



FRL

FILTER-REGULATOR-LUBRICATOR

OWNERS MANUAL

MODEL: 601128



General Dimensions & Descriptions

As you read this manual, you will find information preceded by a NOTICE symbol. That information is intended to help you avoid damage to your post driver, other property, or the environment.

Dimensions in. (mm)

P/N	A	B	B1	C	D	E	F
601128	10.7 (272)	7 (178)	6.9 (175)	2.2 (56)	3.4 (86)	1.6 (41)	5.2 (132)

Descriptions

No.	P/N	Name (Qty.)	Port or Thread Size (NPT)
1	601129	Filter	3/4"
2	601130	Regulator	3/4"
3	601131	Lubricator	3/4"
4	230401	Pipe Nipple (2)	3/4"
5	601134	Bowl Guard (2)	
6	601104	Gauge	1/4"
7	070574	Mounting Bracket (2)	
8	500020	1/4" U-Bolts (2)	
	601115	Pipe Plug*	1/4"

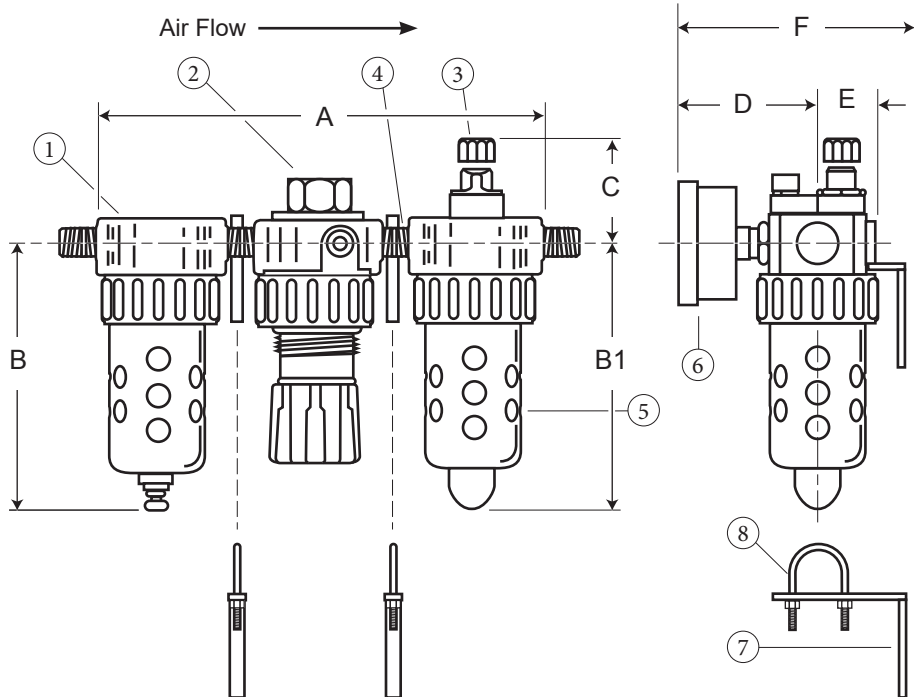


Fig. 1 - FRL General dimensions and parts description.

* Not shown

Rhino® FRL Installation

1. Assemble your FRL in a vertical position (drain on the filter towards the bottom). The air flows in the direction of the arrows.
2. Prior to installation, the upstream equipment to which the FRL will be attached should be internally cleaned to remove all traces of accumulated oil and dirt. Blow all upstream hoses and pipe work clear of accumulated dirt and liquids.
3. New pipe and hoses should be applied between your new Rhino® FRL and the post driver being protected. Pre-lubricate them before installation.
4. Install the mounting brackets on each side of the air regulator, positioned as shown in **Fig. 2**. If you are using your FRL with a Rhino carrier, refer to Fig. 3. (The carrier is optional and not part of the FRL)
5. Locate your FRL as close as possible to your post driver. (25' or closer is recommended) Dependent on height

of posts to be driven and length of hose assembly.

Miscellaneous

1. See the following pages for parts kits and detailed information on each component part of your Rhino FRL.
2. Air gauges are not serviced. If replacement is required, order the complete gauge. (Part No. 601104)
3. With proper care and maintenance, your Rhino FRL will provide many hours of trouble free service while protecting and lubricating your air tools.

