



VSD05M

NFPA D05 (NG10)

SOLENOID OPERATED
DIRECTIONAL VALVES

VSD05M

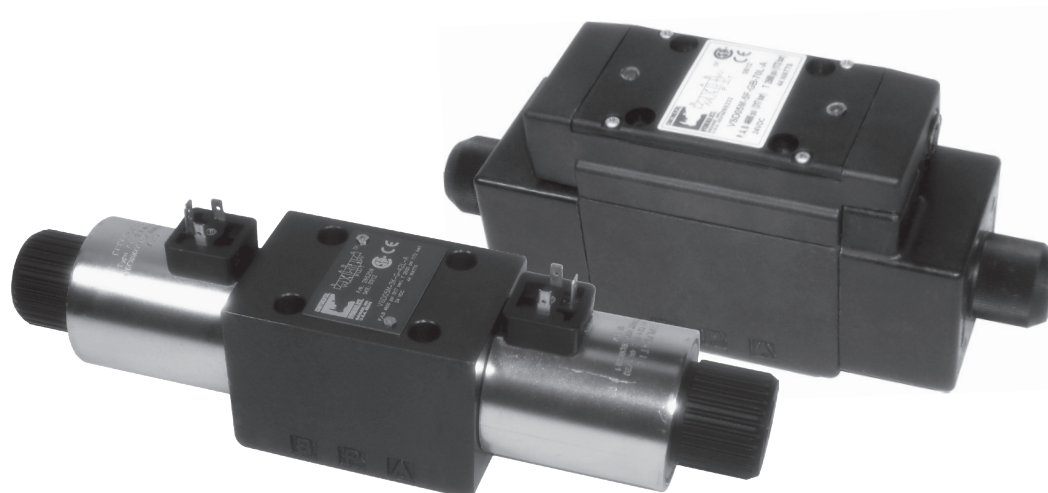


CONTINENTAL

HYDRAULICS™

VSD05M

SOLENOID OPERATED DIRECTIONAL VALVES



DESCRIPTION

These valves conform to NFPA D05 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.

Standard and CSA approved versions are available.

TYPICAL PERFORMANCE SPECIFICATIONS

| | | | | | |
|----------------------------------|--------------------|----------|-----|----------------------------------|---------|
| MAXIMUM OPERATING PRESSURE | P - A - B Ports | Standard | | 4600 psi | 320 bar |
| | | CSA | | 4000 psi | 275 bar |
| | T Port | DC | STD | 3000 psi | 210 bar |
| | | AC | ALL | 2000 psi | 140 bar |
| FLOW RATE | | DC | | 38 gpm | 145 lpm |
| | | AC | | 32 gpm | 120 lpm |
| MOUNTING SURFACE | | | | NFPA D05, ISO 4401-05-04-0-05 | |
| MAXIMUM WEIGHT | | AC | | 8.0 lbs | 3.6 kg |
| | | DC | | 10.6 lbs | 4.8 kg |

| | | | | |
|---------------------|-------------|----------|------------------------------|--------------|
| RANGE TEMPERATURES | Ambient | | - 4 to +130°F | -20 to +54°C |
| | Fluid | Standard | - 4 to +180°F | -20 to +82°C |
| | | CSA | -4 to +150°F | -20 to +66°C |
| FLUID VISCOSITY | Range | | 60 -1900 SUS | 10 - 400 cSt |
| | Recommended | | 120 SUS | 25 cSt |
| FLUID CONTAMINATION | | | ISO 4406:1999 Class 20/18/15 | |

IDENTIFICATION CODE

VSD05M - - - **L** - _____ DESIGN LETTER

SOLENOIDS - See the codes on page 10

| FUNCTION | |
|----------|--|
| 1 | |
| | Single Solenoid 2 Position Spring Offset |
| 2 | |
| | Dual Solenoid 2 Position Detented (No Spring) |
| 3 | |
| | Dual Solenoid 3 Position Spring Centered |
| 5 | |
| | Single Solenoid 2 Position Spring Centered |
| 6 | |
| | Single Solenoid 2 Position Energize To Center |
| 9 | |
| | Single Operator 2 Position - 3 Way Spring Offset |

