DYNEX
High Pressure Hydraulics

ENGINEERING SPECIFICATIONS

D05H Directional Control Valves

D05H SERIES
30 gpm (114 L/min) Nominal
40 gpm (151 L/min) Max
5000 psi (350 bar) Rated Pressure

D05H valves offer high flow capability, one-third greater than D05 valves. Flows to 40 U.S. gpm (151 L/min) are possible at pressures to 5000 psi (350 bar).

Refer to pages 2 and 3 for a description of spools and operators.

Mounting

Subplate, NFPA D05, Alternative B pattern (T3.5.1 R2-2002), with auxiliary "X" and "Y" ports for external pilot and drain.

Actuator Options

6600 Series: Solenoid Operated.
6800 Series: Hydraulic Piloted.
6900 Series: Air Piloted.

Rated Flow

Nominal: 30 U.S. gpm (114 L/min).
Maximum: 40 U.S. gpm (151 L/min).

Models with Spool Type 56 or 58 are rated for 15 gpm (57 L/min) maximum. For higher flows, contact the Dynex Sales department.

Rated Pressure

5000 psi (350 bar).

Tank Port Pressure (Maximum)

Standard External Drain:
5000 psi (350 bar).

Internal Drain ("ID" Option):
3000 psi (210 bar).

Response Time (Full Stroke)

Spring Centered Models:
Solenoid Energized, 40-70 ms.
Spring Returned, 40-45 ms.

Spring Offset Models:
Solenoid Energized, 50-55 ms.
Spring Returned, 85 ms.

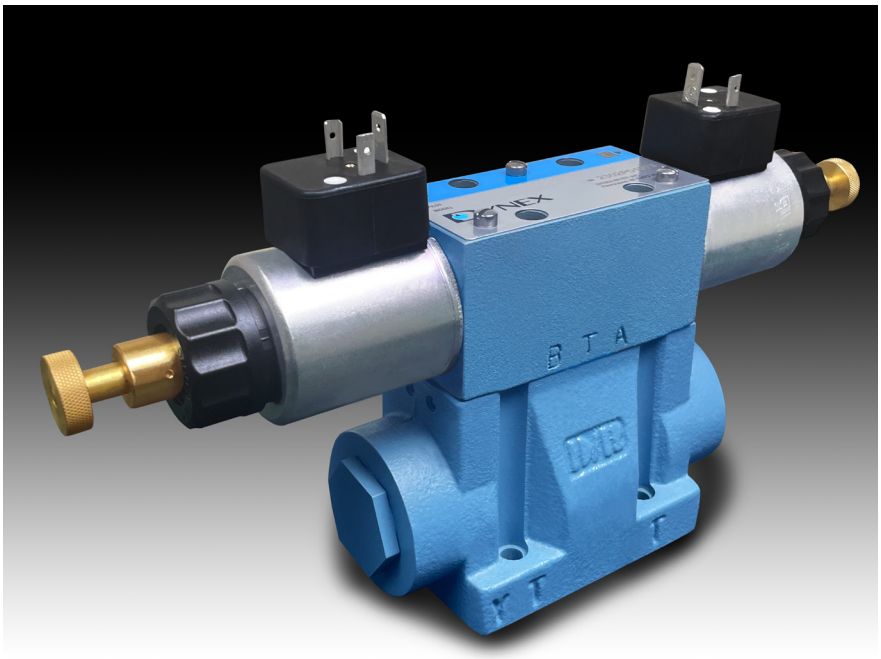


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INTERNAL OPERATORS

The table shows available internal operators and the most common spools. Refer to *Typical Model Code* on page 10 to specify valve model.

Contact the Dynex Sales department for availability of spool options not shown.

The function symbols in the table show solenoid actuated models as reference. Air and hydraulic actuators are also available.

Flow pattern in the center position or during crossover is determined by the selected spool. Refer to *Spool Descriptions* on page 3.

Flow Patterns

Actuator "A" opens flow path (P→A). Actuator "B" opens flow path (P→B).

Spring Centered and Spring Offset models are spring positioned unless actuated.

Detented Models (Solenoid Operated)

Code 3 operators (two position detented) hold the spool in the last actuated position. These valves can be actuated momentarily (minimum electrical signal duration, 50 ms) to shift and the detent will hold the spool in that position.

Reverse "R" Option (Internal Operator Code 4 Only)

Flow pattern can be altered with "R" (Reverse Assembly) option. Refer to *Internal Operator Descriptions* table for flow pattern details.

APPLICATION NOTES

Standard Seals

All valves use Fluorocarbon (Viton®, Fluorel®, or equivalent) o-rings, providing greater fluid compatibility and increased temperature range performance.

