

<b>WARNING: DEVIATION FROM THESE OPERATING INSTRUCTIONS MAY LEAD TO IMPROPER ENGINE/MACHINE OPERATION WHICH COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.</b>
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## **1.0 OVERVIEW**

- 1.1 This instruction applies to GTI Series III and Series IV kits applied to V-type engines generally in the output range above 600 kW. For help locating subjects in this document, a section index is provided - see page 16.
- 1.2 The control system consists of five main parts packaged in an industrial panel enclosure: Display Module DE-2510, Power Supply Module 691122-1, Terminal Module 691127-2, and Temperature Monitoring Module DSM-4388DUS or DSM-43820DUS. Interconnecting cable 693115-1 connects the Module DE-2510 to Module 691127-2.
- 1.3 The Altronic DE-2510 controller system is a dedicated electronic microprocessor-based system designed to sense specific analog and digital input points to control and monitor the GTI Bi-Fuel natural gas fumigation system for diesel engines. The system is configurable for various applications using a PC (personal computer) and the supplied DE-2510 terminal program and contains a non-volatile memory to store the setup. Serial communications provide an interface to PC's, PLC's, modems and satellite uplinks for remote communication if desired. A backlit 4x20 LCD character display shows system status, programmed controller parameters and channel labels. A front mounted keypad serves as the user interface. The DE-2510 provides for the natural gas fueling off/on control function and for an optional closed loop automatic control function to optimize the amount of natural gas substitution of diesel fuel under varying modes of operation. Additionally, the DE-2510 provides for remote data acquisition and supervisory control in a compact, low cost package dedicated to natural gas fuel substitution on industrial diesel engine applications.

## **2.0 DE-2510 DISPLAY MODULE**

- 2.1 The Display Module serves as the user interface for the DE-2510 system. Packaged in a 6.5" x 6.5" panel mounted enclosure, it consists of an alphanumeric 20-character x 4-line backlit LCD display, a 16-key front-mounted keypad, DB-25 D-Sub and DB-9 D-Sub connectors and three pairs of serial port indicators.
- 2.2 The keypad is a sealed membrane unit that contains the familiar STOP, RESET keys as well as other keys used to navigate through channel status and description, view screens, and to edit the setpoints.

<b>WARNING: THE CONTROLLER SYSTEM MUST BE CONFIGURED PRIOR TO USE. REFERENCE SECTION 12.0 PROGRAMMING INSTRUCTIONS, FOR INSTRUCTIONS DESCRIBING HOW TO CONFIGURE THE CONTROLLER FOR THE SPECIFIC APPLICATION. VERIFY THE PROGRAM IN NONVOLATILE MEMORY (THE EEPROM) PRIOR TO STARTING THE SYSTEM.</b>
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- 2.3 The LCD has a “home screen” that displays a status line, BI-FUEL OFF or ON, the optional engine governor actuator position (ACT) 0-100%, the gas supply pressure (GSP) and manifold air pressure (MAP1). Pressing the VIEW CHANNEL key displays the channel number, its timer status, analog value (if applicable) and the user label.
- 2.4 The keypad, along with the LCD display, are used to navigate through channel status and descriptions, view screens, and to view or edit the system's configuration. The ↑UNITS or ↓UNITS or the →TENS or ←TENS keys are used to access channels by increasing or decreasing the channel numbers by one or by ten with each key press. Pressing the NEXT key advances the display to the next screen or item. All menu adjustments are saved in non-volatile EEPROM memory by pressing the ENTER key. The EEPROM memory retains the current configuration during normal operation, after engine shutdown and a system power-down.
- 2.5 Three pairs of LED's are provided on the back of the Display Module for troubleshooting purposes, one Receive (RX) and one Transmit (TX) LED for each port. The TX LED will flash when the Display Module is transmitting serial communications on the labeled port. The RX LED will flash when the Display Module is receiving serial communications on the labeled port.

### **3.0 POWER SUPPLY AND TERMINAL MODULES**

- 3.1 The Power Supply Module is rail mounted and is the interface between the Terminal and Display Modules and to other systems. It plugs directly into the Terminal Module using the DB-25 connectors and is held together with screws and screw locks.
- 3.2 The Power Supply Module uses three industry standard, commercially available 0.6 inch plug-in Output Modules. The Output Modules provide a means of using the DE-2510 controller system status to operate the fuel solenoid valve. The Output Modules are optically isolated solid-state switches which are isolated from power supply minus and engine ground. The Output Modules will be in the open (de-energized) condition when the unit is unpowered. Each of these outputs are fused with a replaceable 6.3 amp slow-blow fuse, Altronic P/N 601653. If 12-24 Vdc is lost to the DE-2510 system, the Output Modules will go to an open state. Output modules 1 and 2 function as normally closed contacts to permit the Bi-Fuel solenoid valve to turn on. Therefore the LED's will be ON in the normal Bi-Fuel ON condition and OFF for a Bi-Fuel OFF or fault condition. Output 3 functions as a driver for the FAULT LED on the front of the panel and will normally be off.
- 3.3 The 12-24 Vdc power for the DE-2510 system is applied to the power supply terminals marked (+) and (–) 12-24 VDC INPUT POWER. A 6.3 amp replaceable slow-blow fuse protects the system from over currents, and a power LED lights when power is applied to the system.
- 3.4 The Terminal Module is rail mounted and is the point of interface between the field sensor wiring terminal strip and the DE-2510 control system. A removable dual terminal strip is used for the connection of the system. The equipment mounted discrete sensors may consist of up to 16 normally open or normally closed switches as well as 14 analog transducers. The 16 discrete sensor inputs are numbered in typical annunciator format as 10-17, 20-27. The 14 analog inputs are numbered 30-37 and 40-45.

#### **4.0 MOUNTING THE PANEL**

- 4.1 Mount the control panel to a post or to a suitable flat surface so that the display is at a convenient viewing height. NOTE: Avoid mounting the unit with the LCD display facing direct sunlight. The display operating temperature range is -31°F to +176°F (-35°C to +80°C). The panel should be mounted within 30 feet of the engine, the fuel solenoid valve and fuel pressure regulator.

#### **5.0 WIRING (SEE WIRING DIAGRAMS)**

- 5.1 SYSTEM COMPONENT WIRING - Up to four individual wiring harnesses are provided in the system kits. Each wiring harness or "bundle" is made up of functionally grouped connections to sensors or actuators which would normally be located in the same general area. Each bundle is marked as "Left Bank Harness", "Right Bank Harness", "Fuel Harness", or "Power Harness". The wiring is protected by a flexible plastic tubing and is approximately 30 feet long. Each wiring bundle is provided with a bulkhead fitting installed. Mount the bulkhead fittings into the holes provided in the bottom of the panel. When routing the wiring, it is essential that the following practices be adhered to:

1. Never run sensor wires in the same conduit with high energy wiring such as the AC line power.
2. Keep high voltage wiring at least eight inches (200mm) away from sensor and sensor wiring.
3. If it becomes necessary to check sensor to panel wiring with an ohmmeter or other checker, first DISCONNECT the plug-in terminal strips from the Terminal Module. Applying voltage to the DE-2510 system through the sensor leads may damage the device.

