

SOLENOID OPERATED DIRECTIONAL VALVE

SWH-G02 SERIES



FEATURES

- Armature operates in oil system. Impact is cushioned, noise is reduced and solenoid life is increased.
- Wet armature solenoid eliminates pushpin seal, therefore no seal wear or leakage for longer valve life.
- Molded coils for maximum insulating properties, which is impervious to moisture and dirt.
- Plug-in solenoid, for ease of maintenance.
- All spools and bodies are interchangeable, simplifying maintenance.
- Indicating signal lights and bolt kits are standard.
- High pressure, high flow rating, and low-pressure drop.
- Specially designed, balanced spool allows proper shifting force, for maximum reliability and long life.
- Viton seal kits are available for fire-resistance fluids.

Model Code

SWH – G 02 – C2 – A120 – 10 – LS

1 **2** **3** **4** **5** **6** **7**

1 Series

SWH: High Pressure, High Flow
Solenoid Directional Control
Valve

2 Mounting Style

G: Subplate Mounted

3 Mounting Size

02: Interface 02
NFPA D03 Size / ISO 4401-03
/ CETOP 3 / NG 06

4 Spool Type

(See Spool Chart)

5 Coil Voltage

A24: AC24V, 60Hz
A110: AC110V, 60Hz; AC100V, 50Hz
A120: AC120V, 60Hz; AC110V, 50Hz
A220: AC220V, 60Hz; AC200V, 50Hz
A240: AC240V, 60Hz; AC220V, 50Hz
R110: AC110V, 50/60Hz
R120: AC120V, 50/60Hz
R220: AC220V, 50/60Hz
R240: AC240V, 50/60Hz
D12: DC12V
D24: DC24V

6 Wiring Type

10: Junction Box with
Indicator Light
20: DIN 43650 Connector
with Indicator Light
31: Lead Wire (DC Only)
41: Dual Spade (DC Only)
SAE J858A)

7 Option

No Code: Standard
LS: Low Surge Voltage

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4-WAY, 3-POSITION SPRING CENTERED		4-WAY, 2-POSITION SPRING OFFSET END-TO-CENTER, RIGHT HAND		4-WAY, 2-POSITION SPRING OFFSET END-TO-CENTER, LEFT HAND		4-WAY, 2-POSITION SPRING OFFSET END-TO-END, RIGHT HAND	
C2		C2B		C2BS		B2	
C24		C24B		C24BS		B3	
C3		C3B		C3BS		B5A	
C4		C4B		C4BS		B6	
C40		C40B		C40BS		B8	
C5		C5B		C5BS		B20	
C5S		C5SB		C5SBS		B21	
C6		C6B		C6BS		4-WAY, 2-POSITION DETENT, END-TO-END	
C60		C60B		C60BS		D2	
C7		C7B		C7BS		D3	
C8		C8B		C8BS		4-WAY, 2-POSITION SPRING OFFSET END-TO-END, RIGHT HAND	
C8S		C8SB		C8SBS		B2S	
C9		C9B		C9BS		B3S	
C92		C92B		C92BS		B5AS	
C9S		C9SB		C9SBS		B6S	
						B8S	
						B20S	
						B21S	
						4-WAY, 2-POSITION NO SPRING, NO DETENT	
						N2	
						N3	

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SPECIFICATIONS:

Maximum operating pressure	310 BAR (4500 PSI)
Rated flow capacity	63 LPM (16.8 GPM) MAX - Varies by spool type
Maximum tank line back pressure	138 BAR (2000 PSI)
Maximum frequencies of operation	300 CPM
Recommended filtration	25 MICRON
Hydraulic fluids	Mineral Oil, Viscosity 10 - 400 cST
Temperature range	-25° C to +90° C (-13° F to +194° F)

SOLENOID RATINGS:

