Solenoid Directional Valves

NFPA D03 & D05

DVS-D03 & D05

Series 4568 psi (315 bar)

ANFIELD

Strength in Products,
Strength in Service

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DVS SERIES DESCRIPTION

Anfield DVS series solenoids actuated directional control valves are used to manage the direction of flow in hydraulic circuits. NFPA D03, D05 industry-standard subplate mountable. The DVS valves are rated for 4568 psi (315 bar) and used for low-to-medium flow applications with the D03 size suited for 8-15 gpm, while D05 valves are larger, supporting higher flow rates typically up to 30 gpm, in both cases depending on the spool type. Moving core immersed in hydraulic oil provides quiet operation.

APPLICATIONS

- Mobile & Transport Equipment
- Industrial / Manufacturing
- Agriculture

FEATURES

- Direct acting, directional control valve with subplate mounting interface acc. to NFPA D03 / NG6 / CETOP 03 and NFPA D05 / NG10 / CETOP 05
- DVS-D03 & D05 are four chamber design.
- Used for pressures up to 4568 psi (315bar) and flows up to 16.6 gpm (63 l/min). (depending on the spool type)
- Available in single or double solenoid.
- DVS-D03 & D05 valves can be ordered with conduit box or DIN connectors.
- Manual override standard.
- Available with a wide range of spools.
- Soft-shift spool available. (Contact Anfield)
- Available with DC and AC solenoids from stock.
- Available option of the R120 solenoid, an AC power supply solenoid using a built-in rectifier bridge providing the advantage of AC current faster activation speed with the precision, lower noise, and longer lifespan of a DC solenoid. *(Only available on DIN connector model (20))*
- UNC mounting bolt kits are standard
- Quick Turnaround - Common configurations and core products delivered from stock and conversions of non-core products delivered in days

DVS PRODUCT WEIGHT

AC solenoid with conduit box (10)

DVS-D03		DVS-D05	
Single sol. AC	Double sol. AC	Single sol. AC	Double sol. AC
1.5 (3.4)	1.9 (4.2)	3.6 (8.0)	4.4 (9.7)

Weight unit: kg (lb)

DC solenoid with conduit box (10)

DVS-D03		DVS-D05	
Single sol. DC	Double sol. DC	Single sol. DC	Double sol. DC
1.6 (3.5)	2.0 (4.4)	4.2 (9.3)	5.6 (12.3)

Weight unit: kg (lb)

AC solenoid with DIN connector (20)

DVS-D03		DVS-D05	
Single sol. AC	Double sol. AC	Single sol. AC	Double sol. AC
1.6 (3.5)	2.1 (4.6)	3.4 (7.5)	4.1 (9.1)

Connection types (31), (41) and (51) weights will be similar to DIN connector model (20).

Weight unit: kg (lb)

DC solenoid with DIN connector (20)

DVS-D03		DVS-D05	
Single sol. DC	Double sol. DC	Single sol. DC	Double sol. DC
1.5 (3.4)	2.0 (4.4)	4.0 (8.8)	5.6 (12.3)

Connection types (31), (41) and (51) weights will be similar to DIN connector model (20).

Weight unit: kg (lb)

DVS-D03 TECHNICAL DATA

Valve Size			**06 (D03)**		**06M (D03) Soft Shift**	
Max. flow		l/min (gpm)	63 (16.6)		40 (10.56)	
Max. operating pressure at ports P, A, B		bar (psi)	standard 315 (4568)		standard 210 (3045)	
Max. operating pressure at port T		bar (psi)	210 (3050) - DC 160 (2320) - AC		160 (2320)	
Fluid temperature range (NBR)		°C (°F)	-20 to +80 (-4 to +176)		-20 to +80 (-4 to +176)	
Fluid temperature range (FKM)		°C (°F)	-15 to +80 (+5 to +176)		-15 to +80 (+5 to +176)	
Ambient temperature range		°C (°F)	-20 to +50 (-4 to +122) NBR/FKM		-20 to +50 (-4 to +122) NBR/FKM	
Supply voltage tolerance		%	AC: ±10	DC: ±10	AC: ±10	DC: ±10
Max. switching frequency		1/h	AC: 7200	DC:15000	AC: 7200	DC:15000
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 14	DC: 43	DC: 70	
	OFF	ms	AC: 19	DC: 17	DC: 30	
Weight - valve with 1 solenoid		kg (lbs)	1.6 (3.5) *(see page 2)*		1.6 (3.5) *(see page 2)*	
- valve with 2 solenoids			2.0 (4.4) *(see page 2)*		2.0 (4.4) *(see page 2)*	
			Type		**Type**	
General information			Products & operating conditions		Products & operating conditions	
Coil types / connectors			DC12V DC24V AC120V	10: Conduit box 20: DIN 43650 Form A PG11	DC12V DC24V AC120V	10: Conduit box 20: DIN 43650 Form A PG11
Mounting interface			ISO 4401 03 *(see page 24)*		ISO 4401 03 *(see page 24)*	

DVS-D05 TECHNICAL DATA

Valve Size			**10 (D05)**		**10M (D05) Soft Shift**	
Max. flow		l/min (gpm)	120 (31.7)		80 (21.1)	
Max. operating pressure at ports P, A, B		bar (psi)	standard 315 (4568)		standard 210 (3045)	
Max. operating pressure at port T		bar (psi)	170 (2465) - DC 160 (2320) - AC		160 (2320)	
Fluid temperature range (NBR)		°C (°F)	-20 to +80 (-4 to +176)		-20 to +80 (-4 to +176)	
Fluid temperature range (FKM)		°C (°F)	-15 to +80 (+5 to +176)		-15 to +80 (+5 to +176)	
Ambient temperature range		°C (°F)	-20 to +50 (-4 to +122) NBR/FKM		-20 to +50 (-4 to +122) NBR/FKM	
Supply voltage tolerance		%	AC: ±10	DC: ±10	AC: ±10	DC: ±10
Max. switching frequency		1/h	AC: 7200	DC:15000	AC: 7200	DC:15000
Switching time at ν=32 mm²/s (156 SUS)	ON	ms	AC: 24	DC: 80	DC: 110	
	OFF	ms	AC: 21	DC: 28	DC: 220	
Weight - valve with 1 solenoid		kg (lbs)	3.4 (7.5) *(see page 2)*		3.4 (7.5) *(see page 2)*	
- valve with 2 solenoids			4.1 (9.0) *(see page 2)*		4.1 (9.0) *(see page 2)*	
			Type		**Type**	
General information			Products & operating conditions		Products & operating conditions	
Coil types / connectors			DC12V DC24V AC120V	10: Conduit box 20: DIN 43650 Form A PG11	DC12V DC24V AC120V	10: Conduit box 20: DIN 43650 Form A PG11
Mounting interface			ISO 4401 05 *(see page 24)*		ISO 4401 05 *(see page 24)*	

DVS SERIES DESIGNATION AND ORDERING CODE

DVS	- D03	- C2	- A120	- 10	-	-	-	-	-

Directional Valve Model
DVS Directional Valve, Solenoid operated Pressure 4568 psi (315 bar)

Valve Size
D03 NFPA D03, NG6 ISO 4401-03, CETOP 03
D05 NFPA D05, NG10 ISO 4401-05, CETOP 05

Spool Type
See table on page 6-7

Solenoid Rated Voltage
Standard AC Solenoids (Dual Frequency):
A110 110V AC/60Hz; 100V AC/50Hz
A120 120V AC/60Hz; 110V AC/50Hz
A220 220V AC/60Hz; 200V AC/50Hz
A240 240V AC/60Hz; 220V AC/50Hz
Built-in Rectifier AC→DC Solenoids:
(R coil only with DIN 43650 connectors)
R110 110V AC 50/60Hz
R120 120V AC 50/60Hz
R220 220V AC 50/60Hz
R240 240V AC 50/60Hz
Standard DC Solenoids:
D12 12V DC
D24 24V DC
GD24 28V DC

Solenoid Connection
Offered on D03 and D05 valves
10 Conduit box with indicator light
20 DIN 43650 Form A PG11
Offered on D03 valves with DC Voltage Only (Factory Order)
31 Top exit flying lead
41 SAE J858A spade connector
51 Deutsch DT04-2P connector

Seal
Omit NBR (Nitrile Rubber) *Anfield Standard
V Viton® FKM Fluorocarbon

Terminal
(Available only for Model 31)
00 No terminal (wire length: 300mm)
01-99 Other special products
(Contact Anfield with requirement. Factory delivery w/ MOQ)

Ground Terminal
Option on D03 valve with DC flying lead (31) only
C0 No ground cable terminal
C1 With ground cable

Omit Standard (without soft-shift)
M Soft-shift spool

Omit Standard type with reverse impulse voltage reduction function
D With reverse voltage cutoff function
(DC-20 only)
(On DC solenoids with DIN connectors only)

DVS-D03 SPECIFICATIONS

Model	Max. Flow gpm [lpm]	Max. Pressure psi [bar]	Max. Allowable Back Pressure psi [bar]	Max.Commutation Frequency cycles/minute
DVS-D03-** (Standard)	16.64 [63]	4567 [315]	AC = 2320 [160] DC = 3045 [210]	300
DVS-D03--31/41/51**	16.64 [63]	4567 [315]	3045 [210]	250
DVS-D03--M** (Soft-shift spool)	10.56 [40]	3045 [210]	2320 [160]	120

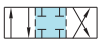
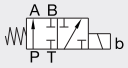
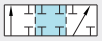
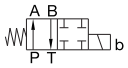
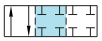
Notes:
1. The max. flow rate refers to the limit flow rate when the valve is normally reversed, and the max. flow rate varies with the function of the valve core and working conditions,
2. Protection level: IP 67 equivalent.
3. Shock resistance: JIS D 1601 class D 70.
4. Water resistance: JIS D 0203 S2.
5. Oil temperature: -20°C~+90°C, ambient temperature: -30°C~50°C.

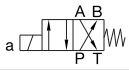
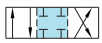
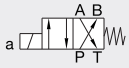
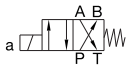
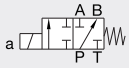
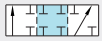
DVS-D03 SOLENOID COIL FUNCTION

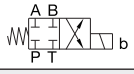
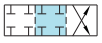
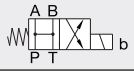
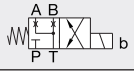
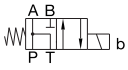
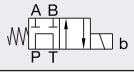
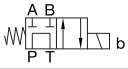
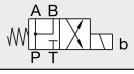
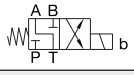
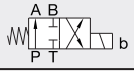
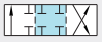
Power	Coil Type	Frequency (Hz)	Voltage		Current & Power at Rated Voltage		
			Rated Voltage	Allowable Range	Starting Current (A)	Holding Current (A)	Power (W)
AC	**A110**	50	100 V AC	90-110	3.30	0.63	26.5
		60	110 V AC	99-121	2.55	0.53	27.5
	A120	50	110 V AC	99-121	2.91	0.57	26.5
		60	120 V AC	108-132	2.32	0.49	27.5
	A220	50	200 V AC	180-220	1.26	0.29	28
		60	220 V AC	198-242	1.23	0.26	28.5
	A240	50	220 V AC	198-242	1.17	0.28	28
		60	240 V AC	216-264	1.14	0.24	28.5
AC→DC Rectified (R)	**R110**	50/60	110 V AC	99-121		0.3	30.0
AC→DC Rectified (R)	**R220**	50/60	220 V AC	198-242		0.15	30.0
AC→DC Rectified (R)	**R120**	50/60	120 V AC	108-132		0.3	30.0
AC→DC Rectified (R)	**R240**	50/60	240 V AC	216-264		0.15	30.0
DC	**D12**	12 V DC		10.8-13.2		2.67	32.0
	D24	24 V DC		21.6-26.4		1.24	30.0
	GD24	28 V DC		24-28		1.14	30.0 (28 V)

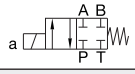
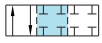
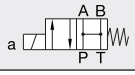
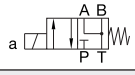
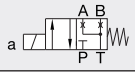
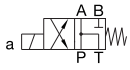
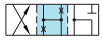
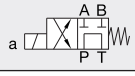
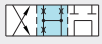
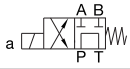
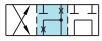
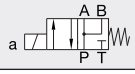
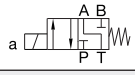
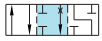
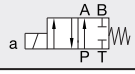
Notes:
1. The allowable range of voltage variation is ±10% of the rated voltage;
2. Short circuit between turns 1500V, not more than three seconds;
3. Insulation resistance more than 100MΩ;
4. The GD24 is a suitable choice for larger trucks, heavy-duty commercial vehicles, buses. These often use 24V (nominal) systems that operate around 28VDC when the engine is running to meet the high power demands of large diesel engines and numerous electrical accessories. The 28V rating refers to the charging voltage needed to properly charge a 24-volt battery bank. The GD24 model solenoids should be considered for these applications.

