ANGI Electronic Priority Panel With ESD

Operator & Maintenance Manual

K01-11-100

REV. 01

15 Plumb Street, Milton, Wisconsin 53563 USA • Tel 800 955 4626 Fax 608 868 2723 • E-mail sales@angienergy.com • www.angienergy.com

Table of Contents

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.
305 W. Delavan Dr.
Janesville, WI, USA 53546

Phone: 608-563-2800
Fax: 608-531-2635
E-mail: service@angienergy.com
Website: www.angienergy.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 that 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

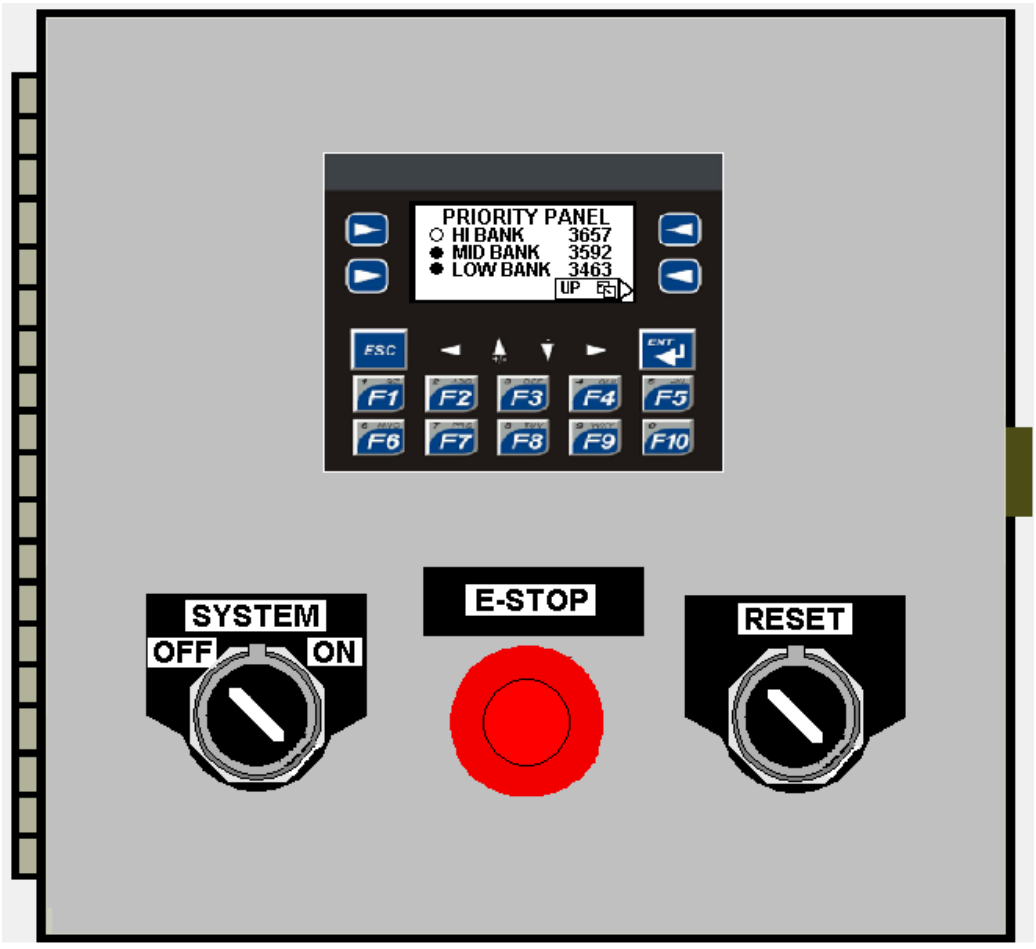


TABLE OF CONTENTS

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

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.

1. INTRODUCTION

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

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.

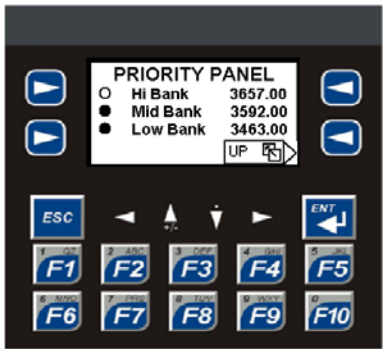
2.5. Faulted
During any of the modes of operations, the control system may detect a shutdown condition and the controller will be placed in FAULTED mode. The fault code and type of alarm are displayed on the OCS Alarm Screen.

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.

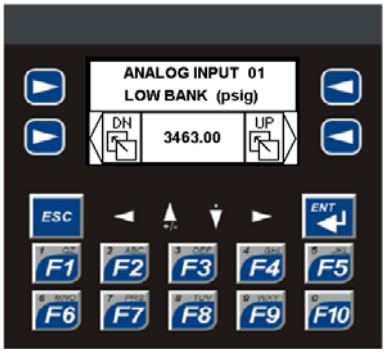
MAIN – SCREEN #1



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).

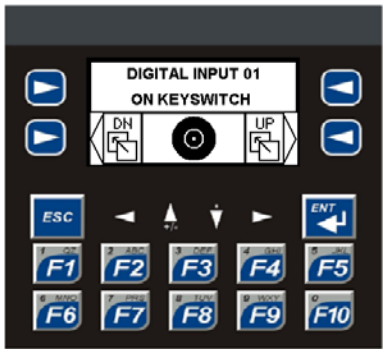
ANALOG MONITOR – SCREENS #2 – 5

AI01 to AI04



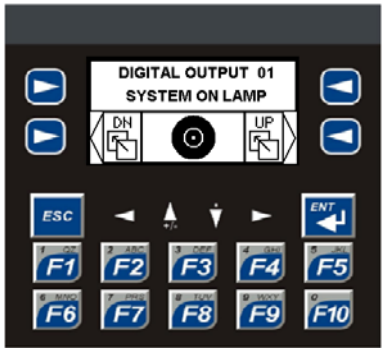
The Analog Inputs monitor in engineering units. The inputs are configured 0 to 20 mA signal = 0 to 32000 count. The count is scaled and displayed to their respective engineering units. Refer to ANGI P&ID drawings for proper transducer scaling.

DIGITAL INPUTS - SCREENS #6 - 12
I01 to I08



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.

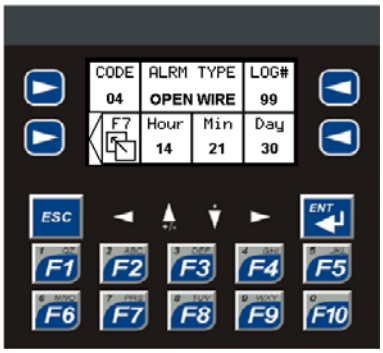
DIGITAL OUPUTS SCREEN #14 - 19
Q01 to Q24



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 I06 – I08
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 I06 – I08
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)

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

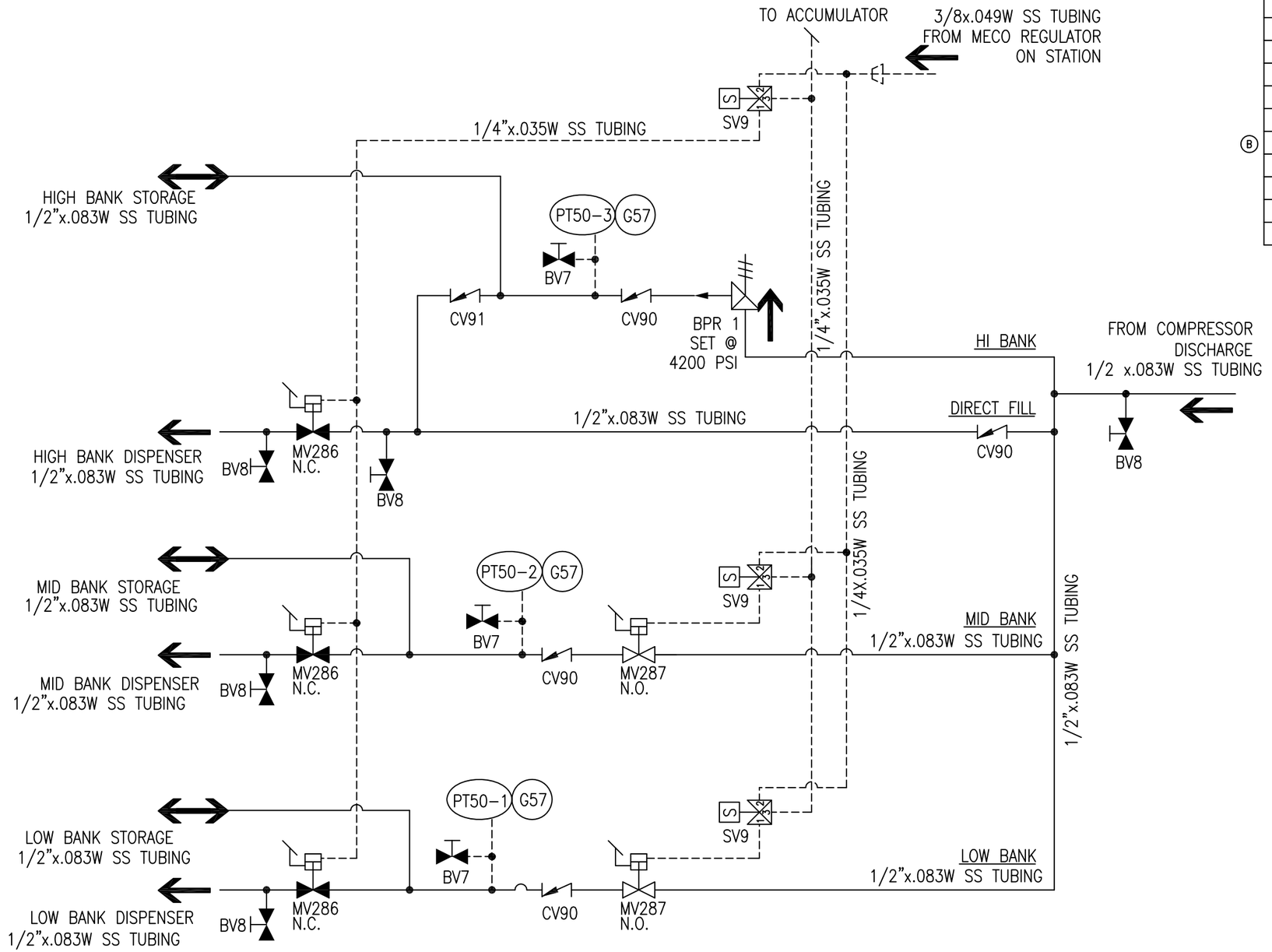
6. TROUBLESHOOTING

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.



