

RACOR[®]

Fuel Filter/Water Separators

Installation, operation parts and service data

Racor Industries, Inc., P.O. Box 3208, Modesto, California 95353 USA (209) 521-7860 Telex: 359-408

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Diesel-Fuel filter/water separators

Installation and Service Instructions

Installation

1. Remove vacuum side filters in fuel line between fuel tank and fuel pump. Cast-in-head or non-removeable housing should be adapted with primary spin-on adaptor (Racor Part No. 11548) where applicable. Otherwise, service and leave in-place.

All secondary or pressure side filters located between pump and engine should be serviced and left in place.

2. Mount Racor filter/separator vertically on the vacuum side of the fuel pump or transfer pump, whichever comes first, in a convenient location for servicing and monitoring contaminants on units with the clear see-through bowl. Do not mount the unit where engine vibration may interfere with filter/separator performance.

Maintain vertical clearance above filter housing for removal of element or elements. (See Specifications Chart, page 15.) Position unit between the horizontal planes of the

bottom of the fuel tank and pump inlet for minimum restriction to the pump. Use maximum fuel line sizes available in order to reduce restriction.

When installing a unit in conjunction with an overhead storage fuel tank, which places head pressure on the unit, a valve must be installed on the *inlet side* of the filter system. This valve is necessary when changing elements.

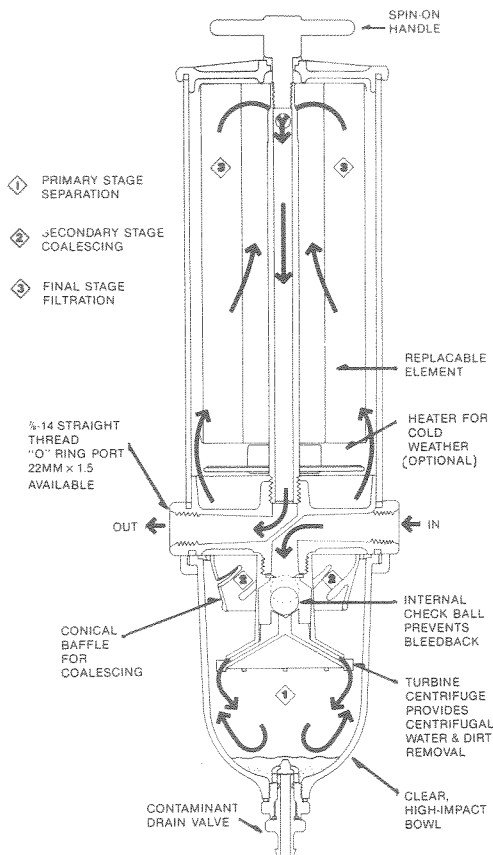
If Racor filter separator in its non-heated version is used in cold weather applications, the unit should be installed behind the engine, in engine compartment or near a manifold, or wherever heat flow is available to strike unit. A Racor heater is available for cold starts, (see page 11). A Racor in-line fuel heater is available for sub-zero conditions, (see page 13).

3. Install fuel line from tank to inlet side of the Racor filter/separator using appropriate fittings. These fittings are available from your dealer or Racor Industries, Inc. (See Fittings & Accessories Chart, page 14.)

4. Install fuel line from the outlet of Racor filter/separator to the inlet of the transfer or fuel pump, again using appropriate fittings as shown with each unit.

5. Remove lid and prime the system by pouring clean fuel into filter cylinder until full. Replace lid and hand tighten T-handle.

6. Start engine and test system. (See Troubleshooting Section, page 3.)



Note:

1. Racor fuel filter/water separators can be ordered with metal bowls for non-automotive gasoline applications.
2. For Racor's complete line of Recycle/Filtering & Recycle/Blending Systems, see "800 Series — Installation & Operating Instructions". Racor Part No. 7095.
3. For Racor's complete line of U.L. Listed Marine Units, see "Marine Diesel-Fuel Filter/Water Separators". Racor Part No. 7096.

8 features to save you time and money

1. Single Unit Tri-functional Design
2. Internal Check Valve System
3. Turbine Centrifuge
4. See-Through Bowl
5. Coalescing
6. Long Life Replaceable Element
7. High Quality Construction
8. Spin-on Handle and Easily Removable Cartridge

Operation

On 75 and 79 Series Models with valving, all valves are in the open position for normal operation. For continuous operation, one unit may be shut down while under power to change element. During element change, reduce fuel flow rate to idle condition.

Service

Element should be changed at 8 to 15 inches of Mercury restriction. (See Accessories Section for gauges.) Measurement should be made at the pump inlet.

1. Remove lid.
2. Inspect gaskets. Replace only if necessary.
3. Remove element.
4. Insert genuine Racor replacement element only, over center return tube with turning motion. See Specifications Chart for correct element number.

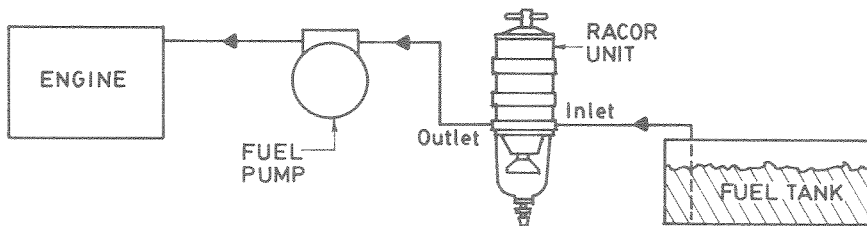


FIG. 1

5. Top off by pouring clean diesel fuel into filter cylinder until full.
6. Replace lid and hand tighten T-handle.

Sump or bowl must be drained at or before contaminant reaches the bottom of the centrifuge assembly. The Water Sensor Light/Alarm Kit is standard equipment on some models and is an available option for other Racor filter/separators. (See Page 13 for details.)

Note: Methanol, ethanol and alcohol-based additives will cause damage to non-metal parts in the Racor unit. When use of an additive is determined to be necessary, use only genuine RACOR FUEL ADDITIVES. RACOR FUEL ADDITIVES provide preventive maintenance protection all year long, helps cold weather starts, protects against damaging foulants, extends element life and maximizes the efficiency of fuel filters and water separators.

Maintenance and Trouble-Shooting Procedures

New Elements — Normal vacuum reading can be 1" to 5" Hg at full governed RPM, depending on the hose I.D., length, elbows, pump efficiency, and height of lift from tank.

Idle RPM should be "O" reading with clean element where pump capacity is dictated by engine RPM.

If vacuum reading does not return to 1" to 5" Hg after element change, check for the following:
collapsed fuel lines;
tank shut-off valves closed;
plugged fuel lines.

If the inlet to the Racor filter/separator is plugged, disconnect inlet line, open drain petcock, and blow out with compressed air. In case of severe stoppages, remove bowl and centrifuge unit and clean with compressed air.

Racor filter/separator systems eliminate the need for "sight glasses" to check air suction leaks. If air bubbles are rising from centrifuge action in the

clear bowl, the air leak is between inlet side of the Racor system and tank.

Check for:
loose fittings;
pin holes in lines;
cracked tank stand pipe;
out of fuel condition;
O-ring not seating;
improper flare angles on hose fittings.*

If no bubbles are noted in bowl and air suction is still evident, check outlet side of Racor system to fuel pump.

Check for:
loose fittings;
pin holes in line;
O-ring not seating;
improper flare angles on hose fittings;*
fuel pump seals;
bleed-off fitting on top of Cummins fuel pump;
top gaskets on Racor filter/separator.

*(For example, a 37° flared female hose fitting pulled up tightly to a 45° male fitting sometimes causes a hair line crack, resulting in air suction.)
If Racor filter/separator is sucking

air at bowl drain fitting gasket or T-handle and top, and cannot be stopped by wetting gasket with fuel and **hand tightening only**, replace gasket.

Bleed Back — If fuel in the filter/separator bleeds back to the tank an air leak or check valve seating problem is indicated. To inspect check valve seat, remove bowl ring, bowl and turbine centrifuge, turning counterclockwise. (See parts diagram for identification of parts.)

Inspect check valve and seat. Clean or replace seat and check valve and reinstall centrifuge **hand tight**. Overtightening causes gasket to warp. Replace bowl ring gasket and reinstall bowl and ring. Fill unit with fuel.

In cold weather operation, installation of a Racor Fuel Heater in the Racor filter/separator will eliminate the need for additives to prevent waxing. Racor's in-line fuel heater is available for extreme cold weather operations. (See Options and Accessories Section.)

Read and follow the Installation Instructions on Page 2 carefully to insure proper performance of your Racor filter/separator.

