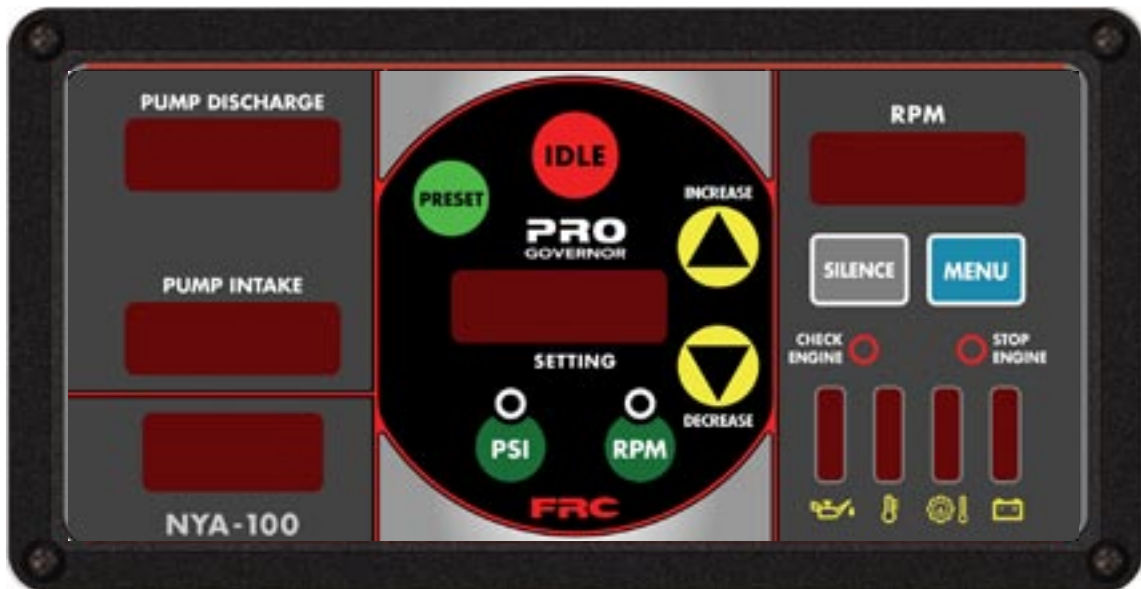




PRESSURE GOVERNOR, ENGINE MONITORING, AND MASTER PRESSURE DISPLAY MODEL: NYA100



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INTRODUCTION

Overview

The pressure governor and all-in-one instrument panel use state-of-the-art, programmable, microprocessor technology. It maintains a steady pump discharge pressure by controlling engine speed or holds a selected engine RPM. It offers complete engine control and remote display in a single, compact unit.

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

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

Return to Engine Idle With the Push of a Button

Display and LED brightness Automatically Adjusts for Day or Night Operation

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.

Control Module

Supply Power:	12 VDC
Supply Current:	1.8 Amp
Dimensions:	10 1/2" Wide by 5 1/2" High by 2" Deep

LED Bar Graphs

Engine Oil Pressure:	10 to 90 PSI
Engine Coolant Temperature:	150 to 240 °F
Transmission Temperature:	140 to 300 °F
Battery Voltage:	11.5 to 15.5 VDC

Intake Pressure Sensor

Model Number:	XE-IO3100PT2
Pressure Range:	-30 in/Hg to 600 PSI
Proof Pressure:	1200 PSI
Excitation Voltage:	5 VDC
Output Voltage:	0.5 to 4.75 VDC

Discharge Pressure Sensor

Model Number:	XE-FP4000PT1	XE-PRO1000PT1
Pressure Range:	0 to 600 PSI	0 to 1000 PSI
Proof Pressure:	1200 PSI	2000 PSI
Excitation Voltage:	5 VDC	5 VDC
Output Voltage:	0.5 to 4.75 VDC	0.5 to 4.5 VDC

Table 1. Pressure Sensor Output Voltage

	0psi	100psi	150psi	200psi	250psi	300psi	600psi	700psi	800psi
XE-IO3100PT2	0.604vdc	1.295vdc	1.640vdc	1.985vdc	2.331vdc	2.677vdc	4.75vdc	---	---
XE-FP4000PT1	0.5vdc	1.12vdc	1.56vdc	1.92vdc	2.27vdc	2.625vdc	4.75vdc	---	---
XE-PRO1000PT1	0.5vdc	0.92vdc	---	1.3vdc	---	1.7vdc	2.9vdc	3.3vdc	3.7vdc

GENERAL DESCRIPTION

The pressure governor and all-in-one instrument panel is programmed from the factory or during installation. It is compatible with the following engines types:

NYA101	Cummins IS Series
NYA102	Detroit Diesel
NYA104	Navistar
NYA105	Caterpillar

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

Components

The information available on the J1939 databus varies depending on the particular engine type. The sensors (if any) that need to be installed will also vary depending on the engine.

The pressure governor and monitoring display consist of the following components:

- Control Module
- Intake Pressure Sensor
- Discharge Pressure Sensor
- Audible Alarm Buzzer
- Cables

Control Module

The control module is waterproof and uses 10 1/2 by 5 1/2 inches of panel space. All controls, indicators, and displays are located on the front of the control module. (Refer to Controls and Indicators.)

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.

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 discharge pressure.

Audible Alarm Buzzer

A ground is provided at the 8-pin connector pin 7 to activate the buzzer (max current: 300mA).

High-Idle

The governor programming includes a high-idle function. To activate the high-idle circuit, provide +12 VDC to the High-Idle Active Input. (Refer to High-Idle Wiring.).

The high-idle is set to 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.

Cables

There are two standard cables that connect to the control module. One 12-Pin connector and one 8-Pin connector. (Refer to Wiring Section.)

Controls and Indicators

All controls and indicators are located on the front of the control module. (Refer to Figure 1.) Display and LED brightness automatically adjusts for day or night operation.

PUMP DISCHARGE and PUMP INTAKE Displays

Shows the pump discharge and intake pressures during normal operations.

Message Display

The message display shows the time and date during normal operations and warning alarms as they occur. It is used when programming and shows detailed information, stored data, and program features.

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. This button can be used in an emergency or for normal shutdown after operations.

SETTING Display

The display shows the pressure or RPM setting during normal operations.

INCREASE / DECREASE Buttons

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

PSI Button and LED

Selects the pressure mode of operation, the LED is on to indicate operation in the pressure mode.

RPM Button and LED

Selects the RPM mode of operation, the LED is on to indicate operation in the RPM mode.

RPM Display

Shows the engine RPM during normal operations.

SILENCE Button

Suppresses audio alarm.

MENU Button

Used to access detailed information and program features. Detailed information includes engine coolant temperature, engine oil pressure, battery voltage, fuel level, pump transmission temperature, engine hours, pump hours and transmission temperature (optional) with the exact measure and units.

