

## Product Manual

# Engine Control

## Mechanical Engine



**Part Number: C3M-2500**

**Revision: 1.0**

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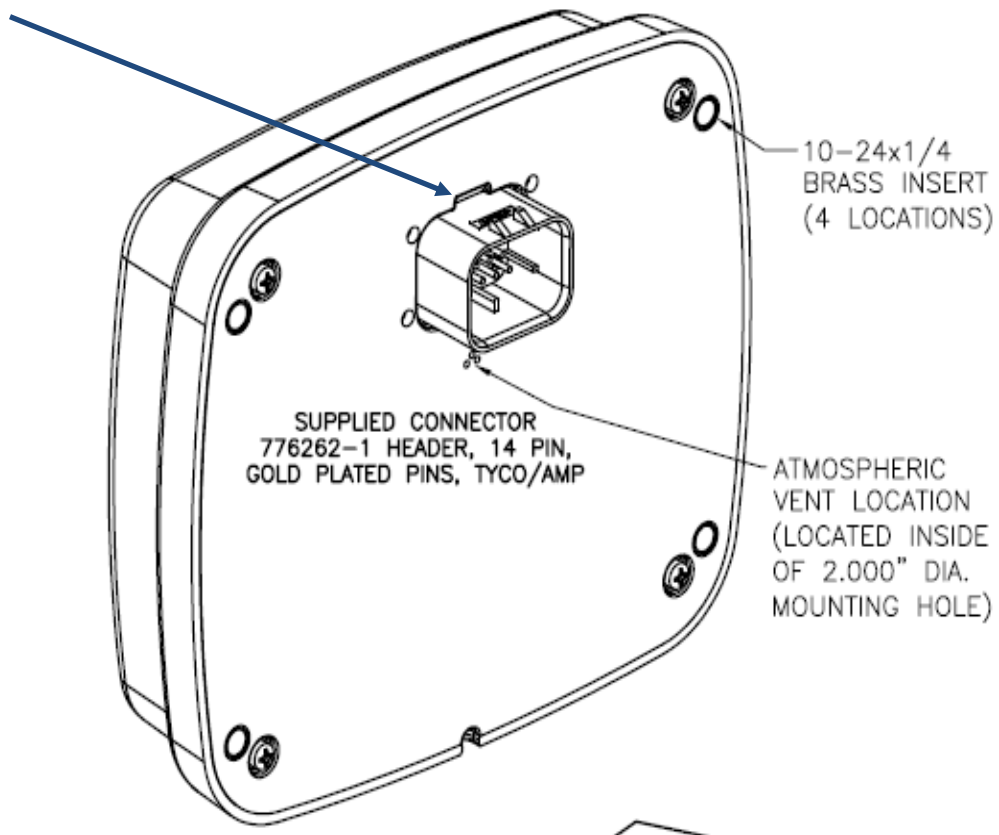
## **PANEL OPERATION**

### **MANUAL OPERATION**

- 1) Engine Start - Turn key to CRANK position**
- 2) Engine Stop - Turn key to OFF position**

## MODULE CONNECTORS

### Primary Connector 14 Pin



## MODULE CONNECTOR (14 Pin)

Pin	Function	Pin	Function
1	Fuel Solenoid	8	MPU
2	Water Temp	9	Battery Positive
3	Battery Positive	10	Key Auto Detect
4	Auto Crank Signal	11	Switched Power to C3M
5	Preheat Signal	12	Battery Negative
6	N/O Relay #1	13	Fuel Level
7	Oil Pressure	14	Digital #1 Input

**CAUTION:**

Maximum current draw for signal circuits is 5 amps

## PANEL CONNECTORS

1. Engine Harness Connector –Deutsch 16 pin (HDP24-24-21PE)

16 Pin Engine Harness Connector	
Pin	Function
S	Battery Positive
F	Battery Negative
R	Key On Power (Fuel/Run Signal)
J	Preheat Signal
D	Crank Signal
C	Oil Pressure Sender Input
H	Engine Temperature Sender Input
A	MPU-
P	MPU+ or Tach Input
G	Alternator Excite
E	Fuel Level
B	Digital Input #1

**CAUTION:**

Maximum current draw for relay output circuits is 5 amps

## ENGINE ALARMS, CODES AND MESSAGES

### WARNINGS & ALARMS

When parameter is outside of its limits, the control panel flashes that parameter the display and illuminates the yellow lamp. If the condition worsens beyond the alarm set point, the red lamp illuminates, the engine shuts down and an alarm message appears on the display identifying the cause.



