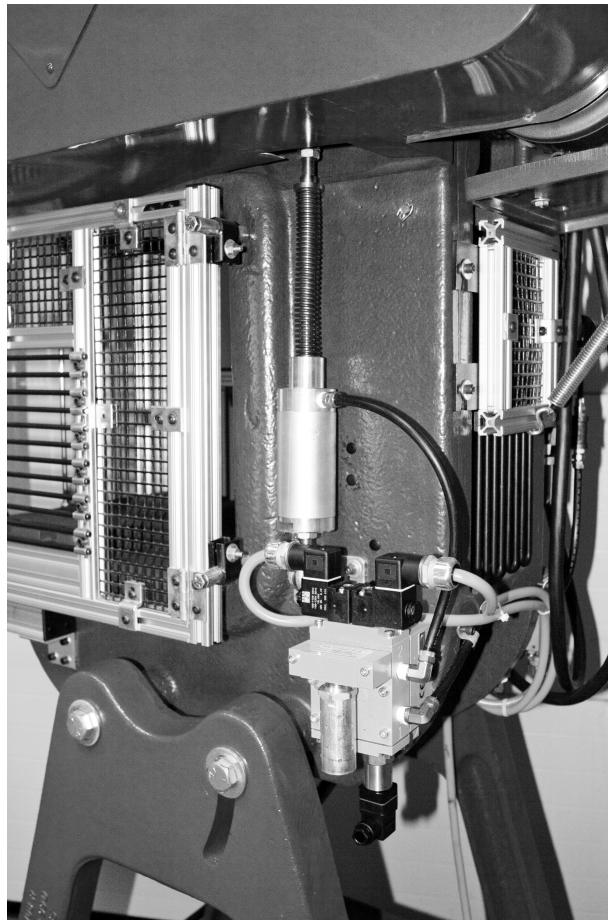




INSTALLATION MANUAL FOR **1/4" Monitored Dual-Solenoid Air Valve**



Part No. RCD-140

IMPORTANT: PLEASE REVIEW THIS ENTIRE PUBLICATION BEFORE INSTALLING, OPERATING, OR MAINTAINING THE DUAL-SOLENOID AIR VALVE.

IN GENERAL

1/4" Dual-Solenoid Valve

Safety Precautions

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



This safety alert symbol identifies important safety messages in this manual. When you see this symbol, be alert to the possibility of personal injury, and carefully read the message that follows.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Efficient and safe machine operation depends on the development, implementation and enforcement of a safety program. This program requires, among other things, the proper selection of point-of-operation guards and safety devices for each particular job or operation and a thorough safety training program for all machine personnel. This program should include instruction on the proper operation of the machine, instruction on the point-of-operation guards and safety devices on the machine, and a regularly scheduled inspection and maintenance program.

Rules and procedures covering each aspect of your safety program should be developed and published both in an operator's safety manual, as well as in prominent places throughout the plant and on each machine. Some rules or instructions which must be conveyed to your personnel and incorporated in to your program include:

DANGER

Never place your hands or any part of your body in this machine.



Never operate this machine without proper eye, face and body protection.



Never operate this machine unless you are fully trained and instructed and unless you have read the instruction manual.



Never operate this machine if it is not working properly—stop operating it and advise your supervisor immediately.



Never use a foot switch to operate this machine unless a point-of-operation guard or device is provided and properly maintained.



Never operate this machine unless two-hand trip, two-hand control or presence-sensing device is installed at the proper safety distance. Consult your supervisor if you have any questions regarding the proper safety distance.



Never tamper with, rewire or bypass any control or component on this machine.

A company's safety program must involve everyone in the company, from top management to operators, since only as a group can any operational problems be identified and resolved. It is everyone's responsibility to implement and communicate the information and material contained in catalogs and instruction manuals to all persons involved in machine operation. If a language barrier or insufficient education would prevent a person from reading and understanding various literature available, it should be translated, read or interpreted to the person, with assurance that it is understood.



FOR MAINTENANCE AND INSPECTION ALWAYS REFER TO THE OEM'S (ORIGINAL EQUIPMENT MANUFACTURER'S) MAINTENANCE MANUAL OR OWNER'S MANUAL. If you do not have an owner's manual, please contact the original equipment manufacturer.

