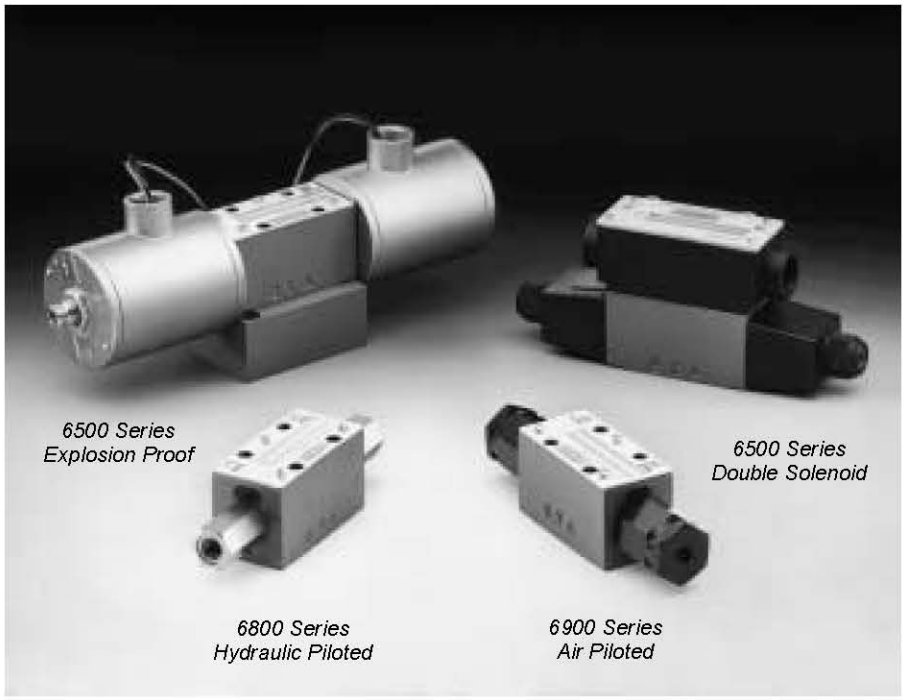
Compact Valves Control Flow to 15 U.S. gpm (57 L/min)

High performance D03 valves are rated for 8 U.S. gpm (30 L/min) nominal and 15 U.S. gpm (57 L/min) maximum flow, at pressures to 5000 psi (350 bar).

This high pressure and high flow capability provides great efficiency in a very compact size.



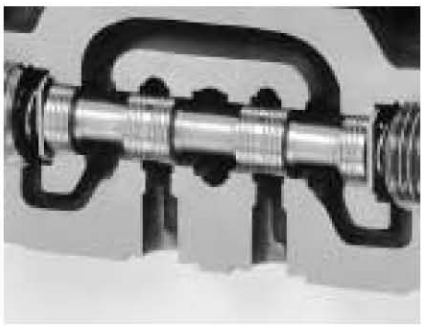
HIGH EFFICIENCY OPERATION

Large internal flow passages, with uniform flow areas throughout the body coring, provide exceptional efficiency. Typical loop pressure drop (open center spool) is a low 98 psi at 8 U.S. gpm (7 bar at 30 L/min) nominal flow (ΔP loop = P→A + B→T).

SMOOTH, RELIABLE SHIFTING

A four-land spool design assures exceptionally smooth spool travel. Additional outboard lands provide greater support, eliminating spool imbalance.

Balancing grooves provide precise centering, reducing silt buildup and potential spool sticking.



Close tolerances assure accurate land sequencing and low leakage. Spools are interchangeable to meet changing requirements.

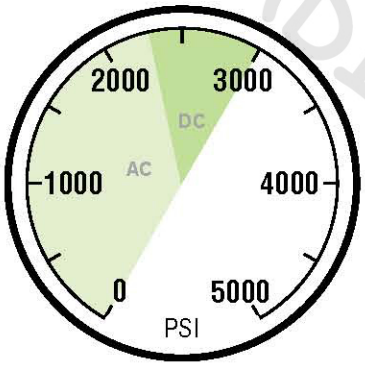
LOW POWER REQUIREMENTS

On solenoid models, efficient low power requirements reduce energy consumption.

Holding power requirements are only 20 Watts for 115 Volt A.C. or 28 Watts for 12 or 24 Volt D.C. solenoids.

