

WARNING: DEVIATION FROM THESE OPERATING INSTRUCTIONS MAY LEAD TO IMPROPER ENGINE/MACHINE OPERATION WHICH COULD CAUSE PERSONAL INJURY TO OPERATORS OR OTHER NEARBY PERSONNEL.

1.0 OVERVIEW

- 1.1 For help locating subjects in this document, a section index is provided on page 37.
- 1.2 The Altronic DE-2200 compressor monitor system is an electronic microprocessor-based system designed to sense various analog sensors, digital switches and industry standard type J or K thermocouples to monitor industrial compressors. The system is field-programmable using a PC (personal computer) and the supplied DE-2200 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. A backlit 4x20 LCD character display shows system status, programmed engine/motor and compressor parameters and channel labels. A front mounted keypad serves as the user interface. The DE-2200 provides the safety shutdown functions needed to prevent unnecessary damage to remote operated equipment. Additionally, the DE-2200 provides for remote data acquisition in a compact, low cost package dedicated to industrial compressor applications.
- 1.3 The system consists of three main parts: a panel mounted Display Module DE-2200, a Power Supply Module 691122-1, and a Terminal Module 691136-1. These components are interconnected by means of Cable assembly 693115-1.

WARNING: THE MONITOR SYSTEM MUST BE CONFIGURED PRIOR TO USE ON A COMPRESSOR SYSTEM. REFERENCE DE-2200 PI PROGRAMMING INSTRUCTIONS, FOR INSTRUCTIONS DESCRIBING HOW TO CONFIGURE THE MONITOR FOR THE SPECIFIC APPLICATION. VERIFY THE PROGRAM IN NONVOLATILE MEMORY (THE EEPROM) PRIOR TO STARTING THE SYSTEM. REFER TO SECTION 10.0 ON HOW TO VIEW THE CURRENT CONFIGURATION.

2.0 DISPLAY MODULE

- 2.1 The Display Module serves as the user interface for the DE-2200 system. It is in a 6.5" x 6.5" panel mounted enclosure and 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 and TEST keys as well as other keys used to navigate through channel status and description, view process screens, and to edit the configuration.
- 2.3 The LCD displays a "home screen" that displays a status line along with three user configurable analog points; typical points are speed, the suction pressure and the discharge pressure. A "view screen", which is available by pressing the VIEW key, displays up to eight user configurable analog process labels, values and bargraphs of the corresponding analog inputs. Pressing the VIEW CHANNEL key displays the channel number, its timer status, analog value (if applicable) and the corresponding 20-character user defined label.

- 2.4 The keypad, along with the LCD display, are used to navigate through channel status and descriptions, view process screens, and to view or edit the system's configuration. The 8UNITS or 9UNITS or the 6TENS or 7TENS 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 compressor 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 MODULE

- 3.1 The Power Supply Module is made to be rail mounted and is the interface between the Terminal and Display Modules and to other systems. It typically 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 is made to accept up to four industry standard commercially available 0.6 inch plug-in Output Modules. The Output Modules provide a means of using the DE-2200 monitor safety shutdown system status to interface with other systems on the engine/motor and compressor. A typical application would be as a relay or solenoid coil driver. 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. The output modules can be software configured for either normally open (N/O) or normally closed (N/C) operation and have an LED indicator associated with them. Outputs 3 and 4 are for use with the optional speed switch and pre/post-lube features respectively. If an Output Module is programmed for normally closed (energized for run), the LED will be ON in the normal run condition and OFF for a fault condition. For Normally open configured modules the LED will be OFF for normal run condition and turn ON for a fault condition.

The standard Output Modules' outputs use the top row of the dual 16-position terminal strip which is marked OUT 1 through OUT 4. Each of these outputs are fused with a replaceable 6.3 amp slow-blow fuse, Altronic P/N 601653. In addition to accepting industry standard Output Modules, a custom Altronic Output Module P/N 691124 is available for tripping ignition powered CD fuel valves and shorting CD ignition shutdown leads upon a fault. When both functions are required, two of these modules are used as follows: OUT 1 slot must be used to trip the fuel valve, and OUT 2 slot must be used to short the ignition. If 12-24 Vdc is lost to the DE-2200 annunciator system, the custom Output Modules will trip the fuel valve and short the ignition shutdown lead. This mimics the "fail-safe" operation of a normally closed Output Module and therefore the LED will be ON in the normal run condition and OFF for a fault condition. In programming the system, these modules are identified by using the IGN/FUEL selection. Terminals IGN+ and IGN! are used to connect the shutdown lead, and FV1 and FV2 are used for the CD fuel valve. A capacitor is included in the Power Supply Module to supply the energy to trip the fuel valve.

- 3.3 The 12-24 Vdc power for the DE-2200 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 external connection for the two serial RS-485 communication ports is on the Power Supply Module terminal strips. Port 2 is for RS-485 serial communication to Altronic instruments, and port 3 is for RS-485 serial communication to a PC (personal computer) or a PLC (programmable logic monitor) to perform remote monitoring or control functions if desired.
- 3.5 Terminals marked IGN IN and PU IN are used by the DE-2200 system to detect either engine rotation or ignition system firings. This input monitors changing signals such as those seen on either the ignition shutdown lead or a magnetic pickup monitoring an engine mounted gear.
- The IGN IN terminal connects to the positive (+) C.D. ignition shutdown lead.
 - The PU IN terminal connects to one magnetic pickup input; the other pickup wire connects to the minus (-) terminal on the Power Supply Module.

NOTE: An installation may use **only one** of the terminals IGN IN or PU IN.

4.0 TERMINAL MODULE

- 4.1 The Terminal Module is made to be rail mounted and is the point of interface between the field sensor wiring and the DE-2200 monitor system. A removable dual terminal strip is used for the connection of the system to the equipment mounted discrete sensors which may consist of up to 16 normally open or normally closed switches as well as up to 14 analog transducers and 7 thermocouples selectable as type "J" or "K". The 16 discrete sensor inputs are similar to previous Altronic DA, DD, and DE annunciator systems and are numbered in the typical annunciator format as 10-17, 20-27. The 14 analog inputs are numbered 30-37 and 40-45; 30-36 accept industry standard transducer signals in the range of 0-5 VDC. Inputs 37 and 40-45 accept 0-5 VDC transducers or industry standard type "J" or "K" thermocouples. Connections from the Terminal Module to the Display Module are made using the 693115-x series Cable Assembly.
- 4.2 The DE-2200 is designed to operate with industry standard, voltage or current amplified output transducers in the range of 0 to 5 Vdc or 0 to 25 mA. Four series of transducers are available from Altronic: pressure transducers 691201-x, 691204-x and temperature transducers 691202/203-300, 691212/213-450.
- 4.3 PRESSURE TRANSDUCERS - The pressure transducers, Altronic P/N 691201-x and P/N 691204-x, are packaged in a rugged sealed case with a NPT pressure port, a corrosion resistant media cavity, and a Packard Electric "Metri-Pack" connector. The ranges available are 0-100, 300, 500, 1000, 2000, and 5000 PSIG for the 691201-x series and 0-50, 100, 300, 500 PSIA for the 691204-x series, all of which have an overload rating of 1.5 times full scale without damage. The three wires from the transducer are: +5 volt excitation, +0.5 to 4.5 volt output, and minus return. These three wires connect directly to the back of the Terminal Module using cable assembly P/N 693008-x.
- 4.4 TEMPERATURE TRANSDUCERS - The temperature transducers, Altronic P/N 691202-300, 691203-300 with a temperature measurement range of +5 to 300EF and the 691212-450, 691213-450 with a temperature range of -40 to +450EF are packaged in a sealed, stainless steel housing with a 5/8"-18 UNF threaded body, and a Packard Electric "Metri-Pack" connector. During configuration the standard calibration for the 691202/203-300 sensor is selected as "dEG1" and the standard calibration for the 691212/213-450 is selected by choosing "dEG2". The three wires from the transducer are: +5 volt excitation, temperature output voltage, and minus return. These wires connect directly to the Terminal Module using cable assembly P/N 693008-x.

- 4.5 THERMOCOUPLE INPUTS - The terminal module accepts industry standard type “J” or “K” thermocouples on inputs 37 and 40-45. Automatic cold junction compensation is built-in. The units can be configured to EF or EC. Both a high and low setpoint is associated with each channel. The monitor can read type J thermocouples between ! 76EF and 1382EF (! 60EC and 750EC) and type K thermocouples between ! 76EF and +1472EF (! 60EC and 800EC).

5.0 MOUNTING

- 5.1 DISPLAY MODULE - Mount the Display Module inside a control panel or to a suitable flat surface so that the display is at a convenient viewing height. A drilling template and mounting dimensions are provided. NOTE: Avoid mounting the unit with the LCD display facing direct sunlight. The display operating temperature range is ! 31EF to +176EF (! 35EC to +80EC).
- 5.2 POWER SUPPLY MODULE - Mount the Power Supply Module in the panel either on the bottom or the side of the main panel. The Power Supply Module is made to be rail mounted onto commercially available 32 or 35 mm DIN mounting rails. It is also made to plug directly into the Terminal Module using the DB-25 connectors and is held together with screws and screw locks. Two end brackets P/N 610751 should be used to keep the modules from sliding off the ends of the mounting rail.

As an alternative, the Power Supply Module and the Terminal Module can be mounted separate from each other on the DIN mounting rails but in the same panel; in this case, a DB-25 male/female cable such as P/N 693115-1 is used to electrically connect these modules. The operating temperature range of the Power Supply Module is ! 31EF to +176EF (! 35EC to +80EC).