| SEAL | |
|----------|------------|
| A | Buna (STD) |
| G | Viton |

Spool Type
See Next Page

| MECHANICAL OMIT IF NOT REQUIRED | |
|------------------------------------|--|
| R | Single Solenoid Operator At 'B' Port End. |
| WD | Wash-Down |

| CONNECTION BOX OPTIONS OMIT IF NOT REQUIRED | |
|--|--|
| See the codes on page 9 | |

| ELECTRICAL OPTION | |
|-------------------|---|
| OMIT | Plug-in terminal solenoid |
| B | Connection box with terminal posts and lights (AC only) |

| APPROVALS | |
|-------------|-------------------------|
| OMIT | STD VALVE |
| CSA | CSA US/CAN (AC only) |

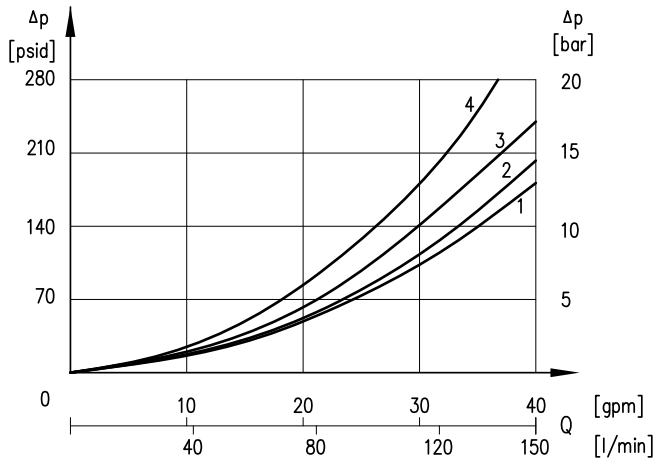
TYPICAL ORDERING CODE:
VSD05M-3A-AB5A-60L-B
VSD05M-3A-A-33L-B

| SPOOLS | | | | | |
|--------------|--------|----------|---------------------------------------|---|-------------------|
| NAME | SYMBOL | FUNCTION | CENTER POSITION | CROSSOVER | FUNCTION MATCHING |
| A | | | All ports blocked | P→B or P→A T blocked | 1, 2, 3, 5, 6 |
| B | | | All ports open | All ports open | 1, 2, 3, 5, 6 |
| E Note 1 | | | P and A blocked, and B→T | All ports blocked or P and A blocked and B→T | 3, 5 |
| F | | | P blocked, A→T and B→T | P blocked and A→T or B→T | 3, 5, 6 |
| F1 Note 1 | | | P blocked, A and B restricted to T | P blocked, A or B restricted to T | 3, 5 |
| G | | | P to A and B T blocked | P→B or P→A T blocked | |
| H Note 1 | | | P and A to T, B blocked | All ports open, restricted | |
| K Note 1 | | | P and B blocked, and A→T | P and B blocked and A→T or all ports blocked | |
| L Note 1 | | | P→T, A and B blocked | All ports open, restricted | |
| Q Note 1 | | | P and B to T, A blocked | All ports open, restricted | 3, 5 |
| X Note 1 | | | - | All ports blocked | 9 |

These are the standard configurations. Contact Continental Hydraulics for special versions.

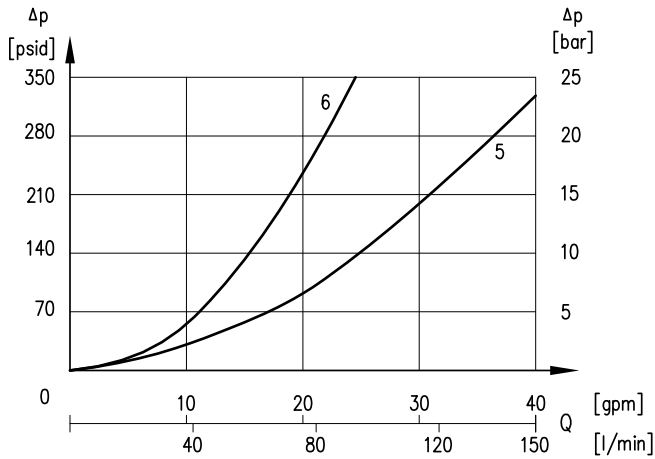
Note 1: Spool not available with Code 68L coils.