HIGH PRESSURE TANK PORT

High pressure tank port capability provides the highest "T" port rating available. This option ("HPT") is ideal for higher pressure "series" circuits.

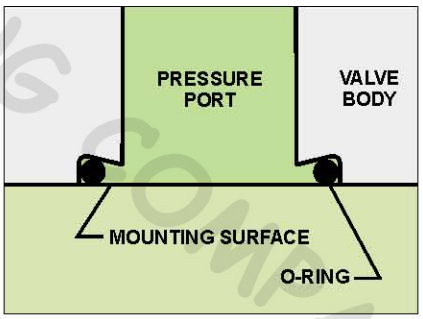


HIGH PRESSURE SOLENOID TUBES

High pressure solenoid tubes (HPT option) make the D03 ideal for use in higher pressure "series" circuits.

RELIABLE VALVE SEALING

Tapered o-ring counterbores reduce leakage, by assuring seal retention in high flow or rapid cycling operation. High-torque mounting prevents weepage between sections when using sandwich accessory valves.



Potential leakage is reduced by tapered o-ring counterbores which assure seal retention in high flow applications.

SPECIFICATIONS

General
For a description of spools,operator functions, electrical options and operating recommendations, refer to *dynexdcvoperating.pdf*.

Mounting
Subplate, N.F.P.A. D03 (CETOP 3) pattern

Operator Options
6100 Series:Manual Lever;
6500 Series: Direct Solenoid;
6800 Series: Hydraulic Piloted;
6900 Series: Air Piloted

Rated Flow
Nominal: 8 U.S. gpm (30 L/min);
Maximum: 15 U.S. gpm (57 L/min)

Maximum flow for models using a Type 011 spool is 9 U.S. gpm (34 L/min) for solenoid models and 10 U.S. gpm (38 L/min) for air and hydraulic pilot operated model. See flow capacity curves on page 4.

Rated Pressure
5000 psi (350 bar)

Tank Port Pressure (Maximum)
Standard:
1500 psi (105 bar);
High Pressure Option ("HPT"):
A.C., 2300 psi (160 bar);
D.C., 3000 psi (210 bar)

Response Time (Full Stroke)
Solenoid Energized:
A.C., 12 ms; D.C., 20 ms
Spring Returned:
A.C., 15 ms; D.C., 20 ms

Solenoids
Models are available with A.C. or D.C. solenoids.

The table above shows electrical specifications for these valves.

ELECTRICAL DATA

Solenoid Code①	Input Voltage (Volts)	Frequency (Hz)	Inrush Current (Amps)	Holding Current (Amps)	Holding Power (Watts)	Coil Resistance (Ohms ± 10%)
24/DF	24 A.C.	50	9.50	2.60	27	1.67
(Dual Frequency)	24 A.C.	60	8.60	1.75	22	1.67
115/DF	110 A.C.	50	1.65	.47	20	40.00
(Dual Frequency)	115 A.C.	60	1.55	.40	20	44.00
230/DF	220 A.C.	50	.86	.22	20	150.00
(Dual Frequency)	230 A.C.	60	.80	.18	20	150.00
460/DF	440 A.C.	50	.40	.13	23	600.00
(Dual Frequency)	460 A.C.	60	.41	.10	21	600.00
12 VDC	12 D.C.	—	—	—	28	5.10
24 VDC	24 D.C.	—	—	—	28	20.60
12VDC EPW	12 D.C.	—	—	—	33	4.36
24VDC EPW	24 D.C.	—	—	—	33	17.50
110/50 EPW	110 A.C.	50	1.86	.54	23	35.20
115/60 EPW	115 A.C.	60	1.90	.50	23	33.50

① *Ordering Codes shown are for standard wire leads with wiring box. "Plug-In-Terminal" solenoids (Hirschmann GDM 209) are also available; see "Typical Model Code" on page 17.*

Electrical Connections
Standard Wiring Box with leads;
Optional Terminal Strip, Cable Grip or Pin Connector (N.F.P.A. standard T3.5-29-1980; A.N.S.I. standard B93,55M-1981);
Optional Plug-In-Terminal Solenoids fit DIN Connector Standard 4365 (Hirschmann GDM 209)

Explosion Proof Option ("EPW")
Solenoids with special enclosures are approved by *UL* and *CSA* for use in hazardous locations. Available with A.C. or D.C. solenoids.

