PRESSURE GOVERNOR, ENGINE MONITORING, AND MASTER PRESSURE DISPLAY
MODEL DDA100
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INTRODUCTION

Overview

The Fire Commander II pressure governor and all-in-one instrument panel uses state of the art programmable microprocessor technology. It will maintain a steady pump discharge pressure by controlling engine speed or hold a selected engine RPM. It offers complete engine control and remote display in a single compact unit.

The Fire Commander operates in one of two modes, pressure or RPM. In pressure mode the Fire Commander maintains a constant pump discharge pressure. The discharge pressure is monitored and compared to the selected pressure setting, the engine RPM is varied to keep the discharge pressure at the selected setting. In RPM mode the Fire Commander maintains a constant engine RPM. The pump discharge pressure is monitored and can vary but, as a safety feature it will be limited to an increase of 30 PSI. If the discharge pressure increases 30 PSI in the RPM mode, the governor will automatically lower the engine RPM to prevent a high pressure surge.

The panel has three 4-digit LED displays for pump discharge, pump intake, and engine RPM. The LEDs are more than 1/2" high. The message display will show pressure and RPM settings; fault and error code information; detailed engine data and program features. There are four LED bar graphs that provide a constant display of the safe operating ranges for engine oil pressure, engine coolant temperature, transmission temperature, and battery voltage. (For detailed information with the exact numbers and units of measure the MENU button is pressed.)

All controls and indicators are located on the front of the control module.

Features

- Power Up in Pressure Mode
- Automatic Regulation of Pump Discharge Pressure
- Manual Control of Pressure or Engine RPM Settings
- Field Programmable Presets
- Diagnostic Capabilities
- No Pressure or RPM Variation When Changing Modes
- Limits Increase of Pressure When in RPM Mode
- Recognition of No Water Condition With Automatic Response
- Interlock Signal Recognition and Throttle Ready LED
- Return to Engine Idle With the Push of a Button
- Accumulated Engine and Pump Hours
GENERAL DESCRIPTION

Controls and Indicators

All Fire Commander II controls and indicators are located on the front of the control module. (Refer to Figure 1.)

PUMP DISCHARGE Display

Shows the pump discharge pressure during normal operations.

PUMP INTAKE Display

Shows the pump intake pressure during normal operations and codes during programming.

IDLE Button

When pressed immediately sets the engine RPM to idle. This button can be used in an emergency or for normal shut down after operations.

PRESSURE LED

The amber LED is on to indicate operation in the pressure mode.

RPM LED

The red LED is on to indicate operation in the RPM mode.

MODE Button

Selects the pressure or RPM mode of operation.

THROTTLE READY LED

This LED will be on when the required interlock conditions are met and the governor is ready to begin operations.

PRESET Button

Press to change/select a pre-programmed value for pressure or RPM setting.

INC / DEC Buttons

During operations the buttons increase and decrease pressure or RPM setting.

RPM Display

Shows the engine RPM during normal operations.

CHECK ENGINE / STOP ENGINE LED

Repeats the engine warnings from the cab.
Message Display

The message display shows the pressure or RPM setting during normal operations, warning alarms as they occur, and detailed information when the menu button is pressed. It shows the time and date when the throttle ready LED is off. It is also used to show stored data and program features.

SILENCE Button

Suppresses audio alarms and used in programming.

MENU Button

Used when accessing detailed information and program features. (Detailed information shown includes engine oil pressure, engine coolant temperature, transmission temperature, battery voltage, engine hours, and pump hours with the exact measure and units.)

OIL LED Display

Shows engine oil pressure safe range with green LEDs. The LEDs will flash red when the pressure is low.

ENG.° LED Display

Shows engine coolant temperature safe range with green LEDs. The LEDs will flash red when the temperature is high.

TRANS.° LED Display

Shows transmission temperature safe range with green LEDs. The LEDs will flash red when the temperature is high.

VOLTS LED Display

Shows battery voltage safe range with green LEDs. The LEDs will flash red when the voltage is outside normal limits.

DayLight Sensor adjusts LED brightness to day/night conditions.

Figure 1. Controls and Indicators
OPERATION

On power-up the Fire Commander II will be in the pressure mode of operation. The RPM display will show engine at idle RPM, the four LED bar graphs will be green indicating readings within normal ranges, and the message display will alternate between showing the date and time.

If a monitored function is not within normal parameters the displays will flash, the RPM display will show an error or fault warning code and a description will show in the message display. (Refer to Table 2. Error Codes or Table 3. Fault Warning Codes.)

If one of the inputs displayed by the LED bar graphs is not within normal range the LEDs will be red.

