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## Mobile Fuel Filtration

400 Series Spin-on Filters

Racor Filter Division Europe - Technical Bulletin



ENGINEERING YOUR SUCCESS.

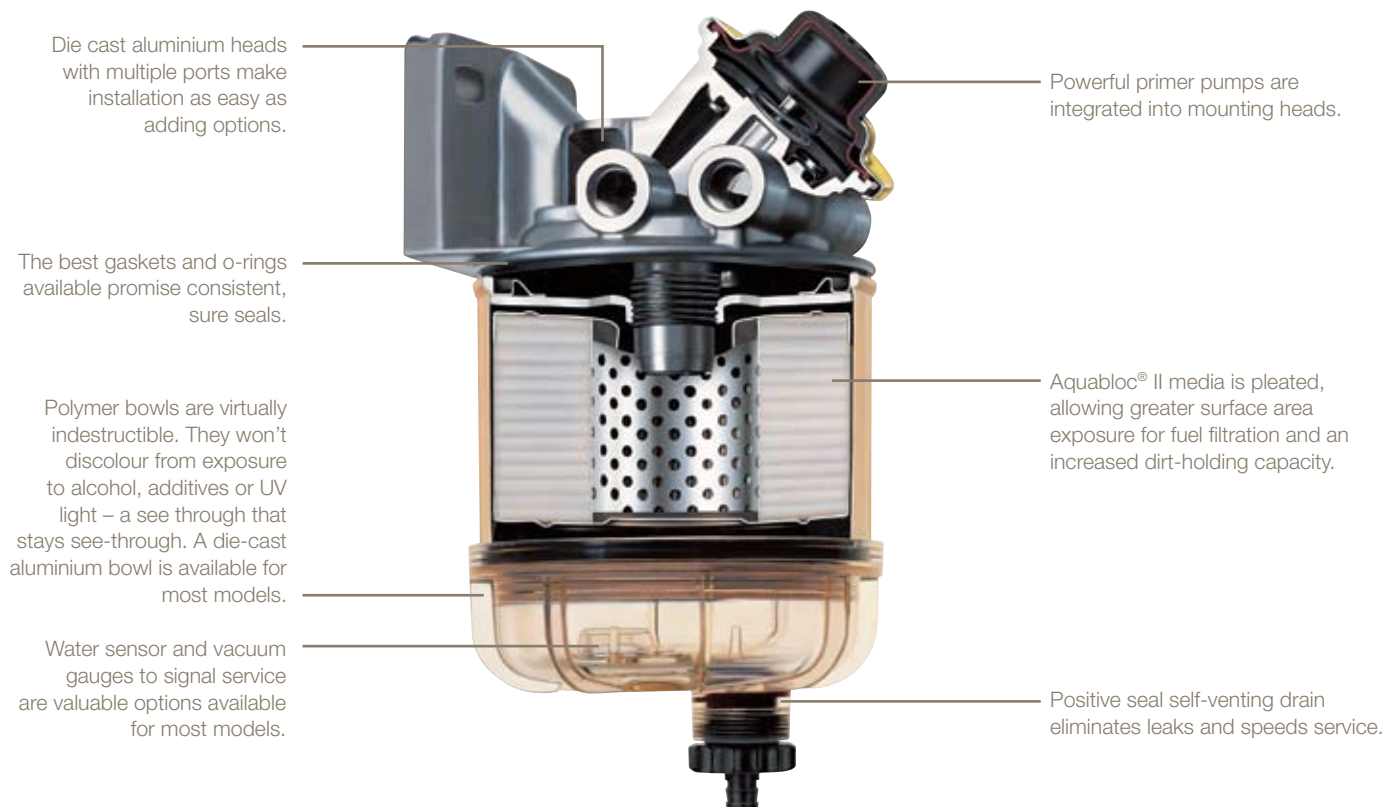
# Mobile Fuel Filtration - 400 Series

All 400 Series Spin-on fuel filter/water separators feature a hand operated fuel priming pump, which simplifies service procedures and yields extremely low flow resistance due to its unique pump bypass characteristic.