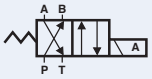
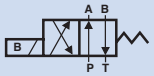
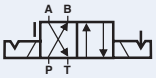
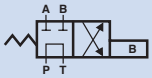
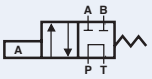
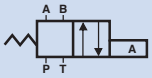
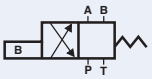
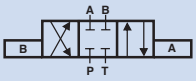
Fluid Recommendations

50 to 1500 SUS (7 to 323 cSt) viscosity; -20° to 200° F (-29° to 93° C) temperature range.

Recommended Filtration

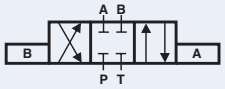
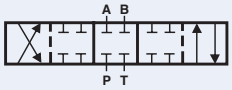
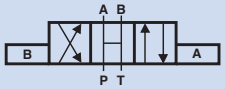
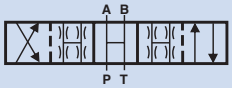
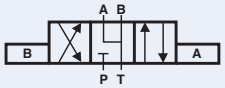
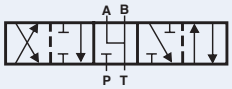
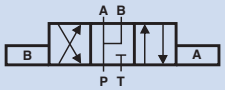
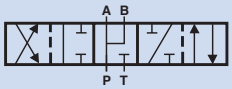
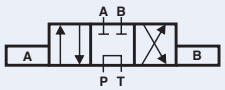
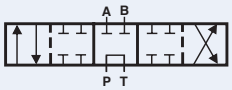
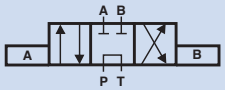
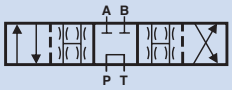
Use filtration to provide fluid which meets these ISO Code 4406 cleanliness values: 19/17/14.

Internal Operator Descriptions①

Internal Operator Code	Actuator, Operation	Spool Type	Operator Functions		
			Non-Actuated	Actuated	Function Symbol②
1	Single Actuator, Two Position	All Spools	P→B	P→A	
2	Single Actuator, Two Position	All Spools	P→A	P→B	
3	Single Actuator, Two Position③	All Spools	Detented in Actuated Positions	P→A or P→B	
4	Single Actuator, Two Position④	56 or 58	Spring Centered	P→B	
		56 or 58 Reverse	Spring Centered	P→A	
		5, 6, 8 or 9	Spring Centered	P→A	
		5, 6, 8 or 9 Reverse	Spring Centered	P→B	
5	Double Actuator, Three Position	All Spools	Spring Centered	P→A or P→B	

① *A & B represent the actuator(s), which can be Air, Hydraulic, or Solenoid.*
② *Symbols show solenoid actuated models, as reference. Air or hydraulic actuators are also available.*
③ *Code 3 operators with solenoid, hydraulic or air-piloted actuators provide two position operation.*
④ *Flow can be reversed with Reverse "R" option (i.e., with "R" in model code, Code 4 operator will direct flow to port "B" [P→B] in the actuated position).*

Spool Descriptions①

Spool Type	Spool Symbol	Crossover Function	Description of Spool Function
5			Closed center spool. All ports blocked in center position.
6			Open center spool. All ports connected in center position. Allows fluid motors or cylinders to move when de-energized. Minimum shock during crossover.
8			Pressure port blocked in center position. Both cylinder ports connected to tank.
9①			Cylinder ports pressurized in center position, tank port blocked. Used for a differential circuit with single rod cylinder. Prevents motor cavitating when decelerating. Reduces crossover shock.
56			Tandem center spool. Cylinder ports blocked, pressure connected to tank in center position with closed crossover. During transition from center to offset position, all ports are closed
58			Tandem center spool, as noted for Type 56 spool, but with open crossover. During transition from center to offset position, all ports are interconnected to eliminate shock in the system.

① *A & B represent the actuator(s), which can be Air, Hydraulic, or Solenoid.*



Represents the actuators.



Represents the work ports of the valve.

VALVE MOUNTING

D05H valves have a second "T" port into a common tank passageway, for lower pressure drop.

