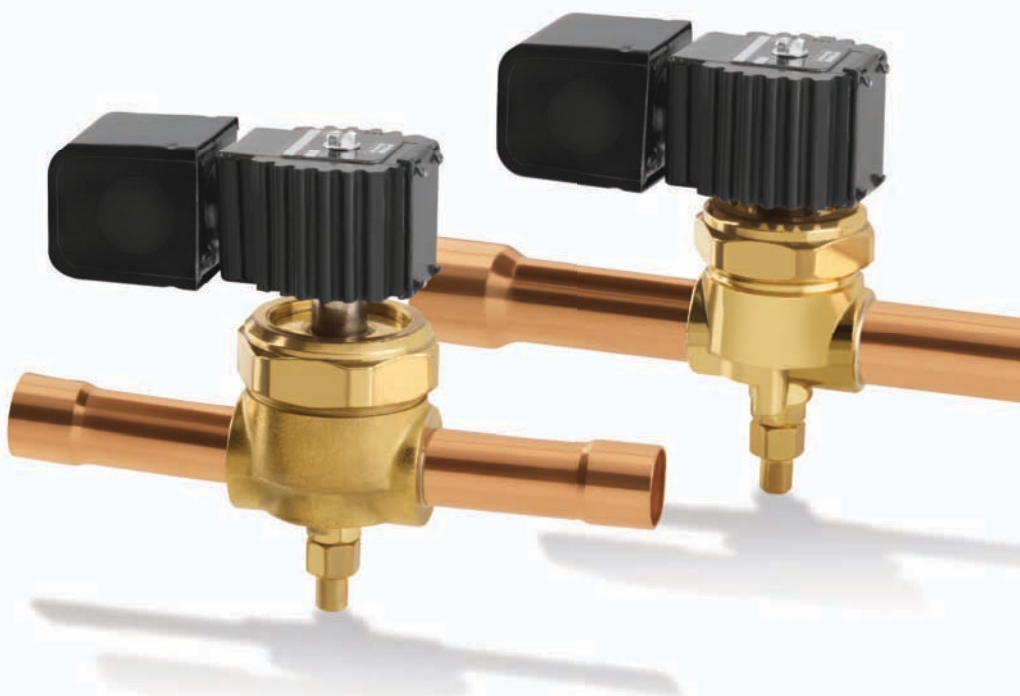




aerospace  
climate control  
electromechanical  
filtration  
fluid & gas handling  
hydraulics  
pneumatics  
process control  
sealing & shielding



# Parker Solenoid Valves R42 - R57 Installation & Servicing Instructions

Catalog D-1a, May 2010



ENGINEERING YOUR SUCCESS.

**NOT FOR USE ON HAZARDOUS OR CORROSIVE FLUIDS**

- The molded PKC-1 coil fits the R52 series normally closed solenoid valves.
- The OPKC-1 coil fits the R53 series normally open solenoid valves.
- The PKC-2 coil fits the R42, R46 and R56 series normally closed solenoid valves.
- The OPKC-2 coil fits the R43, R47 and R57 series normally open solenoid valves.

To ensure peak performance, solenoid valves must be selected and applied correctly; however, proper installation procedures are equally important. The following instructions list the essential points for correct installation.

An exploded view of a typical solenoid valve is illustrated, see Figure 3.

**Position** — All standard solenoid valves may be mounted horizontal, on its side or in a vertical line. The direction of flow is indicated by an **arrow** or the word **IN** on the inlet of the valve body.

**Soldering Precautions**

Solder connections on Parker Solenoid Valves are copper. Any of the commonly used types of solder are satisfactory with these materials. Regardless of the type of solder used, it is important to avoid overheating the valve. Overheating the valve may cause damage to valve components.

The tip of the soldering torch should be large enough to avoid prolonged heating of the connection during the soldering operation. Overheating can also be minimized by directing the flame away from the valve body.

