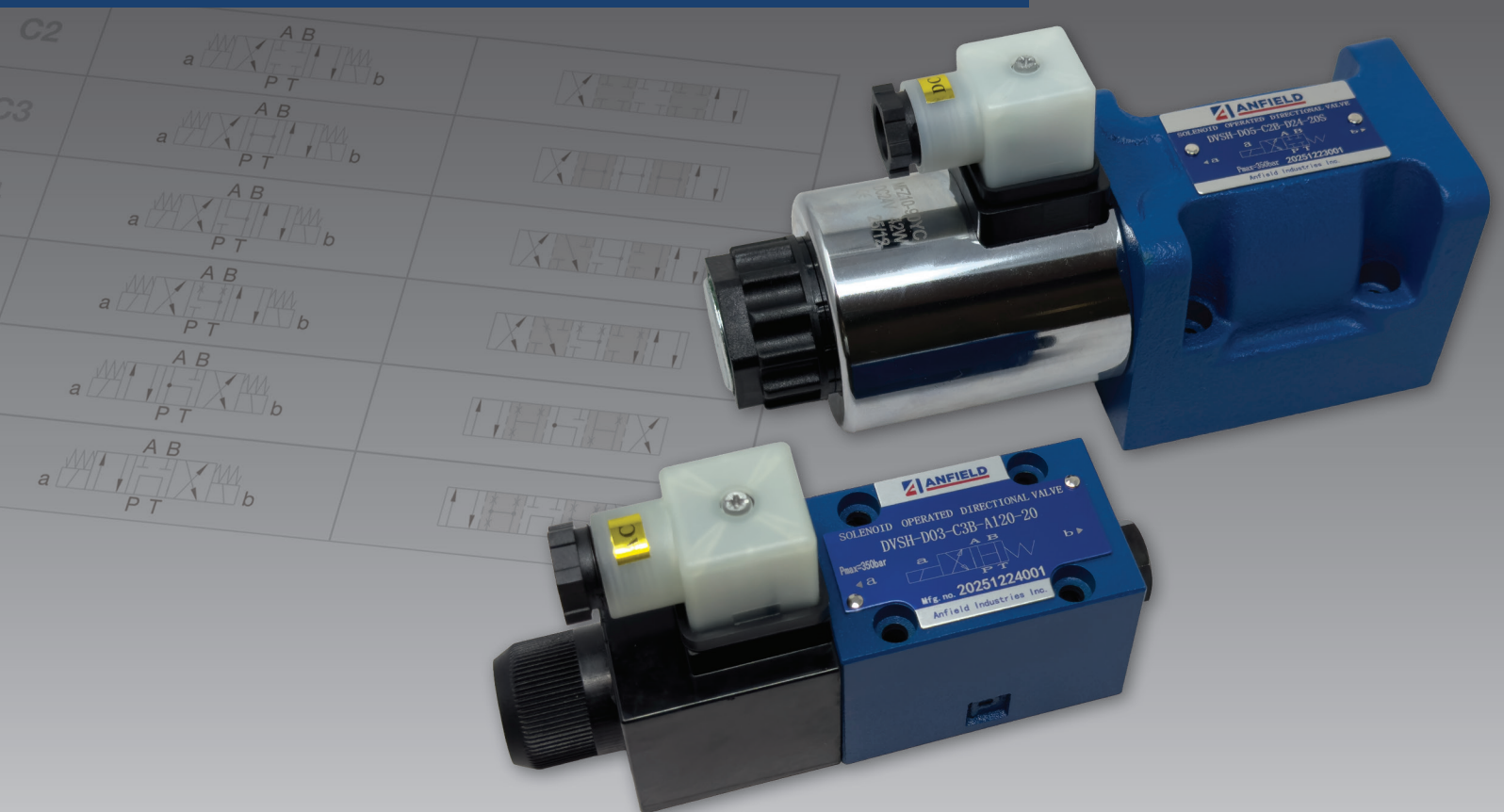


# Solenoid Directional Valves

NFPA D03 & D05

## DVSH-D03 & D05

Series 5076 psi (350 bar)



Strength in Products,  
Strength in Service

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### DVSH SERIES DESCRIPTION

Anfield DVSH series solenoid actuated directional control valves are used to manage the direction of flow in hydraulic circuits. NFPA D03, D05 industry-standard subplate mountable. The DVSH valves are rated for 5076 psi (350bar), and used for low-to-medium flow applications up to approximately 15-20 gpm, while D05 valves are larger, supporting higher flow rates typically up to 39 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
- DVSH-D03 & D05 are five chamber design
- Used for pressures of up to 5076 psi (350bar) and flows up to 39.6 gpm (150 l/min). (depending on the spool type)
- High back pressure up to 3050 psi (210 bar)
- Available in single or double solenoid
- Solenoids offered with DIN 43650 or Deutsch DT04-2P Connectors
- Manual override standard
- Available with a wide range of spools
- DC or AC solenoids
- 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

### DVSH PRODUCT WEIGHT

#### solenoid with conduit box (20)

DVSH-D03		DVSH-D05	
Single sol. AC	Double sol. AC	Single sol. AC	Double sol. AC
1.4 (3.1)	1.8 (4.1)	3.4 (7.5)	4.2 (9.3)

Deutsch DT04-2P connector (51)  
weights will be similar.

Weight unit: kg (lb)

#### solenoid with conduit box (20)

DVSH-D03		DVSH-D05	
Single sol. DC	Double sol. DC	Single sol. DC	Double sol. DC
1.5 (3.4)	2.0 (4.4)	4.1 (9.0)	5.6 (12.3)

Deutsch DT04-2P connector (51)  
weights will be similar.

