



PROMINENT PROMIX “M” SYSTEM

P/N: 7746545-0-700

PROMIX M_0-1500X2-6.2DB

SKID PIPING COMPONENTS

DLTA0730PVT4600UD4031ENO DELTA SOLENOID PUMP
SPEARS SCHEDULE 80 FITTINGS

ASAHI ½” PVC/VITON TYPE 21 BALL VALVE
ACCUDRAW 500ML PVC CALIBRATION COLUMN
ASAHI ½” PVC/VITON TYPE 23 MULTI-L BALL VALVES
PRECISION SS NEAT POLYMER GAUGE

BLACOH ½”X1/4” CPVC/PTFE GAUGE ISOLATOR
PROMINENT ½” PVC BACK PRESSURE VALVE

BRAIDFLEX 70N ½”ID PVC TUBING
LEESON ¾ HP 120VAC TEFC MOTOR
ASCO 1-1/2” BRASS SOLENOID VALVE 120VAC NC
ASCO SOLENOID VALVE DIN CONNECTOR

ASAHI ¾” PVC GLOBE VALVE
SEAMETRICS IP81P-07 FLOW SENSOR
STRATAFLO ¾” BRASS CHECK VALVE
PRECISION SS POLYMER SOLUTION GAUGE
KOFLO 1-1/2” PVC CLEAR STATIC MIXER
SPEARS ¼” PVC LABCOCK (CHAMBER DRAIN)
PROMINENT PVC 3 STAGE MIXING CHAMBER
PROMINENT PVC/SS INJECTION VALVE

ELECTRICAL PANEL COMPONENTS P/N: 7746539

FIBOX POLYCARBONATE AR14127CHSC PANEL
C3 CONTROLS IEC CONTACTORS 300-S09N30
C3 CONTROLS IEC OVERLOAD RELAY 300-B--2U12
C3 CONTROLS SELECTOR SWITCHES 22SS3-AC-X-H-BK
C3 CONTROLS PILOT LIGHTS W22U-24-(LG & LR)-(WLG & WLR)
WEIDULLER SCREW TERMINALS & END BRACKETS
CBI ELECTRIC CIRCUIT BREAKERS QL SERIES
ZIP PORT RJ45 JACK INTERFACE CONNECTOR ZP-PNA-06-101

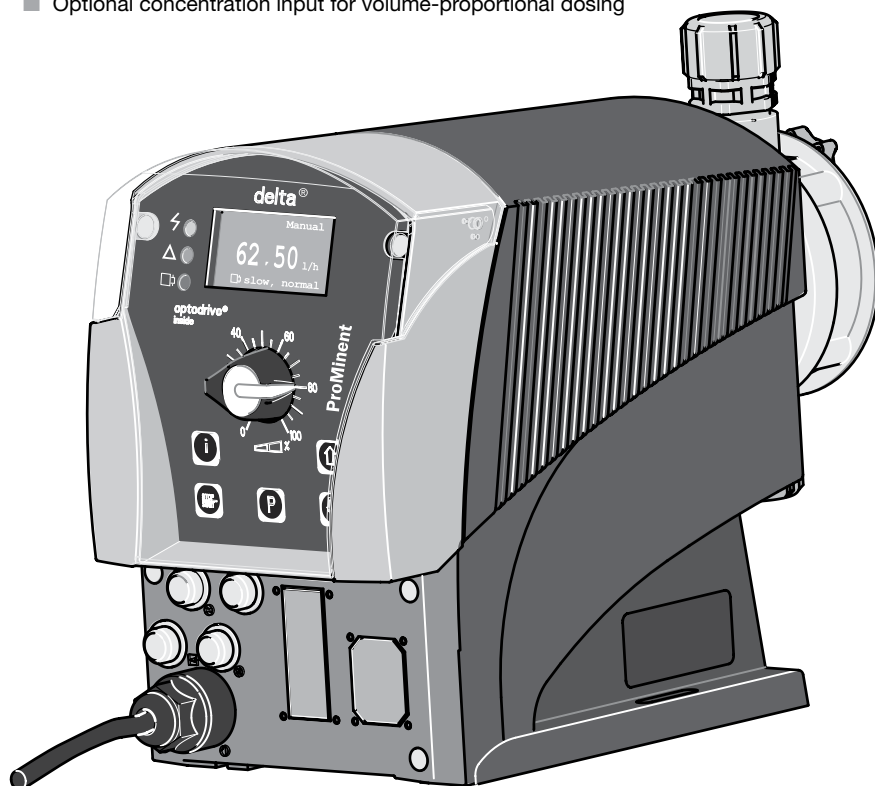
ProMinent® delta® Solenoid Diaphragm Metering Pumps

Overview: delta®

Ideal for applications requiring metering pump accuracy with minimal pulsation

(see [page 131](#) for spare parts, [page 138](#) for accessory kits and [page 138](#) for control cables)

- Continuous or pulsating dosing
- Configurable suction and delivery stroke duration
- Pump can be adapted to the dosing media
- Integrated optoGuard monitoring detects blocked dosing points, broken dosing lines and air or gas bubbles trapped in the dosing head
- Capacities: 2.0 gph (7.5 lph) to 19.8 gph (75.0 lph)
- Stroke length continuously adjustable from 0 - 100% (recommended range 30 - 100%)
- Acrylic, PVDF and stainless steel material versions
- Patented coarse/fine ventilation
- Optional detection and indication of diaphragm failure
- Adjustment and display of pump delivery from the keypad with choice of display in l/h or strokes/min
- Optional external auto-degassing solenoid kit available for outgassing media
- Large backlit graphic display
- External control options via voltage-free contacts with optional increase/reduce speed pulse
- Optional external control via standard 0/4-20 mA signal
- Interfaces for PROFIBUS® DP ([see page 138](#)) or CAN bus system
- 14-day process timer option for time and event-dependent dosing duties
- Connections for 2 stage level switch and flow monitor
- 3 LED displays for operation and warning and error message in plain text
- Optional concentration input for volume-proportional dosing



pk_1_131_2

ProMinent® delta® Solenoid Diaphragm Metering Pumps

Capacity Data

Capacity at Maximum Backpressure

delta® Pump Type	gph (l/h)	psig (bar)	strokes/ min.	Pre-primed suct. lift ft. (m)	Suction/Discharge connectors in.	lbs.	Shipping weights** (kg)
2508	2.0 (7.5)	363 (25)	200	19.6 (6)	3/8" x 1/2" (1/2" MNPT dis. only)	22-24	(10-11)
1608	2.1 (7.8)	232 (16)	200	16.4 (5)	3/8" x 1/4"	22-24	(10-11)
1612	3.0 (11.3)	232 (16)	200	19.6 (6)	3/8" x 1/4"	22-24	(10-11)
1020	5.0 (19.1)	145 (10)	200	16.4 (5)	1/2" x 3/8"	22-24	(10-11)
0730	7.7 (29.2)	102 (7)	200	16.4 (5)	1/2" x 3/8"	22-24	(10-11)
0450	12.9 (49.0)	58 (4)	200	9.8 (3)	5/8" ID hose barb standard*	22-24	(10-11)
0280	19.8 (75.0)	29 (2)	200	6.7 (2)	5/8" ID hose barb standard*	22-24	(10-11)

* (1/2" MNPT optional)

** Higher values are for SS

Note: Universal control cable necessary for external delta control. (see [page 138](#))

Unit pumping Polymer will have a capacity of 6.2 GPH Maximum Capacity.

Materials In Contact With Chemicals

Version	Dosing head	Suction/discharge connector	O-rings	Ball valves
PVT	PVDF	PVDF	PTFE	Ceramic
SST	Stainless steel	Stainless steel	PTFE	Ceramic
NPE	Acrylic	PVC	EPDM	Ceramic
NPB	Acrylic	PVC	Viton®	Ceramic

PTFE-coated dosing diaphragm

Dosing repeatability ± 2% when used in accordance with the operating instructions

Permissible ambient temperature -10°C to +45°C

Viton® is a registered trademark of DuPont Dow Elastomers.

ProMinent® delta® Solenoid Diaphragm Metering Pumps

Identcode Ordering System

DLTA

ProMinent® delta® series

Version:	Capacity:	Version:	Capacity:
2508	2.0 gph (7.5 l/h), 232 psi (16 bar)	0730	7.7 gph (29.2 l/h), 102 psi (7 bar)
1608	2.1 gph (7.8 l/h), 363 psi (25 bar)	0450	12.9 (49.0 l/h), 58 psi (4 bar)
1612	3.0 gph (11.3 l/h), 232 psi (16 bar)	0280	19.8 (75.0 l/h), 29 psi (2 bar)
1020	5.0 gph (19.1 l/h), 145 psi (10 bar)		

Liquid end materials:	
PV	PVDF (for models 1608, 1612, 1020, and 0730)
SS	SS
NP	Acrylic glass/PVC (for pump type 2508, 1608, 1612, 1020 & 0730)

Seals:	
T	PTFE seals
E	EPDM o-rings (NP only)
B	Viton® o-rings (NP only)

Liquid end version:	
0	W/o bleed valve, w/o springs (for SS liquid ends)
1	W/o bleed valve, with springs (for SS liquid ends)
2	With bleed valve, w/o springs
3	With bleed valve, with springs
4	W/o bleed valve, with springs (for high viscosity only)

Connection:	
0	1/2" x 3/8" tubing (for models 1020 & 0730); 5/8" hose barb (for models 0450 & 0280); 3/8" x 1/4" tubing (for models 1608 and 1612)
6	1/2" MNPT Connections (for models 0450 & 0280 and 2508)

Diaphragm failure indicator:	
0	Without diaphragm failure indicator
1	With diaphragm failure indicator

Labeling:	
0	Standard, with ProMinent logo

Electrical connection (± 10%):	
U	115-230 V, 50/60 Hz

Cable and plug with 6 ft (2 m) power cord, single phase:	
A	European plug
D	N. American plug, 115 V
U	N. American plug, 230 V

Relay:	
0	Without relay (Required with Profibus)
1	Fault annunciating relay, drops out
3	Fault annunciating relay, pulls in
4	Option 1 + pacing relay
5	Option 3 + pacing relay
A	Alarm indication + pump shut off
C	Option 1 + 4-20 mA analog output + fault output (24V 100 mA max.)
F	Auto-degassing valve (not available for version 2508)*
G	Auto-degassing valve + fault relay (not available for version 2508)*

Accessory kit:	
0	Not included
1	FV, IV, 15' Tubing (3/8" x 1/4") PVC (for model 1608)
1	FV, IV, 15' Tubing (3/8" x 1/4") PVDF (for model 1612)
1	FV, IV, 15' Tubing (1/2" x 3/8") PVC (for model 1020)
1	FV, IV, 15' Tubing (1/2" x 3/8") PVDF (for model 0730)
1	FV, IV, 5' Suction Tubing (1/2" x 3/8")
1	PVC (1/2" MNPT on Discharge) (for model 2508)
1	FV, IV, 15' Hose (5/8" ID) PVDF (for models 0450 & 0280)

Control Versions:	
0	Manual + External contact (multiplier/divider)
3	Manual + External with pulse control & analog control
4	Option U + 14 day timer*
5	Option 3 + 14 day Timer*
P	Option 3 + Profibus d Sub 9 (Relay must be 0)*
R	Option 3 + Profibus M12 (Relay must be 0)*
C	CANopen

Security:	
0	No Access Code
1	Access Code
Language:	
EN	English

Pause/Float:	
0	Standard

* Available April 2008

DLTA 0730 PV T 4 6 0 0 U D 4 0 3 1 EN 0

ProMinent®

product

solenoid-driven
metering pumps

motor-driven
metering pumps

pump spare parts &
accessories

pump
specifications

analytical
instrumentation

analytical
sensors

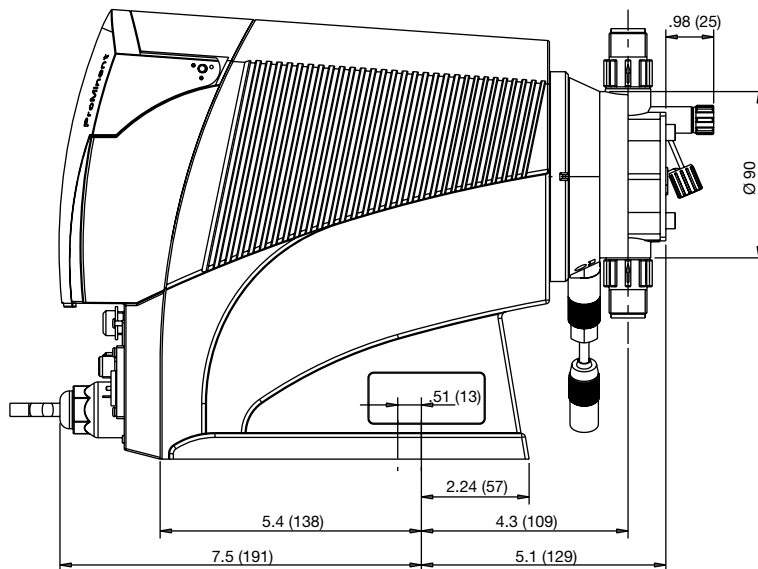
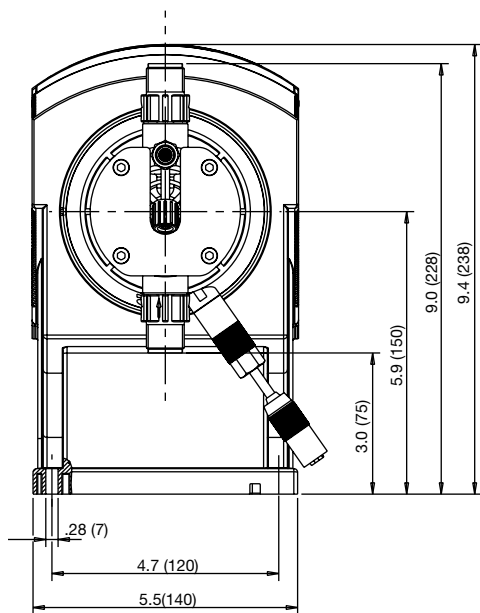
ProMinent® delta® Solenoid Diaphragm Metering Pumps

Dimensional Drawings

Dimensions in inches (mm).

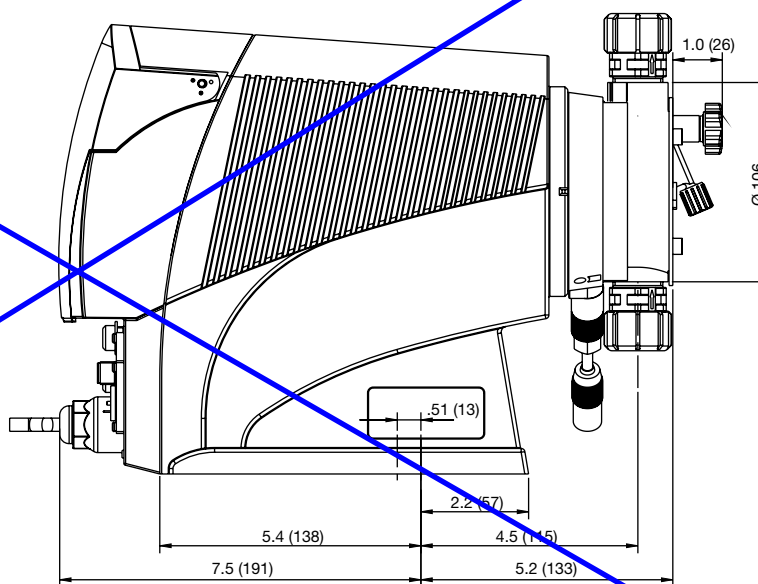
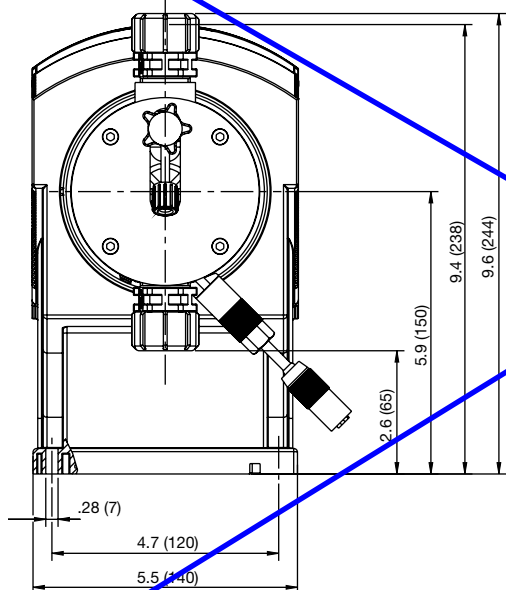
Ranges given, actual dimension dependant on liquid end material.

Dimensions of delta® type 1612 - 0730 PVT



dimensions in inches (mm)

Dimensions of delta® type 0450 - 0280 PVT

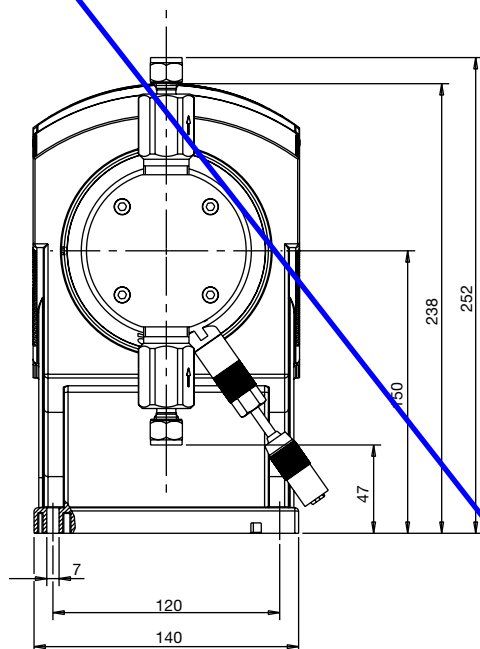


dimensions in inches (mm)

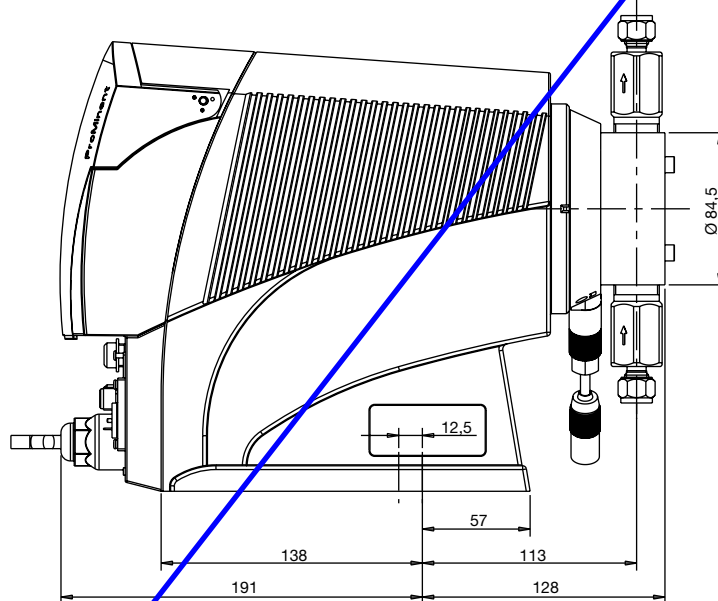
ProMinent® delta® Solenoid Diaphragm Metering Pumps

Dimensional Drawings

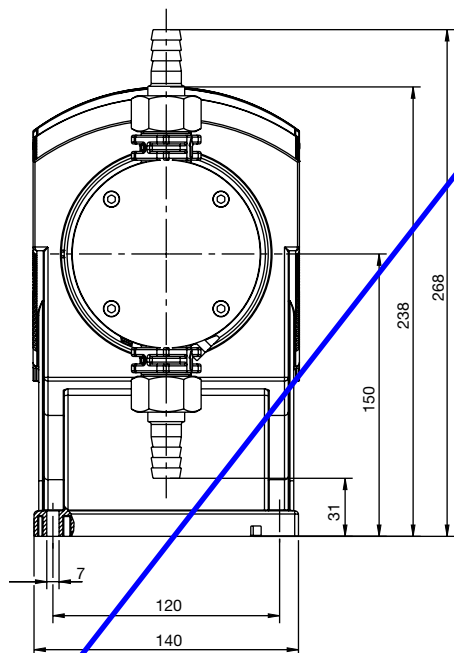
Dimensions of delta® type 1612 - 0730 SST



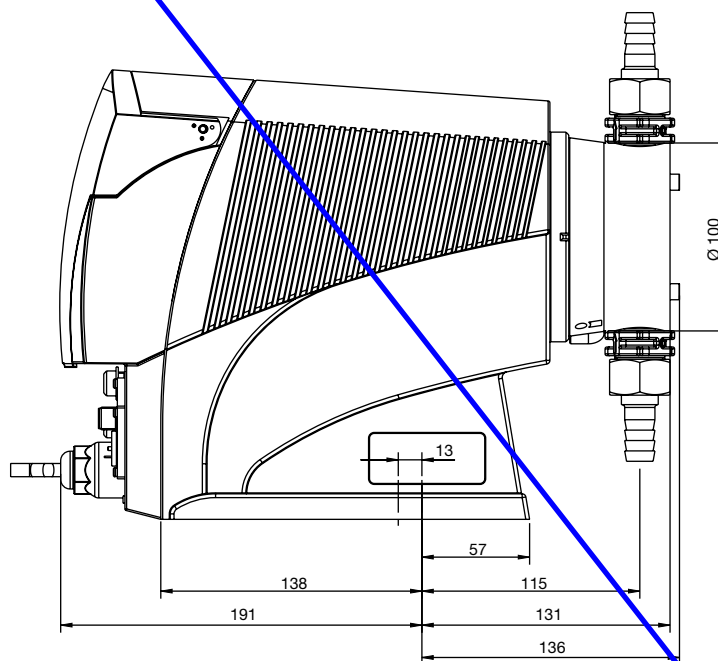
dimensions in inches (mm)



Dimensions of delta® type 0450 - 0280 SST

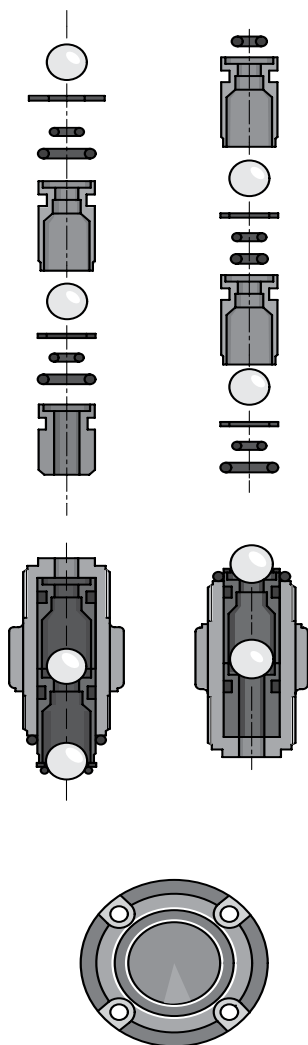


dimensions in inches (mm)



Solenoid Pump Spare Parts

delta®



Spare parts kits for delta®, consisting of:

- 1 diaphragm
- 1 suction valve set
- 1 discharge valve set
- 2 ball valves
- 1 set of O-rings
- 1 connector set

Stainless steel version without suction and discharge valve sets

Spare parts kit for delta®

Liquid End Version	Material Code	Part No.
1612	PVT	1027081
	SST	1027086
1608	PVT	1030225
1020	PVT	1027082
	SST	1027087
0730	PVT	1027083
	SST	1027088
0450	PVT	1027084
	SST	1027089
0280	PVT	1027085
	SST	1027090

Replacement diaphragms for delta® series

Liquid End Version	Material Code	Part No.
1612	all materials	1000248
1020	all materials	1000249
0730	all materials	1000250
0450	all materials	1000251
0280	all materials	1025075

Auto-degassing Retrofit Kit for delta® series

Version	Part No.
115V	1030928

pk_1_008



PVC SCHEDULE 80 FITTINGS

80-2-1000

Performance Engineered & Tested



SPEARS® Schedule 80 PVC fitting designs combine years of proven experience with computer generated stress analysis to yield the optimum physical structure and performance for each fitting. Material reinforcement is uniformly placed in stress concentration areas for substantially improved pressure handling capability. Resulting products are subjected to numerous verification tests to assure obtaining the very best PVC fittings available.

Full 1/4" Through 12" Availability

Spears® comprehensive line of injection molded PVC fittings offers a variety of configurations in molded Schedule 80 sizes 1/4" through 12" conforming to ASTM D 2467 and Spears® exclusive CL150 Flanges in sizes 1/2" through 16".

Exceptional Chemical & Corrosion Resistance

Unlike metal, PVC fittings never rust, scale, or pit, and will provide many years of maintenance-free service and extended system life.

High Temperature Ratings

PVC thermoplastic can handle fluids at service temperatures up to 140° F (60°C), allowing a wide range of process applications, including corrosive fluids.

Lower Installation Costs

Substantially lower material costs than steel alloys or lined steel, combined with lighter weight and ease of installation, can reduce installation costs by as much as 60% over conventional metal systems.

Higher Flow Capacity

Smooth interior walls result in lower pressure loss and higher volume than conventional metal fittings.

Additional Fabricated Configurations through 36"

Extra large, hard-to-find, and custom configurations are fabricated from NSF Certified pipe. Fittings are engineered and tested to provide full pressure handling capabilities according to Spears® specifications.

Advanced Design Specialty Fittings

Spears® wide range of innovative, improved products include numerous metal-to-plastic transition fittings and unions with Spears® patented special reinforced (SR) plastic threads.

PVC Valves

SPEARS® PVC Valve products are available for total system compatibility and uniformity; see SPEARS® THERMOPLASTIC VALVES PRODUCT GUIDE & ENGINEERING SPECIFICATIONS (V-4).



Sample Engineering Specifications

All PVC Schedule 80 fittings shall be produced by Spears® Manufacturing Company from PVC Type I, cell classification 12454, conforming to ASTM Standard D 1784. All injection molded PVC Schedule 80 fittings shall be Certified for potable water service by NSF International and manufactured in strict compliance to ASTM D 2467. All fabricated fittings shall be produced in accordance with Spears® General Specifications for Fabricated Fittings. All PVC flanges shall be designed and manufactured to meet CL150 bolt pattern per ANSI Standard B16.5 and rated for a maximum internal pressure of 150 psi, non-shock at 73°F.

PROGRESSIVE PRODUCTS FROM SPEARS® INNOVATION & TECHNOLOGY

Visit our web site: www.spearsmfg.com

PVC Thermoplastic Pipe Temperature Pressure De-Rating

To determine the maximum internal pressure rating at an elevated temperature, simply multiply the pipe pressure rating at 73°F by the percentage specified for the desired temperature.

System Operating Temperature °F (°C)	73 (23)	80 (27)	90 (32)	100 (38)	110 (43)	120 (49)	130 (54)	140 (60)
PVC	100%	90%	75%	62%	50%	40%	30%	22%

NOTE: Valves, Unions and Specialty Products have different elevated temperature ratings than pipe.

Typical Material Properties

Properties	ASTM Test Method	PVC
Mechanical Properties, 73°F		
Specific Gravity, g/cm³	D 792	1.41
Tensile Strength, psi	D 638	7,000
Modulus of Elasticity, psi	D 638	440,000
Compressive Strength, psi	D 695	9,000
Flexural Strength, psi	D 790	13,200
Izod Impact, notched, ft-lb / in	D 256	.65
Thermal Properties		
Heat Deflection Temperature, °F at 66 psi	D 648	165
Thermal Conductivity, BTU / hr / sq ft / °F / in	C 177	1.2
Coefficient of Linear Expansion, in / in / °F	D 696	3.0 x 10 ⁻⁵
Flammability		
Limited Oxygen Index, %	D 2863	43
UL 94 Rating	94V-0	
Other Properties		
Water Absorption, % 24 hr.	D 570	.05
Industry Standard Color	White / Dark Gray	
ASTM Cell Classification	D 1784	12454
NSF Potable Water Approved	YES	

PVC Chemical Resistance

PVC is generally inert to most mineral acids, bases, salts and paraffinic hydrocarbon solutions. For more information on PVC chemical resistance refer to the Chemical Resistance of Rigid Vinyls Based on Immersion Test, published by the GEON® company.

NOT FOR USE WITH COMPRESSED AIR OR GASES

Spears® Manufacturing Company DOES NOT RECOMMEND the use of thermoplastic piping products for systems to transport or store compressed air or gases, or the testing of thermoplastic piping systems with compressed air or gases in above and below ground locations. The use of our product in compressed air or gas systems automatically voids any warranty for such products, and its use against our recommendation is entirely the responsibility and liability of the installer.

WARNING: DO NOT USE COMPRESSED AIR OR GAS TO TEST ANY PVC OR CPVC THERMOPLASTIC PIPING PRODUCT OR SYSTEM, AND DO NOT USE DEVICES PROPELLED BY COMPRESSED AIR OR GAS TO CLEAR SYSTEMS. THESE PRACTICES MAY RESULT IN EXPLOSIVE FRAGMENTATION OF SYSTEM PIPING COMPONENTS CAUSING SERIOUS OR FATAL BODILY INJURY.



SPEARS® MANUFACTURING COMPANY • CORPORATE OFFICE

15853 Olden St., Sylmar, CA 91342 • PO Box 9203, Sylmar, CA 91392
(818) 364-1611 • www.spearsmfg.com



PACIFIC SOUTHWEST

15860 Olden St.
Sylmar (Los Angeles), CA 91342
(818) 364-1611 • (800) 862-1499
Fax (818) 367-3014

ROCKY MOUNTAIN

4880 Florence St.
Denver, CO 80238
(303) 371-9430 • (800) 777-4154
Fax (303) 375-9546

UTAH

5395 West 1520 South
Salt Lake City, UT 84104
(303) 371-9430 • (800) 777-4154
Fax (303) 375-9546

SOUTHEAST

4205 Newpoint Pl. Suite 100
Lawrenceville (Atlanta), GA 30043
(678) 985-1263 • (800) 662-6326
Fax (678) 985-5642

MIDWEST

1 Gateway Ct. Suite A
Bolingbrook (Chicago), IL 60440
(630) 759-7529 • (800) 662-6330
Fax (630) 759-7515

NORTHWEST

4103 C St. NE Suite 200
Auburn (Seattle), WA 98002
(253) 939-4433 • (800) 347-7327
Fax (253) 939-7557

SOUTH CENTRAL

4250 Patriot Dr. Suite 300
Grapevine (Dallas), TX 76051-2317
(972) 691-4003 • (800) 441-1437
Fax (972) 691-4404

NORTHEAST

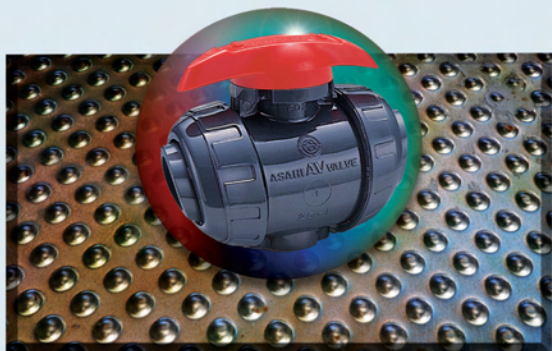
590 Industrial Dr. Suite 100
Lewisberry (Harrisburg), PA 17339-9532
(717) 938-8844 • (800) 233-0275
Fax (717) 938-6547

FLORIDA

9563 Parksouth Court
Orlando, FL 32837
(407) 843-1960 • (800) 327-6390
Fax (407) 425-3563

INTERNATIONAL SALES

15853 Olden St.
Sylmar (Los Angeles), CA 91342
(818) 364-1611 • Fax (818) 898-3774
E-mail: export@spearsmfg.com



Type 21 Ball Valve

Standard Features (Sizes 1/2" – 6")

- Pressure rated up to 230 psi (PVC, CPVC, PVDF)
- Double O-ring seals on stem for an added protection.
- Full bore, sizes 1/2" – 2"
- Full vacuum rated, all sizes
- Blocks in two directions, upstream and downstream, leaving full pressure on the opposite end of the valve
- Integrally molded ISO mounting pad for both manual and actuated operations
- Integrally molded base pad to mount valves securely or panel mounting
- PTFE seats with elastomeric backing cushions ensure bubble-tight shut-off and a low fixed torque, while at the same time compensating for wear
- True Union design for easier installation or repairs without expanding the pipe system
- Built-in spanner wrench on the handle for valve disassembly and assembly
- Two sets of end connectors (socket and threaded) included with all PVC and CPVC valves in sizes 1/2" – 2"
- CPVC threaded end connectors on sizes 1/2" – 1" come with stainless steel reinforcing rings

Options

- Pneumatic and electric actuators & accessories
- Stem extensions
- 2" square operating nut or "T" nut
- Locking and/or spring return handles
- Limit switches
- Vented Ball

Specifications

Sizes: 1/2" – 6"
Models: PVC & CPVC: Socket Threaded and Flanged (ANSI)
 PP & PVDF: IPS and Metric (DIN)
 Socket, Threaded, Butt and Flanged (ANSI)
Bodies: PVC, CPVC, PP and PVDF
Seats: PTFE backed with EPDM or FKM
Seals: EPDM or FKM or AFLAS®†

Sizes 1/2" - 4" PVC/EPDM/FKM Models available with NSF-61 Certification

† Trademark of Asahi Glass Co., Ltd.

