VSD05M

Solenoid Operated Directional Valve

SUBPLATE MOUNTING
ISO 4401-05

P max **4600 PSI 320 bar**
Q max **38 GPM 145 l/min**

VSD05M-3L-GB-60L-B

VSD05M-3A-A-44L-B

► 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.

► PERFORMANCE:

Max Operating Pressure:	**P - A - B Ports**	Standard		4600 psi	320 bar
	T Port	DC	STD	3000 psi	210 bar
		AC	ALL	2000 psi	140 bar
Flowrate		DC		38 gpm	145 l/min
		AC		32 gpm	120 l/min
Mounting Surface				NFPA D05 ISO 4401-05-04-0-05	
Maximum Weight		AC		8 lbs	3.6 kg
		DC		10.6 lbs	4.8 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)

► IDENTIFICATION CODE:

VSD05M - □ □ - □ □ - □ - □ ——— DESIGN LETTER

BASIC VALVE FUNCTIONS / SPOOL CODES
see page 3

SEAL TYPE	
CODE	**DESCRIPTION**
A	BUNA
G	VITON

MECHANICAL (SELECT 1)	
CODE	**DESCRIPTION**
OMIT	No options
R	Single Solenoid - B port end
WD	Wash-Down

VALVES REQIRING TERMINAL BOX CONNECTIONS *Reference Page*		
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	
B3H-60L	120 - 60hz 110 - 50hz	Single Solenoid Box with 3 PIN MALE MINI RECEPTACLE CONNECTOR ON "B" PORT END
B3H-68L (Low Force)	120 - 60hz 110 - 50hz	
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	
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	
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	

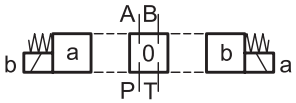
DIN / DEUTSCH COIL CONNECTION *Reference Page*		
CODE	**VOLTAGE**	**CONNECTION TYPE**
33L	120 - 60hz 110 - 50hz	DIN 43650 (Form A)
34L	240 - 60hz 220 - 50hz	
42L	24 Volt DC	
44L	12 Volt DC	
D12K7	12 Volt DC	Deutsch DT04-2P
D24K7	24 Volt DC	

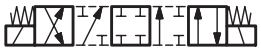
TYPICAL ORDERING CODE:
VSD05M-3A-GB-60L

Please see Connectors Catalog
Form #1027453

▶ FUNCTIONS/SPOOL CODES:

2 solenoids
3 positions with spring centering

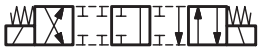


3A 

3B 

3F 

3L 

3E 

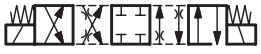
3H 

3Q 

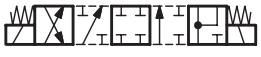
3FI 

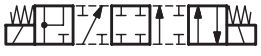
3G 

3K 

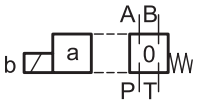
3AI 

3N 

3R 

3V 

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



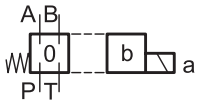
5A 

5B 

5F 

5L 

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



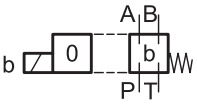
5A*R 

5B*R 

5F*R 

5L*R 

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

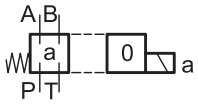


6A 

6B 

6F 

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

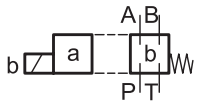


6A*R 

6B*R 

6F*R 

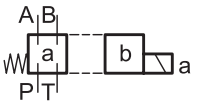
1 solenoid side A
2 external positions with
return spring



1A 

1B 

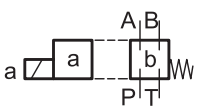
1 solenoid side B
2 external positions with
return spring



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

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.