CHECK ENGINE / STOP ENGINE LEDs

Repeats the engine warnings from the cab.

Engine Oil Pressure LED Display

Shows pressure in safe range with green LEDs. The LEDs flash red when the pressure is low.

Engine Coolant Temperature LED Display

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

Pump Transmission Temperature LED Display

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

Battery Voltage LED Display

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

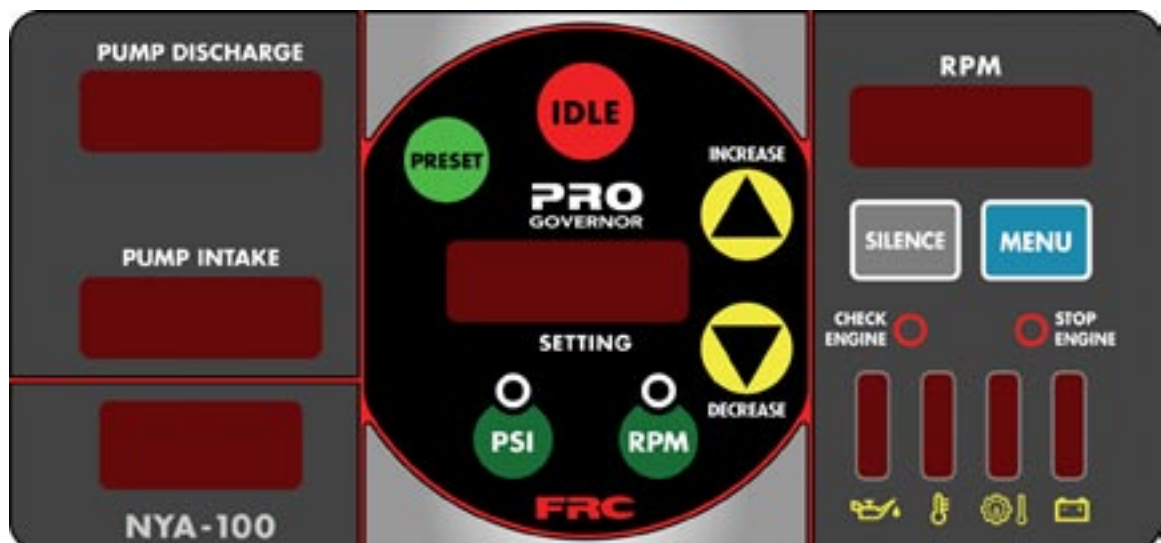


Figure 1. Controls and Indicators

INSTALLATION

When the governor is programmed at the factory, there is a label put on the governor that specifies the engine type. If there is no label the engine type must be verified and/or programmed.

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 9 3/4 by 4 1/4 inch hole and drill four holes for mounting screws.
3. Place control module in position and secure with four screws (10-32 mounting hardware is recommended).
4. Connect cables at rear of the control module. (Refer to Wiring section.)

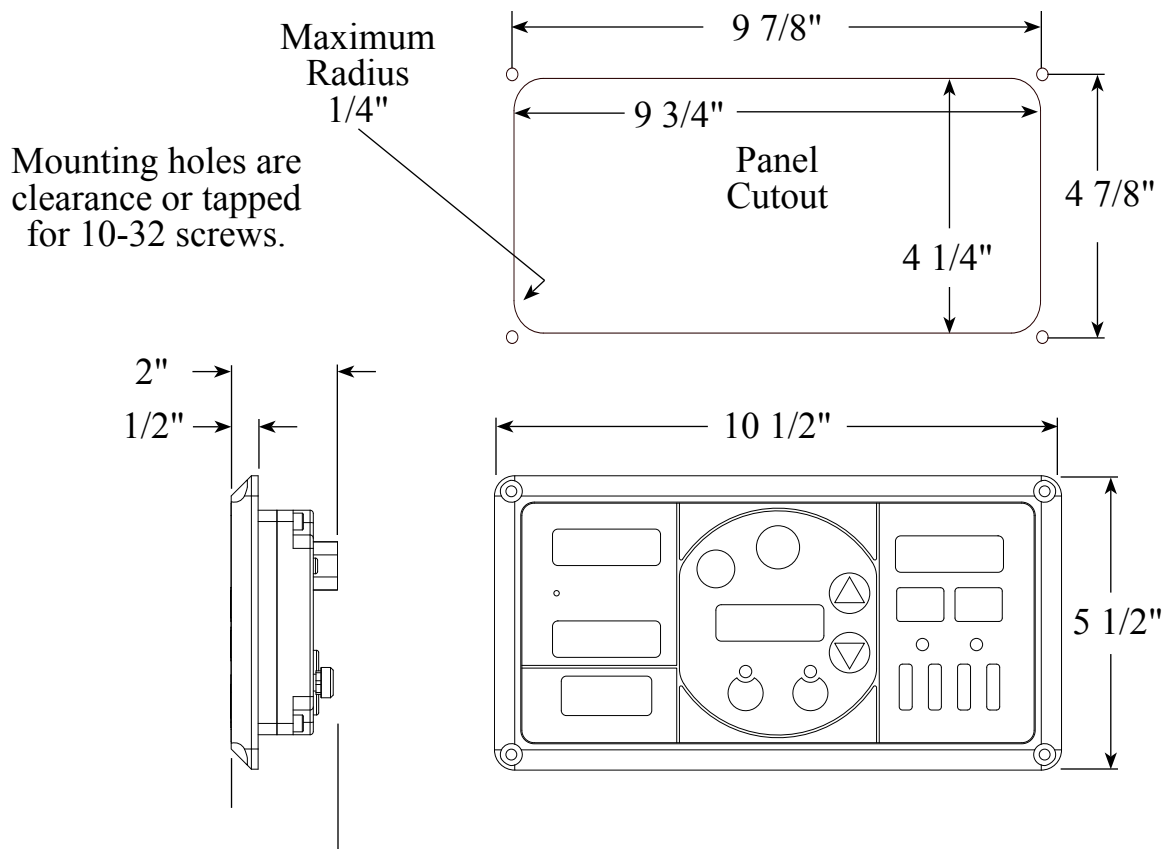


Figure 2. Control Module Mounting Dimensions

Install Pressure Sensors

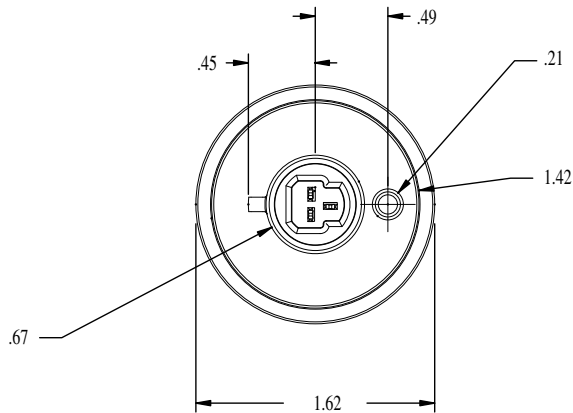
Two pressure sensors are mounted on the pump manifolds, one on the discharge and one on the intake. If there is a check valve in the discharge side of the pump, mount the discharge sensor before the check valve. T-fittings can be used to mount the pressure sensors.

