MAXITROL®

325 Series Appliance Pressure Regulators

For 2 psi, 5 psi, and 10 psi piping systems.

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DESCRIPTION

325 Series pounds to inches regulators are for use on residential, commercial, and industrial applications.

The 325 Series features a high leverage valve linkage assembly to deliver positive dead-end lock-up. The regulators are capable of precise regulating control from full flow down to pilot flow.

B Models: Imblue Technology™ increases corrosion resistance and provides extra protection against the elements for regulators used in outdoor applications.

NOTE: (B) in model number designates Imblue Technology™.

NOTICE

These regulators provide no downstream over-pressure protection in the event of failure. At supply pressures in excess of 2 psi, they should not be used unless downstream appliance controls are rated for supply pressure or protected by some other means. For Technical Support contact a Maxitrol Technical Support Representative. See Maxitrol Safety Warning Instructions, GPR_MI_EN.ES

SPECIFICATIONS

Gases
Suitable for natural, manufactured, mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

Approvals
CSA: ANSI Z21.18/CSA 6.3

Maximum Inlet Pressure

Model	CSA Certified	Maxitrol Tested
325-3(B) 325-5A(B)	2 psi (13.8 kPa), 5 psi (34.5 kPa)	10 psi (69 kPa)
325-7A(B)	Not Certified	
Model	**With 12A09, 12A39, or 12A49 Installed Maximum Inlet Pressure**	
325-3(B) 325-5A(B) 325-7A(B)	NAT: 5 psi (34.5 kPa) LP: 2 psi (13.8 kPa)	

Outlet Pressure Range (CSA Certified)

Model	Inlet Pressure	Spring Ranges
325-3(B)	2 psi (13.8 kPa)	5-9" w.c. 7-11" w.c.
325-3(B) 325-5A(B)	5 psi (34.5 kPa)	6-10" w.c. 7-11" w.c.

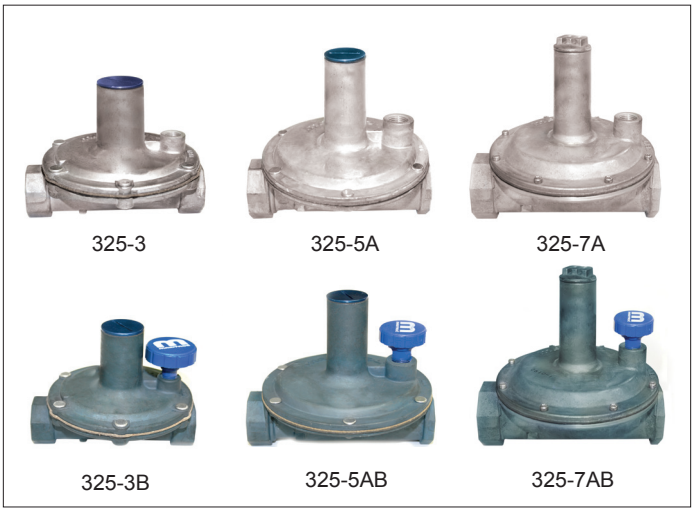


Figure 1: 325 Series Appliance Regulators

Emergency Exposure Limits
All models (Inlet Side Only)..... 65 psi (450 kPa)

Maximum Individual Load
Largest single appliance served by the regulator.
325-3(B) .....100,000 Btu/hr
325-5A(B) ..... 250,000 Btu/hr
325-7A(B) ..... 1,250,000 Btu/hr

Capacity
Total load of multiple appliances combined.
325-3(B) (3/8", 1/2") .....150,000 Btu/hr
325-5A(B) (1/2", 3/4", 1") ..... 300,000 Btu/hr
325-7A(B) (1 1/4", 1 1/2") ..... 1,250,000 Btu/hr

NOTE: Capacity table is used to determine the maximum multiple appliance load.The largest single appliance served by the regulator should not exceed the maximum individual load specified above.

Ambient Temperature Limits
All Models ..... -40ºF to 205ºF (-40ºC to 96ºC)

Vent Pipe Connections
325-3(B) .....1/8" NPT
325-5A(B) ..... 3/8" NPT
325-7A(B) .....1/2" NPT

Mounting Position
The 325 Series is suitable for multi-poise mounting, but when used with a vent limiting device, the regulator must be mounted in a horizontal upright position (see Figure 2). Install the regulator properly with gas flowing as indicated by the arrow on the casting. (See Maxitrol Safety Warning Instructions, GPR_MI_EN.ES)

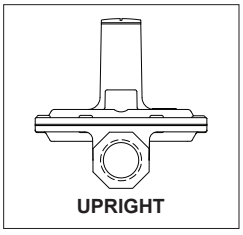


Figure 2: 325 Regulator in Upright Postion

vLimiter® Vent Limiting Devices

12A09 (1/8" NPT) 12A39 (3/8" NPT) 12A49 (1/2" NPT)

vProtector® Vent Protectors

13A15 (1/8" NPT) 13A15-5 (3/8" NPT) 13A25 (1/2" NPT)

Figure 3: Vent Accessories

vLimiter® Vent Limiting Device for Indoor Applications:

325-3(B) 12A09
325-5A(B) 12A39
325-7A(B) 12A49

NOTICE

Maxitrol vent limiting devices eliminate the need to run vent piping to the outside. Vent limiting devices are designed for use indoors and in spaces where limiting the amount of gas escapement due to diaphragm failure is critical. **Vent limiting devices should not be used outdoors if they are exposed to the environment.** Vent protectors are available for all outdoor applications to ensure proper vent protection.

vProtector® Vent Protectors for Outdoor Applications:

325-3(B) 13A15
325-5A(B).....13A15-5
325-7A(B).....13A25

PRESSURE DROP - 0.64 sp. gr. gas expressed in CFH (m^3/h) (for system pressure drop calculations)

Model	Pressure Drop				
	7.0" w.c. (1.7 kPa)	1/2 psi (3.4 kPa)	3/4 psi (5 kPa)	1 psi (7 kPa)	2 psi (13.8 kPa)
325-3(B)	145 (4.0)	204 (5.8)	250 (7.0)	289 (8.2)	—
325-5A(B)	338 (9.6)	476 (13.5)	583 (16.5)	673 (19.1)	—
325-7A(B)	815 (23.1)	1149 (32.5)	1405 (39.8)	1624 (46.0)	2305 (65.3)

NOTE: All Maxitrol gas appliance regulators must be installed and operated in accordance with Maxitrol's Safety Warning Instructions.

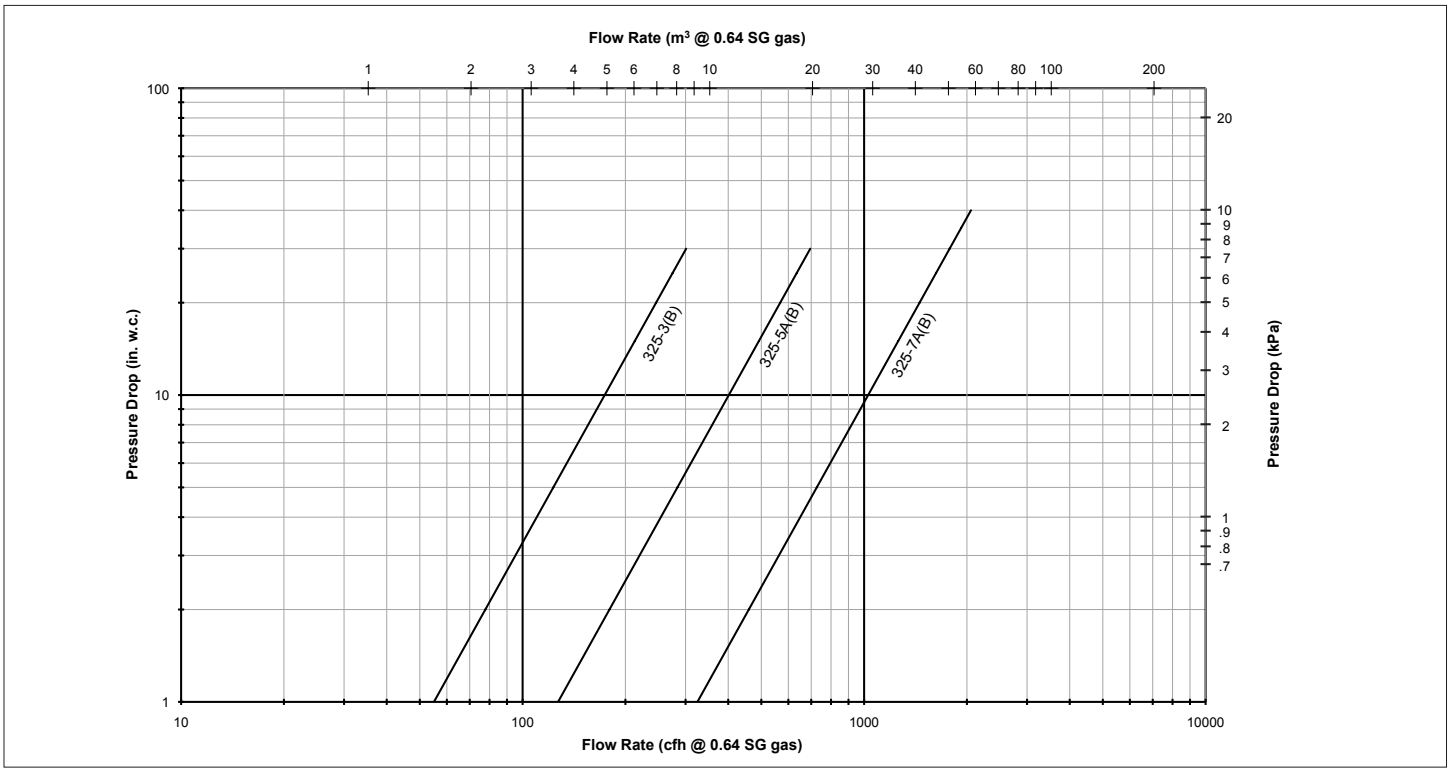


Figure 4: Pressure Drop Chart

CAPACITIES - Based on 1" w.c. pressure droop from set point**. 0.64 sp gr gas expressed in CFH (m^3/h)

Model Number (pipe size)	Outlet Pressure Set Point	CSA Maximum	Operating Inlet Pressure					
			1/2 psi (3.4 kPa)	3/4 psi (5 kPa)	1 psi (7 kPa)	2 psi (13.8 kPa)	5 psi (34.5 kPa)	10 psi (69 kPa)
325-3(B) (3/8", 1/2")	4.0" w.c. (1.0 kPa)	150 (4.2)	160 (4.5)	190 (5.4)	220 (6.2)	220 (6.2)	300 (8.5)	320 (9.1)
	7.0" w.c. (1.7 kPa)	150 (4.2)	120 (3.4)	150 (4.2)	180 (5.1)	220 (6.2)	290 (8.2)	320 (9.1)
	10.0" w.c. (2.5 kPa)	150 (4.2)	100 (2.8)	120 (3.4)	150 (4.2)	220 (6.2)	280 (7.9)	320 (9.1)
325-5A(B) (1/2", 3/4", 1")	4.0" w.c. (1.0 kPa)	300 (8.5)	300 (8.5)	340 (9.6)	416 (11.8)	500 (14.2)	600 (17.0)	680 (19.3)
	7.0" w.c. (1.7 kPa)	300 (8.5)	245 (6.9)	315 (8.9)	340 (9.6)	480 (13.6)	600 (17.0)	680 (19.3)
	10.0" w.c. (2.5 kPa)	300 (8.5)	225 (6.4)	270 (7.6)	312 (8.8)	430 (12.2)	560 (15.9)	680 (19.3)
325-7A(B) (1 1/4", 1 1/2")	4.0" w.c. (1.0 kPa)	---	850 (24.0)	1060 (30.0)	1190 (33.7)	1600 (45.3)	2090 (59.2)	2190 (62.0)
	7.0" w.c. (1.7 kPa)	---	780 (22.0)	950 (26.9)	1060 (30.0)	1500 (42.5)	1860 (52.7)	2060 (58.3)
	10.0" w.c. (2.5 kPa)	---	650 (18.4)	860 (24.4)	990 (28.0)	1300 (36.8)	1620 (45.9)	2060 (58.3)

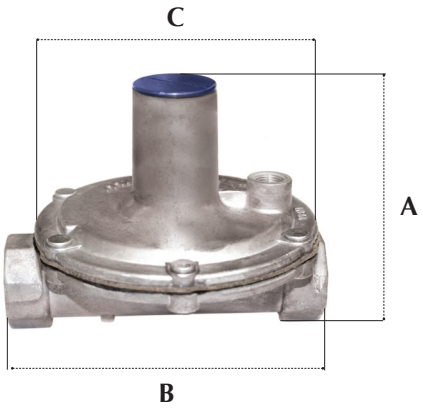
Maximum approved capacity for 325-3(B) is 100 CFH (2.8 m^3/h), 325-5A(B) is 250 CFH (7.1 m^3/h), 325-7A(B) is not CSA certified.
Approval based on use as an appliance regulator.
** Set points (in CFH): 325-3(B) = 50, 325-5A(B) = 150, 325-7A(B) = 500.

DIMENSIONS - Expressed in inches (mm)

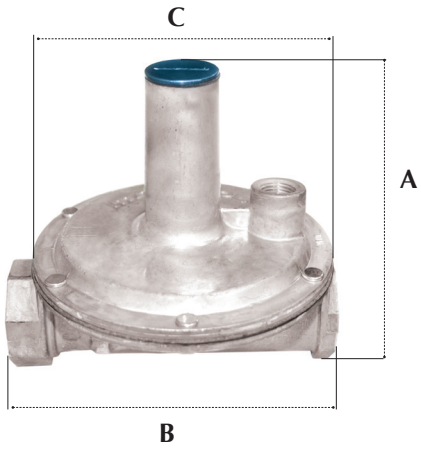
Model Number	Pipe Size*	Swing Radius	Dimensions		
			A	B	C
325-3(B)	3/8", 1/2"	3 (76)	3 1/2 (89)	4 1/4 (108)	3 7/8 (98)
325-5A(B)	1/2", 3/4", 1"	4 7/8 (124)	5 1/4 (133)	5 7/8 (149)	5 7/16 (138)
325-7A(B)	1 1/4", 1 1/2"	6 1/8 (156)	7 1/4 (184)	8 (203)	7 (178)

NOTE: Dimensions are to be used only as an aid in designing clearance for the regulator. Actual production dimensions may vary somewhat from those shown.

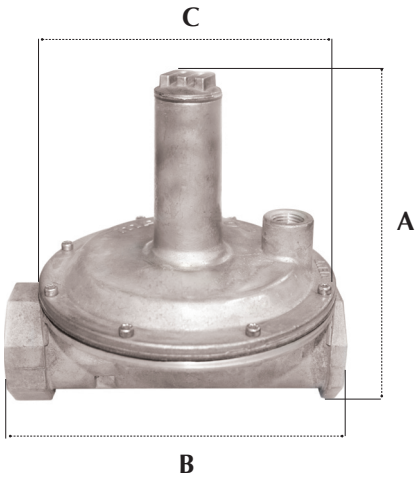
* Standard models NPT threads; 'M' models available with BSP threads.



325-3(B)



325-5A(B)



325-7A(B)

SPRING SELECTION CHART - Inches w.c (kPa) unless noted

Model Number	CSA Certified				Standard Spring	Other Springs Available			
	2 psi (13.8 kPa)		5 psi (34.5 kPa)						
325-3(B)	5 to 9 (1.25 to 2.25)	7 to 11 (1.7 to 2.7)	6 to 10 (1.5 to 2.5)	7 to 11 (1.7 to 2.7)	4 to 12 (1.0 to 3.0)	2 to 6 (0.5 to 1.5)	10 to 22 (2.5 to 5.5)	15 to 30 (3.7 to 1.5)	1 to 2 psi (6.9 to 13.9)
325-5A(B)	5 to 9 (1.25 to 2.25)	7 to 11 (1.7 to 2.7)	6 to 10 (1.5 to 2.5)	7 to 11 (1.7 to 2.7)	4 to 12 (1.0 to 3.0)	2 to 6 (0.5 to 1.5)	10 to 22 (2.5 to 5.5)	15 to 30 (3.7 to 1.5)	1 to 2 psi (6.9 to 13.9)
325-7A(B)	—	—	—	—	4 to 12 (1.0 to 3.0)	2 to 5 (0.5 to 1.2)	10 to 22 (2.5 to 5.5)	15 to 30 (3.7 to 1.5)	20 to 42 (5.0 to 10.4)

SIZING INSTRUCTIONS

When 325 Series regulators are used on 2 psi piping systems, often times the 2 psi systems are sized with a 1 psi pressure drop through the copper or stainless steel tubing. This means there will be 2 psi at the inlet of the regulator under no flow conditions, and 1 psi at the regulator inlet under maximum flow conditions.

TO SELECT AN APPLIANCE REGULATOR OF SUFFICIENT FLOW - ONE MUST KNOW:

1. Available inlet pressure (maximum static/minimum operating).

2. Desired outlet pressure.

3. Required maximum flow rate.

4. Pipe size.

Example: To select a 325 series regulator of sufficient capacity to handle flow...

KNOWN:

A. Desired flow rate 145 CFH.

B. Pipe size 1/2”.

C. Operating inlet pressure 2 psi.

D. Outlet pressure 7” w.c.

E. Lockup required.

SOLUTION:

A. Check pressure drop chart, page 2.

B. The 325-3’s pressure drop at a flow rate of 145 CFH is 7” w.c. This is well below the available differential of 1.75 psi.

C. The 325-3 (1/2”) used with a 5” to 9” spring, set at 7”, is the correct regulator to use for this application.

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Replaces 325 LVR_MS_EN

MAXITROL® company

Capacity Charts for Gas Pressure Regulators

The capacity of any regulator is not an absolute value, but will vary with the application depending on the prevailing differential. We hope the following charts will help you in your selection of a properly sized regulator.
Maxitrol gas appliances regulators should be installed and operated in accordance with our "Safety Warning Bulletin" — no untrained person should attempt to install, maintain, or service a gas pressure regulator.

POPPET MODELS — capacities expressed in Btu/h. — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure..... 1/2 psi

Model	Pipe Size	Pressure Drop @ 0.3" w.c.	Range of Regulation		Individual Load	
			Main Burner	M.B. and Pilot	Fixed Orifices	Ball Check Devices
RV12	1/8" x 1/8" 3/16" x 3/16"	14,800 8,800	30,000	25,000 15,000	20,000 15,000	—
RV20	1/4" x 1/4" 3/8" x 3/8"	30,000	65,000	50,000	30,000	—
RV20C	1/4" X 1/4" 3/8" X 3/8"	30,000	75,000	50,000	15,000	—
CV47 RV47	3/8" X 3/8" 1/2" X 1/2"	55,000 60,000	125,000	90,000	40,000	90,000
CV47A & C RV47A & C	3/8" X 3/8" 1/2" x 1/2"	55,000 60,000	125,000	125,000	40,000	125,000
RV48	1/2" X 1/2" 3/4" X 3/4"	130,000 150,000	230,000 250,000	230,000 250,000	40,000	160,000
RV48C	1/2" x 1/2" 3/4" x 3/4"	130,000 150,000	400,000	275,000 Nat 250,000 LP	40,000	160,000

NOTE: Minimum main burner regulation capacity for all models (except "N") is 150 Btu/h

STRAIGHT-THRU-FLOW — capacities expressed in CFH — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure: RV52 & 53.....1/2 psi
RV61, 81, 91 & 111..... 1 psi
R131..... 2 psi

Model Number and Pipe Size		CSA MAX	Pressure Drop (inches w.c.)												
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	2.0	3.0	4.0
RV52	1/2 x 1/2 3/4 x 3/4	450 450	151 151	214 214	262 262	302 302	338 338	370 370	400 400	427 427	453 453	478 478	676 676	828 828	956 956
RV53	3/4 x 3/4 1 x 1	710 710	217 217	306 306	375 375	433 433	484 484	530 530	573 573	612 612	650 650	684 684	968 968	1185 1185	1369 1369
RV61	1 x 1 1-1/4 x 1-1/4	1100 1100	379 379	536 536	675 675	759 759	848 848	929 929	1004 1004	1073 1073	1138 1138	1200 1200	1742 1742	2134 2134	2464 2464
RV81	1-1/4 x 1-1/4 1-1/2 x 1-1/2	2500 2500	780 780	1102 1102	1350 1350	1559 1559	1743 1743	1909 1909	2062 2062	2204 2204	2339 2339	2465 2465	3485 3485	4269 4269	4929 4929
RV91	2 x 2 2-1/2 x 2-1/2	3275 3275	1212 1212	1714 1714	2100 2100	2424 2424	2711 2711	2969 2969	3208 3208	3429 3429	3637 3637	3834 3834	5422 5422	6640 6640	7668 7668
RV111	2-1/2 x 2-1/2 3 x 3	7500 7500	2742 2742	3878 3878	4750 4750	5485 5485	6132 6132	6718 6718	7256 7256	7757 7757	8227 8227	8572 8572	12134 12134	14862 14862	17161 17161
RV131	4 x 4	—	4734	6695	8200	9468	10586	11596	12525	13390	14202	14971	21172	25930	29942

325 SERIES — capacities expressed in CFH — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure.....10 psi

Model Number and Pipe Size		Pressure Drop 0.3"	0.5"	1.0"	3.0"	5.0"	7.0"	1/2 psi	3/4 psi	1 psi
325-3	3/8 x 3/8	30	38	55	95	122	145	204	250	289
	1/2 x 1/2	30	38	55	95	122	145	204	250	289
325-5A	1/2 x 1/2	70	90	128	221	286	338	476	583	673
	3/4 x 3/4	70	90	128	221	286	338	476	583	673
	1 x 1	70	90	128	221	286	338	476	583	673

		1.0"	3.0"	5.0"	7.0"	1/2 psi	3/4 psi	1 psi	1.5 psi	1.75 psi
325-7	1-1/4 x 1-1/4	260	450	581	690	972	1191	1375	1685	1820
	1-1/2 x 1-1/2									

210 SERIES — capacities expressed in CFH — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure.....10 psi

Model Number and Pipe Size		Pressure Drop (inches w.c.) 0.1	0.3	0.5	1.0	3.0	5.0	7.0	1/2 psi	3/4 psi	1 psi	1.5 psi
210D	1 x 1	—	—	—	900	1600	2000	2400	3300	4100	4750	5800
	1-1/4 x 1-1/4	—	—	—	1100	1900	2500	2900	4100	5000	5850	7150
	1-1/2 x 1-1/2	—	—	—	1200	2100	2700	3200	4500	5500	6350	7750
210E	1-1/2 x 1-1/2	—	1050	1350	1915	3315	4280	5065	7125	8725	10075	12340
	2 x 2	—	1210	1560	2210	3825	4940	5845	8225	10070	11630	14245
210G	2-1/2 x 2-1/2	1410	2450	3160	4470	7740	9995	11825	16635	20375	23525	28810
	3 x 3	1555	2695	3475	4920	8520	11000	13020	18310	22425	25890	31710
210J	4 x 4	2700	4700	6000	8600	15000	19000	23000	32000	40000	45500	55700

R/RS SERIES — capacities expressed in CFH — 0.64
Maxitrol recommended maximum inlet pressure: R Model.....1 psi
RS Model..... 5 psi

Model Number and Pipe Size		Pressure Drop (inches w.c.) 0.2	0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	3.5	4.0
R400 & R400S	3/8 x 3/8	77	110	134	155	174	212	245	274	—	—	—
	1/2 x 1/2	86	121	148	172	192	235	271	303	—	—	—
R500 & R500S	1/2 x 1/2	163	231	283	327	366	447	516	577	635	685	730
	3/4 x 3/4	196	277	340	392	438	537	620	693	760	820	876
R600 & R600S	3/4 x 3/4	298	421	516	595	666	816	942	1054	1150	1245	1335
	1 x 1	330	468	572	661	739	906	1046	1169	1280	1380	1480

MAXITROL® company

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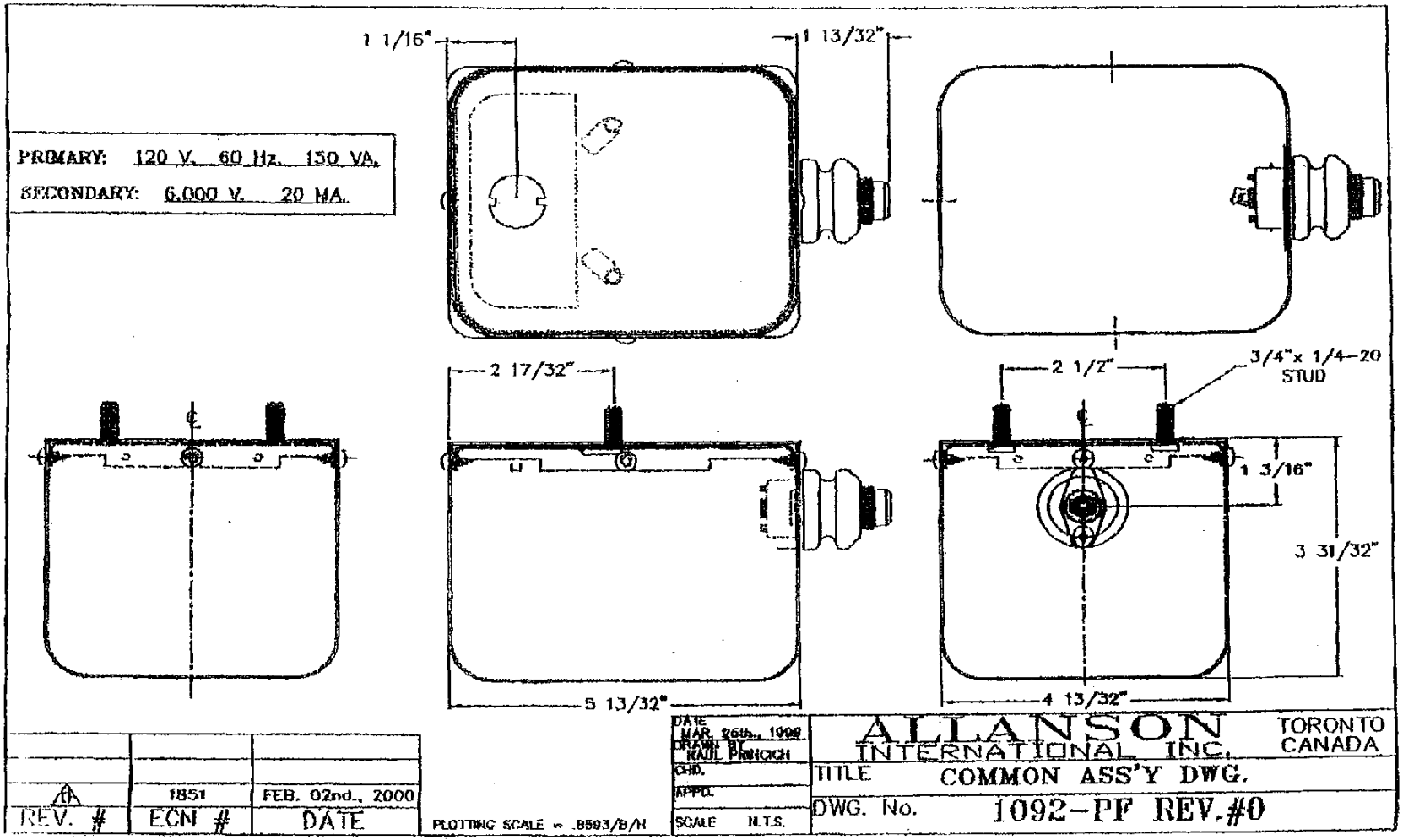
1092 6000 volt Ignition Transformer



32000

Antunes Controls
DIVISION OF A.J.ANTUNES & CO. · ISO 900 1:2000 CERTIFIED

Gas Pressure Switches

Model - G

Model - G

Antunes Controls' new line of Gas Pressure Switches monitors gas pressure and breaks the electrical control circuit when pressure drops below or rises above the desired
set point. The gas pressure settings are adjustable and all models are available in manual or automatic reset operation.

The switches are sturdy and constructed with a durable plastic electrical enclosure and a die-cast aluminum inlet base.

Features:

- Compact Design
- Accurate
- Adjustable Setpoints
- Manual or Automatic Reset
- Ventless
- Cost Effective Pricing
- Custom Design per OEM Specifications
- Mounts to Any Modular Valve Body

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MODEL - G

Specifications:

Reset
LGP-G - Single Unit, Lo-Pressure
HGP-G - Single Unit, Hi-Pressure
MODELS-RECYCLE
RLGP-G Single Unit, Lo-Pressure
RHGP-G Single Unit, Hi-Pressure
Electrical Ratings
10A @ 125 VAC
10A @ 250 VAC
1/3 HP, 125 & 250 VAC
Adjustable operating pressure
.5 W.C. to 4 psi (different ranges)
Surge pressure: 15 psi (1 Bar)
Max. Operating Pressure: 6 psi (400 mbar)
Ambient Operating Temperature:
-40° to 140°F (-40° to 60°C)
Field wiring to be rated @ 60°C for maximum 140°F ambient.
Shipping Weight: .5 lbs. (.225 kilos)

Options: (Contact Antunes Controls)
*NEMA 4 (IP -65)
4-Pin DIN Connector
Neon Lamp Indicator
Side Mounting

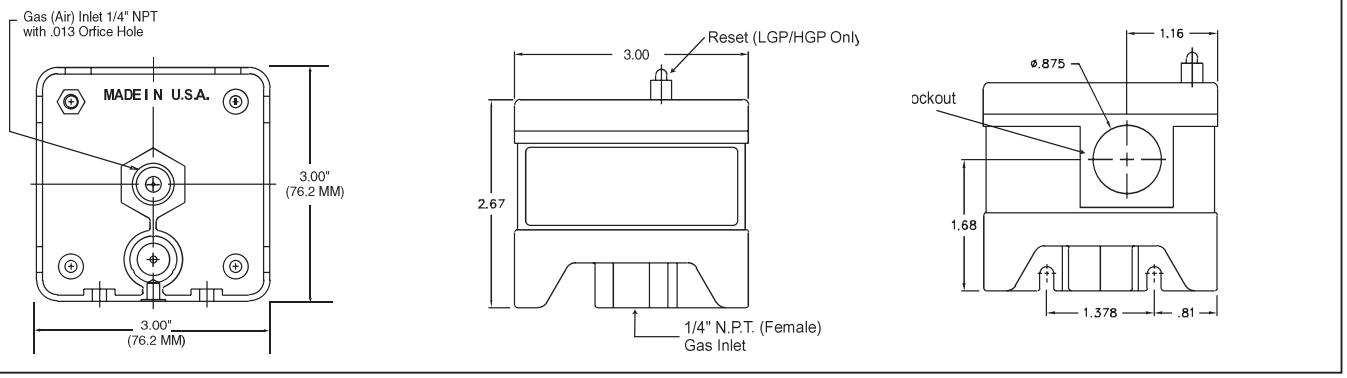
Low Ranges Available:

	Part No.	W.C.	mbar
LGP-G	8103116101	.5" - 4"	1.3 - 10
	8103116202	1" - 20"	3 - 50
	8103116303	5" - 30"	12.5 - 75
	8103116407	7" - 55"	17.5 - 137
RLGP-G	8104116102	.5" - 4"	1.3 - 10
	8104116203	1" - 20"	2.5 - 50
	8104116304	.5" - 30"	12.5 - 75
		PSI	**Bar**
	8104118005	1 - 4	.07 - .28

High Ranges Available:

	Part No.	W.C.	mbar
HGP-G	8101111202	.2" - 20"	5 - 50
	8101111303	8" - 35"	20 - 87
	8101111407	10" - 60"	25 - 150
RHGP-G	8102111102	.8" - 4"	2 - 10
	8102111203	2" - 20"	5 - 50
	8102111304	5" - 35"	12.5 - 87
		PSI	**Bar**
	8102113005	1 - 4	.07 - .28

Dimensions:



GGB 1020810019 Rev B

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Antunes Controls
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Air Pressure Switches
• Differential
• Vacuum
• Pressure
Model - SMD

Model - SMD

Antunes Controls is one of the leading manufacturers of pressure control switches. Our sheet metal air differential switches are compact, sensitive, and reliable. Their design is based on the same principles of reliability, repeatability and accuracy that has made our line of pressure switches so successful.

Features:

- Sensitive Diaphragm
- S.P.D.T. 10 Amp
- Industrial Construction
- Three Range Scales - from .17”W.C. to a maximum of 12” W.C.
- Easy to Install
- Cost Effective Pricing

A.J. Antunes & Co.
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Antunes Controls
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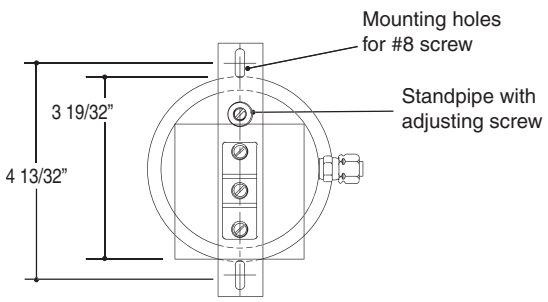
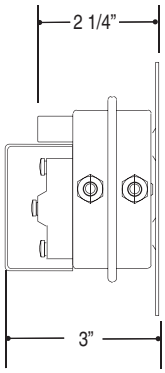
MODEL - SMD

Dimensions:





Electrical:

Ratings - All Models
10A@125VAC, 8A@250VAC, 7A@277VAC
1/8HP@125VAC, 1/4HP@250VAC
Pilot Duty – 125VA@125/277 VAC

Notes:

Standard mounting bracket is shown. For other mounting arrangements, contact factory.

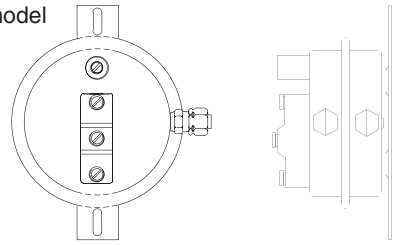
All Models	Optional Fittings
Max. Surge Pressure 20" W.C.	1/4" Barb
Max. Ambient Temp. 170° F	1/4" Tube
Max. Ambient Temp. -40° F	1/2" Compression

Switch Differential @ 70° F

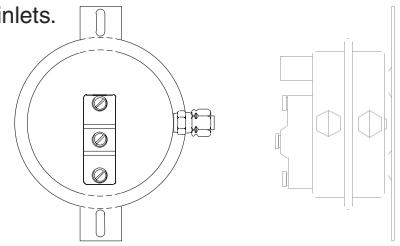
Differential	Operating Pressure Range
.015" to .03" W.C.	.17" - 1" W.C.
.5" W.C.	.17" - 6" W.C.
1.0 W.C.	.17" - 12" W.C.

Location of Inlets

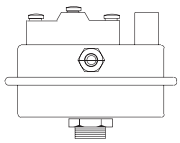
Adjustable differential model shown with side inlets.



Non-adjustable differential model shown with side inlets.



Adjustable differential model shown with one side inlet and machine thread adapter with nut. Specify 1/2"-14 NPSH or 3/4" NPSH.



A.J. Antunes & Co.
ISO 9001 CERTIFIED
180 Kehoe Boulevard Carol Stream, Illinois 60188 • USA
Phone: (630) 784-1000 • (800) 253-2991 • Fax: (630) 784-1650
www.ajantunes

ASCO® Red-Hat®

Direct Acting or Piloted

Aluminum Body Solenoid Valves

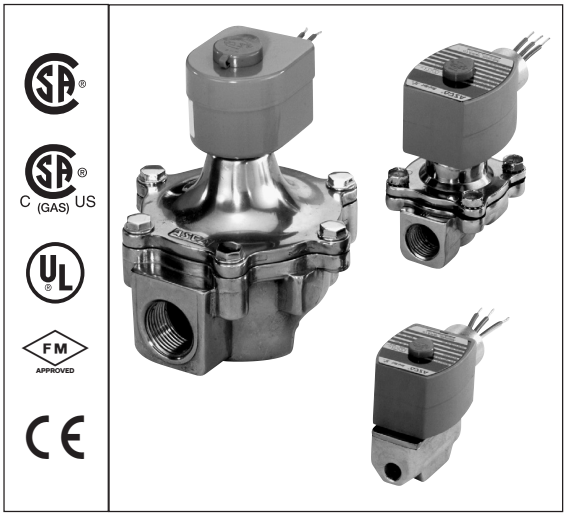
1/8" to 3" NPT

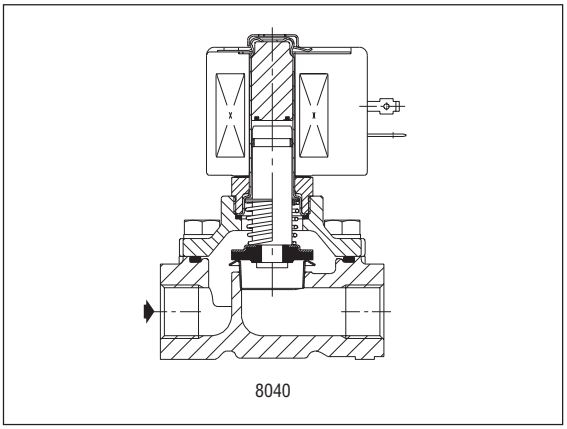
NC NC NO NO

2/2 SERIES 8040 8215

Features

- Lightweight, low-cost valves for air service.
- Ideal for low pressure applications.
- Provides high flow, Cv up to 138 (Kv 118).
- Air and vacuum service.





Construction

Valve Parts in Contact with Fluids	
Body	Aluminum
Seals, Diaphragms, Disc	NBR
Disc-Holder	PA (10.1 and 11.6 watt Normally Open only)
Core Guide	CA
Core Tube	305 Stainless Steel
Rider Rings	PTFE
Core and Plugnut	430F Stainless Steel
Springs	302 Stainless Steel
Shading Coil	Copper

Electrical

Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part No.			
		AC			General Purpose		Explosionproof	
	DC Watts	Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	-	6.1	16	40	238210	-	238214	-
F	11.6	10.1	25	70	238610	238710	238614	238714
B	14.9	-	-	-	-	62691	-	-
F	-	15.4	27	160	99257	-	99257	-
F	-	28.2	50	385	206409	-	206409	-

Standard Voltages: 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz), 6, 12, 24, 120, 240 volts DC. Must be specified when ordering. Other voltages available when required.

Solenoid Enclosures

Standard: Red-Hat II - Watertight, Types 1, 2, 3, 3S, 4, and 4X; Red-Hat - Type I.

Optional: Red-Hat II - Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9; Red-Hat - Explosionproof and Raintight, Types 3, 7, and 9. (Except EF8215A40 and EF8215A90, which are suitable for Types 3 and 7 (C and D) only and have a T2B temperature rating code.) To order, add prefix "EF" to catalog number.
See Optional Features Section for other available options.

Nominal Ambient Temperature Ranges:

Red-Hat II/
Red-Hat AC: 32˚F to 125˚F (0˚C to 52˚C)
Red-Hat II DC: 32˚F to 104˚F (0˚C to 40˚C)
Red-Hat DC: 32˚F to 77˚F (0˚C to 25˚C)
(104˚F/40˚C occasionally)

Refer to Engineering Section for details.

Approvals:

CSA certified to:

8040 Series:

1) Standard C22.2 No. 139 "Electrically Operated Valves," File 10381.
2) Automatic Gas Valves Z21.21 (6.5), File 112872.
3) Automatic Gas Safety Shutoff Valves C/I (3.9), File 112972.

8215 Series Normally Closed:

1) Standard C22.2 No. 139 "Electrically Operated Valves," File 10381.
2) Automatic Gas Valves Z21.21 (6.5), File 112872.

8215 Series Normally Open:

1) Standard C22.2 No. 139 "Electrically Operated Valves," File 10381.

UL listed, as indicated. FM approved
(Normally Closed only, except Catalog Numbers 8215A90 and 8215A40). Red-Hat II meets applicable CE directives.
Refer to Engineering Section for details.

Specifications (English units)

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Gas Capacity Btu/hr ⑥	Operating Pressure Differential (psi)			Max. Fluid Temp. ˚F		Aluminum Body			Watt Rating/ Class of Coil Insulation ②	
				Min.	Max. AC Air-Fuel Gas	Max. DC Air-Fuel Gas	AC	DC	Catalog Number	Constr. Ref. No	UL ⑤ Listing	AC	DC
NORMALLY CLOSED (Closed when de-energized)													
1/8	5/16	1.0	53,700	0	15	-	125	-	8040H6	11	❍	6.1/F	-
1/4	5/16	1.1	59,000	0	15	-	125	-	8040H7	11	❍	6.1/F	-
3/8	5/16	1.2	64,400	0	15	-	125	-	8040H8	11	❍	6.1/F	-
3/8	3/4	3.4	183,000	0	50	25	125	104	8215G10	2	❍	10.1/F	11.6/F
3/8	3/4	3.5	-	5	125	125	125	104	8215G1 ①	1	❍	6.1/F	11.6/F
1/2	3/4	5.4	291,000	0	2	-	125	-	8040G22	13A	❍	10.1/F	-
1/2	3/4	4.4	238,500	0	50	25	125	104	8215G20	2	❍	10.1/F	11.6/F
1/2	3/4	4.8	-	5	125	125	125	104	8215G2 ①	1	❍	6.1/F	11.6/F
3/4	3/4	9.5	449,000	0	2	-	125	-	8040G23	13B	❍	10.1/F	-
3/4	3/4	5.1	247,500	0	50	25	125	104	8215G30	4	❍	10.1/F	11.6/F
3/4	3/4	5.1	-	5	125	125	125	104	8215G3 ①	3	❍	6.1/F	11.6/F
1	1 5/8	21	1,119,000	0	25	25	125	77	8215B50 ③	6	❍	15.4/F	14.9/B
1 1/4	1 5/8	32	1,730,000	0	25	25	125	77	8215B60 ③	6	❍	15.4/F	14.9/B
1 1/2	1 5/8	35	1,900,000	0	25	25	125	77	8215B70 ③	6	❍	15.4/F	14.9/B
2	2 3/32	60	3,251,000	0	25	15	125	77	8215B80 ③	7	❍	15.4/F	14.9/B
2 1/2	3	117	5,821,000	0	5	-	125	-	8215A90	8	❍	28.2/F	-
3	3	138	7,430,000	0	5	-	125	-	8215A40	8	❍	28.2/F	-
NORMALLY OPEN (Open when de-energized)													
3/8	3/4	3.2	172,500	0	125	125	125	104	8215G13	9	●	10.1/F	11.6/F
1/2	3/4	4	206,250	0	125	125	125	104	8215G23	9	●	10.1/F	11.6/F
3/4	3/4	4.6	247,500	0	125	125	125	104	8215G33	10	●	10.1/F	11.6/F
1	1 5/8	22	1,191,750	0	25	15	125	77	8215C53	12	●	15.4/F	14.9/B
1 1/4	1 5/8	33	1,793,250	0	25	15	125	77	8215C63	12	●	15.4/F	14.9/B
1 1/2	1 5/8	37	1,988,250	0	25	15	125	77	8215C73	13	●	15.4/F	14.9/B
2	2 3/32	58	3,100,000	0	25	15	125	77	8215C83	14	●	15.4/F	14.9/B
2 1/2	3	117	6,290,000	0	5	-	125	-	8215B93 ④	15	●	28.2/F	-

Notes:
① Do not use for Fuel Gas.
② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts.
③ FM Approved Process Control Valves. See Engineering Section (Approvals) for details.
④ Type 1 enclosure only.
⑤ ❍ = Safety Shutoff Valve; ● = General Purpose Valve. Refer to Engineering Section (Approvals) for details.
⑥ 1" W.C. Drop @ 2" W.C. Inlet Pressure, 1, 000 Btu/cu.ft. or more, 0.64 Specific Gravity Gas.