PRESSURE DROPS ΔP -Q SHIFTED VALVE (OBTAINED WITH VISCOSITY OF 170 SUS - 36 CST AT 70°F - 50°C)



| SPOOL | FLOW CURVE NUMBER | | | |
|-----------------------------|-------------------|-----|-----|-----|
| | P→A | P→B | A→T | B→T |
| A, A1 | 2 | 2 | 1 | 1 |
| B | 3 | 3 | 1 | 1 |
| E, F, F1, K, 1A, 2A, 1B, 2B | 3 | 3 | 2 | 2 |
| H, L, Q | 1 | 1 | 2 | 2 |
| G | 1 | 1 | 1 | 1 |

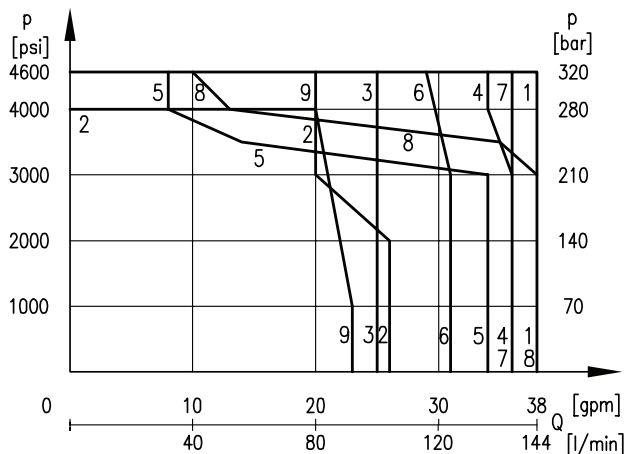
PRESSURE DROPS ΔP -Q CENTRAL POSITION



| SPOOL | FLOW CURVE NUMBER | | | | |
|------------|-------------------|-----|-----|-----|-----|
| | P→A | P→B | A→T | B→T | P→T |
| B, L, H, Q | | | | | 5 |
| E | | | | 6 | |
| F | | | 6 | 6 | |
| G | 3 | 3 | | | |
| K | | | 6 | | |

PERFORMANCE CURVE

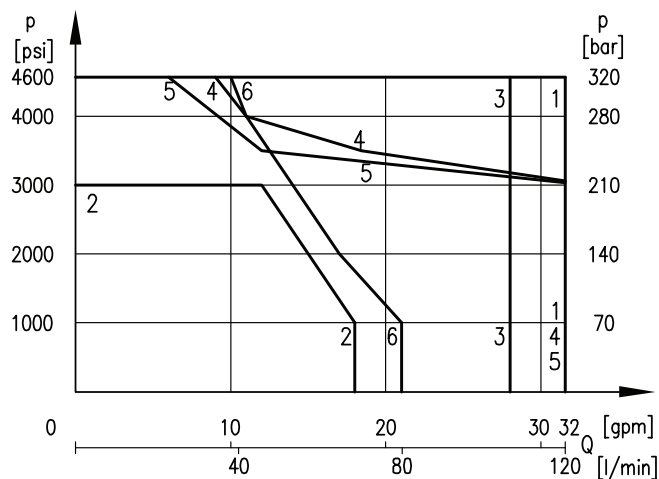
DC VOLTAGE



| CURVE | SPOOL |
|-------|-------------|
| 1 | A, B, G, 9X |
| 2 | L |
| 3 | 1A |
| 4 | 1A-R |
| 5 | F |
| 6 | 1B |
| 7 | F1 |
| 8 | E, K |
| 9 | H, Q |

