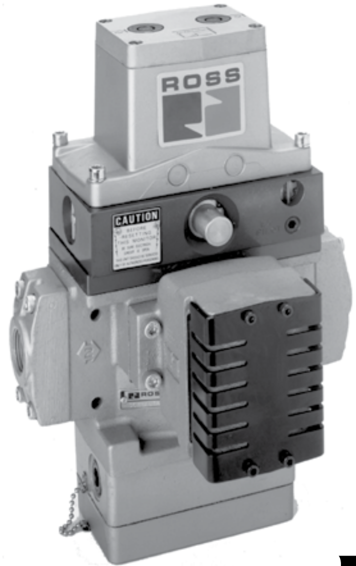


User Manual 362

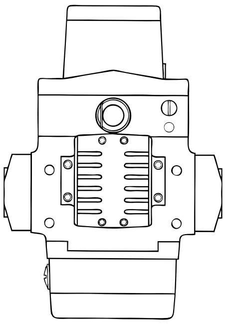
SERPAR®
DOUBLE VALVES
with L-G MONITOR

Sizes 8, 12, 30

TABLE OF CONTENTS

The two main valve elements in the SERPAR® double valve move simultaneously during normal operation. If the valve elements fail to move simultaneously the L-G monitor is designed to detect this condition. The monitor reacts by exhausting pilot air and blocking pilot supply air so that further valve operation is inhibited. The valve is then said to be "locked out" and cannot return to normal operation until the monitor is reset. A lockout is not necessarily an indication that the valve has become faulty. Rather, it is an indication that the monitor has detected non-simultaneous movement of the main valve elements, and that there is a condition in the system that needs correction. The SERPAR® double valve with L-G monitor consists of four interconnected assemblies as shown in the illustration below.

The SERPAR® double valve with L-G monitor consists of four interconnected assemblies as shown in the illustration below.



Pilot Assembly – Consists of two 3/2 normally closed, solenoid controlled pilot valves in a single housing. Each pilot valve controls one of the valve elements in the valve body assembly.

L-G Monitor Assembly – Contains a pressure controlled spool and mechanical lockout mechanism.

Valve Body Assembly – The valve body has parallel flow paths including two in-to-out crossflow paths. The two main valve elements are 3/2 normally closed poppet valve elements, plus spool elements that control air flow through the crossflow passages. A silencer is bolted directly to the exhaust port.

Junction Box Assembly – Contains an electrical terminals trip in a housing with two threaded electrical conduit ports.

ROSS®

Consider it DONE!

NORMAL VALVE OPERATION

CONDITIONS AT START

Inlet air is blocked from the outlet by the two normally closed valve elements A and B (Figure 1). The outlet port 2 is connected to the exhaust port 3. Pilot supply air comes from the inlet port 1, and is carried via passage 4 to spool C of the L-G monitor. It then goes around spool C and up passage 9 to the two 3/2 normally closed pilot valves F.

Spool C is the sensing element of the L-G monitor and is kept in its center position by springs M. Monitoring pressures are conveyed from points just above the inlet poppets U and V by the two passages 6. At the start of a normal operating cycle these pressures are equal.

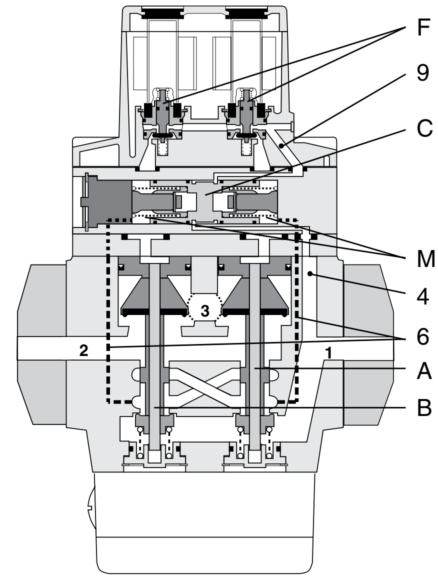


Figure 1 — Solenoids Not Energized

SOLENOIDS ENERGIZED

Simultaneously energizing the two solenoids “a” and “b” (Figure 2) causes the two pilot poppets E to shift. This closes the pilot exhaust passages and opens the pilot supply passages. Pilot air can then go from passage 9 to the main valve pistons J via passages 5. Pressure on the pistons shifts the main valve elements. This closes off the exhaust port 3, and connects the inlet port 1 to the outlet port 2 via the cross flow passages 10 and 11.

With the main valve inlet poppets U and V open, the monitoring passages 6 are open to inlet pressure. This pressure is directed to both ends of spool C. Because these monitoring signal pressures are equal, spool C remains in its center position.

