Valves Control Flow to 40 U.S. gpm (151 L/min)

These reliable valves operate with superior efficiency at pressures to 5000 psi (350 bar). Exceptional flow characteristics are achieved with large internal flow passages with uniform flow areas throughout the body coring. Efficiency is enhanced with the use of the Dynex standard subplate, which takes advantage of the valve’s special double tank port design.

EFFICIENT LOW PRESSURE DROP

The result is exceptionally low loop pressure drop at 20 U.S. gpm (76 L/min) nominal flow: 80 psi (6 bar) with open center spools; 104 psi (7 bar) with closed center spools ($\Delta P$ loop = $P \rightarrow A + B \rightarrow T$).

LONG-LIFE OPERATION

Wet-armature solenoids provide low noise and leak-proof shifting. Reliable manual override is assured with non-corrosive override pins. Tapered o-ring counterbores improve sealing at the mounting surface. A four-land spool design assures exceptionally smooth spool travel. Additional outboard lands provide greater support, eliminating spool imbalance.

HIGH PRESSURE TANK PORT

High pressure tank port capability gives you greater circuit flexibility, especially with “series” circuits.

HIGH-TORQUE MOUNTING

High-torque mounting to 12 lb-ft (16 N·m) prevents weepage between mounting surfaces, especially important when using sandwich valves.

SIMPLIFIED SERVICE

Complete spool interchangeability and a large wiring box make these valves easy to install. Servicing of solenoids is made easier with hand-tightened knurled knob lock nuts.

SPECIFICATIONS

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

Mounting
Subplate, N.F.P.A. D05 (CETOP 5) Pattern

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

Rated Flow
Nominal: 20 U.S. gpm (76 L/min);
Maximum: See “Typical Valve Performance” on page 4.

Rated Pressure
5000 psi (350 bar)

Maximum Tank Port Pressure (Port T)
Solenoid Models, Standard: 1500 psi (105 bar);
High Pressure Option (“HPT”): A.C. Models, 2000 psi (140 bar);
D.C. Models, 2500 psi (170 bar)
Manual Lever Models: 3000 psi (210 bar)
Hydraulic Piloted Models: 3000 psi (210 bar)
Air Piloted Models: 3000 psi (210 bar)

Response Time (Full Stroke)
Solenoid Energized: A.C., 10-20 ms; D.C., 25-35 ms
Spring Returned: A.C., 15-20 ms; D.C., 30-40 ms

Spool travel is exceptionally smooth because of a four-land spool design which provides greater support, eliminating spool imbalance.
### SOLENOID SPECIFICATIONS

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

The table shows electrical specifications for these valves.

#### 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 43650 (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

### MANUAL LEVER MODELS

Lever operated models offer superior handle position flexibility. Choose from eight different lever locations for complete operator convenience.

These high performance valves provide a combination of operating efficiency and circuit layout flexibility.

The valves are rated for 20 U.S. gpm (76 L/min) nominal flow at pressures to 5000 psi (350 bar). Higher intermittent flows may be possible with some models. Consult the Dynex sales department.

### EASY INSTALLATION, SERVICING

With complete spool interchangeability and multiple lever positions which can be adjusted in the field, these valves are easy to install and service.

Choose from eight handle locations, with four positions on either port “A” or port “B” end of valve. To specify, see drawing at right and “Typical Model Code” on page 31.

This feature allows you to put the handle where it’s best for your circuit design, for complete operator convenience.

Changing the location is done by removing the bracket and handle assembly, and rotating it to the desired position.