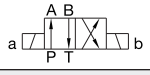
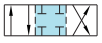
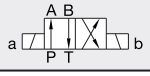
DVS-D03 & D05 SERIES SPOOL TYPES

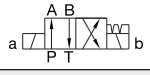
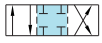
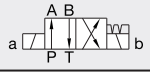
Single Solenoid, 2 Position, Spring Offset (Coil B)		
Spool	Symbol	Transitional State
B2		
B3		
B4		
B20		
B21		

Single Solenoid, 2 Position, Spring Offset (Coil A)		
Spool	Symbol	Transitional State
B2S		
B3S		
B4S		
B20S		

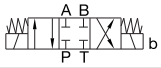
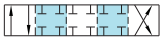
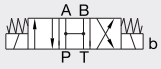
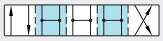
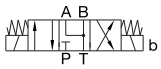
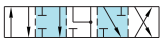
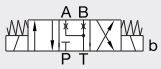
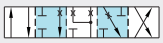
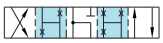
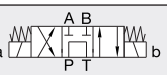
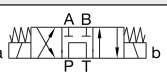
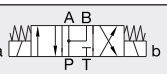
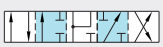
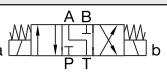
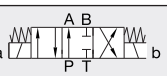
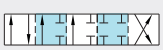
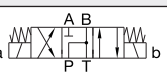
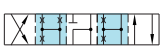
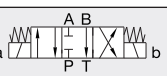
Single Solenoid, 2 Position, Spring Offset (Coil B)		
Spool	Symbol	Transitional State
C2B		
C3B		
C4B		
C40B		
C5B		
C6B		
C60B		
C7B		
C8B		
C9B		

Single Solenoid, 2 Position, Spring Offset (Coil A)		
Spool	Symbol	Transitional State
C2BS		
C3BS		
C4BS		
C40BS		
C5BS		
C6BS		
C60BS		
C7BS		
C8BS		
C9BS		

Double Solenoid, 2 Position, No Spring		
Spool	Symbol	Transitional State
N2		
N3		

Double Solenoid, 2 Position, Detent (No Spring)		
Spool	Symbol	Transitional State
D2		
D3		

DVS-D03 & D05 SERIES SPOOL TYPES

Double Solenoid, 3 Position, Spring Centered		
Spool	Symbol	Transitional State
C2		
C3		
C4		
C40		
C5		
C6		
C60		
C7		
C8		
C9		
C5S		
C8S		

DVS-D03 PRESSURE DROP CHARACTERISTIC CURVE

Q/ΔP diagrams based on mineral oil ISO VG 46 at 40°C

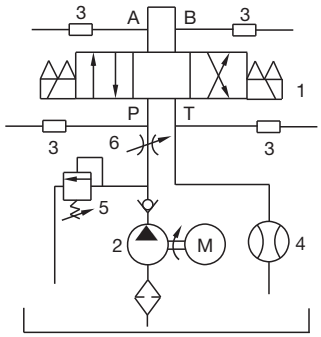
Test System

1. Test item: solenoid directional valve
2. Pump
3. Pressure sensor
4. Flow sensor
5. Pressure valve
6. Flow valve

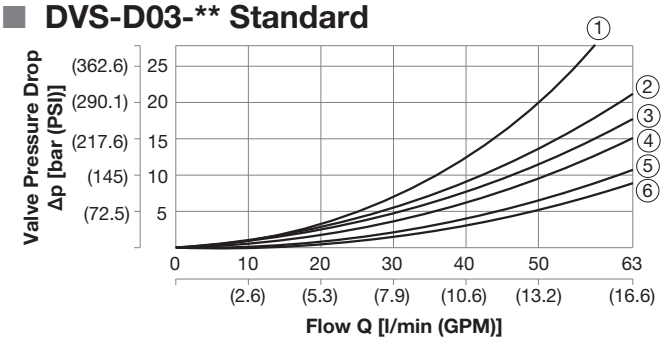
Test Condition

Pressure: 70 bar (1015 psi)
Flow rate: 63 l/min (16.6 gpm)
Viscosity: 46 mm^2/s (cSt) at 40°C
Voltage: 100% V
(after temperature rise and stability)

Test Circuit

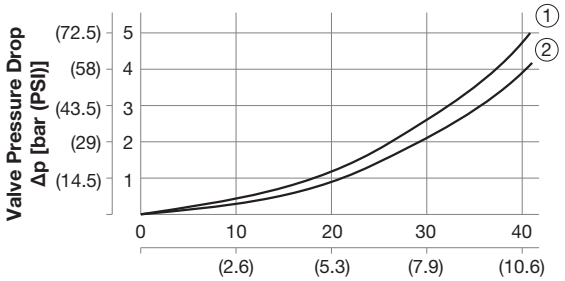


DVS-D03-** Standard



Spool Symbol	Pressure Drop Diagram				
	P→A	B→T	P→B	A→T	P→T
C2	5	5	5	5	–
C3	6	6	6	6	4
C4	5	6	5	6	–
C40	5	5	5	5	–
C5	2	2	2	2	4
C6	1	1	1	1	4
C60	1	1	1	1	3
C7	6	5	6	5	–
C8	5	5	5	6	–
C9	6	5	5	5	–
D2	5	5	5	5	–
D3	5	3	5	3	–
B2	4	5	4	5	–
B3	3	3	5	5	–
B20	2	–	5	–	–
B2S	4	5	4	5	–
B3S	5	5	3	3	–
B20S	5	–	2	–	–

Soft Shift (M)



Spool Symbol	Pressure Drop Diagram			
	P→A	B→T	P→B	A→T
C2	1	1	1	1
C4	1	2	1	2
B2	1	1	1	1

Viscosity Correction Factor - DVS-D03

Viscosity	cSt	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Coefficient (G[1])		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

Note: For other specific gravity (G'), the pressure drop can be calculated by the formula Δp'=Δp(G'/0.85)

DVS-D03 REVERSING TIME *(Standard)*

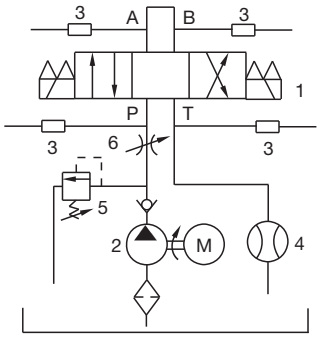
Test System

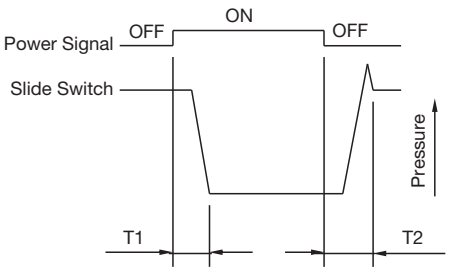
1. Test item: solenoid directional valve
2. Pump
3. Pressure sensor
4. Flow sensor
5. Pressure valve
6. Flow valve

Test Condition

Pressure: 160 bar (2320 psi)
Flow rate: 30 l/min (7.9 gpm)
Viscosity: 46 mm²/s (cSt) at 40°C
Voltage: 100% V
(after temperature rise and stability)

Test Circuit





Test Results

Model	Switching Time (ms)	
	T1	T2
DVS-D03-C2-A*Series	14	19
DVS-D03-C2-D*Series	43	17
DVS-D03-C2-R*Series	46	88

DVS-D03 REVERSING TIME *(Soft Shift - M)*

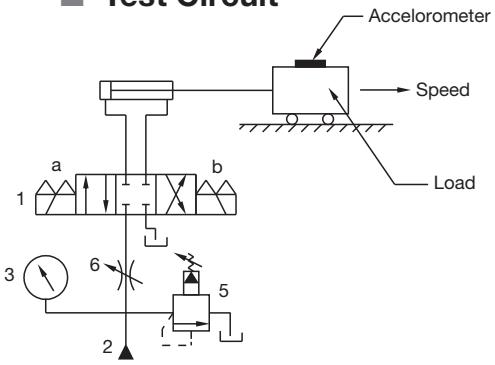
Test System

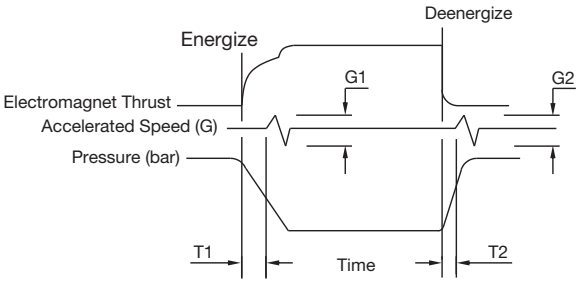
1. Test item: solenoid directional valve
2. Pump
3. Pressure sensor
4. Flow sensor
5. Pressure valve
6. Flow valve

Test Condition

Pressure: 70 bar (1015 psi)
Load: 1000 kg (2200 lb.)
Cylinder Speed: 8 m/min
Viscosity: 46 mm²/s (cSt) at 40°C

Test Circuit





Test Results

Type	Model	Time (ms)		Accelerated speed (m/s²)	
		T1	T2	G1	G2
Standard	**DVS-D03-C2-D***	35	25	18	15
Soft-shift spool	**DVS-D03-C2-D*-M**	70	30	12	7

