both the pilot control and the main spool to return to their original positions.

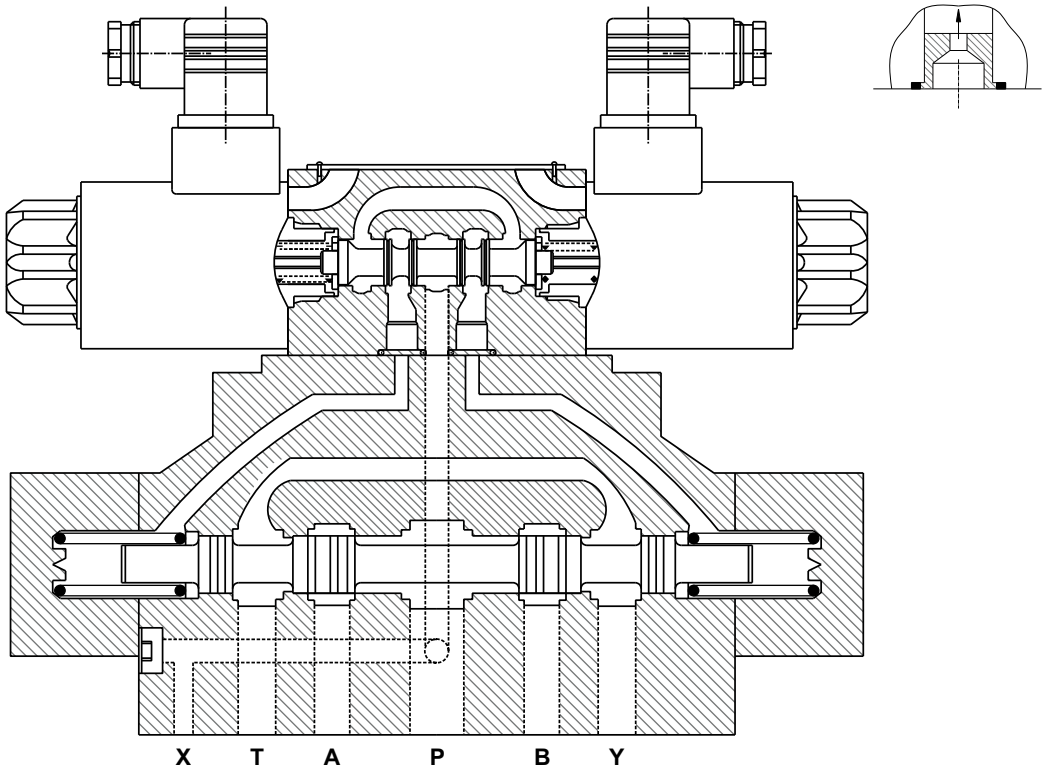
The main spool of the direct operated valves can be moved mechanically by means of lever or stem, or hydraulically from a remote pilot source.

Integral Check

For valves with no-load flow (spools 01, 44, 45, 07) and internal PP an integral check is necessary in P-port of the main valve to obtain the minimum pilot pressure. The integral check should not be used for load holding.

Pilot Valve Orifice

In certain operating conditions a higher flow volume can take place than the functional limit of the valve permits. In this case it is necessary to fit an orifice plug in the P-port of the valve.



