M2500 Engine Controller
Operator Manual
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Revision: 09-07-2010
4.11 Stop button

5 Download of log and configuration files

5.1 SD Card

  5.1.1 Download of log and configuration via SD card

  5.1.2 Saving a configuration file from the M2500 module to the SD card

  5.1.3 Loading a configuration file from the SD card

6 Terminal Connections
1 Preface

The M2500 – Engine Controller is designed for control and monitoring of marine engines. Together with the optional M2600 - Shutdown Unit the M2500 forms a complete alarm, control and protective safety system for marine engines.

Typical applications are auxiliary generators, emergency generators, harbour generators and propulsion engines.

The M2500 is designed for assembly in the main switchboard or at the engine.

This manual describes the operation indications of the M2500 and is intended for the daily user.
2 Front View of M2500

Engine status LEDs for indication of engine condition, alarms and shutdowns

Graphical display for indication of measurements, alarms and configuration

Controller status LEDs for indication of controller condition

Manual Engine Start (only active in Local Mode)

Manual Engine Stop (only active in Local Mode)
3  Front panel LEDs

3.1  Engine running LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Engine running at rated speed</td>
</tr>
<tr>
<td></td>
<td>Detected via pick-up input or crank disconnect input</td>
</tr>
<tr>
<td>Quick flash</td>
<td>Cranking</td>
</tr>
<tr>
<td>(5Hz +/- 10%)</td>
<td>Start attempt in progress</td>
</tr>
<tr>
<td>Slow flash</td>
<td>Stop procedure active or delay time between two start attempts</td>
</tr>
<tr>
<td>(1.25Hz +/- 10%)</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td>Engine stopped</td>
</tr>
</tbody>
</table>

3.2  Remote LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Engine in Remote mode</td>
</tr>
<tr>
<td>Off</td>
<td>Engine in Local mode or selector switch on terminal 7 in OFF position</td>
</tr>
</tbody>
</table>

3.3  Local LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Engine in Local mode</td>
</tr>
<tr>
<td>Off</td>
<td>Engine in automatic mode or selector switch on terminal 7 in OFF position</td>
</tr>
</tbody>
</table>

3.4  Cool Down LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Engine running in cool down mode; engine running without load (open breaker) before stopping after receipt of automatic stop command.</td>
</tr>
<tr>
<td>Off</td>
<td>All other conditions</td>
</tr>
</tbody>
</table>
### 3.5 Stopping LED

- **LED State**: Steady light
- **Description**: Engine stopping (Stop procedure active)
- **LED State**: Off
- **Description**: All other conditions

### 3.6 Override LED

- **LED State**: Steady light
- **Description**: Override Mode active (terminal 10 connected to com) (all shutdowns marked override will be treated as alarms only as long as this LED is active).
- **LED State**: Off
- **Description**: Override Mode deactivated.

### 3.7 Not ready LED

- **LED State**: Steady light
- **Description**: Any condition that pre-alarms the engine from being started from the automatic start command (e.g. engine in local mode, selector switch on terminal 7 in OFF position or any active shutdown).
- **LED State**: Off
- **Description**: Engine ready for automatic start or running in automatic mode.

### 3.8 Alarm LED

- **LED State**: Quick flash (5Hz +/- 10%)
- **Description**: One or more unacknowledged alarms present
- **LED State**: Steady light
- **Description**: Acknowledged alarm present
- **LED State**: Off
- **Description**: No alarm present
### 3.9 Shut Down LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick flash (5Hz +/- 10%)</td>
<td>Unacknowledged shutdown present</td>
</tr>
<tr>
<td>Steady light</td>
<td>Acknowledged shutdown present</td>
</tr>
<tr>
<td>Off</td>
<td>No shutdown present</td>
</tr>
</tbody>
</table>

### 3.10 Power Supply 1 LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Indicates that the primary power supply is connected to the unit and the voltage is within the specified limits.</td>
</tr>
<tr>
<td>Off</td>
<td>Indicates that the primary power supply is not connected to the unit or the voltage is outside the specified limits.</td>
</tr>
</tbody>
</table>

