

## Fluid Control Division

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# INSTALLATION, OPERATING & MAINTENANCE INSTRUCTIONS 2-WAY N.C., N.O., AND D. P. SOLENOID VALVE 1/8", 1/4", AND 3/8" NPT VALVE TYPES: 71215, 71216, 7121V, 71295, 71235

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This document is intended for use as a complementary resource to the User Safety Responsibility Statements located in product literature and posted to [www.parker.com/safety](http://www.parker.com/safety).

## WARNING



FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS ("Products") COULD CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

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Possible consequences of failure or improper selection, or improper use of these Products include, but are not limited to:

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- Work piece or component parts being thrown off at high speeds
- Failure of a device to function properly, for example, failure to clamp or unclamp an associated item or device
- Explosion
- Sudden moving or falling objects
- Release of toxic or otherwise injurious liquids or gases
- Electrical shorts or burn out of equipment

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## **DESCRIPTION**

These valves are 2-way, direct operated models. They are available in normally closed (N.C.), normally open (N.O.), and dual purpose (D.P.) versions. The 71215, 71216, 7121V, 71295, and 71235 are offered in stainless steel construction. Valves may be ordered with either NEMA 2, 4, 4X integrated coils for ordinary locations or NEMA 4, 4X, 7, and 9 for hazardous locations: Divisions I and II; Class I, Groups A, B, C, and D; Class II, Groups E, F, and G. Additional solenoid coils and enclosures are offered as described in our catalog.

## **PRINCIPLES OF OPERATION**

### **Normally closed type: 71215**

**De-energized:** Pressure is connected to Port 2 and is blocked by the plunger seal pressing on the body orifice.

**Energized:** The plunger is lifted off the orifice allowing flow through the valve (Port 2 to 1). On bodies without port markings, the direction of flow is indicated by an arrow on the body.

### **Normally closed type: 7121V**

**De-energized:** Pressure is connected to Port 1 and is blocked by the plunger seal pressing on the body orifice.

**Energized:** Plunger is lifted off the orifice allowing flow through valve (Port 1 to 2). On bodies without port markings, the direction of flow is indicated by an arrow on the body.

### **Normally closed, high pressure type: 71216**

**De-energized:** These valves are direct acting, but utilize an armature, conically shaped pilot, and pilot guide in lieu of a plunger. Pressure is connected to Port 2 and flows up through the pilot guide, surrounding the armature, where it is blocked at the orifice by the pilot.

**Energized:** The armature accelerates upward, contacting the shoulder of the pilot, lifting the pilot off the orifice and allowing flow to occur from Port 2 to Port 1.

### **Normally open type: 71295**

**De-energized:** Pressure is connected to Port 2 and fluid is free to flow out Port 3.

**Energized:** The plunger moves causing the seal to block the normally open orifice. Flow between Ports 2 and 3 is then stopped.

## **Dual purpose type: 71235**

**De-energized:** Pressure may be connected to either Port 1 or Port 2, depending on the desired direction of flow. Pressure is blocked in either direction by the plunger seal pressing against the body orifice.

**Energized:** Plunger is lifted off the orifice allowing flow through valve. Once again, flow is permitted in either direction depending upon the supply pressure connection.

## **FLUID CODES**

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 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 or by using the two (2) #10-32 NF threaded holes in the bottom of the valve body. Mounting brackets are available for those valves having #10-32 NF mounting holes and may be ordered separately.

The 7121V, 71215, 71235, and 71295 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. The 71216 valves must

always be mounted vertically upright to ensure proper operation.

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 sealants is permissible, but should be applied sparingly to male pipe threads only. Loctite primer #764 and pipe sealant #567 are recommended when using stainless steel fittings with stainless steel valve bodies.

**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" NPT - 100 in-lbs., 1/4" NPT - 175 in-lbs., 3/8" NPT - 225 in-lbs. **Do not use the sleeve or enclosure as a lever when applying torque.**

**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 airline 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.

**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 43-53 in-lbs.

**DIN Coil and Terminal Box Assembly {Coil Code D100, D200 or D300; Option Code TB):** Loosen cover screws and swing cover 90° toward the conduit hub in order to access the interior space. Separate the plastic block containing the screw terminals from the metal enclosure using a small flat head screwdriver. Feed the lead wires through the conduit hub and attach them to the appropriate screw terminal. For electrical connection within the terminal box, use field wire that is rated for 90°C or greater. Snap the plastic block back into place inside the metal enclosure. Replace the cover and hand-tighten the cover screws. Place the gasket over the DIN spades on the coil and press the terminal box and coil together. Secure the terminal box to the coil using the mounting screw provided. Apply 20 to 30 in-lbs. torque to the mounting screw.