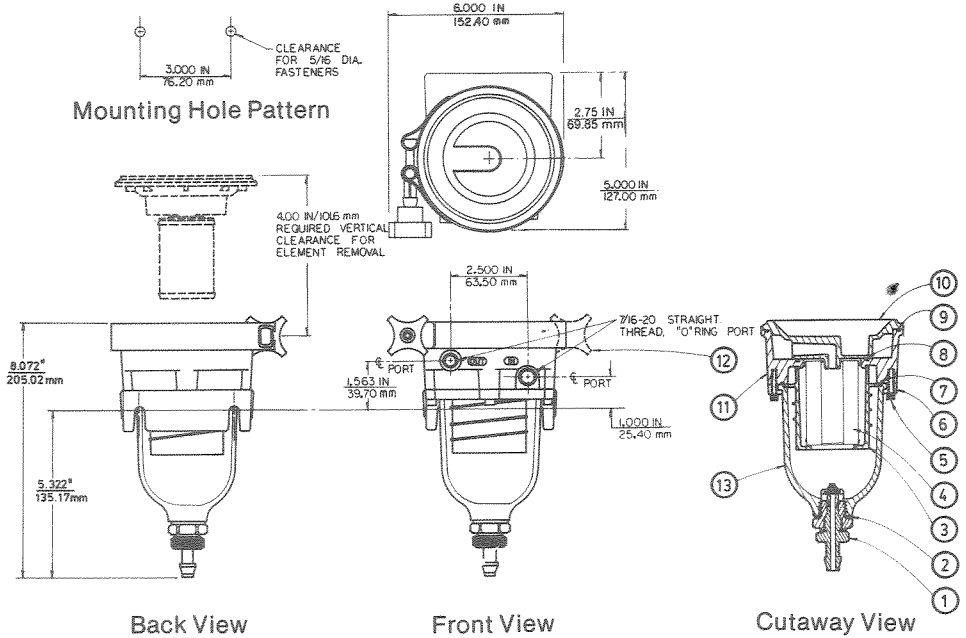
Model 200FG

Maximum Rated Flow .53 gpm (2 lpm)
 Port Size: 7/16" x 20; UNF Str Thd
 w/O-ring

Parts Diagram

Parts List

Item	Part No.	Qty	Description
1	11780	1	Drain Valve
2	11041	1	Bowl Drain Gasket
3	12008A	1	Flow Director
4	2000SM	1	Element
5	15081	4	Bowl Retainer Screw (#10-24 x 7/8" long)
6	12006	1	Bowl Ring Bracket
7	12014	1	Bowl O-Ring
8	12013	1	Lower Lid O-Ring
9	12003	1	Upper Lid O-Ring
10	12075	1	Lid
11	12004A	1	Base
12	12002	1	Retainer Clamp
13	12007	1	Clear Bowl



NOTE: See 200FGM for non-automotive gas-line applications.

NOTE: See mounting bracket on Page 10.

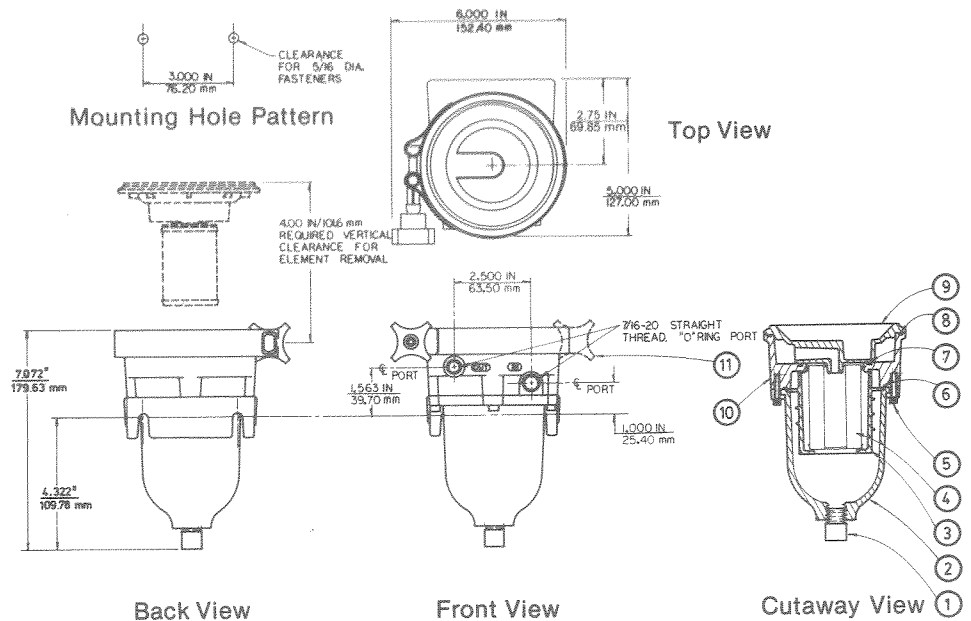
Model 200FGM

Maximum Rated Flow .53 gpm (2 lpm)
 Port Size: 7/16" x 20; UNF Str Thd
 w/O-ring

Parts Diagram

Parts List

Item	Part No.	Qty	Description
1	12041	1	Bowl Plug, 1/4" N.P.T.
2	12021	1	Metal Bowl/Bracket
3	12008A	1	Flow Director
4	2000SM	1	Element
5	15081	4	Bowl Retainer Screw (#10-24 x 7/8" long)
6	12014	1	Bowl O-Ring
7	12013	1	Lower Lid O-Ring
8	12003	1	Upper Lid O-Ring
9	12001	1	Lid
10	12004A	1	Base
11	12002	1	Retainer Clamp




Model 500FG*

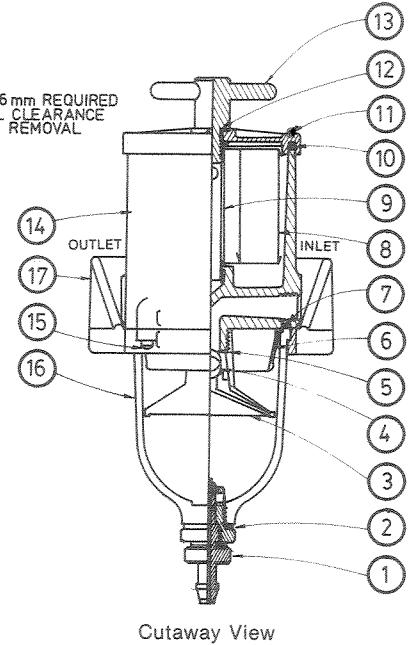
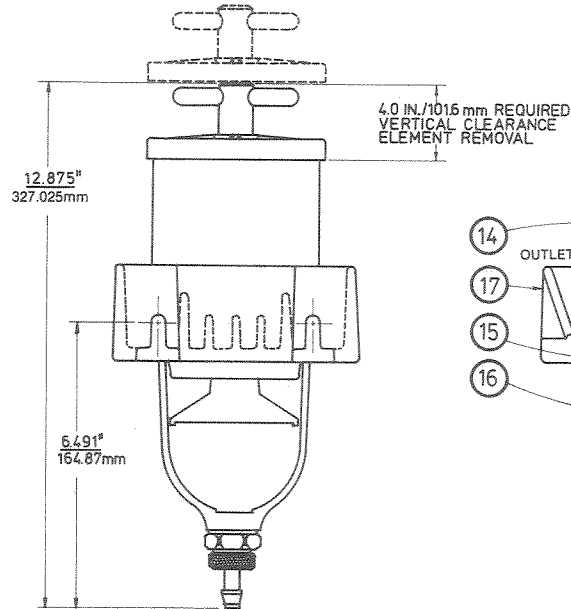
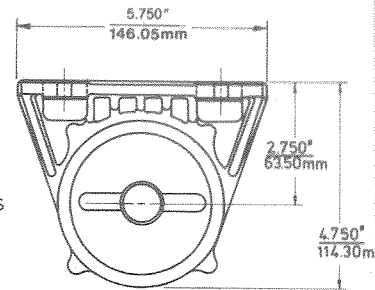
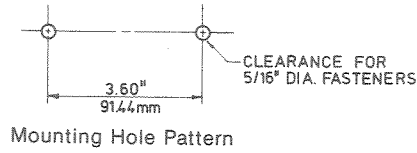
Maximum Rated Flow 1.05 gpm (4 lpm)
 Port Size: 9/16" x 18 UNF Str Thd
 w/O-ring

Parts List

Item	Part No.	Qty	Description
1	11780	1	Drain Valve
2	11041	1	Bowl Drain Gasket
3	15013D	1	Turbine Centrifuge
4	15011	1	Check Ball
5	15010C	1	Check Ball Gasket
6	15012C	1	Conical Baffle
7	15009	1	Bowl O-Ring
8	2010SM	1	Element
9	15079	1	Return Tube
10	15005	1	Lid Gasket
11	15078	1	Lid
12	11350	1	O-Ring
13	11888	1	T-Handle
14	15082	1	Body
15	15081	4	Bowl Retainer Screw (#10-24 x 7/8" long)
16	15014A	1	Clear Bowl
17	15090	1	Ring/Bracket

