

VSD03M

Solenoid Operated Directional Valve

SUBPLATE MOUNTING
ISO 4401-03

P max 5000 PSI 350 bar
Q max 26 GPM 100 l/min

► DESCRIPTION:

These valves conform to NFPA D03 and ISO 4401 mounting standards. They are available in both 3 way and 4 way styles.

All versions are available in 2 position spring offset, 2 position detent, 2 position spring centered and 3 position spring centered versions.

A wide range of spools are available.

► PERFORMANCE:

| | | | | |
|----------------------------|-----------------|----------|------------------------------|--------------|
| Max Operating Pressure: | P - A - B Ports | Standard | 5000 psi | 350 bar |
| | T Port | Standard | 3000 psi | 210 bar |
| Flowrate | | | 20 gpm | 76 l/min |
| Mounting Surface | | | NFPA D03 ISO 4401-03-02-0-03 | |
| Maximum Weight | AC | | 4 lbs | 1.8 kg |
| | DC | | 4.6 lbs | 2.1 kg |
| Temperature Range | Ambient | | -4 to +130°F | -20 to +54°F |
| Fluid Temperature Range | Standard | | -4 to +180°F | -20 to +82°F |
| Fluid Viscosity | Range | | 60-1900 SUS | 10-400 cSt |
| | Recommended | | 120 SUS | 25 cSt |
| Fluid Contamination Degree | | | ISO 4406:1999 Class 20/18/15 | |

(Obtained with mineral oil with viscosity of 36 cSt at 50°C and electronic control card)

VSD03M-1A-GB-70L-C



VSD03M-1A-GB-60L-C



VSD03M-1A-GWD85A-60L-C



VSD03M-3F-ABD4A-70L-C



VSD03M-3B-GB-75L-C



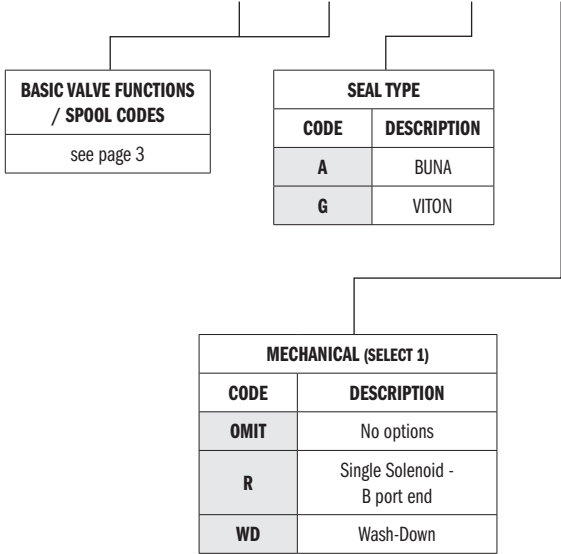
VSD03M-3L-GB-60L-C



VSD03M

► **IDENTIFICATION CODE:**

VSD03M - [] [] - [] [] - [] [] ————— DESIGN LETTER



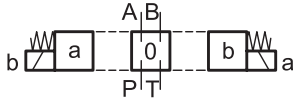
| PILOT VALVES REQUIRING TERMINAL BOX CONNECTIONS | | |
|---|--------------------------|---|
| Reference Page 7-8 | | |
| CODE | VOLTAGE | CONNECTION TYPE |
| B-60L | 120 - 60hz 110 - 50hz | Connection Box with terminal post and lights |
| B-61L | 240 - 60hz 220 - 50hz | |
| B-68L (Low Force) | 120 - 60hz 110 - 50hz | |
| B-70L | 24 V DC | |
| B-75L | 12 V DC | |
| B3H-60L | 120 - 60hz 110 - 50hz | Single Solenoid Box with 3 PIN MALE MINI RECEPTACLE CONNECTOR ON "B" PORT END |
| B3H-61L | 240 - 60hz 220 - 50hz | |
| B3H-68L (Low Force) | 120 - 60hz 110 - 50hz | |
| B3H-70L | 24 V DC | |
| B3H-75L | 12 V DC | |
| B3A-60L | 120 - 60hz 110 - 50hz | Single Solenoid Box with 3 PIN MALE MINI RECEPTACLE CONNECTOR ON "A" PORT END |
| B3A-61L | 240 - 60hz 220 - 50hz | |
| B3A-68L (Low Force) | 120 - 60hz 110 - 50hz | |
| B3A-70L | 24 V DC | |
| B3A-75L | 12 V DC | |
| B4-70L | 24 V DC | Box with 4 PIN MALE MICRO RECEPTACLE CONNECTOR ON "B" PORT END |
| B4-75L | 12 V DC | |
| B4A-70L | 24 V DC | Box with 4 PIN MALE MICRO RECEPTACLE CONNECTOR ON "A" PORT END |
| B4A-75L | 12 V DC | |
| BD4-70L | 24 V DC | Box with 4 PIN MALE MICRO RECEPTACLE CONNECTOR ON "B" PORT END |
| BD4-75L | 12 V DC | |
| BD4A-70L | 24 V DC | Box with 4 PIN MALE MICRO RECEPTACLE CONNECTOR ON "A" PORT END |
| BD4A-75L | 12 V DC | |
| B5H-60L | 120 - 60hz 110 - 50hz | Box with 5 PIN MALE MINI RECEPTACLE CONNECTOR ON "B" PORT END |
| B5H-61L | 240 - 60hz 220 - 50hz | |
| B5H-68L (Low Force) | 120 - 60hz 110 - 50hz | |
| B5H-70L | 24 V DC | |
| B5H-75L | 12 V DC | |
| B5A-60L | 120 - 60hz 110 - 50hz | Box with 5 PIN MALE MINI RECEPTACLE CONNECTOR ON "A" PORT END |
| B5A-61L | 240 - 60hz 220 - 50hz | |
| B5A-68L (Low Force) | 120 - 60hz 110 - 50hz | |
| B5A-70L | 24 V DC | |
| B5A-75L | 12 V DC | |

