Dynasys
Touch Screen CCU System Operations
and
Technical Specifications
Manual

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1. Introduction

The Cabin Control Unit (CCU) is the user interface/controller for Hodyon's Dynasys Auxiliary Power Unit (APU). This APU is a self-contained, stand-alone power generator for use with class 8 trucks. The Dynasys system includes an HVAC system which provides climate control for the truck bunk, additionally; one duplex 120VAC convenience outlet, one main Power Distribution Center (PDC) with dedicated circuit breakers, and provides 12vdc recharging for the truck's batteries while in operation. The Dynasys system uses the truck's diesel fuel supply and 12vdc battery source. This system does not require the usage of the truck's cooling and A/C system.. The Dynasys APU system provides significant fuel savings, reduction of truck engine wear, reliability, increased driver comforts, and legislative compliance.

The CCU mounts inside the truck cabin and provides the user with a touch-screen interface to control cabin temperature, monitor APU engine activities and outputs, provides information about the APU system and it's history, and control automatic starting procedures.. The rear connector port on the CCU provides a connection point to the Engine Control Module (ECM) of the APU. The USB port on the CCU provides a dual purpose; ability to update CCU with any future software updates, and to download complete APU history performance for diagnostic purposes.

2. Environmental / Installation

2.1. Physical

The approximate dimensions of the CCU are as follows:
Height: 3”
Width: 4-1/16”
Depth: 1-3/8”

2.2. Connections

The CCU requires the following electrical connection to the ECM:
Shielded Cat 5 straight Ethernet cable (RJ-45); a minimum 8 foot cable is recommended

NOTE: Although the CCU uses a standard Ethernet cable for the connection to the ECM, the CCU or ECM should NEVER be connected to any other Ethernet enabled device. The electrical pinout on the CCU and the ECM is a custom pinout that does not conform to standard Ethernet enabled devices. This will cause immediate failure of the CCU, the ECM, and any other Ethernet enabled components.

2.3. Proper Environment

The CCU is designed to operate inside the cab of a typical truck.
Operating Temperature (with LCD warming circuit enabled):
-40°F to 130°F (-40°C to 54°C)
Operating Temperature (with LCD warming circuit disabled):
-4°F to 130°F (-20°C to 54°C)
Storage Temperature:
-22°F to 176°F (-30°C to 80°C)

NOTE: If the CCU is powered on, then the LCD warming circuit is enabled. However, if there is an active Battery Discharged alarm, the CCU automatically enters Inactive Mode and the warming circuit is not available. Refer to Section 8 for alarm descriptions.

3. Hardware Description

3.1. LCD

The CCU includes a 3.5”, 320x240, color LCD with built-in touch-screen functionality. No stylus is required, audible feedback for screen touches can be turned on or off.

3.2. USB Port

The USB port located in the bottom right of the CCU consists of a Type A receptacle. The USB port accepts a standard USB flash drive and can be used to download historical data or upload firmware updates (with the appropriate security access level).

3.3. Rear Connection

The connection to the ECM is located in the rear of the CCU. This port consists of an RJ-45 jack and accepts a shielded Cat 5 Ethernet cable. The cable may be routed down the wall using the available strain relief groove or directly through the wall as the installation warrants.

NOTE: Although the CCU uses a standard Ethernet cable for the connection to the ECM, the CCU or ECM should NEVER be connected to any other Ethernet enabled device. The electrical pinout on the CCU and the ECM is a custom pinout that does not conform to standard Ethernet enabled devices. This will cause immediate failure of the CCU, the ECM, and any other Ethernet enabled components.

3.4. Buzzer

The CCU includes a buzzer for audible touch-screen feedback and alarm notifications. The touch-screen feedback can be turned on or off. When an alarm is generated, the buzzer activates for 10 seconds before turning off.

3.5. Temperature Sensor

A temperature sensor is located within the CCU case to monitor the bunk environment. This sensor is located near the vent on the left side of the CCU. Keep this vent and the opposing vent on the right side clear of any obstructions to allow for maximum airflow through the CCU assembly. Failure to maintain maximum bunk ambient air flow through the CCU assembly or partial blockage of the temperature sensor vent could result in inaccurate bunk ambient temperature readings. This could lead to poor HVAC performance issues.

4. Screen Descriptions

4.1. Main Screen

The Main Screen is displayed upon initial connection of power to the CCU or when the Home button is depressed from any screen. This Main Screen provides control of the APU and HVAC functions and displays feedback from the APU. The Main Screen is shown in Figure 1 below.

Figure 1 Main Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner. This day/date/time display is shown on each screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The current battery voltage (in VDC) is displayed in the upper left corner of the screen.
3. The Manual Fan Control button is displayed just below the battery voltage display. . *Refer to Section 5.3 for instructions on controlling the fan speed manually.*
4. The current cabin temperature (in °F or °C) is displayed in the center. *Refer to Section 6.1.2 for instructions on changing the units for the temperature display.* When the manual temperature set point is being adjusted, this display changes so the temperature set point is being displayed and the green "Cabin Temp" text changes to a white "Temp Set point." Approximately 5 seconds after the new set point is selected, the display will return to the current cabin temperature. *Refer to Section 5.4 for instructions on adjusting the manual temperature set point.*
5. The red and blue buttons on the right side allow the manual temperature set point to be adjusted. Pressing either one of these buttons causes the temperature display to show the manual temperature set point. *Refer to Section 5.4 for instructions on adjusting the manual temperature set point.*

6. The Inactive button is in the bottom left-hand corner and switches the CCU to Inactive Mode. *Refer to Sections 4.2 and 5.1 for more information on the Inactive Screen and Inactive Mode.*
7. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, , engine disabled features, , etc). When this button is yellow or red, it is a status indicator and a non- functioning button. *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*
8. The Engine Status button accesses the Engine Status Screen. *Refer to Section 4.5 for a description of the Engine Status Screen.* When a service reminder is active, this button turns yellow, displays Service, and accesses the Service Screen. *Refer to Section 4.6 for a description of the Service Screen and Section 7.1 for service reminders.* When an alarm is active, this button turns red, displays Alarm Status, and accesses the Active Alarms Screen. *Refer to Section 4.7 for a description of the Active Alarms Screen and Section 8 for alarm handling.*
9. The Menus button accesses the Menu Screen. *Refer to Section 4.3 for a description of the Menu Screen.*

4.2. Inactive Screen

The Inactive Screen is displayed when the Inactive button is depressed on the Main Screen. *Refer to Section 5.1 for more information on Inactive Mode.* The Inactive Screen is shown in Figure 2 below.

