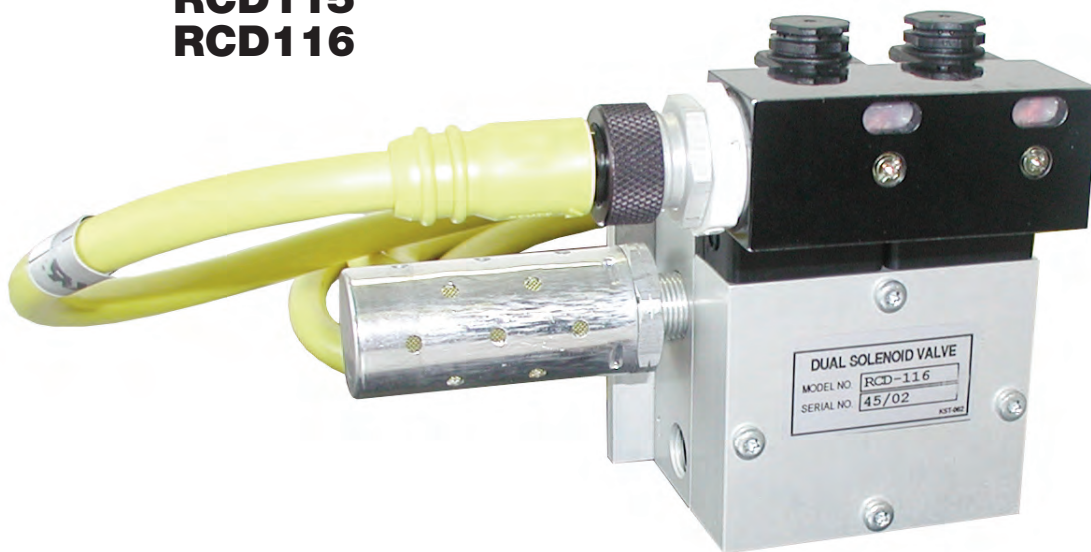




INSTALLATION MANUAL FOR $\frac{1}{4}$ " Monitored Dual-Solenoid Air Valve

For Part Numbers:

RCD115
RCD116



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

IN GENERAL

1/4" Dual-Solenoid Valve

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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.

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 into 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:

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 371954
Pittsburgh, PA 15250-7954
Phone: (202) 512-1800
Fax: (202) 512-2250
www.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.

- B11.1 Mechanical Power Presses
- B11.2 Hydraulic Power Presses
- B11.3 Power Press Brakes
- B11.4 Shears
- B11.5 Iron Workers
- B11.6 Manual Turning Machines (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
- B11.14 Coil Slitting Machines/Systems
- B11.15 Pipe, Tube and Shape Bending Machines
- B11.16 Metal Powder Compacting Presses (Withdrawn)
- B11.17 Horizontal Hydraulic Extrusion Presses
- B11.18 Coil Processing Systems
- B11.19 Performance Requirements for Risk Reduction Measures: Safeguarding and other Means of Reducing Risk
- B11.20 Safety Requirements for Manufacturing Systems/Cells
- B11.21 Lasers
- B11.22 CNC Turning Machines
- B11.23 Machining Centers
- B11.24 Transfer Machines
- B11.TR1 Ergonomics
- B11.TR2 Mist Control
- B11.TR3 Risk Assessment
- B11.TR4 Control Reliability for Design, Construction, and Validation of PESs
- R15.06 Robotic Safeguarding

These standards can be purchased by contacting:

American National Standards Institute
25 West 43rd Street
New York, New York 10036
Phone: (212) 642-4900
Fax: (212) 398-0023
www.ansi.org

OR

AMT—The Association for Manufacturing Technology
7901 Westpark Drive
McLean, Virginia 22102
Phone: (703) 893-2900
Toll-Free: 1-800-524-0475
Fax: (703) 893-1151
E-Mail: AMT@amtonline.org
www.amtonline.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 - 4th Edition
- Safeguarding Concept Illustrations - 6th Edition
- Forging Safety Manual