TYPICAL ORDERING CODE:
VSD03M-3A-GB-60L

Please see Connectors Catalog
Form #1027453

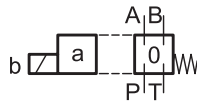
► **FUNCTIONS/SPOOL CODES:**

2 solenoids
3 positions with spring centering



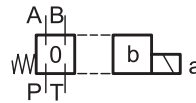
- 3A
- 3B
- 3F
- 3L
- 3J
- 3E
- 3H
- 3Q
- 3FI
- 3G
- 3K
- 3AI
- 3KI
- 3N
- 3EI
- 3R
- 3V
- 3S
- 3T

1 solenoid side A
2 positions (central + external)
with spring centering



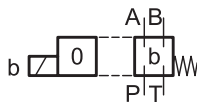
- 5A
- 5B
- 5F
- 5L

1 solenoid side B
2 positions (central + external)
with spring centering



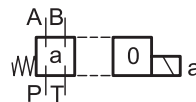
- 5A*R
- 5B*R
- 5F*R
- 5L*R

1 solenoid side A
2 positions (external + central)
with return spring



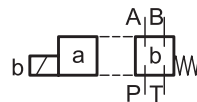
- 6A
- 6B
- 6F
- 6L

1 solenoid side B
2 positions (external + central)
with return spring



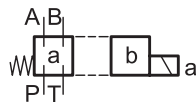
- 6A*R
- 6B*R
- 6F*R
- 6L*R

1 solenoid side A
2 external positions with
return spring



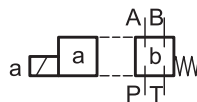
- 1A
- 1B

1 solenoid side B
2 external positions with
return spring



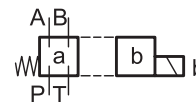
- 1A*R
- 1B*R

1 solenoid side A
2 positions with return spring



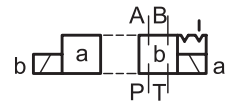
- 9X

1 solenoid side B
2 positions with return spring



- 9X*R

2 solenoids
2 positions with mechanical retention



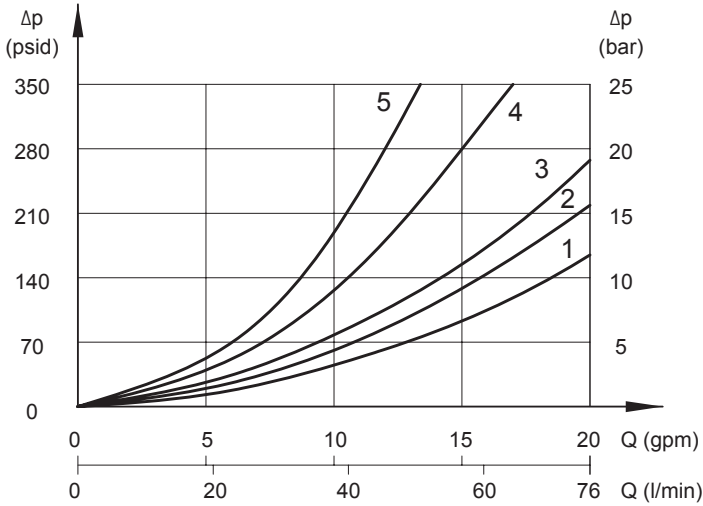
- 2A
- 2B
- 2AN
- 2AJ

Besides the diagrams shown, which are the most frequently used, other special versions are available: consult our technical department for their identification, feasibility and operating limits.

