

ANGI Electronic Priority Panel With ESD

Operator & Maintenance Manual

REV. 01

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WARRANTY

ANGI hereby warrants that the EQUIPMENT sold hereunder shall be free of defects in material and workmanship appearing within 12 months from the date the EQUIPMENT is placed into service or 18 months from the date the GOODS are available to be shipped; whichever comes first. PURCHASER must give written notice of any defect covered by this warranty to ANGI within the warranty period. For any defect covered by this warranty, ANGI shall repair or replace the EQUIPMENT. Repairs or replacement parts are warranted for 90 days from the date that the repaired or replaced EQUIPMENT OR GOODS are shipped from the factory or until termination of the original warranty, whichever is longer. This warranty does not cover labor costs and other contingent expenses for the diagnosis of defects or for removal and reinstallation of the EQUIPMENT. Such repair or replacement shall be PURCHASER's sole and exclusive remedy for ANGI's breach of this AGREEMENT.

This warranty does not extend to any GOODS or EQUIPMENT which have been (a) subject to misuse, neglect, accidents, acts of God, or causes of a similar nature; (b) repaired or altered by anyone other than ANGI, without ANGI's prior approval; (c) improperly installed by anyone other than ANGI or someone under its direction or (d) to consumable parts or materials such as filter elements, seals, belts, or fuses, or (e) damage resulting from overloading the GOODS or EQUIPMENT. This warranty does not extend to nor does ANGI provide any warranty to components such as motors and drive engines that are separately covered by a warranty issued by their respective manufacturers. ANGI shall transfer or pass through to PURCHASER any such warranties received by ANGI. This warranty is in lieu of all other warranties expressed or implied.

EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, THIS IS THE ONLY WARRANTY GIVEN FOR THE SALE OF GOODS, EQUIPMENT AND/ OR SERVICES. NO WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL ANGI BE LIABLE FOR CONSEQUENTIAL, SPECIAL, INDIRECT, PUNITIVE, OR INCIDENTAL DAMAGES RESULTING FROM THE PURCHASE OR USE OF ANGI EQUIPMENT, GOODS, AND/OR SERVICES RESULTING FROM ANY DELAYS OR FAILURE OF PERFORMANCE OF ANGI UNDER ANY AGREEMENT BETWEEN ANGI AND PURCHASER, OR RESULTING FROM ANY SERVICES FURNISHED BY ANGI.

This warranty may not be modified, amended, or otherwise changed except by a written document properly executed by ANGI.

For warranty issues contact: Customer Service
ANGI Energy Systems, Inc.
15 Plumb Street
Milton, WI, USA 53563

Phone: 608-868-4626
Fax: 608-868-2723
E-mail: service@angienenergy.com
Website: www.angienenergy.com

ANGI Electronic 3-Bank Priority Panel

Priority Panels are designed to fill storage vessels and supply gas to dispensers for refueling CNG vehicles. The panel has gas inlet line(s) coming from the compressor discharge of each CNG compressor station. The Priority Panel separates the gas into three banks for storage and dispenser.

The Priority Panel fills storage banks by high, mid, low and a vehicle is filled by the Dispenser by low, mid, high. This is done by the sequencing valves inside the dispenser. If storage is depleted and a vehicle is demanding fuel, fuel will be directed straight from the compressor discharge through the direct fill line in the priority panel.

When storage is in demand, the compressor(s) will start delivering gas to the priority panel. When the pressure reaches the setting of the high bank back pressure regulator, the regulator will open directing gas to high bank. The compressor fills high bank until the pressure becomes greater than the switch pressure setpoint and opens the mid bank valve. The compressor fills mid bank until the pressure becomes greater than the switch pressure setpoint and opens the low bank valve. The compressor fills low bank until the final pressure is achieved. The switch pressure setpoints are pre-programmed in the controller by ANGI.

All actuated ball valves between storage & vehicles should be normally closed. In an ESD situation, these valves will close protecting the vehicle from storage pressure.

CAUTION

Compressed gasses can be dangerous if careless handling practices are used.

- When depressurizing a system keep fingers and hands away from the gas stream. High-pressure gasses can penetrate skin.

Natural gas can be explosive.

- Never use any open flame in close proximity to natural gas.
- Do not operate any systems with any electrical panel open.
- Observe all safety procedures set forth by your employer.
- Do not open energized electrical panels when gas is present.

Operate high-pressure valves with caution.

Set-up and Operational Adjustments

This panel shall only be installed and serviced by qualified personnel

It is important to periodically check the panel for leaks. New panels can develop leaks in shipping and installation. **Never tighten any fittings when compressor is running or panel is pressurized.**

No adjustments are required in this panel.

Maintenance

Leaks: Leaks can and do occur. To repair leaks depressurize the system and perform necessary steps to repair leaks.

Gauges: Over time, liquid filled gauges can lose some of its glycerin fill. Glycerin can be purchased at a local pharmacy and topped off through the rubber fill stopper on the top of the gauge.



OPERATION MANUAL

ELECTRONIC PRIORITY PANEL (EPP) with XLE-OCS Control

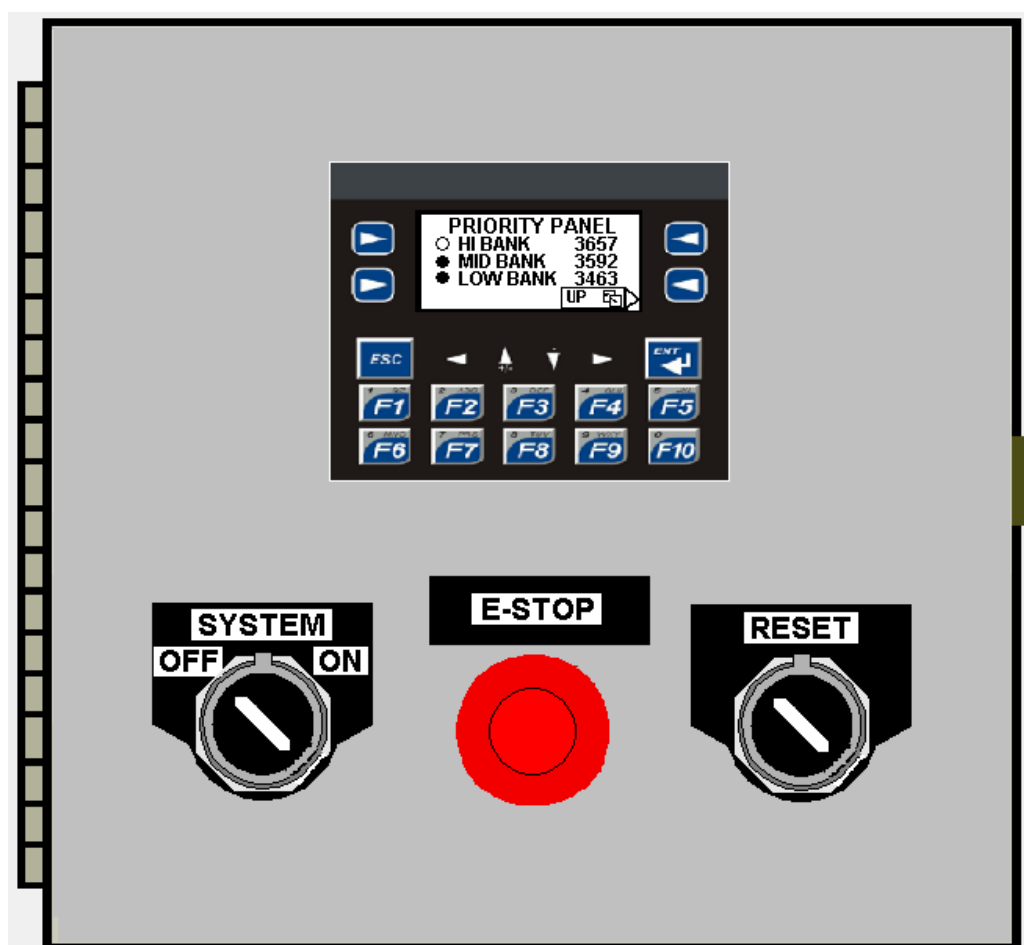




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ELECTRONIC PRIORITY PANEL (EPP) XLE - OCS Control

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SPECIFICATIONS

Electronic Priority Panel

Control System.....	ANGI EPP Control System
Power Supply Output.....	24 VDC @ 2.0 Amps
Power Supply Input.....	100-240 VAC, 50/60 Hz
Maximum Temperature.....	50° C

XLE Parameters

Software Package.....	CScape™
Network.....	CsCAN™, Ethernet
Network ID.....	Programmable
Network Baud.....	125K (CsCAN™)
Firmware Revision.....	refer System Configuration
BIOS Revision.....	refer System Configuration

Electronic Priority Program Outline

Configure Parameters.....	configure machine parameters
Networks.....	write node data to master
Screens.....	main screen logic
Text Tables.....	text table to I/O pointers
Analog Input Monitor.....	read analog inputs
Digital Input Monitor.....	read digital inputs
Priority Sequence.....	Priority valve sequence control
Outputs.....	digital outputs & display lamps
Valve Monitor.....	log maintenance events
AI Monitor sbr.....	scale analog input & fault subroutine
DI Monitor sbr.....	digital input fault subroutine
Alarm Control.....	alarm screen subroutine
Alarm Load Log sbr.....	time & date stamp fault subroutine
Alarm Log Display.....	fault log history subroutine



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IMPORTANT INFORMATION

USER MODIFICATION

ANGI must authorize all modification to this equipment. Any unauthorized modification to this equipment and or software will void the warranty. Modification may damage the equipment and cause bodily injury.

DISCLAIMER

ANGI disclaims any responsibilities whatsoever to the customer or to any person for injury or damage to, or loss of, property or value resulting from the use of its products which have been subjected to misuse, accidents, misapplied, repaired by unauthorized person, or improperly installed.

NOTICE: This manual is as current as possible at the time of printing and is subject to change without notice. For information not covered in this manual or further clarification, contact ANGI Customer Service.

CONTRACTOR OR INSTALLER: Leave this manual with the Unit station after installation is complete.

CUSTOMER: Retain this manual for future reference.



ELECTRONIC PRIORITY PANEL (EPP) XLE - OCS Control

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1. INTRODUCTION

Virtual RUN and OK LEDS can be accessed by pressing the SYSTEM key.

This manual contains information on the operation and maintenance of ANGI Electronic Priority Panel, EPP, used in storage fill applications. The priority panel is designed for continuous duty, unattended operation.

The Electronic Priority Panel is controlled by an ANGI XLE control system. It provides automated valve operation, shut down limit monitoring, fault annunciation, and remote paging annunciation.

The ANGI XLE includes a graphical screen display and includes 12 Digital DC Inputs 4 Analog Inputs (Medium Resolution) 6 Digital Relay Outputs. The XLE provides controller, networking, I/O and operator interface capabilities in one unit using a visual graphic display screen. The OCS has Serial and CAN (Controller Area Network) communication ports. The controller includes embedded features such as Ethernet, MicroFLASH® and Web Server. The units contain an RS-232 port for programming, debugging, monitoring and network administration from an IBM-compatible PC.

Cscape Software is used with the Graphical OCS. The Windows - based software package aids in the integration of a CAN-based Distributed Control System. The program is used for configuring controllers. Cscape is also used for OCS ladder logic, user displays, network configuration for global digital and analog data, setting system-wide security and monitoring other controllers in the system. One serial connection to any node on the network (i.e., CsCAN Network), the program has control over the entire system. The operator can upload, download, monitor and debug to any node on the network.

RUN and OK LEDS are physically located on the front panel of the XLE. CAN OK, and FIBER OK LEDS can be viewed on the back of the XLE OCS next to the fiber connector.



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2. NETWORKS

The NX Controller has several network options to allow remote communications.

CsCAN is a peer-to-peer network developed by Horner Electric. CsCAN is similar to RS485 with multi-drop Nodes on the network. Networks exceeding the maximum total cable length must make use of repeaters. For example, a 125KBaud network running on Belden 3084A Cable can be extended from 500 meters. The two nodes at the physical end-points need to have 121 ohm, 1%, ¼ Watt terminating resistors connected across the CN_L and CN_H terminals.

Ethernet is built into Horner OCS controllers to provide advanced Ethernet communication capabilities. The Ethernet port Module uses a standard TCP/IP protocol. The RJ45 connector with a CAT5 or CAT6 cable can connect to a network hub/switch. It can communicate beyond the local network and onto the Internet. To do so, the Ethernet must be configured with the IP Address of a Network Gateway server, which allows communication outside the local network.

CONTROLS & INSTRUMENTATION

2.1. Control System Overview

The Electronic Priority Panel, EPP, was developed by ANGI to provide fully automatic, unattended operation. The OCS controller provides fault code annunciation and log for quick fault recovery.

2.2. Emergency Shutdown

The Emergency Shutdown, ESD, is remotely monitored by the ESD control relay located in the Master/Compressor Unit Control Panel. ESD is active when the remote ESD Master Relay (MCP/UCP) is de-energized. The ESD pushbutton, located on the EPP panel, may activate an ESD. Also Gas Detectors that sense a High Gas Alarm will activate an ESD. Once ESD is active, the Emergency Shutdown closes the Priority ESD Valve. The OCS activates an ESD fault screen and illuminates an ESD lamp. Activate the Reset pushbutton (MCP/UCP) to return the Priority Panel to normal operation. Note the Priority Panel Reset pushbutton does not reset an ESD.

2.3. Priority Valve Panel

The Priority Valve Panel system provides fill sequencing to a three-bank storage system. The electronic priority system includes unloader valves, pressure gauges, and check valves. Gas is initially delivered to the 'HIGH' bank storage tank and direct vehicle fill line. After 'HIGH' bank storage tank is full gas diverts to 'MID' bank storage tank. When both the 'HIGH' and 'MID' tanks are full, gas delivers to the 'LOW' bank storage tank.

2.4. Priority Panel Operation

With power supplied to the station and the ON/OFF key switch placed in the ON position, the OCS control system will sequence through each of the following operating modes.

- a) The ON/OFF key switch located on the front panel of the EPP is turned ON.
- b) The EPP is not faulted.
- c) The High Bank Pressure is less than the RESET PRESSURE setpoint in the EPP.

- d) The compressor fills High Bank until the pressure becomes greater than the SWITCH PRESSURE setpoint in the EPP and opens the Mid Bank Valve.
- e) The compressor fills Mid Bank until the pressure becomes greater than the SWITCH PRESSURE setpoint in the EPP and opens the Low Bank Valve.
- f) The compressor fills Low Bank until the Final pressure is achieved.

2.5. Faulted

During any of the modes of operations, the control system may detect a shutdown condition and the controller will be placed in FAULTED mode. The fault code and type of alarm are displayed on the OCS Alarm Screen.

3. OPERATOR SCREENS

The controllers contain operator screens that allow the User and Alarm screen numbers to be read. The following is a definition of the two types of screens:

User Screen – These screens display the Priority CNG process. The operator can switch between screens by using the global keys or by using the NEXT (UP) and PREVIOUS (DOWN) touch keys on the controller.

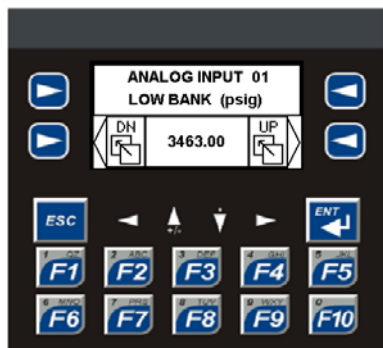
MAIN – SCREEN #1



The F7 key forces the “MAIN” screen to display. The Main Screen shows the Valve Status and the three bank pressures. Lamps are WHITE when OFF (inactive), and BLACK when ON (active).

ANALOG MONITOR – SCREENS #2 – 5

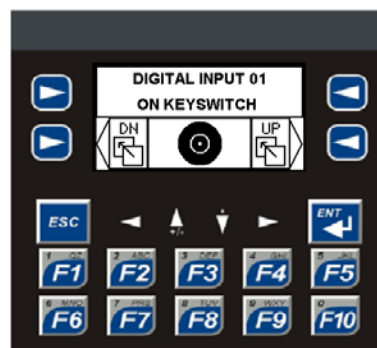
AI01 to AI04



The Analog Inputs monitor in engineering units. The inputs are configured 0 to 20 mA signal = 0 to 32000 count. The count is

scaled and displayed to their respective engineering units. Refer to ANGI P&ID drawings for proper transducer scaling.

DIGITAL INPUTS - SCREENS #6 - 12
IO1 to IO8



This screen monitors the Digital Inputs. Input Lamps are WHITE when OFF (inactive), and BLACK when ON (active). Refer to section “Digital Input Setup” for configuration settings.

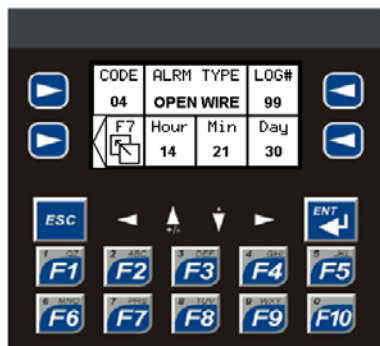
DIGITAL OUPUTS SCREEN #14 - 19
Q01 to Q24



This screen monitors the Digital Outputs. Output Lamps are WHITE when OFF (inactive), and BLACK when ON (active).

4. ALARM LOG SCREEN

Access the Alarm Log Screen by pressing F8 Function key. The Alarm Log places a time and date stamp to each log entry.



The last 100 alarms are logged and stored. The information on the Alarm Log screen is as follows:

ALARM: This displays the current alarm log code. The following table lists the Alarms;

ALARM	
CODE	DESCRIPTION
1 - 4	Analog Inputs AI01 – AI04
46 – 48	Digital Inputs IO6 – IO8
71 – 78	CcCAN Nodes 1 – 8
81 – 88	Ethernet Nodes 1 - 8

ALARM #: The alarm log number identifies which of the last 100 alarms is being viewed.

UP: Increase the Alarm Log Number by pressing the F1 key. When the Alarm Log Number reaches 100, it will advance the Alarm Log Number to 1.

DOWN: Decrease the Alarm Log Number by pressing the F2 key. When the Alarm Log Number reaches 1, it will revert back to Alarm Log Number 99.

TYPE: The alarm type identifies which condition the alarm was activated. The following table lists the Types of Alarms;

TYPES of ALARMS	
CODE	DESCRIPTION
1	Broken Wire (Analog)
2	Low Signal Alarm (Analog)

5	High Signal Alarm (Analog)
6	Input Tripped (Digital)

5. FAULT SCREENS

These screens are forced to display faults generated in ladder logic. Follow the screen instructions to acknowledge and clear alarms.



The screen is annunciated when a machine fault occurs. A shutdown condition places the machine in FAULT mode. The fault is displayed as long as the fault condition exists. The description for the fault and type of fault is displayed. The information on the Machine Fault screen is as follows:

FAULT: This displays the active machine fault. The following table lists the Faults;

MACHINE FAULT	
CODE	DESCRIPTION
1 - 4	Analog Inputs AI01 – AI04
46 – 48	Digital Inputs IO6 – IO8
71 – 78	CcCAN Nodes 1 – 8
81 – 88	Ethernet Nodes 1 - 8

TYPE: A number of digital inputs and analog transducers are monitored by the control system. The control system determines the type of fault associated with the analog or digital input. The following table lists the types of faults.

FAULT TYPES	
CODE	DESCRIPTION
0	No Fault
1	Broken Wire (Analog)
2	Low Signal Alarm (Analog)
5	High Signal Alarm (Analog)
6	Input Tripped (Digital)



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RESET: Activate the RESET Key Switch to clear the fault.

6. TROUBLESHOOTING

Faulted Conditions (General Note)

The transducer faults are analog fault conditions and must be verified with pressure gauge or separate test device prior to carrying out any mechanical repairs. This is to insure that the fault indicated is due to the mechanical equipment not the monitoring system.

The ESD and Site Shutdowns are digital fault conditions. Check the Master Controller (UCP or MCP) to determine the location of the ESD or Site fault condition.

A. If the fault can be verified without the unit running, do so. Correct the fault if needed.

B. Clear the fault code using the FAULT RESET key switch.

	NO.	QTY.	PART NUMBER	DESCRIPTION	LENGTH
	1	1	921-07349	ENCL-HOFF 20Hx16Wx8D CONCEPT ENCLOS	
	2	1	400-07874	OCS-XLE OPERATOR INTERFACE	
	3	1	406-07267	CARD-1GB MICROSD FLASH W/ADAPTER	
	4	1	FC 793-09001	TAG-EMERGENCY STOP RND	
	5	1	FC 793-08001	TAG-WARNING/RISK OF ELECT SHOC	
	6	1	FC 793-08002	TAG-WARNING FUSE REPLACEMENT	
	7	1	FC 793-05003	TAG-TERMINAL TB3 1/2x1 BLK/WHT	
	8	1	FC 793-05005	TAG-TERMINAL TB5 1/2x1 BLK/WHT	
	9	1	FC 793-05006	TAG-TERMINAL TB6 1/2x1 BLK/WHT	
	10	1	FC 793-05007	TAG-TERMINAL TB7 1/2x1 BLK/WHT	
	11	1	FC 793-08014	TAG-OCS CONTROLLER FUNCTIONS	
	12	10	FC 432-07245	TERMINAL BLK-END CLAMP DIN	
	13	2	FC 432-07256	TERMINAL BLK-GROUND DIN RAIL	
	14	8	FC 432-07319	TERMINAL BLK-UK5N 41AMP 800V	
	15	3	FC 432-07321	TERMINAL-END COVER DUK 4/10	
	16	13	FC 432-07292	TERMINAL BLK-UKK5 2-TIER 32AMP	
	17	3	FC 432-07293	TERMINAL-END COVER UKK5 FOR 2-	
	18	5	FC 432-07295	TERMINAL BLK-1.5 3LEVEL ACTUAT	
	19	1	430-07238	TERMINAL-GROUND CONNECT	
	20	1	430-07253	TERMINAL-GROUND BAR ASSY 5CIR	
	21	2	FC 432-07360	TERMINAL BRIDGE-41AMP UK5N SCR	
	22	2	FC 432-07375	TERMINAL MARKER-UC-TM 6 UNPRINTED 6.2	
(B)	23	1	FC 793-08017	TAG-CIRCUIT PROTECTION AND DISCONNECTS	
(B)	24	1	FC 793-10017	TAG-FIELD TERMINATIONS	
	25				
(F)(D)	26	2	400-07501	CONTACT-SQ D N/O HERM.	
(D)	27	1	FC 793-01002	TAG-P.B. 1.2 FAULT/RESET	
(D)	28	1	480-07276	SWITCH-KEY 2POS SPNG RET SQ D	
(D)	29	1	FC 793-08009	TAG- FUSE CHART	
	30	4	490-07249	RELAY W/BASE 24V 6AMP PDT	
	31	1	407-07243	POWER SUPPLY-24VDC 2.5A CL1DIV	
	32				
	33				
	34	1	490-07363	RELAY-120V DPDT MAGNECRAFT HER	
	35	1	492-07236	BASE-RELAY MAGNECRAFT HERM SEA	
	36	1	200-07287	CLIP-RELAY RETAINING MAGNECRAF	
	37				
	38				
	39	8	441-07250	FUSE HOLDER-AGC TYPE SCREW CAP	
	40	1	441-07251	FUSE HOLDER-BRIDGE UK10 DRGNSI	
	41	14	440-07307	FUSE-3 AMP 250V AGC FAST ACT	
	42	2	440-07254	FUSE-5 AMP AGC GLASS CARTRIDGE	
	43				
(A)	44	QTY	FC 432-07257	RAIL-DIN 35MM TERMINAL	38.62"
	45	48"	FC 450-07238	TROUGH-WIRE 1x2 WHT F TYPE	
	46	48"	FC 450-07239	TROUGH-COVER WALL 1"x6' WHT F	

	NO.	QTY.	PART NUMBER	DESCRIPTION	LENGTH
	47	1	480-07329	SWITCH-PUSH PULL W/RED LED 24/28	
	48	1	480-07332	SWITCH-CONTACT BLK,A/B,CL1 DIV2 1N/O	
	49	2	400-07260	SPACER-INSULATING DIN RAIL	
(F)	50				
	51				
	52	1	FC 793-06034	TAG-PRIORITY CONTROLLER	
	53	1	FC 793-05025	TAG-TERMINAL CR17 1/2x1 BLK/WHT	
	54	1	463-07260	LAMP-INDICATING 24/28VDC RED	
	55	1	793-01124	TAG-P.B. 1.2 SYSTEM/FAULT	
	56	1	480-07275	SWITCH-KEY 2POS MAINT SQ D SEL	
	57	1	793-01210	TAG-P.B. 1.2 POWER OFF/ON	
	58	1	FC 793-08003	TAG-SERIAL P&ID	
	59	1	400-07795	CONN-ETHERNET COUPLER CAT5E PASS THR	
(A)	60	1	400-08120	CABLE-ETHERNET CAT5E,UL RJ45M MOLDED	
(A)	61				

CONTROLLED DRAWING

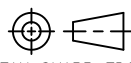
THIS DRAWING COMPLIES WITH AGENCY LISTINGS. DO NOT CHANGE WITHOUT APPROVAL FROM ENGINEERING DEPARTMENT.

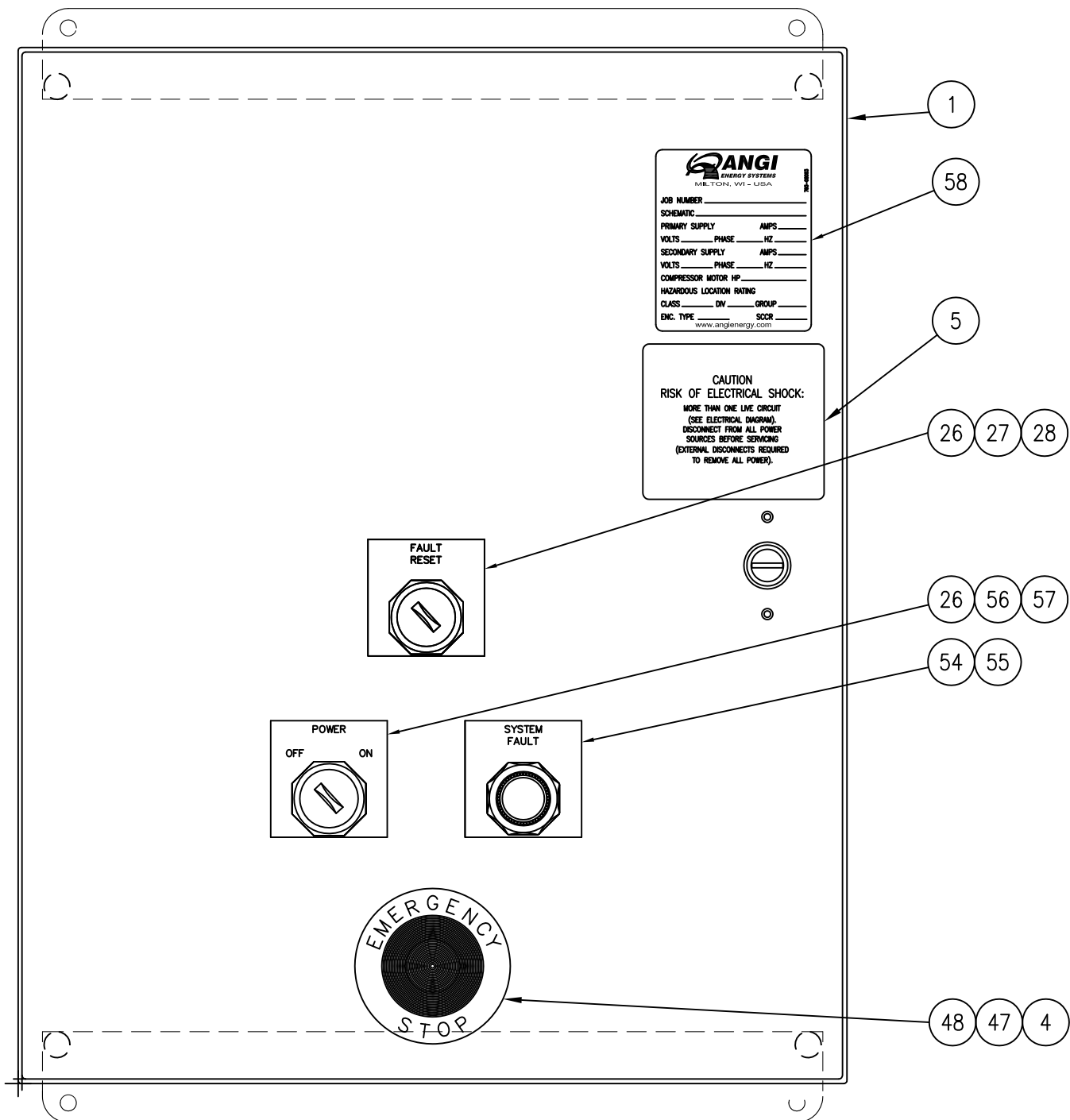
F	03/29/12 NDA	REF. ECN 120309-02 AS BUILT			
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'			
B	4/14/11 MAP	ADDED 23, 24 TAGS FOR UL			
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'			
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION



ANGI ENERGY SYSTEMS
15 PLUMB STREET
MILTON, WI 53563
PH: 608-868-4626
FX: 608-868-2723

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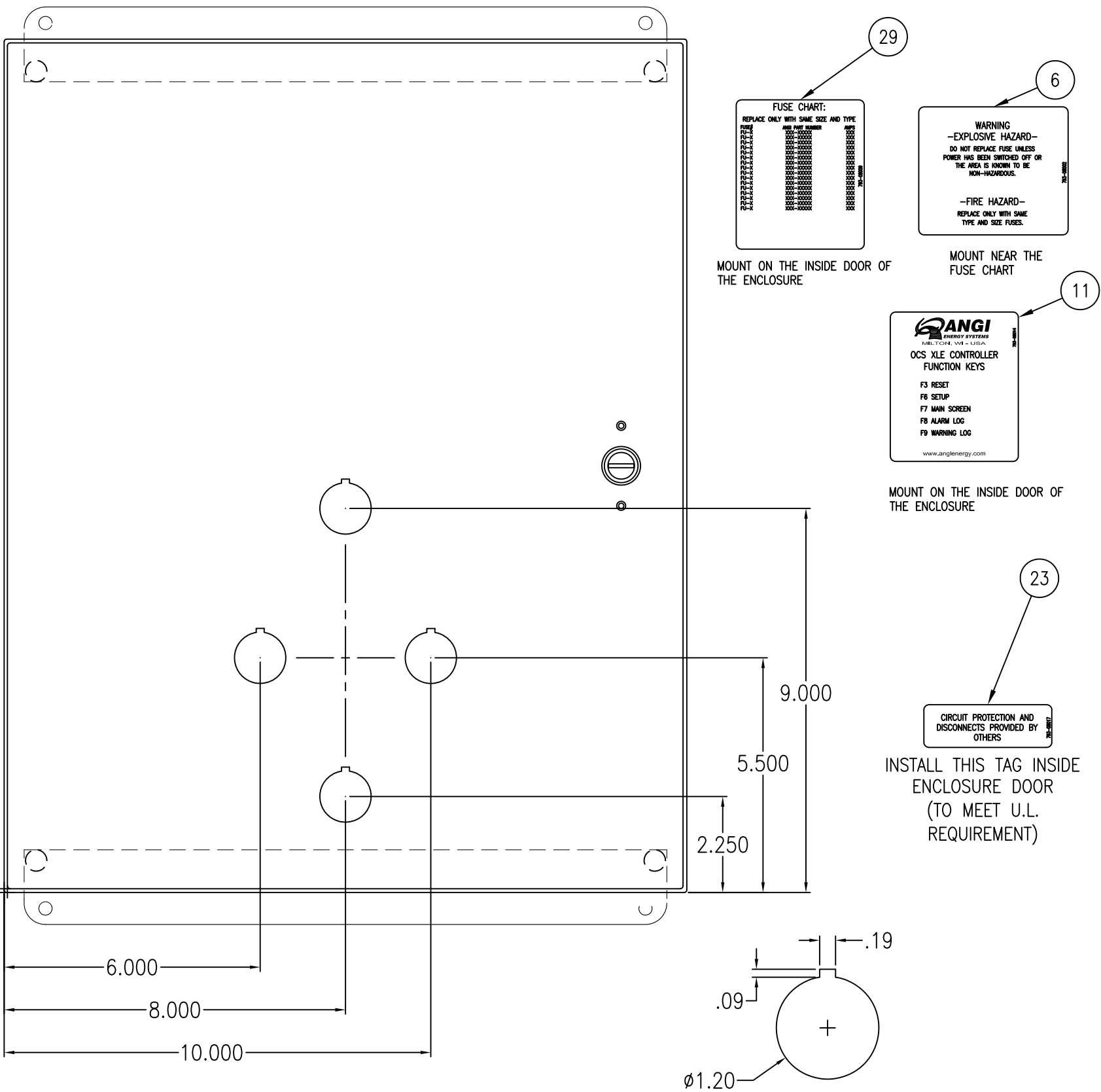
UNLESS OTHERWISE SPECIFIED		TITLE PRIORITY CONTROLLER ASSEMBLY			
 BREAK SHARP EDGES		CUSTOMER			
ALL DIMENSIONS IN INCHES		SHEET 1/9		PROJECT NO.	
FRACTIONAL ±.125 TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005 ANGLES ±1°		SCALE 1:2		DRAWING NO.	
		DRAWN BY NDA		REV. F	
		DATE 12/17/09		E03-90-066	



