OPERATOR MANUAL

GRIP®

IDLE MANAGEMENT SYSTEM

3.0

OPERATOR MANUAL

This manual will give the user the understanding of the operation of the GRIP System. It will cover the setting of the time, control of temperature, information system, and the anti-theft setting. This will also cover any tips or other information that the user may require during operation of the GRIP System.

The following information is subject to change without notice and there may be slight differences in how the system functions on different types of vehicles. To access the latest version of this manual please refer to the website or contact info located on the back cover of this manual.

Please Note: The GRIP system has been developed into a flexible and diverse system with many options, all controlled by the options and settings selected though the Service Tool. The following guide depicts what you can expect to see on the screen, however the options and settings selected for your vehicle specifically will determine which of the icons and features are visible. If you have questions about your available options please contact your supervisor.

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QUICK START

The GRIP Idle Management System is designed to control the vehicle engine, to reduce idling yet maintaining a comfortable work environment for the operator. It is also designed to maintain electrical power required for computers, lighting, and other auxiliary equipment added to the vehicle. It acts as a link between the equipment and the vehicle providing the necessary information for the operator. The system simply controls the vehicle's ignition the same way the operator would. It cycles the key in the run, start, and accessory positions as required. This operator handbook will outline these functions as you may come across them during your operation. It is important to note that the GRIP system only operates while the vehicle is in Park or Neutral. These functions are indicated through the GRIP screen in a series of icon referenced in this manual.

Explanation of Icons

Manual Engine Shut Down: If you wish to shut the engine off before it reaches the ***Max Idle Time***, this button can be held to shut down the engine manually, allowing the system to enter monitoring mode. When pressing the button, you will be prompted in the center of the screen to hold the button for two seconds for the engine to shut down.

Clock: The purpose of the clock is to provide a means of setting the time for auxiliary fuel fired heaters, if they are used as part of the system to provide engine preheating.

Temperature Set Point: The desired temperature can be set by adjusting the temperature using the scroll arrows below the icon. The system will try to maintain this temperature as long as the controls on the vehicle are set correctly by the operator.

Info: The information area provides the operator with feedback about the vehicle system. It will display inside air temperature, outside temperature (if available), coolant temperature, RPM and the idle time. It will also display vital tracking information for engine idle.

Anti-Theft: This is an optional feature that allows the operator to press this button, remove the key allowing the system to continue in monitoring mode. Once the engine has reached the max idle time, the engine will shut down and enter the monitoring phase. This will allow the operator to leave the vehicle unattended and secure it with the vehicle's security system. If someone tries to steal the vehicle, the system will shut down the engine immediately.

Engine Running Status: This icon is displayed any time that the vehicle engine is running while in Park or Neutral. This allows the operator to quickly glance at the screen to see the status of the engine while the system is in monitoring mode. If the engine is running there is no delay in putting the vehicle in drive.

Engine Off Status: This icon will be displayed any time the vehicle is in Park or Neutral and the engine is off. This will allow the operator to quickly glance at the screen, realize that he/she must turn the key forward to the start position to start the engine, before putting the vehicle in drive.

Engine Off - not in Monitoring Mode: If there is no icon displayed and the engine is off, this will indicate that the GRIP system is not in Monitoring Mode.

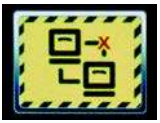
Start/Stop Counter: The counter is displayed when the vehicle engine is about to shut down or start, keeping the operator aware of the vehicle's engine condition. When the idle time reaches the Start/Stop warning time, the counter will appear on the screen and an optional audible alarm may be activated. Once the count reaches "1", the engine will start or stop.

Low Battery Start: The red battery icon will be displayed whenever the battery condition has reached the settings for low battery. During monitoring mode, the Start /Stop counter will be displayed to inform the operator that the engine will start for low battery.

Low Battery Run: This icon is displayed to show the operator that the reason the engine is running is to charge the battery(s). The engine will run for the period of time determined in the system settings. This icon may also be used when the Shore Power Option is selected. When the Shore Power is plugged in, the screen will illuminate and the icon will flash repeatedly.

Air Conditioning: This icon will be displayed when the need for air conditioning exists in the cab. If the system uses the engine to provide A/C then the icon will be displayed, Start /Stop counter will be displayed to inform the operator that the engine will start for air conditioning. If a DC Air Conditioning system is installed, the engine will remain off. The settings of the vehicle HVAC must be set to A/C by the operator in order for the cab to cool. If the vehicle settings are set incorrectly, and temperature increases in the cab, the air conditioning icon will flash and will not restart after the ***Max Run Time*** has been reached. Set the controls to A/C and the system will reset after the vehicle has been started manually.

Heating: When the vehicle requires heat, the heat icon will be displayed. Dependent on the options selected, the engine may either start or it may remain off and auxiliary devices such as the coolant pump or fuel fired heater may be used to provide heat. These options have settings to control when they operate and how long they will operate before the engine is required to start.



Loss of Communication (WARNING): This icon will be displayed in the center of the screen if the system has lost communication with the vehicle or auxiliary devices that are connected to the system. A service representative should be contacted immediately. It is not recommended for the vehicle to be driven until this has been resolved.

Hood Open (WARNING): This icon will be displayed any time the hood is open with the keys in the ignition or when the vehicle is in anti-theft mode. The hood pin is installed to ensure that the vehicle does not start automatically for technicians. As a technician services the vehicle, they need to make sure the hood icon is displayed if they are to leave the keys in the Run position. The engine may be started or stopped by the vehicle's ignition as usual but will not start or shut down automatically by the GRIP system. If the operator notices the icon displayed while the hood is closed, a service representative should be contacted immediately. It is not recommended for the vehicle to be driven until the issue is resolved. The time that the hood is considered open while the vehicle is in use is tracked in the system data.

PTO: This icon will be displayed any time the vehicle is started or running for PTO. The engine will continue to run as long as the PTO is required.

Low Coolant Temperature: This icon will be displayed if the vehicle is starting or running when there is a need for heating the coolant, based on the predetermined ***Low Engine Coolant Temp Set Point***. The engine will run until the coolant temp reaches the predetermined ***High Engine Coolant Temp Set Point***.

Humidity: This icon will be displayed when the vehicle is started to try and reduce the possibility of condensation building up on the inside windshield during operation. It accomplishes this by monitoring the humidity of the air at the windshield as well as the outside temperature, inside temperature, and windshield temperature.

Brake Pedal Release: This icon will be displayed on push button start vehicle if the operator's foot is currently on the brake pedal. The system cannot change ignition positions unless the brake pedal is released.

Air Pressure: The system will monitor the vehicle air brakes and suspension pressure. It will start the engine if the air pressure drops below the predetermined ***Air Pressure Set Point*** minus ***Air Pressure Offset***. The engine will run until the air pressure reaches ***Air Pressure Set Point.***

Hydraulic Temperature: This icon will be displayed when the GRIP system is required to start the engine in order to increase the hydraulic temperature.

Safe Mode: This icon will be displayed when the Safe Mode Feature has been enabled. The system will allow the vehicle to enter into a "Ready State" monitoring mode that can be used to keep the vehicle from reaching a point where the vehicle will not start. It will also keep the vehicle from reaching extreme temperatures for cab, coolant, or hydraulics. **WARNING:** The vehicle should never be parked indoors during this mode.

Manual Heater: The Manual Heater Button allows the operator to manually start the auxiliary fuel fired heater.

SEQUENCE OF OPERATION

Engine Shut Down

The Main Screen will show that the engine is running and may display the day and time, engine status icon, manual engine shut down icon, clock icon, temperature set point, info, and anti-theft icon (if option is selected) *(see picture on right)*.

When the ***Max Idle Time*** is reached, the engine ***Start/Stop Counter*** will be displayed and the engine will shut down after the S***tart/Stop Counter*** time. If the audible alarm option is used, the alarm will sound at the frequency determined in the settings *(see picture on right)*.

After the ***Start/Stop Counter*** counted down to "1", the engine will shut down and the Engine Off Status icon will be displayed. The system is now in Monitoring Mode. To restart the vehicle, simply turn the key to the start position *(see picture on right)*.

Engine Starting for A/C

If air conditioning is required, the A/C icon will be displayed. If the engine is utilized to provide A/C, the S***top/ Start Counter*** will begin counting down to "1" before the engine starts. (If a DC air conditioning system is used, the A/C icon will be displayed and the engine will remain off). If the audible alarm option is used, the alarm will sound at the frequency determined in the settings. The controls for the climate of the vehicle must be in the air conditioning position for this function to work (see picture on right).

Once the engine has started, the Engine Running Status icon will be displayed and the Air Conditioning icon will remain on *(see picture on right)*.