Figure 2 Inactive Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The current cabin temperature (in °F or °C) is displayed in the center of screen. *Refer to Section 6.1.2 for instructions on changing the units for the temperature display.*
3. Touching anywhere on the Inactive Screen switches the CCU into Active Mode and displays the Main Screen. *Refer to Sections 4.1 and 5.1 for more information on the Main Screen and Active Mode.*

4.3. Menu Screen

The Menu Screen is displayed when the Menus button is depressed on any screen, shown below in Figure 3.

Figure 3 Menu Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The Auto button accesses the Auto Menu Screen. *Refer to Section 4.4 for more information on the Auto Menu Screen.*
3. The Clock button accesses the Clock Settings Screens. *Refer to Section 6.1.1 for instructions on setting the clock.*
4. The Settings button accesses the Settings Screens. *Refer to Section 4.10 for more information on the Settings Screens and Section 6 for instructions on changing settings.*
5. The About button accesses the About Screen. *Refer to Section 4.11 for more information on the About Screen.*
6. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on the Main Screen.*
7. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button. *Refer to Section 5.2 for instructions on manually starting and stopping the APU*
8. The Engine Status button accesses the Engine Status Screen. *Refer to Section 4.5 for a description of the Engine Status Screen.* When a service reminder is active, this button

turns yellow, displays Service, and accesses the Service Screen. *Refer to Section 4.6 for a description of the Service Screen and Section 7.1 for service reminders.* When an alarm is active, this button turns red, displays Alarm Status, and accesses the Active Alarms Screen. *Refer to Section 4.7 for a description of the Active Alarms Screen and Section 8 for alarm handling.*

4.4. Auto Menu Screen

The Auto Menu Screen is displayed when the Auto button is depressed on the Menu Screen. The Auto Menu Screen provides access to settings used for all auto start features. The Auto Start programs are Time, Cabin Temp, Coolant Temp, and Battery Voltage. The Auto Menu Screen, shown below in Figure 4.

Figure 4 Auto Menu Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The Time button accesses the Time Auto Start Settings Screens. This feature allows the user to program an auto start based upon time and date. *Refer to Section 5.8 for instructions on setting the Time Auto Start function.*
3. The Coolant Temp button accesses the Coolant Temp Auto Start Settings Screen. This feature allows the user to program an auto start based upon coolant temperature of the APU. *Refer to Section 5.6 for instructions on setting the Coolant Temp Auto Start function.*
4. The Cabin Temp button accesses the Cabin Temp Auto Start Settings Screens. This feature allows the user to program an auto start based upon desired cabin temperature. *Refer to Section 5.7 for instructions on setting the Cabin Temp Auto Start function.*
5. The Low Battery button accesses the Low Battery Auto Start Settings Screen. This feature allows the user to program an auto start based upon battery voltage level. *Refer to Section 5.5 for instructions on setting the Low Battery Auto Start function.*
6. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
7. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the

button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button.. *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*

8. The Engine Status button accesses the Engine Status Screen. *Refer to Section 4.5 for a description of the Engine Status Screen.* When a service reminder is active, this button turns yellow, displays Service, and accesses the Service Screen. *Refer to Section 4.6 for a description of the Service Screen and Section 7.1 for service reminders.* When an alarm is active, this button turns red, displays Alarm Status, and accesses the Active Alarms Screen. *Refer to Section 4.7 for a description of the Active Alarms Screen and Section 8 for alarm handling.*
9. The Menus button accesses the Menu Screen. *Refer to Section 4.3 for a description of the Menu Screen.*

4.5. Engine Status Screen

The Engine Status Screen is displayed when the Engine Status button is depressed on any screen. The Engine Status Screen displays more details about the status of the APU. The Engine Status Screen shown below in Figure 5.

Figure 5 Engine Status Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The screen indicates the current status of the APU, including whether or not the APU is ready to start, what type of APU start is in progress, what mode the APU is running in.
3. The screen indicates whether or not shore power is connected. *Refer to Section 5.9 for more information on Shore Power Mode.*
4. The screen indicates whether or not the HVAC is in heat or cool mode.
5. The screen indicates the setting of the Manual Fan Control button. ***NOTE: This indicates the setting of the Manual Fan Control button which may or may not correspond to the actual fan speed depending on whether or not the APU is on.*** *Refer to Section 5.3 for instructions on controlling the fan speed manually.*
6. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
7. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button. *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*

8. The Service button accesses the Service Screen. *Refer to Section 4.6 for a description of the Service Screen and Section 7.1 for service reminders.*
9. The Alarms button accesses the Active Alarms Screen. *Refer to Section 4.7 for a description of the Active Alarms Screen and Section 8 for alarm handling.*

4.6. Service Screen

The Service Screen is displayed when the Service button is depressed on any screen. The Service Screen displays all active service reminders. *Refer to Section 7.1 for service reminders.* The Service Screen shown below in Figure 6.

Figure 6 Service Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The screen displays all active service reminders. *Refer to Section 0 for service reminders*.
3. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
4. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button. *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*
5. The Clear button allows service reminders to be cleared from the Service Screen with the appropriate security access level.
6. The Menus button accesses the Menu Screen. *Refer to Section 4.3 for a description of the Menu Screen.*

4.7. Active Alarms Screen

The Active Alarms Screen is displayed when the Alarms or Alarm Status button is depressed on any screen. The Active Alarms Screen displays all active alarms. *Refer to Section 8 for alarm handling.* The Active Alarms Screen is shown in Figure 7 below.

Figure 7 Active Alarms Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The screen displays all active alarms. *Refer to Section 8 for alarm handling*.
3. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
4. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button. . *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*
5. The Clear button allows active alarms to be cleared from the Active Alarms Screen. *Refer to Section 8 for alarm handling*.
6. The History button accesses the Alarm History Screen. *Refer to Section 4.8 for a description of the Alarm History Screen.*

4.8. Alarm History Screen

The Alarm History Screen is displayed when the History button is depressed on the Active Alarms Screen. The Alarm History Screen displays all alarms stored in the CCU memory. The Alarm History Screen is shown in Figure 8 below.