Parts List (Sizes 1/2" – 2")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, CPVC, PP, PVDF
2	Ball	1	PVC, CPVC, PP, PVDF
3	Carrier	1	PVC, CPVC, PP, PVDF
4	End Connector	2	PVC, CPVC, PP, PVDF
5	Union Nut	2	PVC, CPVC, PP, PVDF
6	Stem	1	PVC, CPVC, PP, PVDF
7	Seat	2	PTFE
8	O-Ring (A)	2	EPDM FKM, Others
9	O-Ring (B)	1	EPDM FKM, Others
10	O-Ring (C)	2	EPDM FKM, Others
11	O-Ring (D)	1	EPDM FKM, Others
12	O-Ring (E)	1	EPDM FKM, Others
13	Stop Ring*	2	PVDF
14	Handle	1	ABS
4a	Ring**	2	304 Stainless Steel

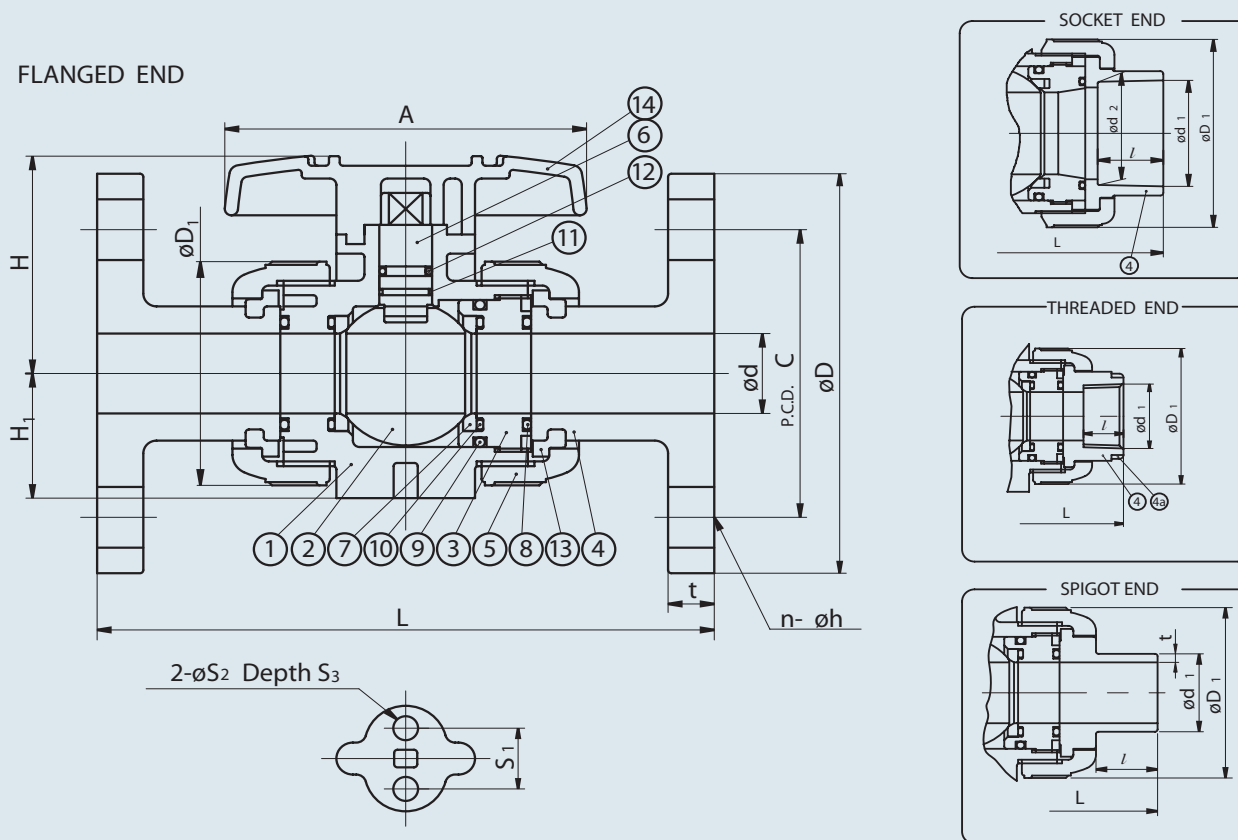
* Used for flanged end

** Used for CPVC body, threaded end, 1/2" – 1"



ASAHI/AMERICA

Rev. C 03-05



Dimensions (Sizes 1/2" – 2")

NOMINAL SIZE		FLANGED							SOCKET										
		ANSI CLASS 150							PVC, CPVC				PP, PVDF (DIN)				PP, PVDF (IPS)		
		ASTM SCH 80							DIN 16962				DIN 16962				DIN 16962		
INCHES	mm	d	D	C	n	h	L	t	d1	d2	L	L	d1	d2	L	L	d1	L	L
1/2	15	0.59	3.50	2.38	4	0.62	5.63	0.47	0.848	0.836	0.875	4.45	0.768	0.760	0.57	3.90	0.83	0.87	4.45
3/4	20	0.79	3.88	2.75	4	0.62	6.77	0.55	1.058	1.046	1.000	5.08	0.965	0.957	0.63	4.49	1.03	1.00	5.08
1	25	0.98	4.25	3.12	4	0.62	7.36	0.55	1.325	1.310	1.125	5.75	1.240	1.232	0.71	4.84	1.30	1.13	5.75
1 1/4	32	1.26	4.62	3.50	4	0.62	7.48	0.63	1.670	1.655	1.250	6.46	1.553	1.543	0.81	5.47	1.65	1.25	6.46
1 1/2	40	1.57	5.00	3.88	4	0.62	8.35	0.63	1.912	1.894	1.375	7.24	1.947	1.937	0.93	5.83	1.89	1.37	7.24
2	50	2.01	6.00	4.75	4	0.75	9.21	0.63	2.387	2.369	1.500	8.23	2.461	2.445	1.08	6.93	2.36	1.50	8.23

NOMINAL SIZE		THREADED							SPIGOT (BUTT END)							
									PP,PVDF							
									DIN 3442		PP	PVDF				
									d1	<i>l</i>	t	t				
INCHES	mm	d1	<i>l</i>	L	D1	H	H1	A	d1	<i>l</i>	t	t	L	S1	S2	S3
1/2	15	1/2-14 NPT	0.59	4.02	1.89	2.03	1.14	3.62	0.787	0.728	0.098	0.075	4.882	0.75	0.29	0.43
3/4	20	3/4-14 NPT	0.67	4.72	2.36	2.34	1.38	3.94	0.984	0.866	0.106	0.075	5.670	0.75	0.29	0.43
1	25	1-11 1/2 NPT	0.79	5.16	2.76	2.68	1.54	4.33	1.260	0.886	0.118	0.094	6.063	0.75	0.29	0.43
1 1/4	32	1 1/4-11 1/2 NPT	0.87	5.91	3.23	3.17	1.85	4.76	1.575	1.024	0.146	0.094	6.850	1.18	0.35	0.59
1 1/2	40	1 1/2-11 1/2 NPT	0.98	6.42	3.94	3.50	2.17	5.16	1.969	1.260	0.181	0.118	7.638	1.18	0.35	0.59
2	50	2-11 1/2 NPT	1.10	7.76	4.96	4.04	2.60	6.26	2.480	1.417	0.228	0.118	8.819	1.18	0.35	0.59

Pressure vs. Temperature (PSI, WATER, NON-SHOCK)

NOMINAL SIZE		PVC				CPVC						PP				PVDF				
		30° F	71° F	106° F	121° F	30° F	71° F	106° F	121° F	141° F	176° F	-5° F	86° F	121° F	141° F	-5° F	71° F	106° F	141° F	176° F
INCHES	mm	70° F	105° F	120° F	140° F	70° F	105° F	120° F	140° F	175° F	195° F	85° F	120° F	140° F	175° F	70° F	105° F	140° F	175° F	210° F
1/2-2	15-50	230	170	150	30	230	170	150	120	75	55	150	110	90	55	230	185	150	115	85
2 1/2	65	230	170	150	NA	230	170	150	120	75	55	150	95	70	40	230	185	150	115	85
3	80	230	170	150	NA	230	170	150	85	55	40	150	95	70	40	230	185	150	100	70
4-6	100-150	150	150	150	NA	150	150	150	85	55	40	150	95	70	40	150	150	150	100	70

Sample Specification

All TYPE 21 Ball Valves, sizes 1/2" to 4", shall be of true union design with two-way blocking capability. All O-rings shall be EPDM or FKM with PTFE seats. PTFE seats shall have elastomeric backing cushion of the same material as the valve seals. Stem shall have double O-rings and be of blowout-proof design. The valve handle shall double as carrier removal and/or tightening tool. ISO mounting pad shall be integrally molded to valve body for actuation. PVC conforming to ASTM D1784 Cell Classification 12454-A, CPVC conforming to ASTM D1784 Cell Classification 23567-A, PP Conforming to ASTM D4101 Cell Classification PP0210B67272 and PVDF conforming to ASTM D3222 Cell Classification Type II. The ball valves, except PP, shall have a pressure rating of 230 psi for sizes 1/2" to 3" and 150 psi for 4" (150 psi for PP, all sizes) at 70 ° F. Type 21 Ball Valves must carry a two-year guarantee, as manufactured by Asahi/America, Inc.

Cv Values

NOMINAL SIZE		Cv
INCHES	mm	
1/2	15	14
3/4	20	29
1	25	47
1 1/4	32	72
1 1/2	40	155
2	50	190
2 1/2	65	365
3	80	410
4	100	680

Weight (POUNDS)

NOMINAL SIZE		SOCKET THREADED	FLANGED
INCHES	mm		
1/2	15	0.44	1.10
3/4	20	0.66	1.54
1	25	1.10	2.70
1 1/4	32	1.54	3.30
1 1/2	40	2.64	4.40
2	50	4.40	8.15
2 1/2	65	6.17	8.80
3	80	9.70	13.00
4	100	24.00	26.67

Caution

- Never remove valve from pipeline under pressure.
- Always wear protective gloves and goggles.
- Watch out for trapped fluid in valve. It is safe to close valve before removing it from the pipeline.

Caution

- Do not use ball valves where media has suspended particles. Use the following valves:
Butterfly Valves – PVDF disc is most abrasion resistant and make sure of chemical compatibility.
Diaphragm Valves – Elastomeric diaphragm is designed for handling suspended particles.
- Volatile fluids such as sodium hypochlorite (NaClO) and hydrogen peroxide (H₂O₂) could be trapped and gasified within the valve. We can provide you with a Type 21 ball valve with a *vented ball* to relieve pressure build-up inside the valve.

Troubleshooting

What if the fluid still flows when valve is closed?

- Carrier is not properly tightened. Tighten it.
- PTFE seat is damaged or worn. Replace seat.
- Foreign material is caught between ball and PTFE seat. Remove material and clean.
- Ball is damaged or worn. Change ball.

What if fluid leaks outside of valve?

- Union nut not properly tightened. Retighten.
- Carrier is not properly tightened. Thread it in firmly.
- Carrier or face O-ring is damaged, worn, or missing. Replace O-ring.

What if handle does not rotate smoothly?

- Foreign material has formed on the ball or seat. Clean both.
- Internal part(s) chemically attacked or swollen. Refer to Asahi/America Chemical Resistance Chart for compatibility. Replace part(s) as required.
- Carrier over-tightened. Retighten properly.

What if handle rotates too freely?

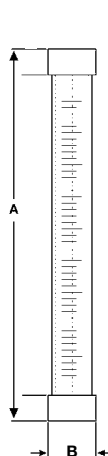
- Stem is damaged. Replace stem.
- Handle is not engaged with stem. Disassemble and reengage. Inspect.
- Engaging part of stem and/or ball is damaged. Change stem and/or ball.

Pump & Systems Accessories

Calibration Columns

Calibration columns

Clear PVC calibration columns

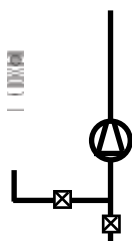


Cylinder size	Fitting size	Dimension (inches)		Threaded base, removable top	Threaded both ends
		A	B		
100 mL	1/2" NPT	10.75	1.39	7500137	7500127
250 mL	1/2" NPT	11.51	1.89	7350138	7500128
500 mL	1/2" NPT	12.75	2.39	7350139	7500129
1000 mL	1/2" NPT	16.75	2.77	7350130	7500135
2000 mL	1" FNPT	20.67	3.52	7500140	7500131
4000 mL	1" FNPT	22.66	4.52	7500141	7500132
10,000 mL	2" FNPT	23.16	6.91	7500134	7500133
20,000 mL	2" FNPT	42.69	6.91	7500142	7500136

Typical Application of Calibration Columns

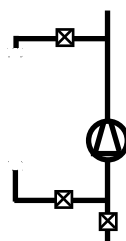
Column w/removable top

Note: Top must be removed during calibration



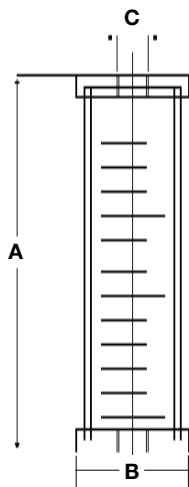
Column threaded both ends

Note: If plumbed as shown, a vent hole must be drilled into the top of the calibration column



Borosilicate Glass calibration columns with Viton® o-rings for Sulfuric Acid Applications

Glass cylinder with acrylic outer shield and 1/2" (316 SS) or 3/4" (PVDF, PVC) thick end flanges. All cylinders are bolted together using stainless steel rods with Viton O-rings for the glass seal and Buna N O-rings for the acrylic seal.



Cylinder size	Fitting size	Dimensions (inches)			Part No.
		A	B	C	
100 mL	1/2" CPVC	10.0	3.0	1/2	7500151
100 mL	1/2" PVDF	10.0	3.0	1/2	7500152
100 mL	1/2" SS	9.5	3.0	1/2	7500153
250 mL	1/2" CPVC	12.5	3.5	1/2	7500154
250 mL	1/2" PVDF	12.5	3.5	1/2	7500155
250 mL	1/2" SS	12.0	3.5	1/2	7500156
500 mL	1/2" CPVC	14.5	4.0	1/2	7500157
500 mL	1/2" PVDF	14.5	4.0	1/2	7500158
500 mL	1/2" SS	14.0	4.0	1/2	7500159
1000 mL	1/2" CPVC	16.75	4.75	1/2	7500160
1000 mL	1/2" PVDF	16.75	4.75	1/2	7500161
1000 mL	1/2" SS	16.25	4.75	1/2	7500162
2000 mL	1" CPVC	18.75	5.5	1	7500163
2000 mL	1" PVDF	18.75	5.5	1	7500164
2000 mL	1" SS	18.25	5.5	1	7500165
4000 mL	1" CPVC	22.5	6.5	1	7500166
4000 mL	1" PVDF	22.5	6.5	1	7500167
4000 mL	1" SS	22.0	6.5	1	7500168

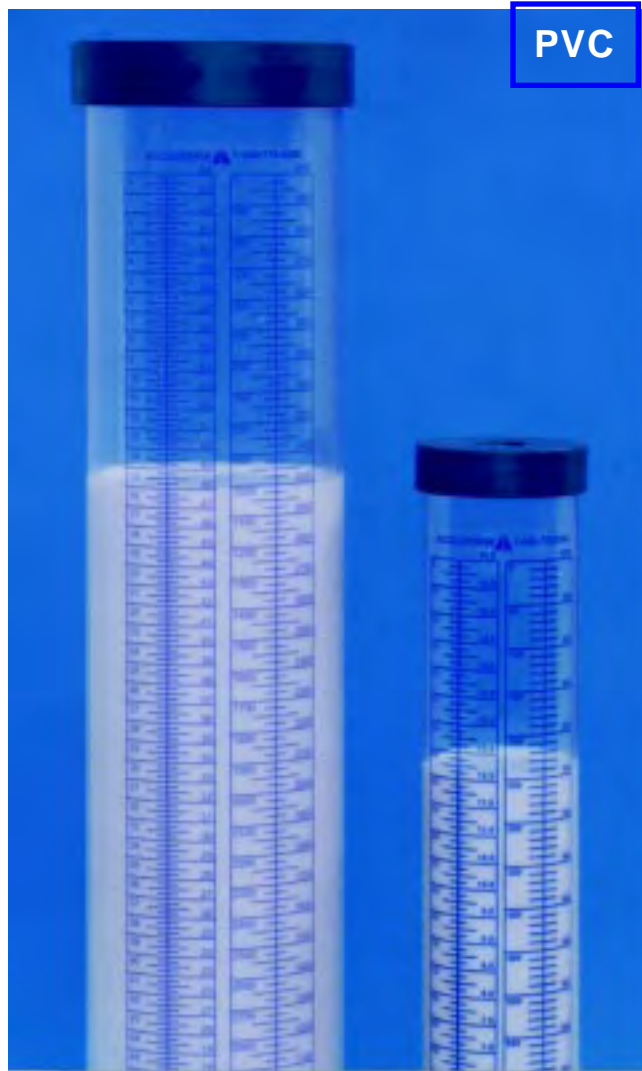


ACCUDRAW® Calibration Cylinders

Polypropylene



PVC



ACCUDRAW® *has been developed for the accurate calibration of metering pumps. Standard features include:*

- translucent
- chemical resistant
- break resistant
- threaded or socket
- colored graduations and lettering
- PVC has dual scale USGPH & ml
- PVC sizes 100 - 20000 ml
- POLY sizes 100 - 4000 ml
- POLY meets ISO standards
- custom sizes and other materials (acrylic, glass) on request





ACCUDRAW®

Calibration Cylinders

"For Accuracy That Counts"

Sizing and Ordering Information

Polypropylene Construction

Size	Conn.	BC	BTC	BDC
100 ml	1/2" NPT	AC#1-100	AC#2-100	AC#3-100
250 ml	1/2" NPT	AC#1-250	AC#2-250	AC#3-250
500 ml	1/2" NPT	AC#1-500	AC#2-500	AC#3-500
1000 ml	1/2" NPT	AC#1-1000	AC#2-1000	AC#3-1000
2000 ml	1.0" NPT	AC#1-2000	AC#2-2000	AC#3-2000
4000 ml	1.0" NPT	AC#1-4000	AC#2-4000	AC#3-4000

BC = bottom connection only, open top

BTC= bottom and top connections

BDC= bottom connection and dust cover top

PVC Construction

Size/Scale	Conn	BC	BTC	BDC
100 ml/ 1.6 GPH	1/2" NPT	PV#1-100	PV#2-100	PV#3-100
250 ml/ 4 GPH	1/2" NPT	PV#1-250	PV#2-250	PV#3-250
500 ml/ 8 GPH	1/2" NPT	PV#1-500	PV#2-500	PV#3-500
1000 ml/ 16 GPH	1/2" NPT	PV#1-1000	PV#2-1000	PV#3-1000
2000 ml/ 32 GPH	1.0" NPT	PV#1-2000	PV#2-2000	PV#3-2000
4000 ml/ 64 GPH	1.0" NPT	PV#1-4000	PV#2-4000	PV#3-4000
10000 ml/ 160 GPH	2.0" NPT	PV#1-10000	PV#2-10000	PV#3-10000
20000 ml/ 320 GPH	2.0" NPT	PV#1-20000	PV#2-20000	PV#3-20000

Note: PVC cylinders available with socket weld connections.

Add suffix "S" to model # e.g. PV#3-100S

For BSP threads, add suffix "B" to model # e.g. PV#3-100B

Dimensional Information

Polypropylene Construction

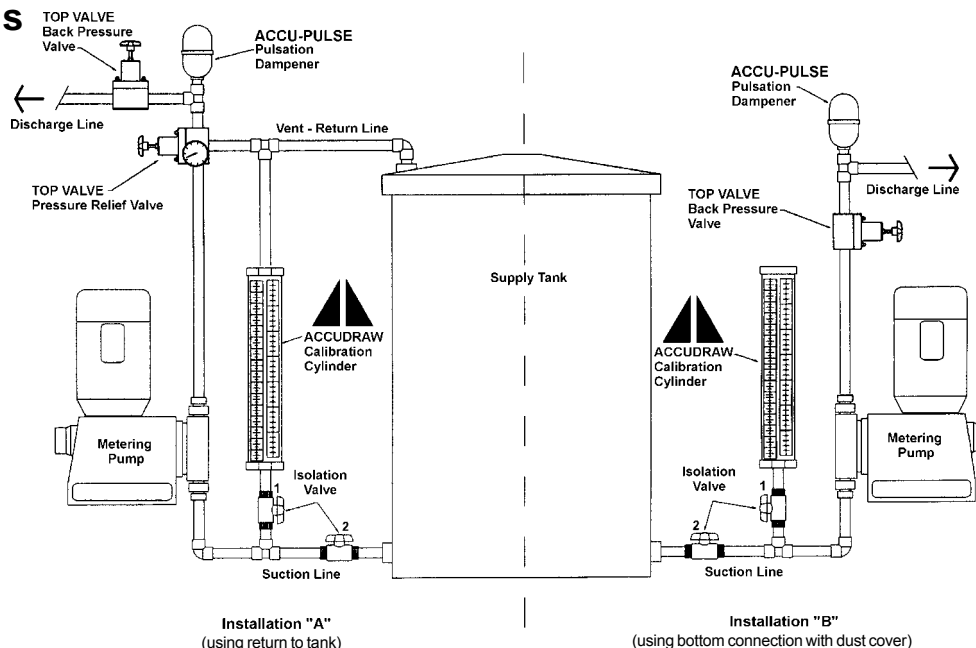
Model	Size (ml)	Dev (ml)	A (inches)	B (inches)
AC#1	100	1	9.88	1.38
AC#1	250	2	12.44	1.75
AC#1	500	5	14.1	2.33
AC#1	1000	10	17.19	2.63
AC#1	2000	20	20.88	3.38
AC#1	4000	50	23.56	4.38
AC#2/AC#3	100	1	9.25	1.38
AC#2/AC#3	250	2	11.63	1.75
AC#2/AC#3	500	5	13	2.32
AC#2/AC#3	1000	10	16.5	2.69
AC#2/AC#3	2000	20	19.5	3.38
AC#2/AC#3	4000	50	22.13	4.38



PVC Construction

Model	Size (ml)	Divisions (ml)	Size (GPH)	Divisions (GPH)	A (inches)	B (inches)
PV#1	100	1	1.6	0.02	10.24	1.388
PV#1	250	2	4	0.05	11.04	1.888
PV#1	500	5	8	0.05	12.25	2.388
PV#1	1000	10	16	0.125	16.24	2.765
PV#1	2000	20	32	0.25	20.16	3.517
PV#1	4000	25	64	0.25	22.16	4.521
PV#1	10000	200	160	2	22.64	6.906
PV#1	20000	200	320	2	42.19	6.906
PV#2/PV#3	100	1	1.6	0.02	10.75	1.388
PV#2/PV#3	250	2	4	0.05	11.51	1.888
PV#2/PV#3	500	5	8	0.05	12.75	2.388
PV#2/PV#3	1000	10	16	0.125	16.76	2.765
PV#2/PV#3	2000	20	32	0.25	20.67	3.517
PV#2/PV#3	4000	25	64	0.25	22.66	4.521
PV#2/PV#3	10000	200	160	2	23.16	6.906
PV#2/PV#3	20000	200	320	2	42.69	6.906

Installations



Conversion Factors

1 ml = 1 cc
 1000 ml = 1 liter
 ml/sec X 60 = ml/min
 1 US gal/min X 0.063 = liters/sec
 1 US gal = 3.786 liters

Distributed By:



PRIMARY FLUID
SYSTEMS INC.

Call Toll Free 1-800-776-6580

Tel: (905) 333-8743

Fax: (905) 333-8746

E-Mail: primary@primaryfluid.com

www.primaryfluid.com

© Registered Trade Mark of Primary Fluid Systems

Distribution Territories Available





Multiport® Ball Valve Type 23

Standard Features (Sizes 1/2" – 6")

- True Union design on all three ports
- Double O-ring seals on stem for added protection
- Integrally molded ISO mounting pad for both manual and actuated operations
- Blow-out proof, solid mold bottom entry design
- Blocks from left or right union ports, leaving full pressure on the opposite end of valve
- Standard "L" port ball permits flow from common port to either left or right port or to "OFF" position
- PTFE seats with elastomeric backing cushions ensure double-tight shut-off and a low fixed torque, while at the same time compensating for wear
- Built-in spanner wrench on the handle for valve disassembly and assembly
- All sizes rated for full vacuum service
- Eliminates need for additional valve and "Tee"

Options

- Pneumatic and electric actuators & accessories
- Stem extensions
- 2" square operating nut or "T" nut
- Locking handles
- Limit switches
- "T" port, Double "L" port

Cross Port Ball Options

- 4 different flow patterns through 3 separate ports are possible because of the crossed flow patterns within the ball
- Changing position of handle changes flow pattern. Handle rotates 360°.

Specifications

Sizes: 1/2" – 6"
Models: PVC & CPVC; Socket, Threaded and Flanged (ANSI)
Bodies: PVC, CPVC, PP, PVDF
Seats: PTFE backed with EPDM or FKM
Seals: EPDM or FKM or AFLAS®†

† Trademark of Asahi Glass Co., Ltd.

Parts List (Sizes 1/2" – 6")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, CPVC, PP, PVDF
2	Ball	1	PVC, CPVC, PP, PVDF
3	Carrier	2	PVC, CPVC, PP, PVDF
4	End Connector	3	PVC, CPVC, PP, PVDF
5	Union Nut	3	PVC, CPVC, PP, PVDF
6	Stem	1	PVC, CPVC, PP, PVDF
7	Seat	2	PTFE
8	O-Ring (A)	3	EPDM, FKM, Others
9	O-Ring (B)	2	EPDM, FKM, Others
10	Cushion*	2	EPDM, FKM, Others
	O-Ring (C)**		
11	O-Ring (D)	1	EPDM, FKM, Others
12	O-Ring (E)	1	EPDM, FKM, Others
13	Stop Ring***	3	PVDF
14	Handle	1	ABS
15	Screw	1	304 Stainless Steel
4a	Ring****	3	304 Stainless Steel

* Used for size 1/2" – 2", **Used for size 3" and 4"

*** Used for flanged end

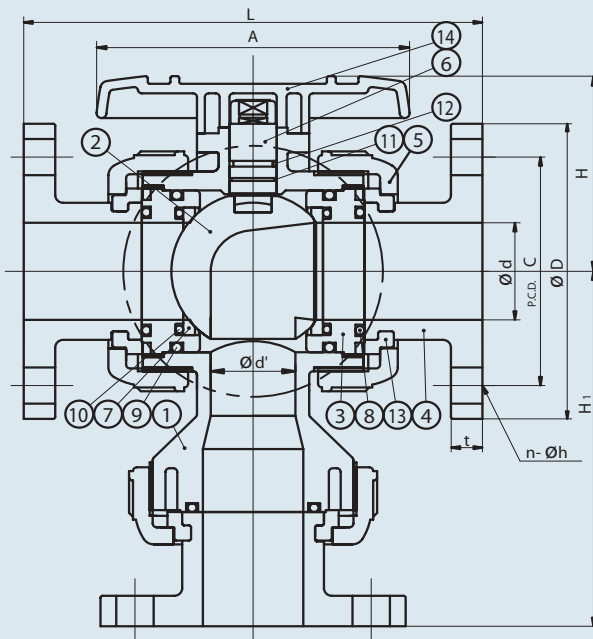
****Used for CPVC body, threaded end, 1/2" – 1"



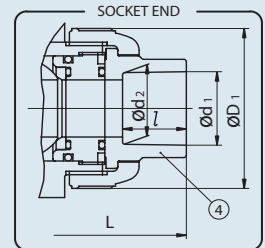
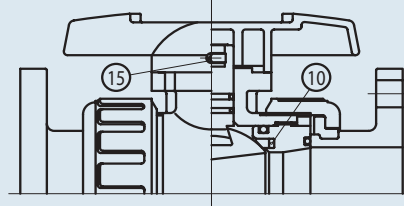
Type 23

Multiport® Ball Valves

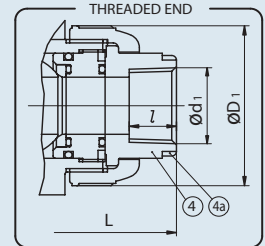
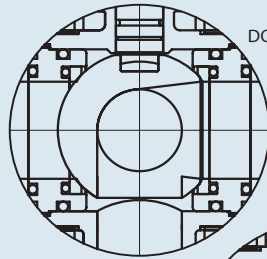
FLANGED END ("L" PORT: STANDARD)



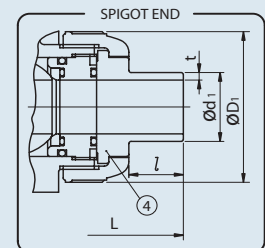
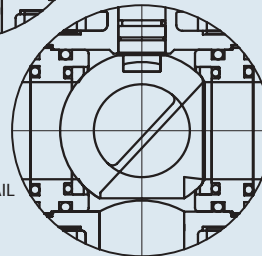
3" & 4"



DOUBLE "L" PORT DETAIL



CROSS PORT DETAIL



Dimensions (Sizes 1/2" – 4") For 6" size consult factory.

NOMINAL SIZE		d	d'	FLANGED							THREADED					D ₁	H	A
				ANSI CLASS 150				L	t	H ₁	d ₂		l	L	H ₁			
INCHES	mm			D	C	n	h											
1/2	15	0.59	0.59	3.50	2.38	4	0.62	5.63	0.47	3.70	1/2-14 NPT	0.59	4.02	2.89	1.89	2.03	3.62	
3/4	20	0.79	0.79	3.88	2.75	4	0.62	6.77	0.55	4.50	3/4-14 NPT	0.67	4.72	3.48	2.36	2.34	3.94	
1	25	0.98	0.98	4.25	3.12	4	0.62	7.36	0.55	5.24	1-11 1/2 NPT	0.79	5.16	4.13	2.76	2.68	4.33	
1 1/2	40	1.57	1.26	5.00	3.88	4	0.62	8.35	0.63	6.50	1 1/2-11 1/2 NPT	0.98	6.42	5.53	3.94	3.50	5.16	
2	50	2.01	1.69	6.00	4.75	4	0.75	9.21	0.63	7.34	2-11 1/2 NPT	1.10	7.76	6.61	4.96	4.04	6.26	
3	80	3.07	2.70	7.50	6.00	4	0.75	11.97	0.71	10.06	3-8 NPT	1.38	10.39	9.25	5.98	5.51	9.45	
4	100	3.94	3.54	9.00	7.50	8	0.75	14.65	0.71	12.01	4-8 NPT	1.77	14.17	11.77	8.27	7.01	12.01	

NOMINAL SIZE		SOCKET															SPIGOT (BUTT END)					
		PVC, CPVC					PP, PVDF (DIN)					PP, PVDF (IPS)					PP, PVDF					
		ASTM SCH 80/40			L	H ₁	DIN 16962			L	H ₁	d ₁	l	L	H ₁	DIN 3442		PP	PVDF	L	H ₁	
INCHES	mm	d ₁	d ₂	l			d ₁	d ₂	l							d ₂	l	t	t			
1/2	15	0.848	0.836	0.875	4.45	3.08	0.768	0.760	0.57	3.90	2.80	0.83	0.87	4.45	3.09	0.787	0.728	0.098	0.075	4.88	3.27	
3/4	20	1.058	1.046	1.000	5.08	3.56	0.965	0.957	0.63	4.49	3.27	1.03	1.00	5.08	3.61	0.984	0.866	0.106	0.075	5.67	3.90	
1	25	1.325	1.310	1.125	5.75	4.32	1.240	1.232	0.71	4.84	3.94	1.30	1.13	5.75	4.37	1.260	0.886	0.118	0.094	6.06	4.53	
1 1/2	40	1.912	1.894	1.375	7.24	5.71	1.947	1.937	0.93	5.83	5.16	1.89	1.37	7.24	5.85	1.969	1.260	0.181	0.118	6.85	6.02	
2	50	2.387	2.369	1.500	8.23	6.66	2.461	2.445	1.08	6.93	6.06	2.36	1.50	8.23	6.76	2.480	1.417	0.228	0.118	8.82	7.01	
3	80	3.516	3.492	1.875	11.10	9.59	3.512	3.498	1.40	9.88	8.82	3.48	1.87	11.10	11.10	3.543	1.496	0.323	0.169	11.61	9.69	
4	100	4.518	4.491	2.000	13.90	11.58	4.293	4.278	1.63	12.20	10.98	4.48	2.25	14.37	14.37	4.331	1.752	0.394	0.209	12.72	11.85	

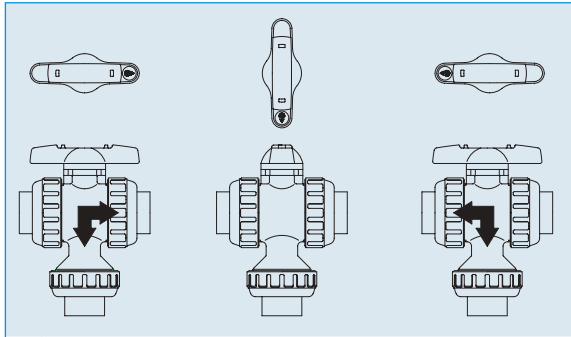
Multiport Ball® Valves Type 23

Pressure vs. Temperature (PSI, WATER, NON-SHOCK)

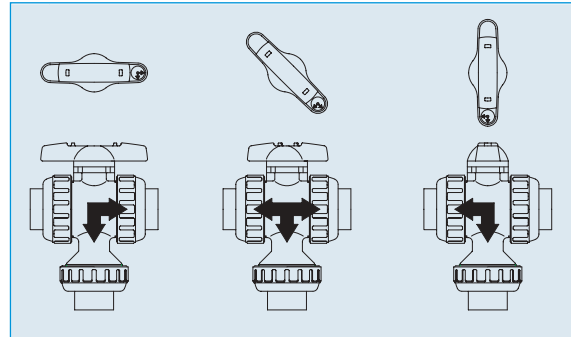
NOMINAL SIZE		PVC			CPVC				PP			PVDF			
		30° F 70° F	71° F 105° F	106° F 120° F	30° F 120° F	121° F 140° F	141° F 175° F	176° F 195° F	-5° F 85° F	86° F 140° F	141° F 175° F	-5° F 140° F	141° F 175° F	176° F 195° F	196° F 210° F
1/2-2	15-50	150	150	150	150	120	85	55	150	90	60	150	120	110	85
3-4	80-100	150	150	150	150	85	55	45	150	75	45	150	100	85	70

Available Flow Patterns

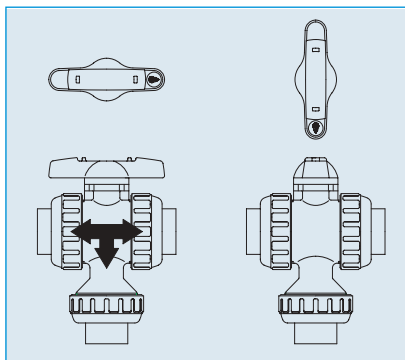
L-Port



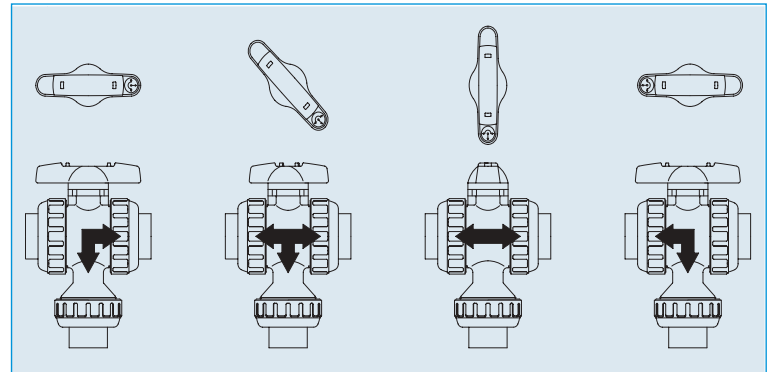
Double L-Port



T-Port



Cross Port



Automation

For Pneumatic Actuation;

"Double L-Port" ball is supplied as a standard feature. Other configurations available as options.

Pneumatic actuators are 2 position.

For Electrical Actuation;

"L-Port" ball is supplied as a standard feature. All other ball configurations are available as options.

Electrical actuators are 2 position with the option for a third "Center" position.

Type 23

Multiport® Ball Valves

Sample Specification

All Type 23 Multiport ball valves shall be of molded thermoplastic construction with union end on all three ports. Carriers must thread into the body in order to provide blocking capabilities in OFF position. Stem shall have double O-Rings and be of blow out proof design. The valve handle shall double as carrier removal and/or tightening tool. ISO mounting pad shall be integrally molded to valve body. PVC conforming to ASTM D1784 Cell Classification 12454-A, CPVC conforming to ASTM D1784 Cell Classification 23567-A, PP conforming to ASTM D4101 Cell Classification PPO210B67272 and PVDF conforming to ASTM D3222 Cell Classification Type II. The valves shall be rated to 150 psi at 70° F. PTFE seats must have elastomeric backing cushion of the same material as the valve seals, as manufactured by Asahi/America, Inc.

Caution

- Never remove valve from pipeline under pressure.
- Always wear protective gloves and goggles.
- Watch out for trapped fluid in valve.
- Only L-port and T-port valves are closed when Handle is positioned perpendicular (90 degrees).
- Even if Handle is perpendicular, valve is not closed if the ball is in the following positions, based upon the following porting configurations:
(a.) *Double L-Port* – Flow is to right or left
(b.) *Cross-Port* – Flow is horizontal as in regular ball valve.

Troubleshooting

What if the fluid still flows when valve is closed?

1. Carrier is not properly tightened. Tighten it firmly.
2. PTFE seat is damaged or worn. Replace seat.
3. Foreign material is caught between ball and PTFE seat. Remove material and clean.
4. Ball is damaged or worn. Change ball.

What if fluid leaks between body and nuts?

1. Carrier or face O-ring is damaged, worn, or missing. Replace O-ring.

What if stem leaks ?

1. Stem is damaged. Replace stem.
2. O-ring is damaged. Replace O-ring.

What if handle does not rotate smoothly?

1. Foreign material has formed on the ball or seat. Clean both.
2. Internal part(s) chemically attacked or swollen. Refer to Asahi/America Chemical Resistance Chart for compatibility. Replace part(s) as required.
3. Carrier over-tightened. Tighten properly.

What if handle rotates too freely?

1. Stem is damaged. Replace stem.
2. Handle is not engaged with stem.
Disassemble and reengage. Inspect.

Cv Values

Weight (POUNDS)

NOMINAL SIZE		Cv	
		L-PORT	DBL-L
INCHES	mm		
1/2	15	7.4	6.3
3/4	20	10	8.5
1	25	23	20
1 1/2	40	43	36
2	50	59	45
3	80	130	99
4	100	260	200

NOMINAL SIZE		SOCKET THREADED	FLANGED
INCHES	mm		
1/2	15	0.66	1.76
3/4	20	1.10	2.42
1	25	1.76	3.52
1 1/2	40	4.18	6.36
2	50	5.73	8.59
3	80	15.43	18.95
4	100	35.27	39.90

302LFW ALL SS BACK MOUNT

Our '300' series gauge line is a high quality line of stainless steel gauges. Hermetically sealing the gauge prevents dust, dirt or other contaminants from entering the case of the gauge and attacking the movement or internals of the gauge. Keeping out such contaminants prolongs the life of the gauge.