*For  listed applications,
 order model 500MA

Parts Diagram



Back View

Cutaway View

Model 500FG S/S

Maximum Rated Flow 1.05 gpm (4 lpm)
 Port Size: 9/16" x 18 UNF Str Thd
 w/O-ring

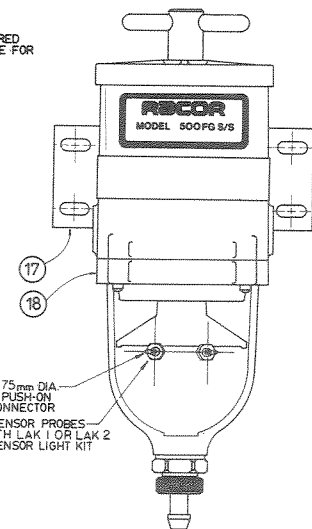
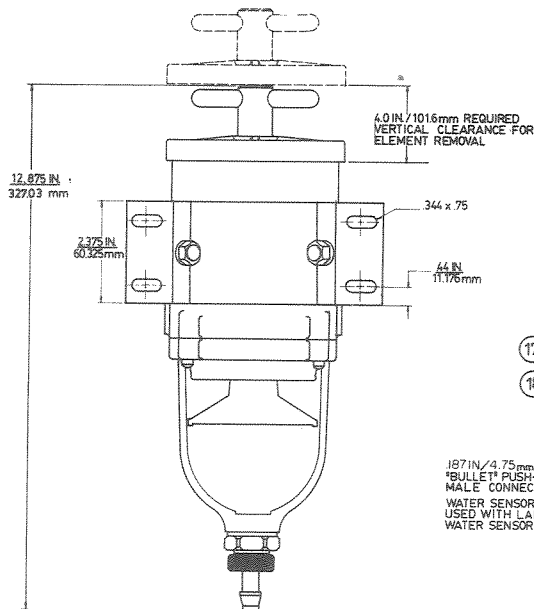
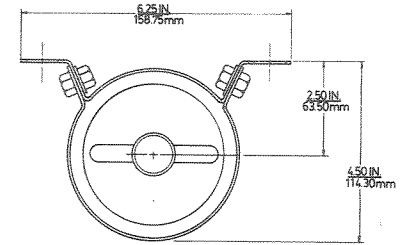
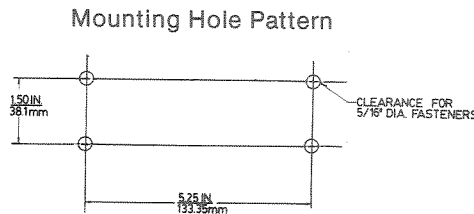
Parts List

Item	Part No.	Qty.	Description
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Items 1-16 - Same as 500FG above.

17	15098	1	Bracket Assembly
18	15035	1	Bowl Ring

Parts Diagram



Back View

Front View

Model 900FG*

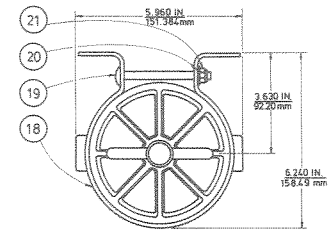
Maximum Rated Flow 1.59 gpm (6 lpm)
 Port Size: 7/8" x 14 UNF Str Thd
 w/O-ring

Parts Diagram

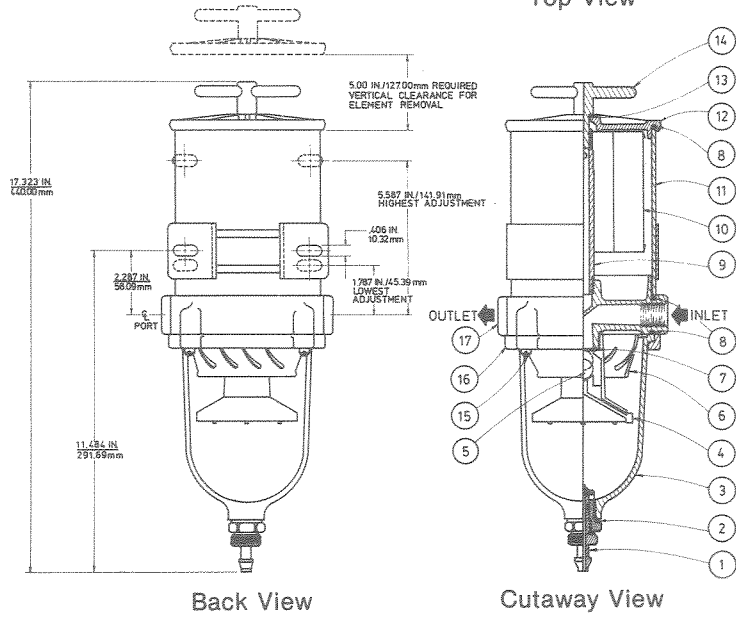
Parts List

Item	Part No.	Qty	Description
1	11780	1	Drain Valve
2	11041	1	Bowl Drain Gasket
3	11031A	1	Clear Bowl
4	11026C	1	Turbine Centrifuge
5	11027	1	3/4" Check Ball
6	11025C	1	Conical Baffle
7	11028B	1	Check Ball Gasket
8	11007	3	Gasket
9	19001	1	Return Tube
10	2040SM	1	Element
11	19002	1	Outer Cylinder
12	11005B	1	Lid
13	11350	1	O-Ring
14	11888	1	T-Handle
15	11542	4	Bowl Retaining Screw
16	11037A	1	Bowl Ring
17	11023B	1	Base
18	11815	1	Bracket Clamp
19	11838	2	5/16" Carriage Bolt
20	12049	2	5/16" Flat Washer
21	11841	2	5/16" Lock Nut

Mounting Hole Pattern



Top View



Back View

Cutaway View

*For listed applications, order model 900MA.

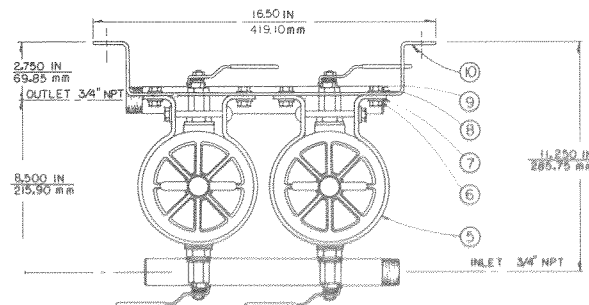
Model 75/900FG*

Maximum Rated Flow 1.59-3.16 gpm
 (6-12 lpm)
 Port Size: 3/4" NPT
 Valves permit servicing under continuous operation. See above for individual Model 900FG Parts List.

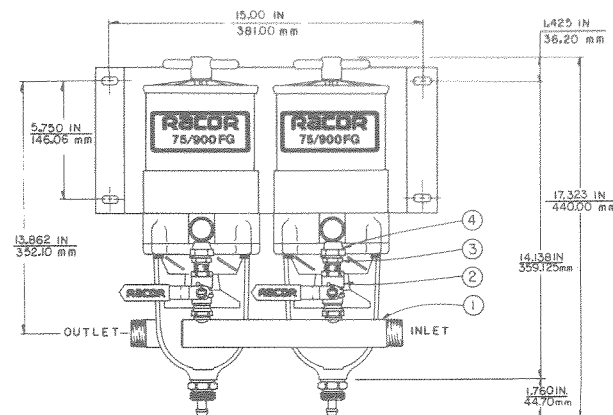
Parts Diagram

Parts List

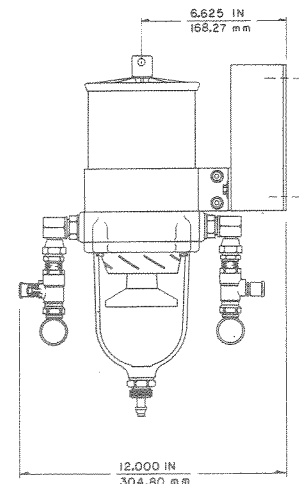
Item	Part No.	Qty	Description
1	11892	2	3/4" Manifold
2	11073	4	Ball Valve Assm. 1/2" NPT
3	11074	4	Strt. Ftg. - 1/2" NPT x 1/2"-14 NPSM
4	11072	4	Elbow Fitting
5	900FG	2	Filter/Separator
6	11078	4	3/8" Hex-Bolt
7	11080	4	3/8" Washer Flat
8	11102	4	3/8" Washer-Lock
9	11079	4	3/8" Hex-Nut
10	11065	1	Double Bracket



Top View



Front View



Back View

*For listed applications, order model 75/900MA.

Valves shown in closed position.