- 5.3 TERMINAL MODULE - Mount the Terminal Module in the panel either on the bottom or the side of the main panel. The Terminal Module and Power Supply Module are made to be rail mounted onto commercially available 32 or 35 mm DIN mounting rails. The Terminal Module is made to plug directly into the Power Supply Module using the DB-25 D-Sub connectors and held together with screws and screw locks. Two end brackets P/N 610751 should be used to secure the modules from sliding off the ends of the mounting rail. The Terminal Module and the Display Module are electrically connected with a DB-25 male/female cable, 693115-x series or equivalent. The operating temperature range of the Terminal Module is ! 31EF to +176EF (! 35EC to +80EC).
- 5.4 PRESSURE TRANSDUCER - Mount the pressure transducer in the panel or in a manifold or tube off of the engine. Do not expose the pressure transducer to temperatures above 221EF. (105EC).
IMPORTANT: Pressure transducers will withstand overloads as high as 1.5 times rated pressure. If the overload rating is exceeded, failure may occur. Pressure fluctuations occur in most reciprocating systems; pick the transducer with a rating high enough to prevent overload by peak pressures of pulsations. It is recommended that a pressure snubber be used which will reduce the peak pressure applied to the transducer. The life of the transducer will be extended with the use of a snubber or pulsation dampener.
- 5.5 TEMPERATURE TRANSDUCER - Mount the temperature transducer in a thermowell on the engine or machine. The actual sensor is located at the bottom of the transducer body; to ensure accuracy, the tip of the probe should be surrounded by the measured media.
IMPORTANT: Do not exceed the absolute maximum rating of the transducers, 350EF (176EC) for the 691202/203-300 or 450EF (232EC) for the 691212/213-450. Care should be taken to protect the wiring and connectors from contact with hot surfaces.

6.0 WIRING (SEE WIRING DIAGRAMS)

6.1 SYSTEM COMPONENT WIRING - A DB-25 male/female cable, 693115-x series or equivalent, is used to connect the Terminal Module to the Display Module and secured with the cable lock screws. If mounted on the same mounting rail, plug the Terminal Module directly into the Power Supply Module using the DB-25 D-Sub connectors at the ends of the modules and secure them together with the screws and screw locks captive to the connectors. If the Power Supply Module and the Terminal Module are mounted separate from each other (must be mounted in the same panel) a DB-25 male/female cable such as P/N 693115-1 or equivalent is used to connect these modules.

6.2 POWER WIRING - 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 must be connected to panel ground which should be the same as engine ground.

NOTE: This is the return path for normally open sensors and must be connected for proper operation. DO NOT ground this device directly to the ignition system common coil ground.

6.3 SENSOR WIRING DISCRETE INPUTS - The sensor leads connect to the removable terminal strips on the Terminal Module. The terminal numbers correspond to the display numbers which also have a user assigned 20 character label associated with it. The sensor inputs are numbered similar to previous Altronic DA and DD annunciator systems: 10-17, 20-27. The set of terminals labeled R and S are for remote Reset and Stop respectively, with PRE/POST-LUBE disabled. With PRE/POST-LUBE enabled, Reset is wired to a lube switch. Sensor inputs 10-27 can be user-configurable as class A, class B or class C logic. Any sensor point can be wired for normally open or normally closed operation. Any unused sensor input must contain a short jumper wire across the input.

- Normally Open (N/O) sensor switches are wired with one wire to the bottom terminal strip of the respective sensor number and the other to engine ground which should be the same as power minus (!). A short jumper from the bottom terminal to the top terminal must be connected for normally open sensors (see wiring diagrams).
- Normally closed (N/C) sensor switches are wired with one wire to the bottom terminal strip and the other to the top terminal strip of the respective sensor number. Note that the short jumper wire must be removed.
- Remote stop and remote reset are wired the same as the sensor switches and can be used with either normally open or normally closed contacts.

Use a wire size of between 16 AWG (max.) to 24 AWG (min.) to connect the sensor switches to the terminal strip connector. Strip the insulation back 3/8"; twist the exposed wires tightly together. Insert the exposed wire completely into the terminal strip and securely tighten the clamping screw. Wires running to sensor switches must be in good condition or replaced with new wires. When running wires, take care not to damage the insulation and take precautions against later damage from vibration, abrasion, or liquids in conduits. An explosion-proof conduit is not required. However; wires should be protected from damage by running them in a protective conduit or in sheaths where appropriate. In addition, it is essential that the following practices be adhered to:

6.3 (continued)

- A. Never run sensor wires in the same conduit with ignition wiring or other high energy wiring such as the AC line power.
- B. Keep secondary wires to spark plugs and other high voltage wiring at least eight inches (200mm) away from sensor and sensor wiring.
- C. Sensor switches may be connected to any passive device using contacts such as standard switch gauges, pressure or level switches. DO NOT connect sensor leads to any voltage producing element.
- D. In the case of a field conversion where sensors have previously been used with Murphy tattletales, it is recommended that the sensors be checked frequently when the DE system is first put into use. Sensor contacts may be burned or pitted from past exposure to ignition system primary voltage. It is advisable to replace such sensors.
- E. If it becomes necessary to check sensor switch 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-2200 system through the sensor leads may damage the device. In addition, the area should be tested as non-hazardous before such testing commences.

6.4 ANALOG SENSOR WIRING - For each analog monitored point inputs 30-37 and 40-45 select a transducer - either an Altronic pressure or temperature transducer listed above or one that outputs a signal in the range of 0 to 5 Vdc or 0 to 25 mA. Mount as described above. Use cable assembly 693008-x or similar to wire transducer to the Terminal Module. All unused inputs must be shorted with a short jumper wire. An internal 5 volt sensor supply (500 mA max.) is available to power the Altronic transducers; see wiring diagrams. If the 5 volt sensor supply exits the panel it must be fused with a 0.5 ampere fuse. If 24 volt powered sensors are used the 24 volt supply to them must be fused appropriately. Take care not to damage the insulation when installing and take precautions against later damage from vibration, abrasion, or liquids in conduits. In addition, it is essential that the following practices be adhered to:

- A. Never run sensor wires in the same conduit with ignition wiring or other high energy wiring such as AC line power.
- B. Keep secondary wires to spark plugs and other high voltage wiring at least eight inches (200mm) away from sensor and sensor wiring.

6.5 THERMOCOUPLES AND THERMOCOUPLE EXTENSION WIRE - Grounded or ungrounded type J or K thermocouples may be used. Use thermocouple extension wire of the same type as the thermocouple probe to connect the thermocouple to the temperature scanner. Use stranded thermocouple wire having a good moisture-resistant insulation such as PVC; for higher ambient temperatures, Teflon or B-fibre insulated thermocouple wire is recommended. To insure an accurate signal is transmitted to the instrument, avoid any added junctions, splices and contact with other metals. All unused inputs must be shorted with a short jumper wire. Take care not to damage the insulation when installing and take precautions against later damage from vibration, abrasion, or liquids in conduits. In addition, it is essential that the following practices be adhered to:

- A. Never run thermocouple wires in the same conduit with ignition wiring or other high energy wiring such as AC line power.
- B. Keep secondary wires to spark plugs and other high voltage wiring at least eight inches (200mm) away from thermocouples and extension wiring.

6.6 OUTPUT SWITCH WIRING - The Power Supply Module is made to accept an industry standard 0.6 inch Output Module. The following modules are available from Altronic:

- 691124 This custom module has two uses: connection to a Murphy fuel valve and directly grounding a C.D. ignition system.
- Use in position OUT 1 to connect to a C.D. ignition type Murphy fuel valve. Connect terminals 3 and 8 of the fuel valve to the Power Supply Module terminals marked F1 (FV1) and F2 (FV2).
 - Use in position OUT 2 to directly ground-out (stop) a C.D. ignition system. Wire the C.D. ignition shutdown lead and ignition ground to the Power Supply Module terminals marked I+ (IGN+) and I! (IGN!) observing the proper polarity for the ignition system. DO NOT connect directly to the ignition system common coil ground.
- 691125 This module is rated for 5-48 Vdc, 5.0 A. and may be used in any of the four output slots OUT 1 through OUT 4.
NOTE: Use this module if it is desired to interrupt the DC supply to DC-powered ignition systems such as Altronic CD1, CPU-90, II-CPU or DISN.
- 691056 This module is rated for 5-60 Vdc, 2.0 A. and may be used in any of the four output slots OUT 1 through OUT 4.
- 691066 This module is rated for 5-200 Vdc, 0.67 A. and may be used in any of the four output slots OUT 1 through OUT 4.
- 691065 This module is rated for 24-280 Vac, 2.0 A. and may be used in any of the four output slots OUT 1 through OUT 4.

NOTE: Other industry standard 0.6 inch modules may be used as required.

6.7 RS-485 COMMUNICATIONS WIRING - There are two RS-485 communication ports available on the DE-2200 system.

- Port 2 is for use with an optional Altronic DSM.
 - Port 3 is for RS-485 serial communication to a PC (personal computer) or a PLC.
- Use a two conductor shielded cable of fine gauge stranded wire and connect the wires for port 2 to the terminals marked "A2" and "B2" and the shield wire to terminal "S2". The wiring for port 3 connects to the terminals marked "A3", "B3" and "S3". Connect to the other communication devices "A" to "A"(!) and "B" to "B"(+). Connect the shield wire to the DE-2200 system ONLY.

6.8 TACHOMETER INPUT - Terminals marked IGN IN and PU IN on the Power Supply Module are used by the DE-2200 system to detect either engine rotation or ignition system firings. This input monitors voltage signals such as those seen on either the ignition shutdown lead, ignition coil or a magnetic pickup monitoring an engine mounted gear.