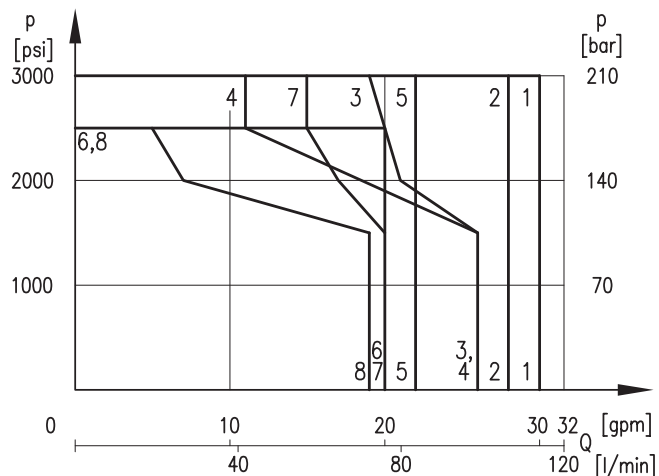
PERFORMANCE CURVE

AC VOLTAGE



| CURVE | SPOOL |
|-------|-------------|
| 1 | A, B, G, 9X |
| 2 | L |
| 3 | 1A |
| 4 | F, F1 |
| 5 | K, E |
| 6 | H, Q |

AC VOLTAGE - LOW FORCE



| CURVE | SPOOL |
|-------|-----------|
| 1 | 1B, 2B, G |
| 2 | 1B-R |
| 3 | 1A |
| 4 | 1A-R |
| 5 | B |
| 6 | A |
| 7 | 2A |
| 8 | F |

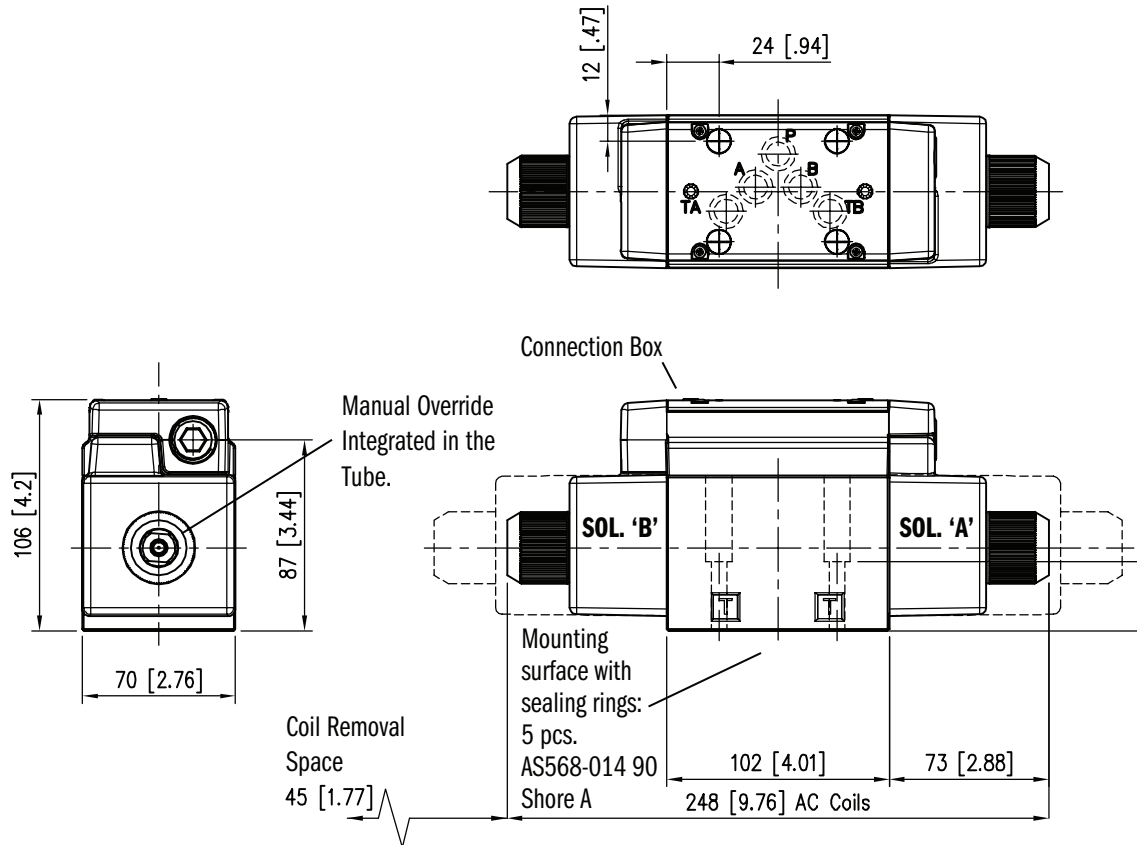
NOTES:

1. The values indicated in the graphs are relevant to the standard valve. The DC Performance Curve used a 42L coil, the AC Performance Curve used a 60L coil, and the AC Low Force Curve used a 68L coil.
2. 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.
3. 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.

