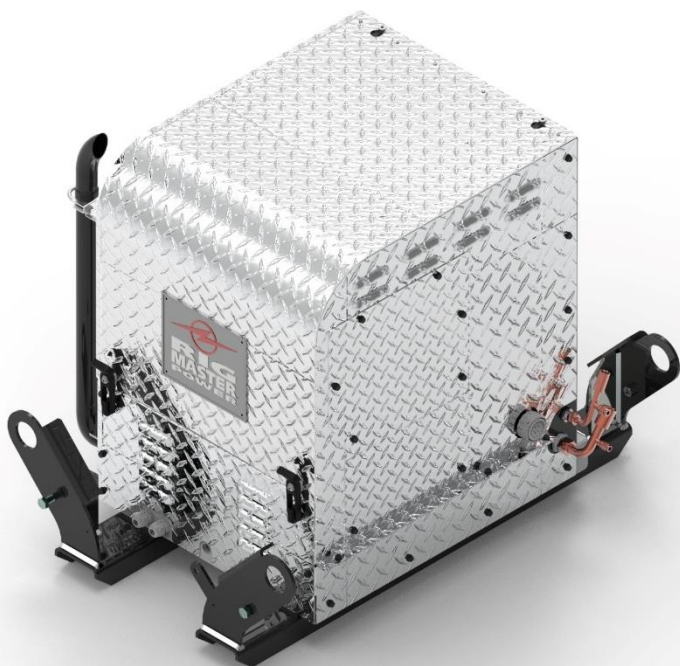
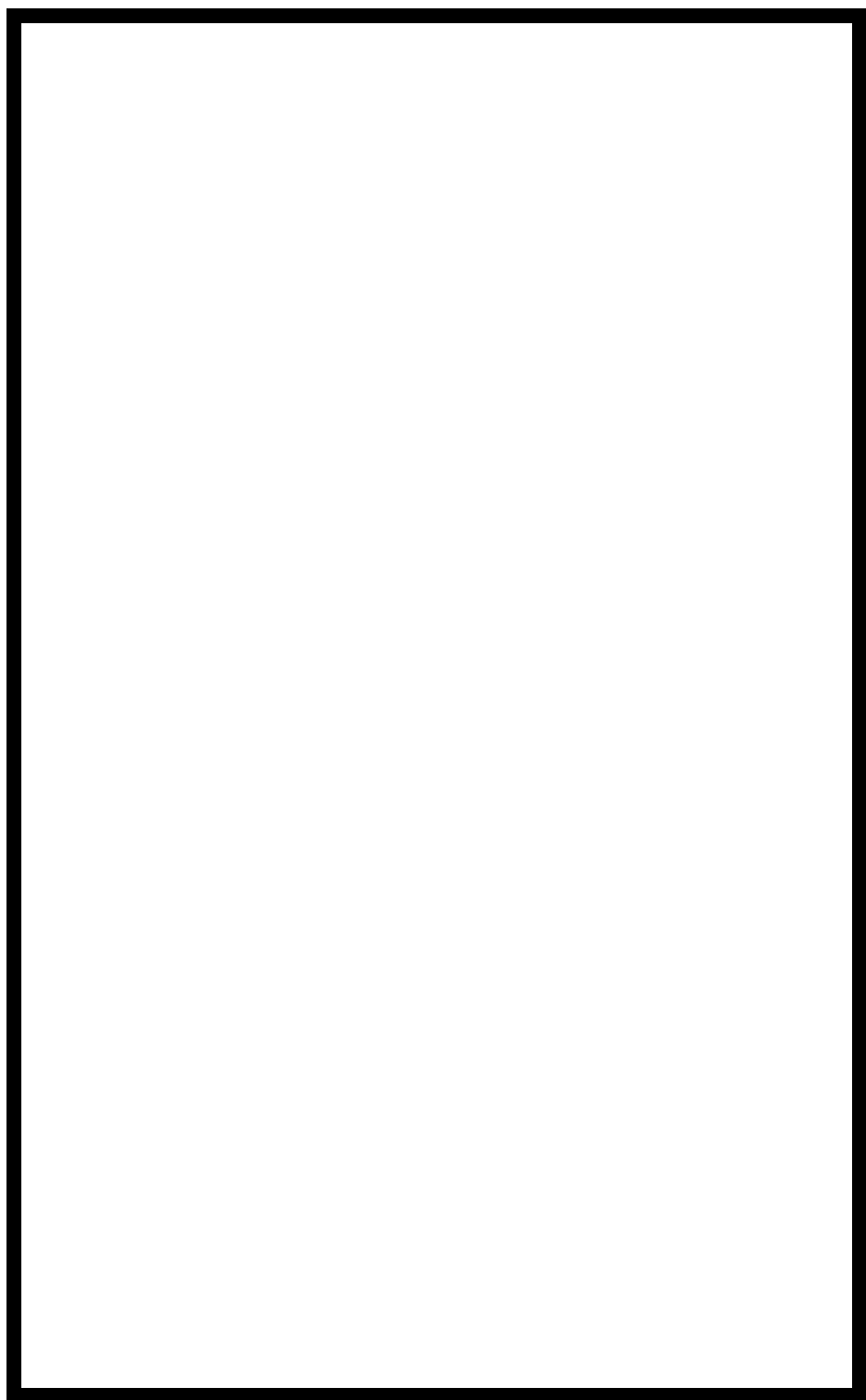




# **Owner's Manual**

## **LG200-24K**





## Congratulations on your purchase of the RigMaster Auxiliary Power Unit.

RigMaster is a totally self-contained, stand-alone Air Conditioner and Heater System. The only items that are shared with the crane are the fuel and battery supply. The RigMaster unit also charges the crane's batteries while in operation.

Superior design and performance have been incorporated into this product to give you trouble-free, economical operation. We are confident you will be satisfied with your new RigMaster Auxiliary Power Unit.

The following pages contain design features, principles of operation, preventative maintenance procedures and troubleshooting guides. Please review it carefully prior to starting and operating your RigMaster Unit. For safety's sake, please also heed all safety warnings and advisories found within your Owner's Manual.

Should you have any questions or concerns please contact your nearest authorized RigMaster Power Dealer, or RigMaster Power International Ltd. at:

**1-800-249-6222**

**(for Technical Support only)**

**Monday to Friday from 8:00 a.m. to 5:00 p.m. Eastern Standard Time**

### HAVE YOUR SERIAL NUMBERS READY WHEN YOU CALL

**To find Engine Serial Number:** Remove the APU Cover and look for Kohler S/N Plate on the left side of the engine, to the left of the bottom of the oil filter.

**To find APU Serial Number:** Remove the APU Cover and look for S/N Plate on bottom right hand corner of frame.

**Write down your Serial Numbers for future reference:**

Engine S/N: \_\_\_\_\_ APU S/N: \_\_\_\_\_



**Or Visit Our Website: [www.rigmasterpower.com](http://www.rigmasterpower.com)**

**Click: Customer Support, Support Materials, Technical Support  
(for other technical information)**

## Definitions

### NOTE

A NOTE describes important information necessary to properly complete a procedure, or information which will make the procedure easier to understand.

### CAUTION

A CAUTION describes a special procedure or special steps which must be taken while completing a task. Disregarding a CAUTION may result in damage to the assembly.

### WARNING!

A WARNING describes a special procedure or steps, which must be taken while completing the procedure where the warning is found. Disregarding a WARNING can result in serious personal injury or death.

## Additional Publications

- Model LG200-24K APU Service Manual
  - Model LG200-24K APU Installation Manual
- Visit [www.kohlerengines.com](http://www.kohlerengines.com) for Engine Owner & Service Manuals.

Licensed dealerships may review and download additional publications by logging into their Dealer portal.

### NOTE

Owner's Manuals and APU Parts Lists are publicly accessible and downloadable:  
go to [www.rigmasterpower.com](http://www.rigmasterpower.com)  
hold your cursor over the "customer support tab" and select "support materials".

This Manual is divided into sections by engine and assembly systems, with a section dedicated to the preventative maintenance of the APU. For detailed information on installation please refer to the "model LG200-24K APU Installation Manual". For detailed information on engine service please refer to the Kohler Service Manual.

Read this entire Manual prior to performing service and maintenance procedures. If you do not fully understand how to perform a process or procedure, or require additional help please contact our Technical Support Department before proceeding.

## Technical Assistance

Before calling for technical assistance please have ready the following:

1. Current LG200-24K Service Manual
2. Model LG200-24K Serial Number
3. Unit Hour Meter Reading
4. Service & Repair History (if available)

**Technical Support is available by**

**Telephone: 1-(800) 249-6222 or (416) 201-0040**

**Monday to Friday from 8:00 a.m. to 5:00 p.m. Eastern Standard Time  
and**

**Website: [www.rigmasterpower.com](http://www.rigmasterpower.com)  
(click: Customer Support, Support Materials, Technical Support)**

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## 1. Zero Energy State

### NOTE: ZERO ENERGY STATE

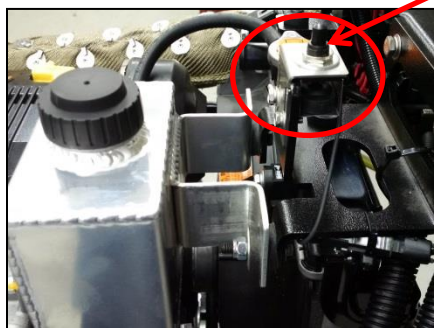
To perform service, maintenance and repairs you must disconnect the RigMaster from its battery source. In the recommended installation configuration, the RigMaster shares the battery bank with the vehicle's main engine. Unplug the J1 harness at the power module before disconnecting the battery cables. After disconnecting the battery cables, check the battery posts inside the RigMaster engine cabinet to confirm there is no voltage to the auxiliary power unit (APU).

## 2. Safety Cover Switch

### WARNING!: SAFETY COVER SWITCH

It is critical that this safety cover switch is never bypassed; failure to comply may result in serious injury.

Figure 1 – Safety Cover Switch



### Safety Cover Switch

The safety cover switch (See Figure 1) is designed to prevent the RigMaster Power APU from starting when the engine cover is loose or has been removed. When the cover is down, the switch is in the closed position. When the cover is open or loose, the switch is in the open position. The switch is located at the very top of the unit enclosure on the surge tank bracket.

## 3. AutoStart Automatic Start/Stop Feature

### CAUTION: AUTOSTART FEATURE

Remember that a properly functioning RigMaster is capable of starting independently of its operator. If the AutoStart feature is enabled, battery voltage, temperature, and time of day can all cause the RigMaster's engine to start. Please see the cabin controller operating instructions for further information on the AutoStart feature. You must deactivate this feature prior to removing the cover or working on the unit.

## 4. Engine Hoist Points

### NOTE: ENGINE HOIST POINTS

The Kohler engine has hoist points that are useful for removal and reinstallation of the engine. It is advised that these hoist points should only be used if no other means of lifting the unit are available.

## 5. Starting Aids

### WARNING!

Do not use any type of starting aids such as ether. Such use could result in an explosion and personal injury, and will render the APU warranty null and void.

## 6. Starting with the Cover Off

### CAUTION

Some installation or repair/diagnostic procedures require that the APU is started with the engine cover off. Do not deactivate or bypass the safety cover switch. Instead, have another individual assist by manually holding the safety cover switch down in the closed position for the duration of the procedure.

## 7. Inspection of the Safety Systems

The safety systems on the RigMaster APU should be examined and tested prior to performing any service work and at 50-hour intervals to ensure that they are in good condition and proper working order.

## 8. Safe Working Practices

Safe working practices are your responsibility. The use of protective safety equipment is mandatory when performing inspections, service, diagnostics and repairs on the RigMaster APU. Follow your local regulations and guidelines regarding occupational health and safety.

## 9. Contact Us

If you do not fully understand this safety information contact RigMaster's Technical Support Department toll free at 1-800-249-6222 before proceeding with the operation or service of this APU.



## Heater

ENGINE COOLANT	TYPE
Engine Coolant	50/50 mixture of ethylene glycol based, "low silica", "diesel specific" antifreeze and distilled water. <b>Use only coolants suitable for aluminum core radiators.</b>

### NOTE

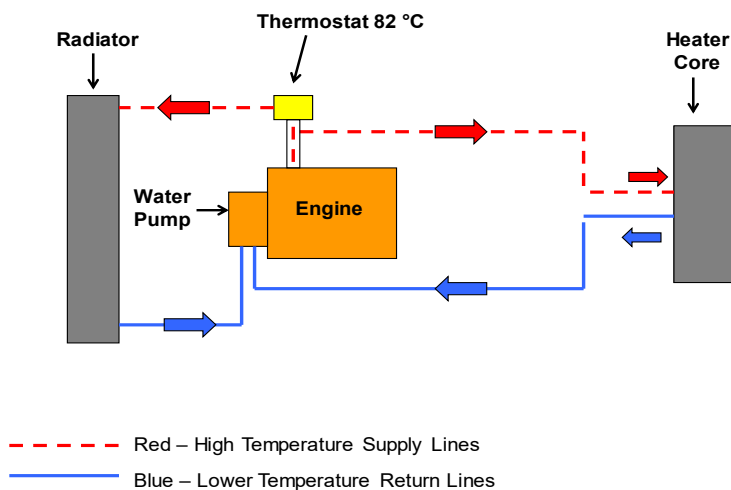
This section is only applicable to those models WITH built-in heat.

