FRC

A Safe Fleet Brand

PUMPBOSS

PRESSURE GOVERNOR
and ENGINE MONITORING
MODEL: PBA400

FIRE RESEARCH CORPORATION

www.fireresearch.com
26 Southern Blvd., Nesconset, NY 11767
TEL 631.724.8888   FAX 631.360.9727   TOLL FREE 1.800.645.0074

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INTRODUCTION

Overview

The Fire Research pressure governor uses state-of-the-art-programmable microprocessor technology and operates in one of two modes, pressure or RPM. It maintains a steady pump discharge pressure within system capabilities by controlling the engine speed or holds a selected engine RPM.

The PBA400 has two pressure sensors that monitor both the pump intake and discharge pressure. The duel sensor configuration provides improved defense against pump cavitations.

In pressure mode the governor 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 governor maintains a constant engine RPM. The pump discharge pressure is monitored, it can vary but is limited to an increase of 30 PSI. If the discharge pressure increases 30 PSI, the pressure governor automatically lowers the engine RPM to reduce the discharge pressure.

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

Features

J1939 CAN Bus for Engine Information and Control

Power Up in Pressure Mode

Automatic Regulation of Pump Discharge Pressure

Manual Control of Pressure or Engine RPM Settings

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 with Throttle Ready LED

Return to Engine Idle With the Push of a Button

Display Brightness Automatically Adjusts for Day or Night Operations

High Idle

Audible Alarm Buzzer (Optional)

KPa / Bar (Optional)

Remote Governor Option

Specifications

The governor is available in various models. Each model is programmed to interface with specific engines. All models provide the same functions, controls, and digital readouts for the management of pump discharge pressure.

Display Module

Supply Power:	12/24 VDC
Supply Current:	0.5 Amps
Dimensions:	4 5/8" Wide by 6 3/4" High

LED Bar Graphs

Oil Pressure:	10 - 100 PSI
Temperature (Engine Coolant):	150 - 240 °F
Transmission Temperature:	140 - 300 °F
Battery Voltage:	11.5 to 15.5 VDC (12 V)
	23.0 - 30 VDC (24 V)

Engine Sensors

Engine Oil Pressure:	0 - 100 PSI, 1/8" NPTF
Engine Coolant Temperature:	100 - 250 °F, 1/2" - 14 NPT
Transmission Temperature:	140 - 320 °F, 1/8" NPTF

Pressure Sensor

	Discharge	Intake
Model Number:	XE-FP4000PT3	XE-IO3100PT3
Pressure Range:	0 - 600 PSI	-30 in/Hg - 600 PSI
Proof Pressure:	1200 PSI	1200 PSI
Excitation Voltage:	5 VDC	5 VDC
Output Voltage:	0.5 - 4.75 VDC (See Table 1)	

Table 1. Pressure Sensor Output Voltage

	0psi	100psi	150psi	200psi	250psi	300psi	600psi
Discharge Sensor XE-FP4000PT3	0.5vdc	1.21vdc	1.56vdc	1.92vdc	2.27vdc	2.625vdc	4.75vdc
Intake Sensor XE-IO3100PT3	0.604vdc	1.295vdc	1.640vdc	1.985vd	2.331vdc	2.667vdc	4.75vdc

GENERAL DESCRIPTION

The pressure governor is compatible with the following engines:

PBA401   Cummins IS Series

PBA402   Detroit Diesel

PBA404   Navistar

PBA405   Caterpillar

PBA406   Ford

PBA407   Mack

PBA408   Scania

PBA410   Mercedes

PBA416   John Deere

PBA424   MAN

PBA426   IVECO

Components

The information available on the J1939 databus varies depending on the particular engine type. Not all wires are used for all engines. Refer to the engine specific wiring diagram for interface connections. The sensors (if any) that need to be installed also vary depending on the engine.

The governor consist of the following components:

Control Module

Discharge Pressure Sensor

Intake Pressure Sensor

Engine Oil Pressure Sensor (As Necessary)

Engine Coolant Temperature Sensor (As Necessary)

Transmission Temperature Sensor (As Necessary)

Audible Alarm Buzzer (Optional)

Cables

Control Module

The control module is waterproof and uses 4 5/8 by 6 3/4 inches of panel space. All controls and indicators are located on the front of the control module. (Refer to Controls and Indicators.)

Discharge Pressure Sensor

The pressure sensor is mounted on the pump discharge manifold. It provides an input signal to the control module that is proportional to the pressure.

Intake Pressure Sensor

The pressure sensor is mounted on the pump intake manifold. It provides an input signal to the control module that is proportional to the intake pressure.

Engine Oil Pressure Sensor

The oil pressure sensor is installed as necessary.

Engine Coolant Temperature Sensor

The engine coolant temperature sensor is installed as necessary.

Transmission Temperature Sensor

The transmission fluid temperature sensor is installed as necessary.

Audible Alarm Buzzer (Optional)

The optional buzzer is installed as required. A ground is provided at the 12-pin connector pin 6 to activate the buzzer (max current: 300mA). The buzzer will sound when a fault code becomes activated. ***(See Table 3 for the Fault Warning Codes list/ descriptions on page 15.)***

Cables

There are three cables that connect to the control module. The 8-pin connector is for the remote throttle interface, the 12-pin connector is for the discharge sensor, monitoring, and display interface. The 6-pin connector is for the intake pressure sensor, FRC datalink, and the auxiliary interlock.

Controls and Indicators

All controls and indicators are located on the front of the control module. (Refer to Figure 1.) See Operation and Programming Sections for more information.

MENU Button

Used to access stored data and program features.

Oil Pressure LED Display

Shows engine oil pressure. The LEDs are green when the pressure is within normal limits and red when it is not.

CHECK ENGINE LED, STOP ENGINE LED

Repeats the warnings from the cab.

Engine Temperature LED Display

Shows engine coolant temperature. The LEDs are green when the temperature is within normal limits and red when it is not.

Transmission Temperature LED Display

Shows transmission temperature. The LEDs are green when the temperature is within normal limits and red when it is not.

RPM Display

Shows the current engine RPM in bright red digits. It also shows error codes, stored data, and program features.

Battery Voltage LED Display

Shows battery voltage. The LEDs are green when the voltage is within normal limits and red when it is not.

Day/Night Sensor

Adjusts the brightness of the displays for day or night operations.

SILENCE Button

Press to suppress audio alarms.

Message Display

The message display shows the pressure or RPM setting during normal operations and warning alarms as they occur. It shows the time and date when the throttle ready LED is off. It also shows stored data and program features.

THROTTLE READY LED

This LED is on when the required interlock conditions are met to begin pump operations.

PRESET Button

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

IDLE Button

When pressed immediately sets the engine RPM to idle.

Control Knob

When rotated changes the pressure or RPM setting. The setting increases or decreases proportionally to the speed and direction the control knob is rotated.

RPM Button

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

PRESSURE Button

Press to select pressure mode. The LED is on to indicate operation in the pressure mode.
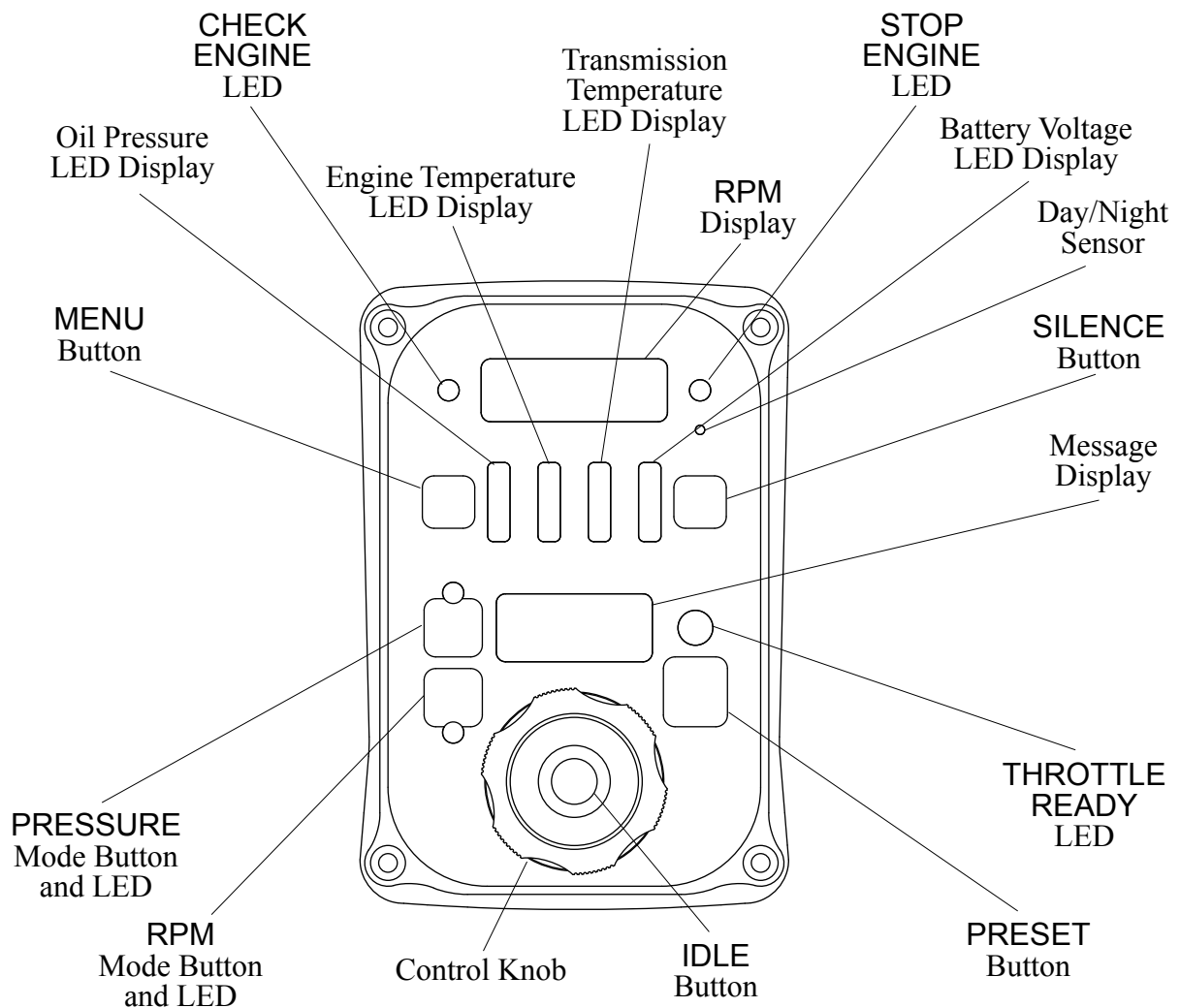
Figure 1. Controls and Indicators

INSTALLATION

Install Control Module

1. Measure and mark mounting location for control module panel cutout and mounting screw holes. Make sure there is clearance behind the panel for the module and cables before cutting holes. Refer to Figure 2 for layout and dimensions.

2. Cut out a 3 1/2 by 5 3/4 inch hole.

3. Drill four holes, clearance or tapped, for 10-32 mounting screws.

4. Place control module in position and secure with screws.

5. Connect cables at rear of the control module. (Refer to Wiring Section.)

4"

Mounting holes are
clearance or tapped
for 10-32 screws.

3 1/2"

Panel
Cutout

5 3/4"

Maximum
Radius
1/2"

5 3/4"

1 1/2"

1 3/4"

4 5/8"

6 3/4"

2 1/2"

4"
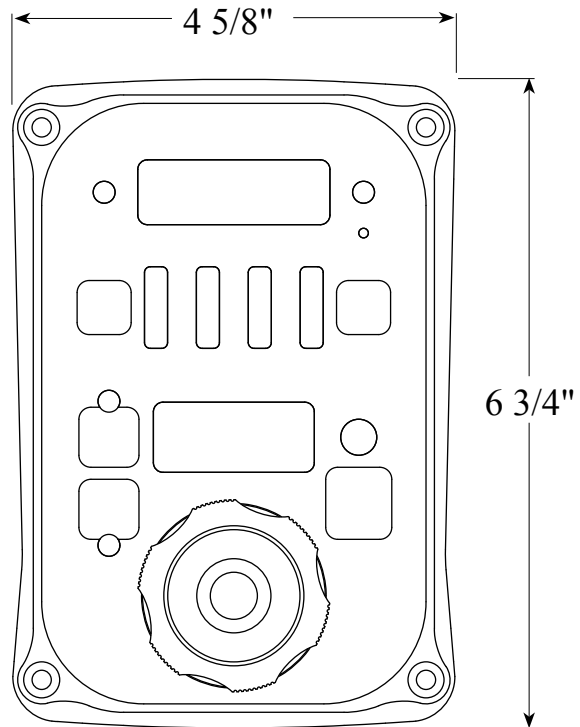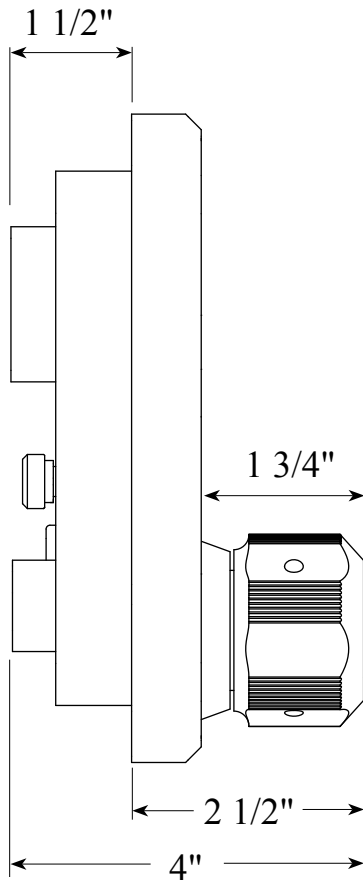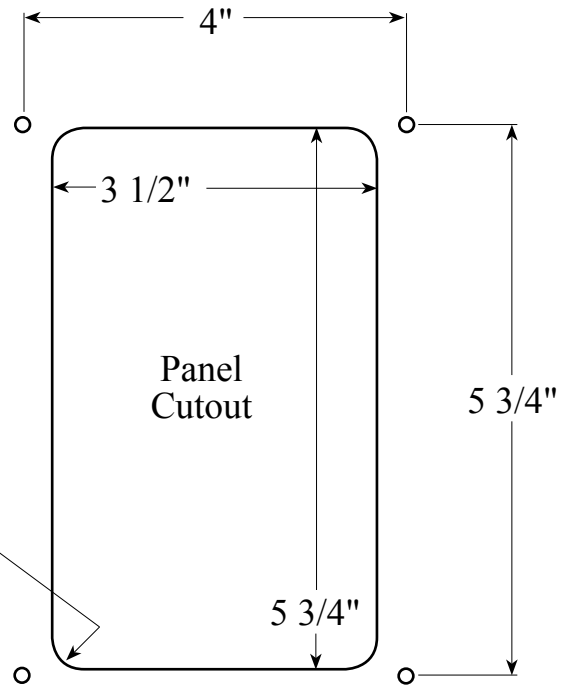
Figure 2. Control Module Mounting Dimensions

Install Pressure Sensor

The discharge pressure sensor is mounted on the pump discharge manifold. If there is a check valve in the discharge side of the pump, mount the discharge sensor before the check valve. The intake pressure sensor is mounted on the pump intake manifold. T-fittings can be used to mount the pressure sensors.

