Parts Page Reorder No. PD12•06
Effective February, 2012

Filter-Regulator-Lubricator

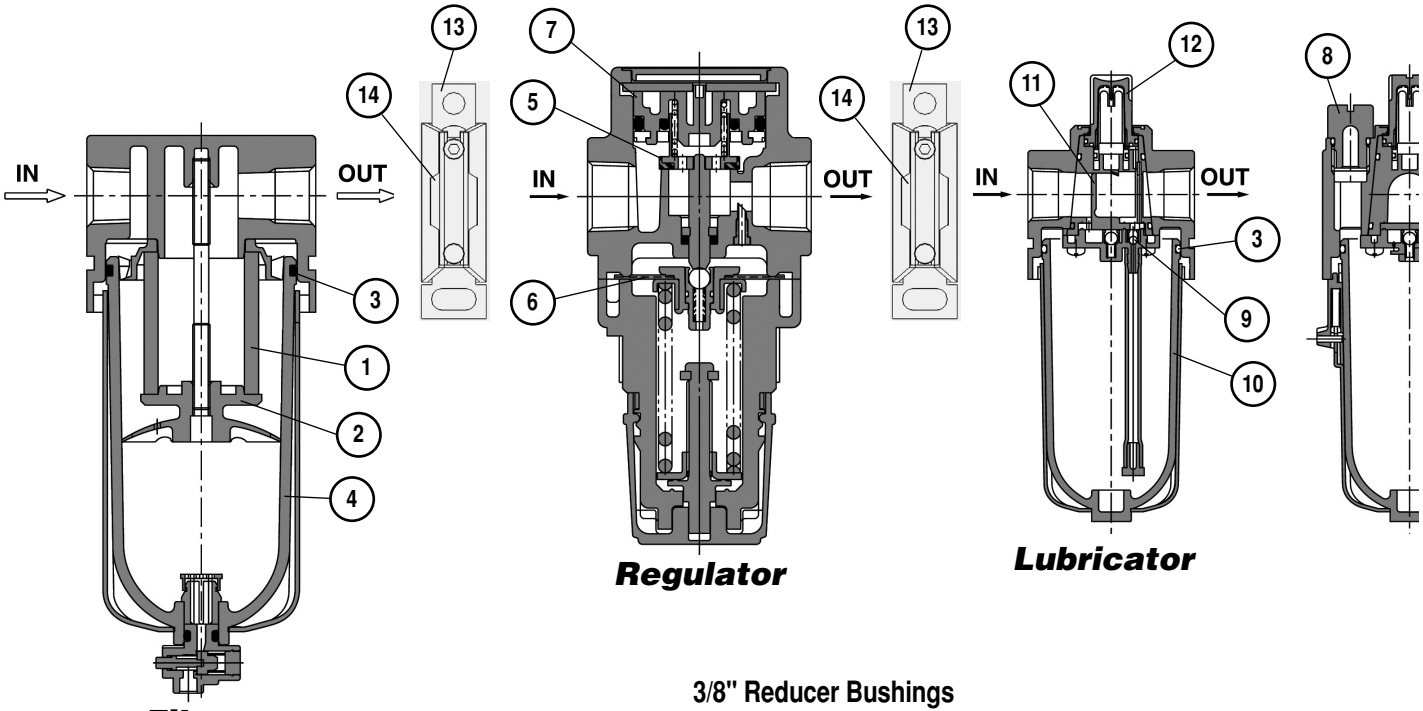
Models:

10671 - 1/2" NPT – Filter
10673 - 1/2" NPT – Regulator
10675 - 1/2" NPT – Lubricator
10677 - 1/2" NPT – Filter-Regulator
10679 - 1/2" NPT – Regulator-Lubricator
10681 - 1/2" NPT – Filter-Regulator-Lubricator

Machine Parts and Operating Instructions

⚠WARNING **Always operate, inspect and maintain this tool in accordance with the Safety Code for portable air tools (ANSI B186.1) and any other applicable safety codes and regulations. Please refer to Dynabrade's Warning/Safety Operating Instructions for more complete safety information.**

To reduce risk of injury, everyone using, installing, repairing, maintaining, changing accessories on, or working near this tool MUST read and understand these instructions before performing any such task. DO NOT DISCARD – GIVE TO USER.