DVS-D03-**-**-10-* DIMENSIONS *(Valves With Conduit Box)*

DVS-D03-**-D/R*-10

NFPA D03

D: DC solenoid

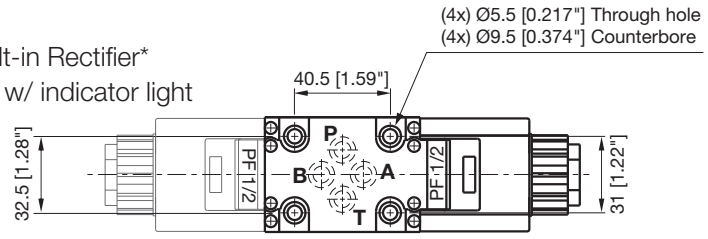
R: AC→DC Built-in Rectifier*

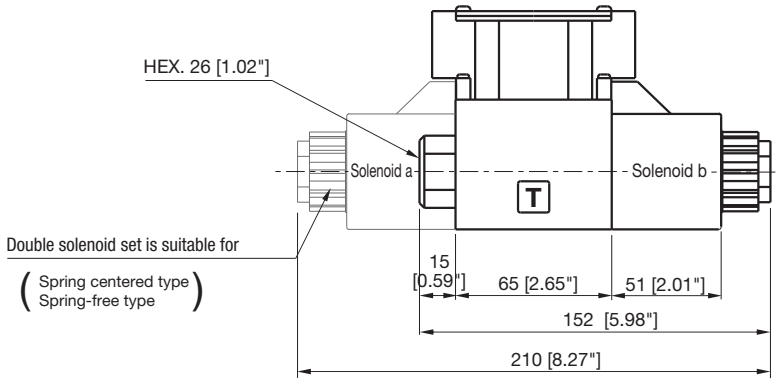
10: Conduit box w/ indicator light

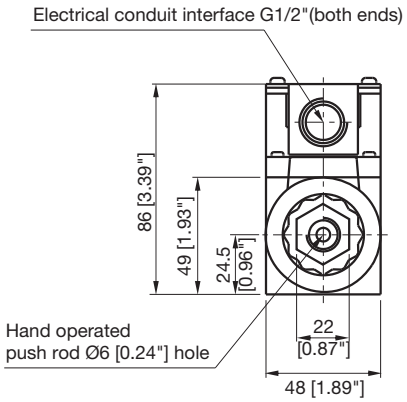
* *Contact Anfield for conduit box w/ Built-in Rectifier MOQ of 500pcs (Conditions apply)*

Installation surface:
ISO 4401-AB-03-4-A

D03 Weight kg (lb)	DC
Single sol. DC	1.6 (3.5)
Double sol. DC	2.0 (4.4)







DVS-D03-**-A*-10

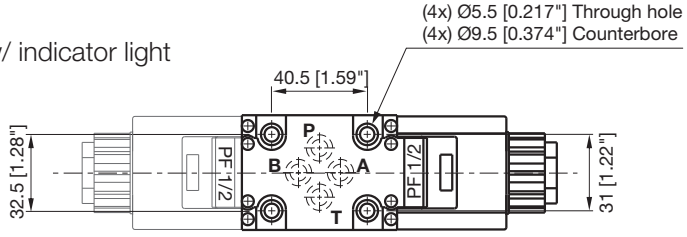
NFPA D03

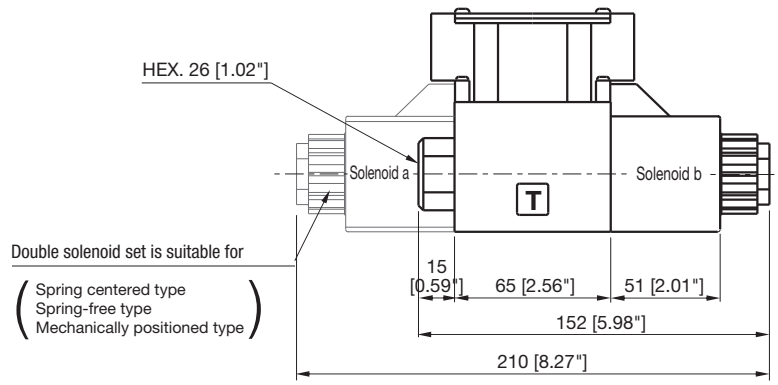
A: AC solenoid

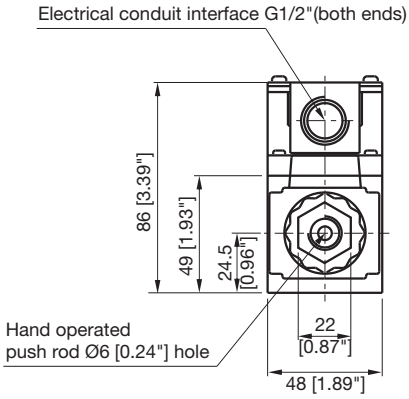
10: Conduit box w/ indicator light

Installation surface:
ISO 4401-AB-03-4-A

D03 Weight kg (lb)	AC
Single sol. AC	1.5 (3.4)
Double sol. AC	1.9 (4.2)







mm [inch]

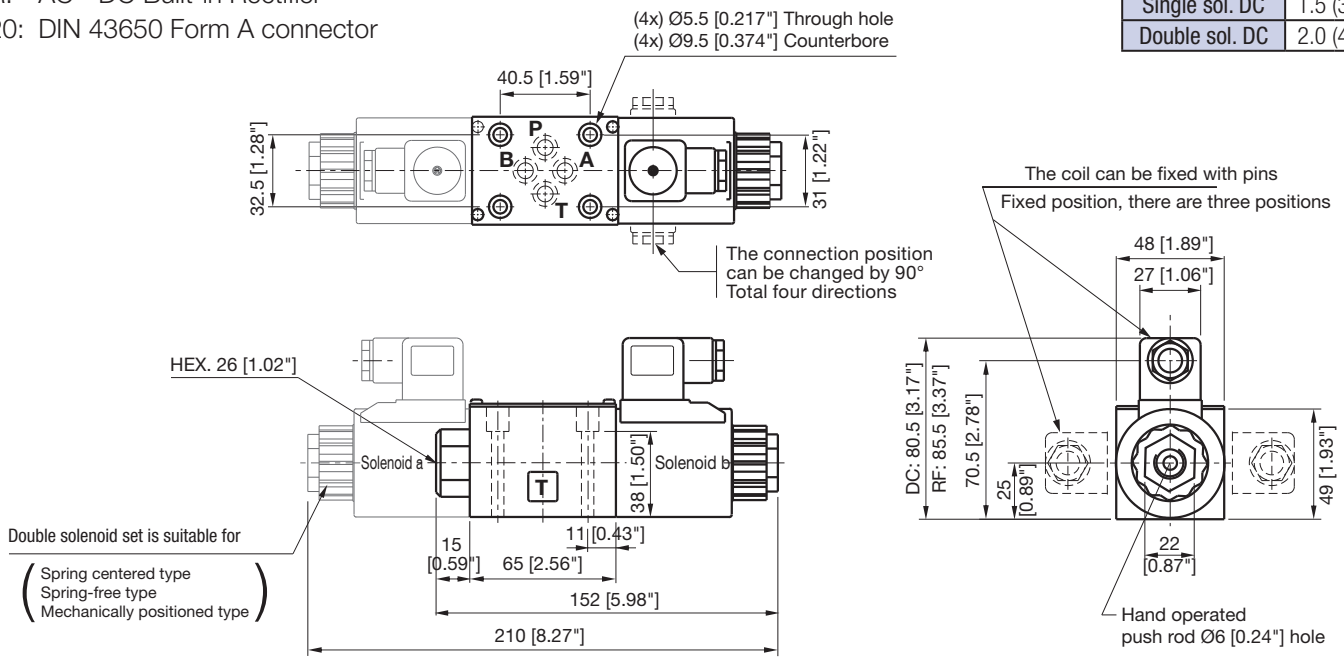
DVS-D03-**-**-20-* DIMENSIONS *(Valves With DIN Connector)*

DVS-D03-**-D/R*-20

NFPA D03
D: DC solenoid
R: AC→DC Built-in Rectifier
20: DIN 43650 Form A connector

Installation surface:
ISO 4401-AB-03-4-A

D03 Weight kg (lb)	DC
Single sol. DC	1.5 (3.4)
Double sol. DC	2.0 (4.4)

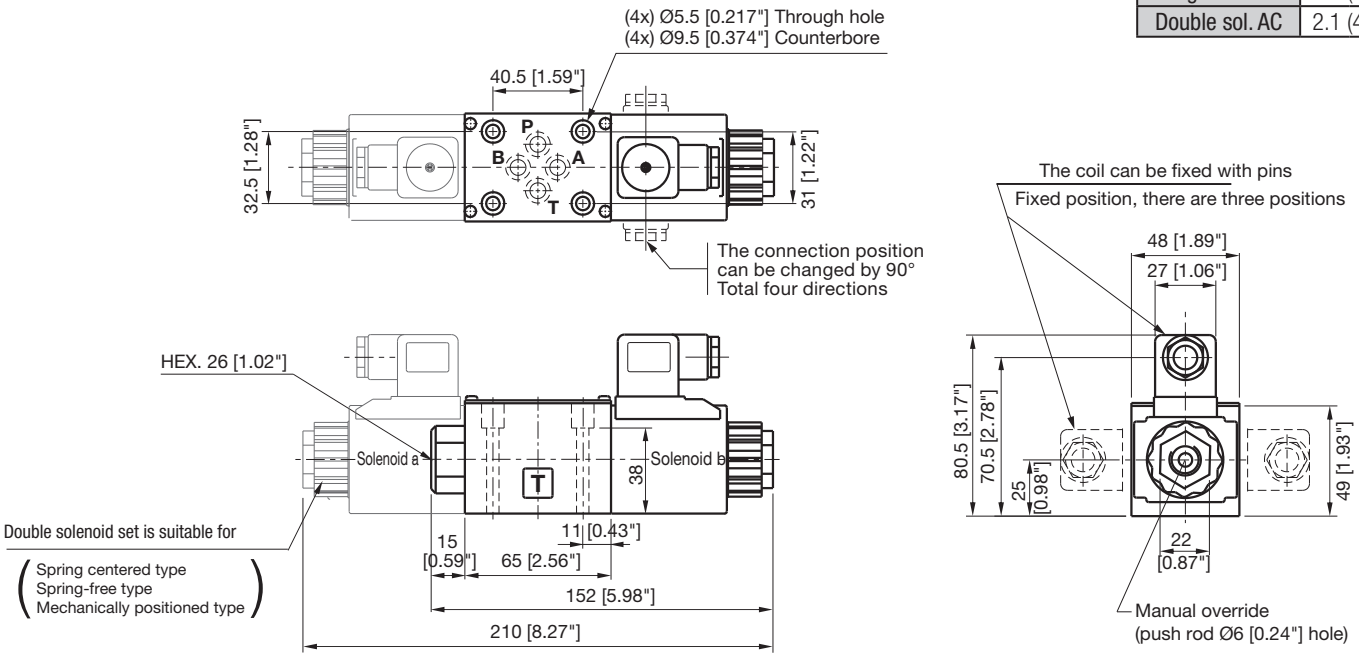


DVS-D03-**-A*-20

NFPA D03
A: AC solenoid
20: DIN 43650 Form A connector

Installation surface:
ISO 4401-AB-03-4-A

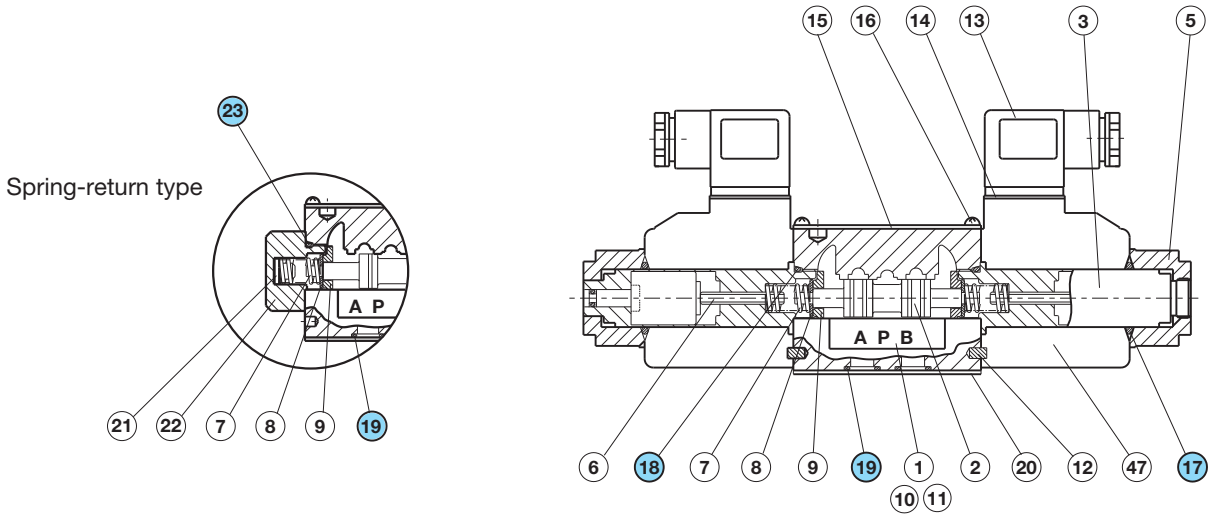
D03 Weight kg (lb)	AC
Single sol. AC	1.6 (3.5)
Double sol. AC	2.1 (4.6)