Safety References

OSH ACT AND FEDERAL REGULATIONS

Since the enclosed equipment can never overcome a mechanical deficiency, defect or malfunction in the machine itself, OSHA (Occupational Safety and Health Administration) has established certain safety regulations that the employers (users) must comply with so that the machines used in their plants, factories or facilities are thoroughly inspected and are in first-class operating condition before any of the enclosed equipment is installed.

1. U.S. Government—An Act—Public Law 91-596, 91st Congress, S. 2193, December 29, 1970:

Duties

SEC. 5. (a) Each employer—

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

2. OSHA 29 CFR Sections that an employer (user) must comply with include:

1910.211 Definitions.

1910.212 General requirements for all machines.

1910.217 Mechanical power presses.

1910.219 Mechanical power-transmission apparatus.

3. OSHA 29 CFR 1910.147 The control of hazardous energy (lockout/tagout).

4. OSHA Publication

"General Industry Safety and Health Regulations Part 1910," Code of Federal Regulations, Subpart O

This publication can be obtained by contacting:

U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954
Phone: (202) 512-1800
<http://bookstore.gpo.gov>

ANSI SAFETY STANDARDS FOR MACHINES

The most complete safety standards for machine tools are published in the ANSI (American National Standards Institute) B11 series. The following is a list of each ANSI B11 Standard available at the printing of this publication.

B11—2008	General Safety Requirements
B11.1	Mechanical Power Presses
B11.2	Hydraulic Power Presses
B11.3	Power Press Brakes
B11.4	Shears
B11.5	Iron Workers
B11.6	Lathes
B11.7	Cold Headers and Cold Formers
B11.8	Drilling, Milling, and Boring Machines
B11.9	Grinding Machines
B11.10	Metal Sawing Machines
B11.11	Gear and Spline Cutting Machines
B11.12	Roll Forming and Roll Bending Machines
B11.13	Automatic Screw/Bar and Chucking Machines
B11.14	Withdrawn (Now see ANSI B11.18)
B11.15	Pipe, Tube and Shape Bending Machines
B11.16	Metal Powder Compacting Presses
B11.17	Horizontal Hydraulic Extrusion Presses
B11.18	Coil Processing Systems
B11.19	Performance Criteria for Safeguarding
B11.20	Integrated Manufacturing Systems
B11.21	Lasers
B11.22	CNC Turning Machines
B11.23	Machining Centers
B11.24	Transfer Machines
B11.TR1	Ergonomic Guidelines
B11.TR2	Mist Control Considerations
B11.TR3	Risk Assessment
B11.TR4	Programmable Electronic Systems (PES/PLC)
B11.TR5	Sound Level Measurement Guidelines
B11.TR7	Risk Assessment
R15.06	Robotic Safeguarding
B15.1	Mechanical Power Transmission Apparatus
B56.5	Guided Industrial Vehicles and Automated Function of Manned Industrial Vehicles
B65.1	Printing Press Systems
B65.2	Binding and Finishing Systems
B65.5	Stand-Alone Patten Presses
B151.1	Horizontal (Plastic) Injection Molding Machines
B152.1	Hydraulic Die Casting Presses
B154.1	Rivet Setting Machines
B155.1	Packaging Machinery
01.1	Woodworking Machinery

These standards can be purchased by contacting:

ANSI—American National Standards Institute
25 West 43rd Street, 4th Floor
New York, New York 10036
Phone: (212) 642-4900
www.ansi.org

(Continued on next page.)