Specifications (Metric units)

Pipe Size (ins.)	Orifice Size (mm)	Kv Flow Factor (m3/h)	Gas Capacity Btu/hr ⑥	Operating Pressure Differential (bar)			Max. Fluid Temp.˚C		Aluminum Body			Watt Rating/ Class of Coil Insulation ②	
				Min.	Max. AC Air-Fuel Gas	Max. DC Air-Fuel Gas	AC	DC	Catalog Number	Constr. Ref. No	UL ⑤ Listing	AC	DC
NORMALLY CLOSED (Closed when de-energized)													
1/8	7.9	.86	53,700	0	1.0	-	51	-	8040H6	11	❍	6.1/F	-
1/4	7.9	.94	59,000	0	1.0	-	51	-	8040H7	11	❍	6.1/F	-
3/8	7.9	1.03	64,400	0	1.0	-	51	-	8040H8	11	❍	6.1/F	-
3/8	19	2.91	183,000	0	3.4	1.7	51	40	8215G10	2	❍	10.1/F	11.6/F
3/8	19	3.00	-	0.3	8.6	8.6	51	40	8215G1 ①	1	❍	6.1/F	11.6/F
1/2	19	4.63	291,000	0	0.1	-	51	-	8040G22	13A	❍	10.1/F	-
1/2	19	3.77	238,500	0	3.4	1.7	51	40	8215G20	2	❍	10.1/F	11.6/F
1/2	19	4.11	-	0.3	8.6	8.6	51	40	8215G2 ①	1	❍	6.1/F	11.6/F
3/4	19	8.14	449,000	0	0.1	-	51	-	8040G23	13B	❍	10.1/F	-
3/4	19	4.37	247,500	0	3.4	1.7	51	40	8215G30	4	❍	10.1/F	11.6/F
3/4	19	4.37	-	0.3	8.6	8.6	51	40	8215G3 ①	3	❍	6.1/F	11.6/F
1	41	18.00	1,119,000	0	1.7	1.7	51	25	8215B50 ③	6	❍	15.4/F	14.9/B
1 1/4	41	27.43	1,730,000	0	1.7	1.7	51	25	8215B60 ③	6	❍	15.4/F	14.9/B
1 1/2	41	30.00	1,900,000	0	1.7	1.7	51	25	8215B70 ③	6	❍	15.4/F	14.9/B
2	53	51.43	3,251,000	0	1.7	1.0	51	25	8215B80 ③	7	❍	15.4/F	14.9/B
2 1/2	76	100.28	5,821,000	0	0.3	-	51	-	8215A90	8	❍	28.2/F	-
3	76	118.28	7,430,000	0	0.3	-	51	-	8215A40	8	❍	28.2/F	-
NORMALLY OPEN (Open when de-energized)													
3/8	19	2.74	172,500	0	8.6	8.6	51	40	8215G13	9	●	10.1/F	11.6/F
1/2	19	3.43	206,250	0	8.6	8.6	51	40	8215G23	9	●	10.1/F	11.6/F
3/4	19	3.94	247,500	0	8.6	8.6	51	40	8215G33	10	●	10.1/F	11.6/F
1	41	18.86	1,191,750	0	1.7	1.0	51	25	8215C53	12	●	15.4/F	14.9/B
1 1/4	41	28.28	1,793,250	0	1.7	1.0	51	25	8215C63	12	●	15.4/F	14.9/B
1 1/2	41	31.71	1,988,250	0	1.7	1.0	51	25	8215C73	13	●	15.4/F	14.9/B
2	53	49.71	3,100,000	0	1.7	1.0	51	25	8215C83	14	●	15.4/F	14.9/B
2 1/2	76	100.28	6,290,000	0	0.3	-	51	-	8215B93 ④	15	●	28.2/F	-

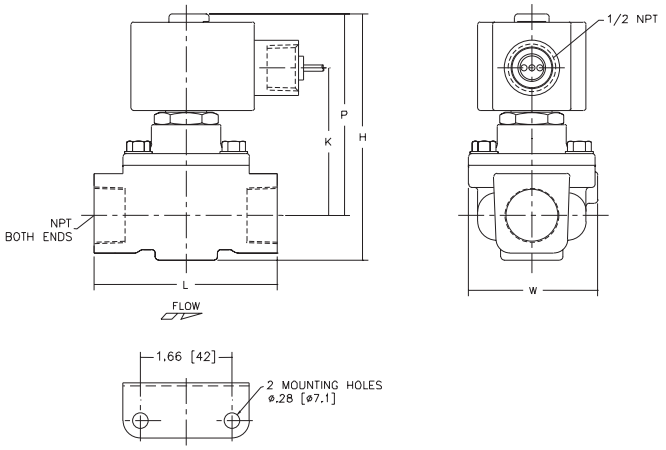
Notes:
① Do not use for Fuel Gas.
② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts.
③ FM Approved Process Control Valves. See Engineering Section (Approvals) for details.
④ Type 1 enclosure only.
⑤ ❍ = Safety Shutoff Valve; ● = General Purpose Valve. Refer to Engineering Section (Approvals) for details.
⑥ 1" W.C. Drop @ 2" W.C. Inlet Pressure, 1, 000 Btu/cu.ft. or more, 0.64 Specific Gravity Gas.

Dimensions: inches (mm)

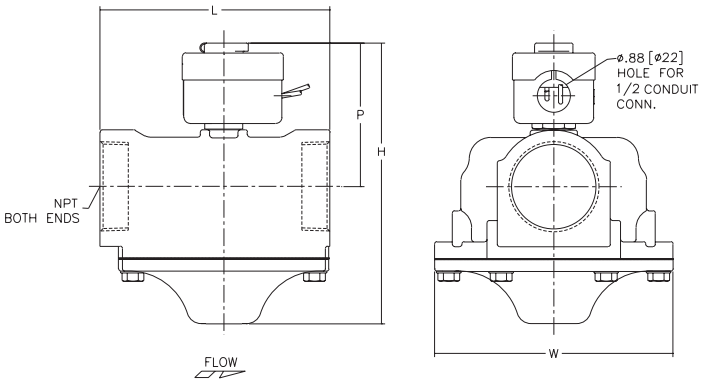
Constr. Ref. No.		H	K	L	P	W
1	ins.	3.42	2.00	2.75	2.87	2.46
	mm	87	51	70	73	63
2	ins	4.02	2.49	2.75	3.46	2.46
	mm	102	63	70	88	63
3	ins.	3.87	2.19	3.31	3.05	2.33
	mm	98	56	84	77	59
4	ins.	4.46	2.68	3.31	3.64	2.33
	mm	113	68	84	92	59
6 ①	ins.	6.84	x	5.00	5.59	5.38
	mm	174	x	127	142	137
7 ①	ins.	7.47	x	6.09	5.94	6.31
	mm	190	x	155	151	160
8 ①	ins.	10.25	x	7.79	7.91	7.94
	mm	260	x	198	201	202
9	ins.	4.42	2.72	2.75	3.86	2.36
	mm	112	69	70	98	60
10	ins.	4.86	2.72	3.31	4.04	2.36
	mm	123	69	84	103	60
11	ins.	2.74	1.44	2.00	2.30	1.69
	mm	69	36	51	58	43
12	ins.	6.84	x	5.00	3.63	5.38
	mm	174	x	127	92	137
13	ins.	6.84	x	5.00	3.56	5.38
	mm	174	x	127	90	137
13A	ins.	4.05	2.46	2.75	3.44	2.42
	mm	103	63	70	87	62
13B	ins.	4.49	2.65	3.31	3.63	2.39
	mm	114	67	84	92	61
14 ②	ins.	7.44	x	6.09	3.81	6.31
	mm	189	x	155	97	160
15 ②	ins.	10.25	x	7.80	5.22	7.94
	mm	260	x	198	133	202

IMPORTANT: Valves may be mounted in any position except all DC constructions and those marked ①, which must be mounted with the solenoid vertical and upright. Constructions marked ② must be mounted with the solenoid vertical and upright or horizontal only.

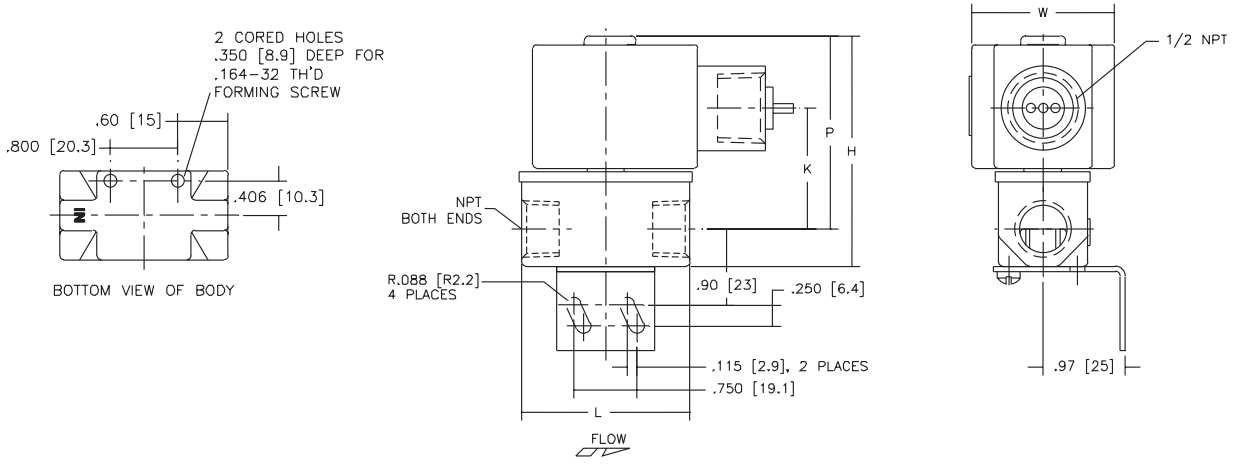
Constr. Refs. 1-4, 9, 10, 13a, 13b



Constr. Refs. 6, 7, 8, 12-15



Constr. Refs. 11



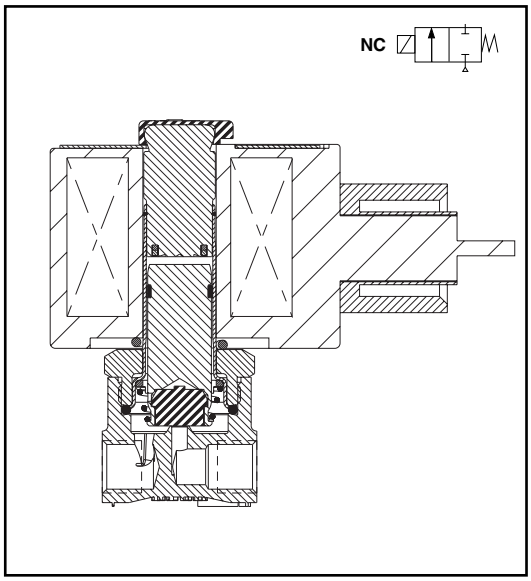
ASCO® RedHat®

Direct Acting
Gas Shutoff Valves
Brass Body
1/8" and 1/4" NPT

2/2 SERIES 8262

Features

- 2-way normally closed operation
- For gas pilot control of commercial and industrial gas burners
- Direct lift with resilient soft seating for tight shutoff
- Brass body construction
- Mountable in any position



Fluid

Fuel Gas

Construction

Valve Parts in Contact with Fluids	
Body	Brass
Seals and Disc	LT NBR
Core Tube	305 Stainless Steel
Core Guide	Acetal
Rider Ring	PTFE
Core and Plugnut	430F Stainless Steel
Springs	Inconel 600
Shading Coil	Copper

Electrical

Standard Coil and Class of Insulation	Watt Rating and Power Consumption			Ambient Temp.°F	Spare Coil Family	
	AC				General Purpose	Explosionproof
	Watts	VA Holding	VA Inrush		AC	AC
F	10.1	25	70	-40 to 131	238610	238614
H	10.1	25	70	-40 to 140	238810	238814

Standard Voltages: 24, 120, 240 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz).
Optional High Ambient Temp: 140˚F Class H coil with prefix HT.

Solenoid Enclosures

Standard: Watertight; Types 1, 2, 3, 3S, 4, and 4X with 1/2" conduit hub.

Optional: RedHat II - Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9; RedHat - Explosionproof and Raintight, Types 3, 7, and 9. (To order, add prefix "EF" to catalog number.)

Valve Response Time

Opening Time: Less than 1 second

Closing Time: Less than 1 second

Options

High Ambient 140˚F (prefix HT)

Din Connector (prefix SC for standard, prefix SU for high temperature)

Mounting Bracket (suffix MB)

Silicone Free Service (suffix SF)

Approvals

UL listed to standard 429 "Electrically Operated Valves," Guide YIOZ, File MP618 Safety Shutoff Valves.

FM Approved to Class 7400 "Liquid and Gas Safety Shutoff Valves."

CSA Certified to:

1) Standard C22.2 No. 139 "Electrically Operated Valves," File 010381.

2) Automatic Gas Valves Z21.21 (6.5), File 112872.

3) Automatic Gas Safety Shutoff Valves C/I (3.9), File 112872.

ASCO®

Specifications (English units)

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Gas Capacity ① Btu/hr.	Operating Pressure Differential (psi) Min.	Operating Pressure Differential (psi) Max.	Max. Fluid Temp.°F	Catalog Number	Const. Ref.	Agency UL	Agency FM	Agency CSA	Wattage	Approx. Shipping Weight (lbs)
COMBUSTION (Fuel Gas) - NORMALLY CLOSED (Closed when de-energized)													
1/8	1/8	.35	18,700	0	200	125	8262H077	1	❍	❍	❍	10.1	1.2
1/4	9/32	1.0	53,500	0	50	125	8262H078	2	❍	❍	❍	10.1	1.3

❍ = Safety Shutoff Valve. ① 1" W.C. Drop @ 2" W.C. Inlet Pressure, 1,000 Btu/cu.ft. or more, 0.64 Specific Gravity Gas.

Specifications (Metric units)

Pipe Size (ins.)	Orifice Size (mm)	Kv Flow (m^3/hr)	Gas Capacity ① Btu/hr.	Operating Pressure Differential (bar) Min.	Operating Pressure Differential (bar) Max.	Max. Fluid Temp.°C	Catalog Number	Const. Ref.	Agency UL	Agency FM	Agency CSA	Wattage	Approx. Shipping Weight (kgs)
COMBUSTION (Fuel Gas) - NORMALLY CLOSED (Closed when de-energized)													
1/8	3	0.30	15,000	0	13.8	52	8262H077	1	❍	❍	❍	10.1	0.5
1/4	7	0.87	51,700	0	3.4	52	8262H078	2	❍	❍	❍	10.1	0.6

❍ = Safety Shutoff Valve. ① 1" W.C. Drop @ 2" W.C. Inlet Pressure, 1,000 Btu/cu.ft. or more, 0.64 Specific Gravity Gas.

Capabilities Chart

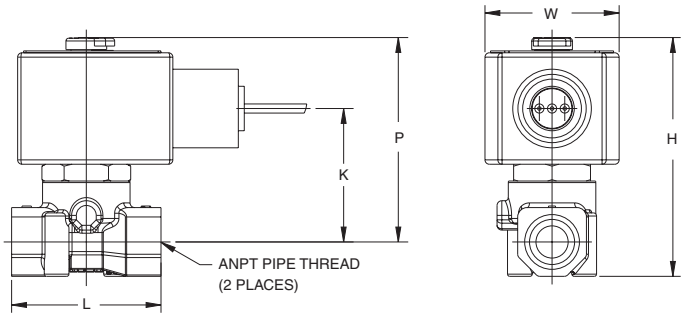
Solenoid Options				Base Catalog Number	Resilient Materials	Standard Rebuild Kit
NEMA Type 3-9	High Temp.	Screw Terminal Wiring Box	Spade Wiring Box	Brass	LT NBR	AC
EF	HT	JKF	JSF	8262H077	●	325039
EF	HT	JKF	JSF	8262H078	●	325039

● = Standard. Other options may be available. All option combinations may not be available.

Dimensions inches (mm)

Const. Ref.		H	K	L	P	W
1	ins	3.05	1.71	1.19	2.69	1.95
	mm	77	43	30	68	50
2	ins	3.12	1.79	1.56	2.76	1.95
	mm	79	45	40	70	50

Const. Ref. 1, 2



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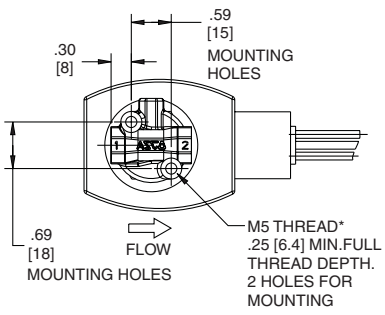
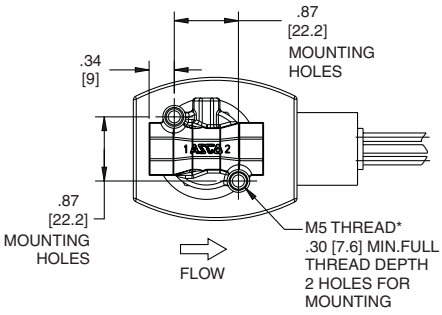


*ACCEPTS STANDARD #10-32 MACHINE SCREW

Const. Ref. 2



COMBUSTION

Product Data Sheet

ATV71HD18N4

SPEED DRIVE, 25HP, 460V, ATV71

List Price	$3,408.00 USD
Availability	**Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Embedded Communication	Modbus and CANopen
Output Phase	3-Phase
Type	ATV71
Integrated EMC Filter	Class A
Enclosure Rating	Open
Degree of Protection	IP20
Horsepower Rating	25HP
Motor Power Rating	18kW
Input Voltage	400/480VAC
Marketing Trade Name	Altivar 71
Output Voltage	Maximum output voltage equal to input voltage
Ampere Rating	41A
Application	Constant Torque
Input Phase	3-Phase
Keypad Style	LCD Keypad
Conformal Coating	No

Shipping and Ordering

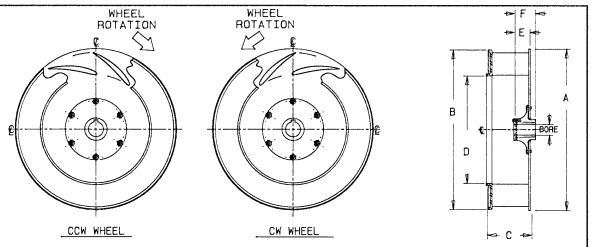
Category	22131 -
Discount Schedule	CP4C
GTIN	00785901503699
Package Quantity	1
Weight	53 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	ID

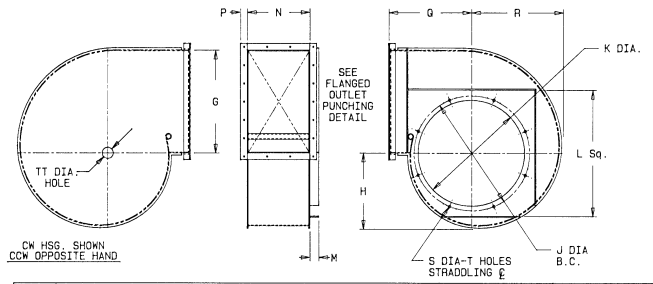
As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

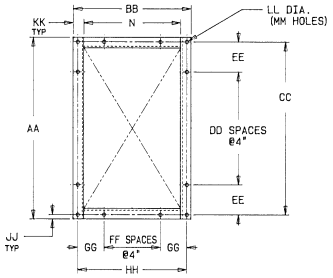
Generated: 09/04/2012 14:32:53

FAN SIZE	100% WHEEL						WHEEL DRAWING NO.	
	A	B	C	D	E	F	CW ROTATION	CCW ROTATION
2000	22 3/4	22 3/4	5 21/32	13 15/16	3	3 1/2	19-5-1065	19-5-1066
2214	25 1/8	25 1/16	6 3/16	15 1/16	3	3 1/2	19-5-1067	19-5-1068
2412	27 7/8	27 3/4	7 1/32	16 13/16	2 1/2	3 1/2	19-5-1069	19-5-1070
* 2700	31	30 5/8	7 3/4	18 11/16	2 1/2	3 1/2	19-5-1071	19-5-1072
3000	34	33 21/32	8 15/32	20 1/2	2 1/2	3 1/2	19-5-1073	19-5-1074
3300	37 3/4	37 15/32	9 13/32	22 27/32	2 1/4	3 1/2	19-5-1075	19-5-1076
3612	41 1/2	41 7/32	10 3/16	25 5/32	2 1/4	3 1/2	19-5-1077	19-5-1078
4014	45 3/4	45 15/32	11 13/32	28 3/32	2 1/4	3 1/2	19-5-1079	19-5-1080

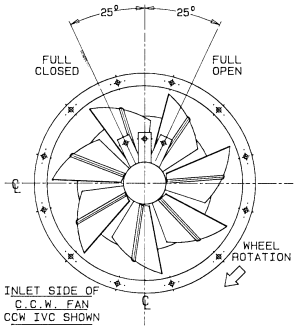
* DIMENSIONS SHOWN ARE FOR 1800 RPM ONLY

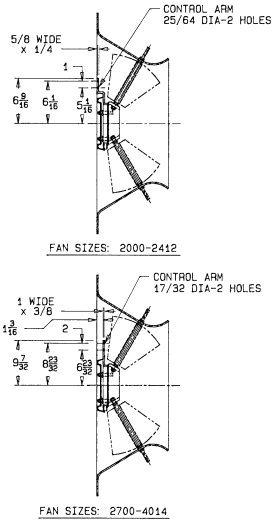




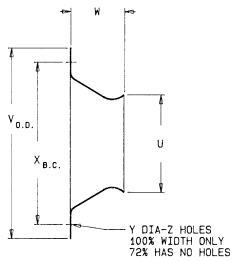


FAN SIZE	100% HOUSING															FLANGED OUTLET PUNCHING											FAN SIZE
	G	H	J	K	L	M	N	P	Q	R	S	T	TT	CW ASSEMBLY NO.	CCW ASSEMBLY NO.	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	
2000	22 3/4	16 13/32	25 1/2	24 1/2	28	2	13 3/4	1 1/2	18 1/4	19 15/16	3/8	8	2 1/4	19-3-1802-17	19-3-1803-17	25 3/4	16 3/4	24 1/2	4	4 1/4	2	3 3/4	15 1/2	5/8	1 1/2	3/8	20	2000
2214	25 5/16	18 13/32	27 1/2	26 1/2	30	2	15 3/8	1 1/2	19 1/4	22 1/2	3/8	16	2 1/4		-18	28 5/16	18 3/4	27 1/16	5	3 17/32	3	2 9/16	17 1/8	5/8	1 1/2	3/8	24	2214
2412	27 7/8	20 3/16	31	29 1/2	33 3/4	2 1/2	16 7/8	2	21 1/8	24 9/32	1/2	16	2 3/4		-19	31 7/8	20 7/8	30 1/8	6	3 1/16	3	3 9/16	19 1/8	7/8	2	7/16	26	2412
2700	30 11/16	22 7/32	34	32 1/2	36 3/4	2 1/2	18 1/2	2	22 5/8	26 11/16	1/2	16	2 3/4		-20	34 11/16	22 1/2	32 15/16	6	4 15/32	3	4 3/8	20 3/4	7/8	2	7/16	26	2700
3000	34 1/8	24 5/8	37	35 1/2	40 1/4	2 1/2	20 1/2	2	24 3/8	29 5/8	1/2	16	3		-21	38 1/8	24 1/2	36 3/8	7	4 3/16	4	3 3/8	22 3/4	7/8	2	1/2	30	3000
3300	37 5/8	27 1/32	40 1/2	39	43 3/4	2 1/2	22 3/4	2	26 1/8	32 5/8	1/2	16	3 1/4		-22	41 9/16	26 3/4	39 13/16	8	3 29/32	5	2 1/2	25	7/8	2	1/2	34	3300
3612	41 1/2	29 13/16	43 3/4	42 1/4	47	3	25	2	27 3/4	35 7/8	1/2	16	3 1/4		-23	45 1/2	29	43 1/4	9	3 5/8	5	3 5/8	27 1/4	7/8	2	1/2	36	3612
4014	45 13/16	32 7/8	48	46 1/2	51	3	27 3/4	2	30 3/4	39 5/16	1/2	16	3 3/4	19-3-1802-24	19-3-1803-24	49 13/16	31 3/4	48 1/16	10	4 1/32	6	3	30	7/8	2	1/2	40	4014





FAN SIZE	IVC ASSEMBLY NO.	
	FOR CW FAN	FOR CCW FAN
2000	19-4-197-9	19-4-197-1
2214	19-4-197-10	19-4-197-2
2412	19-4-197-11	19-4-197-3
2700	19-4-198-6	19-4-198-1
3000	19-4-198-7	19-4-198-2
3300	19-4-198-8	19-4-198-3
3612	19-4-198-9	19-4-198-4
4014	19-4-198-10	19-4-198-5



FAN SIZE	72% INLET CONE AND 100% INLET CONE										
	U		V		W		100% WIDTH ONLY			CONE PART NO.	
	72%	100%	72%	100%	72%	100%	X	Y	Z	72% WIDTH	100% WIDTH
2000	13 3/8	13 13/16	21 1/4	27	3 3/8	7 41/64	25 1/2	5/8	8	41-4-1-7	19-4-192-7
2214	14 5/8	14 29/32	23 1/4	29	3 25/32	8 15/64	27 1/2	5/8	16	-8	-8
2412	16 3/8	16 23/32	25 1/2	32 3/4	4 3/16	9 11/64	31	13/16	16	-9	-9
2700	18 1/8	18 1/4	28	35 3/4	4 9/16	10 1/32	34	15/16	16	-10	-10
3000	19 7/8	20 3/16	31 1/8	39 1/4	5 1/32	11 3/32	37	15/16	16	-11	-11
3300	22 3/16	22 19/32	34 1/4	42 3/4	5 17/32	12 7/16	40 1/2	15/16	16	-12	-12
3612	24 1/2	24 27/32	37 1/2	46	6 1/4	13 23/32	43 3/4	15/16	16	-13	-13
4014	27 1/16	27 29/32	41 1/2	50	6 25/32	15 5/16	48	15/16	16	41-4-1-14	19-4-192-14

ITEM No.	FAN SIZE	WHEEL				HOUSING		INLET CONE		IVC		TAG PARTS
		QUAN.	BORE	ROT	ASSEMBLY NO.	QUAN.	ROT	QUAN.	%	QUAN.	ROT	

CUSTOMER

P.O.#

JOB NAME

LOCATION

ARCHITECT

CONSULTING ENGINEER

NOTES:

CHICAGO BLOWER CORPORATION

1675 GLEN ELLYN ROAD, GLENDALE HEIGHTS, IL 60139

DESIGN 1904 COMPONENT PARTS FOR SIZES 2000 THRU 4014

FURNISHED FOR SALES PURPOSES-DIMENSIONS NOT CERTIFIED BY CBC	DATE	SUBMITTED BY	SALES OFFICE
DRAWING CERTIFIED BY CBC-FURNISHED FOR APPROVAL- NOT RELEASED FOR PRODUCTION	DATE	CBC ENGINEER	SO#
DRAWING CERTIFIED BY CBC-APPROVAL NOT REQUIRED- RELEASED FOR PRODUCTION	DATE	CBC ENGINEER	DWG.#

DIMENSION TOLERANCES +/- 1/8 DO NOT USE FOR GENERAL CONSTRUCTION UNLESS CERTIFIED BY C.B.C. ENG. DEPT.

Data 720
12/10/04

Eclipse Combustion

Butterfly Valves

Full Port & Reduced Port

version 2

Product Description

Eclipse Butterfly Valves are designed to control air and gas flow to all types of combustion systems. *They **should not** be used as tight shut-off valves.*

Types available

Valves are available for either manual or automatic control and in either full port or reduced port construction in 1/2" through 4", with NPT or Rc threads. High pressure drop valves are also available in 1/2", 3/4" and 1". Wafer type valves are available in 6" and 8".

Thread Connections

The 1/2" through 4" valves are available with either NPT or Rc threads. The 6" and 8" valves are wafer type butterfly valves designed to be sandwiched between flanges on connecting pipes.

Shutters

NPT versions: Furnished with beveled or nonbeveled shutters.

Rc versions: Furnished with nonbeveled shutters.

Indication

All Eclipse butterfly valves feature an easy to read indicator plate and a slot on the end of the shaft to provide visual indication of the disc position.

Control

Manual butterfly valves 4" and smaller have an adjusting cover for setting disc position. A locking screw secures the cover at the desired setting.

Automatic control butterfly valves are furnished with a control arm that can be attached to the shaft. This allows integration with a variety of position control devices.

Manual wafer butterfly valves are adjusted by rotating a control arm which can be locked to the indicating plate after positioning.

Manual Control BV

Automatic Control BV

Accessories

Eclipse stocks a selection of electric operators and mounting kits which can be ordered separately. The extended shaft length on the automatic butterfly valves allows the addition of either a second control arm for simultaneous automatic operation in dual valve applications, or a cam for a high/low fire microswitch arrangement.

Note:

ALL 1/2" Butterfly Valves (NPT/Rc, Manual/Automatic Beveled/Non-beveled) DO NOT have a "separate" shutter. The shutter is part of the shaft. The terms beveled and non-beveled do not apply to any of the 1/2" Butterfly Valves covered in this Data Sheet.

Main Specifications

PARAMETER	SPECIFICATIONS		
Maximum operating pressure:	1/2" thru 4" 6" & 8"	5 psig 3 psig	350 mbar 210 mbar
Operating temperature range:	NPT version Rc version	-40 to 140˚ F. 32 to 140˚ F.	-40 to 60˚ C. 0 to 60˚ C.
Materials of construction:	Body: Shaft: Shutter: Shaft Packing Seal:	Powder Coated Cast Iron Zinc plated steel Carbon steel Nitrile rubber (Buna-N)	
Approvals:	UL All models	CE Rc 1/2 thru Rc 3 models only	
Typical application:	Control of air or gas flow in combustion system		
Notes on European applications:	4" screwed not acceptable for gas use. 3" screwed is acceptable if pressure is limited to 100 mbar (1.5 psig).		

ECLIPSE™ Innovative Thermal Solutions

NPT Model Selection and Capacities

NPT Size	Full Port Valves						Reduced Port Valves			
	Manual		Automatic				Manual		Automatic	
	Beveled shutter 75º rotation		Beveled shutter 75º rotation		Nonbeveled shutter 360º rotation		Beveled shutter 75º rotation		Beveled shutter 75º rotation	
	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
1/2"*	102BV-B	501238	2BV-AB	501239	--------	--------	--------	--------	--------	--------
3/4"	103BV-B	501215	3BV-AB	501223	3BV-A	501200	--------	--------	--------	--------
1"	104BV-B	501216	4BV-AB	501224	4BV-A	501201	104BV-RB	501208	4BV-ARB	501231
1-1/4"	105BV-B	501217	5BV-AB	501225	5BV-A	501202	105BV-RB	501209	5BV-ARB	501232
1-1/2"	106BV-B	501218	6BV-AB	501226	6BV-A	501203	106BV-RB	501210	6BV-ARB	501233
2"	108BV-B	501219	8BV-AB	501227	8BV-A	501204	108BV-RB	501211	8BV-ARB	501234
2-1/2"	110BV-B	501220	10BV-AB	501228	10BV-A	501205	110BV-RB	501212	10BV-ARB	501235
3"	112BV-B	501221	12BV-AB	501229	12BV-A	501206	112BV-RB	501213	12BV-ARB	501236
4"	116BV-B	501222	16BV-AB	501230	16BV-A	501207	116BV-RB	501214	16BV-ARB	501237
6" wafer	124BV-B	500915	24BV-AB	500998	--------	--------	124BV-RB	500690	24BV-ARB	500975
8" wafer	132BV-B	500913	32BV-AB	500999	--------	--------	132BV-RB	500691	32BV-ARB	500976

* See Note on Page One.

NPT Size	High Pressure Drop Valve			
	Manual		Automatic	
	Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation	
	Catalog Number	Item Code	Catalog Number	Item Code
1/2"	402BV-HD	100129	402BV-AHD	100130
3/4"	403BV-HD	100133	403BV-AHD	100134
1"	404BV-HD	100119	404BV-AHD	100123

Note: Wafer Butterfly Valves are not threaded. For dimensional information, see page 6.

Multifactors for gases other than air

Gas - Sp. Gr.	Natural - .6	Propane - 1.5	Butane - 2.0
Multifactor	1.29	.81	.70

NPT Size	Flow Coefficient Cv-Full Open	Full Port								
		Capacity scfh air - "wc pressure drop								
		0.5	0.75	1	1.5	2	3	4	6	8
1/2"	5.5	173	212	244	299	345	422	487	595	685
3/4"	15.9	500	612	706	865	998	1,221	1,408	1,720	1,982
1"	29.7	933	1,143	1,319	1,615	1,864	2,280	2,630	3,213	3,702
1-1/4"	65.9	2,071	2,536	2,927	3,583	4,135	5,059	5,835	7,129	8,213
1-1/2"	111.0	3,489	4,272	4,931	6,036	6,965	8,521	9,828	12,009	13,834
2"	180.0	5,657	6,927	7,996	9,788	11,295	13,818	15,937	19,473	22,433
2-1/2"	322.0	10,121	12,391	14,304	17,509	20,206	24,719	28,510	34,836	40,131
3"	457.0	14,364	17,587	20,301	24,850	28,677	35,082	40,462	49,441	56,956
4"	819.0	25,741	31,517	36,383	44,534	51,394	62,871	72,513	88,604	102,072
6" wafer	2600.0	81,718	100,055	115,501	141,377	163,154	199,591	230,201	281,283	324,039
8" wafer	4200.0	132,007	161,628	186,578	228,379	263,557	322,417	371,864	454,380	523,448

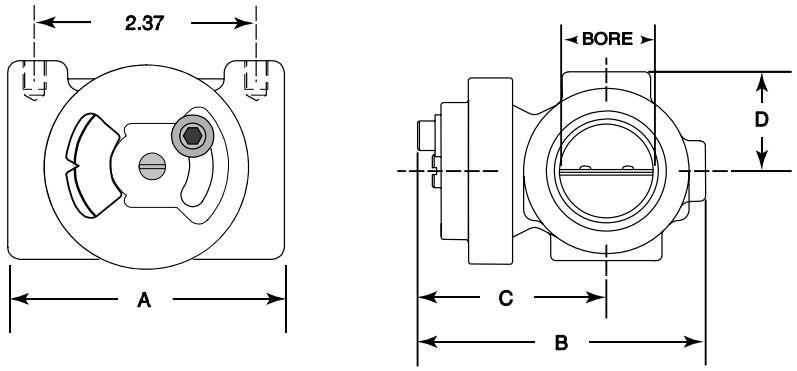
NPT Size	Flow Coefficient Cv-Full Open	Reduced Port								
		Capacity scfh air - "wc pressure drop								
		0.5	0.75	1	1.5	2	3	4	6	8
1"	14.1	443	543	626	767	885	1,082	1,248	1,525	1,757
1-1/4"	22.8	717	877	1,013	1,240	1,431	1,750	2,019	2,467	2,842
1-1/2"	31.4	987	1,208	1,395	1,707	1,970	2,410	2,780	3,397	3,913
2"	62.7	1,971	2,413	2,785	3,409	3,935	4,813	5,551	6,783	7,814
2-1/2"	87.9	2,763	3,383	3,905	4,780	5,516	6,748	7,783	9,510	10,955
3"	149.0	4,683	5,734	6,619	8,102	9,350	11,438	13,192	16,120	18,570
4"	244.0	7,669	9,390	10,839	13,268	15,311	18,731	21,604	26,397	30,410
6" wafer	553.0	17,381	21,281	24,566	30,070	34,702	42,452	48,962	59,827	68,921
8" wafer	721.5	22,677	27,765	32,051	39,232	45,275	55,387	63,881	78,056	89,921

NPT Size	Flow Coefficient Cv-Full Open	High Pressure Drop								
		Capacity scfh air - "wc pressure drop								
		0.5	0.75	1	1.5	2	3	4	6	8
1/2"	2.7	85	104	120	147	169	207	239	292	337
3/4"	3.2	101	123	142	174	201	246	283	346	399
1"	4.2	132	162	187	228	264	322	372	454	523

Dimensions, Manual Valves with NPT threads

NPT Size	FULL PORT Beveled shutter 75˚ rotation			REDUCED PORT Beveled shutter 75˚ rotation			HIGH PRESSURE DROP 90˚ rotation			Dimensions, inches			
	Catalog Number	Item Code	BORE Inches	Catalog Number	Item Code	BORE Inches	Catalog Number	Item Code	BORE Inches	A	B	C	D
1/2*	102BV-B	501238	0.61	-	-	-	402BV-HD	100129	0.44	3.00	3.05	2.05	1.19
3/4	103BV-B	501215	0.87	-	-	-	403BV-HD	100133	0.55	3.00	3.07	2.07	1.06
1	104BV-B	501216	1.10	104BV-RB	501208	0.87	404BV-HD	100119	2 x 0.44	2.87	3.33	2.14	1.31
1-1/4	105BV-B	501217	3.12	105BV-RB	501209	1.02				3.12	3.58	2.26	1.50
1-1/2	106BV-B	501218	1.46	106BV-RB	501210	1.18				3.12	3.82	2.38	1.63
2	108BV-B	501219	2.13	108BV-RB	501211	1.53				3.12	4.45	2.70	1.94
2-1/2	110BV-B	501220	2.64	110BV-RB	501212	1.77				3.87	5.09	3.09	2.25
3	112BV-B	501221	3.23	112BV-RB	501213	2.24				3.87	5.58	3.33	2.50
4	116BV-B	501222	4.17	116BV-RB	501214	2.80				5.00	6.65	3.84	3.06

* See Note on Page One.

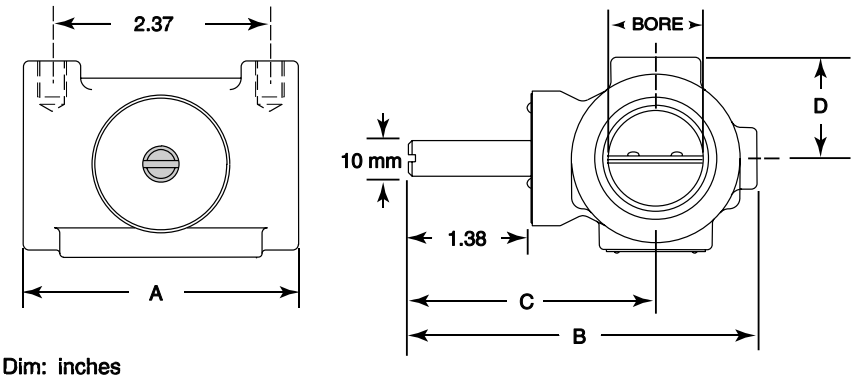


Dim: inches

Dimensions, Automatic Valves with NPT threads

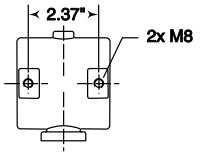
NPT Size	FULL PORT Beveled shutter 75˚ rotation		Nonbeveled shutter 360˚ rotation			REDUCED PORT Beveled shutter 75˚ rotation			HIGH PRESSURE DROP 360˚ rotation			Dimensions, Inches			
	Catalog No.	Item Code	Catalog No.	Item Code	BORE In.	Catalog No.	Item Code	BORE In.	Catalog Number	Item Code	BORE In.	A	B	C	D
1/2*	2BV-AB	501239	-	-	0.61	-	-	-	402BV-AHD	100130	0.44	3.00	3.66	2.66	1.19
3/4	3BV-AB	501223	3BV-A	501200	0.87	-	-	-	403BV-AHD	100134	0.55	3.00	3.60	2.60	1.06
1	4BV-AB	501224	4BV-A	501201	1.10	4BV-ARB	501231	0.87	404BV-AHD	100123	2 x 0.44	2.87	3.90	2.78	1.31
1-1/4	5BV-AB	501225	5BV-A	501202	1.46	5BV-ARB	501232	1.02				3.12	4.22	2.90	1.50
1-1/2	6BV-AB	501226	6BV-A	501203	1.65	6BV-ARB	501233	1.18				3.12	4.47	3.03	1.63
2	8BV-AB	501227	8BV-A	501204	2.13	8BV-ARB	501234	1.54				3.12	5.09	3.34	1.94
2-1/2	10BV-AB	501228	10BV-A	501205	2.64	10BV-ARB	501235	1.77				3.87	5.72	3.72	2.25
3	12BV-AB	501229	12BV-A	501206	3.23	12BV-ARB	501236	2.24				3.87	6.22	3.97	2.50
4	16BV-AB	501230	16BV-A	501207	4.17	16BV-ARB	501237	2.80				5.00	7.28	4.47	3.06

* See Note on Page One.