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

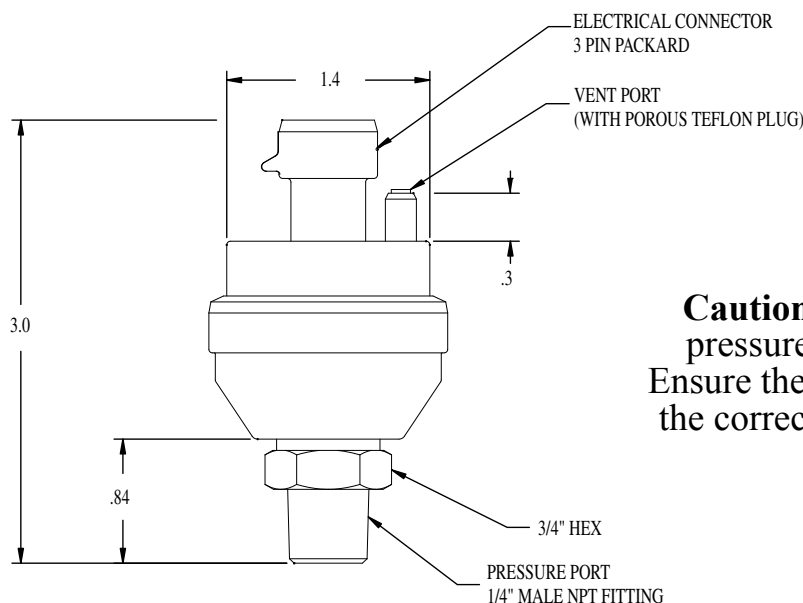
1. Screw the sensor into a 1/4-18 NPT hole.

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 3/4 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.



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 Buzzer

Install the buzzer close to the control module so the audible warning is easily associated with the visual warning on the display.

The buzzer provided by FRC requires a cutout hole of 1-1/8" (1.125").

Pin 7 on the 8-pin connector at the rear of the control module is used to connect the buzzer. Connect the ground side of the buzzer to pin 7. (Maximum current through pin 7 is 300 mA.) Refer to the Wiring section (Figure 5).

Install High-Idle Kit

The high-idle is activated when +12 VDC is provided to pin 4 (High-Idle Active Input) of the 8-pin connector and +12 VDC to pin 3 (Interlock Input) of the 12-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.

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OPERATION

On power up the governor is idle. The RPM display shows engine RPM, the four LED bar graphs are green indicating readings within normal ranges, the SETTING display shows IdLE and the message display shows the date and time.

If a monitored function is not within normal parameters 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 are red and flashing.

When all necessary throttle enables are active and the interlock circuit is complete, the governor is ready to control the engine RPM. The PSI LED lights and the governor is in the pressure mode of operation.

Note: When two discharge pressure sensors are installed the highest pressure of the two sensors is used for pressure control. The PUMP DISCHARGE display shows highest pressure of the two sensors.

Controls

INCREASE/DECREASE Buttons

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

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 changes by 5 PSI twice, then by 10 PSI until the button is released.

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 changes by 50 RPM twice, then by 100 RPM until the button is released.

Error Codes and Fault Warnings

Table 2. Error Codes

RPM Display	Message Display	Probable Cause 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.
E01	NO DATA	>Datalink cable not connected / connected to wrong port >Broken wire / bad connector contact on datalink cable
E02	NO RPM	Engine RPM not detected >Datalink 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 >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 >Sensor cable not connected >Broken wire / bad connector contact on sensor cable >Defective temperature sensor

* When two discharge pressure sensors are installed, error code E5L is for the low pressure sensor and E5H is for the high pressure sensor.

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
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.

Pressure Mode Operation

In the pressure mode of operation the PSI 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.

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

1. Press PSI button.

Result: PSI LED goes on.

2. Press PRESET and/or INCREASE/DECREASE to select pressure setting.

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

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

Result: SETTING display shows IdLE, engine RPM is at idle.

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 and the discharge pressure starts to drop, 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.

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 PSI LED stays on. To alert the operator the RPM LED and the RPM display flash, and the message display flashes LO WATER. 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 setting.

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 pressing INCREASE/DECREASE buttons. In this mode the pressure setting does not change and the PRESET button is disabled. 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. It sets the engine RPM at 1100. 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 engine/pump combinations.)

No Supply Water: If the discharge pressure is below 15 PSI, the engine RPM is set at idle. 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 INCREASE/DECREASE buttons 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 mode to RPM mode the RPM setting is the RPM that the pump was operating at in pressure mode.

1. Press RPM button.

Result: RPM LED goes on.

2. Press PRESET and/or INCREASE/DECREASE to select RPM setting.

Result: SETTING display shows RPM setting, engine RPM changes.

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

Result: SETTING display shows IdLE, engine RPM is at idle.

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 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.

Press the PSI or RPM button and the governor switches modes immediately.

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.

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	
ENG HRS	####	
PUMP HRS	####	
TRANS T.	### °F	(programmable for °C)

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.

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 **SETTING** display. This procedure is to change the pre-programmed setting.

Note: The engine must be running and the pump engaged interlock circuit must be closed.

1. Press **IDLE** button.

Result: Engine goes to idle RPM

2. Press **PSI** or **RPM** button to select which setting to change.

Result: LED indicator goes on for mode selected.

Note: The **SETTING** display must show **IdLE** before changing the preset.

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

Result: **SETTING** display shows **PRESET**. After 5 seconds the current setting flashes.

4. Press **INCREASE/DECREASE** to change preset value.

5. Release **PRESET** button.

Result: The new preset value is programmed. **SETTING** display shows **IdLE**.

High-Idle

The governor includes a high-idle function. To activate the high-idle, set interlocks as called for by 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.

Change High-Idle Setting

Note: The high-idle is set at 1000 RPM at the factory.

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

2. Press and hold **PRESET** button for 3 seconds.

Result: **SETTING** display flashes the high-idle setting.

3. Press and hold the **PRESET** button and press **INCREASE/DECREASE** to set desired RPM.

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

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

Access Program Features

Note: When the program (P) code is flashing in the RPM display, press the PSI 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 V200.01.

2. Press the PSI button.

Result: **P 1 0 2** flashes in the RPM display. The message display shows the manufacturing date MFG DATE 09AUG'07 (ddmmm'yy).

3. Press the PSI button.

Result: **P 1 0 3** flashes in the RPM display. The message display shows the current date SET DATE 17AUG'07.

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 PSI or RPM button to change the year.

