



LUCIFER®

Product Bulletin 407703 - Rév.1 - Page 1 - Part No 494791 - 20/01/2017

## INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS

### 2-WAY N.C. AND N.O. PILOT OPERATED SOLENOID VALVES

#### 1/4" THROUGH 2" BSP & NPT

#### VALVE TYPES: 7321G, 7321H, 7322G, 7322H

#### VALVES TYPES: 321G,321H, 322G, 322H

**DESCRIPTION**

These valves are 2-way, pilot operated models requiring a minimum operating pressure differential to insure valve operation. They are available in normally closed (N.C.) and normally open (N.O.) versions. The 7321G/321G, 7321H/ 322H, 7322G/322G, and 7322H/322H are offered in brass body construction. Valves may be ordered with European electrical parts such as IP65 DIN integrated coils or enclosures/coils Assemblies for ordinary locations or EEx electrical parts for hazardous locations. Additional solenoid coils and enclosures according to American and Canadian Standards such as NEMA 2, 4, 4X Integrated coils for ordinary locations or NEMA 4, 4X, 7 and 9 for hazardous locations are offered in Catalog.

**PRINCIPLES OF OPERATION**

The inlet and outlet ports of the valves are not marked. Instead, the direction of flow is indicated by an arrow on the valve body.

**Normally closed type: 7321G/321G, 7321H/321H**

De-energized: Pressure is connected to the inlet port. Flow through the valve is prevented by a plunger closing off the diaphragm pilot orifice and a diaphragm sealing against the main orifice.

Energized: Plunger is lifted off the pilot orifice and vents the pressure behind the diaphragm. The venting creates a pressure imbalance across the diaphragm, which causes the diaphragm to open the main orifice allowing flow through the valve.

Notes: Certain 7321G/321G and 7322G/322G are supplied with a unique field adjustment device to reduce water hammer in high flow applications. The valve closing speed can be controlled with the use of a 4-position speed control selector located on the valve cover. Position 1 allows fast closing, position 4 provides the slowest closing time and therefore the least water hammer.

**Normally open type: 7322G/322G, 7322H/322H**

De-energized: Pressure is connected to the inlet port and fluid is free to flow through the valve.

Energized: The plunger moves sealing the pilot orifice. Closing the pilot orifice causes the pressure to build up above the diaphragm. The increased pressure and the diaphragm return spring causes the diaphragm to close the main orifice stopping flow.

**CAUTION:** For both normally open and normally closed valves, a minimum operating pressure differential of 0,3 bar or 5 psi is required for proper valve operation. consult nameplate rating.

**FLUID CODES**

Only used for American and Canadian Standards

Listed below are the codes utilized by Underwriters Laboratories (UL) and the Canadian Standards Association (CSA) for various common fluids. The codes for those fluids that are approved or certified by the agencies for use with each valve are printed on the outside of the individual packaging.

**CODE****FLUID**

A	-	Air or nontoxic, nonflammable gases
AC	-	Acetylene
F	-	Common refrigerants except ammonia
G	-	City gas supplied by public utilities
GA	-	Gasoline
HO	-	Petroleum based hydraulic oils having viscosities of up from 125 to 400 SSU at 38°C
02	-	Nos. 1 and 2 fuel oils, oils having viscosities not more than 40 SSU at 38°C
02 - 06	-	No. 2 through No. 6 oil
OX	-	Oxygen
S	-	Steam
W	-	Water or other aqueous nonflammable liquids

For the maximum fluid temperatures, as well as valve ambient temperature limitations, check the valve part number on the nameplate and refer to the catalog or the outside of the shipping package.

**INSTALLATION INSTRUCTIONS**

**Mounting position and pressure limits:** Valves can be mounted directly on piping.

The 7321G/321G, 7321H/321H, 7322G/322G, and 7322H/ 322H valves are designed to be multi-poised and so will perform properly when mounted in any position. However, for optimum life and performance the valves should be mounted vertically upright so as to minimize wear and reduce the possibility of foreign matter accumulating inside the sleeve area.

