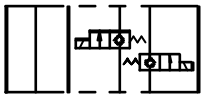
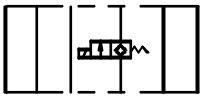
SYMBOLS



P T B A
MSC-03W-*****-NC-

P T B A
MSC-03A-*****-NC-

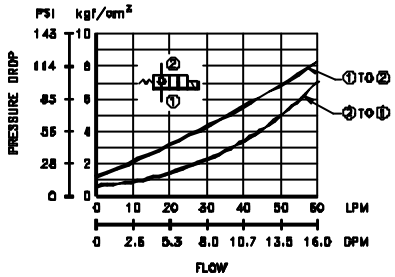


P T B A
MSC-03B-*****-NC-**

PERFORMANCE CURVES

TEST FLUID VISCOSITY : 35 cSt
(175 SSU)

PRESSURE DROP



HOW TO ORDER

MSC - 03 W - 230 AP NC - 10

OPTION
10: W/O MANUAL-OVERRIDE OPTION
20: W/I MANUAL-OVERRIDE OPTION

VALVE CONFIGURATION
NC: NORMALLY-CLOSED

TERMINATIONS
AP: 1/2" CONDUIT FOR AC COIL AG: DIN CONNECTOR FOR AC COIL
DP: 1/2" CONDUIT FOR DC COIL DG: DIN CONNECTOR FOR DC COIL

VALVE CONFIGURATION
12: 12VDC
24: 24VDC
115: 115VAC
230: 230VAC

CONTROL SERIES
W: A,B LINE
A: A LINE
B: B LINE

NOMINAL SIZE
03: 3/8" SERIES

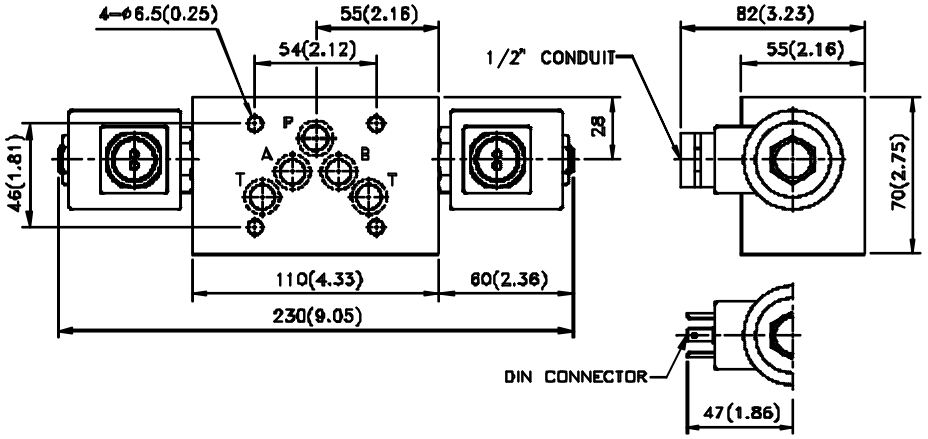
MODULAR SOLENOID CHECK VALVE

SPECIFITIONS

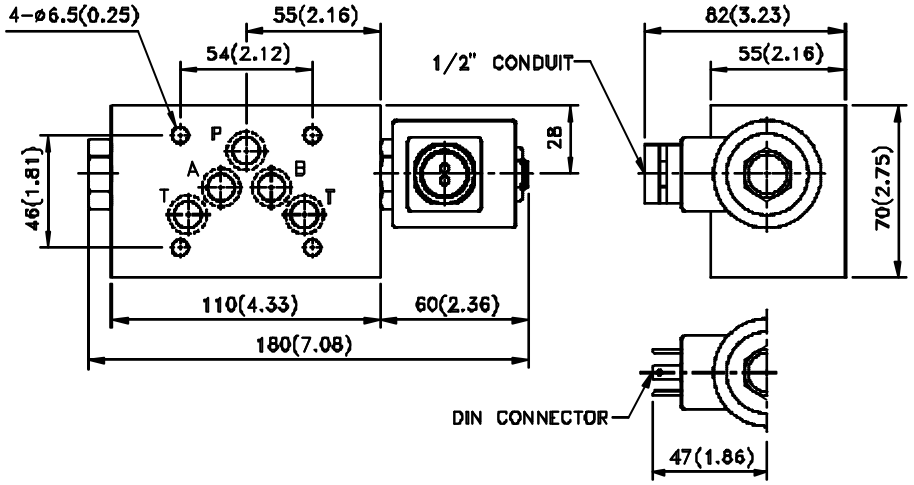
MAX. OPERATING PRESSURE	210 kgf/cm^2 (3000 PSI)
MAX. FLOW CAPACITY	60 LPM (16 GPM)

MSC - 03W - * * * * * - * * - * *

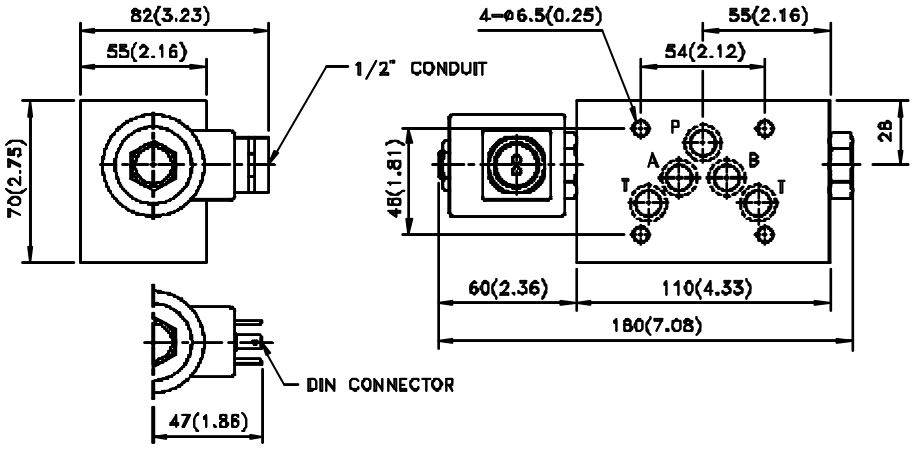
UNIT: mm/(inch)



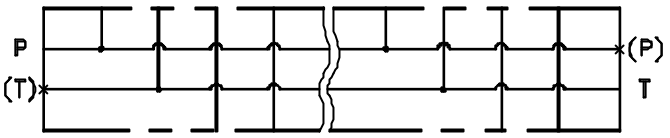
MSC – 03 - * * * * * - * * - * *



MSC - 03B - * * * * * - * * - * *



SYMBOLS



HOW TO ORDER

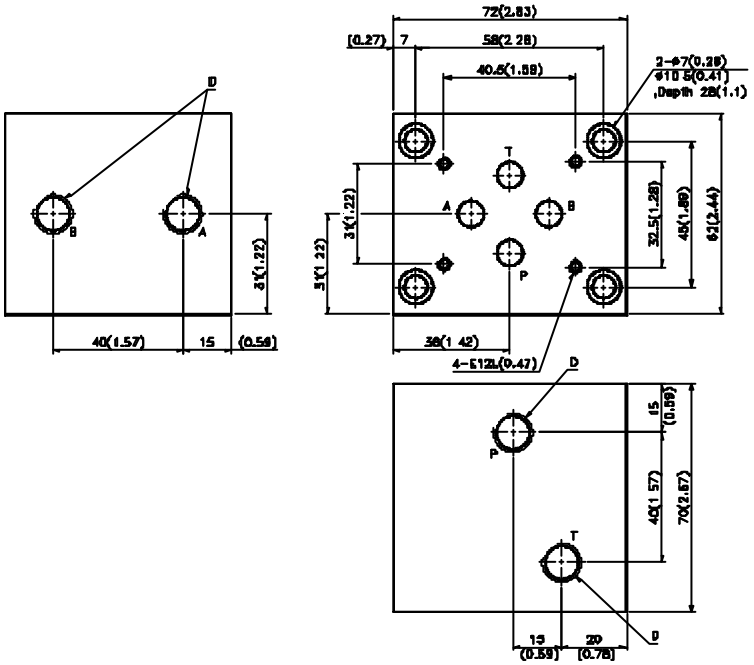
M 0 2 - 1 E - 1

- PORT THREADS
  1.PT
  2.NPT
  3.SAE
- NUMBER OF CONTROL CIRCUIT
- VALVE SIZE
  02 SERIES
  03 SERIES
- MULTI-STATION MANIFOLD BLOCKS

INSTALLATION DIMENSIONS

M02 - 1E - *

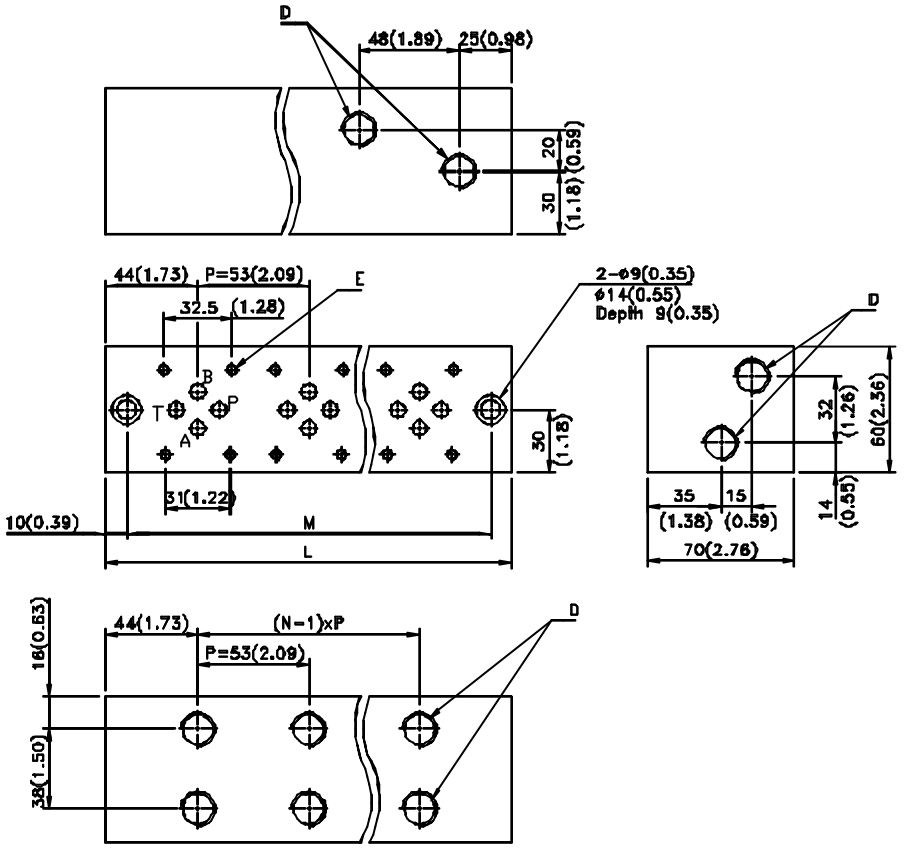
UNIT: mm/ inch



MODEL		D	E	WEIGHT: kgs(lbs)
M02-1E-	1	PT3/8"	M5×0.8P	2.1
	2	NPT3/8"	#10×24UNC	(4.62)

INSTALLATION DIMENSIONS

M02 - ＊E - ＊ UNIT: mm/(inch)



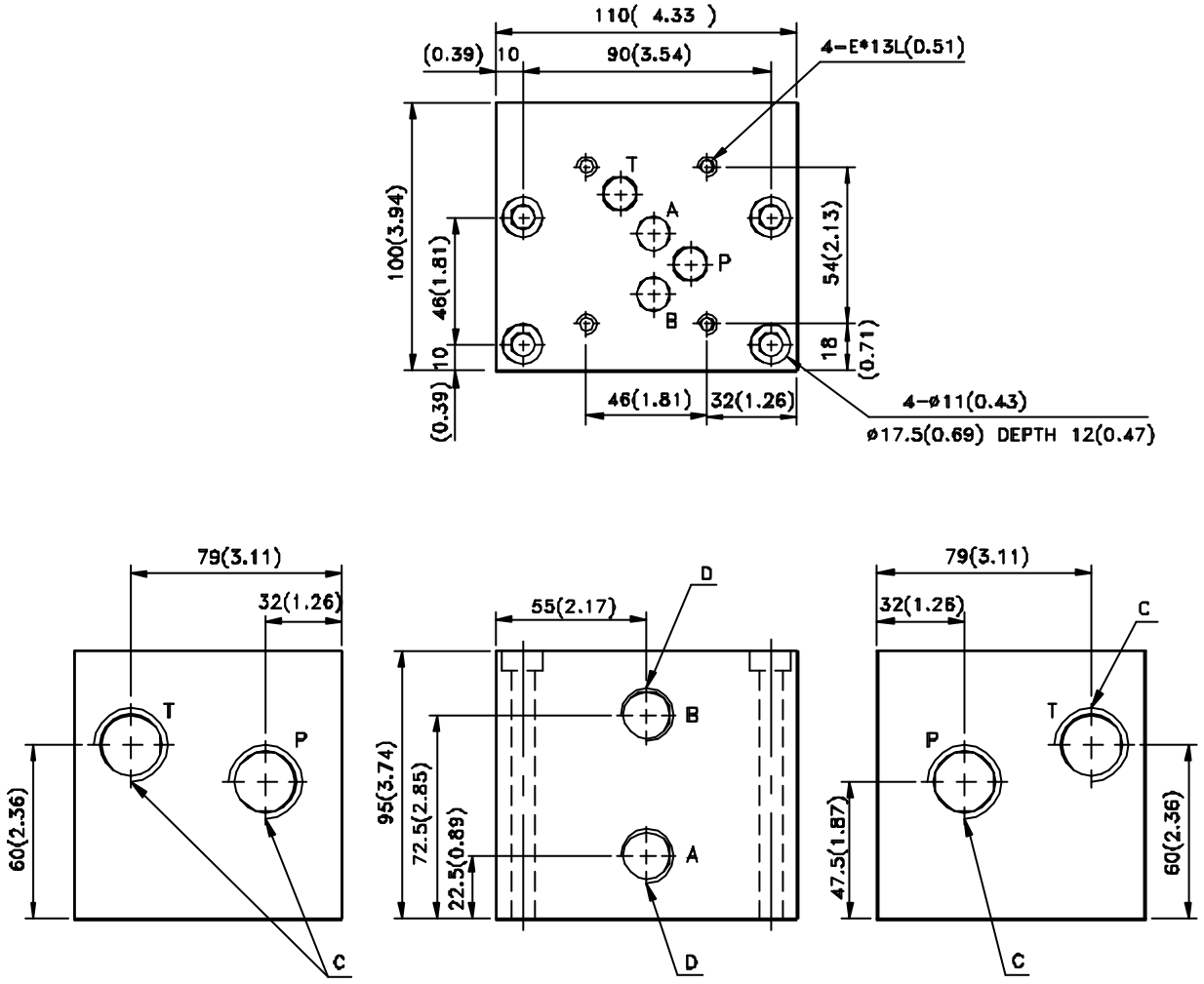
MODEL		D	E	N	M	L	WEIGHT: kgs(lbs)
M02-2E-	1	PT3/8"	M5×0.8P	2	121 (4.76)	141 (5.55)	4.6(10.1)
	2	NPT3/8"	#10-24UNC				
M02-3E-	1	PT3/8"	M5×0.8P	3	174 (6.85)	194 (7.64)	6.3(13.8)
	2	NPT3/8"	#10-24UNC				
M02-4E-	1	PT3/8"	M5×0.8P	4	227 (8.94)	247 (9.72)	8.1(17.8)
	2	NPT3/8"	#10-24UNC				
M02-5E-	1	PT3/8"	M5×0.8P	5	280 (11.03)	300 (11.81)	9.8(21.6)
	2	NPT3/8"	#10-24UNC				
M02-6E-	1	PT3/8"	M5×0.8P	6	333 (13.11)	353 (13.90)	11.6(25.5)
	2	NPT3/8"	#10-24UNC				
M02-7E-	1	PT3/8"	M5×0.8P	7	386 (15.20)	406 (15.98)	13.3(29.3)
	2	NPT3/8"	#10-24UNC				

INDICATING WEIGHT FOR CAST IRON BLOCK MATERIAL

INSTALLATION DIMENSIONS

M03 - 1E - ＊

UNIT: mm/(inch)



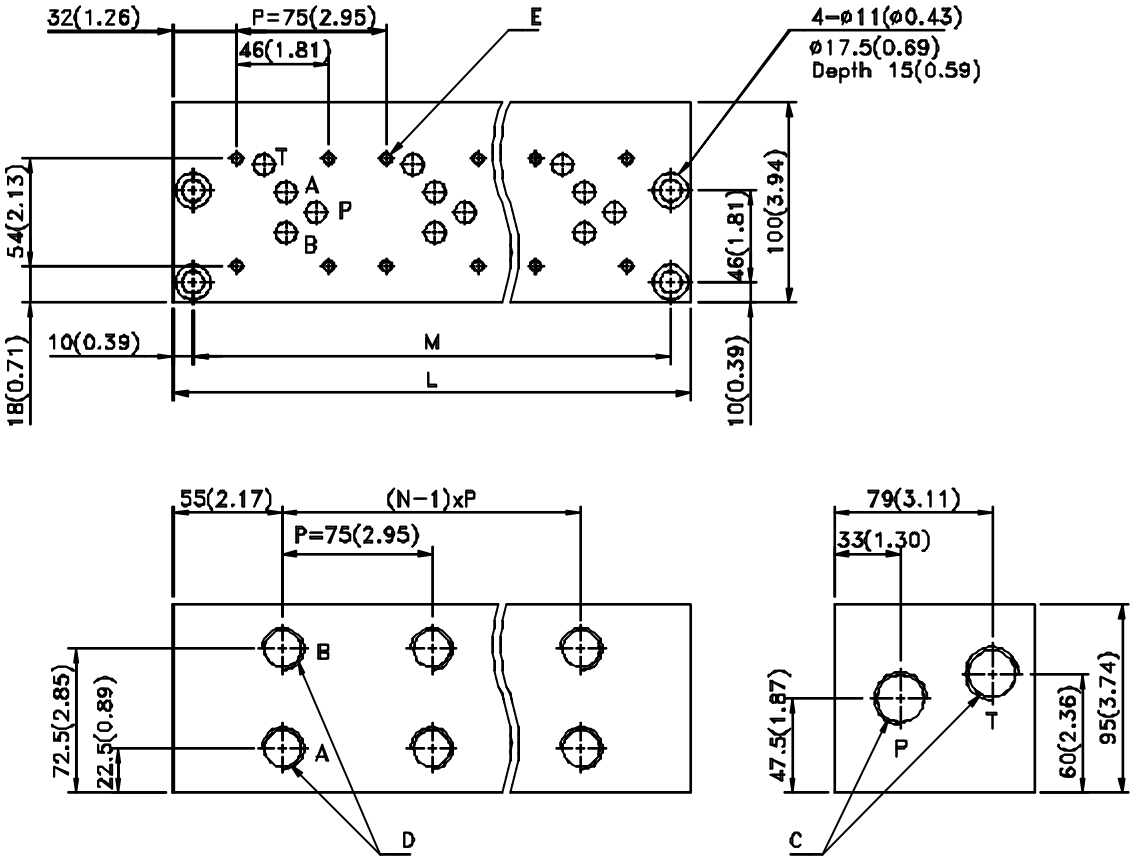
MODEL		C	D	E	WEIGHT: kgs(lbs)
M03-1E-	1	PT3/4"	PT1/2"	M6×1P	6.4
	2	NPT3/4"	NPT1/2"	1/4-20UNC	(14.08)

