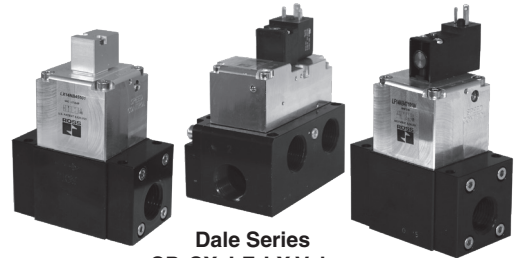


Dale Series CP, CX, LF, LX - *B Model* Inline Poppet Valves & Manifolds



Thank You!

You have purchased a premium-quality ROSS® pneumatic valve. It is a poppet valve with metal internals designed for inline mounting, and has been built to the highest standards. 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 in this folder. Then save it for future reference and for the useful service information it contains.



Dale Series
CP, CX, LF, LX Valves

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.

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.

ROSS Dale Series CP, CX, LF, LX valves are not designed as control valves for air clutch/brake mechanisms on mechanical power presses, and must not be installed for such use.

Only double valves conforming to OSHA standards should be used in such applications.

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.

Valve Outlets (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 Exhausts (Port 3): Do not restrict the air flow from the exhaust port of the valve body or pilot body as this can adversely affect the operation of the valve. However, to reduce exhaust noise, an efficient silencer may be used. ROSS silencers reduce impact noise by as much as 25 dB, and produce little back pressure.

Electrical Supply: The voltage and hertz ratings of the valve solenoids (if any) are shown on the pilot housing.

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 3 for information on maximum power.

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

Pilot Supply: Solenoid Control: Pressure for the pilot valve is supplied internally for most valves and requires no special connection. However, if your valve is designated for external pilot supply, a 10-32, 1/8-inch, M5, or G1/8-inch pilot supply line must be connected to port X-1 in the manifold or top plate.

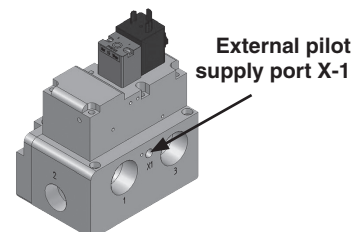
See *Valve specifications* on page 3 for pressure requirements.

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.

EXTERNAL PILOT SUPPLY CONVERSION:

The Dale Series CP valves can be easily field converted to external pilot supply by simply removing existing pipe plug from port X-1, and installing a 10-32, 1/8-inch, M5, or G1/8-inch air supply to the X-1 port on the base manifold.

Note: Valves for vacuum service requires an external pilot supply.



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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 an 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 this valve itself does not require air line lubrication, but some optional adaptors do, i.e., air index, etc.).

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.

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

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

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 some 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 for these valves are listed on page 3.

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 for available downloadable technical documentation.

Electrical Connectors

Valve Type	Port Size	Electrical Connector Form	Electrical Connectors Part Number			
			Lighted Connector Only		Lighted Connector Pre-wired*	
			24 Volts DC	120 Volts AC	24 Volts DC	120 Volts AC
Electrical Connectors for CP, CX Series Solenoid Pilot Controlled Valves.						
2/2	1/4 - 1	EN 175301-803 Form C	2453K77-W	2453K77-Z	2476K77-W	2476K77-Z
2/2	1½-2½	EN 175301-803 Form A	936K87-W	936K87-Z	720K77-W	720K77-Z
3/2	1/2	EN 175301-803 Form C	2453K77-W	2453K77-Z	2476K77-W	2476K77-Z
3/2	1	EN 175301-803 Form A	936K87-W	936K87-Z	720K77-W	720K77-Z
Electrical Connectors for LF, LX Series Solenoid Pilot Controlled Valves.						
2/2	3/8 - 1	EN 175301-803 Form C	2453K77-W	2453K77-Z	2476K77-W	2476K77-Z
2/2	1¼-2½	EN 175301-803 Form A	936K87-W	936K87-Z	720K77-W	720K77-Z



*Pre-wired connectors include a 2 meter (6½ ft.) cord.

VALVE SERVICE

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

Solenoid Coils and Solenoid Assembly. Replacement solenoid coils or solenoid assembly can be ordered by the part numbers listed below.