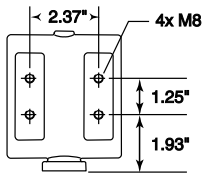
Dim: inches

Actuator Bracket Mounting Holes



1/2" thru 2-1/2"

Dim: inches



3" & 4"

Dim: inches

Rc Model Selection and Capacities

Rc Size	Full Port Valves				Reduced Port Valves			
	Manual		Automatic		Manual		Automatic	
	Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation		Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation	
	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code	Catalog Number	Item Code
1/2*	102BVM	101103	2BVM-A	202081	--------	--------	--------	--------
3/4	103BVM	101104	3BVM-A	101248	--------	--------	--------	--------
1	104BVM	101105	4BVM-A	101249	104BVM-R	101255	4BVM-AR	101261
1-1/4	--------	--------	--------	--------	--------	--------	--------	--------
1-1/2	106BVM	101106	6BVM-A	101250	106BVM-R	101256	6BVM-AR	101262
2	108BVM	101107	8BVM-A	101251	108BVM-R	101257	8BVM-AR	101263
2-1/2	110BVM	101108	10BVM-A	101252	110BVM-R	101258	10BVM-AR	101264
3	112BVM	101109	12BVM-A	101253	112BVM-R	101259	12BVM-AR	101265
4*	116BVM	101110	16BVM-A	101254	116BVM-R	101260	16BVM-AR	101266

6" wafer 8" wafer	*Note: Selection information for these valves appears on page 2. Wafer BV Valves are not threaded and may be used with DN 150 and DN 200 flanged fittings. Dimensions page 6.*

Rc Size	High Pressure Drop Valve			
	Manual		Automatic	
	Nonbeveled shutter 90° rotation		Nonbeveled shutter 360° rotation	
	Catalog Number	Item Code	Catalog Number	Item Code
1/2*	402BVM-HD	100131	402BVM-AHD	100132
3/4	403BVM-HD	100135	403BVM-AHD	100136
1	404BVM-HD	100120	404BVM-AHD	100100

* See Note on Page One.

Multifactors for gases other than air

Gas - Sp. Gr.	Natural - .6	Propane - 1.5	Butane - 2.0
Multifactor	1.29	.81	.70

Rc Size	Flow Coefficient Kv-Full Open	Full Port							
		Capacity nm^3/h air - mbar pressure drop							
		1	2	3	5	8	10	13	15
1/2"	4.7	4	6	7	9	12	13	15	16
3/4"	13.7	12	17	21	27	34	38	43	46
1"	25.5	22	32	39	50	63	70	80	86
1-1/2"	95.8	84	118	145	187	236	264	300	322
2"	155.0	136	192	234	302	382	427	486	521
2-1/2"	277.0	242	342	419	541	683	763	868	932
3"	393.0	344	486	595	767	969	1,082	1,232	1,322
4"*	704.0	615	870	1,065	1,374	1,735	1,938	2,207	2,368
6" wafer*	2251.0	1,968	2,782	3,405	4,392	5,548	6,197	7,056	7,572
8" wafer*	3637.0	3,180	4,495	5,502	7,097	8,964	10,013	11,400	12,234

Rc Size	Flow Coefficient Kv-Full Open	Reduced Port							
		Capacity nm^3/h air - mbar pressure drop							
		1	2	3	5	8	10	13	15
1"	12.1	11	15	18	24	30	33	38	41
1-1/2"	27.0	24	33	41	53	67	74	85	91
2"	53.9	47	67	82	105	133	148	169	181
2-1/2"	75.9	66	94	115	148	187	209	238	255
3"	128.0	112	158	194	250	315	352	401	431
4"*	210.0	184	260	318	410	518	578	658	706
6" wafer*	479.0	419	592	725	935	1,181	1,319	1,501	1,611
8" wafer*	625.0	546	772	946	1,220	1,540	1,721	1,959	2,102

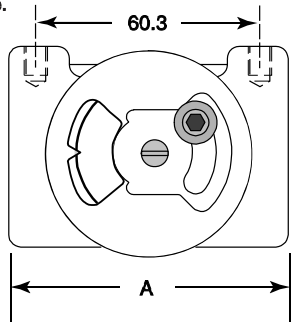
Rc Size	Flow Coefficient Kv-Full Open	High Pressure Drop							
		Capacity nm^3/h air - mbar pressure drop							
		1	2	3	5	8	10	13	15
1/2"	2.3	2.0	2.8	3.5	4.5	5.7	6.3	7.2	7.7
3/4"	2.8	2.4	3.5	4.2	5.5	6.9	7.7	8.8	9.4
1"	3.6	3.1	4.4	5.4	7.0	8.9	9.9	11.3	12.1

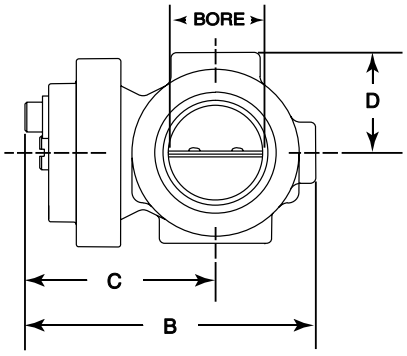
** 4" screwed valve not approved for European use.*
6" and 8" wafer type may be used with DN150 and DN200 flanged fittings.

Dimensions, Manual Valves with Rc threads

Rc Size	FULL PORT Nonbeveled shutter 90˚ rotation			REDUCED PORT Nonbeveled shutter 90˚ rotation			HIGH PRESSURE DROP 90˚ rotation			Dimensions, mm			
	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	A	B	C	D
1/2*	102BVM	101103	15.5	-	-	-	402BVM-HD	100131	11.1	76.2	77.5	52.1	30.2
3/4	103BVM	101104	22	-	-	-	403BVM-HD	100135	13.9	76.2	77.9	52.5	27.0
1	104BVM	101105	28	104BVM-R	101255	22	404BVM-HD	100120	2 x 11.1	73.0	84.7	54.5	33.3
1-1/2	106BVM	101106	42	106BVM-R	101256	30				79.4	97.0	60.5	41.3
2	108BVM	101107	54	108BVM-R	101257	39				79.4	113.0	68.5	49.2
2-1/2	110BVM	101108	67	110BVM-R	101258	45				98.4	129.2	78.5	57.2
3	112BVM	101109	82	112BVM-R	101259	57				98.4	141.7	84.5	63.5
4	116BVM	101110	106	116BVM-R	101260	71				127.0	168.9	97.5	77.8

* See Note on Page One.

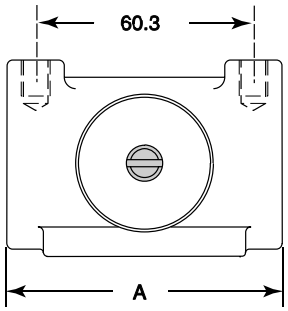


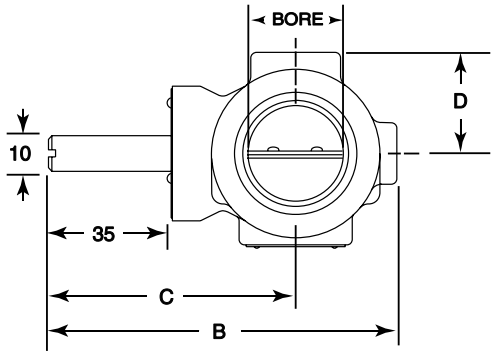


Dim: mm

Dimensions, Automatic Valves with Rc Threads

Rc Size	FULL PORT Nonbeveled shutter 360˚ rotation			REDUCED PORT Nonbeveled shutter 360˚ rotation			HIGH PRESSURE DROP 360˚ rotation			Dimensions, mm			
	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	Catalog Number	Item Code	BORE mm	A	B	C	D
1/2*	2BVM-A	202081	15.5	-	-	-	402BVM-AHD	100132	11.1	76.2	93.0	67.7	30.2
3/4	3BVM-A	101248	22	-	-	-	403BVM-AHD	100136	13.9	76.2	91.3	65.9	27.0
1	4BVM-A	101249	28	4BVM-AR	101261	22	404BVM-AHD	100100	2 x 11.1	73.0	99.2	70.6	33.3
1-1/2	6BVM-A	101250	42	6BVM-AR	101262	30				79.4	113.5	77.0	41.3
2	8BVM-A	101251	54	8BVM-AR	101263	39				79.4	129.4	84.9	49.2
2-1/2	10BVM-A	101252	67	10BVM-AR	101264	45				98.4	145.3	94.5	57.2
3	12BVM-A	101253	82	12BVM-AR	101265	57				98.4	158.0	100.8	63.5
4	16BVM-A	101254	106	16BVM-AR	101266	71				127.0	184.9	113.5	77.8



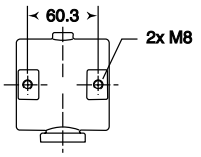


* See Note on Page One.

Dim: mm

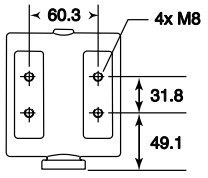
Actuator Bracket Mounting Holes

1/2" thru 2-1/2"



Dim: mm

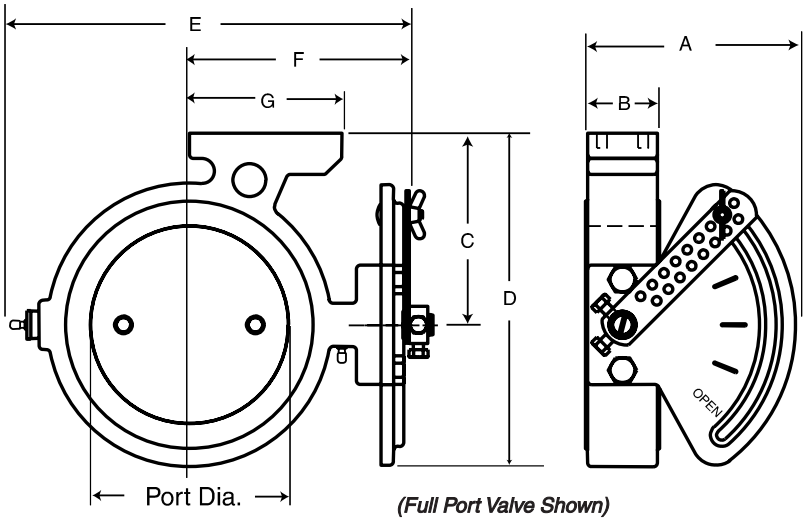
3" & 4"



Dim: mm

Dimensions, Wafer type valves

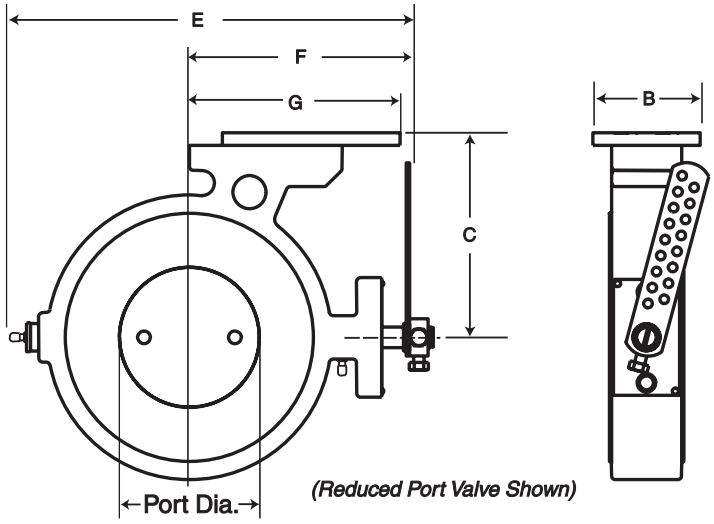
Manual valves



(Full Port Valve Shown)

Size	Cat. No.	Item Code	Dimensions mm (In) A	B	C	D	E	F	G	Port Dia.	Approx Wgt. kg (lb)
Full Port Manual											
6"	124BV-B	500915	162 (6.38)	57 (2.25)	148 (5.81)	257 (10.13)	289 (11.38)	97 (3.81)	117 (4.63)	152 (6.00)	13 (28)
8"	132BV-B	500913	162 (6.38)	57 (2.25)	178 (7.00)	317 (12.47)	351 (13.81)	206 (8.13)	130 (5.13)	203 (8.00)	16 (36)
Reduced Port Manual											
6"	124BV-RB	500690	162 (6.38)	57 (2.25)	148 (5.81)	257 (10.13)	289 (11.38)	97 (3.81)	117 (4.63)	108 (4.25)	16 (35)
8"	132BV-RB	500691	162 (6.38)	57 (2.25)	178 (7.00)	317 (12.47)	351 (13.81)	206 (8.13)	130 (5.13)	130 (5.12)	23 (50)

Automatic Valves



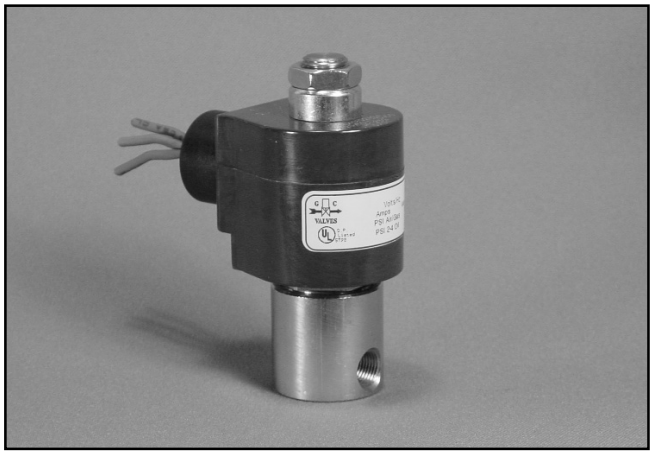
(Reduced Port Valve Shown)

Size	Cat. No.	Item Code	Dimensions mm (In) A	B	C	D	E	F	G	Port Dia.	Approx Wgt. kg (lb)
Full Port Auto											
6"	24BV-AB	500998	162 (6.38)	83 (3.25)	157 (6.18)	257 (10.13)	289 (11.38)	97 (3.81)	162 (6.38)	152 (6.00)	13 (28)
8"	32BV-AB	500999	162 (6.38)	83 (3.25)	187 (7.38)	317 (12.47)	351 (13.83)	206 (8.13)	193 (7.60)	203 (8.00)	16 (36)
Reduced Port Auto											
6"	24BV-ARB	500975	162 (6.38)	83 (3.25)	157 (6.18)	257 (10.13)	289 (11.38)	97 (3.81)	162 (6.38)	108 (4.25)	16 (35)
8"	32BV-ARB	500976	162 (6.38)	83 (3.25)	187 (7.38)	317 (12.47)	351 (13.81)	206 (8.13)	193 (7.60)	130 (5.12)	23 (50)

S30 Series

GC VALVES

1/8" NPT
Stainless Steel Body
2-Way Direct Acting
Normally Open



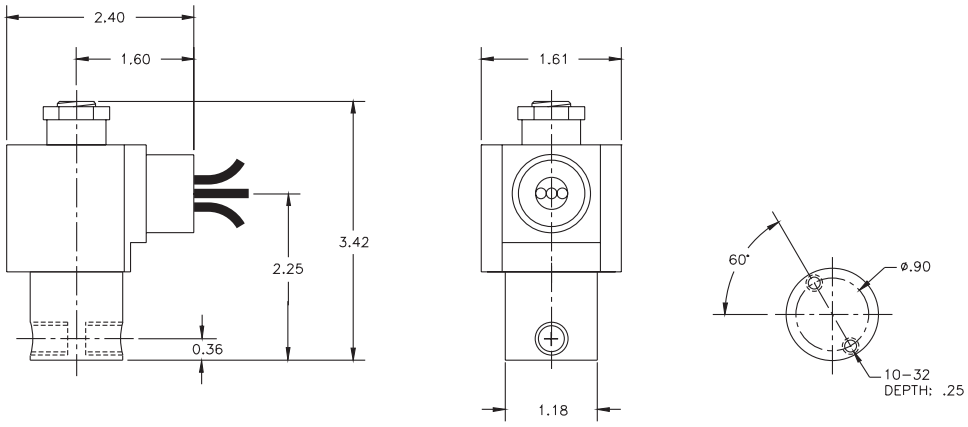
Materials	Seals:	Nitrile, Viton®, Ethylene Propylene, Teflon®, Rulon
	Orifice:	Stainless Steel
Electrical	Standard Housing:	Encapsulated Waterproof Conduit (NEMA 4/4X)
	Optional Housings:	Metallic Conduit, Explosion-proof (NEMA 7), Grommet, Open Frame, Junction Box (single or dual knockouts), DIN; Contact GC Valves Customer Service for others.
	Standard Voltages:	24, 120, 240 AC 60 Hz; 50 Hz available 6, 12, 24 DC; Contact GC Valves Customer Service for Additional Voltages.
	Voltage Tolerance:	±10% of applicable voltage
	Coil Classes:	F, H, N
	Standard Lead Length:	24 inch
Operating Temperature	Ambient (Nominal):	32°F to 125°F
Mounting	Position:	Any
Approvals*	Agency:	UL Listed, UL Recognized, CSA Approved

* Not available for all variations

® Registered Trademark of DuPont Co.

Dimensions/Weight

Weight (lbs.)
1.1

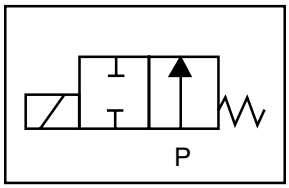


GC Valves Customer Service: 800-828-0484 (7:30am to 4pm ET) or 800-582-4232 (7:30am to 4pm PT)

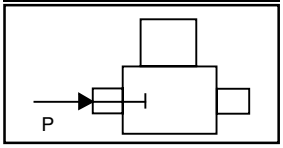
S302 – 1/8" NPT, Stainless Steel Body, Normally Open

Valve Selection List

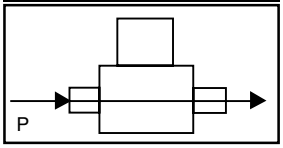
Normally Open



Energized



De-Energized



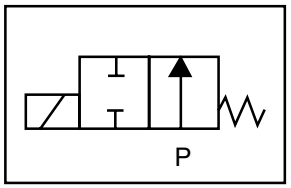
Pipe Size	Orifice Size	C_V	Minimum	Operating Pressure Differential (psi) Maximum								Max Fluid Temp.	Seal Material	Power Consumption (Watts)		Model Code (120V/60HZ — 110V/50HZ Shown)
				Air/Gas		Water		Light Oil		Steam*						
NPT	in.			AC	DC	AC	DC	AC	DC	AC	DC	°F		AC	DC	Stainless Steel Body
1/8	1/32	.03	0	2400	2400	2400	2400	—	—	150*	150*	295	EPR	11	10	S302GF02C2AC1
	3/64	.05	0	600	600	600	600	—	—	150*	150*	295	EPR	11	10	S302GF02C2AC3
	1/16	.10	0	325	325	325	325	—	—	150*	150*	295	EPR	11	10	S302GF02C2AC5
	5/64	.15	0	235	235	2235	235	—	—	150*	150*	295	EPR	11	10	S302GF02C2AC7
	3/32	.20	0	150	150	150	150	—	—	150*	150*	295	EPR	11	10	S302GF02C2AC9
	7/64	.25	0	125	125	125	125	—	—	125*	125*	295	EPR	11	10	S302GF02C2AD3
	1/8	.30	0	100	100	100	100	—	—	100*	100*	295	EPR	11	10	S302GF02C2AD5
	5/32	.43	0	60	60	60	60	—	—	60*	60*	295	EPR	11	10	S302GF02C2AD7
	3/16	.65	0	40	40	40	40	—	—	40*	40*	295	EPR	11	10	S302GF02C2AE1
1/8	1/32	.03	0	2400	2400	2400	2400	2400	2400	—	—	180	Nitrile	11	10	S302GF02N2AC1
	3/64	.05	0	600	600	600	600	600	600	—	—	180	Nitrile	11	10	S302GF02N2AC3
	1/16	.10	0	325	325	325	325	325	325	—	—	180	Nitrile	11	10	S302GF02N2AC5
	5/64	.15	0	235	235	235	235	235	235	—	—	180	Nitrile	11	10	S302GF02N2AC7
	3/32	.20	0	150	150	150	150	150	150	—	—	180	Nitrile	11	10	S302GF02N2AC9
	7/64	.25	0	125	125	125	125	125	125	—	—	180	Nitrile	11	10	S302GF02N2AD3
	1/8	.30	0	100	100	100	100	100	100	—	—	180	Nitrile	11	10	S302GF02N2AD5
	5/32	.43	0	60	60	60	60	60	60	—	—	180	Nitrile	11	10	S302GF02N2AD7
	3/16	.65	0	40	40	40	40	40	40	—	—	180	Nitrile	11	10	S302GF02N2AE1
1/8	1/32	.03	0	2400	2400	2400	2400	2400	2400	—	—	230	Viton	11	10	S302GF02V2AC1
	3/64	.05	0	600	600	600	600	600	600	—	—	230	Viton	11	10	S302GF02V2AC3
	1/16	.10	0	325	325	325	325	325	325	—	—	230	Viton	11	10	S302GF02V2AC5
	5/64	.15	0	235	235	235	235	235	235	—	—	230	Viton	11	10	S302GF02V2AC7
	3/32	.20	0	150	150	150	150	150	150	—	—	230	Viton	11	10	S302GF02V2AC9
	7/64	.25	0	125	125	125	125	125	125	—	—	230	Viton	11	10	S302GF02V2AD3
	1/8	.30	0	100	100	100	100	100	100	—	—	230	Viton	11	10	S302GF02V2AD5
	5/32	.43	0	60	60	60	60	60	60	—	—	230	Viton	11	10	S302GF02V2AD7
	3/16	.65	0	40	40	40	40	40	40	—	—	230	Viton	11	10	S302GF02V2AE1

*** Class H Coil Recommended for Steam and Other High Temperature Applications**

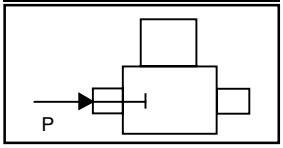
S302 – 1/8" NPT, Stainless Steel Body, Normally Open

Valve Selection List

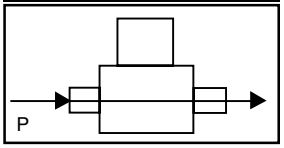
Normally Open



Energized



De-Energized



Pipe Size	Orifice Size	C_V	Minimum	Operating Pressure Differential (psi) Maximum								Max Fluid Temp.	Seal Material	Power Consumption (Watts)		Model Code (120V/60HZ — 110V/50HZ Shown)
				Air/Gas		Water		Light Oil		Steam*						
NPT	in.			AC	DC	AC	DC	AC	DC	AC	DC	°F		AC	DC	Stainless Steel Body
1/8	1/32	.03	0	2400	2400	2400	2400	2400	2400	150*	150*	366	Rulon	11	10	S302GF02R2AC1
	3/64	.05	0	600	600	600	600	600	600	150*	150*	366	Rulon	11	10	S302GF02R2AC3
	1/16	.10	0	325	325	325	325	325	325	150*	150*	366	Rulon	11	10	S302GF02R2AC5
	7/64	.15	0	235	235	235	235	235	235	150*	150*	366	Rulon	11	10	S302GF02R2AC7
	3/32	.20	0	150	150	150	150	150	150	150*	150*	366	Rulon	11	10	S302GF02R2AC9
	7/64	.25	0	125	125	125	125	125	125	125*	125*	366	Rulon	11	10	S302GF02R2AD3
	1/8	.30	0	100	100	100	100	100	100	100*	100*	366	Rulon	11	10	S302GF02R2AD5
	5/32	.43	0	60	60	60	60	60	60	60*	60*	366	Rulon	11	10	S302GF02R2AD7
	3/16	.65	0	40	40	40	40	40	40	40*	40*	366	Rulon	11	10	S302GF02R2AE1
1/8	1/32	.03	0	2400	2400	2400	2400	2400	2400	150*	150*	366	Teflon	11	10	S302GF02T2AC1
	3/64	.05	0	600	600	600	600	600	600	150*	150*	366	Teflon	11	10	S302GF02T2AC3
	1/16	.10	0	325	325	325	325	325	325	150*	150*	366	Teflon	11	10	S302GF02T2AC5
	5/64	.15	0	235	235	235	235	235	235	150*	150*	366	Teflon	11	10	S302GF02T2AC7
	3/32	.20	0	150	150	150	150	150	150	150*	150*	366	Teflon	11	10	S302GF02T2AC9
	7/64	.25	0	125	125	125	125	125	125	125*	125*	366	Teflon	11	10	S302GF02T2AD3
	1/8	.30	0	100	100	100	100	100	100	100*	100*	366	Teflon	11	10	S302GF02T2AD5
	5/32	.43	0	60	60	60	60	60	60	60*	60*	366	Teflon	11	10	S302GF02T2AD7
	3/16	.65	0	40	40	40	40	40	40	40*	40*	366	Teflon	11	10	S302GF02T2AE1

*** Class H Coil Recommended for Steam and Other High Temperature Applications**

S302 – 1/8" NPT, Stainless Steel Body, Normally Open

Part Numbering

1	2	3	4	5	6	7	8	9	10	11	12	13
S	3	0	2	G	F	0	2	C	2	A	C	1
Series			Operating Mode	Housing*	Coil Class*	Voltage*		Seal Material	Body Material	Pipe Connection	Orifice Size	
S30			2: Normally Open	G: Conduit	F: Class F H: Class H	02: 120/60 110/50		C: EPR N: Nitrile V: Viton R: Rulon T: Teflon	2: Stainless Steel	A: 1/8" NPT	C1: 1/32" C3: 3/64" C5: 1/16" C9: 3/32" D5: 1/8" E1: 3/16"	

* See the “Engineering Guide” for additional voltages, variations and options.

Coil Data

Coil Family

Type	Size
All	S4

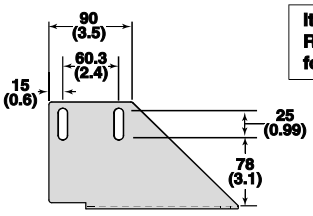
Frequency (Hz)		60	50
Nominal Power (VA)	Inrush	46	46
	Holding	22	25

Accessories for automatic BV's

Control Motor Mounting Kits	Kit Item Code	Major Components			
		Bracket	Control Rod	Coupling	Crank Arm
Eclipse Rotary Actuator					
RH mount, 1/2 thru 4, ver. 1	**100124**	21695	Rod not required	20697	Crank arms not required
LH mount, 1/2 thru 4, ver. 1	**100125**	21696		20697	
RH mount, 1/2 thru 4, ver. 2	**100127**	21695		21048	
LH mount, 1/2 thru 4, ver. 2	**100128**	21696		21048	
Perpendicular mount, 1/2 thru 1-1/2, ver. 2	**100190**	21934		21048	
Perpendicular mount, 2 & 2-1/2, ver. 2	**100191**	21935		21048	
Perpendicular mount, 3 & 4, ver. 2	**100192**	21936		21048	
EMP/EMA, Honeywell					
1/2 thru 4 ver. 1	**500928**	13095	12730-1	14264	500527
1/2 thru 4 ver. 2	**100099**	13095	12730-1	14264	102265
6 and 8 valves	**500928-1**	13095	12730-2	14264	500537
Honeywell M640 & M940					
1/2 thru 4 ver. 1	**500758**	13095 & 12758	12730-1	14264	500527
1/2 thru 4 ver. 2	**120079**	13095 & 12758	12730-1	14264	102265

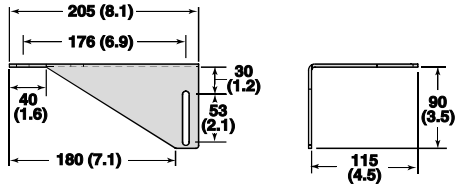
Notes:

- Each Eclipse ver. 2 automatic BV is sold with a Control Motor Arm, Item Code 102265.
- Control Motor Mounting Kits contain brackets, couplings and misc. screws & washers.
- The kits used with EMP/EMA and Honeywell valves also contain a control rod and crank arm.
- These mounting kits are designed to work with a majority of installations. Some applications may require special components.
- Not all kit components are available for individual sale.
- Contact the factory or your Eclipse representative for more detailed information.

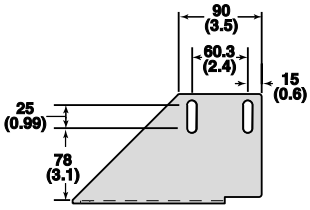


Item Code 21695
Right hand mounting bracket for Eclipse Rotary Actuator

Dims: mm (in.)

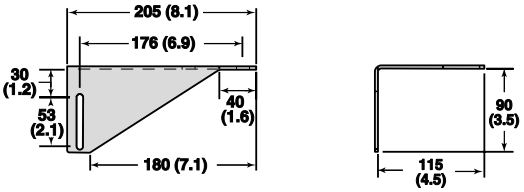


Material:
Powder coated mild steel, 3.4mm (0.13) nominal thickness.



Item Code 21696
Left hand mounting bracket for Eclipse Rotary Actuator

Dims: mm (in.)



Material:
Powder coated mild steel, 3.4mm (0.13) nominal thickness.

=====HOMESTEAD LUBRICATED PLUG VALVES=====

Fig. 611 & 612

Standard Opening

Semi-Steel

Straightway - Wrench Operated

Rectangular Port

U.L. Listed

1/2" thru 4"

200 lb. WOG

150 lb SWP

Test: Air under water 200 p.s.i.g.

U.L. Listed

1' thru 6"

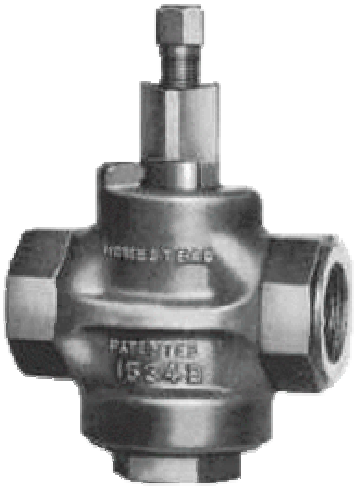


Fig. 611 - Semi-Steel, Screwed

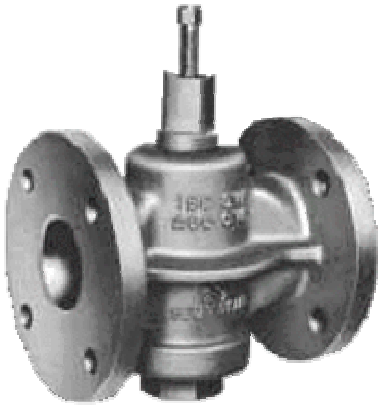
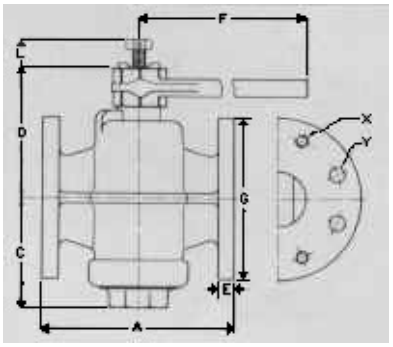


Fig. 612 - Semi-Steel, Flanged

DIMENSIONS		SIZE - INCHES									
		1"	**1 1/4"**	**1 1/2"**	**2"**	**2 1/2"**	**3"**	**4"**	**5"**	**6"**	**8"**
End to End	A	4 1/4	5	5	6	6 3/4	7 5/8	9	-	-	-
Face to Face	A	5 1/2	6	6 1/2	7	7 1/2	8	9	10 1/2	10 1/2	11 1/2
Flange Diameter	G	4 1/4	4 5/8	5	6	7	7 1/2	9	10	11	13 1/2
Flange Thickness	E	7/16	1/2	9/16	5/8	11/16	3/4	15/16	1	1	1 1/8
Number of drilled holes in flange	Y	4	4	4	4	4	4	8	8	8	8
Number of tapped holes in flange	X	-	-	-	-	-	-	-	-	-	-
					4				-	-	-

Center to Top of Stem (Fig. 611)	D	2 29/32	3 5/16	3 5/16		5 1/8	5 13/32	6 17/32			
Center to Top of Stem (Fig. 612)	D	2 29/32	2 29/32	3 1/2	4	5 1/8	5 13/32	6 17/32	7 3/4	7 3/4	9 3/16
Length of Lubricant Screw	L	1 9/16	1 9/16	1 9/16	1 9/16	2 1/2	2 1/2	2 1/2	3 5/8	3 5/8	3 5/8
Lubricant Stick Diameter	-	3/8	3/8	3/8	3/8	1/2	1/2	1/2	1/2	1/2	1/2
Standard Wrench Size	-	F	G	G	G	E	E	L	N	N	N
Center of Port to Bottom	C	2 11/32	2 5/16	2 5/16	3 1/8	3 29/32	4 3/16	4 29/32	6 1/32	6 1/32	6 1/2
Dimension. of Square on Stem	-	25/32	29/32	29/32	29/32	1 7/32	1 7/32	1 1/2	2	2	2
Extreme Width of Screwed Body	-	2 1/8	3 1/2	3 3/8	3 7/8	5	5 5/8	6 3/8	-	-	-
Extreme Width of Flanged Body	-	4 1/4	4 5/8	5	6	7	7 1/2	9	10	11	13 1/3
Weight, pounds - Fig. 611	-	4 1/2	7 1/4	7 1/4	13 1/4	19 1/2	33 3/4	58 1/2	-	-	-
Weight, pounds - Fig. 612	-	7 1/2	10 1/2	10 1/2	19	29 1/2	39	61 1/2	88	100	172



For 8" and larger sizes also see Fig. 612-A.

Face to Face dimensions are in accordance with ANSI B16.10

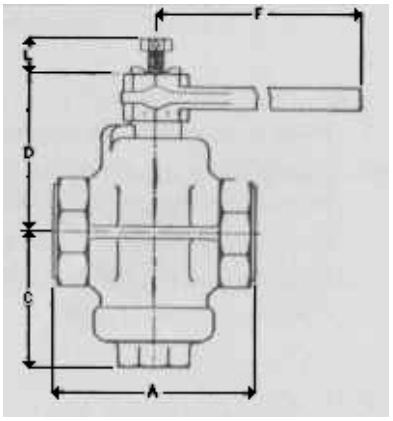
Flanges are drilled to 125 pound ANSI B16.1. Drilling other than

standard are extra. Prices include drilling; and no reduction is made

for valves not drilled.

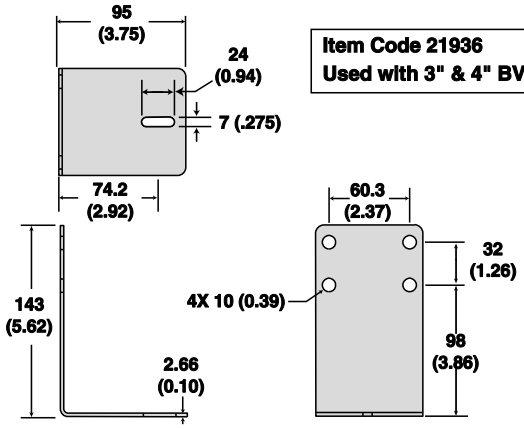
Combination Buttonhead Fitting and Lubricant Screw (Picture on

page 26) is standard on all valves.



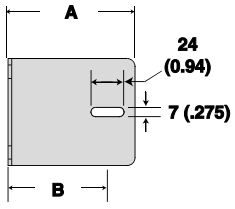
Accessories for automatic BV's (continued)

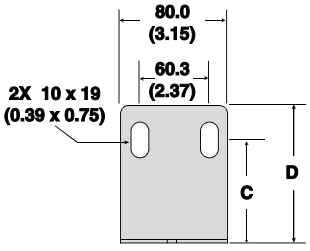
Perpendicular Brackets for Eclipse Rotary Actuator



Item Code 21936
Used with 3" & 4" BV's

Material:
Powder coated mild steel, 3.4mm (0.13) nominal thickness.



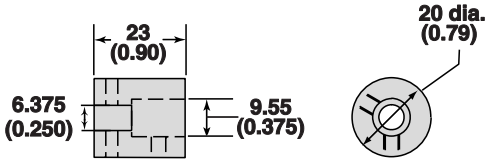


	Item Code 21934 use with 1/2 to 1-1/2 valves		Item Code 21935 use with 2 to 2-1/2 valves	
Dim	mm	(In.)	mm	(In.)
A	128.0	(5.04)	109.0	(4.29)
B	109.1	(4.30)	91.7	(3.61)
C	85.8	(3.38)	103.0	(4.06)
D	103.0	(4.06)	121.0	(4.76)

Material:
Powder coated mild steel, 3.4mm (0.13) nominal thickness.

Couplings for Eclipse Rotary Actuator

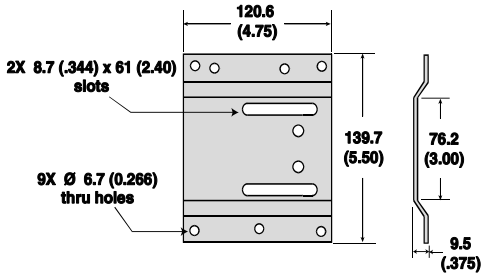
Item Code 20697
Coupling for Eclipse Rotary Actuator
Used with ver. 1 BV's (3/8" dia. shaft)



Material: T7075-T6 Aluminum

Item Code 13095
Mounting plate

Dims: mm (in.)



Material: Powder coated mild steel

MAXITROL® company

Capacity Charts for Gas Pressure Regulators

The capacity of any regulator is not an absolute value, but will vary with the application depending on the prevailing differential. We hope the following charts will help you in your selection of a properly sized regulator.
Maxitrol gas appliances regulators should be installed and operated in accordance with our "Safety Warning Bulletin" — no untrained person should attempt to install, maintain, or service a gas pressure regulator.

POPPET MODELS — capacities expressed in Btu/h. — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure..... 1/2 psi

Model	Pipe Size	Pressure Drop @ 0.3" w.c.	Range of Regulation		Individual Load	
			Main Burner	M.B. and Pilot	Fixed Orifices	Ball Check Devices
RV12	1/8" x 1/8" 3/16" x 3/16"	14,800 8,800	30,000	25,000 15,000	20,000 15,000	—
RV20	1/4" x 1/4" 3/8" x 3/8"	30,000	65,000	50,000	30,000	—
RV20C	1/4" X 1/4" 3/8" X 3/8"	30,000	75,000	50,000	15,000	—
CV47 RV47	3/8" X 3/8" 1/2" X 1/2"	55,000 60,000	125,000	90,000	40,000	90,000
CV47A & C RV47A & C	3/8" X 3/8" 1/2" x 1/2"	55,000 60,000	125,000	125,000	40,000	125,000
RV48	1/2" X 1/2" 3/4" X 3/4"	130,000 150,000	230,000 250,000	230,000 250,000	40,000	160,000
RV48C	1/2" x 1/2" 3/4" x 3/4"	130,000 150,000	400,000	275,000 Nat 250,000 LP	40,000	160,000

NOTE: Minimum main burner regulation capacity for all models (except "N") is 150 Btu/h

STRAIGHT-THRU-FLOW — capacities expressed in CFH — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure: RV52 & 53.....1/2 psi
RV61, 81, 91 & 111..... 1 psi
R131..... 2 psi

Model Number and Pipe Size		CSA MAX	Pressure Drop (inches w.c.)												
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	2.0	3.0	4.0
RV52	1/2 x 1/2 3/4 x 3/4	450 450	151 151	214 214	262 262	302 302	338 338	370 370	400 400	427 427	453 453	478 478	676 676	828 828	956 956
RV53	3/4 x 3/4 1 x 1	710 710	217 217	306 306	375 375	433 433	484 484	530 530	573 573	612 612	650 650	684 684	968 968	1185 1185	1369 1369
RV61	1 x 1 1-1/4 x 1-1/4	1100 1100	379 379	536 536	675 675	759 759	848 848	929 929	1004 1004	1073 1073	1138 1138	1200 1200	1742 1742	2134 2134	2464 2464
RV81	1-1/4 x 1-1/4 1-1/2 x 1-1/2	2500 2500	780 780	1102 1102	1350 1350	1559 1559	1743 1743	1909 1909	2062 2062	2204 2204	2339 2339	2465 2465	3485 3485	4269 4269	4929 4929
RV91	2 x 2 2-1/2 x 2-1/2	3275 3275	1212 1212	1714 1714	2100 2100	2424 2424	2711 2711	2969 2969	3208 3208	3429 3429	3637 3637	3834 3834	5422 5422	6640 6640	7668 7668
RV111	2-1/2 x 2-1/2 3 x 3	7500 7500	2742 2742	3878 3878	4750 4750	5485 5485	6132 6132	6718 6718	7256 7256	7757 7757	8227 8227	8572 8572	12134 12134	14862 14862	17161 17161
RV131	4 x 4	—	4734	6695	8200	9468	10586	11596	12525	13390	14202	14971	21172	25930	29942

325 SERIES — capacities expressed in CFH — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure.....10 psi

Model Number and Pipe Size		Pressure Drop 0.3"	0.5"	1.0"	3.0"	5.0"	7.0"	1/2 psi	3/4 psi	1 psi
325-3	3/8 x 3/8	30	38	55	95	122	145	204	250	289
	1/2 x 1/2	30	38	55	95	122	145	204	250	289
325-5A	1/2 x 1/2	70	90	128	221	286	338	476	583	673
	3/4 x 3/4	70	90	128	221	286	338	476	583	673
	1 x 1	70	90	128	221	286	338	476	583	673

		1.0"	3.0"	5.0"	7.0"	1/2 psi	3/4 psi	1 psi	1.5 psi	1.75 psi
325-7	1-1/4 x 1-1/4	260	450	581	690	972	1191	1375	1685	1820
	1-1/2 x 1-1/2									

210 SERIES — capacities expressed in CFH — 0.64 sp gr gas
Maxitrol recommended maximum inlet pressure.....10 psi

Model Number and Pipe Size		Pressure Drop (inches w.c.) 0.1	0.3	0.5	1.0	3.0	5.0	7.0	1/2 psi	3/4 psi	1 psi	1.5 psi
210D	1 x 1	—	—	—	900	1600	2000	2400	3300	4100	4750	5800
	1-1/4 x 1-1/4	—	—	—	1100	1900	2500	2900	4100	5000	5850	7150
	1-1/2 x 1-1/2	—	—	—	1200	2100	2700	3200	4500	5500	6350	7750
210E	1-1/2 x 1-1/2	—	1050	1350	1915	3315	4280	5065	7125	8725	10075	12340
	2 x 2	—	1210	1560	2210	3825	4940	5845	8225	10070	11630	14245
210G	2-1/2 x 2-1/2	1410	2450	3160	4470	7740	9995	11825	16635	20375	23525	28810
	3 x 3	1555	2695	3475	4920	8520	11000	13020	18310	22425	25890	31710
210J	4 x 4	2700	4700	6000	8600	15000	19000	23000	32000	40000	45500	55700

R/RS SERIES — capacities expressed in CFH — 0.64
Maxitrol recommended maximum inlet pressure: R Model.....1 psi
RS Model..... 5 psi

Model Number and Pipe Size		Pressure Drop (inches w.c.) 0.2	0.4	0.6	0.8	1.0	1.5	2.0	2.5	3.0	3.5	4.0
R400 & R400S	3/8 x 3/8	77	110	134	155	174	212	245	274	—	—	—
	1/2 x 1/2	86	121	148	172	192	235	271	303	—	—	—
R500 & R500S	1/2 x 1/2	163	231	283	327	366	447	516	577	635	685	730
	3/4 x 3/4	196	277	340	392	438	537	620	693	760	820	876
R600 & R600S	3/4 x 3/4	298	421	516	595	666	816	942	1054	1150	1245	1335
	1 x 1	330	468	572	661	739	906	1046	1169	1280	1380	1480

MAXITROL® company

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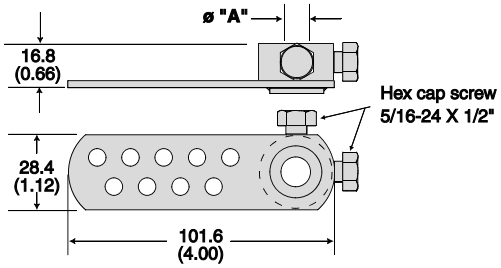
Industriestrasse 1, 48308 Senden,
• Germany
49.2597.9632.0 Fax 49.2597.9632.99

Accessories for automatic BV's (continued)

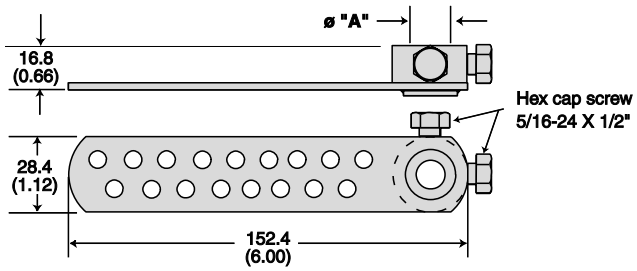
Crank arms for general use

Crank Arm Item Code	DIM "A" mm	DIM "A" (In.)
500527	9.6	(0.380)
500535	12.8	(0.505)
500536	16.0	(0.630)



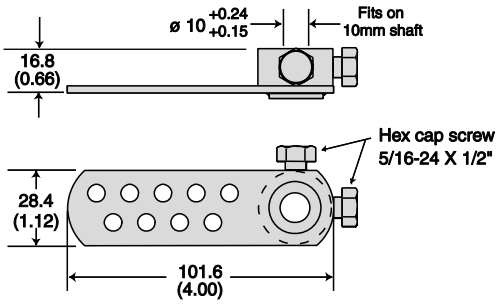
Materials: Zinc plated carbon steel

Crank Arm Item Code	DIM "A" mm	DIM "A" (In.)
500537	16.0	(0.630)
500538	9.6	(0.380)
500539	12.8	(0.505)



Materials: Zinc plated carbon steel

Item Code 102265 Dims: mm (In.)