Note: Install the pressure sensor upright so that the water in the end of the sensor is able to drain back into the pipe.

1. Screw the sensor into a 1/4-18 NPT hole.

Caution: Do not use the main body that houses the electronics to tighten the pressure sensor. Damage to the sensor may occur.

2. Tighten the sensor with a 7/8-inch wrench on the lower hex fitting.

3. Connect the pressure sensor cable from the control module to the pressure sensor. (Refer to Wiring Section.)
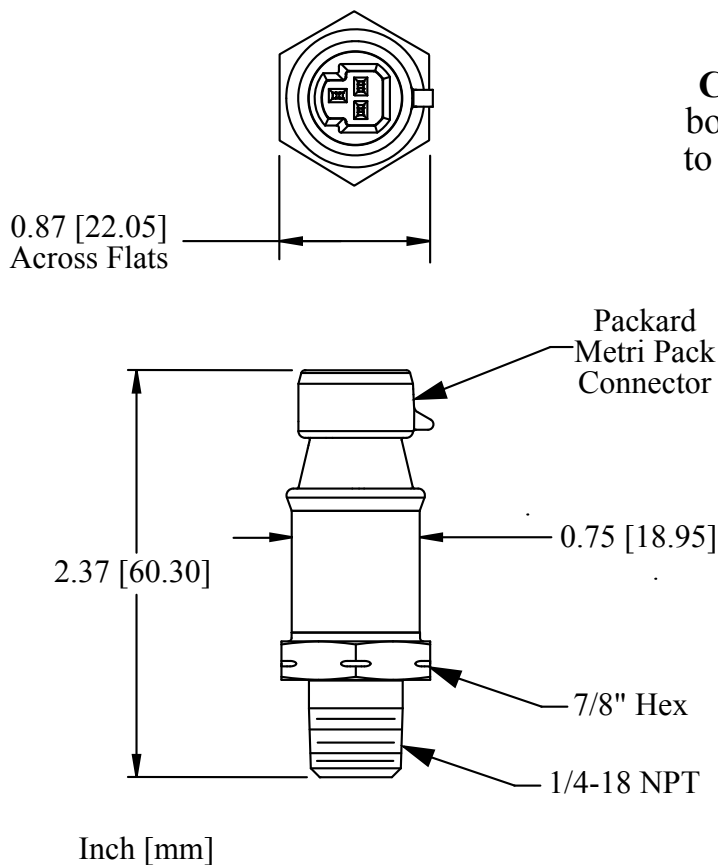
Caution: Do not use the main body that houses the electronics to tighten the sensor. Damage to the sensor may occur.

0.87 [22.05]
Across Flats

Packard
Metri Pack
Connector

2.37 [60.30]

0.75 [18.95]

7/8" Hex

1/4-18 NPT

Inch [mm]

Caution: The discharge and intake pressure sensors are the same size. Ensure the correct sensor is installed on the correct manifold. Refer to Table 1.

Figure 3. Pressure Sensor Dimensions

Install Engine Sensors

For most engines, the governor receives engine RPM, oil pressure, coolant temperature, and transmission temperature data over the J1939 databus. Some engines do not broadcast this data over the databus and sensors may need to be installed.

Note: The PumpBoss may need a programming change for some sensor inputs to be recognized. If the sensor was not ordered as part of the PumpBoss kit you may need to contact FRC technical support for programming information.

The sensors are wired to the 12-pin connector at the rear of the control module. Refer to the Wiring Section.

Install Buzzer

Pin 6 on the 12-pin connector at the rear of the control module is provided to connect an optional buzzer. Connect the ground side of the buzzer to pin 6. Maximum current through pin 6 is 300 mA. The buzzer ordered from FRC requires a 1-1/8 inch diameter mounting hole. (Refer to the Wiring section.)

Install High Idle Kit

The high idle is activated when + VDC is provided to pin 7 (High Idle Active Input) of the 12-pin connector and pin 6 (Interlock Input) of the 8-pin connector. Refer to High Idle Wiring.

Note: It is important that the connection to the Interlock Input from the High Idle circuit be isolated from the apparatus interlock wiring with the two diodes. **The pump must NOT be engaged when using the high idle function and the THROTTLE READY LED will be off.**

Install Remote Governor Option

Refer to Install Control Module for dimensions. The remote governor is connected to power, the J1939 CAN Bus, and the FRC datalink. Refer to Wiring Section.

Note: Program code P303 SYS TYPE must be set to REMOTE in the remote governor program.

OPERATION

Note: When power is applied to the governor the message display shows the Software Program Revision Number for five (5) seconds. It can also be viewed with P101 code, refer to Programming Section.

On power-up the governor is in the pressure mode of operating. The RPM display shows engine RPM, the four LED bar graphs are green indicating readings within normal ranges, and the message display alternates between showing the date and time.

If a monitored function is not within normal parameters the display flashes, the RPM display shows an error or fault warning code and a description shows 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 comes on and the governor is ready to control the engine RPM. The control signal is set at idle regardless of the control knob position.

Controls

Control Knob

The control knob is used to adjust pressure and RPM settings. The governor senses how fast and in what direction the control knob is rotated and sends a signal to the ECM to increase or decrease the engine RPM proportionally.

If the control knob is rotated quickly; the engine RPM changes quickly.

If the control knob is rotated slowly; the engine RPM changes slowly.

• Rotate the control knob clockwise* to increase engine RPM.

• Rotate the control knob counterclockwise* to decrease engine RPM.

• Press the red IDLE button to immediately return the engine to idle.

*NOTE: Opposite knob rotation option is available to increase/decrease the engine RPM.

Error Codes and Fault Warnings

Table 2. Error Codes

RPM Display	Message Display	Probable Cause **Note:** Not all inputs are used for all engines.
E01	NO DATA	>J1939 CAN bus cable not connected / connected to wrong port >Broken wire / bad connector contact on cable
E02	NO RPM	Engine RPM not detected >Data cable not connected / connected to wrong port >Engine not running / ignition key on >Broken wire / bad connector contact on alternator cable
E04	NO OIL SENSOR	No Engine Oil Pressure Data Detected (w/separate sensor input) >Sensor cable not connected >Broken wire / bad connector contact on sensor cable >Defective pressure sensor
E05	NO D. PSR SENSOR	No Discharge Pressure Sensor Detected >Sensor cable not connected >Broken wire / bad connector contact on sensor cable >Defective pressure sensor
E06	NO I. PSR SENSOR	No Intake Pressure Sensor Detected >Sensor cable not connected >Broken wire / bad connector contact on sensor cable >Defective pressure sensor
E07	NO ENG T SENSOR	No Coolant Temperature Data Detected (w/separate sensor input) >Sensor cable not connected >Broken wire / bad connector contact on sensor cable >Defective temperature sensor
E16	NO FRC DATALINK	>FRC datalink cable not connected / connected to wrong port >Broken wire / bad connector contact on cable

Note: E5 and E6 show on a remote governor not programmed correctly (code P303).

Table 3. Fault Warning Codes

RPM Display	Message Display	Description	Factory Default Setting
F01	HI BATT VOLTAGE	High Battery Voltage	15.5 V
F02	LOW BATT VOLTAGE	Low Battery Voltage	11.8 V*
F03	HI TRANS TEMP	High Transmission Temperature	300 °F
F04	LOW OIL PRESSURE	Low Engine Oil Pressure	8 PSI**
F05	DPFR	Discharge Sensor High Voltage	
F06	IPFR	Intake Sensor High Voltage	
F07	HI ENG TEMP	High Engine Coolant Temperature	220 °F**
F08	NO WATER	Out of Water Mode	
F09	ENG NOT RESPOND	Engine Does Not Respond	

* 11.8 engine running, 11.7 engine off.

** J1939 compliant—engine ECM will issue this warning.

Pressure Mode Operation

In the pressure mode of operation the PRESSURE LED is on. The governor maintains a constant discharge pressure within system capabilities. It adjusts the engine RPM automatically to compensate for variations in pressure.

There is a maximum engine RPM programmed in the governor for pressure mode. If the engine reaches the programmed maximum RPM the message display flashes MAX RPM / OPERATOR and the engine RPM is not allowed to go higher. (The maximum engine RPM is normally set at 2100 and is programmable.)

If the discharge pressure is below 15 PSI when the operator increases the pressure setting, the display shows PRESS LOW.

Note: When changing from RPM to pressure mode during operations, hold the PRESSURE button for 3 seconds. The pressure setting is the pressure that the pump was operating at in RPM mode.

1. Press PRESSURE button to select the pressure mode.

   Result: PRESSURE LED goes on.

2. Press PRESET and/or rotate control knob to select pressure setting.

   Result: Message display shows pressure setting, engine RPM changes.

3. Press IDLE button after operations to set engine to idle RPM.

   Result: Message display shows IDLE ENGINE, engine at idle RPM.

Opening/Closing Discharge Valves

In pressure mode the governor maintains the pressure setting regardless of the number of discharge lines that are opened or closed providing there is sufficient water supplied. As lines are opened the discharge pressure starts to drop and the governor raises the engine RPM to maintain the required pressure. As lines are closed and the discharge pressure starts to rise, the governor lowers the engine RPM to maintain the required pressure.

Operating From a Pressurized Supply

When operating from a pressurized water source (hydrant, in-relay, etc.), the intake supply should be routed through a valve. If the pressurized source fails, the pump operator can close the valve. This eliminates the chance of sharp pressure spikes at the pump intake if the supply is resumed suddenly. The operator must open this valve slowly when the supply is resumed to help prevent pressure spikes.

Running Away From Water, Low Water, or No Supply Water

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

The governor constantly monitors discharge pressure and compares it to engine RPM. It is programmed to limit RPM increases when conditions arise that fall outside of normal operating parameters.

Running Away From Water: If the discharge pressure starts dropping while operating in pressure mode, the governor increases the engine RPM and attempts to maintain the selected pressure setting. If pressure drops and an increase in RPM does not bring the pressure back up, the governor recognizes this as a running away from water condition. When this condition occurs the governor switches to the RPM limit mode and controls the engine RPM accordingly.

RPM Limit Mode: When the RPM limit mode is in effect the PRESSURE LED stays on. To alert the operator the RPM LED and the RPM display flash, and the message display flashes OPERATOR / RPM LIMIT. In this mode the pressure setting does not change and the PRESET button is disabled. When the pressure comes back up to the selected pressure setting, the RPM limit mode is canceled and the governor switches to normal operation in pressure mode at the selected pressure.

In some cases the pressure may not come back up but remains at a level above 45 PSI. In the RPM limit mode, the governor behaves like a manual throttle and the operator can raise or lower the engine RPM by rotating the control knob. If the RPM is manually lowered to a point where the pump is not running away from water and pressure is stable, the RPM limit mode is canceled. The governor switches to normal operation in pressure mode with the current discharge pressure as the new pressure setting.

If the engine is set to idle using the IDLE button, the governor comes out of RPM Limit Mode and cancels the pressure setting.

Low Water Cycle: If the discharge pressure is below 45 PSI, but stays above 15 PSI, the governor enters a low water cycle and the message display flashes LO WATER. It sets the engine at 1100 RPM. If the pressure does not rise above 45 PSI in 7 seconds, the governor sets the engine RPM at idle. The governor repeats 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 resumes normal operation. (The values for RPM and PSI in the low water cycle are programmable and may vary for some engine/pump combinations.)

No Supply Water: If the discharge pressure is below 15 PSI, the engine RPM is set at idle and the message display flashes NO WATER. If, within 3 minutes, the discharge pressure rises above 15 PSI the governor enters the low water cycle. If the discharge pressure does not rise above 15 PSI within 3 minutes, the governor switches to idle mode and cancels the pressure setting. To restart pump operations, the operator must take action (press PRESET and/or rotate control knob to select pressure setting).

RPM Mode Operation

In the RPM mode of operation the RPM LED is on. The governor maintains 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 automatically lowers the RPM to prevent a high pressure surge. The RPM LED blinks as the governor sets a lower RPM. This lower RPM will be the new operating RPM setting.

Note: When changing from pressure to RPM mode during operations, hold the RPM button for 3 seconds. The RPM setting is the RPM that the pump was operating at in pressure mode.