Valve Body Service Kits			
Valve Type	Valve Series	Port Size	Kit Number*
2/2	CP, LF	3/8 - 1/2	2484K77
2/2	CP, LF	3/4 - 1	2485K77
2/2	CP, LF	1¼ - 1½	2472K77
2/2	CP, LF	2 - 2½	2473K77
3/2	CP	3/8 - 1/2	2486K77
3/2	CP	3/4 - 1	2487K77
2/2	CX	1/4	2537K77
2/2	CX, LX	3/8 - 1/2	2488K77
2/2	CX, LX	3/4 - 1	2489K77
2/2	CX, LX	1¼ - 1½	2492K77
2/2	CX, LX	2 - 2½	2493K77
3/2	CX	3/8 - 1/2	2490K77
3/2	CX	3/4 - 1	2491K77

Solenoid Pilot Kits and Solenoids Replacement							
Valve Type	Valve Series	Function	Inlet Port Size	Solenoid Coil Part Number		Solenoid Assembly Part Number #	
				24 volts DC	110 or 120 volts AC	24 volts DC	110 or 120 volts AC
2/2	CX	NC	1/4	–	–	1527B7916	1527B79105
		NO	1/4	–	–	1528B7916	1528B79105
2/2	CP, CX	NC	1/2, 1	–	–	1527B7916	1527B79105
			1½ - 2½	411B3316	411B3305	1524C7916	1524C79105
		NO	1/2, 1	–	–	1528B7916	1528B79105
			1½ - 2½	411B3316	411B3305	1540C7916	1540C79105
3/2	CP, CX	NC	1/2	–	–	1527B7916	1527B79105
			1	411B3316	411B3305	1524C7916	1524C79105
		NO	1/2	–	–	1528B7916	1528B79105
			1	411B3316	411B3305	1540C7916	1540C79105
2/2	LF, LX	NC	3/8 - 1	–	–	1527B7916	1527B79105
			1¼ - 2½	411B3316	411B3305	1524C7916	1524C79105
		NO	3/8 - 1	–	–	1528B7916	1528B79105
			1¼ - 2½	411B3316	411B3305	1580B7916	1580B79105

Solenoid assembly includes the coil, and the pilot valve.

VALVE SPECIFICATIONS

Construction: Poppet.

Mounting Type: Inline.

Solenoids: AC or DC power. Rated for continuous duty. Voltage and hertz ratings shown on pilot housing.

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

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

Flow Media: Filtered air. For liquid applications, consult ROSS.

Manual Override: Non-Locking.

Valve Type	Valve Series	Port Size	Standard Voltages/Power Consumption (each solenoid):
2/2	CP, CX	1/4 thru 1	24 volts DC: 1.2 watts on DC; 110 volts AC, 50 Hz: 5.4 VA;
	LF, LX	3/8 thru 1	120 volts AC, 60 Hz: 5.0 VA.
	CP, CX, LF, LX	1½ thru 2½	24 volts DC; 110 volts AC, 50 Hz; 120 volts AC, 50/60 Hz. 5.8 watts nominal on AC and DC, 6.5 watts maximum on AC and DC.
3/2	CP, CX	3/8 thru 1/2	24 volts DC: 1.2 watts on DC; 110 volts AC, 50 Hz: 5.4 VA; 120 volts AC, 60 Hz: 5.0 VA.
	CP, CX	3/4 and 1	24 volts DC; 110 volts AC, 50 Hz; 120 volts AC, 50/60 Hz. 5.8 watts nominal on AC and DC, 6.5 watts maximum on AC and DC.

	Valve Series	Port Size	Solenoid Pilot Controlled	Pressure Controlled
Inlet Pressure	CP, LF	All	30 to 145 psig (2 to 10 bar)	–
	CX	¼	Vacuum to 250 psig (vacuum to 17.2 bar)	–
	CX, LX	½ thru 2½	Vacuum to 145 psig (vacuum to 10 bar)	Vacuum to 250 psig (vacuum to 17.2 bar)
Pilot Pressure	CP, LF	All	30 to 145 psig (2 to 10 bar)	–
	CX	¼	70 to 145 psig (5 to 10 bar)	–
	CX*, LX	½ thru 2½	Vacuum to 145 psig (vacuum to 10 bar)	30 to 250 psig (2 to 17.2 bar)

* CX Series 3/2 valves require a minimum pressure of 50 psig (3.4 bar).

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



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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