MURPHY®
by ENOVATION CONTROLS

PowerCore®

MGC1000 Generator Control Panel Operations Manual

In order to consistently bring you the highest quality, full-featured products, we reserve the right to change our specifications and designs at any time.

00-02-1167
2018-09-18
Section 40

Warranty - A limited warranty on materials and workmanship is given with this Murphy product.
A copy of the warranty may be viewed or printed by going to www.enovationcontrols.com/warranty

ENOVATION CONTROLS has made efforts to ensure the reliability of the MGC1000 and to recommend safe use practices in system applications. Please note that in any application, operation and controller failures can occur. These failures might result in full control outputs or other outputs that might cause damage to or unsafe conditions in the equipment or process connected to the MGC1000.

Good engineering practices, electrical codes and insurance regulations require that you use independent external protective devices to prevent potentially dangerous or unsafe conditions. Assume that the MGC1000 can fail with outputs full ON; outputs full OFF; or that other unexpected conditions can occur.

Please read the following information before installing.

BEFORE BEGINNING INSTALLATION OF THIS MURPHY PRODUCT:

- A visual inspection of this product before installation for any damage during shipping is recommended.
- Disconnect all electrical power to the machine. Failure to disconnect all electrical power connections before welding can result in damage to the panel and/or its components.
- It is your responsibility to have a qualified technician install the unit and make sure installation confirms with local codes.
- Observe all Warnings and Cautions in each section of these instructions.
- The MGC1000 is designed for use in industrial environments. There might be potential difficulties in ensuring electromagnetic compatibility in other environments due to conducted as well as radiated disturbances.
- Please contact ENOVATION CONTROLS immediately if you have any questions.

IMPORTANT! False or improper use and operation of electronic products could be dangerous. It is required that point-of-operation guarding devices be installed and maintained. All such devices must meet OSHA and ANSI Machine safety standards. The manufacturer shall not accept any responsibility for installation, application or safety of systems.

The MGC1000 can be set as an Auto-Start Controller. Please be cognizant at all times of hands and other objects that are in close proximity to the machine(s) being controlled as they may commence operation suddenly and without warning.

LENS CLEANING PROCEDURES

The lens on the MGC1000 is composed of Polycarbonate materials. Use only mild soap and water to clean the lens/display window. Evidence of improper cleaning techniques or chemicals includes cracks, smear marks, scratches, or fogged/hazy lenses.

- THIS PAGE INTENTIONALLY LEFT BLANK -

Table of Contents

Introduction

This document is designed to familiarize a user with the MGC1000 and how to navigate the interface and modify the settings when setting up and operating the controller. The Quick Set Up guide assists with establishing the different functions in the MGC1000. Before attempting to set up the controller, be sure to read and understand this manual in its entirety.

Murphy PowerCore MGC1000 Panel

The Murphy PowerCore MGC1000 Panel is a dedicated Generator controller for both 120 and 480 VAC single or 3 phase.

The MGC1000 is flexible in many aspects, with the ability to:

- use in most applications where auto start is required or desired;
- use the same controller on electronically governed J1939 and mechanical engines;
- use the same controller on 12VDC or 24VDC systems;
- assign multiple levels of passcode protection to the menu;
- use as auto start or manual start controller;
- change the input sensor type for analog inputs;
- use analog inputs as digital ground inputs;
- assign functions and actions to digital inputs;
- use digital inputs as battery positive or ground inputs;
- be mounted in all-weather environments.

Engine Application States and Delays

The Controller follows a standard operating sequence. This operating sequence is a set of machine states that happen in a fixed order. Machine states can be set to zero if not needed or adjusted to fit the application. The following states will be executed during the auto sequence, provided that the corresponding timer has not been set to 00:00:00 or the controller has not been placed in a manual mode of operation:

- **Stabilize:** This is a timed state to allow the controller to enable the ECU or any senders without warnings or errors. This timer can be disabled if set up for mechanical engine use.
- **Stopped:** This is a timed state where the engine is ready to be started manually or automatically.
- **Standby:** This is a timed state that will shut off the LCD backlight, heater and CAN transceiver to conserve power while the unit waits for a key press or an automatic start condition.
- **Wait To Start:** when an engine is not ready to start and sends a message across the J1939 communications stating it is not ready to start.
- **Auto Start Delay:** (**available in Auto Mode only)** The auto start condition is ignored and must remain active throughout this delay or the delay is reset to zero.
- **Prestart Delay 1:** After a start condition has been accepted by the controller, this delay begins timing, and the prestart output turns on. When this delay expires, the output is turned off, and the start sequence continues.
- **Check Safe To Start:** This is a non-timed state that will check to ensure the engine can start safely.
- **ECU Stabilize Timer:** This delay begins timing when the controller is powered up, in Spindown or when the Standby delays have expired. During this delay, the ECU-enabled output is turned on. The ECU output turns off when the Standby, ETS or Spindown delays begin timing.

- **Prestart Delay 2 (Precrank):** After a start condition has been accepted by the controller, this delay begins timing, and the prestart output turns on. When this delay expires, the output is turned off, and the start sequence continues. During this delay, the controller checks for faults, J1939 com, etc.
- **Prestart Delay 2 (Crank Through):** After a start condition has been accepted by the controller, this delay begins timing, and the prestart output turns on. When this delay expires, the output remains on, and the start sequence continues. The output turns off when the engine starts. During this delay, the controller checks for faults, J1939 com, etc.
- **Crank:** This is a timed state to try and start the engine.
- **Crank Rest:** This is a timed state to rest the starter between cranks in case the engine did not start during the crank state.
- **False Start Check:** This is a non-timed state that will ensure the engine stays above the crank cut RPM after cranking.
- **Warm-up:** (**available in Auto mode only)** This is a timed state that will allow the engine to change from idle to desired warm-up RPM after starting. Warm-up will only set as low as the minimum RPM set point.
- **Running Loaded:** This is a non-timed state that the controller will stay in until a stop condition occurs.
- **Auto Stop Delay: (available in Auto Mode only)** The auto stop condition is ignored and must remain active throughout this delay or the delay is reset to zero.
- **Cooldown:** (**available in Auto mode only)** This is a timed state that will allow the engine to run at a desired speed to cool down before allowing to go into a stopped state.
- **Spindown:** The time allotted for the engine to stop all revolutions and be in a stopped state with no frequency.

User Interface

The keypads on the MPC-10 portion of the MGC1000 are comprised of 11 tactile buttons. This section describes the functions of each button.

Figure 1: User Interface

The buttons have the following functions:

- **Start Key** – Allows the operator to start sequence in Manual Mode or initiate an auto start sequence when in Auto Mode (do not use in Auto Mode when set to single contact auto start method).
- **Stop Key** – Allows the operator to initiate the stop sequence in either manual or auto mode of operation. As a safety feature, the stop key will skip the cool-down state when it is pressed twice or held in auto mode. Once shut down, the controller will enter manual mode to eliminate an auto crank condition if the auto start condition is still present.
- **Auto Key** – Allows the operator to change from Auto to Manual or Manual to Auto Mode by pressing the key. When changing from manual to auto mode a confirmation is required by the operator as shown on the display.
- **Alarm Silence Key** – Allows the operator to acknowledge alarms on the controller when warnings and shutdowns are present as well as silences the remote alarm output.
- **Manual Throttle Increase Key** – Not Available
- **Manual Throttle Decrease Key** – Not Available
- **Menu Key** – Allows the operator to get in and out of the menu.
- **Back Key** – Allows the operator to move back one step while in the menu.
- **Enter Key** – Allows the operator to enter a value in the menu when selected and is used to acknowledge internal and external alarms/shutdowns.
- **Up Key** – Allows the operator to navigate up through the menu and page forward on the main pages.
- **Down Key** – Allows the operator to navigate down through the menu and page reverse on the main pages.

Accessing the Menu

The MGC1000 has 3 menu security levels to restrict users from making changes after installation. The security levels are Low, Medium and High. One may consider these security levels as user, technician and OEM. By default the low level security has a small number of menu items a user can access. The medium level security has all the low level menu items plus other menu items a technician may change while in the field. The high security level has the entire menu visible to the operator or OEM.

To access the MGC1000 menu, press the menu key. Review section Menu Glossary and Passcodes to understand the menu level presets in the controller. The following screen will display to enter the passcode: [Low=1111; Medium=5311; High=3482].

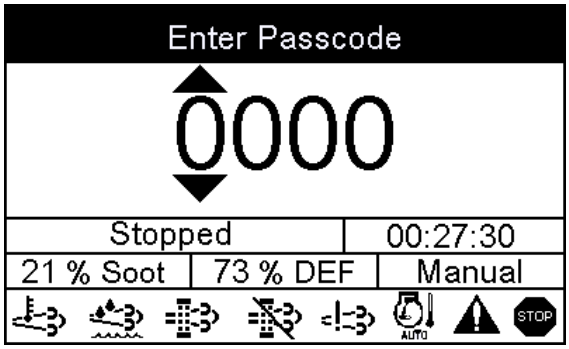


Figure 3: Enter Passcode

The password will be entered left to right. Utilize the up and down arrows, and press the Enter button after each correct number: Entering this password will allow full access to the menu. If you enter the wrong password, it will reset the display to 0000, allowing you to restart the entering process.

> **NOTE:** To learn more about passcode security and changing the security levels, please refer to the Configuration Tool manual for the MPC-10 / TEC-10.

Main Menu

The MGC1000 controller is incredibly versatile within the menu structure. The operator is able to change most parameters and settings from the face without the need of a PC tool, if desired. **The controller must be in its stopped state in order to change a setting in the menu.** (The Tier 4 menu is the sole exception). Described below are the main sections of the controller's menu. **Cycling power to the controller is recommended after making changes to set points and input/output.**

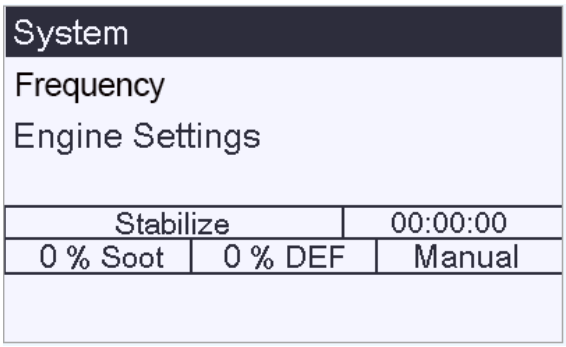


Figure 4: Main Menu, page 1

System

The controller System menu provides the operator with the ability to set the Date/Time, Units, Language, Brightness, Service Reminders and several other system settings. Review System under the Menu Glossary section of this manual for a full list and definition of each setting.

Frequency

The Frequency menu allows the operator to change and select AC Frequency setpoints such as: 50Hz or 60 Hz, alarm settings and associated time delays.

Engine Settings

The Engine Settings menu allows the operator to establish common user-configurable parameters that would be changed from factory default settings when pairing the controller to an engine. This menu allows the operator to choose whether the engine is J1939 or mechanical, the engine's speed source, the minimum and maximum RPM the operator requires/allows the engine to run, warm-up/cool-down settings and other common engine settings. Review Engine Settings under the Menu Glossary section of this manual for a full list and definition of each setting.

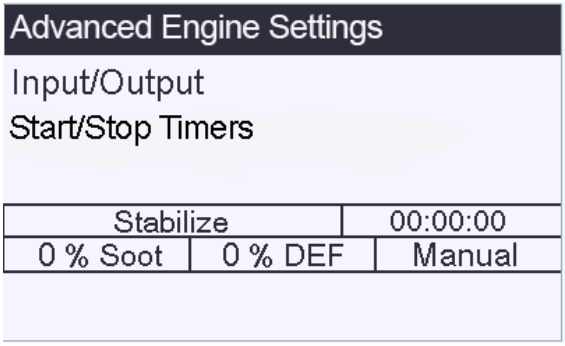


Figure 5: Main Menu page 2

Advanced Engine Settings

The Advanced Engine Settings menu allows the operator to set up the less common user-configurable parameters that are not in the Engine Settings menu and which would be changed from factory default settings when pairing the controller to an engine. This menu allows the operator to set items such as the J1939 address claim for the controller, ECU Source Address, ECU hour select, crank attempts, crank disconnect speed and other user-specific engine settings. Review Advanced Engine Settings under the Menu Glossary section of this manual for a full list and definition of each setting.

