

# 35 Series Crossflow™



## Double Valves with Pressure Switches Basic Size 4, 8, 12, 30

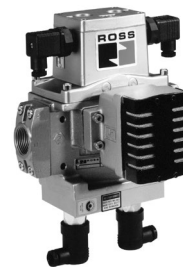
### Thank You!

You have purchased a premium-quality ROSS® pneumatic valve.

It is a SERPAR® Crossflow double valve designed for use ***with a suitable external monitor***. The external monitor must ensure that the operation of the double valve is inhibited should there be a malfunction in the system impacting proper valve functions. With care in its installation and maintenance, you can expect your valve to have a long and reliable service life. Before you go any further, please take a few minutes to look over the information in this folder, and save it for future reference.



Valve Basic Size 4



Valve Basic Size  
12 thru 30

## VALVE INSTALLATION

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

*Additional technical documentation is available for download at [www.rosscontrols.com](http://www.rosscontrols.com).*

*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](http://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 a 5-micron-rated 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. The air supply must not only provide sufficient pressure (see *Valve Specifications, page 3*), but must also provide an adequate flow of air on demand.

**Valve Outlet (Port 2):** 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 Exhaust (Port 3):** Do not restrict air flow from the exhaust port as this can adversely affect the operation of the valve.

**Pilot Solenoid Electrical Supply:** These double valves get electrical power through plug-in connectors. The electrical supply must correspond to the voltage and hertz ratings of the solenoids. Otherwise, the solenoids are subject to early failure. If power is supplied by a transformer, it must be capable of handling the inrush current without significant voltage drop. See *Valve Specifications on page 3* for inrush current data.

**Operating Pressures and Temperatures:** Allowable ranges for pressure and temperatures are given in the *Valve Specifications* on page 3. Exceeding the values shown can adversely affect performance and shorten valve life.

**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.

**Monitor:** These valves do not have their own monitors. *They must be connected to an external monitoring system that ensures that valve operation will be inhibited should a system malfunction occur. If controlling a critical element of machinery affecting safety, i.e., press brake, the valves must be connected to an external monitor.*

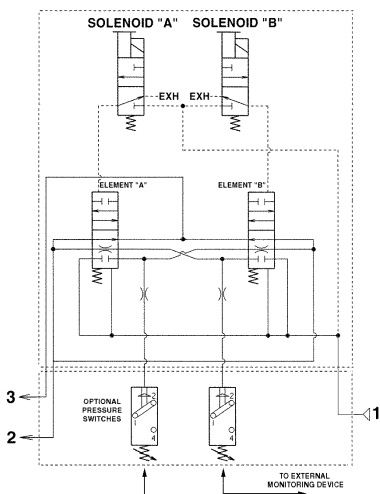
**Pressure Switches:** Some models have two pressure switches that sense that the two valve elements did not move together. The pressure switches are only indicators that the valve elements did not move in step with one another, and the switches will not lock out the valve. They should not be confused with a monitor.

Each pressure switch has four electrical contacts. Contacts 1 and 2 are closed when no air pressure signal is applied to the switch. Contacts 1 and 4 are closed when an air pressure signal is applied to the switch. Contact 3 is for a ground connection. For further information in the use or connection of the pressure switches call your local ROSS distributor or location below, or, in the U.S.A., call ROSS Technical Service at 1-888-TEK-ROSS.

## VALVE OPERATION

**Normal Operation:** After installation the valve is operated by energizing both pilot solenoids simultaneously. This applies inlet air pressure to the pistons of both main valve elements, and causes them to open so that inlet air (port 1) flows to the outlet (port 2). At this time, the pressure switches have air and contacts 1 & 4 on the pressure switch should be closed. When the solenoids are de-energized, both main valve elements close. Air no longer flows from inlet to outlet, and downstream air is exhausted through port 3. At this time, air is removed from the pressure switches and contacts 1 & 2 on the pressure switches should be closed.

**Detecting a Malfunction:** The valve *MUST* be connected to an external monitoring system so that if the main valve elements do not both open or close at the same time, the monitor will detect this condition and lock the valve out so that it cannot be cycled. For further information in the use or connection of the pressure switches call *ROSS Technical Service* at 1-888-TEK-ROSS.



Model illustrated has two pressure switches

## 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. 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 system 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 itself does not require air line lubrication.)

**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 above 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.

### 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. 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 any good commercial solvent. Do *not* scrape varnished surfaces. Also do not use chlorinated solvents 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 MobilGrease 28.