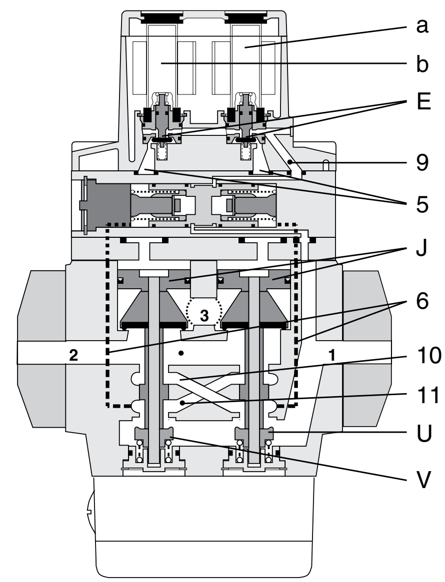


Figure 2 — Solenoids Energized

SOLENOIDS DE-ENERGIZED

Simultaneously de-energizing solenoids “a” and “b” allows the two pilot poppets E to return to their normally closed positions. Pilot pressure on the main valve pistons J is exhausted through exhaust port 3 via internal exhaust passages (not shown). The main valve elements A and B return to their normal deactuated positions. Inlet air is again blocked from outlet port 2 by poppets U and V. Pressure at outlet port 2, at the ends of spool C, and in the monitoring passages 6 is exhausted through exhaust port 3. This completes the normal operating cycle, and the valve has returned to the “Conditions at Start” described above.

VALVE CONDITIONS RESULTING FROM A MALFUNCTION

DURING A MALFUNCTION

Due to a mechanical or electrical malfunction one of the valve elements may not respond to its energizing signal, or alternatively, may not return to its normal position after the signal is removed. In either case, we have the condition depicted in Figure 3 — one valve element closed, one open. Inlet air flowing past open poppet U and into crossflow passage 10 is practically blocked by spool SB on valve element B. Although some air can pass around spool SB, the amount is so small and the exhausting capacity of the valve so large that the pressure at outlet 2 does not exceed two per cent of inlet pressure.

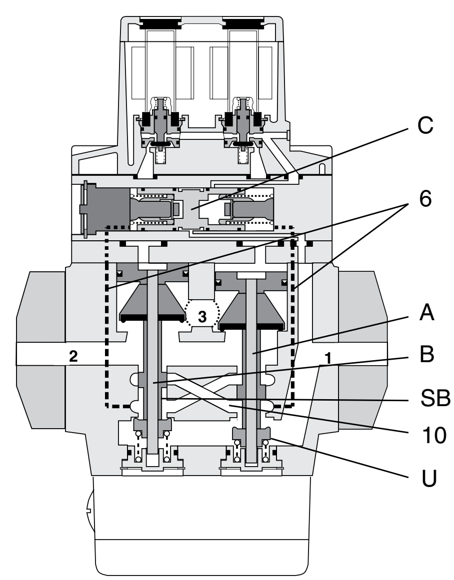


Figure 3 — Valve in Faulted Condition

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VALVE CONDITIONS RESULTING FROM A MALFUNCTION

At the same time a monitoring air signal goes via passage 6 only to the right end of spool C. When the difference in pressure at the ends of the spool exceeds 20 psi (1.5 bar) the spool is shifted. In this case the spool is shifted to the left (see Figure 5). The spring-loaded lockout pin K drops into lockout groove 8 so that the spool is held in its shifted position. Pilot supply air from passage 4 is then diverted around the spool and out to atmosphere via bleed vent 12. Simultaneously, air in the pilot air passage 9 is vented to atmosphere via bleed vent 13. This exhausting of pilot air allows the main valve elements A and B to return to their deactuated positions and prevents further actuation. The valve is now locked out of operation and cannot be actuated until the L-G monitor is reset. Note that the lockout conditions described here also hold true when the L-G spool is shifted to the right.

Lockout Signal Port. Port 16 (Figure 4) can be connected to a pressure indicator to show when a lockout has occurred. During normal operation the pressure at port 16 is equal to line pressure, but during a lockout pressure drops to zero. This drop is due to the pilot air passage 9 being vented to atmosphere as described above. If port 16 is not used it must be plugged.

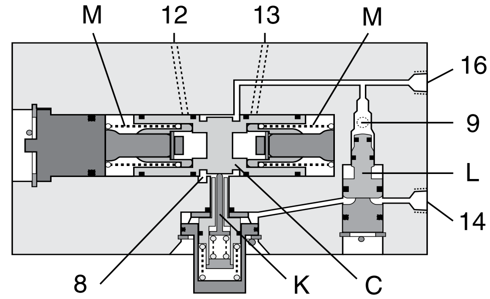

Figure 4 — Cross Section of L-G Monitor

RESETTING THE L-G MONITOR

Caution: To avoid the potential for injury and to ensure that the equipment controlled by the valve does not begin operating immediately after resetting the monitor, electrical power to the solenoids must be off. Otherwise, the energized solenoids will actuate the valve as soon as the reset pressure signal is removed.