The 400 Series also feature multiple fuel ports (two inlets and two outlets) and an integrated mounting bracket for installation convenience. Inlet and outlet connections available in either metric M16 x 1.5 or 3/8" -18 NPTF (SAE J476) for the 445R, 460R and 490R and 3/4" -16 UNF (SAE J1926) for the 4120R. These filter assemblies provide flexibility during mounting to fit any engine application.

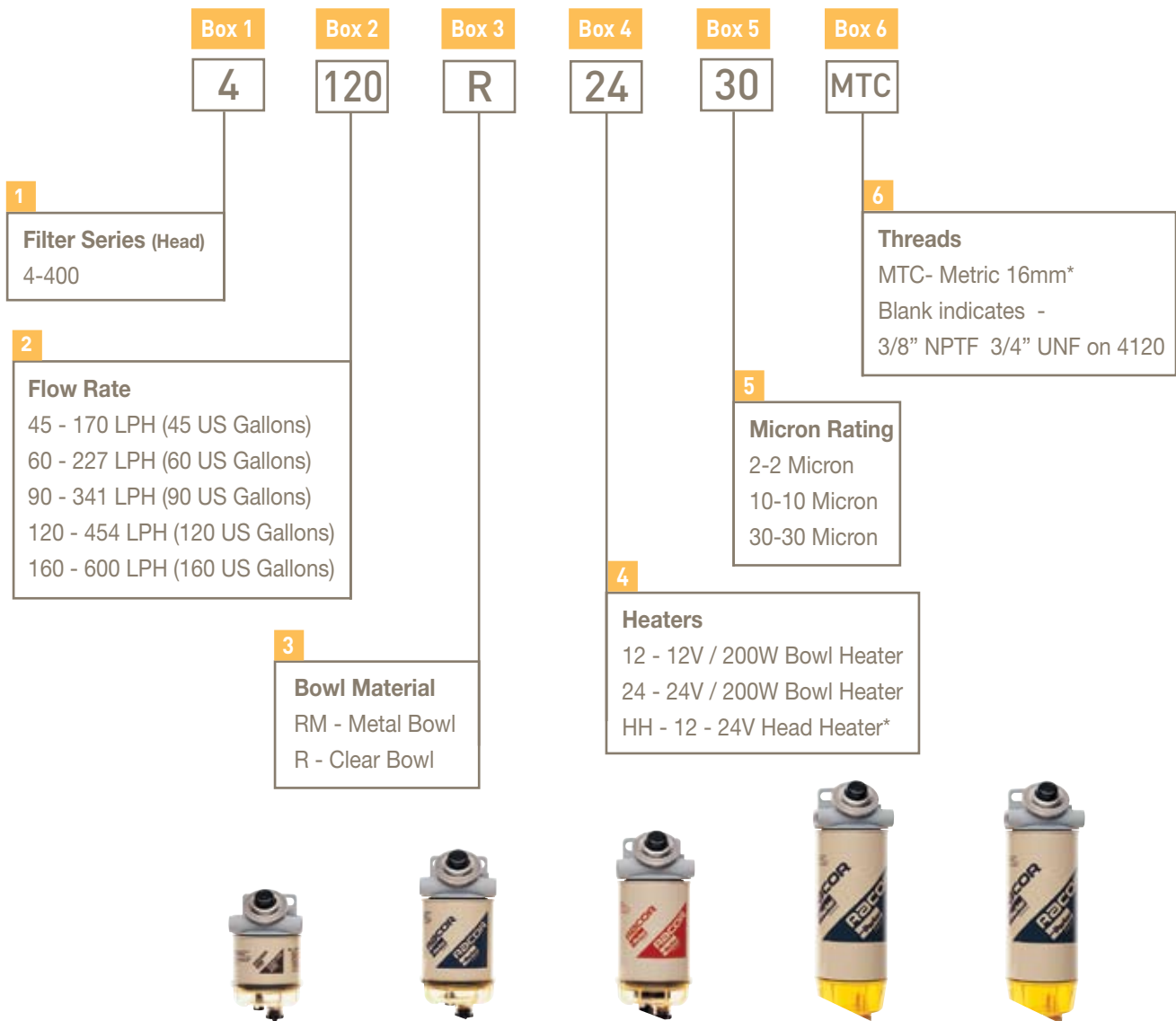
Additional 400 Series features include spin-on, high-capacity, Aquabloc® II replaceable filter elements which stop water, remove solid contamination, and are available in 2, 10 and 30 micron.

