

## Turbine Series Heater & Water Probe Retrofit Kits

FOR A REPLACEMENT HEATER AND WATER PROBE THAT USES 'BULLET-TYPE' BOWL TERMINALS, OR TO ADD A HEATER AND WATER PROBE TO A UNIT THAT DOES NOT HAVE A HEATER FEED-THRU PORT IN THE BODY, USE THE SELECTION GUIDE BELOW.

### 900 and 1000 Series

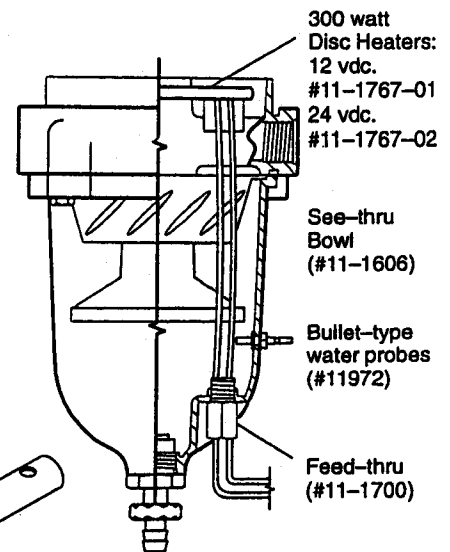
#### Kit Part No. Description / Notes

- |              |  |
|--------------|--|
| RK11-1737    | Retrofit Kit. Includes See-thru Bowl with two 'bullet-type' water probes and self-venting drain, Heater Feed-thru for bowl port, crimp terminals related seals and instructions. Order Heater below. |
| RK11-1767-01 | 12 vdc, 300 watt Heater Kit. Includes T-handle O-ring, Lid and bowl gasket. (Max. power draw 25 amps).   |
| RK11-1767-02 | 24 vdc, 300 watt Heater Kit. Includes T-handle O-ring, Lid and bowl gasket. (Max. power draw 13 amps).   |

#### TOOLS

- |         |                         |
|---------|-------------------------|
| 11-1708 | Heater Feed-thru Wrench |
|---------|-------------------------|

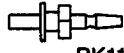


Feed-thru wrench



87

This is the replacement kit for the original bowl that had 4 bullet type water probes / terminals. The upper pair were terminals for the heater + the lower pair were water probes. That bowl is no longer available but the probe / terminal is available:

#### 'BULLET-TYPE' PROBES FOR OLDER TURBINE SERIES MODELS.

- |           |   |  |   |   |
|-----------|---|--|---|---|
| * RK11741 | Water Probe/Terminal Kit. Bullet 'thru-bowl' type, includes 11-1393 connector (1 each). | 500 / 900 / 1000 early <u>see-thru</u> bowls |  RK11741 |  11-1393 |
| RK11972   | Water Probe/Terminal Kit. Bullet 'thru-bowl' type, includes 11-1393 connector (1 each). | 500 / 900 / 1000 early metal bowls           |  RK11972 |   |

The next page is the instruction sheet for the bowl kit and the last 4 pages have general information on the current 900 series filter.

# Installation Instructions:

Retro-fit Feedthru Heater / Water Probe Replacement Bowl Kit  
RK11-1737 for 900/1000FG Series  
Read all instructions prior to installation

## Tools required for installation:

Wire cutter and crimper, 3/8 inch wrench (for the 900/1000FG Series), Phillips head screw driver (for the 500FG Series), heat gun or hair dryer for the heat shrink connectors, and a container for draining the fuel from the filter.

# RACOR®

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Telex 359-408 RACOR MSTO

## Procedure:

Remove one cable from the battery as a safety measure and unplug the heater wires from the side of the RACOR collection bowl.

Unscrew the T-handle from the top of the filter housing and loosen the lid. Drain the fuel from the filter and remove the filter element. Discard the o-ring on the T-handle and the gasket for the lid.

Using a 3/8 inch wrench or screwdriver remove the 4 bolts or screws holding the bowl ring to the filter base. Pull the bowl off the housing and disconnect the heater wires that are connected to it. Discard the gasket that goes between the bowl and base and the bowl.

Put the bowl ring on the new bowl (turn so recess is up).

Take each water probe and lubricate the o-ring with clean fuel.

From the inside of the bowl, pass the threaded end of the probes through the bowl. Tighten the probe nut (Caution: Over tightening may crack the bowl.)

