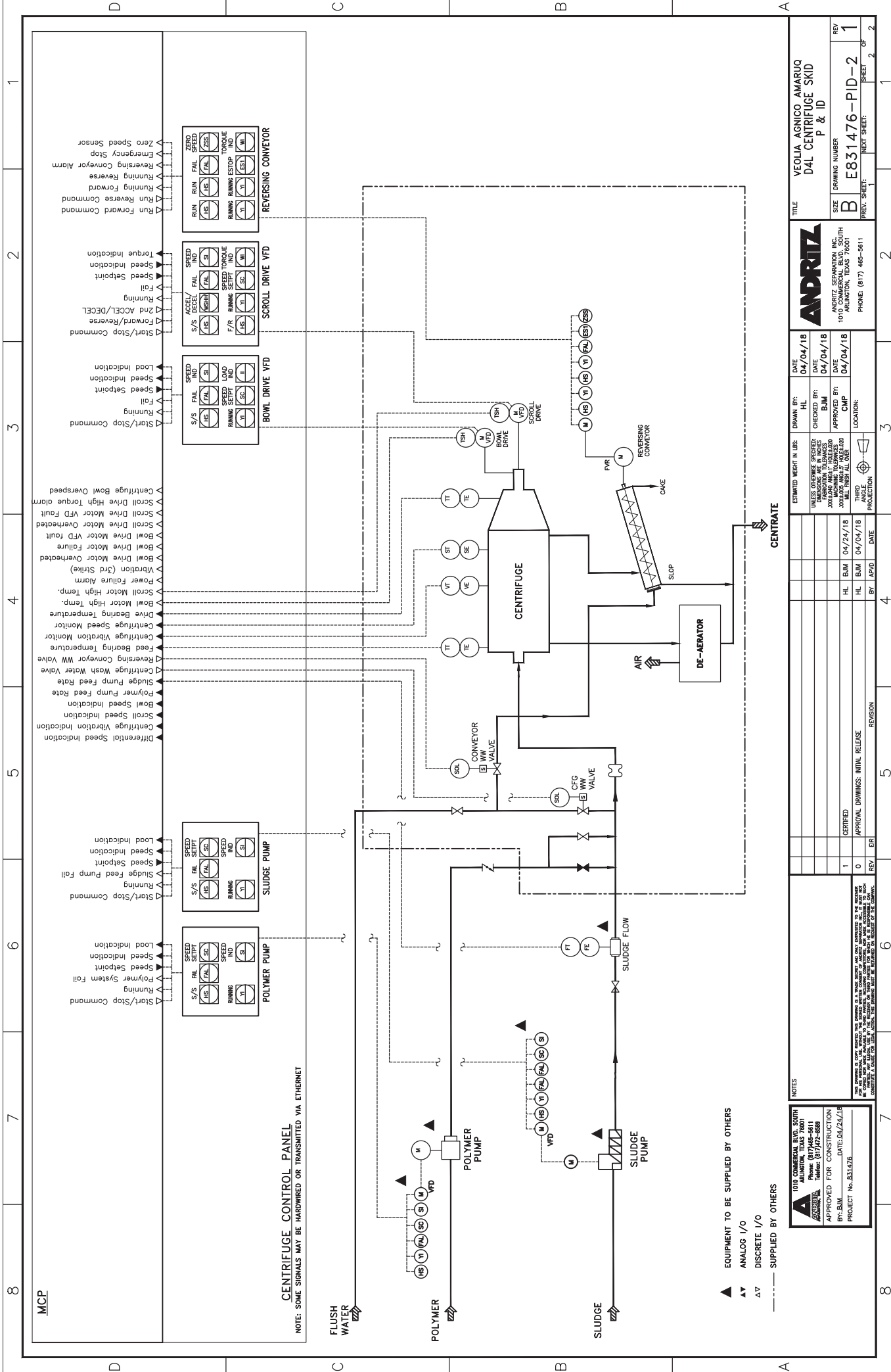






MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

ASCO

EF8210G004, SOLENOID VALVE
EF8210G022, SOLENOID VALVE
8210G089, SOLENOID VALVE

LEFT BLANK

Installation & Maintenance Instructions

2-WAY INTERNAL PILOT-OPERATED SOLENOID VALVES
NORMALLY CLOSED OPERATION — GENERAL SERVICE
1" , 1¼" OR 1½" NPT

SERIES

8210

8211

NOTICE: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Cause of Improper Operation, Coil or Solenoid Replacement.

DESCRIPTION

Series 8210 valves are 2-way normally closed internal pilot-operated solenoid valves designed for general service. Valves are made of rugged forged brass or die cast stainless steel. Series 8210 valves are provided with a general purpose solenoid enclosure. Series EF8210 and 8211 are the same as Series 8210 except they are provided with an explosionproof or explosionproof/watertight solenoid enclosure.

Notice: Brass valves are not certified as lead-free under the Safe Water Drinking Act SWDA 1417 and are not intended for use on drinking water systems. They are intended for control of water in industrial applications. Consult ASCO for valves rated for use in potable water applications.

OPERATION

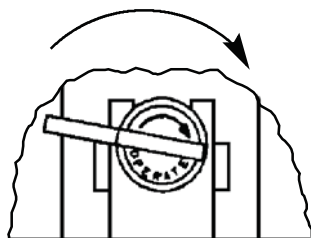
Normally Closed: Valve is closed when solenoid is de-energized; open when energized.

IMPORTANT: Minimum operating pressure differential is 5 psi.

Manual Operator (optional feature)

Manual operator allows manual operation when desired or during an electrical power outage. To engage manual operator (open the valve), turn lever clockwise until it hits a stop. Valve will now be in the same position as when the solenoid is energized. To disengage manual operator (close the valve), turn lever counterclockwise until it hits a stop.

To engage, turn lever clockwise until it hits a stop.



Partial view of
Manual Operator

CAUTION: For valve to operate electrically, manual operator lever must be fully rotated counterclockwise.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Future Service Considerations

Provision should be made for performing seat leakage, external leakage, and operational tests on the valve with a nonhazardous, noncombustible fluid after disassembly and reassembly.

Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to chart below. Check catalog number prefix and watt rating on nameplate.

Watt Rating AC/DC	Catalog Number Prefix	Solenoid Class	Maximum Ambient Temp.	Maximum Fluid Temp.
6	None or DF	F	122 °F (50 °C)	180 °F (82 °C)
AC	HT	H	140 °F (60 °C)	180 °F (82 °C)
6.1	None, KF, SF or SC	F	125 °F (54 °C)	180 °F (82 °C)
AC	HT, KH, ST or SU	H	140 °F (60 °C)	180 °F (82 °C)
11.2	None or HT	F or H	77 °F (25 °C)	150 °F (65 °C)
DC				
11.6	None, HT, KF, KH, SC, SF or ST	F or H	104 °F (40 °C)	150 °F (65 °C)
DC				

Positioning

This valve 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.

Piping

Connect piping to valve according to markings on valve body. Apply pipe compound sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

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

MAINTENANCE

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

Note: It is not necessary to remove the valve from the pipeline for repairs

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the 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. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep medium flowing through the valve as free from dirt and foreign material as possible.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete rebuild kit.

Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Disassembly

1. Disassemble valve in an orderly fashion using exploded views for identification and placement of parts. Refer to Figure 1 for AC construction; Figure 2 for DC construction. For 1" or 1 1/4" NPT valve construction, see Figure 1; for 1 1/2" NPT valve construction, see Figure 2.
 2. Remove solenoid enclosure. See separate instructions.
- For valves supplied with optional manual operators, see section on **Disassembly of Manual Operator**.
 - 3. Unscrew solenoid base sub-assembly from valve body. Then remove core assembly with core spring and solenoid base gasket. For AC construction (Figure 1) core spring is a loose piece.
 - 4. For normal maintenance (cleaning) it is not necessary to remove the valve seat. However, for valve seat removal use a 7/16" thin wall socket wrench
 - 5. Remove bonnet screws, valve bonnet, diaphragm spring, diaphragm assembly, body gasket, body passage eyelet (present on current valve constructions only) and body passage gasket.
 - 6. All parts are now accessible for cleaning or replacement. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

- Service Notice -

When installing a new ASCO Rebuild Kit, please be aware that the diaphragm assembly may not be identical to the diaphragm assembly in the valve. See Figure 1 for alternate diaphragm constructions. The two diaphragm constructions are interchangeable and will perform equally well.

⚠ CAUTION: To ensure proper valve operation, install all parts supplied in ASCO Rebuild Kit. Do not mix old and new parts.

Valve Reassembly

1. Lubricate body gasket, body passage gasket, bonnet gasket and solenoid base gasket with DOW CORNING® 200 Fluid lubricant or an equivalent high-grade silicone fluid.

2. Install body passage gasket, body passage eyelet, diaphragm assembly, diaphragm spring, valve bonnet and bonnet screws. Hand thread screws as far as possible. Then torque bonnet screws in a crisscross manner to 144 ± 15 in-lbs [$16,3 \pm 1,7$ Nm].
 3. If removed, install valve seat in valve body. Apply a small amount of thread compound compatible with valve media to valve seat threads. Torque valve seat to 75 ± 10 in-lbs [$8,5 \pm 1,1$ Nm].
- For valves supplied with optional manual operator, see section on **Reassembly of Manual Operator**.
 - 4. For AC construction (Figure 1), install core spring in core assembly. Wide end of core spring in core first, closed end protrudes from top of core.
 - 5. Install solenoid base gasket, core assembly with core spring and solenoid base sub-assembly in valve body. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm].
 - 6. Install solenoid. See separate instructions.

⚠ WARNING: To prevent the possibility of death, serious injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests with a nonhazardous, noncombustible fluid.

7. Restore line pressure and electrical power supply to valve.
8. After maintenance is completed, operate the valve a few times to be sure of proper operation. A *metallic click* indicates the solenoid is operating.

Disassembly of Manual Operator

1. Unscrew solenoid base sub-assembly from manual operator body.
2. Unscrew manual operator body from valve body. Then remove stem retainer from base of manual operator body and stem/spacer sub-assembly.
3. Pull stem/spacer sub-assembly with stem gasket from side of manual operator body. Then remove core assembly with core spring, solenoid base gasket and manual operator bonnet gasket.
4. For further disassembly refer to section on *Valve Disassembly* step 4.

Reassembly of Manual Operator

1. Lubricate stem gasket with DOW CORNING® 111 Compound lubricant or an equivalent high-grade silicone grease.
2. For AC construction (Figure 1), install core spring in core assembly. Wide end of core spring in core first, closed end protrudes from top of core.
3. Holding the manual operator body in a horizontal position, install core assembly with core spring from the bottom end.
4. Insert the stem/spacer sub-assembly with the stem gasket into the side hole of the manual operator body. Rotate the lever of the stem/spacer sub-assembly to the 12 o'clock position.
5. Install stem retainer on base of manual operator body and simultaneously engage it into the slot provided on the stem/spacer sub-assembly.

IMPORTANT: The spacer on the stem/spacer sub-assembly must be inside of the stem retainer for AC construction (Figure 1) and outside of the stem retainer for DC construction (Figure 2).

6. Install manual operator bonnet gasket and body with preassembled parts into valve body. Torque manual operator body to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm].
7. Replace solenoid base gasket and solenoid base sub-assembly. Torque solenoid base sub-assembly to 175 ± 25 in-lbs [$19,8 \pm 2,8$ Nm].
8. For further reassembly, refer to *Valve Reassembly* step 6.

Torque Chart

Part Name	Torque Value Inch-Pounds	Torque Value Newton-Meters
Solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
Manual operator body		
Bonnet screw	144 ± 15	16,3 ± 1,7
Valve seat	75 ± 10	8,5 ± 1,1

ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk (*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

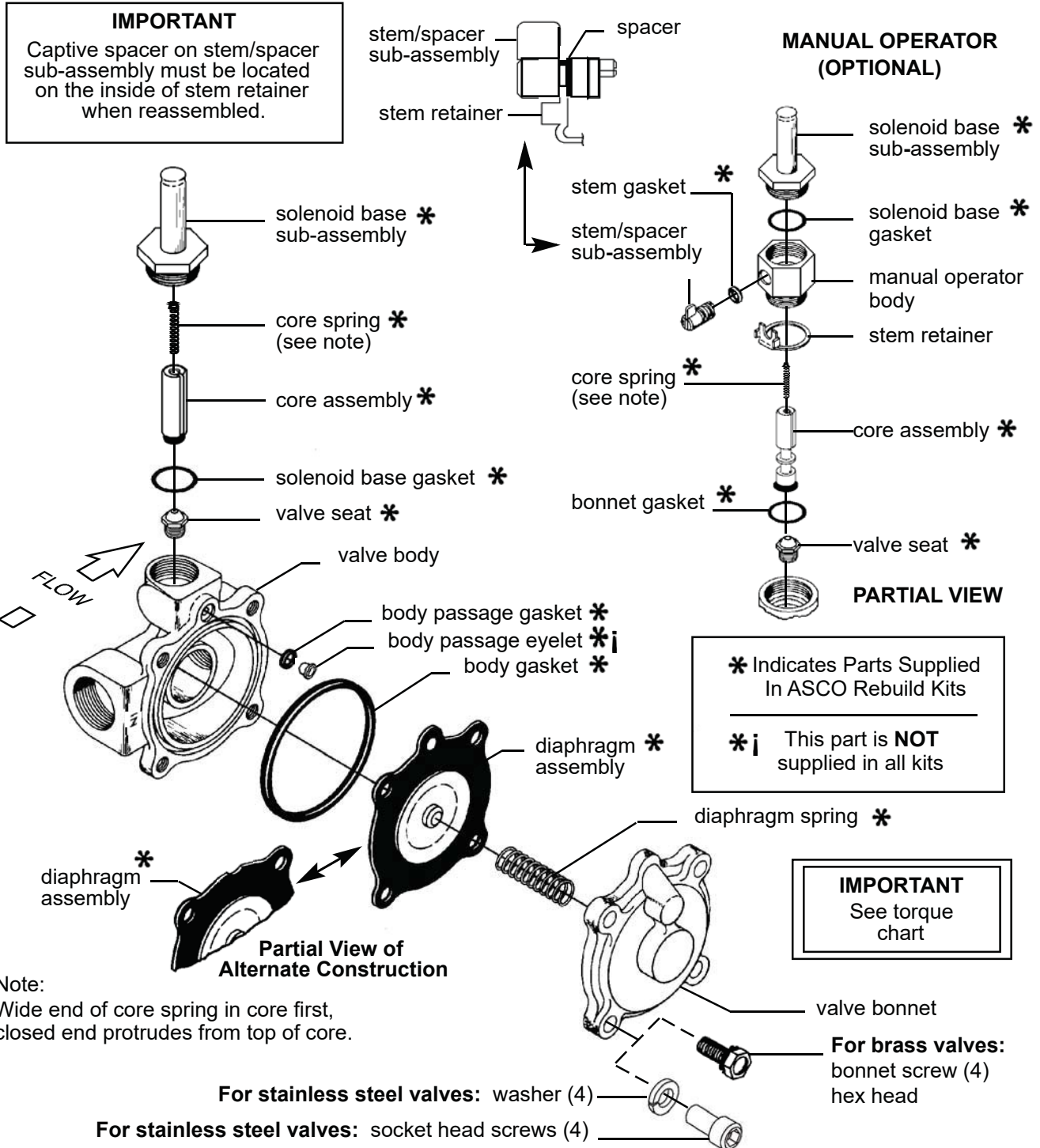


Figure 1. Series 8210 valve without solenoid, AC construction with 1 or 1 1/4" NPT valve body shown.

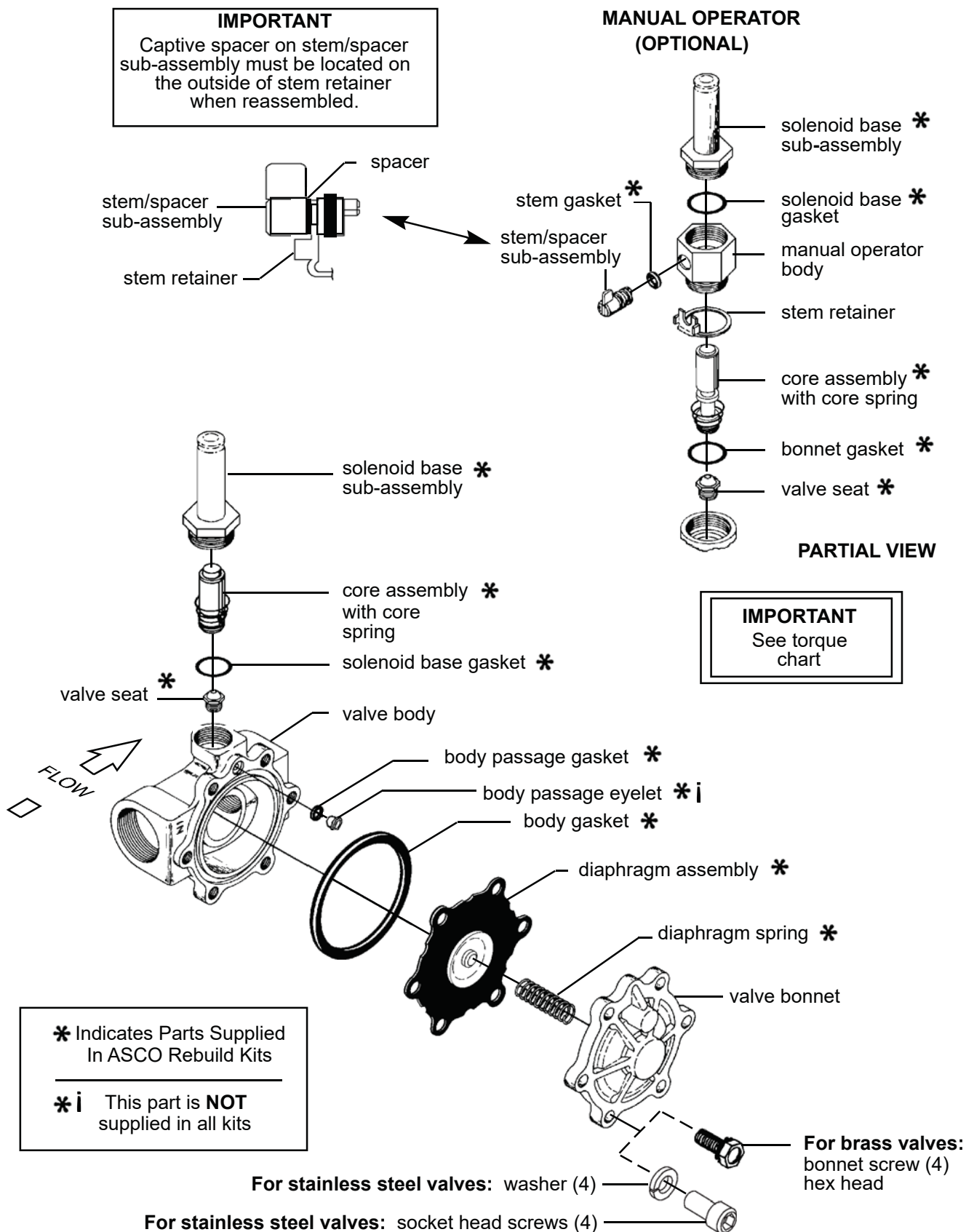


Figure 2. Series 8210 valve without solenoid, DC construction with 1 1/2" NPT valve body shown.

Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS

SERIES

8016G/H

— SERVICE NOTICE —

ASCO™ solenoid valves with design change letter “G” or “H” in the catalog number (ex. 8210G1) have an epoxy encapsulated ASCO Red Hat II® solenoid. This solenoid replaces some of the solenoids with metal enclosures and open-frame constructions. Follow these installation and maintenance instructions if your valve or operator uses this solenoid.

DESCRIPTION

Catalog numbers 8016G/H1 and 8016G/H2 are epoxy encapsulated pull-type solenoids. The green solenoid with lead wires and 1/2 conduit connection is designed to meet Enclosure Type 1-General Purpose, Type 2-Dripproof, Types 3 and 3S-Raintight, and Types 4 and 4X-Watertight. The black solenoid on catalog numbers prefixed “EF” is designed to meet Enclosure Types 3 and 3S-Raintight, Types 4 and 4X-Watertight, Types 6 and 6P-Submersible, Type 7, Explosionproof Class I, Division 1 Groups A, B, C, & D and Type 9, -Dust-Ignitionproof Class II, Division 1 Groups E, F & G. The Class II, Groups F & G Dust Locations designation is not applicable for solenoids or solenoid valves used for steam service or when a class “H” solenoid is used. See *Temperature Limitations* section for solenoid identification and nameplate/retainer for service. When installed just as a solenoid and not attached to an ASCO valve, the core has a 0.250-28 UNF-2B tapped hole, 0.38 minimum full thread.

Series 8016G/H are available in:

- **Open-Frame Construction:** The green solenoid may be supplied with 1/4" spade, screw or DIN terminals. (Refer to Figure 4)
- **Panel Mounted Construction:** These solenoids are specifically designed to be panel mounted by the customer through a panel having a .062 to .093 maximum wall thickness. (Refer to Figure 3 and section on *Installation of Panel Mounted Solenoid*).

Optional Features For Type 1 - General Purpose Construction Only

- **Junction Box:** This junction box construction meets Enclosure Types 2, 3, 3S, 4, and 4X. Only solenoids with 1/4" spade or screw terminals may have a junction box. The junction box provides a 1/2" conduit connection, grounding and spade or screw terminal connections within the junction box (See Figure 5).
- **DIN Plug Connector Kit No. K236034:** Use this kit only for solenoids with DIN terminals. The DIN plug connector kit provides a two pole with grounding contact DIN Type 43650 construction (See Figure 6).

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 0.69lbs (3.1N) and 0.31 lbs (1.38N) for DC.

INSTALLATION

Check nameplate for correct catalog number, service, and wattage. Check front of solenoid for voltage and frequency.

⚠ WARNING: Electrical hazard from the accessibility of live parts. To prevent the possibility of death, serious injury or property damage, install the open - frame solenoid in an enclosure.

FOR BLACK ENCLOSURE TYPES 7 AND 9 ONLY

⚠ CAUTION: To prevent fire or explosion, do not install solenoid and/or valve where ignition temperature of hazardous atmosphere is less than 165°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/retainer for service.

NOTE: These solenoids have an internal non-resettable thermal fuse to limit solenoid temperature in the event that extraordinary conditions occur which could cause excessive temperatures. These conditions include high input voltage, a jammed core, excessive ambient temperature or a shorted solenoid, etc. This unique feature is a standard feature only in solenoids with black explosionproof/dust-ignitionproof enclosures (Types 7 & 9).

⚠ CAUTION: To protect the solenoid valve or operator, 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 and 8601 for strainers.

Temperature Limitations

For maximum valve ambient temperatures, refer to chart. The temperature limitations listed, only indicate maximum application temperatures for field wiring rated at 90°C. Check catalog number prefix and watt rating on nameplate to determine maximum ambient temperature. See valve installation and maintenance instructions for maximum fluid temperature.

NOTE: For steam service, refer to *Wiring* section, *Junction Box* for temperature rating of supply wires.

Temperature Limitations For Series 8016G Solenoids for use on Valves Rated at 6.1, 8.1, 9.1, 10.6 or 11.1 Watts			
Watt Rating	Catalog Number Coil Prefix	Class of Insulation	Maximum § Ambient Temp.
6.1, 8.1, 9.1 & 11.1	None, FB, KF, KP, SC, SD, SF & SP	F	125°F (52°C)
6.1, 8.1, 9.1 & 11.1	HB, HT, KB, KH, SS, ST & SU	H	140°F (60°C)
10.6**	None, KF, SF, SC, HT, KH, ST & SU	F & H	104°F (40°C)
7.1 @ 60Hz (8.1 @ 50Hz)		F & H	175°F (79°C)*
10.6**		F & H	140°F (60°C)

§ Minimum ambient temperature -40°F (-40°C).

* When used with watertight aluminum junction boxers (screw or spade) max. ambient and fluid temperature will be reduced to 157°F (69.4°C)

** 10.6 Watt solenoids rated for 104°F are 8030, 8260, 8316, 8321, 8320, 8360 & 8344 valves while those rated for 140°F are 8040 valves

Temperature Limitations for Series 8003H, 8007H and 8202H solenoids						
		Watt Ratings			Maximum Ambient Temperature	
Prefix ①	Coil Class	AC		DC		
		60 Hz	50 Hz		°C	°F
EF	FT	6.1	8.1	-	52	125
EF	FB	9.1	11.1	-		
	FT	6.1	8.1	-	55	131
	FB	9.1	11.1	-		
	HT	-	-	10.6	40 ②	104②
	HB	-	-	18.6		
EF	HT	-	-	10.6		
EF	HB	-	-	18.6		
	HT	6.1	8.1	-	60 ③	140 ③
	HB	9.1	11.1	-		
EF	HT	6.1	8.1	-		
EF	HB	9.1	11.1	-		

①= EF data applies to Explosionproof coils only.

②= Some DC solenoid valves can be operated at maximum ambient temperature of 55°C / 131°F with reduced pressure ratings. See valve I&M for maximum operating pressure differential ratings.

③= Steam Service Valves have a maximum ambient temperature of 55° C/ 131°F.

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. All solenoids supplied with lead wires are provided with a grounding wire which is green or green with yellow stripes and a 1/2" conduit connection. To facilitate wiring, the solenoid may be rotated 360°. For the watertight and explosionproof solenoid, electrical fittings must be approved for use in the approved hazardous locations.

Additional Wiring Instructions For Optional Features:

• Open-Frame solenoid with 1/4" spade terminals.

For solenoids supplied with screw terminal connections use #12-18 AWG stranded copper wire rated at 90°C or greater. Torque terminal block screws to 10±2 in-lbs [1,0±1,2 Nm]. A tapped hole is provided in the solenoid for grounding, use a #10-32 machine screw. Torque grounding screw to 15-20 in-lbs [1,7-2,3 Nm]. On solenoids with screw terminals, the socket head screw holding the terminal block to the solenoid is the grounding screw. Torque the screw to 15-20 in-lbs [1,7-2,3 Nm] with a 5/32" hex key wrench.

• Junction Box

The junction box is used with spade or screw terminal solenoids only and is provided with a grounding screw and a 1/2" conduit connection. Connect #12-18 AWG standard copper wire only to the screw terminals. Within the junction box use field wire that is rated 90°C or greater for connections. For steam service use 105°C rated wire up to 50 psi or use 125°C rated wire above 50 psi. After electrical hookup, replace cover gasket, cover, and screws. Tighten screws evenly in a crisscross manner.

• DIN Plug Connector Kit No. K236034

1. The open-frame solenoid is provided with DIN terminals to accommodate the plug connector kit.
2. Remove center screw from plug connector. Using a small screwdriver, pry terminal block from connector cover.
3. Use #12-18 AWG stranded copper wire rated at 90°C or greater for connections. Strip wire leads back approximately 1/4" for installation in socket terminals. The use of wire-end sleeves is also recommended for these socket terminals. Maximum length of wire-end sleeves to be approximately 1/4". Tinning of the ends of the lead wires is not recommended.
4. Thread wire through gland nut, gland gasket, washer and connector cover.

NOTE: Connector housing may be rotated in 90° increments from position shown for alternate positioning of cable entry.

5. Check DIN connector terminal block for electrical markings. Then make electrical hookup to terminal block according to markings on it. Snap terminal block into connector cover and install center screw.
6. Position connector gasket on solenoid and install plug connector. Torque center screw to 5±1 in-lbs [0,6±1,1 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently and cannot be converted from one to the other by changing the coil.

Installation of Solenoid

Solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid.

Installation of Panel Mounted Solenoid (See Figure 3)

Disassemble solenoid following instruction under *Solenoid Replacement* then proceed.

3/4" Valve Bonnet Construction

1. Install retainer (convex side to solenoid) in 1.312 diameter mounting hole in customer panel.
2. Position spring washer over plugnut/core tube sub-assembly.
3. Install plugnut/core tube sub-assembly through retainer in customer panel then replace solenoid, nameplate and red cap.

15/16" Valve Bonnet Construction

1. Install solenoid base sub-assembly through 0.69 diameter mounting hole in customer panel.
2. Position spring washer on opposite side of panel over solenoid base sub-assembly then replace.

Solenoid Temperature

Standard solenoids are designed for continuous duty service. When the solenoid is energized for a long period, the solenoid becomes hot and can be touched by hand only for an instant. This is a safe operating temperature.

MAINTENANCE

▲ WARNING: To prevent the possibility of death, serious injury or property damage, turnoff electrical power, depressurize solenoid operator and/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 solenoid 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.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- 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 worn or damaged parts.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* signifies that the solenoid is operating. Absence of the *click* indicates loss of power supply. Check for loose or blown fuses, open-circuited or grounded solenoid, broken leadwires or splice connections.
- **Burned-Out Solenoid:** Check for open-circuited solenoid. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate/retainer and marked on the solenoid. Check ambient temperature and check that the core is not jammed.
- **Low Voltage:** Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

Solenoid Replacement

1. On solenoids with lead wires disconnect conduit, coil leads, and grounding wire.

NOTE: Any optional parts attached to the old solenoid must be reinstalled on the new solenoid.

2. Disassemble solenoids with optional features as follows:

- **Spade or Screw Terminals**

Remove terminal connections, grounding screw, grounding wire, and terminal block (screw terminal type only).

NOTE: For screw terminals, the socket head screw holding the terminal block serves as a grounding screw.

- **Junction Box**

Remove conduit and socket head screw (use 5/32" hex key wrench) from center of junction box. Disconnect junction box from solenoid.

- **DIN Plug Connector**

Remove center screw from DIN plug connector. Disconnect DIN plug connector from adapter. Remove socket head screw (use 5/32" hex key wrench), DIN terminal adapter, and gasket from solenoid.

3. Snap off red cap from top of solenoid base sub-assembly.
4. Push down on solenoid. Then using a suitable screwdriver, insert blade in slot provided between solenoid and nameplate/retainer. Pry up slightly and push to remove. Then remove solenoid from solenoid base sub-assembly.
5. Reassemble using exploded views for parts identification and placement.

Disassembly and Reassembly of Solenoids

1. Remove solenoid, see *Solenoid Replacement*.
2. Remove spring washer from solenoid base sub-assembly.
3. Unscrew solenoid base sub-assembly.

NOTE: Some solenoid constructions have a plugnut/core tube sub-assembly, bonnet gasket and bonnet in place of the solenoid base sub-assembly. To remove bonnet use special wrench adapter supplied in ASCO Rebuild Kit. For wrench adapter only, order ASCO Wrench Kit No. K218948.

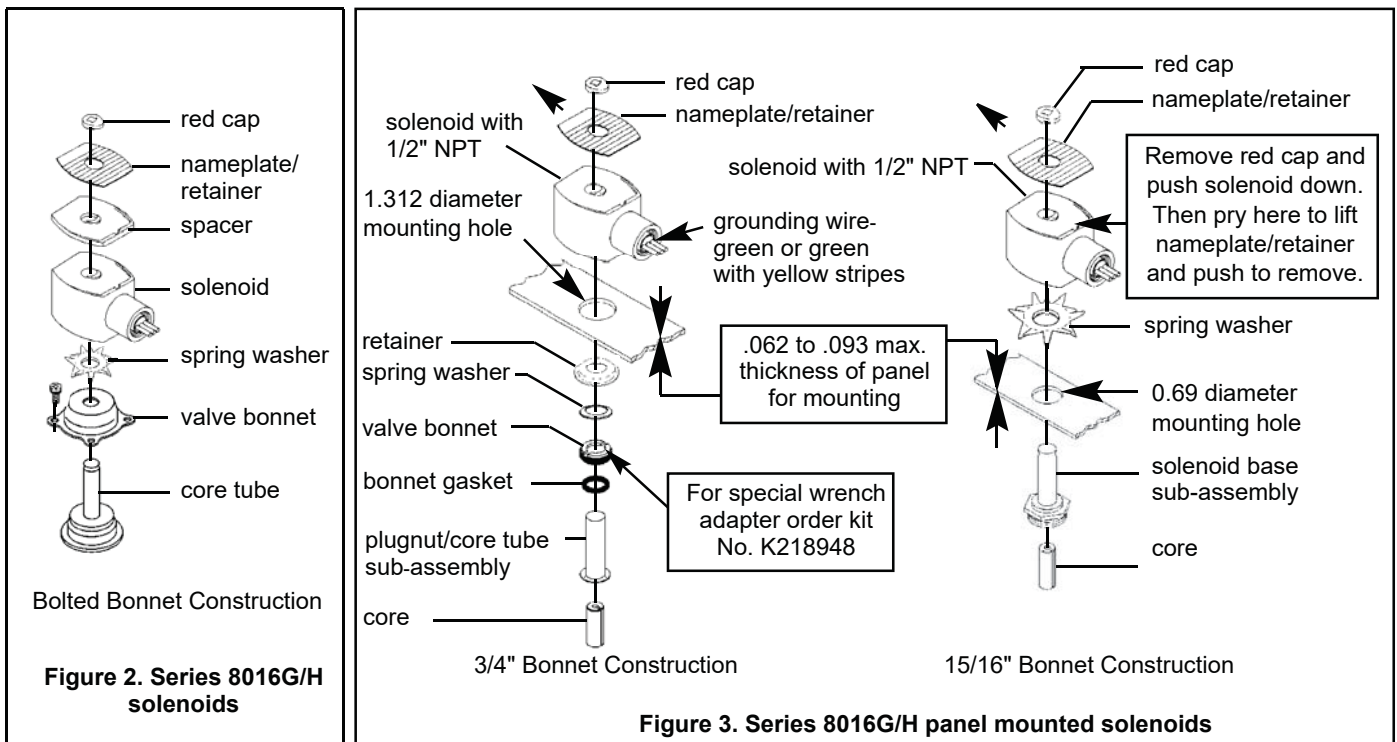
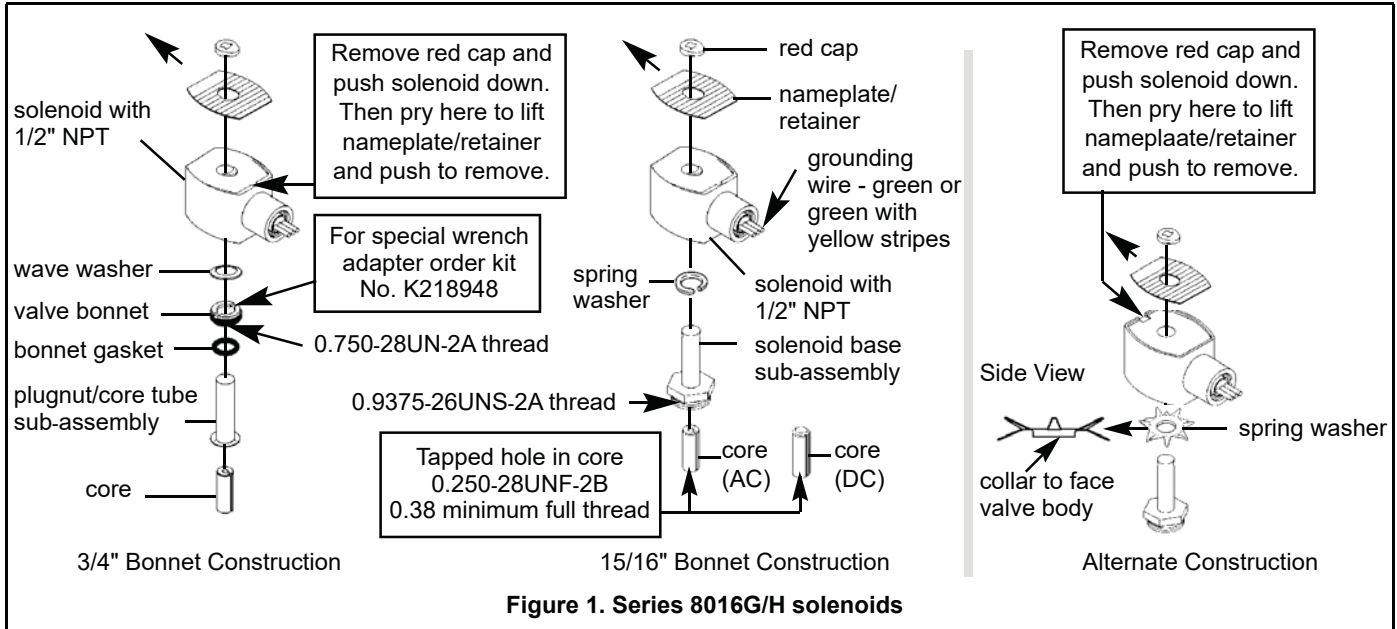
4. The core is now accessible for cleaning or replacement.
5. If the solenoid is part of a valve, refer to basic valve installation and maintenance instructions for further disassembly.
6. Reassemble using exploded views for identification and placement of parts.

ORDERING INFORMATION FOR ASCO SOLENOIDS

When Ordering Solenoids for ASCO Solenoid Operators or Valves, order the number stamped on the solenoid. Also specify voltage and frequency.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
solenoid base sub-assembly	175 ± 25	19,8± 2,8
valve bonnet (3/4" bonnet construction)	90 ± 10	10,2 ± 1,1
bonnet screw (3/8" or 1/2" NPT pipe size)	25	2,8
bonnet screw (3/4" NPT pipe size)	40	4,5



Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS

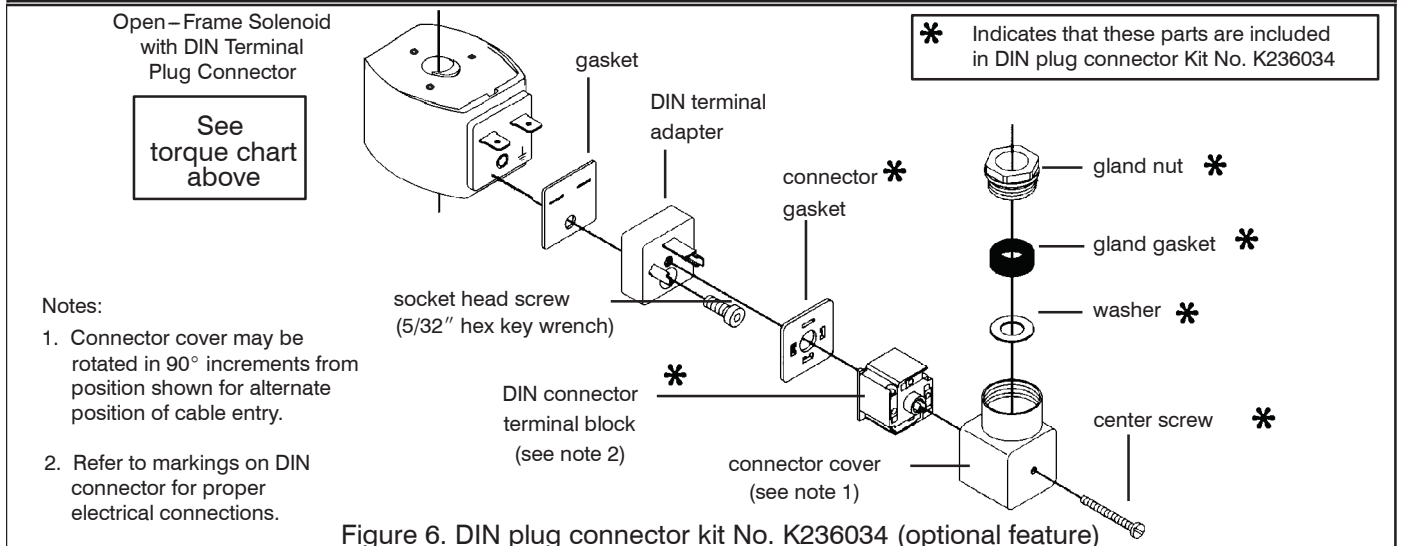
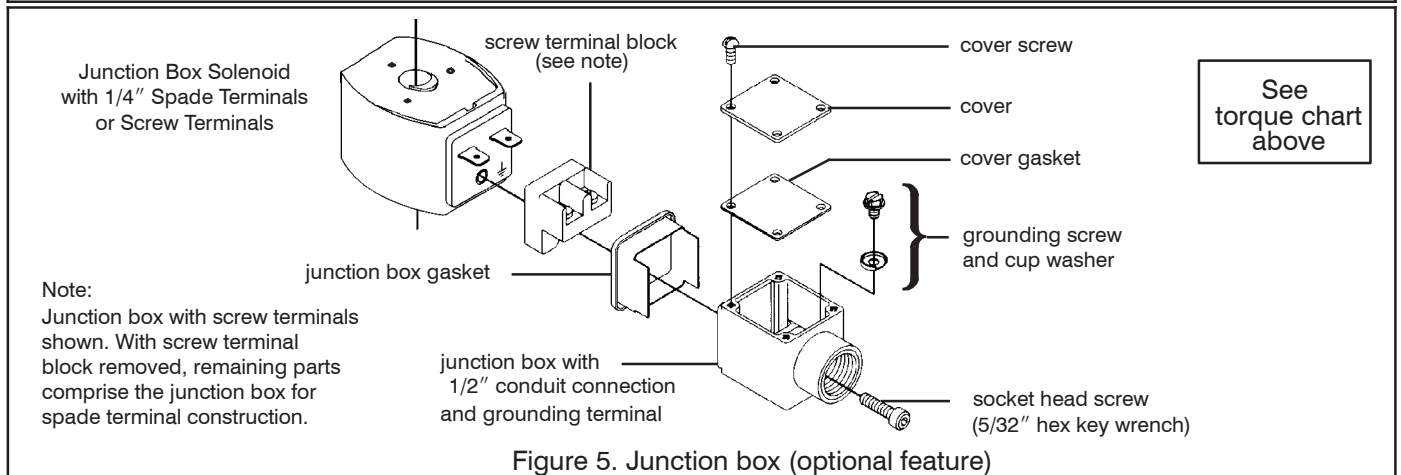
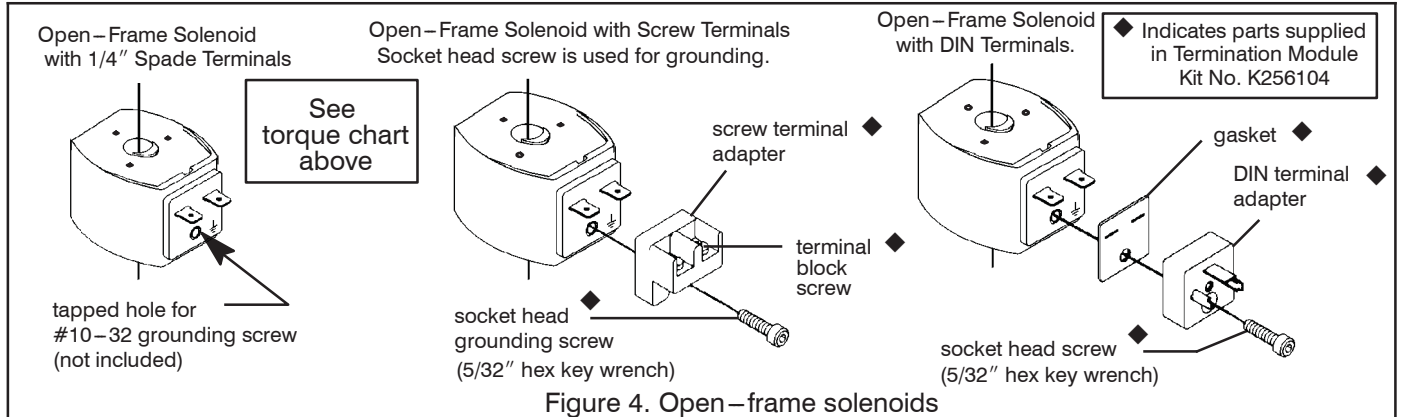
SERIES

8016G/H

NOTICE: See Installation and Maintenance Instructions, I&M No. V6583R11 - Section 1 of 2 for detailed instructions.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
terminal block screws	10 ± 2	1,1 ± 0,2
socket head screw	15 – 20	1,7 – 2,3
center screw	5 ± 1	0,6 ± 0,1



GENERAL INSTALLATION AND MAINTENANCE INSTRUCTIONS

Note: These general Installation and Maintenance Instructions must be read in conjunction with the Instruction Sheet for the specific product.

INSTALLATION

ASCO Numatics components are intended to be used only within the technical characteristics as specified on the nameplate. Changes to the equipment are only allowed after consulting the manufacturer or its representative. Before installation, depressurize the piping system and clean internally.

The equipment may be mounted in any position if not otherwise indicated on the product by means of an arrow.

The flow direction and pipe connection of valves are indicated on the body.

The pipe connections have to be in accordance with the size indicated on the nameplate and fitted accordingly.

Caution:

- Reducing the connections may cause improper operation or malfunctioning.
- For the protection of the equipment install a strainer or filter suitable for the service involved in the inlet side as close to the product as possible.
- If tape, paste, spray or a similar lubricant is used when tightening, avoid particles entering the system.
- Use proper tools and locate wrenches as close as possible to the connection point.
- To avoid damage to the equipment. DO NOT OVERTIGHTEN pipe connections
- Do not use valve or solenoid as lever.
- The pipe connections should not apply any force, torque or strain to the product.

ELECTRICAL CONNECTION

In case of electrical connections, they are only to be made by trained personnel and have to be in accordance with the local regulations and standards.

Caution:

- Turn off electrical power supply and de-energize the electrical circuit and voltage carrying parts before starting work.
- All electrical screw terminals must be properly tightened according to the standards before putting into service.
- Dependent upon the voltage electrical components must be provided with an earth connection and satisfy local regulations and standards.

The equipment can have one of the following electrical terminals:

- Spade plug connections according to ISO-4400 or 3 x DIN-46244 (when correctly installed, this connection provides IP-65 protection).
- Embedded screw terminals in metal enclosure with "Pg" cable gland
- Spade terminals (AMP type).
- Flying leads or cables.

PUTTING INTO SERVICE

Before pressurizing the system, first carry-out an electrical test. In case of solenoid valves, energize the coil a few times and notice a metal click signifying the solenoid operation.

SERVICE

Most of the solenoid valves are equipped with coils for continuous duty service. To prevent the possibility of personal or property damage, do not touch the solenoid which can become hot under normal operating conditions.

SOUND EMISSION

The emission of sound depends on the application, medium and nature of the equipment used. The exact determination of the sound level can only be carried out by the user having the valve installed in his system

MAINTENANCE

Maintenance of ASCO Numatics products is dependent on service conditions. Periodic cleaning is recommended, the timing of which will depend on the media and service conditions. During servicing, components should be examined for excessive wear. A complete set of internal parts is available as spare parts or rebuild kit. If a problem occurs during installation/maintenance or in case of doubt please contact ASCO Numatics or authorized representatives.

*A separate Declaration of Incorporation relating to EU-Directive 2006/42/EC Annex II B is available on request for applicable products. Please provide product identification number and serial numbers of products concerned.

The product, when marked CE, complies with the essential requirements of the EMC 2004/108/EC (until April 20th 2016) and EMC 2014/30/EU (from April 20th 2016) and LVD 2006/95/EC (until April 20th 2016) and LVD 2014/35/EU (from April 20th 2016). A separate Declaration of Conformity is available on request. Please provide product identification number and serial numbers of the products concerned.

INSTRUCTIONS GÉNÉRALES D'INSTALLATION ET D'ENTRETIEN

Note: Ces instructions générales d'installation et d'entretien complètent la notice spécifique du produit.

MONTAGE

Les composants ASCO Numatics sont conçus pour les domaines de fonctionnement indiqués sur la plaque signalétique ou la documentation. Aucune modification ne peut être réalisée sur le matériel sans l'accord préalable du fabricant ou de son représentant. Avant de procéder au montage, dépressuriser les canalisations et effectuer un nettoyage interne.

A moins qu'une flèche ou la notice n'indique un sens de montage spécifique de la tête magnétique, le produit peut être monté dans n'importe quelle position

Le sens de circulation du fluide est indiqué par repères sur le corps et dans la documentation.

La dimension des tuyauteries doit correspondre au raccordement indiqué sur le corps, l'étiquette ou la notice.

Attention:

- Une restriction des tuyauteries peut entraîner des dysfonctionnements.
- Afin de protéger le matériel, installer une crépine ou un filtre adéquat en amont, aussi près que possible du produit.
- En cas d'utilisation de ruban; pâte, aérosol ou autre lubrifiant lors du serrage, veiller à ce qu'aucun corps étranger ne pénètre dans le circuit.
- Utiliser un outillage approprié et placer les clés aussi près que possible du point de raccordement.
- Afin d'éviter toute détérioration, NE PAS TROP SERRER les raccords des tuyauteries.
- Ne pas se servir de la vanne ou de tête magnétique comme d'un levier.
- The pipe connections should not apply any force, torque or strain to the product.

RACCORDEMENT ÉLECTRIQUE

Le raccordement électrique doit être réalisé par un personnel qualifié et selon les normes et règlements locaux.

Attention:

- Avant toute intervention, couper l'alimentation électrique pour mettre hors tension les composants.
- Toutes les bornes à vis doivent être serrées correctement avant la mise en service.
- Selon la tension, les composants électrique doivent être mis à la terre conformément aux normes et règlements locaux.

Selon les cas, le raccordement électrique s'effectue par:

- Déconnecteur débrochable ISO-4400 ou 3 x DIN-46244 avec degré de protection IP-65 lorsque le raccordement est correctement effectué.
- Bornes à vis solidaires du bobinage, sous boîtier métallique avec presse-étoupe "Pg--".
- Cosses (type AMP).
- Fils ou câbles solidaires de la bobine.

MISE EN SERVICE

Avant de mettre le circuit sous pression, effectuer un essai électrique. Dans le cas d'une électrovanne, mettre la bobine sous tension plusieurs fois et écouter le "clic" métallique qui signale le fonctionnement de la tête magnétique.

FONCTIONNEMENT

La plupart des électrovannes comportant des bobinages prévus pour mise sous tension permanente. Pour éviter toute brûlure, ne pas toucher la tête magnétique qui, en fonctionnement normal et en permanence sous tension, peut atteindre une température élevée.

BRUIT DE FONCTIONNEMENT

Le bruit de fonctionnement varie selon l'utilisation, le fluide et le type de matériel employé. L'utilisateur ne pourra déterminer avec précision le niveau sonore émis qu'après avoir monté le composant sur l'installation.

ENTRETIEN

L'entretien nécessaire aux produits ASCO Numatics varie avec leurs conditions d'utilisation. Il est souhaitable de procéder à un nettoyage périodique dont l'intervalle varie suivant la nature du fluide, les conditions de fonctionnement et le milieu ambiant. Lors de l'intervention. Les composants doivent être examinés pour détecter toute usure excessive. Un ensemble de pièces internes est proposé en pièces de rechange pour procéder à la réparation. En cas de problème lors du montage/entretien ou en cas de doute, veuillez contacter ASCO Numatics ou ses représentants officiels.

*Une déclaration d'incorporation relative à la directive UE 2006/42/CE Annexe II B est disponible sur demande pour les produits applicables. Veuillez fournir le numéro d'identification du produit et les numéros de série des produits concernés.

Lorsqu'il est marqué du label CE, le produit est conforme aux exigences essentielles des directives CEM 2004/108/CE (jusqu'au 20 avril 2016) et CEM 2014/30/UE (à partir du 20 avril 2016) et des directives Basse tension 2006/95/CE (jusqu'au 20 avril 2016) et 2014/35/UE (à partir du 20 avril 2016). Une déclaration de conformité peut être fournie sur simple demande. Veuillez fournir le numéro d'identification du produit et les numéros de série des produits concernés.

ALLGEMEINE BETRIEBSANLEITUNG

Achtung: Diese Allgemeine Betriebsanleitung gilt in Zusammenhang mit der jeweiligen Betriebsanleitung für die speziellen Produkte.

EINBAU

Die ASCO Numatics-Komponenten dürfen nur innerhalb der auf den Typenschildern angegebenen Daten eingesetzt werden, Veränderungen an den Produkten sind nur nach Rücksprache mit ASCO Numatics zulässig.

Vor dem Einbau der Ventile muß das Rohrleitungssystem drucklos geschaltet und innen gereinigt werden.

Die Einbaulage der Produkte ist generell beliebig. Ausnahme: Die mit einem Pfeil gekennzeichneten Produkte müssen entsprechend der Pfeilrichtung montiert werden.

Die Durchflußrichtung und der Eingang von Ventilen sind gekennzeichnet.

Die Rohranschlüsse sollten entsprechend den Größenangaben auf den Typenschildern mit handelsüblichen Verschraubungen durchgeführt werden. Dabei ist folgendes zu beachten:

- Eine Reduzierung der Anschlüsse kann zu Leistungs- und Funktionsminderungen führen.
- Zum Schutz der Ventile sollten Schmutzfänger oder Filter so dicht wie möglich in den Ventileingang integriert werden.
- Bei Abdichtung am Gewinde ist darauf zu achten, daß kein Dichtungsmaterial in die Rohrleitung oder das Ventil gelangt.
- Zur Montage darf nur geeignetes Werkzeug verwendet werden.
- Konische Verschraubungen sind sorgfältig anzuziehen. Es ist darauf zu achten, daß beim Anziehen das Gehäuse nicht beschädigt wird.
- Spule und Führungsrohr von Ventilen dürfen nicht als Gegenhalter benutzt werden.
- Die Rohrleitungsanschlüsse sollen fluchten und dürfen keine Spannungen auf das Ventil übertragen.

ELECTRISCHER ANSCHLUß

Der elektrische Anschluß ist von Fachpersonal entsprechend den geltenden VDE- und CEE Richtlinien auszuführen. Es ist besonders auf folgendes zu achten:

- Vor Beginn der Arbeiten ist sicherzustellen, daß alle elektrischen Leitungen und Netzteile spannungslos geschaltet sind.
- Alle Anschlußklemmen sind nach Beendigung der Arbeiten vorschriftsmäßig entsprechend den geltenden Regeln anzuziehen.
- Je nach Spannungsbereich muß das Ventil nach den geltenden Regeln einen Schutzleiterschlüssel erhalten.

Der Magnetantrieb kann je nach Bauart folgende Anschlüsse haben:

- Anschluß für Gerätesteckdose nach DIN 43650 Form A/ISO 4400 oder 3 x DIN 46244 (durch ordnungsgemäße Montage der Gerätesteckdose wird Schutzklasse IP 65 erreicht).
- Anschlüsse innerhalb eines Blechgehäuses mittels Schraubklemmen. Kabeleinführung ins Gehäuse mit PG-Verschraubung.
- Offene Spulen mit Flachsteckern (AMP-Fahnen) oder mit eingegossenen Kabelenden.

INBETRIEBNAHME

Vor Druckbeaufschlagung des Produktes sollte eine elektrische Funktionsprüfung erfolgen:

Bei Ventilen Spannung an der Magnetspule mehrmals ein- und ausschalten. Es muß ein Klicken zu hören sein.

BETRIEB

Die meisten Ventile sind mit Spulen für Dauerbetrieb ausgerüstet. Zur Vermeidung von Personen- und Sachschäden sollte jede Berührung mit dem Ventil vermieden werden, da die Magnetspule bei längerem Betrieb sehr heiß werden kann.

GERÄUSCHEMISSION

Diese hängt sehr stark vom Anwendungsfall, den Betriebsdaten und dem Medium, mit denen das Produkt beaufschlagt wird, ab. Eine Aussage über die Geräuschemission des Produktes muß deshalb von demjenigen getroffen werden, der das Produkt innerhalb einer Maschine in Betrieb nimmt.

WARTUNG

Die Wartung hängt von den Einsatzbedingungen ab. In entsprechenden Zeitabständen muß das Produkt geöffnet und gereinigt werden. Für die Überholung der ASCO Numatics-Produkte können Ersatzteilsätze geliefert werden. Treten Schwierigkeiten bei Einbau, Betrieb oder Wartung auf, sowie bei Unklarheiten, ist mit ASCO Numatics Rücksprache zu halten.

ASCO Numatics Produkte sind entsprechend der EG-Richtlinie 89/392/EWG gefertigt.

*Eine separate Herstellererklärung im Sinne der Richtlinie 2006/42/EWG Anhang II B ist auf Anfrage für die entsprechenden Produkte erhältlich. Geben Sie bitte die Kennnummer sowie die Seriennummer der betreffenden Produkte an.

Das Produkt, wenn mit CE gekennzeichnet, erfüllt die Anforderungen von EMV 2004/108/EWG (bis 20. April 2016) und EMV 2014/30/EU (vom 20. April 2016) und LVD 2006/95/EWG (bis 20. April 2016) und LVD 2014/35/EU (vom 20. April 2016). Eine separate Konformitätserklärung ist auf Anfrage erhältlich. Geben Sie bitte die Kennnummer sowie die Seriennummer der betreffenden Produkte an.



MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

ASCO

8320G094, SOLENOID VALVE

WATER TECHNOLOGIES

LEFT BLANK

Installation & Maintenance Instructions

2-WAY INTERNAL PILOT-OPERATED SOLENOID VALVES
HUNG DIAPHRAGM — 3/8", 1/2" AND 3/4" NPT
NORMALLY CLOSED OPERATION

SERIES
8210
8211

NOTICE: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Cause of Improper Operation, Coil or Solenoid Replacement.

DESCRIPTION

Series 8210 valves are 2-way normally closed, internal pilot operated solenoid valves. Valve body and bonnet are of brass construction. Series 8210 valves may be provided with a general purpose/watertight, open-frame or explosionproof/watertight solenoid.

Series 8210 and 8211 valves with suffix "HW" in the catalog number are specifically designed for hot water service.

Notice: These valves are not certified as lead-free under the Safe Water Drinking Act SWDA 1417 and are not intended for use on drinking water systems. They are intended for control of water in industrial applications. Consult ASCO for valves rated for use in potable water applications.

OPERATION

Normally Closed: Valve is closed when solenoid is de-energized; open when energized.

Manual Operator (Optional)

Valves with suffix "MO" in catalog number are provided with a manual operator which allows manual operation when desired or during an interruption of electrical power. To operate valve manually, push in knurled cap and rotate 180°. Disengage manual operator by rotating knurled cap counterclockwise 180° before operating electrically.

Manual Operator Location (Refer to Figure 3)

Manual operator (when shipped from factory) will be located over the valve outlet. Manual operator may be relocated at 90° increments by rotating valve bonnet. Remove bonnet screws (4) and rotate valve bonnet with solenoid to desired position. Replace bonnet screws (4) and torque in a crisscross manner to 110±10 inch pounds.

If valve is installed in the system and is operational, proceed in the following manner:

⚠ WARNING: To prevent the possibility of death, serious injury or property damage, depressurize valve and vent fluid to a safe area before servicing the valve.

1. Remove the solenoid - see separate solenoid instructions.
2. Remove bonnet screws (4) and rotate valve bonnet to desired position.
3. Replace bonnet screws (4) and torque in a crisscross manner to 110±10 inch pounds.
4. Replace all solenoid parts.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to chart. The temperature limitations listed are for UL applications. For non UL applications, higher ambient and fluid temperature limitations are available. Consult factory. Check catalog number on nameplate to determine maximum temperatures.

Construction	Max. Fluid Temp, °F
AC Construction (Alternating Current)	180
DC Construction (Direct Current)	150
Catalog Numbers Suffixed "HW" AC Construction (Alternating Current)	210

Note: For Maximum Ambient Temperature specifications, see separate solenoid instructions.

Positioning

This valve 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.

Mounting

For mounting bracket (optional feature) dimensions, refer to Figure 1.

