SERVICE NOTICE

ASCO® solenoid valves with design change letter “G” or “H” in the catalog number (ex. 8210G) 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 and 8202G/H 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—Wattertight. The black solenoid on catalog numbers prefixed “EF” or “EV” is designed to meet Enclosure Types 3 and 3S—Raintight, and Types 4 and 4X—Wattertight. 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). See separate instructions for basic valve.

OPERATION

Series 8003G/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-resetable 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, 8601, and 8602 for strainers.

Installation & Maintenance Instructions

ASCO Valves®

©ASCO Valve, Inc.® 50 Hanover Road, Florham Park, New Jersey 07932 www.ascovalve.com
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.

<table>
<thead>
<tr>
<th>Watt Rating</th>
<th>Catalog Number Coil Prefix</th>
<th>Insulation Class of</th>
<th>Maximum Ambient Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.1 &amp; 17.1</td>
<td>None, FB, KF, KP SC, SD, SF, &amp; SP</td>
<td>F</td>
<td>125°F (51.7°C)</td>
</tr>
<tr>
<td>10.1 &amp; 17.1</td>
<td>HB, HT, KB, KH, SS, ST, SU</td>
<td>H</td>
<td>140°F (60°C)</td>
</tr>
<tr>
<td>11.6 &amp; 22.6</td>
<td>None, FB, KF, KP SC, SD, SF, &amp; SP</td>
<td>F</td>
<td>104°F (40°C)</td>
</tr>
<tr>
<td>11.6 &amp; 22.6</td>
<td>HP, HT, KB, KH, SS, ST, SU, &amp; SV</td>
<td>H</td>
<td>104°F (40°C)</td>
</tr>
</tbody>
</table>

*Minimum ambient temperature = -40°F (-40°C).*

### Temperature Limitations for Series 8002G/8003G solenoids

<table>
<thead>
<tr>
<th>Catalog Numbers 8262H &amp; 8263H valves</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature Limitations for series 8002H/8003H</strong></td>
</tr>
<tr>
<td><strong>Prefix[1]</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>EF, EV</td>
</tr>
<tr>
<td>EF, EV</td>
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<td>EF, EV</td>
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<td>EF, EV</td>
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<tr>
<td>EF, EV</td>
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<tr>
<td>EF, EV</td>
</tr>
</tbody>
</table>

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**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, turn off 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 lead wires 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. Snap off red cap 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 plug nut 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.
NOTICE: See Installation and Maintenance Instructions, I&M No. V6584R10– Section 1 of 2 for detailed instructions.

**Torque Chart**

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Torque Value in Inch–Pounds</th>
<th>Torque Value in Newton–Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>solenoid base sub–assembly</td>
<td>175 ± 25</td>
<td>19.8 ± 2.8</td>
</tr>
<tr>
<td>pipe adapter</td>
<td>90 maximum</td>
<td>10.2 maximum</td>
</tr>
</tbody>
</table>

Remove red cap and push solenoid down. Then pry here to lift nameplate/retainer and push to remove.

Figure 1. Series 8003G/H Solenoids

Figure 2. Series 8202G/H Solenoids

Figure 3.

ASCO Valves
Torque Chart

<table>
<thead>
<tr>
<th>Part Name</th>
<th>Torque Value in Inch–Pounds</th>
<th>Torque Value in Newton–Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>terminal block screws</td>
<td>10 ± 2</td>
<td>1,1 ± 0,2</td>
</tr>
<tr>
<td>socket head screw</td>
<td>15 – 20</td>
<td>1,7 – 2,3</td>
</tr>
<tr>
<td>center screw</td>
<td>5 ± 1</td>
<td>0,6 ± 0,1</td>
</tr>
</tbody>
</table>

Open–Frame Solenoid with 1/4” Spade Terminals

- tapped hole for #10–32 grounding screw (not included)
- socket head grounding screw (5/32” hex key wrench)

Open–Frame Solenoid with Screw Terminals. Socket head screw is used for grounding.

Open–Frame Solenoid with DIN Terminals.

- gasket
- DIN terminal adapter

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Figure 4. Open–frame solenoids

Junction Box Solenoid with 1/4” Spade Terminals or Screw Terminals

- junction box gasket
- junction box with 1/2” conduit connection and grounding terminal

Note:
Junction box with screw terminals shown. With screw terminal block removed, remaining parts comprise the junction box for spade terminal construction.

Figure 5. Junction box (optional feature)

Open–Frame Solenoid with DIN Terminal Plug Connector

- gasket
- DIN terminal adapter
- DIN connector terminal block (see note 2)

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)