**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, shut off the air supply, and exhaust the air in the system before beginning any disassembly operation. Service kits are listed on page 3.

# VALVE SPECIFICATIONS

**Construction:** Dual poppet.

**Mounting Type:** Inline.

**Pilot Solenoids:** Two, rated for continuous duty.

**Standard Voltages:** 24 volts DC; 110-120 volts AC, 50/60 Hz.

*Voltages at pressure switches must not exceed 250 volts.*

**Power Consumption** (each solenoid):

**Basic Size 4:** 35 VA maximum in-rush, 22 VA maximum holding on 50 or 60 Hz; 14 watts nominal on DC.

**Basic Size 8, 12, 30:** 8.587 VA maximum in-rush, 30 VA maximum holding on 50 or 60 Hz; 14 watts nominal on DC.

**Electrical Connections:** Uses two cord-grip connectors at solenoids. Connectors according to EN 175301-803 Form A.

**Enclosure Rating:** **Basic Size 4:** IP65, IEC 60529.

**Basic Size 8, 12, 30:** IP 65 according to

IEC-Publication 144 and DIN 40050, Sheet 1.

**Ambient Temperature:** 40° to 120°F (4° to 50°C).

**Media Temperature:** 40° to 175°F (4° to 80°C).

**Flow Media:** Filtered air.

**Inlet Pressure:** **Basic Size 4:** 40 to 150 psig (2.5 to 10 bar).

**Basic Size 8, 12, 30:** 30 to 125 psig (2 to 8.5 bar).

**Port Threads:** NPT, BSPP.

**Functional Safety Data:** Category 4 PL e; B10D: 20,000,000; PFHD: 7.71x10<sup>-9</sup>; MTTFD: 301.9 (n<sub>op</sub>: 662400).

**Certifications:** CE Marked for applicable directives, DGUV Test, CSA/UL.

**Vibration/Impact Resistance:** Tested to BS EN 60068-2-27.

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

Electrical Connector Form	Electrical Connector Type	Cord Length meter (feet)	Cord Diameter	Electrical Connector Model Number		
				Without Light	Lighted Connector	
					24 Volts DC	120 Volts AC
EN 175301-803 Form A	Connector Only	–	–	937K87	936K87-W	936K87-Z
	Connector for threaded conduit (1/2 inch electrical conduit fittings)	–	–	723K77	724K77-W	724K77-Z
	Prewired Connector (18 gauge)	2 (6½)	10-mm	371K77	383K77-W	383K77-Z
	Prewired Connector (18 gauge)	2 (6½)	6-mm	721K77	720K77-W	720K77-Z

**CAUTION:** Do not use electrical connectors with surge suppressors, as this may increase valve response time when de-actuating the solenoids.

## VALVE SERVICE

ROSS would be happy to service this valve for you at its factory repair center. If you purchased your valve from ROSS please contact ROSS customer service, if you purchased your valve thru an authorized ROSS distributor please contact the distributor for return instructions. However, if you choose to service this valve yourself, it is strongly recommended that you visit our website at [www.rosscontrols.com](http://www.rosscontrols.com) for available downloadable technical documentation.

If you service the valve yourself, be sure to turn off electrical power to the valve, shut off the air supply, and exhaust the air in the system before beginning any disassembly operation. Listed below are kits for servicing Basic Size 4, 8, 12, and 30 Crossflow double valves, as well as replacement solenoid information.

**Valve Body Service Kits.** These kits contain all parts needed for complete reconditioning of a valve body. Included are poppets, spindles, gaskets, seals, and instructions for use.

Basic Size 4 .....**541K77**  
 Basic Size 8 .....**429K77**  
 Basic Size 12 .....**432K77**  
 Basic Size 30 .....**435K77**

**Gasket and Seal Kits.** These kits are needed when valve bodies are disassembled for cleaning. They include all necessary gaskets, O-rings, and other seals. These parts are included in the *Valve Body Service Kits* on the left.

Basic Size 4 ..... **N/A**  
 Basic Size 8 ..... **438K77**  
 Basic Size 12 ..... **441K77**  
 Basic Size 30 ..... **444K77**

**Solenoid Coils.** Order two (2) replacement solenoid coils by the following part numbers. Specify voltage and hertz when ordering.

Basic Size 4 .....**319B33**  
 Basic Size 8, 12, 30 .....**411B04**

**Solenoid Pilot Repair Kit:** These assemblies consist of new pilot valve mechanisms ready to bolt in position on the valve.

