THE APU WITH POWER, PERFORMANCE, AND RELIABILITY

GO GREEN APU LLC AUXILIARY POWER UNIT

OWNER's MANUAL

VERSION 1
REV 0

IMPORTANT OWNER INFORMATION

WARRANTY REGISTRATION CARD MUST BE FILLED OUT AND RETURNED TO GO GREEN APU BY INSTALLATION CENTER BEFORE WARRANTY IS VALID. BE SURE CARD IS COMPLETED BEFORE LEAVING CENTER.

YOUR GO GREEN APU SERIAL NUMBER IS:

AK240-

We attempt to make all of our manuals as clear, complete and accurate as possible. If you have any suggestions or corrections, we would welcome them. Please contact us either by phone at (814) 942-9407 or by e-mail to: sales@gogreenapu.com

Thank you – the Go Green APU Team!

Go Green APU LLC • 1052 Mill Run Road• Altoona, PA 16601
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THE APU WITH POWER, PERFORMANCE AND RELIABILITY

GO GREEN APU LLC

COPYRIGHT AND DISCLAIMER

This manual is intended to assist the owner of a Go Green APU.
It is not intended to be a service or installation manual.

Service and installation should only be performed by an Authorized GO GREEN APU Dealer or Service Center.

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GO GREEN APU USER MANUAL

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THE APU WITH POWER, PERFORMANCE AND RELIABILITY

1. OVERVIEW OF THE GO GREEN APU

1.1 The Go Green APU is the highest performing, most reliable APU on the market today with one of the best warranties available. To keep the warranty in force, follow the recommended maintenance procedures and schedules.

1.2 Go Green APU Systems tries to create manuals for its customers and dealers that are easy to read, complete, and accurate. If you have any changes or corrections to suggest, we want to hear from you. Please contact us by phone at 814-942-9407 or by e-mail at: kwyandt@gogreenapu.com

You have just purchased the best APU on the market with the following superior features:

- Best A/C and heating output in the industry
- 1,000 hour oil change interval
- Stand-alone design with no interface to main engine, eliminating truck OEM warranty concerns
- Truck engine failure won't disable APU
- APU failure won't disable the truck
- Smart Power Management
  - APU load balancing between HVAC and electricity generation that directs the power where you need it most
- HVAC temperature control and blower speeds
- Full Instrumentation guards against damage due to:
  - High coolant temperature
  - Low Coolant levels
  - Engine over/under speed
  - Overload
  - Alternator fail to charge
  - Generator and belt failure detection

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2. GO GREEN SPECIFICATIONS

GO GREEN APU

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THE APU WITH POWER, PERFORMANCE AND RELIABILITY

KUBOTA Tier 4 Final - Water Cooled Diesel Engine

Dimensions:	W x H x D 29.5 in (75 cm) 28.5 in (72 cm) 30 in (76 cm)
Engine:	2 Cylinder, Optional 3 Cylinder
Weight:	485 lbs (220 kg) 2 cylinder
Fuel Consumption:	2 Cylinder: 0.25 gal/hr (0.95 l/hr)
AC Power Output:	2 Cylinder 4.0-5.2 kW generator, 3 Cylinder 6.0 kW gen
Electrical Receptacles	2 – 2 cylinder (1 to the block heater)
Operating Temperature Range:	0º F/-32º C to 120º F/50º C
Sound Level:	59.5 dBA with GO GREEN Quiet Comfort Option
DC Power:	45 amps
Heating Main Engine:	120 volt AC to power a Block Heater
Oil Change Interval:	1,000 hours
Environmental:	EPA Tier 4 Final and EU Compliant
Available Options:	GO GREEN Quiet Comfort
	Aluminum Steps
GO GREEN'S Heating, Ventilation and Air Conditioning (HVAC)Unit	
Dimensions:	W x H x D 17 in (43 cm) 10 in (25.4 cm) 18 in (40.6 cm)
Weight:	30 lbs (13.6kg)
Air Conditioning:	26,000 BTU/hr
Heating:	26,000 BTU/hr
Air Flow:	465 cfm
Refrigerant:	R-134A
Warranty:	1 year complete materials and workmanship
	2 years or 2,000 hours – Kubota engine

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3. GO GREEN APU SYSTEMS CONTACT INFORMATION

CUSTOMER SERVICE/WARRANTY

Phone (814) 942-9407
FAX: (814) 942-3354
E-mail: **sales@gogreenapu.com**
www.gogreenapu.com

Hours of Operation: Monday – Friday 8:00 – 5:00
Emergency Hotline: (814) 942-9407 for Technical Support 24/7
Closed Holidays

SALES

PHONE: (814) 942-9407
FAX: (814) 942-3354
E-mail: sales@gogreenapu.com
www.gogreenapu.com

Hours of Operation: Monday-Friday 8:00 – 5:00
Closed Holidays

CORPORATE HEADQUARTERS

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4. SAFETY INFORMATION

California ***Proposition 65*** Warning: Diesel engine exhaust and some of its constituents are known to cause cancer, birth defects and other reproductive harm. Go Green APU LLC encourages all individuals who work with the Go Green APU Auxiliary Power Unit (APU) to:

4.1 Read the Go Green APU User Manual carefully and completely before using the APU. If you have questions on any of the items explained in the manual, please contact us at 814-942-9407 before attempting to use the APU.

4.2 Follow the stated procedures set forth in this Manual.

4.3 Wear protective safety equipment and clothing when working with the APU.

4.4 Do not operate the APU with its cover off, or with any obstructions.

4.5 Always disconnect the main battery cables on the truck before connecting the APU to the truck's interface.

4.6 Allow only qualified and trained personnel to work on the GO GREEN® APU.

4.7 Take appropriate precautions when handling fuel, coolant and oil.

4.8 Do not ingest any such fluids, and avoid contact with skin and eyes.

4.9 Dispose of materials in accordance with all applicable laws.

4.10 Inspect hoses and connections frequently for signs of leakage or damage, since the Go Green APU contains hot oil and coolant under pressure.

4.11 Do not leave children and animals unattended in a truck even with the APU running.

5. WARNING LABELS

5.1 Observe all labeled warnings. Do not remove warning labels.

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6. FLUIDS

6.1 Follow the EPA's instructions for handling and disposing of the engine's coolant and oil.

6.2 Follow the instructions provided by the truck manufacturer regarding handling and disposing of air conditioning refrigerant.

7. ENGINE COOLANT

7.1 The APU uses the same coolant type as the truck. Normally this is low-silicate permanent antifreeze 50% by volume for temperatures down to -32° F/-35.6C. Use 50% clean soft water. Antifreeze should have SAEJ1034 or SAEJ814c Standard.

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8. IMPORTANT INFORMATION FOR OWNERS

8.1 First Oil Change

8.1.1 After 50 hours. **No synthetic oil may be used during the first 50 hours of operation.** CF, CF-4 and CG-4 class oils may be used.

8.2 First Oil Filter Change

8.2.1 After first 50 hours of operation.

8.3 Oil/Filter Change Interval

8.3.1 Change the engine's oil every 1,000 hours, after first 50 hours of operation.

TECH TIP - IMPORTANT - NEVER USE QUICK FILL!

(PNEUMATIC PUMP) Use of quick fill could cause oil to enter combustion chamber and hydraulic lock resulting in damaged engine parts.
DAMAGE CAUSED BY QUICK FILL IS NOT COVERED BY WARRANTY!

8.4 Adding Oil to APU

8.4.1 Unscrew the oil cap, check to see level of oil with dip stick, add as oil as needed.

TECH TIP – CHECKING OIL LEVEL

- Always check oil when "hot" not "cold."
- **IMPORTANT: REMOVE THE DIP STICK BEFORE ADDING OIL**. Removing the dipstick allows the crankcase to breath, allowing the oil to drain down to the crankcase from the valve cover.

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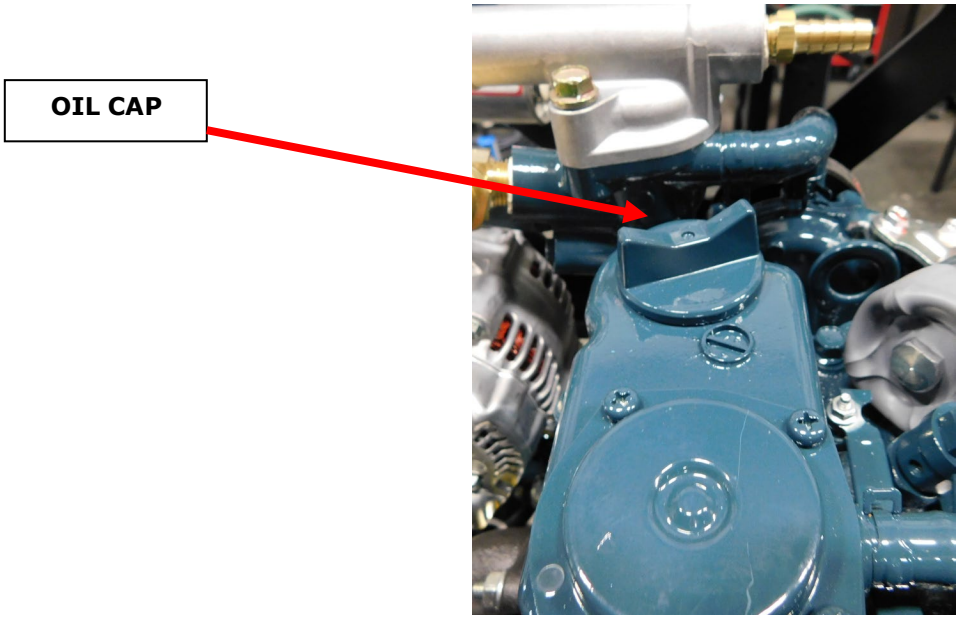

OIL CAP

CAUTION!

DO NOT OVERFILL THE ENGINE.

IF ENGINE IS OVERFILLED IT WILL SMOKE!

ENGINE OIL PAN CAPACITY		
ENGINE TYPE	**CYLINDER**	**GALLONS**
Kubota Z602-E4	2	0.66 Gal 2.5 L
Kubota D902E-1	3	0.98 Gal 3.7 L

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8.5 Changing the APU's Oil

8.5.1 The APU's oil can be changed by removing the APU's bottom panel.

8.5.2 Be sure to inspect all components every 1,000 hours.

8.5.3 IMPORTANT: The APU should never be operated without its bottom panel.

8.6 Preventive Maintenance Kit

Go Green APU Systems has a Preventive Maintenance Kit available for purchase. The Kit can be ordered by calling Customer Service at: (814) 942-9407.