Input / Output

The Input/Output menu allows the user to establish the I/O needed for the application. This includes Digital Inputs, Analog Inputs, Relay Outputs and Digital Outputs. This menu is tied to other aspects of the controller menu such as Auto Start Functions, Auto Throttling Methods, Analog Inputs for Mechanical Engine setup, Warning / Shutdown functions and all outputs needed for starting/controlling the engine and alerting the user.

The Digital Inputs of this menu can be configured from the face of the controller to accept three types of inputs as the Active state of the input.

- High, B(+)
- Low, B(-)
- Open

The Analog Inputs of this menu can be configured from the face of the controller to accept one of four types of senders:

- Resistive
- 4-20mA
- 0-5VDC
- Analog.Digital (B- for additional Digital Inputs)

The Outputs are configurable for the operator to choose which output function to use with the desired output type as shown below.

- Relay [10A, Form C]
- Digital Out [1A, B(+)]
- Digital Out [1A, B(-)]

> **NOTE:** Although the functionality exists to set all analog and digital inputs to the same function, Enovation Controls strongly advises against this.

Start / Stop Timers

The Start/Stop Timers menu provides the operator the ability to add a countdown timer, scheduled start/stop times, and an engine exercise timer. All Start/Stop timers only work when the controller is set to auto mode. The countdown timer allows for the operator to set a desired countdown time and walk away from the engine for a controlled shutdown when the timer expires. There are three Start/Stop Timers the operator can choose from within this menu that allows for the specific day and hour the controller will start and stop utilizing the internal clock. Review Start/Stop Timers under Menu Glossary section of this manual for full list and definition of each setting.

> **NOTE:** Start / Stop timers work in conjunction with other Start / Stop types. The Start / Stop times are independent of the other Auto Start methods. If the engine is already running from another Start / Stop type when a Start / Stop timer occurs, the Start / Stop timer is ignored. Once the engine is started by the Start / Stop timer the Auto Stop method is ignored and will be stopped by the set Stop time.

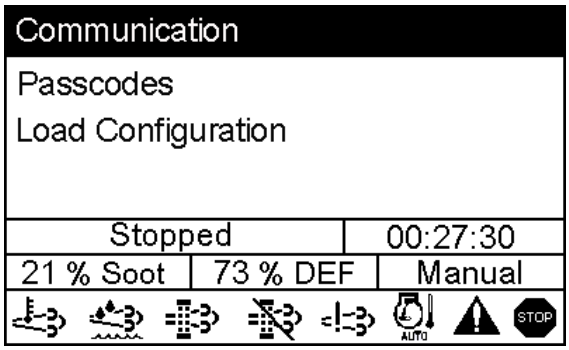


Figure 6: Main Menu page 3

Communication

The Communications menu allows the operator to choose the type of RS485 communications such as PVA Gauge, Modbus or Local Display. The menu also allows for the operator to choose CAN termination and enabling of the CAN Parameter Map. Review Communication under the Menu Glossary section of this manual for a full list and definition of each setting.

Passcodes

The Passcodes menu is only available in the high security menu and allows the operator to see the three level of passcodes set in the controller. The passcodes are read only in this view. Passcodes are able to be changed from default passcode setting via PowerVision for Controllers configuration tool.

Load Configuration

The Load Configuration menu is only available in the high security menu. This menu item allows the operator to choose a file to load onto the controller when a USB drive is attached to the programming harness of the controller. Review Load Configuration under the Menu Glossary section of this manual for a full list and definition of this item.

Auto Start/Stop Functions Defined

There are two automatic start/stop types in the MGC1000. Each is detailed below:

Single Contact Start/Stop (commonly known as a contact from a transfer switch)

The Single Contact Start/Stop occurs when a remote contact is active for auto start and inactive for an auto stop as a digital input.

Local Start Key Start/Stop

The Local Start Key function uses the green and red buttons on the front interface for auto start and stop sequencing. The passcode of 1212 must be entered for the first key start after power up.

Quick-Start Setup

The following sections provide a walk-through of the steps necessary for some of the various configurations and settings available on the MGC1000 Controller. **Cycling power to the controller is recommended after making changes to set points.**

Stepping through the Menu will be depicted as follows:

Menu/System/Brightness directs the operator to go into the Menu first, then look for a parameter titled System and press **[Enter]** to go into the System menu. Then look for a parameter titled Brightness and press **[Enter]** to go into the Brightness menu, etc.

Mechanical Engine Setup

1. Access **Menu/Engine Settings/Engine Type,** and select Mechanical then press **[Enter]**.
2. Press down arrow to **Engine Manufacturer**, select which engine manufacturer the controller is/will be used then press **[Enter]**.

3. Access **Analog Inputs** and assign one Analog input for Oil Pressure and one for Engine Temperature. Press **[Enter]** to save the settings.
4. Press **[Back]** and access Relay and Digital Outputs.
5. Press down arrow to **Relay1-3 or DO1-4**, and assign desired outputs for Crank, Fuel, Prestart, etc.
6. Press the **[Back]** key and up arrow to **Advanced Engine Settings**, and press **[Enter].**
7. Press down arrow to **Warnings and Shutdowns**, press **[Enter]**.
8. Ensure all warnings and shutdowns are set to the appropriate settings for the engine for engine faults such as oil pressure and coolant temperature.
9. Press the **[Back]** key twice and up arrow to **System**, and press **[Enter].**
10. Press down arrow to **Set Machine Hours,** select desired machine/internal hours then press **[Enter]**.
11. Press the **[Menu]** key to exit the menu setup screens.

J1939 Electronic Engine Setup (Factory Default)

1. Access **Menu/Engine Settings/Engine Type** to ensure J1939 is selected.
2. Press down arrow to **Engine Manufacturer**, select which engine manufacturer the controller is/will be used then press **[Enter]**.
3. Press down arrow to **Engine Emission**, select the emissions level of the engine then press **[Enter]**.
4. Press down arrow to **Tier 4** (if a Tier 4 selection is made in Engine Emission menu), press **[Enter].**
    a. Press down arrow to **DEF Gauge**. Select Yes to show this gauge (if needed) then press **[Enter]**.
    b. Press down arrow to **Percent Soot Gauge**. Select Yes to show this gauge (if needed) then press **[Enter]**.
    c. Press down arrow to **Regen Screen**. Select Yes to show this screen (if desired) then press **[Enter]**.
5. Press the **[Back]** key and down arrow to **Advanced Engine Settings**, and press **[Enter]**.
6. Ensure **Address Claim** is set to the CAN address from which the Tier 4 regeneration is expected to be sent to the engine ECU (this is often times designated by the manufacturer/distributor).
7. Press down arrow to **Warnings and Shutdowns**, press **[Enter]**.
8. Ensure all warnings and shutdowns are below or above ECU settings if required to have the ECU shutdown the engine instead of the MGC1000 (for engine faults such as oil pressure and coolant temperature).

> **NOTE:** If requiring the engine ECU to shutdown the engine on any engine shutdown fault without help from the controller, select ECU Shutdowns in the System Menu and change the setting to ECU Only.

9. Press the **[Back]** key and down arrow to **Input/Output**, and press **[Enter]**.
10. Press down arrow to access **Analog Inputs,** ensure the analog inputs aren't set to oil pressure or coolant temp (disable or change to something different).
11. Press down arrow to **Relay1-3 or DO1-4**, and assign desired outputs for Crank, ECU Enable, Prestart, etc.
12. Press the **[Menu]** key to exit the menu setup screens.

Setting to Auto Start on Clock

> **NOTES:**
> **1)** Ensure the correct date and time are established in the System menu prior to establishing the Auto Start on Clock settings.
> **2)** The Clock start timer is independent of other auto start start/stop functions. When started from the clock the controller will shut down the engine from the clock.

1. Access **Menu/Start_Stop Timers**, and select the first Start/Stop Timer.
2. Select Start Day 1 and then select the appropriate day or Daily.
3. Select Start Time 1 and establish the hour, minute and second to start.
4. Establish the Stop Day and Time as in steps 2-3.
5. Press the **[Menu]** key to exit the menu setup screens.

> **NOTE:** The MGC1000 has the ability to establish three different Start/Stop dates and times. If desired, repeat steps 1-3 for subsequent Timers.

Setting up to Stop the Engine from Utilizing the Countdown Timer

The MGC1000 will only utilize this timer when starting in Auto mode. The control and the running of the engine will continue until the chosen stop condition is met or until the Countdown timer runs out of time. Once set, the operator will be required to disable or change the timer in the menu in order to eliminate the countdown timer being active on every auto startup.

1. Access **Menu/Start_Stop Timers/Countdown Timer**.
2. Set the hours, minutes and seconds desired for the running of the engine, and press **[Enter]**.
3. Press the **[Menu]** key to exit the menu setup screens.

> **NOTE:** When the Countdown Timer is set for a countdown, the controller will always countdown upon an auto start until the timer is set to 0.

Screen Examples

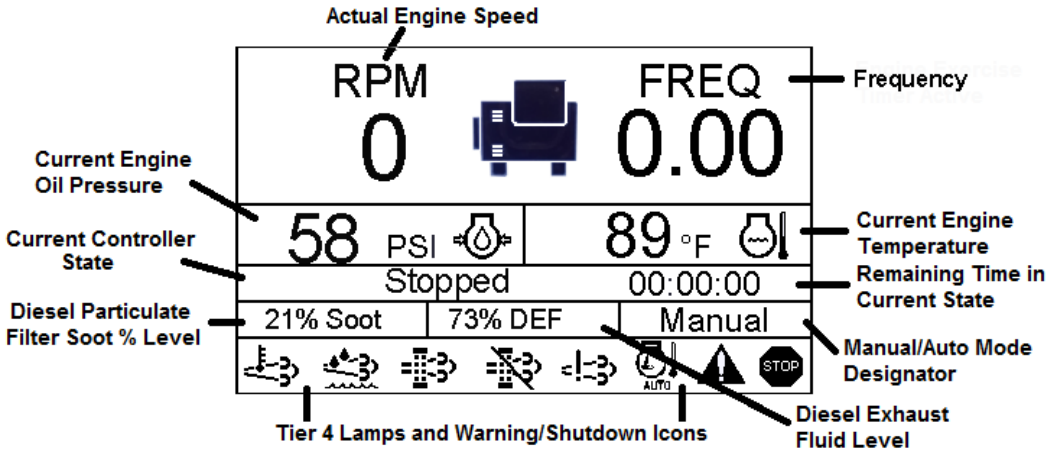


Figure 8: Screen Example

Additional Screens

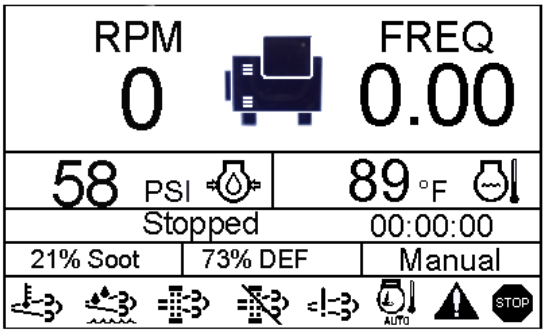


Figure 9: Main Screen

This is the main screen, and it displays actual and target RPM, Mode of Operation, Timer progress, % Soot Level, % DEF Level and current State, along with icons and warnings.

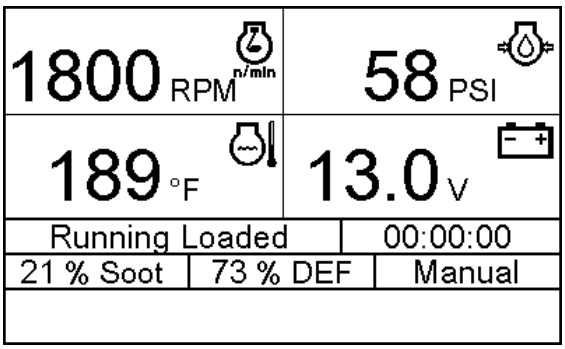


Figure 10: First 4-Up Screen

This is the first 4 up screen, displaying engine RPM, oil pressure, engine temperature and battery voltage. If alternate parameters are desired, these may be changed using the free MGC1000 software configuration tool.