Figure 8 Alarm History Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The screen displays all alarms stored in the CCU memory. The alarms are displayed with a date & time stamp. The screen displays up to 10 alarms at a time. To scroll up or down through all stored alarms, depress the upper (scroll up) or lower (scroll down) half of the area defined by the red outline. Up to 350 alarms are stored. Once this limit is reached, no more alarms are stored in memory.
3. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
4. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button. *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*
5. The Clear button allows the stored alarms to be cleared from the Alarm History Screen with the appropriate security access level.
6. The Active button accesses the Active Alarms Screen. *Refer to Section 4.7 for a description of the Active Alarms Screen.*

4.9. Password Entry Screen

The Password Entry Screen is displayed when the Settings button is depressed on the Menu Screen or a function requiring security clearance is attempted. The Password Entry Screen allows for a 4-character alphanumeric password to be entered. The Password Entry Screen shown below in Figure 9.

Figure 9 Password Entry Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The 4 characters that make up the password are displayed. A blue outline is displayed around the selected character. Depressing a single character moves the blue outline to that character.
3. The up & down arrows along the right side of the screen scroll through the available numbers and letters for the selected character.
4. The Home button in the bottom left-hand corner of screen accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
5. The NONE button bypasses the Password Entry Screen and is the same as entering a Level 0 password. *Refer to Section 6.1 for all Level 0 settings & functions.*
6. The Enter button enters the password currently displayed. The appropriate screen is displayed or function is initiated depending on the security access level of the displayed password. *Refer to Section 6 for all Level 0 and Level 1 settings & functions.*

4.10. Settings Screens

The Settings Screens are displayed when the Settings button is depressed on the Menu Screen and a password has been entered. Also, selected Settings Screens are displayed when a selection is made from the Auto Menu screen. A typical Settings Screen allows up to 4 settings to be adjusted. Values for the settings are not saved to the CCU until the Settings Screens are exited by pressing the Home button. *Refer to Section 6 for all Level 0 and Level 1 settings & functions.* A typical Settings Screen shown below in Figure 10.

Figure 10 Typical Settings Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The title of the Settings Screen is displayed at the top of screen.
3. Up to 4 settings are displayed on each screen. The setting name is displayed above a green rectangle showing the current value of the setting. Depressing a single setting selects that setting and turns the green rectangle to white.
4. The up & down arrows along the right side of the screen scroll through the available range of values for the selected setting.
5. The Home button in the bottom left-hand corner of screen accesses the Main Screen. New values for the settings are not saved to the CCU memory until the Home button is depressed. *Refer to Section 4.1 for more information on Main Screen.*
6. The left (<) button scrolls through the available Settings Screens to the left.
7. The right (>) button scrolls through the available Settings Screens to the right.

4.11. About Screen

The About Screen is displayed when the About button is depressed on the Menu Screen. The About Screen shown below in Figure 11.

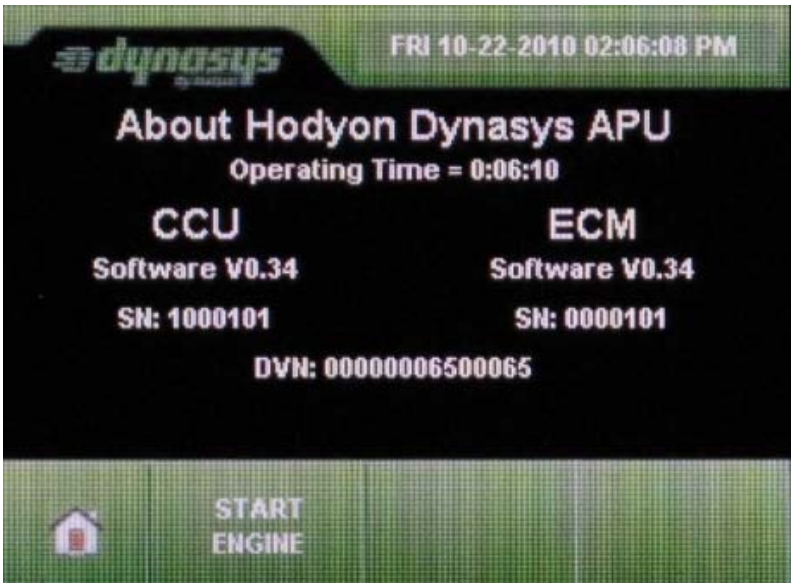

Figure 11 About Screen

1. The current day, date (in MM-DD-YYYY format), and time (in 12-hour or 24-hour format) are displayed in the upper right-hand corner of screen. *Refer to Section 6.1.1 for instructions on setting the clock.*
2. The total operating hours are displayed in HH:MM:SS format. Operating hours accrue when the APU is on or when the system is being operating with shore power. This timer is used to determine when and which service reminders should become active. *Refer to Section 7.1 for service reminders*.
3. The firmware version and serial number of the CCU is displayed.
4. The firmware version and serial number of the ECM is displayed
5. The DVN (Dynasys Validation Number) is displayed.
6. The Home button in the bottom left-hand corner accesses the Main Screen. *Refer to Section 4.1 for more information on Main Screen.*
7. The Start Engine button starts the APU in manual mode. Once the APU has started, this button changes to a Stop Engine button, which when depressed stops the APU and the button cycles back to the Start Engine button. This button also provides limited engine status feedback at various times (engine start and stop status, engine disabled features, etc). When this button is yellow or red, it is a status indicator only and a non-functioning button. *Refer to Section 5.2 for instructions on manually starting and stopping the APU.*

4.12. Screen Saver

If the Screen Saver has not been disabled, then the CCU screen remains active for a defined amount of time (the default time is 120s). If no user activity is detected during that time, the CCU will activate the Screen Saver. The Screen Saver remains active for a defined amount of time (the default time is 300s). If no additional user activity is detected during that time, the CCU screen will turn blank. At any time that the Screen Saver or blank screen is displayed, pressing any part of the screen will return the CCU back to the Main Screen. The Screen Saver shown below in Figure 12. *Refer to Section 6.1.2 for instructions on changing the screen saver settings.*

Figure 12 Screen Saver

5. Operation

5.1. Active/Inactive Modes

Upon initial connection to the ECM, the CCU automatically displays the Main Screen and enters into Active Mode. All functions are available in Active Mode. Depressing the Inactive button in the bottom left-hand corner of screen switches the CCU into Inactive Mode.

