



aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Fuel Filtration Systems

Products and Custom Solutions



ENGINEERING YOUR SUCCESS.

About Racor

Parker Hannifin Corporation, global leader in motion and control technologies, delivers an unmatched breadth of engineered products and solutions. Our commitment to our customers is backed by the strength that comes from over 90 years of knowledge and experience.

About Racor.

For over forty years Parker's Racor Division has been one brand of fuel filtration systems that has earned the confidence and respect of engine and equipment builders, owners and operators around the world.

Leading edge technology and continuous innovation are designed into every system, and genuine Aquabloc® filters have set the global standard.

In every configuration, at every flow rate, and in any operating environment, Racor is the most trusted name in engine protection. Why trust your investment to anything less?



A World of Fuel Challenges

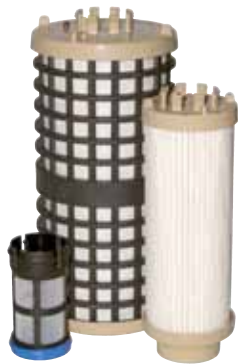
Fuel contamination, either in the form of dirt or water, will find its way into your fuel system however careful you are. With modern engines now injecting fuel at pressures up to 30,000 PSI, and injector tolerance being measured in microns, even a small amount of dirt or water corrosion can start problems. Water or particulates can cause microscopic surface damage that is then focused on by the high-pressure fuel flow, which causes wear that will eventually lead to reduced efficiency and complete breakdown. With this in mind, managing fuel delivery and system cleanliness through proper filtration becomes an absolute imperative for economical engine operation.



For marine applications, please see Racor brochure #7501.

Racor Solutions For Your Future

Racor has quality-certified manufacturing, engineering and distribution in place around the world, so no matter where you are you can rely on Racor to solve tough filtration problems from the refinery to the engine. Over the years, Racor has kept pace with the increasing demands of fuel filtration, from tough engine requirements for ever-finer particle-removal efficiencies and longer life, to the effective processing of ULSD and biodiesel.



The heart of these advances is in Racor's proprietary engineered filter media families. Our selection of Aquabloc® medias is known worldwide for its combination of high efficiency, long life and unsurpassed water-removal performance, meeting and exceeding the challenges of today's diesel engine requirements in all markets and environments.

Using Aquabloc® media, Racor Engineering develops innovative solutions to become integral components in complex engine fuel systems designed by the world's leading OEM engine manufacturers. Racor develops new solutions using ISO, SAE, JIS and other world-recognized testing procedures to conform to any specifications required by our OEM customers. Racor performs on-engine, on-vehicle and laboratory diesel system testing to further the advancement of diesel filtration for today and into the future. All diesel engine users benefit from this ongoing demand for the latest technology in fuel filtration and fuel system designs.



The future of the diesel engine relies on increasingly stringent exhaust emission requirements, while the quality of diesel fuel continues on a worldwide decline. New diesel engines require extraordinary fuel cleanliness and freedom from water contamination to meet these requirements. Ultra low sulfur diesel (ULSD) and the rapidly expanding use of biodiesel pose new filtration challenges due to their tendency to dissolve existing deposits, absorb water, and support the growth of bacteria. Even cold weather operation is compromised by the new fuels, leading to downtime and problems on an increasing frequency.



Cost-Effective Visual Inspection

See-thru collection bowls allow a water-in-fuel condition to be immediately visible.

Environmentally Friendly

Engineered polymer bowls are reusable, impact-resistant and virtually indestructible. When it's time for service, only the filter element is replaced - the see-thru bowl and drain valve assembly are reused. The long life cycle of the bowl saves money and reduces the environmental impact through disposal of less material.

Easy Upgrades

See-thru bowls provide connection ports for upgrades that enhance engine performance and reliability. Powerful in-bowl heaters can be added to improve operation in colder climates and electronic sensors alert the operator to drain water in the bowl.

Corrosion-Free Construction

Advanced polymer technology means bowls will not deteriorate from water collection, alcohol-blended fuels, exposure to harsh additives or UV light.

High quality gaskets and O-rings for consistent, sure seals.

Die cast aluminum mounting heads with multiple ports make installation as easy as adding options.

Durable hand primer pumps are integrated into mounting heads.

The heart of every Racor filter is the engineered filter media. Aquabloc II® is known around the world for its combination of high efficiency, long life and unsurpassed water-removal performance.

Polymer bowls are virtually indestructible. They won't discolor from exposure to alcohol, additives or UV light - a see-thru that stays see-thru. A die cast aluminum bowl is available for most models.

Water sensor and vacuum gauges to signal service are valuable options available for most models.

Positive seal self-venting drain eliminates leaks and expedites service.





Model 460R

445 - 460 - 490

A powerful, integral primer pump makes service quick and easy

The standard equipment primer pump tops the list of extensive options that allow bus fleets, truck fleets, RV owners and others to tailor a filter/separator system specifically to their operating requirements. These options include a choice of a three-micron rating for the Aquabloc® filter element, 200-watt in-bowl resistance heater, water sensor and flow rates up to 120 gph.



Model 660R

645 - 660 - 690

Maximize engine protection with a low-profile, easy-to-fit filtration system

With all the features of the 400 Series, the 600 Series offers engine owners an economical system for applications where an integral primer pump is not needed. Flow rates up to 120 gph, in-bowl heater and water sensor are all available options.



MEDIUM FLOW

MODEL	445	460	490	645	660	690
Maximum Flow Rate	45 gph / 170 lph	60 gph / 227 lph	90 gph / 341 lph	45 gph / 170 lph	60 gph / 227 lph	90 gph / 341 lph
Gasoline or Diesel	Diesel	Diesel	Diesel	Both	Both	Both
Vacuum Installation	Yes	Yes	Yes	Yes	Yes	Yes
Pressure Installation	Yes	Yes	Yes	Yes	Yes	Yes
Maximum PSI / kPa	30 psi / 207 kPa	30 psi / 207 kPa	30 psi / 207 kPa	30 psi / 207 kPa	30 psi / 207 kPa	30 psi / 207 kPa
Clean Pressure	0.17 psi	0.39 psi	0.95 psi	0.01 psi	0.05 psi	0.29 psi
Drop PSI / kPa	1.2 kPa	2.7 kPa	6.5 kPa	0.07 kPa	0.34 kPa	2.0 kPa
No. of Ports	4	4	4	7	7	7
Port Size	3/8" NPT / 16 mm	3/8" NPT / 16 mm	3/8" NPT / 16 mm	3/8" NPT / 16 mm	3/8" NPT / 16 mm	3/8" NPT / 16 mm
Integral Primer Pump ²	Yes	Yes	Yes	No	No	No
Replacement Element No. ³	R45	R60	R90	R45	R60	R90
Bowl / See-Thru	Yes	Yes	Yes	Yes	Yes	Yes
Bowl / Metal	No	No	No	No	No	No
Drain Type	Self-Vent	Self-Vent	Self-Vent	Self-Vent	Self-Vent	Self-Vent
Water Sensor Option ⁴	Yes	Yes	Yes	Yes	Yes	Yes
Electric Heater Option ⁴ (12V/24V)	Yes	Yes	Yes	Yes	Yes	Yes
Height	9.3 / 236 mm	11 / 279 mm	11.8 / 300 mm	8.46 / 215 mm	10.2 / 259 mm	11.2 / 284 mm
Width	4.5 / 114 mm	4.5 / 114 mm	4.5 / 114 mm	4.5 / 114 mm	4.5 / 114 mm	4.5 / 114 mm
Depth	4.8 / 121 mm	4.8 / 121 mm	4.8 / 121 mm	4.5 / 114 mm	4.5 / 114 mm	4.5 / 114 mm
Weight	2.5 lbs / 1.1 Kg	2.7 lbs / 1.3 Kg	2.9 lbs / 1.4 Kg	2.35 lbs / 1.07 Kg	2.58 lbs / 1.17 Kg	2.65 lbs / 1.2 Kg

Notes:

- (1) Pressure installations are applicable up to the maximum PSI/ kPa shown.
- (2) Models with integral primer pumps are not recommended for gasoline applications.
- (3) Replacement element micron rating can be specified as "S" for 2 micron, "T" for 10 micron, or "P" for 30 micron.
- (4) Not for use with gasoline applications.

110A - 120A - 140



Model 120AT

Maximum protection in minimum space
 The 110A is designed for fuel-injected gasoline engines with high working pressures and also can be used on diesel engines. A metal housing is standard. Other models in the 100 Series, the 120A and 140, offer reliable protection for smaller diesel and gasoline engines used in generator sets, pressure washers and other equipment. Their compact size fits tight mounting locations and multiple ports offer installation flexibility.

215 - 230 - 245



Model 230R2

Improved for greater versatility

The 215, 230 and 245 filter/separators come standard with an integral priming pump and a new see-thru contaminant bowl, which can operate in applications up to 30 psi. Another design upgrade is the optional 200-watt in-bowl heater for colder operating conditions. Applications include light-duty and medium-duty trucks and vehicles, construction, agricultural and other diesel-powered equipment.

For marine rated filters, see brochure #7501.



LOW FLOW

MODEL	110A	120A	140	215	230	245
Maximum Flow Rate	15 gph / 57 lph Diesel 35 gph / 132 lph Gas	15 gph / 57 lph	15 gph / 57 lph	15 gph / 57 lph	30 gph / 114 lph	45 gph / 170 lph
Gasoline or Diesel ¹	Both	Both	Both	Diesel	Diesel	Diesel
Vacuum Installation	Yes	Yes	Yes	Yes	Yes	Yes
Pressure Installation	Yes	Yes	Yes	Yes	Yes	Yes
Maximum PSI / kPa	100 psi / 690 kPa	7 psi / 48 kPa	7 psi / 48 kPa	30 psi / 207 kPa	30 psi / 207 kPa	30 psi / 207 kPa
Clean Pressure	0.15 psi	0.15 psi	0.01 psi	0.12 psi	0.31 psi	0.61 psi
Drop PSI/kPa	1.03 kPa	1.03 kPa	0.07 kPa	0.83 kPa	2.14 kPa	4.21 kPa
No. of Ports	4	4	2	3	3	3
Port Size	1/4" NPT/ M14 x 1.5	1/4" NPT/ M14 x 1.5	1/4" NPT/ M14 x 1.5	1/4" NPT/ M14 x 1.5	1/4" NPT/ M14 x 1.5	1/4" NPT/ M14 x 1.5
Integral Primer Pump ³	No	No	No	Yes	Yes	Yes
Replacement Element No. ⁴	R11	R12	R12	R15	R20	R25
Bowl/See-Thru	No	Yes	Yes	Yes	Yes	Yes
Bowl/Metal ¹	STD	Yes	Yes	Yes	Yes	Yes
Drain Type	Positive Seal	Positive Seal	Positive Seal	Positive Seal	Positive Seal	Positive Seal
Water Sensor Option ⁵	Yes	Yes	Yes	Yes	Yes	Yes
Electric Heater Option ⁵ (12V/24V)	No	No	No	Yes	Yes	Yes
Height	6" / 152 mm	6.5" / 166 mm	6" / 152 mm	8.3" / 211 mm	9" / 229 mm	10.5" / 267 mm
Width	3.2" / 81 mm	3.2" / 81 mm	3.2" / 81 mm	4" / 102 mm	4" / 102 mm	4" / 102 mm
Depth	3.2" / 81 mm	3.2" / 81 mm	3.2" / 81 mm	4" / 102 mm	4" / 102 mm	4" / 102 mm
Weight	1.3 lbs / 0.59 Kg	1.1 lbs / 0.50 Kg	1.1 lbs / 0.50 Kg	1.8 lbs / 0.80 Kg	2 lbs / 0.90 Kg	2.2 lbs / 1.0 Kg

- Notes: (1) Metal bowls should be used for gasoline installations.
 (2) Pressure installations are applicable up to the maximum PSI/kPa shown.
 (3) Models with integral primer pumps are not recommended for gasoline applications.
 (4) Replacement element micron rating can be specified as "S" for 2 micron, "T" for 10 micron, or "P" for 30 micron, except for R11.
 (5) Not for use with gasoline applications.