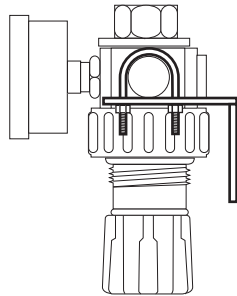


Fig. 2 - Regulator

Filter Installation and Service



WARNING

To avoid unpredictable system

behavior that can cause personal injury and property damage:

- Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed on these instructions.

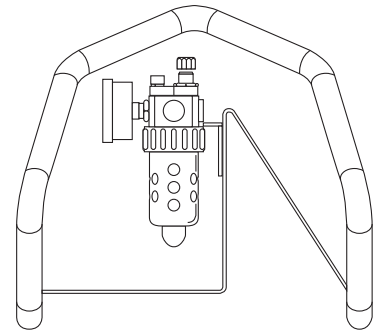
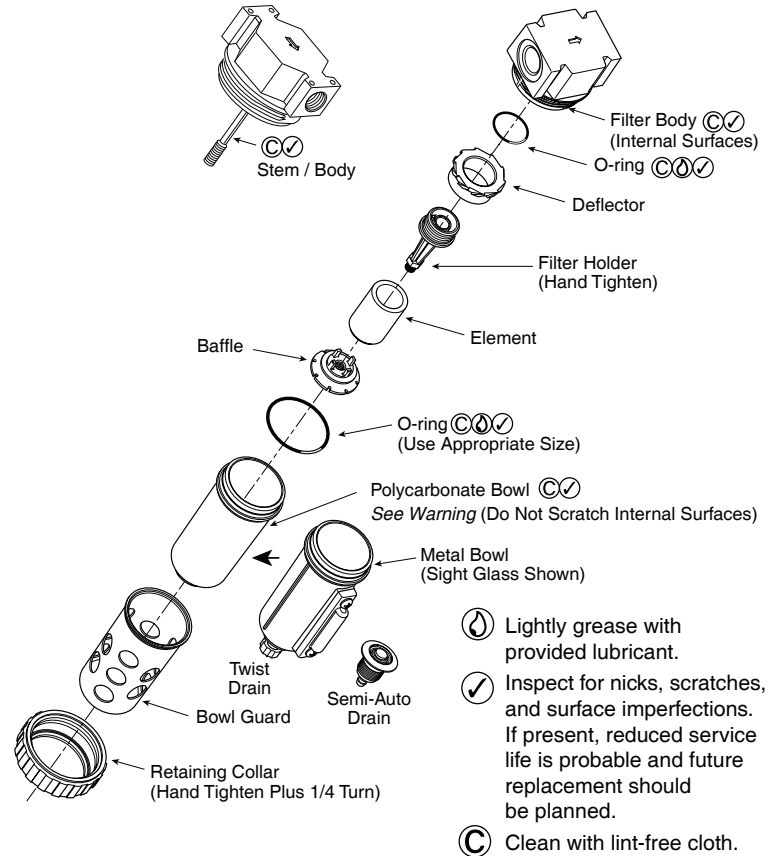


Fig. 3 - FRL installed on optional Rhino® Carrier (P/N 225001).

Filter Installation and Service

- Medium must be moisture-free if ambient temperature is below freezing.
 - Service according to procedures listed in these instructions.
 - Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.
 - After installation, servicing, or conversion, air supply should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
 - Warning and specifications on the product should not be covered with paint, etc. If masking is not possible, contact your local representative for replacement labels.
1. The filter should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use Teflon™ tape to seal pipe joints—pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.



Filter Installation and Service

- The upstream pipe work must be clear of accumulated dirt and liquids.
- Select a filter locating as close as possible to the equipment being protected and upstream of any pressure regulator.
- Install filter so that air flows in the direction of arrow on body.
- Install filter vertically with bowl drain mechanism at the bottom. Free moisture will thus drain into the sump (“quiet zone”) at the bottom of the bowl.

Application Limits

These products are intended for use in general purpose compressed air systems only.

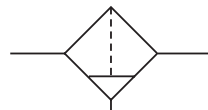
Adsorber Filters are not effective on: Carbon monoxide, carbon dioxide, methane, ethane, ethylene, or hydrogen. For a complete list of vapors that can and cannot be adsorbed effectively by activated charcoal adsorbers consult the factory.