PREVENTIVE MAINTENANCE KIT

- **2 - Kubota Fuel Filters – 209-0007K (36682)**
- **1 - Alternator Belt #3360 (Part of Engine) 209-0011K (RECMF-1350)**
- **1 - Air Filter (Main Element) 109-0006 (CH04-14412-LC**
- **1 – KUBOTA Oil Filter – 209-0009K (15426-32430)**
- **1 – Belt, Driver, Poly V, 8 Grove – 104-0016 (8PK1450)**

8.7 Service and Maintenance Records

It is important to keep all service and maintenance records and receipts for use in warranty-related claims. Failure to produce service records when asked in a warranty claim situation could result in the claim being denied.

TECH TIP – APU BOTTOM PANEL

- The Go Green APU must always be operated with its bottom panel on.
- Operating the APU without its bottom can void the APU's warranty.

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9. GO GREEN APU SYSTEMS WARRANTY PROGRAM

Subject to all terms and conditions contained herein, Go Green APU, LLC (Go Green APU) warrants to the original buyer that under normal service and use the Go Green APU will be free from defects in material and workmanship for **one (1) year of operation,** from the date of original installation on a truck by Go Green APU or an authorized INSTALLATION/SERVICE CENTER (CENTER).

The Kubota standard engine limited warranty period runs for a period of **twenty-four (24) months or two-thousand (2000) engine operation hours**, whichever occurs first. A Kubota Engine extended limited warranty of **thirty-six (36) months or three thousand (3000) engine operating hours**, whichever occurs first, is provided for these specific parts only:

MAJOR COMPONENTS COVERED UNDER WARRANTY

- Cylinder Block
- Cylinder Head
- Crankshaft Forging
- Connecting Rods
- Flywheel
- Flywheel Housing
- Camshaft
- Timing Gears and Gear Case

The Warranty Period for both the Kubota standard engine limited warranty and the Kubota engine extended limited warranty (by duration or operation hours) begins on the date of delivery to the original retail purchaser and is valid only until the applicable warranted duration has passed or the operation hours are exceeded, whichever comes first.

For complete details of the Kubota engine limited warranty, please refer to the *Kubota Engine Operations* manual.

Go Green APU will repair or replace, at its sole discretion, any part covered by this warranty that becomes defective, malfunctions or otherwise fails to conform to this warranty under normal use and during the term of this warranty, at no charge for parts or labor. Repair or replacement will be performed at any SERVICE CENTER approved by Go Green APU, upon presentation of proof of purchase and determination by Go Green APU that a component is defective or has failed under normal service and use. Repair and replacement of components under this warranty shall not extend the warranty period for the APU or for a component of the APU.

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DISCLAIMER OF OTHER WARRANTIES

Go Green APU, INCLUDING ITS AGENTS AND AUTHORIZED INSTALLATION/SERVICE CENTERS, MAKES NO OTHER WARRANTIES, AND EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ALL WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No person, firm or representative is authorized to assume any obligation or make any warranty on behalf of Go Green APU other than the limited warranty as stated here.

MAINTENANCE

The Go Green APU Owner's Manual lists all maintenance functions required to validate this limited warranty. **PLEASE NOTE THAT COMPONENTS, WHICH FAIL DUE TO POOR OR IMPROPER MAINTENANCE, WILL NOT BE COVERED BY THIS LIMITED WARRANTY.** As a condition of this warranty, Go Green APU reserves the right to request proofs; in the form of receipts for maintenance and any other records, that service on the APU has been carried out as per the maintenance list in the User's Manual.

INSTALLATION

In order to validate the APU warranty, an Authorized Go Green Installation/Service Center must install the unit. Go Green APU does not warrant the installation and is not responsible for components that fail or any other damage that occurs as a result of improper installation.

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WARRANTY EXCEPTIONS

This limited warranty does not apply to:

1. Defects, malfunctions or failures resulting from installation, accidents, abuse, improper servicing, contamination, road hazards, or failure to perform required service.
2. Normal maintenance services or parts associated with such services, including but not limited to filters, filter elements, oils, lubricants, coolant, refrigerant, belts, fuses, and glow plugs.
3. Non-approved parts, this includes aftermarket parts.
4. Used parts.
5. Any damage caused by overheating the APU that is not a direct result of a defect in APU materials or workmanship.
6. Damage caused to the host truck, whether or not such damage is related in any way to the presence of the APU on the truck.
7. Time spent on the removal of things such as fairings, skirting and bunks for any repair.
8. Defects, malfunctions or failures resulting from any modification or alteration that is performed without authorization from Go Green APU will void all GO GREEN Warranties and possibly all Kubota Warranties. This includes any and all engine speed or timing adjustments.
9. Shop, Miscellaneous supplies and/or Environmental Fees are not covered under this limited warranty.
10. Defects, malfunctions or failures as a result of the Bottom Panel not being installed on the APU will not be covered under this limited warranty.

Please note that only parts and labor listed on the Go Green APU Authorized Warranty Claim will be paid.

WARRANTY CLAIMS

In order to obtain authorization for warranty repairs, the owner will need to provide verification of proof of purchase with the APU serial number to Go Green APU.

An Authorized Go Green APU Center will provide warranty repairs on any APU regardless of where it was installed. The Center handling the warranty repair must call Go Green APU for authorization prior to the start of any and all warranty work. The Center must provide Go Green APU with the serial number and the hours on the APU in order to receive authorization for any repair work. Go Green APU will provide the Center with an Authorized Warranty Claim Form which will include the authorized number of labor hours, any parts authorized for the warranty repair and a Warranty Claim Number that is only active for thirty (30) days after issuance. The Authorized Warranty Claim Form does not guarantee payment of the Warranty Claim. All payment is contingent upon the test results of the defective part. If the defective part is found to be functional the claim will be denied in its entirety.

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CLAIM REIMBURSEMENT

Labor rate recovery is based on the Installation/Service Center's standard service rate, which must be published and verifiable, multiplied by the Go Green APU authorized number of labor hours. Labor hour recovery is based on Go Green APU's published standards only.

Installation/Service Center will invoice Go Green APU for the Go Green APU Dealer Pricing List cost of replacement part(s) plus 20% for part(s) taken from the Required Service Kit stock for warranty only repairs. Installation/Service Center will restock Required Service Kit Inventory for used part(s) using the standard Go Green APU ordering procedure.

All warranty invoices must be submitted within 30 days of the performance of any warranty repair. If a warranty invoice is submitted after 30 days it will be denied.

Parts replaced under warranty must be retained for ninety (90) days for inspection, and be sent to Go Green APU if so requested. Defective parts that are returned at the request of Go Green APU must be marked or tagged with the Warranty Claim Number. If the requested parts are not returned within thirty (30) days, Go Green APU will deny the warranty claim, this includes parts, labor and any other associated costs and invoice the Center for the cost of the replacement part, including any and all freight costs.

Go Green APU will deal with all component vendors so the Installation/Service Center does not have to, as a result Go Green APU may request that the defective part(s) under warranty be drop shipped from the Center to the original manufacturer on behalf of Go Green APU.

Go Green reserves the right to recall a unit for factory service if the failure under warranty is significant and the cost of repair is excessive.

All replacement parts are covered for three (3) months or the remainder of the original warranty period, whichever is longer.

All other expressed or implied warranties, including, without limitation, those arising under the law of equity and the implied warranties of merchantability and fitness for a particular purpose, are hereby expressly excluded from the sale and purchase of the APU and related apparatus sold hereunder, regardless of whether a claim arises under contract or tort principles, or on any other basis. The buyer's sole remedy hereunder shall be limited to the repair or replacement of any nonconforming equipment or parts, but only if returned to an Installation/Service Center within the warranty period defined above, or with the express written approval of Go Green

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APU management. Go Green APU liability on any and all claims for damage or loss related to the delivery, installation and use of the APU shall not exceed the original installed price of the APU. IN NO EVENT WILL GO GREEN APU BE LIABLE FOR: LOSS OF USE; LOSS OF PROFITS; LOSS OF, OR DAMAGE TO, SHIPPED GOODS; INCONVENIENCE; COMMERCIAL LOSS; OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES.

TRANSFER OF WARRANTY

This warranty shall be for the benefit of the initial purchaser. If a truck upon which the APU is installed is sold and the unit is not removed, the new owner may request in writing, that Go Green APU transfer the remainder of the original warranty. Such a request shall note the hours accumulated by the APU at the time of ownership transfer, as well as the initial date of installation.

If the APU is being removed and installed onto a different truck, then an INSTALLATION/SERVICE CENTER must perform the installation, and the warranty transfer requested in writing as described above.

Upon approval by Go Green APU, the new owner will be covered for the remaining warranty left on the APU. Go Green APU reserves the right to deny transfer of warranty if these conditions are not met.

This warranty is extended under the laws of the Commonwealth of Pennsylvania. Enforcement of this warranty shall be conducted according to the laws of the Commonwealth of Pennsylvania. By acceptance of this warranty, this owner of the APU agrees that any litigation and the resolution of any dispute between Go Green APU and the owner of the APU shall be conducted exclusively in courts of the Commonwealth of Pennsylvania.

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10. SERVICE INTERVALS FOR KUBOTA ENGINE

1) Oil Change: First oil change after 50 hours. **No synthetic oil may be used during the first 50 hours of operation.** CF, CF-4 and CG-4 class oils may be used.
2) Oil Filter Change: First filter change after 50 hours, change oil and filter every 1,000 hours thereafter.

System	Check Item	Daily	Every 50 Hours	Every 250 Hours	Every 400 Hours	Every 1000 Hours	Every 2000 Hours
Fuel	Check Fuel Pipes and Clamp Bands		X				
	Drain Water From Fuel Filter			X			
	Replace Fuel Filter				X		
Engine Oil	Check Engine Oil Level	X					
	Engine Oil Replacement		1st time			2nd and after	
	Engine Oil Filter Replacement						
Radiator fins/fans	Check for functionality	X					
Belts	Replacement of Alternator Belt				500 hrs.		
	Check Fan Belt Tightness			X			
Coolant	Check & Addition of Coolant	X					
	Coolant Replacement					X or 1 year	
	Coolant Water Path Flushing and Maintenance				500 hrs		Contact Dealer
	Check of Radiator and Clamp Bands	Every 6 Months					
Rubber Hoses	Fuel and Water Hose Replacement						X or 2 years
Intake & Exhaust	Air Cleaner Element Cleaning			X			
	Air Cleaner Element Replacement				X		Once a Year
Cylinder Head	Adjust Intake/Exhaust Valve Clearance					800 hrs	
	Lapping Intake/Exhaust Valve Seats					1,500 hrs	
Fuel, Valve, Pump*	Check Fuel Injection Valve Pressure and Adjust					Contact Dealer	
	Check & Adjust Fuel Injection Pump						3,000 hrs
*The specific emissions related parts for EPA/ARB regulations.							

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11. APU OIL FILTER AND OIL CHANGE (10W-30 OIL)

TOOLS REQUIRED:
- Ratchet Handle
- Ratchet Extension
- Strap Wrench for Ratchet
- 7/8" Wrench
- Alternative - (2) 13mm wrenches and Strap Wrench

PARTS REQUIRED:
- Oil Filter, GO GREEN APU P/N 209-0009K (KUBOTA P/N 15426-32430)

CAUTION!