ELECTRIC SOURCE	COIL TYPE	VOLTAGE			CURRENT & POWER		
		Hz	SOURCE RATED	RANGE (±10%)	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
AC (-10 and -20 Options)	A24	60	AC24V	21.6-26.4	6.8	1.7	26
	A110	50	AC100V	90-110	1.60	0.46	
		60	AC100V	90-110	1.40	0.32	
			AC110V	99-121	1.50	0.39	
	A120	50	AC110V	99-121	1.30	0.38	
		60	AC120V	108-132	1.20	0.27	
	A220	50	AC200V	180-220	0.80	0.23	
		60	AC200V	180-220	0.70	0.16	
			AC220V	198-242	0.75	0.19	
	A240	50	AC220V	198-242	0.67	0.19	
		60	AC240V	216-264	0.59	0.13	
R (-10 and -20 Options)	R110	50	AC100V	90-110	0.30	0.30	26
		60	AC110V	99-121	0.30	0.30	
	R220	50	AC200V	180-220	0.15	0.15	
		60	AC220V	198-242	0.15	0.15	
	R240	50	AC220V	180-220	0.14	0.14	
		60	AC240V	216-264	0.14	0.14	
DC (-10 and -20 Options)	D12	DC 12V		10.8-13.2	2.20	2.20	28.8
	D24	DC 24V		21.6-26.4	1.10	1.10	
DC (-31 and -41 Options)	D12	DC 12V		10.8-13.2	2.60	2.60	
	D24	DC 24V		21.6-26.4	1.30	1.30	

TECHNICAL DATA:

- Solenoid can be used within -10% to +10% of the rated voltage of the coil.
- Withstand voltage 1500 v/sec.
- Insulation resistance over 100mQ
- Conforms to rating IP65
- A momentary signal of approx 0.1 second is required for shifting action.

ACCESSORIES:

- Mounting bolt kits are supplied with valve socket head cap screws (#10-24UNCx1-3/4"L 4 pcs) for tightening torque 50-70 kgf-cm (43.3-60.6 lb-in).
- O-Ring AS568-012 4 pcs.

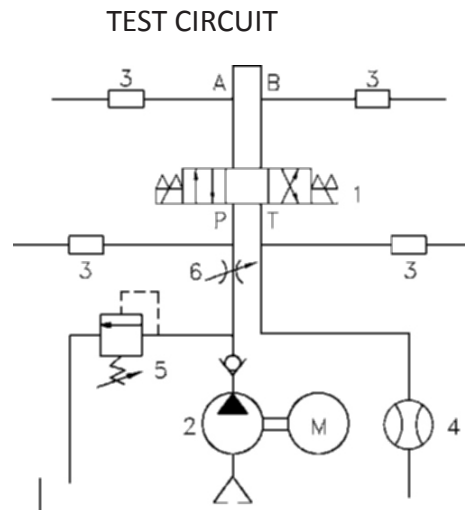
SOLENOID OPERATED DIRECTIONAL VALVE SWH-G02 SERIES

PRESSURE DROP AND PERFORMANCE CURVES TEST SYSTEMS

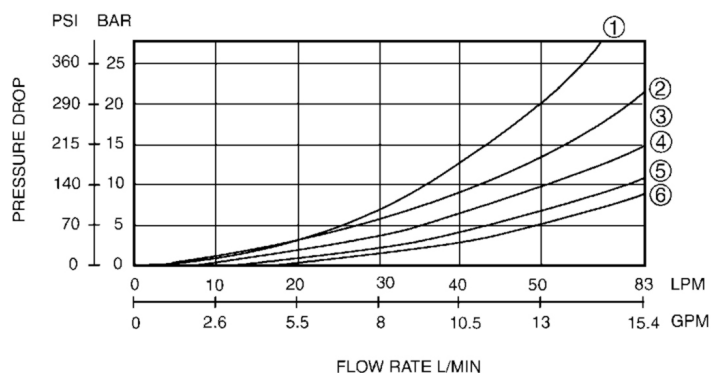
1. Testing Valve
2. Pump
3. Pressure Sensor
4. Flow Sensor
5. Relief Valve
6. Throttle Valve

TEST CONDITIONS

Pressure: 69 BAR (1000PSI)
Flow Rate: 63 LPM(16.8GPM)
Viscosity: 35 cSt (175SSU)



PERFORMANCE CURVES:



MODEL NO.	PRESSURE DROP CURVE NUMBER				
	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	—	—

CONTRAST CHART BETWEEN FACTORS AND VISCOSITIES

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

The pressure drop (AP') can be obtained from the formula
 $AP' = AP (G'/0.85)$ for other specific gravity (G').