＊INDICATING WEIGHT FOR STEEL BLOCK MATERIAL

NSTALLATION DIMENSIONS

M03 - ＊E - ＊

UINT: mm/(inch)



MODEL		C	D	E	N	M	L	WEIGHT: kgs(lbs)
M03-2E-	1	PT3/4"	PT1/2"	M6×1P	2	165	185	13.8
	2	NPT3/4"	NPT1/2"	1/4-20UNC		(6.50)	(7.28)	(30.3)
M03-3E-	1	PT3/4"	PT1/2"	M6×1P	3	240	260	19.5
	2	NPT3/4"	NPT1/2"	1/4-20UNC		(9.45)	(10.24)	(42.9)
M03-4E-	1	PT3/4"	PT1/2"	M6×1P	4	315	335	25.0
	2	NPT3/4"	NPT1/2"	1/4-20UNC		(12.40)	(13.19)	(55.0)
M03-5E-	1	PT3/4"	PT1/2"	M6×1P	5	390	410	31.0
	2	NPT3/4"	NPT1/2"	1/4-20UNC		(15.35)	(16.14)	(68.2)

＊INDICATING WEIGHT FOR STEEL BLOCK MATERIAL

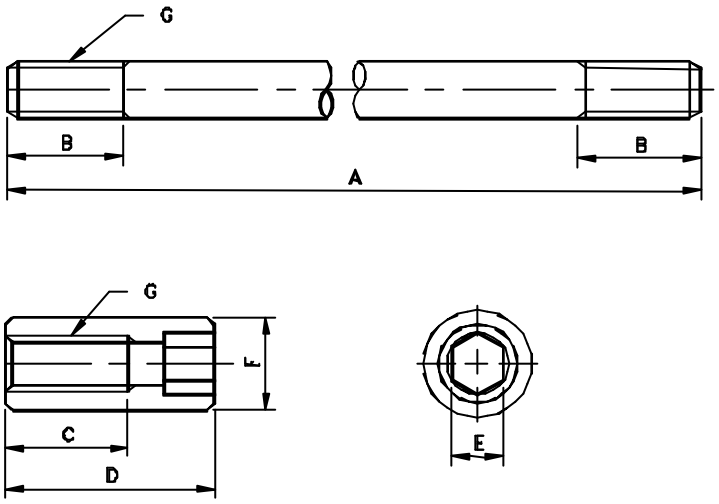
HOW TO ORDER

MBK - 02 - 1 - 1

- THREAD : 1. Meter Size
  2. Inch Size
- NUMBER OF VALVE
- VALVE NOMINAL SIZE
  02 : 1/4"
  03 : 3/8"
- MOUNTING BOLT KITS

DIMENSIONS

UNIT: mm/(inch)



STAGE	SIZE	A
1	02	94 (3.70)
	03	102 (4.17)
2	02	134 (5.27)
	03	157 (6.34)
3	02	174 (6.85)
	03	212 (8.50)
4	02	214 (8.42)
	03	267 (10.67)

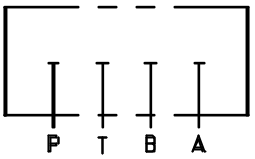
	E	F	G	B	C	D
02	4 (0.16)	8.5(0.33)	M5(#10-24UNC)	9 (0.35)	9 (0.35)	15(0.59)
03	5(0.20)	10(0.39)	M6(1/4-20UNC)	12 (0.47)	13 (0.47)	22 (0.87)

HOW TO ORDER

MEP - 02 - N - 10

- DESIGN NUMBER
- FUNCTION PORT:
  N: NONE
  A: P A, B T
  B: P B. A T
- PORT SIZE
  02: 1/4″
  03: 3/8″
- MODULAR END PLATE

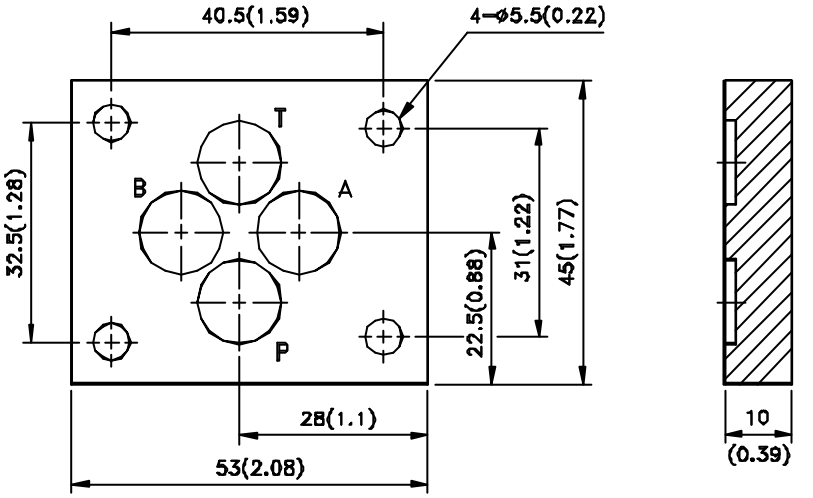
SYMBOLS



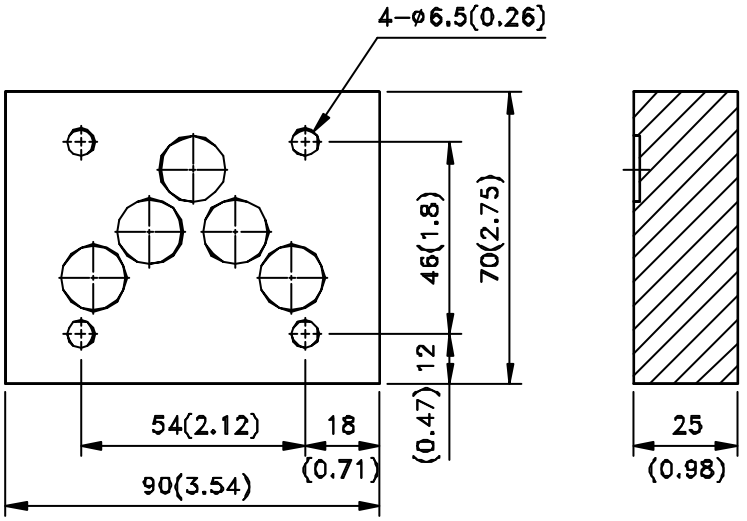
INSTALLATION DIMENSIONS

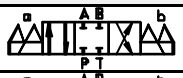
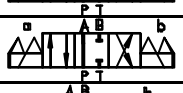
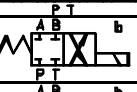
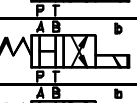
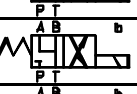
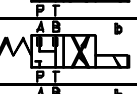
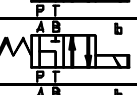
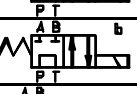
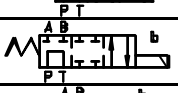
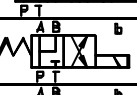
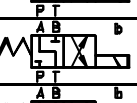
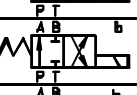
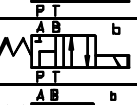
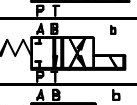
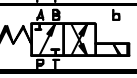
1/4″ END PLATE

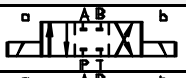
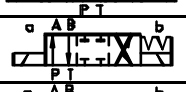
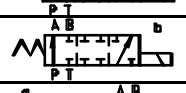
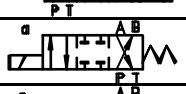
UNIT: mm/(inch)



3/8″ END PLATE



APPLICATION	TYPE	GRAPHIC SYMBOLS
THREE POSITION SPRING CENTERED	C2	
	C3	
	C4	
	C40	
	C5	
	C6	
	C60	
	C7	
	C8	
	C9	
TWO POSITION SPRING OFFSET (SOENOID B)	C2B	
	C3B	
	C4B	
	C40B	
	C5B	
	C6B	
	C60B	
	C7B	
	C8B	
	C9B	
	C5SB	
	C8SB	
	C9SB	

APPLICATION	TYPE	GRAPHIC SYMBOLS
TWO POSITION WITHOUT SPRING WITHOUT CENTERING	N2	
	N3	
TWO POSITION DETENT	D2	
	D3	
TWO POSITION SPRING OFFSET (SOLENOID B)	B2	
	B3	
	B20	
TWO POSITION SPRING OFFSET (SOLENOID A)	B2S	
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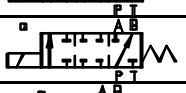
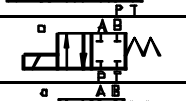
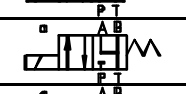
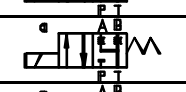
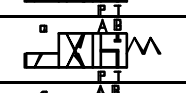
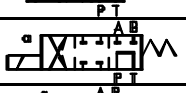
	B20S	
	C2BS	
	C3BS	
	C4BS	
	C40BS	
	C5BS	
	C6BS	
	C60BS	
	C7BS	
	C8BS	
	C9BS	
THREE POSITION SPRING CENTERED	C5S	
	C8S	
	C9S	

PORT INTERCONNECTION:

- WITH SOLENOID “A” ENERGIZED P– >A B– >T
- WITH SOLENOID “B” ENERGIZED P– >B A– >T
- BUT PORT INTERCONNECTIONS ARE REVERSED FOR C5, C6, C60 TYPE.

FEATURES

- Armature operates in oil system. Impact is cushioned, noise is reduced, solenoid life is increased.
- Wet armature solenoid eliminates push pin seal, therefore no seal wear, drop 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 are standard.
- High pressure, high flow rating, provides low pressure drop, with maximum performance.
- 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 - G02 - C2 - A220 - 10 - LS

NO CODE : STANDARD
LS : LOW SURGE VOLTAGE (See page 6)

WIRING:
10 : JOINT BOX WITH INDICATING LIGHT
20 : HIRSCHMANN TYPE WITH INDICATING LIGHT

COIL VOLTAGE:
A240: AC240V, 60Hz; AC220V, 50Hz
A220: AC220V, 60Hz; AC200V, 50Hz R220: AC220V, 60/; 50Hz
A120: AC120V, 60Hz; AC110V, 50Hz
A110: AC110V, 60Hz; AC100V, 50Hz R110: AC110V, 60/, 50Hz
D24: DC24V
D12: DC12V

SPOOL TYPE (See page *1)

NOMINAL SIZE: 1/4" (D03)

SUBPLATE MOUNTED

HIGH PRESSURE HIGH FLOW SOLENOID OPERATED DIRECTIONAL VALVE

SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	315kgf/cm^2(4500PSI)
RATED FLOW CAPACITY	63LPM(16.8GPM)
MAXIMUM TANK LINE BACK PRESSURE	140kgf/cm^2(2000PSI)
MAXIMUM FREQUENCIES OF OPERATION	300CPM
FILTRATION RECOMMENDED	25Micron
HYDRAULIC FLUIDS	Mineraloil,recommendationtemperature0-55°C Max.temperaturerange-25°C~90°C Viscosity10-400cSt

SOLENOID RATINGS

ELECTRIC SOURCE	COIL TYPE	VOLTAGE(V)			CURRENT & POWER AT RATED VOLTAGE		
		SOURCE RATED	Hz	RANGE (±10%)	IN-RUSH CURRENT(A)	HOLDING CURRENT(A)	WATTAGE
A.C.	A110	AC100V	50	90-110	1.6	0.46	
		AC110V	60	99-121	1.5	0.39	
	A120	AC110V	50	99-121	1.3	0.38	
		AC120V	60	108-132	1.2	0.27	
	A220	AC200V	50	180-220	0.80	0.23	
		AC220V	60	198-242	0.75	0.19	
	A240	AC220V	50	198-242	0.67	0.19	
		AC240V	60	216-264	0.59	0.13	
	R110	AC110V	50/60	100-120	0.3	0.3	
	R220	AC220V	50/60	198-242	0.15	0.15	
D.C.	D12	DC12V		10.8-13.2	2.2	2.2	26
	D24	DC24V		21.6-26.4	1.1	1.1	

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:

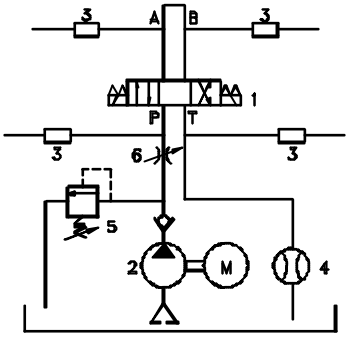
- Mounting bolt kits are supplied with valve socket head cap screws M5x45L 4 pieces (#10-24 UNC x 13/4" L) for tightening torque 50-70 kgf – cm (43.3-60 lbs-in).
- O-ring AS568-0124 pieces.

PRESSURE DROP AND PERFORMANCE CURVES

TEST SYSTEMS

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

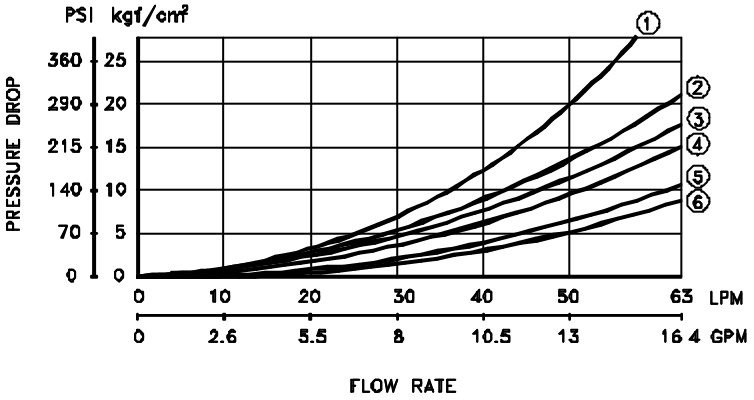
TEST CIRCUIT



TEST CONDITIONS

Pressure:70kgf/cm^2 (1000PSI)
Flow Rate:63 LPM (16.8GPM)
Viscosity: 35 cSt

PERFORMANCE CURVES



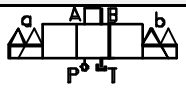
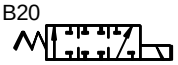
	PRESSURE DROP CURVE NUMBER				
	P A	B T	P B	A T	P T
C2	5	5	5	5	–
C3	6	6	6	6	4
C4	5	6	5	6	–
C40	5	5	5	5	–
C5	2	2	2	2	4
C6	1	1	1	1	4
C60	1	1	1	1	3
C7	6	5	6	5	–
C8	5	5	5	6	–
C9	6	5	5	5	–
D2	5	5	5	5	–
D3	5	3	5	3	–
B2	4	5	4	5	–
B3	3	3	5	5	–
B20	2	–	5	–	–
B2S	4	5	4	5	–
B3S	5	5	3	3	–
B20S	5	–	2	–	–

CONTRAST CHART BETWEEN FACTORS AND VISCOSITIES

	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

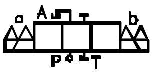
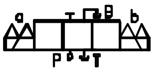
The pressure drop (P') can be obtained from the formula P'= p(G'/0.85) for other specific gravity(G').

LIST OF SPOOL FUNCTIONS

THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE kgf/cm² (PSI)								
SPOOL TYPE NORMAL POSITION	P A, B T P B, A T 						P A	
	50kgf/cm² (735 PSI)	100 kgf/cm² (1470 PSI)	150 kgf/cm² (2200 PSI)	210 kgf/cm² (3000 PSI)	250 kgf/cm² (3675 PSI)	315 kgf/cm² (4500 PSI)	50 kgf/cm² (735 PSI)	100 kgf/cm² (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)	20 (5.3)	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)
D3 	63(16.8)	63(16.8)	63(16.8)	63(16.8)	63(16.8)	63(16.8)	40 (10.7)	30 (8)

NOTTE: 40(10.7) / 32(8.5)

1. The figures in the square shows the parameter among voltage & flow under saturated temperature and 90 % Applied voltage.
2. The upper side number in table describes the maximum flow under DC and RF. The lower side number in Table describes the maximum flow under AC.

				P B 					
150 kgf/cm² (2200 PSI)	210 kgf/cm² (3000 PSI)	250 kgf/cm² (3675 PSI)	315 kgf/cm² (4500 PSI)	50 kgf/cm² (735 PSI)	100 kgf/cm² (1470 PSI)	150 kgf/cm² (2200 PSI)	210 kgf/cm² (3000 PSI)	250 kgf/cm² (3675 PSI)	315 kgf/cm² (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)	28 (7.5)
				45 (12)	45 (12)	45 (12)	45 (12)	45 (12)	45 (12)
25 (6.7)	20 (5.3)	18 (4.8)	15 (4)	63 (16.8)	50 (13.3)	45 (12)	40 (10.7)	32 (8.5)	25 (6.7)
				45 (12)	30 (8)	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)	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)	25 (6.7)	21 (5.6)	16 (4.3)	13 (3.5)

RESULT OF

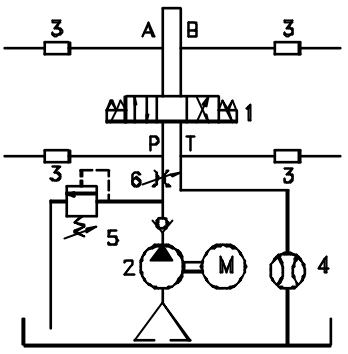
TEST SYSTEMS

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

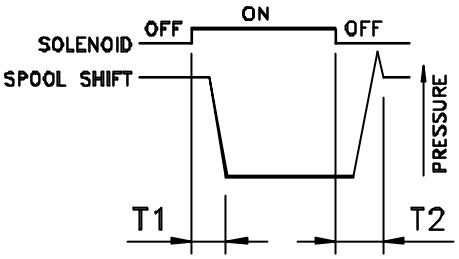
TEST CONDITIONS

Pressure: 140 kgf/cm^2 (2000 PSI)
Flow Rate: 30 LPM (8 GPM)
Viscosity: 35 cSt

TEST CIRCUIT



MODEL	SHIFT 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
SWH-G02-RF SERIES	0.02-0.06	0.02-0.04



LS OPTION

Electrical Surge Control Model

LS OPTION

Valve model: SWH-G02-***-D ** - ** -LS

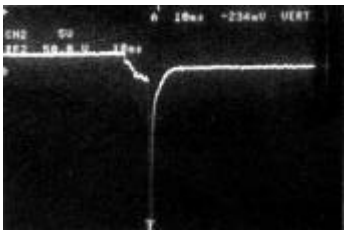
FEATURES

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

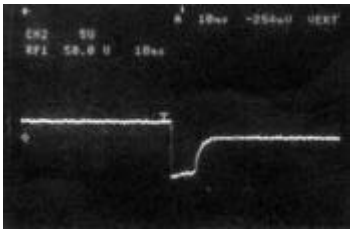
EFFECTS

- 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 eliminate sparks at the control relay contact. It can be directly operated wiht a PLC (programmable logic controller).