Racor Quality in One Easy Spin

- High-capacity, on-engine primary or secondary filtration
- Fits most existing mounting heads
- See-thru bowl with water sensor option
- Mounting heads available, contact Racor or your distributor

320 Engine Spin-On Series



Fuel Filter/ Water Separator w/ Reusable See-Thru Bowl	Spin-On Replace- ment Element (only)	Micron Rating		
B32001 Application: Cummins – 90 gph / Secondary (Final)	S3201	10	10.5"	267 mm
B32002 Application: DDC – 90 gph / Primary	S3202	30	10.5"	267 mm
B32003 Applications: Caterpillar – 60 gph / Secondary (Final) IH (Navistar) – 90 gph / Secondary (Final)	S3203	2	8.63"	219 mm
B32004 Application: IH (Navistar) – 40 gph / Secondary	S3204	30	7.13"	181 mm
B32006 Application: Caterpillar – 90 gph / Secondary (Final)	S3206	2	12"	305 mm
B32007 Application: Cummins – 180 gph / Secondary (Final)	S3207	10	13.5"	343 mm
B32008 Application: Deutz, Volvo – 30 gph	S3208	*	7.25"	184 mm
B32009 Application: Mann, DAF – 60 gph	S3209	*	8.63"	219 mm
B32011 Application: Cummins Short – 90 gph/Secondary (Final)	S3211	10	8.63"	219 mm
B32012 Application: DDC – 90 gph / 8.2L Primary	S3212	30	7.13"	181 mm
B32016 Application: Deutz, Volvo Short – 20 gph	S3216	*	5.85"	149 mm

* Available in 2, 10 or 30 micron.



4125 - 6125
3150 - 3250

High flow applications need not suffer with high maintenance... and Racor offers a range of ultra-high capacity, highly efficient fuel filter/water separators that also deliver spin-on convenience. As you'd expect, Aquabloc® II media is standard and all units provide flexibility in options to customize and meet specific operating conditions.

Model 3250R



HIGH FLOW				
MODEL	4125	6125	3150	3250
Maximum Flow Rate	120 gph / 454 lph	120 gph / 454 lph	150 gph / 570 lph	250 gph / 946 lph
Gasoline or Diesel ¹	Diesel	Both	Diesel	Diesel
Vacuum Installation	Yes	Yes	Yes	Yes
Pressure Installation	Yes	Yes	Yes	Yes
Maximum PSI ² / kPa	15 psi / 103 kPa	15 psi / 103 kPa	7psi / 50 kPa	7 psi / 50 kPa
Clean Pressure Drop PSI	0.85 psi	0.35 psi	0.68 psi	1 psi
No. of Ports	4	7	2	2
Port Size	3/4" SAE / 18 mm	3/8 NPT	0.875" X 14 SAE	0.875" X 14 SAE
Integral Primer Pump ³	Yes	No	No	No
Replacement Element No. ⁴	R125	R125	S3238P	S3207P
Bowl/See-Thru	Yes	Yes	Yes	Yes
Bowl/Metal ¹	No	No	Yes	Yes
Drain Type	Self-Vent	Self-Vent	Self-Vent	Self-Vent
Water Sensor Option ⁵	Yes	Yes	Yes	Yes
Electric Heater Option ⁵ (12V/24V)	Yes	Yes	Yes	Yes
Height	15 / 381 mm	14.12 / 359 mm	13.6 / 345 mm	17.25 / 438 mm
Width	4.5 / 114 mm	4.5 / 114 mm	5 / 127 mm	5 / 127 mm
Depth	4.8 / 121 mm	4.5 / 114 mm	5.5 / 140 mm	5.5 / 140 mm
Weight	3.9 lbs / 1.8 Kg	3.9 lbs / 1.8 Kg	3.6 lbs / 1.6 Kg	4.6 lbs / 2.08 Kg

- Notes:
- (1) Metal bowls should be used for gasoline installations.
 - (2) Pressure installations are applicable up to the maximum PSI/ kPa shown.
 - (3) Models with integral primer pumps are not recommended for gasoline applications.
 - (4) Replacement element micron rating can be specified as "S" for 2 micron, "T" for 10 micron, or "P" for 30 micron.
 - (5) Not for use with gasoline applications.



All Racor filter materials and seals are compatible with ultra-low sulphur diesel (ULSD) fuel and B2 to B20 Biodiesel.

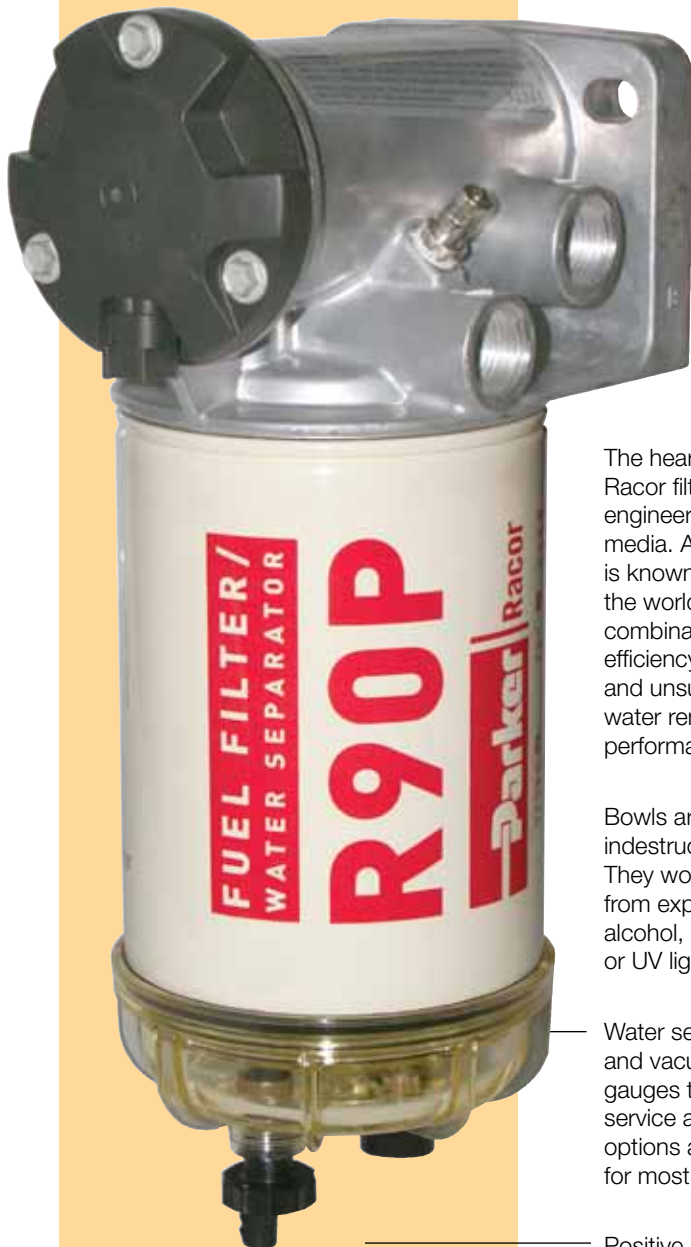
See Racor bulletin #7679.

700 Series Integrated Filter/Separators

The Racor 700 Series is equipped with state-of-the-art fuel pumps with either brush or brushless DC motors. In brushless versions, the motor shaft directly drives the gerotor, creating a unique, positive displacement pump. The gerotor has fewer parts than gear or vane pumps, and the sensorless control technology of the brushless DC motor makes this product the most reliable filter and pump assembly on the market. The brushless pump assembly is ideal for tough on-engine

applications. For off-engine mounting, brushed pumps are a more economical alternative.

The 700 Series Integrated Fuel Filter/Water Separators have a two-stage filtration and repriming system. This complete fuel management system isolates contaminants present in diesel fuels and traps them prior to reaching the fuel injection system, protecting against costly and premature failure.



A rugged roller-cell pump. 60 gallons per hour flow rate while in priming mode.

100 micron pre-screen.

Unitized assembly only 3.3" tall.



12V DC or 24V DC motor.

The heart of every Racor filter is the engineered filter media. Aquabloc II® is known around the world for its combination of high efficiency, long life and unsurpassed water removal performance.

Bowls are virtually indestructible. They won't discolor from exposure to alcohol, additives or UV light.

Water sensor and vacuum gauges to signal service are valuable options available for most models.

Positive seal self-venting drain.



MODEL	745R30	760R30	790R30 ¹	7125R10 ¹ (10 Micron)	7125R30 ¹ (30 Micron)
Maximum Flow Rate	45 gph / 170 lph	60 gph / 227 lph	90 gph / 341 lph	120 gph / 454 lph	
Gasoline or Diesel	Diesel	Diesel	Diesel	Diesel	
Replacement Element	R45P	R60P	R90P	R125T (10 Micron) R125P (30 Micron)	
Clean Pressure Drop	0.25 psi / 1.7 kPa	0.25 psi / 1.7 kPa	0.25 psi / 1.7 kPa	0.25 psi / 1.7 kPa	
Port Size	3/8" NPT	3/8" NPT	3/8" NPT	3/8" NPT	
Water Sensor Option	Yes	Yes	Yes	Yes	
Height	10.8 / 25.7 cm	11.8 / 28.4 cm	12.8 / 31.2 cm	15.8 / 40.1 cm	
Width	4.3 / 11.0 cm	4.3 / 11.0 cm	4.3 / 11.0 cm	4.3 / 11.0 cm	
Depth	6.5 / 16.5 cm	6.5 / 16.5 cm	6.5 / 16.5 cm	6.5 / 16.5 cm	
Weight (dry)	4.5 lbs. / 2.0 kg	5.5 lbs. / 2.5 kg	6.5 lbs. / 3.0 kg	7.7 lbs. / 3.5 kg	
Operating Temperature	-40° to +225°F (-40° to +107°C)				

¹The 700 Series comes in standard with a 12 volt brushed pump assembly. To order the 24 volt brushless pump assembly, insert 24 at the end of the 790 or 7125 part numbers. (example: 790R3024) Fuel pump for priming applications only. Not for continuous operation unless protected by a pre-filter.