► PERFORMANCE DATA:

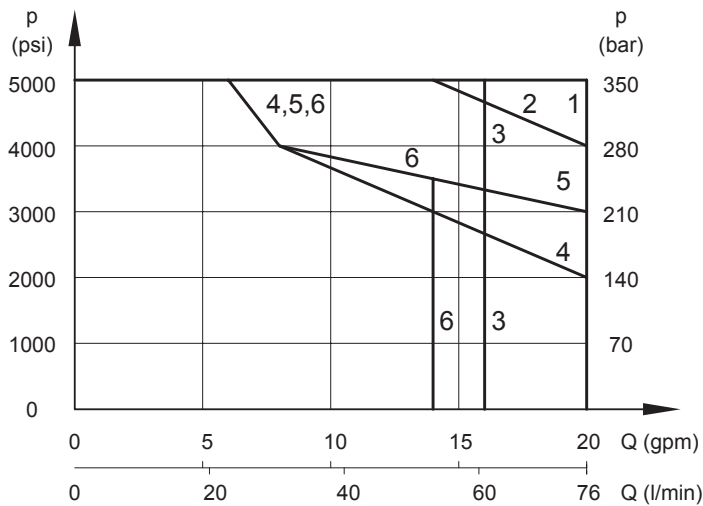
PRESSURE DROPS Δp -Q

(Obtained with viscosity of 170 SUS - 36 CST at 70°F - 50°C)

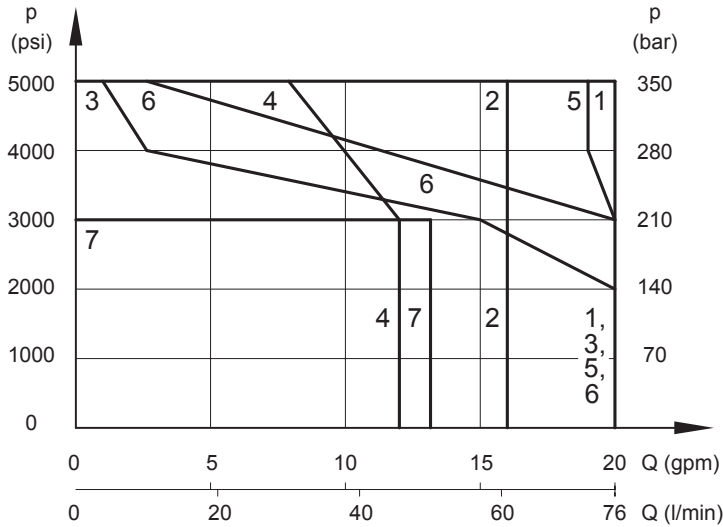


| SPOOL TYPE | FLOW DIRECTION | | | | |
|-------------------|-----------------|-------|-------|-------|-------|
| | P → A | P → B | A → T | B → T | P → T |
| | CURVES ON GRAPH | | | | |
| A, A1, K1, F1, E1 | 2 | 2 | 3 | 3 | |
| B | 1 | 1 | 3 | 3 | 2 |
| E | 2 | 2 | 3 | 1 | |
| F | 3 | 3 | 1 | 1 | |
| G | 1 | 3 | 1 | 3 | |
| H, Q | 4 | 5 | 5 | 5 | 3 |
| J | 2 | 1 | 3 | 3 | |
| K | 2 | 2 | 1 | 3 | |
| L | 5 | 5 | 5 | 5 | 3 |
| N | 1 | 2 | 3 | 3 | |
| 1A, 2A, 2AN, 2AJ | 3 | 3 | 3 | 3 | |
| 1A, 1B, 2A | 2 | 2 | 2 | 2 | |
| 9X | 3 | 3 | | | |