Electrical surge waveform standard DC



Electrical surge controlled DC solenoid

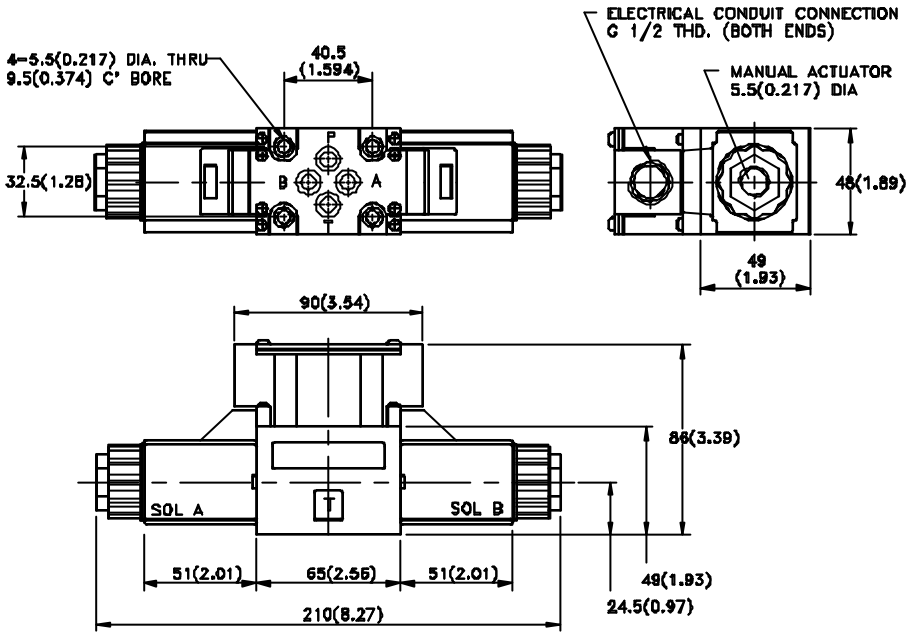


INSTALLATION DIMENSIONS

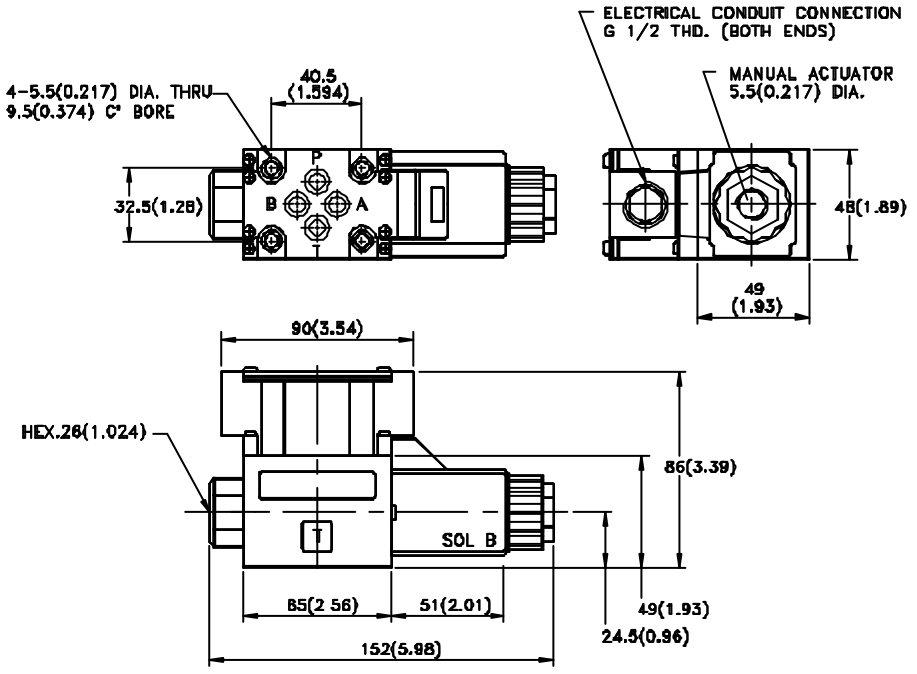
Mounting surface: ISO 4401-AB-03-4-A

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

SWH-G02-C ** - **** - 10 -**
Models with AC, DC, RF solenoids



SWH-G02-B ** - **** - 10 - **
Models with AC, DC, RF Solenoids



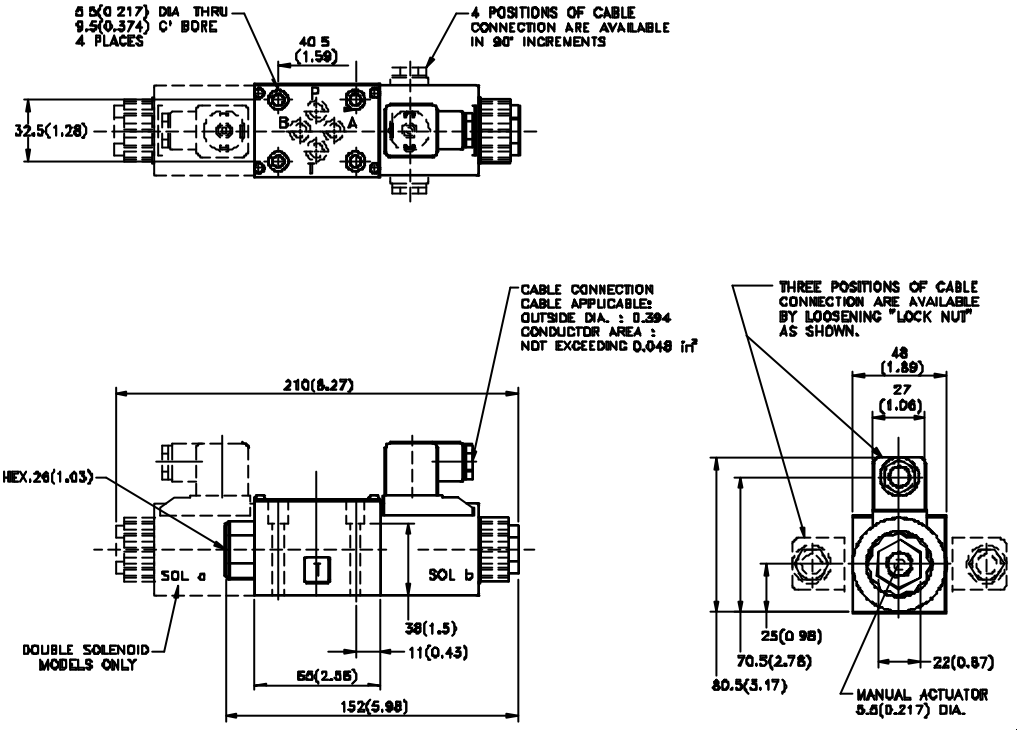
INSTALLATION DIMENSIONS

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

UNIT: mm(inch)

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

Models with AC, DC, RF solenoids



MODEL AND WEIGHT

MODEL	WEIGHT kgs(LB)	MODEL	WEIGHT kgs(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)

FEATURES

- Armature operates in oil system. Impact is cushioned, noise is reduced, solenoid life is increased.
- Wet armature solenoid eliminates push pin seal, therefore no seal wear, drop 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 are standard.
- High pressure, high flow rating, provides low pressure drop, with maximum performance.
- Specially designed, balanced spool allows proper shifting force, for maximum reliability and long life.
- Hydraulic shock caused by abrupt change in the flow condition at flow cut off is minimized by a specially machines spool.
- Specifically designed to control the shock or “bang” in hydraulic systems.
- Minimizes the effect of pressure spikes or instantaneous high flow rates common in many hydraulic systems.
- A.C coil design with flexible timing characteristics when compared to rectified D.C. coil technology.

HOW TO ORDER

S W H - G 02 - C2 - R220 - 10 - M

- M : SHOCKLESS TYPE
- WIRING:
  10 : JOINT BOX WITH INDICATING LIGHT
  20 : HIRSCHMANN TYPE WITH INDICATING LIGHT
- COIL VOLTAGE:
  R220 : AC220V 60/50HZ
  R110 : AC110V 60/50HZ
  D12 : DC12V
  D24 : DC24V
- SPOOL TYPE (See page12)
- NOMINAL SIZE : 1/4”
- SUBPLATE MOUNTED
- HIGH PRESSURE HIGH FLOW SOLENOID DIRECTIONAL VALVE

SPECIFICATIONS

MAXIMUMOPERATINGPRESSURE	210kgf/cm^2(3000PSI)
RATEDFLOWCAPACITY	40LPM(10.5GPM)
MAXIMUMTANKLINEBACKPRESSURE	140kgf/cm^2(2000PSI)
MAXIMUMFREQUENCIESOFOPERATION	120CPM
RECOMMENDEDFILTRATION	25Micron
HYDRAULICFLUIDS	Mineraloil,recommendationtemperature0-55°C Max.temperaturerange-25°C~90°C Viscosity10-400cSt

REMARK: Installation dimensions see page 7, 8.

SOLENOID RATINGS

ELECTRIC SOURCE	COIL TYPE	VOLTAGE(V)			CURRENT & POWER AT RATED VOLTAGE		
		SOURCE RATED	Hz	RANGE	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
R.F	R110	AC110V	60	99-121	0.15	0.15	26
	R220	AC220V	60	198-242	0.30	0.30	
DC	D12	DC12V		10.8-13.2	2.2	2.2	
	D24	DC24V		21.6-26.4	1.1	1.1	

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:

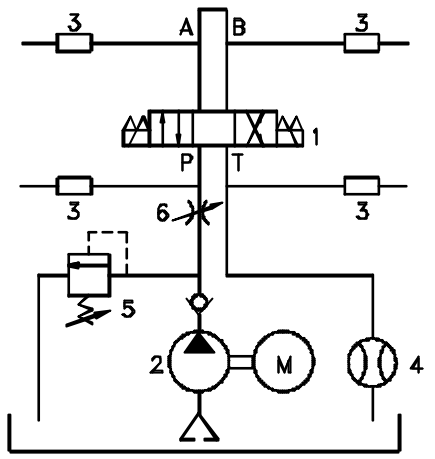
- Mounting bolt kits are supplied with valve socket head cap screws M5 x 45L 4 pieces (#10-24UNC x 1 3/4″) for tightening torque 50-70 kgf-cm. (43.3-60.6 lbs-in)
- O-ring AS568-012 4 pieces.

PRESSURE DROP AND PERFORMANCE CURVES

TESTE SYSTEMS

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

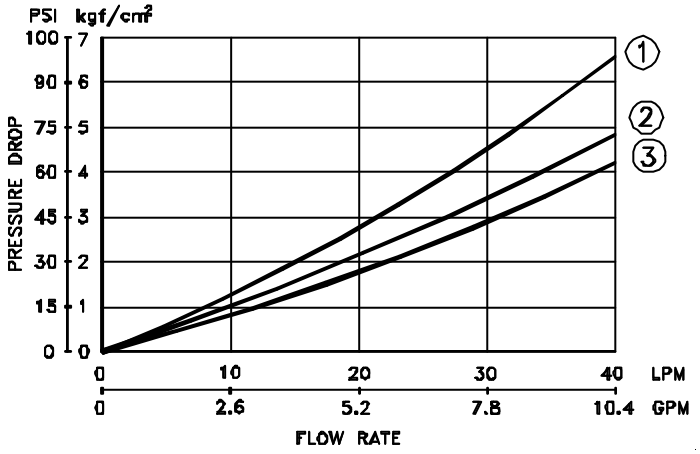
TEST CIRCUIT



TEST CONDITIONS

Pressure: 70kfg/cm^2 (1000PSI)
Flow Rate: 63 LPM (16.8GPM)
Viscosity: 35 cSt

PERFORMANCE CURVES



SPOOL TYPE	PRESSURE DROP CURVE			
	P A	B T	P B	A T
C2	2	2	2	2
C4	2	3	2	3
B3	1	1	2	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

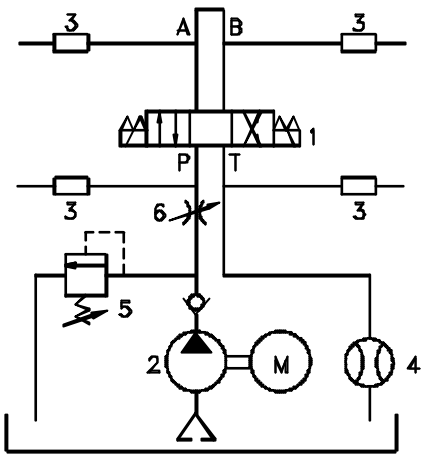
The pressure drop (ΔP') can be obtained from the formula
ΔP' = Δp(G'/0.85) for other specific gravity (G').

RESULT OF

TEST SYSTEMS

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

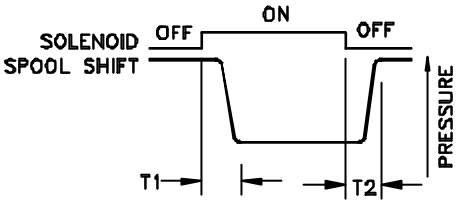
TEST CIRCUIT



TEST CONDITIONS

Pressure: 140 kgf/cm^2 (2000 PSI)
Flow Rate: 30 LPM (8 GPM)
Viscosity: 35 cSt

MODEL	SHIFT OVER TIME (sec)	
	T1	T2
SWH-G02-RF-M SERIES	0.1-0.15	0.1-0.15
SWH-G02-DC-M SERIES	0.1-0.15	0.1-0.15



LIST OF SPOOL FUNCTION

THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE kgf/cm^2(PSI)												
SPOOL TYPE NORMAL POSITION	P A, B T P B, A T				P A				P B			
	50 (735)	100 (1470)	140 (2000)	210 (3000)	50 (735)	100 (1470)	140 (2000)	210 (3000)	50 (735)	100 (1470)	140 (2000)	210 (3000)
C2	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	30 (8)	22 (5.9)	16 (4.3)	10 (2.7)	30 (8)	22 (5.9)	16 (4.3)	10 (2.7)
C4	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	30 (8)	22 (5.9)	16 (4.3)	10 (2.7)	30 (8)	22 (5.9)	16 (4.3)	10 (2.7)
B3	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)	40 (10.7)

HOW TO ORDER

M02 - 02 - S -

PIPE THREADS
1: PT
2: NPT
3: SAE

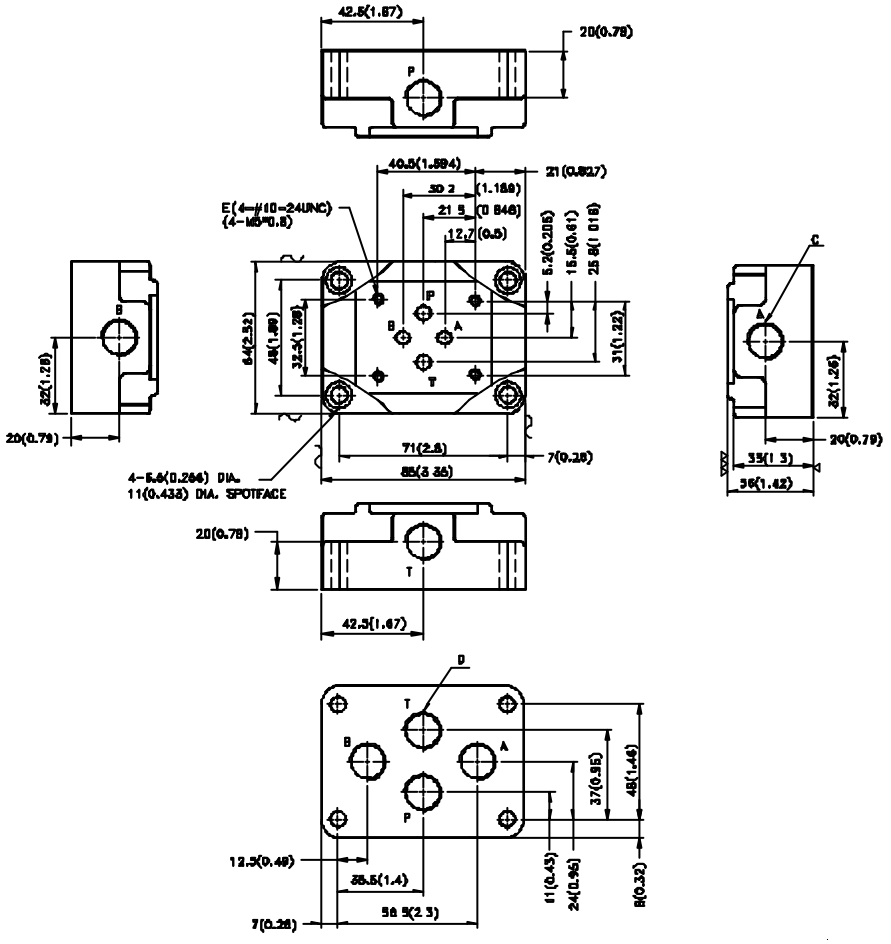
S: SIDE PORTS
B: BOTTOM PORTS
SB: SIDE AND BOTTOM PORTS

PORT SIZE :
02 : 1/4″
03 : 3/8″

SUBPLATE
02

INSTALLATION DIMENSIONS

UNIT: mm (inch)
WEIGHT: 1.07kgs(2.36lbs)



MODEL			PORT SIZE			MODEL			PORT SIZE		
			C	D	E				C	D	E
M02-02	– S	–1	4-1/4″ PT	–	4-M5x0.8P	M02-03	– S	–1	4-3/8″ PT	–	4-M5x0.8P
		–2	4-1/4″ NPT	–	4-#10-24UNC			–2	4-3/8″ NPT	–	4-#10-24UNC
		–3	4-1/4″ SAE-2B	–	4-#10-24UNC			–3	4-3/8″ SAE-2B	–	4-#10-24UNC
	– B	–1	–	4-1/4″ PT	4-M5x0.8P		– B	–1	–	4-3/8″ PT	4-M5x0.8P
		–2	–	4-1/4″ NPT	4-#10-24UNC			–2	–	4-3/8″ NPT	4-#10-24UNC
		–3	–	4-1/4″ SAE-2B	4-#10-24UNC			–3	–	4-3/8″ SAE-2B	4-#10-24UNC
	– SB	–1	4-1/4″ PT	4-1/4″ PT	4-M5x0.8P		– SB	–1	4-3/8″ PT	4-3/8″ PT	4-M5x0.8P
		–2	4-1/4″ NPT	4-1/4″ NPT	4-#10-24UNC			–2	4-3/8″ NPT	4-3/8″ NPT	4-#10-24UNC
		–3	4-1/4″ SAE-2B	4-1/4″ SAE-2B	4-#10-24UNC			–3	4-3/8″ SAE-2B	4-3/8″ SAE-2B	4-#10-24UNC

REMARK: Various port sizes/pipe threads are available upon request.