Item	Characteristics	Symbol of Quantity	Symbol of SI Unit	Technical Data		
1.	**General**					
1.1	Type of unit	–	–	Directional Control Valve		
1.2	Model Number	–	–	Refer to model code page 4		
1.3	Design	–	–	Sliding spool valve		
1.4	Type of mounting	–	–	Subplate		
1.5	Type of port connections	–	–	Threads in subplate		
1.6	Port sizes	–	–	3/4" nominal		
1.7	Mounting position	–	–	Optional but horizontal recommended		
1.8	Direction of flow	–	–	Refer to page 5.		
1.9	Ambient temperature range	θ	°C	-20° min +50° max		
2.	**Hydraulic Characteristics**					
2.1	Operating pressure range					
	Inlet (P,A,B,X)	pi max	bar	350		
	Outlet (T,Y)	po max	bar	350 for external drain, 140 for internal drain		
2.2	Fluid temperature range	θ	°C	-18° min +80° max		
2.3	Viscosity range	v	cSt	10 - 650		
2.3.1	Recommended operating viscosity	vn	cSt	30		
2.4	Max flow	qv	l/min	500		
2.5	Δ p-Q characteristics	Δ p=f(qv)	–	Refer to page 5		
2.6	Permissible drain pressure	pi	bar	140 (solenoid operation)		
2.6.1	Leakage max.	–	ml/min	320...870 (depends on spool type)		
2.7	Overlap, under lap	–	–	Refer to page 5		
3.	**Type of Actuator**					
3.1	**Manual (Lever)**	–	–			
3.1.2	Operating Force	F	N	40 at lever		
3.1.5	Positing of actuators	–	–	"B" end		
3.2	**Mechanical**	–	–	Stem		
3.2.1	Total linear movement	l	mm	23.4		
3.2.2	Operating force	Fmax	N	400		
3.3	Electrical	–	–	by solenoids		
3.3.1	Nominal voltage	Un	V	refer to model code page 4		
	Permissible voltage difference	–	%	+5 — -10		
3.3.2	Type of current	–	–	Alternating Current (AC)		Direct Current (DC)
				115V / 60CY	230V / 60CY	12V/24V/48V
				115V / 50CY	230V / 50CY	
3.3.3	Input power	P20	W	31W		30W
3.3.4	Relative Operating period	OP rel	%	100		
3.3.5	Type of protection	–	–	IP 65		
3.4	Hydraulically	–	–			
3.4.1	Operating Pressure range	Pp min	bar	7.3 for spools with open centre position		
				15 for spools with closed centre position		
		Pp min	bar	350		
3.4.2	Spool displacement	V	ml	17.2		
3.4.3	Connections	–	–	X, Y		
3.4.4	Port sizes X, Y, L (subplate)	–	–	1/4" NPTF; G1/4"		
4.	**Response times (solenoid)**			**AC**	**DC**	**DC-quick energizing**
4.1	Energizing	te	ms	20	46	30
4.2	De - energizing	ta	ms	18	27	30

DC

ORDERING CODE

3D06 - 35 - . .. - .. - .. - . . C 1 - .. .. -

Series

06-Size 3/4"

Control

0 = Direct hydraulic

3 = Stem Operated

4 = Lever Operated

A = Pilot operated, 1 Solenoid (4DO1)

B = Pilot operated, 2 Solenoid (4DO1)

C = Pilot operated, 2 Solenoid (4DO1)
2 pos, detents

Spool Type

01, 02, 03, 07, 08, 09, 10, 13, 14, 44, 45, 46

Spool Position

01 = 2 (a,b),Spring offset pos. "b";activated to "a"

02 = 2 (a,b),Spring offset pos. "a";activated to "b"

03 = 3 (a,o,b),Spring centering pos. "o"
or pressure centred*

04 = 2 (a,b), without Spring , without detent
(pilot with detents)

05 = 2 (o,b),Spring or pressure centred*, pos "o"

06 = 2 (o,a), Spring or pressure centred*, pos "o"

07 = 3(a,o,b), 3 pos. detents (only for stem & lever operation)

11 = 2(b,o), pos "b" spring offset;
pos"o" spool stop (blocked)

12 = 2(a,o), pos "a" spring offset;
pos"o" spool stop (blocked)

* Pressure centering only for controls O, A, B

End Cap

03 = For controls O, A, B, C

04 = For controls 3,4

05 = For controls 3,4 with detent

06 = For controls O,A,B,C pressure centred.

09 = For controls O,A,B,C
adj. spool stop on both sides

Special Application

Pilot Accessories

51 - Plug in connector;
manual over-ride &
indicator lamps.

Solenoid Voltage

AC	DC
W01 = 115V/60CY	GOR = 12V
W02 = 230V/60CY	GOQ = 24V
W06 = 115V/50CY	
W07 = 230V/50CY	

Seal Class

1 = Standard
(for special fluids consult denison)

Design letter

Main Valve Accessories

0 = none
1 = Shift time adjustment
(meter -in-control)
2 = Shift time adjustment
(meter -out-control)
6 = Shift time adjustment
(meter-in-control & integral check in "P"[1])
8 = Shift time adjustment
(meter-out-control & integral check in "P"[1])
4 = Integral Check in "P"[1]