Piping

Connect piping to valve according to markings on valve body. Apply pipe compound or PTFE tape sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

IMPORTANT: Valves with Suffix "HW" in the catalog number have a special diaphragm material which is specifically compounded for hot water service. This material can be attacked by oil and grease. Wipe the pipe threads clean of cutting oils and use PTFE tape to seal pipe joints.

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

MAINTENANCE

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

NOTE: It is not necessary to remove the valve from the pipeline for repairs.

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the 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. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep the medium flowing through the valve as free from dirt and foreign material as possible.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Causes of Improper Operation

- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Coil Replacement (See separate solenoid instructions)

Valve Disassembly (Refer to Figures 2 and 3)

1. Remove the solenoid - see separate solenoid instructions.
2. Unscrew solenoid base sub-assembly and remove bonnet gasket.
3. Remove valve bonnet screws (4) and valve bonnet.
4. For normal maintenance, it is not necessary to disassemble the manual operator (optional feature) unless external leakage is evident. To disassemble, remove stem pin, manual operator stem, stem spring and stem gasket.
5. Remove core spring, core/diaphragm sub-assembly and body gasket. CAUTION: Do not damage or distort hanger spring between core/diaphragm sub-assembly.
6. All parts are now accessible for cleaning or replacement. Replace worn or damaged parts with a complete Spare Parts Kit for best results.

Valve Reassembly

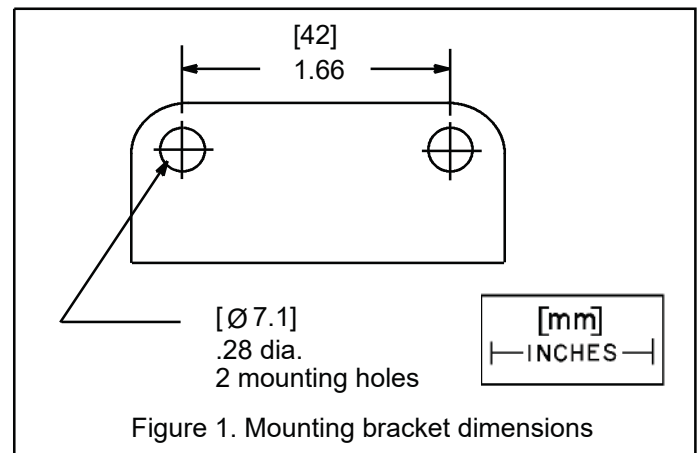
1. Reassemble in reverse order of disassembly paying careful attention to exploded views provided for identification and placement of parts.
2. Lubricate body gasket and solenoid base gasket with DOW CORNING® 200 fluid lubricant or an equivalent high-grade silicone fluid. Lubricate manual operator stem gasket with DOW CORNING® 111 Compound lubricant or an equivalent high-grade silicone grease. On oxygen valves Suffix "N" and special cleaning valves where silicone lubricants are not allowed use FLOROLUBE® GR-362, LG-160 or KRYTOX® GPL -226.

Note: Only the gaskets specified above should be lubricated.

3. Replace body gasket and core/diaphragm sub-assembly. Locate the bleed hole in core/diaphragm sub-assembly approximately 45° from the valve outlet.
4. Replace core spring with wide end in core first; closed end protrudes from top of core.
5. If removed, replace manual operator stem, stem spring, stem gasket and stem pin.
6. Replace valve bonnet and bonnet screws (4). Torque bonnet screws (4) in a crisscross manner to 110±10 inch pounds.
7. Replace bonnet gasket and solenoid base sub-assembly. Put solenoid base sub-assembly to 175±25 inch pounds.
8. Replace solenoid enclosure and retaining cap or clip.
9. After maintenance, operate the valve a few times to be sure of proper opening and closing.

ORDERING INFORMATION FOR ASCO REBUILD KITS

Parts marked with an asterisk(*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO Valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

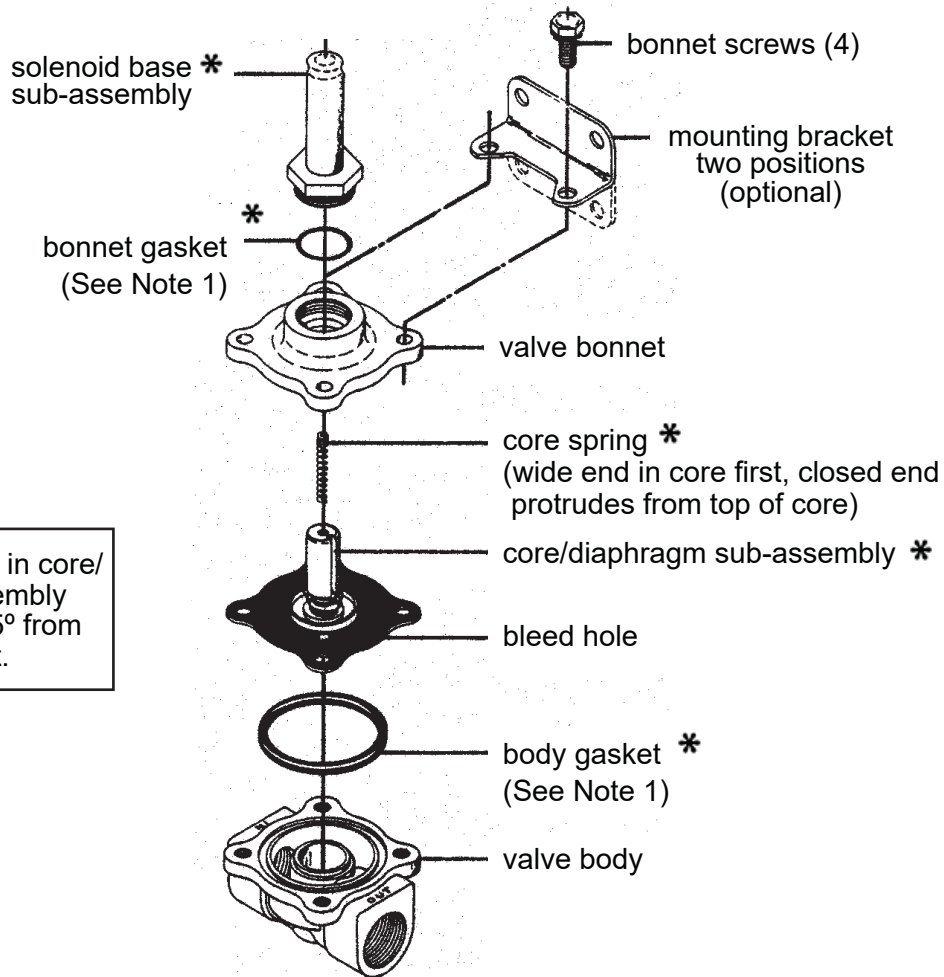


* Indicates parts
supplied in ASCO
Rebuild Kit

Torque solenoid base
sub-assembly to
 175 ± 25 inch pounds.

Torque bonnet screws
(4) in a crisscross
manner to 110 ± 10 inch
pounds.

Locate bleed hole in core/
diaphragm assembly
approximately 45° from
valve outlet.



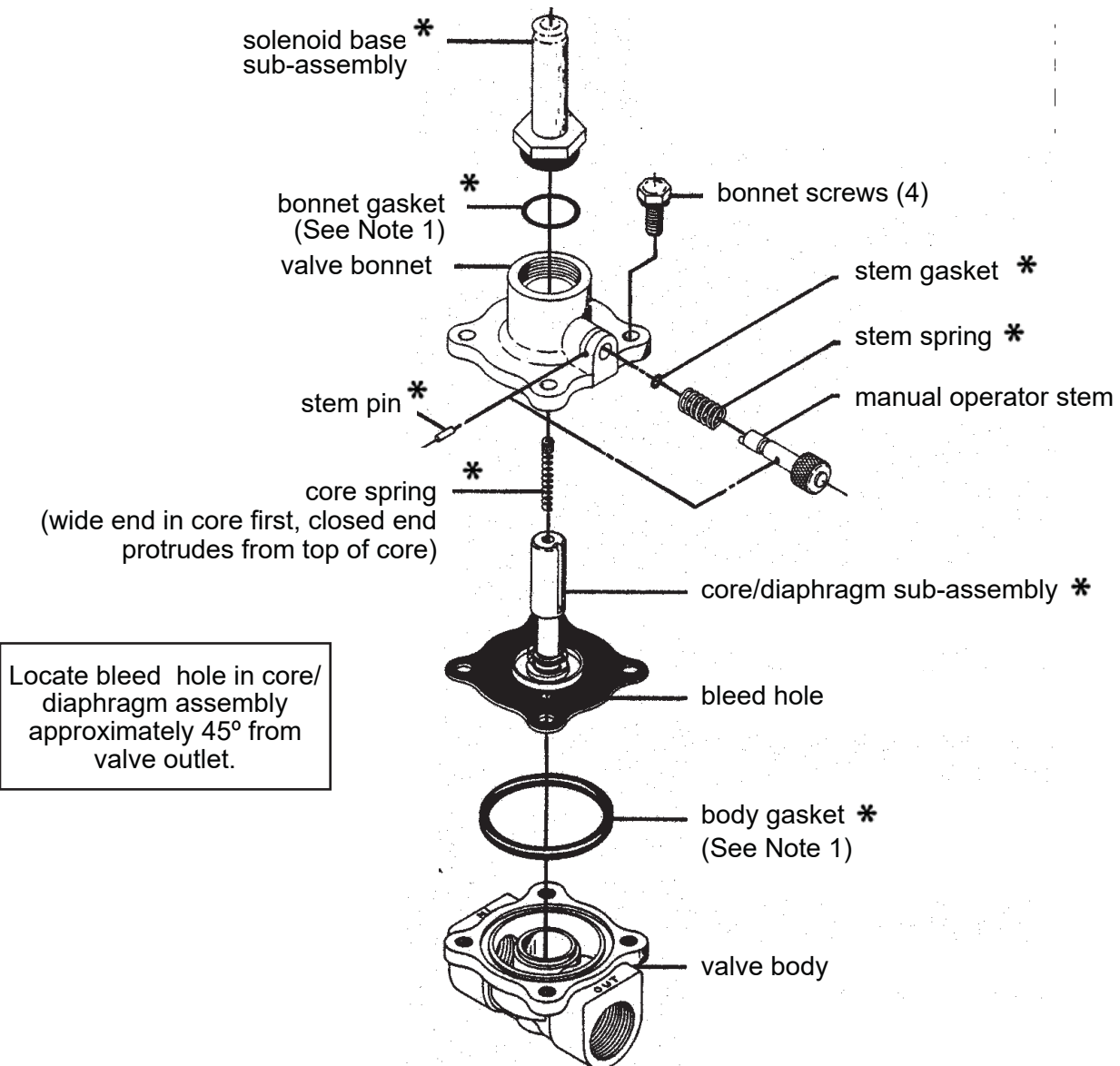
Note 1: Lubrication required for body and bonnet
gaskets. See valve reassembly instructions

Figure 2. Series 8210 - 3/8", 1/2" & 3/4" NPT - AC Construction

* Indicates parts supplied in ASCO Rebuild Kit

Torque solenoid base sub-assembly to 175 ± 25 inch pounds.

Torque bonnet screws (4) in a crisscross manner to 110 ± 10 inch pounds.



Note 1: Lubrication required for body and bonnet gaskets. See valve reassembly instructions

Figure 3. Series 8210 - Manual Operator

Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS
OPTIONAL FEATURE FOR OPEN FRAME (GENERAL PURPOSE) CONSTRUCTION ONLY

SERIES
8003G/H
8007G/H
8202G/H

— SERVICE NOTICE —

ASCO® solenoid valves with design change letter “G” or “H” in the catalog number (ex. 8210G1) have an epoxy encapsulated ASCO™ Red Hat II™ solenoid. This solenoid replaces some of the solenoids with metal enclosures and open-frame constructions. Follow these installation and maintenance instructions if your valve or operator uses this solenoid.

See separate instructions for basic valve.

DESCRIPTION

Catalog numbers 8003G/H, 8007G/H and 8202G/H and are epoxy encapsulated pull-type solenoids. The green solenoid with lead wires and 1/2 conduit connection is designed to meet Enclosure Type 1-General Purpose, Type 2-Dripproof, Types 3 and 3S-Raintight, and Types 4 and 4X-Watertight. The black solenoid on catalog numbers prefixed “EF” or “EV” is designed to meet Enclosure Types 3 and 3S-Raintight, Types 4 and 4X-Watertight, Types 6 and 6P-Submersible, Type 7, Explosionproof Class I, Division1 Groups A, B, C, & D and Type 9, -Dust-Ignitionproof Class II, Division1 Groups E, F & G. The Class II, Groups F & G Dust Locations designation is not applicable for solenoids or solenoid valves used for steam service or when a class “H” solenoid is used. See *Temperature Limitations* section for solenoid identification and nameplate/retainer for service. When installed just as a solenoid and not attached to an ASCO valve, the core has a 0.250-28 UNF-2B tapped hole, 0.38 or 0.63 minimum full thread.

NOTE: Catalog number prefix “EV” denotes stainless steel construction.

Solenoid catalog numbers 8202G/H1, 8202G/H3, 8202G/H5 and 8202G/H7 are epoxy encapsulated push-type, reverse-acting solenoids having the same enclosure types as previously stated for Catalog numbers 8003G/H1 and 8003G/H2. 8007G/H are 3-way solenoid operators with a pipe port or adapter, exhaust protector or vent at the top of the solenoid base sub-assembly.

Series 8003G/H, 8007G/H and 8202G/H solenoids are also available in:

- **Open-Frame Construction:** The green solenoid may be supplied with 1/4” spade, screw or DIN terminals. (Refer to Figure 4)
 - **DIN Plug Connector Kit No. K236034:** Use this kit only for solenoids with DIN terminals. The DIN plug connector kit provides a two pole with grounding contact DIN Type 43650 construction (See Figure 6).
- **Panel Mounted Construction:** These solenoids are specifically designed to be panel mounted by the customer. Refer to Figures specified in this I&M and the section on *Installation of Panel Mounted Solenoid* for details.
- **Junction Box:** This junction box construction meets Enclosure Types 2, 3, 3S, 4, and 4X. Only solenoids with 1/4” spade or screw terminals may have a junction box. The junction box provides a 1/2” conduit connection, grounding and spade or screw terminal connections within the junction box (See Figure 5).
- **Multipin Connectors:** All Multipin connectors (VT, VB, ZT, ZB) do not have any enclosure ratings.

NOTE: For China RoHS Hazardous Substances table, please go to the link below or scan QR code:
www.asco.com/ChinaRoHSDisclosure



OPERATION

Series 8003G/H and 8007G/H - 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 11 ounces, and 5 ounces for DC construction.

Series 8202G/H - When the solenoid is energized, the disc holder assembly seats against the orifice. When the solenoid is de-energized, the disc holder assembly returns. **IMPORTANT:** Initial return force for the disc or disc holder assembly, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force is 1 pound, 5 ounces.

INSTALLATION

Check nameplate for correct catalog number, service, and wattage. Check front of solenoid for voltage and frequency.

⚠ WARNING: Electrical hazard from the accessibility of live parts. To prevent the possibility of death, serious injury or property damage, install the open - frame solenoid in an enclosure.

⚠ AVERTISSEMENT: Risque d'accès aux parties électriques actives. Afin d'éviter tout risque de mort, blessure ou dommage, installer la bobine dans un boîtier.

FOR BLACK ENCLOSURE TYPES 7 AND 9 ONLY

⚠ CAUTION: To prevent fire or explosion, do not install solenoid and/or valve where ignition temperature of hazardous atmosphere is less than 165°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/retainer for service.

⚠ ATTENTION : Afin d'éviter le risque de feu ou d'explosion, ne pas installer la bobine ou l'électrovanne où la température d'inflammation en atmosphère explosible est inférieure à 165°C. Pour les vannes vapeur ou lorsqu'une bobine de classe H est utilisée, ne pas installer en atmosphère explosible lorsque la température d'inflammation est inférieure à 180°C. Consulter les conditions d'utilisations sûres indiquées sur le produit ou dans la notice.

NOTE: These solenoids have an internal non-resettable thermal fuse to limit solenoid temperature in the event that extraordinary conditions occur which could cause excessive temperatures. These conditions include high input voltage, a jammed core, excessive ambient temperature or a shorted solenoid, etc. This unique feature is a standard feature only in solenoids with black explosionproof/dust-ignitionproof enclosures (Types 7 & 9).

⚠ CAUTION: To protect the solenoid valve or operator, 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 and 8601 for strainers.

⚠ ATTENTION : Afin de protéger l'électrovanne ou l'actionneur, installer une crépine ou un filtre adapté le plus proche possible en amont de l'électrovanne ou de l'actionneur. Nettoyer périodiquement le filtre en fonction des conditions d'utilisation. Se référer aux séries 8600 et 8601 pour les crépines.

Temperature Limitations

For maximum solenoid ambient temperatures, refer to chart. The temperature limitations listed, only indicate maximum application temperatures for field wiring rated at 90°C. Check catalog number prefix and watt rating on nameplate to determine maximum ambient temperature. See valve installation and maintenance instructions for maximum ambient and fluid temperatures.

NOTE: For steam service, refer to *Wiring* section, *Junction Box* for temperature rating of supply wires.

Temperature Limitations For Series 8003G, 8007G or 8202G			
Watt Rating	Catalog Number Coil Prefix	Class of Insulation	Maximum § Ambient Temp.
10.1 & 17.1	None, FB, KF, KP, SC, SD, SF, SP, VT, VB, ZT & ZB	F	125°F (52°C)
10.1, 17.1 & 24.6	HB, HT, KB, KH, SS, ST, SU, HC	H	140°F (60°C)
11.6 & 22.6	None, FB, KF, KP, SC, SD, SF, SP, VT, VB, ZT & ZB	F	104°F (40°C)
11.6 & 22.6	HP, HT, KB, KH, SS, ST, SU & SV	H	104°F (40°C)
15.6	None, KB, SS, SV	H	104°F (40°C)

§ Minimum ambient temperature -40°F (-40°C).

Temperature Limitations for Series 8003H, 8007H and 8202H solenoids						
		Watt Ratings			Maximum Ambient Temperature	
Prefix ¹	Coil Class	AC		DC		
		60 Hz	50 Hz		°C	°F
EF, EV	FT	10.1	10.1	-	52	125
EF, EV	FB	17.1	17.1	-		
	FT	10.1	10.1	-	55	131
	FB	17.1	17.1	-		
	HT	-	-	11.6	40 ²	104 ²
	HF	-	-	15.6		
	HB	-	-	22.6		
EF, EV	HT	-	-	11.6		
EF, EV	HF	-	-	15.6		
EF, EV	HB	-	-	22.6	60 ³	140 ³
	HT	10.1	10.1	-		
	HB	17.1	17.1	-		
EF, EV	HT	10.1	10.1	-		
EF, EV	HB	17.1	17.1	-		
EF, EV	HC	-	-	24.6		

¹ = EF, EV data applies to Explosionproof coils only.

² = Some DC solenoid valves can be operated at maximum ambient temperature of 55°C / 131°F with reduced pressure ratings. See valve I&M for maximum operating pressure differential ratings.

³ = Steam Service Valves have a maximum ambient temperature of 55°C / 131°F.

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. All solenoids supplied with lead wires are provided with a grounding wire which is green or green with yellow stripes and a 1/2" conduit connection. To facilitate wiring, the solenoid may be rotated 360°. For explosionproof solenoid version, the conduit lead wires are factory sealed for use in hazardous locations.

⚠ CAUTION: Cryogenic Applications - Solenoid lead wire insulation should not be subjected to cryogenic temperatures. Adequate lead wire protection and routing must be provided.

⚠ ATTENTION: Application cryogénique. Les câbles électriques ne doivent pas être soumis à des températures cryogéniques. Une protection adéquate des câbles électriques doit être fournie.

Additional Wiring Instructions For Optional Features:

• Open-Frame solenoid with 1/4" spade terminals.

For solenoids supplied with screw terminal connections use #12-18 AWG stranded copper wire rated at 90°C or greater. Torque terminal block screws to 10±2 in-lbs [1,0±1,2 Nm]. A tapped hole is provided in the solenoid for grounding, use a #10-32 machine screw. Torque grounding screw to 15-20 in-lbs [1,7-2,3 Nm]. On solenoids with screw terminals, the socket head screw holding the terminal block to the solenoid is the grounding screw. Torque the screw to 15-20 in-lbs [1,7-2,3 Nm] with a 5/32" hex key wrench.

• Junction Box

The junction box is used with spade or screw terminal solenoids only and is provided with a grounding screw and a 1/2" conduit connection. Connect #12-18 AWG standard copper wire only to the screw terminals. Within the junction box use field wire that is rated 90°C or greater for connections. For steam service use 105°C rated wire up to 50 psi or use 125°C rated wire above 50 psi. After electrical hookup, replace cover gasket, cover, and screws. Tighten screws evenly in a crisscross manner.

Multipin Connector		
Connector Type	Mating Connector	Application
VT / VB	4-Pin, M12, Female, Single Keyway	DC
	4-Pin, M12, Female, Dual Reverse Keyway	AC
ZT / ZB	3-Pin, Mini, Female, Single Keyway	AC / DC

• DIN Plug Connector Kit No. K236034

- The open-frame solenoid is provided with DIN terminals to accommodate the plug connector kit.
- Remove center screw from plug connector. Using a small screwdriver, pry terminal block from connector cover.
- Use #12-18 AWG stranded copper wire rated at 90°C or greater for connections. Strip wire leads back approximately 1/4" for installation in socket terminals. The use of wire-end sleeves is also recommended for these socket terminals. Maximum length of wire-end sleeves to be approximately 1/4". Tinning of the ends of the lead wires is not recommended.
- Thread wire through gland nut, gland gasket, washer and connector cover.

NOTE: Connector housing may be rotated in 90° increments from position shown for alternate positioning of cable entry.

5. Check DIN connector terminal block for electrical markings. Then make electrical hookup to terminal block according to markings on it. Snap terminal block into connector cover and install center screw.
6. Position connector gasket on solenoid and install plug connector. Torque center screw to 5 ± 1 in-lbs [$0,6\pm 1,1$ Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently and cannot be converted from one to the other by changing the coil.

Installation of Solenoid

Solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid.

Installation of Panel Mounted Solenoid (See Figures 1 and 2)

1. Disassemble solenoid following instruction under *Solenoid Replacement* then proceed.
2. Install solenoid base sub-assembly through customer panel. 8202H panel mounted solenoids include a retainer to adapt the solenoid base sub-assembly to the customer panel. (See Figure 2)
3. Position finger washer on opposite side of panel over solenoid base sub-assembly.
4. Replace solenoid, nameplate/retainer and red cap.
5. Make electrical hookup, see *Wiring* section.

Solenoid Temperature

Standard solenoids are designed for continuous duty service. When the solenoid is energized for a long period, the solenoid becomes hot and can be touched by hand only for an instant. This is a safe operating temperature.

MAINTENANCE

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

⚠ AVERTISSEMENT: Pour éviter tous danger de mort, de blessure grave ou de dommage matériel, avant d'intervenir sur la vanne, couper le courant, purger la vanne dans une zone sécurisée.

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 solenoid 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.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- 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 worn or damaged parts.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* signifies that the solenoid is operating. Absence of the *click* indicates loss of power supply. Check for loose or blown fuses, open-circuited or grounded solenoid, broken leadwires or splice connections.
- **Burned-Out Solenoid:** Check for open-circuited solenoid. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate/retainer and marked on the solenoid. Check ambient temperature and check that the core is not jammed.
- **Low Voltage:** Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

Solenoid Replacement

1. Disconnect conduit, coil leads, and grounding wire.

NOTE: Any optional parts attached to the old solenoid must be reinstalled on the new solenoid. For 3-way construction, piping or tubing must be removed from pipe adapter.

2. Disassemble solenoids with optional features as follows:

- **Spade or Screw Terminals**

Remove terminal connections, grounding screw, grounding wire, and terminal block (screw terminal type only).

NOTE: For screw terminals, the socket head screw holding the terminal block serves as a grounding screw.

- **Junction Box**

Remove conduit and socket head screw (use $5/32$ " hex key wrench) from center of junction box. Disconnect junction box from solenoid.

- **DIN Plug Connector**

Remove center screw from DIN plug connector. Disconnect DIN plug connector from adapter. Remove socket head screw (use $5/32$ " hex key wrench), DIN terminal adapter, and gasket from solenoid.

3. Remove red cap or retainer from top of solenoid base sub-assembly. For 3-way construction with pipe adapter (Figure 3), remove pipe adapter, nameplate and solenoid. Omit steps 4 and 5.
4. Push down on solenoid. Then using a suitable screwdriver, insert blade between solenoid and nameplate/retainer. Pry up slightly and push to remove. **NOTE:** Series 8202G/H solenoids have a spacer between the nameplate/retainer and solenoid.
5. Remove solenoid from solenoid base sub-assembly.
6. Reassemble in reverse order of disassembly. Use exploded views for identification and placement of parts.
7. Torque pipe adapter to 90 inch-pounds maximum [$10,2$ Nm maximum]. Then make up piping or tubing to pipe adapter on solenoid.

Disassembly and Reassembly of Solenoids

1. Remove solenoid, see *Solenoid Replacement*.
2. Remove spring washer from solenoid base sub-assembly. For 3-way construction, remove pipe adapter and plugnut gasket.
3. Unscrew solenoid base sub-assembly from valve body.
4. Remove internal solenoid parts for cleaning or replacement. Use exploded views for identification and placement of parts.
5. If the solenoid is part of a valve, refer to basic valve installation and maintenance instructions for further disassembly.
6. Torque solenoid base sub-assembly and adapter to 175 ± 25 in-lbs [$19,8\pm 2,8$ Nm].

ORDERING INFORMATION FOR ASCO SOLENOIDS

When Ordering Solenoids for ASCO Solenoid Operators or Valves, order the number stamped on the solenoid. Also specify voltage and frequency.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
pipe adapter	90 maximum	10,2 maximum

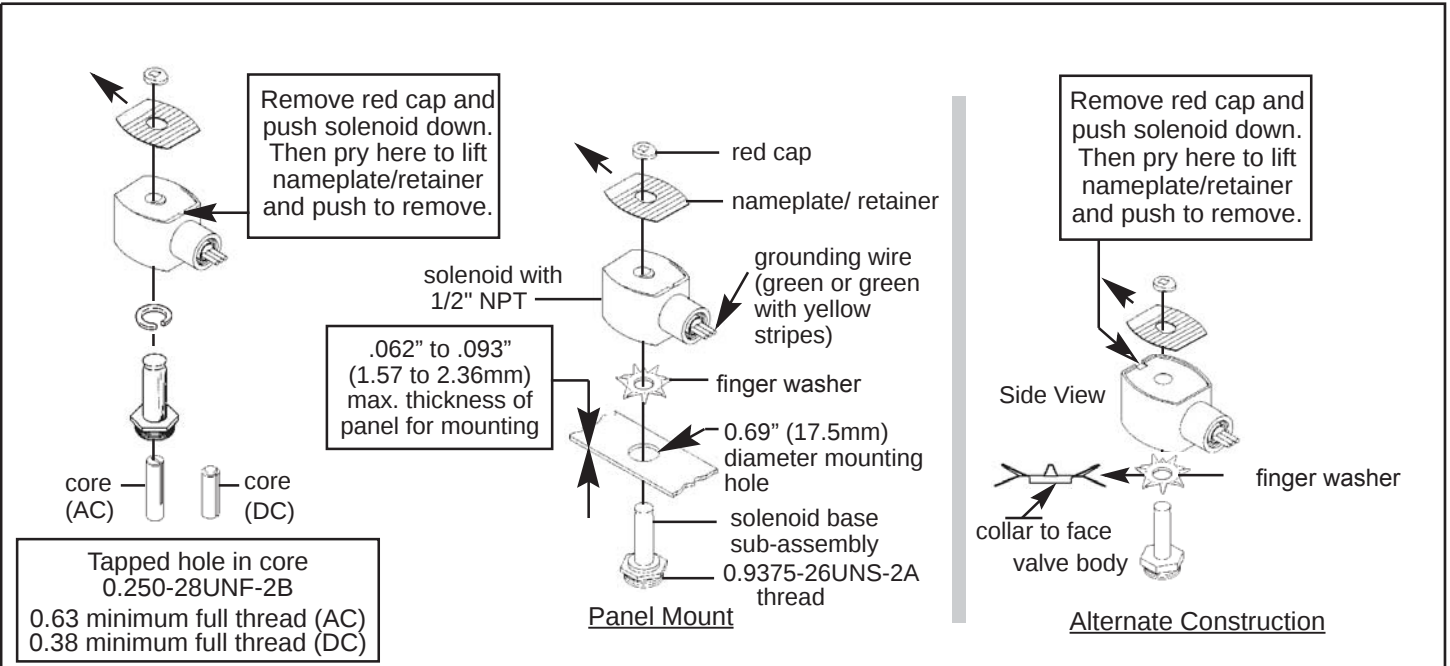


Figure 1. Series 8003G/H Solenoids

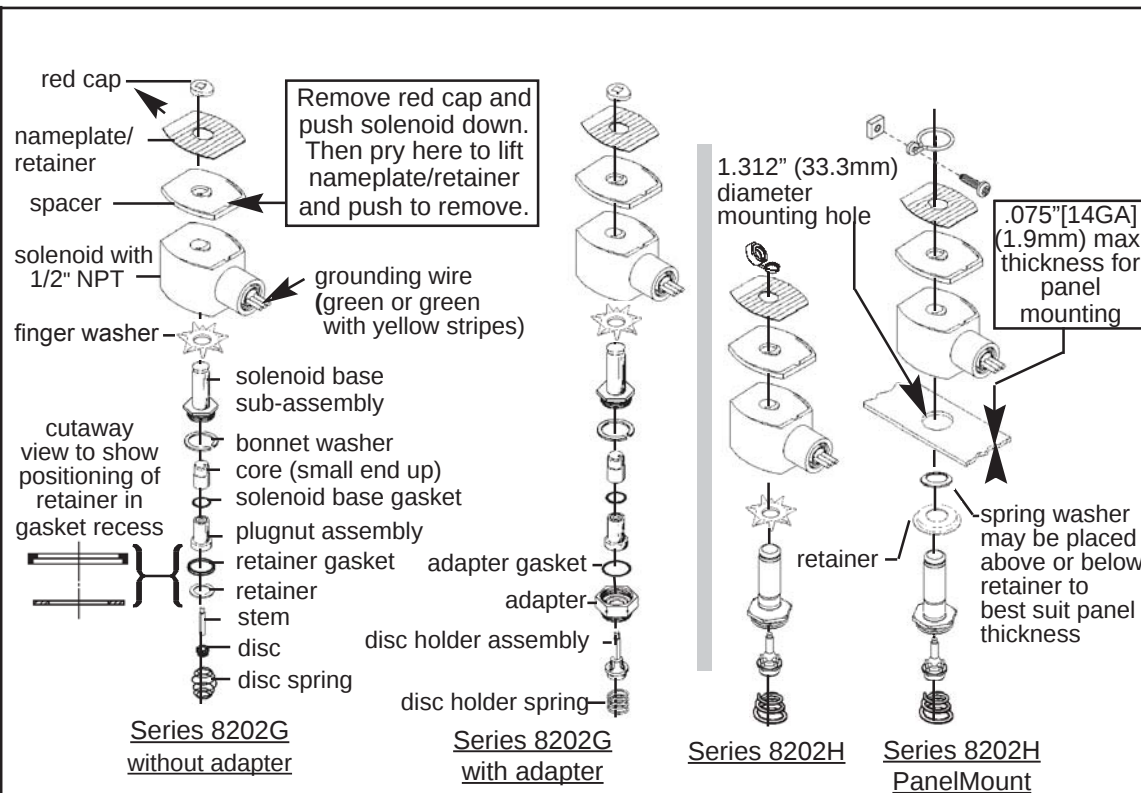
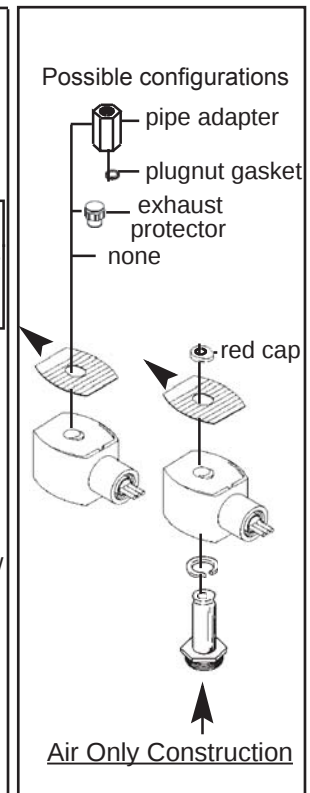


Figure 2. Series 8202G/H Solenoids



**Figure 3.
Series 8007G/H**

Installation & Maintenance Instructions



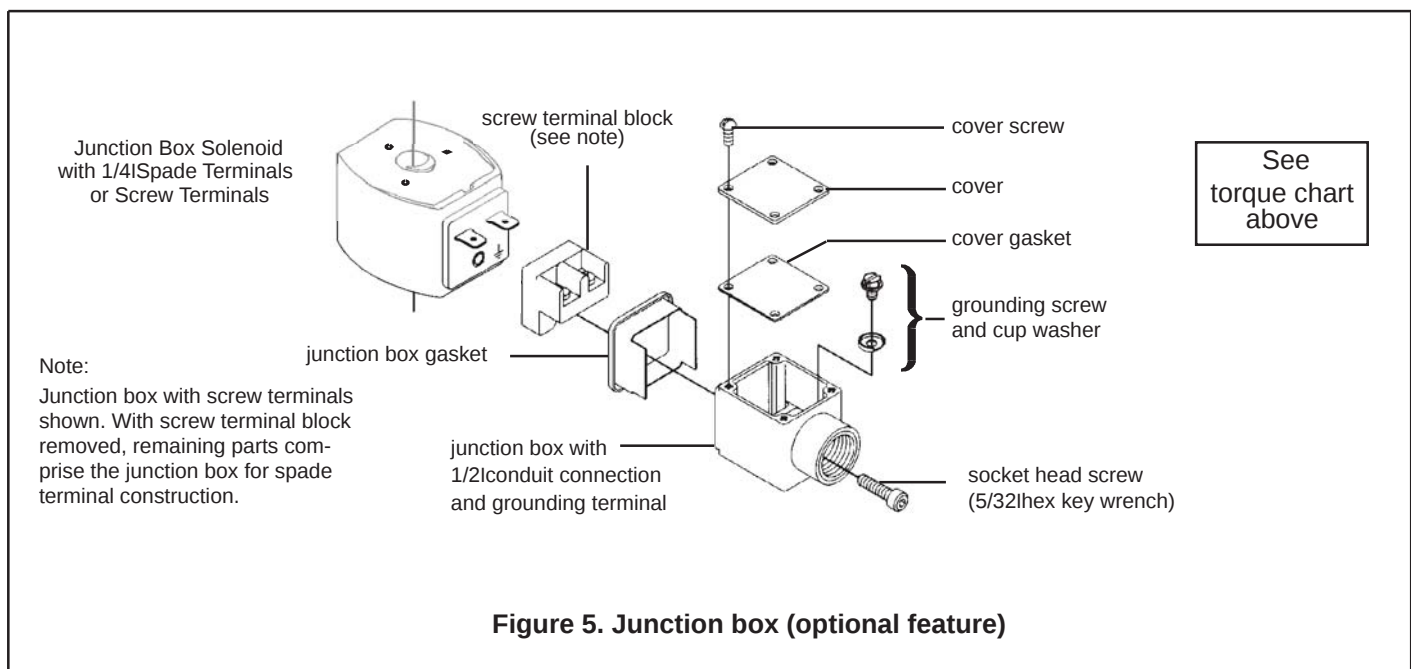
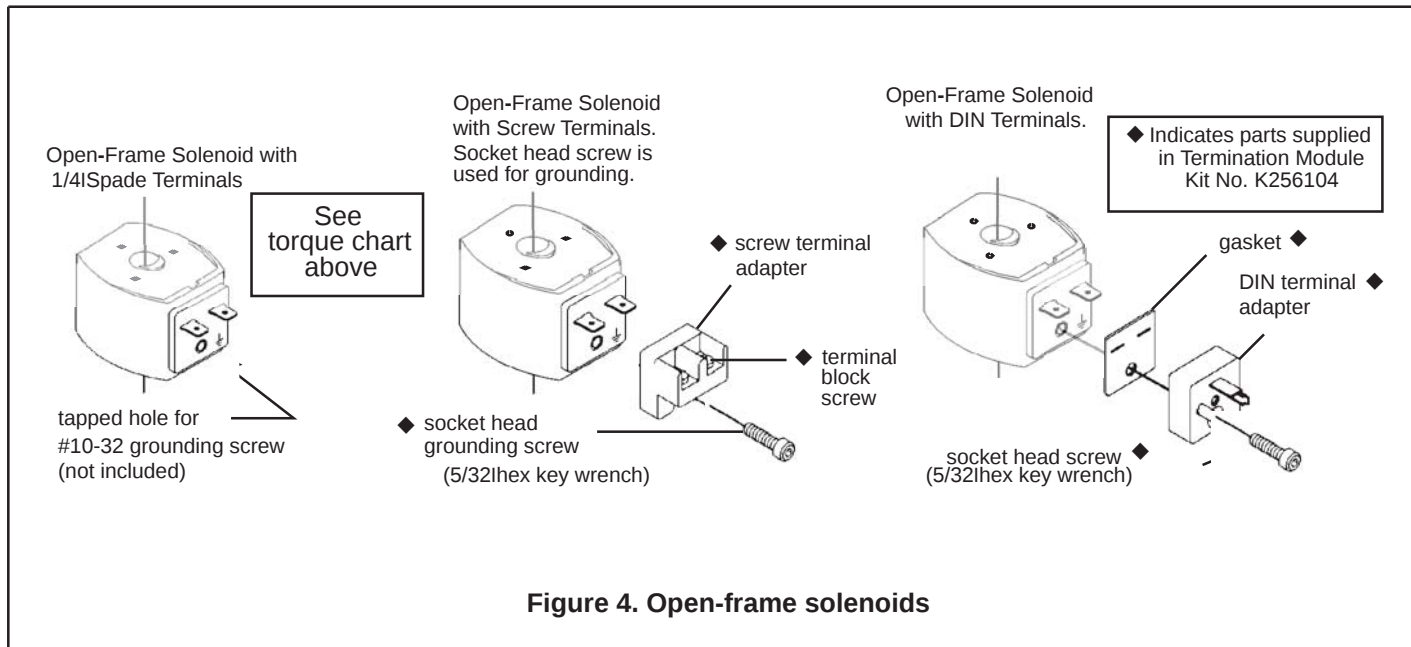
OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS
OPTIONAL FEATURE FOR OPEN FRAME (GENERAL PURPOSE) CONSTRUCTION ONLY

SERIES
8003G/H
8007G/H
8202G/H

NOTICE: See Installation and Maintenance Instructions, I&M No. V_6584_R19 - Section 1 of 2 for detailed instructions.

Torque Chart

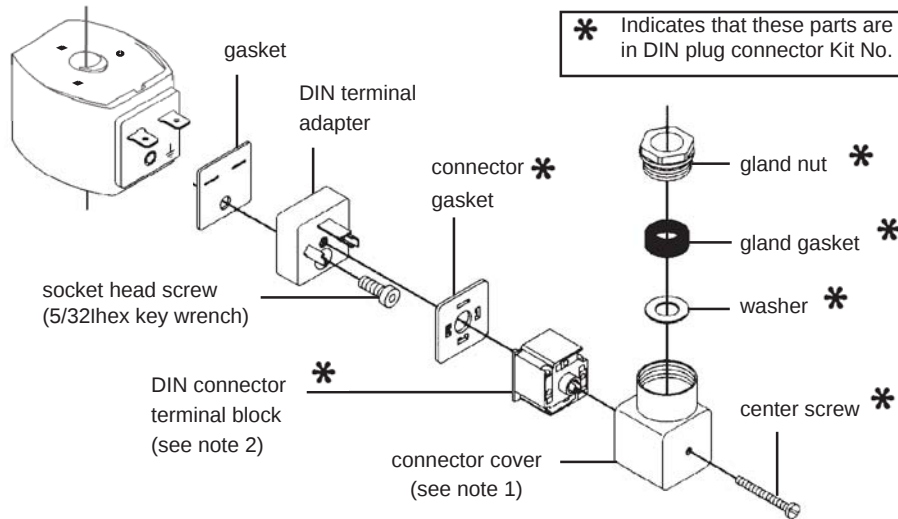
Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
terminal block screws	10 ± 2	1,1 ± 0,2
socket head screw	15 - 20	1,7 - 2,3
center screw	5 ± 1	0,6 ± 0,1



Open-Frame Solenoid
with DIN Terminal
Plug Connector

See
torque chart
above

* Indicates that these parts are included
in DIN plug connector Kit No. K236034

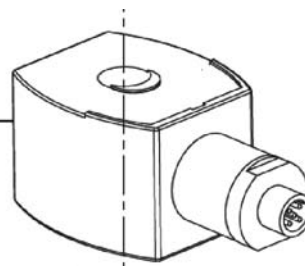


Notes:

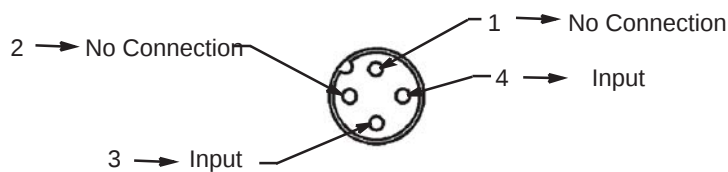
1. Connector cover may be rotated in 90° increments from position shown for alternate position of cable entry.
2. Refer to markings on DIN connector for proper electrical connections.

Figure 6. DIN plug connector kit No. K236034 (optional feature)

Solenoid with
Multi-Pin Connector



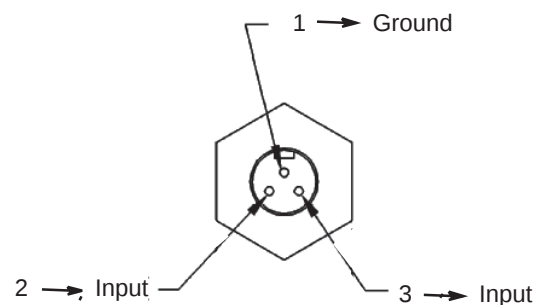
DC: For mating connector, use 4-pin M12 x 1 threaded female connector.



Electrical Connection Size:

DC: Single keyway M12 x 1 (Not polarity sensitive)
AC: Dual keyway 1/2-20UNF Thread

Figure 7.
4-Pin Anodized Aluminum Electrical Termination
(VT/VB)



Electrical Connection Size:

DC/AC: 7/8-16 UNS-2A

Figure 8.
Mini 3-pin Epoxy Coated Zinc Electrical Termination
(ZT/ZB)

GENERAL INSTALLATION AND MAINTENANCE INSTRUCTIONS

Note: These general Installation and Maintenance Instructions must be read in conjunction with the Instruction Sheet for the specific product.

INSTALLATION

ASCO Numatics components are intended to be used only within the technical characteristics as specified on the nameplate. Changes to the equipment are only allowed after consulting the manufacturer or its representative. Before installation, depressurize the piping system and clean internally.

The equipment may be mounted in any position if not otherwise indicated on the product by means of an arrow.

The flow direction and pipe connection of valves are indicated on the body.

The pipe connections have to be in accordance with the size indicated on the nameplate and fitted accordingly.

Caution:

- Reducing the connections may cause improper operation or malfunctioning.
- For the protection of the equipment install a strainer or filter suitable for the service involved in the inlet side as close to the product as possible.
- If tape, paste, spray or a similar lubricant is used when tightening, avoid particles entering the system.
- Use proper tools and locate wrenches as close as possible to the connection point.
- To avoid damage to the equipment. DO NOT OVERTIGHTEN pipe connections
- Do not use valve or solenoid as lever.
- The pipe connections should not apply any force, torque or strain to the product.

ELECTRICAL CONNECTION

In case of electrical connections, they are only to be made by trained personnel and have to be in accordance with the local regulations and standards.

Caution:

- Turn off electrical power supply and de-energize the electrical circuit and voltage carrying parts before starting work.
- All electrical screw terminals must be properly tightened according to the standards before putting into service.
- Dependent upon the voltage electrical components must be provided with an earth connection and satisfy local regulations and standards.

The equipment can have one of the following electrical terminals:

- Spade plug connections according to ISO-4400 or 3 x DIN-46244 (when correctly installed, this connection provides IP-65 protection).
- Embedded screw terminals in metal enclosure with "Pg" cable gland
- Spade terminals (AMP type).
- Flying leads or cables.

PUTTING INTO SERVICE

Before pressurizing the system, first carry-out an electrical test. In case of solenoid valves, energize the coil a few times and notice a metal click signifying the solenoid operation.

SERVICE

Most of the solenoid valves are equipped with coils for continuous duty service. To prevent the possibility of personal or property damage, do not touch the solenoid which can become hot under normal operating conditions.

SOUND EMISSION

The emission of sound depends on the application, medium and nature of the equipment used. The exact determination of the sound level can only be carried out by the user having the valve installed in his system

MAINTENANCE

Maintenance of ASCO Numatics products is dependent on service conditions. Periodic cleaning is recommended, the timing of which will depend on the media and service conditions. During servicing, components should be examined for excessive wear. A complete set of internal parts is available as spare parts or rebuild kit. If a problem occurs during installation/maintenance or in case of doubt please contact ASCO Numatics or authorized representatives.

*A separate Declaration of Incorporation relating to EU-Directive 2006/42/EC Annex II B is available on request for applicable products. Please provide product identification number and serial numbers of products concerned.

The product, when marked CE, complies with the essential requirements of the EMC 2004/108/EC (until April 20th 2016) and EMC 2014/30/EU (from April 20th 2016) and LVD 2006/95/EC (until April 20th 2016) and LVD 2014/35/EU (from April 20th 2016). A separate Declaration of Conformity is available on request. Please provide product identification number and serial numbers of the products concerned.

INSTRUCTIONS GÉNÉRALES D'INSTALLATION ET D'ENTRETIEN

Note: Ces instructions générales d'installation et d'entretien complètent la notice spécifique du produit.

MONTAGE

Les composants ASCO Numatics sont conçus pour les domaines de fonctionnement indiqués sur la plaque signalétique ou la documentation. Aucune modification ne peut être réalisée sur le matériel sans l'accord préalable du fabricant ou de son représentant. Avant de procéder au montage, dépressuriser les canalisations et effectuer un nettoyage interne.

A moins qu'une flèche ou la notice n'indique un sens de montage spécifique de la tête magnétique, le produit peut être monté dans n'importe quelle position

Le sens de circulation du fluide est indiqué par repères sur le corps et dans la documentation.

La dimension des tuyauteries doit correspondre au raccordement indiqué sur le corps, l'étiquette ou la notice.

Attention:

- Une restriction des tuyauteries peut entraîner des dysfonctionnements.
- Afin de protéger le matériel, installer une crépine ou un filtre adéquat en amont, aussi près que possible du produit.
- En cas d'utilisation de ruban; pâte, aérosol ou autre lubrifiant lors du serrage, veiller à ce qu'aucun corps étranger ne pénètre dans le circuit.
- Utiliser un outillage approprié et placer les clés aussi près que possible du point de raccordement.
- Afin d'éviter toute détérioration, NE PAS TROP SERRER les raccords des tuyauteries.
- Ne pas se servir de la vanne ou de tête magnétique comme d'un levier.
- The pipe connections should not apply any force, torque or strain to the product.

RACCORDEMENT ÉLECTRIQUE

Le raccordement électrique doit être réalisé par un personnel qualifié et selon les normes et règlements locaux.

Attention:

- Avant toute intervention, couper l'alimentation électrique pour mettre hors tension les composants.
- Toutes les bornes à vis doivent être serrées correctement avant la mise en service.
- Selon la tension, les composants électrique doivent être mis à la terre conformément aux normes et règlements locaux.

Selon les cas, le raccordement électrique s'effectue par:

- Déconnecteur débrochable ISO-4400 ou 3 x DIN-46244 avec degré de protection IP-65 lorsque le raccordement est correctement effectué.
- Bornes à vis solidaires du bobinage, sous boîtier métallique avec presse-étoupe "Pg--".
- Cosses (type AMP).
- Fils ou câbles solidaires de la bobine.

MISE EN SERVICE

Avant de mettre le circuit sous pression, effectuer un essai électrique. Dans le cas d'une électrovanne, mettre la bobine sous tension plusieurs fois et écouter le "clac" métallique qui signale le fonctionnement de la tête magnétique.

FONCTIONNEMENT

La plupart des électrovannes comportant des bobinages prévus pour mise sous tension permanente. Pour éviter toute brûlure, ne pas toucher la tête magnétique qui, en fonctionnement normal et en permanence sous tension, peut atteindre une température élevée.

BRUIT DE FONCTIONNEMENT

Le bruit de fonctionnement varie selon l'utilisation, le fluide et le type de matériel employé. L'utilisateur ne pourra déterminer avec précision le niveau sonore émis qu'après avoir monté le composant sur l'installation.

ENTRETIEN

L'entretien nécessaire aux produits ASCO Numatics varie avec leurs conditions d'utilisation. Il est souhaitable de procéder à un nettoyage périodique dont l'intervalle varie suivant la nature du fluide, les conditions de fonctionnement et le milieu ambiant. Lors de l'intervention. Les composants doivent être examinés pour détecter toute usure excessive. Un ensemble de pièces internes est proposé en pièces de rechange pour procéder à la réparation. En cas de problème lors du montage/entretien ou en cas de doute, veuillez contacter ASCO Numatics ou ses représentants officiels.

*Une déclaration d'incorporation relative à la directive UE 2006/42/CE Annexe II B est disponible sur demande pour les produits applicables. Veuillez fournir le numéro d'identification du produit et les numéros de série des produits concernés.

Lorsqu'il est marqué du label CE, le produit est conforme aux exigences essentielles des directives CEM 2004/108/CE (jusqu'au 20 avril 2016) et CEM 2014/30/UE (à partir du 20 avril 2016) et des directives Basse tension 2006/95/CE (jusqu'au 20 avril 2016) et 2014/35/UE (à partir du 20 avril 2016). Une déclaration de conformité peut être fournie sur simple demande. Veuillez fournir le numéro d'identification du produit et les numéros de série des produits concernés.

ALLGEMEINE BETRIEBSANLEITUNG

Achtung: Diese Allgemeine Betriebsanleitung gilt in Zusammenhang mit der jeweiligen Betriebsanleitung für die speziellen Produkte.

EINBAU

Die ASCO Numatics-Komponenten dürfen nur innerhalb der auf den Typenschildern angegebenen Daten eingesetzt werden, Veränderungen an den Produkten sind nur nach Rücksprache mit ASCO Numatics zulässig.

Vor dem Einbau der Ventile muß das Rohrleitungssystem drucklos geschaltet und innen gereinigt werden.

Die Einbaulage der Produkte ist generell beliebig. Ausnahme: Die mit einem Pfeil gekennzeichneten Produkte müssen entsprechend der Pfeilrichtung montiert werden.

Die Durchflußrichtung und der Eingang von Ventilen sind gekennzeichnet.

Die Rohranschlüsse sollten entsprechend den Größenangaben auf den Typenschildern mit handelsüblichen Verschraubungen durchgeführt werden. Dabei ist folgendes zu beachten:

- Eine Reduzierung der Anschlüsse kann zu Leistungs- und Funktionsminderungen führen.
- Zum Schutz der Ventile sollten Schmutzfänger oder Filter so dicht wie möglich in den Ventileingang integriert werden.
- Bei Abdichtung am Gewinde ist darauf zu achten, daß kein Dichtungsmaterial in die Rohrleitung oder das Ventil gelangt.
- Zur Montage darf nur geeignetes Werkzeug verwendet werden.
- Konische Verschraubungen sind sorgfältig anzuziehen. Es ist darauf zu achten, daß beim Anziehen das Gehäuse nicht beschädigt wird.
- Spule und Führungsrohr von Ventilen dürfen nicht als Gegenhalter benutzt werden.
- Die Rohrleitungsanschlüsse sollen fluchten und dürfen keine Spannungen auf das Ventil übertragen.

ELECTRISCHER ANSCHLUß

Der elektrische Anschluß ist von Fachpersonal entsprechend den geltenden VDE- und CEE Richtlinien auszuführen. Es ist besonders auf folgendes zu achten:

- Vor Beginn der Arbeiten ist sicherzustellen, daß alle elektrischen Leitungen und Netzteile spannungslos geschaltet sind.
- Alle Anschlußklemmen sind nach Beendigung der Arbeiten vorschriftsmäßig entsprechend den geltenden Regeln anzuziehen.
- Je nach Spannungsbereich muß das Ventil nach den geltenden Regeln einen Schutzleiterschlüssel erhalten.

Der Magnetantrieb kann je nach Bauart folgende Anschlüsse haben:

- Anschluß für Geräteresteckdose nach DIN 43650 Form A/ISO 4400 oder 3 x DIN 46244 (durch ordnungsgemäße Montage der Geräteresteckdose wird Schutzklasse IP 65 erreicht).
- Anschlüsse innerhalb eines Blechgehäuses mittels Schraubklemmen. Kabeleinführung ins Gehäuse mit PG-Verschraubung.
- Offene Spulen mit Flachsteckern (AMP-Fahnen) oder mit eingegossenen Kabelenden.

INBETRIEBNAHME

Vor Druckbeaufschlagung des Produktes sollte eine elektrische Funktionsprüfung erfolgen:

Bei Ventilen Spannung an der Magnetspule mehrmals ein- und ausschalten. Es muß ein Klicken zu hören sein.

BETRIEB

Die meisten Ventile sind mit Spulen für Dauerbetrieb ausgerüstet. Zur Vermeidung von Personen- und Sachschäden sollte jede Berührung mit dem Ventil vermieden werden, da die Magnetspule bei längerem Betrieb sehr heiß werden kann.

GERÄUSCHEMISSION

Diese hängt sehr stark vom Anwendungsfall, den Betriebsdaten und dem Medium, mit denen das Produkt beaufschlagt wird, ab. Eine Aussage über die Geräuschemission des Produktes muß deshalb von demjenigen getroffen werden, der das Produkt innerhalb einer Maschine in Betrieb nimmt.

WARTUNG

Die Wartung hängt von den Einsatzbedingungen ab. In entsprechenden Zeitabständen muß das Produkt geöffnet und gereinigt werden. Für die Überholung der ASCO Numatics-Produkte können Ersatzteilsätze geliefert werden. Treten Schwierigkeiten bei Einbau, Betrieb oder Wartung auf, sowie bei Unklarheiten, ist mit ASCO Numatics Rücksprache zu halten.

ASCO Numatics Produkte sind entsprechend der EG-Richtlinie 89/392/EWG gefertigt.

*Eine separate Herstellererklärung im Sinne der Richtlinie 2006/42/EWG Anhang II B ist auf Anfrage für die entsprechenden Produkte erhältlich. Geben Sie bitte die Kennnummer sowie die Seriennummer der betreffenden Produkte an.

Das Produkt, wenn mit CE gekennzeichnet, erfüllt die Anforderungen von EMV 2004/108/EWG (bis 20. April 2016) und EMV 2014/30/EU (vom 20. April 2016) und LVD 2006/95/EWG (bis 20. April 2016) und LVD 2014/35/EU (vom 20. April 2016). Eine separate Konformitätserklärung ist auf Anfrage erhältlich. Geben Sie bitte die Kennnummer sowie die Seriennummer der betreffenden Produkte an.

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MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

ASCO

(EF) 8345G001, SOLENOID VALVE

WATER TECHNOLOGIES

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Installation & Maintenance Instructions

2-POSITION 4-WAY FUNCTION VALVES

MIDGET SIZE - 1/4 NPT

SERIES

8345G/H

IMPORTANT: See separate solenoid installation and maintenance instructions for information on: Wiring, Solenoid Temperature, Causes of Improper Operation, and Coil or Solenoid Replacement.

DESCRIPTION

Series 8345 valves are 2-position 4-way midget size solenoid valves with rugged forged brass or stainless steel bodies. These valves are extremely compact to meet the requirements where space and weight are important and are primarily used to control small double acting cylinders not larger than 4 inches in diameter. Series 8345 valves may be provided with a general purpose or explosionproof solenoid enclosure.

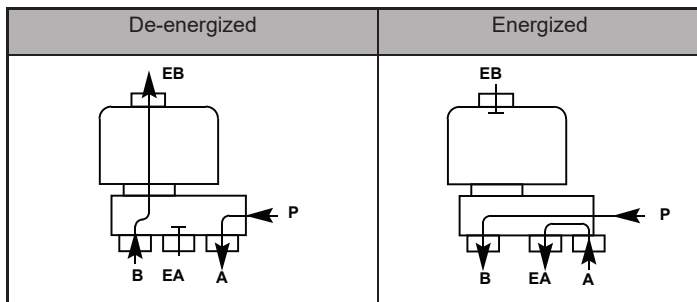
OPERATION

Solenoid De-energized: Flow is from Pressure "P" to Cylinder "A" and from Cylinder "B" to Exhaust "EB". Exhaust "EA" is closed.

Solenoid Energized: Flow is from Pressure "P" to Cylinder "B" and from Cylinder "A" to Exhaust "EA". Exhaust "EB" is closed.

IMPORTANT: Minimum operating pressure differential is 10 psi.

Flow Diagrams



Manual Operator (optional feature)

Manual operator allows manual operation when desired or during an electrical power outage. To operate manual operator, rotate groove pin counter-clockwise 180°. Valve will then remain in the solenoid energized position until stem is rotated clockwise to original position. Manual operator must be in clockwise position for proper electrical operation.

INSTALLATION

Check nameplate for correct catalog number, pressure, voltage, frequency, and service. Never apply incompatible fluids or exceed pressure rating of the valve. Installation and valve maintenance to be performed by qualified personnel.

Temperature Limitations

For maximum valve ambient and fluid temperatures, refer to chart below. Check catalog number on nameplate to determine temperature limitation.

Wattage	Catalog Number Coil Prefix	Coil Class	Max. Ambient Temp. °F	Max. Fluid Temp. °F
10.1	none, KF, SF, SC, EF or EV	F	125	180
10.1	HT, KH, ST, SU, EFHT or EVHT	H	140	180
11.6	none, HT, KF, KH, SC, SF, EF or EV	F or H	104	104

Positioning

This valve 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.

Mounting

Refer to Figure 1 for Mounting dimensions.

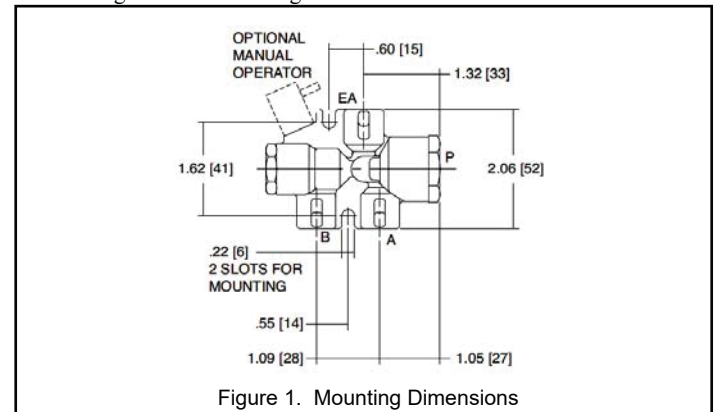


Figure 1. Mounting Dimensions

Piping

Connect piping to valve according to markings on valve body. Apply pipe compound or PTFE tape sparingly to male pipe threads only. If applied to valve threads, the compound may enter the valve and cause operational difficulty. Avoid pipe strain by properly supporting and aligning piping. When tightening the pipe, do not use valve or solenoid as a lever. Locate wrenches applied to valve body or piping as close as possible to connection point.

