



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.

HOW TO ORDER

SWH - G 02 - C2 - A220 -10 - LS

ELECTRICAL SURGE CONTROL OPTION : STANDARD
LS : LOW SURGE VOLTAGE (PLEASE SEE PAGE 8)

WIRING :

10 : JOINT BOX WITH INDICATING LIGHT

20 : HIRSCHMANN TYPE WITH INDICATING LIGHT (DIN TYPE)

31 : LEAD WIRE (DC ONLY)

41 : DUAL SPADE (DC ONLY, SAE J858A)

COIL VOLTAGE :

A110 : AC110V, 60Hz; AC100V, 50Hz

A120 : AC120V, 60Hz; AC110V, 50Hz

A220 : AC220V, 60Hz; AC200V, 50Hz

A240 : AC240V, 60Hz; AC220V, 50Hz

R110 : AC110V 60,50Hz

R120 : AC120V 60,50Hz

R220 : AC220V 60,50Hz

R240 : AC240V 60,50Hz

D12 : DC12V

D24 : DC24V

(CONTACT NORTHMAN FOR ADDITIONAL COIL VOLTAGE)

SPOOL TYPE : (PLEASE SEE PAGE 2)

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

SUBPLATE MOUNTED

HIGH PRESSURE HIGH FLOW SOLENOID DIRECTIONAL VALVE

SOLENOID OPERATED DIRECTIONAL VALVE

SWH-G02 SERIES

SPECIFICATIONS

Maximum operating pressure	310 BAR (4500 PSI)
Rated flow capacity	63 LPM (16.8 GPM)
Maximum tank line back pressure	138 BAR (2000 PSI)
Maximum frequencies of operation	300 CPM
Recommended filtration	25 MICRON
Hydraulic fluids recommended oil temperature	50 ±5°C (122 ± 9°F)

SOLENOID RATINGS

ELECTRIC SOURCE	COIL TYPE	VOLTAGE (V)			CURRENT & POWER		
		Hz	SOURCE RATED	RANGE (±10%)	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
AC	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	
	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	D12	DC 12V		10.8-13.2	2.20	2.20	
	D24	DC 24V		21.6-26.4	1.10	1.10	

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 100mΩ
- 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 M5x45L 4 pcs (#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.

PRESSURE DROP AND PERFORMANCE CURVES

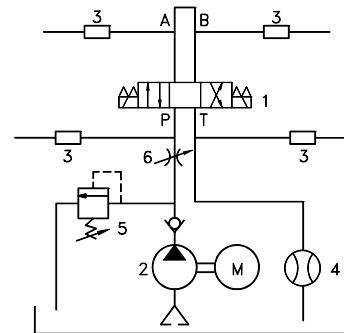
TEST SYSTEMS

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

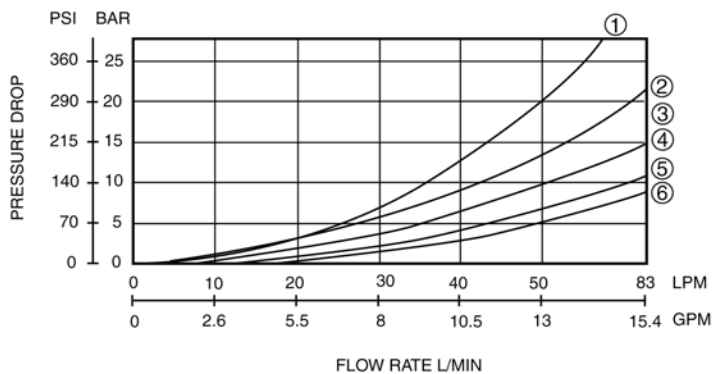
TEST CONDITIONS

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

TEST CIRCUIT



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

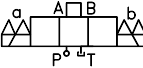
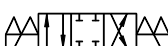
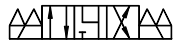
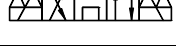
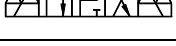
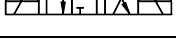
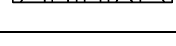
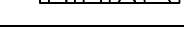
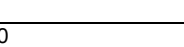
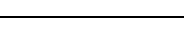
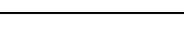
VISCOSITY	cSt	15	20	30	40	50	60	70	80	90	100
	SSU	77	98	141	186	232	278	324	371	417	464
FACTOR (G)		0.81	0.87	0.96	1.03	1.09	1.14	1.19	1.23	1.27	1.30

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

SOLENOID OPERATED DIRECTIONAL VALVE

SWH-G02 SERIES

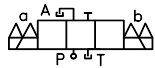
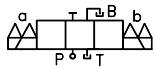
LIST OF SPOOL FUNCTIONS

THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE BAR (PSI)								
SPOOL TYPE NORMAL POSITION	P → A, B → T P → B, A → T 						P → A	
	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) 25 (6.7)
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)

- The figures in the square shows the parameter among voltage & flow under saturated temperature and 90 % applied voltage.
- The upper number in table describes the maximum flow under DC and RF. The lower number in table describes the maximum flow under AC.