UL Classification:
Class I, Group C,D;
Class II, Group E,F,G

CSA/UL Recognized ("C" Option)
Solenoid coils are printed with the symbol:

(*CSA* and *UL* Recognized)

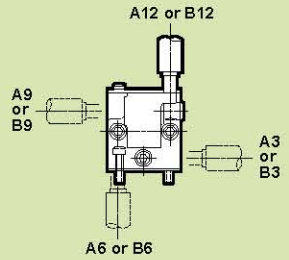
Available with 115/DF coils only. For other voltages, contact the Dynex sales department.

MANUAL OPERATED MODELS

Lever operated models offer handle position flexibility with four positions on either port "A" end or port "B" end of valve.

In-the-field changes are easy, by removing the bracket assembly and rotating the handle to the desired position.

To specify position, see *"Typical Model Code"* on page 8 and refer to the drawing at right.



Handle Position Viewed from Port "A" or Port "B" End of Valve

Typical Valve Performance

SOLENOID MODELS

The flow capacity curves show typical performance for each spool type. The letters in the *"Flow Curve Reference"* table identify the appropriate curve.

LEVER OPERATED MODELS

Most manual models are rated for 15 U.S. gpm (57 L/min) maximum.

The exception is model 613011-D03 which is rated for 13 U.S. gpm (49 L/min) maximum. This model has a Code 3 internal operator (two position, detented operation) with Type 011 spool (tandem center).

PILOT OPERATED MODELS

The maximum flow for pilot operated models is dependent on pilot pressure.

Generally, the maximum flow for most pilot operated models is 15 U.S. gpm (57 L/min). When using a Type 011 spool (tandem center, open cross-over), the maximum flow rating is 10 U.S. gpm (38 L/min).

Minimum Pilot Pressure

The table shows the minimum pressure required to shift the spool, for various flow capacities.

These values are based on zero tank pressure. As back pressure increases above zero, the minimum pilot pressure must be increased equally.

Maximum Pilot Pressure

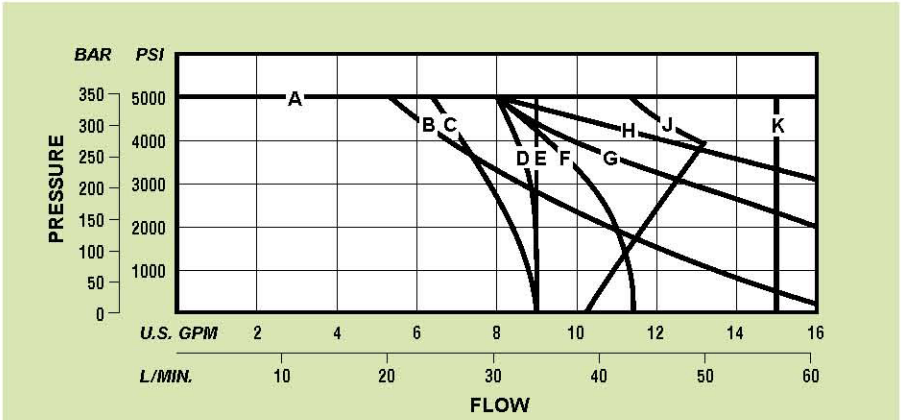
Hydraulic Piloted, 3000 psi (210 bar); Air Piloted, 200 psi (14 bar)

Volume

Maximum required to shift spool full stroke:

Hydraulic, 0.014 in^3 (0,23 cm^3);
Air, 0.220 in^3 (3,61 cm^3)

FLOW CAPACITY



FLOW CURVE REFERENCE

Solenoid Type	Spool Type										
	0	1	3	4	011	2	2R	32	32R	36	03
A.C.	A	A	H	A	C	E	E	J	J	B	B
D.C. and "EPW"	A	A	A	A	D	K	K	F	F	G	A