DESIGNATOR	PART NUMBER	DESCRIPTION
BPR 1	331-07289	REG-BACK PRESSURE 5000# 1/2 NPT CIRCLE SEAL
BV 7	330-07281	VALVE-PURGE 1/4 MNPT 6000# SS
BV 8	330-07312	VALVE-PURGE 1/4-20MSAE 6000# SS
CV 90	336-07319	VALVE-CHECK HOKE 1/2 FSAE (3/4-16FSAE/SAE-8)
CV 91	336-07320	VALVE-CHECK HOKE 3/4 FSAE(1-1/16-12FSAE/SAE-12)
G 57	741-07289	GAUGE-PRES 10,000#/B BM PM GF WIKA
Ⓑ		
MV 286	334-07496	VALVE/ACT-ASSY SVF SAE-8 F.P. 6000# N.C.
MV 287	334-07497	VALVE/ACT-ASSY SVF SAE-8 F.P. 6000# N.O
PT 50	410-07282	TRANSD-AST 0-6000# IS/UL CL1 DIV2
SV 9	330-07243	VALVE-SOLENOID 3WY 1/4 150# 120V NC BRS UL

REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION
B	4/10/12 HMR	REMOVED BLEED BACK LINE SEE ECN #120410-02			
A	3/22/12 HMR	ADDED UNION FOR BETTER CONNECTION SEE ECN #120322-02			

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

UNLESS OTHERWISE SPECIFIED

BREAK SHARP EDGES

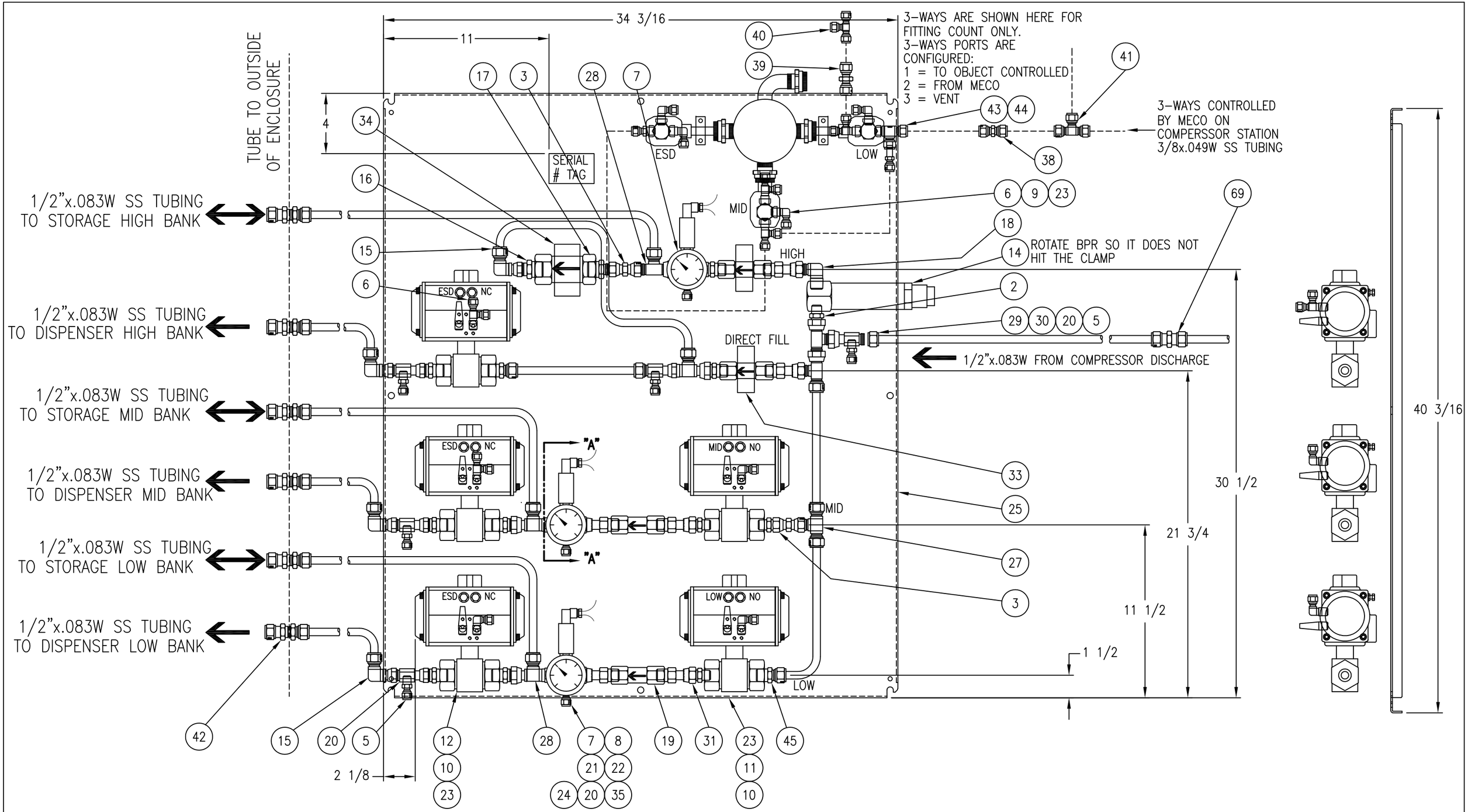
ALL DIMENSIONS IN INCHES

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

TITLE PRIORITY PANEL – ELECTRONIC 1/2", REMOTE CONTROLS MOUNTED INSIDE STATION, W/SAE CVS & SAE ACT VLVS, NO ISO VLVS, NO MECO, P&ID

CUSTOMER		PROJECT NO.	
SHEET 1/4	SCALE 1:6	DRAWING NO. K01-11-100	REV. B
DRAWN BY HMR/JMP	DATE 12/1/11		

WINDCHILL



REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION
B	4/10/12 HMR	REMOVED BLEED BACK LINE SEE ECN #120410-02			
A	3/22/12 HMR	ADDED UNION FOR BETTER CONNECTION SEE ECN #120322-02			

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

UNLESS OTHERWISE SPECIFIED

BREAK SHARP EDGES

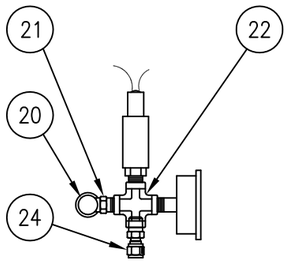
ALL DIMENSIONS IN INCHES

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

TITLE PRIORITY PANEL – ELECTRONIC 1/2, REMOTE CONTROLS MOUNTED INSIDE STATION,W/SAE CVS & SAE ACT VLVS,NO ISO VLVS,NO MECO,EQUIP LAYOUT

CUSTOMER		PROJECT NO.	
SHEET 2/4	SCALE 1:6	DRAWING NO. K01-11-100	REV. B
DRAWN BY HMR/JMP	DATE 12/1/11		

WINDCHILL



VIEW "A–A"

NO.	QTY.	PART NUMBER	DESCRIPTION	LENGTH
48	1	FC(791–02086)	DECAL–PRIORITY PANEL	–
49	1	FC(791–07443)	DECAL–POWER WIRE 1/2X2	–
50	2	FC(791–07442)	DECAL–STORAGE LOW 1/2x3	–
51	2	FC(791–07441)	DECAL–STORAGE MID 1/2x3	–
52	2	FC(791–07440)	DECAL–STORAGE HIGH 1/2x3	–
53	2	FC(791–07439)	DECAL–DISPENSER LOW 1/2x3	–
54	2	FC(791–07438)	DECAL–DISPENSER MID 1/2x3	–
55	1	FC(791–07437)	DECAL–DISPENSER HIGH 1/2x3	–
56	1	FC(791–02079)	DECAL–LOW BANK 1/2x3 BLK/WHT	–
57	1	FC(791–02080)	DECAL–MID BANK 1/2x3 BLK/WHT	–
58	1	FC(791–02077)	DECAL–HIGH BANK 1/2x3 BLK/WHT	–
59	3	FC(384–01422)	NIPPLE–ELEC 1/2xCL	–
60	4	FC(340–02371)	UNION–ELEC 1/2 MLxFML	–
61	2	FC(404–02168)	SEAL OFF–3/4 MLxFML	–
62	2	FC(340–02372)	UNION–ELEC 3/4 FML	–
63	2	FC(391–00304)	BUSHING–ELEC 3/4x1/2	–
64	3	FC(384–03264)	NIPPLE–ELEC 1/2x3	–
65	1	FC(321–00581)	COUPLER–THRD ELEC 1/2	–
66	2	FC(384–02564)	NIPPLE–ELEC 3/4x6	–
67	4	FC(450–07251)	GRIP CORD–1/2" .125/.187	–
68	5	865–07594	BRACKET ASSY–SVF 1/2&SAE HBEV VALVE	
(A) 69	1	340–07255	UNION–1/2" SEAL LOK 9200#	
70				

	NO.	QTY.	PART NUMBER	DESCRIPTION	LENGTH
(B)	1				
	2	1	353–07280	CONN–MNPT 1/2x1/2 SEAL LOK	
	3	2	340–07251	UNION–SWVL 1/2 SEAL LOK	
	4	1	051–07131	STEEL–TUBE SMLS 316 1/2x.083W	240.00
(B)	5	5	330–07312	VALVE–PURGE 1/4–20MSAE 6000#(BV8)	
	6	5	301–02191	TEE–MALE RUN 1/4x1/4 SS GYRO	
	7	3	741–07289	GAUGE–PRES 10,000#/B BM PM GF (G57)	
	8	3	410–07282	TRANSD–AST 0–6000# IS/UL CL1 DIV2 (PT50)	
	9	3	330–07243	VALVE–SOL 3WY 1/4 150# 120V NC (SV 9)	
	10	5	700–07263	MUFFLER–BREATHER VENT 1/4 BRASS FLUSH	
	11	2	334–07497	VALVE/ACT–ASSY SVF SAE–8 F.P. N.O (MV287)	
	12	3	334–07496	VALVE/ACT–ASSY SVF SAE–8 F.P. N.C (MV286)	
(B)	13	1	353–00545	CONN–MNPT 1/4x1/4 SS GYRO	
	14	1	331–07289	REG–BACK PRESSURE 5000# 1/2FNPT CS (BPR 1)	
	15	4	372–07274	ELBOW–SWVLNUT 1/2 SEAL LOK	
	16	2	353–07366	CONN–MSAE 1/2x1–1/16–12 SEAL LOK 6000#	
	17	1	336–07320	VALVE–CHECK HOKE 3/4 FSAE (CV91)	
	18	1	372–07247	ELBOW–MNPT 1/2x1/2 SEAL LOK	
	19	4	336–07319	VALVE–CHECK HOKE 1/2 FSAE (CV90)	
	20	8	350–07265	CONN–SWVL 1/2 SEAL LOK PORT	
	21	3	303–07292	ADAPTER–7/16–20MSAEx1/4MNPT STL	
	22	3	301–00873	CROSS–1/4 7000#	
	23	7	372–00707	ELBOW–MNPT 1/4x1/4 SS GYRO	
(B)	24	3	330–07281	VALVE–PURGE 1/4 FML 6000 C.S. (BV7)	
	25	1	400–07554	PANEL–FOR 42x36 HOFFMAN CONCEPT ENCL	
	26	1	051–02332	STEEL–TUBE SMLS 316 1/4x.035W	120.00
	27	1	301–07283	TEE–ALL TUBE 1/2 SEAL LOK	
	28	6	301–07306	TEE–SWVLNUT RUN 1/2 SEAL LOK	
(A)	29	18	220–07239	NUT–SEAL LOK 1/2	
(A)	30	18	300–07399	SLEEVE–PARAFLANGE 1/2 SS SEAL LOK	
	31	6	353–07336	CONN–SWVL 1/2x3/4–16MSAE SEAL LOK	
(B)	32				
REAM LARGER TO FIT PROPERLY	33	2	750–07281	CLAMP–PIPE 1 PP RAIL STAUFF	
REAM LARGER TO FIT PROPERLY	34	1	750–07289	CLAMP–PIPE 11/2 PP RAIL STAUFF	
(B)	35				
	36	1	751–07275	RAIL–STAUFF CLAMPS	16.00
(B)	37				
	38	1	342–02342	UNION–3/8 SS GYRO	
	39	1	342–02339	UNION–1/4 SS GYRO	
	40	1	301–00720	TEE–ALL TUBE 1/4 SS GYRO	
	41	1	301–02194	TEE–ALL TUBE 3/8" SS GYRO	
	42	6	342–04504	UNION–BLKHD 1/2SS GYRO	
	43	1	304–01647	REDUCER–1/4Tx3/8T SS GYRO	
	44	1	301–07277	TEE–MALE RUN 3/8x1/4 SS GYRO	
	45	12	353–07278	CONN–MSAE 1/2x3/4–16 SEAL LOK 9200#	
	46	1	B01–83–025	SUPPORT FOR PP 34x40 PANEL	
	47	2	865–07536	BRACKET–STRUT, RIGHT ANGLE, NG300	

REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION
B	4/10/12 HMR	REMOVED BLEED BACK LINE SEE ECN #120410–02			
A	3/22/12 HMR	ADDED UNION FOR BETTER CONNECTION SEE ECN #120322–02			