2 solenoids
2 positions with mechanical retention

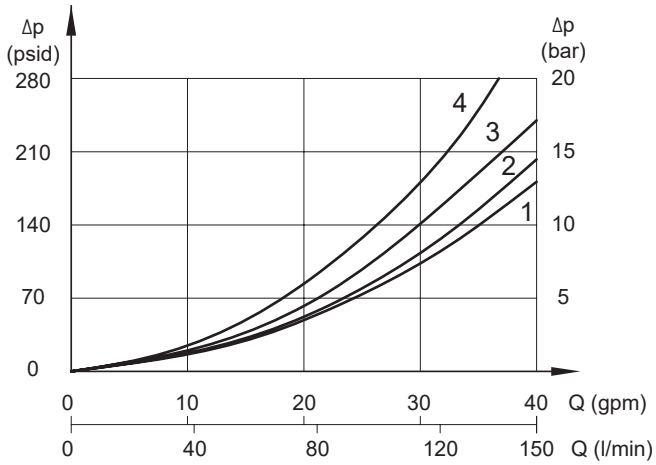
2A

2B

▶ PERFORMANCE DATA:

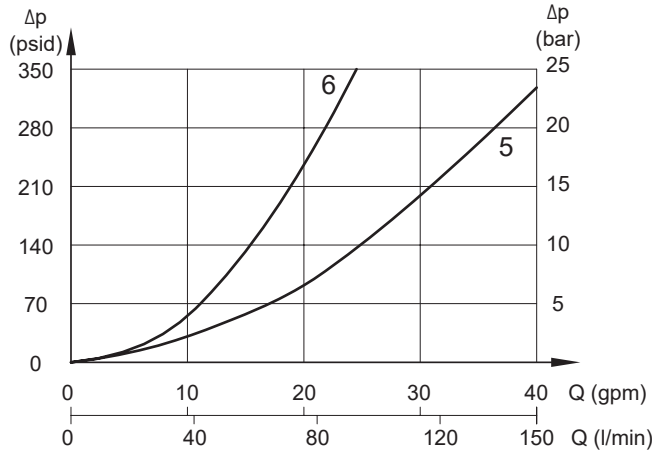
PRESSURE DROPS Δp-Q Shifted Valve

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



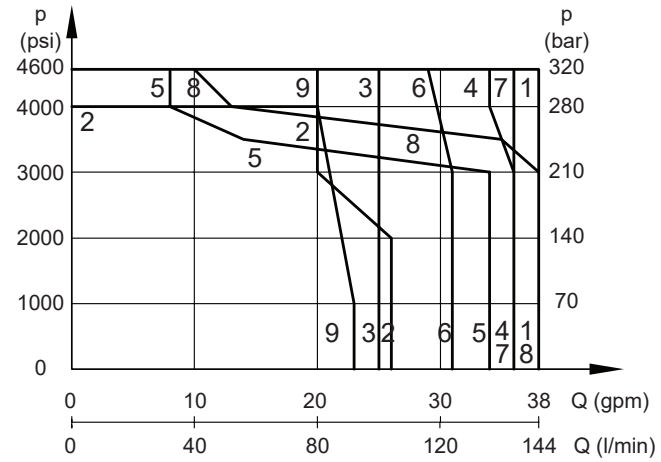
SPOOL TYPE	FLOW DIRECTION			
	P → A	P → B	A → T	B → T
	CURVES ON GRAPH			
A, A1	2	2	1	1
B	3	3	1	1
E, F, F1, K, 1A, 2A, 1B, 2B	3	3	2	2
H, L Q	1	1	2	2
G	1	1	1	1

PRESSURE DROPS ΔP-Q CENTRAL POSITION



SPOOL TYPE	FLOW DIRECTION				
	P → A	P → B	A → T	B → T	P → T
	CURVES ON GRAPH				
B, L H, Q					6
E				6	
F				6	6	
G	3	3			
K			6		