For additional information about Racor Filter/Separator Pump Systems, request brochure #7683.

P Series Fuel Conditioning Modules

Durable, quiet 12V DC roller-cell electric fuel pump offers the benefit of an electric, on-demand priming pump for intermittent or continuous duty.

Thermostatically controlled PTC-style electric (150-watt) heater facilitates cold weather starting.

Rugged, lightweight aluminum housing.

High-performance Aquabloc II® cartridge-style filter media is environmentally friendly and incinerable.

Water-in-fuel (WIF) sensor alerts the operator when service is required. Under-dash control module for pump and water sensor operation is included with pump option.

Positive seal self-venting drain.



All Racor filter materials and seals are compatible with ultra-low sulphur diesel (ULSD) fuel and B2 to B20 Biodiesel.

See Racor bulletin #7679.

Removable and reusable contaminant collection bowl.

Standard: 12V DC brushed pump motor.
Optional: 12V or 24V DC brushless pump motor.



The patented P Series Diesel Fuel Conditioning Module (for vacuum side applications only) was developed for application in any diesel engine fuel injection system.

P Series assemblies are available in three sizes and all feature 3/8" NPT fuel ports. This innovative and modular fuel filter/water separator incorporates low-pressure fuel system components into a single package.

It supplies clean, dry fuel to the fuel system and serves as a repriming system.

Fuel Conditioning Module



Durable, 12 vdc roller-cell electric fuel pump offers the benefit of an electric, on-demand, priming pump.

A fuel filter/water separator and primer pump in one unit.

High-performance Aquabloc® cartridge-style filter media is environmentally friendly and incinerable.



Specifications	P3	P4	P5
Maximum Flow Rate	30 GPH (114 LPH)	40 GPH (151 LPH)	50 GPH (189 LPH)
Clean Pressure Drop	0.4 PSI (0.03 bar)	0.5 PSI (0.03 bar)	0.8 PSI (0.06 bar)
Max. Pump Output (at 14.4 volts)	40 GPH (151 LPH)	40 GPH (151 LPH)	40 GPH (151 LPH)
Standard Fuel Port Size (SAE J476)	3/8"-18 NPT	3/8"-18 NPT	3/8"-18 NPT
Total Number of Ports Available	2	2	2
Fuel Inlets	1	1	1
Fuel Outlets	1	1	1
Replacement Filter			
2 micron	R58060-02	R58095-2	R58039-2
10 micron	R58060-10	R58095-10	R58039-10
30 micron	R58060-30	R58095-30	R58039-30
Minimum Service Clearance	2.5 in. (6.4 cm)	2.5 in. (6.4 cm)	2.5 in. (6.4 cm)
Height	7.7 in. (19.6 cm)	9.0 in. (22.9 cm)	11.5 in. (29.2 cm)
Depth	5.2 in. (13.2 cm)	5.2 in. (13.2 cm)	5.2 in. (13.2 cm)
Width	4.8 in. (12.2 cm)	4.8 in. (12.2 cm)	4.8 in. (12.2 cm)
Weight (dry - approx.)	3.4 lbs (1.5 kg)	3.8 lbs (1.7 kg)	4.2 lbs (1.9 kg)
Maximum Pump Outlet Pressure	10 PSI (0.7 bar)	10 PSI (0.7 bar)	10 PSI (0.7 bar)
Features			
Water Sensor	Standard	Standard	Standard
Heater ¹	Standard	Standard	Standard
Pressure Regulator (10 PSI)	Standard	Standard	Standard
Ambient Temp Range	-40° to +255°F (-40° to +124°C)		
Maximum Fuel Temperature	190°F (88°C)		

Vacuum installations are recommended. ¹ Not for use with gasoline applications.

How To Order (The example below illustrates how part numbers are constructed).

P4	2	10	N	H
Specify Model P3 (for 30 GPH) P4 (for 40 GPH) P5 (for 50 GPH)	Must be in part number. Specifies a 12 vdc pump.	Specify micron rating: 02, 10, or 30	Must be in part number. Specifies 3/8" NPT ports.	Must be in part number. Specifies a 12 vdc 150 watt heater.

Fuel Polishing Module

Daily buildup of condensation in a diesel fuel system can lead to fuel contamination through bacteria growth. Parker's new FPM installation kits combat the daily accumulation of water in the fuel system, preventing corrosion and other problems. Regular use of a Racor Fuel Polishing Module (FPM) maximizes the effectiveness of a Racor fuel filter/water separator while keeping power consumption to a minimum.

Choose From Two Kits

FPM-051 Kit: Includes a FPM-050 Fuel Polishing Module, a Racor 503MA Turbine Series fuel filter/water separator, a USCG approved fuel hose, and fittings.

OR

FPM-052-A Kit: Includes a FPM-050 Fuel Polishing Module, a Racor 503MA fuel filter/water separator, USCG approved fuel hose, fittings, and a stylish black anodized FPM timer that enables you to program the fuel polishing system to run while unattended (#FPM-PTC-12-A).



Specifications	FPM-050
Filtration Rate	50 gal/day (189 L/day)
Power Requirements	< 2 W (< 3 A-hrs/day)
Internal Pressure Drop	< 0.5 PSI (< 0.03 bar)
Voltage Requirements	10-16 VDC, 12 VDC nominal
Approx Dimensions (Body) (Body with Bracket)	3.87" L x 2.47" W x 2.14" D 3.87" L x 4.48" W x 2.14" D
Inlet/Outlet Ports Recirculation Port	3/8" NPTF 1/4" NPTF
Weight	< 2 lbs (< 0.9 kg)
Acceptable Fuels	Diesel, Biodiesel, Kerosene

Note: Pump and FPM timer can be purchased separately.

Filter Funnels



Caution for Users: Petroleum products flowing over a plastic surface generate static electricity. Caution should be taken to ensure that the RFF is grounded to reduce static electricity buildup and reduce the chance of explosions or fire. Electrically bond the funnel by using a wire with a metal clip on each end and clamp one to the upper rim of the funnel and the other to the fueling source. For example, the metal gas can or nozzle from the pump.

Fuel Filter Funnel

Racor Filter Funnel (RFF) is a heavy-duty, fast-flow, filter-in-a-funnel that separates damaging free water and contaminants from gasoline, diesel, heating oil, and kerosene.

The RFF family of products is capable of removing free water and solids down to 0.005 inches and allows you to visually inspect the integrity of your fuel supply as you refuel.

The RFF family is manufactured using industrial-grade black electro-conductive polypropylene. Carbon powder is injected into the plastic so that the RFF will conduct static electricity. The grounding capability of the RFF is an important safety feature. Always use proper fuel handling procedures and follow local, state, and federal regulations.

The high-grade aluminum components and powdercoat paints mean that corrosion is never a worry.

A durable single bolt mounting bracket doubles resistance to vibration fatigue.

Aquabloc® media sheds water and keeps engines waterproof, rustproof and dirtproof.

300-watt heaters start you in the cold. Thermostats are standard to meet the requirements of today's electronic engines.

Polymer bowl withstands impact and temperature extremes.

Self-venting drain. A single twist makes draining clean, fast and easy.

With an Aquabloc II® replacement element, you get a complete kit with all the seals you need.

Aquabloc II® media is a blend of high-grade cellulose compounded with resins and a special chemical treatment.

Aquabloc II® elements filter harmful tiny, particles of dirt and algae from fuel. Aquabloc II® elements are rustproof – with polymer end caps that won't ever corrode.

The First Name In Fuel Filtration.

Every engine runs better with a system that cleans fuel, removes water, heats fuel and senses when it's time for service. The system is the Racor Turbine Series and it's the most complete, most efficient, most reliable high-capacity engine protection you can install. A system that protects your investment in engines and fuel.

For marine rated filters, see brochure #7501.

Primer pump kit shown installed.
Order RKP1912 or RKP1924.

End caps are color-coded for easy identification and application – red for 30 micron primary filtration, blue for 10 micron primary or secondary, and brown for 2 micron secondary/final filtration.

Use original Racor filter elements to ensure premium performance.

An integral bail handle makes changeouts easy.

Our toll-free number is shown on the end cap. It puts you in touch with Racor's technical service staff who can answer any availability, application, or service question.





500FG

900FH

1000FH

75900FHX

731000FH

791000FHV

Model	500FG	900FH	1000FH	75500FGX	75900FHX	731000FH	751000FHX	771000FH	791000FHV
Maximum Flow Rate	60 gph / 227 lph	90 gph / 341 lph	180 gph / 681 lph	120 gph / 454 lph	180 gph / 681 lph	360 gph / 1363 lph	180 / 360 gph / 681 / 1363 lph	540 gph / 2044 lph	360 / 540 gph / 1363 / 2044 lph
Height	11.5 / 292 mm	17 / 432 mm	22 / 559 mm	11.5 / 292 mm	17 / 432 mm	22 / 559 mm	22 / 559 mm	22 / 559 mm	22 / 559 mm
Width	5.8 / 147 mm	6 / 152 mm	6 / 152 mm	14.5 / 368 mm	18.75 / 476 mm	16.5 / 419 mm	18.75 / 476 mm	21.5 / 546 mm	21.5 / 546 mm
Depth	4.8 / 122 mm	7 / 178 mm	7 / 178 mm	9.5 / 241 mm	11 / 279 mm	12 / 305 mm	11 / 279 mm	12 / 305 mm	12 / 305 mm
Weight	4 lbs / 1.7 kgs	6 lbs / 2.7 kgs	10 lbs / 4.5 kgs	17 lbs / 7.7 kgs	23 lbs / 10.4 kgs	26 lbs / 11.8 kgs	30 lbs / 13.6 kgs	39 lbs / 17.7 kgs	52 lbs / 23.6 kgs
Port Size Std.	3/4"-16 UNF	7/8"-14 UNF	7/8"-14 UNF	3/4"-16 UNF	7/8"-14 UNF ¹	3/4" NPT	7/8"-14 UNF ¹	1"-11 1/2 NPT	3/4" NPT
(Option) Clean Pressure	16 mm x 1.5 / 0.25 psi	22 mm x 1.5 / 0.34 psi	22 mm x 1.5 / 0.49 psi	22 mm x 1.5 / 0.70 psi	22 mm x 1.5 / 1.7 psi	22 mm x 1.5 / 1.7 psi	22 mm x 1.5 / 3.7 psi	22 mm x 1.5 / 1.7 psi	22 mm x 1.5 / 2.5 psi
Drop	1.72 kPa	2.4 kPa	3.4 kPa	4.83 kPa	11.7 kPa	11.7 kPa	25.5 kPa	11.7 kPa	17.2 kPa
Maximum Operating Pres.	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa	15 psi / 103 kPa
Element #	2010	2040	2020	2010	2040	2020	2020	2020	2020
Element Removal Clearance	4 / 102 mm	5 / 127 mm	10 / 254 mm	4 / 102 mm	5 / 127 mm	10 / 254 mm	10 / 254 mm	10 / 254 mm	10 / 254 mm

Notes: (1) Male "JIC" 37" fittings.