These manuals and can be obtained by contacting:

National Safety Council
1121 Spring Lake Drive
Itasca, IL 60143-3201
1-800-621-7619 ext. 2199
Fax: (630) 285-0797
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
Fax: (513) 533-8573
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
Fax: (734) 994-3338
www.roboticsonline.com

NEMA (National Electrical Manufacturers Association)
1300 North 17th Street, Suite 1847
Rosslyn, VA 22209
Phone: (703) 841-3200
Fax: (703) 841-5900
www.nema.org

NFPA (National Fire Protection Association)
1 Batterymarch Park
Quincy, MA 02269-9101
Phone: (617) 770-3000
Fax: (617) 770-0700
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

9. Limited Warrantie

9.1. (i) Subject to Section 8.1(ii) below, Rockford Systems makes to Customer the following sole and exclusive warranties with respect to Goods:

(a) with respect to Goods that are manufactured based on Custo specifications, at the time of shipment by Rockford Systems, the Goods sold under the Agreement that are manufactured by Rockford Systems pursuant to such specifications conform to such specifications set forth in the applicable Order Documentation; and

(b) at the time of shipment by Rockford Systems, the Goods sold un the Agreement that are manufactured by Rockford Systems are free from defects in material and workmanship.

(c) Rockford Systems's warranty is for a period of 1 year, and beg from date of shipment from Rockford Systems to the original purchaser. This warranty does not include accessories, parts or equipment sold hereunder that are manufactured by someone other than Rockford Systems.

(ii) Every claim by Customer against Rockford Systems for breac warranty with respect to the Goods shall be deemed waived by Customer unless written notice thereof is received by Rockford Systems within fifteen (15) days after discovery.

9.2. If Rockford Systems breaches either of the warranties set forth in Section 8.1(i) above, and written notice thereof is received by Rockford Systems from Customer within the applicable time period specified in Section 8.1(ii) above, Customer's sole and exclusive remedy and Rockford Systems's only obligation shall be, as Rockford Systems in its sole and exclusive judgment shall determine, the replacement of the nonconforming Goods, or an adjustment to the purchase price for the nonconforming Goods or the repair of the nonconforming Goods. All transportation charges related to replacement or repair of Goods shipped to Rockford Systems's plant or facility (or other place at Rockford Systems's direction) shall be prepaid by Customer. Rockford Systems shall be responsible for reasonable transportation charges back to Customer for Goods that have been replaced or repaired by Rockford Systems. Any replacement Goods or repaired Goods shall be subject to these Terms and Conditions.

9.3. THE EXPRESS WARRANTIES SET FORTH HEREIN ARE THE ONLY WARRANTIES APPLICABLE TO THE SALE OF GOODS BY ROCKFORD SYSTEMS TO CUSTOMER PURSUANT TO THE AGREEMENT, AND THEY EXCLUDE ALL OTHER EXPRESS, ORAL OR WRITTEN WARRANTIES, AS WELL AS ANY WARRANTIES IMPLIED BY LAW WITH RESPECT TO THE GOODS, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PURPOSE, NOTWITHSTANDING ANY DISCLOSURE TO ROCKFORD SYSTEMS OF THE INTENDED USE OF THE GOODS.

9.4. Rockford Systems's warranties under Section 8.1(i) are void if repairs or modifications of the Goods are made by anyone other than Rockford Systems. Without limitation of the foregoing, Rockford Systems assumes no responsibility for and shall have no obligations to Customer because defects in any materials furnished by, or any faulty workmanship provided by, any party other than Rockford Systems.

9.5. Rockford Systems reserves the right to improve its products through changes in design or material without being obligated to incorporate such changes into products of prior manufacture. Customer cannot rely on any such changes as proof of insufficiency or inadequacy of prior designs of the Goods or material contained in the Goods.

