



INDUSTRIAL FLUID POWER COMPONENTS
AND SYSTEMS



D03 SERIES 35

Solenoid Operated Directional Valves



D03SD-2B-115A-35



D03SDS-2H-12D-35



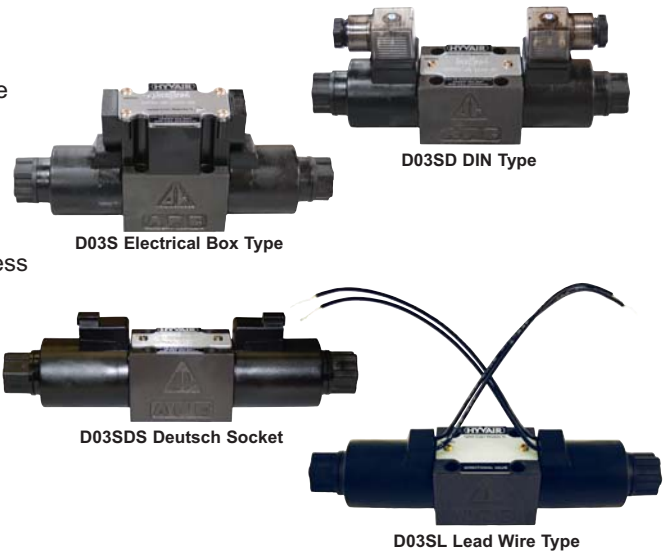
D03S-2B-115A-35

Features









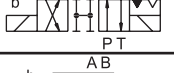
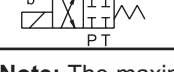
- **High Flow/ High Pressure:** Up to 25 gpm / 5000 psi working pressure*.
- **Oil Immersed, Quiet Solenoid Design:** Moving core immersed in hydraulic oil provides quiet operation.
- **High Tank Port Pressure:** Up to 3000 psi tank port back pressure (Check each spool type for max. allowable).
- **Twin Tank Line Design:** Upper and lower tank line channels (Double Loop) greatly reduces pressure drop.
- **Wiring:** Electrical box with indicator lights and terminal strip connection standard. DIN connector provided standard on DIN style coils. (Connectors may optionally be supplied with lights.) Deutsch socket and lead wire also available.
- **Hydraulic/ Electric Shockless:** Valve coils available electric shockless (rectified)- reducing voltages spikes, extending relay contact life, and providing even quieter operation. Spool shifting time is increased up to four times by metering the oil in the core tube. Option F (Electrical Box version only)
- **Maintenance:** Indicator lamps to diagnose connection; Plug-in coils provide easy changing without disturbing wiring.
- **High Reliability:** Valve designed to last 30 million spool shifts under proper use.
- **Bolt Kit included with valve standard**

*Some spools rated less- check max. pressures and flows chart

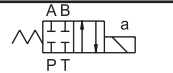

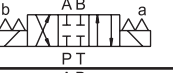


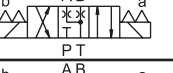





Series 35 High Flow/ High Pressure Directional Valves



Specifications

| Model | | Standard type | | Hydraulic Shockless type | | | |
|---|------------------|--------------------------------------|--------------------------|--------------------------------------|-------------------------------|--|--|
| Symbol | Valve spool type | Max. operating pressure psi (MPa) | Max. flow l/min (gpm) | Max. operating pressure psi (Mpa) | Max. flow gpm (liters/min) | | |
|  | 1A8 | 5000 (35) | 7.9 (30) | 3600 (25) | 30 (7.9) | | |
|  | 1A8R | | | | | | |
|  | 3A8 | | 21.1 (80) | | 50 (13.5) | | |
|  | 1A | | | | | | |
|  | 1AR | | 26.4 (100) | | | | |
|  | 3A | | | | | | |
|  | 1AY | | 17.1 (65) | | | | |
|  | 1ARY | | | | | | |
|  | 3AY | | 26.4 (100) | | | | |
|  | 5B | | | | | | |

Note: The maximum flow capacity is shown here. The maximum flow of each valve differs depending on pressure.

