BASIC MODELS AND CONFIGURATIONS – H010, H040

VALVES

DIRECT ACTING, IN-LINE

H010 Series – 2- and 3-way

Normally Closed (N/C)

H010E1

INDIRECT ACTING

H040 Series – 2- and 3-way

(N/C)

H041E1

(N/O)

H041E1-11

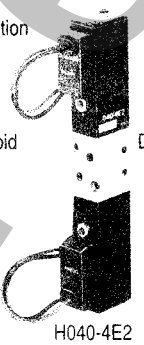
H040 Series – 4-way

2 position

Single solenoid

H040-4E1

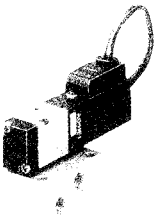
Double solenoid



H040-4E2

SUB-BASE TYPE

(N/C)



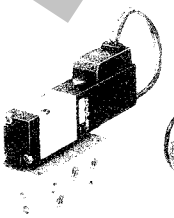
HA041E1

(N/O)

HA041E1-11

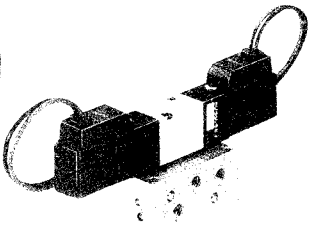
2 position

Single solenoid



HA040-4E1

Double solenoid



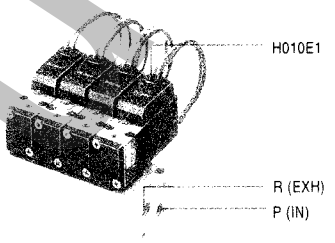
HA040-4E2

MANIFOLDS

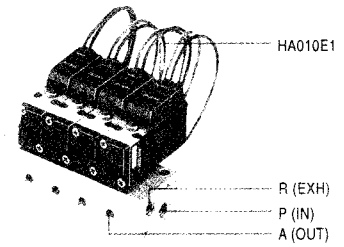
2- AND 3-WAY MINIATURE MANIFOLD

H010 Series

H010M□F – F type manifolds have common inlet and common exhaust ports.



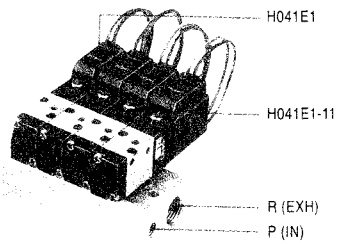
H010M□A – A type manifolds have all ports contained in the manifold.



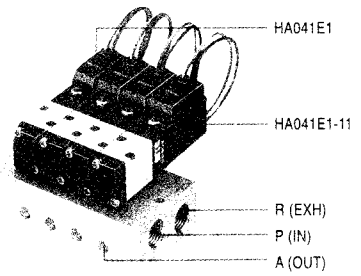
2- AND 3-WAY SMALL MANIFOLD

H041 Series

H041M□F – F type manifolds have common inlet and common exhaust ports.



H041M□A – A type manifolds have inlet, exhaust, and cylinder ports in manifold.

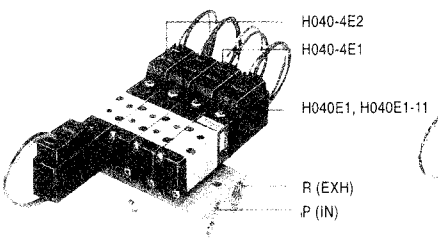


H041M manifolds accommodate 2- and 3-way valves.

2-, 3-, AND 4-WAY SMALL MANIFOLD

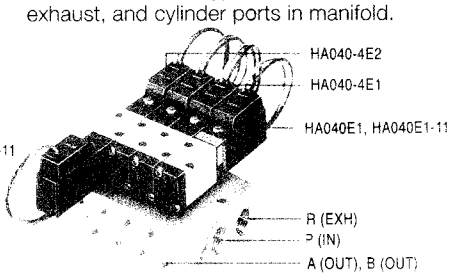
H040 Series

H040M□F – F type manifolds have common inlet and common exhaust ports.



2- and 3-way valves for manifold mounting only.

H040M□A – A type manifolds have inlet, exhaust, and cylinder ports in manifold.



H040M series manifolds accommodate 2-, 3- and 4-way valves in any combination.

LIST OF SPECIFICATIONS – SOLENOID VALVES H010

BASIC MODEL AND VALVE FUNCTIONS

Item	Model		
	In-line and F type manifold	H010E1	HV010E1
	A type manifold	HA010E1 NOTE	HAV010E1
Number of positions		2 position	2 position
Style		2- or 3-way	2- or 3-way
Valve functions		Normally closed only	Normally open or Vacuum normally closed

NOTE: HA010E1 is for A type manifold only.

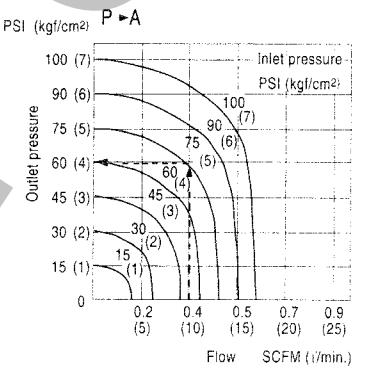
SPECIFICATIONS

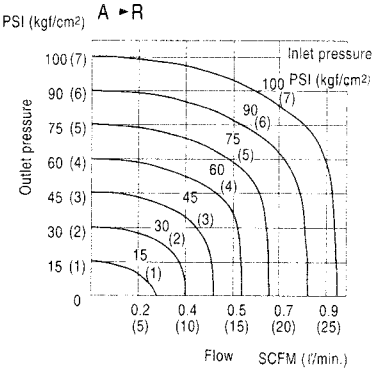
Item		Model	
	In-line and F type manifold	H010E1	
	A type manifold	HA010E1	
Media		Air (HV010E1 - Vacuum)	
Type of operation		Direct acting	
Effective area - in.^{2} (mm^2) [Cv] NOTE 1		P → A 3.1 x 10^{-4} in.^{2} (0.2mm^2) [0.01] In to cyl A → R 4.7 x 10^{-4} in.^{2} (0.3mm^2) [0.02] Cyl to exh	
Port threads NOTE 2		M3x0.5	
Lubrication		Not required	
Pressure range psi (kgf/cm^2)		0 ~ 100 psi (0 ~ 7) NOTE 4	
Proof pressure psi (kgf/cm^2)		150 (10.5)	
Response time NOTE 3 ON/OFF ms	DC5V, DC12V	Below 4/8	
	DC6V, DC24V	Below 4/8	
Maximum cycles/second		5	
Ambient range of operating temperature °F (°C)		40 ~ 120 (5 ~ 50)	
Shock resistance G		140 (60 in direction of stem)	
Mounting direction		Unrestricted	

NOTE 1: Please refer to Effective Area chart on page 9 for details.
NOTE 2: Please refer to Port Dimensions chart on page 9.
NOTE 3: Value with air pressure at 70 psi (5 kgf/cm^2).
NOTE 4: H(A)V010E1 Max. vacuum is 28" HG.

HOW TO READ THE GRAPH

If input pressure is 70 psi and flow is 0.4 cfm, value output pressure is 57 psi.





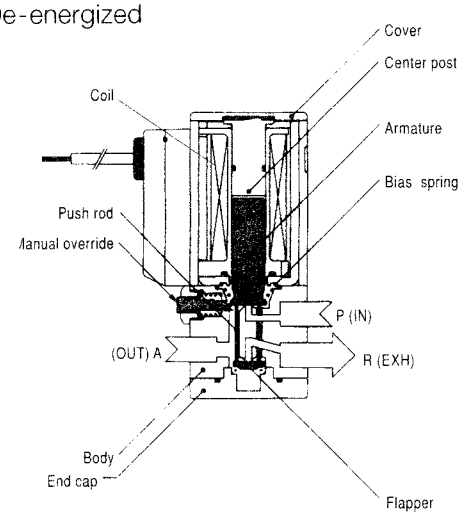
ELECTRICAL SPECIFICATIONS CHART

Item		Voltage			
		5 VDC	6 VDC	12 VDC	24 VDC
Method		Flywheel diode incorporated for transient suppression			
Voltage range (% of rated voltage)		4.5 ~ 5.5 (± 10%)	5.4 ~ 6.6 (± 10%)	10.8 ~ 13.2 (± 10%)	21.6 ~ 26.4 (± 10%)
Current mA	Standard	325 (1.6W)	270 (1.6W)	130 (1.6W)	70 (1.6W)
	With LED	335 (1.7W)	280 (1.7W)	140 (1.7W)	80 (1.9W)
Maximum allowable current leakage mA		30	25	15	5
Heat rise °F (°C)		95° (35°) {Add 10% to rated voltage at ambient temperatures of 122° (50°)}			
Insulation resistance MΩ		Over 100			
Connector and lead wire length	Standard	Grommet type 12 in. (300mm)			
	Option	Plug connector type 12 in. (300mm)			
Lead wire colors		Green (+) Black (–)	Blue (+) Black (–)	Brown (+) Black (–)	Red (+) Black (–)
LED indicator		Red			
Surge suppression		Flywheel diode			

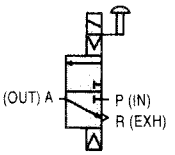
OPERATION PRINCIPLE AND NAME OF PARTS

H010E1

De-energized



Normally closed



EFFECTIVE AREA [Cv] in.^{2} (mm^2)

Model	Standard valve	Notes
H(V)010E1	P → A 3.1 x 10^{-4} in.^{2} {0.2 cm^2} [0.01] A → R 4.7 x 10^{-4} in.^{2} {0.3 cm^2} [0.01]	Use F type manifold
H(V)A010E1	P → A 3.1 x 10^{-4} in.^{2} {0.2 cm^2} [0.01] A → R 4.7 x 10^{-4} in.^{2} {0.3 cm^2} [0.01]	Use A type manifold

VALVE WEIGHTS oz.(gf)

Model	Weight per unit
H(V)010E1	0.63 (18)
H(V)A010E1	0.63 (18)

\MANIFOLD WEIGHTS oz. (gf)

Type	Weight calculation of each station (n = station)	Block off plate
H010M□F	{2.33 (6.6) x n} + 3.17 (9)	0.07 (2)
H010M□A	{2.33 (6.6) x n} + 3.17 (9)	0.07 (2)

MATERIALS OF MAIN PARTS

Part		Material
Valve	Body	Aluminum
	Flapper	Buna
	Armature	Electro magnetic stainless steel
	Center post	
	Mounting base	Steel (zinc plated)
Manifold	Manifold	Aluminum
	Block off plate	Steel (nickel plated)
	Gasket	Buna

PORT DIMENSIONS

Model	Ports	Type	Port dimension
H(V)010E1	P, A, R	Female	M3x0.5

No sub-base plumbing.

MANIFOLD CONNECTION PORT DIMENSIONS

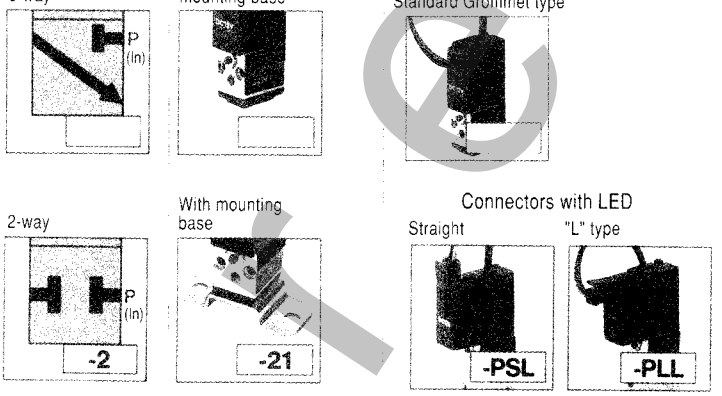
Manifold model	Port	Component	Dimensions
H010M□F	P	Manifold	10-32 UNF
	A	Valve	M3x0.5
	R	Manifold	10-32 UNF
H010M□A	P	Manifold	10-32 UNF
	A		M3x0.5
	R		10-32 UNF

H010 NOMENCLATURE

Valve function
- 3-way
- 2-way

Mounting base
- Without mounting base
- With mounting base

Connector type
- Lead wire length 12 in.(300 mm) Standard Grommet type
- Connectors with LED: Straight, "L" type



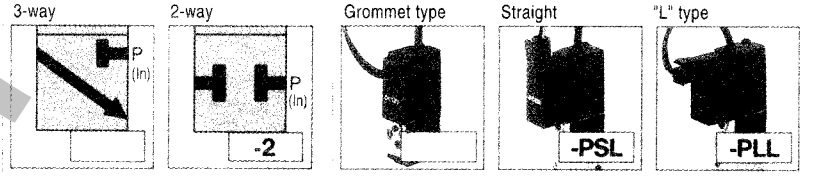
SOLENOID

	Model			Voltage	
Use with "F" type manifold, 2- and 3-way	H(V)010E1	-2	-21	-PSL -PLL	5 VDC 12 VDC 6 VDC 24 VDC
Use with "A" type manifold, 2- and 3-way	HA(V)010E1 NOTE 1	-2			

NOTE 1: Not to be used as stand-alone valve.

Valve function
- 3-way
- 2-way

Connector type
- Lead wire length 12 in. (300 mm) STD
- Grommet type
- Connectors with LED: Straight, "L" type



MANIFOLD

Manifold model	Number of stations		Station	Type		Voltage	
H010M	2 20	F A	stn.□ stn.□	-H(V)010E1 -HA(V)010E1	-2 -2	-PSL -PLL	5 VDC, 12 VDC 6 VDC, 24 VDC

Valves mount from left with operator away.

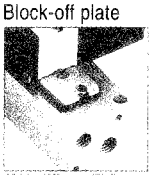
Specify valve type for each station.
Station with block off plate use BP.

ADDITIONAL COMPONENTS (sold separately)

Muffler

For in-line valve.

Block-off plate

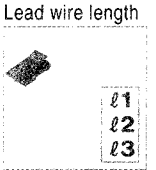


H010 M F -BP
- F — For "F" type.
- A — For "A" type manifolds.

H010 - For H010 Manifolds.

MADE TO ORDER

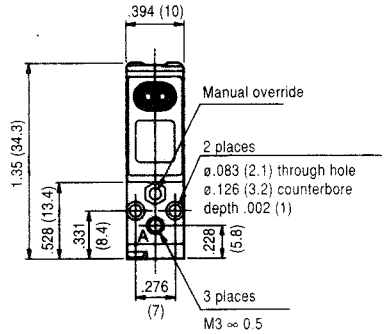
Lead wire length

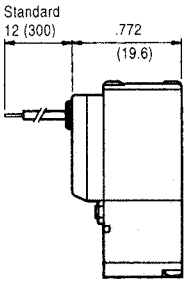


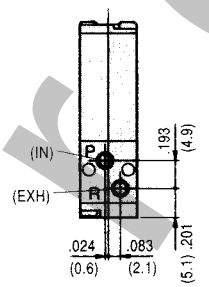
For plug connector.
Length in. (mm) ℓ1=36 (1000)
ℓ2=72 (2000)
ℓ3=108 (3000)

VALVE DIMENSIONS

H(V)010E1



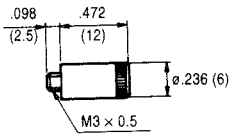




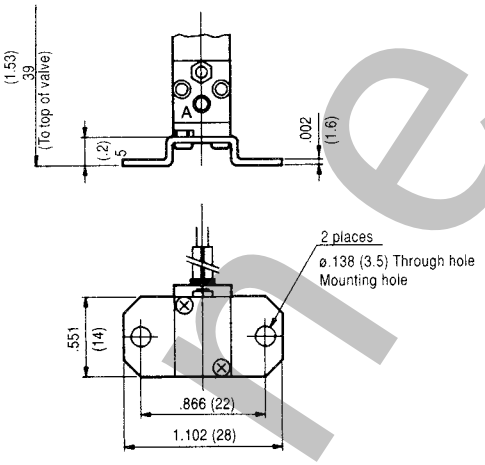
Dimensions in inches (millimeters)

OPTIONS

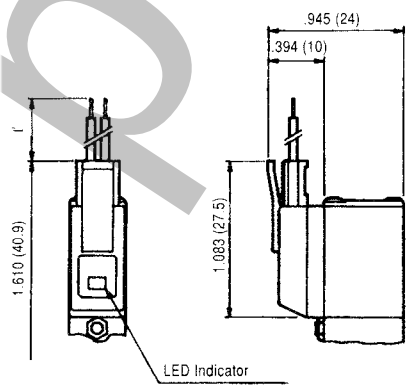
Model HKM-03 muffler sold separately.