#### **5.2 LEFT BANK HARNESS WIRING**

- A. Mount the pressure sensors provided in the accessory kit to the engine in a manifold or tube from the engine. Mount these on the left bank of a V-type engine. Depending upon the specific application there may be unused wires in the bundle. Plug in the mating connectors, VAC1 is the air cleaner vacuum and MAPX is the appropriate MANIFOLD AIR PRESSURE. NOTE: Do not expose the pressure transducer to temperatures above 221°F. (105°C).
- B. Mount the thermocouples to the engine routing the thermocouple wires as required. To accommodate the differences in location of the sensors, remove the individual wires from the plastic tubing as required and tape the tubing closed after proper length to reach the sensor location is known. MAT1 is the MANIFOLD AIR TEMPERATURE and EGT1 is the EXHAUST GAS TEMPERATURE.
- C. If the optional vibration sensor is used, mount as indicated and connect to the wires marked VIB+ (+24vdc) and VIB1L (signal to panel). VIB2L is used for the second transmitter on the same bank.
- D. At the panel end adjust the length of the bundle if required and mount the bulkhead fitting thru the far left hole viewing the panel from the front. Terminate the wires to the customer connection terminal strip. Each wire is marked with the same identifier as the terminal strip; connect these to match.

### 5.3 RIGHT BANK HARNESS WIRING

- A. Mount the pressure sensors provided in the accessory kit to the engine in a manifold or tube from the engine. Mount these on the right bank of a V-type engine. Depending upon the specific application there may be unused wires in the bundle. Plug in the mating connectors, VAC2 is the air cleaner vacuum and MAPX is the appropriate MANIFOLD AIR PRESSURE. NOTE: Do not expose the pressure transducer to temperatures above 221°F. (105°C).
- B. Mount the thermocouples to the engine routing the thermocouple wires as required. To accommodate the differences in location of the sensors remove the individual wires from the plastic tubing as required and tape the tubing closed to hold wires after proper length to reach the sensor location is known. MAT2 is the MANIFOLD AIR TEMPERATURE and EGT2 is the EXHAUST GAS TEMPERATURE.
- C. If the optional vibration sensor is used, mount as indicated and connect to the wires marked VIB+ (+24vdc) and VIB1R (signal to panel). VIB2R is used for the second transmitter on the same bank.
- D. At the panel end adjust the length of the bundle if required and mount the bulkhead fitting through the second from the left hole, viewing the panel from the front. Terminate the wires to the customer connection terminal strip (Item 17). Each wire is marked with the same identifier as the terminal strip; connect these to match.

### 5.4 FUEL HARNESS WIRING - The FUEL HARNESS contains the wiring to the fuel supply and pressure regulator and is not to be routed to the engine.

- A. After mounting the FUEL GAS SOLENOID VALVE, connect the SOL+ and SOL- wires to the solenoid coil.
- B. Connect the ROP wires to the REGULATOR OUTPUT PRESSURE switch terminals. Do not connect the shield wire, it is terminated at the panel end only.
- C. Mount the GAS SUPPLY pressure transducer GSP and plug in the connector.
- D. At the panel end adjust the length of the bundle if required and mount the bulkhead fitting through the third from the left hole viewing the panel from the front. Terminate the wires to the customer connection terminal strip. Each wire is marked with the same identifier as the terminal strip; connect these to match.

### 5.5 POWER HARNESS WIRING - The POWER HARNESS contains the power wiring for the panel.

- A. Connect the supply power wires to the 12-24 Vdc input power terminals on the power supply, plus to terminal (+) and minus to terminal (-); power requirement is 12 to 24 Vdc (10 watts max.). The DC- terminal will be connected to the panel ground which must be the same as engine chassis ground. NOTE: This is the return path for normally open sensors and must be connected to the engine block or chassis ground for proper operation.
- B. At the panel end adjust the length of the bundle if required and mount the bulkhead fitting through the far right hole viewing the panel from the front. Terminate the wires to the customer connection terminal strip. Each wire is marked with the same identifier as the terminal strip; connect these to match.

## **6.0 KEYPAD DESCRIPTION**

- 6.1 The DE-2510 controller Display Module contains a 16-key sealed membrane keypad which is used to adjust, stop and reset the system.
- 6.2 STOP - The STOP key is used for a manual stop condition. By pressing the STOP key, the controller activates the configured output modules in the power supply.
- 6.3 RESET - The RESET key clears all past faulted points and resets all input and output timers to their preset values. This key has no effect when unit is not faulted.
- 6.4 CANCEL TIMERS - The CANCEL TIMERS key cancels all timers.
- 6.5 VIEW CHAN - The VIEW CHANNELS key allows the user to view the status of any input channel and its user defined label.
- 6.6 NEXT - The NEXT key allows the user to view the DYNAMIC FLOW CONTROL screen from the home screen. From the MENU screens, the next value to be edited will appear.
- 6.7 ENTER - The ENTER key is used to accept a selection and to save a new value in memory.
- 6.8 ESC - The ESCAPE key enables the user to exit any view channels, information or menu screens at any time and return to the previous screen without changing programmed values.
- 6.9 MENU - The menu key allows the user to enter the edit menu. Control setpoints may be viewed and adjusted using the MENU key.
- 6.10 UNITS/TENS - ↑UNITS/↓UNITS keys increase or decrease values by one. The →TENS/←TENS keys increase or decrease values by ten. These keys are used to increase or decrease channel numbers, timers and to move the pointer in the menu screen.
- 6.11 F1 - Function key F1 displays the hourmeter. From control screen switches between auto and manual modes.
- 6.12 F2 - Function key F2 displays the time and date of the first fault.
- 6.13 F1 and F2 keys can be used in conjunction with other keys to implement custom functions.

## **7.0 UNDERSTANDING THE HOME SCREENS**

- 7.1 The "home screens" are described as a series of screens used to display several of the most critical operating parameters on one screen. All of the home screens provide a status word on the upper line.

The status line will read one of the following: BI-FUEL ON, BI-FUEL OFF, BI-FUEL INHIB, TIMERS ACTIVE, CHECKING INPUTS, FAULT AL1, MANUAL STOP.

The LCD display always reverts back to one of the home screens after a keypad operation is completed or the operation times out.

- 7.2 To activate the Bi-Fuel system, turn on the power; the unit automatically resets. If no system faults are detected during the CHECKING INPUTS scan, the home screen will display the TIMERS ACTIVE message until the programmed fuel delay timer expires. After the time delay is completed, the home screen will display either the BI-FUEL ON or BI-FUEL OFF status according to the current conditions and the programmed control values. The RESETTING message will be displayed momentarily followed by TIMERS ACTIVE, and the home screen will then re-appear.