1. Press RPM button to select RPM mode.

    Result: RPM LED goes on.

2. Press PRESET and/or rotate control knob 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, engine at idle RPM.

Switching Between Operating Modes

- No variation in discharge pressure or RPM occurs when changing between pressure and RPM modes.

- When changing to RPM mode, the RPM setting is the RPM that the pump was operating at in pressure mode.

- When changing to pressure mode the pressure setting is 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 changes modes immediately.

When the engine RPM is above idle:

Press and <u>hold</u> the mode button for <u>3 seconds</u> 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 RPM at 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.

RPM Limit with Discharge Pressure Less than 100 PSI

The level II programming code P221 sets the maximum RPM when the pump is operating with a discharge pressure less than 100 PSI. The factory set default is for code P221 is 1500. Access to level II programming required a password. Contact FRC if this default limit needs to be changed.

Remote Governor Option

The remote governor option duplicates the primary governor functions.

The remote governor control module is required to be programmed as a remote (program code P303). If error codes E5 and E6 show on power up, check the programming.

Detailed Information

The four LED bar graphs provide constant display of 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. Detailed information is shown in the message display when the MENU button is pressed. Engine hours and pump hours are also 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 detailed information. Each time the MENU button is pressed the display scrolls to show the next value.

The message display indicates the following:

ENG TEMP	### °F	(programmable for °C)
ENG OIL	### PSI	(programmable for kPa or Bar)
BATT VDC	##.# V	(programmable for 12V or 24V)
ENG HRS	####	
PUMP HRS	####	
TRANS T.	### °F	(programmable for °C)
D.SENSOR	#### PSI	(programmable for kPa or Bar)
I.SENSOR	#### PSI	(programmable for kPa or Bar)

The message display reverts to normal operation after 20 seconds if no buttons are pressed. When a button other than the MENU button is pressed, the display immediately reverts to normal operation. The SILENCE button should be used during operations.

High-Idle

The governor programming includes a high-idle function. To activate the high-idle set all interlocks as called for by local SOP (normally this would include the transmission in neutral and the parking brake on). Set the High-Idle switch to ON.

Note: The pump must NOT be engaged when using the high-idle function and the THROTTLE READY LED will be off.

Change High-Idle Setting

Note: The high-idle is set at about 1000 RPM at the factory. (This value varies depending on the specific engine.)

1. With the engine running, set the high-idle switch to ON.

   Result: Engine goes to high idle RPM.

2. Press and hold PRESET button for 3 seconds.

   Result: RPM display flashes and shows the high-idle setting.

3. Keep pressing the PRESET button and rotate control knob to desired RPM.

4. Release PRESET button to store the new high idle setting.

Preset Settings (Pressure or RPM)

The preset button allows the operator to go to a pre-programmed pressure or RPM setting during operations. The preset value shows in the message display. This procedure is to change the pre-programmed setting. (Factory default preset maximum limits are: pressure = 200 PSI; RPM = 1500.)

Note: The engine must be running and the pump engaged interlock circuit must be closed (the THROTTLE READY LED must be on).

1. Press IDLE button.

   Result: Engine goes to idle RPM

2. Press PRESSURE or RPM button to select the setting to be changed.

   Result: LED indicator goes on for mode selected.

Note: The message display must show IDLE ENGINE before changing the preset.

3. Press and hold PRESET button. (Continue to hold through step 4.)

   Result: Message display shows PRESET. After 5 seconds the current setting flashes. The preset value is set at this time but is not allowed to exceed the factory default limits of pressure = 200; RPM = 1500.

Note: If the factory default limits are to be exceeded, step 3a. must be included, if not proceed with step 4.

3a. Press and hold the SILENCE button for 5 seconds to unlock the default limits.

   Result: Message display shows UNLOCKED. Release the SILENCE button (continue to hold the PRESET button). The preset value is now allowed to exceed the default limit.

4. Rotate control knob to change preset setting.

5. Release PRESET button.

   Result: The new preset value is programmed. Message display shows IDLE ENGINE.

PROGRAMMING

The following program functions are always available to view and change:

P101 - Software Program Revision Number - Read Only

P102 - Product Manufacturing Date - Read Only

P103 - Set Current Date - Read/Write

P104 - Set Current Time - Read/Write

P105 - Retrieve Fault Codes - Read Only

P106 - Engine Type Code - Read Only

Access Program Features

Note: When the program (P) code is flashing in the RPM display, press the PRESSURE or RPM button to scroll through the P-codes or press the SILENCE button to exit the programming mode.

1. Press the SILENCE button and hold it until the RPM display shows four dashes − − − − and the message display shows ENTER--- CODE. Release the button.

    Result: P 1 0 1 flashes in the RPM display. The message display shows the program revision number PROG REV V500.03.

2. Press the PRESSURE button.

    Result: P 1 0 2 flashes in the RPM display. The message display shows the manufacturing date MFG DATE 16JAN'15 (ddmmm'yy).

3. Press the PRESSURE button.

    Result: P 1 0 3 flashes in the RPM display. The message display shows the current date SET DATE 16JAN'15.

4. To Change the Date: (If not, go to step 5.)

    a. Press the MENU button.

        Result: P 1 0 3 stops flashing. The message display shows the current date with the year flashing.

    b. Press the PRESSURE or RPM button to change the year.

    c. Press the MENU button.

        Result: The month flashes.

    d. Press the PRESSURE or RPM button to change the month.

    e. Press the MENU button.

        Result: The day flashes.

    f. Press the PRESSURE or RPM button to change the day.

    g. Press and hold the SILENCE button to store the new date.

        Result: P 1 0 4 flashes in the RPM display. The message display shows SET TIME 10:30AM . Go to step 6.

5. Press the PRESSURE button.

    Result: P 1 0 4 flashes in the RPM display. The message display shows SET TIME 10:30AM .

6. To Change the Time: (If not, go to step 7.)

    a. Press the MENU button.

        Result: P 1 0 4 stops flashing. The message display shows the current time with the AM or PM flashing.

    b. Press the PRESSURE or RPM button to change AM or PM.

    c. Press the MENU button.

        Result: The minute flashes.

    d. Press the PRESSURE or RPM button to change the minutes.

    e. Press the MENU button.

        Result: The hour flashes.

    f. Press the PRESSURE or RPM button to change the hours.

    g. Press and hold the SILENCE button to store new time.

        Result: P 1 0 5 flashes in the RPM display. The message display shows NO WARNING or LOGGED DATA. Go to step 8.

7. Press the PRESSURE button.

    Result: P 1 0 5 flashes in the RPM display. The message display shows NO WARNING or LOGGED DATA.

8. Press the MENU button when it shows LOGGED DATA or go to step 9.

    Result: 5   1 flashes in the RPM display. The fault, date, and time that the fault code was recorded shows in the message display.

    a. To scroll through the logged fault code data, press the PRESSURE or RPM button.

    b.   Press the SILENCE button to exit viewing logged data.

9. Press the PRESSURE button.

    Result: P 1 0 6 flashes in the RPM display. The message display shows the engine type code that is set in the program. (Refer to the Engine Code Reference Table, Document Number XE-ECRTREF01-R0A.)

10 Press the PRESSURE or RPM button to scroll through the P-codes or press the SILENCE button to exit the programming mode.

Access Password Protected Programs

The following program functions are available to view and change after the password code has been entered:

Calibration Password Code 1111

> C1 - Discharge Pressure Sensor Zero Calibration
>
> C2 - Intake Pressure Sensor Zero Calibration
>
> C3 - Engine RPM Calibration

Refer to Calibration Section.

Operator Password Code 1221

Operator Password Code 1221 allows the parameter settings of limited program functions to be changed. Refer to Table 4. Operator Password Protected Program Functions.

> P318 - RPM Limit for Pressure Control (Factory default is 2100.)

Enter Password Code

> **Note:** To exit the programming mode, press the SILENCE button when the program code flashes in the RPM display.

1. Press the SILENCE button and hold it until the RPM display shows four dashes − − − − and the message display shows ENTER--- CODE. Release the button.

2. Press the MENU button within three seconds. The message display shows CODE ENTRY. The RPM display shows the number 1000. Each time the MENU button is pressed the first digit increments by 1. Set the first digit to the desired number.

3. Press the SILENCE button to move the curser to the next digit. Press the MENU button to change the digit.

4. Repeat step 3 and enter the password code. (Calibration password is 1111. Operator password is 1221.)

    Result: When a correct password code is entered C 1 for calibration or P 3 1 8 flashes in the RPM display.

5. Press the PRESSURE or RPM button when the program code is flashing to scroll through the program codes.

6. Press the MENU button to enter the programming mode to view and change parameter settings.

   Result: The program code stops flashing. The message display shows a selectable option or a numerical value.

7. Press the MENU button to change a selectable option or the PRESSURE or RPM button to change a numerical value.

8. Press the SILENCE button to save the changes and exit the programming mode.

   Result: The program code advances to the next code and flashes.

9. Repeat steps 5 through 8 as necessary.

10. Press the SILENCE button when the program code is flashing to exit.

Table 4. Operator Password Protected Program Functions
Values shown are standard factory default and may vary with engine type selected.

CODE	DESCRIPTION	MESSAGE DISPLAY	Press MENU button to select; change value with PRESSURE or RPM
P318	RPM limit for pressure control	MAX RPM LIMIT <> 2100	

CALIBRATION

Three programs are available after the calibration password code has been entered:

C1 - Discharge Pressure Sensor Zero Calibration

C2 - Intake Pressure Sensor Zero Calibration

C3 - Engine RPM Calibration

Refer to Table 5. Calibration Codes Quick Reference Chart.

Enter Calibration Password Code 1111

Note: To exit the programming mode, press the SILENCE button when the program code flashes in the RPM display.

1. Enter the password code 1111. (Refer to Programming Section.)

    Result: When the correct password code is entered C 1 flashes in the RPM display. The message display shows D.PSI.

2. Press the PRESSURE or RPM buttons when the program (C) code is flashing to scroll through the program codes.

    Refer to specific calibration section for detailed procedures.

Note: If there is a failure during calibration the message display shows SENSOR PROBLEM.

3. Press the SILENCE button when the program (C) code is flashing to exit.

Table 5. Calibration Codes Quick Reference Chart

CODE	DESCRIPTION	MESSAGE DISPLAY	Press MENU Button Again	Press MENU Button Again
C1	Discharge Pressure Sensor Zero Calibration	D.PSI	D.PSI SET P=0?	D.PSI D.PSI=0
C2	Intake Pressure Sensor Zero Calibration	I.PSI	I.PSI SET P=0?	I.PSI I.PSI=0
C3	Engine RPM Calibration	CAL. ENG RPM	SET RPM XXXX	

Pump Pressure Sensor (Code C1 and C2)

The program for the pump pressure sensor(s) is self-calibrating. There are no adjustments that can be made to the sensors. When the calibration program is activated the signal from the sensor(s) is assumed to be 0 PSI.

Note: If there is pressure in the plumbing where the sensor is mounted this causes the program to be calibrated to a false 0. To prevent false zeroing, drain the pump and plumbing to ensure there is no residual pressure before running the calibration procedure.

1. Apply power to the display module.

2. Enter the calibration password.

3. Scroll to code C1 D.PSI or C2 I.PSI.

4. Press the MENU button SET P=0? flashes.

5. Press the MENU button again to set at 0. D.PSI=0 or I.PSI=0 flashes.

6. Press and hold the SILENCE button for 3 seconds to save the setting into memory.

7. Press the SILENCE button when the program (C) code is flashing to exit calibration. Press the MENU button to enter the next program. Press the PRESSURE or RPM buttons to scroll through program codes.

Engine RPM (Code C3)

This code is not applicable for engines with the J1939 CAN connected. To perform the following calibration, a reference tachometer is needed to verify the correct engine RPM.

1. Apply power to the display module.

2. Enter the calibration password.

3. Scroll to code C3 CAL. ENG RPM.

4. Press the MENU button to show SET RPM.

   Result: Flashing digit is ready to be changed.

5. Set the RPM to match the reference RPM. Press the PRESSURE or RPM buttons to change the value. Press the MENU button to change the digit.

6. Press the SILENCE button to save the setting into memory.

7. Press the SILENCE button when the program (C) code is flashing to exit calibration. Press the MENU button to enter the next program. Press the PRESSURE or RPM buttons to scroll through program codes.
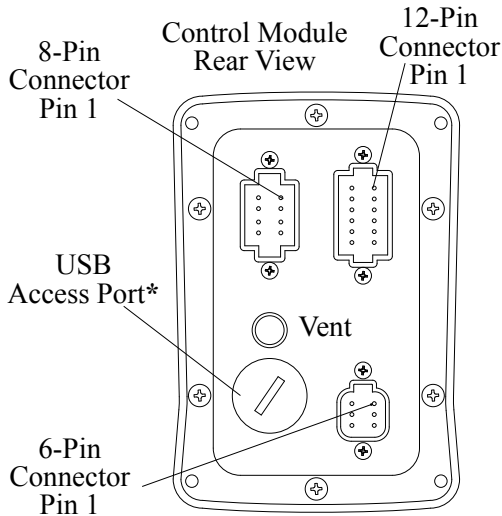
WIRING

The following figures include the schematics, wiring diagrams, block diagrams, and cables for the governor.

Connectors and Cables

For most engines the governor receives engine RPM, oil pressure, and coolant temperature data over the J1939 data link from the ECM. Some engines do not broadcast this data over the data link and sensors may need to be installed.

When a remote governor is installed ensure that the control module program code P303 is set to REMOTE. Refer to Figure 5 for wiring details.