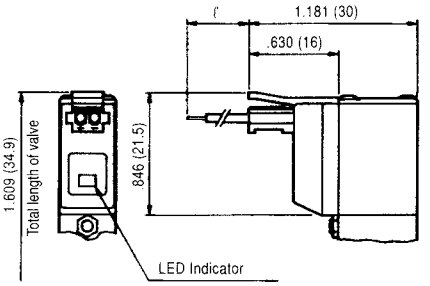
Mounting base



With straight connector – PSL



With "L" type connector – PLL



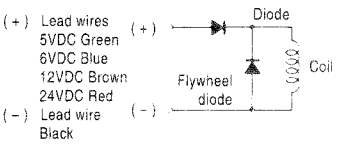
Type	Code	Lead wire length in. (mm)
– PSL, PLL (std.)		12 (300)
Made to order	l'1	36 (1000)
	l'2	72 (2000)
	l'3	108 (3000)

PROPER HANDLING AND PRECAUTIONS

SOLENOID

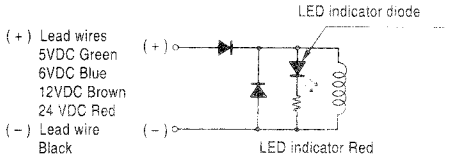
INTERNAL CIRCUIT

STANDARD SOLENOID
(Transient suppression incorporated)



SOLENOID WITH LED INDICATOR
(Transient suppression)

Order No. -PSL, -PLL

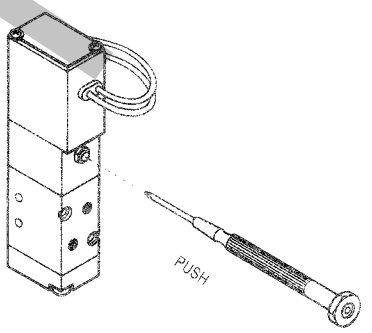


CAUTIONS

1. Do not apply megger across lead wires.
2. Valve is polarity protected.
3. If current leakage within the circuit exceeds the recommended allowable quantity, the solenoid may not drop out. This malfunction is demonstrated by the valve not returning to the "home" position when de-energized (single solenoid).
4. Do not energize double solenoids simultaneously. The valve may midshift.

MANUAL OVERRIDE OPERATION

Push the button all the way down, using a fine-tipped instrument. While pushing the button, the single solenoid valve will enter into the energized position. It will return to the "home" position when released. For the double solenoid, when the push button at the S_1 (S_2) side is pushed, it will switch to the same condition as with the S_1 (S_2) energized position. The valve will remain in that position even after the button is released. To return, operate the push button at the opposite end of the valve S_2 (S_1).



CAUTIONS

1. The H040 series is indirect acting type. Therefore, the body of the valve will not operate when pushing the manual override button unless minimum air pressure is supplied to the P-port.
2. Do not use a sharp tipped instrument to operate the manual override button. It may damage the button.

MANIFOLD

PIPING

Ports P and R are located at both ends of the manifold. Piping direction can be determined according to the mounting location. Ports at one end of the manifold are temporarily plugged during shipping. Remove plugs and reseal with sealing agent.

BLOCK OFF PLATE

Use Block Off Plate to close stations when they are not in use. See charts on page 16 for proper model.

CAUTIONS

1. For P port piping, make sure to select fitting sizes to fit the manifold connecting pipe dimensions. Actuators may not operate properly if there is insufficient flow and/or pressure due to improper piping.

2. When installing fittings or mufflers to R port, make sure that exhaust remains unrestricted. Restriction of exhaust may cause actuators to operate erratically. Consider using R ports at both ends of manifold to enhance exhaust.

3. When several manifold valves are to be operated simultaneously, connect supply air to both ends of manifold. Also exhaust through both ends of manifold. This ensures adequate supply and exhaust capacity.

POINTS TO BE CONSIDERED

INSTALLATION

1. Mount valves in any direction. However, mount valves perpendicular to significant shock or vibration.

2. Location near water, oil, or in excessively dusty conditions requires adequate solenoid housing protection to prevent solenoid actuator contamination. Also consider the installation of breather/muffler in exhaust ports to prevent foreign objects from entering valves.

3. Before installing fittings and tubing, blow all foreign material from them. If using a sealant, take extra care that sealant does not enter valve causing potential malfunction and/or leaks.

4. When valves are installed in tight enclosures, consider the possibility of heat build up. Ensure adequate ventilation.

5. Valves with A or B ports open to atmosphere will not operate properly.

AIR SOURCE

1. Use compressed air or inert gas in accordance with the pressure rating in the specifications.

2. Compressed air should be clean and uncontaminated. When in doubt, install an air filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter element.

3. For optimum performance, use largest possible tubing size and minimum tubing length.

LUBRICATION

No externally applied lubrication is required. However, when dry air is used (air that does not contain water or oil), use of a turbine SAE 20 oil (ISO VG32) or equivalent is recommended. Thin or low viscosity oils (spindle oil, machine oil, etc.) do not provide a good residual film of lubrication, thus should not be used.

AIR QUALITY

These valves cannot be used when media or ambient conditions contain organic solvents, phosphoric acid, ester type machine oil, sulfuric acid gas, or other acids.

Specifications subject to change without notice.

BASIC MODELS AND CONFIGURATIONS – H010, H040

VALVES

DIRECT ACTING, IN-LINE

H010 Series – 2- and 3-way

Normally Closed (N/C)

H010E1

INDIRECT ACTING

H040 Series – 2- and 3-way

(N/C)

H041E1

(N/O)

H041E1-11

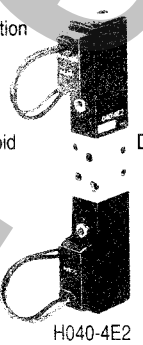
H040 Series – 4-way

2 position

Single solenoid

H040-4E1

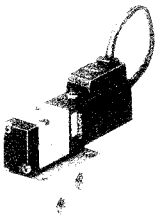
Double solenoid



H040-4E2

SUB-BASE TYPE

(N/C)



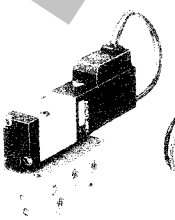
HA041E1

(N/O)

HA041E1-11

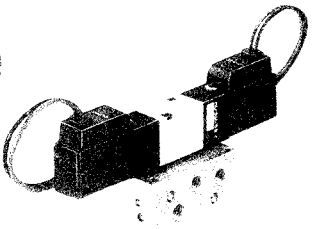
2 position

Single solenoid



HA040-4E1

Double solenoid



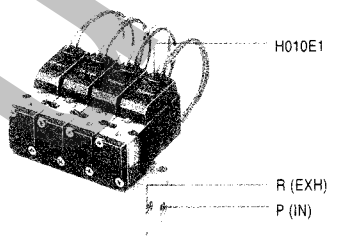
HA040-4E2

MANIFOLDS

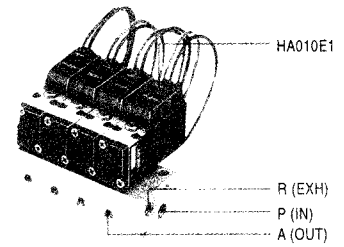
2- AND 3-WAY MINIATURE MANIFOLD

H010 Series

H010M□F – F type manifolds have common inlet and common exhaust ports.



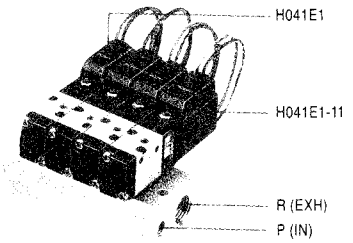
H010M□A – A type manifolds have all ports contained in the manifold.



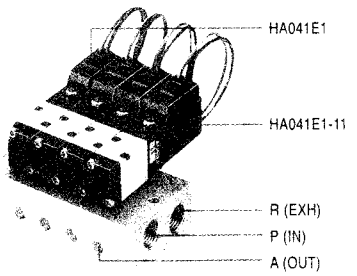
2- AND 3-WAY SMALL MANIFOLD

H041 Series

H041M□F – F type manifolds have common inlet and common exhaust ports.



H041M□A – A type manifolds have inlet, exhaust, and cylinder ports in manifold.

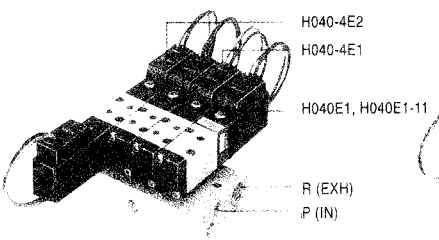


H041M manifolds accommodate 2- and 3-way valves.

2-, 3-, AND 4-WAY SMALL MANIFOLD

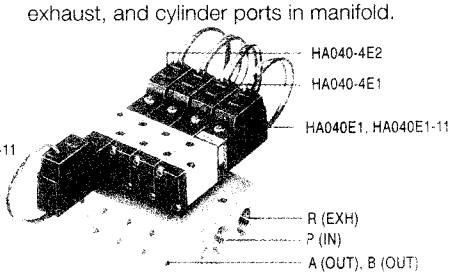
H040 Series

H040M□F – F type manifolds have common inlet and common exhaust ports.



2- and 3-way valves for manifold mounting only.

H040M□A – A type manifolds have inlet, exhaust, and cylinder ports in manifold.



H040M series manifolds accommodate 2-, 3- and 4-way valves in any combination.

LIST OF SPECIFICATIONS
MICRO SOLENOID VALVES SERIES H040

BASIC MODELS AND VALVE FUNCTIONS

Item	Model			
	In-line and F type manifold	H041E1 H040E1	H040-4E1	H040-4E2
	Sub-base and A type manifold	HA041E1 HA040E1NOTE	HA040-4E1	HA040-4E2
Number of positions		2 positions		
Number of ports		2- and 3-way	4-way	
Valve functions		N/C standard N/O optional	Single solenoid	Double solenoid

NOTE: See pages 11 and 12 for option specifications and order code. H040E1 and HA040E1 are the 2- and 3-way valves to be mounted on the 2, 3 and 5 port combination manifolds only. They cannot be used in-line. If the 2- and 3-way valve is used, use H041E1 and HA041E1 with sub-base.

SPECIFICATIONS

Item		Model		
	In-line and F type manifold	H041E1 (H040E1)	H040-4E1	H040-4E2
	Sub-base and A type manifold	HA041E1 (HA040E1)	HA040-4E1	HA040-4E2
Media		Air		
Type of operation		Indirect acting		
Effective area in.^{2} (mm^2) [Cv]NOTE 1		.002 (1.5) [0.08]		
Port threadsNOTE 2		M3x0.5		
Lubrication		Not required		
Pressure range psi (kgf/cm^2)		28.5 ~ 100 psi (2 ~ 7)		
Proof pressure psi (kgf/cm^2)		150 (10.5)		
Response timeNOTE 3 ON/OFF ms	DC5V, DC12V	Below 12.15		12
	DC6V, DC24V			
Maximum cycles/second		5		
Ambient range of operating temperature °F (°C)		41 ~ 122 (5 ~ 50)		
Shock resistance G		140 (60 in direction of stem)		
Mounting direction		Unrestricted		

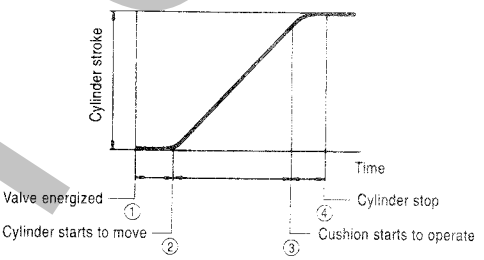
NOTE 1: Please refer to Effective Area chart on page 15 for details.
NOTE 2: Please refer to Port Dimensions chart on page 15.
NOTE 3: Value with air pressure at 70 psi (5 kgf/cm^2). Value of H040-4E2 is with pressure opposite the coil energized.

ELECTRICAL SPECIFICATIONS CHART

Item		Voltage			
		5 VDC	6 VDC	12 VDC	24 VDC
Type		Flywheel diode incorporated for surge suppression			
Voltage range VDC		4.5 ~ 5.5 (5 ± 10%)	5.4 ~ 6.6 (6 ± 10%)	10.8 ~ 13.2 (12 ± 10%)	21.6 ~ 26.4 (24 ± 10%)
Current mA	Standard	120 (0.6W)	105 (0.6W)	55 (0.7W)	28 (0.7W)
	With LED	130 (0.65W)	115 (0.7W)	65 (0.8W)	40 (1.0W)
Maximum allowable current leakage mA		10	7	5	2
Heat rise °F (°C)		68° (20°)			
Insulation resistance MΩ		Over 100			
Connector and lead wire length	Standard	Grommet type 12 in. (300mm)			
	Option	Plug connector type 12 in. (300mm)NOTE 4			
Lead wire colors		Green (+) Black (–)	Blue (+) Black (–)	Brown (+) Black (–)	Red (+) Black (–)
LED indicator		Red			
Surge suppression		Flywheel diode			

NOTE 4: Please refer to page 12 for made-to-order information.

HOW TO FIGURE STROKE TIME (CYLINDER SPEED)



1. To obtain stroke speed, add t1 to t2. t1 is the lag time of coil energizing point 1 to when the cylinder begins to move point 2. t2 is the maximum speed zone of cylinder moving to its fullest position at point 3.
2. If a cushion is incorporated, add t3 to the sum of t1 and t2. Point 3 now becomes the point where the cushion begins to take effect. Point 4 is the end of stroke when cushion is incorporated.

MEASUREMENT CONDITIONS

H040-4E1

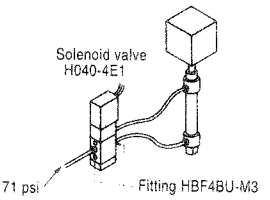
Air pressure: 71 psi (5 kgf/cm^2)

Tubing I.D. and length: ø .098 in. (2.5mm) x 39.370 in. (1000mm)

Fitting: HB4BU-M3

$$\text{Load ratio} = \frac{\text{Load}}{\text{Cylinder theoretical thrust}} \ (\%)$$

Examples for ø 3/8 in. nominal (ø 10mm actual) bore, ø 5/8 in. nominal (ø 16mm actual) bore, the stroke is 2.362 in. (60mm). For ø 3/4 in. nominal (ø 20mm actual), ø 1 1/4 in. nominal (ø 32mm actual) bore, the stroke is 3.397 in. (100mm).



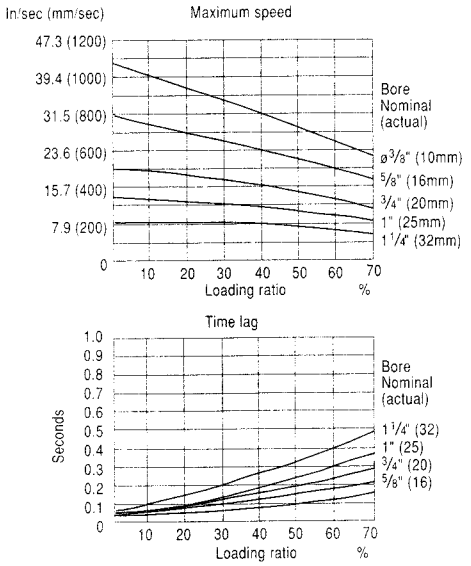
MADE TO ORDER

Plug model number

For plug connector only.
Length in. (mm) ℓ1=36 (1000)
ℓ2=72 (2000)
ℓ3=108 (3000)

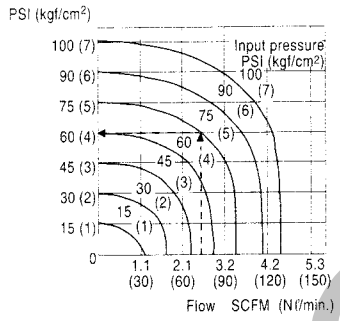
CYLINDER SPEED

H040 Series



AIR FLOW

H041-H040 Series



EFFECTIVE AREA [Cv] in.^{2} (mm^2)

Model	Standard	Notes
H041E1 [H040E1] H040-4E1 H040-4E2	.002 (1.5) [.08]	When HT53-M3M fittings are used in P, A and B ports, valves become .001 (.75) [.001 (.04)]. When HT53-M3M fittings are used in the A and B ports of "F" type manifold, valves become .001 (.80), [.001 (.05)].
HA041E1 [HA040E1] HA040-4E1 HA040-4E2	.002 (1.5) [.08]	When HT54-M5M fittings are in the P, A, and B ports of "A" type manifold, valves become .002 (1.30), [.001 (.07)].