(2) Flow rates shown for one/both filters on-line.

(3) Flow rates shown for two/all filters on-line.

For accurate fuel flow rates consult your engine manual, engine manufacturer's agent or Racor distributor.

Manifold Units:

- 75500, 75900 and 751000 double manifolds with shutoff valve.
- 731000 double manifold without shutoff valves.
- 791000 triple manifold with shutoff valves.
- 771000 triple manifold without shutoff valves.

Biodiesel and other biofuels require extra heat, filtration, and vehicle modifications to burn in diesel engines. Racor fuel filters and heaters are uniquely suited for filtering and conditioning biodiesel and biofuels for use in diesel engines.






Racor Engineering Expertise

Racor has participated in several biodiesel filtration field tests with major OEMs. Racor is actively participating in industry-wide research and development on biodiesel fuel filtration and water separation challenges. Development of technology to support the use of all biofuels is ongoing at Racor.

Challenges and Solutions

Biodiesel tends to shorten filter life and most biodiesels have a low “interfacial tension” – meaning water easily disperses and dissolves in the fuel, greatly reducing efficiency for all types of water separators and coalescers. Racor recommends using the largest filter practical for the application to extend filter life and increase efficiency. When specifying a new biodiesel fuel system, de-rate fuel filter flow by 50% and install on the vacuum side of any pumps, where possible.

Racor Fuel Filtration Systems Recommended for Biodiesel/Biofuels

<p>FUEL DISPENSING</p>  <p>FBO RVFS</p>	<p>ELECTRIC HEATED PRIMARY FILTRATION</p>  <p>6120R1230 1000FH1230</p>
<p>COOLANT HEATED PRIMARY FILTRATION</p>  <p>390RC30 525</p>	<p>ELECTRIC HEATED SECONDARY FILTRATION</p>  <p>6120R122 660R1210</p>
<p>COOLANT TO FUEL HEAT EXCHANGER</p> <p>320HTR4</p> 	

In cold weather, Racor recommends using at least 200 watts of thermostatically controlled electric heating in the head and/or filter bowl. Pour point suppressants and biocides are also necessary for reliable operation and a coolant heat exchanger is required in extreme cold weather conditions.

Racor’s ultra high quality synthetic rubber compounds perform equally well in biodiesel and standard diesel. Seals subject to biodiesel exposure are generally replaced at the same time as the replacement filter. Racor uses all materials compatible with up to 20% biodiesel blend. Above 20% may require material changes to dynamic seals that are not normally replaced at element change-outs.

Biodiesel and Biofuel Filtration Specification Considerations

- 1 Large primary and secondary filters at 50% of their rated flow.
- 2 High-quality, corrosion-resistant materials in construction.
- 3 High-quality, synthetic rubber compounds for seals and hoses.
- 4 Efficient coolant and/or electric heating.
- 5 Fuel source with high-efficiency fuel dispensing.

All Racor filter materials and seals are compatible with ultralow sulphur diesel (ULSD) fuel and B2 to B20 Biodiesel.

300RC Series

The 300RC Series Diesel Fuel Filter/Heater/Water Separators are specifically designed to handle today's tough cold weather and Biodiesel fuel system problems. These units feature a standard high-efficiency coolant heat exchanger to heat incoming fuel.

- High-capacity media – the Racor Aquabloc® II media allows for excellent contaminant removal and water separation. Available in 2, 10, and 30 micron ratings.
- Highly efficient heaters – utilizing heat from the engine's coolant, the heat exchanger transfers heat to the fuel quickly and efficiently.
- Highly efficient water coalescing.
- Biodiesel tested rubber seals and gaskets to prevent swelling.



Model 390RC



MODEL	345	360	390
Fuel Ports	3/8 NPTF	3/8 NPTF	3/8 NPTF
Replacement Element	R45	R60	R90
Flow Rate	45 gph / 170 lph	60 gph / 227 lph	90 gph / 341 lph
Height	8.7" / 221 mm	10.4 / 264 mm	11.25 / 286 mm
Width	4" / 102 mm	4" / 102 mm	4" / 102 mm
Depth	4.8" / 122 mm	4.8" / 122 mm	4.8" / 122 mm
Temperature	-40°F / +255°F -40°C / +121°C	-40°F / +255°F -40°C / +121°C	-40°F / +255°F -40°C / +121°C

425 & 500 Series

The Racor 424 and 525 Fuel Heater/Water Separators are designed to protect the precision components of medium-duty and heavy-duty diesel engines. The lightweight systems use engine coolant for heating fuel in colder climates, helping to eliminate the need for more expensive, blended fuel. The multi-stage water separation process results in superior water-removal efficiency. The self-cleaning water separator screen does not require maintenance and accumulated water is easily emptied through a self-venting drain valve. The 360° rotating cover allows quick installation in a convenient location. Options include an integral thermostat and 12V or 120V electric preheater.



MODEL	WFH424	WFH525	WFH525/ACV
Flow Rate	60 gph / 227 lph	120 gph / 454 lph	120 gph / 454 lph
Port Size (Fuel)	1/2 NPT	1/2 NPT	1/2 NPT
Port Size (Coolant)	1/2 NPT	1/2 NPT	1/2 NPT
Height ¹	10.0" / 254 mm	15.8" / 401.3 mm	15.9" / 403.8 mm
Width	5.3" / 134.6 mm	5.3" / 134.6 mm	5.3" / 134.6 mm
Depth	5.3" / 134.6 mm	5.3" / 134.6 mm	5.3" / 134.6 mm
H ₂ O Removal	99%	99%	99%
Automatic Shut-off Valve	No	No	No
Operating Temperature	-40° to +255°F (-40° to +124°C)		

¹ Allow 4 additional space for screen removal.

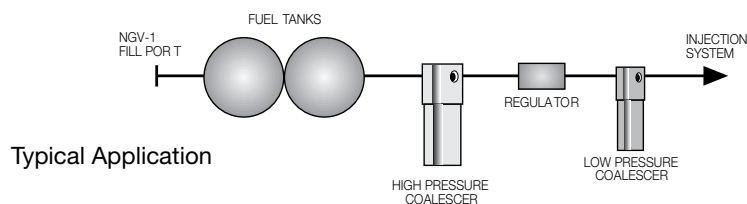
In-Line Fuel Filtration

From personal watercraft to agricultural equipment, Racor in-line filters are designed to protect fuel pumps, carburetors, injectors and related fuel system components. We offer a complete range of disposable and cleanable in-line prescreen products.



MODEL NO.	025-RAC-01	025-RAC-02		025-RAC-10	025-RAC-11	025-RAC-12		PS120
Maximum Flow Rate	25 gph / 95 lph	25 gph / 95 lph		50 gph / 189 lph	15 gph / 57 lph	15 gph / 57 lph		120 gph / 454 lph
Gasoline or Diesel	both	both		both	both	both		both
Vacuum Installation	Yes	Yes		Yes	Yes	Yes		Yes
Pressure Installation	No	No		50 psi	No	No		Yes
Maximum PSI/ kPa	5 / 35	5 / 35		5 / 35	5 / 35	5 / 35		5 / 35
Clean Pressure	0.26 psi	0.35 psi		0.5 psi	0.5 psi	0.5 psi		.25 psi
Drop PSI/ kPa	1.8 kPa	2.4 kPa		3.5 kPa	3.5 kPa	3.5 kPa		1.7 kPa
No. of Ports	2	2		2	2	2		2
Port Size	1/4" NPT	1/4" NPT		1/2" NPT	1/4" BARB	5/16"		3/8"
Replacement Element No.	S2501	S2502		N/A	N/A	N/A		N/A
Height	4.3 / 109.2 mm	4.3 / 109.2 mm		4.75 / 120.7 mm	3.92 / 99.6 mm	3.92 / 99.6 mm		7.25 / 184.2 mm
Width	2.25" / 57.2 mm	2.25" / 57.2 mm		4.19 / 106.4 mm	3.92 / 99.6 mm	3.92 / 99.6 mm		4.0 / 101.6 mm
Depth	2.10 / 53.3 mm	2.10 / 53.3 mm		1.88 / 47.6 mm	2.0 / 50.8 mm	2.0 / 50.8 mm		3.0 / 76.2 mm
Weight	0.3 lb / 136 g	0.3 lb / 136 g		0.3 lb / 136 g	0.25 lb / 113 g	0.25 lb / 113 g		0.75 lb / 340 g

Today's alternative fuels – compressed natural gas, liquid natural gas and liquid propane gas – have the same problems that plague diesel and gasoline... contamination that collects during handling, water that condenses in tanks and compressors that leak oil into the fuel stream.



Typical Application



Prefilter/Strainers

Engineered and precisely manufactured to provide superior performance at operating pressures up to 500 psi, the compact, in-line prefilter/strainers are an essential first step in a complete filtration system.

Low Pressure Fuel Filter/Coalescers

Low pressure coalescers are ideal for operating environments up to 500 psi. All aerosol contaminants in the 0.3 to 0.6 micron range are filtered to an efficiency level that exceeds 95%.

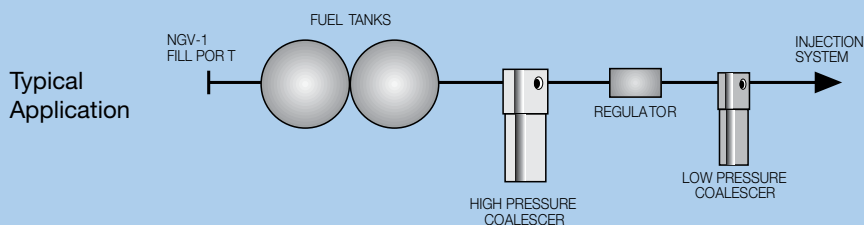


High Pressure Fuel Filter/Coalescers

These patented coalescing filters are constructed to withstand operating pressures to 3,600 psi while removing over 95% of aerosols in the 0.3 to 0.6 micron range.