SECTION 1—IN GENERAL

1/4" Dual-Solenoid Valve

NATIONAL SAFETY COUNCIL SAFETY MANUALS

Other good references for safety on machine tools are the National Safety Council's Safety Manuals. These manuals are written by various committees including the Power Press, Forging and Fabricating Executive Committee. Copies of the following publications are available from their library:

- Power Press Safety Manual - 5th Edition
- Safeguarding Concepts Illustrated - 7th Edition
- Forging Safety Manual

These manuals can be obtained by contacting:

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
1-800-621-7615
www.nsc.org

OTHER SAFETY SOURCES

National Institute of Occupational Safety and Health (NIOSH)
4676 Columbia Parkway
Cincinnati, OH 45226
Toll-Free: 1-800-35-NIOSH (1-800-356-4674)
Phone: (513) 533-8328
www.cdc.gov/niosh

OTHER SAFETY SOURCES (continued)

Robotic Industries Association (RIA)
900 Victors Way, Suite 140
P.O. Box 3724
Ann Arbor, MI 48106
Phone: (734) 994-6088
www.roboticsonline.com

NEMA (National Electrical Manufacturers Association)
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209
Phone: (703) 841-3200
www.nema.org

NFPA (National Fire Protection Association)
1 Batterymarch Park
Quincy, MA 02269-9101
Phone: (617) 770-3000
www.nfpa.org

For additional safety information and assistance in devising, implementing or revising your safety program, please contact the machine manufacturer, your state and local safety councils, insurance carriers, national trade associations and your state's occupational safety and health administration.

Warranty, Disclaimer and Limitation of Liability

WARRANTY

Rockford Systems, LLC warrants that this product will be free from defects in material and workmanship for a period of 12 months from the date of shipment thereof. ROCKFORD SYSTEMS LLC'S OBLIGATION UNDER THIS WARRANTY IS EXPRESSLY AND EXCLUSIVELY LIMITED to repairing or replacing such products which are returned to it within the warranty period with shipping charges prepaid and which will be disclosed as defective upon examination by Rockford Systems, LLC. This warranty will not apply to any product which will have been subject to misuse, negligence, accident, restriction and use not in accordance with Rockford Systems, LLC's instructions or which will have been altered or repaired by persons other than the authorized agent or employees of Rockford Systems, LLC. Rockford Systems, LLC's warranties as to any component part is expressly limited to that of the manufacturer of the component part.

DISCLAIMER

The foregoing Warranty is made in lieu of all other warranties, expressed or implied, and of all other liabilities and obligations on the part of Rockford Systems, Inc., including any liability for negligence, strict liability, or otherwise, and any implied warranty of merchantability or fitness for a particular purpose is expressly disclaimed.

LIMITATION OF LIABILITY

Under no circumstances, including any claim of negligence, strict liability, or otherwise, shall Rockford Systems, LLC be liable for any incidental or consequential damages, or any loss or damage resulting from a defect in the product of Rockford Systems, LLC.

1/4" Dual-Solenoid Valve With Pressure Switch Part No. RCD-140

FEATURES

- **Dynamic Monitoring**—Monitoring and air flow control functions are integrated into two identical valve elements for CAT 3 applications.
- **Basic 3/2 NC Valve Function**—Dirt tolerant, wear compensating poppet design provides quick response and high flow capacity.
- **Ready-to-run**—Ready-to-run again if an abnormality clears itself upon the removal of electricity to both solenoids. It does not remember the abnormality and stay in a locked-out state until intentionally reset.
- **Muffler**—Includes high-flow, clog-resistant muffler.
- **Mounting**—Inline mounted with NPT pipe threads. Inlet and outlet ports on both sides provide for flexible piping. Plugs for unused ports are included.

APPLICATIONS

- Full-revolution-clutch mechanical power presses
- Mechanical-friction-clutch press brakes