Materials: Zinc plated carbon steel

Linkage control rods

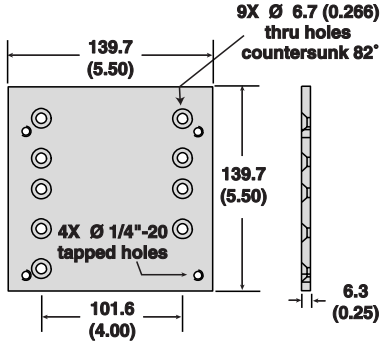
Zinc plated cold rolled steel

Dia. Inches	Item Code	Length In.	Length (mm)
	12730	8	(203)
	12730-1	10	(254)
5/16	12730-2	15	(381)
	12730-3	24	(610)
	12730-5	6	(152)

Dia. Inches	Item Code	Length In.	Length (mm)
	10175-1	12	(305)
	10175-2	15	(381)
	10175-3	18	(457)
	10175-4	24	(610)
1/2	10175-5	30	(762)
	10175-6	36	(914)
	10175-7	48	(1219)
	10175-8	60	(1524)
	10175-9	72	(1829)

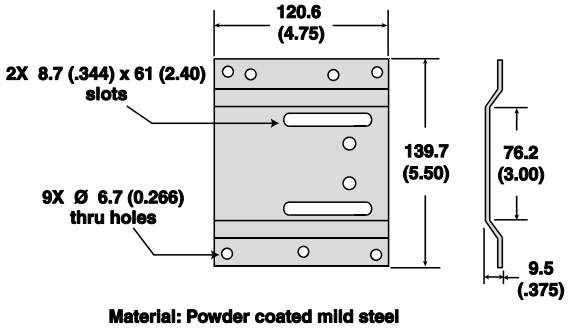
Mounting plates for Honeywell and EMP/EMA actuators

Item Code 12758 Mounting plate Dims: mm (In.)



Material: Powder coated mild steel

Item Code 13095 Mounting plate Dims: mm (In.)



Material: Powder coated mild steel

Valve model number description

Every MAXON gas electro-mechanical valve can be accurately identified by the model number shown on the valve nameplate. The example below shows a typical gas electro-mechanical valve model number, along with the available choices for each item represented in the model number.

Configured item number						Valve body					Actuator					
Valve size	Flow capacity	Valve type	Normal position	Area classification		Body connection	Body seals & bumper material	Body material	Internal trim package		Solenoid OR circuit board voltage	Motor voltage OR handle side plate	Motor timing (automatic valves only)	Switch options	Enclosure rating	Instruction language
300	C	MA	1	1	-	A	A	1	1	-	B	B	2	0	A	0

Valve size
075 - 3/4" (DN20)
100 - 1" (DN25)
125 - 1-1/4" (DN32)
150 - 1-1/2" (DN40)
200 - 2" (DN50)
250 - 2-1/2" (DN65)
300 - 3" (DN80)
400 - 4" (DN100)
600 - 6" (DN150)

Flow capacity
S - Standard
C - CP body construction
H - High capacity

Valve reset type
MA - MAXON automatic (motorized) valve
MM - MAXON manual valve

Normal position
1 - Normally closed shut-off valve
2 - Normally open vent valve

Area classification
1 - General purpose
2 - Non-incendive, Class I, II and III Division 2
4 - Valve body only (400 & 600 high capacity valves only)

Body connection
A - ANSI (NPT) threaded
B - ANSI flanged (PN20)
C - ISO 7/1 threaded
D - DIN PN16 flanged
E - Socket welded nipple
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
H - EN1092-1 PN16 flanged (ISO 7005-1 PN16)

Body seals & bumper material
A - Buna o-rings/Buna bumper
B - Viton o-rings/Buna bumper
C - Viton o-rings/Viton bumper [1]
D - Ethylene Propylene o-rings/Ethylene Propylene bumper [1]
E - Omniflex o-rings/Buna bumper
F - Omniflex o-rings/Viton bumper [1]

Body material
1 - Cast iron
2 - Carbon steel
5 - Stainless steel
6 - Low temp carbon steel

Internal trim package
1 - Trim package 1
2 - Trim package 2
4 - Trim package 2, oxy clean [1]

Solenoid OR circuit board voltage
A - 115VAC 50 Hz
B - 115VAC 60 Hz
C - 230VAC 50 Hz
D - 230VAC 60 Hz
E - 208VAC 50 Hz
F - 24VDC
G - 120VDC

Motor voltage
A - 115VAC 50 Hz
B - 115VAC 60 Hz
C - 230VAC 50 Hz
D - 230VAC 60 Hz
E - 24VDC

OR

Handle side plate
A - Standard handle
B - Tandem main
C - Tandem blocking
D - Tandem overhead
E - Wheel and chain

Motor timing
1 - 2.5 second
2 - 6 second
3 - 12 second
* - N/A with manual valves

Switch options

Automatic valves
0 - VOS1/none
1 - VOS1/VCS1
2 - VOS2/VCS2
3 - VOS2/VCS1
4 - VOS1HC/VCS1HC

Manual valves
0 - None
1 - VOS1/VCS1
2 - VOS2/VCS2
3 - VOS2/VCS1

Enclosure rating
A - NEMA 4
B - NEMA 4X

Instruction language
0 - English

[1] 0°F minimum ambient temperature limit

Valve model cross reference

MAXON valve model numbers have changed to intelligent coded model numbers for easy identification and specification. Valves manufactured prior to October 1, 2008 will contain an older model number system which can be easily cross referenced with the chart below.

Normally-closed (shut-off) valves General purpose, NEMA 4 or 4X	
Model number (prior to October 1, 2008)	**New model designation**
808 808 CP 5000 5000 CP 7000	SMM11 CMM11 SMA11 CMA11 HMA11
Normally-open (vent) valves General purpose, NEMA 4 or 4X	
Model number (prior to October 1, 2008)	**New model designation**
STO-M STO-A STO-A-CP	SMM21 SMA21 CMA21
Normally-closed (shut-off) valves Hazardous area classification	
Model number (prior to October 1, 2008)	**New model designation**
808 NI 808 NI CP 5000 NI 5000 NI CP	SMM12 CMM12 SMA12 CMA12
Normally-open (vent) valves Hazardous area classification	
Model number (prior to October 1, 2008)	**New model designation**
STO-M-NI STO-M-NI-CP STO-A-NI STO-A-NI-CP	SMM22 CMM22 SMA22 CMA22

Valve body assembly options & specifications

Normally-closed shut-off valves							
Nominal pipe size	Flow capacity	Body connections available	Body material	Trim package options	Cv rating	MOPD rating (psig)	Special service MOPD rating (psig) [1]
3/4" (DN20)	S	A, C	1, cast iron	1, 2, 4	19	125	30
1" (DN25)	S	A, C	1, cast iron	1, 2, 4	20	125	30
		A, C, E, F	2, 6, carbon steel				
			5, stainless steel				
1-1/4" (DN32)	S	A, C	1, cast iron	1, 2, 4	45	100	30
1-1/2" (DN40)	S	A, C	1, cast iron	1, 2, 4	53	70	20
		A, C, E, F	2, 6, carbon steel				
			5, stainless steel				
2" (DN50)	S	A, B, C, D, H	1, cast iron	1, 2, 4	86	70	15
		A, C, E, F	2, 6, carbon steel				
			5, stainless steel				
2-1/2" (DN65)	S	A, B, C, D	1, cast iron	1	127	40	10
	CP		1, cast iron	1, 2, 4	304	50	15
		B, D, H	2, 6, carbon steel				
			5, stainless steel				
3" (DN80)	S	A, C	1, cast iron	1	173	30	5
	CP	A, B, C, D, H	1, cast iron	1, 2, 4	423	40	10
		B, D, H	2, 6, carbon steel				
			5, stainless steel				
4" (DN100)	CP	B, D, H	1, cast iron	1, 2, 4	490	40	10
			2, 6, carbon steel				
			5, stainless steel				
	HC		1, cast iron		719	60	10
			2, carbon steel				
			5, stainless steel				
6" (DN150)	S	B, D, H	1, cast iron	1, 2, 4	869	20	Not available
			2, carbon steel				
			5, stainless steel				
	HC		1, cast iron		1172	50	10
			2,carbon steel				
			5, stainless steel				

[1] Special service fuels (see page 10-30.1-12): Valve maximum operating pressure differential (MOPD) to be reduced

Body connections:
A - NPT
B - ANSI flanged (ISO 7005 PN20)
C - ISO 7-1 threaded
D - DIN PN16 flanged
E - Socket welded nipple
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
H - EN1092-1 PN16 (ISO 7005-1 PN16)

Body material:
1 - Cast iron
2 - Carbon steel
5 - Stainless steel
6 - Low temp carbon steel

Trim package options and typical material:
1 - 400 series stainless steel seat, hardened ductile iron disc, PEEK follower ring
2 - 316SS seat, 316SS disc, PEEK follower ring
4 - Oxy clean, trim 2

Body seals and bumper:
- Buna o-rings/Buna bumper
- Viton o-rings/Buna bumper
- Viton o-rings/Viton bumper
- Ethylene Propylene o-rings/Ethylene Propylene bumper
- Omniflex o-rings/Buna bumper
- Omniflex o-rings/Viton bumper

Refer to valve body assembly gas compatibility for proper elastomer selection.

Normally-open vent valves							
Nominal pipe size	Flow capacity	Body connections available	Body material	Trim package options	Cv rating	MOPD rating (psig)	Special service MOPD rating (psig) [1]
3/4" (DN20)	S	A, C	1, cast iron	1, 2, 4	19	125	30
1" (DN25)	S	A, C	1, cast iron	1, 2, 4	20	125	30
		A, C, E, F	2, 6, carbon steel				
			5, stainless steel				
1-1/2" (DN40)	S	A, C	1, cast iron	1, 2, 4	53	70	20
		A, C, E, F	2, 6, carbon steel				
			5, stainless steel				
2" (DN50)	S	A, B, C, D, H	1, cast iron	1, 2, 4	86	70	15
		A, C, E, F	2, 6, carbon steel				
			5, stainless steel				
2-1/2" (DN65)	CP	A, B, C, D	1, cast iron	1, 2, 4	304	50	15
		B, D, H	2, 6, carbon steel				
			5, stainless steel				
3" (DN80)	CP	A, B, C, D, H	1, cast iron	1, 2, 4	423	40	10
		B, D, H	2, 6, carbon steel				
			5, stainless steel				
4" (DN100)	CP	B, D, H	1, cast iron	1, 2, 4	490	40	10
			2, 6, carbon steel				
			5, stainless steel				

[1] Special service fuels (see page 10-30.1-12): Valve maximum operating pressure differential (MOPD) to be reduced

Body connections:
A - NPT
B - ANSI flanged (ISO 7005 PN20)
C - ISO 7-1 threaded
D - DIN PN16 flanged
E - Socket welded nipple
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
H - EN1092-1 PN16 (ISO 7005-1 PN16)

Body material:
1 - Cast iron
2 - Carbon steel
5 - Stainless steel
6 - Low temp carbon steel

Trim package options and typical material:
1 - 400 series stainless steel seat, hardened ductile iron disc, PEEK follower ring
2 - 316SS seat, 316SS disc, PEEK follower ring
4 - Oxy clean, trim 2

Body seals and bumper:
- Buna o-rings/Buna bumper
- Viton o-rings/Buna bumper
- Viton o-rings/Viton bumper
- Ethylene Propylene o-rings/Ethylene Propylene bumper
- Omniflex o-rings/Buna bumper
- Omniflex o-rings/Viton bumper

Refer to valve body assembly gas compatibility for proper elastomer selection.

Valve actuator options

Automatic reset valves							
Nominal pipe size	Flow capacity	Normal position	Area classification	Solenoid OR circuit board voltage	Motor voltage	Motor timing	Switch options
3/4" (DN20)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0 , 1, 2, 3
1" (DN25)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
1-1/4" (DN32)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
1-1/2" (DN40)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1,2 1,2	0, 1, 2, 3, 4 0, 1, 2, 3
2" (DN50)	S	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
2-1/2" (DN65)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
3" (DN80)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	1, 2 1, 2	0, 1, 2, 3, 4 0, 1, 2, 3
2-1/2" (DN65)	C	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	2 2	0, 1, 2, 3, 4 0, 1, 2, 3
3" (DN80)	C	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	2 2	0, 1, 2, 3, 4 0, 1, 2, 3
4" (DN100)	C	1, 2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D	2 2	0, 1, 2, 3, 4 0, 1, 2, 3
4" (DN100)	H	1	1	A, B, C, D, G	A, B, C, D	3	0, 1, 2, 3
6" (DN150)	H	1	1	A, B, C, D, G	A, B, C, D	3	0. 1, 2, 3

Flow capacity
S - Standard
C - CP body construction
H - High capacity

Normal position
1 - Normally-closed shut-off valve
2 - Normally-open vent valve

Area classification
1 - General purpose
2 - Non-incendive, Class I, II and III, Division 2

Solenoid OR circuit board voltage
A - 115VAC 50 Hz
B - 115VAC 60 Hz
C - 230VAC 50 Hz
D - 230VAC 60 Hz
E - 208VAC 50 Hz
F - 24VDC
G - 120VDC

Motor voltage
A - 115VAC 50 Hz
B - 115VAC 60 Hz
C - 230VAC 50 Hz
D - 230VAC 60 Hz
E - 24VDC

Motor timing
1 - 2.5 second
2 - 6 second
3 - 12 second

Switch options
0 - VOS1/None
1 - VOS1/VCS1
2 - VOS2/VCS2
3 - VOS2/VCS1
4 - VOS1HC/VCS1HC

Manual reset valves						
Nominal pipe size	Flow capacity	Normal position	Area classification	Solenoid voltage	Handle side plate options	Switch options
3/4" (DN20)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, E A, E	0, 1, 2, 3 0, 1, 2, 3
1" (DN25)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, E A, E	0, 1, 2, 3 0, 1, 2, 3
1-1/4" (DN32)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
1-1/2" (DN40)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, E A, E	0, 1, 2, 3 0, 1, 2, 3
2" (DN50)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, E A, E	0, 1, 2, 3 0, 1, 2, 3
2-1/2" (DN65)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
3" (DN80)	S	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
2-1/2" (DN65)	C	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	2	A, B, C, D, F, G	A, E	0, 1, 2, 3
3" (DN80)	C	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	2	A, B, C, D, F, G	A, E	0, 1, 2, 3
4" (DN100)	C	1	1 2	A, B, C, D, E, F, G A, B, C, D, F, G	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3
		2	2	A, B, C, D, F, G	A, E	0, 1, 2, 3
6" (DN150)	S	1	1 2	A, B, C, D, E A, B, C, D	A, B, C, D, E A, B, C, D, E	0, 1, 2, 3 0, 1, 2, 3

Flow capacity
S - Standard
C - CP body construction
H - High capacity

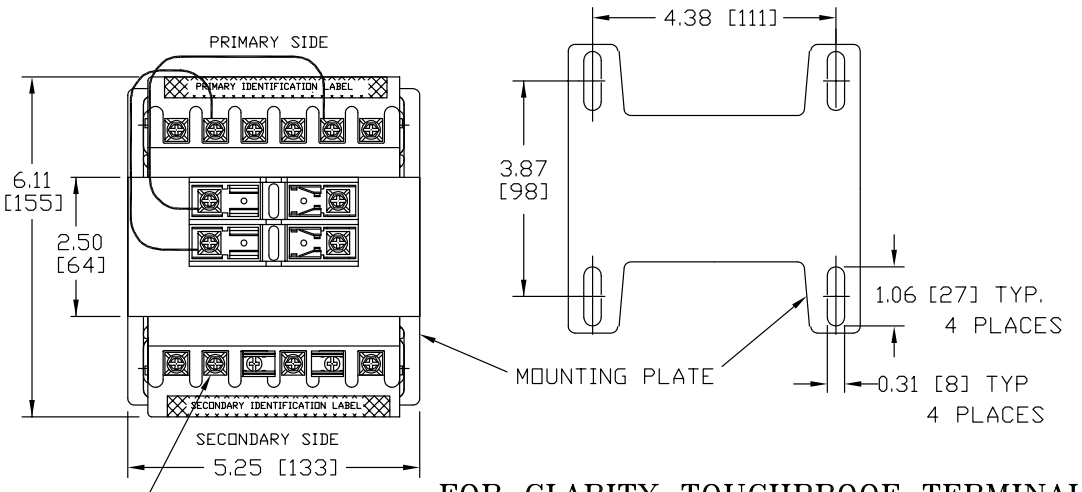
Normal position
1 - Normally-closed shut-off valve
2 - Normally-open vent valve

Area classification
1 - General purpose
2 - Non-incendive, Class I, II and III, Division 2

Solenoid voltage
A - 115VAC 50 Hz
B - 115VAC 60 Hz
C - 230VAC 50 Hz
D - 230VAC 60 Hz
E - 208VAC 50 Hz
F - 24VDC
G - 120VDC

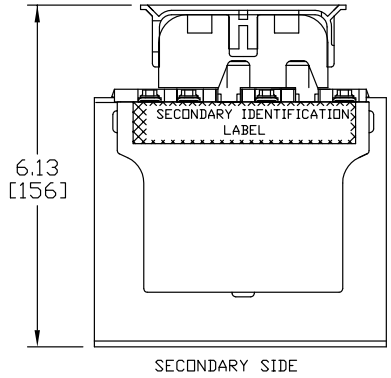
Handle side plate options
A - Standard handle
B - Tandem main
C - Tandem blocking
D - Tandem overhead
E - Wheel and chain

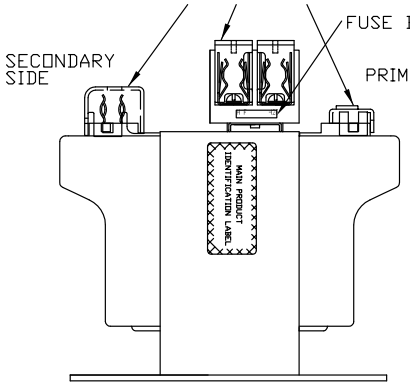
Switch options
0 - None
1 - VOS1/VCS1
2 - VOS2/VCS2
3 - VOS2/VCS1



10-32 PHIL-SLOT-5/16" HEX
WITH SEMS WASHER

FOR CLARITY TOUCHPROOF TERMINAL COVERS SHOWN ON END VIEW ONLY



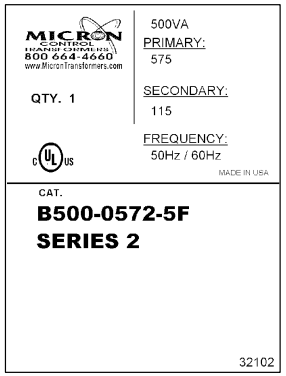


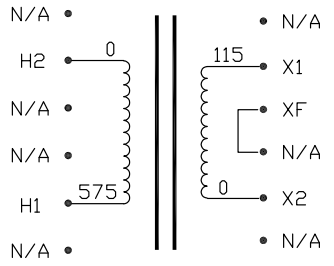
Transformer Specifications	
PRIMARY VOLTAGE(S)	575 (TRIPLE RATED)
SECONDARY VOLTAGE(S)	115
RATED V.A.	500
RATED FREQUENCY	50/60
INSULATION CLASS	130
AGENCY APPROVALS	UL, CUL
ESTIMATED WEIGHT	16.7 LBS

TEST REQUIREMENTS *				
WINDING	H2-H1	X2-X1		
D.C.VOLTS	600	126.3		
LOAD VOLTS	600	120		
F.L. AMPS	0.971	4.167		
HI-POT	4800V	3000V		
EXCITING AMPS		0.15AMPS @ 600 VOLTS, 50HZ		
EXCITING WATTS		26.7 MAX		

* VOLTAGE TOLERANCE IS ±0.95 VOLTS

BOX LABEL



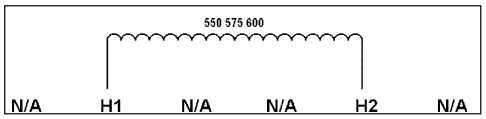


SEC.FUSECLIPS INTERNALLY JUMPERED

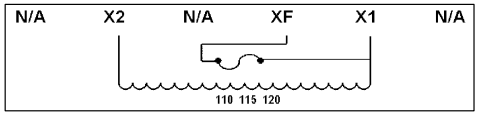
CONNECTION DIAGRAM

NOTE:
1. ALL MEASURMENTS IN INCHES(MM).

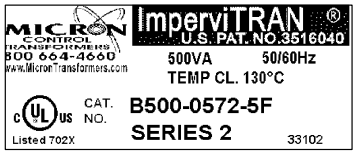
PRIMARY IDENTIFICATION LABEL



SECONDARY IDENTIFICATION LABEL



MAIN PRODUCT IDENTIFICATION LABEL



PACKAGED ACCESSORIES	
1	
-	-
-	-

REVISIONS			
ECL		BY	DATE
A	NEW	J.V	8/9/10

MICRON INDUSTRIES CORPORATION
1211 W.22nd STREET, Suite 200, OAK BROOK, ILL.
Tel. (800)664-4660, (630)516-1222 Fax (630)516-1820
www.MicronPower.com

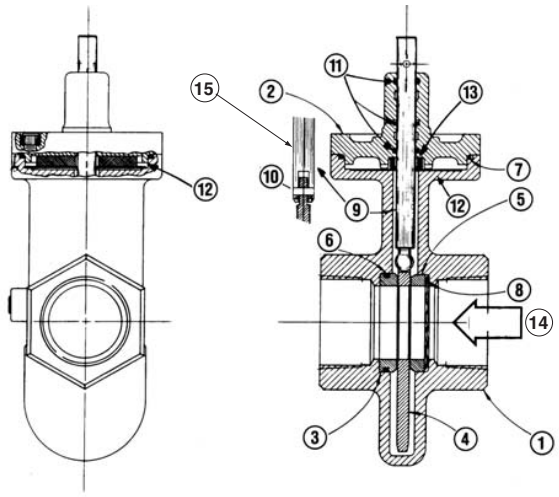
DATE	DRAWN	CHECKED	APPROVED
8/9/10	J.G.V		
RELEASE DATE	CUSTOMER PART NO.		

MICRON PART NO.: B500-0572-5FA7777A2
B500-0572-5FA7777B2

SIZE: C | SCALE: NONE | B500-0572-5F

Valve body assembly specifications

1) Body
2) Bonnet
3) Seat
4) Disc
5) Follower ring
6) Seat o-ring
7) Body o-ring
8) Wavy spring
9) Stem
10) Spring pin
11) Stem o-ring
12) Striker plate
13) Bumper
14) Flow direction
15) Typical stem/disc connection used with smaller sized valves



Threaded CP body design shown

Body and bonnet materials					
Item number	Description	Material code			
		1	2	5	6
1	Body	Cast iron ASTM A126, Class B	Carbon steel ASTM A216, Gr. WCB	Stainless steel ASTM A351 Gr. CF8M	Low temp carbon steel ASTM A352 Gr. LCB
2	Bonnet				

Body seals and bumper material		
Item number	Description	Material
6	Seat o-ring	Buna o-rings/Buna bumper Viton o-rings/Buna bumper Viton o-rings/Viton bumper Ethylene Propylene o-rings/Ethylene Propylene bumper Omniflex o-rings/Buna bumper Omniflex o-rings/Viton bumper
7	Body o-ring	
11	Stem o-ring	
13	Bumper	

Trim package materials			
Item number	Description	Internal trim package	
		1	2
3	Seat	400 series stainless steel	316 stainless steel
4	Disc	Hardened ductile iron	316 stainless steel
5	Follower ring	PEEK	PEEK
8	Wavy spring	300 series stainless steel	
9	Stem	17-4 PH stainless steel	
10	Spring pin (when required)	Carbon steel	400 series stainless steel
12	Striker plate	17-7 PH stainless steel	

MAXON
A Honeywell Company

Valve body assembly - gas compatibility

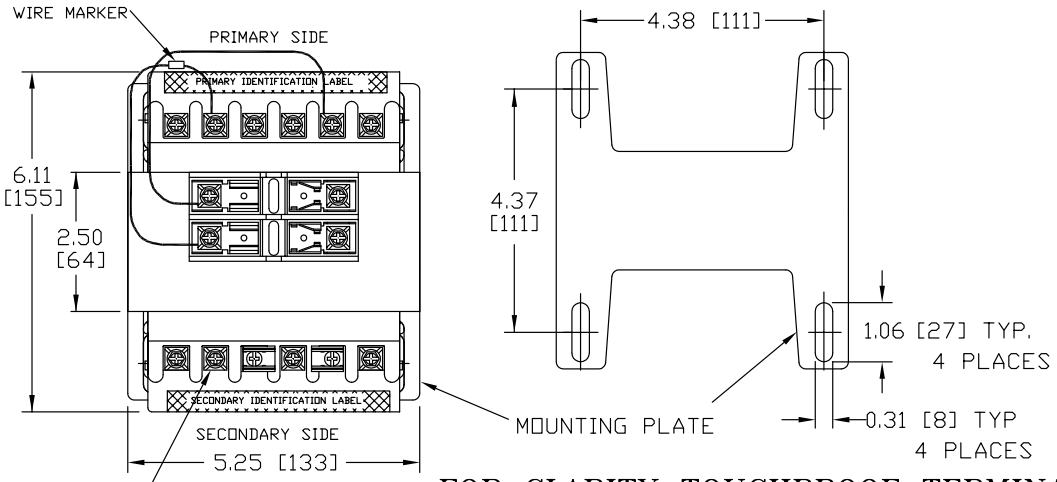
Gas	Gas code	Suggested material options			MOPD rating	Agency approvals and certifications				
		Body seals & bumper	Body & bonnet	Trim package		FM	CSA [3]	CE [4]		UL [3]
								GAD	MD	
Air	AIR	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
Ammonia	AMM	A, D, E	1, 2, 5, 6	1, 2	Std.	X	X		X	
Butane gas	BUT	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X	X	X	X
Coke oven gas	COKE	C, F	1, 2, 5, 6	2	[5]	X	X		X	
Delco	DEL	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
Digester [1]	DIG	Analysis required	5	2	[5]	X	X		X	
Endothermic AGA	ENDO	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
Exothermic gas	EXO	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
Hydrogen gas	HYD	A, B, C, E, F	1, 2, 5, 6	1, 2	[2]	X	X		X	
Manufactured [1]	MFGD	Analysis required	5	2	Std.	X	X		X	
Natural gas	NAT	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X	X	X	X
Nitrogen	NIT	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
No. 1 fuel oil [6]	NO1OIL	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
No. 2 fuel oil [6]	NO2OIL	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X		X	X
Oxygen high	OXYH	C, D, F	2, 5, 6	4	125 psig max	X	X		X	
Oxygen low	OXYL	C, D, F	1, 2, 5, 6	4	30 psig max	X	X		X	
Propane	PROP	A, B, C, E, F	1, 2, 5, 6	1, 2	Std.	X	X	X	X	X
Refinery [1]	REF	Analysis required	5	2	[5]	X	X		X	
Sour natural [1]	SOUR	Analysis required	5	2	[5]	X	X		X	
Town gas [1]	TOWN	Analysis required	5	2	Std.	X	X	X	X	
Land fill gas [1]	LAND	Analysis required	5	2	[5]	X	X		X	

[1] Other body and trim packages may be acceptable pending fuel analysis. For pricing inquiries, Viton or Omniflex o-rings should be used. Contact MAXON for details.
[2] Valve maximum operating pressure differential (MOPD) to be reduced by 25% from standard ratings.
[3] ISO connections are not recognized by CSA or UL standards
[4] SMA11, CMA11, SMM11, CMM11, SMA21, CMA21, SMM21 Series electro-mechanical valves meet the essential requirements of the Low Voltage (73/23/EEC), EMC (2004/108/EC) and Gas Appliance - GAD (90/396/EEC) Directives. The Gas Appliance Directive only covers the use of commercially available fuels (natural gas, butane, town gas and LPG). MD stands for Machinery Directive (98/37/EC).
[5] Special service fuels: Valve maximum operating pressure differential (MOPD) to be reduced from standard ratings
[6] All electro-mechanical valves except HMA11 Series are approved for use with No. 1 and No. 2 fuel oils. Swinging gate style valves are preferable for liquid service.

Body seals & bumper:
A - Buna o-rings/Buna bumper
B - Viton o-rings/Buna bumper
C - Viton o-rings/Viton bumper
D - Ethylene propylene o-rings/Ethylene propylene bumper
E - Omniflex o-rings/Buna bumper
F - Omniflex o-rings/Viton bumper

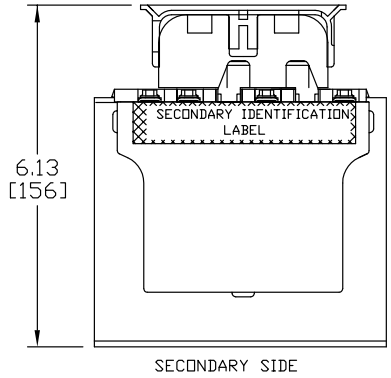
Body & bonnet:
1 - Cast iron
2 - Carbon steel
5 - Stainless steel
6 - Low temp carbon steel

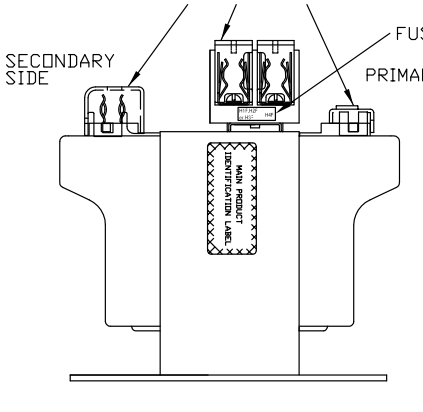
Trim package:
1 - Trim package 1
2 - Trim package 2
4 - Trim package 2, oxy clean



10-32 PHIL-SLOT-5/16" HEX
WITH SEMS WASHER

FOR CLARITY TOUCHPROOF TERMINAL COVERS SHOWN ON END VIEW ONLY



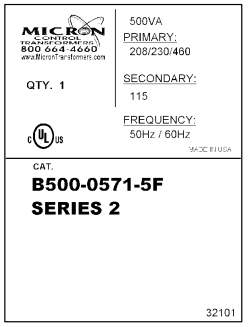


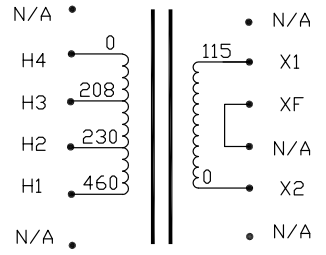
Transformer Specifications	
PRIMARY VOLTAGE(S)	208/230/460
SECONDARY VOLTAGE(S)	115
RATED V.A.	500
RATED FREQUENCY	50/60
INSULATION CLASS	130
AGENCY APPROVALS	UL, CUL
ESTIMATED WEIGHT	17.4 LBS

TEST REQUIREMENTS *			
WINDING	H4-H3-H2-H1	X2-X1	
D.C.VOLTS	208-230-460	121.2	
LOAD VOLTS	208-230-460	115	
F.L. AMPS	2.568/1.284	4.350	
HI-POT	4800V	3000V	
EXCITING AMPS	0.59AMPS @ 460 VOLTS, 50HZ		
EXCITING WATTS	28.9 MAX		

* VOLTAGE TOLERANCE IS ±0.95 VOLTS

BOX LABEL





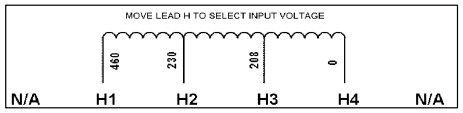
SEC.FUSECLIPS INTERNALLY JUMPERED

CONNECTION DIAGRAM

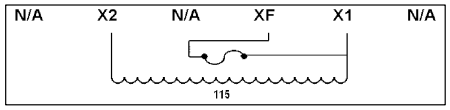
NOTE:

1. ALL MEASURMENTS IN INCHES(MM).

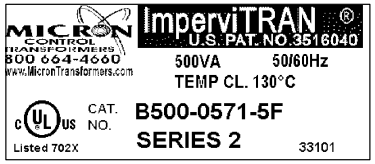
PRIMARY IDENTIFICATION LABEL



SECONDARY IDENTIFICATION LABEL



MAIN PRODUCT IDENTIFICATION LABEL



PACKAGED ACCESSORIES	
1	
-	-
-	-

REVISIONS			
ECL		BY	DATE
A	NEW	J.V	8/9/10

MICRON INDUSTRIES CORPORATION
CONTROL TRANSFORMER
1211 W.22nd STREET, Suite 200, OAK BROOK, ILL.
Tel. (800)664-4660, (630)516-1222 Fax (630)516-1820
www.MicronPower.com

DATE	DRAWN	CHECKED	APPROVED
8/9/10	J.G.V		
RELEASE DATE	CUSTOMER PART NO.		

MICRON PART NO.: B500-0571-5FA7777A2, B500-0571-5FA7777B2

SIZE: C | SCALE: NONE | B500-0571-5F

Electrical data

General

MAXON shut-off valves are electrically actuated from a power source. Standard assemblies include an internal holding solenoid or clutch and printed circuit board.

Position switch wiring diagrams (reproduced below) are part of each valve assembly, summarizing electrical data and wiring for a valve equipped with terminal block and a full complement of optional switches.

Good practice normally dictates that auxiliary switches in valves should be used for signal duty only, not to operate additional safety devices.

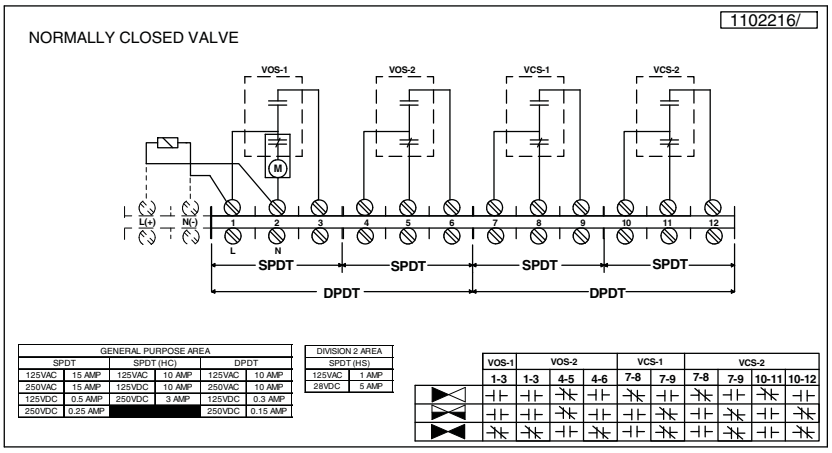
Valve position switches are offered in SPDT (single pole/double throw). Recommended packages include one open switch and one closed switch (VOS1/VCS1). Additional auxiliary switches are designated by VOS2/VCS2.

VCS (valve closed switch) is actuated at the end of the closing stroke. VOS (valve open switch) is actuated at the end of the opening stroke.

Switch amperage ratings are shown on the schematic wiring diagrams below. DO NOT EXCEED rated amperage or total load shown. Diagrams show valve with a full complement of switches. For normally-closed valves, the wiring diagram illustrates the switch contact positions with the valve closed. For normally-open valves, the wiring diagram illustrates the switch contact position with the valve open.

Figure 1: Normally-closed shut-off valves

Standard and CP valves

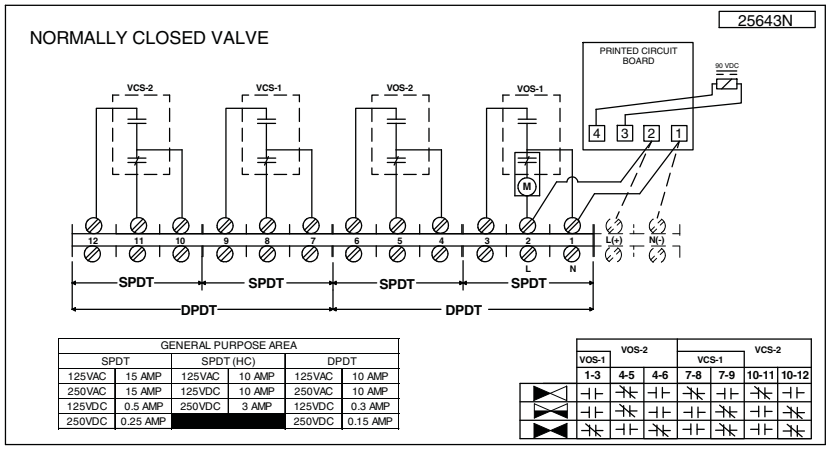


GENERAL PURPOSE AREA					
SPDT		SPDT (HC)		DPDT	
125VAC	15 AMP	125VAC	10 AMP	125VAC	10 AMP
250VAC	15 AMP	125VDC	10 AMP	250VAC	10 AMP
125VDC	0.5 AMP	250VDC	3 AMP	125VDC	0.3 AMP
250VDC	0.25 AMP			250VDC	0.15 AMP

DIVISION 2 AREA	
SPDT (HS)	
125VAC	1 AMP
28VDC	5 AMP

	VOS-1	VOS-2		VCS-1		VCS-2			
	1-3	1-3	4-5	4-6	7-8	7-9	7-8	7-9	10-11	10-12
	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢
	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢

High capacity valves (4” & 6” sizes only)

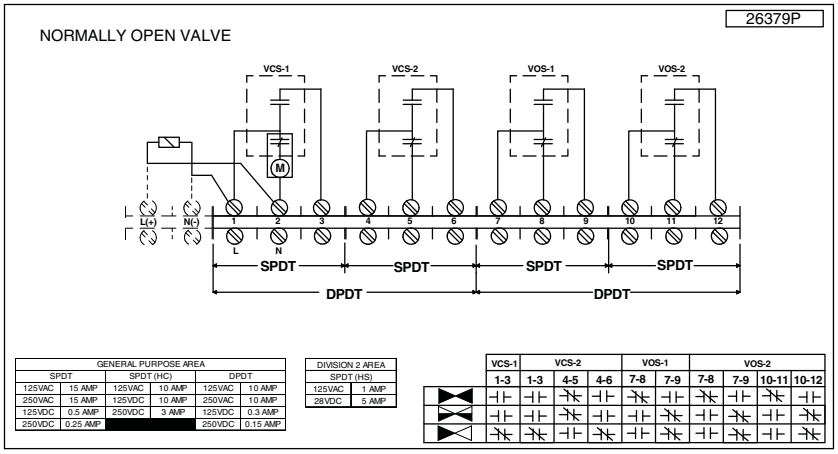


GENERAL PURPOSE AREA					
SPDT		SPDT (HC)		DPDT	
125VAC	15 AMP	125VAC	10 AMP	125VAC	10 AMP
250VAC	15 AMP	125VDC	10 AMP	250VAC	10 AMP
125VDC	0.5 AMP	250VDC	3 AMP	125VDC	0.3 AMP
250VDC	0.25 AMP			250VDC	0.15 AMP

	VOS-1	VOS-2		VCS-1		VCS-2			
	1-3	4-5	4-6	7-8	7-9	7-8	7-9	10-11	10-12
	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢
	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢

Figure 2: Normally-open valves

Standard and CP valves



GENERAL PURPOSE AREA					
SPDT		SPDT (HC)		DPDT	
125VAC	15 AMP	125VAC	10 AMP	125VAC	10 AMP
250VAC	15 AMP	125VDC	10 AMP	250VAC	10 AMP
125VDC	0.5 AMP	250VDC	3 AMP	125VDC	0.3 AMP
250VDC	0.25 AMP			250VDC	0.15 AMP

DIVISION 2 AREA	
SPDT (HS)	
125VAC	1 AMP
28VDC	5 AMP

	VCS-1	VCS-2			VOS-1		VOS-2			
	1-3	1-3	4-5	4-6	7-8	7-9	7-8	7-9	10-11	10-12
	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢
	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢
	⊣/⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢	⊣⊢	⊣/⊢

Model: 11M

Cast Iron Screwed End Y Strainers
Sizes: ¼" - 4" (6-100mm)

Pressure/Temperature–Non-Shock		
Model	Material	Rating
11M	Cast Iron	400psi @ -20°F to 150°F 27.58 bar @ 65.56°C 250psi @ 406°F 17.24 bar @ 207.78°C

11M **Class 250**

Model 11M

Typical Service
- Used extensively to strain foreign matter from pipe lines and provide economical protection for costly pumps, meters, valves and other similar mechanical equipment.