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LIST OF SPOOL FUNCTIONS:

THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE BAR (PSI)								
SPOOL TYPE								
NORMAL POSITION	50 BAR (735 PSI)	100 BAR (1470 PSI)	150 BAR (2200 PSI)	207 BAR (3000 PSI)	250 BAR (3675 PSI)	310 BAR (4500 PSI)	50 BAR (735 PSI)	100 BAR (1470 PSI)
C2	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7) 32 (8.5)	40 (10.7) 40 (10.7)
C3	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)
C4	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7) 32 (8.5)	40 (10.7) 25 (6.7)
C40	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7) 32 (8.5)	40 (10.7) 25 (6.7)
C5	50 (13.3)	50 (13.3)	50 (13.3)	50 (13.3)	50 (13.3)		50 (13.3)	50 (13.3)
C6	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)		40 (10.7)	40 (10.7)
C7	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7) 32 (8.5)	40 (10.7) 25 (6.7)
C8	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7) 32(8.5)	40 (10.7) 25 (6.7)
C9	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7) 32 (8.5)	40 (10.7) 25 (6.7)
B2	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	20(5.3)
B3	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)
B20							35 (9.3)	32 (8.5)
D2	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7)	30 (8.0)
D3	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	40 (10.7)	30 (8.0)

NOTE: 40(10.7) 32(8.5)

1. The figures in the square show the flow under saturated temperature and 90% rated voltage.
2. The upper number in table describes the maximum flow under DC and R. the lower number in table describes the maximum flow under AC.

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150 BAR (2200 PSI)	207 BAR (3000 PSI)	250 BAR (3675 PSI)	310 BAR (4500 PSI)	50 BAR (735 PSI)	100 BAR (1470 PSI)	150 BAR (2200 PSI)	207 BAR (3000 PSI)	250 BAR (3675 PSI)	310 BAR (4500 PSI)
18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)	40 (10.7)	40 (10.7)	18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)
12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)	32 (8.5)	25 (6.7)	12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)
63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)
18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)	40 (10.7)	40 (10.7)	18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)
12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)	32 (8.5)	25 (6.7)	12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)
18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)	40 (10.7)	40 (10.7)	18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)
12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)	32 (8.5)	25 (6.7)	12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)
50 (13.3)	50 (13.3)	50 (13.3)	-	50 (13.3)	50 (13.3)	50 (13.3)	50 (13.3)	50 (13.3)	-
40 (10.7)	40 (10.7)	40 (10.7)	-	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	-
18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)	40 (10.7)	40 (10.7)	18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)
12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)	32 (8.5)	25 (6.7)	12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)
18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)	40 (10.7)	40 (10.7)	18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)
12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)	32 (8.5)	25 (6.7)	12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)
18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)	40 (10.7)	40 (10.7)	18 (4.8)	14 (3.7)	10 (2.7)	10 (2.7)
12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)	32 (8.5)	25 (6.7)	12 (3.2)	9 (2.4)	7 (1.9)	7 (1.9)
20 (5.3)	20 (5.3)	20 (5.3)	20 (5.3)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)
63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	63 (16.8)	37 (9.9)	30 (8.0)	28 (7.5)
				45 (12.0)	45 (12.0)	45 (12.0)	45 (12.0)	45 (12.0)	45 (12.0)
25 (6.7)	20 (5.3)	18 (4.8)	15 (4)	63 (16.8)	50 (13.3)	45 (12.0)	40 (10.7)	32 (8.5)	25 (6.7)
				45 (12.0)	30 (8.0)	28 (7.5)	25 (6.7)	22 (5.9)	18 (4.8)
25 (6.7)	21 (5.6)	16 (4.3)	13 (3.5)	40 (10.7)	30 (8.0)	25 (6.7)	21 (5.6)	16 (4.3)	13 (3.5)
25 (6.7)	21 (5.6)	16 (4.3)	13 (3.5)	40 (10.7)	30 (8.0)	25 (6.7)	21 (5.6)	16 (4.3)	13 (3.5)

SOLENOID OPERATED DIRECTIONAL VALVE SWH-G02 SERIES

TEST SYSTEMS

1. Testing Valve
2. Pump
3. Pressure Sensor
4. Flow Sensor
5. Relief Valve
6. Throttle Valve

TEST CONDITIONS

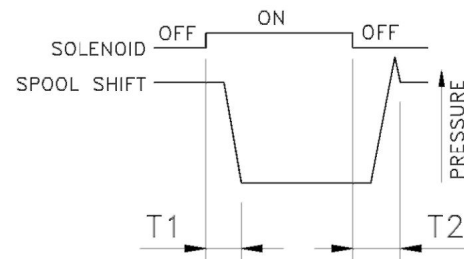
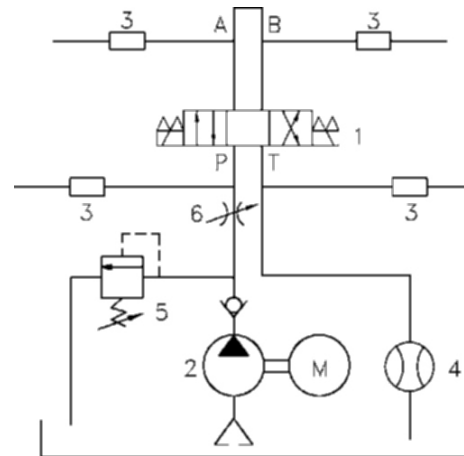
Pressure: 138 BAR (2000PSI)