Line pressure must conform to nameplate rating.

**Piping:** Remove protective closures from the ports. Connect line pressure to the inlet port. Use of Teflon tape, thread compound or sealant is permissible, but should be applied sparingly to male pipe threads only.

**CAUTION:** Do not allow foreign particles, Teflon tape, or thread compound to enter valve. Tightening torque should not exceed the following values for each port size.:

1/8"	-	12 Nm or 100 in-lbs.
1/4"	-	20 Nm or 175 in-lbs.
3/8"	-	26 Nm or 225 in-lbs.
1/2"	-	35 Nm or 300 in-lbs.
3/4"	-	52 Nm or 450 in-lbs.
1"	-	69 Nm or 600 in-lbs.
1-1/4"	-	80 Nm or 700 in-lbs.
1-1/2"	-	87 Nm or 750 in-lbs.
2"	-	110 Nm or 950 in-lbs.

**Only wrench flats provided on the body should be used when applying torque. Do not use sleeve or enclosure as a lever.**

**Media filtration:** Normally filtration is not required, but dirt or foreign material in the media may cause excessive leakage, wear, or in exceptional cases, malfunction. If filtration is used, install the filter on the inlet side as close to the valve as possible. Clean periodically depending on service conditions.

**Lubrication:** Lubrication is not required although air line lubrication will substantially increase valve life.

**CAUTION:** Valves which have seals or other components made from ethylene propylene rubber must not be exposed to petroleum based lubricants or other hydrocarbons.



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**Electrical connection:** Electrical supply must conform to nameplate rating. Connect coil leads or terminals to the electrical circuit using standard electrical practices in compliance with local authorities and the National Electrical Code.

**WARNING:** Valves to be installed in Hazardous Locations, must be outfitted with Hazardous Location coils only. Verify nameplate data and coil part number before installing the valve.

**WARNING:** Turn off electrical power before connecting the valve to the power source.

If the coil assembly is located in an inconvenient orientation, it may be reoriented to facilitate installation. Loosen coil assembly nut, rotate coil assembly to desired position, then retighten the nut with an input torque of 5-6 Nm 43-53 in-lbs.

**DIN Coil :** Loosen plastic cable gland of connector cover and separate gasket and washer. Loosen connector cover screw, and separate the plastic block containing the screw terminals from the plastic connector cover using a small Flathead screwdriver. Feed the lead wires through the plastic cable gland, the washer and the gasket, then the connector cover conduit hub and attach them to the appropriate screw terminal. For electrical connection within the DIN connector, use field wire that is rated for 90° C or greater. Snap the plastic block back into place inside the connector cover. Place the gasket over the DIN spades on the coil and press the terminal box and coil together. Secure the connector to the coil using the mounting screw provided. Apply 2,5 to 3,5 Nm or 20 to 30 in-lbs. torque to the mounting screw.

**Screw Terminal Coil and Enclosure :** Loosen coil assembly nut and remove cover in order to access the interior space of the enclosure. Feed the lead wires through the conduit hub and attach them to the appropriate coil screw terminal. For electrical connection within the enclosure, use field wire that is rated for 90° C or greater. Replace the cover on the enclosure and hand-tighten the coil assembly nut. Apply an input torque of 5-6 Nm or 43-53 in-lbs to the coil assembly nut.

**CAUTION:** When the DIN or Screw Terminal coils are used, be sure to apply a wrench to the wrench flats on the conduit hub when installing electrical conduit.

**Coil/enclosure temperature:** Standard valves are supplied with coils designed for continuous duty service. Normal free space must be provided for proper ventilation. When the coil is energized continuously for long periods of time, the coil assembly will become hot. The coil is designed to operate permanently under these conditions. Any excessive heating will be indicated by smoking and/or odor of burning coil insulation.