- The IGN IN terminal connects to the positive (+) C.D. ignition shutdown lead.
- The PU IN terminal connects to one magnetic pickup input; the other pickup wire connects to the minus (!) terminal on the Power Supply Module.

NOTE: An installation may use **only one** of the terminals IGN IN or PU IN.

7.0 HAZARDOUS AREA OPERATION

7.1 The DE-2200 system is CSA certified for CLASS I, DIVISION 2, GROUPS C and D areas when mounted in a suitable enclosure.

In addition, the following requirements must be met (see NFPA standard no. 493):

1. The low voltage sensor switch wires within the panel enclosure must be kept at least two (2) inches away from other wiring. Run the sensor switch wires leaving the panel in a separate conduit from all other wiring and keep them separate throughout the installation.
2. Wiring to the sensors must have a grade of insulation capable of withstanding an AC voltage of 500 volts RMS.
3. Sensor wires must be run in separate conduits and junction boxes from high voltage wires such as ignition, fuel valve, and other high voltage wiring.

**WARNING: SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY AND/OR SUITABILITY FOR CLASS I, DIV. 2, GROUPS C and D.
DO NOT DISCONNECT EQUIPMENT IN DIV. 2 ENVIRONMENT UNLESS POWER IS SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.**

8.0 KEYPAD DESCRIPTION

- 8.1 The DE-2200 monitor Display Module contains a sixteen-key sealed membrane keypad which is used to stop, reset and test the system. The user can also view process information screens, view channel specifics, cancel timers, and view and edit pertinent operating parameters.
- 8.2 STOP - The STOP key is used for a manual stop condition. By pressing the STOP key, the monitor activates the configured output modules in the power supply.
- 8.3 RESET - The RESET key clears all past faulted points and resets all input and output timers to their preset values.
- 8.4 TEST - The TEST key disables the output modules and allows the user to fault or test the input sensors. Every time the test button is pressed, the test timer resets to its preset value.
- 8.5 CANCEL TIMERS - The CANCEL TIMERS key cancels all timers.
- 8.6 VIEW CHAN - The VIEW CHANNELS key allows the user to view the status of any input channel and its user defined label.
- 8.7 NEXT - From the VIEW screen, allows the user to view the next process information screen. From the MENU screens, the next value to be edited.
- 8.8 VIEW - The VIEW key allows the user to view the process information screens.
- 8.9 ENTER - The ENTER key is used to accept a selection and to save a new value in memory.
- 8.10 ESC - The ESCAPE key enables the user to exit any view channels or menu screens at any time and return to the previous screen without changing programmed values.

- 8.11 MENU - The menu key allows the user to enter the edit menu. The global timers, input class output assignment, output configuration and the time and date may be viewed and adjusted using the MENU key.
- 8.12 UNITS/TENS - 8UNITS/9UNITS keys increase or decrease values by one. The 6TENS/7TENS 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.
- 8.13 F1 - Function key F1 displays the hourmeter and servicemeter messages.
- 8.14 F2 - Function key F2 displays the time and date of the first fault.
- 8.15 F1 and F2 keys can be used in conjunction with other keys to implement custom functions.

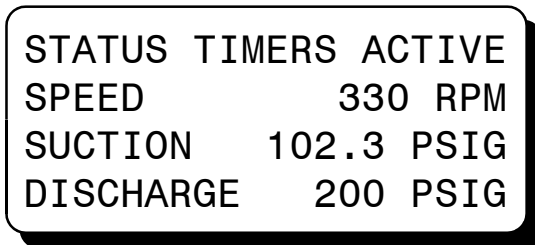
9.0 UNDERSTANDING THE HOME SCREENS

- 9.1 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, and typically the engine speed on the second line, the suction pressure on the third line and the discharge pressure on the fourth line. Other analog parameters may be programmed in for the second, third and fourth lines.

The status line will read one of the following: TIMERS ACTIVE, PRE-LUBE, RUNNING, TEST XXX SEC, FAULT AL12, 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.

- 9.2 TIMERS ACTIVE - To start the engine, press the RESET button. The "TIMERS ACTIVE" message will be displayed and remains until all Class B and Class C inputs have been armed. During the time that the Class B and Class C timers are still active, manually purge and crank the engine.



9.3 PRE-LUBE - If the PRE/POST-LUBE option is selected when configuring the system from the PC, "PRE-LUBE" will appear on the status line when the remote RESET terminal is activated. Output 4 on the power supply module will change state. This allows for activation of an electrically controlled pre-lube pump for a programmed time period prior to cranking. After this user programmed time delay, the status line will display "TIMERS ACTIVE". The timers active message will remain until all Class B and Class C inputs have been armed. During the time that the Class B and Class C timers are still active, manually purge and crank the engine. Note: If the timers active timer is set to less than the pre-lube timer the display will read "RUNNING" when the pre-lube timer lapses.

STATUS	PRE - LUBE
SPEED	0 RPM
SUCTION	2.3 PSIG
DISCHARGE	200 PSIG

9.4 RUNNING - After all Class B and Class C points have timed out and are being monitored, and if no faults are detected, the home screen will show the "RUNNING" message. This is the screen that will remain under normal operation.

STATUS	RUNNING
SPEED	1000 RPM
SUCTION	102.3 PSIG
DISCHARGE	300 PSIG

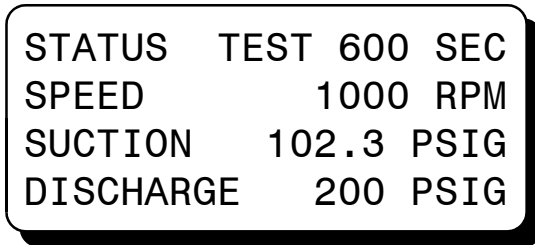
When a programmed servicemeter interval has expired (the hours left reaches 0), a * character will be displayed at the end of the STATUS word on the top line of the HOME screen. Press the F1 key to view the hourmeter and servicemeter times. See section 16.0 HOURMETER SERVICEMETER For further information.

STATUS*	RUNNING
SPEED	1000 RPM
SUCTION	102.3 PSIG
DISCHARGE	300 PSIG

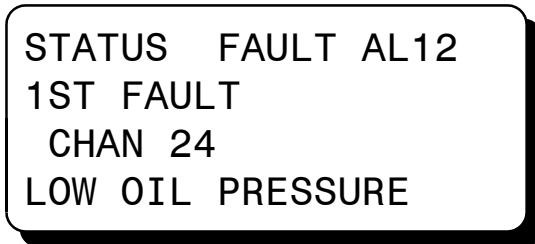
Press to view message **F1**

9.5 TEST - The TEST home screen is entered by pressing the TEST key. The TEST mode disarms all outputs and may only be entered from the RUNNING mode. The test time remaining is shown on the top line. See section 13.0 TEST MODE SCREENS for more information.

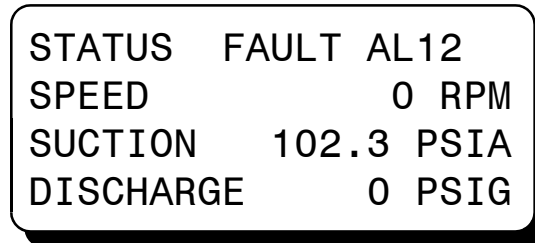
press
to test



9.6 FAULT - If a fault condition occurs, the “FAULT” message for the first faulted channel will appear on the display and will remain there until it is acknowledged. The numbers one through two, after “AL” (alarm), shows the output switch that is faulted. To again view the first fault screen, press the VIEW CHAN key. If all of the faulted sensors have been cleared and the RESET key is pressed, the class B, C and output timers will reset and the display will return to the TIMERS ACTIVE home screen.



returns to
fault
home



press to
return to
1st fault



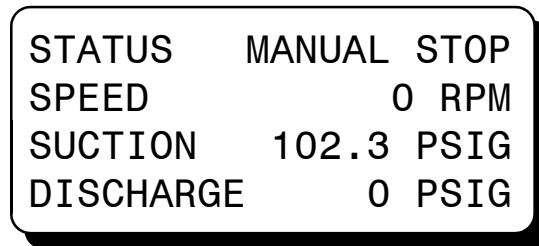
to clear faults,
reset timers &
outputs



NOTE: The reset function can also be implemented by using the external hardwire RESET/ PRE-LUBE input available on the Terminal Module. The behavior of the monitor system will be determined by the programming selections made when configuring the system.

9.7 The "MANUAL STOP" message will supersede all of the above home screens if the STOP key is pressed.

press
to stop



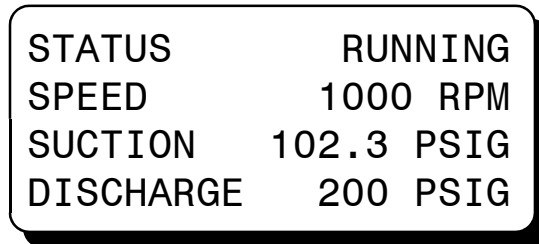
NOTE: The stop function can also be implemented remotely by using the external STOP input available on the Terminal Module. The behavior of the monitor system will be identical to that obtained by pressing the local STOP key on the Display Module.

10.0 VIEW PROCESS INFORMATION SCREENS

10.1 The process information screens can be accessed from any of the home screens (except the test home screen) or from the view channel screen by pressing the VIEW key. There are four process screens: screens one and three each display up to four user programmed process variables; screens two and four display an analog bargraph associated with the previous process variable screen. Thus, up to eight process variables can be displayed both digitally and in bar graph format.