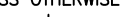
SUPPLIED DOOR AND PANEL GROUND KIT MUST BE INSTALLED ACCORDING TO PANEL MANUFACTURES INSTRUCTIONS

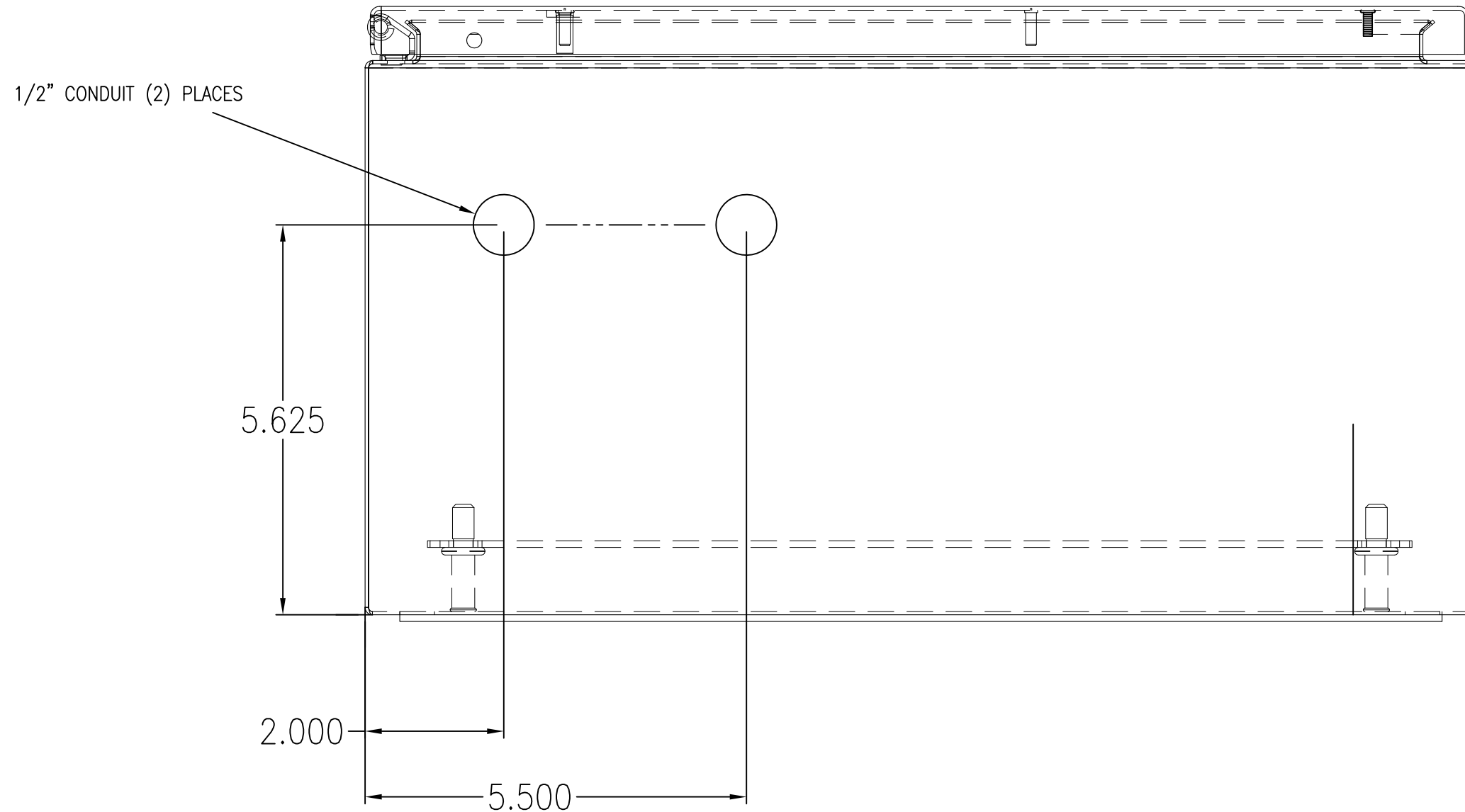
CONTROLLED DRAWING
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NOTE: PER UL 508A ALL PENETRATIONS IN THIS ENCLOSURE MUST BE USED FOR A BUSHING OR DEVISE THAT MEETS OR EXCEEDS THE LABELED TYPE RATING OF THE ENCLOSURE.

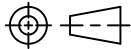


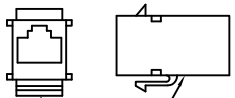
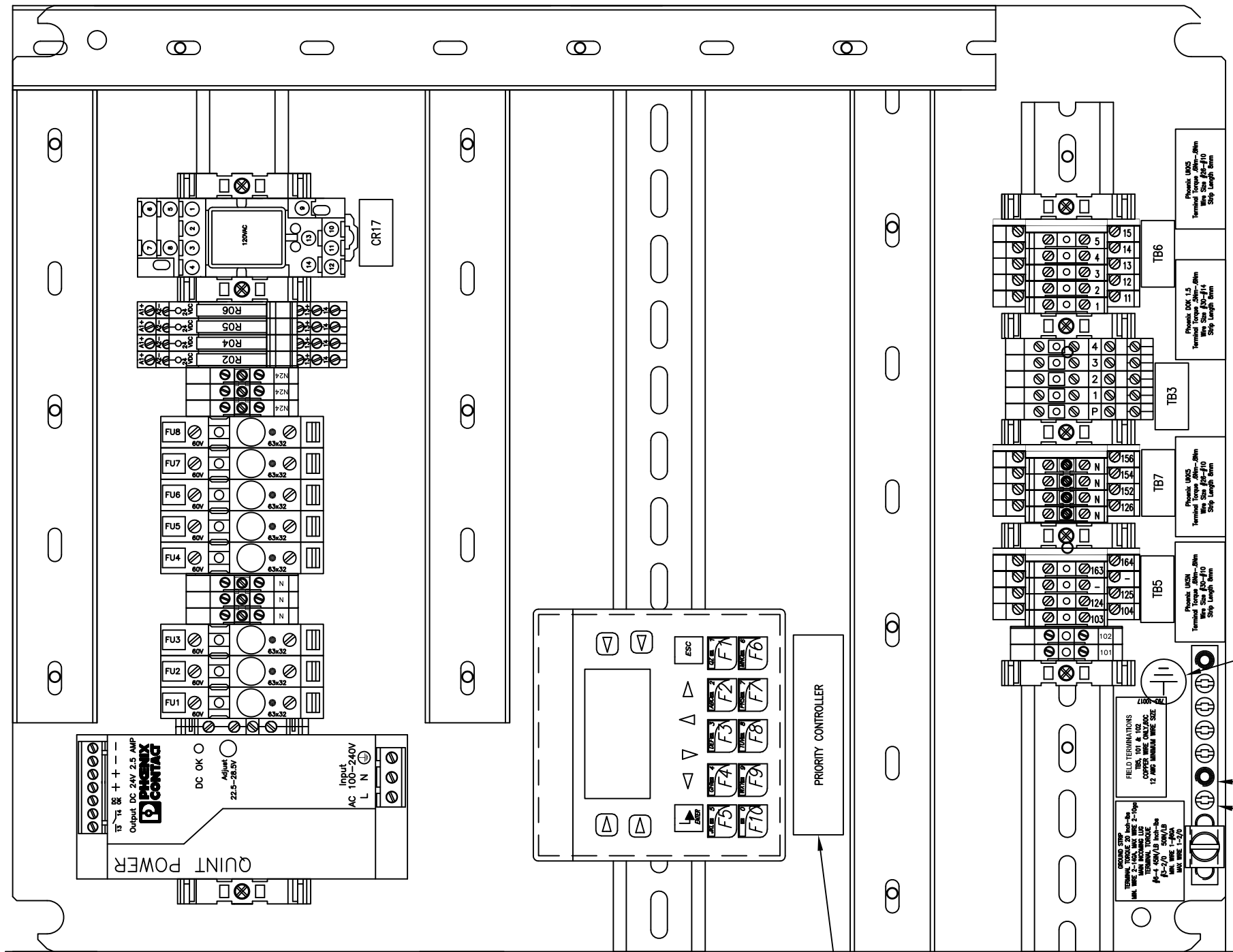
TYPICAL KNOCKOUT FOR SWITCHES AND LAMPS

D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'				 ANGI ENERGY SYSTEMS 15 PLUMB STREET MILTON, WI 53563 PH: 608-868-4626 FX: 608-868-2723 THIS DRAWING AND ALL INFORMATION THEREIN IS THE SOLE PROPERTY OF ANGI AND SHOULD NOT BE COPIED, REPRODUCED, OR SUBMITTED TO OTHERS WITHOUT WRITTEN AUTHORIZATION. ALL REPRODUCTIONS ARE SUBJECT TO RETURN ON DEMAND.	UNLESS OTHERWISE SPECIFIED  BREAK SHARP EDGES ALL DIMENSIONS IN INCHES FRACTIONAL ±.125 TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005 ANGLES ±1°	TITLE PRIORITY CONTROLLER ASSEMBLY				
C	04/19/11 NDA	ADD/CHANGE NOTES						CUSTOMER		PROJECT NO.		
B	4/14/11 MAP	ADDED TAGS 23, 24 FOR UL						SHEET 2/9		SCALE 1:3	DRAWING NO.	REV.
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'	F	03/29/12 NDA	REF. ECN 120309-02 AS BUILT			DRAWN BY NDA		DATE 12/17/09	E03-90-066	F
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION							



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E	09/20/11 NDA	FLOOR REQUESTED HOLE DIM CHANGE							CUSTOMER		PROJECT NO.		
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'					ALL DIMENSIONS IN INCHES		SHEET 3/9		SCALE 1:2		DRAWING NO.
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'					FRACTIONAL ±.125 TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005 ANGLES ±1°		DRAWN BY NDA		DATE 12/17/09		E03-90-066
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION								REV. F

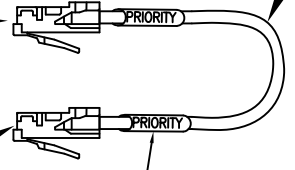


59

INSTALL ITEM #59 ONTO UNPLUGGED END OF ITEM#60 AT ASSEMBLY.

INSTALL ONE RJ45 END OF ITEM #60 INTO J3 PORT OF PRIORITY XEC ETHERNET MODULE AT ASSEMBLY.

*NOTE: ITEM#60 IS TO BE ROUTED WITH WIRES IN WIRE TROUGH AT ASSEMBLY.



60

TIGHTLY CONNECT WITH WRAP-AROUND PANDUIT LABEL (LJSL9-Y3-2.5) OR EQUIVALENT AROUND CABLE

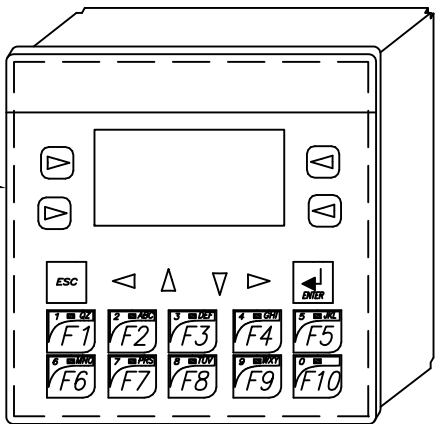
BE SURE TO INSTALL GROUND LABEL SUPPLIED BY VENDOR

20

CLEAN PAINT AWAY FROM UNDER GROUND BAR BEFORE MOUNTING

3

2



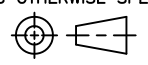
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'			
C	4/19/11 NDA	ADD/CHANGE NOTES			
B	4/14/11 MAP	ADDED 23, 24 TAGS FOR UL			
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'			
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION



ANGI ENERGY SYSTEMS
15 PLUMB STREET
MILTON, WI 53563
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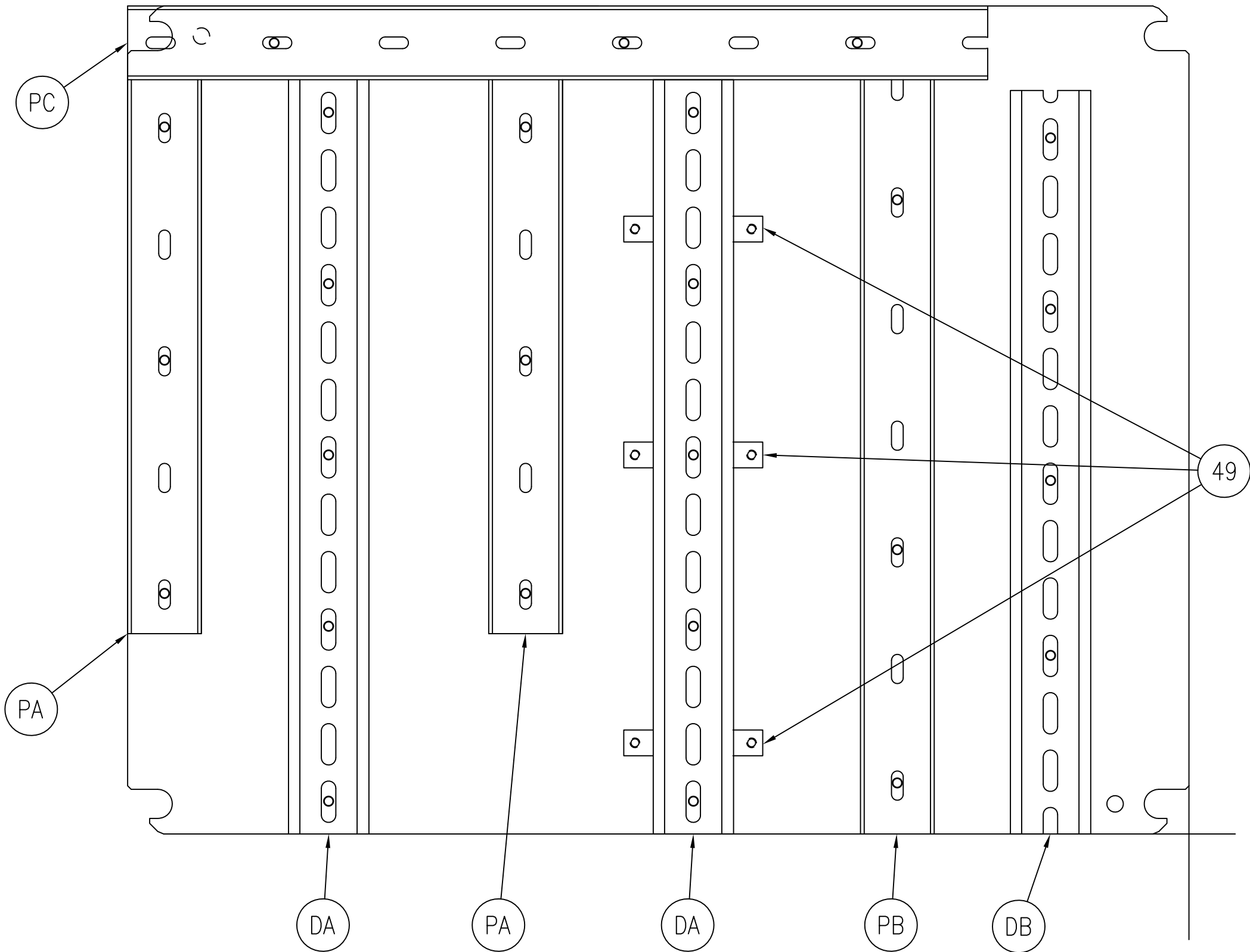


BREAK SHARP EDGES

ALL DIMENSIONS IN INCHES

FRACTIONAL	±.125
TWO PLACE DECIMAL	±.010
THREE PLACE DECIMAL	±.005
ANGLES	±1°

TITLE		PRIORITY CONTROLLER ASSEMBLY			
CUSTOMER		PROJECT NO.			
SHEET	4/9	SCALE	1:2	DRAWING NO.	REV.
DRAWN BY	NDA	DATE	12/17/09	E03-90-066	F



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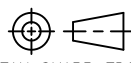
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'			
C	4/19/11 NDA	CHANGE HOLE PATTERN			
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'			



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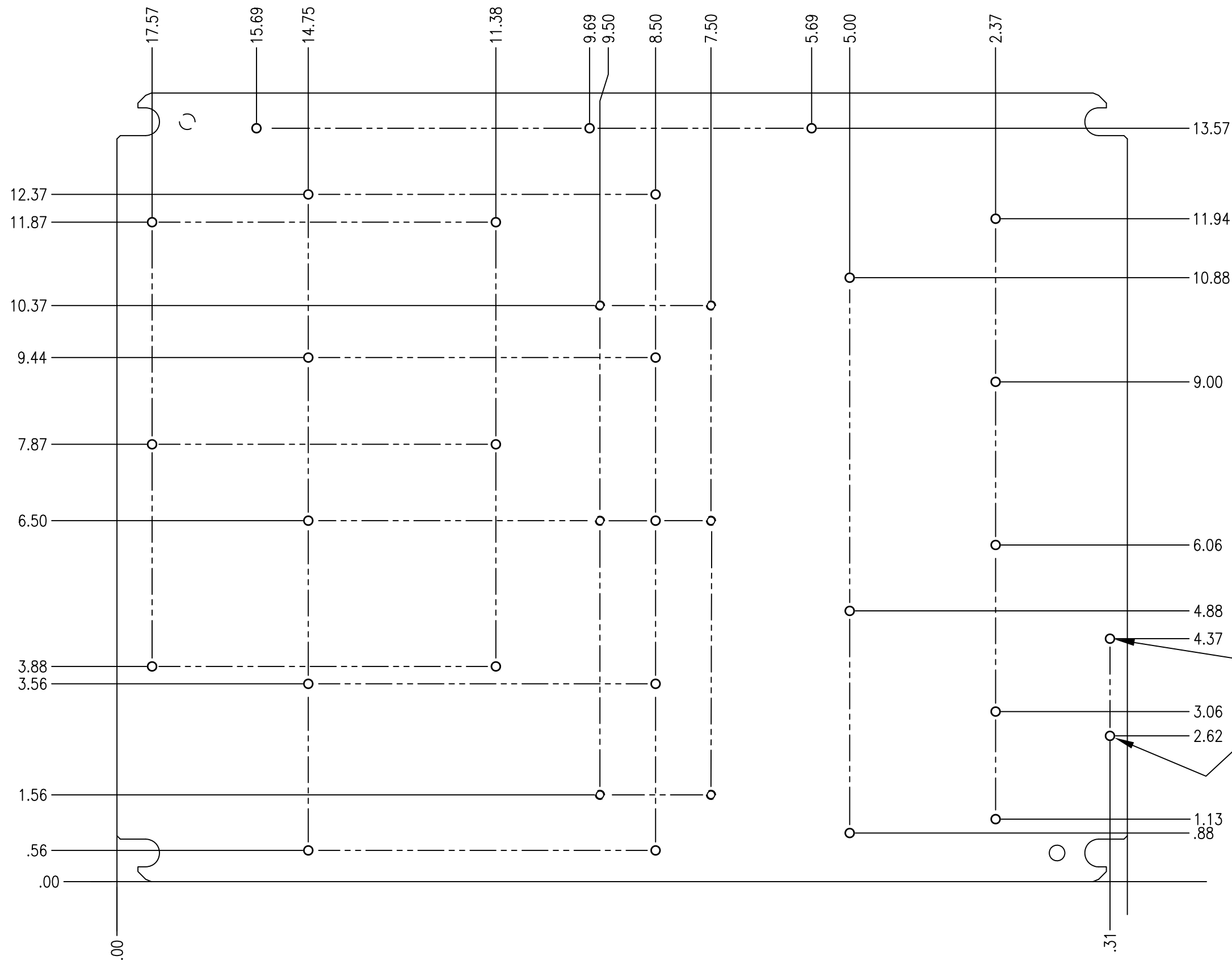
UNLESS OTHERWISE SPECIFIED

 BREAK SHARP EDGES

ALL DIMENSIONS IN INCHES

FRACTIONAL ±.125
TWO PLACE DECIMAL ±.010
THREE PLACE DECIMAL ±.005
ANGLES ±1°

TITLE		PRIORITY CONTROLLER ASSEMBLY			
CUSTOMER			PROJECT NO.		
SHEET	5/9	SCALE	1:2	DRAWING NO.	E03-90-066
DRAWN BY	NDA	DATE	12/17/09	REV.	



ALL HOLES DRILL AND TAP
8-32 UNLESS NOTED

10-32 DRILL AND TAP (2)
PLACES

CONTROLLED DRAWING

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FROM ENGINEERING DEPARTMENT.

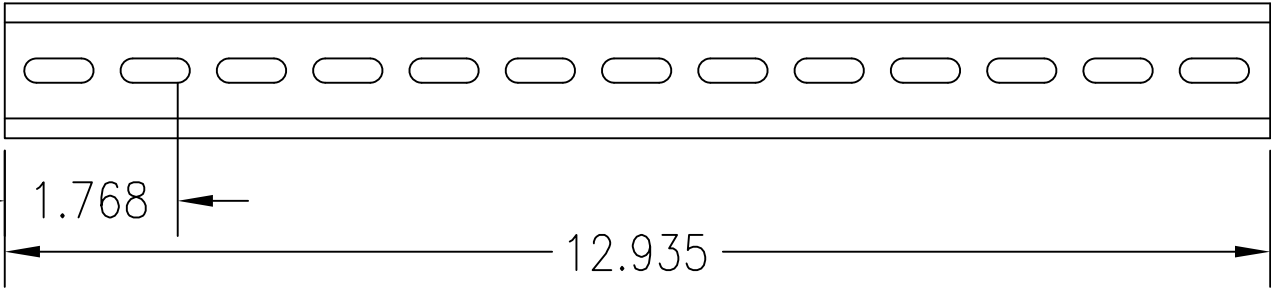
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D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'						BREAK SHARP EDGES		CUSTOMER		PROJECT NO.				
C	4/19/11 NDA	CHANGE HOLE PATTERN					ALL DIMENSIONS IN INCHES		SHEET 6/9		SCALE 1:2		DRAWING NO.		REV.	
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'					FRACTIONAL ±.125 TWO PLACE DECIMAL ±.010 THREE PLACE DECIMAL ±.005 ANGLES ±1°		DRAWN BY NDA		DATE 12/17/09		E03-90-066		F	
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION											



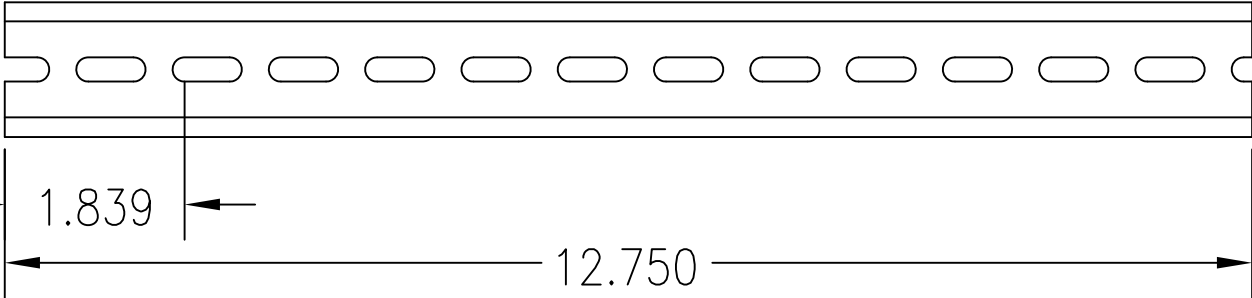
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MILTON, WI 53563
PH: 608-868-4626
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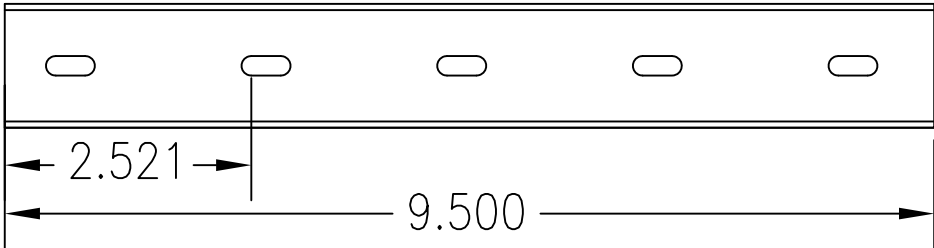
SEE PAGE 1
ITEM 44
DETAIL: DA
35MM DIN RAIL



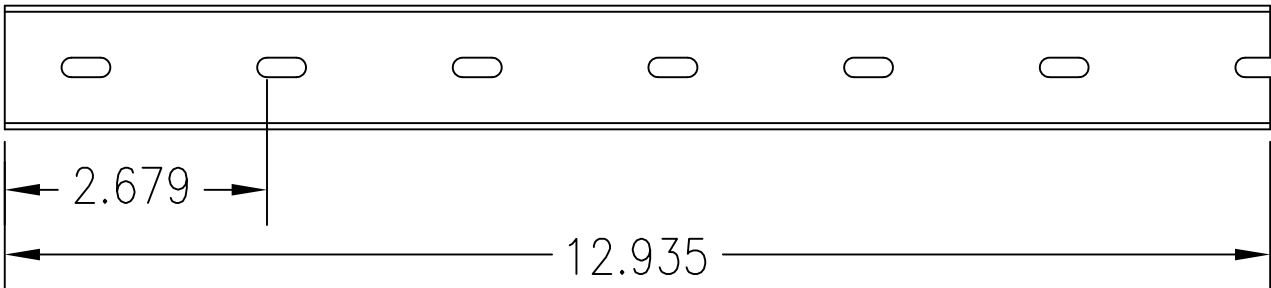
SEE PAGE 1
ITEM 44
DETAIL: DB
35MM DIN RAIL



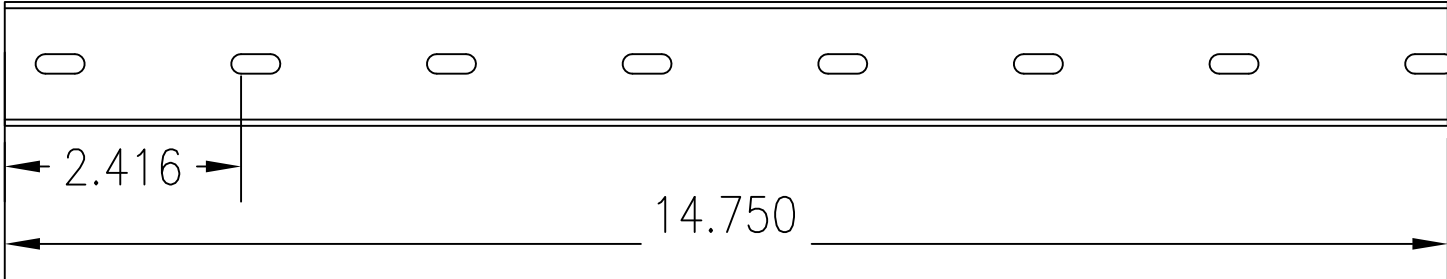
SEE PAGE 1
ITEM 45, 46
DETAIL: PA
TROUGH-SLOTTED
1x2 WHT WIRING



SEE PAGE 1
ITEM 45, 46
DETAIL: PB
TROUGH-SLOTTED
1x2 WHT WIRING



SEE PAGE 1
ITEM 45, 46
DETAIL: PC
TROUGH-SLOTTED
1x2 WHT WIRING



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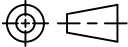
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'			
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'			



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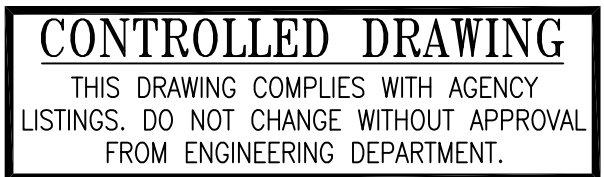
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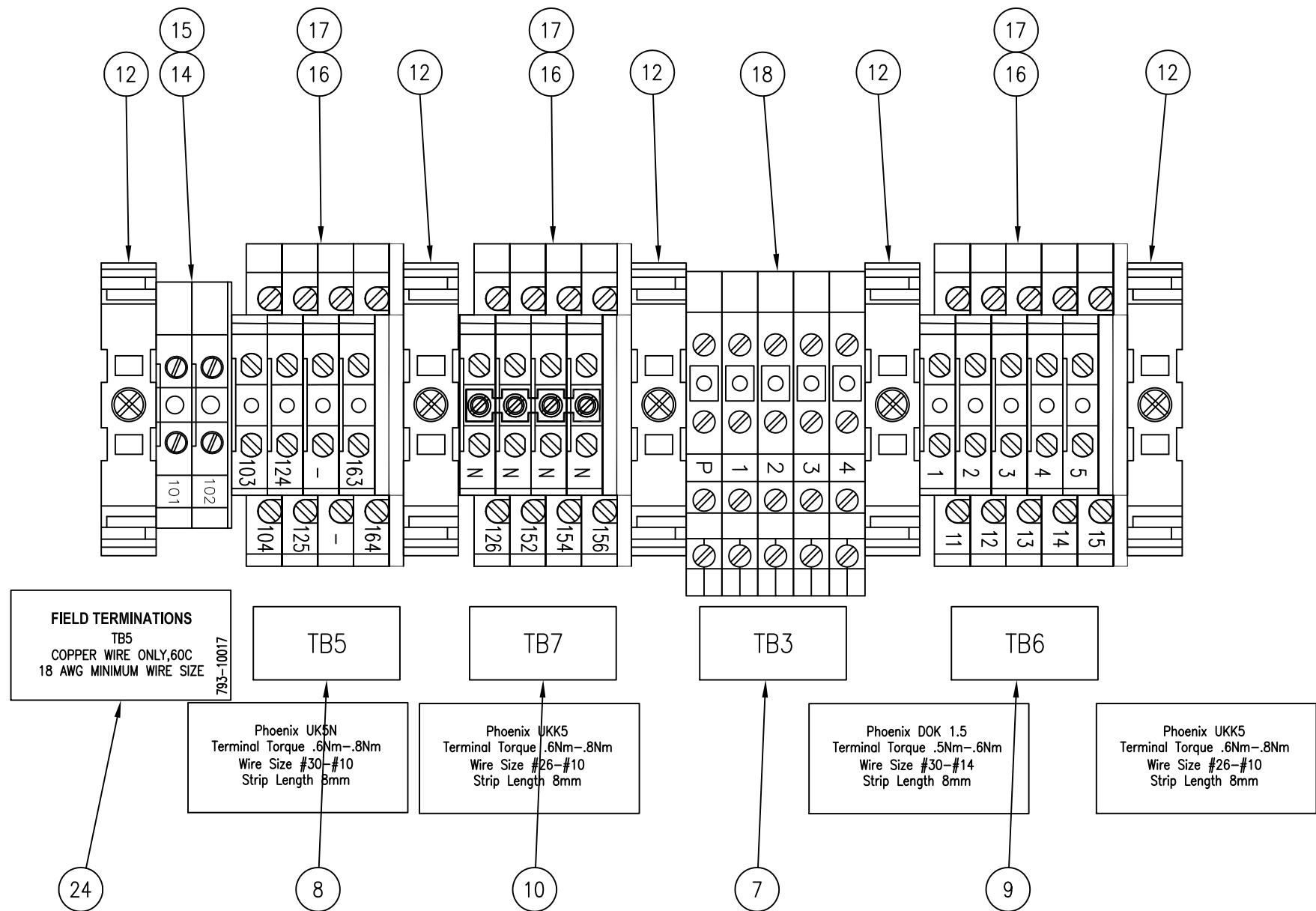


BREAK SHARP EDGES
ALL DIMENSIONS IN INCHES
FRACTIONAL ±.125
TWO PLACE DECIMAL ±.010
THREE PLACE DECIMAL ±.005
ANGLES ±1°

TITLE				PRIORITY CONTROLLER ASSEMBLY							
CUSTOMER				PROJECT NO.							
SHEET		7/9		SCALE		1:2		DRAWING NO.		REV.	
DRAWN BY		NDA		DATE		12/17/09		E03-90-066		F	



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								CUSTOMER		PROJECT NO.		
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'							SHEET 8/9	SCALE 1:1	DRAWING NO.	REV.
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'							DRAWN BY NDA	DATE 12/17/09	E03-90-066	F
REV	DATE/BY	DESCRIPTION			REV	DATE/BY	DESCRIPTION					



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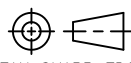
D	05/17/11 JKG	REF. ECN 110517-02 ADDED FAULT RESET SWITCH TO ASSY'			
C	4/19/11 NDA	ADD/CHANGE NOTES			
B	4/14/11 MAP	ADDED TAGS 23, 24 FOR UL			
A	04/01/11 JKG	REF ECN 110401-02 CHANGED TO ETHERNET MOLDED CABLE ASSY'			
REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION



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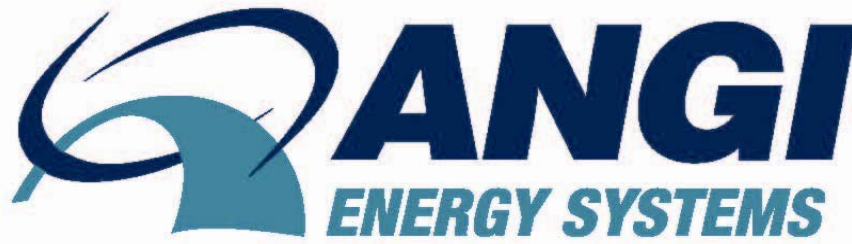
UNLESS OTHERWISE SPECIFIED

 BREAK SHARP EDGES

ALL DIMENSIONS IN INCHES

FRACTIONAL	±.125
TWO PLACE DECIMAL	±.010
THREE PLACE DECIMAL	±.005
ANGLES	±1°

TITLE		PRIORITY CONTROLLER ASSEMBLY			
CUSTOMER			PROJECT NO.		
SHEET	9/9	SCALE	1:1	DRAWING NO.	REV.
DRAWN BY	NDA	DATE	12/17/09	E03-90-066	F



BPR 1

CIRCLE SEAL
5349T-4PP-5000

½" FML ADJUSTTABLE RELIEF VALVE

ANGI PART NUMBER 331-07289

REBUILD KIT – ½ CIRCLE SEAL – 761-07355

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CIRCLE SEAL CONTROLS, INC.