When the temperature set point is reached, the ***Start/Stop Counter*** will be displayed and the engine will shut down. The Engine Off Status icon will be displayed and the system goes back into Monitoring Mode (see picture on right).

Heating

If heat is required, the ***Start/Stop Counter*** will begin counting to "1" to tell the operator the engine is going to start. If the audible alarm option is used, the alarm will sound at the frequency determined in the settings. The controls for the climate of the vehicle must be in the heating position for this function to work *(see picture on right)*.

If the engine is used to produce heat for the cab, it will run continuously if heat is required. Once the engine has started, the Engine Running Status icon will be displayed and the Heating icon will remain on *(see picture on right)*. If the Aux Heater Engine Boost option is enabled, the engine will also start to aid the auxiliary heater if required. The engine will not start at all to provide heat unless the Aux Heater Engine Boost option is enabled.

For vehicles equipped with the auxiliary coolant pump option, the engine will start and raise the coolant temperature to a predetermined set point before shutting the engine off. The pump will circulate until the coolant temperature falls below the operating temperature at which the engine is restarted. For vehicles equipped with auxiliary fuel fire heater option, the engine will not start to provide heat to the coolant. Instead, the auxiliary heater will maintain the coolant at an operating temperature while the pump circulates the coolant. Both of these options will ensure sufficient coolant circulating through the heater exchanger, ensuring warm air is available to heat the cab.

Low Battery Starting

Figure 10: If the battery level becomes low, the Low Battery Start icon will be displayed, the ***Start/ Stop Counter*** will begin and the engine will start.

Figure 10

Figure 11: Once the engine has started, the Engine Running Status icon will be displayed as well as the Low Battery Run icon. The engine will remain running until the **Max Run Time** or the **Current Absorption** setting is reached.

Figure 11

Figure 12: There are three options which could control the length of time in which the engine will run for low battery. **The Max Run Time** is the default option, this will keep the engine running to a predetermined time. The Charge option will shut the engine down once the battery reaches a full state of charge. The Discharge option is used typically in applications with a DC to AC inverter load. As the load is being consumed, the system will continue to run. Once the load has reduced its consumption, the system will run for an additional **Max Run Time** before shutting down the engine.

Figure 12

Low Battery at Start Up: If the vehicle has been parked for longer than the ***Controller Shut Down Time*** or the voltage has dropped below the ***Controller Shut Down Low Battery Set Point***, the GRIP controller will shut down completely. When the operator arrives at the vehicle, the keys must be turned to the run position and allow the controller to turn back on before the vehicle will be able to start. **IMPORTANT: You must leave the key in the run position and allow the controller to power up. It may take several seconds for the controller and the vehicle ECM to both power up.** Do not turn the ignition to the start position at this time or it will delay the starting of the controller and you will have to turn the keys back to accessory and then to run. Once the screen is powered up, the system is ready. This feature is designed to reduce the chance of the vehicle not starting. As long as the starting battery can maintain above 8.5 volts the controller will turn on and activate the solenoid (if equipped) to connect the auxiliary battery and the vehicle will start. After this condition, the clock will need to be set as the information will be lost.

Engine Start for PTO

If the engine is off, as soon as the PTO is engaged the GRIP system will display the PTO icon, the start stop counter will begin and the engine will start *(see picture on right)*.

Once the engine has started the Engine Running icon will be displayed, along with the PTO icon. The engine will continue to run as long as the PTO is engaged *(see picture on right)*.

When the PTO is disengaged, the ***Start/Stop Counter*** will be displayed and the engine will shut down. The Engine Off Status icon will be displayed and the system goes back into Monitoring Mode *(see picture on right)*.

Start for Engine Heating

If the coolant temperature falls below the predetermined threshold ***Low Engine Coolant Temp Set Point***, the Low Coolant Icon will be displayed and the ***Start/Stop Counter*** will begin and the engine will start *(see picture on right)*.

Once the engine has started, the Engine Running Status icon will be displayed. The engine will remain running until the coolant temperature reaches the ***High Engine Coolant Temp Set Point*** *(see picture on right)*.

Once the ***High Engine Coolant Temp Set Point*** is reached, the ***Start/Stop Counter*** will be displayed and the engine will shut down. The Engine Off Status icon will be displayed and the system goes back into Monitoring Mode *(see picture on right)*.

Start for Humidity

If the buildup of condensation is sensed on the inside windshield, the humidity icon will be displayed and the ***Start/Stop Counter*** will begin and the engine will start *(see picture on right)*.

Once the engine has started the Engine Running icon will be displayed along with the humidity icon. The engine will run until it is manually shut down by the operator *(see picture on right)*.

Start for Air Pressure

If the air pressure level falls below the ***Air Pressure Set Point*** minus ***Air Pressure Offset***, the ***Start/Stop Counter*** will begin and the engine will start *(see picture on right)*.

Once the engine has started, the Engine Running Status icon will be displayed along with the Air Pressure icon and the engine will run until the ***Air Pressure Set Point*** is reached *(see picture on right)*.

Once the air pressure requirement is met, the ***Start/Stop Counter*** will be displayed and the engine will shut down. The Engine Off Status icon will be displayed and the system goes back into Monitoring Mode *(see picture on right)*.

Start for Hydraulic Temperature

If the Hydraulic Temperature falls below the predetermined ***Low Hydraulic Temp Set Point***, the ***Start/Stop Counter*** will begin and the engine will start *(see picture on right)*.

Once the engine has started, the Engine Running status icon will be displayed along with the hydraulic temperature icon and the engine will remain running until the ***Hydraulic Temp Set Point*** is reached *(see picture on right)*.

Once ***High Hydraulic Temp Set Point*** is reached, the ***Start/Stop Counter*** will be displayed and the engine will shut down. The Engine Off Status icon will be displayed and the system goes back into Monitoring Mode *(see picture on right)*.

Setting the Temperature

Figure 18: To set the temperature, simply use the scroll button with arrows up and down to adjust. The high and low limits are adjusted using the Service Tool upon installation.

Figure 18

Anti-Theft

Figure 19: The anti-theft function allows the operator to remove the keys without shutting off the engine. The doors can be locked and the vehicle security system activated in order to deter theft of the vehicle. If the vehicle were accessed and the assailant pulls the vehicle into drive, the engine will stall. If this is a keyed ignition, the key must be placed into the ignition. If the ignition is a push button start, the key FOB must re-enter the vehicle in order to de-activate the anti-theft feature (reference the vehicle's supplemental manual for details on specific vehicles).

Figure 20: Press the anti-theft button to engage. It can also be activated on traditional switch plex's used for vehicle lighting etc., if equipped. If the vehicle has a keyed ignition, the key must be removed within 10 seconds of pressing the anti- theft button. If the vehicle has a push start button, must open and close the driver door as they would to exit within 10 seconds otherwise anti-theft will disengage. The icon will be green when the anti-theft is activated.

Figure 19

Figure 20

Figure 21

Figure 21: If the engine is off during monitoring mode, the anti-theft can still be activated to keep monitoring the system while the operator is away from the vehicle. When the anti-theft is engaged, the key position will cycle to accessory (unless the seat belt option is activated and one of the front seatbelts is buckled) rather than to run, if no climate is required to conserve power. If the requirement for climate presents itself, it will automatically cycle back to run. When the ignition is switched to accessory, some functions such as windows etc. will not be accessible. It is not recommended if the operator is in the vehicle to use the anti-theft.

To disengage anti-theft in a vehicle with a keyed ignition, slide the key into the ignition and turn to the Run position. The anti-theft will immediately disengage. If the key is put into the ignition but not turned to the Run position, the system will disengage and will no longer be in monitoring mode. A second option to disengage the anti-theft is pressing the anti-theft button on the screen. The icon will turn white to indicate to the operator that the anti-theft is disengaged. If the key is not in the Run position during this time, the system will disengage and exit out of monitoring mode.

If the vehicle has a push button start ignition (with the key FOB back in the vehicle and doors shut), push the brake pedal or press the anti-theft button on the screen to disengage the anti-theft. If the doors are not closed, the operator will need to cycle push button from Run to Off, then back to Run for the anti-theft to disengage.

INTRODUCTION

The GRIP Idle Management System has been installed to manage the time that the vehicle spends operating in idle. This system not only saves fuel, excessive wear and extends vehicle life. It is also a benefit to the environment reducing emissions caused by unnecessary idle.

The GRIP system works in conjunction with the vehicle's CAN (Controller Area Network). It receives real time data on the vehicle's functions including engine revolutions, transmission position, outside temperature, ignition positions and coolant temperature. Other data required by the GRIP system is received through sensors added when the system is installed in the vehicle. The controller of the system then makes decisions based on the information it receives, allowing it to start and stop the engine of the vehicle as required.