To ensure proper operation of the valve, the pressure and exhaust lines must be full area without restriction. A minimum differential pressure (10psi), as stamped on the nameplate, must be maintained between pressure and exhaust at the moment of shifting. Air reservoirs must have adequate capacity to maintain this minimum pressure during shifting. To check pressure during shifting, install a pressure gauge in the piping as close to valve as possible.

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

Wiring

Wiring must comply with Local and National Electrical Codes. For valves equipped with an Explosionproof/Watertight Solenoid Enclosure, the electrical fittings must be approved for use in the approved hazardous Location. Housings for all solenoids are provided with accommodations or connections for a 1/2 inch conduit. To facilitate wiring, the solenoid enclosure may be rotated 360°.

Solenoid Temperature

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

MAINTENANCE

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

Note: It is not necessary to remove the valve from the pipeline for repairs. However, piping or tubing must be removed from Pressure "P" connection and Exhaust "EB" connection on air and liquid constructions.

Cleaning

All solenoid valves should be cleaned periodically. The time between cleanings will vary depending on the 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. In the extreme case, faulty valve operation will occur and the valve may fail to open or close. Clean strainer or filter when cleaning the valve.

Preventive Maintenance

- Keep medium flowing through the valve as free from dirt and foreign material as possible.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- Depending on the medium and service conditions, periodic inspection of internal valve parts for damage or excessive wear is recommended. Thoroughly clean all parts. If parts are worn or damaged, install a complete rebuild kit.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic click signifies that the solenoid is operating. The absence of the 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.
- **Incorrect Pressure:** Check valve pressure. Pressure to valve must be within range specified on nameplate.
- **Excessive Leakage:** Disassemble valve and clean all parts. If parts are worn or damaged, install a complete ASCO Rebuild Kit.

Valve Disassembly

1. Disassemble valve in an orderly fashion using exploded views for identification and placement of parts.
2. Remove solenoid enclosure. See separate instructions.
3. Unscrew solenoid base sub-assembly and remove bonnet gasket.
4. For normal maintenance (cleaning) it is not necessary to disassemble the manual operator (optional feature) unless external leakage is evident. If disassembly is required, remove stem pin, manual operator stem, stem spring and stem gasket from valve body.
5. Remove core spring and core sub-assembly.
6. Unscrew end cap and remove end cap gasket, body gasket and disc.
7. Unscrew end plug and remove end plug gasket, piston and piston U-cup.
8. All parts are now accessible for cleaning or replacement. If parts are worn or damaged, install a complete ASCO Rebuild Kit

Valve Reassembly

1. Lubricate piston U-cup and all gaskets with Parker Super Lube Compound or an equivalent high-grade silicone grease.
2. Position piston U-cup on piston with mouth or open end facing in the direction of the end plug.
3. Install piston into valve body. Position end plug gasket on end plug and install into valve body. Torque end plug to 200±10 in-lbs [22,6±1,1 Nm].
4. Position body gasket and end cap gasket on end cap. Lubricate disc with DOW CORNING® 111 Compound or an equivalent high grade silicone grease. Install disc and end cap into valve body. Torque end cap to 200±10 in-lbs [22,6±1,1 Nm].
5. If removed, assembly and replace manual operator stem, stem spring, stem gasket and stem pin.
6. Position solenoid base gasket in valve body.
7. Install core assembly and core spring into solenoid base sub-assembly. Thread solenoid base sub-assembly into valve body. Torque solenoid base sub-assembly to 175±25 in-lbs [19,8±2,8 Nm].
8. Install solenoid, see separate solenoid instructions. Then make electrical hookup to solenoid.

⚠ WARNING: To prevent the possibility of death, serious injury or property damage, check valve for proper operation before returning to service. Also perform internal seat and external leakage tests with a nonhazardous, noncombustible fluid.

9. Restore line pressure and electrical power supply to valve.
10. After maintenance is completed, operate the valve a few times to be sure of proper operation. A metallic click signifies the solenoid is operating.

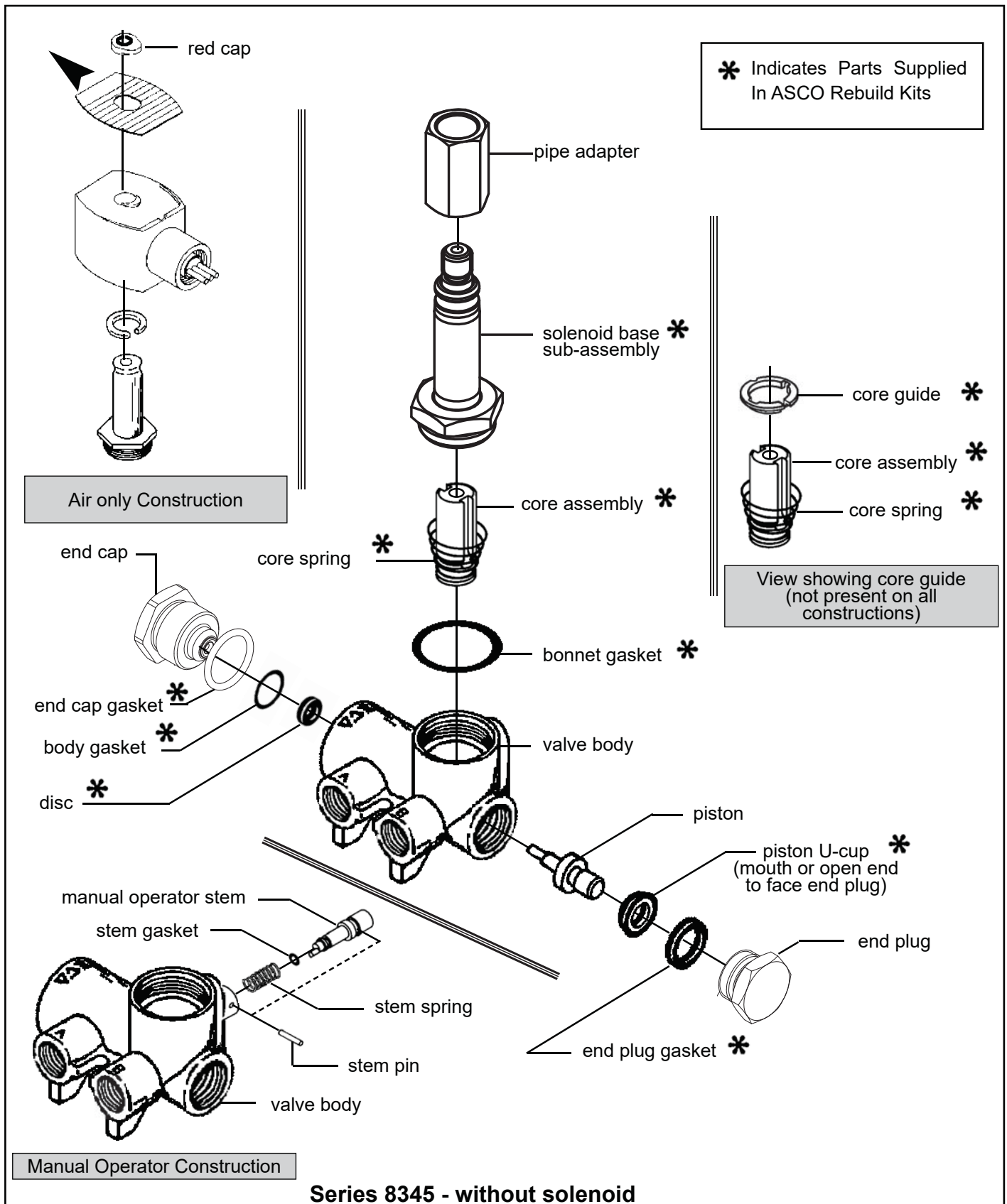
ORDERING INFORMATION

FOR ASCO REBUILD KITS

Parts marked with an asterisk (*) in the exploded view are supplied in Rebuild Kits. When Ordering Rebuild Kits for ASCO valves, order the Rebuild Kit number stamped on the valve nameplate. If the number of the kit is not visible, order by indicating the number of kits required, and the Catalog Number and Serial Number of the valve(s) for which they are intended.

Torque Chart

Part Name	Toque Value Inch-Pounds	Torque Value Newton-Meters
solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
end cap/end plug	200 ± 10	22,6 ± 1,1



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Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS

SERIES

8003G/H

8007G/H

8202G/H

— SERVICE NOTICE —

ASCO® solenoid valves with design change letter “G” or “H” in the catalog number (ex. 8210G1) have an epoxy encapsulated ASCO® Red Hat II® solenoid. This solenoid replaces some of the solenoids with metal enclosures and open-frame constructions. Follow these installation and maintenance instructions if your valve or operator uses this solenoid.

See separate instructions for basic valve.

DESCRIPTION

Catalog numbers 8003G/H, 8007G/H and 8202G/H and are epoxy encapsulated pull-type solenoids. The green solenoid with lead wires and 1/2 conduit connection is designed to meet Enclosure Type 1-General Purpose, Type 2-Dripproof, Types 3 and 3S-Raintight, and Types 4 and 4X-Watertight. The black solenoid on catalog numbers prefixed “EF” or “EV” is designed to meet Enclosure Types 3 and 3S-Raintight, Types 4 and 4X-Watertight, Types 6 and 6P-Submersible, Type 7, Explosionproof Class I, Division 1 Groups A, B, C, & D and Type 9, -Dust-Ignitionproof Class II, Division 1 Groups E, F & G. The Class II, Groups F & G Dust Locations designation is not applicable for solenoids or solenoid valves used for steam service or when a class “H” solenoid is used. See *Temperature Limitations* section for solenoid identification and nameplate/retainer for service. When installed just as a solenoid and not attached to an ASCO valve, the core has a 0.250-28 UNF-2B tapped hole, 0.38 or 0.63 minimum full thread.

NOTE: Catalog number prefix “EV” denotes stainless steel construction.

Solenoid catalog numbers 8202G/H1, 8202G/H3, 8202G/H5 and 8202G/H7 are epoxy encapsulated push-type, reverse-acting solenoids having the same enclosure types as previously stated for Catalog numbers 8003G/H1 and 8003G/H2. 8007G/H are 3-way solenoid operators with a pipe port or adapter, exhaust protector or vent at the top of the solenoid base sub-assembly.

Series 8003G/H, 8007G/H and 8202G/H solenoids are available in:

- **Open-Frame Construction:** The green solenoid may be supplied with 1/4" spade, screw or DIN terminals. (Refer to Figure 4)
- **Panel Mounted Construction:** These solenoids are specifically designed to be panel mounted by the customer. Refer to Figures specified in this I&M and the section on *Installation of Panel Mounted Solenoid* for details.

Optional Features For Type 1 - General Purpose Construction Only

- **Junction Box:** This junction box construction meets Enclosure Types 2, 3, 3S, 4, and 4X. Only solenoids with 1/4" spade or screw terminals may have a junction box. The junction box provides a 1/2" conduit connection, grounding and spade or screw terminal connections within the junction box (See Figure 5).

- **DIN Plug Connector Kit No. K236034:** Use this kit only for solenoids with DIN terminals. The DIN plug connector kit provides a two pole with grounding contact DIN Type 43650 construction (See Figure 6).

OPERATION

Series 8003G/H and 8007G/H - 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 11 ounces, and 5 ounces for DC construction.

Series 8202G/H - When the solenoid is energized, the disc holder assembly seats against the orifice. When the solenoid is de-energized, the disc holder assembly returns. **IMPORTANT:** Initial return force for the disc or disc holder assembly, whether developed by spring, pressure, or weight, must exert a minimum force to overcome residual magnetism created by the solenoid. Minimum return force is 1 pound, 5 ounces.

INSTALLATION

Check nameplate for correct catalog number, service, and wattage. Check front of solenoid for voltage and frequency.

⚠ WARNING: Electrical hazard from the accessibility of live parts. To prevent the possibility of death, serious injury or property damage, install the open - frame solenoid in an enclosure.

FOR BLACK ENCLOSURE TYPES 7 AND 9 ONLY

⚠ CAUTION: To prevent fire or explosion, do not install solenoid and/or valve where ignition temperature of hazardous atmosphere is less than 165°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/retainer for service.

NOTE: These solenoids have an internal non-resettable thermal fuse to limit solenoid temperature in the event that extraordinary conditions occur which could cause excessive temperatures. These conditions include high input voltage, a jammed core, excessive ambient temperature or a shorted solenoid, etc. This unique feature is a standard feature only in solenoids with black explosionproof/dust-ignitionproof enclosures (Types 7 & 9).

⚠ CAUTION: To protect the solenoid valve or operator, 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 and 8601 for strainers.

Temperature Limitations

For maximum valve ambient temperatures, refer to chart. The temperature limitations listed, only indicate maximum application temperatures for field wiring rated at 90°C. Check catalog number prefix and watt rating on nameplate to determine maximum ambient temperature. See valve installation and maintenance instructions for maximum fluid temperature.

NOTE: For steam service, refer to *Wiring* section, *Junction Box* for temperature rating of supply wires.

Temperature Limitations For Series 8003G, 8007G or 8202G Solenoids for use on Valves Rated at 10.1, 11.6, 15.6, 17.1, or 22.6 Watts			
Watt Rating	Catalog Number Coil Prefix	Class of Insulation	Maximum § Ambient Temp.
10.1 & 17.1	None, FB, KF, KP, SC, SD, SF, SP, VT, VB, ZT & ZB	F	125°F (52°C)
10.1 & 17.1	HB, HT, KB, KH, SS, ST, SU	H	140°F (60°C)
11.6 & 22.6	None, FB, KF, KP, SC, SD, SF, SP, VT, VB, ZT & ZB	F	104°F (40°C)
11.6 & 22.6	HP, HT, KB, KH, SS, ST, SU & SV	H	104°F (40°C)
15.6	None, KB, SS, SV	H	104°F (40°C)

§ Minimum ambient temperature -40°F (-40°C).

Temperature Limitations for Series 8003H, 8007H and 8202H solenoids						
Prefix ¹	Coil Class	Watt Ratings			Maximum Ambient Temperature	
		AC		DC		
		60 Hz	50 Hz		°C	°F
EF, EV	FT	10.1	10.1	-	52	125
EF, EV	FB	17.1	17.1	-		
	FT	10.1	10.1	-	55	131
	FB	17.1	17.1	-		
	HT	-	-	11.6	40 ²	104 ²
	HF	-	-	15.6		
	HB	-	-	22.6		
EF, EV	HT	-	-	11.6		
EF, EV	HF	-	-	15.6		
EF, EV	HB	-	-	22.6		
	HT	10.1	10.1	-	60 ³	140 ³
	HB	17.1	17.1	-		
EF, EV	HT	10.1	10.1	-		
EF, EV	HB	17.1	17.1	-		

¹ = EF, EV data applies to Explosionproof coils only.

² = Some DC solenoid valves can be operated at maximum ambient temperature of 55°C / 131°F with reduced pressure ratings. See valve I&M for maximum operating pressure differential ratings.

³ = Steam Service Valves have a maximum ambient temperature of 55° C/ 131°F.

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. All solenoids supplied with lead wires are provided with a grounding wire which is green or green with yellow stripes and a 1/2" conduit connection. To facilitate wiring, the solenoid may be rotated 360°. For the watertight and explosionproof solenoid, electrical fittings must be approved for use in the approved hazardous locations.

⚠ CAUTION: Cryogenic Applications - Solenoid lead wire insulation should not be subjected to cryogenic temperatures. Adequate lead wire protection and routing must be provided.

Additional Wiring Instructions For Optional Features:

• Open-Frame solenoid with 1/4" spade terminals.

For solenoids supplied with screw terminal connections use #12-18 AWG stranded copper wire rated at 90°C or greater. Torque terminal block screws to 10±2 in-lbs [1,0±1,2 Nm]. A tapped hole is provided in the solenoid for grounding, use a #10-32 machine screw. Torque grounding screw to 15-20 in-lbs [1,7-2,3 Nm]. On solenoids with screw terminals, the socket head screw holding the terminal block to the solenoid is the grounding screw. Torque the screw to 15-20 in-lbs [1,7-2,3 Nm] with a 5/32" hex key wrench.

• Junction Box

The junction box is used with spade or screw terminal solenoids only and is provided with a grounding screw and a 1/2" conduit connection. Connect #12-18 AWG standard copper wire only to the screw terminals. Within the junction box use field wire that is rated 90°C or greater for connections. For steam service use 105°C rated wire up to 50 psi or use 125°C rated wire above 50 psi. After electrical hookup, replace cover gasket, cover, and screws. Tighten screws evenly in a crisscross manner.

• DIN Plug Connector Kit No. K236034

1. The open-frame solenoid is provided with DIN terminals to accommodate the plug connector kit.
2. Remove center screw from plug connector. Using a small screwdriver, pry terminal block from connector cover.
3. Use #12-18 AWG stranded copper wire rated at 90°C or greater for connections. Strip wire leads back approximately 1/4" for installation in socket terminals. The use of wire-end sleeves is also recommended for these socket terminals. Maximum length of wire-end sleeves to be approximately 1/4". Tinning of the ends of the lead wires is not recommended.
4. Thread wire through gland nut, gland gasket, washer and connector cover.

NOTE: Connector housing may be rotated in 90° increments from position shown for alternate positioning of cable entry.

5. Check DIN connector terminal block for electrical markings. Then make electrical hookup to terminal block according to markings on it. Snap terminal block into connector cover and install center screw.
6. Position connector gasket on solenoid and install plug connector. Torque center screw to 5±1 in-lbs [0,6±1,1 Nm].

NOTE: Alternating current (AC) and direct current (DC) solenoids are built differently and cannot be converted from one to the other by changing the coil.

Installation of Solenoid

Solenoids may be assembled as a complete unit. Tightening is accomplished by means of a hex flange at the base of the solenoid.

Installation of Panel Mounted Solenoid (See Figures 1 and 2)

1. Disassemble solenoid following instruction under *Solenoid Replacement* then proceed.
2. Install solenoid base sub-assembly through customer panel. 8202H panel mounted solenoids include a retainer to adapt the solenoid base sub-assembly to the customer panel. (See Figure 2)
3. Position finger washer on opposite side of panel over solenoid base sub-assembly.
4. Replace solenoid, nameplate/retainer and red cap.
5. Make electrical hookup, see *Wiring* section.

Solenoid Temperature

Standard solenoids are designed for continuous duty service. When the solenoid is energized for a long period, the solenoid becomes hot and can be touched by hand only for an instant. This is a safe operating temperature.

MAINTENANCE

⚠ WARNING: To prevent the possibility of death, serious injury or property damage, turnoff electrical power, depressurize solenoid operator and/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 solenoid 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.
- Periodic exercise of the valve should be considered if ambient or fluid conditions are such that corrosion, elastomer degradation, fluid contamination build up, or other conditions that could impede solenoid valve shifting are possible. The actual frequency of exercise necessary will depend on specific operating conditions. A successful operating history is the best indication of a proper interval between exercise cycles.
- 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 worn or damaged parts.

Causes of Improper Operation

- **Faulty Control Circuit:** Check the electrical system by energizing the solenoid. A metallic *click* signifies that the solenoid is operating. Absence of the *click* indicates loss of power supply. Check for loose or blown fuses, open-circuited or grounded solenoid, broken leadwires or splice connections.
- **Burned-Out Solenoid:** Check for open-circuited solenoid. Replace if necessary. Check supply voltage; it must be the same as specified on nameplate/retainer and marked on the solenoid. Check ambient temperature and check that the core is not jammed.
- **Low Voltage:** Check voltage across the solenoid leads. Voltage must be at least 85% of rated voltage.

Solenoid Replacement

1. Disconnect conduit, coil leads, and grounding wire.

NOTE: Any optional parts attached to the old solenoid must be reinstalled on the new solenoid. For 3-way construction, piping or tubing must be removed from pipe adapter.

2. Disassemble solenoids with optional features as follows:

- **Spade or Screw Terminals**

Remove terminal connections, grounding screw, grounding wire, and terminal block (screw terminal type only).

NOTE: For screw terminals, the socket head screw holding the terminal block serves as a grounding screw.

- **Junction Box**

Remove conduit and socket head screw (use 5/32" hex key wrench) from center of junction box. Disconnect junction box from solenoid.

- **DIN Plug Connector**

Remove center screw from DIN plug connector. Disconnect DIN plug connector from adapter. Remove socket head screw (use 5/32" hex key wrench), DIN terminal adapter, and gasket from solenoid.

3. Remove red cap or retainer from top of solenoid base sub-assembly. For 3-way construction with pipe adapter (Figure 3), remove pipe adapter, nameplate and solenoid. Omit steps 4 and 5.
4. Push down on solenoid. Then using a suitable screwdriver, insert blade between solenoid and nameplate/retainer. Pry up slightly and push to remove. NOTE: Series 8202G/H solenoids have a spacer between the nameplate/retainer and solenoid.
5. Remove solenoid from solenoid base sub-assembly.
6. Reassemble in reverse order of disassembly. Use exploded views for identification and placement of parts.
7. Torque pipe adapter to 90 inch-pounds maximum [10,2 Nm maximum]. Then make up piping or tubing to pipe adapter on solenoid.

Disassembly and Reassembly of Solenoids

1. Remove solenoid, see *Solenoid Replacement*.
2. Remove spring washer from solenoid base sub-assembly. For 3-way construction, remove pipe adapter and plugnut gasket.

3. Unscrew solenoid base sub-assembly from valve body.
4. Remove internal solenoid parts for cleaning or replacement. Use exploded views for identification and placement of parts.
5. If the solenoid is part of a valve, refer to basic valve installation and maintenance instructions for further disassembly.
6. Torque solenoid base sub-assembly and adapter to 175±25 in-lbs [19,8±2,8 Nm].

ORDERING INFORMATION FOR ASCO SOLENOIDS

When Ordering Solenoids for ASCO Solenoid Operators or Valves, order the number stamped on the solenoid. Also specify voltage and frequency.

Installation & Maintenance Instructions



OPEN-FRAME, GENERAL PURPOSE, WATERTIGHT/EXPLOSIONPROOF SOLENOIDS

SERIES
8003G/H
8007G/H
8202G/H

NOTICE: See Installation and Maintenance Instructions, I&M No. V_6584_R16 - Section 1 of 2 for detailed instructions.

Torque Chart

Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
solenoid base sub-assembly	175 ± 25	19,8 ± 2,8
pipe adapter	90 maximum	10,2 maximum

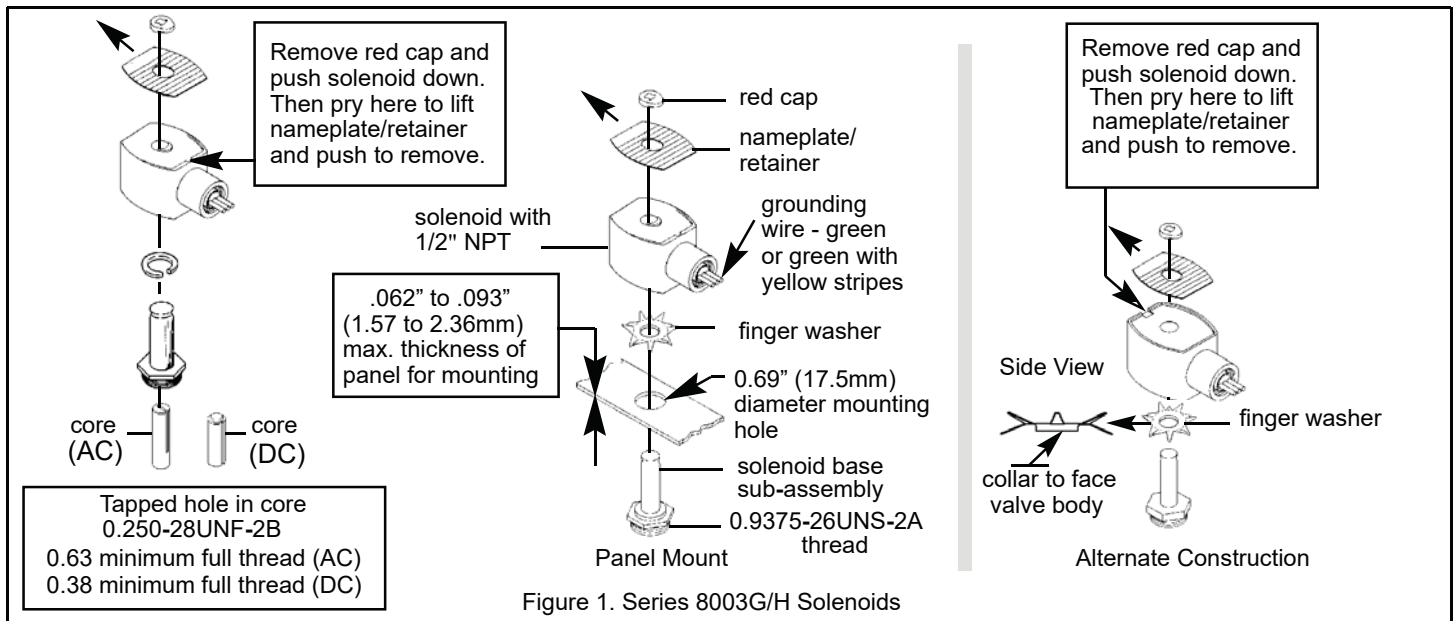


Figure 1. Series 8003G/H Solenoids

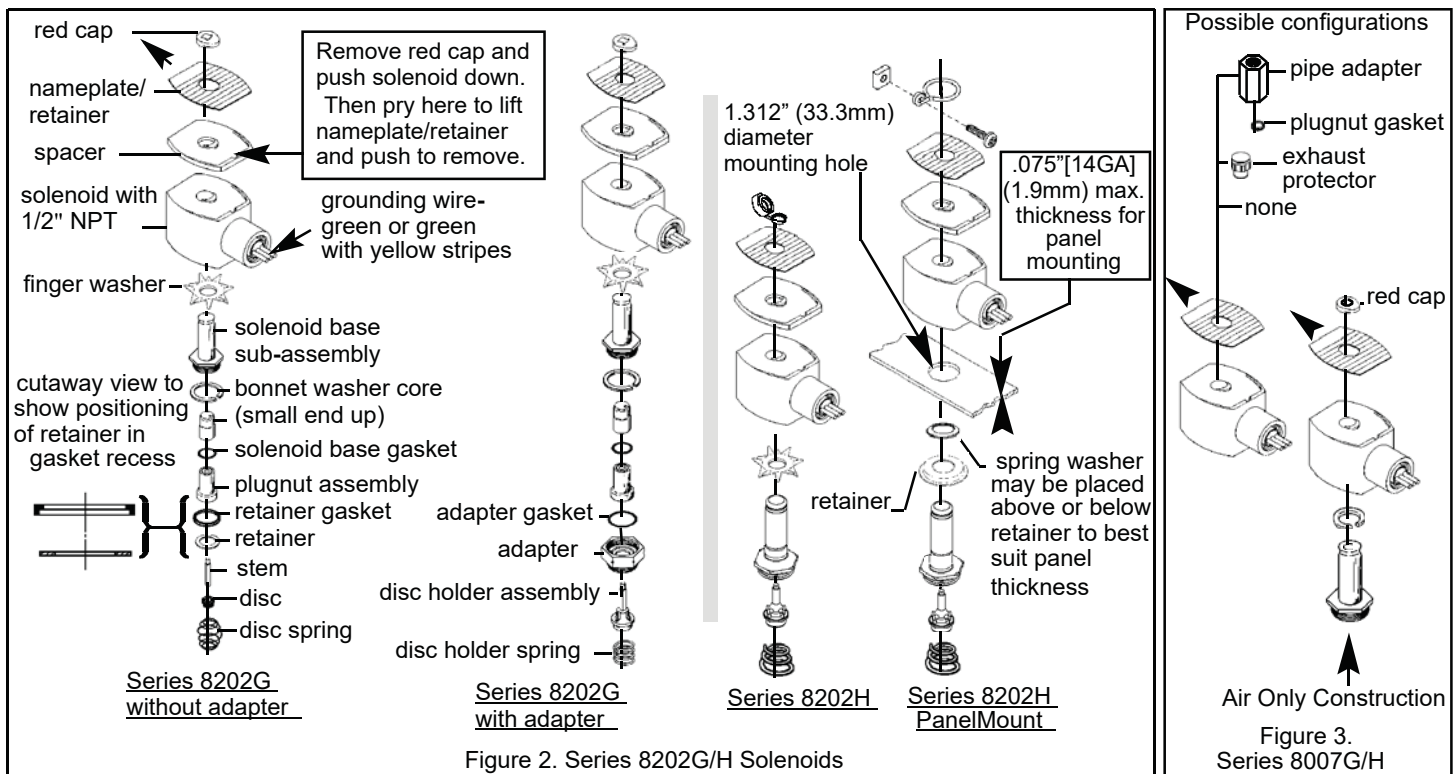


Figure 2. Series 8202G/H Solenoids

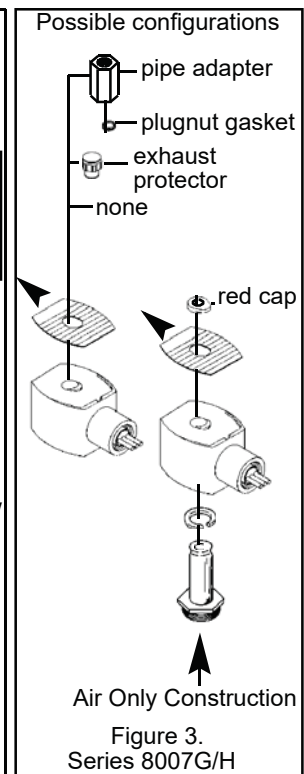
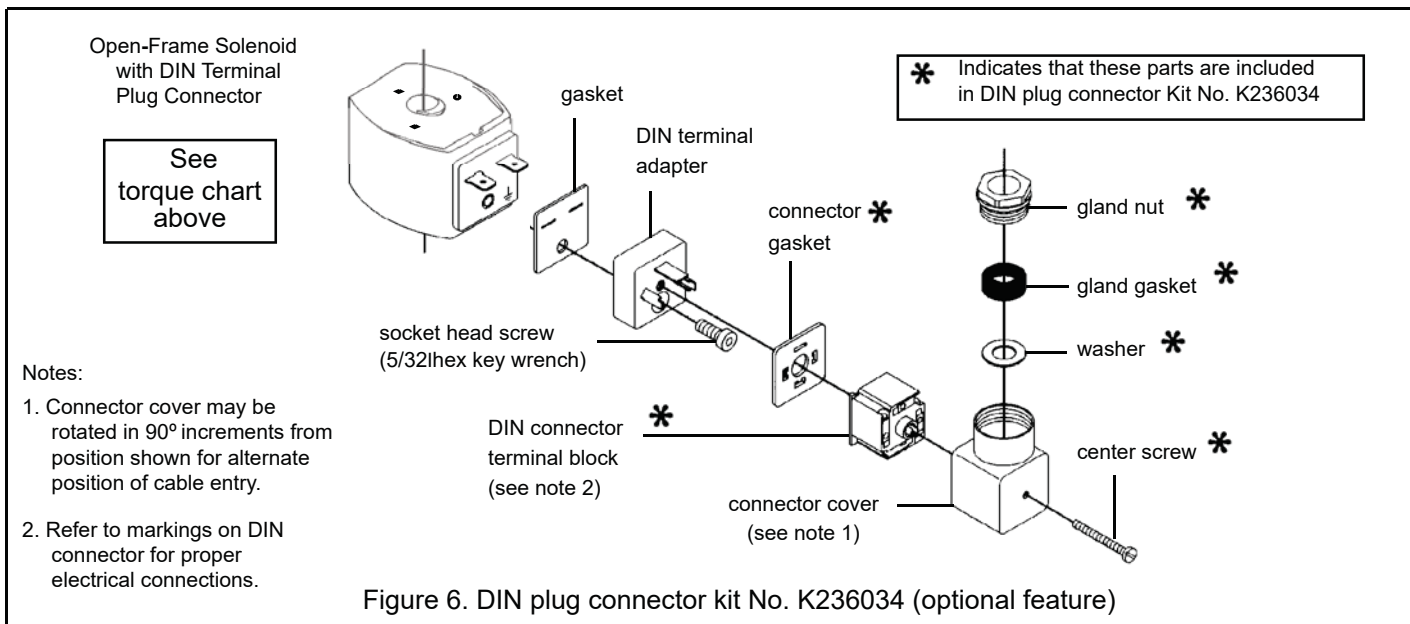
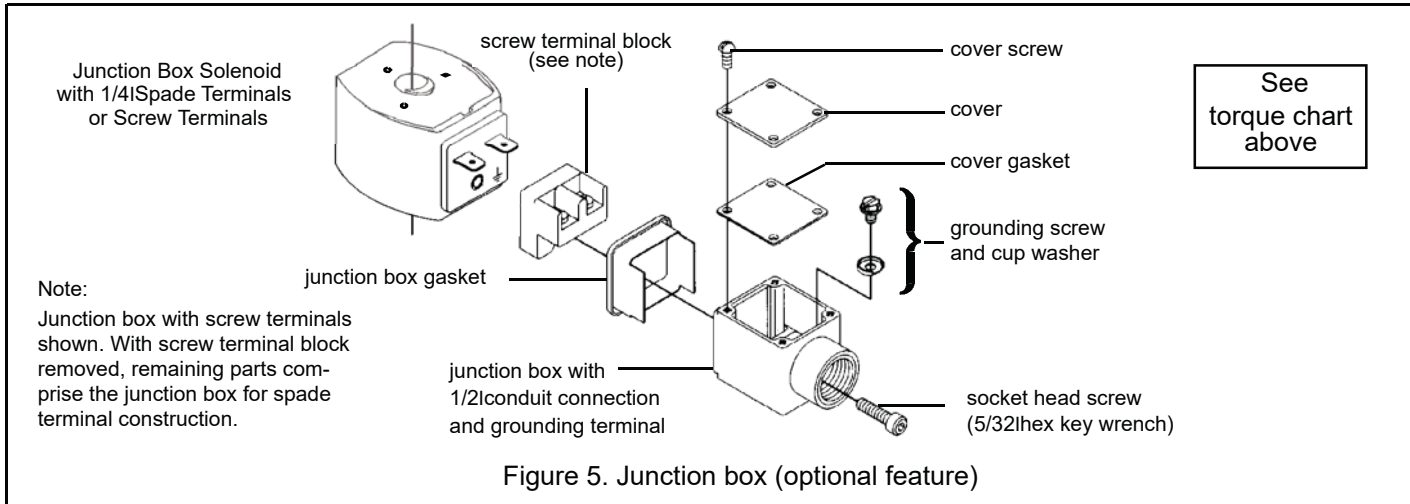
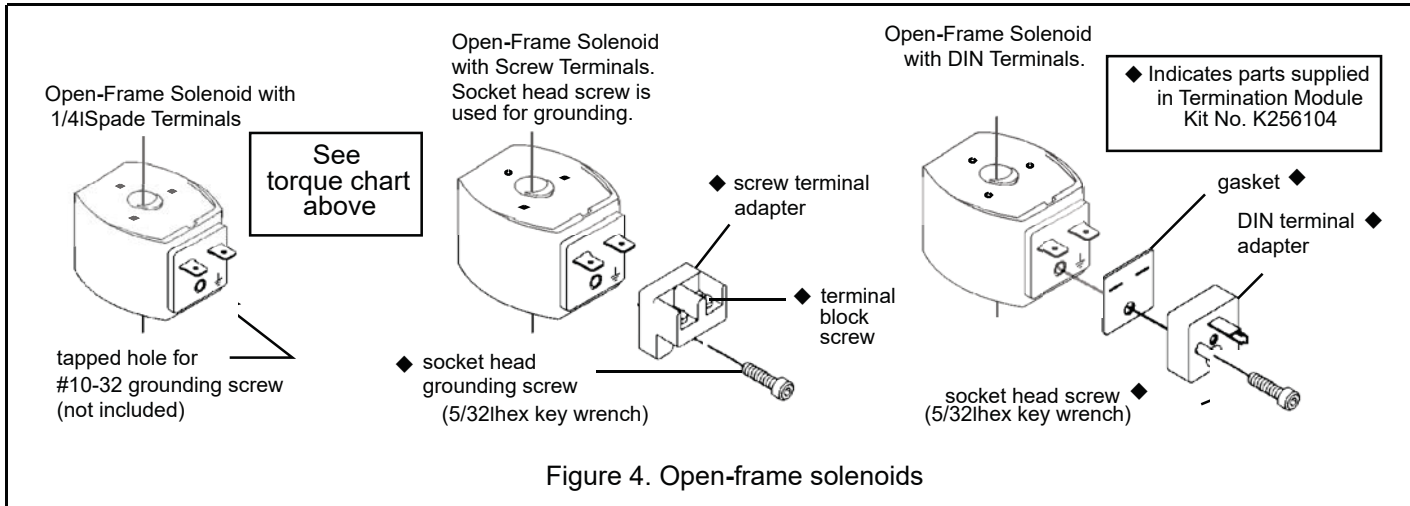


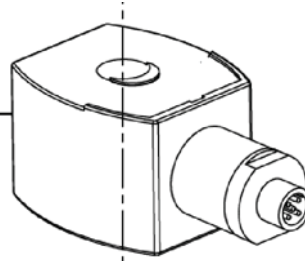
Figure 3. Series 8007G/H

Torque Chart

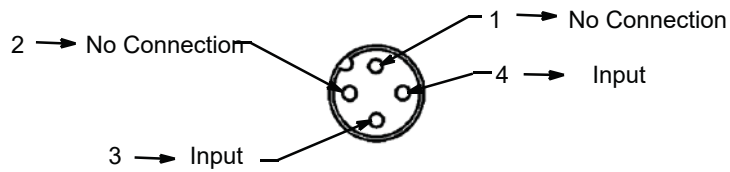
Part Name	Torque Value in Inch-Pounds	Torque Value in Newton-Meters
terminal block screws	10 ± 2	1,1 ± 0,2
socket head screw	15 - 20	1,7 - 2,3
center screw	5±1	0,6 ± 0,1



Solenoid with
Multi-Pin Connector



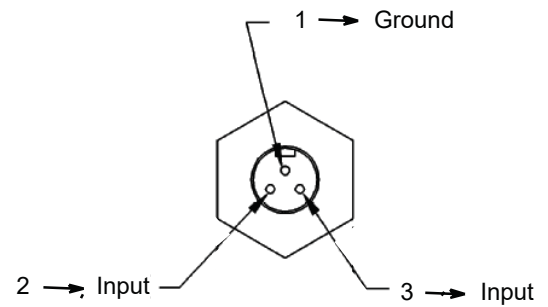
DC: For mating connector, use 4-pin M12 x 1 threaded female connector.



Electrical Connection Size:

DC: Single keyway M12 x 1 (*Not polarity sensitive*)
AC: Dual keyway 1/2-20UNF Thread

Figure 7.
4-Pin Anodized Aluminum Electrical Termination
(VT/VB)



Electrical Connection Size:

DC/AC: 7/8-16 UNS-2A

Figure 8.
Mini 3-pin Epoxy Coated Zinc Electrical Termination
(ZT/ZB)

GENERAL INSTALLATION AND MAINTENANCE INSTRUCTIONS

Note: These general Installation and Maintenance Instructions must be read in conjunction with the Instruction Sheet for the specific product.

INSTALLATION

ASCO Numatics components are intended to be used only within the technical characteristics as specified on the nameplate. Changes to the equipment are only allowed after consulting the manufacturer or its representative. Before installation, depressurize the piping system and clean internally.

The equipment may be mounted in any position if not otherwise indicated on the product by means of an arrow.

The flow direction and pipe connection of valves are indicated on the body.

The pipe connections have to be in accordance with the size indicated on the nameplate and fitted accordingly.

Caution:

- Reducing the connections may cause improper operation or malfunctioning.
- For the protection of the equipment install a strainer or filter suitable for the service involved in the inlet side as close to the product as possible.
- If tape, paste, spray or a similar lubricant is used when tightening, avoid particles entering the system.
- Use proper tools and locate wrenches as close as possible to the connection point.
- To avoid damage to the equipment. DO NOT OVERTIGHTEN pipe connections
- Do not use valve or solenoid as lever.
- The pipe connections should not apply any force, torque or strain to the product.

ELECTRICAL CONNECTION

In case of electrical connections, they are only to be made by trained personnel and have to be in accordance with the local regulations and standards.

Caution:

- Turn off electrical power supply and de-energize the electrical circuit and voltage carrying parts before starting work.
- All electrical screw terminals must be properly tightened according to the standards before putting into service.
- Dependent upon the voltage electrical components must be provided with an earth connection and satisfy local regulations and standards.

The equipment can have one of the following electrical terminals:

- Spade plug connections according to ISO-4400 or 3 x DIN-46244 (when correctly installed, this connection provides IP-65 protection).
- Embedded screw terminals in metal enclosure with "Pg" cable gland
- Spade terminals (AMP type).
- Flying leads or cables.

PUTTING INTO SERVICE

Before pressurizing the system, first carry-out an electrical test. In case of solenoid valves, energize the coil a few times and notice a metal click signifying the solenoid operation.

SERVICE

Most of the solenoid valves are equipped with coils for continuous duty service. To prevent the possibility of personal or property damage, do not touch the solenoid which can become hot under normal operating conditions.

SOUND EMISSION

The emission of sound depends on the application, medium and nature of the equipment used. The exact determination of the sound level can only be carried out by the user having the valve installed in his system

MAINTENANCE

Maintenance of ASCO Numatics products is dependent on service conditions. Periodic cleaning is recommended, the timing of which will depend on the media and service conditions. During servicing, components should be examined for excessive wear. A complete set of internal parts is available as spare parts or rebuild kit. If a problem occurs during installation/maintenance or in case of doubt please contact ASCO Numatics or authorized representatives.

*A separate Declaration of Incorporation relating to EU-Directive 2006/42/EC Annex II B is available on request for applicable products. Please provide product identification number and serial numbers of products concerned.

The product, when marked CE, complies with the essential requirements of the EMC 2004/108/EC (until April 20th 2016) and EMC 2014/30/EU (from April 20th 2016) and LVD 2006/95/EC (until April 20th 2016) and LVD 2014/35/EU (from April 20th 2016). A separate Declaration of Conformity is available on request. Please provide product identification number and serial numbers of the products concerned.

INSTRUCTIONS GÉNÉRALES D'INSTALLATION ET D'ENTRETIEN

Note: Ces instructions générales d'installation et d'entretien complètent la notice spécifique du produit.

MONTAGE

Les composants ASCO Numatics sont conçus pour les domaines de fonctionnement indiqués sur la plaque signalétique ou la documentation. Aucune modification ne peut être réalisée sur le matériel sans l'accord préalable du fabricant ou de son représentant. Avant de procéder au montage, dépressuriser les canalisations et effectuer un nettoyage interne.

A moins qu'une flèche ou la notice n'indique un sens de montage spécifique de la tête magnétique, le produit peut être monté dans n'importe quelle position

Le sens de circulation du fluide est indiqué par repères sur le corps et dans la documentation.

La dimension des tuyauteries doit correspondre au raccordement indiqué sur le corps, l'étiquette ou la notice.

Attention:

- Une restriction des tuyauteries peut entraîner des dysfonctionnements.
- Afin de protéger le matériel, installer une crépine ou un filtre adéquat en amont, aussi près que possible du produit.
- En cas d'utilisation de ruban; pâte, aérosol ou autre lubrifiant lors du serrage, veiller à ce qu'aucun corps étranger ne pénètre dans le circuit.
- Utiliser un outillage approprié et placer les clés aussi près que possible du point de raccordement.
- Afin d'éviter toute détérioration, NE PAS TROP SERRER les raccords des tuyauteries.
- Ne pas se servir de la vanne ou de tête magnétique comme d'un levier.
- The pipe connections should not apply any force, torque or strain to the product.

RACCORDEMENT ÉLECTRIQUE

Le raccordement électrique doit être réalisé par un personnel qualifié et selon les normes et règlements locaux.

Attention:

- Avant toute intervention, couper l'alimentation électrique pour mettre hors tension les composants.
- Toutes les bornes à vis doivent être serrées correctement avant la mise en service.
- Selon la tension, les composants électrique doivent être mis à la terre conformément aux normes et règlements locaux.

Selon les cas, le raccordement électrique s'effectue par:

- Déconnecteur débrochable ISO-4400 ou 3 x DIN-46244 avec degré de protection IP-65 lorsque le raccordement est correctement effectué.
- Bornes à vis solidaires du bobinage, sous boîtier métallique avec presse-étoupe "Pg--".
- Cosses (type AMP).
- Fils ou câbles solidaires de la bobine.

MISE EN SERVICE

Avant de mettre le circuit sous pression, effectuer un essai électrique. Dans le cas d'une électrovanne, mettre la bobine sous tension plusieurs fois et écouter le "clac" métallique qui signale le fonctionnement de la tête magnétique.

FONCTIONNEMENT

La plupart des électrovannes comportant des bobinages prévus pour mise sous tension permanente. Pour éviter toute brûlure, ne pas toucher la tête magnétique qui, en fonctionnement normal et en permanence sous tension, peut atteindre une température élevée.

BRUIT DE FONCTIONNEMENT

Le bruit de fonctionnement varie selon l'utilisation, le fluide et le type de matériel employé. L'utilisateur ne pourra déterminer avec précision le niveau sonore émis qu'après avoir monté le composant sur l'installation.

ENTRETIEN

L'entretien nécessaire aux produits ASCO Numatics varie avec leurs conditions d'utilisation. Il est souhaitable de procéder à un nettoyage périodique dont l'intervalle varie suivant la nature du fluide, les conditions de fonctionnement et le milieu ambiant. Lors de l'intervention. Les composants doivent être examinés pour détecter toute usure excessive. Un ensemble de pièces internes est proposé en pièces de rechange pour procéder à la réparation. En cas de problème lors du montage/entretien ou en cas de doute, veuillez contacter ASCO Numatics ou ses représentants officiels.

*Une déclaration d'incorporation relative à la directive UE 2006/42/CE Annexe II B est disponible sur demande pour les produits applicables. Veuillez fournir le numéro d'identification du produit et les numéros de série des produits concernés.

Lorsqu'il est marqué du label CE, le produit est conforme aux exigences essentielles des directives CEM 2004/108/CE (jusqu'au 20 avril 2016) et CEM 2014/30/UE (à partir du 20 avril 2016) et des directives Basse tension 2006/95/CE (jusqu'au 20 avril 2016) et 2014/35/UE (à partir du 20 avril 2016). Une déclaration de conformité peut être fournie sur simple demande. Veuillez fournir le numéro d'identification du produit et les numéros de série des produits concernés.

ALLGEMEINE BETRIEBSANLEITUNG

Achtung: Diese Allgemeine Betriebsanleitung gilt in Zusammenhang mit der jeweiligen Betriebsanleitung für die speziellen Produkte.

EINBAU

Die ASCO Numatics-Komponenten dürfen nur innerhalb der auf den Typenschildern angegebenen Daten eingesetzt werden, Veränderungen an den Produkten sind nur nach Rücksprache mit ASCO Numatics zulässig.

Vor dem Einbau der Ventile muß das Rohrleitungssystem drucklos geschaltet und innen gereinigt werden.

Die Einbaulage der Produkte ist generell beliebig. Ausnahme: Die mit einem Pfeil gekennzeichneten Produkte müssen entsprechend der Pfeilrichtung montiert werden.

Die Durchflußrichtung und der Eingang von Ventilen sind gekennzeichnet.

Die Rohranschlüsse sollten entsprechend den Größenangaben auf den Typenschildern mit handelsüblichen Verschraubungen durchgeführt werden. Dabei ist folgendes zu beachten:

- Eine Reduzierung der Anschlüsse kann zu Leistungs- und Funktionsminderungen führen.
- Zum Schutz der Ventile sollten Schmutzfänger oder Filter so dicht wie möglich in den Ventileingang integriert werden.
- Bei Abdichtung am Gewinde ist darauf zu achten, daß kein Dichtungsmaterial in die Rohrleitung oder das Ventil gelangt.
- Zur Montage darf nur geeignetes Werkzeug verwendet werden.
- Konische Verschraubungen sind sorgfältig anzuziehen. Es ist darauf zu achten, daß beim Anziehen das Gehäuse nicht beschädigt wird.
- Spule und Führungsrohr von Ventilen dürfen nicht als Gegenhalter benutzt werden.
- Die Rohrleitungsanschlüsse sollen fluchten und dürfen keine Spannungen auf das Ventil übertragen.

ELECTRISCHER ANSCHLUß

Der elektrische Anschluß ist von Fachpersonal entsprechend den geltenden VDE- und CEE Richtlinien auszuführen. Es ist besonders auf folgendes zu achten:

- Vor Beginn der Arbeiten ist sicherzustellen, daß alle elektrischen Leitungen und Netzteile spannungslos geschaltet sind.
- Alle Anschlußklemmen sind nach Beendigung der Arbeiten vorschriftsmäßig entsprechend den geltenden Regeln anzuziehen.
- Je nach Spannungsbereich muß das Ventil nach den geltenden Regeln einen Schutzleiterschlüssel erhalten.

Der Magnetantrieb kann je nach Bauart folgende Anschlüsse haben:

- Anschluß für Gerätesteckdose nach DIN 43650 Form A/ISO 4400 oder 3 x DIN 46244 (durch ordnungsgemäße Montage der Gerätesteckdose wird Schutzklasse IP 65 erreicht).
- Anschlüsse innerhalb eines Blechgehäuses mittels Schraubklemmen. Kabeleinführung ins Gehäuse mit PG-Verschraubung.
- Offene Spulen mit Flachsteckern (AMP-Fahren) oder mit eingegossenen Kabelenden.

INBETRIEBNAHME

Vor Druckbeaufschlagung des Produktes sollte eine elektrische Funktionsprüfung erfolgen:

Bei Ventilen Spannung an der Magnetspule mehrmals ein- und ausschalten. Es muß ein Klicken zu hören sein.

BETRIEB

Die meisten Ventile sind mit Spulen für Dauerbetrieb ausgerüstet. Zur Vermeidung von Personen- und Sachschäden sollte jede Berührung mit dem Ventil vermieden werden, da die Magnetspule bei längerem Betrieb sehr heiß werden kann.

GERÄUSCHEMISSION

Diese hängt sehr stark vom Anwendungsfall, den Betriebsdaten und dem Medium, mit denen das Produkt beaufschlagt wird, ab. Eine Aussage über die Geräuschemission des Produktes muß deshalb von demjenigen getroffen werden, der das Produkt innerhalb einer Maschine in Betrieb nimmt.

WARTUNG

Die Wartung hängt von den Einsatzbedingungen ab. In entsprechenden Zeitabständen muß das Produkt geöffnet und gereinigt werden. Für die Überholung der ASCO Numatics-Produkte können Ersatzteilsätze geliefert werden. Treten Schwierigkeiten bei Einbau, Betrieb oder Wartung auf, sowie bei Unklarheiten, ist mit ASCO Numatics Rücksprache zu halten.

ASCO Numatics Produkte sind entsprechend der EG-Richtlinie 89/392/EWG gefertigt.

*Eine separate Herstellererklärung im Sinne der Richtlinie 2006/42/EWG Anhang II B ist auf Anfrage für die entsprechenden Produkte erhältlich. Geben Sie bitte die Kennnummer sowie die Seriennummer der betreffenden Produkte an.

Das Produkt, wenn mit CE gekennzeichnet, erfüllt die Anforderungen von EMV 2004/108/EWG (bis 20. April 2016) und EMV 2014/30/EU (vom 20. April 2016) und LVD 2006/95/EWG (bis 20. April 2016) und LVD 2014/35/EU (vom 20. April 2016). Eine separate Konformitätserklärung ist auf Anfrage erhältlich. Geben Sie bitte die Kennnummer sowie die Seriennummer der betreffenden Produkte an.



MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

ASCHROFT

TYPE 1009, PRESSURE GAUGE

WATER TECHNOLOGIES

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***PRESSURE GAUGE
INSTALLATION,
OPERATION AND
MAINTENANCE***



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1.0 SELECTION & APPLICATION

Users should become familiar with ASME B40.100 (Gauges – Pressure Indicating Dial Type – Elastic Element) before specifying pressure measuring gauges. That document – containing valuable information regarding gauge construction, accuracy, safety, selection and testing – may be ordered from:

ASME International
Three Park Avenue
New York, N.Y. 10016-5990
800-843-2763 (US/Canada)
001-800-843-2763 (Mexico)
973-882-1170 outside North America
email: infocentral@asme.org
www.asme.org

WARNING: To prevent misapplication, pressure gauges should be selected considering media and ambient operating conditions. Improper application can be detrimental to the gauge, causing failure and possible personal injury, property damage or death. The information contained in this manual is offered as a guide in making the proper selection of a pressure gauge. Additional information is available from Ashcroft Inc.

The following is a highlight of some of the more important considerations:

1.1 Range – The range of the instrument should be approximately twice the maximum operating pressure. Too low a range may result in (a) low fatigue life of the elastic element due to high operating stress and (b) susceptibility to over-pressure set due to pressure transients that exceed the normal operating pressure. Too high a range may yield insufficient resolution for the application.

1.2 Temperature – Refer to Section 2 of this manual for important information concerning temperature related limitations of pressure gauges, both dry and liquid filled.

1.3 Media – The material of the process sensing element must be compatible with the process media. Use of a diaphragm seal with the gauge is recommended for process media that (a) is corrosive to the process sensing element; (b) contain heavy particulates (slurries) or (c) are very viscous including those that harden at room temperature.

1.4 Oxidizing media – Gauges for direct use on oxidizing media should be specially cleaned. Gauges for oxygen service should be ordered to variation X6B and will carry the ASME required dial marking “USE NO OIL” in red letters. Gauges for direct use on other oxidizing media may be ordered to variation X6W. They will be cleaned but carry no dial marking. *PLUS!*[™] Performance gauges or Halocarbon filled gauge or diaphragm fill is required for use with oxidizing media; order variation XCF.

1.5 Pulsation/Vibration – Pressure pulsation can be dampened by several mechanisms; the patented *PLUS! Performance* gauge will handle the vast majority of applications. One exception to this is high frequency pulsation which is difficult to detect. The only indication may be an upscale zero shift due to movement wear. These applications should be addressed with a liquid filled gauge, or in extreme cases, a remotely mounted liquid filled gauge connected with a length of capillary line. The small diameter of the capillary provides excellent dampening, but can be plugged. The Ashcroft 1106 pulsation dampener and 1112 snubber are auxiliary devices which dampen pulsation with less tendency to plug.

1.6 Gauge fills. – Once it has been determined that a liquid filled gauge is in order, the next step is selecting the type of fill.

Glycerin satisfies most applications. While being the least expensive fill, its usable temperature range is 20/180°F.

Silicone filled gauges have a broader service range:

–40/250°F. Oxidizing media require the use of **Halocarbon**, with a service range of –40/250°F. Pointer motion will be slowed at the low end of the low end of these temperature ranges.

1.7 Mounting – Users should predetermine how the gauge will be mounted in service: stem (pipe), wall (surface) or panel (flush). Ashcroft wall or panel mounting kits should be ordered with the gauge. See Section 3.

2.0 TEMPERATURE

2.1 Ambient Temperature – To ensure long life and accuracy, pressure gauges should preferably be used at an ambient temperature between –20 and +150°F (–30 to +65°C). At very low temperatures, standard gauges may exhibit slow pointer response. Above 150°F, the accuracy will be affected by approximately 1.5% per 100°F. Other than discoloration of the dial and hardening of the gasketing and degradation of accuracy, non-liquid filled Type 1279 (phenolic case) and 1379 (aluminum case) Duragauge® gauge, with standard glass windows, can withstand continuous operating temperatures up to 250°F. Unigauge models 2½” and 3½” 1009 and 1008S liquid filled gauges can withstand 200°F but glycerin fill and the acrylic window of Duragauge® gauges will tend to yellow. Silicone fill will have much less tendency to yellow. Low pressure, liquid filled Types 1008 and 1009 gauges may have some downscale errors caused by liquid fill expansion. This can be alleviated by venting the gauge at the top plug (pullout the blue plug insert). To do this the gauge must be installed in the vertical position.

Although the gauge may be destroyed and calibration lost, gauges can withstand short times at the following temperatures: gauges with all welded pressure boundary joints, 750°F (400°C); gauges with silver brazed joints, 450°F (232°C) and gauges with soft soldered joints, 250°F (121°C). For expected long term service below –20°F (–30°C) Duragauge® and 4½” 1009 gauges should be hermetically sealed and specially lubricated; add “H” to the product code for hermetic sealing. Add variation XVY for special lubricant. Standard Duralife® gauges may be used to –50°F (–45°C) without modification.

2.2 Accuracy – Heat and cold affect accuracy of indication. A general rule of thumb for **dry gauges** is 0.5% of full scale change for every 40°F change from 75°F. Double that allowance for gauges with hermetically sealed or liquid filled cases, except for Duragauge® gauges where no extra allowance is required due to the elastomeric, compensating back. Above 250°F there may exist very significant errors in indication.

2.3 Steam service – In order to prevent live steam from entering the Bourdon tube, a siphon filled with water should be installed between the gauge and the process line. Siphons can be supplied with ratings up to 4,000 psi. If freezing of the condensate in the loop of the siphon is a possibility, a diaphragm seal should be used to isolate the gauge from the process steam. Siphons should also be used whenever condensing, hot vapors (not just steam) are present. Super heated steam should have enough piping or capillary line ahead of the siphon to maintain liquid water in the siphon loop.

2.4 Hot or very cold media – A five foot capillary line assembly will bring most hot or cold process media within the recommended gauge ambient temperature range. For media above

750°F (400°C) the customers should use their own small diameter piping to avoid possible corrosion of the stainless steel. The five foot capillary will protect the gauges used on the common cryogenic (less than -300°F (200°C) gases, liquid argon, nitrogen, and oxygen.) The capillary and gauge must be cleaned for oxygen service. The media must not be corrosive to stainless steel, and must not plug the small bore of the capillary.

2.5 Diaphragm seals – A diaphragm seal should be used to protect gauges from corrosive media, or media that will plug the instrument. Diaphragm seals are offered in a wide variety of designs and corrosion resistant materials to accommodate almost any application and most connections. Visit www.ashcroft.com for details.

2.6 Autoclaving – Sanitary gauges with clamp type connections are frequently steam sterilized in an autoclave. Gauges equipped with polysulfone windows will withstand more autoclave cycles than those equipped with polycarbonate windows. Gauges equipped with plain glass or laminated safety glass **should not be autoclaved**. Gauge cases should be vented to atmosphere (removing the rubber fill/safety plug if necessary) **before** autoclaving to prevent the plastic window from cracking or excessively distorting. If the gauge is liquid filled, the fill should be drained from the case and the front ring loosened before autoclaving.

3.0 INSTALLATION

3.1 Location – Whenever possible, gauges should be located to minimize the effects of vibration, extreme ambient temperatures and moisture. Dry locations away from very high thermal sources (ovens, boilers etc.) are preferred. If the mechanical vibration level is extreme, the gauge should be remotely located (usually on a wall) and connected to the pressure source via flexible tubing.

3.2 Gauge reuse – ASME B40.100 recommends that gauges not be moved indiscriminately from one application to another. The cumulative number of pressure cycles on an in-service or previously used gauge is generally unknown, so it is generally safer to install a new gauge whenever and wherever possible. This will also minimize the possibility of a reaction with previous media.