In Inactive Mode, all functions (aside from the LCD warming circuit) are disabled. Touching anywhere on the Inactive Screen switches the CCU back into Active Mode and displays the Main Screen.

5.2. Manual Engine Start/Stop

The APU may be manually started or stopped from any screen displaying the Start Engine or Stop Engine button. To manually start the APU, depress the Start Engine button. The button turns yellow and indicates that the engine is starting. The engine start process time varies due to glow plug duration and how quickly the engine gets up to speed. Once the engine is up to speed, the button on the Main Screen turns back to a green Stop Engine button, indicating that the engine has started.

To manually stop the APU, depress the Engine Stop button. The button turns yellow and indicates that the engine is stopping. The engine stop process time varies due to operating settings being controlled. Once the engine is stopped, the button on the Main Screen turns back to a green Engine Start button, indicating that the engine has stopped and may be restarted again if desired. After the engine has stopped the APU engine fans continue to run for duration as defined by the current settings.

5.3. Manual Fan Control

The APU HVAC fan may be manually controlled using the Manual Fan Control button on the Main Screen. The APU must be running or shore power must be connected for manual fan control to be effective. Depressing this button scrolls through the manual control options for off, low, medium, high, and auto fan settings.

When this button is set to “Fan Off,” the fan turns off and all HVAC functions are disabled.

When this button is set to “Fan Low,” the fan turns on at low speed. If manual and automatic heating and cooling functions are enabled, this may activate depending on the settings. The fan remains at low speed whether or not heating or cooling is active.

When this button is set to “Fan Medium,” the fan turns on at medium speed. If manual and automatic heating and cooling functions are enabled, this may activate depending on the settings. The fan remains at medium speed whether or not heating or cooling is active.

When this button is set to “Fan High,” the fan turns on at high speed. If manual and automatic heating and cooling functions are enabled, this may activate depending on the settings. The fan remains at high speed whether or not cooling is active. During heating, the fan switches to medium speed (high fan speed is disabled during heating). The fan remains at medium speed for a defined duration (based on settings) after heating stops before returning to the high speed.

When this button is set to “Fan Auto,” the fan turns on as needed to maintain manual or automatic temperature control. If manual and automatic heating and cooling functions are enabled. this may activate depending on the settings. *Refer to Sections 5.4 and 5.7 for more information on how fan speed is controlled during manual and automatic temperature control.*

5.4. Manual Temperature Control

Manual temperature control is enabled when the CCU is in Active Mode and the fan speed is manually set to low, medium, high, or auto setting. The APU must be running or shore power must be connected for manual temperature control to be enabled. If the fan speed is set to low, medium or high, the fan speed is controlled as described in Section 5.3; otherwise, manual temperature control functions as described below.

Manual temperature control is based upon a single set point and fan speed setting. To adjust the manual temperature set point, depress the red or blue arrows on the Main Screen. Upon depressing one of the arrows, the set point is displayed. Subsequent button depresses will adjust the set point up or down. The Main Screen stops displaying the set point and returns to the actual cabin temperature approximately 5 seconds after the last adjustment. The set point may be adjusted from 59°F to 90°F.

If the cabin temperature drops sufficiently below the set point, the APU HVAC system begins heating and the fan turns on. As the cabin temperature begins to rise, the fan speed reduces from medium to low (high fan speed is disabled during heating). When the cabin temperature rises sufficiently above the set point, the APU HVAC system stops heating but the fan remains on for a defined duration before turning off (to cool the heating elements for safety purposes).

If the cabin temperature rises sufficiently above the set point, the APU HVAC system begins cooling and the fan turns on. As the cabin temperature begins to drop, the fan speed reduces from high to medium to low. When the cabin temperature drops sufficiently below the set point, the APU HVAC system stops cooling and the fan turns off.

The CCU employs several features to prevent constant cycling of heating and/or cooling. These features include waiting for the cabin temperature to exceed a set point for a defined duration before reacting and disabling heating and cooling for a defined duration right after a heating or cooling cycle ends.

5.5. Low Battery Auto Start

The Low Battery Auto Start function starts the APU as required maintaining a minimum voltage level for the truck battery. This feature is always enabled when the CCU is in Active Mode – even if the truck ignition is on. The only way to disable this function is to place the CCU in Inactive Mode.

The threshold for the Low Battery Auto Start function can be adjusted from 11.5 VDC to 13.0 VDC for a 12-volt system (most common), or 23.0 VDC to 26.0 VDC for a 24-volt system (for future configurations). When the truck battery voltage drops below this threshold for a pre-defined duration, the APU automatically starts to recharge the battery. Should the battery voltage begin not to increase, the APU will shut off and the CCU displays a Battery Charging Failure alarm; otherwise, the APU remains on for a pre-defined duration. If the battery voltage still does not exceed the threshold setting, the APU will restart and attempt to recharge the battery again. The APU makes a pre-defined number of attempts to recharge the battery before generating a Battery Discharged alarm. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

To manually abort any auto start function, press Stop Engine while the APU is running. A Warning message will appear indicating that stopping the APU will put the CCU into Inactive Mode. Press OK to continue with the manual stop sequence or Cancel to continue running in auto start mode. Alternatively, depressing the Inactive button during an auto start function stops the APU without the warning message.

Refer to Section 6.1.3 for instructions on changing Low Battery Auto Start settings.

5.6. Coolant Temperature Auto Start

This feature allows the user to program an auto start based upon coolant temperature of the APU. Any user can enable or disable this function from the appropriate Settings Screen. Once enabled, this function is always enabled when the CCU is in Active Mode – even if the truck ignition is on. This function is disabled when the CCU is in Inactive Mode.