				P → B 					
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

RESULT OF MEASUREMENTS

TEST SYSTEMS

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

TEST CONDITIONS

Pressure: 138 BAR (2000 PSI)
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

OPTION LS

ELECTRICAL SURGE CONTROL MODEL

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

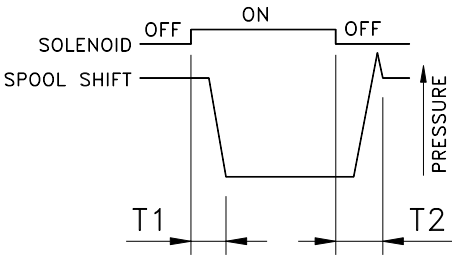
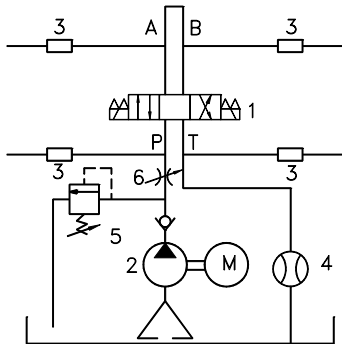
FEATURES

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

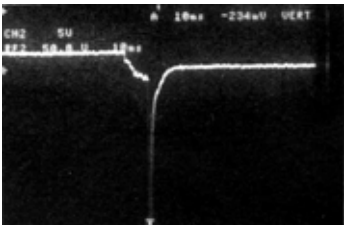
EFFECTS

- 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).