### 3.11 Power Supply 2 LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Indicates that the secondary power supply is connected to the unit and the voltage is within the specified limits.</td>
</tr>
<tr>
<td>Off</td>
<td>Indicates that the secondary power supply is not connected to the unit or the voltage is outside the specified limits.</td>
</tr>
</tbody>
</table>

### 3.12 Main System Error LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady light</td>
<td>Fatal system error has been encountered – System reboot is eminent.</td>
</tr>
<tr>
<td>Off</td>
<td>All other situations</td>
</tr>
</tbody>
</table>
### 3.13 Communication Error LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick flash</td>
<td>One or more unacknowledged communication errors on the CAN J1939 bus (Can bus not connected or no communication on can bus) (5Hz +/- 10%)</td>
</tr>
<tr>
<td>Steady light</td>
<td>All present communication errors acknowledged. Off CAN communication ok</td>
</tr>
</tbody>
</table>

### 3.14 Cable Error LED

<table>
<thead>
<tr>
<th>LED State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick flash</td>
<td>First unacknowledged cable or sensor error present</td>
</tr>
<tr>
<td></td>
<td>(5Hz +/- 10%)</td>
</tr>
<tr>
<td>Steady light</td>
<td>Acknowledged cable or sensor error present</td>
</tr>
<tr>
<td>Off</td>
<td>All other situations</td>
</tr>
</tbody>
</table>
4 Front panel

4.1 Gauges

Pressing the Gauges button will bring up the gauges display, regardless of the current display. It can be thought of as a *Home* button.

**Note:**
The Gauges display is the default screen for the M2500. Therefore after a 5 minute period without activity, the system will automatically return to the gauges display.

Left: Instrument shows always the rpm reading. Depending on the configuration of the system, the source may be the pick-up inputs (terminals 14-16) or the J1939 signal SPN 190. -

The small dot in the RPM meter shows the overspeed shutdown limit according to the system configuration.

Top right: Instrument shows the engine oil pressure. Depending on system configuration, the source may be analogue input “Sensor 1” (Terminal 27) or the J1939 Signal SPN 100.

Bottom right: Instrument shows engine coolant temperature. Depending on system configuration, the source may be analogue input “Sensor 2” (Terminal 28) or the J1939 signal SPN 110.
4.2 Alarms

Pressing the alarm button will show the Current Alarm display, which shows all resent alarms and shutdowns.
In case a new alarm or shutdown appears M2500 will automatically change to the Current Alarm display.
For viewing the Alarm Log move to the Current Alarm display and press the cursor right key.

- Push the alarm button for viewing the present alarms and shutdowns

- Push the alarm button followed by the cursor right key to view the Alarm Log

Current Alarm display:

```
Alarm > Current
(1/2)
"Power supply 2 fail"
"SENS 05: Broken"
```

- Push the cursor up and down keys for choosing individual alarms and shutdown

- Push SIREN button for resetting the siren

- Push RESET button for resetting the siren and accepting all present alarms and shutdown

- Acknowledged alarms are marked with √
**Alarm Log display:**

- Push the cursor up and down keys for choosing individual alarms and shutdowns
- Push RESET button for resetting the siren and accepting all present alarms and shutdowns

*Note:*

The alarm events presented in the alarm log display are cleared when M2500 is powered off (Or the list is manually cleared by pressing “Enter” for 2 seconds”). However all alarm related events are logged in the event log (log.txt on the log drive), which cannot be deleted.

### 4.3 Siren button

Pressing this button resets the siren. Alarms will not be reset by this button.

### 4.4 Reset button

Pressing this button resets the siren and all unacknowledged alarms. It will also send the log and debugging file to the SD card. In case it is necessary to send a log file of the engine to the engine manufacturer or to SELCO (for example due to problems with the engine or the controller), it is possible to safe these files to the SD card. After that the files from the SD card or the SD card itselve can be send.
4.5 Sensors button

After pressing this button the display will move to the sensor display mode. In this mode, it is possible to inspect all system inputs via a number of dedicated displays. Use the ← and → to navigate between the displays.