A division of CIRCOR International, Inc.

5300 Series Relief Valves 400 to 10,500 PSIG

Features

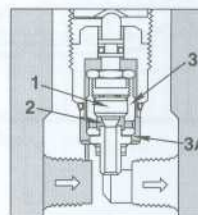
- Zero Leakage to 95% of Cracking Pressure
- Positive Reseal at a High Percentage of Cracking Pressure
- No Chatter or Squeal
- No Pressure Rise with Increasing Flow
- Externally Adjustable

Technical Data

Body Construction Materials:	• Brass, 303 or 316 Stainless Steel
O-ring Materials:	• Buna N, Neoprene, and Viton®
Poppet Materials:	• Liquid service – CRES 440C Gas service to 3074 – Kel F Gas service above 3074 – Polyimide
Retainer Stem:	• 303 Stainless Steel
Seat Material:	• 17-4 PH Stainless Steel
Spring Material:	• 17-7 PH Stainless Steel
Backup Rings:	• Teflon®
Operating Pressure:	• 400 to 10,500 PSIG (28 to 724 BAR); specify cracking pressure
Proof Pressure:	• 4,500 PSIG on gas • 16,000 PSIG on liquid
Burst Pressure:	• Brass – over 30,000 PSIG • Stainless Steel – over 40,000 PSIG
Temperature Range:	• -20° F to +350° F (-29° C to +177° C) Based on o-ring material, see "How to Order"
Connection Size:	• 1/4 inch to 1/2 inch Female Pipe • 1/4 inch to 1 inch Female Tube

NOTE: Proper filtration is recommended to prevent damage to sealing surfaces.

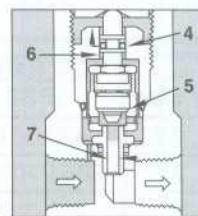
How it Works



CLOSED

In the closed position the poppet (1) is impressed against the orifice (2) by the spring and seals the orifice. This impression is limited by the poppet retainer (3) which bottoms on the shoulder of the orifice nozzle unit at point 3A.

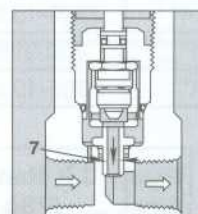
As system pressure rises, pressure within the poppet retainer and above the poppet increases, effecting further sealing efficiency. As pressure rises above normal operating pressure, the poppet retainer (3) moves upward overcoming breakaway friction of the o-ring seal (4) before the preset cracking pressure is reached. This insures extremely precise cracking pressure accuracy.



CRACKING

When system pressure rises above the cracking pressure the force at area (6) is increased and overcomes the preset spring force, permitting the poppet retainer (3) to continue its upward movement and lift the poppet (1) away

from the orifice at (5) permitting flow through the orifice passage (7).



OPEN

Under conditions of flow, back pressure in the orifice nozzle (7) reduces the effective downward force on the poppet, which allows the poppet retainer unit to open further, providing increased flow with little or no increase in pressure.

Where the valve is used as a sequence or priority valve, the downstream pressure buildup permits the poppet to open fully, allowing flow with minimum pressure drop.

5300 Series

400 to 10,500 PSIG

Cracking Pressure Tolerance ±5%

Flow at Cracking Pressure Gas 5cc/min
 Liquid 5cc/min

Reseal Pressure

Crack Pressure

400-599

600-899

900-5999

6000 & greater

Reseal Pressure

80% of CP

85% of CP

90% of CP

95% of CP

Leakage

Gas

Ascending Pressure

Descending Pressure

Liquid

Ascending Pressure

Descending Pressure

zero to 95% of CP

zero at reseal

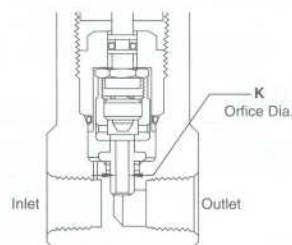
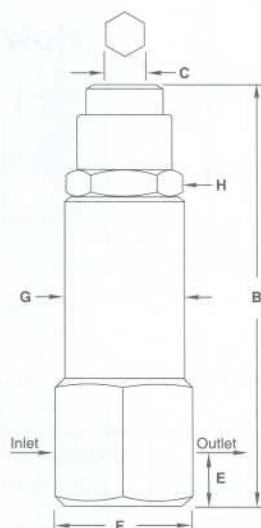
5cc/min max to 95% of CP

15cc/min max at reseal

Repair Kits

In normal service the only part(s) which may require replacement is(are) the seal(s). A repair kit may be ordered by placing a K/ in front of the complete part number, (i.e. K/5349B-4PP).

Dimensions (Inches)



Tube Size	C.P. Range (PSI)	B Max.	C Hex.	E	F Hex.	G Dia.	H Hex	K Dia.	Weight (lbs)	
									Brass	S.S.
1/4", 3/8"	420-3074	4.88	1/2	.52	1.63	1.38	1.25	.125	1.6	1.5
1/4", 3/8"	3075-10,500	5.78	3/8	.52	1.63	1.38	1.25	.125	1.8	1.7
1/2"	420-3074	4.88	1/2	.70	1.88	1.38	1.25	.125	1.6	1.5
1/2"	3075-10,500	5.78	3/8	.70	1.88	1.38	1.25	.125	1.8	1.7
3/4"	400-2299	7.01	9/16	.94	2.50	1.75	1.50	1.88	—	—
3/4"	2300-10,500	8.48	1/2	.94	2.50	1.75	1.50	1.88	—	—
1"	400-2299	7.01	9/16	.94	3.00	1.75	1.50	1.88	—	—
1"	2300-10,500	8.48	1/2	.94	3.00	1.75	1.50	1.88	—	—

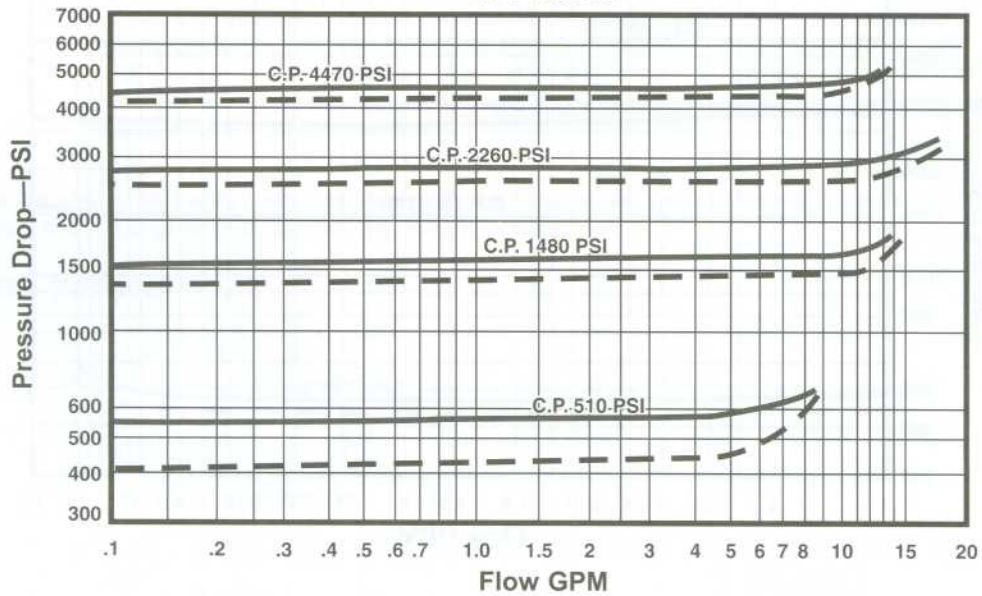
Pipe Size	C.P. Range (PSI)	B Max.	C Hex.	E	F Hex.	G Dia.	H Hex	K Dia.	Weight (lbs)	
									Brass	S.S.
1/4"	420-3074	4.88	1/2	.52	1.50	1.38	1.25	.125	1.6	1.5
1/4"	3075-10,500	5.78	3/8	.52	1.50	1.38	1.25	.125	1.8	1.7
1/2"	400-2299	7.01	9/16	.82	2.00	1.75	1.50	.188	3.2	3.0
1/2"	2300-10,500	8.48	1/2	.82	2.00	1.75	1.50	.188	3.7	3.5

5300 Series

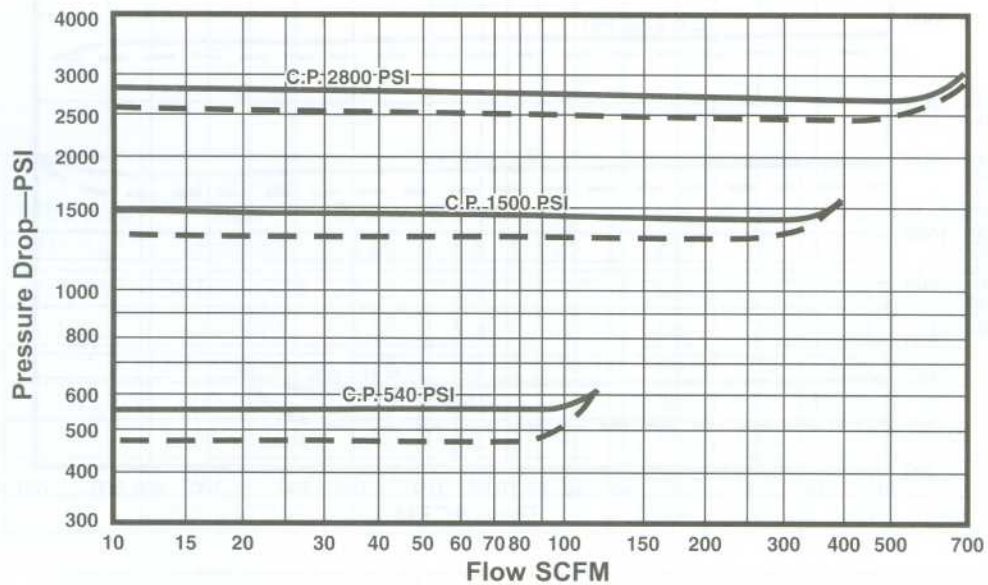
400 to 10,500 PSIG

Typical Flow Curves

5300-BB, 5300-2PP with Hydraulic Fluid
MIL-H-5606



5300-8BB, 5300-2PP with Air

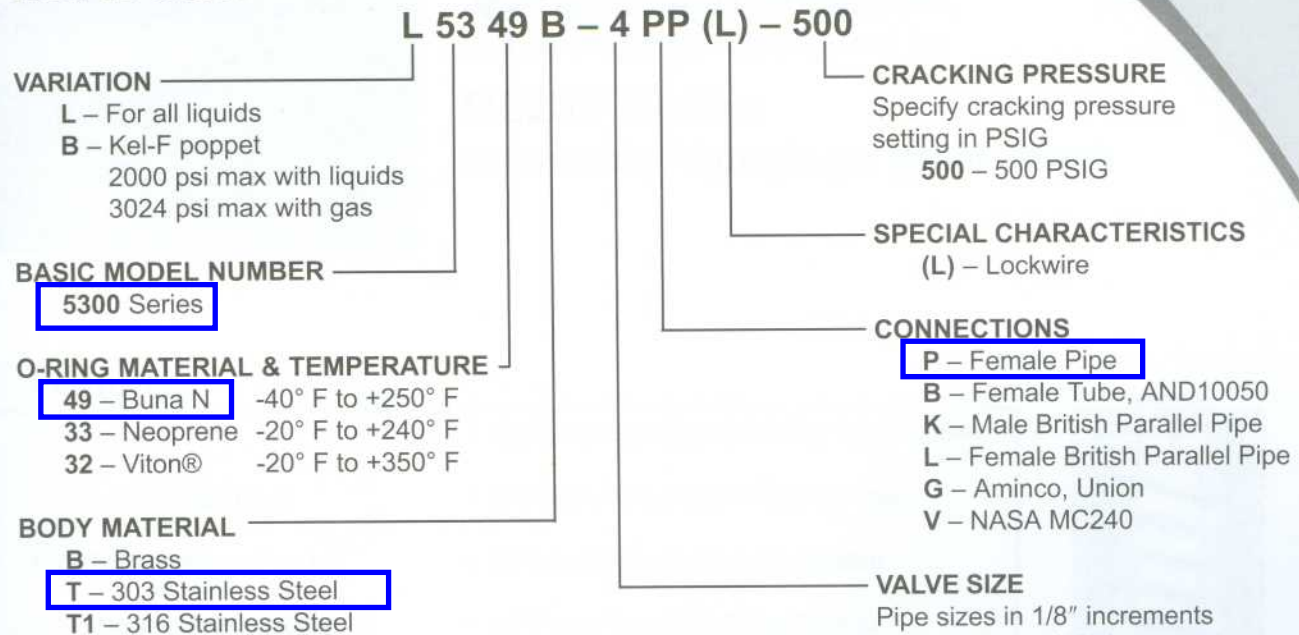


Increasing flow ————— Decreasing flow - - - - -

5300 Series

400 to 10,500 PSIG

How to Order



Notes:

Back Pressure – Any back pressure above atmosphere reduces the cracking pressure by .35 psi for each 1.0 psi of back pressure.

Teflon® and Viton® are registered trademarks of Dupont.

For Your Safety

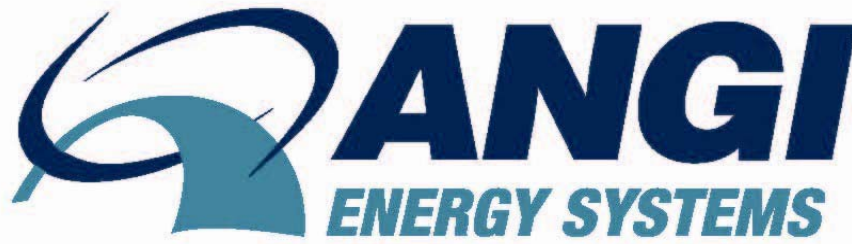
It is the sole responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Material compatibility product ratings and application details should be considered in the selection. Improper selection or use of products described here in can cause personal injury or property damage.

Cracking Pressure Spring Ranges

Consult factory for replacement spring part numbers

Dash No. (Valve Size)	C.P. Range
4PP (1/2") 12BB (3/4") 16BB (1")	400-700
	550-950
	850-1350
	1250-2000
	1650-2700
	1900-3500
	3100-7200
	4000-10,500

Dash No. (Valve Size)	C.P. Range
2PP (1/4") 4BB (1/4") 6BB (3/8") 8BB (1/2")	420-600
	575-850
	825-1190
	1170-1650
	1500-2075
	1710-2570
	2300-3120
	3030-4100
	3890-7560
	4000-10,500



BV 7

HOKE
6610M4Y

PURGE VALVE – ¼" MNPT 6000 PSI STAINLESS STEEL

ANGI PART NUMBER - 330-07281

NO REBUILD KIT AVAILABLE

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Purpose:

- Hoke 6600 Series Bleed Valves allow for quick, easy manual bleed off of system pressure

Typical Applications:

- Air, Hydraulic Systems or **Natural Gas**

Technical Data: **6610 6660, 6670, and 6680 Series Bleed Valves:**

- **Maximum Operating Pressure: 6000 PSIG @ 70°F (414 Bar @ 21°C)**
- **Operating Temperature Range: -40° to 600°F (-40° to 316°C)**
- **End Connections: 1/4, 3/8, 1/2 inch Gyrolok®**

Technical Data: 6631 Series Bleed Valves:

- Maximum Operating Pressure: 5000 PSIG @ 70°F (345 Bar @ 21°C)
- Operating Temperature Range: -20° to 425°F (-29° to 218°C)
- Orifice: .125 in. (3.2mm)
- End Connections: 1/4" NPT, 1/4" Tube Stub

Features:

- Compact Installation
- 316 Stainless Steel Construction
- Straight, Union, Elbow or Tee Flow Configurations
- Integral Tube Ends

Benefits:

- Safe
- Reliable
- Gyrolok® Fitting Connections Eliminate Pipe Thread Leak Paths

Operation Instructions: (For all but the 6631 Series Valves)

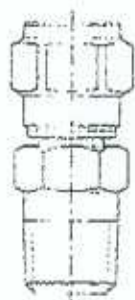
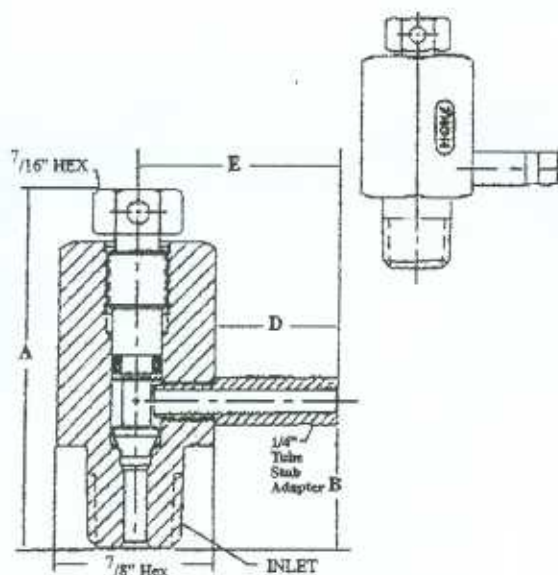
- Valve is operated by turning the bleed port nut with a wrench. Use appropriate back-up wrench to hold body, while turning bleed nut.
- As bleed nut is turned, pressure forces ball off seat. Pressure is vented through a hole drilled in the nut, angled back toward the body of the valve. Make sure flow is directed away from user.
- Those using the valves should wear protective clothing, especially goggles.
- No attempt should be made to repair or dismantle the valve.



6600 SERIES BLEED VALVE

Part Number/Ordering Chart:

Series Designation	Configuration	End Type	End Size	Material
66 - Bleed Valve	10-Straight	G-Gyrolok	4-1/4 in.	Y-316SS
	31-Directed	H-Male NPT x Tube Stub	6-3/8 in.	
	60-Elbow	M-Male NPT	8-1/2 in.	
	70-Union			
	80-Tee			



6631 Series Bleed Valves:

Hoke's 6631 Bleed Valve allows the user to direct the bled fluid as desired. To operate simply turn the 7/16" nut with a wrench or the optional loose fit handle, part number 96706-103.

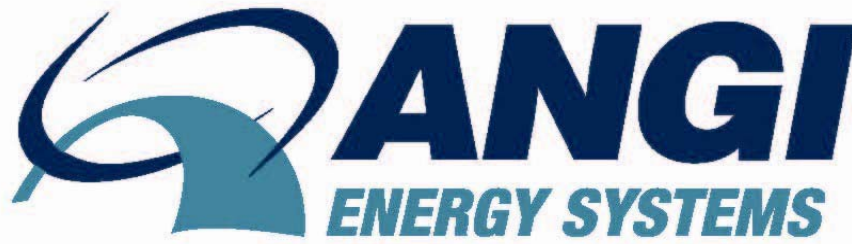
Part Number	Inlet	A (open)	B	D	
6631H4Y	1/4 Male NPT	2 (51mm)	3/4 (19mm)	11/16 (17mm)	1 1/8 (29mm)
6631H84Y	1/2 Male NPT	2 1/8 (54mm)	29/32 (23mm)	11/16 (17mm)	1 1/8 (29mm)

6610, 6660, 6670, And 6680 Series Bleed Valves:

These Hoke Valves come in a variety of configurations including Straight, Elbow, Union, and Tee. See operating instructions and technical data on front cover.

Part Number	P Thread NPT	A Open	B' Hex	C Wrench Flat
6610M4Y	1/4	1 17/32 (39mm)	5/8	9/16
6610MGY	3/8	1 19/32 (40mm)	5/8	11/16
6610M8Y	1/2	1 13/16 (46mm)	5/8	7/8

* Dimensions for reference only and are subject to change without notice.



BV 8

HOKE
6610MS4Y

PURGE VALVE - 7/16 - 20" MSAE 6000 PSI
STAINLESS STEEL

ANGI PART NUMBER - 330-07312

NO REBUILD KIT AVAILABLE

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Purpose:

- Hoke 6600 Series Bleed Valves allow for quick, easy manual bleed off of system pressure

Typical Applications:

- Air, Hydraulic Systems or **Natural Gas**

Technical Data: **6610 6660, 6670, and 6680 Series Bleed Valves:**

- **Maximum Operating Pressure: 6000 PSIG @ 70°F (414 Bar @ 21°C)**
- **Operating Temperature Range: -40° to 600°F (-40° to 316°C)**
- **End Connections: 1/4, 3/8, 1/2 inch Gyrolok®** 

Technical Data: 6631 Series Bleed Valves:

- Maximum Operating Pressure: 5000 PSIG @ 70°F (345 Bar @ 21°C)
- Operating Temperature Range: -20° to 425°F (-29° to 218°C)
- Orifice: .125 in. (3.2mm)
- End Connections: 1/4" NPT, 1/4" Tube Stub

Features:

- Compact Installation
- 316 Stainless Steel Construction
- Straight, Union, Elbow or Tee Flow Configurations
- Integral Tube Ends

Benefits:

- Safe
- Reliable
- Gyrolok® Fitting Connections Eliminate Pipe Thread Leak Paths

Operation Instructions: (For all but the 6631 Series Valves)

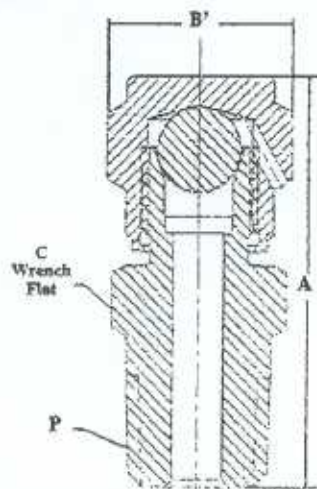
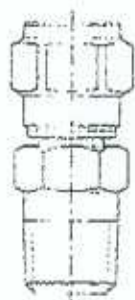
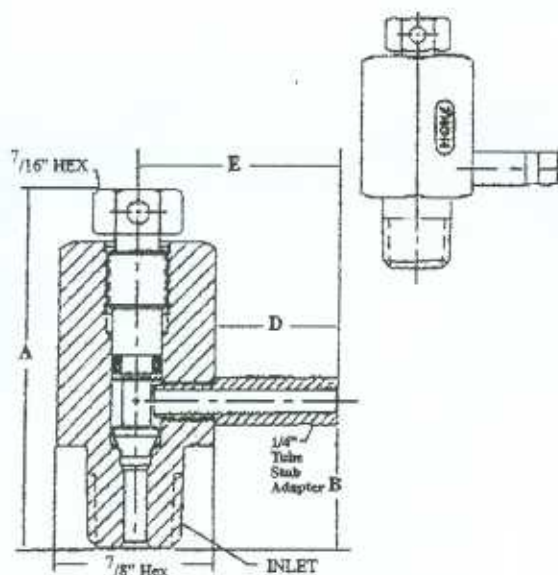
- Valve is operated by turning the bleed port nut with a wrench. Use appropriate back-up wrench to hold body, while turning bleed nut.
- As bleed nut is turned, pressure forces ball off seat. Pressure is vented through a hole drilled in the nut, angled back toward the body of the valve. Make sure flow is directed away from user.
- Those using the valves should wear protective clothing, especially goggles.
- No attempt should be made to repair or dismantle the valve.



6600 SERIES BLEED VALVE

Part Number/Ordering Chart:

Series Designation	Configuration	End Type	End Size	Material
66 - Bleed Valve	10-Straight	G-Gyrolok	4-1/4 in.	Y-316SS
	31-Directed	H-Male NPT x Tube Stub	6-3/8 in.	
	60-Elbow	M-Male NPT	8-1/2 in.	
	70-Union			
	80-Tee			



6631 Series Bleed Valves:

Hoke's 6631 Bleed Valve allows the user to direct the bled fluid as desired. To operate simply turn the 7/16" nut with a wrench or the optional loose fit handle, part number 96706-103.

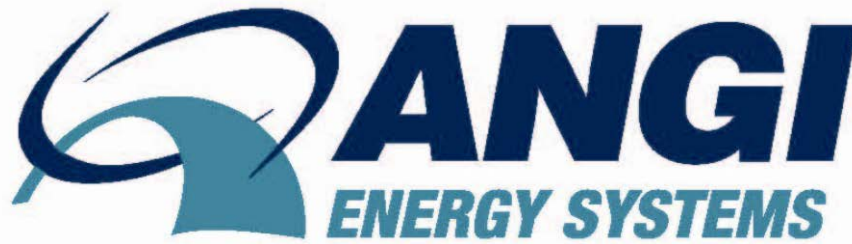
Part Number	Inlet	A (open)	B	D	W
6631H4Y	1/4 Male NPT	2 (51mm)	3/4 (19mm)	11/16 (17mm)	1 1/8 (29mm)
6631H84Y	1/2 Male NPT	2 1/8 (54mm)	29/32 (23mm)	11/16 (17mm)	1 1/8 (29mm)

6610 6660, 6670, And 6680 Series Bleed Valves:

These Hoke Valves come in a variety of configurations including Straight, Elbow, Union, and Tee. See operating instructions and technical data on front cover.

Part Number	P Thread NPT	A Open	B' Hex	C Wrench Flat
6610M4Y	1/4	1 17/32 (39mm)	5/8	9/16
6610MGY	3/8	1 19/32 (40mm)	5/8	11/16
6610M8Y	1/2	1 13/16 (46mm)	5/8	7/8

* Dimensions for reference only and are subject to change without notice.



CV 90

HOKE
CVH-078

CHECK VALVE - ½" FSAE (¾" – 16 FSAE / SAE-8)
20 PSI CRACKING SPRING
6000 PSI

ANGI PART NUMBER – 336-07319

O'RING - 761-07553

SPRING - 650-07357



A division of CIRCOR International, Inc.

CVH Series Check Valves



The CVH Series Check Valves are engineered for a competitive price with no compromise of quality and performance to meet the growing requirements of instrumentation valves. The function of this valve series is to maintain system integrity by preventing back flow of a wide variety of fluids over a broad range of pressures.

