

95 Series

Inline Directional Control Valves



Thank You!

You have purchased a premium quality ROSS® pneumatic valve. It is a resilient seal spool construction, designed for inline or manifold mounting.

With care in its installation and maintenance you can expect it to have a long and economical service life. So before you go any further, please take a few minutes to look over the information on this sheet. Then save it for future reference and for the useful service information it contains. Additional information about these valves is available from ROSS upon request.



VALVE INSTALLATION

Please read and make sure you understand all installation instructions before proceeding with the installation.

If you have any questions about installation or servicing your valve, please contact ROSS or your authorized ROSS distributor, see contact information listed at the back of this document, or visit www.rosscontrols.com to find your distributor.

Pneumatic equipment should be installed only by persons trained and experienced in such installation.

Air Lines: Before installing a valve in a new or an existing system, the air lines must be blown clean of all contaminants. *It is recommended that an air filter be installed in the inlet line close to the valve.*

Valve Inlet (Port 1): Be sure that the supply line is of adequate size and does not restrict the air supply because of a crimp in the line, a sharp bend, or a clogged filter element. An inadequate air supply will adversely affect the performance of your valve.

Valve Outlets (Ports 2 and 4): For faster pressurizing and exhausting of the mechanism being operated by the valve, locate the valve as close as possible to the mechanism. The lines must be of adequate size and be free of crimps and sharp bends.

Valve Exhausts (Ports 3 and 5): To reduce exhaust noise, an efficient silencer may be used. ROSS silencers reduce impact noise by as much as 25 dB.

Electrical Supply: The voltage and hertz ratings of the valve solenoids (if any) are shown on the valve. The electrical supply must correspond to these ratings otherwise the solenoids are subject to early failure. The power supply must be capable of handling the maximum power. See Valve Specifications on page 2 for information on maximum power.

Operating Pressures and Temperatures: Allowable ranges for pressure and temperature are given in the *Valve Specifications*, see page 2. Exceeding the values shown can shorten valve life.

Pilot Supply:

Pressure Control: For valves with single remote pressure control, connect the control line to port 14 in the sub-base or manifold. For valves with double remote pressure control, connect the control lines to ports 12 and 14 in the base. See *Valve Specifications* on page 2 for required pressures.

Solenoid Control: Pressure for pilot valves is supplied from the inlet port. Be sure that port 14 in the base is plugged or pilot air will escape. If the valve must operate with an inlet pressure less than the required pilot pressure (see *Valve Specifications* on page 2), an external pilot supply of sufficient pressure must be provided. Connect the external pilot supply to port 14 in the base.

Non-Air Service: Such applications require an external pilot supply for solenoid valves. Connect to port 14 in the base. *Consult ROSS for fluid media other than air.*

Pipe Installation: To install pipe in valve ports, engage pipe one turn, apply pipe thread sealant (tape not recommended), and tighten pipe. This procedure will prevent sealant from entering and contaminating the valve.

VALVE 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. Filtering the system air 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.

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. Avoid oils with phosphate additives (e.g., zinc dithiophosphate), and diester oils; both types can harm valve components. The best oils to use 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.

Some compatible oils are listed at the right. These oils, although believed to be compatible, could change without notice because manufacturers sometimes reformulate their oils. Therefore, use oils specifically compounded for air line service. If it is a synthetic oil, contact the oil manufacturer for compatibility information.

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.

A schedule should be established for cleaning all valves, the frequency depending on the cleanliness of the air being supplied. To clean the valve use a solvent which will dry without leaving a residue. This is especially important for the spool-and-sleeve assembly. Do not use a chlorinated solvent or abrasive materials which can damage seals or do permanent damage to metal parts.

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

To reassemble the spool and sleeve put one drop of Anderol 735 (or equivalent lubricant) on each spool land. Insert the spool into the sleeve and rotate it several times to ensure even distribution of the lubricant. If the valve is used in a non-lubricated application, do not use a lubricant for reassembly which can dry out and leave a residue. Dry assembly of the spool and sleeve is preferable. Each spool and sleeve is a matched set, so care must be taken not to reverse the position of the spool in the sleeve.

Before inserting the spool-and-sleeve into the valve body, very lightly lubricate the O-rings with a lubricant such as MobilGrease 28. Do not use Anderol; it causes the O-rings to deteriorate.

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

Cleaning the Valve/Replace Worn Components. ROSS does not recommend disassembling the 95 Series valves for cleaning or repair.

VALVE SPECIFICATIONS

Construction: Spool.

Mounting Type: In-line or manifold mounted.

Flow Media: Filtered air.

Manual Override: Pushbutton, non-locking.