#### Warning

Yellow Warning Lamp ON and 2010 RPM Flashing



#### Alarm/Shutdown

Red Shutdown Lamp ON and Text Message with value on display

### ALARM EVENT LOG

The Alarm Log creates an entry allowing the service and/or operator to view the last 32 events. An event is considered either a warning or shutdown. Each event is time stamped with engine run time hours. Access the **Alarm Event Log menu** to view.



Above is an example of high engine speed alarm at 352.9 hours. The most recent event will be the first displayed in the log.

## INDICATION LAMPS

The panel has two lamp indicators.

**Engine  
Fault/Shutdown  
Lamp**

**Engine  
Warning  
Lamp**



## CONTROL PANEL SPECIFIC ALARMS AND SHUT DOWNS

The panel has its own engine safety alarms and shut downs that can be enabled. The available options are listed below and can be accessed via the Engine Safety Configuration menu.

*Each alarm must be enabled in the Engine Safety Configuration menu to activate.*

Heading	Default	Range	Units
Sender Check Bypass	0:10	0:05 – 1:00	Min:Sec
Fuel Sender Type	S-W	S-W/Switch/VDO	
Fuel Level Check	Run	Off / Always / Run	
Low Fuel Pre-Alarm	20	0-100	%
Low Fuel Alarm	1	0-100	%
Fuel Alarm Delay	5	0-59	Sec.
Oil Pressure Sender	S-W	S-W / VDO	
Oil Pressure Check	Run	Off / Always / Run	
Low Oil Press Pre Alarm	15	0 - 100	PSI
Low Oil Press Alarm	10	0 - 100	PSI
Oil Press Alarm Delay	5	0:01 – 1:40	Sec
Temperature Check	Run	Off / Always / Run	
Low Temp Pre Alarm	0	0 - 300	Deg F
Low Temp Alarm	0	0 - 300	Deg F
High Temp Pre Alarm	220	150 - 300	Deg F
High Temp Alarm	230	150 - 300	Deg F
Temp Alarm Delay	0:05	0:01 – 1:40	Min:Sec
Battery Volts Check	Off	Off / Always / Run	
Low Battery Pre Alarm	12.0	0.0 – 40.0	Volts
Hi Battery Pre Alarm	15.0	0.0 – 40.0	Volts
Over Speed Check	Off	Off / Always / Run	
Over Speed Alarm	3000	650 - 5000	RPM
Over Speed Alarm Delay	0:05	0:01 – 1:40	Min:Sec

- 1) Off / Always / Run – Describes when the parameter will be monitored for alarm conditions. Run refers to when the engine is running. Off disables the alarm conditions. Always enables the alarm constantly regardless of engine state.
- 2) Alarm Delay – The time period, after Sender Check Bypass, that the parameter must be on the alarm condition before the alarm becomes latched.



## CONTROL PANEL DIGITAL INPUT

The panel provides the analog and digital inputs defined below located in the ***Input Configuration menu***. *The panel is shipped from the factory with the **highlighted** inputs enabled in the panel. Inputs not highlighted need to be enabled/configured in the menu system to be used.*

Input	Heading	Default	Options	Connector	Pin
Digital 1	Normally	Open	Open / Closed	16 Pin Connector	B
	Function	None			
	Message	None			
	Check	Always	Off / Always / Run		

## DIGITAL FUNCTIONS

The digital inputs can be configured for different uses depending on the application. These include the following:

- 1) Alarm – Engine shutdown when active with display message as assigned. A red lamp will also be illuminated.
- 2) Pre Alarm – Warning message will be displayed along with a yellow lamp when active.

## DIGITAL FUNCTION MONITORING

Off / Always / Run – Describes when the parameter will be monitored for alarm conditions. Run refers to when the engine is running. Off disables the alarm conditions. Always enables the alarm constantly regardless of engine state.

## DIGITAL FUNCTION DELAYS

Alarm Delay – The time period, after Sender Check Bypass, that the parameter must be on the alarm condition before the alarm becomes latched.

## CONTROL PANEL RELAY OUTPUTS

The panel provides relay outputs defined below located in the **Output Configuration menu**. The relays are rated at 5 amps.

*The panel is shipped from the factory with the **highlighted** outputs enabled and pre-wired in the panel.*

Relay	Heading	Default	Connector	Pin
Relay 1 Ground output only	Function	None		
	Polarity	Positive		
	Initial State	Off		
<b>Relay 2</b>	<b>Function</b>	<b>Fuel/Run</b>	16 Pin Connector	<b>R</b>
	<b>Polarity</b>	Positive		
	<b>Initial State</b>	On		
<b>Relay 3</b>	<b>Function</b>	<b>Preheat</b>	16 Pin Connector	<b>J</b>
	<b>Polarity</b>	Positive		
	<b>Initial State</b>	Off		
Relay 4	Function	None		
	Polarity	Positive		
	Initial State	Off		

## RELAY FUNCTIONS

Available relays can be assigned for different uses.