The GRIP controller will only control the vehicle engine's ability to start and stop when the vehicle's transmission is in the park or neutral position. The vehicle will not shut down when stopped in traffic, at a stop sign, or traffic light, provided the vehicle's transmission is not put into the park or neutral position.

One of the unique features of this system is that input from the operator is vital to the operation of the system. The operator has the ability to control the climate inside the vehicle to their desired temperature with a simple push of a button. Since the GRIP system monitors batteries and auxiliary optional equipment as well, it allows the operator to perform all tasks as usual. The only difference being, that the engine will be shut down for unnecessary idle without compromising the operator's functionality, comfort, or safety. The GRIP system doesn't just simply shut down your engine when it idles; it has been designed with the user in mind keeping the vehicle operating experience practically the same.

Before operating your vehicle, check with your supervisor to see what optional equipment has been installed with your GRIP system. This will help you understand what the GRIP is doing with your vehicle, as well as being able to apply the information in this manual.

The system has several settings that allow the GRIP system to function properly. If you feel that some of your settings need adjusting, please contact your supervisor and they can determine the best solution.

BASIC COMPONENTS

Take some time to locate and identify some of the basic components included with your GRIP system. Also take note of any optional equipment your system may have and its location as well.

Controller

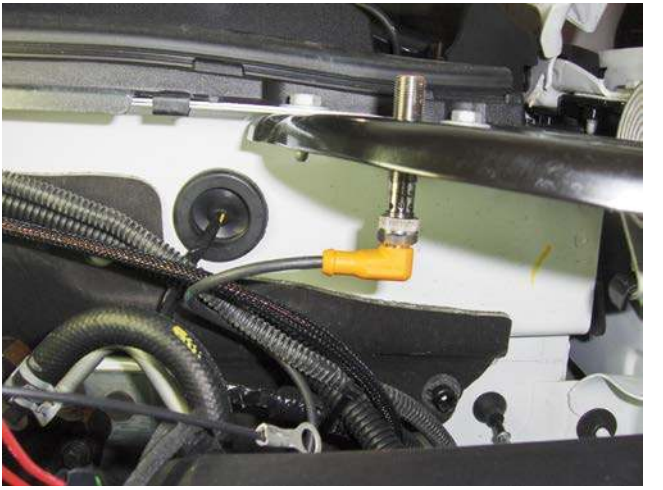
The controller is “the brain” of the GRIP system, responsible for making decisions based on the data received from the vehicle as well as the operators input. The controller is typically mounted under the dash.

Screen

The screen of the GRIP system is the location where all interaction between the operator and the GRIP controller will take place. The screen can be mounted in three different ways. It is recommended to have the screen in a position that is comfortable for the operator to see and reach with ease. Take some time to become familiar with all the icons on the screen and what they represent, as it will allow you to understand the GRIP system’s functions.

The description of each icon can be found in the quick start section. The screen is where the operator can interact with the system allowing them to set the temperature and the clock, as well as control some of the functions that the GRIP monitors. The operator screen will always display what the system is doing such as but not limited to; engine status, why it is running, what function it is operating in and when the engine is starting or stopping. It will display the real-time information of the system and also some of the crucial data that the system is collecting. The screen is only accessible when the vehicle is in park or neutral, when in drive the screen will be blank. This important safety feature ensures it will not be a driving distraction for the operator.

Hood Pin



The hood pin is a magnetic sensing safety feature for servicing the engine. It needs to make contact with a magnet installed directly above the position of the hood pin. The hood pin is typically mounted near the hinge point of the hood or at the front of the engine compartment. A yellow led light will illuminate on the hood pin when it has made contact with the magnet. When the hood pin does not sense the magnet, the GRIP will no longer monitor the vehicle. This is very important so that service can be performed on the vehicle safely when the hood is up; the GRIP will not be able to start the vehicle. The only way to start up or shut down the engine at this point would be manually with a key. An icon will appear on the screen when the hood is up for additional safety. All service work on the vehicle should be done with the hood up. The GRIP will begin monitoring the vehicle after the hood is closed and the engine is started manually.

CAN Connection

This connection is where the GRIP controller reads the vehicle information necessary to make decisions for starting and stopping the engine. The connection is made into the existing OBD connector and is typically found on the driver side of the vehicle, near the gas and brake pedals.

Temperature Sensor

Rear View

Front View

The temperature sensor is how the GRIP reads the interior temperature of the vehicle cabin. It is typically mounted on the dash of the vehicle, out of the path of vents or direct sunlight, to ensure accurate readings.

Fuses

The fuses for the GRIP controller, as well as the optional auxiliary heater, are typically located near the battery in the engine compartment or connected to the solenoid; if auxiliary batteries are being used. The GRIP uses a 5-amp and a 10-amp fuse while the auxiliary heater uses a 20-amp fuse.

OPERATION

Initial Start and Stop

Initial Start Up Screen

When the vehicle is started, a green engine icon will appear in the center of the screen, identifying that the engine is running. When the engine RPM drops below the ***Max Idle RPM*** setting and is in park or neutral, an adjustable count-down warning called the ***Start/ Stop Counter*** will be displayed. When the count reaches "1", the engine shuts down and a red engine icon with a line through it will be displayed. This is the point at which the GRIP system begins to monitor the vehicle's battery, interior climate, coolant temperature, air pressure, and hydraulic temperature (depending on which features are enabled). The vehicle's key should be left in its current position. It is important to note that all of the functions of the vehicle such as windows, wipers, vehicle safety systems, and other accessories will also function while the GRIP is monitoring and the engine is off.

Start/Stop Counter

Engine Shut Down

Monitoring

Engine Shut Down

After the engine is shut off automatically, the GRIP system monitors the vehicle's battery, interior climate, coolant temperature, air pressure, hydraulic temperature (depending on which features are enabled) and will manage these conditions by starting the vehicle's engine or controlling auxiliary devices. Every time the GRIP starts or shuts down the engine, the ***Start/Stop Counter*** will appear in the center of the screen. It counts down by one second until it reaches "1", providing a warning to the operator that the engine's starting or shutting down sequence is about to occur. In addition to the countdown, the screen will also display an icon that correlates to the reason the GRIP is initiating the start up or shut down. The GRIP will only start up or shut down the engine if the transmission is in park or neutral. At any point when the engine is off, the operator can simply turn the key ahead to the start position and start the vehicle. There are other ways to start the engine but the following features must be enabled through the service tool: seatbelt start, driver's door start and/or remote start using an input.

CLIMATE CONTROL

The operator can adjust the temperature using the up/ down arrows on the main screen (Item 1). The GRIP system will monitor the interior temperature based on the operators request as well as the basic offsets that are programmed into the system. The temperature selected on the screen will be the average temperature of the vehicle (Item 2). If the vehicle is equipped with the GRIP Automatic Climate Control 0ption, the temperature control of the vehicle will be automatically controlled by the GRIP system while in the monitoring mode, to maintain the temperature set on the screen.

Air Conditioning

If the temperature increases above a predetermined offset which is set in the system. The GRIP system will start the engine to provide Air Conditioning. The snowflake icon will be displayed to indicate that the system is in the air conditioning mode. The ***Start/Stop Counter*** will appear to let the operator know that the engine is about to start. When the ***Start/ Stop Counter*** reaches "1", the engine will start and the engine icon will turn to green (see Engine Start for A/C).

The climate controls of the vehicle must be set to the air conditioning position to achieve the temperature selected. Unless the System is equipped with Automatic Climate Control, which the system will automatically set the correct position. After the temperature is achieved, the ***Start/Stop Counter*** will appear and countdown to "1". The engine will shut down and the engine icon will change to red. If the air conditioning icon is flashing, this means that the controls are not set correctly or the outside temperature is too low to accept a request for air conditioning. If the system recognizes a three-degree temperature increase after the air conditioning has run for the ***Max Run Time***, the screen will flash the air conditioning icon to let the operator know there is a problem with the settings of the vehicle's climate controls. The operator should check the vehicle's climate settings, to ensure they are set for air conditioning and the blower is on a low to medium setting. It is best to set the controls to a maintaining position rather than at a full setting, in case the vehicle starts for low battery.

Engine Start For Air Conditioning

Engine Running For Air Conditioning

Heating

There are three ways that heating is provided depending on the installation of additional equipment.

1. Engine Only for Heating

If the temperature decreases below a predetermined offset which is set in the system. The GRIP system will proceed to run for heating. The heating icon will be displayed to indicate that the system is in the heating mode. ***The Start/Stop Counter*** will appear to let the operator know that the engine is about to start. When the ***Start/ Stop Counter*** reaches "1", the engine will start and the engine icon will turn to green.