RESETTING

Appears immediately after power-up or a user RESET command for about 1 second

CHECKING INPUTS

ACT 42.3 %  
GSP 9.0 PSIG  
MAP1 12.0 PSIG

Appears after RESET as unit scans inputs for pre-existing fault conditions

STATUS TIMERS ACTIVE

ACT 42.3 %  
GSP 9.0 PSIG  
MAP1 12.0 PSIG

Appears after RESET when no faults are detected and the programmed BI-Fuel delay timer is active

STATUS BI-FUEL ON

ACT 42.3 %  
GSP 9.0 PSIG  
MAP1 12.0 PSIG

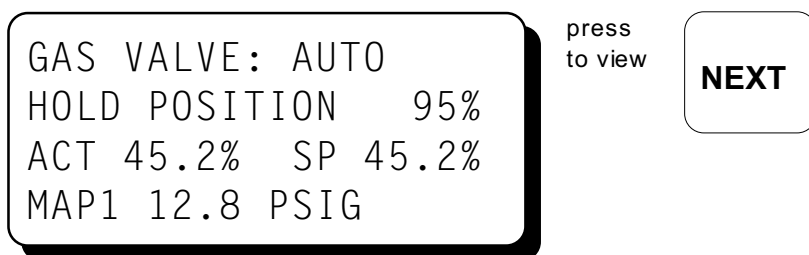
Appears when all timers are expired, all faults are clear and all control settings are permitting the Bi-Fuel gas valve to be ON.

STATUS BI-FUEL OFF

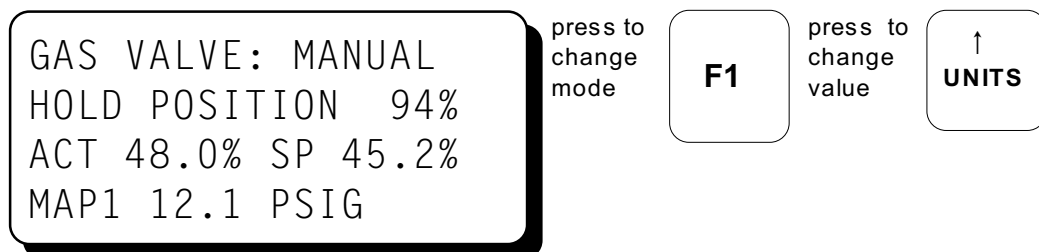
ACT 42.3 %  
GSP 9.0 PSIG  
MAP1 12.0 PSIG

Appears when all timers are expired, all faults are clear and one or more control setting is keeping Bi-Fuel gas valve in the OFF position until conditions change

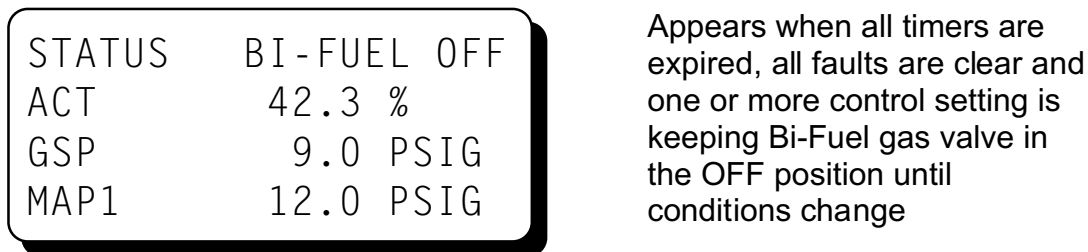
- 7.3 From the BI-FUEL ON home screen, the optional DYNAMIC FLOW CONTROL home screen is accessed by pressing the NEXT key once. DYNAMIC FLOW CONTROL adds the ability to change the amount of natural gas substitution on the basis of the engine manifold pressure in order to optimize the diesel fuel usage reduction. Standard Bi-Fuel control typically is modulated in a fixed manner by the gas mixing valve on the basis of air flow into the engine. The DYNAMIC FLOW CONTROL adds the ability to adjust the flow of natural gas to achieve a target diesel fuel governor actuator position (ACT) on the basis of the current engine manifold pressure. The engine manifold pressure MAP1 is used as an indicator of engine load. In order to control the Bi-Fuel substitution rate in a closed loop manner, a fuel pressure modulation valve is added between the fuel pressure regulator and the mixer. The percentage that this valve is OPEN is controlled by the DE-2510 output. This home screen will display the current controller mode AUTO or MANUAL and status of the controller function including hold position, increase gas and decrease gas. Additionally, Bi-Fuel inhibit conditions caused by secondary control inputs overriding the primary controller output are also displayed.



To disable the optional automatic control and force the controller output to a particular value press the F1 key. The display will indicate that the unit is in MANUAL and the current value of the output. Use the UNITS arrow keys to change the value.



- 7.4 The DE-2510 controller continuously monitors the system for two different levels of setpoints. The first group are called control setpoints and when violated cause the Bi-Fuel function to be temporarily suspended (engine reverts to 100% diesel operation) until conditions change. The violation of these setpoints may occur readily in normal operation of the engine and the system does not require any USER intervention to begin re-supplying natural gas when these clear.



```
STATUS BI-FUEL INHIB.  
ACT          42.3 %  
GSP          9.0 PSIG  
MAP1         12.0 PSIG
```

Appears when channel 27 has been actuated.

This occurs by grounding the input for Normally Open systems or by opening up the jumper connection on Normally Closed systems. This input prevents OPTO output #2 from turning on, which prevents Bi-Fuel operation. Bi-Fuel operation may begin after the input is no longer actuated.

- 7.5 The second level of monitored setpoints are the safety shutdowns. When any of these setpoints are violated even momentarily, the Bi-Fuel will stop supplying natural gas (engine reverts to 100% diesel operation) and will NOT begin re-supplying gas, until a USER initiated RESET is received. When one of the safety shutdown setpoints has been violated, the gas solenoid valve is closed, and the "FAULT" message for the first faulted channel will appear on the display and will remain until it is acknowledged by a RESET. The number 1, after "AL" (alarm), shows the output switch that is faulted. If all of the faulted sensors have been cleared and the RESET key is pressed, the class B and output timers will reset and the display will repeat the sequence of section 7.2.

```
STATUS  FAULT AL1  
1ST FAULT  
CHAN 12  
ROP REG. OUT. PRESS.
```

returns to  
home  
screen

**ESC**

```
STATUS  FAULT AL1  
ACT          42.3 %  
GSP          9.0 PSIG  
MAP1         12.0 PSIG
```

press to  
return to  
1st fault  
screen

**VIEW  
CHAN**

to clear faults,  
reset timers &  
outputs

**RESET**

When a fault occurs on an analog channel 30-47, a "HIGH" or "LOW" indication will additionally be displayed as to whether the point faulted on a high or low setpoint.

```
STATUS  FAULT AL1  
1st FAULT HIGH  
CHAN 35  18 PSIG  
MAP2 ENG MAN PRESS 2
```

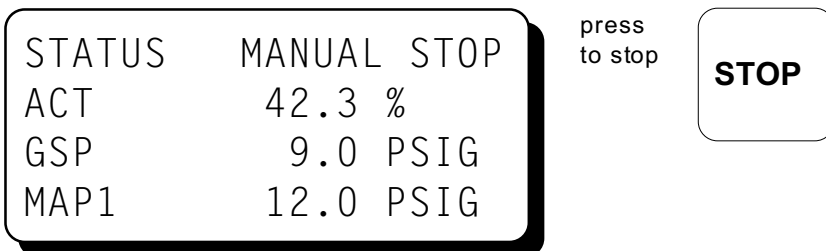
A high setpoint faulted on an analog input. The current analog value and "HIGH" are displayed.



