

INSTALLATION MANUAL

FOR FILTER-REGULATOR-LUBRICATOR:

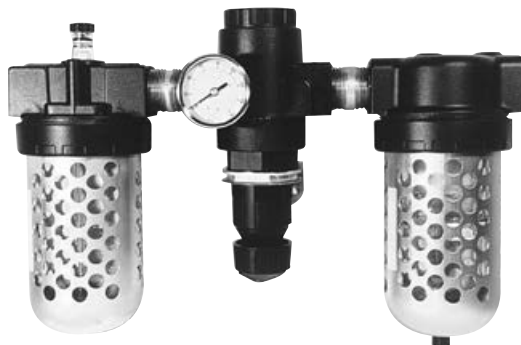


RCL-048 1/8" Regulator and Gauge
(not shown)

RCL-043 1/4" FRL Assembly
RCL-044 1/2" FRL Assembly



RCL-045 3/4" FRL Assembly



RCL-046 1" FRL Assembly
RCL-047 1 1/2" FRL Assembly


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SECTION 1—IN GENERAL


Safety Precautions

“  **DANGER** ” Danger is used to indicate the presence of a hazard which WILL cause SEVERE personal injury if the warning is ignored.


“  ” 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.


 **DANGER** 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.

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, LLC, 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.

Warnings for FRL (Filter-Regulator-Lubricator) Assemblies

These filter-regulator-lubricators are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under specifications.

The polycarbonate plastic bowl/reservoir used on these products can be damaged and possibly burst if exposed to certain substances (i.e., solvents, strong alkalies, compressor oils containing ester-based additives or synthetic oils). Fumes from these substances that come in contact with the polycarbonate bowl, externally or internally, can also result in damage. Clean with warm water only.

If outlet pressure is in excess of the filter-regulator pressure setting, it could cause downstream equipment to rupture or malfunction. Install a pressure relief device downstream of the filter-regulator if this is a concern. The relief pressure and flow capacity of the relief device must satisfy system requirements.

The accuracy of the indication of pressure gauges can change, both during shipment (despite care in packaging) and during the service life. If a pressure gauge is to be used with these products and if inaccurate indications may be hazardous to personnel or property, the gauge should be calibrated before initial installation and at regular intervals during use. For gauge standards, refer to ANSI B40.1.

In lubrication applications, some oil mist may escape from the point of use into the surrounding atmosphere. Users should refer to OSHA regulations for limiting oil mist contamination and for the use of protection equipment.

SECTION 2—SPECIFICATIONS

Filter-Regulator-Gauge

Fluid.....	Compressed Air
Operating Temperature	40°-125°F (4° - 52°C)
Maximum Inlet Pressure.....	150 psi (10.3 bar)
Port Size	1/4", 1/2", 3/4", 1", or 1 1/2" NPTF
Gauge Ports	1/4"
Type.....	Relieving
Filter Bowl	Transparent withMetal Shatterguard
Element.....	5-Micron
Filter Drain	Manual

Lubricator

Operating Temperature	125°F (52°C)
Maximum Inlet Pressure.....	150 psi (10.3 bar)
Port Size	1/4", 1/2", 3/4", 1", or1 1/2" NPTF
Reservoir	Transparent with guard
Lubricants	Misting-type oil rated at 80 to120 SSU at 100°F (38°C)

SECTION 3—INTRODUCTION

Filter-Regulator-Lubricator Assemblies

The air filter cleans the air that goes to the solenoid valves, air cylinder, clutch and brake, or any equipment that requires air pressure. The regulator and gauge are used to adjust the air pressure to the proper amount needed for proper operation. The lubricator keeps the solenoid air valve, the clutch/brake, or the air cylinder properly lubricated. These assemblies include a steel mounting bracket and either a module connector or two nipples.

The filter removes most liquid and solid particles that may be in the air line coming to the machine. However, water vapor will pass through these filter/regulators and could condense into liquid form downstream as the air temperature drops. An air dryer should be used if water condensation could be a problem in this application.