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

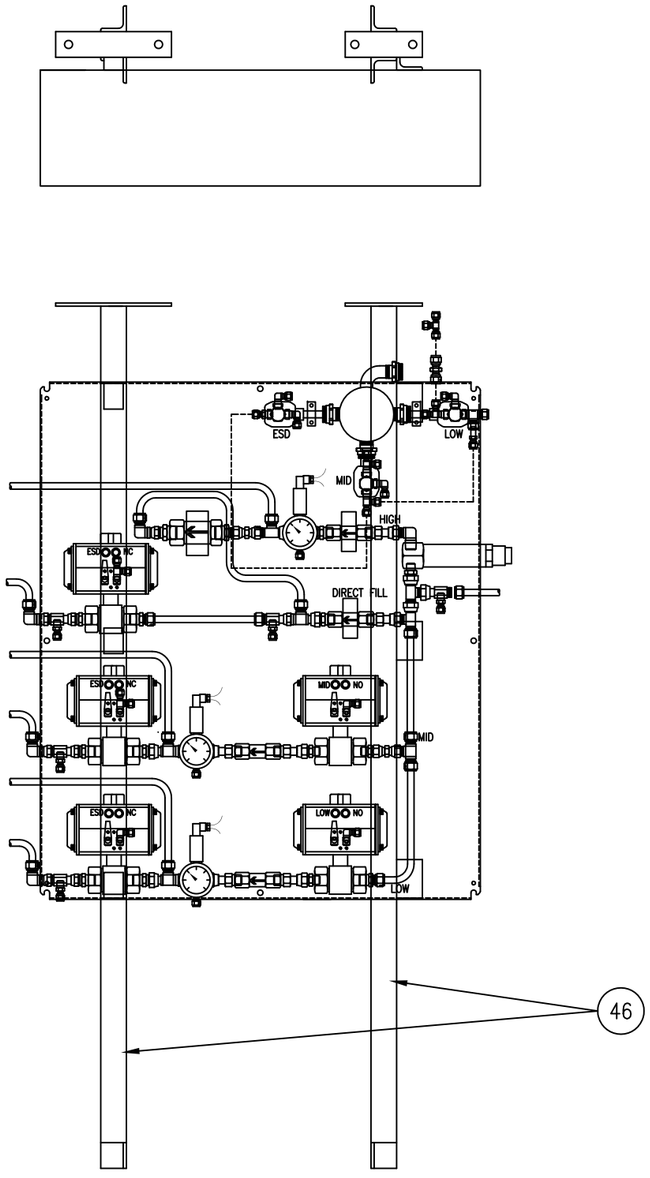
UNLESS OTHERWISE SPECIFIED
BREAK SHARP EDGES
ALL DIMENSIONS IN INCHES

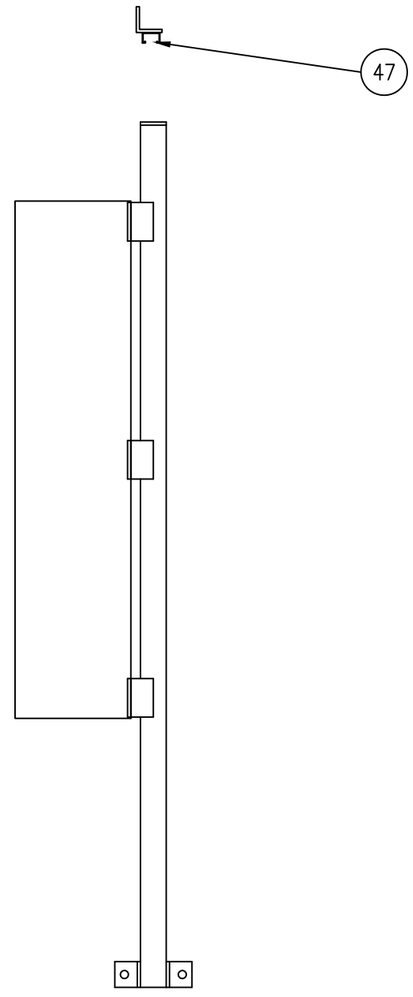
FRACTIONAL	±.125
TWO PLACE DECIMAL	±.010
THREE PLACE DECIMAL	±.005
ANGLES	±1°

TITLE PRIORITY PANEL – ELECTRONIC 1/2, REMOTE CONTROLS MOUNTED INSIDE STATION, W/SAE CVS & SAE ACT VLVS, NO ISO VLVS, NO MECO, BOM

CUSTOMER		PROJECT NO.	
SHEET 3/4	SCALE 1:6	DRAWING NO. K01–11–100	REV. B
DRAWN BY HMR/JMP	DATE 12/1/11		

WINDCHILL





REV	DATE/BY	DESCRIPTION	REV	DATE/BY	DESCRIPTION
B	4/10/12 HMR	REMOVED BLEED BACK LINE SEE ECN #120410-02			
A	3/22/12 HMR	ADDED UNION FOR BETTER CONNECTION SEE ECN #120322-02			

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

UNLESS OTHERWISE SPECIFIED

BREAK SHARP EDGES

ALL DIMENSIONS IN INCHES

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

TITLE PRIORITY PANEL – ELECTRONIC 1/2, REMOTE CONTROLS MOUNTED INSIDE STATION, W/SAE CVS & SAE ACT VLVS, NO ISO VLVS, NO MECO

CUSTOMER		PROJECT NO.	
SHEET 4/4	SCALE 1:12	DRAWING NO. K01-11-100	REV. B
DRAWN BY HMR/JMP	DATE 12/1/11		

WINDCHILL

BPR 2

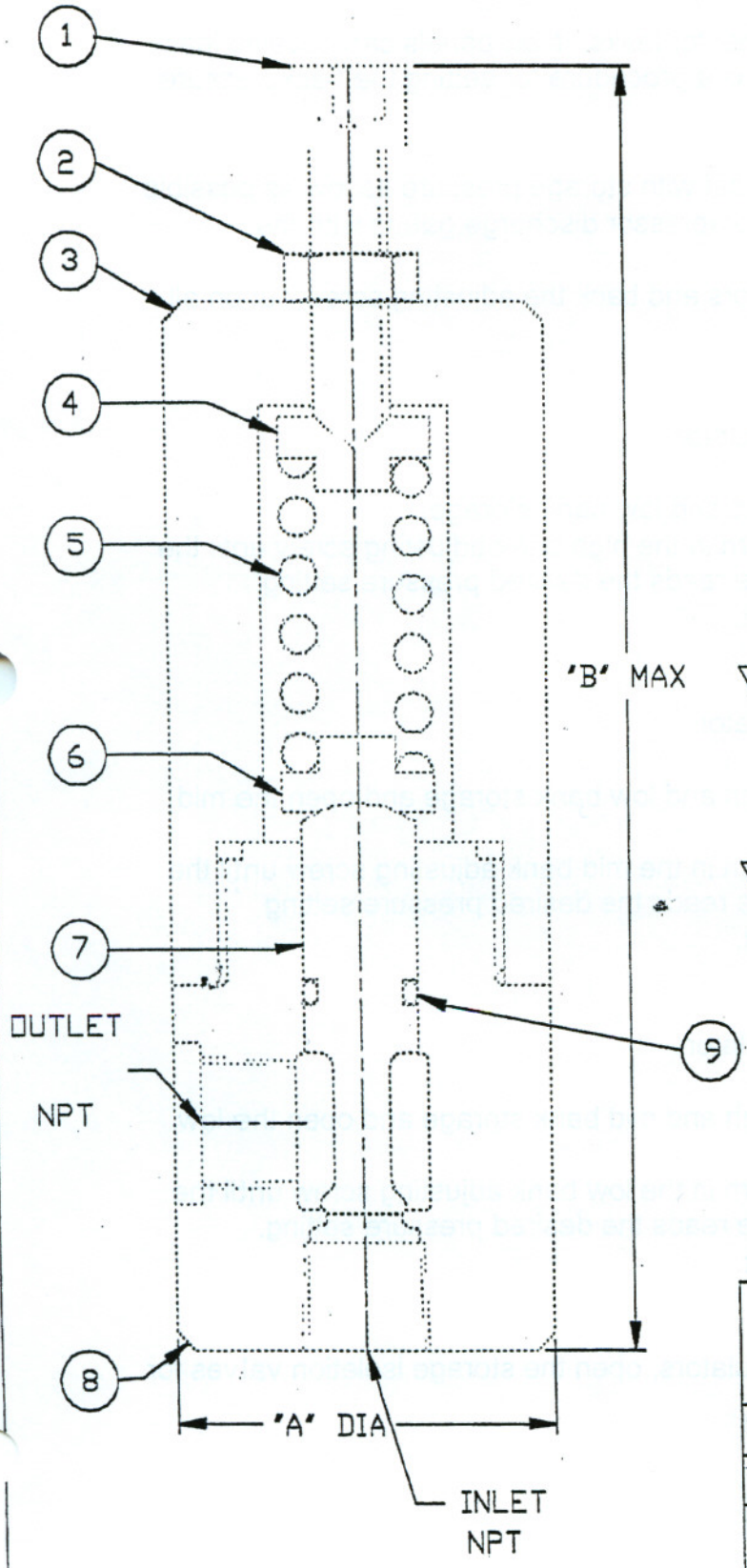
STRAVAL
3/4”BP01207T-N2277
3/4”, 5000 PSI BACK PRESSURE REGULATOR

ANGI PART NUMBER 990-07235

REPLACEMENT O’RING-1/2 VITON, 95 DURO – 710-07541

REBUILD KIT-STRAVAL 3/4 - 762-07231

THIS PAGE LEFT INTENTIONALLY BLANK



MATERIAL LIST & SPECIFICATION

1	ADJUSTING SCREW	STEEL
2	LOCK NUT	STEEL
3	SPRING CHAMBER	STEEL
4	SPRING PUSHER	STEEL
5	ADJUSTING SPRING	STEEL
6	SPRING CARRIER	STEEL
7	POPPET	ST. STEEL
8	BODY	ST. STEEL
9	O RING	VITON

DIMENSIONS

SIZE	A (IN)	B (IN)	STRAVAL SPEC#
3/8	1 3/4	6 1/2	BP00503T-SS
1/2	2 1/4	9 5/8	BP01905T-SS
3/4	2 1/2	8 1/2	BP01207T-SS
1	3	10 3/4	BP00510T-SS

(A) BP1905T-SS WAS BP1705T-SS 6-28-01

MAX INLET PRESSURE 5000 PSI

FOR ANGI INTERNATIONAL

STRA-VAL

1000 MAIN AVE, CLIFTON, NEW JERSEY

MATL: SEE ABOVE	TITLE: BACK PRESS RELIEF VALVE SS 3/8"-1" NPT MODEL BPS-05
SCALE: NONE	
DATE: 9-11-00	DWG NO: BPS05-ANGI
DRWN: EDS	REV: A

Back Pressure Regulator
Set-up and Operational Adjustments

It is important to periodically check the panel for leaks. New panels can develop leaks in shipping and installation. The following is a procedure for setting the backpressure regulators:

- Backpressure regulators should be set with storage pressure as low as possible.
- Read the pressure settings at the compressor discharge gauge with the compressor running.
- Loosen the lock nuts on the regulators and back the adjusting screw out on all three back pressure regulators.

To set the HIGH BANK back pressure regulator:

- Close the isolation valves on the mid and low bank storage.
- While the compressor is running, turn in the high bank adjusting screw until the compressor final discharge pressure reads the desired pressure setting.
- Tighten the adjusting screw lock nut.

To set the MID BANK back pressure regulator:

- Close the isolation valves on the high and low bank storage and open the mid bank isolation valve.
- While the compressor is running, turn in the mid bank adjusting screw until the compressor final discharge pressure reads the desired pressure setting.
- Tighten the adjusting screw lock nut.

To set the LOW BANK back pressure regulator:

- Close the isolation valves on the high and mid bank storage and open the low bank isolation valve.
- While the compressor is running, turn in the low bank adjusting screw until the compressor final discharge pressure reads the desired pressure setting.
- Tighten the adjusting screw lock nut.