Model 1000FG*

Maximum Rated Flow 3.16 gpm (12 lpm)

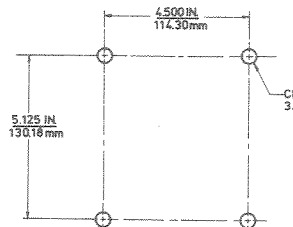
Port Size: 7/8" x 14 UNF Str Thd
w/O-ring

Parts Diagram

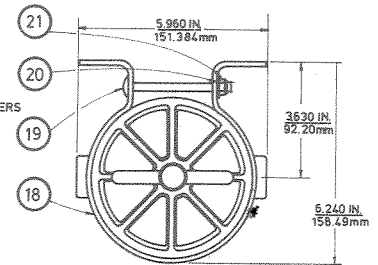
Parts List

Item	Part No.	Qty	Description
1	11780	1	Drain Valve
2	11041	1	Bowl Drain Gasket
3	11031A	1	Clear Bowl
4	11026C	1	Turbine Centrifuge
5	11027	1	3/4" Check Ball
6	11025C	1	Conical Baffle
7	11028B	1	Check Ball Gasket
8	11007	3	Gasket
9	11023B	1	Base
10	2020SM	1	Element
11	11008	1	Return Tube
12	11005B	1	Lid
13	11350	1	O-Ring
14	11888	1	T-Handle
15	11542	4	Bowl Retaining Screw
16	11037A	1	Bowl Ring
17	11021	1	Outer Cylinder
18	11815	2	Bracket Clamp
19	11838	4	5/16" Carriage Bolt
20	12049	4	5/16" Flat Washer
21	11841	4	5/16" Lock Nut

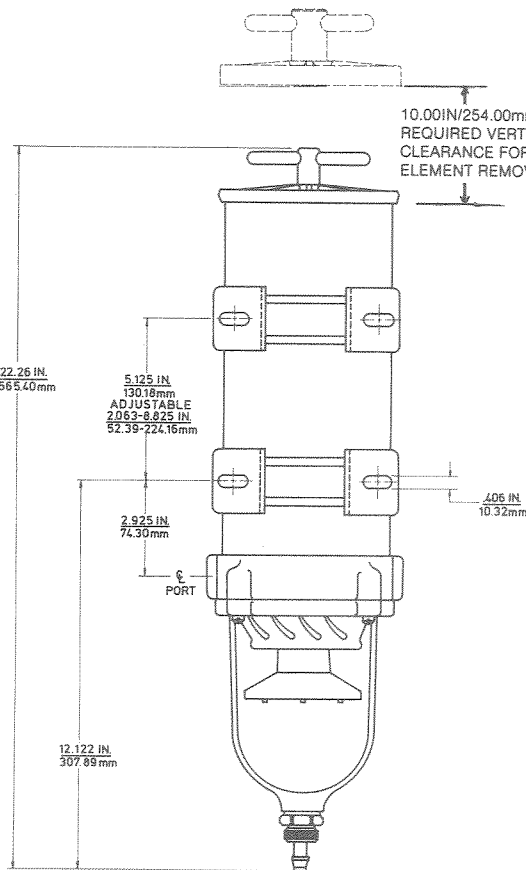
*For  listed applications,
order model 1000MA



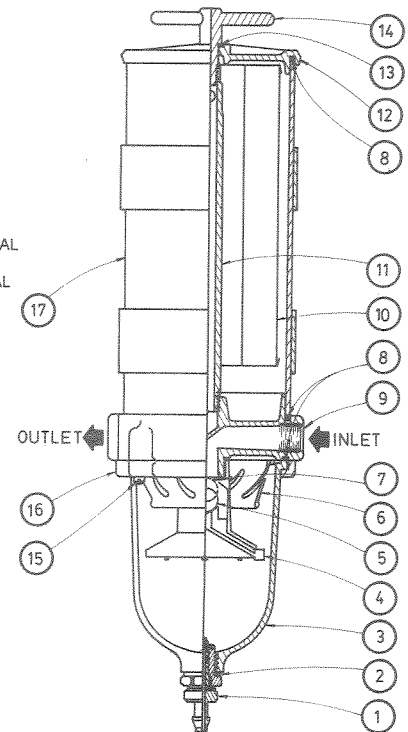
Mounting Hole Pattern



Top View



Back View



Cutaway View

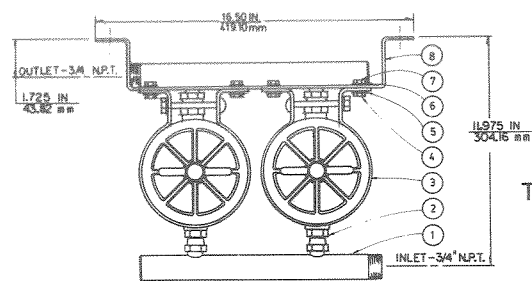
Model 73/1000FG*

Maximum Rated Flow 6.32 gpm (24 lpm)
 Port Size: 3/4" NPT
 See Page 8 for individual Model 1000FG
 Parts List.

Parts List

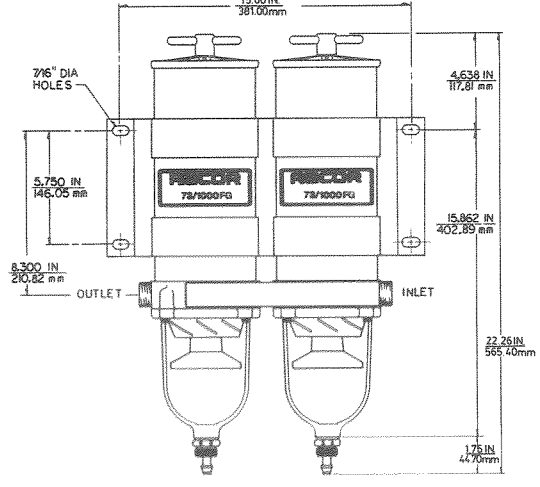
Item	Part No.	Qty	Description
1	11892	2	3/4" Manifold
2	11071	4	Fittings
3	1000FG	2	Filter/Separator
4	11078	8	3/8" Hex-Bolt
5	11080	8	3/8" Washer-Flat
6	11102	8	3/8" Washer-Lock
7	11079	8	3/8" Hex-Nut
8	11065	1	Double Bracket

*For  listed applications,
 order model 73/1000MA.

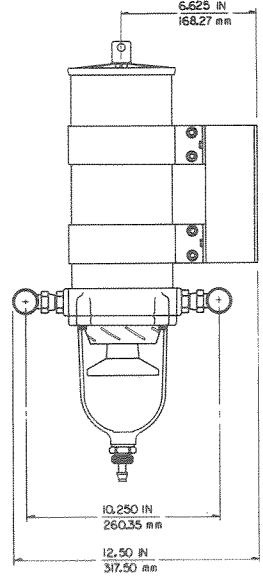


Parts Diagram

Top View



Front View



Side View

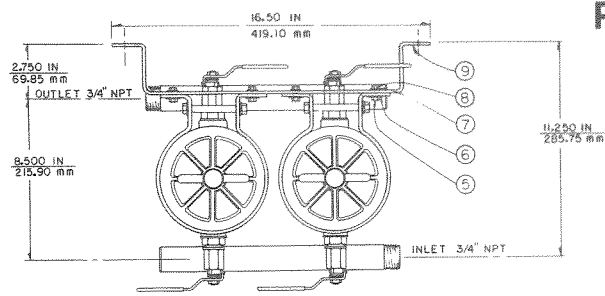
Model 75/1000FG*

Maximum Rated Flow 3.16-6.32 gpm
 (12-24 lpm)
 Port Size: 3/4" NPT
 *Valves permit servicing under contin-
 uous operation. See Page 8 for indivi-
 dual Model 1000FG Parts List.

Parts List

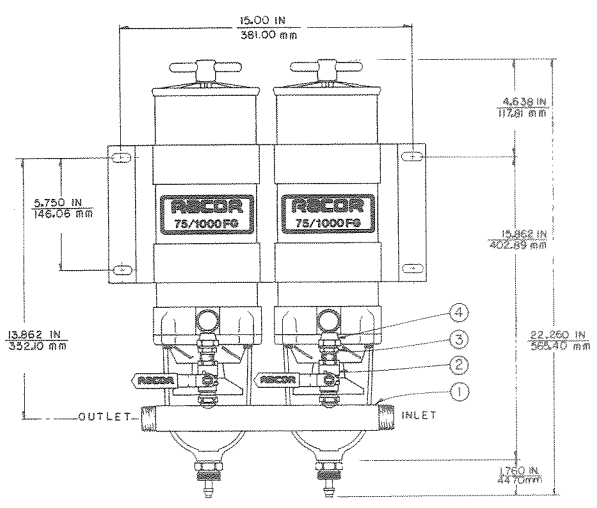
Item	Part No.	Qty	Description
1	11892	2	3/4" Manifold
2	11073	4	Ball Valve Assm. 1/2" NPT
3	11074	4	Strt. Ftg. - 1/2" NPT x 1/2"-14 NPSM
4	11072	4	Elbow Fitting
5	11078	8	3/8" Hex-Bolt
6	11080	8	3/8" Washer-Flat
7	11102	8	3/8" Washer-Lock
8	11079	8	3/8" Hex-Nut
9	11065	1	Double Bracket
10	1000FG	2	Filter/Separator

*For  listed applications,
 order model 75/1000MA.