The analog values are monitored by a microprocessor on the terminal board and are configured by using a PC and the terminal program. The bargraph end points are set by the low and high setpoints of the safety shutdown function. Unused channel screens will not be displayed.

from

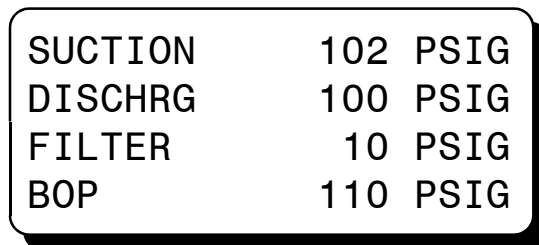


press



NOTE: Screens one and two display in digital and bargraph form the first group of four selected analog inputs.

then at



press to
view
bargraph



11.1 (continued)

Upon pressing the view channel key, channel 10 will be shown. The UNITS and TENS keys allow the user to quickly navigate through the monitors channels. Use the 8 UNITS or 9 UNITS keys to increase or decrease the viewed channel by one. Use the 6 TENS or 7 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.

from current home screen

STATUS TIMERS ACTIVE
SPEED 330 RPM
SUCTION 102.3 PSIG
DISCHARGE 200 PSIG

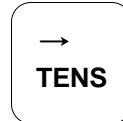
press



to see channel 20 from channel 10

STATUS TIMERS ACTIVE
NOT ARMED
CHAN 10
ENGINE OIL PRESSURE

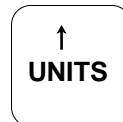
press



to see channel 21 from channel 20

STATUS TIMERS ACTIVE
ARMED
CHAN 20
MANIFOLD PRESSURE

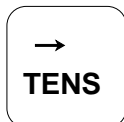
press



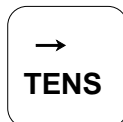
to see channel 40 from channel 21

STATUS TIMERS ACTIVE
NOT ARMED
CHAN 21
LB MANIFOLD PRESSURE

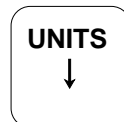
press



then press



then press

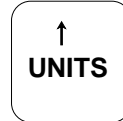


11.1 (continued)

to see channel 41 from
channel 40

```
STATUS      RUNNING
ARMED
CHAN 40     83 PSIG
COMP OIL PRESSURE
```

press



to exit view channels
mode

```
STATUS      RUNNING
ARMED
CHAN 41     10.5 PSIG
SUCTION PRESSURE
```

press



12.0 SHUTDOWN OR FAULT STATUS SCREENS

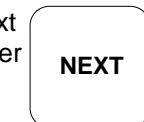
12.1 With the engine running and the monitor system monitoring points, if a fault occurs, the display will show the first fault detected. The phrase "1ST FAULT" and "AL12" will be displayed; "AL1" is for the first output, "AL12" is for outputs one and two. The output or outputs configured for that channel will trip. The first fault will stay displayed on the screen until it is acknowledged by one of the keypad keys RESET or ESC. Use VIEW CHAN key to view the status of all channels.

After all of the current faulted channels are displayed, the display will revert back to the first fault. If no class A sensors are faulted, pressing the RESET key will clear all displayed faults and return the display to the timers active home screen. All class B and C input timers and the output timers will be reset. Pressing the ESC key when the fault screen is displayed will return the display to the fault home screen. To again view the "first fault" from the fault home screen, press the VIEW CHAN key.

Upon a fault,
the first fault is shown.

```
STATUS FAULT  AL12
1st FAULT
CHAN 24
HIGH LIQUID LEVEL 1
```

press next
for another
fault



press to
reset
timers &
outputs



```
STATUS TIMERS ACTIVE
SPEED          330 RPM
SUCTION        102.3 PSIG
DISCHARGE      200 PSIG
```

12.2 When a fault occurs on an analog channel 30-46, a "HIGH" or "LOW" indication will additionally be displayed as to whether the point faulted on a high or low setpoint.

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

```

STATUS FAULT AL12
1st FAULT HIGH
CHAN 42 300 EF
HIGH DISCHARGE TEMP
    
```

press
reset to
clear fault

RESET

13.0 TEST MODE SCREENS

WARNING: TEST MODE DISARMS ALL OUTPUTS. ACTUAL FAULTS WILL DISPLAY BUT WILL NOT TRIP THE SYSTEM ALARM AND SHUTDOWN OUTPUTS. USE MANUAL STOP FOR EMERGENCY SHUTDOWN.

13.1 The test mode is used for testing sensors without tripping the outputs. The monitor system stays in the test mode for a preset timed period. To enter the test mode, make sure the home screen status line says "RUNNING", and press the TEST key on the keypad. The status line will display "TEST xxx SEC"; xxx being the remaining test time. To test an input, momentarily fault a sensor. The display will show the faulted point, its description and "1st FAULT" for the first point tested. To test another point press the TEST key, this will clear the tested sensor from the display and will refresh the test timer to its full programmed test time.

press to
enter test
mode

TEST

```

STATUS TEST 600 SEC
SPEED 1000 RPM
SUCTION 102 PSIG
DISCHARGE 200 PSIG
    
```

Test screen is shown with no faulted points. Test key was pressed from the "RUNNING" home screen.

sensor point 24 is tested.

```

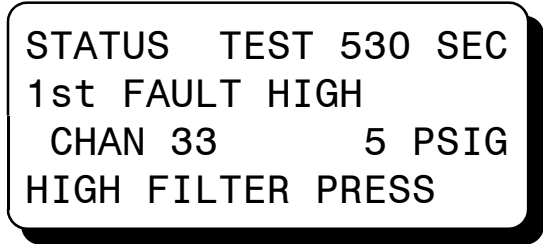
STATUS TEST 525 SEC
1st FAULT
CHAN 24
LIQUID LEVEL STAGE 1
    
```

press
to test
another
sensor

TEST

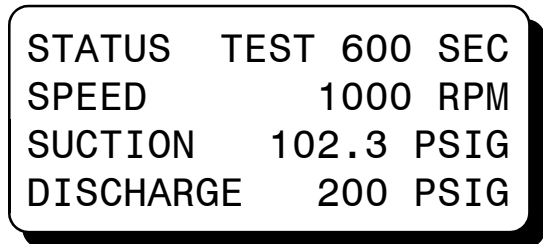
13.2 When any of the analog channels 30-46 are tested, a “HIGH” or “LOW” indication will additionally be displayed indicating whether a high or low setpoint was tested. The display will show the current analog value for the channel selected.

A high setpoint was faulted on an analog input



13.3 If no sensors are faulted and the TEST key is pressed, the display will return to the test home screen. The test timer will be reset and the home screen parameters and values will be displayed.

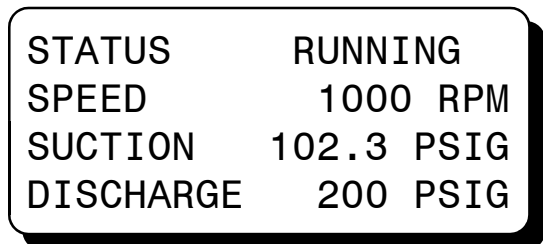
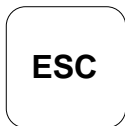
press test key



No sensors faulted. Test home screen is displayed.

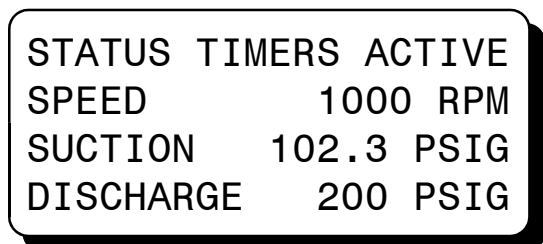
13.4 To exit the test screen, press either the ESC or RESET key. Pressing the ESC key takes the user to the “STATUS RUNNING” home screen and does not reset the class B, C and output timers. Pressing the RESET key takes the user to the “STATUS TIMERS ACTIVE” home screen with the class B, C and output timers reset.

press esc key



No sensors faulted. Running home screen is displayed.

press reset key



No sensors faulted. Timers active home screen is displayed.

14.0 AUTO PRE-LUBE / POST-LUBE OPTION

- 14.1 If enabled, AUTO PRE-LUBE is initiated by either a local contact closure of the reset terminals on the terminal board or by the receipt of the appropriate serial command string. To enable pre-lube the AUTO PRE-LUBE / POST-LUBE option must be selected when configuring the system from the PC. The pre-lube time can be set from 0 to 999 seconds. Upon initiation of the external reset, OUTPUT #4 on the power supply module will be activated and remain activated for the length of the pre-lube timer and up to the configured pre-lube RPM setpoint. The display will show "STATUS PRE-LUBE" on the top line indicating that OUTPUT #4 is active. Upon the time out of the pre-lube timer and the configured pre-lube RPM setpoint OUTPUT #4 will normalize and the display will return to "TIMERS ACTIVE" or if the timers active timer has timed out "RUNNING". Pre-lube will be aborted by the detection of any monitored fault or the activation of the STOP key. If the pre-lube timer is set to zero the system will act as though auto pre-lube was not configured. RPM must be at zero during the activation of the remote reset to activate the pre-lube timer.
- 14.2 If enabled, AUTO POST-LUBE is initiated by the detection of any monitored fault or the activation of the STOP key.