SECTION 4—ASSEMBLY

The 1/4", 1/2" and 3/4" assemblies consist of:

- 1—Filter-Regulator
- 1—Gauge
- 1—Lubricator
- 1—Connector Kit (Connector and Cover)
- 1—Mounting Bracket with Nut
- 1—1/4" Port Plug

The 1" and 1 1/2" assemblies consist of:

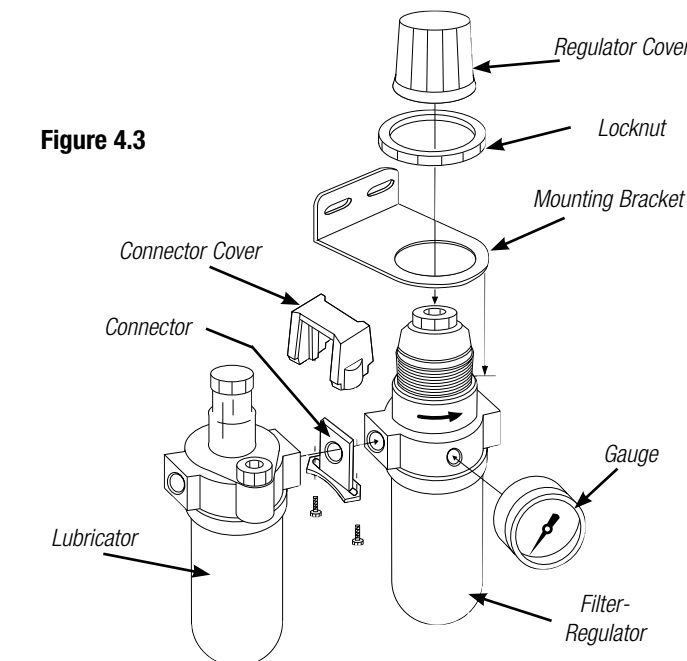
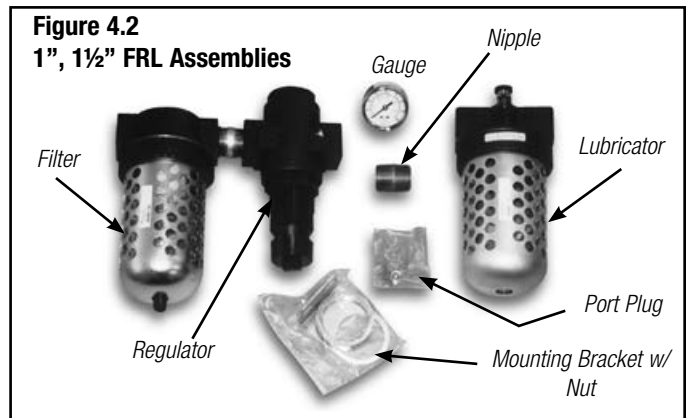
- 1—Assembled Filter-Regulator
- 1—Lubricator
- 1—Gauge
- 1—Nipple
- 1—Mounting Bracket with Nut
- 1—1/4" Port Plug

1. Locate the FRL assembly. Remove all components from the shipping containers. Lay them out on a bench or working surface. Verify the parts supplied for this assembly against the packing list.
2. Before assembling these components, determine the direction of air flow and the mounting location on the machine or equipment. The filter-regulator should be mounted upstream of any lubricators and as near as possible to the application point.
3. The major components are connected by either a connector kit (1/4", 1/2" and 3/4" assemblies) or a nipple (1" and 1 1/2" assemblies). If there is a connector kit, place the connector between the filter-regulator and the lubricator. Slide the connector (1/4", 1/2" and 3/4" assemblies) cover over the connector, the filter-regulator, and the lubricator (this joins the filter-regulator to the lubricator). Tighten the two screws (furnished). Refer to Figure 4.3.

OR

Place one close nipple between the preassembled filter-regulator and the lubricator and tighten.

4. Make sure air flow is in the direction of the arrow or the "in/out" indication on the body of the filter-regulator-lubricator assembly.



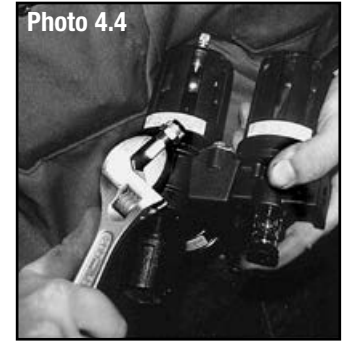
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SECTION 4—ASSEMBLY

Filter-Regulator-Lubricator Assemblies

5. Locate the pressure gauge. Use teflon tape on the male threads. Make sure the tape does not extend beyond the threaded portion of the gauge (Photo 4.1).
6. Install the pressure gauge in the threaded port opposite the mounting surface on the regulator. Tighten securely (Photo 4.2).
7. A 1/4" port plug is supplied. Use this if there is an unused port on the regulator. If other pneumatic equipment will be installed (i.e., air pressure switch or lockout valve), a brass elbow (not furnished) is required. The elbow size depends on the air line piping being used for the FRL. Use teflon tape on the male threads of the plug or the elbow (photo 4.3). Again make sure the tape does not extend beyond the threaded portion. Install either the plug or elbow into the port and tighten securely (photo 4.4).