Install the bowl drain and heater feedthru.

Cut off the terminals on the ends of the heater wires as close to the terminals as possible and strip off 1/4 inch of the insulation from these ends.

Slide one of the two gaskets over the yellow and red wires on the new bowl kit. This is important to do before the following step.

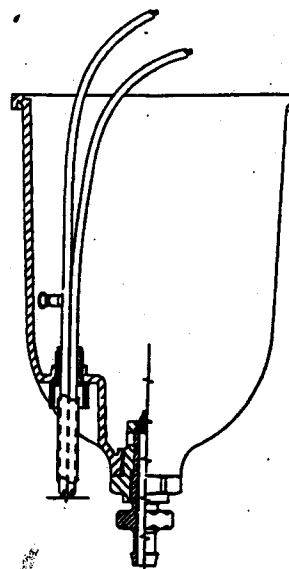
Using two of the blue butt-splice connectors, crimp one of the heater wires to the yellow wire in the new bowl kit and crimp the remaining heater wire to the red wire in the new bowl.

Make the power and ground connections to the feedthru using the remaining two butt-splice connectors.

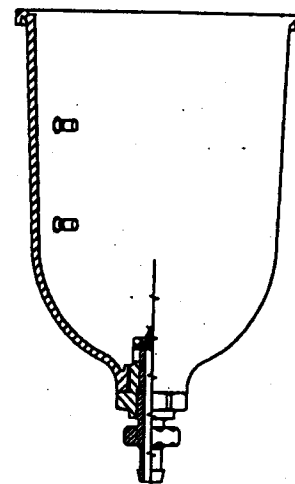
Once all of the electrical connections are made, use a heat gun or hair dryer to shrink fit the connectors to the wires. Just turn on the heat gun and aim it directly at the connectors. The connectors will automatically shrink fit themselves around the wires.

After the wires have been connected and shrunk, the bowl can be reattached to the base. Tuck the remaining lengths of wires into the bowl. Tighten the bolts or screws until they fit snugly.

Put the filter element back into the filter housing and fill with clean fuel. Using the remaining gasket and o-ring, tighten the lid onto the filter housing. Do not forget to reattach the battery cable. Start engine and check to see that there are no leaks. Correct if necessary.



New Design



Old design



Filtration

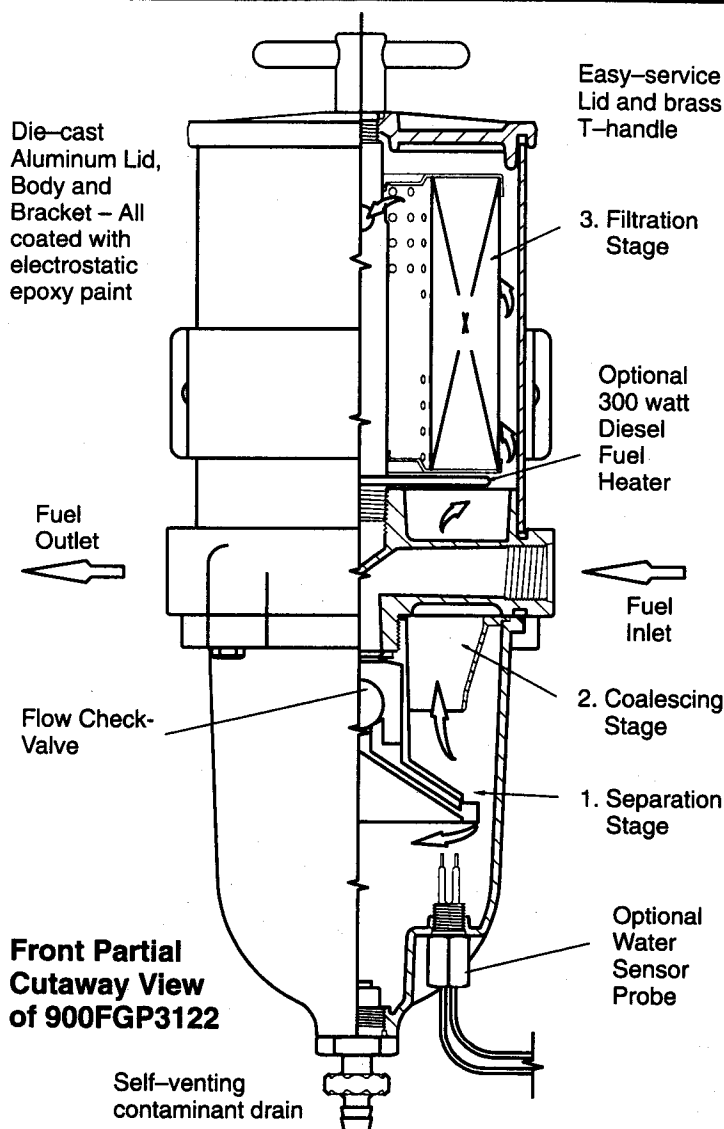
# 900FG – 1000FG Series Fuel Filter / Water Separators for Diesel Powered Engines