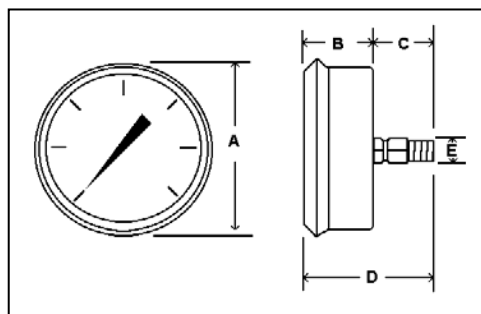
This gauge has been specifically designed with original equipment manufacturers in mind. It is typically used in chemical processing or food processing applications as well as any commercial or industrial application where stainless steel components are required.

SPECIFICATIONS:

- Available Dial Sizes: 1 ½", 2", 2 ½", 3 ½", 4"
- Available Connection Sizes:
1/8"MNPT on 1 ½" and 2"
1/4"MNPT on 2", 2 ½", 3 ½" and 4"
- Stainless Steel Case And Bezel
- SS Internals & Connection
- Connection Welded at Case
- 316SS Bourdon Tube
- Liquid Filled (Dry Available) (GLYCERINE)
- Accuracy : 1.5 % Full Scale
(Special Accuracy Available Upon Request)
- Dual Scale: PSI & Bar (x100=kPa)
Single Scale available from stock
- Ambient temperature: FILLED: 30°F to 160°F
DRY: -30°F to 180°F



RANGE	CODE	Major In	Minor In
30/0"VAC	A	5	0.5
30/0/15	CB	5	0.5
30/0/30	CC	10	1
30/0/60	CD	10	1
30/0/100	CE	20	2
30/0/150	CF	20	2
30/0/300	CH	50	10
0/15	B	2	0.2
0/30	C	5	0.5
0/60	D	10	1
0/100	E	20	2
0/160	F	20	2
0/200	G	40	5
0/300	H	50	5
0/400	I	50	5
0/600	K	100	10
0/1000	M	200	20
0/1500	N	200	20
0/2000	O	400	50
0/3000	P	500	50
0/5000	R	1000	100
0/10,000	U	1000	100
0/15,000	V	2000	200



		A	B	C	D	E	F	G
1 ½"	In	1.88	1.06	.89	1.95	1/8"	2.63	1.63
Dial	MM	48	27	23	50	NPT	67	42
2"	In	2.23	1.09	.71	1.99	1/8" OR	2.81	2.00
Dial	MM	57	28	23	51	1/4"NPT	72	51
2 ½"	In	2.80	1.28	1.19	2.46	1/4"	3.48	2.50
Dial	MM	71	33	30	63	NPT	88	64
3 ½"	In	3.83	1.14	1.08	2.20	1/4"	3.70	3.5
Dial	MM	97	29	27	56	NPT	94	89
4"	In	4.32	1.63	1.14	2.77	1/4"	5.20	3.87
Dial	MM	110	42	29	71	NPT	132	98

Note:

All Dial Size Gauges are Center Back Connection Except 3 ½" Dial Size which are Lower Back Connection

GUARANTEED PROTECTION!

SENTINEL DIAPHRAGM SEALS

Unconditionally **GUARANTEED**
for three years!

***Blacoh GUARANTEES** it's Sentinel Diaphragms and Seal bodies for three years from the date of purchase. If any failure occurs, Blacoh will replace your Diaphragm Seal at no cost to you!

(Guarantee does not apply to gauges or custom models)



SENTINEL DIAPHRAGM SEAL ►

Available in a variety of chemically resistant plastics and metals

▲ SENTINEL DIAPHRAGM SEAL

Protect & isolate all forms of system instrumentation from hazardous and corrosive process fluids

SENTINEL FLOW THRU ►

Prevents clogging of viscous process fluids

NEW

◀ SENTINEL "REVOLUTION"

All PVC construction and threaded housings are ideal for corrosive environments

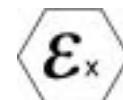
USE A DIAPHRAGM SEAL TO:

- Protect & isolate all forms of system instrumentation from hazardous and corrosive process fluids
- Ensure gauge and switch accuracy
- Smooth out erratic pressure surges
- Extend the life of pressure instrumentation
- Protect gauges from freezing and slurries
- Receive accurate and consistent readings when working with corrosive or solids-laden fluids
- Replace expensive gauges with low cost utility gauges

SENTINEL FEATURES:

- Three year guarantee on diaphragms & seal bodies
- Accuracy of $\pm 2\%$ full deflection or better
- Pressure ranges up to 1000 PSI (68.95 BAR)
- 1/4" (6.35 mm) up to 3/4" (19.05 mm) inlet ports
- All standard models available from stock
- Bodies available in a full range of chemically resistant materials
- Custom models available

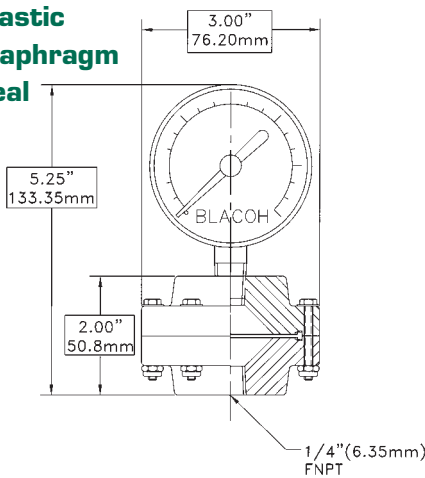
(800) 603-7867
www.Blacoh.com





SENTINEL DIAPHRAGM SEALS

Plastic Diaphragm Seal



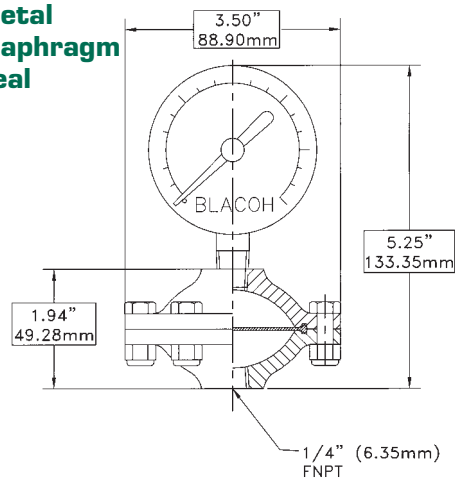
BODY MATERIALS:

POLYPROPYLENE
PVC
PVDF
CPVC

DIAPHRAGM MATERIALS:

PTFE
EPDM
VITON

Metal Diaphragm Seal



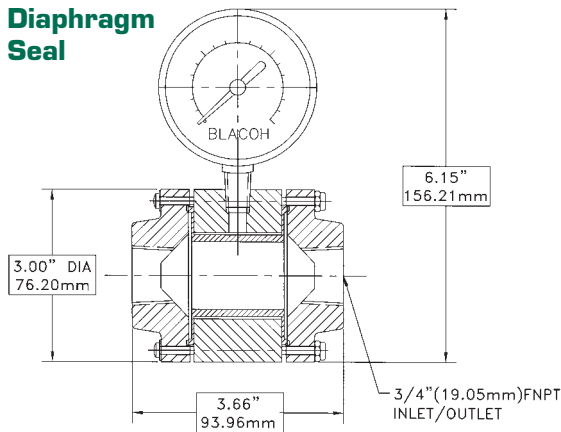
BODY MATERIALS:

316 STAINLESS STEEL
ALLOY 20
HASTELLOY C

DIAPHRAGM MATERIALS:

PTFE
EPDM
VITON

Flow-Thru Diaphragm Seal



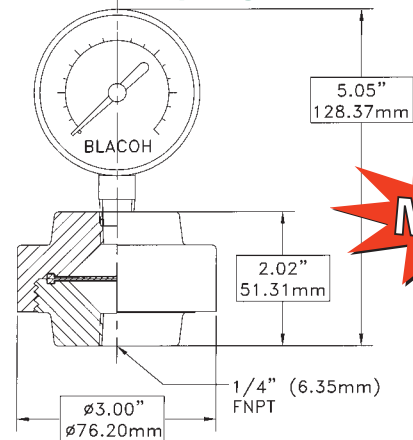
BODY MATERIALS:

PVC
POLYPROPYLENE

TUBE DIAPHRAGM MATERIALS:

EPDM
VITON

"Revolution" Diaphragm Seal



BODY MATERIALS:

PVC

DIAPHRAGM MATERIALS:

EPDM
VITON

Please call your local distributor:



Call for your **FREE**
Demonstration CD

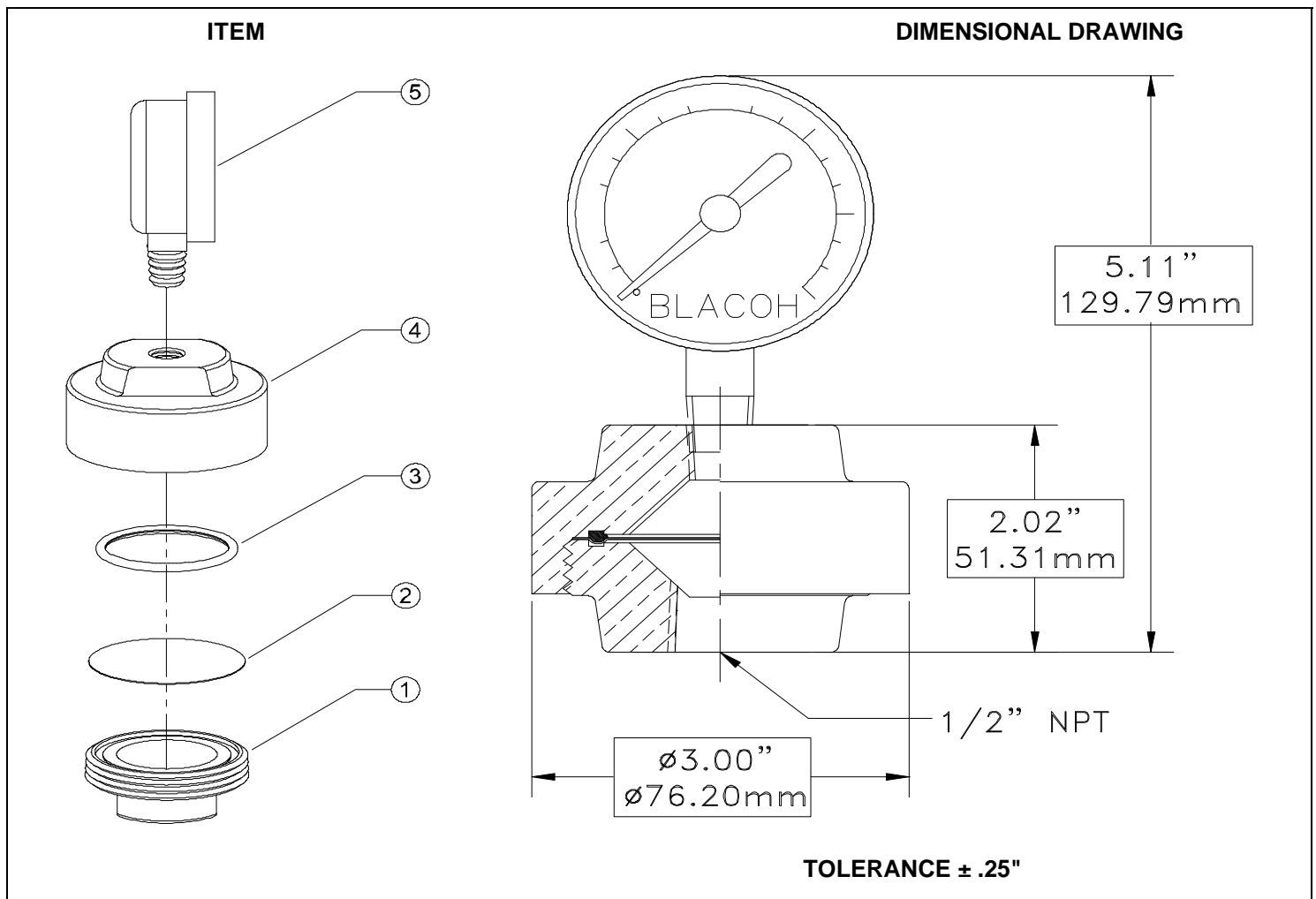
BLACOH
FLUID CONTROL

601 Columbia Ave., Bldg. D, Riverside, CA 92507 • USA
Tel: (800) 603-7867 or (951) 342-3100 • Fax: (951) 342-3101
E-mail: sales@blacoh.com • Website: www.blacoh.com

SENTINEL MODEL #:	RC00T-18-5
MAXIMUM PRESSURE:	200 PSI
WETTED HOUSING:	CPVC
NONWETTED HOUSING:	CPVC
FILL	GLYCERIN
DIAPHRAGM MATERIAL	PTFE
INLET:	1/2" FNPT

DESCRIPTION				
ITEM	PART #	QTY	Component	Material
1	11-27-5	1	Wetted Housing	CPVC
2	11-10	1	Diaphragm	PTFE
3	11-12	1	O-Ring	EPDM
4	11-24	1	Nonwetted Housing	CPVC
5	G18	1	Gauge	Stainless Steel -Brass - Liquid Filled

1/16/2008



BLACOH FLUID CONTROL, INC

RIVERSIDE, CA 92507 USA

TEL: 800.603.7867 or 951.342.3100 Fax: 951.342.3101

E-mail: sales@blacoh.com web site: www.blacoh.com

Pump & Systems Accessories

Backpressure Valves

Pressure Relief Valves

Backpressure, antisiphon and pressure relief valves



In-line pressure relief valve (3 port)



Backpressure valve (2 port)



Backpressure valve on tee for pressure relief

Technical data

Size:

1/2"

Diaphragm

Materials:

PTFE-faced EPDM

Liquid Handling

Materials:

PP, PVC, PTFE, PVDF
316 Stainless Steel

Pressure Adjustment:

0-150 psig (0-10.3 bar)

Flow rates @ 45 psig (3.1 bar):

1/4" - 132 U.S. gph (500 L/h)

1/2" - 132 U.S. gph (500 L/h)

Flow rates @ 150 psig:

1/2" (PP, PVC) - 200 U.S. gph (757 L/h)

1/2" (PVDF, TT, SS) - 300 U.S. gph (1135 L/h)

3/4" - 300 U.S. gph (1135 L/h)

1" - 500 U.S. gph (1893 L/h)

1-1/2" - 900 U.S. gph (3407 L/h)

2" - 1200 U.S. gph (4542 L/h)

Max. Temperature:

PP - 195°F (90°C)

PVC - 140°F (60°C)

PTFE - 250°F (121°C)

PVDF - 250°F (121°C)

316 Stainless - 250°F (121°C)

Max. Pressure Rating 170 psig @ 120°F

Backpressure (2-port) valves may be used in-line to provide a constant discharge pressure for protection from siphoning, or they may be teed off of the discharge line for pressure relief, discharging back to the source tank or to the pump suction line to create a bypass.

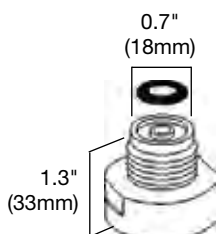
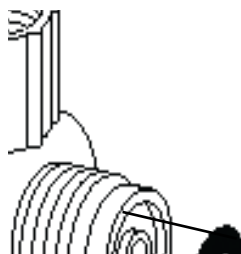
Pressure relief (3-port) valves are mounted in the discharge line, featuring a separate relief port which discharges back to the source tank or to the pump suction line to create a bypass.

Backpressure valves provide several functions: they improve repeatability by providing a constant discharge pressure; they provide antisiphon protection for discharge into pressurized water lines or vacuums, or where suction head exceeds discharge head; and they minimize pulsation when used in conjunction with a pulsation dampener.

In-line backpressure/antisiphon and pressure relief valves

These adjustable backpressure (2-port) and pressure relief (3-port) valves have FNPT ports and require tubing adapters for use with flexible tubing.

Can be adjusted with screwdriver.



Adapter included with all back-pressure/pressure relief valves. Optional use in the event of diaphragm failure.

DIMENSIONS: 1/4" to 1/2" valves

D	A (in)	B (in)	C (in)
1/4"	4.90	2.6	1.2
*1/4"	*3.5	*2.375	*0.75
1/2"	4.9	2.6	1.2
*1/2"	*5.5	*3.5	*1.125
3/4"	5.4	3.5	1.1
1"	5.7	3.9	1.4
1-1/2"	8.5	4.6	2.2
2"	8.5	4.6	2.2v

*Note: Dimensions apply to SS and PTFE valves only.

DIMENSIONS (for replacement valves only): 1/4" to 1/2" valves - SEE PG. 8

D	A (in)	B (in)	C (in)
1/4"	3.9	2.375	0.75
*1/4"	*3.5	*2.375	*0.75
1/2"	4.6	2.375	1.125
*1/2"	*5.5	*3.5	*1.125
3/4"	5.5	3.5	1.125
1"	5.8	3.5	1.25
1-1/2"	9.0	4.5	2.1
2"	9.0	5.0	2.1

*Note: Dimensions apply to SS, PVDF and PTFE valves only.



FuelFLEX™ 65 PVC Fuel Tubing

Features and Benefits:

- Flexible and easy to install (65A durometer)
- Resists swelling and hardening
- Easy-to-identify transparent yellow

Recommended Applications:

- For intermittent use with petroleum-based products
- Fuel drain lines, vent tubes and overflow tubes
- Transfer of gasoline, heating oils, cutting compounds and coolants
- Lab handling of distillates
- NOT intended for use with foods or beverages

FuelFLEX 65 Cat. No.	Size, in.					Oper. Pressure, psig @ 73°F	Case Qty., ft.
	ID	x	OD	x	Wall		
8365-4230	3/32		3/16		3/64	54	100
8365-4245	1/8		1/4		1/16	62	100
8365-4295	3/16		5/16		1/16	48	100
8365-4335	1/4		3/8		1/16	40	100
8365-4390	5/16		7/16		1/16	36	100
8365-4430	3/8		1/2		1/16	30	100
8365-4465	7/16		5/8		3/32	40	100
8365-4515	1/2		3/4		1/8	40	100
8365-4570	5/8		7/8		1/8	34	100
8365-2605	3/4		1		1/8	30	50

BraidFLEX™ 70N Braided PVC Tubing

Features and Benefits:

- Now complies with NSF-51
- Complies with FDA CFR 21 for food packaging
- Embedded braid prevents material entrapment, ensures easy cleaning
- Easy to bend into place
- Flexible; permits tight clamping for leakproof connections
- Maximum working pressure clearly printed on tubing
- Clear tubing allows full visual flow monitoring

Recommended Applications:

- Transfer lines
- Higher-pressure applications, including lab, food and beverage use
- Pneumatic circuitry
- Cell culture
- Use with insert/barbed fittings
- NOT recommended for vacuum applications

BraidFLEX 70N Cat. No.	Size, in.					Oper. Pressure, psig @ 73°F	Case Qty., ft.
	ID	x	OD	x	Wall		
8470-4300	3/16		3/8		3/32	276	100
8470-7300	3/16		3/8		3/32	276	250
8470-4340	1/4		7/16		3/32	276	100
8470-7340	1/4		7/16		3/32	276	250
8470-4395	5/16		1/2		3/32	276	100
8470-4435	3/8		9/16		3/32	250	100
8470-7435	3/8		9/16		3/32	250	250
8470-4515	1/2		3/4		1/8	230	100
8470-7515	1/2		3/4		1/8	230	250
8470-4570	5/8		7/8		1/8	230	100
8470-7570	5/8		7/8		1/8	230	250
8470-2605	3/4		1		1/8	176	50
8470-7605	3/4		1		1/8	176	250
8470-2680	1		1-5/16		5/32	140	50
8470-7680	1		1-5/16		5/32	140	250
8470-2715	1-1/4		1-5/8		3/16	100	50
8470-2750	1-1/2		1-7/8		3/16	80	50
8470-2790	2		2-1/2		1/4	70	50



ELECTRIC MOTORS, GEARMOTORS AND DRIVES

Site Search


[Home](#) [News](#) [Products](#) [Product Quick Search](#) [Technical Information](#) [Custom Solutions](#) [Literature](#) [Where to Buy](#) [Service & Warranty](#)
[Contact Us](#)

Product Features

List Price : \$ 498

[Contact Sales Office](#)

Catalog No 110057.00

Model C6C17FC6L

Product type AC MOTOR

Stock Stock

Description 3/4HP..1725RPM.56.TEFC./V.1PH.60HZ.CONT.

Information shown is for current motor's design

[View Outline](#) | [View Connection](#)

Engineering Data

Volts 115

Volts 208-230

Volts

F.L. Amps 10.8

F.L. Amps 5.4

F.L. Amps

S. F Amps 11.4

S. F Amps 5.7

S. F Amps

RPM 1725

Hertz 60

HP 3/4

Duty CONTINUOUS

TYPE CF

KW 0.56

Frame 56C

Serv. Factor 1.15

Phase 1

Max Amb 40

Design N

Code L

Insul Class B4

Protection NOT

Therm.Prot.

Eff 100%

Eff 75%

PF 64

UL Yes

CSA Yes

Bearing OPE 6203

CC Number

CE No

Bearing PE 6203

Load Type

Inverter Type

Speed Range NONE

Motor Wt. 28

Enclosure TEFC

Lubrication POLYREX EM

Nameplate 993500

Mounting C FACE

Rotation SELECTIVE CCW

Assembly

Shaft Dia. 5/8 IN

Ext. Diag. [005005.01](#)

Cust Part No MULTIPLE

Outline [028854-600B](#)

Ext. Diag2

Packaging B

Outline Dash No

Winding C634258

Carton Label Leeson Gen
Purpose

GROUP: 3 A

Iris

Paint STANDARD

Test Card 02

Form Factor

RMS Amps

Const Torque Speed
Range

Torque

Peak

AB Code

Peak@DegC

Resistance

Connection

Rework Status

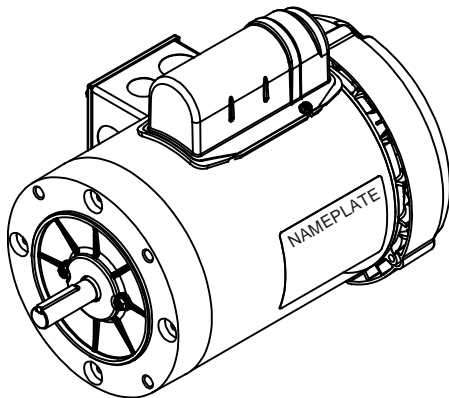
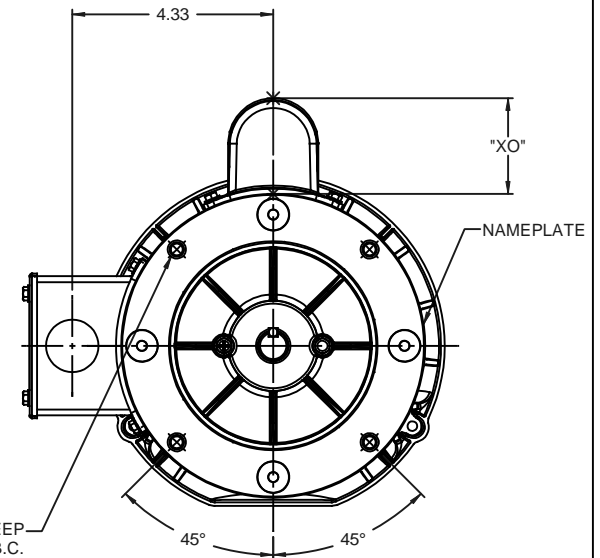
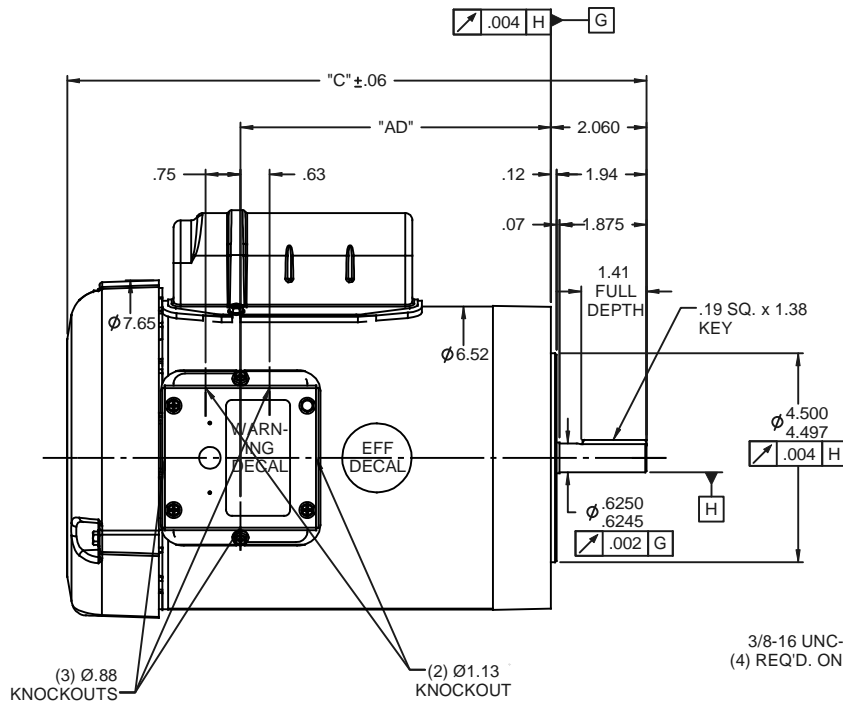
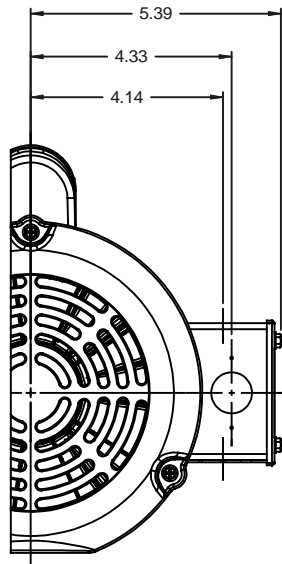
Rework TYPE

Explosion Proof NONE

Temp Op Code

Brake Motors

Class	Class	GROUP:	GROUP:	FORCE	VDC	ADC		
							Brake Coil OHMs @25 C	
Performance								
Torque UOM	OZ-FT	Inertia (WK²)	.08 LB-FT^2					
Torque	35.95(Full Load)	98.47(Break Down)	84.19(Pull Up)	114.48(Locked Rotor)				
CURRENT (amps)	5.46(Full Load)	15.2(Break Down)	19.2(Pull Up)	30.1(Locked Rotor)				
Efficiency (%)	0(Full Load)	67.8(75% Load)	61.3(50% Load)	46(25% Load)				
PowerFactor	64(Full Load)	55.3(75% Load)	44.6(50% Load)	31.6(25% Load)				
Load Curve Data @60 Hz, 230 Volts, 3/4 Horsepower								
Load	Amps	KW	RPM	Torque	EFF	PF	Rise By Resis	Frame Rise
0.0	4.13	0.172	1798	0.0	0.0	18.1	0.0	-
0.25	4.2	0.306	1786	8.85	46.0	31.6	0.0	-
0.5	4.45	0.456	1777	17.72	61.3	44.6	0.0	-
0.75	4.86	0.519	1766	26.79	67.8	55.3	0.0	-
1.0	5.42	0.792	1754	35.94	70.7	63.6	78.0	40.0
1.25	6.11	0.978	1740	45.3	71.5	69.6	90.0	45.0
1.5	6.97	1.191	1723	55.09	70.8	74.3	0.0	-
1.75	7.97	1.421	1703	64.75	88.9	77.4	0.0	-
SOURCE: CALCULATED GROUP: 3								

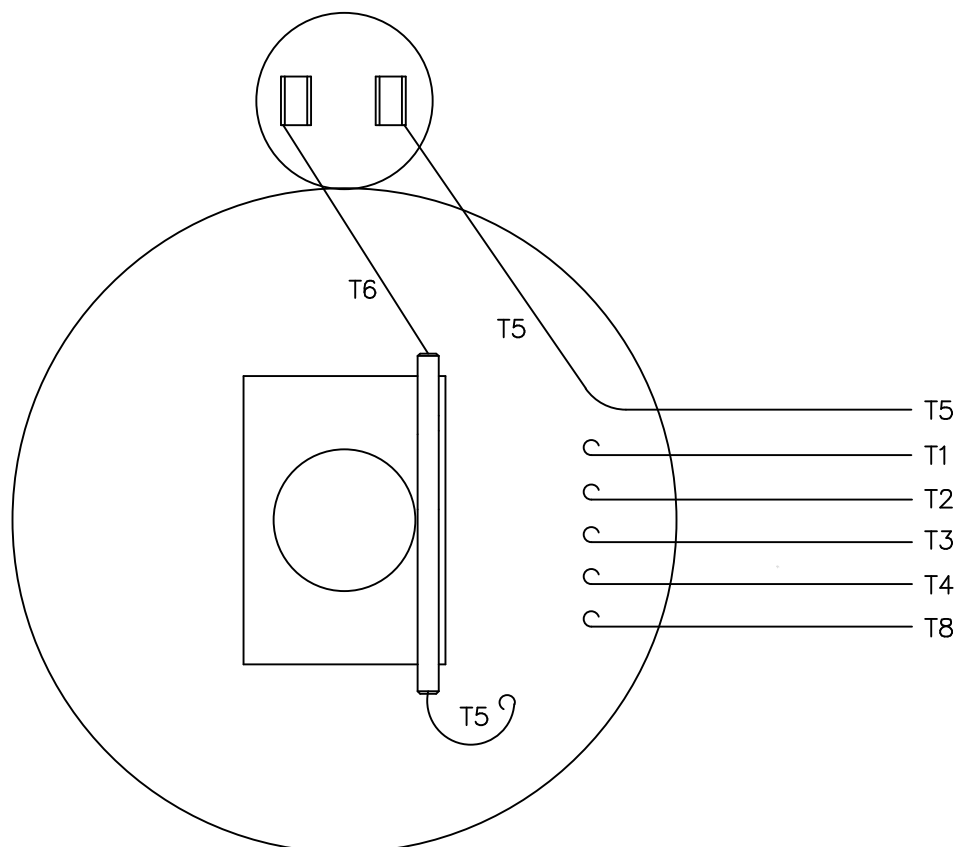


NOTES:
1) GASKETS THROUGHOUT

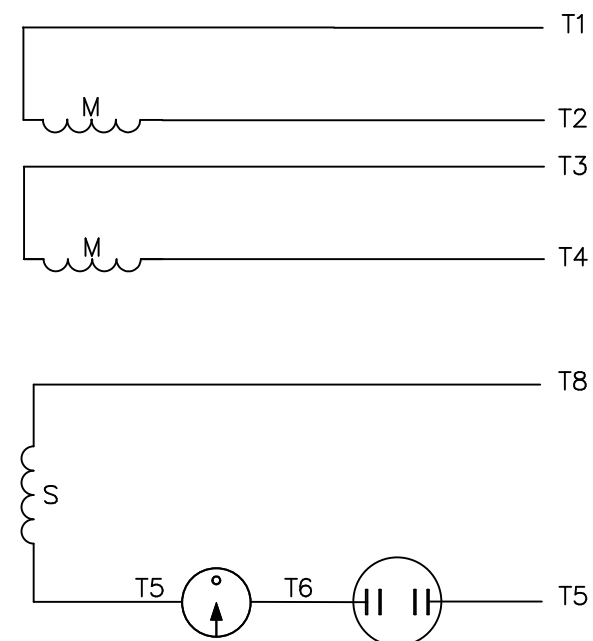
DASH NO.	"C"	"AD"	CAP DASH	XO
500	10.48	4.69		
550	10.98	5.19		
600	11.48	5.69		
650	11.98	6.19		
700	12.48	6.69		
750	12.98	7.19		
800	13.48	7.69	A	1.61
850	13.98	8.19	B	2.08
			C	2.32

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

VIEW FROM OUTSIDE OF MOTOR AT SWITCH END.



LINE LEADS



	ROTATION FACING LEAD END	L1	L2	JOIN
HIGH VOLT	C.C.W.	T1	T4 T5	T2,T3 T8
	C.W.	T1	T4 T8	T2,T3 T5
LOW VOLT	C.C.W.	T1,T3 T8	T2,T4 T5	---
	C.W.	T1,T3 T5	T2,T4 T8	---

27	UPDATED TO CURRENT STANDARDS	DBT	05/27/97	TOLERANCES UNLESS OTHERWISE SPECIFIED		LEESON ELECTRIC CORPORATION		
26	ADDED PAGE 32(114787) & PAGE 33(114788) PG	KAZ	12/20/95					
25	ADDED PAGE 31	DL	KAZ	04/19/95	DECIMALS		EXT. WIRING DIAGRAM TYPE "C" W/O PROTECTOR	
24	ADDED PAGES 29 & 30	DL	KMM	03/30/95	.00	± .01		
23	ADDED PAGE 28		KMM	01/27/95	.000	± .005	MAT'L. DECAL - 004012	
22	REDRAWN ON CAD	KH	SAW	10/28/94	.0000	± .0005		
NO.	REVISION	BY	DATE	FRACTIONS	± 1/64	SCALE	1=1	
THIS DRAWING IN DESIGN AND DETAIL IS OUR PROPERTY AND MUST NOT BE USED EXCEPT IN CONNECTION WITH OUR WORK ALL RIGHTS OF DESIGN AND INVENTION ARE RESERVED				ANGLES	± 1/2°	REF.	FIG. 2-23 C4A	
				INCH/MM		FMF		
							FINISH	SIZE
								A
								DRAWING NO.
								005005-01

BRF

Lubrication Instructions For Ball Bearing Motors

Lubrication

This motor is supplied with pre-lubrication ball bearings. No lubrication required before start up.

Relubrication Intervals

The following intervals are suggested as a guide:

SUGGESTED RELUBRICATION INTERVALS		
HOURS OF SERVICE PER YEAR	H.P. RANGE	RELUBE INTERVAL
5,000	Sub Fractional to 7 1/2 10 to 40 50-200	5 Years 3 Years 1 Year
Continuous Normal Applications	Sub Fractional to 7 1/2 10 to 40 50 to 200	2 Years 1 Year 9 Months
Season Service Motor Idle 6 Months or More	All	1 Year (Beginning of Season)
Continuous High Ambients Dirty or Moist Locations High Vibrations Where Shaft End is Hot (Pumps-Fans)	Sub Fractional to 40 50 to 200	6 Months 3 Months

Lubrication

Use high quality ball bearing lubricant. Use consistency of lubricant suitable for class of insulation stamped on nameplate as follows:

LUBRICATION CONSISTENCY				
INSULATION CLASS	CONSISTENCY	TYPE	TYPICAL LUBRICATION	FRAME TYPE
B & F F & H	Medium	Polyurea	Shell Dolium R and/or Chevron SR1 2	Sub Fractional to 447T All

Procedure

If motor is equipped with Alemite fitting, clean tip of fitting and apply grease gun. Use 1 to 2 full strokes on motors in NEMA 215T frame and smaller. Use 2 to 3 strokes on NEMA 254T thru NEMA 365 T frame. Use 3 to 4 strokes on NEMA 404T frames and larger. On motors having drain plugs, remove drain plug and operate motor for 20 minutes before replacing drain plug.

On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 2 to 3 inch length of grease string into each hole on motors in NEMA 215T frame and smaller. Insert 3 to 5 inch length on larger motors. For motors having drain plug and operate motor for 20 minutes before replacing drain plug.

CAUTION: Keep lubricant clean. Lubricate motors at standstill. remove and replace drain plugs at standstill. Do not mix petroleum lubricant and silicone lubricant in motor bearings.



ELECTRIC MOTORS, GEARMOTORS AND DRIVES

LEESON ELECTRIC

GRAFTON, WISCONSIN 53024-0241 U.S.A.
TEL (262)377-8810 FAX (262)377-9025 www.leeson.com

A Subsidiary of Regal-Beloit Corporation

Installation Maintenance Instructions

AC Induction Motors

Installation

After unpacking, check for damage. Be sure that shaft rotates freely. Before making electrical power connections, check for proper grounding of motor and application. All electrical contacts and connections must be properly insulated and enclosed. Couplings, belts, chains or other mounted devices must be in proper alignment, balance and secure to insure safe motor operation.