If a valve is disassembled, re-assemble as follows, see Figure 3:

- Place the seat disc into the valve body with the smaller diameter end facing up.
- Place the enclosing tube gasket onto the valve body above the threads.
- Hold the plunger with one hand so that the pointed end is resting in the pilot port of the disk. Make sure the small springs and spring guide are in place on the top of the plunger. (**Note: Does not apply to normally open series.**)
- With the other hand, place the enclosing tube over the plunger, making sure the enclosing tube gasket is in position.
- Replace the enclosing tube locknut and tighten. (See Recommended Torque, Table 1.) **Do not over tighten.**
- Replace manual lift stem. Tighten lift stem assembly and seal cap.
- Replace the coil assembly. (**Note: For normally open valves replace spacer and spacer cup with coil assembly.**)

**Note:** Excessive tightening of the enclosing tube locknut can damage the valve body bore. Please observe the torques listed, see Table 1.

**Types: All R Series (Extended Copper Connections)**

May be brazed into the line without disassembly because the valve contains extended connections. Use caution by placing a wet cloth or chill block on the extensions at the body to prevent excessive overheating.

- Remove the coil assembly.
- Locate the word **IN** or the directional **arrow** on the valve body.
- Place the valve in the line, in the proper direction of flow, and solder.
- Replace the coil assembly and tighten coil hex screw.

**Installation — All Valves**

**Mounting** — A Type 1216-1 universal mounting bracket, Figure 1, is available, when ordered. It fits standard Parker Solenoid Valves R42, R43, R46 and R47. It does not fit types R52, R53, R56 and R57. The slots in the bracket match the tapped

Figure 1

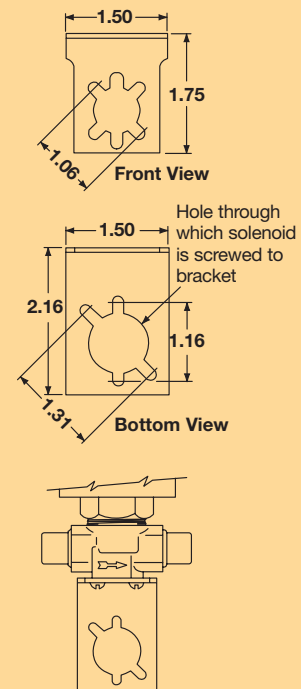
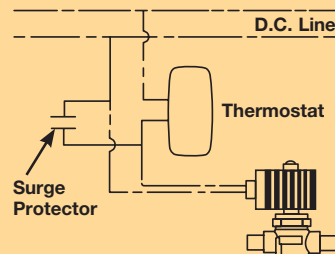


Figure 2



holes in the standard solenoid valves so that they may be secured by two screws supplied with the bracket. Installation is shown in Figure 1.

**Wiring** — Check the electrical specifications of the coil to be sure they correspond to the available electrical service.

The 1/2" BX conduit connection or junction box on the coil may be rotated to any position by loosening the coil hexscrew.

**Installation Precautions**

- Do not attempt to disassemble the valve before pumping the system down. Make absolutely certain the pressure in the lines is no more than 2 or 3 psi above atmospheric pressure before removing any valve parts (except coil assembly).
- The solenoid coil must not be energized unless it is installed on the valve. To do so would cause coil to overheat and burn out.
- The solenoid coil should be fused in accordance with local codes.
- If additional brazing is required after the system has been charged, additional precautions are necessary.

Recommended Torque (ft.-lbs.)

Table 1

| Valve Series ① | Enclosing Tube Locknut | Enclosing Tube Screws | Pilot Valve Assembly Locknut | Lower Body Locknut | Coil Screw | Coil Locknut | Flange Plate Bolts/Screws | Flange Connection Assembly | Manual Lift Stem Assembly | Seal Cap | Valve Mounting Position |                 |           |
|----------------|------------------------|-----------------------|------------------------------|--------------------|------------|--------------|---------------------------|----------------------------|---------------------------|----------|-------------------------|-----------------|-----------|
|                |                        |                       |                              |                    |            |              |                           |                            |                           |          | Vertical Line ②         | Horizontal Line | On Side ② |
| R42, R43       | 35 – 45                | —                     | —                            | —                  | 2.3        | 4.0          | —                         | —                          | 11 – 12                   | 4 – 6    | Yes                     | Yes             |           |
| R46, R47       | 60 – 65                | —                     | —                            | —                  | 2.3        | 4.0          | —                         | —                          | 11 – 12                   | 4 – 6    | Yes                     | Yes             |           |
| R52, R53       | 10 – 15                | —                     | —                            | —                  | 2.3        | 4.0          | —                         | —                          | 11 – 12                   | 4 – 6    | Yes                     | Yes             |           |
| R56, R57       | 25 – 30                | —                     | —                            | —                  | 2.3        | 4.0          | 13 – 20                   | —                          | 11 – 12                   | 10 – 15  | Yes                     | Yes             |           |
| P8D            | 10 – 15                | —                     | 60 – 65                      | 60 – 65            | 2.3        | —            | —                         | —                          | —                         | —        | Yes                     | No              |           |
| P12D           |                        |                       |                              | —                  |            |              |                           |                            |                           |          |                         |                 |           |

① Valves with mounting holes use a #8-32 screw torqued not more than 15 in.-lb.