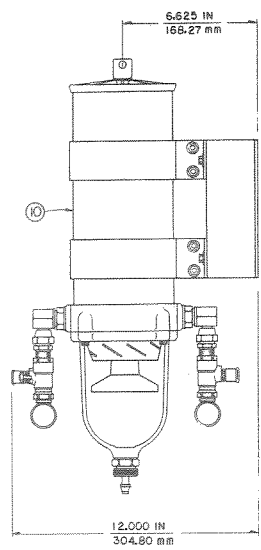


Parts Diagram

Top View



Front Section View



Side View

Valves shown in closed position.

Model 77/1000FG*


Maximum Rated Flow 9.48 gpm (36 lpm)

Port Size: 1" NPT

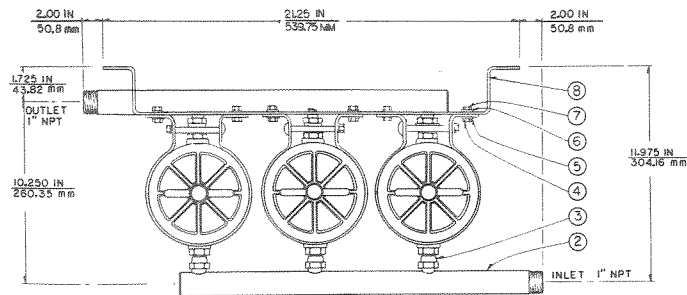
See Page 7 for Individual Model 1000FG Parts List.

Parts List

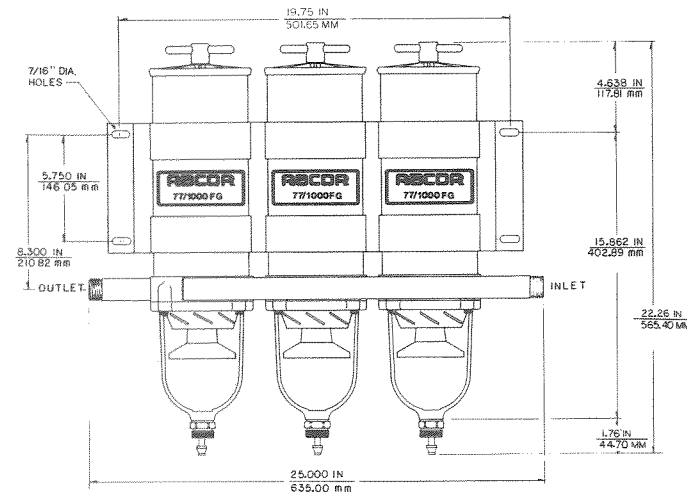
Item	Part No.	Qty	Description
1	1000FG	3	Filter/Separator
2	11076	2	1" Manifold
3	11071	6	Fittings
4	11078	12	3/8" Hex-Bolt
5	11080	12	3/8" Washer-Flat
6	11102	12	3/8" Washer-Lock
7	11079	12	3/8" Hex-Nut
8	18998	1	Triple Bracket

*For  listed applications, order model 77/1000MA.

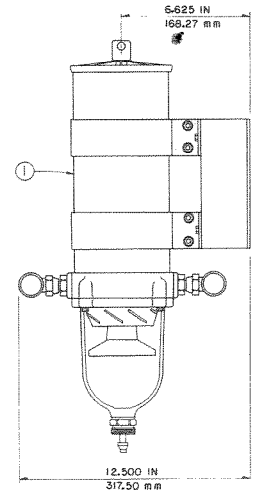
Parts Diagram



Top View



Front Section View



Side View

Model 79/1000FG*


Maximum Rated Flow 3.16-6.32-9.48 gpm (12-24-36 lpm)

Port Size: 1" NPT

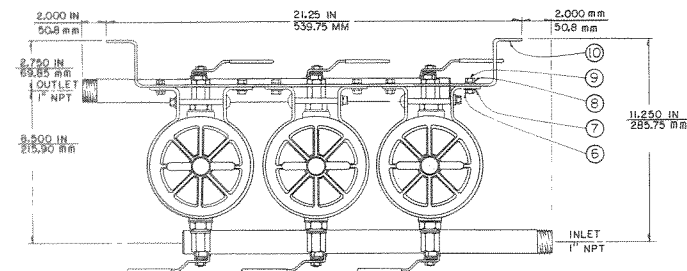
*Valve permit servicing under continuous operation. See Page 7 for individual Model 1000FG Parts List.

Parts List

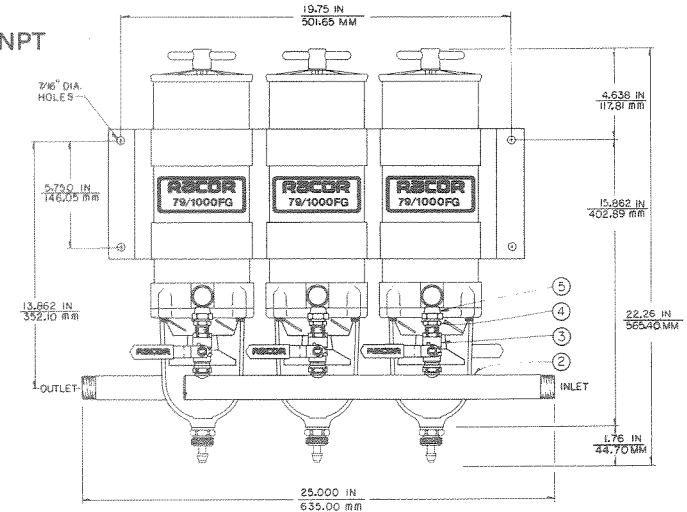
Item	Part No.	Qty	Description
1	1000FG	3	Filter/Separator
2	11076	2	1" Manifold
3	11073	6	Ball Valve Assm. - 1/2" NPT
4	11074	6	Strt. Ftg. - 1/2" NPT x 1/2"-14 NPSM
5	11072	6	Elbow Fitting
6	11078	12	3/8" Hex-Bolt
7	11080	12	3/8" Washer-Flat
8	11102	12	3/8" Washer-Lock
9	11079	12	3/8" Hex-Nut
10	18998	1	Triple Bracket

*For  listed applications, order model 79/1000MA.

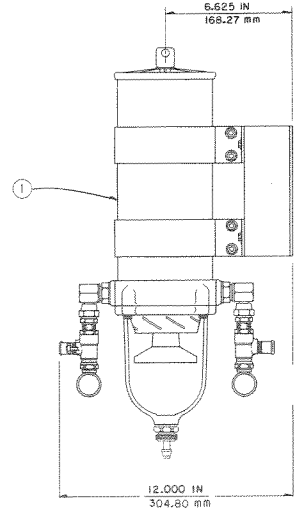
Parts Diagram



Top View



Front Section View



Side View

Valves shown in closed position.

Options & accessories

For Racor Fuel Filter/Water Separators

Vacuum Gauge

1606B Kit

The Racor Vacuum Gauge permits accurate monitoring of the vacuum level in the outlet line of a Racor filter/separator.

Installing a Racor Vacuum Gauge increases troubleshooting efficiency, eliminates guess work and lengthens element change periods.

The 0-15 scale 2" color-keyed face gauge is remotely mounted, using a No. 4 hose and T-fitting, into the line between the filter/separator and pump.

Installation Instructions

1. Drill and tap 1/8" pipe hole or install "T" in fuel line between outlet port of Racor filter/separator and inlet port of pump. (See Fittings & Accessories Chart, page 14, for adaptor fitting.)
2. Install male hose fitting into tapped hole or "T".
3. Attach low pressure No. 4 hose to push-on hose fitting (available as an option).
4. Install 2" gauge in panel or bracket.
5. Connect female push-on hose fitting to gauge.
6. Connect hose to gauge hose fitting.