9.6. If Customer grants to an end user of the Goods (or any other customer of Customer) any warranty that is greater in scope or time than the warranty and claims period stated herein, Rockford Systems shall not be liable beyond the scope of the limited warranty, the claim period, the damages and the remedies provided for under this Section.

9.7. Solely to the extent transferable, Rockford Systems assigns and transfers to Customer the original manufacturer's warranty on Goods sold hereunder that are not manufactured by Rockford Systems.

Ordering Information

Part No.	Description
RCD115	Valve With Pressure Switch (for Fault Indication)
RCD116	Valve Without Pressure Switch (No Fault Indication)

Specifications of Valve:

Working mediumCompressed air, filtered, lubricated or nonlubricated
 Temperature15° to 140°F
 Operating pressure20 to 120 psig
 Body.....Aluminum
 Piston sealsPolyurethane
 Port size1/4" Inlet and outlet; 3/8" exhaust

Air Flow

Cv (Flow Rate)	
1 → 2	2 → 3
2.3	1.6

Specifications of Fault Pressure Switch (RCD115 Only):

Pressure range*7.25—116 psi (0.5—8 bar)
 Maximum pressure1,160 psi (80 bar)
 Maximum voltage250 V AC
 Maximum current3 A
 Maximum temperature176°F (80°C)

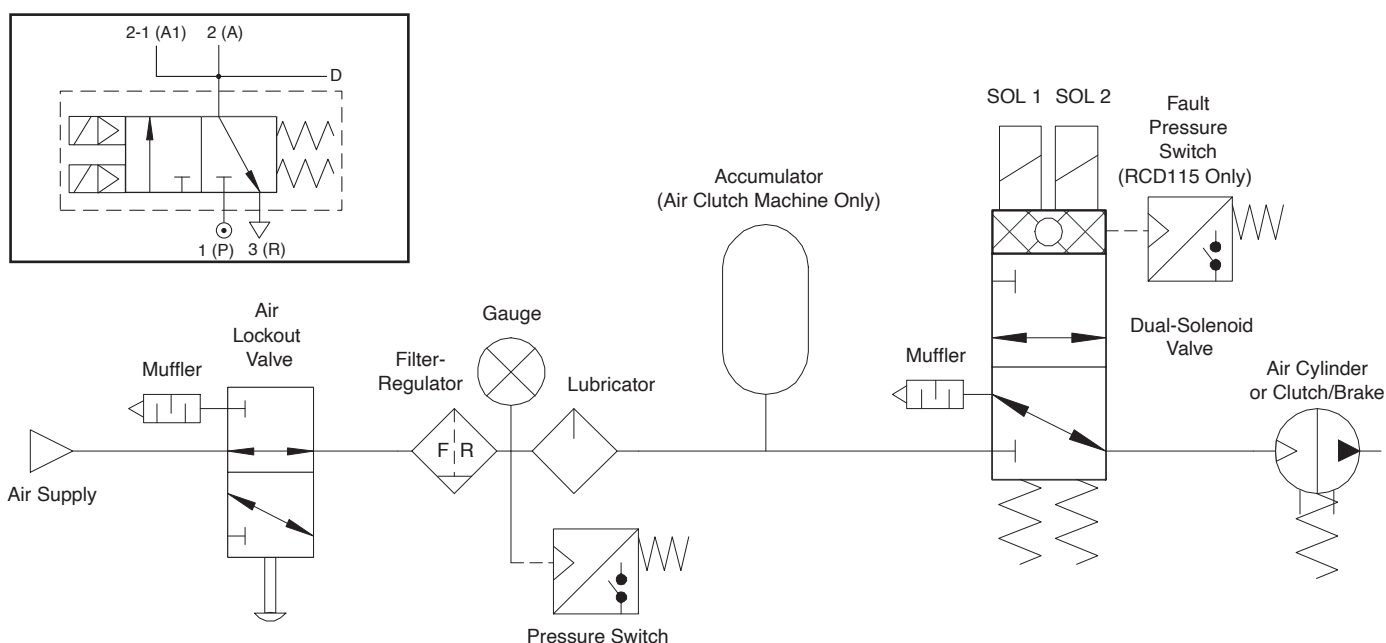
*Although the pressure is adjustable, it has been factory set to the appropriate amount and should not be changed.