② Coil housing must not be below horizontal.

**Note:** Standard torque charts do not apply. Do not over tighten the enclosing tube locknut. Damage to the enclosing tube assembly could result from over tightening. For installation and service instructions on Parker Three-Way Heat Reclaim Valves, Types P8D and P12D, request SD-337.

Table 2

## Transformer Selection

| Coil Kit        | 24v/50-60c      |         | 120v/50-60c |         | 240v/50-60c |         | Transformer Rating<br>Volt-Amperes    |
|-----------------|-----------------|---------|-------------|---------|-------------|---------|---------------------------------------|
|                 | Current Amperes |         |             |         |             |         | For 100% of<br>rated MOPD<br>of Valve |
|                 | In-rush         | Holding | In-rush     | Holding | In-rush     | Holding |                                       |
| PKC-1           | 1.9             | .63     | .39         | .14     | .19         | .09     | 60                                    |
| OPKC-1          | 1.9             | .94     | .42         | .21     | .20         | .10     | 60                                    |
| PKC-1<br>OPKC-2 | 3.1             | 1.4     | .60         | .26     | .31         | .13     | 100                                   |

- Pump the entire system down and purge the section where brazing is to be done. Do not use a solenoid valve as a safety shut off while making repairs to a system. After reducing the pressure to atmospheric, the valve may be opened and internal parts removed. **The area should be vented thoroughly to prevent formation of dangerous fumes which could result from the refrigerant in the presence of an open flame.**
- Make sure the line and/or valve body is cooled sufficiently before reassembly to avoid damage to synthetic materials.
  - If a hand valve is installed ahead of a solenoid valve, it should be closed only to service the system. The hand valve should be opened as soon as the service is complete. **If the solenoid valve were closed and the hand valve remains closed, trapping liquid between the two, dangerous hydrostatic pressures could result causing bodily injury.**
  - Do not twist the valve assembly by pulling or pushing on the enclosing tube or coil assembly.
  - Do not carry a coil assembly or complete valve by the coil leads. This could damage the coil and cause a coil burnout.
  - Electrically ground the valve body. Typically this is done through the fluid piping or the electrical conduit.
  - Before energizing the valve, verify that the supply voltage and frequency matches the solenoid coil marking.

## Servicing Instructions

**Caution:** Dangerous hydraulic pressures may develop if a hand valve is installed in the liquid line ahead of the solenoid valve and the hand valve is closed while the solenoid valve is closed. This may cause extrusion of the teflon seat in the disc. Extrusion may cause the valve to fail to open, fail to close and/or have excessive seat leakage. Also the line between these two valves should be pumped down completely before disassembling the solenoid valve for service.

**Note:** The optional manual lift stem is designed to prevent damage to the disc. If the stem is turned in too far, the threads become disengaged. These threads can be re-engaged by applying slight outward force while turning counterclockwise. A thread stop is provided to prevent the stem from backing all the way out of the assembly. Back the stem to the stop and replace the seal cap when service is complete.

## Typical Malfunctions

There are only three possible malfunctions:

- Coil burnout.**
  - Failure to open.**
  - Failure to close.**
- Each is discussed.

### 1. Coil Burnout

Coil burnouts are extremely rare unless caused by one of the following:

- Improper electrical characteristics.

- Continuous over-voltage, more than 10%.
- Under-voltage of more than 15%. This applies only if the operating conditions are such that the reduced MOPD causes stalling of the plunger, which results in excessive current draw.
- Incomplete magnetic circuit due to the omission of parts such as the plunger on the PKC molded model coils.
- Mechanical interference with plunger movement which may be caused by a deformed enclosing tube.
- Voltage spike.
- Valve ambient exceeds 120°F.
- Fluid or gas temperatures greater than 240°F, while the valve ambient is 120°F.