The RigMaster heating system is fully automatic. A constant comfort zone is maintained with the temperature selector (see Cabin Controller Operation – Page 14). The cab heating system is a complete stand-alone system that is not integrated into the vehicle's cooling system. When heat is selected, and the RigMaster is in operation, the hot coolant flows through the heater core installed in the HVAC unit in the cab of the crane – See Figure 2.

The heater/air conditioner blower motor (fan) circulates the cab air through the heater core pushing warm air into the cab area. The coolant is then re-circulated back to the RigMaster Unit.

This system is designed to maximize the cab of the crane heating efficiency.

**Figure 2 – Heater**

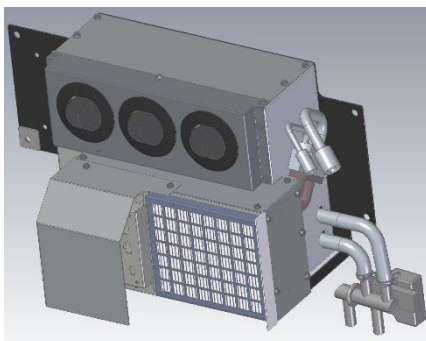
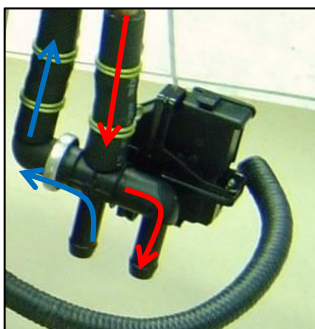


## Heating System

For heating, the APU's coolant flow is directed into the HVAC box mounted inside the cab of the crane. A water valve mounted to the HVAC box regulates the flow of coolant through the heater core.

Voltage at the J2 Connector Pin-1 on the power module will indicate if the water valve is open or closed. (Closed=0 volts / Open=12.4 volts).

**Figure 3 – Heating System**



### NOTE

Notice the coolant flow when the valve is open. The coolant will travel to the HVAC box and then return on the opposite pipe.

## Electronic Coolant Control Valve

The electronic coolant control valve motor shaft is a good indication if the valve is opening when changing temperature modes. Marking the shaft with a black marker, which will make the shaft rotation more visible. When the valve is closed, the loop back to the engine.

**Figure 4 – Control Valve Motor Shaft**

**Figure 5 – Loop back to Engine**

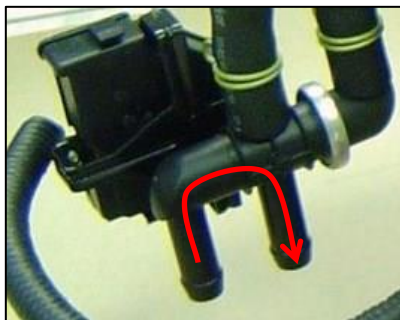


Figure 6 – APU Utilities Layout

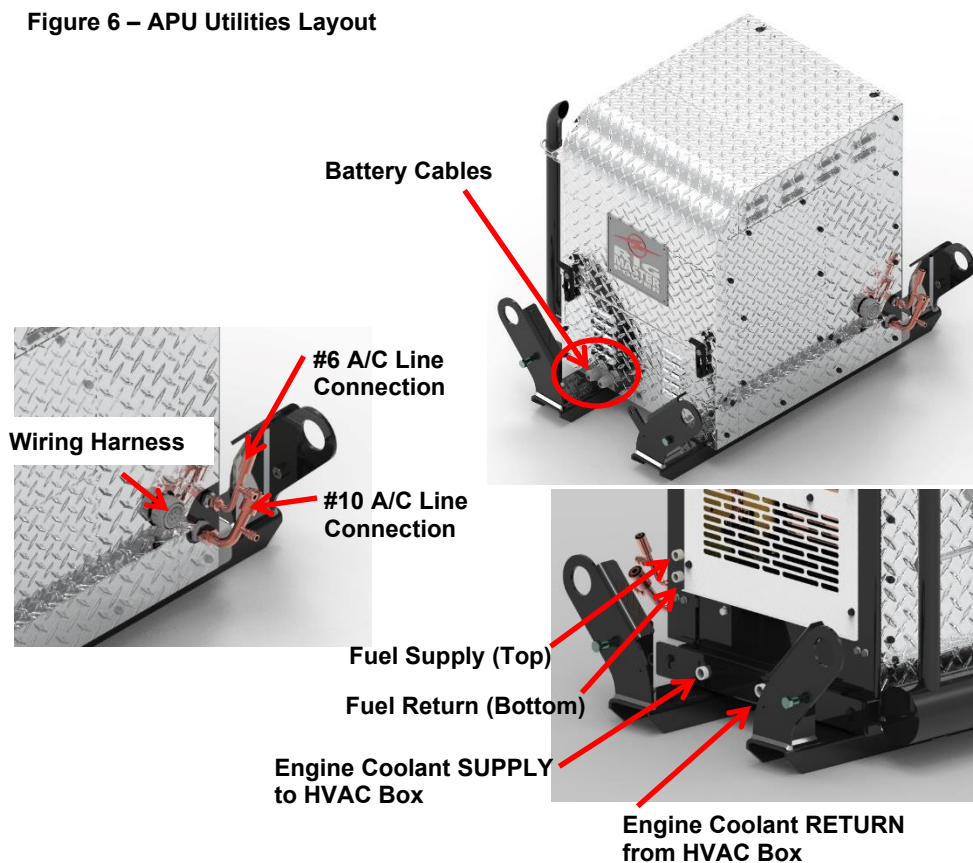
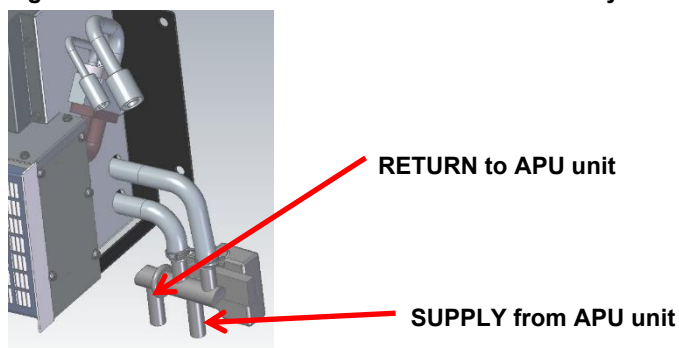


Figure 7 – HVAC Coolant control valve connection layout

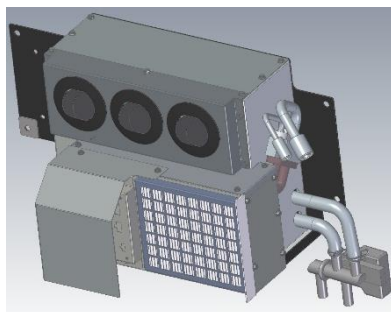


**NOTE**

When hooking up the engine coolant lines to the HVAC box it is very important to mark the lines and hook them up correctly. Improper connections will result in poor heating in the cab.

**Figure 8 – HVAC Box****Radiator Filling and Purging**

1. Ensure all fluids are checked and are topped up on the engine.
2. Start the engine and turn heat on a high setting.
3. Set HVAC blower to either high or med. or low.
4. Run the engine for no more than 2-3 minutes, this will allow the coolant to fill the heater core at the HVAC unit.
5. Shut down the engine and allow it to cool before removing the radiator cap.
6. Top off radiator as needed.
7. Start the engine and keep in the heat mode with the blower on for 5-10 minutes.
8. You should start to feel the heat coming out of the vents at the HVAC unit.
9. Stop the engine and allow it to cool before topping up the coolant in the rad and the overflow coolant tank.

**WARNING! SAFETY COVER SWITCH**

Allow the cooling system to cool before attempting to remove the radiator cap, serious injury can occur.

**NOTE**

The cooling system of the APU when hot is under pressure. Always allow the system to cool down after running before checking and adjusting fluid levels,

## Air Conditioner

The RigMaster air conditioner is also fully automatic. A constant comfort zone is maintained with the temperature selector setting (see Cabin Controller Operation – Page 14). The RigMaster air conditioner is an R134A system that is not integrated into the vehicle's existing air conditioning system.

### WARNING!

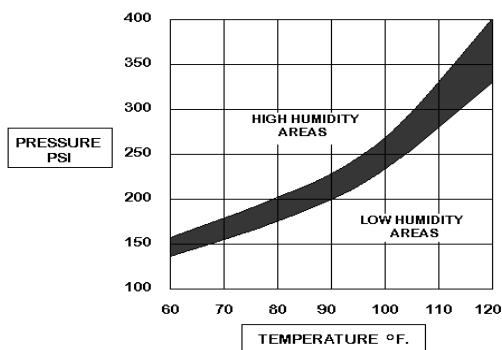
ONLY CERTIFIED AIR CONDITIONING TECHNICIANS SHOULD SERVICE THE AIR CONDITIONER.

### HIGH PRESSURE VS. TEMPERATURE READINGS

High temperatures and pressures are approximate.

Readings within 10-15% (See Figure 4) will deliver acceptable performance.

**Figure 4 – Air Conditioning Performance**



### SUCTION PRESSURES – LOW SIDE

Usual low side pressure 15-40 PSI depending on outside temperature and humidity.

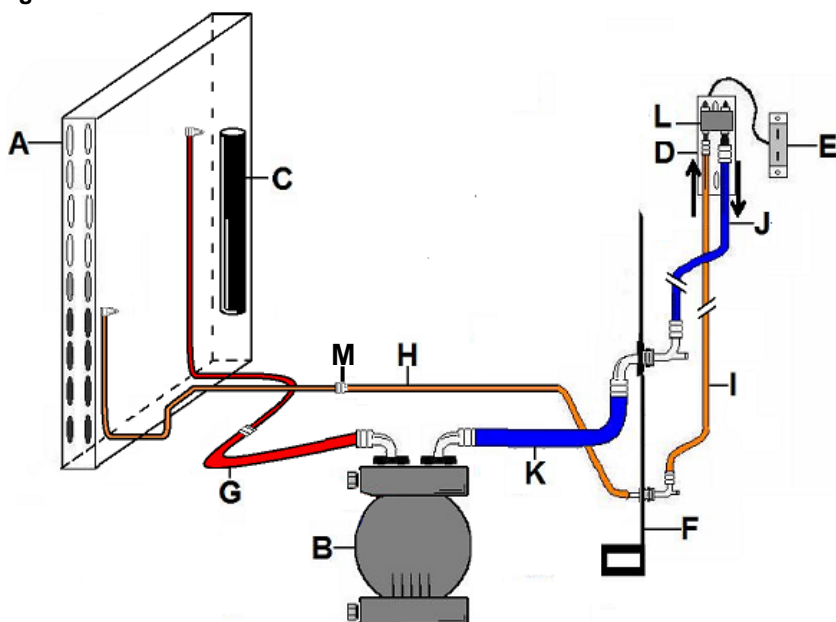
### DISCHARGE PRESSURES – HIGH SIDE

Usual high side pressure 150-300+ PSI depending on outside temperature and humidity.

AIR CONDITIONING	SPECIFICATIONS
Refrigerant Type	R134A
Volume of Refrigerant (20,000 BTU HVAC)	1.0 lb.; (16 oz.; 0.4 Kg.)
Compressor Oil Type	DN8 or PAG 46 Compressor Oil ONLY
Compressor Oil Capacity (pre-filled) <b>DO NOT ADD OIL TO A/C SYSTEM</b>	6.3 fl. oz.; (186.3 cc.; 186.3 mL)
Evaporator Temperature Switch	Range = 30°F to 42°F (-1°C to 6°C)
Binary Pressure Switch	Range = 28 to 450 psi

The compressor within the RigMaster unit pumps the refrigerant gas through the condenser that dissipates the heat and changes the refrigerant from a gas to a liquid. The liquid refrigerant passes through a filter (receiver drier), and then through the evaporator core located in the cab heater/air conditioner [HVAC] unit. The heater/air conditioner blower motor (fan) then activates, and cool dry air is forced into the cab area.