8-Pin Connector Pin 1

Control Module Rear View

12-Pin Connector Pin 1

USB Access Port*

Vent

6-Pin Connector Pin 1

*NOTE: If opened, USB access port plug must be tightened to a torque of 8-10 in-lbs. Exceeding this torque value can result in damage to its water seal capability. **Warning: Flange may not fully bottom out.**

8 Pin Connector/Cable

Pin	Wire Color	Description
1	Red	Supply Power (12/24 VDC)
2	Black	Ground
3	Orange	+5 VDC Reference From ECM
4	White	Throttle Signal To ECM
5	Green	Signal Return From ECM
6	Yellow	Interlock Input (+ VDC)
7	Blue	Throttle Enable Signal Output
8	Brown	Foot Pedal Signal Input

Notes:
- Not all wires are used for all engines. Refer to the engine specific wiring diagram for interface connections.
- An adapter and cable assembly replaces the basic 8-pin cable when connecting the governor to a GMC engine. Refer to the engine specific wiring diagram.

12 Pin Connector/Cable

Pin	Wire Color	Description
1	Red	+ 5 VDC Discharge Pressure Sensor
2	Black	Ground Discharge Pressure Sensor
3	White	Signal Discharge Pressure Sensor
4	Blue	Engine Oil Press. Sensor Signal
5	Orange	Engine Temp. Sensor Signal
6	Brown	Buzzer Ground (300mA)
7	Violet	High Idle Active Input (+ VDC)
8	White	J1939 CAN (Shield)
9	Black	J1939 CAN (−)
10	Red	J1939 CAN (+)
11	Green	Transmission Temp. Sensor Signal
12	Yellow	RPM Signal

Notes:
- Not all wires are used for all engines.
- High idle is not available for GMC.
- When using an FRC provided engine sensor cable, the red wire is sensor signal and the black wire connects to a ground.

Figure 4. PBA Connectors

6 Pin Connector/Cable

Pin	Wire Color	Description
1	Red	+ 5 VDC Intake Pressure Sensor
2	Black	Ground Intake Pressure Sensor
3	White	Signal Intake Pressure Sensor
4	Green	FRC Datalink (−)
5	Yellow	FRC Datalink (+)
6		N/C

Notes:
- Pump intake sensor on PBA400 only.
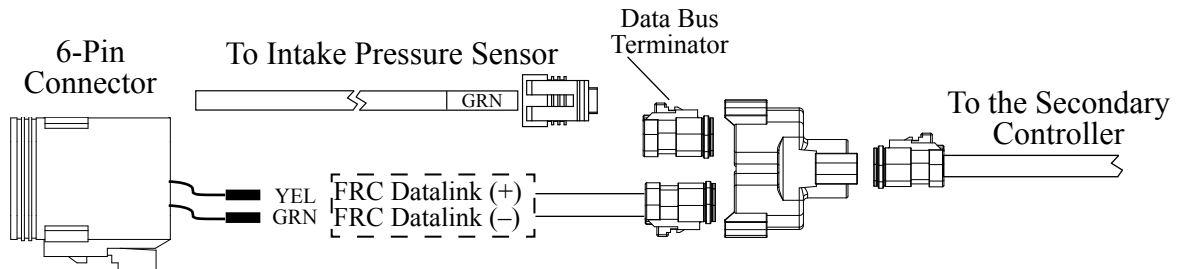
Secondary Controller, Cables and Connections

Secondary Controller
12, 8 and 6 Pin Connector Wiring

Note: The program code P303 must be set to REMOTE on the Secondary Controller control module.
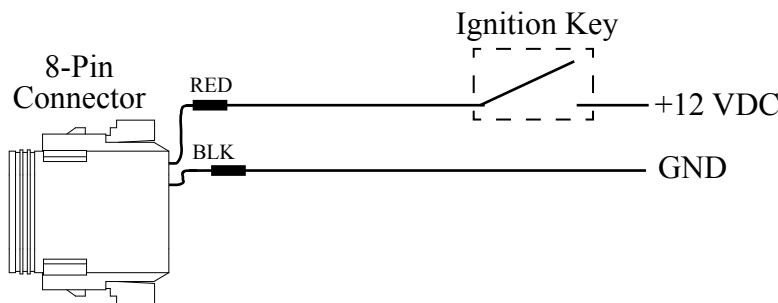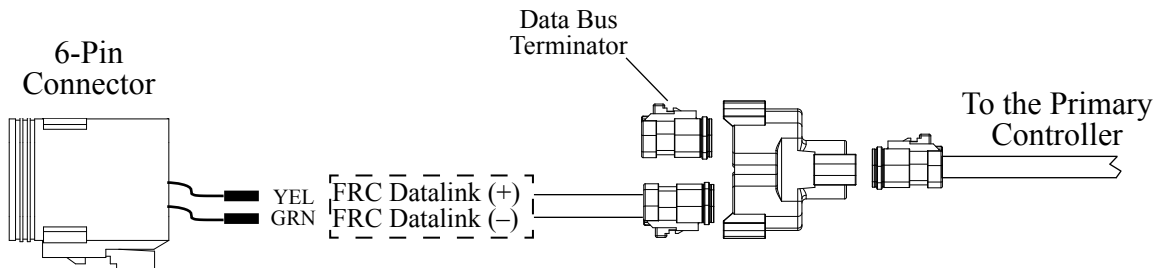
NOTE: Terminating resistor and adapters are included in the kit for connection to the primary display; no other wires are required for remote operation.
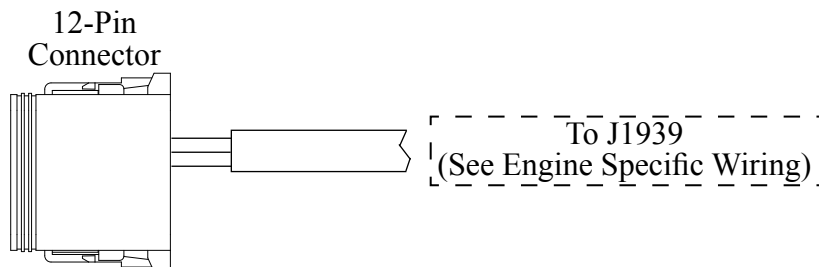
Figure 5. PBA Connector Wiring

Pressure Sensor

Pressure Sensor
Cable
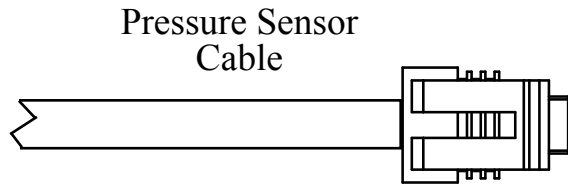
**Pressure Sensor Cable
3-Pin Connector**

Pin/Wire	Description
A/Black	Ground
B/Red	Supply Voltage
C/White	Signal

Pressure Sensor
Top View

Ground

Supply
Voltage

Signal
Output
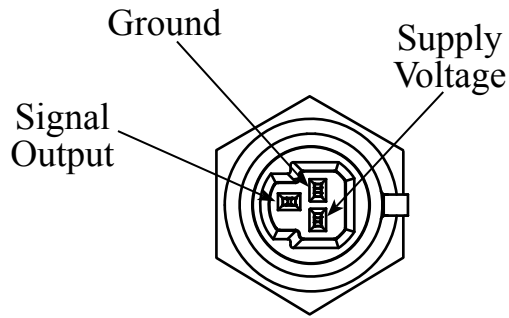
Pressure Sensor
Side View
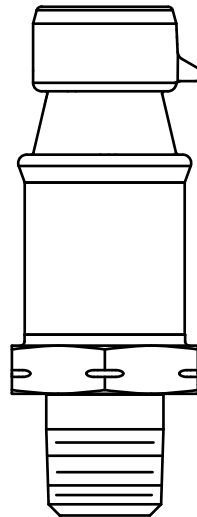
Caution: The discharge and intake
pressure sensors are the same size.
Ensure the correct sensor is installed on
the correct manifold. Refer to Table 1.

Figure 6. Pressure Sensor Wiring

Common OEM Diagnostic Connector

Typical 9-pin Deutsch Diagnostic Connector.
Commonly found under the driver side dashboard.

FRONT
VIEW
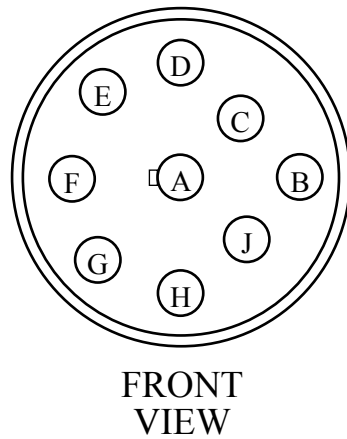
9-Pin Connector	
Pin	Description
A	BATTERY GROUND
B	+12 VDC
C	J1939 CAN (+)
D	J1939 CAN (−)
E	J1939 SHIELD
F	J1587 DATA BUS (+)
G	J1587 DATA BUS (−)
H	PLUG
J	PLUG

Figure 7. Common OEM 9-Pin Diagnostic Connector

Cummins Harness Connections

Interface Information

For use on 2004 or newer engines.

The governor is designed to control engine throttle directly over the SAE J1939 databus.

If the PUMPBOSS is being used on a COMMERCIAL CHASSIS with a Cummins Engine, ENSURE that the Cummins Engine EMERGENCY VEHICLE CALIBRATION is programmed in the engine ECM for the PUMPBOSS to work.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

12-Pin Connector (Refer to Figure 4)

2013 CM2350 Model Engines

Pin 9 Black Wire — J1939 Datalink (−) 46
Pin 10 Red Wire — J1939 Datalink (+) 22

ECM OEM Connector

12-Pin Connector (Refer to Figure 4)

2010 ISC8.3/CM2250/ISL9 Model Engines

Pin 9 Black Wire — J1939 Datalink (−) 18
Pin 10 Red Wire — J1939 Datalink (+) 17

ECM OEM Connector
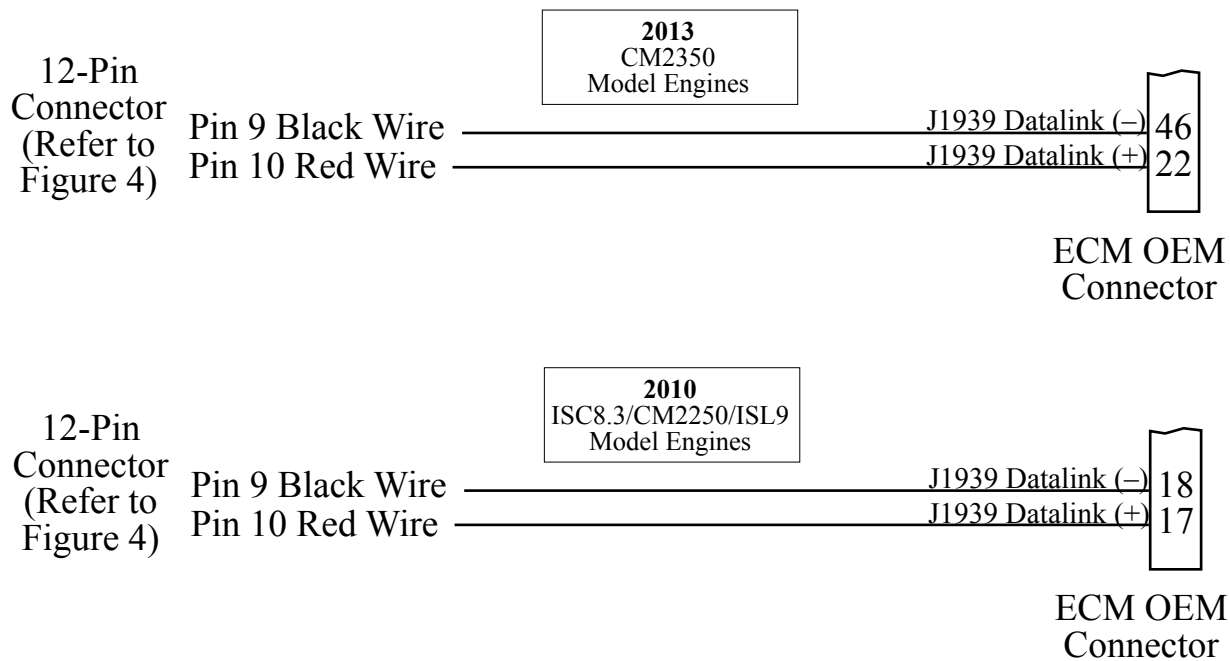
Figure 8. Cummins PBA401 Wiring

Detroit Diesel Harness Connections

Interface Information.

The governor is designed to control engine throttle directly over the SAE J1939 databus. Remote throttle does not need to be enabled in the ECM.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock connections.

For DDEC VI 2007 and Newer Engines

DDEC VI ECU

12-Pin Connector (Refer to Figure 4)

Pin 9 Black Wire ——————————— 2/16   J1939 CAN (–)

Pin 8 White Wire ——————————— 2/17   J1939 SHIELD

Pin 10 Red Wire ——————————— 2/18   J1939 CAN (+)

Vehicle Interface Harness
18-Pin Connector #2

For DDEC V 2003 to 2006 Engines.

DDEC V ECU

12-Pin Connector (Refer to Figure 4)

Pin 10 Red Wire ————————— Dk Blu/Red V-43   J1939 CAN (+)

Pin 8 White Wire ————————— Dk Blu/Yel V-44   Shield

Pin 9 Black Wire ————————— Dk Blu V-58   J1939 CAN (–)

Vehicle Interface
Harness Connector

Figure 9. Detroit Diesel PBA402 Wiring

Navistar Harness Connections

Interface Information

The ECM must be programmed for remote variable throttle operation.