Filtration needs should be based on application, fuel quality, operating climates, and maintenance schedules. Also included are spin-on water collection bowls. The clear bowl option will not discolour from alcohol, additives, or UV light and have a leak-proof, positive seal, self-venting drain for easy servicing. Water and contamination levels can be seen easily at a glance. Options for the 400 Series filters include: water detection kits (for diesel applications only), vacuum or compound gauges and 12 or 24 volt dc fuel heaters.



# Diesel and Petrol Spin-On Series

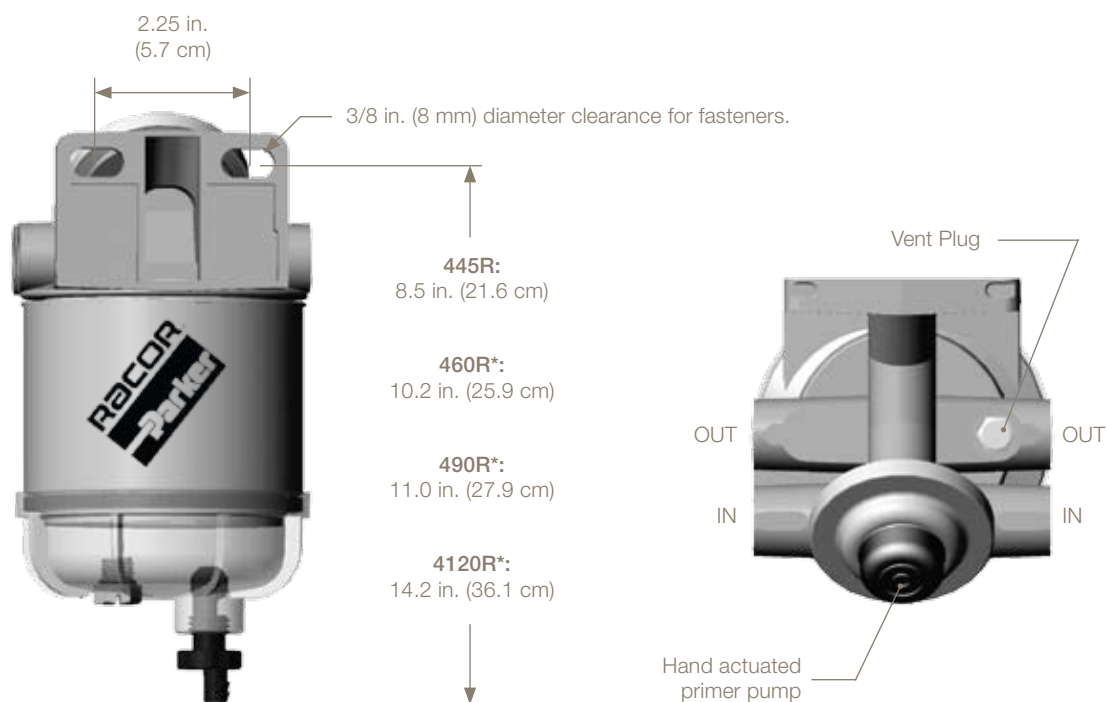
## - 400 Series



Model	445	460	490	4120	4160
Maximum Flow Rate	170 LPH (45 GPH)	227 LPH (60 GPH)	341 LPH (90 GPH)	454 LPH (120 GPH)	600 LPH (160 GPH)
Maximum Pressure Bar	2.06	2.06	2.06	2.06	2.06
No. of Ports	4	4	4	4	4
Port Size*	M16 x 1.5 – 3/8NPTF	M16 x 1.5 – 3/8NPTF	M16 x 1.5 – 3/8NPTF	M16 x 1.5 – 3/4SAE	M16 x 1.5
Integral Primer Pump	Yes	Yes	Yes	Yes	Yes
Water Sensor Option	Yes	Yes	Yes	Yes	Yes
Electric Heater Option	Yes	Yes	Yes	Yes	Yes
Height mm	236	279	300	381	381
Width mm	114	114	114	114	114
Depth mm	121	121	121	121	121
Weight Kg	1.1	1.3	1.4	1.8	1.8

\*HH head Heater filters only available with M16 x 1.5 ports in R60, 90 and 160 sizes.