3.3 Tightening of gauge – Torque should never be applied to the gauge case. Instead, an open end or adjustable wrench should always be used on the wrench flats of the gauge socket to tighten the gauge into the fitting or pipe. NPT threads require the use of a suitable thread sealant, such as pipe dope or teflon tape, and must be tightened very securely to ensure a leak tight seal.

CAUTION: Torque applied to a diaphragm seal or its attached gauge, that tends to loosen one relative to the other, can cause loss of fill and subsequent inaccurate readings. Always apply torque **only** to the wrench flats on the lower seal housing when installing filled, diaphragm seal assemblies or removing same from process lines.

3.4 Process isolation – A shut-off valve should be installed between the gauge and the process in order to be able to isolate the gauge for inspection or replacement without shutting down the process.

3.5 Surface mounting – Also known as wall mounting. Gauges should be kept free of piping strains. The gauge case mounting feet, if applicable, will ensure clearance between the pressure relieving back and the mounting surface.

3.6 Flush mounting – Also known as panel mounting. The applicable panel mounting cutout dimensions can be found at www.ashcroft.com

4.0 OPERATION

4.1 Frequency of inspection – This is quite subjective and depends upon the severity of the service and how critical the accuracy of the indicated pressure is. For example, a monthly inspection frequency may be in order for critical, severe service applications. Annual inspections, or even less frequent schedules, are often employed in non-critical applications.

4.2 In-service inspection – If the accuracy of the gauge cannot be checked in place, the user can at least look for (a) erratic or random pointer motion; (b) readings that are suspect – especially indications of pressure when the user believes the true pressure is 0 psig. Any gauge which is obviously not working or indicating erroneously, should be immediately valved-off or removed from service to avoid a possible pressure boundary failure.

4.3 When to check accuracy – Any suspicious behavior of the gauge pointer warrants that a full accuracy check be performed. Even if the gauge is not showing any symptoms of abnormal performance, the user may want to establish a frequency of bench type inspection.

4.4 When to recalibrate – This depends on the criticality of the application. If the accuracy of a 3-2-3% commercial type gauge is only 0.5% beyond specification, the user must decide whether it's worth the time and expense to bring the gauge back into specification. Conversely if the accuracy of a 0.25% test gauge is found to be 0.1% out of specification then the gauge should be recalibrated.

4.5 Other considerations – These include (a) bent or unattached pointers due to extreme pressure pulsation; (b) broken windows which should be replaced to keep dirt out of the internals; (c) leakage of gauge fill; (d) case damage – dents and/or cracks; (e) any signs of service media leakage through the gauge including its connection; (f) discoloration of gauge fill that impedes readability.

4.6 Spare parts – As a general rule it is recommended that the user maintain in inventory one complete Ashcroft® instrument for every ten (or fraction thereof) of that instrument type in service.

5.0 GAUGE REPLACEMENT

It is recommended that the user stock one complete Ashcroft® instrument for every ten (or fraction thereof) of that instrument type in service. With regard to gauges having a service history, consideration should be given to discarding rather than repairing them. Gauges in this category include the following:

- a. Gauges that exhibit a span shift greater than 10%. It is possible the Bourdon tube has suffered thinning of its walls by corrosion.
- b. Gauges that exhibit a zero shift greater than 25%. It is likely the Bourdon tube has seen significant overpressure leaving residual stresses that may be detrimental to the application.
- c. Gauges which have accumulated over 1,000,000 pressure cycles with significant pointer excursion.
- d. Gauges showing any signs of corrosion and/or leakage of the pressure system.
- e. Gauges which have been exposed to high temperature or exhibit signs of having been exposed to high temperature – specifically 250°F or greater for soft soldered systems; 450°F or greater for brazed systems; and 750°F or greater for welded systems.

- f. Gauges showing significant friction error and/or wear of the movement and linkage.
- g. Gauges having damaged sockets, especially damaged threads.
- h. Liquid filled gauges showing loss of case fill.

NOTE: ASME B40.100 does not recommend moving gauges from one application to another. This policy is prudent in that it encourages the user to procure a new gauge, properly tailored by specification, to each application that arises.

6.0 ACCURACY: PROCEDURES/DEFINITIONS

Accuracy inspection – Readings at approximately five points equally spaced over the dial should be taken, both upscale and downscale, before and after lightly rapping the gauge to remove friction. **A pressure standard with accuracy at least four times greater than the accuracy of the gauge being tested is recommended.**

Equipment – A finely regulated pressure supply will be required. It is critical that the piping system associated with the test setup be leaktight. The gauge under test should be positioned as it will be in service to eliminate positional errors due to gravity.

Method – ASME B40.100 recommends that **known** pressure (based on the reading from the pressure standard used) be applied to the gauge under test. Readings including any error from the nominal input pressure, are then taken from the gauge under test. The practice of aligning the pointer of the gauge under test with a dial graduation and then reading the error from the master gauge (“reverse reading”) can result in inconsistent and misleading data and should NOT be used.

Calibration chart – After recording all of the readings it is necessary to calculate the errors associated with each test point using the following formula: $\text{ERROR in percent} = 100 \text{ times } (\text{TRUE VALUE minus READING}) \div \text{RANGE}$. Plotting the individual errors (Figure 1) makes it possible to visualize the total gauge characteristic. The plot should contain all four curves: upscale – before rap; upscale – after rap; downscale – before rap; downscale – after rap. “Rap” means lightly tapping the gauge **before** reading to remove friction as described in ASME B40.100.

Referring to Figure 1, several classes of error may be seen:

Zero – An error which is approximately equal over the entire scale. This error can be manifested when either the gauge is

FIG. 1

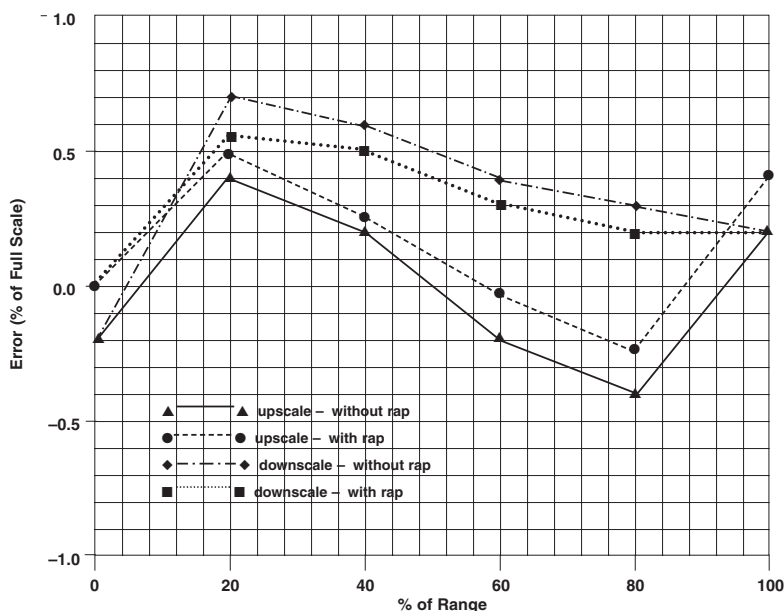
TYPICAL CALIBRATION CHART

INDICATED VALUE (PSI)

True Value – PSI	Increasing – Without RAP	Increasing – With RAP	Decreasing – Without RAP	Decreasing – With RAP
0	–.4	0	–.4	0
40	+.8	+1.0	+1.4	+1.1
80	+.4	+.5	+1.2	+1.0
120	–.4	–1.0	+.8	+.6
160	–.8	–.5	+.6	+.4
200	+.4	+.8	+.4	+.4

ERROR (% OF FULL SCALE)

True Value – % of Range	Increasing – Without RAP	Increasing – With RAP	Decreasing – Without RAP	Decreasing – With RAP
0	–.20	0	–.20	0
20	+.40	+.50	+.70	+.55
40	+.20	+.25	+.60	+.50
60	–.20	–.05	+.40	+.30
80	–.40	–.25	+.30	+.20
100	+.20	+.40	+.20	+.20



dropped or overpressured and the Bourdon tube takes a permanent set. This error may often be corrected by simply repositioning the pointer. Except for test gauges, it is recommended that the pointer be set at midscale pressure to “split” the errors.

Span – A span error exists when the error at full scale pressure is different from the error at zero pressure. This error is often proportional to the applied pressure. Most Ashcroft gauges are equipped with an internal, adjusting mechanism with which the user can correct any span errors which have developed in service.

Linearity – A gauge that has been properly spanned can still be out of specification at intermediate points if the response of the gauge as seen in Figure 1 (Typical Calibration Chart) is not linear. The Ashcroft Duragauge® pressure gauge is equipped with a rotary movement feature which permits the user to minimize this class of error. Other Ashcroft gauge designs (e.g., 1009 Duralife®) require that the dial be moved left or right prior to tightening the dial screws.

Hysteresis – Some Bourdon tubes have a material property known as hysteresis. This material characteristic results in differences between the upscale and downscale curves. This class of error can **not** be eliminated by adjusting the gauge movement or dial position.

Friction – This error is defined as the difference in readings before and after lightly tapping the gauge case at a check point. Possible causes of friction are burrs or foreign material in the movement gearing, “bound” linkages between the movement and the bourdon tube, or an improperly tensioned hairspring. If correcting these potential causes of friction does not eliminate excessive friction error, the movement should be replaced.

6.1 Calibration – Rotary Movement Gauges and Type 1259 Gauges

– Inspect gauge for accuracy. Many times gauges are simply “off zero” and a simple pointer adjustment using the micrometer pointer is adequate. If inspection shows the gauge warrants recalibration to correct span and/or linearity errors, proceed as follows:

- Remove ring, window and, if solid front case, the rear closure assembly.
- Pressurize the gauge **once** to full scale and back to zero.
- Refer to Figure 2 (Ashcroft System Assembly w/Rotary Gear Movement) for a view of a typical Ashcroft rotary system assembly with component parts identified. Refer to Figure 2A for link configuration of Type 1259 gauge.

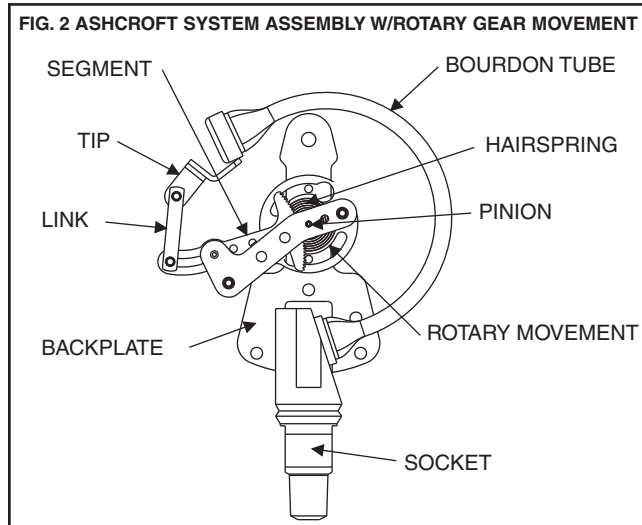
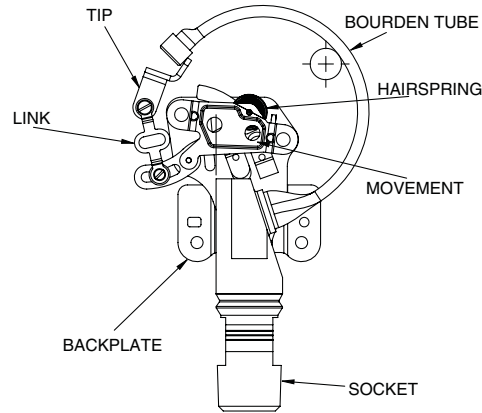


FIG. 2A ASHCROFT TYPE 1259 SYSTEM ASSEMBLY



- Adjust the micrometer pointer so that it rests at the true zero position. For open front gauges the pointer and dial must also be disassembled and the pointer should then be lightly pressed onto the pinion at the 9:00 o'clock position.
- Apply full scale pressure and note the magnitude of the span error. With open front gauges, ideal span (270 degrees) will exist when at full scale pressure the pointer rests exactly at the 6:00 o'clock position.
- If the span has shifted significantly (span error greater than 10%), the gauge should be replaced because there may be some partial corrosion inside the Bourdon tube which could lead to ultimate failure. If the span error exceeds 0.25%, loosen the lower link screw and move the lower end of the link toward the movement to increase span or away to decrease span. An adjustment of 0.004 inch will change the span by approximately 1%. This is a repetitive procedure which often requires more than one adjustment of the link position and the subsequent rechecking of the errors at zero and full scale pressure.
- Apply midscale pressure and note error in reading. Even though the gauge is accurate at zero and full scale, it may be inaccurate at the midpoint. This is called linearity error. For corrections to linearity with the Type 1259 gauges refer to Figure 2B. For rotary movement gauges,

FIG. 2B LINEARITY ADJUSTMENT & LINK CONFIGURATION FOR ASHCROFT TYPE 1259

To increase pointer indication at mid-scale, use a pliers to open the link.



To decrease pointer indication at mid-scale, use a pliers to close the link.



note the following: if the error is positive, the movement should be rotated counter clockwise. Rotating the movement one degree will change this error by approximately 0.25%. Rotating the movement often affects span and it should be subsequently rechecked and readjusted if necessary according to step 6.1e and 6.1f.

- While recalibrating the gauge, the friction error – difference in readings taken with and without rap – should be noted. This error should not exceed the basic accuracy

of the gauge. If the friction error is excessive, the movement should be replaced. One possible cause of excessive friction is improper adjustment of the hairspring. The hairspring torque, or tension, must be adequate without being excessive. The hairspring should also be level, unwind evenly (no turns rubbing) and it should never tangle.

NOTES:

- 1 For operation of test gauge external zero reset, refer to Figure 1 on page 19.
- 2 For test gauge calibration procedure, refer to Figure 2 on page 20.

7.0 DIAPHRAGM SEALS

7.1 General – A diaphragm seal (isolator) is a device which is attached to the inlet connection of a pressure instrument to isolate its measuring element from the process media. The space between the diaphragm and the instrument's pressure sensing element is solidly filled with a suitable liquid. Displacement of the liquid fill in the pressure element, through movement of the diaphragm, transmits process pressure changes directly to a gauge, switch or any other pressure instrument. When diaphragm seals are used with pressure gauges, an additional 0.5% tolerance must be added to the gauge accuracy because of the diaphragm spring rate.

Used in a variety of process applications where corrosives, slurries or viscous fluids may be encountered, the diaphragm seal affords protection to the instrument where:

- The process fluid being measured would normally clog the pressure element.
- Pressure element materials capable of withstanding corrosive effects of certain fluids are not available.
- The process fluid might freeze due to changes in ambient temperature and damage the element.

7.2 Installation – Refer to bulletin OH-1 for information regarding (a) seal configurations; (b) filling fluids; (c) temperature range of filling fluids; (d) diaphragm material pressure and temperature limits; (e) bottom housing material pressure and temperature limits; (f) pressure rating of seal assembly; (g) accuracy/temperature errors of seal assembly; (h) diaphragm seal displacement. The volumetric displacement of the diaphragm must at least equal the volumetric displacement of the measuring element in the pressure instrument to which the seal is to be attached.

It is imperative that the pressure instrument/diaphragm seal assembly be **properly** filled prior to being placed in service. Ashcroft diaphragm seal assemblies should only be filled by a seal assembler certified by Ashcroft Inc. Refer to section 3.3 for a cautionary note about not applying torque on either the instrument or seal relative to the other.

7.3 Operation – All Ashcroft® diaphragm seals, with the exception of Type 310 mini-seals, are continuous duty. Should the pressure instrument fail, or be removed accidentally or deliberately, the diaphragm will seat against a matching surface preventing damage to the diaphragm or leakage of the process fluid.

7.4 Maintenance – Clamp type diaphragm seals – Types 100, 200 and 300 – allow for replacement of the diaphragm or diaphragm capsule, if that ever becomes necessary. The Type 200 top housing must also be replaced with the diaphragm. With all three types the clamping arrangement allows field disassembly to permit cleaning of the seal interior.

7.5 Failures – Diaphragm failures are generally caused by

either corrosion, high temperatures or fill leakage. Process media build-up on the process side of the diaphragm can also require seal cleaning or replacement. Consult Customer Service, Stratford CT for advice on seal failures and/or replacement.

WARNING: All seal components should be selected considering process and ambient operating conditions to prevent misapplication. Improper application could result in failure, possible personal injury, property damage or death.

8.0 DAMPENING DEVICES

8.1 General – Some type of dampening device should be used whenever the pressure gauge may be exposed to repetitive pressure fluctuations that are fairly rapid, high in magnitude and especially when transitory pressure spikes exceeding the gauge range are present (as with starting and stopping action of valves and pumps). A restricted orifice of some kind is employed through which pressure fluctuations must pass before they reach the Bourdon tube. The dampener reduces the magnitude of the pressure pulse thus extending the life of the Bourdon tube and movement. This reduction of the pressure pulsation as “seen” by the pressure gauge is generally evidenced by a reduction in the pointer travel. If the orifice is very small the pointer may indicate the average service pressure, with little or no indication of the time varying component of the process pressure.

Commonly encountered media (e.g. – water and hydraulic oil) often carry impurities which can plug the orifice over time thus rendering the gauge inoperative until the dampener is cleaned or replaced.

Highly viscous media and media that tend to periodically harden (e.g., asphalt) require a diaphragm seal be fitted to the gauge. The seal contains an internal orifice which dampens the pressure fluctuation within the fill fluid.

8.2 Throttle Screws & Plugs – These accessories provide dampening for the least cost. They have the advantage of fitting completely within the gauge socket and come in three types: (a) a screwed-in type which permits easy removal for cleaning or replacement; (b) a pressed in, non-threaded design and (c) a pressed in, threaded design which provides a highly restrictive, helical flow path. Not all styles are available on all gauge types.

8.3 Ashcroft Pulsation Dampener – Type 1106 Ashcroft pulsation dampener is a moving pin type in which the restricted orifice is the clearance between the pin and any one of five preselected hole diameters. Unlike a simple throttle screw/plug, this device has a self-cleaning action in that the pin moves up and down under the influence of pressure fluctuations.

8.4 Ashcroft Pressure Snubber – The heart of the Type 1112 pressure snubber is a thick porous metal filter disc. The disc is available in four standard porosity grades.

8.5 Ashcroft Needle Valves – Type 7001 thru 7004 steel needle valves provide varying degrees of dampening. These devices, in the event of plugging, can easily be opened to allow the pressure fluid to clear away the obstruction.

8.6 Chemiquip® Pressure Limiting Valves – Model PLV-255, PLV-2550, PLV-5460, PLV-5500 and PLV-6430, available with and without built-in snubbers, automatically “shut off” at adjustable preset values of pressure to protect the gauge from damage to overpressure. They are especially useful on hydraulic systems wherein hydraulic transients (spikes) are common.

9.0 TEST EQUIPMENT & TOOL KITS

See our website www.ashcroft.com for more details

9.1 Pressure Instrument Testing Equipment

Type 1305D Deadweight Tester

Type 1327D Pressure Gauge Comparator

Type 1327CM "Precision" Gauge Comparator

9.2 Tools & Tool Kits For Recalibration of 4½" and Larger Gauges

Type 2505 universal carrying case for 1082 test gauge

Type 266A132-01 span wrench for 1082 test gauge

Type 1281 socket O-Ring kit for 1279/1379 lower connect

Type 1285 4½" ring wrench for 1279/1379 lower & back connect

Type 1286 6" ring wrench for 1379 lower & back connect

Type 3220 pointer puller (all gauges except 1009 Duralife®)

Type 3530 pinion back-up tool for 1009 Duralife®

Type 3220 Handjack set

Type 1105 Tool Kit

9.3 Kits to Convert a Dry Gauge to a Liquid Filled or Weather Proof Case Gauge

Type 1280 conversion kit for 4½" lower connect 1279/1379

Type 1283 conversion kit for 4½" back connect 1279/1379

Type 1284 conversion kit for 6" lower & back connect



TYPE 1105
TOOL KIT

TYPE 3220
HAND JACK SET



9.4 2½ & 3½ 1009 Duralife® Gauge Tools

Description	Part No.
Pointer Puller Screw/Pin ⁽²⁾⁽³⁾⁽⁴⁾	112A381-01
Pointer Puller Body ⁽²⁾⁽³⁾⁽⁴⁾	292A133-01
Pointer Staker ⁽²⁾⁽⁴⁾	188A101-01
Span Wrench ⁽²⁾⁽⁵⁾ (to adjust span)	266A137-01
Ring Wrench 3½" ⁽¹⁾⁽⁵⁾ (for ring removal) (35 1009)	266B134-01
Ring Wrench 2½" ⁽¹⁾⁽⁵⁾ (for ring removal) (25 1009)	266B135-01
Nest 2½" & 3½" ⁽¹⁾⁽⁵⁾ (to hold gauge for ring removal) (25/35 1009)	266B136-01
Ring Removal Tool ⁽⁶⁾ (25 1009)	101B221-02
Ring Removal Tool ⁽⁶⁾ (35 1009)	101B221-01
Nest 2½" ⁽⁶⁾ (to hold gauge for ring removal) (25 1009)	101B220-02
Nest 3½" ⁽⁶⁾ (to hold gauge for ring removal) (35 1009)	101B220-01
Type 1230 throttle plug insertion (¼ NPT) for 1009 Duralife®	1230
Type 1231 throttle plug insertion (¼ NPT) for 1009 Duralife® (body only)	1231
Tool to open orifice on push-in throttle plug	101A206-01

(1) Formerly 1206T Tool Kit.

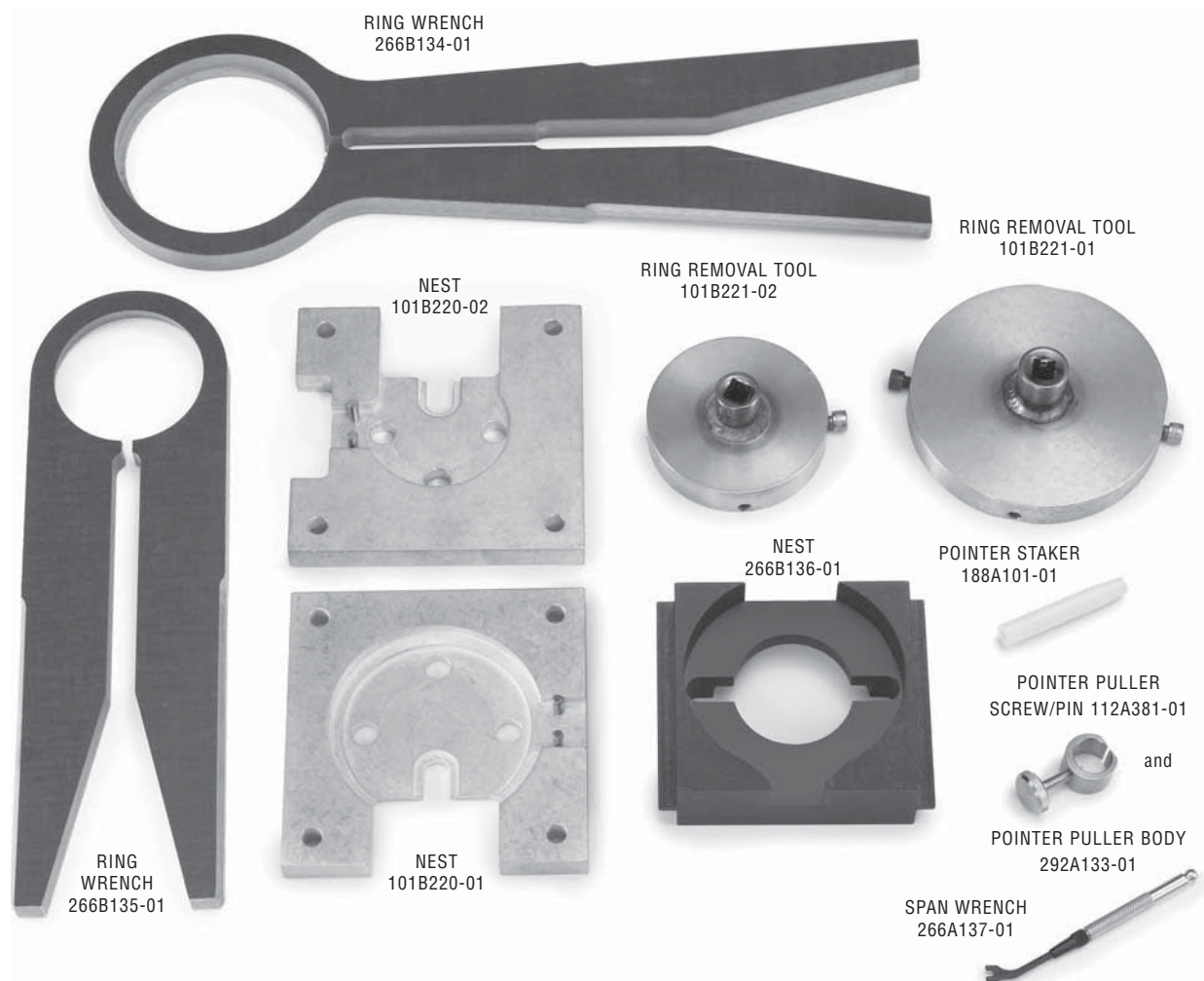
(2) Formerly some parts in 1205T Tool Kit.

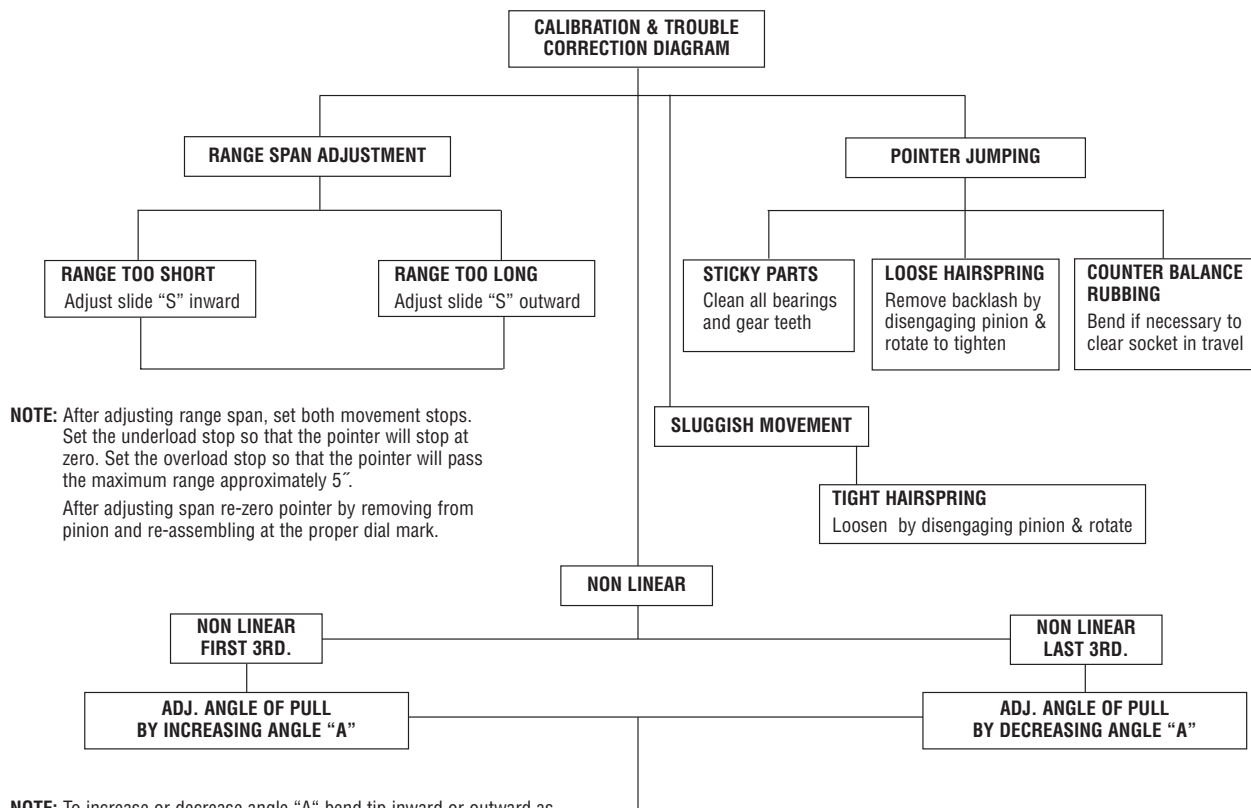
(3) Both parts must be purchased together.

(4) Previous and current design.

(5) Previous design only.

(6) Current design only.





NOTE: After adjusting range span, set both movement stops. Set the underload stop so that the pointer will stop at zero. Set the overload stop so that the pointer will pass the maximum range approximately 5".

After adjusting span re-zero pointer by removing from pinion and re-assembling at the proper dial mark.

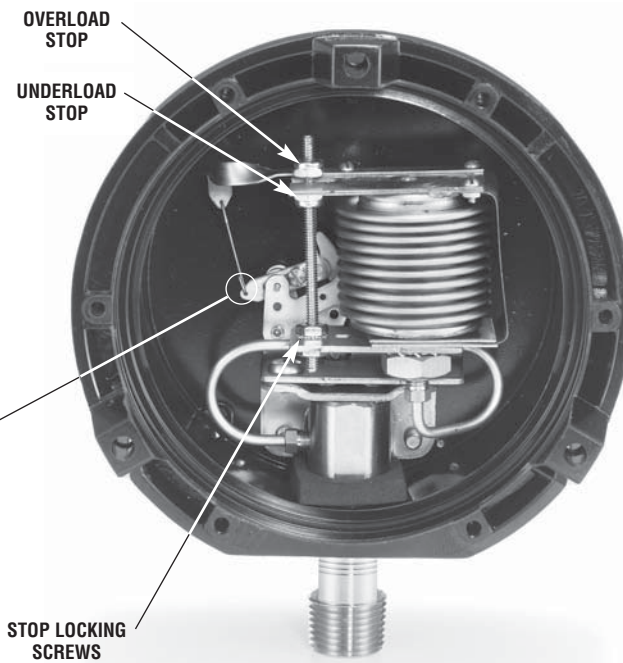
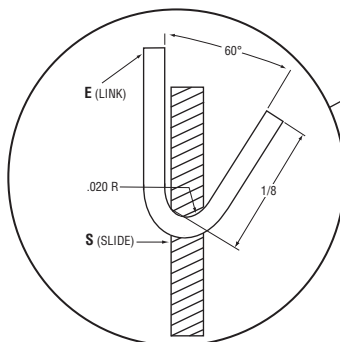
NOTE: To increase or decrease angle "A," bend tip inward or outward as required. Doing this may run the movement segment off the pinion. This can be corrected by cutting off one end off the link "E" decreasing its length, or makin a new length from .032 dia. phos. bronze wire.

Caution: When reproducing link end, follow figure 44 very closely. this will prevent too much play, or, binding in operation.

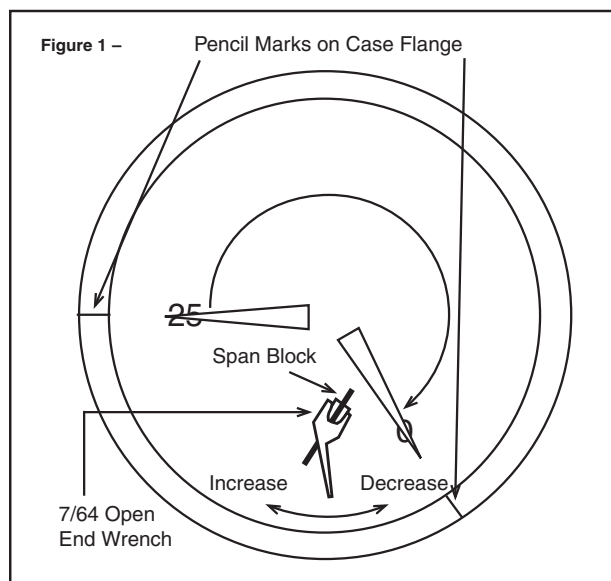
REF: Replacing System Bellows

After assembling bellows to the gauge socket securely, subject system to 30 psi for five minutes, allowing bellows to travel approximately 1/8" against the overload stop. After this, heat treat system for 15 hours at 250°F, this procedure is necessary to prevent gauge drift.

SLIDE AND LINK (angle "A")
Enlarged view of slide and link



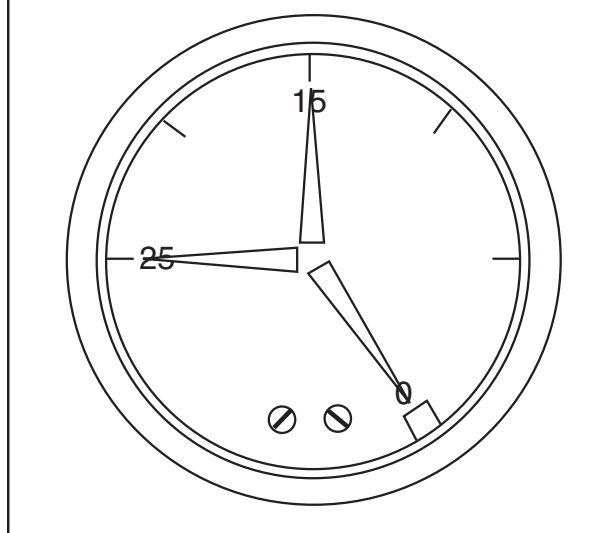
1. Remove ring, window and gasket pointer.
2. Using a pencil, refer to dial and mark the 0 and 25" Hg positions on the case flange.
3. Remove dial.
4. Apply 25" Hg vac.
5. Lightly press pointer onto pinion carefully aligning it with the 25" Hg vac. mark on the flange.
6. Release vacuum fully.
7. Note agreement of pointer to zero mark on flange.
8. If span is high or low, turn span block as shown in Figure 1.



9. Repeat steps 4 through 8 until span is correct.
10. Remove pointer.
11. With 25" Hg vac applied, reassemble dial, dial screws (finger tight) and point.
12. Apply 15" Hg vac. and note accuracy of indication. If required, slide dial left or right to reduce error to 1% maximum.
13. Firmly tighten dial screws.
14. Firmly tap pointer onto pinion.

15. recheck accuracy at 15 and 25" Hg vac. (Figure 2).
16. Reassemble window, gasket and ring.

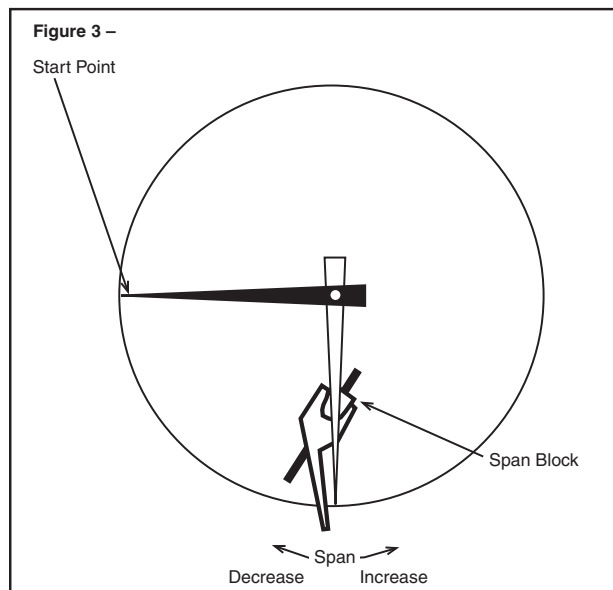
Figure 2 –



Notes: See page 10 for any tools required to calibrate.

**For models produced prior to
September 2008 for 2½" version and
December 2008 for 3½" version.
Back of gauge will have a date code sticker.**

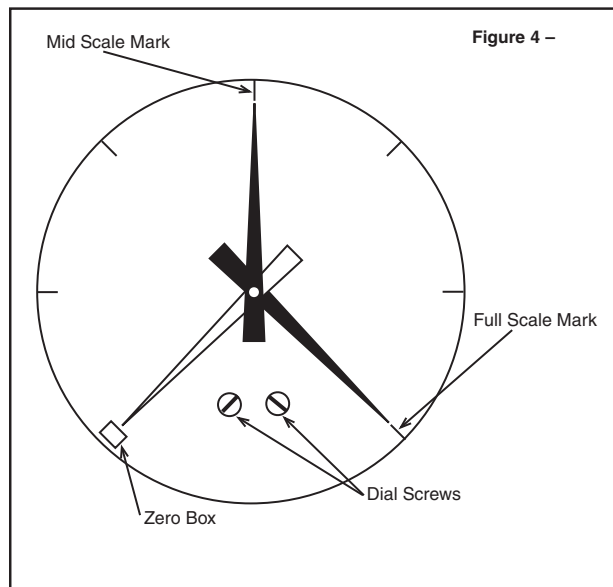
Step 1. With the dial off, install pointer at 9 o'clock "lightly," Figure 3.



Step 2. Go to full scale pressure...rotate span block with tool until pointer rests at 6 o'clock.

Step 3. Go to zero pressure (9 o'clock)...if pointer has not moved away from start point, go to Step 4. If pointer has moved, repeat Step 1 until span is correct.

Step 4. Install dial with screws snug.



Step 5. Install pointer centered in zero box, Figure 4.

Step 6. Go to full scale pressure...check that pointer is within 1% of full scale mark. If not, remove pointer and dial and return to step 1, Figure 4.

Step 7. Go to mid-scale pressure...rotate dial until mid-scale mark is aligned with pointer, Figure 4.

Step 8. Tighten dial's screws and stake on pointer.

Step 9. Check zero and full scale. Reassemble window, gasket and ring.

Notes: See page 10 for any tools required to calibrate.

**For models produced prior to
September 2008 for 2½" version and
December 2008 for 3½" version.
Back of gauge will have a date code sticker.**

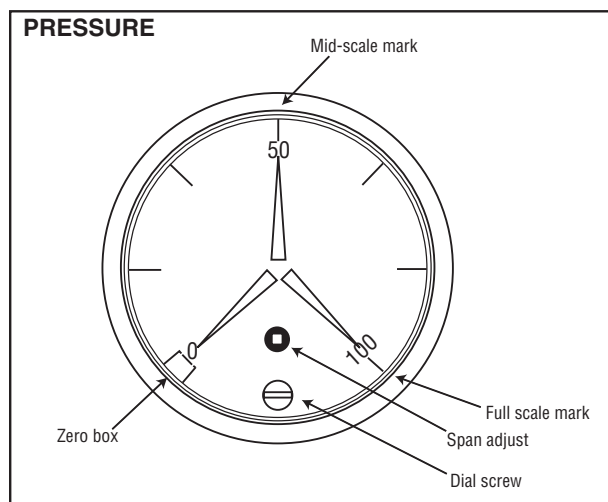
ASHCROFT® Current Type 1009 Duralife® Calibration Procedure – Pressure and Vacuum Range



Calibration – 1009 Duralife® Gauge –

Inspect gauge for accuracy. At times gauges are simply “off zero” and opening the ventable plug at the top of the gauge will relieve internal gauge pressure and correct the offset. If this is not adequate and inspection shows that the gauge warrants recalibration to correct zero, span and/or linearity errors, proceed as follows:

Remove ring, window, and gasket using Ashcroft Ring Removal Tools P/N 101B220-02 and 101B221-02 for 2½” gauges and 101B220-01 and 101B221-01 for 3½” gauges.



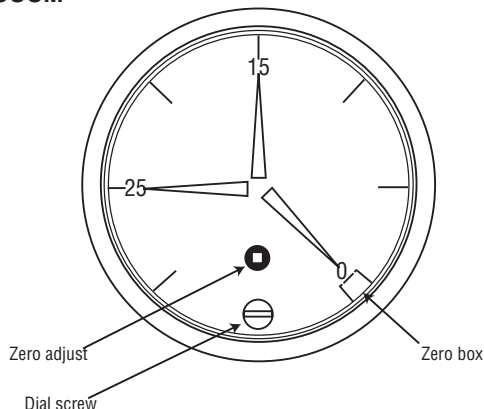
Positive Pressure Ranges –

1. Adjust pointer with a slotted screwdriver until it is in the center of the zero box. This is often all that is required to correct calibration issues.
2. Apply full scale pressure. If error exceeds 1% rotate the black span adjustment device with a #0 square drive bit. Clockwise increases span, counterclockwise decreases span.
3. Fully exhaust pressure and check that pointer still is still in the zero box. If not, repeat step 1 and 2
4. Once 0 and full scale are within tolerance, pressurize gauge to mid-scale.
5. If gauge is within 1%, calibration is complete. If not loosen the dial screw and rotate dial left or right to adjust midpoint. Retighten dial screw.
6. If an adjustment was made in step 5, recheck the gauge at zero and full scale, adjust accordingly until zero, mid and full scale points are in tolerance.

Vacuum Range –

1. Adjust pointer with a slotted screwdriver until it is in the center of the zero box. This is often all that is required to correct calibration issues.
2. Apply 25 inches Hg vacuum. If the error exceeds 1% adjust pointer with a slotted screwdriver until gauge is within tolerance.

VACUUM



3. Vent to 0 pressure and check pointer position in the zero box. If error exceeds 1% rotate the black span adjustment device with a #0 square drive bit. Clockwise rotation moves pointer clockwise, counterclockwise rotation moves the pointer counterclockwise.
4. Repeat step 1 and 2 until 0 and 25 inches of Hg are within gauge tolerance.
5. Apply 15 inches Hg vacuum. If gauge is within 1%, calibration is complete. If not loosen the dial screw and rotate dial left or right to adjust midpoint. Retighten dial screw.
6. If an adjustment was made in step 4, recheck the gauge at zero and 25 inches of Hg vacuum, adjust accordingly until zero, 15 and 25 inches Hg are in tolerance.
7. Continue below.
Re-assemble window and ring to gauge:
 - a. If plastic window is used, push window back into front of gauge, ensure the o-ring does not roll out of window groove (lubricate if necessary). Align the tabs of the window with the tabs of the case front. Once window is in place, install ring and tighten with tools referenced above and shown on page 10.
 - b. If safety glass is used, reinstall window, gasket, and ring. Ensure that the gasket is seated properly under all four tabs of the ring and does not wrinkle when ring is tightened.

Note: Tighten ring: Apply 120-200inlb of torque. Rotate ring clockwise to tighten. Warning: over tightening of safety glass may induce cracking.

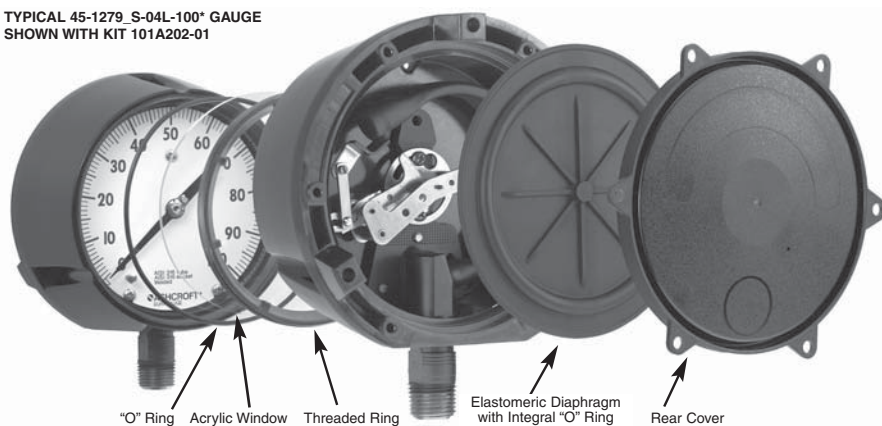
Notes: See page 10 for any tools required to calibrate.

**For models produced after
September 2008 for 2½” version and
December 2008 for 3½” version.
Back of gauge will have a date code sticker.**

Type 1279 & 1379 Solid Front Duragauge® Pressure Gauge Liquid Fill Conversion Instructions



TYPICAL 45-1279 S-04L-100° GAUGE
SHOWN WITH KIT 101A202-01



	1279		1379		
	4½" LOWER	4½" BACK	4½" LOWER	4½" BACK	6" LOWER & BACK
KIT PART NO.	101A202-01	101A203-01	1280	1283	1284
	QUANTITY INCLUDED				
ACRYLIC WINDOW	1	1	1	1	1
FRONT O-RING	1	1	1	1	1
DIAPHRAGM	1	1	1	1	2(1-LC:1-BC)
REAR COVER	1	1	1	1	2(1-LC:1-BC)
COVER SCREWS	4	4	-	-	-
THROTTLE SCREWS	2	2	2	2	2
GARTER SPRING	-	1	1	1	1
FILL IDENTIFICATION	1	1	1	1	1
THREADED RING	-	-	1	1	1

	Ambient Temp. Limits		60 psi and Under Down Scale Zero Shift Required
	°F	°C	
Weatherproof	-50/150	-45/65	N/A
Hermetically Sealed	-10/125	-25/50	N/A
Glycerin Filled	0/150	30/65	.15 psi
Silicone Filled	-50/150	-45/65	.12 psi

1. Unscrew front threaded ring (turn CCW). Remove and discard glass window. For range spans 60 psi and under, shift pointer down scale by the amount shown in the table. With either the glass or plastic window, replace the O-ring with one furnished in the kit.
2. Remove protective paper from acrylic plastic window taking care not to scratch window. Assemble window in gauge.
3. Moisten face of threaded ring with silicone oil or silicone grease where ring bears up against window. Replace front threaded ring and tighten firmly hand tight. See instructions on reverse side for applying proper torque to ring to establish desired squeeze on O-ring seal. (Fig. 4).
It is important to hold gauge **rigidly**, otherwise ring lugs may be damaged during removal or assembly process.
4. From rear of gauge, remove and discard these

parts: rear cover and cover gaskets from case.

Note: Disregard Step No.s 5a and 5b if converting to hermetically sealed version. When converting a 45-1379 with the top fill hole configuration, p/n 256A176-01 fill plug is required and must be ordered separately.

5. Filling Procedures:

a. Manual Filling Procedure: Place gauge face down on bench and **tip gauge** by blocking up front with a ¾ inch block at the 12 o'clock dial position. Tipping of the gauge is necessary so fluid will flow into front cavity of the case. Pour in fill liquid to within about ⅛ inch of rear seal lip. When bubbles stop rising, front cavity is filled. Remove ¾ inch block and pour in liquid until level is about ⅛ inch below rear sealing lip.

Note: An alternative method of filling is to

fill the front dial cavity, adding the front window, etc., as in Step No. 3. Then fill the rear of the gauge. This method eliminates the need to tip the gauge.

b. Vacuum Pump Fill Procedure: (This procedure is recommended when filling a large number of gauges.) Place gauge face down and insert a ½ inch diameter tube, connected to a vacuum pump, through the 12 o'clock position hole in the rear, solid front portion of the case (see Fig. 5). Evacuate the air from the front dial cavity while pouring in the fill fluid through the case back. The vacuum will displace the air with fluid. When the dial cavity is solidly filled, remove the tubing and continue to pour the fill fluid to within ⅛ inch BELOW the O-ring channel lip.

Pre-measuring fill amount is not necessary with above methods. For reference, amount of fill is approximately 400 ml. or 14 fluid oz. (4½" GA.) and 455 ml. or 16 fluid oz. (6" GA.).

c. Note: The liquid fill level should be ⅛" (± ⅛") as measured from the inside of the ring at the 12:00 o'clock position.

6. On lower connection gauges, assemble rear seal diaphragm to case.

For back connection gauges see instructions on reverse side. (Fig. 2/4).

7. For 1279:

Assemble rear cover and six self tapping screws in a criss-cross pattern and torque to 200 in lbs.

For 1379:

- Thread rear ring and torque to 200 in lbs
- Install stainless steel back cover using two screws

8. Assemble throttle screw to threaded hole in socket.

Note: If system is monel (socket wrench flat stamped "PHS" or "PH") use monel throttle screw.

9. Check appropriate box on fill identification label, and peel off label back, and attach fill label to gauge case.

10. If gauge is to be repackaged:

a. Include enclosed instruction sheet inside carton.

b. Change type number on carton label to:

(1) Hermetically Sealed - 1279(*)SH.

(2) Liquid Filled - 1279(*)SL.

*Bourdon Tube System Code

Glycerin or silicone should not be used in applications involving Oxygen, Chlorine, Nitric Acid, Hydrogen Peroxide or other strong oxidizing agents, because of danger of spontaneous chemical reaction, ignition or explosion. Halocarbon should be specified. Products with this fill can be ordered from factory. The use of fluids other than those listed in the table above (for example, Hydrocarbon-based oils) may result in leakage caused by a reaction between the fluid and the elastomeric seals. Consult the factory before filling with any other fluid.

Type 1279 & 1379 Solid Front Duragauge® Pressure Gauge Liquid Fill Conversion Instructions

ASHCROFT®

INSTRUCTIONS FOR USING CONE TOOL AND RING WRENCH

Garter Spring & Diaphragm Assembly (Back Connection Gauge Only)

- Place cone tool over socket shank as shown.
- Moisten lip of socket and outer O-ring surface with silicone oil or grease.
- Place diaphragm with rib side facing upward over cone into case groove.
Diaphragm O-ring must be completely in socket-shank groove.
- Place garter spring over cone as shown and slide onto diaphragm in socket groove
- Assemble rear cover with screws per step 7.

Front Ring Assembly (All Gauges)

- Assemble ring to case by hand to start.
- Place ring on wrench as shown
- Use $\frac{1}{2}$ " drive extension and torque ring to 200 in. lb

Alternate Method

- Tighten ring snugly by hand
- Mark case and ring.
- Turn ring another 100 to 120 degrees (slightly less than $\frac{1}{2}$ turn) using the ring wrench and $\frac{1}{2}$ " drive socket wrench or place the blunt end of a wooden or plastic dowel against a ring lug and tap with a hammer.

INSTRUCTIONS FOR LIQUID FILLING ASHCROFT® TYPE 1279 AND 1379 SOLID FRONT DURAGAUGE® PRESSURE GAUGES USING A VACUUM PUMP

- Insert a length of $\frac{1}{8}$ " diameter tubing through the 12 o'clock position hole in the rear, solid front portion of the case, as shown.
- Evacuate the air from the front dial cavity while pouring in the fill fluid through the case back. The vacuum will displace the air with fluid.*
- When the dial cavity is solidly filled, remove the tubing and continue to pour the fill fluid to within $\frac{1}{16}$ " below the o-ring channel lip, as shown.
- When converting a 45-1379 with the top fill hole configuration, p/n 256A176-01 fill plug is required and must be ordered separately.

*To prevent breakage, reduce vacuum to 15 in. Hg for plain glass and safety glass.

BACK CONNECTION ASSEMBLED GAUGE

Fig. 2

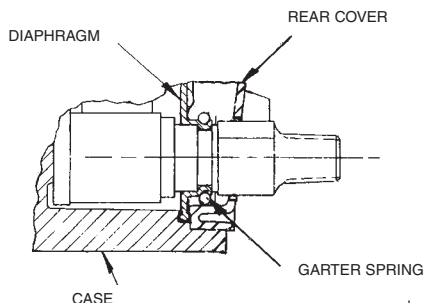


Fig. 3

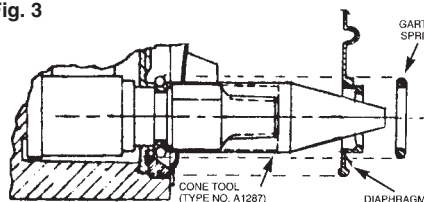


Fig. 4

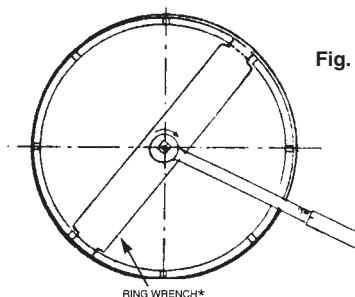
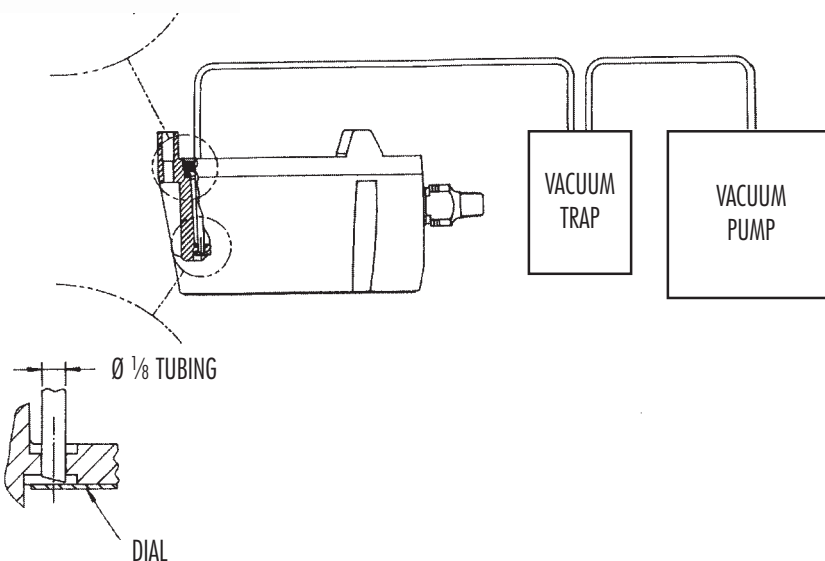
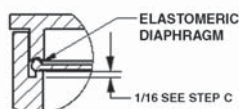
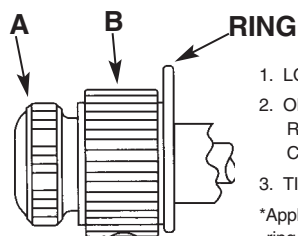


Fig. 5



**INSTRUCTIONS FOR USE OF EXTERNAL
EASY ZERO™ ADJUST FEATURE***

Fig. 1



1. LOOSEN RING-LOCKING SCREW **A**.
2. OBTAIN REQUIRED ADJUSTMENT BY ROTATING KNOB **B** CLOCKWISE OR COUNTER-CLOCKWISE.
3. TIGHTEN SCREW **A** DOWN ON KNOB **B**.

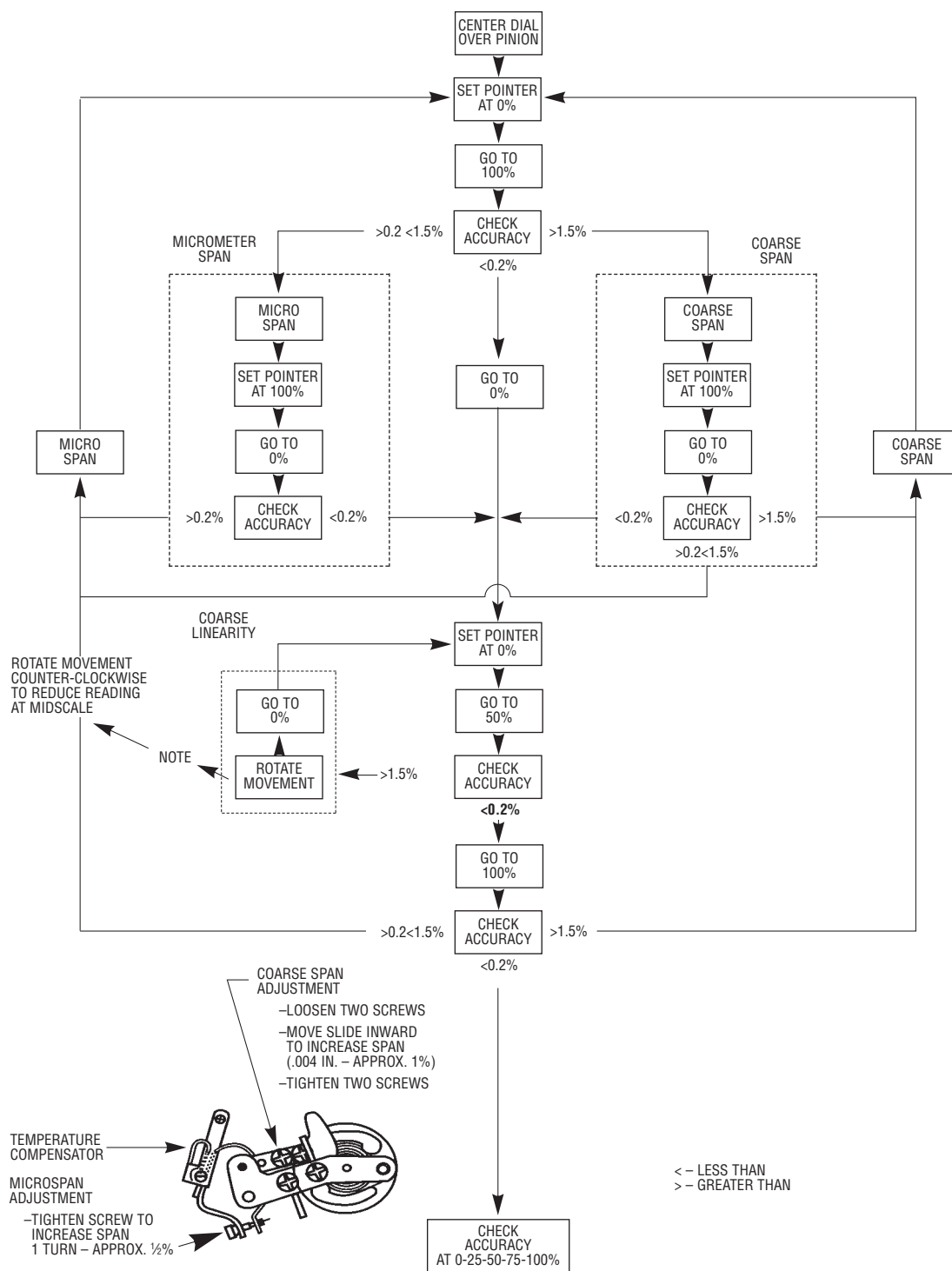
*Applicable only for test gauge with hinged ring design.

**ADDITIONAL
CALIBRATION INSTRUCTIONS**

- 1) "Standards shall have nominal errors no greater than $\frac{1}{4}$ of these permitted for the gauge being tested."
(Ref: ASME B40-100-1998)
- 2) The instrument used as the calibration standard should have a maximum range no greater than 2x that of the gauge being tested. (i.e. Do not use a 400psi standard to test a 15psi gauge.)
- 3) "Known pressure shall be applied at each test point on increasing pressure (or vacuum) from one end to the other end of the scale. At each test point the gauge shall be . . .
lightly tapped, and then read . . ."
(Ref: ASME B40.1 ¶ 6.2.4.1)
- 4) To read gauge indication, move eye over red pointer tip at OD of printed dial until red reflection in mirror band is no longer visible, and then read the pointer position in reference to the dial.

Fig. 2

THIS TEST GAUGE IS PROVIDED WITH A MICROSPAN™ ADJUSTMENT TO SIMPLIFY CALIBRATION. THE FLOW CHART BELOW OUTLINES THE RECOMMENDED CALIBRATION PROCEDURE



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I&M008-10098-5/02 (250-1353-K) Rev. 11/10

Visit our web site www.ashcroft.com



MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

ASCHROFT

TYPE 101, DIAPHRAGM SEAL
TYPE 310, DIAPHRAGM SEAL

LEFT BLANK

Type 100 Series Threaded Capsule Diaphragm Seal



TYPE 100 SHOWN

PRODUCT FEATURES

- The top housing and diaphragm capsule are interchangeable with all Ashcroft bottom housings.
- A fill/bleed connection is standard, which permits filling the seal and instrument simultaneously after evacuation and allows the fill to flow into the completed unit.
- A Viton O-ring, compatible with all standard fill fluids, and a Teflon back-up ring provide a seal between the diaphragm capsule and the top housing.
- A thin Teflon PTFE gasket between the diaphragm and bottom housing ensures a leak-tight corrosion resistant seal even at high pressure.
- Top housing and pressure instrument are removable.
- Continuous-duty design will prevent loss of process fluid if pressure instrument is removed or fails.