Following set-up for the back pressure regulators, open the storage isolation valves for normal operation.

Procedure for Reassembly and Test

When all the valve parts are cleaned and inspected, the valve can be reassembled in reverse order. Make sure a valve seal lubricant is used to lubricate the seal and is compatible with the elastomer used. Make sure no dirt or foreign particles are embedded in the valve seat, which might cause the valve seat to stay partially open and cause unwanted leakage. When the spring and spring hardware is assembled and the spring chamber threaded on to the body tightly, the valve is ready for final installation and test.

Testing should be done with the valve completely piped up with the discharged piped safely away. At the proper system over pressure, turn the adjusting screw until the valve begins to open. Next reduce the system pressure to the normal operating pressure and check to see if the valve reseats properly and shuts off.

If it is not possible to change the system pressure to an overpressure condition, at which point the valve must open, then the valve must be tested and set off line using a hydrostatic testing device.

Procedure for Disassembly

Make sure the valve is isolated and is not under pressure. Next remove the valve from the system. Back out the spring adjusting screw until there is no longer any spring compression. It may also be removed completely if desired. Unscrew the spring chamber using the flats provided on top of the spring chamber.

Now the top of the poppet is exposed. While still assembled, test to see if the poppet is free to move by hand. There should only be a slight resistance to movement resulting from the O-ring friction between the piston and the body. The piston can now be pulled out through the top of the body. Examine the O-ring or seal to see if any deterioration has taken place and replace if necessary. Next examine the poppet seating surface where it contacts the body and the mating surface on the body. Usually if there is severe leakage, the condition of these seating surfaces will indicate a worn or deteriorated surface finish. If the seat leakage is only minor, a re-lapping procedure using a #600 lapping compound will usually solve the problem.

Examine the body bore where the piston or poppet is housed. If the surface is not smooth, the bore should be polished with a very fine abrasive paper or fine scotch brite. The same should be done with the piston or poppet outside diameter. These operations can be done in a small lathe. Use extreme caution when polishing the body so as not to get a finger caught in the discharge port if the body is rotating in a lathe while polishing.

If the valve body and poppet require re-matching from extreme wear or corrosion, use only an experienced tool room machinist to perform this operation on a precision lathe, as the parts must be completely concentric to within .001 TIR. If this is not done properly, the valve will not seat properly and it may not even be possible to lap the valve in. If the bore requires re-matching, there is a risk that too much clearance will result in the seat not closing properly because of excessive side movement. Ordinarily the side clearance between the piston and body bore should only be about 0.001 to 0.0025 in depending on the size. Consult factory for proper clearances for your specific valve.

If the valve is severely damaged and if it is not practical to re-machine because side clearances would be excessive, then a new valve should be purchased, or the valve shipped to STRA-VAL for a repair evaluation, and possible repair or replacement.

Don't forget to examine the adjusting spring to look for signs of corrosion or outright failure. Replace if necessary. Springs are usually always in stock at STRA-VAL and can be shipped readily.

BV 7

HOKE
6610M4Y

PURGE VALVE – ¼” MNPT 6000 PSI STAINLESS STEEL

ANGI PART NUMBER - 330-07281

NO REBUILD KIT AVAILABLE

THIS PAGE LEFT INTENTIONALLY BLANK

6600 SERIES BLEED VALVE

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

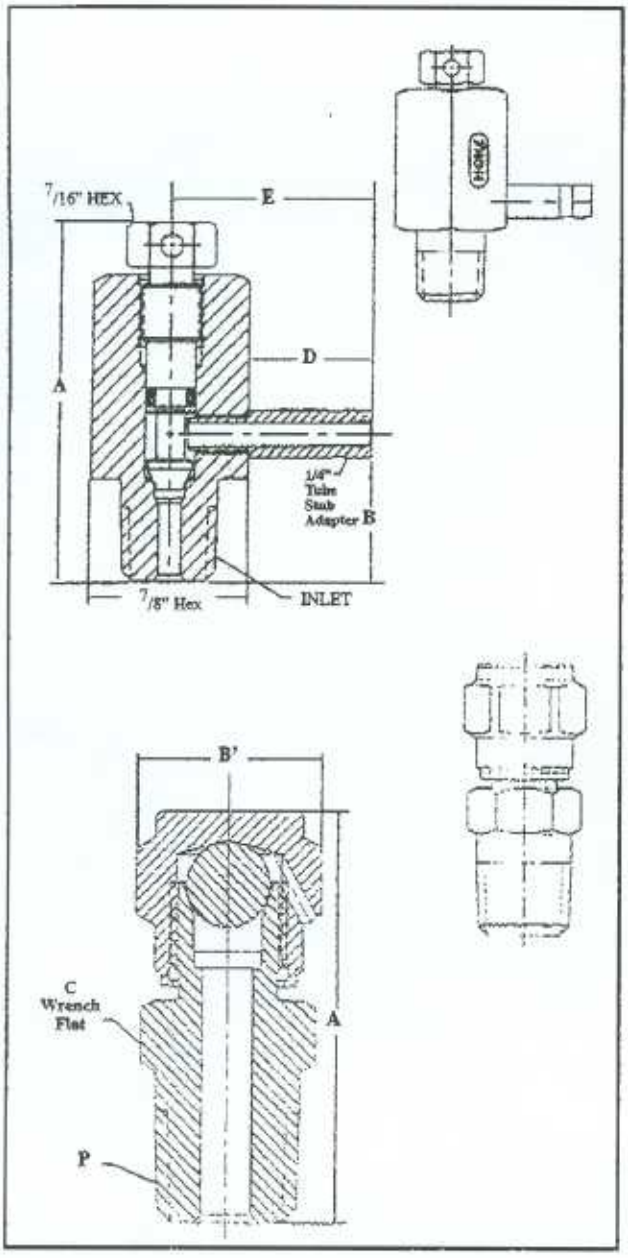
Operation Instructions: (For all but the 6631 Series Valves)

- 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 31-Directed 60-Elbow 70-Union 80-Tee	G-Gyrolok H-Male NPT x Tube Stub M-Male NPT	4-1/4 in. 6-3/8 in. 8-1/2 in.	Y-316SS



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	E
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

THIS PAGE LEFT INTENTIONALLY BLANK

6600 SERIES BLEED VALVE

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

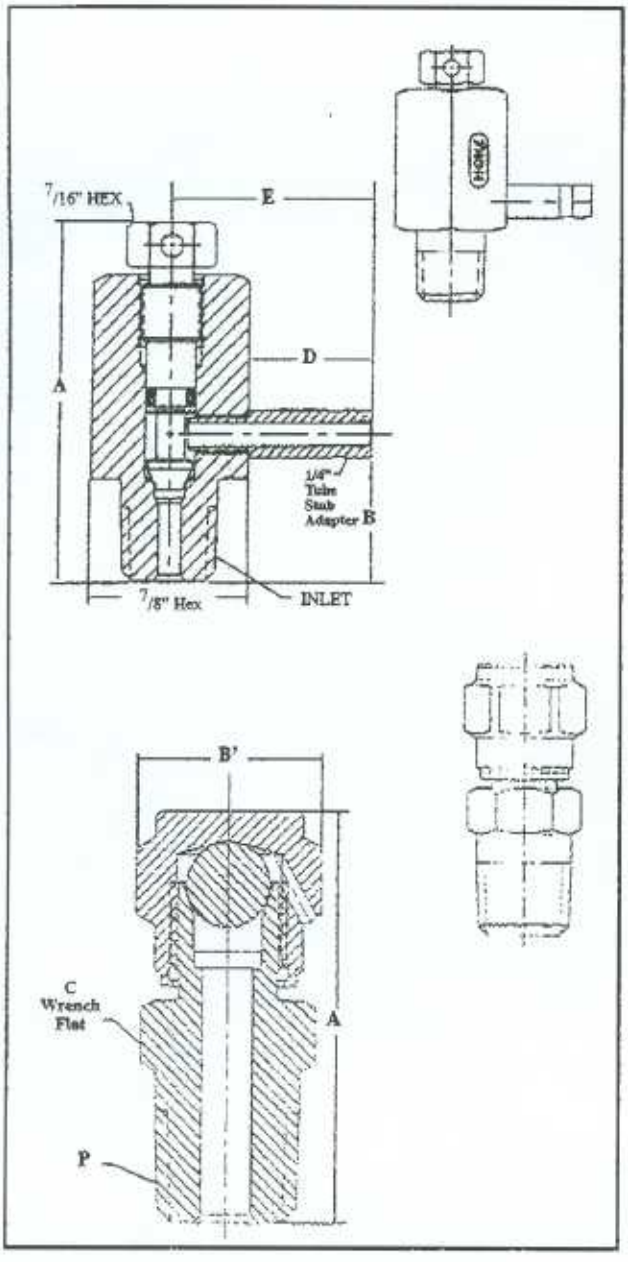
Operation Instructions: (For all but the 6631 Series Valves)

- 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 31-Directed 60-Elbow 70-Union 80-Tee	G-Gyrolok H-Male NPT x Tube Stub M-Male NPT	4-1/4 in. 6-3/8 in. 8-1/2 in.	Y-316SS



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	E
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

HOKE

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

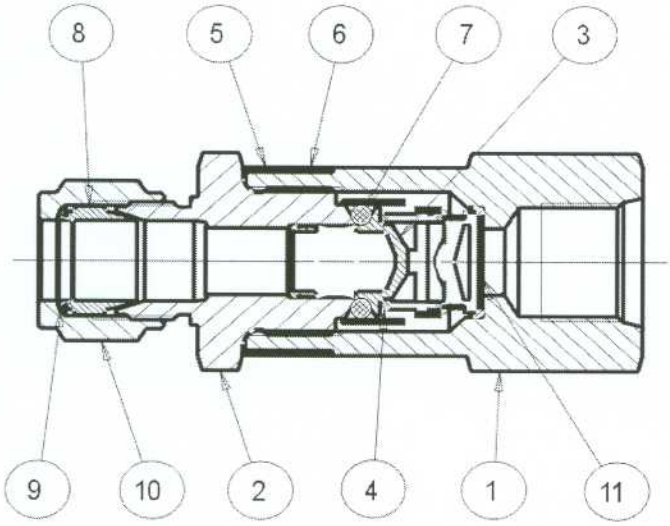
Flow Chart

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

Materials of Construction

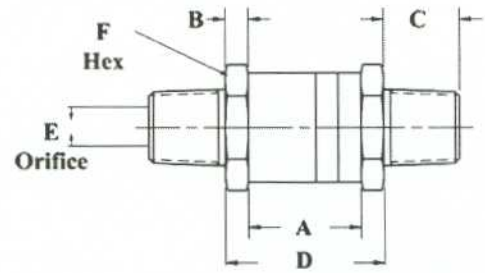
Item	Part	Standard Materials (others on request)
1.	Body* (outlet)	316 stainless steel
2.	End Adapter* (inlet)	316 stainless steel
3.	Poppet*	316 stainless steel
4.	Spring*	302 stainless steel
5.	Part Number Band	Anodized Aluminum
6.	O-ring Band	Anodized Aluminum
7.	O-ring*	Viton®
8.	Front Ferrule*	316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

*Wetted component



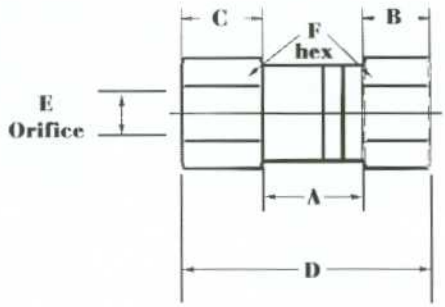
CVH Series Check Valves

Charts of Dimensions



Male NPT

	Size	A	B	C	D	E	F
Fractional (Inches)	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

	Size	A	B Inlet	C Outlet	D	E	F
Fractional (Inches)	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"
- **04** 4mm, 1/4"
- **06** 6mm, 3/8"
- **08** 8mm, 1/2"
- **10** 10mm
- **12** 12mm, 3/4"
- **14** 14mm
- **16** 16mm, 1"
- **18** 18mm
- **22** 22mm
- **25** 25mm