# Mounting Information



\* Head heater versions are dimensionally different please refer to CID drawings on page 11.

# Installation Instructions

**Refer to Mounting information and Installation Diagram and install as follows:**

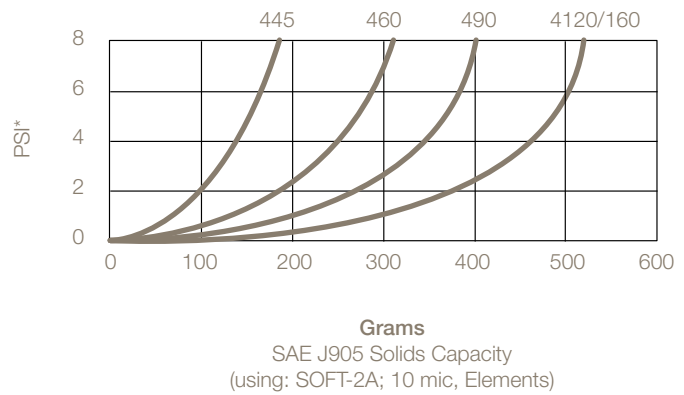
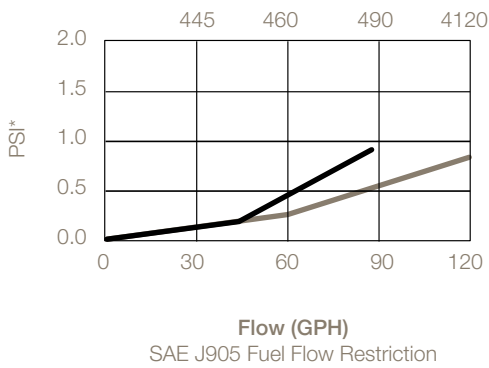
1. Make sure engine is off and cool to touch.
2. 445R, 460R and 490R: Apply thread sealant to NPT fittings (do not use thread tapes as particles may break off and contribute to clogging element). 4120R: Apply motor oil or diesel fuel to O-ring on UNF fittings.
3. Thread fittings into appropriate fuel ports and manually tighten. Plug unused ports (if any) with port plugs and manually tighten.
4. Mount filter vertically in a protected area and away from heat sources. Maintain at least 2.0" (5.1 cm) of clearance below filter for draining water and servicing element.
5. Attach fuel lines to filter. Avoid tight bends and rubbing areas when routing hose.
6. Connect water probe and heater wires (if supplied).
7. Open vent plug and operate hand primer pump until fuel purges from vent.
8. Close vent plug and start engine. Correct as necessary with engine off.