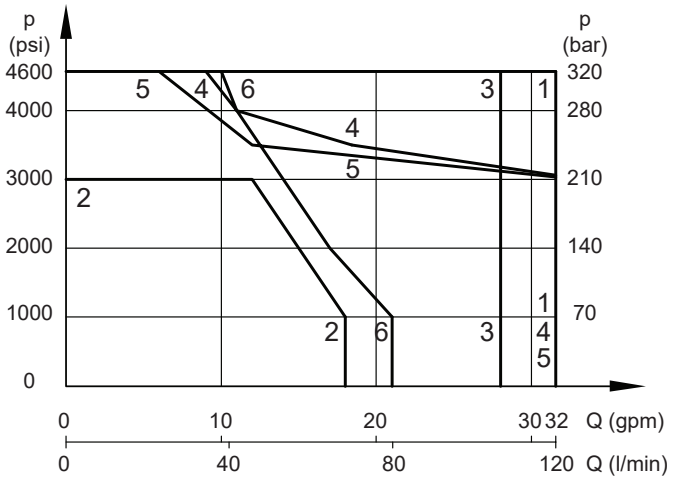
PERFORMANCE CURVE - DC VOLTAGE



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

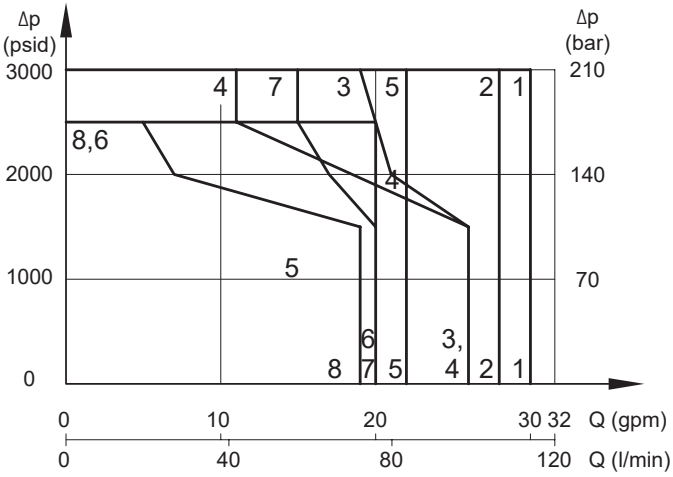
► PERFORMANCE DATA:

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:

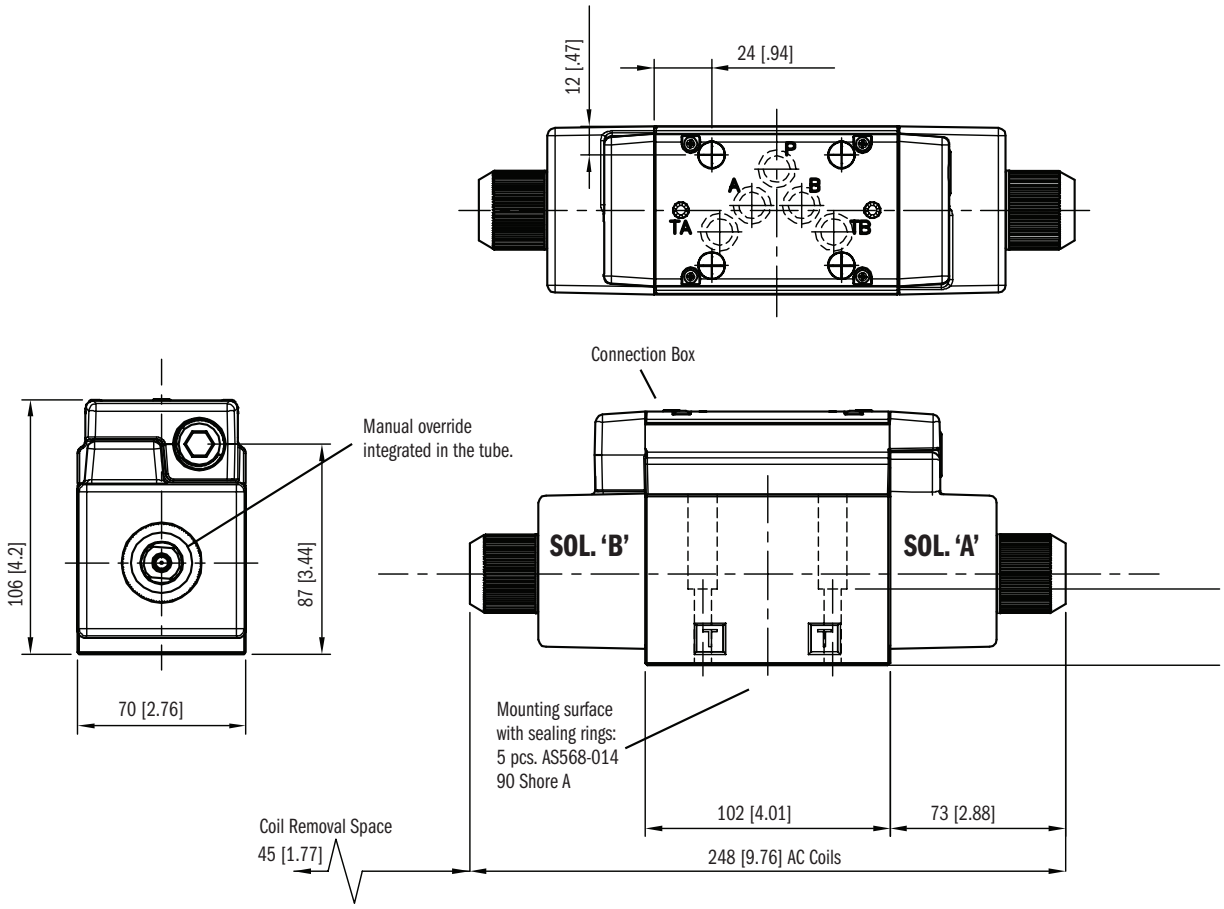
1. The values indicated in the graphs are relevant to the standard valve. The DC Performance Curve used a 42L coil, the AC Performance Curve used a 60L coil, and the AC Low Force Curve used a 68L coil.
2. Valve performance was tested in a four way circuit (full loop). Performances may be reduced from 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.