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

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

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)

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

(others available on request)

Band Options
- **A** Aluminum Bands (std.)
- **Y** Stainless Steel Bands

Cleaning Options
- **O** Standard
- **B** Industrial Cleaning
- **C** Cyrogenic Cleaning
- **D** NACE Compliant

Hoke

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

HOKE

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

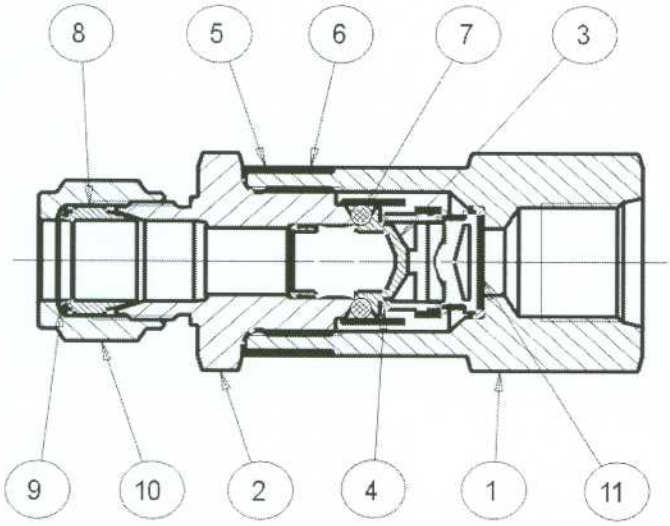
Flow Chart

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

Materials of Construction

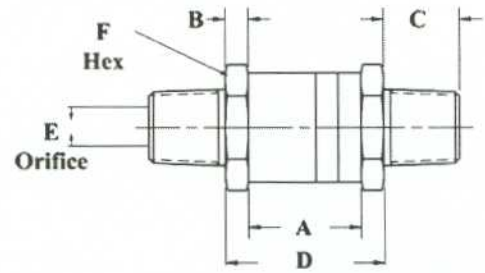
Item	Part	Standard Materials (others on request)
1.	Body* (outlet)	316 stainless steel
2.	End Adapter* (inlet)	316 stainless steel
3.	Poppet*	316 stainless steel
4.	Spring*	302 stainless steel
5.	Part Number Band	Anodized Aluminum
6.	O-ring Band	Anodized Aluminum
7.	O-ring*	Viton®
8.	Front Ferrule*	316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

*Wetted component



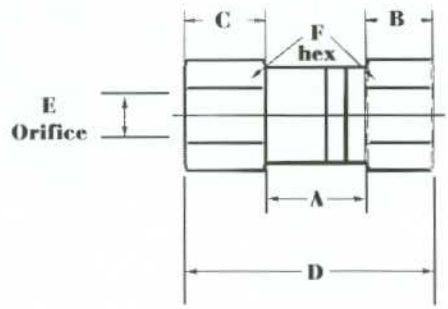
CVH Series Check Valves

Charts of Dimensions



Male NPT

	Size	A	B	C	D	E	F
Fractional (Inches)	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

	Size	A	B Inlet	C Outlet	D	E	F
Fractional (Inches)	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"
- **04** 4mm, 1/4"
- **06** 6mm, 3/8"
- **08** 8mm, 1/2"
- **10** 10mm
- **12** 12mm, 3/4"
- **14** 14mm
- **16** 16mm, 1"
- **18** 18mm
- **22** 22mm
- **25** 25mm

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

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

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)

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

(others available on request)

Band Options
- **A** Aluminum Bands (std.)
- **Y** Stainless Steel Bands

Cleaning Options
- **O** Standard
- **B** Industrial Cleaning
- **C** Cyrogenic Cleaning
- **D** NACE Compliant

Hoke

G 57

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

ANGI PART NUMBER 741-07289

THIS PAGE LEFT INTENTIONALLY BLANK

WIKA

Industrial Gauges

Type 23X.53

Liquid Fillable

- 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 WIKA 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:** ±1.5% of span (2" & 2½"); (4") ± 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

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				
Connection	LM	CBM			
Conn. Size	1/4" NPT				
Size	2½"				
Pressure Scale[1]	PSI	PSI	PSI/BAR	PSI/KPA	PSI/KG/CM²
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

[1]"PSI/BAR" denotes dual scale; PSI outside in black, BAR inside in red; "PSI/KPA" denotes dual scale; PSI outside in black, KPA inside in red; "PSI/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 WIKA Distributor or the Factory.

Data sheet: 23X.53

For liquid filled gauges, add "-829" to part numbers above for 2½" size or "-834" for 4" size.

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

WIKA

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	2½"	4"	4"		2½"
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 ½"	4"
Connection	LM	
Conn. Size	1/4" NPT	
30"-0-150 PSI / 84°F	9797144	9797127
30"-0-300 PSI / 126°F	9797152	9797135

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

SVF Flow Controls INCORPORATED

Scan the barcode with your SmartPhone app and view the latest publication of this document

Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

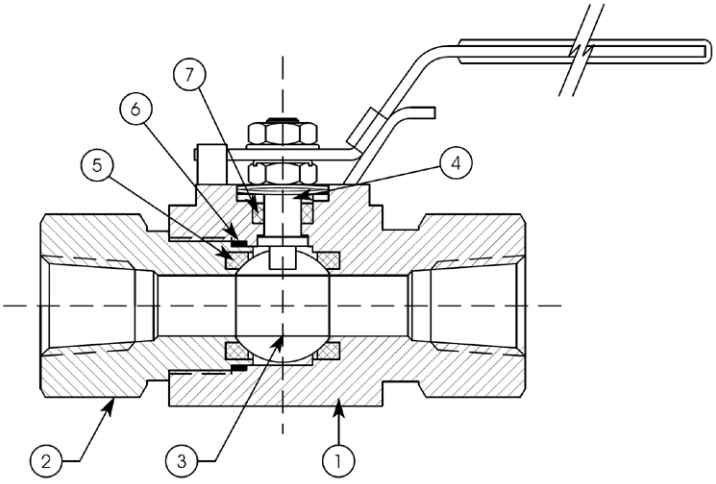
HBEV

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

www.SVF.net
SVF Flow Controls, Inc. • 13560 Larwin Circle • Santa Fe Springs, CA 90670 • Tel: 1.800.783.7836 • FAX: 562.802.3114
Sales@SVF.net • Visit our website: www.SVF.net • © SVF Flow Controls, Inc. • Specifications subject to change without notice

SVF Flow Controls INCORPORATED

Scan the barcode with your SmartPhone app and view the latest publication of this document

Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

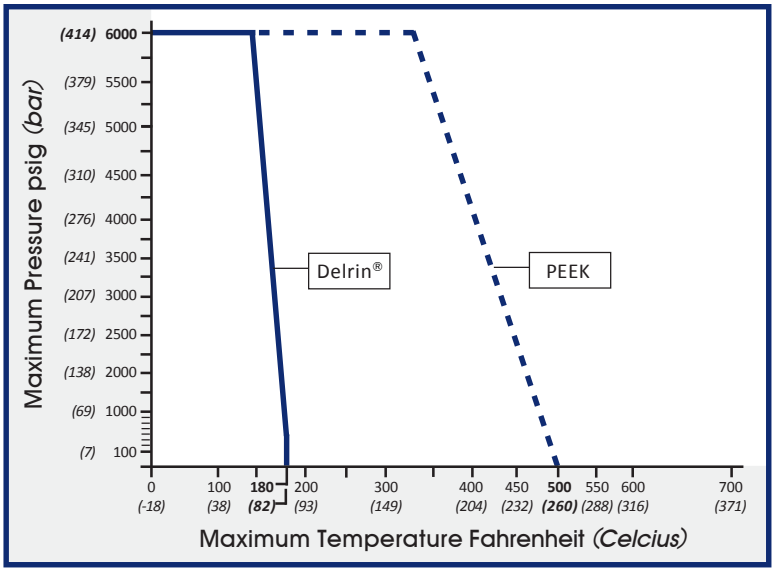
HBEV

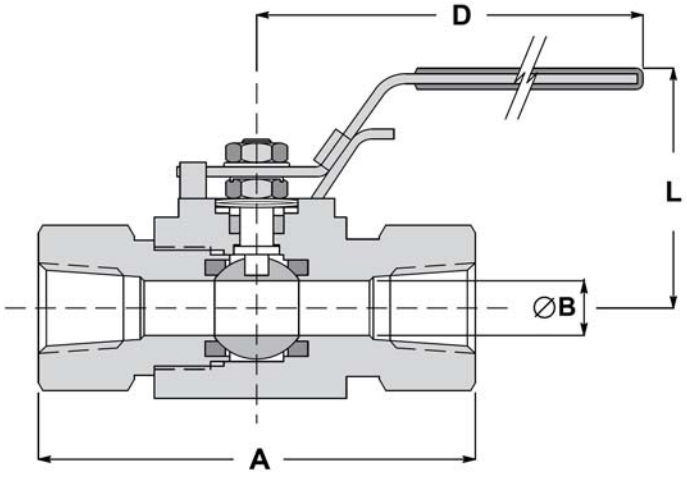
DIMENSIONS, WEIGHT, Cv, TORQUE

Size	A		B		D		L		Weight.		Cv	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*

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

HBEV - PRESSURE/TEMPERATURE CHART





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)

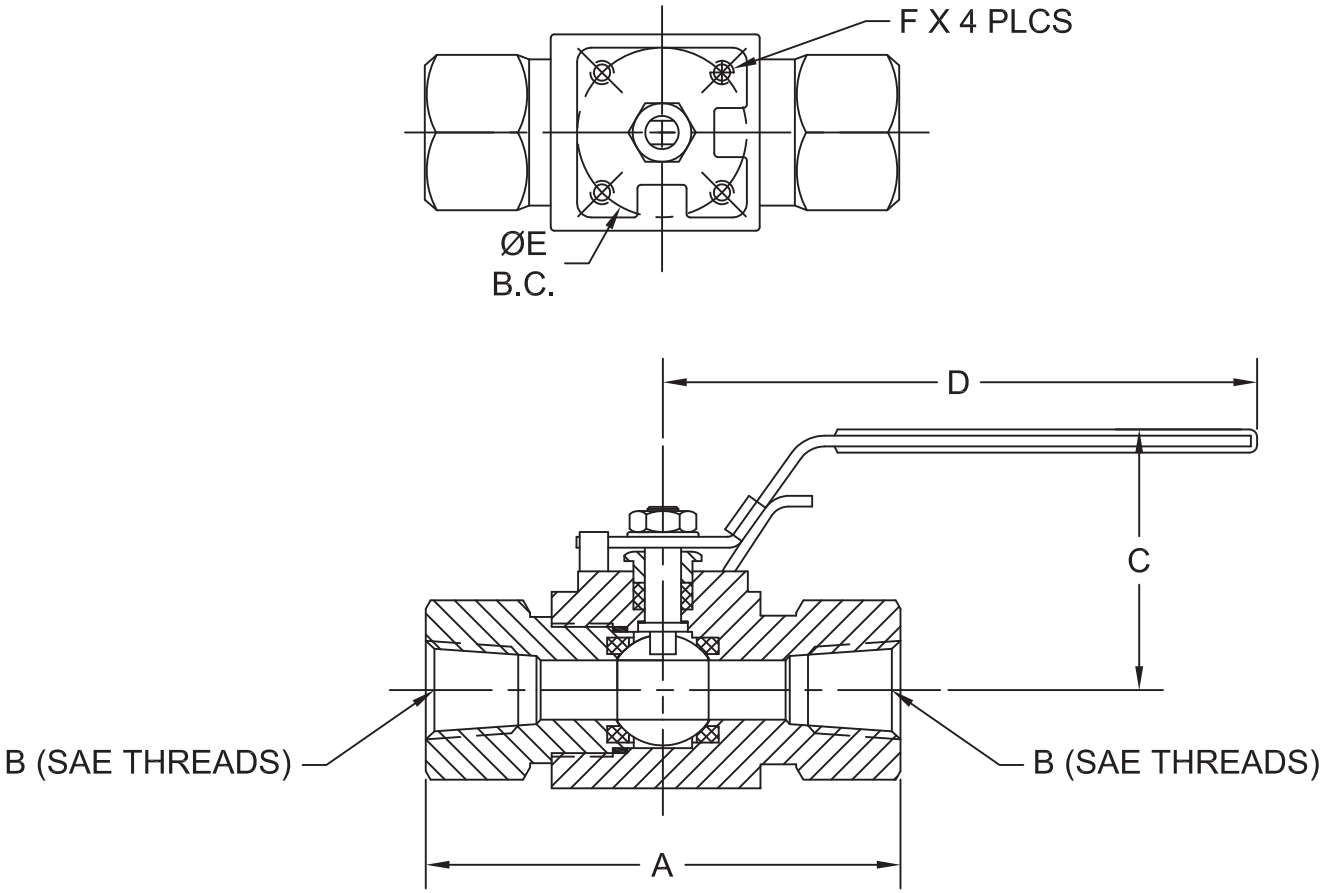
Example Description:
316 Stainless Steel Body & Ends, 316 Stainless Steel Ball with 17-4ph Stem, Delrin® Seat, PTFE Body Seal, Screwed Ends (FNPT), ½" Size