- | | |
|--------------------|--|
| • High Flow | 7.4 Cv Maximum |
| • High Pressure | 0 to 6000 psig |
| • High Performance | Quick acting, zero leakage,
low maintenance |
| • Size Range | 1/8" to 1" 6mm to 25mm |

Features & Specifications

- Colored band makes the o-ring easy to identify and promotes safety
- Resilient o-ring seat provides cushioned, quiet closing and zero leakage
- Floating o-ring design – o-ring is continually cleaned and contaminants do not prevent sealing
- Various materials of construction can be used with any liquid or gas service
- Various end connections can be assembled in any system or application
- Spring-loaded poppet can be mounted in any orientation
- Full flow with minimal restriction for maximum Cv rates
- Virtually maintenance free for maximum dependability
- Pressure up to 6000 psig
- Cracking pressure range is .5 to 20psi
- Flow up to 7.4 Cv maximum
- More than 100,000 life cycles

CVH Series Check Valves

Specifications

Pressure Range	0 to 6000 PSIG/ 0 to 414 BAR
Temperature Range	-320° F to +900° F / -196° C to +482° C
Flow Range	.32 Cv to 7.4 Cv
Crack Pressure Range	.5 to 20 PSI / .035 to 1.379 BAR
Leakage	External All – zero Internal Soft seat – zero Teflon seat --< 5cc/minute Metal seat -- < 30cc/minute
Life Cycles	In excess of 100,000 cycles

Operating Temperatures

Seal Material	Temperature F	Temperature C	Color Band
Teflon®	-320° to +400°	-196° to +204°	Maroon
Chemraz	-20° to +425°	-29° to +218°	Olive
Viton®	-20° to +400°	-29° to +204°	Blue
Neoprene	-40° to +250°	-40° to +121°	Red
Ethylene Propylene	-65° to +300°	-54° to + 149°	Purple
Fluorosilicone	-80° to +350°	-62° to +177°	Black
Kalrez®	-40° to +550°	-40° to +288°	Olive
Buna-N	-65° to +275°	-54° to +135°	Green
Metal	-320° to +900°	-196° to +482°	Gold

Flow Chart

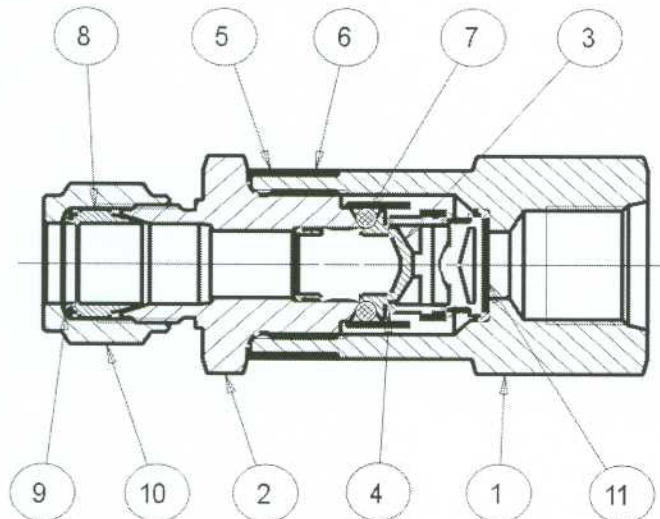
Valve Size	2	4	6	8	10	12	16
Cv	.32	.79	1.71	3.08	3.87	7.38	7.38

CVH Series Check Valves

Materials of Construction

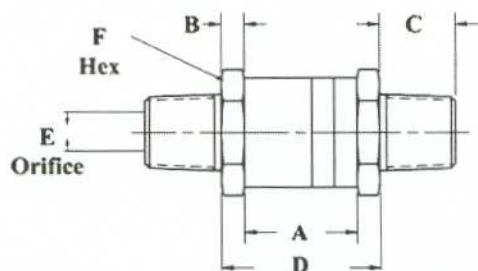
Item	Part	Standard Materials (others on request)
1.	Body* (outlet)	316 stainless steel
2.	End Adapter* (inlet)	316 stainless steel
3.	Poppet*	316 stainless steel
4.	Spring*	302 stainless steel
5.	Part Number Band	Anodized Aluminum
6.	O-ring Band	Anodized Aluminum
7.	O-ring*	Viton®
8.	Front Ferrule*	316 stainless steel
9.	Rear Ferrule	316 stainless steel
10.	Nut	316 stainless steel
11.	Spring Guide	316 stainless steel

*Wetted component



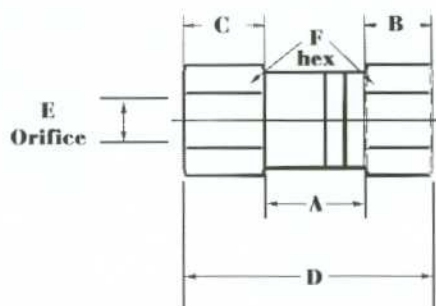
CVH Series Check Valves

Charts of Dimensions



Male NPT

Fractional (Inches)	Size	A	B	C	D	E	F
	02	0.83	0.20	0.40	1.23	.19	0.81
	04	0.83	0.20	0.59	1.23	.19	0.81
	06	1.26	0.20	0.59	1.66	.39	1.19
	08	1.26	0.20	0.77	1.66	.42	1.19
	12	2.05	0.50	0.77	3.05	.66	2.00
	16	2.05	0.50	0.98	3.05	.66	2.00



Female NPT

Fractional (Inches)	Size	A	B Inlet	C Outlet	D	E	F
	02	0.83	0.68	0.78	2.29	.19	0.81
	04	0.83	0.91	1.01	2.75	.19	0.81
	06	1.26	0.92	0.97	3.15	.39	1.19
	08	1.26	1.12	1.17	3.55	.42	1.19
	12	2.05	1.40	1.12	4.57	.66	2.00
	16	2.05	1.61	1.33	4.99	.66	2.00

CVH Series Check Valves

How to Order

CVH Y 04 G 04 M 32 010 A O H

Material

B Brass	C Carpenter 20
I Inconel	O 254 SMO CRES
M Monel	H Hastelloy C276
Y 316 SS	T Titanium

Inlet Size

02 1/8"	14 14mm
04 4mm, 1/4"	16 16mm, 1"
06 6mm, 3/8"	18 18mm
08 8mm, 1/2"	22 22mm
10 10mm	25 25mm
12 12mm, 3/4"	

Inlet Type

G Gyrolok™ Tube Fitting-Per HOKE
A Gyrolok™ Tube Adapter- Per HOKE
Z Metric Gyrolok™ Tube Fitting-Per HOKE
W Metric Gyrolok™ Tube Adapter-Per HOKE
S Male SAE-Per J514
R Female SAE-Per J1926
L Male British Parallel Pipe-Per ISO 1179
K Female British Parallel Pipe-Per ISO 1179
M Male NPT-Per ANSI/ASME B1.20.1
F Female NPT-Per ANSI/ASME B1.20.1
Q Male British Tapered Pipe ISO 7/1
P Female British Tapered Pipe ISO 7/1

Outlet Size

02 1/8"	14 14mm
04 4mm, 1/4"	16 16mm, 1"
06 6mm, 3/8"	18 18mm
08 8mm, 1/2"	22 22mm
10 10mm	25 25mm
12 12mm, 3/4"	

Hokey

Cleaning Options

O Standard **C** Cryogenic Cleaning
B Industrial Cleaning **D** NACE Compliant

Band Options

A Aluminum Bands (std.)
Y Stainless Steel Bands

Cracking Pressure

005 00.5 PSI/.035 BAR	050 05.0 PSI/0.344 BAR
010 01.0 PSI/.069 BAR	100 10.0 PSI/.688 BAR
030 03.0 PSI/0.206 BAR	200 20.0 PSI/1.379 BAR

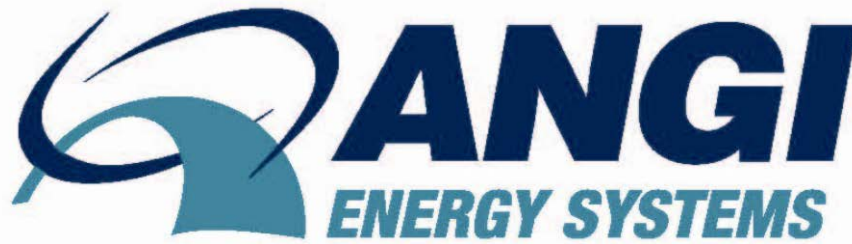
(others available on request)

Seal Materials

20 Teflon®
25 Chemraz
32 Viton®
40 Teflon® (Cryogenic Service)
53 Neoprene
62 Ethylene Propylene
64 Fluorosilicone
65 Kalrez®
77 Buna N
00 Metal (high temperature service)

Outlet Type

G Gyrolok™ Tube Fitting-Per HOKE
A Gyrolok™ Tube Adapter-Per HOKE
Z Metric Gyrolok™ Tube Fitting-Per HOKE
W Metric Gyrolok™ Tube Adapter-Per HOKE
S Male SAE-Per J514
R Female SAE-Per J1926
L Male British Parallel Pipe-Per ISO 1179
K Female British Parallel Pipe-Per ISO 1179
M Male NPT-Per ANSI/ASME B1.20.1
F Female NPT-Per ANSI/ASME B1.20.1
Q Male British Tapered Pipe ISO 7/1
P Female British Tapered Pipe ISO 7/1



CV 91

HOKE
CVH-079

CHECK VALVE-3/4" FSAE (1-1/16-12 FSAE / SAE-12)
20 PSI CRACKING SPRING
6000 PSI

ANGI PART NUMBER 336-07320

O'RING – 761-07417

SPRING – 650-07358



A division of CIRCOR International, Inc.

CVH Series Check Valves



The CVH Series Check Valves are engineered for a competitive price with no compromise of quality and performance to meet the growing requirements of instrumentation valves. The function of this valve series is to maintain system integrity by preventing back flow of a wide variety of fluids over a broad range of pressures.

- | | |
|--------------------|--|
| • High Flow | 7.4 Cv Maximum |
| • High Pressure | 0 to 6000 psig |
| • High Performance | Quick acting, zero leakage,
low maintenance |
| • Size Range | 1/8" to 1" 6mm to 25mm |

Features & Specifications

- Colored band makes the o-ring easy to identify and promotes safety
- Resilient o-ring seat provides cushioned, quiet closing and zero leakage
- Floating o-ring design – o-ring is continually cleaned and contaminants do not prevent sealing
- Various materials of construction can be used with any liquid or gas service
- Various end connections can be assembled in any system or application
- Spring-loaded poppet can be mounted in any orientation
- Full flow with minimal restriction for maximum Cv rates
- Virtually maintenance free for maximum dependability
- Pressure up to 6000 psig
- Cracking pressure range is .5 to 20psi
- Flow up to 7.4 Cv maximum
- More than 100,000 life cycles

CVH Series Check Valves

Specifications

Pressure Range	0 to 6000 PSIG/ 0 to 414 BAR
Temperature Range	-320° F to +900° F / -196° C to +482° C
Flow Range	.32 Cv to 7.4 Cv
Crack Pressure Range	.5 to 20 PSI / .035 to 1.379 BAR
Leakage	External All – zero Internal Soft seat – zero Teflon seat --< 5cc/minute Metal seat -- < 30cc/minute
Life Cycles	In excess of 100,000 cycles

Operating Temperatures

Seal Material	Temperature F	Temperature C	Color Band
Teflon®	-320° to +400°	-196° to +204°	Maroon
Chemraz	-20° to +425°	-29° to +218°	Olive
Viton®	-20° to +400°	-29° to +204°	Blue
Neoprene	-40° to +250°	-40° to +121°	Red
Ethylene Propylene	-65° to +300°	-54° to + 149°	Purple
Fluorosilicone	-80° to +350°	-62° to +177°	Black
Kalrez®	-40° to +550°	-40° to +288°	Olive
Buna-N	-65° to +275°	-54° to +135°	Green
Metal	-320° to +900°	-196° to +482°	Gold

Flow Chart

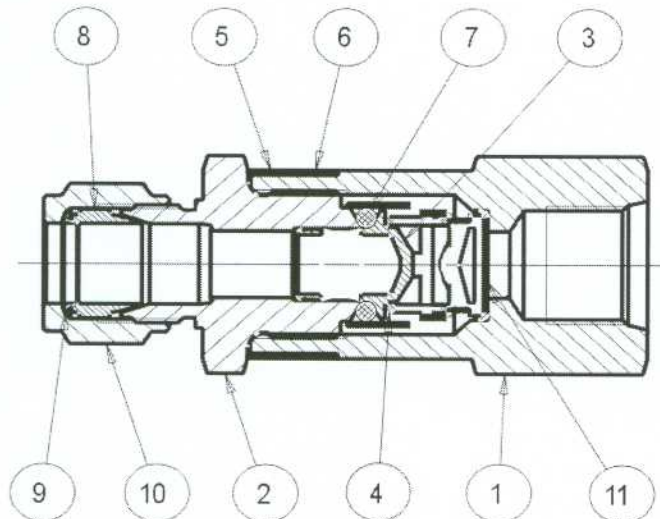
Valve Size	2	4	6	8	10	12	16
Cv	.32	.79	1.71	3.08	3.87	7.38	7.38

CVH Series Check Valves

Materials of Construction

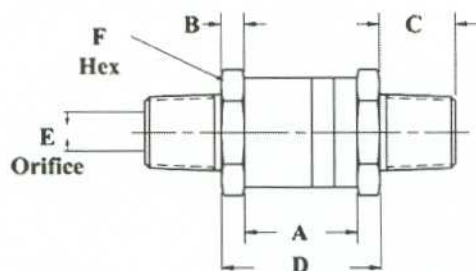
Item	Part	Standard Materials (others on request)
1.	Body* (outlet)	316 stainless steel
2.	End Adapter* (inlet)	316 stainless steel
3.	Poppet*	316 stainless steel
4.	Spring*	302 stainless steel
5.	Part Number Band	Anodized Aluminum
6.	O-ring Band	Anodized Aluminum
7.	O-ring*	Viton®
8.	Front Ferrule*	316 stainless steel
9.	Rear Ferrule	316 stainless steel
10.	Nut	316 stainless steel
11.	Spring Guide	316 stainless steel

*Wetted component



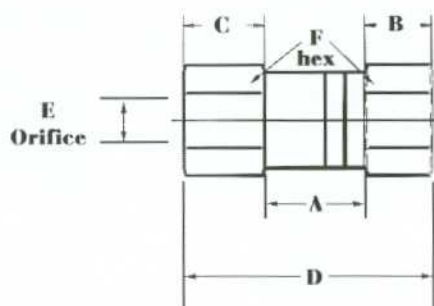
CVH Series Check Valves

Charts of Dimensions



Male NPT

Fractional (Inches)	Size	A	B	C	D	E	F
	02	0.83	0.20	0.40	1.23	.19	0.81
	04	0.83	0.20	0.59	1.23	.19	0.81
	06	1.26	0.20	0.59	1.66	.39	1.19
	08	1.26	0.20	0.77	1.66	.42	1.19
	12	2.05	0.50	0.77	3.05	.66	2.00
	16	2.05	0.50	0.98	3.05	.66	2.00



Female NPT

Fractional (Inches)	Size	A	B Inlet	C Outlet	D	E	F
	02	0.83	0.68	0.78	2.29	.19	0.81
	04	0.83	0.91	1.01	2.75	.19	0.81
	06	1.26	0.92	0.97	3.15	.39	1.19
	08	1.26	1.12	1.17	3.55	.42	1.19
	12	2.05	1.40	1.12	4.57	.66	2.00
	16	2.05	1.61	1.33	4.99	.66	2.00

CVH Series Check Valves

How to Order

CVH Y 04 G 04 M 32 010 A O H

Material

B Brass	C Carpenter 20
I Inconel	O 254 SMO CRES
M Monel	H Hastelloy C276
Y 316 SS	T Titanium

Inlet Size

02 1/8"	14 14mm
04 4mm, 1/4"	16 16mm, 1"
06 6mm, 3/8"	18 18mm
08 8mm, 1/2"	22 22mm
10 10mm	25 25mm
12 12mm, 3/4"	

Inlet Type

G Gyrolok™ Tube Fitting-Per HOKE
A Gyrolok™ Tube Adapter- Per HOKE
Z Metric Gyrolok™ Tube Fitting-Per HOKE
W Metric Gyrolok™ Tube Adapter-Per HOKE
S Male SAE-Per J514
R Female SAE-Per J1926
L Male British Parallel Pipe-Per ISO 1179
K Female British Parallel Pipe-Per ISO 1179
M Male NPT-Per ANSI/ASME B1.20.1
F Female NPT-Per ANSI/ASME B1.20.1
Q Male British Tapered Pipe ISO 7/1
P Female British Tapered Pipe ISO 7/1

Outlet Size

02 1/8"	14 14mm
04 4mm, 1/4"	16 16mm, 1"
06 6mm, 3/8"	18 18mm
08 8mm, 1/2"	22 22mm
10 10mm	25 25mm
12 12mm, 3/4"	

Hokey

Cleaning Options

O Standard **C** Cryogenic Cleaning
B Industrial Cleaning **D** NACE Compliant

Band Options

A Aluminum Bands (std.)
Y Stainless Steel Bands

Cracking Pressure

005 00.5 PSI/.035 BAR	050 05.0 PSI/0.344 BAR
010 01.0 PSI/.069 BAR	100 10.0 PSI/.688 BAR
030 03.0 PSI/0.206 BAR	200 20.0 PSI/1.379 BAR

(others available on request)

Seal Materials

20 Teflon®
25 Chemraz
32 Viton®
40 Teflon® (Cryogenic Service)
53 Neoprene
62 Ethylene Propylene
64 Fluorosilicone
65 Kalrez®
77 Buna N
00 Metal (high temperature service)

Outlet Type

G Gyrolok™ Tube Fitting-Per HOKE
A Gyrolok™ Tube Adapter-Per HOKE
Z Metric Gyrolok™ Tube Fitting-Per HOKE
W Metric Gyrolok™ Tube Adapter-Per HOKE
S Male SAE-Per J514
R Female SAE-Per J1926
L Male British Parallel Pipe-Per ISO 1179
K Female British Parallel Pipe-Per ISO 1179
M Male NPT-Per ANSI/ASME B1.20.1
F Female NPT-Per ANSI/ASME B1.20.1
Q Male British Tapered Pipe ISO 7/1
P Female British Tapered Pipe ISO 7/1



G 22

WIKA
50394771

0-200 PSI/BAR PRESSURE GAUGE

ANGI PART NUMBER 741-07240

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Industrial Gauges

Type 23X.53



- Stainless Steel Case & Crimp Ring
- Welded Case-to-Socket Connection
- Field Liquid-Fillable

Type 232.53 - Dry case
Type 233.53 - Liquid filled case

The rugged construction of WIKAI Type 23X.53 stainless steel gauges provides resistance to the most corrosive media and environments. These gauges feature 316 stainless steel wetted parts and a 304 stainless steel case and crimped ring, and can be liquid-filled in the field.

Standard Features

- Nominal Case Size: 2" (53 mm) **2½"** (68 mm), 4" (100 mm)
- Case Material: 304 stainless steel
- Wetted Parts: 316 SS
- Window Type & Material: 2½" Polycarbonate; 4" Acrylic
- Removable Window: No
- Dial Material: White aluminum
- Bezel Ring Type & Material: Crimp on SS polished
- Liquid Fillable Gauge: Yes
- Case-to-Socket O-ring Material: Welded
- "Other" Gaskets/O-ring Types & Materials:
Window gasket, BUNA-N
- Pointer Material/Type: Black aluminum
- Adjustable Pointer: No
- Accuracy: $\pm 1.5\%$ of span (2" & 2½");
(4") $\pm 1.0\%$ of span-ASME B40.100 Grade 1A
- Connection locations: LM (Lower Mount),
CBM (Center Back Mount)
& LBM (Lower Back Mount) (4" only)
- Media Operating Temperature: 212°F
- Ambient Operating Temperature: -40°F to 140°F dry;
-4°F to 140°F glycerine case fill; -40°F to 140°F silicone
case fill

Type	232.53				
Connection	LM 	CBM 			
Conn. Size	1/4" NPT				
Size	2 1/2"				
Pressure Scale ¹	PSI	PSI	PSI/BAR	PSI/KPA	PSI/KG/CM ²
30" Hg	9768777	9768394			
30"-0-15 PSI					
30"-0-30 PSI	9768769	9768386			
30"-0-60 PSI	9768750	9768378			
30"-0-100 PSI					
30"-0-160 PSI	9768742	9768360			
30"-0-200 PSI					
15 PSI	9768734	9768351			
30 PSI	9768726	9768343			
60 PSI	9768718	9768335	8992848	8993089	8992962
100 PSI	9768700	9768327	8992856	8993097	8992970
160 PSI	9768696	9768319	8992865	8993101	8992988
200 PSI	9768688	9768300	8992873	8993119	8992996
300 PSI	9768670	9768297	8992881	8993127	8993004
400 PSI	9768661	9768289			
600 PSI	9768653	9768270	9779685	9779693	
800 PSI					
1,000 PSI	9768645	9768262	8992899	8993135	8993012
1,500 PSI	9768637	9768254	8992903	8993144	8993020
2,000 PSI	9768629	9768246	8992911	8993152	8993038
3,000 PSI	9768610	9768238	8992929	8993160	8993046
5,000 PSI	9768602	9768220	8992937	8993178	8993055
6,000 PSI		8993208	8992945	8993186	8993063
10,000 PSI	9768599	9768211	8992954	8993195	8993071
15,000 PSI		9779715	9776715		9779731

¹PSI/BAR² denotes dual scale; PSI outside in black, BAR inside in red; ²PSI/KPA² denotes dual scale; PSI outside in black, KPA inside in red; ³PSI/KG/CM² denotes dual scale; PSI outside in black, KG/CM² inside in red. Note: Vacuum scale: 30" Hg outside in black; 760 mm Hg inside in red. ²

Note: For options not shown - consult your WIKAI Distributor or the Factory.

Data sheet: 23X.53

For liquid filled gauges, add "-B29" to part numbers above for 2½" size or "-B34" for 4" size.

Items shown with part numbers indicate readily available standard WIKAI products. Items shown without part numbers are available on special order.

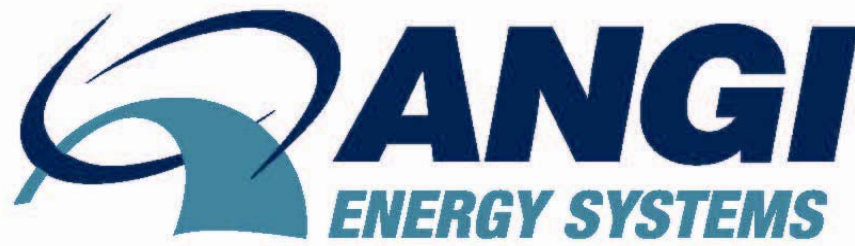
Available Options:

- "Dampened Movement" Option: Yes,
(N/A on 2½" CBM or 2" LM/CBM) & LBM
- U-Clamp Bracket: Yes (CBM only)
- Front Flange: Yes (CBM & LBM only)
- Rear Flange: Yes (LM, CBM & LBM)
- Restrictor: Yes
- Safety Glass Window: No
- Instrument Glass Window (flat glass): No
- Drag Pointer (maximum reading indicator): Yes
- Cleaned for Use in Oxygen Service: Yes
- Panel Mount Kit: Yes (see front flange or u-clamp option)
- Magnetic or Inductive Contact Switches: No
- Receiver Gauge Scales: Yes
- Special Connection: Limited to wrench flat area

Type	232.53- liquid fillable		
Connection	LM 	LM 	LBM 
Conn. Size	1/4" NPT		1/2" NPT
Size	4"		
Pressure Scale	PSI	PSI	PSI
30" Hg	9767576	9768459	9737057
30"-0-15 PSI	9737910	9768467	9737065
30"-0-30 PSI	9767398	9768475	9737073
30"-0-60 PSI	9767401	9768483	9737081
30"-0-100 PSI	9737898	9737880	9737090
30"-0-160 PSI	9767410	9768491	9737103
30"-0-200 PSI	9737901	9768505	9737111
30"-0-300 PSI	4260147		
30"-0-400 PSI	4260155		
15 PSI	9767428	9768513	9737120
30 PSI	9767436	9768521	9737138
60 PSI	9767444	9768530	9737146
100 PSI	9767452	9768548	9737154
160 PSI	9767460	9768556	9737162
200 PSI	9767479	9768564	9737170
300 PSI	9767487	9768572	9737189
400 PSI	9767495	9768580	9737197
600 PSI	9767509	9768963	9737200
800 PSI			9737219
1,000 PSI	9767517	9768858	9737227
1,500 PSI		9768866	9737235
2,000 PSI		9768807	9737243
3,000 PSI		9768874	9737251
5,000 PSI		9768823	9737260
10,000 PSI		9768831	9737278
15,000 PSI		9768840	9737286

Type	233.53- glycerine filled				
Connection	LM 	LM 	LBM 	CBM 	
Conn. Size	1/4" NPT		1/2" NPT		1/4" NPT
Size	2 1/2"	4"	4"		2 1/2"
Pressure Scale	PSI	PSI	PSI	PSI	PSI
30" Hg	9833646	9833124	9833328	9831504	9833310
30"-0-15 PSI		9831775	9833336	9831512	
30"-0-30 PSI	9833638	9832993	9833345	9831520	9833302
30"-0-60 PSI	9833620	9833000	9833353	9831538	9833298
30"-0-100 PSI		9831759	9831741	9831546	
30"-0-160 PSI	9833612	9833018	9833361	9831555	9833280
30"-0-200 PSI		9831767	9833379	9831563	
30"-0-300 PSI					
30"-0-400 PSI					
15 PSI	9833604	9833026	9833387	9831571	9833272
30 PSI	9833590	9833035	9833395	9831589	9833264
60 PSI	9833582	9833043	9833409	9831597	9833255
100 PSI	9833574	9833051	9833417	9831601	9833247
160 PSI	9833565	9833069	9833425	9831619	9833239
200 PSI	9833557	9833077	9833434	9831627	9833221
300 PSI	9833549	9833085	9833442	9831635	9833213
400 PSI	9833531	9833094	9833450	9831644	9833205
600 PSI	9833523	9833107	9833727	9831652	9833191
800 PSI					
1,000 PSI	9833515	9833115	9833697	9831678	9833183
1,500 PSI	9833506		9833701	9831686	9833175
2,000 PSI	9833493		9833655	9831695	9833166
3,000 PSI	9833485		9833719	9831708	9833158
5,000 PSI	9833476		9833663	9831716	9833140
10,000 PSI	9833468		9833671	9831725	9833132
15,000 PSI			9833689	9831733	

Type	232.53- Stock Gauges with Ammonia Scales	
Size	2 1/2"	4"
Connection	LM 	
Conn. Size	1/4" NPT	
30"-0-150 PSI / 84°F	9797144	9797127
30"-0-300 PSI / 126°F	9797152	9797135



G 57

WIKA
4272016
0-10,000 PSI/BAR PRESSURE GAUGE

ANGI PART NUMBER 741-07289

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Industrial Gauges

Type 23X.53



- Stainless Steel Case & Crimp Ring
- Welded Case-to-Socket Connection
- Field Liquid-Fillable

Type 232.53 - Dry case
Type 233.53 - Liquid filled case

The rugged construction of WIKAI Type 23X.53 stainless steel gauges provides resistance to the most corrosive media and environments. These gauges feature 316 stainless steel wetted parts and a 304 stainless steel case and crimped ring, and can be liquid-filled in the field.

Standard Features

- Nominal Case Size: 2" (53 mm) **2½"** (68 mm), 4" (100 mm)
- Case Material: 304 stainless steel
- Wetted Parts: 316 SS
- Window Type & Material: 2½" Polycarbonate; 4" Acrylic
- Removable Window: No
- Dial Material: White aluminum
- Bezel Ring Type & Material: Crimp on SS polished
- Liquid Fillable Gauge: Yes
- Case-to-Socket O-ring Material: Welded
- "Other" Gaskets/O-ring Types & Materials:
Window gasket, BUNA-N
- Pointer Material/Type: Black aluminum
- Adjustable Pointer: No
- Accuracy: $\pm 1.5\%$ of span (2" & 2½");
(4") $\pm 1.0\%$ of span-ASME B40.100 Grade 1A
- Connection locations: LM (Lower Mount),
CBM (Center Back Mount)
& LBM (Lower Back Mount) (4" only)
- Media Operating Temperature: 212°F
- Ambient Operating Temperature: -40°F to 140°F dry;
-4°F to 140°F glycerine case fill; -40°F to 140°F silicone
case fill

Type	232.53				
Connection	LM 	CBM 			
Conn. Size	1/4" NPT				
Size	2 1/2"				
Pressure Scale ¹	PSI	PSI	PSI/BAR	PSI/KPA	PSI/KG/CM ²
30" Hg	9768777	9768394			
30"-0-15 PSI					
30"-0-30 PSI	9768769	9768386			
30"-0-60 PSI	9768750	9768378			
30"-0-100 PSI					
30"-0-160 PSI	9768742	9768360			
30"-0-200 PSI					
15 PSI	9768734	9768351			
30 PSI	9768726	9768343			
60 PSI	9768718	9768335	8992848	8993089	8992962
100 PSI	9768700	9768327	8992856	8993097	8992970
160 PSI	9768696	9768319	8992865	8993101	8992988
200 PSI	9768688	9768300	8992873	8993119	8992996
300 PSI	9768670	9768297	8992881	8993127	8993004
400 PSI	9768661	9768289			
600 PSI	9768653	9768270	9779685	9779693	
800 PSI					
1,000 PSI	9768645	9768262	8992899	8993135	8993012
1,500 PSI	9768637	9768254	8992903	8993144	8993020
2,000 PSI	9768629	9768246	8992911	8993152	8993038
3,000 PSI	9768610	9768238	8992929	8993160	8993046
5,000 PSI	9768602	9768220	8992937	8993178	8993055
6,000 PSI		8993208	8992945	8993186	8993063
10,000 PSI	9768599	9768211	8992954	8993195	8993071
15,000 PSI		9779715	9776715		9779731

¹PSI/BAR² denotes dual scale; PSI outside in black, BAR inside in red; ²PSI/KPA² denotes dual scale; PSI outside in black, KPA inside in red; ³PSI/KG/CM² denotes dual scale; PSI outside in black, KG/CM² inside in red. Note: Vacuum scale: 30" Hg outside in black; 760 mm Hg inside in red. ²

Note: For options not shown - consult your WIKAI Distributor or the Factory.

Data sheet: 23X.53

For liquid filled gauges, add "-B29" to part numbers above for 2½" size or "-B34" for 4" size.

Items shown with part numbers indicate readily available standard WIKAI products. Items shown without part numbers are available on special order.

Available Options:

- "Dampened Movement" Option: Yes,
(N/A on 2½" CBM or 2" LM/CBM) & LBM
- U-Clamp Bracket: Yes (CBM only)
- Front Flange: Yes (CBM & LBM only)
- Rear Flange: Yes (LM, CBM & LBM)
- Restrictor: Yes
- Safety Glass Window: No
- Instrument Glass Window (flat glass): No
- Drag Pointer (maximum reading indicator): Yes
- Cleaned for Use in Oxygen Service: Yes
- Panel Mount Kit: Yes (see front flange or u-clamp option)
- Magnetic or Inductive Contact Switches: No
- Receiver Gauge Scales: Yes
- Special Connection: Limited to wrench flat area

Type	232.53- liquid fillable		
Connection	LM 	LM 	LBM 
Conn. Size	1/4" NPT		1/2" NPT
Size	4"		
Pressure Scale	PSI	PSI	PSI
30" Hg	9767576	9768459	9737057
30"-0-15 PSI	9737910	9768467	9737065
30"-0-30 PSI	9767398	9768475	9737073
30"-0-60 PSI	9767401	9768483	9737081
30"-0-100 PSI	9737898	9737880	9737090
30"-0-160 PSI	9767410	9768491	9737103
30"-0-200 PSI	9737901	9768505	9737111
30"-0-300 PSI	4260147		
30"-0-400 PSI	4260155		
15 PSI	9767428	9768513	9737120
30 PSI	9767436	9768521	9737138
60 PSI	9767444	9768530	9737146
100 PSI	9767452	9768548	9737154
160 PSI	9767460	9768556	9737162
200 PSI	9767479	9768564	9737170
300 PSI	9767487	9768572	9737189
400 PSI	9767495	9768580	9737197
600 PSI	9767509	9768963	9737200
800 PSI			9737219
1,000 PSI	9767517	9768858	9737227
1,500 PSI		9768866	9737235
2,000 PSI		9768807	9737243
3,000 PSI		9768874	9737251
5,000 PSI		9768823	9737260
10,000 PSI		9768831	9737278
15,000 PSI		9768840	9737286

Type	233.53- glycerine filled				
Connection	LM 	LM 	LBM 	CBM 	
Conn. Size	1/4" NPT		1/2" NPT		1/4" NPT
Size	2 1/2"	4"	4"		2 1/2"
Pressure Scale	PSI	PSI	PSI	PSI	PSI
30" Hg	9833646	9833124	9833328	9831504	9833310
30"-0-15 PSI		9831775	9833336	9831512	
30"-0-30 PSI	9833638	9832993	9833345	9831520	9833302
30"-0-60 PSI	9833620	9833000	9833353	9831538	9833298
30"-0-100 PSI		9831759	9831741	9831546	
30"-0-160 PSI	9833612	9833018	9833361	9831555	9833280
30"-0-200 PSI		9831767	9833379	9831563	
30"-0-300 PSI					
30"-0-400 PSI					
15 PSI	9833604	9833026	9833387	9831571	9833272
30 PSI	9833590	9833035	9833395	9831589	9833264
60 PSI	9833582	9833043	9833409	9831597	9833255
100 PSI	9833574	9833051	9833417	9831601	9833247
160 PSI	9833565	9833069	9833425	9831619	9833239
200 PSI	9833557	9833077	9833434	9831627	9833221
300 PSI	9833549	9833085	9833442	9831635	9833213
400 PSI	9833531	9833094	9833450	9831644	9833205
600 PSI	9833523	9833107	9833727	9831652	9833191
800 PSI					
1,000 PSI	9833515	9833115	9833697	9831678	9833183
1,500 PSI	9833506		9833701	9831686	9833175
2,000 PSI	9833493		9833655	9831695	9833166
3,000 PSI	9833485		9833719	9831708	9833158
5,000 PSI	9833476		9833663	9831716	9833140
10,000 PSI	9833468		9833671	9831725	9833132
15,000 PSI			9833689	9831733	

Type	232.53- Stock Gauges with Ammonia Scales	
Size	2 1/2"	4"
Connection	LM 	
Conn. Size	1/4" NPT	
30"-0-150 PSI / 84°F	9797144	9797127
30"-0-300 PSI / 126°F	9797152	9797135



MLV 4

HOKE
I711F4Y

1/2" FNPT MANUAL LINE VALVE 6000 PSI SS

ANGI PART NUMBER 338-07125

REBUILD KIT-HOKE NEEDLE VALVE SEAT & PKG – 761-07286

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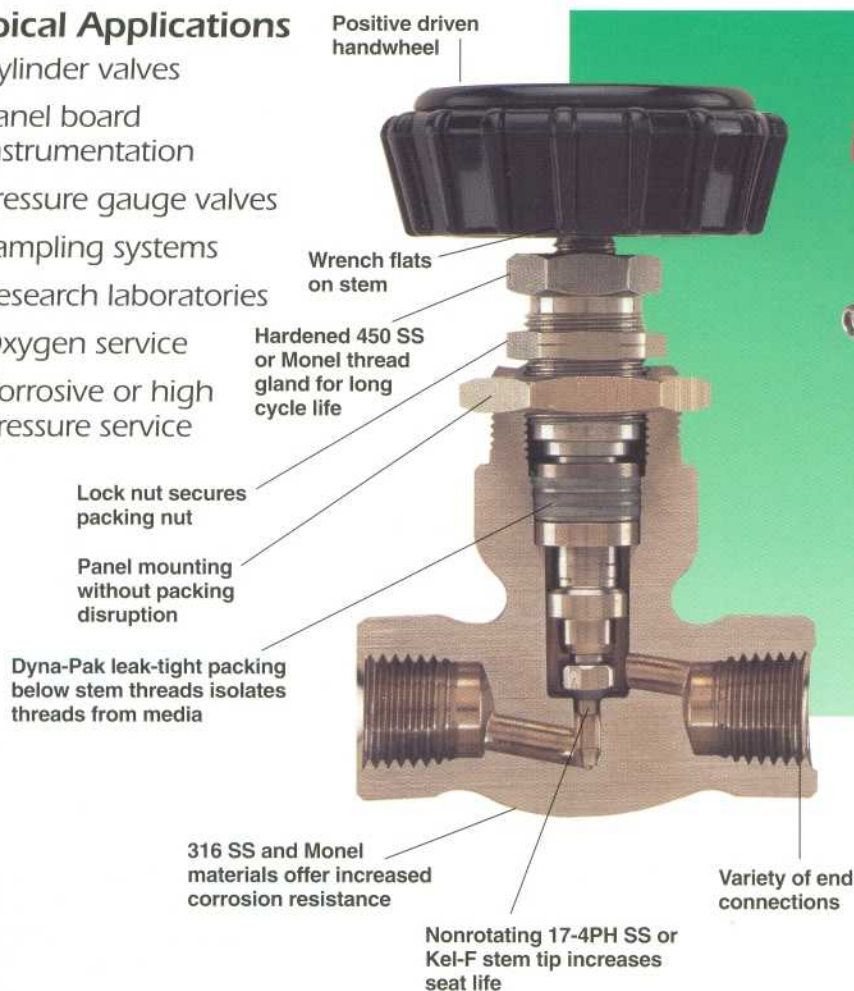


1700 Series

Forged Body, Integral Bonnet Needle Valves

Typical Applications

- Cylinder valves
- Panel board instrumentation
- Pressure gauge valves
- Sampling systems
- Research laboratories
- Oxygen service
- Corrosive or high pressure service



With nonrotating stem tips and isolated stem threads for severe service and Dyna-Pak packing to help prevent fugitive emissions, these affordable valves are suited for a variety of applications.