The DE-2510 controller system “stamps” the time and date occurrence of the first fault. To view the time and date of the first fault, press the F2 key after a fault occurs but before reset is initiated. The time and date of the first fault will be displayed. If no key is pressed for 10 seconds, the display will revert back to the first fault screen.



- 7.6 The “MANUAL STOP” message will supersede all of the above home screens if the STOP key is pressed. The fuel solenoid valve will close and remain closed until RESET.



NOTE: The stop function can also be implemented remotely by using the external STOP input available on the Terminal Module. The behavior of the controller and display will be identical to that obtained by pressing the local STOP key on the Display Module.

## **8.0 VIEW CHANNEL STATUS SCREENS**

- 8.1 Use the VIEW CHAN key to enter the view channels screens. Once in the VIEW CHAN mode, the user can view any channel’s details. Upon pressing the view channel key, channel 1 will be shown. The UNITS and TENS keys allow the user to quickly navigate through the controller channels. Use the ↑ UNITS or ↓ UNITS keys to increase or decrease the viewed channel by one. Use the → TENS or ← TENS keys to increase or decrease the viewed channel by ten. To exit the VIEW CHAN mode, press the ESC key. After five minutes with no keypad activity, the display will revert back to the current home screen.

## **9.0 VIEWING OR EDITING THE SETPOINT VALUES USING THE MENU MODE**

- 9.1 The menu screens can be accessed from any home screen by pressing the MENU key. The menu screens allow the user to view or edit values, and the time and date. The controller must be initially configured using the terminal program running on a PC connected to the RS-232 port on the back of the controller. Reference the programming instructions section 12.0 for details on how to configure the controller system for a specific application. The menu screens are intended to view or edit the already programmed values in the field. Changes made in the menu are stored in permanent memory and remain fixed until changed again.

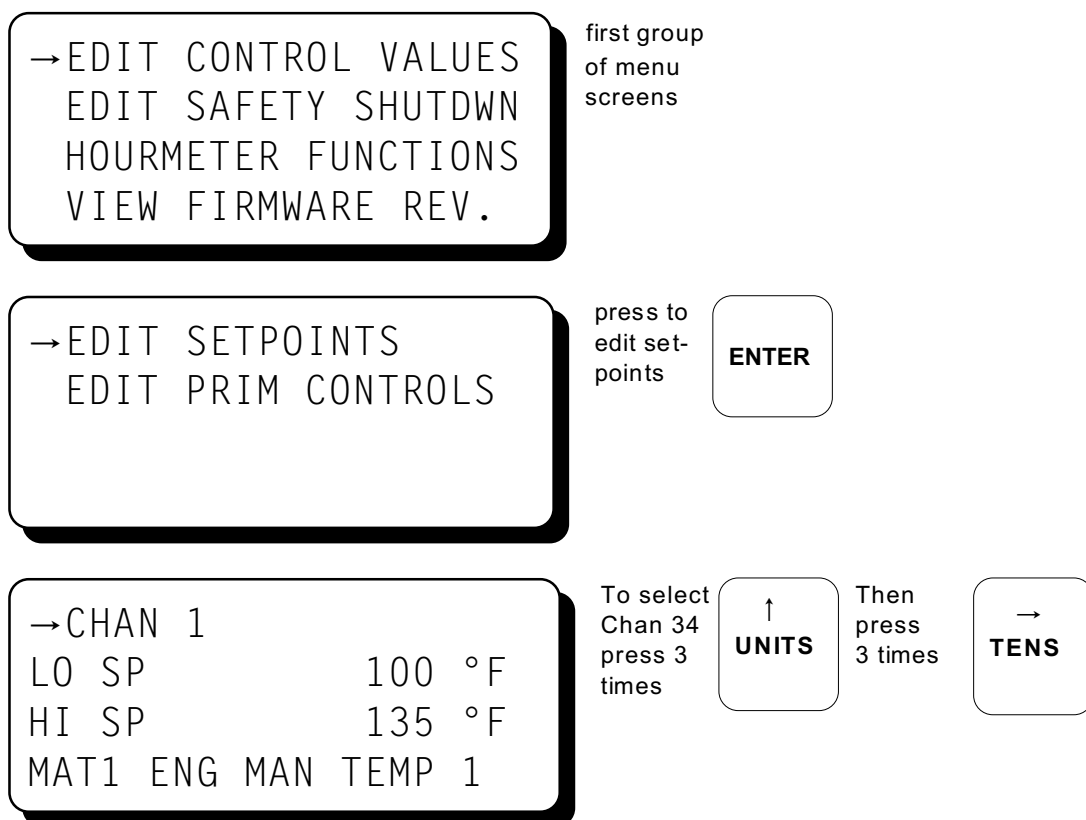
- 9.2 To view the controller configuration, from the home screen press the MENU key. Use the NEXT key to select the group to be viewed and press ENTER. To edit the controller configuration, the controller system requires a password key sequence.

The password procedure is: Press the MENU key. Then press the F2 key followed by the F1 key. Upon pressing this sequence, changes can be made to the configuration.

- 9.3 The menu screens have two levels. The first level lists the headings of the items to be viewed or edited. Upon selecting one of the headings, the second level is displayed. Press the MENU key to enter the first level of the menu screens. The arrow points to the first selection to be viewed or edited. Three keys can be used to navigate the first level of menu selections: NEXT or ↑UNITS or ↓UNITS keys. The NEXT key will move the arrow down one selection. The ↑UNITS or ↓UNITS keys will move the selector arrow up or down one selection. Once the arrow is pointing to the selection group to be edited, press the ENTER key. The display will advance to the second level to view or allow changes to the values.

