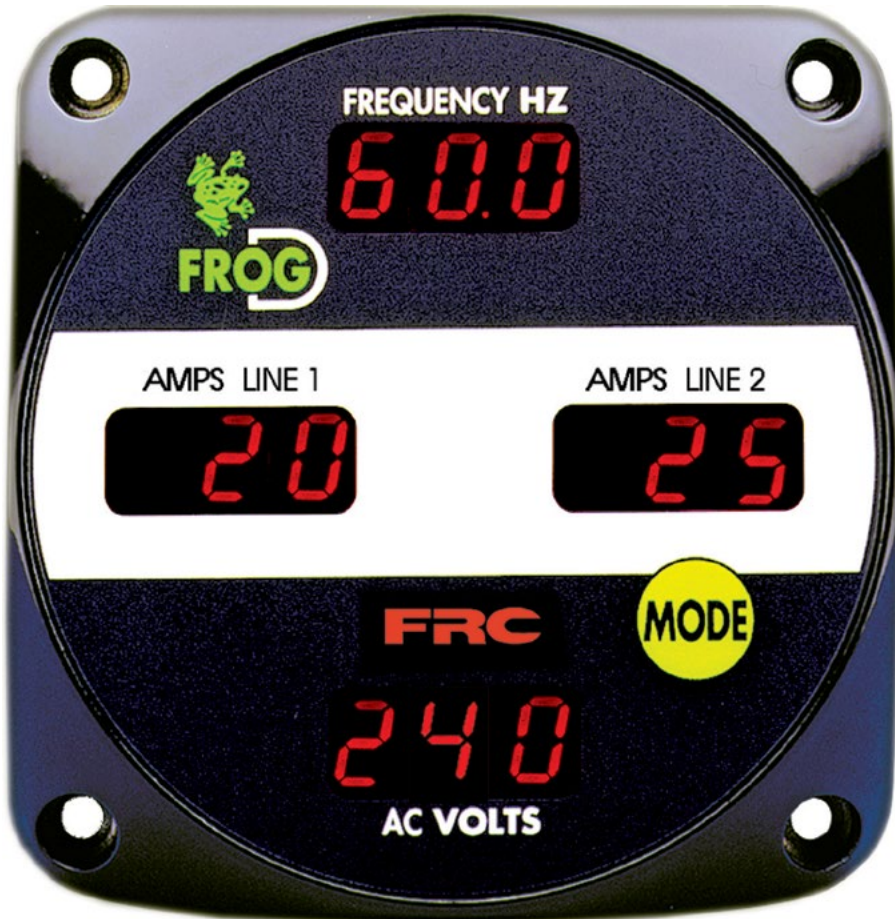




A Safe Fleet Brand



FROG-D GENERATOR DISPLAY FREQUENCY READOUT OF GENERATOR MODEL FDA100



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CONTENTS

Table of Contents

CONTENTS.....	2
INTRODUCTION	3
Overview.....	3
Features.....	3
Specifications.....	3
GENERAL DESCRIPTION.....	4
Components	4
Controls and Indicators.....	5
INSTALLATION	6
Install Display Module.....	6
Install Current Sensor	8
Install Voltage Transformer.....	8
Install Optional Hydraulic Oil Temperature Sensor	8
Install Optional Buzzer	8
OPERATION	10-11
CALIBRATION.....	12
Generator Rated Capacity Setting.....	12
Current and Voltage Readings	12
Temperature Warning.....	13
WIRING.....	14

List of Figures

Figure 1. Controls and Indicators.....	5
Figure 2. Display Module Mounting Dimensions	7
Figure 3. Current Sensor.....	9
Figure 4. Transformer	9
Figure 5. Kilowatt Ratings.....	13
Figure 6. Wiring	14-15

INTRODUCTION

Overview

The Fire Research FROG-D is a generator output display panel for 50/60 Hz generators rated from 6 to 45 kW.

The ultra-brite LED displays on the FROG-D constantly show the operator generator frequency, current on two lines, and AC volts.