Technical Data

Maximum Operating Pressure:
6000 PSIG @ 70°F (41.4 MPa @ 21°C)

Operating Temperature Range:

Metal Stem Tip
-65° to 450°F (-54° to 232°C)

Kel-F Stem Tip
-20° to 250°F (-29° to 121°C)

Orifice:
.187 in. (4.8mm)

Cv Factor:
.31

End Connections:
1/8 to 3/8 in. Gyrolok®
1/4 to 3/8 NPT
6 to 8mm Gyrolok

Benefits

Safety

Lock nut secures packing nut against accidental removal.

Long cycle life

Packing below stem threads prevents fluid from contacting the stem threads. Nonrotating hardened 17-4PH stainless steel or replaceable Kel-F stem tips combine with a hardened 450 stainless steel or Monel thread gland to reduce galling.

Helps eliminate fugitive emissions

Dyna-Pak® packing provides a leak-tight seal with low operating torque.



Reliability

All valves are tested for bubble-tight leakage at both seat and packing.

Installation variety

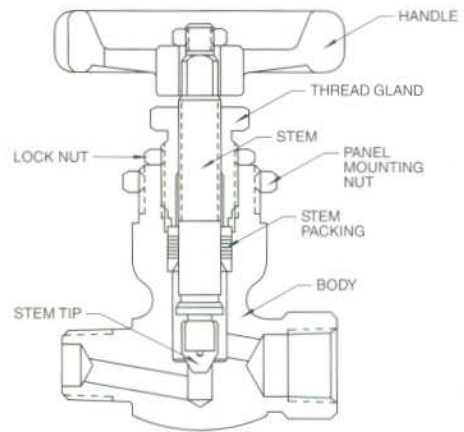
Broad selection of male NPT, female NPT, and Hoke Gyrolok fractional or metric tube fitting connections.

Panel mounting

Panel mounting is standard on all models.

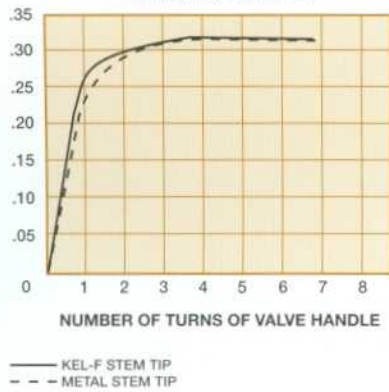
Materials of Construction

Description	316 SS Valves	Monel® Valves
Body	316 SS	Monel
Stem	316 SS	Monel
Stem Tip		
Soft	Kel-F®	Kel-F
Hard	17-4PH SS	Monel
Stem Packing	TFE/316 SS Wafers	TFE/Monel Wafers
Thread Gland	450 SS	Monel
Lock Nut	316 SS	316 SS
Handle		
1711 Series	Aluminum	Aluminum
1751 Series	ABS	ABS
Panel Mounting Nut	Nickel Plated Brass	Nickel Plated Brass

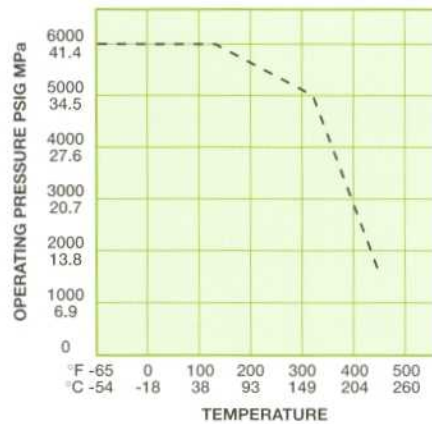


Flow Curve

HANDLE TURNS VS. Cv



Pressure vs. Temperature Curve



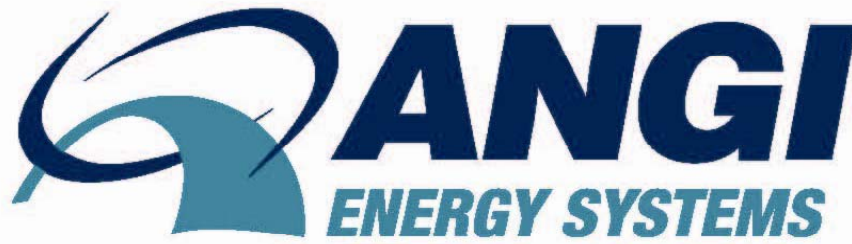
Valve Ordering Charts



1711L4Y

1700 Series Globe Pattern Metal Stem Tip for Service to 450°F .187 Orifice/.31 Cv

End Connections		Order by Part Number	
Inlet	Outlet	316 SS	Monel
1/8 Gyrolok	1/8 Gyrolok	1711G2Y	—
1/4 Gyrolok	1/4 Gyrolok	1711G4Y	—
1/4 Male NPT	1/4 Male NPT	1711M4Y	1711M4M
1/4 Male NPT	1/4 Female NPT	1711L4Y	—
1/4 Female NPT	1/4 Female NPT	1711F4Y	1711F4M
3/8 Gyrolok	3/8 Gyrolok	1711G6Y	—
3/8 Male NPT	3/8 Male NPT	1711M6Y	—
6mm Gyrolok	6mm Gyrolok	1711G6Y/MM	—
8mm Gyrolok	8mm Gyrolok	1711G8Y/MM	—



MV 166

SVF

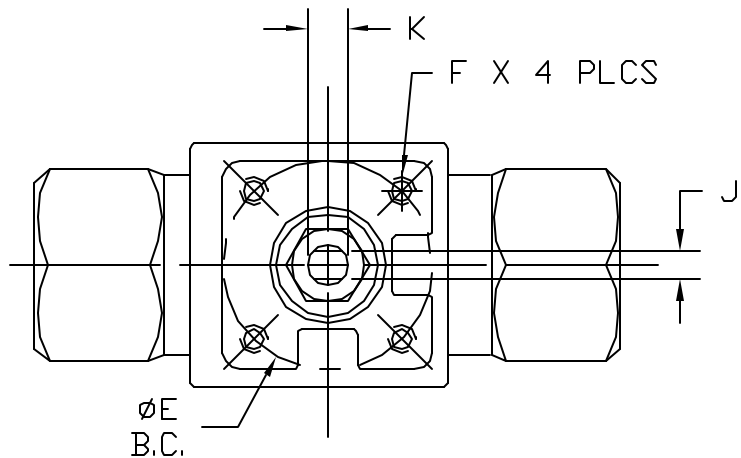
1/2" HBEV766DTSE

1/2" BALL VALVE FML, FULL PORT, SS, 6000 PSI,
2-PIECE SEAL WELDED W/ LOCKING HANDLE

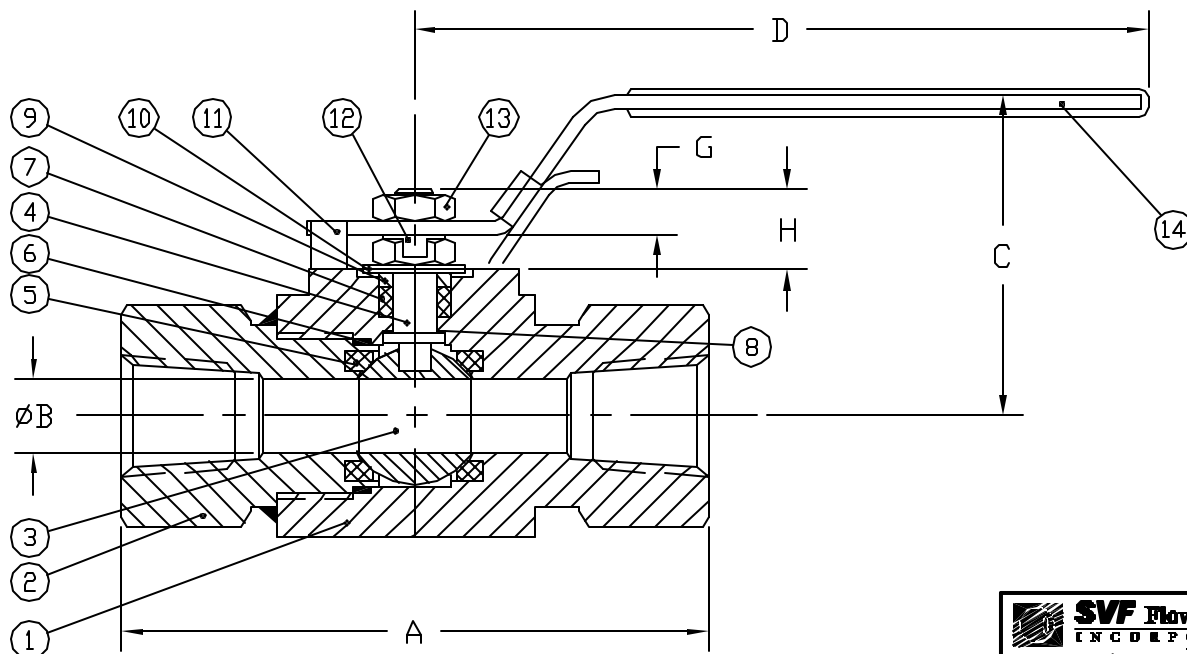
ANGI PART NUMBER 334-07362

NO REBUILD KIT AVAILABLE

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- FEATURES:
1. SEAL WELD CONSTRUCTION.
 2. BLOW-OUT PROOF STEM.
 3. FIRE SAFE TEST CERTIFIED.
 4. ISO ACTUATOR MOUNTING PADS.
 5. STANDARD LOCKING DEVICE.
 6. NACE MR01-75 COMPLIANT.

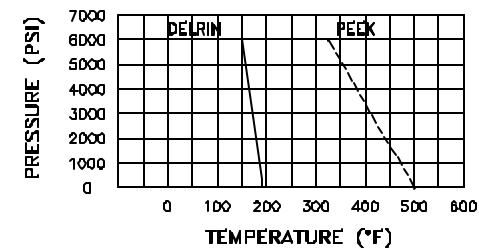


SIZE	A	ØB	C	D	ØE	F	G	H	J	K
1/4"	3.00	0.25	2.20	5.00	1.417	M5 X 0.8P	0.33	0.60	0.217	3/8"
3/8"	3.00	0.38	2.20	5.00	1.417	M5 X 0.8P	0.33	0.60	0.217	3/8"
1/2"	3.99	0.50	2.20	5.00	1.417	M5 X 0.8P	0.33	0.60	0.217	3/8"
3/4"	4.25	0.75	2.70	6.30	1.654	M5 X 0.8P	0.50	0.81	0.299	7/16"
1"	4.50	1.00	3.50	8.25	1.969	M6 X 1.0P	0.51	0.87	0.345	9/16"
1-1/2"	5.25	1.50	4.45	10.20	2.756	M8 X 1.25P	0.64	1.04	0.394	5/8"
2"	6.64	2.00	4.80	10.20	2.756	M8 X 1.25P	0.64	1.04	0.394	5/8"

MATERIALS OF CONSTRUCTION

ITEM	NAME	MATERIAL	STANDARD
1	BODY	STAINLESS STEEL	ASTM A351-CF8M
2	END CONNECTORS	STAINLESS STEEL	ASTM A351-CF8M
3	BALL	STAINLESS STEEL	ASTM A351-CF8M
4	STEM	STAINLESS STEEL	17-4PH
5	SEAT	DELRI/PEEK	
6	SEAL	PTFE	
7	STEM PACKING	GRAPHITE	
8	THRUST WASHER	PEEK	
9	PACKING GLAND	STAINLESS STEEL	
10	BELLEVILLE WASHER	STAINLESS STEEL	
11	STOP PIN	STAINLESS STEEL	
12	LOCK WASHER	STAINLESS STEEL	
13	HANDLE NUT	STAINLESS STEEL	
14	HANDLE	STAINLESS STEEL	

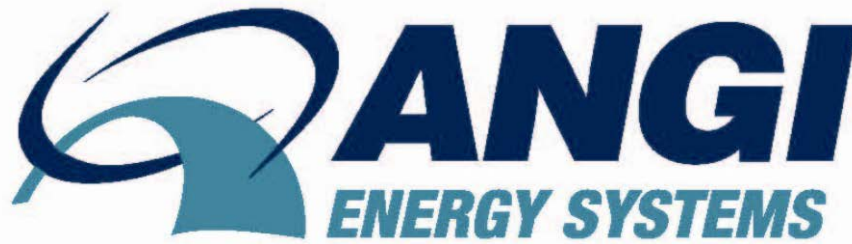
PRESSURE TEMPERATURE CHART



4. MOUNTING HARDWARES, HANDLE, GEAR OPERATOR, HANDWHEEL, ACTUATOR AND ACCESSORIES ARE MANUFACTURER'S STANDARDS WHERE APPLICABLE.
3. PRESSURE RATING CLASS 6000PSI CWP.
2. VALVES CONFORM TO ASME B16.34.
1. ALL DIMENSIONS ARE MAXIMUM, EXCEPT FACE TO FACE.
- NOTE:

SVF Flow Controls INCORPORATED 13360 Larch Circle Northridge, CA 91320, U.S.A. Phone: (818) 715-7138 Fax: (818) 715-5114 WWW.SVF.COM	NAME 1/4" TO 2" SERIES HBEV7 BALL VALVES		VALVE MODEL NUMBER HBEV766	
	TAG NUMBER N/A		REMARK	
	DRAWN BY Charles Chen		DATE 08/31/05	
	CHECKED BY		DATE	
CUSTOMER NAME N/A	SALES ORDER NUMBER N/A		CERTIFIED BY	DATE
P.O. NUMBER N/A	SCALE N.T.S.		DRAWING NUMBER HBEV766-0520	SHEET 1 OF 1
	REV. A			

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MV 286

SVF/SVF

HBEV766DTSAE05/A2S-35-12-V-NC

ACTUATOR / VALVE ASSEMBLY - SAE-8
FULL PORT 6000 PSI STAINLESS STEEL
W / A2S-35-12-V-NORMALLY CLOSED ACTUATOR

ANGI PART NUMBER – 334-07496

ACTUATOR REBUILD KIT – 761-07460

NO REBUILD KIT AVAILABLE – VALVE IS SEAL WELDED



Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

HBEV

The SVF Series HBEV high pressure, fire safe ball valve is designed to meet applications up to 6,000 psi. This high performance valve adds safety and reliability to high pressure systems and applications in a wide range of industrial applications.

SERIES HBEV DESIGN FEATURES

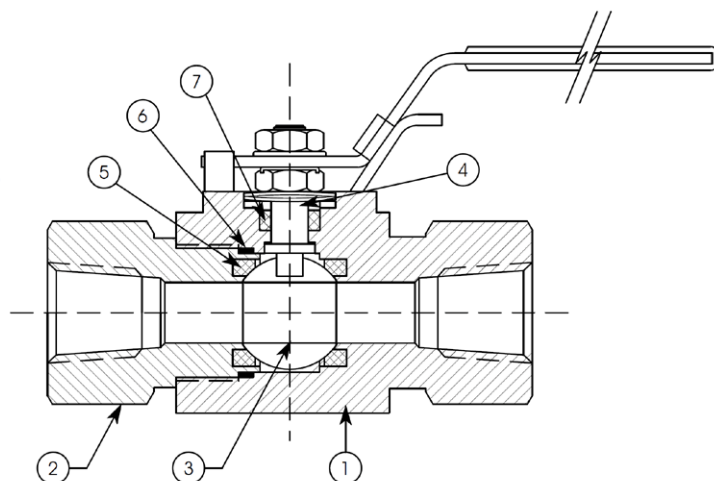
- ✓ High pressure to 6,000 psi
- ✓ Seal Welded Construction
- ✓ Full Ported flow path in a high performance design for process-quality applications
- ✓ Fire Safe certification to API-607
- ✓ Live loaded stem packing ensures seal-tight pressure even under thermal cycling
- ✓ Latch lock handle is standard
- ✓ ISO 5211 mounting pad for easy actuation
- ✓ Seat materials:
Delrin® seats standard with SE (Screwed End) valves
PEEK seats standard with SW (Socket Weld) valves.
- ✓ Stainless Steel construction



The Series HBEV Two-Piece Seal Welded Ball Valve.

MATERIALS OF CONSTRUCTION

ITEM	DESCRIPTION	MATERIALS SPECIFICATIONS (Additional options available)
1	Body	Stainless Steel (ASTM A351 CF8M)
2	End Connector	Stainless Steel (ASTM A351 CF8M)
3	Ball	Stainless Steel (ASTM A351 CF8M)
4	Stem	Stainless Steel 17-4 ph (ASTM A564 630)
5	Seat	Delrin® (Screwed End Valves), PEEK (Socket Weld Valves)
6	Body Seal	PTFE, GRAFOIL® (GRAFOIL® Body Seal only on Socket Weld Valves)
7	Stem Seal	GRAFOIL®



SPECIFICATION STANDARDS OF COMPLIANCE

SVF Series HBEV Ball Valves are available in designs that meet the following Industry Standards:

- ANSI
- ASME
- API
- NACE
- ASTM
- DIN
- ISO
- MSS

Contact SVF for specific applications

What do you need today?™

HIGH PURITY
CleanFLOW
www.CleanFLOW.net

PRO-SPEC
PROCESS SPECIFIC
www.PRO-SPEC.NET

QUALITY FLOWS
THROUGH US

Data subject to change. Visit www.SVF.net for the latest updates on this Data Sheet. All Data Sheets posted on our website supersede all prior publications. • [Document #SVF_HBEV_Data_Sheet • HBEV Data Sheet - 06/31/2011]

www.SVF.net

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Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

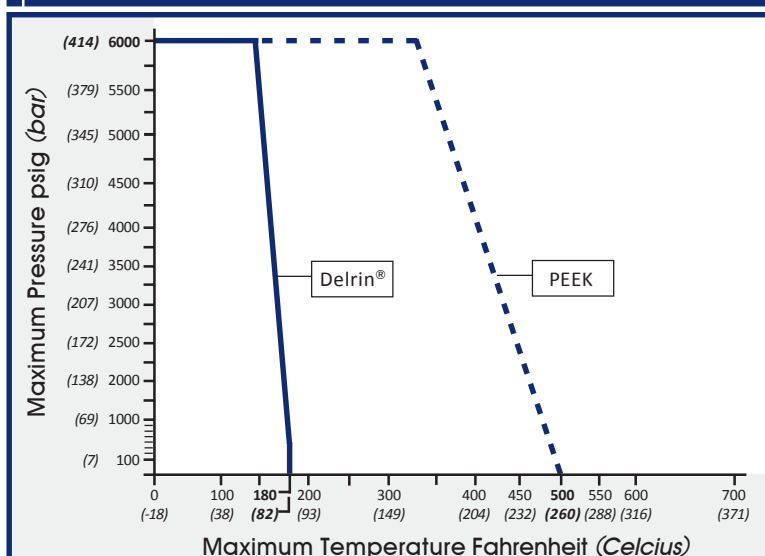
Sizes 1/2" ~ 2"

HBEV

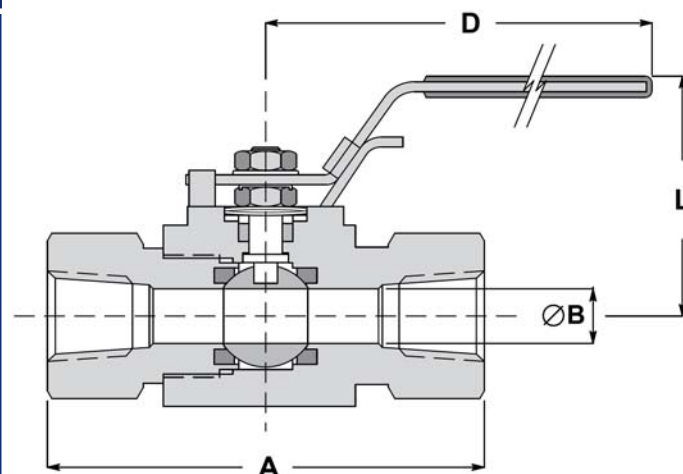
DIMENSIONS, WEIGHT, C_v, TORQUE

Size	A		B		D		L		Weight.		C _v	Torque*	
	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg		in-lb _f	Nm
1/2"	3.99	101	0.50	12.7	5	129	2.2	57	2	0.9	10	150	17
3/4"	4.25	108	0.75	20.0	6.3	150	2.7	71	4	1.8	32	200	23
1"	4.50	114	1.00	25.4	8.25	205	3.5	82	5	2.3	57	320	36
1-1/2"	5.25	133	1.50	38.1	10.2	260	4.5	105	11	5.0	104	575	65
2"	6.64	169	2.00	50.8	10.2	260	4.8	114	17	7.7	240	1000	113

HBEV - PRESSURE/TEMPERATURE CHART



* At full differential pressure for clean fluids with Delrin® Seats



HOW TO ORDER SERIES HBEV BALL VALVES

SERIES	BODY & END MATERIAL	BALL & STEM MATERIAL	SEAT**	BODY SEAL**	ENDS**	SIZE
HBEV7 = Full Port	6 = 316 Stainless Steel ASTM A351 CF8M	6 = 316 Stainless Steel ASTM A351 CF8M Ball with Stainless Steel 17-4 ph ASTM A564 630 Stem	D = Delrin® K = PEEK	T = PTFE G = GRAFOIL®	SE = Screwed Ends (FNPT) SW = Socket Weld Ends	05 = 1/2" 07 = 3/4" 10 = 1" 15 = 1-1/2" 20 = 2"
** PEEK Seat available on SW (Socket Weld) valves only. GRAFOIL® Body Seal available on SW valves only. SW End valves have PEEK Seat and GRAFOIL® Body Seal.						
Order Example: (HBEV766DTSE05)						

Example Description:

316 Stainless Steel Body & Ends, 316 Stainless Steel Ball with 17-4ph Stem, Delrin® Seat, PTFE Body Seal, Screwed Ends (FNPT), 1/2" Size

HBEV7	6	6	D	T	SE	05
-------	---	---	---	---	----	----

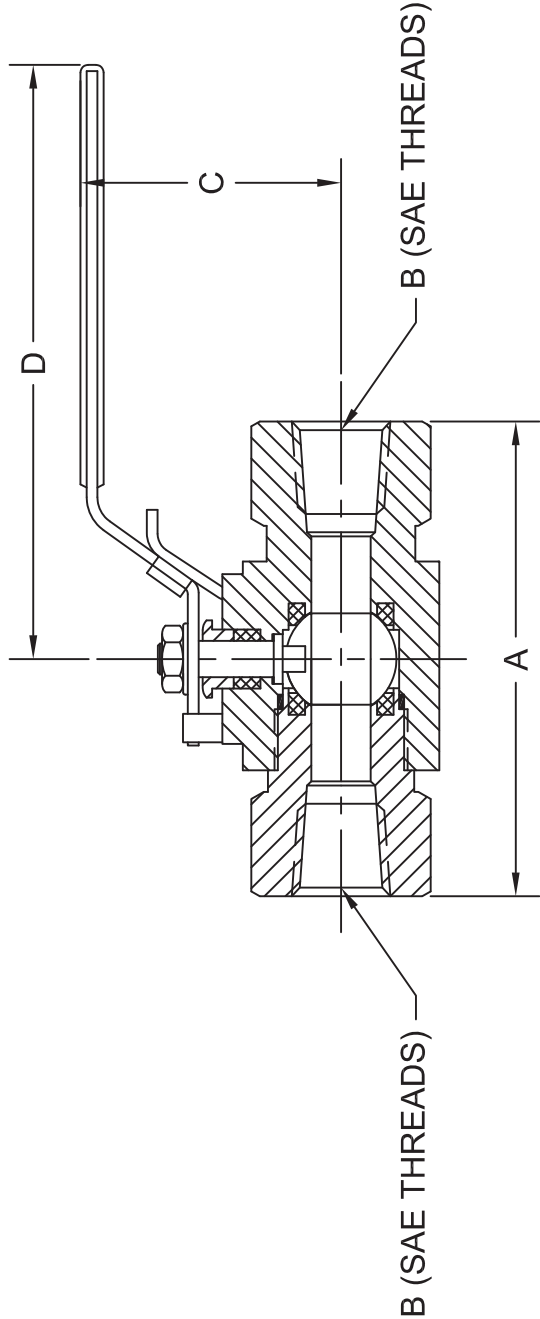
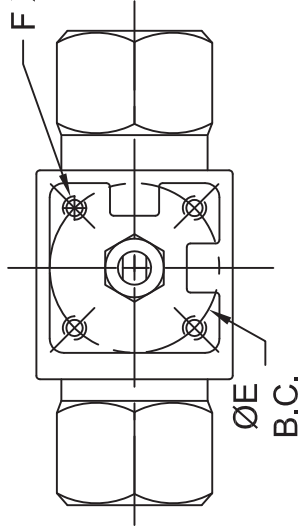
Data subject to change. Visit www.SVF.net for the latest updates on this Data Sheet. All Data Sheets posted on our website supersede all prior publications • [Document #SVF_HBEV_Data_Sheet • HBEV Data Sheet - 06/31/2011]

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REVISIONS

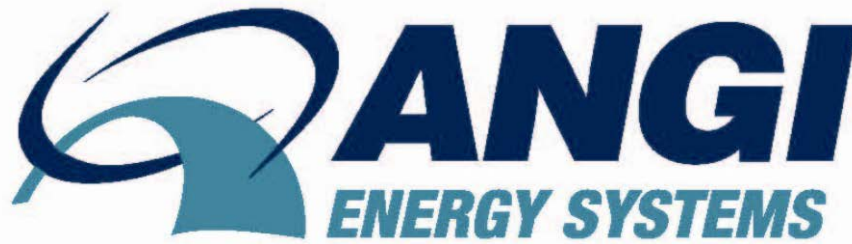
REV	ECO	DESCRIPTION	DATE	APPROVED
A		NEW RELEASE	5-18-2011	-

F X 4 PLCS



SIZE	A	B	C	D	ØE	F
1/2"	3.99	SAE 8	2.24	5.00	1.417	M5 X 0.8P
1"	4.50	SAE 16	3.23	8.10	1.653	M5 X 0.8P

 SVF Flow Controls, Inc. 13560 Larwin Circle Santa Fe Springs, CA 90670 1.800.783.7836 www.SVF.net	DRAWN BY	DATE	PART NAME:	
	V. ALVARADO	5-18-2011	1/2" & 1" HBEV WITH SAE THREADS	
	CHECKED	DATE	DWG. NO.:	REV
	APPROVED	DATE	HBEV SAE0510	A
	SIZE & SERIES ID		PART NO.	
1/2" & 1" HBEV		SCALE		SHEET 1 OF 1
TOLERANCES: +.030"		N.T.S.		
ANGULAR: .XXX=+0.005				
DECIMALS: .XX =+0.010				
FRACTIONS: .X =+0.10				



MV 287

SVF/SVF

HBEV766DTSAE05/A2S-35-12-V-NO

ACTUATOR / VALVE ASSEMBLY - SAE-8
FULL PORT 6000 PSI STAINLESS STEEL
W / A2S-35-12-V-NORMALLY OPEN ACTUATOR

ANGI PART NUMBER – 334-07497

ACTUATOR REBUILD KIT – 761-07460

NO REBUILD KIT AVAILABLE – VALVE IS SEAL WELDED



Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

HBEV

The SVF Series HBEV high pressure, fire safe ball valve is designed to meet applications up to 6,000 psi. This high performance valve adds safety and reliability to high pressure systems and applications in a wide range of industrial applications.

SERIES HBEV DESIGN FEATURES

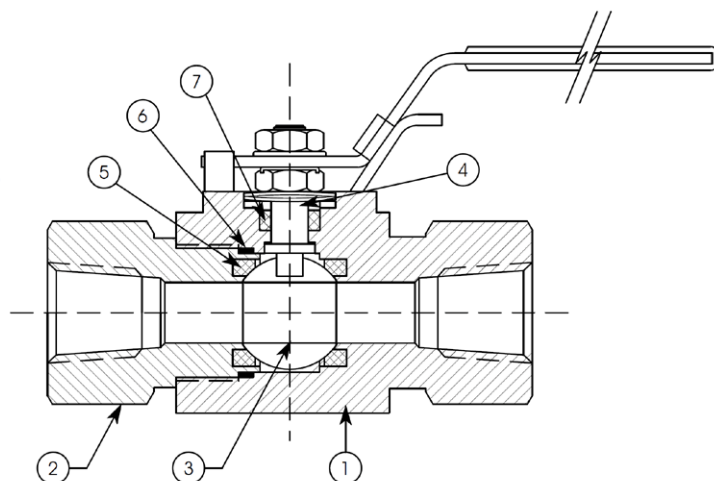
- ✓ High pressure to 6,000 psi
- ✓ Seal Welded Construction
- ✓ Full Ported flow path in a high performance design for process-quality applications
- ✓ Fire Safe certification to API-607
- ✓ Live loaded stem packing ensures seal-tight pressure even under thermal cycling
- ✓ Latch lock handle is standard
- ✓ ISO 5211 mounting pad for easy actuation
- ✓ Seat materials:
Delrin® seats standard with SE (Screwed End) valves
PEEK seats standard with SW (Socket Weld) valves.
- ✓ Stainless Steel construction



The Series HBEV Two-Piece Seal Welded Ball Valve.