APPLICATIONS INCLUDE:

- Elevated process temperatures
- Corrosive service
- Isolation of the process for safety
- Suspended solids in the process
- Sanitary connections
- Minimize process dead leg
- Ease of cleaning between batches

When isolation of the process from an instrument is required, Ashcroft® offers a comprehensive line of diaphragm seals. Seal types include threaded, flanged, in-line threaded, in-line flanged, in-line socket weld, in-line butt weld, saddle and sanitary seals. Also available is a complete offering of isolation or iso-rings and isolation or iso-spools.

SPECIFICATIONS

Model Number: Type 100, 101, 102, 103, 104, 105, 106, 107, 108

Process Connection Size: See Table A (Pg. 2)
Instrument Connection Size: 1/4, 1/2 NPT

Diaphragm Material: See Table B (Pg. 2)

Bottom Housing Materials: See Table C (Pg. 2)

Filling Fluid: Glycerin, Halocarbon, Silicone, Stylytherm

OPTIONS

316 stainless steel top housing	Code YT
Stainless steel clamp rings and flanged ring – includes 300 stainless steel clamping bolts (1500 psi max)	SE
300 series stainless steel clamping bolts (max pres is 1500 psi)	SB
Pipe plugs for flushing connections – pipe plugs are available in the same materials as bottom housings per Table C (Pg. 2)	PU
5000 psi pressure rating – (Type 100 only) threaded inlet only, no flushing connection (metal diaphragm only)	HP
Welded instrument to diaphragm seal	DU
Dual flushing connections (1/2 NPT) (Limited to 2" thru 3" flanged seals)	DB
Ring joint (Flanged seal only)	RJ
Flat face (Flanged seal only)	FF
Clean for gaseous oxygen or strong oxidizing agent applications	6B

Type 100 Series Threaded Capsule Diaphragm Seal

TYPE 100 SERIES THREADED CAPSULE SEAL TYPES

Type 100 –Threaded ¼, ½, ¾, 1 NPT



Type 101 –Threaded with flushing connection ¼, ½, ¾, 1 NPT



Type 102 – Raised Face Flanged ½, ¾, 1, 1½, 2, 3"



Type 103 – Raised Face Flanged ½, ¾, 1, 1½, 2, 3 with flushing connection



Type 104 – In-line Threaded ¼, ½, ¾, 1 NPT



Type 105 – Saddle 3, 4" pipe only



Type 106 – In-line Flanged ½, ¾, 1, 1½, 2, 3, 4, 6, 8"



Type 107 – In-line Socket Weld ½, ¾, 1, 1½, 2"



Type 108 – In-line Butt Weld ½, ¾, ¾, 1, 1½, 2"



Table A – Process Connection/Type Number

Process Connection	Process Connection Size/Code—Inches											Type Number
	Size	¼	½	¾	1	1½	2	3	4	6	8	
Threaded—female NPT	Code	25	50	75	10	15	20	30	40	60	80	
Threaded—female NPT		•	•	•	•	•						100
Threaded—female NPT (with flushing conn.)		•	•	•	•	•						101
Flanged ⁽¹⁾			•	•	•	•	•	•				102
Flanged (with flushing conn.)			•	•	•	•	•	•				103
In-line—threaded NPT		•	•	•	•							104
Saddle								•	AND LARGER			105
In-line—butt weld		•	•	•	•	•	•					108
In-line—flanged ⁽²⁾			•	•	•	•	•	•	•	•	•	106
In-line—socket weld		•	•	•	•	•	•	•				107

Pressure Ratings—All 2500 psi except flanged seals are per ASME B 16.5, temperature limit determined by diaphragm, bottom housing and/or filling fluid.

Table B – Diaphragm Material

Material	Code
316L stainless steel	S
304L stainless steel	C
Monel 400	P
Nickel	N
Carpenter 20	D
Tantalum	U
Hastelloy B	G
Hastelloy C 22 ⁽³⁾	J
Hastelloy C 276 ⁽³⁾	H
Halar Coated Monel	PH
Gold Plated 304 SS	W

Table C – Housing Materials

Bottom	Code	Top
Steel	B	Nickel
304L SS	C	Nickel
316L SS	S	Nickel
Hastelloy B	G	Nickel
Hastelloy C 22 ⁽³⁾	J	Nickel
Hastelloy C 276 ⁽³⁾	H	Nickel
Carpenter 20	D	Nickel
Monel "400"	M	Nickel
Inconel "600"	W	Nickel
Nickel	N	Nickel
PVC ⁽⁴⁾⁽⁹⁾	V	Nickel
Tantalum clad SS ⁽⁵⁾	SU	Nickel
Halar coated SS ⁽⁶⁾	BH	Nickel
Teflon flanged steel ⁽⁷⁾	T	Nickel
Kynar ⁽⁸⁾⁽⁹⁾	KY	Nickel
Titanium	TI	Nickel

Table D – Instrument Connection

Size – NPT	Code
¼	02T
½	04T

Notes:

(1) 150, 300, 600, 900, 1500 & 2500 class flanges.

(2) 1" 150 thru 8" 300 class flanges only.

(3) Use on applications where NACE standard MR-01-75/ISO 1516 w/Sept. 2005 corrigendums.

(4) Maximum Press./Temp.
Threaded: 200 psi/74°F, 125 psi/125°F, 80 psi/150°F.
Flanged: 75 psi/100°F.

(5) Type 102 only.

(6) Type 102 only – Temp. Limits: –40/300°F.

(7) Only available in 1", 1½", & 2" 150 class, Types 102.

Max. Press./Temp. – 270 psi and 150°F. Consult factory for conditions beyond these limits.

(8) Maximum Pressure/Temp.: 200 psi and 180°F.

(9) Type 100: ¼ or ½ NPT only. Larger sizes offered with solvent weld joint. N/A in 101 or 103 design.

Table E – Filling Fluid

Filling	Service	Connection to Instrument	Temperature Range °F	Code
Glycerin	Pressure	Direct Only	0/400	CG
Silicone	Pressure/Vacuum	Direct or Flexible Line	–40/600	CK
Halocarbon	Pressure/Vacuum in presence of strong oxidizing agent	Direct or Flexible Line	–70/300	CF
Syltherm	Pressure/Vacuum	Direct or Flexible Line	–40/750	HA

Monel is a registered trademark of Huntington Alloys, Inc.

Hastelloy is a registered trademark of Cabot Corp.

Halocarbon is a registered trademark of Halocarbon Products

GYLON 3510 is a registered trademark of Garlock Inc.

HOW TO ORDER:

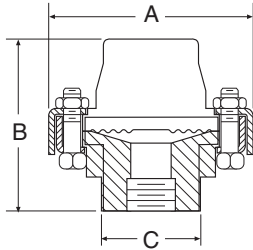
- From Table A...select TYPE NUMBER based on process connection, process connection size and diaphragm type/construction. (e.g., Threaded/1"/capsule-code-10-100)
- From Table B...select DIAPHRAGM MATERIAL. (e.g., 316L stainless steel-code S)
- From Table C...select BOTTOM HOUSING MATERIAL. (e.g., 316 stainless steel-code S)
- From Table D...select INSTRUMENT CONNECTION size. (e.g., ¼ NPT-code 02T)
- From Table E...select FILLING FLUID, if diaphragm seal will be attached to instrument. (e.g., Glycerin-code CG)
Typical code: 10-100SS-02T-CG

Type 100 Series Threaded Capsule Diaphragm Seal

DIMENSIONS

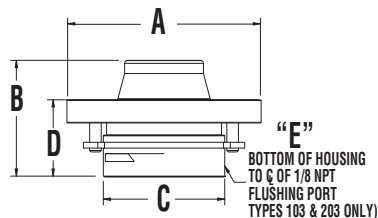
Type 100 – Threaded

¼, ½, ¾, 1 NPT



A		B		C	
in	mm	in	mm	in	mm
¾	(95)	2 7/8	(73)	1 13/16	(46)

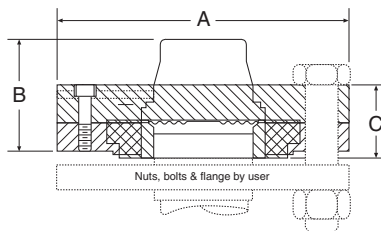
Type 102 – Flanged 1" (raised face only)
one piece bottom housing, with and without
flushing connection



Flange Size	Rating #	in.	A mm	in.	B mm	in.	C mm
1	150 300 or 600	4-1/4 5	(100) (127)	2-9/16	(65)	1-23/32	(69)

Flange		D		E	
Size	Rating #	in.	mm	in.	mm
1	150 300 or 600	1-5/8	(41)	3/8	(9)

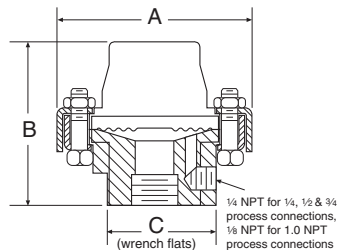
Type 102 – Flanged 1" (raised face only)
two piece bottom housing, 1½, 2, - PVC, Teflon
and Kynar



Flange Size	Rating #	in.	A mm	in.	B mm	in.	C mm
1½"	150	5	(127)	2 5/8	(59)	1 13/32	(39)
2"	150	6	(152)	2 5/8	(54)	1 9/16	(40)

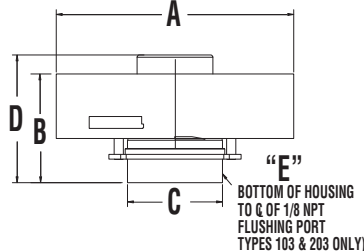
Type 101 – Threaded

¼, ½, ¾, 1 NPT (with flushing connection)



A		B		C	
in	mm	in	mm	in	mm
¾	(95)	2 7/8	(73)	1 13/16	(46)

Type 102 – Flanged 1" (raised face only)
one piece bottom housing, with and without
flushing connection

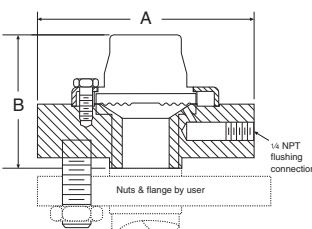


Flange Size	Rating #	in.	A mm	in.	B mm	in.	C mm
1	900 or 1500 2500	5-7/8 6-1/4	(149) (159)	2-7/8	(73)	2-1/4	(57)

Flange		D		E	
Size	Rating #	in.	mm	in.	mm
1	900 or 1500 2500	3-3/8	(86)	3/8	(9)

Type 103 – Flanged

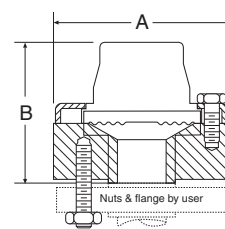
½, ¾" (with flushing connection)



Flange Size	Rating #	in.	A mm	in.	B mm
150		3 1/2	(89)	2 15/16	(75)
½"	300 or 600	3 3/4	(95)	3	(76)
900 or 1500		4 3/4	(121)	3 3/16	(81)
150		3 7/8	(98)	2 13/16	(71)
¾"	300 or 600	4 1/2	(117)	3	(76)

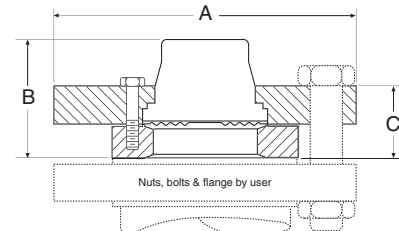
Type 102 – Flanged

½, ¾"



Flange		A		B	
Size	Rating #	in	mm	in	mm
150		3 1/2	(89)	2 15/16	(75)
½"	300 or 600	3 3/4	(95)	3	(76)
900 or 1500		4 3/4	(121)	3 3/16	(81)
150		3 7/8	(98)	2 13/16	(71)
¾"	300 or 600	4 1/2	(117)	3	(76)
900 or 1500		5 1/2	(130)	3 3/16	(81)

Type 102 – Flanged (raised face only)
1½, 2, 3" one piece bottom housing -
all materials except PVC, Teflon and Kynar

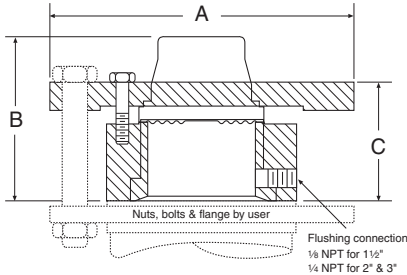


Flange Size	Rating #	in.	A mm	in.	B mm	in.	C mm
150		5	(127)			1 1/2	(38)
1½"	300 or 600	6 1/4	(159)	2 3/8	(61)	1 1/2	(38)
900 or 1500		7	(178)			1 1/2	(38)
150		6	(152)			1 3/8	(35)
2"	300 or 600	6 1/2	(165)	1 15/16	(49)	1 1/2	(38)
900 or 1500		8 1/2	(216)			2 1/8	(54)
150		7 1/2	(191)	2	(51)	1 5/8	(41)
3"	300 or 600	8 1/4	(206)	2 1/16	(52)	1 7/8	(47)
900 or 1500		10 1/2	(267)	2 11/16	(68)	3 1/4	(82)

Type 100 Series Threaded Capsule Diaphragm Seal

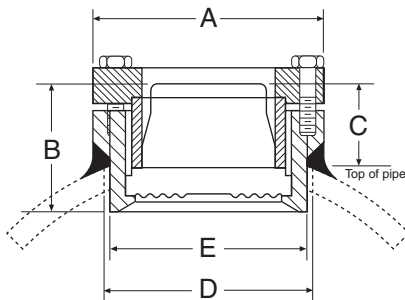
DIMENSIONS

Type 103 – Flanged 1½", 2", 3" (raised face only)
one piece bottom housing with flushing connection



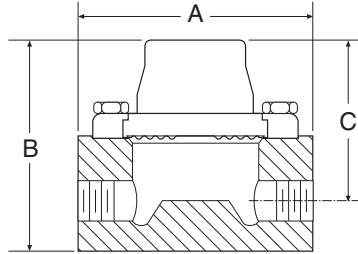
Flange Size	Rating #	A in mm	B in mm	C in mm
150		5 (127)		
1½"	300 or 600	6¼ (159)	3 (76)	2½ (64)
900 or 1500		7 (178)		
150		6 (152)		
2"	300 or 600	6½ (165)	3½ (89)	2¾ (71)
900 or 1500		8½ (216)		
150		7½ (191)	3¾ (95)	2⅞ (73)
3"	300 or 600	8¾ (221)	3⅞ (98)	2⅞ (73)
900		9½ (241)		
1500		10½ (267)	3⅞ (98)	2¾ (70)

Type 105 – Saddle
4" Pipe only



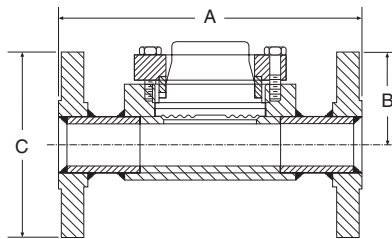
A in mm	B in mm	C in mm	D in mm	E in mm
3½ (89)	1½ (38)	1¾ (41)	3 (76)	2¾ (70)

Type 104 – In-Line Threaded
¼, ½, ¾, 1 NPT



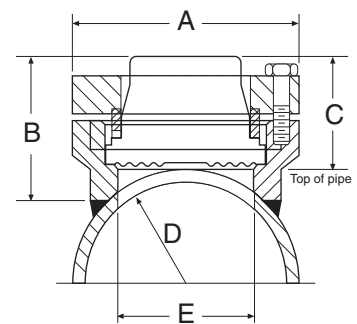
Process Connection	A in mm	B in mm	C in mm
¼ NPT		2½ (64)	2½ (64)
½ NPT	4 (102)	3¾ (95)	2¾ (71)
¾ NPT		3¾ (95)	3 (76)
1 NPT		3¾ (95)	3 (76)

Type 106 – In-Line Flanged
½", 1", 1½", 2", 3"



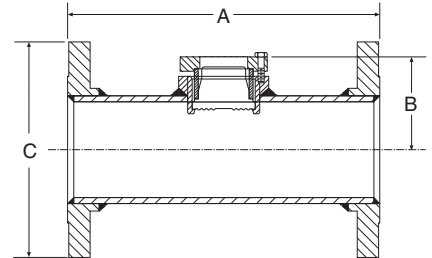
Flange Size	Rating #	A in mm	B in mm	C in mm
150		7 (178)		3½ (89)
½"	300	7 (178)	2⅞ (73)	3¾ (95)
150		7 (178)		4¼ (108)
1"	300	8 (203)	2⅞ (73)	4¾ (123)
150		8 (203)		5 (127)
1½"	300	9 (229)	2⅞ (73)	6 (152)
150		9 (229)		6 (152)
2"	300	10 (254)	2⅞ (73)	6½ (165)
150		11 (279)		7½ (191)
3"	300	12 (305)	3¾ (95)	8¼ (210)

Type 105 – Saddle
3" Pipe only



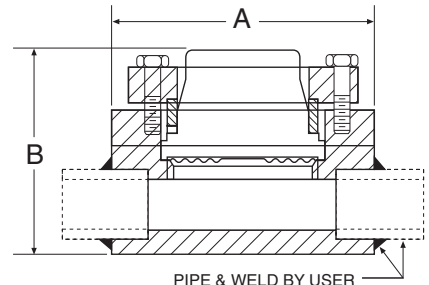
A in mm	B in mm	C in mm	D in mm	E in mm
3½ (89)	2¼ (57)	1⅞ (48)	1¾ (44)	2½ (64)

Type 106 – In-Line Flanged
4", 6", 8"



Flange Size	Rating #	A in mm	B in mm	C in mm
150		13 (330)		9 (229)
4"	300	14 (356)	3¾ (95)	10 (254)
150		16 (406)		11 (279)
6"	300	17 (432)	4⅞ (125)	12½ (318)
150		16 (406)	5⅞ (148)	13½ (343)
8"				

Type 107 – In-Line Welded
¼", ½", ¾", 1", 1½", 2"



Pipe Size	A in mm	B in mm
¼"		2⅞ (73)
½", ¾"		2⅞ (73)
1"	4 (102)	2⅞ (73)
1½"		2⅞ (73)
2"		2⅞ (73)

Type 310, 315 All-Welded “Mini” Diaphragm Seal



PRODUCT FEATURES

- Compact size to fit space-restricted areas
- Designed to protect transducers, mini-switches and 3/8" or smaller pressure gauges from corrosion, plugging or freeze-up
- All-welded metal construction prevents leakage of process media
- Rated for 2500 psi at 100°F
- Fill/bleed connection is standard
- Available with male process connection (Type 310)

The compact size of the Ashcroft® 310 mini-seal allows it to fit into space-restricted areas and is designed to protect transducers, mini-switches, and 3/8" or smaller dial size pressure gauges from corrosion, plugging or freeze-up. All welded metal construction prevents leakage of process media. It is rated for 2500 psi at 100°F and has a 316L stainless steel top housing standard. Lower housing materials include 316L stainless steel or Hastelloy C. Diaphragm materials include 316L stainless, Hastelloy C or Tantalum. 1/4 NPT or 1/2 NPT process connection sizes are available.

PRODUCT SPECIFICATIONS

Model Number:	Type 310, 315
Process Connection Size:	1/4", 1/2" (1/8", 3/4", 1"- 310 only) (see table A)
Instrument Connection Size:	1/8", 1/4 NPT
Diaphragm Material:	316L SS, Hastelloy C276, Tantalum, Monel
Bottom Housing Materials:	316L SS, Hastelloy C276, Monel, Hastelloy B
Filling Fluid:	Glycerin, Silicone, Halocarbon, Syltherm

Type 310, 315 All-Welded “Mini” Diaphragm Seal

Table A – Process Connection

Process Connection	Size	Code
Threaded – male NPT*	1/8	01
Threaded – male NPT*	1/4	02
Threaded – male NPT*	1/2	04
Threaded – male NPT*	3/4	06
Threaded – male NPT*	1	08
Threaded – female NPT†	1/4	25
Threaded – female NPT†	1/2	50

*Available in Type 310 only.

†Available in Types 310 & 315.

Pressure Ratings – All 2500 psi except flanged seals are per ASME B 16.5, temperature limit determined by diaphragm, bottom housing and/or filling fluid.

Table B – Type

Description	Code
All-welded mini-seal	310
All-welded midi-seal w/flushing connection	315

Table C – Diaphragm Materials

Materials	Code
316L stainless steel	S
Hastelloy C-276	H
Tantalum	U
Monel	P

Table D – Housing Materials

Bottom ⁽¹⁾	Code	Top ⁽²⁾
316L SS	S	316L SS
Hastelloy C-276	H	316L SS
Monel	M	Monel

(1) Other bottom housing materials on application.

(2) Top housing material is 316L SS (standard). Monel mini-seal standard with monel top housing.

Table E – Instrument Connection

Instrument Connection	Size	Code
Threaded – female NPT	1/4	02T
Threaded – female NPT	1/8	01T

NOTES:

- (1) For use with most 31/2" and smaller gauges. Movementless gauge 4 1/2" (exception).
- (2) Other bottom housing materials on application.
- (3) Top housing material is 316L SS (standard). Monel mini-seal standard with monel top housing.
- (4) Not available with monel bottom housing.

Table F – Filling Fluid

Fill	Service	Connection to Instrument	Temperature Range °F	Code
Glycerin	Pressure	Direct Only	0/400	CG
Silicone	Pressure/Vacuum	Direct or Flexible Line	-40/600	CK
Halocarbon	Pressure/Vacuum in presence of strong oxidizing agent	Direct or Flexible Line	-70/300	CF
Syltherm	Pressure	Direct or Flexible Line	-40/750	HA

Monel is a registered trademark of Huntington Alloys, Inc.

Hastelloy is a registered trademark of Cabot Corp.

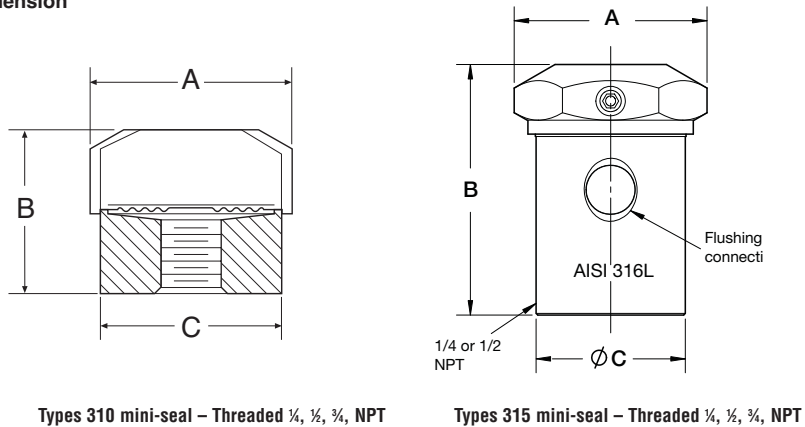
Halocarbon is a registered trademark of Halocarbon Products

GYLON 3510 is a registered trademark of Garlock Inc.

HOW TO ORDER:

1. From Table A... select PROCESS CONNECTION (e.g., 1/4" process code 25)
2. From Table B... select TYPE (310)
3. From Table C... select DIAPHRAGM MATERIAL. (e.g., 316L stainless steel-code S)
4. From Table D... select BOTTOM HOUSING MATERIAL. (e.g., 316 stainless steel-code S)
5. From Table E... select INSTRUMENT CONNECTION size. (e.g., 1/4 NPT-code 02T)
6. From Table F... select FILLING FLUID, if diaphragm seal will be attached to instrument. (e.g., Glycerin-code CG)

Coded order: 25-310SS-02T-CG

Dimension


	A		B		C	
	in	mm	in	mm	in	mm
Type 310	1.75	(38)	.81	(30)	1.34	(34)
Type 315	1.73	(44)	2.25	(57.2)	1.34	(34)



MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
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BALDOR

INTEGRAL HORSEPOWER SERIES, MOTOR

WATER TECHNOLOGIES

LEFT BLANK



Integral Horsepower AC Induction Motors

Installation & Operating Manual

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Section 1

General Information

- Overview** This manual contains general procedures that apply to Baldor Motor products. Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements. A Warning statement indicates a possible unsafe condition that can cause harm to personnel. A Caution statement indicates a condition that can cause damage to equipment.
- Important:** **This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact your Baldor distributor for more information or clarification.**
- Before you install, operate or perform maintenance, become familiar with the following:
- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
 - The National Electrical Code
 - Local codes and Practices

Limited Warranty

www.baldor.com/support/warranty_standard.asp

- Safety Notice:** This equipment contains high voltage! Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt installation, operation and maintenance of electrical equipment.
- Be sure that you are completely familiar with NEMA publication MG-2, safety standards for construction and guide for selection, installation and use of electric motors and generators, the National Electrical Code and local codes and practices. Unsafe installation or use can cause conditions that lead to serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.
- WARNING:** **Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.**
- WARNING:** **Disconnect all electrical power from the motor windings and accessory devices before disassembly of the motor. Electrical shock can cause serious or fatal injury.**
- WARNING:** **Be sure the system is properly grounded before applying power. Do not apply AC power before you ensure that all grounding instructions have been followed. Electrical shock can cause serious or fatal injury. National Electrical Code and Local codes must be carefully followed.**
- WARNING:** **Avoid extended exposure to machinery with high noise levels. Be sure to wear ear protective devices to reduce harmful effects to your hearing.**
- WARNING:** **Surface temperatures of motor enclosures may reach temperatures which can cause discomfort or injury to personnel accidentally coming into contact with hot surfaces. When installing, protection should be provided by the user to protect against accidental contact with hot surfaces. Failure to observe this precaution could result in bodily injury.**
- WARNING:** **This equipment may be connected to other machinery that has rotating parts or parts that are driven by this equipment. Improper use can cause serious or fatal injury. Only qualified personnel should attempt to install operate or maintain this equipment.**
- WARNING:** **Do not by-pass or disable protective devices or safety guards. Safety features are designed to prevent damage to personnel or equipment. These devices can only provide protection if they remain operative.**
- WARNING:** **Avoid the use of automatic reset devices if the automatic restarting of equipment can be hazardous to personnel or equipment.**
- WARNING:** **Be sure the load is properly coupled to the motor shaft before applying power. The shaft key must be fully captive by the load device. Improper coupling can cause harm to personnel or equipment if the load decouples from the shaft during operation.**
- WARNING:** **Use proper care and procedures that are safe during handling, lifting, installing, operating and maintaining operations. Improper methods may cause muscle strain or other harm.**
- WARNING:** **Thermostat contacts automatically reset when the motor has slightly cooled down. To prevent injury or damage, the control circuit should be designed so that automatic starting of the motor is not possible when the thermostat resets.**

Safety Notice Continued

- WARNING:** UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.
- WARNING:** Pacemaker danger – Magnetic and electromagnetic fields in the vicinity of current carrying carrying conductors and permanent magnet motors can result result in a serious health hazard to persons with cardiac pacemakers, metal implants, and hearing aids. To avoid risk, stay way from the area surrounding a permanent magnet motor.
- WARNING:** Before performing any motor maintenance procedure, be sure that the equipment connected to the motor shaft cannot cause shaft rotation. If the load can cause shaft rotation, disconnect the load from the motor shaft before maintenance is performed. Unexpected mechanical rotation of the motor parts can cause injury or motor damage.
- WARNING:** Use only UL/CSA listed explosion proof motors in the presence of flammable or combustible vapors or dust.
- WARNING:** Motors that are to be used in flammable and/or explosive atmospheres must display the UL label on the nameplate along with CSA listed logo. Specific service conditions for these motors are defined in NFPA 70 (NEC) Article 500.
- WARNING:** Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions, should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.
- Caution:** To prevent premature equipment failure or damage, only qualified maintenance personnel should perform maintenance.
- Caution:** Do not over-lubricate motor as this may cause premature bearing failure.
- Caution:** Do not over tension belts. Excess tension may damage the motor or driven equipment.
- Caution:** Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.
- Caution:** If eye bolts are used for lifting a motor, be sure they are securely tightened. The lifting direction should not exceed a 20° angle from the shank of the eye bolt or lifting lug. Excessive lifting angles can cause damage.
- Caution:** To prevent equipment damage, be sure that the electrical service is not capable of delivering more than the maximum motor rated amps listed on the rating plate.
- Caution:** If a HI POT test (High Potential Insulation test) must be performed, follow the precautions and procedure in NEMA MG1 and MG2 standards to avoid equipment damage.

If you have any questions or are uncertain about any statement or procedure, or if you require additional information please contact your Baldor distributor or an Authorized Baldor Service Center.

Receiving Each Baldor Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

Handling The motor should be lifted using the lifting lugs or eye bolts provided.

Caution: Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.

1. Use the lugs or eye bolts provided to lift the motor. Never attempt to lift the motor and additional equipment connected to the motor by this method. The lugs or eye bolts provided are designed to lift only the motor. Never lift the motor by the motor shaft or the hood of a WP11 motor.
2. To avoid condensation inside the motor, do not unpack until the motor has reached room temperature. (Room temperature is the temperature of the room in which it will be installed). The packing provides insulation from temperature changes during transportation.
3. When lifting a WP11 (Weather Proof Type 2) motor, do not lift the motor by inserting lifting lugs into holes on top of the cooling hood. These lugs are to be used for hood removal only. A spreader bar should be used to lift the motor by the cast lifting lugs located on the motor frame.

-
4. If the motor must be mounted to a plate with the driven equipment such as pump, compressor etc., it may not be possible to lift the motor alone. For this case, the assembly should be lifted by a sling around the mounting base. The entire assembly can be lifted as an assembly for installation.
Do not lift the assembly using the motor lugs or eye bolts provided. Lugs or eye bolts are designed to lift motor only. If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting. If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.

Storage

Storage requirements for motors and generators that will not be placed in service for at least six months from date of shipment.

Improper motor storage will result in seriously reduced reliability and failure. An electric motor that does not experience regular usage while being exposed to normally humid atmospheric conditions is likely to develop rust in the bearings or rust particles from surrounding surfaces may contaminate the bearings. The electrical insulation may absorb an excessive amount of moisture leading to the motor winding failure.

A wooden crate "shell" should be constructed to secure the motor during storage. This is similar to an export box but the sides & top must be secured to the wooden base with lag bolts (not nailed as export boxes are) to allow opening and reclosing many times without damage to the "shell".

Minimum resistance of motor winding insulation is 5 Meg ohms or the calculated minimum, which ever is greater. Minimum resistance is calculated as follows: **$R_m = kV + 1$**

where: (Rm is minimum resistance to ground in Meg-Ohms and
kV is rated nameplate voltage defined as Kilo-Volts.)

Example: For a 480VAC rated motor $R_m = 1.48$ meg-ohms (use 5 MΩ).

For a 4160VAC rated motor $R_m = 5.16$ meg-ohms.

Preparation for Storage

1. Some motors have a shipping brace attached to the shaft to prevent damage during transportation. The shipping brace, if provided, must be removed and stored for future use. The brace must be reinstalled to hold the shaft firmly in place against the bearing before the motor is moved.
2. Store in a clean, dry, protected warehouse where control is maintained as follows:
 - a. Shock or vibration must not exceed 2 mils maximum at 60 hertz, to prevent the bearings from brinelling. If shock or vibration exceeds this limit vibration isolation pads must be used.
 - b. Storage temperatures of 10°C (50°F) to 49°C (120°F) must be maintained.
 - c. Relative humidity must not exceed 60%.
 - d. Motor space heaters (when present) are to be connected and energized whenever there is a possibility that the storage ambient conditions will reach the dew point. Space heaters are optional.
Note: Remove motor from containers when heaters are energized, reprotect if necessary.
3. Measure and record the resistance of the winding insulation (dielectric withstand) every 30 days of storage.
 - a. If motor insulation resistance decreases below the minimum resistance, contact your Baldor District office.
 - b. Place new desiccant inside the vapor bag and re-seal by taping it closed.
 - c. If a zipper-closing type bag is used instead of the heat-sealed type bag, zip the bag closed instead of taping it. Be sure to place new desiccant inside bag after each monthly inspection.
 - d. Place the shell over the motor and secure with lag bolts.
4. Where motors are mounted to machinery, the mounting must be such that the drains and breathers are fully operable and are at the lowest point of the motor. Vertical motors must be stored in the vertical position. Storage environment must be maintained as stated in step 2.

-
5. Motors with anti-friction bearings are to be greased at the time of going into extended storage with periodic service as follows:
 - a. Motors marked "Do Not Lubricate" on the nameplate do not need to be greased before or during storage.
 - b. Ball and roller bearing (anti-friction) motor shafts are to be rotated manually every 3 months and greased every 6 months in accordance with the Maintenance section of this manual.
 - c. Sleeve bearing (oil lube) motors are drained of oil prior to shipment. The oil reservoirs must be refilled to the indicated level with the specified lubricant, (see Maintenance). The shaft should be rotated monthly by hand at least 10 to 15 revolutions to distribute oil to bearing surfaces.
 - d. "Provisions for oil mist lubrication" – These motors are packed with grease. Storage procedures are the same as paragraph 5b.
 - e. "Oil Mist Lubricated" – These bearings are protected for temporary storage by a corrosion inhibitor. If stored for greater than 3 months or outdoor storage is anticipated, connected to the oil mist system while in storage. If this is not possible, add the amount of grease indicated under "Standard Condition" in Section 3, then rotate the shaft 15 times by hand.
 6. All breather drains are to be fully operable while in storage (drain plugs removed). The motors must be stored so that the drain is at the lowest point. All breathers and automatic "T" drains must be operable to allow breathing and draining at points other than through the bearings around the shaft. Vertical motors should be stored in a safe stable vertical position.
 7. Coat all external machined surfaces with a rust preventing material.
An acceptable product for this purpose is Exxon Rust Ban # 392.

Non-Regreaseable Motors

Non-regreaseable motors with "Do Not Lubricate" on the nameplate should have the motor shaft rotated 15 times to redistribute the grease within the bearing every 3 months or more often.

All Other Motor Types

Before storage, the following procedure must be performed.

1. Remove the grease drain plug, if supplied, (opposite the grease fitting) on the bottom of each bracket prior to lubricating the motor.
2. The motor with regreaseable bearing must be greased as instructed in Section 3 of this manual.
3. Replace the grease drain plug after greasing.
4. The motor shaft must be rotated a minimum of 15 times after greasing.
5. Motor Shafts are to be rotated at least 15 revolutions manually every 3 months and additional grease added every nine months (see Section 3) to each bearing.
6. Bearings are to be greased at the time of removal from storage.

Removal From Storage

1. Remove all packing material.
2. Measure and record the electrical resistance of the winding insulation resistance meter at the time of removal from storage. The insulation resistance must not be less than 50% from the initial reading recorded when the motor was placed into storage. A decrease in resistance indicates moisture in the windings and necessitates electrical or mechanical drying before the motor can be placed into service. If resistance is low, contact your Baldor District office.
3. Regrease the bearings as instructed in Section 3 of this manual.
4. Reinstall the original shipping brace if motor is to be moved. This will hold the shaft firmly against the bearing and prevent damage during movement.

Section 2

Installation & Operation

Overview

Installation should conform to the National Electrical Code as well as local codes and practices. When other devices are coupled to the motor shaft, be sure to install protective devices to prevent future accidents. Some protective devices include, coupling, belt guard, chain guard, shaft covers etc. These protect against accidental contact with moving parts. Machinery that is accessible to personnel should provide further protection in the form of guard rails, screening, warning signs etc.

Location

It is important that motors be installed in locations that are compatible with motor enclosure and ambient conditions. Improper selection of the motor enclosure and ambient conditions can lead to reduced operating life of the motor.

Proper ventilation for the motor must be provided. Obstructed airflow can lead to reduction of motor life.

1. **Open Drip-Proof/WPI** motors are intended for use indoors where atmosphere is relatively clean, dry, well ventilated and non-corrosive.
2. **Totally Enclosed and WPII** motors may be installed where dirt, moisture or dust are present and in outdoor locations.

Severe Duty, IEEE 841 and Washdown Duty enclosed motors are designed for installations with high corrosion or excessive moisture conditions. These motors should not be placed into an environment where there is the presence of flammable or combustible vapors, dust or any combustible material, unless specifically designed for this type of service.

Hazardous Locations are those where there is a risk of ignition or explosion due to the presence of combustible gases, vapors, dust, fibers, or flyings. Facilities requiring special equipment for hazardous locations are typically classified in accordance with local requirements. In the US market, guidance is provided by the National Electric Code.

Caution:

Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.

Mounting

The motor must be securely installed to a rigid foundation or mounting surface to minimize vibration and maintain alignment between the motor and shaft load. Failure to provide a proper mounting surface may cause vibration, misalignment and bearing damage.

Foundation caps and sole plates are designed to act as spacers for the equipment they support. If these devices are used, be sure that they are evenly supported by the foundation or mounting surface.

After installation is complete and accurate alignment of the motor and load is accomplished, the base should be grouted to the foundation to maintain this alignment.

The standard motor base is designed for horizontal or vertical mounting. Adjustable or sliding rails are designed for horizontal mounting only. Consult your Baldor distributor or authorized Baldor Service Center for further information.

Alignment

Accurate alignment of the motor with the driven equipment is extremely important. The pulley, sprocket, or gear used in the drive should be located on the shaft as close to the shaft shoulder as possible.

It is recommended to heat the pulley, sprocket, or gear before installing on the motor shaft.

Forcibly driving a unit on the motor shaft will damage the bearings.

1. **Direct Coupling**

For direct drive, use flexible couplings if possible. Consult the drive or equipment manufacturer for more information. Mechanical vibration and roughness during operation may indicate poor alignment. Use dial indicators to check alignment. The space between coupling hubs should be maintained as recommended by the coupling manufacturer.

2. **End-Play Adjustment**

The axial position of the motor frame with respect to its load is also extremely important. The motor bearings are not designed for excessive external axial thrust loads. Improper adjustment will cause failure.

3. **Pulley Ratio**

The pulley ratio should not exceed 8:1.

Caution:

Do not over tension belts. Excess tension may damage the motor or driven equipment.

4. **Belt Drive**

Align sheaves carefully to minimize belt wear and axial bearing loads (see End-Play Adjustment). Belt tension should be sufficient to prevent belt slippage at rated speed and load. However, belt slippage may occur during starting.

5. Sleeve bearing motors are only suitable for coupled loads.

- Doweling & Bolting** After proper alignment is verified, dowel pins should be inserted through the motor feet into the foundation. This will maintain the correct motor position should motor removal be required. (Baldor motors are designed for doweling.)
1. Drill dowel holes in diagonally opposite motor feet in the locations provided.
 2. Drill corresponding holes in the foundation.
 3. Ream all holes.
 4. Install proper fitting dowels.
 5. Mounting bolts must be carefully tightened to prevent changes in alignment. Use a flat washer and lock washer under each nut or bolt head to hold the motor feet secure. Flanged nuts or bolts may be used as an alternative to washers.

WARNING: Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions, should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.

- Guarding** Guards must be installed for rotating parts such as couplings, pulleys, external fans, and unused shaft extensions. This is particularly important where the parts have surface irregularities such as keys, key ways or set screws. Some satisfactory methods of guarding are:
1. Covering the machine and associated rotating parts with structural or decorative parts of the driven equipment.
 2. Providing covers for the rotating parts. Covers should be sufficiently rigid to maintain adequate guarding during normal service.

Power Connection Motor and control wiring, overload protection, disconnects, accessories and grounding should conform to the National Electrical Code and local codes and practices. Flying leads must be insulated with two full wraps of electrical grade insulating tape or heat shrink tubing.

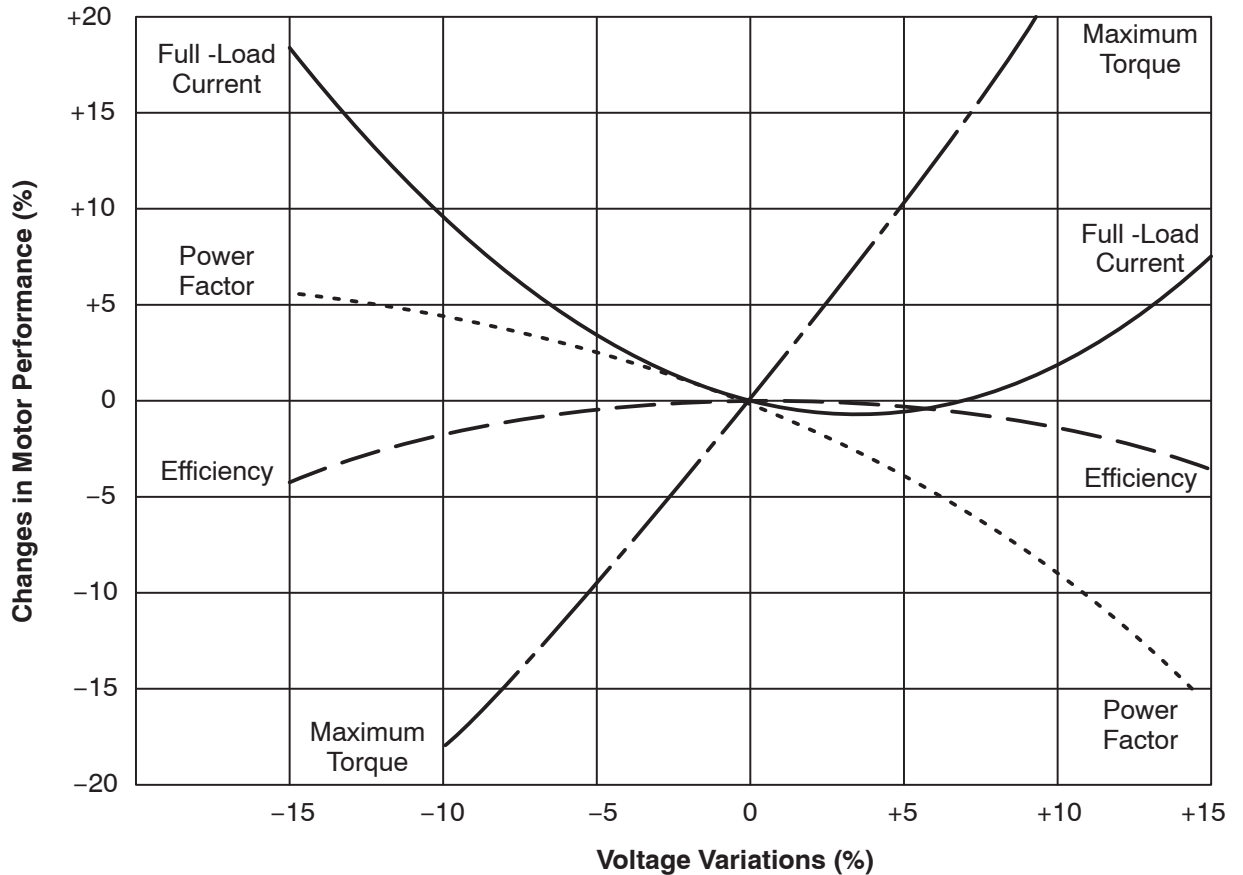
Conduit Box For ease of making connections, an oversize conduit box is provided. The box can be rotated 360° in 90° increments. Auxiliary conduit boxes are provided on some motors for accessories such as space heaters, RTD's etc.

- AC Power** Connect the motor leads as shown on the connection diagram located on the name plate or inside the cover on the conduit box. Be sure the following guidelines are met:
1. AC power is within $\pm 10\%$ of rated voltage with rated frequency. (See motor name plate for ratings).
OR
 2. AC power is within $\pm 5\%$ of rated frequency with rated voltage.
OR
 3. A combined variation in voltage and frequency of $\pm 10\%$ (sum of absolute values) of rated values, provided the frequency variation does not exceed $\pm 5\%$ of rated frequency.
- Performance within these voltage and frequency variations are shown in Figure 2-2.

Figure 2-1 Accessory Connections

HEATERS H1 ——— H2 H1 ——— H2	One heater is installed in each end of motor. Leads for each heater are labeled H1 & H2. (Like numbers should be tied together).
THERMISTORS T1 ——— T2	Three thermistors are installed in windings and tied in series. Leads are labeled T1 & T2.
WINDING RTDS RED ——— WHITE	Winding RTDs are installed in windings (2) per phase. Each set of leads is labeled W1, W2, W3, W4, W5, & W6.
BEARING RTD RED ——— WHITE	* One bearing RTD is installed in Drive endplate (PUPE), leads are labeled RTDDE. * One bearing RTD is installed in Opposite Drive endplate (FREPE), leads are labeled RTDODE. * Note RTD may have 2-Red/1-White leads; or 2-White/1-Red Lead.

Figure 2-2 Typical Motor Performance VS Voltage Variations



Rotation All three phase motors are reversible. To reverse the direction of rotation, disconnect and lock out power and interchange any two of the three line leads for three phase motors. For single phase motors, check the connection diagram to determine if the motor is reversible and follow the connection instructions for lead numbers to be interchanged. Not all single phase motors are reversible.

Adjustable Frequency Power Inverters used to supply adjustable frequency power to induction motors produce wave forms with lower order harmonics with voltage spikes superimposed. Turn-to-turn, phase-to-phase, and ground insulation of stator windings are subject to the resulting dielectric stresses. Suitable precautions should be taken in the design of these drive systems to minimize the magnitude of these voltage spikes. Consult the drive instructions for maximum acceptable motor lead lengths, and proper grounding.

First Time Start Up Be sure that all power to motor and accessories is off. Be sure the motor shaft is disconnected from the load and will not cause mechanical rotation of the motor shaft.

1. Make sure that the mechanical installation is secure. All bolts and nuts are tightened etc.
2. If motor has been in storage or idle for some time, check winding insulation integrity.
3. Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity.
4. Be sure all shipping materials and braces (if used) are removed from motor shaft.
5. Manually rotate the motor shaft to ensure that it rotates freely.
6. Replace all panels and covers that were removed during installation.
7. Momentarily apply power and check the direction of rotation of the motor shaft.
8. If motor rotation is wrong, be sure power is off and change the motor lead connections. Verify rotation direction before you continue.
9. Start the motor and ensure operation is smooth without excessive vibration or noise. If so, run the motor for 1 hour with no load connected.
10. After 1 hour of operation, disconnect power and connect the load to the motor shaft. Verify all coupling guards and protective devices are installed. Ensure motor is properly ventilated.

Coupled Start Up This procedure assumes a coupled start up. Also, that the first time start up procedure was successful.

1. Check the coupling and ensure that all guards and protective devices are installed.
2. Check that the coupling is properly aligned and not binding.
3. The first coupled start up should be with no load. Apply power and verify that the load is not transmitting excessive vibration back to the motor through the coupling or the foundation. Vibration should be at an acceptable level.
4. Run for approximately 1 hour with the driven equipment in an unloaded condition.

The equipment can now be loaded and operated within specified limits. Do not exceed the name plate ratings for amperes for steady continuous loads.

Jogging and Repeated Starts Repeated starts and/or jogs of induction motors generally reduce the life of the motor winding insulation. A much greater amount of heat is produced by each acceleration or jog than by the same motor under full load. If it is necessary to repeatedly start or jog the motor, it is advisable to check the application with your local Baldor distributor or Baldor Service Center.

Heating - Duty rating and maximum ambient temperature are stated on the motor name plate. Do not exceed these values. If there is any question regarding safe operation, contact your local Baldor District Office or Baldor Service Center.

Section 3

Maintenance & Troubleshooting

WARNING: UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.

General Inspection Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first. Keep the motor clean and the ventilation openings clear. The following steps should be performed at each inspection:

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Check that the motor is clean. Check that the interior and exterior of the motor is free of dirt, oil, grease, water, etc. Oily vapor, paper pulp, textile lint, etc. can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.
2. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
3. Check all electrical connectors to be sure that they are tight.

Relubrication & Bearings Bearing grease will lose its lubricating ability over time, not suddenly. The lubricating ability of a grease (over time) depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program.

Type of Grease A high grade ball or roller bearing grease should be used. Recommended grease for standard service conditions is **Polyrex EM (Mobil)**. Do not mix greases unless compatibility has been checked and verified.

Equivalent and compatible greases include:

Texaco Polystar, Rykon Premium #2, Pennzoil Pen 2 Lube and Chevron SRI.

Relubrication Intervals Recommended relubrication intervals are shown in Table 3-1. It is important to realize that the recommended intervals of Table 3-1 are based on average use.

Refer to additional information contained in Tables 3-2, 3-3 and 3-4.

Table 3-1 Relubrication Intervals *

NEMA / (IEC) Frame Size	Rated Speed - RPM					
	10000	6000	3600	1800	1200	900
Up to 210 incl. (132)	**	2700 Hrs.	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
Over 210 to 280 incl. (180)		**	3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
Over 280 to 360 incl. (225)		**	* 2200 Hrs.	7400 Hrs.	12000 Hrs.	15000 Hrs.
Over 360 to 5800 incl. (300)		**	*2200 Hrs.	3500 Hrs.	7400 Hrs.	10500 Hrs.

* Relubrication intervals are for ball bearings.

For vertically mounted motors and roller bearings, divide the relubrication interval by 2.

** For motors operating at speeds greater than 3600 RPM, contact Baldor for relubrication recommendations.

Table 3-2 Service Conditions

Severity of Service	Hours per day of Operation	Ambient Temperature Maximum	Atmospheric Contamination
Standard	8	40° C	Clean, Little Corrosion
Severe	16 Plus	50° C	Moderate dirt, Corrosion
Extreme	16 Plus	>50° C* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion, Heavy Shock or Vibration
Low Temperature		<-29° C **	

* Special high temperature grease is recommended (Dow Corning DC44). Note that Dow Corning DC44 grease does not mix with other grease types. Thoroughly clean bearing & cavity before adding grease.

** Special low temperature grease is recommended (Aeroshell 7).

Table 3-3 Relubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1
Low Temperature	1.0

Some motor designs use different bearings on each motor end. This is normally indicated on the motor nameplate. In this case, the larger bearing is installed on the motor Drive endplate. For best relubrication results, only use the appropriate amount of grease for each bearing size (not the same for both).

Table 3-4 Bearings Sizes and Types

Frame Size NEMA (IEC)	Bearing Description (These are the “Large” bearings (Shaft End) in each frame size)			
	Bearing	Weight of Grease to add * oz (Grams)	Volume of grease to be added	
			in ³	teaspoon
56 to 140 (90)	6203	0.08 (2.4)	0.15	0.5
140 (90)	6205	0.15 (3.9)	0.2	0.8
180 (100–112)	6206	0.19 (5.0)	0.3	1.0
210 (132)	6307	0.30 (8.4)	0.6	2.0
250 (160)	6309	0.47 (12.5)	0.7	2.5
280 (180)	6311	0.61 (17)	1.2	3.9
320 (200)	6312	0.76 (20.1)	1.2	4.0
360 (225)	6313	0.81 (23)	1.5	5.2
400 (250)	6316	1.25 (33)	2.0	6.6
440 (280)	6319	2.12 (60)	4.1	13.4
5000 to 5800 (315–450)	6328	4.70 (130)	9.2	30.0
5000 to 5800 (315–450)	NU328	4.70 (130)	9.2	30.0
360 to 449 (225–280)	NU319	2.12 (60)	4.1	13.4
AC Induction Servo				
76 Frame 180 (112)	6207	0.22 (6.1)	0.44	1.4
77 Frame 210 (132)	6210	0.32 (9.0)	0.64	2.1
80 Frame 250(160)	6213	0.49 (14.0)	0.99	3.3

* Weight in grams = .005 DB of grease to be added

Note: Not all bearing sizes are listed. For intermediate bearing sizes, use the grease volume for the next larger size bearing.

Caution: To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.

Relubrication Procedure Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your Baldor distributor or an authorized service center if a grease other than the recommended type is to be used.

Caution: Do not over-lubricate motor as this may cause premature bearing failure.

With Grease Outlet Plug

1. With the motor stopped, clean all grease fittings with a clean cloth.
2. Remove grease outlet plug.

Caution: Over-lubricating can cause excessive bearing temperatures, premature lubrication breakdown and bearing failure.

3. Add the recommended amount of grease.
4. Operate the motor for 15 minutes with grease plug removed.
This allows excess grease to purge.
5. Re-install grease outlet plug.

Without Grease Provisions

Note: Only a Baldor authorized and UL or CSA certified service center can disassemble a UL/CSA listed explosion proof motor to maintain it's UL/CSA listing.

1. Disassemble the motor.
2. Add recommended amount of grease to bearing and bearing cavity. (Bearing should be about 1/3 full of grease and outboard bearing cavity should be about 1/2 full of grease.)
3. Assemble the motor.

Sample Relubrication Determination

Assume - NEMA 286T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 43° C and the atmosphere is moderately corrosive.

1. Table 3-1 list 9500 hours for standard conditions.
2. Table 3-2 classifies severity of service as "Severe".
3. Table 3-4 shows that 1.2 in³ or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.

Table 3-5 Troubleshooting Chart

Symptom	Possible Causes	Possible Solutions
Motor will not start	Usually caused by line trouble, such as, single phasing at the starter.	Check source of power. Check overloads, fuses, controls, etc.
Excessive humming	High Voltage.	Check input line connections.
	Eccentric air gap.	Have motor serviced at local Baldor service center.
Motor Over Heating	Overload. Compare actual amps (measured) with nameplate rating.	Locate and remove source of excessive friction in motor or load. Reduce load or replace with motor of greater capacity.
	Single Phasing.	Check current at all phases (should be approximately equal) to isolate and correct the problem.
	Improper ventilation.	Check external cooling fan to be sure air is moving properly across cooling fins. Excessive dirt build-up on motor. Clean motor.
	Unbalanced voltage.	Check voltage at all phases (should be approximately equal) to isolate and correct the problem.
	Rotor rubbing on stator.	Check air gap clearance and bearings.
		Tighten "Thru Bolts".
	Over voltage or under voltage.	Check input voltage at each phase to motor.
	Open stator winding.	Check stator resistance at all three phases for balance.
	Grounded winding.	Perform dielectric test and repair as required.
	Improper connections.	Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity. Refer to motor lead connection diagram.
Bearing Over Heating	Misalignment.	Check and align motor and driven equipment.
	Excessive belt tension.	Reduce belt tension to proper point for load.
	Excessive end thrust.	Reduce the end thrust from driven machine.
	Excessive grease in bearing.	Remove grease until cavity is approximately $\frac{3}{4}$ filled.
	Insufficient grease in bearing.	Add grease until cavity is approximately $\frac{3}{4}$ filled.
	Dirt in bearing.	Clean bearing cavity and bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.
Vibration	Misalignment.	Check and align motor and driven equipment.
	Rubbing between rotating parts and stationary parts.	Isolate and eliminate cause of rubbing.
	Rotor out of balance.	Have rotor balance checked and repaired at your Baldor Service Center.
	Resonance.	Tune system or contact your Baldor Service Center for assistance.
Noise	Foreign material in air gap or ventilation openings.	Remove rotor and foreign material. Reinstall rotor. Check insulation integrity. Clean ventilation openings.
Growling or whining	Bad bearing.	Replace bearing. Clean all grease from cavity and new bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.

Suggested bearing and winding RTD setting guidelines

Most large frame AC Baldor motors with a 1.15 service factor are designed to operate below a Class B (80°C) temperature rise at rated load and are built with a Class H winding insulation system. Based on this low temperature rise, RTD (Resistance Temperature Detectors) settings for Class B rise should be used as a starting point. Some motors with 1.0 service factor have Class F temperature rise.

The following tables show the suggested alarm and trip settings for RTDs. Proper bearing and winding RTD alarm and trip settings should be selected based on these tables unless otherwise specified for specific applications.

If the driven load is found to operate well below the initial temperature settings under normal conditions, the alarm and trip settings may be reduced so that an abnormal machine load will be identified.

The temperature limits are based on the installation of the winding RTDs imbedded in the winding as specified by NEMA. Bearing RTDs should be installed so they are in contact with the outer race on ball or roller bearings or in direct contact with the sleeve bearing shell.

Winding RTDs – Temperature Limit In °C (40°C Maximum Ambient)

Motor Load	Class B Temp Rise ≤ 80°C (Typical Design)		Class F Temp Rise ≤ 105°C		Class H Temp Rise ≤ 125°C	
	Alarm	Trip	Alarm	Trip	Alarm	Trip
≤ Rated Load	130	140	155	165	175	185
Rated Load to 1.15 S.F.	140	150	160	165	180	185

Note: • Winding RTDs are factory production installed, not from Mod-Express.

• When Class H temperatures are used, consider bearing temperatures and relubrication requirements.

Bearing RTDs – Temperature Limit In °C (40°C Maximum Ambient)

Bearing Type Oil or Grease	Anti-Friction		Sleeve	
	Alarm	Trip	Alarm	Trip
Standard*	95	100	85	95
High Temperature**	110	115	105	110

Note: * Bearing temperature limits are for standard design motors operating at Class B temperature rise.

** High temperature lubricants include some special synthetic oils and greases.

Greases that may be substituted that are compatible with Polyrex EM (but considered as “standard” lubricants) include the following:

- | | | |
|--------------------|---------------------------|-----------------------------|
| – Texaco Polystar | – Rykon Premium #2 | – Chevron SRI #2 |
| – Mobilith SHC-100 | – Pennzoil Pennzlube EM-2 | – Chevron Black Pearl |
| – Darmex 707 | – Darmex 711 | – Petro-Canada Peerless LLG |

See the motor nameplate for replacement grease or oil recommendation.

Contact Baldor application engineering for special lubricants or further clarifications.



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SERIES SS-2, BALL VALVE

WATER TECHNOLOGIES

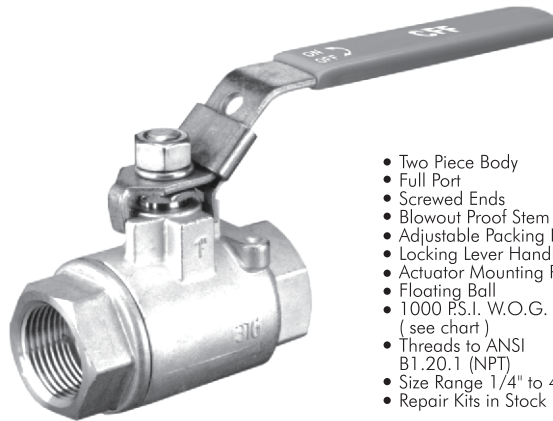
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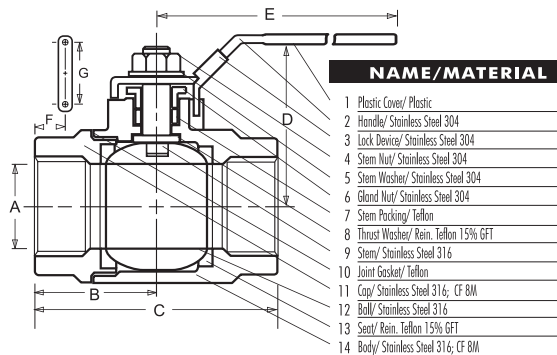


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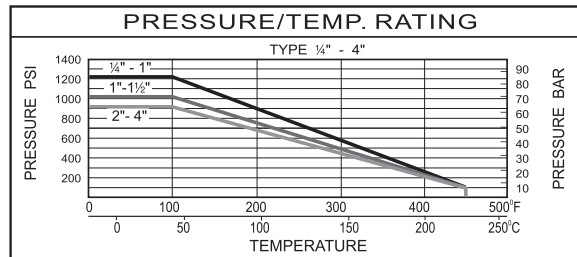
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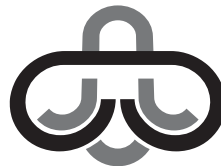
BALL VALVES

DIMENSIONS								
	Nominal Size	(mm/in) A	(mm/in) B	(mm/in) C	(mm/in) D	(mm/in) E	(mm/in) F	(mm/in) G
8	¼	11.6	30	60	45	110	12.7	28.45
		0.457	1.181	2.362	1.772	433.1	0.50	1.120
10	⅜	12.7	30	60	45	110	12.7	28.45
		0.50	1.181	2.362	1.772	433.1	0.50	1.120
15	½	15	32	64	45	130	12.7	28.45
		0.591	1.260	2.520	1.772	5.118	0.50	1.120
20	¾	20	38.5	77	50	130	22.10	34.80
		0.787	1.516	3.032	1.969	5.118	0.87	1.37
25	1	25.4	45	90	65	155	22.10	38.10
		1.00	1.772	3.543	2.559	6.102	0.87	1.37
32	1¼	32	50	100	70	155	23.62	38.10
		1.260	1.967	3.937	2.756	6.102	0.93	1.50
40	1½	38.1	59	118	75	185	23.62	38.10
		1.50	2.323	4.646	2.953	7.283	0.93	1.50
50	2	50.8	68.5	137	85	185	23.62	38.10
		2.00	2.697	5.398	3.346	7.283	0.93	1.50
65	2½	65	82.5	165	136	250	—	70
		2.561	3.248	6.496	5.364	9.843	—	2.756
80	3	80	97.5	195	149	250	—	70
		3.152	3.839	7.677	5.866	9.843	—	2.756

Design and materials are subject to change without notice.