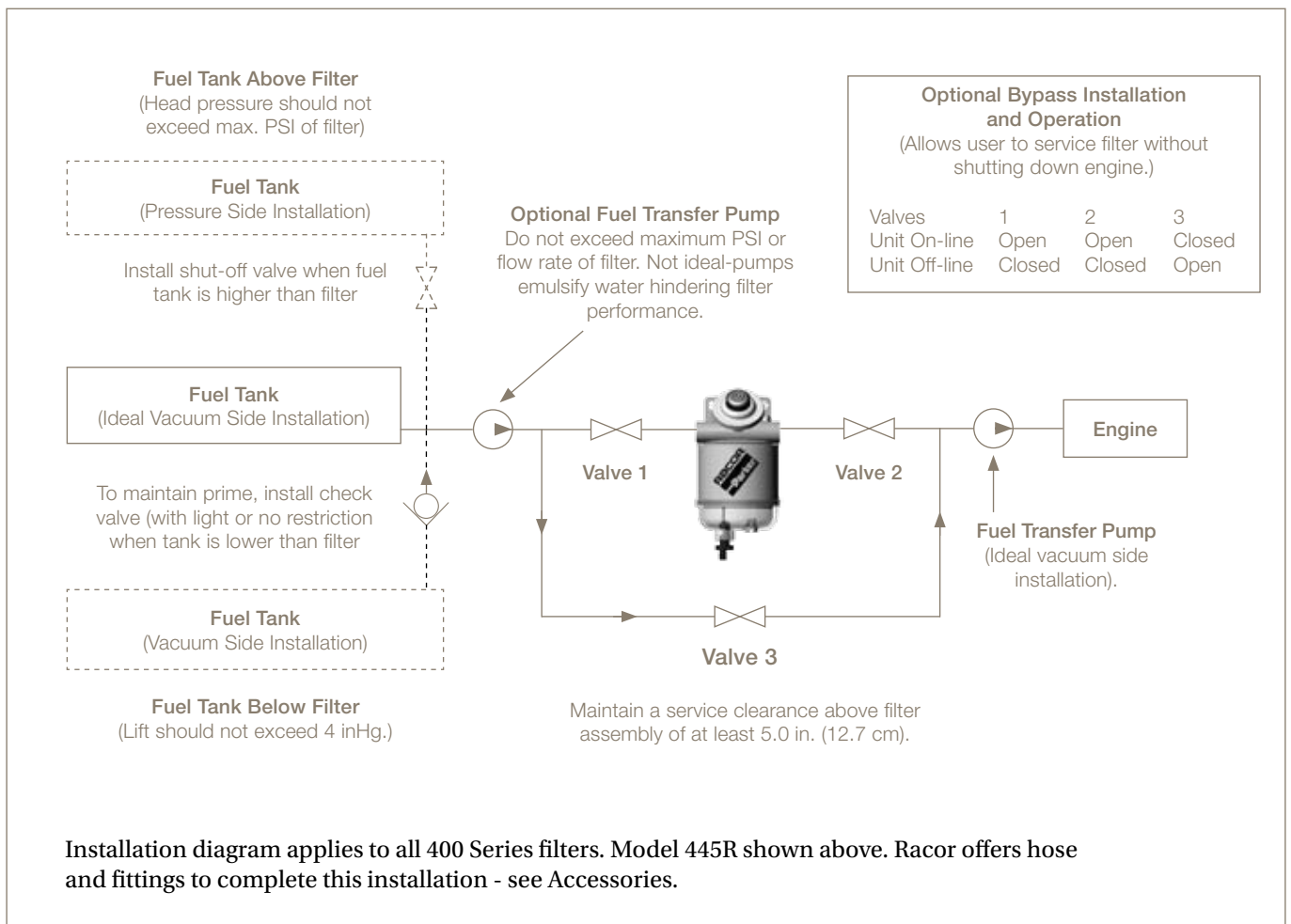
# Test Data

Test results are from controlled laboratory testing. Field results may vary.

\*PSI X 2.036 = inHg. (PSI X 6.895 = kPa)



# Installation Diagram



# Service Instructions

## Element replacement frequency is determined by contamination level in fuels.

Fuel flow to engine becomes restricted as element gradually blocks with contaminants, resulting in noticeable power loss and/or hard starting. As a guideline, change element every 500 hours, 10,000 miles, every other oil change, annually, or at first indication of power loss, whichever occurs first. Always carry extra replacement elements as one tankful of excessively dirty fuel can quickly block a filter.

1. Make sure engine is off and cool to touch.
2. Close all fuel valves, if applicable, to make sure excess fuel does not spill during servicing.
3. Disconnect water probe and heater connectors, if equipped.
4. Open vent plug on mounting head.
5. Drain unit of fuel.
6. Remove bowl and element. Dispose element properly. Bowl is reusable.

7. Lubricate new element seals with motor oil or clean fuel and install only with new element.
8. Re-install bowl and tighten by hand only - do not use tools.
9. Connect water probe and heater connectors, if equipped.
10. Open all fuel valves, if applicable.
11. Operate hand primer pump until fuel purges from vent.
12. Close vent plug and start engine. Correct as necessary with engine off.