Applications:

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

SECTION 2—INSTALLATION

Figure 1.1 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. For machines with an air clutch, an accumulator (air surge tank) is recommended directly ahead of the valve to assure sufficient air volume. Install the dual valve as close to the clutch and brake or air cylinder as possible. This provides rapid dumping of the operating air to provide fast clutch and brake action. If the clutch and brake are split, two dual valves with electrical monitoring may be required.

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 or clutch/brake 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.

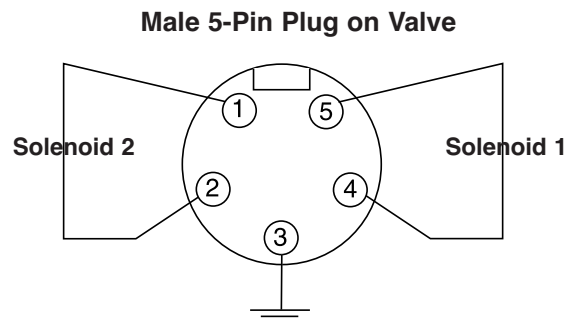


The exhaust muffler must be kept clean at all times. Never operate the machine unless it is clean.

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.

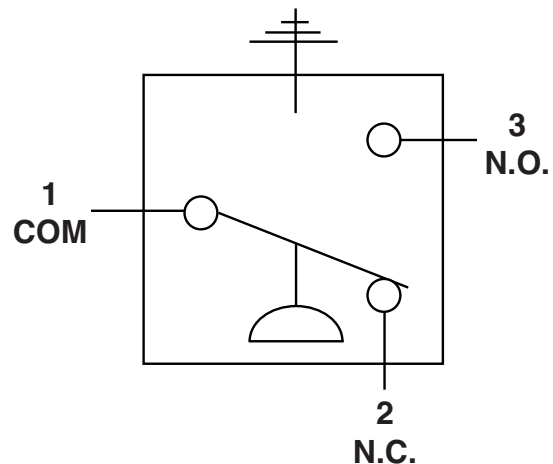
WIRING SCHEMATIC—SOLENOIDS



COLOR-CODING OF WIRES IN CABLE

- 1—White
- 2—Red
- 3—Green
- 4—Orange
- 5—Black

WIRING SCHEMATIC—FAULT PRESSURE SWITCH (RCD-115 ONLY)



Mounting and Connecting the Valve

1. Determine the mounting location for the dual-solenoid air valve on the machine.
 - The dual-solenoid air valve should be mounted as close to the air cylinder or clutch/brake as possible.
2. Measure or spot holes on the machine at the mounting location.
3. Drill and tap four holes for 1/4-20 x 3/8" screws (not furnished).
4. Attach the dual-solenoid air valve to the machine with four 1/4-20 x 3/8" screws and tighten securely.

Mounting and Connecting the Valve (continued)

