

INSTALLATION MANUAL

FOR FILTER-REGULATOR-LUBRICATOR:



RCL048 $\frac{1}{8}$ " Regulator and Gauge
(not shown)

RCL043 $\frac{1}{4}$ " FRL Assembly

RCL044 $\frac{1}{2}$ " FRL Assembly



RCL045 $\frac{3}{4}$ " FRL Assembly



RCL046 1" FRL Assembly

RCL047 $1\frac{1}{2}$ " FRL Assembly

TABLE OF CONTENTS

Filter-Regulator-Lubricator Assemblies

SECTION 1—IN GENERAL	2-4
SECTION 2—SPECIFICATIONS	4
SECTION 3—INTRODUCTION	5
SECTION 4—ASSEMBLING THE FILTER-REGULATOR-LUBRICATOR.....	5
SECTION 5—INSTALLATION	6 - 7
SECTION 6—FILTER ADJUSTMENT AND MAINTENANCE.....	8
SECTION 7—LUBRICATOR ADJUSTMENT AND MAINTENANCE.....	9
SECTION 8—REPLACEMENT PARTS.....	10-11

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.

SECTION 1—IN GENERAL

Filter-Regulator-Lubricator Assemblies

Warranty

9. Limited Warranties.

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 Customer 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 under 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 begins 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 breach of 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.

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 with
.....	Metal 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", or
.....	1 1/2" NPTF
Reservoir	Transparent with guard
Lubricants	Misting-type oil rated at 80 to
.....	120 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.

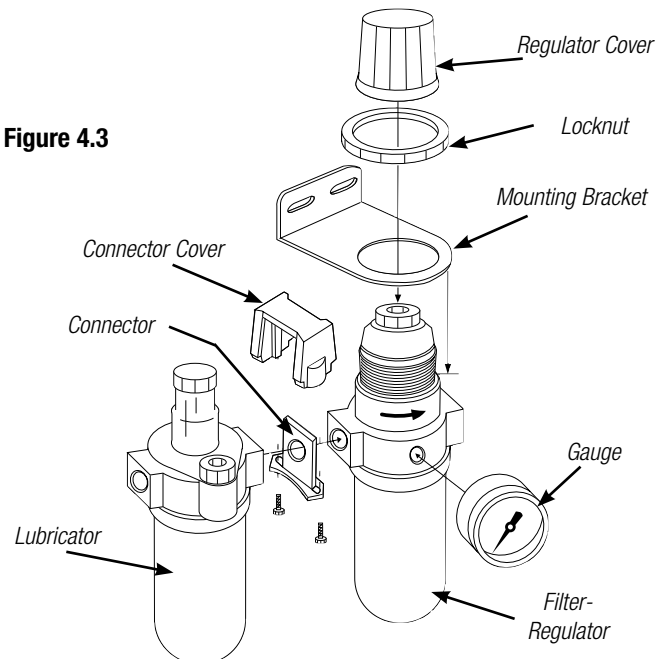
Figure 4.1
1/4", 1/2" and 3/4" FRL Assemblies



Figure 4.2
1\", 1 1/2\" FRL Assemblies



Figure 4.3



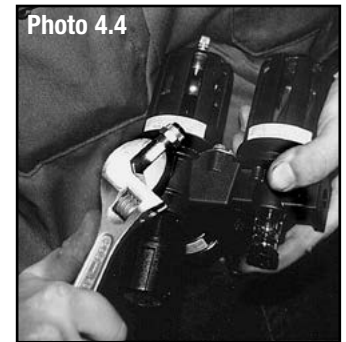
(Continued on next page.)