- c. Press the MENU button.

Result: The month flashes.

- d. Press the PSI or RPM button to change the month.

- e. Press the MENU button.

Result: The day flashes.

- f. Press the PSI 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 AM or PM flashing.

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

c. Press the MENU button.

Result: The minute flashes.

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

e. Press the MENU button.

Result: The hour flashes.

f. Press the PSI 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 PSI 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 PSI or RPM button.

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

9. Press the PSI 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

Note: When two discharge pressure sensors are installed, C1 is for the low pressure sensor and C8 is for the high pressure sensor.

C2 - Intake Pressure Sensor Zero Calibration

C3 - Engine RPM Calibration

Refer to Calibration Programs and Table 4. Calibration Codes Quick Reference Chart.

Operator Password Code 1221

Operator Password Code 1221 is available with software revision V203.03 and newer. This 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 cursor 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.

CDOE	DESCRIPTION	MESSAGE DISPLAY	Press MENU button to select; change value with PRES-SURE 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

Note: When two discharge pressure sensors are installed, C1 is for the low pressure sensor and C8 is for the high pressure sensor.

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 (C8)	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	

Calibration Notes:

- When two discharge pressure sensors are installed, C1 is for the low pressure sensor and C8 is for the high pressure sensor. When C8 is selected the message displayed is HI_D.PSI.

Pump Pressure Sensor (Code C1, C2, and C8)

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. (See Calibration Programs.)
3. Scroll to code C1 D.PSI or C2 I.PSI (or C8 HI_D.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 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 PSI 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. (See Calibration Programs.)
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 PSI 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 PSI or RPM buttons to scroll through program codes.

WIRING

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

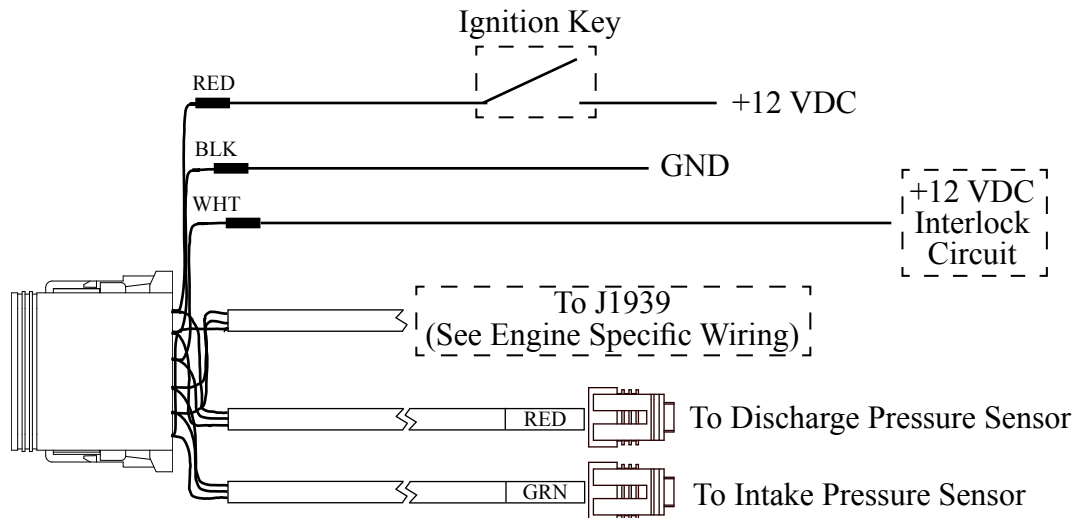
Connectors and Cables

The information available on the J1939 databus varies depending on the particular engine type.

12 Pin Connector/Cable		
Pin	Wire Color	Description
1	Red	+12 VDC Supply Voltage
2	Black	Ground
3	White	Interlock Input (+12 VDC)
4	Red	J1939 CAN (+)
5	Black	J1936 CAN (-)
6	Red	+5 VDC Discharge Sensor
7	Black	Ground Discharge Sensor
8	White	Signal Discharge Sensor
9	Red	+5 VDC Intake Sensor
10	Black	Ground Intake Sensor
11	White	Signal Intake Sensor
12	Yellow	J1939 Shield

Notes:

- The Interlock Input pin 3 must be made for the governor to control the engine.
- The J1939 CAN bus is terminated with a 120 ohm resistor.



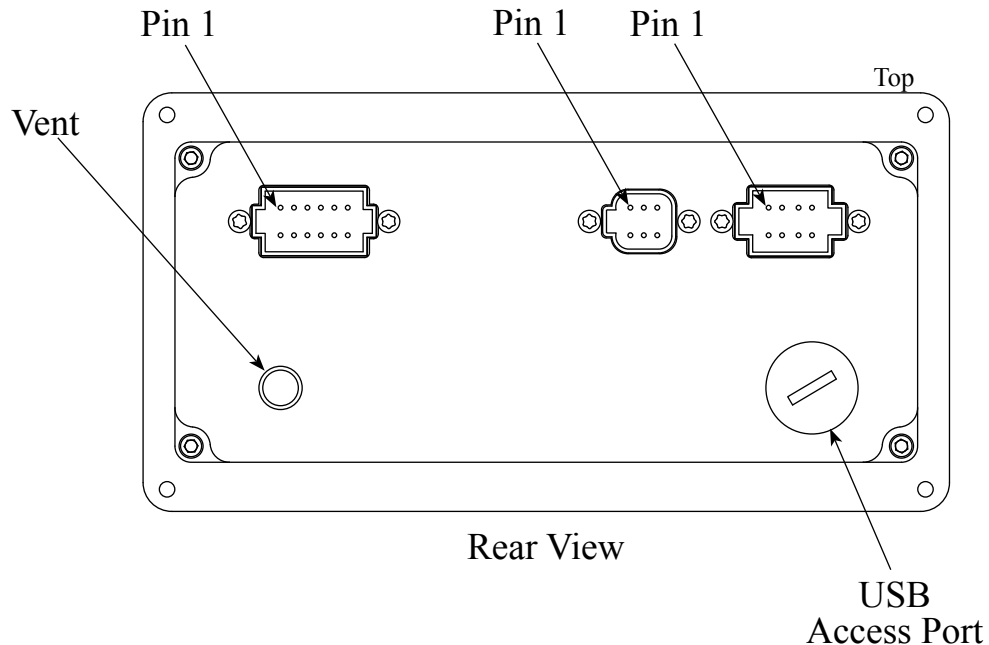
Standard sensor cable length is 10 feet.

Note: Governors using the additional 1000 PSI discharge pressure sensor will have a 6-pin connector for the extra sensor cable.