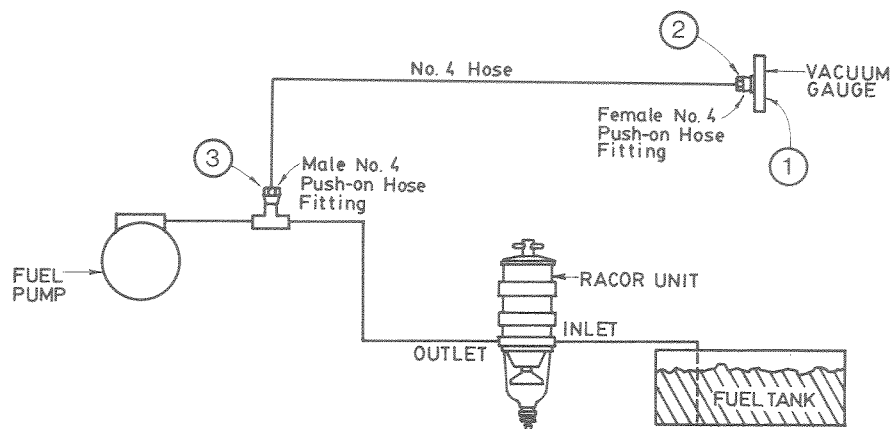
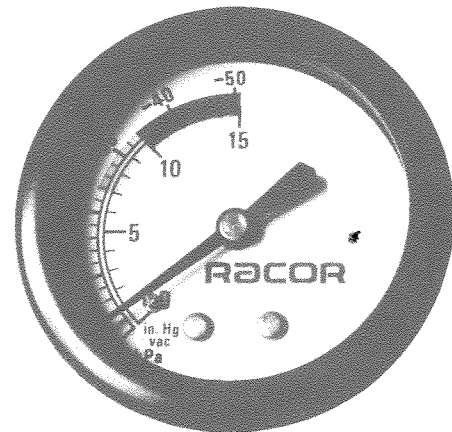
NOTE: Seal all connections with Teflon tape or an equivalent sealant.

Parts List

1. (1) No. 11233 Vacuum Gauge
2. (1) No. 7234-4 Female fitting
3. (1) No. 7232-4 Male fitting
4. (1) No. 18-1202 Vacuum Gauge Label

Optional:

- No. 11268 No. 4 Hose (Specify length)
- No. 9040-10-8DT Filter port fitting for gauge
- No. 11369 1/4" x 1/8" brass adaptor

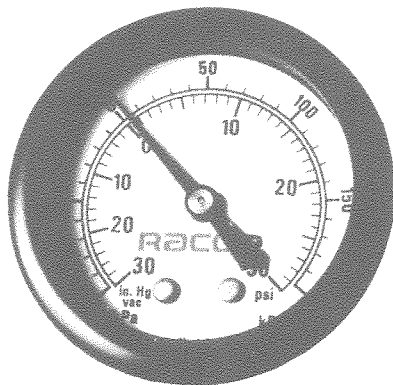


Vacuum/Pressure Gauge

Part No. 18-1104

The Racor "compound" gauge provides measurement of both vacuum and pressure over a wider range in applications that may be exposed to both vacuum and pressure (i.e. installations with a positive head pressure on the Filter/Separator).

The compound gauge is also provided with the Racor "TK" series test kits, to simplify vacuum and pressure checking. Pressure and vacuum readings are expressed in both the familiar English measurements and the international standard of Kg/cm².



Automotive Mounting Bracket Kits

A complete line of mounting bracket kits is manufactured for installing the 200 Series Filter/Separators on automobiles.

They contain the Racor-approved mounting bracket (specifically designed for the year, make and model automobile) and all the necessary hardware for correct installation.

Racor In-Filter Disc Heater

The Disc Heater is Racor's newest In-Filter Heater available in sizes to fit the 500 FE/FF/FG/SS and the 900/1000 FE/FF/FG Fuel Filter/Water Separator. It provides:

- A) More direct heat to the element
- B) Full insulation
- C) More accurate temperature sensitivity
- D) Less wires
- E) Stronger construction
- F) Positive or negative ground hookup

Operation

An internal automatic thermostat turns on the Racor In-Filter Disc Heater as the fuel temperature drops below 35°F (-1.1°C).

The In-Filter Disc Heater operates on the vehicle's DC current, supplying heat to the fuel filter just below the replaceable element. This critical placement provides increased fuel temperature as the fuel passes through the fine micron filtering element. The power rating of the 500 Disc Heater is 100 watts maximum, 10 amperes for the 12V heater, 5 amperes for the 24V heater. The power rating of the 900/1000 Disc Heater is 200 watts maximum, 15.5 amperes for the 12V heater, 7.8 amperes for the 24V heater.

When the engine is not running and the temperature is below 30°F, the heater is operated by turning on the master switch for a maximum of 7 minutes for the 500 heater, 10 minutes for the 900/1000 heater prior to starting the engine. With the diesel fuel temperature above 30°F there is no waxing or icing of the filter element. The In-Filter Heater is primarily a cold starting aid. For sub-zero running where the Racor Filter/Separator is exposed to chill factor winds, the use of the Racor In-Line Fuel Heater, RX-20A, is suggested (See Page 13).

WARNING: Racor In-Filter Heater is not to be used when filtering gasoline or other highly volatile liquids.

Installation

The chart below is to be used only as a guide for 900/1000 Disc Heater installation. Electrical checks must be made to determine if your truck's electrical system is capable of handling an additional amperage load.

Guide to Optional 12V And 24V Relay		
Truck Manufacturer	Relay Required	
	Yes	No
Ford	X	
Freightliner		X
GMC—Chevrolet		X
International Harvester "S" Series 1600—2600	X	X
Iveco	X	
Kenworth		X
Mack		X
Marmon	X	
Mercedes	X	
Peterbilt		X
Volvo	X	
White	X	

For flexibility, three different electrical system connections are possible. An electrical check must be performed for each option before final installation is made.

Option A:

Ignition Switch Electrical Connection 500 Disc Heater

Prior to installation, determine if your vehicle's ignition switch is capable of an additional 10 amperage load for a 12V system, 5 amps for a 24V system. If the ignition switch proves capable of the additional load, proceed with final electrical connection.

900/1000 Disc Heater

Prior to installation, determine if your truck's ignition switch is capable of an additional 15.5 amperage load for a 12V system, 7.8 amps for a 24V system. If the ignition switch proves capable of the additional load, proceed with final electrical connection. SEE "PREPARING HEATER TERMINALS FOR ELECTRICAL CONNECTION" ON PAGE 12 AND DIAGRAM A BELOW.

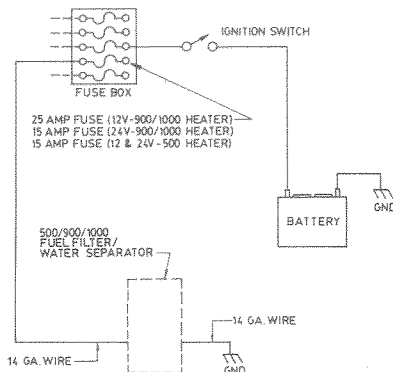


DIAGRAM A

Option B:

Existing Heavy-Duty Electrical Connection

Prior to installation, determine if your vehicle's existing heavy-duty relay is capable of the additional amperage load as stated in Option A. If the heavy-duty relay proves capable of the additional amperage load, proceed with final electrical connection. SEE "PREPARING HEATER TERMINALS FOR ELECTRICAL CONNECTION" ON PAGE 12 AND DIAGRAM B BELOW.

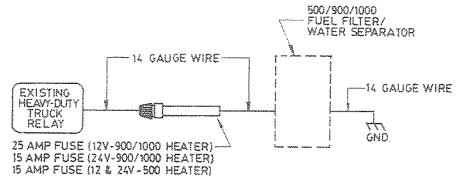


DIAGRAM B

Option C:

Optional Relay Electrical Connection

If, after running the electrical checks in Option A & B, the ignition switch and/or existing heavy-duty relay proves incapable of an additional amperage load, an optional relay must be installed. SEE "PREPARING HEATER TERMINALS FOR ELECTRICAL CONNECTION" THIS PAGE, AND DIAGRAM C BELOW.

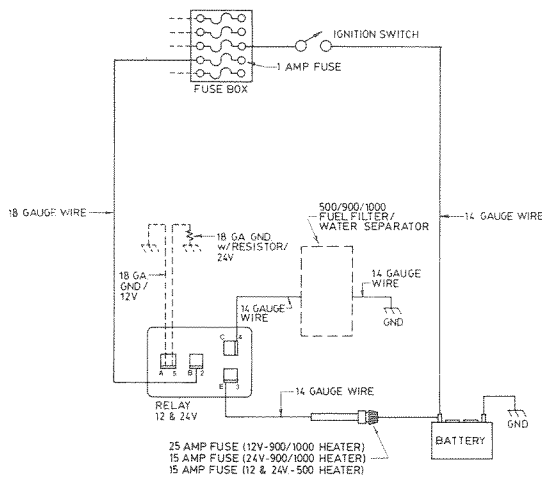


DIAGRAM C

An optional Racor relay replacement kit can be ordered which includes specific instructions for relay installation. Refer to chart below for ordering information:

SYSTEM VOLTAGE	RACOR PART NUMBER	
	500	900/1000
12V	15156	11861
24V	15157	11862

An equivalent relay is available through the following manufacturers:

Manufacturer	Part No.
Nartron	1300-1
Cole-Hersee	24059
Bosch	36-002
Delco-Remy	1114223

To Prepare Heater Terminals for Electrical Connections

- 1) Unpack the (2) 90° insulated connectors.
- 2) Connect to two lengths of 14 gauge wire. The length of wire depends on which option you are using for electrical connection.
- 3) Push each connector onto an installed terminal. Either terminal may be used as ground.
- 4) All electrical connections must be made to accommodate the power of the heater using appropriate lug and terminal connections.