Rockford Systems, LLC
Call: 1-800-922-7533

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

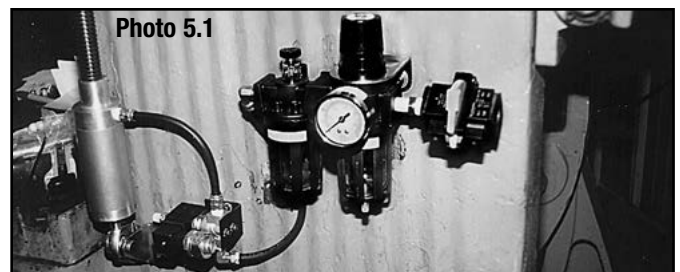
Notes

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

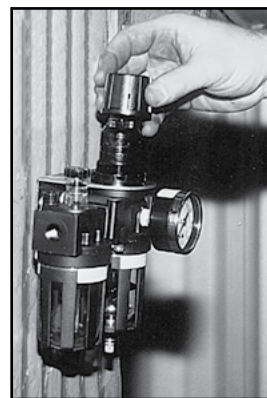
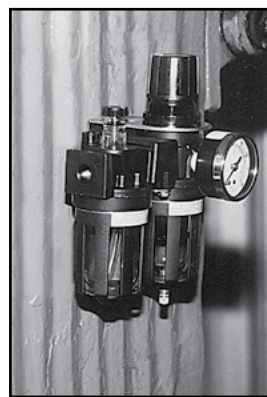


Photo 5.7



(Continued on next page.)

Rockford Systems, LLC
Call: 1-800-922-7533

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

RCL043 ¼" FRL Assembly Replacement Parts

Part No.	Description
RCC079	Filter Element Kit—includes filter element and O-ring
RCC080	Regulator Repair Kit—includes piston assembly and O-ring
RCC081	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC098	Filter Bowl Kit—includes filter bowl and O-ring

RCL044 ½" FRL Assembly Replacement Parts

Part No.	Description
RCC079	Filter Element Kit—includes filter element and O-ring
RCC080	Regulator Repair Kit—includes piston assembly and O-ring
RCC081	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC098	Filter Bowl Kit—includes filter bowl and O-ring

RCL045 ¾" FRL Assembly Replacement Parts

Part No.	Description
RCC082	Filter Element Kit—includes filter element and O-rings
RCC083	Regulator Repair Kit—includes diaphragm assembly
RCC084	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC099	Filter Bowl Kit—includes filter bowl and O-ring

RCL046 1" FRL Assembly Replacement Parts

Part No.	Description
RCC087	Filter Element Kit—includes filter element and O-ring
RCC085	Regulator Repair Kit—includes piston assembly
RCC089	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC100	Filter Bowl Kit—includes filter bowl and O-ring

RCL047 1½" FRL Assembly Replacement Parts

Part No.	Description
RCC088	Filter Element Kit—includes filter element assembly with O-ring
RCC086	Regulator Repair Kit—includes piston assembly
RCC090	Lubricator Bowl Kit—includes lubricator bowl and O-ring
RCC101	Filter Bowl Kit—includes filter bowl and O-ring

(Continued on next page.)

Rockford Systems, LLC
Call: 1-800-922-7533

SECTION 8—REPLACEMENT PARTS

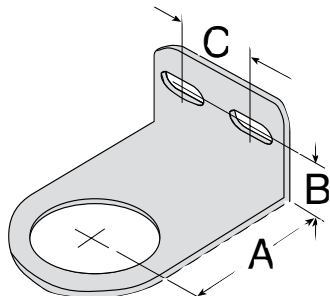
Filter-Regulator-Lubricator Assemblies

FRL Brackets, Connector Kits, and Nipples

BRACKET

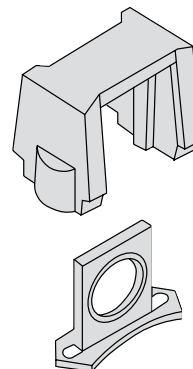
Size (cm)

Bracket	Size	A	B	C	Hole
RCC074	¼" & ½"	2.4 (6.1)	1.0 (2.5)	0.75 (1.9)	1.6 (4.1)
RCC075	¾", 1", 1½"	2.4 (6.1)	1.0 (2.5)	0.75 (1.9)	2.1 (5.2)



CONNECTOR KIT

Part No. RCC076 for ¼", ½", & ¾" FRLs



NIPPLE

Part No. FKL160 for 1" FRL

Part No. FKL188 for 1½" FRL



GAUGE

Part No. RCC058 for ¼", ½", ¾", 1", & 1½" FRLs

Part No. RCC077 for ⅛" FRL

Note: Each regulator is furnished with a pressure gauge.



⅛" REGULATOR-GAUGE COMBINATION

Part No. RCL048

⅛" Regulator-Gauge and Mounting Bracket