DVS-D03 INSTALLATION KIT

Parts	Qty	Imperial Standard	Metric Standard	Note
Mounting screw (hex socket screw)	4	10-24UNC×1-3/4" *(Anfield standard)*	M5×45	Mounting screw torque values 43 - 60 in.lb 3.6 - 5.0 ft-lb 50 -70 kgf-cm
Mounting surface O-ring	4	AS568-012	AS568-012	

DVS-D03-**-**-20-* SEALS AND SOLENOID ASSEMBLIES



Sealing Elements

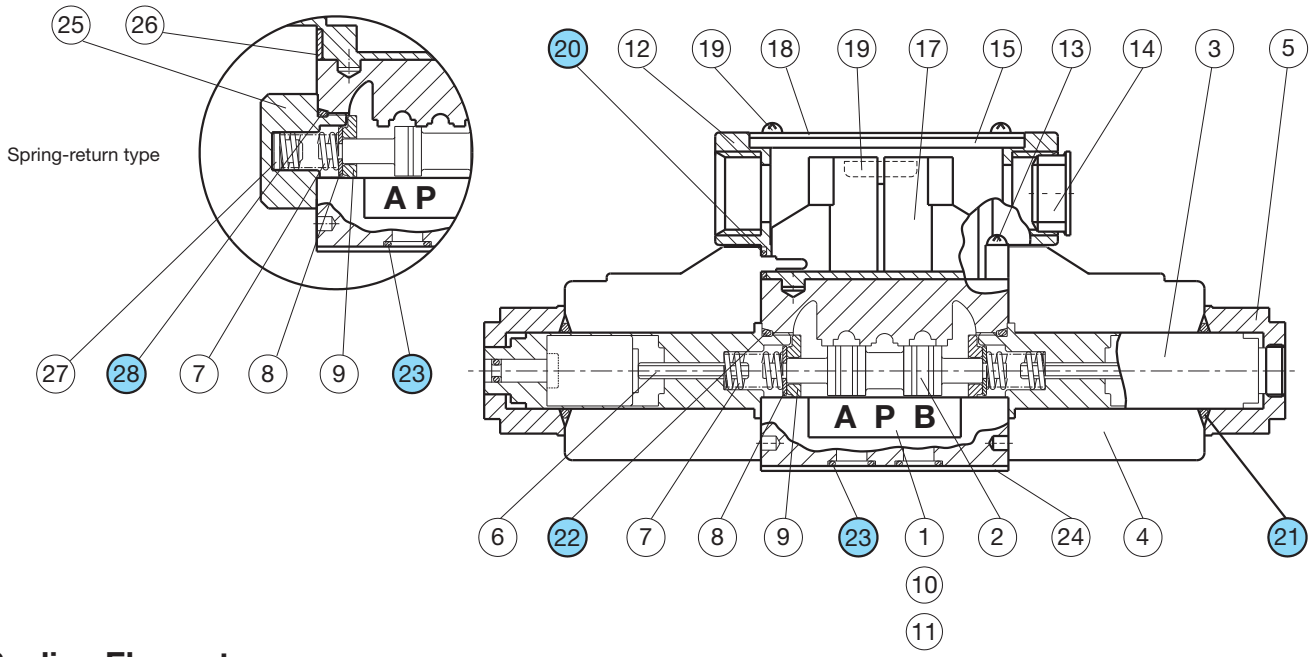
No.	Parts	Model	Qty	Note
17	O-ring	P20 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
18	O-ring	P18 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
19	O-ring	AS568-012 HS90	4	
23	O-ring	P18 HS70	1	

Electromagnet and Coil Table

Solenoid Valve Model	Electromagnet Type	Coil Type	Angle plug type
DVS-D03--A240-20-***	DVS-D03 AC Core Tube	DVS-D03 240VAC Coil DIN	DVS-D03-AC angle plug DVS-D03-AC-LS angle plug
DVS-D03--A220-20-***		DVS-D03 220VAC Coil DIN	
DVS-D03--A120-20-***		DVS-D03 120VAC Coil DIN	
DVS-D03--A110-20-***		DVS-D03 110VAC Coil DIN	
DVS-D03--R240-20-***	DVS-D03 DC Core Tube	DVS-D03 240RAC Coil DIN	DVS-D03-RF angle plug DVS-D03-RF-LS angle plug
DVS-D03--R220-20-***		DVS-D03 220RAC Coil DIN	
DVS-D03--R120-20-***		DVS-D03 120RAC Coil DIN	
DVS-D03--R110-20-***		DVS-D03 110RAC Coil DIN	
DVS-D03--D24-20-***	DVS-D03 DC Core Tube	DVS-D03 24VDC Coil DIN	DVS-D03-DC angle plug DVS-D03-DC-LS angle plug
DVS-D03--D12-20-***		DVS-D03 12VDC Coil DIN	

AC and DC power conversion: When the power conversion (AC◀▶DC), need to replace the electromagnet, coil and bend plug;
Voltage conversion: As soon as the coil is replaced, the new voltage specification can be used.
For example: AC240(220/50)◀▶AC110(110/60) or DC12◀▶DC24.

DVS-D03-**-**-10-* SEALS AND SOLENOID ASSEMBLIES



Sealing Elements

No.	Parts	Model	Qty	Note
20	O-ring	P4 HS70	4	The spool type is a two-position spring return type, and the quantity is 2
21	O-ring	P20 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
22	O-ring	P18 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
23	O-ring	AS568-012 HS90	4	
28	O-ring	P18 HS70	1	

Electromagnet and Coil Table

Solenoid Valve Model	Electromagnet Type	Coil Type	Angle plug type
DVS-D03--A240-10-***	DVS-D03 AC Core Tube	DVS-D03 240VAC Coil DIN	DVS-D03-AC conduit box DVS-D03-AC-LS conduit box
DVS-D03--A220-10-***		DVS-D03 220VAC Coil DIN	
DVS-D03--A120-10-***		DVS-D03 120VAC Coil DIN	
DVS-D03--A110-10-***		DVS-D03 110VAC Coil DIN	
DVS-D03--D24-10-***	DVS-D03 DC Core Tube	DVS-D03 24VDC Coil DIN	DVS-D03-DC conduit box DVS-D03-DC-LS conduit box
DVS-D03--D12-10-***		DVS-D03 12VDC Coil DIN	

AC and DC power conversion: When the power conversion (AC◀▶DC), need to replace the electromagnet, coil and conduit box;
Voltage conversion: As soon as the coil is replaced, the new voltage specification can be used.
For example: AC240(220/50)◀▶AC110(110/60) or DC12◀▶DC24.

DVS-D03-**-**-31/41/51-* DIMENSIONS *(Factory Order)*

DVS-D03-**-D*-31-*Δ

***Factory Order**

NFPA D03

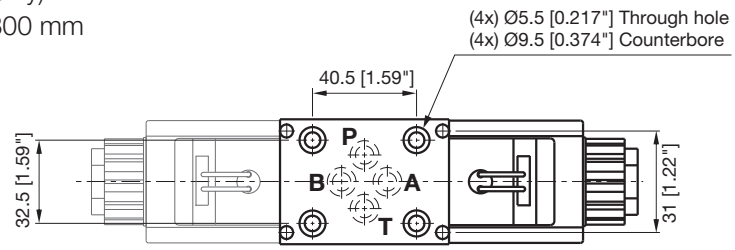
D: DC solenoid

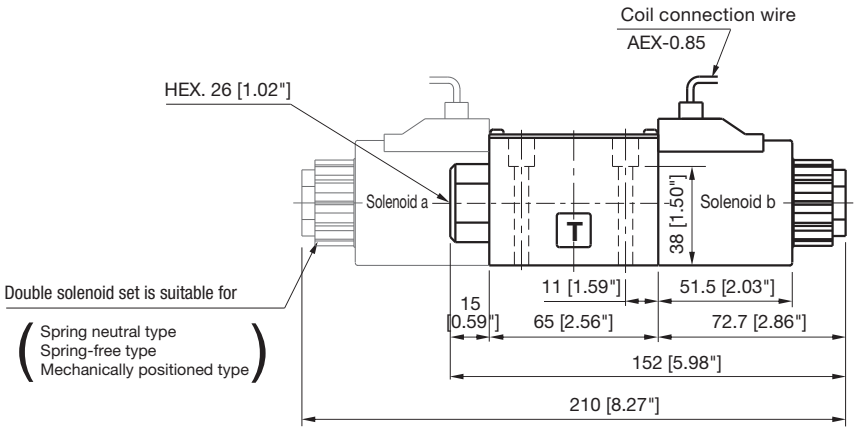
31: w/ top exit flying lead (DC voltage only)

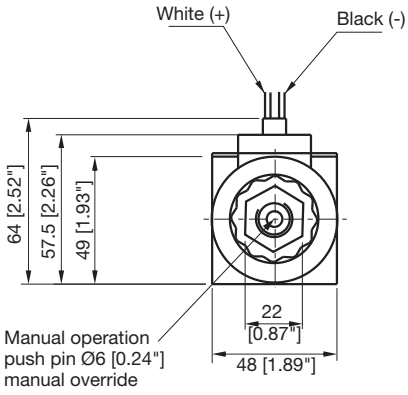
Δ: Wire length 300 mm

Installation surface:
ISO 4401-AB-03-4-A

D03 Weight kg (lb)	DC
Single sol. DC	1.5 (3.4)
Double sol. DC	2.0 (4.4)







mm [inch]