After the cause of a lockout has been corrected the spool in the monitor must be reset in its normal center position in order for the valve to function. This is done by applying an air pressure signal of at least 60 psig (4 bar) to the pneumatic reset port 14 (Figure 4). Pressurizing port 14 produces two results: (1) lockout pin K is lifted out of the lockout groove so that the centering springs M can return the spool to the center position, and (2) differential spool L is shifted so that it blocks pilot air passage 9, thereby cutting off pilot air supply during the resetting process. This keeps the valve inoperative while resetting air pressure is applied so that any attempt to circumvent the functions of the L-G monitor is inhibited.

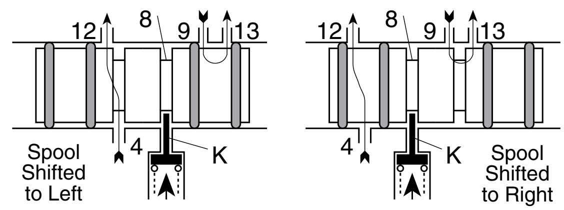

Figure 5 — Lockout Positions of L-G Spool

INSTALLATION NOTES

Pneumatic equipment should be installed only by persons trained and experienced in the installation of pneumatic equipment.

Air Lines. Before installing a ROSS double valve in an existing system, the air lines must be blown clean of all contaminants. Experience has shown that one of the leading causes of lockouts is foreign material from the air lines which becomes lodged in the valve. It is strongly recommended that an air filter be installed ahead of and close to the valve. ROSS recommends a 5-micron-rated filter.

Valve Inlet 1. (See Figure 6.) DO NOT RESTRICT THE AIR SUPPLY. Any restriction of the air supply lines (for example, sharp bends or undersized lines) will reduce the speed with which the outlet volume is pressurized. See *Inadequate Air Supply*, page 6, for further discussion.

Valve Outlet 2. For faster pressurizing and exhausting of the outlet volume put the valve as close as possible to the mechanism being operated. Also, any restriction in the outlet lines will reduce pressurizing and exhausting speeds.

Valve Exhaust 3. DO NOT RESTRICT THE EXHAUST. Limiting the exhausting speed decreases an important safety feature of the double valve. During a malfunction in which only one of the valve elements has shifted, air escaping past the spool in the valve stem of the closed valve element (see Figure 3) must be quickly exhausted to keep outlet pressure at or below the design pressure of two per cent of inlet pressure. Therefore, use only a properly sized and designed silencer. See CAUTION on page 7.

Pneumatic Reset Port 14. Use an air supply of not less than 60 psig (4 bar), and a 3/2 manually or solenoid controlled reset valve.

Electrical Conduit Port 15. It is very important that the electrical supply be of the correct voltage and frequency. ROSS solenoids are rated for continuous duty at 85% to 110% of the voltage shown on the pilot housing. A supply voltage that does not fall within this range can cause nuisance lockouts or premature solenoid burnout. If electrical power is supplied by a transformer, it must be capable of handling the inrush current of the solenoids without significant voltage drop.

Mounting Position. It is recommended that ROSS double valves be mounted with the pilot assembly upward.

Pressure Range. ROSS double valves have an operating pressure range of 30 to 125 psig (2 to 8.5 bar). Pressure below this range can create the potential for injury by reducing the speed with which the outlet volume is pressurized, or by rendering the monitor inoperative. It can also cause intermittent lockouts. Pressure above the specified range causes excessive poppet impact and can shorten the life of the valve.

Temperature Range. ROSS double valves have an operating media temperature range of 40°F to 175°F (4°C to 80°C), and an ambient temperature range of 40°F to 120°F (4°C to 50°C). Improper valve action and/or a shortening of valve life can result if these temperature limits are not observed.

TEST PROCEDURE

ROSS valves are thoroughly tested after assembly for proper operation. It is recommended that the following tests be made when the valve is initially installed, or whenever the valve has been disassembled. These tests should be made at the repair bench and at the installation. At the installation take normal press operation safety precautions during these tests to avoid possible injury or damage to equipment.

All tests should be performed only by persons trained and experienced in the testing of pneumatic equipment.

These tests call for the use of the manual overrides. If your valve is not so equipped, use the corresponding solenoids instead. This will require wiring the solenoids so that they can be individually energized. If the valve fails any of these tests, refer to *Troubleshooting* beginning on page 4.

