

Installation and Maintenance Recommendations

GENERAL

ASCO/JOUCOMATIC has supported a valve kit program already for years. Each kit includes the internal parts that require replacement in normal service including discs, seats, springs, cores and all gaskets. Diaphragms, piston rings and U-cup seals are also included where applicable.

Kits give you the following benefits:

1. Restore valves to like-new condition; ALL parts subject to wear are contained in the ASCO/JOUCOMATIC kit.
2. Costs are significantly less than a replacement valve.
3. Service life of the valve is extended.
4. Easy to rebuild; exploded views and detailed instructions are included.
5. Complete rebuilding can normally be done without removing the valve from the system.
6. Downtime is greatly reduced.
7. Easy to order.
8. Kits are complete and easy to stock.

INSTRUCTIONS

Installation and Maintenance sheets packaged with ASCO/JOUCOMATIC kits include exploded views and detailed step-by-step instructions to simplify rebuilding.

PARTS NOT INCLUDED IN ASCO KITS

Solenoid enclosure parts, solenoid base and pressure boundary parts (such as bodies and bonnets) are not normally included in kits. Special solenoid enclosure kits and hardware kits are also available.

OBSOLETE VALVES

Many obsolete valves are not listed in this catalogue because few, if any, replacement parts are available. Since demand is infrequent, the cost to manufacture parts in small quantities is uneconomical. Further, many valves have been redesigned to simpler, more economical constructions. In most cases a complete new valve is less expensive than the replacement parts for an obsolete valve.

CONTENTS OF SPARE PARTS KITS

Each ASCO/JOUCOMATIC spare parts kit includes all the internal parts that would require replacement during normal service, such as the core, resilient disc, seats, springs and gaskets. Where applicable, diaphragms and piston rings or "U" cup seals are also included. Where practical, parts in the kits are furnished as assemblies to save installation time. Also, special wrenches and inserts, if applicable, are provided in ASCO/JOUCOMATIC spare parts kits to assure that you have everything you need to do the job. Installation and Maintenance sheets packaged with ASCO/JOUCOMATIC spare parts kits include exploded views or cross sectional drawings of valves and show locations of all parts in the valve to simplify rebuilding. Also, detailed step-by-step instructions are provided.

TO ORDER ASCO/JOUCOMATIC SPARE PARTS KITS

Refer to Kits and Coils **catalogue X010** for **ASCO** products and **PR-EVT** for **JOUCOMATIC** products, or, if you need help in ordering ASCO/JOUCOMATIC spare parts kits or cannot find an exact listing of your valve catalogue number, contact your nearest ASCO/JOUCOMATIC source and give them your valve catalogue number, voltage and serial number.

HOW TO INSTALL AND MAINTAIN

Proper installation and maintenance procedures go a long way toward prolonging valve life. Read and follow the instruction packed with each valve.

Nameplate data-voltage, pressure, etc. should be checked to ensure compatibility with system conditions. Check too, that the type of solenoid enclosure is compatible with your operating environment.

A strainer or filter should always be installed as close as possible to the inlet of a solenoid valve.

Some valves are designed to operate in any mounting position, while others must be oriented in a certain way to operate properly. Whenever possible, however, all valves should be mounted with the solenoid in a vertical and upright position to reduce the possibility of foreign matter accumulating in the core tube area. The first line of defence against this occurrence, however, is the installation of a filter or strainer as close as possible to the valve inlet.

INSTALLATION PRACTICES

Teflon tape or pipe joint compound should be used, but only on male pipe threads. To prevent foreign matter from entering the valve, **do not apply either sealant to the first two male threads or to any of the female threads.**

Two wrenches should be used to attach the valve to its piping. Use a pipe wrench to turn the pipe into the valve and a second wrench on the flat of the valve body. To prevent distortion of the valve body, apply the second wrench to the side of the valve into which the pipe is being inserted.

Because the Teflon tape or pipe joint compound reduces friction and makes turning easy, there is a tendency to over torque when installing valves. This poses potential damage to the valve body, especially aluminium or die-cast body valves.

Two wrenches should be used when removing or installing a solenoid valve. Stress on the valve body can be prevented by placing the wrench on the same side of the valve as the pipe that is being screwed out or into the valve.

Inlet and outlet piping must be properly supported to prevent strain on the valve body.

Wiring must comply with local safety codes and the National Electrical Regulation. Be sure that the solenoid leads cannot be pulled from the coil. If you are not using flexible conduit for transition into the valve, the supply conduit must be properly supported to prevent stress on the solenoid assembly.

A considerable amount of foreign matter can collect in a system, especially during new construction. So, always flush the system thoroughly before releasing it for normal operation.