DVS-D03-**-**-31/41/51-* DIMENSIONS *(Factory Order)*

DVS-D03-**-D*-41-**

***Factory Order**

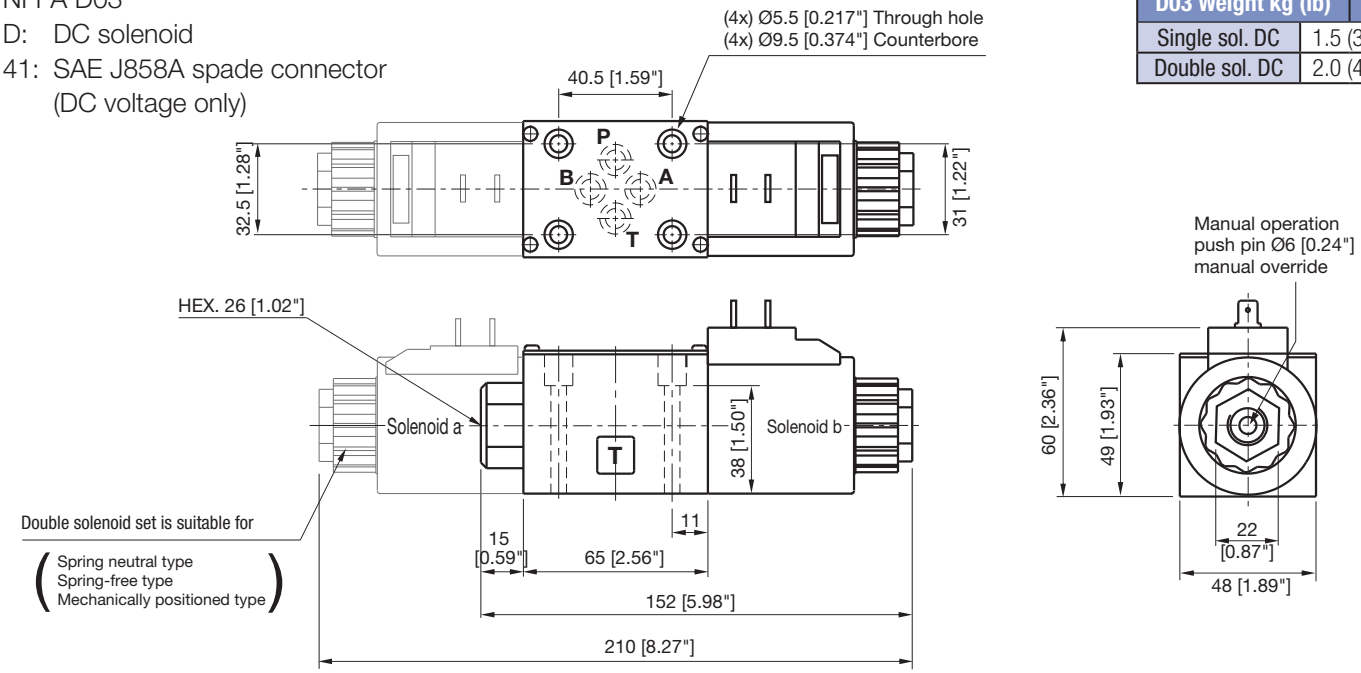
NFPA D03

D: DC solenoid

41: SAE J858A spade connector
(DC voltage only)

Installation surface:
ISO 4401-AB-03-4-A

D03 Weight kg (lb)	DC
Single sol. DC	1.5 (3.4)
Double sol. DC	2.0 (4.4)



DVS-D03-**-D*-51

***Factory Order**

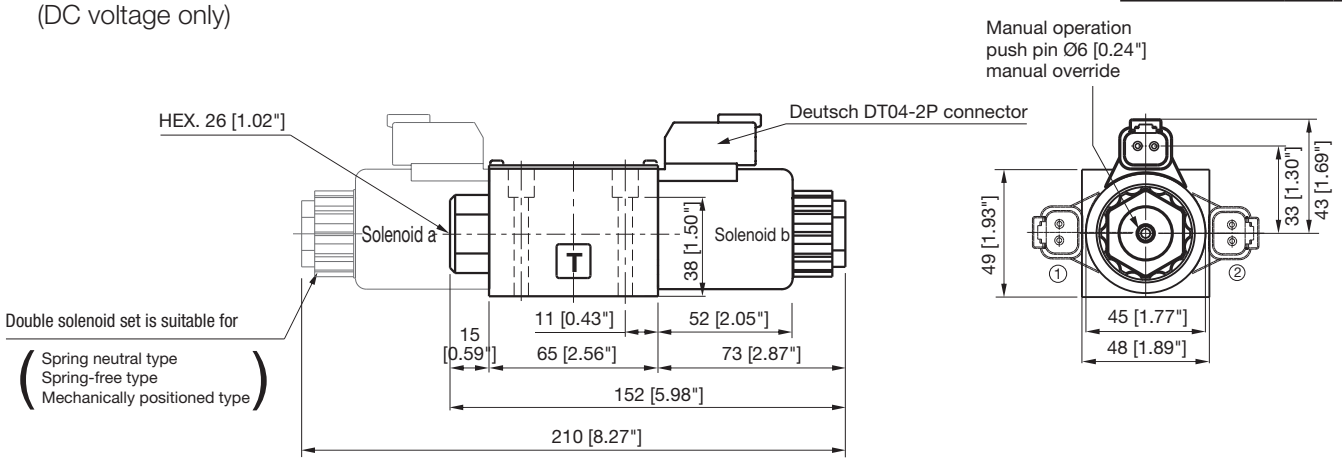
NFPA D03

D: DC solenoid

51: Deutsch DT04-2P connector
(DC voltage only)

Installation surface:
ISO 4401-AB-03-4-A

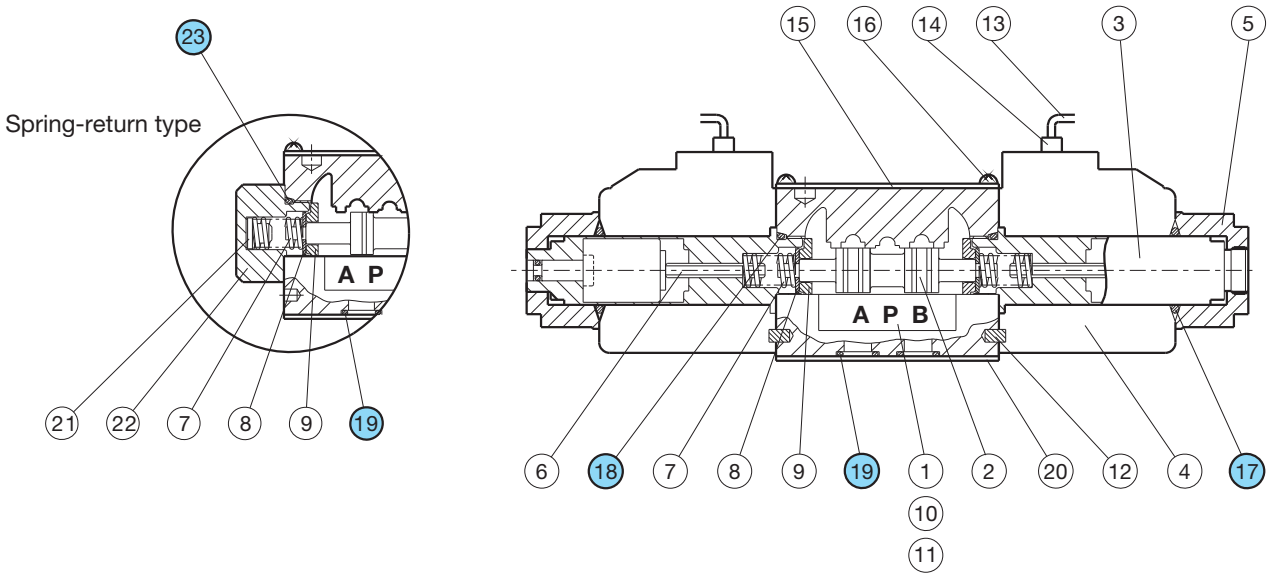
D03 Weight kg (lb)	DC
Single sol. DC	1.5 (3.4)
Double sol. DC	2.0 (4.4)



DVS-D03 INSTALLATION KIT

Parts	Qty	Imperial Standard	Metric Standard	Note
Mounting screw (hex socket screw)	4	10-24UNC×1-3/4" *(Anfield standard)*	M5×45	Mounting screw torque values 43 - 60 in.lb 3.6 - 5.0 ft-lb 50 -70 kgf-cm
Mounting surface O-ring	4	AS568-012	AS568-012	

DVS-D03-**-**-31/41/51-* SEALS AND SOLENOID ASSEMBLIES



Sealing Elements

No.	Parts	Model	Qty	Note
17	O-ring	P20 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
18	O-ring	P18 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
19	O-ring	AS568-012 HS90	4	
23	O-ring	P18 HS70	1	

Electromagnet and Coil Table

Solenoid Valve Model	Electromagnet Type	Coil Type	Note
DVS-D03--D**-31-***	DVS-D03 DC Core Tube	DVS-D03-D**-31 Coil	Voltage conversion: The supply voltage can be changed simply by replacing the coil.
DVS-D03--D**-41-***		DVS-D03-D**-41 Coil	
DVS-D03--D**-51-***		DVS-D03-D**-51 Coil	

DVS-D05 SPECIFICATIONS

Model	Max. Flow gpm [lpm]	Max. Pressure psi [bar]	Max. Allowable Back Pressure psi [bar]	Max.Commutation Frequency cycles/minute
DVS-D05-** (Standard)	31.70 [120]	4567 [315]	AC = 2320 [160] DC = 2465 [170]	240
DVS-D05--M** (Soft shift spool)	21.13 [80]	3045 [210]	2320 [160]	120

Notes:
1. The max. flow rate refers to the limit flow rate of the valve when it is normally reversed. The max. flow rate varies with the function of the valve core and working conditions.
2. The characteristic parameters of M3 series are the same as those of standard type.

DVS-D05 SOLENOID FUNCTION

Power	Coil Type	Voltage			Current & Power at Rated Voltage		
		Rated Voltage	Frequency (Hz)	Allowable Range (±10%)	Starting Current (A)	Holding Current (A)	Power (W)
AC	**A110**	AC100	50	90-110	4.95	0.95	43
		AC110	60	99-121	4.06	0.84	46.5
	A120	AC110	50	99-121	4.40	0.86	43
		AC120	60	108-132	3.68	0.78	46.5
	A220	AC200	50	180-220	2.14	0.44	43.5
		AC220	60	198-242	2.03	0.42	47.5
	A240	AC220	50	198-242	2.04	0.43	43.5
		AC240	60	216-264	1.86	0.39	47.5
AC→DC Rectified (R)	**R110**	AC110	50/60	99-121		0.39	41
AC→DC Rectified (R)	**R220**	AC220	50/60	198-242		0.20	41
AC→DC Rectified (R)	**R120**	AC120	50/60	108-132		0.35	38
AC→DC Rectified (R)	**R240**	AC240	50/60	216-264		0.175	38
DC	**D12**	12 V DC		10.8-13.2		3.43	40.8
	D24	24 V DC		21.6-26.4		1.75	42
	GD24	28 V DC		24-28		1.51	42

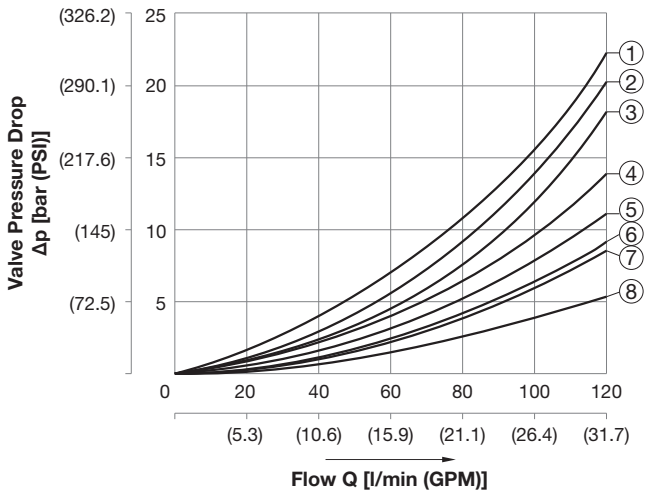
Notes:
1. The allowable range of voltage variation is ±10% of the rated voltage;
2. Resistance voltage 1500v/sec;
3. The insulation resistance is greater than 100MΩ.
4. It is recommended that the selection and use of GD24V coil should be set in the case that the engine is started, but it may also be in the shutdown state, directly driven from the battery. In accordance with the 28VDC design, so the power supply is not recommended for the engine power generation system.