To enable the post-lube the AUTO PRE-LUBE / POST-LUBE option must be selected when configuring the system from the PC. The post-lube time can be set from 0 to 999 seconds. Upon the detection of any monitored fault or the activation of the STOP key, OUTPUT #4 on the power supply module will be activated and remain activated for the length of the post-lube timer. Upon the time out of the post-lube timer OUTPUT #4 will normalize. Pre-lube can be aborted by activation of either the CANCEL TIMERS key or the RESET key. If the post-lube timer is set to zero the system will act as though auto post-lube was not configured. A pre-lube / post-lube panel indicator can be tied to OUTPUT #4 indicating when the lube pump is active.

15.0 SPEED SWITCH OPTION

- 15.1 A user configurable speed switch function is available to activate pumps etc. at a specified speed. OUTPUT #3 on the power supply module will be activated by the speed switch. The speed switch RPM is configured in the terminal program. Upon reaching the set speed, OUTPUT #3 on the power supply module will be activated and remain activated as long as the RPM is above the switch setting. When the RPM goes below the switch setting OUTPUT #3 will normalize. There is a 10 RPM hysteresis at the switch point.

16.0 THE HOURMETER AND SERVICE METER

- 16.1 The hourmeter and the servicemeter are active with a speed signal from either the Ignition or the pickup input located on the power supply. The range for the each meter is 99999 hours. The hourmeter counts up by one hour and the servicemeters count down by one hour. There are 11 configurable servicemeters; the desired messages and service intervals are selected when programming the DE-2200 system. The service hours can only be changed by using the terminal program and the PC. The hourmeter can be pre-set or reset by using the menu on the display module. The servicemeters can be reset using the F2 key.

16.2 Whenever a programmed servicemeter interval has expired (the hours left reaches 0), a * character will be displayed at the end of the STATUS word on the top line of the HOME screen. Press the F1 key to display the hourmeter then the servicemeter messages. The servicemeter will show the hours remaining until a scheduled maintenance is required. When a scheduled maintenance is due, the hours left will display 0.

```
STATUS*      RUNNING
SPEED        1000 RPM
SUCTION      102.3 PSIA
DISCHARGE    300 PSIG
```

Press to view message **F1**

```
HOURLMETER / SERVICE
MESSAGE NUMBER: 600
TOTAL HOURS:    8971
RUN TIME HOURS
```

press to change number **8 UNITS**

```
HOURLMETER / SERVICE
MESSAGE NUMBER: 601
HOURS LEFT:    100
CHANGE FILTERS
```

press to change number **8 UNITS**

Proceed through the servicemeter messages to find the required service. The number of hours left until the listed maintenance is due is displayed for each service message. There are up to eleven user programmable service messages. The servicemeter alert can be reset after the required service is performed by pressing the F2 key with the desired message displayed. Each servicemeter message is individually reset.

```
HOURLMETER / SERVICE
MESSAGE NUMBER: 602
HOURS LEFT:    0
OIL CHANGE REQUIRED
```

press to reset hours left **F2**

17.0 VIEWING OR EDITING THE CONFIGURATION USING THE MENU MODE

17.1 The menu screens can be accessed from any home screen (except test) by pressing the MENU key. The menu screens allow the user to view or edit safety shutdown functions, the test time, the hourmeter functions, the time and date, the communications functions, view the input class and configure the outputs. The monitor must be initially configured using the terminal program running on a PC connected to the RS-232 port on the back of the monitor. Reference the programming instructions form DE PI for instructions on how to configure the monitor 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. Listed below are the values that can be viewed or edited:

A: EDIT SAFETY SHUTDOWN:

1. VIEW OR EDIT SETPOINTS.
 - Edit analog setpoints 30-46
2. VIEW INPUT CLASS:
 - Class A - no time delay on start-up.
 - Class B - 10 to 999 seconds time delay on start-up before input is active.
 - Class C - 1 to 999 minutes safe-until-first-met with a global time delay.
3. VIEW OR EDIT TEST TIME - from 1 to 999 seconds.
4. VIEW OR EDIT THE OUTPUT CONFIGURATION:
 - N/O (Normally Open) - open in the normal run state and closes upon a fault
 - N/C (Normally Closed) - closed in the normal run state and opens upon a fault or loss of 12-24 Vdc input power.
 - IGN (Ignition Shorting and Fuel Valve Trip Module, Altronic P/N 691124) - open in the normal run state and closes upon a fault or loss of 12-24 Vdc.
5. ACTIVATION DELAY TIME - from 0 to 99 seconds.

B: HOURMETER FUNCTIONS:

1. VIEW OR EDIT HOURMETER FUNCTIONS - 00 through 11

C: COMMUNICATIONS:

1. NODE NUMBER - from 1 to 99 (default is 1).
2. PORT 1 - ASCII OR MODBUS RTU
2. PORT 3 - ASCII OR MODBUS RTU

D: VIEW or EDIT THE TIME AND DATE:

1. TIME or DATE

E: VIEW FIRMWARE REVISION

1. DISPLAY:
2. TERMINAL:

17.2 To VIEW the monitor configuration, from the home screen press the MENU key. Use the UP or DOWN arrow keys to select the group to be viewed and press ENTER. To EDIT the monitor configuration, the monitor system requires a password key sequence. NOTE: The password is required to edit the safety shutdown values only.

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.

17.3 The following keys have the same effect in all of the menu screens. If no key is pressed within one minute, the menu screen will time out and return to the current home screen.

NEXT: The NEXT key moves the selection arrow to the next selection or value without making a change to the previous value.

↑UNITS: The ↑UNITS key moves the selection arrow up one selection or increases the value by one.

↓UNITS: The ↓UNITS key moves the selection arrow down one selection or decreases the value by one.

→TENS: The →TENS key increases the value by ten.

←TENS: The ←TENS key decreases the value by ten.

ENTER: The ENTER key saves the new value and advances the selection arrow to the next value to be changed.

ESC: The ESC key returns the display back to the previous level of menu screens and when pressed again back to the current home screen.

17.4 The menu screens have 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 THE SAFETY SHUTDOWN VALUES, 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.

press to enter the menu screens



6EDIT SAFETY SHUTDOWN
HOURMETER FUNCTIONS
COMMUNICATIONS
NEXT MENU

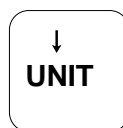
first group of menu screens are shown

Use the following keys to navigate the menu screen.

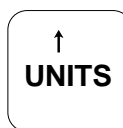
to move selection arrow down



to move selection arrow



to move selection arrow up



- 17.5 To edit the safety shutdown values, point to “EDIT SAFETY SHUTDOWN” and press the ENTER key. The edit setpoint values menu is shown. The arrow points to the “EDIT SETPOINTS”.

press to
edit
safety
shutdown

ENTER

```
6EDIT SETPOINTS
VIEW INPUT CLASS
EDIT TEST TIME
OUTPUT CONFIG.
```

```
CHAN 630
LO SP      20.0 PSIG
HI SP      60.0 PSIG
MANIFOLD PRESSURE
```

- 17.6 To view input class, choose “EDIT SAFETY SHUTDOWN” from main menu. Select ‘VIEW INPUT CLASS’ from next menu.

```
EDIT SETPOINTS
6VIEW INPUT CLASS
EDIT TEST TIME
OUTPUT CONFIG.
```

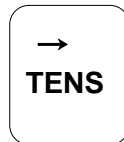
```
CHAN 610
INPUT CLASS  A , B  C
300 SECONDS TIME
DELAY ON START-UP
```

Channel 10's input class configuration will be displayed. Each input channel 10-46 can be either class A, B, or C. The class is programmed in the terminal program using the PC. Both the high and low setpoints of the analog input channels can be individually set for either class. On channels 10-27 a diamond next to the input class letter indicates the class for the displayed channel.

17.6 (continued)

To view channel 20's input class.

press



```
CHAN →20
INPUT CLASS , A B C
NO TIME DELAY ON
START-UP
```

To view the next channel number, press the ↑UNITS or ↓UNITS keys to increase or decrease the channel by one or use the →TENS or ←TENS key to increase or decrease the channel by ten and press ENTER.

- 17.7 To edit the test timer values, select "EDIT SAFETY SHUTDOWN" from the main menu. Select "EDIT TEST TIME" from the next menu.

```
EDIT SETPOINTS
VIEW INPUT CLASS
6EDIT TEST TIME
OUTPUT CONFIG.
```

press to
edit the
test time



```
EDIT TEST TIME
TEST TIME 6 100 SEC
```

To change the test time use the ↑UNITS or ↓UNITS keys to increase or decrease the value by one. Use the →TENS or ←TENS keys to increase or decrease the value by ten. The displayed test time is saved when exiting the test time menu. The range of the test timer is 0 to 999 seconds.

- 17.8 To edit the output configuration, choose "EDIT SAFETY SHUTDOWN" from the main menu. Press ENTER and select "OUTPUT CONFIG.".

```
EDIT SETPOINTS
VIEW INPUT CLASS
EDIT TEST TIME
6OUTPUT CONFIG.
```


17.8 (continued)

```

OUTPUT 61  2  3  4
DELAY TIME      0 SEC
N/O      N/C      , IGN
    
```


A selection arrow pointing to output 1 along with output 1's delay time and a diamond showing whether it is configured for N/O (normally open), N/C (normally closed), or IGN (ignition output module 691124) will be shown. To view an output's configuration, use the NEXT or →TENS or ←TENS keys to place the selection arrow in front of the output to be viewed. The output's time delay and output state will be shown for each output.