ANSI Symbols

Maximum Pressure Drop	psig	bar	kPa
Particulate Filter	10	0.7	70
Adsorber Filter	1.5	0.1	10

With Polycarbonate Bowl	psig	bar	kPa
Operating Pressure Maximum	150	10.3	1000
Operating Temperature Maximum	+ 125°F (+52°C)		
Operating Temperature Minimum	+32°F (0°C)		

With Metal Bowl	psig	bar	kPa
Operating Pressure Maximum	250	17.0	1700
Operating Temperature Maximum	+ 125°F (+52°C)		
Operating Temperature Minimum	+32°F (0°C)		



Filter
w/Manual Drain



Adsorber
w/Manual Drain

Filter Operation and Service

- Both free moisture and solids are removed automatically by the filter. There are no moving parts.
- Manual drain filters must be drained regularly before the separated moisture and oil reaches the bottom of the lower baffle.
- The particulate filter element should be removed and replaced when pressure differential across the filter is 10 PSIG.
- To replace the filter element:
 - Shut off air supply and depressurize the unit.
 - Unscrew the threaded collar and remove bowl.
 - Unscrew the lower baffle and remove filter element.
 - Clean all internal parts and bowl before reassembling. See following polycarbonate bowl cleaning section.

Filter Operation and Service

- E. Install element.
- F. Attach lower baffle and tighten firmly.
- G. Replace bowl seal; lubricate seal to assist in retaining it in position. Use only mineral base oils or grease. Do not use synthetic oils such as esters and do not use silicones.
- H. Install bowl into body and tighten standard collar to 48 - 32 inch pounds torque.

Maintenance Service Kit*	Part No.
-5 Micron	601137
-40 Micron	601136

* Element Kits include Body, Bowl Seal

CAUTION SAFETY: Polycarbonate Bowls

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight,

an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Polycarbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.

CAUTION To clean polycarbonate bowls use mild soap and water ONLY.

DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Regulator Installation and Service

WARNING To Avoid unpredictable system behavior that can cause personal injury and property damage:

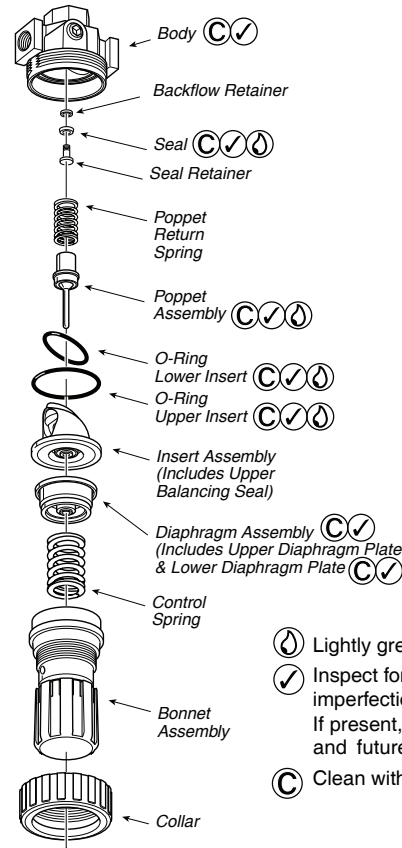
- Disconnect air supply and depressurize all air lines connected to this product before installation servicing or conversion.
- Operate within the manufacturer's specified pressure, temperature, and other conditions listed on these instructions.
- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.

Regulator Installation and Service... cont.

- After installation, servicing, or conversion, air supply should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warning and specifications on the product should not be covered with paint, etc. If masking is not possible, contact your local representative for replacement labels.

⚠ WARNING Product rupture can cause serious injury. Do not connect regulator to bottled gas. Do not exceed maximum primary pressure rating.

1. The regulator should be installed with reasonable accessibility for service whenever possible. Repair Kits are available. Keep pipe or tubing lengths to minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. **Do not use Teflon™ tape to seal pipe joints**—pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
2. Install regulator so that air flow is in the direction of arrow. Installation must be upstream from devices it is to service (lubricator, valve, cylinder or tool), and mounted closely to these devices. Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a



Regulator Installation and Service Instructions ...cont.

gauge or socket pipe plug into each port during installation.