Filter ***Regulator*** ***Lubricator***

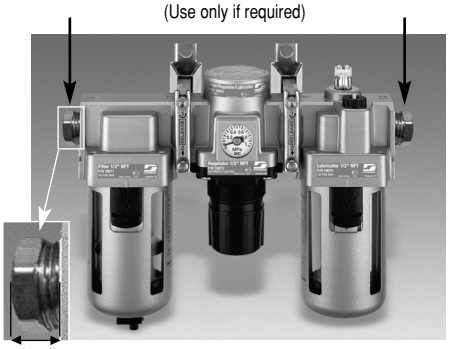
Index Key

No.	Part #	Description
1	**10645**	Filter Element (5 micron)
2	**10646**	Baffle
3	**10647**	Bowl O-Ring
4	**10648**	Bowl Assembly
5	**10640**	Valve Assembly
6	**10641**	Diaphragm Assembly
7	**10642**	Valve Guide Assembly
8	**10657**	Lubrication Plug Assembly
9	**10658**	Damper Retainer Assembly
10	**10660**	Bowl Assembly
11	**10659**	Damper Assembly
12	**10656**	Sight Dome Assembly
13	**10655**	(2)Mounting Bracket
	10644	Pressure Guage (Not Shown)
14	**10661**	Seal

3/8" Reducer Bushings

The two enclosed bushings are supplied to reduce the 1/2" NPT openings of the enclosed filter/regulator/lubricator to 3/8" NPT.

(Use only if required)



IMPORTANT:

Do not overtighten the bushings

- The bushings will not engage entirely into the 1/2" NPT opening after tightening.
- Refer to recommended tightening torque chart on page 6.

Inlet/Outlet Port Size	Max.Air Pressure	Max. Air Flow	Max. Air Temperature
1/2" NPT	145 PSIG/9.7 Bars	55 SCFM/1,558 LPM	140˚ F/60˚

Important Operating, Maintenance and Safety Instructions

Carefully read all instructions before operating or servicing any Dynabrade® Accessories.

Installation Instructions:

Notice: Close the air line system by turning off the air pressure in the area where the FRL unit will be installed.

1. Be sure to select a proper site for the FRL unit by locating the area of the air line system that is as close to the actual work area as possible.
   Note: This site should be free of direct sunlight, excessively high temperatures, and hazardous chemicals.
2. Using either 3/8" or 1/2" air fittings refer to other side for proper model and air fitting sizes. Mount the FRL unit, or individual units, in the air line system with the arrows on the unit pointed in the direction of the air flow within the air system. Failure to do so can damage components(s).
3. How to reduce from the 1/2" NPT openings to 3/8"- If required, use the two reducer bushings shipped with this item. (See front page for further details).
4. Fill the oil bowl with air tool oil. Please see the section below on lubrication.
5. Open the air line system and check for leaks around the FRL unit.

Standard Operating Instructions:

Filter (Filtration)

1. If the water level exceeds the maximum limit on the filter bowl, please drain the filter. This is done by pushing the orange button on the bottom of the filter.

Regulator (Regulation)

Warning: Set the regulator while verifying the displayed values of the inlet and outlet pressure gauges. Turning the knob excessively can cause damage to the internal parts. Pressure regulator knob should be adjusted by hand only. Do not use tools.

1. Regulation of air pressure is controlled by the black knob found on the regulator portion of the FRL unit. The air pressure is measured by the gauge on the front.
2. Maximum operating air pressure is 145 PSIG.
3. To increase the air pressure, be sure to unlock the knob before adjusting. Pull the pressure regulator knob to unlock. (You can visually verify this with the "orange mark" that appears in the gap). To decrease the air pressure, turn the black knob counterclockwise. Once the proper air pressure is established push the pressure regulator knob to lock. When the knob is not easily locked, turn it left and right a little and then push it (when the knob is locked, the "orange mark," i.e., the gap will disappear).



Lubricator (Lubrication)

1. Oil fill port; Check valve allows oil to be added to the Lubricator oil reservoir bowl without shutting off the air supply and interruption to work operations.
2. Remove the fill black cap plug by turning it counterclockwise.
3. Fill the bowl to the fill line with air tool oil. Use Dynabrade P/N **95842** Air Lube or equivalent air tool oil (10W/NR).
4. Replace the fill plug by turning in clockwise.
5. After filling Lubricator bowl with oil, oil is dispensed within 10-20 seconds. (Response time for many competitor units: 15-20 minutes.) Oil Flow Adjustment Control, allows for easy, fast and accurate dispensing of oil.
6. Oil feed sight dome; Allows visible adjustment in the amount of dispensed oil (dropped) into the flow of compressed air.
7. Turn the sight dome valve clockwise to decrease oil drop rate and turn counterclockwise to increase oil drop rate. The higher the air flow (SCFM) rate, the more the oil drop rate needs to be. With tool running, adjust to 1 drop per minute for each 20 SCFM of air flow. Flow rates for individual tools are supplied by tool manufacture.