Figure 4. NYA 12-Pin Connector Wiring

12, 6, and 8 Pin Connectors

6-Pin Optional Connector/Cable		
Used with second high pressure discharge sensor XE-PRO1000PT1		
Pin	Wire Color	Description
1	Red	+5 VDC Discharge Sensor
2	Black	Ground Discharge Sensor
3	White	Signal Discharge Sensor
4	N/C	
5	N/C	
6	N/C	



8-Pin Connector/Cable		
Pin	Wire Color	Description
1	Red	+5 VDC Reference From ECM
2	Black	ECM Ground
3	Orange	Engine Control Signal To ECM
4	White	High-Idle Active Input (Ground)
5	Green	FRC Data (+)
6	Yellow	FRC Data (-)
7	Blue	Buzzer Ground (300 mA max)
8	Brown	Throttle Enable Signal Output

Note: Not all wires are used for all engines. Refer to the engine specific wiring diagram for interface connections.

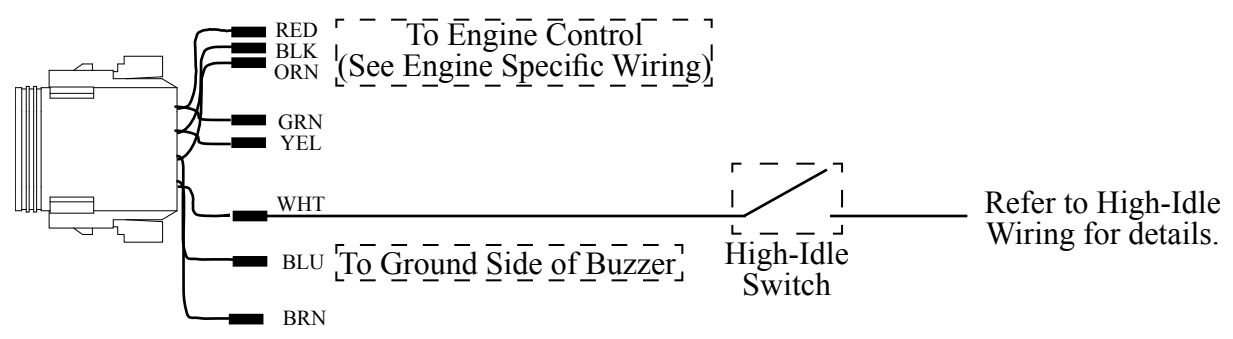
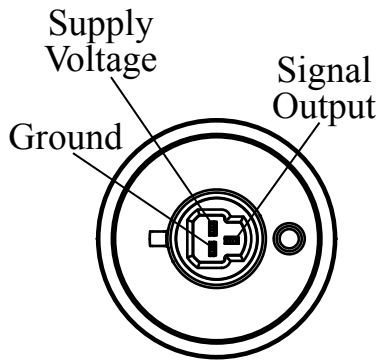


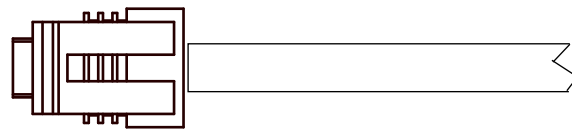
Figure 5. NYA 8-Pin and 6-Pin Connector Wiring

Pressure Sensor

Pressure Sensor
(Top View)



Pressure Sensor
Cable



**Pressure Sensor Cable
3-Pin Connector**

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

Pressure Sensor
(Side View)

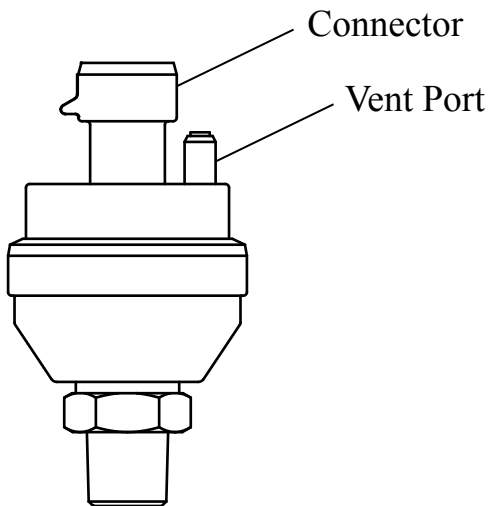
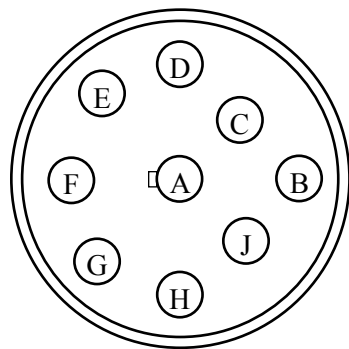


Figure 6. Pressure Sensor Wiring

Common OEM Diagnostic Connector

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



Front View

9-Pin Connector	
<u>Pin</u>	<u>Description</u>
A	Battery Ground
B	+12 VDC
C	J1939 Data Link (+)
D	J1939 Data Link (-)
E	J1939 Shield
F	J1587 Data Link (+)
G	J1587 Data Link (-)
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 governor 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 governor to work.

Note: Refer to Figure 4. NYA 12-Pin Connector Wiring for power and interlock wire connections.