VALVE PORT DIMENSIONS

Model	Port	Type	Dimensions
H041E1 (H040E1[NOTE])	P, A, R	Female thread	M3x0.5
H040-4E1 H040-4E2	P, A, B, R	Female thread	M3x0.5
HA041E1-25 HA040-4E1-25 HA040-4E2-25	P	Female thread	10-32 UNF
	A, B		
	R		
	PR		

NOTE: H040-4E1 is to be used on manifolds only. Use H041E1 for in-line service.

MANIFOLD CONNECTION PORT DIMENSIONS

Manifold model	Port	Component	Dimensions
H041M□F H040M□F	P	Manifold	10-32 UNF
	A, B	Valve	M3x0.5
	R	Manifold	1/8 NPT
H041M□A H040M□A	P	Manifold	1/8 NPT
	A, B	Manifold	10-32 UNF
	R	Manifold	1/8 NPT

VALVE WEIGHTS oz.(gf)

Model	Weight per unit
H041E1	0.81 (23)
H040E1	0.88 (25)
H040-4E1	0.88 (25)
H040-4E2	1.48 (42)
HA041E1	0.85 (24)*
HA040E1	0.88 (25)
HA040-4E1	0.88 (25)**
HA040-4E2	1.48 (42)**

* Add .60 oz. (13 gf) for sub-base weight, code 25.
** Add .81 oz. (23 gf) for sub-base weight, code 25.

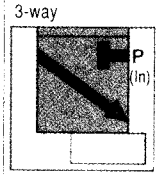
MANIFOLD WEIGHT oz. (gf)

Type	Weight calculation of each station (n = number of stations)	Block-off plate
H041M□F	{0.36 (10.1) x n} + 0.53 (14.9)	0.07 (2)
H041M□A	{0.43 (12.3) x n} + 0.67 (19)	0.11 (3)
H040M□F	{0.31 (8.8) x n} + 0.52 (14.8)	0.11 (3)
H040M□A	{0.63 (17.8) x n} + 1.35 (38.2)	0.14 (4)

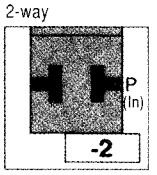
H040 SERIES ORDERING NOMENCLATURE

2- and 3-way Valve Function

3-way

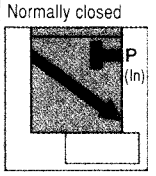


2-way

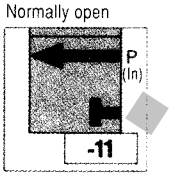


2- and 3-way Valve Function

Normally closed



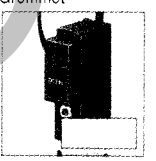
Normally open



Connector type

Standard lead wire length of 12 in. (300 mm)

Grommet



Straight connector with LED

"L" type connector with LED

		Model			Voltage	
In-line Valve	2- and 3-way	H040E1	-2	-11	-PSL -PLL	5 VDC 6 VDC 12 VDC 24 VDC
	4-way Single solenoid	H040-4E1				
	4-way Double solenoid	H040-4E2				
		HA040-4E2				
Sub-base Mounted	2- and 3-way	HA041E1	-2	-11	-PSL -PLL	5 VDC 6 VDC 12 VDC 24 VDC
	4-way Single solenoid	HA040-4E1				
	4-way Double solenoid	HA040-4E2				
* 2-, 3-, and 4-way manifolds for using 3- and 4-way valves	H040M□ F 2- and 3-way	H040E1	-2	-11	-PSL -PLL	5 VDC, 6 VDC 12 VDC, 24 VDC
	H040M□ A 2- and 3-way	HA040E1	-2	-11		

* NOTE: This series cannot be used without manifold.

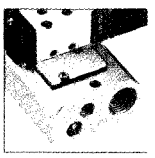
OPTIONAL PARTS (AVAILABLE SEPARATELY)

Mufflers

For in-line valves.

For sub-base.

Block-off plates



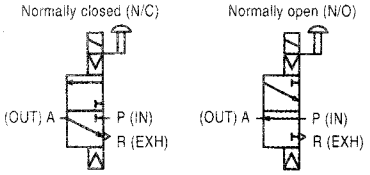
H040 M F -BP

F- For "F" type manifold.
A- For "A" type manifold.

H041- H041M only.
H040- H040M only.

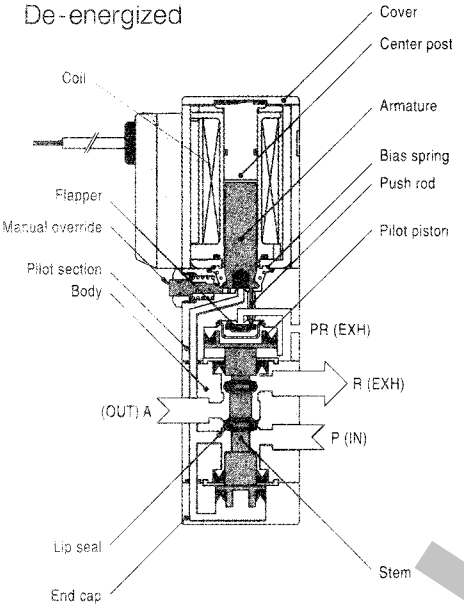
3 WAYS

H041E1



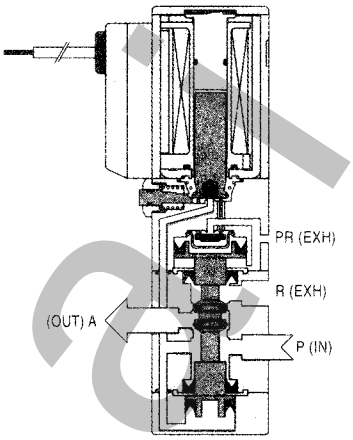
H041E1

De-energized



H041E1-11

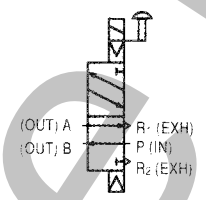
De-energized

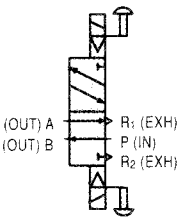


MATERIALS OF MAIN PARTS

Part		Material
Valve	Body	Aluminum
	Stem	
	Lip seal	Buna N
	Flapper	
	Mounting base	Zinc plated steel
	Sub-base	Aluminum
	Armature	Electro magnetic Stainless steel
	Center post	
Manifold	Body	Aluminum
	Block-off plate	Nickel plated steel
	Seal	Buna N

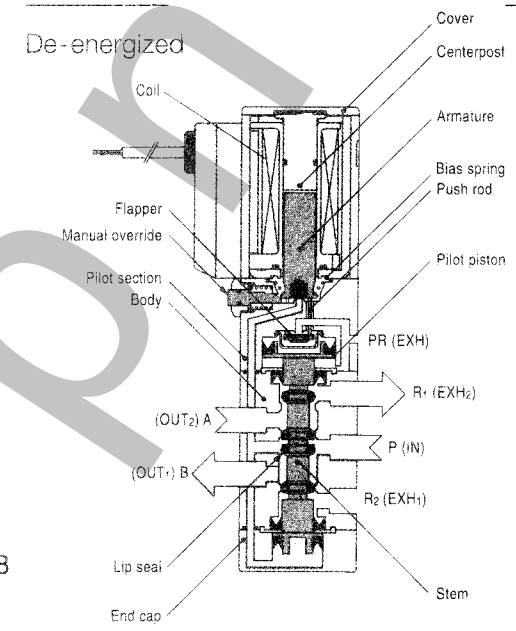
4 WAYS



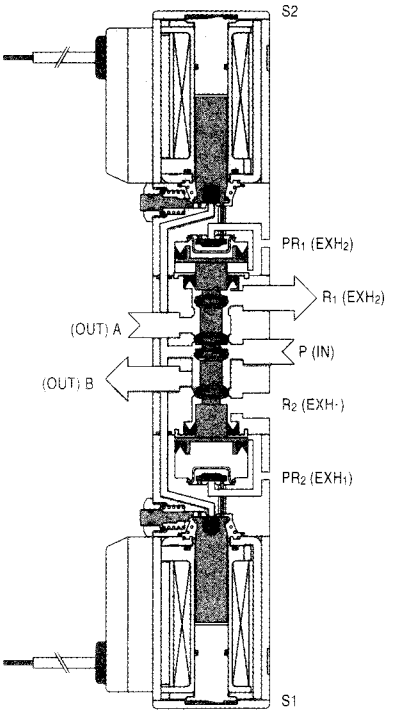


H040-4E1

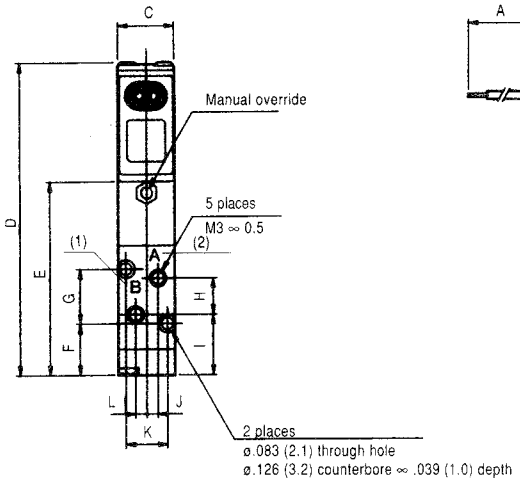
De-energized

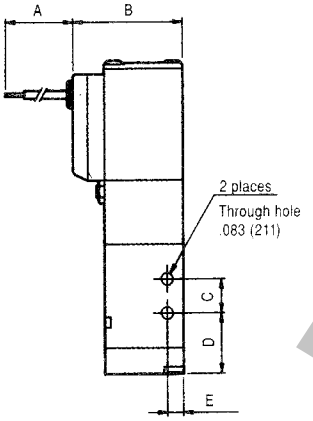


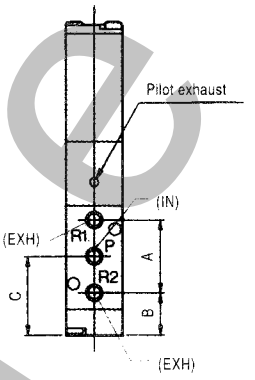
H040-4E2



H040-4E1







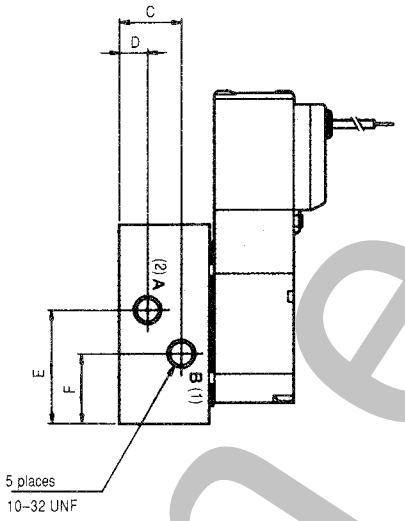
C	D	E	F	G
0.398 (10)	2.157 (54.8)	1.330 (33.9)	0.354 (9)	0.378 (9.6)

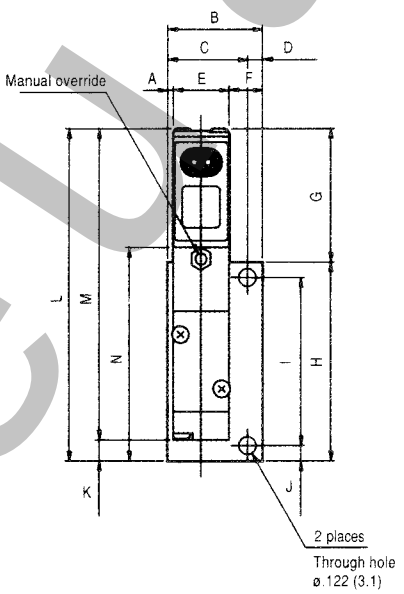
H	I	J	K	L
0.251 (6.4)	0.417 (10.6)	0.079 (2)	0.291 (7.4)	0.079 (2)

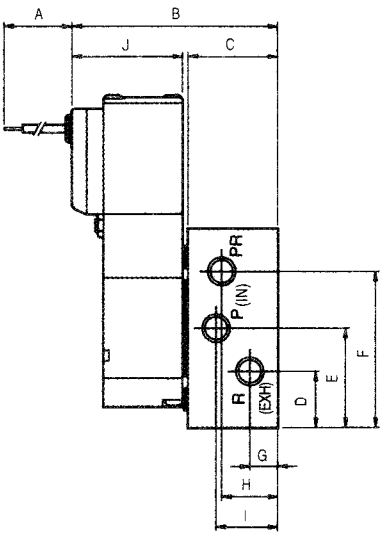
A	B	C	D	E
12 (300)	0.772 (19.6)	0.251 (6.4)	0.417 (10.6)	0.114 (2.9)

A	B	C
0.504 (12.8)	0.291 (7.4)	0.543 (13.8)

HA040-4E1-25







C	D	E	F
0.433 (11)	0.197 (5)	0.787 (20)	0.504 (12.3)

A	B	C	D	E	F	G
0.039 (1)	0.669 (17)	0.563 (14.3)	0.106 (2.7)	0.394 (10)	0.236 (6)	0.925 (23.5)

H	I	J	K	L	M	N
1.378 (35)	1.165 (29.6)	0.106 (2.7)	0.146 (3.7)	2.303 (58.5)	2.157 (54.8)	1.480 (37.6)

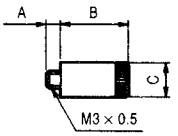
A	B	C	D	E
12 (300)	1.441 (36.6)	0.630 (16)	0.390 (9.9)	0.689 (17.5)

F	G	H	I	J
1.083 (27.5)	0.197 (5)	0.394 (10)	0.433 (11)	0.772 (19.6)

Valve mounting screws to manifolds and subbases: M2xL16

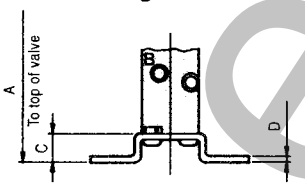
OPTIONS

Muffler: Code 75. For use with in-line valve, use HKM-03.



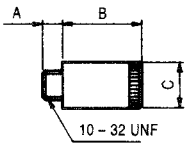
A	B	C
0.098 (2.5)	0.472 (12)	0.236 (6)

Mounting base: Code 21

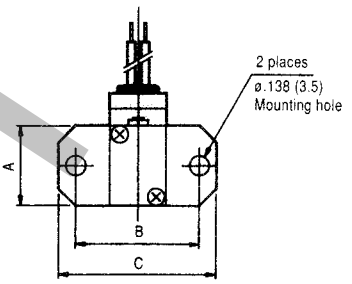


A	C	D
2.343 (59.5)	0.197 (5)	0.063 (1.6)

For sub-base mounted valves, use HKM-05.