The FROG-D built-in safety features include: current overload, voltage fluctuation, and high hydraulic oil temperature warnings.

Features

Generator Hourmeter

Audible Alarm Buzzer (Optional)

Hydraulic Oil Temperature Sensor (Optional)

J1939 Output (Option)

Specifications

Display Module

Supply Power:	12 VDC
Supply Current:	1.25 Amps
Dimensions:	4.25" Wide by 4.25" High

LED Displays

Frequency:	0 - 99.9 Hz
Current:	0 - 200 Amps Each Line
Voltage:	0 - 400 AC volts
Hourmeter:	0 - 99999.9 (0.1 Hour Increments)
Hydraulic Oil Temperature:	0 - 230 °F

GENERAL DESCRIPTION

Components

The FROG-D consists of the following components:

Display Module

Current Sensors

AC Voltage Transformer

Engine Oil Temperature Sensor (Optional)

Audible Alarm Buzzer (Optional)

Cables

Display Module

The display module is waterproof and can be mounted anywhere on the electrical panel. The FROG-D display module has a square flange with overall dimensions of 4.25" X 4.25". A cutout hole of 3.75" in diameter is required.

Current Sensors

Two current sensors are supplied with the FROG-D. Both current sensors are identical and they can be used either to measure line 1 current draw or line 2 current draw. Run the wires from the main circuit breaker to the current sensors; one wire through each current sensor.

AC Voltage Transformer

The voltage transformer supplied will work for 120 or 240 volt AC systems. The transformer should be securely mounted inside the electrical box.

Hydraulic Oil Temperature Sensor (Optional)

The optional hydraulic oil temperature sensor has a 1/8 NPT male threads and is installed as required.

Audible Alarm Buzzer (Optional)

The optional buzzer is installed as required.

Cables

The cables to connect power and the sensors are provided. Refer to the Wiring Section.

Controls and Indicators

All controls and indicators are located on the front of the display module. (Refer to Figure 1.)

FREQUENCY HZ LED Display

Shows generator frequency in hertz.

AMPS LINE 1 and LINE 2 LED Displays

Shows current flow in amperes on the lines through the current sensors.

AC VOLTS Display

Shows the generator output voltage in volts.

MODE Button

Press to show total generator hours and hydraulic oil temperature.

Menu Button

Used to program the rated capacity of the generator in kW. This is only used at installation if needed.