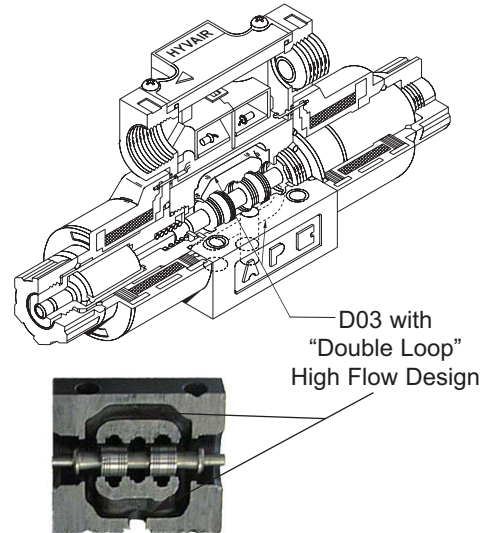
| Model | | Standard type | | Hydraulic Shockless type | | | |
|--|------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------|--|--|
| Symbol | Valve spool type | Max. operating pressure psi (MPa) | Max. flow l/min (gpm) | Max. operating pressure psi (Mpa) | Max. flow gpm (liters/min) | | |
|  | 5BR | 5000 (35) | 26.4 (100) | 3600 (25) | 50 (13.5) | | |
|  | 2J | | | | | | |
|  | 2B | | | | | | |
|  | 2T | | | | | | |
|  | 2K1 | | | | | | |
|  | 2F1 | | | | | | |
|  | 2K | | AC: 65 (17.1) DC: 80 (21.1) | | | | |
|  | 2F | | | | | | |
|  | 2H | | 50 (13.2) | | 10.6 (40) | | |
|  | 2C | | | | | | |
|  | 2C5 | | | | | | |

Note: The maximum flow capacity is shown here. The maximum flow of each valve differs depending on pressure. See HP (Pressure-Flow curve for each model).

Specifications

| | | | AC solenoid | DC solenoid | |
|-----------------------------------|-----------------------------|----------------|---|--------------------|-----|
| | | | | Built-in rectifier | |
| | | | AC | RAC | DC |
| Max. operating pressure | P, A, B ports | | 5070 psi (35 Mpa) Note: Less for some valve types such as hyd. shockless and tandem spool | | |
| Maximum permissible back pressure | T port | | 3040 psi (35:21 MPa) | | |
| Changeover frequency (cycles/min) | | Standard type | 300 | 120 | 300 |
| | | Shockless type | — | | 120 |
| Mounting Surface | Nfpa, (ISO) | | T3.5.1.MR1-D03, (4401-03) | | |
| Internal Leakage [✱] | cu-in/min, (ml/min) | | 0.18, (3) | | |
| Mass lbs (kg) | Double solenoids | | 4 (1.8) | 4.4 (2.0) | |
| | Single solenoid | | 3.1 (1.4) | 3.3 (1.5) | |
| Recommended operating conditions | Operating temperature range | | -4 ~ 158 °F (-20 ~ 70 °C) | | |
| | Operating viscosity | | 80 ~ 1400 SUS (15 ~ 300 mm /s ²) | | |
| | Viscosity index | | 90 or above | | |
| | Filtration | | 25 µm or less | | |

 * @3000psi Viscosity of hydraulic fluid: 150SUS (32mm²/s)

Internal Structure

Symbols

| | | | | |
|--|--|--|--|--|
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Common 115 VAC Models

| D03 | Symbol | D03 | Symbol |
|------------------|--------|-----------------|--------|
| D03S-1A-115A-35 | | D03S-2H-115A-35 | |
| D03S-1AY-115A-35 | | D03S-2K-115A-35 | |
| D03S-2B-115A-35 | | D03S-2T-115A-35 | |
| D03S-2C-115A-35 | | D03S-3A-115A-35 | |
| D03S-2F-115A-35 | | | |

Common Configurations

Electrical Box



Din Coil

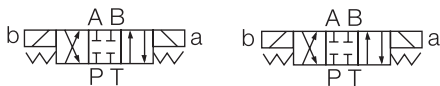


Example of Code “R” Reversed (symbols shown in simplified form)