**NOTE: TO EDIT ANY VALUE, THE PASSWORD COMBINATION MUST BE ENTERED FROM FIRST LEVEL MENU. PRESS THE F2 KEY FOLLOWED BY THE F1 KEY. UPON PRESSING THIS SEQUENCE, CHANGES CAN BE MADE TO THE CONFIGURATION.**

- 9.4 To edit the setpoint values, point to “EDIT CONTROL VALUES” and press the ENTER key. The edit control values menu is shown. The arrow points to the “EDIT SETPOINTS”. The example shows how to change the LO setpoint of Chan 34. Use arrow keys as shown to select desired channels. Use ENTER key as shown to select LO or HI setpoint.



```

→CHAN 34
LO SP      2.0 PSIG
HI SP      15.0 PSIG
MAP1 ENG MAN PRESS 1

```

press to  
edit LO  
setpoint

**ENTER**

```

CHAN 34
LO SP      → 2.0 PSIG
HI SP      15.0 PSIG
MAP1 ENG MAN PRESS 1

```

press to  
change  
LO value

↑  
**UNITS**

accept  
and go to  
HI value

**ENTER**

- 9.5 To edit Primary Controls select “EDIT CONTROL VALUES” from main menu and press the ENTER key. The edit control values menu is shown. The arrow points to the “EDIT PRIM. CONTROLS”.

```

EDIT SETPOINTS
→EDIT PRIM CONTROL

```

press to  
edit prim.  
controls

**ENTER**

```

CYCLE TIME → 2 s
PROP. BAND 40 %
DEAD BAND 0.5 %

```

press to  
change  
value

↑  
**UNITS**

press to  
accept or  
go to next  
value

**ENTER**

- 9.6 To view or edit safety shutdown values, choose “EDIT SAFETY SHUTDOWN” from the main menu. To edit or view setpoints, choose “EDIT SETPOINTS”.

```

EDIT CONTROL VALUES
→EDIT SAFETY SHUTDWN
HOURMETER FUNCTIONS
VIEW FIRMWARE REV.

```

first group  
of menu  
screens

press to  
go to next  
menu

**ENTER**

→ EDIT SETPOINTS  
VIEW INPUT CLASS  
EDIT GLOBAL VALUES  
MORE MENUS

second group  
of menu  
screens

press to  
go to next  
screen

ENTER

CHAN →1  
LO SP                   0 °F  
HI SP                   140 °F  
MAT1 ENG MAN TEMP1

press to  
go to LO  
setpoint

ENTER

9.7 To view or edit the time and date, select “EDIT SAFETY SHUTDOWN” from the main menu. Select “MORE MENUS” from the following menu. Finally, select “EDIT TIME AND DATE” from the last menu.

→ EDIT TIME AND DATE  
COMMUNICATIONS  
TO PREVIOUS MENU

press

ENTER

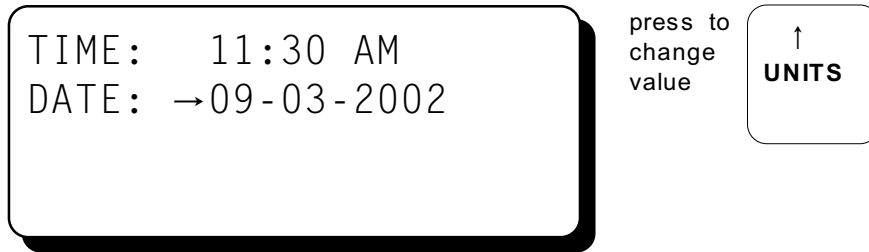
The time and date will be displayed with the selection arrow pointing to the time. The hours and minutes can be edited separately, AM and PM follow the hours. With the selection arrow pointing to the hours, use the ↑UNITS or ↓UNITS keys to increase or decrease the hours. Press ENTER to save the new hour setting; the selection arrow will point to the minutes. Use the same procedure to edit the minutes. Use the NEXT key to move through the time and date screen without making a permanent change in memory.

TIME: → 11:30 AM  
DATE:    09-03-2002

press to  
change  
value

↑  
UNITS

The date is shown as month-day-year. The month, day and year can be edited separately. With the selection arrow pointing to the month, use the ↑UNITS or ↓UNITS keys to increase or decrease the month. Press ENTER to save the new month setting; the selection arrow will point to the day. Use the same procedure to edit the day and the year.



- 9.8 To view the Hourmeter message, select "HOURMETER FUNCTIONS" from the main menu and press ENTER.



## **10.0 CONTRAST RATIO ADJUSTMENT**

- 10.1 The LCD contrast ratio is adjusted for optimum contrast over a large temperature range at the factory. It may be necessary however to make slight adjustments to the LCD contrast ratio because of aging and or extreme temperature changes. The contrast ratio potentiometer (TP1) is located on the back of the Display Module as shown in the drawings section. Use an adjusting tool and turn the potentiometer clockwise to lighten the contrast ratio or counterclockwise to darken the contrast ratio.

To set the potentiometer back to the factory setting: with the Display Module at an ambient temperature of approximately 65°F to 77°F (18°C to 25°C), turn the potentiometer clockwise until the display contrast ratio is almost too light to read. Turn the potentiometer counterclockwise 3 to 3-1/2 turns. The display should then be at a desirable contrast ratio.

## **11.0 DATA LOGGING AND COMMUNICATION OPTIONS**

- 11.1 The DE-2510 controller system contains a data logging feature. Data logging collects information from the system and keeps track of, or logs, that information over a period of time. That data is then available through a PC or PLC at port 1, the RS-232 port or port 3, the RS-485 port.
- 11.2 **NODE NUMBER** - The node number is the address of the controller being contacted. This number is programmed by the terminal program and can be viewed or edited in the menu screen. A two digit number from 01 to 99 can be used.

- 11.3 COMMUNICATIONS PARAMETERS - The following must be set in the PC or PLC to communicate with the controller system:

Baud Rate: 9600  
Data Bits: 8  
Stop Bits: 1  
Parity: None

- 11.4 The data logging memory can retain a total of 100 records before writing over the oldest information. The most current data is always record number one; the next most current is number two, etc. The oldest information, record 100, is lost when a new record is written. The logging period is the time between data logs and can be set from 5 minutes to 999 minutes. The logging period must be set in the terminal program. For example, if the logging period is set for 60 minutes and there are 100 records, it would take 100 hours or 4.16 days before any logged data was overwritten.

A new record is also written when a first fault occurs. If the first fault occurs between the logging period, the first fault record will be record number one and the next scheduled record will be number two.

- 11.5 Refer to files on the DE-2510 CD-ROM for more information on serial communication specifications. This document contains in depth information on MODBUS, ASCII, ROI (Remote Operator Interface), data logging, and dial in/out features.

## **12.0 PROGRAMMING THE DE-2510**

- 12.1 The DE-2510 terminal program operates from a standard PC and permits the operator to configure the system. There is a monitor mode that the operator can use to monitor an existing installation and access system data. This data can be accessed locally or remotely via a modem.

The following user-supplied hardware is required:

Computer: IBM-compatible PC, Windows 95/98/ME, hard drive (10 MB of free disk space required), CD-ROM drive, SVGA graphics (800X600 or greater preferred) with color monitor.

Serial Port - RS-232 port for programming.

Modem - 9600 baud (or greater) modem required for monitor function.

- 12.2 The terminal program installs from a CD-ROM drive. A minimum of 10MB of free disk space is required. Additional disk space will be required if the remote data log database function is used. The space required will be dependent on the size of the working database.

Insert the CD-ROM disk into the CD-ROM drive and run the setup.exe file. If you have the autorun selection enabled on your CD-ROM drive, the install program will run automatically. The install program will prompt you for a destination folder where the program will be installed. The default folder is **C:\program files\de-2510\**. After the install completes, you can run the program from the Windows Start button, Programs Menu, Altronic DE-2510 system, and select the DE-2510 menu selection.