SECTION 5—INSTALLATION

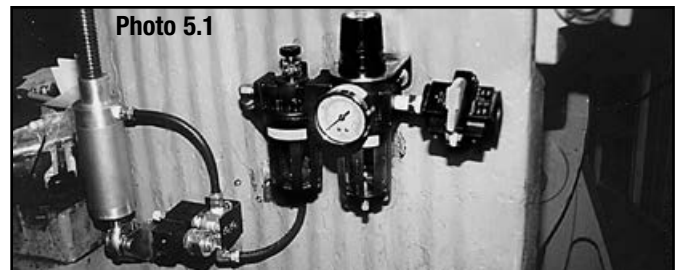
Notes

Please note the following points before mounting and installing this assembly.

- To avoid excessive piping, be sure to mount the filter-regulator-lubricator close to other air-operated equipment (Photo 5.1).
- Make sure it is at floor level for easy access. Install the FRL vertically (filter drain at the bottom) in the air line. Locate the filter-regulator upstream of any lubricators. In systems with cyclic demand, install the filter-regulator and lubricator upstream of cycling control valves.
- Make sure the outlet port of the lubricator is oriented toward the inlet port (2) of the next component to be mounted in the air line, usually the solenoid valve.
- Before applying air pressure, make sure the bowls are tight.

Mounting

1. Measure and spot holes on the machine for the mounting bracket (Photo 5.2). Drill and tap holes for the bracket (Photo 5.3). Attach the mounting bracket to the machine. Tighten the fasteners (Photo 5.4).
2. Remove the cover from the top of the regulator.



(Continued on next page.)

SECTION 5—INSTALLATION

Filter-Regulator-Lubricator Assemblies

Mounting (continued)

3. Locate the locknut. Insert the regulator portion of the FRL up through the mounting bracket hole (Photo 5.5). Place the locknut over the regulator and tighten it securely. Snap or screw the cover back onto the regulator (Photo 5.6). Make sure the FRL unit is level after the installation (Photo 5.7).
4. Fill the lubricator with a good quality lubricant (see the machine owner's manual for the OEM's specifications) to the level indicated by the maximum fill line on the transparent reservoir. Do not overfill. When the machine is cycled, the lubricator drip rate may be adjusted according to the instructions on page 7 of this manual.

Note: Air pressure must be regulated high enough to develop sufficient action to actuate the clutch mechanism cleanly. Depending on the clutch construction and linkage design, this will usually be between 60 and 75 psi.



Do not use more pressure than is necessary and never apply more than 125 psi.



The air filter must be kept clean at all times. Never operate the machine unless the air filter is clean.



The lubricator must not be filled while under pressure.

Photo 5.5



Photo 5.6

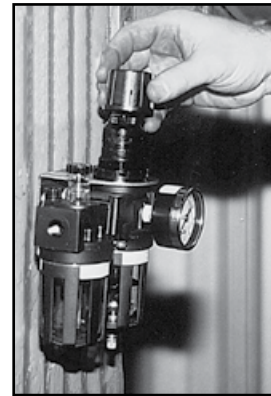
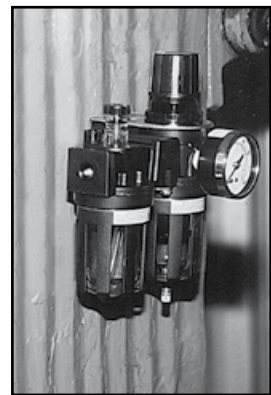


Photo 5.7



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SECTION 6—FILTER ADJUSTMENT AND MAINTENANCE

Filter-Regulator-Lubricator Assemblies

Adjusting the Filter-Regulator

1. Before turning on the system air pressure, turn the knob counterclockwise until all load is removed from the regulating spring.
2. Turn on the system air pressure. Next, turn the knob clockwise until the desired outlet pressure is reached.
3. To avoid minor readjustment after making a change in the pressure setting, always approach the desired pressure from a lower pressure. When reducing from a higher to a lower setting, reduce the pressure to less than the desired setting. Next, bring it up to the desired pressure.
4. Push or pull the adjusting knob downward or upward to lock the pressure setting. To release it, pull or push the knob in the appropriate direction.