Features
- Machined seats in both body and cap align and lock the screen in place to stop sediment bypass.

Construction
- Gasketed cap is used for easy disassembly and assembly. Many others use Loctite, rendering disassembly virtually impossible.

Self-Cleaning
- Self cleaning is accomplished by opening the plug or valve connected to the blowoff outlet.

Blowoff Outlets
- Outlets are NPT Tapped
- Sizes of tapping specified on the next page.
- Not normally furnished with plug. Plug available, specify with order.

Capacity
- Generously proportioned bodies
- Open Area Ratio much greater than pipe size, ensure low pressure loss.

Screens

		STANDARD (WATER)		STEAM RECOMMENDATION	
MODEL	SIZES	MATERIAL	OPENING	MATERIAL	OPENING
11M	½" 2"	304SS	20 mesh	304SS	30 mesh
11M	2½" 4"	304SS	.062 perf	304SS	.045 perf

Pressure Drop
Pressure Drop Charts in Technical Data section of Mueller Steam Specialty Engineering binder.

Material

	11M
Body	Cast Iron ASTM A126 B
Gasket	Metal filled Graphite

Job Name _____ Contractor _____

Job Location _____ Approval _____

Engineer _____ Contractor's P.O. No. _____

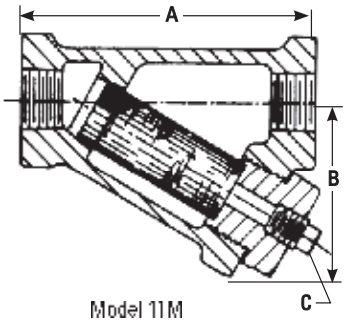
Approval _____ Representative _____

Mueller Steam Specialty™

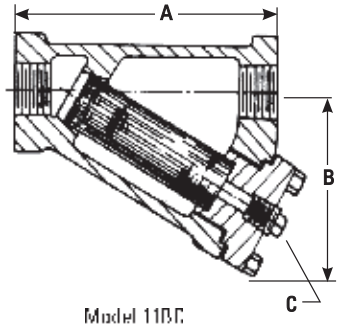
Dimensions and Weights

SIZE		DIMENSIONS						WEIGHTS	
		A		B		C			
in	mm	in	mm	in	mm	in	mm	lbs	kgs
¼	6	3⅜16	81	2⅛16	52	¼	6	1.0	0.7
⅜	10	3⅜16	81	2⅛16	52	¼	6	1.6	0.7
½	15	3⅜16	81	2⅛16	52	¼	6	1.0	0.7
¾	20	3¾	95	2⅛16	61	⅜	10	2.4	1.1
1	25	4	102	2⅝	66	⅜	10	3.0	1.4
1¼	32	5	127	3⅜	85	¾	20	5.2	2.3
1½	40	5¾	146	3⅞	98	¾	20	8.0	3.6
2	50	7	177	4¾	121	1	25	12.5	5.7
2½	65	9¼	234	5⅞	149	1½	40	22.0	10.0
3	80	10	254	6	152	1½	40	30.0	13.6
4	100	15⅜16	386	11¼	286	1½	40	70.0	32.0

Apply for Certified Drawings.



Model 11M



Model 11BF

Mueller Steam Specialty™

A Watts Water Technologies Company

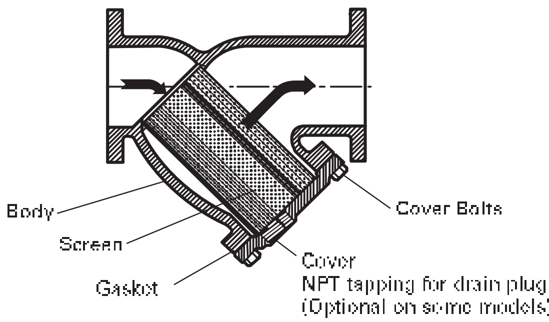
USA: St. Pauls, NC • tel. 1 800 334 6259 • fax 1 800 421 6772 • www.muellersteam.com

ES-MS-11-M 1020

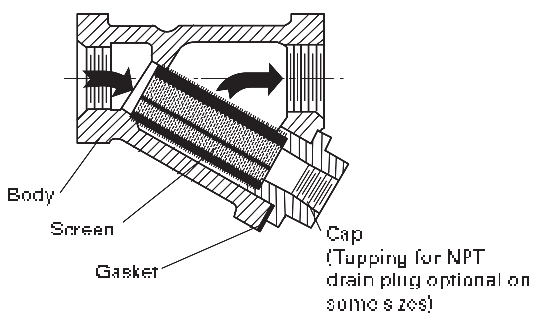
Installation, Operation and Maintenance

"Y" Strainers

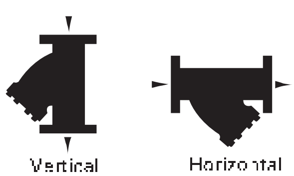
Typical flanged end "Y" strainer



Typical threaded "Y" strainer



Mounting Positions



The cover of the "Y" side should face down

Before installing the "Y" strainer, be sure its pressure rating is correct for the system. If the end connections are threaded or designed for soldering or brazing, be sure the piping is straight and not at an angle or offset. If the strainer has flanged ends, be sure the flanges of the connecting piping are square with the pipe so that no undue stresses are put on the strainer or piping when tightening flange bolts. Tighten in sequence, crossing to opposites.

For maximum efficiency, a differential pressure gauge installed across the inlet and outlet will indicate pressure loss due to clogging and may be used as a guide to determine when cleaning is required. Normally, when differential pressure reaches 5-10psi, screen must be cleaned. If the strainer is equipped with a blow down valve, open and flush out until any sediment is removed. If the strainer is not fitted for blow down cleaning, (strainer must be off line), remove the cover or cap and clean the screen. Reinstall the screen in the strainer in the same position as before and tighten cover or cap. Replace the gasket if necessary.

Keeping a spare, clean screen will minimize shut down time.

Warning

Individuals performing removal and disassembly should be provided with suitable protection from possibly hazardous liquids.

Note: Large size "Y" strainers are supplied with Breech-Lok screens. To remove screen, rotate screen 45°, Breech-lok will disengage.

Spare Parts

To order replacement screens or gaskets, which are the only items normally required, you should specify the following:

A. Size and model number of strainer or casting number as it appears on the body of the strainer.

B. Specify the type of service. For example: water, steam, gas, oil, air. The working pressure and temperature of the system and the particle size to be strained out should also be specified.

CALIFORNIA PROPOSITION 65 WARNING

WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. (California law requires this warning to be given to customers in the State of California.)

For more information: www.watts.com/prop65

ISO 9001-2008 CERTIFIED

Mueller Steam Specialty™

USA: 1491 NC Hwy 20 West, St. Pauls, NC 28384; www.muellersteam.com
Tel: 910-865-8241 Fax: 910-865-6220
Toll Free Phone: 1-800-334-6259 Toll Free Fax: 1-800-421-6772

A Watts Water Technologies Company

Available voltages and electrical data - General Purpose areas

All MAXON valves are electrically actuated from a power source through the flame safeguard and/or safety control circuits. Standard valve assemblies include an internal holding solenoid on standard flow and CP body constructions, or a printed circuit board on high capacity valves. The solenoid (or printed circuit board) is energized whenever the valve is powered. The motor operator on automatic reset valves is powered only during the opening stroke for normally-closed valves, or the closing stroke for normally-open versions.

Standard flow and CP body constructions

Solenoids					
3/4" - 1-1/2" standard flow		2" - 3" standard flow		2-1/2"CP - 4"CP & 6" standard flow	
Voltage	Power	Voltage	Power	Voltage	Power
115VAC, 50 Hz	23VA	115VAC, 50 Hz	23VA	115VAC, 50 Hz	40VA
115VAC, 60 Hz	23VA	115VAC, 60 Hz	23VA	115VAC, 60 Hz	40VA
230VAC, 50 Hz	23VA	230VAC, 50 Hz	23VA	230VAC, 50 Hz	40VA
230VAC, 60 Hz	23VA	230VAC, 60 Hz	23VA	230VAC, 60 Hz	40VA
208VAC, 50 Hz	23VA	208VAC, 50 Hz	23VA	208VAC, 50 Hz	40VA
24VDC	14W	24VDC	24W	24VDC	24W
120VDC	14W	120VDC	34W	120VDC	34W

Motor operators	
Voltage	Power
115VAC, 50 Hz	322VA
115VAC, 60 Hz	196VA
230VAC, 50 Hz	322VA
230VAC, 60 Hz	198VA
24VDC	60W

To determine valve OPENING power: (or CLOSING power for normally-open versions)

Automatic reset valves

- Total power is the sum of the motor and solenoid power ratings for the appropriate voltage/frequency in the tables above.
- If supply voltages are different, then the circuits must be segregated.

Manual reset valves

- Total power consists of only the solenoid power rating.

To determine valve HOLDING power:

- Holding power consists of the solenoid power rating for the appropriate voltage/frequency.

4” and 6” high capacity valves

Printed circuit boards	
Voltage	Power
115VAC, 50 Hz	13VA
115VAC, 60 Hz	13VA
230VAC, 50 Hz	25VA
230VAC, 60 Hz	25VA
120VDC	14W

Motor operators	
Voltage	Power
115VAC, 50 Hz	667VA
115VAC, 60 Hz	391VA
230VAC, 50 Hz	667VA
230VAC, 60 Hz	391VA

To determine valve OPENING power:

- Total power is the sum of the motor and printed circuit board power ratings for the appropriate voltage/frequency in the tables shown.

- If supply voltages are different, then the circuits must be segregated.

To determine valve HOLDING power:

- Holding power consists of the printed circuit board power rating for the appropriate voltage/frequency.

Available voltages and electrical data - Non-incendive areas

All MAXON valves are electrically actuated from a power source through the flame safeguard and/or safety control circuits. Standard valve assemblies include an internal holding solenoid on standard flow and CP body constructions, or a printed circuit board on high capacity valves. The solenoid (or printed circuit board) is energized whenever the valve is powered. The motor operator on automatic reset valves is powered only during the opening stroke for normally-closed valves, or the closing stroke for normally-open versions.

Standard flow and CP body constructions

Solenoids					
3/4" - 1-1/2" standard flow		2" - 3" standard flow		2-1/2"CP - 4"CP & 6" standard flow	
Voltage	Power	Voltage	Power	Voltage	Power
115VAC, 50 Hz	23VA	115VAC, 50 Hz	23VA	115VAC, 50 Hz	34VA
115VAC, 60 Hz	16VA	115VAC, 60 Hz	16VA	115VAC, 60 Hz	26VA
230VAC, 50 Hz	23VA	230VAC, 50 Hz	23VA	230VAC, 50 Hz	34VA
230VAC, 60 Hz	16VA	230VAC, 60 Hz	16VA	230VAC, 60 Hz	26VA
24VDC	18W	24VDC	24W	24VDC	24W
120VDC	26W	120VDC	34W	120VDC	34W

Motor operators	
Voltage	Power
115VAC, 50 Hz	322VA
115VAC, 60 Hz	196VA
230VAC, 50 Hz	322VA
230VAC, 60 Hz	198VA

To determine valve OPENING power: (or CLOSING power for normally-open versions)

Automatic reset valves

- Total power is the sum of the motor and solenoid power ratings for the appropriate voltage/frequency in the tables above.
- If supply voltages are different, then the circuits must be segregated.

Manual reset valves

- Total power consists of only the solenoid power rating.

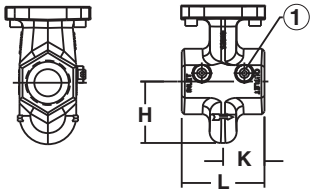
To determine valve HOLDING power:

- Holding power consists of the solenoid power rating for the appropriate voltage/frequency.

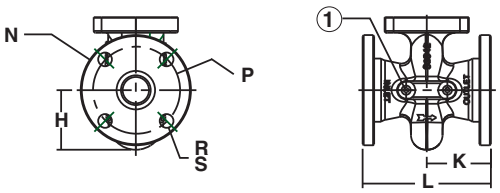
Dimensions and weights

Valve bodies: 3/4” (DN20) to 3” (DN80)

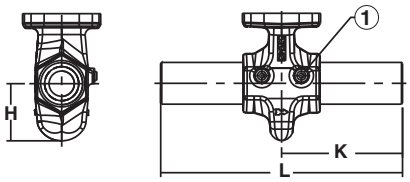
Body connection A & C



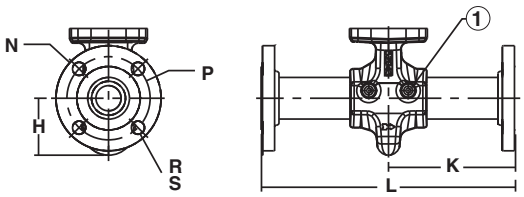
Body connection B, D & H



Body connection E



Body connection F



1) (2) 1/4” NPT test connection

Valve size	Flow capacity	Body Connection	Body/ bonnet material	Approximate dimensions (in inches)							Approximate weight (in lbs)		
				H	K	L	N Ø	P Ø	R Ø	S # of holes	Body assembly	Actuator assembly	Total weight
3/4” (DN20)	S	A, C	Cast iron	2.0	1.9	3.8	N/A				8	11	19
1” (DN25)	S	A, C	Cast iron				N/A				8		19
		A, C	Carbon steel & stainless steel				N/A				9		20
		E			6.9	13.8	N/A				11		22
		F			7.3	14.5	4.3	3.1	0.62	4	15		26
1-1/4” (DN32)	S	A, C	Cast iron	2.4	2.0	4.0	N/A				9		20
1-1/2” (DN40)	S	A, C	Cast iron	2.7			N/A				11		22
		A, C	Carbon steel & stainless steel				N/A				11		22
		E			6.8	13.6	N/A				14		25
		F			7.2	14.4	5.0	3.9	0.62	4	21		32
2” (DN50)	S	A, C	Cast iron	3.3	2.2	4.4	N/A				16	13	29
		B			3.5	7.0	6.0	4.8	0.75	4	26		39
		D, H					6.5	4.9	0.71		26		39
		A, C	Carbon steel & stainless steel		2.2	4.4	N/A				18		31
		E			6.9	13.8	N/A				23		36
		F			7.3	14.5	6.0	4.8	0.75	4	33		46
2-1/2” (DN65)	S	A, C	Cast iron	2.9	2.5	5.0	N/A				19		32
		B		3.1	3.8	7.5	7.0	5.5	0.75	4	30		43
		D, H					7.3	5.7	0.71		30		43
3” (DN80)	S	A, C	Cast iron	3.0	2.6	5.2	N/A				20		33

Flow capacity:
S - Standard
C - CP body construction
H - High capacity

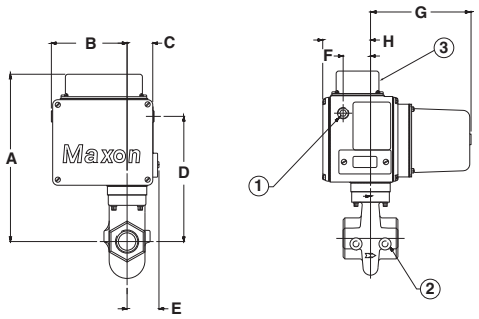
Body connection:
A - NPT
B - ANSI flanged (ISO 7005 PN20)
C - ISO 7-1 threaded
D - DIN PN16 flanged
E - Socket welded nipple
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
H - EN 1092-1 PN16 (ISO 7005-1 PN16)

Valve actuators: 3/4” through 1-1/2” valves

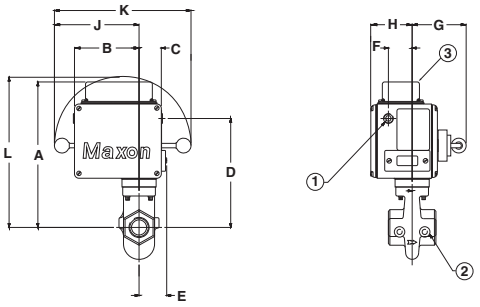
1) (2) 3/4” NPT conduit connection
2) (2) 1/4” NPT test connection
3) Terminal block cover

NOTE: 2.75” needed for terminal block cover removal

Automatic reset type (SMA11, SMA21, SMA12, SMA22)
(formerly 5000, STO-A, 5000 NI, STO-A-NI)



Manual reset type (SMM11, SMM21, SMM12, SMM22)
(formerly 808, STO-M, 808 NI, STO-M-NI)



Valve size	Flow capacity	Valve type	Approximate dimensions (in inches)										
			A	B	C	D	E	F	G	H	J	K	L
3/4” (DN20)	S	MM11, MM21	12.25	5.5	1.87	8.11	2.3	2	4.5	3.49	7.13	11.5	11.58
		MM12, MM22								5.48			
		MA11, MA21							7.34	3.49			
		MA12, MA22								5.48			
1” (DN25)	S	MM11, MM21	12.25			8.11			4.5	3.49	7.13	11.5	11.58
		MM12, MM22								5.48			
		MA11, MA21							7.34	3.49			
		MA12, MA22								5.48			
1-1/4” (DN32)	S	MM11	12.81			8.67			4.5	3.49	7.13	11.5	12.14
		MM12								5.48			
		MA11							7.34	3.49			
		MA12								5.48			
1-1/2” (DN40)	S	MM11, MM21	13.31			9.14			4.5	3.49	7.13	11.5	12.61
		MM12, MM22								5.48			
		MA11, MA21							7.34	3.49			
		MA12, MA22								5.48			

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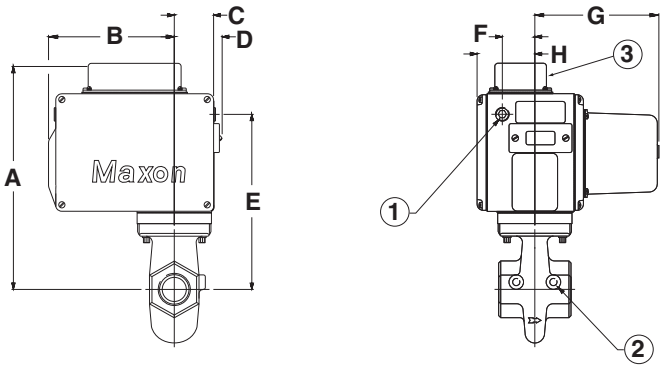
Valve actuators: 2” through 3” valves

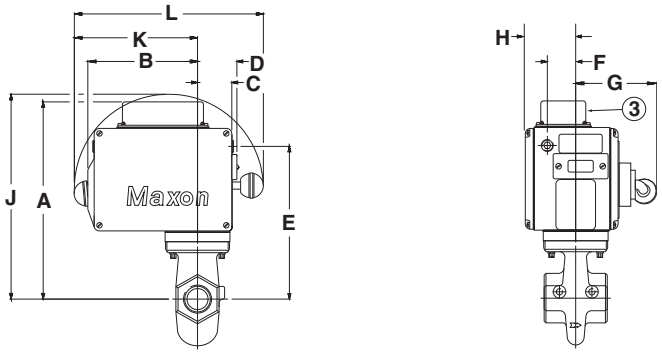
Automatic reset type (SMA11, SMA21, SMA12, SMA22)
(formerly 5000, STO-A, 5000 NI, STO-A-NI)



1) (2) 3/4” NPT conduit connection
2) (2) 1/4” NPT test connection
3) Terminal block cover

NOTE: 2.75” needed for terminal block removal

Manual reset type SMM11, SMM21, SMM12, SMM22)
(formerly 808, STO-M, 808 NI, STO-M-NI)

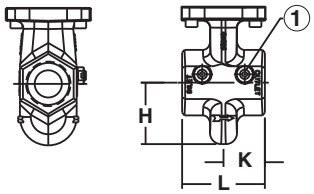


Valve size	Flow capacity	Valve type	Approximate dimensions (in inches)										
			A	B	C	D	E	F	G	H	J	K	L
2” (DN50)	S	MM11, MM21	14.75	7.61	2.38	2.9	10.6	1.97	5.63	3.5	14.38	8.55	13.12
		MM12, MM22								5.38			
		MA11, MA21							7.51	3.5			
		MA12, MA22								5.38			
2-1/2” (DN65)	S	MM11	14.62				10.46		5.63	3.5	14.25	8.55	13.12
		MM12								5.38			
		MA11							7.51	3.5			
		MA12								5.38			
3” (DN80)	S	MM11	14.86				10.71		5.63	3.5	14.49	8.55	13.12
		MM12								5.38			
		MA11							7.51	3.5			
		MA12								5.38			

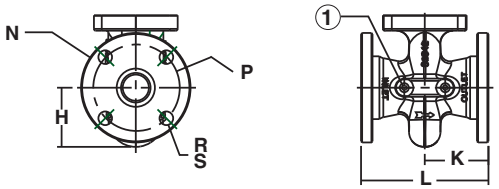
Valve bodies: 2-1/2” CP (DN65), 3” CP (DN80), 4” CP (DN100) and 6” (DN150)

1) (2) 1/4” NPT test connection

Body connection A & C



Body connection B, D & H



Valve size	Flow capacity	Body connection	Body/bonnet material	Approximate dimensions (in inches)							Approximate weight (in lbs)		
				H	K	L	N Ø	P Ø	R Ø	S #of holes	Body assembly	Actuator assembly	Total weight
2-1/2” (DN65)	C	A, C	Cast iron	4.3	2.5	5.0	N/A				19	15	34
		B		4.5	3.8	7.5	7.0	5.5	0.75	4	31		46
		D					7.3	5.7	0.71		31		46
		H					7.3	5.7	0.71	8	31		46
		B	Carbon steel & stainless steel				7.0	5.5	0.75	4	34		49
		D					7.3	5.7	0.71		34		49
		H					7.3	5.7	0.71	8	30		45
3” (DN80)	C	A, C	Cast iron	5.1	2.8	5.5	N/A				24		39
		B		5.2	4.0	8.0	7.5	6.0	0.75	4	46		61
		D, H					7.9	6.3	0.71	8	46		61
		B	Carbon steel & stainless steel				7.5	6.0	0.75	4	47		62
		D, H					7.9	6.3	0.71	8	47		62
4” (DM100)	C	B	Cast iron	5.5	4.5	9.0	9.0	7.5	0.75	8	64		79
		D, H					8.7	7.1	0.71		64		79
		B	Carbon steel & stainless steel				9.0	7.5	0.75		64		79
		D, H					8.7	7.1	0.71		64		79
6” (DN150)	S	B	Cast iron	7.5	5.25	10.5	11.0	9.5	0.88	8	115		130
		D, H					11.2	9.4	0.86		115		130 59
		B	Carbon steel & stainless steel				11.0	9.5	0.88		115		130
		D, H					11.2	9.4	0.86		115		130

Flow capacity:
S - Standard
C - CP body construction
H - High capacity

Body connection:
A - NPT
B - ANSI flanged (ISO 7005 PN20)
C - ISO 7-1 threaded
D - DIN PN16 flanged
E - Socket welded nipple
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
H - EN1092-1 PN16 (ISO 7005-1 PN16)

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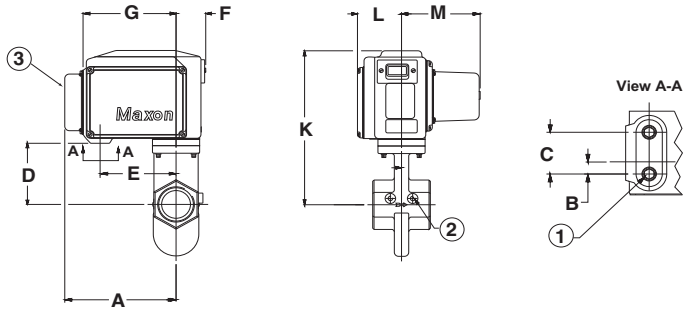
Valve actuators: 2-1/2” CP through 4” CP and 6” valves

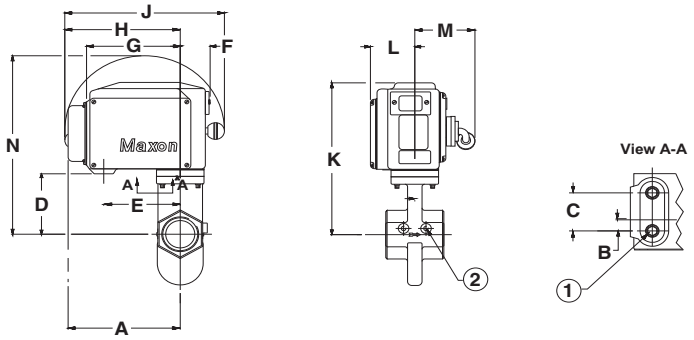
1) (2) 3/4” NPT conduit connection
2) (2) 1/4” NPT test connection
3) Terminal block cover

NOTE: 2.75” needed for terminal block cover removal

Automatic reset type (CMA11, CMA21, CMA12, CMA22)
(formerly 5000 CP, STO-A-CP, 5000 NI-CP, STO-A-NI-CP)



Manual reset type (CMM11, CMM12, CMM22, SMM11, SMM12)
(formerly 808 CP, 808-NI-CP, STO-M-NI-CP, 808, 808 NI)

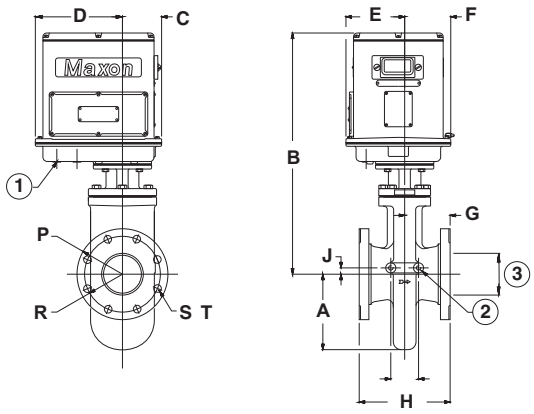


Valve size	Flow capacity	Valve type	Approximate dimensions (in inches)													
			A	B	C	D	E	F	G	H	J	K	L	M	N
2-1/2” (DN65)	C	MM11	11.68	0.88	3	6.09	7.25	2.83	8.87	10.94	15.12	14.56	4.2	6.29	14.56
		MM12, MM22											6.14		
		MA11, MA21											4.2	7.51	
		MA12, MA22											6.14		
3” (DN80)	C	MM11								10.94	15.12	15.29	4.2	6.29	17.97
		MM12, MM22											6.14		
		MA11, MA21											4.2	7.51	
		MA12, MA22											6.14		
4” (DN100)	C	MM11								10.94	15.12	15.29	4.2	6.29	17.97
		MM12, MM22											6.14		
		MA11, MA21											4.2	7.51	
		MA12, MA22											6.14		
6” (DN150)	S	MM11								10.94	15.12	20.75	4.2	6.29	23.43
		MM12											6.14		

Valve bodies and actuators: 4” & 6” high capacity valves

1) (2) 3/4” NPT conduit connection
2) (2) 1/4” NPT test connection
3) Pipe size

HMA11 versions only
(formerly 7000)



Valve size	Flow capacity	Valve type	Approximate dimensions (in inches)					
			A	B	C	D	E	F
4” (DN100)	H	MA11	7.31	23.88	3.87	8.63	4.19	4.56
6” (DN150)	H	MA11	8.38	25.0			5.81	

Valve size	Body connection	Body/bonnet material	Approximate dimensions (in inches)							Approximate weight (in lbs)		
			G	H	J	P Ø	R Ø	S Ø	T # of holes	Body assembly	Actuator assembly	Total weight
4” (DN100)	B	Cast iron	4.5	9.0	0.62	9.0	7.5	0.75	8	94	45	139
	D, H					8.7	7.1	0.72		94		139
	B	Carbon steel & stainless steel				9.0	7.5	0.75		94		139
	D, H					8.7	7.1	0.72		94		139
6” (DN150)	B	Cast iron	5.25	10.5	0.62	11.0	9.5	0.88	8	117	45	162
	D, H					11.2	9.4	0.86		117		162
	B	Carbon steel & stainless steel				11.0	9.5	0.88		126		171
	D, H					11.2	9.4	0.86		126		171

Flow capacity:
S - Standard
C - CP body construction
H - High capacity

Body connection:
A - NPT
B - ANSI flanged (ISO 7005 PN20)
C - ISO 7-1 threaded
D - DIN PN16 flanged
E - Socket welded nipple
F - Socket welded nipple w/Class 150 flange (ISO 7005 PN20)
H - EN1092-1 PN16 (ISO 7005-1 PN16)

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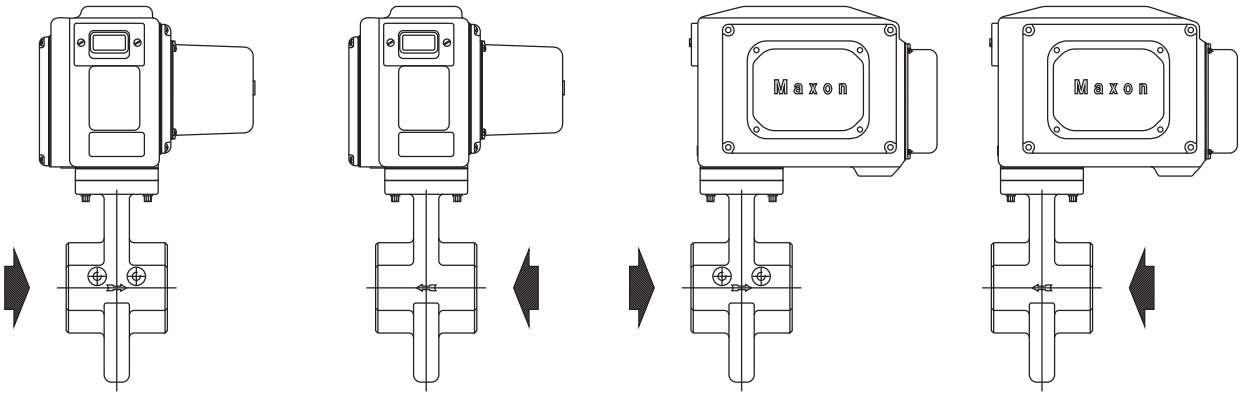
Available top assembly positions

The valve top assembly can be positioned on the body in four different orientations. See sketches below to determine the designation of the required orientation for your application.



Position “R” Position “L” Position “AW” Position “TO”

Tandem arrangements

(for simultaneous opening of main and blocking valves)

General

Wherever insurance underwriters or other regulatory groups require the use of a double-valve or “block-and-bleed” system, but manual operation is preferred to the use of automatic reset valves, operation can be simplified by adding a tandem arrangement to a pair of MAXON manual reset shut-off valves.

A linkage overtravel spring in the tandem arrangement latches the blocking valve just before the main valve is latched, assuring latching of both valves.

If it is necessary to locate a tandem valve above arms reach, an overhead wheel and chain assembly may be added which includes a loop of chain accessible to operating personnel.

To order

Valves are to be specified in the usual manner and must be in top assembly position TO or AW.

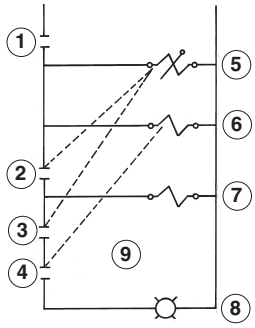
VOS and VCS switches must be included on the main valve and a VOS switch on the blocking valve to permit electrical connection as shown in the wiring schematic illustrated below.

If overhead wheel and chain assembly is also required, specify loop length to reach appropriate operating position. Extra chain (in one foot increments) may be specified.

Center line distance between valves must be within the ranges indicated in Table 1 and shown in sketch below and must be specified at the time of order.

1) Flame safeguard contact
2) VCS in main valve
3) VOS in main valve
4) VOS in blocking valve
5) Main valve (normally-closed)
6) Blocking valve (normally-closed)
7) Vent valve (normally-open)
8) Main fuel panel light
9) For illustration only (not a wiring diagram)

Wiring schematic



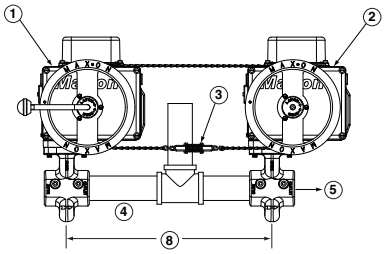
Main valve and blocking valve wired in parallel. VCS switch on main valve powers vent valve. VOS switches on main and blocking valves wired in series to signal light.

Table 1: Allowable valve spacing for tandem arrangement (in inches)

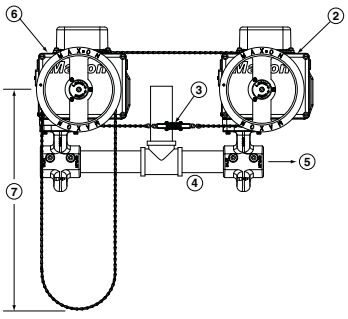
Valve size	Minimum C-C	Maximum C-C
3/4” - 1-1/2”	18	24
2” - 3”	20	27
4” & 6”	27	33

1) Tandem main valve
2) Tandem blocking valve
3) Tension spring
4) Piping by others
5) Flow
6) Tandem overhead valve
7) Specify loop length if overhead wheel & chain option
8) See Table 1 above

Tandem arrangement



Tandem arrangement with overhead wheel & chain



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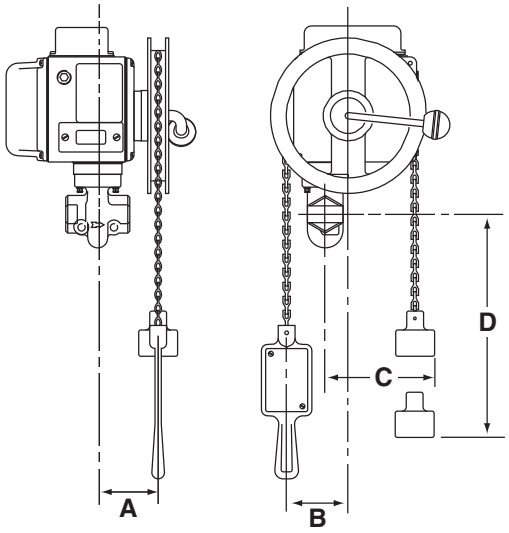
Overhead wheel & chain assembly

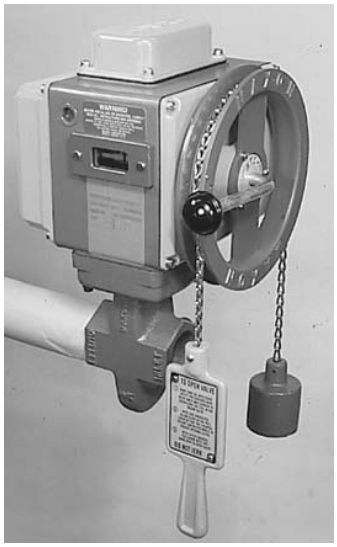
Overhead wheel and chain assembly allows operation of a manual reset valve in an otherwise inaccessible overhead location. A wheel is mounted onto the handle of the valve. The attached chain is weighted on one end and has a paddle handgrip on the other.

Once the valve is electrically energized, pulling down on the paddle will open normally-closed versions or close normally-open versions.

MAXON valve's free-handle design permits valve to trip to its rest position on any power interruption.

Wheel and chain assembly includes a length of chain to position the paddle handgrip slightly below pipe centerline. A standard length of 7 feet of chain is included with CP and larger valve sizes and 5 feet is included with all other valves. Extra chain (in one foot increments) may be specified to fit your specific location.



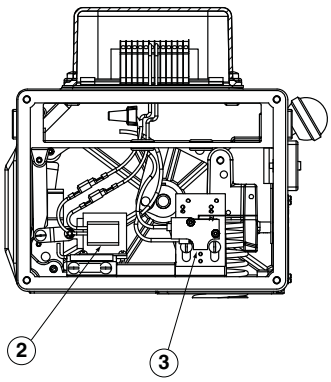


Dimensions (in inches)			
A	B	C	D
5.25 maximum	4.06	7.25	12.19 maximum

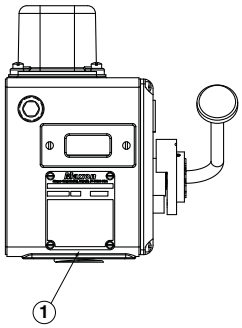
Valve actuator spare part identification

1) Nameplate
2) Solenoid
3) VOS motor limit/signal switch for normally-closed valve; VCS for normally-open valve
4) Motor
5) Printed circuit board (PCB)
6) Clutch

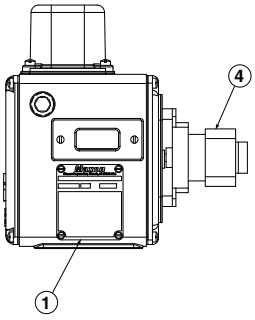
3/4" standard flow through 4" CP actuators



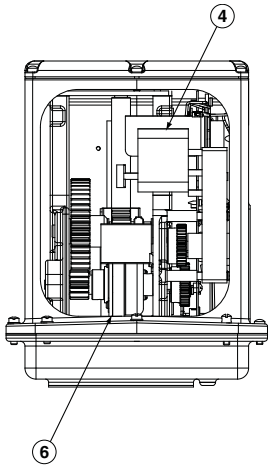
Manual reset actuator (side view)

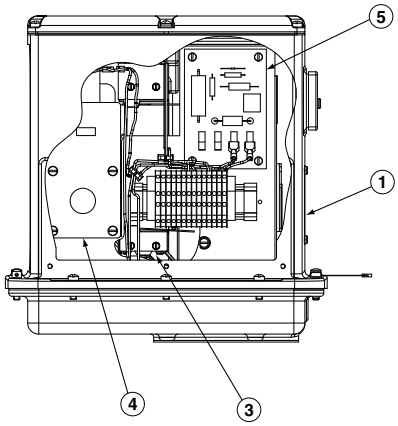


Automatic reset actuator (side view)



4" & 6" high capacity actuators (automatic reset only)





- MAXON nameplates include a model designation, which can be used to easily identify the exact components for each valve configuration.
- Standard flow and CP flow valve spare parts include the solenoid, motor, and switches as shown above.
- High capacity valve spare parts include the clutch, motor and circuit board as shown above.

Please read the operating and mounting instructions before using the equipment. Install the equipment in compliance with the prevailing regulations.

Bedrijfs- en montagehandleiding voor gebruik goed lezen! Apparaat moet volgens de geldende voorschriften worden geïnstalleerd.

Lire les instructions de montage et de service avant utilisation! L'appareil doit imperativement être installé selon les règlementations en vigueur.

Betriebs- und Montageanleitung vor Gebrauch lesen! Gerät muß nach den geltenden Vorschriften installiert werden.

The installation, operation and maintenance instructions contain important information that must be read and followed by anyone operating or servicing this product. Do not operate or service this equipment unless the instructions have been read. IMPROPER INSTALLATION OR USE OF THIS PRODUCT COULD RESULT IN BODILY INJURY OR DEATH.

Description

MAXON electro-mechanical valves are electrically actuated fuel shut-off valves. The valves are designed for a fast acting return to the at rest position upon removal of a control voltage signal. Motorized automatic and manual actuators are available depending on application needs. In addition, normally-closed and normally-open options are available. The normally-closed versions will shut off flow when de-energized and pass flow when energized. The normally-open versions will shut off flow when energized and pass flow when de-energized. Electro-mechanical valves are also offered in configurations that meet hazardous locations.

Nameplate and abbreviations

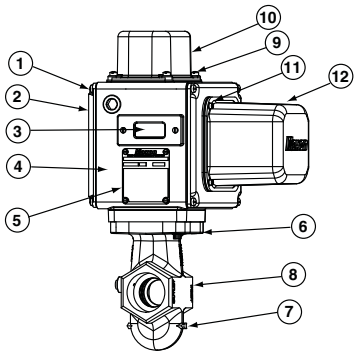
Consult the nameplate of your valve. This lists the maximum operating pressure, temperature limitations, voltage requirements and service conditions of your specific valve. Do not exceed nameplate ratings.