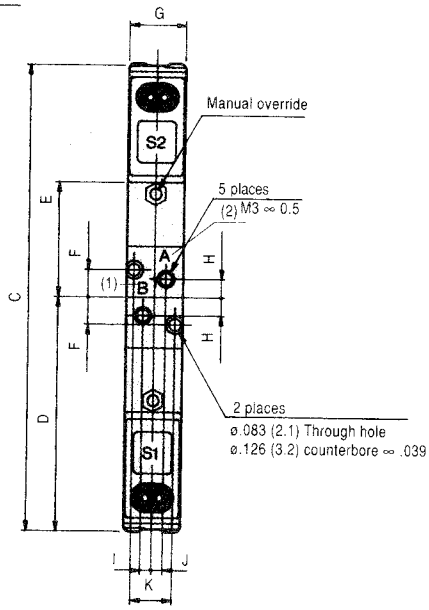


A	B	C
0.138 (3.5)	0.551 (14)	0.315 (8)



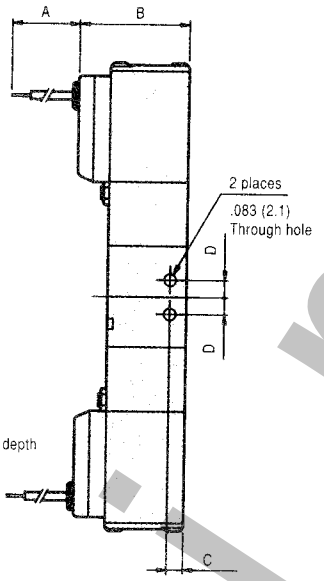
A	B	C
0.551 (14)	0.866 (22)	1.102 (28)

H040-4E2

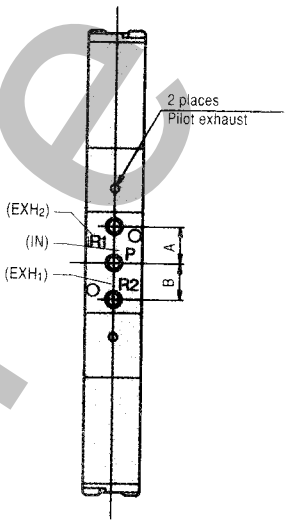


C	D	E	F	G
3.228 (82.0)	1.614 (41.0)	0.791 (20.1)	0.189 (4.8)	0.398 (10)

H	I	J	K
0.126 (3.2)	0.079 (2)	0.079 (2)	0.291 (7.4)

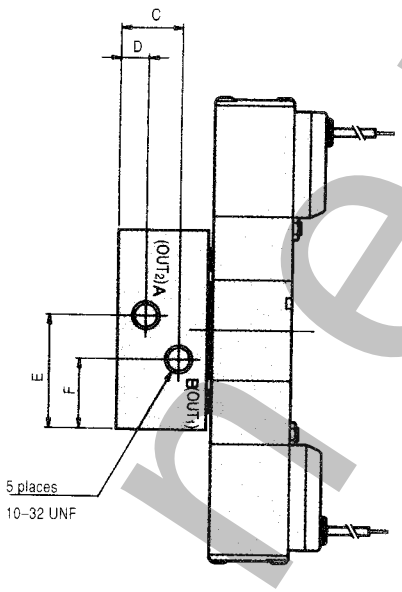


A	B	C	D
12 (300)	0.772 (19.6)	0.114 (2.9)	0.126 (3.2)

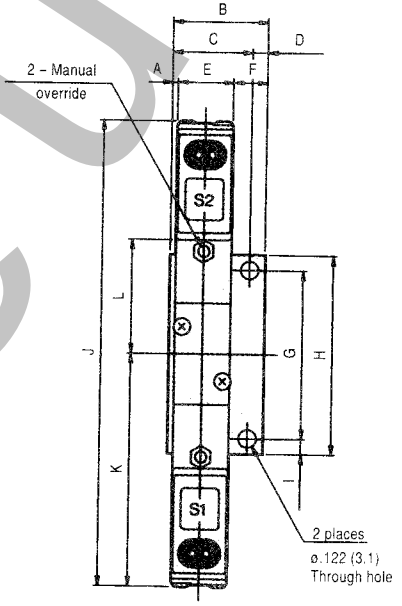


A	B
0.252 (6.4)	0.252 (6.4)

HA040-4E2-25

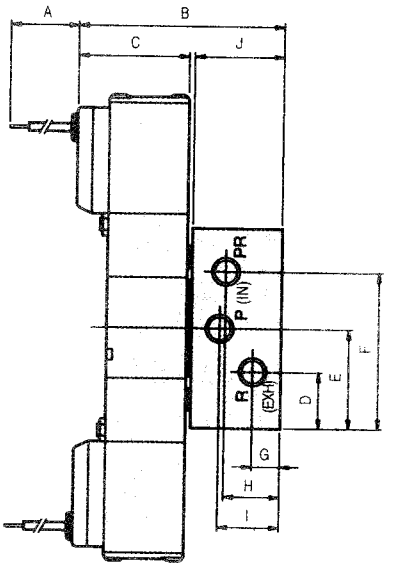


C	D	E	F
0.433 (11)	0.197 (5)	0.787 (20)	0.484 (12.3)



A	B	C	D	E	F
0.039 (1)	0.669 (17)	0.563 (14.3)	0.106 (2.7)	0.394 (10)	0.236 (6)

G	H	I	J	K	L
1.165 (29.6)	1.378 (35)	0.106 (2.7)	3.228 (82.0)	1.614 (41.0)	0.791 (20.1)



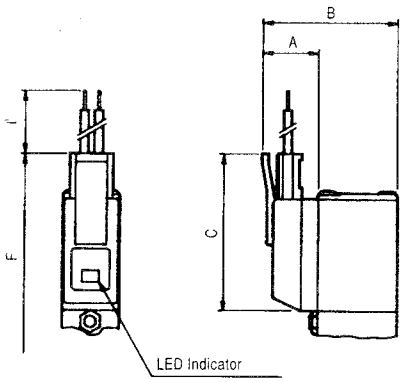
A	B	C	D	E
12 (300)	1.441 (36.6)	0.772 (19.6)	0.390 (9.9)	0.689 (17.5)

F	G	H	I	J
1.083 (27.5)	0.197 (5)	0.394 (10)	0.433 (11)	0.630 (16)

Valve mounting screws to manifolds and subbases: M2×L16

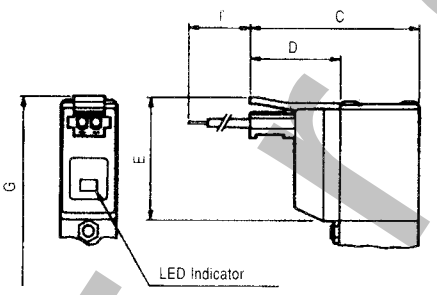
OPTIONS

Solenoid with straight connector – PSL



A	B	C
0.394 (10)	1.024 (26)	1.083 (27.5)

Solenoid with "L" connector – PLL



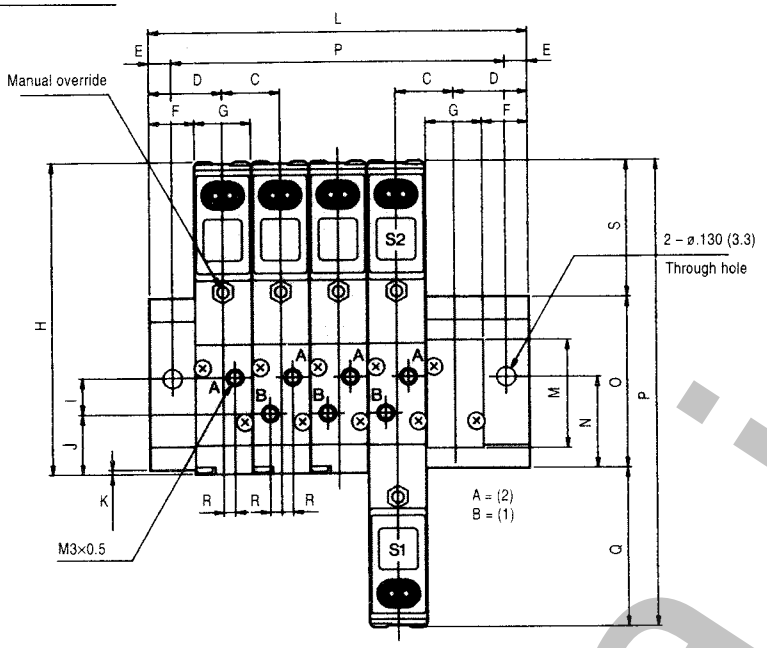
C	D	E
1.181 (30)	0.630 (16)	0.846 (21.5)

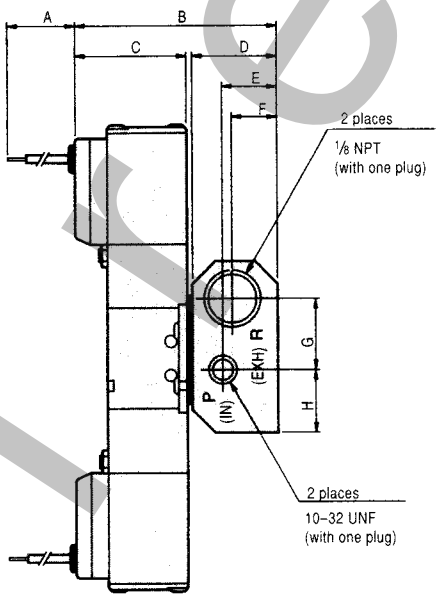
DIMENSIONS

Valve	F	G	l' (Lead wire length)	Notes
H041E1, HA041E1-25	2.271 (57.7)	2.035 (51.7)	-PSL, -PLL: 12 (300) Made to order: l'1 – 36 (1000) l'2 – 72 (2000) l'3 – 108 (3000)	Whole lengths to valve end or sub-base end
H040-4E1	2.417 (61.4)	2.181 (55.4)		
HA040-4E1-25	2.562 (65.1)	2.326 (59.1)		
H040-4E2, HA040-4E2-25	3.747 (95.2)	3.275 (83.2)		Whole length from the solenoid end to opposite end of valve

MANIFOLD DIMENSIONS FOR 2, 3-, AND 4-WAY VALVE COMBINATIONS

H040M□F

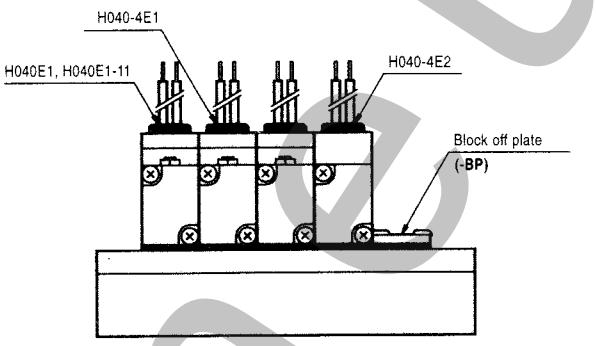




C	D	E	F	G	H	I	J
0.402 (10.2)	0.516 (13.1)	0.157 (4)	0.318 (8.1)	0.394 (10)	2.157 (54.8)	0.252 (6.4)	0.417 (10.6)

A	B	C	D	E	F	G	H
12 (300)	1.402 (35.6)	0.772 (19.6)	0.590 (15)	0.382 (9.7)	0.315 (8)	0.492 (12.5)	0.433 (11)

K	L	M	N	O	P	Q	R	S
0.031 (0.8)	0.945 (24.0)	0.748 (19)	0.630 (16)	1.181 (30)	3.228 (82)	1.102 (28.0)	0.079 (2)	0.945 (24)



"F" TYPE MANIFOLD DIMENSIONS BY UNIT in. (mm)

Model	L	P	Model	L	P
H040M2F	1.433 (36.4)	1.118 (28.4)	H040M12F	5.449 (138.4)	5.134 (130.4)
H040M3F	1.835 (46.6)	1.520 (38.6)	H040M13F	5.850 (148.6)	5.535 (140.6)
H040M4F	2.236 (56.8)	1.921 (48.8)	H040M14F	6.252 (158.8)	5.937 (150.8)
H040M5F	2.638 (67)	2.323 (59)	H040M15F	6.654 (169)	6.339 (161)
H040M6F	3.039 (77.2)	2.724 (69.2)	H040M16F	7.055 (179.2)	6.764 (171.8)
H040M7F	3.441 (87.4)	3.126 (79.4)	H040M17F	7.457 (189.4)	7.142 (181.4)
H040M8F	3.843 (97.6)	3.528 (89.6)	H040M18F	7.858 (199.6)	7.543 (191.6)
H040M9F	4.244 (107.8)	3.929 (99.8)	H040M19F	8.230 (209.8)	7.945 (201.8)
H040M10F	4.646 (118)	4.331 (110)	H040M20F	8.661 (220)	8.346 (212)
H040M11F	5.047 (128.2)	4.732 (120.2)	–	–	–

Valve mounting screws to manifolds and subbases: M2×L16

MANIFOLD

PIPING

Ports P and R are located at both ends of the manifold. Piping direction can be determined according to the mounting location. Ports at one end of the manifold are temporarily plugged during shipping. Remove plugs and reseal with sealing agent.

BLOCK OFF PLATE

Use Block Off Plate to close stations when they are not in use. See charts on page 16 for proper model.

CAUTIONS

1. For P port piping, make sure to select fitting sizes to fit the manifold connecting pipe dimensions. Actuators may not operate properly if there is insufficient flow and/or pressure due to improper piping.

2. When installing fittings or mufflers to R port, make sure that exhaust remains unrestricted. Restriction of exhaust may cause actuators to operate erratically. Consider using R ports at both ends of manifold to enhance exhaust.

3. When several manifold valves are to be operated simultaneously, connect supply air to both ends of manifold. Also exhaust through both ends of manifold. This ensures adequate supply and exhaust capacity.

POINTS TO BE CONSIDERED

INSTALLATION

1. Mount valves in any direction. However, mount valves perpendicular to significant shock or vibration.

2. Location near water, oil, or in excessively dusty conditions requires adequate solenoid housing protection to prevent solenoid actuator contamination. Also consider the installation of breather/muffler in exhaust ports to prevent foreign objects from entering valves.

3. Before installing fittings and tubing, blow all foreign material from them. If using a sealant, take extra care that sealant does not enter valve causing potential malfunction and/or leaks.

4. When valves are installed in tight enclosures, consider the possibility of heat build up. Ensure adequate ventilation.

5. Valves with A or B ports open to atmosphere will not operate properly.

AIR SOURCE

1. Use compressed air or inert gas in accordance with the pressure rating in the specifications.

2. Compressed air should be clean and uncontaminated. When in doubt, install an air filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter element.

3. For optimum performance, use largest possible tubing size and minimum tubing length.

LUBRICATION

No externally applied lubrication is required. However, when dry air is used (air that does not contain water or oil), use of a turbine SAE 20 oil (ISO VG32) or equivalent is recommended. Thin or low viscosity oils (spindle oil, machine oil, etc.) do not provide a good residual film of lubrication, thus should not be used.

AIR QUALITY

These valves cannot be used when media or ambient conditions contain organic solvents, phosphoric acid, ester type machine oil, sulfuric acid gas, or other acids.

Specifications subject to change without notice.

SUPERIOR SERVICE. UNLEASHED.

Title: H240 In-Line Solenoid Valves

ISO Date: July 28, 2004

Don't Take Chances

Compressed air is an extremely powerful medium. Always take maximum precautions when handling any component of a compressed air system. **Never** attempt to construct, replace, operate or service any component of a compressed air system unless you have been specifically and properly trained to do so. **Always** disconnect the supply air and exhaust the air system before attempting to remove or service a component of that system Failure to heed these warnings could result in SERIOUS, EVEN FATAL, PERSONAL INJURY.

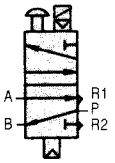
Design And Specifications

The design and specifications and other product information contained in this catalog is for general reference purposes based upon customary and usual manufacturing standards and product applications. However, it is difficult to predict or to anticipate the functioning or suitability of the product for any particular application or use. Therefore, nothing herein shall be deemed a representation or warranty of the product design or specifications and Buyer shall have the responsibility for investigating and testing the product in any particular application or use and all risks attendant in such use.