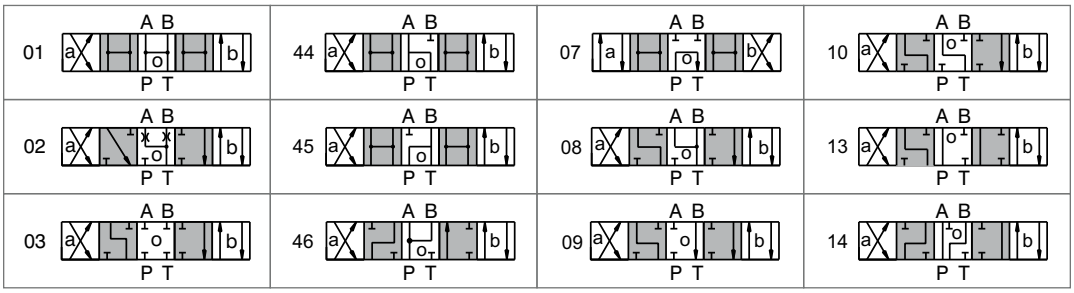
Pilot Connection

0 = For control O, hydraulically operated
1 = Internal PP, Internal PD
2 = Internal PP, External PD
3 = External PP, Internal PD
4 = External PP, External PD
5 = Internal PD, (max 10 bar)
6 = External PD

} only for controls 3,4 (mech operated)

DC

SPOOL TYPES



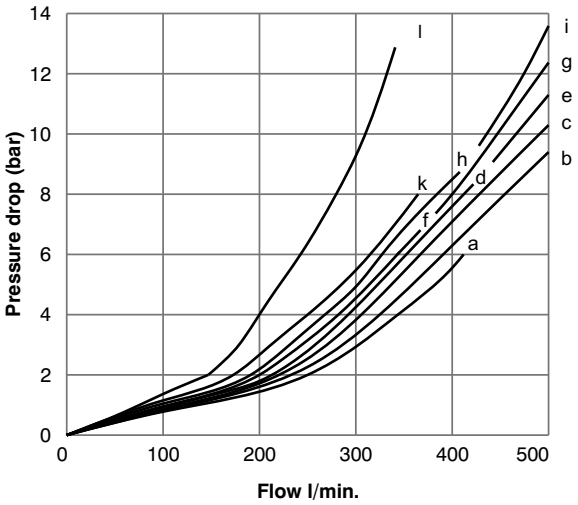
Functional Limits

The functional limits have been obtained with warm solenoid condition and at 10 under voltage.

Spool type	Flow (l/min) at a pressure (bar) of				
	70	140	210	280	350
01	500	500	450	400	360
02, 46, 08	500	500	500	450	420
03, 09, 10, 13, 14	500	500	500	500	500
44, 45	420	360	360	330	300
07	360	360	360	360	360

All flow data given is considered at a minimum pilot pressure of 13 bar and for 2 flow directions (e.g. from P--- A and simultaneous from B---T.

Pressure Drop

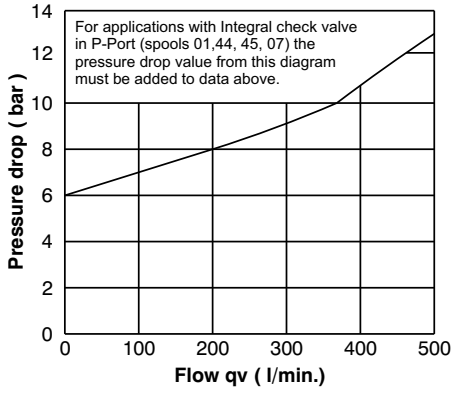


Spool Type	Direction of Flow				
	P--A	P--B	P--T	A--T	B--T
01 02, 08	c e	c e	c	c c	i i
03, 44, 45	e a	g d	h	b d	g d
46 07	e k	c k	l	c f	g k
09 10	e e	e e		b c	i g
13 14	c g	e e		b b	i g

Integral Check Valve (opening pressure approx. 6 bar)