When all necessary throttle enables are active and the interlock circuit is complete the THROTTLE READY LED will light and the Fire Commander II will be ready to control the engine RPM.

Controls

INC/DEC Buttons

The INC and DEC buttons are used to change pressure and RPM settings or program preset values. The rate and amount the numbers change when a button is pressed depends on the mode and how long the button is held.

In Pressure Mode, Press either button momentarily to change the pressure setting by 1 PSI. Press and hold the button for more than 2 seconds and the pressure setting will change by 5 PSI twice and then by 10 PSI until the button is released.

In RPM Mode, Press either button momentarily to change the RPM setting by 10 RPM. Press and hold the button for more than 2 seconds and the RPM setting will change by 50 RPM twice and then by 100 RPM until the button is released.

MODE Button

Switches between pressure and RPM modes.

MENU Button

Shows detailed information in the message display.

SILENCE Button

The silence button is used to suppress an optional audio alarm.

PRESET Button

Selects a pre-programmed value for pressure or RPM setting.
Table 2. Error Codes

<table>
<thead>
<tr>
<th>RPM Display</th>
<th>Message Display</th>
<th>Probable Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>E01</td>
<td>No Data</td>
<td>&gt; Datalink cable not connected / connected to wrong port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Broken wire / bad connector contact on datalink cable</td>
</tr>
<tr>
<td>E02</td>
<td>No RPM</td>
<td>Engine RPM not detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Datalink cable not connected / connected to wrong port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Engine not running / ignition key on</td>
</tr>
<tr>
<td>E03</td>
<td>No Trans T. Sensor</td>
<td>No Transmission Data Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Datalink cable not connected / connected to wrong port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Broken wire / bad connector contact on datalink cable</td>
</tr>
<tr>
<td>E04</td>
<td>No Eng Oil Sensor</td>
<td>No Engine Oil Pressure Data Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Datalink cable not connected / connected to wrong port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Broken wire / bad connector contact on datalink cable</td>
</tr>
<tr>
<td>E05</td>
<td>No D. Sensor</td>
<td>No Discharge Pressure Sensor Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Sensor cable not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Broken wire / bad connector contact on sensor cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Defective pressure sensor</td>
</tr>
<tr>
<td>E06</td>
<td>No I. Sensor</td>
<td>No Intake Pressure Sensor Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Sensor cable not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Broken wire / bad connector contact on sensor cable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Defective pressure sensor</td>
</tr>
<tr>
<td>E07</td>
<td>No Eng T. Sensor</td>
<td>No Coolant Temperature Data Detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Datalink cable not connected / connected to wrong port</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; Broken wire / bad connector contact on datalink cable</td>
</tr>
</tbody>
</table>

Note: Not all inputs are used for all engines. For systems that use a datalink to pass information the datalink cable and connectors or ECM programming would be the probable cause.

Table 3. Fault Warning Codes

<table>
<thead>
<tr>
<th>RPM Display</th>
<th>Message Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F01</td>
<td>Hi Batt</td>
<td>High Battery Voltage</td>
</tr>
<tr>
<td>F02</td>
<td>Low Batt</td>
<td>Low Battery Voltage</td>
</tr>
<tr>
<td>F03</td>
<td>Hi Trans</td>
<td>High Transmission Temperature</td>
</tr>
<tr>
<td>F04</td>
<td>Low Oil</td>
<td>Low Engine Oil Pressure</td>
</tr>
<tr>
<td>F07</td>
<td>Hi Eng T.</td>
<td>High Engine Coolant Temperature</td>
</tr>
<tr>
<td><strong>F08</strong></td>
<td>No Water</td>
<td>Out of Water Mode</td>
</tr>
<tr>
<td>F09</td>
<td>No Resp</td>
<td>Engine Does Not Respond</td>
</tr>
</tbody>
</table>
Pressure Mode Operation

In the pressure mode of operation the PRESSURE LED will be on. The Fire Commander will maintain a constant discharge pressure within system capabilities. It will adjust the engine RPM automatically to compensate for variations in pressure.

**Note:** When changing from RPM mode to pressure mode the pressure setting will be the pressure that the pump was operating at in RPM mode.

1. Press and hold PSI mode button for **3 seconds**.
   
   Result: PRESSURE LED goes on.

2. Press PRESET and/or the INC DEC buttons to select pressure setting.
   
   Result: Message display shows pressure setting, engine RPM changes.

3. Press IDLE button after operations to bring engine to idle RPM.
   
   Result: Message display shows IDLE, engine at idle RPM.

