

HP05 Pattern Directional Control Valves

Also refer to "Directional Valve Features, Selection and Operating Recommendations" ([dynexdcvoperating.pdf](#))

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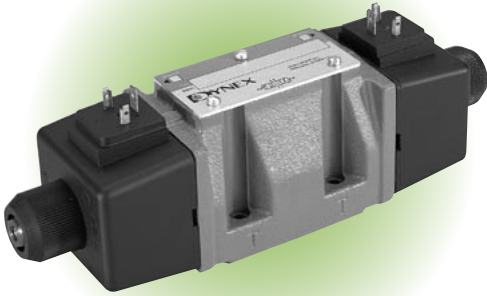
BROCHURE NOTES:

Consult the Dynex sales department for a review of any application which requires operating above the rated flows or pressures, or higher than normal operating temperatures.

Specifications shown were in effect when published. Since errors or omissions are possible, contact your sales representative for the most current specifications before ordering. Dynex reserves the right to discontinue or change designs at any time without incurring any obligation.



HIGH PRESSURE HP05 PATTERN



VALVE DESCRIPTION

HP05 valves operate at pressures to 8000 psi (560 bar), 60% higher than most other conventional subplate mounted valves.

These compact sliding-spool valves provide true four-way control in a simple compact package. A range of actuators, spools, internal operators and electrical options provides design flexibility.

Low pressure drop is enhanced with the use of the Dynex standard subplate, which takes advantage of this valve's special double tank port design.

For a description of spools, operators and application information, see [dynexdcvoperating.pdf](#).

Mounting

Special HP05 pattern. Refer to page 4.

Actuator Options

6500 Series: Direct Solenoid;
6800 Series: Hydraulic Piloted;
6900 Series: Air Piloted.

Rated Flow

5 U.S. gpm (19 L/min) nominal. Flows to 25 U.S. gpm (95 L/min) are possible with some models. See "Valve Flow Capacity".

Rated Pressure

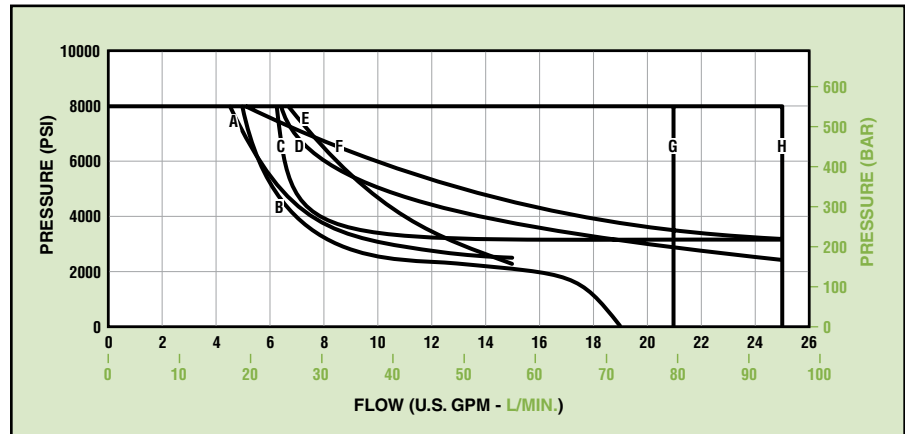
8000 psi (560 bar).

Tank Port Pressure (Maximum)

Solenoid Actuated Models:
Standard,
1500 psi (70 bar);
High Pressure Option ("HT"),
AC models, 2000 psi (140 bar);
DC models, 2500 psi (170 bar).

Hydraulic and air actuated models:
3000 psi (210 bar).

Flow Capacity – Solenoid Models



Flow Curve Reference

Solenoid Type	Spool Type						
	0	20	1	21	3	4	03
AC	H	B	G	C	F	H	A
DC and "EP"	H	B	H	C	D	H	E

Response Time (Full Stroke)

Solenoid Energized:
AC, 10-20 ms; DC, 25-35 ms.
Spring Returned:
AC, 15-20 ms; DC, 30-40 ms.

Solenoid Options

Models are available with standard AC or DC solenoids. Optional Plug-In-Terminal Solenoids fit DIN Connector, Standard 43650 Form A ("Hirschmann" type).