D03SD-2B
(standard)

D03SD-2BR
(no change to DIN coil valve, electrical box flipped for opposite coil markings)



D03SD-1A
(standard)

D03SD-1AR
(coil supplied reversed from normal position & spool reversed)



(symbol shown blocked during valve transition only)

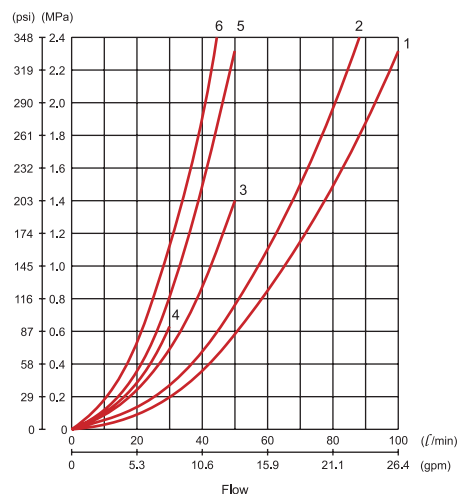


D03SD-5B
(standard)

D03SD-5BR
(right or “b” coil side of valve provided)



Pressure Drop Curves



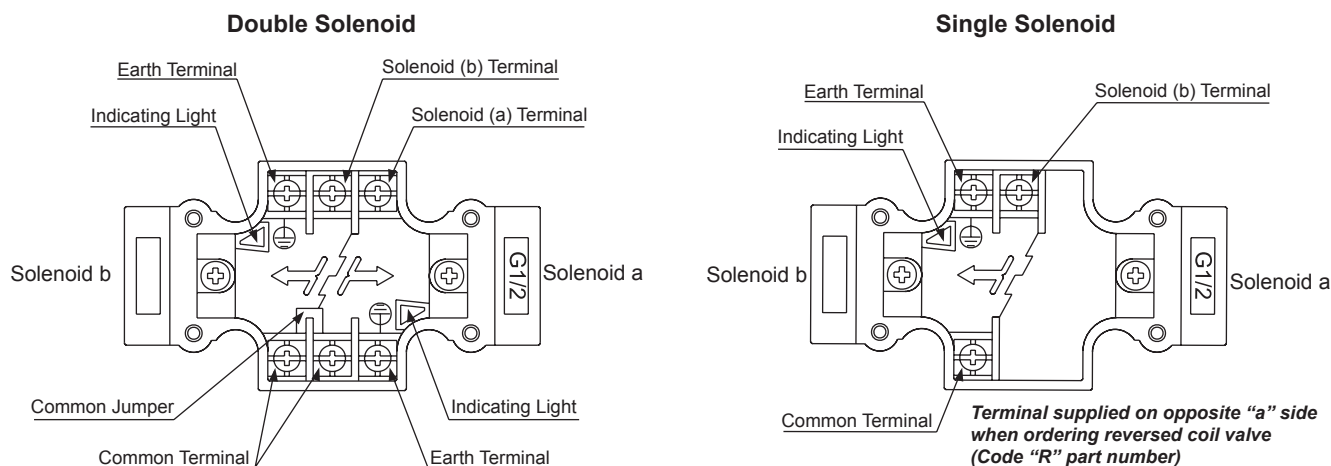
| Model | Valve spool type | P→A | P→B | A→T | B→T | P→T |
|------------|------------------|-----|-----|-----|-----|-----|
| D03 SERIES | 1A8, 1A8R, 3A8 | 4 | 4 | — | — | — |
| | 1A, 1AR | 2 | 2 | 2 | 2 | — |
| | 3A | 2 | 2 | 2 | 2 | — |
| | 1AY, 1AYR, 3AY | 1 | 1 | 1 | 1 | — |
| | 2H | 1 | 1 | 1 | 1 | 1 |
| | 5B, 5BR, 2B, 2F | 2 | 2 | 2 | 2 | — |
| | 2K, 2K1 | 2 | 2 | 1 | 2 | — |
| | 2J | 1 | 2 | 2 | 2 | — |
| | 2F | 2 | 2 | 1 | 1 | — |
| | 2C | 6 | 6 | 5 | 5 | 3 |
| | 2C5 | 1 | 6 | 2 | 5 | 3 |
| | 2T | 1 | 1 | 2 | 2 | — |