1. Remove silencer. Apply compressed air in the 30 to 125 psig (2 to 8.5 bar) range to inlet port 1 (see Figure 6). There should be no pressure at outlet port 2 or exhaust 3.

2. Connect outlet port 2 to a small volume (25–50 cubic inches) fitted with a damped pressure gauge. Simultaneously energize both solenoids. Inlet and outlet pressures should be equal. There should be no leakage at the exhaust port. De-energize both solenoids.

3. Depress both manual overrides simultaneously *(If the actuation of the overrides is not simultaneous the valve will lock out.).*

Release override N on the outlet side of the valve. Outlet pressure should drop to approximately two percent of inlet pressure, and there should be a flow of exhaust air. On the back of the L-G monitor are two bleed vents (Figure 6). Bleed vent 12 should emit a continuous flow of air. Release manual override P.

4. Step 3 should have caused the L-G monitor to lock out. Depress both overrides simultaneously. There should be no pressure at either the outlet or the exhaust port. Bleed vent 12 should continue to emit air. Release overrides.

5. Reset the monitor by applying air pressure of at least 60 psig (4 bar) to the pneumatic reset port 14. Air flow from bleed vent 12 should stop. With reset pressure still applied, energize both solenoids. No action should occur. Remove reset pressure.

6. Depress both manual overrides simultaneously. Release override P. Conditions should correspond to those described in step 3. Release override N.

7. Step 6 should have caused the L-G monitor to lock out. Depress both overrides simultaneously. Conditions should correspond to those described in step 4. Release overrides.

8. Reset the monitor as described in step 5. Bleed air should stop. Install silencer. The valve is now ready for normal operation.

MAINTENANCE

Pneumatic equipment should be maintained only by persons trained and experienced in the maintenance of such equipment.

Supply Clean Air. Foreign material lodging in valves is a major cause of breakdowns. The use of a 5-micron-rated air filter located close to the valve is strongly recommended. The filter bowl should be drained regularly, and if its location makes draining difficult, the filter should be equipped with an automatic drain.

Check Lubricator Supply Rate. A lubricator should put a fine oil mist into the air line in direct proportion to the rate of air flow. Excessive lubrication can cause puddling in the valve and lead to malfunctions. For most applications an oil flow rate in the lubricator of one drop per minute is adequate. (Note that the double valve does not itself require airline lubrication.) See below for information about lubricants that are compatible with the materials used in the double valve and are suitable for use in compressed air systems.

Compatible Lubricants. Although this valve does not require air line lubrication, it may be used with lubricated air being supplied to other mechanisms. Some oils contain additives that can harm seals or other valve components and so cause the valve to malfunction.

The best oils to use are those specifically compounded for air line service. These are generally petroleum base oils with oxidation inhibitors, an aniline point between 180°F (82°C) and 220°F (104°C), and an ISO 32 or lighter viscosity.

COMPATIBLE LUBRICANTS

Maker	Brand Name
Amoco	American Industrial Oil 32, Amoco Spindle Oil C, Amolite 32
Citgo	Pacemaker 32
Exxon	Spinesstic 22, Teresstic 32
Mobil	Velocite 10
Non-Fluid Oil	Air Lube 10H/NR
Shell	Turbo T32
Sun	Sunvis 11, Sunvis 722
Texaco	Regal R&O 32
Union	Union Turbine Oil

Cleaning the Valve. If the air supplied to the valve has not been well filtered, the interior of the valve may accumulate dirt and varnish which can affect the valve's performance. Although very tolerant of dirty air, the valve may sometimes need cleaning. To clean the valve use any good commercial solvent or kerosene. Do not use a chlorinated solvent or abrasive materials. The former damages seals, and abrasives can do permanent damage to metal parts. Before reassembling the valve lubricate all sliding surfaces with a grease such as Dow Corning BR-2.

Electrical Contacts. In the electrical circuits associated with the valve solenoids, keep all switches or relay contacts in good condition to avoid solenoid malfunctions.

Replace Worn Components. In most cases it is not necessary to remove the valve from its installation for servicing. However, turn off the electrical power to the valve, shutoff the air supply, and exhaust the air in the system before beginning any disassembly operation.

TROUBLESHOOTING

The SERPAR® double valve with L-G monitor is designed to monitor the outlet pressures of the main valve elements. If the valve elements fail to move synchronously, the monitor is designed to detect this condition and to lock out the valve. A lockout is not necessarily an indication that the valve is faulty. Rather, it indicates that the monitor has detected incorrect movement of the main valve elements, and that there is a condition in the system that needs correcting. Troubleshooting involves finding and correcting the condition that caused the lockout.