Pressure Controlled

Ambient/Media Temperature: 41° to 140°F (5° to 60°C).

Inlet Pressure: 30 to 150 psi (2 to 10 bar).

Pilot Pressure: Must be equal to or greater than inlet pressure.

Solenoid Pilot

Standard Voltages: 24 volts DC; 110 volts AC, 50/60 Hz.

Power Consumption: 3.5 VA holding on 50/60 Hz; 2.5 watts on DC.

Ambient/Media Temperature: 41° to 140°F (5° to 60°C).

Inlet Pressure: 22.5 to 150 psig (1.5 to 10 bar).

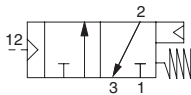
Electrical Connectors	Electrical Connector Form	Port Size	Max. Diameter Cable Size	Model Number	
	C1 Micro-Mini	1/8	4-6 mm	1766L77	1780L77
	CN2 Industrial Form B DIN 43650	1/4, 3/8, 1/2	6-8 mm	1767L77	1781L77



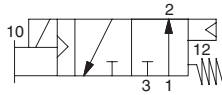
IMPORTANT NOTE: Please read carefully and thoroughly all the **CAUTIONS** and **WARNINGS** on page 4.

VALVE OPERATION

3/2 SINGLE CONTROL NORMALLY CLOSED VALVES



Pressure Controlled

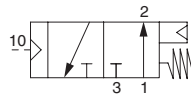


Solenoid Pilot

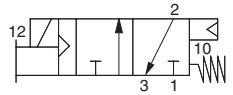
No Signal Applied: Inlet 1 closed; outlet 2 connected to exhaust 3.

Signal 12 Applied: Inlet 1 connected to outlet 2; exhaust 3 closed.

3/2 SINGLE CONTROL NORMALLY OPEN VALVES



Pressure Controlled

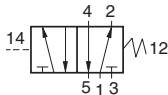


Solenoid Pilot

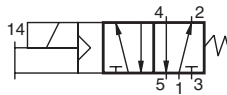
No Signal Applied: Inlet 1 connected to outlet 2; exhaust 3 closed.

Signal 12 Applied: Port 1 closed; outlet 2 connected to exhaust 3.

5/2 SINGLE CONTROL VALVES



Pressure Controlled

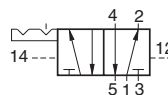


Solenoid Pilot

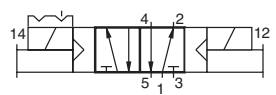
No Signal Applied: Inlet 1 connected to outlet 2; outlet 4 connected to exhaust 5; exhaust 3 closed.

Signal 14 Applied: Inlet 1 connected to outlet 4; outlet 2 connected to exhaust 3; exhaust 5 closed.

5/2 MOMENTARY CONTROL VALVES



Pressure Controlled

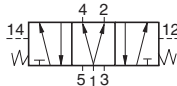


Solenoid Pilot

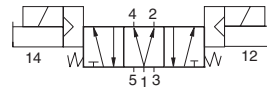
Signal 12 Applied Momentarily: Inlet 1 connected to outlet 2; outlet 4 connected to exhaust 5; exhaust 3 closed.

Signal 14 Applied Momentarily: Inlet 1 connected to outlet 4; Outlet 2 connected to exhaust 3; exhaust 5 closed.

5/3 POWER CENTER VALVES



Pressure Controlled



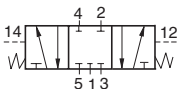
Solenoid Pilot

No Signal Applied: Inlet 1 connected to outlet 2 & outlet 4; exhaust 3 & exhaust 5 closed.

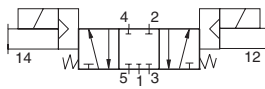
Signal 12 Applied: Inlet 1 connected to outlet 2; outlet 4 connected to exhaust 5; exhaust 3 closed.

Signal 14 Applied: Inlet 1 connected to outlet 4; outlet 2 connected to exhaust 3; exhaust 5 closed.

5/3 CLOSED CENTER VALVES



Pressure Controlled



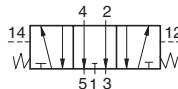
Solenoid Pilot

No Signal Applied: All ports closed.

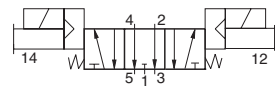
Signal 12 Applied: Inlet 1 connected to outlet 2; outlet 4 connected to exhaust 5; exhaust 3 closed.

Signal 14 Applied: Inlet 1 connected to outlet 4; outlet 2 connected to exhaust 3; exhaust 5 closed.

5/3 OPEN CENTER VALVES



Pressure Controlled



Solenoid Pilot

No Signal Applied: Inlet 1 closed; outlet 2 connected to exhaust 3; outlet 4 connected to exhaust 5.