Opening/Closing Discharge Valves

In pressure mode the governor will maintain the pressure setting regardless of the number of discharge lines that are opened or closed providing there is a sufficient water supply. As lines are opened the discharge pressure will start to drop and the governor will raise the engine RPM to maintain the required pressure. As lines are closed the discharge pressure will start to rise and the governor will lower the engine RPM to maintain the required pressure.
Running Away From Water, No or Low Supply Water

There are situations during pump operations when there may be no or low supply water. This can be due to an empty water tank, a problem on the intake line, or when switching the water supply source.

The governor constantly monitors the discharge pressure and compares it to the engine RPM.

**If discharge pressure drops very quickly** (from air coming into the pump) the governor will limit the RPM increase to +300 and not allow the engine to exceed 1900 RPM. If the discharge pressure does not increase after 3 seconds the governor will reduce the engine speed by 150 RPM and this RPM will be held as long as the pressure stays above 45 PSI. (See below for pressure drop below 45 PSI.) The governor will resume normal operation when air stops coming into the pump.

If the discharge pressure starts dropping while running at a selected pressure in pressure mode, the governor will increase the engine RPM and attempt to maintain the selected pressure setting. If pressure drops and an increase in RPM does not bring the pressure back up, the governor will recognize this as a running away from water condition and hold the engine at a steady RPM. (The engine will not go to the maximum RPM. The governor will hold it at the RPM it was at when the running away from water condition was recognized.) When the running away from water condition stabilizes the operator may have to take action (using preset or inc/dec buttons) to reset the pressure setting.

**If the discharge pressure drops below 45 PSI** but stays above 15 PSI the governor will go into a low water cycle. It will set the engine to 1100 RPM, if the pressure does not rise above 45 PSI in 7 seconds the governor will set the engine at idle RPM. The governor will repeat the low water cycle as long as the discharge pressure is between 15 and 45 PSI. When the pressure rises above 45 PSI the governor will resume normal operation.

If the discharge pressure drops below 15 PSI the engine will be set at idle RPM. When the discharge pressure rises above 15 PSI the governor will resume the low water cycle.
RPM Mode Operation

In the **RPM mode** of operation the RPM LED will be on. The Fire Commander will maintain a constant engine RPM.

The pump discharge pressure can vary but, as a safety feature, the governor limits the increase in pressure to 30 PSI over the last established PSI value. As the discharge pressure approaches this limit the governor will automatically lower the RPM to prevent a high pressure surge. The **RPM LED** will blink as the governor sets a lower RPM. This lower RPM will be the new operating RPM setting.

**Note:** When changing from pressure mode to RPM mode the RPM setting will be the RPM that the pump was operating at in pressure mode.

1. Press and **hold RPM mode button for 3 seconds**.
   
   Result: RPM LED goes on.

2. Press **PRES**et and/or the **INC DEC** buttons to select RPM setting.
   
   Result: Message display shows RPM setting, engine RPM changes.

3. Press **IDLE** button after operations to bring engine to idle RPM.
   
   Result: Message display shows **IDLE**, engine at idle RPM.
Switching Between Operating Modes

- No variation in discharge pressure or RPM will occur when changing between pressure and RPM modes.
- When changing to RPM mode, the RPM setting will be the RPM that the pump was operating at in pressure mode.
- When changing to pressure mode the pressure setting will be the pressure that the pump was operating at in RPM mode.

When the engine is at idle RPM:

Press the MODE button and the governor switches modes immediately.

When the engine RPM is above idle:

Press and hold the MODE button for 3 seconds and the governor changes modes.
(This is to avoid an accidental change over if the buttons get bumped.)

Pump Discharge Pressure is High at Engine Idle

Once the governor has set the engine to idle, it can do no more to reduce discharge pressures. To reduce discharge pressure the pump operator can gate incoming water, reduce pressure at the intake relief valve, gate discharges, or disable the pump.
Detailed Information

The four LED bar graphs provide a constant display of the safe operating ranges for engine oil pressure, engine coolant temperature, transmission temperature, and battery voltage, they do not show exact numbers or units of measure. This detailed information is shown in the message display when the MENU button is pressed. Included with the above, engine hours and pump hours will be shown.

Show Detailed Information

Note: Detailed information is a display only mode and no changes can be made to the data.

The MENU button allows the operator to gain access to the detailed information. Each time the MENU button is pressed the display will scroll to show the next.

The message display will show the following:

- Eng Oil  ###PSI (programmable for kPa or Bar)
- Eng Temp  ###°F (programmable for °C)
- Trans T.  ###°F (programmable for °C)
- Batt VDC  ##.##
- Eng Hrs  ####
- Pump Hrs  ####

The message display will revert to normal operation after 20 seconds if no buttons are pressed or immediately when a button other than the MENU button is pressed.