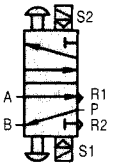
Humphrey Products Company
1-800-477-8707
Kalamazoo MI 49003
http://www.humphrey-products.com

OPERATING PRINCIPLE, VALVE SYMBOLS, AND MATERIALS OF CONSTRUCTION

Single solenoid

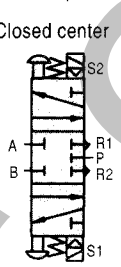


2-position double solenoid

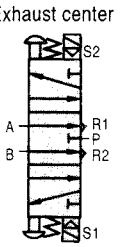


3-position double solenoid

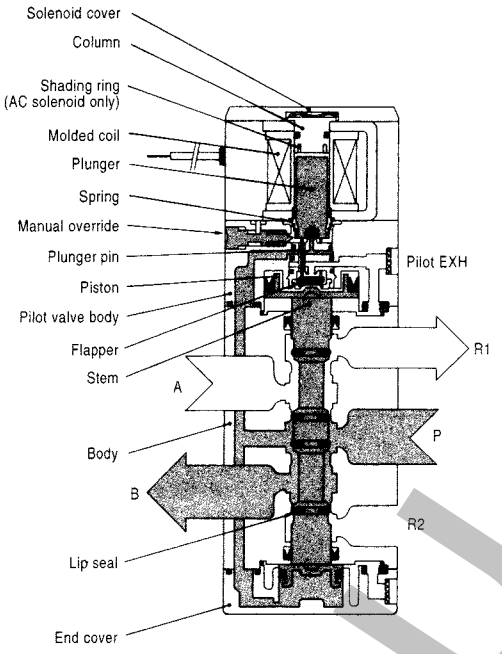
Closed center



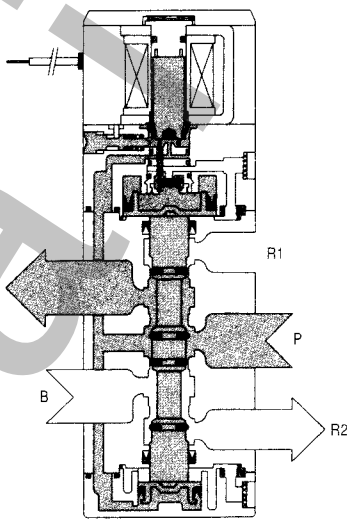
Exhaust center



BASIC OPERATION AND NOMENCLATURE



Actuated

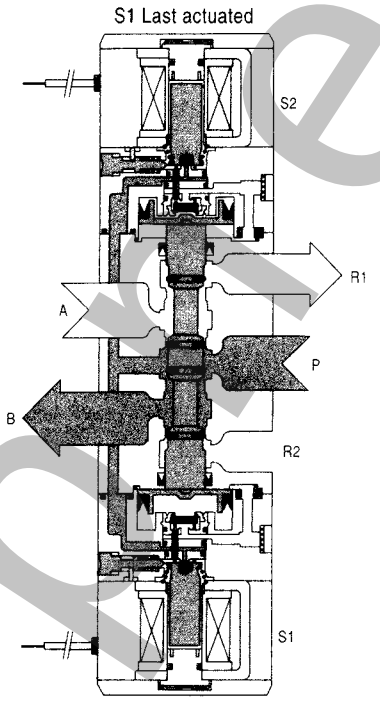


MATERIALS

Item	Material
Body	Diecast aluminum
Stem	Aluminum
Lip seal	Buna N
Flapper	Buna N
Mounting base	Mild steel (zinc plated)
Subbase	Diecast aluminum
Plunger	Electromagnetic stainless steel

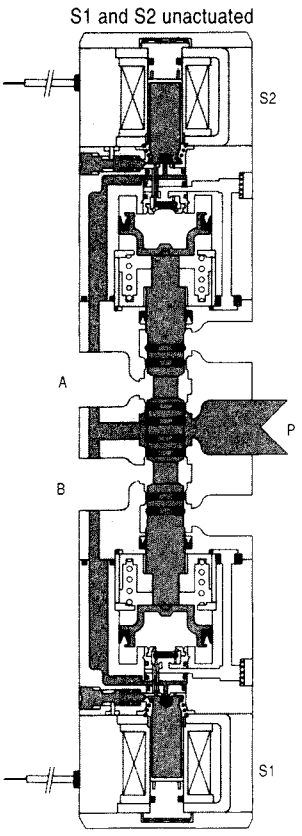
H240-4E2

S1 Last actuated



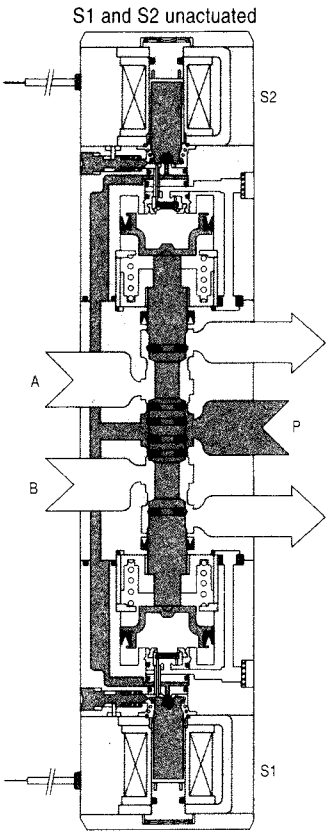
H243-4E2

S1 and S2 unactuated

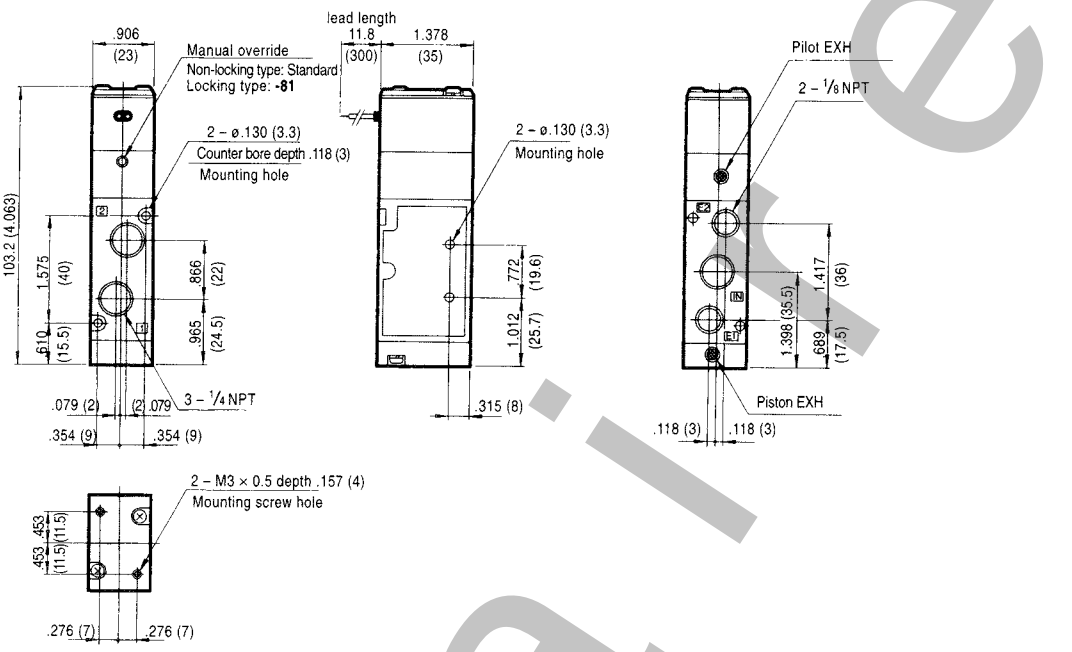


H243-4E2-13

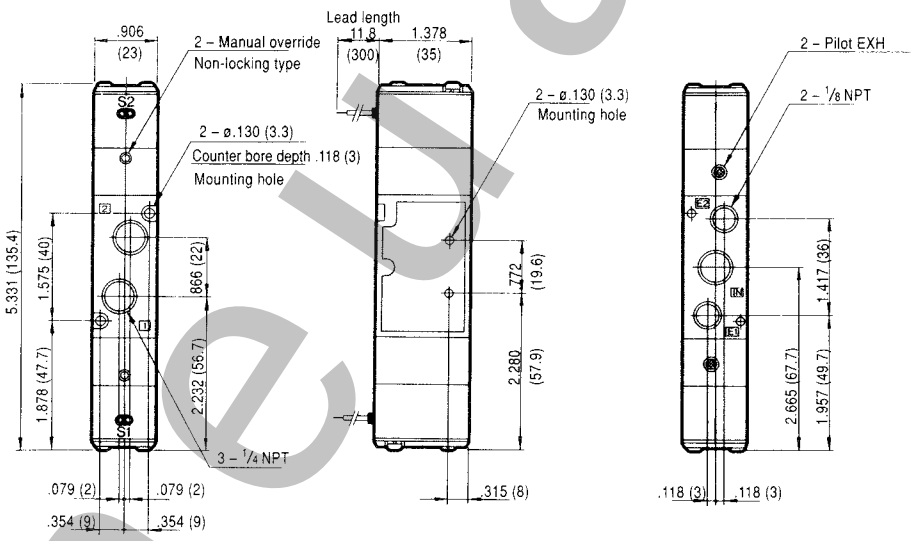
S1 and S2 unactuated



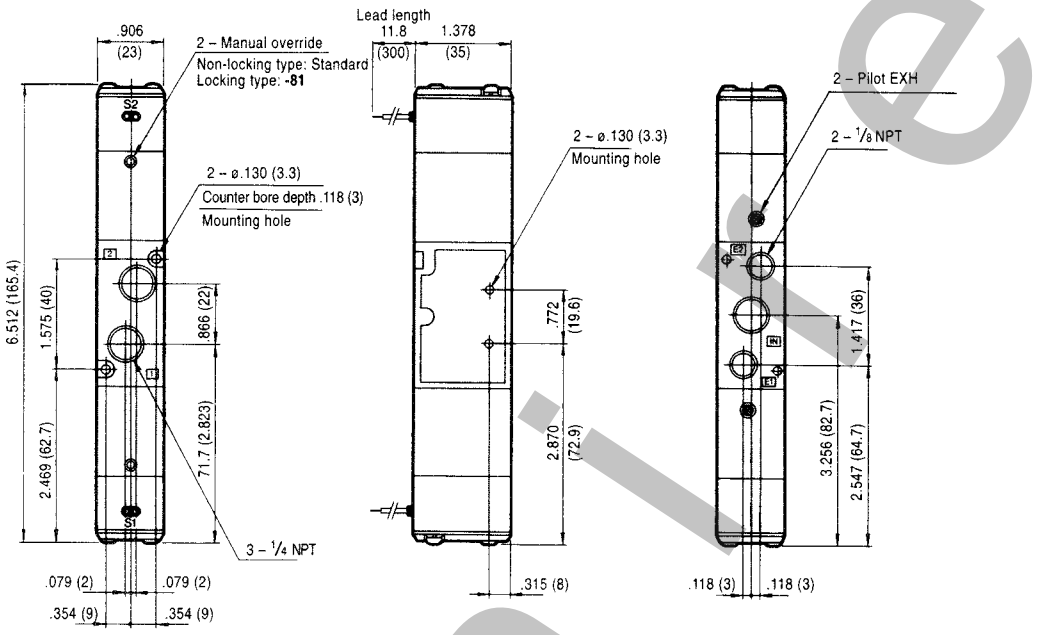
4240-4E1



4240-4E2

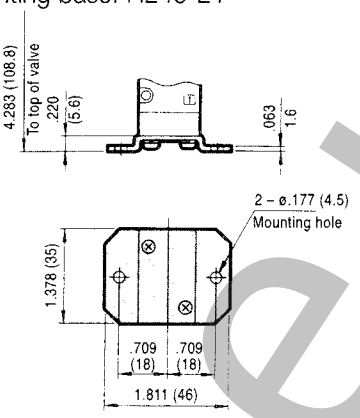


H243-4E2

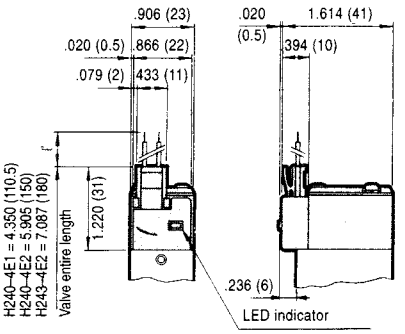


OPTIONS

Mounting base: H240-21

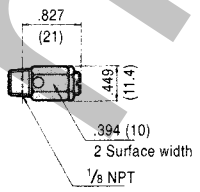


Straight connector w/LED indicator

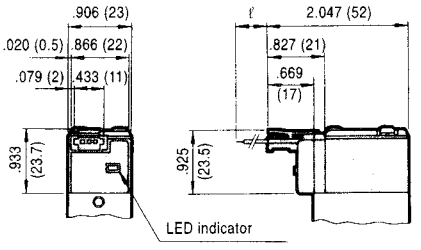


Surge suppressor varistor: -ZR.
Same dimensions as standard.

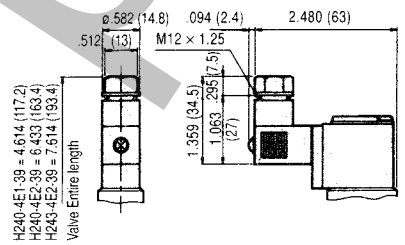
Speed controller: HSCE-01



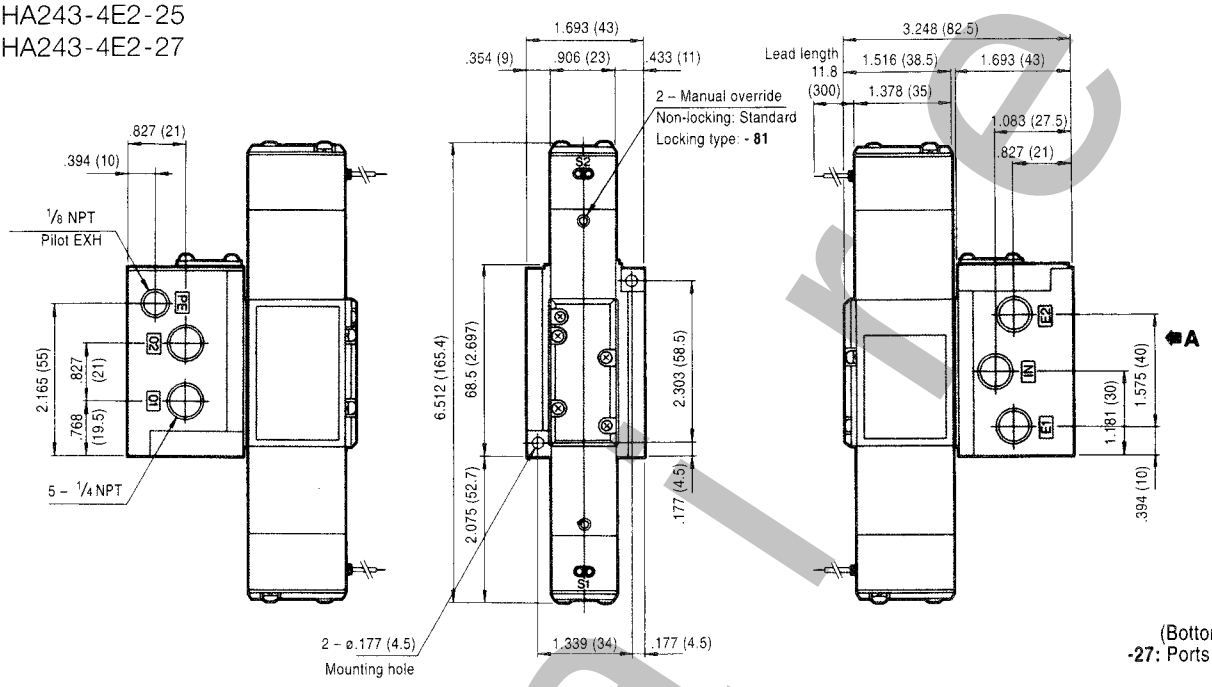
L-connector w/LED indicator



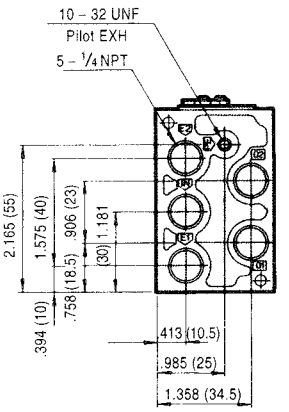
DIN connector solenoid: (-39)



HA243-4E2-25
HA243-4E2-27

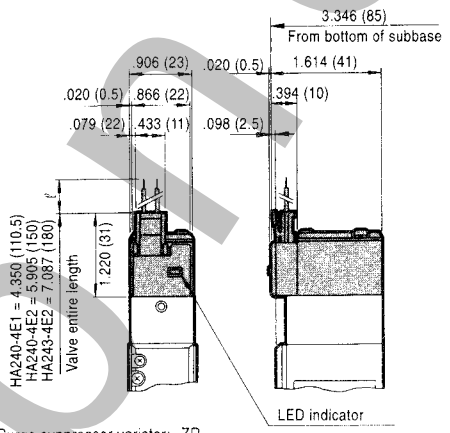


(Bottom view **A**)
-27: Ports at the bottom



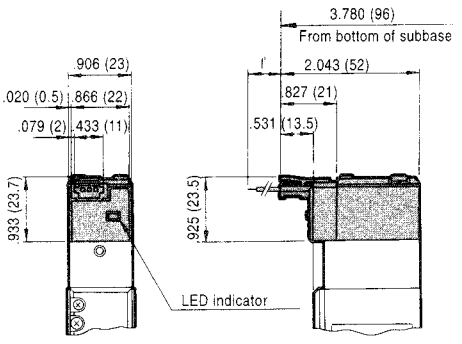
OPTIONS

Straight connector w/LED indicator

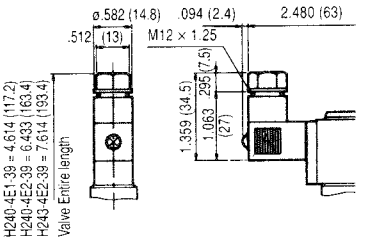


Surge suppressor varistor: -ZR.
Same dimensions as standard.