Abbreviation or symbol	Description
M.O.P.	Maximum operating pressure
OPENING	Valve opening time (for automatic valves only). Units shown in seconds.
	Solenoid/clutch voltage and frequency
	Motor voltage and frequency
T_{AMB}	Ambient temperature range
T_F	Fluid temperature range
SHUT	Visual indication that valve is shut
OPEN	Visual indication that valve is open
SPDT (HS)	Single pole double throw hermetically-sealed switch(es)
SPDT	Single pole double throw switch(es)
SPDT (HC)	Single pole double throw high capacity switch(es) (used when DC motors are ordered)
DPDT	Double pole double throw switch(es)
GENERAL PURPOSE AREA	Designates components used in general purpose areas
DIVISION 2 AREA	Designates components used in Division 2 hazardous locations areas
	Valve is shut
	Valve is partially open
	Valve is full open
VOS-1/2	Valve open switch(es)
VCS-1/2	Valve closed switch(es); proof of closure

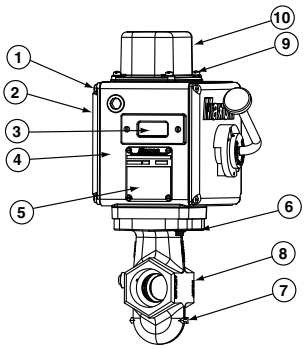
Component identification

1) Access cover screws
2) Access cover
3) Visual indication
4) Mainbase
5) Nameplate
6) Actuator bolts
7) Flow arrow
8) Valve body
9) Terminal block cover screws
10) Terminal block cover
11) Motor cover screws
12) Motor cover
13) Top cover plate screws
14) Top cover plate
15) Top housing
16) Top housing screws

Automatic (motorized) valve
Current model designation
(former model designation)
SMA11 (5000), CMA11 (5000 CP),
SMA21 (STO-A), CMA21 (STO-A-CP)



Manual valve
Current model designation
(former model designation)
SMM11 (808), CMM11 (808 CP), SMM21 (STO-M)



Automatic (motorized) valve - 4” & 6” high capacity
Current model designation (former model designation)
HMA11 (7000)

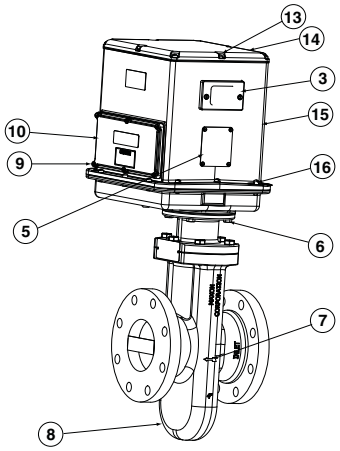


Table 1 - Torque specifications			
Valve type	Item number	Description	Torque
Standard and CP valves	1	Access cover screws 1/4-20	96 in-lbs
	6	Actuator bolts 5/16-18 (3/4” - 1-1/2” sizes)	35 ft-lbs
	6	Actuator bolts 3/8-16 (2” - 6” sizes)	40 ft-lbs
	9	Terminal block cover screws 1/4-20	50 in-lbs
	11	Motor cover screws #10-24	30 in-lbs
High capacity valves	9	Terminal block cover screws #10-24	30 in-lbs
	13	Top cover plate screws 1/4-20	96 in-lbs
	16	Top housing screws 1/4-20	96 in-lbs

Installation

1. A gas filter or strainer of 40 mesh (0.6 mm) or smaller is recommended in the fuel gas piping to protect the downstream safety shut-off valves.

2. Properly support and pipe the valve in the direction of the flow arrow on the valve body. Valve seats are directional. Sealing will be maintained at full rated pressures in one direction only. Sealing will be provided in reverse flow only at reduced pressures.

3. Mount valve so that open/shut window indicator will be visible to your operating personnel. The open/shut window indicator should never face downward. The valve side plates should be located in a vertical plane for best performance. Valves are usually installed in horizontal piping; however, other orientations are acceptable, subject to the above limitations. The top assemblies of all MAXON valves are field rotatable to allow installations involving conflicts with these mounting restrictions.

4. Wire the valve in accordance with all applicable local and national codes and standards. In U.S. and Canada, wiring must conform to the NEC ANSI/NFPA 70 and/or CSA C22.1, Part 1.
   - Supply voltages must agree with valve's nameplate voltage within -15%/+10% for proper operation. For electrical wiring schematic, see instructions or sample affixed inside valve terminal block cover.
   - Grounding is achieved with a grounding screw, which is located in the top assembly.
   - Customer connections are provided via terminal blocks located in the top assembly.
   - Main power wiring (120 VAC or 240 VAC) must be segregated from lower voltage 24 VDC signal wiring, when both are required.

5. Maintain integrity of the electro-mechanical actuator enclosures by using the appropriate electrical connectors for the (2) 3/4" NPT conduit threaded connections. The electrical enclosure is NEMA 4 rated with an option for NEMA 4X.

6. All access cover plate screws should be tightened using an alternate cross-corner tightening pattern to the values shown in Table 1 on page 10-30.1-31.

7. Verify proper installation and operation by electrically actuating the valve for 10-15 cycles prior to the first introduction of gas.

Auxiliary features

- Non-adjustable proof of closure switch(es) with valve seal over travel interlock
- Auxiliary switch for indication of full travel (open for normally-closed valves, closed for normally-open valves)

Operating environment

- Actuators rated for NEMA 4 or optional NEMA 4X
- Ambient and fluid temperature range of -20°F to +140°F for standard and CP flow constructions
- Ambient and fluid temperature range of -20°F to +125°F for high capacity flow constructions
- All valves for oxygen service or using Ethylene Propylene body seals are limited to a minimum ambient and fluid temperature of 0°F

Actuator assembly rotation

MAXON electro-mechanical valves should be ordered in a configuration compatible with planned piping. If valve orientation is not correct, the actuator assembly can be rotated in 90° increments around the valve body centerline axis using the procedure below.

1. Shut off all electrical power and close off upstream manual cock.
2. Remove terminal block cover plate and disconnect power lead wires. (Tag carefully for later re-assembly.)
3. Remove conduit and electrical leads.
4. Note physical position of any signal switch actuator wands on auxiliary signal switches.
5. Unscrew the two actuator bolts screwed up from the bottom to 1/4 inch. DO NOT completely remove. These bolts secure the valve body to the valve's top assembly housing.
6. Gently lift the top assembly (not more than 1/4" in height); just enough to break the seal between the valve body assembly and the rubber gasket adhering to the bottom of the top housing.

WARNING: Lifting too far may dislodge some small parts inside the top housing, requiring complex re-assembly and retesting by trained factory personnel.

7. Remove the two actuator bolts screwed up from the bottom (were partially unscrewed in step 5).
8. Carefully rotate top assembly to the desired position in a plane parallel to the top of the valve body casting. Rotate the top housing about 30° beyond this position, and then rotate it back. Reposition the top housing back down onto the valve body casting. This should align the open/shut indicator with its window and provide proper alignment of the internal mechanism.
9. Realign holes in valve body casting with the corresponding tapped holes in the bottom of the top assembly housing. Be sure the gasket is still in place between the body and top housing.
10. Reinsert the actuator bolts up from the bottom through the body and carefully engage threads of the top assembly. Tighten securely.
11. Reconnect conduit and electrical leads, then check that signal switch wands are properly positioned and that the open/shut indicator moves freely. Failure to correct any such misalignment can result in extensive damage to the internal mechanism of your valve.
12. Energize valve and cycle several times from closed to full open position. Also electrically trip the valve in a partially opened position to prove valve operates properly.
13. Replace and secure terminal block cover plate and place valve in service.

Field installation of valve position switch

General

- Shut off fuel supply upstream of valve, then de-energize valve electrically.
- Remove terminal block and access cover to provide access, being careful not to damage gaskets.
- Compare with illustrations below to identify your valve type.

Replacement switches

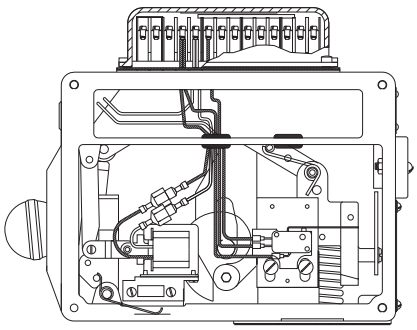
- Note wand position and mounting hole location carefully, then remove 2 screws and lift existing switch.
- Install replacement switch in same mounting holes on bracket and verify correct wand position.
- Replace existing wiring one connection at a time, following original route and placement.

Add switches

NOTE: Instructions below are written for normally-closed valves. For normally-open valves, reverse switch nomenclature (VOS becomes VCS and vice versa).

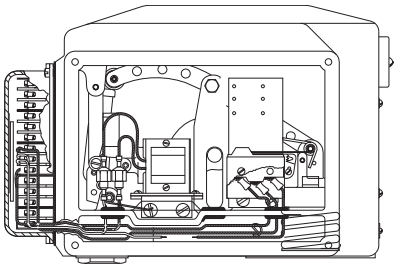
- Check illustrations below. If your valve uses a switch mounting bracket as in Fig. 1 & 2, mount switches to bracket using the mounting holes appropriate for valve type and size. For high capacity valves, mount switches on the support stand.
- Position bracket so VCS wand just touches top of actuator, then move downward slightly, depressing wand until switch clicks, then tighten mounting screws to hold this position.
- Pin bracket by drilling 1/8" diameter holes 1/4" deep into bracket mounting pad through drive pin holes, then tap drive pin in until flush (not required for high capacity valves).
- Route wires to wiring compartment as shown, then complete wiring connections and clean out metal drilling chips from previous procedure.
- Cycle valve, checking switch actuation points carefully. (VCS actuates at top of stem stroke, VOS at bottom.) Simultaneously the valve body must be tested for switch continuity and seat leakage. Bend VOS switch wands slightly if necessary to insure valve is opening fully.
- Replace covers, then return valve to service.

Fig. 1
Manual reset actuator
3/4" - 3" standard flow



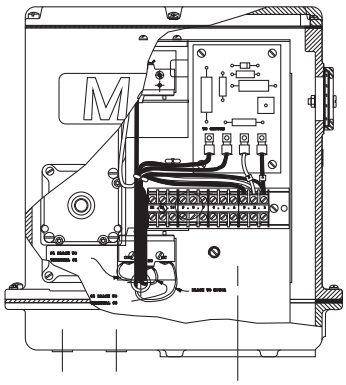
Reference mounting bracket A

Fig. 2
Automatic reset actuator
2-1/2" CP - 4" CP and 6" standard flow



Reference mounting bracket B

Fig. 3
Automatic reset actuator
4" & 6" high capacity



Switches mount on support stand

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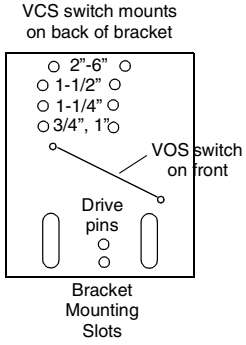
Wand position (for normally-closed valves)

VOS switch wand should be actuated from above

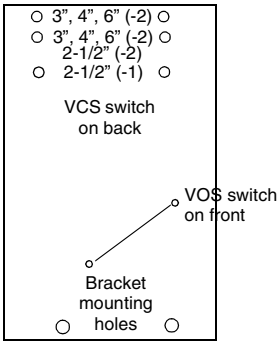
VCS switch wand should be actuated from below

Mounting brackets

Mounting bracket A



Mounting bracket B



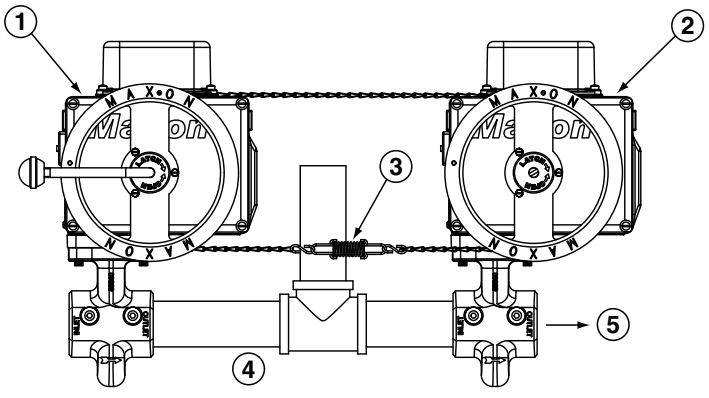
Tandem arrangements

(for simultaneous opening of main and blocking valves)

Installation instructions for tandem arrangements

1. Review and comply with all general valve installation instructions provided separately. (See sketch below.)
2. Mount both valves in fuel line with center to center spacing as originally specified, and blocking valve (without handle) downstream of main valve (with handle).
3. Check valve alignment to be certain that operating wheels lie in the same plane.
4. Remove tape from the wheel of the main valve and unwind the attached chain. Do not remove the screw holding chain to wheel; it has been factory positioned to assure correct alignment. Do not remove tension spring attached to one end of chain or the wooden block insert which preloads the spring.
5. Take free end of chain and loop it around the wheels of both main and blocking valve as shown in sketch below. Depending on the specific valve series and arrangement, tension spring may be located either above or below the wheel centerline.
6. Draw free end of chain and tension spring together so that as much slack as possible is eliminated, then insert the open eye of the spring “S” hook through the link in the chain that will most nearly maintain this position.
7. Crimp the “S” hook shut around the chain link, then cut and discard excess chain.
8. Remove spring preload wood block insert from the tension spring, and verify that the chain is drawn tight.
9. Rotate the operating handle of the main valve fully to latching position for your particular valve, then hold handle firmly in this position while performing the next few steps.
10. Rotate blocking valve wheel fully counter-clockwise until it strikes a stop (it will slide within the loop of chain).
11. Still holding main valve wheel in place, move blocking valve wheel approximately 1/4 to 1/2 inch back in the clockwise direction. Insert the #10-24 X 1/2” screw (furnished) through the chain link that lines up with the tapped hole on bottom of blocking valve wheel, then fasten securely.
12. Verify that the valves are wired in parallel as shown in wiring schematic on page 10-30.1-13.

1) Tandem main valve
2) Tandem blocking valve
3) Tension spring
4) Piping by others
5) Flow direction



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To add wheel & chain assembly to existing tandem valves

1. Verify that both valves are in the same top assembly position (TO or AW). Rotate if necessary. (See top assembly rotation instructions on page 10-30.1-33.)
2. Bend handle of main valve outward about 25°.
3. Cut off handle of blocking valve at outer wheel face.
4. Remove hardware holding main valve wheel in place and mount new wheel and spacer to the existing wheel with new hardware provided.
5. Cut chain loop to the desired length and secure to both wheels.

Maintenance instructions

MAXON electro-mechanical valves are endurance tested far in excess of the most stringent requirements of the various approval agencies. They are designed for long life even if frequently cycled, and to be as maintenance-free and trouble-free as possible. A valve operational test should be performed on an annual basis. If abnormal opening or closing is observed, the valve should be removed from service and your MAXON representative should be contacted. (See MAXON Technical Document 10-35.1.)

Valve leak test should be performed on an annual basis to assure continued safe and reliable operation. Every MAXON valve is operationally tested and meets the requirements of FCI 70-2 Class VI Seat Leakage when in good operable condition. Zero leakage may not be obtained in the field after it has been in service. For specific recommendations on leak test procedures, see MAXON Technical Document 10-35.2. Any valve that exceeds the allowable leakage, as set forth by your local codes or insurance requirements should be removed from service and your MAXON representative should be contacted.

Actuator assembly components require no field lubrication and should never be oiled.

Auxiliary switches, solenoids, motors, clutches or circuit boards may be replaced in the field.

Do not attempt field repair of valve body or actuator. Any alterations void all warranties and can create potentially hazardous situations.

If foreign material or corrosive substances are present in the fuel line, it will be necessary to inspect the valve to make certain it is operating properly. If abnormal opening or closing is observed, the valve should be removed from service. Contact your MAXON representative for instructions.

Operator should be aware of and observe characteristic opening/closing action of the valve. Should operation ever become sluggish, remove valve from service and contact MAXON for recommendations.

Address inquiries to MAXON. Local worldwide offices may be located at www.maxoncorp.com. Include valve serial number and nameplate information.

Control Motors

Model	Eclipse Item Code	Stroke Degrees	Timing Seconds	Torque In-Lb	Electrical Volts	Hz.	Amps	Auxiliary Switch [3]	Crank Arm Item Code	Crank Arm Included w/Motor
Eclipse Rotary Actuator										
Std. keypad	ACT004A1A1A1AX	90	18	30	110/120	50/60	.04	2	Mounts directly	
Keypad inverted 180°	ACT004A2A1A1AX	90	18	30	110/120	50/60	.04	2	to shaft	
Two Position										
EMA										
EMA-405	12616	180	20	16	120	60	.4	No	15181	Yes
EMA-405-1	10916	90	10	16	120	60	.4	No	15181	Yes
EMA-418-1	10912	90	10	60	120	60	.9	No	15181	Yes
Honeywell M6184 A 1015	10826	90	30	150	24	60	.9	No	18093	No
Position Proportioning with Slidewire Feedback										
EMP										
EMP-423-1[1]	12618	90	12	60	120	60	.65	Yes	15181	Yes
EMP-424-1[1]	12622	90	12[2]	60	120	60	.65	Yes	15181	Yes
EMP-453-1[1]	12632	90	40	220	120	60	.65	Yes	15181	Yes
EMP-454-1[1]	12634	90	40[2]	220	120	60	1.80	Yes	15181	Yes
Potentiometer Slaved Proportioning										
EMP										
EMP-423-2	12640	90	12	60	120	60	.65	Yes	15181	Yes
EMP-424-2	12642	90	12[2]	60	120	60	.65	Yes	15181	Yes
EMP-453-2	12646	90	40	220	120	60	.65	Yes	15181	Yes
EMP-454-2	12651	90	40[2]	220	120	60	.65	Yes	15181	Yes
Honeywell										
M9494 D 1000[4]	16107	90/160	60/120	300	24	50/60	0.8	No	18093	No
M9484 D 1002[4]	15800-4	90/160	15/30	75	24	50/60	0.8	No	18093	No
M9484 D 1028[4]	17997	90/160	30/60	150	24	50/60	0.8	No	18093	No
Proportioning, 4-20mA, Weathertight										
EMP										
EMP-423-4	22755	90	12	60	120	60	.65	Yes	15181	Yes
EMP-424-4	22735	90	12[2]	60	120	60	.65	Yes	15181	Yes
EMP-453-4	22756	90	40	220	120	60	.65	Yes	15181	Yes
EMP-454-4	22757	90	40[2]	220	120	60	.65	Yes	15181	Yes
Honeywell										
M7284 A 1004	12200	90	30	150	120	50/60	.65	No	18093	No

Notes:

[1] Can be used as two position if internal slidewire is not connected

[2] Timing can be increased (slower rotation) up to approximately ten times this rating by turning a slotted adjustment screw located on the outside of the case.

[3] Rotary actuator=SPST, 120VAC, 0.2A inductive, 0.4 non-inductive
EMP=SPDT, 120VAC, 5.8A inductive, 12A non-inductive. 240VAC, 2.9A inductive, 6A non-inductive

[4] Can be used with 4-20mA signal with Item Code 12740 resisistor kit.

Control Motor Accessories

Eclipse Item Code	Description	Eclipse Item Code	Description
EMP/EMA Only		**Honeywell Only**	
12674	Auxiliary slidewire kit.	14892	120 to 24VAC transformer. Mounts ininternally
12670	Auxiliary switch kit.	16291	Transformer, step down 120/50/60/25V secondary 40 VA
12676	Weather resistant cover.	11946	Adapter bracket
12677	Paralleling relay.	12659	Screw terminal kit
12707	135 ohm, 90° slidewire.	12740	Resistor kit
15766-2	Converter, 4-20mA, for EMP		

Swivel Connectors

for 5/16” Diameter Control Rods

Item Code 500558 is a rotating swivel block connector assembly for joining control rod to control arm. It allows 360° rotation.

Item Code 500569 serves to connect two control rods to one control arm and also allows 360° rotation.

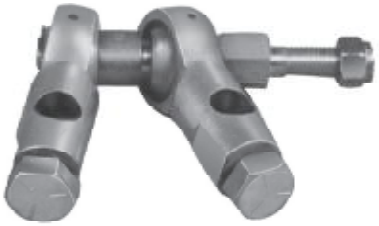
Item Code 14316 swivel connector allows 360° rotation. It provides a 20° flex from the swivel center line to accommodate an angular approach of a linkage control rod, but immediacy of response is less positive than Item Code 14264 (at right).

Item Code 14264 is a non-flexing swivel connector that allows 360° rotation around swivel center line. Ite provides a more positive positioning and immediacey of response thatn Item Code 14316 (at left).

for 1/2” Diameter Control Rods

Item Code 500542 is a swivel block that rotates 360°

Item Code 500543 is a single ball swivel that rotates 360° while permitting an angular approach of rod toward control arm.



Item Code 500544 is a double ball swivel that connects two rods to one control arm. Allows angular approach of rod to arm, rotates 360°.

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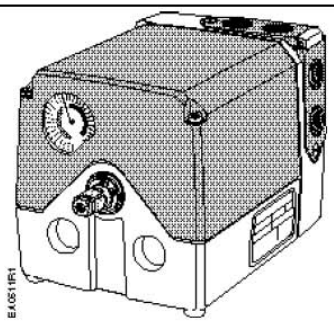
SIEMENS

Technical Instructions
Document No. 155-517P25
May 3, 2010

SQM5…

Reversing Actuators

ISO 9000 and 14000
REGISTERED FIRM



Description

SQM5... reversing actuators are used for the positioning of flow control valves, butterfly valves, dampers, or any application requiring rotary motion. The SQM5… actuators accommodate control input signals of 4 to 20 mA, 0 to 135 Ω, 0 to 10 Vdc, 0 to 20 mA, position proportional and floating control. The available output signals include 4 to 20 mA, 0 to 135 Ω, 0 to 10 Vdc, 0 to 20 mA, and 0 to 1000 Ω. SQM5… actuators are available with up to six internal, easily adjustable switches.

A selection of exchangeable circuit boards provide a variety of functions including auto/manual selector switch, manual forward/reverse toggle switch, zero and span adjustment, parallel or master/slave operation, split range control, input signal override, and selectable electronic linearization.

The SQM5… is engineered for precision. It is particularly well suited for applications requiring a high degree of modulating accuracy and repeatability.

The SQM5… actuator may be mounted in any position. A selection of mounting brackets and shafts provides installation flexibility and allows for the simple replacement of most competitive actuators.

Features

- Two limit switches, plus up to four internal auxiliary switches
- Fully closed “economy position” switch
- Drive shaft and cam drum disengagement clutches
- Auto/manual switch, manual control forward/reverse toggle switch
- UL, CSA approved 24 and 110 Vac versions
- CE approved 220 Vac versions
- Field reversible clockwise (cw) or counterclockwise (ccw) operation
- Various torque ratings and running times available
- Selection of field exchangeable single-ended and dual-ended shafts
- Mounting brackets to replace competitive actuators

Features, Continued

- Connections for both base and face mounting
- Low hysteresis actuator and potentiometer gearing
- Externally visible position indication
- Selection of input and output signals
- Zero and span adjustment
- Field exchangeable circuit boards and potentiometers
- Electronic damper linearization function
- Split range and selectable parallel or master/slave operation
- Adjustable input signal override function

Application

SQM5 actuators are uniquely suited for both industrial and commercial applications. The high level of accuracy permits precise modulating control of industrial process and process heating applications, often significantly enhancing performance and product quality.

In commercial and industrial burner applications requiring high turndown and reliable ignition, the auxiliary switches can be applied to create separate positions for burner ignition and low fire. In dual fuel applications, additional switches can be used to create separate high fire, low fire and ignition positions for each fuel. The economy position switch is used to drive the actuator to the full closed position when the burner is off.

In all applications, commissioning is simplified. Shaft and cam drum disengagement clutches allow for the quick manual alignment of the actuator shaft and switch cams. The forward/reverse toggle switch in combination with the auto/manual selector switch provides direct manual control.

Table Of Contents

Product Numbers

Table 1. Product Numbers for Pre-assembled Actuators.

Torque[1] [lb-in]	Running Time[2] 90°@ 60 Hzsec	Rotation Direction	Input Control Signals[3]				Product Number		
			Line Voltage	4-20 mA	0-135 W	0-10 Vdc	110 V	220 V	24 V
90	8	ccw	x	x			SQM50.261R1G3		
90	8	cw	x	x			SQM50.261R1G3R		
90	8	ccw	x	x	x	x	SQM50.261R1Z3		
90	8	ccw	x				SQM50.264R1A	SQM50.264R2A	
90	8	cw	x				SQM50.264R1A0R		
90	8	ccw	x				SQM50.264R1A3		
90	8	cw	x	x			SQM50.264R1G3R		
90	8	ccw	x	x			SQM50.264R1G4	SQM50.264R2G4	
90	8	ccw	x	x	x	x	SQM50.264R1Z3		
140	12	ccw	x	x			SQM50.361R1G3		
140	12	cw	x	x			SQM50.361R1G3R		
140	12	ccw	x	x			SQM50.361R1G7		
140	12	ccw	x	x	x	x	SQM50.361R1Z3		
140	12	ccw	x	x			SQM50.364R1G3		
140	12	cw	x	x			SQM50.364R1G3R		
140	12	cw	x	x			SQM50.364R1G4R		
140	12	ccw	x	x	x	x	SQM50.364R1Z3		
140	25	ccw	x				SQM50.461R1A		
140	25	ccw	x				SQM50.461R1A3		
140	25	ccw	x	x			SQM50.461R1G3		
140	25	cw	x	x			SQM50.461R1G3R		
140	25	ccw	x		x		SQM50.461R1H3		
140	25	ccw	x	x	x	x	SQM50.461R1Z3		
140	25	ccw	x	x	x	x	SQM50.461R1Z7		
140	25	ccw	x				SQM50.464R1A		SQM50.464R8A
140	25	cw	x				SQM50.464R1A0R		
140	25	ccw	x				SQM50.464R1A3		
140	25	cw	x				SQM50.464R1A3R		
140	25	ccw	x	x			SQM50.464R1G3	SQM50.464R2G3	SQM50.464R8G3
140	25	ccw	x	x			SQM50.464R1G4		
140	25	cw	x	x			SQM50.464R1G3R	SQM50.464R2G3R	
140	25	ccw	x	x			SQM50.464R1G7		
140	25	cw	x	x			SQM50.464R1G7R		
140	25	ccw	x		x		SQM50.464R1H3		SQM50.464R8H3
140	25	cw	x		x		SQM50.464R1H3R		
140	25	ccw	x	x	x	x	SQM50.464R1Z3	SQM50.464R2Z3	SQM50.464R8Z3
140	25	cw	x	x	x	x	SQM50.464R1Z3R		
140	25	cw	x	x	x	x	SQM50.467R1Z3R		
200	25	ccw	x	x	x	x	SQM53.461R1Z3		
200	25	ccw	x				SQM53.464R1A		
200	25	ccw	x				SQM53.464R1A3		
200	25	ccw	x	x			SQM53.464R1G3		
200	25	ccw	x	x			SQM53.464R1G7		
200	25	cw	x	x			SQM53.464R1G7R		
200	25	ccw	x	x	x	x	SQM53.464R1Z3	SQM53.464R2Z3	
200	25	ccw	x	x	x	x	SQM53.467R1Z3		
200	25	cw	x	x	x	x	SQM53.467R1Z3R		
200	25	ccw	x					SQM53.467R2A3	
310	37	ccw	x				SQM56.564R1A		
310	37	ccw	x	x			SQM56.564R1G4		
310	37	ccw	x	x			SQM56.564R1G7		
310	37	ccw	x		x		SQM56.564R1H4		
310	37	ccw	x	x	x	x	SQM56.564R1Z3		

Product Numbers

Table 1. Product Numbers for Pre-assembled Actuators, Continued.

Torque[1] [lb-in]	Running Time [2] 90°@ 60 Hzsec	Rotation Direction	Input Control Signals[3]				Product Number		
			Line Voltage	4-20 mA	0-135 W	0-10 Vdc	110 V	220 V	24 V
400	50	ccw	x	x			SQM56.664R1G3		
400	50	cw	x	x			SQM56.664R1G3R	SQM56.664R2G3R	
400	50	ccw	x		x		SQM56.664R1H3		
400	50	cw	x		x		SQM56.664R1H3R		
400	50	ccw	x	x	x	x	SQM56.664R1Z3		
400	50	cw	x	x	x	x	SQM56.664R1Z3R		
400	50	cw	x				SQM56.667R1A3R		
400	50	ccw	x	x			SQM56.667R1G3		
400	50	cw	x	x			SQM56.667R1G7R		
400	50	ccw	x	x	x	x	SQM56.667R1Z3		

1. Torque will vary with the selection of the shaft. See *Specifications*.
2. Running time for 135° □ multiply by 1.5. For 50 Hz □ multiply by 1.2
3. SQM5x.xxxxx**Z**x models also accept a 0 to 20 mA input signal.

Table 2. Product Numbers for Accessories.

Electronic Circuit Boards

AGA56.1A97	24-250 Vac	(A) board for SQM5x.xxxxx**A**x
AGA56.9A87	24 Vac	(Z) board for SQM5x.xxxxx**Z**x
AGA56.9A17	110 Vac	(Z) board for SQM5x.xxxxx**Z**x
AGA56.9A27	220 Vac	(Z) board for SQM5x.xxxxx**Z**x
AGA56.41A87	24 Vac	(G) board for SQM5x.xxxxx**G**x
AGA56.41A17	110 Vac	(G) board for SQM5x.xxxxx**G**x
AGA56.41A27	220 Vac	(G) board for SQM5x.xxxxx**G**x
AGA56.42A87	24 Vac	(H) board for SQM5x.xxxxx**H**x
AGA56.42A17	110 Vac	(H) board for SQM5x.xxxxx**H**x
AGA56.42A27	220 Vac	(H) board for SQM5x.xxxxx**H**x
AGA56.43A87	24 Vac	(K) board for SQM5x.xxxxx**K**x
AGA56.43A17	110 Vac	(K) board for SQM5x.xxxxx**K**x
AGA56.43A27	220 Vac	(K) board for SQM5x.xxxxx**K**x

See Figure 1. Product Number Identification Legend.

Mounting Brackets & Adapters

AGA57.3 for replacement of Honeywell MOD III, IV actuators

AGA57.4 for replacement of Honeywell M640/740/940 and Barber Colman EA20/40/50/60 actuators. Directly adaptable to Eclipse butterfly valves.

ASK33.9 mounting kit for direct attachment to Siemens VKF41... butterfly valve. (Shaft AGA58.1 required)

Shafts

AGA58.1 10 mm round with key. Gear end only.
AGA58.2 12 mm round with key. Gear end only.
AGA58.3 9 mm square. Dual-ended.
AGA58.4 3/8 inch square. Dual-ended.
AGA58.7 14 mm round with key. Gear end only.
For exact shaft sizes, see *Dimensions*.

Potentiometers

ASZ12.803 and ASZ12.30 1000Ω, 90°
ASZ12.833 and ASZ12.33 1000Ω, 135°
ASZ22.803 and ASZ22.30 1000/1000Ω double potentiometer, 90°
ASZ22.833 and ASZ22.33 1000/1000Ω double potentiometer, 135°
ASZ16.703 135Ω, 90° (wire wound)
ASZ16.733 135Ω, 135° (wire wound)
ASZ66.733 135Ω/135Ω, double potentiometer 135° (wire wound)

Additional potentiometer models available. See *Siemens technical data sheet 7921*.

Product Number Identification Legend

For actuator identification only. To select product numbers for ordering, see Table 1.

Figure 1. SQM5… Product Number Identification Legend.

SQM5 0 . 4 6 4 R 1 Z 3 R

Actuator family

Torque in-lb @ 60 (50) Hz.
- **0** 90 for 8 (10) sec. running time
- **0** 140 for 12 (15), 25 (30), 37 (45) sec.
- **3** 200 for 25 (30) sec.
- **6** 310 for 37 (45) sec.
- **6** 400 for 50 (60), 75 (90)sec.

Running time for 90°

Not all actuator running times are available in each torque. Refer to table 1

60 Hz.		50 Hz.	
2	8 sec.	2	10 sec.
3	12 sec.	3	15 sec.
4	25 sec.	4	30 sec.
5	37 sec.	5	45 sec.
6	50 sec.	6	60 sec.

Number of SPDT switches
- **6** 2 limit and 4 auxiliary switches

Shaft selection
- **0** no shaft **(shaft must be ordered separately)**
- **1** round 10 mm, single ended (for use with VKF41... butterfly valves)
- **4** square 3/8 inch, dual ended
- **7** round 14 mm, single ended

Approvals
- **R** UL recognized, CSA certified

Operating voltage (Vac @50-60 Hz)
- **1** 110-120 Vac
- **2** 220-240 Vac
- **8** 24 Vac

Internal circuit board (SQM5x.xxxxx **G, H, K , Z**x actuators require potentiometer ASZ…)
- **A** AGA56.1A97 (position proportional control)
- **G** AGA56.41A... (4 to 20 mA input)
- **H** AGA56.42A... (0 to 135 Ohm input)
- **K** AGA56.43A... (0 to 10 Vdc input)
- **Z** AGA56.9... (all inputs/outputs, linearization, split ranging, override and pre-set positioning)

Potentiometer (1000 Ohm required when using SQM5x.xxxxx **G, H, K, Z**x actuators)
- **3** ASZ12.30 (1000 ohm, 90°)
- **4** ASZ12.33 (1000 Ohm, 135°)
- **7** ASZ22.30 (1000/1000 Ohm, 90°)
- **8** ASZ22.33 (1000/1000 Ohm, 135°)
- **B** ASZ16.703 (135 Ohm, 90°)
- **C** ASZ16.733 (135 Ohm, 135°)
- **L** ASZ66.733 (135/135 Ohm, 135°)

Rotational Direction (Product numbers ending without R are ccw)
- **R** Clockwise (when facing gear end. See *Figure 6* .)

Installation and Operation Instructions

SQM5… actuators are sometimes shipped without the shaft installed. To install the selected shaft:

1. Loosen the two screws on the actuator cover corners. See Figure 2.

2. Lift the screws and raise the cover. See Figure 3.

Shaft Installation

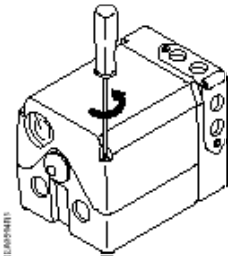


Figure 2.

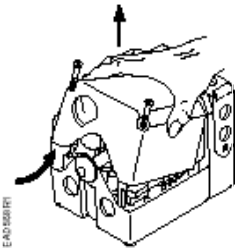


Figure 3.

3. Each shaft is supplied with two washers and a “C” clip. See Figure 4. Using spreading pliers, remove the “C” clip and the washers from the shaft.

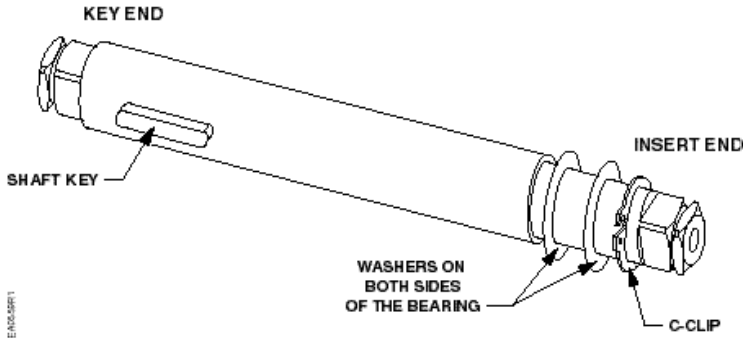


Figure 4.

4. Insert the “insert end” of the shaft into the “gear end” of the actuator.
5. Push the shaft until the “insert end” reaches just short of the brass bushing at the other end of the actuator.
6. Put one of the washers on the insert end of the shaft. See Figure 5.

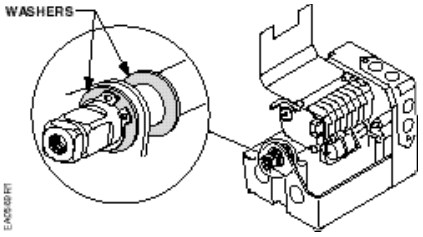


Figure 5.

7. Line up the “shaft key” with the key slot on the “gear end” of the actuator and slide the shaft until the “insert end” is completely through the brass bushing.
8. Place the second washer onto the “insert end” of the shaft. Using spreading pliers, install the “C” clip.

Rotational Direction Verification

Actuator model numbers that end with “R” are factory configured for clockwise (cw), minimum to maximum rotation when facing the gear end of the actuator, or counterclockwise (ccw) rotation when facing the other end of the actuator. The gear end of the actuator is the side opposite of the visual position indicator.

To field reverse the direction of rotation, see *Service Guide*, “Reversing Rotational Direction”.

Actuator Mounting

SQM5 actuators can be mounted in any orientation using the four holes located on the bottom corners of the actuator base. Optional base mounting brackets are available. See Table 2.
SQM5 actuators can also be face mounted using self tapping screws in combination with the various holes on the face of the actuator gear end.

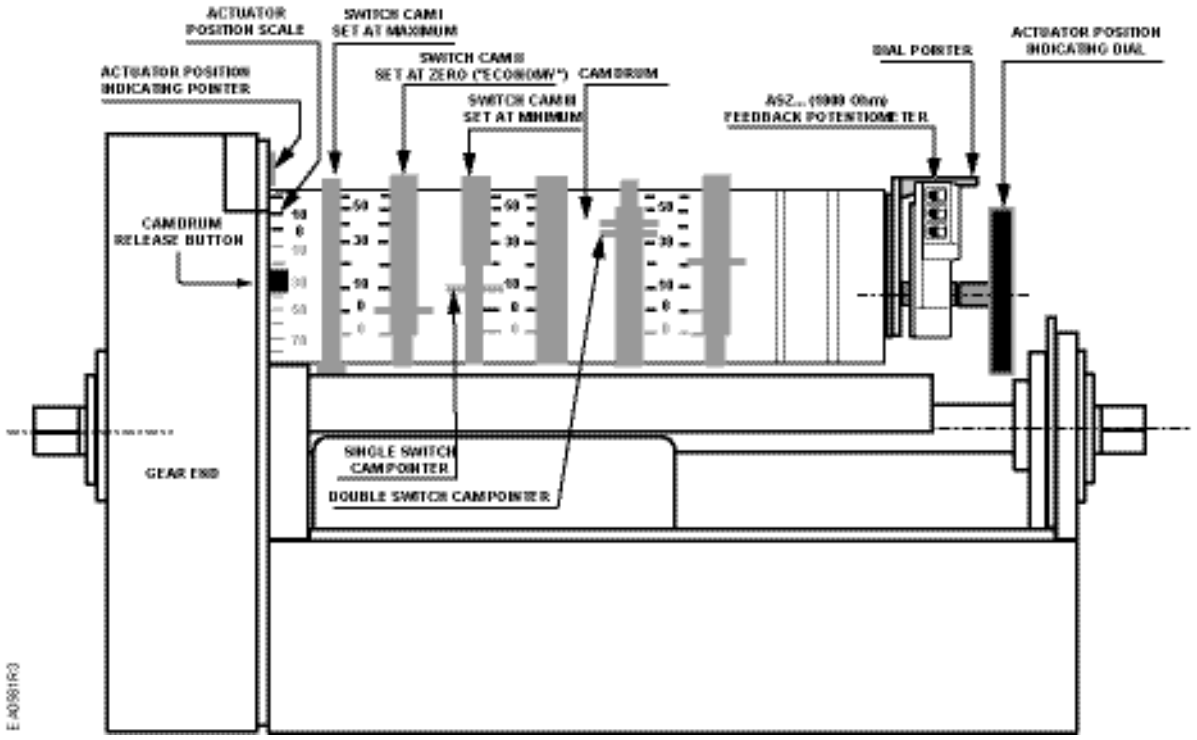


Figure 6. Component Identification on the Cam Drum Side of the SQM5 Actuator.

Switch Adjustment

See Figure 6.

All SQM5 actuators are factory wired with Switch I (maximum), Switch II (fully closed “economy position”) and Switch III (minimum). The individual switch cams I, II, and III are factory set to 90°, 0° and 10° respectively.

NOTE: The single switch cam pointers are used together with the black scales when configured for counterclockwise (ccw) operation.

The double switch cam pointers are used together with the red scales when configured for clockwise (cw) operation.

The individual switch cams can be adjusted by hand or with the use of the tool attached to the outside of the hinged switch terminal protection lid.

Switch Adjustment, Continued

NOTE: If a potentiometer is installed, the adjustable range of the switches depends on the range of the potentiometer.
SQM5x.xxxxx**A**x actuators may be adjusted between 0° and 160°.
SQM5x.xxxxxx**3** actuators have a 90° potentiometer and the switches must be adjusted only between 0 and 90°.
SQM5x.xxxxxx**4** actuators have a 135° potentiometer and the switches must be adjusted only between 0 and 135°.

Shaft Adjustment

See Figure 6.

The actuator shaft can be disengaged by pressing the silver shaft release button. The button is located above the grounding screw, under the hinged terminal protection cover, and to the right of the auto/manual switch. After pressing the shaft release button in and slightly upward, the shaft can be manually rotated. After the shaft has been manually aligned to the closed position, re-engage the shaft by pushing the shaft release button downwards.

Cam Drum Adjustment

See Figure 6.

Position Indicating Dial Adjustment

Once the shaft has been set, the cam drum must be manually aligned by pressing and holding the black cam drum release button (see Figure 6). Rotate the cam drum until the "0" mark on the actuator position scale (left scale on the cam drum) is aligned with the gray actuator position indicating pointer.

The actual position of the SQM5 actuator is indicated by the gray actuator position indicating pointer (see Figure 6). The position is also displayed by the indicating dial through the housing's window. Ensure that the actuator position indicating dial is aligned with the actuator position scale. If necessary, rotate the dial in the clockwise direction.

CAUTION:

Turning the dial in the counterclockwise direction may loosen the potentiometer locking screw.

Wiring

Electrical Connection

SQM5 actuators are equipped with two removable conduit connection plates located on the upper corner of the gear housing. Each plate is provided with two threaded connections for 1/2" NPSM conduit connectors. The use of flexible stranded wire is recommended.

Grounding

CAUTION:

To avoid electro-magnetic interference, the SQM5 actuators must be grounded.

The ground terminal is located to the right of the auto/manual switch.

Disconnect the circuit board wire marked 51 during high voltage testing. Reconnect it to the grounding terminal after the test.

Wiring Connections

NOTE: SQM5 actuators require a single source, single phase power supply.

Wiring connections vary depending on which AGA56 . circuit board is installed.

AGA56.1 circuit boards.

See Figures 7 and 8.