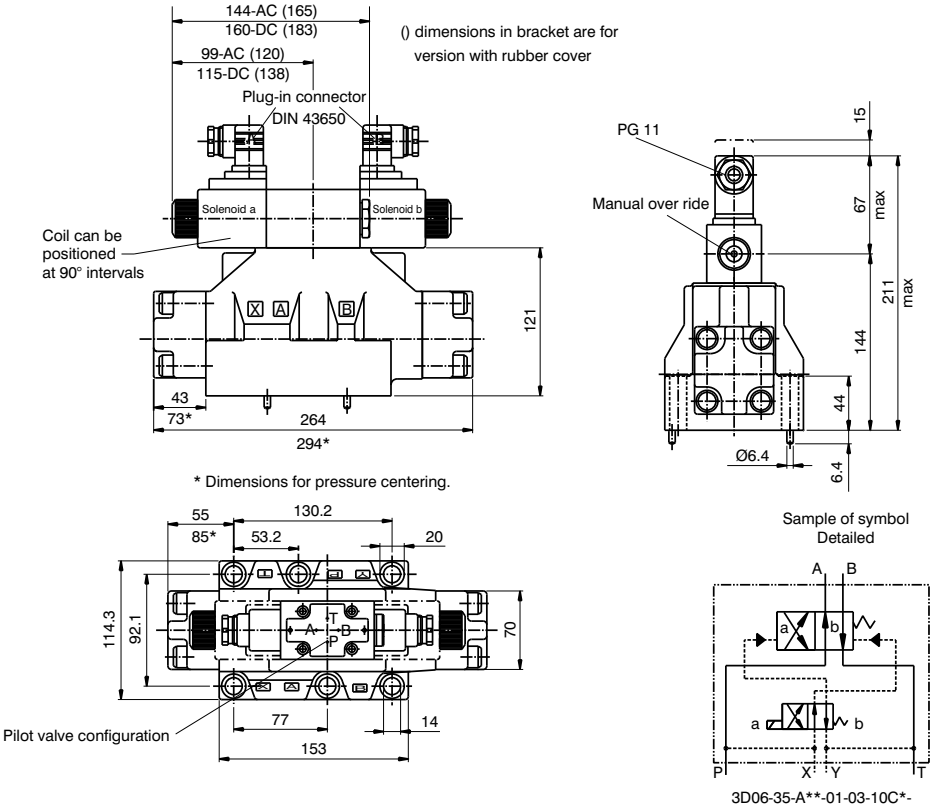
All performance data given is typical and can be influenced by application

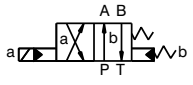
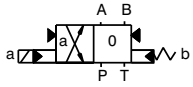
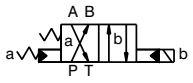
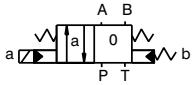
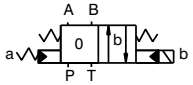
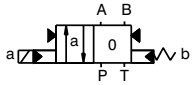
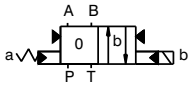
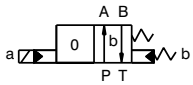
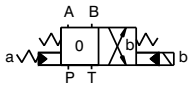
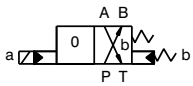
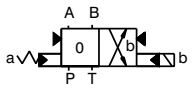
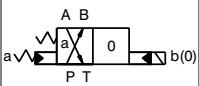
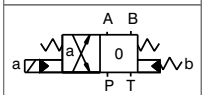
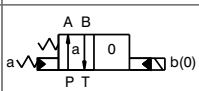
Oil temperature 50°C; Oil viscosity 36 cSt.



DC

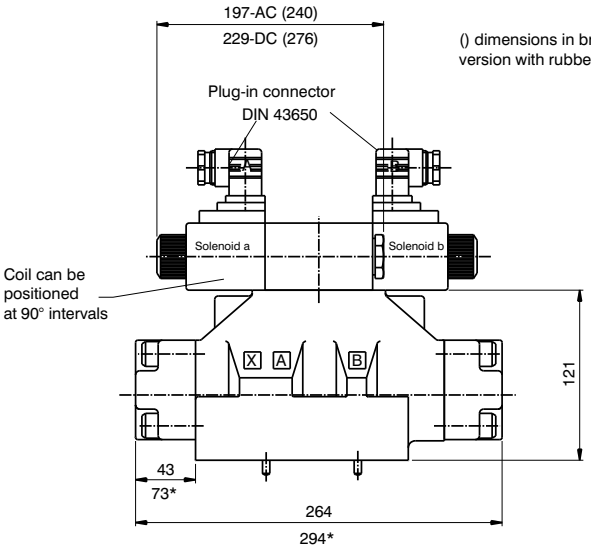
1 SOLENOID -- 2 SPOOL POSITIONS - PILOT OPERATED