DVS-D05 PRESSURE DROP CHARACTERISTIC CURVE

Q/ΔP diagrams based on mineral oil ISO VG 46 at 40°C

DVS-D05-** (Standard)

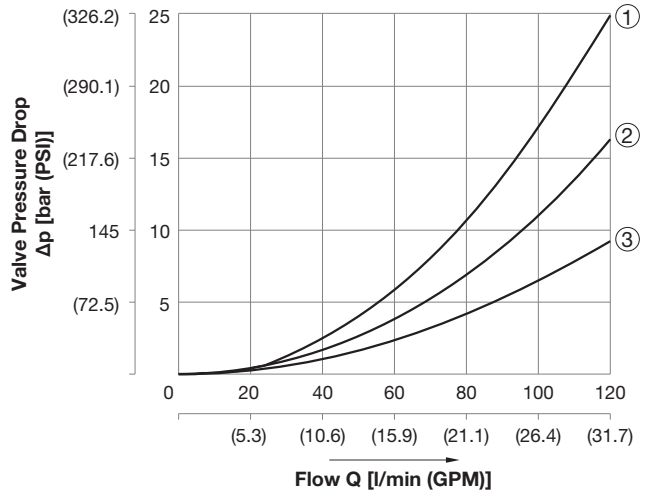
Test conditions: Viscosity: 46 mm²/s (cSt) at 40°C; Pressure: 70 bar (1015 psi); Flow rate: 120 lpm (31.7 gpm)



Model	P→A	B→T	P→B	A→T	P→T
C2	6	6	6	6	–
C3	7	7	7	7	5
C4	6	7	6	7	–
C40	6	7	6	7	–
C5	5	2	2	2	8
C6	2	2	2	2	5
C60	1	1	1	1	4
C7	7	6	7	6	–
C8	5	5	5	6	–
C9	6	6	6	7	–
B2	2	2	6	6	–
B3	3	3	6	6	–
B20	5	–	5	–	–
B2S	6	6	2	2	–
B3S	6	6	3	3	–
B20S	5	–	5	–	–

DVS-D05-**-M (Soft-shift spool)

Test conditions: Viscosity: 46 mm²/s (cSt) at 40°C; Pressure: 70 bar (1015 psi); Flow rate: 120 lpm (31.7 gpm)



Model	P→A	B→T	P→B	A→T	P→T
C2	2	2	2	2	–
C3	2	2	3	3	–
B2	1	2	2	2	–

Viscosity Correction Factor - DVS-D05

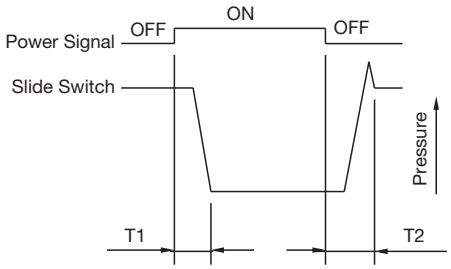
Viscosity	cSt	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
Coefficient (G')		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

For other specific gravity (G'), the pressure drop can be calculated by the formula Δp'=Δp(G'/0.85).

DVS-D05 REVERSING TIME *(Standard)*

Test Condition

Pressure: 160 bar (2320 psi)
Flow rate: 30 l/min (16.6 gpm)
Viscosity: 46 mm2/s (cSt) at 40°C
Voltage: 100% V
(after temperature rise and stability)



Test Results

Model	Switching Time (ms)	
	T1	T2
DVS-D05-C2-A*Series	24	21
DVS-D05-C2-D*Series	80	28
DVS-D05-C2-R*Series	80	190

DVS-D05 REVERSING TIME *(Soft Shift - M)*

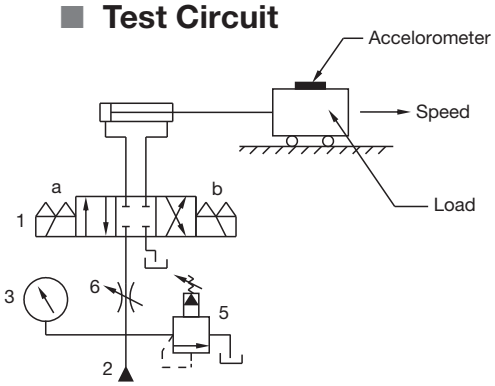
Test System

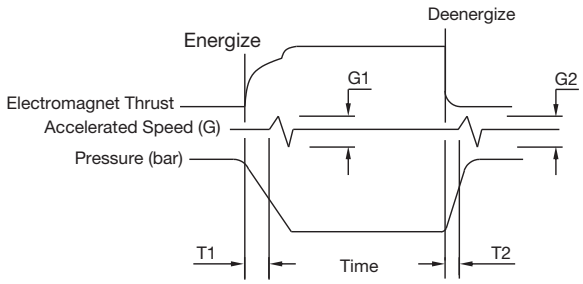
1. Test item: solenoid directional valve
2. Pump
3. Pressure sensor
4. Flow sensor
5. Pressure valve
6. Flow valve

Test Condition

Pressure: 70 bar (1015 psi)
Load: 1000 kg (2200 lb.)
Cylinder Speed: 8 m/min
Viscosity: 46 mm^2/s (cSt) at 40°C

Test Circuit





Test Results

Type	Model	Time (ms)		Accelerated speed (m/s^2)	
		T1	T2	G1	G2
Standard	**DVS-D05-C2-D*-****	70	40	14	12
Soft-shift spool	**DVS-D05-C2-D*-**-M**	110	120	6.5	6.5

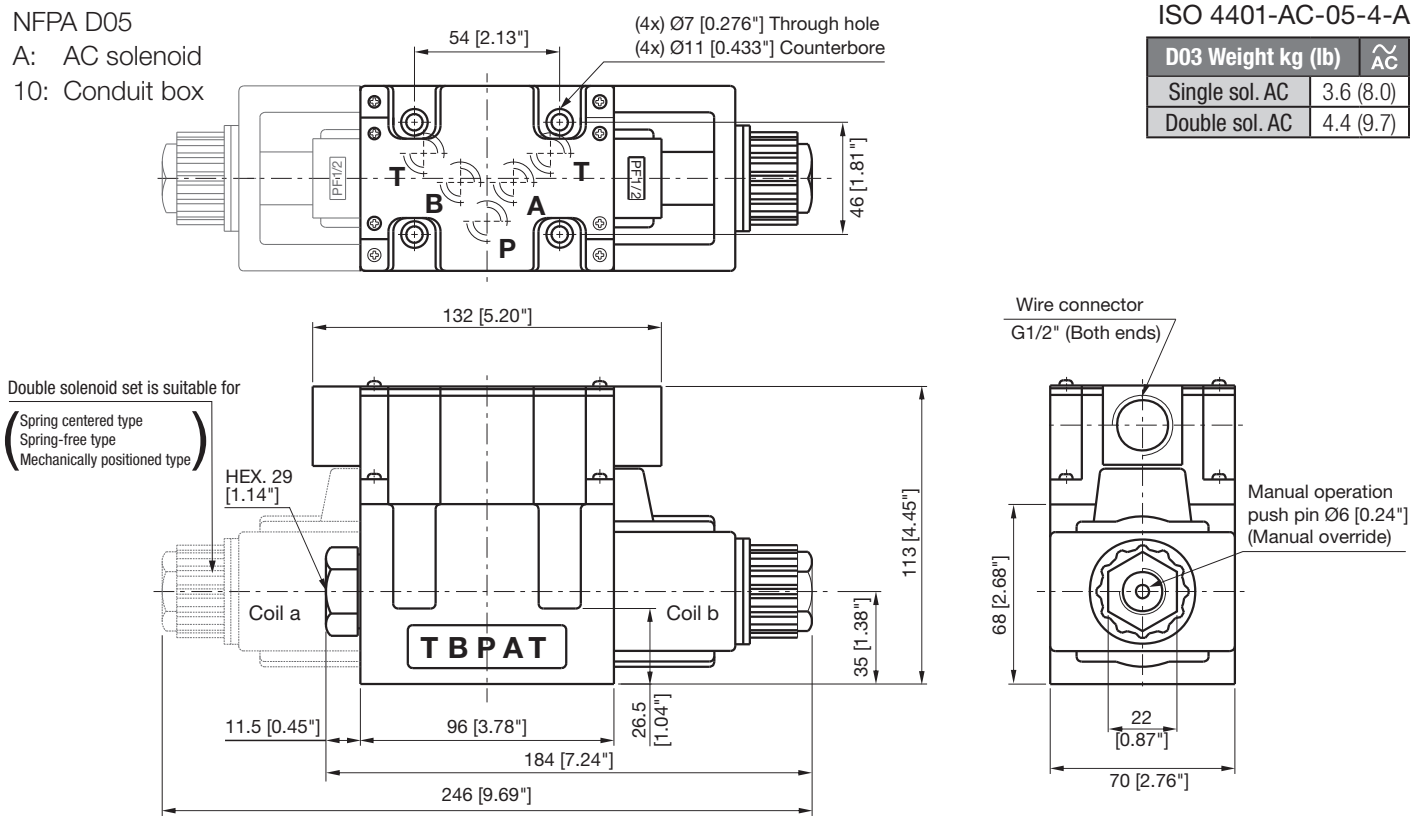
DVS-D05-**-**-10-* DIMENSIONS *(Valves With Conduit Box)*

DVS-D05-**-A*-10

NFPA D05
A: AC solenoid
10: Conduit box

Installation surface:
ISO 4401-AC-05-4-A

D03 Weight kg (lb)	AC
Single sol. AC	3.6 (8.0)
Double sol. AC	4.4 (9.7)