FEATURES

- The indicating lights are the standard equipment.
- Coil screws are especially designed to prevent shocks.
- Electrical connections are with joint box type and hirschmann din type plug-in connector.
- Join box is of waterproof and dust-resistance.
- The space for electrical connections is large enough for connection layout.
- Electrical connection points are aligned with the axial direction to be compatible with modular system.
- For ease of installation and repair, the valve mounting screws are on the outside of the body.
- To sustain high pressure up to 315 kgf/cm^2 (4500 psi), allows for large flow rates up to 120 lpm (32 gpm).
- The ideal design of flow passages will minimize the pressure drop.
- The 4-way 4-land constructure design is applied, for reducing the flow force and system surging pressure.
- To sustain high back pressure up to 160 kgf/cm^2 (2350 psi)
- Manufactured with unified specifications allows for parts and accessories interchangeably.
- Viton seal kits are available for five-resistance fluids.

HOW TO ORDER

SWH - G03 - C2 - A220 - 10 - LS

- NO CODE : STANDARD
  LS: LOW SURGE VOLTAGE(See page 22)
- WIRING:
  10: JOINT BOX WITH INDICATING LIGHT
  20: HIRSCHMANN TYPE WITH INDICATING LIGHT
- COIL VOLTAGE:
  A240: AC240V, 60Hz; AC220V, 50Hz
  A220: AC220V, 60Hz; AC200V, 50Hz R220: AC220V, 50/60Hz
  A120: AC120V, 60Hz; AC110V, 50Hz
  A110: AC110V, 60Hz; AC100V, 50Hz R110: AC110V, 50/60Hz
  D24: DC24V
  D12: DC12V
- SPOOL TYPE (See page *1)
- NOMINAL SIZE: 3/8” (D05)
- SUBPLATE MOUNTED
- HIGH PRESSURE HIGH FLOW SOLENOID DIRECTIONAL VALVE

SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	315 kgf/cm^2 (4500 PSI)
MAXIMUM FLOW CAPACITY	120 LPM (32 GPM)
MAXIMUM TANK LINE BACK PRESSURE	160 kgf/cm^2 (2350 PSI)
MAXIMUM FREQUENCIES OF OPERATION	240 CPM
RECOMMENDED FILTRATION	25 Micron
HYDRAULIC FLUIDS	Mineral oil, recommendation temperature 0-55°C Max. temperature range -25°C ~ 90°C Viscosity 10-400 cSt

SOLENOID RATINGS

ELECTRIC SOURCE	COIL TYPE	VOLTAGE (V)			CURRENT & POWER AT RATED VOLTAGE		
		SOURCE RATED	Hz	RANGE	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
A.C.	A110	AC100V	50	90-110	4.79	0.86	31
		AC100V	60	90-115	3.71	0.62	23
		AC110V		99-126	4.2	0.74	32
	A120	AC110V	50	99-121	4.29	0.78	30
		AC120V	60	108-138	3.99	0.70	32
	A220	AC200V	50	180-220	2.31	0.42	30
		AC200V	60	180-220	1.87	0.31	23
		AC220V		198-253	2.05	0.36	32
	A240	AC220V	50	198-242	2.04	0.37	29
		AC240V	60	216-274	1.88	0.33	32
	R110	AC110V	50/60	99-126	0.47	0.47	46
	R220	AC220V	50/60	198-253	0.24	0.24	46
D.C.	D12	DC12V		10.8-13.2	2.58	2.58	32
	D24	DC24V		21.6-26.4	1.33	1.33	32

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.

ACCESSORIES:

- Mounting bolt kits are supplied with valve socket head cap screws M 6 x 35L 4 pieces (1/4"–20UNC x 1 3/8" L) for tightening torque 120-150 kgf-cm. (104-130 lbs-ib)
- O-ring AS568-0145 pieces.

PRESSURE DROP AND PERFORMANCE CURVES

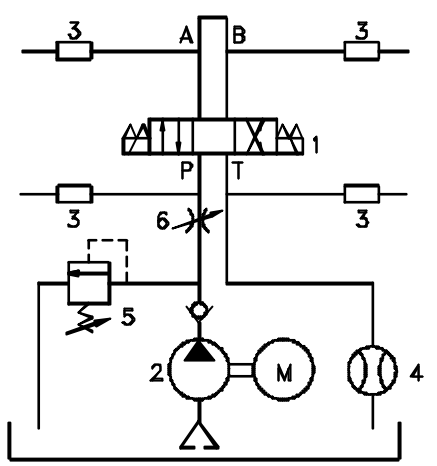
TEST SYSTEM

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

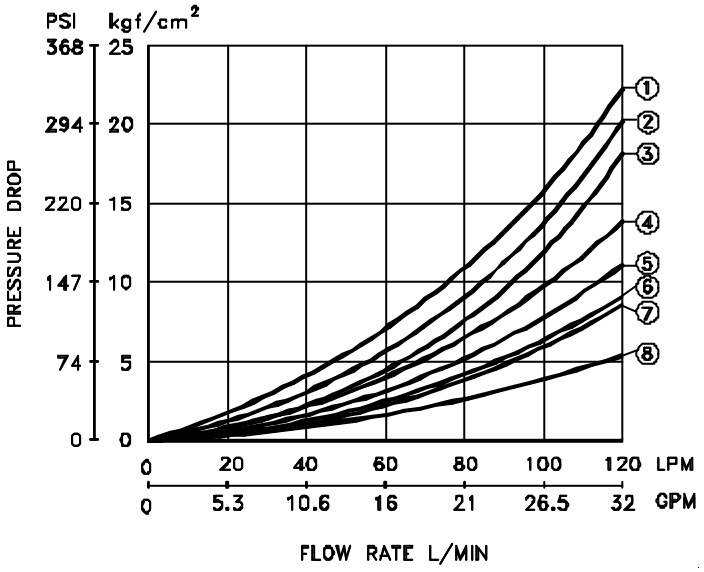
TEST CONDITIONS

Pressure: 70kgf/cm^2(1000PSI)
Flow Rate: 140 LPM (370GPM)
Viscosity: 35 cSt

TEST CIRCUIT



PERFORMANCE CURVES



SPOOL TYPE	Pressure Drop Curve Number				
	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	5	8
C6	2	2	2	2	5
C60	1	1	1	1	4
C7	7	6	7	6	–
C8	6	6	6	7	–
C9	7	6	6	6	–
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	–	–

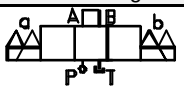
CONTRAST CHART BETWEEN FACTORS AND VISCOSITIES

	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

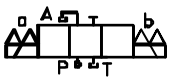
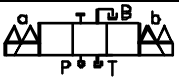
The pressure drop (ΔP') can be obtained from the formula

ΔP'= ΔP(G'/0.85) for other specific gravity (G')

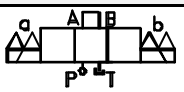
LIST OF SPOOL FUNCTION

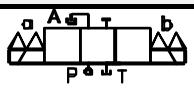
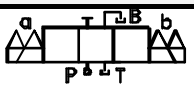
THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI) SWH G03 AC TYPE								
SPOOL TYPE NORMAL POSITION	P A,B T P B,A T 						P A	
	50 (735)	100 (1470)	150 (2200)	210 (3000)	250 (3675)	315 (4500)	50 (735)	100 (1470)
C2 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	54(14.3)
								38(10.0)
C3 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)
C4 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	54(14.3)
								42(11.1)
C40 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)
								75(19.8)
C5 	88(23.2)	88(23.2)	88(23.2)	88(23.2)	88(23.2)	–	100(26.4)	100(26.4)
	82(21.7)	82(21.7)	82(21.7)	82(21.7)	82(21.7)			
C6 	84(22.2)	84(22.2)	84(22.2)	84(22.2)	84(22.2)	–	100(26.4)	100(26.4)
	75(19.8)	75(19.8)	75(19.8)	75(19.8)	75(19.8)		95(25.1)	95(25.1)
C7 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	63(16.6)	63(16.6)
C8 	100(26.4)	100(26.4)	100(26.4)	44(11.6)	30(7.9)	19(5.0)	100(26.4)	100(26.4)
			76(20.1)	28(7.4)	21(5.5)	14(3.7)		53(14.0)
C9 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	57(15.1)	57(15.1)
B2 	90(23.8)	90(23.8)	90(23.8)	90(23.8)	90(23.8)	90(23.8)	63(16.6)	63(16.6)
	72(19.0)	72(19.0)	72(19.0)	72(19.0)	72(19.0)	72(19.0)		
B3 	89(23.5)	89(23.5)	89(23.5)	89(23.5)	89(23.5)	89(23.5)	100(26.4)	100(26.4)
	81(21.4)	81(21.4)	81(21.4)	81(21.4)	81(21.4)	81(21.4)		
B20 	–	–	–	–	–	–	81(21.4)	29(7.7)
D2 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	60(15.9)	40(10.6)
D3 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	70(18.5)	60(15.9)

NOTE: The figures in the square shows the parameter among voltage & flow under saturated temperatu -re and 90%applied voltage.

				P B 					
150 (2200)	210 (3000)	250 (3675)	315 (4500)	50 (735)	100 (1470)	150 (2200)	210 (3000)	250 (3675)	315 (4500)
40(10.6)	28(7.4)	25(6.6)	20(5.3)	100(26.4)	54(14.3)	40(10.6)	28(7.4)	25(6.6)	20(5.3)
27(7.1)	17(4.5)	13(3.4)	10(2.6)		38(10.0)	27(7.1)	17(4.5)	13(3.4)	10(2.6)
100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)
30(7.9)	23(6.1)	18(4.8)	14(3.7)	100(26.4)	54(14.3)	30(7.9)	23(6.1)	18(4.8)	14(3.7)
27(7.1)	16(4.2)	11(2.9)	8(2.1)		42(11.1)	27(7.1)	16(4.2)	11(2.9)	8(2.1)
33(8.7)	28(7.4)	22(5.8)	18(4.8)	100(26.4)	100(26.4)	33(8.7)	28(7.4)	22(5.8)	18(4.8)
23(6.1)	21(5.5)	15(4.0)	12(3.2)		75(19.8)	23(6.1)	21(5.5)	15(4.0)	12(3.2)
100(26.4)	100(26.4)	100(26.4)	–	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)
100(26.4)	100(26.4)	100(26.4)	–	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	–
95(25.1)	95(25.1)	95(25.1)		95(25.1)	95(25.1)	95(25.1)	95(25.1)	95(25.1)	
63(16.6)	63(16.6)	63(16.6)	63(16.6)	63(16.6)	63(16.6)	63(16.6)	63(16.6)	63(16.6)	63(16.6)
37(9.8)	34(9.0)	28(7.4)	20(5.3)	100(26.4)	61(16.1)	33(8.7)	27(7.1)	20(5.3)	16(4.2)
32(8.5)	28(7.4)	21(5.5)	15(4.0)		48(12.7)	27(7.1)	21(5.5)	15(4.0)	9(2.4)
57(15.1)	57(15.1)	57(15.1)	57(15.1)	100(26.4)	53(14.0)	47(12.4)	45(11.9)	40(10.6)	34(9.0)
					40(10.6)	37(9.8)	34(9.0)	29(7.7)	25(6.6)
63(16.6)	63(16.6)	63(16.6)	63(16.6)	100(26.4)	78(20.6)	45(11.9)	43(11.4)	38(10.0)	32(8.5)
					74(19.6)	38(10.0)	36(9.5)	31(8.2)	27(7.1)
100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	95(25.1)	82(21.7)	75(19.8)	65(17.2)
					89(23.5)	84(22.2)	77(20.3)	70(18.5)	62(16.4)
19(5.0)	12(3.2)	9(2.4)	7(1.8)	100(26.4)	80(21.1)	32(8.5)	25(6.6)	20(5.3)	14(3.7)
					42(11.1)	28(7.4)	22(5.8)	17(4.5)	12(3.2)
40(10.6)	40(10.6)	30(7.9)	28(7.4)	60(15.9)	40(10.6)	40(10.6)	40(10.6)	30(7.9)	28(7.4)
60(15.9)	60(15.9)	42(11.1)	36(9.5)	70(18.5)	60(15.9)	60(15.9)	60(15.9)	42(11.1)	36(9.5)

LIST OF SPOOL FUNCTION

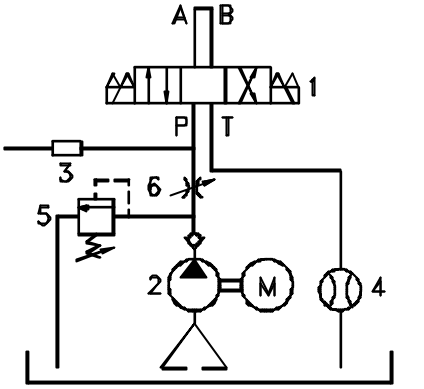
THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI) SWH G03 DC TYPE								
SPOOL TYPE NORMAL POSITION	P A,B T P B,A T 						P A	
	50 (735)	100 (1470)	150 (2200)	210 (3000)	250 (3675)	315 (4500)	50 (735)	100 (1470)
C2 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7) 100(26.4)
C3 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)
C4 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7) 100(26.4)
C40 	120(31.7)	120(31.7)	120(31.7) 100(26.4)	97(25.6) 75(19.8)	78(20.6) 54(14.3)	60(15.9) 41(10.8)	120(31.7)	120(31.7) 115(30.4)
C5 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)
C6 	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)
C7 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	65(17.2)	65(17.2)
C8 	120(31.7)	120(31.7)	120(31.7) 100(26.4)	97(25.6) 85(22.5)	78(20.6) 54(14.3)	66(17.4) 41(10.8)	120(31.7)	120(31.7)
C9 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	65(17.2)	65(17.2)
B2 	95	95	95	95	95	95	69(18.2)	69(18.2)
B3 	89(23.5)	89(23.5)	89(23.5)	89(23.5)	89(23.5)	89(23.5)	120(31.7)	120(31.7)
B20 	–	–	–	–	–	–	85(22.5)	35(9.2)
D2 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	60(15.9)	40(10.6)
D3 	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	70(18.5)	60(15.9)

									
150 (2200)	210 (3000)	250 (3675)	315 (4500)	50 (735)	100 (1470)	150 (2200)	210 (3000)	250 (3675)	315 (4500)
73(19.3)	63(16.6)	54(14.3)	37(9.8)	120(31.7)	120(31.7)	73(19.3)	63(16.6)	54(14.3)	37(9.8)
55(14.5)	48(12.7)	38(10.0)	29(7.7)		100(26.4)	55(14.5)	48(12.7)	38(10.0)	29(7.7)
120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)	120(31.7)
90(23.8)	73(19.3)	60(15.9)	47(12.4)	120(31.7)	120(31.7)	90(23.8)	73(19.3)	60(15.9)	47(12.4)
78(20.6)	64(16.9)	51(13.5)	39(10.3)		100(26.4)	78(20.6)	64(16.9)	51(13.5)	39(10.3)
75(19.8)	54(14.3)	42(11.1)	37(9.8)	120(31.7)	120(31.7)	75(19.8)	54(14.3)	42(11.1)	37(9.8)
50(13.2)	39(10.3)	30(7.9)	21(5.5)		115(30.4)	50(13.2)	39(10.3)	30(7.9)	21(5.5)
100(26.4)	100(26.4)	100(26.4)	–	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	–
100(26.4)	100(26.4)	100(26.4)	–	100(26.4)	100(26.4)	100(26.4)	100(26.4)	100(26.4)	–
65(17.2)	65(17.2)	65(17.2)	65(17.2)	65(17.2)	65(17.2)	65(17.2)	65(17.2)	65(17.2)	65(17.2)
68(18.0)	51(13.5)	37(9.8)	27(7.1)	120(31.7)	85(22.5)	50(13.2)	36(9.5)	25(6.6)	19(5.0)
52(13.7)	39(10.3)	28(7.4)	18(4.8)		65(17.2)	40(10.6)	28(7.4)	15(4.0)	12(3.2)
65(17.2)	65(17.2)	65(17.2)	65(17.2)	120(31.7)	100(26.4)	94(24.8)	85(22.5)	76(20.1)	70(18.5)
					85(22.5)	80(21.1)	74(19.6)	54(14.3)	49(12.9)
69(18.2)	69(18.2)	69(18.2)	69(18.2)	120(31.7)	120(31.7)	77(20.3)	63(16.6)	57(15.1)	45(11.9)
						66(17.4)	55(14.5)	44(11.6)	38(10.0)
120(31.7)	120(31.7)	120(31.7)	120(31.7)	100(26.4)	100(26.4)	95(25.1)	82(21.7)	75(19.8)	65(17.2)
					89(23.5)	84(22.2)	77(20.3)	70(18.5)	62(16.4)
28(7.4)	19(5.0)	15(4.0)	10(2.6)	120(31.7)	120(31.7)	95(25.1)	74(19.6)	61(16.1)	43(11.4)
					95(25.1)	84(22.2)	63(16.6)	50(13.2)	34(9.0)
40(10.6)	40(10.6)	30(7.9)	28(7.4)	60(15.9)	40(10.6)	40(10.6)	40(10.6)	30(7.9)	28(7.4)
60(15.9)	60(15.9)	42(11.1)	36(9.5)	70(18.5)	60(15.9)	60(15.9)	60(15.9)	42(11.1)	36(9.5)

INSTALLATION DIMENSION

TEST SYSTEMS

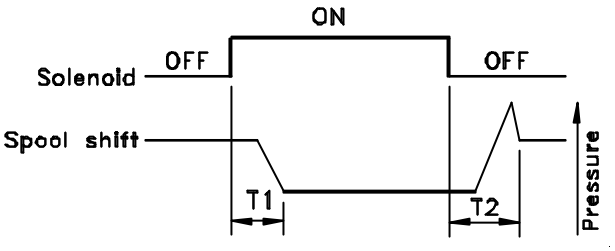
1. Testing Valve
2. Pump
3. Pressure Sensor
4. Flow Meter
5. Relief Valve
6. Throttle Valve



TEST CONDITIONS

Pressure: 160 kgf/cm^2 (2350 PSI)
Flow Rate: 140 LPM (37 GPM)
Viscosity: 35 cSt

MODEL	SHIFT OVER TIME (SEC)	
	T 1	T 2
SWH-G03-AC SERIES	0.02	0.02
SWH-G03-DC SERIES	0.07	0.07
SWH-G03-RF SERIES	0.07	0.07



LS OPTION

Electrical Surge Control Model

LS OPTION

Valve model: SWH-G03-∗∗∗-D∗∗-∗∗-LS

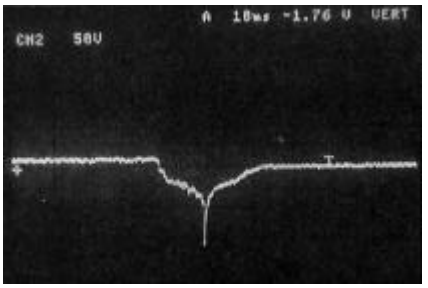
FEATURES

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

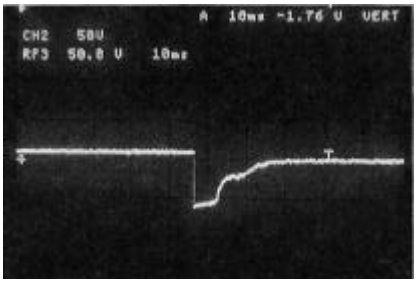
Effects

- 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 eliminate sparks at the control relay contact. It can be directly operated with a PLC (programmable logic controller).