Servicing the Filter

1. Filter must be drained as frequently as necessary to keep liquid level below the baffle inside. If the liquid level rises above the baffle, liquid will be carried downstream. To drain the unit, open the manual drain stem.
2. Replace the filter element when it becomes plugged or dirty.

Filter-Regulator Disassembly

1. Shut off the air pressure. Bleed air pressure to the atmosphere.
2. Remove bowl assembly by turning the metal shatterguard counterclockwise.
3. To service the valve assembly, rotate the bowl baffle counterclockwise. Remove the filter element and the element cap.

4. Rotate valve retainer counterclockwise to gain access to the valve assembly. Please note the position of the head baffle and the element gasket.
5. The filter element should be replaced when it is dirty. Do not attempt to clean it.
6. To service the piston assembly, or the adjusting screw assembly, remove the spring load by rotating the adjusting knob counterclockwise. Remove the dome by unscrewing it counterclockwise. The piston assembly can now be removed from the dome. The pilot insert and the O-ring can also be removed at this time.

Cleaning The Filter

1. Clean the transparent bowl using only warm water. Clean other parts using warm water and soap.
2. Dry parts and blow out internal passages in the body using clean, dry compressed air. Blow air through the filter element from inside to outside. Replace the element when it is plugged.
3. Inspect parts and replace those found to be damaged.

Filter Reassembly

1. Lubricate the O-rings on the valve, the stem, and the body of the valve with a wipe coat of good quality O-ring grease. Lubricate the threads on the adjusting screw with a wipe coat of grease.
2. Reassemble the filter. Make sure the seals and gaskets are properly positioned. The clamp washer should be between the diaphragm and the dome. The dome should be tightened with a strap wrench.

SECTION 7—LUBRICATOR ADJUSTMENT AND MAINTENANCE

Lubricator Adjustment

1. The sight dome divides the oil into drops. It is used to monitor the oil-feed rate (drops/min.).
2. The oil-feed rate is controlled by adjusting the removable, tamper-resistant knob. Turn this knob clockwise for less oil delivery; turn it counterclockwise for more oil delivery. All oil passing through the sight dome is dispensed into the air line.
3. Remove the adjusting knob to make the lubricator tamper-resistant.
4. Monitor the device being lubricated for a few days following the initial adjustment. Readjust the oil-feed rate if the oil delivery at the device appears either excessive or low.

Lubricator Disassembly

1. Shut off air pressure. Bleed air pressure to the atmosphere.
2. Remove bowl assembly by turning the metal shatterguard counterclockwise.
3. The bowl can then be removed by pulling down on it. Before

removing the cartridge assembly, bleed off trapped air by depressing the lever. To remove the cartridge assembly, unscrew the four Phillips-head screws. Do not attempt to clean or repair the cartridge assembly. If it needs cleaning or repair, replace it.

4. To fill under pressure, use the Q-cap. Do not remove the bowl when the unit or system is pressurized.

Cleaning the Lubricator

1. Clean the transparent bowl using only warm water. Clean other parts using warm water and soap.
2. Dry parts and blow out internal passages in the body using clean, dry compressed air.
3. Inspect parts and replace those found to be damaged. If the polycarbonate reservoir shows signs of cracking or cloudiness, it

Lubricator Reassembly

1. Lubricate the O-rings with a wipe coat of good quality O-ring grease.
2. Reassemble the lubricator.

SECTION 8—REPLACEMENT PARTS

Filter-Regulator-Lubricator Assemblies

RCL-043 ¼" FRL Assembly Replacement Parts

Part No.	Description
RCC-079	Filter Element Kit—includes filter element and O-ring
RCC-080	Regulator Repair Kit—includes piston assembly and O-ring
RCC-081	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC-098	Filter Bowl Kit—includes filter bowl and O-ring

RCL-044 ½" FRL Assembly Replacement Parts

Part No.	Description
RCC-079	Filter Element Kit—includes filter element and O-ring
RCC-080	Regulator Repair Kit—includes piston assembly and O-ring
RCC-081	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC-098	Filter Bowl Kit—includes filter bowl and O-ring