FLOW COEFFICIENT CV										
Size (in.)	¼	⅜	½	¾	1	1¼	1½	2	2½	3
Cv	6	7	10	25	35	46	80	110	310	360
Operating Torques (lbs.)	36	36	43	65	101	158	187	230	430	1380



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TYPE 21, BALL VALVE

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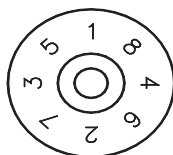
LEFT BLANK

MAINTENANCE & INSTALLATION INSTRUCTIONS

For Chemline Type 21 True Union Ball Valve Size 1/2" - 4"

Installation:

1. Make sure all surfaces are clear and free of debris prior to installing valve in pipeline. Pipeline should be empty at connection site.
2. Valve should be set to the closed position.
3. When installing valves with socket connections, ensure that only PVC solvent cement is used. Excessive use of cement can cause sticking in the valve interior, therefore use caution when applying cement, especially on vertical piping.
4. For threaded connections we recommend the use of sealing tape and, with the use of a strap wrench, to tighten no more than 2 full turns past finger-tight. Use of a pipe wrench can deform the pipe or union nut and cause damage to the valve and/or connection(s).
5. Flanged connections should be torqued evenly and in a symmetrical pattern with a torque wrench and as per the figure and chart below:



RECOMMENDED FLANGE BOLT TORQUES

VALVE SIZE	FLANGE	BOLT TORQUE	IN FT-LB	AXIAL MISALIGNMENT	PARALLELISM (INCH)
	PSI - 50	PSI - 100	PSI - 150		
1½	11	13	14	0.04	0.03
2	13	14	16	0.04	0.03
2½	13	14	16	0.04	0.03
3	18	20	22	0.04	0.03
4	20	20	22	0.04	0.04
5	22	15	29	0.04	0.04
6	25	15	32	0.04	0.04
8	25	32	40	0.06	0.04
10	25	32	40	0.06	0.04
12	29	36	43	0.06	0.04
14	32	36	43	0.06	0.04
16	36	[58-85 PSI]	58	0.06	0.04
18	36	[58-85 PSI]	-		
20	72	-	-		
24	72	-	-		

Maintenance Instructions Type 21 Ball Valve cont.

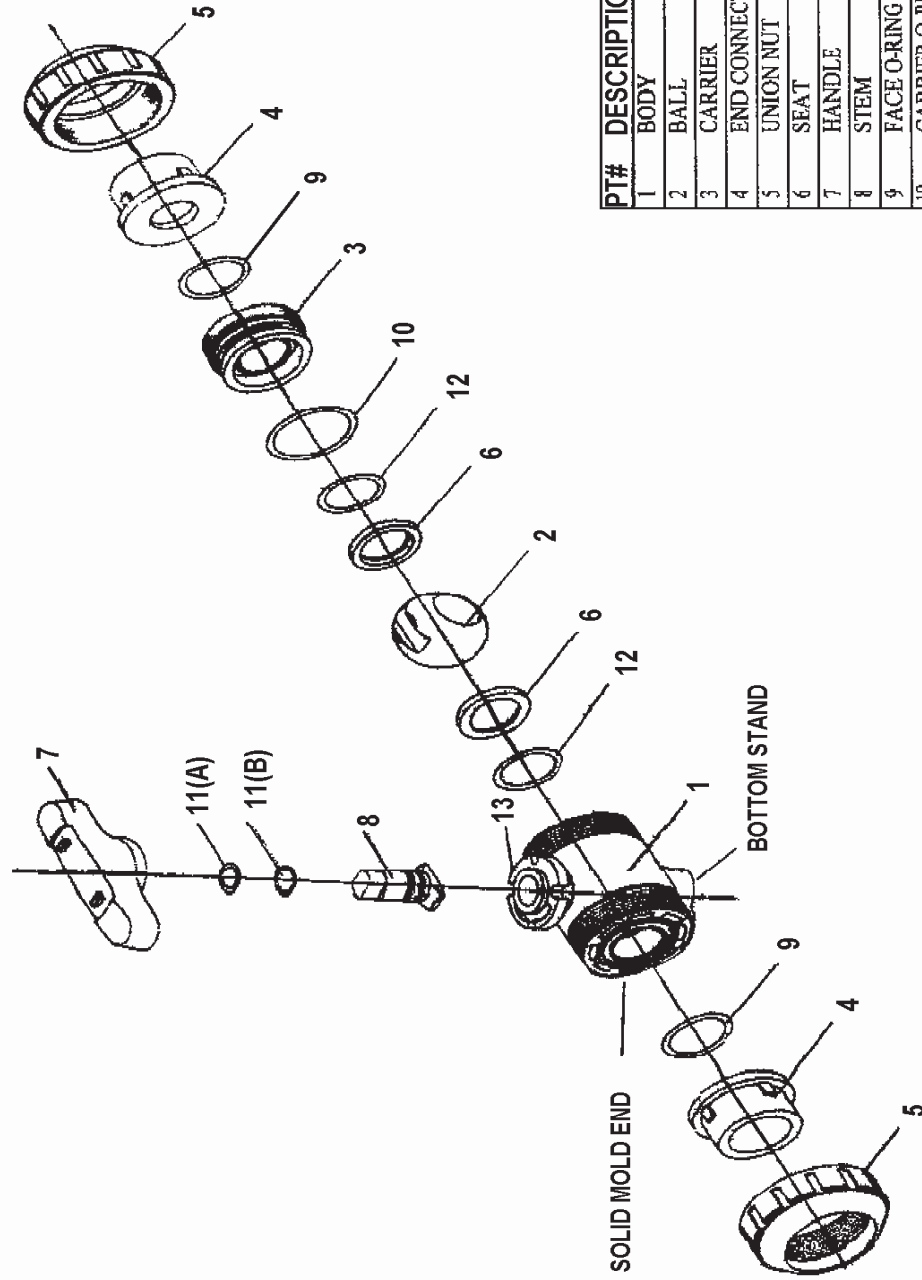
Maintenance:

Refer to **ASSEMBLY DRAWING T21V Rev. 0.** And proceed as follows:

1. Turn valve to the closed position.
2. Unscrew union nut (5) from both ends of valve.
3. Remove end connectors (4).
4. On solid mold end, remove face o-ring (9). This completely disassembles this end of valve.
5. Pull upward on handle (7) to remove.
6. On opposite end of valve, remove face o-ring (9) and use handle (7) as a spanner wrench to remove carrier (3).
7. Remove carrier o-ring (10).
8. Remove seat (6) and seat cushion (12) to expose ball (2).
9. Remove ball (2) by pushing from solid molded end of body.
10. Remove stem (6) by pushing it down into body (1).
11. Remove stem o-rings 11(A) and 11(B) from grooves in stem.
12. Remove other seat (6) and seat cushion (12).
13. Inspect all parts for wear and replace as necessary.
14. Before re-assembling valve, lubricate all o-rings with Dow Corning III silicone compound or equivalent.
15. To re-assemble valve follow steps 1 through 10 in reverse order.

NOTE: If mounting actuator on mounting flange (13), make sure handle (7) is removed and stem (6) and actuator are aligned.

After replacing carrier (3), the face of the carrier should remain slightly projected from the end of the body. Make sure the ball rotates smoothly with only a touch of resistance.



PT#	DESCRIPTION	QTY	MATERIALS
1	BODY	1	PVC/PP/PVDF/CPVC
2	BALL	1	PVC/PP/PVDF/CPVC
3	CARRIER	1	CPE/EPDM/VITON/HYP.
4	END CONNECTOR	2	PVC/PP/PVDF/CPVC
5	UNION NUT	2	PVC/PP/PVDF/CPVC
6	SEAT	1	CPE/EPDM/CITON/HYP.
7	HANDLE	1	PVC/PP/PVDF/CPVC
8	STEM	1	PVC/PP/PVDF/CPVC
9	FACE O-RING	2	CPE/EPDM/VITON/HYP.
10	CARRIER O-RING	1	CPE/EPDM/VITON/HYP.
11(A)	STEM O-RING (Upper)	1	CPE/EPDM/VITON/HYP.
11(B)	STEM O-RING (Lower)	1	CPE/EPDM/VITON/HYP.
12	SEAT CUSHION	2	CPE/EPDM/VITON/HYP.
13	MOUNTING FLANGE	1	PVC/PP/PVDF/CPVC

TITLE	CHEMLINE TYPE 21 TRUE UNION BALL VALVE		SCALE		DATE	CHEMLINE PLASTICS	
	REFERENCE		DR. BY			CHEMLINE	
SIZES 1/2" - 4"		CHKD BY				DWG. NO.	REV.
		APP. BY				T21V	0

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ChemFlare™ End Connectors



SERIES: ChemFlare™

VALVE SIZES: 3/8", 1/2", 3/4", 1" & 1-1/4"

TUBING SIZES: 1/4", 3/8", 1/2", 3/4", 1" & 1-1/4"



All Chemline valves with True Union ends are available with ChemFlare™ end connections. ChemFlare™ is a long term leak-free connection design for difficult applications such as sodium hypochlorite¹. These flared end connections are easy to install and allow for compact plumbing and a small footprint.

They are available on all Chemline valves which have True Union ends, flow meters and controls up to 1-1/4". They connect PFA tubing down to 1/4" size.

Tubing must be flared using a mechanical flare tool or by heating and using a forming flare tool (preferred method). Consult Chemline for flare tools.

Features

Full Valve Working Pressure

Weldless Design

- Eliminates all fusion welds and glued joints
- Threaded connection between flared end and tube nut is not wetted

Easy Installation

- Flaring the tube ends is easy
- Assembly is by hand²

Low Down Time

- No welding or curing waiting time. The system may be pressure tested immediately.

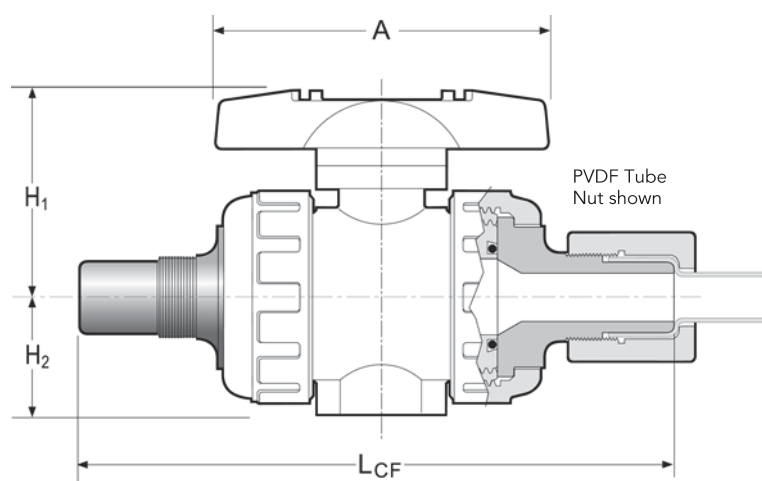
Minimum Dead Volume

- The flared tubing connection has minimum dead volume desirable on sodium hypochlorite and ultrapure applications

¹ For sodium hypochlorite applications Chemline recommends venting ball valves by drilling a hole on the upstream side of the ball in the closed position.

² ChemFlare™ fitting nuts should be hand tightened only. Use of a wrench can result in excessive tightening and stripped threads.

ChemFlare™ for Type 21 Ball Valves



DIMENSIONS INCHES

Valve Size	Tube Size ¹	A	H ₁	H ₂	LCF
1/2"	1/4"	3.6	2.03	1.14	5.52
1/2"	3/8"	3.6	2.03	1.14	6.04
1/2"	1/2"	3.6	2.03	1.14	6.12
3/4"	3/4"	3.9	2.34	1.38	6.52
1"	1"	4.3	2.68	1.54	7.26
1-1/4"	1-1/4"	4.8	3.17	1.85	9.58

MAXIMUM PRESSURES PSI

Valve Size	Tube Size ¹	PVC				PP					PVDF					
		20°C 68°F	30°C 86°F	40°C 104°F	50°C 122°F	30°C 86°F	40°C 104°F	50°C 122°F	60°C 140°F	70°C 158°F	30°C 86°F	50°C 122°F	70°C 158°F	80°C 176°F	90°C 194°F	100°C 212°F
1/2"	1/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1/2"	3/8"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1/2"	1/2"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
3/4"	3/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1"	1"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1-1/4"	1-1/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15

Temperature Ranges: PVC 0 to 60°C (32 to 140°F), PP -20 to 90°C (-4 to 194°F), PVDF -40 to 100°C (-40 to 212°F).

¹ChemFlare™ ends are available for reduced tube sizes down to 1/4". Tube nuts are always supplied with end connectors.

SAMPLE SPECIFICATION

1. All True Union Ball Valves in PVC, CPVC, PP or PVDF shall be Chemline Type 21 or equal sizes 1/2" to 2" in PVC, CPVC, and PVDF rated at 230 psi and in PP 150 psi maximum working pressure. Sizes 2-1/2", 3" and 4" rated at 150 psi maximum working pressure with EPDM, FKM (Viton®) or CPE seals. Cushioned PTFE ball seats shall be provided for positive closure with minimum stem torques.
2. All valves will have Safety Shear stem design, blowout-proof with double o-rings for safety. The top o-ring groove shall be deeper so that if the stem breaks under excessive torque the lower o-ring will remain intact and the valve will hold pressure.
3. All valves shall be full port and two-way blocking.
4. All PVC/EPDM and PVC/FKM (Viton®) valves shall be certified under NSF/ANSI Standard 61 for contact with drinking water.
5. All valves will be CRN (Canadian Registration Number) registered with TSSA.
6. All valves for sodium hypochlorite service shall have the ball vented on the upstream side to prevent the accumulation of chlorine gas due to off-gassing.
7. All valves shall have chemical resistant labels permanently marked with manufacturing number to provide production level traceability.
8. PVC compound shall have an ASTM cell classification 12454, as per ASTM D-1784 (CSA Report LO 4000-1172) and a chemical resistance equal to S20-1-3-R as per ASTM D5260.
9. End connections shall be ChemFlare™ design for connection to flared PFA tubing.

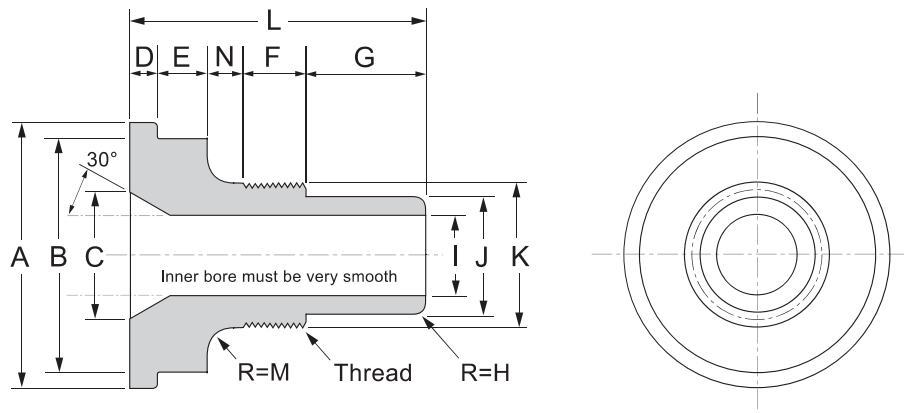
ChemFlare™ for Type 21 Ball Valves



TYPE 21 CONNECTOR DIMENSIONS INCHES

Tube Conn.	Item No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Thread
1/4"	21005-4-4N ¹	1.470	1.215	0.590	0.185	0.310	0.500	0.440	0.047	0.125	0.302	0.500	1.435	0.000	0.000	1/2 – 20 UNF
3/8"	21005-4-6N	1.470	1.215	0.590	0.185	0.310	0.500	0.500	0.047	0.251	0.420	0.625	1.695	0.200	0.200	5/8 – 20 UN
1/2"	21005-4-8N	1.470	1.215	0.590	0.185	0.310	0.419	0.591	0.055	0.376	0.547	0.735	1.705	0.200	0.200	3/4 – 20 UNEF
3/4"	21005-4-12N	1.470	1.215	0.590	0.185	0.310	0.441	0.591	0.055	0.626	0.785	1.000	1.802	0.200	0.200	1 – 20 UNEF
1/4"	21007-4-4N	1.860	1.500	0.797	0.180	0.370	0.500	0.440	0.047	0.125	0.302	0.500	1.510	0.000	0.000	1/2 – 20 UNF
3/8"	21007-4-6N	1.860	1.500	0.797	0.180	0.370	0.500	0.500	0.047	0.251	0.420	0.625	1.770	0.200	0.200	5/8 – 20 UN
1/2"	21007-4-8N	1.860	1.500	0.797	0.180	0.370	0.419	0.591	0.055	0.376	0.574	0.735	1.780	0.200	0.200	3/4 – 20 UNEF
3/4"	21007-4-12N	1.860	1.500	0.797	0.180	0.370	0.441	0.591	0.055	0.626	0.785	1.000	1.802	0.200	0.200	1 – 20 UNEF
1"	21007-4-16N	1.860	1.500	0.797	0.180	0.370	0.600	0.635	0.130	0.876	1.142	1.435	1.955	0.200	0.200	1-7/16 – 12 UN
1/4"	21010-4-4N	2.100	1.800	0.987	0.230	0.340	0.500	0.440	0.047	0.125	0.302	0.500	1.510	0.000	0.000	1/2 – 20 UNF
3/8"	21010-4-6N	2.100	1.800	0.987	0.230	0.340	0.500	0.500	0.047	0.251	0.420	0.625	1.770	0.200	0.200	5/8 – 20 UN
1/2"	21010-4-8N	2.100	1.800	0.987	0.230	0.340	0.419	0.591	0.055	0.376	0.547	0.735	1.780	0.200	0.200	3/4 – 20 UNEF
3/4"	21010-4-12N	2.100	1.800	0.987	0.230	0.340	0.441	0.591	0.055	0.626	0.785	1.000	1.802	0.200	0.200	1 – 20 UNEF
1"	21010-4-16N	2.100	1.800	0.987	0.230	0.340	0.600	0.635	0.130	0.876	1.142	1.435	1.955	0.200	0.200	1-7/16 – 12 UN
1/4"	21012-4-4FN	2.530	2.190	1.220	0.230	0.454	0.500	0.440	0.047	0.125	0.302	0.500	1.624	0.000	0.000	1/2 – 20 UNF
3/8"	21012-4-6FN	2.530	2.190	1.220	0.230	0.454	0.500	0.500	0.047	0.251	0.420	0.625	1.884	0.200	0.200	5/8 – 20 UN
1/2"	21012-4-8FN	2.530	2.190	1.220	0.230	0.454	0.419	0.591	0.055	0.376	0.547	0.735	1.894	0.200	0.200	3/4 – 20 UNEF
3/4"	21012-4-12N	2.530	2.190	1.220	0.230	0.454	0.441	0.591	0.055	0.626	0.785	1.000	1.916	0.200	0.200	1 – 20 UNEF
1"	21012-4-16N	2.530	2.190	1.220	0.230	0.454	0.600	0.635	0.130	0.876	1.142	1.435	2.069	0.200	0.200	1-7/16 – 12 UN
1-1/4"	21012-4-20N	2.530	2.190	1.220	0.230	0.454	0.760	0.820	0.165	1.095	1.430	1.745	2.414	0.150	0.150	1-3/4 – 11.5 UN
1"	21015-4-16N	3.040	2.680	1.500	0.280	0.354	0.600	0.635	0.130	0.876	1.142	1.435	2.069	0.200	0.200	1-7/16 – 12 UN
1"	21020-4-16N	3.800	3.170	2.000	0.340	0.454	0.600	0.635	0.130	0.876	1.142	1.435	2.069	0.200	0.200	1-7/16 – 12 UN
1-1/4"	21020-4-20N	3.800	3.170	2.000	0.340	0.454	0.760	0.820	0.165	1.095	1.430	1.745	2.414	0.150	0.150	1-3/4 – 11.5 UN

¹All fittings with 1/4" tube connections to have threads up to the flange face. See dimensions M and N.



ORDERING EXAMPLE

ChemFlare™ End Connections for Type 21 Ball Valves		21	005	–4	A	8N	–1
Valve Size	005 – 1/2"	007 – 3/4"	010 – 1"	012 – 1-1/4"			
End Connector	–4– for all sizes						
Material	A – PVC	C – CPVC	B – PP	K – PVDF			
Tube Size ²	4N – 1/4"	6N – 3/8"	8N – 1/2"	12N – 3/4"	16N – 1"	20N – 1-1/4"	
Tube Nut	–1 – includes nut		Blank – without nut				

Example: Chemline ChemFlare™ End Connectors for Type 21 True Union Ball Valves, 1/2" valve size, PVC, with 1/2" tube size, including nuts.

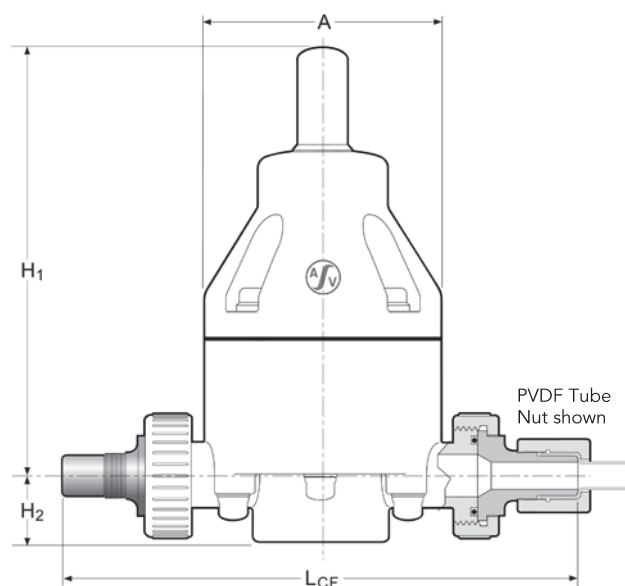
²Tube size must be equal or smaller than the valve size.



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ChemFlare™ for SB Series Back Pressure/Relief Valves



DIMENSIONS INCHES

Valve Size	Tube Size ¹	A	H ₁	H ₂ PVC	H ₂ PP/PVDF	L _{CF}
3/8"	3/8"	3.2	6.9	1.0	0.9	8.20
1/2"	1/4"	3.2	6.9	1.0	0.9	7.74
1/2"	3/8"	3.2	6.9	1.0	0.9	8.26
1/2"	1/2"	3.2	6.9	1.0	0.9	8.34
3/4"	3/4"	4.2	8.0	1.5	1.4	9.72
1"	1"	4.2	8.0	1.5	1.4	10.20
1-1/4"	1-1/4"	5.8	10.3	2.2	2.1	13.25

MAXIMUM PRESSURES PSI

Valve Size	Tube Size ¹	PVC				PP					PVDF					
		20°C 68°F	30°C 86°F	40°C 104°F	50°C 122°F	30°C 86°F	40°C 104°F	50°C 122°F	60°C 140°F	70°C 158°F	30°C 86°F	50°C 122°F	70°C 158°F	80°C 176°F	90°C 194°F	100°C 212°F
1/2"	1/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1/2"	3/8"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1/2"	1/2"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
3/4"	3/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1"	1"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15
1-1/4"	1-1/4"	150	105	60	15	150	90	60	37	15	150	100	60	45	30	15

Temperature Ranges: PVC 0 to 60°C (32 to 140°F), PP -20 to 90°C (-4 to 194°F), PVDF -40 to 100°C (-40 to 212°F).

¹ChemFlare™ ends are available for reduced tube sizes down to 1/4". Tube nuts are always supplied with end connectors.

SAMPLE SPECIFICATION

1. All Back Pressure/Relief Valves in PVC, PP or PVDF shall be Chemline SB10 or SB11 Series or equal in sizes 1/2" to 2". SB10 shall have inlet set pressure range of 3 to 60 psi and SB11 shall have an inlet set pressure range of 7 to 150 psi. SB12 valves shall have an inlet set pressure range of 5 to 150 psi. All valves shall have a maximum inlet pressure rating of 150 psi. Valves shall be suitable for aggressive, clean, non-scaling chemicals.
2. All valves shall have a large PTFE coated control diaphragm to fully open at 10-15% over pressure, provide low hysteresis ("backlash") and no flutter.
3. Static seals shall be EPDM or FPM (Viton®).
4. End connections shall be ChemFlare™ design for connection to flared PFA tubing.
5. PVC compound shall have an ASTM cell classification 13463-A, with minimum suffix "A" designation for chemical resistance as per ASTM D-1784.
6. All polypropylene material shall conform to ASTM D-4101 PP 0211B67272 material requirements.
7. All PVDF material shall be unpigmented conforming to ASTM D-3222 Type 2 suspension resin material requirements and also with USDA Title 21, Chapter I, Part 177.2510 requirements for contact with food.
8. All valves shall have chemical resistant labels permanently marked with manufacturing number to provide production level traceability.

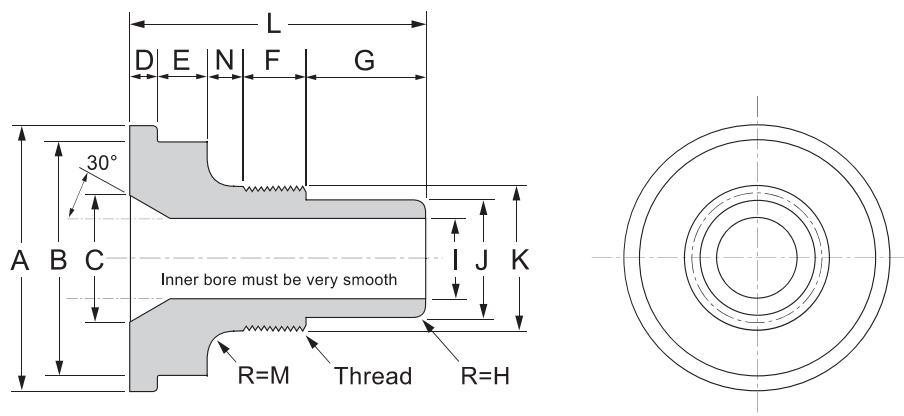
ChemFlare™ for SB Series Back Pressure/Relief Valves



SB/SR CONNECTOR DIMENSIONS INCHES

Tube Conn.	Item No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Thread
1/4"	SB002-17-4N ¹	0.927	0.845	0.250	0.200	0.230	0.500	0.440	0.047	0.125	0.302	0.500	1.370	0.000	0.000	1/2 – 20 UNF
1/4"	SB003-17-4N ¹	0.940	0.865	0.317	0.200	0.250	0.500	0.440	0.047	0.125	0.302	0.500	1.390	0.000	0.000	1/2 – 20 UNF
3/8"	SB003-17-6N	0.940	0.865	0.317	0.200	0.250	0.500	0.500	0.047	0.251	0.420	0.625	1.650	0.200	0.200	5/8 – 20 UN
1/2"	SB003-17-8N	0.940	0.865	0.317	0.200	0.250	0.419	0.591	0.055	0.376	0.547	0.735	1.660	0.200	0.200	3/4 – 20 UNEF
1/4"	SB005-17-4N ¹	1.190	1.080	0.590	0.200	0.250	0.500	0.440	0.047	0.125	0.302	0.500	1.390	0.000	0.000	1/2 – 20 UNF
3/8"	SB005-17-6N	1.190	1.080	0.590	0.200	0.250	0.500	0.500	0.047	0.251	0.420	0.625	1.650	0.200	0.200	5/8 – 20 UN
1/2"	SB005-17-8N	1.190	1.080	0.590	0.200	0.250	0.419	0.591	0.055	0.376	0.574	0.735	1.660	0.200	0.200	3/4 – 20 UNEF
3/4"	SB005-17-12N	1.190	1.080	0.590	0.200	0.250	0.441	0.591	0.055	0.626	0.785	1.000	1.482	0.200	0.200	1 – 20 UNEF
1/4"	SB007-17-4N	1.520	1.410	0.797	0.240	0.250	0.500	0.440	0.047	0.125	0.302	0.500	1.430	0.000	0.000	1/2 – 20 UNF
3/8"	SB007-17-6N	1.520	1.410	0.797	0.240	0.250	0.500	0.500	0.047	0.251	0.420	0.625	1.690	0.200	0.200	5/8 – 20 UN
1/2"	SB007-17-8N	1.520	1.410	0.797	0.240	0.250	0.419	0.591	0.055	0.376	0.547	0.735	1.700	0.200	0.200	3/4 – 20 UNEF
3/4"	SB007-17-12N	1.520	1.410	0.797	0.240	0.250	0.441	0.591	0.055	0.626	0.785	1.000	1.722	0.200	0.200	1 – 20 UNEF
1"	SB007-17-16N	1.520	1.410	0.797	0.240	0.250	0.600	0.635	0.130	0.876	1.142	1.435	2.004	0.200	0.200	1-7/16 – 12 UN
1/4"	SB010-17-4N	1.750	1.630	1.090	0.240	0.310	0.500	0.440	0.047	0.125	0.302	0.500	1.490	0.000	0.000	1/2 – 20 UNF
3/8"	SB010-17-6N	1.750	1.630	1.090	0.240	0.310	0.500	0.500	0.047	0.251	0.420	0.625	1.750	0.200	0.200	5/8 – 20 UN
1/2"	SB010-17-8N	1.750	1.630	1.090	0.240	0.310	0.419	0.591	0.055	0.376	0.547	0.735	1.760	0.200	0.200	3/4 – 20 UNEF
3/4"	SB010-17-12N	1.750	1.630	1.090	0.240	0.310	0.441	0.591	0.055	0.626	0.785	1.000	1.782	0.200	0.200	1 – 20 UNEF
1"	SB010-17-16N	1.750	1.630	1.090	0.240	0.310	0.600	0.635	0.130	0.876	1.142	1.435	2.004	0.200	0.200	1-7/16 – 12 UN
1"	SB012-17-16N	2.223	2.068	1.090	0.240	0.310	0.600	0.635	0.130	0.876	1.142	1.435	2.004	0.200	0.200	1-7/16 – 12 UN

¹All fittings with 1/4" tube connections to have threads up to the flange face. See dimensions M and N.



ORDERING EXAMPLE

ChemFlare™ End Connections for SB Series Back Pressure/Relief Valves		SB	005	-17	A	8N	-1
Valve Size	003 – 3/8"	005 – 1/2"	007 – 3/4"	010 – 1"	012 – 1-1/4"		
End Connector	-17 – for all sizes						
Material	A – PVC	C – CPVC	B – PP	K – PVDF			
Tube Size ²	4N – 1/4"	6N – 3/8"	8N – 1/2"	12N – 3/4"	16N – 1"	20N – 1-1/4"	
Tube Nut	-1 – includes nut		Blank – without nut				

Example: Chemline ChemFlare™ End Connectors for SB10, SB11 and SB12 Back Pressure Relief Valves, 1/2" valve size, PVC, with 1/2" tube size, including nuts.

²Tube size must be equal or smaller than the valve size.



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MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

CHEMLINE

TYPE SM2, METERING BALL VALVE

LEFT BLANK

Metering Ball Valves



SERIES: SM2

SIZES: 1/2" – 1"

ENDS: Threaded, Socket, Butt¹ or ChemFlare™²

SEATS: PTFE

O-RINGS: EPDM, FPM (Viton®)



Integral 180° Scale with 5° Increments

- Linear flow control and settable flow rates

Chemline SM Series Metering Ball Valve is designed for fine linear flow control of chemicals or clean fluids. The ball is solid with graduated V-groove cut on the outside surface. Precise linear flow control is accomplished through 180° rotation of the handle. With a positioning electric actuator, this becomes an inexpensive control valve. If higher C_v values are required, refer to SP Series Proportional ball valves.

Features

Precise Linear Flow Control

- Provided by a special V-groove ball and wide handle travel (0° to 180°)

Full Size Range

- 6 valves sizes 1/2" to 2" offers a large selection of C_v values

High End Ball Valve Features

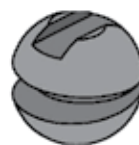
- Full Blocking design
- Double Stem O-Rings for safety
- PTFE seats with elastomer cushion
 - Automatically compensates for seat wear or expansion
- 230 psi pressure rated (PVC)

Low Stem Torques

- Due to floating ball design and cushioned PTFE seats

Bidirectional

- Works with flow in either direction



Ball Detail



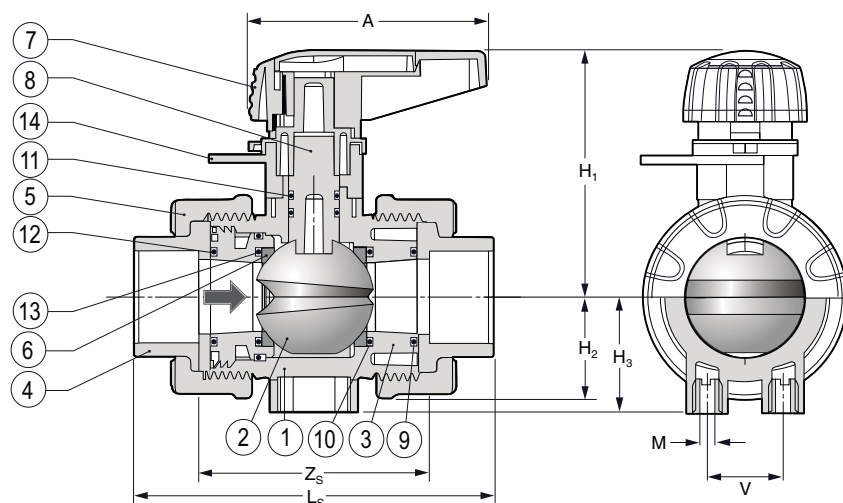
¹Butt ends for fusion to Chemline metric PP piping.
²For ChemFlare™ end connectors, consult Chemline.

Metering Ball Valves



PARTS

No.	Part	Pcs.	Materials
1	Body	1	PVC, PP, PVDF
2	Ball	1	PVC, PP, PVDF
3	Carrier	1	PVC, PP, PVDF
4	End Connector	2	PVC, PP, PVDF
5	Union Nut	5	PVC, PP, PVDF
6	Ball Seat	2	PTFE
7	Handle	1	PVC
8	Stem	1	PVC, PP, PVDF
9	Carrier Face O-Ring	1	EPDM, FPM(Viton®)
10	Carrier O-Ring	1	EPDM, FPM(Viton®)
11	Stem O-Ring ¹	2	EPDM, FPM(Viton®)
12	Face O-Ring	1	EPDM, FPM(Viton®)
13	Seat Cushion ¹	2	EPDM, FPM(Viton®)
14	Position Indicator Scale	1	PVC



DIMENSIONS INCHES

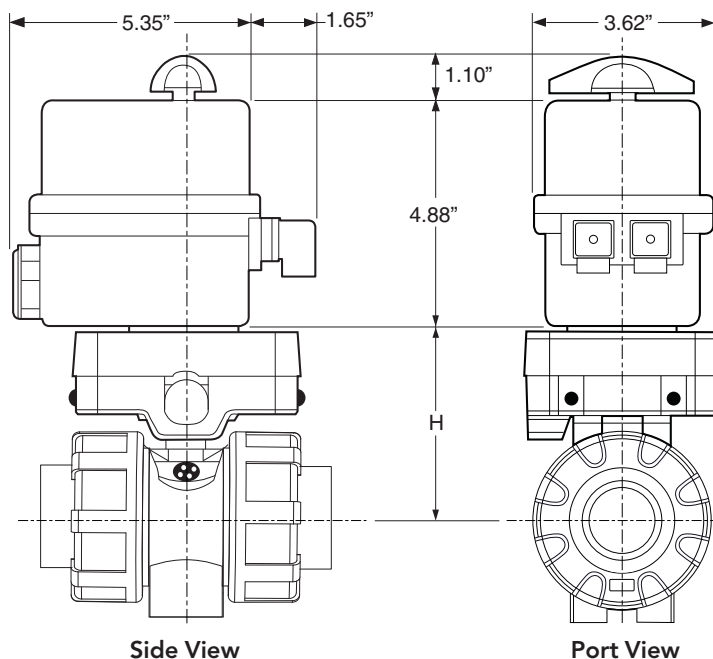
Size	A	H ₁	H ₃	H	M	V	PVC			PP		
							Z _s	L _s	H ₂	Z _s	L _s	H ₂
1/2"	2.62	2.48	1.10	2.50	M5	0.98	2.48	3.74	0.99	2.64	3.74	1.06
3/4"	3.21	3.03	1.20	2.70	M5	0.98	2.83	4.33	1.16	3.03	4.29	1.18
1"	3.21	3.39	1.60	3.00	M6	1.02	3.11	4.84	1.39	3.27	4.69	1.57

ELECTRICALLY OR PNEUMATICALLY ACTUATED

The metering ball valve becomes a proportional control valve with the addition of a Q or E Series electric or P Series pneumatic actuator with 4-20 mA positioner

- Thermoplastic housing and mounting bracket
- Manual override
- Position indication
- Mechanical travel stops
- Different voltages are available

E Series Electric Actuator on a SM2 Valve



Q Series Electric



E Series Electric



P Series Pneumatic

Metering Ball Valves



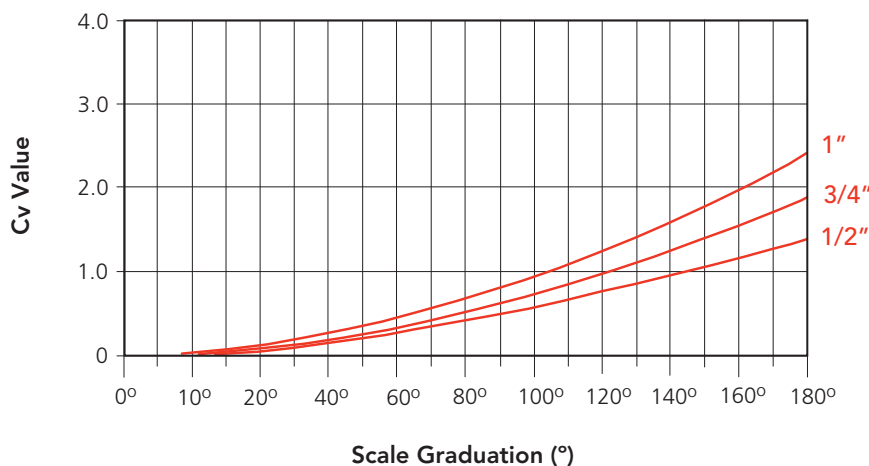
WORKING PRESSURES PSI

NET WEIGHTS LB. Cv VALUES

Size	PVC			PP				PVC	PP	USGPM Flow at 1 psi ΔP
	20°C 68°F	40°C 104°F	60°C 140°F	20°C 68°F	40°C 104°F	60°C 140°F	80°C 176°F			
1/2"	230	130	30	150	100	65	20	0.35	0.29	1.4
3/4"	230	130	30	150	100	65	20	0.60	0.44	1.9
1"	230	130	30	150	100	65	20	0.84	0.64	2.3

Temperature Ranges: PVC 0 to 60°C (32 to 140°F), PP 0 to 95°C (32 to 203°F)

Cv VALUE vs. VALVE OPENING



SAMPLE SPECIFICATION

1. All low flow control valves, 1/2" to 1", will be Chemline SM Series metering ball valves.
2. Body material will be PVC or PP, and o-rings will be EPDM or FPM (Viton®).
3. Body will be full blocking design with double stem o-rings for safety, rated at 230 psi maximum working pressure for PVC and 150 psi for PP material.
4. Ball will be floating design, molded solid with a V-groove for linear flow control over a 180° range of handle rotation.
5. Seats will be PTFE with elastomer cushions for positive closure with minimum stem torques and automatic compensation for seat wear and expansion.
6. Position indicating scale will be 0° to 180° with 5° increments for fine flow control and settable flow rates.
7. End connections will be 1/2" to 1" ANSI socket or FNPT threaded or 150 lb flanged or butt fusion for Chemline metric PP pipe or ChemFlare™ for PFA tubing.

ORDERING EXAMPLE

Chemline Metering Ball Valves				SM2	A	010	E	S
Valve Material		A – PVC	B – PP					
Size	005 – 1/2"	007 – 3/4"	010 – 1"					
Seals	E – EPDM	V – FPM (Viton®)						
Ends	S – Socket	T – Threaded	B – Butt ¹	CF – ChemFlare™				

Example: SM2 Series Ball Valve, PVC, 1", EPDM seals, socket ends.

¹ PP metric butt fusion ends (1/2" to 2") connect to Chemline PP piping systems.

VACUUM RATING

- 29.9 inches mercury

OPTIONS & ACCESSORIES

- Reduced Ends
- Electric or Pneumatic Actuator with Positioner
 - Operates as a linear control valve



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MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

CHEMLINE

SERIES BT-BC-FV-FT, BALL CHECK AND FOOT VALVES

LEFT BLANK

MAINTENANCE INSTRUCTIONS

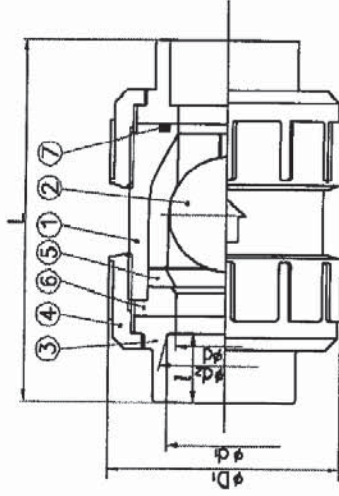
For Chemline Ball Check Valves and Ball Foot Valves Sizes 1/2" to 4"

Maintenance

Refer to dwg. **APR-050** or **ASSEMBLY DRAWING BC-003 rev.0** and proceed as follows:

1. Loosen union nut (5) and remove valve from line.
(Note: make sure there is no pressure in line prior to removing valve.)
2. **Important** Hold seat/seal (3) in place while removing valve, as the seat, stop ring (6) and ball (2) may fall out.
3. Remove seat (3), stop ring (6) and ball (2). Inspect for excessive wear. The ball should not show signs of wear or deformation.
4. When re-installing ball (2), stop ring (6) and seat (3), check inside body for any foreign debris that may have become lodged in the valve.
5. Replace union nut (5) and tighten.
6. For Foot Valves with strainer baskets, remove basket (7) and clean thoroughly.

SOCKET CONNECTION



NOMINAL SIZE	FLANGE										□ THREAD			
	□ ANSI 150 LBS										□ 1 1/2" NPT			
	□ ANSI 25 LBS													
	D	C	n	h	L	t	d ₁	l	L	d	D ₁			
1/2"	1.50	2.38	4	0.63	5.12	0.47	1/2 - 14 NPT	0.59	3.39	0.59	1.89			
3/4"	2.00	3.86	2.76	4	0.63	6.10	0.55	3/4 - 14 NPT	0.67	4.06	0.79	2.36		
1"	2.50	4.25	3.13	4	0.63	6.50	0.55	1 - 11 1/2 NPT	0.79	4.45	0.98	2.76		
1 1/4"	3.00	—	—	—	—	—	1 1/4 - 11 1/2 NPT	0.87	5.00	1.22	3.78			
1 1/2"	4.00	5.00	3.88	4	0.63	7.56	0.63	1 1/2 - 11 1/2 NPT	0.98	5.94	1.57	3.78		
2"	5.00	5.98	4.74	4	0.75	8.43	0.63	2 - 11 1/2 NPT	1.10	6.72	2.01	4.17		

NOMINAL SIZE	SOCKET												
	PVC, C-PVC						PVOF						
	□ ANSI		SCH 40		SCH 80		□ ANSI		SCH 40		SCH 80		
	d ₁	d ₂	l	d ₁	d ₂	l	d ₁	d ₂	l	d ₁	d ₂	l	
1/2"	15	0.648	0.835	0.688	3.43	0.848	0.835	0.875	3.80	0.825	—	0.890	3.83
3/4"	20	1.058	1.045	0.719	3.86	1.058	1.046	1.000	4.41	1.030	—	1.015	4.49
1"	25	1.325	1.310	0.875	4.37	1.325	1.310	1.125	4.88	1.300	—	1.140	4.98
1 1/4"	30	1.670	1.659	0.938	4.92	1.670	1.655	1.250	5.55	1.650	—	1.265	5.58
1 1/2"	40	1.912	1.894	1.094	5.94	1.912	1.894	1.375	6.50	1.890	—	1.390	6.57
2"	50	2.367	2.359	1.156	6.77	2.367	2.359	1.500	7.44	2.350	—	1.515	7.52
2 1/2"	60	2.812	2.794	1.312	7.87	2.812	2.794	1.688	8.50	2.780	—	1.700	8.57

Customer
Customer PO#
Chemline PS#

End Connection

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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DRAWN	LC	DATE	SCALE
CHECKED		09/28/98	~
APPROVED		DRAWING No. APR-050	

CHEMLINE PLASTICS LTD.



MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

CHEMLINE

TYPE 57, BUTTERFLY VALVE

WATER TECHNOLOGIES

LEFT BLANK

Serial No.

H-V036E-4

Butterfly Valves

Type 57 : 40mm(1 1/2") - 350mm(14")

Type 56 : 400mm(16")

User's Manual



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ASAHI AV VALVES

(1) General Operating Instructions

Operate the valve within the pressure vs. temperature range.

The valve can be damaged by operating beyond the allowable range.

Select a valve material that is compatible with the media, refer to “CHEMLINE CHEMICAL RESISTANCE GUIDE”.

Some chemicals may damage incompatible valve materials.

Do not use the valve on condition that fluid has crystallized.

(The valve will not operate properly.)

Do not step on the valve or apply excessive weight on valve. (It can be damaged.)

Do not exert excessive force in closing the valve.

Make sure to consult a waste treatment dealer to dispose of the valves.

(Poisonous gas is generated when the valve is burned improperly.)

Allow sufficient space for maintenance and inspection.

Keep the valve away from excessive heat or fire. (It can be deformed, or destroyed.)

Do not change or replace valve parts under line pressure.

The valve is not designed to bear any kind of external load. Never stand on or place anything heavy on the valve at anytime.

Using a positive-pressure gas with our plastic piping may pose dangerous condition due to the repellent force peculiar to compressed fluids, even when the gas is under the same pressure as water. Therefore, be sure to take the necessary safety precautions such as covering the piping protective material. For inquiries, please contact us.

(2) General Instructions for Transportation, Unpacking and Storage

Keep the valve in its original packaging until needed for installation.

Avoid contact with any coal tar creosote, insecticides, vermicides or paint.

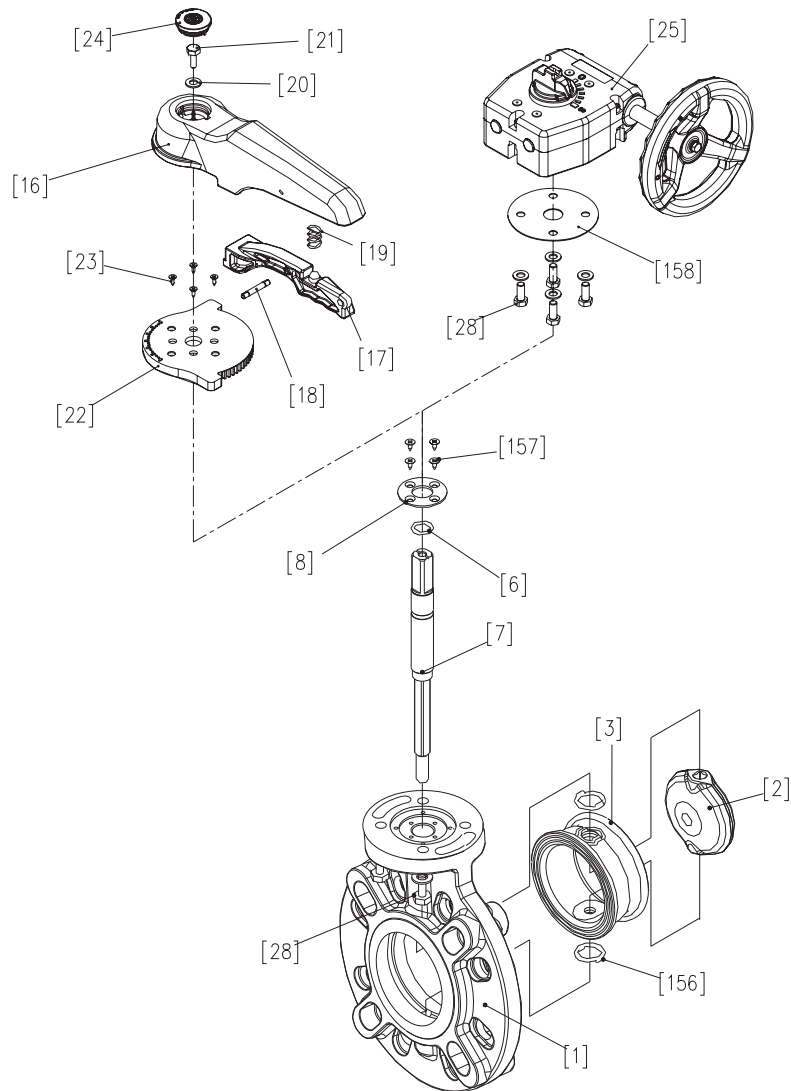
The force of swelling may damage the valve.

The valve is not designed to handle any kind of impact. Avoid throwing or dropping the valve.

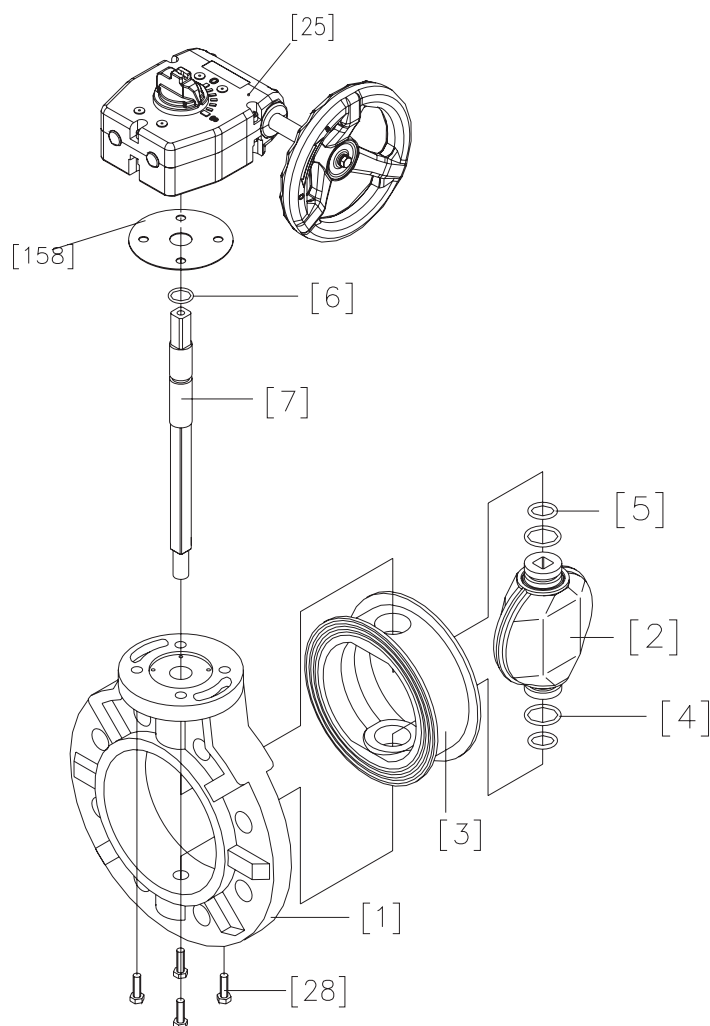
Avoid scratching the valve with any sharp object.

(3) Parts description

Type57: 40mm (1-1/2") – 350mm (14")

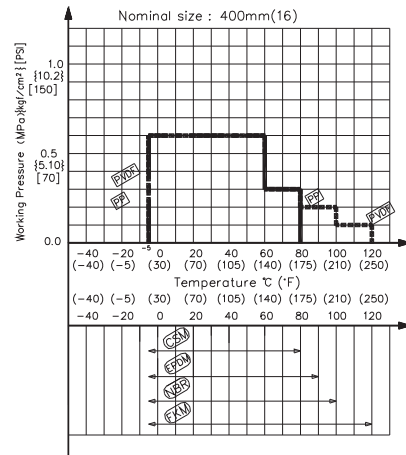
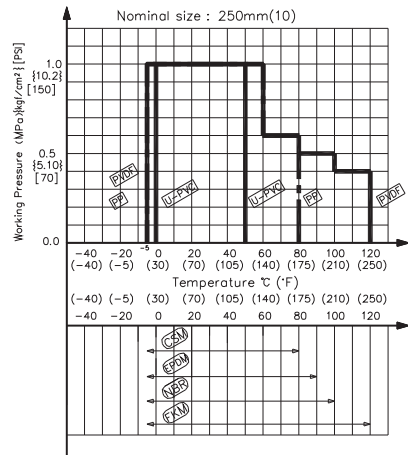
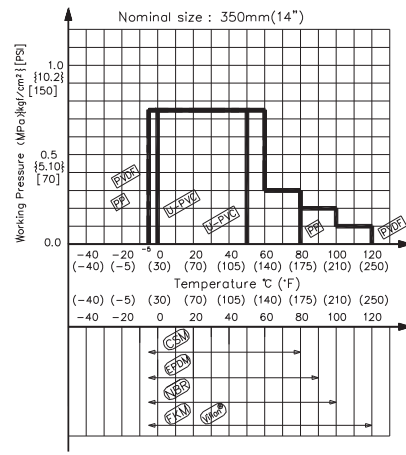
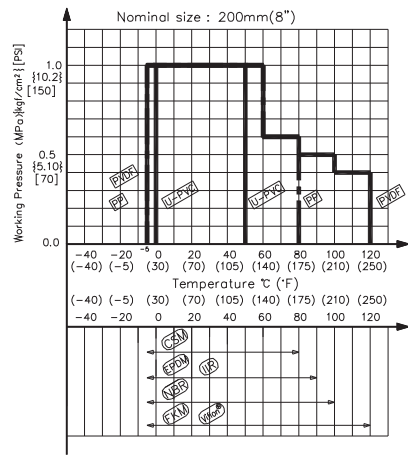
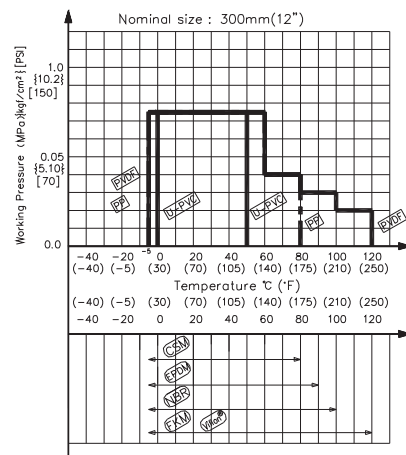
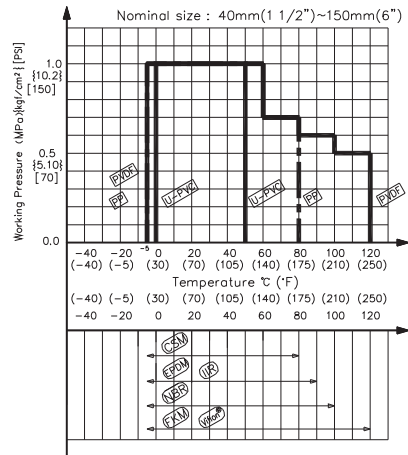


No.	Description	No.	Description	No.	Description
[1]	Body	[17]	Handle Lever	[24]	Cap (A)
[2]	Disc	[18]	Pin	[25]	Gear Box
[3]	Seat	[19]	Spring	[28]	Bolt (C)
[6]	O-Ring (C)	[20]	Washer (A)	[156]	Stabilization Ring
[7]	Stem	[21]	Bolt (A)	[157]	Screw (F)
[8]	Stem Holder (A)	[22]	Locking Plate	[158]	Gasket (L)
[16]	Handle (A)	[23]	Screw (B)		

Type56 (Gear Type): 400mm (16")

No.	Description	No.	Description	No.	Description
[1]	Body	[5]	O-Ring (B)	[28]	Bolt (C)
[2]	Disc	[6]	O-Ring (C)	[158]	Gasket (L)
[3]	Seat	[7]	Stem		
[4]	O-Ring (A)	[25]	Gear Box		

(4) Working Temperature vs. Pressure



Caution

Do not operate the valve beyond the range of working temperature and pressure.
(The valve can be damaged.)

(5) Installation Procedure



Caution

- 1) The valve disc is sent in the position indicated by solid lines in Fig. 5-1 prior to shipment from the factory. If the valve is opened or closed after unpacking, it must be reset in this position before installation. Failure to do so will result in damage to the surface of the valve seat during handling and installation.
- 2) The valve must not be dropped or thrown against other objects, since the sealing surface of the disc and the sealing surface of the valve seat may easily be damaged.
- 3) Care must be used during piping installation to ensure that the pipes or flanges are properly aligned so that the valve disc does not contact them in any setting. Misalignment as in Fig. 5-2 will result in damage to the valve.
- 4) The installed valve must never be opened or closed when foreign matter such as sand is present in the pipeline.