Electrical Wiring

Prior to connecting to the power line, check nameplate for proper voltage and rotation connection. This motor should be installed in compliance with the National Electrical Code and any other applicable codes. Voltage at motor not to exceed + or -10% of nameplate. Authorized person should make all electrical connections.

Mounting

This motor should be securely mounted to the application. Sufficient ventilation area should be provided to insure proper operation.

RECOMMENDED COPPER WIRE & TRANSFORMER SIZE

SINGLE PHASE MOTORS - 230 VOLTS						
H.P.	TRANSFORMER KVA	DISTANCE - MOTOR TO TRANSF. IN FT.				
		100	150	200	300	500
1 1/2	3	10	8	8	6	4
2	3	10	8	8	6	4
3	5	8	8	6	4	2
5	7 1/2	6	4	4	2	0
7 1/2	10	6	4	3	1	0

THREE PHASE MOTORS - 230 & 460 VOLTS							
H.P.	VOLTS	TRANSFORMER KVA	DISTANCE - MOTOR TO TRANSF. IN FT.				
			100	150	200	300	500
1 1/2	230	3	12	12	12	12	10
1 1/2	460	3	12	12	12	12	12
2	230	3	12	12	12	10	8
2	460	3	12	12	12	12	12
3	230	5	12	10	10	8	6
3	460	5	12	12	12	12	10
5	230	7	10	8	8	6	4
5	460	1/2	12	12	12	10	8
7 1/2	230	7 1/2	8	6	6	4	2
7 1/2	460	10	12	12	12	10	8
10	230	10	6	4	4	4	1
10	460	15	12	12	12	10	8
15	230	15	4	4	4	2	0
15	460	20	12	10	10	8	6
20	230	20	4	2	2	1	000
20	460		10	8	8	6	4
25	230		2	2	2	0	000
25	460	Consult	8	8	6	6	4
30	230	Local	2	1	1	00	0000
30	460	Power	8	6	6	4	2
40	230	Company	1	0	00	0000	300
40	460		6	6	4	2	0
50	230		1	0	00	0000	300
50	460		4	4	2	2	0
60	230		1	00	000	250	500
60	460		4	2	2	0	00
75	230		0	000	0000	300	500
75	460		4	2	0	00	000



Features

- Wide range of pressure ratings, sizes, and resilient materials provide long service life and low internal leakage
- High Flow Valves for liquid, corrosive, and air/inert gas service
- Industrial applications include:
 - Car wash
 - Laundry equipment
 - Air compressors
 - Industrial water control
 - Pumps

Construction

Valve Parts in Contact with Fluids		
Body	Brass	304 Stainless Steel
Seals and Discs	NBR	or PTFE
Disc-Holder	PA	
Core Tube	305 Stainless Steel	
Core and Plugnut	430F Stainless Steel	
Springs	302 Stainless Steel	
Shading Coil	Copper	Silver

Electrical

Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part Number			
	DC Watts	AC			General Purpose		Explosionproof	
		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
F	16.8	16.1	35	180	272610	97617	272614	97617
F	-	17.1	40	93	238610	-	238614	-
F	-	20	43	240	99257	-	99257	-
F	-	20.1	48	240	272610	-	272614	-
H	30.6	-	-	-	-	74073	-	74073
H	40.6	-	-	-	-	238910	-	238914

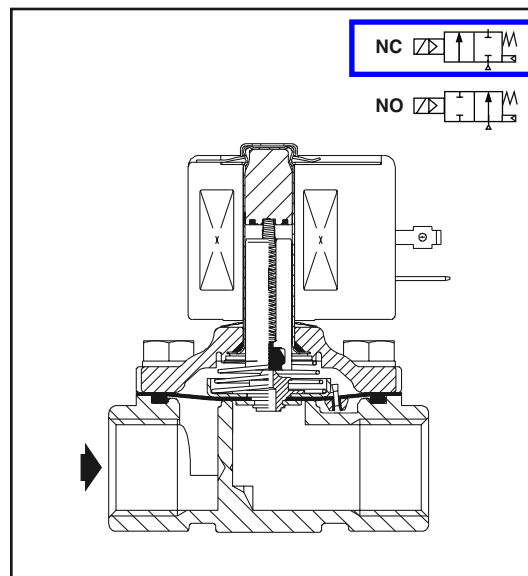
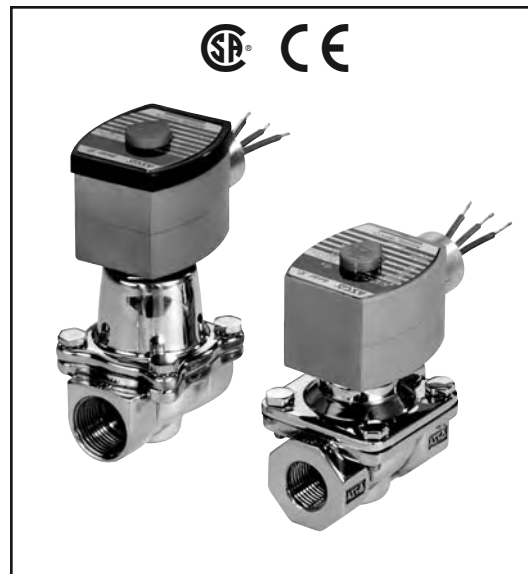
Standard Voltages: 24, 120, 240, 480 volts AC, 60 Hz (or 110, 220 volts AC, 50 Hz). 6, 12, 24, 120, 240 volts DC. Must be specified when ordering.
 Other voltages available when required.

Solenoid Enclosures

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

Optional: RedHat II - Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9; Red-Hat - Explosionproof and Watertight, Types 3, 4, 4X, 7, and 9.

(To order, add prefix "EF" to catalog number, except Catalog Numbers 8210B057, 8210B058, and 8210B059, which are not available with Explosionproof enclosures.)
 See *Optional Features Section* for other available options.



Nominal Ambient Temp. Ranges

RedHat II/
 RedHat AC: 32°F to 125°F (0°C to 52°C)

RedHat II DC: 32°F to 104°F (0°C to 40°C)

RedHat 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. RedHat II meets applicable CE directives.

Refer to *Engineering Section* for details.

Specifications (English units)

Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressure Differential (psi)							Max. Fluid Temp. °F		Brass Body			Stainless Steel Body			Watt Rating/ Class of Coil Insulation ⑦	
			Min.	Max. AC			Max. DC												
				Air-Inert Gas	Water	Light Oil @ 300 SSU	Air-Inert Gas	Water	Light Oil @ 300 SSU	AC	DC	Catalog Number	Const. Ref. ④	UL ⑤ Listing	Catalog Number	Const. Ref. ④	UL ⑤ Listing	AC	DC
NORMALLY CLOSED (Closed when de-energized), NBR or PTFE ② Seating																			
3/8	3/8	1.5	①	150	125	-	40	40	-	180	150	8210G073 ③	1P	●	8210G036 ③	1P	●	6.1/F	11.6/F
3/8	5/8	3	0	150	150	-	40	40	-	180	150	8210G093	5D	○	-	-	-	10.1/F	11.6/F
3/8	5/8	3	5	200	150	135	125	100	100	180	150	8210G001	6D	○	-	-	-	6.1/F	11.6/F
3/8	5/8	3	5	300	300	300	-	-	-	175	-	8210G006	5D	○	-	-	-	17.1/F	-
1/2	7/16	2.2	①	150	125	-	40	40	-	180	150	8210G015 ③	2P	●	8210G037 ③	2P	●	6.1/F	11.6/F
1/2	5/8	4	0	150	150	-	40	40	-	180	150	8210G094	5D	○	-	-	-	10.1/F	11.6/F
1/2	5/8	4	0	150	150	125	40	40	-	175	150	-	-	-	8210G087	7D	●	17.1/F	11.6/F
1/2	5/8	4	5	200	150	135	125	100	100	180	150	8210G002	6D	○	-	-	-	6.1/F	11.6/F
1/2	5/8	4	5	300	300	300	-	-	-	175	-	8210G007	5D	○	-	-	-	17.1/F	-
1/2	3/4	4	5	-	300	-	-	300	-	180	125	8210G227	5D	○	-	-	-	17.1/F	40.6/H
3/4	5/8	4.5	0	150	150	125	40	40	-	175	150	-	-	-	8210G088	7D	●	17.1/F	11.6/F
3/4	3/4	5	5	125	125	125	100	90	75	180	150	8210G009	9D	○	-	-	-	6.1/F	11.6/F
3/4	3/4	5	0	150	150	-	40	40	-	180	150	8210G095	8D	○	-	-	-	10.1/F	11.6/F
3/4	3/4	6.5	5	250	150	100	125	125	125	180	150	8210G003	11D	○	-	-	-	6.1/F	11.6/F
3/4	3/4	6	0	-	-	-	200	180	180	-	77	8210B026 ② ‡	10P	-	-	-	-	-	30.6/H
3/4	3/4	6	0	350	300	200	-	-	-	200	-	8210G026 ② ‡	40P	●	-	-	-	16.1F	-
1	1	13	0	-	-	-	100	100	80	-	77	8210B054 ‡	31D	-	8210D089	15D	-	-	30.6/H
1	1	13	0	150	125	125	-	-	-	180	-	8210G054	41D	●	8210G089	45D	●	16.1/F	-
1	1	13	5	150	150	100	125	125	125	180	150	8210G004	12D	○	-	-	-	6.1/F	11.6/F
1	1	13.5	0	300	225	115	-	-	-	200	-	8210G027 ‡	42P	●	-	-	-	20.1/F	-
1	1	13.5	10	300	300	300	-	-	-	175	-	8210G078 ②	13P	-	-	-	-	17.1/F	-
1 1/4	1 1/8	15	0	-	-	-	100	100	80	-	77	8210B055 ‡	32D	-	-	-	-	-	30.6/H
1 1/4	1 1/8	15	0	150	125	125	-	-	-	180	-	8210G055	43D	●	-	-	-	16.1/F	-
1 1/4	1 1/8	15	5	150	150	100	125	125	125	180	150	8210G008	16D	○	-	-	-	6.1/F	11.6/F
1 1/2	1 1/4	22.5	0	-	-	-	100	100	80	-	77	8210B056 ‡	33D	-	-	-	-	-	30.6/H
1 1/2	1 1/4	22.5	0	150	125	125	-	-	-	180	-	8210G056	44D	●	-	-	-	16.1/F	-
1 1/2	1 1/4	22.5	5	150	150	100	125	125	125	180	150	8210G022	18D	●	-	-	-	6.1/F	11.6/F
2	1 3/4	43	5	150	125	90	50	50	50	180	150	8210G100	20P	●	-	-	-	6.1/F	11.6/F
2 1/2	1 3/4	45	5	150	125	90	50	50	50	180	150	8210G101	21P	●	-	-	-	6.1/F	11.6/F
NORMALLY OPEN (Open when de-energized), NBR Seating (PA Disc-Holder, except as noted)																			
3/8	5/8	3	0	150	150	125	125	125	80	180	150	8210G033	23D	●	-	-	-	10.1/F	11.6/F
3/8	5/8	3	5	250	200	200	250	200	200	180	180	8210G011 ⑧ ⑨	39D	●	-	-	-	10.1/F	11.6/F
1/2	5/8	4	0	150	150	125	125	125	80	180	150	8210G034	23D	●	-	-	-	10.1/F	11.6/F
1/2	5/8	3	0	150	150	100	125	125	80	180	150	-	-	-	8210G030	37D	●	10.1/F	11.6/F
1/2	5/8	4	5	250	200	200	250	200	200	180	180	8210G012 ⑧ ⑨	39D	●	-	-	-	10.1/F	11.6/F
3/4	3/4	5.5	0	150	150	125	125	125	80	180	150	8210G035	25D	●	-	-	-	10.1/F	11.6/F
3/4	5/8	3	0	150	150	100	125	125	80	180	150	-	-	-	8210G038	38D	●	10.1/F	11.6/F
3/4	3/4	6.5	5	-	-	-	250	200	200	-	180	8210C013	24D	●	-	-	-	-	16.8/F
3/4	3/4	6.5	5	250	200	200	-	-	-	180	-	8210G013	46D	●	-	-	-	16.1/F	-
1	1	13	0	125	125	125	-	-	-	180	-	8210B057 ⑥ ⑩	34D	●	-	-	-	20/F	-
1	1	13	5	-	-	-	125	125	125	-	180	8210D014	26D	●	-	-	-	-	16.8/F
1	1	13	5	150	150	125	-	-	-	180	-	8210G014	47D	●	-	-	-	16.1/F	-
1 1/4	1 1/8	15	0	125	125	125	-	-	-	180	-	8210B058 ⑥ ⑩	35D	●	-	-	-	20/F	-
1 1/4	1 1/8	15	5	-	-	-	125	125	125	-	180	8210D018	28D	●	-	-	-	-	16.8/F
1 1/4	1 1/8	15	5	150	150	125	-	-	-	180	-	8210G018	48D	●	-	-	-	16.1/F	-
1 1/2	1 1/4	22.5	0	125	125	125	-	-	-	180	-	8210B059 ⑥ ⑩	36D	●	-	-	-	20/F	-
1 1/2	1 1/4	22.5	5	-	-	-	125	125	125	-	180	8210D032	29D	●	-	-	-	-	16.8/F
1 1/2	1 1/4	22.5	5	150	150	125	-	-	-	180	-	8210G032	49D	●	-	-	-	16.1/F	-
2	1 3/4	43	5	-	-	-	125	125	125	-	150	8210 103	30P	●	-	-	-	-	16.8/F
2	1 3/4	43	5	125	125	125	-	-	-	180	-	8210G103	50P	●	-	-	-	16.1/F	-
2 1/2	1 3/4	45	5	-	-	-	125	125	125	-	150	8210 104	27P	●	-	-	-	-	16.8/F
2 1/2	1 3/4	45	5	125	125	125	-	-	-	180	-	8210G104	51P	●	-	-	-	16.1/F	-

① 5 psi on Air; 1 psi on Water.

② Valve provided with PTFE main disc.

③ Valve includes Ultem (G.E. trademark) piston.

④ Letter "D" denotes diaphragm construction; "P" denotes piston construction.

⑤ ○ Safety Shutoff Valve; ● General Purpose Valve.

Refer to Engineering Section (Approvals) for details.

⑥ Valves not available with Explosionproof enclosures.

⑦ On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts.

⑧ AC construction also has PA seating.

⑨ No disc-holder.

⑩ Stainless steel disc-holder.

‡ Must have solenoid mounted vertical and upright.

Specifications (Metric units)

Pipe Size (ins.)	Orifice Size (mm)	Kv Flow Factor (m3/h)	Operating Pressure Differential (bar)								Max. Fluid Temp. °C		Brass Body			Stainless Steel Body			Watt Rating/Class of Coil Insulation ⑦	
			Min.	Max. AC			Max. DC													
				Air-Inert Gas	Water	Light Oil @ 300 SSU	Air-Inert Gas	Water	Light Oil @ 300 SSU	AC	DC	Catalog Number	Const. Ref. ④	UL ⑤ Listing	Catalog Number	Const. Ref. ④	UL ⑤ Listing	AC	DC	
NORMALLY CLOSED (Closed when de-energized), NBR or PTFE ② Seating																				
3/8	10	1.89	①	10	9	-	3	3	-	82	65	8210G073 ③	1P	●	8210G036 ③	1P	●	6.1/F	11.6/F	
3/8	16	2.57	0	10	10	-	3	3	-	82	65	8210G093	5D	○	-	-	-	10.1/F	11.6/F	
3/8	16	2.57	0.3	14	10	9	9	7	7	82	65	8210G001	6D	○	-	-	-	6.1/F	11.6/F	
3/8	16	2.57	0.3	21	21	21	-	-	-	79	-	8210G006	5D	○	-	-	-	17.1/F	-	
1/2	11	1.89	①	10	9	-	3	3	-	82	65	8210G015 ③	2P	●	8210G037 ③	2P	●	6.1/F	11.6/F	
1/2	16	3.43	0	10	10	-	3	3	-	82	65	8210G094	5D	○	-	-	-	10.1/F	11.6/F	
1/2	16	3.43	0	10	10	9	3	3	-	79	65	-	-	-	8210G088	7D	●	17.1/F	11.6/F	
1/2	16	3.43	0.3	14	10	9	9	7	7	82	65	8210G002	6D	○	-	-	-	6.1/F	11.6/F	
1/2	16	3.43	0.3	21	21	21	-	-	-	79	-	8210G007	5D	○	-	-	-	17.1/F	-	
1/2	19	3.43	0.3	-	21	-	-	21	-	82	52	8210G227	5D	○	-	-	-	17.1/F	40.6H	
3/4	16	3.86	0	10	10	9	3	3	-	79	65	-	-	-	8210G088	7D	●	17.1/F	11.6/F	
3/4	19	4.29	0.3	9	9	9	7	6	5	82	65	8210G009	9D	○	-	-	-	6.1/F	11.6/F	
3/4	19	4.29	0	10	10	-	3	3	-	82	65	8210G095	8D	○	-	-	-	10.1/F	11.6/F	
3/4	19	5.57	0.3	17	10	7	9	9	9	82	65	8210G003	11D	○	-	-	-	6.1/F	11.6/F	
3/4	19	5.14	0	-	-	-	14	12	12	-	25	8210B026 ② ‡	10P	-	-	-	-	-	30.6/H	
3/4	19	5.14	0	24	21	14	-	-	-	93	-	8210G026 ② ‡	40P	●	-	-	-	16.1F	-	
1	25	11.14	0	-	-	-	-	7	6	-	25	8210B054 ‡	31D	-	8210D089	15D	-	-	30.6/H	
1	25	11.14	0	10	9	9	-	-	-	82	-	8210G051	41D	●	8210G089	45D	●	16.1/F	-	
1	25	11.14	0.3	10	10	7	9	9	9	82	65	8210G004	12D	○	-	-	-	6.1/F	11.6/F	
1	25	11.57	0	21	16	8	-	-	-	93	-	8210G027 ‡	42P	●	-	-	-	20.1/F	-	
1	25	11.57	0.7	21	21	21	-	-	-	79	-	8210G078 ②	13P	-	-	-	-	17.1/F	-	
1 1/4	29	12.86	0	-	-	-	7	7	6	-	25	8210B055 ‡	32D	-	-	-	-	-	30.6/H	
1 1/4	29	12.86	0	10	9	9	-	-	-	82	-	8210G055	43D	●	-	-	-	16.1/F	-	
1 1/4	29	12.86	0.3	10	10	7	9	9	9	82	65	8210G008	16D	○	-	-	-	6.1/F	11.6/F	
1 1/2	32	19.29	0	-	-	-	7	7	6	-	25	8210B056 ‡	33D	-	-	-	-	-	30.6/H	
1 1/2	32	19.29	0	10	9	9	-	-	-	82	-	8210G056	44D	●	-	-	-	16.1/F	-	
1 1/2	32	19.29	0.3	10	10	7	9	9	9	82	65	8210G022	18D	●	-	-	-	6.1/F	11.6/F	
2	44	36.86	0.3	10	9	6	3	3	3	82	65	8210G100	20P	●	-	-	-	6.1/F	11.6/F	
2 1/2	44	38.57	0.3	10	9	6	3	3	3	82	65	8210G101	21P	●	-	-	-	6.1/F	11.6/F	
NORMALLY OPEN (Open when de-energized), NBR Seating (PA Disc-Holder, except as noted)																				
3/8	16	2.57	0.0	10	10	9	9	9	6	82	65	8210G033	23D	●	-	-	-	10.1/F	11.6/F	
3/8	16	2.57	0.3	17	14	14	17	14	14	82	82	8210G011 ⑧ ⑨	39D	●	-	-	-	10.1/F	11.6/F	
1/2	16	3.43	0	10	10	9	9	9	6	82	65	8210G004	23D	●	-	-	-	10.1/F	11.6/F	
1/2	16	2.57	0	10	10	7	9	9	6	82	65	-	-	-	8210G030	37D	●	10.1/F	11.6/F	
1/2	16	3.43	0.3	17	14	14	17	14	14	82	82	8210G012 ⑧ ⑨	39D	●	-	-	-	10.1/F	11.6/F	
3/4	19	4.71	0	10	10	9	9	9	6	82	65	8210G035	25D	●	-	-	-	10.1/F	11.6/F	
3/4	16	2.57	0	10	10	7	9	9	6	82	65	-	-	-	8210G038	38D	●	10.1/F	11.6/F	
3/4	19	5.57	0.3	-	-	-	17	14	14	-	82	8210C013	24D	●	-	-	-	-	16.8/F	
3/4	19	5.57	0.3	17	14	14	-	-	-	82	-	8210G013	46D	●	-	-	-	16.1/F	-	
1	25	11.14	0	9	9	9	-	-	-	82	-	8210B057 ⑥ ⑩	34D	●	-	-	-	20/F	-	
1	25	11.14	0.3	-	-	-	9	9	9	-	82	8210D014	26D	●	-	-	-	-	16.8/F	
1	25	11.14	0.3	10	10	9	-	-	-	82	-	8210G014	47D	●	-	-	-	16.1/F	-	
1 1/4	29	12.86	0	9	9	9	-	-	-	82	-	8210B058 ⑥ ⑩	35D	●	-	-	-	20/F	-	
1 1/4	29	12.86	0.3	-	-	-	9	9	9	-	82	8210D018	28D	●	-	-	-	-	16.8/F	
1 1/4	29	12.86	0.3	10	10	9	-	-	-	82	-	8210G018	48D	●	-	-	-	16.1/F	-	
1 1/2	32	19.29	0	9	9	9	-	-	-	82	-	8210B059 ⑥ ⑩	36D	●	-	-	-	20/F	-	
1 1/2	32	19.29	0.3	-	-	-	9	9	9	-	82	8210D032	29D	●	-	-	-	-	16.8/F	
1 1/2	32	19.29	0.3	10	10	9	-	-	-	82	-	8210G032	49D	●	-	-	-	16.1/F	-	
2	44	36.86	0.3	-	-	-	9	9	9	-	65	8210 103	30P	●	-	-	-	-	16.8/F	
2	44	36.86	0.3	9	9	9	-	-	-	82	-	8210G103	50P	●	-	-	-	16.1/F	-	
2 1/2	44	38.57	0.3	-	-	-	9	9	9	-	65	8210 104	27P	●	-	-	-	-	16.8/F	
2 1/2	44	38.57	0.3	9	9	9	-	-	-	82	-	8210G104	51P	●	-	-	-	16.1/F	-	

① 0.3 bar on air; 0.0 bar on Water.

② Valve provided with PTFE main disc.

③ Valve includes Ultem (G.E. trademark) piston.

④ Letter "D" denotes diaphragm construction; "P" denotes piston construction.

⑤ Safety Shutoff Valve; ● General Purpose Valve.

Refer to Engineering Section (Approvals) for details.

⑥ Valves not available with Explosionproof enclosures.

⑦ On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts.

⑧ AC construction also has PA seating.

⑨ No disc-holder.

⑩ Stainless steel disc-holder.

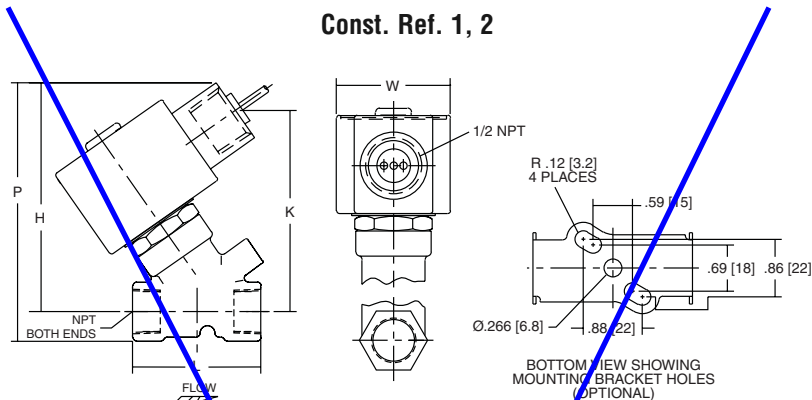
‡ Must have solenoid mounted vertical and upright.

Dimensions: inches (mm)

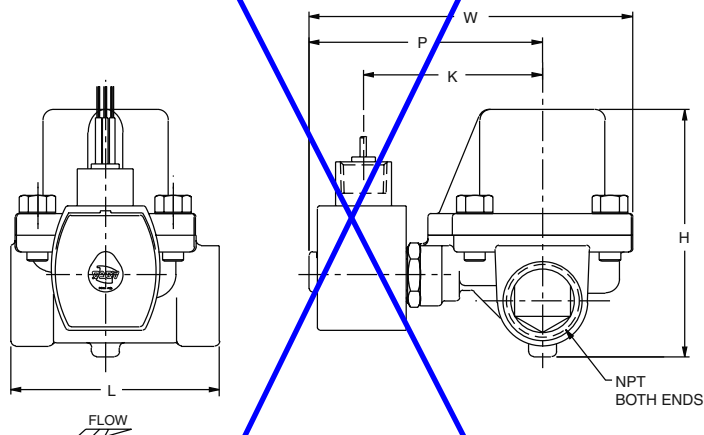
Const. Ref.		H	K	L	P	W
1*	ins.	3.85	3.00	1.91	3.41	1.69
	mm	98	76	49	87	43
2*	ins.	4.17	3.25	2.28	3.63	1.69
	mm	106	83	58	92	43
5	ins.	3.84	2.31	2.75	3.28	2.28
	mm	98	59	70	83	58
6*	ins.	3.38	1.94	2.75	2.80	2.28
	mm	86	49	70	71	58
7	ins.	4.19	2.50	2.81	3.47	2.39
	mm	106	64	71	88	61
8	ins.	4.13	2.47	2.81	3.44	2.29
	mm	105	63	71	87	58
9*	ins.	3.66	2.10	2.81	2.96	2.28
	mm	93	53	71	75	58
10*	ins.	5.25	X	2.81	4.59	2.31
	mm	133	X	71	117	59
11*	ins.	4.16	2.66	3.84	3.52	2.75
	mm	106	68	98	89	70
12	ins.	5.64	3.15	3.75	4.01	3.36
	mm	143	80	95	102	85
13	ins.	4.44	3.22	3.75	4.19	5.81
	mm	113	82	95	106	147
15*	ins.	5.34	X	3.75	4.47	3.84
	mm	136	X	95	114	98
16	ins.	5.64	3.15	3.66	4.01	3.56
	mm	143	80	93	102	90
18	ins.	6.11	3.30	4.38	4.16	3.92
	mm	155	84	111	106	100
20*	ins.	7.33	3.71	5.06	4.57	4.87
	mm	186	94	129	116	124
21*	ins.	7.33	3.71	5.50	4.57	4.87
	mm	186	94	140	116	124
23	ins.	4.35	2.65	2.75	3.79	2.28
	mm	110	67	70	96	58
24	ins.	5.06	X	3.78	4.44	2.75
	mm	129	X	96	113	70
25	ins.	4.64	2.81	2.81	3.94	2.28
	mm	118	71	71	100	58
26	ins.	6.53	X	3.75	4.91	3.19
	mm	166	X	95	125	81
27	ins.	8.22	X	5.50	5.47	4.87
	mm	209	X	140	139	124
28	ins.	6.53	X	3.66	4.91	3.19
	mm	166	X	93	125	81
29	ins.	7.03	X	4.38	5.06	4.40
	mm	179	X	111	129	112

* DC dimensions slightly larger.

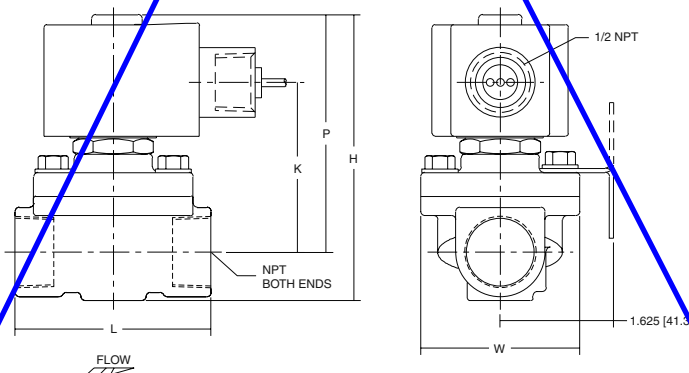
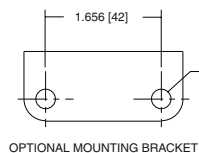
IMPORTANT: Valves may be mounted in any position, except as noted in specifications table.



Const. Ref. 13



Const. Ref. 5-9, 11, 20, 21, 23, 25, 27, 38

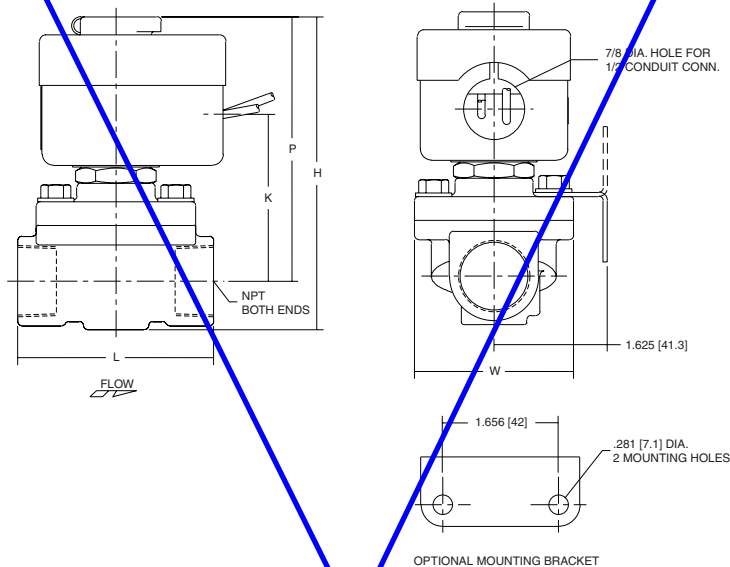


Dimensions: inches (mm)

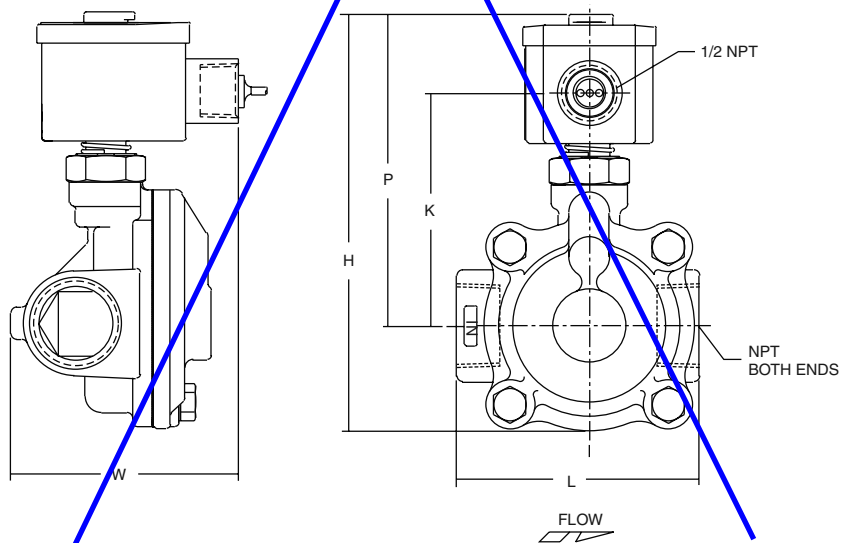
Const. Ref.		H	K	L	P	W
30	ins.	8.22	X	5.06	5.47	4.87
	mm	209	X	129	139	124
31	ins.	5.25	X	3.75	4.44	3.25
	mm	133	X	95	113	83
32	ins.	5.69	X	3.66	4.69	3.25
	mm	145	X	93	119	83
33	ins.	6.06	X	4.38	4.94	3.91
	mm	154	X	111	125	99
34	ins.	6.91	X	3.75	6.09	3.25
	mm	176	X	95	155	83
35	ins.	7.34	X	3.66	6.34	3.25
	mm	186	X	93	161	83
36	ins.	7.66	X	4.38	6.56	3.91
	mm	195	X	111	167	99
37	ins.	4.61	2.75	2.81	3.89	2.39
	mm	117	70	71	99	61
38	ins.	4.61	2.75	2.81	3.89	2.39
	mm	117	70	71	99	61
39	ins.	5.42	2.31	2.75	4.86	3.80
	mm	138	59	70	123	97
40	ins.	5.20	3.29	2.81	4.50	2.28
	mm	132	83	71	114	58
41	ins.	5.13	3.10	3.75	4.32	3.25
	mm	130	79	95	110	83
42	ins.	6.43	4.40	3.93	5.62	3.25
	mm	163	112	100	143	83
43	ins.	5.57	3.35	3.66	4.57	3.25
	mm	142	85	93	116	83
44	ins.	5.90	3.57	4.38	4.79	3.91
	mm	150	91	111	122	99
45	ins.	5.26	3.17	3.75	4.38	3.84
	mm	134	81	95	111	98
46	ins.	4.95	3.10	3.84	4.31	2.75
	mm	126	79	98	110	70
47	ins.	6.43	3.59	3.75	4.81	3.52
	mm	163	91	95	122	90
48	ins.	6.43	3.59	3.66	4.81	3.73
	mm	163	91	93	122	95
49	ins.	6.91	3.75	4.38	4.96	4.40
	mm	176	95	111	126	112
50	ins.	8.13	4.15	5.06	5.37	4.87
	mm	207	105	129	136	124
51	ins.	8.13	4.15	5.50	5.37	5.18
	mm	207	105	140	136	132

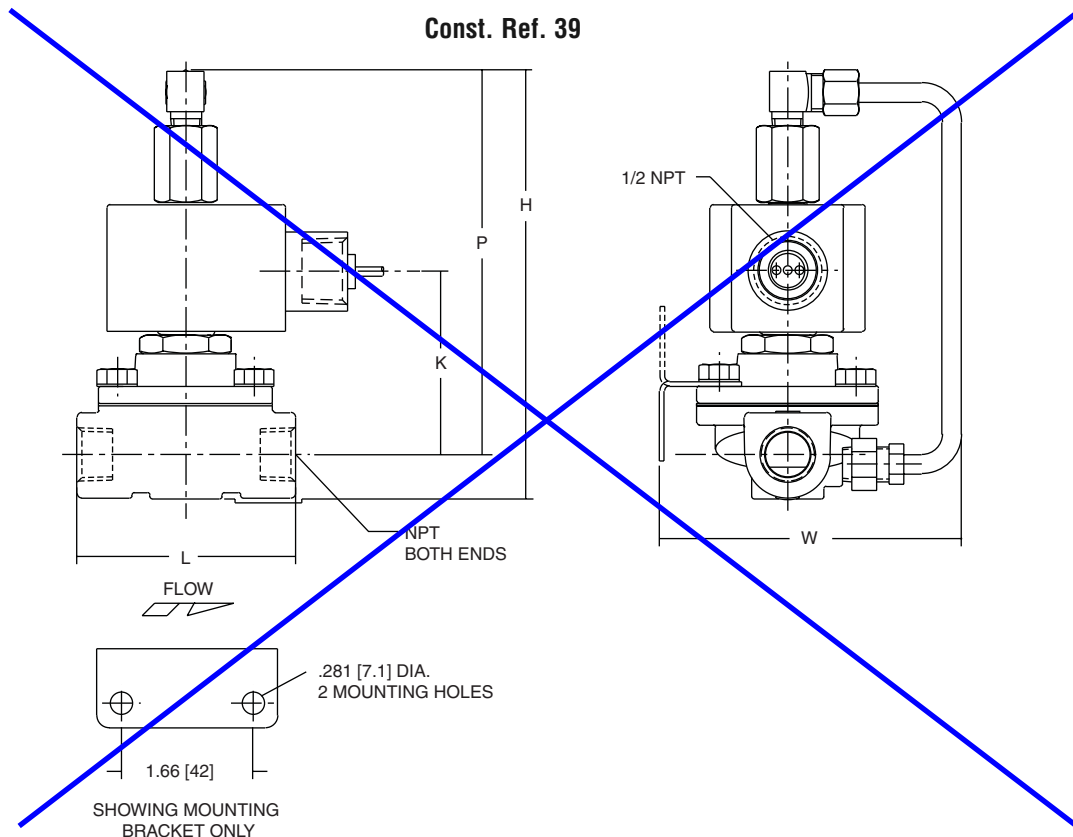
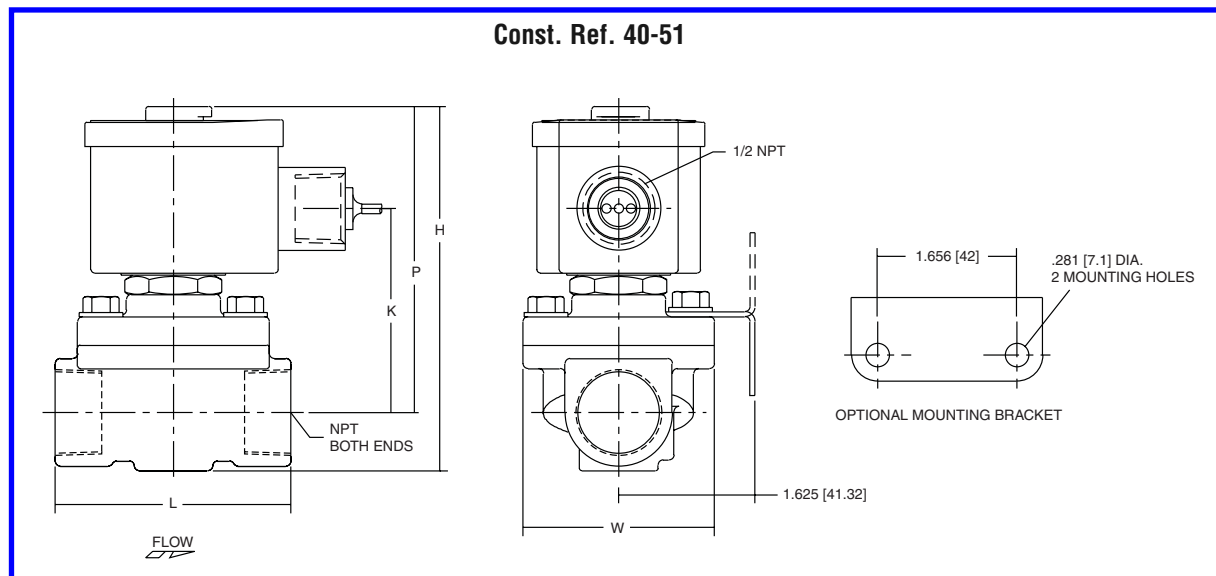
IMPORTANT: Valves may be mounted in any position, except as noted in specifications table.