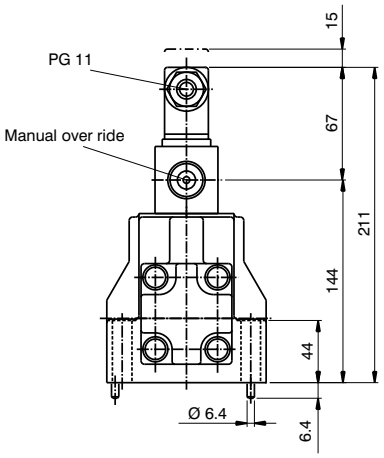
Symbol	Model-No	Spool type ** (also refer to page 5)	Symbol	Model-No	Spool type ** (also refer to page 5)
	3D06-35-A**-01-03	01, 03		3D06-35-A**-06-06	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14
	3D06-35-A**-02-03	01, 03		3D06-35-A**-06-03	07
	3D06-35-A**-05-03	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14		3D06-35-A**-06-06	07
	3D06-35-A**-05-06	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14		3D06-35-A**-11-03	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14
	3D06-35-A**-05-03	07		3D06-35-A**-11-03	07
	3D06-35-A**-05-06	07		3D06-35-A**-12-03	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14
	3D06-35-A**-06-03	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14		3D06-35-A**-12-03	07

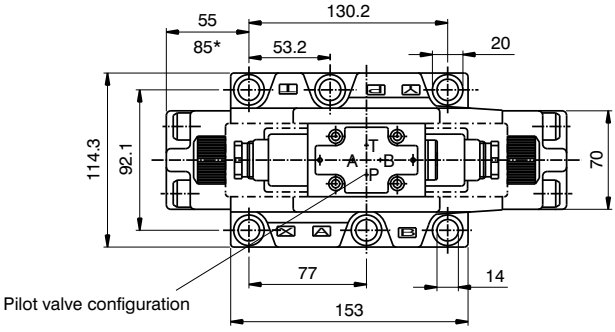
0 Symbol for neutral position depends on spool type, refer to page 5.

2 SOLENOIDS -- 2 OR 3 SPOOL POSITIONS - PILOT OPERATED

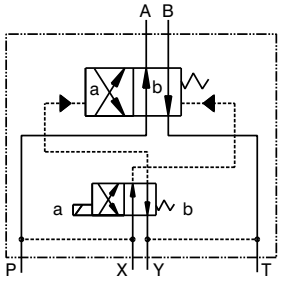


* Dimensions for pressure centering.

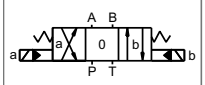
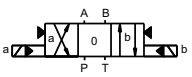
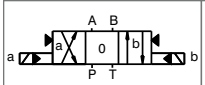
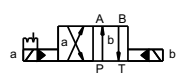
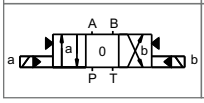
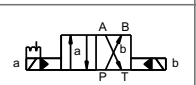




Sample of symbol
Detailed



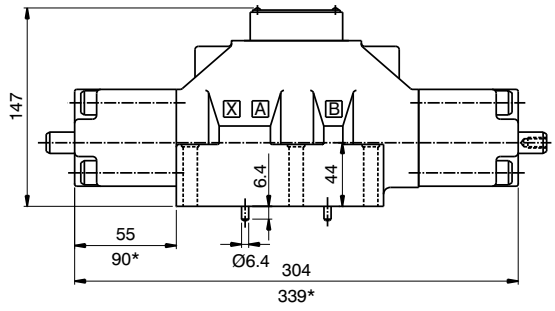
3D06-35-A**-01-03-10C*-

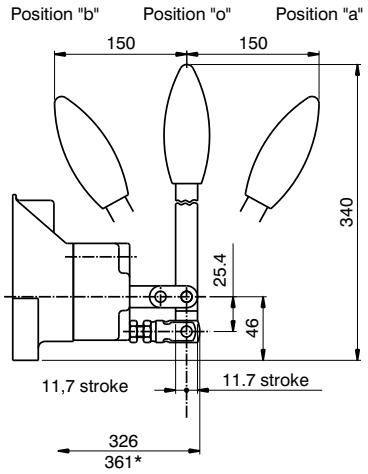
Symbol	Model-No	Spool type ** (also refer to page 5)	Symbol	Model-No	Spool type ** (also refer to page 5)
	3D06-35-B**-03-03	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14		3D06-35-B**-03-06	07
	3D06-35-B**-03-06	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14		3D06-35-C**-04-03	01, 03
	3D06-35-B**-03-03	07		3D06-35-C**-04-03	07