Note:
When leaving the sensor view, e.g. due an alarm being raised or pressing the Gauges button, the sensor view remembers which display was the last viewed. When pressing the sensor button next time, the display will move back to the last sensor display viewed.

4.5.1 Analogue inputs

Example for the analogue sensors:

<table>
<thead>
<tr>
<th>Sensor number</th>
<th>Sensor Name</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>SENS 2:</td>
<td>Coolant water temp.</td>
<td>57 °C</td>
</tr>
</tbody>
</table>

This view presents the operator with a summary of the configuration of the analogue inputs as well as the current signal present at the input terminal.

By moving the cursor over the individual inputs, the signal currently applied to the input can be monitored.

The display simply indicates the current input values, regardless of the value triggering any alarms.
4.5.2 Analogue input statistics

The screen shows the sensor number, the measurement and the minimum and maximum values measured since last statistic reset. The statistic reset can be done separately for each sensor by choosing the sensor and then pressing [RESE] for 2 seconds.

Please note that the statistics are reset when the M2500 is powered off.

4.5.3 Digital inputs

Example for the digital sensors:

The screen shows the digital input number, the condition of this input [open, closed or cable fail] and the input name.
4.5.4 J1939 inputs

This display presents the operator with a list of the current values on the specified inputs (J1939 SPNs). The display does not indicate if the input values are resulting in alarms being triggered.

4.5.5 J1939 active diagnostics codes

This display presents the operator with a list of present diagnostics codes as reported by the ECU via J1939.
4.5.6 Engine Controller

<table>
<thead>
<tr>
<th>Sensors &gt; Engine Controller</th>
<th>Output terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input terminals</td>
<td></td>
</tr>
<tr>
<td>□ [05] REMOTE</td>
<td>□ [36] READY</td>
</tr>
<tr>
<td>□ [06] LOCAL</td>
<td>□ [37] START WARN</td>
</tr>
<tr>
<td>□ [07] OFF</td>
<td>□ [38] RUN</td>
</tr>
<tr>
<td>□ [08] AUTO START</td>
<td>□ [39] COOL DOWN</td>
</tr>
<tr>
<td>□ [09] AUTO STOP</td>
<td>[41] LUBE PUMP</td>
</tr>
<tr>
<td>□ [10] OVERRIDE</td>
<td>[42] CRANK</td>
</tr>
<tr>
<td>RPM: 1513 @Pickup</td>
<td>[44] AIR INTAKE</td>
</tr>
<tr>
<td>Running</td>
<td>□ [64] ENGINE STOP</td>
</tr>
<tr>
<td></td>
<td>□ [66] RUN/STOP</td>
</tr>
</tbody>
</table>

√ means that the in or output is activated.

This display presents the operator with an instant overview of all I/O directly related to controlling and monitoring the engine – Inputs are presented on the left, and outputs are presented on the right.

The RPM signal can be delivered by either pick-up or J1939. The input source is indicated after the ‘@’.

The state of the engine controller component is indicated at the bottom of the screen (Stopped, starting, running, stopping, blocked etc.).
4.6 Config button

This button opens the configuration menu of the M2500 Engine Controller. Before getting access to the configuration the unit will ask for a pin code.

4.7 Cursor keys

Used for scrolling the cursor in the display and shifting between display pages.

In the configuration menu the up and down keys are also used for increasing and decreasing set points.

4.8 ESC button

Return to the previous display or when in programming settings in configuration mode, return to the last page without saving changes.

4.9 Enter button

In Configuration mode pressing the Enter button will accept a change in the configuration.

4.10 Start button

Start of the engine in local mode.

If the start signal is configured as a pulse signal, cranking will take place until the pre-configured crank time has expired or the M2500 has detected that the engine has fired (crank disconnect speed).

If the start signal is configured as a continuous signal, cranking will only take place as long as the start button is pushed. However the cranking will be interrupted as soon as the M2500 detects that the engine has fired or the pre-configured crank time has expired.

4.11 Stop button

Stop of the engine in local mode.