Note: Check the governor engine code to verify the program setting (for J1939 control use 4C and for voltage control use 4D). Wire accordingly or change the code.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

J1939 CAN Bus Control 12VXY
2010 and Newer MAXXFORCE 11 and 13 Engines

12-Pin Connector (Refer to Figure 4)

Pin 9 Black Wire ———————————— J1939 (−) | C1-47

Pin 10 Red Wire ———————————— J1939 (+) | C1-34

ECM 58-Pin C1 Connector
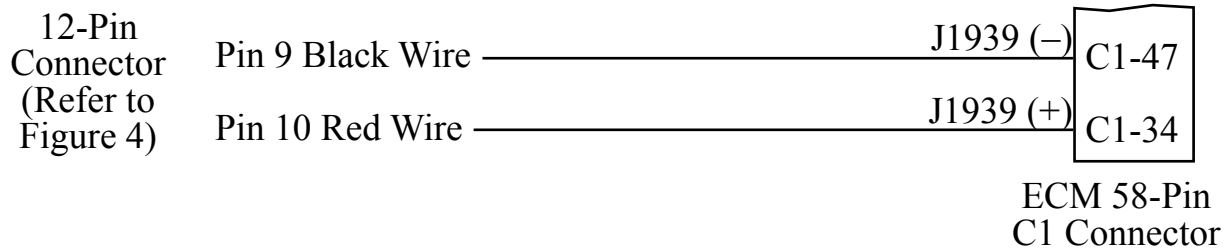
Voltage Control
Post 2007 MAXXFORCE 7, DT, 9, 10, 11, and 13 Engines

8-Pin Connector (Refer to Figure 4)	12VZA Circuit # (I6)	12VZA Circuit # (V8)		12VZB Circuit # (IBBE)		ECM Function
Pin 3 Orange Wire	K97FV	K95	X1-27	K92A4	X1-14	Voltage Ref 5V
Pin 5 Green Wire	K97WA	K95R	X1-35	K92A3	X1-6	Signal Return
Pin 4 White Wire	K99F	K97RPS	X1-50	K92A5	X1-20	REM Accelerator
Pin 7 Blue Wire	K97CC	K97RVAR	X1-60	K92A12	X3-20	Variable PTO Enable
	K97XC	K97SCX	X1-11	K92A7	X4-6	Transfer Case

Split Shaft Only

12-Pin Connector (Refer to Figure 4)

Pin 8 White Wire ———————————— J1939 CAN (Shield) | Pin E

Pin 9 Black Wire ———————————— J1939 CAN (−) | Pin D

Pin 10 Red Wire ———————————— J1939 CAN (+) | Pin C

EST Connector

Figure 10. Navistar PBA404 Wiring

Navistar / International Chassis Harness Connections

Interface Information

   Note: This function is not available on custom chassis, refer to Figure 10. Navistar PBA Wiring.

   Vehicles must be equipped with an Electronic System Controller (ESC) and have the Body Builder J1939 Datalink available.

   Remote Engine Speed must be set to ON (Feature Code 0595AHA)

   Connect the Body Builder J1939 Datalink to the FRC Datalink for engine control as shown below.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

1602
(ESC J5)
Connector

Engine Control Output

| 6-Pin Connector (Refer to Figure 4) | Pin 4 Green Wire | FRC Datalink (−) | Body Builder J1939 Datalink (−) | F5 |
| | Pin 5 Yellow Wire | FRC Datalink (+) | Body Builder J1939 Datalink (+) | F6 |
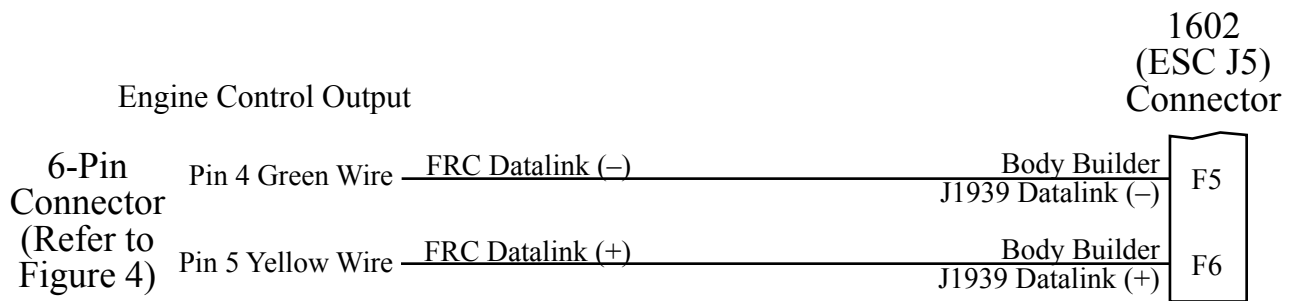
Note: The Body Builder J1939 Datalink is for engine control, the J1939 CAN Bus provides engine information to the governor.

ATA
Datalink
Connector

Engine Information Input

12-Pin Connector (Refer to Figure 4)	Pin 8 White Wire	J1939 CAN (Shield)	Pin E
	Pin 9 Black Wire	J1939 CAN (−)	Pin D
	Pin 10 Red Wire	J1939 CAN (+)	Pin C
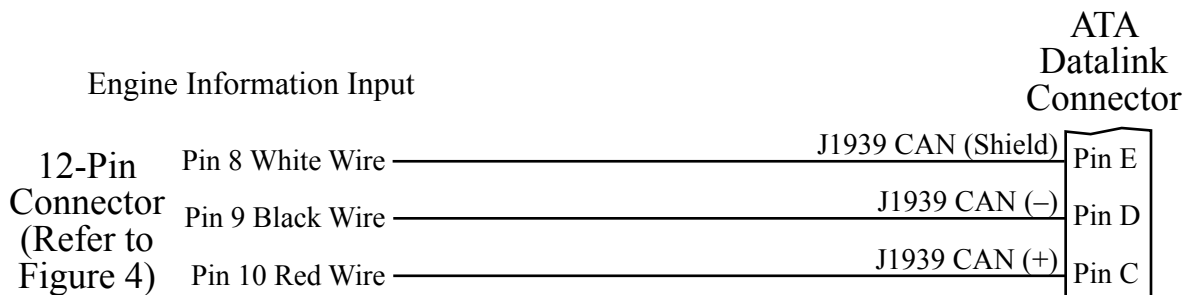
Figure 11. Navistar/International Chassis PBA404 Wiring

Caterpillar Harness Connections

Interface Information

The parameter settings for PTO Configuration is programmed to Remote Throttle or Remote Throttle with J1939 Speed Command.

ECM software with a Personality Module release date of May08 for C7, C9, C13, C15 engines, has the Remote Throttle with J1939 Speed Command setting available. This setting allows the engine speed to be controlled during PTO operations by a J1939 compliant device.

Refer to an authorized dealer to program one of these options.

C7, C9, C10, C11, C12, C13, C15 Engine Interface

Engines with 70-pin OEM connector.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

12-Pin Connector (Refer to Figure 4)	Wire		ECM
	Pin 8 White Wire — A249-BK	42	J1939 Datalink Shield
	Pin 9 Black Wire — K990-GN	34	J1939 Datalink Negative (−)
	Pin 10 Red Wire — K900-YL	50	J1939 Datalink Positive (+)
8-Pin Connector (Refer to Figure 4)	Pin 5 Green Wire — 993-BR	3	Input Sensor Common #2
	Pin 4 White Wire — G845-PU	68	Input #8 (Remote Throttle PWM)
	Pin 7 Blue Wire — K999-GN	56	Input #1 PTO ON/OFF Switch

70-Pin Vehicle Harness Connector
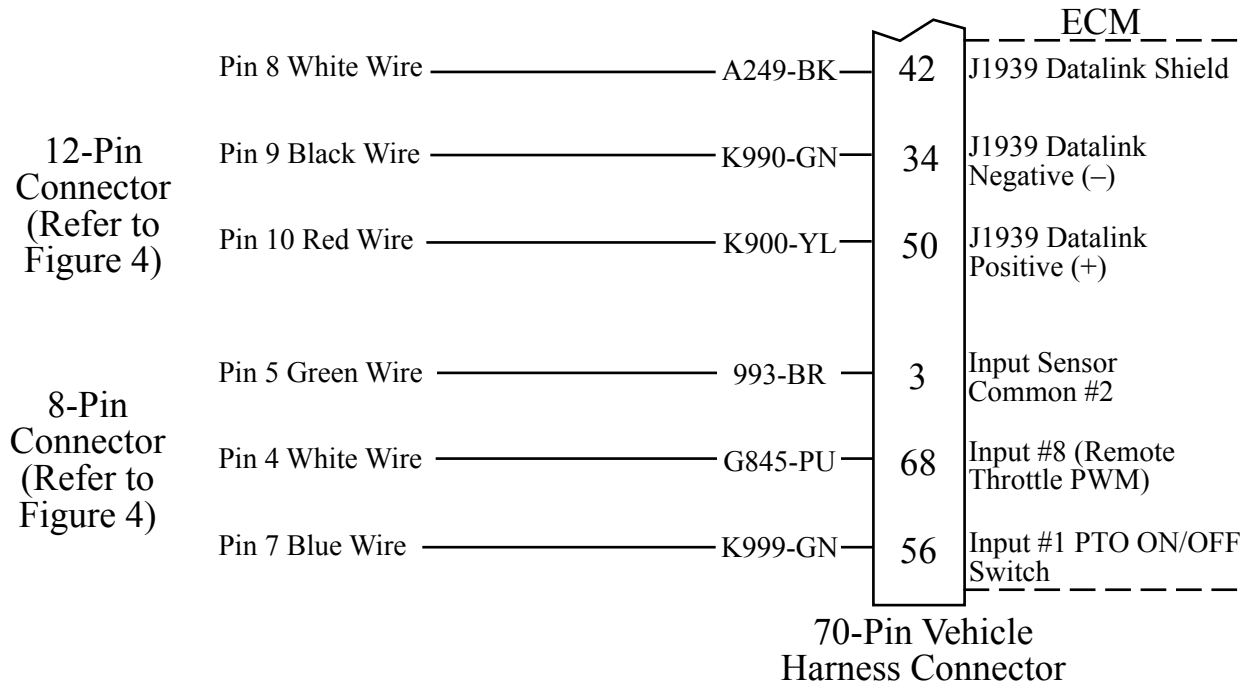
Figure 12. Caterpillar PBA405 Wiring

Ford Harness Connections

J1939 Interface Information

A J1939 CAN input is required to provide engine information to the governor. The Ford vehicle CAN Bus information needs to be interpreted. A J1939 Translator Module with a harness to connect it to the ODB-II connector must be installed.

Note: The ODB-II connector and wiring is accessed under the dash.

There are two scenarios:

I. The J1939 Translator Module is installed as a component with governor kit (no Seat Belt Monitoring System is installed).

Install the J1939 Translator Module and the ODB-II interconnecting harness (provided with the governor kit). A 2-Pin connector is provided for the wires to governor.

II. The J1939 Translator Module is installed as part of the NFPA1901 compliant Seat Belt Monitoring and VDR System.

The Translator Module/ODB-II/VDR harness is under the driver side dash. A T-cable (provided with the governor kit) needs to be installed at the 4-Pin connector that is between the harness and the VDR.

Stationary Elevated Idle Control (SEIC) Interface Information

Note: Access wires for SEIC are located in cabin, tagged and bundled above the parking brake pedal assembly behind datalink connector.

SEIC is used in two modes: stationary and split shaft. The governor provides a variable RPM control to the Ford Power train Control Module (PCM) when all enabling conditions are met. Refer to Figure 14 Ford PBA PCM Wiring.
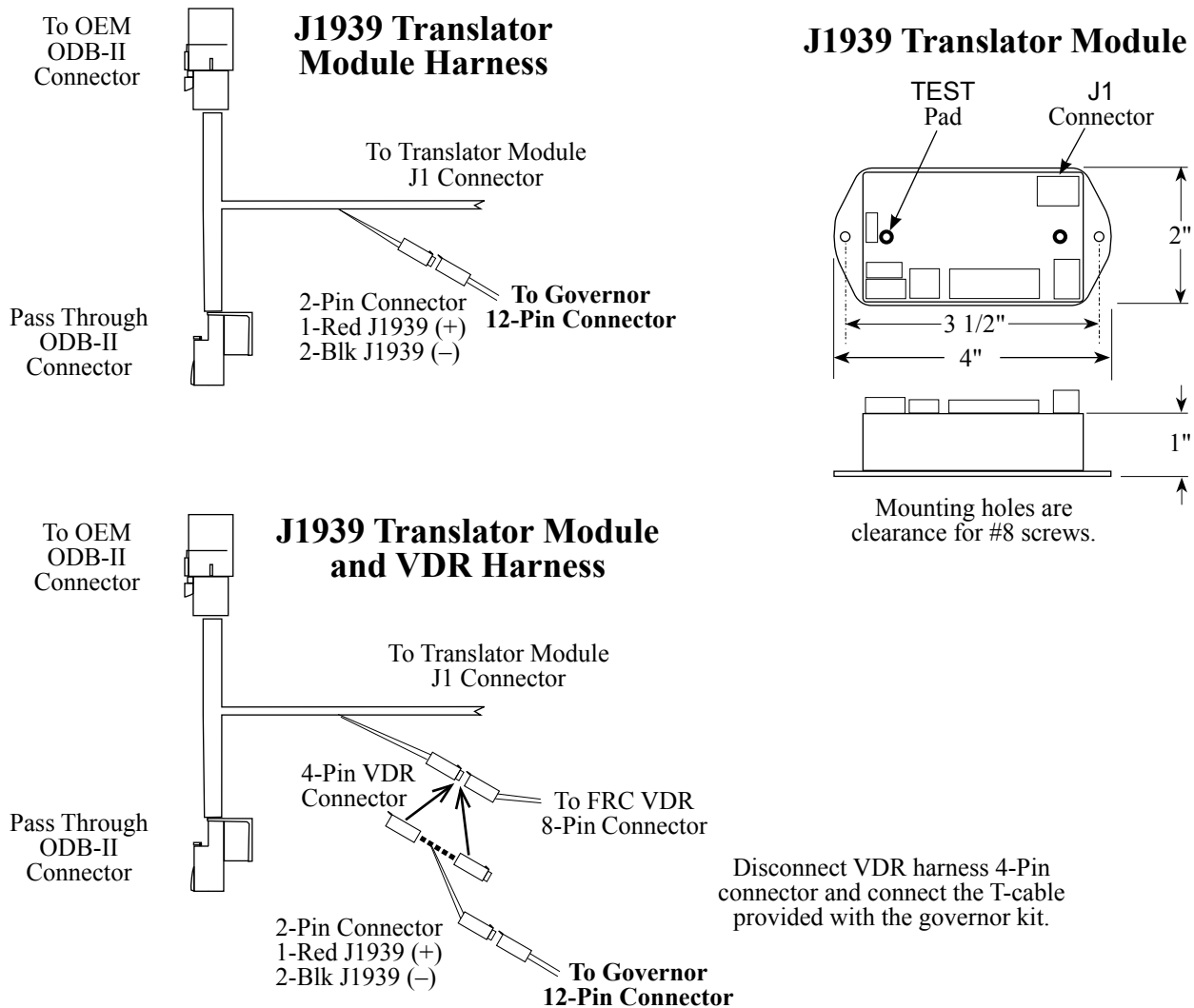
SEIC Enablers: Parking brake applied; Foot off of service brake; Vehicle in park; Foot off of accelerator pedal; Vehicle speed is 0 mph (stationary); Engine at a stable base idle speed.