Electrical surge waveform standard DC Solenoid.



Electrical surge controlled DC solenoid.



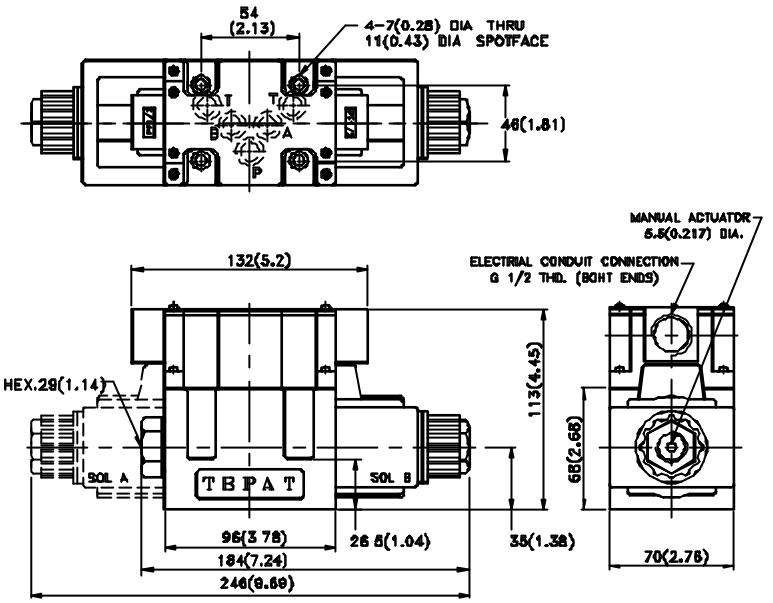
INSTALLATION DIMENSIONS

Mounting Surface: ISO 4401-AC-05-4-A

SWH-G03 -***-A***-10-**
Models with AC solenoids

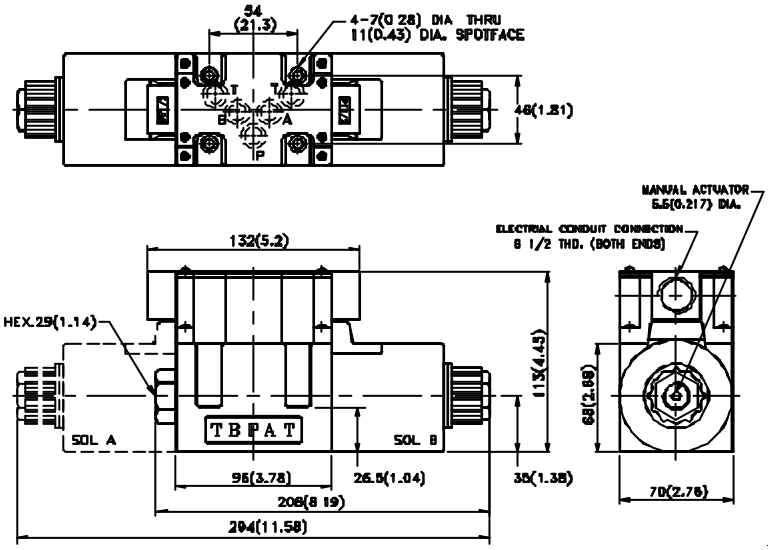
UNIT:mm(inch)

MODEL	WEIGHT kgs(lb)
SWH-G03-C**-A***-10	4.1(9.02)
SWH-G03-B**-A***-10	3.4(7.48)



SWH-G03 -***-****-10-**
Models with Dc, RF solenoids

MODEL	WEIGHT kgs(lb)
SWH-G03-C**-D**-10	5.5(12.1)
SWH-G03-C**-R***-10	
SWH-G03-B**-D**-10	4.0(9.68)
SWH-G03-B**-R***-10	



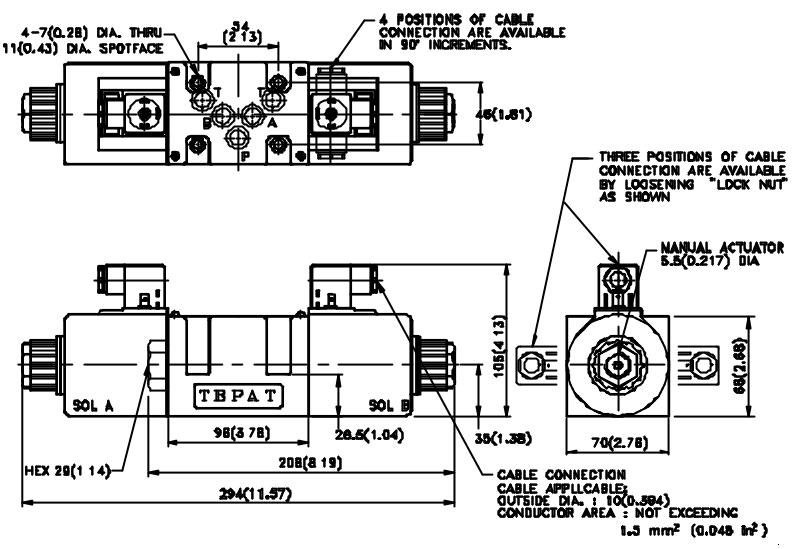
INSTALLATION DIMENSIONS

Mounting Surface: ISO 4401-AC-05-4-A

UNIT:mm(inch)

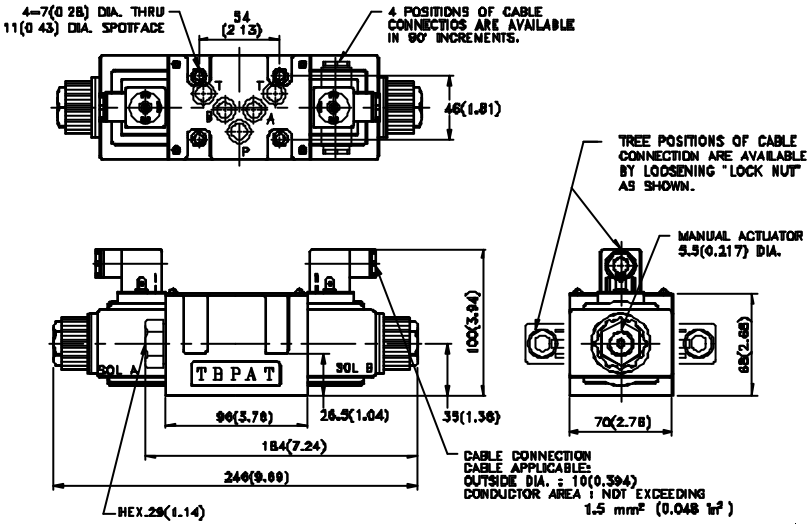
SWH-G03 -***-A***-20-**
Models with AC solenoids

MODEL	WEIGHT kgs(lb)
SWH-G03 -C**-A***-20	4.1(9.02)
SWH-G03 -B**-A***-20	3.4(7.48)



SWH-G03 -***- ****-20-**
Models with DC, RF solenoids

MODEL	WEIGHT kgs(lb)
SWH-G03-C **-D **-20	5.5(12.1)
SWH-G03-C**-R ***-20	
SWH-G03-B **-D **-20	4.0(9.68)
SWH-G03-B**-R ***-20	



FEATURES

- The indicating lights are the standard equipment.
- Coil screws are especially designed to prevent shocks.
- Electrical connections are with joint box type and hirschmann DIN type plug-in connector.
- Join box is of waterproof and dust-resistance.
- The space for electrical connections is large enough for connection layout.
- Electrical connection points are aligned with the axial direction to be compatible with modular system.
- For ease of installation and repair the valve mounting screws are on the outside of the body.
- To sustain high pressure up to 210 kgf/cm^2 (3000 PSI), allows for large flow rates up to 80 LPM (21 GPM).
- The ideal design of flow passages will minimize the pressure drop.
- The 4-WAY 4-LAND constructure design is applied, for reducing the flow force and system surging pressure.
- To sustain high back pressure up to 160 kgf/cm^2 (2350 PSI)
- Manufactured with unified specifications allows for parts and accessories interchangeably.
- Specifically designed to control the shock or “bang” in hydraulic systems.
- Minimizes the effect of pressure peaks or instantaneous high flow rates common in many hydraulic systems.
- A.C. coil design with flexible timing characteristics when compared to rectified D.C coil technology.

HOW TO ORDER

SWH - G03 - C2 - R220 - 10 - M

- M: SHOCKLESS TYPE
- WIRING:
  - 10: JOINT BOX WITH INDICATING LIGHT
  - 20: HIRSCHMANN TYPE WITH INDICATING LIGHT
- COIL VOLTAGE:
  - R240: AC240V, 60Hz; AC220V, 50Hz
  - R220: AC220V, 60Hz; AC220V, 50Hz
  - R120: AC120V, 60Hz; AC110V, 50Hz
  - R110: AC110V, 60Hz; AC110V, 50Hz
  - D12: DC12V
  - D24: DC24V
- SPOOL TYPE (See page 28)
- NOMINAL SIZE: 3/8” (D05)
- SUBPLATE MOUNTED
- HIGH FLOW HIGH PRESSURE SOLENOID DIRECTIONAL VALVE

SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	210 kgf/cm^2 (3000 PSI)
MAXIMUM FLOW CAPACITY	80 LPM (21 GPM)
MAXIMUM TANK LINE BACK PRESSURE	160 kgf/cm^2 (2350 PSI)
MAXIMUM FREQUENCIES OF OPERATION	240 CPM
RECOMMENDED FILTRATION	25 Micron
HYDRAULIC FLUIDS	Mineral oil, recommendation temperature 0-55°C Max. Temperature range – 25°C~ 90°C Viscosity 10-400 cSt

REMARK: Installation dimensions see page23, 24

SOLENOID RATINGS

ELECTRI SOURCE	COIL TYPE	VOLTAGE (V)			CURRENT & POWER AT RATED VOLTAGE		
		SOURCE RATED	Hz	RANGE	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
R.F	R110	AC 110V	50/60	99-126	0.47	0.47	46
	R220	AC 220V	50/60	198-253	0.24	0.24	46
D.C.	D12	DC12V		10.8-13.2	2.58	2.58	32
	D24	DC24V		21.6-26.4	1.33	1.33	32

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

ACCESSORIES:

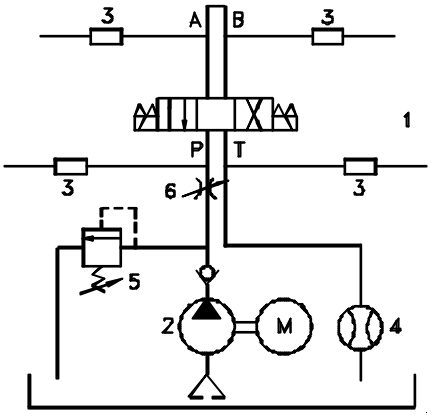
- Mounting bolt kits are supplied with valve socket head cap screws M6 x 35L 4 pieces(1/4" – 20UNC x 1 3/8") for tightening torque 120-150 kgf-cm. (104-130 lbs-in)
- O-ring AS568-014. 5pieces.

PRESSURE DROP AND PERFORMANCE CURVES

TEST SYSTEMS

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

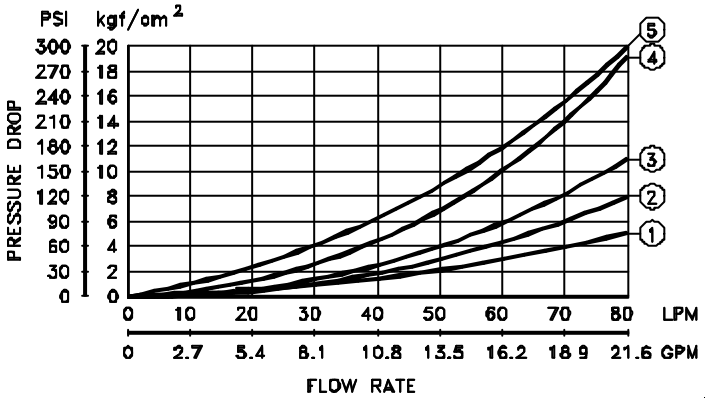
TEST CIRCUIT



TEST CONDITIONS

Pressure: 70 kgf/cm^2 (1000 PSI)
Flow Rate: 80 LMP(21 GPM)
Viscosity: 35 cSt

PERFORMANCE CURVES



SPOOLTYPE	Pressure Drop Curve Number				
	P A	B T	P B	A T	P T
C2	1	1	1	1	–
C3	5	5	5	5	2
C4	1	1	1	1	–
C6	4	4	4	4	3
B2	2	2	2	2	–
B3	2	2	2	2	–

CONTRAST CHART BETWEEN FACTORS AND VISCOSITIIES

	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 (ΔP') can be obtained from the formula
ΔP'= ΔP (G'/0.85) for other specific gravity (G')

RESULT OF

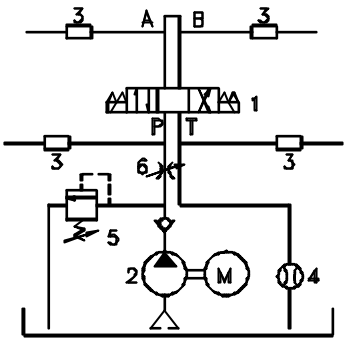
TEST SYSTEMS

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

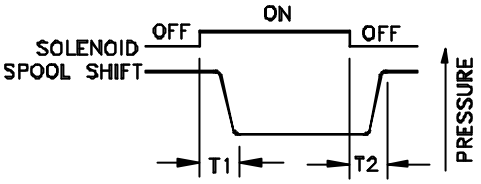
TEST CONDITIONS

Pressure: 140 kgf/cm^2 (2000 PSI)
Flow Rate: 30 LPM (8 GPM)
Viscosity: 35 cSt

TEST CIRCUIT



MODEL	CHANGE OVER TIME (sec.)	
	T1	T2
SWH-G03-RF-M SERIES	0.1-0.15	0.1-0.15
SWH-G03-DC-M SERIES	0.1-0.15	0.1-0.15



LIST OF SPOOL FUNCTION

THE MAXIMUM FLOW RATE LPM(GPM) UNDER DIFFERENT PRESSURE kgf/cm^2(PSI)												
SPOOL TYPE	P A,B T P B,A T				P A				P B			
NORMAL POSITION	50 (735)	100 (1470)	150 (2200)	210 (3000)	50 (735)	100 (1470)	150 (2200)	210 (3000)	50 (735)	100 (1470)	150 (2200)	210 (3000)
C2	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	67 (18.0)	80 (21.5)	80 (21.5)	80 (21.5)	67 (18.0)
C3	80 (21.5)	80 (21.5)	80 (21.5)	67 (18.0)	80 (21.5)	50 (13.5)	32 (8.5)	28 (7.5)	80 (21.5)	50 (13.5)	32 (8.5)	28 (7.5)
C4	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)
C6	80 (21.5)	30 (8)	28 (7.5)	20 (5.4)	80 (21.5)	35 (9.4)	30 (8)	20 (5.4)	80 (21.5)	35 (9.4)	30 (8)	20 (5.4)
B2	80 (21.5)	80 (21.5)	80 (21.5)	28 (7.5)	70 (18.5)	70 (18.5)	70 (18.5)	70 (18.5)	70 (18.5)	70 (18.5)	70 (18.5)	70 (18.5)
B3	80 (21.5)	80 (21.5)	80 (21.5)	28 (7.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)	80 (21.5)

HOW TO ORDER

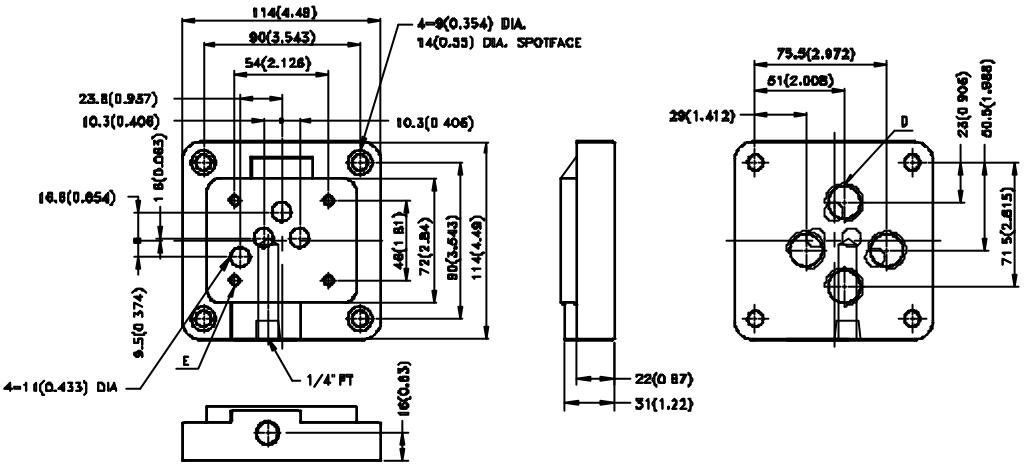
M03 - 03 - S - 1

- PIPE THREADS
  1:PT
  2:NPT
  3:SAE
- S: SIDE PORT
  B: BOTTOM PORTS
  SB: SIDE AND BOTTOM PORTS
- PORT SIZE
  03: 3/8"
  04: 1/2"
  06: 3/4"
- SUBPLATE
  03