**Figure 5 – Air Conditioner**



	LEGEND	PRESSURE	PART #
A	Condenser	High	LG9-001
B	Compressor	High/Low	LG9-004
C	Receiver Drier	High	LG9-007K
D	Evaporator	High	LG9-002
E	Thermostatic Switch	High/Low	RP9-113-R2
F	Bulkhead Section of Frame	N/A	KL10-001-R2
G	A/C Line – Compressor to Condenser – #8	High	LG9-405
H	A/C Line – Condenser to Bulkhead – #6	High	LG9-407K
I	A/C Line – Bulkhead to Evaporator – #6	High	LG9-404
J	A/C Line – Evaporator to Bulkhead – #10	Low	LG9-403
K	A/C Line – Bulkhead to Compressor – #10	Low	LG9-406
L	Expansion Valve	High/Low	LG9-003
M	Binary Switch	High	LG9-005

## **Pre-Start Inspection**

### **with the RigMaster TURNED OFF**

1. Remove the cover.
2. Visually inspect the unit for evidence of any oil or coolant leakage.
3. Check the oil and add oil if necessary.
4. Check all belts for wear and cracking.
5. Check the mounting bolts and tighten if necessary.
6. Check for broken, corroded, or loose connectors and/or wires.
7. Check the physical condition and tightness of all hoses and hose clamps.
8. Replace and secure the cover.

## Cabin Controller Operating Instructions

Before beginning the start-up procedure, it is necessary to know how to operate the cabin controller.

**Figure 6 – Cabin Controller Controls**



The Cabin Controller consists of two sections:

1. LCD (Liquid Crystal Display) with basic control buttons.
2. Advanced control buttons.

The LCD and basic control buttons are always visible to the user.

The advanced control buttons are concealed behind a semi-circular cover, open cabin controller cover to access controls.

The controller also contains an LED indicator. When the LED is green, the system is active; if it glows red then the system is detecting a problem, and an error message will scroll across the bottom of the LCD screen. The LED is turned off in low power mode.

### 1. Basic Controls and Functions

Basic controls contain the following buttons:

1. Start system.
2. Stop system.
3. Up arrow (Red triangular button).
4. Down arrow (Blue triangular button).



If the unit is in *advanced* mode, pressing any of the basic control buttons will return the unit to basic mode. Alternately, the control panel will return to basic mode after two minutes of inactivity.

If the unit shows the current temperature, pressing either the up or down button will show the set point temperature without changing it. Once the set point is indicated, pressing up or down buttons will adjust the set point. The new set point takes effect only when display is returned to show internal temperature.

## 2. Advanced Controls and Functions

The advanced controls are as follows:

1. **Power** button controls whether the module is active. In *inactive* mode all system functions including engine start, climate control and AutoStart are disabled. You can still see the temperature reading, current time and use the alarm clock function.
2. **Fan** button is used to change the fan setting. Pressing the button cycles between auto, high, med, low, and off settings.
3. **Clear** button will take you back to the main screen without saving any information.
4. **Clock** button is used to set the time/date/day menu features.
5. **Alarm** button is used to set the alarm menu features.
6. **AutoStart** button is used to access and set AutoStart menu features.
7. **Mode** button is used to activate the different operational modes. Pressing the mode button will back you out of a menu mode but does not save the information just entered.
8. **Ext. Temp** button will display the external temperature on the LCD when pressed.
9. **Opertg. Hours** button will display the total hours of use.
10. **Select** button enters the data and advances the program to the next menu step. Pressing the select button will save the information when entering operational data.
11. Left scroll button (◀).
12. Right scroll button (▶).

The left and right arrow buttons are used to locate the desired data and/or adjust those values.

## Cabin Controller LCD Display

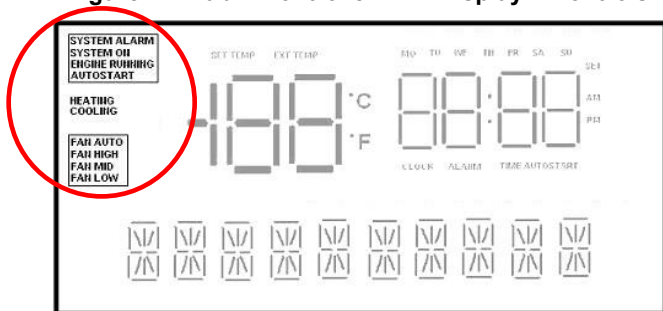
The Cabin Controller LCD has a white backlight that turns on each time a user presses a button and will remain on for 2 minutes after the last button has been pushed. The backlight will turn red when there is an alarm condition. A fault code will be displayed if the unit shuts down or fails to start.

The LCD displays 4 groups of information:

1. System information.
2. Temperature information.
3. Clock, day and alarm information.
4. Alphanumeric display for additional information.

### 1. System Information:

**Figure 7 – Cabin Controller LCD Display – Controls**



**SYSTEM ALARM** symbol will flash if an alarm condition has occurred. The alphanumeric display along the bottom of the display screen will show more information about the alarm. (Red status LED will be on.)

**SYSTEM ON** symbol will display if the unit is in ON mode. (Green status LED will be on.)

**ENGINE RUNNING** symbol will display when the engine is running.

**AUTOSTART** symbol will display and flash if temperature AutoStart is enabled (when engine is off). If the engine has been started through AutoStart, this symbol is constantly on while the engine is running.

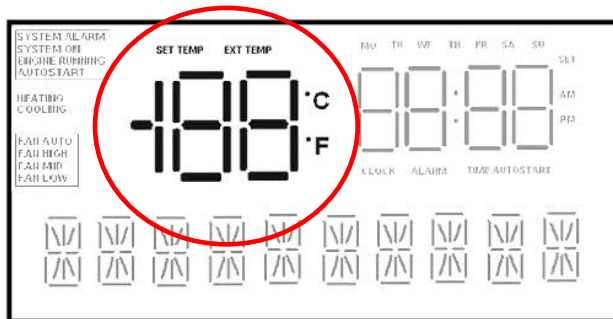
**HEATING** symbol will display when the system is in heating mode.

**COOLING** symbol will display when the system is in cooling mode.

**FAN AUTO, FAN HIGH, FAN MED, or FAN LOW** symbol will display depending on which setting has been selected. Nothing will display in this area if the fan is set to off.

## 2. Temperature Information:

**Figure 8 – Cabin Controller LCD Display – Temperature**



This area indicates the internal (or external) temperature and can be programmed to display in either “Celsius” or “Fahrenheit”.

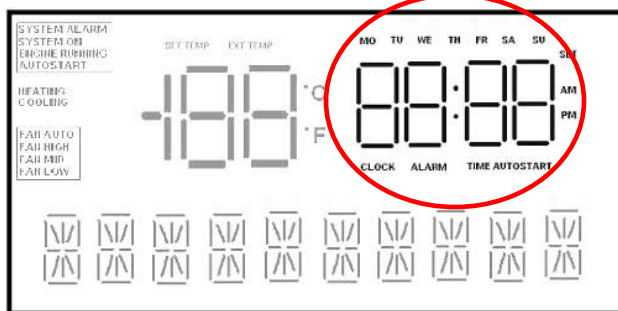
Internal temperature is shown if **EXT TEMP** and **SET TEMP** symbols are not illuminated. Pressing the **Ext. Temp** button will momentarily display the outside temperature. After 5 seconds, the display will default back to showing the internal temperature.

**EXT TEMP** symbol will flash when showing external temperature. After a few seconds the display returns to show internal temperature.

**SET TEMP** symbol appears (and the numeric temperature value will flash) whenever adjusting temperature set point. A few seconds after adjusting the temperature, the display returns to show internal temperature.

### 3. Clock and Alarm:

**Figure 9 – Cabin Controller LCD Display – Clock & Alarm**



This is a 12:00 hour clock system with **AM/PM** symbols and 7 symbols indicating day of the week: **MO, TU, WE, TH, FR, SA, SU**.

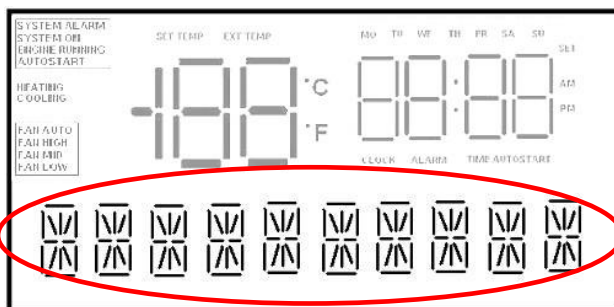
**CLOCK** symbol appears when the current time is showing.

**ALARM** symbol appears to indicate that the alarm setting is showing. Pressing the alarm button allows you to set the alarm. The alarm symbol flashes when the alarm has been set.

**TIME AUTOSTART** symbol appears if the display shows time AutoStart setting. It flashes if Time AutoStart is set.

### 4. Additional Information/Message Area:

**Figure 10 – Cabin Controller LCD Display – Message Area**



This line is used to show extra information in the basic mode; error messages to provide interface when going through menus in advanced mode. Longer text lines are scrolled to the left on the display.

## Operation of the Cabin Controller (Functions)

### To Turn Power On

Press the **POWER** button to activate the system. When the power switch is activated the LCD display will light and **SYSTEM ON** symbol will turn on (active mode). Press **POWER** button again for 2 seconds to switch the unit back to low power mode.

### Engine Start

Press **START** button.

The control panel will display the status of the operation as it occurs: *Glow Plug* and a countdown will display on the screen. Once the countdown is complete the display will read *Cranking* as the APU starts up and the **ENGINE RUNNING** symbol will blink. Once started the control will display *Engine Running* for 5 seconds (and **ENGINE RUNNING** symbol will turn on).

### Engine Stop

Press **STOP** button.

The screen will initially display *Stopping* and then change to *Stopped* once the operation is complete. The **Engine Running** symbol will turn off.

### Temperature Control

Press UP or DOWN (red/blue) buttons to adjust temperature set point on the display. When editing the set point, the LCD display will show the set point instead of internal cabin temperature. The set point is stored without a need to press any other buttons.

#### NOTE

The manual temperature control ranges from 59°F to 90°F (15°C to 32°C). The system will remember the last set temperature when the APU is turned on. If the system is already running, the change will take effect a few seconds after the last UP or DOWN key is pressed, and the display will switch back from set point to internal cabin temperature.

### Clock and Date Set-Up

It is necessary to enter the time and date programming mode if the module has never been programmed or a different time zone is required. (**SET** symbol is flashing and **CLOCK** symbol is turned on during clock setup).

1. Press **CLOCK** button. (The display will read *Set Clock*.)
2. Press **SELECT** button to continue, **MODE** to exit. (*Clock hour* will start flashing.)
3. Press LEFT or RIGHT scroll button to adjust Clock hour.
4. Press **SELECT** button. (*Clock hour* will stop flashing and *Clock minutes* will start flashing.)
5. Press LEFT or RIGHT scroll button to adjust *Clock minutes*.
6. Press **SELECT** button. (*Clock minutes* will stop flashing and *AM/PM* will start flashing.)
7. Press LEFT or RIGHT scroll button to change.
8. Press **SELECT** button. (*AM/PM* will stop flashing and *Day of week* will start flashing.)
9. Press LEFT or RIGHT scroll button to change.
10. Press **SELECT** button. (*Day of week* will stop flashing and *Month* will start flashing.)
11. Press LEFT or RIGHT scroll button to change.
12. Press **SELECT** button. (*Month* will stop flashing and *Date* will start flashing.)
13. Press LEFT or RIGHT scroll button to change.
14. Press **SELECT** button to save settings and return to menu or press **MODE** to return to menu without saving.

### Set Alarm Clock

1. Press **ALARM** button. (The display will read *Set Alarm.*)
2. Press **SELECT** button to continue, **MODE** to exit. (*Alarm Clock hour* will start flashing.)
3. Press LEFT or RIGHT scroll button to adjust Alarm Clock hour.
4. Press **SELECT** button. (*Alarm Clock hour* will stop flashing and *Alarm Clock minutes* will start flashing.)
5. Press LEFT or RIGHT scroll button to adjust *Alarm Clock minutes*.
6. Press **SELECT** button. (*Alarm Clock minutes* will stop flashing and *AM/PM* will start flashing.)
7. Press LEFT or RIGHT scroll button to change.
8. Press **SELECT** button.
9. Press LEFT or RIGHT scroll button to turn Alarm clock on/off.
10. Press **SELECT** button to save settings and return to menu or press **MODE** to return to menu without saving.

When enabled, **ALARM** symbol is flashing.

### Fan Speed Control

1. Press **FAN** button to adjust fan speed.
2. Press the **FAN** button to cycle through fan settings. (*AUTO OFF, AUTO ON, FAN LOW, FAN MEDIUM, FAN HIGH, FAN OFF.*)

There is no need to press any other buttons to confirm.

AUTO OFF is for heating efficiency during winter operation.

AUTO ON is for air conditioning efficiency during summer operation.