The climate controls of the vehicle must be set to the heating position to achieve the temperature selected. Unless the System is equipped with Automatic Climate Control, where the system will automatically set the correct position. After the temperature is

Engine Running For Heating

achieved, the ***Start/Stop Counter*** will appear and countdown to "1". The engine will shut down and the engine icon will change to red. If the heating icon is flashing, this means that the controls are not set correctly. If the system recognizes a three- degree temperature decrease after the system has run for the ***Max Run Time***, the screen will flash the heating icon to let the operator know there is a problem with the settings of the vehicle's climate controls. The operator should check the vehicle's climate settings, to ensure they are set for heating and the blower is on a low to medium setting. It is best to set the controls to a maintaining position rather than at a full setting, in case the vehicle starts for low battery

2. Engine and Coolant Pump Option

If an auxiliary coolant pump is installed, the GRIP system may not need to start the engine depending on the temperature of the coolant. If the temperature of the coolant is warm enough, it will circulate the coolant through the heat exchanger without having to start the vehicle's engine. The vehicle's climate control needs to

Coolant Pump Providing Heat

be adjusted to a ***low heat position and the fan must be turned on and set to a low setting*** (unless the vehicle is equipped with the GRIP Automatic Climate Control Option). It is best to set the controls to a maintaining position rather than at full settings in case the vehicle starts for low battery. If the temperature of the coolant is not warm enough to produce the heat that is required through the heater exchanger, the vehicle's engine will start in order to heat the coolant. The ***Start/Stop Counter*** will appear and when it reaches "1", the engine will start and the engine icon will change to green. Once the conditions for heat are satisfied or the coolant temperature has increase to a sufficient temperature, the ***Start/Stop Counter*** will appear. When it reaches "1", the system will shut the engine off and the engine icon will change to red. If heat is still required, the coolant pump will start and continue to circulate the warm coolant through the heat exchanger until the condition for heat are satisfied. Once satisfied, the heat icon will disappear and the system will continue the monitor the vehicle.

Engine Started for Low Coolant Temperature

3. Auxiliary Fuel Fired Heater

If an auxiliary fuel fired heater is installed, it will heat the coolant rather than starting the engine. The system will display the heat icon on the screen to indicate that the auxiliary heater is running. Depending on the mounting position of the auxiliary heater, you may be able to hear the heater when it starts. The heater sounds similar to a jet engine. When the auxiliary heater is running and the coolant temperature reaches the heaters internal set point, the heater will shut off but continue to operate the coolant pump to circulate the hot coolant through the vehicle's heat exchanger to warm the vehicle. The vehicle's climate control needs to be adjusted to a ***low heat position and the fan must be turned on and set to a low setting***. It is best to set the controls to a maintaining position rather than at full settings in case the vehicle starts for low battery. Once temperature is achieved, the heat icon will disappear from the screen and the GRIP will continue monitoring the vehicle. If the vehicle needs to be started by the operator or the GRIP, at any time during the operation of the auxiliary heater, the heater will shut down as the vehicle's heating system will then take over.

If the Aux Heater Engine Boost option is enabled, the GRIP system will then use the engine to aid the auxiliary heater. To achieve this, the coolant temperature must drop below the ***Low Engine Coolant Temp Set Point*** while the auxiliary heater is running, the S***tart/Stop Counter*** will count to "1". The engine will start and run while the auxiliary heater continues to run in order to heat the coolant. Once the coolant temperature reaches the ***High Engine Coolant Temp Set Point***, the ***Start/Stop Counter*** will count to "1" and the engine will shut down. If the heat in the cab is not satisfied yet, the auxiliary heater will continue to run.

Climate Performance Tips

1. Setting Climate Controls: When setting the vehicle controls, it is important to set the blower to a low or medium setting to achieve the maximum benefit of the vehicle being off and it will require less performance to maintain the desired temperature. If running the engine for air conditioning on hot days, it will require the blower to be set to high and the climate control to the coldest setting, to be able to achieve the temperature set point.

2. Window fogging: If the inside windshield begins to fog, depending on the outside temperature, the vehicle's climate system may be required to be set for recirculation or outside air. Typically, the driest air, either inside or outside should be used in these conditions. Set the air distribution of the vehicle to defrost. If the vehicle is equipped with the humidity sensor and the automatic climate control option the system will monitor the fogging condition and control the HVAC to overcome the buildup of condensation. It will automatically set the vehicle's climate system and air distribution as required and enable the rear window defroster.

3. While in Anti-theft: If the vehicle has been left in anti-theft and the vehicle starts for low battery, the temperature may increase or decrease beyond the temperature set point since the controls are fixed. It is recommended that the operator set the controls only to maintain the temperature and not at the maximum setting. Set the controls to just add a small amount of heat or a/c to maintain the temperature and select a low speed fan setting. Similar to when you are sitting in the seat, after the vehicle has been running and the temperature has stabilized, you would turn the controls down.

4. If the vehicle's climate system is equipped with automatic climate control, be sure that the settings are set near the same temperature set on the GRIP screen to maintain the same climate set point.

5. If the operator is inside the vehicle while the system is in monitoring mode, the climate control features can still be adjusted to satisfy personal comfort levels such as blower speed and air distribution.

Low Battery

A low battery condition occurs when the voltage of battery(s) drop below a predetermined threshold. When this occurs, the low battery icon will be displayed by the screen with a red battery icon. While the GRIP system is in monitoring mode, the ***Start/Stop Counter*** will appear and countdown to "1"before starting the engine in order to recharge the battery(s) using the vehicle's alternator. The low battery icon will switch to the charging icon which is indicated with a yellow battery icon. These predetermined thresholds are setup based on conditions that will allow the battery(s) to always provide enough power to safely start the engine. The GRIP system will run the engine based on the options the system is configured for. By default, the engine will run to charge the battery(s) until the ***Max Run Time*** has been reached. If the current sensor option is installed, the GRIP system will run the engine until the current draw has been reduced, which could exceed or fall short of the Max Run Time.

If the low battery occurs while the GRIP system is not in monitoring mode, the low battery icon will be displayed but GRIP system will not start the engine. If the vehicle is off or the keys are removed, the GRIP system will eventually power down in order to try and preserve the battery(s) for engine starting by the operator (determined by ***Controller Shutdown Low Battery Set Point***). This powering down of the controller can also occur after the ***Controller Shutdown Time*** has been reached. If this happen, the GRIP system controller will need to be powered up before starting the engine. This may be achieved by placing the vehicle ignition in Run and waiting 2-3 seconds for the screen to turn on before starting the engine. Do not hold the key in the start position until the screen is on. If this condition occurs on a frequent basis, you may want to have the health and performance of battery(s) checked.

If the red battery icon is flashing, this will indicate that there is a "bad battery". The bad battery condition will occur when the vehicle battery drops rapidly when the GRIP system has shut the engine off. The battery health and performance will need to be checked as the battery may not be operating at its optimum performance.

Low Battery 1

Battery Charging

One Battery System

When the vehicle is not equipped with the auxiliary battery option, the GRIP system will only monitor the vehicle battery. A red battery icon will be indicated on the screen when the voltage level of the vehicle battery drops below the ***Main Battery Low Set Point***. While the GRIP system is in monitoring mode, the ***Start/Stop Counter*** will appear on the screen and countdown to "1" before starting the

engine. The battery icon will change from red to yellow indicating the vehicle is running in order to charge the battery. Once the GRIP system ran for the ***Max Run Time*** or the battery is monitored to be fully charged (based on the current sensor option), the ***Start/Stop Counter*** will appear to warn the operator the engine will shut down once it reaches "1".

Auxiliary Battery System

Engine Starting for Low Battery

Vehicles equipped with auxiliary battery, there are two methods of operation, Extend or Either mode. The difference of the two modes is in how the GRIP system will start the engine based on the voltage level of the battery(s). In both modes, the GRIP system will show a red battery icon indicating the voltage level is low and need to be restored. While in monitoring mode, the ***Start/Stop Counter*** will appear on the screen and countdown to "1" before starting the engine. Once the GRIP system has ran for the ***Max Run Time*** or

the battery is monitored to be fully charged (based on the current sensor option), the ***Start/Stop Counter*** will appear to warn the operator the engine will shut down once it reaches "1".

When the system is setup in Extend mode, this will further the amount of time between having to start up the engine for low battery conditions. The vehicle is typically wired to draw from the vehicle battery before the GRIP system latches the auxiliary battery to the vehicle battery through the Separating Solenoid. This latching will occur when the voltage level of the vehicle battery drops below the ***Main Battery Low Set Point***. Once the auxiliary battery drops below the ***Auxiliary Battery Low Set Point***, the GRIP system will then show the red battery icon and proceed to start the engine.