MATERIALS OF CONSTRUCTION

ITEM	DESCRIPTION	MATERIALS SPECIFICATIONS (Additional options available)
1	Body	Stainless Steel (ASTM A351 CF8M)
2	End Connector	Stainless Steel (ASTM A351 CF8M)
3	Ball	Stainless Steel (ASTM A351 CF8M)
4	Stem	Stainless Steel 17-4 ph (ASTM A564 630)
5	Seat	Delrin® (Screwed End Valves), PEEK (Socket Weld Valves)
6	Body Seal	PTFE, GRAFOIL® (GRAFOIL® Body Seal only on Socket Weld Valves)
7	Stem Seal	GRAFOIL®



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Sales@SVF.net • Visit our website: www.SVF.net • © SVF Flow Controls, Inc. • Specifications subject to change without notice



Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

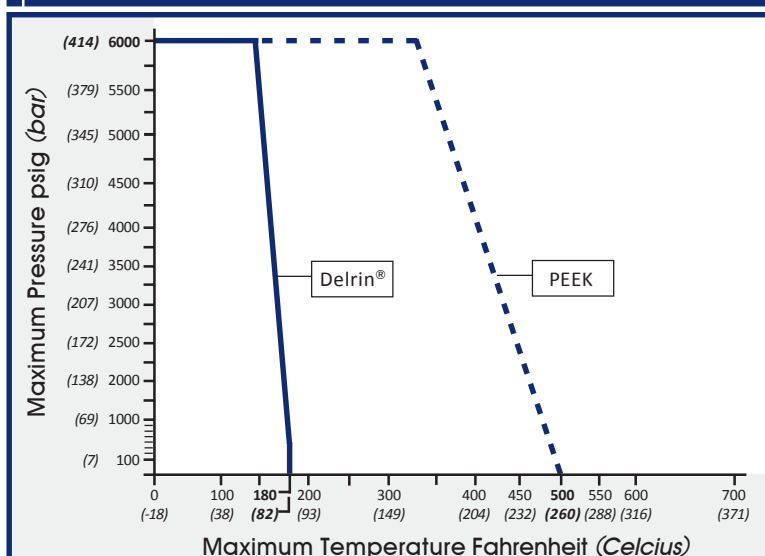
Sizes 1/2" ~ 2"

HBEV

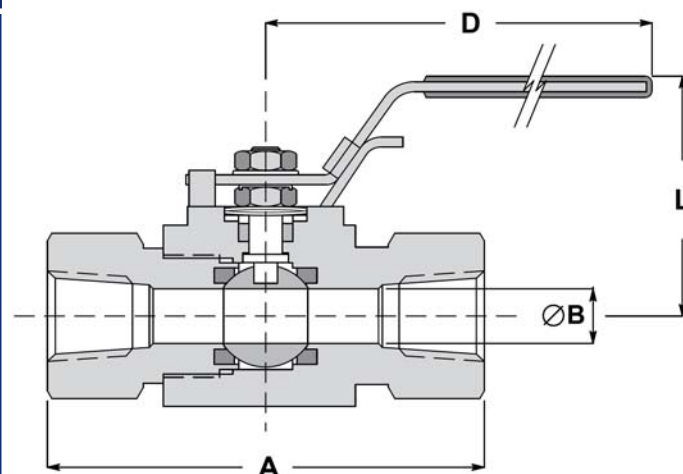
DIMENSIONS, WEIGHT, C_v, TORQUE

Size	A		B		D		L		Weight.		C _v	Torque*	
	in.	mm	in.	mm	in.	mm	in.	mm	lbs	kg		in-lb _f	Nm
1/2"	3.99	101	0.50	12.7	5	129	2.2	57	2	0.9	10	150	17
3/4"	4.25	108	0.75	20.0	6.3	150	2.7	71	4	1.8	32	200	23
1"	4.50	114	1.00	25.4	8.25	205	3.5	82	5	2.3	57	320	36
1-1/2"	5.25	133	1.50	38.1	10.2	260	4.5	105	11	5.0	104	575	65
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HBEV - PRESSURE/TEMPERATURE CHART



* At full differential pressure for clean fluids with Delrin® Seats



HOW TO ORDER SERIES HBEV BALL VALVES

SERIES	BODY & END MATERIAL	BALL & STEM MATERIAL	SEAT**	BODY SEAL**	ENDS**	SIZE
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** PEEK Seat available on SW (Socket Weld) valves only. GRAFOIL® Body Seal available on SW valves only. SW End valves have PEEK Seat and GRAFOIL® Body Seal.						
Order Example: (HBEV766DTSE05)						

Example Description:

316 Stainless Steel Body & Ends, 316 Stainless Steel Ball with 17-4ph Stem, Delrin® Seat, PTFE Body Seal, Screwed Ends (FNPT), 1/2" Size

HBEV7	6	6	D	T	SE	05
-------	---	---	---	---	----	----

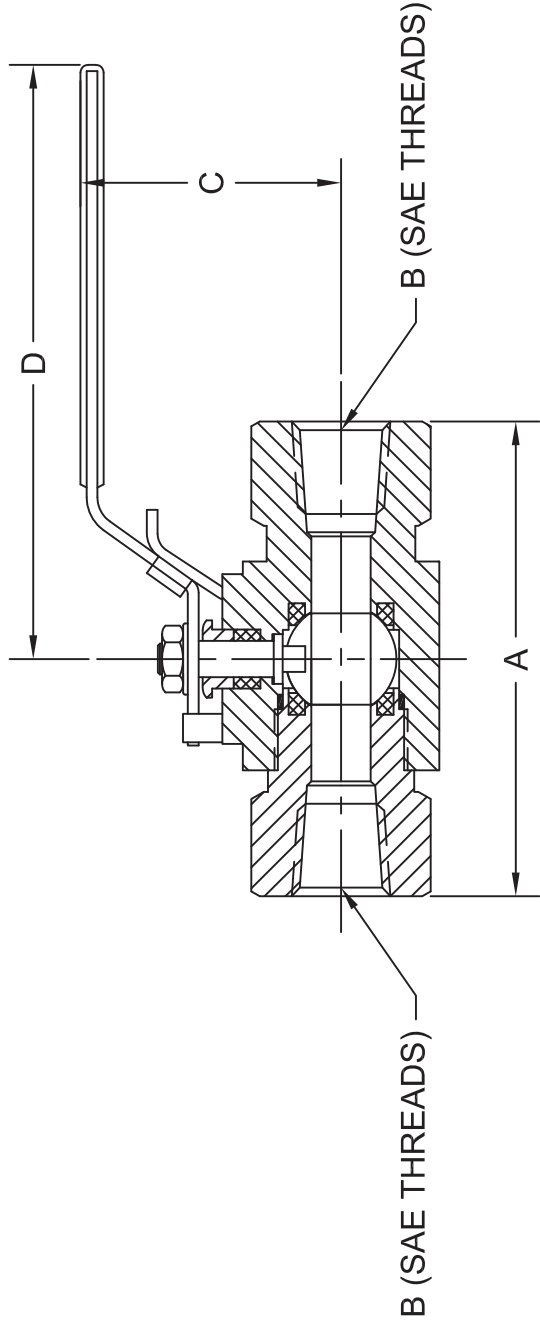
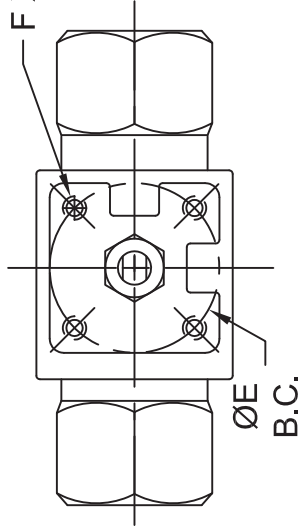
Data subject to change. Visit www.SVF.net for the latest updates on this Data Sheet. All Data Sheets posted on our website supersede all prior publications • [Document #SVF_HBEV_Data_Sheet • HBEV Data Sheet - 06/31/2011]

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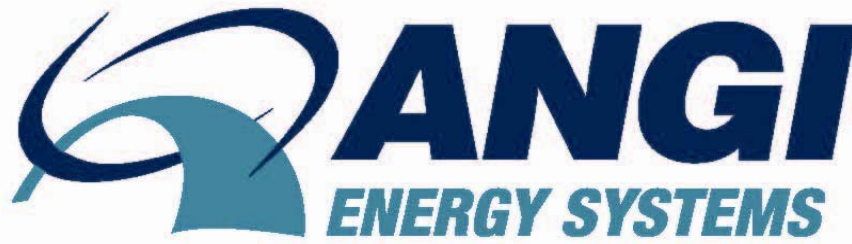
REV	ECO	DESCRIPTION	DATE	APPROVED
A		NEW RELEASE	5-18-2011	-

F X 4 PLCS



SIZE	A	B	C	D	ØE	F
1/2"	3.99	SAE 8	2.24	5.00	1.417	M5 X 0.8P
1"	4.50	SAE 16	3.23	8.10	1.653	M5 X 0.8P

 SVF Flow Controls, Inc. 13560 Larwin Circle Santa Fe Springs, CA 90670 1.800.783.7836 www.SVF.net	DRAWN BY	DATE	PART NAME:	
	V. ALVARADO	5-18-2011	1/2" & 1" HBEV WITH SAE THREADS	
	CHECKED	DATE	DWG. NO.:	REV
	APPROVED	DATE	HBEV SAE0510	A
SIZE & SERIES ID		PART NO.		
1/2" & 1" HBEV		SCALE N.T.S.		
FRACTIONS: +0.1		SHEET 1 OF 1		



PR 13

MECO
5648-9717

125 PSI PRESSURE REGULATOR

ANGI PART NUMBER 500-01674

REBUILD KIT ASSY - MECO PRIMARY REGULATOR – 840-04319

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NGV REGULATORS & ENVIRO-CAP®

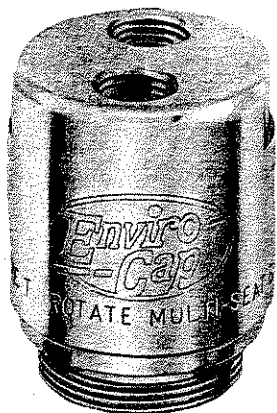
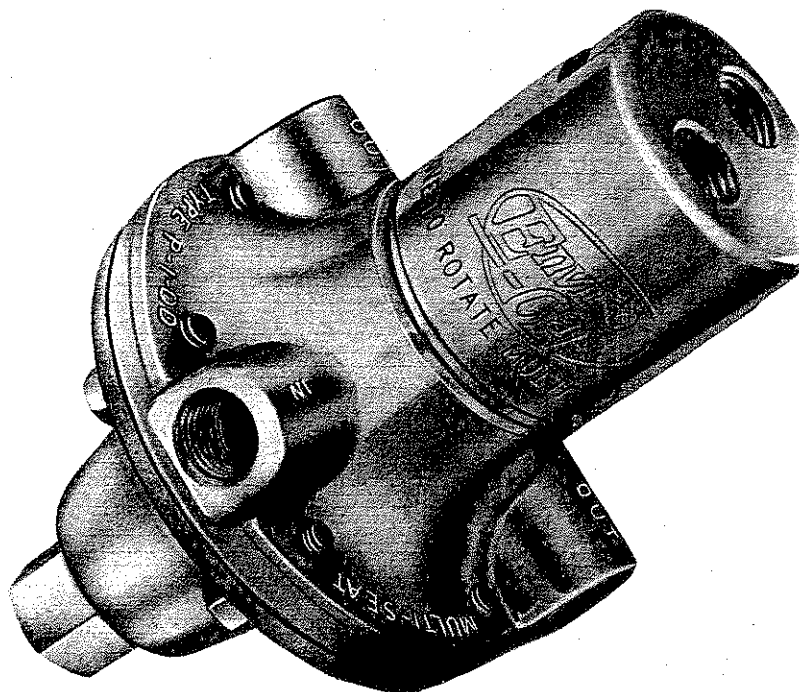
TYPE "P-NGV"

THE DEPENDABILITY OF THE "YOKE" TYPE REGULATOR IS IDEALLY SUITED AS THE HIGH PRESSURE REGULATOR IN POSITIVE PRESSURE NGV SYSTEMS. RATED FOR INLET PRESSURES TO 5,500 PSI, DELIVERY PRESSURES BETWEEN 2 AND 500 PSI ARE RELIABLY ACHIEVED.

A SPECIAL FEATURE IS THE DIA-BLOK CONSTRUCTION. THE DIAPHRAGM IS CONNECTED TO THE SEAT BLOCK BY MEANS OF A YOKE. THIS ONE PIECE ACTION PROVIDES INSTANT RESPONSE TO VARIATIONS IN DEMAND AND INSURES INSTANTANEOUS AND POSITIVE SHUTOFF.

THE ENVIRO-CAP CAN BE USED TO RETROFIT ANY MECO TYPE "P" REGULATOR WHERE FREEZING AND RESULTING ERRATIC GAS FLOW IS A PROBLEM.

ENGINE COOLANT IS CIRCULATED THROUGH THE BACK CAP TO PREVENT "FREEZE-UP" AND MAINTAIN A UNIFORM GAS FLOW. CONNECTIONS TO THE ENGINE COOLING SYSTEM ARE THROUGH 1/4" NPT PORTS.



SPECIFICATIONS:

Maximum Inlet Pressure: 5,500 psi

Delivery Pressure Ranges:

Standard	Optional
0-125 psi	0-30 psi
0-150 psi	0-50 psi
0-225 psi	0-500 psi

Ports:

1/4" NPT Female

Effective Diaphragm Size:

2 1/8" diameter

Materials of Construction:

Body Forged Brass

Bonnet Forged Brass

Diaphragm .. Stainless Steel

Seat Nylon

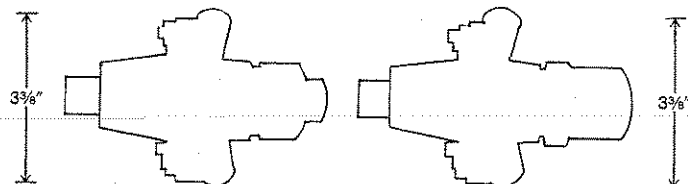
Seals Teflon & SBR

Nozzle Stainless Steel

Inlet Filter ... Sintered Bronze

Options: (at extra cost)

Mounting bolts and nuts



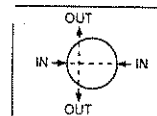
Standard Type P
NGV Regulator

Type P NGV Regulator
with ENVIRO-CAP

Ordering Information

PORTING STYLE P-1-DD

Stock No.	Max. Outlet Pressure	Connections		Enviro-Cap	Wt.
		Inlet	Outlet		
8429	125 psi	(2) 1/4" NPTF	(2) 1/4" NPTF	YES	3 1/2 #
8431	150 psi				
8433	225 psi				
8440	125 psi	(2) 1/4" NPTF	(2) 1/4" NPTF	NO	3 1/4 #
8441	150 psi				
8442	225 psi				
4534	ENVIRO-CAP, WATER HEATED BACK CAP ONLY				



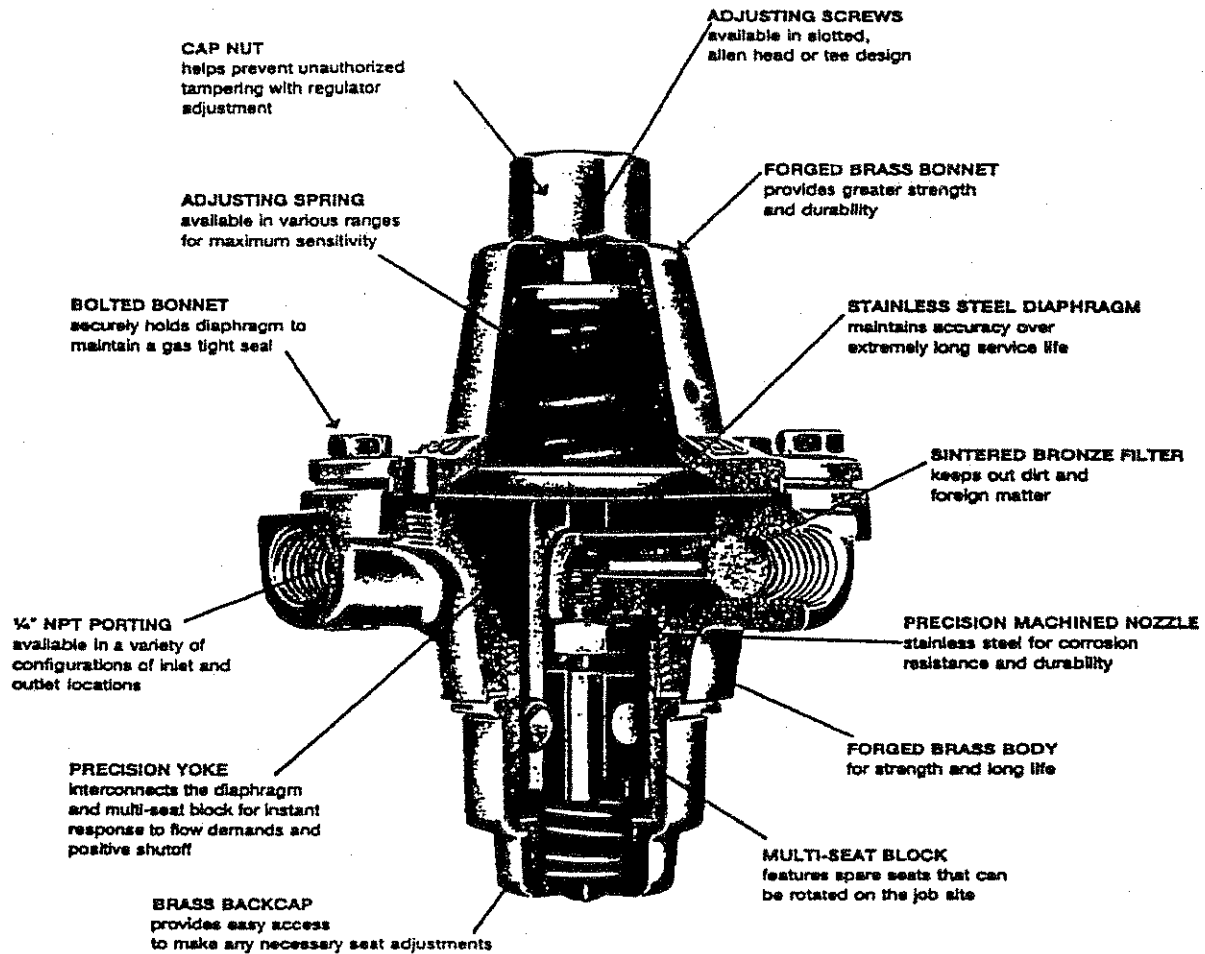
These are MECO's standard models. Additional models with other outlet pressure ranges, other porting and accessories are also available. Please consult with us on your custom regulator application.

MECO Regulators are included in kits certified by A.G.A. and C.A.R.B. MECO Regulators are approved by the Railroad Commission of Texas and are also available with Underwriters Laboratories (UL) Listing. Additional certifications may be applicable; please consult MECO for current listings.

Control Gas Regulator



YOKE TYPE REGULATORS



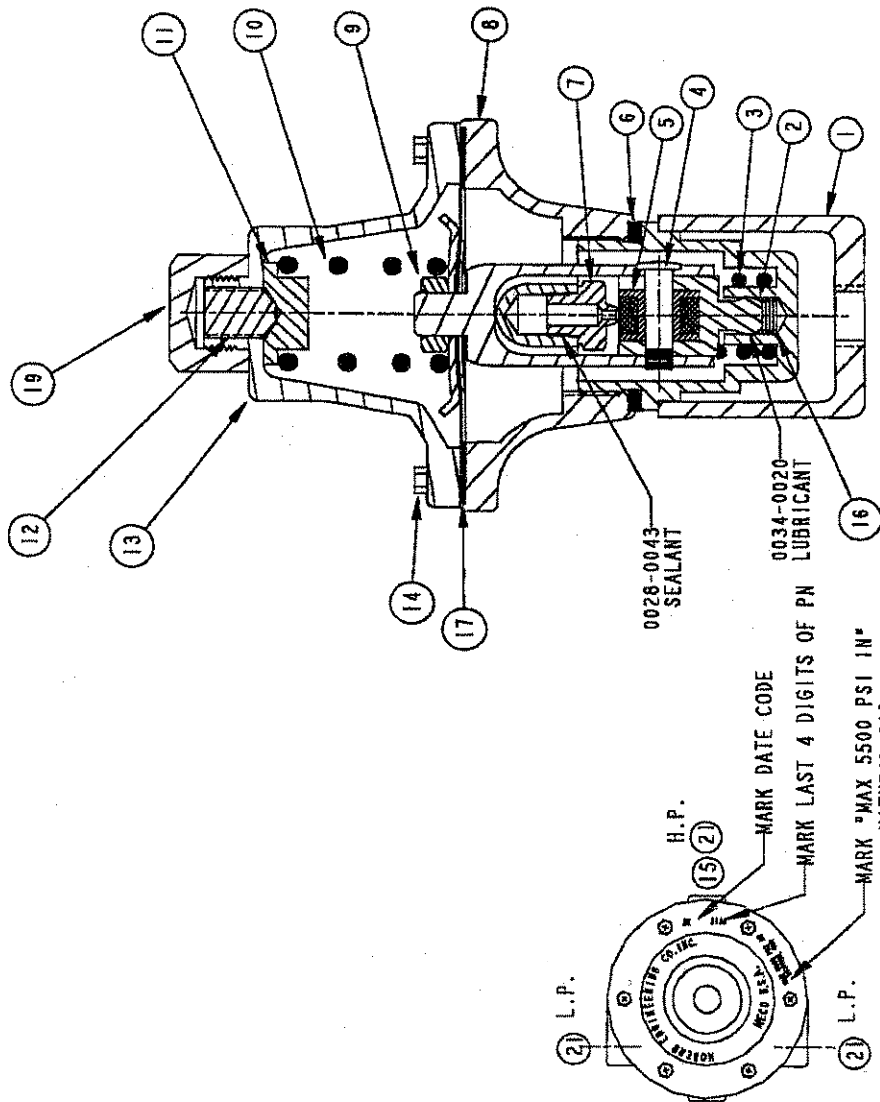
THE TYPE P HIGH PRESSURE REGULATORS . . . fill numerous needs throughout industry. Time proven for reliability and service, these regulators are designed around the special DIA-BLOCK feature. The diaphragm and seat block are directly connected by a precision machined YOKE. Any action on the diaphragm is instantly transmitted to the seat. The results being a high degree of sensitivity and accuracy.

MULTI-SEAT BLOCK . . . contains four seating surfaces which can be easily revolved as needed. No special tools are required to make this change. Various seating materials are available

DWG. NO. 5648-9777

NOTES

1. TEST REGULATOR PER 0090-0040, SHEET 2 PROCEDURE 11.2.
2. MARK REGULATOR PER DETAIL "A" BELOW.
3. SEE DWG 0093-0416 FOR TORQUE REQUIREMENTS.
4. USE 0034-0020 LUBRICANT AND 0028-0043 SEALANT WHERE SHOWN.



REVISIONS

SYM	REF.	DATE	SYM	DATE	SYM	REF.	DATE
DWG	RELEASE	B	E960	10-00			
E0	E542	11-99	C	F305B	12-01		
A	E675	8-00					

28	LUBRICANT	0034-0020	A/R
27	SEALANT	0028-0043	A/R
26			
25	INSTRUCTION MANUAL	0056-1625	I
24			
23			
22			
21	CAPLUG	1417-0005	3
20			
19	BONNET NUT	5213-5274	I
18			
17	DIAPHRAGM GASKET	5213-5269	I
16	O-RING	5199-2135	4
15	FILTER	5213-5215	I
14	BONNET SCREW	5213-5145	6
13	BONNET	5203-5419	I
12	ADJUSTING SCREW	5204-5279	I
11	SPRING BUTTON	5213-5259	I
10	BONNET SPRING (GREY)	5205-5400	I
9	DIAPH-YOKE ASSY	5232-4564	I
8	BODY	5202-5411	I
7	NOZZLE	5213-5161	I
6	BACK CAP GASKET	5213-5429	I
5	SEAT BLOCK ASSEMBLY	5233-4521	I
4	YOKE CLAMPING SCREW	5213-5181	I
3	BACK CAP SPRING	5205-5177	I
2	YOKE GUIDE	5213-5182	I
1	BACK CAP ASSEMBLY	5235-4534	I

BILL OF MATERIALS

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VICTOR®
VICTOR EQUIPMENT COMPANY
DENTON TEXAS

REF. DATA		70420		FINISH		MATERIAL		DRAWN BY DATE		TITLE	
								E. BRADFORD 11-5-99		SPECIAL P REGULATOR NRG	
								CHECKED L. TURNER 11-99		PRESET 125 PSI	
								APVD L. TURNER 11-99		SIZE B	
								DIMENSIONS ARE IN INCHES UNLESS NOTED		Dwg. No. 5648-9777	
								PROJECTION		SHEET 1 OF 1	

DETAIL A

STM	REF.	DATE	STM	REF.	DATE	STM	REF.	DATE
A	E514	9-99	C	E572	12/99			
	REV & REDWN		D	E605	01-00			
B	E516	10-99						

TEST PROCEDURE MECO PRESET REGULATORS

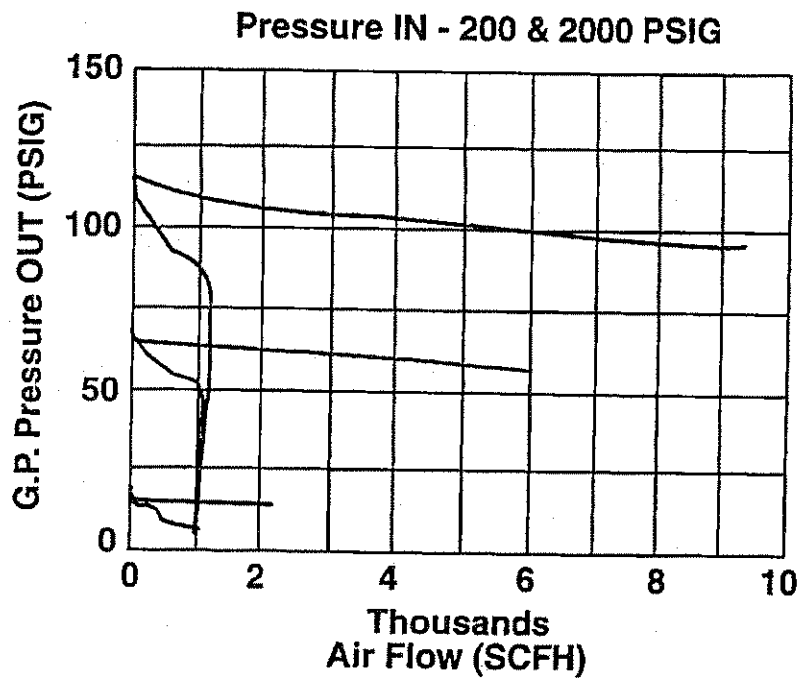
1. INSTALL A TEST GUN WITH A #52 (.0835) ORIFICE TO REGULATOR OUTLET. USE A J PSIG OUTLET GAUGE FOR TESTS.
2. PRESSURIZE THE REGULATOR WITH A PSIG OF OIL FREE AIR OR DRY NITROGEN.
3. LEAK TEST: ADJUST THE REGULATOR TO DELIVER H PSIG. CLOSE THE INLET VALVE AND TURN THE ADJUSTING SCREW ONE TURN COUNTER CLOCKWISE. OBSERVE BOTH GAUGES FOR 5 MINUTES. NO CHANGE IN EITHER GAUGE READING IS PERMITTED. A LEAK TEST MAY BE PERFORMED BY OTHER MEANS PROVIDED THE LEAK RATE USING AIR DOES NOT EXCEED K PER MINUTE.
4. DROP TEST: ADJUST THE REGULATOR TO DELIVER H PSIG STATIC. OPEN THE TEST GUN. THE DROP ON THE OUTLET TEST GAUGE MUST NOT EXCEED L PSIG.
5. SLOW SHUT-OFF/CREEP TEST: ADJUST THE REGULATOR TO DELIVER H PSIG FLOWING. CLOSE THE TEST GUN AND OBSERVE THE DELIVERY PRESSURE READING FOR 5 MINUTES. AN INITIAL SLOW SHUT-OFF INCREASE OF M PSIG DURING THE FIRST MINUTE IS PERMISSIBLE. NO FURTHER CREEP IS PERMISSIBLE DURING THE NEXT 4 MINUTES.
6. PRESET THE REGULATOR TO N PSIG STATIC.

[illegible]

70420 REF. DATA		MATERIAL	UNLESS SPECIFIED REAM ALL ENDS .015-.018 MACHINED SURFACES .125 ALL FEATURES WITH A COMMON ANGLE MOST OR CHAMFER WITHIN .250 P.I.A.B. TOLERANCES .1 .250 .125 .063 .031 .015 .008 .004 UNLESS NOTED	DATE E. BRADFORD 10-22-88		TITLE TEST PROCEDURE	
				CHECKED L. TURNER 11-89	SIZE B	MECO PRESET REGULATORS	
APVD		L. TURNER 11-89	UNP. NO. 0080-0040	SCALE 1" = 2'		SHEET 2	OF 2

Flow Data (SCFH)

Meco "P" Series Cylinder Regulator Single Stage/Heavy Duty



Reference: "P" Regulator Section A, Page 37

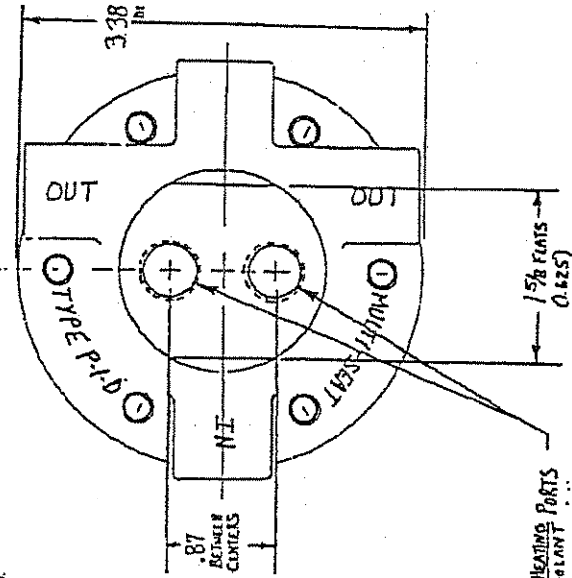
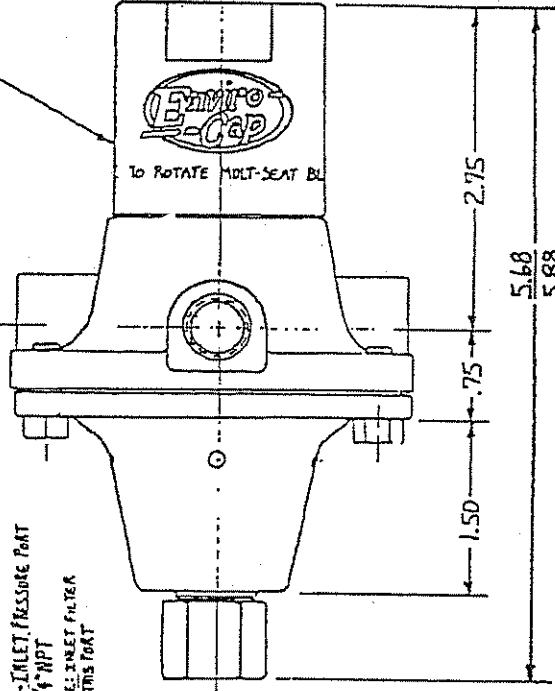
OUTLET MEASURE PORT
1/4" NPT

BONNET SCREW (6 REQ'D) — (NOTE: SET SCREW NOT CAN
EQUALLY SPACED ON 2.75 IN. BOLT CIRCLE — ALSO BE USED — SEE ATTACHED)
1/4-20 UNC TH'D. — 3/8 IN. X HEAD

INLET/OUTLET OPTIMUM
PRESSURE PORT — 1/4" NPT

ENVIRO-CAPSM

INLET PRESSURE PORT
1/4" NPT
NOTE: INLET FILTER
IN THIS PORT



HEATING PORTS
COOLANT
1/4 NPT-2 PLACES
NOTE: ORIENTATION IS
RANDOM BUT RADIAL
TO CENTERLINE

WEIGHT - 3.5 LB. APPROX.

MODERN ENGINEERING COMPANY GALLIUM, MS • ST. LOUIS, MO U.S.A.	
SUBJECT TYPE "P" NGV REGULATOR	DATE 6-25-91
DRAWN WFF	CHECKED BY
SCALE FULL (APPROX.)	