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Troubleshooting should be done only by persons trained and experienced in the servicing of pneumatic equipment. If the trouble shooting is done at the installation instead of the repair bench, take normal press operation safety precautions to avoid possible injury or damage to equipment.

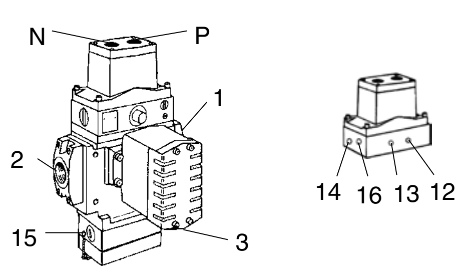
The *Troubleshooting* Chart below can serve as a guide to locating and correcting malfunctions. After the valve has been repaired, it should be tested for normal operation by following the test procedures on page 4. If valve operation is still abnormal, repeat the troubleshooting procedure.

TROUBLESHOOTING CHART

If the valve fails to operate properly follow the *Tests* given in the chart below. The *Repair Procedures* specified in the chart are detailed on the following pages. Before returning the valve to normal service follow the *Test Procedure* given on page 4.

Tests	Symptoms	Possible Causes	Repair Procedure
TEST 1 Electrical power to solenoids must be off. Remove silencer. Check for lockout bleed air at vent 12, and for exhaust air.	No lockout bleed and no exhaust air	Inadequate air supply	**A**
		Incorrect voltage at solenoids	**B**
		Both solenoids inoperative	**C**
		Faulty seals on monitor spool	**E**
		Contaminants in monitor	**G**
	Have both lockout bleed air and exhaust air	Faulty seals on monitor spool	**E**
		Main inlet poppets not sealing	**J**
		Pilot poppet not sealing	**D**
		Jammed solenoid plunger	**C**
	Have lockout bleed air but no exhaust air	Proceed to TEST 2.	—
TEST 2 With electrical power still off and silencer removed, attempt to reset monitor by applying pressure of not less than to reset port 14. (See Figure 6.)	Will not reset	Faulty seals on monitor spool	**E**
		Bent lockout pin	**H**
		Contaminants in monitor	**G**
	Resets correctly	Proceed to TEST 3.	—
TEST 3 *Take normal press operation safety precautions during this test to ensure that there is no danger to personnel or equipment when the press cycles.* With silencer removed and monitor reset, cycle valve several times by energizing the solenoids in a normal manner.	Locks out intermittently	Inadequate air supply	**A**
		Incorrect voltage at solenoids	**B**
		Worn bore in monitor.	**F**
		Varnish deposits in valve	**L**
		Excessive lubrication	**M**
	Valve performs normally	Transient foreign material	**I**
		Dirty or undersized silencer	**N**
	Locks out on first cycle	Proceed to TEST 4.	—
TEST 4 With electrical power off, silencer removed and monitor reset, proceed as follows: *Take normal press operation safety precautions to ensure that there is no danger to personnel or equipment when the press cycles.* Actuate the valve by depressing, holding, then releasing both manual overrides. Be sure to depress overrides simultaneously.	Locks out as overrides are depressed	Inadequate air supply	**A**
		Jammed solenoid plunger	**C**
		Pilot poppet not sealing	**D**
		Varnish deposits in valve	**L**
		Excessive lubrication	**M**
		Leaking piston poppet seal	**K**
	Locks out as overrides are released	Varnish deposits in valve	**L**
		Excessive lubrication	**M**
	Operation normal with overrides	Faulty solenoid	**C**

Figure 6 —
External Ports and Overrides



N, P	Manual overrides
1	Inlet Port
2	Outlet Port
3	Exhaust Silencer
12, 13	Monitor Bleed Vents
14	Pneumatic Reset Port
15	Electrical Conduit Port
16	Lockout Indicator Port

REPAIR PROCEDURES

A INADEQUATE AIR SUPPLY

Even though the air supply pressure is in the correct 30 to 125 psig (2 to 8.5 bar) range, the *air volume* supplied can be too small. An inadequate air supply volume causes excessive pressure drop during valve actuation, i.e., pilot air supply is sufficient to unseat the main valve elements but the pressure drop which results from filling the outlet volume depletes the pilot air supply. The main valve elements may be only partially actuated so that inlet air flows out the exhaust. The lowered pilot pressure can also exaggerate the effects of small differences in the operating characteristics of pilots and valve elements so that the valve elements may not move simultaneously. This can produce intermittent valve lockouts.

Check for very long, under size, or pinched supply lines, sharp bends, and restrictive fittings. All can reduce the air volume supplied to the valve.

B INCORRECT VOLTAGE AT SOLENOIDS

ROSS solenoids are rated for continuous duty at 85% to 110% of the voltage shown on the pilot housing. A supply voltage that does not fall within this range can cause nuisance lockouts, premature solenoid burnout, or impact damage.