► INSTALLATION DATA:

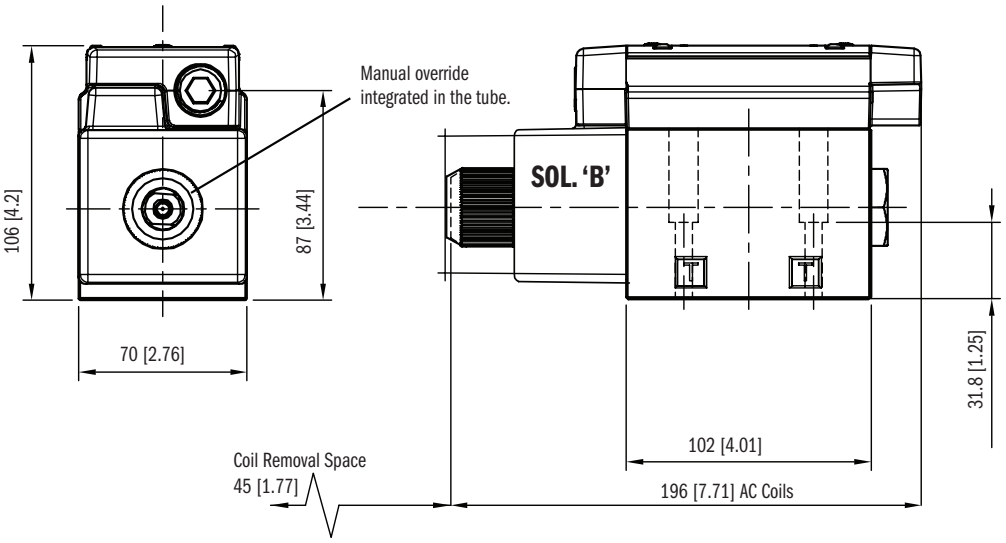
Dimensions mm [in]