Manual Operation

1. Set the AUTO/MAN switch in the MAN position.
2. Connect ground to the screw located below the shaft release button.
3. Connect neutral to the double terminal block, located on the left side of the gray switch housing.
4. Only terminal "L" must be to enable manual operation. The actuator can now be driven to the maximum position (switch cam I) or the fully closed "economy position" (switch cam II) by using the toggle switch located to the left of the AUTO/MAN switch.

Automatic Operation

1. Set the AUTO/MAN switch in the AUTO position.
2. Connect ground to the screw located below the shaft release button.
3. Connect neutral to the double terminal block located on the left side of the gray switch housing.
4. Connect line voltage to terminal A to drive the actuator in the opening direction.
5. Connect line voltage to terminal Z to drive the actuator in the closing direction.

CAUTION:

Do not power terminals A and Z simultaneously. Actuator damage will occur.

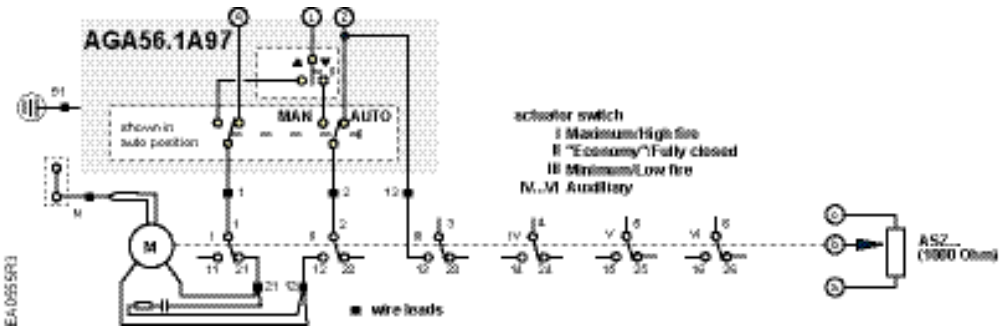


Figure 7. Basic Functional Diagram of AGA56.1

Wiring, Continued

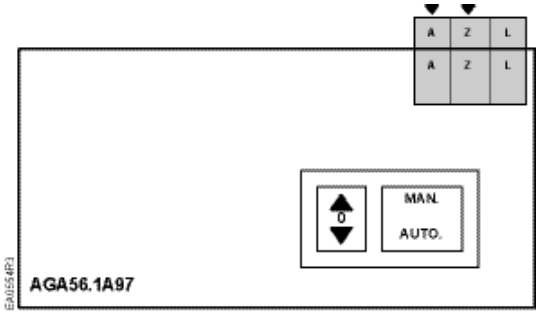


Figure 8. AGA56.1A97 Terminal/Auto-Manual Board.

AGA56.41/42/43
Circuit Boards.

See Figures 9 and 10.

Manual Operation

1. Set the AUTO/MAN switch in the MAN position.
2. Connect ground to the screw located below the shaft release button.
3. Connect neutral to terminal N.
4. Only terminal "L" must be powered to enable manual operation. The actuator can now be driven to the maximum (high fire) position (switch cam I) or the fully closed "economy position" (switch cam II) by using the toggle switch located to the left of the AUTO/MAN switch.

Automatic Operation

1. Set the AUTO/MAN switch in the AUTO position.
2. Connect ground to the screw located below the shaft release button.
3. Connect neutral to terminal N.
4. Connect line voltage at all times to terminal L to provide power to the electronic circuit board.
5. Connect line voltage to terminal LR to provide power when modulating. Connect line voltage to Terminal LR **only** after removing power on terminals A and Z (otherwise actuator damage may result).
6. Connect line voltage to terminal A to drive the actuator to the maximum (high fire purge) position.
   Once the maximum position is reached, terminal 11 (on switch I) will be energized to provide position feedback.
7. Connect power to terminal ZL to drive the actuator to the minimum (low-fire) position. Once the minimum position is reached, terminal 23 (on switch III) will be energized to provide position feedback. Adjustment of switch III will determine the low-fire stop position. Switch III (low fire) must be set at a higher position than switch II (fully closed). Terminal ZL may be energized only after removing power from terminals A, Z, 13, and LR.
8. Connect line voltage to terminal Z to drive the actuator to the fully closed/economy position (switch II).
9. Connect the input control signal wires to the appropriate terminals. See Figure 9.

CAUTION:

Do not power terminals A and Z simultaneously. Actuator damage will occur.

Wiring, Continued

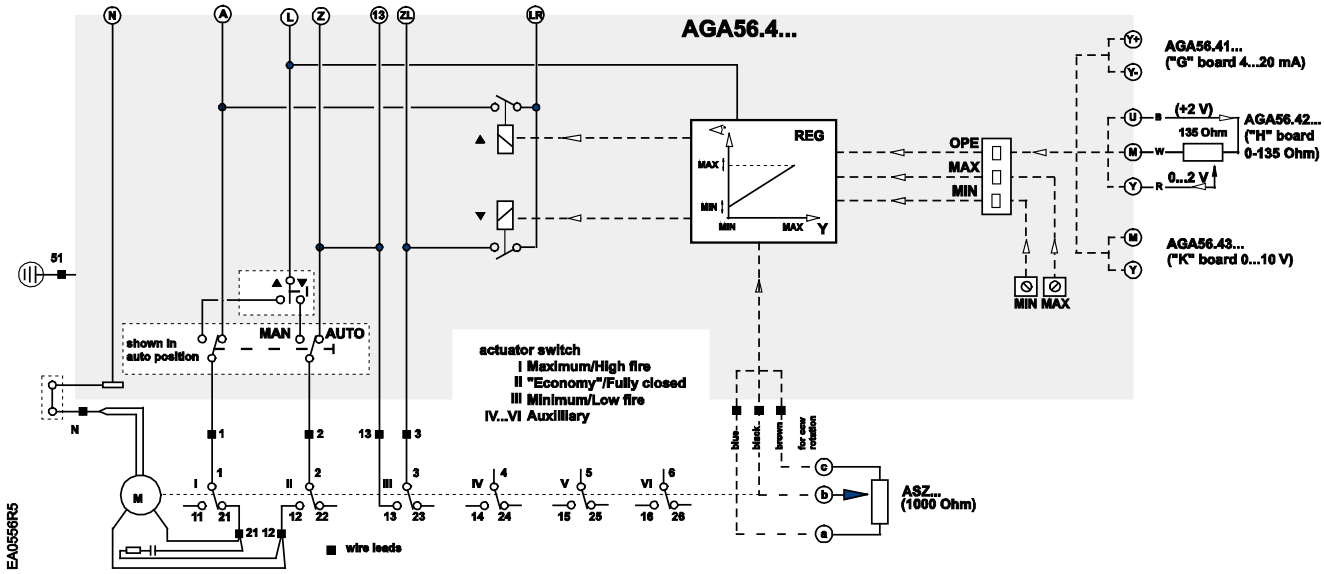


Figure 9. Basic Functional Diagram of AGA56.4

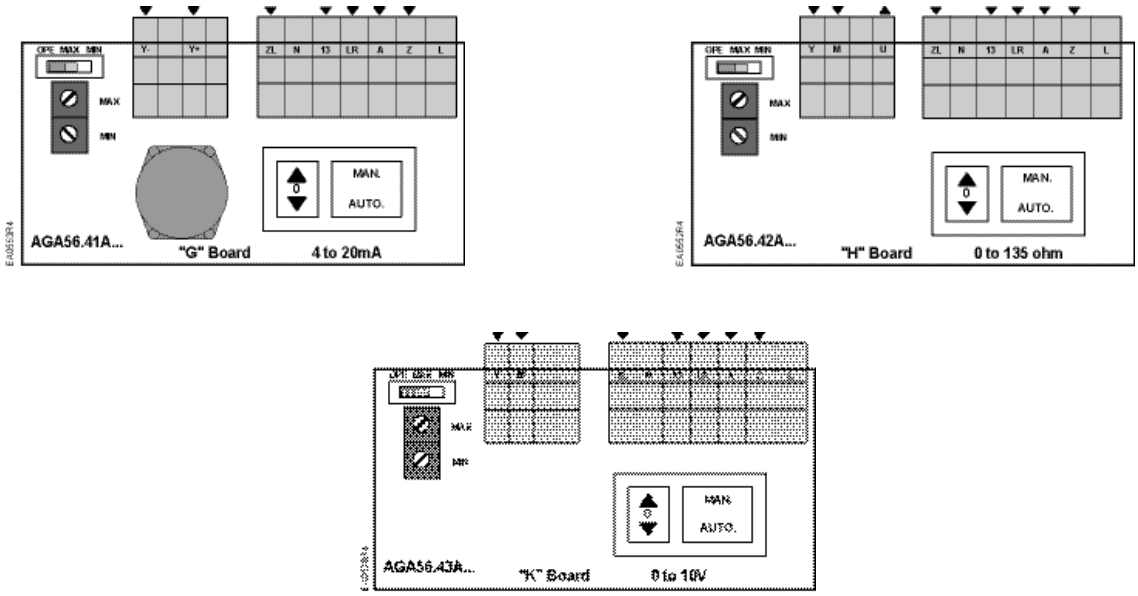


Figure 10. AGA56.41/42/43 Terminal and Trim Potentiometer Boards.

AGA56.9 Circuit Boards

See Figures 11 and 12.

Manual Operation

1. Set the AUTO/MAN switch in the MAN position.
2. Connect ground to the screw located below the shaft release button.
3. Connect neutral to terminal N.
4. Only terminal "L" must be powered to enable manual operation. The actuator can now be driven to the maximum (high fire) position (switch cam I) or the fully closed "economy position" (switch cam II) by using the toggle switch located to the left of the AUTO/MAN switch.

Automatic Operation

1. Set the AUTO/MAN switch in the AUTO position.
2. Connect ground to the screw located below the shaft release button.
3. Connect neutral to terminal N.
4. Connect line voltage at all times to terminal L to provide power to the electronic circuit board.
5. Connect line voltage to terminal L1 to provide power when modulating. Connect line voltage to terminal L1 **only** after removing power on terminals A and Z (otherwise actuator damage may result).
6. Connect line voltage to terminal A to drive the actuator to the maximum (high fire purge) position. Once the maximum position is reached, terminal 11 (on switch I) will be energized to provide position feedback.
7. Connect power to terminal ZL to drive the actuator to the minimum (low-fire) position. Once the minimum position is reached, terminal 23 (on switch III) will be energized to provide position feedback. Adjustment of switch III will determine the low-fire stop position. Switch III (low fire) must be set at a higher position than switch II (fully closed). Terminal ZL may be energized **only** after removing power from terminals A, Z, 13, and LR.
8. Connect line voltage to terminal Z to drive the actuator to the fully closed/economy position (switch II).
9. Connect the input control signal wires to the appropriate terminals. See Figure 11.

CAUTION:

Do not power terminals A and Z simultaneously. Actuator damage will occur.

Wiring, Continued

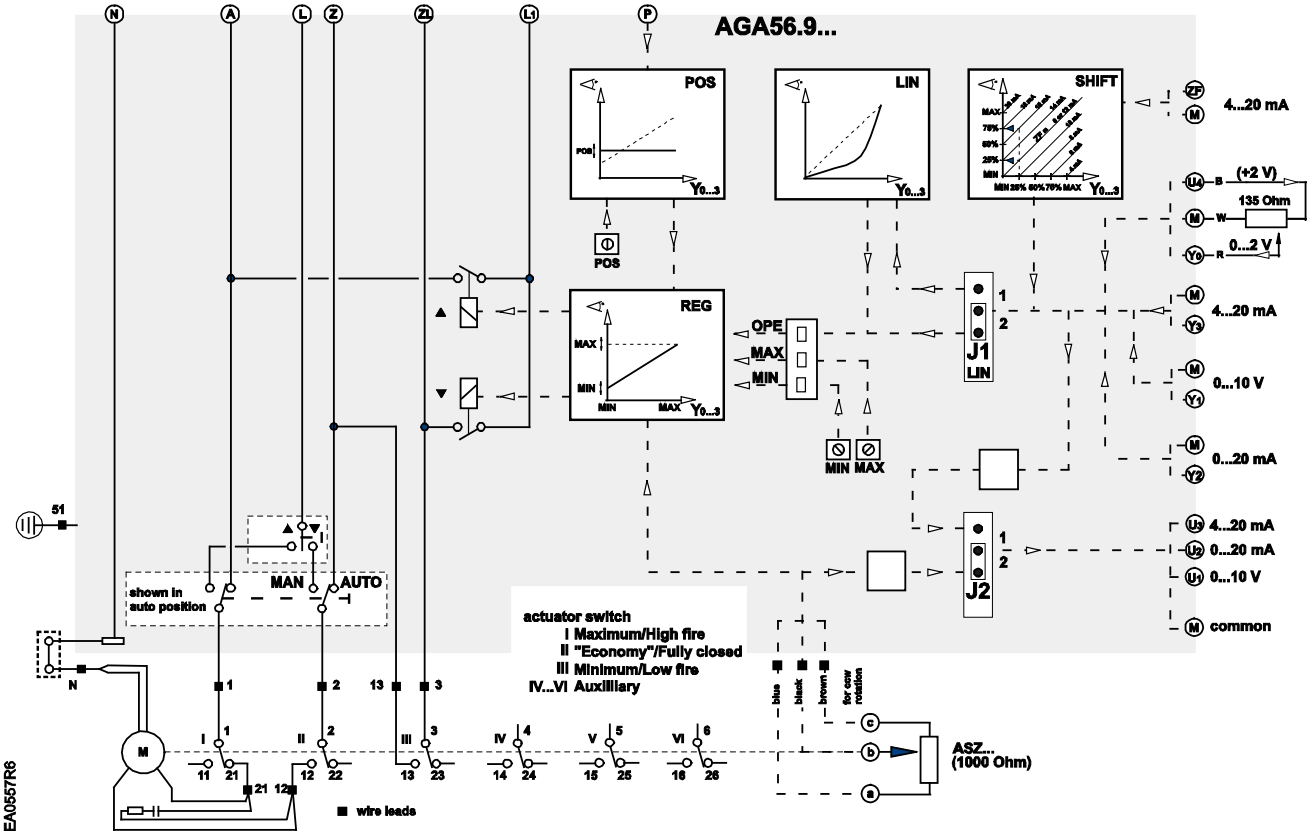


Figure 11. Basic Functional Diagram of AGA56.9

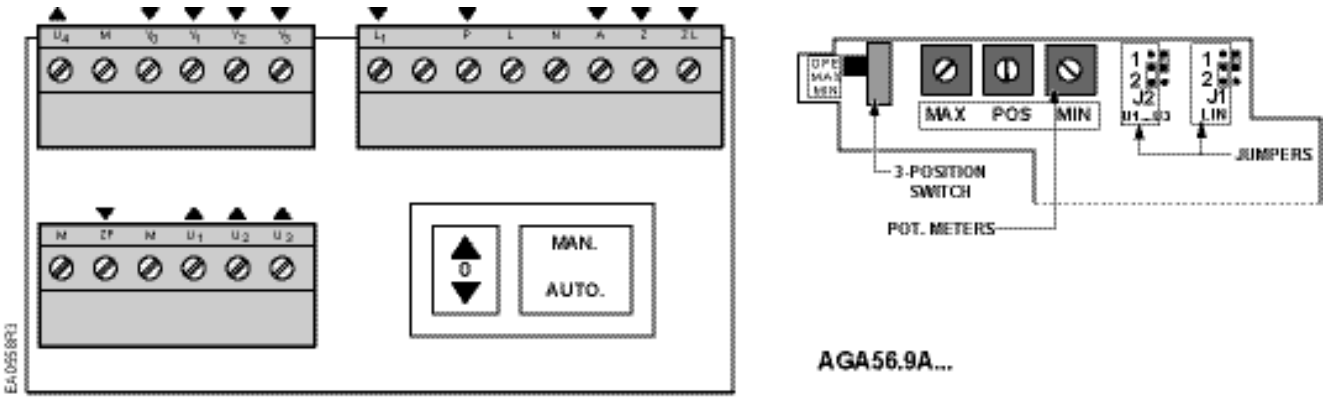


Figure 12. AGA56.9 Terminal and Trim Potentiometer/Jumper Board.

Modulation Adjustment

See Figures 10 and 12.

The blue trim potentiometers allow the adjustment of the minimum (zero) and maximum (span) positions.
The factory setting of the MIN trim potentiometer is rotated fully counter clockwise.
The factory setting of the MAX trim potentiometer is rotated fully clockwise.

Zero Adjustment

Set the OPE/MAX/MIN slide switch to MIN. The blue MIN trim potentiometer can now be gently adjusted to the required minimum position. Return the OPE/MAX/MIN slide switch to OPE for operation.

NOTE: Do not set switch cam I higher than:

90° when using feedback potentiometers ASZxx.30
135° when using feedback potentiometers ASZxx.33

Span Adjustment

Set the OPE/MAX/MIN slide switch to MAX. The blue MAX trim potentiometer can now be gently adjusted to the required maximum position. Return the OPE/MAX/MIN slide switch to OPE for operation.

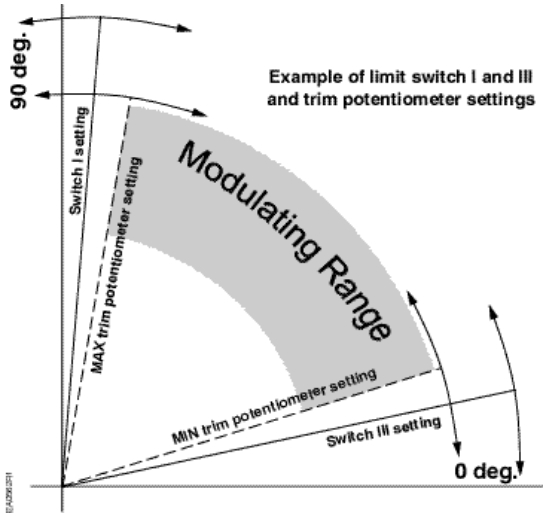


Figure 13. Switch cam and Trim Potentiometer Setting.

NOTE: The actual minimum and maximum modulating range is determined either by the setting of the MIN and MAX trim potentiometers or the setting of switch cam III (Minimum) and switch cam I (Maximum). The actuator can never modulate outside of the range set by switch cam I and III. If the MIN and MAX trim potentiometers are set outside the setting range of switch cams I and III, then the switch cam settings determine the modulating range. If a soft stop is desired, the modulating range can be defined by the trim potentiometers if the MIN and MAX trim potentiometers are set inside the setting range of switch cams I and III. See the example in Figure 13.

Cover Installation

1. Lift the two screws on the cover corners and slide the cover end into the grooves at the gear end of the actuator. See Figure 14.
2. Press the cover into place and then press the screws inward and tighten. See Figure 15.

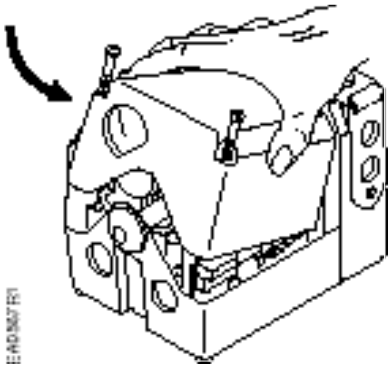


Figure 14.

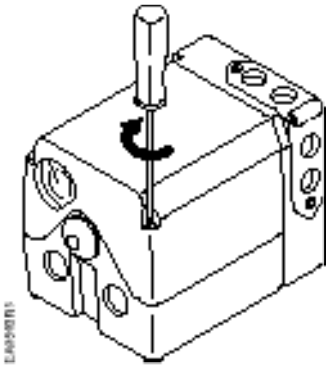


Figure 15.

Features of SQM5x.xxxxxZx Actuators

SQM5xx.xxxxx**Z**x actuators contain the AGA56.9A multi function circuit board. This circuit board provides the following features:

Multiple Input Signals

The AGA56.9A circuit board accepts the following input signals:

Line voltage

- Power to A drives the actuator open to the setting of switch cam I (Maximum).
- Power to ZL drives the actuator closed to the setting of switch cam III (Minimum).
- Power to Z drives the actuator closed to the setting of switch cam II (Economy).
- **4 to 20 mA** (Signal to Y3, common to M)
- **0 to 135 Ω** (Slide wire signal to Y0, potentiometer connected to M and U4)
- **0 to 10 Vdc** (Signal to Y1, common to M)
- **0 to 20 mA** (Signal to Y2, common to M)

Multiple Output Signals

The AGA56.9A circuit board provides the following output signals:

- **4 to 20 mA** (Signal from U3, common to M)
- **0 to 10Vdc** (Signal from U1, common to M)
- **0 to 20mA** (Signal from U2, common to M)

Double potentiometers ASZ22 provide additional output signals.

Electronic Linearization Function

Butterfly valves have non-linear flow characteristics. Near the fully closed position, a small change in the valve's position will produce a very large change in flow. Near the fully open position, a large position change will produce a relatively small change in flow.

The linearization function is intended to minimize the initial steep flow curve characteristics of a typical butterfly valve. The linearization function is enabled when Jumper J1 is in position 1 (upper position). Consequently, the actuator will make smaller rotational movements when subjected to lower input signals and larger rotational movements when subjected to higher input signals.

For example (based on a 90° modulating range), a change in input signal from 4 to 8 mA will cause a rotational movement of 11.25°. An equal change from 16 to 20 mA will cause a rotational movement of 45°. Thus, with the linearization function enabled, the change in flow is closely proportional to the change in input signal.

The linearization function is disabled when Jumper J1 is in position 2 (lower position). When disabled, the rotational movement of the shaft is proportional to the input signal.

Input Signal Override

Line voltage to terminal P will drive the actuator to a pre-set adjustable position, overriding all modulating input signals. Use the potentiometer marked POS to adjust the override position to any setting within the setting range of switch cams I and III.

NOTE: The input signal override can also be used for the ignition position of burners if different from the low fire position.

Parallel Operation

Set Jumper J2 in position 1 (upper position) to configure the actuator for parallel operation. Input signals Y0, Y1, Y2 or Y3 are directly shunted to output signals U1, U2 and U3. All output signals are available regardless of which input signal is applied.

Master/Slave Operation

Set J2 in position 2 (lower position) to configure the actuator for master/slave operation. The output signals U1, U2 and U3 reflect actual shaft position.

Split Ranging

AGA56.9 circuit boards have a modulating signal shift feature which can be used for split ranging. If no signal is present on Y0, Y1, Y2 or Y3, the actuator will modulate through the full rotational range in response to a 12 to 20 mA signal applied at ZF. If a maximum signal is present on Y0, Y1, Y2, or Y3, then the actuator will modulate through the full rotational range in response to a 4 to 12 mA signal applied at ZF. (Maximum signal can be easily achieved by bridging terminals U4 and Y0.) See Figure 16.

NOTE: It is possible to configure the actuator for split range operation 12 to 4 mA and 20 to 12 mA. Consult your authorized Siemens Building Technologies combustion products sales representative for details.

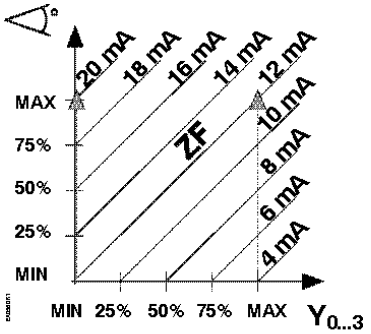


Figure 16. Split Ranging.

Features of SQM5x.xxxxxGx, SQM5x.xxxxxHx, SQM5x.xxxxxKx Actuators

SQM5x.xxxxx**G**x actuators contain the AGA56.41A circuit board with terminals Y- and Y+ for 4 to 20 mA modulating input.

SQM5x.xxxxx**H**x actuators contain the AGA56.42A circuit board with terminals Y, M and U for 0 to 135 Ω modulating input.

SQM5x.xxxxx**K**x actuators contain the AGA56.43A circuit board with terminals Y and M for 0 to 10 Vdc modulating input.

Input Signals

The AGA56.4xA circuit boards accept the following additional input signal:

Line voltage

- Power to A drives the actuator open to the setting of switch cam I (Maximum).
- Power to Z drives the actuator closed to the setting of switch cam II (Economy).
- Power to ZL drives the actuator closed to the setting of switch cam III (Minimum).

Output Signals

The AGA56.4xA circuit boards do not provide output signals. Install a double potentiometer ASZ22 to obtain a 0 to 1000 Ω actuator position output signal.

Features of SQM5x.xxxxxAx Actuators

The AGA56.1A97 circuit boards accept the following additional input signal:

Line voltage

Input Signals

- Power to A drives the actuator open to the setting of switch cam I (Maximum).
- Power to Z drives the actuator closed to the setting of switch cam II (Economy).
- Power to switch III, terminal 3 drives the actuator to the setting of switch cam III (Minimum).

Output Signals

The AGA56.1A97 circuit board provides no output signals. Install an ASZ potentiometer to obtain an actuator position output signal.

Service Guide

WARNING:

Disconnect the power supply to the actuator before performing any service functions.

Reversing Rotational Direction

1. Disconnect the wires marked 21 and 12, and reverse.
2. Adjust all switch cams to the desired settings (see Figure 6):
   - For CCW rotation use the black cam drum scales and the single switch cam pointers.
   - For CW rotation, use the red cam drum scales and the double switch cam pointers.

   NOTE: Press and hold the black cam drum release button to rotate the cam drum. This will give easy access to the switch cams and a better view of the cam drum scales.

If no potentiometer ASZ is installed, the reversing procedure is complete. If a potentiometer ASZ is installed, complete Steps 3 through 9.

Reversing Rotational Direction, Continued

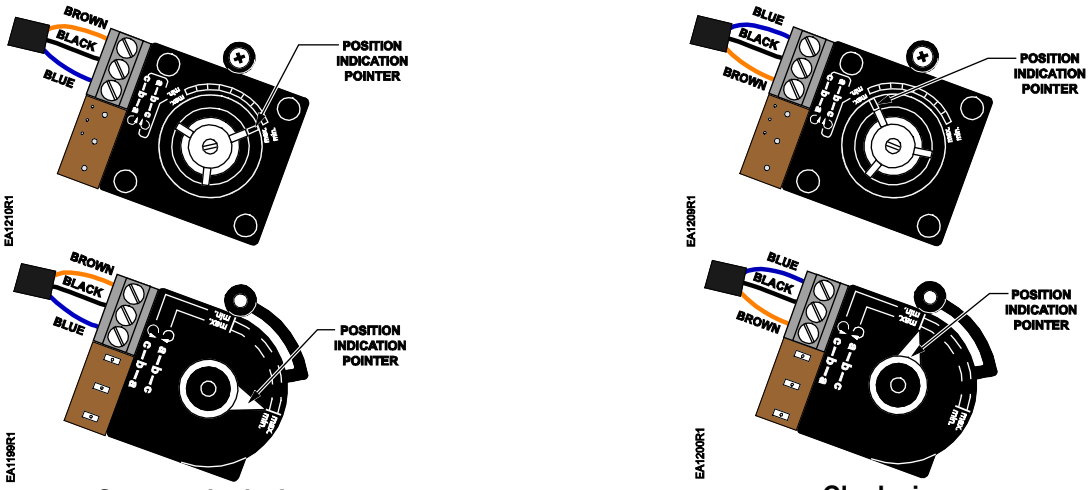


Figure 17. Reversing Rotational Direction on the ASZ Potentiometer.

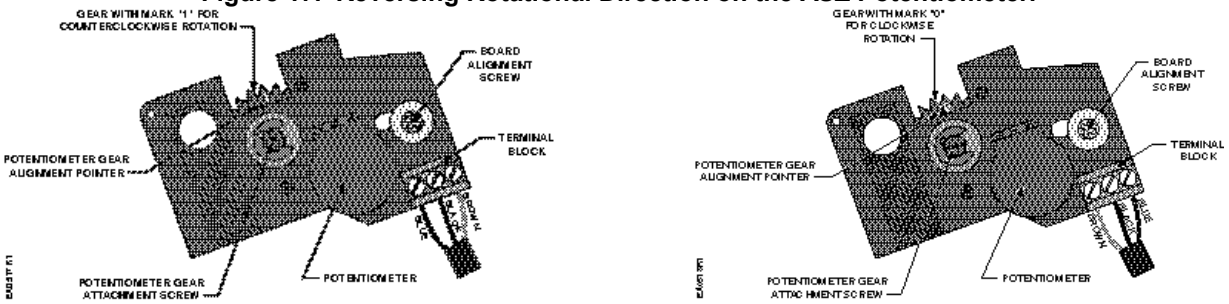


Figure 17a. Reversing Rotational Direction on the ASZ Potentiometer (Gear Models).

3. Disconnect the blue and brown wires from the terminal block located on the ASZ potentiometer circuit board and reverse. The black wire remains connected to the middle terminal. See Figures 17 and 17a.
4. Remove the white plastic actuator position-indicating dial by gently pulling while rotating in the clockwise direction. See Figure 6.
5. The actuator position indicating pointer, located near the actuator gear end of the cam drum, must point to the “0” mark on the actuator position scale (scale on the cam drum nearest to the actuator gear end). Press and hold the black cam drum release button while manually rotating the cam drum.
6. Loosen the black potentiometer cam attachment screw approximately one turn. Gently wedge a small screwdriver between the potentiometer and the gray plastic housing. Gently twist the screwdriver until the potentiometer releases from the cam drum shaft.
7. Change potentiometer end position:
   - Manually rotate the potentiometer position indication pointer **exactly** to the other end mark (see Figure 17).
   - Gear models (see Figure 17a):
     For clockwise rotation, manually rotate the potentiometer gear until the white line next to the “0” mark on the potentiometer gear face is **exactly** in alignment with the potentiometer gear alignment pointer.
     For counterclockwise rotation, manually rotate the potentiometer gear until the white line next to the “1” mark on the potentiometer gear face is **exactly** in alignment with

the potentiometer gear alignment pointer

Reversing Rotational Direction, Continued

8. Firmly tighten the black potentiometer cam attachment screw while manually holding the potentiometer position indication pointer in alignment. Check the alignment again.
9. Re-install the white actuator-indicating dial by gently pressing it onto the potentiometer cam attachment screw. Align scale position “0” on the actuator position indicating dial with the dial pointer by rotating the dial in the clockwise direction to avoid loosening the potentiometer cam attachment screw.

Shaft Installation

See *Installation and Operation Instructions*.

Preparation Before Circuit Board Installation

WARNING:

Disconnect the power supply to the actuator before replacing the circuit boards.

The black circuit board mounting bracket, installed on the inside base of the SQM5 actuator has four vertical, slotted circuit board supports. Remove the terminal section and circuit board(s) from the mounting bracket.

The actuator motor capacitor is attached to the lower section of the gray plastic switch housing using snap-on holding clips. Gently pull the capacitor forward until it unclips and temporarily place it on top of the gear housing. See Figure 18.

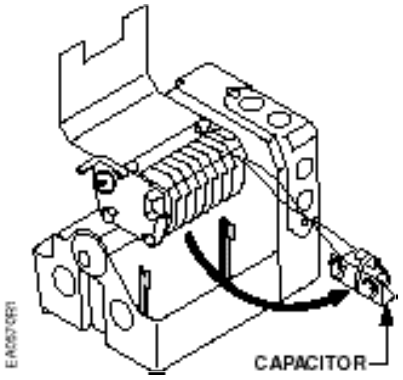


Figure 18.

CAUTION:

Do not disconnect any capacitor wiring.

AGA56.41/42/43 Circuit Board Installation

Remove the AGA56.41/42/43 circuit board from the packaging. The circuit board is shipped as one board.

Separate the board at the perforation by holding the circuit board at both ends and gently bending the board until it separates.

Move the terminal section containing the auto/manual switch to the opposite end of the base circuit board.

From the switch housing side of the actuator, guide the base circuit board into the bottom of the circuit board mounting bracket. See Figure 19.

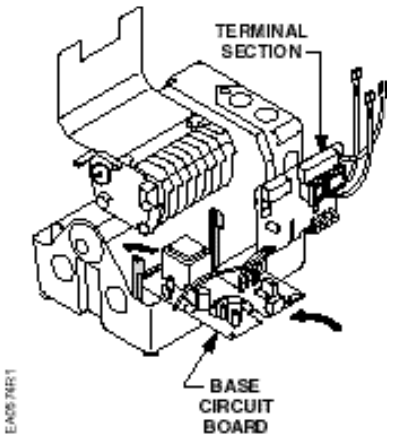


Figure 19.

AGA56.41/42/43 Circuit Board Installation, Continued

Re-install the actuator motor capacitor. See Figure 20.

Gently guide the terminal section into the support slots and slide the terminal board downward until both supports snap into place. Ensure that the four brown wires and the flat white connector cable which connect the two circuit boards are positioned correctly in their respective corners allowing the board to freely slide into place without pinching either wire. See Figure 21.

Connect the bundled blue, black and brown potentiometer wires to the terminal block located on the ASZ potentiometer circuit board. See *Potentiometer Installation*.

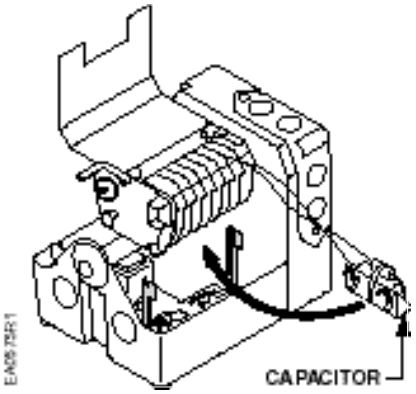


Figure 20.

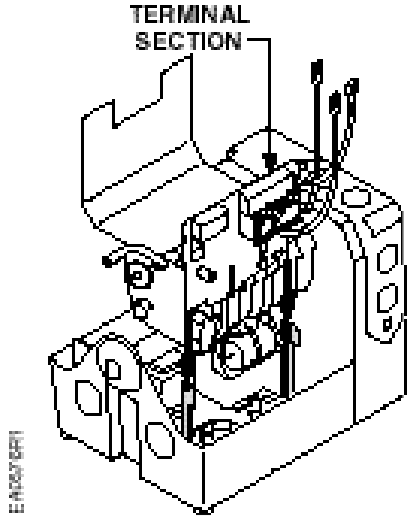


Figure 21.

AGA56.41/42/43 Circuit Board Installation, Continued

Make the following connections to the actuator: See Figure 22.

a. Connect the wire, marked “1” from the circuit board to switch I, terminal 1.
b. Connect the wire, marked “2” from the circuit board to switch II, terminal 2.
c. Connect the wire, marked “3” from the circuit board to switch III, terminal 3.
d. Connect the wire, marked “13” from the circuit board to switch III, terminal 13.
e. Connect the blue neutral wire marked “N” to the double terminal block located on the outer end of the switch housing
f. Connect the grounding wire marked "51" to the ground terminal located to the right of the auto/manual switch.

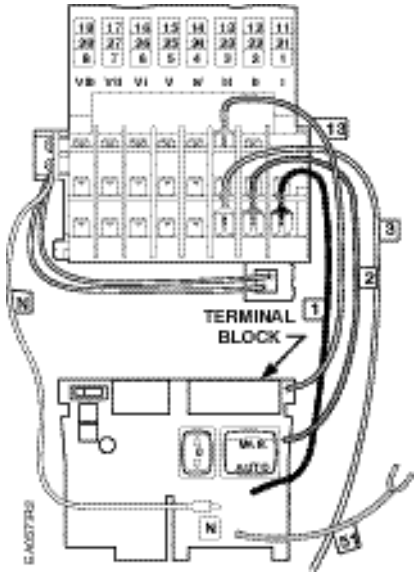


Figure 22.

AGA56.9A Circuit Board Installation

1. Remove the ASZ... potentiometer if already installed on the SQM5... actuator. See *Potentiometer Removal/Installation Instructions*.

2. Remove the AGA56.9A circuit boards from the packaging. The three separate AGA56.9A circuit boards are shipped in a circuit board mounting bracket.

3. Remove the two upright circuit boards from the mounting bracket by gently pulling aside the vertical supports and sliding the boards upward. Remove the base circuit board from the bottom of the mounting bracket. Discard the shipping mounting bracket.

AGA56.9A Circuit Board Installation, Continued

4. Guide the base circuit board from the switch housing side of the actuator into the bottom of the circuit board mounting bracket. See Figure 23.

5. Re-install the actuator motor capacitor. See Figure 24.

6. Gently guide the terminal board into the support slots and slide the terminal board downward until both supports snap into place. See Figure 25.

7. See Figure 26 and make the following connections to the actuator:

   a. Connect the wire, marked “1” from the circuit board to switch I, terminal 1.

   b. Connect the wire, marked “2” from the circuit board to switch II, terminal 2. Connect the white wire, marked “3” from the circuit board to switch III, terminal 3.

   c. Connect the wire, marked “13” from the circuit board to switch III, terminal 13.

   d. Connect the neutral wire, marked “N” to the double terminal block located on the outer end of the switch housing.

   e. Connect the grounding wire marked "51" to the ground terminal located to the right of the auto/manual switch.

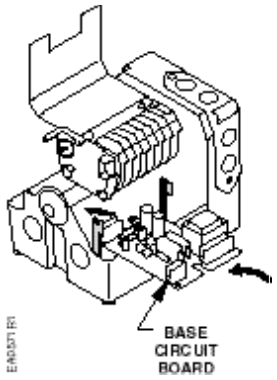


Figure 23.

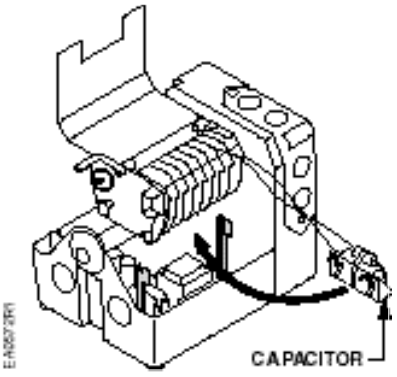


Figure 24.

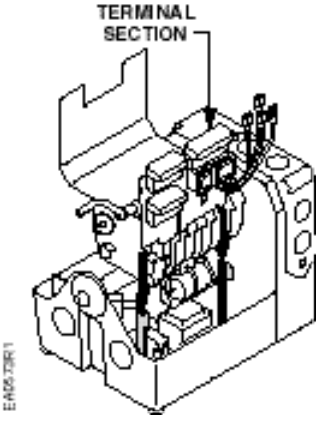


Figure 25.

AGA56.9A Circuit Board Installation, Continued

8. Gently guide the L-shaped circuit board containing the three blue trim potentiometers into the vertical support slots located on the cam drum side of the actuator. See Figure 27.

9. Slide the circuit board downward until both supports snap into place. Install the ASZ potentiometer. (See *Potentiometer Removal/Installation Instructions.*)

10. Connect the bundled blue, black and brown potentiometer wires to the terminal block located on the ASZ potentiometer circuit board.

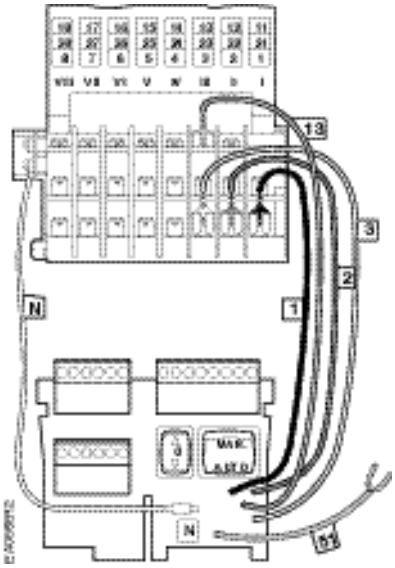


Figure 26.

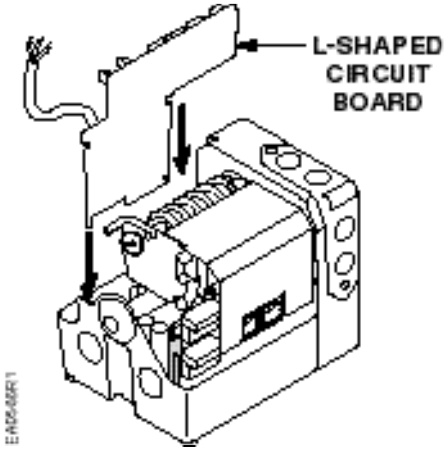


Figure 27.

AGA56.1A97 Circuit Board Installation

1. Install the AGA56.1A97 circuit board into the two slotted circuit board supports located on the switch housing side of the actuator.

2. Gently guide the AGA56.1A97 circuit board into the support slots and slide the board downward until both supports snap into place.

3. Make the following connections to the actuator:
   a. Connect the wire, marked “1” from the circuit board to switch I, terminal 1.
   b. Connect the wire, marked “2” from the circuit board to switch II, terminal 2.
   c. Connect the wire, marked “13” from the circuit board to switch III, terminal 13.

Potentiometer Removal

Remove the white plastic actuator position-indicating dial by gently pulling while rotating in the clockwise direction. See Figure 6.

Disconnect the blue, black and brown wire from the potentiometer terminal block. See Figure 17.

Remove the silver potentiometer alignment screw.

Loosen the black potentiometer cam attachment screw approximately one turn.

Gently wedge a small screwdriver between the potentiometer and the gray plastic housing.

Carefully twist the screwdriver until the potentiometer releases from the cam drum shaft. Remove the ASZ potentiometer.

Potentiometer Installation

1. Install the new ASZ potentiometer by gently sliding the bushing over the cam drum shaft.

2. Align the potentiometer alignment screw hole with the hole in the gray plastic housing and install the potentiometer alignment screw. See Figures 17 and 17a.

3. The actuator position indicating pointer, located near the actuator gear end of the cam drum, must point to the “0” mark on the actuator position scale. See Figure 6. The scale is located on the cam drum nearest to the actuator gear end. Press and hold the black cam drum release button while manually rotating the cam drum.

4. If installing a potentiometer without gear, manually rotate the potentiometer pointer until the pointer is **exactly** in the “min” position. See Figure 17. Firmly tighten the black potentiometer cam attachment screw while manually holding the potentiometer pointer in alignment. Check the alignment again.

5. If installing a gear model potentiometer, manually rotate the potentiometer gear until the white line next to the “0” or “1” mark on the potentiometer gear face is **exactly** in alignment with the potentiometer gear alignment pointer. See Figure 17a. For counterclockwise (ccw) operation the line beside the “1” mark must exactly align with potentiometer gear alignment pointer. For clockwise (cw) operation the line beside the “0” mark must exactly align with potentiometer gear alignment pointer. Firmly tighten the black potentiometer cam attachment screw while manually holding the potentiometer gear in alignment. Check the alignment again.