For the maximum valve ambient conditions, as well as the fluid temperatures, check the valve part number on the nameplate and refer to the catalog or the outside of the shipping package.

## MAINTENANCE

Note: Depending on service conditions, fluid being used, filtration, and lubrication, it may be required to periodically clean and/or replace worn components. See Disassembly Instructions.

**CAUTION:** Do not expose plastic or elastomeric materials to any type of commercial cleaning fluid. Parts should be cleaned with a mild soap and water solution.

## DISASSEMBLY INSTRUCTIONS

**WARNING:** Depressurize system and turn off electrical power to the valve before attempting repair.

The valves need not be removed from the line.

### **To remove the coil assembly:**

**Normally Closed and Normally Open Valves** - For both ordinary and hazardous location constructions, unscrew the nut on the top of the coil assembly. The wave washer and coil assembly can now be removed.

### **To disassemble the pressure vessel:**

**CAUTION:** Do not use a pipe wrench directly on the sleeve tube.

**Normally Closed and Normally Open Valves** - These valves contain a hex style flange in the sleeve assembly. A wrench may be applied directly to the hex flange in order to loosen the sleeve assembly. Unscrew the sleeve assembly. In the case of normally closed valves, the plunger and return spring may now be removed. For normally open valves, the plunger, spring, wave washer, stop, and O-ring may now be removed.

**Manual override removal (where applicable)** - The manual override may be disassembled once the sleeve assembly has been separated from the valve body. Rotate override stem until it is free to remove.

Unscrew the four (4) cover screws. If the cover cannot be easily lifted off the body, laterally tap the cover or gently pry the cover from the body with a screwdriver. Care must be taken not to damage diaphragm, cover, or body. Diaphragm return spring(s), diaphragm assembly, and O-rings can now be removed.

On 7321G/321G and 7322G/322G models, the 4-position speed control selector may also be removed.

**Replacement Parts:** When ordering replacement parts kits, specify valve number and voltage from nameplate. Parts kits are available for each valve. Parts included in each kit are marked with an asterisk (\*). See exploded views.

## REASSEMBLY INSTRUCTIONS

### **To reassemble the pressure vessel:**

**WARNING:** Valves equipped with Hazardous Location coils must use Hazardous Location replacement coils only. Verify nameplate data and coil part number before installing the replacement coil.

Refer to exploded view drawings. Parts must be replaced in the order shown.

On models 7321G/321G and 7322G/322G, place the diaphragm assembly into the body with the diaphragm bleed hole, located in the diaphragm retainer, oriented towards the valve outlet port. On types 7321H/321H and 7322H/322H, the diaphragm must be attached to the diaphragm retainer with the diaphragm groove facing the body.

Assemble the diaphragm spring(s) and cover to the body. Be sure that cover bypass lines up with passage in body. For the 7321G/321G and 7322G/322G valves, tighten the four (4) cover screws with an input torque of 15-16 Nm or 125-135 in-lbs. For the 7321H/321H and 7322H/322H valves, apply 8-9 Nm or 70-80 in-lbs. of torque to the cover screws.

Assemble the manual override (where available) into the cover prior to sleeve assembly. Insert the manual override into the valve cover. Rotate the override until it engages with the override retention pin in the cover. Continue to rotate the override until the large flat surface on the override is facing out of the cover. This orientation is required for proper sleeve assembly.

Install the plunger and spring in the sleeve. Tighten sleeve assembly with an input torque of 30-32 Nm or 260-270 in-lbs. With coil assembly repositioned on the sleeve, slide the wave washer over the sleeve and tighten coil assembly nut with an input torque of 5-6 Nm or 43-53 in-lbs.