VALVE SPECIFICATIONS

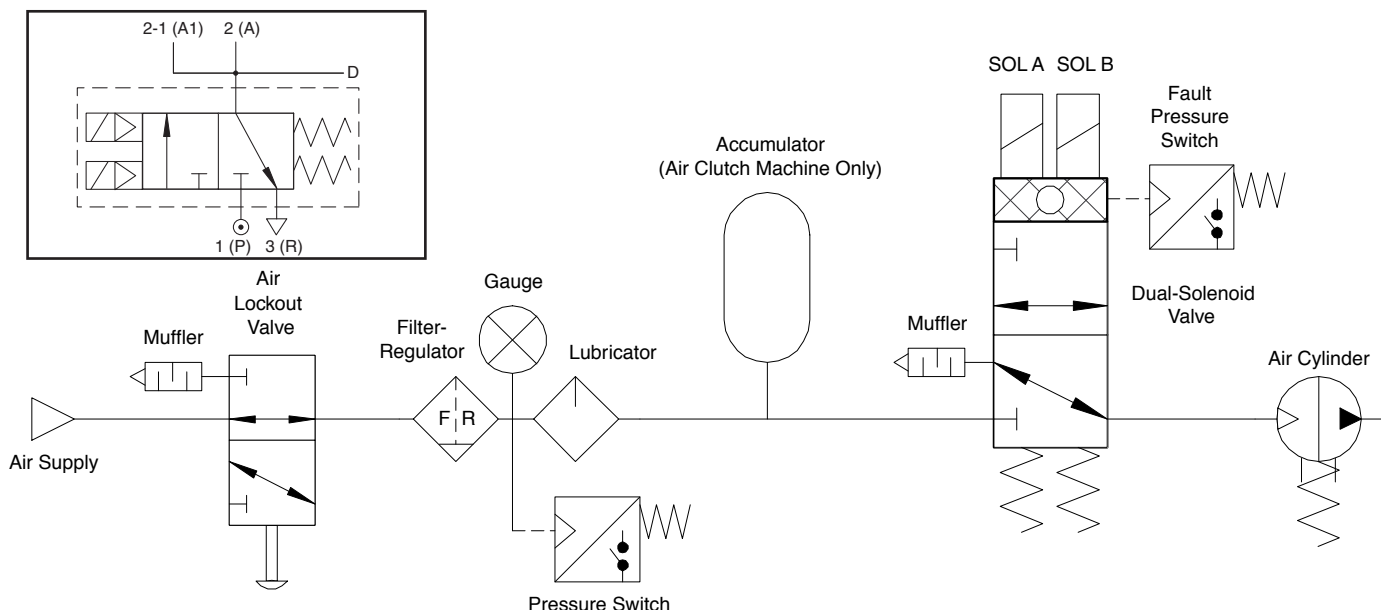
Standard Voltages120 V AC, 50/60 Hz; 24 V DC
 Inlet Pressure30 to 116 psig (2 to 8 bar)
 Port size.....1/4" Inlet and outlet; 1/2" exhaust
 Working mediumFiltered, lubricated, or nonlubricated air
 Ambient Temperature15° to 120°F
 Air Temperature40° to 175°F
 Pressure Switch Rating5 amps @ 250 V AC
 5 amps @ 30 V DC

AIR FLOW

Cv (Flow Rate)	
1 → 2	2 → 3
1.34	2.43

SECTION 2—INSTALLATION

Typical Installation



SECTION 2—INSTALLATION

1/4" Dual-Solenoid Valve

Installation Considerations

For convenience, an air lockout valve should be installed in the air line just ahead of the filter-regulator-lubricator assembly. Make sure that the air filter-regulator-lubricator is consistent in size with that of the dual-solenoid air valve. Port size and pipe size must be the same to prevent air flow restriction. If this is not done, the performance of the machine will be affected. Install the dual valve as close to the air cylinder as possible. This provides rapid dumping of the operating air to provide fast action.

When ready to install the dual-solenoid valve, remove the dust covers from the valve port connections. Avoid getting particles, such as chips, sealing compounds or scale, in the piping. This may affect the performance of the machine.

VALVE INLET (PORT 1)

Do not restrict air supply when installing the valve. Any restriction of the air supply lines (i.e., sharp bends or undersized lines) will reduce the speed with which the outlet volume is pressurized.

VALVE OUTLET (PORT 2)

For faster pressurizing and exhausting of the outlet volume, locate the valve as close to the air cylinder as possible. Any restriction in the outlet lines will reduce both pressurizing and exhausting speeds.

VALVE EXHAUST (PORT 3)

Do not restrict exhausted air. Limiting the exhausting speed decreases an important safety feature of the dual-solenoid valve. Only the muffler furnished should be used.