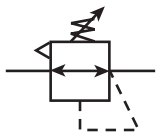
- For protection against rust, pipe scale and other foreign matter, install a filter on the upstream (high pressure) side as closely to the regulator as possible.

Application Limits

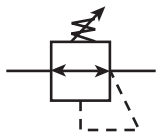
These products are intended for use in general purpose compressed air systems only.

Operating Pressure	psig	bar	kPa
Operating Pressure Maximum	250	17	1700
Operating Temperature Maximum	+ 175°F (+80°C)		
Operating Temperature Minimum	+32°F (0°C)		

ANSI Symbols



Relieving Regulator Adjustable



Non-Relieving Regulator Adjustable

Regulator Operation and Service

- Before turning on the air supply, turn the adjusting knob counterclockwise until compression is released from the pressure control spring, then turn on air supply. Proceed to adjust the desired downstream pressure by turning adjusting knob clockwise. This permits pressure to build up slowly in the downstream file.
 - Disengage the adjusting knob by pulling upward.
Turn adjusting knob counterclockwise until the compression is released from the pressure control spring. Turning the knob counterclockwise does not vent downstream pressure on non-relieving regulators. Downstream pressure must be vented before servicing regulator.
 - Unscrew the threaded collar and remove the bonnet assembly.
 - Disassemble, clean and carefully inspect parts for wear or damage. If replacement is necessary, use parts from the service kits.
 - Lubricate o-ring and vee packing seals with grease found in the kit
 - Install poppet return spring, poppet assembly, upper and lower seat insert o-rings and seat insert.
 - Install diaphragm assembly into bonnet.
- To decrease regulated pressure setting, always reset from a pressure lower than the final setting required. Example, lowering the secondary pressure from 80 PSIG to 60 PSIG is best accomplished by dropping the secondary pressure to 50 PSIG, then adjusting upward to 60 PSIG.
- When desired secondary pressure setting has been reached, push the adjusting knob down to lock the adjusting knob.
- To service the regulator diaphragm, poppet assembly and seat insert:
 - Shut off the air supply and depressurize the unit.

Regulator Operation and Service ...cont.

H. Assemble bonnet to body and tighten threaded collar hand tight plus 1/4 turn.

- Turn on air pressure and check regulator for leakage. If leakage occurs, **DO NOT OPERATE** - Conduct repairs again.

Maintenance Service Kits	Part No.
Relieving Regulator Repair Kit	601138
Seat Insert Repair Kit	601140
Additional Accessories	Part No.
Gauges - 0—160 psi (Standard)	601104
Mounting Bracket Kit (Standard)	070574
Air Pilot Conversion (Relieving)	601138
Bonnet Assembly	601139

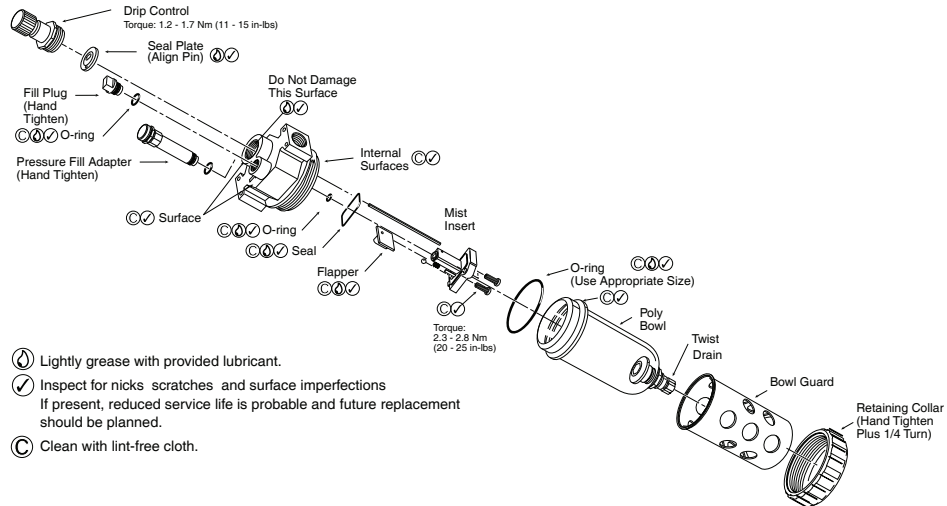
Lubricator Installation and Service Instructions

⚠ WARNING To avoid unpredictable system behavior that can cause personal injury and property damage:

- Disconnect air supply and depressurize all air lines connected to this product before installation servicing or conversion.
- Operate within the manufacturer's

specified pressure, temperature, and other conditions listed on these instructions.