Clean the strainers and filters after the line pressure and electric power have been shut off, but be sure to open the strainer service cap slowly to release trapped pressure. A second flush may be necessary.

After electric power and fluid line pressure have been shut off, the first step in valve disassembly is to remove the solenoid mechanism.

MAINTENANCE PROCEDURES

Cleaning of filters and strainers should be part of your normal preventive maintenance program, along with cleaning and inspection of the valve. If the valve is not operating properly and corrective steps are required, confirm that the problem is in the valve and not caused by other conditions in the system.

Foreign matter in the valve, such as pipe joint sealant, corrosion from pipes and process vessels, mineral deposits and other solids, is a major cause of solenoid valve failure.

If valve disassembly is required, always follow the instructions supplied with the valve for disassembly, cleaning and reassembly.

Before disassembling the valve, it is always best to have on hand those parts subject to wear which are most likely to require replacement. ASCO/JOUCOMATIC offers rebuild kits containing all the internal parts needed to restore the valve to its like-new condition.

Dirt on the valve body and on internal parts should be wiped off with a lint-free cloth.

Except on very old valves, you will find the rebuild kit number listed in the **ASCO catalogue X010** or in the **JOUCOMATIC catalogue** (consult ASCO/JOUCOMATIC). These kits include comprehensive instructions and an exploded view of the valve. (All our Installation and Maintenance Instructions and Spare Parts leaflets may be consulted and downloaded at: www.ascojoucomatic.com)

On all valves, always be sure to reinstall the nameplate. The nameplate serves sometimes as a retainer to hold the solenoid to the valve.

MAINTENANCE TIPS

Direct-Acting Valves

Always turn off electrical and fluid supplies before disassembling a valve and loosen the solenoid base slowly to release any trapped pressure.

Remove internal parts and wipe them clean with a lint-free cloth.

Examine the valve body for foreign materials and deposits. Be especially careful not to scratch the valve seat or disc during cleaning.

The movable core and core tube should be examined for signs of binding and wear. If present, all internal parts should be replaced.

The solenoid core must move freely in the core tube and should be free from signs of binding and excessive wear.

If there is excessive wear to the valve body (e.g. wire drawing of the seat), the valve should be replaced.

The disc at the end of the movable core or piston should be checked for signs of excessive impacting. If deep impressions are noted and the system involves liquids, a water hammer condition may exist. To protect the pipes and equipment in the system, install a water hammer cushion close to the valve inlet, or replace the valve by an ASCO slow closing valve.

After reassembly, check the valve operation by energizing the solenoid coil. A sharp metallic click should be heard if the valve is operating properly.

Pilot Operated Valves

Cleaning and inspection procedures are essentially the same as for direct-acting valves. However, pilot operated valves also have a diaphragm or piston with bleed holes which must be cleaned. The piston should move freely in its cylinder and the piston rings should rotate freely in the groove.

ASCO/JOUCOMATIC offers rebuild kits which contain all components needed to make a valve like new again.

HOW TO TROUBLESHOOT SOLENOID VALVES

Because there are so many potential reasons for solenoid valves to malfunction, they are often thought to be complex, trouble-prone devices. Actually, they are quite simple and very reliable. Many of the problems originate outside the valves themselves, while others are caused by mis-application or improper installation. Troubleshooting should begin with a check of the voltage and pressure input. The problem may be caused by an inoperative control relay or a fluctuating pressure regulator. If voltage and pressure are correct inspect the valve. The main reasons a direct-acting solenoid valve fails to operate:

- Low or no voltage
- Burned-out solenoid
- Pressure higher than the valve's rating
- Foreign matter in the valve
- Binding core or damaged core tube

To operate properly, a solenoid valve core must move within the core tube and contact the plugnut when the coil is energized. You should hear a sharp metallic click at energization. Absence of the click usually indicates an electrical problem. For most valves, voltage applied to the coil must be at least 85% of the nameplate voltage rating.

If the valve coil is receiving the proper voltage, absence of a click may mean that the line pressure is higher than the valve's rating. Check that next.

If line pressure is OK, foreign matter may be preventing the core from moving in the core tube. Core movement can also be restricted if the top of the core has been opened over millions of operations, if the disc is swollen or cut, or if the core itself has been damaged.