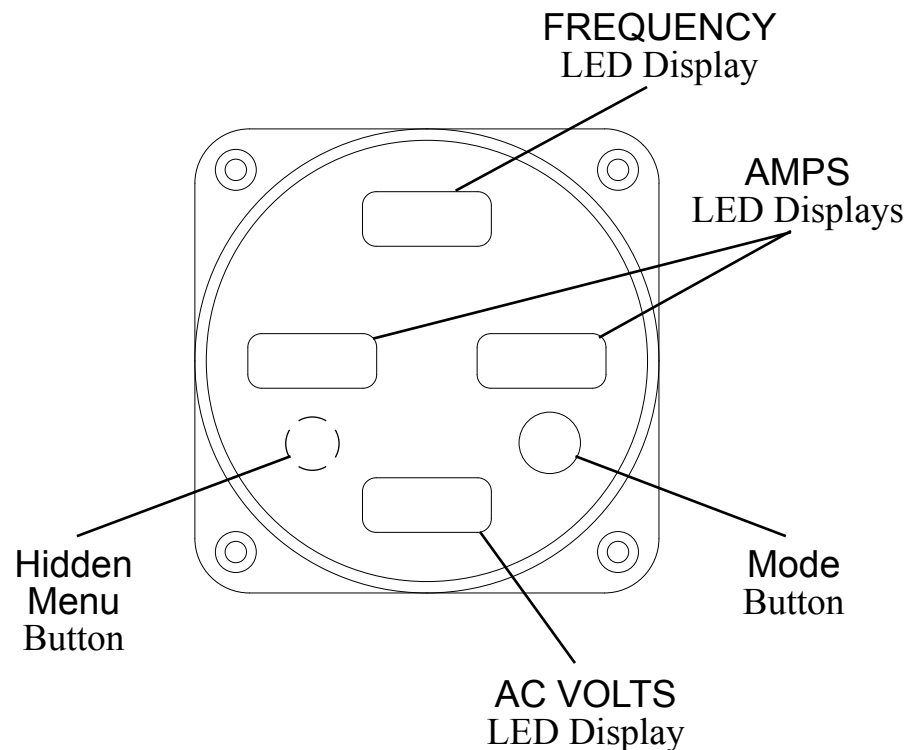


Figure 1. Controls and Indicators

INSTALLATION

The FROG-D must match the rated output of the generator. It is set from 6 to 45 kW. Ensure that the generator power rating and the FROG-D rating match. If an adjustment is needed, refer to the Calibration Section.

Install Display Module

1. Measure and mark the mounting location for display 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 3.75" mounting hole in panel.
3. Drill four holes, clearance or tapped, for 10-32 mounting screws.
4. Place the control module in position and secure with screws.
5. Connect cables at rear of the display module. (Refer to the Wiring section.)

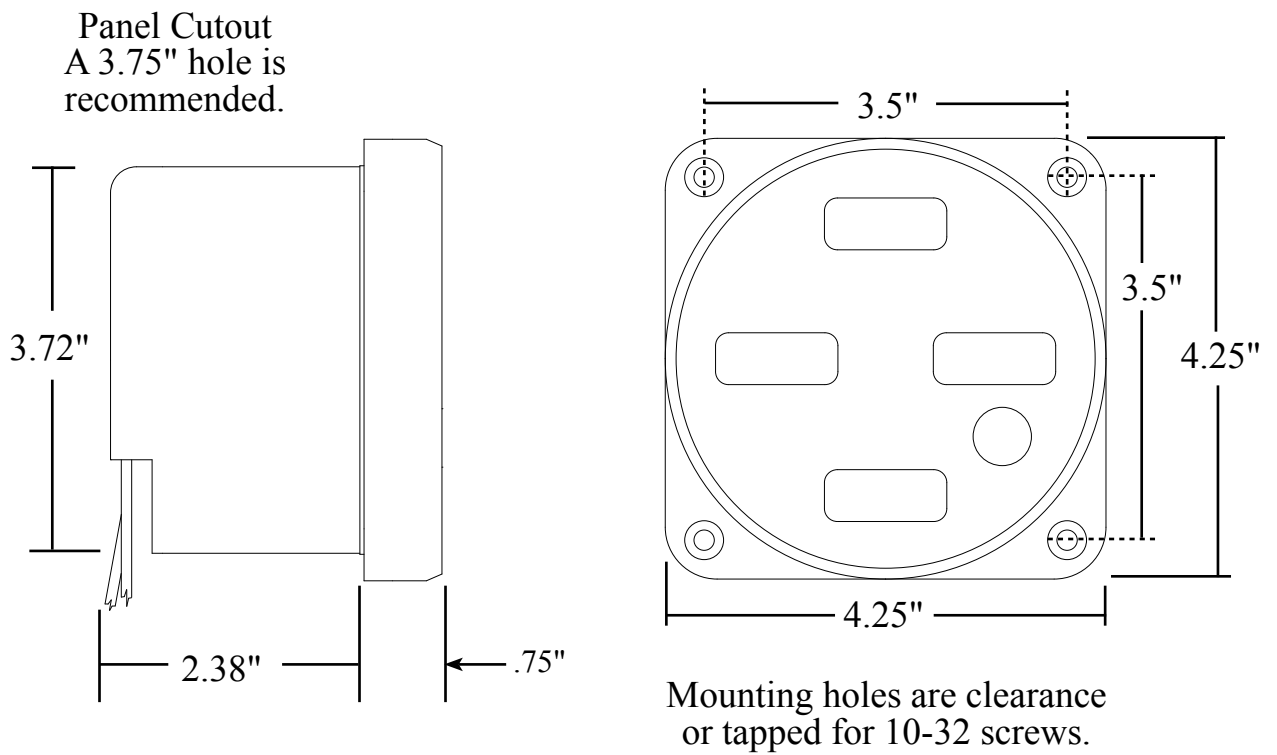


Figure 2. Display Module Mounting Dimensions

Install Current Sensor

Two current sensors are supplied. It is best to mount the sensors in the circuit breaker box. For each line that is to be monitored, run the wire from the generator through the current sensor to the input side of the circuit breaker. (Refer to Wiring Section.)