Const. Ref. 10, 15, 24, 26-36



Const. Ref. 12, 16, 18



Dimensions: inches (mm)**Const. Ref. 39****Const. Ref. 40-51**

ASCO's electrical connection devices are designed using the DIN 43650/ISO 4400 or DIN 46244 (Pg 9P) form standards consistent with our solenoid valve coil designs and permitting industry interchangeability. Each size is available for user wiring or factory prewired installations. Other options include 1/2" conduits, and LED/VDR models.

Features

- Glass fiber reinforced polyamide housing and lid
- IP65 protection against moisture entry and washdown when properly installed with gaskets
- **LED:** Light Emitting Diode. A solid-state diode that emits light to indicate power to the connector
- **VDR:** Varistor absorbing the self-inductance of the coil. The VDR is there to protect the coil or controller against supply over-voltage or peak
- Maximum voltage 240 Volts



Size 11 mm, Form B

Part Number	Description	Orientation	Rotatable	Figure
290413-001	1/2" conduit	Ground Down	180°	A
289281-001	1/2" conduit with LED/VDR	Ground Down	180°	A
290414-001*	PG 9 cable gland	Ground Down	180°	B
290415-120	PG 9 cable gland with LED/VDR 120/AC-DC	Ground Down	180°	B
290415-240	PG 9 cable gland with LED/VDR 240/AC-DC	Ground Down	180°	B
290415-024	PG 9 cable gland with LED/VDR 24/AC-DC	Ground Down	180°	B
285483-015**	4.5' leads with LED 120/AC-DC PVC	Ground Up	No	B
285482-015**	4.5' leads with LED 24/AC-DC PVC	Ground Up	No	B
285481-018**	6' leads with stripped ends	Ground Down	180°	B

Available in 10 pack; part number 226061-001-

**Also available in 9', 16', and 33' lengths. Consult factory.

Figure A

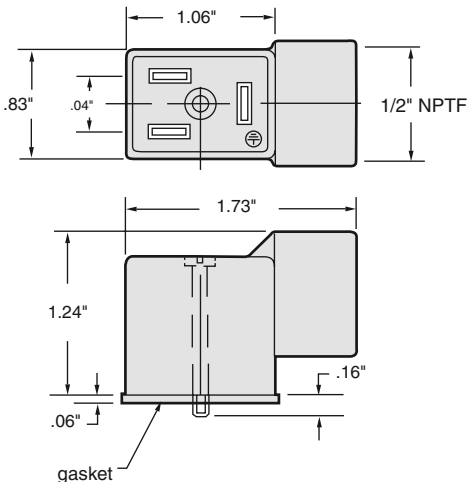
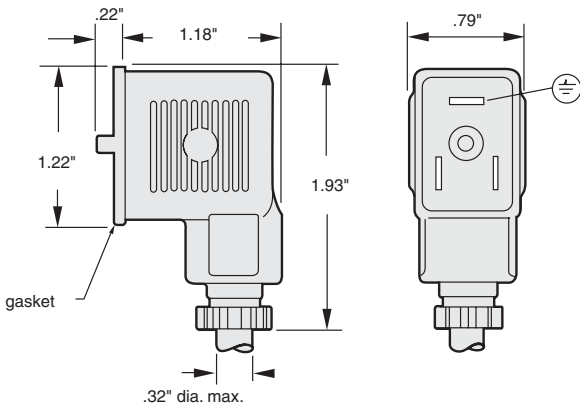


Figure B



Size 18 mm, Form A

Part Number	Description	Orientation	Rotatable	Figure
290410-001	1/2" conduit	Ground Up	90°	C
289280-001	1/2" conduit with LED	Ground Up	90°	C
290411-001*	PG 9 cable gland	Ground Up	90°	D
290412-120	PG 11 cable gland with LED/VDR 120/AC-DC	Ground Up	90°	D
290412-240	PG 11 cable gland with LED/VDR 240/AC-DC	Ground Up	90°	D
290412-024	PG 11 cable gland with LED/VDR 24/AC-DC	Ground Up	90°	D
290412-048	PG 11 cable gland with LED/VDR 48/AC-DC	Ground Up	90°	D
285480-015**	4.5' leads with LED 120/AC-DC PVC	Ground Up	No	D
290409-015**	4.5' leads with LED 240/AC-DC PVC	Ground Up	No	D
285479-015**	4.5' leads with LED 24/AC-DC PVC	Ground Up	No	D
272852	6' leads with North American outlet plug	Ground Up	No	D
272852-003	6' leads with North American outlet plug (rotated 90 degrees)	Ground Up	No	D
285478-015**	4.5' leads with stripped ends	Ground Up	No	D

*Available in 50 pack; part number 266615.
 **Also available in 9', 16', and 33' lengths. Consult factory.

Figure C

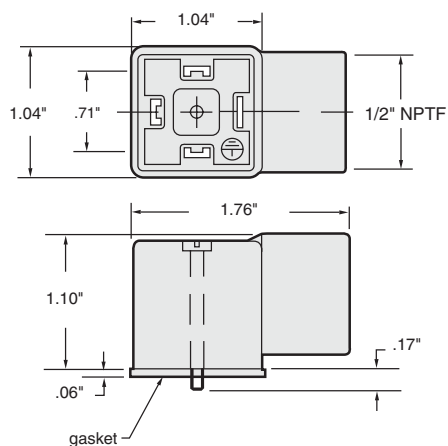
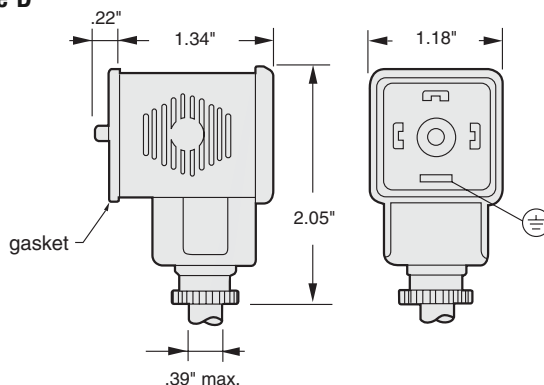


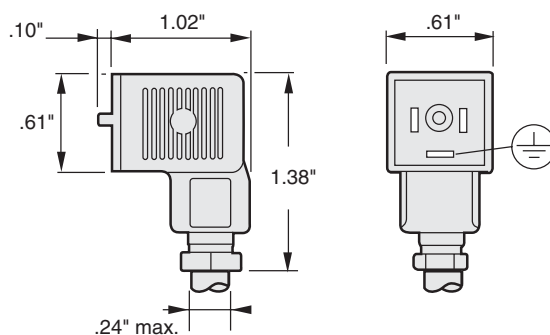
Figure D



Size 9.4 mm, Form C

Part Number	Description	Orientation	Rotatable
290417-001	PG 7 cable gland	Ground Up	180°
290418-001	PG 7 cable gland LED/VDR 120-240/AC 50/60	Ground Up	180°
289278-001	PG 7 cable gland LED/VDR 48-120/AC 50/60	Ground Up	180°
289282-001	PG 7 cable gland LED/VDR 48-120/DC	Ground Up	180°
289277-001	PG 7 cable gland LED/VDR 6-48/AC-DC	Ground Up	180°
290416-013**	4.5' leads with LED 120/AC-DC PVC	Ground Up	No
285485-015**	4.5' leads with LED 24/AC-DC PVC	Ground Up	No
272852-004**	6' leads	Ground Up	No

**Also available in 9', 16', and 33' lengths. Consult factory.





Globe Valve

Standard Features (Sizes 1/2" - 4")

- Used for efficient throttling of flow
- Positive shut-off
- Displays excellent flow regulating characteristics throughout the entire lift of the disc
- All sizes rated for full vacuum service
- EPDM seals. FKM optional

Parts List/Thd-Soc (Sizes 1/2" - 2")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, PP
2	Bonnet	1	PVC, PP
3	Stem	1	PVC, PP
4	Gland	1	PVC, PP
5	Gland Nut	1	PVC, PP
6	Sheet Gasket	1	EPDM, Others
7	Gland Packing	2	EPDM, Others
8	Disc	1	PP
9	Stem Holder	1	PP
13	Ring	1	Stainless Steel 304
14	Hand Wheel	1	PP
15	Nut	1	PVC
16	Washer	1	PVC

Sample Specification

All Globe Valves shall be of a thermoplastic construction and have no metal part that comes in contact with media. Sizes 1/2" through 2" shall be of union bonnet design, 2-1/2" through 4" shall be of outside stem and yoke type. PVC shall conform to ASTM D1784 Cell Classification 12454-A and PP conforming to ASTM D4101 Cell Classification PP0210B67272. PVC valves shall be rated to 150 psi at 70 degrees F sizes 1/2" thru 2" 110 psi at 70 degrees F sizes 2-1/2" thru 4". PP rated to 110 psi at 70 degrees F sizes 1/2" thru 4", as manufactured by Asahi/America, Inc.

Specifications			
Sizes:	1/2" - 4"		
Bodies:	PVC and PP		
Models:	Flanged ANSI	1/2" - 4"*	
	Socket PVC	1/2" - 2"	
	PP**	1/2" - 1"	
	Thread PVC	1/2" - 2"	
	PP	1/2" - 1"	
Plug:	PP		
Seals:	EPDM or FKM		

* 2-1/2" - 4": Outside stem and yoke type
** DIN Socket also available

Parts List/Flanged (Sizes 1/2" - 4")

PARTS			
NO.	DESCRIPTION	PCS.	MATERIAL
1	Body	1	PVC, PP
2	Bonnet	1	PVC, PP
3	Stem	1	PVC, PP
4	Gland	1	PVC, PP
5	Gland Nut	1	PVC, PP
6	Gland Gasket	1	EPDM, FKM
7	Gland Packing	1	EPDM, FKM
8	Disc	1	PP
9	Stem Holder	1	PVC, PP
10	Stem with Trapezoid Screw	1	Copper Alloy
11	Bolt, Nut, Washer	8	Stainless Steel 304
12	Stud Bolt, Nut	2	Stainless Steel 304
13	Stem Support	1	PP
14	Hand Wheel	1	PP
15	Nut (A)	1	PVC (1/2" - 2")
		2	Stainless Steel 304
16	Washer	1	PVC (1/2" - 2")
		1	Stainless Steel 304
17	Reinforcing Ring	1	Stainless Steel 304
18	Inserted Nut	1	Copper Alloy
19	Stem Metal Insert	1	Steel
20	Inserted Metal	1	Bronze

* PVC nut and washer on sizes 1/2" through 2"

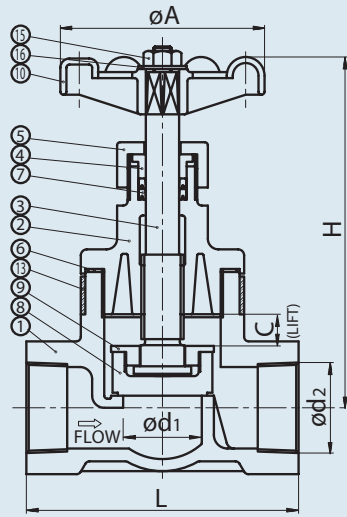
Pressure vs. Temperature (PSI, WATER, NON-SHOCK)

NOMINAL SIZE		PVC			PP		
		30° F 70° F	71° F 105° F	106° F 120° F	-5° F 70° F	71° F 120° F	121° F 175° F
1/2 - 1 1/2	15-40	150	150	110	110	95	65
2	50	150	150	95	110	75	45
2 1/2 - 3	65-80	110	110	95	110	60	35
4	100	110	80	65	110	60	35

Globe Valves

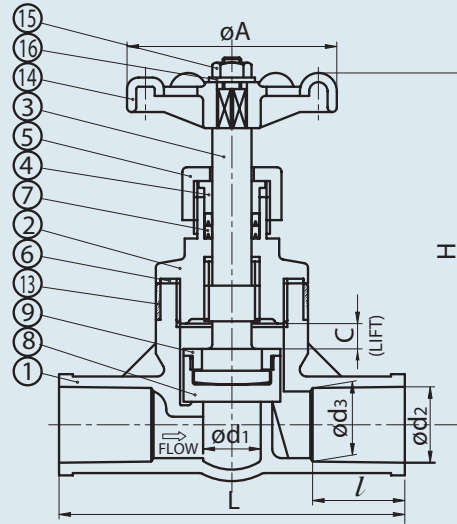
SOCKET AND THREADED END

1 1/2" — 2"



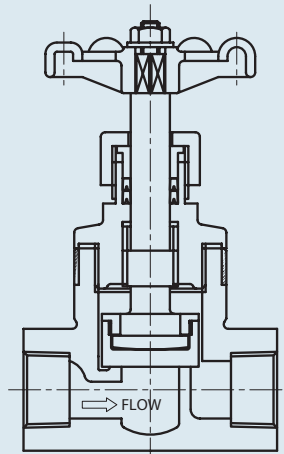
SOCKET END

1/2" — 1 1/4"

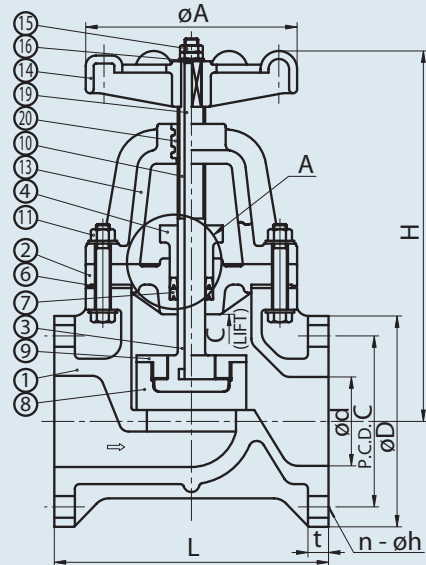


THREADED END

1/2" — 1 1/4"

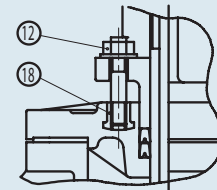
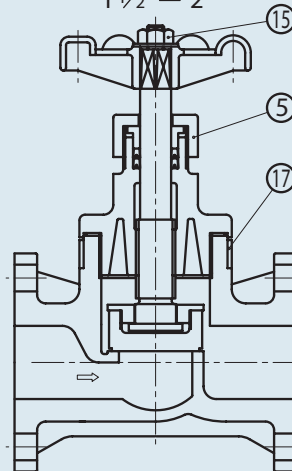


FLANGED 2 1/2" — 4"



FLANGED

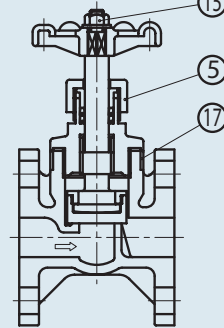
1 1/2" — 2"



DETAIL OF "A"

FLANGED

1/2" — 1 1/4"



Dimensions (INCHES)

NOMINAL SIZE		FLANGED										SOCKET AND THREADED										Cv VALU- ES
		WT. (LBS)	d	C	D	L	t	LIFT C	H (open)	n	h	WT. (LBS)	THREADED		SOCKET			LIFT C	d1	H (open)	A	
IN.	mm												d2	L	d2	L	<i>l</i>					
1/2	15	0.88	0.71	2.38	3.50	3.35	0.47	0.31	5.20	4	0.62	0.66	NPT 1/2	3.35	0.85	4.33	1.18	0.32	0.59	5.20	2.60	4.1
3/4	20	1.10	0.94	2.75	3.88	3.74	0.55	0.31	5.51	4	0.62	1.10	NPT 3/4	3.74	1.06	5.12	1.38	0.32	0.71	5.51	2.60	6.4
1	25	2.20	1.10	3.12	4.25	4.33	0.55	0.43	6.34	4	0.62	1.10	NPT 1	4.33	1.33	5.91	1.58	0.43	0.98	6.34	3.58	9.7
1 1/4	32	2.90	1.46	3.50	4.62	5.31	0.63	0.51	6.57	4	0.62	1.30	NPT 1 1/4	5.32	1.67	5.32	0.98	0.51	1.38	6.58	3.58	18.0
1 1/2	40	4.41	1.61	3.88	5.00	7.48	0.63	0.79	9.06	4	0.62	2.70	NPT 1 1/2	5.51	1.91	5.51	0.98	0.79	1.61	9.06	5.31	22.0
2	50	5.30	2.05	4.75	6.00	7.87	0.63	0.94	9.92	4	0.75	3.50	NPT 2	7.09	2.38	7.09	1.06	0.95	2.05	9.92	5.31	29.0
2 1/2	65	13.25	2.64	5.50	7.00	8.66	0.71	1.38	13.58	4	0.75	—	—	—	—	—	—	—	—	—	7.28	57.0
3	80	15.00	3.07	6.00	7.50	9.45	0.71	1.38	14.13	4	0.75	—	—	—	—	—	—	—	—	—	7.28	78.0
4	100	22.00	3.94	7.50	9.00	11.42	0.71	1.57	16.50	8	0.75	—	—	—	—	—	—	—	—	—	7.28	115.0



FEATURES

- Low-friction, long-life jewel bearings
- One moving part
- Fully field-repairable
- Choice of materials for compatibility with variety of chemicals
- Fits 1/2" to 8" pipe
- Fixed depth in fitting ensures proper placement in pipe

APPLICATIONS

- Industrial water/wastewater treatment
- Cooling water monitoring
- Industrial fluid control
- Chemical proportioning

GENERAL INFORMATION

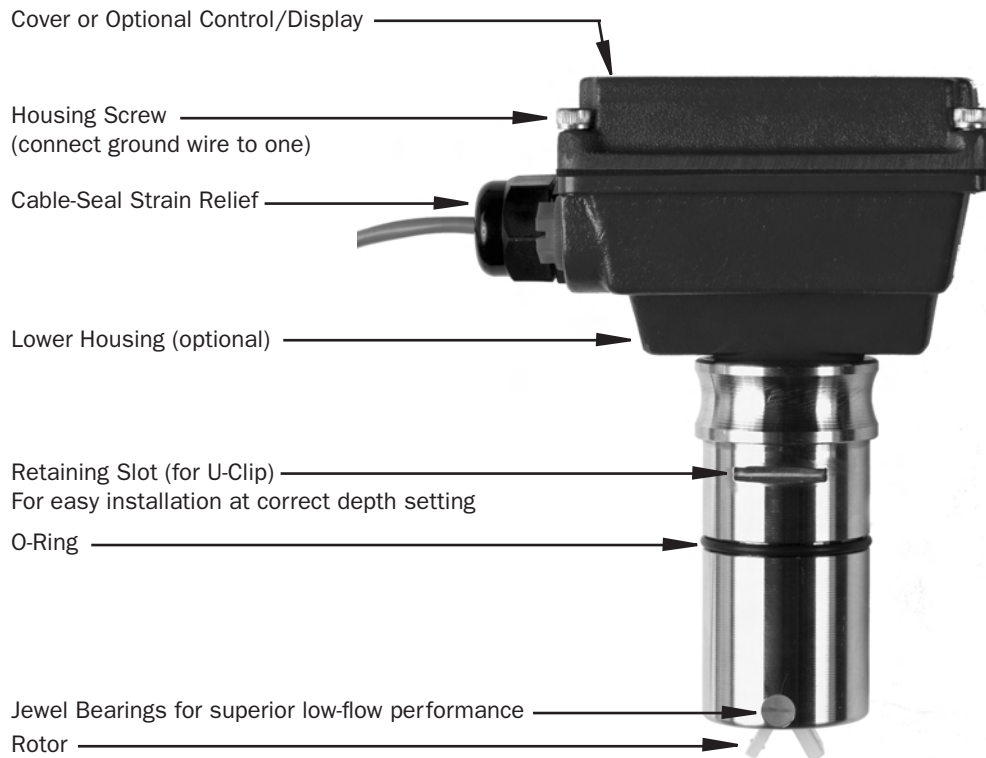
The **IP80-Series** are impeller (or "paddlewheel") insertion meters designed for use with a wide variety of liquids in pipe sizes 1/2" to 8". Sensors are available in brass, 316 stainless steel, PVC, and polypropylene. Bodies are machined from a solid rod for maximum precision. High-quality jewel bearings and nickel-bound tungsten carbide shafts are used for extreme low friction and long life. Low-flow performance is good, although other SeaMetrics flow meters are recommended where extremely low flows are being measured.

The rotation of the rotor is detected by a non-drag Hall-effect sensor. Output is a current-sinking pulse (square wave), which can be sent long distances (up to 2,000 feet) without a transmitter. This signal can be connected directly to PLC's, counters, and computer cards, as well as a variety of SeaMetrics controls and displays.

SeaMetrics IP meters are ideal for chemical proportioning applications. If no display is required, a simple divider such as the PD10 provides adjustable pump pacing. For rate and total display, the FT415 (battery powered) or FT420 (loop powered) flow indicator can be mounted directly on the IP80-Series meter, or remotely on a wall or panel. The AO55 blind analog transmitter can be used to convert to a 4-20 mA output. IP meters are also compatible with the DL75 data logger and FT520 batch processor.

The IP80-Series require special fittings that ensure correct depth placement in the pipe. Fittings come in a variety of materials for compatibility with specific applications. Tee fittings are individually wet-calibrated at the factory and marked with the K-factor (pulses per gallon). Saddle fittings must be field-installed on the pipe and do not come wet-calibrated. K-factors for saddles are based on factory-testing.

FEATURES



SPECIFICATIONS*

Materials	Sensor Body	Brass, 316 Stainless Steel, PVC, or Polypro		
	Rotor	PVDF		
	Shaft	Nickel-bonded tungsten carbide (Ceramic optional)		
	Bearings	Ruby jewel		
	O-Ring	EPDM (Viton optional)		
Rotor Pickup		GMR (Giant Magnetoresistive) Sensor		
Maximum Pressure	Brass	316 SS	PVC or Polypro (See Pressure vs. Temp. Chart)	
	200 PSI (14 bar)	250 PSI (17 bar)	175 PSI (12 bar) @ 75° F	
Maximum Temperature		200° F (93° C)	200° F (93° C)	130° F (55° C)
Flow Range		0.3 - 30 ft./sec.		
Accuracy		+/- 1.5% of full scale		
Signal		Hall effect current sinking pulse		
Power		6-24 Vdc, 2 mA		
Maximum Current		20 mA		
Cable		#22 AWG, 3 Cond, 18 foot (maximum 2000' run)		

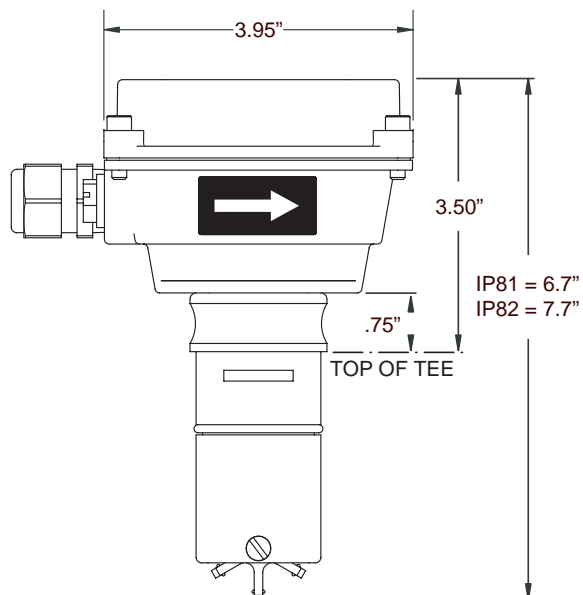
*Specifications subject to change • Please consult our website for current data (www.seametrics.com).



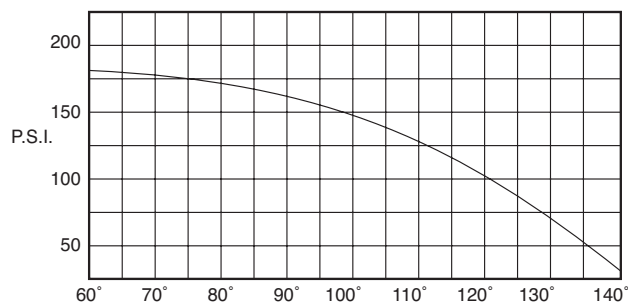
IP80-SERIES Insertion Paddlewheel Flow Sensor

DIMENSIONS

NOTE: Housing Optional



PRESSURE VS. TEMPERATURE (PVC/Polypro)



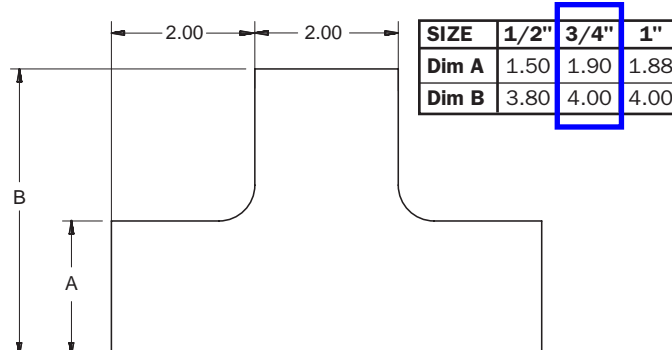
FLOW RANGE (In Gallons Per Minute)

	1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"
Min	0.28	0.5	0.8	1.9	3.1	6.9	12	27	46.8
Max	28	50	80	190	314	691	1190	2700	4680

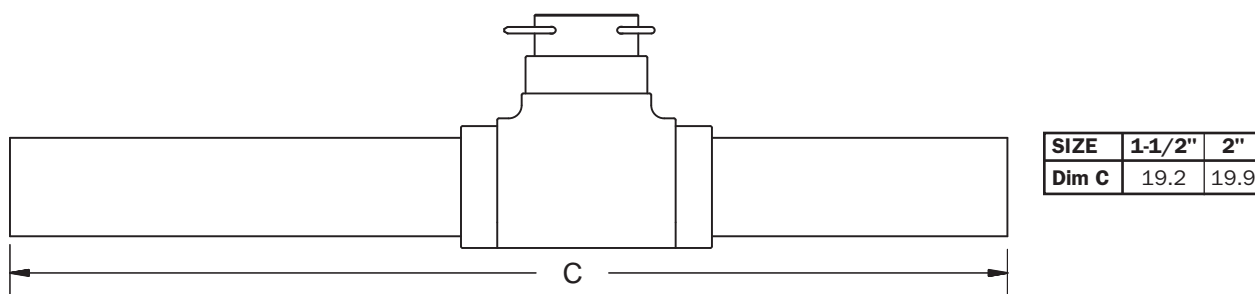
AVAILABLE FITTINGS

	Tee	Saddle	Weld	Braze	Sweat Tee
Bronze	1/2-4"	3-4"	x	3-8"	1/2-4"
PVC	1/2-2"	3-8"	x	x	x
Stainless Steel	1/2-2" 304SS	x	3-8" 316SS	x	x
Carbon Steel	1/2-2"	x	3-8"	x	x
Ductile Iron	x	3-8"	x	x	x

PVC BLOCK TEE FITTING



PVC TEE FITTINGS





IP80-SERIES Insertion Paddlewheel Flow Sensor

HOW TO ORDER

MODEL	MATERIAL	OPTIONS	FITTINGS
1/2" - 4" = IP81 6" - 8" = IP82	Brass = B 316 Stainless Steel = S PVC = P Polypro = Y	Ceramic Shaft = -01 Micropower Pickup = -04 (Use with FT415 or DL75) LMI Pump Connector = -06 SeaMetrics Control Connector = -07 Viton® O-Ring = -60	Select from chart above (Fitting Type and Material)
IP81	P	07	

ACCESSORIES

Rate and Total Indicator with pulse & 4-20 mA outputs = FT420	Pulse divider = PD10
Rate and Total Indicator, battery powered = FT415	Data logger = DL75
Analog transmitter, blind 4-20 mA converter = AO55	Mounting kit, converts wall to meter mount = MK10
Power converter, plug-in, 110-115 Vac, 24 Vdc = PC3	Mounting kit, converts meter to wall mount = MK20

CONTACT YOUR SUPPLIER

All position line check valves

STAINLESS STEEL POPPET

No. 400

No. 400 Check Valves with metal poppets are ruggedly constructed and are suitable for a wide variety of applications including hot water, cold water, steam, oil, gas, compounds and chemicals.

The one-piece body is cast brass; the poppet is stainless steel for a metal-to-metal seal. Like the No.300, a sensitive spring allows this valve to be used in any position. Working pressure 200 lbs. WOG, 75 lbs. steam. Maximum temperature 300° F. Not for air compressor service.



One-piece cast brass for a lifetime of service.

No. 400 Specifications

Pipe Size	400 Series Part No.	Over-all Length	Valve Weight
3/8"	400-038	2.63"	0.50 lb
1/2"	400-050	2.69"	0.65 lb
3/4"	400-075	3.31"	0.90 lb
1"	400-100	3.69"	1.25 lb
1 1/4"	400-125	4.57"	2.00 lb
1 1/2"	400-150	4.88"	2.35 lb
2"	400-200	5.56"	3.80 lb

NPT threaded

NO.400



Proprietary stainless steel poppet assures perfect seating and sensitive operation.

Our '300' series gauge line is a high quality line of liquid filled gauges. The glycerine filling helps dampen the effects of pulsation and vibration, while also perpetually lubricating the movement (and keeping contaminants such as dirt away from all moving parts) which will extend the life of the gauge.

This gauge has been specifically designed with original equipment manufacturers in mind. It is typically used in chemical processing or food processing applications as well as any commercial or industrial application where stainless steel components are required.

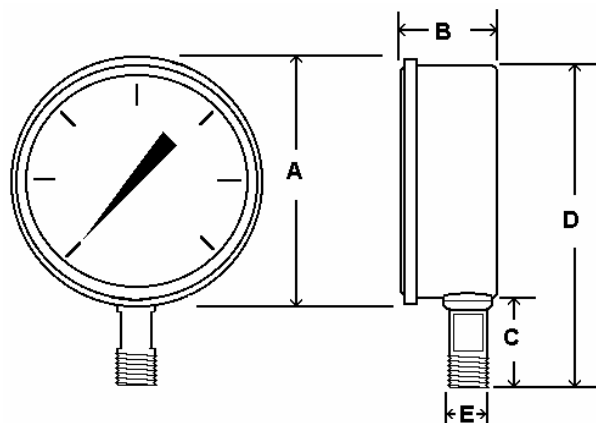
SPECIFICATIONS:

- Available Dial Sizes: 2 1/2", 4", 6"
- Available Connection Sizes:
 - 1/4" MNPT on 2", 2 1/2" and 4"
 - 1/2" MNPT on 4" and 6"
- Stainless Steel Case and Crimped Bezel
- SS Internals
- 316 SS Bourdon Tube & Connection
- Connection Welded to Case
- Liquid Filled (Dry Available) (GLYCERINE)
- Accuracy : 2 1/2" Dial Size = 1.5 %
4" and 6" Dial Size = 1 %
- Dual Scale: PSI & Bar (x100=kPa)
(Single Scale available)
- Ambient temperature: FILLED: 30°F to 160°F
DRY: -30°F to 180°F

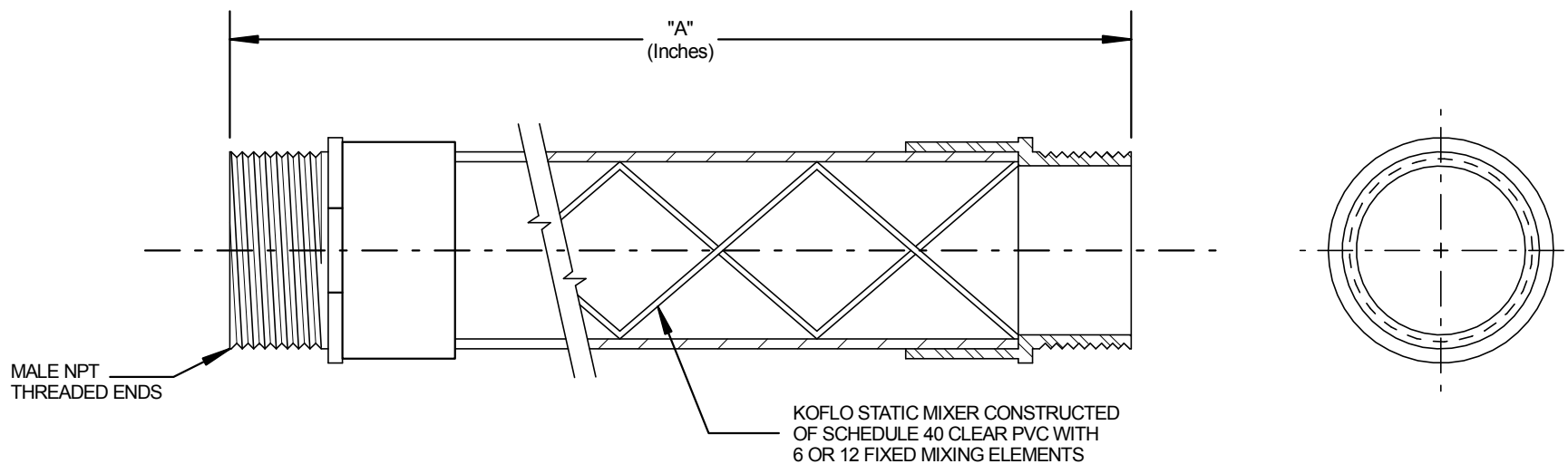


RANGE	CODE	Major In	Minor In
30/0"VAC	A	5	0.5
30/0/15	CB	5	0.5
30/0/30	CC	10	1
30/0/60	CD	10	1
30/0/100	CE	20	2
30/0/150	CF	20	2
30/0/300	CH	50	10
0/15	B	2	0.2
0/30	C	5	0.5
0/60	D	10	1
0/100	E	20	2
0/160	F	20	2
0/200	G	40	4
0/300	H	50	5
0/400	I	50	5
0/500	J	100	10
0/600	K	100	10
0/800	L	100	10
0/1000	M	200	20
0/1500	N	200	20
0/2000	O	400	50
0/3000	P	500	50
0/4000	Q	500	50
0/5000	R	1000	100
0/6000	S	2000	200
0/10,000	U	2000	200
0/15,000	V	2000	200


Some ranges not available in all dial sizes, please call with your particular application



		A	B	C	D	E
2 1/2" Dial	In	2.67	1.30	1.04	3.50	1/4" NPT
	MM	68	33	26	89	
4" Dial	In	4.32	1.63	1.25	5.57	1/4" or 1/2" npt
	MM	110	42	32	141	
6" Dial	In	6.54	1.70	1.68	8.22	1/4" or 1/2" npt
	MM	166	43	43	210	



Size	6 Element Model Number	"A" 6 Element	12 Element Model Number	"A" 12 Element
3/8"	3/8-40C-4-6-2	6-1/2	3/8-40C-4-12-2	11
1/2"	1/2-40C-4-6-2	7	1/2-40C-4-12-2	12
3/4"	3/4-40C-4-6-2	9	3/4-40C-4-12-2	15
1"	1-40C-4-6-2	11	1-40C-4-12-2	18
1-1/4"	1.25-40C-4-6-2	14	1.25-40C-4-12-2	25
1-1/2"	1.5-40C-4-6-2	15	1.5-40C-4-12-2	28
2"	2-40C-4-6-2	19	2-40C-4-12-2	35

		Koflo Corporation 309 CARY POINT DR. CARY, IL 60013	
		SCALE: NONE	APPROVED BY <i>JLF</i>
DATE: 1/18/94		REVISED 10/15/01	
CUSTOMER:		REVISED 5/22/08	
		REVISED 6/12/09	
MODEL NO: CLEAR PVC SCHEDULE 40 MIXER		DRAWING NUMBER: KD-993	



LAB BALL VALVES



Sample Engineering Specification

All thermoplastic valves shall be sealed unit Lab type constructed from PVC Type I, ASTM D 1784 Cell Classification 12454 or CPVC Type IV, ASTM D 1784 Cell Classification 23447. All O-rings shall be EPDM or Viton®. All valves shall have double stop Polypropylene handle. All 1/4" valves shall have optional field installable male thread and tubing end connector adapters. All valves shall be certified by NSF International for use in potable water service. All valves shall be pressure rated at 150 psi for water at 73°F, as manufactured by Spears® Manufacturing Company.