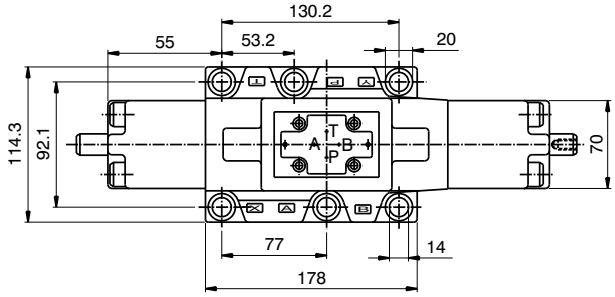
0 Symbol for neutral position depends on spool type, refer to page 5.

DC

STEM & LEVER OPERATED - 2 OR 3 SPOOL POSITIONS

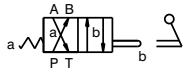
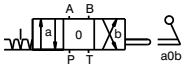
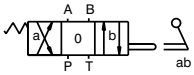
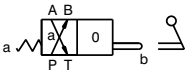
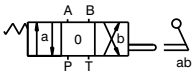
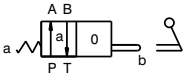
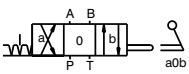






* Dimensions for detent version

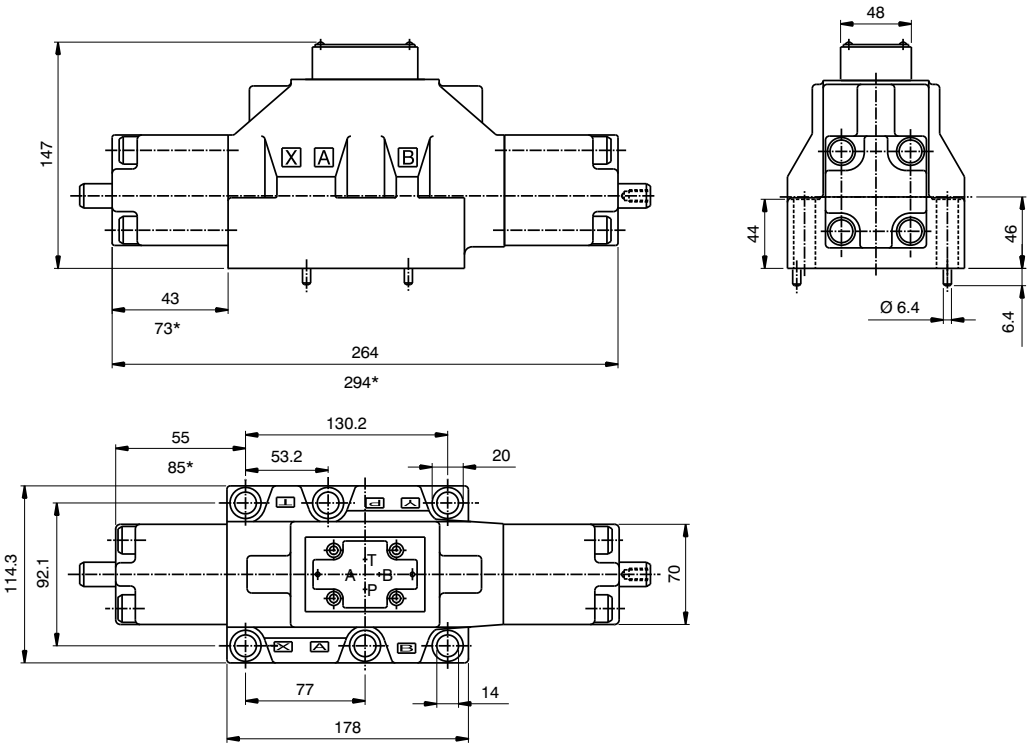
DC

Symbol	Model-No	Spool type ** (also refer to page 5)	Symbol	Model-No	Spool type ** (also refer to page 5)
	3D06-35 $\frac{3}{4}$**-02-04	01, 03	3D06-35-$\frac{3}{4}$**-07-05		07
	3D06-35 $\frac{3}{4}$**-03-04	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14	3D06-35-$\frac{3}{4}$**-12-04		01, 02,03,44, 45,46,08,09 10,13,14
	3D06-35 $\frac{3}{4}$**-03-04	07	3D06-35-$\frac{3}{4}$**-12-04		07
	3D06-35 $\frac{3}{4}$**-07-05	01, 02, 03, 44, 45, 46, 08, 09, 10, 13, 14			

3 = Stem operation
4 = Lever operation

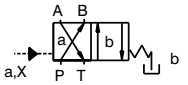
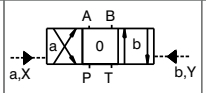
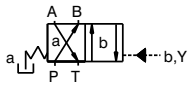
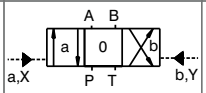
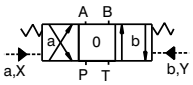
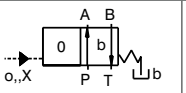
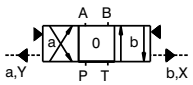