Flow Rate: 30 LPM(8 GPM)

Viscosity: 35 cSt(175 SSU)

MODEL	CHANGE OVER TIME (sec)	
	T1	T2
SWH-G02-AC SERIES	0.01-0.04	0.02-0.04
SWH-G02-DC SERIES	0.02-0.06	0.02-0.04

TEST CIRCUIT



OPTION LS-

ELECTRICAL SURGE CONTROL MODEL

SWH - G02 - *** - D ** - ** - LS

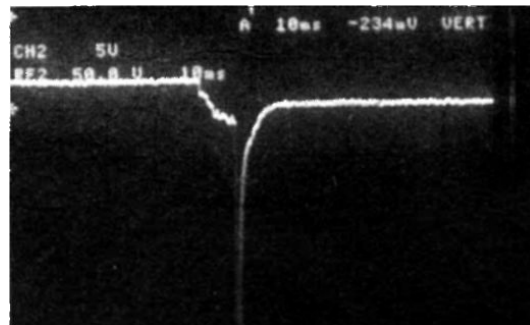
FEATURES

- Suppresses the surge voltage.
- Eliminates sparks between relay contacts.
- Extends the life of the relay contact.

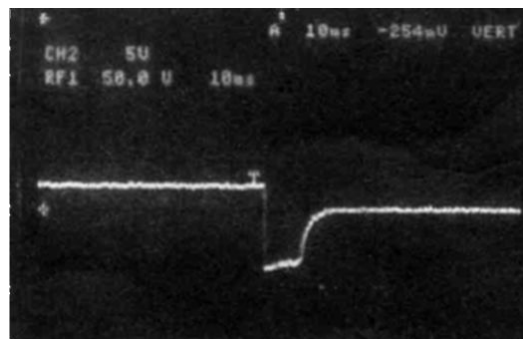
EFFECTS

- Improves the reliability of the control relay.
- Extends the life of conventional relays.
- Can be operated with a miniature relay.
- The RAC rectifier built-in DC model eliminates sparks at the control relay contact. It can be directly operated with a PLC (programmable logic controller).