TURN OFF THE GO GREEN APU BEFORE WORKING ON THE UNIT.

IF DRAINING HOT OIL, USE APPROPRIATE PROTECTION FOR HANDS AND FACE.

11.1 Removing Oil Filter:

11.1.1 When removing the Oil Filter, we recommend using a strap wrench that is attached to a ratchet handle with an extension when removing the oil filter.

11.1.2 If a strap wrench is unavailable, use (2) 13mm wrenches as an alternative.

11.2 Draining Oil from Pan:

11.2.1 Remove the lower APU Splash Shield (bottom cover) from the APU to access the drain plug.

11.2.2 Remove the Drain Plug on the bottom of the APU Oil Pan using a 17mm wrench to unscrew it.

11.2.3 Drain all of the oil from the APU Oil Pan into an appropriate container and recycle appropriately.

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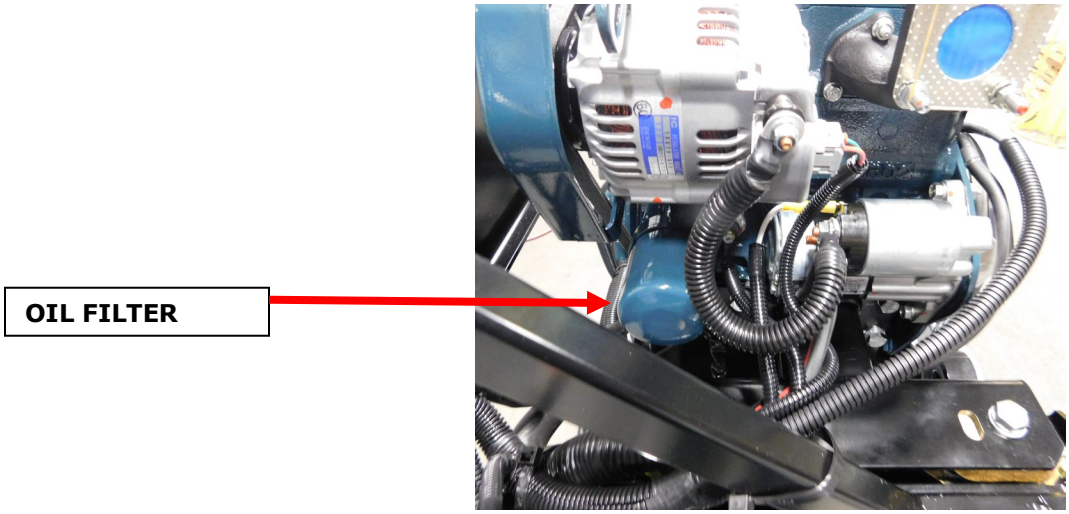
11.2.4 Replace the Oil Drain Plug in the bottom of the Oil Pan after all the oil has been drained from the Pan.
(Torque to 40 ft/lbs)

11.3 Remove and Replace Oil Filter

11.3.1 Wait for the engine to cool before removing the Oil Filter.

11.3.2 Remove the old Oil Filter, right below the alternator, using a strap wrench that can be used with a ratchet and an extension.



REMOVING OIL FILTER

11.3.3 Replace with new Oil Filter.

11.4 Filling APU with Oil

TECH TIP 4 – CHECKING OIL LEVEL

- Always check oil when "hot" not "cold."
- **IMPORTANT: REMOVE THE DIP STICK BEFORE ADDING OIL**. Removing the dipstick allows the crankcase to breath, allowing the oil to drain down to the crankcase from the valve cover.

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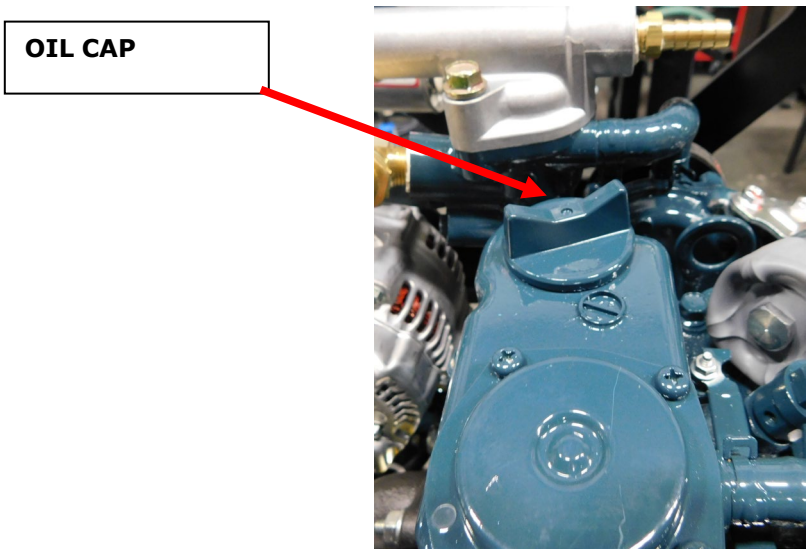

OIL CAP

CAUTION!

DO NOT OVERFILL THE ENGINE.

IF ENGINE IS OVERFILLED IT WILL SMOKE!

11.4.1 Oil can be added to the APU engine by removing the blue oil cap.

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ENGINE OIL PAN CAPACITY		
ENGINE TYPE	**CYLINDER**	**GALLONS**
KUBOTA Z602-E4	2	0.66 Gal 2.5 L
KUBOTA D902E-1	3	0.98 Gal 3.7 L

11.4.2 The APU's oil can be replaced by removing the APU's bottom panel.

11.4.3 Slowly fill the APU engine with 10W-30 oil. Check the oil level on the dipstick to avoid overfilling.

11.4.4 Be sure to inspect all components every 1,000 hours.

11.4.5 **IMPORTANT:** The APU should never be operated without its bottom panel.

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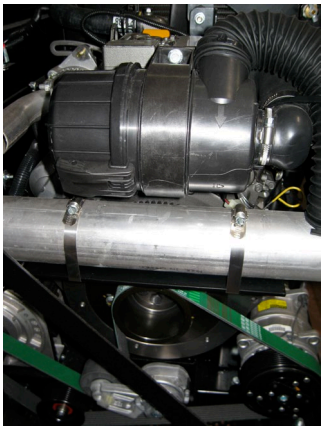
12. APU AIR FILTER CHANGE

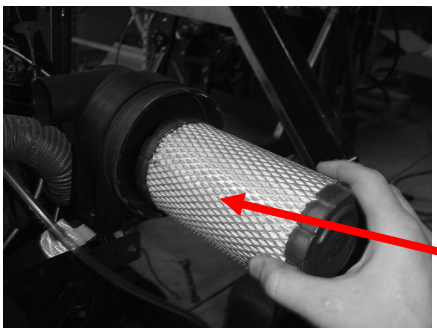
PARTS REQUIRED:
- Air Filter, Go Green P/N 109-0006
  (Manufacturer's P/N: Enginaire P/N 2S-E1)

12.1 Remove screw, unlatch the APU Air Filter (twist to the left) and remove the Cover.



APU AIR FILTER COVER WITH LATCH

12.2 Remove and replace the Air Filter.



REMOVING AIR FILTER

12.3 Replace APU's Cover and re-latch in place.

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13. APU FUEL FILTER ELEMENT CHANGE

PARTS REQUIRED:

- Fuel Filter Element, Go Green P/N 204-0057K (KUBOTA P/N 36691)

13.1 Close the valve on the APU Fuel Filter.

13.2 Remove the Fuel Filter Element replace with a new Element.

FUEL FILTER

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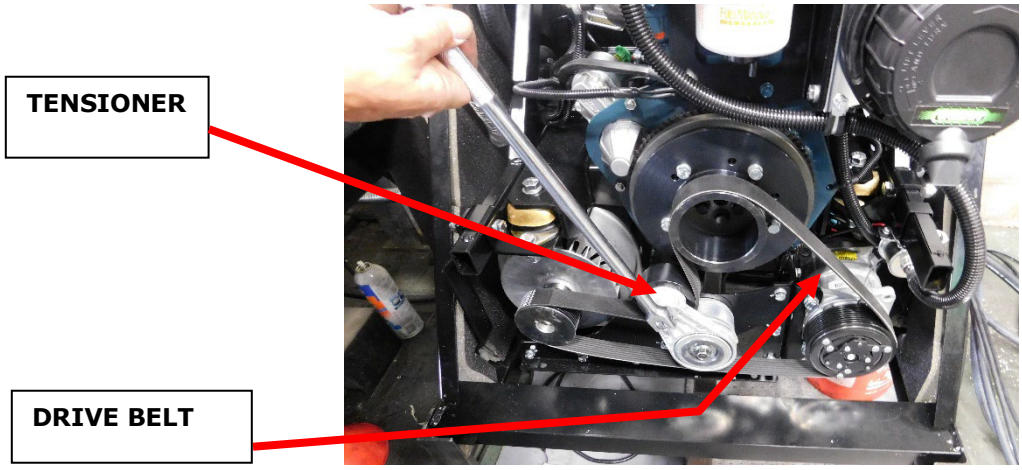
14. CHANGING THE APU DRIVE BELT

PARTS REQUIRED:
- Drive Belt, Go Green P/N 104-0016
  (Napa Belt P/N 25-080570)

TOOLS REQUIRED:
- 1/2" Ratchet



TENSIONER BELT

14.1 Turn the APU "OFF" by pressing the green START/STOP button at the ECU.

14.2 Inspect the Drive Belt to see if:

14.2.1 Excessive cracking (1 per 1/2") is evident.

14.2.2 Wear is evident.

14.2.3 Belt Tensioner is less than 1/2" inch from the full travel position.

14.3 If any of the above are present, the belt needs to be replaced.

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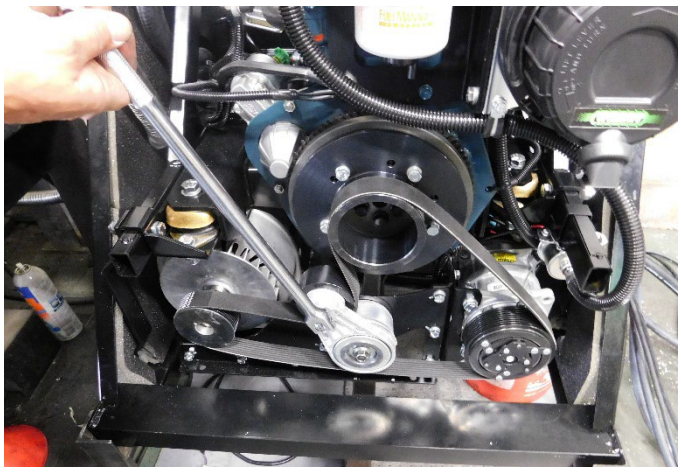
14.4 Insert a 1/2" ratchet into the square depression in the Belt Tensioner.