## Draining the Collection Bowl

Water is heavier than fuel and will settle to bottom of bowl and appear different in color if collected in a clear jar. In high humidity environments, check bowl frequently (daily if a poor fuel source is suspected). 400 Series bowls are equipped with a water sensor port that will accept a water probe (sold separately) and will alert operator of a high water condition in the filter.

Do NOT use water probe electronics in gasoline applications - an explosion could occur.

1. Make sure engine is off and cool to touch.
2. Open vent plug.
3. Drain water from filter by opening self-venting drain. Close as soon as all water has evacuated. If drain is open too long, the entire filter may drain completely of water and fuel.
4. Follow priming instructions.

## Priming Instructions

1. Prime filter by operating hand primer pump until fuel spills out of vent port.
2. Close vent plug snugly.
3. Verify all other connections are tight.
4. Start engine and check for leaks. Correct as necessary with engine off.

# Trouble Shooting



If a 400 Series filter fails to hold prime, first check vent plug, drain valve, fittings, head, element and bowl are properly tightened. Next, check fuel line connections and verify that they are free of pinches or unnecessary bends and check to see if fuel tank strainer (or pick-up tube) is clogged.

**If problems persist and element is new, contact Racor Technical Support:**

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# Replacement Parts

445R, 460R and 490R		
	Part Number	Description
1	RK10110	Metal Vent Plug Kit (3/8"-24 SAE)
2	RK22425	Mounting Head Kit (3/8"-18 NPTF) (includes head, #1, #3 and #4)
	DRK00008	Mounting Head Kit (M16 X 1.5) (includes same as RK22425)
3	RK22798	Bypass Valve Kit
4	RK22998	Element Gasket Kit
5	See Replacement Element Chart	
6	RK22333	Bowl Gasket Kit
Replacement Bowl Kits (includes bowl #6, #8 and #9):		
7	RK21113-13-11	Clear Bowl Kit
	RK22616-01 <sup>1</sup>	Heated Clear Bowl Kit (same as above, 12 vdc heater)
	RK22616-02 <sup>1</sup>	Heated Clear Bowl Kit (same as above, 24 vdc heater)
8	RK20126	Plug Kit (1/2"-20 SAE)
9	RK30476	Self-Venting Drain Kit
10	RK30964 <sup>2</sup>	Water Probe Kit
	Additional Parts (not shown)	
	RK223231	Heater Connector Kit
	22209	Installation Instructions

<sup>1</sup> In-bowl heater may require a Heater Relay Kit. Power requirements (maximum) are: 12 vdc = 16.6 amps, 24 vdc = 8.3 amps.

<sup>2</sup> Water probe must be used with a Water Detection Kit – see Accessories. Do not use on gasoline applications.



Replacement Elements			
Model Number	2 Micron (Final Filtration)	10 Micron (Secondary Filtration)	30 Micron (Primary Filtration)
445R	R45S or R47S	R45T	R45P
460R	R60S	R60T	R60P
490R	R90S	R90T	R90P

Please note: for head heater models the replacement elements available are R60T-D-MAX, R90T-D-MAX, and R160T

# Replacement Parts

4120R		
	Part Number	Description
1	RK10110	Metal Vent Plug Kit (3/8"-24 SAE)
2	RK22168	Mounting Head Kit (3/4"-16 SAE) (includes head, #1, #3 and #4)
	DRK00008	Mounting Head Kit (M16 x 1.5)
3	RK22998	Element Gasket (includes #3 and #6)
4	RK22798	By-Pass Valve Kit
Replacement Elements:		
5	R120S	2 micron
	R120T	10 micron
	R120P	30 micron
6	RK22998	Bowl O-Ring
Replacement Bowl Kits (includes bowl #6, #8 and #9):		
7	RK30063	Clear Bowl Kit
	RK30900 <sup>1</sup>	Heated Clear Bowl Kit (same as above, 12 vdc heater)
	RK30925 <sup>1</sup>	Heated Clear Bowl Kit (same as above, 24 vdc heater)
8	RK20126	Plug Kit (1/2" SAE)
9	RK30476	Self-Venting Drain Kit
10	RK30964 <sup>2</sup>	Water Probe Kit
	Additional Parts (not shown)	
	22209	Installation Instructions

<sup>1</sup> In-bowl heater may require a Heater Relay Kit. Power requirements (maximum) are: 12 vdc = 16.6 amps and 24 vdc = 8.3 amps - see Accessories.