The threshold for the Coolant Temperature Auto Start function can be adjusted from -40 to 35°F. When the APU coolant temperature drops below this threshold, the APU automatically starts in order to warm up the APU coolant. The APU remains on for a pre-defined duration (1 to 60 minutes, adjustable by a Level 1 user). After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

To manually abort any auto start function, press Stop Engine while the APU is running. A Warning message appears indicating that stopping the APU will put the CCU into Inactive Mode. Press OK to continue with the manual stop sequence or Cancel to continue running in auto start mode. Alternatively, pressing the Inactive button during an auto start function stops the APU without the warning message.

Refer to Sections 6.1.4 and 6.2.1 for instructions on changing Coolant Temperature Auto Start settings.

5.7. Cabin Temperature Auto Start

This feature allows the user to program an auto start based upon desired cabin temperature. . Any user can change the mode setting for this function from the appropriate Settings Screen. This function may be set to off, heat, cool or auto mode. This function is disabled when the CCU is in Inactive or Shore Power Mode.

If the fan speed is set to low, medium or high, then the fan speed is controlled as described in Section 5.3; otherwise, the Cabin Temperature Auto Start functions as described in the following sections.

The CCU employs several features to prevent constant cycling of heating and/or cooling. These features include waiting for the cabin temperature to exceed a set point for a pre-defined duration before reacting and disabling heating and cooling for a defined duration right after a heating or cooling cycle ends.

To manually abort any auto start function, press Stop Engine while the APU is running. A Warning message appears indicating that stopping the APU will put the CCU into Inactive Mode. Press OK to continue with the manual stop sequence or Cancel to continue running in auto start mode. Alternatively, pressing the Inactive button during an auto start function stops the APU without the warning message.

Refer to Section 6.1.5 for instructions on changing Cabin Temperature Auto Start settings.

5.7.1. Cabin Temperature Auto Start - Off

If the Cabin Temperature Auto Start function is set to off, then the APU does not automatically start based on cabin temperature.

5.7.2. Cabin Temperature Auto Start - Heat

If the Cabin Temperature Auto Start function is set to heat, then automatic temperature control is based on a single set point and settings. Any user can change the “heat only” set point for this function from the appropriate Settings Screen. The set point range is 32 to 95°F.

If the cabin temperature drops sufficiently below the “heat only” set point, the APU starts, the HVAC system begins heating and the fan turns on. As the cabin temperature begins to rise, the fan speed reduces from medium to low (high fan speed is disabled during heating). When the cabin temperature rises sufficiently above the set point, the HVAC system stops heating but the fan remains on for a defined duration before turning off. Once the APU fans turn off, then the APU stops as well. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

5.7.3. Cabin Temperature Auto Start - Cool

If the Cabin Temperature Auto Start function is set to cool, then automatic temperature control is based on a single set point and settings. Any user can change the “cool only” set point for this function from the appropriate Settings Screen. The set point range is 32 to 95°F.

If the cabin temperature rises sufficiently above the “cool only” set point, the APU starts, the HVAC system begins cooling and the fan turns on. As the cabin temperature begins to drop, the fan speed reduces from high to medium to low. When the cabin temperature drops sufficiently below the set point, the HVAC system stops cooling, the fan turns off, and the APU stops. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

5.7.4. Cabin Temperature Auto Start - Auto

If the Cabin Temperature Auto Start function is set to auto, then automatic temperature control is based on two set points and settings. The user can change the “auto high” and “auto low” set points for this function from the appropriate Settings Screen. The set points may be adjusted from 59 to 90°F.

If the cabin temperature drops sufficiently below the “auto low” set point, the APU starts, the HVAC system begins heating and the fan turns on. As the cabin temperature begins to rise, the fan speed reduces from medium to low (high fan speed is disabled during heating). When the cabin temperature rises sufficiently above the set point, the HVAC system stops heating but the fan remains on for a defined duration before turning off. Once the APU fans turn off, then the APU stops as well. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

If the cabin temperature rises sufficiently above the “auto high” set point, the APU starts, the HVAC system begins cooling and the fan turns on. As the cabin temperature begins to drop, the fan speed reduces from high to medium to low. When the cabin temperature drops sufficiently below the set point, the HVAC system stops cooling, the fan turns off, and the APU stops. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

5.8. Time Auto Start

. This feature allows the user to program an auto start based upon time and date.. Any user can enable or disable this function from the appropriate Settings Screen. The recurrence setting for this function may be set to none, daily or weekly. This function is disabled when the CCU is in Inactive Mode.

The start time for the Time Auto Start function can be set from the appropriate Settings Screen. The start time can only be set up to 1 week in advance (only the day of the week,

hour, and minute can be set – not the date). The duration of the Time Auto Start function can be adjusted from 0.01 to 24.00 hours.

If the Time Auto Start recurrence is set to none, then the APU automatically starts at the set time and runs for the set duration. After the Time Auto Start has occurred, this function is disabled (i.e., the function is not recurring). After the APU has stopped the APU engine fans continue to run for a duration defined by the settings.

If the Time Auto Start recurrence is set to daily, then every day the APU automatically starts at the set time and runs for the set duration. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings. The Time Auto Start function starts at the same time every day until the function is disabled or the settings are changed.

If the Time Auto Start recurrence is set to weekly, then every week the APU automatically starts at the set time and runs for the set duration. After the APU has stopped the APU engine fans continue to run for a duration defined by the settings. The Time Auto Start function starts at the same time every week until the function is disabled or the settings are changed.

To manually abort any auto start function, press Stop Engine while the APU is running. A Warning message appears indicating that stopping the APU will put the CCU into Inactive Mode. Press OK to continue with the manual stop sequence or Cancel to continue running in auto start mode. Alternatively, pressing the Inactive button during an auto start function stops the APU without the warning message.

Refer to Section 6.1.6 for instructions on changing Time Auto Start settings.

5.9. Shore Power Mode

The CCU enters Shore Power Mode whenever shore power is connected to the APU. If the APU is running whenever shore power is connected, then the APU automatically stops. In Shore Power Mode, all auto starts (except for Low Battery Auto Start) are disabled. Manual temperature control is enabled in Shore Power Mode. From the appropriate Settings Screen, a Level 1 user may enable or disable the ability to manually start the APU in Shore Power Mode. If manual APU starts have been disabled, the Main Screen indicates that. When shore power is disconnected, the CCU returns to Active Mode.

Refer to Section 6.2.2 for instructions on changing Shore Power settings.