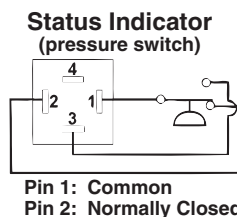
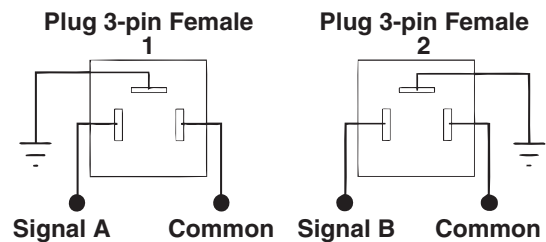
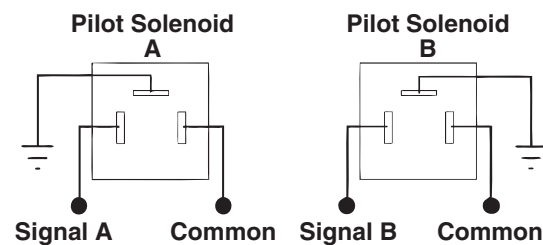
The exhaust muffler must be kept clean at all times. Never operate the machine unless it is clean.

Electrical Connections

The solenoids are rated for continuous duty at 120 volts. A supply voltage that is too high or too low can cause nuisance lockouts or premature solenoid burnouts. The transformer should be capable of handling the inrush current of the solenoids without significant voltage drop.

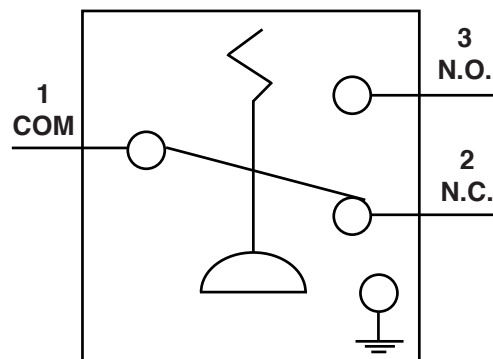
WIRING DIAGRAM

Pilot Solenoids—Should be fired simultaneously from separate channels to operate the valve normally.



Terminals 1 and 3 are connected when air pressure is present and the valve is "ready-to-run". If a fault has occurred or pressure is removed from the valve inlet, terminals 1 and 2 are connected.

WIRING SCHEMATIC—FAULT PRESSURE SWITCH



Mounting and Connection

1. Determine the mounting location for the dual-solenoid air valve on the machine. Vertical mounting is recommended.
 - The dual-solenoid air valve should be mounted as close to the air cylinder as possible.
2. Measure or spot holes on the machine at the mounting location.
3. Drill and tap two holes for the screws provided.
4. Attach the dual-solenoid air valve to the machine with the two screws and tighten securely.
5. Attach a pipe or hose (customer to furnish) to the inlet port 1 on the valve body. The other end of the pipe or hose connects via piping to the FRL assembly. Use pipe thread sealant on the male threads.
 - Plug the unused port 1 on the opposite side of the valve using the furnished plug.
 - A minimum of 30 psi must be maintained at the valve for proper operation.
6. Attach a flexible hose (customer to furnish) to the outlet port 2 on the valve body. Attach the other end of this hose to the threaded inlet port of the air cylinder.
 - Plug the unused port 2 on the opposite side of the valve using the furnished plug.
7. Remove the receptacle to access the terminals for the fault pressure switch. Connect the wires to the appropriate terminals. The other end of the wires go to the control box. Reattach the receptacle and tighten.
8. Perform a test procedure after installation and/or repair prior to normal use to ensure normal equipment operation in order to avoid personal injury or equipment damage.
9. **Always perform a test procedure after installation and/or repair prior to normal use.**

Test Procedure

1. Electrically energize both pilot solenoids simultaneously. The valve should supply pressure from inlet port 1 to outlet port 2. There should not be any flow to the exhaust port at this time.
2. De-energize one of the pilot solenoids. The valve should go into a lockout condition and any downstream pressure in outlet port 2 will be exhausted to the atmosphere through the exhaust port. There should also be a small audible flow of air out the exhaust port as long as the valve remains in the lockout condition.
3. Re-energize the pilot solenoid that was de-energized in step 2. The valve must remain in the lockout condition.
4. De-energize both pilot solenoids. The valve should return to the "ready" condition. There should be no pressure at the outlet port 2 and no audible flow of air to the exhaust port.
5. Energize both pilots simultaneously again. As in step 1, the valve should supply pressure from inlet port 1 to outlet port 2, and there should not be any flow to the exhaust port at this time.
6. De-energize the other pilot solenoid. As in step 2, the valve should again go into a lockout condition.
7. Re-energize the pilot solenoid that was de-energized in step 6. The valve must remain in the lockout condition.
8. De-energize both pilot solenoids. The valve should return to the "ready" condition as in step 4.