LUBRICATOR SETTING
1 DROP PER MINUTE 20 SCFM (566 LPM)

Maintenance Instructions:

Other than when adding oil to the lubricator, always turn off air pressure and discharge all air inside FRL unit before performing any maintenance procedures.

Filter:

1. Remove the filter cover to inspect the filter assembly and check the amount of debris that may be collected on the filter cartridge itself. Clean the filter with soap and water. If the filter is damaged or contains heavy debris, it must be replaced. Refer to the parts breakdown for more information. Replace the element every 2 years or when the pressure drop becomes 15 PSIG (1 Bar), whichever comes first, to prevent damage to the element.
2. Clean the clear portion of the filter bowl with soap and water. **Warning:** Polycarbonate Bowl. Do not use any cleaning fluids that may be hazardous to plastic materials. Examples of incompatible chemicals are thinners, carbon tetrachloride, chloroform, kerosene, sulfuric and nitric acid.

Regulator:

1. No maintenance expected.

Lubricator:

1. Fill oil as required to fill line on bowl.

Safety Instructions:

Products offered by Dynabrade should not be converted or otherwise altered from original design without expressed written consent from Dynabrade, Inc.

- Never exceed maximum operating pressure of 145 PSIG.
- Always turn off air pressure and discharge inside FRL before performing any maintenance procedure.

Filter - 10671

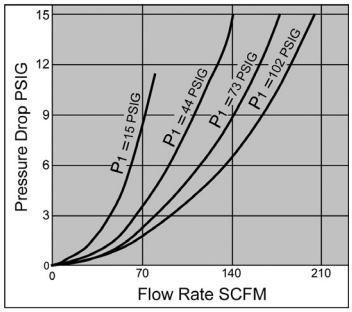


Standard Specifications

Port Size:	1/2"
Fluid:	Air
Proof Pressure:	218 PSIG (15 Bar)
Maximum Operating Pressure:	145 PSIG (10 Bar)
Ambient and Fluid Temperature:	23 to 140˚F (-5 to 60˚C) [with no freezing]
Normal Filtration Rating:	5µm
Bowl Material:	Polycarbonate
Bowl Guard:	Standard
Drain Capacity oz (cm³):	1.58 (45)
Weight lb (kg):	0.99 (0.49)

These specifications are applicable if the 3/8" reducer bushings are used.

Flow Characteristics (Representative values)



Regulator - 10673

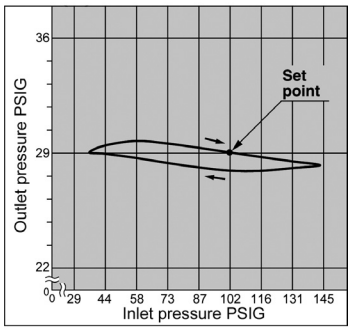


Standard Specifications

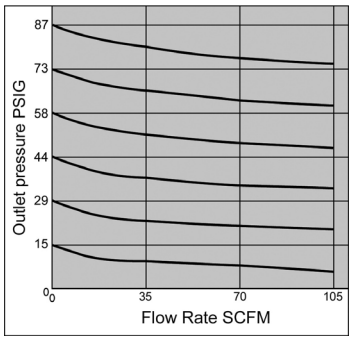
Port Size:	1/2"
Fluid:	Air
Proof Pressure:	218 PSIG (15 Bar)
Maximum Operating Pressure:	7 to 123 PSIG (8.5 Bar)
Pressure Gauge Port Size:	Rc, NPT, G1/4
Relief Pressure:	Set Pressure +7 PSIG (.5 Bar)
Ambient and Fluid Temperature:	23 to 140˚F (-5 to 60˚C) [with no freezing]
Construction:	Relieving Type
Weight lb (kg):	0.97 (0.44)

These specifications are applicable if the 3/8" reducer bushings are used.