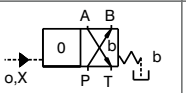
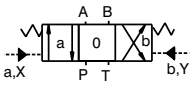
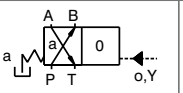
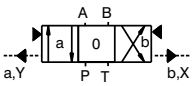
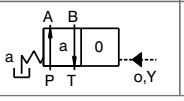
0 Symbol for neutral position depends on spool type, refer to page 5.

DIRECT HYDRAULICALLY OPERATED VALVE- 2 OR 3 SPOOL POSITIONS



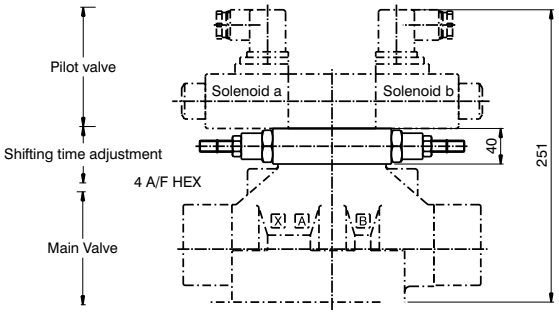
*** Dimensions for pressure centering.**

DC

Symbol	Model-No	Spool type ** (also refer to page 5)	Symbol	Model-No	Spool type ** (also refer to page 5)
	3D06-35-0 ** -01-03	01,03		3D06-35-0 ** -04-03	01,02,03,44, 45,46,08,09 10,13,14
	3D06-35-0 ** -02-03	01,03		3D06-35-0 ** -04-03	07
	3D06-35-0 ** -03-03	01,02,03,44, 45,46,08,09 10,13,14		3D06-35-0 ** -11-03	01,02,03,44, 45,46,08,09 10,13,14
	3D06-35-0 ** -03-06	01,02,03,44, 45,46,08,09 10,13,14		3D06-35-0 ** -11-03	07
	3D06-35-0 ** -03-03	07		3D06-35-0 ** -12-03	01,02,03,44, 45,46,08,09 10,13,14
	3D06-35-0 ** -03-06	07		3D06-35-0 ** -12-03	07

0 Symbol for neutral position depends on spool type, refer tp page 5.

SHIFTING TIME ADJUSTMENT (1.2 kg)

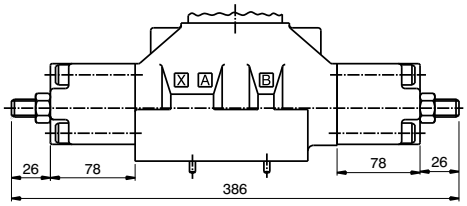


The shifting time adjustment is affected by a double throttle valve with check, which is mounted between main and pilot valve. The illustration depicts the “meter out” control For “meter in” invert the control.