Weight unit: kg (lb)



## DVSH-D03 TECHNICAL DATA

Valve Size			06 (D03)	
Max. flow		l/min (gpm)	80 (21) - DC 60 (15.8) - AC	
Max. operating pressure at ports P, A, B		bar (psi)	standard 350 (5076)	
Max. operating pressure at port T		bar (psi)	210 (3050) - DC 160 (2320) - AC	
Fluid temperature range (NBR)		°C (°F)	-20 to +80 (-4 to +176)	
Fluid temperature range (FKM)		°C (°F)	-15 to +80 (+5 to +176)	
Ambient temperature range		°C (°F)	-20 to +50 (-4 to +122) NBR/FKM	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	AC: 7200	DC: 15000
Switching time at $v=32 \text{ mm}^2/\text{s}$ (156 SUS)	ON	ms	AC: 10-20	DC: 25-45
	OFF	ms	AC: 15-40	DC: 10-25
Weight - valve with 1 solenoid		kg (lbs)	1.45 (3.2) (see page 4)	
- valve with 2 solenoids		kg (lbs)	1.95 (4.3) (see page 4)	
			Type	
General information	Products & operating conditions			
Coil types / connectors			DC12V DC24V AC120V	20: DIN 43650 Form A PG11 51: Deutsch DT04-2P
Mounting interface	ISO 4401 03 (details on page 13)			

## DVSH-D05 TECHNICAL DATA

Valve Size			10 (D05)	
Max. flow		l/min (gpm)	150 (39.6)	
Max. operating pressure at ports P, A, B		bar (psi)	standard 350 (5076)	
Max. operating pressure at port T		bar (psi)	210 (3050)	
Fluid temperature range (NBR)		°C (°F)	-20 to +80 (-4 to +176)	
Fluid temperature range (FKM)		°C (°F)	-15 to +80 (+5 to +176)	
Ambient temperature range		°C (°F)	-20 to +50 (-4 to +122) NBR/FKM	
Supply voltage tolerance		%	AC: ±10	DC: ±10
Max. switching frequency		1/h	AC: 7200	DC: 15000
Switching time at $v=32 \text{ mm}^2/\text{s}$ (156 SUS)	ON	ms	45-60	
	OFF	ms	AC: 250-360	DC: 20-30
Weight - valve with 1 solenoid		kg (lbs)	3.9 (8.6) (see page 4)	
- valve with 2 solenoids		kg (lbs)	5.5 (12.1) (see page 4)	
			Type	
General information	Products & operating conditions			
Coil types / connectors			DC12V DC24V AC120V	20: DIN 43650 Form A PG11 51: Deutsch DT04-2P
Mounting interface	ISO 4401 05 (details on page 13)			

## DVSH-D03 & D05 SERIES DESIGNATION AND ORDERING CODE

<b>DVSH</b>	-	<b>D03</b>	-	<b>C4</b>	-	<b>D24</b>	-	<b>20</b>	-	<b>S</b>	-	<b> </b>
<p><b>Directional Valve Model</b>  <b>DVSH</b> Directional Valve, Solenoid operated          High pressure          5076 psi (350 bar)</p> <p><b>Valve Size</b>  <b>D03</b> NFPA D03, NG6 ISO 4401-03, CETOP 03  <b>D05</b> NFPA D05, NG10 ISO 4401-05, CETOP 05</p> <p><b>Spool Type</b>          See table on pages 5-6</p>												
<p><b>Seal</b>  <b>Omit</b> NBR (Nitrile Rubber) *Anfield Standard  <b>V</b> Viton® FKM Fluorocarbon</p> <p><b>S</b> High-performance solenoid (DC only)</p> <p><b>Solenoid Connection</b>  <b>20</b> DIN 43650 Form A PG11  <b>51</b> Deutsch DT04-2P connector</p> <p><b>Solenoid Rated Voltage</b>   <b>Standard AC Solenoids (Dual Frequency):</b>  <b>A110</b> AC110 V, 60 Hz; AC100 V, 50 Hz  <b>A120</b> AC120 V, 60 Hz; AC110 V, 50 Hz  <b>A220</b> AC220 V, 60 Hz; AC200 V, 50 Hz  <b>A240</b> AC240 V, 60 Hz; AC220 V, 50 Hz   <b>Standard DC Solenoids:</b>  <b>D12</b> DC12 V  <b>D14</b> DC14 V  <b>D24</b> DC24 V  <b>D28</b> DC28 V</p>												

## DVSH-D03 & D05 SERIES SPECIFICATIONS

Model	Max. Flow gpm [lpm]	Max. Pressure psi [bar]	Max. Allowable Back Pressure psi [bar]	Max. Commutation Frequency cycles/minute
<b>DVSH-D03-**</b>	21.13 [80]	5076 [350]	AC = 2320 [160]	300
	15.85 [60]		DC = 3045 [210]	
<b>DVSH-D05-**</b>	39.63 [150]	5076 [350]	AC = 2320 [160]	300
			DC = 3045 [210]	

- **Oil:** ISO VG 32,46,68
- **Viscosity range:** 2.8-500 cSt
- **Contamination Standards:** ISO 4066:1999 Class 20/18/15
- **Operating Temperature:** -30°C to +80°C ( Nitrile rubber)

**DVSH-D03 & D05 SERIES SPOOL TYPES**

Single Solenoid, 2 Position, Spring Offset (Coil A)		
Spool	Symbol	Transitional State
<b>B2</b>		
<b>B3</b>		
<b>B4</b>		
<b>B20</b>		
<b>B21</b>		