Viscosity of hydraulic fluid 150 SUS {32 mm /s²}

Electrical Information

| D03 | Solenoid Coil Specifications | | | | | | | | | | | | |
|-------------------------------|------------------------------|------|-------|-----------|------|-------|----------------------|------|----------------------|-------|-----------|-----------|------|
| Solenoid Voltage | 115V-AC | | | 230V-AC | | | 115V-RAC (rectified) | | 230V-RAC (rectified) | | 12V-DC | 24V-DC | |
| Coil Model D03S (Elect. Box) | 2BH-C1/C3 | | | 2BH-C2/C4 | | | 2BF-R1/R3 | | 2BF-R2/R4 | | 2BF-D1 | 2BF-D2 | |
| Coil Model D03SD (DIN) | 2AH-C1/C3 | | | 2AH-C2/C4 | | | 2AF-R1/R3 | | 2AF-R2/R4 | | 2AF-D1 | 2AF-D2 | |
| Applied Voltage | AC110 | | AC120 | AC220 | | AC240 | AC110 | | AC120 | AC220 | AC240 | DC12 | DC24 |
| Frequency (Hz) | 50 | 60 | 60 | 50 | 60 | 60 | 50 / 60 | | 50 / 60 | | | | |
| Starting Current (A) | 2.2 | 2.0 | 2.2 | 1.1 | 1.0 | 1.0 | | | | | | | |
| Holding Current (A) | 0.54 | 0.41 | 0.47 | 0.25 | 0.19 | 0.23 | 0.31 | 0.32 | 0.15 | 0.16 | 2.5 | 1.25 | |
| Holding Power (W) | 25 | 22 | 28 | 25 | 22 | 28 | 30 | 32 | 30 | 32 | 30 | 30 | |
| Permissible Voltage Range (V) | 80-120 | | | 180-240 | | | 80-130 | | 180-250 | | 10.8-13.2 | 21.6-26.4 | |
| Insulation Resistance (MΩ) | 100 or above (500V) | | | | | | | | | | | | |

Electrical Box Wiring



Notes:

- DIN Coils manufactured to accept standard 3 pin DIN 43 650 and ISO 4400 connectors.
- AC Coils are rated for both 50/60Hz (rewiring not required)
- DC coils are not polarity sensitive
- Rectifier is supplied: in the electrical box- D03S, in the coil (internal)- D03SD
- Hydraulic shockless AC valves are always supplied with rectifier.
- Hydraulic shockless valves will not operate as shockless until the tank line has become filled with oil- occurs automatically after the first few cycles. Mounting valve below the reservoir oil level or using check valve ensures that the tank line remains filled.
- Do not supply electrical power to the AC coils unless the coil is mounted on the valve.
- Do not exceed voltage specifications shown above.
- Electrical power should be maintained on detented valves (spool code 3A). Detent only maintains start-up position of the valve.

Dimensional Data

Electrical Box Type

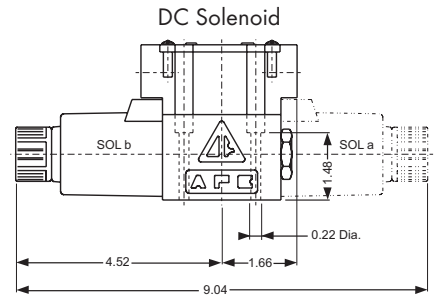
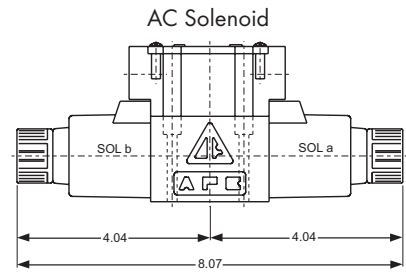
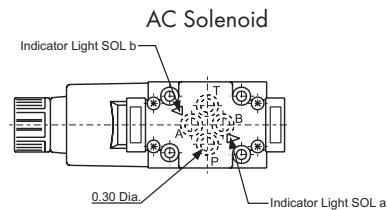
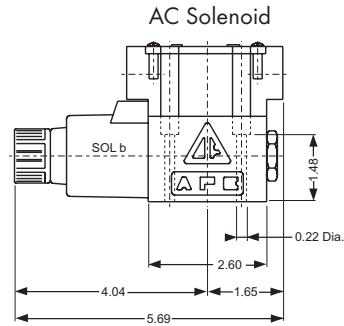
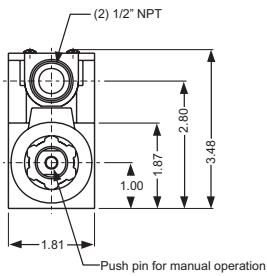
D03S