5.10. Truck Ignition Interlock

The APU is interlocked with the truck ignition switch to prevent the APU from running while the truck engine is on. There are two exceptions;the Low Battery Auto Start and Coolant Temperature Auto Start functions are the only instances that allow the APU to run while the truck is on. If the truck engine is on, the Main Screen indicates that and prevents the APU from being manually started.

6. Changing the Settings

The following sections describe all Level 0 and Level 1 settings including their definitions, security levels, allowable ranges, default values, units, and how to access them.

6.1. Level 0

All Level 0 settings are accessible without a password. These settings should be modified as needed by a truck driver.

6.1.1. Setting the Clock

To access the clock settings, from the Main Screen press Menu and then Clock. Scroll through the 2 Clock Settings Screens using the left (<) and right (>) buttons in the bottom right-hand corner of the screen. The year, month, date and day can be changed from the Clock 1 Settings Screen. The hour, minute and clock format (12-hour or 24-hour) can be changed from the Clock 2 Settings Screen. The time must always be entered in 24-hour format (i.e., 13:45 for 1:45 pm). However, the time can be displayed on all screens in the 12-hour or 24-hour format.

Table 6-1 Clock Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Clock 1	Year	Clock Settings	Settings for the system clock.	0	2000 to 2999	N/A	year
Clock 1	Month				Jan thru Dec		month
Clock 1	Date				01 to 31		date
Clock 1	Day				SUN thru SAT		day
Clock 2	Hour				00 to 23		hour
Clock 2	Minute				00 to 59		minute
Clock 2	12/24h				12/24 hour format	12	hour

6.1.2. User Preferences

To access the user preferences, from the Main Screen press Menu and then Settings and enter a Level 0 password (or press None). Scroll to the 2 User Settings Screens using the left (<) and right (>) buttons in the bottom right-hand corner of the screen. The CCU brightness and screen saver settings can be changed from the User 1 Settings Screen. The audible keypad feedback and temperature units can be changed from the User 2 Settings Screen. There is also an option to change the CCU language, but the current CCU version is only in English.

Table 6-2 User Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
User 1	B/L Time (s)	Backlight Duration	The duration that the CCU screens remain active after the last detected user activity before switching to the screen saver.	0	30 to 600	120	seconds
User 1	S/S Time (s)	Screen Saver Duration	The duration that the screen saver remains active before the screen turns blank.	0	30 to 600	300	seconds
User 1	B/L Bright	Backlight Brightness	The brightness level of the backlight.	0	0 to 10	5	N/A
User 1	B/L Perm	Backlight Permanent Enable	Enables the CCU screens to remain active at all times, even after no user activity is detected (i.e., the screen saver is disabled).	0	on, off	off	N/A
User 2	Audible Key	Audible Keypad Feedback	Audible feedback from pressing a key.	0	on, off	on	n/a
User 2	Language	Language	Language of text displayed on the LCD. Currently only English is available.	0	English, French, Spanish	English	n/a
User 2	Temp Unit	Temperature Unit	Temperature units displayed on the LCD.	0	°F, °C	°F	n/a

6.1.3. Low Battery Auto Start

To access the low battery auto start settings, from the Main Screen press Menu, then Auto and then Low Battery. The battery voltage threshold for the low battery auto start function can be changed from the Low Battery 1 Settings Screen. If the Dynasys APU is configured as a 12V system (default configuration), only the setpoint with the 11 to 13.5 range is applicable. If the Dynasys APU is configured as a 24V system (future option), only the setpoint with the 23 to 26 range is applicable.

Table 6-3 Low Battery Auto Start Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Low Battery 1	Low SP (V)	Low Battery Setting (12V)	Setpoint used to trigger low battery auto start in a 12V system. APU starts when battery voltage drops below this value.	0	11.5 to 13.0	12.5	VDC
Low Battery 1	Low SP (V)	Low Battery Setting (24V)	Setpoint used to trigger low battery auto start in a 24V system. APU starts when battery voltage drops below this value.	0	23.0 to 26.0	25	VDC

6.1.4. Coolant Temperature Auto Start

To access the coolant temperature auto start settings, from the Main Screen press Menu, then Auto and then Coolant Temp. The temperature threshold for the coolant temperature auto start function can be changed from the Coolant Auto 1 Settings Screen. The coolant temperature auto start function can also be enabled or disabled from this screen.

Table 6-4 Coolant Temperature Auto Start Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Coolant Auto 1	Enable	APU Coolant Temperature Auto-Start Enable	Enable/disable setting for the APU coolant temperature auto-start function.	0	on, off	off	n/a
Coolant Auto 1	Temp SP (°F)	APU Coolant Temperature Auto-Start Temperature Setpoint	Setpoint used to trigger APU coolant temperature auto-start.	0	-40°F to 35°F	0°F	°F

6.1.5. Cabin Temperature Auto Start

To access the cabin temperature auto start settings, from the Main Screen press Menu, then Auto and then Cabin Temp. Scroll through the 2 Temp Auto Settings Screens using the left (<) and right (>) buttons in the bottom right-hand corner of the screen. The mode for the cabin temperature auto start function can be set from the Temp Auto 1 Settings Screen. The temperature thresholds for the cabin temperature auto start function in auto, heat or cool modes can be changed from the Temp Auto 2 Settings Screen.

Table 6-5 Cabin Temperature Auto Start Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Temp Auto 1	Mode	Temperature Auto-Start Mode	Mode setting for the temperature auto-start function.	0	off, auto, heat, cool	off	n/a
Temp Auto 2	Heat Only (°F)	Temperature Auto-Start Heating Temperature Setpoint (Heat Mode)	Setpoint used to trigger heating cycle during Heat Auto-Start Mode.	0	32°F to 95°F	59°F	°F
Temp Auto 2	Auto Low (°F)	Temperature Auto-Start Heating Temperature Setpoint (Auto Mode)	Setpoint used to trigger heating cycle during Auto Auto-Start Mode.	0	59°F to 90°F (must be less than or equal to Auto High)	59°F	°F
Temp Auto 2	Cool Only (°F)	Temperature Auto-Start Cooling Temperature Setpoint (Cool Mode)	Setpoint used to trigger cooling cycle during Cool Auto-Start Mode.	0	32°F to 95°F	90°F	°F
Temp Auto 2	Auto High (°F)	Temperature Auto-Start Cooling Temperature Setpoint (Auto Mode)	Setpoint used to trigger cooling cycle during Auto Auto-Start Mode.	0	59°F to 90°F (must be greater than or equal to Auto Low)	90°F	°F

6.1.6. Time Auto Start

To access the time auto start settings, from the Main Screen press Menu, then Auto and then Time. Scroll through the 2 Time Auto Settings Screens using the left (<) and right (>) buttons in the bottom right-hand corner of the screen. The time auto start function can be enabled or disabled from the Time Auto 1 Settings Screen. The recurrence and duration for the time auto start function can also be changed from this screen. The start time (day, hour, minute) for the time auto start function can be set from the Time Auto 2 Settings Screen. The start time must always be entered in 24-hour format (i.e., 13:45 for 1:45 pm).