### ELECTRICAL DATA

<table>
<thead>
<tr>
<th>Solenoid Code</th>
<th>Input Voltage (Volts)</th>
<th>Frequency (Hz)</th>
<th>Inrush Current (Amps)</th>
<th>Holding Current (Amps)</th>
<th>Holding Power (Watts)</th>
<th>Coil Resistance (Ohms ± 10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/DF</td>
<td>24 A.C.</td>
<td>50</td>
<td>23.00</td>
<td>4.10</td>
<td>38</td>
<td>0.56</td>
</tr>
<tr>
<td>(Dual Frequency)</td>
<td>24 A.C.</td>
<td>60</td>
<td>21.00</td>
<td>4.30</td>
<td>38</td>
<td>0.56</td>
</tr>
<tr>
<td>115/DF</td>
<td>110 A.C.</td>
<td>50</td>
<td>4.80</td>
<td>0.88</td>
<td>37</td>
<td>10.20</td>
</tr>
<tr>
<td>(Dual Frequency)</td>
<td>115 A.C.</td>
<td>60</td>
<td>4.30</td>
<td>0.72</td>
<td>35</td>
<td>10.20</td>
</tr>
<tr>
<td>230/DF</td>
<td>220 A.C.</td>
<td>50</td>
<td>2.40</td>
<td>0.44</td>
<td>37</td>
<td>40.80</td>
</tr>
<tr>
<td>(Dual Frequency)</td>
<td>230 A.C.</td>
<td>60</td>
<td>2.20</td>
<td>0.36</td>
<td>35</td>
<td>40.80</td>
</tr>
<tr>
<td>460/DF</td>
<td>440 A.C.</td>
<td>50</td>
<td>1.30</td>
<td>0.23</td>
<td>37</td>
<td>188.50</td>
</tr>
<tr>
<td>(Dual Frequency)</td>
<td>460 A.C.</td>
<td>60</td>
<td>1.20</td>
<td>0.20</td>
<td>35</td>
<td>188.50</td>
</tr>
<tr>
<td>12VDC</td>
<td>12 D.C.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>48</td>
<td>3.00</td>
</tr>
<tr>
<td>24VDC</td>
<td>24 D.C.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>48</td>
<td>12.00</td>
</tr>
<tr>
<td>250VDC</td>
<td>250 D.C.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>48</td>
<td>1300.00</td>
</tr>
<tr>
<td>12VDC EPW</td>
<td>12 D.C.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>48</td>
<td>3.00</td>
</tr>
<tr>
<td>24VDC EPW</td>
<td>24 D.C.</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>48</td>
<td>12.00</td>
</tr>
<tr>
<td>110/50 EPW</td>
<td>110 A.C.</td>
<td>50</td>
<td>4.20</td>
<td>1.00</td>
<td>43</td>
<td>10.72</td>
</tr>
<tr>
<td>115/60 EPW</td>
<td>115 A.C.</td>
<td>60</td>
<td>3.90</td>
<td>8.90</td>
<td>43</td>
<td>10.47</td>
</tr>
<tr>
<td>220/50 EPW</td>
<td>220 A.C.</td>
<td>50</td>
<td>2.09</td>
<td>0.50</td>
<td>43</td>
<td>43.35</td>
</tr>
</tbody>
</table>

*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 8.*
Typical Valve Performance

SOLENOID MODELS
The flow capacity curves show typical performance for each internal operator and spool. The letters in the “Flow Curve Reference” table identify the appropriate curve.

AN EXAMPLE
In the table under spool type 01, curve “F” is called out for Operator Code 4, A.C. Models. Looking at the curves, “F” indicates that the maximum flow is 20 U.S. gpm (76 L/min) up to the maximum pressure rating of 5000 psi (350 bar).

PILOT OPERATED MODELS
The maximum flow for pilot operated valves is dependent on pilot pressure. Generally, the maximum flow for most pilot operated models is 20 U.S. gpm (76 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 by the same level.

Maximum Pilot Pressure
Hydraulic Piloted:
3000 psi (210 bar);
Air Piloted:
200 psi (14 bar)

Volume
Maximum required to shift spool full stroke:
Hydraulic, 0.018 in³ (0.30 cm³);
Air, 0.640 in³ (10.49 cm³)
**VALVE EFFICIENCY**

Exceptional flow characteristics are achieved with large internal flow passages. Efficiency is enhanced with the use of our standard subplate, which takes advantage of the valve’s special double tank port design.

The result is exceptionally low pressure drop. At 20 U.S. gpm (76 L/min) flow, loop pressure drop is a low 102 psi (7.0 bar) with open center spools (Type 1) and 121 psi (8.3 bar) with closed center spools (Type 0).

**Determining Pressure Drop**

The curves show resistance to flow for various spool types. The “Curve Reference” 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 \( P \rightarrow A \). 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 \( A \rightarrow B \) and \( B \rightarrow T \) (or \( P \rightarrow B \) and \( A \rightarrow T \)) must be added.

---

**Installation and Dimensions**

**GENERAL VALVE MOUNTING**

This valve has a second “T” port into a common tank passageway, for lower pressure drop and increased efficiency. The mounting surface drawing shows the standard N.F.P.A. D05 (CETOP 5) pattern, with the optional second “T” port.

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. 250-20 U.N.C. Threaded x 1.00 inch (25.4 mm), Grade 8 or better; four required. Recommended mounting torque is 12 lb-ft (16 Nm) maximum.

---

**PRESSURE DROP (\( \Delta P \))**

![Pressure Drop Graph](image)

**CURVE REFERENCE**

<table>
<thead>
<tr>
<th>Flow Path</th>
<th>Spool Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>P→A</td>
<td>D</td>
</tr>
<tr>
<td>P→B</td>
<td>D</td>
</tr>
<tr>
<td>A→T</td>
<td>F</td>
</tr>
<tr>
<td>B→T</td>
<td>F</td>
</tr>
<tr>
<td>P→T</td>
<td>—</td>
</tr>
</tbody>
</table>

Recommended Minimum Mounting Surface, N.F.P.A. D05 (CETOP 5) Pattern With Two Ports (T) Into Common Tank Passageway

---

![Mounting Surface Drawing](image)
**Solenoid Model Dimensions**

Refer to the basic installation drawing, which shows typical dimensions common to all DO5 valves.