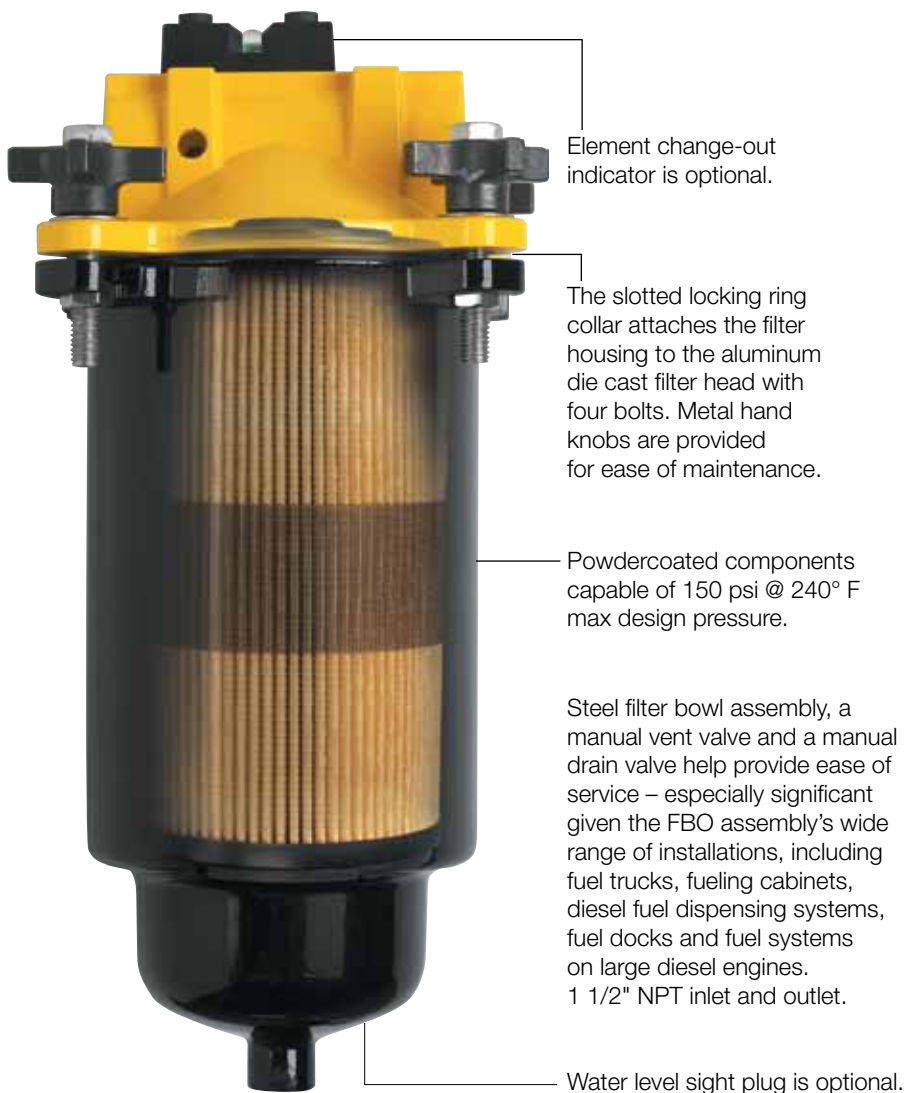


Protecting the fuel injectors and components of an alternative fuel system is vital to efficient vehicle operation. Racor offers the most complete line of fuel filter/coalescers and prefilter/strainers for on-vehicle applications. These filters ensure removal of damaging aerosol contamination as small as 0.3 to 0.6 micron and exceed 95% efficiency, depending on the grade of element specified. Units are available in a range of pressure ratings and are constructed of aluminum, stainless steel or painted steel. The fuel filter/coalescer elements are produced by a patented process of arranging microglass fibers into a tubular form. During operation, fuel is forced through the coalescing media from the inside of the cartridge through the tubular wall to the outside, where the large droplets fall to the bottom of the housing. Oily water emulsion accumulates until drained while the dirt particles remain trapped on the surface of the fibers.



	LOW			MEDIUM	HIGH		
MODEL	FFC-119	FFC-110	FFC-110L	FFC-112 FFC-112-SAE	FFC-113	FFC-114	FFC-116
Type	Prefilter/ Strainer	Coalescer	Coalescer	Coalescer	Coalescer	Coalescer	Coalescer
Port	5/8" Outlet 1/4" Inlet	1/4" NPT	1/2" NPT	1/4" NPT	1/2" NPT 9/16 SAE	1/2" NPT	1/4" NPT
PSI (Max.)	500 PSI	500 PSI	500 PSI	3600 PSI	3600 PSI	3600 PSI	3600 PSI
Rated Flow ⁵	25	25	50	15	50	50	8.4
Length (in / mm)	4.87" / 123.69 mm	7.16" / 181.86 mm	10.4" / 264.16 mm	4.75" / 120.65 mm	8.03" / 203.96 mm	6.98" / 177.29 mm	3.85" / 97.79 mm
Diameter (in / mm)	2.63" / 66.80 mm	3.13" / 79.50 mm	3.13" / 79.50 mm	2.25" / 57.15 mm	2.97" / 75.43 mm	2.97" / 75.43 mm	1.75" / 44.45 mm
CNG		•	•	•	•	•	•
LNG			• ²		• ³	• ³	
LPG	•	•	•				
Weight lbs. / kg	.5 lbs / .23 kg	1.5 lbs / .68 kg	1.8 lbs / .82 kg	1.5 lbs / .68 kg	5.5 lbs / 2.49 kg	5.25 lbs / 2.3 kg	1.75 lbs / .79 kg
Element Number	N/A	CLS110-10	CLS110-10L	CLS112-10	CLS113-6	CLS113-6	CLS116-10
Sump Capacity Oz.	N/A	5.0	7.0	0.5	5.0	3.0	0.25
Material	Painted Steel	Painted Steel	Painted Steel	Stainless Steel	Anodized Aluminum	Stainless Steel	Stainless Steel

Notes: (1) Use in conjunction with coalescer. (2) Low flow rate LNG applications. (3) Medium flow rate LNG applications. Bypass included. (4) High flow rate LNG applications. Bypass included. (5) SCFM at 100 PSIG.



FBO Filter Assembly

Racor's FBO-10 and FBO-14 filter assemblies are designed to meet the toughest hydrocarbon refueling conditions and provide for ease of filter change-outs. The FBO Assembly can flow 25 gpm/95 lpm or up to 75 gpm/230 lpm depending on the model, the elements installed and fuel being filtered.

The assembly features a locking ring collar, which attaches the filter housing to the aluminum die cast filter head with four bolts. The slotted locking ring collar allows maintenance personnel to hand-loosen the four collar bolts, rotate and lower the bowl assembly for element change-outs. With new element installed, simply raise the bowl and rotate into position on the locking ring and hand tighten evenly.

The closure hardware consists of stainless steel nuts, bolts and washers with metal hand knobs for ease of maintenance – one person can easily change the filter element. No wrenches or other special tools are required.

Performance Specifications

FBO-10	Maximum Flow Rates				Clean Dry	Change
	Flow Range	Diesel	Jet Fuel	Gasoline	Delta P	Delta P
Prefilter	5-40 gpm	20	40	50	**	20 PSID
Filter Sep	5-35 gpm	18	35	45	**	15 PSID
Absorber	5-25 gpm	18	35	45	**	30 PSID
FBO-14	Flow Range	Diesel	Jet Fuel	Gasoline	Delta P	Delta PP
Prefilter	10-60 gpm	30	60	75	**	20 PSID
Filter Sep	10-50gpm	25	50	65	**	15 PSID

** Varies with fluid and flow rate.

Versatile RV Series

Racor RV Series filter vessel applications include removing liquid and solid contaminants from diesel fuel, gasoline, kerosene, aviation gas, jet fuel and other lubricating or hydraulic oils. RV vessels utilize proven filter design technology and can be used as a coalescer/separator, water absorber or clay treater by changing internal components, flow direction, or by selecting optional filter cartridges when ordering. The vessels are fabricated from carbon steel with an exterior primer coating of Gavlon suede gray and the interior is epoxy coated to meet MIL-C-4556E.

Element choices include a coalescer/separator, pre-filter, water absorber or clay treater. Completely dressed factory filter vessels can be specified with differential pressure gauges, water sight glasses, air eliminators, and manual or automatic drains. Wall mount units can be special ordered.

See bulletin #7648 for the full line of high flow filtration products.



Model RVFS

Features

- Carbon steel construction; other materials are available.
- 250 psi ASME Code, Section VIII construction, stamped and certified.
- Yellow zinc-plated swing bolt closure.
- Buna-N O-ring cover seal.
- Interior: Epoxy-coated MIL-C4556 E.
- Exterior: Prime coated.
- Knife-edge cartridge mounting seals.

Connections

- Inlet and outlet: 2" NPT.
- Main drain and liquid level ports: 1/2 inch"
- Vent and pressure relief connection: 3/4" NPT.
- Differential pressure gauge/sample ports: 1/8" NPT.

Spin-On Protection At The Pump

Racor's Fuel Dispensing Filters are essential for stationary and overhead tanks and mobile service vehicles, so you can start protecting your investment at the source. With their easy-to-install heads, they remove virtually 100% of the contaminants from diesel fuel. Racor elements feature a super-absorbent, chemically treated media that absorbs 25 times its weight in water, "locking it in" as a barrier against free and emulsified water. There is no bypass valve, which ensures that fuel is completely protected. As the media swells, it significantly reduces the fuel flow rate, signaling a need to replace the element.



Racor offers filter protection down to 25 microns. Flow rates range from 15 to 100 gpm. Element service is clean and easy – there's no cartridge to replace – just spin-on a new Racor filter element.

Fuel dispensing filters can be used with diesel fuel or gasoline.

FBO Filter Cart

New to the FBO family of filters is the Racor heavy duty Fuel Recycler Cart. The filter cart polishes, cleans up, and recycles old or contaminated fuel. It can be used in preventative maintenance as a servicing unit. The all aluminum construction keeps it lighter for mobility purposes, while being durable and corrosion resistant for many years of operation.





Coolant Heaters

The Racor ECH™ tank-type coolant heaters operate using the thermo-siphon circulation principle. Heated coolant is returned to the engine as colder coolant is drawn into the heater. By utilizing standard alternating current (AC) from the customer-supplied source, they heat and maintain the engine coolant at a pre-determined temperature range. This warm coolant helps keep the engine ready for instant operation. Racor ECH™ tank type coolant heaters are mounted off the engine for long life and increased wattage output.

Note: Not for use as fuel heaters.



Compact Fuel Heater

Plumbed into the fuel upstream from filters, the coolant heater is another compact way to run through the cold. An optional internal thermostatically-controlled valve allows fuel to bypass the heater once it has reached operating temperature. Depending on fuel flow rate, you can get as much as 89°F heat rise. Like its electric partner, there are no moving parts, nothing to rust or corrode.