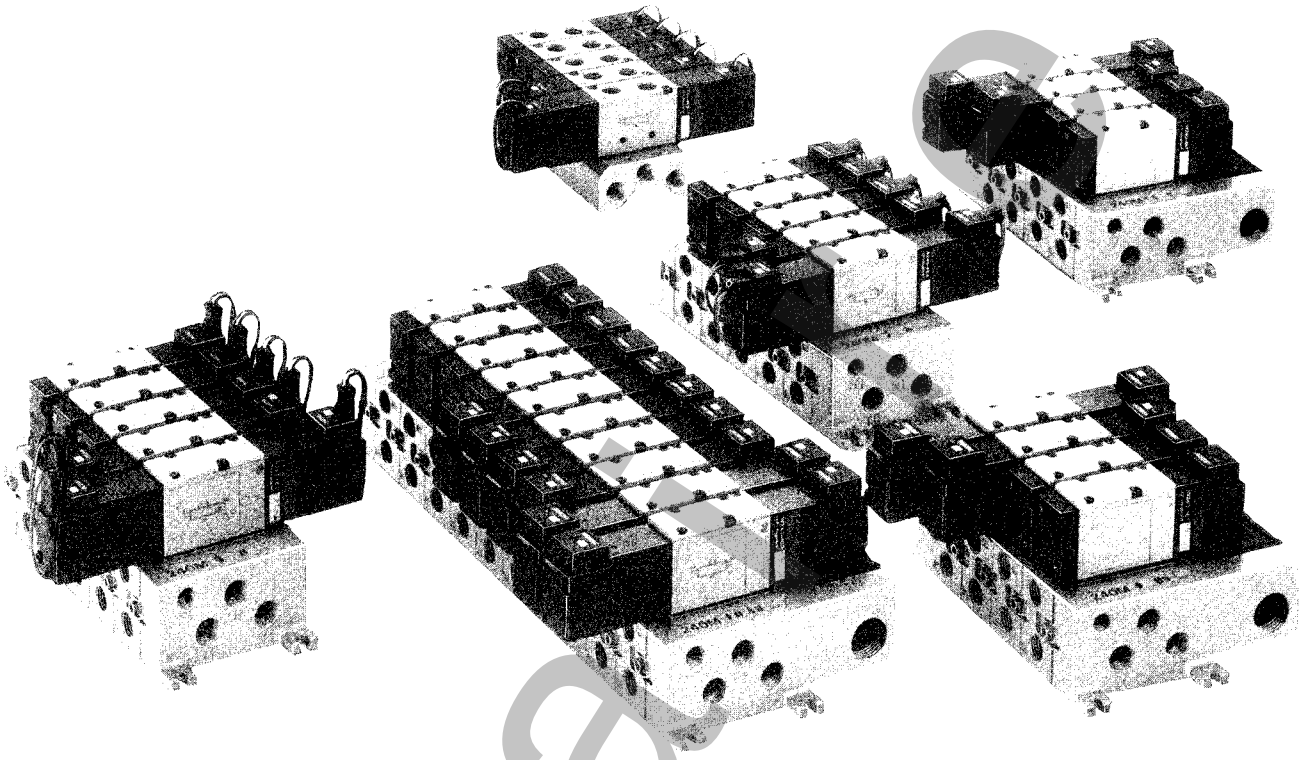
L-connector w/LED indicator



DIN connector solenoid: (-39)



H240 SERIES MANIFOLDS



SPECIFICATIONS AND PIPE CONNECTION DIMENSIONS

Manifolds	Specifications		Port Dimensions NPT		Valves	Notes
H240M□F	IN, EXH manifold, OUT valve		P	1/4	H240-4E1 H240-4E2 H243-4E2	No pilot EXH piping
			A, B			
			R1, R2			
H240M□A	All ports in manifold		P	1/4	HA240-4E1 HA240-4E2 HA243-4E2	
			A, B			
			R1, R2			
			PE	1/8		
H240M□AW	All ports in plug-in manifold		P	1/4	HW240-4E1 HW240-4E2 HW243-4E2	
			A, B			
			R1, R2			
			PE	1/8		
H240M□B	All ports in manifold: choice of ports in side or bottom	end plate and side ports	P	1/4	HA240-4E1 HA240-4E2 HA243-4E2	P, A, B, R1, R2 ports can be at the side or bottom by using isolator (end plate only for pilot EXH, PE port).
			A, B			
			R1, R2			
			PE	1/8		
		bottom ports	P	1/8		
			A, B			
			R1, R2			
H240M□BW	All ports in plug-in manifold: choice of ports in side or bottom	end plate and side ports	P	1/4	HW240-4E1 HW240-4E2 HW243-4E2	P, A, B, R1, R2 ports can be at the side or bottom by using isolator (end plate only for pilot EXH, PE port).
			A, B			
			R1, R2			
			PE	1/8		
		bottom ports	P	1/8		
			A, B			
			R1, R2			

MATERIALS OF MAIN PARTS

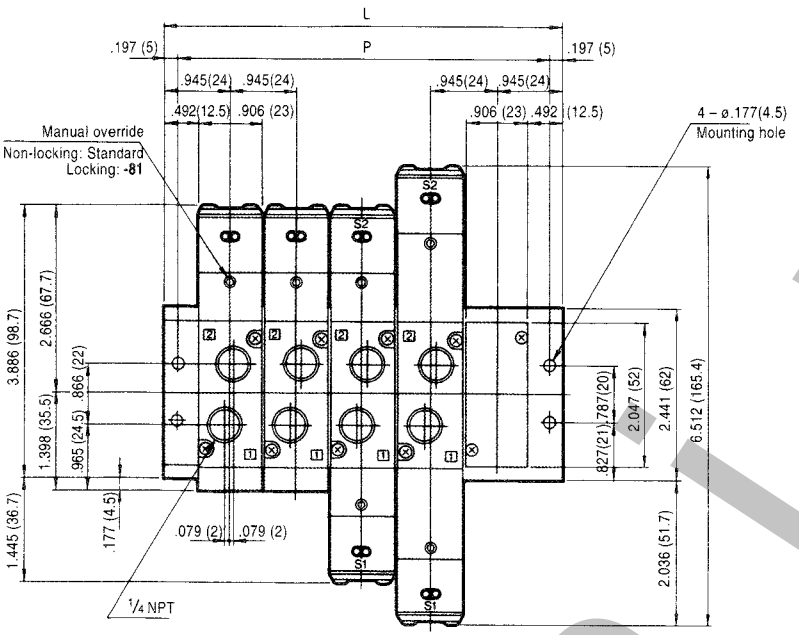
Item	Material
Manifold body	Diecast aluminum
Block-off plate	Mild steel (nickel plated)
Seal	Buna N

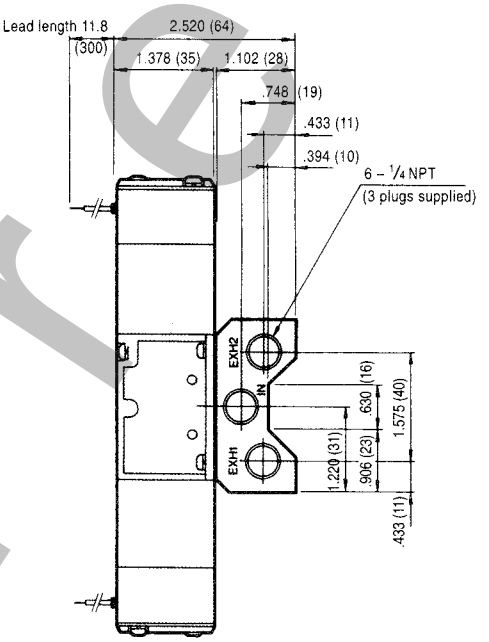
WEIGHT

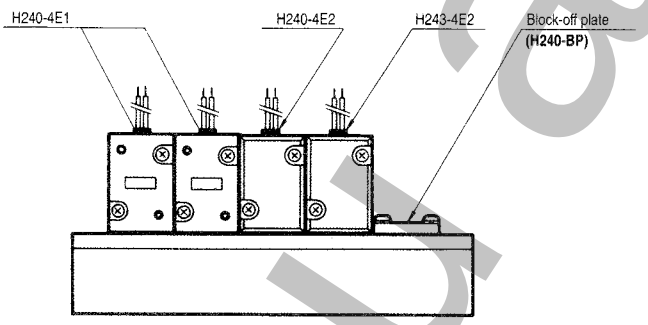
oz. (gf)

Manifolds	Calculation of each unit (N = stations)	Valves									Block-off plate
		H240-4E1	H240-4E2	H243-4E2	HA240-4E1	HA240-4E2	HA243-4E2	HW240-4E1	HW240-4E2	HW243-4E2	
H240M□F	2.4xn+2.4 (69xn+69)	5.6 (160)	8.1 (230)	9.2 (260)	–	–	–	–	–	–	1.1 (30)
H240M□A	5.9xn+7.7 (167xn+217)	–	–	–	5.6 (160)	8.1 (230)	9.2 (260)	–	–	–	
H240M□AW	7.1xn+9.5 (199xn+270)				–	–	–	5.6 (160)	8.1 (230)	9.2 (260)	
H240M□B	5.9xn+7.7 (167xn+217)				5.6 (160)	8.1 (230)	9.2 (260)	–	–	–	
H240M□BW	7.1xn+9.5 (199xn+270)				–	–	–	5.6 (160)	8.1 (230)	9.2 (260)	

H240M□F





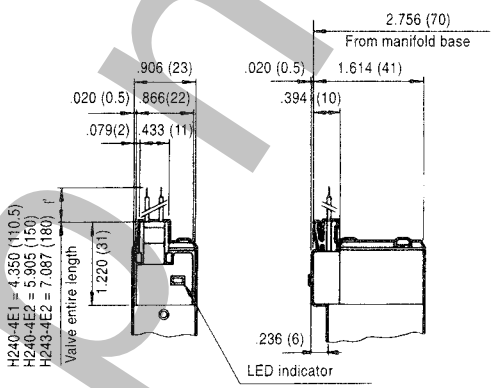


UNIT DIMENSIONS in. (mm)

Model	L	P
H240M2F	2.835 (72)	2.441 (62)
H240M3F	3.780 (96)	3.386 (86)
H240M4F	4.724 (120)	4.331 (110)
H240M5F	5.669 (144)	5.276 (134)
H240M6F	6.614 (168)	6.220 (158)
H240M7F	7.559 (192)	7.165 (182)
H240M8F	8.504 (216)	8.110 (206)
H240M9F	9.449 (240)	9.055 (230)
H240M10F	10.394 (264)	10.0 (254)

OPTIONS

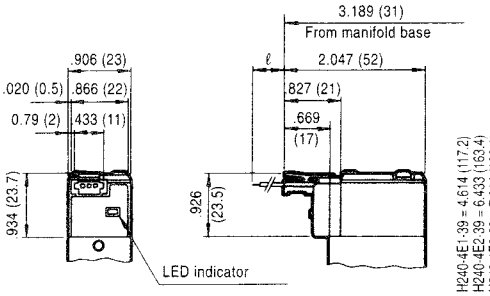
Straight connector w/LED indicator



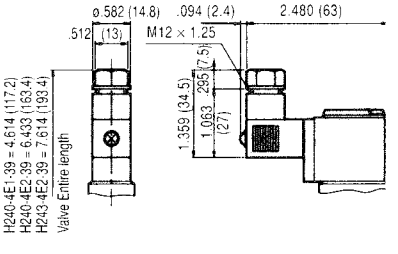
Surge suppressor varistor: -ZR.

Same dimensions as standard.

L-connector w/LED indicator



DIN connector solenoid: (-39)



BASIC MODELS AND CONFIGURATIONS – H010, H040

VALVES

DIRECT ACTING, IN-LINE

H010 Series – 2- and 3-way

Normally Closed (N/C)

H010E1

INDIRECT ACTING

H040 Series – 2- and 3-way

(N/C)

H041E1

(N/O)

H041E1-11

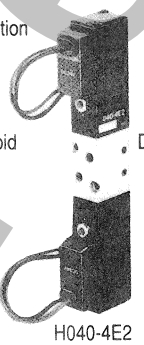
H040 Series – 4-way

2 position

Single solenoid

H040-4E1

Double solenoid

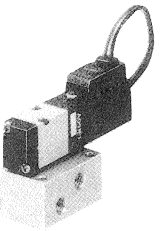


H040-4E2

SUB-BASE TYPE

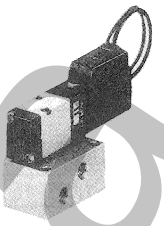
2 position

(N/C)



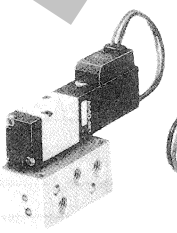
HA041E1

(N/O)



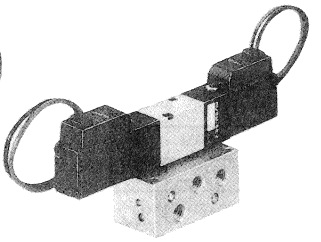
HA041E1-11

Single solenoid



HA040-4E1

Double solenoid



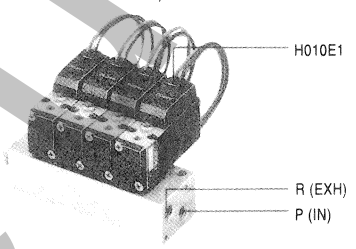
HA040-4E2

MANIFOLDS

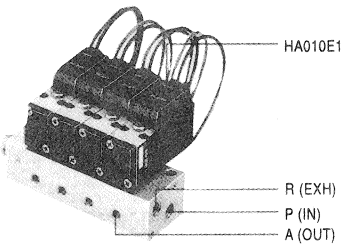
2- AND 3-WAY MINIATURE MANIFOLD

H010 Series

H010M□F – F type manifolds have common inlet and common exhaust ports.



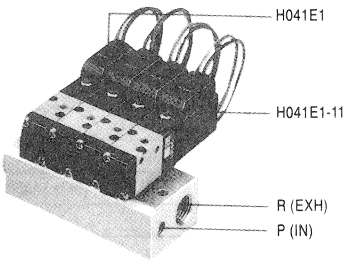
H010M□A – A type manifolds have all ports contained in the manifold.



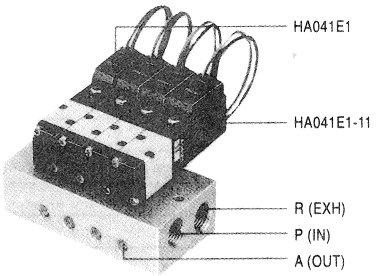
2- AND 3-WAY SMALL MANIFOLD

H041 Series

H041M□F – F type manifolds have common inlet and common exhaust ports.



H041M□A – A type manifolds have inlet, exhaust, and cylinder ports in manifold.

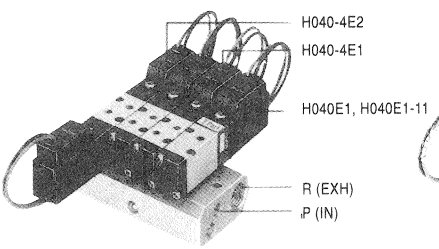


H041M manifolds accommodate 2- and 3-way valves.

2-, 3-, AND 4-WAY SMALL MANIFOLD

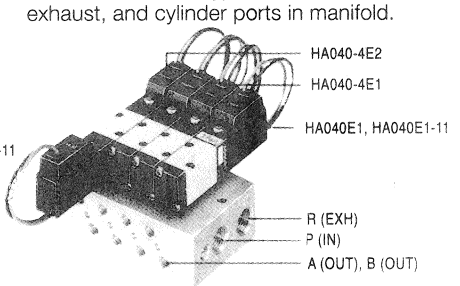
H040 Series

H040M□F – F type manifolds have common inlet and common exhaust ports.