#### NOTE

The air conditioning/heating system will only operate when the fan speed is in a setting other than *OFF*. To stop the operation of the air conditioning/heating system, the fan speed must be set to *OFF*. If the system was stopped by another method, the air conditioning/heating will start immediately when the system is restarted.

## AutoStart Features and Operation

### AutoStart Feature – Time/Day

Allows you to program a day and time for the APU to start automatically, up to 7 days in advance. This feature will run for three hours and shut down. At the end of the AutoStart program the cabin controller will display the error code #10, "Run Timeout"; this is normal.

### Set Automatic Start-Up/Shut-Down – Time/Day

The user can adjust the time and day for the next timed AutoStart event. (*SET* symbol is flashing and *TIME AUTOSTART* symbol is turned on during alarm setup).

1. Press **AUTOSTART** button. (*Time AutoStart* will scroll across the screen.)
2. Press **SELECT** button to continue, **MODE** to exit.
3. Press LEFT or RIGHT scroll button to adjust *AutoStart hour* as required.
4. Press **SELECT** button.
5. Continue to set the *AutoStart Minutes* and *AM/PM* as you would set the clock. (See Section: *Clock and Date Set-Up*).
6. Press **SELECT** button after each entry.
7. Press LEFT or RIGHT scroll button to adjust *AutoStart Day* as required.
8. Press **SELECT** button.
9. Press LEFT or RIGHT scroll button to locate *On/Off*.
10. Press **SELECT** button to save settings or press **MODE** button to return to menu without saving.

**NOTE:** When enabled, **Time AutoStart** symbol will be flashing.

### AutoStart Feature – Temperature

Allows you to program a comfortable temperature setting; the APU regulates the temperature giving you further fuel savings on extended absences from the cab.

### Set Automatic Start-Up/Shut-Down – Temperature

1. Press **AUTOSTART** button twice. (*Temp AutoStart* will scroll across the screen.)



2. Press **SELECT** button to continue, **MODE** to exit.
3. Press LEFT or RIGHT scroll button to select mode of temperature control. (Mode options include *OFF*, *AUTO*, *HEAT* or *COOL only*.)
4. Press **SELECT** button to continue, **MODE** to exit.
5. Press LEFT or RIGHT scroll button to select AutoStart temperature set-point if *HEAT* or *COOL* have been selected.
6. Press **SELECT** button to save settings or press **MODE** to return to menu without saving.

**NOTE:** When enabled, the **AutoStart** symbol will flash.

AutoStart temperature start-up will engage when the inside temperature is more than 5°F (-15°C) lower or more than 5°F (-15°C) higher than the temperature control setting (in auto mode). It also engages at least 1 minute after enabling AutoStart temperature.

### AutoStart Feature – Low Battery

Automatically starts up the APU to charge the crane's battery if they are low. This option is always enabled in active mode. The voltage sensitivity of the low battery AutoStart feature can be adjusted up or down depending on where you would like the APU to start up. Please contact RigMaster for the proper instructions on how to adjust this feature.

### Set Automatic Start-Up – Low Battery

Low Battery AutoStart does not require that it be set by the user in the same way as the time/date and temperature based AutoStart features. All that is necessary to ensure that low battery AutoStart functions is to leave the APU engine OFF and the cabin controller powered on (active mode). However, the battery voltage that the AutoStart engages at can be reset or adjusted. The default voltage is 24V +/- 0.2V.

### Version Display

1. Press **MODE** button.
2. Current version of the Power Module software will appear on the screen.
3. Press **MODE** or **SELECT** to return.

## FAULT CODES

The LG200's electronic control will display fault codes on the LCD display if the unit fails to start or shuts down. The following table contains fault codes and information on the cause and/or remedy. These fault codes will display one time only; if the code is cleared from the cabin controller, failure will have to reoccur for the code to be displayed again.

CODE	REMEDY/CAUSE	REMEDY/COMMENT
<b>Error Code 1</b>  <b>Emergency Stop Activated <u>OR</u> Safety Cover Open</b>	The Emergency stop switch is activated on the crane <b>OR</b> Engine cover of APU unit is open. APU will not start or run until the cover is closed.	<ul style="list-style-type: none"> <li>• Reset Emergency stop switch.</li> <li>• Cover not seated.</li> <li>• Damaged wiring.</li> <li>• Failed cover switch.</li> <li>• Switch out of adjustment.</li> </ul>
<b>Error Code 2</b>  <b>Low Oil Pressure</b>	Low oil pressure.	<ul style="list-style-type: none"> <li>• Low oil level.</li> <li>• Wiring damaged.</li> <li>• Faulty switch.</li> <li>• Dirty oil filter.</li> </ul>
<b>Error Code 3</b>  <b>Battery Low Voltage</b>	Low battery voltage. Start the system immediately to charge batteries.	<ul style="list-style-type: none"> <li>• Damaged or broken battery cables; failed battery.</li> <li>• Excessive load on batteries.</li> <li>• Faulty charging system.</li> </ul>
<b>Error Code 4</b>  <b>Engine Run Failure</b>	Engine may have started but didn't run properly. "AutoStart" is disengaged; attempt manual starting with START button.	<ul style="list-style-type: none"> <li>• Speed sensor adjustment (set air gap at 0.015"). Damaged speed sensor wiring.</li> <li>• Failed speed sensor.</li> </ul>
<b>Error Code 5</b>  <b>Low Coolant / Engine Overheated</b>	Engine will not run until temperature becomes normal <b>OR</b> coolant level is at full in surge tank.	<ul style="list-style-type: none"> <li>• Low coolant or failed coolant level switch.</li> <li>• High engine temperature or failed engine temperature sensor (top of water pump, has single wire).</li> <li>• Damaged wire providing ground.</li> </ul>
<b>Error Code 6</b>  <b>Module Failure</b>	Power Module is not responding.	<ul style="list-style-type: none"> <li>• Failed power module.</li> </ul>

CODE	REMEDY/CAUSE	REMEDY/COMMENT
<b>Error Code 7</b> <b>Engine Start Failure</b>	Engine did not start. "AutoStart" is disabled until operator presses <i>Select</i> button.	<ul style="list-style-type: none"> <li>• Bad glow plugs or relay.</li> <li>• Bad starter relay.</li> <li>• Failed glow plug.</li> <li>• Possible speed sensor issue.</li> </ul>
<b>Error Code 8</b> <b>No Communication Error</b>	No communication between control panel and power module. Re-establish communication.	<ul style="list-style-type: none"> <li>• "Cat5e" communication cable possibly damaged (commonly available).</li> <li>• Poor connection at terminal; try plugging in a few times.</li> </ul>
<b>Error Code 9</b> <b>Main Engine Running</b>	APU will not run if the Truck's main engine is already running. This feature is "optional".	<ul style="list-style-type: none"> <li>• If a "switched 12 volt DC wire" is connected to the J4, Pin #4 (red) wire at the power module, the APU will not run. This is "optional".</li> </ul>
<b>Error Code 10</b> <b>Run Timeout</b>	APU shuts down at three (3) hours of running when the "AutoStart" Time/Day Setting is used.	<ul style="list-style-type: none"> <li>• Engine will only run for three (3) hours when set on AutoStart Time/Day.</li> </ul>
<b>Error Code 11</b> <b>Check Power Module Fuse</b>	Very low battery voltage detected at the power module.	<ul style="list-style-type: none"> <li>• Check 20 Amp. fuse and J1 connector at the power module (located on the HVAC unit under the front cover)</li> </ul>
<b>Error Code 12</b> <b>Battery Charging Failure</b>	Battery voltage still low two (2) minutes after cranking. Auto and manual starts can occur.	<ul style="list-style-type: none"> <li>• Faulty charging system; failed batteries; poor connection.</li> <li>• Engine harness ground wires disconnected at the HVAC unit.</li> </ul>
<b>Error Code 13</b> <b>Battery Discharge</b>	Alarm system will enter low power mode. No starting options given.	<ul style="list-style-type: none"> <li>• Failed batteries or connection.</li> <li>• Possible poor connection at power module.</li> </ul>
<b>Error Code 14</b> <b>Check External Temperature Sensor</b>	External temp. sensor may not be connected to the power module.	<ul style="list-style-type: none"> <li>• External temperature sensor disconnected or failed.</li> <li>• Connection loose or damaged.</li> </ul>

CODE	REMEDY/CAUSE	REMEDY/COMMENT
<b>Error Code 15</b> <b>External Temp Disable Limit</b>	Engine shut down due to external temperature outside the programmed range.	<ul style="list-style-type: none"> <li>The APU has been programmed not to start when the external temperature is outside a preprogrammed range.</li> </ul>
<b>Error Code 16</b> <b>Module Reset – Set Clock</b>	Power to the cabin controller has been lost.	<ul style="list-style-type: none"> <li>Reset clock.</li> </ul>
<b>Error Code 17</b> <b>Service Exhaust Filter</b> [this code is not used for this model]	This code is only used on selected APU models. If this code appears, power down and power back up.	<ul style="list-style-type: none"> <li>Unplug the J1 connector at the power module for 1min. then re-connect.</li> </ul>
<b>Error Code 18</b> <b>Replace Exhaust Filter</b> [this code is not used for this model]	This code is only used on selected APU models. If this code appears, power down and power back up.	<ul style="list-style-type: none"> <li>Unplug the J1 connector at the power module for 1min. then re-connect.</li> </ul>
<b>Error Code 19</b> <b>Please Register Unit</b>	Unit will run for four (4) hours after installation. Registration code must be entered into the cabin controller display keypad.	<ul style="list-style-type: none"> <li>To obtain registration code, please call installing dealer or RigMaster Power Int. (1-800-249-6222) with the serial # of your unit. There is no charge for this service.</li> </ul>
<b>Error Code 20</b> <b>Water Valve Overcurrent</b>	Electronic coolant control valve drawing excess amperage.	<ul style="list-style-type: none"> <li>Unplug J2 connector, turn POWER ON again. Code should not display when J2 is unplugged.</li> </ul>
<b>Error Code 21</b> <b>GP Overcurrent</b>	Glow plug relay drawing excess amperage.	<ul style="list-style-type: none"> <li>Glow plug relay operation is faulty or wire broken.</li> </ul>

CODE	REMEDY/CAUSE	REMEDY/COMMENT
<b>Error Code 22</b> <b>Run or GP Overcurrent</b>	Run solenoid or glow plug relay drawing excess amperage.	<ul style="list-style-type: none"> <li>Unplug run solenoid; power with jumper wire; attempt again. If code returns, glow plug relay problem.</li> </ul>
<b>Error Code 23</b> <b>Run Overcurrent</b>	Run solenoid is drawing excess amperage.	<ul style="list-style-type: none"> <li>Unplug run solenoid; power with jumper wire; attempt again; measure Amps. If code returns, broken wire.</li> </ul>
<b>Error Code 24</b> <b>Start or Run Overcurrent</b>	Starter relay or run solenoid drawing excess current.	<ul style="list-style-type: none"> <li>Unplug run solenoid; power with jumper wire; attempt again. If code returns, starter relay problem.</li> </ul>
<b>Error Code 25</b> <b>AC or Run Overcurrent</b>	A/C clutch or run solenoid drawing excess current.	<ul style="list-style-type: none"> <li>Unplug run solenoid; power with jumper wire; attempt again. If code returns, A/C clutch problem.</li> </ul>
<b>Error Code 26</b> <b>BH Overcurrent</b>	Phantom Code – block heater is not operated by power module output. (no output on J1 Pin #7).	<ul style="list-style-type: none"> <li>May indicate damage to power module circuit board. Possible solution: Unplug J1 connector for 30 seconds.</li> </ul>
<b>Error Code 27</b> <b>Power down to clear overcurrent</b>	Power must be turned off with the power button then turned back on.	<ul style="list-style-type: none"> <li>This message appears if engine start is attempted without turning POWER OFF. Turn power OFF then ON.</li> </ul>
<b>Error Code 28</b> <b>Output Overcurrent</b>	A power module output circuit sees a rise in amperage while trying to activate an electronic component. Output circuit shuts off to protect itself.	<ul style="list-style-type: none"> <li>Similar to a circuit breaker function; caused by a stuck or failed relay, solenoid or servo. Power OFF with controller for a minute and function will return. Test each power module output circuit for amperage draw.</li> </ul>

## Fuel System

FUEL	SPECIFICATIONS
Fuel Type	Ultra Low Sulfur Diesel (ULSD)
Biodiesel	Tier 4 engines – 20% R.M.E.

### WARNING!

Do **not** use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury and will render the warranty null and void.

The RigMaster incorporates a low/high pressure fuel system with fuel supply and return lines interconnected with the vehicle's fuel system. The engine lift pump supplies fuel to the filter assembly and then to the injection pump. The APU's fuel supply line has a check valve that is installed to not allow the APU to lose fuel prime when main engine is running.