# RACOR®

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Filtration



Front Partial  
Cutaway View  
of 900FGP3122

The Racor 900/1000 Series Fuel Filter/Water Separators protect the precision components of your engine from dirt, rust, algae, asphaltines, varnishes and especially water which is prevalent in engine fuels. Racor removes contaminants using a patented three stage process:

- 1. Separation:** The turbine separates large solids and 'free' water through centrifugal action.
- 2. Coalescing:** Smaller water droplets and solids coalesce on the surfaces of the conical baffle and fall to the bottom of the collection bowl.
- 3. Filtration:** Engines will benefit from near 100% water separation and fuel filtration with Racor's proprietary **Aquabloc™** water repelling media. The replaceable filter elements are available in 2, 10 and 30 micron (nominal) ratings.

These units are designed for installation on the suction (vacuum) side of the fuel transfer pump for best efficiency.

The standard fuel ports are 7/8"-14 SAE J1926 O-ring seal type. 22mm metric ports are optional. Fittings are not supplied with this unit but are available from your Racor dealer. Please refer to the fittings chart on the back page.

The bracket is an adjustable one-piece clamp-type with grade 5 fasteners for ensured durability. The 900 series use one clamp bracket and the 1000 series use two.

The see-thru contaminant collection bowl provides for a quick visual check of water and solid accumulation.

**OPTIONAL FEATURES:** For diesel fuel applications only. See Accessories.

An in-filter 300 watt heater quickly warms the fuel providing easier starting in colder climates.

A water sensor probe alerts the operator when it's time to drain the bowl ( especially useful for models with a metal bowl). Must be used with a Racor water detection kit.

A vacuum gauge kit (not shown) is also available to inform the operator when it's time to change the element.

## PART NUMBER IDENTIFICATION

The example below illustrates how the part numbers are constructed.

900FG	-P	-324	-10
Basic Model	Water Sensor Probe	Heater Option	Element Rating:
900FG = 90 GPH		312 = 12 vdc	2 micron
1000FG = 180 GPH		324 = 24 vdc	10 micron
Call for metric ports.	Add 'P'		30 micron

SPECIFICATIONS	900	1000
Fuel Ports, SAE J1926	7/8"-14 or 22mm	7/8"-14 or 22mm
Maximum Flow Rate	90 GPH / 341 LPH	180 GPH / 681 LPH
Replacement Element	2040 Series	2020 Series
Overhead space required	5" / 127mm, min.	10" / 254mm, min.
Clean Pressure Drop*	.34 PSI / 2.4 kPa	.49 PSI / 3.3 kPa
Height	16" / 406 mm	21" / 533 mm
Width	6" / 152 mm	6" / 152mm
Depth	7" / 178 mm	7" / 178mm
Weight, Dry	6 lbs. / 3 kgs	10 lbs. / 5 kgs
Temperature Rating	- 40° / +255°F - 40° / +121°C	- 40° / +255°F - 40° / +121°C

\* Specifications result from tests conducted at the maximum flow rate.

**Simplified Flow Rate Formula for Medium & Heavy Duty Engines**  
Horsepower X .36 = Approximate (GPH) fuel pump flow rate.  
Consult your engine manufacturer for exact specifications.