Single Solenoid, 2 Position, Spring Offset (Coil B)		
Spool	Symbol	Transitional State
<b>B2S</b>		
<b>B3S</b>		
<b>B4S</b>		
<b>B20S</b>		

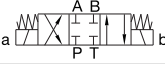
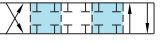






















Single Solenoid, 2 Position, Spring Offset (Coil A)		
Spool	Symbol	Transitional State
<b>C2B</b>		
<b>C3B</b>		
<b>C4B</b>		
<b>C40B</b>		
<b>C5B</b>		
<b>C6B</b>		
<b>C6TB</b>		
<b>C7B</b>		
<b>C8B</b>		
<b>C9B</b>		
<b>C5SB</b>		
<b>C8SB</b>		

Single Solenoid, 2 Position, Spring Offset (Coil B)		
Spool	Symbol	Transitional State
<b>C2BS</b>		
<b>C3BS</b>		
<b>C4BS</b>		
<b>C40BS</b>		
<b>C5BS</b>		
<b>C6BS</b>		
<b>C6TBS</b>		
<b>C7BS</b>		
<b>C8BS</b>		
<b>C9BS</b>		
<b>C5SBS</b>		
<b>C8SBS</b>		

Double Solenoid, 2 Position, No Spring		
Spool	Symbol	Transitional State
<b>N2</b>		
<b>N3</b>		

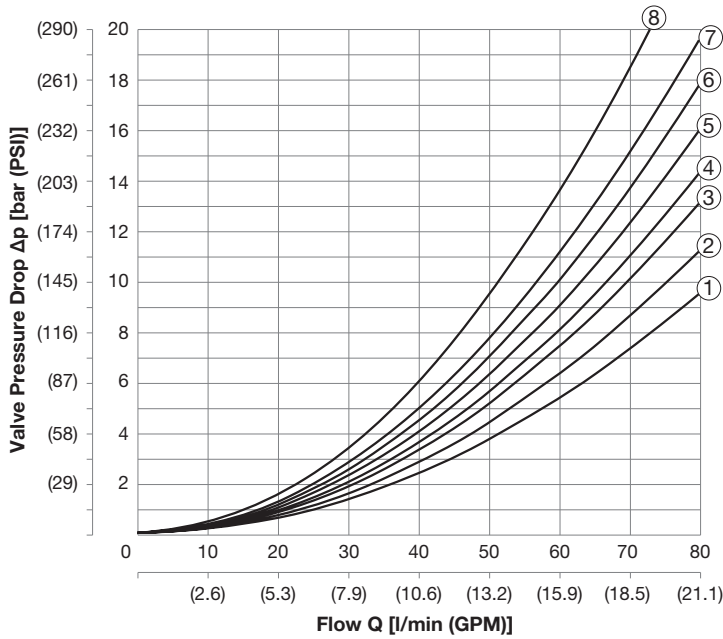
Double Solenoid, 2 Position, Detent (No Spring)		
Spool	Symbol	Transitional State
<b>D2</b>		
<b>D3</b>		

## DVSH-D03 & D05 SERIES SPOOL TYPES

Double Solenoid, 3 Position, Spring Centered		
Spool	Symbol	Transitional State
<b>C2</b>		
<b>C3</b>		
<b>C4</b>		
<b>C40</b>		
<b>C5</b>		
<b>C6</b>		
<b>C6T</b>		
<b>C7</b>		
<b>C8</b>		
<b>C9</b>		
<b>C5S</b>		
<b>C8S</b>		

## DVSH-D03 CHARACTERISTIC CURVE

Test conditions: Viscosity: 46 mm<sup>2</sup>/s (cSt) at 40 ±5°C (104 ±41°F)



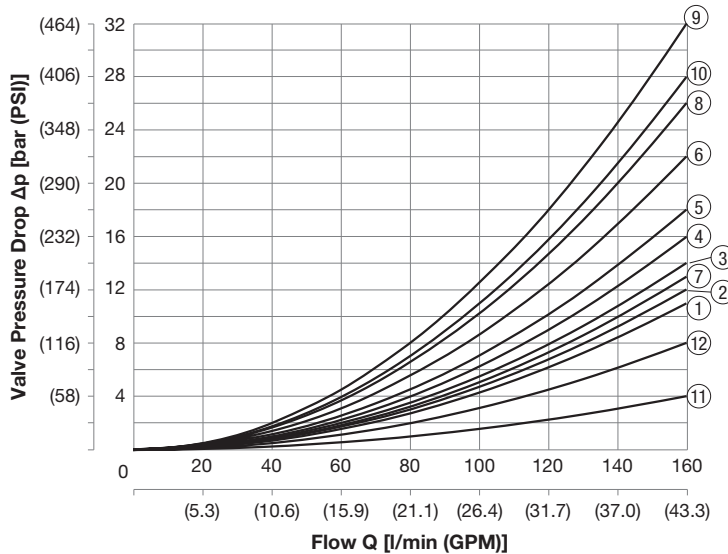
Model	P→A	P→B	A→T	B→T
<b>B20, B20S</b>	5	5	–	–
<b>B3</b>	3	3	5	3
<b>B2, B2S</b>	6	6	5	5
<b>C2</b>	5	5	3	3
<b>C5</b>	3	5	3	3
<b>C6T</b>	8	8	4	4
<b>C3</b>	2	1	2	2
<b>C4</b>	3	3	2	3
<b>C8</b>	5	5	1	4
<b>C7</b>	2	1	5	5
<b>C5S</b>	5	3	3	3
<b>C40</b>	3	3	2	2
<b>C8S</b>	5	5	4	1
<b>C6</b>	7	7	4	4