OVERALL AND MOUNTING DIMENSIONS - CONNECTION BOX VERSION

VSD05M-2*, 3*



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

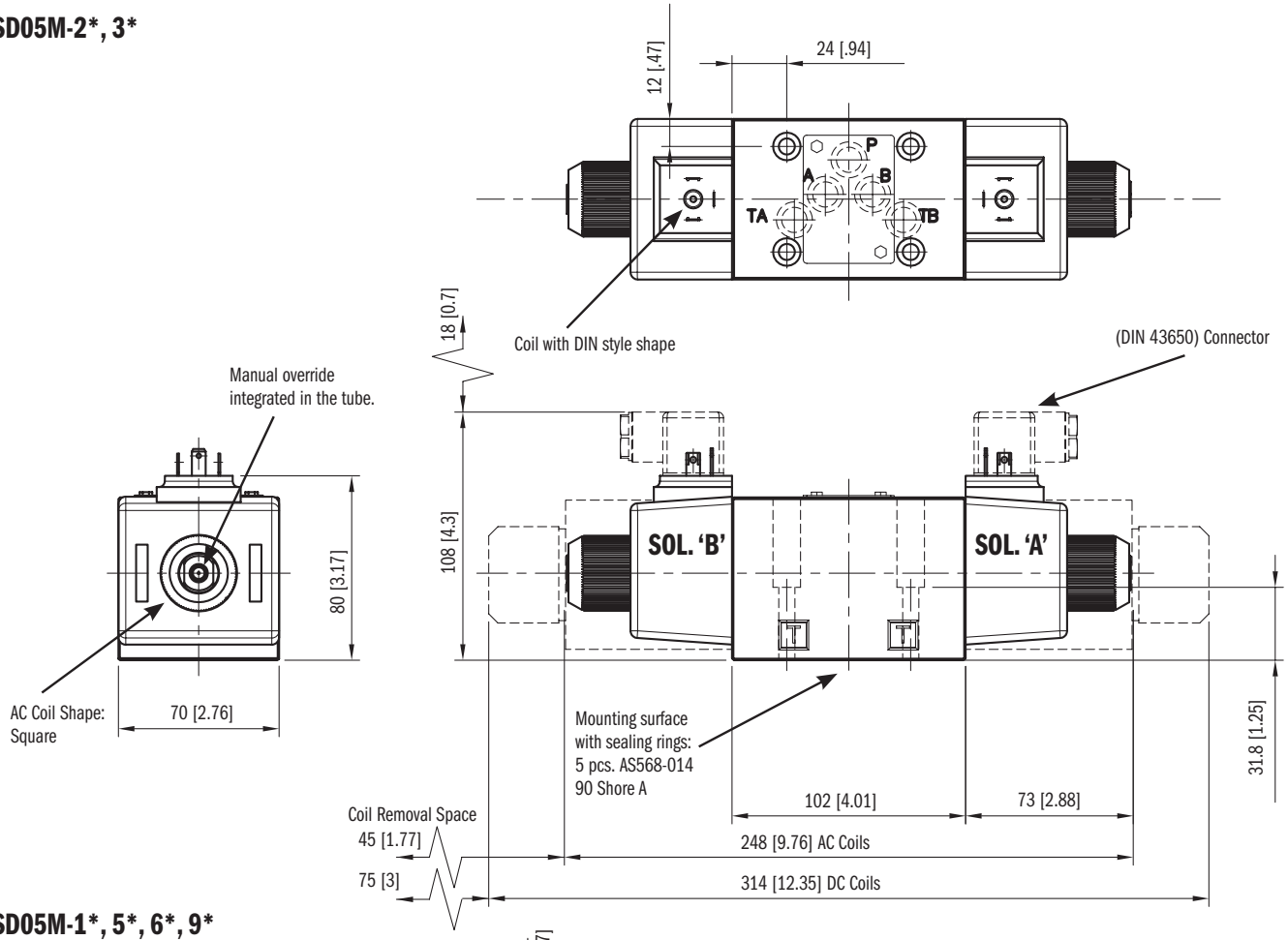


► INSTALLATION DATA:

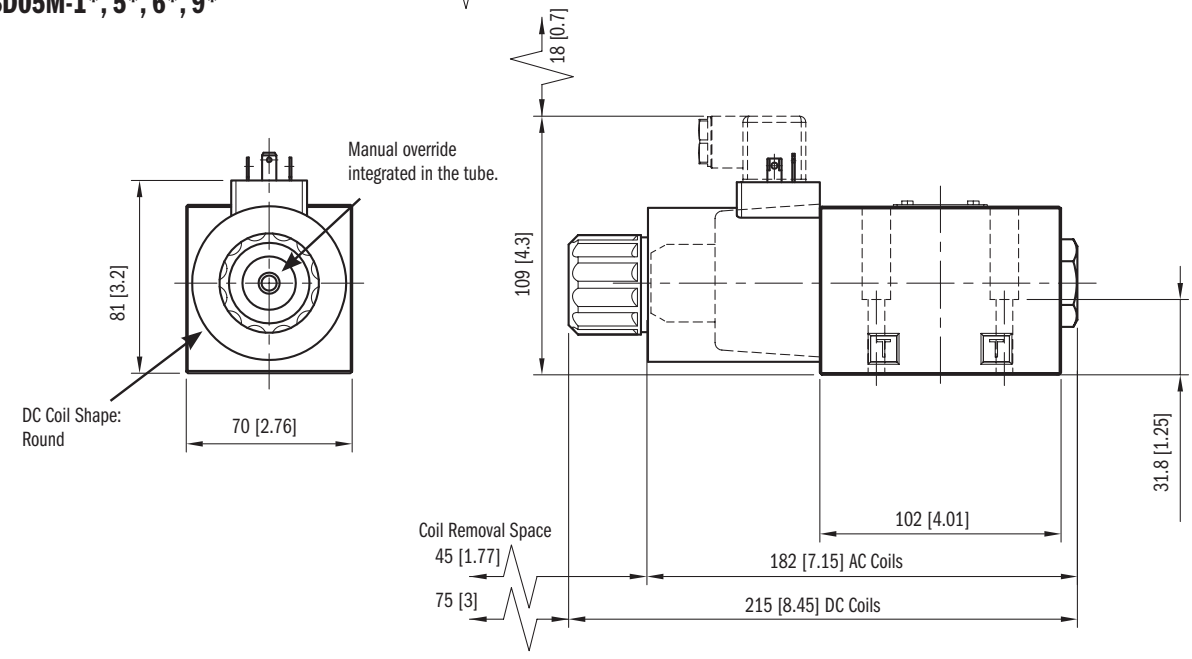
Dimensions mm [in]