Electrical Connections

Standard Wiring Box with UL listed and CSA approved wire 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).

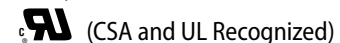
Explosion Proof Option ("EP")

Solenoids with special enclosures are approved by UL and CSA for use in hazardous locations. Available with AC or DC 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:



This option is available with "115DF" standard AC solenoids only. For availability with other voltages, contact the Dynex sales department.

VALVE FLOW CAPACITY

Flow capacity depends on valve actuator, internal operator and spool type.

Solenoid Models

The flow capacity curves, above, show typical performance for each internal operator and spool type. The letters in the "Flow Curve Reference" table identify the appropriate curve.

HIGH PRESSURE HP05

Pilot Operated Models

The nominal flow capacity for most pilot operated valves is 10 U.S. gpm (38 L/min).

Maximum flow for pilot operated valves is dependent on pilot pressure.

Minimum Pilot Pressure:

Hydraulic, 500 psi (35 bar);
Air, 75 psi (5 bar).

Maximum Pilot Pressure:

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

Required Volume (to shift spool full stroke):

Hydraulic, 0.014 in³ (0,23 cm³);
Air, 0.220 in³ (3,61 cm³).

VALVE EFFICIENCY

HP05 valves provide exceptionally low pressure drop, as shown in the performance curves. The values indicate typical performance using the Dynex standard subplate, which takes advantage of the valve's special double tank port design.

Flow may be limited for certain spools. See "Flow Capacity" curves on page 2.

Determining Pressure Drop

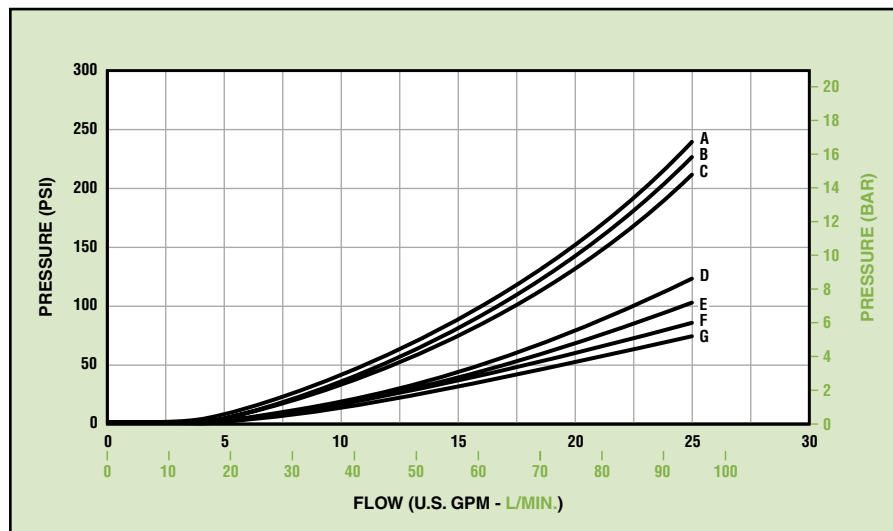
The curves show typical resistance to flow for various spool types. The table identifies the proper pressure drop curve for each spool and flow path.

An Example

In the table under spool Type 1, curve "D" is called out to determine the pressure drop for P→A. Looking at the curves, "D" indicates a drop of about 28 psi at 12 U.S. gpm (1,9 bar at 45 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.

Pressure Drop (ΔP)



Flow Curve Reference

Flow Path	Spool Type						
	0	20	1	21	3	4	03
P→A	B	B	C	C	A	C	B
P→B	B	B	C	C	A	C	B
A→T	D	D	G	D	F	E	–
B→T	D	D	G	D	F	E	–
P→T	–	–	B	–	–	–	–