6. Connect the bundled blue, black and brown potentiometer wires to the terminal block located on the ASZ potentiometer board. See *Potentiometer Installation* and Figures 17 and 17a.

7. Re-install the white actuator-indicating dial by gently pressing it onto the potentiometer cam attachment screw. Align scale position “0” on the actuator position indicating dial with the dial pointer by rotating the dial in the clockwise direction to avoid loosening the potentiometer gear attachment screw. See Figure 6.

Specifications

SQM5... Reversing Actuator

SQM5... Reversing actuator	
Agency approvals	UL, CSA, CE
Operating voltage	24 Vac +10%-15% 110 Vac-15% to 120 Vac +10% 220 Vac-15% to 240 Vac +10%
Operating frequency	50 to 60 Hz
Power consumption	20 VA
Type of motor	Reversing synchronous motor
Duty cycle	100%
Torque	See Table 1.
Maximum shaft torque	
AGA58.1	90 lb-in
AGA58.2	200 lb-in
AGA58.3	220 lb-in
AGA58.4	270 lb-in
AGA58.7	400 lb-in
Timings	See Table 1.
Rotational range of operation	
SQM5x.xxxxx**A** models	0° to 160°
SQM5x.xxxxxx**3** models	0° to 90°
SQM5x.xxxxxx**4** models	0° to 135°
SQMSx.xxxxxx6 models	0° to 160°
Direction of rotation	Reversible
Shaft	Selectable. See Table 2. Custom versions on request
Shaft disengagement	Independent, cam and drive shaft
Number of auxiliary switches	4 switches (standard, maximum 6)
Limit switches	2 switches (standard)
Electrical rating of auxiliary switches	7.5 (3) A, 250 Vac
Mounting position	Optional
Ambient operating temperature	-5°F to 140°F (-20°C to 60°C)
Shipping temperature	-58°F to 140°F (-50°C to 60°C)
NEMA ratings	NEMA 1, 2, 3, 3R, 3S, 5, 12, and 13
Connections	
Switches	Spade connectors
Boards	Screwed and spade connectors
Dimensions	See Figures 28 through 31.
Weight	7.3 lb (3.3 kg)
Housing	Aluminum pressure die casting
Enclosure (cover)	Lexan
Motor	Lock resistant
Disengagements	Manual for drive and cam shaft

Specifications

SQM5... Reversing Actuator, Continued

	Conduit connection	Two removable inserts with two 1/2-inch NPSM threads. Each insert allows insertion of entire cable tree for easy servicing
	Gears and bearings	Maintenance-free
	Mounting	Bottom or face mounting possible
	Adaptation to other actuator brands	Screw pattern and shaft height Adaptation with AGA57... adapters See Table 2.
	AGA56.1A97 Switch circuit board	
	Operating voltage	Voltage independent
	Operating frequency	50 to 60 Hz
Circuit Boards	Auto/manual switch	2-position switch
	Manual toggle switch	3-position switch
AGA56.1A97	Ambient operating temperature	-5°F to 140°F (-20°C to 60°C)
	Shipping temperature	-58°F to 140°F (-50°C to 60°C)
	Weight	0.22 lb (0.1 kg)
	AGA56.41A Electronic circuit boards	Single potentiometer ASZ... (1000 ohm) is required
	Operating voltage	24 Vac +10%-15%
		110 Vac -15% to 120 Vac +10%
		220 Vac -15% to 240 Vac +10%
AGA56.41A	Operating frequency	50 to 60 Hz
	Ambient operating temperature	-5°F to 140°F (-20°C to 60°C)
	Shipping temperature	-58°F to 140°F (-50°C to 60°C)
	Input signal	4 to 20 mA
	Impedance	
	Current input	≤300 Ω
	Zero adjustment	MIN: 0 to 75%
	Span adjustment	MAX: min 100%
	Auto/manual switch	2-position switch
	Manual toggle switch	3-position switch
	Weight	0.7 lb (0.33 kg)
	AGA56.42A Electronic circuit boards	Same specifications as AGA56.41A except
	Input signal	0 to 135 ohm
	Impedance	
	Current input	≤300 Ω
AGA56.42A	Voltage input	≥100K Ω

Specifications, continued

AGA56.43A	**AGA56.43A Electronic circuit boards**	Same specifications as AGA56.41A except:
	Input signal	0 to 10 Vdc
	Impedance	
	Voltage input	≥100K Ω
AGA56.9A	**AGA56.9A Multi function electronic circuit boards**	Single potentiometer ASZ... (1000 ohm) is required
	Operating voltage	24 Vac +10%-15% 110 Vac -15% to 120 Vac +10% 220 Vac -15% to 240 Vac +10%
	Operating frequency	50 to 60 Hz
	Input signals	4 to 20 mA 0 to 20 mA 0 to 10 Vdc 0 to 135 ohm
	Impedance	
	Current input	≤300 Ω
	Voltage input	≥100K Ω
	Output signals	4 to 20 mA 0 to 20 mA 0 to 10 Vdc
	Max output load	
	Current output	<600 ohm
	Voltage output	> 1.5K ohm
	Zero adjustment	MIN: 0 to 75%
	Span adjustment	MAX: min-100%
	Split ranging (SHIFT)	4 to 20 mA on terminal ZF
	Input signal override (POS)	Line voltage (... Vac) on terminal P adjust with POS potentiometer
	Ambient operating temperature	-5°F to 140°F (-20°C to 60°C)
	Shipping temperature	-58°F to 140°F (-50°C to 60°C)
ASZ... Potentiometers	Auto/manual switch	2-position switch
	Manual toggle switch	3-position switch
	Weight	0.7 lb (0.33 kg)
	ASZ... Potentiometers	
	Versions	Single and double potentiometer
	Resistor values	See Table 2 and *Data Sheet 7921*.
	Hysteresis	< 0.3% related to drive shaft

Dimensions

The first dimension given is measured in inches. Millimeters are shown in parentheses.

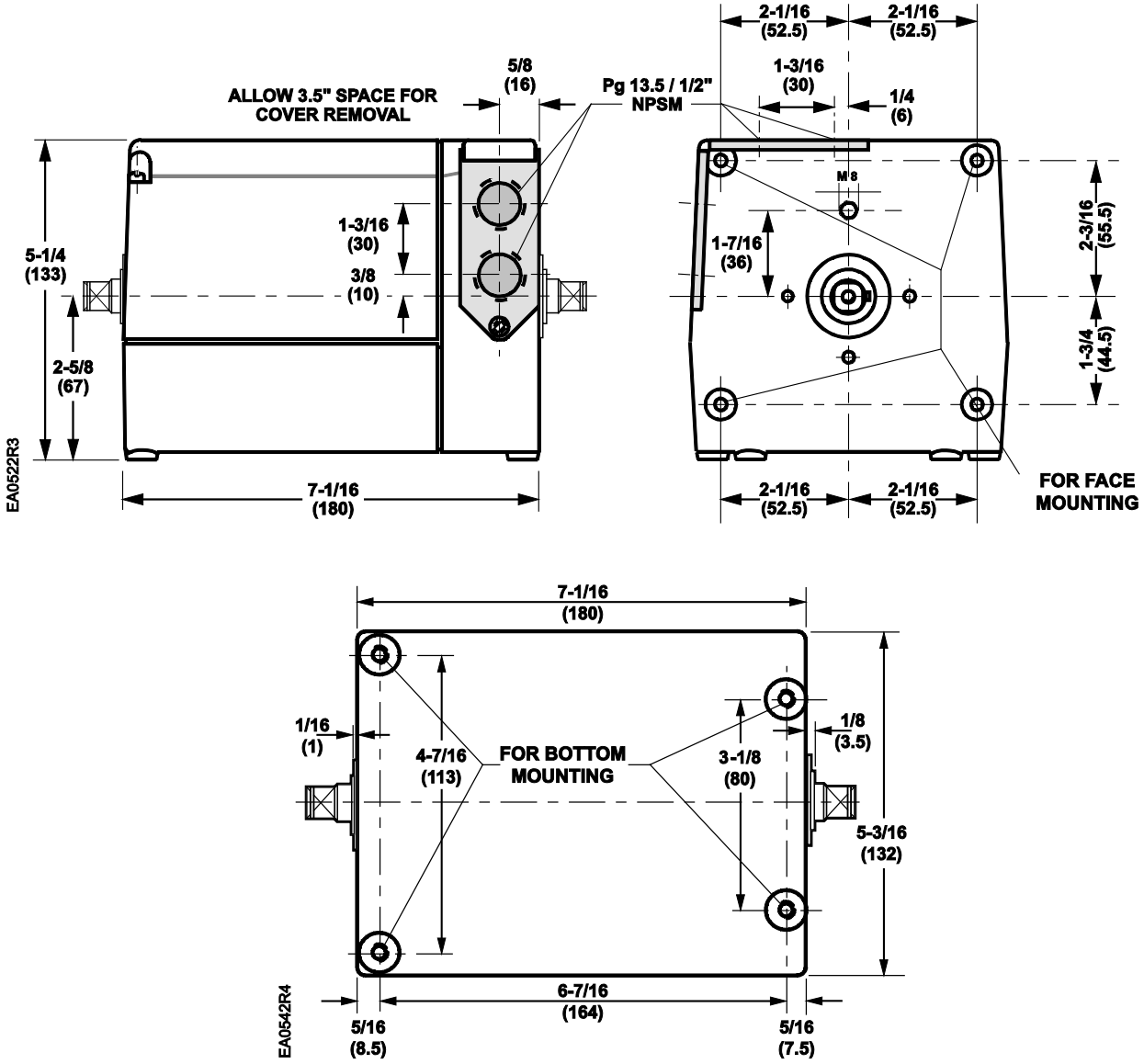


Figure 28. SQM5x.xxxRxx Dimensions.

Dimensions, Continued

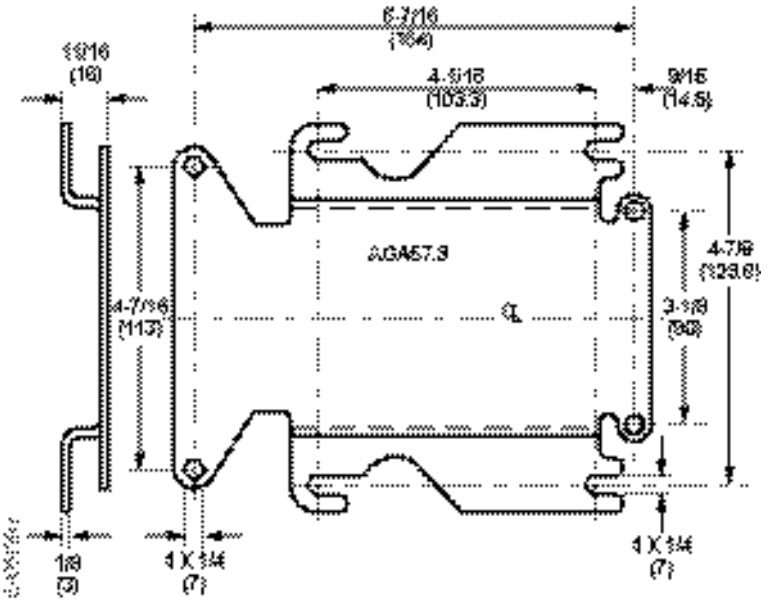


Figure 29. Mounting Bracket AGA57.3.

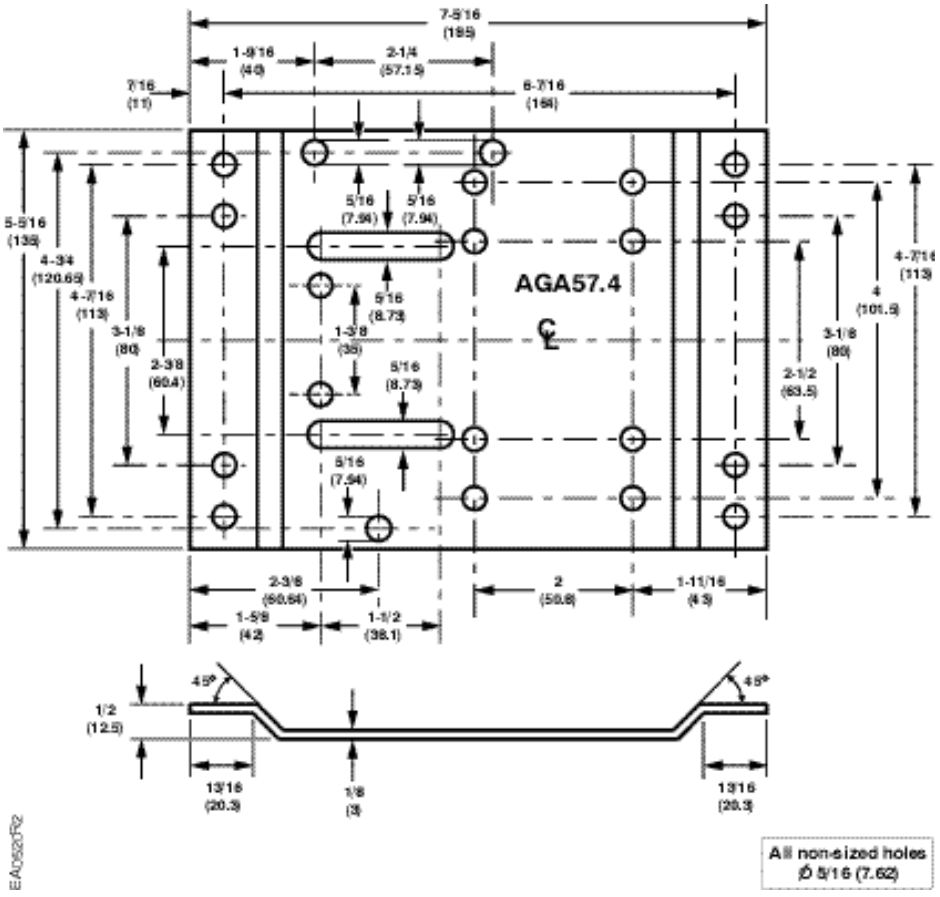


Figure 30. AGA57.4 Mounting Bracket.

Dimensions, Continued

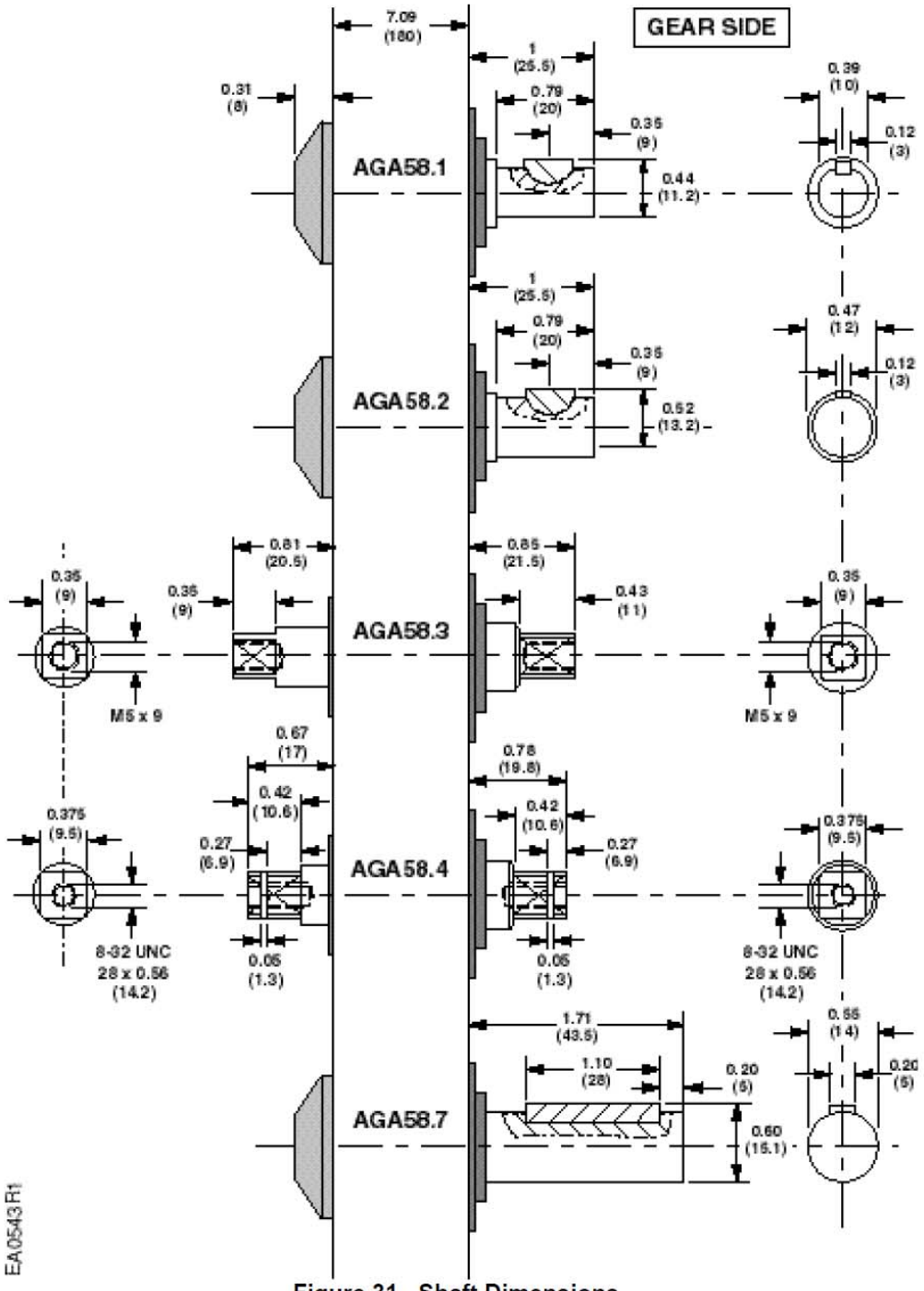


Figure 31. Shaft Dimensions.

Low Pressure

Premium

Description & Features:

- Highly accurate reading of low pressures
- Brass or Stainless Steel wetted part
- Ranges from 10 psi to as low as 15" WC

- **CRN Registered**

Applications:

- Suitable for measuring gaseous media both corrosive and non-corrosive
- Used to measure natural gas pressure as well air flow indications and leak detection
- Vacuum pumps, air compressors, air filters, gas burners, vacuum ovens, suction Regulators and respirators

Low Pressure

Specifications Brass Internals	
Dial:	2 1/2" (63mm), 4" (100mm), 4 1/2" (115mm) and 6" (150mm), white aluminum dial with black and red markings
Case:	Steel, painted black 2.5" & 4" or cast aluminum, painted black 4.5" & 6"
Lens:	2 1/2" (63mm) - polycarbonate 4" (100mm), 4 1/2" (115mm) and 6" (150mm) - glass
Ring:	2 1/2" (63mm) 4" (100mm), - steel 4 1/2" (115mm) and 6" (150mm) - aluminum
Back Flange:	Steel, painted black
Pointer:	Aluminum, anodized black
Socket:	Brass
Connection:	1/4" NPT standard
Diaphragm Element:	Phosphor Bronze
Movement:	Engineering plastic upper and lower plate with brass pinion and sector (2 1/2" [63mm]), brass (4" [100mm], 4.5" [115mm] & 6" [150mm])
Working Pressure:	60% of full scale value (fluctuating); 75% of full scale value (static)
Ambient Temperature:	-40°F to 150°F (-40°C to 65°C)
Process Temperature:	-40°F to 150°F (-40°C to 65°C)
Accuracy:	2.5" = ±3%/2%/3% accuracy (GRADE B) - 4", 4.5", 6" = 1% accuracy(Grade 1A)
Enclosure Rating:	IP52

Specifications Stainless Steel Internals	
Dial:	2 1/2" (63mm), 4" (100mm), 4 1/2" (115mm) and 6" (150mm), white aluminum dial with black and red markings
Case:	2 1/2" (63mm) and 4" (100mm) - AISI 304 stainless steel 4 1/2" (115mm) and 6" (150mm) - aluminum, painted black
Lens:	2 1/2" (63mm) - polycarbonate 4" (100mm), 4 1/2" (115mm) and 6" (150mm) - glass
Ring:	2 1/2" (63mm) and 4" (100mm) - steel 4 1/2" (115mm) and 6" (150mm) - aluminum
Back Flange:	Steel, painted black
Pointer:	Aluminum, anodized black
Socket:	AISI 316 stainless steel
Welding:	TIG
Connection:	1/4" NPT standard
Diaphragm Element:	AISI 316 stainless steel
Movement:	AISI 316 stainless steel
Working Pressure:	75% of full scale value
Over-pressure Limit:	30% of full scale value
Ambient Temperature:	-40-150F (-40C to 65C)
Process Temperature:	-40-150F (-40C to 65C)
Accuracy:	2.5" = ±3%/2%/3% accuracy (GRADE B) - 4", 4.5", 6" = 1% accuracy(Grade 1A)
Enclosure Rating:	IP52

Low Pressure

Premium

PRODUCT CODES

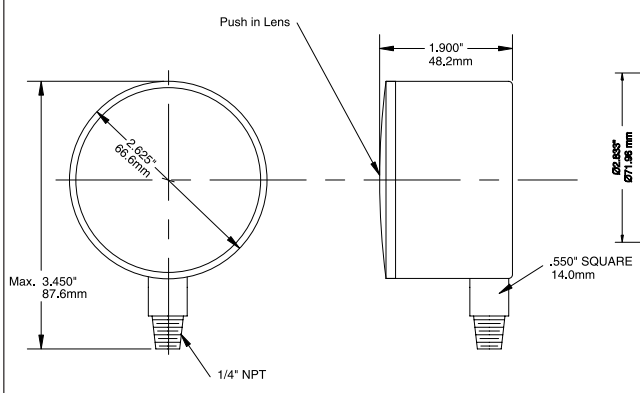
How to order: Specify product code
Products shown in BOLD are normally in stock.

Dial Size	2 1/2″(63mm)			4″(100mm)				4 1/2″(115mm)				6″(150mm)			
Case Material	Steel		St/St	Steel	St/St	Steel		Aluminum		Aluminum		Aluminum		Aluminum	
Connection	Bottom 1/4″	Center Back 1/4″	Bottom 1/4″	Bottom 1/4″		Center Back 1/4″		Bottom 1/4″		Center Back 1/4″		Bottom 1/4″		Center Back 1/4″	1/4″
Movement socket, capsule	Brass	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St
0-15″ water vac	**P300V**	**P340V**	**P350V**	**P310V**	P4200V	**P4230V**	**P4240V**	P4250V	P4260V	P4290V	P4300V	P4310V	P4320V	-	-
0-32″ water vac.	**P301V**	**P341V**	P351V	P311V	**P4201V**	**P4231V**	**P4241V**	P4251V	P4261V	P4291V	P4301V	P4311V	P4321V	-	-
0-55″ water vac.	**P302V**	**P342V**	**P352V**	**P312V**	**P4202V**	**P4232V**	**P4242V**	P4252V	P4262V	P4292V	P4302V	P4312V	P4322V	-	-
0-100″ water vac.	**P304V**	**P343V**	**P353V**	**P313V**	**P4203V**	**P4233V**	**P4243V**	P4253V	P4263V	P4293V	P4303V	P4313V	P4323V	-	-
0-200″ water vac.	P303V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0-15″ water/oz	**P300**	**P340**	**P350**	**P310**	**P4200**	**P4230**	**P4240**	P4250	P4260	P4290	P4300	P4310	P4320	-	P4360
0-32″ water/oz	**P301**	**P341**	**P351**	**P311**	P4201	**P4231**	**P4241**	P4251	P4261	**P4291**	P4301	P4311	P4321	P4351	P4361
0-55″ water/oz	**P302**	**P342**	**P352**	**P312**	**P4202**	**P4232**	**P4242**	**P4252**	**P4262**	P4292	P4302	P4312	P4322	-	-
0-100″ water/oz	**P304**	**P343**	**P353**	**P313**	**P4203**	P4233	**P4243**	P4253	P4263	**P4293**	P4303	P4313	P4323	P4353	P4363
0-200″ water/oz	**P303**	P346	**P356**	**P316**	P4206	**P4236**	**P4246**	P4256	P4266	P4296	P4306	P4316	P4326	-	-
0-5 psi/kPa	**P305**	**P344**	**P354**	**P314**	**P4204**	P4234	**P4244**	P4254	P4264	P4294	P4304	P4314	P4324	P4354	P4364
0-10 psi/kPa	**P306**	**P345**	**P355**	**P315**	**P4205**	**P4235**	**P4245**	P4255	P4265	P4295	P4305	P4315	P4325	P4355	P4365

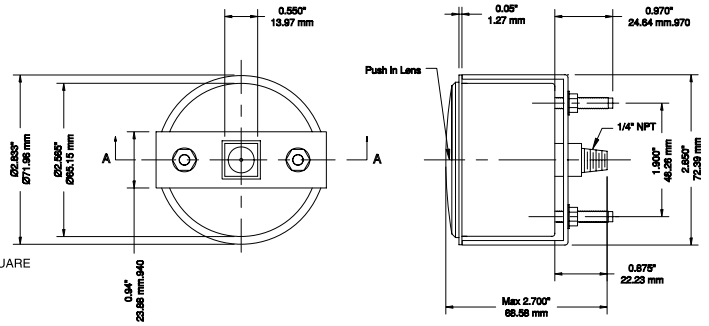
Notes: Other ranges available upon request.
Other connection sizes available upon request.

Option Suffix:
- UC = U-clamp (2 1/2″(63mm) only)
- LPFF = Front flange 4 1/2″(115mm) only)
- LPFF6 = 6″(150mm) Front flange.
- LPBF = Back flange (all sizes except 2.5″)
- 45PHENOLIC = Phenolic case available on 4.5″ stainless steel

2.5″ Bottom Connection Brass

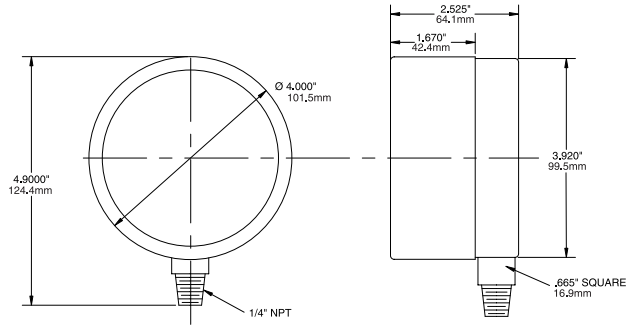


2.5″ Back Connection with u-clamp Brass

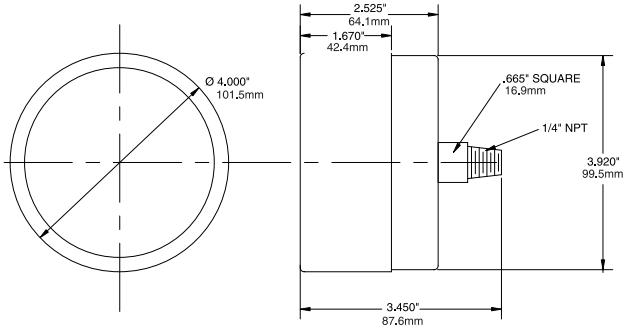


Low Pressure

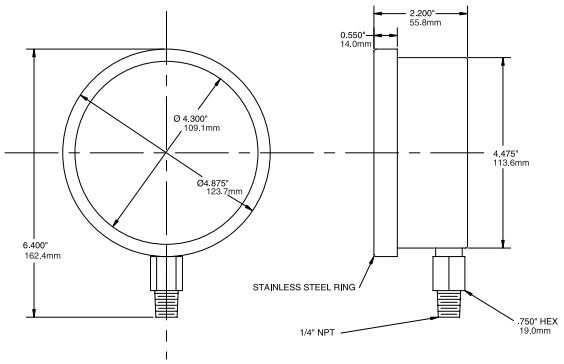
4″ Bottom Connection Brass



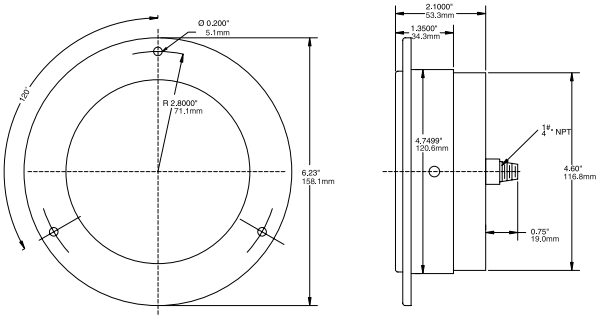
4″ Back Connection Brass



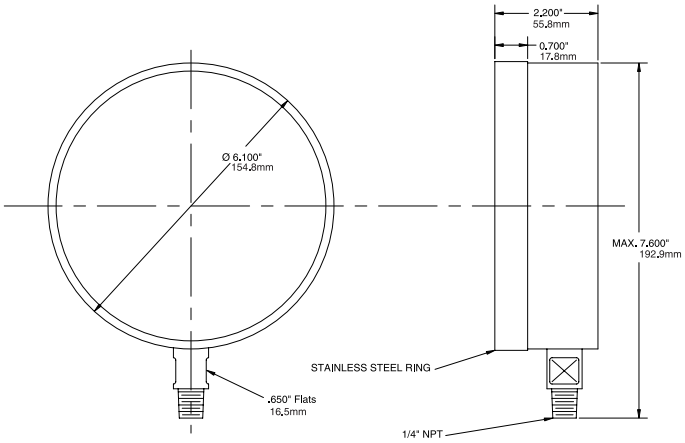
4.5″ Bottom Connection Stainless Steel



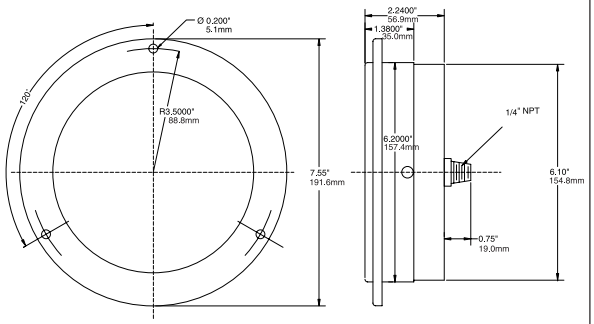
4.5″ Back Connection Stainless Steel



6″ Bottom Connection Stainless Steel



6″ Back Connection Stainless Steel



Low Pressure

Premium

Description & Features:

- Highly accurate reading of low pressures
- Brass or Stainless Steel wetted part
- Ranges from 10 psi to as low as 15" WC

- **CRN Registered**

Applications:

- Suitable for measuring gaseous media both corrosive and non-corrosive
- Used to measure natural gas pressure as well air flow indications and leak detection
- Vacuum pumps, air compressors, air filters, gas burners, vacuum ovens, suction Regulators and respirators

Low Pressure

Specifications Brass Internals	
Dial:	2 1/2" (63mm), 4" (100mm), 4 1/2" (115mm) and 6" (150mm), white aluminum dial with black and red markings
Case:	Steel, painted black 2.5" & 4" or cast aluminum, painted black 4.5" & 6"
Lens:	2 1/2" (63mm) - polycarbonate 4" (100mm), 4 1/2" (115mm) and 6" (150mm) - glass
Ring:	2 1/2" (63mm) 4" (100mm), - steel 4 1/2" (115mm) and 6" (150mm) - aluminum
Back Flange:	Steel, painted black
Pointer:	Aluminum, anodized black
Socket:	Brass
Connection:	1/4" NPT standard
Diaphragm Element:	Phosphor Bronze
Movement:	Engineering plastic upper and lower plate with brass pinion and sector (2 1/2" [63mm]), brass (4" [100mm], 4.5" [115mm] & 6" [150mm])
Working Pressure:	60% of full scale value (fluctuating); 75% of full scale value (static)
Ambient Temperature:	-40°F to 150°F (-40°C to 65°C)
Process Temperature:	-40°F to 150°F (-40°C to 65°C)
Accuracy:	2.5" = ±3%/2%/3% accuracy (GRADE B) - 4", 4.5", 6" = 1% accuracy(Grade 1A)
Enclosure Rating:	IP52

Specifications Stainless Steel Internals	
Dial:	2 1/2" (63mm), 4" (100mm), 4 1/2" (115mm) and 6" (150mm), white aluminum dial with black and red markings
Case:	2 1/2" (63mm) and 4" (100mm) - AISI 304 stainless steel 4 1/2" (115mm) and 6" (150mm) - aluminum, painted black
Lens:	2 1/2" (63mm) - polycarbonate 4" (100mm), 4 1/2" (115mm) and 6" (150mm) - glass
Ring:	2 1/2" (63mm) and 4" (100mm) - steel 4 1/2" (115mm) and 6" (150mm) - aluminum
Back Flange:	Steel, painted black
Pointer:	Aluminum, anodized black
Socket:	AISI 316 stainless steel
Welding:	TIG
Connection:	1/4" NPT standard
Diaphragm Element:	AISI 316 stainless steel
Movement:	AISI 316 stainless steel
Working Pressure:	75% of full scale value
Over-pressure Limit:	30% of full scale value
Ambient Temperature:	-40-150F (-40C to 65C)
Process Temperature:	-40-150F (-40C to 65C)
Accuracy:	2.5" = ±3%/2%/3% accuracy (GRADE B) - 4", 4.5", 6" = 1% accuracy(Grade 1A)
Enclosure Rating:	IP52

Low Pressure

Premium

PRODUCT CODES

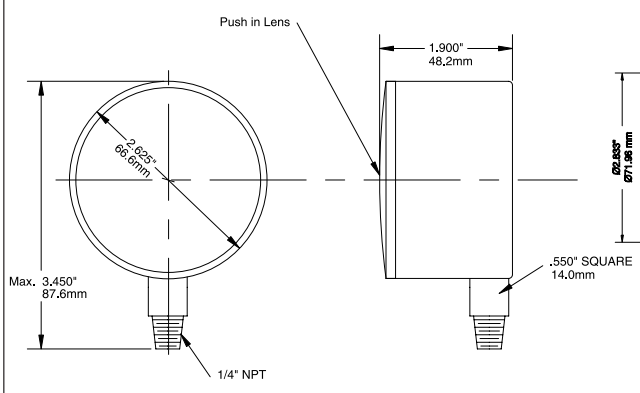
How to order: Specify product code
Products shown in BOLD are normally in stock.

Dial Size	2 1/2″(63mm)			4″(100mm)				4 1/2″(115mm)				6″(150mm)			
Case Material	Steel		St/St	Steel	St/St	Steel		Aluminum		Aluminum		Aluminum		Aluminum	
Connection	Bottom 1/4″	Center Back 1/4″	Bottom 1/4″	Bottom 1/4″		Center Back 1/4″		Bottom 1/4″		Center Back 1/4″		Bottom 1/4″		Center Back 1/4″	1/4″
Movement socket, capsule	Brass	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St	Brass	St/St
0-15″ water vac	**P300V**	**P340V**	**P350V**	**P310V**	P4200V	**P4230V**	**P4240V**	P4250V	P4260V	P4290V	P4300V	P4310V	P4320V	-	-
0-32″ water vac.	**P301V**	**P341V**	P351V	P311V	**P4201V**	**P4231V**	**P4241V**	P4251V	P4261V	P4291V	P4301V	P4311V	P4321V	-	-
0-55″ water vac.	**P302V**	**P342V**	**P352V**	**P312V**	**P4202V**	**P4232V**	**P4242V**	P4252V	P4262V	P4292V	P4302V	P4312V	P4322V	-	-
0-100″ water vac.	**P304V**	**P343V**	**P353V**	**P313V**	**P4203V**	**P4233V**	**P4243V**	P4253V	P4263V	P4293V	P4303V	P4313V	P4323V	-	-
0-200″ water vac.	P303V	-	-	-	-	-	-	-	-	-	-	-	-	-	-
0-15″ water/oz	**P300**	**P340**	**P350**	**P310**	**P4200**	**P4230**	**P4240**	P4250	P4260	P4290	P4300	P4310	P4320	-	P4360
0-32″ water/oz	**P301**	**P341**	**P351**	**P311**	P4201	**P4231**	**P4241**	P4251	P4261	**P4291**	P4301	P4311	P4321	P4351	P4361
0-55″ water/oz	**P302**	**P342**	**P352**	**P312**	**P4202**	**P4232**	**P4242**	**P4252**	**P4262**	P4292	P4302	P4312	P4322	-	-
0-100″ water/oz	**P304**	**P343**	**P353**	**P313**	**P4203**	P4233	**P4243**	P4253	P4263	**P4293**	P4303	P4313	P4323	P4353	P4363
0-200″ water/oz	**P303**	P346	**P356**	**P316**	P4206	**P4236**	**P4246**	P4256	P4266	P4296	P4306	P4316	P4326	-	-
0-5 psi/kPa	**P305**	**P344**	**P354**	**P314**	**P4204**	P4234	**P4244**	P4254	P4264	P4294	P4304	P4314	P4324	P4354	P4364
0-10 psi/kPa	**P306**	**P345**	**P355**	**P315**	**P4205**	**P4235**	**P4245**	P4255	P4265	P4295	P4305	P4315	P4325	P4355	P4365

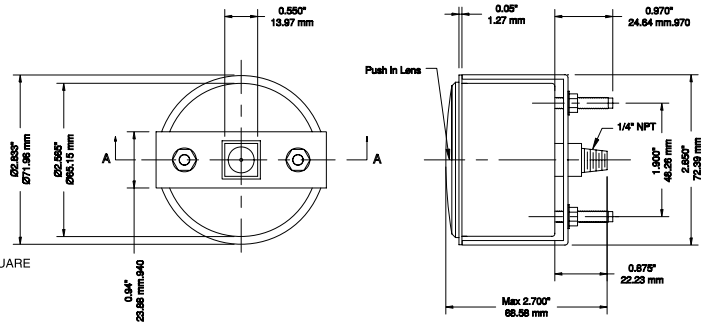
Notes: Other ranges available upon request.
Other connection sizes available upon request.

Option Suffix:
- UC = U-clamp (2 1/2″(63mm) only)
- LPFF = Front flange 4 1/2″(115mm) only)
- LPFF6 = 6″(150mm) Front flange.
- LPBF = Back flange (all sizes except 2.5″)
- 45PHENOLIC = Phenolic case available on 4.5″ stainless steel

2.5″ Bottom Connection Brass

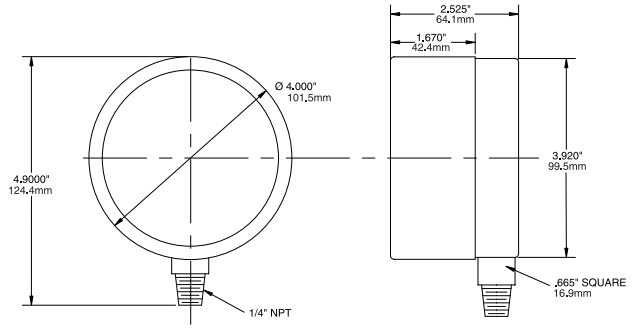


2.5″ Back Connection with u-clamp Brass

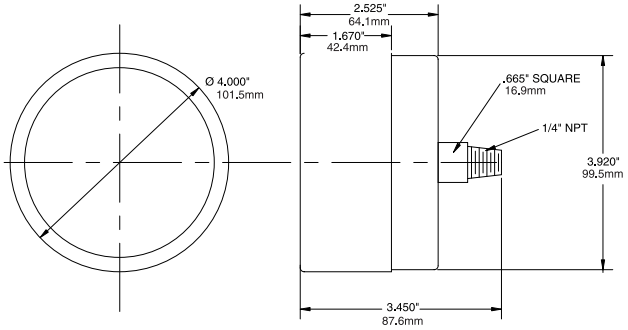


Low Pressure

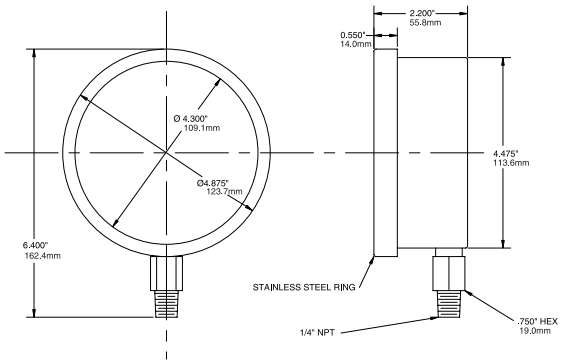
4″ Bottom Connection Brass



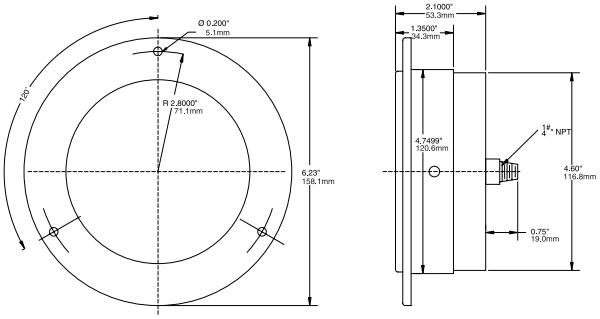
4″ Back Connection Brass



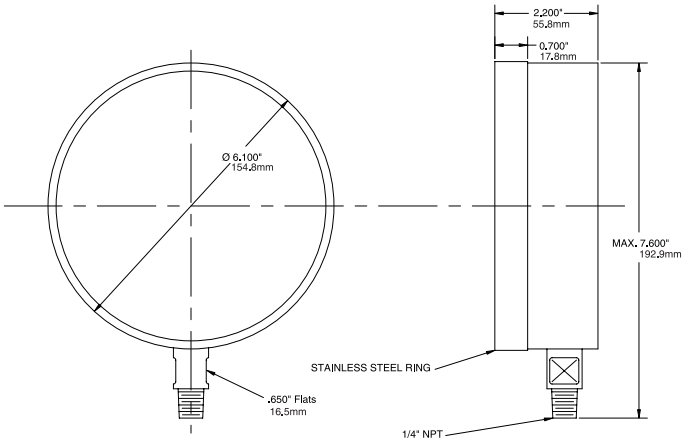
4.5″ Bottom Connection Stainless Steel



4.5″ Back Connection Stainless Steel



6″ Bottom Connection Stainless Steel



6″ Back Connection Stainless Steel