- Medium must be moisture-free if ambient temperature is below freezing.
- Service according to procedures listed in these instructions.
- Installation, service and conversion of these products must be performed by



- L** Lightly grease with provided lubricant.
- ✓** Inspect for nicks scratches and surface imperfections. If present, reduced service life is probable and future replacement should be planned.
- C** Clean with lint-free cloth.

Lubricator Installation and Service Instructions ...cont.

knowledgeable personnel who understand how pneumatic products are to be applied.

- After installation, servicing, or conversion, air supply should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.
- Warning and specifications on the product should not be covered with paint, etc. If masking is not possible, contact your local representative for replacement labels.



WARNING To avoid polycarbonate bowl rupture than can cause personal injury or property damage, do not exceed bowl pressure or temperature ratings. Polycarbonate bowls have a 150 PSIG pressure rating and maximum temperature rating of 125° F.

Installation

1. The lubricator should be installed with

reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use Teflon™ tape to seal pipe joints—pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction. Also, new pipe or hose should be installed between the filter and equipment being protected.

2. Install lubricator so that air flows in the direction of arrow on body.
3. Installation should be upstream of the device it is to lubricate (valve, cylinders, tool, etc.).

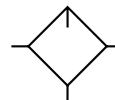
Application Limits

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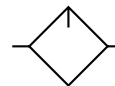
With Polycarbonate Bowl	psig	bar	kPa
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Operating Temperature Maximum	+ 125°F (+52°C)		
Operating Temperature Minimum	+32°F (0°C)		

With Metal Bowl	psig	bar	kPa
Operating Pressure Maximum	250	17.0	1700
Operating Temperature Maximum	+ 175°F (+80°C)		
Operating Temperature Minimum	+32°F (0°C)		

ANSI Symbols



**Lubricator
w/ Manual Drain**



**Lubricator
Less Drain**

Lubricator Operation and Service

1. Filling - The Mist lubricator can be filled without turning off the upstream pressure. Slowly remove the fill plug (black) by turning counterclockwise. This allows the bowl pressure to vent.

Suggested lubricant: SAE 5 wt. for cold weather, SAE 10 wt. for mild weather to 80 degrees, and SAE 20 wt. for hot weather. Do not use oils with adhesives, compound oils containing solvents, graphite, detergents or synthetic oils as they impede atomization of the oil in the air stream.

2. Replace the fill plug (by turning clockwise) and seat firmly. Excessive torque is not required.
3. Oil delivery adjustment - To adjust oil delivery, turn adjustment knob on top of lubricator:
Leaner - clockwise
Richer - Counterclockwise

By counting the number of drops per minute in the sight dome, you can adjust to your requirements.

Mist lubricator - Every drop visible in the sight dome goes downstream. Generally, one drop per minute downstream for every 10 - 15 SCFM flow is satisfactory.

25 drops per minute equals one (1) ounce per hour - volume of oil passing through the sight dome.

NOTE This is a constant density type lubricator which delivers a constant ratio of oil air flow.

Therefore, if air flow increases or decreases, oil delivery will be adjusted proportionately. **Only if a different ratio is desired should your adjustment knob setting be changed after your initial setting.**

4. To replace fill plug:
 - A. Turn off air supply and depressurize the unit.
 - B. Unscrew fill plug and clean sealing surfaces on lubricator body.
 - C. Lubricate the o-ring seal on replacement part with grease included in

the kit. Assemble o-ring to fill plug. Install the fill plug and tighten hand tight.

D. Turn on air supply and check for leakage. If leaks occur, repeat repair procedure.

5. To replace drip control: (see cutaway view)

A. Turn off air supply and depressurize the unit.

B. Unscrew drip control by rotating sight dome counterclockwise. Carefully remove seal plate. Note: Do not damage surface of body underneath seal plate.

C. Lubricate seal plate with grease found in the kit. Align and install seal plate.

D. Install sight dome and drip tube. Tighten to 10 - 15 inch pounds of torque.

E. Turn on air supply and check for leakage. If leaks occur, repeat procedure.

Lubricator Operation and Service ... cont.