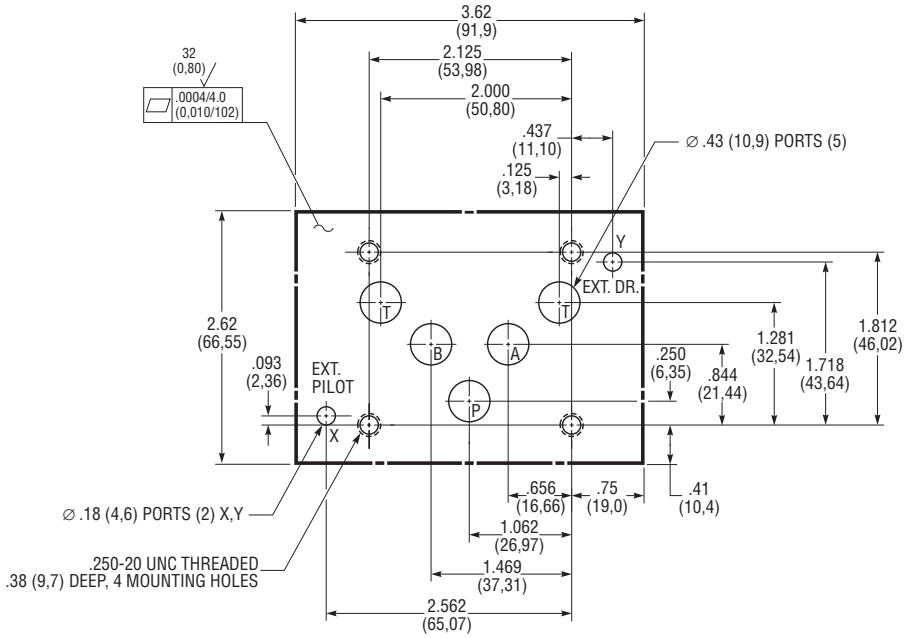
The mounting surface drawing shows the minimum flush or raised surface required for the NFPA D05, Alternative B pattern (T3.5.1 R2-2002).

Port o-rings are included with all valves.

Mounting bolts must be ordered separately: .250-20 UNC x 1.00 inch (25,4 mm), Grade 8 or better, four required. Recommended mounting torque is 12 lb•ft (16 N•m).

P22-BK (Bolt Kit) available.

Note: Installation drawing dimensions are shown in inches (millimeters in parentheses) and are nominal.



Minimum Mounting Surface

VALVE EFFICIENCY

The table identifies the appropriate pressure drop curve for each spool and flow path.

For example, in the table under spool Type 5, curve "B" is called out to determine the pressure drop for P→A. Looking at the curves, "B" indicates a drop of about 165 psi at 30 U.S. gpm (11,4 bar at 114 L/min).

Determining Pressure Drop

The *Pressure Drop (ΔP) Curves* show typical resistance to flow for various spool types. The *Flow Curve Reference* table identifies the typical pressure drop curve for desired spool and flow path.

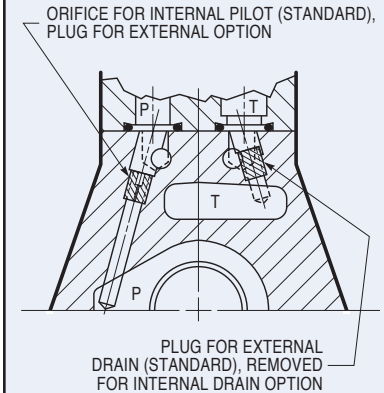
If the valve has simultaneous flow through it in more than one direction, then the "Loop" pressure drop should be determined to estimate total pressure drop (ΔP) through the valve.

To determine total "Loop" drop, the individual pressure drops for both flow paths (for example: P→A + B→T) must be added together.

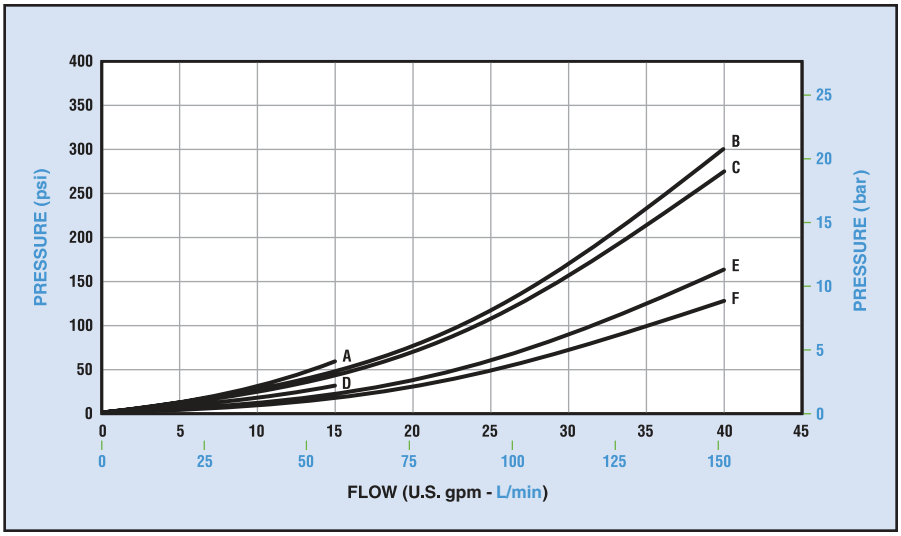
Valve Flow Capacity

Flow capacity depends on valve actuator, internal operator and spool type. Refer to *Typical Model Code* on page 10.