TROUBLE SHOOTING	
PROBLEM	PROCEDURE
Valve fails to operate	<ol style="list-style-type: none"> <li>1. Check electrical supply with voltmeter Voltage must agree with nameplate rating.</li> <li>2. Check coil with ohmmeter for shorted or open coil.</li> <li>3. Make sure that pressure complies with nameplate rating.</li> </ol>
Valve is sluggish or inoperative - electrical supply and pressure check out.	<ol style="list-style-type: none"> <li>1. Disassemble valve as per the Disassembly Instructions. Clean out all extraneous matter ensuring passages are clear.</li> <li>2. The plunger must be free to move without binding. The plunger spring must not be broken, Replace spring if necessary.</li> <li>3. The diaphragm must also be free to move without binding. Check diaphragm bleed hole and pilot orifice for clogging or tearing. Damaged bleed hold may require replacing the diaphragm. Examine diaphragm return spring(s) and replace if broken.</li> <li>4. Where present, remove closing speed control device and check screen and flow passages for contamination. Clean as required.</li> </ol>
External leakage at sleeve flange to cover joint	<ol style="list-style-type: none"> <li>1. Check that sleeve is torqued to 30-32 Nm or 260-270 in-lbs.</li> <li>2. If leakage persists, remove sleeve and check cover and sleeve for nicks at point of contact between sleeve and cover. Replace if defective.</li> </ol>
External leakage at flange joint between body and cover	<ol style="list-style-type: none"> <li>1. Retighten cover screens on 7321G/321G and 7322G/322G valves with an input torque of 15-16 Nm or 125-135 in-lbs. For 7321H/321H and 7322H/322H valves, tighten with input torque of 8-9 Nm or 70-80 in-lbs.</li> <li>2. If leakage persists, diaphragm, O-ring, and/or body or cover with damaged sealing surfaces may have to be repaired or replaced.</li> </ol>
External leakage at manual override (where available)	<ol style="list-style-type: none"> <li>1. Remove sleeve. Rotate override until free to remove. Check O-ring and the surface it contacts. Clean or replace worn or damaged O-ring as required.</li> </ol>
External leakage at Closing Speed Control Device (where available)	<ol style="list-style-type: none"> <li>1. Remove cover. Remove speed control device. Check O-rings and surfaces they contact. Clean or replace worn or damaged O-rings as required.</li> </ol>
Internal leakage	<ol style="list-style-type: none"> <li>1. Disassemble valve as per the Disassembly Instructions. Remove extraneous matter. Clean parts in a mild soap and water solution.</li> <li>2. Examine surface of the plunger seal and diaphragm. If damaged, replace plunger or diaphragm.</li> <li>3. Inspect orifices in the body, cover and diaphragm for nicks or dirt. Clean as necessary. Damage may require a new valve or replacement parts.</li> <li>4. Examine surfaces of the diaphragm or seal in contact with the main orifice. Clean if dirty or replace if damaged or worn.</li> <li>5. Check all springs. If broken, replace.</li> <li>6. On N.O. valves, examine the stop O-ring and the surface it contacts. Clean or replace damaged O-ring, stop, or cover as required.</li> </ol>

**DECLARATION**

Parker Lucifer Division certifies its valve appliance products complies with the essential requirements of the applicable European Community Directives. We hereby confirm that the appliance has been manufactured in compliance with the applicable standards and is intended for installation in a machine or application where commissioning is prohibited until evidence has been provided that the machine or application is also in compliance with EC directives.

The data supplied in the Parker Lucifer catalogs and general Installation, Operating & Maintenance Instructions are to be consulted and pertinent accident prevention regulations followed during product installation and use. Any unauthorized work performed on the product by the purchaser or by third parties can impair its function and relieves Parker Hannifin of all warranty claims and liability for any misuse and resulting damage.

A separate Declaration of Conformity or Manufacturer's declaration is available upon request. Please provide valve identification numbers and order serial numbers of products concerned.