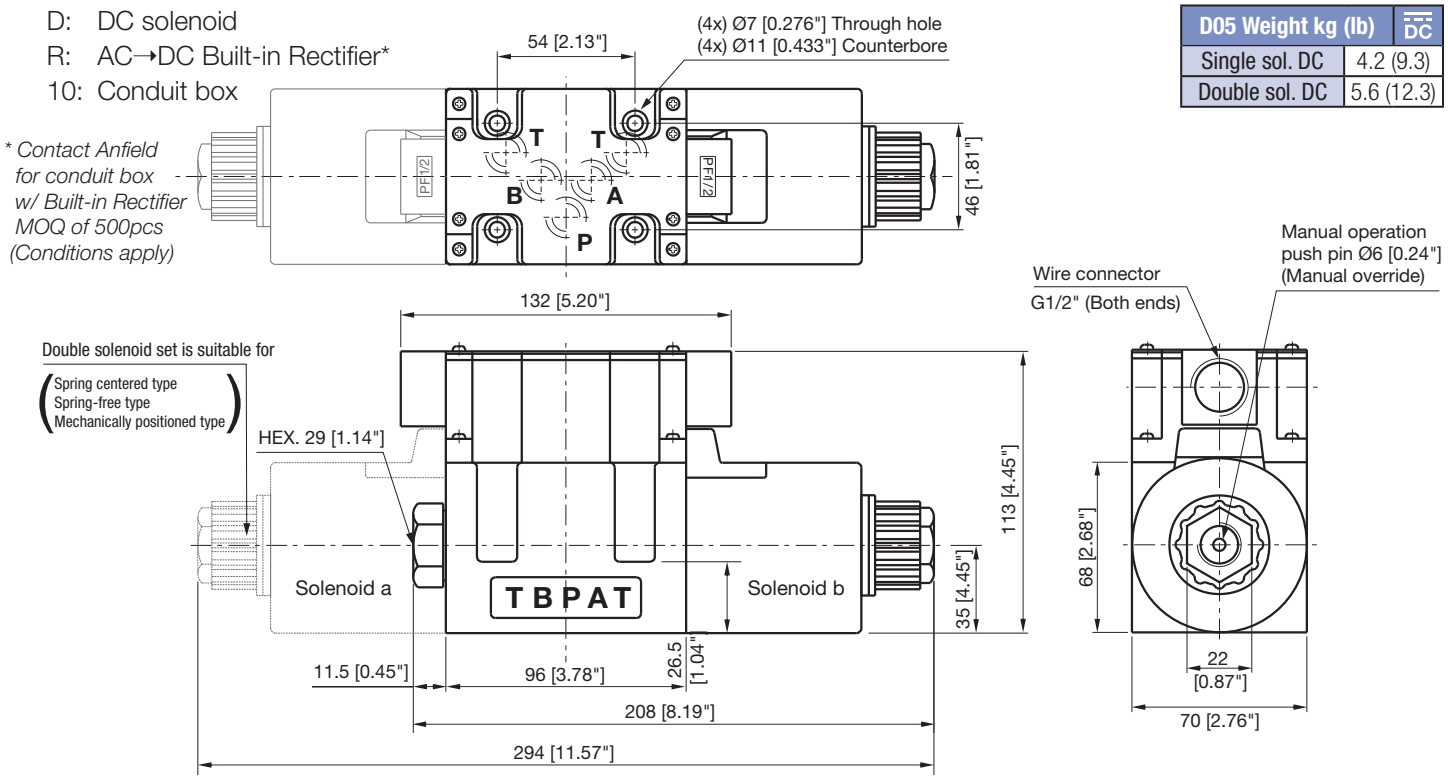
DVS-D05-**-D/R*-10

NFPA D05
D: DC solenoid
R: AC→DC Built-in Rectifier*
10: Conduit box

** Contact Anfield for conduit box w/ Built-in Rectifier MOQ of 500pcs (Conditions apply)*

Installation surface:
ISO 4401-AC-05-4-A

D05 Weight kg (lb)	DC
Single sol. DC	4.2 (9.3)
Double sol. DC	5.6 (12.3)



mm [inch]

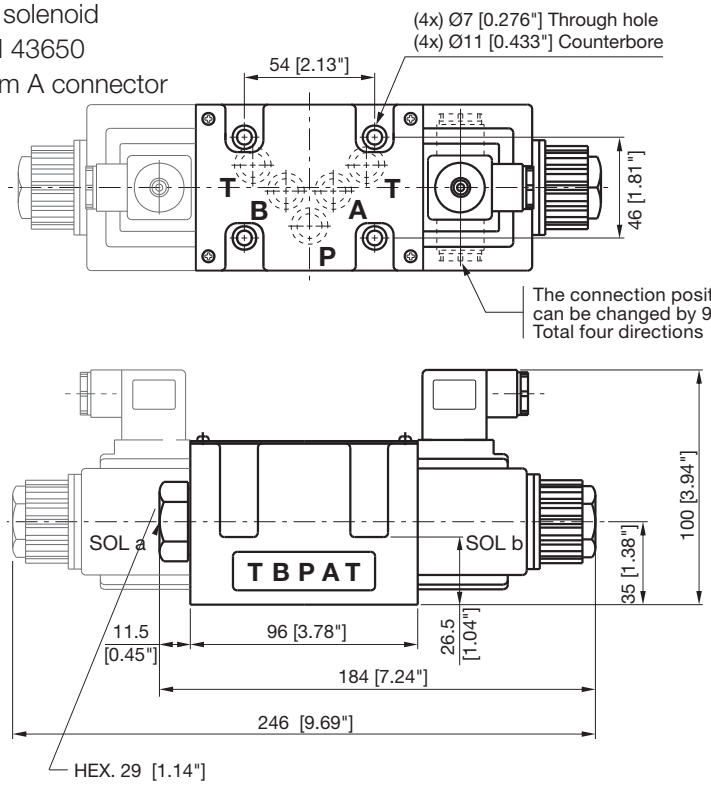
DVS-D05-**-**-20-* DIMENSIONS *(Valves With DIN Connector)*

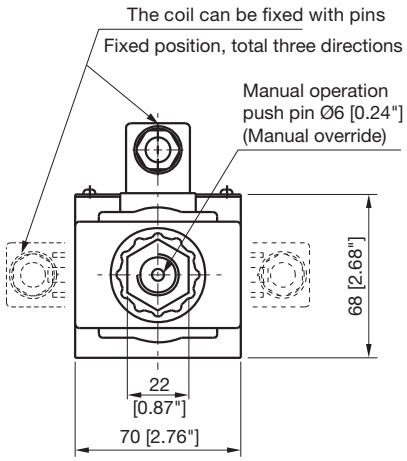
DVS-D05-**-A*-20

NFPA D05
A: AC solenoid
20: DIN 43650
Form A connector

Installation surface:
ISO 4401-AC-05-4-A

D05 Weight kg (lb)	AC
Single sol. AC	3.4 (7.5)
Double sol. AC	4.1 (9.1)



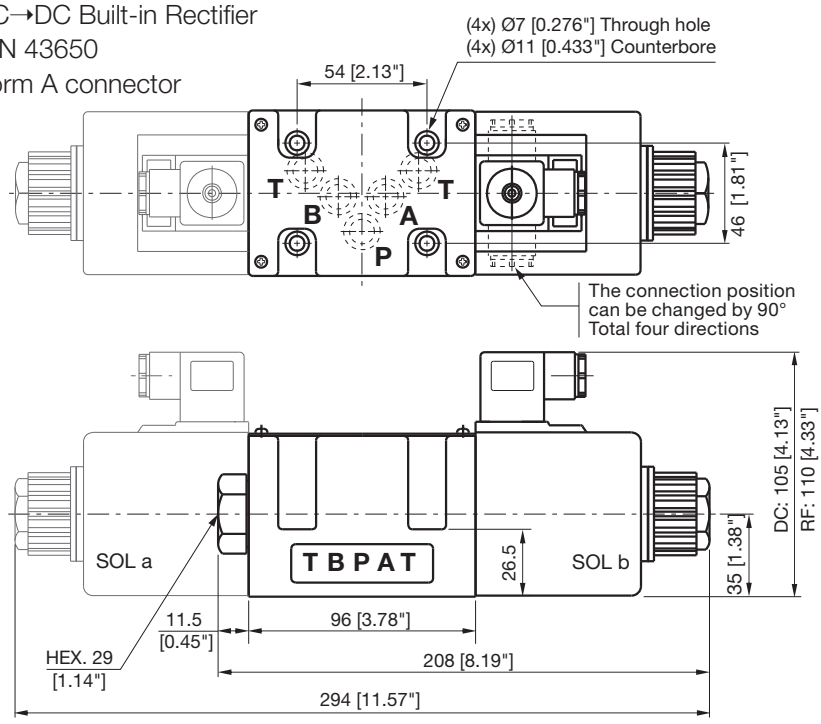


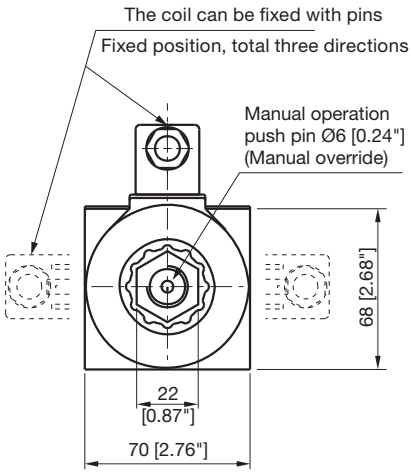
DVS-D05-**-D/R*-20

NFPA D05
D: DC solenoid
R: AC→DC Built-in Rectifier
20: DIN 43650
Form A connector

Installation surface:
ISO 4401-AC-05-4-A

D05 Weight kg (lb)	DC
Single sol. DC	4.0 (8.8)
Double sol. DC	5.6 (12.3)

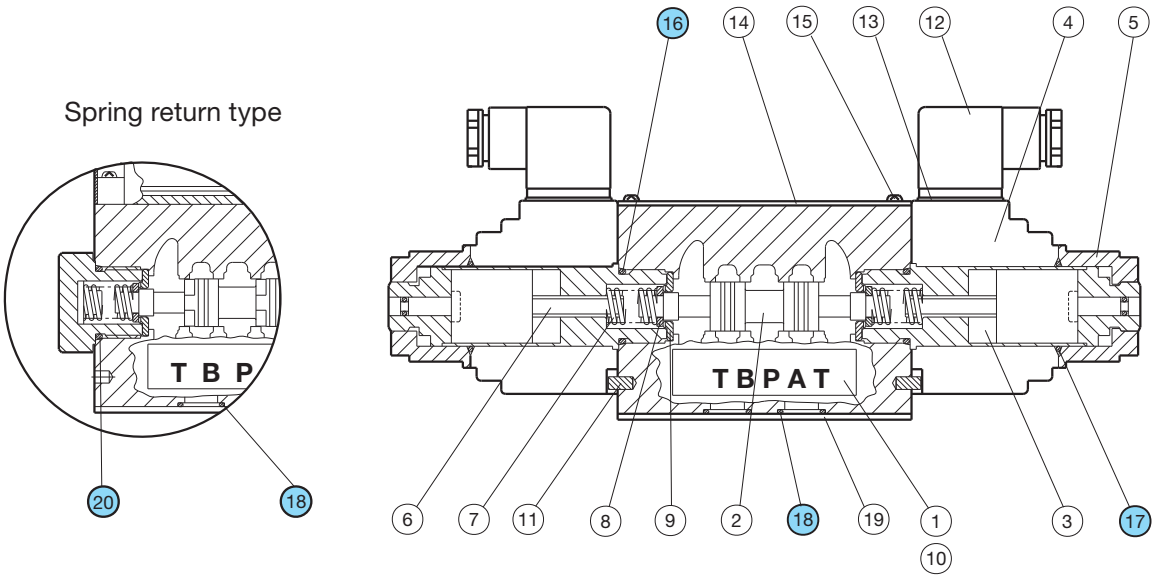




DVS-D05 INSTALLATION KIT

Parts	Qty	Imperial Standard	Metric Standard	Note
Mounting screw (hex socket screw)	4	1/4"-20UNC×1-3/8" *(Anfield standard)*	M5×45	Mounting screw torque values 104 - 130 in-lb 8.7 - 10.8 ft-lb 120-150 kgf-cm
Mounting surface O-ring	5	AS568-014	AS568-014	