Pilot and Drain Options



Flow and Pressure Drop (ΔP) Curves



① *Curves are based on the use of 100 SUS (20 cSt) petroleum-based fluid at 120° F (50° C).*

Flow Curve Reference

Flow Path	Spool Type 5	6	8	9	56①	58①
P→A	B	C	B	B	C	C
P→B	B	C	B	B	C	C
A→T	E	F	F	E	D	D
B→T	E	F	F	E	D	D
P→T	–	C	–	–	A	A

① *Models with Type 56 and 58 spools are rated for 15 U.S. gpm (57 L/min) maximum flow.*

Typical Pressure Drop (ΔP Example)

To determine the pressure drop (ΔP) for Spool Type "0"

From *Flow Curve Reference* table, cross reference:

Spool Type "0" with the **Flow Path** for P→A or P→B functions = **(B curve)**

Spool Type "0" with the **Flow Path** for A→T or B→T functions = **(E curve)**

From *Pressure Drop (ΔP) Curves*:

At 15 gpm: **(B curve)** = approx. **50 psi** (P→A)

At 15 gpm: **(E curve)** = approx. **25 psi** (B→T)

To determine total (for example: P→A + B→T):

Loop Pressure Drop = 50 psi + 25 psi = **75 psi**

SOLENOID OPTIONS

These models use a D03 valve as a pilot. Models are available with AC or DC solenoids.

Electrical Connections

Plug-In-Terminal Solenoids fit Deutsch DT04-2P Connector or EN175301-803 (DIN 43650 Form A) Connector.

Standard Solenoids

Solenoids are easily removed without manual wiring or opening the hydraulic system for replacement. Coils can be rotated 360° for flexible installation.

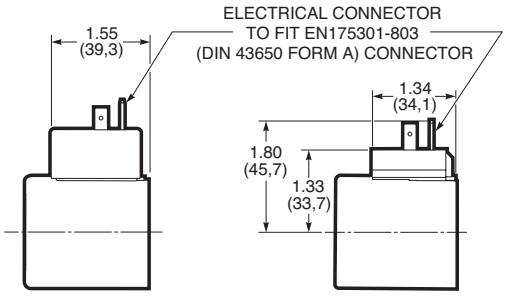
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Solenoid Electrical Data

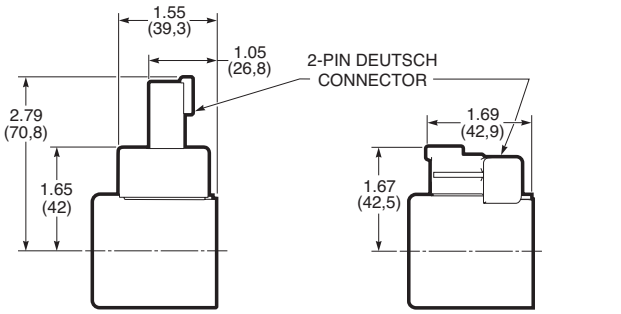
Solenoid Type	Volts	Coil Resistance (Ohms) at 77°F (25°C)	Power (Watts)
AC	24AC①	19.4 - 21.4	23
	115AC①	444 - 492	23
	230AC①	1823 - 1941	23
DC	12DC	4.56 - 5.04	30
	24DC	18.24 - 20.16	30
Explosion Proof	115AC①	830.4 - 900.0	18.6
	24DC	44.3 - 46.1	19

① *Information shown is for 60Hz models only. At other frequencies the coil characteristics must be revised.*



AC DIN CONNECTOR COIL

DC DIN CONNECTOR COIL



AC DEUTSCH CONNECTOR COIL

DC DEUTSCH CONNECTOR COIL

EXPLOSION PROOF SOLENOID OPTIONS

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

See table for Solenoid Ratings.

Weight (Mass):

Single Solenoid, 14.9 lb (6,8 kg).

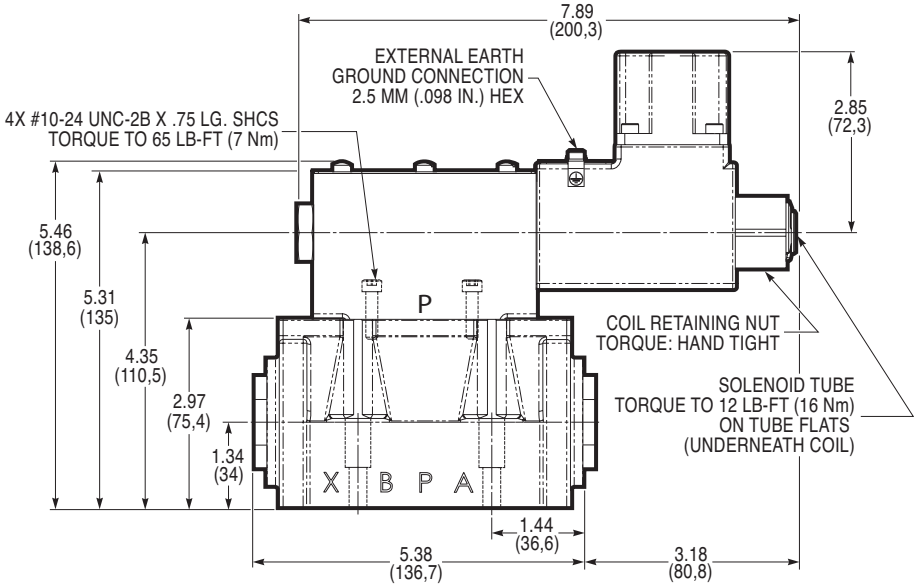
Double Solenoid, 18.1 lb (8,2 kg).