Quick-View Valve Selection Chart

Valve Size	O-ring Material	PVC Part Number ¹			Pressure Rating
		Socket	Threaded	Threaded with Kit	
1/4	EPDM	1522-002	1521-002	1529-002	150 psi Non-Shock Water @ 73°F
	Viton®	1532-002	1531-002	1539-002	
3/8	EPDM	1522-003	1521-003	N/A	
	Viton®	1532-003	1531-003	N/A	

¹: For CPVC Valves, add the letter "C" to part number listed (e.g., 1521-002C)

Valve & Adapter Kit

Kit allows multiple connection options. Adapters use O-ring seals for easy connection to threaded valve. Complete Kit includes:

- 1 – 1/4" Threaded Valve
- 2 – 1/4" O-ring Sealed Mpt x Mpt Adapters
- 2 – 1/4" O-ring Sealed Mpt x Barb Adapters (for 3/8" I.D. tubing)
- 2 – EPDM or Viton® O-rings (AS568A-013 size)
- 1 – End Connector Wrench

Features – PVC, CPVC

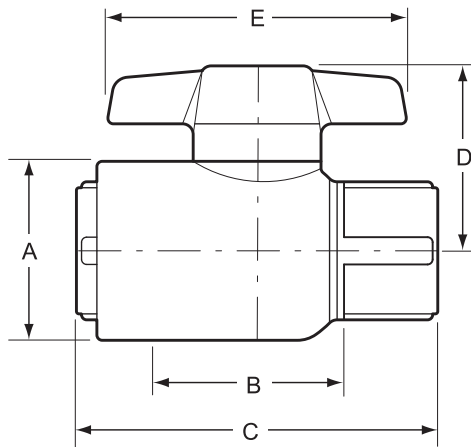
This versatile quarter-turn shutoff valve is ideally suited for a variety of laboratory, system monitoring and OEM applications. Available in IPS sizes 1/4" - 3/8" with socket or threaded end connectors, plus 1/4" threaded Valve & Adapter Kit to provide multiple connection options.

- Chemical & Corrosion Resistant PVC or CPVC Construction
- Maintenance-Free Sealed Unit
- Individual Valve or Multi-functional Valve & Adapter Kit
- Schedule 80 Full-Bore Design
- High Impact Polypropylene Handle
- EPDM or Viton® O-rings
- PTFE Floating Seat Design
- Sizes 1/4" - 3/8" Pressure Rated to 150 psi @ 73°F
- NSF Certified for Potable Water use
- Assembled with Silicone-Free, Water Soluble Lubricant

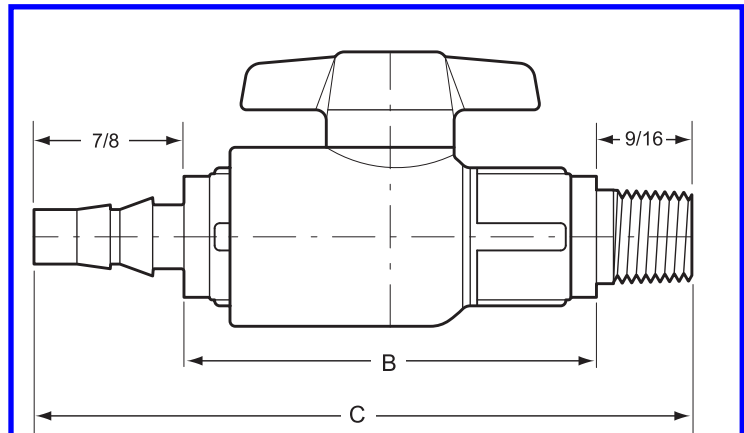


LAB VALVE WITH ADAPTER KIT

LAB BALL VALVES



Basic Valve



Valve with Adapter Kit

Dimensions, Weights & C_v Values

Nominal Size	Dimension Reference (inches, ± 1/16)					Approx. Wt. (Lbs.)		C _v ² Values
	A	B ¹	C	D	E	PVC	CPVC	
1/4	1-1/16	15/16	2-1/8	1-1/16	1-3/4	.10	.11	10
1/4 w/Kit	1-1/16	2-7/16	3-7/8	1-1/16	1-3/4	.14	.15	6
3/8	1-5/16	1	2-3/16	1-1/4	2	.12	.13	24

1: Valve Lay Length

2: Gallons per minute at 1 psi pressure drop. Values calculated from valve laying length, based on derivative of Hazen-Williams equation with roughness factor of C=150.

Temperature Pressure Rating

System Operating Temperature °F (°C)		73 (23)	100 (38)	110 (43)	120 (49)	130 (54)	140 (60)	150 (66)	160 (71)	170 (77)	180 (82)	190 (88)
Valve Pressure Rating psi (MPa)	PVC	150 (1.03)	124 (.85)	100 (.69)	75 (.52)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)	-0- (-0-)
	CPVC	150 (1.03)	140 (.97)	130 (.90)	120 (.83)	110 (.76)	100 (.69)	90 (.62)	80 (.55)	70 (.48)	60 (.41)	-0- (-0-)

NOT FOR USE WITH COMPRESSED AIR OR GASES

ProMix M Series PVC Mixing Chamber

SPECIFICATIONS:

- Material: PVC
- Volume: 3.2 Gallons
- Water Inlet Connection: ¾" NPT
- Polymer Inlet Connection: ¾" NPT
- Polymer Solution Outlet Connection: ¾" NPT
- Maximum Chamber Pressure: 150 PSIG
- Normal Operating Pressure: 100 PSIG
- Recommended Running Temp: +50°F - 100°F
- Weight: 75 lbs.
- Motor Horsepower: 3/4
- Motor Frame: 56C, TEFC
- Voltage: 120VAC, 60Hz, 1 Phase
- Direct Coupled Motor & Sealed Bearing

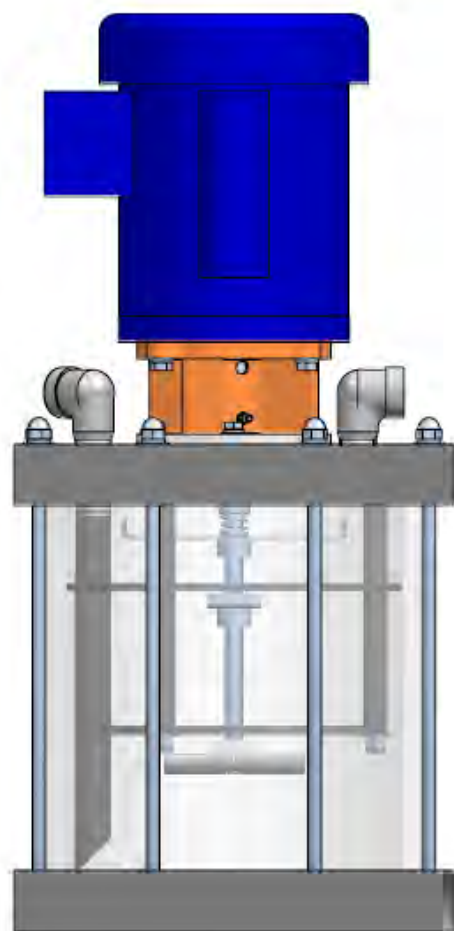
DESCRIPTION:

- Three Distinct Mixing Zones
- Three Different Mixing Blades for delivery of proper energy.

1st Zone = The first mixing blade delivers high shear at the precise point of polymer injection, creating immediate dispersion before agglomeration takes place.

2nd Zone = The second mixing blade induces a vortex and draws solution down through the center of the chamber from Zone 1 and forces the solution outward to the sides and then down into Zone 3.

3rd Zone = The third mixing blade gently agitates/blends the active polymer solution before it exits the chamber through the bottom of the discharge tube.



ProMix PVC Injection Valve

SPECIFICATIONS:

- Material: PVC & 316SS
- Polymer Inlet Connection: ½" NPT
- Mixing Chamber Connection: ¾" NPT
- Location: Top Side of Mixing Chamber
- Spring Pressure: 27 PSIG
- Maximum Operating Pressure: 150 PSIG
- Normal Operating Pressure: 100 PSIG
- Weight: < 1 lbs

DESCRIPTION:

- Pass through design with large openings straight to the injection point.
- The injection tip can easily be unscrewed from the main body so that it can be cleaned periodically or during plant shut downs.





FIBOX

Enclosing innovations

NEW



**ARCA – Upgrade to
the 21st Century**

ARCA Enclosures – Upgrade to the 21st Century



Fibox's new ARCA non-metallic enclosures provide users of classic electrical junction boxes an easy upgrade path to a high performance enclosure featuring 21st century technology. Precision, injection molded, ARCA enclosures feature superior chemical resistance and the wide temperature utilization range of polycarbonate plastic. Available in classic sizes, these enclosures feature industry standard dimensions and panels.

ARCA enclosures advance beyond tradition to meet and exceed the growing demands of 21st century applications. ARCA's rugged construction achieves a unique appearance without sacrificing robustness. The stylized cover features an overlapping design providing superior protection of the formed-in-place PUR gasket.

ARCA enclosures are available as a screw cover enclosure, a hinged screw cover enclosure, or a hinged enclosure with latches. Select from a variety of latch options. Enclosure covers are available as either opaque or transparent clear. Complete ranges of mounting plates, fixed inner panels and hinged inner panels are available, in metal or non-metallic versions.

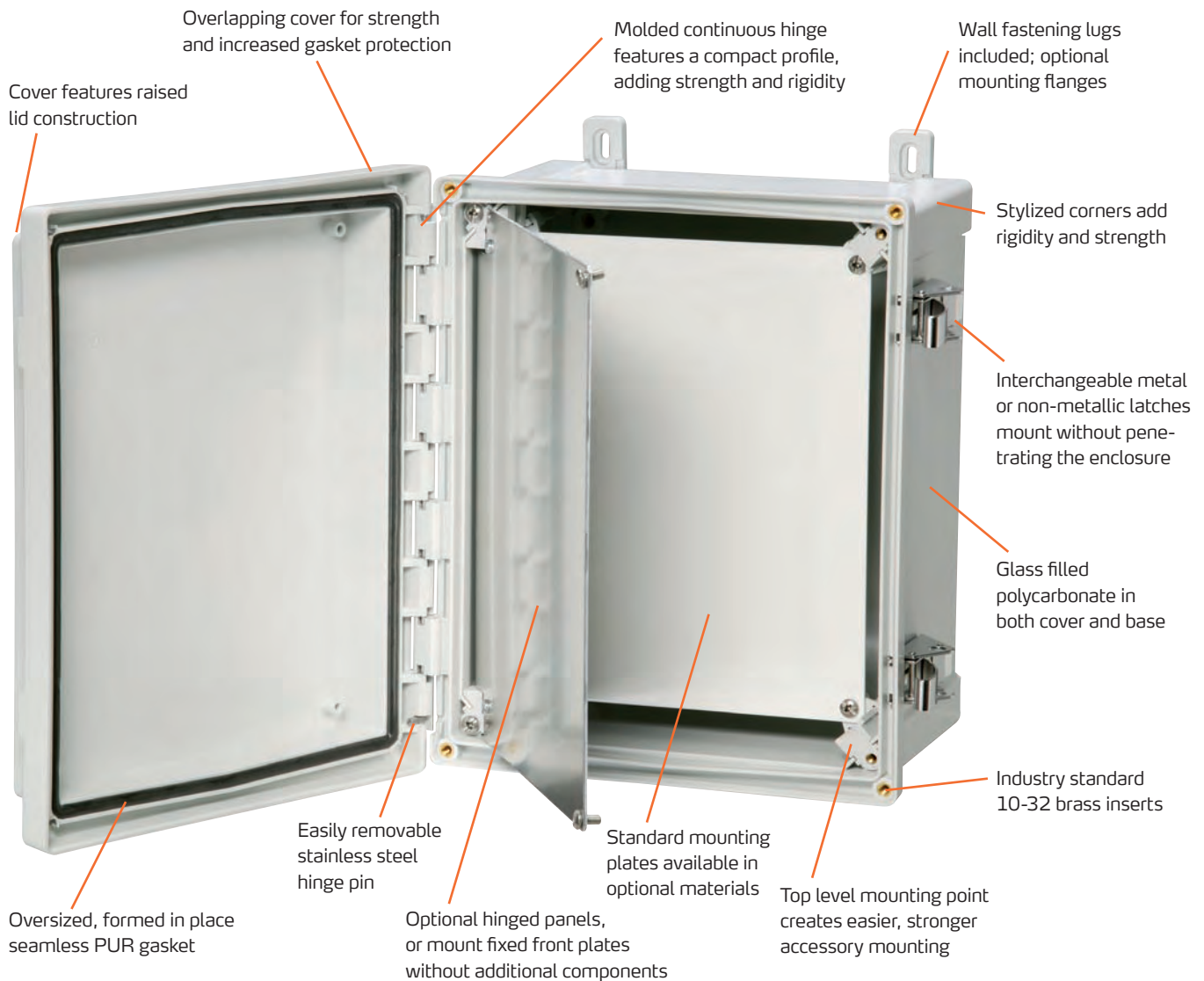
ENCLOSURES

Catalog Number			Enclosure Size A x B x C	Panel Catalog Number	Panel Size h x w	Enclosure Mounting F x G	Exterior Overall H x W x D
Screw Cover	Hinged Screw Cover	Hinged with Latch*					
AR664SC	AR664CHSC	AR664CHSSL	6.0 x 6.0 x 4.0	ABP66	4.9 x 4.9	6.7 x 4.0	7.6 x 7.4 x 4.7
AR664SCT	AR664CHSCT	AR664CHSSLT	(152 x 152 x 102)		(124 x 124)	(170 x 102)	(192 x 188 x 120)
AR865SC	AR865CHSC	AR865CHSSL	8.0 x 6.0 x 5.0	ABP86	6.7 x 4.9	8.7 x 4.0	9.5 x 7.4 x 5.7
AR865SCT	AR865CHSCT	AR865CHSSLT	(203 x 152 x 127)		(171 x 124)	(220 x 102)	(242 x 189 x 145)
AR1086SC	AR1086CHSC	AR1086CHSSL	10.0 x 8.0 x 6.0	ABP108	8.9 x 6.9	10.7 x 6.0	11.5 x 9.3 x 6.7
AR1086SCT	AR1086CHSCT	AR1086CHSSLT	(254 x 203 x 152)		(225 x 175)	(271 x 152)	(291 x 237 x 171)
AR12106SC	AR12106CHSC	AR12106CHSSL	12.0 x 10.0 x 6.0	ABP1210	10.8 x 8.9	12.7 x 8.0	13.5 x 11.4 x 6.7
AR12106SCT	AR12106CHSCT	AR12106CHSSLT	(305 x 254 x 152)		(275 x 225)	(322 x 203)	(342 x 289 x 171)
AR14127SC	AR14127CHSC	AR14127CHSSL	14.0 x 12.0 x 7.0	ABP1412	12.8 x 10.8	14.8 x 10.0	15.5 x 13.3 x 7.7
AR14127SCT	AR14127CHSCT	AR14127CHSSLT	(356 x 305 x 178)		(324 x 275)	(375 x 254)	(393 x 339 x 196)
AR16148SC	AR16148CHSC	AR16148CHSSL	16.0 x 14.0 x 8.0	ABP1614	14.8 x 12.9	16.7 x 12.0	17.8 x 15.5 x 8.7
AR16148SCT	AR16148CHSCT	AR16148CHSSLT	(406 x 356 x 203)		(376 x 328)	(424 x 305)	(452 x 394 x 221)
AR181610SC	AR181610CHSC	AR181610CHSSL	18.0 x 16.0 x 10.0	ABP1816	16.7 x 14.9	18.7 x 14.0	19.8 x 17.5 x 10.7
			(457 x 406 x 254)		(424 x 378)	(475 x 356)	(503 x 444 x 272)

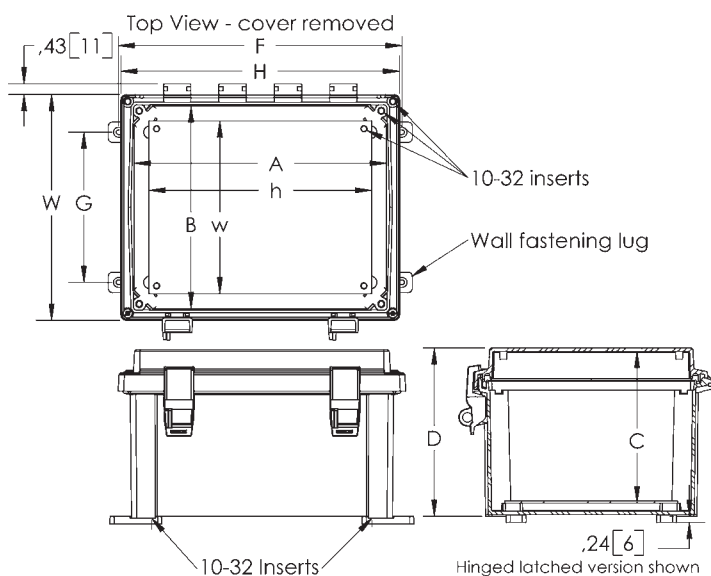
* Latch options available - metallic latch shown

P/N suffix T denotes transparent cover

ARCA is a trademark of Fibox Inc.



DRAWINGS



TECHNICAL INFORMATION

PROPERTY

Environmental ingress	UL Type 4, 4X, 6, 6P, 12 and 13
Impact resistance	Impact rating per UL 508/UL 50
NRTL Listing	Underwriters Laboratories UL, cUL Listed under UL 508
Temperature Range: °Celsius	-40° ... +140°C
Short term °Fahrenheit	-40° ... +284°F
Temperature Range: °Celsius	-40° ... +80°C
Long term °Fahrenheit	-40° ... +175°F
Electrical insulation	Totally insulated
Color	RAL 7035 - Light gray
Cover screws and hardware	10-32, stainless steel
Accessory mounting screws	10-32, stainless steel
Gasket	Formed in place polyurethane (PUR)
Flammability rating	Enclosure flammability rating per UL 508
Toxicity	Non-Toxic, halogen free, RoHS compliant

Data subject to change without notice.

Fibox Enclosures

Fibox, a privately owned Finnish company, is one of the largest enclosure manufacturers in the world, and is the market leader in thermoplastic enclosures used for protecting electrical and electronic components operating in hostile environments. Fibox enclosures are manufactured in modern factories located in Finland, Germany, China and Republic of Korea.

Fibox Inc.
810 Cromwell Park Drive
Suite R
Glen Burnie, MD 21061

Tel (+1) 410 760 9696
Toll-free USA 1 888 342 6987
Fax (+1) 410 760 8686
E-mail sales@fiboxusa.com

www.fiboxusa.com

ABOUT FIBOX

1000 CHOICES TO MEET YOUR DEMANDING ENVIRONMENTS

The Fibox range of standard enclosures provides the designer with over 1000 choices for packaging electrical and electronics equipment operating in hostile environments. Fibox enclosures comply with UL 50/508 and EN 60529. Most of our enclosures have achieved Type ratings of NEMA 4X, 6 and 6P, and Ingress ratings of IP 66/IP 67. Enclosure performance is verified by independent laboratory testing and on-going monitoring of production. Fibox brand accessories make our enclosures more functional and are easy to use. Standard solutions exist for panel management, hinged inner doors, and air ventilation.

CUSTOMIZED ENCLOSURES TO EXPAND YOUR OPTIONS

To increase the range and flexibility of our packaging solutions, Fibox has developed a comprehensive range of services, permitting cost effective customization for specific applications. The two most important of these are machining services and customized tooling. Our advanced CNC machinery can supply enclosures with holes, cutouts and openings to your specification. For large OEM volumes, our sophisticated, multiple slide tooling permits cost effective modification of any side of the enclosure. CAD drawings of standard enclosures are available at www.fiboxusa.com to aid the engineer in creating the most cost effective customization.

New!

Have you been looking for a line of IEC Contactors that save panel space, with features

that make them easy to install, and are rated

and approved to perform in a broad range of application

requirements anywhere in the world? c3controls' Series 300

Non-Reversing and Series 310 Reversing Contactors satisfy those

requirements and give you more! DIN rail and panel mounting, shared accessories,

IP20 guarded terminals, multi-point coils, a wide variety of accessories – and of

course c3controls quality are just a few of the features that will make Series 300

and Series 310 Contactors ideal for your application.



series
300

series
310

IEC Contactors

TECHNICAL DATA

CERTIFICATIONS

Conformity to Standards:

UL 508

CSA C22.2 No. 14

IEC 60947-1, 60947-4-1

Certifications:

UL File #: E236197, E68568



CE Marked (per EU Low Voltage Directive 73/23/EEC and 93/68/EEC)

GENERAL SPECIFICATIONS

Maximum Operating Voltage:

UL/CSA: 600V AC

IEC: 690V AC

Impulse Voltage Withstand:

6kV (9 ~ 40A), 8kV (50A ~ 105A)

Terminal Protection:

IP20

Maximum Power Ratings:

5HP @ 460V AC (4kW @ 400V AC) to

75HP @ 460V AC (55kW @ 400V AC)

Ambient Operating Temperature:

-25 to 55° C (-13 to 131° F)

Pollution Degree:

3

See pages 35 - 38 for comprehensive electrical, mechanical, environmental and construction specifications.

Series 300 Non-Reversing	28
Series 310 Reversing	30
Accessories	32
Replacement Components	34
Specifications	35
Dimensions	40

IT'S EASY TO BUILD YOUR OWN CONTACTOR

Simply pick the code number from each of the sections below and combine them to build your part number. See page 4 for more detailed directions.

IEC Non-Reversing Contactors



Example: To build one of our most popular Contactors, the part number would be **I + II + III** or **300-S40N30D00**



I. NON-REVERSING CONTACTORS (3 NORMALLY OPEN POLES)

CODE	MAX. Ie (A)		RATINGS FOR SWITCHING AC MOTORS - AC-2, AC-3, AC-4										LIST
			kW (50Hz)				HP (60Hz)						
			3 PHASE				1 PHASE		3 PHASE				
			230V	400/415V	500V	690V	115V	230V	200V	230V	460V	575V	
300-S09N30	9	25	2.2	4	5.5	5.5	1/2	1-1/2	3	3	5	7-1/2	\$ 12.00
300-S12N30	12	25	3	5.5	7.5	7.5	3/4	2	3	3	7-1/2	10	\$ 18.00
300-S18N30	18	32	4	7.5	10	10	1	3	5	5	10	15	\$ 23.00
300-S25N30	25	45	7.5	11	15	15	1-1/2	3	5	7-1/2	15	15	\$ 29.00
300-S32N30	32	60	9	15	18.5	18.5	2	5	10	10	20	25	\$ 35.00
300-S40N30	40	60	11	18.5	25	30	3	5	10	10	25	25	\$ 48.00
300-S50N30	50	90	15	22	30	35	3	7-1/2	15	15	30	40	\$ 59.00
300-S65N30	65	110	18.5	30	40	45	5	10	20	20	40	50	\$ 67.00
300-S80N30	80	110	22	37	45	45	5	15	20	25	50	60	\$ 77.00
300-S95N30	95	140	25	45	55	55	7-1/2	15	25	30	60	75	\$133.00
300-S105N30	105	140	30	55	65	65	10	20	30	40	75	75	\$153.00

II. COIL VOLTAGE CODE

AC COIL VOLTAGE CODES															
VOLTAGE	12	24	48	110	120	208	220	230	240	277	380	400	400 ~ 415	440	480
50Hz	G	H	K	D	—	—	M	N	—	—	Q	AM	R	S	—
60Hz	B	C	J	—	D	L	—	—	F	P	—	—	—	—	R
50/60Hz	XB	XC	XJ	XD	—	—	XAJ	XN	XF	—	—	XAM	—	XQ	—

DC COIL VOLTAGE CODES

VOLTAGE	12	24	24 ~ 28	48	42 ~ 48	110	125	110 ~ 125	250	220 ~ 250	LIST
-S09 to -S25	ZB	ZC	—	ZK	—	ZD	ZQ	—	ZP	—	\$ 8.00
-S32 to -S40	ZB	ZC	—	ZK	—	ZD	ZQ	—	ZP	—	\$ 28.00
-S50 to -S105	—	—	YC*	—	YK*	—	—	YL*	—	YE*	\$131.00

*NOTE: Can also be actuated with an AC control voltage.

III. AUXILIARY CONTACT CONFIGURATION

CODE	DESCRIPTION	LIST
00	Without Auxiliary Contacts (Contactors 300-S25 to 300-S105 only)	\$ —
10	1 Normally Open*	\$4.00
01	1 Normally Closed*	\$4.00

*NOTE: Integral right side mounted on 9A ~ 18A contactors, front mounted on 25A ~ 105A contactors.



SOME OF OUR POPULAR CONFIGURATIONS:

IEC NON-REVERSING CONTACTORS

CATALOG NUMBER	DESCRIPTION	LIST
300-S09N30D10	Non-Reversing, 9A, 3 Pole, 120V AC Coil, 1 NO Auxiliary Contact	\$16.00
300-S09N30ZC10	Non-Reversing, 9A, 3 Pole, 24V DC Coil, 1 NO Auxiliary Contact	\$24.00
300-S25N30D10	Non-Reversing, 25A, 3 Pole, 120V AC Coil, 1 NO Auxiliary Contact	\$33.00

IEC NON-REVERSING CONTACTORS

c3controls Series 300 Contactors are ideal for motor, actuator, solenoid, and other power switching applications where panel space is a premium and device modularity is required to satisfy virtually any application requirement. cULus and CE Markings make them suitable for use anywhere in the world. Small size, IP20 guarded terminals with dual terminal markings, and shared accessories will help reduce your total installed costs and enhance the features and performance of your equipment. Just look and see what the Series 300 has to offer.

Product features include:

- Compact size – five (5) frame sizes for devices rated from 9A to 105A. Contactors rated 15HP @ 460V (11kW @ 400V) are only 45mm (1.77") wide reducing panel area requirements – smaller enclosures can be used for lower installed costs.
- AC and DC operating coils for control circuit application flexibility. 50A to 105A DC operated devices feature electronic coil control and can be actuated with AC or DC control voltages.
- Environmentally friendly contacts are cadmium free and non-metallic materials are asbestos, halogen, and cadmium free.
- IP20 guarded terminals prevent accidental contact with live parts.
- Dual IEC and NEMA terminal markings for ease of wiring anywhere in the world.
- Device identification marker for labeling contactors and front mounted auxiliary contacts simplifies trouble shooting in panels with many contactors.
- 35mm DIN rail mounting for all contactors from 9A to 105A for fast and easy installation and removal or panel mounting for more secure installation in high shock and vibration applications.
- Modular design allows Series 320 Overload Relays to be easily installed or can be used with the complete range of Series 330 Motor Protection Circuit Breakers and accessories.
- Combination head terminal screws allow the use of straight, phillips, or posidrive screwdrivers. Allen head screws on 50A through 105A contactors make it easy to apply the proper terminal tightening torque for secure conductor connections.
- Snap-on front mounted auxiliary contacts install without the use of tools for lower installed costs. Single circuits available so you only purchase what you need.



UNIQUE PRODUCT FEATURES

3 AND 4 TERMINAL COILS

4 terminal coils on 9A ~ 25A contactors and 3 terminal coils on 50A to 105A contactors are easily accessible on contactor and overload relay assemblies or contactor and motor protection circuit breaker assemblies. The control circuit can be wired from the line side or the load side of the contactor, whichever is most convenient for the installation. Control circuit wire runs can be minimized, and the devices can be easily substituted in your existing equipment without disturbing or changing your control wires. So no matter what components are being used, Series 300 Contactors can be easily and quickly wired, reducing your labor and installation costs.





IEC OVERLOAD RELAYS Series 320

Need reliable, accurate overload and phase-loss protection for your motors? c3's Series 320 Bimetallic Overload Relays provide unmatched protection and can be directly installed on all Series 300 IEC Contactors, saving you time and panel space. Plus, cULus and CE markings make them applicable worldwide.



Conformity to Standards:

UL 508
CSA C22.2 No. 14
IEC 60947-1, 60947-3

Certifications:

UL File #: E68568 (Guide NKCR, NKCR7)
CE Marked (per EU Low Voltage Directive
73/23/EEC and 93/68/EEC)



Overload Relays 52

Specifications 54

Accessories 55

Trip Characteristics and
Circuit Diagrams 56

Dimensions 57

IT'S EASY TO BUILD YOUR OWN OVERLOAD RELAY

Simply pick the code number from each of the sections below and combine them to build your part number. See page 1 for more detailed directions.

IEC Bimetallic Overload Relays

320-B

/ II

Example: To build one of our most popular Overload Relays, the part number would be **320-B + II** or **320-B2D18**



**NEW
EXPANDED
PRODUCT
OFFERING!**

I. OVERLOAD RELAY TYPE

CODE	DESCRIPTION
320-B	Bimetallic Overload Relay

Our Series 320 Bimetallic Overload Relays are available in five frame sizes for motor full load currents from 0.28 ~ 112A.

**DISCOUNT
SCHEDULE C**

320-B1*** Available March '07.

II. OVERLOAD RELAY FRAME SIZE AND CURRENT ADJUSTMENT RANGE

CODE	INSTALLS ON CONTACTOR	CURRENT ADJUSTMENT RANGE	LIST
1C40	-M07, -M09, -M12, -M16	0.28 ~ 0.4	\$21.50
1C63	-M07, -M09, -M12, -M16	0.4 ~ 0.63	\$21.50
1C80	-M07, -M09, -M12, -M16	0.56 ~ 0.8	\$21.50
1D12	-M07, -M09, -M12, -M16	0.8 ~ 1.2	\$21.50
1D18	-M07, -M09, -M12, -M16	1.2 ~ 1.8	\$21.50
1D28	-M07, -M09, -M12, -M16	1.8 ~ 2.8	\$21.50
1D40	-M07, -M09, -M12, -M16	2.8 ~ 4.0	\$21.50
1D63	-M07, -M09, -M12, -M16	4.0 ~ 6.3	\$21.50
1D80	-M07, -M09, -M12, -M16	5.6 ~ 8.0	\$21.50
1U10	-M07, -M09, -M12, -M16	7.0 ~ 10.0	\$21.50
1U12	-M07, -M09, -M12, -M16	8.0 ~ 12.5	\$21.50
1U15	-M07, -M09, -M12, -M16	10 ~ 15	\$21.50
1U17	-M07, -M09, -M12, -M16	11 ~ 17	\$21.50
2C40	-S09, -S12, -S18, -S25, -S32, -S40	0.28 ~ 0.4	\$23.50
2C63	-S09, -S12, -S18, -S25, -S32, -S40	0.4 ~ 0.63	\$23.50
2C80	-S09, -S12, -S18, -S25, -S32, -S40	0.56 ~ 0.8	\$23.50
2D12	-S09, -S12, -S18, -S25, -S32, -S40	0.8 ~ 1.2	\$23.50
2D18	-S09, -S12, -S18, -S25, -S32, -S40	1.2 ~ 1.8	\$23.50
2D28	-S09, -S12, -S18, -S25, -S32, -S40	1.8 ~ 2.8	\$23.50
2D40	-S09, -S12, -S18, -S25, -S32, -S40	2.8 ~ 4.0	\$23.50
2D63	-S09, -S12, -S18, -S25, -S32, -S40	4.0 ~ 6.3	\$23.50
2D80	-S09, -S12, -S18, -S25, -S32, -S40	5.6 ~ 8.0	\$23.50
2U10	-S09, -S12, -S18, -S25, -S32, -S40	7.0 ~ 10.0	\$23.50
2U12	-S09, -S12, -S18, -S25, -S32, -S40	8 ~ 12.5	\$23.50
2U15	-S09, -S12, -S18, -S25, -S32, -S40	10 ~ 15	\$23.50
2U17	-S09, -S12, -S18, -S25, -S32, -S40	11 ~ 17	\$23.50
2U23	-S09, -S12, -S18, -S25, -S32, -S40	15 ~ 23	\$23.50
2U32	-S09, -S12, -S18, -S25, -S32, -S40	22 ~ 32	\$23.50
3U40	-S32, -S40	25 ~ 40	\$37.50
4U50	-S50, -S65, -S80	32 ~ 50	\$45.00
4U57	-S50, -S65, -S80	40 ~ 57	\$45.00
4U63	-S50, -S65, -S80	50 ~ 63	\$45.00
4U70	-S50, -S65, -S80	57 ~ 70	\$45.00
5U80	-S95, -S105	63 ~ 80	\$53.00
5U97	-S95, -S105	78 ~ 97	\$53.00
5X11	-S95, -S105	90 ~ 112	\$53.00

SOME OF OUR POPULAR CONFIGURATIONS:

IEC BIMETALLIC OVERLOAD RELAYS

CATALOG NUMBER	DESCRIPTION	LIST
320-B1D80	5.6 ~ 8.0A Overload Relay for Installation on 300-M07 Contactor	\$21.50
320-B2U10	7 ~ 10A Overload Relay for Installation on 300-S09 Contactor	\$23.50
320-B2U23	15 ~ 23A Overload Relay for Installation on 300-S25 Contactor	\$23.50
320-B3U40	25 ~ 40A Overload Relay for Installation on 300-S40 Contactor	\$37.50
320-B4U50	32 ~ 50A Overload Relay for Installation 300-S50 Contactor	\$45.00
320-B5U97	78 ~ 97A Overload Relay for Installation on 300-S95 Contactor	\$53.00

AVAILABLE FRAME SIZES
FOR OVERLOAD RELAYS

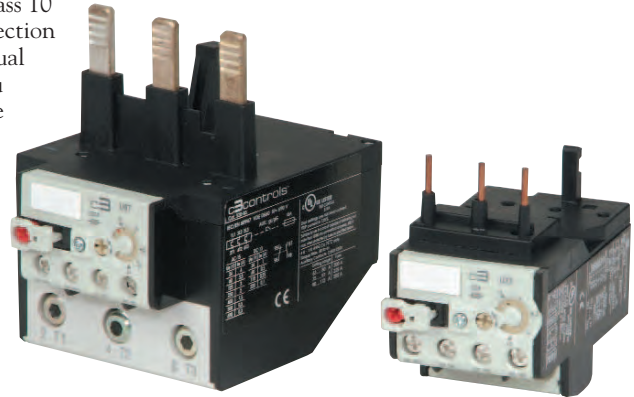


IEC BIMETALLIC OVERLOAD RELAYS

c3controls Series 320 Bimetallic Overload Relays provide thermal Trip Class 10 overload protection for single and three phase motors, and phase loss protection for three phase motors. Other features like IP20 guarded terminals with dual terminal markings, integral stop button, and direct mounting will help you reduce your total installed costs and enhance the features and performance of your equipment. Just look and see what the Series 320 Overload Relays have to offer.