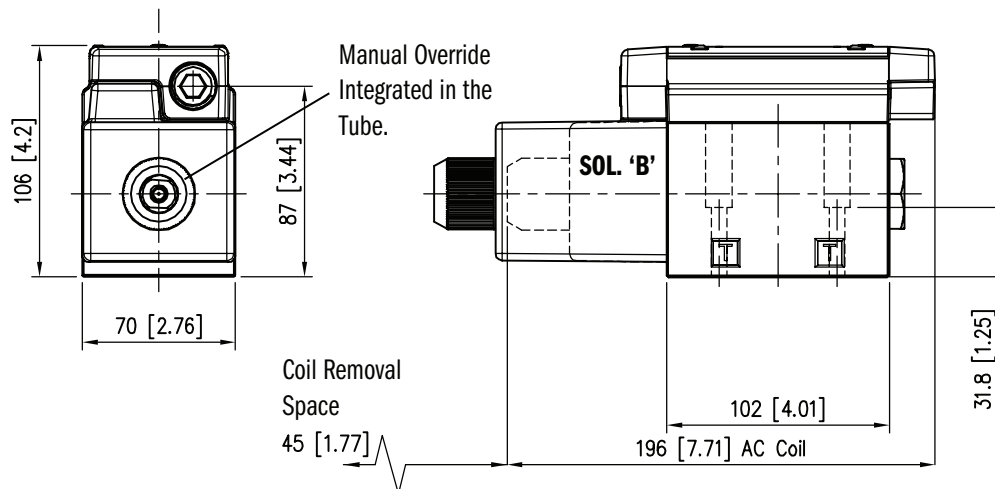
OVERALL AND MOUNTING DIMENSIONS - CONNECTION BOX VERSION

VSD05M-2*, 3*

Dimensions in mm [IN]