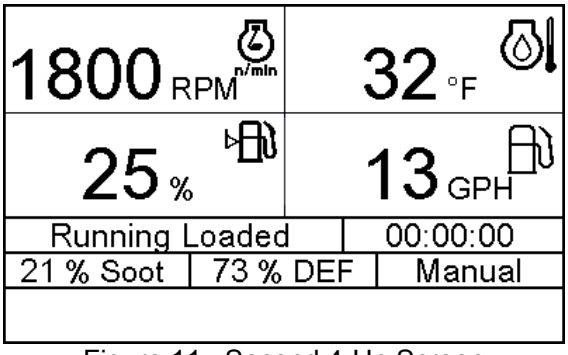
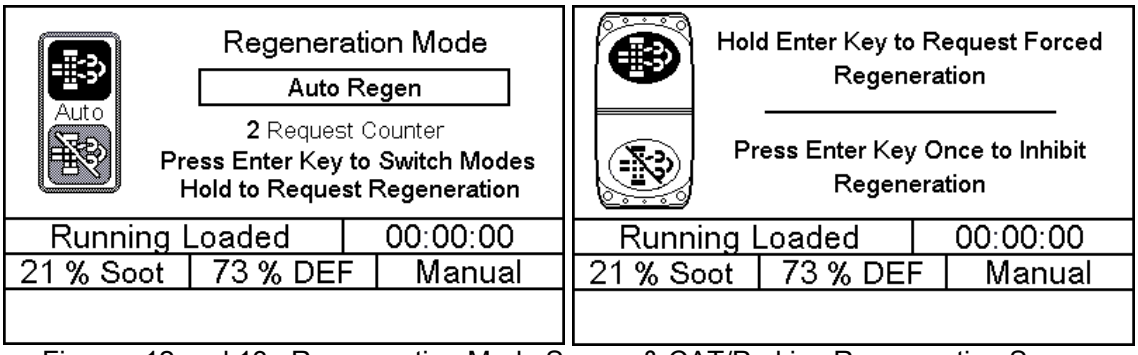


Figure 11: Second 4-Up Screen

This is the second 4 up screen, displaying engine RPM, engine temperature, fuel level and GPH. If alternate parameters are desired, these may be changed using the free MGC1000 software configuration tool.

This screen displays the auto start/stop type and will also illustrate the throttling method for the auto start/stop.



Figures 12 and 13: Regeneration Mode Screen & CAT/Perkins Regeneration Screen

This is the Tier 4 Regeneration screen that is selected to be shown in the Tier 4 menu. This screen shows and allows the user to select the regeneration mode without accessing the menu, if desired.

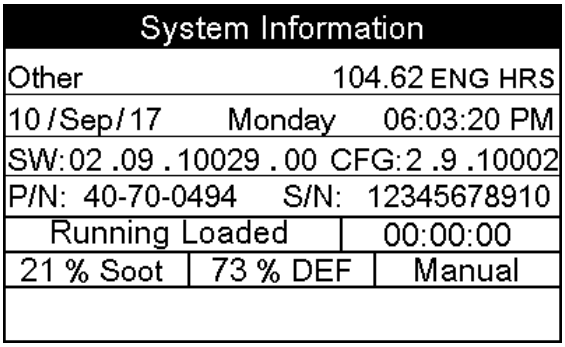


Figure 14: System Information

This screen displays the Engine Manufacturer, Engine Hours, date, day, time, software version number, configuration number, part number (if available) and serial number (if available). This page will assist Technical Services Support should their services be needed.

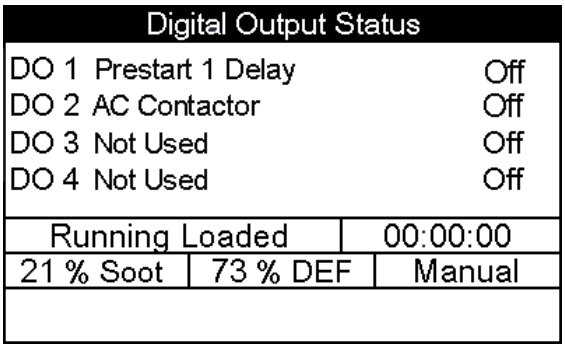


Figure 15: Digital Output Status

This screen will allow the operator to see what the digital output functions are set to without accessing the menu and the active setting which informs the user of the output status.

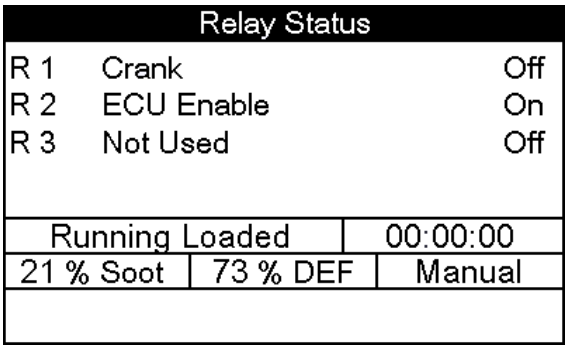


Figure 16: Relay Status

This screen will allow the operator to see what the relay status functions are set to without accessing the menu and the active setting which informs the user of the relay status.

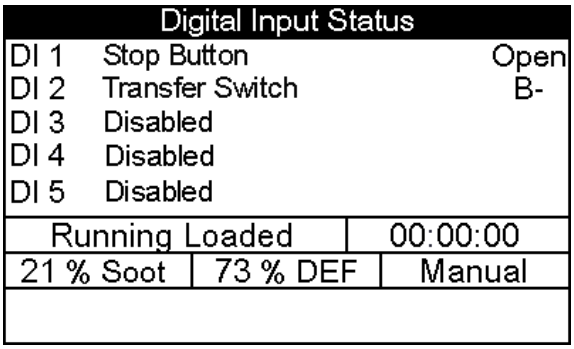


Figure 17: Digital Input Status

These two screens will allow the operator to see what the digital input functions are set to without accessing the menu and the active setting which informs the user of the input status.

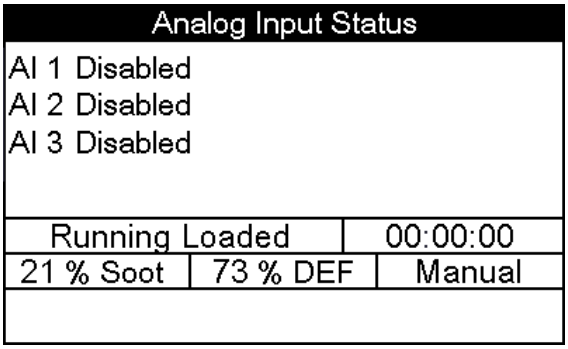


Figure 18: Analog Input Status

This screen displays the Analog Input's function selected in the menu for each input.

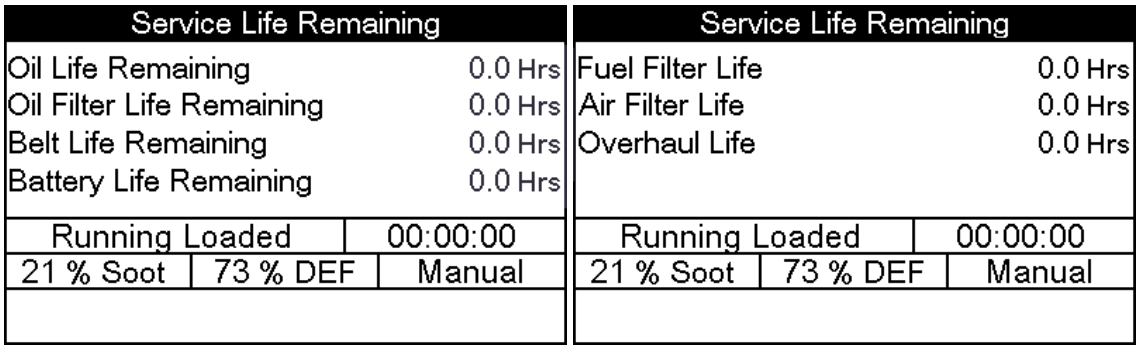


Figure 19: Service Life Remaining Screens

These two screens provide a list of service reminders and the hours left until the internal alarm will display the services needed. All the reminders are set to 0.0 Hrs to disable by default and the screens are hidden by default. The screens can be shown by setting the Show Service Reminders Screens to “Show” in the service reminders menu.

ISO Icons

The following ISO icons can be displayed on the controller to designate specific parameters and Tier 4 Emission Alerts, as well as Warnings and Shutdowns.

Icon	Description
	Displays when High Exhaust System Temperature (HEST) is active and exhaust temperature is above normal operating condition.
	Low diesel exhaust fluid. Displays when the DEF is low.
	Displays when engine aftertreatment is in need of regeneration. This is due to the aftertreatment filter reaching the engine manufacturer's set soot level for a regeneration to occur.
	Displays when the Engine ECU has inhibited a regeneration from occurring. This should also be shown when inhibiting regeneration selection is made in the menu.
	Displays when an emissions aftertreatment malfunction has occurred. Contact your local engine manufacturer's service department for direction.
	Deutz – Engine Aftertreatment Override Active Status.
	Deutz – Wash Bit Ash Load High. Status 1 Solid, Status > 1 Flashing.

	CAT/ PERKINS DPF Burner Temp (HEST). Exhaust System High Temperature Lamp Command.
	CAT/PERKINS - Delayed Engine Shutdown. Required for C7.1 ACERT engines having DES enabled.
	FPT (DEF Level – Operator Warning) – Warning DEF Level below 10%
	FPT (DEF Level – Mid Level Inducement) – 65% of torque reduction; 40% engine speed reduction ramped within 40 minutes
	FPT (DEF Level – Severe Inducement) – Engine commanded to low idle within 30 minutes
	JCB/Deutz - Emissions Malfunction Low
	JCB/Deutz - Emissions Malfunction High
	JCB - Catalyst Tank Level below 15%
	JCB - Catalyst Tank Level below 5%
	JCB – DPF Emissions Filter Above 80%. Engine Refresh Required
	JCB – DPF Emissions Filter Above 90%. Engine Overloaded
	JCB – DPF Emissions Filter at 100%. Engine Plugged
	JCB – Inducement Level 2,3 or Final.
	Displays when an active or unacknowledged warning fault exists. The icon will disappear if the fault is acknowledged and is no longer active.

	Displays when an active or unacknowledged shutdown fault exists. The icon will disappear if the fault is acknowledged and no longer active.
	Gear Box Pressure
	Fuel Rate
	Fuel Level
	Pump Flow Rate
	Engine Oil Level
	Discharge Pressure
	Current Oil Pressure
	Current RPM
	Ambient Temperature
	Oil Temperature
	System Level
	Suction Pressure
	Percent Load at Current RPM
	Current Engine Temperature
	Battery Voltage

Icon Troubleshooting

The warnings and shutdowns internally generated by the controller will show an Internal Fault on the top of the screen when a fault is displayed. Check all fluid levels and pressures. Ensure the cooling system and engine are functioning properly.

The warnings and shutdowns the ECU generates will also be accompanied by a cause for the error. Consult with the engine manufacturer regarding fault codes shown on the screen.

If the fault states it is internal and everything checks out normal, consider checking the set points or the bypass timer(s) to ensure the ranges are within normal operating settings for the engine and application.

Menu Glossary

System (Low Security)

Date/Time (Low Security)**:** allows the setting of the controller's date and time.

Units (Medium Security)**:** allows the setting of the units of measurement for information presented on the display.

Language (Medium Security)**:** select: English, French, German, Spanish, and Italian. **Factory set to English.**

Brightness (Medium Security)**:** allows the backlight of the screen to be adjusted. **Factory set to 90.**

Parameter Setup (Low Security)**:** allows four-up Page 1 and Page 2 parameters to be changed without using a PC.