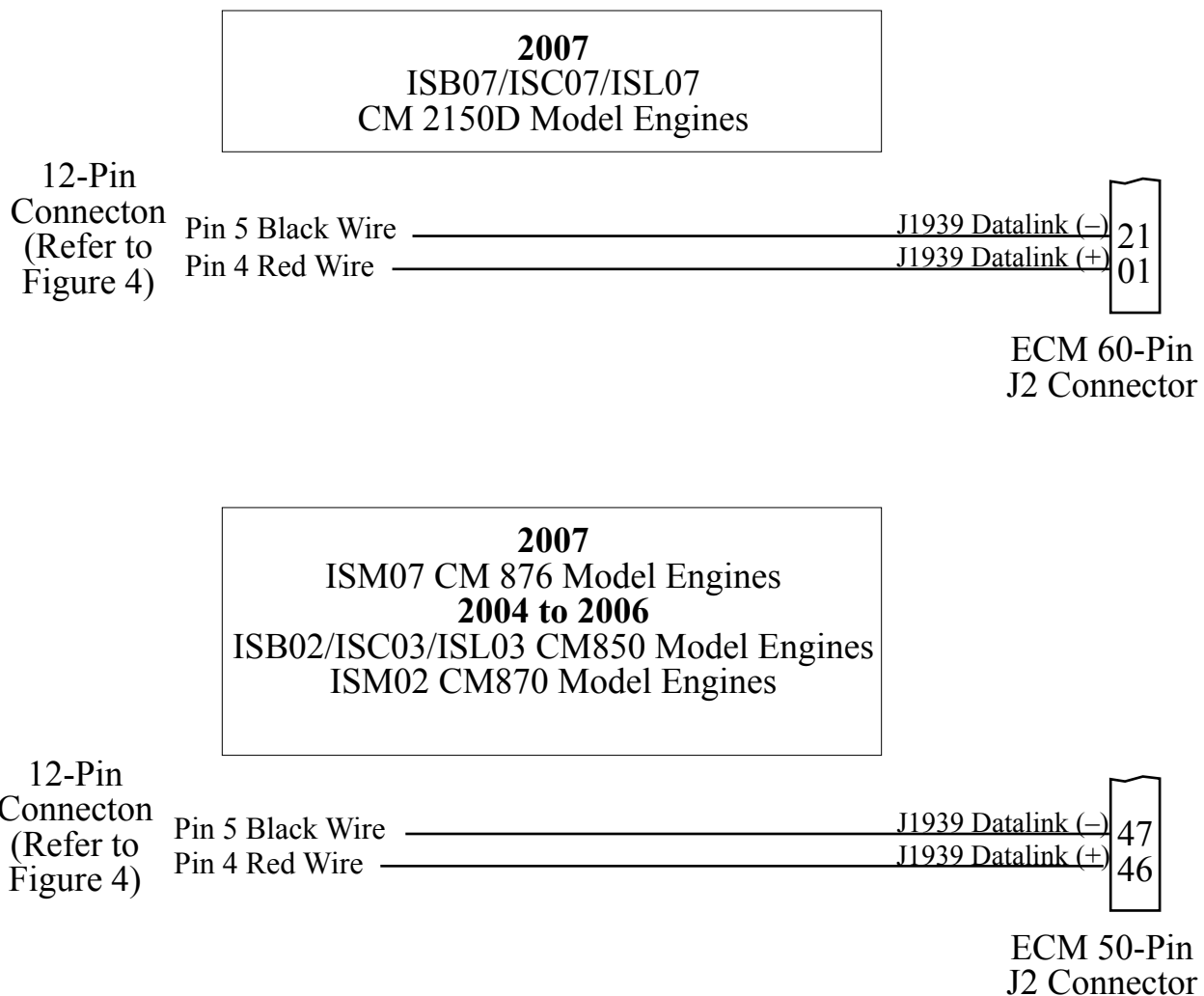


Figure 8. Cummins NYA101 Wiring

Detroit Diesel Harness Connections

Interface Information

Note: Refer to Figure 4. NYA 12-Pin Connector Wiring for power and interlock wire connections.

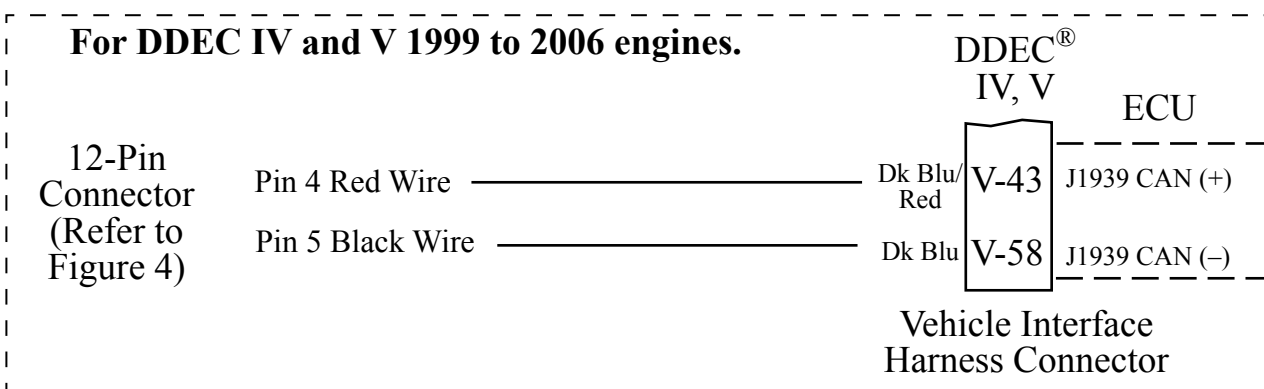
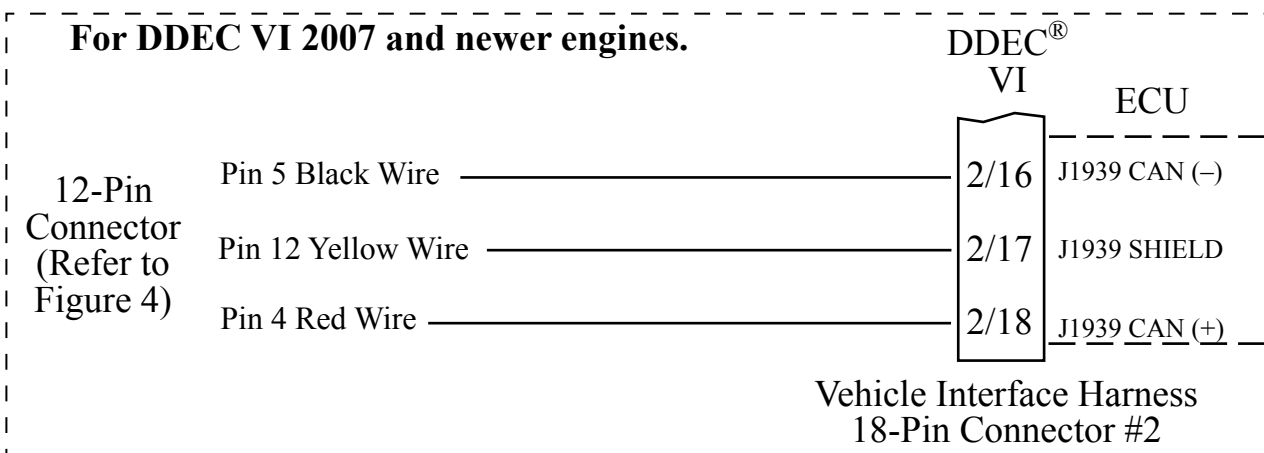