Note: The status indicator can be used to signal the machine control that a lockout has occurred. The status indicator utilizes a pressure switch which has four electrical contacts (contact 4 is a ground). During normal operation, the pressure switch is pressurized. A lockout condition depressurizes the switch until the valve is ready to run (after power has been removed from both pilot solenoids. Contacts 1 and 2 are closed when the switch is depressurized (NC) and contacts 1 and 3 are closed when an adequate pressure signal is applied to the switch (NO).



The exhaust air muffler must be kept clean at all times. Never operate the machine unless the muffler is clean. The muffler must be cleaned on a regular basis.



These valves require clear air. Blow all lines clean of dirt, scale, etc., before making final connection. Drain water from the filter bowl regularly. Should this bowl refill in a short period of time, it may indicate the need for a larger filter in the main air supply line. The air filter must be kept clean at all times. Never operate the machine unless the air filter is clean and water is drained.

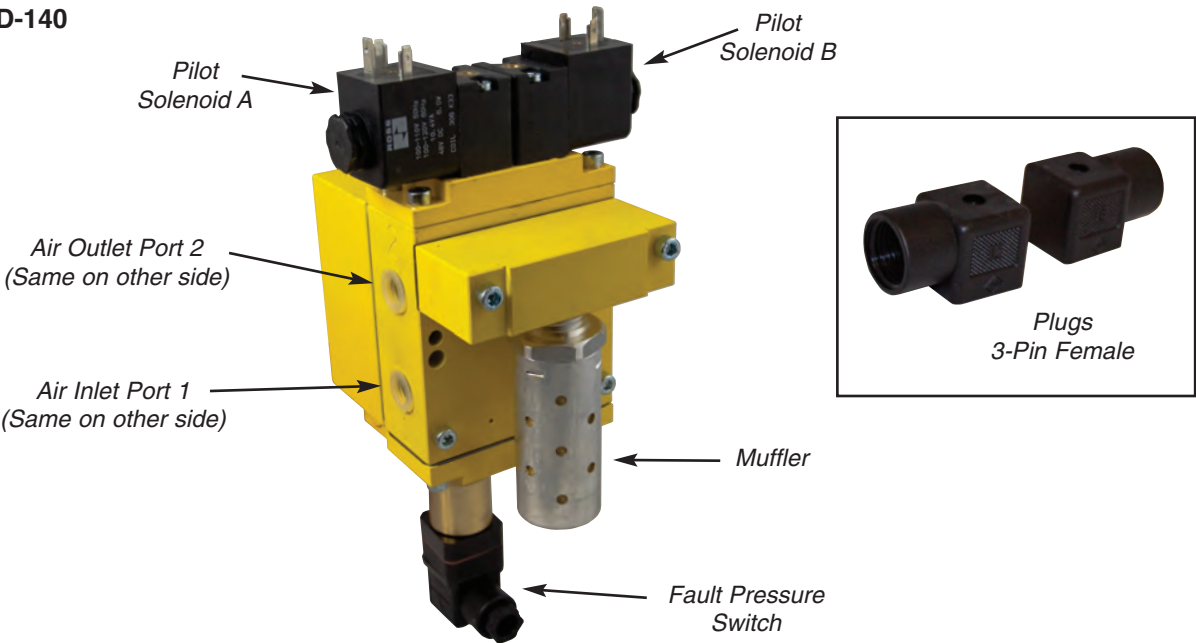


For safety reasons, do not install any pneumatic devices between the valve and the air cylinder.

SECTION 2—INSTALLATION

1/4" Dual-Solenoid Valve

Part No. RCD-140



Dimensions—Inches (mm)