PERFORMANCE CURVE - DC VOLTAGE



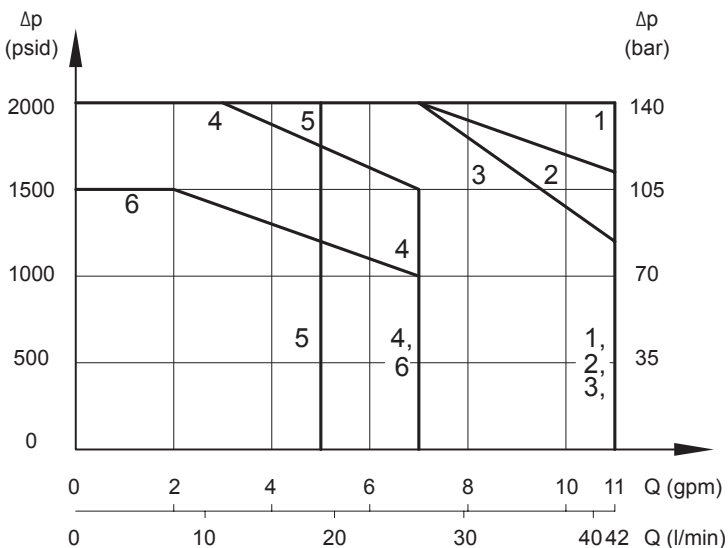
| CURVE | SPOOL |
|-------|---------------------------------------|
| 1 | A, 2A, A1, AN, AJ, E1, G, K1, J, N, X |
| 2 | F1 |
| 3 | H, L, Q, B |
| 4 | F |
| 5 | 1A |
| 6 | 1B, E, K |

► PERFORMANCE DATA:
PERFORMANCE CURVE - AC VOLTAGE


| CURVE | SPOOL |
|-------|---------------------|
| 1 | A, A1, AN, AJ, G, X |
| 2 | B |
| 3 | F |
| 4 | L, H, Q |
| 5 | J, N |
| 6 | F1, E1, K1 |
| 7 | K, E |

NOTES:

- The values indicated in the graphs are relevant to the standard solenoid valve, with 70L coils.
- Valve performance was tested in a four way circuit (full loop). Performances may be reduced from that shown when used in a three-way circuit (half circuit), i.e. A or B port plugged.
- The values have been obtained according to ISO 6403 norm with solenoids at rated temperature and supplied with voltage equal to 90% of the nominal voltage. The value have been obtained with filtration according to ISO 4406:1999 class 18/16/13.

PERFORMANCE CURVE - AC VOLTAGE - LOW FORCE


| CURVE | SPOOL |
|-------|-----------|
| 1 | 2A, AN, B |
| 2 | 1A, 1B, G |
| 3 | A |
| 4 | A1 |
| 5 | L |
| 6 | F |

RESPONSE TIME

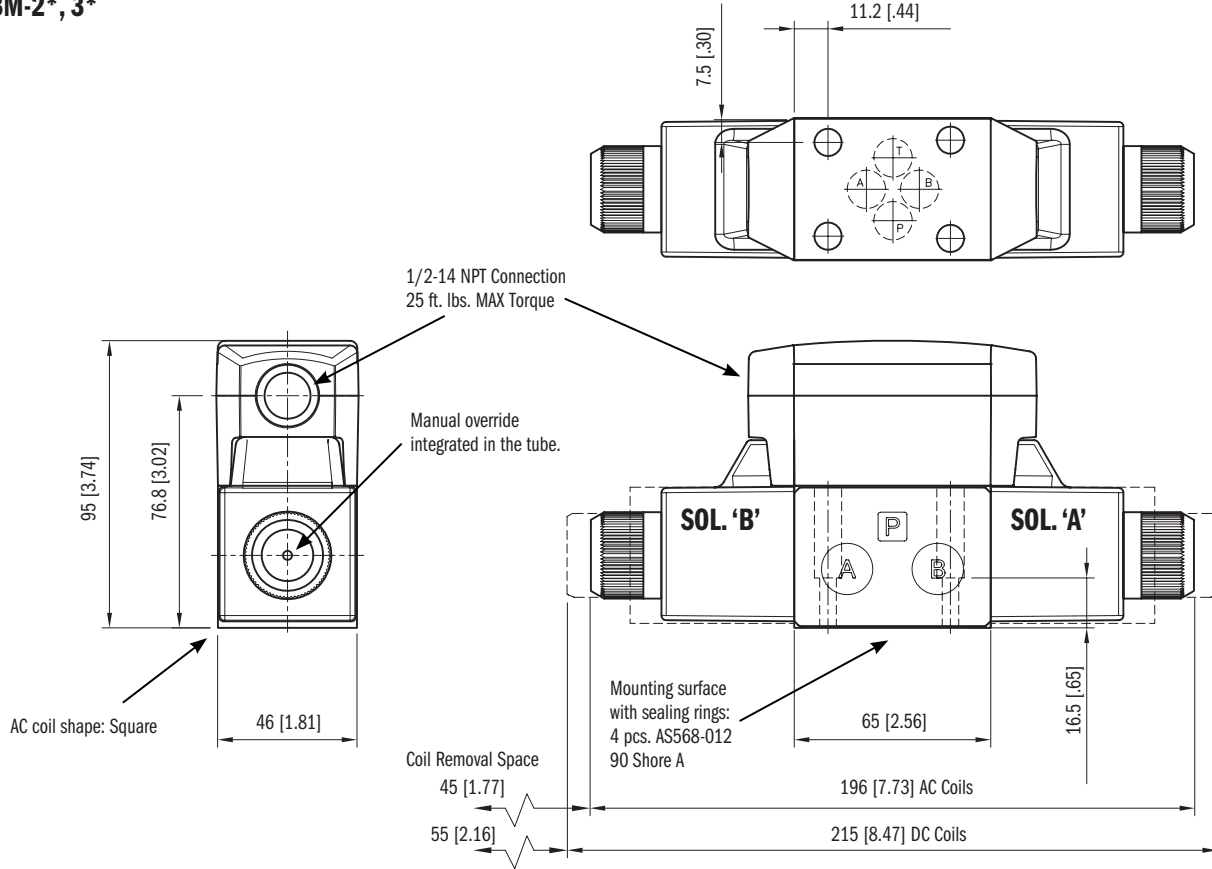
| TIMES (± 10%) [MS] | |
|--------------------|---------------|
| ENERGIZING | DE-ENERGIZING |
| AC 10 - 25 | AC 15 - 30 |
| DC 25 - 75 | DC 15 - 25 |