Pressure Characteristics (Representative values)
Condition: Inlet pressure 102 PSIG
Outlet pressure 29 PSIG
Flow rate .7 SCFM



Flow Characteristics (Representative values)
Condition: Inlet pressure 102 PSIG



Lubricator - 10675

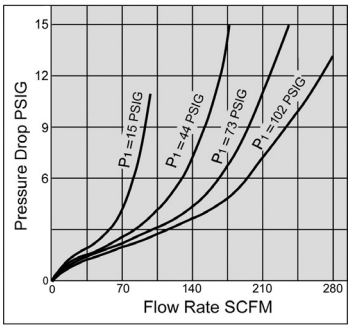


Standard Specifications

Port Size:	1/2"
Fluid:	Air
Proof Pressure:	218 PSIG (15 Bars)
Maximum Operating Pressure:	145 PSIG (10 Bars)
Minimum Dripping Flow Rate [L/min (ANR)]:	1/2: 50
Oil Capacity oz (cm³):	4.6 (135)
Recommended Lubricant:	Class 1 turbine oil (ISO VG32)
Ambient and Fluid Temperature:	23 to 140˚F (-5 to 60˚C) [with no freezing]
Bowl Material:	Polycarbonate
Bowl Guard:	Standard
Weight lb (kg):	1.04 (0.47)

These specifications are applicable if the 3/8" reducer bushings are used.

Flow Characteristics (Representative values)
Condition: Inlet pressure 102 PSIG





Safety Instructions

These safety instructions are intended to prevent a hazardous situation and/or equipment damage. These instructions indicate the level of potential hazards by labels of "**Caution**," "**Warning**" or "**Danger**." To ensure safety, be sure to observance ISO 444[Note 1)], JIS B 8370[Note 2)] and other safety practices.

Explanation of the Labels

Labels	Explanation of the Labels
Danger	In extreme conditions, there is a possible result of serious injury or loss of life.
Warning	Operator error could result in serious injury or loss of life.
Caution	Operator error could result in injury[Note 3)].

Note 1) ISO 4414: Pneumatic fluid power - General rules relating to systems

Note 2) JIS B 8370: General Rules for Pneumatic Equipment

Note 3) Injury indicates light wounds, burns and electrical shocks that do not require hospitalization or hospital visits for long-term medical treatment

Selection/Handling/Applications

1. The compatibility of the pneumatic equipment is the responsibility of the person who designs the pneumatic system or decides its specifications.

Since the products specified here are used in various operating conditions, their compatibility for the specific pneumatic system must be based on specifications or post analysis and/or tests to meet the specific requirements. The expected performance and safety assurance are the responsibility of the person who has determined the compatibility of the system. This person should continuously review the suitability of all items specified, referring to the latest catalog information with a view to giving due consideration to any possibility of equipment failure when configuring a system.

2. Only trained personnel should operate pneumatic machinery and equipment.

Compressed air can be dangerous if handled incorrectly. Assembly, handling or repair of the systems using pneumatic equipment should be performed by trained and experienced operators. (Understanding JIS B 8370 General Rules for Pneumatic Equipment, and other safety rules are included.)

3. Do not service the machinery/equipment or attempt to remove components until safety is confirmed.

1. Inspection and maintenance of the machinery/equipment should only be performed once measures to prevent falling or runaway of the driven objects have been confirmed.
2. If the equipment must be removed, confirm the safety process as mentioned above. Turn off the supply pressure for the equipment and exhaust all residual compressed air in the system, and release all the energy (liquid pressure, spring, condenser, gravity).
3. Before the machinery/equipment is restarted, take measures to prevent quick extension of a cylinder piston rod, etc.

4. If the equipment will be used in the following conditions or environment, please contact Dynabrade first and be sure to take all necessary safety precautions.

1. Conditions and environments beyond the given specifications, or if product is used outdoors.
2. Installation on equipment in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverages, recreation equipment, emergency stop circuits, clutch and brake circuits in press applications, or safety equipment.
3. An application which has the possibility of having negative effects on people, property, requiring special safety analysis.
4. If the products are used in an interlock circuit, prepare a double interlock style circuit with a mechanical protection function for the prevention of a breakdown. And, examine the devices periodically if they function normally or not.

Exemption from Liability

1. Dynabrade is exempted from liability for any damages caused by operations not contained in the catalogs and/or instruction manuals, and operations outside of the specification range.

2. Dynabrade is exempted from liability for any loss or damage whatsoever caused by malfunctions of its products when combined with other devices or software.



F.R.L. Unit Precautions 1

Be sure to read before handling

Design

Warning

1. The standard bowl for the air filter, regulator and lubricator as well as the sight dome for the lubricator are made of polycarbonate. Do not use in an environment where they are exposed to, or come in contact with organic solvents, chemicals, cutting oil, synthetic oil, alkali, and thread lock solutions.
2. Avoid applications where pressurized air is frequently introduced to and released from the standard bowl of an air filter, regulator, or lubricator. It may cause the bowl to be damaged. Use of a metal bowl is recommended for such occasions.
3. Consult with Dynabrade if the intended application calls for absolutely zero leakage due to special atmospheric requirements, or if the use of a fluid other than air is required.