In-Tank Fuel Heater

The Racor Hot STK In-Tank/Standpipe Fuel Heater – also available with integrated Racor fuel sender – delivers warm fuel directly from the fuel tank for fast start-ups in cold weather operations. Innovative dual-action heating radiates heat into the standpipe, producing a 32°F temperature rise for optimum efficiency in extreme conditions. It is also ideal for warming hydraulic fluid to improve the performance of hydraulic systems in cold climate off-road equipment applications. The adaptable Hot STK unit is available in standard lengths from 8" to 29" or can be ordered in any specified length. A 360° rotating head provides for easy mounting in existing sender holes. Available with thermostat, integral fuel level sender or both.



W8791 In-Line Heater

The W8791 in-line diesel fuel heaters incorporate hot engine coolant to heat cold diesel fuel and keep equipment running in the most extreme weather conditions. Since the hot coolant surrounds the fuel, it is heated the entire time it passes through the fuel heater. This heated path is recommended for extended use in cold weather environments and severe conditions. It prevents power loss and stall, and assists starting down to -40°F. The field-proven system allows operators the cost-saving convenience of using #2 diesel fuel all year round. The W8791 is constructed out of steel and requires no maintenance.



Why you need a Racor fuel heater.

All diesel fuels (other than #1) contain dissolved waxes. At cold temperatures the wax crystallizes, leading to filter plugging and fuel gelling. These changes greatly reduce fuel flow, adversely affecting the operability of vehicles.

With the increased popularity of biodiesel, and the use of ultra low sulfur diesel (ULSD), there are new cold weather challenges. While proper fuel winterization normally avoids trouble, both biodiesels and ULSD may experience wax crystallization and gelling at higher than expected temperatures and contribute to cold fuel flow problems anyway.

Keeping this in mind, it is more necessary now than ever to design an efficient fuel heating system for all cold weather applications.

Racor offers a number of efficient heaters. Compact coolant and electric heaters install in minutes, yet deliver years of trouble-free service. There is even an in-line heater which actually turns a fuel line into a heated path from tank to filter.

Spin-On Series In-Bowl Heaters

Racor equips the Spin-On Series fuel filter/water separators with the option of a 200W resistance heater integrated into the bowl. Placing the heat source just below the element allows for maximum transfer. Racor Spin-On Series In-Bowl heaters are available installed in assembly upon order (consult catalog for part numbers) or as a retrofit kits.



Spin-On Series In-Bowl Heaters

Part No.	RK 22354-01	RK 22354-02	RK 30900	RK 30925
Heater Retrofit Kit For	200 Series	200 Series	3150, 3250, 4120, 6120	3150, 3250, 4120, 6120
Wattage	200W	200W	200 W	200W
Voltage	12V	24V	12V	24V
Bowl Type	Clear	Clear	Clear	Clear

Part No.	RK 22616-01	RK 22616-02	RK 30895	RK 30924
Heater Retrofit Kit For	300RC, 400, 600 Series	300RC, 400, 600 Series	320 Series	320 Series
Wattage	200W	200W	200 W	200W
Voltage	12V	24V	12V	24V
Bowl Type	Clear	Clear	Clear	Clear

Turbine Series Heater

The Racor Turbine Series comes available with a powerful heater situated directly below the filter element to assist with cold starting. Thermostats are standard to meet the requirements of today's advanced electronic engines. These heaters begin to work in just a few moments and place minimal demand on the battery. Racor Turbine Series heaters are available installed in assembly upon order (consult catalog for part numbers) or as a retrofit kits.



300 Series In-Head Heater

The in-head 150W heater is a cold weather aid and is thermostatically controlled when power is provided. The heater will automatically turn on if the fuel temperature drops below 45°F (7°C) and will automatically turn off at 75°F (24°C). Heat is supplied directly below the inlet port to melt the wax crystals and allow fuel to efficiently pass through the element. The heater is operated by turning the ignition switch on for a minimum of five minutes prior to starting the engine.



Consult catalog for part numbers.

Thermoline™ In-Fuel-Line Heater

The heavy-duty Thermoline™ Diesel Fuel Heater comes installed inside a new fuel line and literally replaces the fuel line between the tank and the primary filter. It prevents power loss and stall, and assists starting down to -40°F. This heated path is recommended for extended use in cold weather environments and severe conditions.

Thermoline In-Fuel-Line Heater comes factory pre-wired with all hardware, ready for quick installation.

Consult catalog for part numbers.



Nomad Electric Heaters



The Racor Nomad Diesel Fuel Heater is available in 300 and 500 watts and is one of the most compact, most efficient ways to heat fuel on the road today.

Installation usually takes about an hour. An optional frame rail mounting bracket eliminates drilling and welding.

Consult catalog for part numbers.

Vacuum Gauge/Compound Gauge/ Service Indicator Kits

Vacuum, Compound (vacuum/pressure), and Service Indicator Kits are available to monitor element condition.

During normal operation, filter elements slowly become clogged with contaminants, and the restriction (resistance to flow) through the filter increases until the engine loses power and eventually stalls. By installing a vacuum gauge in your fuel system (at the outlet side of the Racor filter), visual monitoring of element condition is possible at a glance. At the first indication of decreased performance, note the dial reading or apply the "red line" decal provided with most kits. This will assist in knowing when to change the filter at the next interval.

A Fuel Service Indicator measures and remembers the highest fuel filter restriction at the maximum fuel flow. As the fuel filter plugs with contaminants, a yellow position indicator moves in the clear window, locking at several



points until reaching the red zone. When the red zone is reached, the fuel filter should be changed and the indicator re-set by pressing the top button. Note: Intervals of element changeout may vary depending on fuel cleanliness. See bulletin #7721.

Always keep a spare Racor element on hand. Compound gauges are necessary to avoid gauge damage where there is "head" pressure, such as in overhead fuel tank installations. Liquid-filled (glycerin) gauges are recommended for applications subject to additional vibration.



RK 32037
Fuel Service
Indicator

Note on gauges: Internal pressure changes may result in external fluid leakage or failure of the pointer to return to zero with the engine off. If evident, clean leakage. Some models may be bled of excess internal pressure (and re-zeroed) by removing the top rubber plug momentarily. Make sure the plug is reinstalled properly. Take care not to push the plug into the gauge housing.

Water Detection Modules & Kits

The RK30880 water-in-fuel sensor has electronics built in. Racor Water Detection Kits are available in a wide selection for various installation requirements. Under-dash, in-dash and remote-mount, these solid state units may be used with any Racor fuel filter/water separator and water probe. They are manufactured using the highest quality materials and are all 100% electrically tested.



An electronic detection module analyzes electrical resistance at the water probe and determines if water is present.

If so, the detection module operates to indicate water. All units reset automatically after water is removed (unless specified).

Caution: The water probe and detection modules work with 12 or 24 volts, direct current only and should never be wired to other brand modules or household 110 or 220 volts, alternating current.

Monitors

Coolant Monitor

Monitors coolant level instead of temperature while engine is running, so coolant loss is sensed before engine damage occurs.

Oil Monitor

Monitors oil level while engine is running. It senses oil by volume, not pressure, and alerts operator of oil loss before engine damage occurs.



Pre-Trip Monitor

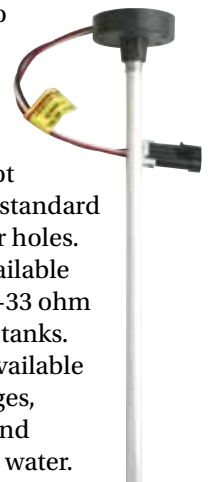
Permits operator to check oil and coolant levels without raising the hood, saving maintenance time. Weatherproof control module features red and green lights to indicate levels. Ensures maximum life and performance from an engine's oil, coolant, fuel and filter systems.



Racor Solid State Electronic Fuel Sender

Ruggedly reliable, this 100% solid state 12-volt or 24-volt sender, for any petroleum-based product, eliminates the need to continuously replace mechanical senders.

For either stand-alone application or integration with Hot STK fuel heater, it fits standard 5-bolt SAE fuel sender holes. Standard units are available for 0-88 ohm and 240-33 ohm gauges and 13" to 30" tanks. Custom sensors are available for different ohm ranges, special applications and other fluids including water.



Vacuum / Compound Gauge Kits

Vacuum and compound (vacuum/pressure) gauges and related hardware are available to monitor element condition. As the filter element slowly becomes clogged with contaminants, the restriction (resistance to flow) increases. The fuel pump still tries to draw fuel (suction) but because of this restriction, less fuel is delivered to the engine and instead more air is pulled from it (fuel de-gassing). These results can cause the engine to lose power and eventually stall. By installing a vacuum gauge in your fuel system (at the outlet side of

the Racor filter), visual monitoring of element condition is possible at a glance. Note the position of the dial, or apply the "red line" decal provided with most kits. This will assist in easy monitoring as filter efficiency begins to decrease when a filter change is necessary.

Note: Intervals of element changeout may vary depending on fuel cleanliness. Always keep a spare Racor element on hand. Compound gauges are recommended for applications where pressure is occasionally present. These conditions are typically a result of "head" pressure which is present



RK11-16776E Gauge

in overhead fuel tank installations. Whatever the reason, compound gauges should be used because damage may result if a straight vacuum-only gauge is used.