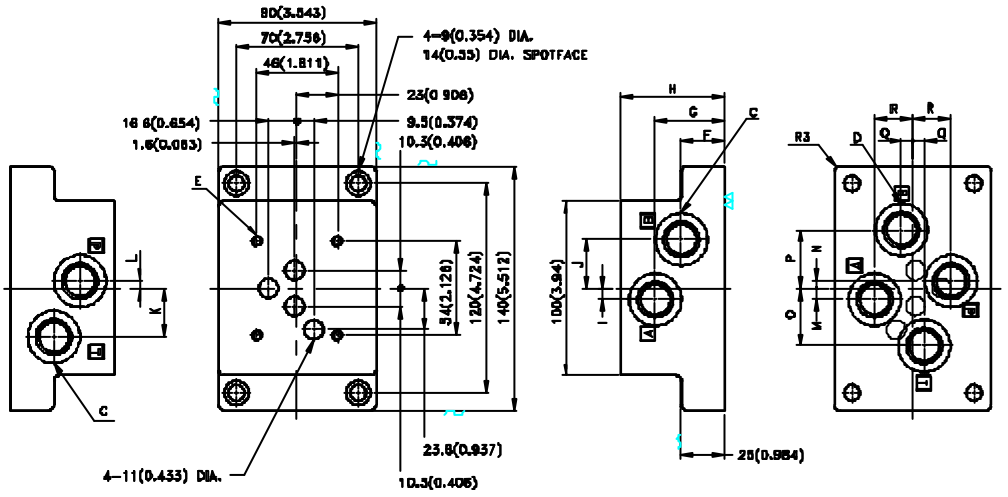
INSTALLATION DIMENSIONS

UNIT: mm(inch)
WEIGHT: 1kgs(2.3 lbs)

M03-** - B- *



M03 - ** - S/SB- *



MODEL			PORT SIZE & INSTALLATION DIMENSIONS							
			C	D	E	F	G	H	I	J
M03–03	– S	–1	4- 3/8"PT	–	4- M6 x 1P	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–2	4- 3/8"NPT	–	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–3	4- 3/8"SAE-2B	–	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
	– B	–1	–	4- 3/8"PT	4- M6 x 1P	–	–	–	–	–
		–2	–	4- 3/8"NPT	4- 1/4 – 20UNC	–	–	–	–	–
		–3	–	4- 3/8"SAE-2B	4- 1/4 – 20UNC	–	–	–	–	–
	– SB	–1	4- 3/8"PT	4- 3/8"PT	4- M6 x 1P	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–2	4-3/8"NPT	4- 3/8"NPT	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–3	4- 3/8"SAE-2B	4- 3/8"SAE-2B	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)

MODEL			INSTALLATION DIMENSIONS							
			K	L	M	N	O	P	Q	R
M03–03	– S	–1	28(1.1)	4.0(0.16)	–	–		–	–	
		–2	28(1.1)	4.0(0.16)	–	–	–	–	–	–
		–3	28(1.1)	4.0(0.16)	–	–	–	–	–	–
	– B	–1	–	–	–	–	–	–	–	–
		–2	–	–	–	–	–	–	–	–
		–3	–	–	–	–	–	–	–	–
	– SB	–1	28(1.1)	4.0(0.16)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
		–2	28(1.1)	4.0(0.16)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
		–3	28(1.1)	4.0(0.16)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)

MODEL			PORT SIZE & INSTALLATION DIMENSIONS							
			C	D	E	F	G	H	I	J
M03–04	– S	–1	4- 1/2"PT	–	4- M6 x 1P	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–2	4- 1/8"NPT	–	4- 1/4 –20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–3	4- 1/2"SAE-2B	–	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
	– B	–1	–	4- 1/2"PT	4- M6 x 1P	–	–	–	–	–
		–2	–	4- 1/2"NPT	4- 1/4 – 20UNC	–	–	–	–	–
		–3	–	4- 1/2"SAE-2B	4- 1/4 – 20UNC	–	–	–	–	–
	– SB	–1	4- 1/2"PT	4- 1/2"PT	4- M6 x 1P	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–2	4- 1/2"NPT	4- 1/2"NPT	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–3	4- 1/2"SAE-2B	4- 1/2"SAE-2B	4- 1/4 – 20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)

MODEL			INSTALLATION DIMENSIONS							
			K	L	M	N	O	P	Q	R
M03–04	– S	–1	28(1.1)	4.0(0.16)	–	–		–	–	
		–2	28(1.1)	4.0(0.16)	–	–	–	–	–	–
		–3	28(1.1)	4.0(0.16)	–	–	–	–	–	–
	– B	–1	–	–	–	–	–	–	–	–
		–2	–	–	–	–	–	–	–	–
		–3	–	–	–	–	–	–	–	–
	– SB	–1	28(1.1)	4.0(0.16)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
		–2	28(1.1)	4.0(0.16)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
		–3	28(1.1)	4.0(0.16)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)

MODEL			PORT SIZE & INSTALLATION DIMENSIONS							
			C	D	E	F	G	H	I	J
M03-06	– S	–1	4- 3/4"PT	–	4-M6 x 1P	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–2	4- 3/4"NPT	–	4-1/4-20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
	– B	–1	–	4– 3/4"PT	4-M6 x 1P	–	–	–	–	–
		–2	–	4– 3/4"NPT	4-1/4-20UNC	–	–	–	–	–
	– S B	–1	4- 3/4"PT	4– 3/4"PT	4-M6 x 1P	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)
		–2	4- 3/4"NPT	4– 3/4"NPT	4-1/4-20UNC	25(0.98)	40(1.58)	60(2.36)	6.5(0.26)	28(1.1)

MODEL			INSTALLATION DIMENSIONS							
			K	L	M	N	O	P	Q	R
M03-06	– S	–1	28(1.1)	4.0(1.6)	–	–	–	–	–	–
		–2	28(1.1)	4.0(1.6)	–	–	–	–	–	–
	– B	–1	–	–	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
		–2	–	–	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
	– S B	–1	28(1.1)	4.0(1.6)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)
		–2	28(1.1)	4.0(1.6)	6.5(0.26)	4.0(0.16)	33(1.3)	33.5(1.32)	6.5(0.26)	22(0.87)

REMARK : Various port sizes/Pipe threads are available upon request.

FEATURES

- Armature operates in system oil. Impact is decreased with cushion added, making noise lowered & solenoid life prolonged.
- Wet armature solenoid eliminates push pin seal, therefore no seal wear, drop or leakage for longer valve life.
- Molded coil gives maximum insulating properties. It is protected by a special resin and is impervious to moisture and dirt for ease of maintenance.
- Plug-in solenoid, easy to change coil.
- Change of pilot and drain can be easily accomplished by plugging or un-plugging.
- Spool is designed to avoid creating jet flow or turbulence under high pressure and large flow operation.

HOW TO ORDER

SW-G04-C2-ET-A220-10-AB-K

K: WITH KNOB
NO CODE: WITHOUT KNOB

NO CODE: STANDARD TYPE
AB: WITH STROKE ADJUSTMENT BOTH ENDS
A: WITH STROKE ADJUSTMENT PORT "A" END
B: WITH STROKE ADJUSTMENT PORT "B" END

WIRING:
10: WITH JOINT BOX WITH INDICATING LIGHT
20: HIRSCHMANN TYPE WITH INDICATING LIGHT

COIL VOLTAGE:
A240: AC240V, 60Hz; AC220V, 50Hz
A220: AC220V, 60Hz; AC200V, 50Hz R220: AC220V 50/60Hz
A120: AC120V, 60Hz; AC110V, 50Hz
A110: AC110V, 60Hz; AC110V, 50Hz R110: AC110V 50/60Hz
D24: DC24V
D12: DC12V

T: EXTERNAL DRAIN (See page 32)
NO CODE: FOR STANDARD INTERNAL DRAIN TYPE

E: EXTERNAL PILOT (See page 32)
NO CODE: FOR STANDARD INTERNAL PILOT TYPE

SPOOL TYPE (See page *1)

NOMINAL SIZE: 1/2" (D07)

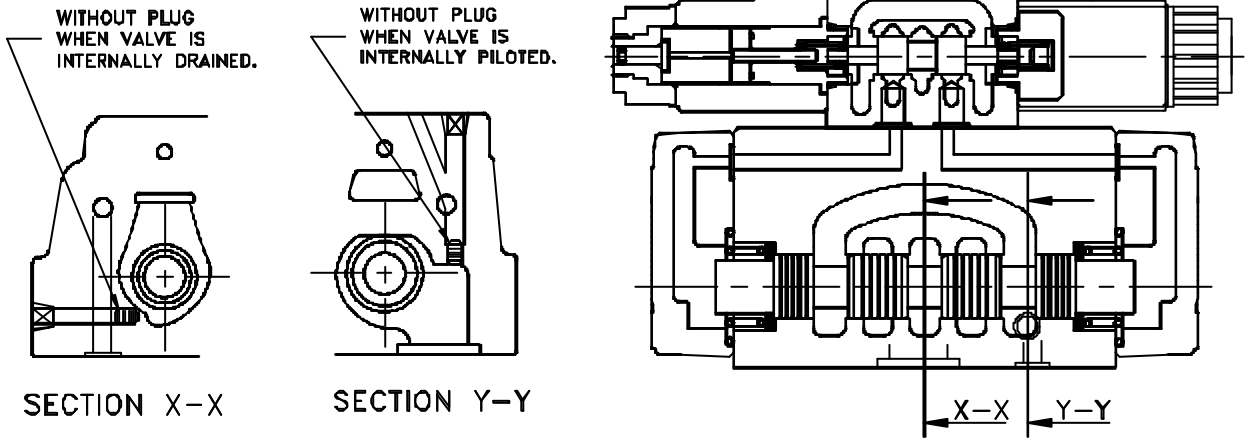
SUBPLATE MOUNTED

HIGH PRESSURE HIGH FLOW SOLENOID DIRECTIONAL VALVE

SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	315 kgf/cm^2 (4500 PSI)
MAXIMUM TANK LINE BACK PRESSURE	210 kgf/cm^2 (3000 PSI) externally drained
	140 kgf/cm^2 (2000 PSI) internally drained
PILOT PRESSURE	Min. 8 kgf/cm^2 (113 PSI)
	Max. 250 kgf/cm^2 (3550 PSI)
MAXIMUM FLOW	300 LPM (80 GPM)
WEIGHT	SW-G04-C,D SERIES 8.2 kgs (18 lbs)
	SW-G04-B, SERIES 7.9 kgs (17.5 lbs)

LS OPTION



SOLENOID RATINGS

ELECTRIC SOURCE	COIL TYPE	VOLTAGE (V)			CURRENT & POWER AT RATED VOLTAGE		
		SOURCE RATED	H_Z	RANGE	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
A.C.	A110	AC100V	50	90-110	1.6	0.46	
		AC100V	60	90-110	1.4	0.36	
		AC110V		99-121	1.5	0.39	
	A120	AC110V	50	99-121	1.3	0.38	
		AC120V	60	108-132	1.2	0.27	
	A220	AC200V	50	180-220	0.80	0.23	
		AC220V	60	198-242	0.75	0.19	
	A240	AC220V	50	198-242	0.67	0.19	
		AC240V	60	216-264	0.59	0.13	
	R110	AC110V	50/60	99-121	0.3	0.3	
	R220	AC220V	50/60	198-242	0.15	0.15	
D.C.	D12	DC12V		10.8-13.2	2.2	2.2	26
	D24	DC24V		21.6-26.4	1.1	1.1	

TECHNICAL DATA:

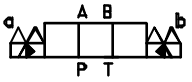
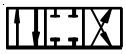
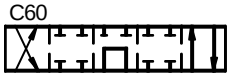
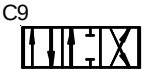
- Solenoid can be used within – 10% to + 10% of the rated voltage of the coil.
- Withstand voltage 1500 v/sec.
- Insulation resistance over 100MΩ.
- A momentary signal of approx 0.1 second is required for shifting action.
- Pilot pressure of internally drained valves must always exceed tank port pressure by a minimum of 8.0 kgf/cm^2 (113 PSI) Valve must be externally drained if there is a possibility of tank line persuader surges overcoming this differential.
- Open center spools C3, C5, C6, C60 must be externally drained.

ACCESSORIES:

- Mounting bolt kits are supplied with valve socket head cap screws

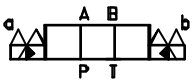
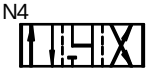
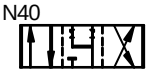
  M6 x 45 L 2 pieces (1/4"– 20 UNC – 2B x 1 3/4"L) for tightening torque 120-150 kgf-cm.(104-130 lbs-in).
  M10 x 50 L 4 pieces (3/8" – 16 UNC-2B x 2"L) for tightening torque 580-720 kgf-cm.(502-624 lbs-in).
- O-ring P22A 90° 4 pieces, P9 90 ° 2 pieces.

LIST OF SPOOL FUNCTION

THE MAXIMUM FLOW RATE LPM (GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI)						
SPOOL TYPE NORMAL POSITION	SPRING CENTERED 					
	50 (710)	100 (1420)	150 (2130)	210 (3000)	250 (3550)	315 (4500)
C2 	300(80.0)	300(80.0)	300(80.0)	260(69.3)	200(53.3)	140(37.3)
	300(80.0)	300(80.0)	260(69.3)	155(41.3)	120(32.0)	110(29.3)
C3 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
C4 	300(80.0)	300(80.0)	300(80.0)	260(69.3)	245(65.3)	160(42.7)
	300(80.0)	300(80.0)	260(69.3)	185(49.3)	140(37.3)	110(29.3)
C40 	300(80.0)	300(80.0)	300(80.0)	260(69.3)	200(53.3)	145(38.7)
	300(80.0)	300(80.0)	260(69.3)	155(41.3)	120(32.0)	110(29.3)
C5 	260(69.3)	255(68.0)	250(66.6)	245(65.3)	240(64.0)	240(64.0)
C6 	300(80.0)	300(80.0)	265(80.0)	255(68.0)	245(65.3)	235(62.7)
C60 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
C7 	300(80.0)	300(80.0)	300(80.0)	290(80.0)	280(74.7)	255(68.0)
C8 	300(80.0)	300(80.0)	285(76.0)	230(61.3)	170(45.3)	135(36.0)
	300(80.0)	300(80.0)	255(68.0)	165(44.0)	120(32.0)	110(29.3)
C9 	300(80.0)	300(80.0)	270(72.0)	200(53.3)	160(42.7)	140(37.3)

NOTE: The upper-side number in table describes the maximum flow for standard type.
The lower-side number in table describes the maximum flow for shock-less type.

LIST OF SPOOL FUNCTION

THE MAXIMUM FLOW RATE LPM (GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI)						
SPOOL TYPE NORMAL POSITION	NO SPRING 					
	50 (710)	100 (1420)	150 (2130)	210 (3000)	250 (3550)	315 (4500)
N2 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
N3 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
N4 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
N40 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)

THE MAXIMUM FLOW RATE LPM (GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI)						
SPOOL TYPE NORMAL POSITION	SPRING OFFSET 					
	50 (710)	100 (1420)	150 (2130)	210 (3000)	250 (3550)	315 (4500)
B2 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
B3 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
B4 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)
B40 	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)	300(80.0)

PRESSURE DROP AND PERFORMANCE CURVES

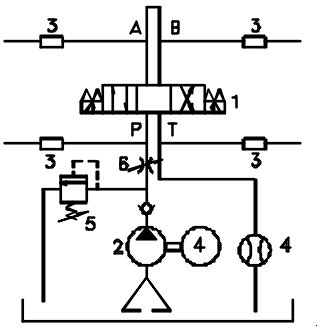
TEST SYSTEMS

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

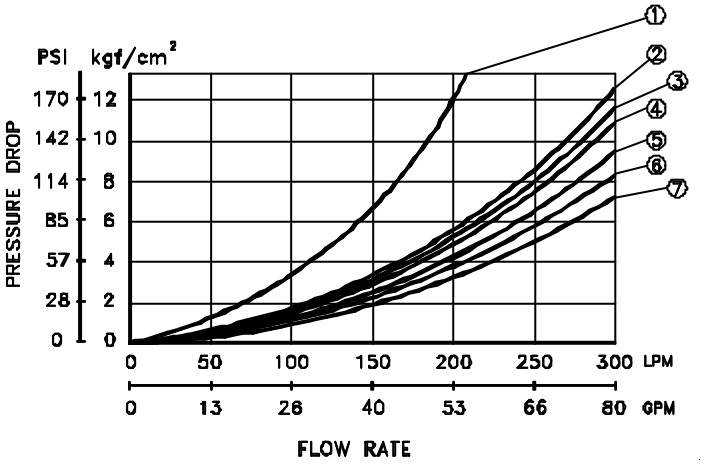
TEST CONDITIONS

Pressure: 70 kgf/cm^2 (1000 PSI)
Flow Rate: 300 LPM(80 GPM)
Viscosity: 35 cSt

TEST CIRCUIT



PERFORMANCE CURVES



SPOOL TYPE	Pressure Drop Curve Number				
	P A	B T	P B	A T	P T
C2	5	4	5	6	–
C3	5	3	5	5	7
C4	5	3	5	5	–
C40	5	4	5	6	–
C5	7	4	5	5	5
C6	5	3	5	6	1
C60	7	5	7	7	2
C7	5	4	5	6	–
C8	5	4	5	5	–
C9	6	4	5	6	–

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

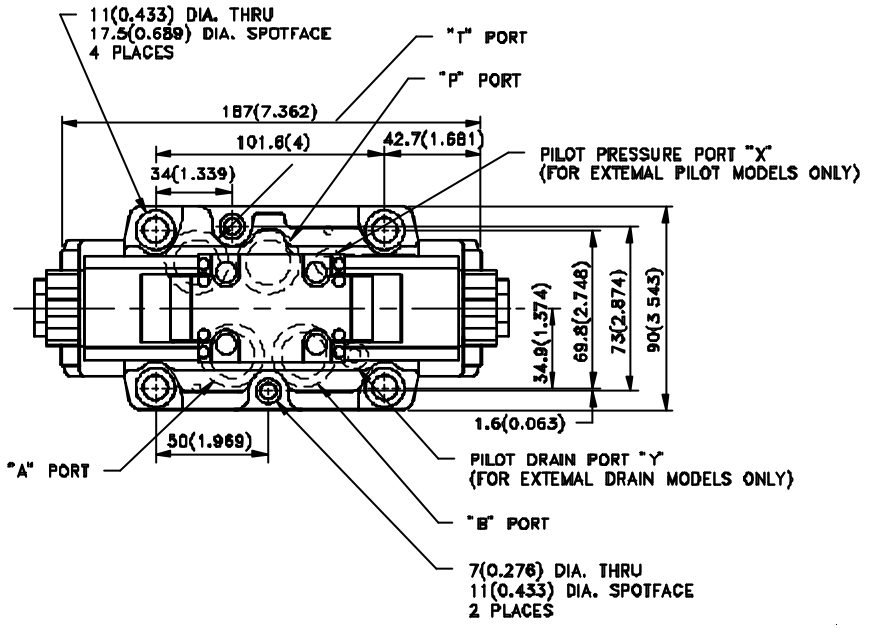
The pressure drop (Δ P') can be obtained from the formula
Δ P' = Δ P(G'/0.85) for other specific gravity (G').