# INSTALLATION INSTRUCTIONS

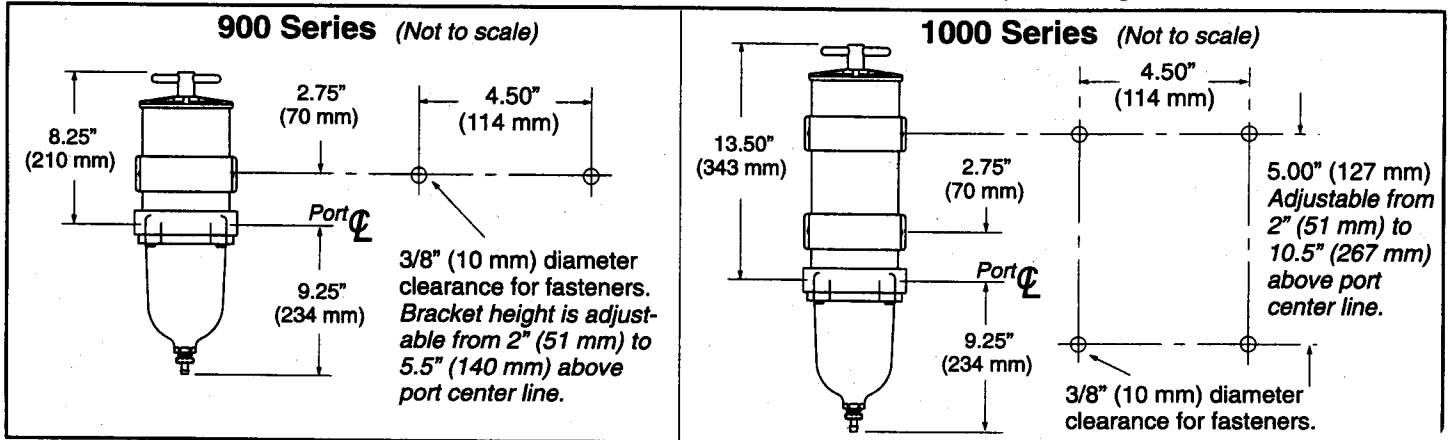
## WHEN POSITIONING THE UNIT:

1. The Racor 900/1000 Series should be installed on the suction (vacuum) side of the fuel transfer pump for optimum water separating efficiency. See the illustration below.
2. To keep fuel line restriction to a minimum, locate the unit between the horizontal planes of the bottom of the fuel tank and the inlet of the fuel pump, if at all possible.  
If the Racor filter is in an application where the fuel tank is higher, a shut-off valve must be installed between the tank and the Racor INLET for use when servicing the replacement filter.
3. Maintain clearance above the unit for element servicing: 5" /127mm for the 900 and 10" /254mm for the 1000.

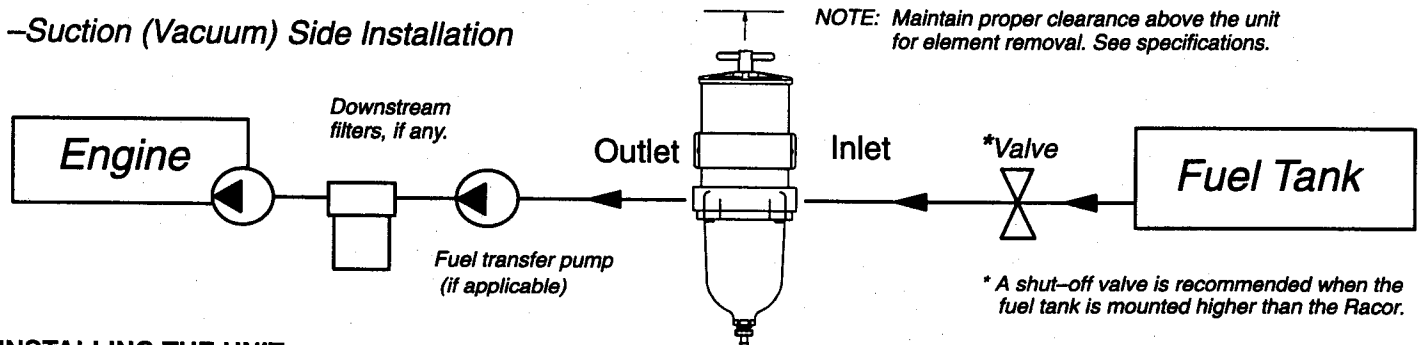
## BEFORE INSTALLING THE UNIT:

1. Ensure fuel port fittings are in hand along with fuel line and all needed installation tools and materials.
2. Maintain a safe working environment. Obtain good ventilation, lighting and **Do not** smoke or allow open flame near the installation. The engine must be off for the installation.