Figure 9. Detroit Diesel NYA102 Wiring

Navistar Harness Connections

Interface Information

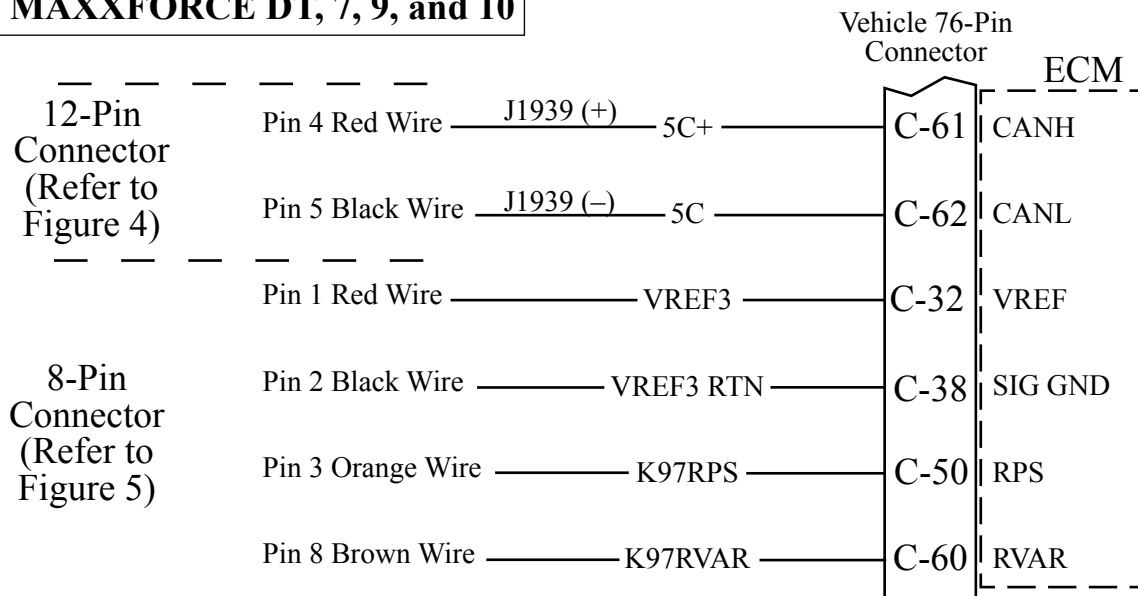
The ECM must be programmed for a remote throttle input. When using code 12VZA or 12VXY, the following parameters must be set:

PTO-REMOTE-PEDAL to 1-Yes; PTO-REM-PEDAL-RTZ to 1-RTZ-not;

PTO-DISABLE-CAB-INTERFACE to 1-Yes; DRIVELINE-MODE to 1.

Note: Refer to Figure 4. NYA 12-Pin Connector Wiring for power and interlock wire connections.

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Note: 2004 to 2006 model engines with code 12VXY and the Remote Engine Speed Controller Module (RESCM) installed.

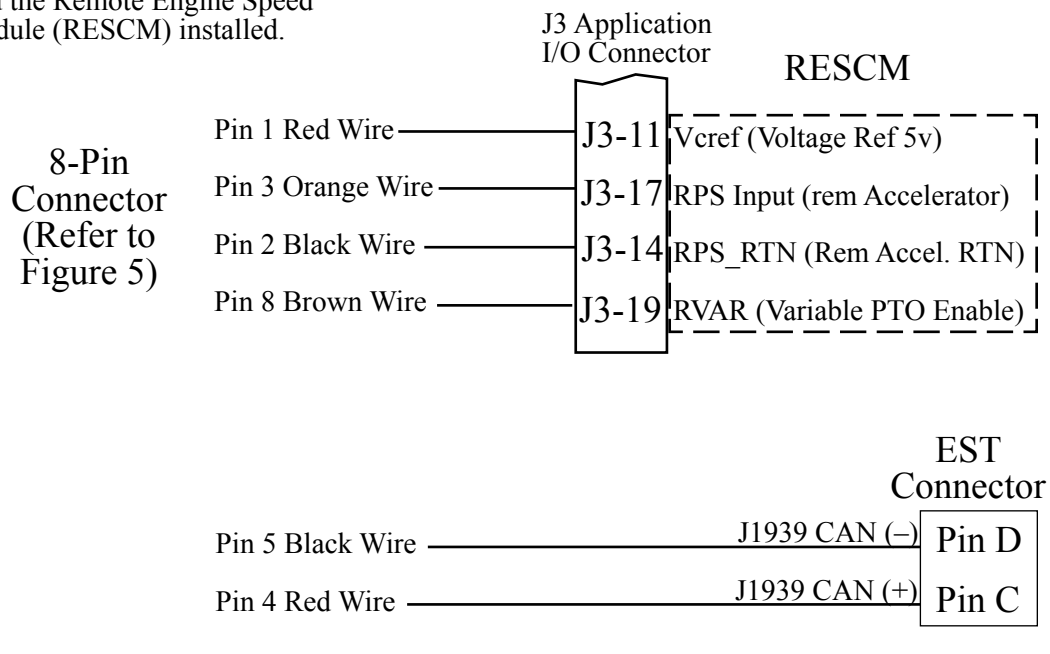


Figure 10. Navistar NYA104 Wiring

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, will have 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. NYA 12-Pin Connector Wiring for power and interlock wire connections.

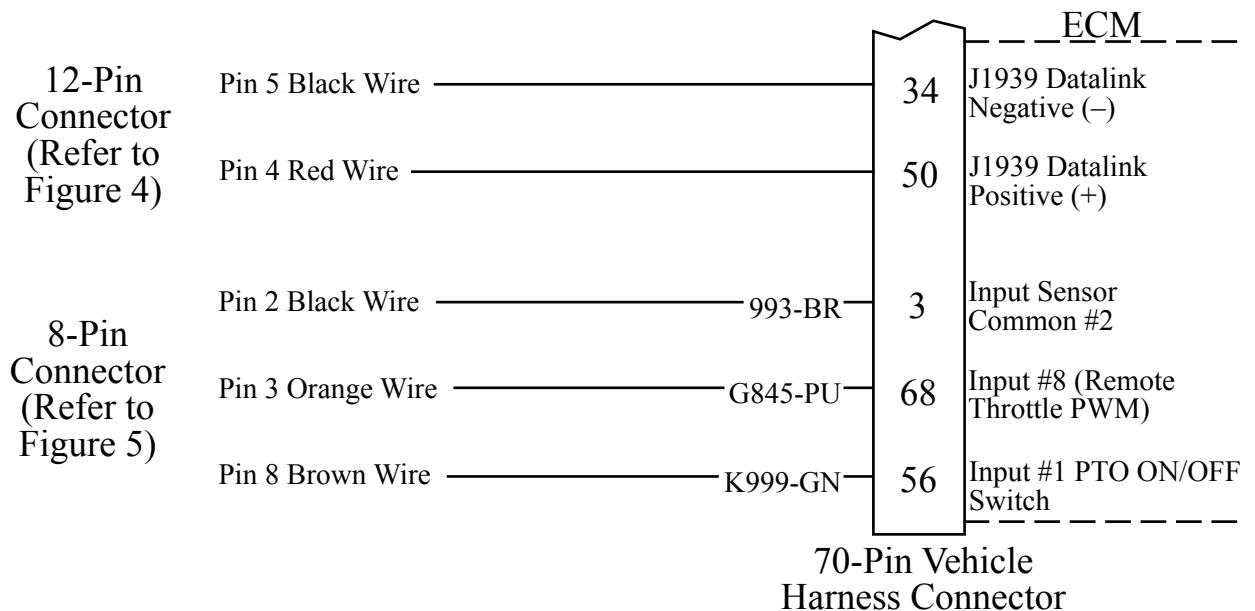


Figure 11. Caterpillar NYA105 Wiring

High-Idle Wiring

The governor includes a high-idle function. To activate the high-idle provide +12 VDC to pin 4 (High-Idle Active Input) of the 8-pin connector and +12 VDC to pin 3 (Interlock Input) of the 12-pin connector. The high-idle connection to pin 3 must be isolated from 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 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 varies 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