Install Voltage Transformer

The voltage transformer supplied will work for 120 or 240 volt AC systems. The transformer should be securely mounted inside the electrical box. (Refer to the Wiring Section.)

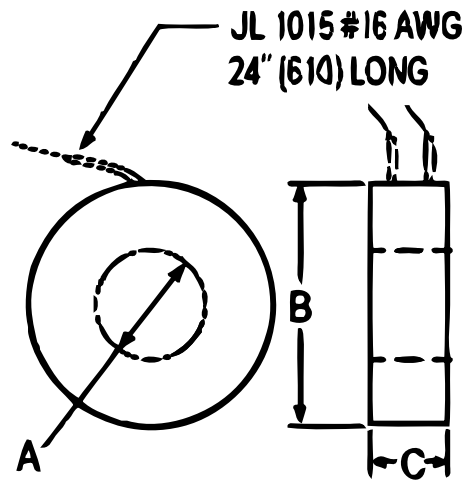
Install Optional Hydraulic Oil Temperature Sensor

The hydraulic oil temperature sensor has 1/8-27 NPT male threads. (Refer to the Wiring Section.)

Install Optional Buzzer

Install the buzzer close to the control module so the audible warning is easily associated with the visual warning on the display. The optional buzzer provided by FRC requires a cutout hole of 1-1/8" (1.125"). (Refer to the Wiring Section.)

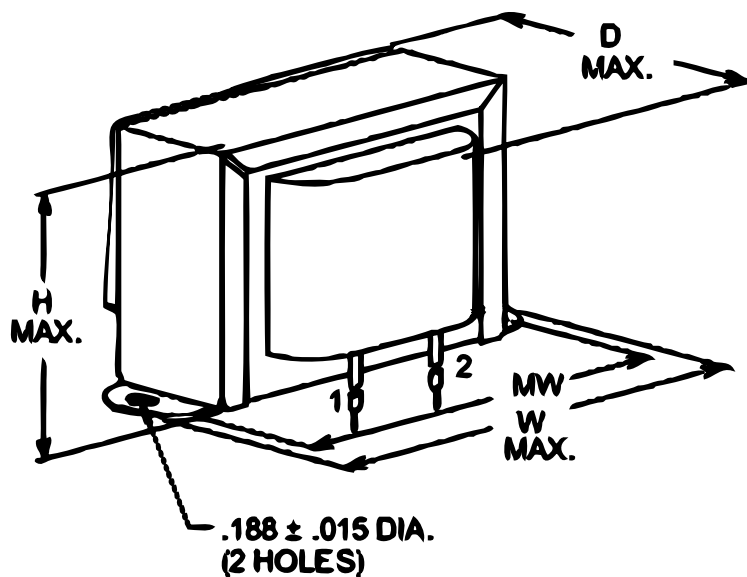
Current Sensor
 Ratio: 150 : 5



Dimensions
 A = 1.13"
 B = 2.46"
 C = 1.05"

Figure 3. Current Sensor

Voltage Transformer
 Input: 120/240 VAC
 Output: 12/24 VAC @ 0.2A



Dimensions
 D = 1 1/2"
 H = 1 3/8"
 W = 2 3/8"
 MW = 2"

Figure 4. Transformer

OPERATION

On power-up, the FROG-D shows the total generator operating hours.

MODE Button

During normal operations, the MODE button is used to display the accumulated hours and hydraulic oil temperature, if this option is installed.

Over Current Warning

When the generator is operating outside the range of its rated capacity, the LINE 1 or LINE 2 displays start to flash. An optional audible buzzer can be connected for an audible warning.