A **pilot-operated valve** might fail to operate when energized even though a click has been heard. A no-flow condition may be caused by:

- Insufficient pressure drop across the valve
- Ruptured diaphragm or damaged piston ring
- Plugged or restricted pilot orifice

Both **pilot-operated** and **direct-acting valves** can fail to operate when de-energized because of:

- Faulty control circuit
- Scale or other foreign matter in the valve
- Binding core or damaged core tube
- Broken spring

Pilot-operated valves may also malfunction when de-energized due to:

- Plugged bleed orifice
- Damaged pilot seat or disc
- Damaged diaphragm or piston
- Insufficient pressure drop across the valve

Excessive solenoid noise (hum or chatter) can be caused by:

- Low voltage
- Faulty relay or improper electrical control signal
- Loose solenoid parts
- Foreign matter on core or plugnut face
- Worn core of plugnut face
- Damaged spring
- Excessive system pressure

When troubleshooting 4-way valves controlling cylinders, it is important to follow the instructions provided with the valve. Some 4-way valves require an oil-mist lubricator for proper operation. Pilot-actuated 4-way valves normally require full-size piping for pressure inlet and exhaust. In some of these valves, restrictive speed control devices should be installed in the cylinder connections.

Because faulty cylinder operation is often caused by the cylinder itself, it should be checked for:

- Misalignment between the piston rod and connected load
- Lack of lubrication
- Worn and leaking piston cups which allow fluid to exhaust through the valve
- Foreign matter in the speed controls
- System overloading, low line pressure, or undersized hoses or fittings

If the problems does not appear to be in the cylinder, the valve should be checked.

TROUBELSHOOTING GUIDE

Problem	Possible Cause	Probable Solution	
Direct acting valve Valve will not operate when valve circuit is energized	Low voltage or no voltage to solenoid coil	Check voltage at coil; for most valves, voltage should be at least 85% of nameplate rating.	
	Burned out coil	See "Coil Failure" below.	
	Excessive foreign matter jamming core in core tube	Clean valve; install strainer close to valve inlet.	
	Binding core or damaged core tube	Replace parts.	
	Excessive fluid pressure	Reduce pressure to valve nameplate pressure rating or install suitable valve.	
Pilot operated valve Valve will not operate when valve circuit is energized	Same causes and solution as for direct acting -valve, plus:		
	Low pressure drop across valve	Valve might be oversized; replace valve with one having a smaller orifice. Increase pressure, if possible.	
	Ruptured diaphragm or piston ring	Replace damaged parts.	
Direct acting valve Valve will not close or shift when valve circuit is de-energized	Plugged or restricted pilot orifice	Clean valve and pilot orifice.	
	Coil not de-energized	Check electrical control circuit.	
	Excessive foreign matter jamming core in core tube	Clean valve; install strainer close to valve inlet.	
	Damaged disc or seat causing internal leakage	Replace with new parts	
	Binding core or damaged core tube	Replace with new spring. Never elongate or shorten spring.	
Pilot operated valve Valve will not close or shift when valve circuit is de-energized	Damaged spring	Replace with new spring. Never elongate or shorten spring.	
	Same causes and solutions as for direct-acting valve, plus:		
	Plugged bleed orifice	Clean orifice.	
	Damaged pilot seat or pilot disc	Replace with new parts.	
	Damaged diaphragm or piston	Replace with new spring. Never elongate or shorten spring.	
Wire drawing	Damaged pilot spring	Replace with new spring. Never elongate or shorten spring.	
	Insufficient pressure drop across the valve	Valve might be oversized; replace valve by one having a smaller orifice. Increase pressure, if possible.	
	Dirt or foreign matter is lodged on seat	Replace valve body or install new valve; install suitable strainer close to inlet or valve.	
	Coil failure*	Overvoltage	Check voltage at coil; voltage must conform to nameplate rating.
		Damaged core or core tube causing inrush current to be drawn continuously	Check for damaged core and core tube, or damaged spring. Check for scale or foreign matter on the core or inside the core tube. Clean thoroughly and replace any damaged parts.
Excessive foreign matter jamming core in core tube and causing inrush current to be drawn continuously		Reduce pressure or install suitable valve	
Excessive fluid pressure causing inrush current to be drawn continuously		Refer to the data listed for class E, F and H (page V1105)	
Excessive ambient or fluid temperature		Refer to the data listed for class E, F and H (page V1105)	
Missing solenoid parts	Missing solenoid parts	Install missing solenoid housing and other metal parts or properly install incorrectly assembled metal parts. The housing and other metal parts form part of the magnetic circuit and are required to provide the impedance needed to limit current draw	
	Moisture inside solenoid enclosure	Waterproof the entrance conduit to prevent entry of moisture. If valve is mounted outdoors, check to see that enclosure is weatherproof and that gaskets are in good condition; use appropriate sealant where required. If general purpose enclosure is used in a damp or humid atmosphere use watertight, moulded coils.	

* In Explosionproof solenoids, a binding core, high-input voltage, or excessive ambient or fluid temperature may cause the solenoid's non-resettable thermal fuse to open. If this occurs, the solenoid must be replaced.