RCL-045 ¾" FRL Assembly Replacement Parts

Part No.	Description
RCC-082	Filter Element Kit—includes filter element and O-rings
RCC-083	Regulator Repair Kit—includes diaphragm assembly
RCC-084	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC-099	Filter Bowl Kit—includes filter bowl and O-ring

RCL-046 1" FRL Assembly Replacement Parts

Part No.	Description
RCC-087	Filter Element Kit—includes filter element and O-ring
RCC-085	Regulator Repair Kit—includes piston assembly
RCC-089	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC-100	Filter Bowl Kit—includes filter bowl and O-ring

RCL-047 1½" FRL Assembly Replacement Parts

Part No.	Description
RCC-088	Filter Element Kit—includes filter element assembly with O-ring
RCC-086	Regulator Repair Kit—includes piston assembly
RCC-090	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC-101	Filter Bowl Kit—includes filter bowl and O-ring

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SECTION 8—REPLACEMENT PARTS

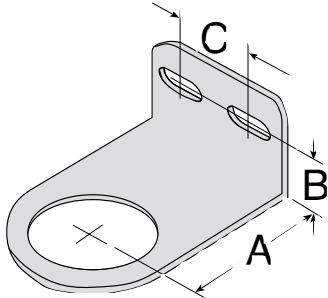
Filter-Regulator-Lubricator Assemblies

FRL Brackets, Connector Kits, and Nipples

BRACKET

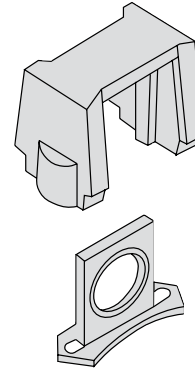
zes (cm)

Bracket	Size	A	B	C	Hole
RCC-074	¼" & ½"	2.4 (6.1)	1.0 (2.5)	0.75 (1.9)	1.6 (4.1)
RCC-075	¾", 1", 1½"	2.4 (6.1)	1.0 (2.5)	0.75 (1.9)	2.1 (5.2)



CONNECTOR KIT

Part No. RCC-076 for ¼", ½", & ¾" FRLs



NIPPLE

Part No. FKL-160 for 1" FRL

Part No. FKL-188 for 1½" FRL



GAUGE

Part No. RCC-058 for ¼", ½", ¾", 1", & 1½" FRLs

Part No. RCC-077 for ⅛" FRL

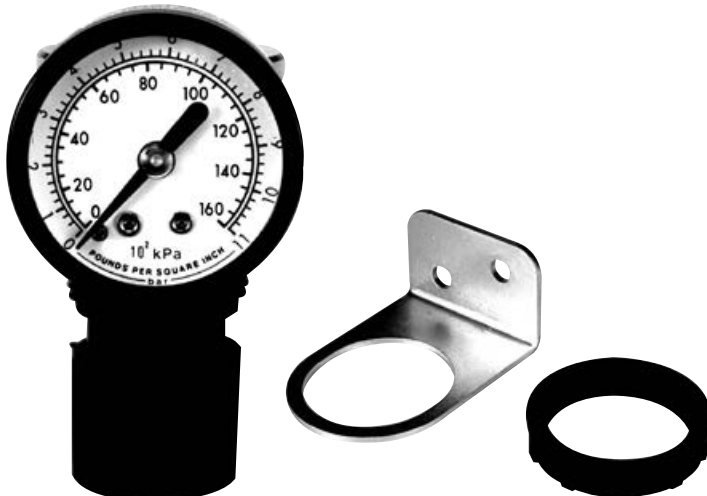
Note: Each regulator is furnished with a pressure gauge.



⅛" REGULATOR-GAUGE COMBINATION

Part No. RCL-048

⅛" Regulator-Gauge and Mounting Bracket



SECTION 10—ORDER FORM FOR SIGNS AND LITERATURE

Filter-Regulator-Lubricator Assemblies

This instruction manual references signs and literature available for your machines. This order form is for your convenience to order additional signs and literature as needed. This order form is part of your installation manual so please make a copy of it before writing an order.

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____

Name _____ Purchase Order No. _____ Date _____

Part No.	Description	Quantity Required
KSL-208	Installation Manual—Filter-Regulator-Lubricator	_____
KSL-051	Booklet—Mechanical Power Press Safety (MPPS)	_____
CNTRLS	Catalog—Press and Press Brake Control Systems	_____
SFM	Catalog—Safeguarding Metal-Cutting Machines	_____

For prices and delivery, please use address, phone or fax number listed on the front cover of this manual.

Your Signature _____ Date _____