VSD05M-1*, 5*, 6*, 9*

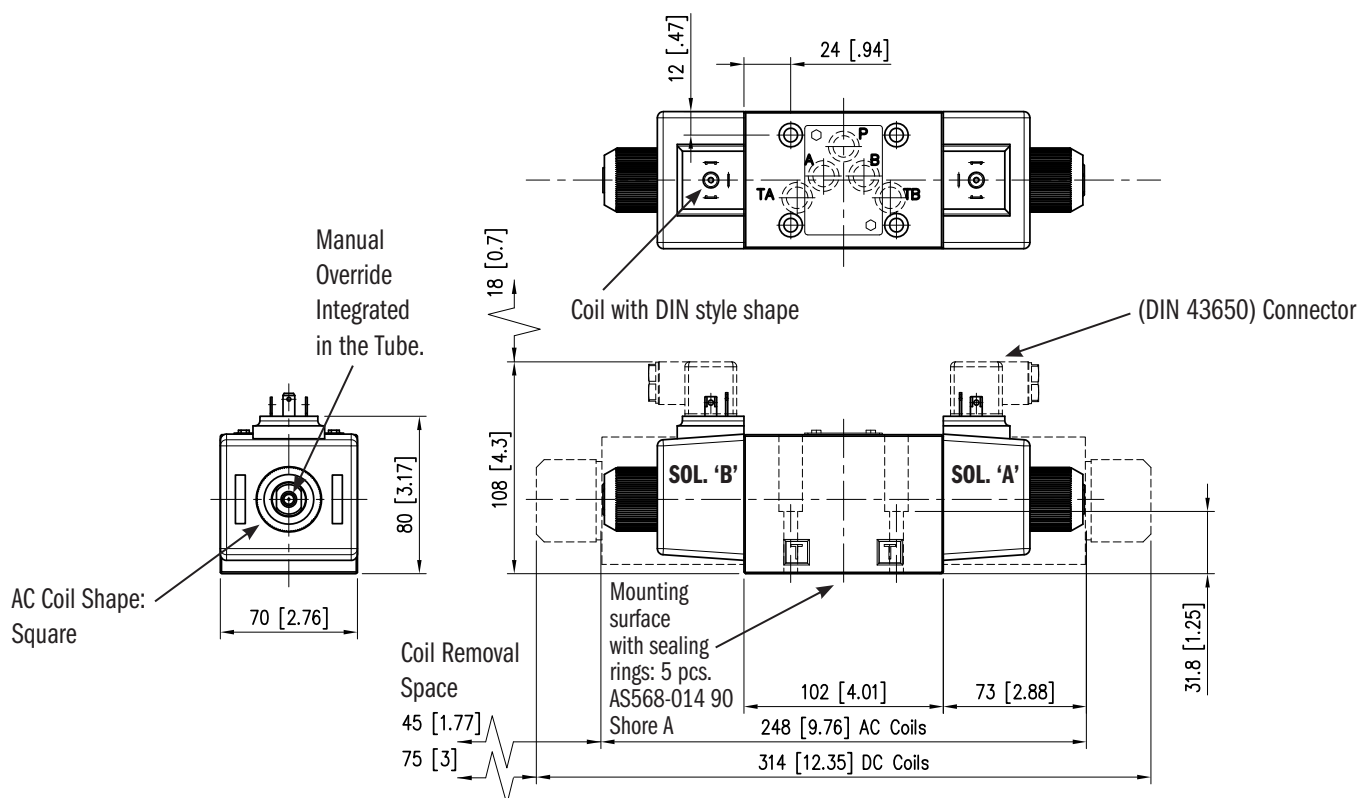


OVERALL AND MOUNTING DIMENSIONS - DIN STYLE VERSION

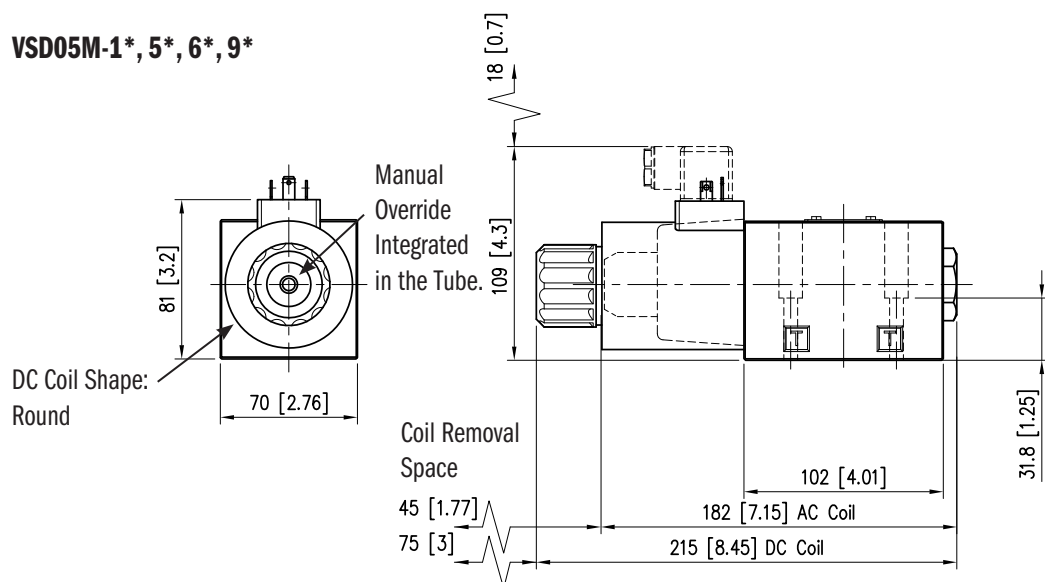
VSD05M-2*, 3*

Dimensions in mm [IN]

VSD05M - SOLENOID OPERATED DIRECTIONAL VALVES



VSD05M-1*, 5*, 6*, 9*



ELECTRICAL CHARACTERISTICS

Valves are available with an electrical connection box or with DIN 43650 solenoids in both AC and DC voltages. Deutsch DT04 is also available in DC voltages only.