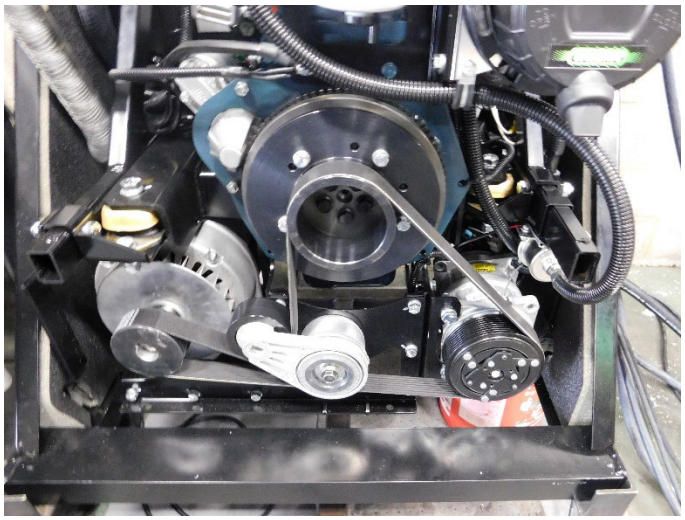
14.5 Push down on the ratchet handle to loosen the belt.

14.6 When belt is loose, remove off the Pulleys.



REMOVING DRIVE BELT

14.7 Replace the new Drive Belt by wrapping it around the pulleys following the path in Photo 10. Use the ratchet to pull the Belt Tensioner so the Drive Belt is installed around it.



BELT PATH

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15. ADJUSTING APU ALTERNATOR BELT

PARTS REQUIRED:
- Alternator Belt, Go Green P/N 209-0010K
  KUBOTA P/N 15881-97010

TOOLS REQUIRED:
- 12mm Wrench
- 13mm Wrench

15.1 Turn the APU "OFF" by pressing the green START/STOP at the ECU.

15.2 Inspect the APU Alternator Belt, which is located at the rear of the APU, to see if it is damaged or needs adjustment.

15.3 If the belt is damaged, remove and replace with new Belt.

15.4 To check if Belt needs adjustment, apply moderate pressure at its midpoint below the Alternator. The Belt should deflect approximately no more than 5/16" (7mm to 9mm).

15.5 If Belt deflects more than 5/16", the belt needs to be tightened.

15.6 With the APU "OFF," loosen the Alternator Mounting Bolts.

15.7 Place a lever-type tool between the Alternator and the Engine Block.

15.8 Push the Alternator Belt out until Belt deflection is within acceptable 5/16" limit.

15.9 Tighten all alternator mounting bolts.

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16. ADDING COOLANT TO APU

PARTS REQUIRED:
- 50% Dex-Cool or equivalent, 50% water

CAUTION!

REMOVING COOLANT PRESSURE CAP WHILE ENGINE IS HOT CAN RESULT IN PERSONAL INJURY.

16.1 Before checking the Degas Bottle/Coolant Tank, press the START/STOP button at the ECU to turn the APU "ON."

16.2 Turn the Temperature Control Knob on the ECU clockwise until the Window Display reads: MAX COOL.

16.3 Let the APU cool.

16.4 Turn the APU "OFF" by pressing the START/STOP button at the ECU.

16.5 Locate the Degas Bottle/Coolant Tank on the outside sleeper cab wall.

16.6 Be sure it is cool to touch.

16.7 Carefully remove Coolant Pressure Cap from the Bottle/Tank.

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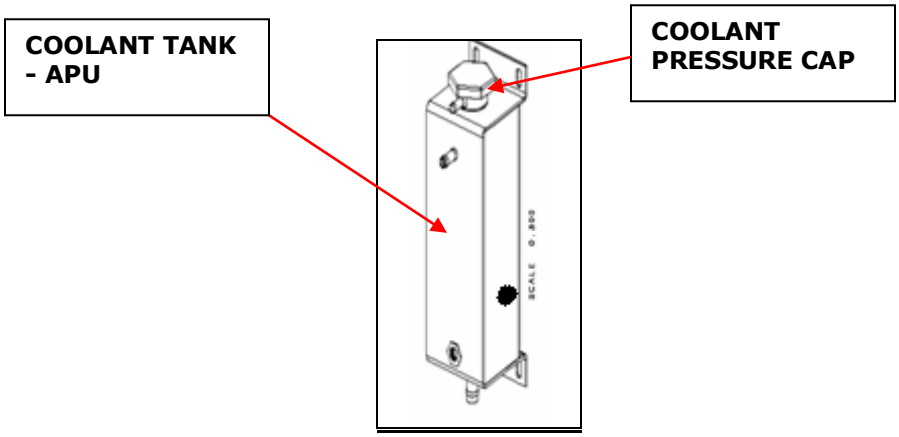
16.8 Fill Bottle until is "topped off" with a 50% anti-freeze and 50% water mix.

16.9 Replace Pressure Cap.



APU COOLANT TANK

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17. ELECTRICAL CONTROL UNIT (ECU)

17.1) INTRODUCTION

The electronic panel **GL-P6HGG001** is a microprocessor-based equipment, designed to command and supervise an auxiliary power unit and an air conditioning system. It acts at a temperature range from -40°F to +176°F. The panel **GL-P6HGG001** communicates with the module **GL-M9HGG001** through a single-wire communication. This system can monitor internal and external temperature, pressure and all APU signals, it also has outputs for Heating valve, Compressor, Three Blowers speed, Fan and all APU signals.

17.2) SYSTEM COMPONENTS

17.2.1) Control Set

The control set is comprised by the panel **GL-P6HGG001**, control box **GL-Q0HGG001** and interconnection harness. The relay board **GL-R1HGG001** and control module **GL-M9HGG001** are inside the control box. The harness interconnects control box and command panel and has coupled in it the external (outside) temperature sensor.

17.2.2) Command Panel

The command panel **GL-P6HGG001** is the human machine interface of the system. It is composed of a keyboard for operational programming of the APU and air cooling system, different colors LED's to show active functions and a screen for viewing parameters, setpoint, failures, battery voltage, temperature and all other information. The internal (or inside) temperature sensor is mounted on the panel fixing device (bracket). The sensor is connected to the panel through a small cable.

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17.2.3) Control Module

The control module **GL-M9HGG001** is responsible for starting APU engine as well as controlling the air conditioning system. It generates the correct output signals and timings to operate the APU. For this task the module monitors sensors, turns on and off outputs and receive user commands from the **GL-P6HGG001** panel. The module is coupled with a relay board called **GL-R1HGG001**.

17.2.4) Relay Board

The goal of the relay board **GL-R1HGG001** is to switch the high current loads of the APU system. Its relays are commanded by the control module **GL-M9HGG001.** To protect the installation against overcurrent or short-circuits, there are fuses for each load.

17.3) SYSTEM OPERATION

17.3.1) Power

After plug power to the control set the panel will show a Logo screen while loading parameters and then will change to main screen. Panel alone may work with 12VDC and 24VDC, but control box is assembled with 12VDC or 24VDC relays, limiting the system to one voltage.

17.3.2) Graphic Display

The screen shows the setpoint value, external temperature and the clock. It will be the interface for user to set parameters, set timers, faults and will also pop-up the function when user press a key. At the main screen is possible to have the internal temperature instead of setpoint at central position, according to parameter **P248** or it is possible to have the internal temperature instead of external temperature at corner position, according to parameter **P249**.

17.3.3) Temperature Sensors

The control set has two temperature sensors, internal and external temperatures, both are capable of operating from -40°F to +176°F. In case of failure, a warning symbol will appear for few seconds and a fault will be recorded. During a fault, temperature control will assume the value of 72ºF for internal sensor and end of scale for external. The string “---“ appears on main screen temperature locations when the sensor in witch that temperature belongs to is in fault condition.
The parameter **P000** and **P001** are external and internal offsets for the sensors. To allow the installer to compensate any deviation on application. Parameters adjust will be described in the parameters section of this manual.

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17.3.4) Setpoint

Setpoint is the desired temperature inside the vehicle. To regulate it press UP or DOWN. The setpoint temperature will change on the screen, press again one of these keys until the desired temperature is obtained. The setpoint value has the “SP” indication beside it.

After adjusting the desired temperature the control will work to maintain the adjusted temperature according to the selected operating mode (Automatic, Heating or Cooling).

17.3.5) Operation Mode

The control unit has 6 operating modes: Automatic, Heating, Cooling, Manual Ventilation, Generator mode and Battery Monitor. All modes will turn on Auxiliary Power Unit and each mode will have different behavior that will be explained in the succeeding items. It is also possible to set the Auxiliary Power Unit (APU) in Continuous or Automatic mode using the parameter P640. If set to Automatic it will turn on and off the APU during Heating, Cooling or Automatic control.

To set the operating mode press the correspondent button, the screen will show a symbol to confirm that the panel has recognize the command.

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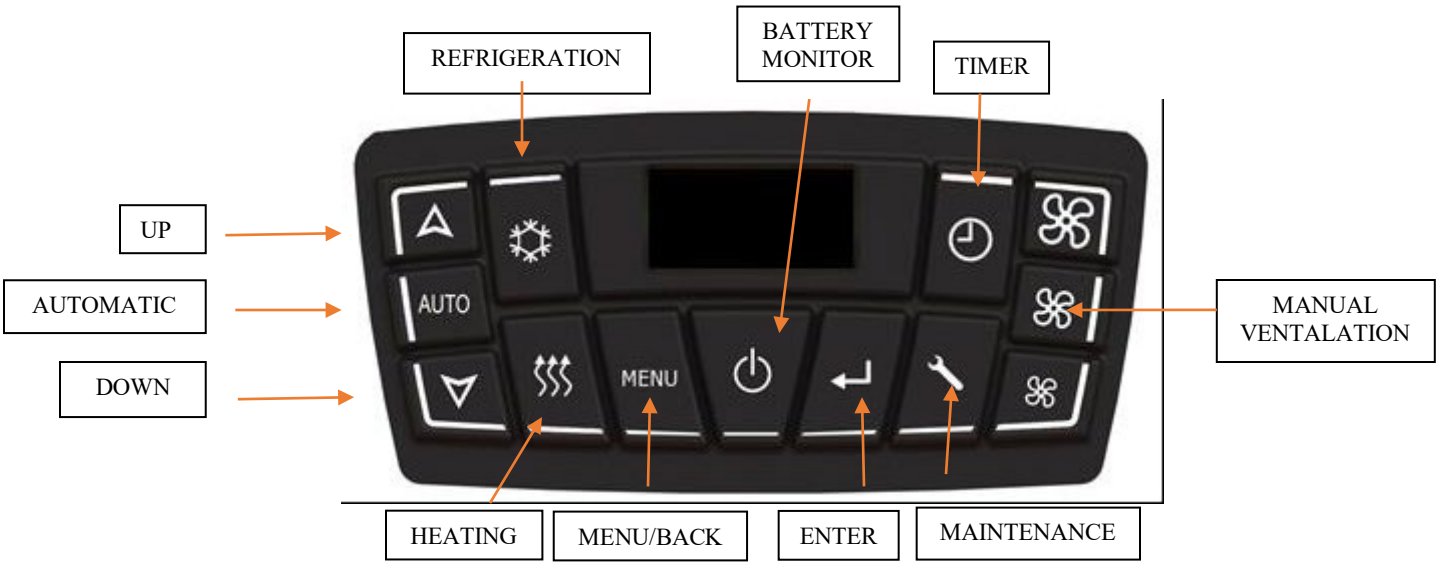

17.3.5.1) Navigation Keys

The product navigation keys allow screen changing, value inputting, operations confirmation, menu displacement etc.:

- **UP**: Scrolling of options and value increase.
- **DOWN**: Scrolling of options and value decrease.
- **ENTER**: Is the “Enter” for confirming the operations.
- **BACK**: When pressed, it goes back to the previous menu/screen.