Backlight Control (Medium Security)**:** turns off (disables) or on (enables) the screen's backlight. **Factory set to Enable.**

Standby Timer (Medium Security)**:** allows the screen the designated amount of time before the controller goes into Standby mode. Standby is also referred to as sleep mode. **Factory set to 00:30:00.**

Service Reminders (Medium Security)**:** when the service reminder is set to 0, the alarms will be disabled; however, the countdown will continue and will show the numbers as (-) numbers as it counts down past 0 for the following parameters: **All service reminders factory set to 0.0 Hrs. If service reminders are desired they should be set within this menu.**

Show Service Screens (Medium Security)**:** factory set to Hide.

Oil Life (Medium Security)**:** factory set to 0 Hrs

Reset Oil Life (Medium Security)**:** resets Oil Life reminder to factory setting.

Oil Filter Life (Medium Security)**:** factory set to 0 Hrs

Reset Oil Filter Life (Medium Security)**:** resets Oil Filter Life reminder to factory setting.

Belt Life (Medium Security)**:** factory set to 0 Hrs

Reset Belt Life (Medium Security)**:** resets Belt Life reminder to factory setting.

Battery Life (Medium Security)**:** factory set to 0 Hrs

Reset Battery Life (Medium Security)**:** resets Battery Life reminder to factory setting.

Fuel Filter Life (Medium Security)**:** factory set to 0 Hrs

Reset Fuel Filter Life (Medium Security)**:** resets Fuel Filter Life reminder to factory setting.

Air Filter Life (Medium Security)**:** factory set to 0 Hrs

Reset Air Filter Life (Medium Security)**:** resets Air Filter Life reminder to factory setting.

Overhaul Life (Medium Security)**:** factory set to 0 Hrs

Reset Overhaul Life (Medium Security)**:** resets Overhaul Life reminder to factory setting.

Reset All (Medium Security)**:** Resets all service reminders to factory setting.

ECU Fault Codes (Medium Security)**:** allows the operator to request stored fault codes from the ECU and request to clear active as well as stored codes in the ECU.

Stored Fault Codes (Medium Security)**:** allows the operator to query the Engine ECU for review of its stored fault codes.

Clear Active ECU Fault Codes (High Security)**:** Clears any active fault codes broadcast from the ECU as long as the ECU accepts the request.

Clear Stored ECU Fault Codes (High Security)**:** Clears any stored fault codes in the ECU as long as the ECU accepts the request.

Auto / Manual (Low Security)**:**

Manual Only (Medium Security)**:** allows the operator to lock anyone out of placing the controller in Auto mode of operation. **Factory set to Disable**

Power Up Auto/Manual (High Security)**:** allows the controller to power up in either Manual or Auto Mode of operation depending on the selection chosen. The operator can enable Manual only and disable the choice of auto on power up. **Factory set to Manual**

Show Auto Start Confirmation (Low Security)**:** ensures the operator knows the controller is in auto by making the operator accept the Auto mode on power up. This is only shown if Power Up in Auto/Manual is set to Auto. **Factory set to Yes**

Green LED (High Security)**:** select either Auto Operation or Running Loaded for the built-in green LED.

Restore Factory Defaults (Medium Security)**:** allows the operator to reset all settings back to default.

Set Machine Hours (High Security)**:** allows the operator to set the internal hours of the controller if Engine Type is set to Mechanical or ECU Hour Select is set to Internal.

Event History (Medium Security)**:** allows the operator to view up to 32 previous alarms with date and time stamp. Also allows the operator to clear the event history log.

View Event History (Medium Security)**:** allows the viewing of controller stored alarms.

Clear Event History (High Security)**:** allows the clearing of controller stored events (alarms).

Alternator Excite Setup (High Security)**:** allows the operator to set the dedicated alternator excite output to desired control. The alternator excite pulses the output and senses for feedback. If feedback is not received from the alternator in terms of a charge the MGC1000 will allow for a Warning or shutdown. If there is a diode in the harness between the alternator and the controller, but still need to excite the

alternator the operator is able to set the Show Alt Excite Warning to No to allow for the pulsing without feedback. If the alternator is self-exciting or this output is not needed the control can be set to Disable to ensure no voltage is live on the output.

Alt/Excite Control (High Security)**:** allows the operator to enable or disable the dedicated output for Alt Excite. **Factory set to Enable**

Alternator Excite Alert (High Security)**:** allows the operator to select if Alt Fail is a warning or shutdown. **Factory set to Warning.**

Show Alt Excite Warning (High Security)**:** allows the controller to ignore the warning if excitation of the alternator is not sensed to eliminate the Alt Fail Warning. **Factory set to Yes**

Alt Excite Frequency (High Security)**:** allows the operator to set how the Alternator excite out behaves. During setup for the engine the operator can choose Pulse 50ms, Pulse 100ms, or Steady for the frequency the alternator excite output turns on for exciting the field on a non-self-exciting alternator. The Alt Failure Warning will only work with the pulse setting. If setting to Steady (on during all running states) the Show Alt Excite Warning will need to be set to No. **Factory set to Pulse 50ms**

ECU Shutdowns (High Security): allows the controller to not shutdown the engine if a red lamp status (reserved for shutdown) is broadcast across the CANbus. When set to ECU Only the controller will show the fault while completely relying on the engine to shutdown the engine when the fault is broadcast on the CANbus. When set to Controller and ECU the controller will turn off the ECU enable output when a red lamp status is broadcast on the CANbus. **Factory set to Controller & ECU**.

Frequency

AC Frequency (Medium Security)**:** Allows the operator to choose the operating frequency of the generator. 50 or 60 Hz. **Factory set to 60 Hz**

Run Speed (Medium Security)**:** Allows the operator to choose the operating engine RPM of the generator. **Factory set to 1800 RPM**

Low Frequency Action (Medium Security)**:** Allows the operator to choose the action when a low frequency occurs. Not Used/Warning/Shutdown. **Factory set to Shutdown**

Low Frequency Value (Medium Security)**:** Allows the operator to choose the setpoint for the low frequency alarm. **Factory set to 55 Hz.**

Post Lockout Timer (Medium Security)**:** Allows the operator to choose the amount of time to ignore the low frequency alarm on start up. **Factory set to 5 sec**

High Frequency Action (Medium Security)**:** Allows the operator to choose the action when a high frequency occurs. Not Used/Warning/Shutdown. **Factory set to Shutdown**

High Frequency Value (Medium Security)**:** Allows the operator to choose the setpoint for the high frequency alarm. **Factory set to 65 Hz.**

Abnormal Frequency Threshold, Electronic Engines Only (Medium Security)**:** A shutdown will occur if the frequency is within this % of the running frequency and 0 rpm is being broadcasted. This occurs on shutdowns and startups. **Factory set to 20 %**

Frequency Out of Range Timer Value (Medium Security)**:** Allows the operator to choose the amount of time the frequency is out of range high or low. **Factory set to 1 sec**

Engine Settings (Low Security)

Engine Type (High Security)**:** allows the selection between J1939 and Mechanical. If Mechanical is chosen, some parameters associated with J1939 will no longer appear in the menu. **Factory set to J1939.**

Engine Manufacturer (High Security)**:**

1. Other (Factory Default)
2. Hatz (M-T4F)
3. GM (MEFI ECU)
4. Yanmar (M-T4F)
5. Kohler KDI
6. Kubota (M-T4F, T4F DOC only)
7. Kubota (Gaseous)
8. Doosan
    a. D18-33HP
    b. D18-49HP
    c. D24-49HP
    d. D24-61HP
    e. D24-66HP
    f. D24-74HP
    g. D34-74HP
    h. D34-85HP SCR
1. Caterpillar (M-T4F
2. Cummins (M-T4F)
3. John Deere (M-T4F)
4. Deutz (M-T4F)
5. JCB (T4F)
6. Volvo (T3-T4F)
7. FPT (T4F)
8. Isuzu (M)
9. PSI (EControls ECU)
10. Scania (Y3-T4F)
11. Perkins (M-F)T

Speed Source: AC Voltage, Alternator, Magnetic Pickup. **Factory set to AC Voltage.**

Engine Emission (High Security)**:** allows the selection of the emissions controls (i.e., Tier 3 or Less, Interim Tier 4 or Tier 4 / EU Stage IIIA, IIIB, IV). **Factory set to Tier 3 or Less.**

Tier 4 (Low Security)**:** (only appears if Interim Tier 4 or Tier 4 / EU Stage IIIA, IIIB, IV is chosen) allows the automatic or inhibition of after treatment regeneration and/or the requesting of a regeneration.

Auto/Inhibit regen (Low Security)**:** allows the operator to inhibit an after treatment regeneration by setting to inhibit. **Factory set to Auto**

Request Regen (Low Security)**: s**ends a request to the engine ECU for regeneration. **Factory set to No**

DEF Gauge (High Security)**: s**hows the DEF gauge when set to Yes. **Factory set to No**

Percent Soot Gauge (High Security)**:** shows the % Soot gauge when set to Yes. **Factory set to No**

Regen Screen (High Security)**:** shows the regeneration screen in the main screens when set to Yes. **Factory set to No**

> **NOTE:** Inhibiting the Regen may cause the engine to de-rate or shut down if the soot level is too high. Recommend leaving this setting in Auto Regen. The ECU may not allow the Regen request if certain parameters do not meet the engine manufacturers' requested levels.

Warm Up Delay (Low Security)**:** allows the operator to set the desired warm-up time/delay for the engine. This is the length of time the engine will run at a lower speed for its warm-up cycle. **Factory set to 3 minutes**

Cooldown Delay (Low Security)**:** allows the operator to set the desired cool-down time/delay for the engine. This is the length of time the engine will run at a lower speed for its cool-down cycle. **Factory set to 3 minutes**

Advanced Engine Settings (Low Security)

Address Claim (High Security)**:** allows the operator to set the address claim of the controller when used on the CANbus. This address is relative to the address the ECU requires the TSC1 to be broadcast from along with any Tier 4 messaging. Consult your engine manufacturer or dealer to obtain the correct source address the controller should be set to communicate correctly with the engine ECU. **Factory set to 3 and changed per Engine Manufacturer setting**

ECU Source Address (High Security)**:** source address of the ECU being connected to. Normally set to 0, 1 or 2 per SAE J1939 specifications. This menu item is only shown if J1939 is selected for the Engine Type. **Factory set to 0**

ECU Hour Select (High Security)**:** choose from ECU Hours (engine hours reported by the ECU) or Internal (hours calculated internally by the MGC1000) provided the RPM>50. This menu item is only shown if J1939 is selected for the Engine Type. **Factory set to ECU Hours**

Crank Attempts (High Security)**:** format of 1.00 to 20.00. The number of times the engine will attempt to start before providing an overcrank shutdown. **Factory set to 3**

Crank Disconnect Speed (Medium Security)**:** the speed at which the crank will disconnect barring other input parameters. **Factory set to 500 RPM**

Run To Destruct (High Security)**:** this feature is used when the controller is not able to shut down the engine, but allows faults to be shown on screen and LEDs per application requirement. **Factory set to Disable**

Timers/Delays (Low Security)**:** establish operational settings for:

Auto Start Delay (Medium Security)**:** the auto start condition must remain active throughout this delay for an auto start to occur. If the auto start condition is removed during this delay, the delay is reset to zero. **Factory set to 3 seconds**

Auto Stop Delay (Medium Security)**:** this auto stop condition must remain active throughout this delay for an auto stop to occur. If the auto stop condition is removed during this delay, the delay is reset to zero. **Factory set to 3 seconds**

ECU Stabilize Timer (High Security)**:** on start-ups, this delay allows the ECU to stabilize and broadcast on the CAN bus prior to actual cranking. **Factory set to 5 seconds**

Crank Time (High Security)**:** this is the length of time the crank output is turned on during cycle cranking. **Factory set to 10 seconds**

Crank Rest (High Security)**:** this is the length of time the crank output is turned off during cycle cranking. **Factory set to 10 seconds**

Prestart Delay 1 (Low Security)**:** after a start condition has been accepted by the controller, this delay begins timing, and the prestart #1 output turns on. When this delay expires, the output is turned off, and the auto sequence continues.

Auto Only (Medium Security)**: Factory set to Disabled.**

Prestart Delay (Low Security)**: Factory set to 00.00.00**

Prestart Delay 2 (Low Security)**:** after a start condition has been accepted by the controller, this delay begins timing, and the prestart #2 output turns on.