Explosion Proof Solenoid Ratings

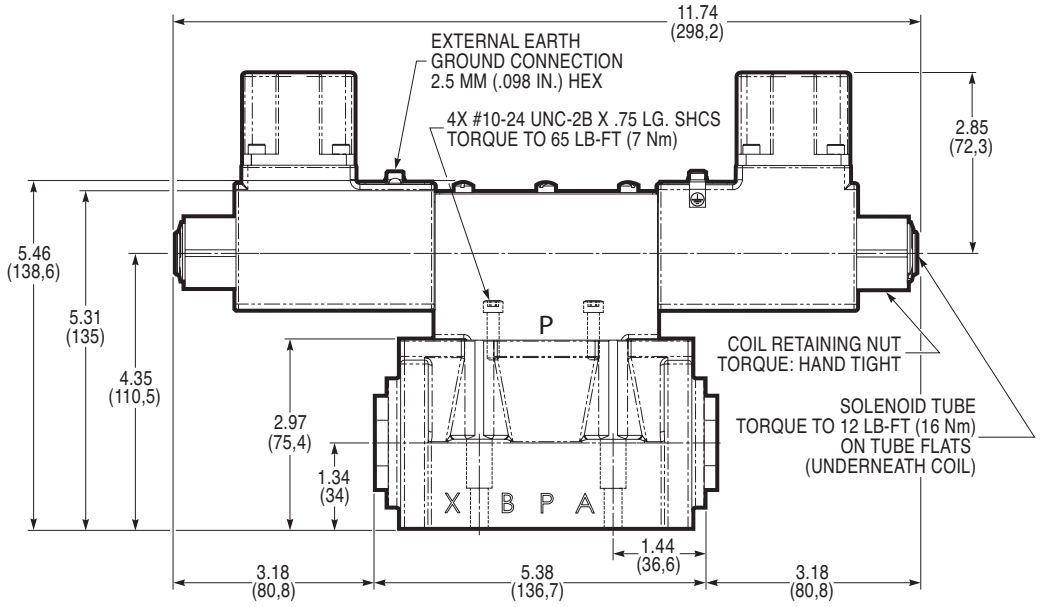
Location	Governing Standard	Dust & Gas Ratings
United States	NEC 500	Class I (Division 1) Group C & D Class II (Division 1) Group E, F, & G
United States	NEC 505 & 506	Class I (Zone 1) AEx db IIC T4 Gb Class I (Zone 21) AEx tb IIIC T135 Db
Canada	CEC/CSA	Ex db IIC T4 Gb (Zone 1)
Europe	ATEX	C€2813 II 2GD
International (Excluding Above)	IECEx	Ex db IIC T4 Gb Ex tb IIIC T135 Db

Installation Instructions:

1. *Temperature of the fluid flowing through the valve and the solenoid must not exceed ambient temperaturespecified on the nameplate (-65°F to 140°F (-54°C to 60°C)).*
2. *Fasteners securing the terminal box cover shall be M4X0.7-6G X 15mm per ISO-4762 and torqued to 15 LB-IN. Material: A2 - 70 or A4 - 70 of ISO-3506-1*
3. *Solenoid shall be mounted to a valve body/manifold/frame as heat sink ≥ 225 cm² surface area and mass of 1.7 kg of steel.*
4. *Note coil is polarity insensitive.*
5. *Solenoid tube to be torqued to 12 LB-FT min.*



6600 Series, Single "EP" Solenoid Models



6600 Series, Double "EP" Solenoid Models

6600 SERIES SOLENOID OPTIONS

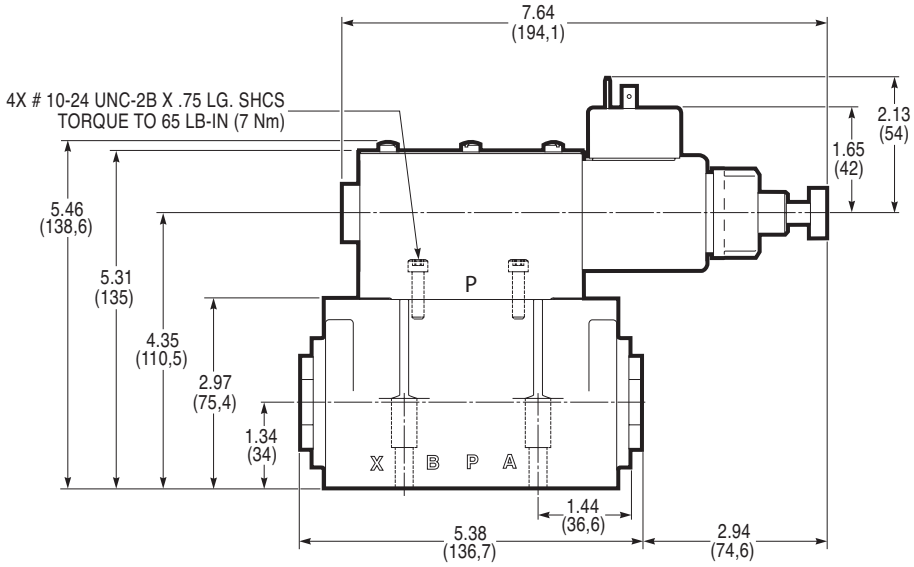
Models are available with AC or DC solenoids.