Electrical surge control DC solenoid



Electrical surge waveform standard DC solenoid

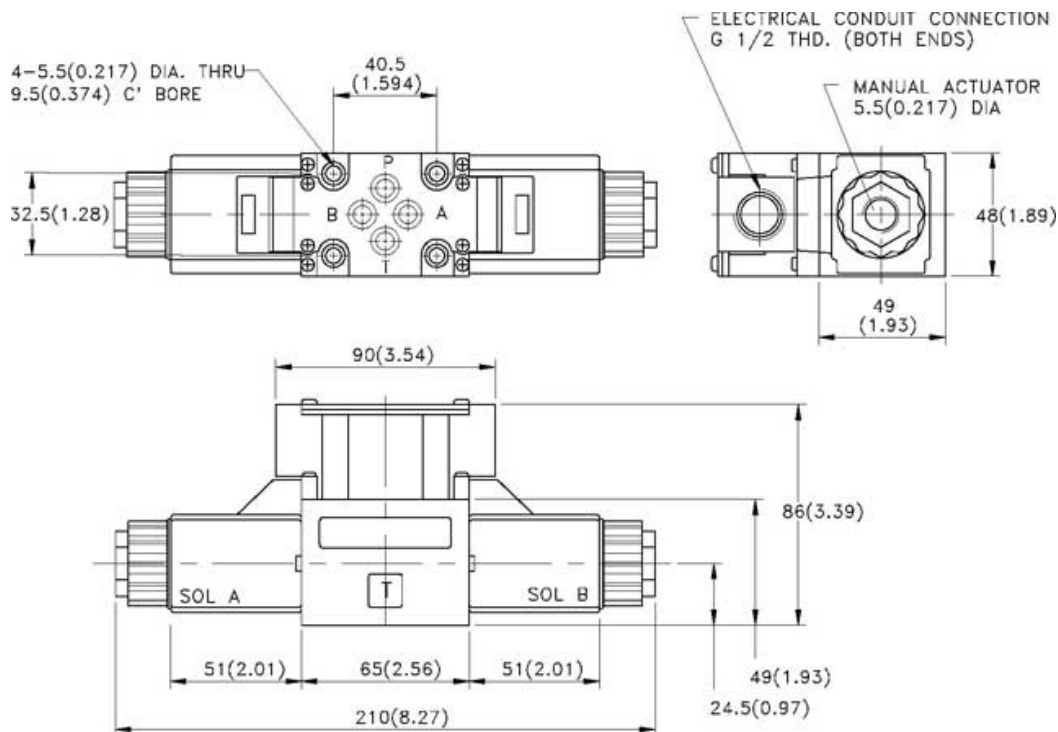


SOLENOID OPERATED DIRECTIONAL VALVE SWH-G02 SERIES

Dimensions

SWH - G02 - C ** - **** - 10 - **
with AC/DC/RF solenoids

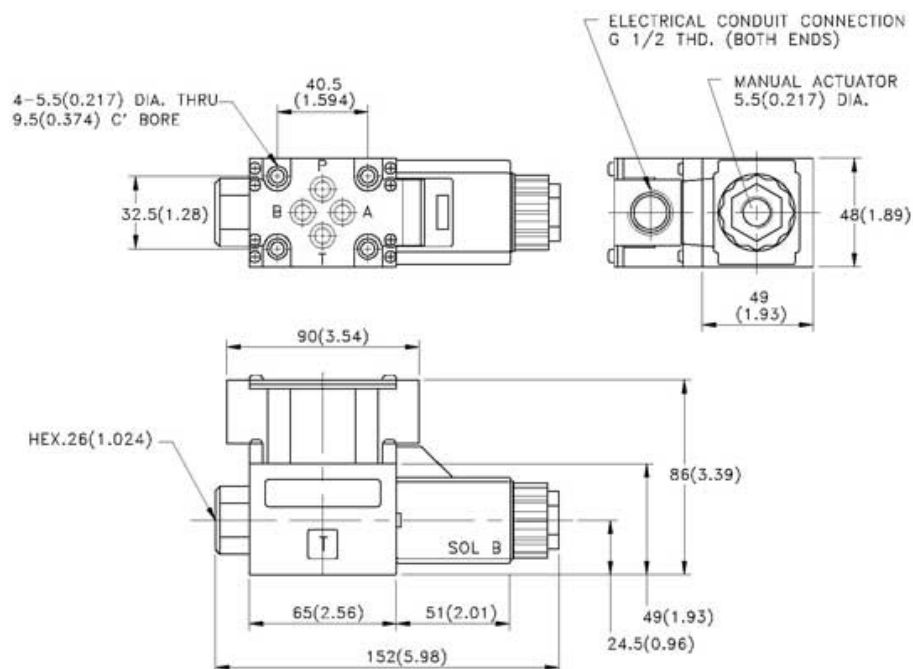
MOUNTING SURFACE: ISO 4401-AB-03-4-A
UNIT: mm(inch) WEIGHT: 2.0 kgs (4.4 lbs)



Dimensions

SWH - G02 - B ** - **** - 10 - **
with AC/DC/RF solenoids

MOUNTING SURFACE: ISO 4401-AB-03-4-A
UNIT: mm(inch) WEIGHT: 2.0 kgs (4.4 lbs)