- a. None - Assign to "none" when not used.
- b. Throttle B1 - Reserved for OEM applications.
- c. Throttle B0 - Reserved for OEM applications.
- d. Pre Alarm - Relay will be active when there is a pre alarm condition. Typically used to drive an alarm horn or lamp. Also can be used to send a signal to a monitoring station.
- e. Alarm - Relay will be active when there is an alarm condition. Typically used to drive an alarm horn or lamp. Also can be used to send a signal to a monitoring station.
- f. Pre Alarm & Alarm - Energizes an external audible alarm when a pre alarm or alarm condition is present. Pressing the ENTER button will silence.
- g. Alarm Horn - Energizes an external audible alarm when an alarm condition is present. Pressing the ENTER button will silence.

- h. Engine Run - Relay will be active when engine RPM is greater than 600. Typically used to drive an auxiliary circuit such as louvers or send a signal to a monitoring station.
- i. Switch Trip - Relay will be active if digital input is active.
- j. Fuel / Run - Relay will be active during an engine start request and while the engine is running. Used to drive the engine's ECU circuit. Also active when requesting active and stored J1939 codes.
- k. Custom 1 - Reserved for OEM applications.
- l. Preheat - Relay will be active during programmed preheat period. Used to drive a preheat relay.

## RELAY POLARITY

- a. Positive - Relay acts as a normally open contact.
- b. Invert - Relay acts as a normally closed contact.

## RELAY INITIAL STATE

- a. On - Relay is activated upon power up.
- b. Off - Relay is not activated upon power up.

## MENU SYSTEM

### To Enter Menu System

Hold MENU button and press ENTER button.

### Menu Navigation

Press MENU button to scroll menu options.

Press the UP arrow button to enter menu.

Press the DOWN arrow button to reverse.

### Exit Menu System

Hold MENU button and press ENTER button.

### To Change a Setting

Press the ENTER button to bring up brackets [ ].

Press UP arrow button and DOWN arrow button to change setting.

Press ENTER button to make selection, brackets disappear.

**Recycle key to the OFF position after changing a setting.**

## MAIN MENUS

<b>Operation Event Log</b>	View Last 32 Events (Start, Stop, Alarms)	}	<b>Viewing Menus</b>
<b>Alarms Event Log</b>	View Last 32 ECU and Controller Alarms)		
<b>Module Information Menu</b>	Control Unit Part# View Control Unit Software Version View		
<b>Controller Setup Menus</b> (PASSWORD PROTECTED)	Input Configuration (1) Output Configuration (2) Throttle Configuration (3) Engine Safety Configuration (4) Module Configuration (5) Calibration (6)	}	<b>Configuration Menus</b>

## CONFIGURATION MENUS

(1) <b>Input Configuration</b>	Digital Input 1 - Setup (NO/NC, Action, Message, When Active, Delay)
(2) <b>Output Configuration</b>	Relay Output 1 Setup (Function, Polarity, Initial State)
	Relay Output 2 - Pre Set to Fuel/Run
	Relay Output 3 - Pre Set to Preheat
	Relay Output 4 Setup - Pre Set to Crank Signal
(3) <b>Throttle Configuration</b>	Throttle Type - Throttle Type Selection (Default = Off)
(4) <b>Engine Safety Configuration</b>	Sender Check Bypass Time Period Selection
	Fuel Sender Type
	Fuel Level Check (Off / Always / Run)
	Low Fuel Level Pre-Alarm % Selection
	Low Fuel Level Alarm % Selection
	Fuel Alarm Time Delay Selection
	Oil Pressure Check On/Off Selection
	Low Oil Pressure Pre Alarm % Selection
	Low Oil Pressure Alarm % Selection
	Oil Pressure Alarm Time Delay Selection
	Engine Temperature Check On/Off
	Engine Temperature Pre Alarm Selection
	Engine Temperature Alarm Selection
	Engine Temperature Alarm Time Delay Selection
	Battery Volt Check On/Off
	Low Battery Volt Pre Alarm Selection
	High Battery Volt Pre Alarm Selection
	Battery Volt Trim Setting
	Over Speed Alarm On/Off
	Over Speed Alarm RPM Setting
Over Speed Alarm Time Delay Selection	
(5) <b>Module Configuration</b>	Preheat M:S (Default 0:00)
	Hour Meter
	Clear Operation Log Yes/No
	Clear Alarm Log Yes/No
(6) <b>Calibration</b>	Flywheel Teeth (Default 30)
	Auto Set Teeth (No/Yes)