To edit an output's configuration, use the NEXT or →TENS or ←TENS keys to place the selection arrow in front of the desired output and press the ENTER key. The selection arrow will point to the delay time. Each output switch can have its own activation delay time from 0 to 999 seconds. An output switch with a delay time of 0 seconds will trip immediately upon a fault. If a delay time is set for an output switch, the output will trip following a fault plus the delay time selected. This allows, for example, a delay time between when the fuel valve trips on output 1 and when the ignition shorts on output 2.

press 

```


OUTPUT 1 →2  3  4
DELAY TIME      2 SEC
N/O      N/C      , IGN
    
```

 then press 

A diamond will replace the arrow in front of the selected output switch. An arrow will proceed the delay time indicating a change can be made to the selected output's delay time. Use the ↑UNITS or ↓UNITS keys to increase or decrease the value by one or use the →TENS or ←TENS key to increase or decrease the value by ten. The ENTER key accepts the change and advances the pointer to select either N/O, N/C or IGN.

```

OUTPUT 1 , 2  3  4
DELAY TIME →3 SEC
N/O      N/C      , IGN
    
```

press to accept the value change 

The selection arrow replaces the diamond indicating a change can be made. The selected output switch can be configured for N/O (normally open), N/C (normally closed), or IGN (ignition module 691124).

NOTE: The IGN selection is intended for the Altronic output module 691124 only. The IGN selection can be made for output switch numbers 1 and 2 only.

17.8 (continued)

An output switch configured for normally open will be open in the normal run state and close upon a fault.

An output switch configured for normally closed will be closed in the normal run state and will open upon a fault or loss of 12-24 Vdc input power.

An output switch configured for the ignition module will be open during normal run and will close upon a fault or loss of 12-24 Vdc input power. Use the NEXT key to make a selection and press ENTER to save.

press to
select



```
OUTPUT  1 , 2  3  4
DELAY TIME  , 3 SEC
N/O      N/C   →IGN
```

press to
accept
the value
change



Upon pressing the ENTER key, a diamond will replace the selection arrow. To view or edit the next output number, press the NEXT or →TENS or ←TENS keys until the arrow points to the desired output number and repeat the process.

- 17.9 To view or edit the hourmeter and servicemeter messages, select “HOURMETER FUNCTIONS” from the main menu and press ENTER.

```
EDIT SAFETY SHUTDOWN
6HOURMETER FUNCTIONS
COMMUNICATIONS
NEXT MENU
```

press to
edit hour-
meter
functions



```
HOURMETER / SERVICE
MESSAGE NUMBER: 600
TOTAL HOURS:      0
RUN TIME HOURS
```

Message number 00 is the hourmeter labeled as “RUN TIME HOURS”; message numbers 01 through 11 are the servicemeter hours. The servicemeter labels are programmed from the terminal program using a PC. Use the UNITS and TENS keys to view the run time hours and the eleven user-programmable service messages. Each service meter message is displayed on the bottom line. Use the F2 key to reset the hour / servicemeter total hours for each individual message number.

17.10 To view or edit the communications setup, select “COMMUNICATIONS” from the main menu and press ENTER.

EDIT SAFETY SHUTDOWN
HOURMETER FUNCTIONS
6COMMUNICATIONS
NEXT MENU

press to
edit
communi-
cations

ENTER

COMMUNICATIONS
NODE 6 1
PORT 1 ASCII
PORT 3 MODBUS RTU

Use the NEXT key to select node, port 1 or port 3; then use the UP or DOWN arrow keys to change the node number from 1 to 99 and port 1 and port 3 from ASCII to MODBUS communications. Press the ENTER key to save the selection.

17.11 To view or edit the time and date, select “NEXT MENU” from the main menu. Then select “EDIT TIME AND DATE”.

from

→EDIT TIME AND DATE
VIEW FIRMWARE REV.
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 minutes. 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: 03-25-2001

17.11 (continued)

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.

```
TIME:  11:30 AM
DATE:  →03-25-2001
```

17.12 To view the firmware revisions of the DISPLAY and TERMINAL modules, select “NEXT MENU.” from the main menu then press ENTER.

```
EDIT TIME AND DATE
VIEW FIRMWARE REV.
PREVIOUS MENU
```

```
DE - 2200
DISPLAY:  1.0.0
TERMINAL: 1.0.0
```

NOTE: Special firmware versions will display file reference number on bottom line.

```
DE - 2200
DISPLAY:  1.0.0
TERMINAL: 1.0.0
SPECIAL: 000001
```

18.0 VIEWING THE TIME AND DATE OF THE FIRST FAULT

- 18.1 The DE-2200 monitor 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. Press the ESC key to return to the current home screen.

view time
& date of
first fault

F2

TIME AND DATE OF
THE FIRST FAULT.
TIME: 3:10 PM
DATE: 03-25-2001

19.0 CONTRAST RATIO ADJUSTMENT

- 19.1 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 65EF to 77EF (18EC to 25EC), 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.

20.0 DATA LOGGING AND COMMUNICATION OPTIONS

- 20.1 The DE-2200 monitor 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.
- 20.2 NODE NUMBER - The node number is the address of the monitor being contacted. This number is programmed by the terminal program and can be viewed or edited in the menu screen, refer to section 14.9. A two digit number from 01 to 99 can be used.
- 20.3 COMMUNICATIONS PARAMETERS - The following must be set in the PC or PLC to communicate with the monitor system:

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

20.4 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. Reference the programming instructions form DE PI to set the logging period. So 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.

20.5 The DE-2200 system uses a simple ASCII command to read the data collected. The ASCII command must be transmitted to the monitor by the PC or PLC before it can respond. The command is shown below. The hexadecimal values for the characters are shown only for those using low level (assembly language) decoding and will not appear on the communications terminal screen.

ASCII >(01 DL 001)

HEX 3Eh 28h 30h 32h 20h 44h 4Ch 20h 30h 30h 32h 29h

COMMAND HEADER ">" (3Eh) - The command must begin with the command header.

START OF TEXT "(" (28h) - The start of text character must be next.

NODE NUMBER 01 - 99 - The node number or address of the monitor being contacted is next. 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.

SPACE (20h) - Following the node number is an ASCII space character (not printable, value 20h) to act as a delimiter between the node number and the two character command word.

COMMAND WORD "DL" (44h, 4Ch) - The command is an upper case DL for data log.

SPACE (20h) - A space again is used as a delimiter.

RECORD NUMBER 001 - 100 - The record number is the requested record. This number can be any number from 001 to 100. Record number 001 always contains the most recent record, 002 the second most recent and so on. The monitor holds a maximum of 100 records in its memory before overwriting the oldest record.

END OF TEXT ")" (29h) - The end of text completes the message.

20.6 One record contains the following information:

COMP. STATION #1 GIRARD, OHIO	User entered data log header describing location
001 10333 HRS	Record number and running hours
10-19-1998 9:46 AM	Date/time the record information was collected
STATUS RUNNING	Normal home screen status line
SPEED 925 RPM	Normal home screen, line two
SUCTION 102.3 PSIA	Normal home screen, line three
DISCHARGE 300 PSIG	Normal home screen, line four
PRESS 1 102.3 PSIG	* First view process screen, line one
PRESS 2 355 PSIG	* First view process screen, line two
PRESS 3 250 PSIG	* First view process screen, line three
PRESS 4 275 PSIG	* First view process screen, line four
TEMP 1 55 EF	* Second view process screen, line one
TEMP 2 170 EF	* Second view process screen, line two
TEMP 3 180 EF	* Second view process screen, line three
TEMP 4 190 EF	* Second view process screen, line four
TEMP 5 220 EF	* 11th Analog channel value
PRESS 5 22 PSIA	* 12th Analog channel value
USER LABEL	* 13th Analog channel value
USER LABEL	* 14th Analog channel value
1ST FAULT HIGH	** First fault indication when fault occurs
CHAN A3 500 PSI	** Channel number and value of first fault
HIGH INTRSTAGE PRESS	** 20 character label associated with the first fault
10-19-1998 9:46 AM	** Date and time of the first fault

* If a view process screen line is not programmed in the monitor, the line will be blank.

** These lines will be blank when there are no faults.

20.7 If it is desired to read more than one record, the read command can be sent in succession with a different record number. The time between read commands should be one second or longer.

20.8 The first fault data log record can be read remotely if a current fault exists in the monitor. Send the following ASCII command for the first fault data log:

>(01 DL 999)

01 is the node number and should match the monitor. 999 is where the current first fault is located. If this command is sent with no faults on the monitor, it will respond with NO DATA AVAILABLE.

20.9 The most current data can be read remotely by sending the following ASCII command:

>(01 DL 000)

20.10 The value of parameters being monitored through the use of an auxiliary Altronic DSM series device can be retrieved serially through the DE-2200. This is done by sending a special serial command.

>(01 DL 00A)

The response from the DE-2200 will consist of a 512 byte ASCII text string with delimiters. The message will include the values of the monitored DSM channels as well as appropriate header information and engineering units. For this feature to be active the auxiliary DSM option must be selected during the programming of the DE-2200.

20.11 The DE-2200 system can be reset or stopped remotely by sending a serial command string.

REMOTE RESET >(01 AUTO)

REMOTE STOP >(01 STOP)

20.12 The DE-2200 is compliant to the Modicon **Modbus RTU** standard. The DE-2200 only supports register reads; data is duplicated for the 30000's & 40000's address range. Maximum number of registers that can be read at one time has been limited to 32. See the Modbus address list at pages 35-36. Note the first 8 Modbus registers duplicate the registers of the Altronic DD-40NTS to simplify user software requirements, if both types of systems are in use.

20.13 IDENTIFICATION - In addition to the above, the DE-2200 will respond to function code 17 with an identification string as follows:

Query:

NN 17 CRC CRC

NN = node number, 17 = ID function code, CRC CRC = two byte Modbus RTU CRC.