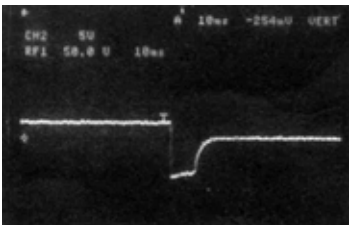
TEST CIRCUIT



Electrical surge waveform standard DC solenoid



Electrical surge control DC solenoid

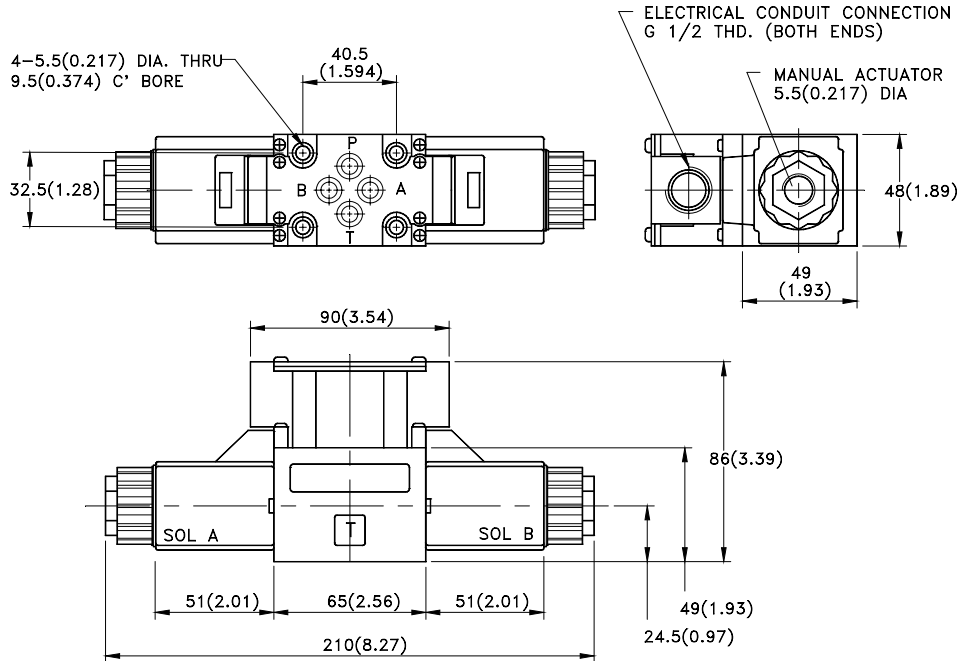


INSTALLATION DIMENSIONS

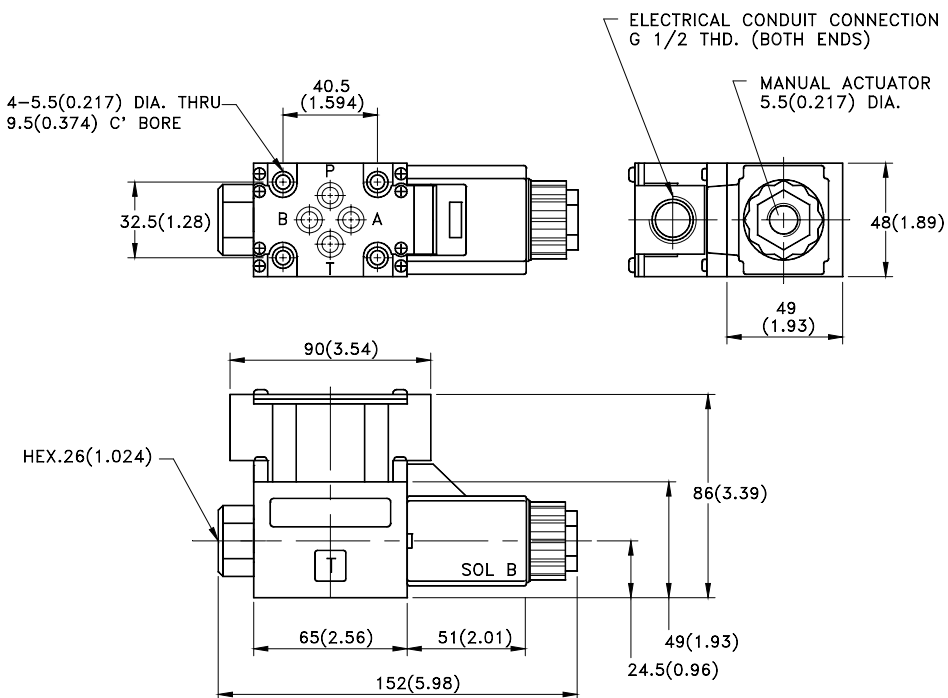
SWH - G02 - C ** - ** - 10 - ****
with AC/DC/RF solenoids

MOUNTING SURFACE: ISO 4401-AB-03-4-A

UNIT: mm(inch)
WEIGHT: 2.0 kgs (4.4 lbs)



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



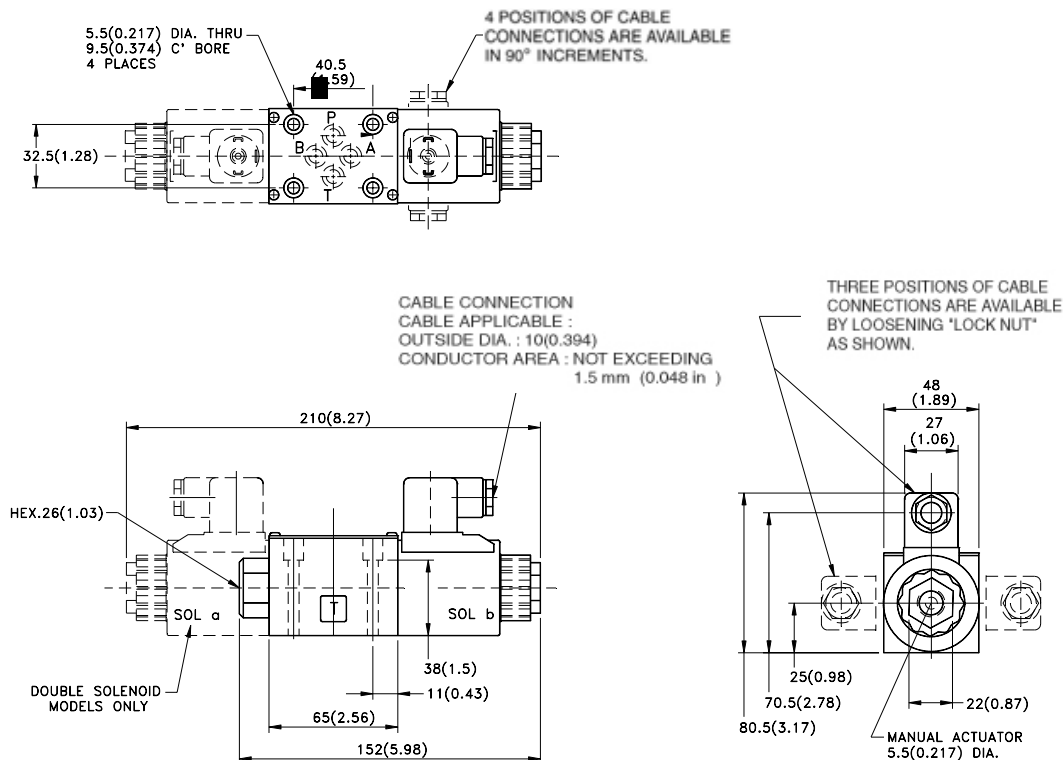
SOLENOID OPERATED DIRECTIONAL VALVE SWH-G02 SERIES

INSTALLATION DIMENSIONS

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

SWH - G02 - *** - **** - 20 - **

with AC/DC/RF solenoids



MODEL AND WEIGHT

MODEL	WEIGHT KGS (LBS)	MODEL	WEIGHT KGS (LBS)
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 (3.30)
SWH-G02-C**-D**-10-**	2.0 (4.40)	SWH-G02-C**-D**-20-**	2.0 (4.40)
SWH-G02-C**-R***-10-**	2.0 (4.40)	SWH-G02-C**-R***-20-**	2.0 (4.40)
SWH-G02-B**-D**-10-**	1.6 (3.52)	SWH-G02-B**-D**-20-**	1.6 (3.52)
SWH-G02-B**-R***-10-**	1.6 (3.52)	SWH-G02-B**-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**-10-**	1.9 (4.18)	SWH-G02-D**-D**-20-**	1.9 (4.18)
SWH-G02-D**-R***-10-**	1.9 (4.18)	SWH-G02-D**-R***-20-**	1.9 (4.18)