To check the electrical supply, remove the junction box cover at the bottom of the valve and attach voltmeter leads to the supply terminals. Read the voltmeter while the solenoids are energized. If the voltage falls below the allowable operating range, the electrical supply is inadequate even though the supply voltage might be correct without the electrical load.

A voltage that exceeds the allowable maximum can cause premature solenoid burnout, loss of air gap due to impact damage, or a stuck solenoid plunger. See Repair *Procedure C* below.

C FAULTY SOLENOID OPERATION

Before removing solenoids for inspection check to see if the pilot cover is loose. A loose cover can prevent full travel of one or both pilot valves. However, the valve can operate normally if manual actuation is used because the manual pressure pushes the solenoids down into their correct positions.

If the cover is not loose, shut off electrical power to the solenoids, remove pilot cover, slip wires off solenoid terminals, and remove both solenoids.

Check for the following:

Jammed solenoid plunger. Great overheating or delamination of the plunger can cause it to jam. Such a solenoid must be replaced.

Defective solenoid coil. Check resistance of each coil with an ohmmeter. The coil is defective if resistance is zero or infinite. The most common cause of solenoid burnout is incorrect supply voltage. *See Repair Procedure B*. If the coils are not defective, examine the solenoids for the conditions described below.

Broken shading coil. See S, Figure 7. Copper shading coils reduce the solenoid's tendency to buzz when operated on alternating current. If a shading coil is loose or broken, the solenoid must be replaced.

Wear that causes a loss of air gap. There must be a small gap between the solenoid plunger and the field frame when the solenoid is energized. See air gap 17, Figure 7. If significant wear is apparent in areas 18, the air gap can be lost and the solenoid will buzz loudly when energized. With this much wear the solenoid should be replaced.

Lubrication will help to prolong solenoid life by preventing some of the above troubles. Solenoids should be lubricated periodically with a lithium based grease. Put grease on the plunger and all impact surfaces.

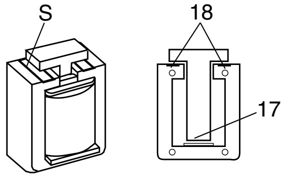


Figure 7 - Solenoid

D FAULTY PILOT INSERT

Shut off electrical power to solenoids. Shut off and exhaust the air supply. Disassemble pilot section in the following way:

1. Remove pilot cover Q (Figure 8).
2. Slip leads off solenoid tab terminals and lift out solenoids. To check solenoids see *Repair Procedure C.*
3. Remove rubber cushions CA from tops of inserts.
4. With Truarc type pliers remove retaining rings CB.
5. Remove inserts by grasping them at the shoulder area and pulling with a circular motion. Removing inserts by pulling on the spring or stem may damage the inserts.
6. Be sure that poppet return springs CC are removed.
7. Check action of each insert. The stem should move easily with light finger pressure, and should not jerk or grab during its travel (about .03 inch). If a stem does not move smoothly the insert should be replaced.

Inspect the poppets E and their seats for foreign particles or damage. If the poppets are swollen or have deteriorated, improper lubricants may be the cause. See page 4 for information about compatible lubricants.

If a poppet or inlet (upper) seat is defective the insert must be replaced. Blow out passages 5 and 9 to remove loose dirt particles. If an exhaust (lower) seat is defective the entire pilot must be replaced.

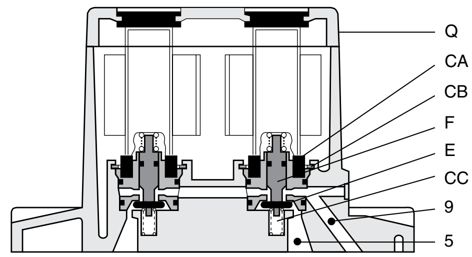


Figure 8 – Cross Section of Pilot Assembly

E FAULTY SEALS ON MONITOR SPOOL

Faulty seals on spool C (Figure 9) can result in air leaks or cause the spool to jam so that the L-G monitor does not function properly.

Before beginning disassembly to inspect the L-G monitor, shut off electrical power to the solenoids. Shut off and exhaust the air supply. Proceed as follows:

1. Remove pilot cover, disconnect solenoid leads, and remove pilot assembly.
2. Remove pin X (Figure 9), retaining ring Y, and lockout pin assembly Z.
3. Remove pin T, retaining ring R, end plug G, and spring M.
4. Remove spool C with your finger. If the spool is stuck it will be necessary to remove the monitor from the valve body, then apply low air pressure to sensing port 7 on the bottom face of the monitor. As pressure is applied place your hand over the bore opening so that the spool does not fall out and become damaged.