5. Attach a pipe or hose (customer to furnish) to the inlet port (marked "1" on the valve body). The other end of the pipe or hose connects via piping to the FRL assembly. Use teflon tape on the male threads. Make sure the tape does not extend beyond the threaded portion.
 - A minimum of 20 to 30 psi must be maintained at the valve for proper operation.
6. Attach a flexible hose (customer to furnish) to the outlet port (marked "2" on the valve body). Attach the other end of this hose to the threaded inlet port of the air cylinder.
7. Attach the furnished muffler to the exhaust port (marked "3" on the valve body).
8. Each valve is furnished with a 12', 5-conductor cable. Attach the quick-connect receptacle to the male 5-pin plug on the valve. The other end of the cable needs to be wired in to the control box. When installing, the cable can be cut to the exact length required. For more than 12' of cable, please contact the factory. Refer to the wiring schematics furnished with the control for proper wiring.
9. **RCD-115 Only:** Unscrew and remove the black plastic receptacle on top of the fault pressure switch. Using a small flat screwdriver, pop out the terminal block in the receptacle by inserting the screwdriver in the slot that says "lift" with an arrow pointing to it. Unscrew the fitting and remove the washer and rubber grommet inside the receptacle. Using the appropriate multiple-conductor cable (such as SO or SJO), strip the appropriate amount of the jacket off to expose the individual wires. Insert the wires through the fitting, washer, and rubber grommet. Please note that the hole in the rubber grommet may be too small for the wires to

fit through—it may need to be enlarged by breaking out some of the pre-cut concentric pieces around the hole. Make sure that only the individual wires, and not the entire cable, are going through the rubber grommet and into the receptacle housing. Connect the wires to the appropriate terminals on the terminal block. The other end of the cable needs to be wired in to the control box. Refer to the wiring schematics furnished with the control for proper wiring. Insert the terminal block back into the receptacle and tighten the fitting on the cable. Replace the receptacle on top of the fault pressure switch.

Photo 2.2 Dual-Solenoid Air Valve Mounted Close to Air Cylinder on a Full-Revolution-Clutch Press

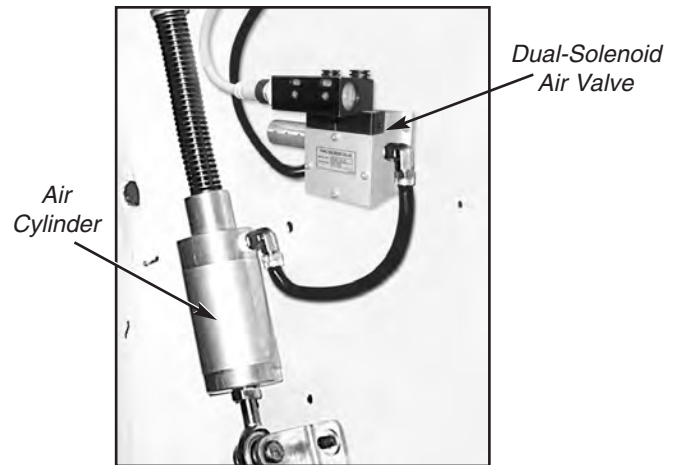
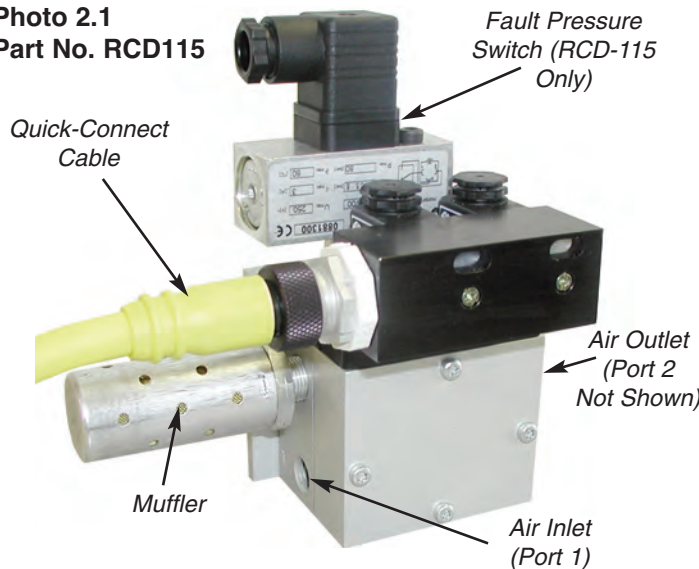


Photo 2.1 Part No. RCD115



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 or clutch/brake.