Voltage Out-Of-Range Warning

If the output voltage is below 200 VAC or above 270 VAC, the VOLTS readout begins to flash. This gives the operator an indication that the generator output falls outside the safe operating level. There is no audible alarm for the voltage out of range warning.

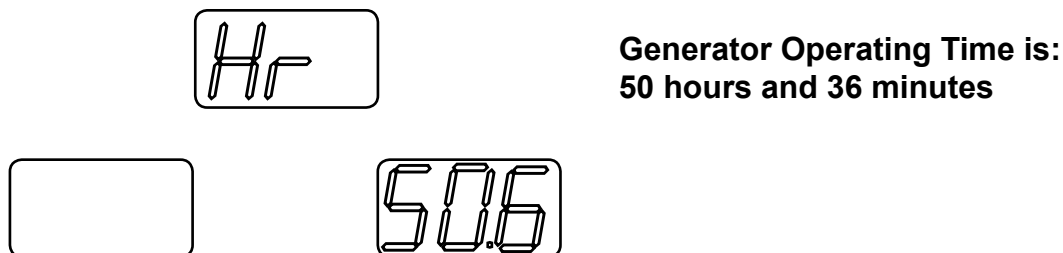
Hydraulic Oil Temperature Warning (Optional)

This warning is activated if the oil temperature rises above 180 °F. The frequency readout flashes OIL to warn the operator, and the optional audio alarm is activated.

OPERATION

Operations with the MODE Button

The mode switch allows the user to read the operational hours on the generator and the current hydraulic oil temperature. The first time the **MODE** button is pressed, the FROG-D displays the generator hours as follows:



Pressing the **MODE** button again switches the display to show the hydraulic oil temperature:



Pressing the **MODE** button again returns the display to the normal display mode.

CALIBRATION

Generator Rated Capacity Setting

Each FROG-D is set to operate at a customer specified generator rating. The over current warning will not work properly, if this is not set correctly. Check the label on the rear of the control module to ensure that it is set at the correct kilowatt rating for the generator.

If the kilowatt rating for the FROG-D is not correct, it needs to be changed.

Adjust Kilowatt Rating

There is a MODE button on the right hand side of the display module. There is also a hidden MENU button on the left hand side as shown, refer to Figure 5. Kilowatt Ratings. To change the kilowatt rating, follow the procedures below:

1. Press the MENU button twice, followed by the MODE button twice.
Result: The display shows the existing kilowatts setting.
2. Press the MENU button to step through the kilowatt ratings available. (Refer to Figure 5.)
3. Press and hold the MODE, and then the MENU button to accept the selection.
4. Release both buttons after the FROG- D has returned to the normal display.

Current and Voltage Readings

Set the generator at its rated operating condition. Turn on the load between 20% to 60% of the generator's rated load. Find out the reference current and voltage reading using a known calibrated meter, and follow the procedures below:

1. Press the MENU button three times, followed by the MODE button twice and the MENU button once.
Result: The display shows the voltage and current values with a digit flashing.
2. Press the MENU button to change the number, press the MODE button to move to the next digit. Step through and set each digit as necessary.
3. Press and hold the MODE, and then the MENU button, to accept the selection.
4. Release both buttons after the FROG- D has returned to the normal display.

Note: If only the voltage reading needs to be calibrated, skip the current calibration and proceed directly to the voltage calibration. It will not alter the current calibration if no load is turned on and the display reads 000 for both lines.

Temperature Warning

The default hydraulic oil temperature warning is set at 180°F at the factory. If the warning level needs to be adjusted because of a unique application, it can be done by following the procedures below:

1. Press the MENU button three times, followed by the MODE button three times.
Result: The display shows the warning setting with a digit flashing.
2. Press the MENU button to change the number, and press the MODE button to move to the next digit. Step through and set each digit as necessary.
3. Press and hold the MODE and then the MENU button to accept the selection.
4. Release both buttons after the FROG- D has returned to the normal display.