Response:

NN 17 07 D E - 2 2 0 0 CRC CRC

NN = node number, 17 = ID function code, 07 = number of bytes to follow, DE-2200 (seven byte ASCII ID string), CRC CRC = two byte Modbus RTU CRC

20.14 REMOTE STOP/RESET - Register 40999 can be written to remotely trigger the stop and reset functions. It will respond to a single write only (function code 06). The stop command is 0xAC53. The reset command is 0xBE41.

20.15 REMOTE OPERATOR INTERFACE - The DE-2500 has a feature called the Remote Operator Interface or "ROI" that can be accessed through function code 20 , This makes it possible for any function normally accessible locally on the keypad to be implemented remotely via Modbus. Since the response to the Key Press commands automatically returns the current display on the device possible conflict between local and remote control authorities can be readily avoided and the actual device status on the display is known at both locations.

Query:

NN 20 KP CRC CRC

Where: NN = node number, 20 = KP function code, KP is the single byte "Key Press" from the table below, CRC CRC = two byte Modbus RTU CRC.

"Key Press" Table

00 = NONE (no keypress, returns current display)
01 = CANCEL TIMERS
02 = TEST
03 = RESET
04 = STOP
05 = VIEW
06 = NEXT
07 = UP/UNITS
08 = VIEW CHAN
09 = F1
10 = RIGHT/TENS
11 = ENTER
12 = LEFT/TENS
13 = F2
14 = MENU
15 = DOWN/UNITS
16 = ESC

Response:

NN 20 88 (20 bytes 1st line of display) CR LF (20 bytes 2nd line) CR LF (20 bytes 3rd line)
CR LF (20 bytes 4th line) CR LF CRC CRC

NN = node number, 20 = KP function code, 88 = number of bytes to follow,
CR = Carriage Return, LF = Linefeed, 4 20 byte ASCII blocks that is the display, CRC
CRC = two byte Modbus RTU CRC

21.0 AUTOMATIC CALL OUT USING AN EXTERNAL MODEM

21.1 The DE-2200 monitor system can perform an automatic call out upon a fault condition. When a fault occurs, the DE-2200 monitor system will dial up to four preprogrammed phone numbers stored in an external modem, negotiate communications and send the first fault data log report message (the 999 command) to the Altronic monitor program on a PC or to a customer supplied device.

21.2 An external modem of 9600 baud or greater along with a null modem cable or adapter connected to the RS-232 port on the monitor is used for remote modem communications. Set port 1 to communicate in ASCII mode when configuring the system. See the drawing WIRING DIAGRAM - EXTERNAL MODEM and the modems user's guide for more information on installing the modem.

21.3 The modem must first be configured using the monitor program to the following configuration: Note: The related modem configuration commands are shown in parenthesis. The commands not listed are set to factory defaults. Modem profile 0 (zero) is used by the monitor system. Up to four phone numbers can be programmed in the modem.

9600 baud only (S37=9)

8 data bits, 1 stop bit

no parity

DTR is always on (&D0)

Local Echo off (E0)

Display verbal result codes (V1)

Auto answer on the first ring (S00=1)

Set inactivity timer to one minute (S19=1)

Store the current configuration as profile 0 in nonvolatile memory (&W0)

Use modem profile 0 (&Y0)

store up to four telephone numbers in nonvolatile memory (&Zn=x)

n is the memory location, x is the phone number to be stored

For more information on configuring the modem please see the programming instructions Also please refer to the modems user's guide and reference manual.

21.4 Upon a fault, the monitor sends the dial string to dial the first stored phone number in the modem (ATDTS0). If communications are established, the first fault data log report message is sent. After the first fault message is sent, a pause of about ten seconds occurs allowing for time to request other data logs. After ten seconds of no activity the monitor causes the modem to go offline. The first fault data log is then available on the remote PC for customer use. If more than one phone number is programmed in the modem, the monitor will attempt to dial each number until all numbers have been successfully negotiated. If the first stored phone number in the modem is not available, the monitor will immediately dial the second stored phone number. After attempting to dial all of the programmed phone numbers and if any of them were not answered, a pause of 10 minutes will occur.

After the 10 minute wait period for the line to clear, the monitor will send the dial string for the unanswered stored phone numbers. This sequence will occur twenty times or until it gets a connect signal for each programmed phone number. If all faults are cleared by initiating a reset, the monitor will cease dialing out.

22.0 TROUBLESHOOTING THE DE-2200 MONITOR SYSTEM

- 22.1 The power LED's on the Power Supply and Terminal Module are blank as well as the LCD on the display module:
- A. Check the power supply voltage at the 12-24 Vdc input terminals; should be between 12 and 24 Vdc.
 - B. Check the power supply power fuse and replace if blown. NOTE: A spare fuse (part number 601653 - 6.3 amp) is provided on the power supply board.
 - C. If the Terminal Module power LED or the Display Module LCD is not on, make sure the 25 pin connectors and cable assembly are connected and are secured.
- 22.2 The normally open sensors do not cause a fault:
- A. Make sure the power supply minus terminal is grounded to the panel and the panel is grounded to the engine block. They must all be at the same potential for normally open sensors that use the engine block as a return path. Use an ohmmeter and measure between the power supply minus terminal and the panel and engine block - this reading should be less than 2 ohms.
- 22.3 The output LED's are changing state but the relays or solenoid valves connected to the outputs are not tripping:
- A. Check that the wiring is correct and check the output module fuse. NOTE: A spare fuse (part number 601653 - 6.3 amp) is provided on the power supply board.
- 22.4 The power LED's are lit as well as the LCD backlighting but the LCD is blank or shows "WARNING: THE DE-2200 Monitor MUST BE CONFIGURED PRIOR TO USE ON AN ENGINE":
- A. The monitor system needs to be configured. See the programming instruction form DE-2200 PI to configure the system.
- 22.5 The home screen displays NO COMM. message for either the speed, suction or discharge:
- A. Communications from the terminal PCB to the DE-2200 monitor have been broken. Check cable connections.

MODBUS ADDRESS LIST

ADDRESS	DESCRIPTION OF FUNCTION	RANGE
40001	RPM	0 to 9999
40002	Hours	0 to 65535
40003	Reserved	0 at all times
40004	Status, 00=start up, 01=running, 60=stop, xx=fault no.	00 to 60
40005	Output status 1-4=bits 0-3 in order, 0=fault, 1=inactive	0 to 16
40006	Inputs 10-17=bits 0-7, 20-27= bits 8-15, 0=faulted	0 to 65535
40007	Inputs 30-37=bits 0-7, 40-46=bits 8-14, 0=faulted, bit 15=1	32768 to 65535
40008	Reserved	65535 at all times
40009	CHAN. 30-46 faults, bit 0=1 Lo setpoint bit 1=1 Hi setpoint	0 to 2
40010	From this register to 40049 reserved for future use	0 to 65535
40050	Optional DSM CHAN. 1 analog value	-9999 to 9999
40051	Optional DSM CHAN. 2 analog value	-9999 to 9999
40052	Optional DSM CHAN. 3 analog value	-9999 to 9999
40053	Optional DSM CHAN. 4 analog value	-9999 to 9999
40054	Optional DSM CHAN. 5 analog value	-9999 to 9999
40055	Optional DSM CHAN. 6 analog value	-9999 to 9999
40056	Optional DSM CHAN. 7 analog value	-9999 to 9999
40057	Optional DSM CHAN. 8 analog value	-9999 to 9999
40058	Optional DSM CHAN. 9 analog value	-9999 to 9999
40059	Optional DSM CHAN. 10 analog value	-9999 to 9999
40060	Optional DSM CHAN. 11 analog value	-9999 to 9999
40061	Optional DSM CHAN. 12 analog value	-9999 to 9999
40062	Optional DSM CHAN. 13 analog value	-9999 to 9999
40063	Optional DSM CHAN. 14 analog value	-9999 to 9999
40064	Optional DSM CHAN. 15 analog value	-9999 to 9999
40065	Optional DSM CHAN. 16 analog value	-9999 to 9999
40066	Optional DSM CHAN. 17 analog value	-9999 to 9999
40067	Optional DSM CHAN. 18 analog value	-9999 to 9999
40068	Optional DSM CHAN. 19 analog value	-9999 to 9999
40069	Optional DSM CHAN. 20 analog value	-9999 to 9999
40070	Optional DSM CHAN. 21 analog value	-9999 to 9999
40071	Optional DSM CHAN. 22 analog value	-9999 to 9999
40072	Optional DSM CHAN. 23 analog value	-9999 to 9999
40075	Optional DSM CHAN. 1 decimal point position from right	0 to 3
40076	Optional DSM CHAN. 2 decimal point position from right	0 to 3
40077	Optional DSM CHAN. 3 decimal point position from right	0 to 3
40078	Optional DSM CHAN. 4 decimal point position from right	0 to 3
40079	Optional DSM CHAN. 5 decimal point position from right	0 to 3
40080	Optional DSM CHAN. 6 decimal point position from right	0 to 3
40081	Optional DSM CHAN. 7 decimal point position from right	0 to 3
40082	Optional DSM CHAN. 8 decimal point position from right	0 to 3
40083	Optional DSM CHAN. 9 decimal point position from right	0 to 3
40084	Optional DSM CHAN. 10 decimal point position from right	0 to 3

MODBUS ADDRESS LIST (continued)