Pilot Pressure:

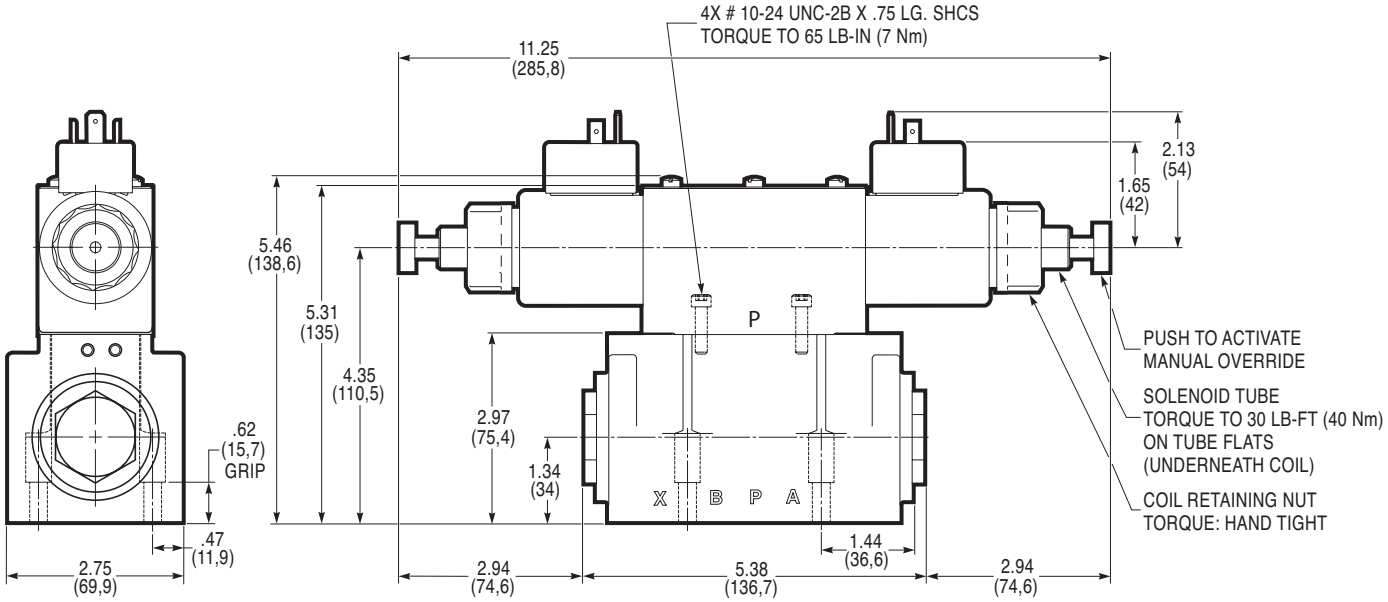
Minimum, 65 psi (5 bar).
Maximum, 5000 psi (350 bar).

Weight (Mass):

Single Solenoid, 12.6 lb (5,7 kg).
Double Solenoid, 13.5 lb (6,1 kg).



6600 Series, Single Solenoid Piloted Models (AC DIN Connector Version Shown)



6600 Series, Double Solenoid Piloted Models (AC DIN Connector Version Shown)

6800 SERIES HYDRAULIC PILOTED MODELS

The nominal flow capacity for most pilot operated valves is 30 U.S. gpm (114 L/min).

Maximum flow for pilot operated valves is dependent on pilot pressure. The table shows the minimum pressure required to shift the spool, for various flow capacities.

Pilot Pressure:

Minimum,100 psi (7 bar), except models with Code 5 internal operator, 85 psi (6 bar).

Maximum, 3000 psi (210 bar).