- 12.3 CONFIGURE KEY - The DE-2510 needs to be initially programmed using the DE-2510 Terminal program. Select the given file for download which best fits the intended application.

- 12.4 MONITOR KEY - This feature allows the user to retrieve data logged messages which is typically used for PC monitoring or SCADA/PLC systems. The connections can use either a modem or connected directly into the comm. Port. Data logs may be retrieved into a standard EXCEL file format.

The following keys are applicable during the monitor function:

CONNECT KEY - This feature selects how the PC is going to connect to the DE-2510. Select either a comm port or a telephone number for a modem.

HANGUP KEY - This disconnects the PC from the port or the modem.

DATALOGS KEY - This feature allows for retrieval of data logged messages in the PC. Data logs may be retrieved into a standard EXCEL file format.

AUTO START KEY - This feature allows for serial communications to STOP Bi-Fuel operation or RESET Bi-Fuel operation.

VIEW DATABASE / CHART DATABASE KEY - These powerful tools allow users to display and chart the data logged information.

- 12.5 CALIBRATE KEY - This allows the user to calibrate analog sensor channels.

- 12.6 EXIT KEY - Exits the DE-2510 PC Terminal program.

### **13.0 DSM OPERATION**

- 13.1 The Altronic DSM-4388DUS series and DSM-43820DUS series digital setpoint monitors are microprocessor-based instruments designed to monitor temperatures. The LCD display indicates both the channel number and the monitored temperature. The front panel sealed membrane keypad provides easy selection and adjustment of the units, setpoints, and other configuration data. High and low setpoints can be set from the front of the device using the keypad and the display. Any fault trips a form C, solid-state output switch; fault information by sequence of occurrence is available on the display and via the serial port. In the GTI 2000 or 3000 series panels, the integral RS-485 port communicates the monitored values to the DE-2510 controller for display and adjustment.

- 13.2 DSM-4388DUS - The DSM-4388 accepts eight (8) type J or K thermocouple inputs, user-programmable for readout in degrees C or F. In the GTI 2000 series panels, the DSM is used to monitor manifold temperatures and exhaust temperatures. Refer to form DSM4388 II for more information on this device.

- 13.3 DSM-43820DUS (3000 SERIES PANEL) - Designed to be a diesel engine exhaust system temperature scanner, the DSM-43820 accepts twenty (20) J or K thermocouple inputs, user-programmable for readout in degrees C or F. The points are organized into three groups: channels 1-16 for engine cylinders with High-1, High-2, and Deviation setpoints; channels 17-20 are reserved for manifold temperature and exhaust temperature in the GTI 3000 series panel. Refer to form DSM43820 II for more information on this device.

In the 3000 series panel, the DSM-43820 output 1 is connected to discrete input channel 11 on the DE-2510 terminal module. Any fault condition detected by the temperature scanner will cause the system to revert to 100% diesel operation. Output 2 of the DSM-43820DUS can be connected by the user if desired to cause shutdown of the engine regardless of whether it is operating in Bi-Fuel or full diesel mode.

**INDEX BY SECTION:**

- 1.0 OVERVIEW
- 2.0 DISPLAY MODULE
- 3.0 POWER SUPPLY AND TERMINAL MODULES
- 4.0 MOUNTING
- 5.0 WIRING
- 6.0 KEYPAD DESCRIPTION
- 7.0 UNDERSTANDING THE HOME SCREENS
- 8.0 VIEW CHANNEL STATUS SCREENS
- 9.0 VIEWING OR EDITING THE SETPOINT VALUES USING THE MENU MODE
- 10.0 CONTRAST RATIO ADJUSTMENT
- 11.0 COMMUNICATIONS
- 12.0 PROGRAMMING
- 13.0 DSM OPERATION



**DE-2510 CHANNEL DESCRIPTION CHART:**

CHANNEL	DESCRIPTION	DISPLAYED UNITS (English)	DISPLAYED UNITS (Metric)
1	MAT1 ENG MAN TEMP 1	°F	°C
2	MAT2 ENG MAN TEMP 2	°F	°C
3	EGT1 ENG EXH TEMP 1	°F	°C
4	EGT2 ENG EXH TEMP 2	°F	°C
11	DSM43820 OUTPUT (optional)	—	—
12	ROP REG. OUT. PRESS.	—	—
27	BI-FUEL INHIB.	—	—
30	ACT GOVERNOR OUTPUT	%	%
31	GSP GAS SUPPLY PRESS	PSIG	Kpa
32	VAC1 AIR FILTER 1	PSIG	Kpa
33	VAC2 AIR FILTER 2	PSIG	Kpa
34	MAP1 ENG MAN PRESS 1	PSIG	Kpa
35	MAP2 ENG MAN PRESS 2	PSIG	Kpa
36	MAP3 ENG MAN PRESS 3	PSIG	Kpa
37	MAP4 ENG MAN PRESS 4	PSIG	Kpa
40	VIB1L ENG VIBRATION 1L	IPS	MPS
41	VIB1R ENG VIBRATION 1R	IPS	MPS
42	VIB2L ENG VIBRATION 2L	IPS	MPS
43	VIB2R ENG VIBRATION 2R	IPS	MPS

**PANEL APPLICATION CHART - SERIES III:**

ENGINE TYPE	V-ENGINE COMMON MANIFOLD	V-ENGINE DUAL MANIFOLDS	V-ENGINE QUAD MANIFOLDS
Bi-Fuel Kit Series	III-B	III-C	III-D
Panel Accessory Kit (see detail below)	Kit B G13002	Kit C G13003	Kit D G13004
Standard Panel Type - 2000 Series Temperature Monitor	GPN2000V DSM-4388DUS		
Optional Panel Type - 3000 Series Temperature Monitor	GPN3000V DSM-43820DUS		