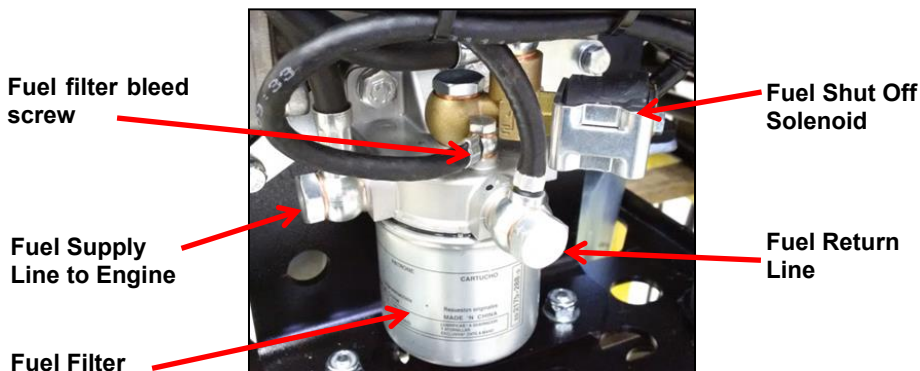
### NOTE

This type of fuel system will de-aerate itself. The system does not need to be bled, in normal conditions. There is an air bleed screw located on the top of the fuel filter assembly that can be used when doing maintenance. (see Figure 11 for location).

## Replacing the Fuel Filter

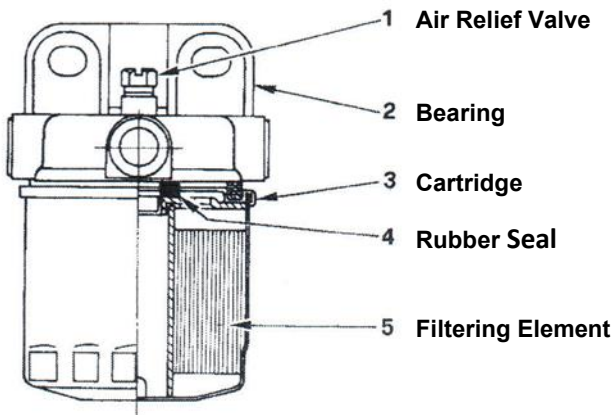
If proper procedures are followed during filter service, a minimal amount of air bleeding is required after changing the filter.

Figure 11 – Fuel System



**Fuel Filter Replacement Procedure**

1. Shut unit off and ensure unit will not start up automatically.
2. Remove the fuel old filter on unit.
3. Remove and replace the rubber seal installed inside the fuel filter housing.
4. If possible, fill the new fuel filter with clean diesel fuel to ensure the least amount of air allowed to enter the fuel system.
5. Re-install fuel filter.
6. Tighten filter.

**Figure 12 – Fuel Filter**

## Fuel System Bleeding Procedure

**TOOLS REQUIRED**

10mm Wrench  
Oil Filter Wrench

**NOTE**

The low-pressure fuel system will de-aerate itself. The system does not need to be bled, in normal conditions. Running the engine will remove any air that could still be in the fuel system, but the fuel filter housing does have a bleeder valve if too much air is contained within the system.

1. Position a container or shop wipe under the fuel filter to contain any spilled fuel.
2. Using a 10mm wrench loosen the Air Relief Valve (See Figure 12, Location 1).
3. Prime the system using the manual lift pump lever located on the lift pump (see Figure 13).

**WARNING!**

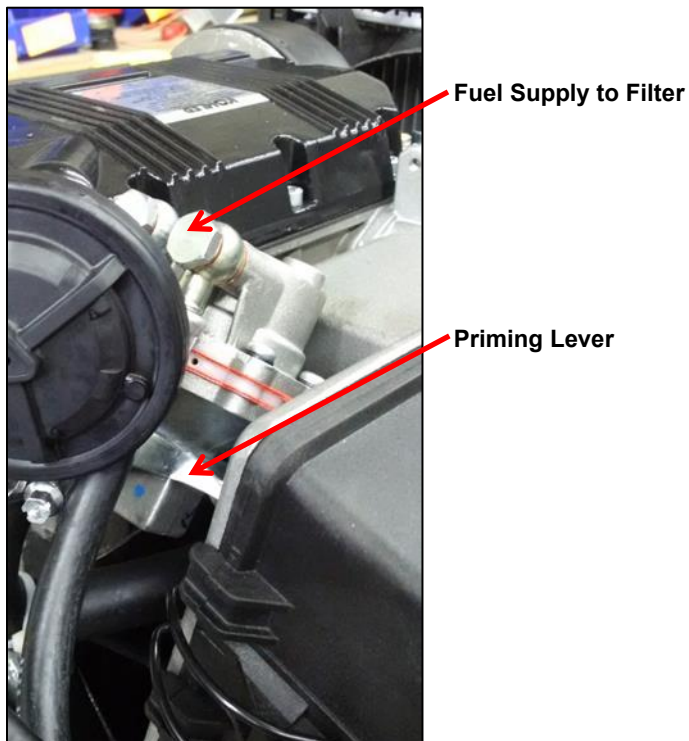
Do **not** use the priming lever when the engine is cranking or running. Only use priming lever when engine is off.

Since the pump is mechanical and has a diaphragm, it may be necessary to manually turn the engine by hand so that the engine camshaft allows full stroke on the lift pump.

4. Continue to pump the lever until the air relief valve shows signs of fuel passing out of the bleed screw.
5. Tighten the air relief valve bolt.
6. Bleeding low pressure system is complete.



Figure 13 – Lift Pump

**WARNING!**

Do **not** use the priming lever when the engine is cranking or running. Only use priming lever when engine is off.

### Use of Biodiesel Fuel

Fuels containing less than 20% methyl ester or B20, are suitable for use in this engine. Biodiesel fuels meeting the specification of BQ-9000, EN 14214 or equivalent are recommended. Additionally:

- No mixture above the listed percentage for the Tier 4 engine is acceptable, as this can result in filter blocking.
- Fuel storage must be to recommended standards, to avoid the absorption of water, and degradation. In any event, storage should not exceed twelve (12) months. Fuel degradation, if allowed to occur, can result in the corrosion of metallic components, and the premature failure of seals.
- RME is a powerful solvent. Damage may occur if it comes into contact with paint.

<b>CAUTION</b>
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DO NOT use vegetable oil as a biofuel for this engine.
--

No legal liability can be accepted for failure attributable to operating products with fuels for which the products were not designed, and no warranties or representations are made as to the possible effects of running these products with such fuels. Non-compliance of the fuel to agreed standards, whether being evident by appearance of the known degradation products of these fuels, or their effects within the fuel injection equipment, will render the manufacturer's guarantee null and void.

If you require further information, please contact RigMaster Power.

## Preventative Maintenance

### The first oil change must be performed at 50 hours

of service and then at 1000-hour intervals thereafter. Please read the following chart for detailed information. The maintenance schedules are for **Normal** conditions and the specific hour intervals must be adhered to in order to maintain the manufacturers' warranties. For **SEVERE** conditions perform the scheduled maintenance sooner.

SCHEDULED INTERVALS IN HOURS				MAINTENANCE ITEMS
50	250	500	1000	
X	X	X	X	Check coolant level.
X				Check oil level ( <b>every 50 hours</b> ).
X				First Engine Oil and filter Change.
X	X	X	X	Check APU for leaks/damage; repair if found.
	X			Inspect Fan Belt Condition/Adjustment.
	X			Inspect Serpentine Belt for wear.
X	X	X	X	Check all Fasteners for tightness.
		X		Valve Clearance Inspection. Intake and Exhaust valve clearance are both 0.0078".
		X	X	Vibration Mounts – pry up on the engine mount plates, there should be less than 1" of upward movement.
			X	Change Engine Oil and Filter. <sup>1</sup>
		X	X	Check HVAC unit filter; clean if necessary.
		X	X	Clean engine compartment, condenser, and radiator. Use compressed air or liquid degreaser.
		X		Check engine air filter; change if necessary.
			X	Change fuel filter and rubber sealing ring.
	X	X	X	Check fan belt; change if necessary. <sup>2</sup>
			X	Check serpentine belt; change if necessary.
			X	Check coolant concentration; renew if necessary.
*** 4000 Hrs. - Timing Belt Replacement ***				

#### NOTE

The use of conditioner may extend the service life of belts; consult the belt manufacturer for more information on the maintenance belt.

<sup>1</sup> Recommended Lubricant for Fuel with Low Sulfur Content: API CJ4  
(Regions in which diesel normally has a low sulfur content: Europe, North America, and Australia).

<sup>2</sup> The use of conditioner may extend the service life of belts; consult the belt manufacturer for more information on belt maintenance.



## Oil Change

### TOOLS REQUIRED

$\frac{3}{8}$ " Ratchet

22mm Socket Wrench

$\frac{7}{16}$ " Socket Wrench

OIL	S.A.E./(S.I.)
Volume	5 Liters / 5.3 US Quarts
Type	API CJ4 Oil
Viscosity	Variable: See Figure 14

### NOTE

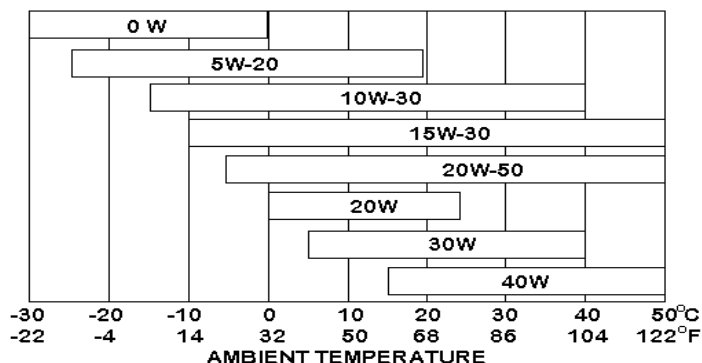
Recommended Lubricant for Fuel with Low Sulfur Content: API CJ4  
(Regions in which diesel normally has a low sulfur content:  
Europe, North America, and Australia).

### CAUTION

Consult RigMaster Power about the use of synthetic oil in your APU.  
Service intervals for oil and oil filter replacements are 1000 hours.  
Synthetic oil is suitable for use; however, it is recommended that mineral-based oils are used for the break-in period.

## Oil Viscosity vs. Temperature

Figure 14



10W30 and 15W40 are the most commonly used grades of oil.

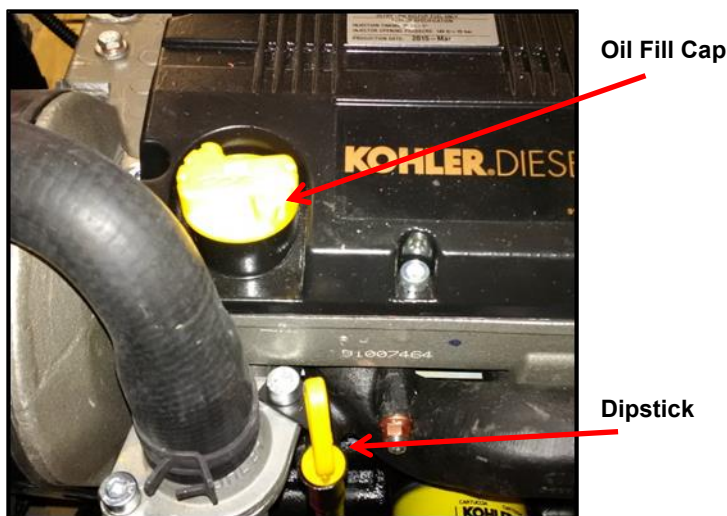
Low viscosity oil must be used in lower temperatures.

## Replacing the Engine Oil and Oil Filter

### CAUTION

It is important to follow the recommendations below when changing or filling the lubricating oil system. This will avoid the possibility of a hydraulic lock within the cylinder(s) from occurring.

**Figure 15 – Oil Fill Cap and Dipstick**



### Oil Filter Replacement Procedure

1. Remove front cover ensuring proper operation of the cover safety switch or disconnect battery prior to this step for your safety.
2. Remove the oil fill cap.
3. Remove the oil dipstick from the dipstick tube and wipe clean.  
DO NOT REPLACE THE DIPSTICK AT THIS TIME.
4. Locate the oil drain valve under the APU [this APU is supplied with a remote oil drain tube]
5. Get a suitable oil container to be placed under the oil drain valve.
6. Remove the oil drain plug from the oil drain valve and open the valve.
7. Remove the oil filter.
8. Install a new oil filter.

9. Allow oil to drain completely from the engine, once complete reinstall oil drain valve plug.
10. Fill the lubricating oil system with the recommended quantity of engine oil through the fill port.

**NOTE**

Make sure engine is stopped, on a level grade and cool so oil has time to drain into the sump. It is very important to use the correct grade of oil for the operating conditions in which the unit will be working. Improper oil grade selection can result in engine damage. Use only type CJ4 engine oil.