CAUTION: Loose or improper connections will cause electrical arcing, shorts and corrosion.

Racor recommends installing a Water Sensor/Light Alarm Kit, the LAK-1 (12V) or the LAK-2 (24V). See page 13.

The water sensor will allow monitoring of the water level in the clear bowl. Do not allow the water to reach the level of the disc heater. Water level reaching the disc heater will cause damage to the heater. Drain accumulated water when present.

Disc Heater Kits

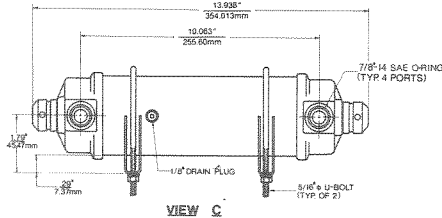
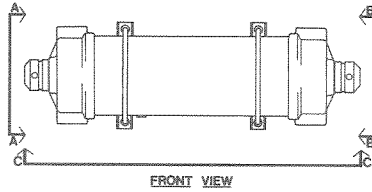
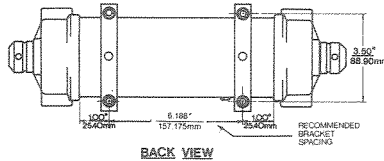
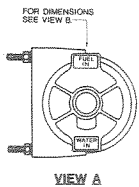
Part No.	Description
15133	500FF/FG — 12V Disc Heater Kit (Includes 12V heater, FF/FG clear bowl with terminals)
15134	500FF/FG — 24V Disc Heater Kit (Includes 24V heater, FF/FG clear bowl with terminals)
15137	500FFP/FGP — 12V Disc Heater Kit (Includes 12V heater, FFP/FGP clear bowl with probes and terminals)
15138	500FFP/FGP — 24V Disc Heater Kit (Includes 24V heater, FFP/FGP clear bowl with probes and terminals)
11721	900/1000FF/FG — 12V Disc Heater Kit (Includes 12V heater, FF/FG clear bowl with terminals)
11722	900/1000FF/FG — 24V Disc Heater Kit (Includes 24V heater, FF/FG clear bowl with terminals)

NOTE: 500FE and 900/1000FE Model Disc Heater Kits are available upon request.

Racor's RX-20A In-Line Diesel Fuel Heater

How It Works

The RX-20A is Racor's newest in-line heat exchanger. It combines excellent heat rise efficiency and reliability in a rugged design that requires virtually no maintenance. The unit is designed to be mounted externally on diesel-powered machinery and vehicles which operate primarily in cold weather climates. Heat is transferred from a tube bundle containing hot radiator fluid to the cold fuel circulating around the tubes. (See Diagram A.) The heater's design reduces any possibility of internal leaks as the two liquids move through separate compartments of the unit. Internal baffle spacing and overall design of the RX-20A yields maximum efficiency possible with minimum flow restriction. An integral water shut-off valve is a standard feature on the RX-20A. For warm weather operation the flow of hot radiator fluid through the unit can be shut off, eliminating possible overheating of the diesel fuel. The RX-20A is also equipped with a fuel drain plug that allows the operator to drain any water contamination that accumulates.

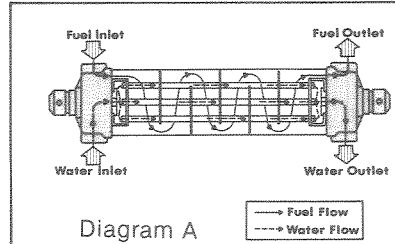
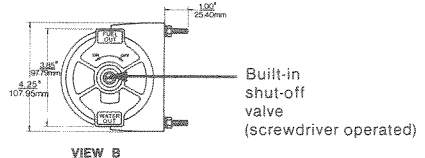


RX-20A PERFORMANCE					
Inlet Fuel Temp.		Outlet Fuel Temp (°F/°C)			
		2.5 GPM/9.4 LPM		1.5 GPM/5.6 LPM	
°F	°C	°F	°C	°F	°C
-40°F	-40°C	40°F	4.4°C	50°F	10°C
-20°F	-28.89°C	45°F	7.22°C	54°F	12.22°C
-0°F	-17.78°C	50°F	10°C	60°F	15.56°C

NOTE: Lower flow rates result in a higher heat rise

Temperature Rise For Various Engine Models				
Manufacturer	Engine Model	Fuel Temp In	Expected Fuel Temp Out	
Cummins	350/355	-40°F	+50°F	
		-20°F	+54°F	+60°F
Cummins	290	-40°F	+62°F	
		-20°F	+65°F	+77°F
Detroit Diesel Allison	8V71 & 8V92	-40°F	+50°F	
		0°F	+54°F	+60°F
Cat	3406	-40°F	+62°F	
		0°F	+65°F	+77°F
Mack	E8315 & ETA/673A & END1/673A	-40°F	+50°F	
		-20°F	+54°F	+60°F
Mack	ETA 1005 & EM8-400	-40°F	+40°F	
		-20°F	+45°F	+50°F

This information is based upon maximum flow rates. Vehicles with a lower fuel flow rate can expect a higher heat rise.



The LAK-1/LAK-2 Water Sensor Light/Alarm Kit

A functional accessory for all Racor filter/separators, the all solid-state Water Sensor Light/Alarm alerts the operator when liquid contaminants filtered out of the system should be drained from the collector bowl, thereby maintaining maximum filter/separator efficiency.

In the primary stage of the Racor Fuel Filter, water and solid contaminants are separated out of the fuel by centrifugal action. The water and solids fall to the bottom of the bowl. When the water in the bowl reaches the level of the sensor probes, a low voltage circuit is completed and the warning light and buzzer are activated. See **Water Level Diagram**. When the warning light and buzzer come on, the bowl must be drained to remove the trapped contaminants and water, insuring maximum engine protection and filtration efficiency (be sure to turn off engine before draining).

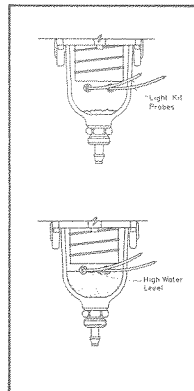
WARNING: Racor Light Kit is not to be used when filtering gasoline or other highly volatile liquids.

Installation

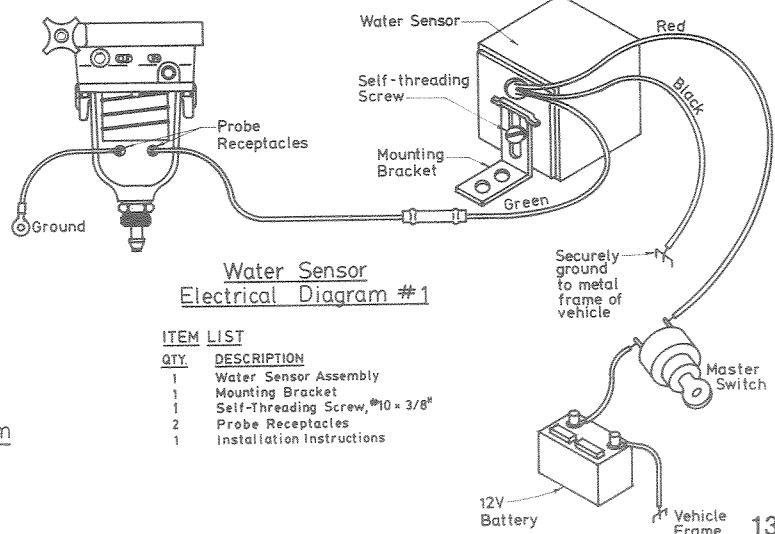
The Racor Water Sensor Light/Alarm Kit is designed for 12V DC (LAK-1) and 24V DC (LAK-2) power sources.

A collector bowl with probes is required when installing a light kit on Racor Fuel Filter/Water Separators. Contact your Racor dealer for the collector bowl to meet the application.

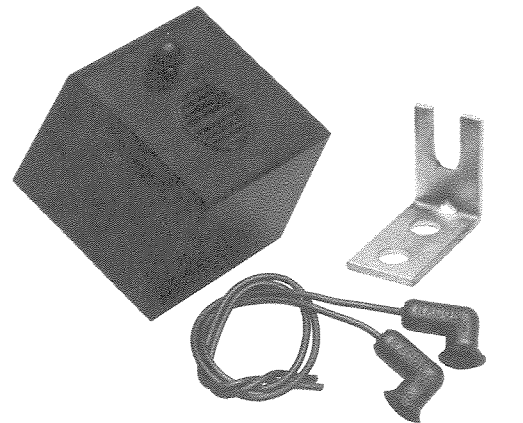
An optional Adaptor Kit, Racor Part #11-1048, is available for mounting the LAK-1 and LAK-2 in dash.