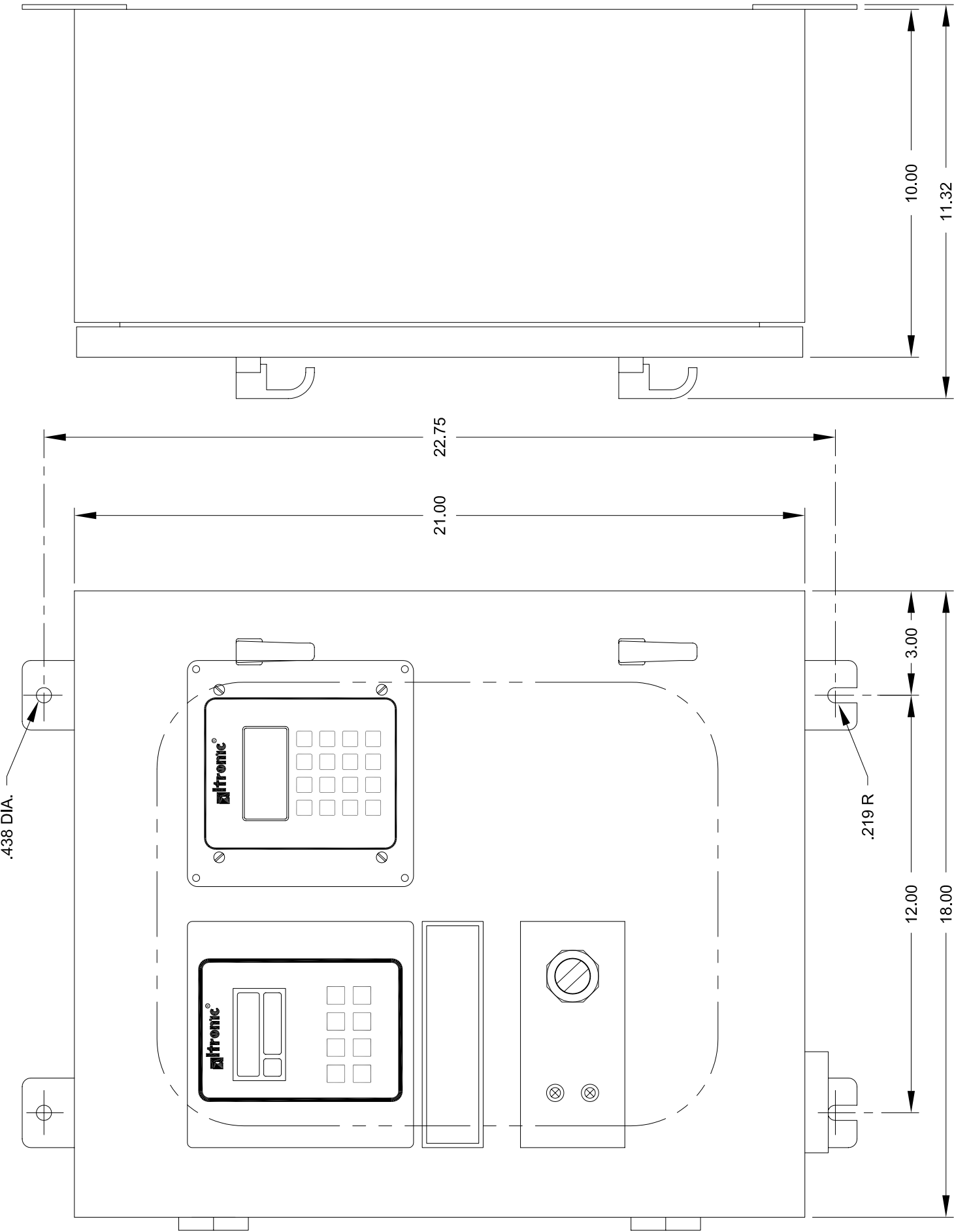
**PANEL APPLICATION CHART - SERIES IV:**

ENGINE TYPE	V-ENGINE COMMON MANIFOLD	V-ENGINE DUAL MANIFOLDS	V-ENGINE QUAD MANIFOLDS
Bi-Fuel Kit Series	IV-B	IV-C	IV-D
Panel Accessory Kit (see detail below)	Kit B G13002	Kit C G13003	Kit D G13004
Vibration Monitoring Kit	G13006	G13006	G13006
Standard Panel Type - 2000 Series Temperature Monitor	GPN2000V DSM-4388DUS		
Optional Panel Type - 3000 Series Temperature Monitor	GPN3000V DSM-43820DUS		

**PANEL ACCESSORY KIT - SERIES III AND IV:**

PANEL ACCESSORY KIT:		KIT B G13002	KIT C G13003	KIT D G13004
Left Bank Harness	PART NO. FUNCTIONS	693118-1 MAP1 VAC1 EGT1 MAT1 VIB+, 1L, 2L	693118-1 MAP1 VAC1 EGT1 MAT1 VIB+, 1L, 2L	693120-1 MAP1 MAP3 VAC1 EGT1 MAT1 VIB+, 1L, 2L
Right Bank Harness	PART NO. FUNCTIONS	693121-1 VAC2 EGT2	693122-1 MAP2 VAC2 EGT2 MAT2 VIB+, 1R, 2R	693123-1 MAP2 MAP4 VAC2 EGT2 MAT2 VIB+, 1R, 2R
Fuel Harness Assembly	PART NO. FUNCTIONS	693124-1 GSP ROP SOL+,-	693124-1 GSP ROP SOL+,-	693124-1 GSP ROP SOL+,-
Power Harness Assembly	PART NO. FUNCTIONS	693125-1 +, -, GND	693125-1 +, -, GND	693125-1 +, -, GND
691201-15 Transducer		1 - GSP	1 - GSP	1 - GSP
691201-50 Transducer		1 - MAP1	2 - MAP1, MAP2	4 - MAP1,2,3,4
691204-50 Transducer		2 - VAC1, VAC2	2 - VAC1, VAC2	2 - VAC1, VAC2