11. Replace the oil fill cap.
12. Run the engine until the operating temperature has been reached (approximately 5 minutes).
13. Stop the engine and allow oil to drain down to the oil pan.
14. Check the oil level on the dipstick and add as necessary.

**NOTE**

Replace the oil filter and oil at first 50 hrs. of service then replace the engine oil and filter every 1000 hrs. intervals.

## Replacing the Air Filter

**NOTE**

The air filter should be inspected every 500 hours of operation.

**CAUTION**

This unit accepts ONLY the RigMaster P/N K-001 (Kohler P/N ED0021751640-S) Air Filter. Do not use unapproved cross-referenced parts.

**Figure 17 – Air Filter**



### Procedure to Replace the Air Filter

1. Remove the cover from the air filter.
2. Remove the air filter element and clean the inside of the air cover. Allow the air cover to dry completely.
3. Replace air filter element. (Use only manufacturer-approved filters).
4. Reinstall the air filter cover and latches.

**NOTE**

Before test running the engine inspect the filter hoses for cracks or brittle sections. Damaged or deteriorating hoses should be replaced.

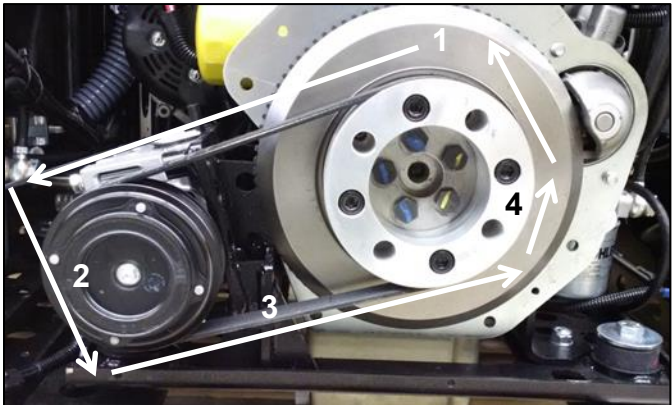


Serpentine Drive Belt

RigMaster LG200-24K is equipped with a serpentine drive belt that drives the air conditioning compressor from the flywheel of the engine.

Belt rotation is Counter-clockwise.

Figure 18 – Serpentine “Stretch-Fit” Compressor Belt



#	COMPONENT	PART #
1	Flywheel	ED0098816150-S
2	Compressor (includes pulley)	KC9-004
3	Serpentine Belt	LG8-006
4	Flywheel Drive Pulley	KL8-001

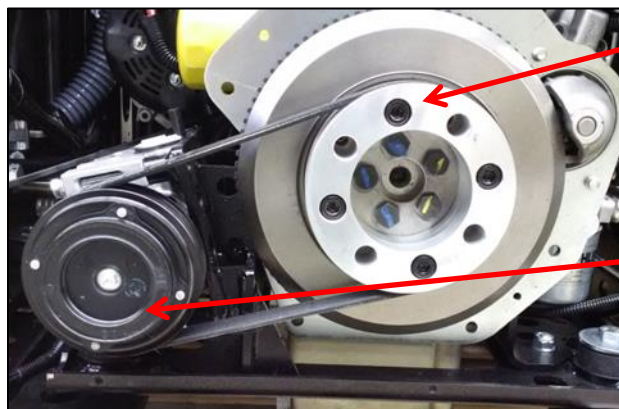
NOTE

The Serpentine belt is a stretch fit belt so there is no need for tension adjustment.

## Procedure to Replace Serpentine Belt

**TOOLS REQUIRED** $\frac{5}{16}$ " Allen Key $\frac{1}{2}$ " Socket Wrench $\frac{7}{16}$ " Socket Wrench

Figure 19 – Pulleys



Flywheel Drive Pulley

A/C Compressor Pulley

**WARNING!**

A diesel engine may start at any time when its crankshaft is turned.  
This includes turning by wrench or hand!

1. Remove front cover ensuring proper operation of the cover safety switch or disconnect battery prior to this step for your safety.
2. Remove belt guard with  $\frac{7}{16}$ " Socket Wrench or 12mm Socket Wrench.
3. Remove belt from the flywheel drive pulley using the shaft of a wrench or screwdriver to help pry the belt over the edge of the pulley.
4. Remove the belt and inspect for wear and cracking. If the belt looks good, clean and re-install the belt.
5. If the belt is worn, install a new serpentine belt onto the A/C compressor pulley, then over the flywheel pulley.
6. Rotate the engine with a ratchet wrench and socket wrench to ensure that the belt is properly positioned on all pulleys before starting the engine. **DO NOT USE YOUR HANDS OR A "J-BAR"!**
7. Reinstall the belt guard.

**NOTE**

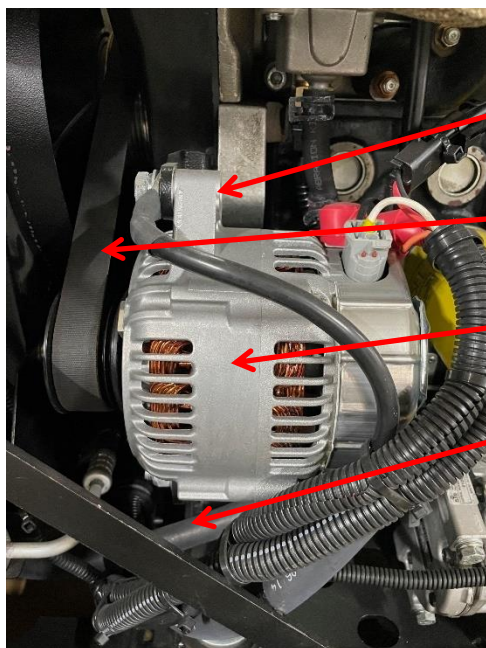
The serpentine belt requires NO adjustments. The A/C compressor is in a fixed location so there is no need for adjustment brackets.

## Fan and Alternator Belt

**WARNING!**

**A DIESEL ENGINE MAY START AT ANY TIME WHEN ITS CRANKSHAFT IS TURNED. THIS INCLUDES TURNING BY WRENCH OR BY HAND!**

Figure 20 – Alternator



Alternator top Lock Bolt

Fan / Alternator Belt

Alternator

Alternator bottom Lock Bolt

**TOOLS REQUIRED**

$\frac{1}{2}$ " Wrench or Ratchet

$\frac{5}{16}$ " Allen Key or Socket Wrench

17mm Socket Wrench

**NOTE**

The serpentine belt requires NO adjustments. The alternator is in a fixed location so there is no need for adjustments

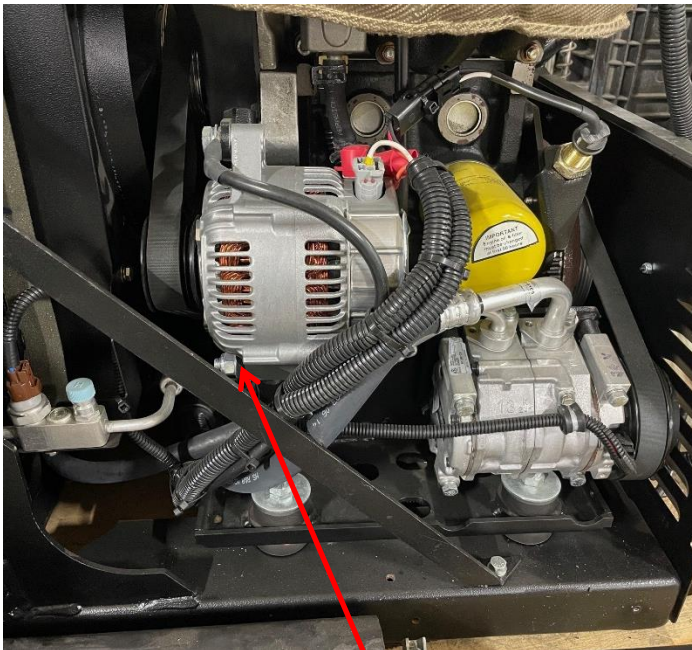
### Procedure to Replace the Fan Belt

1. Disconnect battery prior to this step for your safety.
2. Remove the top alternator lock bolt and loosen the bottom lock bolt.
3. Remove the belt and inspect for wear and cracking. If the belt looks good, clean and re-install the belt. If the belt is worn, install a new serpentine belt.

4. Install the belt over the pulleys, using a pry bar, adjust the top of the alternator so the top locking bolt can be installed.
5. Tighten top and bottom alternator locking bolts to 37 ft/lbs. each.
6. Rotate the engine with a ratchet wrench and socket wrench to ensure that the belt is properly positioned on all pulleys before starting the engine.

**NOTE**

If space allows. The side panel of the APU can be removed to gain better access to the bottom alternator locking bolt



**Alternator bottom Lock Bolt and nut**

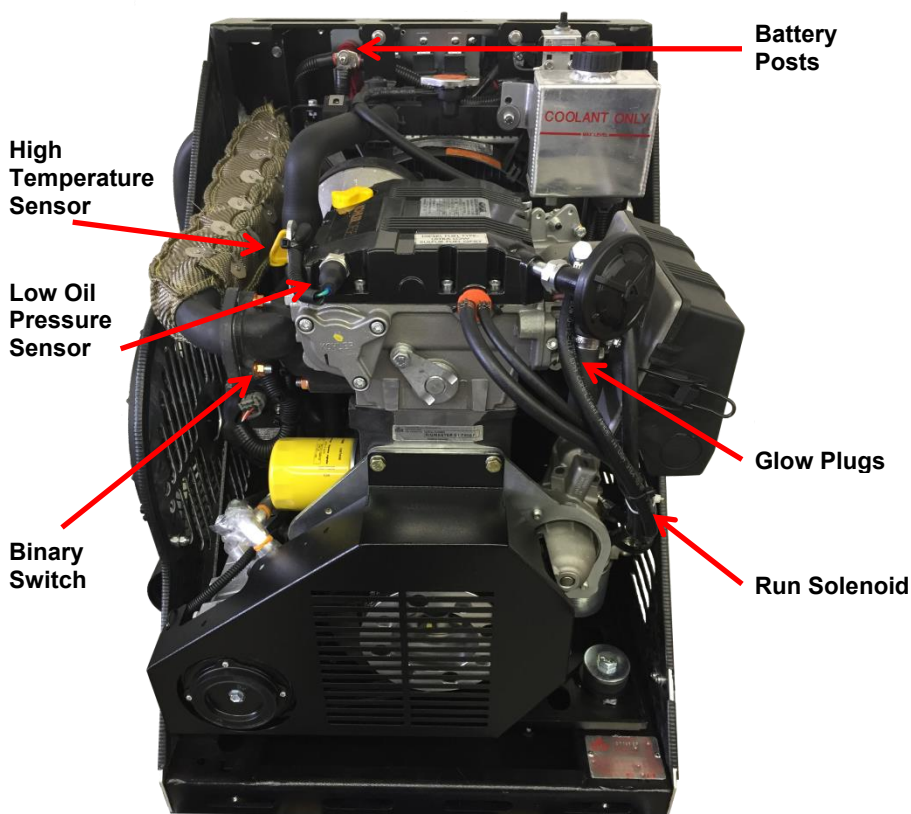
## Cleaning Instructions

The RigMaster Auxiliary Power Unit should be periodically inspected and any accumulation of contaminants (such as: paper; plastic; dirt; oil; etc.) must be removed. The main components, as outlined below, must be kept clean and free of contaminants and/or debris.

### NOTE

The following parts are not shown in the picture, but make sure that the wire to the starter solenoid & the positive post on the alternator & starter is sprayed with battery spray. Apply dielectric grease to the low oil sensor, high temperature sensor & the binary switch. For all other connections, use a silicon-based spray product. **Make sure the boots are installed back on to the sensors.**

Figure 21 – Main Unit



## Main Unit General Cleaning

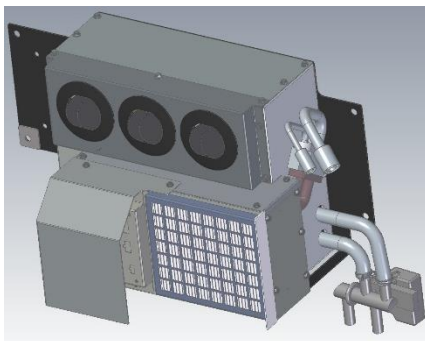
1. Wash the exterior of the main unit making sure that all louvered areas are clear (this is especially important so that air may easily enter and exit the APU).
2. Remove the front cover and gently wash the interior of the APU being careful to keep sprayer 2 feet (24 inches) from any component.
3. Before replacing the front cover you will have to spray all electrical connections & sensors to prevent the connections & sensors from corroding. Make sure the engine compartment is dry first. Using battery sealant, spray the positive & negative post, glow plugs, and run solenoid. (See Figure 21 for areas to spray with battery sealant).