When the system is setup in Either mode, this will start the engine during monitoring mode when either the vehicle battery or auxiliary battery drops below their low voltage threshold. The red battery icon will be displayed to indicated that the vehicle battery or the auxiliary battery is low before starting the engine.

Battery Charging

Door Start

Vehicles equipped with the option of Door Start, the GRIP system will monitor the operation of the driver door as it opens. When the door is opened and closes while the engine is running or in monitoring mode, as if the operator is leaving the vehicle. The system will then enter into a ***No Occupant*** mode, this mode could shorten the time in which the system will run the engine before shutting down due to idling (based on the ***Max Idle – No Occupants*** time). While in No Occupant mode, when the door is opened and closed as if the operator is returning back to the vehicle, the system will exit out of No Occupant mode. If the engine is shut down and in monitoring mode, the system will start the engine immediately and run for the ***Max Idle Time*** or ***Max Idle Time Door Left Open*** (as long as the door is left open). No Occupant mode will continue to enter and exit as the door opens and closes. If the mode is in No Occupant while the operator is in the vehicle, the operator can simply start the engine or take the vehicle out of Park or Neutral to reset the mode. As there are no icons to indicate on the screen what mode the Door Start option is currently in.

The Door Start option also has an additional option which is called ***Door Left Open Start*** which will monitor the door left open while in No Occupant mode. If enabled, when the engine is off during monitoring mode and No Occupant mode, the system will start the engine after the ***Door Open Delay*** has elapsed and run for the time set by ***Max Idle Time Door Left Open***. This is to ensure that if the operator leaves the door open with the anticipation of returning soon, the system will have the engine running on their return unless the Max Idle Time Door Left Open has expired. Make sure to discuss with your supervisor on the times of the door open delay and duration time of the door left open to know when the engine will start and shut off for this option.

Engine Start for Low Coolant Temperature

Vehicles equipped with the option to monitor the coolant temperature, the GRIP system will start the engine while in monitoring mode if the coolant drops below the ***Low Engine Coolant Temp Set Point***. The Low Coolant Temperature icon will display on the screen and the ***Start/Stop Counter*** will count to "1" before starting the engine. While the engine is running and the coolant has reached the ***High Engine Coolant Temp Set Point*** or the ***Max Run Time*** the ***Start/Stop Counter*** will count down to "1" before shut down the engine. This will ensure that the engine coolant temperature is kept at an optimal operating temperature while the engine is off and in monitoring mode.

Engine Run for Initial Low Coolant

Vehicles equipped with this option will have the engine run until the coolant is at an optimal temperature before the GRIP system shuts the engine off. This is only used when the engine has been started by the operator and the coolant is less than ***Engine Run for Initial Low Coolant Set Point*** and the ***Max Idle Time*** has elapsed. Before the ***Start/Stop Counter*** is displayed, the system will determine if the engine needs to continue to run. The Low Coolant Temperature icon will display. Once the coolant reaches the ***Engine Run for Initial Low Coolant Set Point***, the ***Start/Stop Counter*** will count down to "1" before shutting the engine off.

Air Pressure Start

Vehicles equipped with air brakes can only use this option. The GRIP system will start the engine while in monitoring mode if the air pressure of the primary tank drops below the ***Air Pressure Set Point*** minus the offset ***Air Pressure Offset***. The Air Pressure icon will display on the screen and the ***Start/Stop Counter*** will count to "1" before starting the engine. While the engine is running and the coolant has reached the ***Air Pressure Set Point*** or the ***Max Run Time*** the ***Start/Stop Counter*** will count down to "1" before shut down the engine. This will ensure that the air pressure for the brakes are at an optimal operating pressure. If this feature is starting the vehicle on a frequent basis, the vehicle air system may need to be checked for leaks.

Hydraulic Temperature

Only vehicles or equipment which have an onboard hydraulic system can use this option. The GRIP system will start the engine while in monitoring mode if the hydraulic temperature drops below the ***Low Hydraulic Temp Set Point***. The Hydraulic Temperature icon will display on the screen and the ***Start/Stop Counter*** will count to "1" before starting the engine. While the engine is running and the coolant has reached the ***High Hydraulic Temp Set Point*** or the ***Max Run Time*** the ***Start/Stop Counter*** will count down to "1" before shut down the engine. This will ensure that the hydraulics temperature is kept at an optimal operating temperature while the engine is off and in monitoring mode.

PTO/Lights/Aux Option

Only vehicles which are required to monitor the PTO status or auxiliary equipment on the vehicle will require this option. When PTO is required, the GRIP system will start the engine immediately or keep the engine running while this request is needed. Once PTO is reset, the ***Start/Stop Counter*** will be countdown to "1" before shutting the engine off.

High Idle Function

Vehicles equipped with this option will notice the engine rpm at a high idle. There are two configurations which can control the high idle. The first configuration when setup in the system, will place the vehicle into high idle while the GRIP system is running the engine for air conditioning or low battery. The second configuration is an auxiliary input which will trigger the engine into high idle whenever the engine is running. In both configurations, the system will release the high idle one minute before shutdown to allow a cool down period before shutting the engine off.

Shore Power

Vehicles equipped with shore power, the GRIP system will sense when the signal for shore power is connected. When connected, the Charging icon will be flashing on the screen to indicate that the shore power is connected. When the icon is flashing the vehicle will not be able to start even by the operator to ensure that the operator does not try to drive away while connected to shore power. If the engine is running while the shore power is connected and the system's interlocks are safe to shut down, the GRIP system will shut the engine down immediately. Disconnecting the shore power will then allow the operator to start the vehicle's engine.

Clock Programming

Clock Programming with Auxiliary Heater

From the main screen, press the clock button. This will divert you to the next screen, using the direction arrows, scroll down to the set clock field and press the "ok" button to enter the set clock screen. To ensure accuracy for vehicles that are equipped with the auxiliary heater option and the seven-day scheduler, the clock must be set correctly.

To Set the Clock

Setting the Clock

Press the set button that corresponds with the section of the clock you wish to change. To adjust the date, push the button below date on the screen. The icon will turn orange when it is able to be set. Press and hold the up or down arrows to adjust to the appropriate day of the week. To adjust the time, push the button below the set hour icon and the icon will turn orange when it can be set. Press and hold the up or down arrows to adjust the hour. To adjust the minutes, push the button below the Minute icon and the icon will turn orange when it can be set. Once you are done setting the date and time, simply press the button below the back-arrow icon. Check and verify the date and time has been set correctly on the main screen.

Engine Stop

The engine can be shut down by pushing and holding the button below the engine icon. This feature allows the engine to be shut off and enter monitoring mode without waiting for the ***Max Idle Time*** to be reached. A prompt will be displayed on the screen indicating to "Hold" the button as it is being pressed. The engine will shut down after three seconds and the engine icon will turn to red. If the button is pressed and not held for three seconds, the engine will not shut down. This will prevent any accidental button presses. The engine stop feature will only work when the engine is running in park or neutral.

Hood Open Icon

Hood Open Icon

The Hood Open icon will appear on the screen indicating that the hood of the vehicle is open. This sensor is a safety feature to prevent the engine from starting or stopping by the GRIP system. **It is important for anyone preforming service on the vehicle to open the hood to prevent the GRIP system from unintentionally starting the engine while being serviced**. Once the hood is opened, the system will cancel any operation it was preforming. The operator can still stop and start the engine but only using the vehicle's ignition. If the engine was off when the hood was opened, the system will not start the engine once the hood is returned closed. The operator will need to start the engine and allow the engine to shut down by the GRIP system in order to return to monitoring mode. If the hood icon is present while the hood is closed, the operator can still safely drive the vehicle but it is imperative to have the GRIP system serviced by a trained technician.

Communications Icon

Communications Icon

If the communications icon appears on the screen, a communications error has occurred between the GRIP controller and the vehicle or auxiliary devices that are connected to the system. In this instance, the engine can only be started and stopped manually by the operator through the vehicle's ignition. The automatic functions will no longer be active while the vehicle is in park or neutral. The vehicle will be safe to drive but will require service to check the operation of the system. When this icon is present, contact your fleet maintenance department immediately to ensure that there are no other defects on the vehicle that may cause the vehicle to be unsafe to drive.

Information Icon

Information Icon

Pushing the button below the info icon will bring you to another selection screen. Scroll down and choose from the following screens: **System Status, System Data, User Settings and Software Version**.

SYSTEM STATUS

From the main GRIP screen, pushing the button below the Info icon will bring you to another selection screen, scroll down to the **System Status** and click the "ok" button. This will give you access to read-time data of the important information that the GRIP system uses to determine the status of the vehicle.