INSTALLATION AND DIMENSIONS

Special Valve Mounting

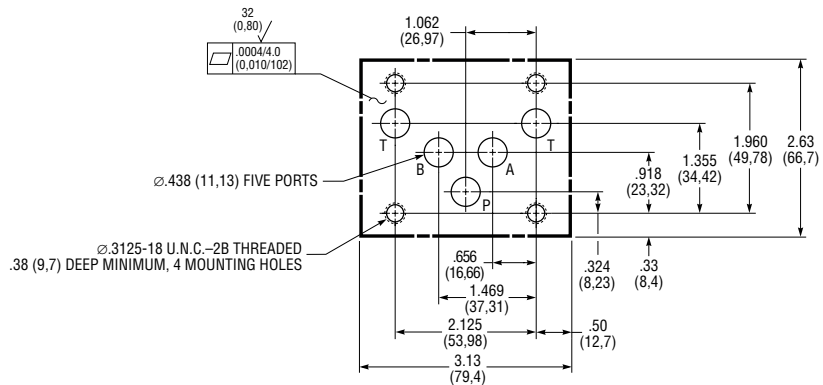
Although similar to standard N.F.P.A. D05 (CETOP 5) valves in size, HP05 valves require a special high pressure mounting pattern.

These valves have a second "T" port into a common tank passageway for lower pressure drop. The mounting surface drawing shows the HP05 pattern with the optional second "T" port.

Port o-rings are included with valves.

Mounting bolts must be ordered separately: 0.3125-18 U.N.C. Threaded x 1.00 inch (24,5 mm), Grade 8 or better, four required. Recommended mounting torque is 25 lb·ft (34 N·m).

See "Subplate and Bolt Kits" on page 5.



Minimum Mounting Surface, Special HP05 Pattern with Two Ports (T) into Common Tank Passageway

Solenoid Model Dimensions

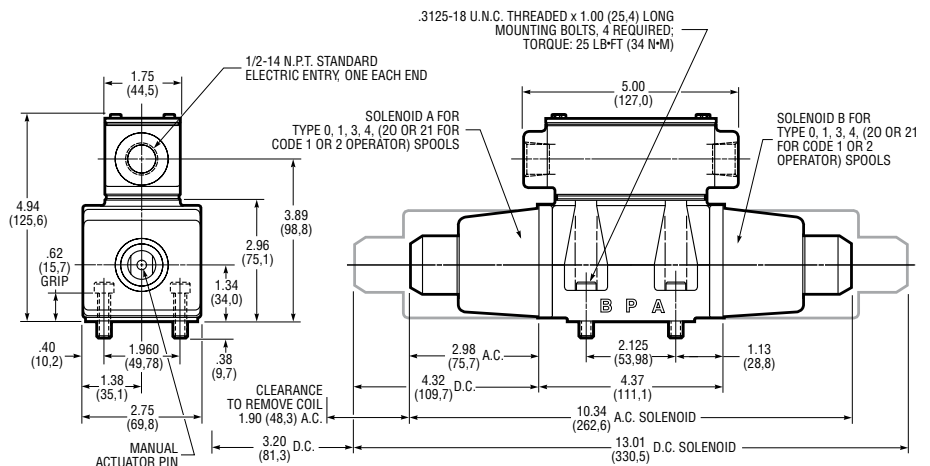
Dimensions are shown for both AC and DC solenoids. DC configuration is shown printed in gray.

The overall length of a single solenoid model (not shown) is 7.67 inches (194,8 mm) AC and 9.02 inches (229,11 mm) DC.

Weight (Mass):

Single Solenoid,
AC, 8.1 lb (3,7 kg);
DC, 9.5 lb (4,3 kg).

Double Solenoid,
AC, 9.6 lb (4,4 kg);
DC, 12.6 lb (5,7 kg).