► INSTALLATION DATA:

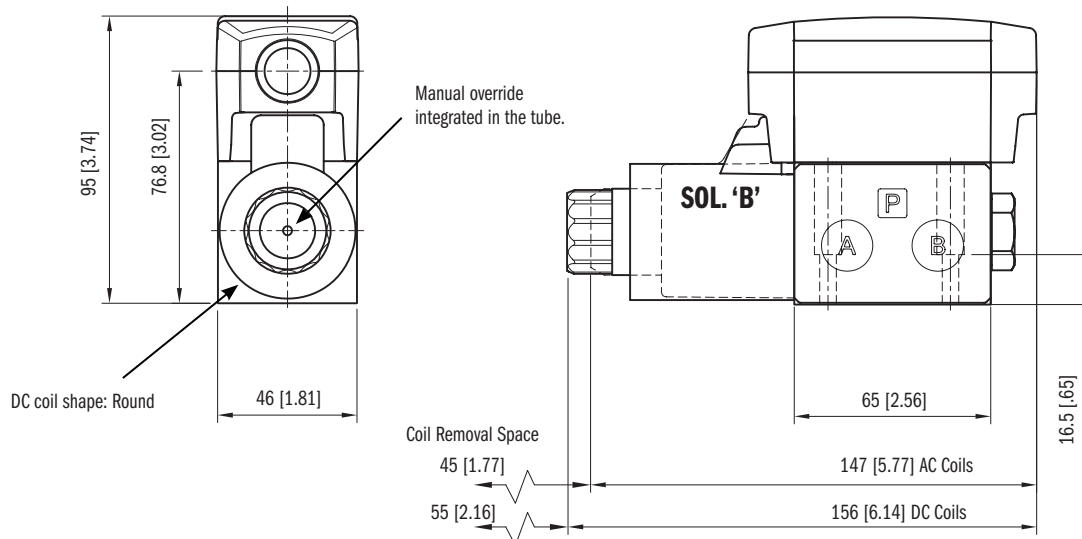
Dimensions mm [in]

OVERALL AND MOUNTING DIMENSIONS CONNECTION BOX VERSION

VSD03M-2*, 3*



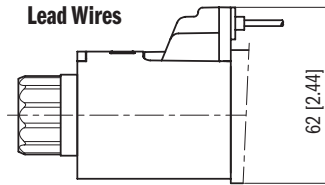
VSD03M-1*, 5*, 6*, 9*



► ELECTRICAL:

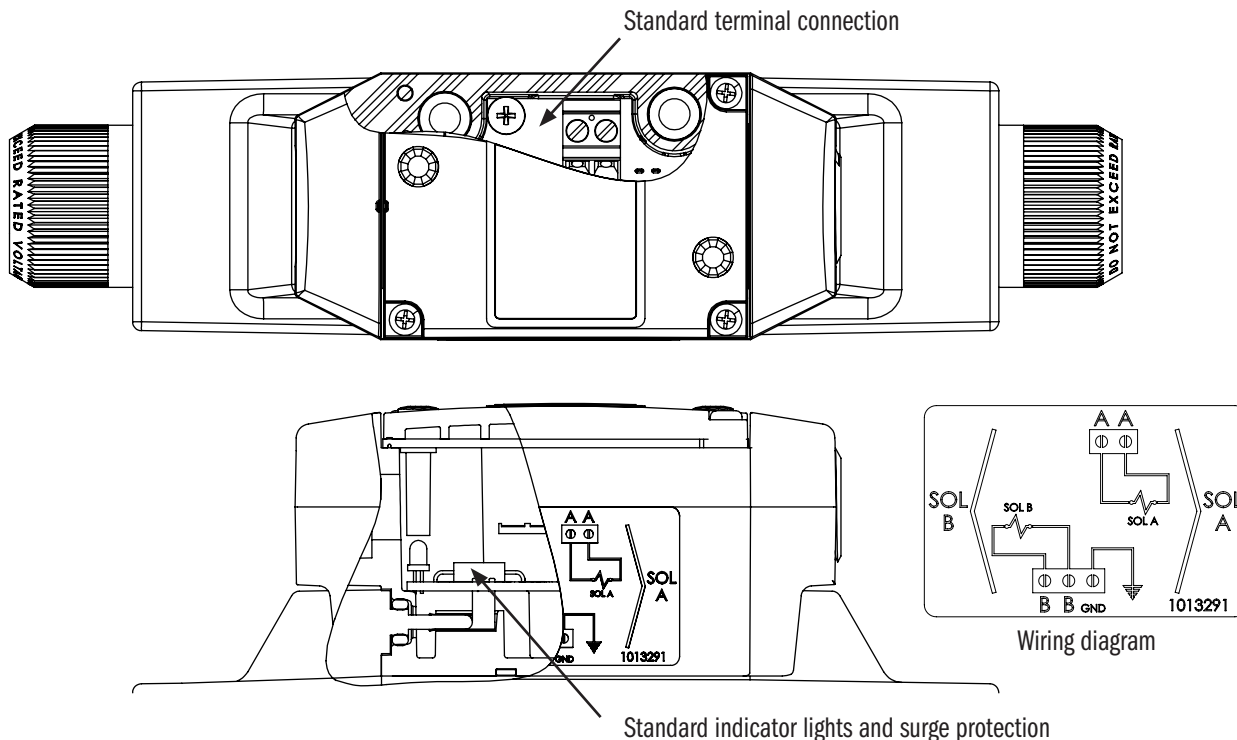
CONNECTION BOX SOLENOIDS

This is a two pin solenoid which connects to the circuit board. Wiring is done on the terminal strip inside the box.



| BOX CONNECTION COIL CODE | VOLTAGE & FREQ. [VOLT - HERTZ] | VOLTAGE LIMITS [MIN - MAX] | RESISTANCE ±10% [OHM] | INRUSH CURRENT [A] | HOLDING CURRENT [A] | HOLDING POWER [W] | REPLACEMENT |
|--------------------------|--------------------------------|----------------------------|-----------------------|--------------------|---------------------|-------------------|-------------|
| 60L | 120 - 60 110 - 50 | 108 - 126 99 - 116 | 35.7 | 1.35 1.41 | 0.46 0.53 | 22 23 | 1012953AD |
| 61L | 240 - 60 120 - 50 | 216 - 252 198 - 231 | 146.4 | 0.61 0.71 | 0.23 0.26 | 22 23 | 1012953AC |
| 68L (Low Force) | 120 - 60 110 - 50 | 108 - 132 99 - 121 | 75.8 | 0.72 0.74 | 0.22 0.24 | 10 10 | 1012953AB |
| 70L | 24 V DC | 21 - 26 | 19.2 | 1.25 | 1.25 | 30 | 1012957AC |
| 75L | 12 V | 10 - 13 | 4.8 | 2.5 | 2.5 | 30 | 1012957AB |

STANDARD TERMINAL BOX CODE "B"



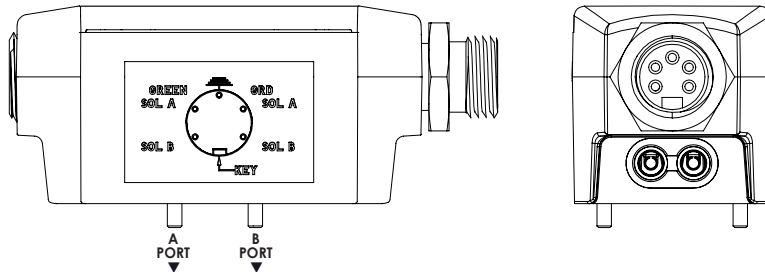
WASHDOWN OPTION (CODE WD)

The wash-down option with the electrical box is designed for an IP65 rating. This option uses a special cover without the mounting bolt access holes and uses silicone sealant to help seal between the coil and core tube.