1. **Idle Time:** The idle time is a count in seconds of how much time the vehicle has been in Park or Neutral with the engine is idling.

2. **Vehicle Battery:** The battery voltage of the vehicle battery. When this voltage drops below the ***Main Battery Low Set Point***, the system may start the engine or connect the battery to the auxiliary battery depending on the settings and options.

3. **Auxiliary Battery:** The battery voltage of the auxiliary battery which was added as an option. When this voltage drops below the ***Auxiliary Battery Low Set Point*** the system may start the engine.

4. **Engine Speed:** This reading is taken from the vehicle communication system to determine the engine status.

5. **Inside Temperature:** The interior temperature is provided by a sensor that has been installed to read the temperature of the cab for controlling the cab temperature.

6. **Outside Temperature:** The exterior temperature is received from the vehicle's communication. If the information is not available it will be indicated with a "n/a" value.

7. **Coolant Temperature:** Supplied by the vehicle communications network, this information is used to allow the GRIP system to control the heating of the coolant for operator comfort.

8. **Windshield Temperature:** If the Humidity Option is selected, this will display the windshield temperature which is used to determine the buildup of condensation on the inside windshield.

9. **Relative Humidity:** If the Humidity Option is selected, this will display the humidity in the air at the windshield sensor. This is used to determine the buildup of condensation on the inside windshield.

10. **Current Sensor:** If the current sensor is used, this will display the current passing through the sensor which is connected to all of the batteries, to monitor the discharge and the charging current.

11. **Hydraulic Sensor:** If the Hydraulic Option is used, this will display the temperature of the hydraulics fluids from the vehicle's communication.

12. **Primary Pressure:** If the Air Pressure Start option is used, this will display the air pressure of the primary air tank which is read from the vehicle's communication.

13. **Secondary Pressure:** If the Air Pressure Start option is used, this will display the air pressure of the secondary air tank which read from the vehicle's communication.

This information is important as it can help the operator understand what functions are working and why. Navigation back to the main screen can be achieved at any time, by scrolling to the return field and pressing "ok".

SYSTEM DATA

From the main GRIP screen, pushing the button below the Info icon will bring you to another selection screen, scroll down to the System Data and click the “ok” button. This will give you access to the accumulative data the GRIP system has recorded from the time of installation.

1. **Life Hours:** Total number of hours the vehicle’s key is in the run position.

2. **Shore Power Hours:** Total number of hours the vehicle has been connected to shore power.

3. **Park and Neutral:** Total number of hours the engine has been running in Park or Neutral.

4. **Idling in Drive Hours:** Total number of hours the engine has been while not in Park or neutral and the vehicle speed is less than 0.6 MPH (1km/h).

5. **Driving Hours:** Total number of hours the engine has been running while not in Park or Neutral and the vehicle speed is above 0.6 MPH (1km/h).

6. **Monitoring Hours:** Total number of hours the GRIP system has been in monitoring mode.

7. **Hood Open:** Total number of hours the hood has been open.

8. **Air Conditioning – Engine Off:** Total number of hours the engine has been off while air conditioning is running.

9. **Heating Hours - Engine Off:** Total number of hours the engine has been off while heat is running.

10. **Monitoring Without Climate:** Total number of hours the engine has been off while heat and air conditioning are not running.

11. **Engine Running for Heating:** Total number of hours the engine has been running to heat the cab.

12. **Engine Running for Air Conditioning:** Total number of hours the engine has been running to cool the cab

13. **Engine Running for Air Humidity:** Total number of hours the engine has been running for humidity.

14. **Low Battery Charging Hours:** Total number of hours the engine has been running to charge the battery(s)

15. **PTO/Lights/Aux Hours:** Total number of hours the engine has been running for PTO.

16. **Low Coolant Temperature Hours:** Total number of hours the engine has been running to heat the coolant.

17. **Throttle Override Hours:** Total number of hours the engine has been running due to operator overriding the shutdown.

18. **Door Start Hours:** Total number of hours the engine has been running due to the operator opening the driver's door to start the vehicle.

19. **Door Left Open Hours:** Total number of hours the engine has been running due to the operator leaving the driver's door open.

20. **Seat Belt Start Hours:** Total number of hours the engine has been running due to the operator buckling the seat belt to start the engine.

21. **Seat Belt Only Hours:** Total number of hours the engine has been running due to the seat belt being buckled.

22. **Anti-Theft Only:** Total number of hours the engine has been running due to the system being in "Anti-Theft" mode, when the "Anti-Theft Only" option is enabled.

23. **Air Pressure Hours:** Total number of hours the engine has been running to build up air pressure.

24. **Hydraulic Hours:** Total number of hours the engine was running for low hydraulic temperature.

25. **Parking Brake Engaged - In Drive:** Total number of hours the engine has been running while in drive with the parking brake engaged.

26. **Brake Pedal Engaged - In Drive:** Total number of hours the engine has been running while in drive and the brake pedal is engaged.

27. **Anti-Theft Hours:** Total number of hours the engine has been running in 'Anti-Theft' mode.

28. **Scheduler Heating Hours:** Total number of hours the engine has been running due to scheduler being set to heat the cab.

29. **Door Start Count:** Total number of times the operator has started the vehicle by opening the driver's door.

30. **Seat Belt Start Count:** Total number of times the operator has started the vehicle by buckling their seat belt.

31. **Throttle Override Count:** Total number of times the operator has overridden the engine shutting down by pressing the throttle.

32. **Liters / Gallons Per Hour - Life Time:** Total number of liters/ gallons the vehicle has used under the Max Idle RPM.

This page's information is important as the operator can see how often the GRIP is working to keep the idling to a minimum. It can also identify any changes that need to be made in any of the settings of the system. Navigation back to the main screen can be achieved at any time, by scrolling to the return field and pressing "ok".

USER SETTINGS

From the main GRIP screen, pushing the button below the Info icon will bring you to another selection screen, scroll down to the **User Settings** and click the "ok" button. This will give you access which the operator can configure the system to their own preference. Some settings may not appear as described as they may not be enabled based on the system configuration.

1. **Celsius or Fahrenheit:** Will display any temperature on the screen in Celsius or Fahrenheit.
2. **12 or 24-Hour Clock:** Will display the clock in 12 or 24-hour convention.
3. **Dim Screen Control:** When enabled, the operator will have the ability to change the screen brightness from the main screen using the left and right arrows. This percentage will display for 2 second where the temperature set point is displayed.
4. **Dim Screen:** This will control the brightness of the screen.
5. **Safe Mode:** When enabled, the GRIP system will be placed into Safe Mode.
6. **Manual Heater:** When enabled, the heater button will be displayed on the main screen only before the engine is started and the GRIP system is not in monitoring mode.

SOFTWARE VERSION

From the main GRIP screen, pushing the button below the Info icon will bring you to another selection screen, scroll down to the Softeware Verison and click the “ok” button. This page will display the program versions. This can be used to verify if a program is up to date. If an update is required, only a trained technician can update a controller or module.

OPTIONAL EQUIPMENT

Anti-Theft *(optional)*

The anti-theft will allow the operator to leave the vehicle safely unattended and still have all of the functionality such as climate control and low battery monitoring. By pressing the button below the anti-theft icon and removing the keys, the operator can secure the vehicle and the GRIP system will continue to monitor all of its functions without the operator in the vehicle. When the button is pressed, the anti-theft icon will change color from white to green, identifying that it has entered anti -theft mode. At this time, vehicles with cylinder keys must have their keys removed from the ignition. Vehicles with push button must open and close the driver door as they would to exit. If this step is not done within 10 seconds, the anti-theft will be canceled. During the time that the operator is away, the engine may start and shut down for battery conditions, heat or air conditioning. If the vehicle is placed into drive or reverse while in anti -theft mode, the engine will shut down immediately and will not restart. They system will keep the engine off until key is returned to the ignition or the key fob is returned inside the vehicle

and the operator has started the vehicle manually. To reset the anti-theft after it was set, the key must be returned and advanced to the run position within 10 seconds or the anti-theft will reset and the vehicle will shut down. On some vehicles that have a push button start, pressing the brake pedal after the doors are closed, or cycling the push button manually from Off to Run will reset the anti-theft. Once the vehicle's ignition is in Run position and the anti-theft is reset, the system will continue to monitor as usual.

With vehicles that are equipped with the option of passenger seat belt monitoring, the GRIP system will keep the vehicle in the Run position while the passenger keeps the seat belt fastened. This is to ensure the vehicles safety equipment like air bags are still active while the ignition is in the Run position. If the passenger returns to the vehicle while the engine is off and the system is in monitoring mode, the vehicle may not register the seat belt is fasten and the system will not change to the Run position. Discuss with your supervisor to see if this option is equipped on your vehicle's GRIP system.