## Cabin Air Filter Replacement

### NOTE

The HVAC unit has been designed with a replaceable cabin air filter. The filter should be inspected every 1000 hours of operation.

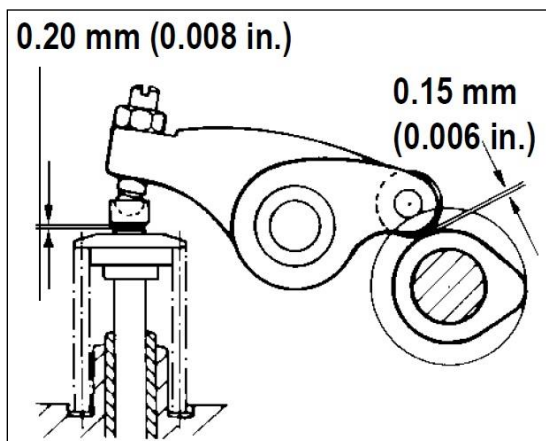
1. Pull old filter out of HVAC unit
2. Slightly bend filter to completely remove from unit.
3. Reinsert with new filter.



\*\* Replacement cabin air filter P/N-ME9-020

## Valve Clearance Inspection

Figure 24 – Valve Clearance



Valve clearance adjustment values are the same for both the intake and the exhaust.

### NOTE

Valve clearance measurements are affected by temperature; therefore, only inspect or adjust at Room Temperature.

All maintenance should be performed on a cool engine.

Perform every 500 hours.

## Troubleshooting

Technical Support is available by calling (800) 249-6222  
(Monday to Friday from 8:00 a.m. to 5:00 p.m. Eastern Standard Time)

Technical Support can also be accessed via the internet at  
[www.rigmasterpower.com](http://www.rigmasterpower.com)  
(click: Customer Support, Support Materials, Technical Support)

## Troubleshooting – Engine Systems

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Engine does not Crank</b>	<ol style="list-style-type: none"> <li>1. Low battery voltage.</li> <li>2. Battery connections loose.</li> <li>3. Starter relay problem.</li> <li>4. Broken engine ground strap.</li> <li>5. Starter motor faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check batteries.</li> <li>2. Tighten connections.</li> <li>3. Check for power at relay during starting sequence.</li> <li>4. Replace strap.</li> <li>5. Check for power at starter solenoid.</li> </ol>
<b>Engine Cranks but does not Start</b>	<ol style="list-style-type: none"> <li>1. Clogged air filter.</li> <li>2. Clogged fuel filter.</li> <li>3. Run solenoid not operating.</li> <li>4. Glow plug or glow plug relay.</li> <li>5. Lift pump faulty.</li> <li>6. Governor Assembly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace air filter.</li> <li>2. Replace fuel filter.</li> <li>3. Check 12V at run solenoid.</li> <li>4. Check for power at the glow plugs and relay.</li> <li>5. See fuel system section.</li> <li>6. See Kohler Service Manual.</li> </ol>
<b>Engine Hard to Start</b>	<ol style="list-style-type: none"> <li>1. Air filter clogged.</li> <li>2. Fuel.</li> <li>3. Glow plugs.</li> <li>4. Injectors clogged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace air filter.</li> <li>2. See fuel system section.</li> <li>3. Check for power at the glow plugs.</li> <li>4. Inspect/service fuel injectors.</li> </ol>



SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Engine Cranks Slowly</b>	<ol style="list-style-type: none"> <li>1. Weak or bad batteries.</li> <li>2. Damaged/corroded battery connections.</li> <li>3. Faulty starter.</li> <li>4. Belt driven component problem.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect batteries.</li> <li>2. Replace or clean the battery connections.</li> <li>3. Check starter connections.</li> <li>4. Compressor or other belt driven component seized.</li> </ol>
<b>Engine Shuts Down</b>	<ol style="list-style-type: none"> <li>1. Clogged air filter.</li> <li>2. Clogged fuel filter.</li> <li>3. Blown fuses.</li> <li>4. Damaged or loose wiring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace air filter.</li> <li>2. Replace fuel filter.</li> <li>3. Replace fuse.</li> <li>4. Inspect condition of wiring and wiring connections.</li> </ol>
<b>Dark Gray/Black Smoke</b>	<ol style="list-style-type: none"> <li>1. Engine over loaded.</li> <li>2. Clogged air filter.</li> </ol>	<ol style="list-style-type: none"> <li>1. Seized belt driven component.</li> <li>2. Check and/or replace air filter.</li> </ol>
<b>Engine Starts and Stalls</b>	<ol style="list-style-type: none"> <li>1. Speed sensor.</li> <li>2. Clogged fuel filter.</li> <li>3. Damaged or loose wiring connections.</li> <li>4. Excessive load on the engine; alternator; or A/C compressor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check speed sensor resistance and gap.</li> <li>2. Replace fuel filter.</li> <li>3. Inspect wiring connection and connectors.</li> </ol>
<b>White or Blue Smoke</b>	<ol style="list-style-type: none"> <li>1. Engine oil too full.</li> <li>2. Coolant in combustion chamber.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect &amp; correct oil level.</li> <li>2. Possible failed head gasket.</li> </ol>

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Engine Runs Rough</b>	<ol style="list-style-type: none"> <li>1. Air filter clogged.</li> <li>2. Fuel filter clogged.</li> <li>3. Fuel leak.</li> <li>4. Worn/clogged fuel injectors.</li> <li>5. Engine in poor condition.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check air filter assembly.</li> <li>2. Replace fuel filter.</li> <li>3. Inspect all fuel hoses and clamps.</li> <li>4. Inspect/service injectors.</li> <li>5. Replace/rebuild the engine.</li> </ol>
<b>Loss of Engine Oil</b>	<ol style="list-style-type: none"> <li>1. Oil seals leaking.</li> <li>2. Leaking drain plug.</li> <li>3. Pinched or clogged breather tube.</li> <li>4. Engine worn or in poor condition.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace crankshaft seals.</li> <li>2. Replace oil pan plug gasket.</li> <li>3. Repair or replace breather tube.</li> <li>4. Replace and/or rebuild the engine.</li> </ol>

## Troubleshooting – Charging System

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Batteries not Charging</b>	<ol style="list-style-type: none"> <li>1. Loose or broken belt.</li> <li>2. Damaged or loose battery connection.</li> <li>3. Poor battery condition.</li> <li>4. Faulty alternator.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten or replace belt.</li> <li>2. Inspect and/or replace battery connections.</li> <li>3. Test batteries.</li> <li>4. Check voltage at alternator field coil wire and truck batteries.</li> </ol>
<b>Batteries Overcharging</b>	<ol style="list-style-type: none"> <li>1. Faulty alternator.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check alternator output.</li> </ol>

## Troubleshooting – Fuel System

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Fuel Odor or Leak</b>	<ol style="list-style-type: none"> <li>1. Loose fuel fittings.</li> <li>2. Damaged fuel line.</li> <li>3. Damaged fuel filter.</li> <li>4. Fuel lift pump leak.</li> </ol>	<ol style="list-style-type: none"> <li>1. Tighten clamps.</li> <li>2. Replace fuel hose.</li> <li>3. Replace fuel filter assembly.</li> <li>4. Replace lift pump.</li> </ol>
<b>No Start Condition (fuel getting to cylinders)</b>	<ol style="list-style-type: none"> <li>1. Dirty fuel.</li> <li>2. Clogged fuel filter.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean fuel system.</li> <li>2. Replace fuel filter. (15% bio-diesel only)</li> </ol>
<b>Air in Fuel System</b>	<ol style="list-style-type: none"> <li>1. Worn or crack in fuel line.</li> <li>2. Lose hose clamps.</li> <li>3. If pick-up tube was installed in tank, may draw air if fuel too low.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace fuel line.</li> <li>2. Tighten clamps.</li> <li>3. Add fuel to tank so pick-up tube is submerged.</li> </ol>

## Troubleshooting – Cooling System

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Engine Overheating</b>	<ol style="list-style-type: none"> <li>1. Coolant level low.</li> <li>2. Engine fan belts loose.</li> <li>3. Radiator fins blocked.</li> <li>4. Electric fan.</li> <li>5. Electrical fan temperature switch.</li> <li>6. Faulty engine thermostat.</li> <li>7. Engine overloading.</li> </ol>	<ol style="list-style-type: none"> <li>1. Add coolant and leak test system.</li> <li>2. Tighten or replace fan belt.</li> <li>3. Clean radiator fins.</li> <li>4. Replace electric fan.</li> <li>5. Replace switch.</li> <li>6. Replace thermostat.</li> <li>7. Seized belt driven component.</li> </ol>
<b>Engine Overcooling</b>	<ol style="list-style-type: none"> <li>1. Check coolant mixture.</li> <li>2. Faulty engine thermostat.</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace coolant.</li> <li>2. Replace engine thermostat.</li> </ol>
<b>Coolant Loss</b>	<ol style="list-style-type: none"> <li>1. System over-filled.</li> <li>2. External hose leak.</li> <li>3. Internal hose leak.</li> <li>4. Failed head gasket.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check coolant level.</li> <li>2. Check coolant hoses from main unit to the HVAC box.</li> <li>3. Check coolant hoses inside the engine compartment.</li> <li>4. Check/replace head gasket.</li> </ol>

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Poor Circulation</b>	<ol style="list-style-type: none"> <li>1. Water pump not operating properly.</li> <li>2. Cooling system restricted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check water pump and belt tension.</li> <li>2. Check for weak or kinked hoses.</li> </ol>

## Troubleshooting – HVAC System

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Poor Air Flow</b>	<ol style="list-style-type: none"> <li>1. HVAC filter clogged.</li> <li>2. HVAC air intake obstructed.</li> <li>3. Excessive duct hose.</li> <li>4. Poor placement of vent.</li> <li>5. Faulty blower motor.</li> <li>6. Ducted through truck's ventilation system.</li> </ol>	<ol style="list-style-type: none"> <li>1. Clean filter.</li> <li>2. Remove obstruction.</li> <li>3. Reduce the hose length.</li> <li>4. Relocate the vent.</li> <li>5. Replace blower motor.</li> <li>6. See Installation Manual for mounting methods.</li> </ol>
<b>Little or No Hot Air</b>	<ol style="list-style-type: none"> <li>1. Insufficient engine load.</li> <li>2. Low electronic coolant control valve faulty.</li> <li>3. Low coolant or air lock.</li> <li>4. Cooling system blocked.</li> <li>5. Engine overcooling.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check if main engine block heater is plugged in.</li> <li>2. Check water valve operation.</li> <li>3. Bleed system of air and fill.</li> <li>4. Flush cooling system.</li> <li>5. Faulty engine thermostat.</li> </ol>
<b>Little or No Cold Air</b>	<ol style="list-style-type: none"> <li>1. Cabin Controller not set to A/C mode.</li> <li>2. No Output power to Pin #2 on connector J1.</li> <li>3. A/C system leak.</li> <li>4. Condenser/radiator dirty.</li> <li>5. Compressor not working.</li> <li>6. Evaporator core frozen.</li> <li>7. Electric fan not operating.</li> <li>8. Electronic coolant control valve faulty.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set Controller temperature.</li> <li>2. Check for 12V at A/C clutch control output.</li> <li>3. Check system pressures.</li> <li>4. Clean radiator/condenser.</li> <li>5. Check the compressor and fuse.</li> <li>6. Replace thermostatic switch.</li> <li>7. Check fan relay and fuse.</li> <li>8. Replace electronic coolant control valve.</li> </ol>

## Troubleshooting – Serpentine Drive Belt

SYMPTOM	PROBABLE CAUSE	REMEDY/COMMENT
<b>Belt has Premature Wear</b>	<ol style="list-style-type: none"><li>1. Use of incorrect belt.</li><li>2. Damage to pulleys.</li><li>3. Misalignment of pulleys.</li></ol>	<ol style="list-style-type: none"><li>1. Use correct belt.</li><li>2. Replace damaged pulleys.</li><li>3. Realign pulleys.</li></ol>
<b>Belt is Loose and/or comes off repeatedly during Operation</b>	<ol style="list-style-type: none"><li>1. Use of incorrect belt.</li><li>2. Damage to pulleys.</li><li>3. Maladjusted Belt.</li></ol>	<ol style="list-style-type: none"><li>1. Use correct belt.</li><li>2. Replace damaged pulleys.</li><li>3. Replace belt.</li></ol>

For additional diagnostic and troubleshooting information, please visit **[www.rigmasterpower.com](http://www.rigmasterpower.com)** and click on the "Customer Support" heading, "Support Materials" menu option.