Symbol "C3" in central position P – T "C3"

Symbol "C6" and "C6T" in central position P – T

## DVSH-D05 CHARACTERISTIC CURVE

Test conditions: Viscosity: 46 mm<sup>2</sup>/s (cSt) at 40 ±5°C (104 ±41°F)



Model	P→A	P→B	A→T	B→T
<b>B20, B20s</b>	5	5	–	–
<b>B3</b>	1	2	4	5
<b>B2</b>	2	2	4	5
<b>C2</b>	3	7	5	6
<b>C5</b>	2	3	6	8
<b>C6</b>	4	4	9	9
<b>C3</b>	1	1	6	6
<b>C4</b>	3	3	6	10
<b>C8</b>	3	3	6	6
<b>C7</b>	1	1	5	5
<b>C8S</b>	3	3	5	10
<b>C40</b>	9	3	4	5
<b>B2S</b>	3	9	4	6

Center position:

Model	P→A	P→B	A→T	B→T	P→T
<b>C3</b>	3	9	4	6	–

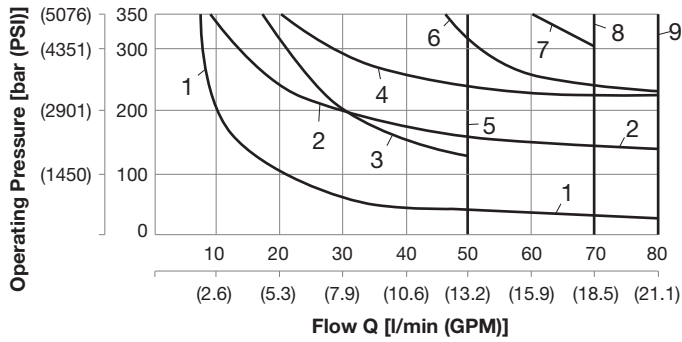
## DVSH-D03 OPERATING LIMIT CURVE

### CAUTION!

The provided operating limits apply to applications with flow in both directions (e.g., from P to A, while simultaneously returning from B to T).

Due to hydrodynamic forces inside the valve, the permissible power limit may be significantly reduced when flow occurs in only one direction (e.g., from P to A with port B closed)!

### DVSH-D03 Valve with DC solenoid



### Test Conditions

Oil viscosity: 46cSt

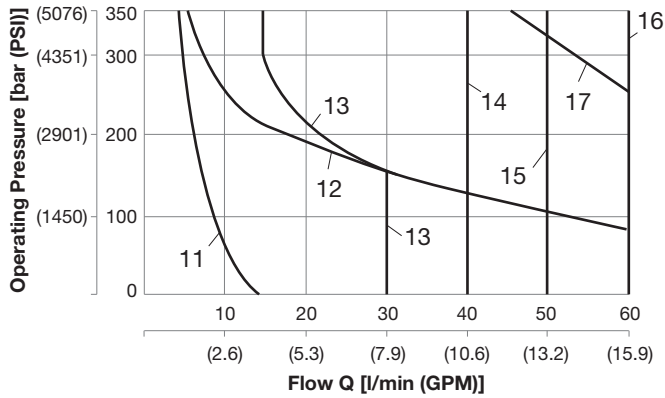
Oil temperature: 40±5°C (104 ±41°F)

The power limit is determined under the following conditions: The solenoid is at its operating temperature; supply voltage is 10% below the rated voltage; and no back pressure is present at port T.

DC solenoid			
Curve	Spool Symbol	Curve	Spool Symbol
1	B20, B20S <sup>1)</sup>	6	C8, C8S
2	B20, B20S	7	B2, B2S
3	C5, C5S	8	C7
4	C4	9	C2, C40
5	C6, C3, C60		

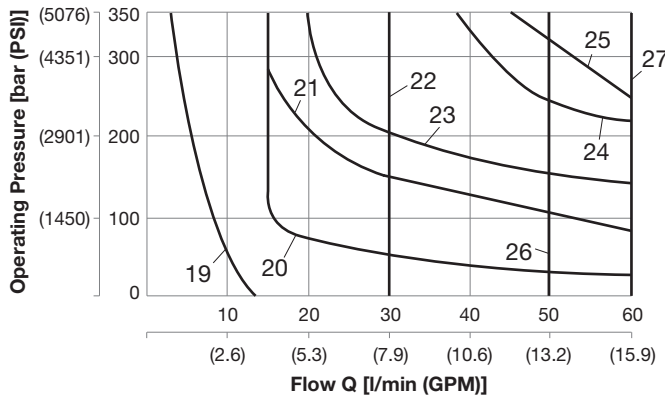
1) With manual override

### DVSH-D03 Valve with AC solenoid



AC solenoid - 50 Hz	
Curve	Spool Symbol
11	B20, B20S <sup>1)</sup>
12	B20, B20S
13	C5, C5S
14	C6, C60
15	C3
16	C2, C4, C7, C8, C8S
17	B2, B2S

1) With manual override



AC solenoid - 60 Hz	
Curve	Spool Symbol
19	B20, B20S <sup>1)</sup>
20	B20, B20S
21	C5, C5S
22	C6, C60
23	C4, C8, C8S
24	C40
25	B2, B2S
26	C3
27	C2, C7

1) With manual override

## DVSH-D05 OPERATING LIMIT CURVE

### CAUTION!

The provided operating limits apply to applications with flow in both directions (e.g., from P to A, while simultaneously returning from B to T).