Auto Only (Medium Security)**: Factory set to Disabled.**

Prestart Delay (Low Security)**: Factory set to 00.00.00**

Prestart Delay 2 Mode (High Security)**:** this setting determines if the prestart #2 output is active through the crank state or only through the prestart #2 state. **Factory set to PreCrank**

Spindown Timer (Medium Security)**:** this delay begins timing when there is no call to run and the engine speed is zero. No auto start functions will occur until this delay expires. **Factory set to 30 seconds** (Unable to set below 5 seconds)

Post Crank Lockout Setup (Medium Security)**:** this is a setup for a delay that begins timing after crank disconnect at startup. During this delay, the selected functions are ignored. When this delay expires, the selected functions are armed. During the duration of this delay, the selected functions can cycle from active to not active and not reset the delay.

Post Crank Lockout Time (Medium Security)**: Factory set to 30 seconds**
Post Crank Lockout 1 (Medium Security)**: Factory set to Low Oil Pressure**
Post Crank Lockout 2 (Medium Security)**: Factory set to High Engine Temperature**
Post Crank Lockout 3 (Medium Security)**: Factory set to Disabled**
Post Crank Lockout 4 (High Security)**: Factory set to Disabled**
Post Crank Lockout 5 (High Security)**: Factory set to Disabled**

Post Warm-up Lockout Setup (Medium Security)**:** this is a setup for a delay that begins timing when the warm-up delay expires. During this delay, the selected functions are ignored. When this delay expires, the selected functions are armed. During the duration of this delay, the selected functions can cycle from active to not active and not reset the delay.

Post Warm-up Lockout Time (Medium Security)**: Factory set to 00.00.00**
Post Warm-up Lockout 1 (Medium Security)**: Factory set to Disabled**
Post Warm-up Lockout 2 (Medium Security)**: Factory set to Disabled**
Post Warm-up Lockout 3 (Medium Security)**: Factory set to Disabled**
Post Warm-up Lockout 4 (High Security)**: Factory set to Disabled**
Post Warm-up Lockout 5 (High Security)**: Factory set to Disabled**

Bubble Lockout Setup (Medium Security)**:** this is a setup for a delay that begins timing when the selected functions are active. If the selected functions are removed during this delay, the delay resets to zero. If the selected functions remain active throughout this delay, the selected action for the parameter will occur.

Bubble Lockout Time (Medium Security)**: Factory set to 00.00.00**
Bubble Lockout 1 (Medium Security)**: Factory set to Disabled**
Bubble Lockout 2 (Medium Security)**: Factory set to Disabled**
Bubble Lockout 3 (Medium Security)**: Factory set to Disabled**
Bubble Lockout 4 (Medium Security)**: Factory set to Disabled**
Bubble Lockout 5 (Medium Security)**: Factory set to Disabled**

No Speed During Crank: If during the first crank, the controller does not see a speed signal from the designated speed source before this delay expires, the controller will shutdown on “No Speed Signal”. **Factory set to 00:00:06.**

Warnings and Shutdowns (Low Security)**:** establish alerts for the listed parameters. When values reach the set points in this menu the controller will show **INTERNAL FAULT** on the top left of the screen. If nuisance faults keep occurring lower or raise the set point within this menu.

Low Oil Pressure Shutdown (High Security)**:** a shutdown will occur when the pressure reaches this set point. **Factory set to 10 PSI.**

Low Oil Pressure Warning (High Security)**:** an alarm will occur when the pressure reaches this set point. **Factory set to 15 PSI.**

High Engine Temp Shutdown (Medium Security)**:** a shutdown will occur when the temperature reaches this set point. **Factory set to 225 F.**

High Engine Temp Warning (Medium Security)**:** an alarm will occur when the temperature reaches this set point. **Factory set to 210 F.**

High Oil Temp Shutdown (Medium Security)**:** a shutdown will occur when the temperature reaches this set point. **Factory set to 225 F.**

High Oil Temp Warning (Medium Security)**:** an alarm will occur when the temperature reaches this set point. **Factory set to 210 F.**

Low Fuel Level Shutdown (Medium Security)**:** a shutdown will occur when the level reaches this set point. **Factory set to 5%.**

Low Fuel Level Warning (Medium Security)**:** an alarm will occur when the level reaches this set point. **Factory set to 10%.**

High Battery Warning (Low Security)**:** an alarm will occur when the VDC reaches this set point. **Factory set to 16.0 VDC.**

Low Battery Warning (Low Security)**:** an alarm will occur when the VDC reaches this set point. This setting is armed after crank disconnect upon startup. **Factory set to 8.0 VDC.**

Weak Battery Warning (Low Security)**:** an alarm will occur when the VDC reaches this set point. **Factory set to 6.0 VDC.**

Underspeed Shutdown (Medium Security)**:** a shutdown will occur when the engine speed reaches this set point. **Factory set to 0 RPM**

Overspeed Shutdown (Medium Security)**:** a shutdown will occur when the engine speed reaches this set point. **Factory set to 2400 RPM.**

Test Run (High Security)**:** This allows running the generator with the frequency alarms disabled. Disable/Enabled. **Factory set to Disabled**

Input / Output Menu

Digital Inputs (1-5) (Medium Security)**:** for each of the digital inputs, the ability to select the following parameters exists:

Digital input 1 (Medium Security)**: Factory set to Function: Stop Button, Active: B-, Action: Not Used**
Digital Input 2 (Medium Security)**: Factory set to Function: Transfer Switch, Active: B-, Action: Not Used**
Digital Input 3 (Medium Security)**: Factory set to Function: Disabled, Active: B-, Action: Not Used**
Digital Input 4 (Medium Security)**: Factory set to Function: Disabled, Active: B-, Action: Shutdown**
Digital Input 5 (Medium Security)**: Factory set to Function: Disabled, Active: B-, Action: Shutdown**

Function (Medium Security)**:**
- **Disabled**
- **Transfer Switch**
- **Remote Alarm Acknowledge**
- **Low Fuel Level**
- **Fuel Leak**
- **Fuel Filter Restriction**
- **Low Lube Oil Level**
- **Low Coolant Level**
- **Stop Button**
- **Remote Manual/Auto**
- **Water in Fuel**
- **No Flow**
- **User 1**
- **User 2**
- **Air Damper Closed**
- **Air Filter Restriction**
- **Battery Charger Fail**
- **Oil Filter Restriction**
- **Low Oil Pressure**
- **High Engine Temperature**

Active (Medium Security)**:**
- **B-** (when input closes to ground it enables action of digital function)
- **B+** (when input closes to battery positive it enables action of digital function)
- **Open** (when input opens it enables action of digital function)

Action (Medium Security)**:**
- **Not Used:** (chosen when using digital input for anything except a fault)
- **Warning:** (chosen for an immediate warning to the operator when function is active)
- **Shutdown:** (chosen for an immediate shutdown of engine when function is active)
- **Shutdown, Controlled:** (chosen to allow the controller to shutdown through the normal sequence of operation including cooldown when function is active. User acknowledgement of the fault is required to restart in Auto after shutdown occurs)
- **Relay Control:** (chosen for control of one of the relay outputs when function is active)
- **Shutdown, Controlled, Restart:** (chosen to allow the controller to shutdown through the normal sequence of operation including cooldown when function is active. User acknowledgement of the fault is **NOT** required to restart in Auto after shutdown occurs if active shutdown is removed from controller)

Analog Inputs (1-3) (Medium Security)**:** for each of the analog inputs, the ability to select the following parameters exists:

Analog input 1 (Medium Security)**: Factory set to Function: Disabled**
Analog Input 2 (Medium Security)**: Factory set to Function: Disabled**
Analog Input 3 (Medium Security)**: Factory set to Function: Disabled**

Function (Medium Security)**:**

Disabled
Datcon Oil Pressure
Murphy Oil Pressure (ES2P-100)
VDO5 Bar Oil Pressure
VDO7 Bar Oil Pressure
Murphy Engine Temp (ES2T-250/300)
Datcon Engine Temp
VDO Engine Temp
Murphy Fuel Level (ES2F)
VDO Fuel Level
Datcon Fuel Level
Murphy Oil Temp (ES2T-250/300)
Datcon Oil Temp
VDO Oil Temp
Murphy PMK-400 Pressure (Gear Box Pressure, Murphy PMK-400 Sensor)
Analog.Digital1

Relay (1-3) and Digital (1-4) Outputs (Medium Security)**:** these same parameters are used for both the Relay and Digital Outputs.

Relay 1 (Medium Security)**: Factory set to Crank, Starter Relay**
Relay 2 (Medium Security)**: Factory set to ECU Enable**
Relay 3 (Medium Security)**: Factory set to Not Used**
DO1 (B+, 1A) (Medium Security)**: Factory set to Prestart 1 Delay**
DO2 (B+, 1A) (Medium Security)**: Factory set to AC Contactor**
DO3 (B-, 1A) (Medium Security)**: Factory set to Not Used**
DO4 (B-, 1A) (Medium Security)**: Factory set to Not Used**

Not Used: This function does not allow the output to turn on when chosen.
Prestart 1 Delay: Output turns on when in Prestart 1 state. See Timers on page 23.
Prestart 2 Delay: Output turns on when in Prestart 2 state. See Timers on page 23.
Crank: Output turns on when in Crank state. See Timers on page 23.
Fuel: Output turns on when cranking and turns off after cooldown. See Timers on page 23.
ECU Enable Used for enabling the ECU on electronic engines. This output turns on anytime the controller is powered up or in the crank/run state. It's turned off if the controller is in spindown or standby states.
Excite Engine Alternator This output can be used if the dedicated Alt Excite output is not used.
Shutdown This output turns on when a fault shutdown occurs.
Common Alarm This output turns on when either a shut-down or a non-shutdown warning occurs.
Remote Alarm This output turns on when a either a shutdown or a non-shutdown warning occurs.
Not in Auto This output turns on when the controller is in the manual mode.

Engine Running This output turns on after the engine actually starts and off when the engine stops.
Digital Input (1-5) A digital input can be assigned to turn on a digital output.
Analog (1-3) Digital An analog input configured to be a digital input can be assigned to turn on a digital output.
Failed to Start This output turns on when the cranking cycles have completed and the engine fails to start in an overcrank situation.
Ignition On (off in standby) This output turns on any time the controller is keyed on with the exception of standby. This output is disabled during standby (sleep mode) to help reduce parasitic loads.
Ignition On (on in standby) This output turns on any time the controller is keyed on. Be cautious of using where a parasitic load can drain the battery and not allow the engine to start.
AC Contactor
Prestart Alarm

Start / Stop Timers (Low Security)

> **NOTE:** When the engine is started using one of the start timers, the timer which started the engine is the timer which will stop the engine. Other start/stop timers will be ignored if they happen to overlap from the timer that starts the engine.

This section allows the setting of the timers to start and stop the engine. There are three timers, each with a Start Day and a Stop Day, a Start Time and a Stop Time. This is based on the internal real-time clock.

Countdown Timer (Low Security)**:** the countdown timer will be active upon every auto start up until the time is changed or disabled. It is used when it is desirable for a machine to run for a specific amount of time unmonitored and then shut itself off when that time has expired or when a local key stop occurs. Format of HH:MM:SS. Maximum countdown time is 120 hours. **Factory set to 00:00:00**

> **NOTE:** The countdown timer is only active when starting in Auto mode. This timer will not start counting when starting the engine in manual mode and switching to auto mode after the engine is running.

Start / Stop Timer (1-3) (Low Security)**:** each of the three timers contains the ability to select from the following parameters:

Start Day (Low Security)**: Factory set to Off**
- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
- Daily
- Off

Start Time: format of HH:MM:SS (Low Security): **Factory set to 12.00.00 AM.**
Stop Day (Low Security)**: Factory set to Off**
- Sunday
- Monday
- Tuesday
- Wednesday

Thursday
Friday
Saturday
Daily
Off

Stop Time: format of HH:MM:SS (Low Security): **Factory set to 12.00.00 AM.**

Engine Exerciser (Medium Security)**:** This feature allows the operator to set a voltage point for when the battery voltage drops below for a given period of time the controller will provide an auto start for a defined period of time to energize the battery using the engine alternator.