6. To service lubricator, (see cutaway view)
 - A. Turn off air supply and depressurize the unit.
 - B. Unscrew threaded collar and remove the bowl and seat.
 - C. Remove the two (2) screws in the body holding the plastic insert. Remove insert, insert seal and o-ring from body.
 - D. Clean all internal sealing surfaces and bowl assembly. (See polycarbonate bowl cleaning section.)
 - E. Lubricate all seals and o-rings with grease found in the kit.
 - F. Install bowl o-ring into body.
NOTE: The kit contains both Compact and Standard bowl seals. Use the appropriate o-ring and discard the extra one.
7. Sub-assemble insert, o-ring, seat, check ball and spring (under flapper, Standard only), flapper, baffle

(Compact only) and mounting screws.
NOTE: The flapper must be assembled so that the hole in the flapper lines up with the hole in the insert.

8. Install insert and tighten the two (2) screws to 10 - 12 inch pounds of torque.
9. Install bowl into body. Tighten Standard collar to 48 - 52 inch pounds of torque.
10. Turn on air supply and check lubricator for leakage. If leakage occurs, DO NOT OPERATE - conduct repairs again.



CAUTION

Polycarbonate bowls, being transparent and tough, are ideal for use with Filters and Lubricators. They are suitable for use in normal industrial environments, but should not be located in areas where they could be subjected to direct sunlight, an impact blow, nor temperatures outside of the rated range. As with most plastics, some chemicals can cause damage. Poly-

carbonate bowls should not be exposed to chlorinated hydrocarbons, ketones, esters and certain alcohols. They should not be used in air systems where compressors are lubricated with fire-resistant fluids such as phosphate ester and di-ester types.

Metal bowls are recommended where ambient and/or media conditions are not compatible with polycarbonate bowls. Metal bowls resist the action of most such solvents, but should not be used where strong acids or bases are present or in salt laden atmospheres. Consult the factory for specific recommendations where these conditions exist.



CAUTION

To clean polycarbonate bowls use mild

soap and water ONLY!

DO NOT use cleansing agents such as acetone, benzene, carbon tetrachloride, gasoline, toluene, etc., which are damaging to this plastic.

Maintenance Service Kits - Standard 3/4"

Service Kit	Order Number
Mist Lubricator Repair Kit	601143
Sight Dome and Fill Kit	601142
Regulator Relieving Kit	601138
Lubricator Poly Bowl Kit (No Drain)	601141
Poly Bowl Push & Drain Kit	601133
Metal Bowl Guard	601134
Drain Kit (Push-N-Drain)	601135
40 Micron Element Kit	601136
5 Micron Element Kit	601137
Air Gauge (0—160 psi)	601104
Lubricator Sight Dome & Fill Kit	601142
Regulator Bonnet Assembly	601139
Regulator Seat Insert Kit	601140

Call your local dealer, service center or Rhino Tool Company for more assistance with your equipment.

For more information on this, and other Rhino Tool products, please visit www.rhinotool.com or call 866-707-1808.

Keep this owner's manual available, so you can refer to it at any time. This owner's manual is considered a permanent part of the equipment and should remain with the equipment if resold.

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Rhino Tool Company



TAKE SAFETY SERIOUSLY

This book contains important safety information.
Please read it carefully.

Your safety, and the safety of others, is very important. The proper and safe use of your Rhino® equipment is an important responsibility and should be taken seriously. This entire book is filled with important safety information. Please read it carefully.


 **WARNING** FAILURE OF IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HERE-IN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.


This document and other information for Rhino® Tool Company, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through their own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.


The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Rhino® Tool Company at any time without notice.

To help you make informed decisions about safety, you will find important safety information in a variety of forms, including:

- Safety Labels on the equipment
- Safety Messages Preceded by a safety alert symbol and one of three signal words, DANGER, WARNING, or CAUTION. These signal words mean:

 **DANGER** Immediate hazards that will result in severe personal injury or death.

 **WARNING** Hazards or unsafe practices that could result in personal injury.

 **CAUTION** Hazards or unsafe practices that could result in injury, product or property damage.

- Safety Headings such as IMPORTANT SAFETY INFORMATION.
- Safety Sections
- Instructions how to use this equipment correctly and safely.



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