17.3.5.2) Generator mode

In this mode the unit will turn on the Auxiliary Power Unit, providing mainly AC power to the system, but also DC power and mechanical torque. At this moment the control module will check and monitor several inputs of the diesel motor to confirm that every subsystem is working properly. Main subsystems that are monitored at this moment are: Oil, Water coolant, Alternator, Fan feedback and Fire sensor. All subsystems are monitored during the whole operation and will trigger specific faults which will be described on this manual at Failures item.

There is a specific timing of the outputs to start and maintain the generator, this sequence, with default parameters value, is shown below:

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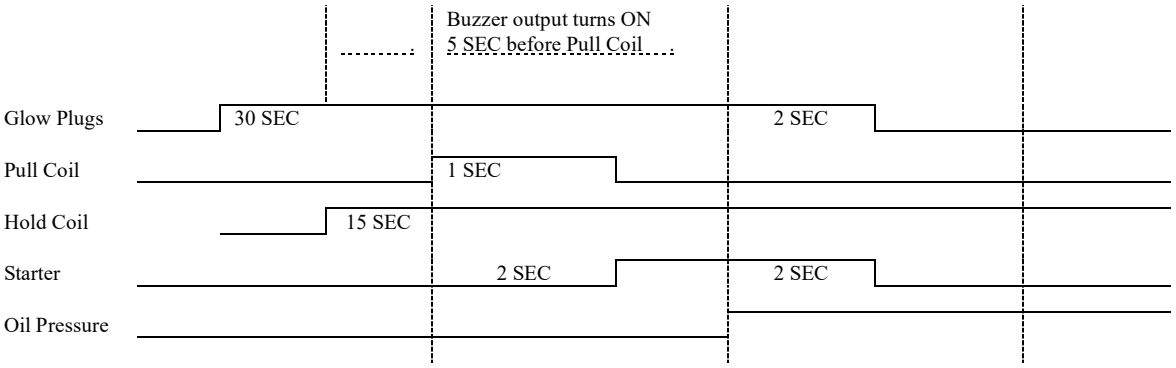

Glow plug time depends on external temperature, if temperature is below or equal to 14°F it consider Winter and will follows **P852**, if it is above 14°F it will consider Summer and follow **P853**. **P854** is the time that Pull Coil will be active.
After Starter output become active the control will count parameter **P857** (in seconds) waiting for Oil Pressure input to become active. If there is no activation at the Oil Pressure the system will turn off the engine and start the process again. The Hold Coil output will be active for **P855** after turning off the engine due to lack of Oil Pressure. System will repeat the whole motor start process 3 times before an engine fault is generated. To start/stop the engine press POWER button for 3 seconds. The button illumination becomes **green** as soon engine starting process initiates.
All other operation modes need generator running because they require power, either mechanical or DC. This means the user should always start the engine for other functions become available.
Note: Battery Monitor feature may also start the engine to prevent low battery voltage. Please read section bellow and **P870** in parameters section to avoid unwanted engine starts.

17.3.5.3) Battery Monitor

Battery Monitor is a function that monitors the battery and starts engine automatically if battery voltage drops below **P869**. To become available to the user, the parameter **P870** or **P888** must be set to “Enable”. When both of parameters are enabled, the panel follows **P888** configuration: the battery monitor function will remain active as long as the panel is turned ON, running automatically (Warning: for continuous operation, **P888** and **P870** shall be set to Enable!). However, when just **P870** is enabled, to activate/deactivate Battery Monitor, press POWER button through a “single” click. The button illumination becomes red, indicating the engine is

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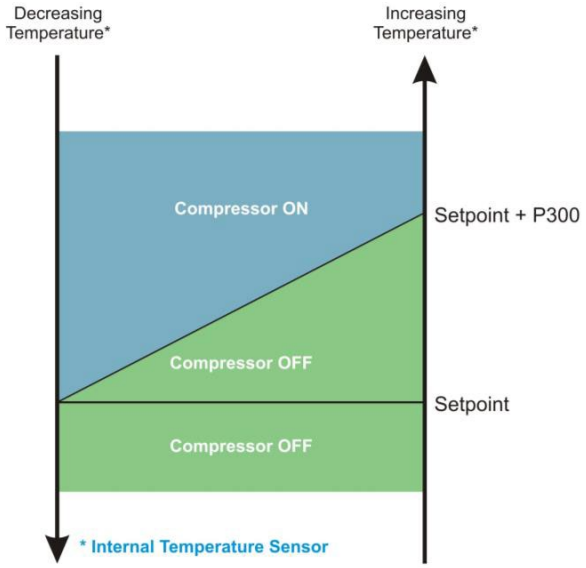
going to start as soon the voltage drops below **P869**. Once the engine had started, it remains running for a time defined in parameter **P871**. This time counter starts after the battery voltage is above **P869**.

17.3.5.4) Cooling mode

In cooling mode, the product controls the compressor and ventilation in order to reduce the internal temperature to the setpoint value. The engine must be running to allow COOLING button to be pressed. The following graph describe the compressor behavior.



Note: The compressor will not turn on if it has not passed 30 seconds since it was turned off, it has a protection time of 30 seconds to prevent possible damages.

During cooling mode, blowers will be activated as follows:

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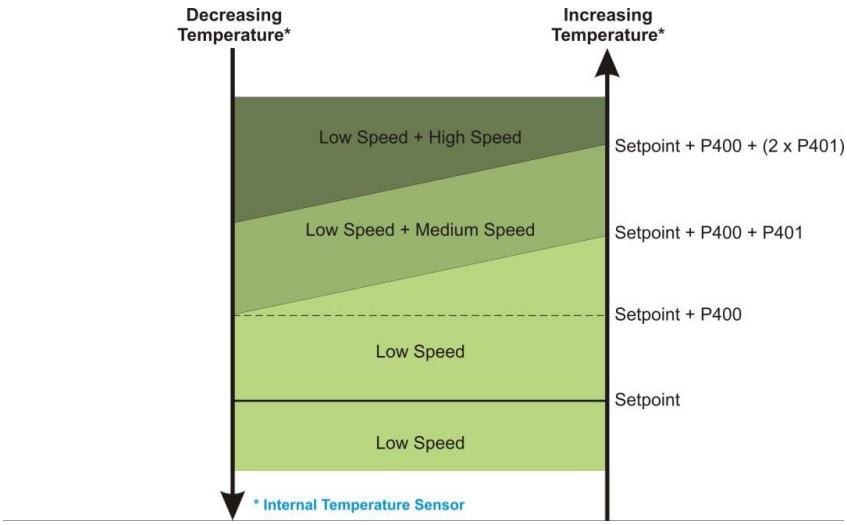
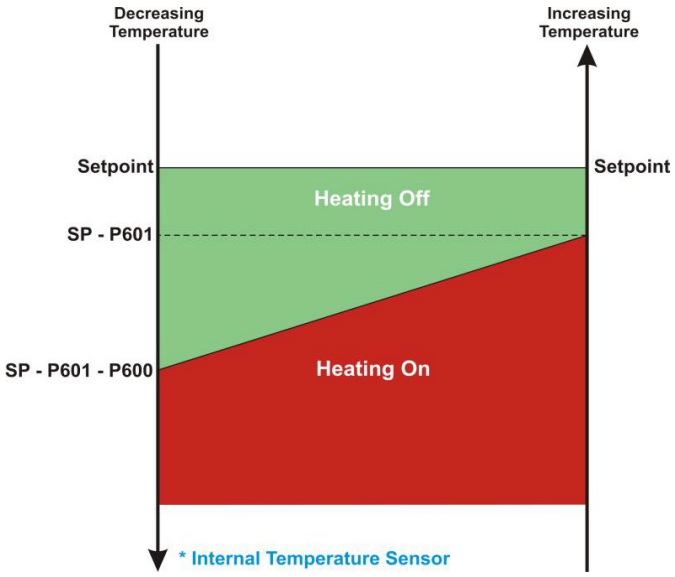


17.3.5.5) Heating mode

In heating mode the product controls the heating valve and ventilation in order to increase the internal temperature to the setpoint value. The engine must be running to allow HEATING button to be pressed. The following graph describe the heating valve behavior:



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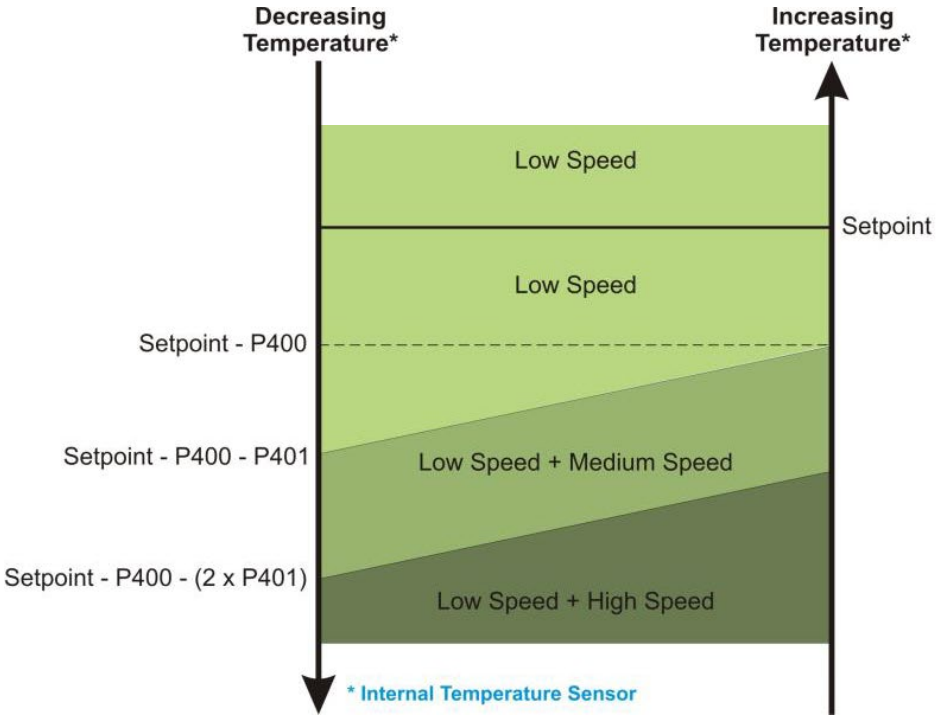
During heating mode, blowers will be activated as follows:



17.3.5.6) Automatic mode

In automatic mode the product control the air conditioning system in order to reach the setpoint value. To reach the setpoint value the unit may cool, heat or just keep ventilation on. The engine must be running to allow AUTO button to be pressed.