D03SF

Units: Inches

Mounting: (4) 10-24 SHCS x 1-3/4"

Torque 40-45 in-lbs



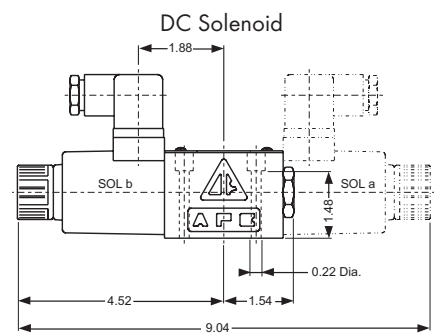
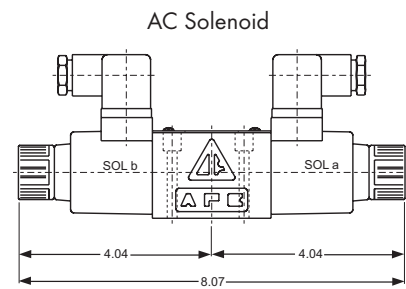
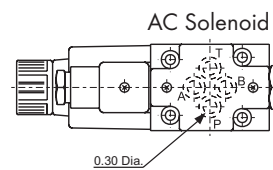
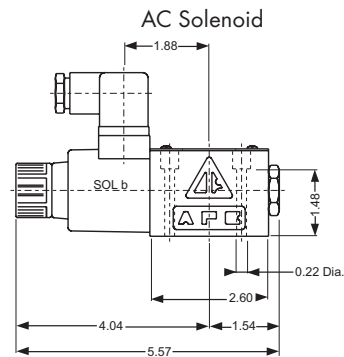
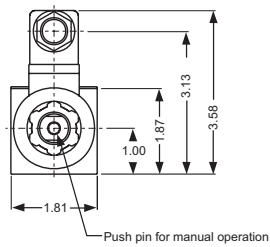
DIN Type

D03SD

Units: Inches

Mounting: (4) 10-24 SHCS x 1-3/4"