**MOUNTING HOLE PATTERNS:** Use the dimensions below when drilling holes or positioning the unit.



## -Suction (Vacuum) Side Installation



## INSTALLING THE UNIT:

1. Completely remove any vacuum side filter(s) in the fuel line between the fuel tank and fuel pump. This is where your Racor filter will mount. Leaving these filters in place will only add to fuel line restriction. Filter heads cast into the engine or that are non-removable or hard piped should be serviced with a new element and left in place.
2. To keep fuel flow restriction values to a minimum: Use maximum size fuel line where possible; Do not make sharp bends with flexible fuel line as kinks may occur and avoid the use of two 45° elbow fittings where one 90° elbow will work.
3. If routing new fuel hose, avoid surfaces that will move, have sharp edges or will get hot, such as exhaust piping.

## FUEL SYSTEM PRIMING:

Remove the lid T-handle, fill the unit with clean fuel and coat the lid seal with fuel as well. Replace the lid and tighten the T-handle snugly by hand ONLY. If applicable, refer to the equipment operator's service manual to complete the fuel priming / bleeding procedure. Start the engine and check the installation for potential leaks.

## TROUBLESHOOTING PROCEDURES:

A major cause of poor starting or power loss is the result of an air leak or high restriction. If your unit will not prime, fails to hold a prime or if air bubbles are visible in the see-thru bowl, first check that the T-handle and drain valve are properly tightened. Next, check all fitting connections and ensure none of the fuel lines are pinched or clogged with contaminants. If your fuel tank is equipped with an in-tank strainer, check it for potential clogging. If problems persist (and the filter element is new) call your Racor dealer or Racor Customer Service for assistance at 800/344-3286, PST.

## INSTALLING OPTIONAL FEATURES

**NOTE: RACOR ELECTRICAL OPTIONS ARE FOR USE WITH DIESEL FUEL ONLY.**

**WATER SENSOR.** Most Racor units can be specified with a water sensor probe. The probe senses continuity values and **must** be used with a special electronic detector to function properly. Due to the various models available, these electronic detectors are sold separately and installation instructions are supplied with each kit. See Accessories for part numbers. Kits may be ordered from your Racor Dealer.

**IN-FILTER HEATER.** The in-filter disc heater is a cold weather starting aid with an internal automatic thermostat that turns the heater on if the fuel temperature drops below +45 °F (+7.2 °C). Heat is supplied in the unit just below the replacement element to melt the wax crystals and allow fuel to pass through the element for quick, easy starts. The 300 watt heater is available in 12 or 24 vdc (volts, direct current). The heater is operated by turning the ignition switch ON for a minimum of five minutes prior to starting the engine.

### CUSTOMER SUPPLIED ITEMS.

1. Because of the heater power demand: 25 amps for 12 vdc and 13 amps for 24 vdc, an additional relay is recommended for the safest method of installation.

**Racor offers two relay kits available from your dealer:**

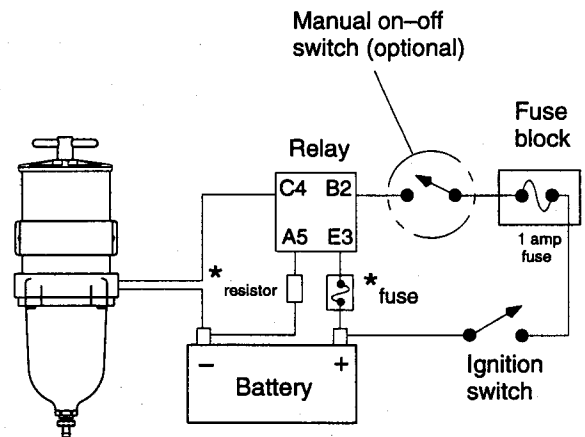
**RK11861 (for 12 vdc) and RK11862 (for 24 vdc).**

These kits include an in-line fuse holder (and fuse) and the RK11862 kit also includes a resistor. Use the 25 amp fuse with 12 vdc and the 15 amp fuse (and resistor) with 24 vdc systems.

2. An on-off toggle switch may be used to control power to the heater relay. This allows the operator to cut power to the heater relay during summer use.
3. All wires should be 14 AWG (American Wire Gauge) minimum.