Due to hydrodynamic forces inside the valve, the permissible power limit may be significantly reduced when flow occurs in only one direction (e.g., from P to A with port B closed)!

### ■ Test Conditions

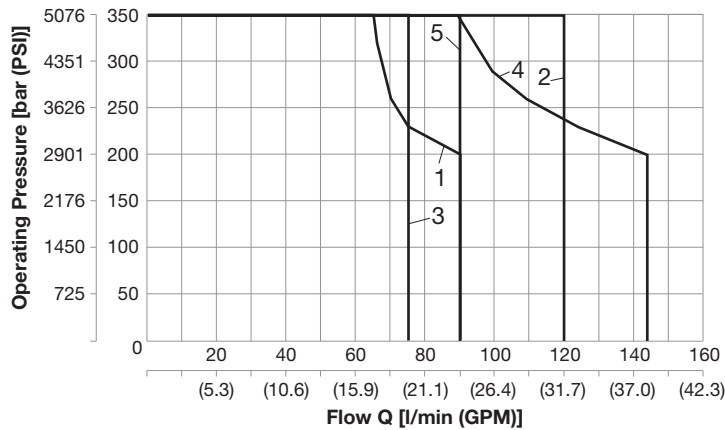
Oil viscosity: 46cSt

Oil temperature: 40±5°C (104 ±41°F)

The power limit is determined under the following conditions:  
The solenoid is at its operating temperature; supply voltage is 10% below the rated voltage; and no back pressure is present at port T.

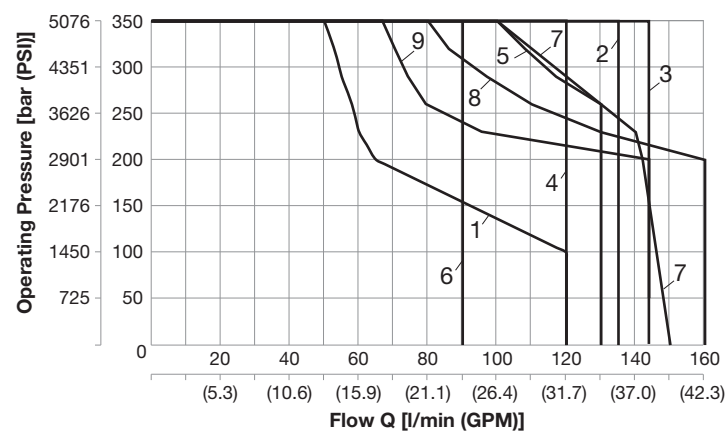
### ■ DVSH-D05 Valve with DC solenoid

#### Spring side



Curve	Spool Symbol
1	C5
2	C3
3	C7
4	C8S
5	B2S

#### Solenoid side

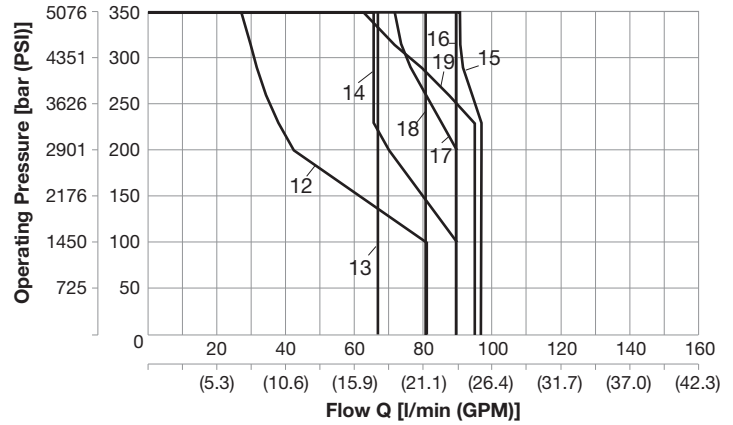
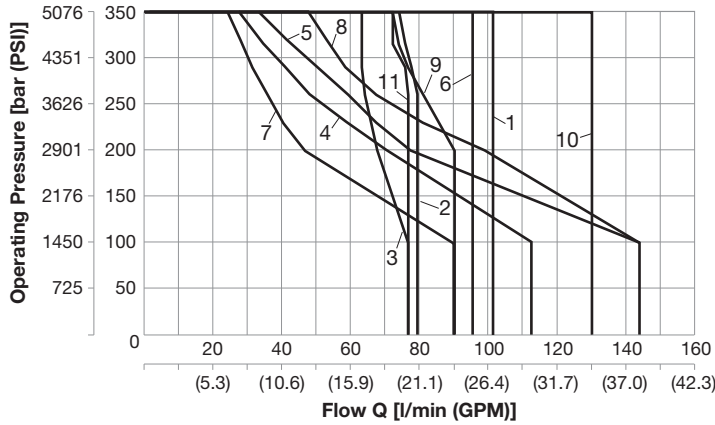