<sup>2</sup> Water probe must be used with a Water Detection Kit - see Accessories. Do not use on gasoline applications.





# Replacement Parts

4160HH		
	Part Number	Description
1	RK10110	Metal Vent Plug Kit (3/8"-24 SAE)
2	DRK 00199	Mounting head kit M16 x 1.5
3	RK22998	Element Gasket (#3 and #6)
4	RK22798	By-Pass Valve Kit
Replacement Elements:		
5	R60T-D-MAX	10 Micron
	R90T-D-MAX	10 Micron
	R160T	10 Micron
6	R60P-D-MAX	30 Micron
	R90P-D-MAX	30 Micron
	R160P	30 Micron
Replacement Bowl Kits (includes bowl #6, #8 and #9):		
7	DRK00055	Clear Bowl Kit
8	RK20126	Plug Kit (1/2" SAE)
9	RK30476	Self-Venting Drain Kit
10	RK30964 <sup>1</sup>	Water Probe Kit

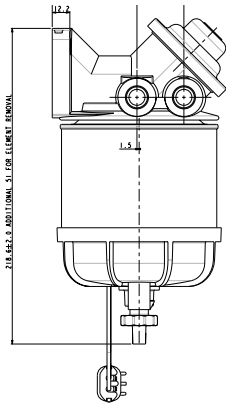
<sup>1</sup> Water probe must be used with a Water Detection Kit - see Accessories.  
Do not use on gasoline applications.