### INSTALLATION

1. Either heater wire may be used for Hot (+) or Ground (-).
2. Wire / terminal connections should be soldered and crimped.
3. Run wires in protected locations. Avoid hot surfaces and places that could pinch or rub on the wires.



\*Use resistor and 15 amp fuse with 24 vdc systems.

## SERVICE

Frequency of water draining or element replacement is determined by the contamination level of the fuel. The collection bowl must be drained before contaminants reach the bottom of the turbine or when the water detector (optional) indicates it's time to 'drain water'. Inspect or drain the collection bowl of water daily and replace the element every 10,000 miles, every 500 hours, every other oil change or if a power loss is noticed, *whichever comes first*.

If a vacuum gauge has been installed on the outlet side of the filter, change the element between 6 to 10 inches of mercury (restriction). The actual measurement varies in different fuel systems.

**Note:** Always carry an extra Racor element as one tankful of excessively contaminated fuel can plug a filter.

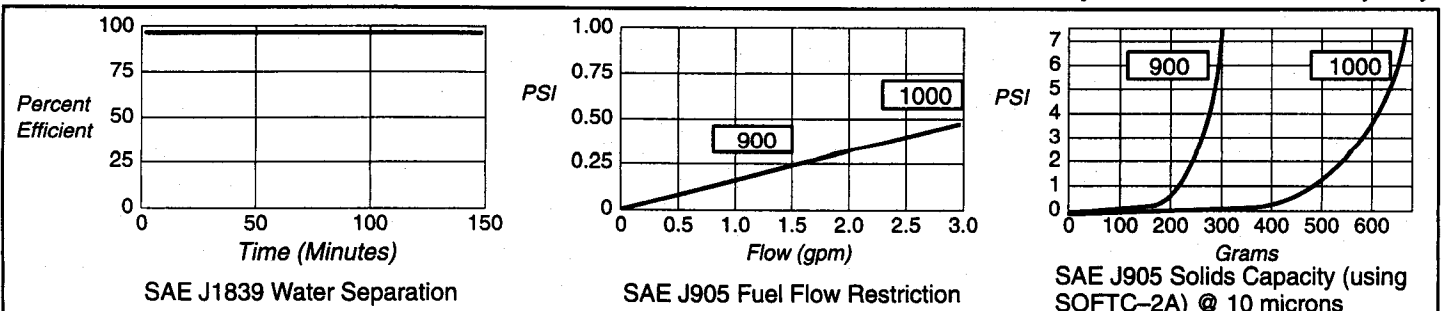
### TO DRAIN WATER:

Open the self-venting drain to evacuate contaminants. If necessary, remove the lid and prime the unit by filling with clean fuel. Replace the lid and tighten the T-handle snugly by hand ONLY.

**TO REPLACE ELEMENT:** Only genuine Racor replacement filter elements feature specially treated **Aquabloc™** media and an exclusive seal design to resist element fuel by-pass. A convenient molded handle on the top of the element simplifies removal. Remove the lid and then remove the element by slowly pulling upward on the molded handle with a turning motion. Replace the lid gasket with the one supplied with the new element. Apply a coating of clean fuel to the seal prior to reassembly. Fill the unit with clean fuel, then replace the lid and tighten the T-handle snugly by hand ONLY. Start the engine and check for leaks. Correct any leaks with the engine off.