Fig. 5-1

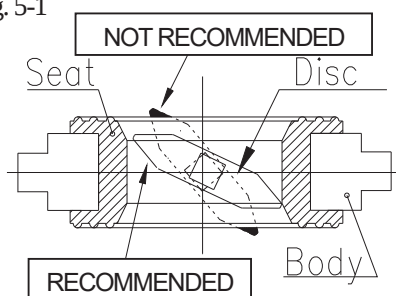
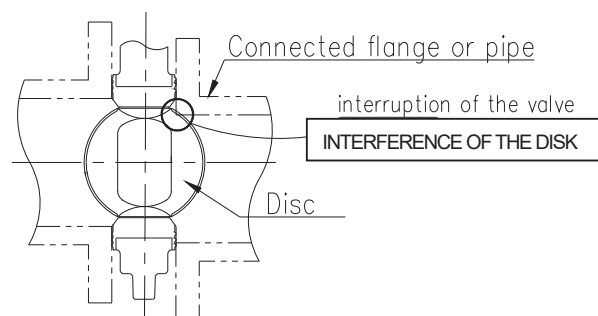
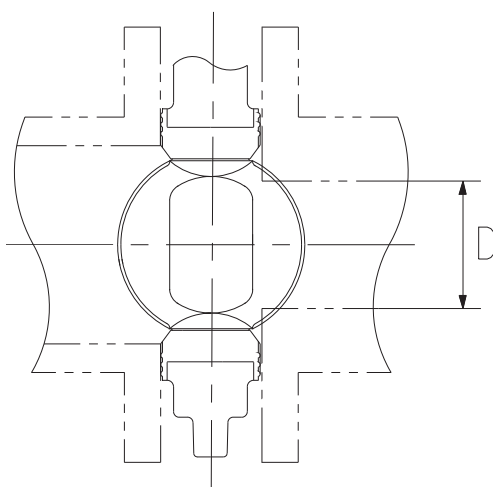


Fig. 5-2



In case of the thick wall of the connection part (flange and pipe) is too thick, shave the flange or the pipe inside in order to avoid the contact of pipe and disc. If inside diameter of the connection part is larger than size D, shaving is not necessary.



Nominal Size	Diameter D
40mm (1 1/2")	30mm (1.18")
50mm (2")	44mm (1.73")
65mm (2 1/2")	67mm (2.64")
80mm (3")	71mm (2.80")
100mm (4")	90mm (3.54")
125mm (5")	115mm (4.53")
150mm (6")	136mm (5.35")
200mm (8")	179mm (7.05")
250mm (10")	237mm (9.33")
300mm (12")	289mm (11.38")
350mm (14")	340mm (13.39")
400mm (16")	370mm (14.57")

Necessary items

● Torque Wrench

● Spanner Wrench

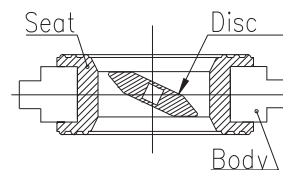
Procedure



Caution

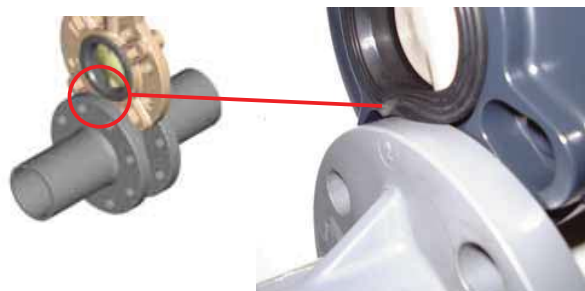
The disk [2] is prevented from overflowing. (The disk [2] is damaged.)

- 1) Install the valve between flanges and open the valve slightly.
- 2) Insert bolts, set nuts and washer and tighten the bolts and nuts temporarily by hand.



Caution

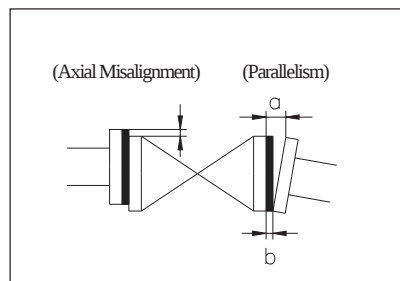
When you insert a valve between flanges, please insert after extending the fields of flanges fully.
(If you insert a valve by force without fully extending fields of flanges, a liner may be turned over and suffer a crack..)



The parallelism and axial misalignment of the flange surface should be under the values shown in the following table to prevent damage the valve. (A failure to observe them can cause destruction due to stress application to the pipe)

Unit : mm (inch)

Nom. Size	Axial Misalignment	Parallelism (a-b)
40 - 80mm (1 1/2"-3")	1.0 (0.04)	0.8 (0.03)
100-150mm (4"-6")	1.0 (0.04)	1.0 (0.04)
200-400mm (8"-16")	1.5 (0.06)	1.0 (0.04)



- 3) Tighten the bolts and nuts gradually with torque wrench to the specified torque in a diagonal manner.

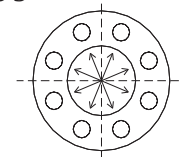
(Refer to Fig. 5-3)

Recommended torque value

Unit N-m kgf-cm [lb-inch]

Nom. Size	40mm (1 1/2")	50, 65mm (2", 2 1/2")	80, 100 mm (3", 4")
Torque value	20.0 {204} [177]	22.5 {230} [200]	30.0 {306} [266]

Fig. 5-3



Nom. Size	125, 150 mm (5", 6")	200, 250 mm (8", 10")	300, 350 mm (12", 14")	400 mm (16")
Torque value	40.0 {408} [355]	55.0 {561} [488]	60.0 {612} [532]	80.0 {816} [710]

Caution : Avoid excessive tightening. (The valve can be damaged.)

<JIS Standard>

Dimension of Insert Bolt A

Nom. Size		Bolt (Minimum)			Nut	Washer
		d	L	S		
40mm	1 1/2"	M16	125mm (4.92")	35mm (1.38")	M16	16mm (0.63")
50mm	2"		125mm (4.92")			
65mm	2 1/2"		130mm (5.12")			
80mm	3"		130mm (5.12")			
100mm	4"		145mm (5.71")			
125mm	5"	M20	165mm (6.50")	40mm (1.57")	M20	20mm (0.79")
150mm	6"		175mm (6.89")			
200mm	8"		190mm (7.48")			
250mm	10"	M22	220mm (8.66")		M22	22mm (0.87")
300mm	12"		245mm (9.65")			
350mm	14"		250mm (9.82")			
400mm	16"	M24	300mm (11.81")	45mm (1.77")	M24	24mm (0.94")

Dimension of Insert Bolt B

Nom. Size		Bolt (Minimum)				Nut	Washer
		1	L ₁	S ₁	S ₂		
400mm	16"	M24	120mm (4.72")	45mm (1.77")	27mm (1.06")	M24	24mm (0.94")

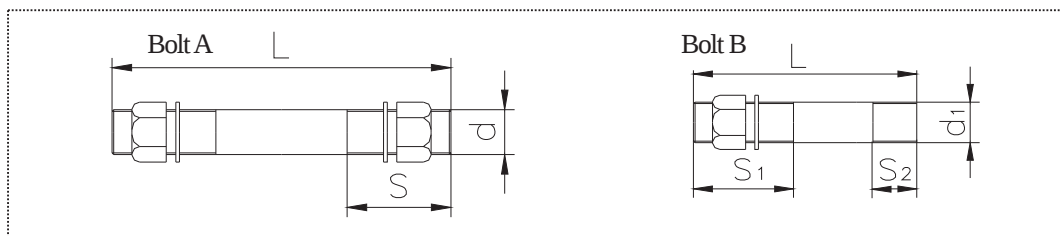
<ANSI Standard>

Dimension of Insert Bolt A

Nom. Size		Bolt (Minimum)			Nut	Washer
		d	L	S		
40mm	1 1/2"	5/8" - 11	125mm (4.92")	35mm (1.38")	5/8" - 11	5/8" Flat (0.63")
50mm	2"		125mm (4.92")			
65mm	2 1/2"		130mm (5.12")			
80mm	3"		130mm (5.12")			
100mm	4"		145mm (5.71")			
125mm	5"	3/4" - 10	165mm (6.50")	40mm (1.57")	3/4" - 10	3/4" Flat (0.79")
150mm	6"		175mm (6.89")			
200mm	8"		190mm (7.48")			
250mm	10"	7/8" - 9	220mm (8.66")		7/8" - 9	7/8" Flat (0.87")
300mm	12"		245mm (9.65")			
350mm	14"		250mm (9.82")			
400mm	16"	1" - 8	300mm (11.81")	45mm (1.77")	1" - 8	1" Flat (0.94")

Dimension of Insert Bolt B

Nom. Size		Bolt (Minimum)				Nut	Washer
		1	L ₁	S ₁	S ₂		
400mm	16"	1" - 8	120mm (4.72")	45mm (1.77")	27mm (1.06")	1" - 8	1" Flat (0.94")

**Caution**

The gasket is unnecessary. (The seat [3] carries out the role of the gasket.)

(6) Operating Procedure



Caution

The lever operation and the steering wheel operation are done by the hand.

- 1) Open and close the valve by turning handle smoothly.
Turn clockwise to close and counterclockwise to open.
- 2) In case of lever type (40-200 mm {1 1/2"-8"}), the direction of handle is same as the disc as shown in Fig. 6-1.
For the full-shut (Close) position, the handle is perpendicular to the piping axis direction.
For the full-opened position, the handle is parallel to the piping axis direction.

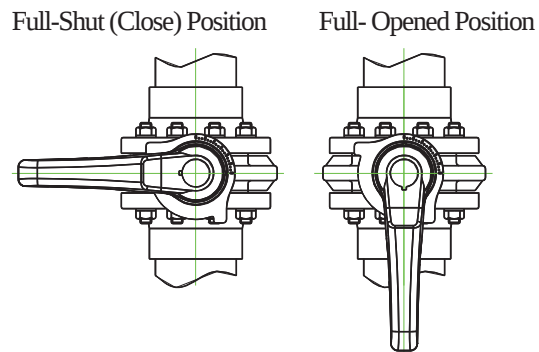


Fig. 6-1

- 3) In case of gear type (40-400 mm {1 1/2"-16"}), the indicator shows the position of the disc on the top of gear box. (Fig.6-2)
For the full-shut (close) position, the indication shows Shut (S).
For the full-opened position, the indication shows Open (O).

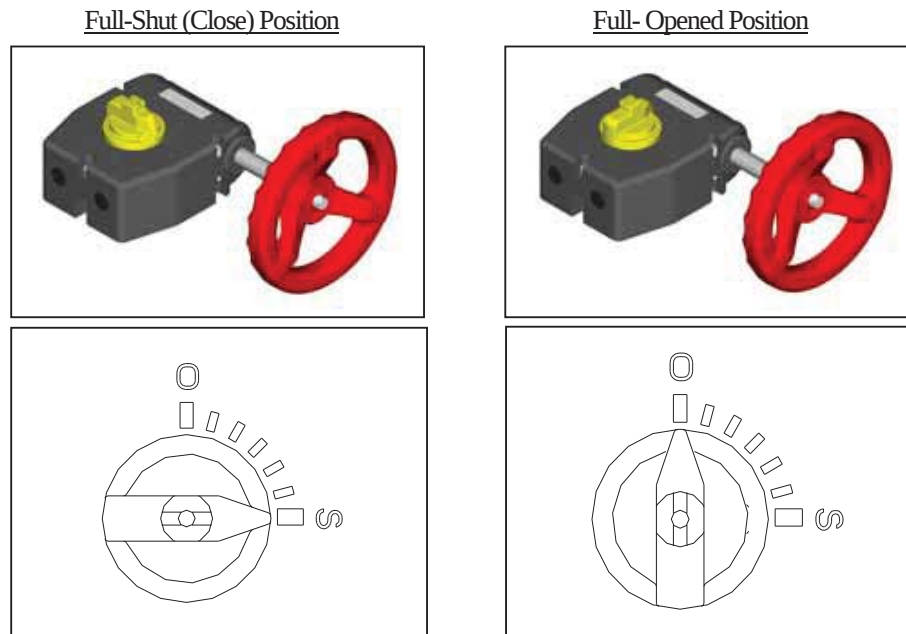


Fig. 6-2

Technical Data for Operation

Nom. Size	Stem Torque (N m)		Required Hand-Wheel Torque (N m)		Length of Lever and Diameter of Handle (mm)		Required Operating Force (N)	
	Peak	Seal	Peak	Seal	Lever	Gear	Lever	Gear
40mm (1 1/2")	5	5	0.4	0.4	220	80	23	5.0
50mm (2")	10	10	0.8	0.8	220	80	46	10
65mm (2 1/2")	15	15	1.2	1.2	220	80	68	15
80mm (3")	20	20	1.7	1.7	250	80	80	22
100mm (4")	30	30	2.5	2.5	250	80	120	32
125mm (5")	65	40	5.4	3.3	320	80	125	42
150mm (6")	85	65	7.0	5.4	320	80	205	68
200mm (8")	190	165	16	13	420	80	395	163
250mm (10")	300	250	25	21	-	80	-	263
300mm (12")	370	330	25	22	-	150	-	147
350mm (14")	420	400	28	27	-	150	-	180
400mm (16")	930	780	63	53	-	150	-	353

Note : Data mentioned in the table above is reference only.

These data are measured in standard condition and it slightly differs depending on conditions.

(7) Disassembly and Assembly Procedure for Parts Replacement

Necessary items

- | | | |
|---------------------|---------------------|------------------------------------|
| ● Protective Gloves | ● Vise | ● Circular Stick (Plastic or Wood) |
| ● Goggles | ● Grease (Silicone) | ● Pressing Machine |
| ● Spanner Wrench | ● Square Lumber | ● Hammer |
| | | ● Screw Driver (+) |
| | | ● Screw Driver (-) |



Caution

Wear protective gloves and goggles in case some dangerous fluid remains in the valve body.

(You might be injured by working without them.)

The handle part can be removed with line pressure present. The locking plate [22] can't be removed with line pressure present. If locking plate [22] needs to be removed, there can not be line pressure present.

<< Disassembly >>

Procedure

- 1) Drain fluid completely from the pipeline.
- 2) Leave the valve slightly opened.
- 3) Loosen the connecting bolts and nuts.
- 4) Remove the valve from the pipeline.

Lever Type <Nominal size 40mm-200mm (1 1/2"-8")>

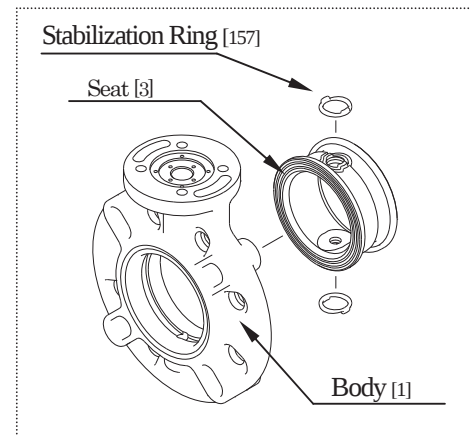
- 5) To remove handle[16], first take off the cap [24] by using screw driver (-) and release bolt [21] by using socket wrench, then pull up the handle [16] while holding handle lever[17].
- 6) To take off locking plate [22], release 4 self-tapping screws [23] by using screw driver(+) and take off stem holder[8].

Gear Type <Nominal size 40mm-400mm (1 1/2"-16")>

- 5) Loosen set bolt [28] for gear box [25] and pull off the gear box upward with gasket [158].
- 6) <Nominal size 40mm-350mm (1 1/2"-14") *It advances 400mm (16") as follows.>
To take off stem holder [8]. Release 4 tapping screws [157] by using screw driver (+).

Lever & Gear Type

- 7) Hold flat surface of Stem [7] with vise and pull off valve body[1].
- 8) (A) Set the valve body [1] on square lumbers at edges of valve body on the press and put a lumber on the disc[2].
Operate the press slowly and push disc [2] and seat [3] out if the valve body[1].
(B) Set the valve body [1] on square lumbers at edges of valve body and put a circular stick on the disc[2].
Strike the circular stick with a hammer and remove disc [2] and seat [3] out of the valve body[1].
- 9) Set the disc [2] parallel to the working desk to half opened position. Push the seat[3], and remove the disc[2].
- 10) <Nominal size 40mm-350mm (1 1/2"-14") *It advances 400mm (16") as follows.>
Remove the stabilization ring [156] and the O-ring(C) [6]from the stem[7].



<< Assembly >>

Procedure

- 1) Put the O-ring(C) [6] onto the stem [7].
- 2) Before starting assembly, grease (Silicone) should be spread on the top and bottom disc [2], the stem hole of the seat [3] and the stem O-ring(C) [6].
- 3) <Nominal size: 40mm-350mm(1 1/2"-14") *It advances 400mm (16") as follows.>
Insert the stabilization ring [156] into the upper side slot of the seat [3]. The upper side slot of seat [3] has larger stem hole than lower side.

**Caution**

Make certain tabs are properly aligned. Both upper and lower stabilization ring [156] are identical.

- 4) Insert the stem [7] about 1/3 into the body [1]. Install the seat [3] into the body [1] by aligning upper seat stem hole with the stem [7].
- 5) Collapse the left or right side of seat [3] in towards opposing side exposing lower stem hole by screw driver (-).
<Nominal size: 40mm-350mm(1 1/2"-14") *It advances 400mm (16") as follows.>
Install the stabilization ring [156] into the body [1] aligning tabs of ring with center groove of the body [1]. Seat [3] tabs should line up when bottom of seat is reset into body of valve.
- 6) Remove the stem [7].
- 7) Reset the seat [3] into the body [1].

**Caution**

<Nominal size: 40mm-350mm(1 1/2"-14") *It advances 400mm (16") as follows.>

Make certain stabilization rings [156] sit flush inside of seat [3] with tabs properly aligned. If stabilization rings [156] are not installed correctly, the seat [3] will not sit in the body [1] properly. This is indicated by a visible gap between seat [1] and body [1], and disc [2] will not fit properly.

- 8) To install disc [2], make certain valve size on disc [2] is in upright direction. Install top of disc [2] into seat [3] aligning with upper stem hole.
- 9) Rotate disc [2] to 75% (Approx.) closed position and install stem [7] about 50% into the body [1].
- 10) Press in bottom of disc [2] to lower stem hole.

**Caution**

Look into valve body [1] to be certain full square in disc [2] is centered with upper valve [1] stem hole. If not, repeat step 8), 9), and 10).

Make certain line scribed on top of stem [7] indicates disc [2] position while installing stem [7].

- 11) Install the stem [7] into valve body [1] and disc [2]. If disc [2] is properly aligned, stem [7] should slide in smoothly. If stem [7] does not slide in smoothly, report from step 8) to properly align the disc [2] in the valve body [1].
- 12) <Nominal size: 40mm-350mm(1 1/2"-14") *It advances 400mm (16") as follows.>
Install stem holder [8] onto valve body [1] with countersunk holes facing up using 4 screws [157].
- 13) To install lever or gear operator reverse disassembly procedure #5).
- 14) After assembly, make sure that the valve can be fully opened and closed smoothly.

(8) Installation procedure for handle

Necessary items

- Plastic Hammer
- Socket Wrench
- Screw Driver
- Goggles
- Protective Gloves



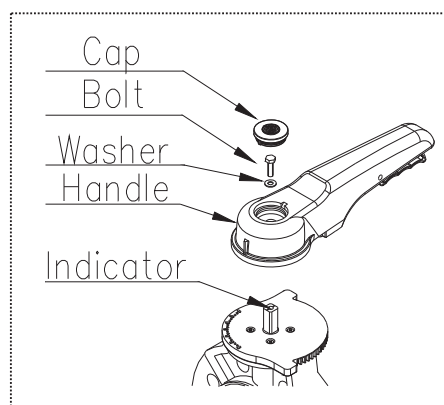
Caution

Do not give any unjust force to cap, in installing or removing the cap.
It can be damaged

Installation

Procedure

- 1) Install the handle on the stem. Set the direction of handle in the indication line at the top of stem.
- 2) Fix the handle at the top of stem with the attached bolts and washer by using socket wrench.
- 3) Set the convex part at the side of the cap and the concave of the handle, and set in the cap by striking lightly by using a plastic hammer.

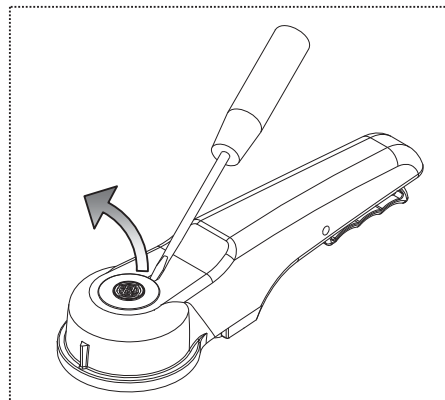


Nominal Size	40-100mm (1 1/2"-4")	125-200mm (5"-8")
Bolt Size	M6×15L	M8×15L
Socket Size	10	13

Remove

Procedure

- 1) To remove the cap, push up the side of the cap by using a screw driver
- 2) Loose the bolts and washer by using a socket wrench, then remove the handle.

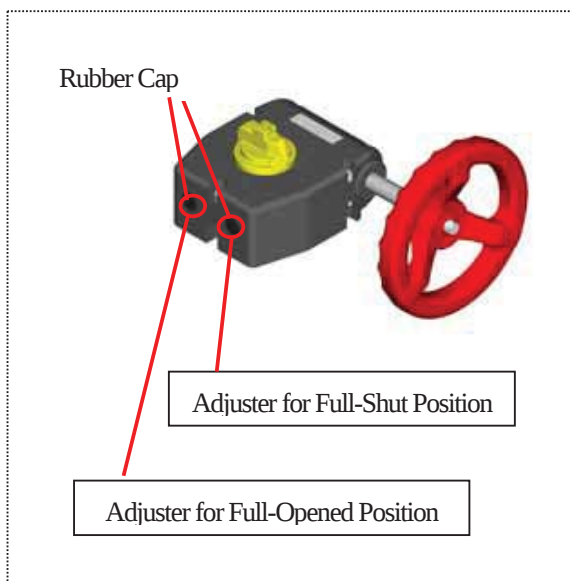


(9) Adjustment Procedure for Stopper Gear Type

Necessary Items

- Hexagon Wrench

The adjustments for full-opened and full-shut position are step-less, and it can be done with the stopper adjuster.



Adjustment for Full-shut (Full-opened) position

- 1) Remove the rubber cap of Full-closing (Full-opening) adjuster.
- 2) Loosen the first stopper hex-bolt completely by Hex. Wrench.
- 3) Adjust the disc of valve to required position.
- 4) Tighten the stopper hex-bolts.
- 5) Put the rubber cap of Full-closing (Full-opening) adjuster back on gearbox.

(10) Inspection Items

Inspect the following items.

(1)	Check for flaw, crack, or deformation on the valve.
(2)	Check for leaks to the outside.
(3)	Check for the deformation of seat due to improper installation of valve.
(4)	Check for the smoothness of handle operation..

(11) Troubleshooting

Phenomenon	Cause	Treatment
Fluid is not stopped in the full closed position at the seat.	1) The stopper is not set correctly. 2) The seat is damaged or worn. 3) Foreign materials are caught. 4) The disc is damaged or worn. 5) The connecting bolts are over tightened or tightened unevenly.	Adjust the stopper. Replace the seat. Clean it up. Replace the disc. Adjust and retighten.
Fluid leaks to the outside.	1) The seat is damaged or worn. 2) The connecting bolts are not tightened in proper torque or evenly.	Replace the seat. Adjust and retighten.
The handle does not work smoothly.	1) Foreign materials have adhered. 2) The gear box is damaged. 3) The connecting bolt is over tightened.	Clean it up. Repair or replace. Adjust and retighten.
Valve does not operate	1) The gear box is damaged 2) The stem is damaged.	Repair or replace. Replace the stem.

(12) Handling of Residual and Waste Materials



Caution

Make sure to consult waste treatment dealer to dispose valves.
 (Poisonous gas is generated when the valve is burned improperly.)

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MANUFACTURER INSTALLATION OPERATION AND MAINTENANCE MANUAL
AMARUQ WTP – NUNAVUT
VEOLIA PROJECT: 5000 218 009

CHEMLINE
SERIES E, ELECTRIC ACTUATOR

LEFT BLANK

PLUS

CE

Système sécurité
**FAIL
SAFE**
Security system

Positionnement
POSI
Positioning

3 Positions
GF3
3 Positions

10Nm
⇓
100Nm

Facteur de marche
50%
Duty rating

Indice de protection
IP66
Enclosure

Anti-condensation
intégrée

Integrated
anti-condensation



ER PLUS

ACTIONNEUR ÉLECTRIQUE

ELECTRIC ACTUATOR

ELEKTRISCHE STELLANTRIEBE

ACTUADOR ELÉCTRICO

DOCUMENTATION TECHNIQUE
MISE EN SERVICE

TECHNICAL LITERATURE
SET UP PROCEDURE

TECHNISCHE UNTERLAGEN
BETRIEBSANLEITUNG

DOCUMENTACIÓN TECNICA
PUESTA EN SERVICIO



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FAILSAFE Modelle	16	
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Modèles POSI

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Modèles GF3

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GF3 Modelle	28	
Modelos GF3	28	



Données techniques

<i>Technical datas</i>	30	30
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DESCRIPTION

Ces actionneurs électriques ont été conçus pour permettre le pilotage d'une vanne 1/4 tour. Pour tout autre application, nous consulter préalablement. Nous ne pouvons être tenus responsables en cas d'autre utilisation.

TRANSPORT ET STOCKAGE

- Les transporteurs étant responsables des avaries et des retards de livraison, les destinataires doivent émettre des réserves, le cas échéant, avant de prendre livraison des marchandises. Les envois directs d'usine sont soumis aux mêmes conditions.
- Le transport sur site est effectué dans un emballage rigide.
- Les produits doivent être stockés dans des endroits propres, secs et aérés, de préférence sur des palettes de manutention ou sur des étagères.

MAINTENANCE

- La maintenance est assurée par notre usine. Si le matériel ne fonctionne pas, vérifier le câblage suivant le schéma électrique et l'alimentation de l'actionneur électrique concerné.
- Pour toute question, prendre contact avec le service après-vente.
- Pour nettoyer l'extérieur de l'appareil, utiliser un chiffon (et de l'eau savonneuse).
NEPAS UTILISER D'AGENT A BASE DE SOLVANT OU D'ALCOOL

GARANTIE

- 100% des actionneurs ont été testés et réglés en usine.
- Ces produits sont garantis 2 ans ou 50000 manœuvres contre tous vices de fabrication et de matière, à partir de la date de livraison (facteur de service et classe du modèle suivant la norme CEI34).
- Cette garantie n'est valable que dans le cas où le matériel aura été, entre temps, ni démonté, ni réparé. Cette garantie ne s'étend pas à l'usure provoquée par suite de chocs ou maladresse, ainsi que par l'utilisation du matériel dans les conditions qui ne seraient pas conforme à ses caractéristiques. Cette garantie est strictement limitée au remplacement de la ou des pièces d'origines reconnues défectueuses, par nos services, après expertise. Les frais de port aller et retour, ainsi que la main d'œuvre, restent à la charge du client. Aucune responsabilité ne serait nous incomber au sujet des accidents ou risques directs ou indirects découlant d'une défectuosité de nos matériels. La garantie ne couvre pas les conséquences d'immobilisation et exclut tout versement d'indemnité. Les accessoires et adaptations ne sont pas couverts par cette garantie. Au cas où le client n'aurait pas réalisé ponctuellement les paiements stipulés aux échéances convenues, notre garantie sera suspendue jusqu'au paiement des échéances en retard et sans que cette suspension puisse augmenter la durée de la garantie à la mise à disposition.

RETOUR DE MARCHANDISE

- L'acheteur est tenu de vérifier au moment de la livraison la conformité de la marchandise par rapport à sa définition.
- L'acceptation par l'acheteur de la marchandise dégage le fournisseur de toute responsabilité, si l'acheteur découvre une non-conformité postérieurement à la date d'acceptation. Dans un tel cas, les frais de mise en conformité seront à la charge de l'acheteur qui supportera également seul, les conséquences financières du dommage. Les retours des marchandises sont acceptés que si nous les avons préalablement autorisés : ils doivent nous parvenir franco de tous frais à domicile et ne comporter que des produits dans leur emballage d'origine. Les marchandises rendues sont portées au crédit de l'acheteur, déduction faite des 20% de reprise du matériel calculé sur la base du montant initial des marchandises retournées.

CONSIGNES DE SECURITE



A lire avant toute installation du produit

- L'alimentation électrique doit être coupée avant toute intervention sur l'actionneur électrique (avant de démonter le capot ou de manipuler la commande manuelle de secours).
- Toute intervention doit être effectuée par un électricien qualifié ou une personne formée aux règles d'ingénierie électrique, de sécurité et tout autre directive applicable.
- Respecter impérativement l'ordre des consignes de raccordement et de mise en service décrites dans le manuel sans quoi le bon fonctionnement n'est plus garanti. Vérifier les indications portées sur la plaque d'identification de l'actionneur : elles doivent correspondre à votre réseau électrique d'alimentation.



- Ne pas monter l'actionneur « tête en bas ».

Risques encourus :

Disfonctionnement du mécanisme de débrayage

Possible écoulement de graisse sur la partie électronique

- Ne pas monter l'actionneur à moins de 30 cm d'une source de perturbations électromagnétiques

INSTRUCTIONS AND SECURITY

DESCRIPTION

These electric actuators have been designed to perform the control of a valve with 90° rotation. Please consult us for any different application. We cannot be held responsible if the mentioned actuators are used in contradiction to this advice.

TRANSPORT AND STORAGE

- The forwarding agents being held as responsible for damages and delays of the delivered goods, the consignees are obliged to express if applicable their reserves, prior to accept the goods. The goods delivered directly ex works are subject to the same conditions.
- The transport to the place of destination is carried out by using rigid packing material.
- The products must be stored in clean, dry, and ventilated places preferably on appropriate palettes or shelves.

MAINTENANCE

- Maintenance is ensured by our factory. If the supplied unit does not work, please check the wiring according to the electric diagram as well as the power supply of the concerned electric actuator.
- For any question, please contact our after-sales service.
- To clean the outside of the actuator, use a lint and soapy water.

DO NOT USE CLEANING PRODUCT WITH SOLVENT OR ALCOHOL

GUARANTEE

- 100% of the actuators are fully tested and set in the factory.
- These products are guaranteed two years from the delivery date or 50,000 operating cycles against all types of manufacturing and material faults (operating time and model class according to standard CEI34).
- This guarantee will only be valid if the unit has not been disassembled or self-repaired during its service life. It does not cover any wear and damage caused by shocks or faulty operation neither by the use of the unit under conditions not in accordance with its nominal characteristics. The guarantee is strictly limited to the replacement of original parts found defective on checking by our service personnel. The cost of shipping to our premises, the return of devices to the customer as well as the repair cost will be chargeable. We will not assume the responsibility for any direct or indirect accidents/risks originated by a failure of our products. The guarantee does not cover the consequences of breakdown and excludes any payments for indemnities. The accessories and adaptations are excluded from the guarantee. In the case where a customer has not proceeded to payments within the agreed period, our guarantee will be suspended until the delayed payments have been received and with the consequence that this suspension will not prolong the guarantee period in any case.

RETURN OF GOODS

- The customer is obliged to check the conformity of the goods with regard to their definition at the time of delivery.
- The acceptance of the goods by the purchaser disclaims the supplier of all responsibility if the purchaser discovers any non-conformity after the date of acceptance. In such case, the repair cost will be borne by the purchaser who will also exclusively bear all financial consequences of any resulting damage. Returned goods will only be accepted if our prior agreement has been given to this procedure : the goods must be sent free of all cost and being shipped solely and in their original packing. The returned goods will be credited to the purchaser with a reduction of 20% on the unit's price charged in accordance with the original invoice of the returned goods.

SAFETY INSTRUCTIONS



To be read prior to the installation of the product

- The electric power supply must be switched-off before any intervention on the electric actuator (i.e. prior demounting its cover or manipulating the manual override knob).
- Any intervention must only be carried out by a qualified electrician or other person instructed in accordance with the regulations of electric engineering, safety, and all other applicable directives.
- Strictly observe the wiring and set-up instructions as described in the manual: otherwise, the proper working of the actuator can not be guaranteed anymore. Verify that the indications given on the identification label of the actuator fully correspond to the characteristics of the electric supply.



- Do not mount the actuator « upside down ».

Risks:

Declutching mechanism failure

Possible flow of the grease on the electronic board

- Do not mount the actuator less than 30 cm of a electromagnetic disturbances source.

BESCHREIBUNG

Die elektrischen Stellantriebe wurden entwickelt, um Ventile mit Vierteldrehung zu steuern. Bitte ziehen Sie uns vor jeder anderen Verwendung zur Rate. Für jeglichen weitergehenden Einsatz können wir keine Verantwortung übernehmen.

TRANSPORT UND LAGERUNG

- Da die Spediteure für Schäden und Lieferverspätungen verantwortlich sind, müssen die Empfänger gegebenenfalls vor Annahme der Waren Vorbehalte äußern. Lieferungen direkt ab Werk unterliegen den gleichen Bedingungen.
- Der Transport vor Ort erfolgt in einer festen Verpackung.
- Die Lagerung muss an einem sauberen, gelüfteten und trockenen Ort erfolgen, bevorzugt auf Transportpaletten oder in Regalen.

WARTUNG

- Die Wartung wird in unserem Werk vorgenommen. Falls das Material nicht funktioniert, überprüfen Sie bitte die Kabelanschlüsse nach dem Schaltplan und die Stromzufuhr des betreffenden elektrischen Stellantriebes.
- Bei Fragen wenden Sie sich bitte an den Kundendienst.
- Verwenden Sie zur Außenreinigung des Antriebs ein Tuch und Seifenlösung.

BITTE NIE LÖSUNGSMITTEL ODER ALKOHOLHALTIGE MITTEL ZUR REINIGUNG BENUTZEN.

GARANTIE

- 100% der Stellantriebe werden im Werk geprüft und eingestellt.
- Die Produkte unterliegen einer Garantie von zwei Jahren oder 50000 Bedienvorgängen bezüglich allen Herstellungs- und Materialfehlern, vom Datum der Auslieferung an (Einschaltdauer und Modellklasse nach Norm CEI34).
- Diese Garantie tritt nur in Kraft, wenn die Ware zwischenzeitlich weder repariert noch zerlegt worden ist. Sie bezieht sich weder auf Verschleiß durch Stöße oder Fehlbedienung noch auf den Einsatz des Materials unter nicht geeigneten Bedingungen. Diese Garantie ist eingeschränkt auf den Ersatz des oder der Originalteile, die von uns nach Begutachtung als defekt anerkannt wurden. Die Frachtkosten für Hin- und Rückweg sowie der Arbeitslohn obliegen dem Kunden. Wir übernehmen keinerlei Verantwortung bezüglich Unfällen oder direkten oder indirekten Risiken, die sich aus einem Defekt unserer Waren ergeben. Die Garantie deckt die Folgen eines Stillstandes nicht ab und schließt jede Entschädigungszahlung aus. Zubehör und Umbauten fallen nicht unter die Garantie. Für den Fall, daß der Kunde zeitweise nicht den Zahlungen zu den vereinbarten Fälligkeiten nachgekommen ist, wird die Garantie bis zur Zahlung der verspäteten Fälligkeiten ausgesetzt, ohne daß diese Unterbrechung die Dauer der gewährleisteten Garantie verlängert.

RÜCKSENDUNG VON WAREN

- Der Käufer ist gehalten, bei Erhalt der Ware die Übereinstimmung mit den Vorgaben zu überprüfen.
- Die Annahme der Ware durch den Käufer befreit den Lieferanten von jeglicher Verantwortung, falls der Käufer eine Reklamation nach dem Zeitpunkt der Annahme feststellt. In einem solchen Fall obliegen dem Käufer allein die Kosten für die Beseitigung sowie die Folgekosten des Schadens. Warenrücksendungen werden nur angenommen, wenn wir sie zuvor genehmigt haben: sie müssen frei Haus, ohne jegliche Gebühren, an unseren Firmensitz geliefert werden und dürfen ausschliesslich originalverpackte Ware enthalten. Die zurückgesendeten Waren werden dem Käufer gutgeschrieben, abzüglich 20% Warenrücksendungspauschale, veranschlagt auf Grundlage des ursprünglichen Rechnungsbetrags der zurückgesandten Waren.

ANLEITUNG UND SICHERHEITSHINWEISE



Vor jeglicher Installation des Produktes zu lesen

- Die Stromzufuhr muss vor jeglichem Eingriff am elektrischen Stellantrieb unterbrochen werden (bevor die Haube abgenommen oder die Handnotbetätigung bedient wird).
- Jeglicher Eingriff darf nur von qualifizierten Elektrikern oder von nach den Regeln der Elektrotechnik, der Sicherheit und allen anderen anwendbaren Normen geschultem Personal vorgenommen werden.
- Beachten Sie unbedingt die Reihenfolge der Anweisungen zum Anschliessen und zur Inbetriebnahme, welche im Handbuch beschrieben werden, ansonsten wird die einwandfreie Funktion nicht gewährleistet. Überprüfen Sie die Angaben auf dem Typenschild des Stellantriebes : sie müssen Ihrer Stromversorgung entsprechen.



- Antrieb nie über Kopf einbauen

Risiken:

Störung der Kupplung des Antriebes

Mögliche Fettleckage auf die elektronische Karte

- Immer einen Mindestabstand von 30cm zu einer elektromagnetischen Störquelle einhalten .

INSTRUCCIONES Y SEGURIDAD

DESCRIPCIÓN

Estos actuadores eléctricos han sido concebidos para permitir el pilotaje de válvulas 1/4 de vuelta. Para otra aplicación, consultarnos. No podemos valorar responsabilidad en caso de otra utilización.

TRANSPORTE Y ALMACENAMIENTO

Al ser responsables los transportistas de averías y retrasos de entrega, los destinatarios deben emitir reservas, si llega el caso, antes de tomar entrega de las mercancías. Los envíos directos de fábrica están sometidos en las mismas condiciones.

- El transporte sobre sitio es efectuado en un embalaje rígido.
- Los productos deben ser almacenados en lugares limpios, secos y airados, preferentemente sobre paletas de manutención o sobre estanterías.

MANTENIMIENTO

- El mantenimiento es asegurado por nuestra fábrica. Si el material no funciona, verificar que el cableado, sigue el esquema eléctrico y la alimentación del actuador eléctrico concernido.
- Para toda pregunta, entrar en contacto con servicio posventa.
- Para limpiar el exterior del actuador, utilizar un trapo, y del agua jabonosa.

NO UTILIZAR PRODUCTO DE LIMPIEZA CON DISOLVENTE O ALCOHOL

GARANTÍA

- El 100% de los actuadores están sometidos a un testigo y vienen ajustados de fábrica.
- Este producto es garantizado 2 años o 50000 maniobras contra todo vicio de fabricación y de materia, a partir de la fecha de entrega (factor de servicio y clase del modelo, sigue la norma CEI34).
- Esta garantía es valida tan solo en caso de que el material habrá sido, entre tanto, ni desmontado, ni reparado. Esta garantía no se extiende al desgaste provocado por choques o torpeza, así como por la utilización del material en las condiciones que serian conformes a sus características. Esta garantía es estrictamente limitada a la sustitución de una o varias piezas de orígenes reconocidas defectuosas por nuestros servicios, después de someterlos a un control de expertos. Los gastos de transportes ida y vuelta así como la mano de obra, se quedan al cargo del cliente. Ninguna responsabilidad debe incumbirnos respeto a los accidentes o los riesgos directos o indirectos que emanarían de una defectuosidad de nuestros materiales. La garantía no cubre las consecuencias de inmovilización y excluye todo pago de indemnidad. Los accesorios y las adaptaciones no son cubiertos por esta garantía. En caso de que el cliente no habría realizado puntualmente los pagos estipulados a los vencimientos convencionales, nuestra garantía será suspendida hasta el pago de los vencimientos tardes y sin que esta suspensión pueda aumentar la duración de la garantía a la disposición.

DEVOLUCIÓN DE LA MERCANCÍA

- El comprador debe verificar al momento de la entrega la conformidad de la mercancía en relación a su definición.
- La aceptación por el comprador de la mercancía suelta al proveedor de toda responsabilidad; igual que si el comprador descubre una non conformidad posteriormente a la fecha de aceptación. En tal caso, los gastos de devolución para conformidad están a cargo del comprador que soportara también las consecuencias financieras del daño. Las devoluciones de las mercancías son aceptadas que si previamente las autorizamos: deben llegar sin cargo a nuestro domicilio y comportar solamente productos dentro sus embalajes de origen. Las mercancías devueltas son abonadas a cuenta del comprador, deducción hecha de 20% por devolución del material, calculado sobre el importe inicial de las mercancías a devueltas.

CONSEJOS DE SEGURIDAD



A leer antes de toda instalación del producto.

- La alimentación eléctrica debe ser cortada antes de toda intervención sobre el actuador eléctrico (antes de desmontar la tapa o de manipular el mando de socorro).
- Toda intervención debe ser efectuada por un electricista cualificado o una otra persona formada a las reglas de seguridad y otras directivas aplicables.
- Respetar obligatoriamente el orden de las consignas de conexión y de las puestas en marcha descritas en el manual al fin de garantizar el buen funcionamiento. Verificar las indicaciones puestas sobre la placa de identificación del actuador : deben corresponder a su red eléctrico de alimentación.



- No montar el actuador "cabeza de bajo"

Riesgos incurridos :

**Avería del mecanismo de desembrague
derrame Posible de grasa sobre la tarjeta electrónica**

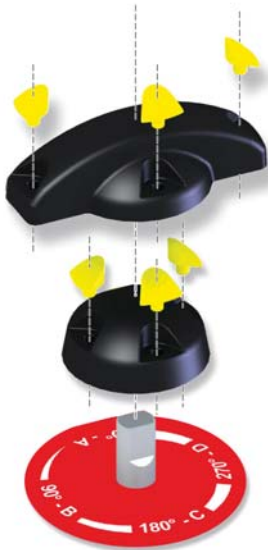
- No montar el actuador por menos de 30 cm de una fuente de perturbaciones electromagnéticas

Indicateur modulable, livré avec 5 repères de signalisation (3 jaunes + 2 noirs), à positionner en fonction du type de vanne à piloter.

Modular position indicator with three removable position markers (3 yellow + 2 black), adjustable according the type of valve to be actuated.

Stellungsanzeige mit 5 einstellbaren Markierungsknöpfen (3 gelbe + 2 schwarze), die je nach Armaturtyp zu positionnieren sind

Indicador modulable, entregado con 5 marcas de señalización (3 amarillos y 2 negros), a colocar con arreglo al tipo de válvula a maniobrar



poignée avec indicateur de position pour ER10/20

Handle with position indicator for ER10/20

Hebel mit integrierter Stellungsanzeige für ER10/20

puñado con indicador de posición para ER10/20

Indicateur de position pour ER35-60-100

Position indicator for ER35-60-100

Stellungsanzeige für ER35-60-100

Indicador de posición para ER35-60-100



Vanne 2 voies en position fermée

2 ways valve in closed position

2 Wege Armatur in Zu Stellung

Válvulas de 2 vías en position cerrada



Vanne 3 voies de type L

3 ways L type valve

3 Wege Ventil Typ „L“

Válvulas de 3 vías de tipo L

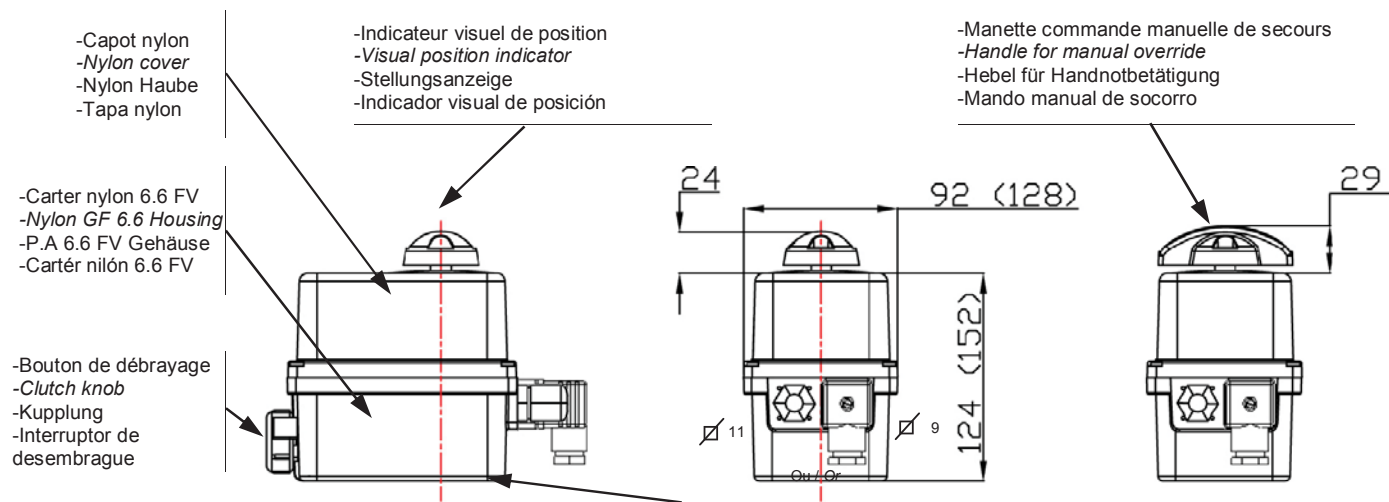


Vanne 3 voies de type T

3 ways T type valve

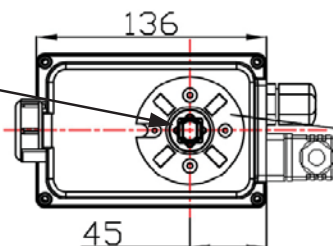
3 Wege Ventil Typ „T“

Válvulas de 3 vías de tipo T



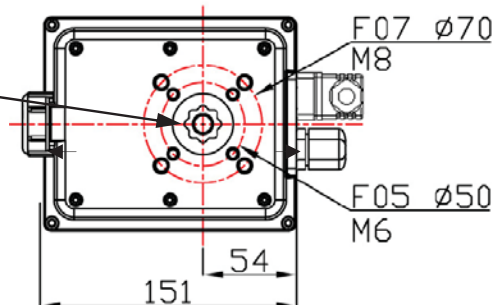
ER10/20

-Etoile / Star
-Stern / Estrella 14



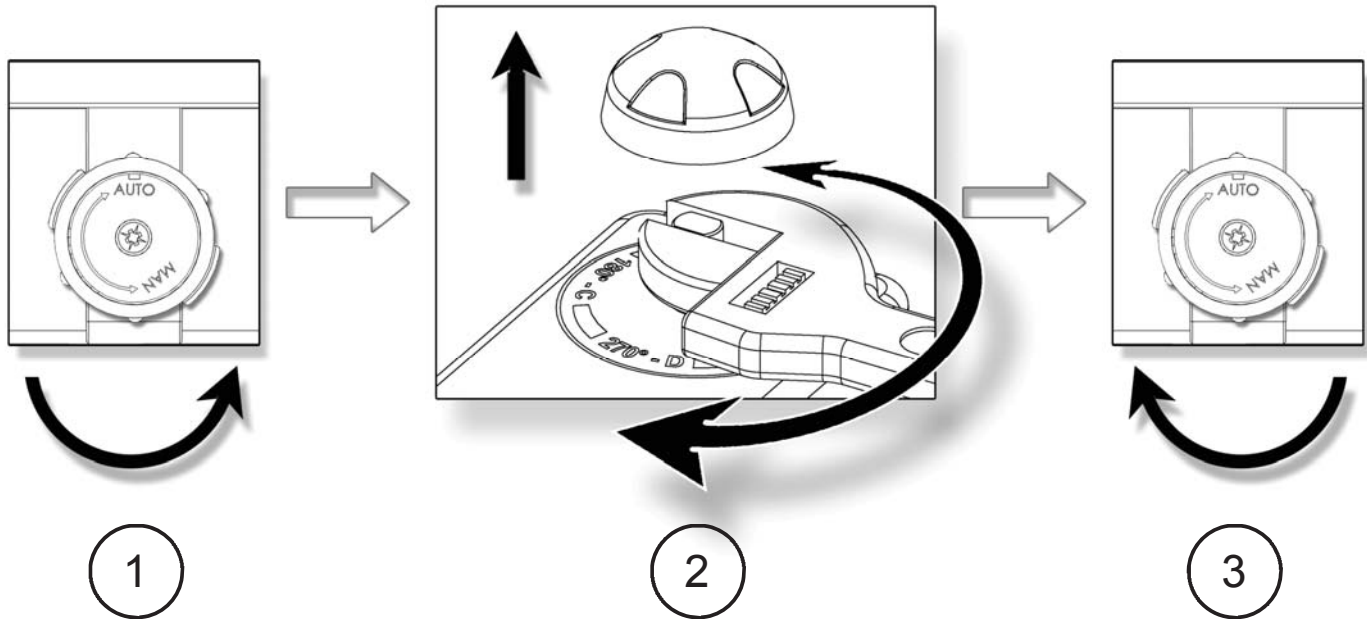
ER35/60/100

-Etoile 22
-Star 22
-Stern 22
-Estrella 22



Carré / Etoile	Profondeur
Square / Star drive nut	Depth
Vierkant / Stern	Tiefe
Cuadrado / Estrella	Profundidad
14	16
17	19
22	24

Fixation ISO F	Diamètre	Taraudé M	Profondeur	Nombre de vis
ISO F flange	Diameter	M threaded	Depth	Screws quantity
ISO F Anschluss	Diameter	M Gewinde	Tiefe	Anzahl der Schrauben
Fijación ISO F	Diámetro	Aterrajado M	Profundidad	Número de tornillos
F03	36	M5	14.2	4
F04	42	M5	14.2	4
F05	50	M6	14.2 / 16.4	4
F07	70	M8	16.4	4



L'actionneur fonctionne en priorité électrique. S'assurer que l'alimentation est coupée avant de le manœuvrer manuellement.

FR

1. Tourner le bouton de débrayage vers la position MAN (sens antihoraire) et le maintenir dans cette position.
2. Tourner l'axe sortant de l'actionneur à l'aide d'une clé à molette.
3. Pour revenir en position automatique, relâcher le bouton de débrayage (rappel par ressort).



The priority functioning mode of this actuator is electric. Be sure that the power supply is switched off before using the manual override.

GB

1. Turn the knob to position MAN (counter-clockwise) and hold it in position.
2. Turn the outgoing drive shaft of the actuator with the help of an adjusting spanner.
3. In order to re-engage the reduction, release the knob (spring return).



Die Priorität der Funktion des Antriebs ist Automatikbetrieb. Bitte prüfen, dass die Stromversorgung abgeschaltet ist bevor der Antrieb von Hand betätigt wird.

D

1. Stellen Sie den Schalter auf MAN (gegen den Uhrzeigersinn) um und halten Sie ihn in dieser Position.
2. Drehen Sie die Achse des Stellantriebes mit Hilfe eines Rollgabelschlüssels.
3. Um den Kraftschluss wiederherzustellen, lassen Sie den Kupplungsschalter los (federrückstellend).



El actuador funciona en prioridad eléctrica. Asegurarse que la alimentación es cortada antes de maniobrarlo manualmente.

ES

1. Girar el interruptor de desembrague hacia la posición MAN y mantenerlo en esta posición.
2. Girar el eje saliente del actuador con la ayuda de una llave inglesa.
3. Para reenganchar la reducción, relajar el interruptor de desembrague (retorno por muelles)

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Symboles utilisés :



Danger : risque de choc électrique



Terre de protection



Tension continue



Tension alternative

- Le branchement à une prise de Terre est obligatoire au-delà de 42V suivant la norme en vigueur.
- L'actionneur étant branché en permanence, il doit être raccordé à un dispositif de sectionnement (interrupteur, disjoncteur), assurant la coupure d'alimentation de l'appareil.
- La température du bornier peut atteindre 90°C
- Pour une utilisation avec de grandes longueurs de câbles, le courant induit généré par les câbles ne doit pas dépasser 1mA
- Afin d'optimiser la sécurité des installations, le câblage du report défaut (D1 et D2) est fortement conseillé.

Used symbols :



Danger : risk of electric shock



Earth protection



Direct voltage



Alternating voltage

- As stipulated in the applicable regulation, the connection to earth contact is compulsory for devices with working voltages exceeding 42 V.
- The actuator is always powered, so it must be connected to a disconnection system (switch, circuit breaker) to ensure the actuator power cut.
- The terminal temperature can reach 90°C
- For a use with a long power supply wiring, the induction current generated by the wires musn't be higher than 1mA
- To optimize the installation security, please connect the failure feedback signal (D1 and D2).

Verwendete Symbole :



Gefahr : Gefahr eines elektrischen Schlages



Schutzerdung



Gleichspannung



Wechselspannung

- Die Erdung ist nach der geltenden Norm bei über 42V vorgeschrieben.
- Der Antrieb ist dauerhaft unter Spannung, daher muß beim Anschluß ein Abschaltsystem (Leistungsschalter) vorgesehen werden um die Unterbrechung der Stromzufuhr zu gewährleisten.
- Die Terminal-Temperatur kann bis zu 90°C erreichen.
- Bei Verwendung einer langen Zuleitung für die Spannungsversorgung darf die Induktionsspannung der Leitung nicht größer als 1mA sein.
- Um die Sicherheit der Anlagen zu optimieren empfehlen wir die Verkablung der Fehlermeldung (D1/D2 Stecker)

Símbolos utilizados:



Peligro: riesgo de choque eléctrico



Tierra de protección



Tensión continua



Tensión alternativa

- El enchufe a una toma de tierra es obligatorio más allá de 42V según la norma corriente.
- El actuador esta siempre conectado, debe ser empalmado a un dispositivo de seccionamiento (interruptor, disyuntor), asegurando la cortadura de alimentación del aparato.
- La temperatura del Terminal de conexión puede alcanzar 90°C
- Para una utilización con los grandes largo de cables, la corriente induce engendrado por los cables no debe adelantar 1mA
- Para optimizar la seguridad de las instalaciones, el cableado del señal de retorno de la información de defecto (D1 y D2) es aconsejado

**RESPECTER LES CONSIGNES DE SECURITE**

Nos presse-étoupe acceptent un câble de diamètre compris entre 7mm et 12mm.

- Retirer l'indicateur visuel, dévisser les 4 vis et retirer le capot.

CABLAGE DE L'ALIMENTATION ET DE LA COMMANDE

- Vérifier sur l'actionneur que la tension indiquée sur l'étiquette correspond à la tension du réseau.
- Connecter les fils sur le connecteur suivant le mode de pilotage souhaité. (Voir schémas p.13 ou p.22 pour les modèles POSI)
- Pour garantir le bon fonctionnement de la résistance anti-condensation, l'actionneur doit être alimenté en permanence

CABLAGE DE LA RECOPIE (Sauf POSI : p.21)

Nos actionneurs sont par défaut équipés de 2 contacts fins de course auxiliaires secs, soit normalement ouverts, soit normalement fermés (voir schéma électrique DSBL0436). Par défaut, la came blanche est utilisée pour détecter l'ouverture (FC1) et la came noire pour détecter la fermeture (FC2).

Les fins de courses auxiliaires doivent être connectés avec des câbles rigides. Si la tension appliquée est supérieure à 42V, l'utilisateur doit prévoir un fusible dans la ligne d'alimentation.

- Dévisser le presse-étoupe droit et passer le câble.
- Enlever 25mm de gaine et dénuder chaque fil de 8mm.
- Connecter les fils sur le bornier suivant le schéma p.13 (ou p.22 pour les modèles POSI) .
- Revisser le presse-étoupe (s'assurer du bon remontage de celui-ci afin de garantir une bonne étanchéité).

REGLAGE DES CONTACTS FINS DE COURSE

L'actionneur est pré-réglé en usine. Ne pas toucher les 2 comes inférieures sous peine de perturber le fonctionnement de l'actionneur voire d'endommager ce dernier.

- Pour ajuster la position des contacts auxiliaires, faire pivoter les 2 comes supérieures en utilisant la clé appropriée.
- Remonter le capot, visser les 4 vis et monter l'indicateur visuel.

**RESPECT SAFETY INSTRUCTIONS**

Our cable glands are designed for cables with a diameter between 7mm and 12mm.

- Remove the position indicator, unscrew the four screws and take off the cover.

SUPPLY AND CONTROL WIRING

- Ensure that the voltage indicated on the actuator ID label corresponds to the voltage supply.
- Connect the wires to the connector in accordance with the required control mode. (see diagram p.13 or p.22 for POSI models)
- To ensure the correct functioning of the anti condensation heater, the actuator must be always supplied

WIRING OF THE FEEDBACK SIGNAL (Except POSI: p.21)

Our actuators are equipped with two simple limit switch contacts normally set either in open position, either in closed position (see wiring diagram DSBA0436). As per factory setting, the white cam is used to detect the open position (FC1) and the black cam is used to detect the closed position (FC2).

The auxiliary limit switches must be connect with rigid wires. If the applied voltage is higher than 42V, the user must foresee a fuse in the power supply line.

- Unscrew the right cable gland and insert the cable.
- Remove 25mm of the cable sheath and strip each wire by 8mm.
- Connect the wires to the terminal strip in accordance with the diagram 13 (or p.22 for POSI models).
- Tighten the cable gland (Ensure that it's well mounted to guaranty the proofness).

SETTING OF END LIMIT SWITCHES

The actuator is pre-set in our factory. Do not touch the two lower cams in order to avoid any malfunctioning or even damage to the actuator.

- To adjust the position of the auxiliary contacts, make rotate the two superior cams by using the appropriate wrench.
- Re-mount the cover, fasten the four screws and attach the position indicator.



BEACHTEN SIE UNBEDINGT DIE SICHERHEIT ANWEISUNGEN

Unsere Kabelverschraubungen sind zulässig für Kabel mit einem Durchmesser zwischen 7mm und 12mm.

- Den Stellanzeiger abziehen, die vier Schrauben lösen und die Haube abnehmen.

VERKABELUNG DER STROMZUFUHR UND DER STEUERUNG

- Überprüfen Sie am Stellantrieb, daß die angegebene Spannung auf dem Typenschild der Spannung des Netzes entspricht.
- Schließen Sie die Drähte an der Verbindung an, je nach gewünschter Steuerungsart. (bitte siehe Schaltplan S.13 oder 23 für POSI)
- Die richtige Funktion der Heizwiderstände zu gewährleisten, muss der Antrieb immer mit Strom versorgt sein

VERKABELUNG DER RÜCKMELDUNG (außer den Modellen POSI: S.21)

Unsere Stellantriebe sind serienmäßig mit 2 einfachen Endschalterkontakten versehen, welche normalerweise geöffnet sind (NO). Gemäß Voreinstellung dient die weiße Nocke dazu, die Öffnung zu erfassen (FC1) und die schwarze Nocke, um das Schliessen zu erfassen (FC2).

- Die Klemmen "Kunde" müssen mit biegesteif Anschlusskabel verkabelt werden. Sollte die Spannung 42v überschritten, so muss vom Anwender eine Sicherung in der Stromzufuhr vorgesehen werden.

- Lösen Sie die Kabelverschraubung und führen Sie das Kabel durch.
- Entfernen Sie 25mm der Ummantelung und legen Sie jeden Draht auf 8mm frei.
- Schließen Sie die Drähte gemäß dem nebenstehenden Schaltplan an der Klemmleiste an. (siehe Schaltplan S.13 oder S.23 für POSI)
- Die Kabelverschraubung wieder festziehen.

EINSTELLUNG DER ENDSCHALTERKONTAKTE

Der Stellantrieb wird im Werk voreingestellt. Berühren Sie die beiden unteren Nocken nicht, da sonst die Funktion des Stellantriebes gestört oder letzterer sogar beschädigt werden kann.

- Um die Position der Hilfskontakte einzustellen, drehen Sie die beiden oberen Nocken unter Zuhilfenahme eines geeigneten Schlüssels.
- Die Haube wieder anbringen, die vier Schrauben anziehen und den Stellanzeiger aufstecken.



RESPETAR LAS CONSIGNAS DE SEGURIDAD

Nuestros prensas a estopa aceptan un cable de diámetro entre 7mm y 12mm.