Curve	Spool Symbol
1	B20, B20S
2	B2, B3
3	D2, D3
4	C3
5	C2
6	C6
7	C4
8	C8
9	C40

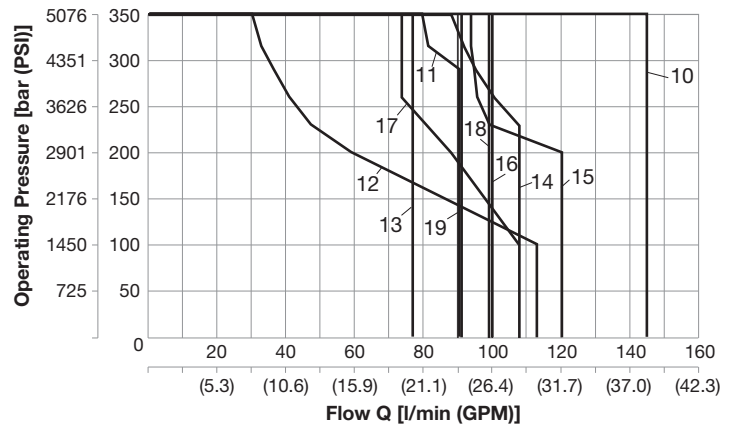
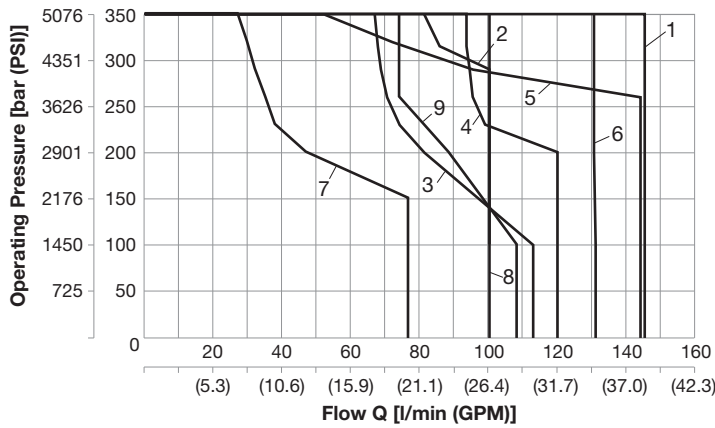
### DVSH-D05 OPERATING LIMIT CURVE

#### ■ DVSH-D05 Valve with AC solenoid

##### A110/A120



##### A220/A240



Curve	Spool Symbol	Curve	Spool Symbol	Curve	Spool Symbol
1	B2	8	B2S	15	C4BS
2	C2	9	C7	16	C8BS
3	C6	10	C2B	17	C7B, C7BS
4	C4	11	C2BS	18	C8S
5	B20	12	C5	19	C40
6	B3	13	C3B		
7	C8	14	C6B		

**DVSH-D03 DIMENSIONS** (Valves With DIN Connector)

■ **DVSH-D03-\*\*-D-20**

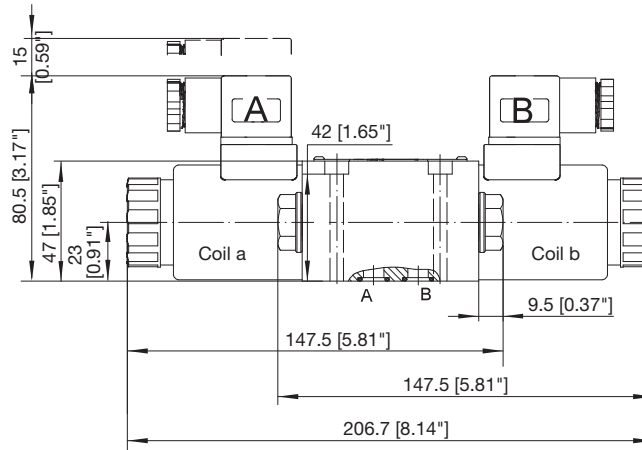
NFPA D03

D: DC solenoid

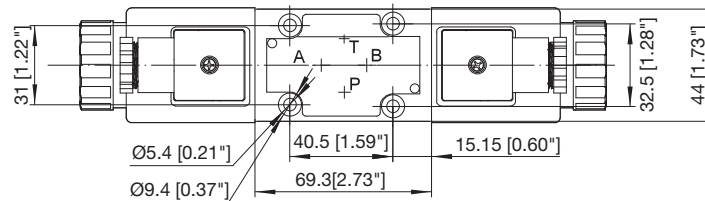
20: DIN 43650 Form A connector

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

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



**Note:**  
Coil a is on side A of the valve body.



■ **DVSH-D03-\*\*-A-20**

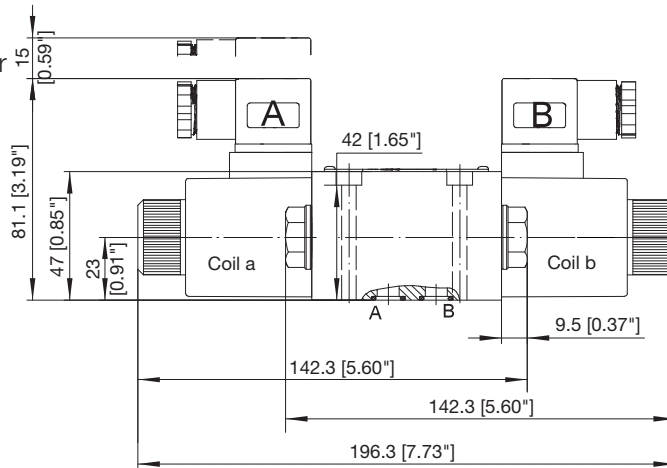
NFPA D03

A: AC solenoid

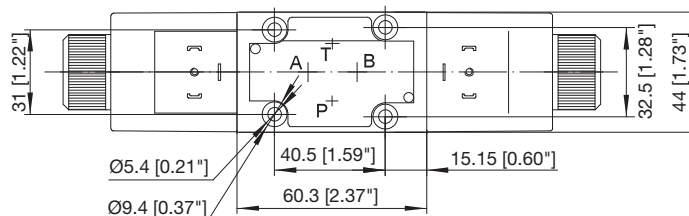
20: DIN 43650 Form A connector

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

D03 Weight kg (lb)	
Single sol. AC	1.4 (3.1)
Double sol. AC	1.8 (4.1)