6500 Series, Double Solenoid Models

Explosion Proof Solenoids

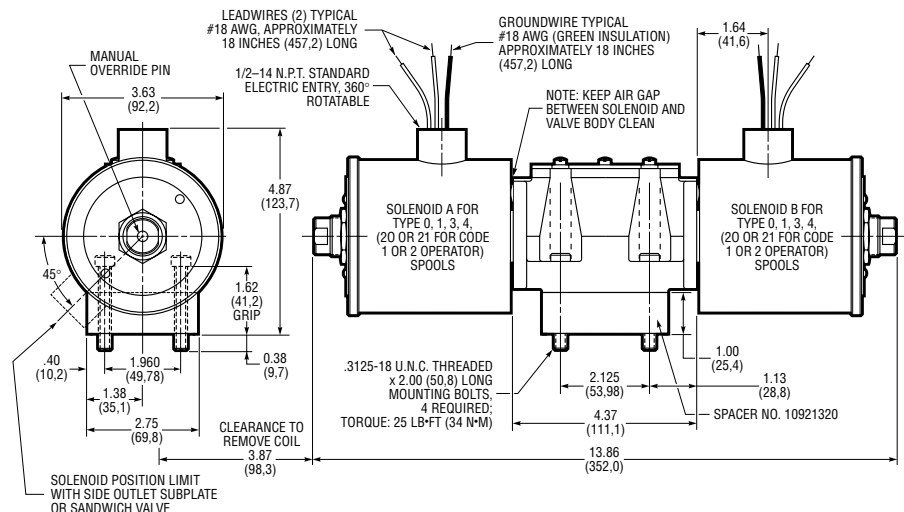
"EP" solenoids with special enclosures are approved by UL and CSA for use in hazardous locations.

Overall length of single solenoid models (not shown) is 9.31 inches (236,5 mm).

A kit with a spacer plate and bolts (part number KV00501066) is required when valves are mounted on manifolds, side outlet subplates or when used as a pilot valve.

Weight (Mass):

Single Solenoid, 15.7 lb (7,1 kg);
Double Solenoid, 24.8 lb (11,2 kg).



6500 Series, Double "EP" Solenoid Models

HIGH PRESSURE HP05

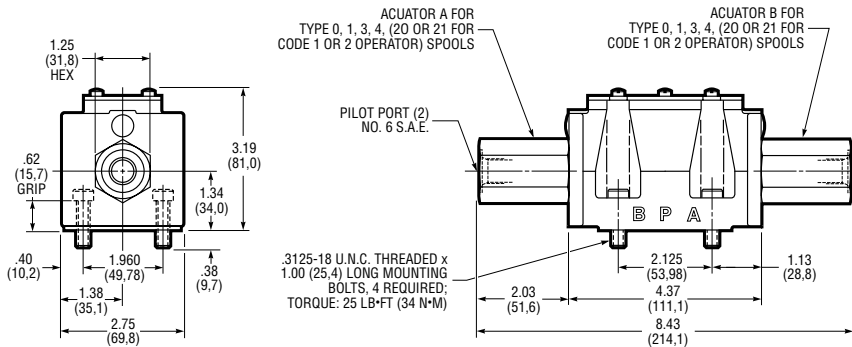
Hydraulic Pilot Operated

Overall length of single actuator configuration (not shown) is 6.60 inches (167,6 mm).

Weight (Mass):

Single Actuator, 7.1 lb (3,2 kg);

Double Actuator, 7.8 lb (3,5 kg).



6800 Series, Double Hydraulic Piloted Models

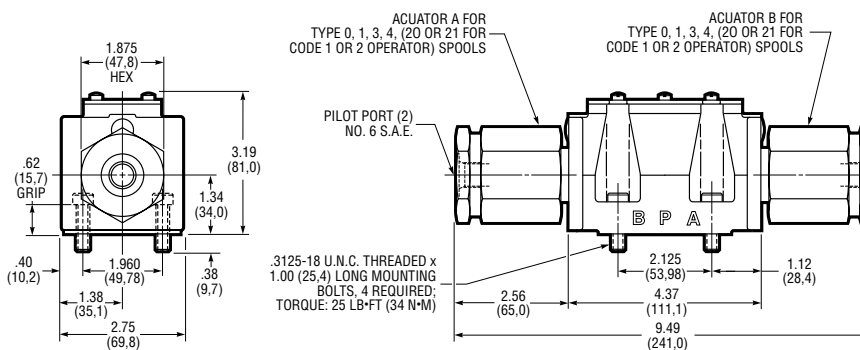
Air Piloted Models

Overall length of single actuator configuration (not shown) is 7.13 inches (118,1 mm).

Weight (Mass):

Single Actuator, 8.0 lb (3,6 kg);

Double Actuator, 9.5 lb (4,3 kg).