> **NOTE:** The exerciser is only active when the controller is in Auto mode. If the exerciser starts the engine the exerciser is the only auto stop method to stop the engine. This holds true with all the Start/Stop Timers.

Exercise Mode (Medium Security)**:** Set point for the operator to enable the voltage exerciser of the engine. **Factory set to Disabled**

Low Voltage Set Point (Medium Security)**:** Voltage the operator sets for the battery voltage to drop below before an auto start will initiate to exercise the engine for recharging the battery. **Factory set to 9.5V**

Low Voltage Time (Medium Security)**:** Time the operator sets for the voltage to be below the low voltage set point before an auto start is initiated. **Factory set to 10 minutes**

Exercise Running Loaded Time (Medium Security)**:** Time the operator sets for the engine to run if voltage drops below the low voltage set point. **Factory set to 15 minutes**

Communication (High Security)

Communication Type (High Security)**:**

PVA Gauge: this function will be used if utilizing PVA Gauges on the RS485 Communications Port.

Modbus: this function will be used if using a SCADA or telemetry device for polling the Modbus register list on the RS485 Communications Port. See Modbus Register Map. **Factory Default.**

Local Display: (for future use) this function will be used to connect the display to a remote viewing application. This can be a program running on a PC or another MGC1000 with a custom configuration set up as a remote viewer.

Slave Address (High Security)**:** This is the RS485 Modbus slave node number. **Factory set to 1**.

Serial Setup (High Security)**:** Allows the operator to change the controller's RS485 serial communication settings.

Baudrate (High Security)**: Factory set to 19200**

9600
19200
38400
57600
115200

Stopbits (High Security)**: Factory set to 1**

0

1
2

Parity (High Security)**: Factory set to None**
None
Odd
Even

PV CAN Backlight Enable (High Security)**:** allows the MGC1000 to control the backlights of the PVCAN gauges when used with the controller. **Factory set to Off**

CAN Termination (High Security)**:** allows the operator to enable or disable the controller's internal 120 ohm terminating resistor. This should be enabled if the MGC1000 is located at the end of the CAN bus and the end terminating resistor is not in the harness. **Factory set to Enable.**

CAN Parameter Map (High Security)**:** allows the operator to enable or disable the proprietary CAN parameter map. The CAN Parameter Map can be used in place of the Modbus map when using a CAN device to talk to the controller for starting, stopping and control functions via telematics or another CAN based system. See CAN Parameter Map Section below for definition of the mapping. **Factory set to Disable.**

CAN Baud rate (High Security)**: Factory set to 250 Kbps**
10 Kbps
20 Kbps
50 Kbps
100 Kbps
125 Kbps
250 Kbps
500 Kbps
800 Kbps
1 Mbps

Passcodes (High Security)

This menu allows the operator using the High Security passcode to see the three 4-digit passcodes for Low, Medium and High security. This is a visual menu only. The security passcodes are only able to be altered via PowerVision for Controllers PC tool.

Load Configuration (High Security)

> **NOTE:** It is essential that the USB Drive is formatted to a FAT file system before using to load software. If the drive is not formatted to FAT and left in another format the file may not load correctly.

This menu allows the MPC-10 operator using the High Security passcode to select a file from a USB drive plugged into the programming harness for the controller. Once the files are stored on the drive after generated in PowerVision for Controllers the file will show as long as the software was for the MPC-10 hardware and has the file extension .gcibin. Once the file is found it will show in the screen. Follow directions on the screen to load desired file. The screen will turn off then all three LEDs will come on then the Amber LED will begin flashing. Once the file is finished loading the Green LED stays on stead while the Amber and Red LEDs flash. The USB drive can now be removed to initiate a reboot of the controller or simply cycle power off then back on.

NOTE: If the file does not fully load due to the file being corrupt, the controller turned off during installing file, or the USB drive removed during drive the operator will be required to load a file created for the MPC-10 named configurationFull.gcibin to recover the controller from its bootloader mode. Once this is done the operator will be able to load a file from the menu again following power up.

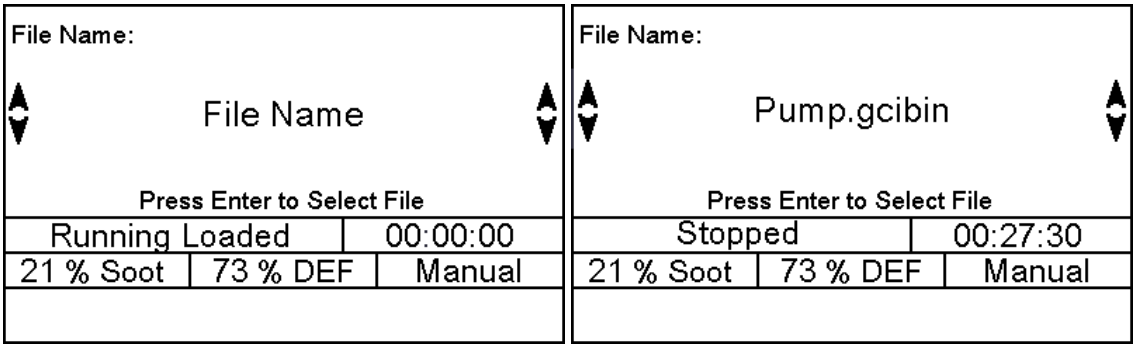


Figure 20: File Selection

Communication Mapping

This section outlines the RS485 Modbus Register Map and CAN Parameter Map.

Modbus Registers

NOTE: The registers labeled Read/Write will allow the operator to change values through the Modbus as a temporary modification. If power is cycled to the MGC1000, the values changed via Modbus will revert back to the last value entered locally.

REGISTER #	TYPE	DESCRIPTION	UNITS
40001-40002	Read Only	Current Engine Hours (32 Bit)	Hours
40003	Read Only	Actual Engine Speed	RPM
40004	Read Only	System Voltage (12.5 will read 125)	VDC
40005	Read Only	Actual Engine Oil Pressure	kPa
40006	Read Only	Actual Engine Temperature	Celsius
40007	Read Only	Controller State (Active State: Numeral Indicated)	Numerals
		0 = ECU Stabilize Delay	
		1 = Engine Stopped	
		2 = Controller in Standby	
		3 = Prestart 1 Delay	
		4 = Check Safe to Start	
		5 = Prestart 2 Delay	
		6 = Crank On	
		7 = Crank Rest	
		8 = False Start Check	
		9 = Engine Warmup Delay	
		10 = Line Fill 1 Delay	
		11 = Line Fill 2 Delay	
		12 = Running Loaded	
		13 = Running Cooldown Delay	

		14 = Energize to Stop Delay	
		15 = Engine Spindown Delay	
		16 = Wait to Start Delay	
40008	Read Only	Active Shutdown Status (Active Fault: Bit = 1, Inactive: Bit = 0)	
		0 = Overspeed SD	(0 or 1)
		1 = Underspeed SD	(0 or 1)
		2 = Overcrank SD	(0 or 1)
		3 = Low Oil Pressure SD	(0 or 1)
		4 = High Engine Temp SD	(0 or 1)
		5 = Low Fuel SD	(0 or 1)
		6 = Low Discharge Pressure SD	(0 or 1)
		7 = High Discharge Pressure SD	(0 or 1)
		8 = Speed Signal Lost SD	(0 or 1)
		9 = Low Lube Level SD	(0 or 1)
		10 = Fuel Leak SD	(0 or 1)
		11 = Fuel Filter Restriction SD	(0 or 1)
		12 = Reserved	Reserved
		13 = Reserved	Reserved
		14 = Reserved	Reserved
		15 = Remote Stop SD	(0 or 1)
40009	Read Only	Active Shutdown Status (Active Fault: Bit = 1, Inactive: Bit = 0)	
		0 = Coolant Level SD	(0 or 1)
		1 = High Level SD	(0 or 1)
		2 = Low Level SD	(0 or 1)
		3 = High Flow SD	(0 or 1)
		4 = Low Flow SD	(0 or 1)
		5 = Reserved	Reserved
		6 = Reserved	Reserved
		7 = Water in Fuel SD	(0 or 1)
		8 = Low Suction SD	(0 or 1)
		9 = High Suction SD	(0 or 1)
		10 = Reserved	Reserved
		11 = High Engine Oil Temp SD	(0 or 1)
		12 = Low Gear Box Pressure SD	(0 or 1)
		13 = High Gear Box Pressure SD	(0 or 1)
		14 = Reserved	Reserved
		15 = Red Lamp Status	(0 or 1)
40010	Read Only	Active Shutdown Status (Active Fault: Bit = 1, Inactive: Bit = 0)	
		0 = Pivot Alignment SD	(0 or 1)
		1 = Reserved	Reserved
		2 = Reserved	Reserved
		3 = Reserved	Reserved
		4 = Reserved	Reserved
		5 = Reserved	Reserved
		6 = Reserved	Reserved
		7 = Reserved	Reserved
		8 = Reserved	Reserved
		9 = Reserved	Reserved

		10 = Reserved	Reserved
		11 = Reserved	Reserved
		12 = Reserved	Reserved
		13 = Reserved	Reserved
		14 = Reserved	Reserved
		15 = Reserved	Reserved
40011	Read Only	Actual System Level	Feet
40012	Read & Write	Modbus Engine Start/Stop Auto Mode Only (Stop = 0, Start = 1)	(0 or 1)
40013	Read & Write	Maximum Engine Speed Setpoint	RPM
40014	Read Only	Actual Ambient Temp	Celsius
40015	Read & Write	Auto/Manual Mode (Manual = 0, Auto = 1)	(0 or 1)
40016	Read & Write	Running Loaded Speed in Auto Setpoint	RPM
40017	Read & Write	Manual Only (Manual Only Enabled = 1, Disabled = 0)	(0 or 1)
40018	Read & Write	Prestart 1 Auto Only (Prestart Auto Only = 1, Prestart Auto & Manual = 0)	(0 or 1)
40019	Read & Write	Prestart 2 Auto Only (Prestart Auto Only = 1, Prestart Auto & Manual = 0)	(0 or 1)
40020	Read Only	J1939.Actual Engine Torque	Percent
40021	Read Only	Reserved	Reserved
40022	Read Only	J1939.Diesel Particulate Filter Outlet Temperature	Celsius
40023	Read Only	J1939.Diesel Particulate Filter Intake Temperature	Celsius
40024	Read Only	J1939.Exhaust Temperature	Celsius
40025	Read Only	J1939.Engine Exhaust Manifold Bank 1 Temperature	Celsius
40026	Read Only	J1939.Boost Pressure	kPa
40027	Read Only	J1939.Engine Fuel Temperature	Celsius
40028	Read Only	J1939.Engine Intercooler Temperature	Celsius
40029	Read Only	J1939.Diesel Particulate Filter Ash Load Percent	Percent
40030	Read Only	J1939.Diesel Exhaust Fluid Tank Temperature	Celsius
40031	Read Only	J1939.Engine Fuel Delivery Pressure	kPa
40032	Read Only	J1939.Barometric Pressure	kPa
40033	Read Only	J1939.Air Filter Diff. Pressure	kPa
40034	Read Only	J1939.Exhaust Gas Temperature	Celsius
40035	Read Only	J1939.Hydraulic Pressure	kPa
40036	Read Only	J1939.Hydraulic Temperature	Celsius
40037	Read Only	J1939.Diesel Particulate Filter Active Regeneration Status: The following is a description of enumeration values.	Numerals
		0 = Not Active	
		1 = Active	
		2 = Regeneration Needed	
		3 = Not Available	
40038	Read & Write	System Level Engine Start (Auto)	Feet
40039	Read & Write	System Level Engine Stop (Auto)	Feet
40040	Read & Write	System Level Maintain Value (Auto)	Feet
40041	Reserved	Reserved	Reserved
40042	Reserved	Reserved	Reserved
40043-40044	Read Only	Actual Discharge Pressure	kPa
40045-40046	Read & Write	Pressure Engine Start (Auto)	kPa
40047-40048	Read & Write	Pressure Engine Stop (Auto)	kPa