MINIMUM PILOT PRESSURE

Series	Spool Type	Pilot Pressure At: 5 U.S. gpm (19 L/min)		8 U.S. gpm (30 L/min)		15 U.S. gpm (57 L/min)	
		psi	bar	psi	bar	psi	bar
6800 Series Hydraulic Piloted	0	130	9,0	165	11,4	200	13,8
	1	150	10,3	165	11,4	420	29,0
	3	145	10,0	165	11,4	180	12,4
	4	130	9,0	165	11,4	200	13,8
	011	190	13,1	275	19,0	—	—
	2 or 2R	190	13,1	275	19,0	—	—
	32 or 32R	150	10,3	200	13,8	—	—
	36	150	10,3	200	13,8	350	24,1
	03	130	9,0	165	11,4	200	13,8
6900 Series Air Piloted	0	25	1,7	28	1,9	33	2,3
	1	21	1,4	22	1,5	24	1,7
	3	25	1,7	28	1,9	34	2,3
	4	25	1,7	28	1,9	33	2,3
	011	23	1,6	40	2,8	—	—
	2 or 2R	23	1,6	40	2,8	—	—
	32 or 32R	25	1,7	30	2,1	—	—
	36	25	1,7	28	1,9	34	2,3
	03	25	1,7	28	1,9	33	2,3

VALVE EFFICIENCY

D03 valves provide exceptionally low pressure drop, as shown in the performance curves.

Large internal flow paths, with tank return pressure boost, increase available shifting forces for dependable high flow operation.

DETERMINING PRESSURE DROP

The curves show resistance to flow for various spool types. The table identifies the proper pressure drop curve for each spool and flow path.

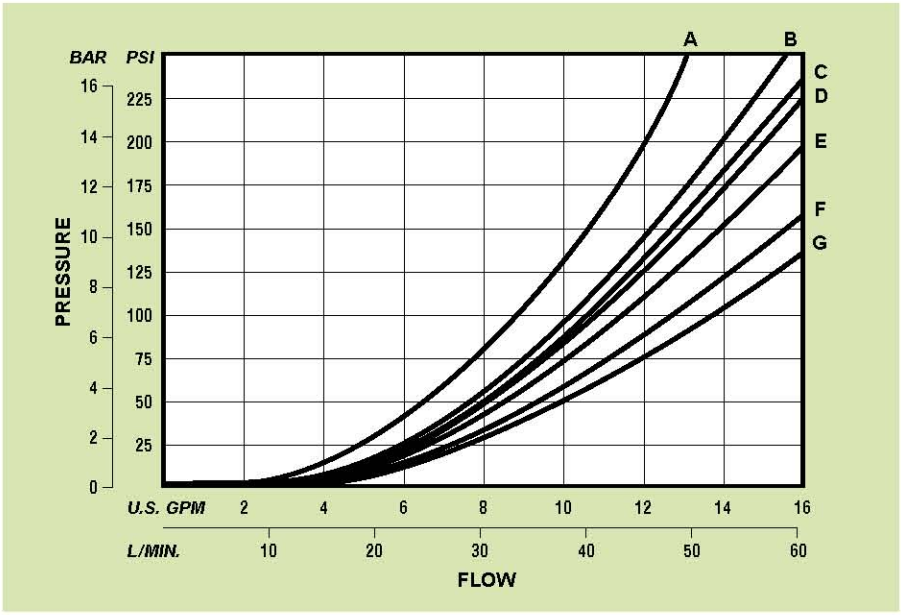
AN EXAMPLE

In the table under spool Type 1, curve "C" is called out to determine the pressure drop for P→A. Looking at the curves, "C" indicates a drop of about 55 psi at 8 U.S. gpm (3,8 bar at 30 L/min).

To determine total "loop" drop, the individual pressure drops for P→A and B→T (or P→B and A→T) must be added.

For example, curve "F" is used for the return flow B→T for spool Type 1. Curve "F" indicates a pressure drop of 35 psi at 8 U.S. gpm (2,4 bar at 30 L/min). Adding the individual pressure drops results in a "loop" drop through the valve in both directions of 55 + 35 = 90 psi (3,8 + 2,4 = 6,2 bar).