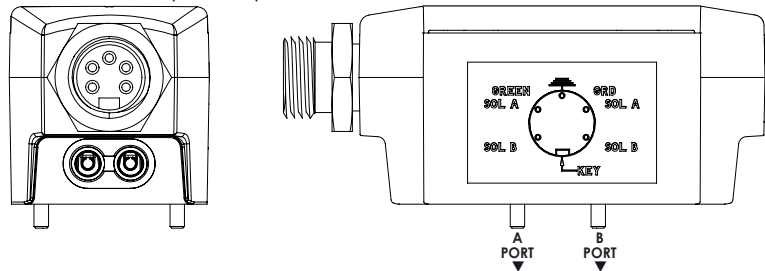
For valve requiring DIN, Deutsch solenoid connections with high IP ratings: Please see the VS6M series catalog.

► **ELECTRICAL OPTIONS: TERMINAL BOX CONNECTION**

CODE: B5H



CODE: B5A



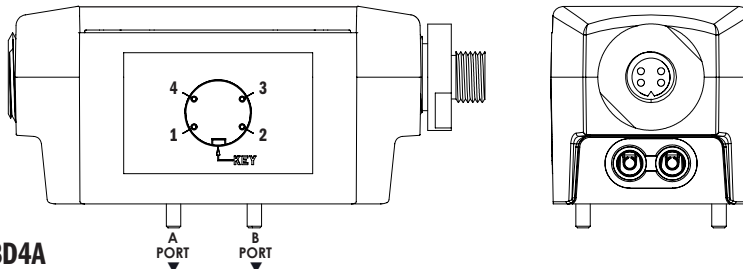
5 PIN RECEPTACLE

Male mini receptacles conform to NFPA/T3.5.29 R1 - 2007 used with single or double solenoid valve.
26 mm [1"] Wrench

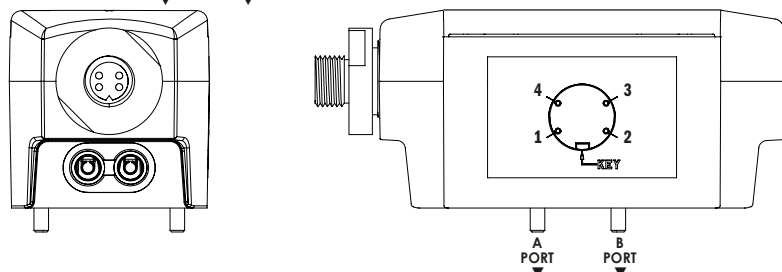
| | |
|---|---------------------|
| 1 | Lead to Solenoid B |
| 2 | Lead to Solenoid A |
| 3 | Ground Lead (Green) |
| 4 | Lead to Solenoid A |
| 5 | Lead to Solenoid B |

CODE: B4 / BD4

(4 PIN CONNECTION OPTION FOR DC VOLTAGE COILS ONLY)



CODE: B4A / BD4A



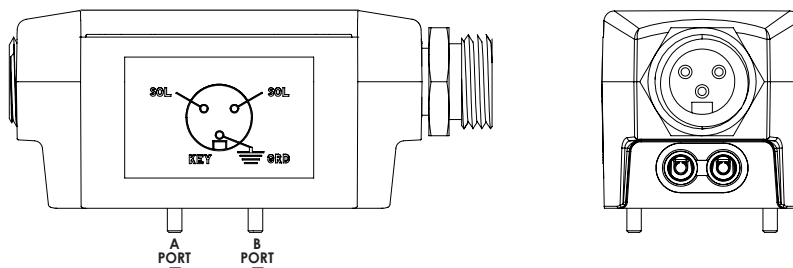
4 PIN RECEPTACLE

Male micro receptacles (M12x1 thread) used with DC valve only.
23 mm [7/8"] Wrench

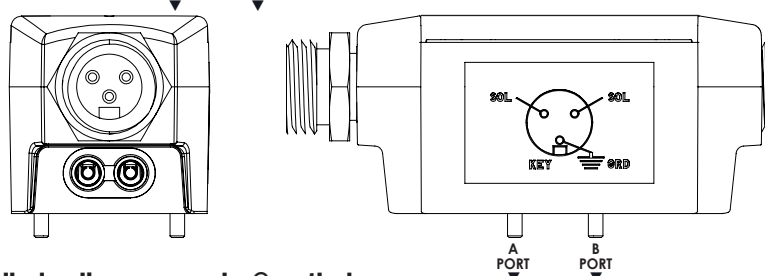
| 4A & 4 | |
|--------|--------------------------------|
| 1 | Brown Lead to Solenoid A |
| 2 | White No Connection |
| 3 | Blue Common Lead to Sol. A & B |
| 4 | Black Lead to Solenoid B |

| D4A & D4 | |
|----------|--------------------------------|
| 1 | Brown No connection |
| 2 | White Lead to Solenoid A |
| 3 | Blue Common Lead to Sol. A & B |
| 4 | Black Lead to Solenoid B |