HBEV7	*6*	*6*	*D*	*T*	*SE*	*05*

www.SVF.net
SVF Flow Controls, Inc. • 13560 Larwin Circle • Santa Fe Springs, CA 90670 • Tel: 1.800.783.7836 • FAX: 562.802.3114
Sales@SVF.net • Visit our website: www.SVF.net • © SVF Flow Controls, Inc. • Specifications subject to change without notice

REVISIONS

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



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

CUSTOMER: N/A	DRAWN BY: V. ALVARADO	DATE: 5-18-2011	SVF Flow Controls, Inc. 13560 Larwin Circle Santa Fe Springs, CA 90670 1.800.783.7836 www.SVF.net
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED. TOLERANCES: ± 0'30" ANGULAR: .XXX=±0.005 DECIMALS: .XX =±0.010 .X =±0.10 FRACTIONS: +0.1	CHECKED	DATE	
	APPROVED	DATE	PART NAME: 1/2" & 1" HBEV WITH SAE THREADS
	SIZE & SERIES ID: 1/2" & 1" HBEV		DWG. NO.: HBEV SAE0510 / REV: A
	PART NO.: -		SCALE N.T.S. / SHEET 1 OF 1

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

SVF Flow Controls INCORPORATED

Scan the barcode with your SmartPhone app and view the latest publication of this document

Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

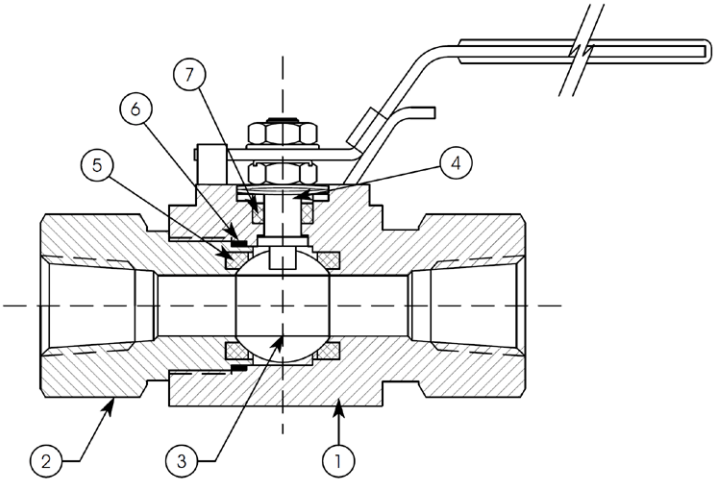
HBEV

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

www.SVF.net
SVF Flow Controls, Inc. • 13560 Larwin Circle • Santa Fe Springs, CA 90670 • Tel: 1.800.783.7836 • FAX: 562.802.3114
Sales@SVF.net • Visit our website: www.SVF.net • © SVF Flow Controls, Inc. • Specifications subject to change without notice

SVF Flow Controls INCORPORATED

Scan the barcode with your SmartPhone app and view the latest publication of this document

Series HBEV Ball Valve

High Pressure, Fire Safe Ball Valve

Sizes 1/2" ~ 2"

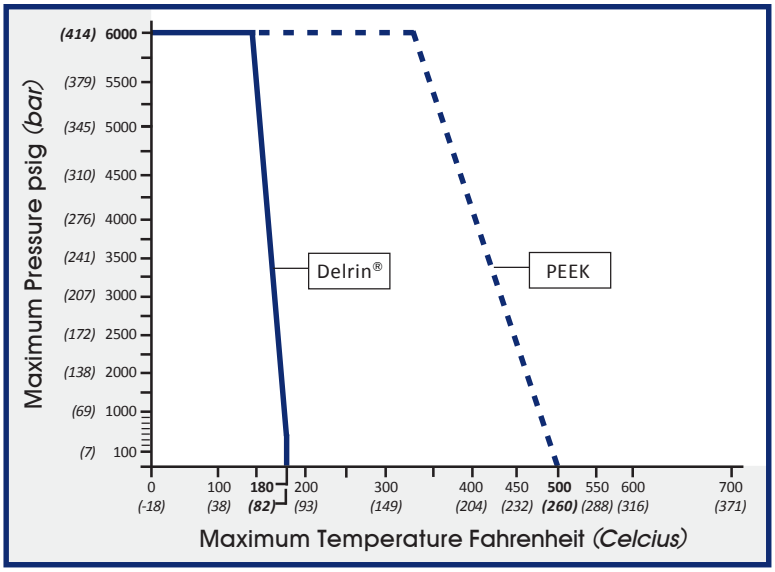
HBEV

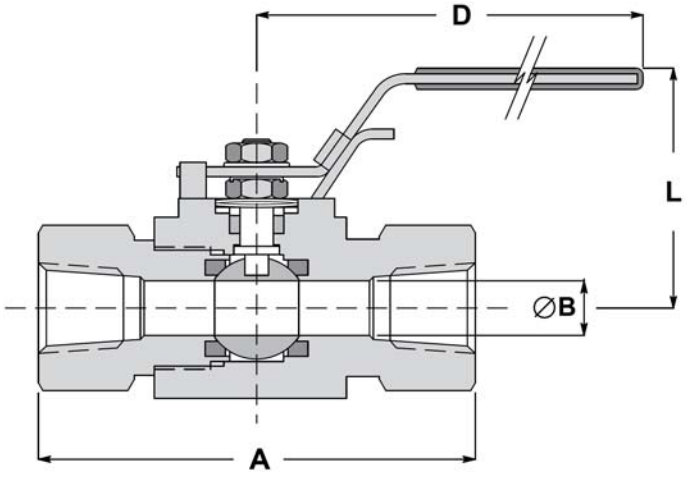
DIMENSIONS, WEIGHT, Cv, TORQUE

Size	A		B		D		L		Weight.		Cv	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*

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

HBEV - PRESSURE/TEMPERATURE CHART





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)

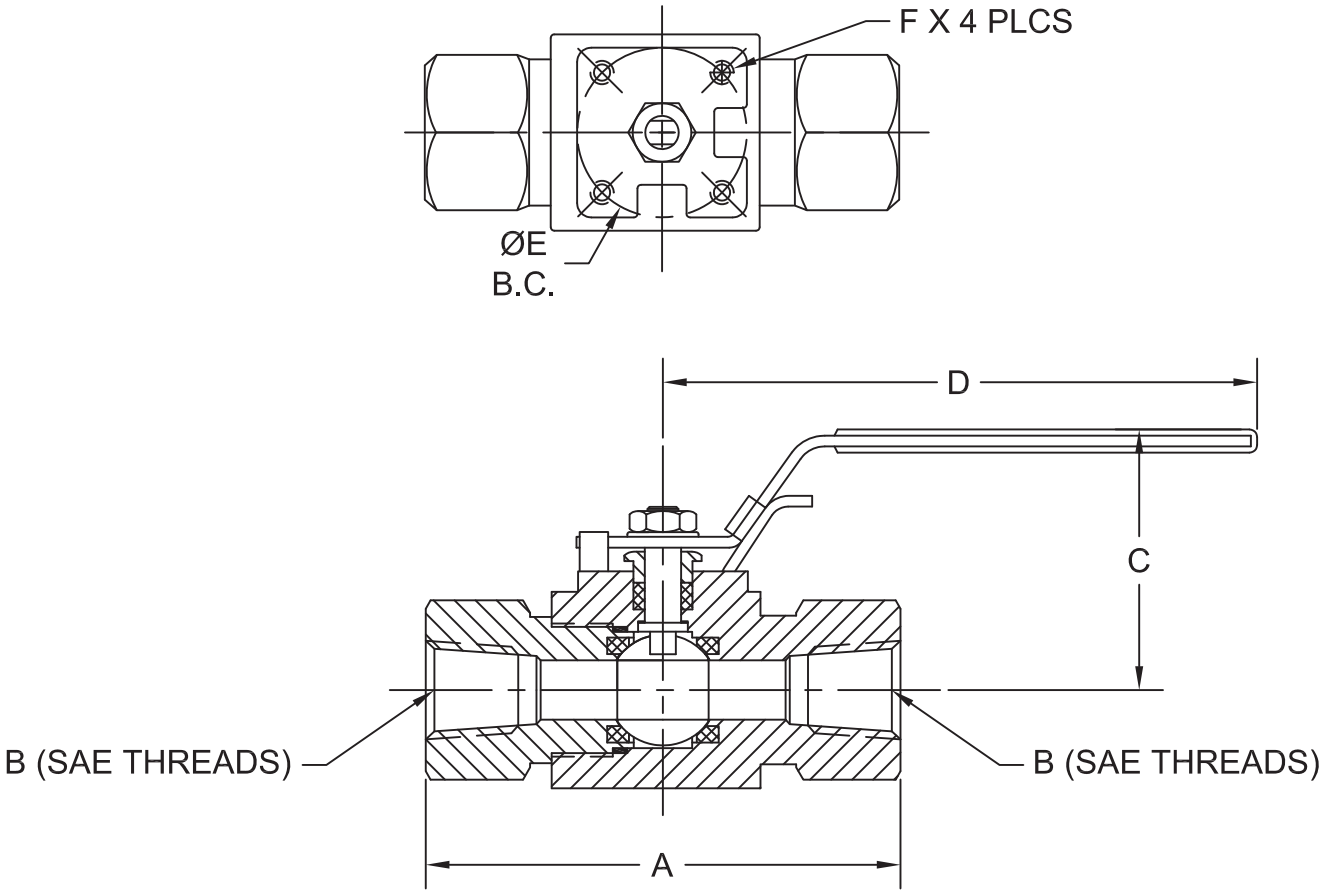
Example Description:
316 Stainless Steel Body & Ends, 316 Stainless Steel Ball with 17-4ph Stem, Delrin® Seat, PTFE Body Seal, Screwed Ends (FNPT), ½" Size

HBEV7	*6*	*6*	*D*	*T*	*SE*	*05*

www.SVF.net
SVF Flow Controls, Inc. • 13560 Larwin Circle • Santa Fe Springs, CA 90670 • Tel: 1.800.783.7836 • FAX: 562.802.3114
Sales@SVF.net • Visit our website: www.SVF.net • © SVF Flow Controls, Inc. • Specifications subject to change without notice

REVISIONS

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



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

CUSTOMER: N/A	DRAWN BY: V. ALVARADO	DATE: 5-18-2011	SVF Flow Controls, Inc. 13560 Larwin Circle Santa Fe Springs, CA 90670 1.800.783.7836 www.SVF.net
ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED. TOLERANCES: ± 0'30" ANGULAR: .XXX=±0.005 DECIMALS: .XX =±0.010 .X =±0.10 FRACTIONS: +0.1	CHECKED	DATE	
	APPROVED	DATE	PART NAME: 1/2" & 1" HBEV WITH SAE THREADS
	SIZE & SERIES ID: 1/2" & 1" HBEV		DWG. NO.: HBEV SAE0510 / REV: A
	PART NO.: -		SCALE N.T.S. / SHEET 1 OF 1

PT 50

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

ANGI PART NUMBER 410-07282

THIS PAGE LEFT INTENTIONALLY BLANK

AST4400 *Stainless Steel Media Isolated Pressure Sensor*

CSA Approved For Hazardous Locations with Approved Barrier

RoHS COMPLIANT LEAD FREE

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.