Product features include:

- New Series 320-B1 Overload Relays for use with Series 300 IEC Mini Contactors.
- New Series 320-B1 Overload Relays include integral connection to auxiliary and coil terminations for ease of wiring during installation when installed on Series 300 IEC Mini Contactors.
- New Series 320-B1 Overload Relays share the same great features and benefits of the larger frame sizes.
- Trip Class 10 for reliable and accurate protection against overload conditions.
- Single phase sensitivity to protect motors against damaging phase loss conditions.
- Direct mounting to all contactors, including new 320-B1 Overload Relays for use with Series 300 IEC Mini Contactors.
- Dual IEC and NEMA terminal markings for ease of wiring anywhere in the world.
- Device identification marker for labeling overload relays simplifies troubleshooting in panels with many overload relays or starters.
- IP20 guarded terminals prevent accidental contact with live parts.
- Combination head terminal screws allow the use of straight, phillips or posidrive screwdrivers.
- Stop button for convenient and economical control circuit wiring.
- Ambient temperature compensation ensures reliable motor protection even in high temperature environments.



UNIQUE PRODUCT FEATURES



A – Automatic Reset Only
 AUTO – Automatic Reset and Test
 H – Manual Reset Only
 HAND – Manual Reset and Test

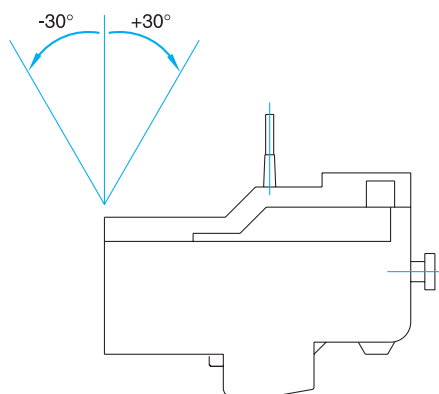
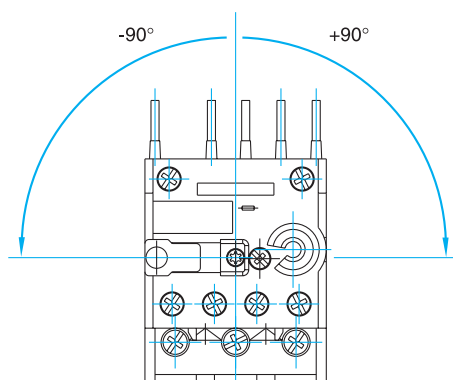
c3controls Series 320 Bimetallic Overload Relays feature a multi-function reset button enabling the user to select the reset mode – manual or automatic and whether or not to enable the test function.

When the reset button is pressed, with the test function enabled, the Normally Open (NO) contact closes and the Normally Closed (NC) contact opens to verify the control circuit functionality. In addition, the NC contact can be used in a “Stop” circuit. With the test function disabled, the NO and NC contacts do not change state when the reset button is pressed – preventing unauthorized personnel from operating the control circuit.

Multiple functions in a single device help you to reduce inventory and customize the overload relay operation to provide the performance and features you need for your specific application.

SPECIFICATIONS:

ELECTRICAL AND ENVIRONMENTAL SPECIFICATIONS						
		320-B1	320-B2	320-B3	320-B4	320-B5
ELECTRICAL GENERAL						
	UNITS					
Current Setting Range	A	0.28 ~ 17	0.28 ~ 32	25 ~ 50	40 ~ 80	63 ~ 112
Operating Frequency	Hz	0 ~ 400				
Power Dissipation per Pole	W	0.9 ~ 1.4	1.3 ~ 2.0	1.3 ~ 2.0	1.9 ~ 4.8	3 ~ 4.8
ELECTRICAL UL/CSA APPLICATIONS						
MAIN CIRCUITS						
Rated Operating Voltage, Ue	VAC	600				
Short Circuit Rating	kA	5	5	5	10	10
Maximum Fuse Size*	A	60	90	125	200	250
CONTROL CIRCUITS						
Pilot Duty Rating	AC	C600				
	DC	R300				
ELECTRICAL IEC APPLICATIONS						
MAIN CIRCUITS						
Rated Insulation Voltage, Ui	V	690				
Rated Impulse Voltage, Uimp	kV	6				
Rated Operating Voltage, Ue	VAC	690				
Maximum Rated Operating Current, Ie	A	17	32	50	80	112
Maximum Fuse Size*	A	40	63	100	125	250
CONTROL CIRCUITS						
Rated Insulation Voltage, Ui	V	690				
Rated Operating Current, Ie						
AC-15						
@ 24V AC	A	4				
@ 60V AC	A	3.5				
@ 120V AC	A	3				
@ 240V AC	A	2				
@ 415V AC	A	1.5				
@ 500V AC	A	0.5				
@ 690V AC	A	0.3				
DC-13						
@ 24V DC	A	1				
@ 60V DC	A	0.5				
@ 110V DC	A	0.25				
@ 220V DC	A	0.1				
Maximum Fuse Size (gL/gG)	A	6				
ENVIRONMENTAL						
Ambient Operating Temperature		-25 to +60° C (-13 to +140° F)				
Ambient Storage Temperature		-40 to +70° C (-40 to +158° F)				
Altitude	m/ft.	2,000/6,562				
*Varies by current setting range of overload relay.						



CONSTRUCTION SPECIFICATIONS						
		320-B1	320-B2	320-B3	320-B4	320-B5
CONSTRUCTION						
	UNITS					
Number of Poles		3				
Trip Class		10				
Pollution Degree		3				
INGRESS PROTECTION						
Main Circuit Terminals		IP20 (with wires connected)				
Control Circuit Terminals		IP20				
WEIGHT	kg	0.15	0.15	0.31	0.31	0.37
	lbs.	0.33	0.33	0.68	0.68	0.82
CONDUCTOR SIZE						
MAIN CIRCUITS						
UL/CSA	AWG	14 ~ 16	14 ~ 16	18 ~ 2	18 ~ 2	8 ~ 1/0
Solid	mm ²	2 x 1.5 ~ 6.0	2 x 1.5 ~ 6.0	1 x 6 ~ 35	2 x 6 ~ 35	1 x 25 ~ 35
Stranded	mm ²	2 x 1.5 ~ 6.0	2 x 1.5 ~ 6.0	1 x 6 ~ 35	2 x 6 ~ 35	1 x 25 ~ 35
Fine Strand with Sleeve	mm ²	2 x 1.5 ~ 10.0	2 x 1.5 ~ 10.0	2 x 6 ~ 35	3 x 6 ~ 35	1 x 25 ~ 35
Terminal Torque	Nm	4.0 ~ 6.0	4.0 ~ 6.0	4.0 ~ 6.0	4.0 ~ 6.0	14 ~ 26
	Lb-in.	35 ~ 53	35 ~ 53	35 ~ 53	35 ~ 53	124 ~ 230
CONTROL CIRCUITS						
UL/CSA	AWG	18 ~ 14				
Solid	mm ²	2 x 1 ~ 2.5				
Stranded	mm ²	2 x 1 ~ 2.5				
Fine Strand	mm ²	2 x 1 ~ 2.5				
Fine Strand with Sleeve	mm ²	2 x 1 ~ 2.5				
Terminal Torque	Nm	1.4 ~ 2.3				
	Lb-in.	12.4 ~ 20.4				

SEPARATE MOUNTING ADAPTERS



Separate mounting adapters enable Series 320 Overload Relays to be installed separately from a contactor on a 35mm DIN rail or with fixing screws to a panel.

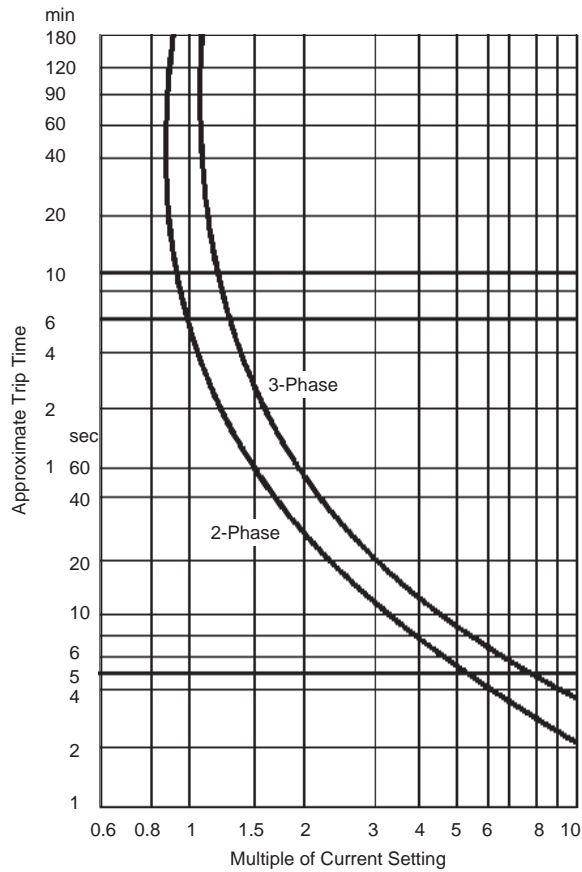
CODE	FOR USE WITH	LIST
320-BSMA2	320-B2*** Overload Relays	\$7.00
320-BSMA4	320-B3*** and 320-B4*** Overload Relays	\$12.00
320-BSMA5	320-B5*** Overload Relays	\$15.00

DISCOUNT
SCHEDULE

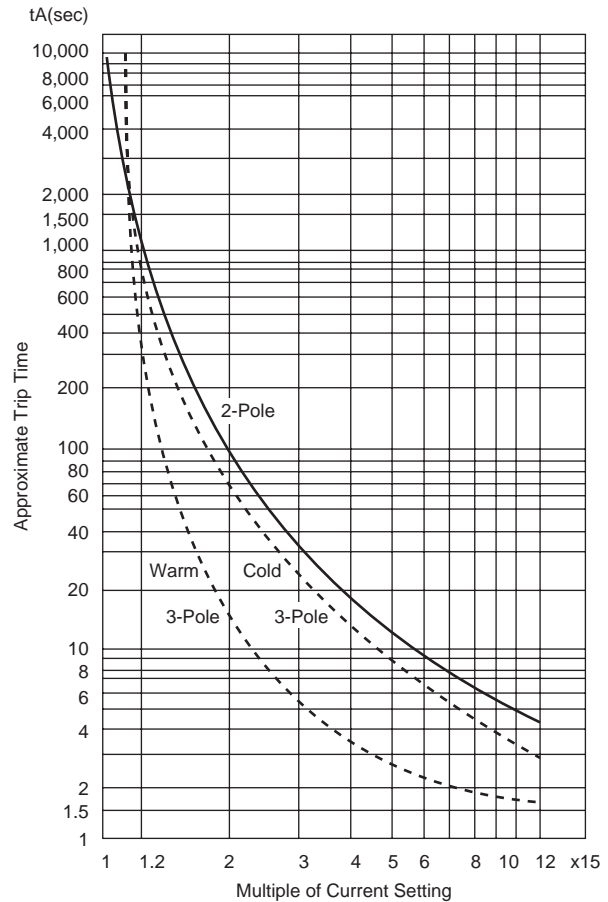
C

TRIP CHARACTERISTICS

320-B1***, 320-B2***, 320-B3***, & 320-B4***

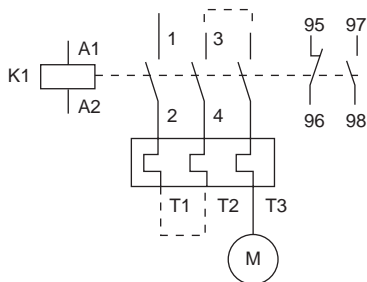


320-B5***

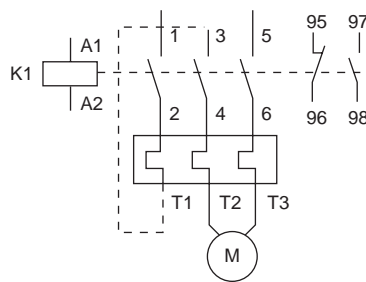


CIRCUIT DIAGRAMS

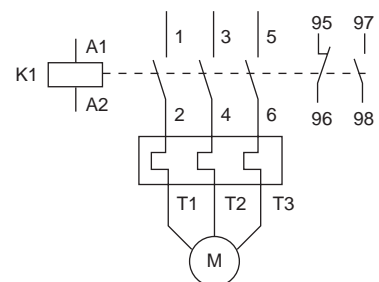
1-PHASE



2-PHASE

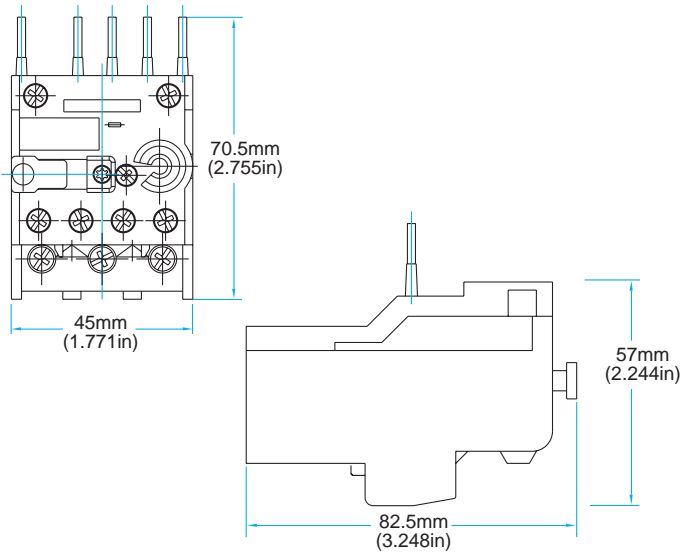


3-PHASE

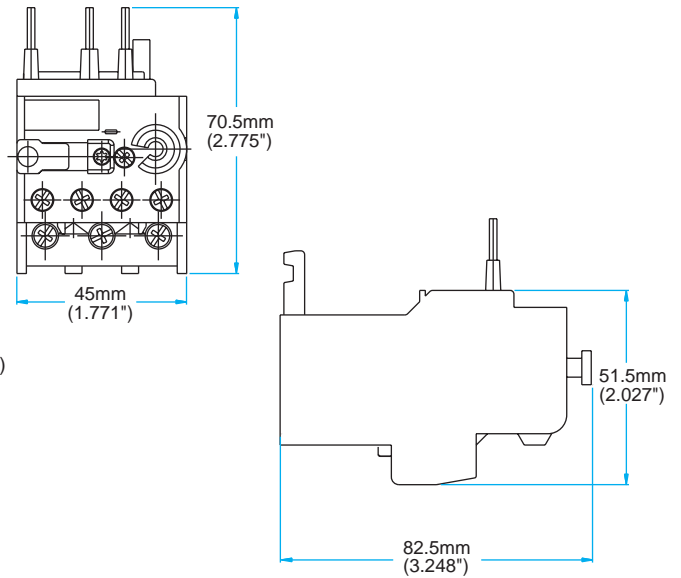


SERIES 320 IEC BIMETALLIC OVERLOAD RELAYS

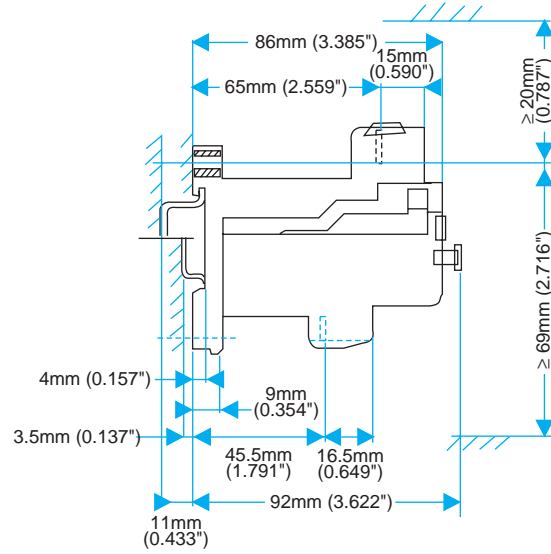
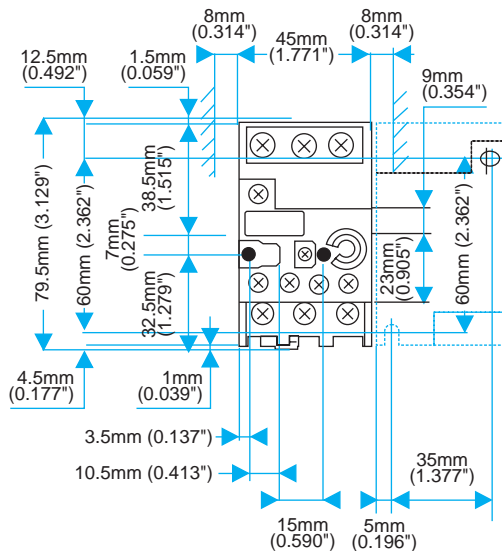
320-B1***



320-B2***



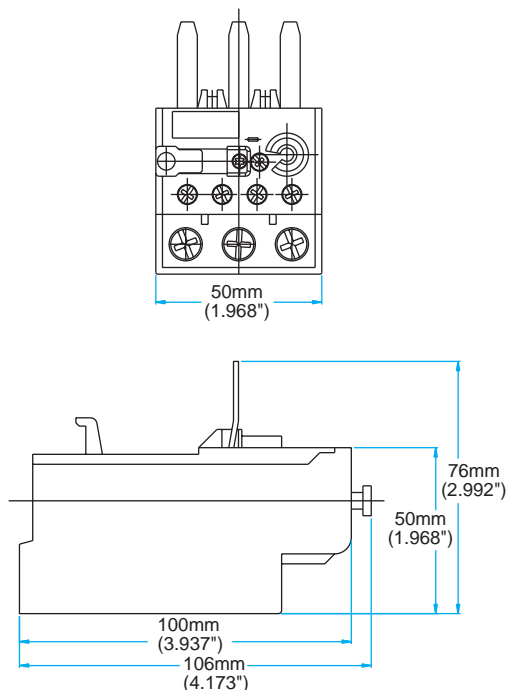
320-B2* WITH SEPARATE MOUNTING ADAPTER
320-BSMA2**



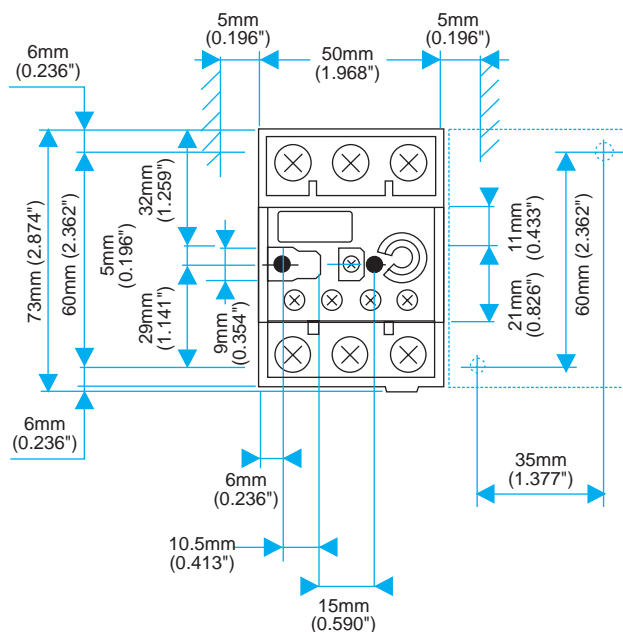
**VISIT WWW.C3CONTROLS.COM
TO DOWNLOAD CAD DRAWINGS**

SERIES 320 IEC BIMETALLIC OVERLOAD RELAYS (CONT.)

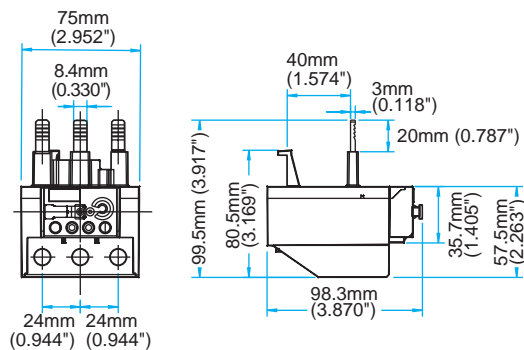
320-B3*** OR 320-B4***



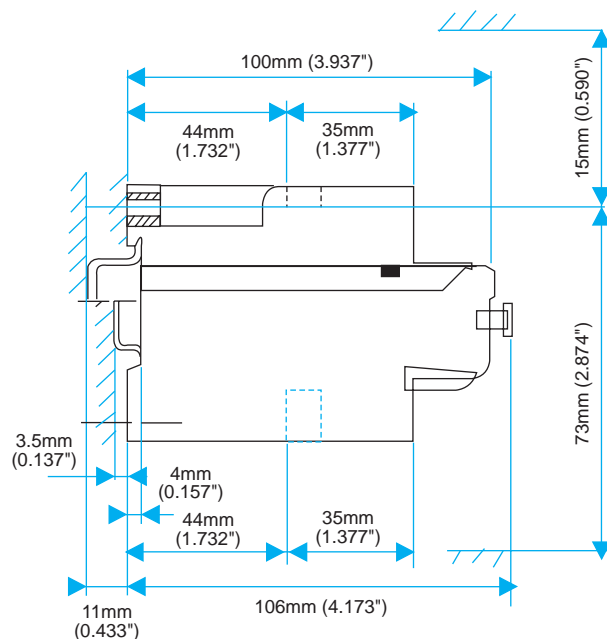
320-B3*** OR 320-B4*** WITH
SEPARATE MOUNTING ADAPTER
320-BSMA4



320-B5***



320-B5*** WITH SEPARATE
MOUNTING ADAPTER
320-BSMA5



IT'S EASY TO BUILD YOUR OWN SELECTOR SWITCH

Simply pick the code number from each of the sections below and combine them to build your part number. See page 1 for more detailed directions.

Selector Switches

I II - III IV V

Example: To build one of our most popular Selector Switches, the part number would be **I + II + III + IV + V** or **22SS3AC-XHBK**



I. BASIC SELECTOR SWITCH OPERATOR FUNCTION

CODE	POS./FUNCTION	LIST
22SS2	2/Maintained	\$10.00
22SRL	2/Spring Return, R to L	\$13.00
22SS3	3/Maintained	\$10.00
22SAC	3/Spring Return, L & R to C	\$13.00
22SLC	3/Spring Return, L to C	\$13.00
22SRC	3/Spring Return, R to C	\$13.00

Our 22mm Selector Switches come with integral contacts ready for field wiring.

HANDLE POSITIONS

2-POSITION



3-POSITION



II. CIRCUIT DESIGNATION BASED ON OPERATOR FUNCTION

2-POSITION CONTACT BLOCK CIRCUIT DESIGNATION

HANDLE POSITION

CODE	LEFT	RIGHT	LIST
G	X	O	\$ 6.00
H	O	X	\$ 6.00
GH	X	O	\$11.00
	O	X	
GG	X	O	\$11.00
	X	O	
HH	O	X	\$11.00
	O	X	

3-POSITION CONTACT BLOCK CIRCUIT DESIGNATION

HANDLE POSITION

CODE	LEFT	CENTER	RIGHT	LIST
AB	X	O	O	\$11.00
	O	X	O	
AC	X	O	O	\$11.00
	O	O	X	
AD	X	O	O	\$12.00
	X	O	X	
AF	X	O	O	\$12.00
	X	X	O	
BC	O	X	O	\$11.00
	O	O	X	
BD	O	X	O	\$12.00
	O	X	X	
BF	O	X	O	\$12.00
	X	X	O	
CD	O	O	X	\$12.00
	O	X	X	
CE	O	O	X	\$12.00
	X	O	X	
DE	O	X	X	\$12.00
	X	O	X	
DF	O	X	X	\$12.00
	X	X	O	
EF	X	O	X	\$12.00
	X	X	O	

O = OPEN X = CLOSED

III. CLAMP RING

CODE	DESCRIPTION	LIST
X	Polyester (Type 4X)	—
M	Aluminum (Type 4)	\$2.00

IV. HANDLE TYPE

CODE	DESCRIPTION	LIST
H	Standard	\$5.00
L	Lever	\$5.00
G	Guarded*	\$8.00

*NOTE: Only available with a polyester clamp ring.

V. HANDLE/INSERT COLOR

CODE	HANDLE COLOR	INSERT COLOR
BK	Black	White
BE	Blue	White
GN	Green	White
GY	Grey	White
RD	Red	White
WE	White	Black
YW	Yellow	Black

CONTACT BLOCKS ARE AVAILABLE TO ADD TO BASIC OPERATORS TO INCREASE THE NUMBER AND TYPE OF CONTACTS. UP TO THREE BLOCKS WITH TWO CIRCUITS EACH MAY BE ADDED GIVING A TOTAL OF EIGHT CONTACTS PER OPERATOR. BLOCKS SIMPLY SCREW ON THE BACK OF THE OPERATOR. REFER TO PAGE 220 FOR DETAILS.

DISCOUNT
SCHEDULE

B

MIX AND MATCH ANY COLOR AND SELECTOR SWITCH HANDLE



Standard

Standard

Standard

Standard

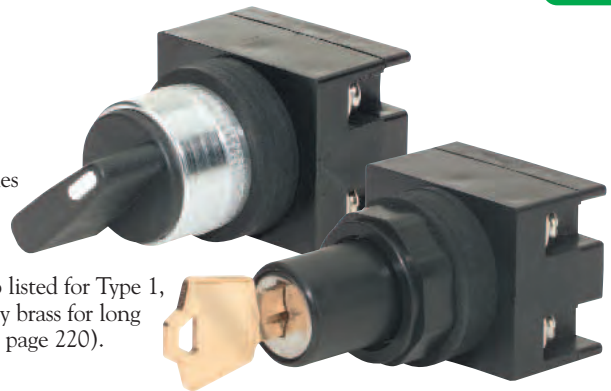
Standard

Lever

Guarded

22MM NEMA STANDARD & KEYED SELECTOR SWITCHES

With our unique universal cam design, c3controls 22mm NEMA Selector Switches offer multiple functions in a single device eliminating the need to install separate devices to perform individual functions based on contact block configuration. All operators feature polyester housings, are UL Listed, and are rated Type 4/4X as standard for watertight and corrosion resistance. In addition, operators are also listed for Type 1, 2, 3, 3R, 12 and 13, and meet global standards requirements. Keys are extra heavy brass for long life. Add-on contact blocks are available for up to eight circuits per operator (see page 220).



UNIQUE PRODUCT FEATURES

SAVE TIME & MONEY - WITH C3CONTROLS, ONE CAM DOES IT ALL!



1. One-Cam does it all vs. our competitors who need up to fifteen cams to perform the same function. This One-Cam design eliminates the need for multiple cam configurations and selector switch configuration nightmares, saving time, inventory, money, and ensuring 100% cam selection configuration accuracy.
2. Our revolutionary U-Cup seal is infused with a Teflon coating to eliminate cracking when exposed to harsh conditions such as heat, dryness and sunlight.
3. All frictional parts are molded with an internal self-lubricant to provide outstanding wear and smooth cam operations without troublesome greases used by others that attracts dust and other particles in the area.

ADD-ON CONTACT BLOCKS FOR 2 & 3-POSITION SELECTOR SWITCHES*

ADD-ON CONTACT BLOCK SELECTION FOR 3-POSITION SELECTOR SWITCHES					
CIRCUIT DESIG.	HANDLE POSITION			CONTACT BLOCK TYPE	LIST
	LEFT	CENTER	RIGHT		
A	X	O	O	22CBNO	\$ 6.00
B	O	X	O	22CBNC	\$ 6.00
C	O	O	X	22CBNO	\$ 6.00
D	O	X	X	22CBDB	\$ 8.00
E	X	O	X	22CBEM	\$ 8.00
F	X	X	O	22CBDB	\$ 8.00
AB	X	O	O	22CBNONC	\$11.00
	O	X	O		
AC	X	O	O	22CB2NO	\$11.00
	O	O	X		
AE	X	O	O	22CBNOEM	\$12.00
	X	O	X		
AF	X	O	O	22CBNODB	\$12.00
	X	X	O		
BC	O	X	O	22CBNONC	\$11.00
	O	O	X		
BD	O	X	O	22CBNCDB	\$12.00
	O	X	X		
BF	O	X	O	22CBNCDB	\$12.00
	X	X	O		
CD	O	O	X	22CBNODB	\$12.00
	O	X	X		
CE	O	O	X	22CBNOEM	\$12.00
	X	O	X		
DE	O	X	X	22CBDBEM	\$12.00
	X	O	X		
DF	O	X	X	22CB2DB	\$12.00
	X	X	O		
EF	X	O	X	22CBDBEM	\$12.00
	X	X	O		

ADD-ON CONTACT BLOCK SELECTION FOR 2-POSITION SELECTOR SWITCHES				
CIRCUIT DESIG.	HANDLE POSITION		CONTACT BLOCK TYPE	LIST
	LEFT	RIGHT		
G	X	O	22CBNC	\$6.00
H	O	X	22CBNO	\$6.00
GH	X	O	22CBNONC	\$11.00
	O	X		
GG	X	O	22CB2NC	\$11.00
	X	O		
HH	O	X	22CB2NO	\$11.00
	O	X		

O = OPEN X = CLOSED

*Specify the Circuit Designation code(s) from the charts above when ordering add-on contact blocks for all types of 22mm NEMA selector switches. To include an add-on contact block in your part builder number, simply add a hyphen (-) after the completed number and then the circuit designation code desired. For multiple add-on contact blocks, place a hyphen between each additional code.

IT'S EASY TO BUILD YOUR OWN PILOT LIGHT

Simply pick the code number from each of the sections below and combine them to build your part number. See page 4 for more detailed directions.

Unibody Pilot Lights

W22U - I - II - III - IV

Example: To build one of our most popular Pilot Lights, the part number would be **W22U + II + III + IV** or **W22U-120LR-WLR**



I. OPERATOR TYPE

CODE	DESCRIPTION
W22U	Unibody Light Unit

II. VOLTAGE

CODE	DESCRIPTION
	FULL VOLTAGE
6	6V AC/DC
12	12V AC/DC
24	24V AC/DC
120	120V AC/DC

III. LAMP TYPE/COLOR

CODE	DESCRIPTION
	LED
LA	Amber
LB	Blue
LG	Green
LR	Red
LW	White
	INCANDESCENT
I	Clear
F	Clear Flashing Bulb*
	*NOTE: Incandescent flashing bulbs available for any 6V full voltage application.
NL	No Lamp

IV. LENS/COLOR

CODE	DESCRIPTION
WLA	Amber
WLB	Blue
WLC	Clear
WLG	Green
WLR	Red
WLW	White

SEE PAGE 147 FOR LAMP
TECHNICAL DATA AND LAMP
REPLACEMENT CHARTS.

DISCOUNT
SCHEDULE **C**

AVAILABLE LENS COLORS FOR UNIBODY PILOT LIGHTS



22MM IEC UNIBODY PILOT LIGHTS

Our 22mm IEC Unibody Pilot Lights were designed with simplicity in function to save you valuable time and money. Wiring is made easy by utilizing rear self captive mounting screws with side wire entry that accommodates 0.5 - 4mm² (#22 to #12 AWG) wires (one or two wires per terminal). In addition, this full voltage light unit is available in 6, 12, 24 and 120 volts using either Incandescent or our new and improved LED lamps with leakage protection. We offer six different lens color options to add to your flexibility. All c3controls 22mm IEC operators are UL Listed and are rated Type 4/4X as standard for watertight and corrosion resistance. In addition, operators are also listed for Type 1, 2, 3, 3R, 12, 13 and IP65 applications, and meet global standards requirements.

Product features include:

- Polyester construction for superior corrosion resistance, moisture rejection and electrical insulation.
- Operators conveniently mount in a round 22.5mm (7/8") hole that is directly interchangeable with competitors units and eliminate the labor required for notching.
- All lights use miniature bayonet base lamps to provide reliable lamp secureness.
- c3controls LED lamp design life is 100,000 hours – that's 11.4 years!



UNIQUE PRODUCT FEATURES



1. Vibration resistant compact design.
2. Our seal is infused with a coating to eliminate cracking when exposed to harsh conditions such as heat, dryness and sunlight. This seal also acts as a light reflector because it is white which increases light output and improves visibility from all angles.
3. Our rugged Lexan™ lenses provide better visibility and can resist high impact for reliable performance in most environments, even in high temperature ambients.
4. Wiring is made easy by utilizing rear access captive mounting screws with side wire entry.

SOME OF OUR POPULAR CONFIGURATIONS:

UNIBODY PILOT LIGHTS	
CATALOG NUMBER	DESCRIPTION
W22U-120LA-WLA	120V Full Voltage Light w/Amber LED & Lens
W22U-120LG-WLG	120V Full Voltage Light w/Green LED & Lens
W22U-120LR-WLR	120V Full Voltage Light w/Red LED & Lens
W22U-120I-WLR	120V Full Voltage Light w/Incand. Lamp & Red Lens

**General ordering data**

Material No.	1010100000
Short text for material	WPE 4
Description of part	PE terminals
EAN	4008190039820

Approvals

Approvals

**CSA rating data**

Max. rated cross-section (CSA)	AWG 10
Min. rated cross-section (CSA)	AWG 26

Dimensions

Width	6.1 mm
TS 35 offset	11 mm
Height of lowest version	47 mm
Length	60 mm

PE rating data

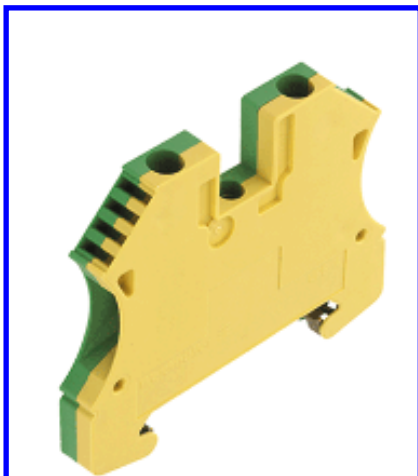
Torque rating with electric screwdriver type DMS 2	
Rated short-time current	480 A (4 mm ²)
Centre screw on PE terminals	M 3
Pollution severity	3
Rated impulse voltage for adjacent terminal	8 kV
PEN-Function	no
Tightening torque range fixing screw	0.5...0.8 Nm
Rated cross-section	4 mm ²
Rated voltage for adjacent terminal	800 V
Norm	IEC 60947-7-2

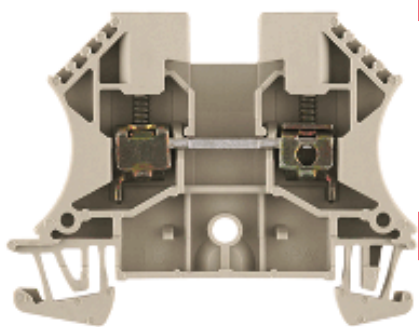
Rating data EN 60079-7

Marking Ex-RL 94/9 EEC	Ex II 2 G D
Marking Ex-RL 94/9 EEC	II 2 G D
Marking EN 60079-7	Ex e II
EC conformity verification certificate	KEMA 98ATEX1683 U

UL rating data

Max. conductor cross-section (UL)	AWG 10
Min. conductor cross-section (UL)	AWG 22





General ordering data

Material No.	1020100000
Short text for material	WDU 4
Description of part	Feed-through terminal 4 mm ²
EAN	4008190150617

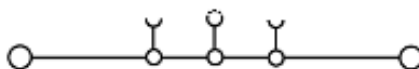
Approvals

Approvals



CSA rating data

CSA current	35 A
Max. rated cross-section (CSA)	AWG 10
Min. rated cross-section (CSA)	AWG 26
Voltage CSA	600 V



Conductors for clamping (2) with equal cross-section (rated connection)

Flexible, min.	0.5 mm ²
Flexible with ferrule, min. (DIN 46228 pt 1)	0.5 mm ²
Solid, min.	0.5 mm ²
Solid, max.	2.5 mm ²
Flexible, max.	1.5 mm ²
Flexible with ferrule, max. (DIN 46228 pt 1)	1.5 mm ²

Dimensions

TS 35 offset	15 mm
Width	6.1 mm
Height of lowest version	47 mm
Length	60 mm
Weight	10.40 g

Rating data EN 60079-7

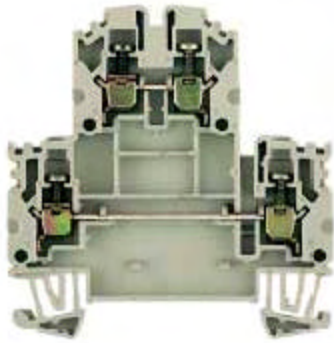
Marking EN 60079-7	Ex e II
Current EEx e	28 A
Voltage at cross-connection DU+QV/PE	420 V
EC conformity verification certificate	KEMA 98ATEX1683 U
Voltage EEx e	690 V
Voltage at cross-connection DU+QV/PE with AP	750 V
Voltage EEx i EN 50020	60 V
Voltage at cross-connection DU+QV/DU	750 V
Marking Ex-RL 94/9 EEC	Ex II 2 G D
Marking Ex-RL 94/9 EEC	II 2 G D
Voltage at cross-connection DU+QV skipping	110 V

UL rating data

Current (UL)	35 A
Max. conductor cross-section (UL)	AWG 10
Min. conductor cross-section (UL)	AWG 22
Voltage UL	600 V

additional technical data

Type of connection	screwed
No. of identical terminals	1
Version	Feed-through terminal
End plate required	yes
Explosion-tested version "EEx e"	yes
Number of terminal strips per level	2
Levels, internally cross connected	no
Type of mouting	clipped
Flammability class of insulation material acc. to UL 94	V-0
Installation advice	TS 35
Colour of insulating material	dark beige
Insulation material	Wemid
Open sides	right
Range of operating temperature	- 50 °C, + 120 °C
Connection direction	sideways
Product family	W-Series
Number of levels	1



Two-tier modular terminals

In the WDK two-tier modular terminals two potentials are fed through one terminal.