Note: Do not press the accelerator or service brake pedal when engaging the fire pump, this prevents the switch into SEIC.
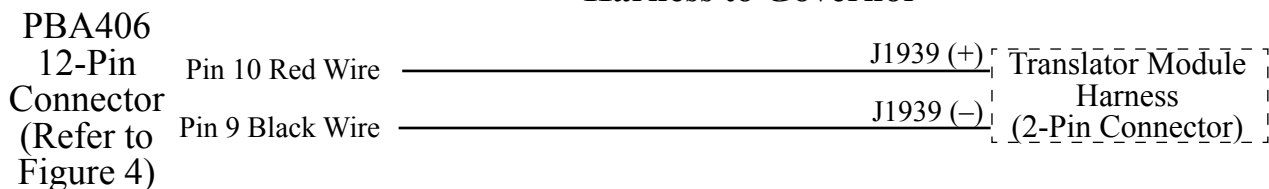
Install the J1939 Translator Module with the ODB-II Interconnecting Harness or Install the T-cable between 4-Pin connectors.

To install the J1939 Translator Module with ODB-II harness, read and follow the installation instructions provided with the Translator Module kit.

Note: The TEST pad on the module circuit board has to be held at ground when the harness connector is plugged into the J1 connector.

To OEM ODB-II Connector

J1939 Translator Module Harness

To Translator Module J1 Connector

To Governor 12-Pin Connector

2-Pin Connector
1-Red J1939 (+)
2-Blk J1939 (−)

Pass Through ODB-II Connector

J1939 Translator Module

TEST Pad   J1 Connector

2"

3 1/2"

4"

1"

Mounting holes are clearance for #8 screws.

To OEM ODB-II Connector

J1939 Translator Module and VDR Harness

To Translator Module J1 Connector

4-Pin VDR Connector

To FRC VDR 8-Pin Connector

Disconnect VDR harness 4-Pin connector and connect the T-cable provided with the governor kit.

2-Pin Connector
1-Red J1939 (+)
2-Blk J1939 (−)

To Governor 12-Pin Connector

Pass Through ODB-II Connector

Translator Module Harness to Governor

PBA406 12-Pin Connector (Refer to Figure 4)

Pin 10 Red Wire ———————————— J1939 (+)

Pin 9 Black Wire ———————————— J1939 (−)

Translator Module Harness (2-Pin Connector)

Note: Refer to Figure 4. PBA Connector Wiring for governor power and interlock wire connections.

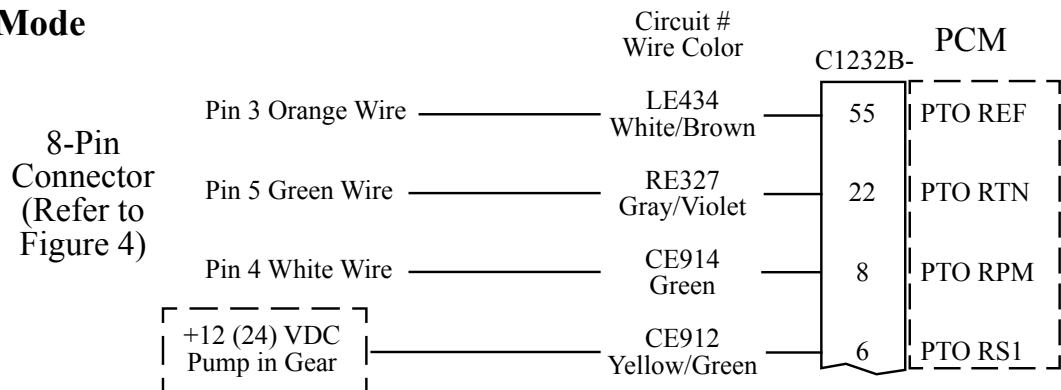**Figure 13. Ford PBA406 J1939 Translator Module Wiring**

2011 Model F-250/350/450/550 - 6.7L Diesel Engine
Stationary Elevated Idle Control (SEIC)

> **Note:** Do not press the accelerator or service brake pedal when engaging the fire pump, this prevents the switch into SEIC.
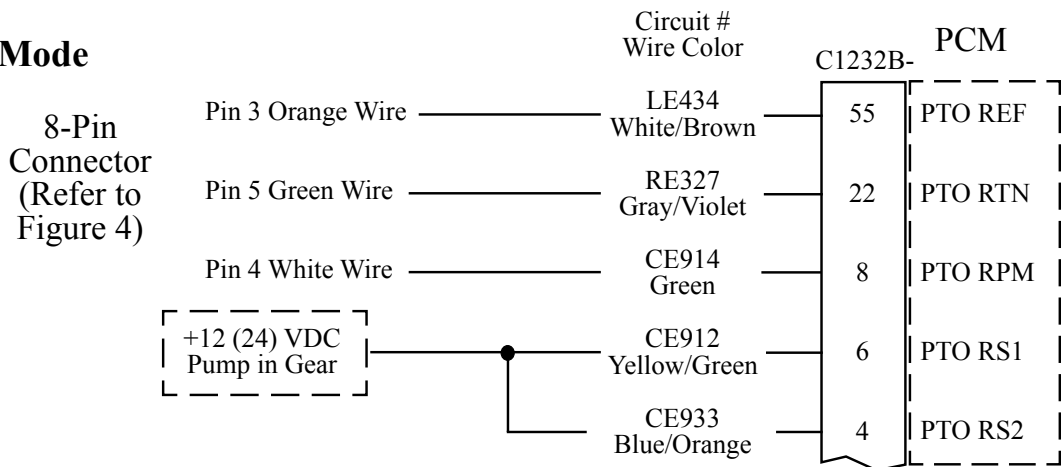
Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

> Access wires for SEIC are located in cabin, tagged and bundled above the parking brake pedal assembly behind datalink connector.

Stationary Mode

		Circuit # Wire Color	C1232B-	PCM
8-Pin Connector (Refer to Figure 4)	Pin 3 Orange Wire	LE434 White/Brown	55	PTO REF
	Pin 5 Green Wire	RE327 Gray/Violet	22	PTO RTN
	Pin 4 White Wire	CE914 Green	8	PTO RPM
+12 (24) VDC Pump in Gear		CE912 Yellow/Green	6	PTO RS1

Split Shaft Mode

		Circuit # Wire Color	C1232B-	PCM
8-Pin Connector (Refer to Figure 4)	Pin 3 Orange Wire	LE434 White/Brown	55	PTO REF
	Pin 5 Green Wire	RE327 Gray/Violet	22	PTO RTN
	Pin 4 White Wire	CE914 Green	8	PTO RPM
+12 (24) VDC Pump in Gear		CE912 Yellow/Green	6	PTO RS1
		CE933 Blue/Orange	4	PTO RS2

Split Shaft Mode is activated by applying supply voltage to both the PTORS1 and PTORS2 PCM circuits simultaneously.
1. Assure engine is running and fully warmed-up.
2. Apply parking brake.
3. Transmission in neutral to disengage drive wheels.
4. With foot off brake and accelerator, switch Split-Shaft PTO on.
5. **While pressing the service brake, shift transmission into drive.**
6. Engage PTO load.

> **NOTE**: *_Refer to Ford SVE Bulletin_ for SEIC details. (**For 2017, see Q-256 Ford bulletin**.)*
> *(**For 2016 and older, see Q-180R4 Ford SVE Bulletin**.)*

Once the system enablers are met voltage may be added to the SEIC system for activation.
If power is applied prior to the enablers being met, a system error may occur, and the SEIC system will have to be reset.
If an SEIC disabler occurs the engine requires a change-of-state, meaning the operator is required to turn off voltage to the PTO-Request circuit, and back on again to re-invoke SEIC and PTO operation.

Figure 14. Ford PBA406 PCM Wiring

Mack Harness Connections

Interface Information.

For V-MACK IV 07 and newer, the governor is designed to control engine throttle directly over the SAE J1939 databus.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.
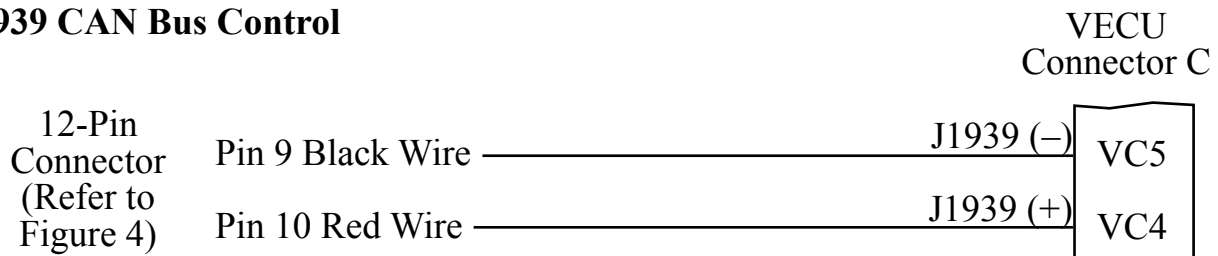
J1939 CAN Bus Control

VECU
Connector C

12-Pin
Connector
(Refer to
Figure 4)

Pin 9 Black Wire ———————— J1939 (−) | VC5
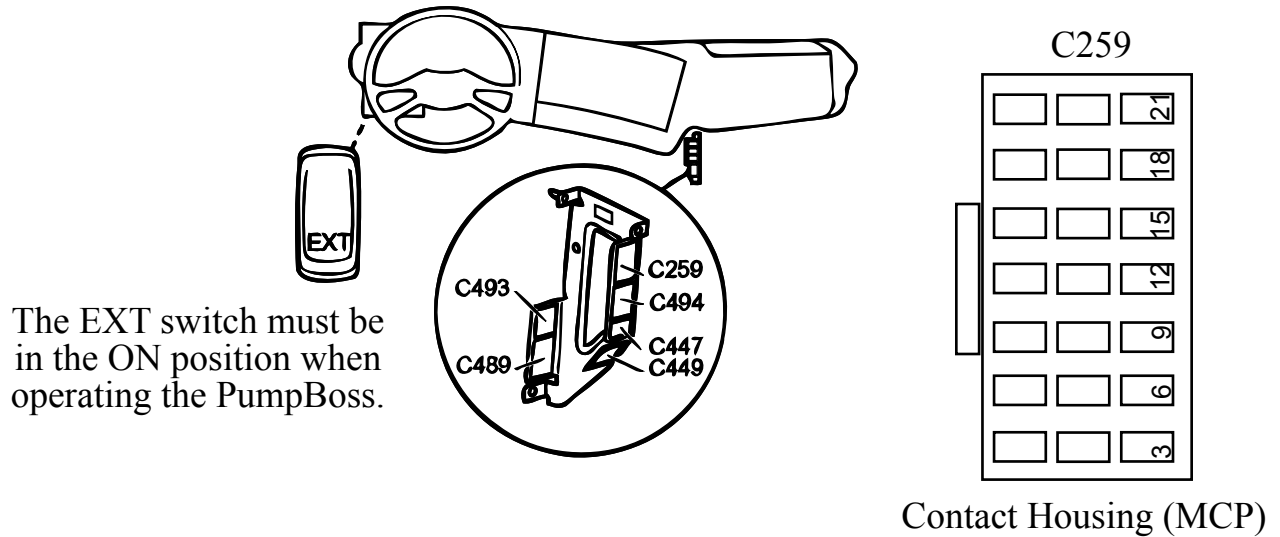
Pin 10 Red Wire ———————— J1939 (+) | VC4

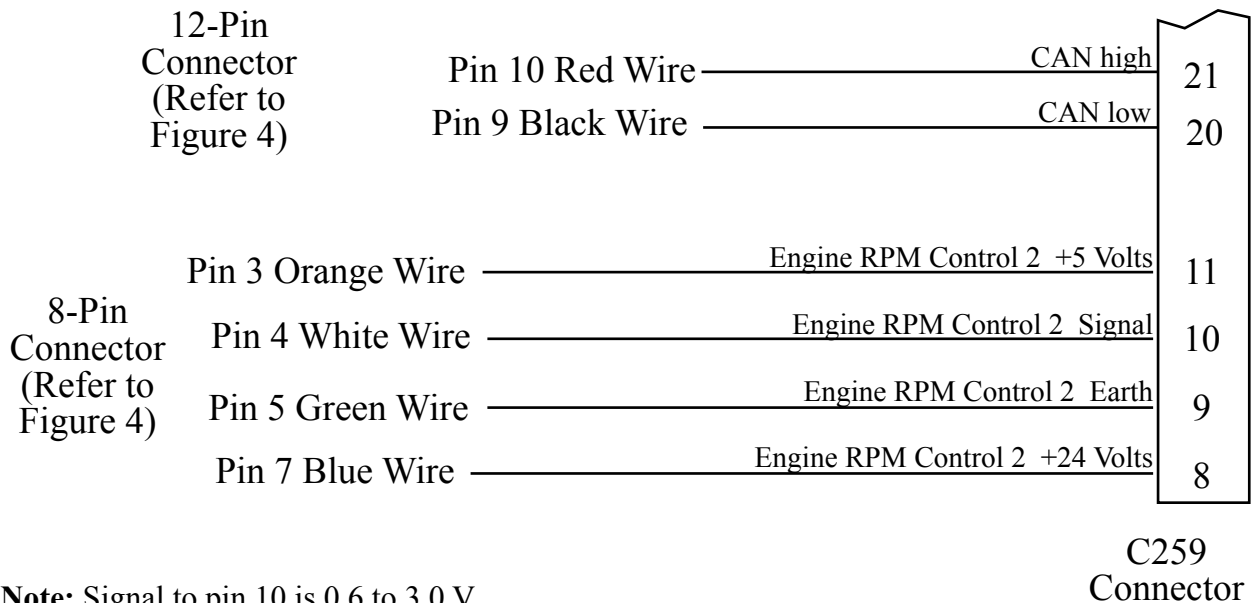**Figure 15. Mack PBA407 Wiring**

Scania Harness Connections—Type A

Interface Information

For use on P, R, and T-series trucks equipped with a bodywork control unit (BWS). Connector C259 is available on all vehicles ordered with any of the bodywork options. It is located on the plate for the electrical bodywork interface for body builders. Connector C259 is white and has 21 pins. (February 2005 to 2015.)