**Note:**  
Coil a is on side A of the valve body.



### DVSH-D05 DIMENSIONS

#### ■ DVSH-D05-\*\*-D-20

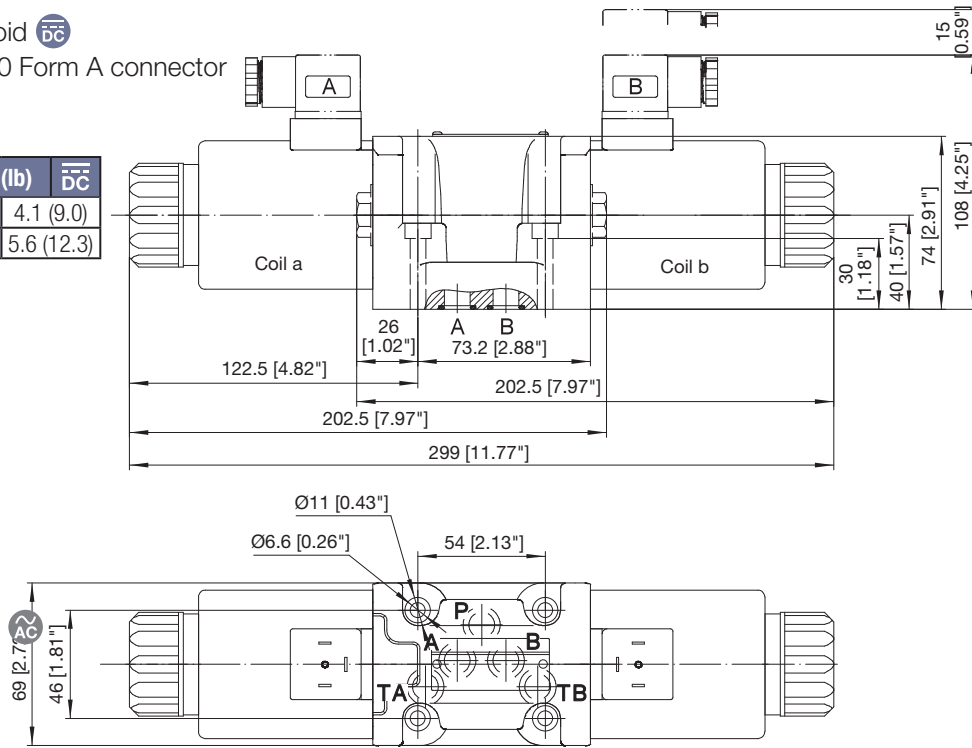
NFPA D05

D: DC solenoid

20: DIN 43650 Form A connector

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

D05 Weight kg (lb)	
Single sol. DC	4.1 (9.0)
Double sol. DC	5.6 (12.3)



**Note:**  
Coil a is on side A  
of the valve body.

#### ■ DVSH-D05-\*\*-A-20

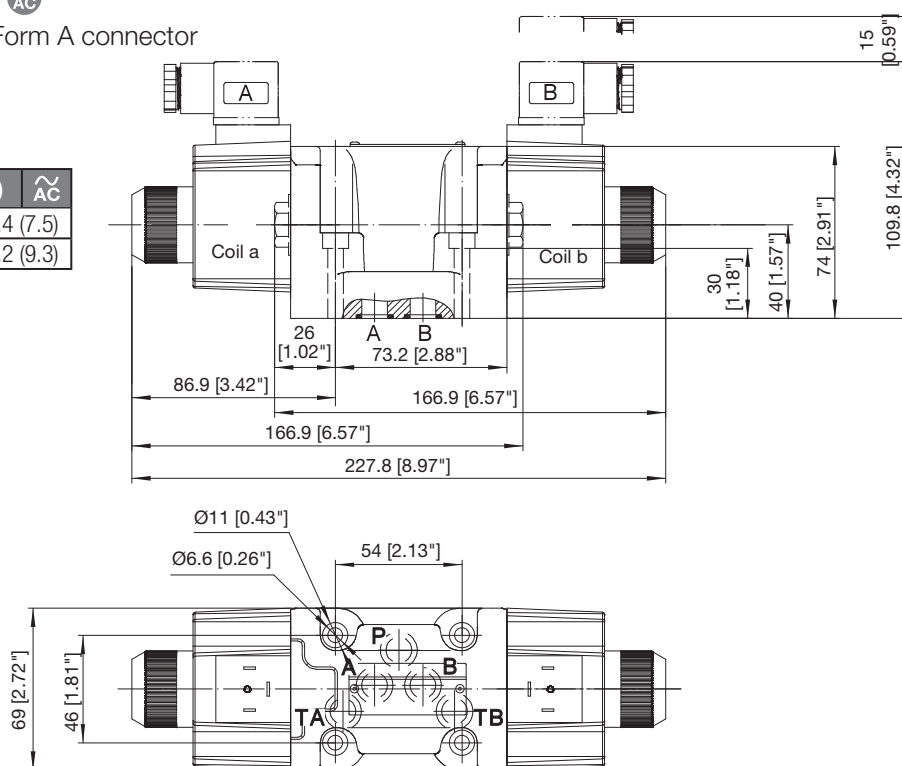
NFPA D05

A: AC solenoid

20: DIN 43650 Form A connector

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

D05 Weight kg (lb)	
Single sol. AC	3.4 (7.5)
Double sol. AC	4.2 (9.3)