NOW APPROVED SINGLE SEAL ANSI / ISA 12.27.01-2003

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

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

Now With DIN43650A!

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

Options
000 -No special options

Single Seal

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

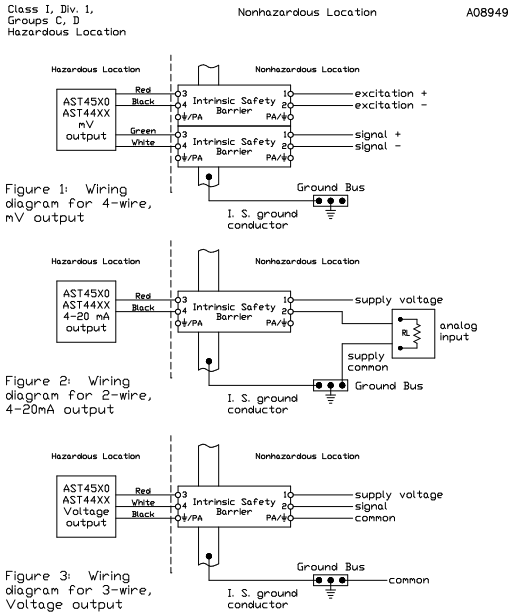


Figure 1: Wiring diagram for 4-wire, mV output

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	Models AST4400, AST4410 and AST44P with integral cable	Models AST4500, AST4510 and AST4520
Vmax = 28 Vdc Imax = 175 mA Ci = 0.45 uF Li = 0	Vmax = 28 Vdc Imax = 175 mA Ci = 0.45 uF Li = 1.32 uH	Vmax = 28 Vdc Imax = 175 mA Ci = 0.46 uF Li = 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:

Voc or Uo <= Vmax
Isc or Io <= Imax
Po <= Pi (if applicable)
Ca or Co >= Ci + Ccable
La or Lo >= Li + Lcable

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:

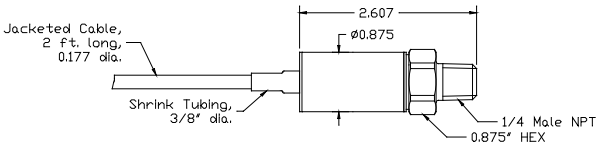
Voc or Uo <= Vmax
Isc or Io <= I max
Po <= Pi (if applicable)
Ca or Co >= Ci + Ccable
La or Lo >= Li + Lcable

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

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

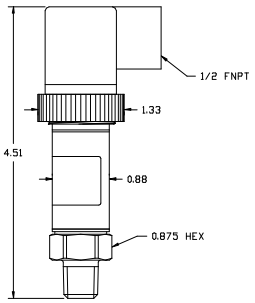
5. A grounding method is not provided by the manufacturer as part of the integral design of the Transducer. For units which are connected through a grounded shunt diode safety barrier, ensure that the transducer is mounted to a surface which is at the same potential as the barrier ground.

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.

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

THIS PAGE LEFT INTENTIONALLY BLANK

Direct Acting

General Service Solenoid Valves

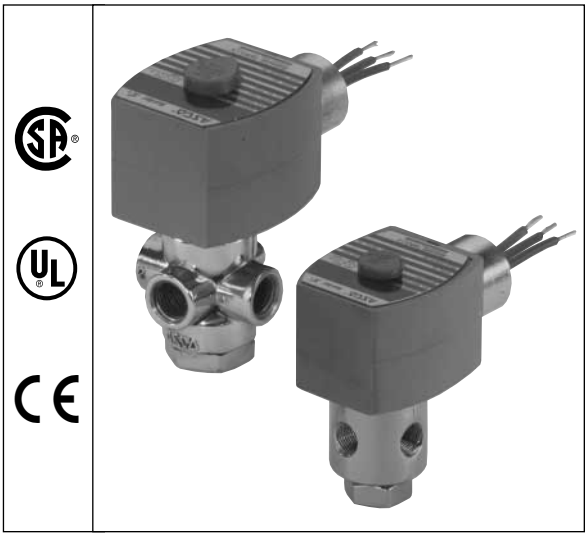
Brass or Stainless Steel Bodies
1/8" to 1/4" NPT

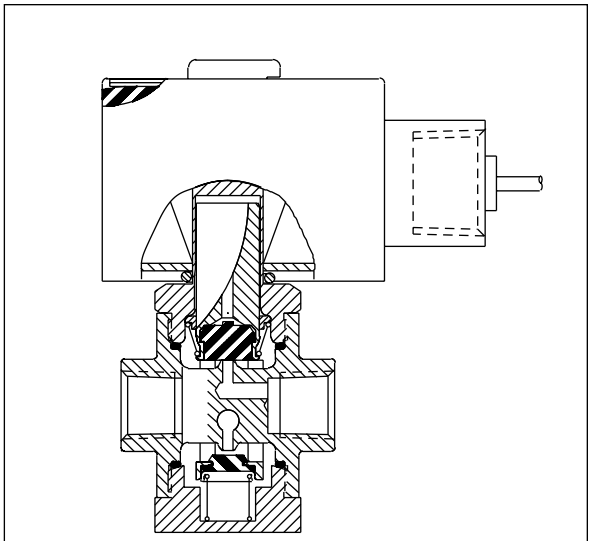
NC U NO

3/2
SERIES
8320

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.





8320 1/4" NPT

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.			
		AC			General Purpose		Explosionproof	
	DC Watts	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. AC: Air-Inert Gas	Max. AC: Water	Max. AC: Lt. Oil @ 300 SSU	Max. DC: Air-Inert Gas	Max. DC: Water	Max. DC: Lt. Oil @ 300 SSU	Max. Fluid Temp. ˚F: AC	Max. Fluid Temp. ˚F: DC	Brass Body: Catalog Number	Brass Body: Constr. Ref. No.	Stainless Steel Body: Catalog Number	Stainless Steel Body: Constr. Ref. No.	Watt Rating/ Class of Coil Insulation ②: AC	Watt Rating/ Class of Coil Insulation ②: 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.

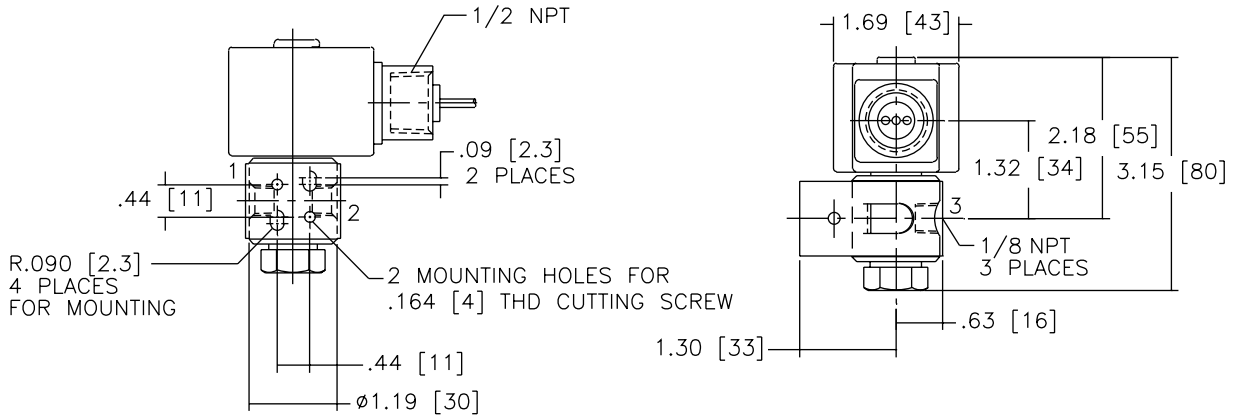
Specifications (Metric units)

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

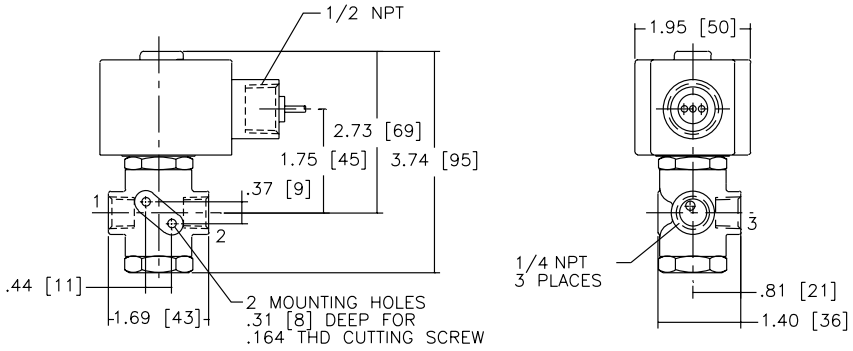
Notes: ① Supplied with cast UR disc.
② On 50 hertz service, the watt rating for the 6.1/F solenoid is 8.1 watts; the watt rating for the 9.1/F solenoid is 11.1 watts.

Dimensions: inches (mm)

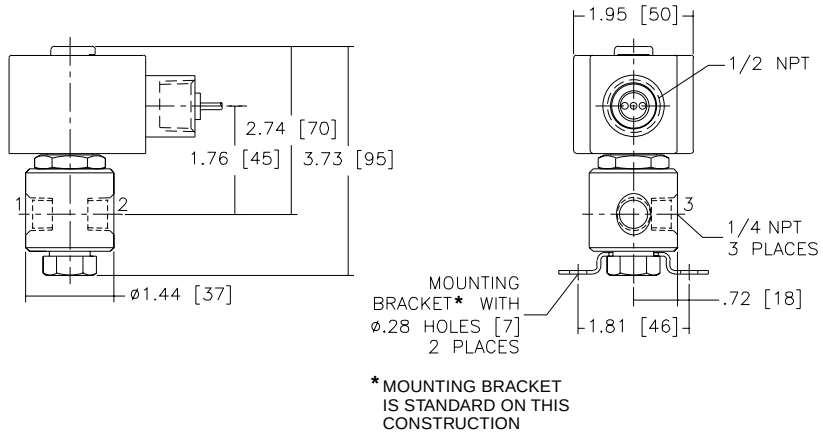
Constr. Ref. 1



Constr. Ref. 2

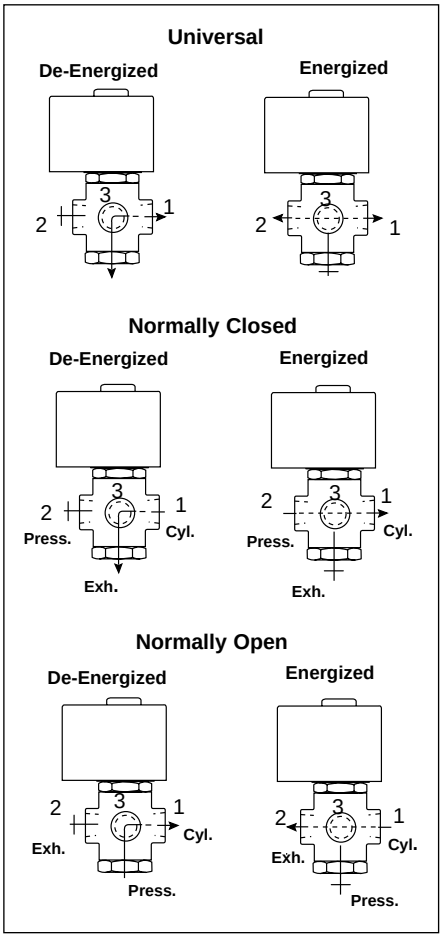


Constr. Ref. 3



*MOUNTING BRACKET IS STANDARD ON THIS CONSTRUCTION

FLOW DIAGRAMS



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 ± 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 ± 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 ± 2,8