OVERALL AND MOUNTING DIMENSIONS - DIN STYLE VERSION

VSD05M-2*, 3*



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



► SOLENOIDS:

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

CONNECTION BOX SOLENOIDS

This is a two pin solinoid 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 COIL
60L	120 - 60 110 - 50	108 - 126 99 - 116	9.2	5 6.2	0.91 1.1	45 43	450980AD
61L	240 - 60 220 - 50	216 - 252 198 - 231	38	2.9 3	0.48 0.53	45 43	450980AC
68L (Low Force)	120 - 60 110 - 50	108 - 126 99 - 116	16.4	3.7 3.8	0.38 0.41	22 21	450980AB

DIN SOLENOID

DIN 43650 FORM A

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

DIN CONNECTION COIL CODE	VOLTAGE & FREQ. [VOLT - HERTZ]	VOLTAGE LIMITS [MIN - MAX]	RESISTANCE ±10% [OHM]	INRUSH CURRENT [A]	HOLDING CURRENT [A]	HOLDING POWER [W]	REPLACEMENT COIL
33L	120 - 60 110 - 50	108 - 126 99 - 116	9.2	5 6.2	0.91 1.1	45 43	307251
34L	240 - 60 220 - 50	216 - 252 198 - 231	38	2.9 3	0.48 0.53	45 43	307252
42L	24 V DC	21 - 26	14.2	1.68	1.68	40.3	M1902876
44L	12 V DC	10 - 13	3.1	3.87	3.87	45.8	M1902870

DEUTSCH SOLENOIDS CONNECTIONS

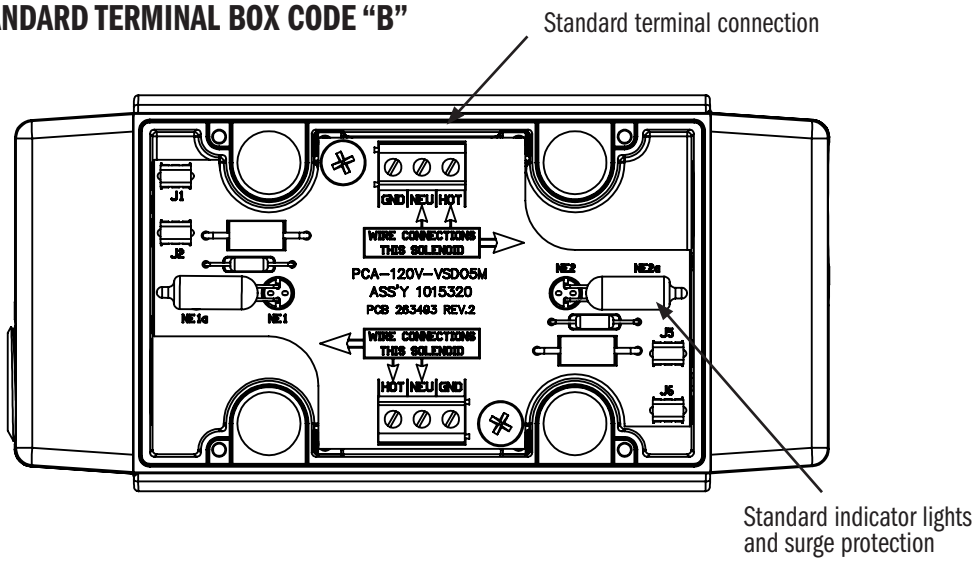
This solenoid used for higher IP Protection ratings is Deutsch DT04-2P for male connectors type Deutsch DT06-2S (Available in 12 and 24 VDC voltages only).