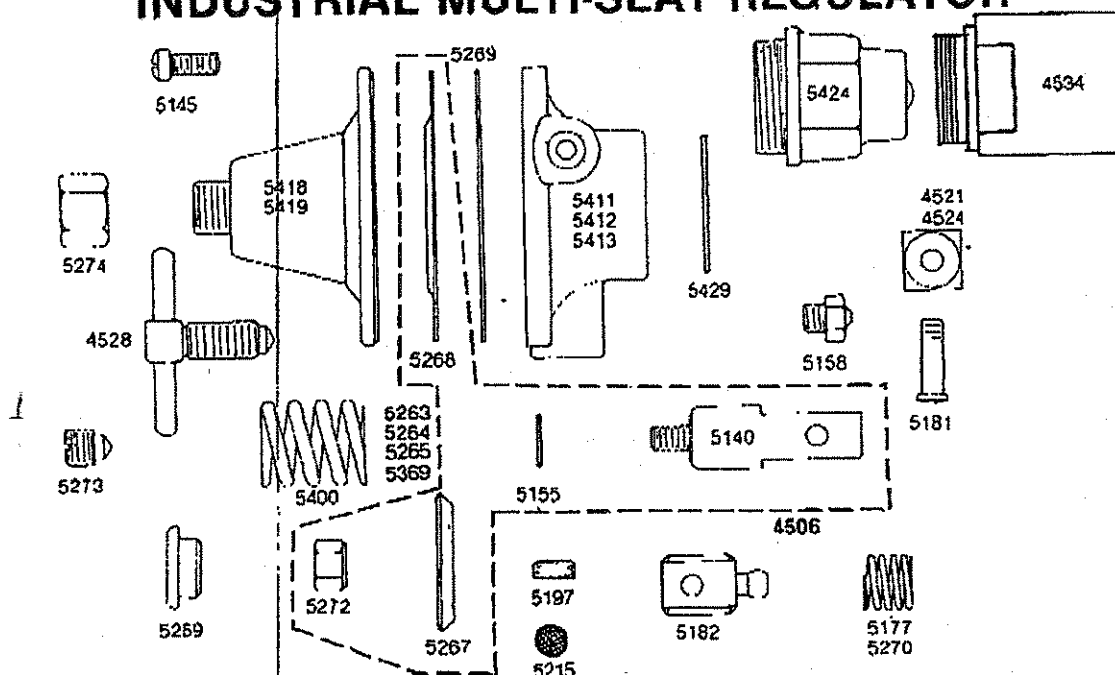
ALL DIMENSIONS IN INCHES
TOLERANCE
1 PLACE DECIMAL AND FRACTIONAL DIMENSIONS ± .03
3 PLACE DECIMAL DIMENSIONS ± .001
UNLESS OTHERWISE SPECIFIED
UNLESS OTHERWISE SPECIFIED

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INSTALLATION DWG. ("P" NGV)	
DATE	11/08/90
DRAWN BY	



TYPE P-30, P-50, P-125, P-150, & P-225 INDUSTRIAL MULTI-SEAT REGULATOR

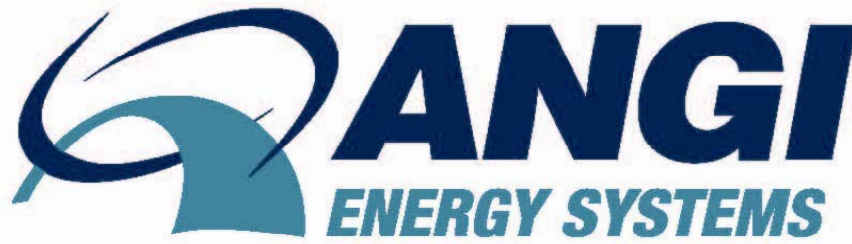


Stock No.

Description

4506	Diaphragm-Yoke Assembly
4521	Seat Block with White Nylon Seats
4524	Seat Block with Kel-F Seats for CO ₂
4528	Adjusting Screw Assembly
4534	ENVIRO-CAP, Water Heated Back Cap Assembly
5140	Yoke (Part of 4506)
5145	Bonnet Screw 6 required, Pkg. 12
5155	Yoke Gasket, Teflon, Pkg. 12 (Part of 4506)
5158	Nozzle with 5/84" Orifice, Pkg. 6
5177	Rear Spring, for over 500 PSI Inlet Pressure, Standard
5181	Yoke Clamping Screw, Pkg. 6
5182	Yoke Guide
5197	Filter Screen, pkg. 6
5215	Sintered Filter, pkg. 12, Standard
5259	Spring Button
5263	Compression Spring for 30 PSI Pressure (Red)
5264	Compression Spring for 125 PSI Pressure (Green)
5265	Compression Spring for 150 PSI pressure (Purple)
5267	Diaphragm Plate (Part of 4506)
5268	Stainless Steel Diaphragm (Part of 4506)
5269	Diaphragm Gasket, Pkg. 6
5272	Diaphragm Plate Nut (Part of 4506)
5273	Slot Type Adjusting Screw
5274	Protection Cap for Slot Adjusting Screw
5369	Compression Spring for 50 PSI pressure (Black)
5400	Compression Spring for 225 PSI pressure (Grey)
5411	Body, 1 Inlet, 2 outlets P-1-DA
5412	Body, 1 Inlet, 3 outlets P-1-DC
5413	Body, 2 inlets, 2 outlets P-1-DD
5418	Bonnet, for "T" Type Adjusting Screw
5419	Bonnet, for Slotted Type Adjusting Screw
5423	Allen Head Adj. Screw
5424	Back Cap
5429	Back Cap Gasket, Teflon, Pkg. 12

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PT 50

AMERICAN SENSOR TECHNOLOGIES (AST)
AST4400A06000P4E0437
0-6000 PSI PRESSURE TRANSDUCER, IS/UL
CL1 DIV2, GROUPEC&D, 4-20Ma, 1/4MNPT, SS

ANGI PART NUMBER 410-07282

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AST4400 *Stainless Steel Media Isolated Pressure Sensor*

CSA Approved For Hazardous Locations with Approved Barrier 



Overview

The AST4400 is a media isolated stainless steel pressure sensor with a wide variety of options. In addition to its rugged construction and best price-to-performance ratio in the industry, the AST4400 is the solution for pressure measurement in Intrinsically Safe areas.

Benefits

- **ANSI/ISA - 12.27.01.2003 Certified "Single Seal"**
(No need for expensive secondary seal)
- **CSA 157 Class 1** Groups C, D IS with approved Barrier (page 2)
- **CAN/CSA-C22.2 No. 157.92** - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations
- High Strength Stainless Steel Construction
- No Oil, Welds or Internal O-rings
- Wide Operating Temperature Range
- Ranges up to 10,000 PSI
- Low Static and Thermal Errors
- Unparalleled Price and Performance
- Compatible with Wide Range of Liquids and Gases
- EMI/RFI Protection
- 500VAC Isolation

Applications

- Industrial OEM Equipment
- Water Management
- Pneumatics
- Hydrogen Storage (316L SS)
- HVAC/R Equipment
- Control Panels
- Hydraulic Systems
- Data Loggers

Performance @25°C (77°F)

Accuracy*	< ±0.25% BFSL
Stability (1 year)	±0.25%FS, typical
Over range Protection	2X Rated Pressure
Burst Pressure	5X or 20,000 PSI (whichever is less)
Pressure Cycles	> 100 Million

* Accuracy includes non-linearity, hysteresis & non-repeatability



Environmental Data

Temperature

Operating	-40 to 85°C (-40 to 185°F)
Storage	-40 to 100°C (-40 to 212°F)

Thermal Limits

Compensated Range	0 to 55°C (30 to 130°F)
TC Zero	<±1.5% of FS
TC Span	<±1.5% of FS

Other

Shock	100G, 11 msec, 1/2 sine
Vibration	10G peak, 20 to 2000 Hz.
EMI/RFI Protection	Yes
Rating	IP-66

Electrical Data

Output	4-20mA	1-5VDC, 1-6VDC	0-50mV (10mV/V)	0.5-4.5V Ratiometric
Excitation	10-28VDC	10-28VDC	5VDC, typical	5VDC, regulated
Output Impedance	>10k Ohms	<100 Ohms, Nominal	1100 Ohms, Nominal	<100 Ohms, Nominal
Current Consumption	20mA, typical	<10mA	<5mA	<10mA
Bandwidth	(-3dB): DC to 250 Hz	(-3dB): DC to 1kHz	(-3dB): DC to 5kHz, min	(-3dB): DC to 1kHz
Output Noise	-	<2mV RMS	-	<2mV RMS
Zero Offset:	<±1% of FS	<±1% of FS	< ±2% of FS	<±1% of FS
Span Tolerance	<±2% of FS	<±1.5% of FS	< ±2% of FS	<±1.5% of FS
Output Load	0-800 Ohms@10-28VDC	10k Ohms, Min.	>1M Ohms	10K Ohms, Min.
Reverse Polarity Protection	Yes	Yes	-	No

Ordering Information

AST4400 **A** **00500** **P** **4** **E** **0** **000** **-SS**

Series Type

Process Connection
A=1/4" NPT Male
B=1/8" NPT Male
C=1/4" BSPP Male
F=7/16" - 20 UNF Male
I= 1/4" NPT Female

Pressure Range
Insert pressure range from chart

Pressure Unit
B= Bar
K= kg/cm²
P= PSI

Outputs
1= 0.5-4.5V ratiometric 6= 1-6V
3= 1-5V A= 0-50mV (10mV/V)
4= 4-20mA (2 wire loop powered)

Electrical F= Packard Metripack 150 3-Pin Conn.
A= 2 ft. (0.6 m) I= DIN 43650A
B= 4 ft. (1.2 m) L= Conduit fitting, Cable 2 ft.
C= 6 ft. (1.8 m) M= Conduit fitting, Cable 4 ft.
D= 10 ft. (3.0 m) N= Conduit fitting, Cable 6 ft.
E= Mini DIN 43650 P= Conduit fitting, Cable 10 ft.

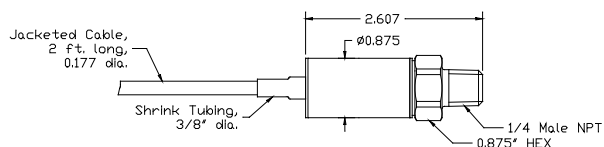
Wetted Material
0=17-4PH
1=316 L

Options
000 -No special options

Single Seal

Now With DIN43650A!

Dimensional Data

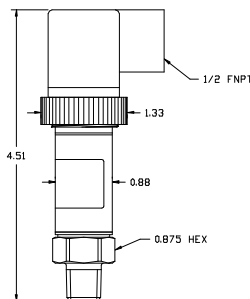


DIN43650A

Output	Pin 1	Pin 2	Pin 3	Wide Pin
4-20mA	+V Supply	Ground	Case GND	N/C
3W Voltage	+V Supply	Ground	+ Signal	Case GND

CABLE

Output	Red	Black	White	Green
4-20mA	+V Supply	Ground	N/C	Case GND
3W Voltage	+V Supply	Ground	+ Signal	Case GND



Warranty

Workmanship - AST, Inc. pressure transmitters have a limited one-year warranty to the original purchaser. AST, Inc. will replace or repair, free of charge, any defective transmitter. This warranty does not apply to any units that have been modified; misused, neglected or installed where the application exceeds published ratings. AST's sensors are made with pride in New Jersey, USA. If in the area please feel free to stop by for a visit!

Installation/Applications - The purchaser is responsible for media compatibility, functional adequacy, and correct installation of the transmitter.

Pressure Ranges*

PSIG Measurement Range	Pressure Range Code	BARG Measurement Range	Pressure Range Code
-14.7 to 25**	V0025**	-1 to 2**	V0002**
0-25	00025	0-2	00002
0-50	00050	0-5	00005
0-100	00100	0-10	00010
0-200	00200	0-20	00020
0-500	00500	0-50	00050
0-1,000	01000	0-100	00100
0-2,500	02500	0-250	00250
0-5,000	05000	0-350	00350
0-7,500	07500	0-500	00500
0-10,000	10000	0-700	00700

*Typical ranges. All ranges between 0-25 PSI and 0-10,000 PSI available.

**Compound ranges up to -14.7 to 2500 PSI available. Please consult factory.

Barrier Installation

Class I, Div. 1, Groups C, D Hazardous Location Nonhazardous Location A08949

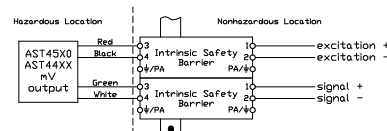


Figure 1: Wiring diagram for 4-wire, mV output

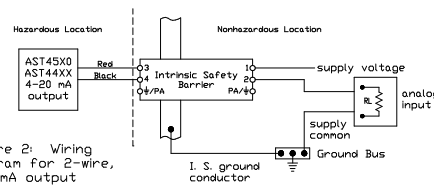


Figure 2: Wiring diagram for 2-wire, 4-20mA output

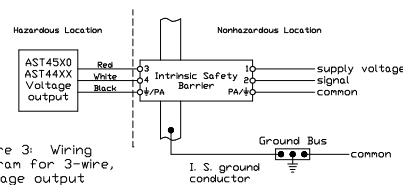


Figure 3: Wiring diagram for 3-wire, Voltage output

Entity Parameters

Models AST4400, AST4410 and AST44LP

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 0

Models AST4400, AST4410 and AST44P with integral cable

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 1.32 uH

Models AST4500, AST4510 and AST4520

V_{max} = 28 Vdc
I_{max} = 175 mA
C_i = 0.45 uF
L_i = 16.5 uH

1. For installation in accordance with Fig. 2, barrier must be a CSA Certified, Single Channel grounded Shunt-Diode Zener Barrier or a Single Channel Isolating Barrier.

Barrier parameters must meet the following requirements:

$$V_{oc} \text{ or } U_o \leq V_{max} \quad C_a \text{ or } C_o \geq C_i + C_{cable}$$

$$I_{sc} \text{ or } I_o \leq I_{max} \quad L_a \text{ or } L_o \geq L_i + L_{cable}$$

$$P_o \leq P_i \text{ (if applicable)}$$

2. For installations in accordance with Figs. 1 and 3, one dual-channel or two single-channel barriers may be used, where in either case, both channels have been Certified for use together with combined entity parameters.

The following conditions must be satisfied:

$$V_{oc} \text{ or } U_o \leq V_{max} \quad C_a \text{ or } C_o \geq C_i + C_{cable}$$

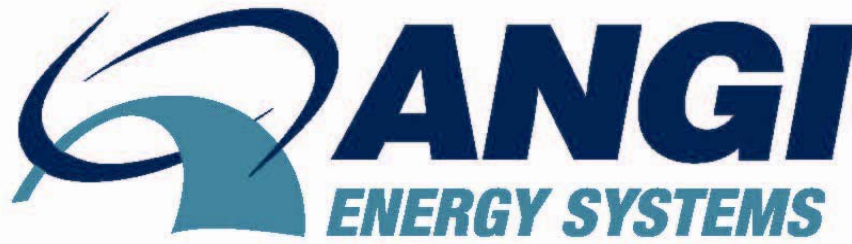
$$I_{sc} \text{ or } I_o \leq I_{max} \quad L_a \text{ or } L_o \geq L_i + L_{cable}$$

$$P_o \leq P_i \text{ (if applicable)}$$

3. Maximum non-hazardous area voltage must not exceed 250 V.

4. Installation should be in accordance with Canadian Electrical Code, Part I.

5. A grounding method is not provided by the manufacturer as part of the integral design of the Transducer. For units which are connected through a grounded shunt diode safety barrier, ensure that the transducer is mounted to a surface which is at the same potential as the barrier ground.



SRV 37

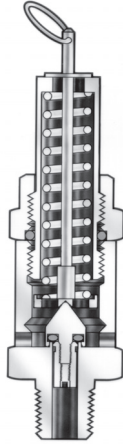
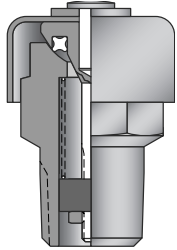
CIRCLE SEAL
D559N-2M-125 ASME

125 PSI 1/4" ASME, SAFETY RELIEF VALVE

ANGI PART NUMBER 991-07663

NO REBUILD KIT AVAILABLE

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CIRCLE SEAL CONTROLS, INC.

A division of CIRCOR International, Inc.

D500 Series 15 to 150 PSIG

M5100 Series 20 to 1200 PSIG

ASME Safety Relief Valves

Features

- D500 Features Cap Design
- M5100 Offered with Ring or Lift Handle
- MD500 Features Cup Design with Manual Override Ring.

Technical Data

ASME	• American Society of Mechanical Engineers
Body Construction Materials:	• D500 – Naval Brass or 316 Stainless Steel • M5100 – Naval Brass or 316 Stainless Steel
O-ring Materials:	• M5100 – Buna N, Neoprene, Teflon®, Viton®, and EPDM • D500 – Buna N, Neoprene, Teflon®, Viton®, EPDM, and silicone
Set Pressure:	• D500 – 15 to 150 PSIG 1/4" • M5100 – 20 to 1,200 PSIG 1/8", 3/4", 1" 50 to 1,200 PSIG 1/4", 3/8", 1/2"
Temperature Range:	• -100° F to +400° F (-73° C to 204° C) Based on o-ring material, see "How to Order"
Connection Sizes:	• D500 – 1/4" Male Pipe • M5100 – 1/8" to 1" Male Pipe

Terminology For ASME Safety Relief Valves

SAFETY RELIEF VALVES

An automatic pressure relieving device actuated by the static pressure upstream of the valve, which opens in proportion to the increase in pressure over the opening pressure.

START-TO-LEAK PRESSURE

The pressure at the valve inlet where the relieved fluid is first detected (on the down-stream side of the seat) before normal relieving action takes place.

OPENING PRESSURE (SET PRESSURE)

The valve inlet pop point pressure at which there is a measurable lift or discharge becomes continuous as determined by seeing, hearing or feeling. In the pop type of safety valve, it is the inlet pressure at which the valve opens, allowing a larger amount of fluid as compared with corresponding valve movements at higher or lower pressures.

NOTE: A safety relief valve is not considered to open when it is simmering at a pressure just below the popping point even though the simmering may be audible. This set pressure distinguishes our ASME relief valves from our standard relief valves whose cracking pressure indicates initial flow.

RELIEVING PRESSURE

(Opening Pressure plus Overpressure) The pressure measured at the valve inlet at which the relieving capacity is determined.

CLOSING PRESSURE

(Reset Pressure) The pressure measured at the valve inlet, at which the valve closes, flow is substantially shut off, and there is no measurable lift.

SEAL-OFF PRESSURE

The pressure (measured at the valve inlet) after closing at which no further gas is detected at the down-stream side of the seat.

OPERATING PRESSURE

The actual pressure at which a vessel is maintained in normal operation.

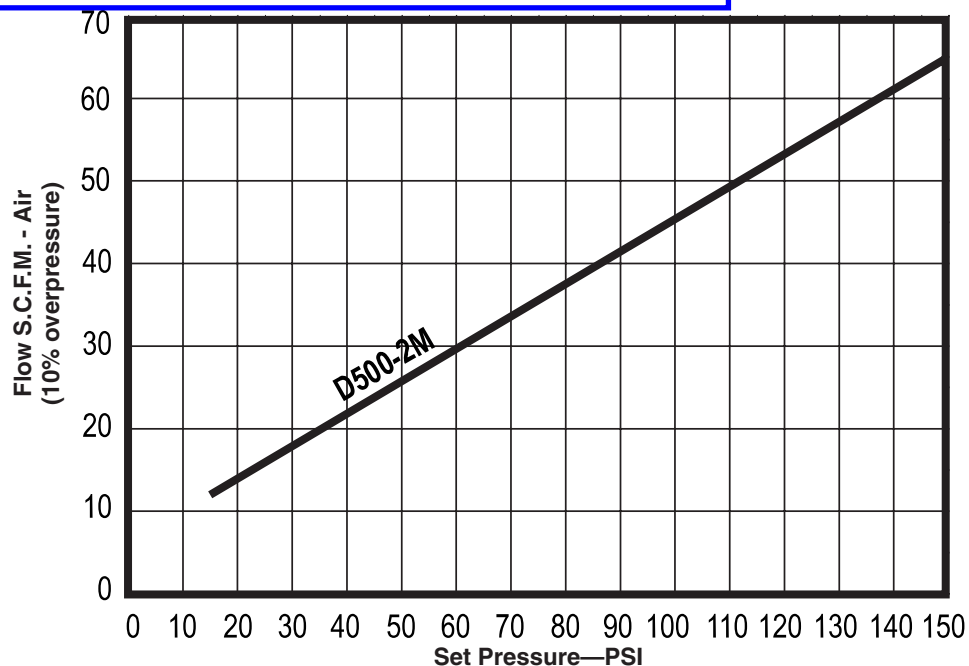
ACCUMULATION

Pressure build-up or overpressure beyond the set pressure of a safety relief valve, at which capacity flow is rated. Capacities are usually based on 10% accumulation.

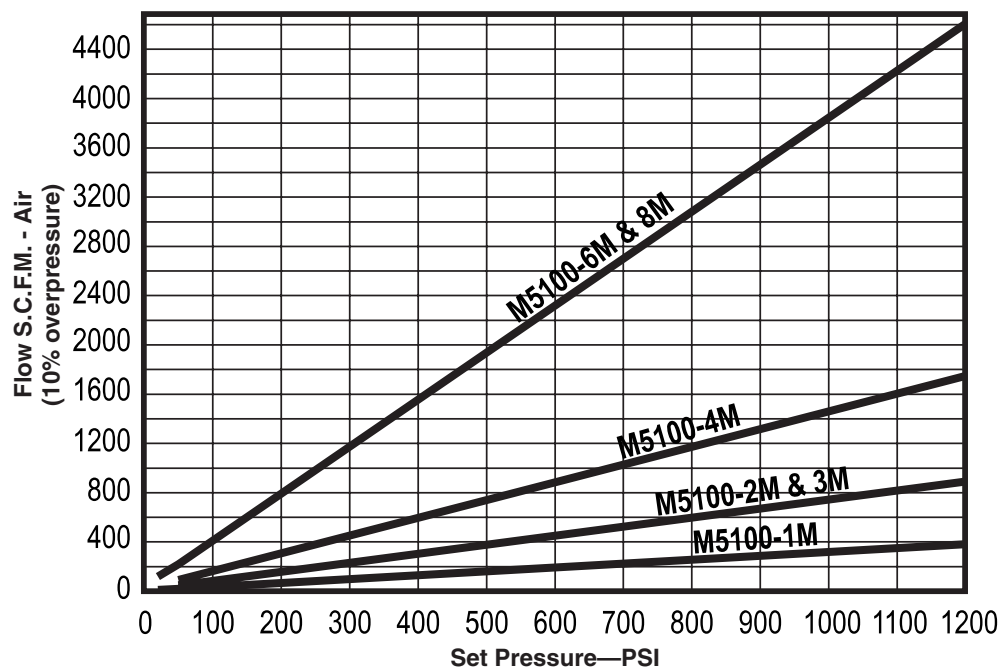
NOTE: Proper filtration is recommended to prevent damage to sealing surfaces.

D500 Series 15 to 150 PSIG
M5100 Series 20 to 1200 PSIG
ASME Safety Relief Valves

Flow Curve D500 Series ASME Safety Relief Valve



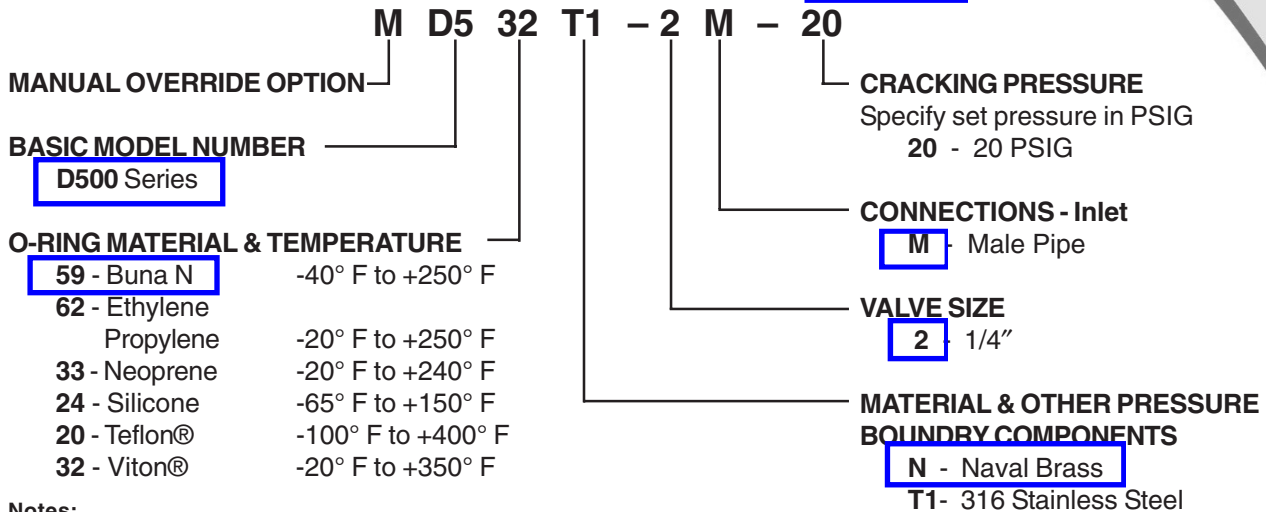
Flow Curve M5100 Series ASME Safety Relief Valve



D500 Series 15 to 150 PSIG M5100 Series 20 to 1200 PSIG ASME Safety Relief Valves

How to Order

D500 Series ASME Safety Relief Valve—15 to 150 PSI



Notes:

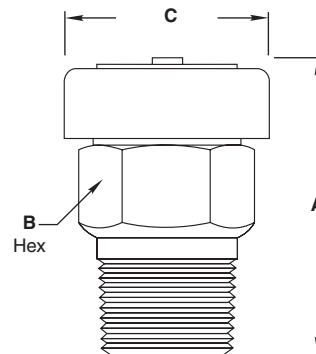
Teflon® is a registered trademark of DuPont.

Viton® is a registered trademark of DuPont Dow Elastomers.

Please consult your Circle Seal Controls Distributor or our factory for information on special connections, lubricants, operating pressures and temperature ranges.

Dimensions (Inches)

Dash No.	Size	A	B Hex	C Dia
2M	1/4"	1.375	.625	.90



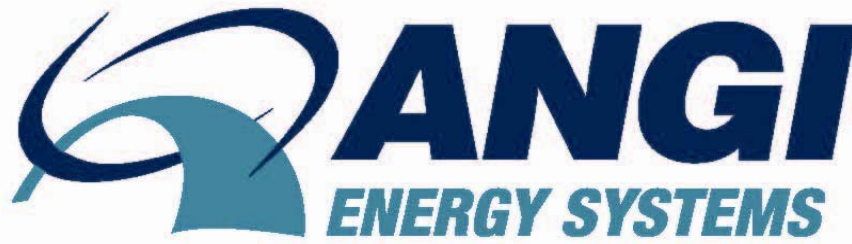
Recommended Installation

- 1 Before installing a new safety relief valve, we recommend that a pipe tap be used to assure clean-cut and uniform threads in the vessel opening and to allow for normal hand engagement followed by a half to one turn by wrench.
- 2 Avoid over-tightening as this can distort the valve seat.
- 3 Avoid excess "popping" of the valve. Safety relief valves should only be operated often enough to assure they are in good working order.
- 4 Apply only a moderate amount of pipe compound or tape to the threads, leaving the first thread clean parts.
- 5 Don't oversize the valve, as this may cause chatter resulting in rapid wear of the moving parts.
- 6 Avoid wire, cable or chain pulls for attachments to levers that do not allow a vertical pull. The weight of these devices should not be applied to the safety relief valve.
- 7 Avoid having the operation pressure too near the valve set pressure. A minimum differential of 10% is recommended.

For Your Safety

It is the sole responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation and maintenance of these products. Material compatibility product ratings and application details should be considered in the selection. Improper selection or use of products described here in can cause personal injury or property damage.

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SV 9

ASCO
EF8320G184-120/60

1/4" 3-WAY, 120V, 150 PSI SOLENOID VALVE

ANGI PART NUMBER 330-07243

REBUILD KIT- ASCO 3-WAY SOLENOID 120V 150 PSI – 761-07358

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Features

- All NPT connections are in the valve body to allow in-line piping.
- No Minimum Operating Pressure Differential required.
- Sturdy design for long years of reliable service.
- Broadest range of applications.
- Mountable in any position.

Construction

Valve Parts in Contact with Fluids		
Body	Brass	303 Stainless Steel
Seals and Discs	NBR or Cast UR, as Listed	
Core Tube	305 Stainless Steel	
Core and Plugnut	430F Stainless Steel	
Core Springs	302 Stainless Steel	
Shading Coil	Copper	Silver
Disc-Holder	CA	
Core Guide	CA (10.1 and 17.1 Watt only)	

Electrical

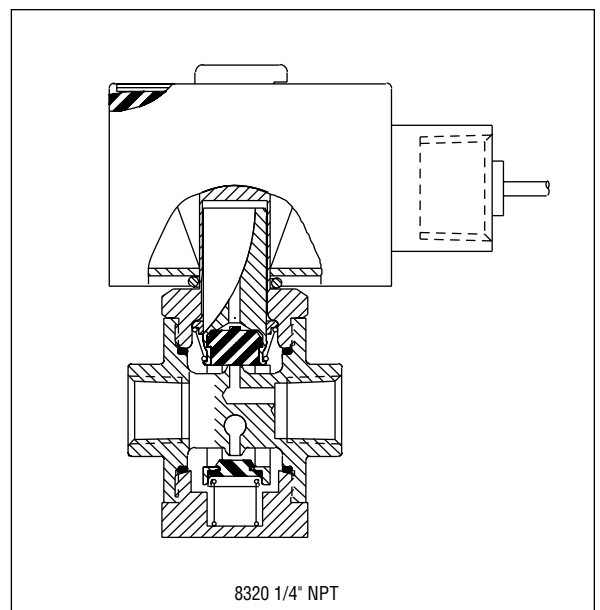
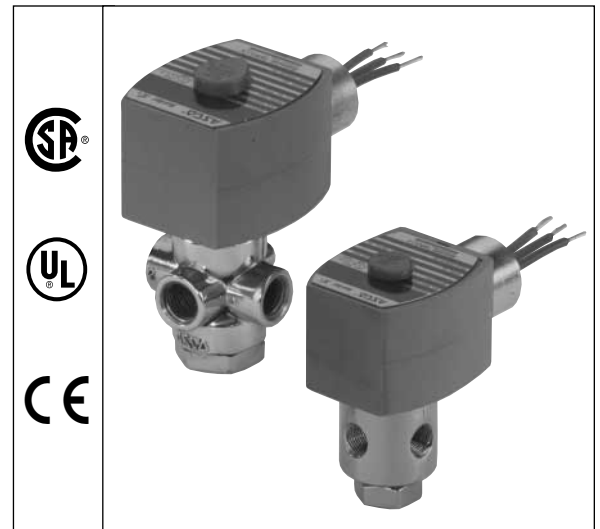
Standard Coil and Class of Insulation	Watt Rating and Power Consumption				Spare Coil Part No.			
	DC Watts	AC			General Purpose		Explosionproof	
		Watts	VA Holding	VA Inrush	AC	DC	AC	DC
F	10.6	6.1	16	30	238210	238310	238214	238314
F	-	9.1	25	40	238210	-	238214	-
F	11.6	10.1	25	50	238610	238710	238614	238714
F	-	17.1	40	70	238610	-	238614	-

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 are available when required.

Solenoid Enclosures

Standard: Watertight, Types 1, 2, 3, 3S, 4, and 4X.

Optional: Explosionproof and Watertight, Types 3, 3S, 4, 4X, 6, 6P, 7, and 9. (To order, add prefix "EF" to the catalog number.)
 See Optional Features Section for other available options.



Nominal Ambient Temperature Ranges:

AC: 32°F to 125°F (0°C to 52°C)

DC: 32°F to 104°F (0°C to 40°C)

Refer to Engineering Section for details.

Approvals:

CSA certified. UL listed General Purpose Valves.
 Meets applicable CE directives.

Refer to Engineering Section for details.