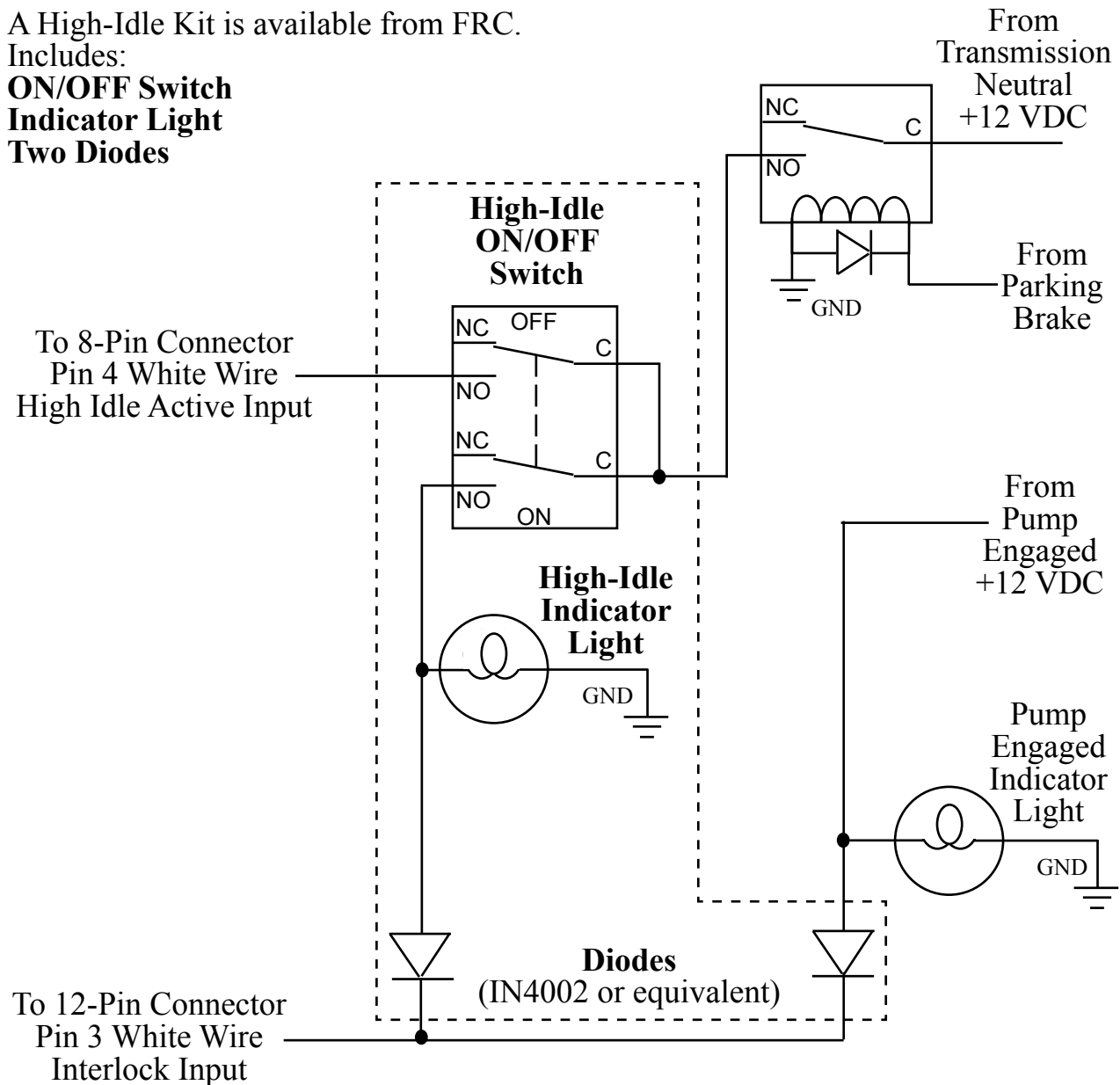


Figure 12. High-Idle Wiring

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 a FRC governor.

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

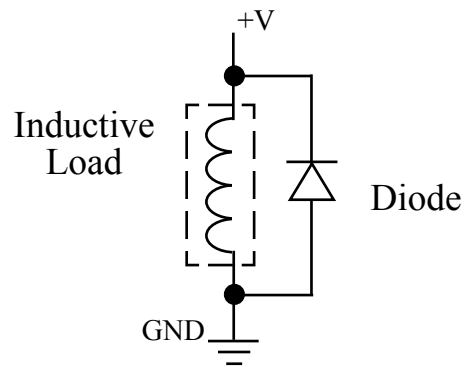


Diagram showing a flyback diode connected on a typical pump primer motor solenoid.

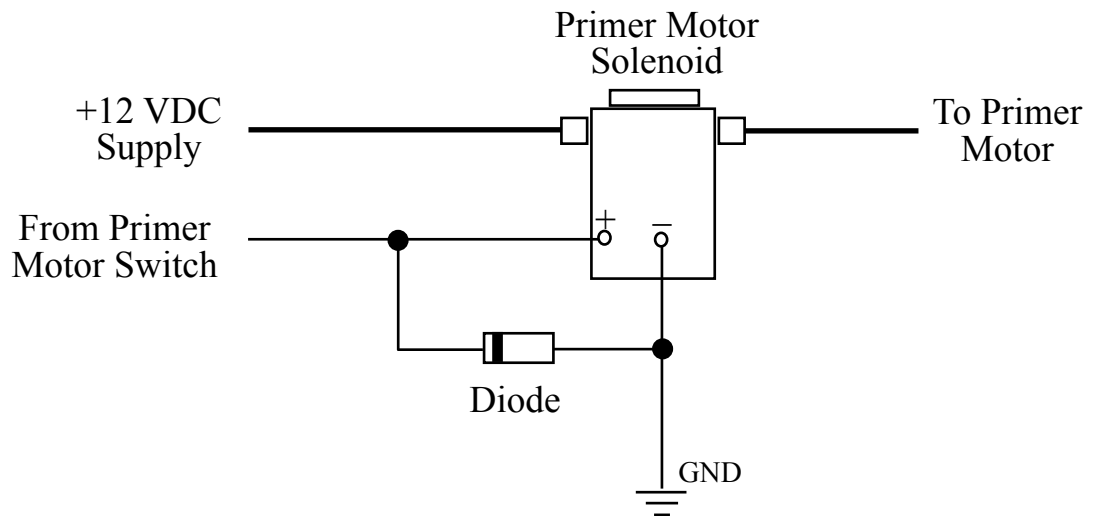


Figure 13. Flyback Diode