CONNECTION BOX OPTIONS

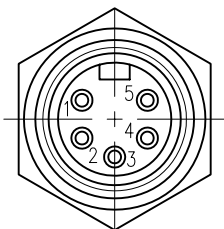
To simplify the connections and prevent wiring mistakes, we offer the option with connection boxes with quick connect pin receptacles, already wired.

Valves are available with receptacles on solenoid side 'A' or 'B' and several connector styles.

Below are the codes to be included in the box 'option' of the ordering code, depending on the version you choose.

Wiring diagrams below show the standard connections for 3-pin and 5-pin connectors. The commercially available mating "female" connector are not included.

| CODE | PIN | SHAPE | PORT END | NOTES |
|------|-----|-----------|----------|--------------------------|
| 5A | 5 | Male Mini | A | Single and Dual Solenoid |
| 5H | 5 | | B | |
| 3A | 3 | Male Mini | A | Single Solenoid Only |
| 3H | 3 | | B | |

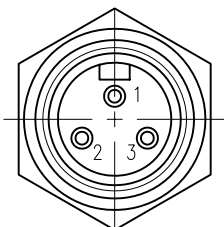


5 PIN RECEPTACLE

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 |



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 |

SOLENOIDS

Listed below the types of solenoids available and the numbers to be added in the solenoid box on page 3.

PLUG-IN TERMINAL SOLENOID

DIN 43650

This solenoid has three terminal posts. Use bi-polar connectors that meet ISO 4400 / DIN 43650 (EN 175301-803). Protection against atmospheric agent: IP 65

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.

| DIN CONNECTION CODE | BOX CONNECTION CODE | VOLTAGE & FREQ. [VOLT - HERTZ] | VOLTAGE LIMITS [MIN - MAX] | RESISTANCE ±10% [OHM] | INRUSH CURRENT [A] | HOLDING CURRENT [A] | HOLDING WATTS [W] |
|---------------------------|---------------------------|--------------------------------------|----------------------------------|-----------------------------|--------------------------|---------------------------|-------------------------|
| 33 | 60 | 120 - 60 110 - 50 | 108 - 126 99 - 116 | 9.2 | 5 6.2 | 0.91 1.1 | 45 43 |
| 34 | 61 | 240 - 60 220 - 50 | 216 - 252 198 - 231 | 38 | 2.9 3 | 0.48 0.53 | 45 43 |
| NOT AVAILABLE | 68 | 120 - 60 110 - 50 | 108 - 132 99 - 121 | 16.4 | 3.7 3.8 | 0.38 0.41 | 22 21 |
| 42 | - | 24 V DC | 21 - 26 | 12 | 2 | 2 | 48 |
| 44 | - | 12 V DC | 10 - 13 | 3.2 | 3.75 | 3.75 | 45 |

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.

The DIN, Deutch coils versions of the wash-down option uses silicone sealant to help seal between the coil and core tube.

APPLICATION DATA

FLUIDS

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 VISCOSITIES | Cst | 10 | 14.5 | 32 | 36 | 43 | 54 | 65 | 76 | 86 | 108 | 216 | 324 | 400 |
|-------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | 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 degrees F causes the accelerated degradation of seals as well as degradation of the fluids physical and chemical properties.

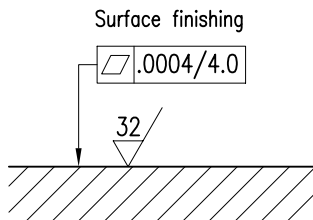
From a safety standpoint, temperatures above 130 degrees F are not recommended.

| RANGE TEMPERATURES: | Ambient | | - 4 to +130 °F | -20 to +54 °C |
|---------------------|-------------|-----|------------------------------|---------------|
| | Fluid | STD | - 4 to +180 °F | -20 to +82 °C |
| | | CSA | - 4 to +150 °F | -20 to +66 °C |
| FLUID VISCOSITY | Range | | 60-1900 SUS | 10- 400 cSt |
| | Recommended | | 120 SUS | 25 cSt |
| FLUID CONTAMINATION | | | ISO 4406:1999 Class 20/18/15 | |

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 | 1015300 |
| Viton Seal Kit | 1015301 |

BOLT KIT

| | |
|----------|--------|
| BD05-175 | 131110 |
|----------|--------|