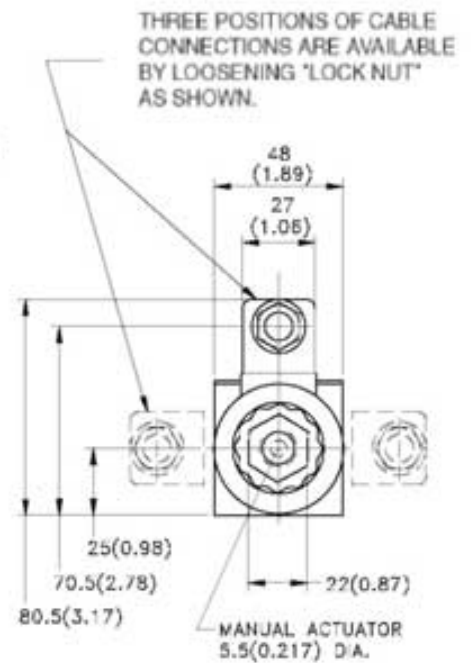
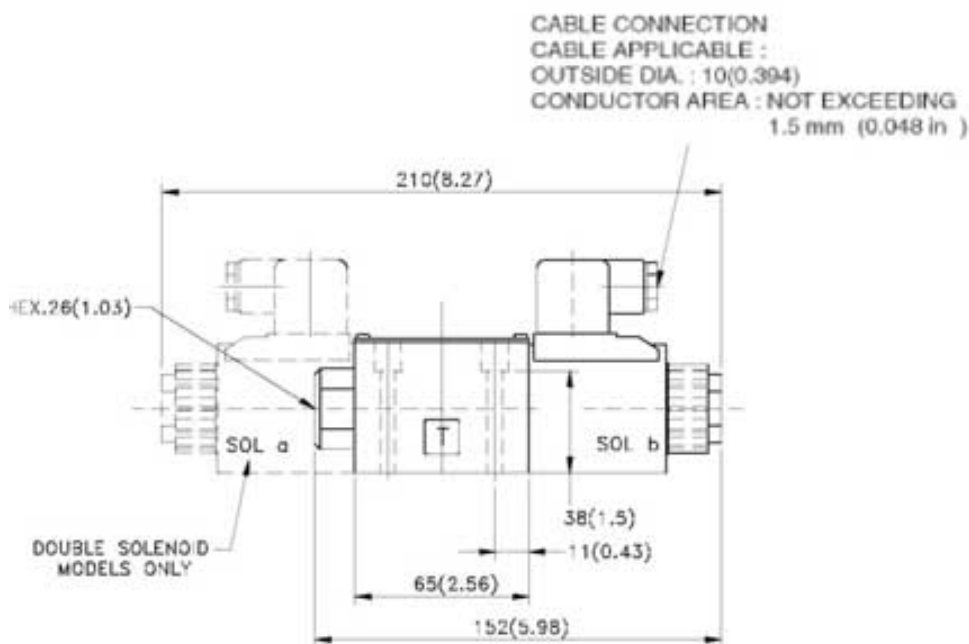
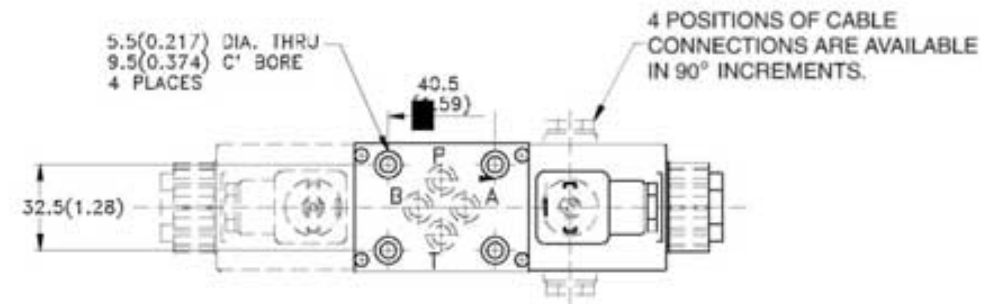
SOLENOID OPERATED DIRECTIONAL VALVE

SWH-G02 SERIES

Dimensions

MOUNTING SURFACE: ISO 4401-AB-03-4-A
UNIT: mm(inch)

SWH - G02 - *** - **** - 20 - **
with AC/DC/RF solenoids



MODEL	WEIGHT kg(lb)	MODEL	WEIGHT kg(lb)
SWH-G02-C ** - A *** - 10 - **	1.9(4.18)	SWH-G02-C - A *** - 20 - **	1.9(4.18)
SWH-G02-B ** - A *** - 10 - **	1.6(3.52)	SWH-G02-B - A *** - 20 - **	1.5(3.3)
SWH-G02-C ** - D/R *** - 10 - **	2.0(4.4)	SWH-G02-C - D/R *** - 20 - **	2.0(4.4)
SWH-G02-B ** - D/R *** - 10 - **	1.6(3.52)	SWH-G02-B - D/R *** - 20 - **	1.6(3.52)
SWH-G02-D ** - A *** - 10 - **	1.9(4.18)	SWH-G02-D - A *** - 20 - **	1.9(4.18)
SWH-G02-D ** - D/R *** - 10 - **	1.9(4.18)	SWH-G02-D - D/R *** - 20 - **	1.9(4.18)