### 2. Failure to Open (Normally Closed Types)

- Coil burned out or an open circuit to coil connections.
- Improper electrical characteristics.
- In pilot operated valves, dirt, scale or sludge may prevent the piston, disc or diaphragm from lifting. This could also be caused by a deformed body.
- High differential pressure that exceeds the MOPD rating of the valve.
- Diameter reduction of synthetic seating material in pilot port because of high temperatures and/or pressures, or severe pulsations. Contact Parker, Broadview, Illinois.

The problem of dirt can be avoided by installing a Parker Filter-Drier upstream from the solenoid valve. The filter-drier will retain much smaller particles than a conventional strainer.

### 3. Failure to Close

- Valve is oversized.
- In pilot operated valves, dirt, scale or sludge may prevent the piston, disc or diaphragm from closing. This could also be caused by a deformed body.
- Held open by the manual lift stem.
- In pilot operated valves only, a damaged pilot port may prevent closing.
- A floating disc due to severe discharge pulses, contact Parker, Broadview, Illinois.
- Have voltage feedback to the coil after the coil de-energizes.

## Miscellaneous

**1. Liquid Hammer** — Industrial solenoid valves, or other liquid line valves, may cause liquid hammer when installed on liquid lines with high liquid velocities. If this occurs, it can be minimized by the use of larger pipes, (i.e. lower velocities), or a standpipe installed in the piping near the solenoid valve inlet. Commercially available shock absorbers may also be used to reduce this noise. Recommended maximum velocity is approximately 300 fpm.

**2. AC Hum** — A loose coil hex screw or coil locknut may cause this problem on the PKC molded model coils.

Foreign material between the magnetic top plug and the plunger in the Types R42, R43, R46, R47, R52, R53, R56, R57 Series Solenoid valves may cause AC hum also.

**3. Leak Testing** — Special care should be taken when leak testing valves with synthetic gaskets. Gasket materials typically have a miniscule permeability. Leak rates of 0.5 oz. per year, depending on the valve size, is acceptable in most cases. Note the sensitivity of electronic leak detectors. Most have the capability of finding a leak smaller than 0.05 oz. per year. Double check small seal leaks with soap bubbles or a halide torch if possible. **Do not over tighten the enclosing tube locknut.** If a leak occurs, change the gasket and verify the metal surfaces have a clean smooth finish.

## Replacement Coils

Table 3

| Valve Series | Replacement Coil Kit Number |
|--------------|-----------------------------|
| R42          | PKC-2                       |
| R43          | OPKC-2                      |
| R46          | PKC-2                       |
| R47          | OPKC-2                      |
| R52          | PKC-1                       |
| R53          | OPKC-1                      |
| R56          | PKC-2                       |
| R57          | OPKC-2                      |