40049-40050	Read & Write	Pressure Maintain Value (Auto)	kPa
40051-40200	Read Only	Reserved	Reserved
40201	Read Only	Version.App.1	Numerals
40202	Read Only	Version.App.2	Numerals
40203	Read Only	Version.App.3	Numerals
40204	Read Only	Version.App.4	Numerals
40205	Read Only	Version.Config.1	Numerals
40206	Read Only	Version.Config.2	Numerals
40207	Read Only	Version.Config.3	Numerals
40208	Read Only	Reserved	Reserved
40210	Read Only	J1939.Engine Catalyst Tank Level	Percent
40211	Read Only	J1939.Diesel Particulate Filter 1 Soot Load Percent	Percent
40212	Read Only	J1939.Diesel Particulate Filter Regeneration Inhibit Switch (Inhibit Switch Active = 1)	(0 or 1)
40213	Read Only	The following is a description of bits:	
		0 = J1939.Diesel Particulate Filter Active Regeneration Inhibited Due to Inhibit Switch (Inhibited = 1)	(0 or 1)
		1 = Reserved	Reserved
		2 = Reserved	Reserved
		3 = Reserved	Reserved
		4 = Reserved	Reserved
		5 = Reserved	Reserved
		6 = Reserved	Reserved
		7 = Reserved	Reserved
		8 = Reserved	Reserved
		9 = Reserved	Reserved
		10 = Reserved	Reserved
		11 = Reserved	Reserved
		12 = Reserved	Reserved
		13 = Reserved	Reserved
		14 = Reserved	Reserved
		15 = Reserved	Reserved
40214	Read Only	Controller State Timer	Seconds
40215	Read Only	Target Engine Speed from Controller	RPM
40216	Read Only	All Purpose Auto Start Function: (Active Function: Numeral Indicated)	Numerals
		0 = Single Contact	
		1 = Local Start Button	
		2 = Two Contact Maintained	
		3 = Pressure Transducer	
		4 = Level Transducer	
40217	Read & Write	Pressure Maintain Deadband (Auto)	kPa
40218	Read & Write	System Level Maintain Deadband (Auto)	Feet
40219	Reserved	Reserved	Reserved
40220	Read & Write	Ambient Temperature Engine Start (Auto)	Celsius
40221	Read & Write	Ambient Temperature Engine Stop (Auto)	Celsius
40222	Reserved	Reserved	Reserved
40223	Reserved	Reserved	Reserved

40224	Read & Write	Minimum Engine Speed Setpoint	RPM
40225	Read Only	Service Reminder - Air Filter Life	Hours
40226	Read Only	Service Reminder - Air Filter Life Remaining	Hours
40227	Read Only	Service Reminder - Battery Life	Hours
40228	Read Only	Service Reminder - Battery Life Remaining	Hours
40229	Read Only	Service Reminder - Belt Life	Hours
40230	Read Only	Service Reminder - Belt Life Remaining	Hours
40231	Read Only	Service Reminder - Fuel Filter Life	Hours
40232	Read Only	Service Reminder - Fuel Filter Life Remaining	Hours
40233	Read Only	Service Reminder - Oil Filter Life	Hours
40234	Read Only	Service Reminder - Oil Filter Life Remaining	Hours
40235	Read Only	Service Reminder - Oil Life	Hours
40236	Read Only	Service Reminder - Oil Life Remaining	Hours
40237	Read Only	Service Reminder - Overhaul Life	Hours
40238	Read Only	Service Reminder - Overhaul Life Remaining	Hours
40239	Read Only	Actual Fuel Level	Percent
40240	Read & Write	Modbus EEPROM Values Save (Save = 1)	(0 or 1)
40241	Read Only	Modbus EEPROM Values Saved Confirmation (Saved = 1)	(0 or 1)
40242	Read Only	Active Warning Status (Active Fault: Bit = 1, Inactive: Bit = 0)	
		0 = Low Fuel Warn	(0 or 1)
		1 = Fuel Leak Warn	(0 or 1)
		2 = Fuel Filter Restriction Warn	(0 or 1)
		3 = Low Lube Level Warn	(0 or 1)
		4 = Coolant Level Warn	(0 or 1)
		5 = Water in Fuel Warn	(0 or 1)
		6 = No Flow Warn	(0 or 1)
		7 = High Engine Oil Temp Warn	(0 or 1)
		8 = Low Oil Pressure Warn	(0 or 1)
		9 = High Engine Temp Warn	(0 or 1)
		10 = High Discharge Pressure Warn	(0 or 1)
		11 = Low Discharge Pressure Warn	(0 or 1)
		12 = High Suction Warn	(0 or 1)
		13 = Low Suction Warn	(0 or 1)
		14 = High Level Warn	(0 or 1)
		15 = Low Level Warn	(0 or 1)
40243	Read Only	Active Warning Status (Active Fault: Bit = 1, Inactive: Bit = 0)	
		0 = High Flow Warn	(0 or 1)
		1 = Low Flow Warn	(0 or 1)
		2 = Reserved	(0 or 1)
		3 = Reserved	(0 or 1)
		4 = Low Gear Box Pressure Warn	(0 or 1)
		5 = High Gear Box Pressure Warn	(0 or 1)
		6 = Reserved	(0 or 1)
		7 = Reserved	(0 or 1)
		8 = Reserved	(0 or 1)
		9 = Low Engine Temp Warn	(0 or 1)
		10 = Reserved	(0 or 1)

		11 = Reserved	(0 or 1)
		12 = Run To Destruct Warn	(0 or 1)
		13 = Battery High Warn	(0 or 1)
		14 = Battery Low Warn	(0 or 1)
		15 = Amber Lamp Status	(0 or 1)
40244	Read Only	Active Warning Status (Active Fault: Bit = 1, Inactive: Bit = 0)	
		0 = Pivot Alignment Warn	(0 or 1)
		1 = Reserved	Reserved
		2 = Reserved	Reserved
		3 = Reserved	Reserved
		4 = Reserved	Reserved
		5 = Reserved	Reserved
		6 = Reserved	Reserved
		7 = Reserved	Reserved
		8 = Reserved	Reserved
		9 = Reserved	Reserved
		10 = Reserved	Reserved
		11 = Reserved	Reserved
		12 = Reserved	Reserved
		13 = Reserved	Reserved
		14 = Reserved	Reserved
		15 = Reserved	Reserved
40245-40246	Read Only	J1939.Aftertreatment 1 Diesel Particulate Filter Time to Next Active Regeneration	Seconds
40247	Read & Write	Remote Alarm Acknowledgement	(0 or 1)

CAN Parameter Map

This feature of the MPC-10 allows an operator to control functions of the controller over CAN (J1939) similar to Modbus over the RS485 serial port. The map below will allow for devices to communicate via CAN in place of RS485 to start, stop, and control features listed in the map by enabling the setting in the Communications menu.
All the parameters shown in the map below have a resolution of one and an offset of zero. The PGNs used are shown in HEX and listed as a proprietary parameters in the J1939 standard.

All PGNs received from the MPC-10 will have identification bytes A3, and AD respectively for the first two bytes. Sending to the MPC-10 the PGN will be the same as the one it is received from, however the first two identification bytes will be changed to be A5, AD. The priority will be 18 (hex), and the source address will be 70 (hex). To save the value in the controller through power cycles, send PGN FFBB bit 16 a value of 1. When the controller receives this command a save occurs. In order to save again, FFBB bit 16 needs to be returned to a 0 before it will allow a 1 again.

Parameter Map updates once per second on the CANbus when enabled.

PGN	LENGTH	Start BIT	Stop BIT	TYPE	DESCRIPTION	UNITS
FF90	2 Bytes	16	31	Read Only	Actual Engine Speed	RPM
	2 Bytes	32	47	Read Only	Target Engine Speed	RPM

FF91	2 Bytes	16	31	Read & Write	Minimum Engine Speed Setpoint	RPM
FF92	2 Bytes	16	31	Read & Write	Maximum Engine Speed Setpoint	RPM
FF93	2 Bytes	16	31	Read Only	System Voltage (12.5 will read 125)	VDC
	2 Bytes	32	47	Read Only	Actual Engine Oil Pressure	kPa
	2 Bytes	48	63	Read Only	Actual Engine Temperature	Celsius
FF94	4 Bytes	16	47	Read Only	Current Engine Hours	Hours
	2 Bytes	48	63	Read Only	Actual Fuel Level	Percent
FF95	1 Byte	16	23	Read Only	Controller State (Active State: Numeral Indicated)	Numerals
					0 = Stabilize	
					1 = Stopped	
					2 = Standby	
					3 = Prestart 1 Delay	
					4 = Check Safe To Start	
					5 = Prestart 2 Delay	
					6 = Crank	
					7 = Crank Rest	
					8 = False Start Check	
					9 = Engine Warmup	
					10 = Line Fill 1	
					11 = Line Fill 2	
					12 = Running Loaded	
					13 = Engine Cooldown	
					14 = Energize to Stop	
					15 = Spindown	
					16 = Wait to Start	
	2 Bytes	24	39	Read Only	Controller State Timer	Seconds
FF96	1 Bit	16	16	Read & Write	Communication Engine Start/Stop Auto Mode Only (Stop = 0, Start = 1)	(0 or 1)
FF97	1 Bit	16	16	Read & Write	Auto/Manual Mode (Manual = 0, Auto = 1)	(0 or 1)
FF98	1 Bit	17	17	Read & Write	Manual Only (Manual Only Active = 1, Auto and Manual = 0)	(0 or 1)
FF99	1 Bit	18	18	Read & Write	Prestart 1 Auto Only (Prestart Auto Only = 1, Prestart Auto & Manual = 0)	(0 or 1)
FF9A	1 Bit	19	19	Read & Write	Prestart 2 Auto Only (Prestart Auto Only = 1, Prestart Auto & Manual = 0)	(0 or 1)
FF9B	2 Bytes	16	31	Read & Write	Running Loaded Speed in Auto Setpoint	RPM
FF9C	2 Bytes	16	31	Read Only	Active Discharge Pressure	kPa
FF9D	2 Bytes	16	31	Read & Write	Pressure Engine Start (Auto)	kPa
FF9E	2 Bytes	16	31	Read & Write	Pressure Engine Stop (Auto)	kPa
FF9F	2 Bytes	16	31	Read & Write	Pressure Maintain Value (Auto)	kPa
FFA0	1 Byte	16	23	Read & Write	Pressure Maintain Deadband (Auto)	kPa
FFA1	2 Bytes	16	31	Read Only	Actual System Level	Feet
FFA2	2 Bytes	16	31	Read & Write	System Level Engine Start (Auto)	Feet
FFA3	2 Bytes	16	31	Read & Write	System Level Engine Stop (Auto)	Feet
FFA4	2 Bytes	16	31	Read & Write	System Level Maintain Value (Auto)	Feet