Dimensions are shown for both A.C. and D.C. models, with D.C. configuration shown printed in gray.

**Weight (Mass)**

Single Solenoid:
- A.C.: 8.1 lb (3.7 kg);
- D.C.: 9.5 lb (4.3 kg)

Double Solenoid:
- A.C.: 9.6 lb (4.4 kg);
- D.C.: 12.6 lb (5.7 kg)

**Explosion Proof Solenoids**

Solenoids with special enclosures are approved by UL and CSA for use in hazardous locations. Overall length of single “EPW” solenoid models (not shown) is 9.31 inches (236.5 mm).

Note that spacer plate, part number 10711320, is required when valves are mounted on manifolds and side outlet subplates.

Valves can be mounted without removing nameplate.

**Weight (Mass)**

Single Solenoid:
- A.C.: 15.7 lb (7.1 kg);
- Double Solenoid:
- 24.8 lb (11.2 kg)

6500 Series, Double “EPW” Solenoid Models
MANUAL OPERATED MODELS
Manual lever valves allow you to choose from eight handle locations, with four positions on either port “A” or port “B” end of valve. To specify, see drawing on page 26 and “Typical Model Code” on page 8.
Valves can be mounted without removing nameplate.

Weight (Mass)
7.8 lb (3.5 kg)

HYDRAULIC PILOTED MODELS
Single and double actuator models are available. Overall length of single configuration (not shown) is 6.60 inches (167.6 mm).
Valves can be mounted without removing nameplate.

Weight (Mass)
Single Actuator: 7.1 lb (3.2 kg);
Double Actuator: 7.8 lb (3.5 kg)

AIR PILOTED MODELS
Single and double actuator models are available. Overall length of single configuration (not shown) is 7.13 inches (181.1 mm).
Valves can be mounted without removing nameplate.

Weight (Mass)
Single Actuator: 8.0 lb (3.6 kg);
Double Actuator: 9.5 lb (4.3 kg)
**Typical Model Code**

<table>
<thead>
<tr>
<th>Number</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Valve Type</td>
<td>Subplate Mounted Directional Control</td>
</tr>
<tr>
<td>5</td>
<td>Valve Type</td>
<td>Hydraulic Piloted</td>
</tr>
<tr>
<td>4</td>
<td>Valve Type</td>
<td>Solenoid Operated</td>
</tr>
<tr>
<td>0</td>
<td>Valve Type</td>
<td>Manual Lever</td>
</tr>
<tr>
<td>10</td>
<td>Valve Type</td>
<td>Air Piloted</td>
</tr>
<tr>
<td>11</td>
<td>Valve Type</td>
<td>Reverse Flow Operator Code 4 and 6 Only</td>
</tr>
<tr>
<td>12</td>
<td>Valve Type</td>
<td>Modification Number</td>
</tr>
</tbody>
</table>

**Valve Size**

D05 = 20 U.S. gpm (76 L/min) Nominal Flow, N.F.P.A. D05 (CETOP 5) Pattern

**Reverse Flow Operator**

- **Code 4:** Two Position; Spring Centered, Actuator Offset (P→B), Actuator Centered
- **Code 6:** Two Position; Spring Offset (P→B), Actuator Centered

**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

**Options (Solenoid Models Only)**

- C — CSA and UL Recognized Coils (Etched with Symbol)
- M — Hand Actuated Manual Override
- T — Terminal Strip
- CG — Cable Grip, for .38 to .44 inch (9.5 to 11.1 mm) O.D. machine tool cables
- SL — Solenoid Lights (Available 115/DF A.C. Only)
- HPT — High Pressure Tank Port
- BHS — 3-pin Connector (N.F.P.A. standard T3.539-1980), for single solenoid models, on port “A” end of valve
- BHB — 3-pin Connector, for single solenoid models, on port “B” end of valve
- BHSA — 5-pin Connector, for single or double solenoid models, on port “A” end of valve
- BHSB — 5-pin Connector, for single or double solenoid models, on port “B” end of valve

- **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
    - 250 VDC — Direct Current, 250 Volts
    - 12VDC EPW — Explosion Proof Solenoids
    - 24VDC EPW — Explosion Proof Solenoids
    - 110/50 EPW — Explosion Proof Solenoids
    - 115/80 EPW — Explosion Proof Solenoids
    - 220/50 EPW — Explosion Proof Solenoids

  - **PLUG-IN TERMINAL SOLENOIDS:**
    - 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**

  - Fits DIN Connector Standard 43650 (Hirschmann GDM 209)