Basic Size 4 ..... **N/A**  
 Basic Size 8, 12, 30 ..... **1189K77**

# CAUTIONS And WARNINGS



**ROSS OPERATING VALVE, ROSS CONTROLS®, ROSS DECCO®, and Automatic Valve Industrial, collectively the “ROSS Group”.**

## PRE-INSTALLATION or SERVICE

1. Before servicing a valve or other pneumatic component, be sure all sources of energy are turned off, the entire pneumatic system is shut down and exhausted, and all power sources are locked out (ref: OSHA 1910.147, EN 1037).
2. All ROSS Group Products, including service kits and parts, should be installed and/or serviced only by persons having training and experience with pneumatic equipment. Because any product can be tampered with and/or need servicing after installation, persons responsible for the safety of others or the care of equipment must check ROSS Group Products on a regular basis and perform all necessary maintenance to ensure safe operating conditions.
3. All applicable instructions should be read and complied with before using any fluid power system 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 Group location.
4. Each ROSS Group Product should be used within its specification limits. In addition, use only ROSS Group components to repair ROSS Group Products.

**WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.**

## FILTRATION and LUBRICATION

1. 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. The ROSS Group recommends a filter with a 5-micron rating for normal applications.
2. All standard ROSS Group filters and lubricators with polycarbonate plastic bowls are designed for compressed air applications only. 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 and hazardous leakage. Immediately replace crazed, cracked, or deteriorated bowls.
3. Only use lubricants which are compatible with materials used in the valves and other components in the system. Normally, compatible

lubricants are 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. Avoid oils with phosphate type additives which can harm polyurethane components, potentially leading to valve failure which risks personal injury, and/or damage to property.

**WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.**

## AVOID INTAKE/EXHAUST RESTRICTION

1. Do not restrict air flow in the supply line. To do so could reduce the pressure of the supply air below minimum requirements for the valve and thereby causing erratic action.
2. 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: Failure to follow these instructions can result in personal injury and/or property damage.**

## SAFETY APPLICATIONS

1. 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.
2. Safety exhaust (dump) valves without a self-contained monitoring device should be used only in conjunction with a control system which assures monitoring of the valve. All safety exhaust valve installations should incorporate a monitoring system which inhibits further operation of the valve and machine in the event of a failure within the valve mechanism.
3. Per specifications and regulations, the ROSS L-O-X® and L-O-X® with EEZ-ON®, N06 and N16 Series operation products are defined as energy isolation devices, NOT AS EMERGENCY STOP DEVICES.

**WARNINGS: Failure to follow these instructions can result in personal injury and/or property damage.**

## STANDARD WARRANTY

All products sold by the ROSS Group are warranted for a one-year period [with the exception of Filters, Regulators and Lubricators (“FRLs”) which are warranted for a period of seven (7) years] from the date of purchase. All products are, during their respective warranty periods, warranted to be free of defects in material and workmanship. The ROSS Group's obligation under this warranty is limited to repair, replacement or refund of the purchase price paid for products which the ROSS Group has determined, in its sole discretion, are defective. All warranties become void if a product has been subject to misuse, misapplication, improper maintenance, modification or tampering. Products for which warranty protection is sought must be returned to the ROSS Group freight prepaid.

ALL PRODUCTS SOLD BY THE ROSS GROUP ARE WARRANTED FOR A ONE-YEAR PERIOD [WITH THE EXCEPTION OF FILTERS, REGULATORS AND LUBRICATORS (“FRLS”) WHICH ARE WARRANTED FOR A PERIOD OF SEVEN (7) YEARS] FROM THE DATE OF PURCHASE. ALL PRODUCTS ARE, DURING THEIR RESPECTIVE WARRANTY PERIODS, WARRANTED TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP. THE ROSS GROUP'S OBLIGATION UNDER THIS WARRANTY IS LIMITED TO REPAIR, REPLACEMENT OR REFUND OF THE PURCHASE PRICE PAID FOR PRODUCTS WHICH THE ROSS GROUP HAS DETERMINED, IN ITS SOLE DISCRETION, ARE DEFECTIVE. ALL WARRANTIES BECOME VOID IF A PRODUCT HAS BEEN SUBJECT TO MISUSE, MISAPPLICATION, IMPROPER MAINTENANCE, MODIFICATION OR TAMPERING. PRODUCTS FOR WHICH WARRANTY PROTECTION IS SOUGHT MUST BE RETURNED TO THE ROSS GROUP FREIGHT PREPAID.

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