MAIN VALVE WITH ADJUSTABLE SPOOL STOP

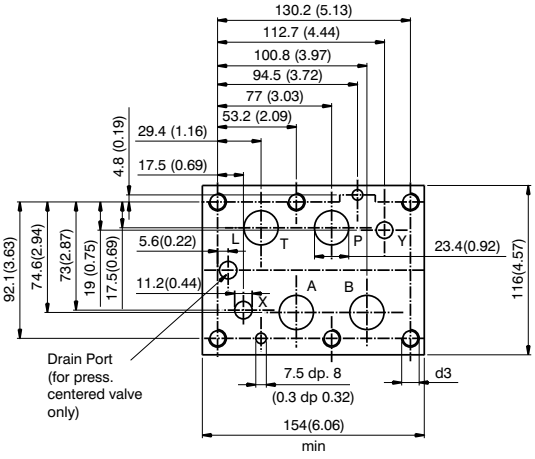
End cap :
09 = Spool stop on both sides

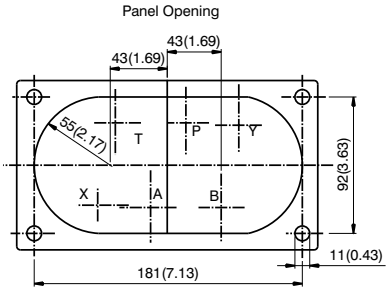
Applications :
For controls 0, A, B, C.
(refer to model code page 4)



DC

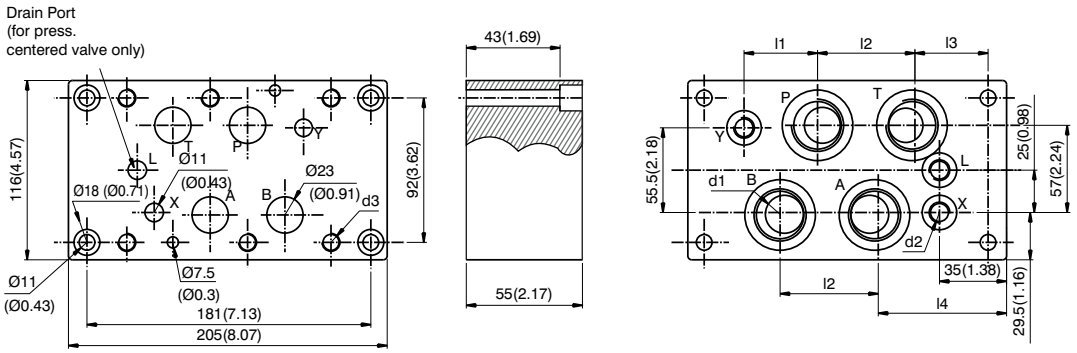
MOUNTING CONFIGURATION ACCORDING TO NFA, CETOP, ISO AND DIN





Block mounting face
Flatness .003/3.93 inches (0.01 mm /100 mm) length
Surface finish 0.8

SUBPLATES (MOUNT. CONFIGURATION ACCORD. NFPA, CETOP, ISO AND DIN) WEIGHT : ≈17 LBS(8 KG)



Portings:

P = Pressure Port

A & B = Acturator Ports

T = Tank Port

X = Pilot Port (for hydr. operated and for pilot operated valves with external PP)

Y = Drain Port (for external PD: pilot operated and mech. operated valves)

= Pilot port (for hydr. operated valves)

L = Drain port (connect for pressure centered valves only)

Please note:

Fixing screws are included in subplate order. For valves ordered without subplate fixing screws must be ordered separetely.

Qty.	Fixing screws	Order-No.
6	M 12 x 65, DIN 912;10.9	361-12293-8
6	1/2"-13 UNC x 2 1/2" (SAE)	358-20280

DC

Model-No.	Order-No.	d1 (A,B,P,T)	d2 (X,Y,L)	d3	l1	l2	l3	l4
SS-B-12-G 130-L	S26-34487	3/4" B.S.P.P	1/4" B.S.P.P	M12	55 (2.16)	49 (1.93)	66 (2.60)	90 (3.54)
SS-B-16-G 130-L	S26-34488	1" B.S.P.P	1/4" B.S.P.P	M12	48.5 (1.91)	59.5 (2.34)	62 (2.44)	82 (3.23)
SS-P-16-G 129-L	S26-34489	1" NPTF	1/4" NPTF	1/2" -13 UNC				