Figure 3

**Design A**  
Typical view of R56  
Series Solenoid Valve

**Design B**  
Typical view of R42, R43,  
R46, and R47 Series  
Solenoid Valves

**Design C**  
Typical view of R52  
Series Solenoid Valve

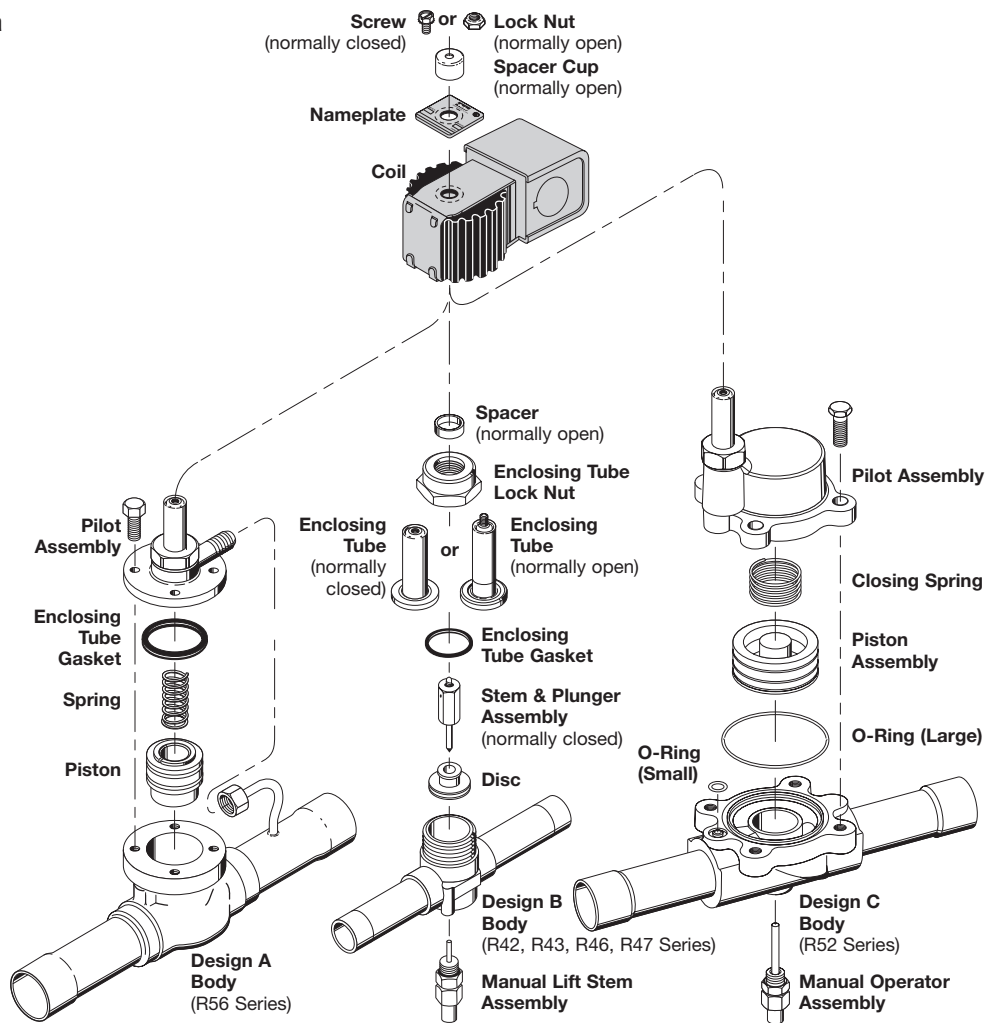
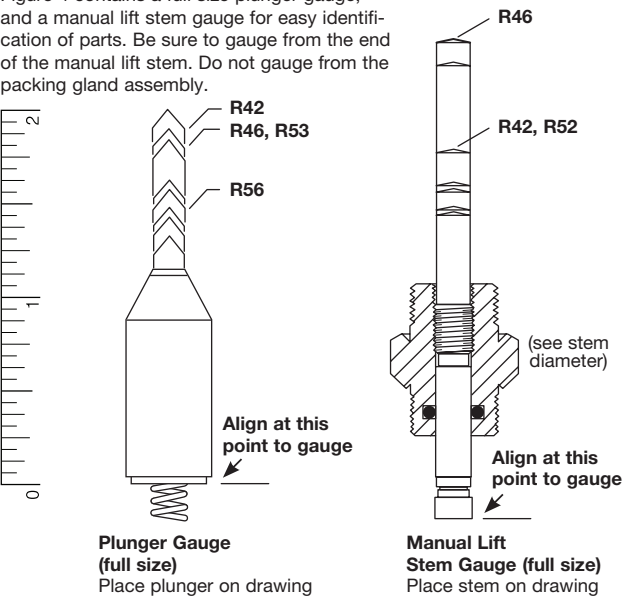


Figure 4

Figure 4 contains a full size plunger gauge, and a manual lift stem gauge for easy identification of parts. Be sure to gauge from the end of the manual lift stem. Do not gauge from the packing gland assembly.



Refrigerant Solenoid Valves Table 4

| Basic Valve Type | Ambient Temp. Rating (°F)* | Fluid Temp. Rating (°F)** | Approved Fluids |
|------------------|----------------------------|---------------------------|-----------------|
| R42              | 120                        | 240                       | ①               |
| R46              |                            |                           |                 |
| R52              |                            |                           |                 |
| R56              |                            |                           |                 |

① All Halogenated Refrigerants  
\* Minimum ambient temperature is -40°F  
\*\* Minimum fluid or gas temperature is -40°F

Stem Diameter

.165

R42, R46, and R52