Specifications (English units)

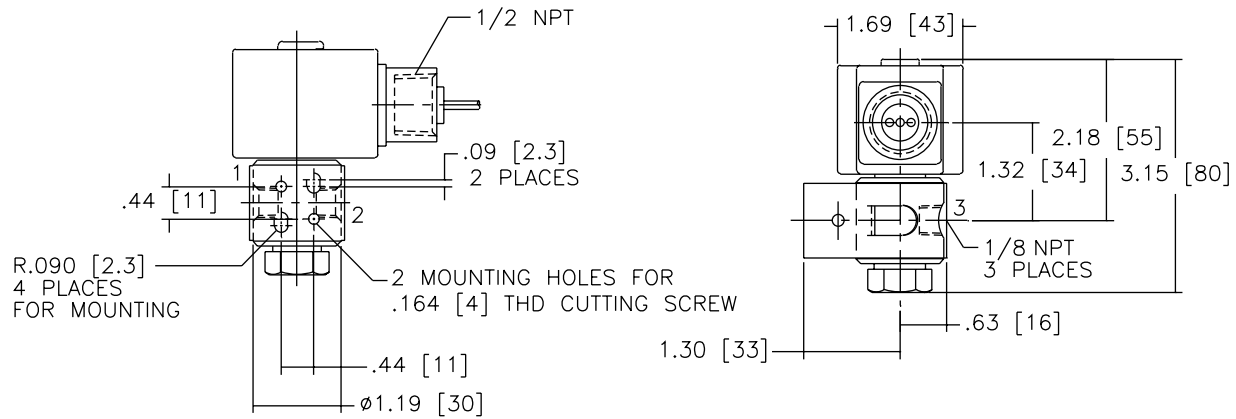
Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Operating Pressure Differential (psi)						Max. Fluid Temp. °F		Brass Body		Stainless Steel Body		Watt Rating/ Class of Coil Insulation ②	
			Max. AC			Max. DC										
			Air-Inert Gas	Water	Lt. Oil @ 300 SSU	Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	DC	Catalog Number	Constr. Ref. No.	Catalog Number	Constr. Ref. No.	AC	DC
UNIVERSAL OPERATION (Pressure at any port)																
1/8	3/64	.06	175	175	175	125	125	125	140	120	8320G130 ①	1	8320G140 ①	1	9.1/F	10.6/F
1/8	1/16	.09	100	100	100	65	65	65	180	120	8320G1	1	8320G41	1	9.1/F	10.6/F
1/8	3/32	.12	50	50	50	50	50	50	180	120	8320G83	1	8320G87	1	6.1/F	10.6/F
1/8	1/8	.21	30	30	30	20	20	20	180	120	8320G3	1	8320G43	1	9.1/F	10.6/F
1/4	1/16	.09	125	130	130	75	75	75	200	150	8320G172	2	--	--	10.1/F	11.6/F
1/4	3/32	.12	100	100	100	60	60	60	200	150	8320G174	2	8320G200	3	17.1/F	11.6/F
1/4	1/8	.25	50	50	50	25	25	25	200	150	8320G176	2	8320G201	3	17.1/F	11.6/F
1/4	11/64	.35	20	20	20	12	12	12	200	150	8320G178	2	--	--	10.1/F	11.6/F
NORMALLY CLOSED (Closed when de-energized)																
1/8	3/64	.06	200	200	200	200	200	200	180	120	8320G132	1	8320G142	1	6.1/F	10.6/F
1/8	1/16	.09	150	125	125	125	125	125	180	120	8320G13	1	8320G45	1	6.1/F	10.6/F
1/8	3/32	.12	100	100	100	100	100	100	180	120	8320G15	1	8320G47	1	6.1/F	10.6/F
1/8	1/8	.21	40	40	40	40	40	40	180	120	8320G17	1	8320G49	1	6.1/F	10.6/F
1/4	1/16	.09	210	225	225	160	160	160	200	150	8320G182	2	--	--	17.1/F	11.6/F
1/4	3/32	.12	150	150	150	115	115	115	200	150	8320G184	2	8320G202	3	10.1/F	11.6/F
1/4	1/8	.25	85	85	85	60	60	60	200	150	8320G186	2	8320G203	3	10.1/F	11.6/F
1/4	11/64	.35	45	45	45	25	25	25	200	150	8320G188	2	--	--	10.1/F	11.6/F
NORMALLY OPEN (Open when de-energized)																
1/8	3/64	.06	200	200	200	200	200	200	180	120	8320G136	1	8320G146	1	6.1/F	10.6/F
1/8	1/16	.09	150	125	125	125	125	125	180	120	8320G27	1	8320G51	1	6.1/F	10.6/F
1/8	3/32	.12	100	100	100	100	100	100	180	120	8320G29	1	8320G53	1	6.1/F	10.6/F
1/8	1/8	.21	40	40	40	40	40	40	180	120	8320G31	1	8320G55	1	6.1/F	10.6/F
1/4	1/16	.09	250	250	250	160	160	160	200	150	8320G192	2	--	--	17.1/F	11.6/F
1/4	3/32	.12	150	140	140	100	100	100	200	150	8320G194	2	8320G204	3	10.1/F	11.6/F
1/4	1/8	.25	70	70	70	55	55	55	200	150	8320G196	2	8320G205	3	10.1/F	11.6/F
1/4	11/64	.35	40	40	40	30	30	30	200	150	8320G198	2	--	--	10.1/F	11.6/F
Notes: ① Supplied with cast UR disc. ② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts; the watt rating for the 9.1/F solenoid is 11.1 watts.																

Specifications (Metric units)

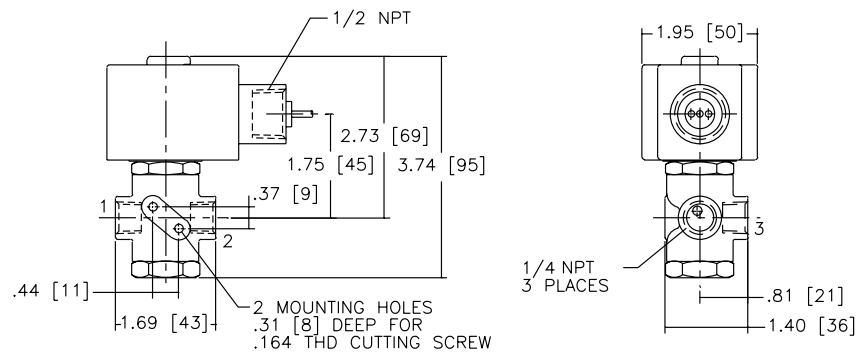
Pipe Size (ins.)	Orifice Size (mm)	Kv Flow Factor (m3/h)	Operating Pressure Differential (bar)						Max. Fluid Temp. °C		Brass Body		Stainless Steel Body		Watt Rating/ Class of Coil Insulation ②	
			Max. AC			Max. DC										
			Air-Inert Gas	Water	Lt. Oil @ 300 SSU	Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	DC	Catalog Number	Constr. Ref. No.	Catalog Number	Constr. Ref. No.	AC	DC
UNIVERSAL OPERATION (Pressure at any port)																
1/8	1.2	.05	12	12	12	9	9	9	59	48.4	8320G130 ①	1	8320G140 ①	1	9.1/F	10.6/F
1/8	1.6	.08	7	7	7	4	4	4	81	48.4	8320G1	1	8320G41	1	9.1/F	10.6/F
1/8	2.4	.10	3	3	3	3	3	3	81	48.4	8320G83	1	8320G87	1	6.1/F	10.6/F
1/8	3.2	.18	2	2	2	1	1	1	81	48.4	8320G3	1	8320G43	1	9.1/F	10.6/F
1/4	1.6	.08	9	9	9	5	5	5	92	64.9	8320G172	2	--	--	10.1/F	11.6/F
1/4	2.4	.10	7	7	7	4	4	4	92	64.9	8320G174	2	8320G200	3	17.1/F	11.6/F
1/4	3.2	.21	3	3	3	2	2	2	92	64.9	8320G176	2	8320G201	3	17.1/F	11.6/F
1/4	4.4	.30	1	1	1	1	1	1	92	64.9	8320G178	2	--	--	10.1/F	11.6/F
NORMALLY CLOSED (Closed when de-energized)																
1/8	1.2	.05	14	14	14	14	14	14	81	48.4	8320G132	1	8320G142	1	6.1/F	10.6/F
1/8	1.6	.08	10	9	9	9	9	9	81	48.4	8320G13	1	8320G45	1	6.1/F	10.6/F
1/8	2.4	.10	7	7	7	7	7	7	81	48.4	8320G15	1	8320G47	1	6.1/F	10.6/F
1/8	3.2	.18	3	3	3	3	3	3	81	48.4	8320G17	1	8320G49	1	6.1/F	10.6/F
1/4	1.6	.08	14	16	16	11	11	11	92	64.9	8320G182	2	--	--	17.1/F	11.6/F
1/4	2.4	.10	10	10	10	8	8	8	92	64.9	8320G184	2	8320G202	3	10.1/F	11.6/F
1/4	3.2	.21	6	6	6	4	4	4	92	64.9	8320G186	2	8320G203	3	10.1/F	11.6/F
1/4	4.4	.30	3	3	3	2	2	2	92	64.9	8320G188	2	--	--	10.1/F	11.6/F
NORMALLY OPEN (Open when de-energized)																
1/8	1.2	.05	14	14	14	14	14	14	81	48	8320G136	1	8320G146	1	6.1/F	10.6/F
1/8	1.6	.08	10	9	9	9	9	9	81	48	8320G27	1	8320G51	1	6.1/F	10.6/F
1/8	2.4	.01	7	7	7	7	7	7	81	48	8320G29	1	8320G53	1	6.1/F	10.6/F
1/8	3.2	.18	3	3	3	3	3	3	81	48	8320G31	1	8320G55	1	6.1/F	10.6/F
1/4	1.6	.08	17	17	17	11	11	11	92	65	8320G192	2	--	--	17.1/F	11.6/F
1/4	2.4	.10	10	10	10	7	7	7	92	65	8320G194	2	8320G204	3	10.1/F	11.6/F
1/4	3.2	.21	5	5	5	4	4	4	92	65	8320G196	2	8320G205	3	10.1/F	11.6/F
1/4	4.4	.30	3	3	3	2	2	2	92	65	8320G198	2	--	--	10.1/F	11.6/F
Notes: ① Supplied with cast UR disc. ② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts; the watt rating for the 9.1/F solenoid is 11.1 watts.																

Dimensions: inches (mm)

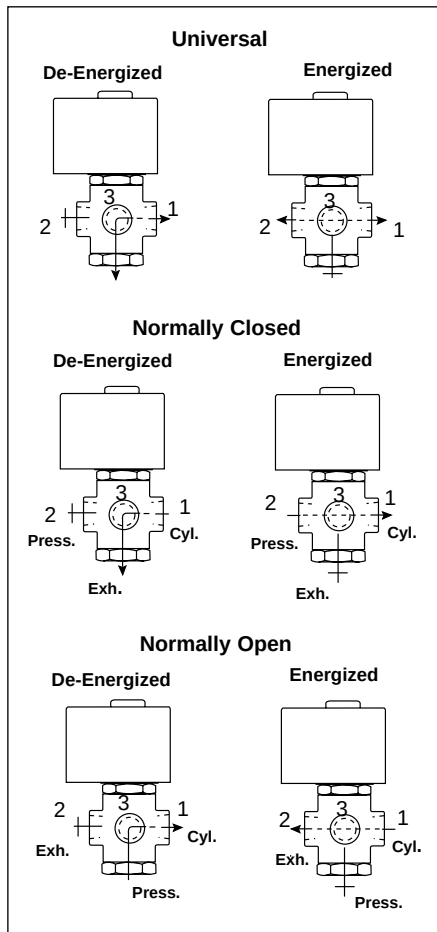
Constr. Ref. 1



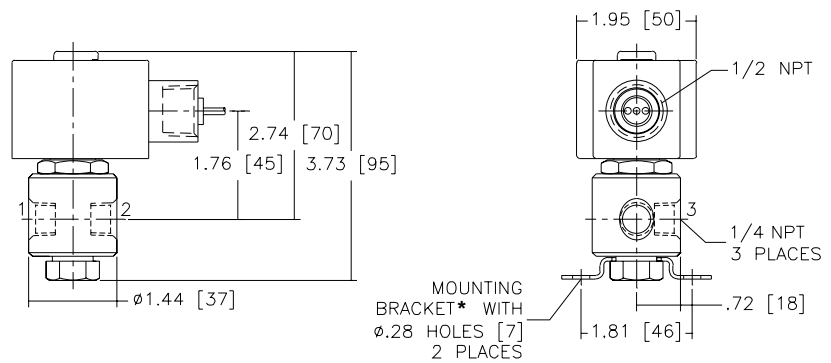
Constr. Ref. 2



FLOW DIAGRAMS



Constr. Ref. 3



*MOUNTING BRACKET IS STANDARD ON THIS CONSTRUCTION

NOTE:
Bulletin 8320 is for General Purpose Solenoid Enclosure
For Explosion Proof Solenoid Enclosure -
See Form No. V5380

Installation & Maintenance Instructions

GENERAL PURPOSE AND EXPLOSIONPROOF SOLENOIDS

SERIES

8003

Form No.V5380R9

IMPORTANT: See separate valve installation and maintenance instructions for information on: Operation, Positioning, Mounting, Cleaning, Preventive Maintenance, Causes of Improper Operation, Disassembly, and Reassembly of basic valve.

DESCRIPTION

Catalog numbers 80031 and 80032 solenoids have a Type 1, General Purpose Solenoid Enclosure. Catalog numbers EF80031, EF80032, 80033, and 80034 solenoids have an explosionproof solenoid enclosure designed to meet Enclosure Type 3—Raintight, Type 7 (C & D) Explosionproof Class I, Division 1, Groups C & D and Type 9 (E, F, & G) — Dust Ignitionproof Class II, Division 1, Groups E, F, & G, and have a temperature range code of TC3. Series 8003 solenoids (when installed as a solenoid and not as part of an ASCO valve), are supplied with a core which has a 0.250–28 UNF–2B tapped hole with 0.38 or 0.63 minimum full thread.

OPERATION

When the solenoid is energized, the core is drawn into the solenoid base sub—assembly.

IMPORTANT: When the solenoid is de—energized, the initial return force for the core, whether developed by spring, pressure, or weight must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force for AC construction is 1 lb, 5 oz, and 5 oz, for DC construction.

INSTALLATION

Check nameplate for correct catalog no., voltage, frequency, wattage, and service.

Enclosure Types 3, 4, 7, and 9

▲ CAUTION: To prevent fire or explosion, do not install solenoid enclosure where ignition temperature of hazardous atmosphere is less than 160° C. On valves used for steam service or when a class “H” solenoid is used, do not install in hazardous atmosphere where ignition temperature is less than 180° C. See nameplate for service. Open circuit before disassembling. Reassemble before operating.

When used in –40° C Ambient Temperature Applications

▲ WARNING: To prevent fire or explosion, use only conduit runs ½” in size with a sealing fitting connected within 5 feet of the solenoid enclosure.

IMPORTANT: To protect a solenoid operator or valve, install a strainer or filter, suitable for the service involved in the inlet side as close to the valve or operator as possible. Clean periodically depending on service conditions. See ASCO Series 8600, 8601 and 8602 for strainers.

Positioning

This solenoid is designed to perform properly when mounted in any position. However, for optimum life and performance, the solenoid should be mounted vertically and upright to reduce the possibility of foreign matter accumulating in the solenoid base sub—assembly area.

Wiring

Wiring must comply with local codes and the National Electrical Code. The general purpose solenoid housing has a 7/8” diameter hole to accommodate 1/2” conduit. To facilitate wiring, the general purpose solenoid enclosure may be rotated 360° by removing the retaining cap or clip.

▲ CAUTION: When metal retaining clip disengages, it will spring upward.

Rotate solenoid enclosure to desired position. Then replace retaining cap or clip before operating. On some solenoids, a grounding wire which is green or green with yellow stripes is provided. Use rigid metallic conduit to ground all enclosures not provided with a green grounding wire. For the explosionproof solenoid enclosure, electrical fittings must be approved for use in hazardous locations. The explosionproof solenoid enclosure has a 1/2” conduit connection and may be rotated 360° to facilitate wiring.

▲ WARNING: To prevent the possibility of death, serious injury or property damage, from accidental disengagement of solenoid from valve body, hold housing securely by wrenching flats while removing or replacing housing cover.

To rotate enclosure, loosen housing cover using a 1” socket wrench. Two wrenching flats are provided on the housing to hold it securely in place while the cover is being loosened or tightened. Rotate housing to desired position and replace cover before operating. Torque housing cover to 135 ± 15 in—lbs [15,3 ± 1,7 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently. To convert from one to the other, it is necessary to change the complete solenoid including the core and solenoid base sub—assembly, not just the coil. Consult ASCO.

Solenoid Enclosure Assembly

Catalog 80031 and 80032 solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid enclosure.

Catalog EF80031, EF80032, 80033, and 80034 solenoids may be assembled as a complete unit. Tightening is accomplished by means of two milled slots (wrenching flats) above the threaded area of the solenoid base sub—assembly. Use special ASCO wrench supplied (order No. K168146–1). An alternate type wrench adapter is also available which tightens the assembly by means of four (4) pin holes in the solenoid base sub—assembly. If this alternate wrench is used the solenoid must be completely disassembled, see *Coil Replacement* section.

Solenoid Temperature

Standard solenoids are supplied with coils designed for continuous duty service. When the solenoid is energized for a long period, the solenoid enclosure becomes hot and can be touched by hand only for an instant. This is a safe operating temperature. Any excessive heating will be indicated by the smoke and odor of burning coil insulation.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turn off electrical power, depressurize solenoid operator or valve, and vent fluid to a safe area before servicing.

Cleaning

All solenoid operators and valves should be cleaned periodically. The time between cleaning will vary depending on medium and service conditions. In general, if the voltage to the coil is correct, sluggish valve operation, excessive noise, or leakage will indicate that cleaning is required. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the solenoid operator or valve as free from dirt and foreign material as possible.
- While in service, the solenoid operator or valve should be operated at least once a month to ensure proper opening and closing.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. Replace any parts that are worn or damaged.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* indicates loss of power supply. Check for loose or blown fuses, open—circuited or grounded coil, broken lead wires or splice connections.
- **Burned—Out Coil:** Check for open—circuited coil. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate and as marked on the coil.
- **Low Voltage:** Check voltage across the coil leads. Voltage must be at least 85% of nameplate rating.

Coil Replacement

Solenoid Catalog Numbers 80031 and 80032

General Purpose Enclosure (Refer to Figure 1 below)

1. Disconnect coil lead wires and grounding wire if present.
2. Remove retaining cap or clip, nameplate (if present), and housing or housing with nameplate (alternate construction).

CAUTION: When metal retaining clip disengages, it will spring upward.

3. Slip spring washer, insulating washer, and coil off the solenoid base sub—assembly. Insulating washers are omitted when a molded coil is used.
4. Coil is now accessible for replacement
5. Torque housing cover to 135 ± 15 in—lbs [$15,3 \pm 1,7$ Nm].

Catalog Numbers EF80031, EF80032, 80033 and 80034

Explosionproof Solenoid Enclosure

NOTE: This solenoid has two constructions, refer to Figure 2 on page 3 for the first construction and Figure 3 on page 4 for the alternate construction.

1. Disconnect coil lead wires and grounding wire if present.

WARNING: To prevent the possibility of death, serious injury or property damage from accidental disengagement of solenoid from valve body, hold housing securely by wrenching flats while removing or replacing housing cover.

2. Unscrew housing cover using 1" socket wrench. Two wrenching flats are provided to hold the housing securely in place while the cover is being removed or replaced.
3. Remove take—up spring, flux washer, insulating washer, coil and insulating washer. For the alternate construction, slide retaining cup sideways to disengage it from the top of the solenoid base sub—assembly. Then remove yoke, spring washer, insulating washer, coil and insulating washer. Insulating washers are omitted when a molded coil is used.
4. Reassemble solenoid according to exploded view. Before reassembly, refer to NOTE following for cleaning and greasing requirements.
5. Torque housing cover to 135 ± 15 in—lbs [$15,3 \pm 1,7$ Nm].

CAUTION: Solenoid must be fully reassembled because the housing and internal parts complete the magnetic circuit. Be sure to replace an insulating washer at each end of non—molded coil.

NOTE: Solenoid Catalog Nos. EF80031, EF80032, 80033, and 80034, —Installation and maintenance of explosionproof equipment requires more than ordinary care to ensure safe performance. All finished surfaces of the solenoid are constructed to provide flame—proof seal. Be sure that the surfaces are wiped clean before reassembling. Grease the explosionproof solenoid enclosure with DOW CORNING® 111 Compound lubricant or an equivalent high—grade silicone grease. Grease all joints thoroughly including the underside of the solenoid base sub—assembly flange and internal threads of the housing cover.

Part Name	Torque Value in Inch—Pounds	Torque Value in Newton—Meters
Solenoid Base Sub—Assembly	175 ± 25	$19,8 \pm 2,8$

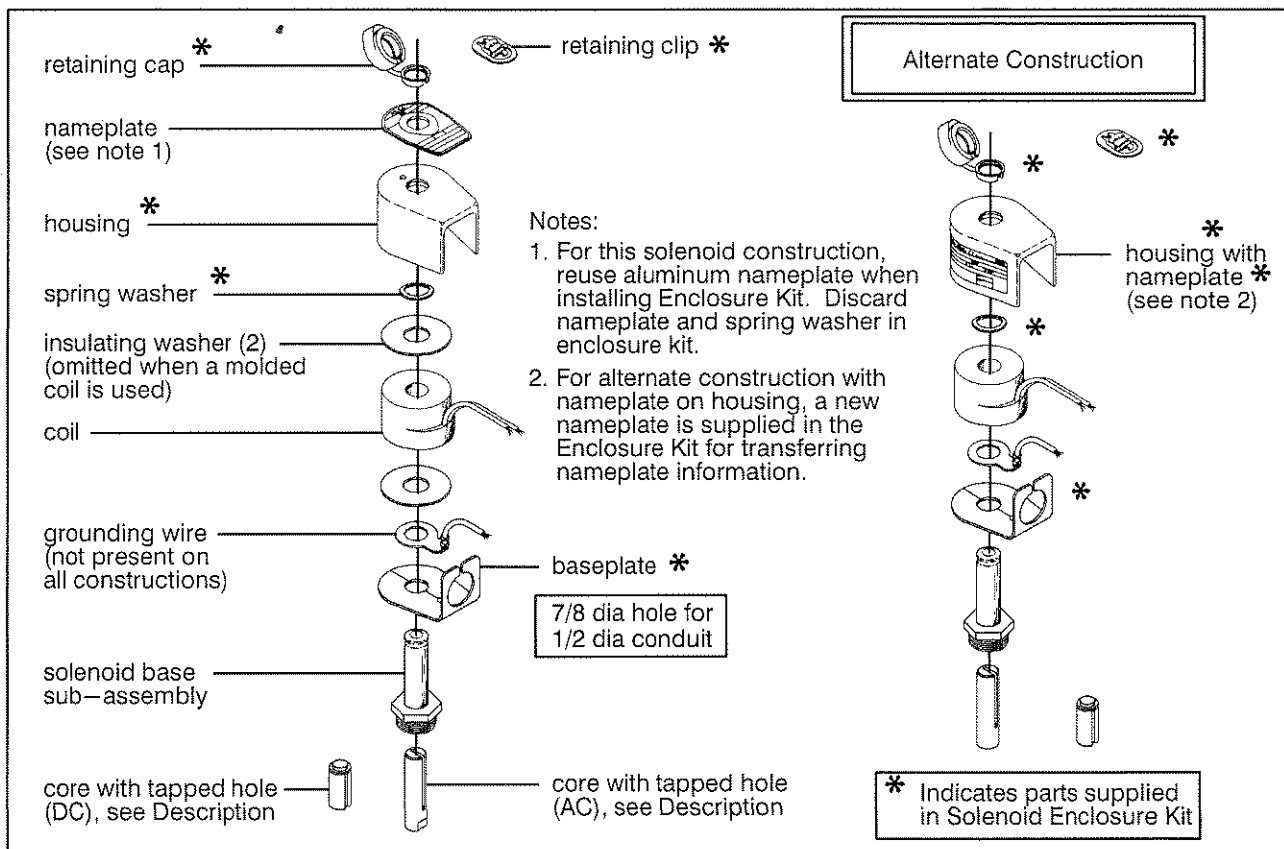


Figure 1, Catalog Nos. 80031 and 80032 General Purpose Solenoid Enclosure.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
Solenoid Base Sub-Assembly	175 ± 25	19,8 ± 2,8
Housing Cover	135 ± 15	15,3 ± 1,7

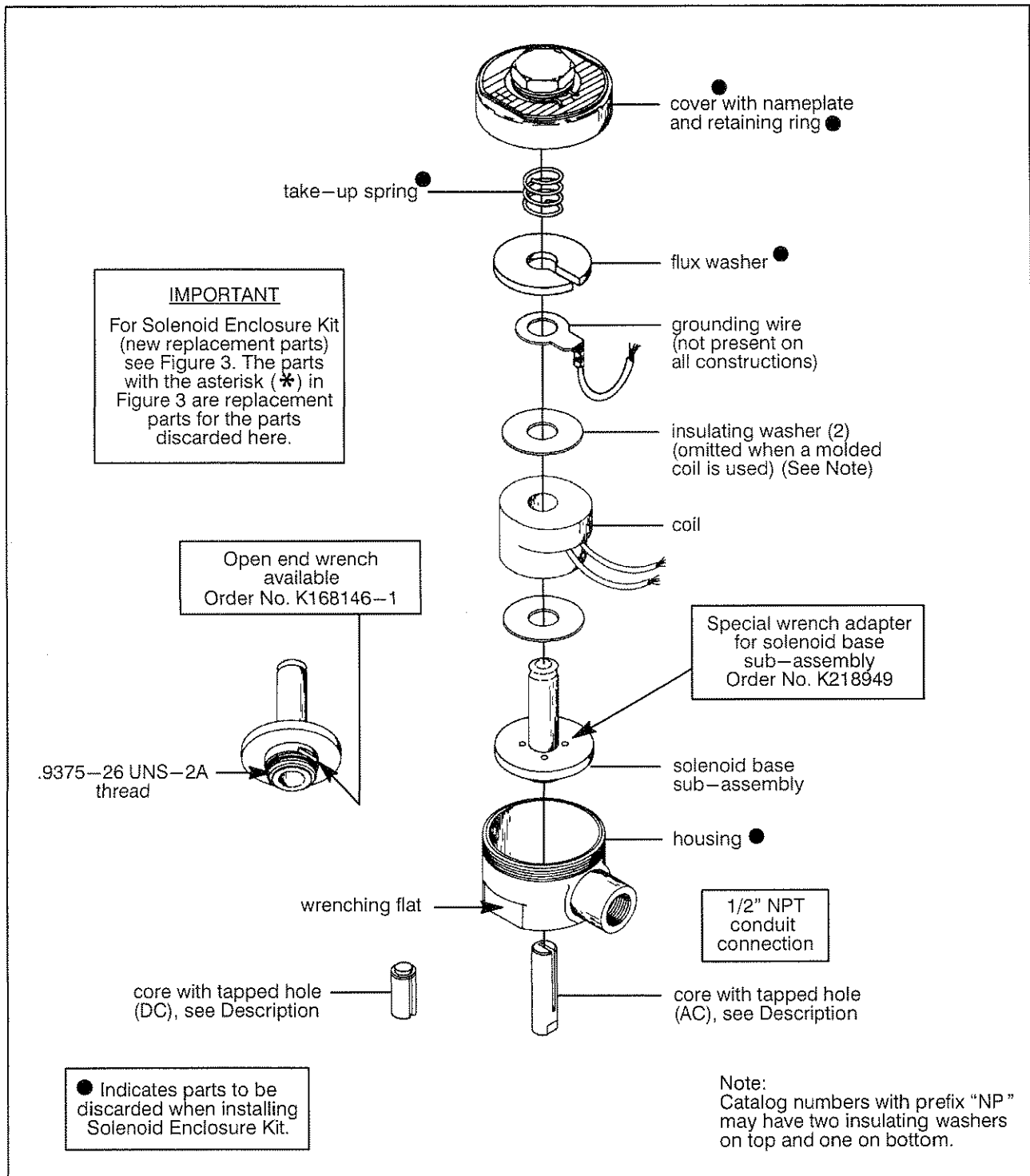


Figure 2. Catalog Nos. EF80031, EF80032 80033 and 80034 Explosionproof Solenoid Enclosure.

Torque Chart

Part Name	Torque Value in Inch—Pounds	Torque Value in Newton—Meters
Solenoid Base Sub—Assembly	175 ± 25	19,8 ± 2,8
Housing Cover	135 ± 15	15,3 ± 1,7

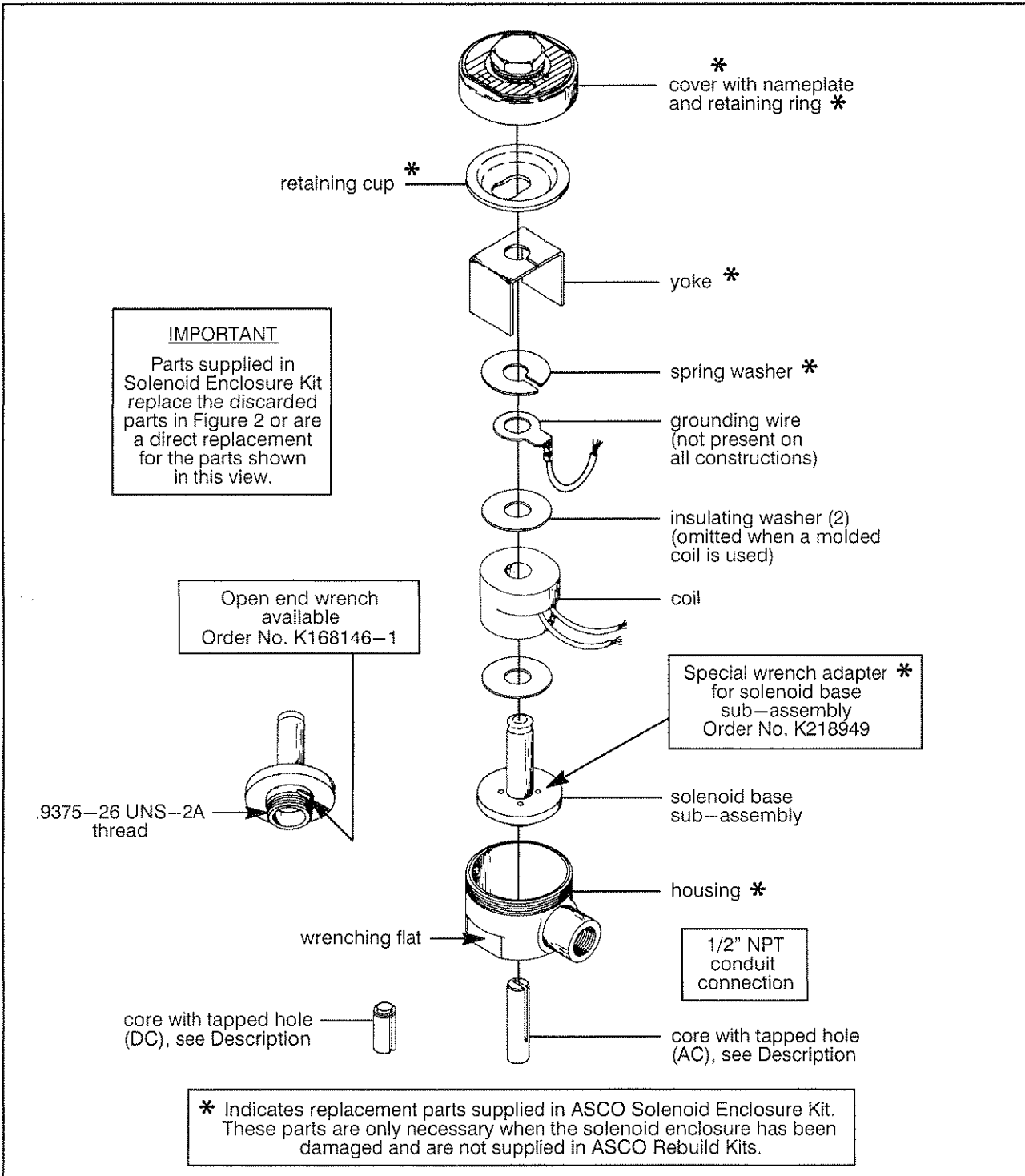


Figure 3. Catalog Nos. EF80031, EF80032, 80033 and 80034 Alternate Construction
Explosionproof Solenoid Enclosure.

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