Torque 40-45 in-lbs



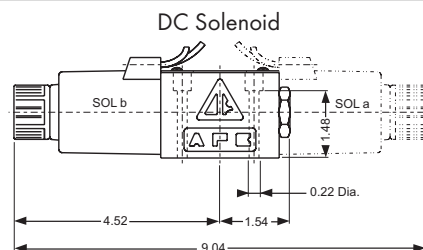
Lead Wire Type

D03SL

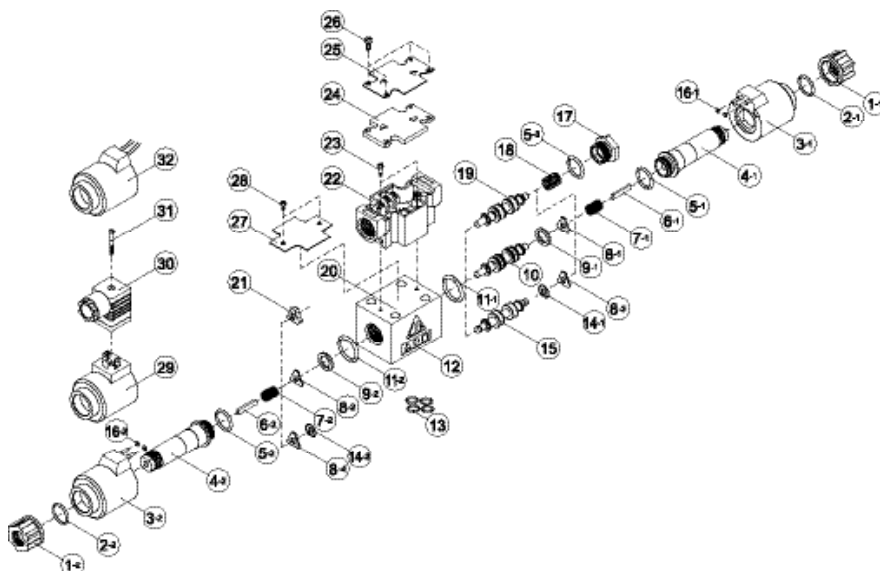
Units: Inches

Mounting: (4) 10-24 SHCS x 1-3/4"

Torque 40-45 in-lbs



Parts Breakdown D03S/ D03SD/ D03SL Series 35



Parts Breakdown D03S/ D03SD/ D03SL Series 35

| | | | |
|------------------------------|-------------------------------|--------------------------------|-------------------------------|
| 1) Solenoid Nut | 9) Washer | 17) Hex Plug | 25) Nameplate (Elect. Box) |
| 2) O-Ring | 10) Spool (3 position) | 18) Spring | 26) Screw |
| 3) Coil For Elect. Box Type) | 11) O-Ring | 19) Spool (2 pos. single coil) | 27) Nameplate (Non-Box Type) |
| 4) Armature (Core Tube) | 12) Body | 20) Body | 28) Screw |
| 5) O-Ring | 13) O-Ring | 21) Retainer | 29) Coil (For DIN Type) |
| 6) Push Pin | 14) Concave Pin | 22) Electrical Box | 30) Connector |
| 7) Springs | 15) Spool (2 position detent) | 23) Screw | 31) Screw |
| 8) Retainer | 16) O-Ring | 24) Acrylic Cover | 32) Coil (For Lead Wire Type) |

Ordering Information

D03 S-2 B-115 A-35

| | | | | | | | | | |
|---------------------------|-------------|---------------------------------|-------------|---|-------------|--------------------------|----------------|-------------------------------|----|
| Size D03 | Code | Actuator | Code | Configuration | Code | Spool Function | Voltage | Current/ Connector | |
| | S | Solenoid | 1 | Single solenoid • 2 position spring offset | A | P to A, B to T | 12 | A | AC |
| | SD | Soln. w/ Din Coil | 2 | Double solenoid • 3 position spring centered | AY | P to A, B to T | 24 | D | DC |
| | SF | Hydraulic Shockless | 3 | Double solenoid • 2 position no center, detented | B | All Ports Blocked | 115 | | |
| | SDS | Deutsch Socket (D03 only) | 5 | Single solenoid • 2 position spring centered | C | A & B Blocked P to T | 230 | | |
| | | | | | F | A & B to T P Blocked | | | |
| | | | | | H | All Ports Open | | | |
| | | | | | K | A to T P & B Blocked | | | |
| | | | | | T | P to A & B, T Blocked | | | |

Specify: (special order)
SL for Lead Wire
SP for Single Spade Plug

SF All Spools are Open in Transition

Notes:
Lights included standard on
electrical box style.

Code "R" (reversed)
added behind spool
code for flow supplied
opposite of standard.

Specify: (special order)
SL for Lead Wire
SP for Single Spade Plug

SF All Spools are Open in Transition

Notes:
Lights included standard on
electrical box style.

Code "R" (reversed)
added behind spool
code for flow supplied
opposite of standard.

Codes 1AR & 1AYR: spool & coil reversed
Codes 2*R & 3AR: electrical box reversed
Code 5*R: coil provided on reversed side

A spool is closed in transition
AY spool is open in transition

Mounting Bolt/ O'Ring Information

| Size | Thread US Metric | Torque in-lbs/ (Nm) | O'Ring |
|------------|---------------------|------------------------|---------------------|
| D03 | 10 - 24 UNC | 40 - 45 (4.5 - 5.1) | 9mm I.D. x 2mm C.S. |