Kit Part No.	Description	Application Suction (vacuum) or Pressure	
RK11233	Vacuum Gauge, all liquid filled out, 2" dial, 0-30 in.Hg. with 1/4" NPT back bracket mount.	Vacuum (Suction) or Pressure	
1606B	Vacuum Gauge Kit. Gauge (RK11233), one 7232-4 & 7234-4 fitting. Instrument panel installation. #4 hose not included.	Vacuum (Suction) or Pressure	
7232-4	Adapter fitting, 1/8"NPTM X#4 (1/4") hose. Use with 0102-4-2 fitting, if needed.		
7234-4	Adapter fitting, 1/4" swivel X #4 (1/4") hose. Use with all gauges, if needed.		
0102-4-2	Adapter fitting, straight 1/4" NPTM x 1/8" NPTF. For use with 7232-4 / 7234-4 fittings, if needed.		
RK11-1676E	Inlet snubbed, 1/4" NPTF thread, Black restriction pointer. Silicone dampened movement. Red tell-tale restriction pointer.	Vacuum (Suction) only	
RK11-1669	'T-Handle' Vacuum Gauge Kit. Includes Gauge (11-1676) and lid fitting (11-1668).	Vacuum (Suction) or Pressure	
RK18-1104	Compound Gauge, liquid filled, 2" dial, 0-30 inHg. / 0-30 psi. 1/4" NPT back bracket mount.	Vacuum (Suction) or Pressure	
RK18-1551	Compound Gauge, liquid filled, 2 1/2" dial, 0-30 inHg / 0-30 psi. 1/4" NPT back boss mount.	Vacuum (Suction) or Pressure	
RK19476	Compound Gauge, 2" dial, 0-25 in.Hg. / 0-15 psi. 1/4" NPT bottom boss mount.	Vacuum (Suction) or Pressure	

Vacuum Gauge or Switch Adapter Fittings





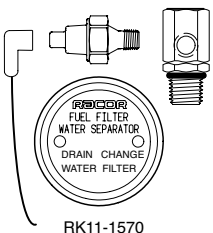
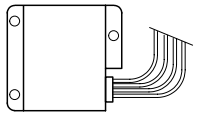
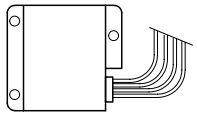
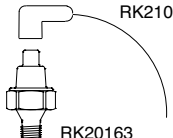
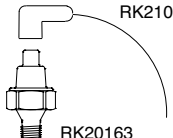
Fitting Part No.	Old Part No.	Use with:	Thread 1	Fitting end 2	Qty.	
913-06-D6	9010HF6-6DTB	500 Series	9/16"-18	3/8" hose	10	
	Features 1/8" NPTF to attach vacuum gauge hose fitting.					
911-08-D8	New	500 / 4120R	3/4"-16	3/4"-16 SAE	10	
911-010-D10	New	900 / 1000	7/8"-14	7/8"-14 SAE	10	
9040-10-DT	No change	900 / 1000	7/8"-14	1/2"-14 NPTF	10	
Both above feature 1/4" NPTF to attach vacuum gauge or hose fitting.						

Water Detection Modules & Kits

Racor Water Detection Kits are available in a wide selection for various installation requirements. Under-dash, in-dash and remote-mount, these solid-state units may be used with any Racor fuel filter/water separator and water probe. They are manufactured using the highest quality materials and are all 100%

electrically tested. An electronic detection module analyzes electrical resistance at the water probe and determines if water is present. If so, the detection module operates to indicate water, based on its features listed below. All units reset automatically after water is removed (unless specified).

Caution: The water probe and detection modules work with 12 or 24 volts, direct current only and should never be wired to other brand modules or household 110 or 220 volts, alternating current. Use the guide below to find the correct detection module for your application.

Kit Part No.		Use with the following voltage:	
RK30880E	Water Sensor with built-in electronics. No external electronic module necessary. Direct connection to lights or alarms. For Racor bowls with 1/2"-20 threaded port, see bulletin #7752.	12 or 24 volt DC	 RK30880E
RK12870	Under-dash Water Detection Module illuminates and sounds when water is detected. Water must be drained to reset light and stop horn. Plastic enclosure measures: 1.38" square x 1.25 deep.	12V DC	 RK12870 / RK12871
RK12871	Under-dash Water Detection Module, same as above.	24V DC	
RK20725	Under-dash Mount Water Detection Module. Light only. Green 'ON' lamp illuminates with power and red 'DRAIN' lamp illuminates when water is detected. Initial power – up self diagnosis feature and circuit protection included. Plastic enclosure measures: 2.75" x 1" x 1.5".	12V DC	 RK20725 / RK20725-24
RK20725-24	Under-dash Water Detection Module, same as above.	24V DC	
RK20726	2" Gauge Type Water Detection Module. Light and audio. Red 'DRAIN' lamp illuminates continuously and horn sounds momentarily when water is detected. Initial power-up self diagnosis feature and circuit protection included. Plastic case, satin black dial with white lettering.	12 or 24V DC	 RK20726
RK30056	2" Gauge Type Water Detection Module and Water Probe Kit. (Module RK20726 and Probe RK21069, with 1/2"-20 threads).	12 or 24V DC Bowl must have water probe port	
RK11-1570	2" Gauge Type Water Detector & Filter Restriction Module. Includes pre-set vacuum switch (7in.Hg.), connector and outlet adapter fitting. Red 'DRAIN' or 'CHANGE FILTER' lamp illuminate continuously and horn sounds momentarily when water is detected. Probe not included. Steel case, black dial with white lettering.	12 or 24V DC For units with 7/8" SAE ports	 RK11-1570
RK14329	Remote Detection Unit. Sends 12V DC hot (+) signal when an input ground signal (from a water probe or a vacuum switch – not included) is received. Must be used with a relay to power a horn or indicator lamp (if draw is over 1 amp). Plastic enclosure measures: 3" x 2.5" x .75.	12V DC	
RK14321	Remote Detection Unit. Same as above but sends 24V DC hot (+) signal.	24V DC	
RK14332	Under-dash mount. Same as RK14329 but sends a ground (–) signal. Enclosure size is same as RK20725, above.	12V DC	 RK14329 / RK14321
RK20163	Vacuum Switch Kit. 12 or 24V DC, non-adjustable, 'NORMALLY OPEN' contacts close at 7 in.Hg., 118" NPT threads. For use with all models.		 RK21030
RK21030	Vacuum Switch Connector Kit (for use with above). Molded connector with single 18 AWG., 18" blue wire lead.		 RK20163



Biodiesel Challenges

All diesel fuels contain wax, and below a certain temperature, will undergo changes such as crystallization, gelling, or viscosity increase. These changes reduce the ability of the fuel to flow and create filter plugging concerns, adversely affecting the operability of vehicles.

With traditional diesel, operability concerns are understood. Today, with well established additive treatments, operability issues have become increasingly rare. But with biodiesel, there are some new challenges:

- Wax crystallization begins at higher temperatures in biodiesel and biodiesel blends, causing them to gel faster than conventional fuels
- The pour and cold filter plugging points can occur at too high of a temperature to meet specifications and winter requirements
- Traditional cold flow additives are often not effective in biodiesel stocks

Since the introduction of biodiesel, several performance concerns have been raised.

- Deposits can block injectors, impacting fuel metering, and leading to deteriorations in driveability, economy, and emissions. Biodiesel has a reputation for increasing injector deposits
- Foaming can also increase with biodiesel use
- Biodiesels may contain a high amount of emulsified water which can lead to corrosion and increased wear on engine
- Biodiesel often has stability problems associated with its lack of antioxidants

Diesel Conditioner Plus+

Diesel Conditioner Plus+ is a multi-functional fuel additive for all seasons. Its formulation contains a superior detergent rating and a cetane improver which enhances power delivery, starting, and helps engines run smoother and quieter.

- Passes BOCLE test for lubricity
- Reduces rust and corrosion in fuel systems
- Contains lubricity additive to reduce friction; prevents wear and tear, extending engine life
- Stabilizes fuel quality during prolonged storage
- Promotes oxidative stability
- Improved fuel economy and lower emissions
- Reduces injector coking
- Reduces sediment formation which can result in reduced maintenance



- Dissolves gum and varnishes to keep fuel system clean
- Cetane improver for added engine performance
- Alcohol free

Part Number	Container Size	Treats
ADT 1116	16 ounces	320 gallons
ADT 1201	1 gallon	2,560 gallons
ADT 1555	55 gallon drum	140,800 gallons

Diesel Biocide

Diesel Biocide is a multi-functional petroleum additive that is used to help maintain color stability and clarity. It can be used to eliminate and/or prevent the growth of bacteria, fungi, organic reactions, sludge formation, and also acts as a corrosion inhibitor.

- Excellent for use with all forms of Biodiesel
- Formulated to treat more forms of algae and bacteria than other brands
- Concentrated formula treats more gallons per ounce
- EPA approved as both a biocide and aftermarket fuel additive
- Prevents internal corrosion from microbial fouling



- Fuel and water soluble
- Does not cause foaming
- Promotes fuel stability during storage

Part Number	Container Size	Treats
ADT 2116	16 ounces	1,280 gallons
ADT 2201	1 gallon	10,240 gallons
ADT 2405	5 gallon	51,200 gallons
ADT 2555	55 gallon drum	563,200 gallons

Diesel Performance Plus+

Diesel Performance Plus+ is specifically formulated to help your engine reach its optimum performance. It improves horsepower and combustion allowing for better fuel economy and longer engine life. The added performance comes with improved lubricity for better fuel system protection.

- Noticeably improves horsepower
- Better fuel economy through more efficient combustion
- Detergency additive extends service intervals
- Formulated for smooth starting
- Lubricity additive extends component life
- Stabilizes fuel quality during prolonged storage
- Dissolves gum and varnish to keep fuel systems clean



- Lubricity improver passes HFRR Lubricity Test for diesel fuel per ASTM D6079-99
- Stabilizes fuel and prevents corrosion per ASTM D665A
- Alcohol free

Part Number	Container Size	Treats
ADT 3116	16 ounces	80 gallons

Gasoline Conditioner Plus+

Gasoline Conditioner Plus+ is a multifunctional gasoline additive which cleans as it protects. It can be used with all types of internal combustion systems and gasoline blends. By cleaning the engine's fuel injectors and carburetor, it provides better combustion, better fuel economy, and lower exhaust emissions.

- Cleans the fuel delivery and intake system providing fuel economy and reduced emissions
- Protects intake system against corrosion
- Use with leaded or unleaded gasoline, gasohol, and ethanol in two and four cycle engines
- Prevents accumulation of deposits
- Improves efficiency of fuel filter/water separators through deemulsification
- Compatible with terminal and mobile fuel systems
- Formulated to not harm catalytic converters



- Stabilizes fuel during storage
- Alcohol free

Part Number	Container Size	Treats
ADT 5116	16 ounces	320 gallons



Diesel Winter Plus+

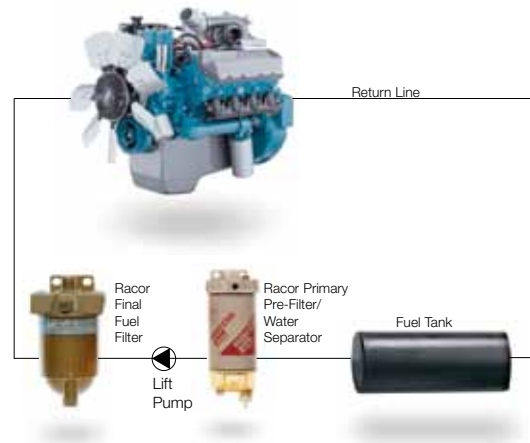
Diesel Winter Plus+ is added to middle petroleum distillates such as No. 2 heating oil or diesel fuel to improve their low temperature operability as measured by pour point and cold filter plugging point. It prevents the plugging of lines, filter screens, and valves, and contains a deicer, which can help reduce line freezing.