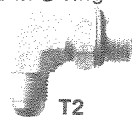
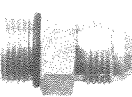
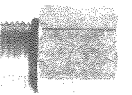


Water Level Diagram



- ITEM LIST**
- | QTY. | DESCRIPTION |
|------|----------------------------------|
| 1 | Water Sensor Assembly |
| 1 | Mounting Bracket |
| 1 | Self-Threading Screw, #10 x 3/8" |
| 2 | Probe Receptacles |
| 1 | Installation Instructions |



Racor Fittings Chart

FITTING	RACOR PART NO.	UNIT USAGE	T1	T2
Straight Thread w/O-ring 90° Elbow/ Male JIC37° 	9010-4-4 9010-6-4 9010-6-6 9010-10-8 9010-10-10	200 500 500 900/1000 & RX-20 A 900/1000 & RX-20 A	7/16-20 w/o-ring 9/16-18 w/o-ring 9/16-18 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring	7/16-20 7/16-20 9/16-18 3/4-16 7/8-14
Straight Thread w/O-ring/ Male JIC37° 	9020-4-4 9020-6-4 9020-6-6 9020-10-6 9020-10-8 9020-10-10	200 500 500 900/1000 & RX-20 A 900/1000 & RX-20 A 900/1000 & RX-20 A	7/16-20 w/o-ring 9/16-18 w/o-ring 9/16-18 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring	7/16-20 7/16-20 9/16-18 9/16-18 3/4-16 7/8-14
Straight Thread w/O-ring/ Female Pipe 	9040-4-4 9040-6-4 9040-6-6 9040-10-4 9040-10-6 9040-10-8 9040-10-8DT 9040-10-12	200 500 500 900/1000 & RX-20 A 900/1000 & RX-20 A 900/1000 & RX-20 A 900/1000 900/1000 & RX-20 A	7/16-20 w/o-ring 9/16-18 w/o-ring 9/16-18 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring 7/8-14 w/o-ring	1/4-18 pipe thd. 1/4-18 pipe thd. 3/8-18 pipe thd. 1/4-18 pipe thd. 3/8-18 pipe thd. 1/2-14 pipe thd. 1/2-14 pipe thd. 3/4-14 pipe thd.
Hose Fittings 	9010-HF-4-5 9010-HF-4-6 9010-HF-6-5 9010-HF-6-6	200 200 500 500	7/16-20 w/o-ring 7/16-20 w/o-ring 9/16-18 w/o-ring 9/16-18 w/o-ring	5/16 hose 3/8 hose 5/16 hose 3/8 hose
Hose Fittings 	9020-HF-4-5 9020-HF-4-6 9020-HF-6-5 9020-HF-6-6	200 200 500 500	7/16-20 w/o-ring 7/16-20 w/o-ring 9/16-18 w/o-ring 9/16-18 w/o-ring	5/16 hose 3/8 hose 5/16 hose 3/8 hose

† Racor recommends using 9040 fittings for customers' existing pipe that does not match Racor's 37° JIC fitting.

*For use with U. L. listed fuel hose only.

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Some states do not allow the exclusion or limitation of incidental or consequential damages or limitations on the duration of an implied warranty so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Specifications

MODEL NO.	200FG	200FGM	500FG	900FG	1000FG	75-900FG	73-1000FG ^① 75-1000FG ^②	77-1000FG ^③ 79-1000FG ^④
MAXIMUM FLOW RATE								
gpm	.53	.53	1.05	1.59	3.16	3.16	6.32 ^① 3.16/6.32 ^②	9.48 ^③ 6.32/9.48 ^④
lpm	2	2	4	6	12	12	24 ^① 12/24 ^②	36 ^③ 24/36 ^④
CLEAN VACUUM DROP								
inHg	1.25	1.25	1.25	2.0	3.0	2.0	3.5 ^① 5.0 ^②	3.5 ^③ 5.0 ^④
kgs./sq. cm.	.043	.043	.043	.069	.104	.069	.121 ^① .173 ^②	.121 ^③ .173 ^④
WORKING PRESSURE (PRESSURE SIDE USE NOT RECOMMENDED)								
psi	15	15	15	100	100	100	100	100
bars	1.05	1.05	1.05	6.89	6.89	6.89	6.89	6.89
PROOF PRESSURE								
psi	100	100	100	200	200	200	200	200
bars	6.89	6.89	6.89	13.79	13.79	13.79	13.79	13.79
MAXIMUM VACUUM								
inHg	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
mmHg	723.90	723.90	723.90	723.90	723.90	723.90	723.90	723.90
ELEMENT MODEL NO.								
	2000SM	2000SM	2010SM	2040SM	2020SM	2040SM	2020SM	2020SM
ELEMENT MATERIAL RESIN IMPREGNATED CELLULOSE								
DIRT CAPACITY (AC Fine Dust) *								
	45 gms	45 gms	250 gms	500 gms	1000 gms	1000 gms	2000 gms	3000 gms
ELEMENT REMOVAL CLEARANCE								
in.	4.0	4.0	4.0	5.0	10.0	10.0	10.0	10.0
mm	101.6	101.6	101.6	127.0	254.0	254.0	254.0	254.0
TEMPERATURE RATINGS								
F°	-50/225	-50/225	-50/225	-50/225	-50/225	-50/225	-50/225	-50/225
C°	-46/107	-46/107	-46/107	-46/107	-46/107	-46/107	-46/107	-46/107
PORT SIZE								
in.	7/16"-20 UNF	7/16"-20 UNF	9/16"-18 UNF	7/8"-14 UNF	7/8"-14 UNF	3/4" NPT.	3/4" NPT.	1" NPT.
mm			14mm x 1.5	22mm x 1.5	22mm x 1.5			
HEIGHT								
in.	8.072	7.072	12.875	17.323	22.26	17.323	22.26	22.26
mm	205.02	179.63	327.025	440.00	565.40	440.00	565.40	565.40
WIDTH								
in.	6.00	6.00	5.750	5.960	5.960	16.50	16.50	25.00
mm	152.40	152.40	146.05	151.384	151.384	419.10	419.10	635.00
DEPTH								
in.	5.00	5.00	4.750	6.240	6.240	12.00	12.50 ^① 12.00 ^②	12.50 ^③ 12.00 ^④
mm	127.00	127.00	120.65	158.49	158.49	304.80	317.50 ^① 304.80 ^②	317.50 ^③ 304.80 ^④
TOP TO ϕ OF INLET								
in.	1.00	1.00	6.00	8.126	13.00	15.287	13.0 ^① 18.50 ^② 330.20 ^① 469.90 ^②	13.0 ^③ 18.50 ^④ 330.20 ^③ 469.90 ^④
mm	25.40	25.40	152.40	206.40	330.20	388.29		
TOP TO ϕ OF OUTLET								
in.	1.00	1.00	5.75	8.126	13.00	15.287	13.0 ^① 18.50 ^② 330.20 ^① 469.90 ^②	13.0 ^③ 18.50 ^④ 330.20 ^③ 469.90 ^④
mm	25.40	25.40	146.05	206.40	330.20	388.29		
WEIGHT								
lbs.	3	3.61	3.90	6.68	8.73	27	35	47
kg	1.36	1.637	1.77	3.03	3.96	12.24	15.88	21.32
SEALS BUNA N								
VALVES BALL TYPE NONE BALL TYPE ^② NONE BALL TYPE ^④								

*Specifications shown are the result of tests conducted at the optimum flow rate for each unit (equal to 1/2 the maximum flow rate).

CAUTION: ALCOHOLS AND ACIDS WILL HAVE A DETRIMENTAL EFFECT ON CLEAR BOWL & PLASTIC PARTS

Simplified Flow Rate Formula For Medium Range Diesel Engines.

Hp x .006 = Approximate gpm pump flow rate

(This formula is an approximate flow rate for engines below 600 H.P. Consult your engine manufacturer for accurate flow rate specifications.)

- FOOTNOTES:**
- ① Model 73-1000FG w/ Shut-Off Valves
 - ② Model 75-1000FG w/ Shut-Off Valves
 - ③ Model 77-1000FG w/ Shut-Off Valves
 - ④ Model 79-1000FG w/ Shut-Off Valves

RACOR®

**For the name of the Racor distributor nearest you, call
1-800/344-3286. In Alaska, California and Hawaii, call
1-209/521-7860. Telex: 359-408.**

P.O. Box 3208, Modesto, California 95353 USA (209) 521-7860 Telex: 359-408

Printed in U.S.A.
RAC-5300/1-83/50M
Racor No. 7091FG