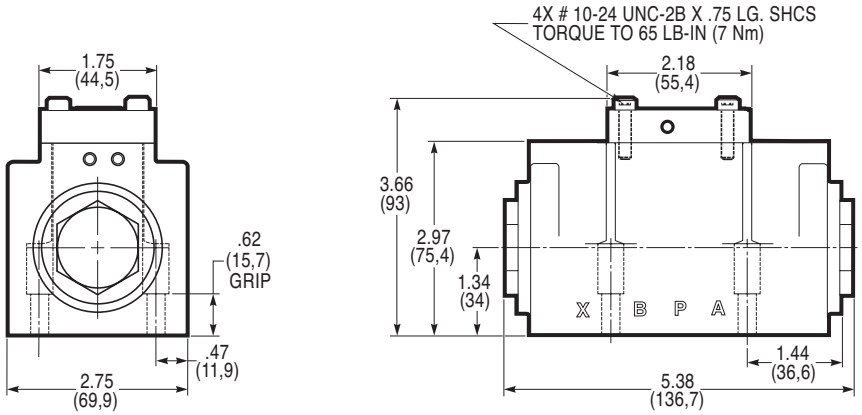
Required Volume (to shift spool full stroke): 0.21 in^3 (3,4 cm^3).

Weight (Mass):

8.8 lb (4 kg).

Direct Hydraulic Pilot Operated

As shown, these models use a cross-over block to direct pilot pressure from auxiliary ports "X" and "Y".



6800 Series, Direct Hydraulic Piloted Models

"X" and "Y" Port Function

Model	Port "X"	Port "Y"
681*	Actuator A	External Drain
682*	External Drain	Actuator B
685*	Actuator A for: Type 5, 6, 8, 9 Actuator B for: Type 56, 58	Actuator B for: Type 5, 6, 8, 9 Actuator A for: Type 56, 58

6900 SERIES AIR PILOTED MODELS

These models use an air piloted D03 valves as a pilot. The nominal flow capacity for most pilot operated valves is 30 U.S. gpm (114 L/min).

Maximum flow for pilot operated valves is dependent on pilot pressure. The table shows the minimum pressure required to shift the spool, for various flow capacities.

Pilot Pressure:

Minimum, 40 psi (3 bar).

Maximum, 200 psi (14 bar).

Required Volume (to shift spool full stroke): 0.220 in^3 (3,61 cm^3).

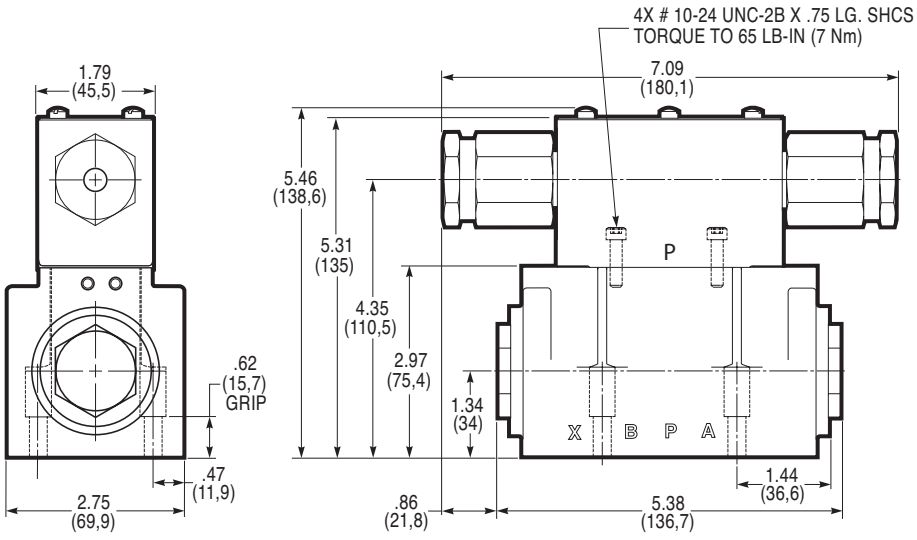
Air Piloted Dimensions

Overall length of single actuator configuration is 6.24 inches (158,5 mm).

Weight (Mass):

Single Actuator, 11.9 lb (5,3 kg).

Double Actuator, 12.0 lb (5,4 kg).



6900 Series, Double Air Piloted Models

OPTIONS

Flow Control (Pilot Choke) (CH OPTION)

A pilot choke increases the amount of time it takes to shift the main valve from one position to another.

It is designed to allow free flow to one end of the main stage spool but restricts flow out of the opposite end.

The rate of spool travel in either direction can be slowed by loosening a locknut and turning an adjusting screw clockwise. To increase the rate of spool travel, turn the adjusting screws counterclockwise.

When a pilot choke is used, pilot pressure should be taken from a constant pressure source. The pilot choke is mounted between the pilot valve and the main valve.