## RigMaster Power APU Warranty Policy

### The Limited Warranty

This limited warranty applies to the RigMaster Auxiliary Power Unit (RigMaster APU) which consists of the following components:

1. The generator set.
2. The generator set control panel.
3. The combination heater/air conditioning system.

### Warranty Coverage

Rig Master Power International Ltd. warrants that, under normal service and use, the RigMaster APU will be free from defects in material and workmanship for a term of 12 months/2000 hours or a term of 24 months/4000 hours, depending on the term of the warranty coverage purchased, for the APU components listed, excluding the engine (Refer to the engine warranty coverage section of the policy). The RigMaster APU warranty coverage shall begin from the date of installation or from the time the Owner takes possession of the RigMaster APU if the APU is installed with a new vehicle purchase, whichever comes first, and is subject to all terms and conditions, limitations and provisions of the limited warranty. This limited warranty is governed by the laws of the Province of Ontario, Canada, and any claims or disputes arising out of this limited warranty shall be governed by the laws of the Province of Ontario, Canada.

### Warranty Obligation

During the warranty period, RigMaster Power will replace failed parts only, as deemed defect on the RigMaster APU, which consists of:

1. The electronic controls.
2. The combination heater/air conditioning system components.

Replacement parts will be supplied to an authorized fleet, upon presentation of proof of purchase and determination by RigMaster Power that a component has failed under normal service and use, at NO CHARGE to the Owner, within the established warranty period of 12 months/2000 hours or 24 months/4000 based on the warranty coverage purchased.

### Engine Warranty Coverage

The RigMaster APU comes equipped with a Kohler engine. The engine comes with a 3 yr./2000 hours warranty from the engine manufacturer which covers all engine components excluding alternator and starter. The alternator and starter are warranted for a period of 12 months by the engine manufacturers.

### Disclaimer of Other Warranties

**RIGMASTER POWER, INCLUDING ITS AGENTS AND AUTHORIZED DEALERS, MAKES NO OTHER WARRANTIES AND EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE.** No person, firm or representative is authorized to assume any obligation or make any warranty on behalf of RigMaster Power other than the limited warranty as stated herein.

### Maintenance

The RigMaster Owner's Manual lists all maintenance functions to validate this limited warranty. **PLEASE NOTE THAT FAILED COMPONENTS DUE TO POOR OR IMPROPER MAINTENANCE WILL NOT BE COVERED BY THIS LIMITED WARRANTY.** Where a dispute arises regarding proper maintenance, the manufacturer reserves the right to request proof in the form of receipts for maintenance and any other records of service to establish that proper maintenance has been performed, as per the maintenance schedule.

### Installation

It is the responsibility of the installer and the Owner to ensure that **ALL** RigMaster APU components are in proper working order at the time of installation. The manufacturer is not responsible for failed components that are a result of improper installation. In the event the Owner/Fleet wishes to install the APU themselves, it is the Owner/Fleet's responsibility if unsure of the installation requirements to install the APU to contact RigMaster Power for a copy of the installation manual. RigMaster Power will provide installation instructions free of charge to the Owner/Fleet upon request. To validate your RigMaster warranty, the APU must be inspected and an installation check list submitted to RigMaster Power upon completion of the installation of the APU within 30 days. Once validation of installation is complete the warranty coverage begins from the date of **PURCHASE** and **NOT** the date of certification.

### Warranty Voided or Terminated

Any modifications to the RigMaster without written authorization from the manufacturer will void this limited warranty. Repair, replacement, or maintenance, using other than approved parts, may be cause to terminate this limited warranty, as will use of starting aids such as ether.

### Exclusions For Limited Warranty

The cost of normal maintenance, such as but not limited to, tune-ups, adjustments, and inspections, tightening of clamps, fasteners, hoses, the replacement of belts, fuel, air and oil filters, unless damaged by cause of a warrantable failure, are excluded from this limited warranty.

### **Limitations of Remedies**

The remedy of repair or replacement as set forth herein is the exclusive remedy available to the purchaser or user of the RigMaster. RigMaster Power International Ltd. disclaims and shall not be liable or responsible to the Owner or user of the RigMaster APU or any other person for incidental, consequential, direct, indirect, special or general damages of any kind arising out of or in any way related to the use of the RigMaster APU, including but not limited to, towing charges, accident repairs, road calls, traveling expenses, loss of revenue profits, loss of equipment use or damage to persons or property. No claim of any kind asserted against RigMaster Power International Ltd., whether asserted under legal theories of negligence, strict liability, warranty, or any other common law or statutory basis, shall be greater in amount than the purchase price of the RigMaster APU with respect to which damages are claimed.

### **Indemnity**

The user and Owner of the RigMaster APU agree to indemnify and hold RigMaster Power International Ltd. harmless from any and all claims, expenses, suits or liability of any nature whatsoever asserted against RigMaster Power International Ltd. arising out of or in any way related to negligence on the part of the user or Owner of the Rig Master APU.

### **Warranty Claims**

Failed or defective parts must be inspected and their replacement installed by an authorized RigMaster Dealer. The manufacturer reserves the right to inspect failed or defective parts prior to a decision on any claim under this limited warranty. It is the Owner's responsibility to act promptly in submitting any such claim.

### **Transfer of Warranty**

Where the vehicle with the RigMaster APU has been sold by the first Owner to a second Owner and the RigMaster has not been removed, this limited warranty is transferable from the original Owner to a second Owner with whatever portion of the limited warranty that remains from the date of sale. Where the RigMaster APU has been removed and sold by the first Owner to a second Owner, upon the completion of the re-installation the Owner must submit a new installation check list to RigMaster Power for validation. Once received by RigMaster Power and is validated the remaining portion of this limited warranty can be transferred. Where the original Owner transfers the RigMaster APU to a new vehicle, once the completion of the re-installation of the APU is complete, the Owner must submit a new installation check list to RigMaster Power for validation. Once received by RigMaster Power and is validated the unit will then carry any remaining portion of this limited warranty.



## Warranty Policy

RigMaster Power International Ltd. warrants that under normal service and use, the RigMaster APU will be free from defects in materials and workmanship as stated.

During the warranty period RigMaster Power International Ltd. will provide the exclusive remedy of ensuring the repair or replacement of those **parts** which are demonstrated to be defective in material or workmanship. RigMaster Power International Ltd. will not, under any terms, replace the entire APU as a means of repair.

The purpose of this warranty is to provide the Owner of the RigMaster APU with **free** replacement of defective parts in a manner outlined in the following policy. This remedy does not apply to normal wear and tear of service parts, improper installation, deterioration, modification or economic loss.

## Warranty Qualification

RigMaster Power APU's standard warranty is 12 months/2000 hours from the "in-service" date recorded by the installing Dealer/ Fleet/ Authorized installer. Optional coverage can be purchased within 30 days of the "in-service" date that doubles this warranty to 24 months/4000 hours. These warranties cover all RigMaster parts excluding the engine. If you have questions about your RigMaster warranty or coverage, contact RigMaster Power International Ltd. Please have your RigMaster APU serial number and engine serial number ready.

## Kohler Engine Warranty

The RigMaster's Kohler engine is warranted against manufacturing defects in materials or workmanship for 3 years from date of purchase or 2000 hours of use, whichever occurs first.

The Kohler engine warranty begins at the same time the RigMaster unit is registered as being "in-service" by an authorized RigMaster Power Dealer/ Fleet/ Authorized installer (see "Warranty Registration" below).

RigMaster Power International Ltd. administers the Kohler engine warranty directly. Engine repairs to be covered by warranty may only be performed to correct a defect, as previously mentioned. Warranty does not cover: incorrect installation of the APU or replacement engine or any replacement parts, incorrectly performed repairs or maintenance, misuse, any kind of damage from accident or environmental exposure or corrosion, neglect, or lack of maintenance. The Kohler engine must be maintained as specified by RigMaster and Kohler service manuals. Copies of maintenance records including invoices and parts receipts must be provided by the customer if requested by RigMaster or Kohler during the investigation of a failure, or for the purpose of determining warranty coverage.

Any remedy, component replacement or repair provided for the Kohler engine under warranty by RigMaster or Kohler will have warranty coverage only to the end of what was the original Kohler engine's coverage.

To obtain warranty service for the engine, bring the engine to an authorized Kohler service facility. Visit [www.kohlerengines.com](http://www.kohlerengines.com), and use the locator function, or call 1-800-544-2444.

### Warranty Registration

Note: The "in-service date" is the date that the owner takes possession of the APU, not a later date when the APU installation is inspected if so needed. It is the responsibility of the installing/inspecting Dealer/ Fleet/ Authorized installer or Owner to submit an installation check list to RigMaster Power for validation.

In the event the Owner/ Fleet have installed the RigMaster APU themselves, the Owner/Fleet must fill out an "Installation Checklist" and submit it to RigMaster Power International Ltd. within thirty (30) days of purchase to validate the warranty (printable at <http://www.rigmasterpower.com/support-materials.php>, "Manuals").

The completed form must be submitted to [warranty@rigmasterpower.com](mailto:warranty@rigmasterpower.com)

Failure to submit the "Installation Checklist" to RigMaster Power International Ltd. within thirty (30) days of purchase to validate the warranty shall render the warranty void.

Any warranty claims filed for RigMaster APU's out of warranty shall be rejected by Rig Master Power International Ltd.

### When Failures Occur due to Improper Installation

When a failure occurs due to an improper installation by their installing Dealer/ Fleet/ Authorized installer, it is the Dealer's / Fleet/ Authorized installer responsibility to repair the RigMaster APU and correct the installation error at no cost to the Owner. At no time shall RigMaster Power International Ltd. warrant any repairs to the RigMaster APU due to improper installation by the installing Dealer/ Fleet/ Authorized installer.

When a RigMaster Dealer/ Fleet/ Authorized installer determines a failure to have occurred due to an improper installation from another installing Dealer/ Fleet/ Authorized installer, it is the Dealer's/ Fleet/ Authorized installer responsibility to offer the Owner of the RigMaster APU one of two choices:

1. Have the Owner return to the installing Dealer/ Fleet/ Authorized installer to have the APU repaired by the installing Dealer/ Fleet/ Authorized installer.
2. Where the Owner cannot or is unwilling to return to the installing Dealer/ Fleet/ Authorized installer, perform the repairs at the Owner's expense. It would then be the Owner's responsibility to obtain a refund for work performed from the installing Dealer/ Fleet/ Authorized installer.

If the Dealer/ Fleet/ Authorized installer is in doubt as to whether the repair is warrantable or not, it is the Dealer's/ Fleet/ Authorized installer responsibility to contact RigMaster Power International Ltd. RigMaster Power International Ltd. reserves the right to, and final determination of, whether a repair can be claimed as warranty.

### **Use of Aftermarket Components for Warranty Repairs**

At no time shall a RigMaster Dealer/ Fleet/ Authorized installer use aftermarket parts for warrantable repairs on a Rig Master APU. The use of aftermarket components for warranty repairs is strictly prohibited by RigMaster Power International Ltd. At no time shall a Dealer/ Fleet/ Authorized installer manufacture their own parts, including but not limited to, air conditioning hoses, brackets and fittings.

### **Transfer of Warranty**

It is the Owner's responsibility to notify RigMaster Power International Ltd. of a change of ownership when a RigMaster APU has been sold by the first Owner to a second Owner. The Owner must inform RigMaster Power by means of a written notice with both original Owner's information and new Owner's information so all records can be updated for warranty purposes. When the APU has been removed and sold to a new Owner with the remaining warranty, the Dealer/ Fleet/ Authorized installer must transfer and inspect the APU installation and notify RigMaster Power International Ltd. in writing of the transfer of warranty.

### **Customer Assistance Procedure**

To obtain warranty approval you must contact RigMaster Power International Ltd. within the warranty period.

A reasonable time must be allowed for approval of the defective parts and may require pictures and information about the failure to be sent to RigMaster Power International Ltd. as requested by RigMaster Power International Ltd.

To ensure your complete satisfaction the following procedures must be followed in the event you have a problem:

1. Contact RigMaster Power International Ltd as soon as a failure happens for trouble shooting and technical support. Prior to contacting RigMaster Power International Ltd., please have the following information available:
  - i. Unit serial number
  - ii. Hour meter reading
  - iii. In service (Purchase) date
  - iv. Nature of problem.

If you prefer to submit your matter through mail, please present the entire matter in writing to:

RigMaster Warranty Administration  
946 Warden Ave  
Toronto, Ontario, Canada  
M1L 4C9

Fax: (416) 293-5104

or Email: [rigmastertechsupport@rigmasterpower.com](mailto:rigmastertechsupport@rigmasterpower.com)









**RigMaster Power International Ltd.**

945 Warden Ave  
Toronto, ON, Canada M1L4C9

Tel: 1-416-201-0040

**Toll Free: 1-800-249-6222**

Fax: 1-416-293-5104

[www.rigmasterpower.com](http://www.rigmasterpower.com)

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