2- and 3-way valves for manifold mounting only.

H040M□A – A type manifolds have inlet, exhaust, and cylinder ports in manifold.



H040M series manifolds accommodate 2-, 3- and 4-way valves in any combination.

LIST OF SPECIFICATIONS
MICRO SOLENOID VALVES SERIES H040

BASIC MODELS AND VALVE FUNCTIONS

Item	Model			
	In-line and F type manifold	H041E1 H040E1	H040-4E1	H040-4E2
	Sub-base and A type manifold	HA041E1 HA040E1[NOTE]	HA040-4E1	HA040-4E2
Number of positions		2 positions		
Number of ports		2- and 3-way	4-way	
Valve functions		N/C standard N/O optional	Single solenoid	Double solenoid

NOTE: See pages 11 and 12 for option specifications and order code. H040E1 and HA040E1 are the 2- and 3-way valves to be mounted on the 2, 3 and 5 port combination manifolds only. They cannot be used in-line. If the 2- and 3-way valve is used, use H041E1 and HA041E1 with sub-base.

SPECIFICATIONS

Item		Model		
	In-line and F type manifold	H041E1 (H040E1)	H040-4E1	H040-4E2
	Sub-base and A type manifold	HA041E1 (HA040E1)	HA040-4E1	HA040-4E2
Media		Air		
Type of operation		Indirect acting		
Effective area in.^{2} (mm^2) [Cv][NOTE 1]		.002 (1.5) [0.08]		
Port threads[NOTE 2]		M3x0.5		
Lubrication		Not required		
Pressure range psi (kgf/cm^2)		28.5 ~ 100 psi (2 ~ 7)		
Proof pressure psi (kgf/cm^2)		150 (10.5)		
Response time[NOTE 3] ON/OFF ms	DC5V, DC12V	Below 12/15		12
	DC6V, DC24V			
Maximum cycles/second		5		
Ambient range of operating temperature °F (°C)		41 ~ 122 (5 ~ 50)		
Shock resistance G		140 (60 in direction of stem)		
Mounting direction		Unrestricted		

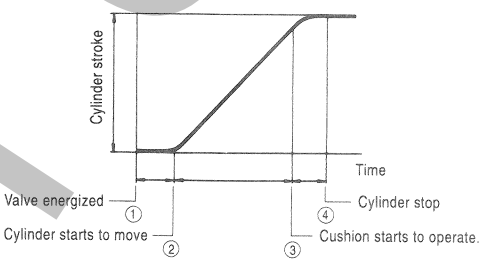
NOTE 1: Please refer to Effective Area chart on page 15 for details.
NOTE 2: Please refer to Port Dimensions chart on page 15.
NOTE 3: Value with air pressure at 70 psi (5 kgf/cm^2). Value of H040-4E2 is with pressure opposite the coil energized.

ELECTRICAL SPECIFICATIONS CHART

Item		Voltage			
		5 VDC	6 VDC	12 VDC	24 VDC
Type		Flywheel diode incorporated for surge suppression			
Voltage range VDC		4.5 ~ 5.5 (5 ± 10%)	5.4 ~ 6.6 (6 ± 10%)	10.8 ~ 13.2 (12 ± 10%)	21.6 ~ 26.4 (24 ± 10%)
Current mA	Standard	120 (0.6W)	105 (0.6W)	55 (0.7W)	28 (0.7W)
	With LED	130 (0.65W)	115 (0.7W)	65 (0.8W)	40 (1.0W)
Maximum allowable current leakage mA		10	7	5	2
Heat rise °F (°C)		68° (20°)			
Insulation resistance MΩ		Over 100			
Connector and lead wire length	Standard	Grommet type 12 in. (300mm)			
	Option	Plug connector type 12 in. (300mm)[NOTE 4]			
Lead wire colors		Green (+) Black (–)	Blue (+) Black (–)	Brown (+) Black (–)	Red (+) Black (–)
LED indicator		Red			
Surge suppression		Flywheel diode			

NOTE 4: Please refer to page 12 for made-to-order information.

HOW TO FIGURE STROKE TIME (CYLINDER SPEED)



1. To obtain stroke speed, add t1 to t2. t1 is the lag time of coil energizing point 1 to when the cylinder begins to move point 2. t2 is the maximum speed zone of cylinder moving to its fullest position at point 3.
2. If a cushion is incorporated, add t3 to the sum of t1 and t2. Point 3 now becomes the point where the cushion begins to take effect. Point 4 is the end of stroke when cushion is incorporated.

MEASUREMENT CONDITIONS

H040-4E1

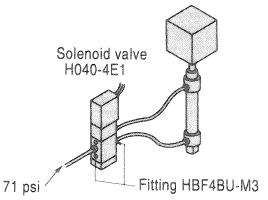
Air pressure: 71 psi (5 kgf/cm^2)

Tubing I.D. and length: ø .098 in. (2.5mm) x 39.370 in. (1000mm)

Fitting: HB4BU-M3

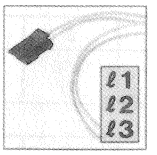
$$\text{Load ratio} = \frac{\text{Load}}{\text{Cylinder theoretical thrust}} \ (\%)$$

Examples for ø 3/8 in. nominal (ø 10mm actual) bore, ø 5/8 in. nominal (ø 16mm actual) bore, the stroke is 2.362 in. (60mm). For ø 3/4 in. nominal (ø 20mm actual), ø 1 1/4 in. nominal (ø 32mm actual) bore, the stroke is 3.397 in. (100mm).



MADE TO ORDER

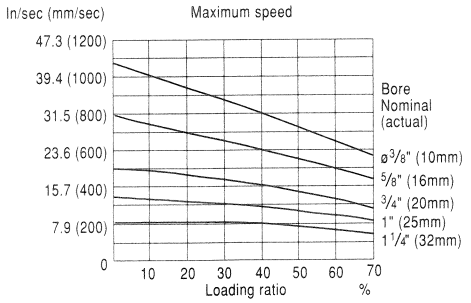
Plug model number

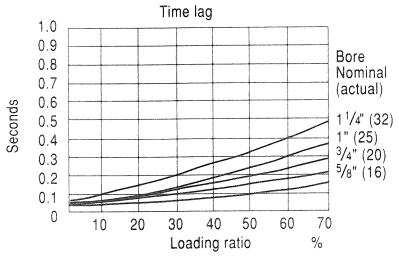


For plug connector only.
Length in. (mm) ℓ1=36 (1000)
ℓ2=72 (2000)
ℓ3=108 (3000)

CYLINDER SPEED

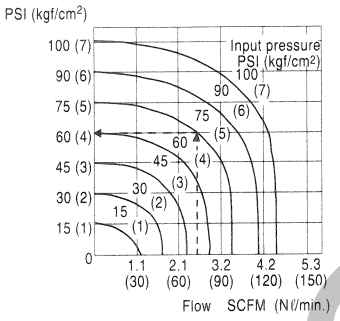
H040 Series





AIR FLOW

H041-H040 Series



EFFECTIVE AREA [Cv] in.^{2} (mm^2)

Model	Standard	Notes
H041E1 [H040E1] H040-4E1 H040-4E2	.002 (1.5) [.08]	When HT53-M3M fittings are used in P, A and B ports, valves become .001 (.75) [.001 (.04)]. When HT53-M3M fittings are used in the A and B ports of "F" type manifold, valves become .001 (.80), [.001 (.05)].
HA041E1 [HA040E1] HA040-4E1 HA040-4E2	.002 (1.5) [.08]	When HT54-M5M fittings are in the P, A, and B ports of "A" type manifold, valves become .002 (1.30), [.001 (.07)].

VALVE PORT DIMENSIONS

Model	Port	Type	Dimensions
H041E1 (H040E1NOTE)	P, A, R	Female thread	M3x0.5
H040-4E1 H040-4E2	P, A, B, R	Female thread	M3x0.5
HA041E1-25 HA040-4E1-25 HA040-4E2-25	P	Female thread	10-32 UNF
	A, B		
	R		
	PR		

NOTE: H040-4E1 is to be used on manifolds only. Use H041E1 for in-line service.

MANIFOLD CONNECTION PORT DIMENSIONS

Manifold model	Port	Component	Dimensions
H041M□F H040M□F	P	Manifold	10-32 UNF
	A, B	Valve	M3x0.5
	R	Manifold	1/8 NPT
H041M□A H040M□A	P	Manifold	1/8 NPT
	A, B	Manifold	10-32 UNF
	R	Manifold	1/8 NPT

VALVE WEIGHTS oz.(gf)

Model	Weight per unit
H041E1	0.81 (23)
H040E1	0.88 (25)
H040-4E1	0.88 (25)
H040-4E2	1.48 (42)
HA041E1	0.85 (24)*
HA040E1	0.88 (25)
HA040-4E1	0.88 (25)**
HA040-4E2	1.48 (42)**

* Add .60 oz. (13 gf) for sub-base weight, code 25.
** Add .81 oz. (23 gf) for sub-base weight, code 25.

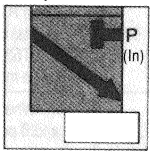
MANIFOLD WEIGHT oz. (gf)

Type	Weight calculation of each station (n = number of stations)	Block-off plate
H041M□F	{0.36 (10.1) x n} + 0.53 (14.9)	0.07 (2)
H041M□A	{0.43 (12.3) x n} + 0.67 (19)	0.11 (3)
H040M□F	{0.31 (8.8) x n} + 0.52 (14.8)	0.11 (3)
H040M□A	{0.63 (17.8) x n} + 1.35 (38.2)	0.14 (4)

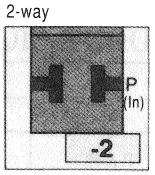
H040 SERIES ORDERING NOMENCLATURE

2- and 3-way Valve Function

3-way

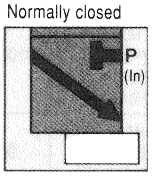


2-way

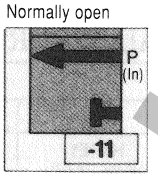


2- and 3-way Valve Function

Normally closed



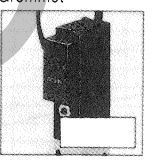
Normally open



Connector type

Standard lead wire length of 12 in. (300 mm)

Grommet



Straight connector with LED

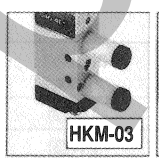
"L" type connector with LED

		Model			Voltage	
In-line Valve	2- and 3-way	H040E1	-2	-11	-PSL -PLL	5 VDC 6 VDC 12 VDC 24 VDC
	4-way Single solenoid	H040-4E1				
	4-way Double solenoid	H040-4E2				
		HA040-4E2				
Sub-base Mounted	2- and 3-way	HA041E1	-2	-11	-PSL -PLL	5 VDC 6 VDC 12 VDC 24 VDC
	4-way Single solenoid	HA040-4E1				
	4-way Double solenoid	HA040-4E2				
* 2-, 3-, and 4-way manifolds for using 3- and 4-way valves	H040M□ F 2- and 3-way	H040E1	-2	-11	-PSL -PLL	5 VDC, 6 VDC 12 VDC, 24 VDC
	H040M□ A 2- and 3-way	HA040E1	-2	-11		

* NOTE: This series cannot be used without manifold.

OPTIONAL PARTS (AVAILABLE SEPARATELY)

Mufflers



For in-line valves.

For sub-base.

Block-off plates

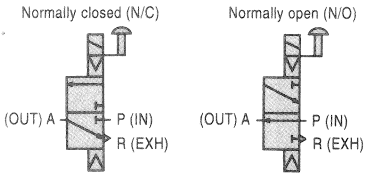
H040 M F -BP

F- For "F" type manifold.
A- For "A" type manifold.

H041- H041M only.
H040- H040M only.

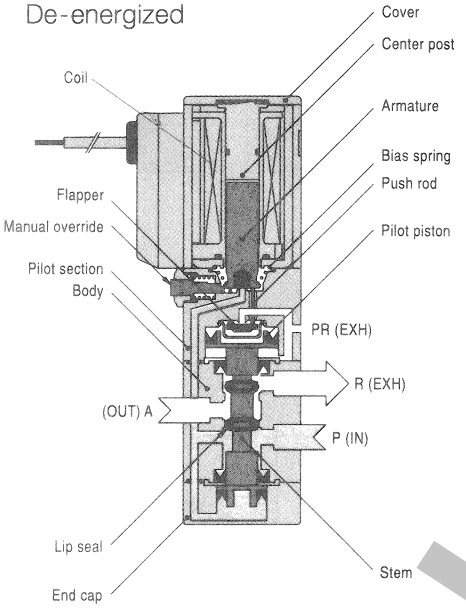
3 WAYS

H041E1



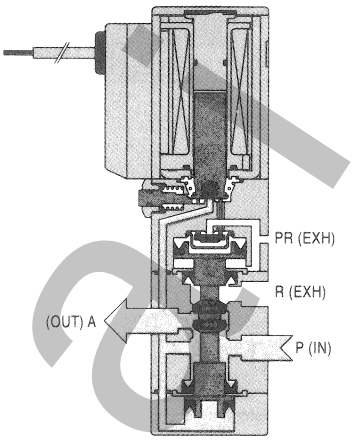
H041E1

De-energized



H041E1-11

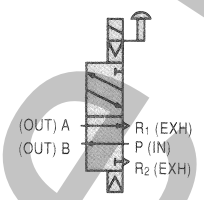
De-energized

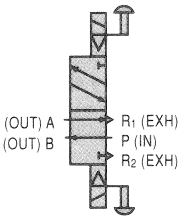


MATERIALS OF MAIN PARTS

Part		Material
Valve	Body	Aluminum
	Stem	
	Lip seal	Buna N
	Flapper	
	Mounting base	Zinc plated steel
	Sub-base	Aluminum
	Armature	Electro magnetic Stainless steel
	Center post	
Manifold	Body	Aluminum
	Block-off plate	Nickel plated steel
	Seal	Buna N

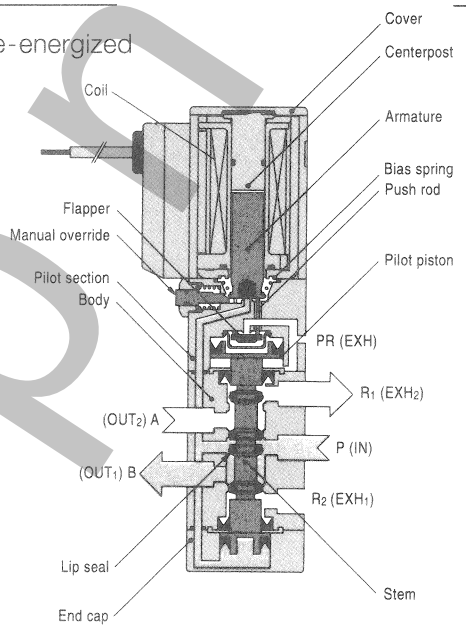
4 WAYS



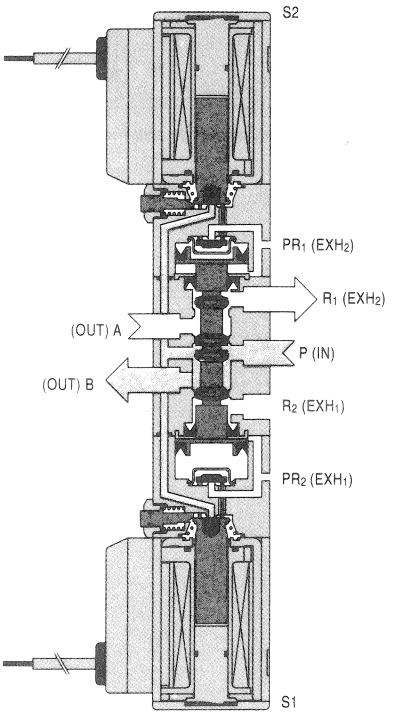


H040-4E1

De-energized

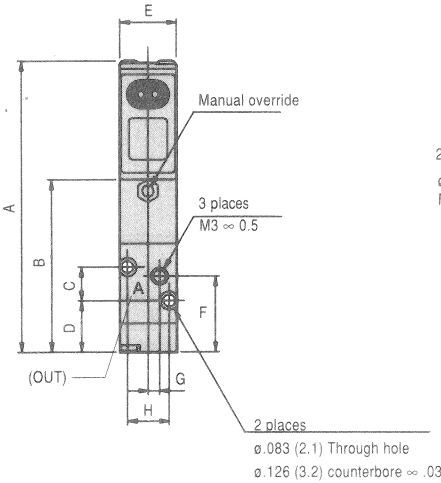


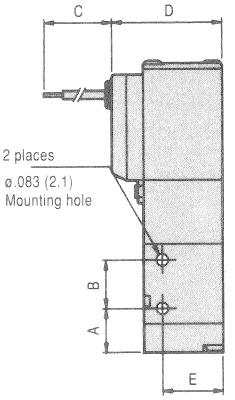
H040-4E2

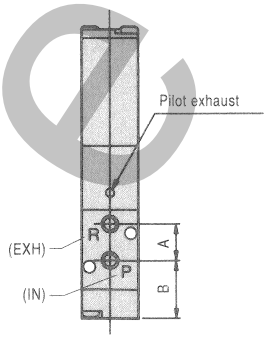


2- AND 3-WAY VALVE SERIES – in. (mm)