The EXT switch must be in the ON position when operating the PumpBoss.

C259

Contact Housing (MCP)

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

12-Pin Connector (Refer to Figure 4)

Pin 10 Red Wire —————————— CAN high | 21
Pin 9 Black Wire —————————— CAN low | 20

8-Pin Connector (Refer to Figure 4)

Pin 3 Orange Wire ———— Engine RPM Control 2 +5 Volts | 11
Pin 4 White Wire ———— Engine RPM Control 2 Signal | 10
Pin 5 Green Wire ———— Engine RPM Control 2 Earth | 9
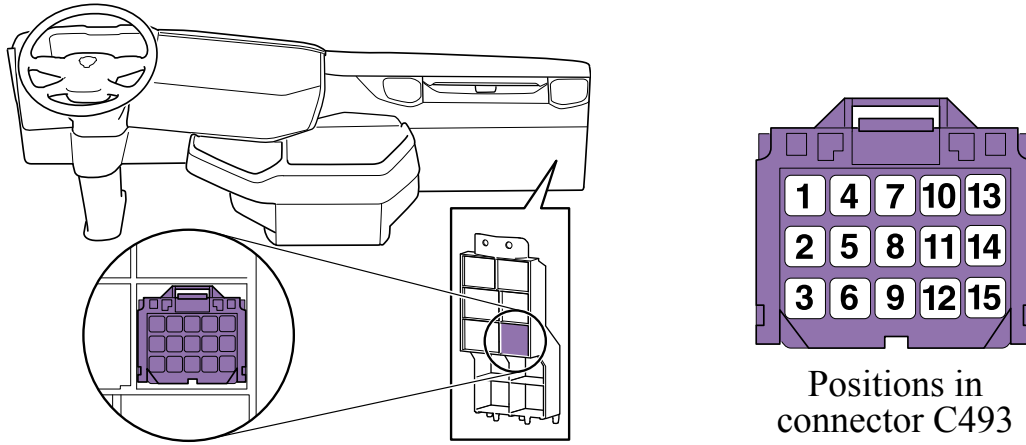Pin 7 Blue Wire ———— Engine RPM Control 2 +24 Volts | 8

C259 Connector

Note: Signal to pin 10 is 0.6 to 3.0 V

Figure 16. Scania PBA408 Wiring—Type A

Scania BCI Harness Connections—Type D

Interface Information

For use with BCI (Bodywork Communication Interface) module.

Connector C493 is located in
the bodywork console.

Positions in
connector C493

Note: Refer to Figure 4. PBA Connector Wiring for
power and interlock wire connections.

12-Pin
Connector
(Refer to
Figure 4)

Pin 4 Red Wire ———————— J1939 CAN high   4

Pin 5 Black Wire ———————— J1939 CAN low   3

C493
Connector
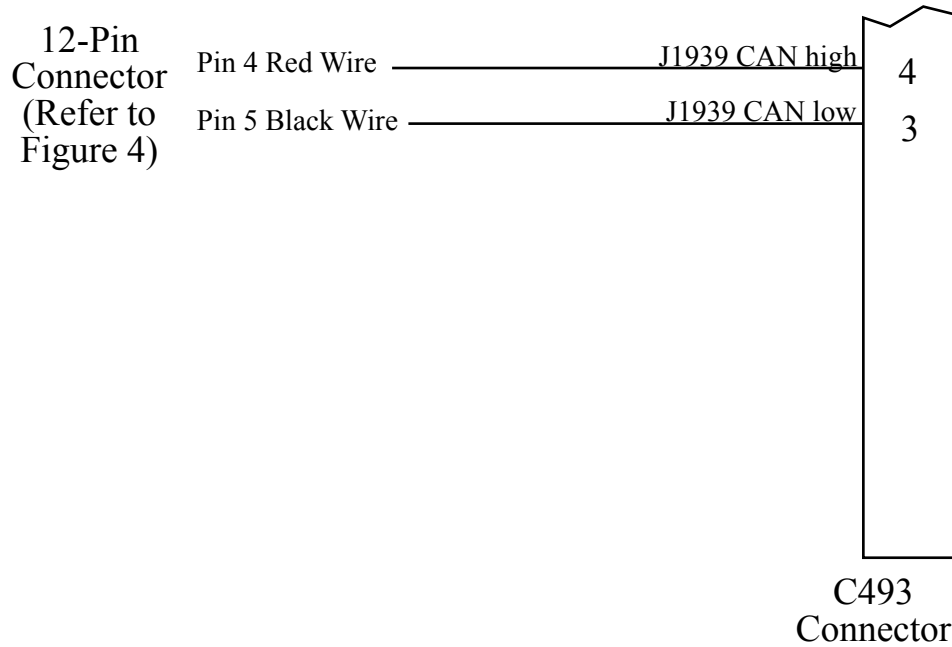
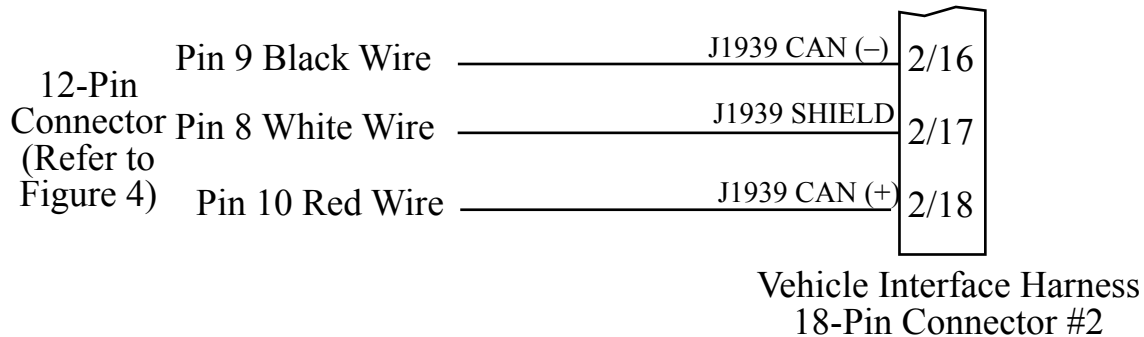**Figure 17. Scania BCI PBA408 Wiring—Type D**

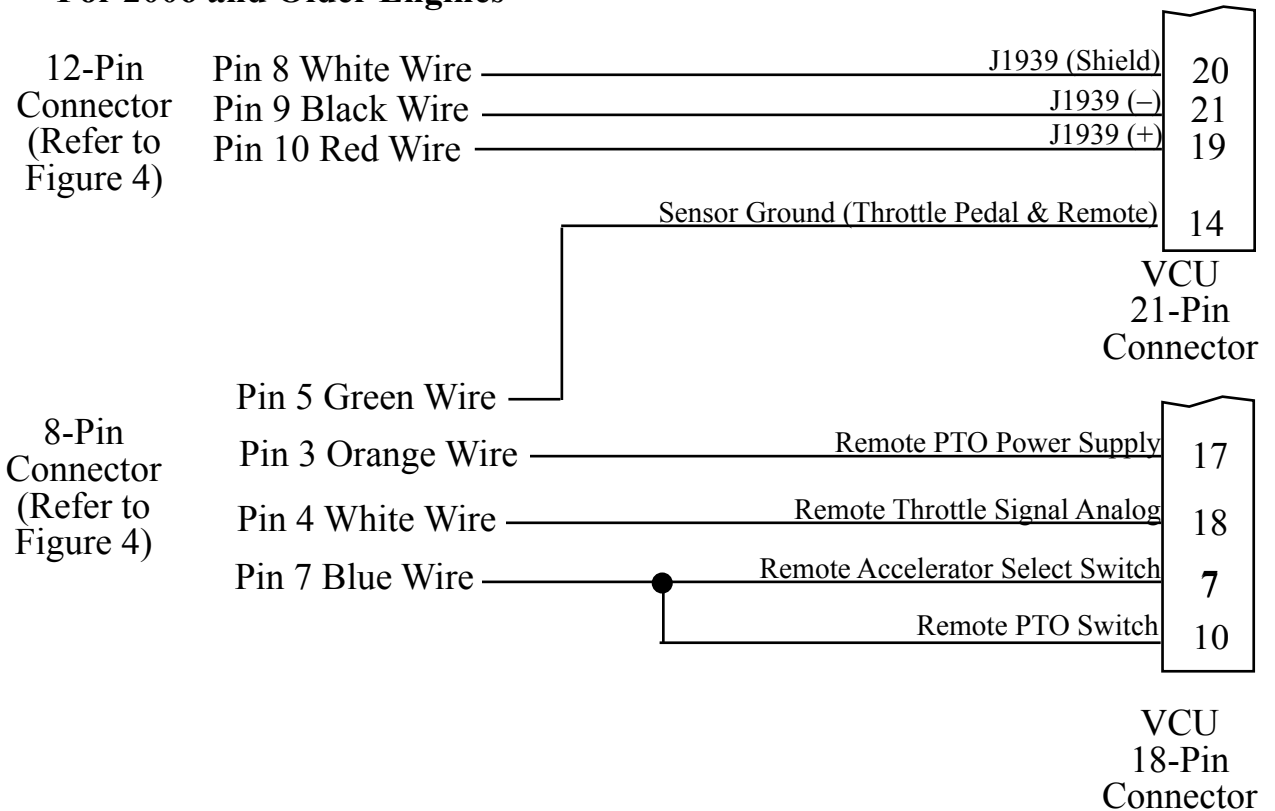# Mercedes Harness Connections

Interface Information.

For 2007 and newer engines, the governor is designed to control engine throttle directly over the SAE J1939 databus. Remote throttle does not need to be enabled in the ECM.

Note: Refer to Figure 4. PBA Connector Wiring for power and interlock wire connections.

For 2007 and Newer Engines

12-Pin Connector (Refer to Figure 4)

Pin 9 Black Wire ——————— J1939 CAN (−) 2/16

Pin 8 White Wire ——————— J1939 SHIELD 2/17

Pin 10 Red Wire ——————— J1939 CAN (+) 2/18

Vehicle Interface Harness
18-Pin Connector #2

For 2006 and Older Engines

12-Pin Connector (Refer to Figure 4)

Pin 8 White Wire ——————— J1939 (Shield) 20

Pin 9 Black Wire ——————— J1939 (−) 21

Pin 10 Red Wire ——————— J1939 (+) 19

Sensor Ground (Throttle Pedal & Remote) 14

VCU
21-Pin
Connector

8-Pin Connector (Refer to Figure 4)

Pin 5 Green Wire ———

Pin 3 Orange Wire ——————— Remote PTO Power Supply 17

Pin 4 White Wire ——————— Remote Throttle Signal Analog 18

Pin 7 Blue Wire ——————— Remote Accelerator Select Switch 7

Remote PTO Switch 10

VCU
18-Pin
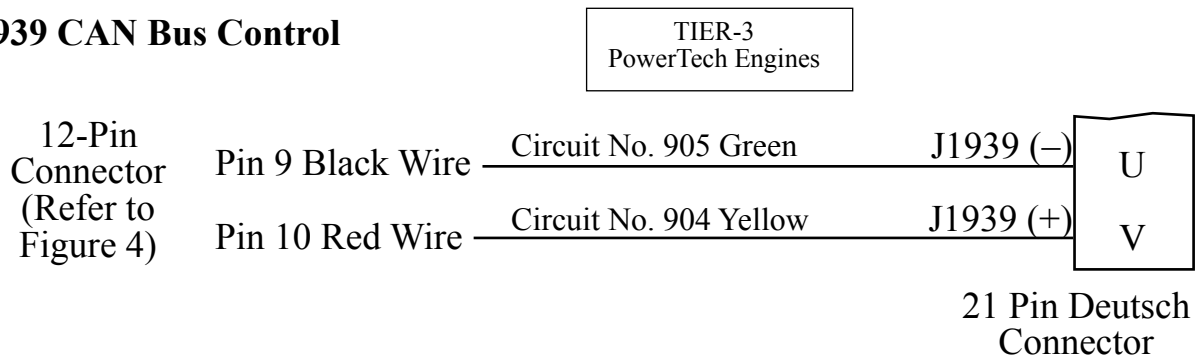Connector

Figure 18. Mercedes PBA410 Wiring

John Deere Harness Connections

Interface Information

CAN Controller will request a torque by means of TSC1. This option is disabled by default and is selectable in the Trim Options page for this application. Source address 57 should be programmed.