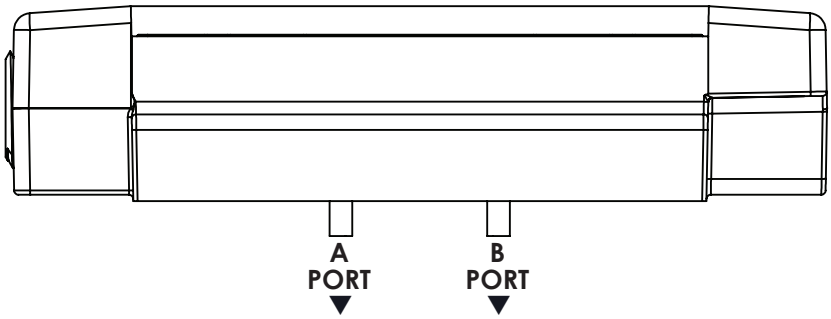
DEUTSCH CONNECTION COIL CODE	VOLTAGE & FREQ. [VOLT - HERTZ]	VOLTAGE LIMITS [MIN - MAX]	RESISTANCE ±10% [OHM]	INRUSH CURRENT [A]	HOLDING CURRENT [A]	HOLDING POWER [W]	REPLACEMENT COIL
D24K7	24 VDC	±10%	12	2	2	48	M1903621
D12K7	12 VDC	±10%	3	4	4	48	M1903620

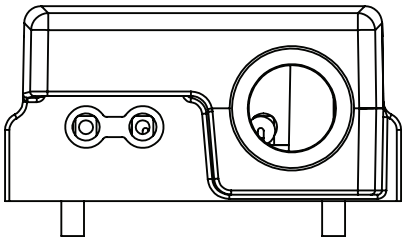
► ELECTRICAL:

Dimensions mm [in]

STANDARD TERMINAL BOX CODE "B"







WASHDOWN OPTION (CODE WD)

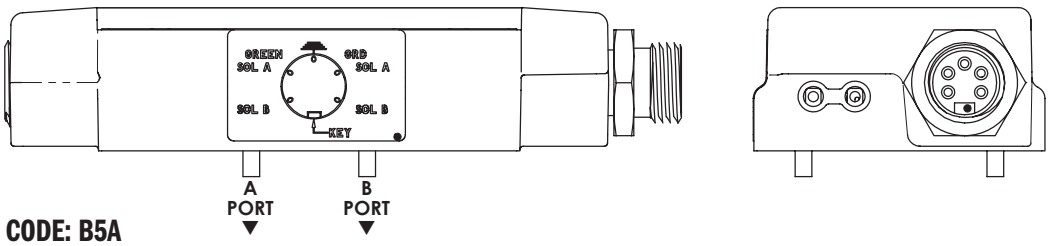
The wash-down option with the electrical box is designed for an IP65 rating. This option uses a special cover without the mounting bolt access holes and uses silicone sealant to help seal between the coil and core tube.

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

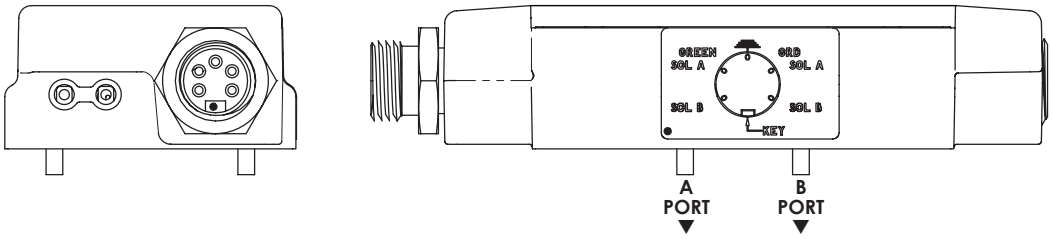
► ELECTRICAL OPTIONS:

TERMINAL BOX CONNECTION

CODE: B5H



CODE: B5A

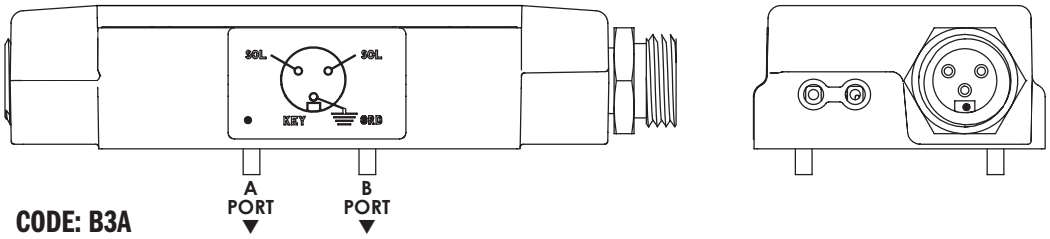


5 PIN RECEPTACLE

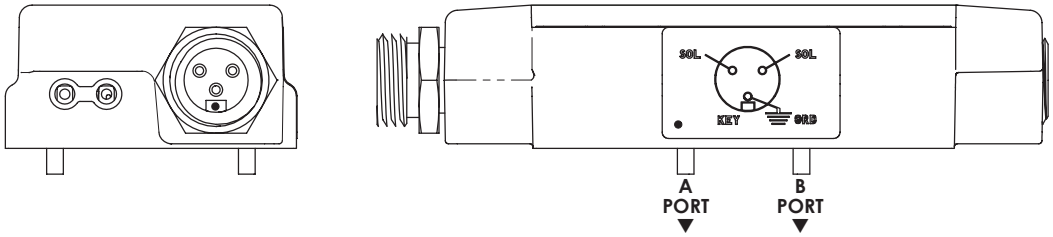
Male mini receptacles conform to NFPA/T3.5.29 R1 - 2007 used with single or double solenoid valve.
26 mm [1"] Wrench

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: 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

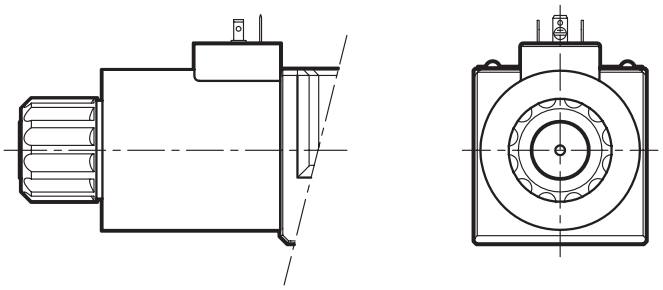
► ELECTRICAL:

Dimensions mm [in]

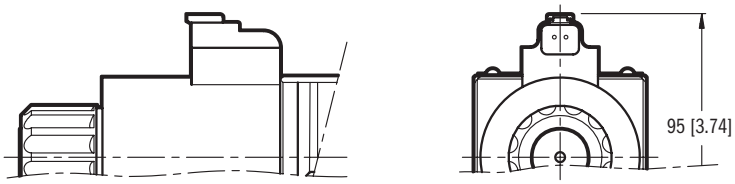
CONNECTIONS

See Connectors and Cable Sets Catalog (1027453) for all available connection styles.

Connection for
EN 175301-803 (ex DIN 43650)
connector type code 33, 34, 42, 44



Connection for
DEUTSCH DT06-2S male
connector type code D12K7, D24K7



► 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. ΔP1 = ΔP (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°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	

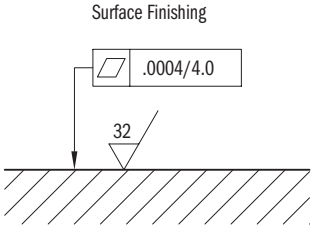
▶ INSTALLATION DATA:

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.

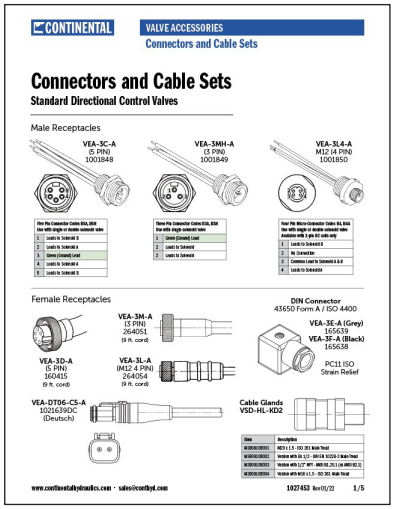


SEAL KIT

BUNA SEAL KIT	1015300
VITON SEAL KIT	1015301

BOLT KIT

BD05-175	131110



Connectors and Cables Sets
Form #1027453