PRESSURE DROP (ΔP)



FLOW CURVE REFERENCE

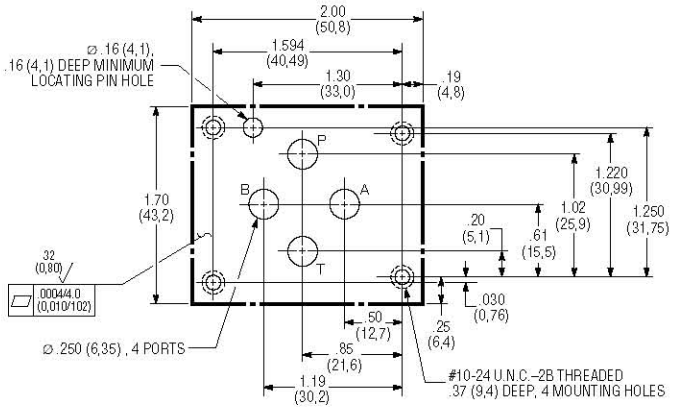
Flow Path	Spool Type										
	0	1	3	4	011	2	2R	32	32R	36	03
P→A	B	C	B	C	C	C	C	B	B	B	B
P→B	B	C	B	C	C	C	C	B	B	B	B
A→T	E	F	F	E	C	C	C	E	F	G	—
B→T	E	F	F	E	C	C	C	F	E	G	—
P→T	—	D	—	—	A	A	A	—	—	—	—

Installation and Dimensions

GENERAL VALVE MOUNTING

The mounting surface drawing shows the minimum flush or raised surface required for the N.F.P.A. D03 (CETOP 3) pattern. Mounting face must be flat within 0.0004 inch/4.0 inches (0,010 mm/102 mm) with a surface finish of 32 microinch(0,80 µm) AA.

Port o-rings are included with all valves. Mounting bolts must be ordered separately; 10-24 U.N.C. Threaded x 0.75 inch (19 mm), Grade 8 or better; four required. Recommended mounting torque is 65 lb·in (7,3 N·m) maximum.



Minimum Mounting Surface, N.F.P.A. D03 (CETOP 3) Pattern

SOLENOID MODEL DIMENSIONS

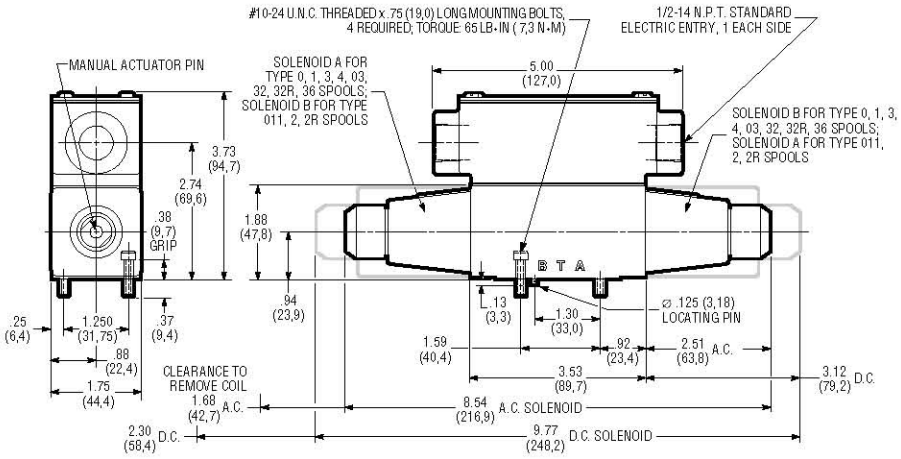
Refer to the basic installation drawing for typical dimensions common to all D03 valves.

Dimensions are shown for both A.C. and D.C. solenoids; D.C. configuration shown printed in gray.

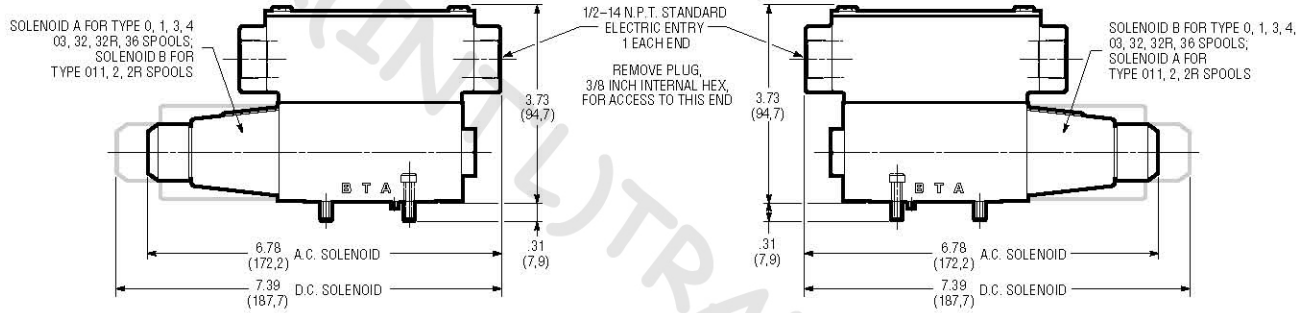
Weight (Mass)