4. **Regulator and filter regulator**

   Be sure to install a safety device to prevent damage of malfunction of the outlet side components when the output pressure exceeds the set pressure value.

Selection

Warning

1. The mineral grease used on internal sliding parts and seals may run down to outlet side components.

2. **Regulator and filter regulator**

   a. Residual pressure release (outlet pressure release) is not complete by releasing the inlet pressure. To release residual pressure, select a model with a back flow mechanism. Using a model without a back flow mechanism makes for inconsistent residual pressure release (i.e. residual pressure may or may not be released) depending on the operating conditions.

   b. Contact Dynabrade if air will not be consumed in the system for a long period of time, or if the outlet side will be used with a sealed circuit and a balanced circuit, as this may cause the set pressure of the outside to fluctuate.

   c. Set the regulating pressure range for the outlet pressure of the regulator in a range that is 85% or less of the inlet pressure. If set to above 85%, the outlet pressure will be easily affected by fluctuations in the flow rate and inlet pressure and become unstable.

   d. A safety margin is calculated into the maximum regulating pressure range appearing in the catalog's specification table. However, the outlet pressure may exceed the set pressure due to a delay in the valve's closing.

   e. Contact Dynabrade when a circuit requires the use of a regulator having relief sensitivity with high precision and setting accuracy.

3. **Lubricator**

   a. Contact Dynabrade when the lubricator is used in high frequency operations, such as in a press.

   b. Lubrication cannot be properly performed if the operating flow rate is too low. Select proper size lubricator by referring to the minimum dripping flow rate provided in this catalog.

   c. Avoid the use of a lubricator that causes back flow as this may cause damage to internal parts.

   d. Use a check valve to prevent the lubricant from back flowing when redirecting the piping on the side.

F.R.L. Unit Precautions 2

Be sure to read before handling

Mounting

Caution

1. To avoid reversed connections of the air inlet/outlet, make connections after confirming the “IN/OUT” mark or arrows that indicate the direction of air flow. Reversed connections can cause malfunction.
2. Components with a bowl, e.g., air filter, filter regulator, lubricator, must be installed vertically with the bowl downward so that faulty drain discharge and dripping can be verified.
3. Ensure sufficient top, bottom, and front clearance for maintenance and operation of each component. Refer to the dimensions section for the minimum clearance for each component.
4. **Regulator and filter regulator**

   Be sure to unlock the knob before adjusting the pressure and to lock it after the pressure is set.

Adjustment

Warning

1. **Regulator and filter**
   a. Set the regulator while verifying the displayed values of the inlet and outlet pressure gauges. Turning the knob excessively can cause damage to the internal parts.
   b. Do not use a tool on the pressure regulator knob as this can cause damage. It must be operated manually.

Caution

1. **Regulator and filter regulator**
   a. Be sure to check the inlet pressure before setting the outlet pressure.
   b. To set the pressure using the knob, turn the knob in the direction that increases pressure and lock the knob after the pressure is set. If this is done in the direction that decreases pressure, the pressure may drop from the original set pressure. Turning the knob clockwise increases the outlet pressure, and turning it counterclockwise reduces the pressure.

Piping

Warning

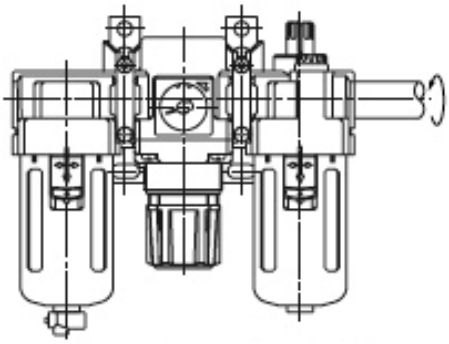
1. To screw piping materials into components, tighten with a recommended tightening torque while holding the female thread side. If the minimum tightening torque is not observed, this can cause a looseness and seal failure. On the other hand, excess tightening torque can cause damage to the threads. Furthermore, tightening without holding the female thread side can cause damage due to the excess force that is applied directly to the piping bracket.

Recommended tightening torque Unit: lb.-ft.