## PERFORMANCE GRAPHS

*These results are from controlled laboratory tests. Field results may vary.*

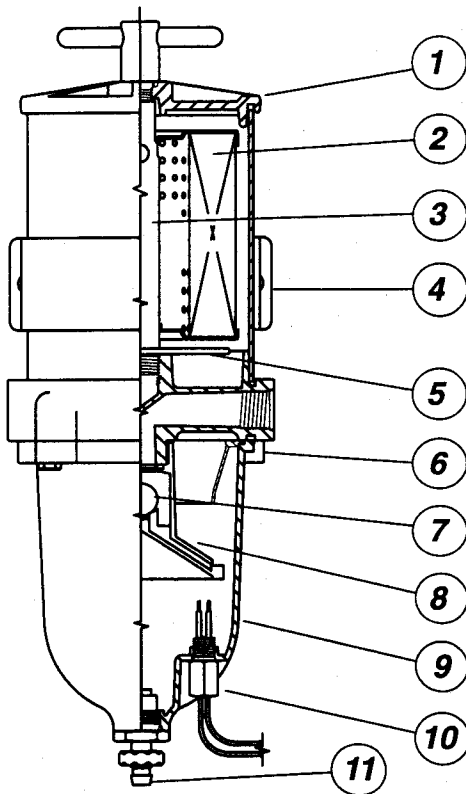


## 900/1000 REPLACEMENT PARTS LIST

Item	Part No.	Description (quantity is one each)
1	RK11005/A RK11-1778	T-handle / Lid Assembly One piece Lid Assy. (not shown)
2	2040SMOR 2040TMOR 2040PMOR 2020SMOR 2020TMOR 2020PMOR	900 Rpl. Element, 2 micron Rpl. Element, 10 micron Rpl. Element, 30 micron 1000 Rpl. Element, 2 micron Rpl. Element, 10 micron Rpl. Element, 30 micron
3	RK19474 RK11-775	900 Return Tube 1000 Return Tube
4	RK11815-101	Body Clamp Bracket
5	RK11-1767-01 RK11-1767-02	Heater, 12 vdc, 300 watt Heater, 24 vdc, 300 watt
6	RK21067	Heater feed-thru Connector
7	RK11037A	Bowl Ring for See-thru Bowls
8	RK11028B	Check Ball and Seal Kit
9	RK11026D	Turbine and Centrifuge Kit
10	RK11-1606	See-thru Bowl & Water Sensor Port
11	RK21069	Water Sensor Probe*
12	RK30488 RK11-1404	Self-Venting Drain Valve Seal Service Kit (all models)

\*For see-thru bowl, must be used with Decion Module.

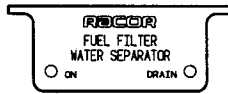
Front  
Cutaway  
View of  
900FGP312



## ACCESSORIES

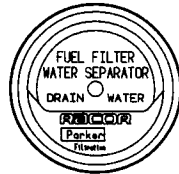
### Water Detection Kit # RK20725

12 vdc underdash module which illuminates an LED when water is detected. Measures 2 3/4" X 1" X 1 1/2". Hardware and instructions included. Wire and terminals are customer supplied.



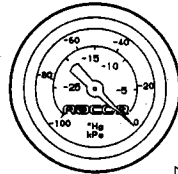
### Water Detection Kit # RK20726

12 or 24 vdc gauge type module which illuminates an LED and sounds a momentary buzzer when water is detected. Fits 2 1/16" diameter panel openings. Hardware and instructions included. Wire and terminals are customer supplied.



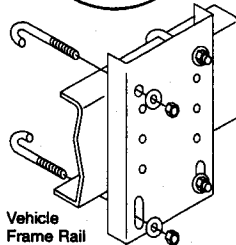
### Element Restriction Gauge Kit #1606B

Plumbed on the outlet side of the filter, the gauge monitors element restriction. Helps in determining when it's time for a filter change. Most hardware and instructions included.



### Frame Rail Mounting Kit #RK11-1518.

Adjustable to fit frame rails up to 10" in height by 4" in depth and 3/4" in thickness. No drilling or welding of the frame rail is necessary. Hardware shown and instructions included.



Vehicle  
Frame Rail

## FITTINGS CHART

PLATED STEEL FITTINGS FOR 7/8"-14 SAE J1926 PORTS \*

Description	T2	Part Number
SAE 37° Elbow	3/4"-16 7/8"-14	9010-10-8 9010-10-10
SAE 37° Straight	3/4"-16 7/8"-14	9020-10-8 9020-10-10
NPT Female	3/8" NPT 1/2" NPT 3/4" NPT	9040-10-6 9040-10-8 9040-10-12
Description	Hose Inside Diameter Typical SAE100R5	Part Number
Barbed Elbow	3/8" (#6) 1/2" (#8) 5/8" (#10)	13/32" (#8) 1/2" (#10) 5/8" (#12)
Barbed Straight	3/8" (#6) 1/2" (#8) 5/8" (#10)	13/32" (#8) 1/2" (#10) 5/8" (#10)

\* Order metric fittings from your PARKER dealer. Call 1-800-C-PARKER for the dealer nearest you.

**WARNING** The following statement is required pursuant to Proposition 65 applicable in the State of California: 'This product may contain a chemical known to the State of California to cause cancer.'

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