Single Solenoid:
A.C., 3.4 lb (1,5 kg);
D.C., 3.9 lb (1,8 kg)

Double Solenoid:
A.C., 4.0 lb (1,8 kg);
D.C., 5.3 lb (2,4 kg)



6500 Series, Double Solenoid Models



6500 Series, Single Solenoid Models

EXPLOSION PROOF SOLENOIDS

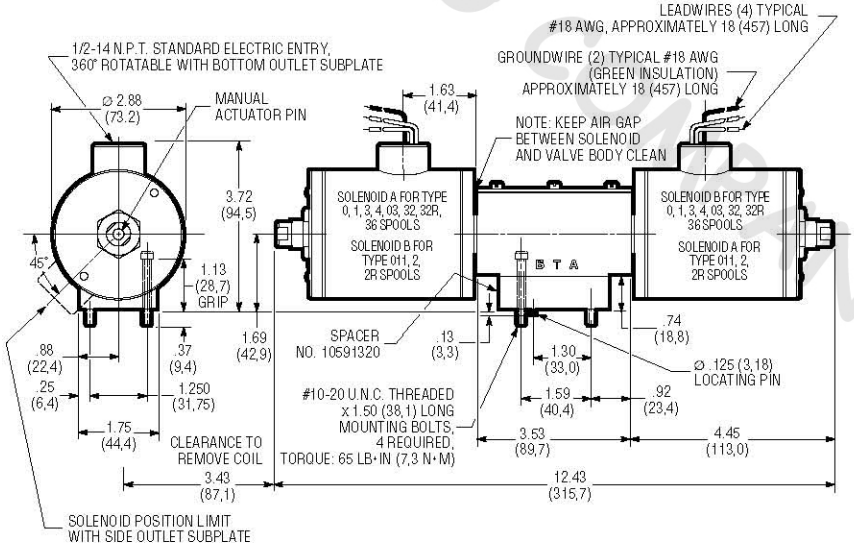
Solenoids with special enclosures are approved by *UL* and *CSA* for use in hazardous locations. Overall length of single solenoid models (not shown) is 8.23 inches (209,9 mm).

Note that spacer plate, part number 10591320, is required when valves are mounted on manifolds, side outlet subplates or when used as a pilot valve.

Valves can be mounted without removing nameplate. Openings in nameplate provide access to mounting holes in valve body.

Weight (Mass)

Single Solenoid: 8.3 lb (3,8 kg);
Double Solenoid: 14.0 lb (6,4 kg)



6500 Series, Double "EPW" Solenoid Models

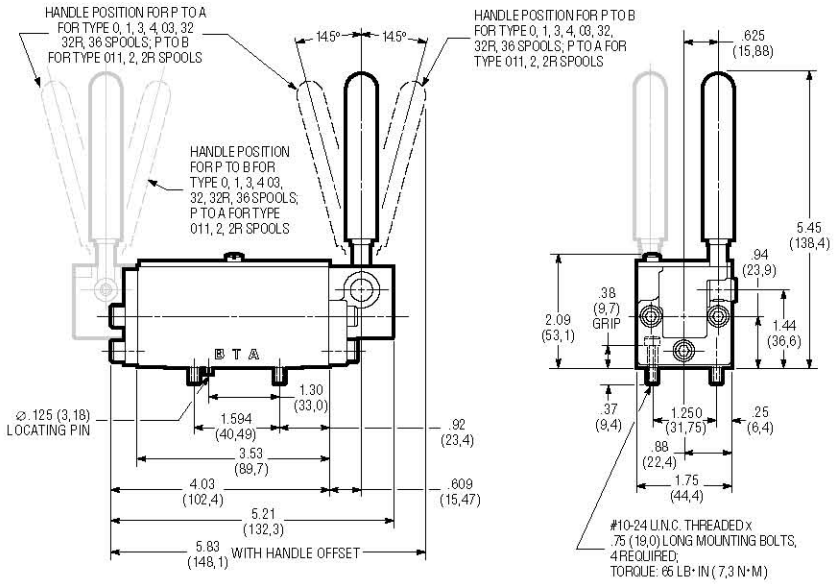
MANUAL OPERATED MODELS

Manual models are lever actuated, with handle positioned in a choice of four positions on either port "A" or port "B" end of valve. Refer to drawing on page 3 and "*Typical Model Code*" on page 8.