6900 Series, Double Air Piloted Models

HP05 SUBPLATE AND BOLT KITS

Part Number	Description
<i>Subplates:</i>	
PSO31-HP05-SAE12	Side Ports, No. 12 S.A.E.
PSO31-HP05-BSP12	Side Ports, G 3/4 (B.S.P.)
PSO31-HP05-.75MP ^①	Side Ports, 3/4 Medium Pressure Coned and Threaded, 3/4-14 N.P.S.M.
<i>Mounting Bolts:</i>	
P31-BK-16	Four .3125-18 U.N.C. Threaded x 1.00 inch (25,4 mm)

^① Port uses Autoclave Medium Pressure, Butech M/P or equivalent fitting.

HIGH PRESSURE HP05

TYPICAL MODEL CODE

6 5 4 0 - HP05 - 115DF - R - C - 2 0

Valve Type	
6	Subplate Mounted Directional Control

Actuator	
5	Solenoid Operated
8	Hydraulic Piloted
9	Air Piloted

Valve Size	
HP05	High Pressure Special Mounting Pattern

Reverse Flow Option	
R	Reverse Flow (Code 4 and Code 6 Internal Operators Only)

Design Number
C

Modification Number
2

Internal Operator	
1	Two Position: Spring Offset (P→B), Actuator Offset (P→A) ^①
2	Two Position: Spring Offset (P→A), Actuator Offset (P→B) ^①
3	Two Position: Actuator Offset, Detented ^②
4	Two Position: Spring Centered, Actuator Offset ^③
5	Three Position: Spring Centered, Actuator Offset
6	Two Position: Spring Offset, Actuator Centered ^④

① Only available with Type 20 and 21 spools.
 ② Only available with Type 0, 1 and 03 spools.
 ③ For most spools, normal flow is actuator offset P→A. For Spool Type 01 (tandem center) normal flow is actuator offset P→B.
 ④ For most spools, normal flow is spring offset P→B. For Spool Type 01 (tandem center) normal flow is spring offset P→A.

Solenoid Options	
BH3A	3-pin Connector for single solenoid models on port "A" end ^{①②③}
BH3B	3-pin Connector for single solenoid models on port "B" end ^{①②③}
BH5A	5-pin Connector for single or double solenoid models on port "A" end ^{①②③}
BH5B	5-pin Connector for single or double solenoid models on port "B" end ^{①②③}
C	CSA and UL Recognized Coils (Etched with Symbol) ^④
CG	Cable Grip for .38 to .44 inch (9,5 to 11,1 mm) O.D. machine tool cable ^{①②}
HT	High Pressure Tank Port: 2300 psi (160 bar) maximum AC models; 3000 psi (210 bar) maximum DC models
M	Hand Actuated Manual Override ^①
SL	Solenoid Lights (available 115DF AC only) ^{①②}
T	Terminal Strip ^{①②}

① Option not available with "EP" solenoid models.
 ② Option not available with "Plug-In Terminal" solenoid models.
 ③ N.F.P.A. standard T3.539-1980; A.N.S.I. standard B93.55M-1981.
 ④ Available with 115DF solenoids only.

Spools	
0,20 ^①	
1,21 ^①	
3 ^②	
4 ^②	
03	

① Code 1 or 2 Operators only use Type 20 or 21 spools. These spools provide the same function, but are not interchangeable with Type 0 or 1 spools.
 ② Not available with Type 3 Internal Operator.

Electrical (Solenoid Options)			
Standard AC Solenoids (Dual Frequency):		Standard DC Solenoids:	
24DF	24V/60Hz, 24V/50Hz	12DC	12VDC
115DF	115V/60Hz, 110V/50Hz	24DC	24VDC
230DF	230V/60Hz, 220V/50Hz	250DC	250VDC
460DF	460V/60Hz, 440V/50Hz		
Plug-In Terminal AC Solenoids: ^①		Plug-In Terminal DC Solenoids: ^①	
115HA	115V/60Hz, 110V/50Hz	12HD	12VDC
230HA	230V/60Hz, 220V/50Hz	24HD	24VDC
Explosion-Proof AC Solenoids:		Explosion-Proof DC Solenoids:	
115EP	115V/60Hz	12EP	12VDC
110EP	110V/50Hz	24EP	24VDC
220EP	220V/50Hz		

① Fits DIN Connector Standard 43650 Form A ("Hirschmann" type).