FIG.1 MOUNTING DIMENSIONS, GPN-2000V, GPN-3000V



**FIG.2 BACK PANEL/WIRE HARNESS LAYOUT, GPN-2000V, GPN-3000V**

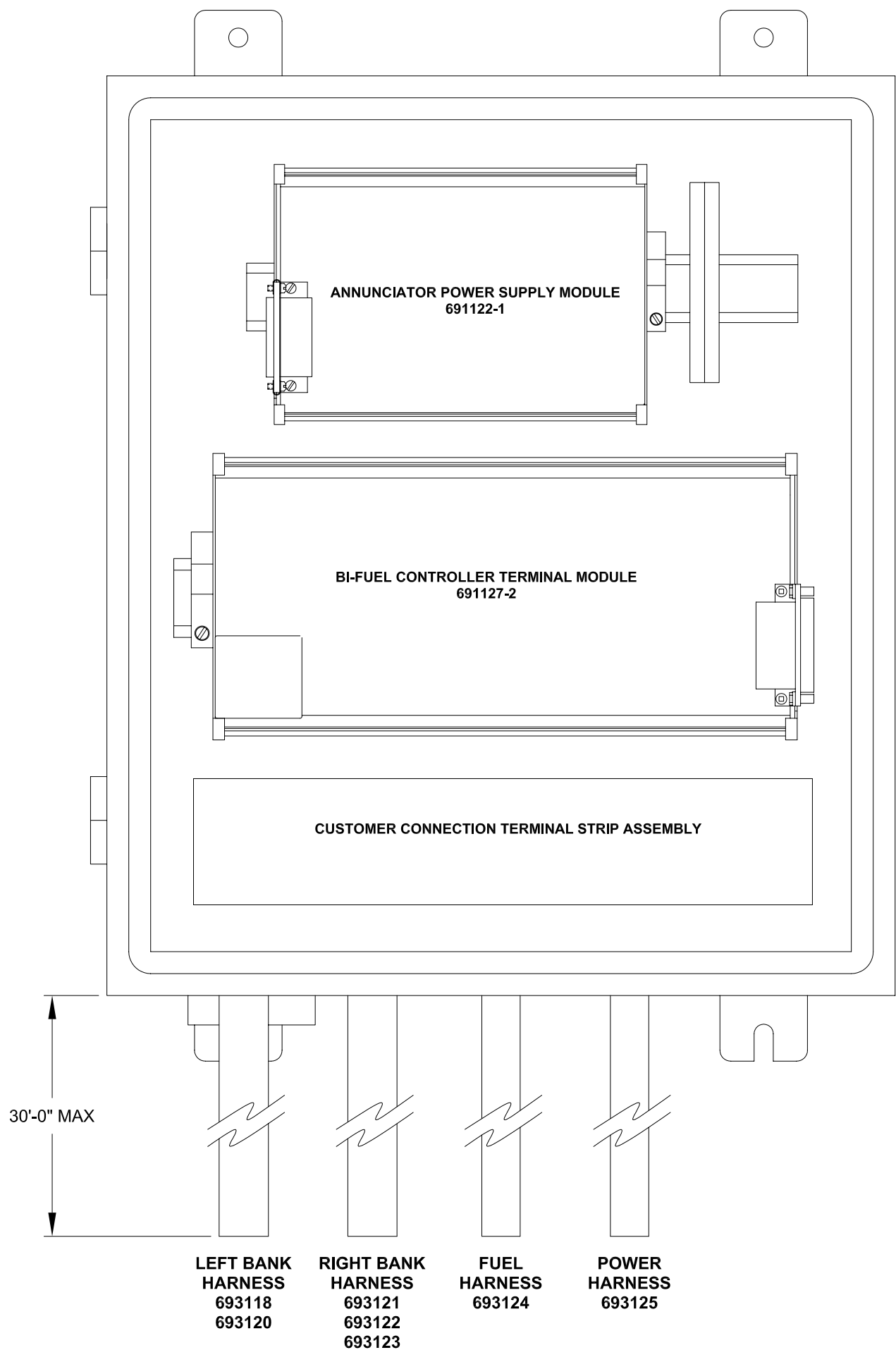
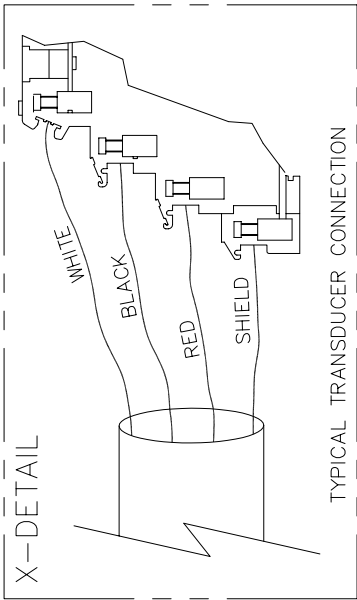
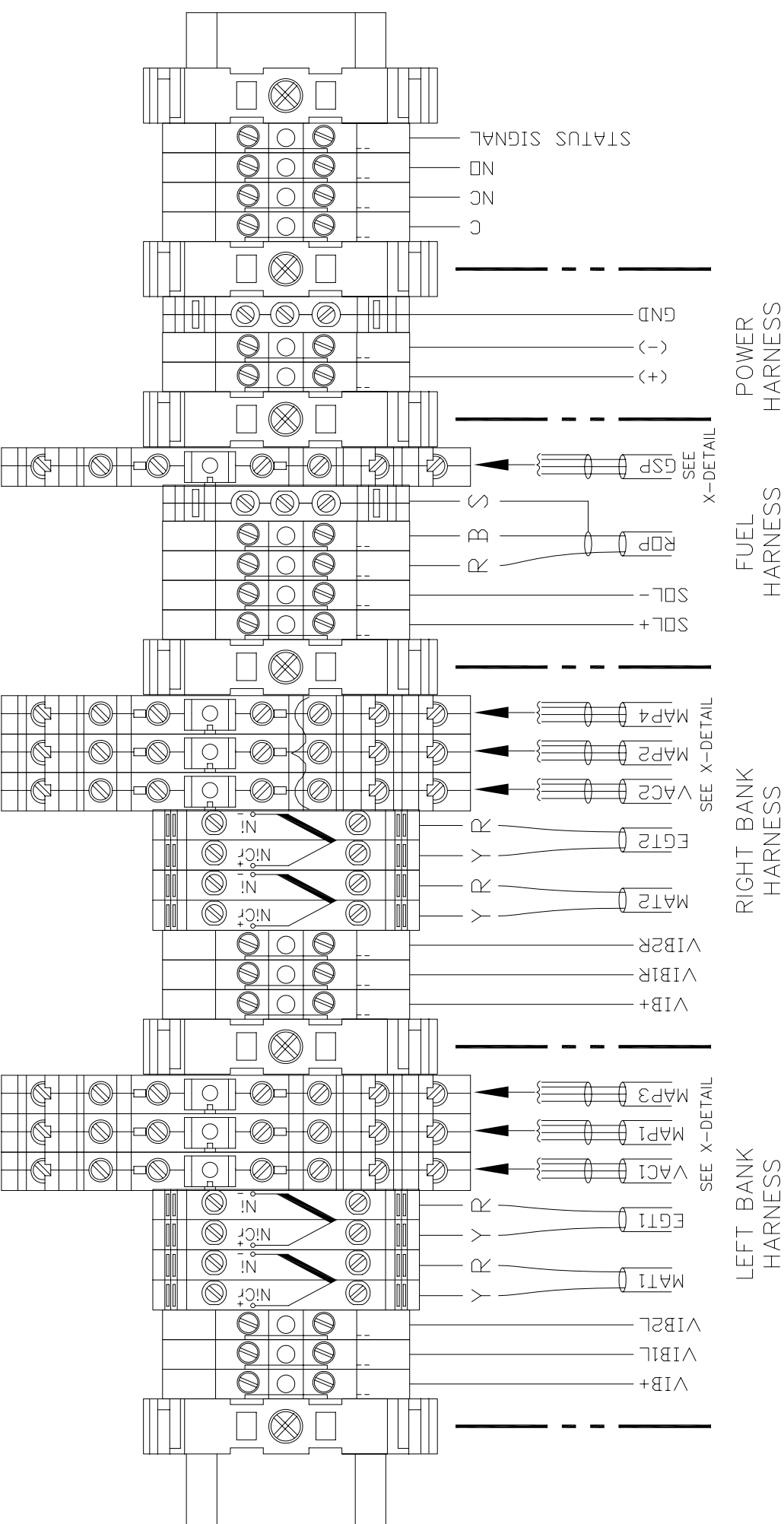


FIG.3 WIRING DIAGRAM - CUSTOMER CONNECTIONS, GPN-2000V, GPN-3000V



**NOTE:** SOME APPLICATIONS DO NOT  
USE ALL SENSOR CONNECTIONS.

**FIG.4 WIRING DIAGRAM - LADDER LOGIC, GPN-2000V, GPN-3000V**