Note: The vehicle should never be left in anti theft while the vehicle is parked in an enclosed area. This may cause serious injury or death due to toxic fumes from the vehicle engine idling.

Safe Mode

Safe Mode is an option which works similar to anti-theft, with the difference of only monitoring particular parameters rather than all parameters for long periods of time. To set the vehicle into safe mode, the GRIP system must be in monitoring mode or the engine running. On the GRIP screen, navigate to the **Information** page then to **User Settings**. Scroll down to the Safe Mode option and select **ON**. This will then place the system in to **Safe Mode**. At this time, vehicles with cylinder keys must have their keys removed from the ignition. Vehicles with push button must open and close the driver door as they would to exit. If this step is not done within 10 seconds, the Safe Mode will be canceled.

Exiting out of Safe Mode follows the same procedure as anti-theft. To reset, the key must be returned to the ignition. The key must be advanced to the run position within 10 seconds or the vehicle will shut down. On some vehicles that have a push button start, pressing the brake while doors are closed or cycling the push button manually from Off to Run will reset the Safe Mode.

Solenoid *(optional)*

The solenoid is added to the system when the auxiliary battery is equipped. The purpose of the solenoid is to separate and/or latch the two batteries together to extend the time that the engine may be off. Upon start up, the solenoid receives a signal from the GRIP to latch or join the two batteries together to ensure starting voltage is available. While the vehicle engine is running, the batteries remain latched together so both sets of batteries are being charged by the alternator of the vehicle.

Auxiliary Coolant Pump *(optional)*

An auxiliary coolant pump is added to the vehicle coolant system to keep already warmed coolant flowing through the vehicle's heat exchanger allowing the engine to shut down for longer periods of time. When the coolant temperature drops down to ***Low Engine Coolant Temp Set Point***, the engine will start and bring the coolant temperature to the ***High Engine Coolant Temp Set Point***. The engine will then shut down and the coolant pump may continue to run to circulate the hot coolant.

Auxiliary Heater *(optional)*

The auxiliary heater can be installed to allow the coolant of the vehicle to be heated without the engine running. This fuel fired heater with its' fuel supply comes from the vehicle's fuel tank. This option will further reduce the amount of time the engine will run. The GRIP system will control the heater to start for engine preheating by use of the seven-day scheduler or fleet scheduler. If the engine is started and the coolant temperature is low, the heater will start to further heat the coolant even while the vehicle is driving to help the coolant reach operating temperature as quickly as possible. Once the engine temperature has reached 75°C (167°F) the heater will shut down. The 20-amp fuse for the auxiliary heater is located at the main battery, in a one battery configuration or at the solenoid in an auxiliary battery configuration. For further information, see Heating section of this Operator's Manual.

Engine Preheating

Seven-Day Scheduler *(optional)*

Seven Day Scheduler

The seven-day scheduler option is available when the auxiliary heater option has been selected and installed. This option can be used to pre-heat the engine. It is important that the day and time on the clock settings are correct for this option to work properly. Refer to setting the clock if the day and time are set incorrectly. This option should never be used if the vehicle is stored indoors, as the heater will produce emissions. Ask your supervisor what length of time the heater has been set to operate, the heater can be set to operate between 1 and 120 min, you should take this into consideration when you set the time for the heater to start.

For example: Heater max operation time set to 90 min, operator shift starts at 7:00am heater should be set to start at 5:30am.

Should you need to operate the vehicle before the heater max operating time has elapsed, you can simply start the vehicle and the heater will continue to run until the coolant temperature has reached 75°C (167°F). The heater may start and stop on its own depending on the temperature of the engines coolant. The heater itself contains a computer that controls functions and speeds automatically.

Once the Seven Day Scheduler has completed the operation time, the timer will automatically skip to the next day but keeping the same time. On a daily basis, the operator has the ability to go to the seven-day scheduler page and press the "ok" button to reactivate the scheduler. If the time requirement has changed, then it must be set before the "ok" button is pressed. If at any point when the heater is operating using the seven-day scheduler and the voltage reached the Low Voltage Shut Down for Scheduler Set Point, the heater will be shut down to preserve the battery for vehicle starting. Since the schedules runs outside monitoring mode, the engine will not start up to charge the batteries.

In order to navigate to the screen to set up your seven -day scheduler you will need to:

1. Press the button below the clock icon and you will be directed to a screen with two options, set clock and Scheduler 7 Day heater.

2. Select the Scheduler 7 Day heater option and press the "ok" button and you will be directed to the next screen.

3. Press the button below the day icon and the icon will turn orange. Using the up or down arrows change to the desired day.

4. Press the button below the hour icon and the icon will turn orange. Set the hour you would like the heater to come on


Tap "ok" to select item
Return
Set Clock
Scheduler 7 Day Heater
ok


MON
04:39
SUN
14
6
Tap "ok" to Enable/Disable
Day
Hour
Min
ok


MON
04:38
SUN
14
6
set for 8 days, 8 hours, 28 minutes from now
Day
Hour
Min
ok

using the up or down arrows. When selecting the time, keep in mind that the heater will run for **Scheduler Max Run Time**.

5. Press the button below the minute icon and the icon will turn orange. Select the minute using the up or down arrows.

When you are finished, press the "ok" button and this will set the heater to operate on the date and time specified. Be sure that the clock on the main screen is set correctly.

Manual Heater

The Manual Heater option is only available if the auxiliary heater is installed. If the operator wants to run the heater manually or forgot to set the Seven Day Scheduler but still want to preheat the engine, the Manual Heater option can be used. Under the **Information** page, scroll down to **User Settings**, the **Manual Heater** option needs to be set to ON. Once enabled, the user can control the heater on the main page by the Manual Heater button. This icon will only appear when the vehicle ignition is in Run and GRIP system in not in monitoring mode. The operator can activate the option which will change the icon color from white to green. The heater will run for the duration of the max operating time used by Seven Day Scheduler. (This can be from 1 to 120 minutes. Talk to your supervisor to know what time was configured for your vehicle.) To manually shut the heater off you can either press the heater icon button or simply start the engine.

Humidity Sensor *(optional)*

This option is used to prevent the inside windshield from condensation building up while the engine is off during monitoring mode. It accomplishes this by monitoring the humidity of the air at the windshield as well as the outside temperature, inside temperature and windshield temperature using an algorithm to determine when fogging is about to occur. If the inside windshield begins to fog, depending on the outside temperature, the vehicle's climate system may be required to be set for recirculation or outside air. Typically, the driest air, either inside or outside should be used in these conditions. Set the air distribution of the vehicle to defrost. If the vehicle is equipped with the humidity sensor and the automatic climate control option (using an algorithm to determine when fogging is about to occur), the system will monitor the fogging condition and control the HVAC to overcome the buildup of condensation. It will automatically set the vehicle's climate system and air distribution as required and enable the rear window defroster.

Audible Alarm *(optional)*

The audible alarm is a function that will warn the operator that the system is going to start or shut down. When it is installed, the alarm will automatically sound when the ***Start/Stop Counter*** is displayed the screen. The audible alarm for starting is different than the alarm for shutting down. The audible alarm starts and stop warning can be turned ON/OFF and the alarm frequency can be adjusted, using the service tool Alarm Options. On vehicles which have a push button ignition, there is an audible alarm that will warn the operator to depress the brake pedal if the pedal is pressed during the changing of ignition position by the GRIP system.

Current Sensor *(optional)*

The current sensor option is for the purpose of monitoring the load of your vehicle. The GRIP system can be configured in two different current monitoring configurations, Charge and Discharge. The Charge configuration monitors the current which the battery is consuming during charging. The Discharge configuration monitors the current which a particular load is consuming and ensures the engine does not shut down while this load is in use.

Charging – if this is selected, the current sensor can be used to monitor the current going back into the battery, to know when the battery is fully charged instead of using the ***Max Run Time***. Sometimes the battery may require additional time for recharging, sometimes less time and this will maximize the efficiency for engine run time for battery charging. It will also ensure that the battery is kept to a better state of charge (SOC).

Discharging – if this is selected, you can use the current sensor to keep the engine running once it has started for low battery. If you have a device that draws a great deal of current requiring the engine to be running, this will ensure that the engine continues to run while the current is being drawn. Once the current draw drops below the Charge/Discharge Set Point, the vehicle will run for the ***Max Run Time*** to further charge the batteries.

SERVICING THE VEHICLE

This part of the Operator's Manual is used for service technicians that are unfamiliar with the system to ensure that they are safe and that the technical information is available.