The following versions are available:

- feed-through two-tier modular terminal (WDK ...)
- interconnected version with internal bridging of both levels (WDK... V)
- combined feed-through/PE system terminal (WDK... DU-PE)
- two-tier terminal with electronics (WDK.../D - diode, LD - LED, R - resistor)

Another distinguishing feature is the availability of different types of cross-connection for potential distribution: screw (WQV) or plug-in (ZQV).

Products

Material No.	Short text for material	Rated cross-section
1041600000	WDK 2.5N	2.5 mm ²
1041650000	WDK 2.5N DU-PE	2.5 mm ²
7916730000	WDK 2.5N DU-PE/E	2.5 mm ²
1041610000	WDK 2.5N V	2.5 mm ²
7916720000	WDK 2.5N V/E	2.5 mm ²
1812570000	WDK 2.5N V/E BL	2.5 mm ²
1041800000	WDK 2.5N/10	
1041700000	WDK 2.5N/10 (0-9)	
1041680000	WDK 2.5N BL	2.5 mm ²
7916690000	WDK 2.5N/E	2.5 mm ²
7916700000	WDK 2.5N/E BL	2.5 mm ²
1041660000	WDK 2.5N OR	2.5 mm ²
1041900000	WDK 4N	4 mm ²
1041980000	WDK 4N BL	4 mm ²
1041950000	WDK 4N DU-PE	4 mm ²
7916780000	WDK 4N DU-PE/E	4 mm ²
1041960000	WDK 4N OR	4 mm ²
1041910000	WDK 4N V	4 mm ²

General ordering data

Material No.	1041900000
Short text for material	WDK 4N
Description of part	Feed-through terminals
EAN	4032248138814

Approvals

Approvals

**CSA rating data**

CSA current	30 A
Max. rated cross-section (CSA)	AWG 10
Min. rated cross-section (CSA)	AWG 26
Voltage CSA	300 V

Conductors for clamping (2) with equal cross-section (rated connection)

Flexible, min.	0.5 mm ²
Flexible with ferrule, min. (DIN 46228 pt 1)	0.5 mm ²
Solid, min.	0.5 mm ²
Solid, max.	1.5 mm ²
Flexible, max.	1.5 mm ²
Flexible with ferrule, max. (DIN 46228 pt 1)	1.5 mm ²

Dimensions

Width	6.1 mm
TS 35 offset	13 mm
Height of lowest version	64.1 mm
Length	60.7 mm

Rating data EN 60079-7

Voltage EEx e	550 V
Voltage EEx i EN 50020	60 V
Voltage at cross-connection DU+QV/DU	550 V
Marking Ex-RL 94/9 EEC	II 2 G D
Voltage at cross-connection DU+QV skipping	275 V
Voltage at cross-connection DU+QV/PE	550 V
Marking Ex-RL 94/9 EEC	Ex II 2 G D
Marking EN 60079-7	Ex e II
Current EEx e	28 A
EC conformity verification certificate	KEMA 00ATEX2061 U

UL rating data

Current (UL)	35 A
Max. conductor cross-section (UL)	AWG 10
Min. conductor cross-section (UL)	AWG 26
Voltage UL	600 V

rating data

Rated cross-section	4 mm ²
Rated voltage	800 V
Rated impulse voltage	8 kV
Rated current	32 A
Norm	IEC 60947-7-1
Current for max. conductor	35 A
Pollution severity	3

information boxes, print catalogue

Notes, technical data

Rated voltage 400 V when using cross-connection ZQV
2 conductors 1.5mm², solid, require a tightening torque of 0.6 Nm.

isolating terminals

Torque rating with electric screwdriver type DMS 2

Related products

Material No.	Short text for material	Rated cross-section
1041600000	WDK 2.5N	2.5 mm ²
1041650000	WDK 2.5N DU-PE	2.5 mm ²
7916730000	WDK 2.5N DU-PE/E	2.5 mm ²
1041610000	WDK 2.5N V	2.5 mm ²
7916720000	WDK 2.5N V/E	2.5 mm ²
1812570000	WDK 2.5N V/E BL	2.5 mm ²
1041800000	WDK 2.5N/10	
1041700000	WDK 2.5N/10 (0-9)	
1041680000	WDK 2.5N BL	2.5 mm ²
7916690000	WDK 2.5N/E	2.5 mm ²
7916700000	WDK 2.5N/E BL	2.5 mm ²
1041660000	WDK 2.5N OR	2.5 mm ²
1041980000	WDK 4N BL	4 mm ²
1041950000	WDK 4N DU-PE	4 mm ²
7916780000	WDK 4N DU-PE/E	4 mm ²
1041960000	WDK 4N OR	4 mm ²
1041910000	WDK 4N V	4 mm ²



General ordering data

Material No.	1061200000
Short text for material	WEW-35/2
Description of part	End bracket for TS 35
EAN	4008190030230

Approvals

Approvals



Related products

Material No.	Short text for material
0383560000	EW 35
1805610000	MEW 35/1
1059000000	WEW 35/1
9540000000	ZEW 35
8630740000	ZEW 35/2

Q-Series Miniature Circuit Breakers



Product Type		QL	QY	QZ	QDC
Standard Ampere Ratings (A)			0.1 – 63 (1 pole)	0.1 – 60 (UL 1077)	0.1 – 63 (1 pole)
			0.1 – 50 (2 poles)	5 – 50 (IEC 60947-2)	0.1 – 50 (2 poles)
		0.1 – 25	20 – 100 (2p parallel)		20 – 100 (2p parallel)
			110 – 150 (3p parallel)		110 – 150 (3p parallel)
Number of Poles		1, 2, 3, 1+N, 3+N	1, 2	1, 2, 3, 1+N, 3+N	1, 2
			2, 3p parallel		2, 3p parallel
					2 poles in series
Rated Voltage (V)		120V AC (1p)	80V DC	120V AC (1p)	80V DC
		120/240V AC(2p)	125V DC (1, 2p & 2p parallel)	240V AC (1p)	125V DC (1, 2p & 2p parallel)
		240V AC (1p)	Polarity sensitive	240/415V AC (2, 4p)	250V DC (2p in series)
		240/415V AC 2, 4p)		277V AC (1p)	Polarity sensitive
Approvals & Interrupt. Capacity (kA)	VDE (EN 60947-2)	6kA (240/415V AC)	10kA	3kA (240/415V AC)	10kA
	CE	✓	✓	✓	✓
	cULus (UL489_CSA)	10kA (120/240V AC)			
	UL489A	✓	10kA		
Mounting Options	cURus (UL1077_CSA)	✓		5kA (1p, 120V ac)	
				5kA (277/480V ac)	
	Dual Mounting (DIN & Mini)	✓	✓	✓	✓
	DIN Rail	✓	✓	✓	✓
Tripping curves	Surface Clip	✓	✓	✓	✓
	Plug-in		✓		✓
Resistance to shock		I, 9, KM	OP, U2, I, 9	I, 2, 3, 9	OP, U2, I, 9
Vibration			IEC 60068-2-27, 5G/30ms half sine wave		
Operating temperature			IEC 77/IEC 60068-2-6, 3G/10-150Hz		
Optional Accessories			-40°C to +65°C		
Features		– Aux. switch		– Trip alarm	
		– Aux. switch + trip alarm		– Bus bar	
		– Handle lock			
		– Compact 13mm/module width		– Hydraulic-magnetic technology	
		– Precision tripping		– Suitable for isolation	
		– Temperature independent trip point		– Mid trip handle	

Q-Series Miniature Circuit Breakers

Features



QL

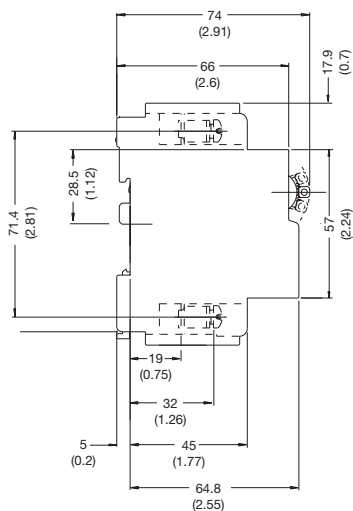
- AC circuit breaker
- UL 489 Listed
- VDE, CSA, CE Approved
- One and two pole units
- Current ratings up to 25A

QY

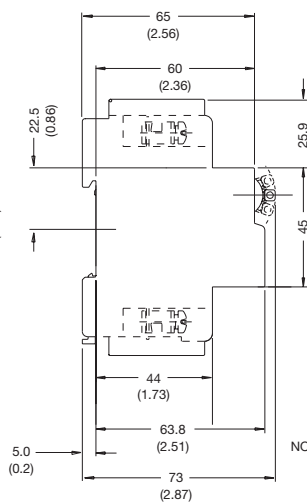
- DC circuit breaker
- UL 489A listed
- VDE & CE Approved
- One and two pole units
- Current ratings up to 150A
- 80V dc & 125V DC

QDC

- DC circuit breaker
- VDE and CE Approved
- One and two pole units
- Current ratings up to 150A
- 80V DC 125V DC and 250V DC (250V DC 2 poles in series)



DUAL MOUNT



DIN RAIL MOUNT

NOTE: DIMENSIONS IN BRACKETS ARE IN "INCHES"

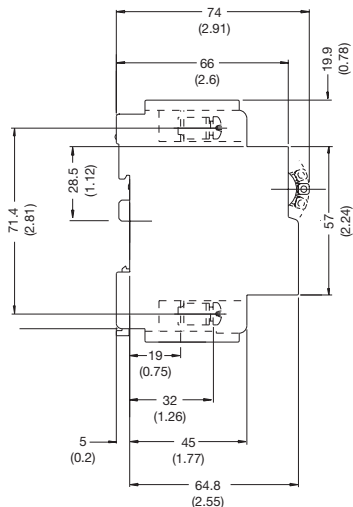
QY/QDC, 2 & 3 POLES
BRIDGED IN PARALLEL

Features

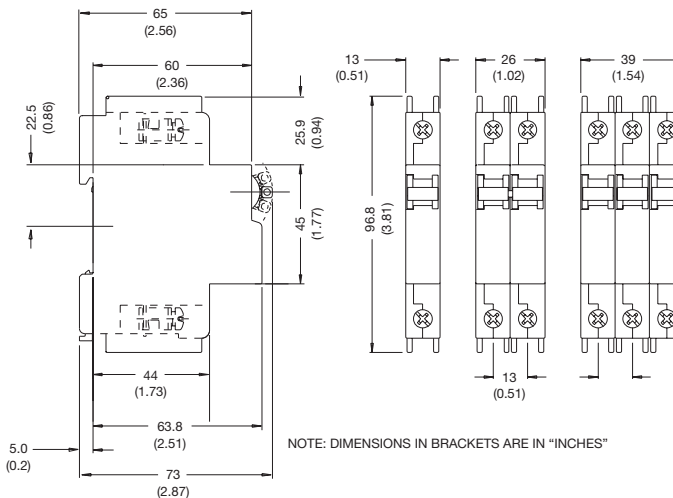


QZ

- AC circuit breaker
- UL 1077 Recognized
- VDE, CE, CSA certified
- One, two and three pole units
- Current ratings up to 60A



DUAL MOUNT



DIN RAIL MOUNT

NOTE: DIMENSIONS IN BRACKETS ARE IN "INCHES"

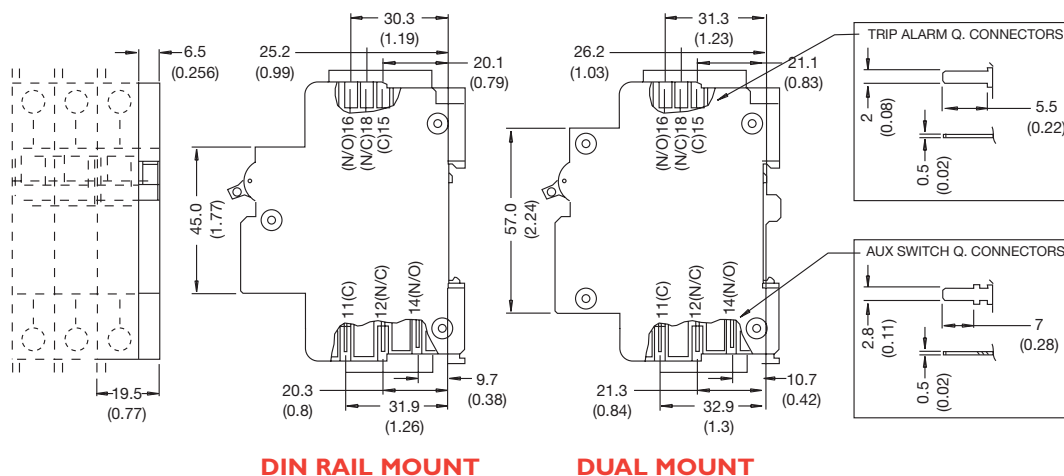
Q-Series Miniature Circuit Breakers

Features

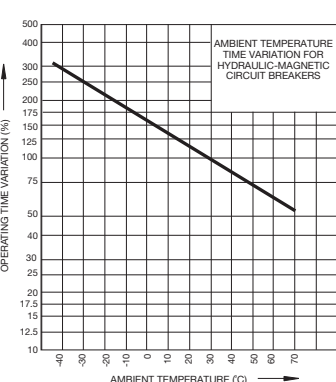
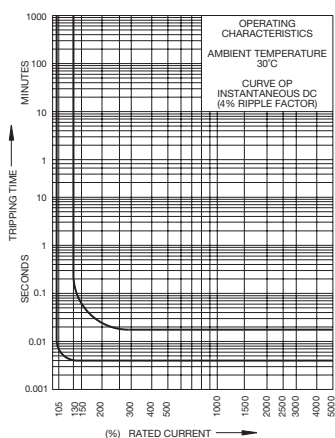
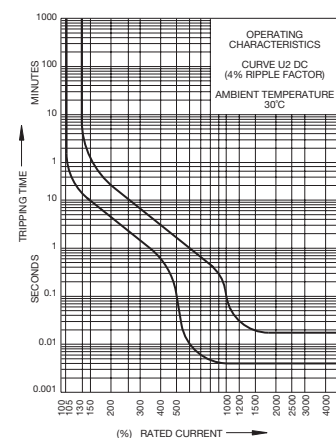
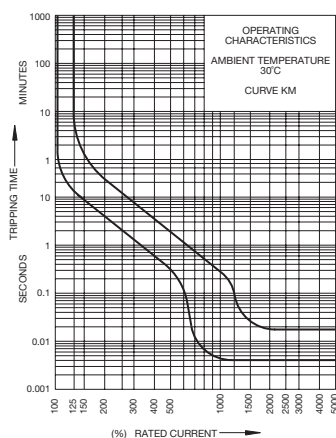
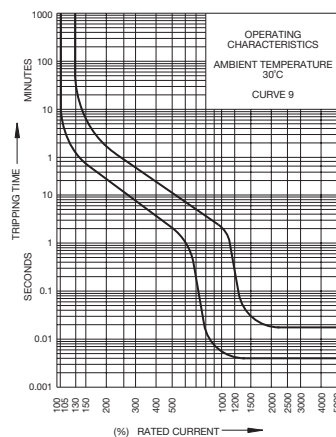
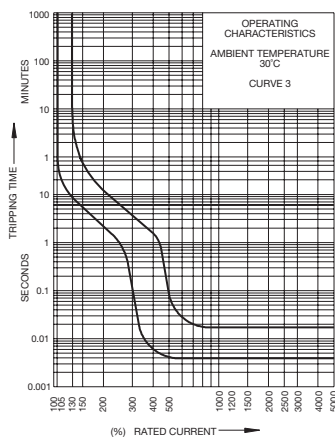
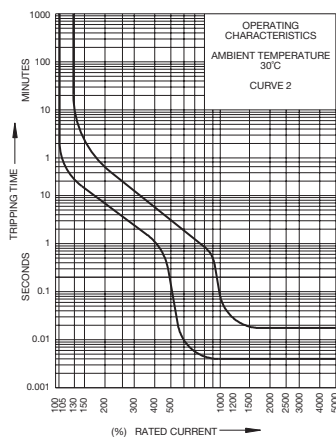
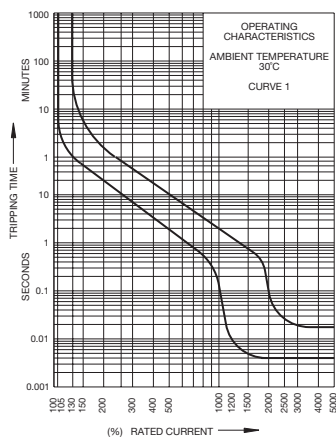


Auxiliary switch, Trip alarm, Combo

- AC and DC voltages
- UL 489 listed
(5A, 250V AC; 0.5A, 80V DC Auxiliary; 0.5A, 125V DC Trip alarm)
- IEC 60947-5-1 approved
(5A, 250V AC; 0.5A, 110V DC Auxiliary; 0.5A, 125V DC Trip alarm)
- Factory fitted
- Compact 6.5mm width
- Attached to right hand side of circuit breaker
- Available on Dual and DIN rail mounting



Standard Time Delay Curves

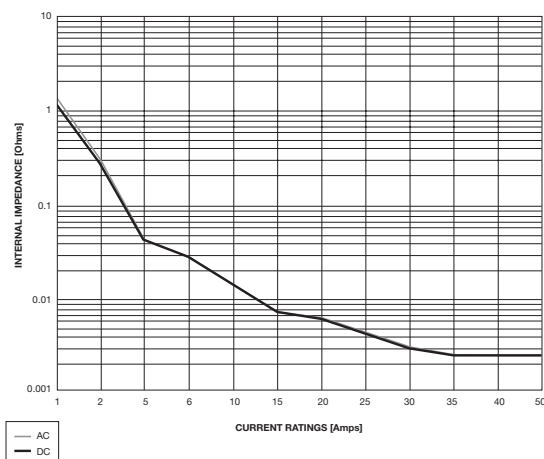


Q-Series Miniature Circuit Breakers

Long Code			
Group 1: Frame Type	Code	Frequency	Approvals
	QL	AC	UL 489
	QY	DC	UL489A,VDE, CE
	QZ	AC	CURus,VDE,CE
	QDC	DC	EN 60947-2, CE
Group 2:	Code	Description	Comments
	N	Neutral	Leave blank if not applicable
	S	Switch	
Group 3: Auxiliary	Code	Description	Comments
	A	Auxiliary Switch	Leave blank if not applicable
	T	Trip Alarm	
	AT	Auxiliary Switch + Trip Alarm	
Group 4: Number of Poles	Code	Description	Comments
	1	Single Pole	
	2	Double Pole	
	3	Triple Pole	
	4	Four Pole	
Group 5: Module width	Code	Description	Comments
	13	13mm	
	18	18mm	
	19	19.5mm	
	26	26mm	
Group 6: Mounting	Code	Description	Comments
	D	DIN – 45mm Escutcheon	
	DM	Dual Mount – DIN & Mini-Rail, 57mm Escutcheon	
	PI	Plug-in, DIN	
	P2	Plug-in, Dual Mount	
Group 7: Time Delays	Code	Description	Comments
	1	Curve 1	
	2	Curve 2	
	3	Curve 3	
	9	Curve 9	
	U2	Curve U2	
	KM	Curve KM	
	OP	Instantaneous	
Group 8: Current Ratings	Code	Description	Comments
	0.1	0.1A	
	0.2	0.2A	
	0.5	0.5A	
	01	1A	
	1.5	1.5A	
	02	2A	
	2.5	2.5A	
	03	3A	
	04	4A	
	05	5A	
	06	6A	
	10	10A	
	15	15A	
	16	16A	
	20	20A	
	25	25A	
	30	30A	
	32	32A	
	35	35A	
	40	40A	
	45	45A	
	50	50A	
	60	60A	
	63	63A	
	70	70A	
	80	80A	
	100	100A	
	125	125A	
	150	150A	
Group 9:	Code	Description	Comments
	B0	80V DC Bottom Connected (Positive at bottom)	Leave blank if not applicable
	B1	125V DC Bottom Connected (Positive at bottom)	
	B2	250V DC Bottom Connected (Positive at bottom)	
	Z	DC – Bridged (Link not supplied)	

Example codes: **QY-1(13)-D-U2-20A-B1**
QDC-2(13)-DM-U2-50A-B2
QL-A-2(13)-D-9-25A
QZ-N-AT-4(13)-DM-60A

INTERNAL IMPEDANCE vs CURRENT RATING



A member of the **REUNERT** Group

South Africa

CBI-electric: low voltage
 Tripswitch Drive Elandsfontein
 Gauteng South Africa
 Tel: +27 11 928 2000
 Fax: +27 11 392 2354
 E-mail: cbi@cbi-electric.com
 Website: www.cbi-electric.com

Germany

Circuit Breaker Industries GmbH
 Postfach 101240 D-86882
 Landsberg Germany
 Tel: +49 8191 9472900
 Fax: +49 8191 94729011
 E-mail: office@cbibreakers.de
 Website: www.cbibreakers.com

USA

Circuit Breaker Industries Inc
 35E Uwchlan Ave Suite 328
 Exton PA 19341 USA
 Tel: +91 610 524 9949
 Fax: +91 610 524 9945
 E-mail: info@cbibreakers.com
 Website: www.cbibreakers.com

Australia

Heinemann Electric (Pty) Ltd
 821 Springvale Road Mulgrave Melbourne
 Victoria 3170 Australia
 Tel: +61 3 9560 3522
 Fax: +61 3 9562 0420
 E-mail: heinelec@heinelec.com.au
 Website: www.heinemannelectric.com.au



Overview

What is a Panel Interface Connector?

A panel interface connector (PIC) is a pass-through unit that mounts to the outside of a control panel containing a PLC or other programmable device. Using the pass-through connections, the operator is able to interface with the PLC or other units within the control box without opening the enclosure door. PICs usually contain a power outlet and various connectors necessary for the PLC or other programmable units in the control box. ZipPort PICs are available with single, duplex or GFCI power outlets, as well as a no-power option. Connectors available include D-Sub, RJ45, RJ12, USB, Ethernet, and Data Highway, and units are available in various combinations needed for the typical control panel.

Why should I use a Panel Interface Connector?

Installing a PIC on an enclosure allows the operator to access the components inside the enclosure without opening the door. This is an important safety feature which removes many of the risks of working with an open electrical panel. Using a PIC may also eliminate the need for operators to wear fire-resistant suits, hoods and gloves, and use non-conductive tools, prior to accessing electrical enclosures capable of producing Arc Flash*, per NFPA 70E requirements.

***Note: An Arc Flash is a voltage breakdown of resistance of air, resulting in an arc which can occur where there is sufficient voltage in an electrical system and a path to ground or lower voltage.**

Features

- Aluminum housing with gasket
- All connections are normally straight through, pin 1 to pin 1, etc.
- All D-Sub connectors are FEMALE EXTERIOR and MALE INTERIOR referenced to the cabinet.
- The 9-pin D-Sub pin configuration is available as a break out configuration in some units. These connectors allow for the D-Sub to be separated into individual lines. This allows the user to connect to the D-Sub using screw terminal connections.
- Some units are configured for Allen Bradley's®* Data Highway system. In this case, the 9-pin D-Sub and/or 8-pin "mini-DIN" are connected to a 3-pin pluggable terminal block commonly used with "BLUE HOSE" applications.
- The internal power connection for frame sizes 32 and 48 is made via a covered terminal block with spring-type connections.
- The internal power connection for frame sizes 16 and 24 is made via female push-on terminals for Line-in and Neutral, plus a ring terminal for ground.
- The standard reset is a 3 Amp circuit breaker to limit the power output of the unit.

*Registered trademark of Allen Bradley Company, LLC

Agency Approvals

- NEMA / UL Type 12, 4, & 4x
- IP 65
- UL file number E329932
- RoHS compliant





Panel Interface Connectors Specifications

ZIPport Panel Interface Connectors Specifications						
Part Number	Price	Housing Size	Outside Connections (excluding power outlet)	Outside Cable(s) [†] (Table 1)	Inside Connections (excluding power outlet)	Inside Cable(s) [†] (Table 1)
<i>The port sequence is exactly the same for outside connections and inside connections.</i>						
No power						
ZP-PNA-06-100	<--->	6	Female DB9	1, 3	Male DB9	1, 2, 4, 5, 7
ZP-PNA-06-101	<--->	6	RJ45 jack		RJ45 jack	8
ZP-PNA-10-200	<--->	10	2 - Female DB9	1, 3	2 - Male DB9	1, 2, 4, 5, 7
115V AC Simplex outlet (single)						
ZP-PSA-16-100	<--->	16	Female DB9	1, 3	Male DB9	1, 2, 4, 5, 7
ZP-PSA-16-101	<--->	16	RJ45 jack		RJ45 jack	8
ZP-PSA-16-102	<--->	16	RJ12 jack	4, 5	RJ12 jack	4, 5, 7
ZP-PSA-16-103	<--->	16	Female HD15		Male HD15	11
ZP-PSA-16-104	<--->	16	Female DB15	9	Male DB15	9
ZP-PSA-16-200*	<--->	16	Female DB9	1, 3	Male DB9	1, 2, 4, 5, 7
ZP-PSA-24-100	<--->	24	Female DB25		Male DB25	10
ZP-PSA-32-300*	<--->	32	Female DB9, Female USB Form B	1, 3, 6	Male DB9, Female USB form A	1, 2, 3, 4, 5, 6, 7
ZP-PSA-32-400*	<--->	32	2 - Female DB9, RJ45 jack	1, 3	2 - Male DB9, RJ45 jack	1, 2, 4, 5, 7, 8
115V AC Duplex outlet						
ZP-PDA-32-200*	<--->	32	Female DB9	1, 3	Male DB9	1, 2, 4, 5, 7
ZP-PDA-32-201*	<--->	32	RJ45 jack		RJ45 jack	8
ZP-PDA-32-202*	<--->	32	Female USB form A	3	Female USB form A	3, 6
ZP-PDA-32-300*	<--->	32	Female DB9, RJ45 jack	1, 3	Male DB9, RJ45 jack	1, 2, 4, 5, 7, 8
ZP-PDA-32-301*	<--->	32	Female DB9, RJ45 jack	1, 3	9-Pin terminal block, RJ45 jack	8
ZP-PDA-32-302*	<--->	32	Female DB9, Female USB Form B	1, 3, 6	Male DB9, Female USB Form A	1, 2, 3, 4, 5, 6, 7
ZP-PDA-32-303*	<--->	32	Female DB9, Female 8-Pin Mini-Din	1, 3	3-pin terminal block, (Data Highway)	
ZP-PDA-32-304*	<--->	32	Female DB9, RJ45 jack	1, 3	3-pin terminal block, (Data Highway), RJ45 jack	8
ZP-PDA-32-305*	<--->	32	Female DB9, Female USB form A	1, 3, 6	Male DB9, Female USB form A	1, 2, 3, 4, 5, 6, 7
ZP-PDA-32-400*	<--->	32	2 - Female DB9, Female USB form B	1, 3, 6	2 - Male DB9, Female USB form A	1, 2, 3, 4, 5, 6, 7
ZP-PDA-32-401*	<--->	32	Female DB9, Female USB form B, Female USB form A	1, 3, 6	Male DB9, Female USB form A, Female USB form B	1, 2, 3, 4, 5, 6, 7
ZP-PDA-32-402*	<--->	32	RJ45 jack, Female USB form B, Female USB form A	3, 6	RJ45 jack, Female USB form A, Female USB form B	3, 6, 8
ZP-PDA-32-403*	<--->	32	Female DB9, RJ12 jack, Female USB form A	1, 3, 4, 5	Male DB9, RJ12 jack, Female USB form A	1, 2, 3, 4, 5, 6, 7
115V AC GFCI outlet						
ZP-PGA-32-200*	<--->	32	Female DB9	1, 3	Male DB9	1, 2, 4, 5, 7
ZP-PGA-32-201*	<--->	32	RJ45 jack		RJ45 jack	8
ZP-PGA-32-300*	<--->	32	Female DB9, RJ45 jack	1, 3	Male DB9, RJ45 jack	1, 2, 4, 5, 7, 8
ZP-PGA-32-301*	<--->	32	Female DB9, Female USB form B	1, 3, 6	Male DB9, Female USB form A	1, 2, 3, 4, 5, 6, 7
ZP-PGA-48-400*	<--->	48	Female DB9, Female USB form B, Female USB form A	1, 3, 6	Male DB9, Female USB form A, Female USB form B	1, 2, 3, 4, 5, 6, 7
ZP-PGA-48-500*	<--->	48	2 - Female DB9, Female USB form B, Female USB form A	1, 3, 6	2 - Male DB9, Female USB form A, Female USB form B	1, 2, 3, 4, 5, 6, 7

[†]Note: Based on application. *Note: 3 Amp resettable circuit breaker. Note: Port sequence for inside connections mirrors port sequence for outside connections

ZIPport Panel Interface Connectors General Specifications	
Electrical Specifications for PICs with Power Outlet(s)	
Voltage Rating	115 VAC
Current Rating	3 A with resettable circuit breaker, 15 A without resettable circuit breaker
SCCR	10 kA
Technical Specs	
Agency Approvals	UL Recognized, RoHS compliant
Degree of Protection	IP65, NEMA/UL 4, 4x, 12 (when mounted with supplied gasket)
Suggested Mounting Screw	#8 -32 x 3/4" for housing sizes 6 through 32. #10 - 32 x 3/4" for size 48 Mounting screws not included with product.
Suggested Screw Torque	10.62 lb/in for housing sizes 6 through 32. 17.7 lb/in for housing size 48
Material Specifications	
Body	Epoxy-coated Die-cast Aluminum
Gasket	Thermo-plastic (TPE)
Handle	Polyamide
Levers	Stainless Steel
Accessories	
One gasket supplied and required during mounting to meet Degree of Protection standards.	
Insert with Panel Cutout dimensions for mounting	

Table 1		
Cable Code	Cable Part Number	Cable Description
1	ZL-DB9-CBL-2	Male DB9 to Female DB9 adapter cable
2	SVC-PCCFG-CBL	Female DB9 to Female Firewire Servo adapter cable
3	USB-RS232	Male USB form A to Male DB9 adapter cable
4	D2-DSCBL	Programming cable for DL05/06, DL105, DL205, DL350, D4-450, Click
5	GS-232CBL	RJ12 to Female DB9 for GS2 DRIVES ONLY
6	USB-CBL-AB_	USB form A to USB form B cable series
7	FA-ISOCN	RS232 - RS422/485 converter
8	OP-MCBL-1	Optimate cable for Modbus PLCs
9	ZL-DB15-CBL-2	Male DB15 to Female DB15 adapter cable
10	ZL-DB25-CBL-2	Male DB25 to Female DB25 adapter cable
11	ZL-DN15TB-CBL	Programming cable for DL06, D2-250(-1), D2-260 CPU

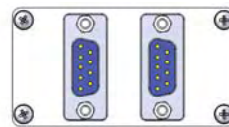
No Power



ZP-PNA-06-100



ZP-PNA-06-101

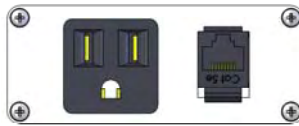


ZP-PNA-10-200

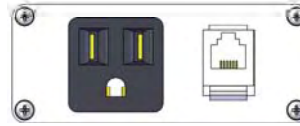
Simplex Outlet, 115V AC



ZP-PSA-16-100



ZP-PSA-16-101



ZP-PSA-16-102



ZP-PSA-16-103



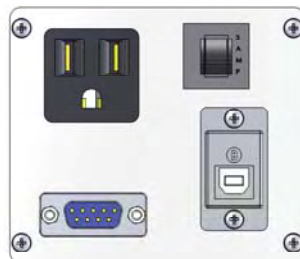
ZP-PSA-16-104



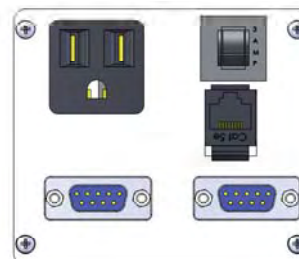
ZP-PSA-16-200



ZP-PSA-24-100



ZP-PSA-32-300



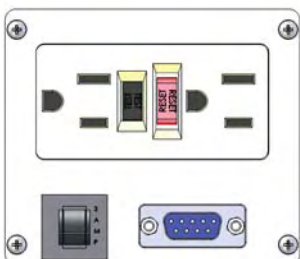
ZP-PSA-32-400



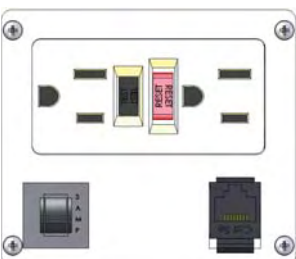
Back view of ZP-PSA-24-100

Crimp terminals are supplied for hot and neutral connection for housing sizes 6 through 24. Ground wire supplied with an M3 ring terminal (recommended screw size #6).

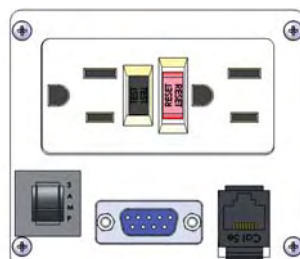
GFCI Outlet, 115V AC



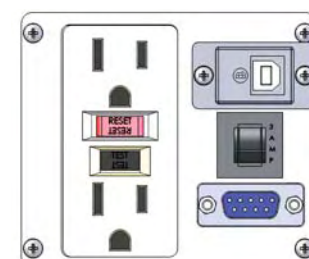
ZP-PGA-32-200



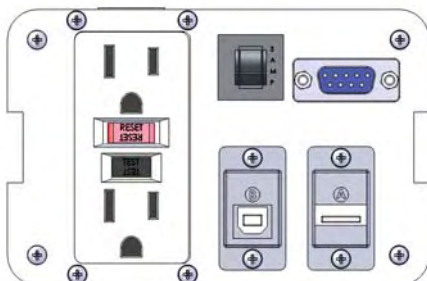
ZP-PGA-32-201



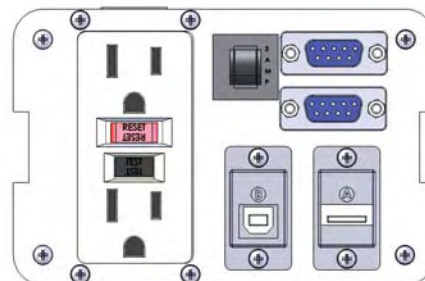
ZP-PGA-32-300



ZP-PGA-32-301



ZP-PGA-48-400



ZP-PG-48-500

Company Info.

PLCs

Field I/O

Software

C-more & other HMI

AC Drives

AC Motors

Power Transmiss.

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temp. Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Appendix

Part Index