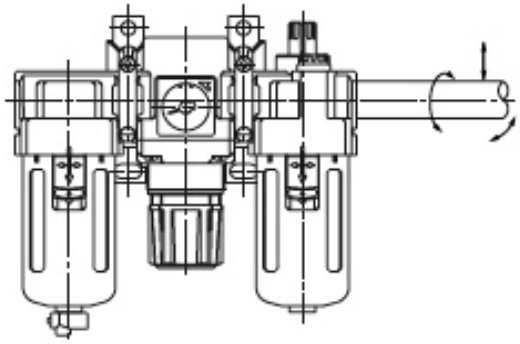
Connection Thread	3/8"	1/2"
Torque	16.2 to 17.7	20.6 to 22.1

** Alternatively tighten by hand, then tighten further approximately 1/6 turn using a tightening tool.*

2. Avoid excessive torsional moment or bending moment other than those caused by the equipment’s own weight as this can cause damage. Support external piping separately.



3. Piping materials without flexibility such as steel tube piping are prone to be affected by excess moment load and vibration from the piping side. Use flexible tubing in between to avoid such an effect.





F.R.L. Unit Precautions 3

Be sure to read before handling

Piping

Caution

1. **Lubricator**

   Try to avoid riser piping and branch lines as much as possible on the outlet side, otherwise proper lubrication will be compromised.

Air Supply

Caution

1. When there is excessive condensate, install a device that eliminates water such as a dryer or water separator (drain catch) on the inlet side of the air filter.

Maintenance

Warning

1. When disassembly or installation is required during the maintenance, repair, or replacement of a device, be sure to follow the instructions provided in the instruction manual or safety instructions in this catalog.
2. Perform periodical inspections to detect any cracks, scratches, or other deterioration of the transparent resin bowl of the air filter, filter regulator, and lubricator or the sight dome of the lubricator.

   Replace with a new bowl, sight dome, or metal bowl when any kind of deterioration is found, otherwise this can cause damage.
3. Perform periodical inspections to detect dirt on the transparent resin bowl of the air filter, filter regulator, and lubricator or the sight dome of the lubricator. When you find dirt on any of the above devices, clean with a mild household cleanser. Do not use other cleaning agents, otherwise this can cause damage.
4. **Air filter**

   a. Replace the element every 2 years or when the pressure drop becomes 15 PSIG (1 Bar), whichever comes first, to prevent damage to the element.

   b. Release accumulated condensate periodically before it reaches the maximum capacity. Condensate that flows out to the outlet side can cause malfunctions.

Caution

1. Perform periodical inspections of the filter element and replace it as necessary. Check the element whenever the outlet pressure drops below normal or air does not flow smoothly during operation.
2. **Regulator and filter regulator**

   Check the sliding part or seat of the internal valve when a setting malfunction or relief leakage occurs and temporary or emergency repairs need to be made.
3. **Lubricator**

   Check the dripping amount once a day. Drip failure can cause damage to the components being lubricated.

Filter-Regulator-Lubricator

Cost-Effective Maintenance for Air Supply Systems

Filter

- Five-micron filter element is standard.
- Manual push-button drain easily discharges contaminants.

Part Number	Air Inlet Thread
10671	1/2" NPT



Filter-Regulator

- Unit has modular connections with mounting brackets for easy installation.

Part Number	Air Inlet Thread
10677	1/2" NPT



Regulator

- Compensation built into unit responds faster to changes in incoming pressure and flow.
- Built-in PSI pressure dial guage.

Part Number	Air Inlet Thread
10673	1/2" NPT



Regulator-Lubricator

- Unit has modular connections with mounting brackets for easy installation.

Part Number	Air Inlet Thread
10679	1/2" NPT



Lubricator

- Built-in check valve permits tool to be filled with oil without having to turn off air pressure.
- Adjustable oil drop to meter amount of oil into air system.

Part Number	Air Inlet Thread
10675	1/2" NPT



Filter-Regulator-Lubricator

- Unit has modular connections with mounting brackets for easy installation.

Part Number	Air Inlet Thread
10681	1/2" NPT



***Each unit includes two bushings for easy conversion to 3/8" NPT.**

Additional Specifications: Maximum Operating Pressure – See Standard Specification Tables on Page 3.

FRL Flow Characteristics

Flow • SCFM (LPM)	Pressure Drop Across FRL • PSIG (Bar)
15 (425)	2.0 (.14)
30 (850)	3.0 (.21)
45 (1274)	6.0 (.41)
60 (1699)	7.0 (.48)
75 (2124)	8.0 (.55)

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