To Safely Service the Vehicle

When the vehicle is being serviced it is recommended to follow these safety guidelines. To ensure that the vehicle will not start automatically, follow all of these instructions to stop the system from starting and stopping automatically.

1. Remove the keys completely from the ignition of the vehicle. Be sure that the vehicle has not been left in anti-theft. This should be able to be identified if the keys are removed and the screen goes off immediately.

2. If the keys are required for troubleshooting, or if starting and stopping the vehicle is required, open the hood of the vehicle and the Hood Open icon will display on the screen. This will tell the GRIP controller that it is not safe to start or stop the vehicle automatically. The vehicle will start and stop manually with the key but eliminates all automatic features.

3. To disable the vehicle completely, the GRIP fuses must be removed. The fuses are located at the separator solenoid in a plastic sealed enclosure. The vehicle will not be able to be started manually in this situation.

4. Disconnect the batteries negative terminal. If additional batteries are added the grounds for them must be disconnected as well.

OBD2 / J1939 Service Port Connection

The GRIP Idle Management System connects to the vehicle CAN by the service connection. The "Tee" is installed as a pass-through connection and will not affect the reading of the vehicle communication. To connect a diagnostic device to the vehicle, it is recommended to do one of two things to ensure that the communication will function correctly.

1. If the hood is open and the vehicle is in Park, the GRIP system will temporarily stop reading the CAN of the vehicle, eliminating any communication. As soon as the hood is closed, the communication will resume.

2. If the system is to be eliminated in a troubleshooting process, there are two connections that can be removed to test the vehicle systems on their own. The CAN connection and the ignition connections can be removed in the steering column. This will allow for testing of the vehicle safely but the connections must be made before the vehicle should be driven.

FREQUENTLY ASKED QUESTIONS

Q. When the system shuts the vehicle off and I want to start the vehicle again what do I do?

A. The vehicle ignition remains in the "run" position when the engine shuts down. You simply need to cycle the key to the "start`` position. You do not need to turn the key off and back on.

Q. Is there an override for the system?

A. There is not really an override to keep the system off. However, the system only shuts the vehicle engine down if it is in Park/Neutral and is idling. If the system tries to shut the vehicle down and you do not wish to have the engine shut down, you can press the accelerator to temporarily delay the shut-down process. Dependent on the settings, this function may only be available for a limited number of times.

Q. If the GRIP starts my vehicle and I need to drive it, can I just put the vehicle in drive or do I need to restart it myself?

A. Any time the vehicle is running, simply put the vehicle in drive, it does not need to be restarted.

Q. If the vehicle engine is off, do the air bags still work?

A. Yes, they do. The airbags on the vehicle are on any time that the vehicle computers are live. The GRIP Idle Management System always keeps the vehicle computers live while it is in operation.

Q. Will the GRIP system affect the vehicle's warranty?

A. No. The GRIP system only reads information from the vehicle computer and uses the key as an input, making the decision of key position the same way that the operator does. In a sense, it is replacing the operator when the vehicle is in park and idling.

Q. Won't the vehicle go through starters quickly having to start and stop more often?

A. No. The main reason a starter fails is due to low voltage, causing high current to cross over the connections in the starter solenoid. Proper maintenance of batteries, cables and connections will ensure that the life of the starter will not be affected.

Q. Why not just use the key to shut off the vehicle instead of using the engine shut down button?

A. Using the engine shutdown will allow the GRIP to keep monitoring the vehicle. Shutting the vehicle down by turning the key will stop the GRIP from monitoring, losing its ability to maintain temperature and battery voltage.

Q: Will my vehicle shut down for idle while I am stopped in traffic, at a traffic light or stop sign?

A: The only time the GRIP system will shut the vehicle down for idle, is if the transmission is in park or neutral.

Q: If I forget to lock my vehicle when I have set it to anti-theft mode, can anyone get in it and drive away if the GRIP has the vehicle running?

A: No. The keys need to be returned to the ignition to deactivate the anti-theft feature. If there are no keys present and an attempt is made to take the vehicle out of park or neutral the vehicle will be shut down and will not start again until the keys are present.

Q: The screen has the heat icon present, but why did the vehicle not start?

A: If your vehicle has the auxiliary coolant pump or auxiliary heater, the vehicle may not need to start every time to produce heat. The GRIP may be controlling these options to produce the heat required.

Q: Will the vehicle start for low battery when in anti-theft mode?

A: Yes, the vehicle will start in anti-theft mode for low battery; it will start for temperature as well.

Q: Is there a time limit that my vehicle can be in anti-theft mode?

A: No. The only way to take the vehicle out of anti-theft mode is to press the button below the anti-theft icon or put the keys into the ignition. Since the time is unlimited, it is imperative that the anti-theft feature not be used while the vehicle is parked indoors.

Q: Is it possible for my vehicle to shut down while driving because the communication icon came on the screen?

A: If the communication icon appears on your screen while you are driving, the vehicle will not shut down and you can drive the vehicle as normal. You should contact your fleet supervisor immediately to fix this problem however, as the GRIP system is no longer monitoring correctly.

Q: What happens if the GRIP tries to start my vehicle and it will not start?

A: The GRIP will try to start the vehicle five times for ten seconds. If the vehicle does not start within these five tries, the vehicle should be taken for service.

Q: Will my computer, lights, and other devices that I normally use with the vehicle running still operate when the GRIP shuts down my vehicle?

A: Yes, the GRIP allows all of your equipment to remain fully functioning with the vehicle is shut down in monitoring mode. It monitors the batteries to ensure they are at a level strong enough to run all electronics and start the vehicle when it is needed.

BASIC TROUBLESHOOTING

1. Symptom: The vehicle cabin is not getting warm when the vehicle is shut down for idle.

Solution: Verify your heat settings by using the screen arrow buttons. Make sure that the vehicle's climate control is set to the heat setting and the fan is on.

2. Symptom: The vehicle's cabin is not getting air conditioning during shut down for idle.

Solution: Verify your climate settings by using the screen arrow buttons. Make sure that the vehicle's climate control is set to air conditioning and the fan is on.

3. Symptom: Snowflake icon is flashing.

Solution: Confirm the correct temperature settings are on the screen, using the up or down scroll buttons; that the vehicle's air conditioning settings are correct; that the vehicle's climate control has been set to air conditioning. If the outside temperature is below a predetermined set point (Default 10°C (50°F)), the system will not allow the vehicle to start for air conditioning.

4. Symptom: Hood Pin icon is displayed on screen.

Solution: Make sure the hood is closed and latched. Once this is verified, the icon should not be present on the screen. If the icon is still present, the vehicle can be started and run as normal, however the GRIP system will not be monitoring. Contact fleet supervisor.

5. Symptom: The clock is not showing the proper time or date.

Solution: Refer to the manual in order to reset clock.

6.Symptom: Anti-theft feature will not work.

Solution: Verify that the key icon located above the anti-theft button has been pressed and is green.

7.Symptom: Seven-day timer did not start heater at proper time.

Solution: Verify your clock settings are correct. If settings are not correct, please refer to user manual section to set clock. Once settings are verified as correct, navigate to seven- day timer screen and verify the time and day the heater will come on. Make sure you have pressed "ok". This function needs to be set every day, as it does not automatically reset itself. If the clock settings are correct, a low voltage condition may have occurred, and you may need to check the status of your battery health.

8. Symptom: The communications icon appears on the screen.

Solution: Contact your fleet supervisor. The vehicle can be started and run as normal. The GRIP will not be monitoring your vehicle in this condition.

9. Symptom: When I get to the vehicle, the battery seems to be dead and nothing happens when I try to start the vehicle.

Solution: The GRIP system is designed to shut itself down once the voltage drops to the **Controller Shut Down Time.** This is to preserve enough energy in the batteries to start the vehicle. To activate the controller, turn the key to the run position and allow 2-3 seconds for the controller and the vehicle computers to boot up before changing the key position. If this happens often, consult your supervisor as there may be an issue with the settings or the batteries themselves.

10. Symptom: Red LED light is illuminated on the bottom right portion of screen.

Solution: Cycle key, if the light remains on, the controller may need to be reset. This can be done by pulling out and reinserting the 10-amp mini fuse located on the main power harness. This will either be situated at the main vehicle battery in a one battery system or at the solenoid in a two-battery system. If this problem persists, service will need to be scheduled.

11. Symptom: Red LED light flashing on bottom right portion of screen.

Solution: If the red light is flashing, it is indicating a low voltage condition. Check condition of batteries and charge if necessary.

For all other troubleshooting please contact your supervisor.

SUPPORT

Web site: www.gripidlemanagement.com

Phone: 905-304-0400

Toll Free: 844-304-0400

Fax: 905-304-0466

Email: info@gripidlemanagement.com

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