Table 6-6 Time Auto Start Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Time Auto 1	Enable	Time Auto-Start Enable	Enable/disable setting for the time auto-start function.	0	on, off	off	n/a
Time Auto 1	Recurrence	Time Auto-Start Recurrence	Recurrence setting for the time auto-start function.	0	none, daily, weekly	none	n/a
Time Auto 1	Duration (h)	Time Auto-Start Duration	Duration for the time auto-start function. This duration begins when the engine has successfully started.	0	0.01 to 24.00	1.00	hour
Time Auto 2	Start Day	Time Auto-Start Start Time	Start time for the time auto-start function.	0	SUN thru SAT	N/A	day
Time Auto 2	Start Hour				00 to 23		hour
Time Auto 2	Start Minute				00 to 59		minute

6.2. Level 1

All Level 1 settings are accessible with a Level 1 password. These settings should be modified as needed by a truck or fleet owner.

6.2.1. Coolant Temperature Auto Start

To access the Level 1 coolant temperature auto start settings, from the Main Screen press Menu, then Settings and then enter a Level 1 password. Scroll to the Coolant Auto 2 Settings Screen using the left (<) and right (>) buttons in the bottom right-hand corner of the screen. The duration of the coolant temperature auto start function can be changed from this screen.

Table 6-7 Coolant Temperature Auto Start Level 1 Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Coolant Auto 2	Duration (m)	APU Coolant Temperature Auto-Start Duration	Duration of APU coolant temperature auto-start.	1	1 to 60	20	minutes

6.2.2. Miscellaneous

To access the miscellaneous settings, from the Main Screen press Menu, then Settings and then enter a Level 1 password. Scroll to the 2 Misc Settings Screens using the left (<) and right (>) buttons in the bottom right-hand corner

of the screen. The maximum allowable run time for auto or manual mode, and the cabin temperature disable zone can be changed from the Misc 1 Settings Screen. The ability to start the APU with shore power connected can be enabled or disabled from the Misc 2 Settings Screen.

Table 6-8 Miscellaneous Settings

Screen	Parameter Name	Parameter	Definition	Security	Range	Default	Units
Misc 1	Max Man (h)	Max Run Time (Manual Start)	The maximum runtime for the APU after a manual start.	1	0 to 24	0 (no time limit)	hours
Misc 1	Max Auto (h)	Max Run Time (Auto Start)	The maximum runtime for the APU after an auto start.	1	1 to 24	4	hours
Misc 1	Disable H (°F)	Cabin Temperature Disable Zone - Hi Temp	The maximum cabin temperature that defines the zone in which the APU shall not start or run (with the exception of low battery auto start).	1	32°F to 95°F, disabled (both values the same)	disabled	°F
Misc 1	Disable L (°F)	Cabin Temperature Disable Zone - Lo Temp	The minimum cabin temperature that defines the zone in which the APU shall not start or run (with the exception of low battery auto start).	1	32°F to 95°F, disabled (both values the same)	disabled	°F
Misc 2	Shore Restart	Shore Power APU Restart	Allows user to restart APU while shore power is connected.	1	enabled, disabled	disabled	n/a

7. Service & Maintenance

7.1. APU Service Matrix

Table 7-1 below defines APU service task reminders and the operating hour interval where each task is required. When the operating hour timer reaches a milestone listed in the table, the Main Screen displays a yellow Service Status button. Pressing the button displays the Service Screen including the service reminders for that milestone. The table below provides a description of each task since some of the Service Screen reminders are condensed to fit on the CCU. *Refer to Section 4.6 for a description of the Service Screen.*

Table 7-1 APU Service Matrix

Reminder	Task Description	Total Operating Hours							
		50	500	1000	2000	3000	4000	5000	6000
Change oil & filter	Change oil and filter.	x		x	x	x	x	x	x
Check belts, hoses & separator	Visually inspect belts, hoses, water separator.	x	x	x	x	x	x	x	x
Check for leaks & loose parts	Check for leaking or loose components (specifically the mounting hardware).	x	x	x	x	x	x	x	x
Check for noise & vibration	Check for unusual noise or vibration.	x	x	x	x	x	x	x	x
Check switch, terminals & wiring	Check cover safety switch, battery terminals and all wiring to insure nothing is damaged, loose or has corrosion.		x	x	x	x	x	x	x
Change air cleaner filter	Change air cleaner filter.			x	x	x	x	x	x
Clean condenser & air inlets	Clean condenser coil, generator air inlet, HVAC air inlet filter.			x	x	x	x	x	x
Change fuel filter	Change fuel filter.				x		x		x
Change engine coolant	Change engine coolant.				x		x		x
Check engine speed	Check engine speed.				x		x		x

The Service Screen reminders can only be cleared by a qualified dealer or service provider. If the Service Screen is not cleared before the next milestone is reached, the unique service reminders associated with the next milestone are displayed in addition to the ignored reminders.

7.2. Cleaning the CCU

The CCU screen should be cleaned as needed. Follow these instructions to clean the CCU screen:

- Disconnect the cable at the rear of the CCU to power it off.
- Take notice of any smudges or areas to be cleaned.