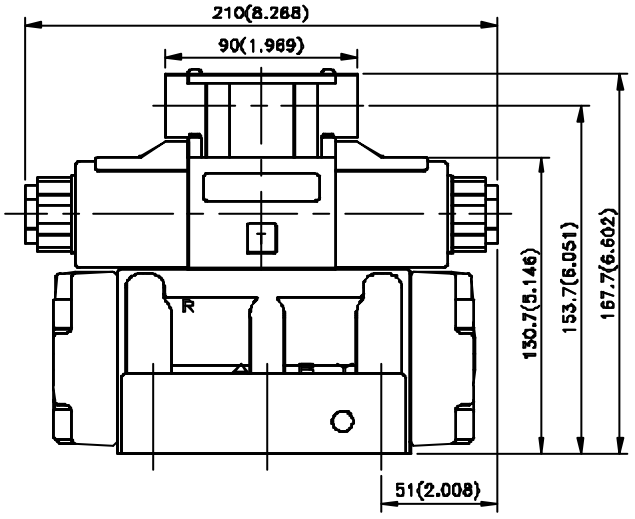
INSTALLATION DIMENSIONS

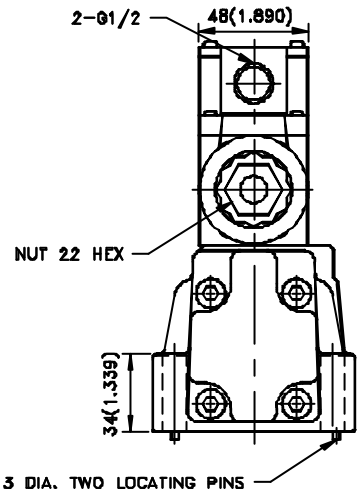
Mounting Surface: ISO 4401-AD -07 - 4 -A

UNIT: mm(inch)

SW-G04- *** – ** – **** – 10





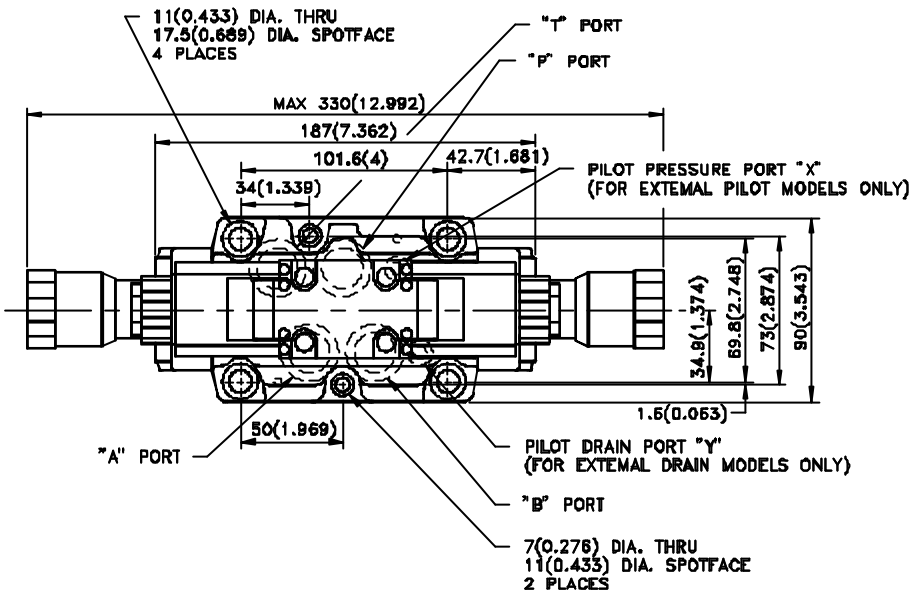


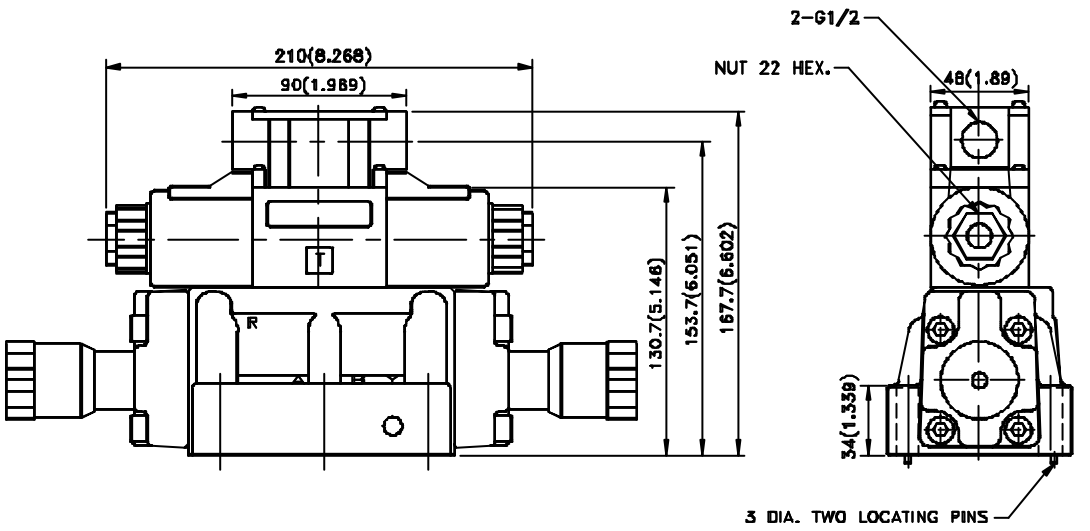
INSTALLATION DIMENSIONS

Mounting Surface: ISO 4401-AD -07 - 4 -A

UNIT: mm(inch)

SW-G04 – *** – ** – **** – 10 – AB – K





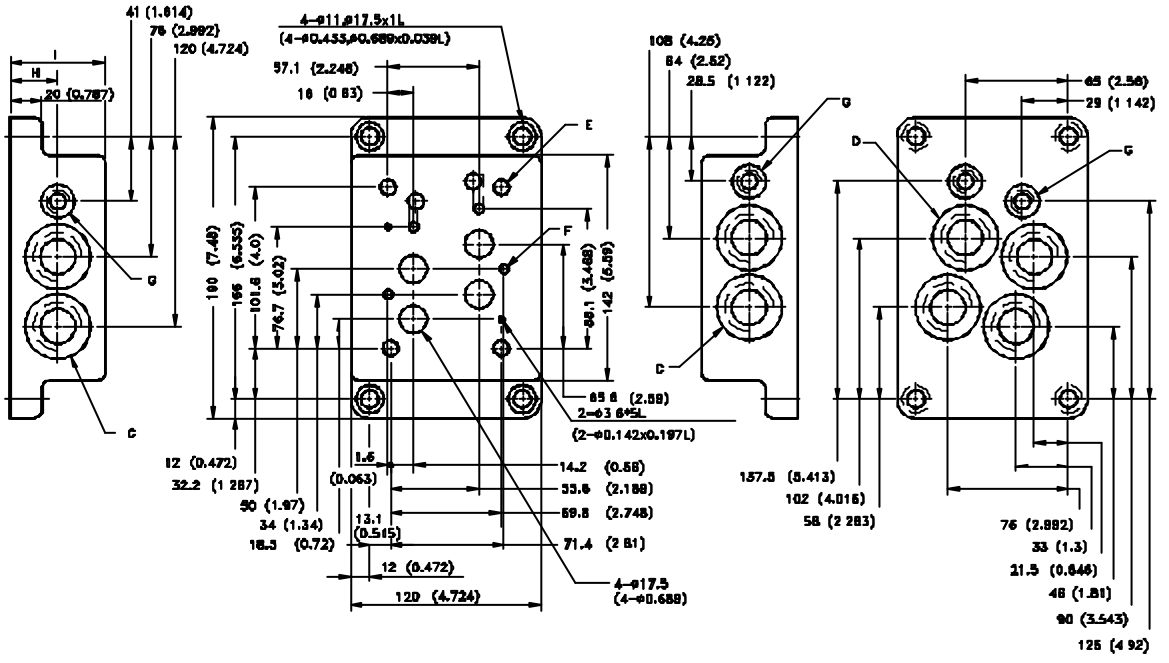
HOW TO ORDER

M04 – 04 – S – 1

- SUBPLATE
  04
- PORT SIZE
  04: 1/2"
  06: 3/4"
- S: SIDE PORTS
  B: BOTTOM PORTS
  SB: SIDE AND BOTTOM PORTS
- PIPE THREADS
  1.PT
  2.NPT
  3.SAB

INSTALLATION DIMENSIONS

UNIT: mm(inch)
WEIGHT: 8.4 kgs(18.5 lbs)



UNIT:mm(inch)

MODEL			PORT SIZE & INSTALLATION DIMENSIONS						
			C	D	E	F	G	H	I
M04–04	– S	–1	4-1/2"PT	–	4-M10 x 1.5P	2-M6x1.0P	2-1/4" PT	–	36 (1.417)
		–2	4-1/2"NPT	–	4-3/8–160 UNC-2B	2-1/4-20 UNC-2B	2-1/4" NPT		
		–3	4-1/2"SAE-2B	–	4-3/8–160 UNC-2B	2-1/4-20 UNC-2B	2-1/4" SAE-2B		
	– B	–1	–	4-1/2"PT	6-M12x1.75P	2-M6x1.0P	2-1/4" PT	30 (1.181)	60 (2.362)
		–2	–	4-1/2"NPT	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	2-1/4" NPT		
		–3	–	4-1/2"SAE-2B	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	2-1/4"SAE-2B		
	– SB	–1	4-1/2"PT	4-/2"PT	6-M12x1.75P	2-M6x1.0P	4-1/4"PT	30 (1.181)	60 (2.362)
		–2	4-1/2"NPT	4-1/2"NPT	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	4-1/4"NPT		
		–3	4-1/2"SAE-2B	4-1/2"SAE-2B	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	4-1/4"SAE-2B		

MODEL			PORT SIZE & INSTALLATION DIMENSIONS						
			C	D	E	F	G	H	I
M04–06	– S	–1	4-3/4"PT	–	4-M10 x 1.5P	2-M6x1.0P	2-1/4" PT	–	36 (1.417)
		–2	4-3/4"NPT	–	4-3/8–160 UNC-2B	2-1/4-20 UNC-2B	2-1/4" NPT		
		–3	4-3/4"SAE-2B	–	4-3/8–160 UNC-2B	2-1/4-20 UNC-2B	2-1/4" SAE-2B		
	– B	–1	–	4-3/4"PT	6-M12x1.75P	2-M6x1.0P	2-1/4" PT	30 (1.181)	60 (2.362)
		–2	–	4-3/4"NPT	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	2-1/4" NPT		
		–3	–	4-3/4"SAE-2B	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	2-1/4" SAE-2B		
	– SB	–1	4-3/4"PT	4-3/4"PT	6-M12x1.75P	2-M6x1.0P	4-1/4"PT	30 (1.181)	60 (2.362)
		–2	4-3/4"NPT	4-3/4"NPT	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	4-1/4"NPT		
		–3	4-3/4"SAE-2B	4-3/4"SAE-2B	6-1/2-13 UNC-2B	2-1/4-20 UNC-2B	4-1/4"SAE-2B		

REMARK: Various port sizes/ Pipe Threads are available upon request.

FEATURES

- Armature operates in system oil. Impact is increased with cushion added, making noise lowered & solenoid life Prolonged.
- Wet armature solenoid eliminates push pin seal, therefore no seal wear, drop or leakage for longer valve life.
- Molded coil gives maximum insulating properties. It is protected by a special resin and is impervious to moisture and dirt for ease of maintenance.
- Plug-in solenoid, easy to change coil.
- Change of pilot and drain can be easily accomplished by plugging or unplugging.
- Spool is designed to avoid creating jet flow or turbulence under high pressure and large flow operation.

SW - G06 - C2 - ET - A220 - 10 - AB - K

K: WITH KNOB
NO CODE: WITHOUT KNOB

NO CODE: STANDARD TYPE
AB: WITH STROKE ADJUSTMENT BOTH ENDS
A: WITH STROKE ADJUSTMENT PORT "A" END
B: WITH STROKE ADJUSTMENT PORT" B" END

WIRING:
10: WITH JOINT BOX WITH INDICATING LIGHT
20: HIRSCHMANN TYPE WITH INDICATING LIGHT

COIL VOLTAGE:
A240: AC 240V, 60Hz; AC220V, 50Hz
A220: AC 220V, 60Hz; AC200V, 50Hz R 220: AC220V 50/60Hz
A120: AC 120V, 60Hz; AC110V, 50Hz
A110: AC 110V, 60Hz; AC100V, 50Hz R 110: AC110V 50/60Hz
D12: DC12V
D24: DC24V

T: EXTERNAL DRAIN (See page 42)
NO CODE: STANDARD INTERNAL DRAIN TYPE

E: EXTERNAL PILOT (See page 42)
NO CODE: FOR STANDARD INTERNAL PILOT TYPE

SPOOL TYPE (See page 44~45)

NOMINAL SIZE: 3/4" (D08)

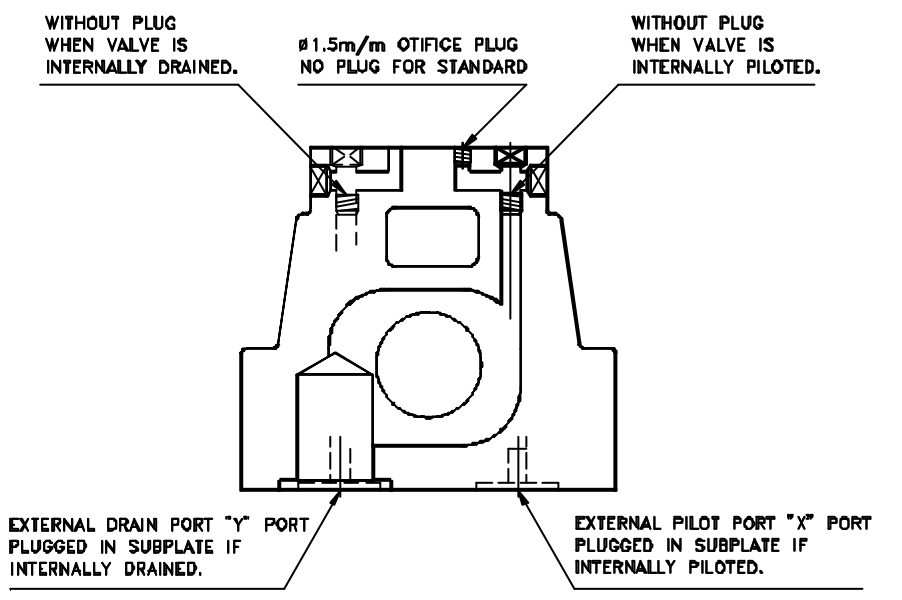
SUBPLATE MOUNTED

HIGH PRESSURE HIGH FLOW SONENOLD DIRECTIONAL VALVE

SPECIFICATIONS

MAXIMUM OPERATING PRESSURE	315 KGF/CM^2 (4500 PSI)
MAXIMUM TANK LINE BACK PRESSURE	210 KGF/CM^2 (3000 PSI) EXTERNALLY DRAINED
	140 KGF/CM^2 (2000 PSI) INTERMALLY DRAINED
PILOT PRESSURE	MIN. 3.5 KGF/CM^2 (50 PSI)
	MAX. 250 KGF/CM^2 (3550 PSI)
MAXIMUM FLOW	500 LPM (133 GPM)
WEIGHT	SW-G06-C,D SERIES 12.8 KGS(28 LBS)
	SW-G06-B SERIES 12.5 kgs(27.5 lbs)

ET OPTION



SOLENOID RATINGS

ELECTRIC SOURCE	COIL TYPE	VOLTAGE (V)			CURRENT & POWER AT RATED VOLTAGE		
		SOURCE RATED	Hz	RANGE	IN-RUSH CURRENT (A)	HOLDING CURRENT (A)	WATTAGE
A.C.	A110	AC100V	50	90-110	1.6	0.46	
		AC110V	60	99-121	1.5	0.39	
	A120	AC110V	50	99-121	1.3	0.38	
		AC120V	60	108-132	1.2	0.27	
	A220	AC200V	50	180-220	0.80	0.23	
		AC220V	60	198-242	0.75	0.19	
	A240	AC220V	50	198-242	0.67	0.19	
		AC240V	60	216-264	0.59	0.13	
	R110	AC110V	50/60	99-121	0.3	0.3	
	R220	AC220V	50/60	198-242	0.15	0.15	
D.C.	D12	DC12V		10.8-13.2	2.2	2.2	26
	D24	DC24V		21.6-26.4	1.1	1.1	

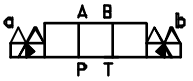
TECHNICAL DATA:

- 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.
- Pilot pressure of internally drained valves must always exceed tank port pressure by a minimum of 3.5 kgf/cm^2 (50 PSI) Valve must be externally drained if there is a possibility of tank line pressure surges overcoming this differential.
- Open center spools C3, C5, C6, C60 must be externally drained.

ACCESSORIES:

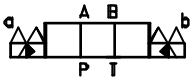
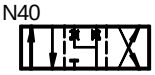
- Mounting bolt kits are supplied with valve socket head cap screws
  M12x60L 6 pieces (1/2"-13UNC-2Bx2 3/8" L) for tightening torque 1000 - 1230 kgf-cm. (886 - 1066 lbs-in).
- O-ring P28 90° 4 pieces, P21 90 ° 2 pieces.

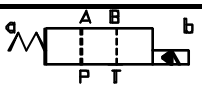
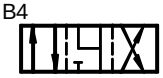
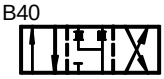
LIST OF SPOOL FUNCTION

THE MAXIMUM FLOW RATE LPM (GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI)						
SPOOL TYPE NORMAL POSITION	SPRING CENTERED 					
	50 (710)	100 (1420)	150 (2130)	210 (3000)	250 (3550)	315 (4500)
C2 	500(133.0)	500(133.0)	500(133.0)	450(120.0)	410(109.3)	310(82.6)
	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
C3 	500(133.0)	500(133.0)	500(133.0)	480(128.0)	460(122.6)	360(96.0)
C4 	500(133.0)	500(133.0)	500(133.0)	450(120.0)	410(109.3)	310(82.6)
	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
C40 	500(133.0)	500(133.0)	500(133.0)	450(120.0)	410(109.3)	310(82.6)
	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
C5 	500(133.0)	500(133.0)	500(133.0)	450(12.0)	420(112.0)	350(93.3)
C6 	500(133.0)	470(125.3)	400(106.6)	350(93.3)	300(80.0)	230(61.3)
C60 	500(133.0)	470(125.3)	425(113.3)	385(102.6)	340(90.6)	280(74.6)
	500(133.0)	470(125.3)	425(113.3)	385(102.6)	340(90.6)	280(74.6)
C7 	500(133.0)	500(133.0)	500(133.0)	480(128.0)	450(120.0)	360(96.0)
C8 	500(133.0)	500(133.0)	500(133.0)	450(120.0)	410(109.3)	310(82.6)
	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
C9 	500(133.0)	500(133.0)	500(133.0)	450(120.0)	410(109.3)	310(82.6)
	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)

NOTE: The upper-side number in table describes the maximum flow for standard type.
The lower-side number in table describes the maximum flow for shock-less type.