- Quitar el indicador visual, destornillar los 4 tornillos y quitar la tapa.

CABLEADO DE LA ALIMENTACIÓN

- Verificar sobre el actuador que el voltaje indicado sobre la etiqueta corresponde al voltaje de la red.
- Conectar los cables sobre el conector siguiente el modo de pilotaje deseado. (ver esquema p.13 o p.23 para los actuadores POSI)
- Para un buen funcionamiento de la resistencia anti-condensación, el actuador debe ser alimentado en permanencia

CABLEADO DE LA RECOPIA (salvo los modelos POSI : P.21)

Nuestros actuadores son equipados por defecto de 2 contactos de finales de carrera auxiliares secos normalmente abiertos o normalmente cerrados (Ver el esquema eléctrico DSBL0436). Por defecto, la leva blanca es utilizada para detectar la apertura (FC1) y la leva negra para detectar el cierre (FC2).

Los finales de carrera deben ser conectados con cables rígidos. Si la tensión aplicada es superiora a 42V, el usuario debe prever un fusible en la alimentación.

- Destornillar la prensa a estopa de derecho y pasar el cable .
- Quitar 25mm de tubo y desnudar cada cable de 8mm .
- Conectar los cables sobre el terminal según el esquema p.13 (o p.23 para los actuadores POSI)..
- Reatornillar la prensa-estopa correctamente para garantizar una buena hermeticidad

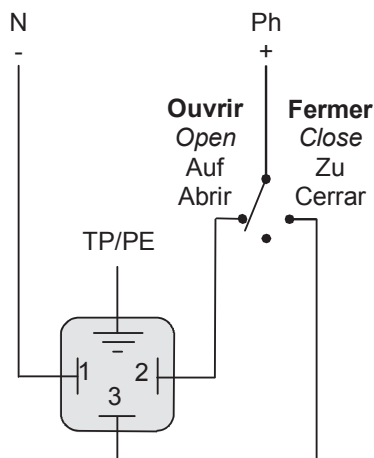
REGLAJE DE LOS CONTACTOS DE FINALES DE CARRERA

El actuador es preajustado en fábrica. No tocar las 2 levas inferiores so pena de perturbar el funcionamiento del actuador incluso de dañarlo .

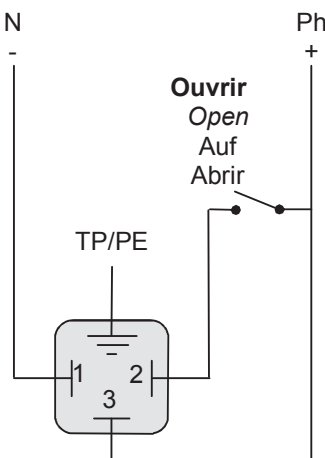
- Para ajustar la posición de los contactos auxiliares, hacer girar las 2 levas superiores utilizando la llave apropiada.
- Volver a montar la tapa, atornillar los 4 tornillos y montar el indicador visual .

CABLAGE CLIENT SUGGERE / SUGGESTED CUSTOMER WIRING
EMPFOHLENE VERDRAHTUNG / CABLEADO SUGERIDO CLIENTE

Mode 3 points modulants
3-points modulating mode
3-Punkt-Modus
Modo 3 puntos modulantes

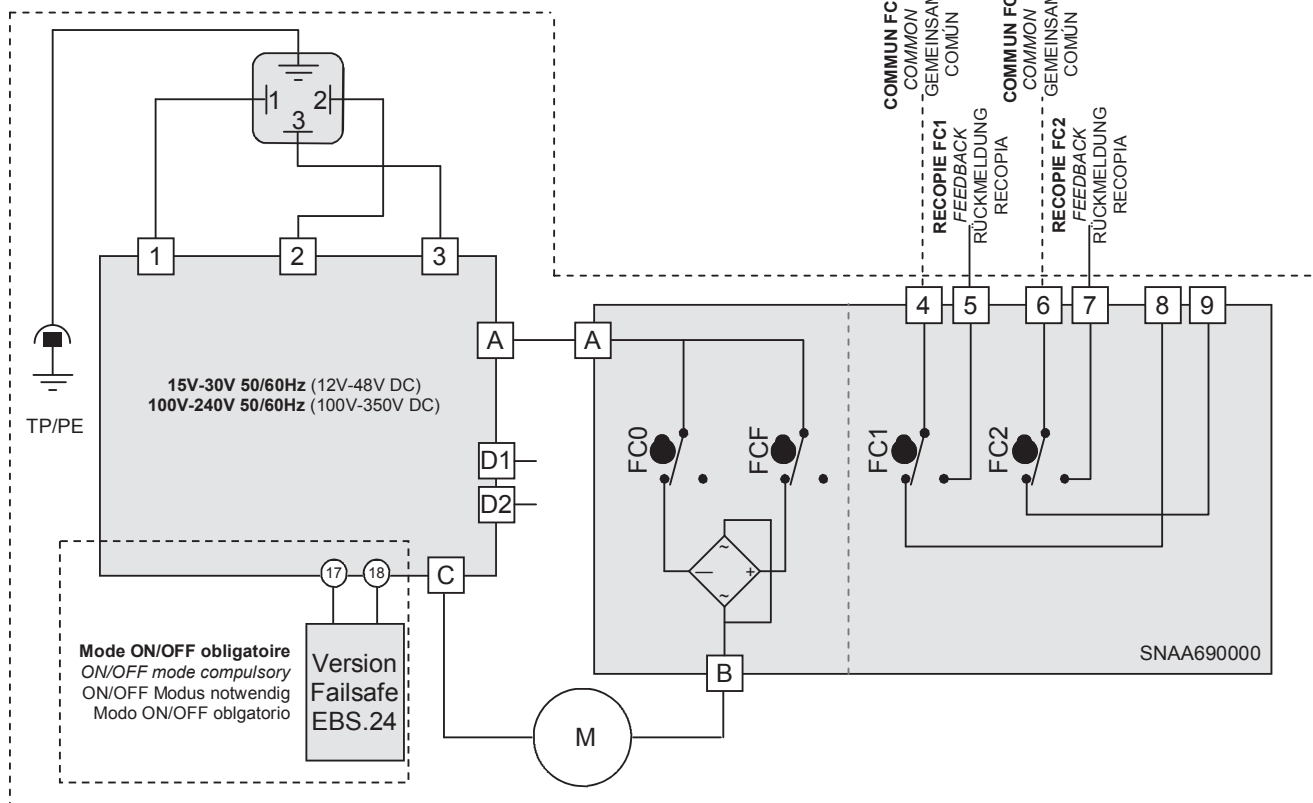


Mode Tout ou rien (ON/OFF)
On-Off mode
Auf-Zu Modus
Modo Todo o nada (ON-OFF),



REP	DESIGNATION / BESCHREIBUNG DESIGNACIÓN
FC0	Fin de course ouverture Open limit switch Endschalter AUF Final de carrera apertura
FCF	Fin de course fermeture Close limit switch Endschalter ZU Final de carrera cierre
FC1	Fin de course auxiliaire 1 Auxiliary limit switch 1 Zusätzlicher Endschalter 1 Final de carrera auxiliar 1
FC2	Fin de course auxiliaire 2 Auxiliary limit switch 2 Zusätzlicher Endschalter 2 Final de carrera auxiliar 2
D1/D2	Bornier report défaut (24V DC / 3A max) Failure report Terminal strip (24V DC / 3A max) Fehlermeldung Klemmleiste (24V DC / 3A max) Terminal retorno de defecto (24V DC / 3A max)

RECOPIE / FEEDBACK
RÜCKMELDUNG



- 1 — COM
- 2 — OPEN : FCO
- 3 — CLOSE : FCF

ALIMENTATION
POWER
SUPPLY
SPANNUNGSVER-
SORGUNG
ALIMENTACIÓN

- 4 — COM
- 5 — OPEN(NO) : FC1
- 6 — COM
- 7 — CLOSE(NO) : FC2
- 8 — OPEN(NC) : FC1
- 9 — CLOSE(NC) : FC2

FINS DE COURSE
LIMIT SWITCH
OUTPUT
RÜCKMELDUNG
RECOPIA

La température du bornier peut atteindre 90°C
The terminal temperature can reach 90°C
Die Terminal-Temperatur kann bis zu 90°C erreichen.
La temperatura del Terminal de conexión puede alcanzar 90°C

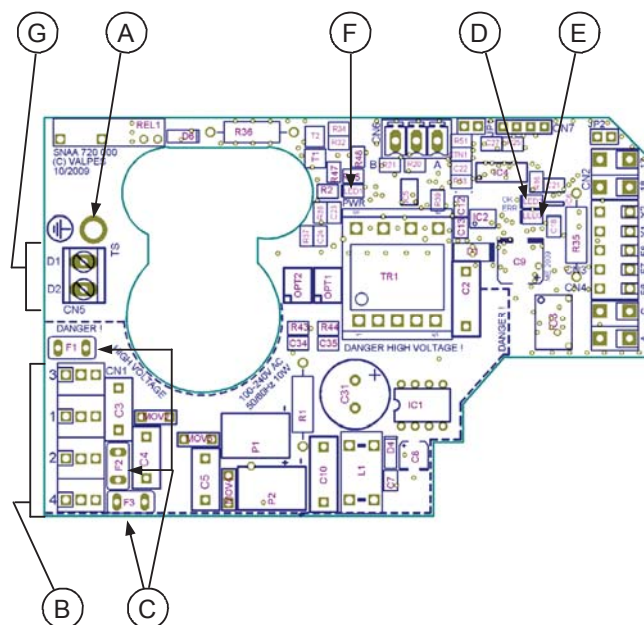
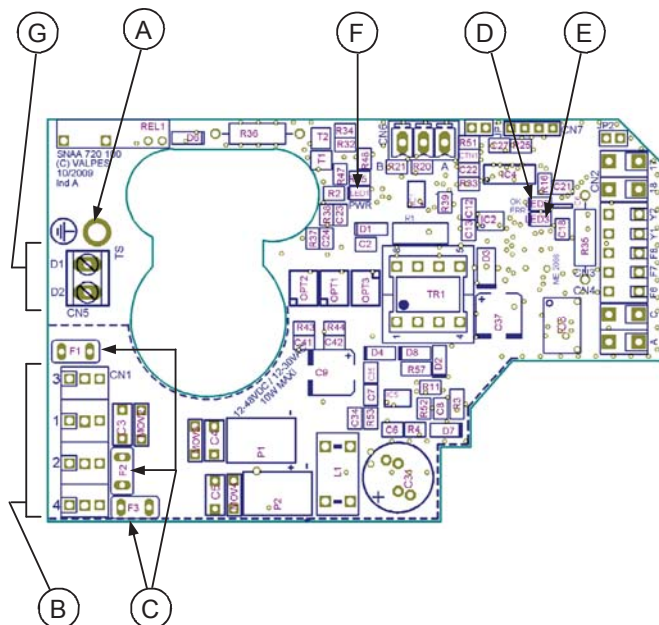


DSBL0436

Cartes d'alimentation et commande pour ER 10-20-35 / Pilot and power supply cards for ER 10-20-35
Steuerung und Stromversorgung Karten für ER 10-20-35 / Tarjetas de alimentación y mando para ER 10-20-35

SNA720100
15V-30V 50/60Hz (12V-48V DC)

SNA720000
100V-240V 50/60Hz (100V-350V DC)



Rep.	Désignation	Designation	Bezeichnung	Designación
A	Vis de terre	Earth screw	Erde Schraube	Tornillo de tierra
B	Bornier alimentation et commande	Pilot and power supply terminal strip	Steuerung und Stromversorgung Verbindung	Terminal de alimentación y mando
C*	Fusibles protection carte	Card protection fuses	Karte Sicherung	Fusibles de protección de la tarjeta
D	LED 2 : microprocesseur ok	LED 2 : microprocessor ok	LED 2 : Mikroprozessor ok	Diodo 2 : microprocesador ok
E**	LED 3 : défaut détecté	LED 3 : detected failure	LED 3 : Aufgespürter Fehler	Diodo 3 : Defecto detectado
F	LED 1 : présence tension	LED 1 : power presence	LED 1 : Spannungsanwesenheit	Diodo 1 : Presencia de tensión
G	Bornier report défaut (24V DC - 3A max)	Failure report Terminal strip (24V DC - 3A max)	Fehlermeldung Klemmleiste (24V DC - 3A max)	Terminal retorno de defecto (24V DC - 3A max)

* **Fusibles pour carte multi-tensions / Fuses for multivolt card / Sicherung für Multispannung Karte :**
- Carte / Card / Karte **SNA720100** : 2A / T 250V (Multicomp MST 2A 250V)
- Carte / Card / Karte **SNA720000** : 500mA / T 250V (Multicomp MST500MA 250V)

** **Défauts possibles : limitation de courant, limitation thermique ou erreur programme**
=> vérifier que le couple de la vanne n'est pas supérieur au couple maximum fourni par l'actionneur
=> vérifier que l'actionneur ne dépasse pas la durée sous tension donnée (surchauffe possible)
Pour redémarrer l'actionneur, inverser le sens de marche ou l'éteindre et le remettre sous tension.

Possible defects : limitation of current, thermic limitation or program error
=> check that the valve torque is not superior to the maximum torque stand by the actuator
=> check that the actuator do not exceed the duty cycle indicated (possible overheat)
To re-start the actuator, reverse the sense of rotation or switch the power off and on.

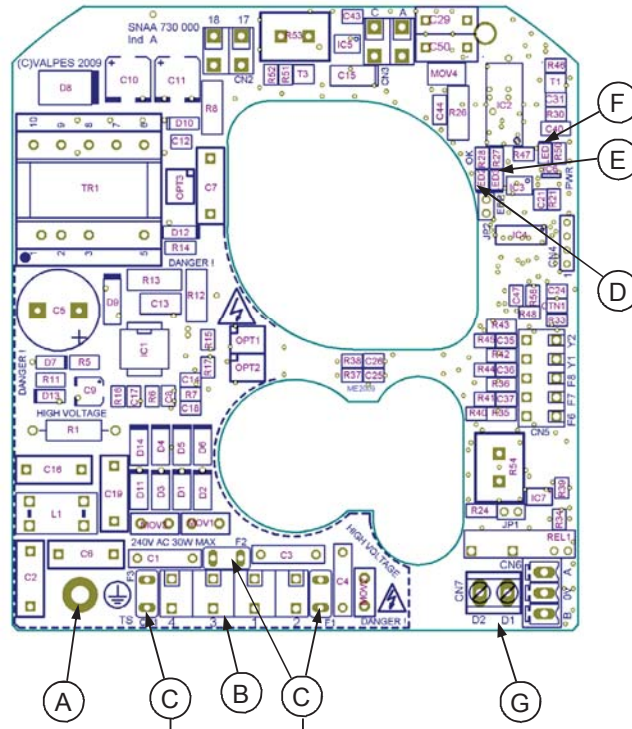
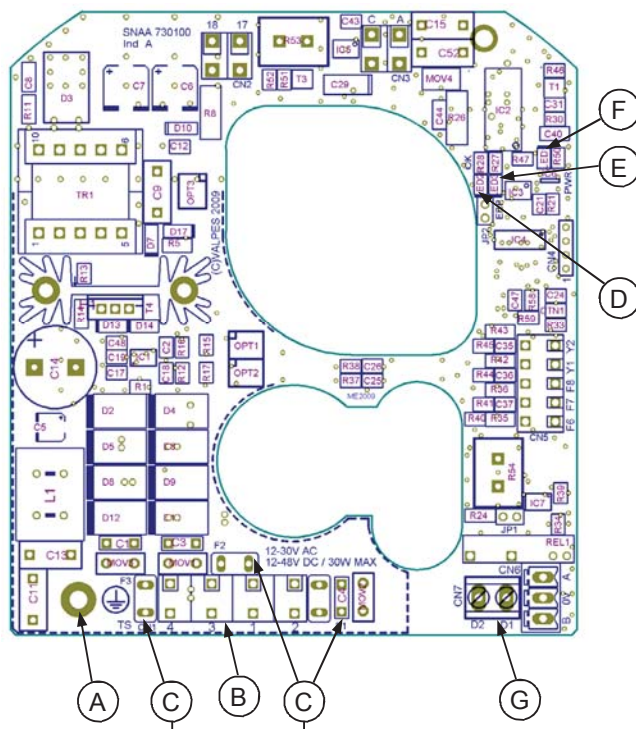
Mögliche Fehler : Strombegrenzung, thermische Begrenzung oder Programmfehler
=> Überprüfen sie das Drehmoment von dem Ventil
=> Überprüfen sie das die Einschaltdauer nicht grober als spezifiziert in die technischen Daten von den Antrieb ist
Um die Antrieb neue zu starten, muss man den Drehrichtung auswechseln oder die Spannung Auf/Zu Umschalten.

Defectos posibles : limitación de corriente, limitación térmica o error del programa
=> comprobar que el par de la valvula no es superior al par máxima soportado por el actuador
=> comprobar que el actuador no adelanta el tiempo bajo tensión dado (recalentamiento posible)
Para arrancar de nuevo el actuador, invertir la dirección del funcionamiento o apagarlo y ponerlo bajo tensión.

Cartes d'alimentation et commande pour ER 35-60-100 / Pilot and power supply cards for ER 35-60-100
Steuerung und Stromversorgung Karten für ER 35-60-100 / Tarjetas de alimentación y mando para ER 35-60-100

SNA730100
15V-30V 50/60Hz (12V-48V DC)

SNA730000
100V-240V 50/60Hz (100V-350V DC)



Rep.	Désignation	Designation	Bezeichnung	Designación
A	Vis de terre	Earth screw	Erde Schraube	Tornillo de tierra
B	Bornier alimentation et commande	Pilot and power supply terminal strip	Steuerung und Stromversorgung Verbindung	Terminal de alimentación y mando
C*	Fusibles protection carte	Card protection fuses	Karte Sicherung	Fusibles de protección de la tarjeta
D	LED 2 : microprocesseur ok	LED 2 : microprocessor ok	LED 2 : Mikroprozessor ok	Diodo 2 : microprocesador ok
E**	LED 3 : défaut détecté	LED 3 : detected failure	LED 3 : Aufgespürter Fehler	Diodo 3 : Defecto detectado
F	LED 1 : présence tension	LED 1 : power presence	LED 1 : Spannungsanwesenheit	Diodo 1 : Presencia de tensión
G	Bornier report défaut (24V DC - 3A max)	Failure report Terminal strip (24V DC - 3A max)	Fehlermeldung Klemmleiste (24V DC - 3A max)	Terminal retorno de defecto (24V DC - 3A max)

* Fusibles pour carte multi-tensions / Fuses for multivolt card / Sicherung für Multispannung Karte :
- Carte / Card / Karte SNA730100 : 5A / T 125V (Littelfuse 39615000000)
- Carte / Card / Karte SNA730000 : 3,15A / T 250V (Multicomp MST 3,15A 250V)

** Défaits possibles : limitation de courant, limitation thermique ou erreur programme
=> vérifier que le couple de la vanne n'est pas supérieur au couple maximum fourni par l'actionneur
=> vérifier que l'actionneur ne dépasse pas la durée sous tension donnée (surchauffe possible)
Pour redémarrer l'actionneur, inverser le sens de marche ou l'éteindre et le remettre sous tension.

Possible defects : limitation of current, thermic limitation or program error
=> check that the valve torque is not superior to the maximum torque stand by the actuator
=> check that the actuator do not exceed the duty cycle indicated (possible overhear)
To re-start the actuator, reverse the sense of rotation or switch the power off and on.

Mögliche Fehler : Strombegrenzung, thermische Begrenzung oder Programmfehler
=> Überprüfen sie das Drehmoment von dem Ventil
=> Überprüfen sie das die Einschaltdauer nicht grober als spezifiziert in die technischen Daten von den Antrieb ist
Um die Antrieb neue zu starten, muss man den Drehrichtung auswechseln oder die Spannung Auf/Zu Umschalten.

Defectos posibles : limitación de corriente, limitación térmica o error del programa
=> comprobar que el par de la valvula no es superior al par máxima soportado por el actuador
=> comprobar que el actuador no adelanta el tiempo bajo tensión dado (recalentamiento posible)
Para arrancar de nuevo el actuador, invertir la dirección del funcionamiento o apagarlo y ponerlo bajo tensión.

FAILSAFE - Description et caractéristiques

FAILSAFE - Description and specifications.....	15	15
FAILSAFE - Beschreibung und Eigenschaften.....	15	
FAILSAFE - Descripción y características	15	

FAILSAFE - Schéma électrique

FAILSAFE - Electric wiring	16	16
FAILSAFE - Schaltplan.....	16	
FAILSAFE - Esquema eléctrico	16	

Actionneurs avec système de sécurité intégré (mode Tout ou Rien obligatoire)

Actuator with failsafe integrated security system (ON/OFF mode compulsory)

Stellantriebe mit Sicherheitsblock (AUF/ZU Modus notwendig)

Actuadores con sistema de seguridad (Modo ON/OFF obligatorio)

Le modèle failsafe intègre un bloc batterie de secours piloté par une carte électronique. Sa fonction est de prendre le relais en cas de coupure d'alimentation aux bornes 1, 2 et 3 de l'actionneur. Le modèle failsafe peut être configuré en normalement ouvert (NO) ou normalement Fermé (NF) selon l'application client.

La carte pilotant la batterie gère le cycle de charge et vérifie l'état de la batterie. Si un défaut est détecté au niveau de la batterie, un contact sec entre les bornes 65 et 66 s'ouvre. Si ce contact est relayé par le client il a ainsi la possibilité de détecter un défaut sans ouvrir l'actionneur et de prévoir le remplacement de la batterie.

Le modèle failsafe fonctionne en câblage ON/OFF.

Un autre schéma de câblage est possible en utilisant les bornes 1, 2, 3 et 65, 66, l'avantage de ce câblage est que le pilotage moteur n'est autorisé que lorsque le contact entre 65 et 66 est fermé et donc le bloc batterie en état de marche.

Failsafe option integrate battery pack monitored by electronic board in the actuator. Its function is to relay in case of power supply failure on terminal PIN 1,2 and 3 of the actuator. The fail safe option could be set on different position like normally open (NO) or normally close (NC) depends on customer application.

The electronic board monitors the battery pack and check the status of battery (cycle load and failure)

If a battery failure is detected, a contact on PIN 65 and 66 switch off. If customer use this contact he could be aware that there is a failure on battery in the actuator without remove cover and plan the replacement.

Fail safe option required ON/OFF mode.

An another wiring diagram is also available using terminal PIN 1, 2, 3 and 65, 66. The advantage of it is actuator could not ne derive if failure battery pack is detected

FAILSAFE-Modelle beinhalten einen Batteriesatz, der von der elektronischen Karte im Antrieb gesteuert wird. Seine Aufgabe ist, einen Spannungsausfall an Klemme 1,2 und 3 zu überbrücken. Die FAILSAFE-Position kann zwischen ÖFFNER (NC) oder SCHLIESSER (NO) abhängig vom Verwendungszweck frei gewählt werden.

Die elektronische Karte prüft stets den Batteriesatz (Ladezustand bzw. Ausfall). Wenn ein Batterieausfall erkannt wird, kann dieser über einen an Klemme 65 und 66 angelegten Schaltkreis signalisiert werden. Somit kann der Anwender den Zustand der Batterie überwachen, ohne den Antriebsdeckel entfernen zu müssen.

Die FAILSAFE-Option ist sowohl im AUF/ZU-Modus als auch im 3-Punkt-Modulier-Modus verwendbar.

Durch Spannungsversorgung an Klemme 1, 2, 3 über Klemme 65 und 66 kann sichergestellt werden, daß der Antrieb bei schlechtem Batteriezustand nicht mehr die Sicherheitsposition verlässt.

El modelo failsafe integra un bloque de baterías de seguridad, pilotado por una tarjeta electrónica. Su función es de tomar el relevo en caso de apagón a los conectadores 1, 2 y 3 del actuador. El modelo failsafe puede ser configurado en normalmente abierto (NO) o normalmente cerrado (NF), según la utilización del cliente.

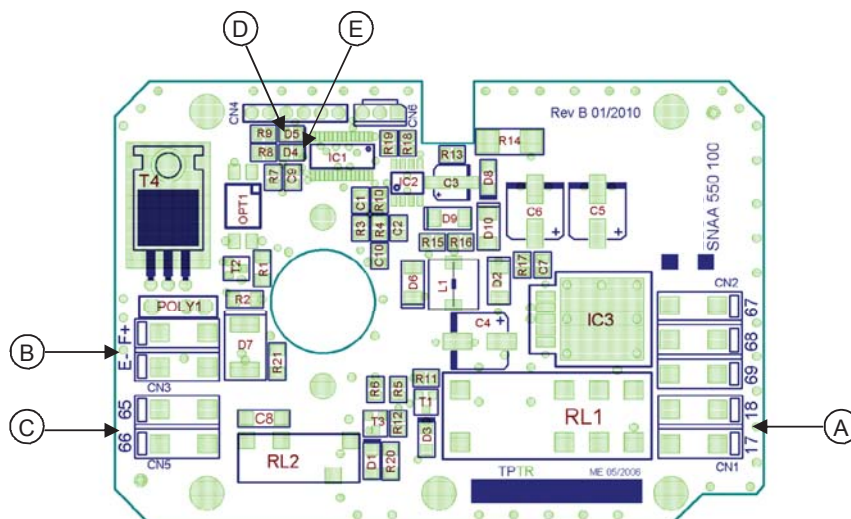
La tarjeta comprueba el ciclo de carga y el estado de la batería. Si un defecto es detectado al nivel de la batería, un contacto seco entre los conectadores 65 y 66 se abre. Si este contacto es utilizado, el cliente tiene la posibilidad de detectar un defecto sin abrir el actuador y así prever el reemplazo de la batería.

El modelo failsafe funciona con el modo ON/OFF.

Un otro tipo de cableado es posible utilizando los conectadores 1, 2, 3 y 65, 66, la ventaja de este cableado es que el pilotaje del motor es autorizado solamente cuando el contacto entre 65 y 66 es cerrado, luego, que el bloque de baterías en estado de funcionamiento.

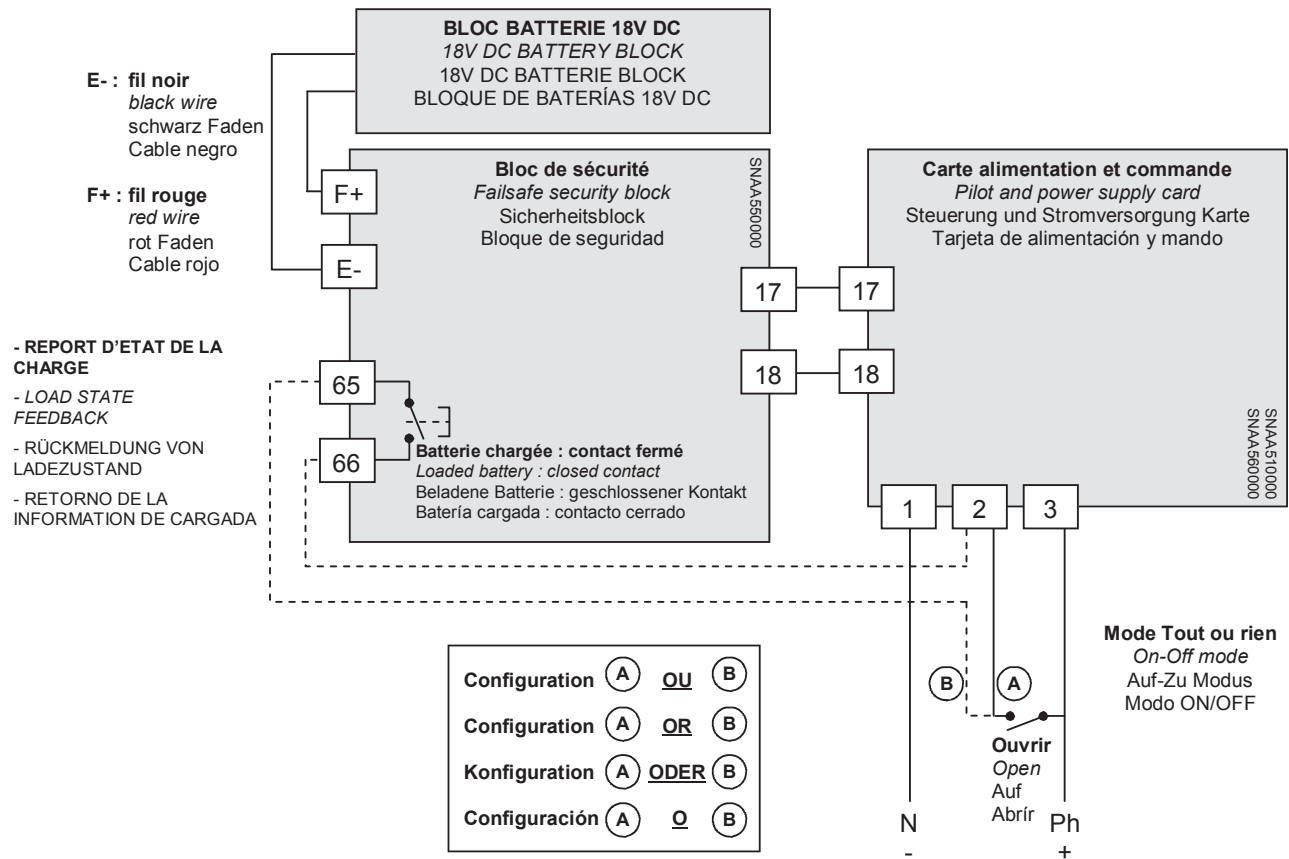
Tension / Voltage / Spannung / Voltaje	18V DC
Courant nominal / Nominal current / Nennstrom / Corriente nominal	0,8A
Courant maximal / Maximal current / Max. Strom / Corriente máximo	2,4A
Durée initiale de charge / Initial loading time / Ladezeit / Duración de carga	14h max
Relais de report d'état de la charge / Load state feedback relay Rückmelderelais für Ladezustand /	24V DC - 1A max
Température / Temperature / Temperatur / Temperatura	-10°C à/to/bis/a 40°C

CARTE ELECTRONIQUE CHARGEUR / LOADING ELECTRONIC CARD
LOADER ELECTRONISCHE KARTE / TARJETA ELÉCTRICA CARGADORA



Rep.	Désignation	Designation	Bezeichnung	Designación
A	Connecteur 18V DC	18V DC terminal strip	18V DC Verbindung	Conector 18V DC
B	Connecteur bloc batterie	Block battery terminal strip	Batterie Block Verbindung	Conector de las baterías
C	Connecteur report d'état (défaut de charge/batterie)	State feedback terminal strip (load or battery failure)	Verbindung für Rückmeldung (Ladezustand bzw. Ausfall)	Conector del retorno de information (
D*	LED verte	Green LED	Grüne LED	LED verde
E**	LED rouge	Red LED	Rote LED	LED rojo

- * **LED verte allumée : fonctionnement sur réseau / LED verte clignotante : fonctionnement sur batteries (max. 3min)**
 Green LED lighting : functioning on network / Green LED twinkling : functioning on battery (max. 3min)
 Grüne LED leuchtet auf : Betrieb auf Netz / Grüne LED blinkt auf : Betrieb auf Batterie (max. 3min)
 LED verde enciendo : funcionamiento conectado sobre el red eléctrico / LED verde parpadeo : funcionamiento con baterías (max. 3min)
- ** **LED rouge éteinte : batteries chargées / LED rouge clignotante : batteries en charge (max. 14h)**
 Red LED switched off : loaded battery / Red LED twinkling : battery loading (max. 14h)
 Rote LED leuchtet auf : beladene Batterie / Rote LED blinkt auf : Batterie beladet (max. 14h)
 LED rojo apagado : baterías cargadas / LED rojo parpadeo : baterías se cargan (max. 14h)



Fermé par défaut / Pre-set to closed / Voreinstellung geschlossen / Cerrado por defecto

Configuration A ou B :

A- Mode standard : en cas de pilotage de l'actionneur avec un automate, le report d'état de la charge peut être connecté à celui-ci pour plus de sécurité.

B- Mode de sécurité totale (en utilisant le relais de report d'état, bornes 65 et 66) : l'actionneur n'ouvrira la vanne que si le bloc de sécurité est opérationnel (charge suffisante, carte initialisée).

Configuration A or B :

A- Standard mode : when piloting the actuator with an automat (PLC), the load state feedback can be connected to it for more safety.

B- Total security mode (using the feedback relay, terminals 65 and 66) : the actuator will open only if the security block is operational (sufficient loading, initialized card).

Konfiguration A oder B :

A- Standard Modus : Im Falle der Steuerung des Antrieb mit einer Automat kann der Rückmeldung des Batteriesladung an diesen hier für Sicherheit angeschlossen sein.

B- Total Sicherheit Modus (mit benutzung des Rückmeldungsrelais, Klemmen 65 und 66) : der Antrieb wird den Hahn nur öffnen wenn das Sicherheitsblock geladen ist (gemügender Ladung, initialisierte Karte).

Configuración A o B :

A - Modo estándar : en caso de un pilotaje del actuador con un automático, el retorno de la información de carga puede ser conectado a éste para más de seguridad.

B - Moda de seguridad total (utilizando el relé de retorno de estado, conectadores 65 y 66): el actuador abrirá la válvula solamente si el bloque de seguridad es operativo (carga suficiente, tarjeta inicializada).

POSI - Carte électronique

<i>POSI - Electronic card</i>	18	18
<i>POSI - Elektronische Karte</i>	18	
<i>POSI - Tarjeta electrónica</i>	18	

POSI - Branchements électriques

<i>POSI - Electric connections</i>	19	19
<i>POSI - Elektrische Verbindung</i>	19	
<i>POSI - Conexiones eléctricas</i>	19	

POSI - Schéma électrique

<i>POSI - Electric wiring</i>	20	20
<i>POSI - Schaltplan</i>	21	
<i>POSI - Esquema eléctrico</i>	21	

POSI - Séquence de paramétrage

<i>POSI - Parameter selection sequence</i>	23	22
<i>POSI - Parametrisierungsschritte</i>	24	
<i>POSI - Secuencia de reglaje</i>	25	

Différents types de consigne (pilotage carte Bornier N°15 et N°16)

Nos cartes sont paramétrables en usine sur demande. Le signal de commande (consigne) et signal de recopie peuvent être de nature différente (courant ou tension). **Sans aucune information du client les cartes sont paramétrées en courant 4-20mA (consigne+recopie client)**

Pilotage en 0-10V et 0-20mA :

Lors d'un événement extérieur, absence de consigne (coupure accidentelle câble par ex) mais en présence de l'alimentation carte.

La convention veut que l'actionneur se retrouve en une position définie (vanne ouverte ou fermée). En standard nos actionneurs se fermeront en absence de consigne, mais d'autres états sont possibles sur demande

Pilotage en 4-20mA.

La convention veut que l'actionneur reste dans sa position lors de la coupure de la consigne (coupure accidentelle câble par ex) mais en présence de l'alimentation carte.

Lors du rétablissement de la consigne l'actionneur se repositionne automatiquement selon la valeur de la consigne

Various control types (control signal on terminals N°15 and N°16)

On request, our cards can be set in factory. The consign and the feedback signal can have different forms (current or voltage).

Without any information from the customer, the cards are set for current 4-20mA (control + feedback signal)

Control in modes 0-10V and 0-20mA

In case of outside event, absence of control signal (accidental wires cut for example) but in presence of power, the actuator will travel to defined position (open or closed valve).

In standard our actuators will close themselves in absence of control signal but there are other possibilities on request.

Control in mode 4-20mA

In case of outside event, absence of control signal (accidental wires cut for example) but in presence of power, the actuator will stay in its position.

In the both cases, when the control signal is restored, the actuator reach automatically the position corresponding to control signal value.

Verschiedene Steuersignale (über Anschlüsse 15 und 16)

Unsere Karten können nach Bedarf parametrierbar werden. Ein- und Ausgangssignal können dabei unabhängig voneinander gewählt werden (Strom- oder Spannungssignal). **Standardmäßige Voreinstellung ist 4-20mA für Ein- und Ausgangssignal.**

Ansteuerung mit 0-10V oder 0-20mA:

Bei Ausfall des Steuersignals (z.B. Kabelbruch) aber Aufrechterhaltung der Spannungsversorgung fährt der Antrieb in die voreingestellte Sicherheitsposition (Auf oder Zu). **Standardmäßige Voreinstellung ist « Schliesser ».**

Ansteuerung mit 4-20mA:

Bei Ausfall des Steuersignals (z.B. Kabelbruch) aber Aufrechterhaltung der Spannungsversorgung verharrt der Antrieb in seiner letzten Position. In beiden Fällen fährt der Antrieb automatisch in die dem Steuersignal entsprechende Position, sobald es wieder anliegt.

Diferentes tipos de mando – Bornes N°15 y N°16)

Nuestras tarjetas, a petición, pueden ser parametrizadas en fábrica. El señal de mando y el señal de recopia pueden ser de tipos diferentes, corriente o tensión. **Sin ninguna información del cliente las tarjetas son parametrizadas en el modo corriente 4-20mA (mando + recopia cliente)**

Pilotaje en 0-10V y 0-20mA :

En el caso de un acontecimiento exterior, ausencia de mando (corte accidental del cableado por ejemplo) pero en presencia de la alimentación de la tarjeta, el actuador coloca la válvula en una posición definida (válvula abierta o cerrada).

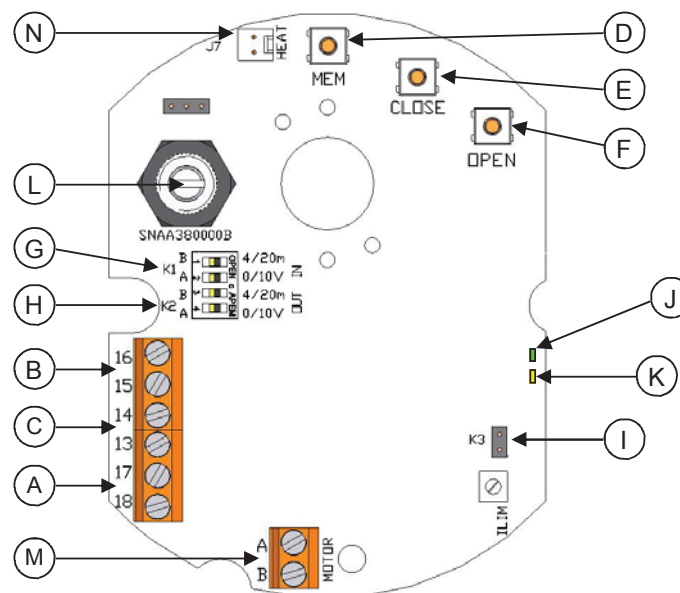
Por defecto, nuestros actuador se cerrarán en ausencia de mando pero otras posibilidades son posibles a petición.

Pilotaje en 4-20mA.

En el caso de un acontecimiento exterior, ausencia de mando (corte accidental del cableado por ejemplo) pero en presencia de la alimentación de la tarjeta, el actuador se queda en la misma posición.

Cuando se restablece el mando, el actuador se repositiona automáticamente según el valor del mando

Carte de positionnement P6 (0-20mA / 4-20mA / 0-10V)
P6 positioning card (0-20mA / 4-20mA / 0-10V)
P6 Regelkarte (0-20mA / 4-20mA / 0-10V)
Tarjeta de posicionamiento P6 (0-20mA / 4-20mA / 0-10V)



Rep.	Désignation	Designation
A	Bornier d'alimentation 24V AC/DC	24V AC/DC power supply terminal trip
B	Bornier de consigne	Instruction terminal trip
C	Bornier de recopie	Feed back terminal trip
D	Bouton de réglage MEM	Adjustment button MEM
E	Bouton de réglage CLOSE	Adjustment button CLOSE
F	Bouton de réglage OPEN	Adjustment button OPEN
G	Cavalier K1	K1 shunt
H	Cavalier K2	K2 shunt
I	Cavalier K3	K3 shunt
J	LEDs verte et rouge	Green and red LEDs
K	LED jaune : présence tension	Yellow LED : power supply indication
L	Potentiomètre	Potentiometer
M	Connexion moteur	Motor connexion
N	Connecteur résistance de réchauffage	Heating resistor connector

Rep.	Bezeichnung	Designación
A	24V AC/DC Spannungsversorgung	Terminal de alimentación 24V AC/DC
B	Anschlussklemmen des Signalgebers	Terminal de mando
C	Anschlussklemmen der Rückmeldung	Terminal de recopia
D	Einstellknopf MEM	Pulsador de reglaje MEM
E	Einstellknopf CLOSE	Pulsador de reglaje CLOSE
F	Einstellknopf OPEN	Pulsador de reglaje OPEN
G	K1 Steckbrücke	Grapa K1
H	K2 Steckbrücke	Grapa K2
I	K3 Steckbrücke	Grapa K3
J	Grüne und rote LEDs	LEDs verdes y rojos
K	Gelb LED : Stromversorgung Anzeige	LED amarillo : Presencia de tención
L	Potentiometer	Potenciómetro
M	Motor Zusammenhang	Conexión del motor
N	Heizwiderstandsverbindung	Conector de la resistencia de calefacción



ACTIONNEUR DEJA PRE-REGLE EN USINE

CABLAGE CONSIGNE ET RECOPIE DE LA CARTE P6

Afin de limiter les perturbations électromagnétiques, l'utilisation de câbles blindés est obligatoire (câbles supérieurs à 3m).

- Dévisser le presse-étoupe droit et passer le câble.
- Connecter la consigne entre les bornes 15 et 16 (annexe p.20 rep.B).
La borne 15 est la polarité négative (-) et la borne 16 la polarité positive (+).
- Connecter la recopie entre les bornes 13 et 14 (annexe p.20 rep.C).
La borne 13 est la polarité positive (+) et la borne 14 la polarité négative (-).
- Revisser le presse-étoupe (s'assurer du bon remontage de celui-ci afin de garantir une bonne étanchéité).

Montage départ usine : par défaut, consigne et recopie en 4-20mA, sens normal.

Pour reparamétrer la carte : voir page 24, « Séquence de paramétrage ».

Pour vérifier le bon fonctionnement de la carte : voir page 24, « Mode de fonctionnement normal ».



ACTUATOR PRE-SET IN FACTORY

POSITIONING CARD WIRING (OUTPUT AND INPUT SIGNAL)

In order to avoid electromagnetic perturbations, it is compulsory to use shielded cables (cables longer than 3m).

- Unscrew the right gland and pass the cable.
- Connect the input signal between terminals 15 and 16 (attached p.20 mark.B)..
Terminal 15 is the negative polarity (-) and terminal 16 is the positive polarity (+).
- Connect the output signal between terminals 13 and 14.(attached p.20 mark.B)..
Terminal 13 is the positive polarity (+) and terminal 14 is the negative polarity (-).
- Tighten the cable gland (Ensure that it's well mounted to guaranty the proofness).

The feedback must be connect with rigid wires. If the applied voltage is higher than 42V, the user must foresee a fuse in the power supply line.

Factory setting : by default, 4-20mA input and output signals with normal rotation sense.

To proceed to a new setting of the card : please see page 25, "Parameter selection sequence".

To check the proper operation of the card : please see page 25, "Normal operating mode".



STELLANTRIEB IST SCHON IM WERK VOREINGESTELLT

REGELUNGKARTE VERKABELUNG (SIGNALELMELDUNG UND RUCKMELDUNG)

Um elektromagnetische Störungen zu vermeiden, müssen abgeschirmte Kabel benutzt werden (Kabel länger als 3m).

- Lösen Sie die Kabelverschraubung und führen Sie das Kabel durch.
- Verkabeln Sie den Signalgeber zwischen den Klemmen 15 und 16.
Die Klemme 15 ist negativ gepolt (-) und die Klemme 16 positiv (+).
- Verkabeln Sie den Positionrückmelder zwischen den Klemmen 13 und 14.
Die Klemme 13 ist positiv gepolt (+) und die Klemme 14 negativ (-).
- Die Kabelverschraubung wieder befestigen.

Aufbau ab Werk : Voreingestellt, Signalgeber und Rückmeldung 4-20mA, im normal Drehrichtung.

Um die Karte wieder zu programmieren : siehe Seite 26, « Parametrisierungsschritte ».

Um die richtige Arbeitsweise zu prüfen : siehe Seite 26, « Normalbetrieb ».



ACTUADOR YA PREREGADO EN FÁBRICA

CABLEADO, MANDO Y RECOPIA DE LA TARJETA P6

Al fin de limitar las perturbación electromagnéticas, la utilización de cables blindados es obligatoria (cables de longitud más que 3m).

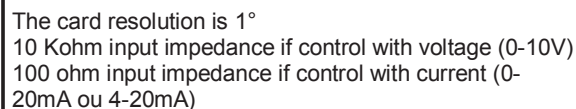
- Destornillar la prensa a estopa de derecho y pasar el cable .
- Conectar el mando entre los bornes 15 y 16. (anexo p.20 Ref. B)
El borne 15 es la polaridad negativa (-) y el borne 16 la polaridad positiva (+).
- Conectar la recopia entre los bornes 13 y 14. (anexo p.20 Ref. C).
El borne 13 es la polaridad positiva (+) y el borne 14 la polaridad negativa (-).
- Reatornillar la prensa-estopa correctamente para garantizar una buena hermeticidad

Montaje a la salida de fábrica : Por defecto, mando y recopia en 4-20mA, dirección normal.

Para ajustar de nuevo la tarjeta : ver página 27, « Secuencia de reglaje ».

Para verificar el buen funcionamiento de la tarjeta : ver página 27, « Modo de funcionamiento normal ».

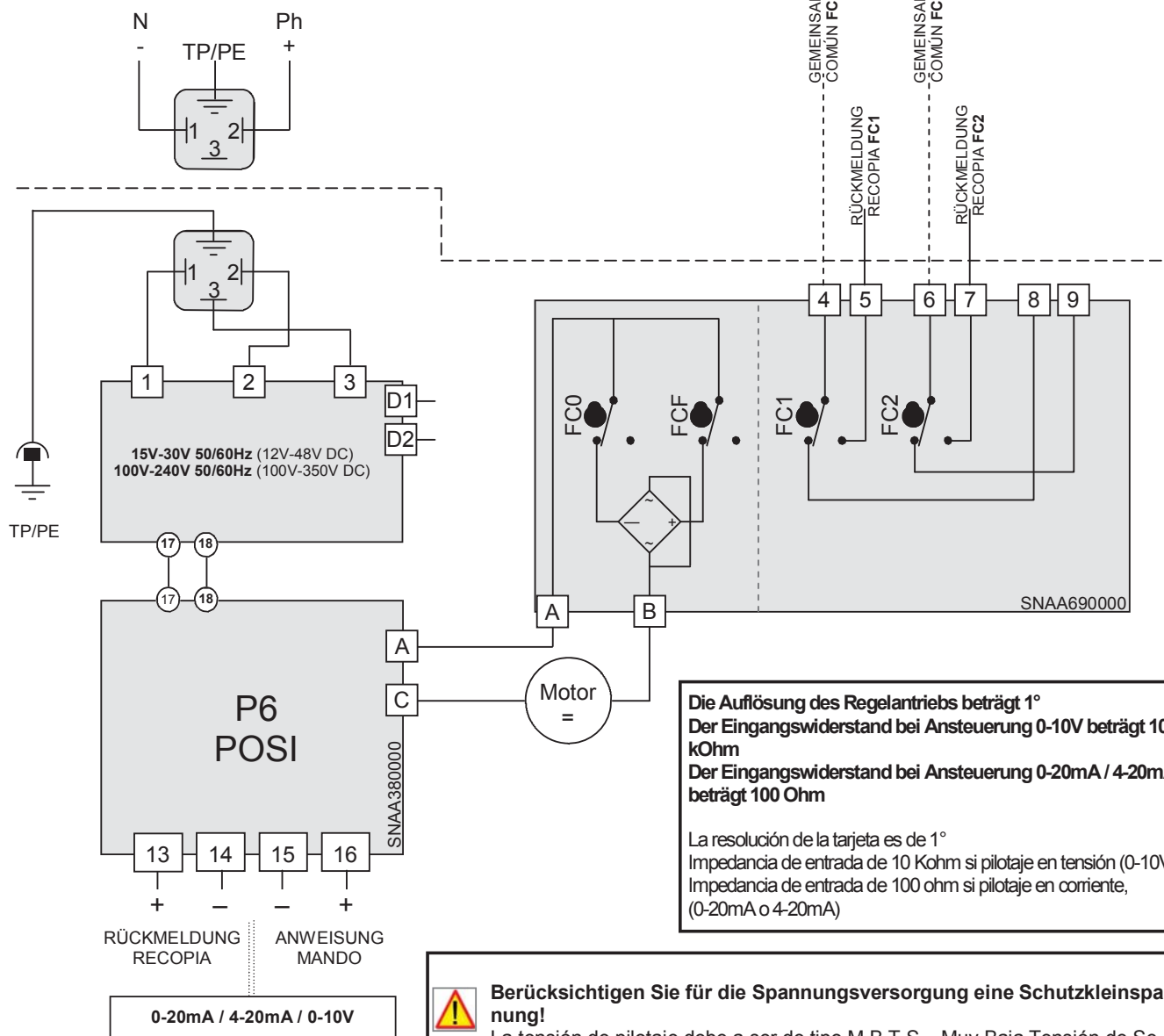
RECOPIE / FEEDBACK



 2007 AC/DC,
The used wires must be rigid (feedback voltages : 4 to 250V AC

SPANNUNGSVERSORGUNG : 3P+T DIN43650 VERBINDUNG
ALIMENTACIÓN : CONECTOR 3P+T DIN43650

RECOPIE / FEEDBACK
RÜCKMELDUNG



REP	BESCHREIBUNG DESIGNACIÓN
FC0	Endschalter AUF Final de carrera apertura
FCF	Endschalter ZU Final de carrera cierre
FC1	Zusätzlicher Endschalter 1 Final de carrera auxiliar 1
FC2	Zusätzlicher Endschalter 2 Final de carrera auxiliar 2
D1/D2	Fehlermeldung Klemmleiste (24V DC / 3A max) Terminal retorno de defecto (24V DC / 3A max)



Berücksichtigen Sie für die Spannungsversorgung eine Schutzkleinspannung!

La tensión de pilotaje debe a ser de tipo M.B.T.S. , Muy Baja Tensión de Seguridad,



Die Terminal-Temperatur kann bis zu 90°C erreichen

La temperatura del Terminal de conexión puede alcanzar 90°C



Die Klemmen "Kunde" müssen mit biegesteif Anschlusskabel verkabelt werden. Sollte die Spannung 42v überschritten, so muss vom Anwender eine Sicherung in der Stromzufuhr vorgesehen werden.

La recopia debe ser conectada con cables rígidos. Si la tensión aplicada es superiora a 42V, el usuario debe prever un fusible en la alimentación.



Bei Verwendung einer langen Zuleitung für die Spannungsversorgung darf die Induktionsspannung der Leitung nicht größer als 1mA sein.

Para una utilización con los grandes largo de cables, la corriente induce engendrado por los cables no debe adelantar 1mA



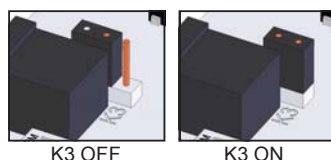
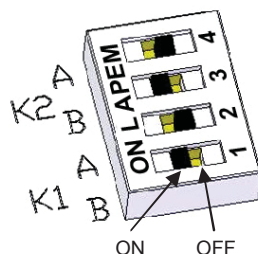
Die Anschlusskabel müssen biegesteif sein (Rückmeldespannungen 4 bis 250V AC/DC)

Los cables eléctricos utilizados deben ser rígidos (tención para el señal de retorno : 4 hasta 250V AC/DC)

SEQUENCES DE PARAMETRAGE

1 Positionnement des cavaliers K1, K2 et K3

- Positionner les cavaliers d'après le tableau suivant (avant chaque modification, mettre la carte hors tension) :



Consigne	Recopie	Cavalier K1		Cavalier K2		Cavalier K3
		A	B	A	B	
0-10V	0-10V	ON	OFF	ON	OFF	OFF
0-10V	0-20mA	ON	OFF	OFF	ON	OFF
0-10V	4-20mA	ON	OFF	OFF	ON	ON
0-20mA	0-10V	OFF	ON	ON	OFF	OFF
0-20mA	0-20mA	OFF	ON	OFF	ON	OFF
0-20mA	4-20mA	OFF	ON	OFF	ON	ON
4-20mA	0-10v	OFF	ON	ON	OFF	OFF
4-20mA	0-20mA	OFF	ON	OFF	ON	OFF
4-20mA	4-20mA	OFF	ON	OFF	ON	ON

2 Choix du sens de la vanne



2.1 Sens normal (par défaut)

- Appuyer sur **OPEN** et mettre la carte sous tension en maintenant le bouton enfoncé.
- La **LED verte s'allume**. Relâcher le bouton **OPEN**.
- Débrancher la carte.



2.2 Sens inverse

- Appuyer sur **CLOSE** et mettre la carte sous tension en maintenant le bouton enfoncé.
- La **LED rouge s'allume**. Relâcher le bouton **CLOSE**.
- Débrancher la carte.

3 Choix du type de consigne



3.1 Consigne en tension 0-10V

- Appuyer sur **MEM** et mettre la carte sous tension en maintenant le bouton enfoncé.
- La **LED rouge clignote 3 fois**. Relâcher le bouton.
- Débrancher la carte.



3.2 Consigne en courant 0-20mA

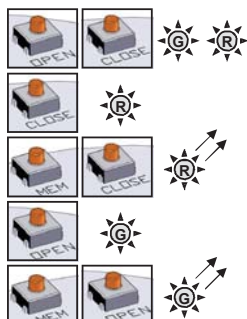
- Appuyer sur **MEM** et **OPEN** et mettre la carte sous tension en maintenant les boutons enfoncés.
- La **LED rouge clignote 3 fois**. Relâcher les boutons.
- Débrancher la carte.



3.3 Consigne en courant 4-20mA (par défaut)

- Appuyer sur **MEM** et **CLOSE** et mettre la carte sous tension en maintenant les boutons enfoncés.
- La **LED rouge clignote 3 fois**. Relâcher les boutons.
- Débrancher la carte.

4 Mode apprentissage



- Appuyer sur **OPEN** et **CLOSE** et mettre la carte sous tension en maintenant les boutons enfoncés.
- Les **2 LEDs s'allument**. Relâcher les boutons, les 2 LEDs s'éteignent. Le mode apprentissage est sélectionné.

- Appuyer sur **CLOSE** pour faire venir la vanne en position fermée. La **LED rouge s'allume**.
- Mémoriser la position fermée par **MEM + CLOSE**, la **LED rouge clignote 2 fois** pour acquitter.

- Appuyer sur **OPEN** pour faire venir la vanne en position ouverte. La **LED verte s'allume**.
- Mémoriser la position ouverte par **MEM + OPEN**, la **LED verte clignote 2 fois** pour acquitter.

- Les positions sont mémorisées, débrancher la carte.

MODE DE FONCTIONNEMENT NORMAL

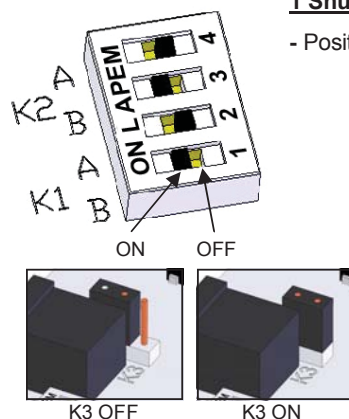
- Mettre la carte sous tension. La **LED verte clignote 3 fois**.
- Lors du fonctionnement normal, la LED verte s'allume lorsque le moteur ouvre la vanne, et la LED rouge lorsque le moteur ferme la vanne.
- Lorsque les 2 LEDs sont éteintes, le moteur n'est pas sollicité.

- En cas de couple trop important, les **2 LEDs s'allument** pour indiquer la limitation et l'actionneur s'arrête. Pour le redémarrer, il faut soit inverser le sens de marche, soit éteindre et remettre sous tension la carte.

PARAMETER SELECTION SEQUENCE

1 Shunts positioning K1, K2 and K3

- Position the shunts as follows (before modification, switch off the card) :



Input signal	Output signal	Schunt K1		Schunt K2		Schunt K3
		A	B	A	B	
0-10V	0-10V	ON	OFF	ON	OFF	OFF
0-10V	0-20mA	ON	OFF	OFF	ON	OFF
0-10V	4-20mA	ON	OFF	OFF	ON	ON
0-20mA	0-10V	OFF	ON	ON	OFF	OFF
0-20mA	0-20mA	OFF	ON	OFF	ON	OFF
0-20mA	4-20mA	OFF	ON	OFF	ON	ON
4-20mA	0-10v	OFF	ON	ON	OFF	OFF
4-20mA	0-20mA	OFF	ON	OFF	ON	OFF
4-20mA	4-20mA	OFF	ON	OFF	ON	ON

2 Selection of the flow direction of the valve

2.1 Normal flow direction (by default)

- Press the **OPEN** button and apply the operating voltage to the card while keeping this button depressed.
- The **green LED lights up**. Release the **OPEN** button.
- Disconnect the card.



2.2 Inverse flow direction

- Press the **CLOSE** button and apply the operating voltage to the card while keeping this button depressed.
- The **red LED lights up**. Release the **CLOSE** button.
- Disconnect the card.



3 Selection of the type of set value

3.1 Voltage set value 0-10V

- Press the **MEM** button and apply the operating voltage to the card while keeping this button depressed.
- The **red LED will light up 3 times**. Release this button.
- Disconnect the card.



3.2 Current set value 0-20mA

- Press the **MEM** and **OPEN** buttons and apply the operating voltage to the card while keeping these buttons depressed.
- The **red LED will light up 3 times**. Release these buttons.
- Disconnect the card.



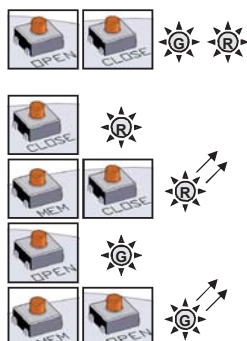
3.3 Current set value 4-20mA (by default)

- Press the **MEM** and **CLOSE** buttons and apply the operating voltage to the card while keeping these buttons depressed.
- The **red LED will light up 3 times**. Release these buttons.
- Disconnect the card.



4 Learning mode

- Press the **OPEN** and **CLOSE** buttons and apply the operating voltage to the card while keeping these buttons depressed.
- The **2 LEDs will light up**. Release these buttons and the 2 LEDs will extinguish. The card is now in the learning mode.
- Press the **CLOSE** button to put the valve in its closed position. The **red LED will light up**.
- Store this selected closed position by pushing **MEM + CLOSE**, the **red LED will light up 2 times** as a confirmation of acknowledgement.
- Press the **OPEN** button to put the valve in its open position. The **green LED will light up**.
- Store this selected open position by pushing **MEM + OPEN**, the **green LED will light up 2 times** as a confirmation of acknowledgement.
- Now, the positions selected have been stored. Disconnect the card.



NORMAL OPERATING MODE

- Apply the operating voltage to the card. The **green LED will light up 3 times**.
- Under normal operating conditions, the green LED will light up when the drive motor opens the valve, and the red LED will light up when the drive motor closes it.
- If both LEDs remain extinguished, it means that the drive motor has not been triggered.



- In the case of an over torque, the motor stops and the **2 LEDS lights** then together to indicate the action of the torque limiter. To re-start it, you must either reverse the sense of rotation, either switch the power off and on.