After pushing the stop button M2500 will activate the stop procedure, regardless if the engine was detected as running (crank disconnect speed) or not.
5 Download of log and configuration files

If there are questions regarding the operation of the engine or the controller, it can be useful to share the log and configuration files of the engine with the engine manufacturer or SELCO. For this no special software is required. Both, configuration and log file can be viewed from your Web Browser.

The log file can be downloaded and send from the unit by 2 different ways:

- Connect the M2500 to your PC via the USB type A to type B cable
- Takeout SD card from unit and download the file via SD card Reader

In case no computer is available; take out the SD card and send it by courier (the SD card is not required for operation of the engine).

5.1 SD Card

The M2500 includes a slot for an SD card. Purpose of this SD card is to share log and configuration files.

The SD card is not required for operation of the engine. All files on the SD card are copies only. The files are stored in the internal memory of the M2500 and then copied to the SD card. In case the SD card is removed, still all files (including log) are saved in the internal memory.

When a new SD card is plugged into the M2500, the log file is automatically saved to the SD card. Configuration files are not copied automatically to the SD card. If required this can be done manually. It is possible to copy configuration files both ways, from SD card to the controller and vice versa.
5.1.1 Download of log and configuration via SD card

For sharing of configuration files take out the SD card from the M2500 and place it in your SD card reader. After a moment the M2500 will appear in the directory of your Explorer (As the folder named “res” is hidden, it may or may not be visible depending on the settings of your file manager).

It can be seen that both the log-viewer and the configuration tools are made available on the SD card. When M2500 detects an SD card being inserted, it will test if the necessary files are present – If not, M2500 will copy them onto the SD card.

5.1.1.1 Log File (log.txt)

The log is saved in the log.txt file. For sharing the log file, simply copy the file to your hard disk or send it attached to an e-mail.

5.1.1.2 Configuration file (config.cfg)

M2500 exports its configuration to a file named “config.cfg” (see M2500 Configuration manual).

The configuration can be inspected and edited by double clicking on config.ha, which will bring up the SELCO configuration tool. The configuration tool expects to find a config.cfg file in the same location as the application itself (Here, the SD card root directory). It will load the configuration file and present the content. If changes have been made, they can be saved by clicking the “Save all” button. The changes are saved to a file called “config.cmd” which is placed in the same location as the application (here, the root of the SD card).

When the SD card is inserted into the M2500, the config.cmd file will be recognized as a configuration file. The user interface will prompt the operator for the pincode before it loads the configuration saved from the configuration tool (Immediately after M2500 have consumed the config.cmd file, it will be deleted).
5.1.2 Saving a configuration file from the M2500 module to the SD card

- For this enter the configuration mode by pressing \( \text{CONFIG} \) button.

- Type pin code and press \( \text{ENTER} \) button.

- Choose Save configuration to SD card by pressing \( \text{DOWN} \) a few times.

- Press \( \text{ENTER} \) button.

- Now the configuration is copied to the SD card.

5.1.3 Loading a configuration file from the SD card

For loading of a configuration file from the SD card press the \( \text{CONFIG} \) button and choose the “Load configuration from SD card” parameter.

Press \( \text{ENTER} \) button and the unit will ask for the Pin code.

Type pin code and \( \text{ENTER} \) press again.

Now the configuration will be uploaded from the SD card and saved on the M2500 module.
6 Terminal Connections

- USB interface for configuration and read out of alarm log
- RS232 interface for configuration and read out of alarm log
- Outputs for indication of engine state (e.g. to PMS)
- Control outputs
- Common alarm outputs
- Programmable outputs for indication of alarms and shut downs
- Engine stop relay
- Programmable output for stop or run solenoid with cable monitoring
- Siren relay

Primary and back-up power supply

Inputs for activation of operation modes, Inputs for remote start and stop

Input for magnetic, NPN or PNP pick-up for speed detection

Digital sensor inputs for alarms and shut downs

Analogue sensor inputs for alarms and shut downs

Interface for CANJ1939

Interface for future I/O cards

RS485 Interface for Modbus

Slot for SD card for read out of log and configuration