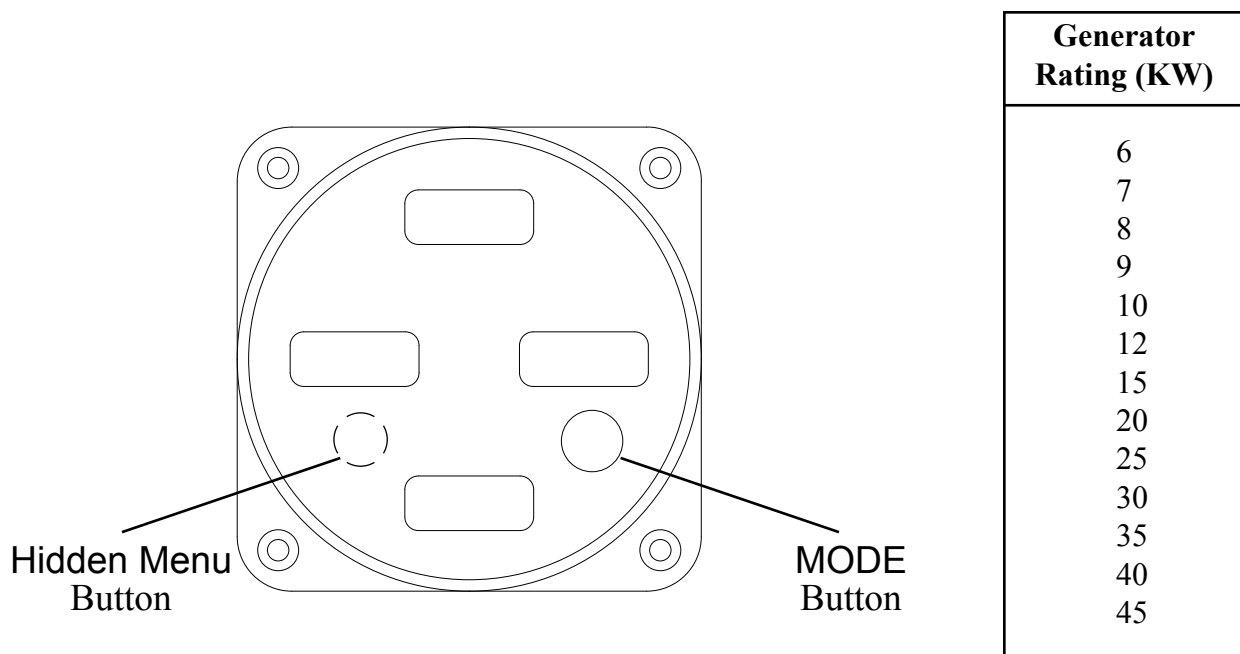
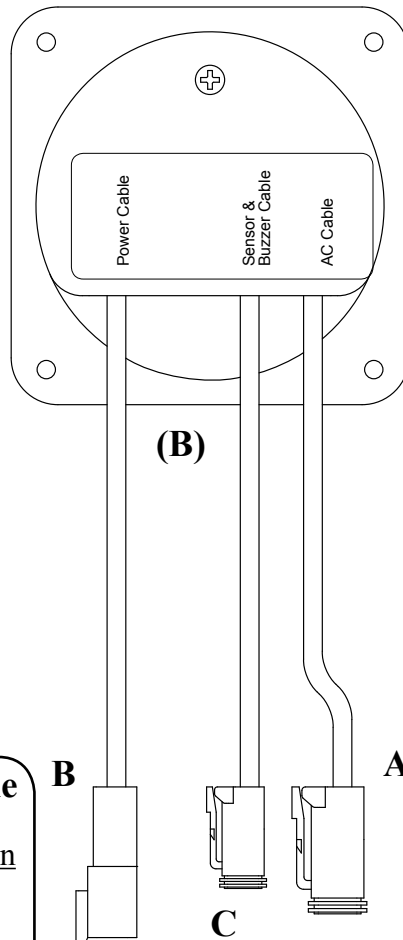


Figure 5. Kilowatt Ratings

WIRING

The following figures include the schematics, wiring diagrams, block diagrams, and cables for the FROG-D.