CODE: B3H



CODE: B3A



3 PIN RECEPTACLE

Male mini receptacles conform to NFPA/T3.5.29 R1 - 2007 used with single solenoid valve.
26 mm [1"] Wrench

| | |
|---|---------------------|
| 1 | Ground Lead (Green) |
| 2 | Lead to Solenoid |
| 3 | Lead to Solenoid |

► APPLICATION DATA:
Protection from atmospheric agents IEC 60529

All pressure drops shown on these data pages are based on 170 SUS fluid viscosity and 0.87 specific gravity. For any other specific gravity (G1) the pressure drop (ΔP) will be approx. $\Delta P_1 = \Delta P (G1/G)$. See the chart for other viscosities.

| | | | | | | | | | | | | | | |
|--------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Fluid | Cst | 10 | 14.5 | 32 | 36 | 43 | 54 | 65 | 76 | 86 | 108 | 216 | 324 | 400 |
| Viscosities | SUS | 60 | 75 | 150 | 170 | 200 | 250 | 300 | 350 | 400 | 500 | 1000 | 1500 | 1900 |
| Multiplier | | 0.77 | 0.81 | 0.97 | 1.00 | 1.04 | 1.10 | 1.15 | 1.20 | 1.24 | 1.31 | 1.56 | 1.72 | 1.83 |

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals. For fluids HFDR type (phosphate esters) use FPM seals (code G). For the use of other kinds of fluid such as HFA, HFB, HFC, please consult our technical department.

Using fluids at temperatures higher than 180°F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties. From a safety standpoint, temperatures above 130° F are not recommended.

| | | | |
|-----------------------------------|-------------|------------------------------|--------------|
| Temperature Ranges | Ambient | -4 to +130°F | -20 to +54°F |
| Fluid Temperature Range | Standard | -4 to +180°F | -20 to +82°F |
| Fluid Viscosity | Range | 60-1900 SUS | 10-400 cSt |
| | Recommended | 120 SUS | 25 cSt |
| Fluid Contamination Degree | | ISO 4406:1999 Class 20/18/15 | |

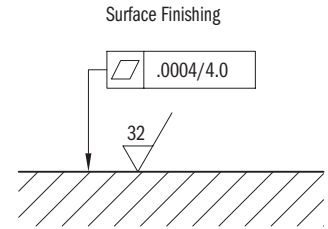
► INSTALLATION DATA:

Dimensions inch [mm]

INSTALLATION

Valves with centering and return springs can be mounted in any position without impairing correct operation. Valves with mechanical detent should have horizontal mounting.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed, fluid can easily leak between the valve and support surface.

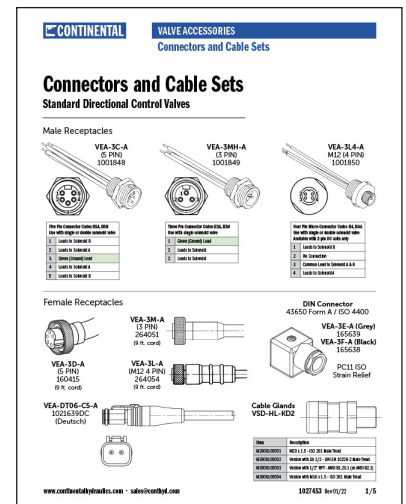


SEAL KIT

| | |
|----------------|---------|
| BUNA SEAL KIT | 1013326 |
| VITON SEAL KIT | 1013327 |

BOLT KIT

| | |
|--------|--------|
| VSD03M | 121472 |
|--------|--------|

CONTINENTAL VALVE ACCESSORIES
Connectors and Cable Sets

Connectors and Cable Sets

Standard Directional Control Valves

Male Receptacles

- VEA-3C-A (12 PIN) 1001848
- VEA-3MH-A (12 PIN) 1001849
- VEA-3L-A (M12 4 PIN) 1001850

Female Receptacles

- VEA-3M-A (12 PIN) 104051
- VEA-3D-A (12 PIN) 104052
- VEA-3L-A (M12 4 PIN) 104054
- VEA-DT06-CS-A (12 PIN) 1021639DC

DIN Connector
43550 Form A / 150-4400

- VEA-3E-A (Grey) 165639
- VEA-3F-A (Black) 165638
- PC11 ISO Swivel-Redukt

Cable Glands
VSD-HL-KDZ

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Connectors and Cable Sets

Form #1027453