DVS-D05-**-**-20-* SEALS AND SOLENOID ASSEMBLIES



Sealing Elements

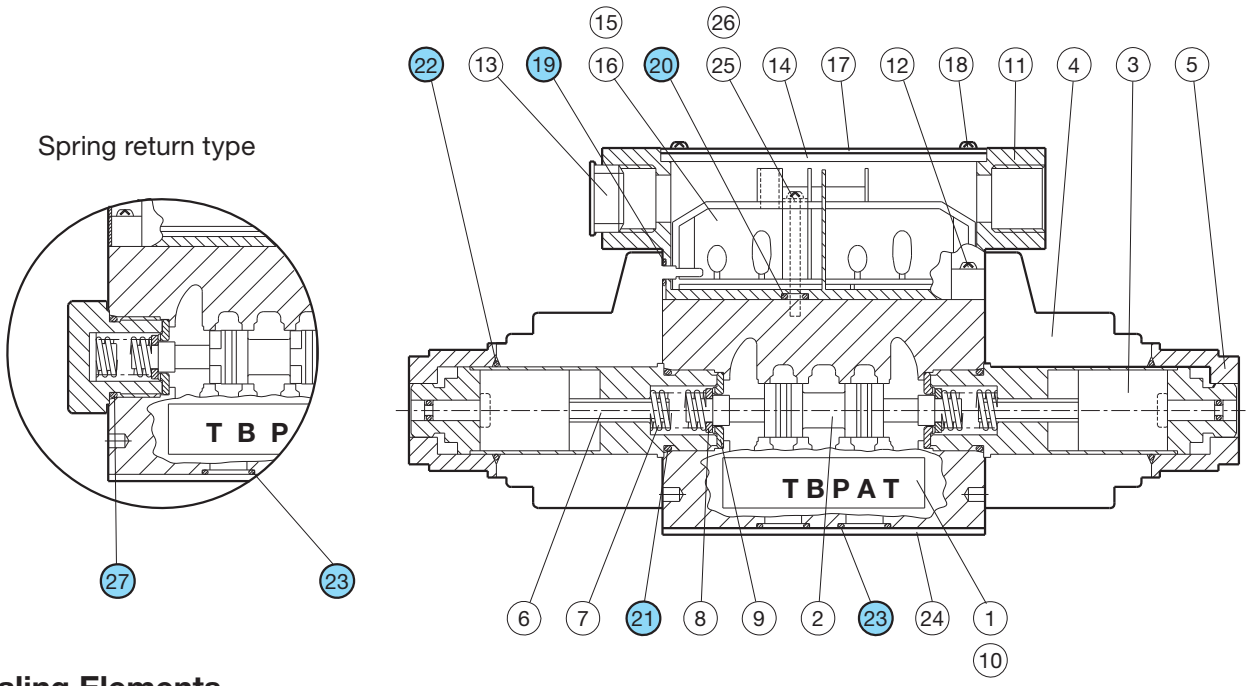
No.	Parts	Model	Qty	Note
16	O-ring	P21 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
17	O-ring	AS568-120 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
18	O-ring	AS568-014 HS90	5	
20	O-ring	P21 HS70	1	

Electromagnet and Coil Table

Solenoid Valve Model	Electromagnet Type	Coil Type	Angle Plug Type
DVS-D05--A*-20-****	DVS-D05 AC Core Tube - 315 bar	DVS-D05-A*-20 Coil	DVS-D05-AC angle plug DVS-D05-AC-LS angle plug
DVS-D05--D*-20-****	DVS-D05 DC Core Tube - 315 bar	DVS-D05-D*-20 Coil	DVS-D05-DC angle plug DVS-D05-DC-LS angle plug
DVS-D05--A*-20-****		DVS-D05-R*-20 Coil	DVS-D05-RF angle plug DVS-D05-RF-LS angle plug

AC and DC power conversion: When the power conversion (AC◀▶DC), need to replace the electromagnet, coil and bend plug;
Voltage conversion: As soon as the coil is replaced, the new voltage specification can be used.
For example: AC240(220/50)◀▶AC110(110/60) or DC12◀▶DC24.

DVS-D05-**-**-10-* SEALS AND SOLENOID ASSEMBLIES



Sealing Elements

No.	Parts	Model	Qty	Note
19	O-ring	P4 HS70	4	The spool type is a two-position spring return type, and the quantity is 2
20	O-ring	P5 HS70	2	
21	O-ring	P21 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
22	O-ring	AS568-120 HS70	2	The spool type is a two-position spring return type, and the quantity is 1
23	O-ring	AS568-014 HS90	5	
27	O-ring	P21 HS70	1	

Electromagnet and Coil Table

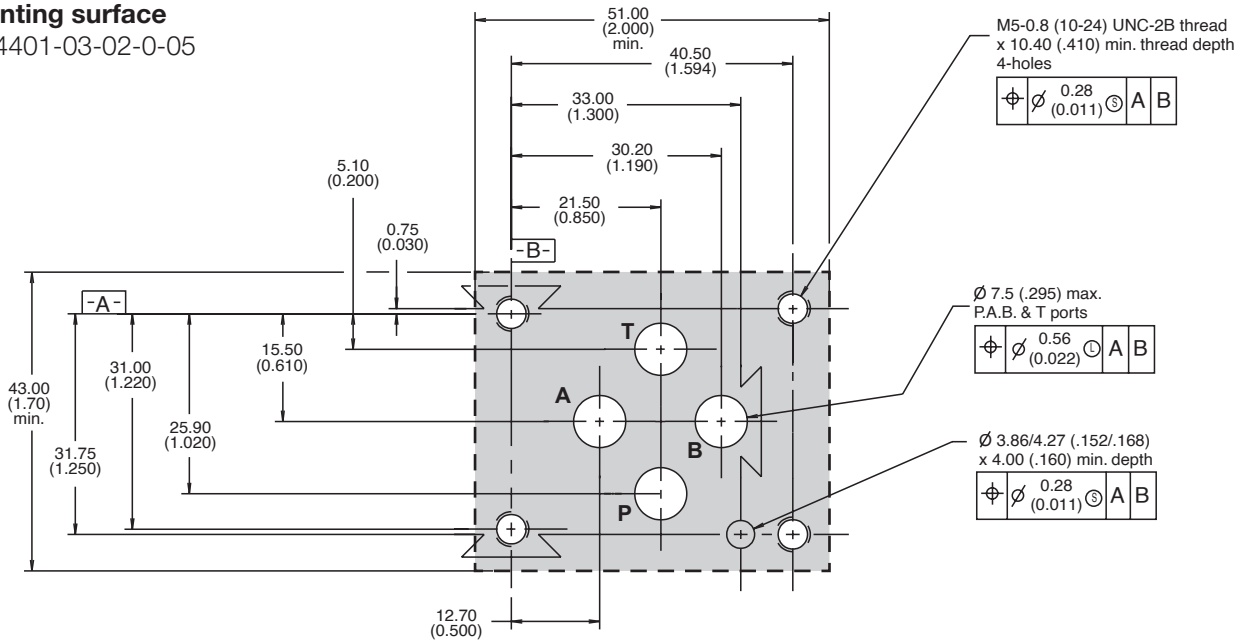
Solenoid Valve Model	Electromagnet Type	Coil Type	Conduit Box Type
DVS-D05--A*-10-****	DVS-D05 AC Core Tube	DVS-D05-A*-10 Coil	DVS-D05-AC conduit box DVS-D05-AC-LS conduit box
DVS-D05--D*-10-****	DVS-D05 DC Core Tube DC-M Core Tube	DVS-D05-D*-10 Coil	DVS-D05-DC conduit box DVS-D05-DC-LS conduit box
DVS-D05--A*-10-****		DVS-D05-R*-10 Coil	DVS-D05-RF conduit box DVS-D05-RF-LS conduit box

AC and DC power conversion: When the power conversion (AC◀▶DC), need to replace the electromagnet, coil and conduit box;
Voltage conversion: As soon as the coil is replaced, the new voltage specification can be used.
For example: AC240(220/50)◀▶AC110(110/60) or DC12◀▶DC24.

DVS-D03 MOUNTING SURFACE INFORMATION

Mounting Pattern – NFPA D03, CETOP 3 & NG6

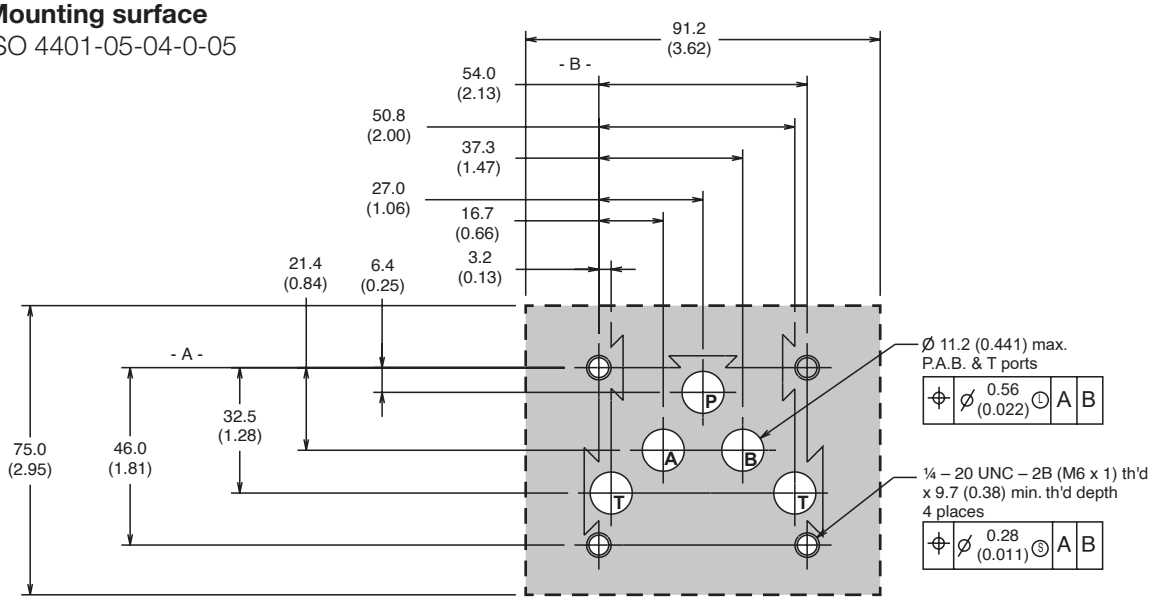
Mounting surface
ISO 4401-03-02-0-05



DVS-D05 MOUNTING SURFACE INFORMATION

Mounting Pattern – NFPA D05, CETOP 5 & NG10

Mounting surface
ISO 4401-05-04-0-05



mm [inch]

NOTES

NOTES

Strength in Products, Strength in Service

- Pressure Switches
- Temperature Switches
- Differential Switches
- Level Switches
- Vacuum Switches
- Transducers
- Gear Pumps
- Vane Pumps
- Dump Pumps
- Variable Piston Pumps
- Orbital Motors
- Gerotor Motors (High Speed/Low Torque)
- Vane Motors
- Gear Motors
- Solenoid Operated Directional Control Valves
- Monoblock Valves
- High Pressure Ball Valves
- Flow Controls & Needle Valves
- Drive Couplings
- Flanges
- Gauges
- Test Points

ANFIELD

Anfield Industries Inc.

USA
375 International Park
Suite 300
Newnan, Georgia 30265
Phone: (404) 530-3804
Fax: (404) 530-3805
Email: info@anfieldind.com
Web: www.anfieldind.com

Canada
8831 Keele Street
Concord, Ontario
L4K 2N1
Phone: (905) 303-1369
Fax: (905) 303-7256
Email: sales@mpfiltricanada.com
Web: www.mpfiltricanada.com