Note: Refer to Figure 4 Connector Wiring for Power and Interlock wire connections.

J1939 CAN Bus Control

TIER-3 PowerTech Engines	

12-Pin Connector (Refer to Figure 4)

Pin 9 Black Wire ——— Circuit No. 905 Green ——— J1939 (−) U

Pin 10 Red Wire ——— Circuit No. 904 Yellow ——— J1939 (+) V

21 Pin Deutsch Connector

Figure 19. John Deere PBA416 Wiring

MAN Harness Connections

Interface Information

Parameters for various functions can be set on the KSM using MAN-cats II.

The KSM can accept the Engine speed request from the Governor on the A-CAN.

Note: Refer to Figure 4 Connector Wiring for Power and Interlock wire connections.

J1939 CAN Bus Control

18-Pin Connector
X1997

12-Pin
Connector
(Refer to
Figure 4)

Pin 9 Black Wire ——— Brown-Orange/0.75 A-CAN-L ——— J1939 (−) | X1997/18 |

Pin 10 Red Wire ——— Orange/0.75 A-CAN-H ——— J1939 (+) | X1997/17 |
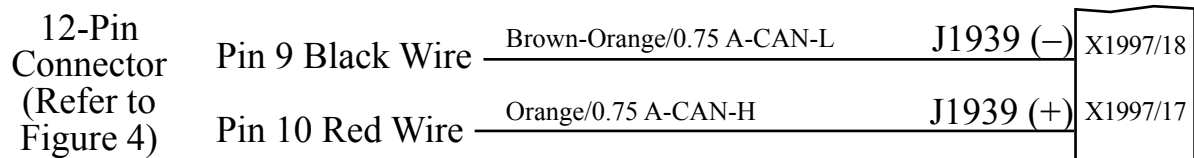
Figure 20. MAN PBA424 Wiring

IVECO Harness Connections

Interface Information

The vehicles shall be ordered with EM w/ CANopen (OPT0384) and FMS (OPT14569). The CANopen XDC needs to be downloaded. This service is available from the official IVECO TeleService tool-chain worldwide. Also an adapter cable needs to be installed to connect Controller to the CAN Bus. This option is currently available only for EUROCARGO-V.

Note: Refer to Figure 4 for the Connector Wiring for Power and Interlock wire connections.
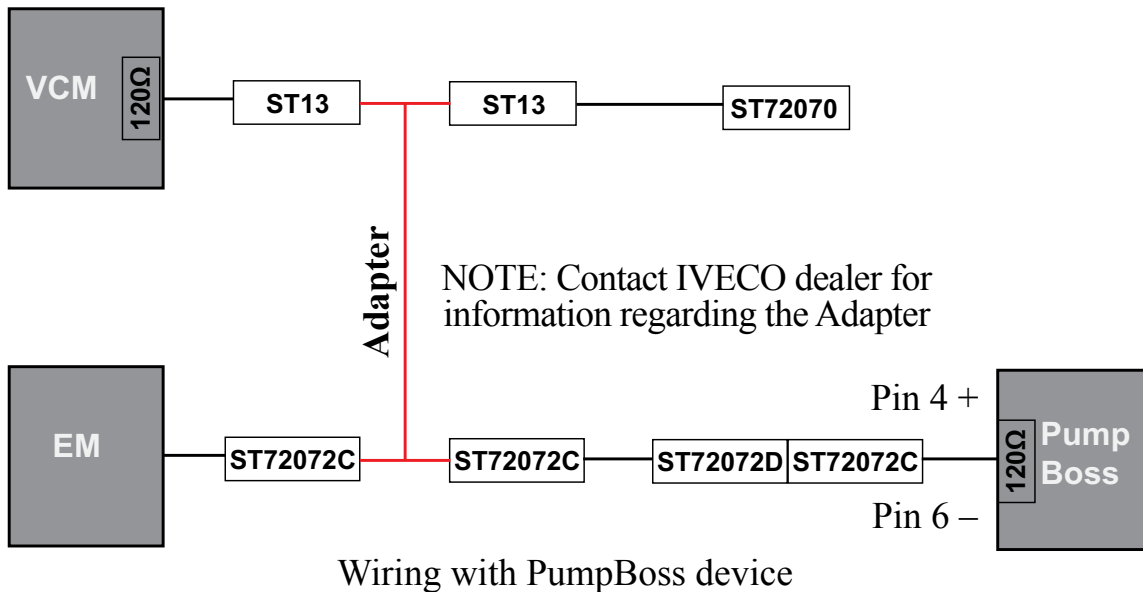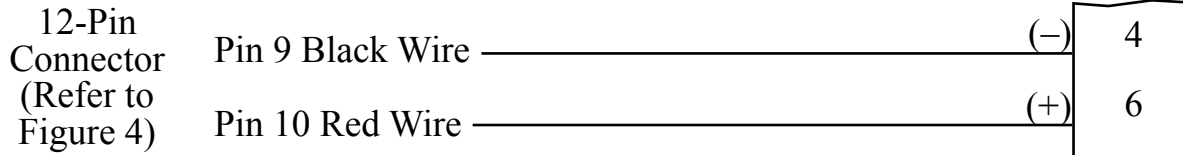
Figure 21. IVECO PBA426 Wiring

High-Idle Wiring

The governor programming includes a high-idle function. To activate the high-idle provide + VDC to pin 7 (High-Idle Active Input) of the 12-pin connector and pin 6 (Interlock Input) of the 8-pin connector. The high-idle connection to pin 6 must be isolated form the interlock circuit using two diodes (see schematic).

Note: It is important that the connection to the Interlock Input from the High-Idle circuit be isolated from the apparatus interlock wiring with the two diodes. Refer to the wiring diagram. **The pump must NOT be engaged when using the high idle function.**

The high-idle is set at about 1000 RPM at the factory. (This value will vary depending on the specific engine.) To adjust this setting refer to High-Idle in the Operation Section.
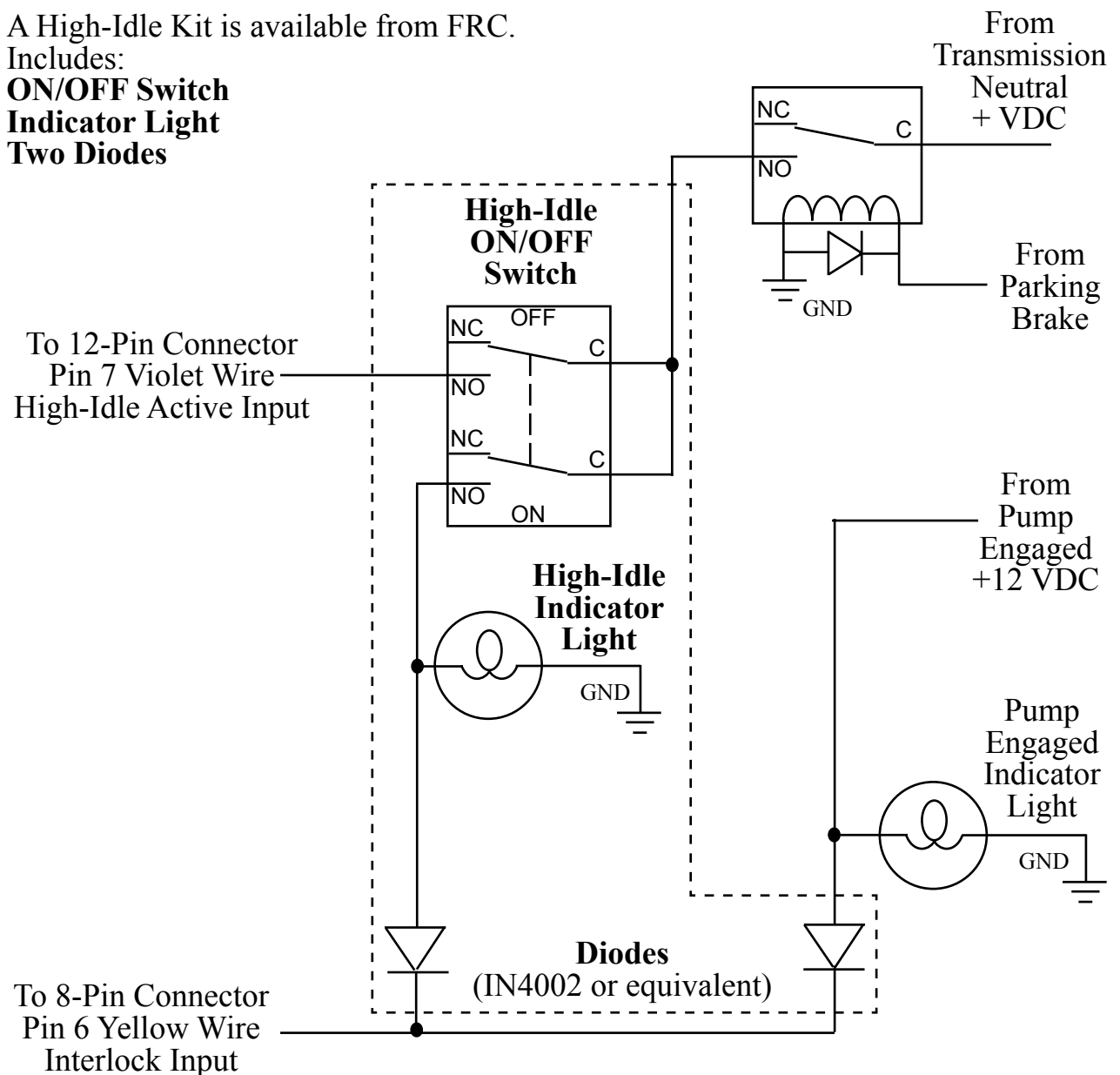
A High-Idle Kit is available from FRC.
Includes:
ON/OFF Switch
Indicator Light
Two Diodes

Figure 22. High-Idle Wiring
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FLYBACK DIODE INFORMATION

It is good engineering practice to include a flyback diode when switching an inductive load (solenoid coil, relay coil, electric motor winding, etc.). It is recommended that a flyback diode be installed on inductive devices that share a common power source/ground with an FRC governor.

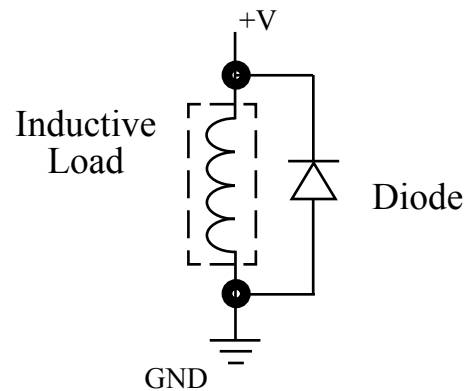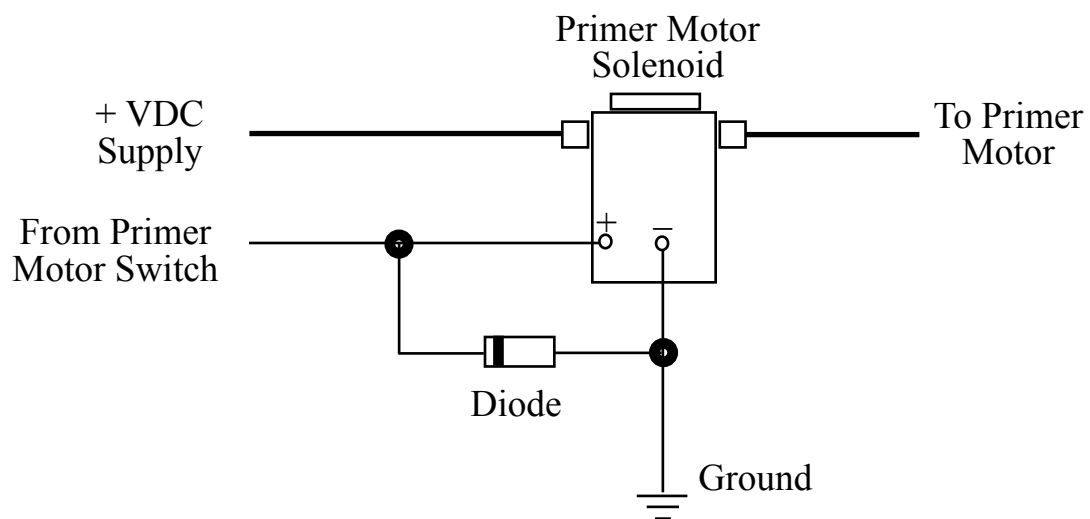Typical circuit showing a flyback diode installed across an inductive load.

Diagram showing a flyback diode connected on a typical pump primer motor solenoid.

Figure 23. Flyback Diode

NOTES

NOTES

NOTES

⚠ DANGER

PERSONAL RESPONSIBILITY CODE

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.

2. It is your responsibility to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called upon to use.

3. It is your responsibility to know that you have been properly trained in Firefighting and/or Emergency Response and in the use, precautions, and care of any equipment you may be called upon to use.

4. It is your responsibility to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.

5. It is your responsibility to know that your equipment is in operable condition and has been maintained in accordance with the manufacturer's instructions.

6. Failure to follow these guidelines may result in death, burns or other severe injury.

FEMSA

Fire and Emergency Manufacturers and Services Association, Inc.
P.O. Box 147, Lynnfield , MA 01940 www.FEMSA.org