- Use a dry microfiber cloth to remove any dust and gently brush off any dirt particulars.
- Using a microfiber cloth and cleaning solution (isopropyl alcohol/distilled water), gently wipe the CCU screen clean in a circular motion. Do not press hard on the cloth.
- Never spray any cleaning solutions directly onto the CCU screen. Spray the cleaning solution into the cleaning cloth.
- Don't leave any liquid on the CCU screen. Remove all excess moisture.
- Let the CCU screen dry thoroughly before plugging the cable back into the rear of the CCU.
- For hard to remove stains or ink marks, repeat this procedure several times.

Hodyon sells a protective film for the touch screen CCU. It is Hodyon part # 55-8412.

8. Alarm Handling

Table 8-1 below defines the CCU alarm messages and the resulting APU behavior and required user actions. When an alarm is active, the Main Screen displays a red Alarm Status button and the buzzer sounds for 10s. Pressing the button displays the Active Alarm Screen including all active alarms.

Many of the alarm messages are automatically clearing; as soon as the problem (i.e., safety cover is open) is resolved, the alarm message clears from the Active Alarm Screen. Others are required to be manually cleared after the problem is resolved. To clear an alarm, access the Active Alarm Screen and press the Clear button. *Refer to Section 4.7 for a description of the Active Alarms Screen.*

Up to 350 alarm messages are logged in the CCU. To access the logged alarm messages, access the Alarm History Screen. All alarm messages are displayed with a date & time stamp. The Alarm History Screen can only be cleared by a qualified dealer or service provider. *Refer to Section 4.8 for a description of the Alarm History Screen.*

Table 8-1 Alarm Messages

Alarm Message	Definition	APU Behavior and User Actions
Safety Cover Is Open	APU safety cover is open.	If running, the APU will stop. The APU will not start if the safety cover is open. This alarm clears automatically when the safety cover is closed.
Oil Pressure Is Low	APU oil pressure is low for an extended period of time during the APU start sequence or a shorter time while the APU is running.	If starting, the APU start sequence will abort. If running, the APU will stop. The APU will not start if this alarm is not manually cleared.
Coolant Is Low	APU coolant level is low.	If running, the APU will stop. The APU will not start if the coolant level is low. This alarm clears automatically when the coolant level sensor senses enough coolant.

Alarm Message	Definition	APU Behavior and User Actions
Engine Start Failure	APU did not start properly based on no or low APU speed feedback.	If no APU speed feedback, the APU will make multiple start attempts before aborting and generating this alarm. If low APU speed feedback, the APU will generate this alarm, but continue to make multiple start attempts before aborting. With this alarm active and all start attempts exhausted, the APU will not start if this alarm is not manually cleared.
Engine Run Failure	APU speed was outside of specified range while running.	The APU will start and run multiple times before shutting down and generating this alarm. The APU will not start if this alarm is not manually cleared.
Engine Overheated	APU coolant temperature is too high.	If running, the APU will stop. The APU will not start if the APU coolant temperature is too high. This alarm clears automatically when the APU coolant temperature is below the maximum specification.
Battery Charging Failure	The battery voltage failed to increase after APU started in Low Battery Auto Start.	The APU will stop and the Low Battery Auto Start function will abort. The APU will not start if this alarm is not manually cleared.
Battery Discharged	The battery failed to charge after multiple Low Battery Auto Starts.	The APU will stop, the Low Battery Auto Start function will abort, and the CCU will enter Inactive Mode. The LCD warming circuit will be disabled. The user may enter Active Mode, but the APU will not start if this alarm is not manually cleared.
ECM CCU Comm Failure	CCU and ECM lost communication connection.	If running, the APU will stop. The APU will not start if communication is lost between the CCU and ECM. This alarm clears automatically when communication is restored.

9. Troubleshooting Tips

Problem	Possible Cause/Solution
APU won't start (CCU briefly goes blank and start sequence is aborted)	▪ The truck battery is not sufficiently charged to keep the CCU powered up through the APU start sequence. Charge the battery by running the truck engine or connecting to shore power.
APU won't start (Engine Start Failure Alarm)	▪ The APU tachometer may have become disconnected from the ECM. Check all wiring to the ECM. ▪ The truck battery is not sufficiently charged to turn the APU starter and/or get the APU up to speed. Charge the battery by running the truck engine or connecting to shore power.
CCU is blank	▪ The CCU may be in a low-power mode. Touch the CCU screen to see if the Main Screen is displayed again. ▪ The CCU may have become disconnected from the ECM. Check the connection at the rear of the CCU and at the ECM. ▪ The power connection to the ECM may have become disconnected. Check the power connection at the ECM. ▪ The truck battery may be completely discharged or disconnected. Check the connections at the truck battery and at the APU. Charge the battery by running the truck engine or connecting to shore power.
APU starts disabled	▪ The truck ignition may be on. Access the Engine Status Screen to see if the truck ignition is on. ▪ Shore power may be connected and APU restarts with shore power connected may have been disabled. Access the Engine Status Screen to see if shore power is connected. Disconnect shore power, or enabled APU restarts using a Level 1 password. ▪ An alarm may be active. Access the Active Alarms Screen to see any active alarms. Resolve any alarm issues and manually clear alarms if necessary. ▪ A Level 1 user may set up a disable temperature zone that prevents the APU from running when the cabin temperature is within a defined range. The APU will not start unless the cabin temperature is outside of this range.
HVAC fan won't turn on	▪ The APU may be off. The APU must be running (or shore power connected) in order for the HVAC fan to run. Start the APU or connect shore power.
HVAC fan speed doesn't match manual setting	▪ The APU may be off. The APU must be running (or shore power connected) in order for the HVAC fan to run. Start the APU or connect shore power. ▪ The HVAC fan will not run at high speed during heating.

Problem	Possible Cause/Solution
APU shuts off with no alarm	▪ The dealer has set a maximum run time for both manual and auto starts. After this duration, the APU will automatically turn off. ▪ A Level 1 user may set up a disable temperature zone that prevents the APU from running when the cabin temperature is within a defined range. When the cabin temperature enters this range, the APU shuts off if it was running and will not start unless the cabin temperature is outside of this range. ▪ The APU will automatically turn off at the completion of an auto start function (after the appropriate duration for time, coolant temperature and low battery auto starts; after the cabin temperature reaches the appropriate temperature for cabin temperature auto starts).
CCU screen is frozen	▪ Reset the CCU by unplugging and reconnecting the rear connection.