- Improves fuel flow and facilitates cold weather starting, inhibits fuel icing, waxing, and gelling in cold weather
- Depresses the pour point by modifying the diesel wax crystal structure
- Improves efficiency of fuel filter/water separators through deemulsification
- Smoother, quieter engine operation
- Prevents corrosion
- Stabilizes fuel quality during prolonged storage
- Contains a cetane improver and deicer
- Alcohol free

Part Number	Container Size	Treats
ADT 4116	16 ounces	128 gallons
ADT 4201	1 gallon	1,024 gallons
ADT 4555	55 gallon drum	56,320 gallons

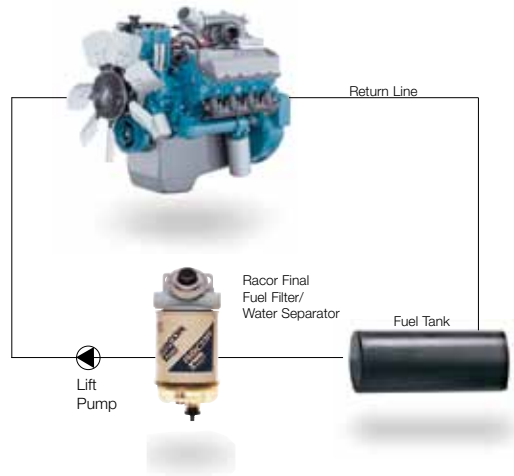
Primary (Pre-) Fuel/Water Separator For Vacuum Applications And Final Fuel For Pressure Applications

Fuel is drawn out of the fuel reservoir by the lift pump into and out of the pre-fuel filter/water separator. The fuel is pre-filtered through a 10 to 30 micron rated filter which also removes harmful water, thereby protecting the lift pump and injection system. The lift pump pressurizes the pre-filtered fuel into the final filter. Fuel is then filtered by a 1 to 7 micron rated filter, ensuring purified fuel is delivered. The combination filtration system design provides superior protection for heavy-duty applications where high levels of contamination and high volumes of fuel require a high filter capacity. Fuel conditioning options (drain, water sensor, hand primer pump, heater, etc.) are usually installed in the primary assembly. Racor's P-Series (page 9) integrates the primary pre-filter and a lift pump into one package.



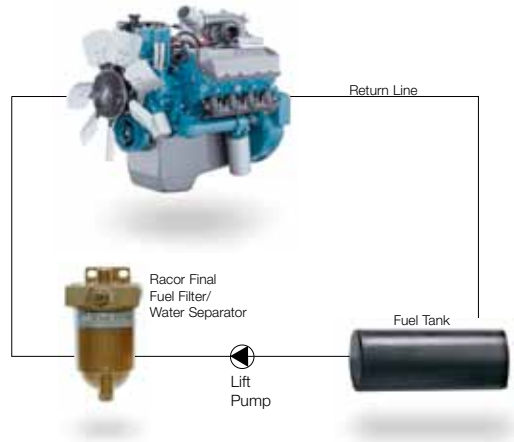
Secondary (Final) Fuel Filter/Water Separators For Vacuum Applications

This design integrates the primary fuel filter/water separator and final fuel filter into one system that is installed prior to the lift pump. The single assembly provides total filtration (4 to 7 microns) and water separation for the entire fuel system. This filtration system design provides excellent protection for applications where cost and service constraints are a challenge. Sufficient space for an adequate size combination unit must be available.



Secondary (Final) Fuel Filter/Water Separators For Pressure Applications

This design integrates the primary fuel filter/water separator and final fuel filter into one compact system that is installed after the lift pump. Generally, an in-fuel reservoir filter screen (100 to 200 micron) is utilized to complete the filtration system. The final fuel filter/water separator is installed after the lift pump and provides protection (4 to 7 microns) to the high pressure injection system. This filtration system design provides economical fuel injection system protection for small diesel engines, automotive and light-truck applications that already have generally good fuel quality and a relatively low volume of fuel usage.



Typical Filter/Separator Options



245R



460R



325R



110A



120AT

Heavy-Duty Air Cleaners & Replacement Elements

Racor has expanded its air filtration family of products to include Heavy-Duty Air Cleaners and replacement air filter elements (formerly Farr Transportation Products Group). These high-capacity, efficient and flexible products expand the breadth of line that Racor customers have grown to expect.



Brochure number #7539.

Heavy-Duty Combination Air Filters & Pre-Cleaners

Racor Combination Air Filters and Pre-Cleaners are designed to be connected to the air intake or to replace the existing standard air cleaner on diesel and gasoline engines. There is a wide range of centrifugal pre-cleaners and combination air filter/centrifugal pre-cleaners for agricultural machinery; earth-moving equipment; stationary engines; generator sets; trucks, buses and recreational vehicles; material handling equipment; snow removal equipment; and street sweepers.



Brochure numbers #7539.

Air Filter/Silencers & Crankcase Ventilation Filtration Systems

Racor Air Filter/Silencers and Crankcase Ventilation Filtration Systems help to keep marine engines and engine rooms contaminant and vapor free. The patented CCV™ contains Racor's high-performance Vaporbloc™ filter made with depth-loading, engineered fiber-coalescing media. The marine air filter/silencer contains a washable media and is designed to connect easily to the Racor CCV to complete the system.



AFM

CCV™

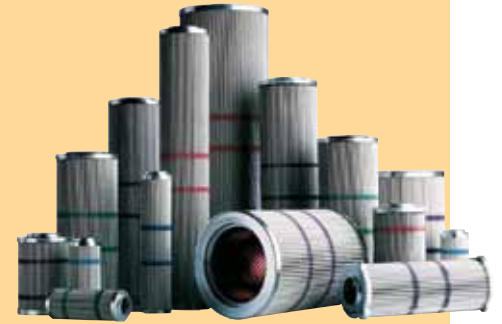
Brochure numbers #7790 and 7501.

Marine Air Replacement Filters

Racor now offers replacement filters for marine applications. These filters are direct replacements for the intake air filter portion of various brands of air filters/silencers.



Brochure number #7501.



ParFit™ Hydraulic Elements

The competitively priced ParFit™ hydraulic elements are interchangeable with OEM and aftermarket elements to allow users to acquire all their replacement elements from one quality source.

Brochure number #7729.

Bypass Oil Filtration Systems

Removes dirt, varnish, ash, tar, soot and other contaminants along with condensed water which forms damaging acids if left in the oil.



Bypass Oil Absolute Series

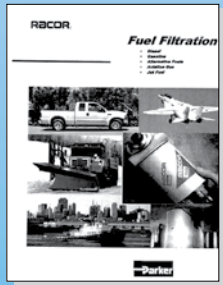
Brochure number #7815.

Parker Racor Division Quality Management System Certifications

- **ISO/TS 16949: 2002**
- **ISO 14001: 2004**

Fuel Filtration

Racor Division wrote the book on fuel filtration technology. Please call us at 1-800-344-3286. Ask for technical service to request part number #7550.



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 E-mail: c-parker@parker.com
 Hours: Monday - Friday 8:00 a.m. to 6:30 p.m. EST
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 Hours: Monday - Friday 08:30 to 18:00 CET

Parker Filtration's Products and Systems



AEROSPACE

Key Products

- Filter Vessels (API/IP)
- Fluid Conditioning Monitors (Fuel & Hydraulic)
- Fuel Filter/Water Separators
- Fuel Inerting Systems (OBIGGS)
- Fuel Loading Filters (API/IP)
- Fuel, Hydraulic, & Lubrication Filters
- Nitrogen Tire Inflation Systems



FOOD & BEVERAGE

Key Products

- Carbon Dioxide Purifiers
- Compressed Air Dryers
- Fiber & Membrane Filters
- Nitrogen Generators
- Stainless Steel Filter Housings
- Steam & Sterile Air Filters
- Validation Test Equipment
- Water Chillers
- Water Filters



INDUSTRIAL & PLANT EQUIPMENT

Key Products

- ASME Coded Vessels
- Compressed Air Filters
- Condensate Management
- Contamination Monitoring
- Desiccant Dryers
- Membrane Filters & Dryers
- Refrigerated Dryers
- Hydraulic Filters
- Oil/Water Separators
- Process Filters
- Portable Hydraulic Systems



LIFE SCIENCES

Key Products

- Breathing Air Filters & Systems
- Chillers
- Compressed Air Filters
- Filter Integrity Analyzers
- Gas Sterilization Filters
- High Purity Gas Filters
- Hydrogen Gas Generators
- Nitrogen TriGas Systems
- Sterile Water Filters
- Syringe Filters



MARINE

Key Products

- Air Intake Filters
- ASME High Flow Vessels
- Crankcase Emission Filter Systems
- Fuel Dispensing Filters
- Engine Fuel Filter/Water Separators
- Engine Oil & Coolant Filters
- Gasoline Filters
- Hydraulic Filters
- Hydrocarbon Fluid Filters
- Oil/Water Separators
- Submarine CO₂ Reduction Units
- Water Desalination & Purification Systems



OIL & GAS

Key Products

- Air Intake Filters
- ASME High Flow Vessels
- Compressed Air Filters & Dryers
- Compressed Air Water Separators
- Crankcase Emission Filter Systems
- Engine Fuel Filter/Water Separators
- Engine Oil & Coolant Filters
- Fluid Condition Monitoring Systems
- Fuel Dispensing Filters
- Hydraulic Filters
- Hydrocarbon Fluid Filters
- Integrity Test Equipment
- Nitrogen Generators
- Mechanical Separators
- Membrane & Sterile Air Filters
- Oil/Water Separators



POWER GENERATION

Key Products

- Air Intake Filters
- ASME High Flow Vessels
- Bioenergy Water Chillers
- Crankcase Emission Filter Systems
- Engine Fuel Filter/Water Separators
- Fluid Condition Monitoring Systems
- Fuel Dispensing Filters
- Load Tap Filters
- Hydrogen Generators
- Magnetic Prefilters
- Nitrogen Generators
- Portable Hydraulic Systems
- Water Sensors



PROCESS

Key Products

- Alternative Gas Dryers & Absorbers
- Bag Filters
- Compressed Air Dryers
- Instrumentation Filters
- Nitrogen Generators
- Oil Absorption Filters
- Pleated Filter Cartridges
- Process Filters
- Semiconductor Filter Cartridges
- Stainless Steel Prefiltration Vessels
- Zero Air Generators



TRANSPORTATION & MOBILE EQUIPMENT

Key Products

- Air Intake Filters
- Alternative Fuel Filters
- ASME High Flow Vessels
- Crankcase Emission Systems
- Fuel Delivery Systems
- Fuel Dispensing Filters
- Fuel Filter/Water Separators
- Multi-stage Filter Systems
- High Pressure Natural Gas Filters
- Nitrogen Tire Inflation Systems
- Suction & Return Line Hydraulic Filters
- Transmission Filters
- Truck & Railway Dryers



WATER

Key Products

- Desalination & Purification Systems
- Oil Absorption Filters
- Oil/Water Separators
- Pleated Filter Cartridges
- Stainless Steel Prefiltration Vessels
- Sterile Water Filters



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