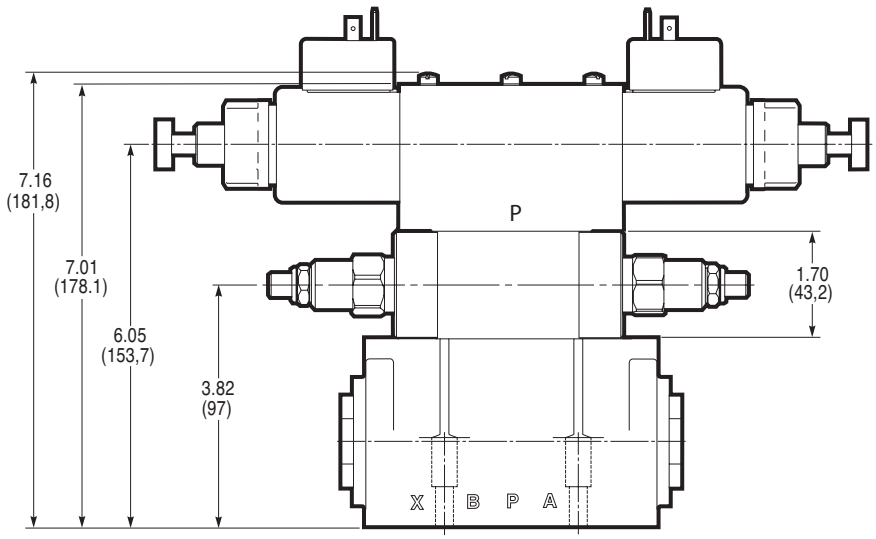
CH option adds 3.1 lb (1.4 kg).

Maximum Pressure:

3000 psi (210 bar).

Consult Dynex Sales department for pressures above 3000 psi (210 bar).

Note: Installation drawing dimensions are shown in inches (millimeters in parentheses) and are nominal.



Optional Spool Stroke Adjustment and Flow Control

TYPICAL MODEL CODE

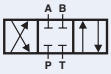
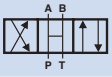
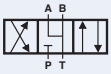
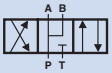
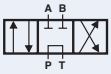
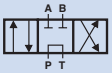
6 6 1 5 – D05H – 115DA – R – CH – E – 3 0

Valve Type	
6	Subplate Mounted Directional Control

Actuators	
6	Solenoid Operated
8	Hydraulic Piloted
9	Air Piloted

Internal Operators	
1	Two Position: Spring Offset (P→B), Actuated Position (P→A)
2	Two Position: Spring Offset (P→A), Actuated Position (P→B)
3	Two Position: Actuated Position, Detented
4	Two Position: Spring Centered, Actuated Position①
5	Three Position: Spring Centered, Actuated Position

① *For most spools, normal flow is actuated position P→A. For Spool Types 56 or 58, normal flow is actuated position P→B.*

Spool Types	
5	
6	
8	
9	
56①	
58②	

① *Closed Crossover.*
② *Open Crossover.*

Valve Size	
D05H	NFPA D05, Alternative B pattern (T3.5.1 R2-2002), with auxiliary "X" and "Y" ports for external pilot and drain

Seals	
No Code	Fluorocarbon (Viton® or Fluorel ®)
E	EPR (Ethylene-Propylene Rubber)

General Options①	
CH	Flow Control (Pilot Choke) - 3000 psi (210 bar) maximum pressure
ID	Internal Drain
XP	External Pilot

① *Not available with Hydraulic Piloted models.*

Reverse Assembly Option	
R	Used with Internal Operator Code 4 only.

Electrical Options			
*AC Solenoids Deutsch Connector:*①		*DC Solenoids Deutsch Connector:*①	
115DA	115V/60Hz, 110V/50Hz	**12DD**	12VDC
230DA	230V/60Hz, 220/50Hz	**24DD**	24VDC
24DA	24V/60Hz, 24V/50Hz		
*AC Solenoids DIN Connector:*②		*DC Solenoids DIN Connector:*②	
115HA	115V/60Hz, 110V/50Hz	**12HD**	12VDC
230HA	230V/60Hz, 220/50Hz	**24HD**	24VDC
*AC Explosion Proof:*③		*DC Explosion Proof:*③	
115EP	115V/60Hz	**24EP**	24VDC

① *Fits Deutsch DT04-2P Connector.*
② *Fits EN 175301-803 (DIN 43650 Form A) Connector.*
③ *Junction box with 1/2" NPT entry for cable glands.*



USA Headquarters

770 Capitol Drive
Pewaukee, WI 53072
Tel: +1 (262) 691-0300
Fax: +1 (262) 691-0312
sales@dynexhydraulics.com



Power Units & Systems

54 Nickerson Road
Ashland, MA 01721
Tel: +1 (508) 881-5110
ashland@dynexhydraulics.com



European Sales

Unit C5 Steel Close, Little End Road,
Eaton Socon, St Neots,
Cambs. PE19 8TT United Kingdom
Tel: +44 (0) 1480 213980
Fax: +44 (0) 01480 405662
sales@dynexhydraulics.co.uk



Middle East Sales

JAFZA 1, Tower A, 11th Floor
Jebel Ali Freezone
Dubai, UAE
Tel: +971 547422353
UAEsales@dynexhydraulics.com

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

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