If the internal temperature is above setpoint, the panel will control the compressor according to section 3.5.4) Cooling mode, if it is below setpoint, will control the heating valve as the graph show in section 3.5.5) Heating mode. The ventilation graph is a mix of both graphs presented before and shown below:

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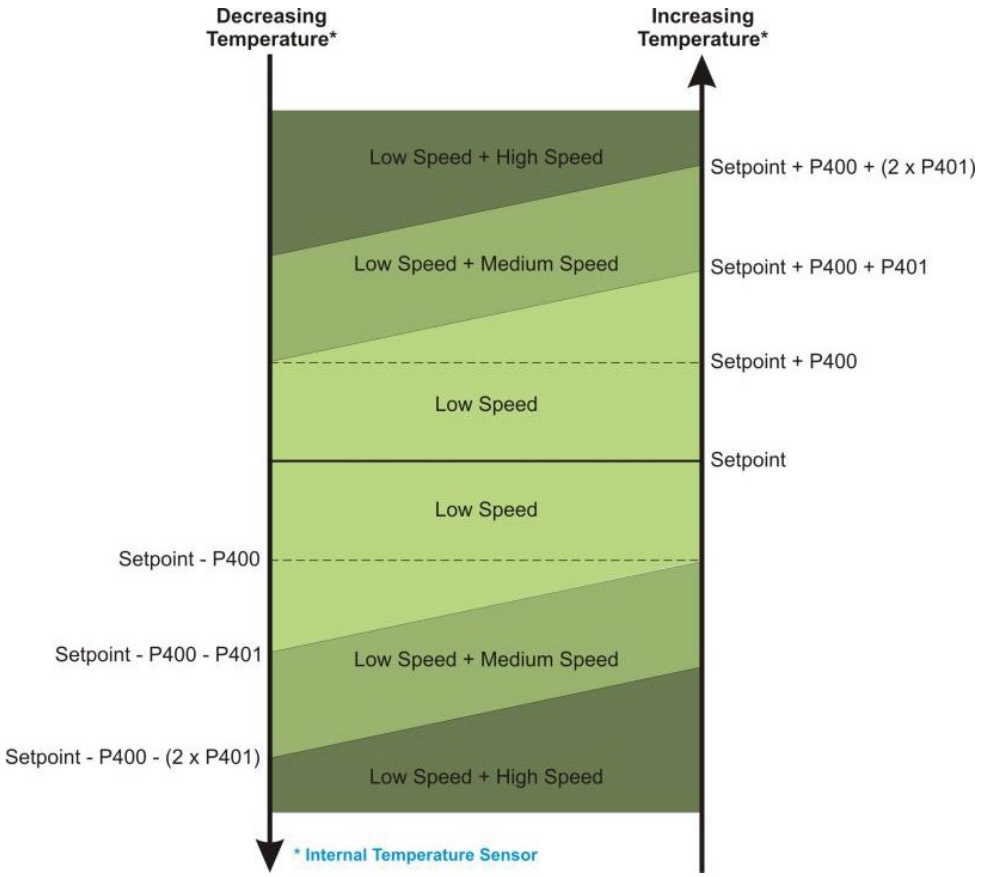

3.5.7) APU operation mode

In Automatic, Heating and Cooling temperature control mode the system will require the APU to be running while those function are active. If desired the system can turn on and off the APU when it is neither Automatic Cooling or Heating and if **P640** is set to "**Automatic**".

When **P640** is set to "**Continuous**" the system will behave as described on previews topics; 3.5.3) Cooling mode 3.5.4) Heating mode 3.5.5) Automatic mode.

With "**Automatic**" APU operation mode the APU will turn off when the temperature is near to the setpoint and turn on again when cooling or heating is necessary. There are specific parameters for this operation mode to allow a better control of the APU, **P641**, **P642**, **P643** are similar to **P300**, **P600**, **P601** respectively. There is also a time hysteresis in minutes to avoid constantly on and off of the APU, **P644**. See the graphic below:

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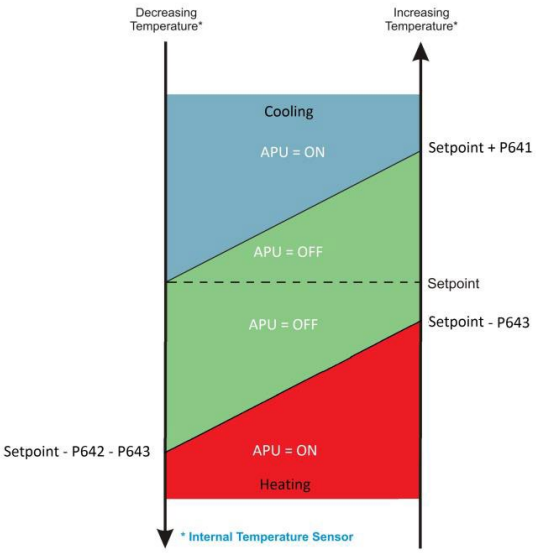
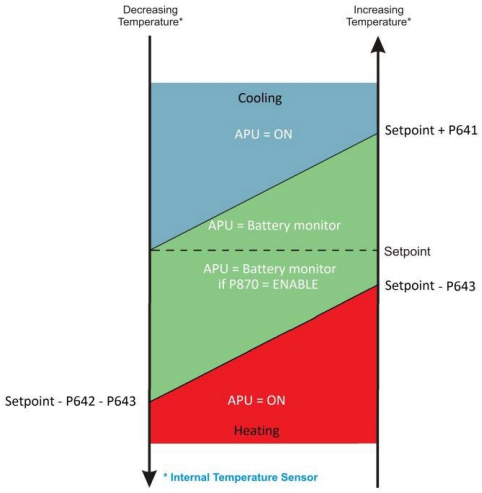


When the temperature reaches the hysteresis values, the APU turns on and turn off when closer to the setpoint and after **P644** elapsed. Also, if the battery monitor parameter is enable the APU will also turn on to guaranty battery voltage as described on 3.5.3) Battery Monitor see the next graphic:



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The battery control turns on APU when the parameter **P870** is ENABLE. Also, the power supply voltage must be lower than **P869**, and a temperature control is active.

Note: Generator LED will be **red** if the APU can be automatically turned ON (Battery Monitor or Automatic APU operation mode) and it will be **green** when APU is ON or turning ON.

17.3.5.8) Manual ventilation

During heating, cooling or auto mode is possible set the blowers speeds manually just by pressing the desired speed. However, turning off ventilation while in automatic, heating or cooling mode is not allowed. If user press the active speed button again it will return ventilation to automatic. Ventilation will only work while engine running if parameter **P877** is set as "disable". If you want ventilation to be available even with engine off, **P877** must be adjusted to "enable".[1]

17.3.5.9) Condenser fan

The control will turn both condenser fans on when cooling, after A/C starts it will count 4 seconds and start Fan number 1 and after more 4 seconds will start Fan number 2. In case of Fan Temperature input become active the unit will turn on immediately both Fans. If Coolant Temperature input become active the unit will also turn on immediately both Fans and will turn off diesel engine.
Note: Both Fan Temperature and Coolant Temperature can activate the Fans without the generator and may drain the battery.

[1] The Ventilation with engine OFF function is present only in software version higher than v1.3 for both panel and ECU. That means, for example, if a panel v1.3 is connected to a ECU v1.4, or a ECU v1.3 is connected to a panel v1.4, the Ventalation with engine OFF function will not work, but all other functions remain available.

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17.3.5.10) Blocking Input

There is an input in M9HGG01 module used to block APU from starting-up. The intended use for this input is to turn OFF APU engine and inhibit it every time main truck engine is working. If the input is put to GND, APU engine and HVAC functions will be turned OFF and can only be ON again if the input backs to unconnected or is put to VCC. All operating modes and function respect this input. It means even when APU is scheduled to start by a timer, at the moment timer tries to turn ON the function, it will not get success if blocking input is active. Also works with Bluetooth commands and battery monitor function. If user tries to turn ON functions with blocking active, an informative message is shown to the user.[2]

17.3.5.11) Temperature unit

The panel starts at Fahrenheit degrees, but is possible to change to °C, all parameters related to temperature will be converted. To change between °F and °C use parameter **P216**.
Note: Is recommended to first change the temperature unit and then regulate other temperature parameters.

17.3.5.11) Backlight control

The panel has a backlight control to diminish bright when user is not touching the panel. Active brightness is set at **P202** and can be set from 0 to 100% while dimmer brightness is set at **P203** and can be set from 0 to 100%.

17.3.5.12) Time/Date and Timers

To access the time/date and timers configuration just press the TIMER button in the panel. Time can be adjust to the format of 12/24H. Besides that, the panel has four timers that can be programmed individually. Timers can be programmed for any day/days of the week, for the selected duration and activing any function as Automatic, heating, cooling, generator or manual ventilation low/medium/high. Timers can also be enable/disable. Whenever a timer is configured to automatically activate a function, the TIMER button illumination is turned on. This indicate to the user that at least one timer is configured and can start the engine/function programmed in it.

[2] Blocking input function is available only in software version v1.5 and higher for both panel and module.

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17.4) SYSTEM PARAMETERS

- To access the parameters press, **Menu** key
- Press DOWN key to reach the **PARAMETERS** option;
- Enter password **1041** by using the **DOWN** and **UP** keys. Confirm the digit entry using the **ENTER** key;
- The first parameter is **P000**. Select the desired parameter by using either **DOWN** or **UP**. Press **ENTER** to edit the parameter;
- Change the parameter by pressing **DOWN** or **UP**. Press **ENTER** to confirm;
- Return to the previous screen by pressing the BACK key;

NOTE: The parameter values can be reset to their default values via **RESET PARAMETERS** tab, with password **0370**.