Valves can be mounted without removing nameplate. Openings in nameplate provide access to mounting holes in valve body.

Weight (Mass)

3.2 lb (1,5 kg)



6100 Series, Manual Lever Operated

HYDRAULIC PILOTED MODELS

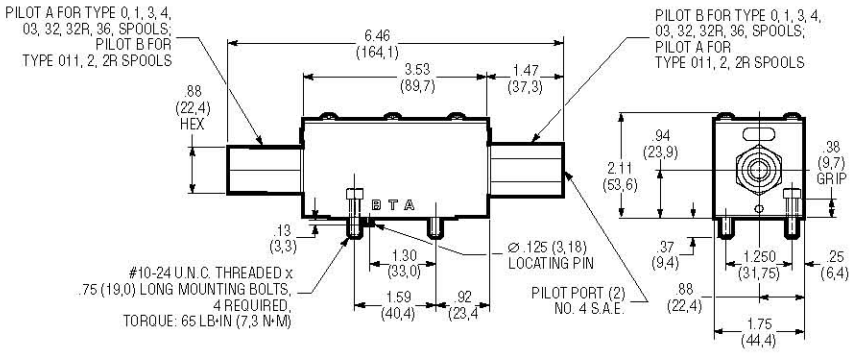
Single and double actuator models are available. Overall length of single configuration (not shown) is 5.25 inches (133,4 mm).

Valves can be mounted without removing nameplate. Openings in nameplate provide access to mounting holes in valve body.

Refer to page 3 for required shifting pressure and volume.

Weight (Mass)

Single Actuator: 2.5 lb (1,1 kg);
Double Actuator: 2.8 lb (1,3 kg)



6800 Series, Double Hydraulic Piloted Models

AIR PILOTED MODELS

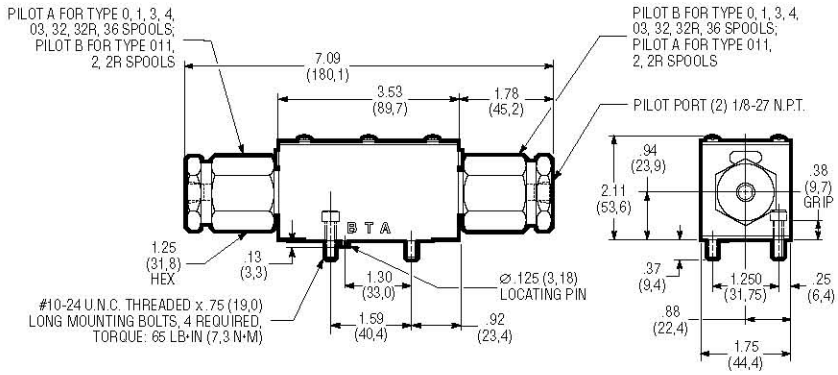
Single and double actuator models are available. Overall length of single configuration (not shown) is 5.56 inches (141,2 mm).

Valves can be mounted without removing nameplate. Openings in nameplate provide access to mounting holes in valve body.

Refer to page 3 for required shifting pressure and volume.

Weight (Mass)

Single Actuator: 2.3 lb (1,0 kg);
Double Actuator: 2.5 lb (1,1 kg)



6900 Series, Double Air Piloted Models

Typical Model Code

6 — 5 4 0 — D03 — 115/DF — R — ✳ — SL — 1 — 0

Valve Type
6 — Subplate Mounted Directional Control

Valve Size
D03 — 8 U.S. gpm (30 L/min) Nominal Flow, N.F.P.A. D03 (CETOP 3) Pattern

Reverse Flow Operator (Code 4 and 6 Only)
R — Code 4: Two Position; Spring Centered, Actuator Offset (Reverse Flow)
Code 6: Two Position; Spring Offset (Reverse Flow), Actuator Centered