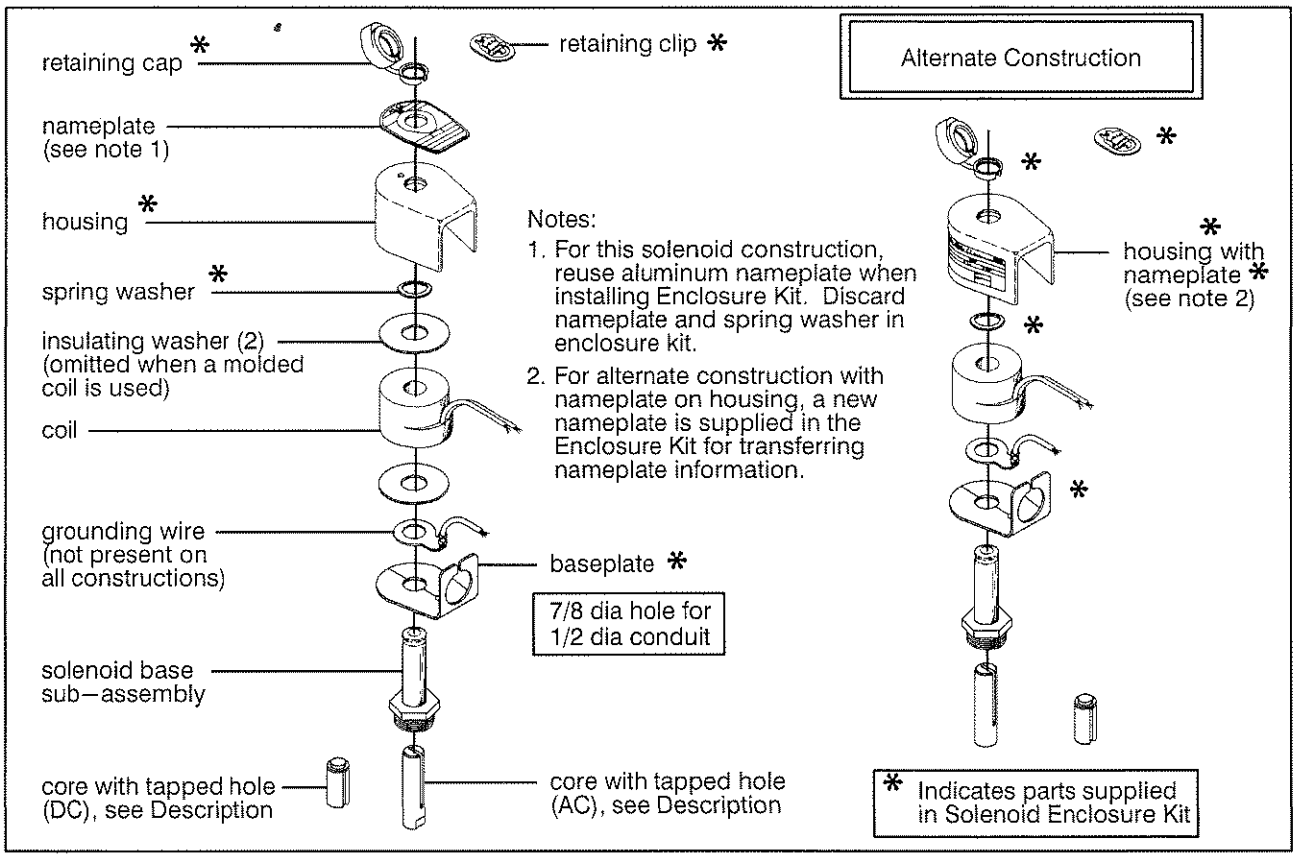


Figure 1, Catalog Nos. 80031 and 80032 General Purpose Solenoid Enclosure.

ASCO®

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

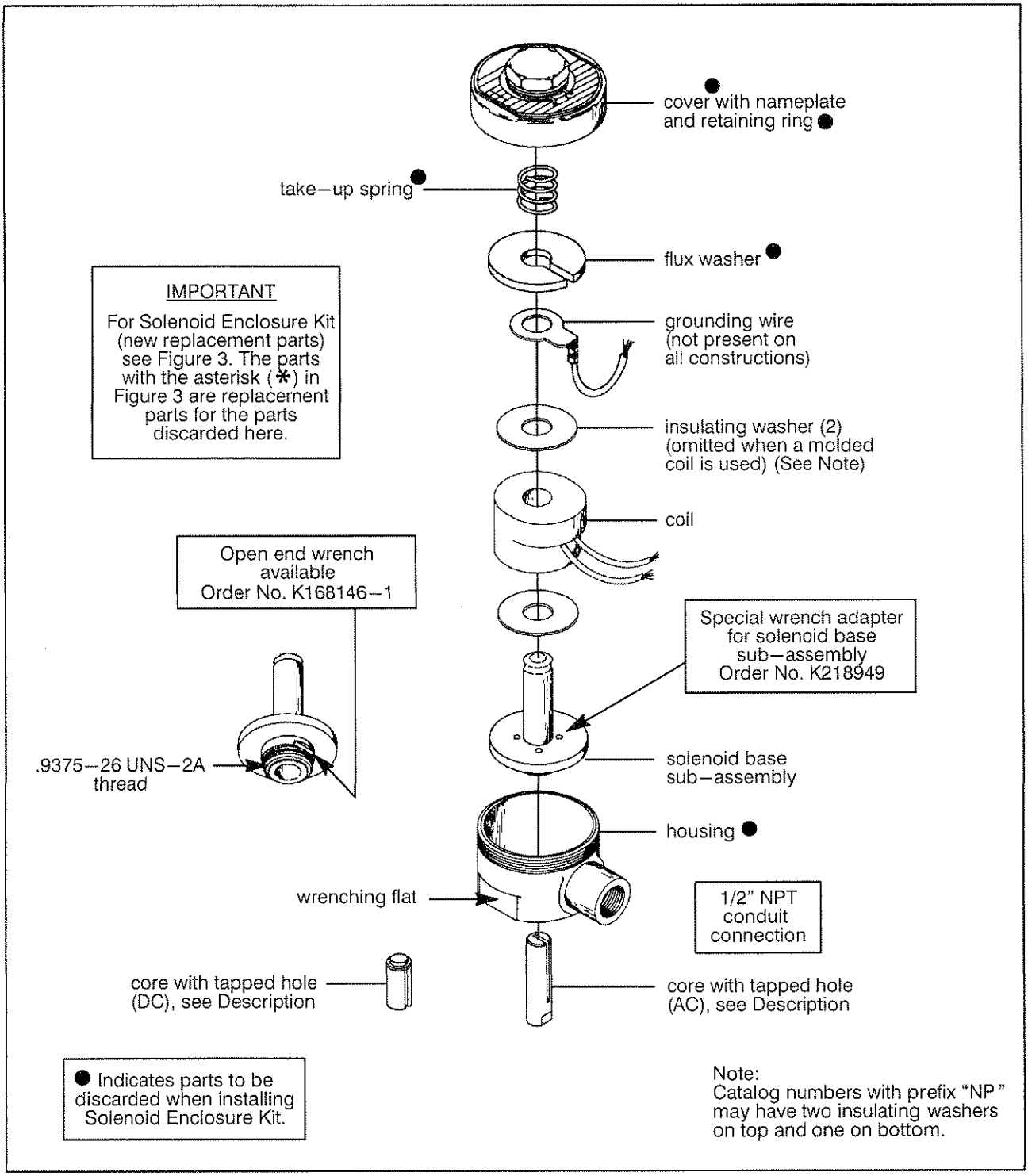


Figure 2. Catalog Nos. EF80031, EF80032 80033 and 80034 Explosionproof Solenoid Enclosure.

ASCO®

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

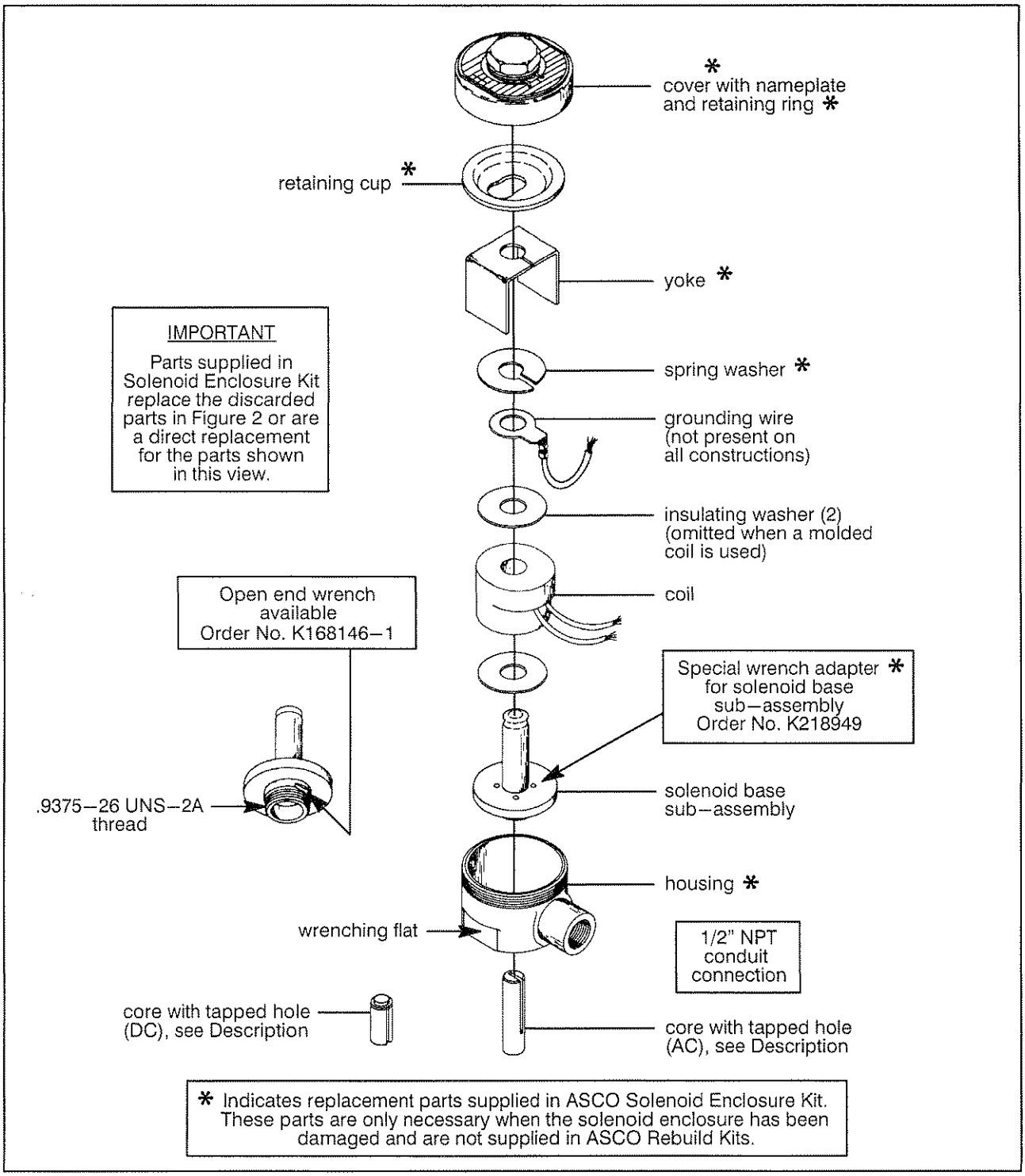


Figure 3. Catalog Nos. EF80031, EF80032, 80033 and 80034 Alternate Construction Explosionproof Solenoid Enclosure.

ASCO®

THIS PAGE LEFT INTENTIONALLY BLANK