Inspect the Teflon surfaces of the slipper seals for scratches or other defects that could affect their sealing qualities.

If the seals are defective replace the entire spool-and-seal assembly. Before reassembly inspect the bore for burrs or grit that might have damaged the seals. See *Repair Procedure F* for remarks about bore wear.

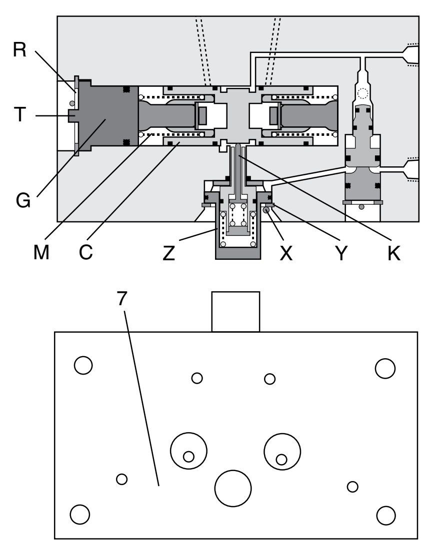


Figure 9 – Cross Section and Bottom Face of Monitor

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F WORN SPOOL BORE

A worn spool bore can cause the L-G monitor to lockout because of poor sealing and consequent air leakage. To check bore, disassemble as described in *Repair Procedure E*. If bore is worn or badly scratched, the entire monitor must be replaced**.**

G CONTAMINANTS IN SPOOL BORE

A buildup of grease, oil, or water in the spool bore can restrict or prevent movement of the spool. This can create an unsafe condition by preventing the L-G monitor from locking out when it should, or can prevent resetting after a lockout has occurred. To inspect and clean the bore follow disassembly steps in *Repair Procedure E*.

H BENT LOCKOUT PIN

If lockout pin K (Figure 9) is bent it will not retract when resetting pressure is applied, and the monitor remains locked out. To remove the lockout pin follow steps 1 and 2 in *Repair Procedure E*. Assembly with a new pin is the reverse of disassembly.

I TRANSIENT FOREIGN MATERIAL

If the valve resumes normal operation after being reset, the cause of the lockout may have been a transient foreign particle. A bit of scale or other foreign material could lodge at various points in the valve to cause a nuisance lockout. After resetting, the air flow of the next operating cycle can "wash" the foreign material out, thus permitting the valve to return to normal operation. This situation is most common after a period of press inactivity. An efficient filter located close to the valve will help to eliminate this problem.

J MAIN INLET POPPET NOT SEALING

If one of the inlet poppets is not sealing air can be detected escaping at the exhaust port. Foreign particles are sometimes responsible for holding a poppet off its seat. Manually cycle the valve several times to see if the flow of air through the valve will flush out the particles. Take normal press operation safety precautions during this procedure in order to avoid injury or damage to equipment. If cycling the valve does not clear the valve, it will be necessary to disassemble the valve and clean it.

To disassemble the valve, first turn off the electrical power to the valve, then shut off the air supply and exhaust the air in the system. Remove the pilot assembly, L-G monitor, adaptor plate (if used), and junction box. Read the note below before undertaking this disassembly.

Disassembly Note. Before removing the pilot assembly the solenoid leads must be slipped off the solenoid terminals. When the junction box is removed exercise care in withdrawing the solenoid leads from the passage through the valve body and monitor. To remove the valve elements, first remove the retaining rings H (Figure 10), end plugs W, and springs BA at the lower end of the bores. Pull inlet poppets U and V off the valve stems, and remove the remaining parts of the valve elements through the top of the valve body.

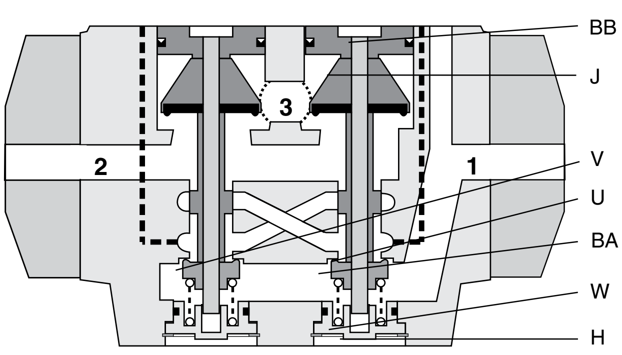

Figure 10 – Cross Section of Valve Body Assembly

If the inlet poppets U and V are damaged or have deteriorated, replace them. Deteriorated poppet material suggests the use of incompatible lubricants. Only lubricants such as those described on page 4 should be used.