**Screw Terminal Coil and Terminal Box Assembly (Coil Code S100, S200, or S300; Option Code TB):** Loosen cover screws and swing cover 90° toward the conduit hub in order to access the interior space. Feed the lead wires through the conduit hub and attach them to the appropriate screw terminal. For electrical connection within the terminal

box, use field wire that is rated for 90°C or greater. Replace the cover and hand-tighten the cover screws. Press the terminal box and coil together. Secure the terminal box to the coil using the mounting screw provided. Apply 20 to 30 in-lbs. torque to the mounting screw.

**CAUTION:** When the DIN or Screw Terminal coils are used with the Terminal Box Assembly, 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.

## **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 N.C. and D.P. valves need not be removed from the line. If the pipe connection to N.O. valves is made to the sleeve port, disconnect piping prior to commencing repair.

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

**Normally Closed and Dual Purpose 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.

**Normally Open Valves -** First unscrew the sleeve adapter and remove. Then follow the same instructions as for normally closed and dual purpose valves stated above.

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

**CAUTION:** If the sleeve assembly does not have a hex style flange, do not use a pipe wrench directly on the sleeve. Instead, use a Skinner U99-011 wrench nut to remove and install the sleeve assembly.

### **Normally Closed, Normally Open, and Dual Purpose Valves -**

Slide the Skinner U99-011 wrench nut over the sleeve tube. To unscrew the sleeve assembly, mate the wrench nut to the sleeve flange and turn the wrench nut. The plunger, return spring, and flange seal may now be removed. The 7121V valves contain a hex style flange in the sleeve assembly. In this case, a wrench may be applied directly to the hex flange in order to loosen the sleeve assembly.

Manual override removal (where applicable) - Extract the override retention pin. Rotate override stem until it is free to

remove. Withdraw override lever, or the spring and roller in the case of larger size valves (1/8" orifice diameter or greater).

**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

**WARNING:** When replacing coils, 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.

### To reassemble the pressure vessel:

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

Assemble manual override (where available) prior to assembly of sleeve to body. Insert override lever into body. Replace the override stem. Orient stem so that the arrow stamped on the override is pointing up towards the sleeve. Insert the override retention pin and O-ring into body insuring that the pin fits into the override stem groove. Install the

plunger and spring in the sleeve. Tighten sleeve assembly in the body with an input torque of 130-150 in-lbs (260-270 in-lbs for 7121V).

For valves with orifice sizes greater than 1/8", place the spring on the override pin. Assemble roller on the pin. Carefully insert assembly into valve body. Orient stem so that the arrow stamped on the override is pointing up towards the sleeve. Insert override retention pin and O-ring into body insuring that the pin fits into the override stem groove. Install the plunger and spring in the sleeve. Tighten sleeve assembly in the body with an input torque of 130-150 in-lbs (260-270 in-lbs for 7121V).

**CAUTION:** Failure to properly insert override retention pin into override stem could allow the override stem to blow out when valve is pressurized and cause damage.

With coil assembly repositioned on the sleeve, slide the wave washer over the sleeve and tighten coil assembly nut with an input torque of 43-53 in-lbs.

Refer to the Installation Instructions for remaining installation procedures.

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. Mark 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 extraneous matter. The plunger must be free to move without binding.</li> <li>2. The plunger spring must not be broken. Replace spring if necessary.</li> </ol>
External leakage at exhaust adaptor to sleeve joint	<ol style="list-style-type: none"> <li>1. Check that sleeve is torqued to 130 - 150 in-lbs. (260-270 in-lbs. For 7121V).</li> <li>2. If leakage persists, remove sleeve and check flange seal for damage. Replace if defective.</li> </ol>
External leakage at exhaust adaptor to sleeve joint	<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 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>
Internal leakage at body port (N.C. and D.P. valves) or at sleeve port (N.O. valves).	<ol style="list-style-type: none"> <li>1. Disassemble valve as per the Disassembly Instructions. Remove extraneous matter. Clean parts in mild soap and water solution.</li> <li>2. Examine surface of the plunger seal. If damaged, replace plunger.</li> <li>3. Inspect orifice in the body/stop for nicks. Damage may require a new valve or replacement parts.</li> </ol>

## DECLARATION

Parker's Fluid Control Division certifies its valve appliance products comply 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 valve 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.