Connector Key
A 6-Pin Deutsch
B 3-Pin Deutsch
C 4-Pin Deutsch

Supply Power Cable Connector

Pin/Wire	Description
A/Red	+12 VDC
B/Black	Ground
C/White	N/A

AC Sensor Cable Connector

Pin/Wire	Description
1/Blue	Line 1 Sensor BLK
2/Orange	Line 2 Sensor WHT
3/Green	Line 1 Sensor WHT
4/Brown	Line 2 Sensor BLK
5/Black	AC Transformer BLU
6/Red	AC Transformer BLU

Sensor/Buzzer Cable Connector

Pin/Wire	Description
1/Red	+12 Volts Red
2/Black	Temp Sensor Black
3/White	Temp Sensor Green
4/Yellow	Buzzer GND

Current Sensors and Transformer
(See Sheet 2)

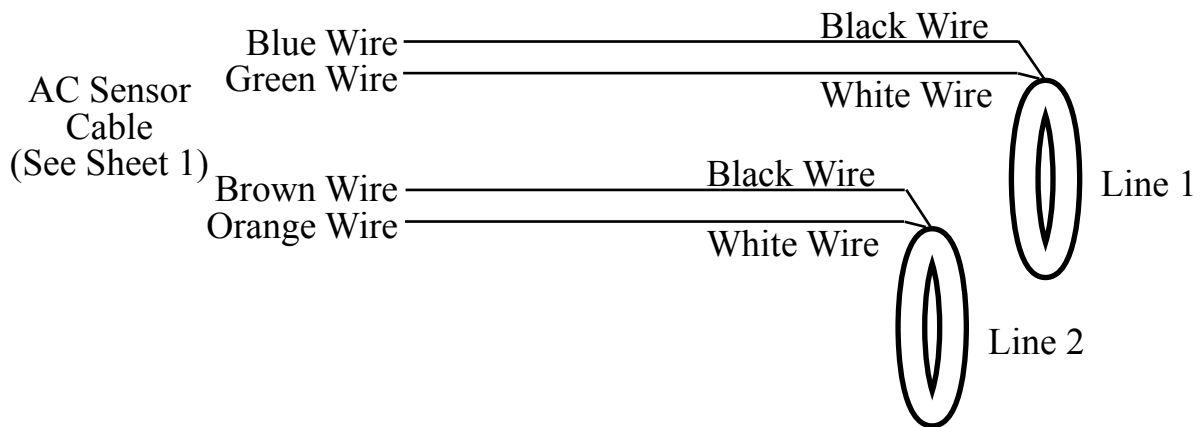
(Optional Cable)

J1939 Output Option Cable Connector

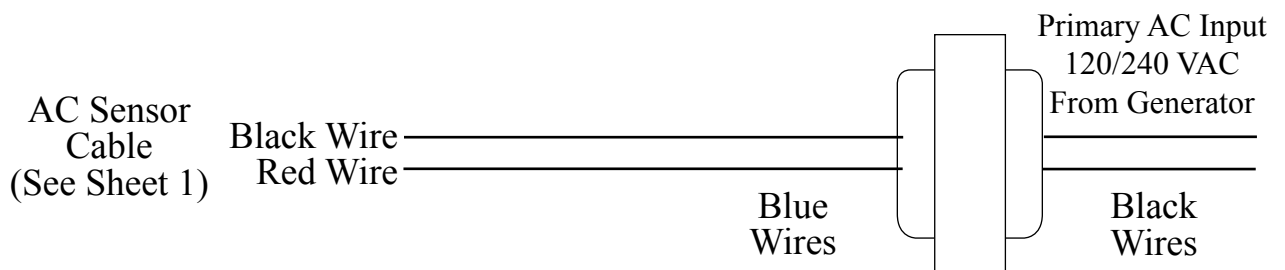
Pin/Wire	Description
A/Red	J1939 H
B/Black	J1939 L
C/White	Shield

**Figure 6. Wiring
(Sheet 1 of 2)**

Current Sensors



Transformer



**Figure 6. Wiring
(Sheet 2 of 2)**