While the valve is disassembled, also inspect the piston poppets J for damage or deterioration. Inspect the bores for varnish deposits or excess wear. See *Repair Procedures L* and *M.*

K LEAKING PISTON SEAL

A worn or damaged piston seal BB (Figure 10) can allow pilot pressure to leak by the piston and cause erratic valve action and intermittent lockouts. Disassemble to inspect seals. See *Repair Procedure K* for disassembly instructions.

When installed, a piston seal should have some compression in the bore. It is advisable at this time also to inspect for varnish deposits and wear or damage to poppets and their seats.

Replace any worn or damaged parts. If any parts show signs of deterioration, incompatible lubricants or solvents may be the cause. See paragraphs on compatible lubricants and cleaning on page 4.

L VARNISH DEPOSITS

Varnish deposits in the valve may affect the movement of a piston and cause intermittent lockouts. Varnish results from the action of oxygen on lubricating oils and can be aggravated by excess heat. Varnish can also come from overheated compressor oil carried over into the airlines and deposited in the valve.

To disassemble for cleaning, follow the procedure given in *Repair Procedure K*.

Use a water soluble detergent for cleaning varnished areas. Avoid chlorinated solvents (trichloroethylene, for example) and abrasive materials. The former can damage seals and poppets, and abrasives can do permanent damage to metal parts.

M EXCESSIVE LUBRICATION

Excess oil on the piston walls can sometimes cause erratic valve action and result in intermittent lock-outs. Although lubrication is not required by ROSS double valves, if an air line lubricator is used it should deposit only a thin film of oil on the piston walls. Check lubricator for correct rate of oil flow. A lubricator flow rate of one drop per minute when air is flowing is adequate for most applications.

N UNDERSIZED OR PLUGGED SILENCER

The silencer supplied with SERPAR® Crossflow double valves is designed to create minimal back pressure. However, after long usage with contaminant-laden air it may become clogged. The increased back pressure can cause erratic movement of the valve elements and lead to intermittent lockouts. A dirty silencer should be removed and cleaned with a water soluble detergent solution.

If a silencer other than the ROSS SERPAR® silencer is used, be sure that it is of the correct capacity. Otherwise, excessive back pressure may be immediately present and cause sluggish operation of the valve.

If a valve locks out intermittently but performs normally when the silencer is removed, clean the silencer or replace it with one of the correct capacity.

CAUTION: *Restricting the exhaust port of a double valve can adversely affect its operation. Silencers must be resistant to clogging and have a flow capacity greater than the exhaust capacity of the valve.*

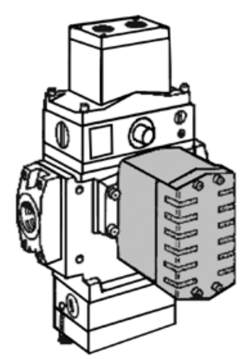

Figure 11 – SERPAR® Silencer

ROSS expressly disclaims all warranties and responsibility for any unsatisfactory performance or injuries caused by the use of the wrong type, wrong size, or inadequately maintained silencer installed with a ROSS product.

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ROSS CONTROLS®
Troy, MI., U.S.A.
Telephone: + 1-248-764-1800
Fax: + 1-248-764-1850
In the United States:
Safety Department: 1-248-764-1816
Customer Service: 1-800-GET ROSS (438-7677)
Technical Service: 1-888-TEK-ROSS (835-7677)
www.rosscontrols.com

ROSS UK Ltd.
Birmingham, United Kingdom
Telephone: + 44-121-559-4900
Fax: + 44-121-559-5309
Email: sales@rossuk.co.uk

ROSS SOUTH AMERICA Ltda.
São Paulo, Brazil CEP 09725-020
Telephone: + 55-11-4335-2200
Fax: + 55-11-4335-3888
Email: vendas@ross-sulamerica.com.br

ROSS EUROPA® GmbH
Langen, Germany
Telephone: + 49-6103-7597-0
Fax: + 49-6103-74694
Email: info@rosseuropa.com
www.rosseuropa.com

ROSS ASIA® K.K.
Kanagawa, Japan
Telephone: + 81-427-78-7251
Fax: + 81-427-78-7256
www.rossasia.co.jp

ROSS CONTROLS (CHINA) Ltd
Shanghai, China
Telephone: + 86-21-6915-7951
Fax: + 86-21-6915-7960
www.rosscontrolschina.com

ROSS CONTROLS® INDIA Pvt. Ltd.
Chennai, India
Telephone: + 91-44-2624-9040
Fax: + 91-44-2625-8730
Email: rossindia@airtelmail.in

DIMAFLUID s.a.s.
Saint Ouen, France
Telephone: + 33-01-4945-6565
Fax: + 33-01-4945-6530
Email: dimafluid@dimafluid.com
www.dimafluid.com

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