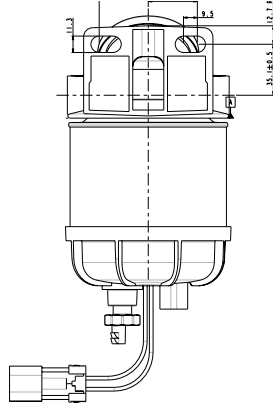
# Customer Interface Drawings

445R

Side View

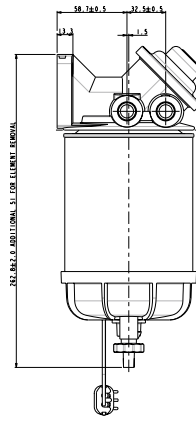


Rear View

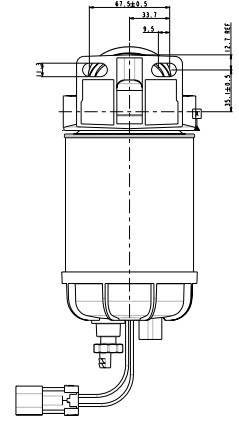


460R

Side View

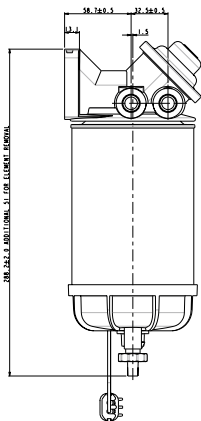


Rear View

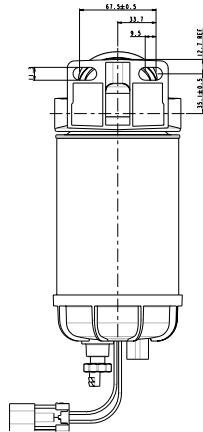


490R

Side View

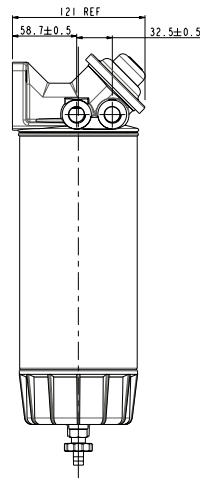


Rear View

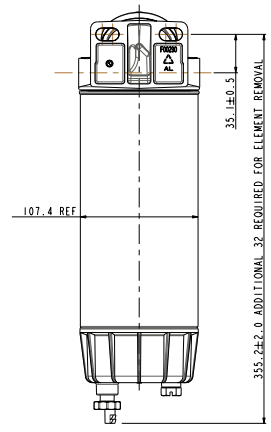


4120R

Side View



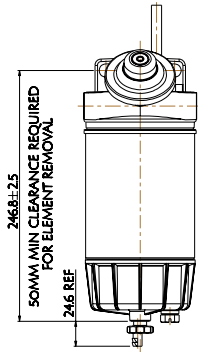
Rear View



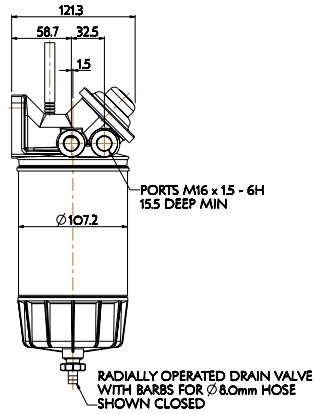
# Customer Interface Drawings

## 460RHH

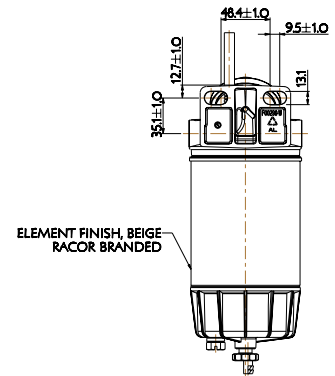
Front View



Rear View

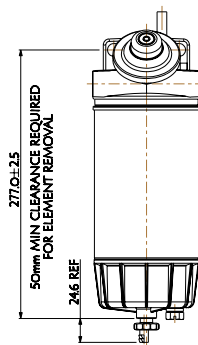


Rear View

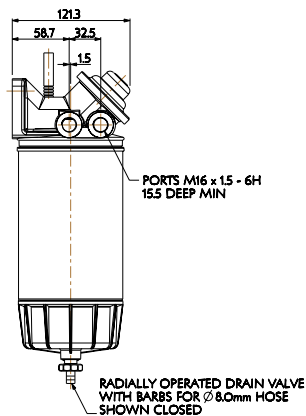


## 490RHH

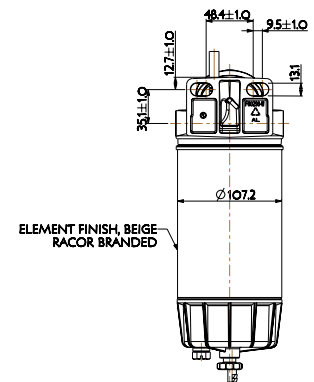
Front View



Rear View

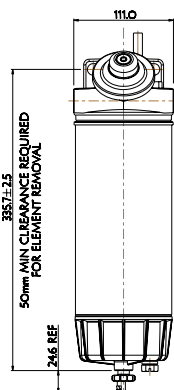


Rear View

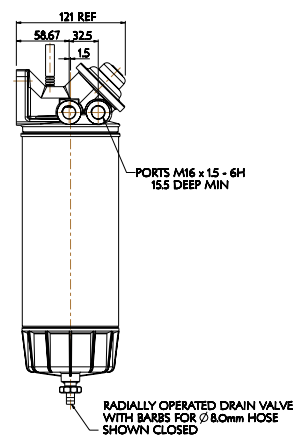


## 4160RHH

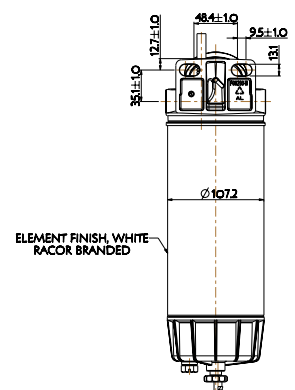
Front View



Rear View



Rear View



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