FFA5	1 Byte	16	23	Read & Write	System Level Deadband (Auto)	Feet
FFA6	2 Bytes	16	31	Reserved	Reserved	Reserved
FFA7	2 Bytes	16	31	Reserved	Reserved	Reserved
FFA8	2 Bytes	16	31	Reserved	Reserved	Reserved
FFA9	2 Bytes	16	31	Reserved	Reserved	Reserved
FFAA	1 Byte	16	23	Reserved	Reserved	Reserved
FFAB	2 Bytes	16	31	Read Only	Actual Ambient Temp	Celsius
FFAC	2 Bytes	16	31	Read & Write	Ambient Temperature Engine Start (Auto)	Celsius
FFAD	2 Bytes	16	31	Read & Write	Ambient Temperature Engine Stop (Auto)	Celsius
FFAE	4 Bytes	16-48		Active Warning Status (Active Fault: Bit = 1, Inactive: Bit = 0)		
		16	16	Read Only	Low Fuel Warn	(0 or 1)
		17	17	Read Only	Fuel Leak Warn	(0 or 1)
		18	18	Read Only	Fuel Filter Restriction Warn	(0 or 1)
		19	19	Read Only	Low Lube Level Warn	(0 or 1)
		20	20	Read Only	Low Coolant Level Warn	(0 or 1)
		21	21	Read Only	Water in Fuel Warn	(0 or 1)
		22	22	Read Only	No Flow Warn	(0 or 1)
		23	23	Read Only	High Engine Oil Temp Warn	(0 or 1)
		24	24	Read Only	Low Oil Pressure Warn	(0 or 1)
		25	25	Read Only	High Engine Temp Warn	(0 or 1)
		26	26	Read Only	High Discharge Pressure Warn	(0 or 1)
		27	27	Read Only	Low Discharge Pressure Warn	(0 or 1)
		28	28	Read Only	High Suction Warn	(0 or 1)
		29	29	Read Only	Low Suction Warn	(0 or 1)
		30	30	Read Only	High Level Warn	(0 or 1)
		31	31	Read Only	Low Level Warn	(0 or 1)
		32	32	Read Only	High Flow Warn	(0 or 1)
		33	33	Read Only	Low Flow Warn	(0 or 1)
		34	34	Reserved	Reserved	Reserved
		35	35	Reserved	Reserved	Reserved
		36	36	Read Only	Low Gear Box Pressure Warn	(0 or 1)
		37	37	Read Only	High Gear Box Pressure Warn	(0 or 1)
		38	38	Reserved	Reserved	Reserved
		39	39	Reserved	Reserved	Reserved
		40	40	Reserved	Reserved	Reserved
		41	41	Read Only	Low Engine Temp Warn	(0 or 1)
		42	42	Reserved	Reserved	Reserved
		43	43	Reserved	Reserved	Reserved
		44	44	Read Only	Run To Destruct Warn	(0 or 1)
		45	45	Read Only	Battery High Warn	(0 or 1)
		46	46	Read Only	Battery Low Warn	(0 or 1)
		47	47	Read Only	Amber Lamp Status	(0 or 1)
		48	48	Read Only	Pivot Alignment Warn	(0 or 1)
FFAF	4 Bytes	16-49		Active Shutdown Status (Active Fault: Bit = 1, Inactive: Bit = 0)		
		16	16	Read Only	Overspeed SD	(0 or 1)
		17	17	Read Only	Underspeed SD	(0 or 1)
		18	18	Read Only	Overcrank SD	(0 or 1)
		19	19	Read Only	Low Oil Pressure SD	(0 or 1)

		20	20	Read Only	High Engine Temp SD	(0 or 1)
		21	21	Read Only	Low Fuel SD	(0 or 1)
		22	22	Read Only	Low Discharge Pressure SD	(0 or 1)
		23	23	Read Only	High Discharge Pressure SD	(0 or 1)
		24	24	Read Only	Speed Signal Lost SD	(0 or 1)
		25	25	Read Only	Low Lube Level SD	(0 or 1)
		26	26	Read Only	Fuel Leak SD	(0 or 1)
		27	27	Read Only	Fuel Filter Restriction SD	(0 or 1)
		28	28	Reserved	Reserved	Reserved
		29	29	Reserved	Reserved	Reserved
		30	30	Reserved	Reserved	Reserved
		31	31	Read Only	Remote Stop SD	(0 or 1)
		32	32	Read Only	Coolant Level SD	(0 or 1)
		33	33	Read Only	High Level SD	(0 or 1)
		34	34	Read Only	Low Level SD	(0 or 1)
		35	35	Read Only	High Flow SD	(0 or 1)
		36	36	Read Only	Low Flow SD	(0 or 1)
		37	37	Reserved	Reserved	Reserved
		38	38	Reserved	Reserved	Reserved
		39	39	Read Only	Water in Fuel SD	(0 or 1)
		40	40	Read Only	Low Suction SD	(0 or 1)
		41	41	Read Only	High Suction SD	(0 or 1)
		42	42	Reserved	Reserved	Reserved
		43	43	Read Only	High Engine Oil Temp SD	(0 or 1)
		44	44	Read Only	Low Gear Box Pressure SD	(0 or 1)
		45	45	Read Only	High Gear Box Pressure SD	(0 or 1)
		46	46	Reserved	Reserved	Reserved
		47	47	Read Only	Red Lamp Status	(0 or 1)
		48	48	Reserved	Reserved	Reserved
		49	49	Read Only	Pivot Alignment SD	(0 or 1)
FFB0	2 Bytes	16	31	Read Only	Service Reminder - Air Filter Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Air Filter Life Remaining	Hours
FFB1	2 Bytes	16	31	Read Only	Service Reminder – Battery Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Battery Life Remaining	Hours
FFB2	2 Bytes	16	31	Read Only	Service Reminder – Belt Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Belt Life Remaining	Hours
FFB3	2 Bytes	16	31	Read Only	Service Reminder – Fuel Filter Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Fuel Filter Life Remaining	Hours
FFB4	2 Bytes	16	31	Read Only	Service Reminder – Oil Filter Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Oil Filter Life Remaining	Hours
FFB5	2 Bytes	16	31	Read Only	Service Reminder – Oil Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Oil Life Remaining	Hours
FFB6	2 Bytes	16	31	Read Only	Service Reminder – Overhaul Life	Hours
	2 Bytes	32	47	Read Only	Service Reminder – Overhaul Life Remaining	Hours

FFB7	1 Byte	16	23	Read Only	All Purpose Autostart Function (Current Function = Numeral Indicated)	Numerals
					0 = Single Contact	
					1 = Local Start Button	
					2 = Two Contact Maintained	
					3 = Pressure Transducer	
					4 = Level Transducer	
FFB8	1 Byte	16	23	Read Only	Version.App.1	Numerals
	1 Byte	24	31	Read Only	Version.App.2	Numerals
	2 Bytes	32	47	Read Only	Version.App.3	Numerals
	1 Byte	48	55	Read Only	Version.App.4	Numerals
FFB9	1 Byte	16	23	Read Only	Version.Config.1	Numerals
	1 Byte	24	31	Read Only	Version.Config.2	Numerals
	2 Bytes	32	47	Read Only	Version.Config.3	Numerals
FFBA	4 Bytes	16	47	Read Only	Reserved	Reserved
FFBB	1 Bit	16	16	Read & Write	CAN Map EEPROM Values Save (Save = 1)	(0 or 1)
	1 Bit	17	17	Read Only	CAN Map EEPROM Values Saved Confirmation (Saved = 1)	(0 or 1)
FFBC	1 Bit	16	16	Read & Write	Remote Alarm Acknowledgement	(0 or 1)

Supplementary Information

Passcodes

The MPC-10 & TEC-10 controllers house three levels of passcode protection. This feature allows the OEM, technician or owner to set desired menu parameters to be shown and changed only by selected operators. The three levels are low security, medium security and high security. The default passcodes can easily be changed via the PC Configuration Software (also known as PowerVision for Controllers). Refer to the Glossary section of this manual to know which parameters are set to low, medium and high by default.

Low Security: allows operators to see the lowest security level menus items as set in PowerVision for Controllers. This can be thought to be a user level menu where only particular items such as the warm-up delay times and cool-down delay times are able to be shown and altered. This will keep the user from getting confused in the menu and changing parameters they shouldn't change.

Medium Security: allows operators to see the low and medium security level menus items as set in PowerVision for Controllers. This security can be thought to be a technician level where more access is needed for other critical items in the menu but not necessarily the items like engine manufacturer and Engine Emissions Tier Rating.

High Security: allows operators to see the low, medium and high security level menus items as set in PowerVision for Controllers. This level of security can be thought to be an OEM level where the entire menu is present and is able to be changed. This security level allows the OEM full access to every menu item while setting up the controller for a particular engine and/or application where the OEM may not want the user to have access.

PC Configuration Software

PowerVision for Controllers (PC Configuration Software)

The MGC1000 controller is released utilizing Enovation Controls' PowerVision Configuration Studio®. PowerVision allows engineering the ability to deliver quicker software updates with the flexibility of a software developer's environment. The addition of PowerVision gives Enovation Controls the ability to provide a free-of-charge basic PC configuration program (PowerVision for Controllers) to all customers for changing default parameters within the controller.

PowerVision for Controllers allows fast changes of default menu settings, customer splash screen, parameters in the 4-up gauges screens, security levels, and text strings within the controller for a ready to load and go setup. PowerVision for Controllers is available via download from our website (forum). http://forum.fwmurphy.com/viewforum.php?f=49

Customers requiring a software developer's environment for changing or adding further functionality into the controller may do so in their own time without waiting or paying non-recurring engineering fees (also referred to as NRE) to make changes. This developer's environment is PowerVision Configuration Studio® and requires purchase of the software license from Enovation Controls. PowerVision Configuration Studio® allows custom software changes to almost all aspects of the controller from languages, screen layouts, text strings, Modbus communications, CAN communications, IO, faults, state machines, activity diagrams (visual scripting), and menu building to name a few.

MPC-10 Specifications

Interface

Display:
Monochrome HR-TFT, 2.7 in. / 68mm, WQVGA (400 x 240 pixels)
(3) LEDs**:** green (mode), yellow (warning) and red (shutdown)
Operator controls:
(11) Raised silicon keypads, tactile feedback

Power Supply

Operating Voltage: 8-32 VDC, reverse battery polarity and load-dump protected
Cranking Power Holdup: 0 VDC up to 50mS (also good for brownout/blackout instances)
Power Consumption:
18W max without two 1A High-side FETs active,
146W max with two 1A High-side FETs active

Inputs

(5) Digital, configurable (active on High, Low, Open)
(3) Analog, configurable (4-20mA, 0-5V, resistive or digital ground)
(1) Frequency, supporting:
Magnetic Pickup (30 Hz – 10 kHz, 2.0 VAC – 120 VAC) &
Engine Alternator (30 Hz – 10 kHz, 4.5 VRMS – 90 VRMS)

Outputs

(3) Relay:
(1) SPDT
(2) B+ out
(2) Low-side FET (-DC), 1A
(2) High-side FET (+DC), 1A
(1) Dedicated Alternator Excitation, +DC, 1A

Communications

(1) CAN: J1939
(1) RS485: Modbus RTU
(1) USB: 2.0B (Supported for quick programming)

Mating Connectors

12 Position, DT06-12SA PO12 (Gray)
12 Position, DT06-12SB-PO12 (Black)
12 Position, DT06-12SC-PO12 (Green)

Physical / Environmental

Enclosure Material: Polycarbonate / ABS
Dimensions (WxHxD): 9.59 x 7.34 x 5.20 in. (243.48 x 186.5 x 132.23 mm)
Weight: 4 lbs (1.8 kg)
IP Rating: IP69K & IP67 front and back, IP66 panel seal when used with accessory gasket
Operating & Storage Temperature: -40° to +85° C (-40° to +185° F)
Vibration: 7.86 Grms (5-2000 Hz), 3-axis random
Shock: ±50G, 3 axis
Emissions & Immunity: SAE J1113, 2014/30/EU & 2014/35/EU

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

ENOVATION CONTROLS CORPORATE HEADQUARTERS
5311 S 122ND EAST AVENUE
TULSA, OK 74146

ENOVATION CONTROLS LTD. – UNITED KINGDOM
CHURCH ROAD LAVERSTOCK
SALISBURY SP1 1QZ UK

SUN MURPHY INTERNATIONAL TRADING (SHANGHAI) CO., LTD
B15 ROOM, 6# BUILDING, 351 SIZHUAN ROAD
SONGJIANG DISTRICT, SHANGHAI 201601, CHINA

ENOVATION CONTROLS INDIA PVT. LTD.
301, 3RD FLOOR, KRSNA CHAMBERS,
11 GALAXY GARDENS, NORTH MAIN ROAD,
KOREGAON PARK, PUNE 411001,
MAHARASHTRA, INDIA

U.S. SALES & SUPPORT

PHONE: 918 317 4100
EMAIL: SALES@ENOVATIONCONTROLS.COM
WWW.ENOVATIONCONTROLS.COM

MURPHY INDUSTRIAL PANEL DIVISION
PHONE: 918 317 4100
EMAIL: IPDSALES@ENOVATIONCONTROLS.COM

INTERNATIONAL SALES & SUPPORT

EUROPE, MIDDLE EAST, AFRICA
PHONE: +44 1722 410055
EMAIL: SALES@ENOVATIONCONTROLS.EU

CHINA
PHONE: +86 21 6237 5885
EMAIL: APSALES@ENOVATIONCONTROLS.COM

INDIA
PHONE: +91 91581 37633
EMAIL: INDIASALES@ENOVATIONCONTROLS.COM

FM 28221 (Tulsa, OK - USA)
FM 29422 (UK)