ADJUSTABLE PARAMETERS

Parameter	Function	Default	Minimum	Maximum
P000	External (outside) Offset temperature	0°F	-9°F	9°F
P001	Internal (ambient) Offset temperature	0°F	-9°F	9°F
P100	Minimum setpoint temperature	62°F	59°F	68°F
P101	Maximum setpoint temperature	77°F	73°F	86°F
P110	Internal setpoint temperature	77°F	59°F	86°F
P202	Active backlight while user is using the unit	80	0	100
P203	Reduced backlight when user is not using the unit	30	0	100
P216	Temperature values to be shown in degrees Fahrenheit or Celsius.	°F	°C	°F
P248	Show internal temperature instead of setpoint on main screen	Disable	Disable	Enable
P249	Choose between internal or external temperature to show on main screen corner	Disable	Disable	Enable
P300	Temperature hysteresis for compressor activation	1°F	1°F	7°F
P400	Temperature above setpoint to start blower speed control	1°F	1°F	9°F
P401	Hysteresis temperature for blower velocity change	1°F	1°F	5°F
P600	Temperature hysteresis for heater activation	1°F	1°F	14°F
P601	Differential between internal temperature and setpoint to disable the heater	1°F	0°F	14°F

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P640	APU operation mode	Continuous	Continuous	Automatic
P641	Compressor hysteresis temperature (Auto)	2°F	1°F	7°F
P642	Heater hysteresis temperature (Auto)	2°F	1°F	14°F
P643	Heater differential temperature (Auto)	1°F	0°F	14°F
P644	Time hysteresis for APU switch (Auto)	3 mon.	0 min.	10 min.
P750	Language for texts of the product	English	English	English
P851	Bellow this temperature is considered winter, otherwise is summer	14°F	14°F	77°F
P852	Time for heating engine glow plug on winter	45 sec	5 sec	240 sec
P853	Time for heating engine glow plug on summer	20 sec	5 sec	120 sec
P854	Pull coil activation time	1 sec	1 sec	20 sec
P855	Hold coil activation time	10 sec	1 sec	40 sec
P856	After engine had started-up, starter motor will remain powered by this time	2 sec	1 sec	20 sec
P857	Maximum engine start-up time	10 sec	5 sec	240 sec
P858	Enable engine oil reading	Disable	Disable	Enable
P859	Maximum APU temperature alarm	176°F	122°F	248°F
P860	This selects between 120V or 210V power systems	120V	120V	210V
P861	Maximum allowed voltage for 120V generator	126V	120V	130V
P862	Minimum allowed voltage for 120V generator	114V	100V	115V
P863	Maximum allowed voltage for 120V shore power	126V	120V	130V
P864	Minimum allowed voltage for 120V shore power	114V	100V	115V
P865	Maximum allowed voltage for 210V generator	229V	210V	230V
P866	Minimum allowed voltage for 210V generator	197V	190V	205V
P867	Maximum allowed voltage for 210V shorepower	229V	210V	230V
P868	Minimum allowed voltage for 210V shorepower	197V	190V	205V
P869	Minimum battery voltage for engine auto power-up	10V	5V	14V

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P870	Enable engine auto power-up at low battery voltage	Disable	Disable	Enable
P871	Engine running time after auto power-up by low battery voltage	8 min	5 min	120 min
P872	The buzzer will ring before engine start-up	Enable	Disable	Enable
P877[3]	Enable blowers with engine OFF	Disable	Disable	Enable
P888	Constant APU power-up at low battery voltage	Disable	Disable	Enable
P950	Bluetooth initial status	Enable	Disable	Enable
P951	Password for Bluetooth connection	Enable	Disable	Enable

17.5) INPUT AND OUTPUT DISPLAY

Use this option to check whether the inputs and outputs are ON or OFF.
• To view the inputs and outputs press key **MENU** select **MAINTENANCE** and then **VIEWS**;
• Inputs and outputs can be with ON or OFF status. The temperatures are in the selected unit at **P216** (Celsius or Fahrenheit), and the voltage value is expressed in hundredths of volt x 10; thus, if the indicated value is 245, it means that the voltage is 24.5V.
• Information that depend on the communication with the GL-M9HGG001 module will indicate “FC” in case a communication failure occurs.
• Information that indicates any type of failure on sensors, or that have invalid or out-of-range values, will show “F!”.

Item	Description
Battery Voltage	Divide this value by 10 to obtain the battery voltage. Example, 113 represents 11.3 V.
Blower Low Speed	ON: The output is connected to V_{DC}. OFF: The output is connected to GND.
Blower Medium Speed	
Blower High Speed	
Water Valve	
Fan 1	

[3] The Ventilation with engine OFF function s present only in software version higher than v1.3 for both panel and ECU. That means, for example, if a panel v1.3 is connected to a ECU v1.4, or a ECU v1.3 is connected to a panel v1.4, the Ventalation with engine OFF function will not work, but all other functions remain available.

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Fan 2	
Glow Plug	ON: The output is connected to V_{DC}. OFF: The output is connected to GND.
Starter	
Fuel Hold	
Fuel Pull	
Air conditioning	
Alternator excitation	
Buzzer	
Generator Switch	
Shorepower Switch	
Fan Temperature	ON: The output is connected to V_{DC}. OFF: The output is open or connected to GND.
Oil Pressure	
Coolant Level	
Alternator D+ Input	
Manual APU start up	
Coolant Temperature	Shows the temperature valve (°F or °C, according to the parameter setting).
Fire Alarm	ON: The output is connected to V_{DC}. OFF: The output is open or connected to GND.
Truck Main Engine	ON: The output is connected to GND. OFF: The output is open or connected to the V_{DC}.
External Temperature	Shows the temperature value ((°F or °C, according to the parameter setting).
Internal Temperature	
Grid AC voltage	Shows grid voltage and frequency values.
Grid AC frequency	
Generator AC voltage	
Generator AC frequency	
Software	ECU Part's identification.
Release	
Bootloader	
Hardware	
Bluetooth	
Software Panel	Panel Part's identification
Release Panel	
Bootloader Panel	
Hardware Panel	

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17.6) TEST MODE

Use this mode to test the outputs, where you can change their status.

• In order to enter the test mode press key **MENU**, select **MAINTENANCE ->TEST MODE**;

• Enter password **2453**;

• To enable an output, select the desired output and press the ENTER key. To disable it, press **ENTER** again or displace the selected output.

Item	Description
Battery Voltage	Divide this value by 10 to obtain the battery voltage. Example, 113 represents 11.3 V.
Blower Low Speed	ON: The output is connected to VDC. OFF: The output is connected to GND.
Blower Medium Speed	
Blower High Speed	
Water Valve	
Fan 1	
Fan 2	ON: The output is connected to VDC. OFF: The output is connected to GND
Glow Plug	
Starter	
Fuel Hold	
Fuel Pull	
Air conditioning	
Alternator excitation	
Buzzer	
Generator Switch	
Shorepower Switch	
Fan Temperature	ON: Input is connected to VDC. OFF: Input is open or connected to GND.
Oil Pressure	
Coolant Level	ON: Input is connected to the VDC. OFF: Input is open or connected to the GND.
Alternator D+ Input	
Manual APU start up	
Coolant Temperature	Shows the temperature valve (°F or °C, according to the parameter setting).
Fire Alarm	ON: Input is connected to VDC. OFF: Input is open or connected to GND.
Truck Main Engine	ON: Input is connected to GND. OFF: Input is open or connected to the VDC.

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External Temperature	Shows the temperature value (°F or °C, according to the parameter setting).
Internal Temperature	
Grid AC voltage	Shows grid voltage and frequency values.
Grid AC frequency	
Generator AC voltage	
Generator AC frequency	
Software	ECU Part's identification.
Release	
Bootloader	
Hardware	
Bluetooth	
Software Panel	Panel Part's identification
Release Panel	
Bootloader Panel	
Hardware Panel	
Red LED	Activates red LEDs on the product
Green LED	Activates green LEDs on the product
Blue LED	Activates blue LEDs on the product
White LED	Activates white LEDs on the product
Blacklight	Adjust maximum LEDs brightness
Keys	---

17.7) HOUR METERS

Use this option to see the hour meters. The GL-P6HGG001 panel is fitted with a time counter (hour meter). To access it enter **MENU**, select the option **MAINTENANCE** and finally submenu **HOUR METERS**. Panel has hour meter for; Compressor, Blowers, Fan and D+ (any blower or fan speed will count the hour meter).

NOTE: The hour meters values can be reset to their default values via RESET PARAMETERS tab, with password **9270**. Do not share this password, otherwise hour meters will be useless.

17.8) BLUETOOTH OPERATION

The panel has a bluetooth interface that can be paired with a cellular phone with the appropriate Globus app. The "Globus AirCom" can be download from Google Play and Apple Store.

The app allows the user to control the setpoint temperature as well as activating the engine and the air conditioning functions far from the panel. It is a great feature that improves user comfort.

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To enable/disable the bluetooth functions go to the MENU button and choose bluetooth option. If bluetooth is enabled, open the “Globus AirCom” in your phone and search for the panel. The panel is showed on phone screen as “GoGreen” device. Tap this tag and wait for the options to come up. It is also possible to define the initial state of bluetooth by adjusting **P950**. If adjusted to “Enable”, every time the panel is turned ON the bluetooth is enabled. Otherwise, if parameter is set to “Disable”, bluetooth will be disabled when turned ON.
When the first connection with the device is performed, the app request by default a password. At this same moment, the password is displayed in the panel. The password request option can be enabled or disabled by adjusting **P951**.

Note: the bluetooth interface must be enabled in your phone to allow pairing.

17.9) FAILURES
When a failure occurs on the system, the key **MENU** will turn to red. This indication will be turned off only when no more failures exist. When the **MENU** button is pressed with an active failure, the last failure occurred will be displayed if it has not been previously viewed. To clear the failure from the screen, press ENTER. The currently active failures are viewed on the submenu **FAULTS** in the screen **MAINTENANCE**, while the failure history can be viewed in the option **LOG FAULTS** of the screen **MAINTENANCE**. The log records provide the following information:

Fault number	**ID**	**Time**	**Date** (mm/mm/yyyy)
3 (newest)	F100	12:01	02/20/2017
2	F500	12:00	02/20/2017
1	F001	22:15	02/19/2017

The fault log can be cleared from the **MAINTENANCE** → **RESET LOGS** menu by using the password **1792**.

Shown below is the fault list with the actions taken by the controller for each one:

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	Description	Action
F000	Internal temperature sensor fault	Assumes 72°F for internal temperature – User can use setpoint to active heating or cooling. Above 72°F will heat and bellow will cool.
F001	External temperature sensor fault	Assumes the end of scale measure for external temperature. This can impact the winter/summer definition for glow plug, depending on which side de end of scale the fault was.
F100	Alternator fault	Turn off APU
F150	Fire sensor triggered	Turn off APU
F300	Panel to ECU communication fault	ECU assume last state and keep controlling for 20 seconds. After this time, the engine will be turned off.
F500	Oil pressure fault	Turn off APU and try again 3 times
F505	Cooling water level fault	Turn off APU
F506	Diesel engine water temperature fault	Turn off APU, Turn on FAN
F520	Diesel engine startup fault	-

Note 1: Control module LED will blink green if there is no fault and communication is working properly. It will blink red if there is an active fault or there is no communication.
Note 2: Generator LED will be red if the APU can be automatically turned ON (Battery Monitor or Automatic APU operation mode) and it will be green when APU is ON or turning ON.