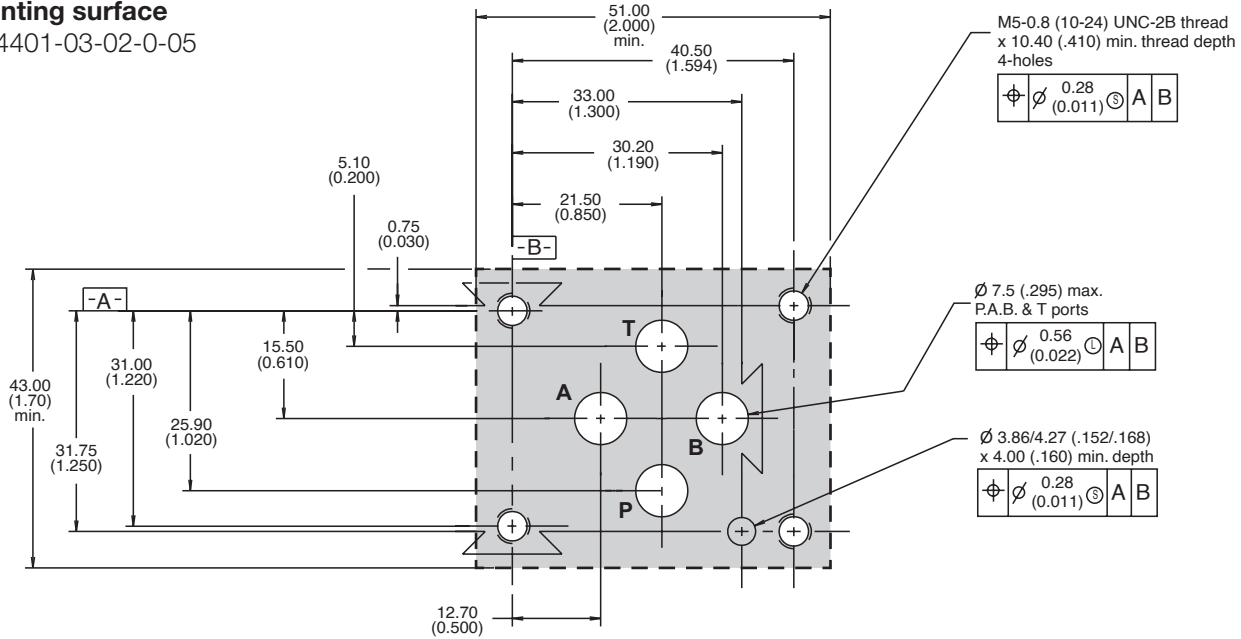
**Note:**  
Coil a is on side A  
of the valve body.

## DVSH-D03 MOUNTING SURFACE INFORMATION

### ■ Mounting Pattern – NFPA D03, CETOP 3 & NG6

**Mounting surface**

ISO 4401-03-02-0-05

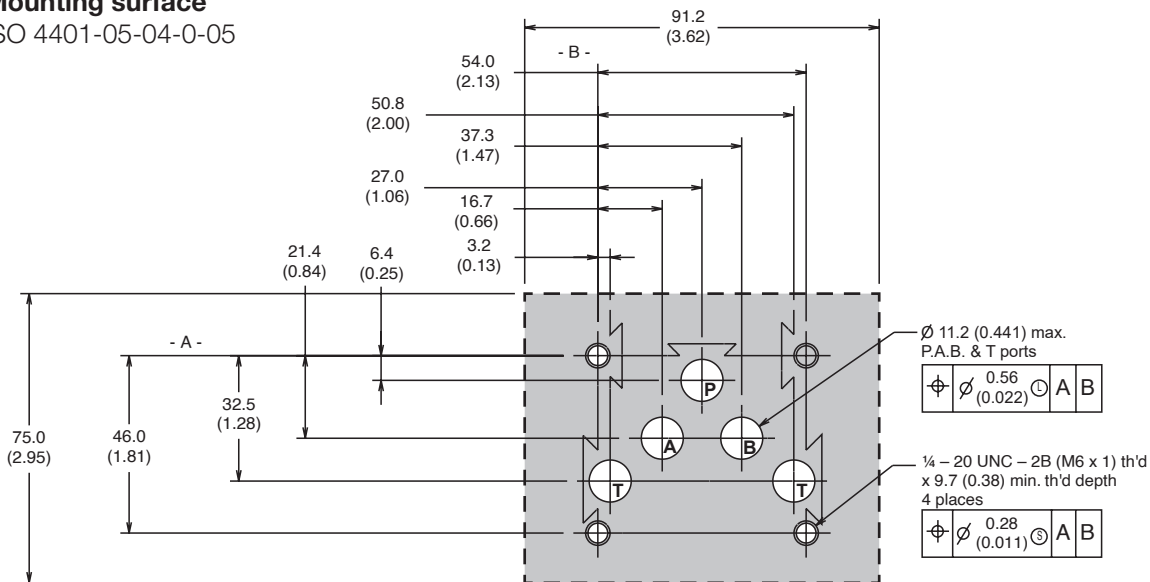


## DVSH-D05 MOUNTING SURFACE INFORMATION

### ■ Mounting Pattern – NFPA D05, CETOP 5 & NG10

**Mounting surface**

ISO 4401-05-04-0-05





# 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



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