Modification Number

Design Number

Actuator
1 — Manual Lever
5 — Solenoid Operated
8 — Hydraulic Piloted
9 — Air Piloted

Lever Position (Manual Models Only)
A12 — 12 o'clock position, on port "A" end of valve
A9 — 9 o'clock position, on port "A" end of valve
A6 — 6 o'clock position, on port "A" end of valve
A3 — 3 o'clock position, on port "A" end of valve
B12 — 12 o'clock position, on port "B" end of valve
B9 — 9 o'clock position, on port "B" end of valve
B6 — 6 o'clock position, on port "B" end of valve
B3 — 3 o'clock position, on port "B" end of valve

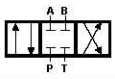
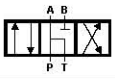
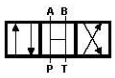
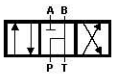
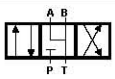
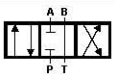
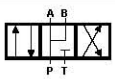
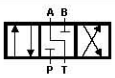
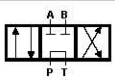
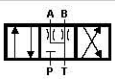
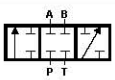
Internal Operator
1 — Two Position; Spring Offset (P→B), Actuator Offset (P→A)
2 — Two Position; Spring Offset (P→A), Actuator Offset (P→B)
3 — Two Position; Actuator Offset, Detented for Non-Manual Actuators①
Three Position; Detented for Manual Lever
4 — Two Position; Spring Centered, Actuator Offset②
5 — Three Position; Spring Centered, Actuator Offset
6 — Two Position; Spring Offset, Actuator Centered②
7 — Manual Lever Only; Two Position, Detented

① *Only available with Type 0, Type 1 and Type 03 spools.*
② *Not available with Manual Lever Operated valves.*

Options (Solenoid Models Only)
C — CSA and UL Recognized Coils (Etched with Symbol)①
M — Hand Actuated Manual Override②
T — Terminal Strip②③
CG — Cable Grip, for .38 to .44 inch (9,5 to 11,1 mm) O.D. machine tool cable②③
SL — Solenoid Lights (Available 115/DF A.C. Only)②③
HPT — High Pressure Tank Port
2300 psi (160 bar) maximum A.C. models
3000 psi (210 bar) maximum D.C. models
BH3A — 3-pin Connector (N.F.P.A. standard T3.539-1980), for single solenoid models, on port "A" end of valve②③④
BH3B — 3-pin Connector, for single solenoid models, on port "B" end of valve②③④
BH5A — 5-pin Connector, for single or double solenoid models, on port "A" end of valve②③④
BH5B — 5-pin Connector, for single or double solenoid models, on port "B" end of valve②③④

① *Available with 115/DF solenoids only. For other voltages, consult the Dynex sales department.*
② *Option not available with "EPW" solenoid models.*
③ *Option not available with "Plug-In-Terminal" solenoid models.*
④ *N.F.P.A. standard T3.539-1980; A.N.S.I. standard B93.55M-1981.*

Spools

0		2①	
1		2R①	
3①		32①	
4①		32R①	
011①②		36①	
		03	

① *Not available with Type 3 Internal Operators (except manual lever models).*
② *Open crossover*

Electrical – Solenoid Options

STANDARD SOLENOIDS:
24/DF — Dual Frequency, 24/60, 24/50
115/DF — Dual Frequency, 115/60, 110/50
230/DF — Dual Frequency, 230/60, 220/50
460/DF — Dual Frequency, 460/60, 440/50
12VDC — Direct Current, 12 Volts
24VDC — Direct Current, 24 Volts
12VDC EPW — Explosion Proof Solenoids
24VDC EPW — Explosion Proof Solenoids
115/60 EPW — Explosion Proof Solenoids
110/50 EPW — Explosion Proof Solenoids
220/50 EPW — Explosion Proof Solenoids

PLUG-IN TERMINAL SOLENOIDS:①
115/HAC — Dual Frequency, 115/60, 110/50
230/HAC — Dual Frequency, 230/60, 220/50
12/HDC — Direct Current, 12 Volts
24/HDC — Direct Current, 24 Volts

For Other Voltages, Consult the Dynex Sales Department

① *Fits DIN Connector Standard 43650 (Hirschmann GDM 209)*