LIST OF SPOOL FUNCTION

THE MAXIMUM FLOW RATE LPM (GPM) UNDER DIFFERENT PRESSURE kgf/cm^2 (PSI)						
SPOOL TYPE NORMAL POSITION	NO SPRING 					
	50 (710)	100 (1420)	150 (2130)	210 (3000)	250 (3550)	315 (4500)
N2 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
N3 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
N4 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
N40 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)

SPOOL TYPE NORMAL POSITION	SPRING OFFSET 					
	50 (710)	100 (1420)	150 (2130)	210 (3000)	250 (3550)	315 (4500)
B2 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
B3 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
B4 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)
B40 	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)	500(133.0)

PRESSURE DROP AND PERFORMANCE CURVES

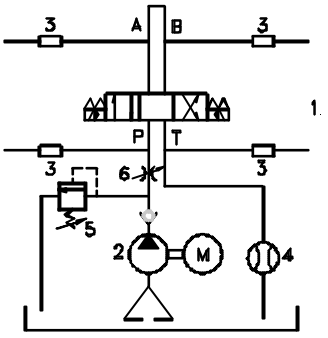
TEST SYSTEMS

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

TEST CONDITIONS

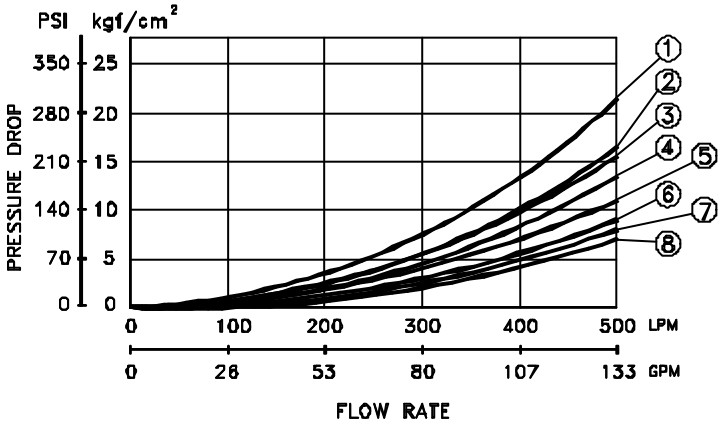
Pressure: 70 kgf/cm^2 (1000 PSI)
Flow Rate: 600 L/mim(189 GPM)
Viscosity: 35 cSt

TEST CIRCUIT



SPOOL TYPE	Pressure Drop Curve Number				
	P A	B T	P B	A T	P T
C2	8	5	8	7	–
C3	6	4	6	7	6
C4	8	5	8	7	–
C40	8	5	8	7	–
C5	8	4	5	7	2
C6	5	1	5	4	3
C60	6	5	6	7	3
C7	6	5	6	7	–
C8	8	5	8	7	–
C9	8	4	5	7	–
D2	8	5	8	7	–
D3	6	4	6	7	–
B2	8	5	8	7	–
B3	6	4	6	7	–
B20	5	–	8	–	–
B2S	8	5	8	7	–
B3S	6	4	6	7	–
B20S	8	–	5	–	–

PERFORMANCE CURVES



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

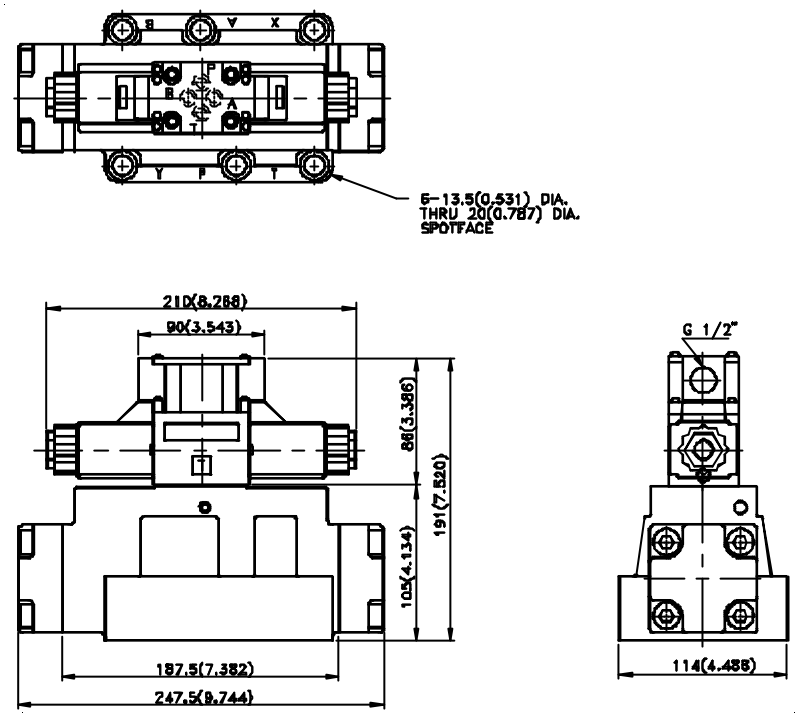
The pressure drop (ΔP') can be obtained from the formula
ΔP'= ΔP(G/0.85) for other specific gravity (G').

INSTALLATION DIMENSIONS

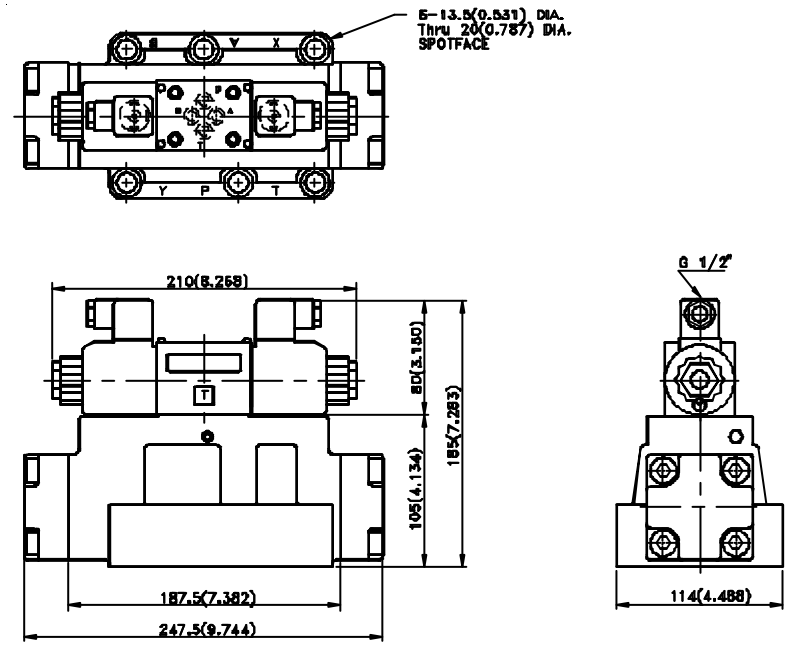
Mounting Surface: ISO 4401-AE-08-4-A

UNIT: mm (inch)

SW-G06-***-**-****-10



SW-G06-***-**-****-20

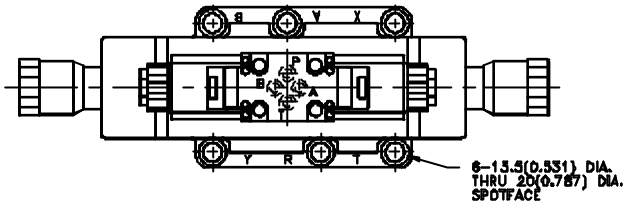


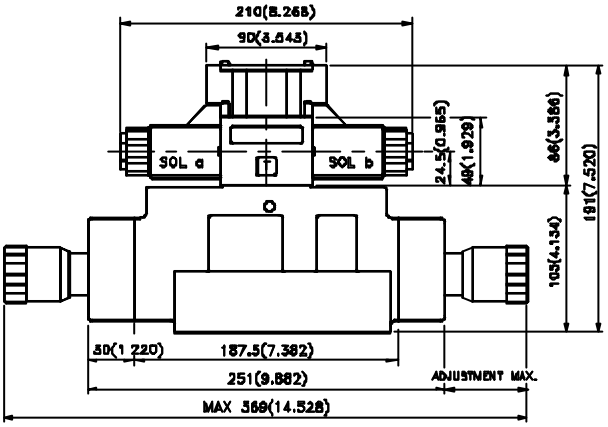
INSTALLATION DIMENSIONS

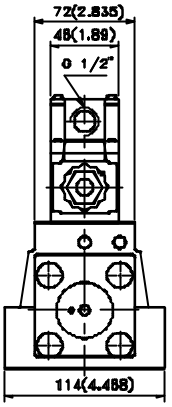
Mounting Surface: ISO 4401-AE-08-4-A

UNIT:mm (inch)

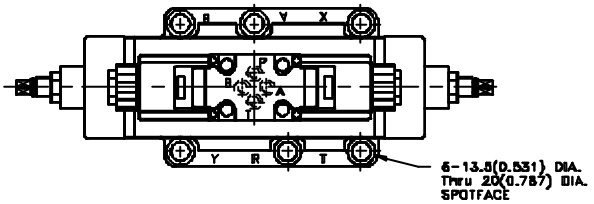
SW-G06-***-**-****-10-AB-K

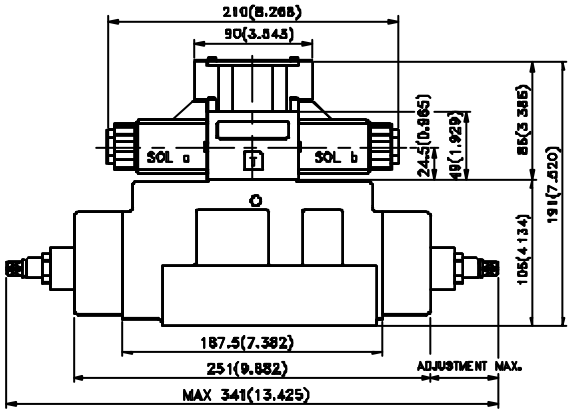


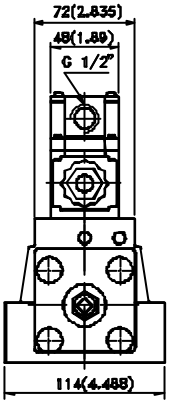




SW-G06-***-**-****-10-AB





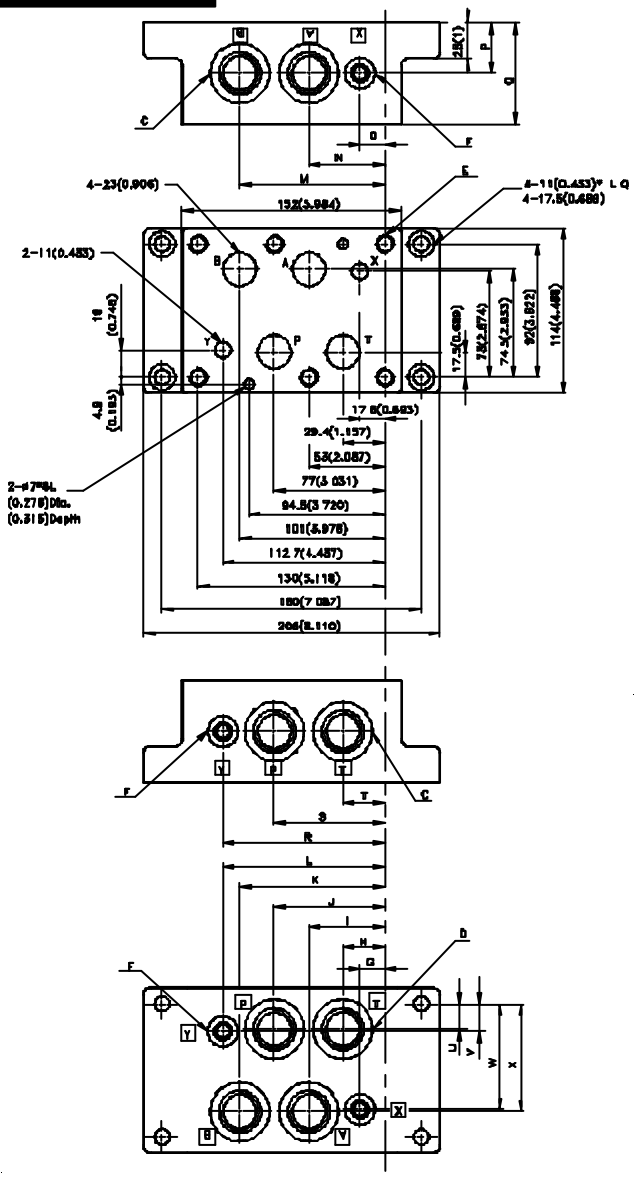


HOW TO ORDER

M06 - 06 - S - 1

- PIPE THREADS
  1.PT
  2.NPT
  3.SAE
- S: SIDE PORTS
  B: BOTTOM PORTS
  SB: SIDE AND BOTTOM PORTS
- PORT SIZE
  06: 3/4"
  08: 1"
  10: 1-1/4"
- SUBPLATE
  06

INSTALLATION DIMENSIONS



MODEL			PORT SIZE & INSTALLATION DIMENSIONS			
			C	D	E	F
M06–06	– S	–1	4-3/4"PT	–	6-M12x1.75P	2-1/4" PT
		–2	4-3/4"NPT	–	6-1/2-13UNC-2B	2-1/4" NPT
		–3	4-3/4"SAE-2B	–	6-1/2-13UNC-2B	2-1/4"SAE-2B
	– B	–1	–	4-3/4"PT	6-M12x1.75P	2-1/4" PT
		–2	–	4-3/4"NPT	6-1/2-13UNC-2B	2-1/4"NPT
		–3	–	4-3/4"SAE-2B	6-1/2-13UNC-2B	2-1/4"SAE-2B
	– SB	–1	4-3/4"PT	4-3/4"PT	6-M12x1.75P	4-1/4" PT
		–2	4-3/4"NPT	4-3/4"NPT	6-1/2-13UNC-2B	4-1/4" NPT
		–3	4-3/4"SAE-2B	4-3/4"SAE-2B	6-1/2-13UNC-2B	4-1/4"SAE-2B

MODEL		INSTALLATION DIMENSIONS																	
		G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
M06–06	– S	–	–	–	–	–	–	101 (3.976)	53 (2.087)	17.6 (0.693)	35 (1.378)	70 (2.756)	112.7 (4.437)	77 (3.031)	29.4 (1.157)	–	–	–	–
	– B	17.6 (0.693)	29.4 (1.157)	53 (2.087)	77 (3.031)	101 (3.976)	112.7 (4.437)	–	–	–	–	–	–	–	–	17.5 (0.689)	19 (0.748)	73 (2.874)	74.5 (2.933)
	– SB	17.6 (0.693)	29.4 (1.157)	53 (2.087)	77 (3.031)	101 (3.976)	112.7 (4.437)	101 (3.976)	53 (2.087)	17.6 (0.693)	35 (1.378)	70 (2.756)	112.7 (4.437)	77 (3.031)	29.4 (1.157)	17.5 (0.689)	19 (0.748)	73 (2.874)	74.5 (2.933)

MODEL			PORT SIZE & INSTALLATION DIMENSIONS			
			C	D	E	F
M06–06	– S	–1	4-1" PT	–	6-M12x1.75P	2-1/4" PT
		–2	4-1" NPT	–	6-1/2-13UNC-2B	2-1/4" NPT
		–3	4-1"SAE-2B	–	6-1/2-13UNC-2B	2-1/4"SAE-2B
	– B	–1		4-1" PT	6-M12x1.75P	2-1/4" PT
		–2	–	4-1" NPT	6-1/2-13UNC-2B	2-1/4" NPT
		–3	–	4-1"SAE-2B	6-1/2-13UNC-2B	2-1/4"SAE-2B
	– SB	–1	4-1" PT	4-1" PT	6-M12x1.75P	4-1/4" PT
		–2	4-1" NPT	4-1" NPT	6-1/2-13UNC-2B	4-1/4" NPT
		–3	4-1"SAE-2B	4-1"SAE-2B	6-1/2-13UNC-2B	4-1/4"SAE-2B

MODEL		INSTALLATION DIMENSIONS																	
		G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
M06–06	– S	–	–	–	–	–	–	106 (4.173)	53 (2.087)	17.6 (0.693)	35 (1.378)	70 (2.756)	112.7 (4.437)	77 (3.031)	24.4 (0.961)	–	–	–	–
	– B	17.6 (0.693)	24.4 (0.691)	53 (2.087)	77 (3.031)	101 (3.976)	112.7 (4.437)	–	–	–	–	–	–	–	–	17.5 (0.689)	19 (0.748)	73 (2.874)	74.5 (2.933)
	– SB	17.6 (0.693)	24.4 (0.961)	53 (2.087)	77 (3.031)	101 (3.976)	112.7 (4.437)	106 (4.173)	53 (2.087)	6 (0.693)	35 (1.378)	70 (2.756)	7 (4.437)	77 (3.031)	4 (0.961)	17.5 (0.689)	19 (0.748)	73 (2.874)	74.5 (2.933)

MODEL			PORT SIZE & INSTALLATION DIMENSIONS			
			C	D	E	F
M06–06	– S	–1	4 -1 1/4" PT	–	6-M12x1.75P	2-1/4" PT
		–2	4 -1 1/4" NPT	–	6-1/2-13UNC-2B	2-1/4" NPT
		–3	4 -1 1/4" SAE-2B	–	6-1/2-13UNC-2B	2-1/4"SAE-2B
	– B	–1	–	4 -1 1/4" PT	6-M12x1.75P	2-1/4" PT
		–2	–	4 -1 1/4" NPT	6-1/2-13UNC-2B	2-1/4" NPT
		–3	–	4 -1 1/4" SAE-2B	6-1/2-13UNC-2B	2-1/4"SAE-2B
	– SB	–1	4 -1 1/4" PT	4 -1 1/4" PT	6-M12x1.75P	4-1/4" PT
		–2	4 -1 1/4" NPT	4 -1 1/4" NPT	6-1/2-13UNC-2B	4-1/4" NPT
		–3	4 -1 1/4" SAE-2B	4 -1 1/4" SAE-2B	6-1/2-13UNC-2B	4-1/4"SAE-2B

MODEL		INSTALLATION DIMENSIONS																	
		G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
M06–06	– S	–	–	–	–	–	–	106 (4.173)	48 (1.890)	85 (0.335)	45 (1.772)	90 (3.543)	121.5 (4.783)	82 (3.228)	24.4 (0.961)	–	–	–	–
	– B	85 (0.335)	24.4 (0.961)	48 (1.890)	82 (3.228)	106 (4.173)	121.5 (4.783)	–	–	–	–	–	–	–	–	17.5 (0.689)	19 (0.748)	73 (2.874)	74.5 (2.933)
	– SB	85 (0.335)	24.4 (0.961)	48 (1.890)	82 (3.228)	106 (4.173)	121.5 (4.783)	106 (4.173)	48 (1.890)	85 (0.335)	45 (1.772)	90 (3.543)	121.5 (4.783)	82 (3.228)	24.4 (0.961)	17.5 (0.689)	19 (0.748)	73 (2.874)	74.5 (2.933)

REMARK: Various port sizes/Pipe threads are available upon request.