H041E1





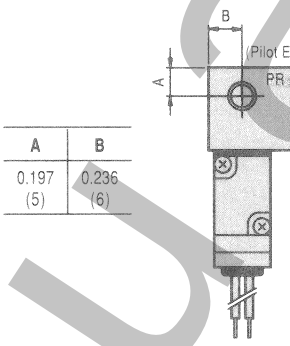


DIMENSIONS – in. (mm)

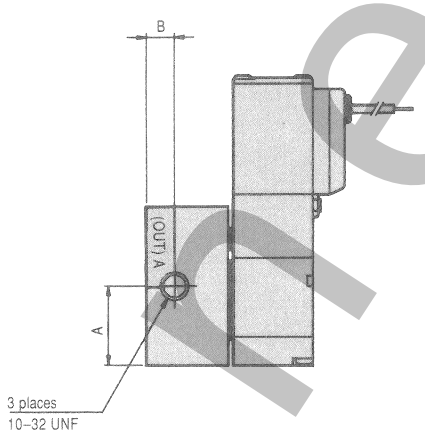
A	B	C	D	E	F
2.012 (51.1)	1.189 (30.2)	0.232 (5.9)	0.354 (9)	0.394 (10)	0.534 (13.3)

A	B	C	D	E	G	H	A	B
0.303 (7.7)	0.335 (8.5)	12 (300)	0.772 (19.6)	0.423 (10.75)	.078 (2.0)	.29 (7.4)	0.251 (6.4)	0.398 (10.1)

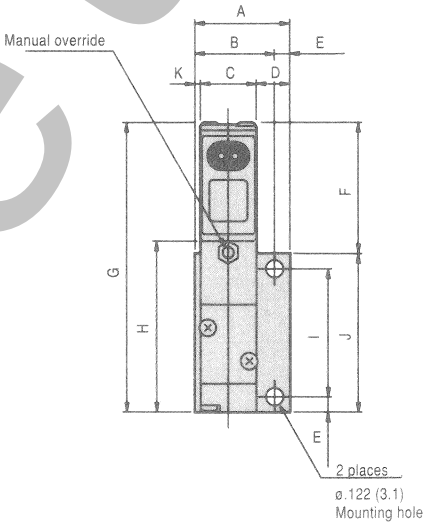
HA041E1-25



A	B
0.197 (5)	0.236 (6)

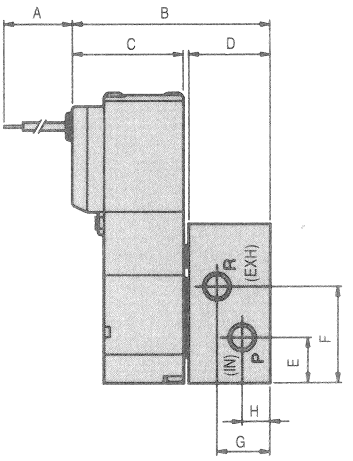


A	B
0.551 (14)	0.197 (5)



A	B	C	D	E	F
0.669 (17)	0.563 (14.3)	0.394 (10)	0.236 (6)	0.106 (2.7)	0.909 (23.1)

G	H	I	J	K
2.0 (50.8)	1.189 (30.2)	0.890 (22.6)	1.102 (28)	0.039 (1)



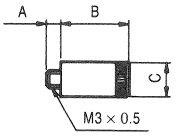
A	B	C	D
12 (300)	1.382 (35.1)	0.772 (19.6)	0.571 (14.5)

E	F	G	H
0.315 (8)	0.669 (17)	0.374 (9.5)	0.197 (5)

Valve mounting screws to manifolds and subbases: M2xL16

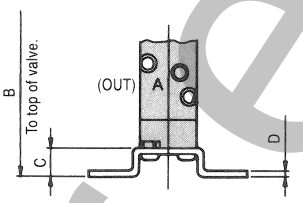
OPTIONS

Muffler: Sold separately.
Order number HKM-03.



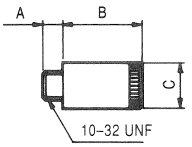
A	B	C
0.098 (2.5)	0.472 (12)	0.236 (6)

Mounting base: Code 21

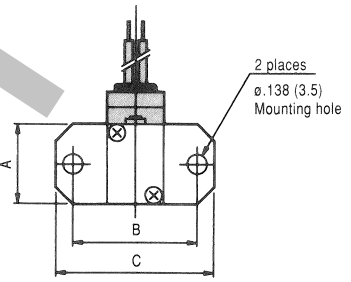


B	C	D
2.197 (55.8)	0.197 (5)	0.063 (1.6)

For sub-base use. Sold separately.
Order number HKM-05.



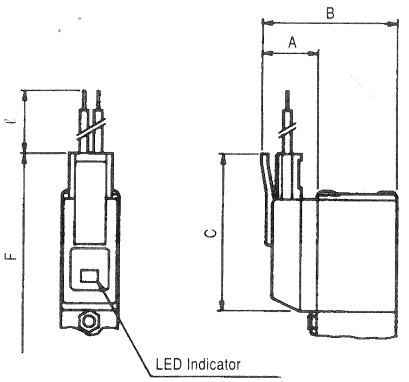
A	B	C
0.138 (3.5)	0.551 (14)	0.315 (8)



A	B	C
0.551 (14)	0.866 (22)	1.102 (28)

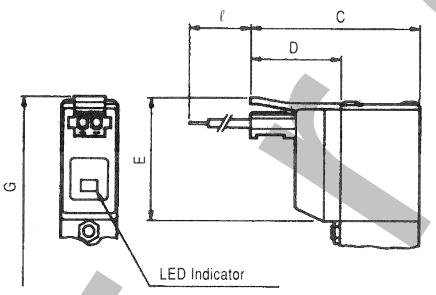
OPTIONS

Solenoid with straight connector – PSL



A	B	C
0.394 (10)	1.024 (26)	1.083 (27.5)

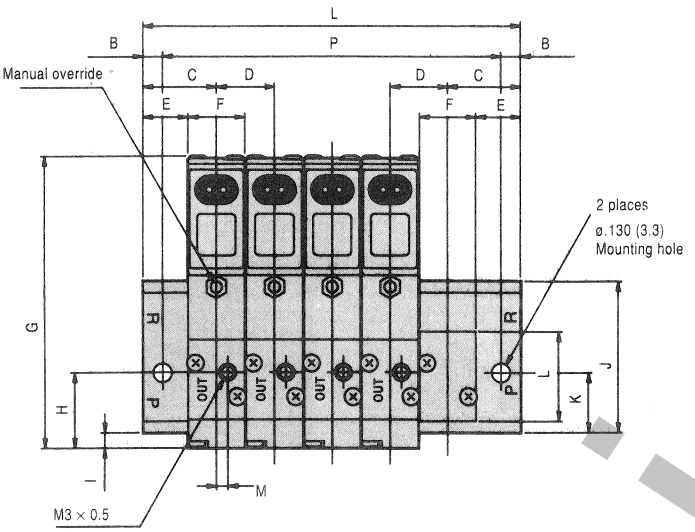
Solenoid with "L" connector – PLL

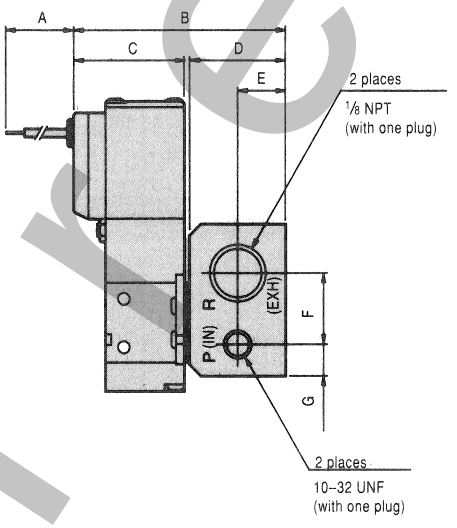


C	D	E
1.181 (30)	0.630 (16)	0.846 (21.5)

DIMENSIONS

Valve	F	G	ℓ (Lead wire length)	Notes
H041E1, HA041E1-25	2.271 (57.7)	2.035 (51.7)	-PSL, -PLL: 12 (300) Made to order: ℓ1 – 36 (1000) ℓ2 – 72 (2000) ℓ3 – 108 (3000)	Whole lengths to valve end or sub-base end
H040-4E1	2.417 (61.4)	2.181 (55.4)		
HA040-4E1-25	2.562 (65.1)	2.326 (59.1)		
H040-4E2, HA040-4E2-25	3.747 (95.2)	3.275 (83.2)		Whole length from the solenoid end to opposite end of valve



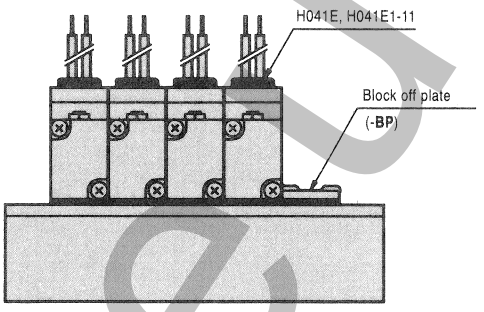


B	C	D	E	F	G
0.138 (3.5)	0.512 (13)	0.402 (10.2)	0.315 (8)	0.394 (10)	2.012 (51.1)

H	I	J	K	L	M
0.524 (13.3)	0.106 (2.7)	1.043 (26.5)	0.413 (10.5)	0.618 (15.7)	0.079 (2.0)

A	B	C	D
12 (300)	1.481 (37.6)	0.772 (19.6)	0.669 (17)

E	F	G
0.335 (8.5)	0.492 (12.5)	0.217 (5.5)



"F" TYPE MANIFOLD DIMENSIONS BY UNIT in. (mm)

Model	L	P	Model	L	P
HA041M2F	1.425 (36.2)	1.150 (29.2)	HA041M12F	5.441 (138.2)	5.165 (131.2)
HA041M3F	1.827 (46.4)	1.551 (39.4)	HA041M13F	5.843 (148.4)	5.567 (141.4)
HA041M4F	2.228 (56.6)	1.953 (49.6)	HA041M14F	6.244 (158.6)	5.968 (151.6)
HA041M5F	2.630 (66.8)	2.354 (59.8)	HA041M15F	6.646 (168.8)	6.370 (161.8)
HA041M6F	3.031 (77)	2.756 (70)	HA041M16F	7.047 (179)	6.772 (172)
HA041M7F	3.433 (87.2)	3.157 (80.2)	HA041M17F	7.449 (189.2)	7.173 (182.2)
HA041M8F	3.835 (97.4)	3.559 (90.4)	HA041M18F	7.850 (199.4)	7.575 (192.4)
HA041M9F	4.236 (107.6)	3.961 (100.6)	HA041M19F	8.252 (209.6)	7.976 (202.6)
HA041M10F	4.638 (117.8)	4.362 (110.8)	HA041M20F	8.654 (219.8)	7.984 (212.8)
HA041M11F	5.040 (128)	4.764 (121)	–	–	–

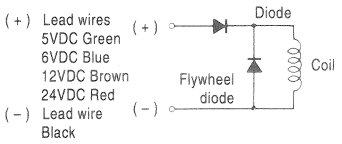
Valve mounting screws to manifolds and subbases: M2 x L16

PROPER HANDLING AND PRECAUTIONS

SOLENOID

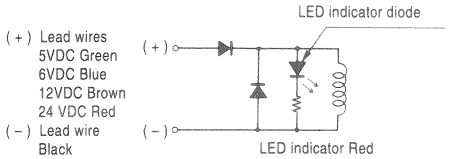
INTERNAL CIRCUIT

STANDARD SOLENOID (Transient suppression incorporated)



SOLENOID WITH LED INDICATOR (Transient suppression)

Order No. -PSL, -PLL

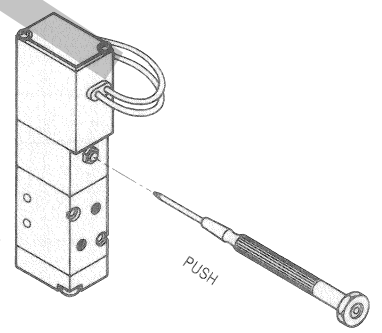


CAUTIONS

1. Do not apply megger across lead wires.
2. Valve is polarity protected.
3. If current leakage within the circuit exceeds the recommended allowable quantity, the solenoid may not drop out. This malfunction is demonstrated by the valve not returning to the "home" position when de-energized (single solenoid).
4. Do not energize double solenoids simultaneously. The valve may midshift.

MANUAL OVERRIDE OPERATION

Push the button all the way down, using a fine-tipped instrument. While pushing the button, the single solenoid valve will enter into the energized position. It will return to the "home" position when released. For the double solenoid, when the push button at the S_1 (S_2) side is pushed, it will switch to the same condition as with the S_1 (S_2) energized position. The valve will remain in that position even after the button is released. To return, operate the push button at the opposite end of the valve S_2 (S_1).



CAUTIONS

1. The H040 series is indirect acting type. Therefore, the body of the valve will not operate when pushing the manual override button unless minimum air pressure is supplied to the P-port.
2. Do not use a sharp tipped instrument to operate the manual override button. It may damage the button.

MANIFOLD

PIPING

Ports P and R are located at both ends of the manifold. Piping direction can be determined according to the mounting location. Ports at one end of the manifold are temporarily plugged during shipping. Remove plugs and reseal with sealing agent.

BLOCK OFF PLATE

Use Block Off Plate to close stations when they are not in use. See charts on page 16 for proper model.

CAUTIONS

1. For P port piping, make sure to select fitting sizes to fit the manifold connecting pipe dimensions. Actuators may not operate properly if there is insufficient flow and/or pressure due to improper piping.

2. When installing fittings or mufflers to R port, make sure that exhaust remains unrestricted. Restriction of exhaust may cause actuators to operate erratically. Consider using R ports at both ends of manifold to enhance exhaust.

3. When several manifold valves are to be operated simultaneously, connect supply air to both ends of manifold. Also exhaust through both ends of manifold. This ensures adequate supply and exhaust capacity.

POINTS TO BE CONSIDERED

INSTALLATION

1. Mount valves in any direction. However, mount valves perpendicular to significant shock or vibration.

2. Location near water, oil, or in excessively dusty conditions requires adequate solenoid housing protection to prevent solenoid actuator contamination. Also consider the installation of breather/muffler in exhaust ports to prevent foreign objects from entering valves.

3. Before installing fittings and tubing, blow all foreign material from them. If using a sealant, take extra care that sealant does not enter valve causing potential malfunction and/or leaks.

4. When valves are installed in tight enclosures, consider the possibility of heat build up. Ensure adequate ventilation.

5. Valves with A or B ports open to atmosphere will not operate properly.

AIR SOURCE

1. Use compressed air or inert gas in accordance with the pressure rating in the specifications.

2. Compressed air should be clean and uncontaminated. When in doubt, install an air filter with filtering capacity of 40 microns. Periodically remove and clean or replace filter element.

3. For optimum performance, use largest possible tubing size and minimum tubing length.

LUBRICATION

No externally applied lubrication is required. However, when dry air is used (air that does not contain water or oil), use of a turbine SAE 20 oil (ISO VG32) or equivalent is recommended. Thin or low viscosity oils (spindle oil, machine oil, etc.) do not provide a good residual film of lubrication, thus should not be used.

AIR QUALITY

These valves cannot be used when media or ambient conditions contain organic solvents, phosphoric acid, ester type machine oil, sulfuric acid gas, or other acids.