Signal 12 Applied: Inlet 1 connected to outlet 2; outlet 4 connected to exhaust 5; exhaust 3 closed.

Signal 14 Applied: Inlet 1 connected to outlet 4; outlet 2 connected to exhaust 3; exhaust 5 closed.

VALVE SERVICE

If you have any questions about installing or servicing your valve, call ROSS Technical Services at your nearest ROSS location (see page 4) or in the U.S.A. at: 1-888-TEK-ROSS.

CAUTIONS And WARNINGS



PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure that all sources of energy are turned off, the entire pneumatic system is shut off and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS® products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any installation can be tampered with or need servicing after installation, persons responsible for the safety of others or the care of equipment must check every installation on a regular basis and perform all necessary maintenance.
3. All applicable instructions should be read and complied with before using any fluid power system in order to prevent harm to persons or equipment. In addition, overhauled or serviced valves must be functionally tested prior to installation and use. If you have any questions, call your nearest ROSS location listed in the table below.
4. Each ROSS product should be used within its specification limits. In addition, use only ROSS parts to repair ROSS products.

WARNINGS: *Failure to follow these directions can adversely affect the performance of the product or result in the potential for human injury or damage to property.*

FILTRATION and LUBRICATION

5. Dirt, scale, moisture, etc. are present in virtually every air system. Although some valves are more tolerant of these contaminants than others, best performance will be realized if a filter is installed to clean the air supply, thus preventing contaminants from interfering with the proper performance of the equipment. ROSS recommends a filter with a 5-micron rating for normal applications.
6. All standard ROSS filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. Do *not* fail to use the metal bowl guard, where provided, to minimize danger from high pressure fragmentation in the event of bowl failure. Do not expose these products to certain fluids, such as alcohol or liquefied petroleum gas, as they can cause bowls to rupture, creating a combustible condition, hazardous leakage, and the potential for human injury or damage to property. Immediately replace a crazed, cracked, or deteriorated bowl. When bowl gets dirty, replace it or wipe it with a clean dry cloth.

7. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible lubricants are petroleum based oils with oxidation inhibitors, an aniline point between 180°F (82°C) and 220°F (104°C), and an ISO 32, or lighter, viscosity. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks human injury, and/or damage to property.

AVOID INTAKE/EXHAUST RESTRICTION

8. Do not restrict the air flow in the supply line. To do so could reduce the pressure of the supply air below the minimum requirements for the valve and thereby cause erratic action.
9. Do not restrict a valve's exhaust port as this can adversely affect its operation. Exhaust silencers must be resistant to clogging and must have flow capacities at least as great as the exhaust capacities of the valves. Contamination of the silencer can result in reduced flow and increased back pressure.

WARNINGS:

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

POWER PRESSES

10. Mechanical power presses and other potentially hazardous machinery using a pneumatically controlled clutch and brake mechanism must use a press control double valve with a monitoring device. A double valve without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All double valve installations involving hazardous applications should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.

ENERGY ISOLATION/EMERGENCY STOP

11. Per specifications and regulations, ROSS **L-O-X®** valves and **L-O-X®** valves with **EEZ-ON®** operation are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

STANDARD WARRANTY

All products sold by ROSS CONTROLS are warranted for a one-year period [with the exception of all Filters, Regulators and Lubricators ("FRLs") which are warranted for a period of seven years] from the date of purchase to be free of defects in material and workmanship. ROSS' obligation under this warranty is limited to repair or replacement of the product or refund of the purchase price paid solely at the discretion of ROSS and provided such product is returned to ROSS freight prepaid and upon examination by ROSS is found to be defective. This warranty becomes void in the event that product has been subject to misuse, misapplication, improper maintenance, modification or tampering. THE WARRANTY EXPRESSED ABOVE IS IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES AND ROSS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES EITHER EXPRESSED OR IMPLIED WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ROSS MAKES NO WARRANTY WITH RESPECT TO ITS PRODUCTS MEETING THE PROVISIONS OF ANY GOVERNMENTAL OCCUPATIONAL SAFETY AND/OR HEALTH LAWS OR REGULATIONS. IN NO EVENT IS ROSS LIABLE TO PURCHASER, USER, THEIR EMPLOYEES OR OTHERS FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHICH MAY RESULT FROM A BREACH OF THE WARRANTY DESCRIBED ABOVE OR THE USE OR MISUSE OF THE PRODUCTS. NO STATEMENT OF ANY REPRESENTATIVE OR EMPLOYEE OF ROSS MAY EXTEND THE LIABILITY OF ROSS AS SET FORTH HEREIN.

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