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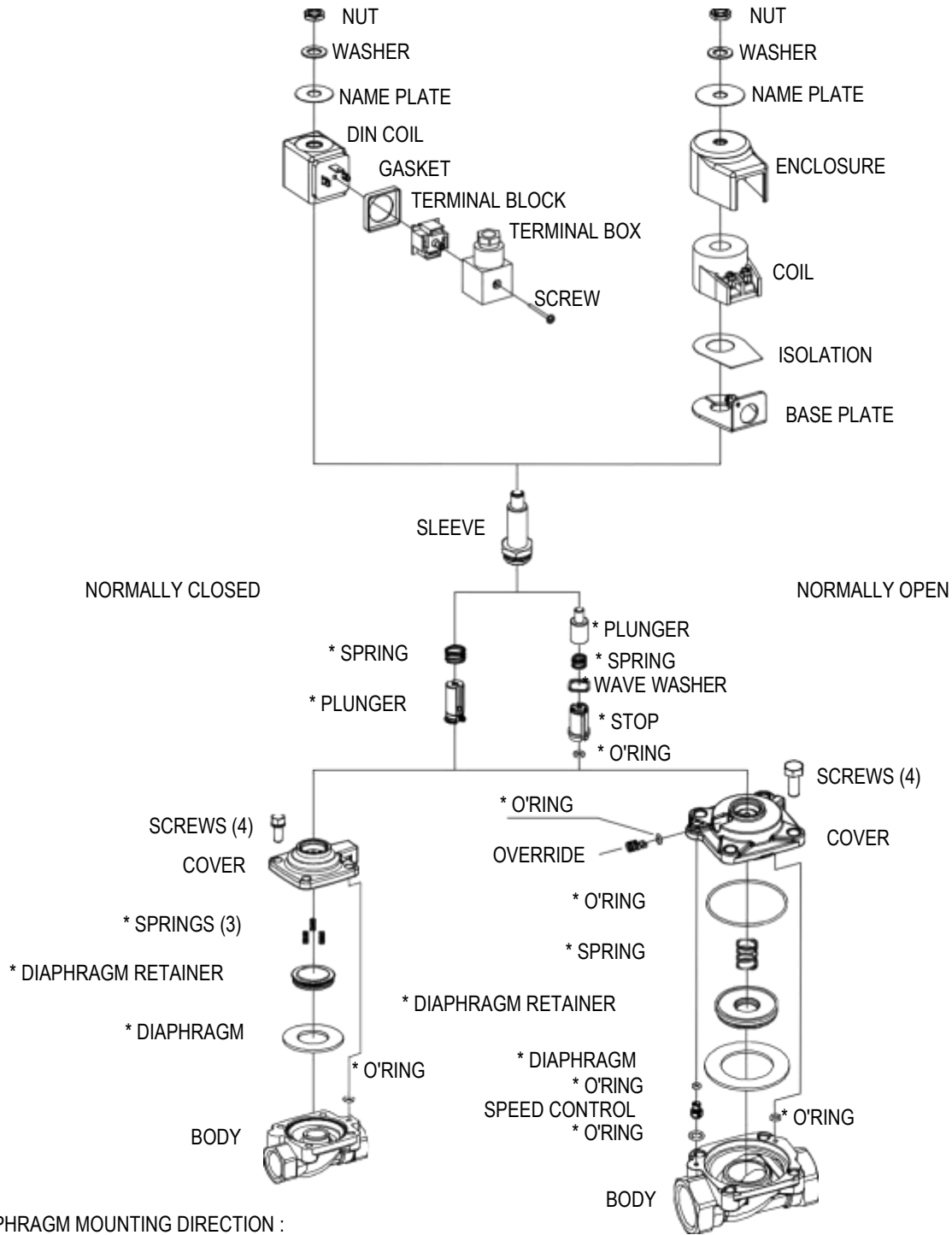
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DIAPHRAGM MOUNTING DIRECTION :  
GROOVE UNDERNEATH

**TYPES 321H , 322H  
TYPES 7321H , 7322H**

**TYPES 321G , 322G  
TYPES 7321G , 7322G**



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