17.10) SOFTWARE UPDATE FOR GL-P6HGG001

PANEL – GL-P6HGG001

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Panel GL-P6HGG001/GL-M9HGG001 can be updated through the **PROGRAMMER P4SGL001**. Follow the instructions bellow:

• Plug both GL-P6HGG001/GL-M9HGG001 and **P4SGL001** to the same CAN network and keep only these devices attached to it.
• Download the file "**P6HGG001**.bin" (for the panel) or "**M9HGG001**.bin" (for the ECU) sent by Globus to a flash drive. Only put these files inside the flash drive.
• Power both devices with 12VDC/24VDC power source.
• Plug the flash drive to the **P4SGL001** and select the option **Update SW>>P6XXXNNN** or SW>>**M9XXXNNN**;
• GL-P6HGG001 will enter programming mode. Wait the transfer until "**Update OK**" shows up on the screen.
• Check the software version on the GL-P6HGG001 start-up screen or on the views menu for GL-M9HGG001 version.

17.11) OPERABILITY

• The control box operates within a temperature range from -40ºF to +176ºF.
• The control set operates with rated voltages of 12VDC.
• The control set must support -12VDC (polarity inversion) indefinitely, without suffering any damage.

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17.12) CHANGE HISTORY

Revision	Date	Author	Description
01	03/01/2017	FW	Original file.
02	06/30/2017	DA	Changes due to software revision 1.3.
03	11/09/17	DA	Changes due to software revision 1.4: added parameters P877 in enable ventilation while engine OFF in section 4). Added “Apple Store” location for downloading “Globus AirCom” app in section 10).
04	07/12/18	DA	Changes due to software revision 1.5: added section 3.5.8) Blocking Input. This input is used to disable APU when main truck engine is running.
05	26/02/2019	LP	Changes due to software revision 1.6: added section 3.5.5) APU operation mode. This mode is used to choose
06	05/07/2019	RW	Continuous mode or Automatic mode. And added same parameters for controller this new operation. Inclusion of parameters P888, P950, P951 on **4) SYSTEM PARAMETERS**; Changing of Battery mode description on **3.5.2) Battery Monitor**; Changing of **8) BLUETOOTH OPERATION** item. Improvement of several items: images, operation steps and descriptions.
07	03/22/2021	DA	Changes due to panel software revision 2.0: the parpameter P203 now turns OFF leds and screen when set to 0% (previous versions kept screen ON). Changes due to ECU software revision 1.7: the Hold Coil activates 15 seconds before the Pull Coil on engine start-up.

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18. SMART POWER MANAGEMENT

18.1 All GO GREEN APU® family products come standard with our Smart Power Management System.

18.2 If the electrical demand places a strain on the APU engine without tripping a circuit breaker, it is possible that the GO GREEN APU® Smart Power Management System will engage.

18.3 The APU Smart Power Management system will monitor the load and return the APU to normal once the load is reduced.

18.4 It is important to note that during this time the air conditioning output will be reduced in order to supply the required electrical output.

19. ENGINE BLOCK HEATER

19.1 To utilize the block heater, plug the correct end of the block heater extension cord into the main engine's block heater receptacle and the other end into one of the APU electrical outlets to turn the block heater on.

20. GO GREEN APU OPTIONS

20.1 GO GREEN QUIET COMFORT™

The GO GREEN Quiet Comfort™ enhancement was designed to provide drivers with additional ambient comfort while in their cab.
GO GREEN Quiet Comfort™ reduces the APU's already quiet sound to a mere whisper with this innovative sound reducing enhancement.

Neighbors parked on either side of a truck equipped with a GO GREEN® APU product will barely know its there when it's running. This enhancement makes the sound so quiet, talking on a cell phone and being heard is never a problem.

20.2 ALUMINUM STEPS

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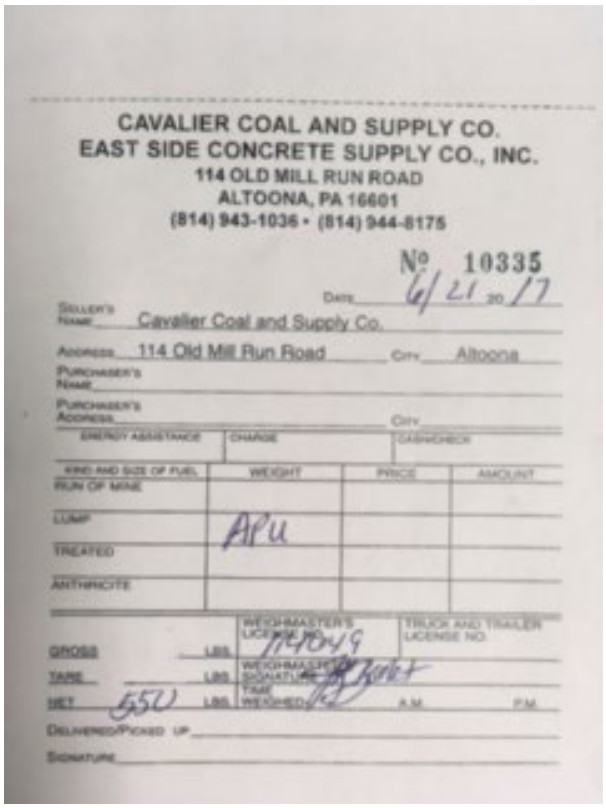
THE APU WITH POWER, PERFORMANCE AND RELIABILITY

Certification of Vehicle Weight Exemption

Go Green APU, LLC certifies that our Auxiliary Power Unit, AK240, has a weight of 550 lbs. This certification was completed by PA Weighmaster's License No. 114649 Weighbill No 10335.

In August of 2005, President George W. Bush signed the Energy Policy Act of 2005. Section 756 of the Energy Bill made changes to Title 23, Section 127(a) that regulates the weight of vehicles to be used on interstate highways. This section provides a 400-pound Vehicle Weight Exemption for idle reduction technology. Recently, with the implementation of the new highway bill, MAP-21, the weight tolerance has been expanded to 550 pounds. States are not compelled to grant the increased weight tolerance so please check with you state for the current exemptions. Please contact Go Green APU LLC at 814-942-9407 with questions.



CAVALIER COAL AND SUPPLY CO.
EAST SIDE CONCRETE SUPPLY CO., INC.
114 OLD MILL RUN ROAD
ALTOONA, PA 16601
(814) 943-1036 • (814) 944-8175

No 10335

Date 6/21/17

Seller's Name: Cavalier Coal and Supply Co.

Address: 114 Old Mill Run Road City: Altoona

Purchaser's Name:

Purchaser's Address: City:

Energy Assistance | Charge | Cash/Check

Kind and Size of Fuel	Weight	Price	Amount
Run of Mine			
Lump	APU		
Treated			
Anthracite			

Weighmaster's License No. 114649 | Truck and Trailer License No.

Gross Lbs.

Tare Lbs. Weighmaster's Signature

Net 550 Lbs. Time Weighed A.M. P.M.

Delivered/Picked Up

Signature

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THE APU WITH POWER, PERFORMANCE AND RELIABILITY

Go Green APU Mechanic Installation Check List

Date: _____ **Truck Number:** _____

APU Model Number: _____ **APU Serial Number:** _____

Customer:_____ **Installation Location:** _____

1. FORM MUST STAY WITH THE APU UNTIL INSTALLATION IS COMPLETED.
2. COMPLETED CUSTOMER PRE-INSTALLATION AUTHORIZATION and WORK ESTIMATE, INSTALLATION CHECKLIST AND WARRANTY CARD MUST BE RETURNED TO: **Go Green APU, LLC. • 1052 Mill Run Road• Altoona, PA 16601** WITHIN 7 DAYS OF APU INSTALLATION.

Items to be Checked During Installation

1. Unit Installation
- ☐ APU Mounting Bolts Torqued to 150 lbs
- ☐ Holes in Frame Filled with Bolts
- ☐ Dipstick Accessible
- ☐ Cover Easily Removed with No Obstruction
- ☐ Air Bags Inflated

2. Fuel System
- ☐ Hose Routing & Secure
- ☐ Check for Leaks
- ☐ Check for Air in Filter

3. HVAC System
- ☐ Installed Drain Tubes
- ☐ Heater Valve Function
- ☐ Air Temperature Output
- ☐ Hose Routing & Secure
- ☐ Engagement of the A/C Clutch
- ☐ Proper Cycle of Compressor
- ☐ Blower Fan Speed

4. 120 Volt AC
- ☐ 120 Volt AC Outlet Function
- ☐ Use volt meter at duplex to check for 125 volt +/- 3

5. Control Panel
- ☐ Lights on Power Switch in ON Position
- ☐ Unit Starts Properly
- ☐ Hour Meter Function
- ☐ Variable Temperature with Dial Selection
- ☐ "O" Turns off APU/Engine

6. Water System
- ☐ Hose Routed to Correct Ports
- ☐ Hoses Secure
- ☐ No Water Leaks
- ☐ Degas Bottle Full after Warm Up/Cool Down
- ☐ No Air Locks

7. Engine Performance
- ☐ Engine Shuts Down when Temp Switch is Shorted
- ☐ Engine Shuts Down when Oil Switch is Shorted
- ☐ Muffler Secure
- ☐ No Leaks
- ☐ No Excessive Smoke
- ☐ Wiring Secure and Weatherproof
- ☐ Loom Secure
- ☐ Battery Cables Secure
- ☐ Runs Smooth
- ☐ Alternator Output Minimum 13.5 Volt
- ☐ Starts Easily
- ☐ Check Oil Level
- ☐ Check Fan Operation @ Operating Temperature

Items to be Checked upon Completion of Installation (Completed by Technician):

- ☐ All connections installed and fully tested.
- ☐ Engine oil installed and checked.
- ☐ Coolant tank properly installed and checked.
- ☐ Air ducts tested and louvers properly installed.
- ☐ Coolants and refrigerants installed and tested.
- ☐ AirVac Coolant
- ☐ Amount of Freon Charged in System _____
- ☐ Sealants checked for leaks, etc.
- ☐ Check operation of Battery Monitor.

A/C Readings: Low Side:_____ High Side:_____ Temp Ambient:_____ Hot:_____ Cold:_____

Test all features on the Control Console:
- ☐ Warning Lights
- ☐ H/C Switch
- ☐ Temp. Control
- ☐ Stop Button
- ☐ Air Fan Speed
- ☐ Main Power Switch
- ☐ Load Management Indicator Light
- ☐ Start Button
- ☐ Hour Meter
- ☐ Power Light

After Unit is Installed, Run In Time:_____Hours

Installation Mechanic Signature: _____ Date:_____

Customer Signature/Shop Manager:_____ Date:_____

Go Green APU Representative:_____ Date: _____

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