ADDRESS	DESCRIPTION OF FUNCTION	RANGE
40085	Optional DSM CHAN. 11 decimal point position from right	0 to 3
40086	Optional DSM CHAN. 12 decimal point position from right	0 to 3
40087	Optional DSM CHAN. 13 decimal point position from right	0 to 3
40088	Optional DSM CHAN. 14 decimal point position from right	0 to 3
40089	Optional DSM CHAN. 15 decimal point position from right	0 to 3
40090	Optional DSM CHAN. 16 decimal point position from right	0 to 3
40091	Optional DSM CHAN. 17 decimal point position from right	0 to 3
40092	Optional DSM CHAN. 18 decimal point position from right	0 to 3
40093	Optional DSM CHAN. 19 decimal point position from right	0 to 3
40094	Optional DSM CHAN. 20 decimal point position from right	0 to 3
40095	Optional DSM CHAN. 21 decimal point position from right	0 to 3
40096	Optional DSM CHAN. 22 decimal point position from right	0 to 3
40097	Optional DSM CHAN. 23 decimal point position from right	0 to 3
40100	Analog value CHAN. 30	-9999 to 9999
40101	Analog value CHAN. 31	-9999 to 9999
40102	Analog value CHAN. 32	-9999 to 9999
40103	Analog value CHAN. 33	-9999 to 9999
40104	Analog value CHAN. 34	-9999 to 9999
40105	Analog value CHAN. 35	-9999 to 9999
40106	Analog value CHAN. 36	-9999 to 9999
40107	Analog value CHAN. 37	-9999 to 9999
40108	Analog value CHAN. 40	-9999 to 9999
40109	Analog value CHAN. 41	-9999 to 9999
40110	Analog value CHAN. 42	-9999 to 9999
40111	Analog value CHAN. 43	-9999 to 9999
40112	Analog value CHAN. 44	-9999 to 9999
40113	Analog value CHAN. 45	-9999 to 9999
40114	Analog value CHAN. 46	-9999 to 9999
40115	CHAN. 30 decimal point position from right	0 to 3
40116	CHAN. 31 decimal point position from right	0 to 3
40117	CHAN. 32 decimal point position from right	0 to 3
40118	CHAN. 33 decimal point position from right	0 to 3
40119	CHAN. 34 decimal point position from right	0 to 3
40120	CHAN. 35 decimal point position from right	0 to 3
40121	CHAN. 36 decimal point position from right	0 to 3
40122	CHAN. 37 decimal point position from right	0 to 3
40123	CHAN. 40 decimal point position from right	0 to 3
40124	CHAN. 41 decimal point position from right	0 to 3
40125	CHAN. 42 decimal point position from right	0 to 3
40126	CHAN. 43 decimal point position from right	0 to 3
40127	CHAN. 44 decimal point position from right	0 to 3
40128	CHAN. 45 decimal point position from right	0 to 3

INDEX BY SECTION:

- 1.0 OVERVIEW
- 2.0 DISPLAY MODULE
- 3.0 POWER SUPPLY MODULE
- 4.0 TERMINAL MODULE
- 5.0 MOUNTING
- 6.0 WIRING
- 7.0 HAZARDOUS AREA OPERATION
- 8.0 KEYPAD DESCRIPTION
- 9.0 HOME SCREEN DESCRIPTION
- 10.0 VIEW PROCESS SCREENS
- 11.0 VIEW CHANNEL SCREENS
- 12.0 SHUTDOWN OR FAULT STATUS SCREENS
- 13.0 TEST MODE SCREENS
- 14.0 AUTO PRE-LUBE / POST-LUBE
- 15.0 SPEED SWITCH
- 16.0 THE HOURMETER AND SERVICE METER
- 17.0 VIEWING OR EDITING THE CONFIGURATION USING THE MENU MODE
- 18.0 VIEWING THE TIME AND DATE OF THE FIRST FAULT
- 19.0 CONTRAST RATIO ADJUSTMENT
- 20.0 DATA LOGGING AND COMMUNICATION OPTIONS
- 21.0 AUTOMATIC CALL OUT OPTION
- 22.0 TROUBLESHOOTING

DRAWINGS SECTION:

DE-2200 MOUNTING DIMENSIONS AND SPECIFICATIONS

DE-2200 TERMINAL MODULE AND POWER SUPPLY MODULE

WIRING DIAGRAM, GENERAL HOOK-UP

WIRING DIAGRAM, SENSOR, TRANSDUCER AND THERMOCOUPLE INPUTS

WIRING DIAGRAM, POWER SUPPLY MODULE

WIRING DIAGRAM, TACHOMETER INPUT

POWER SUPPLY LED AND OUTPUT MODULE LOCATIONS

WIRING DIAGRAM, RS-485 COMMUNICATIONS

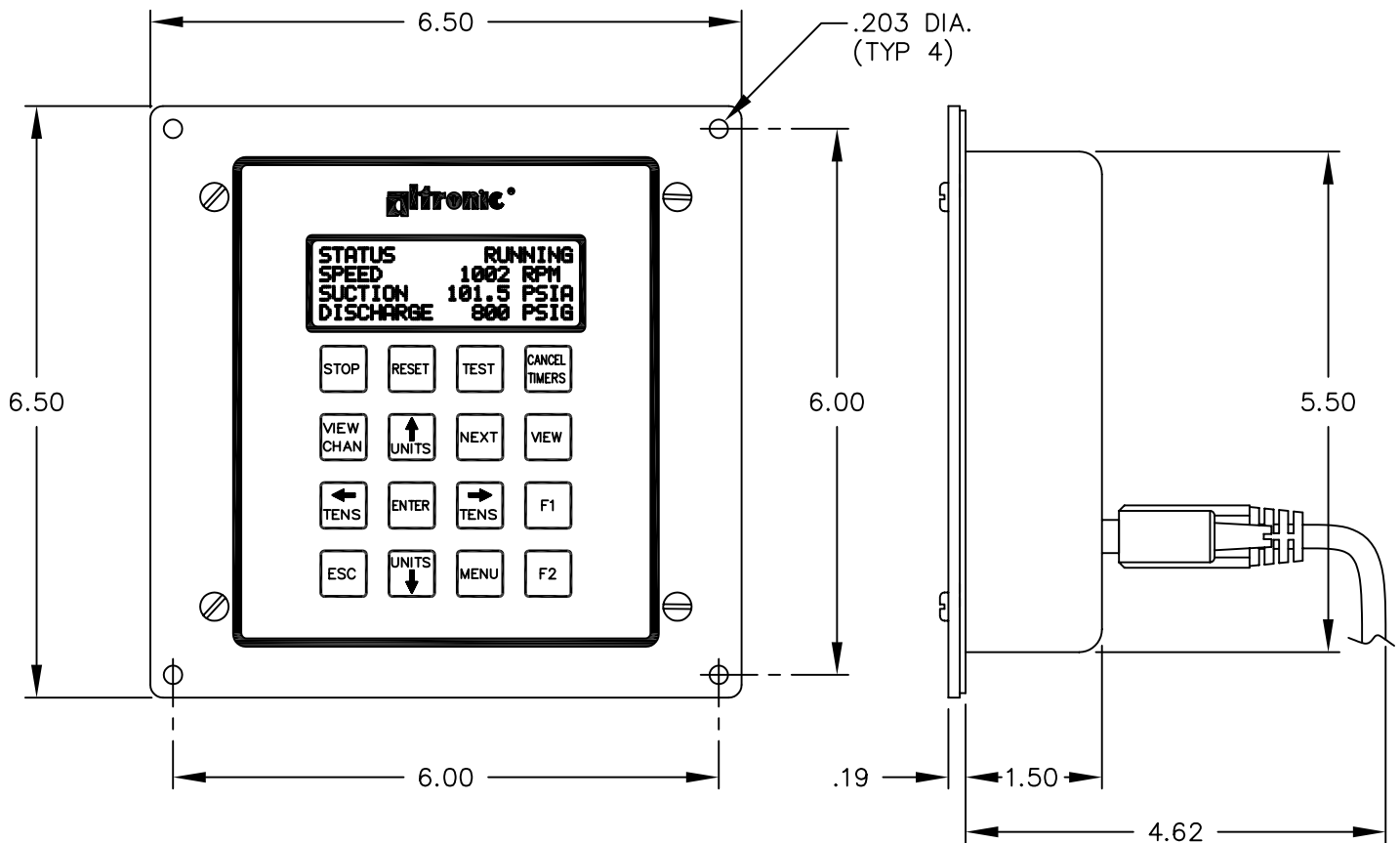
WIRING DIAGRAM, PERSONAL COMPUTER

CONTRAST ADJUSTMENT AND MEMORY LOCATION

WIRING DIAGRAM, EXTERNAL MODEM

DE-2200 COMPRESSOR MONITOR

MOUNTING DIMENSIONS AND SPECIFICATIONS



SPECIFICATIONS:

POWER REQUIRED: DC POWERED 12–24 VDC, 10 WATTS TYPICAL 15 WATTS MAXIMUM.

INPUTS: 16 DISCRETE SWITCH INPUTS EITHER NORMALLY OPEN OR NORMALLY CLOSED.
REMOTE RESET AND REMOTE STOP.

UP TO 14 ANALOG INPUTS 0–5 VOLTS.

UP TO 7 TYPE "J" OR "K" THERMOCOUPLE INPUTS.

RPM INPUT: .5 – 361 PPR

OUTPUTS: UP TO FOUR STANDARD DIGITAL OUTPUT MODULES OR AN ALTRONIC
IGNITION SHUTDOWN AND FUEL VALVE TRIP OUTPUT MODULE (691124)
AND TWO STANDARD DIGITAL MODULES FOR ENGINE CONTROL.

DISPLAY: 4 X 20 LCD CHARACTER DISPLAY WITH LED BACKLIGHT.

TIME KEEPING: REAL TIME CLOCK AND CALENDAR WITH BATTERY BACKUP.

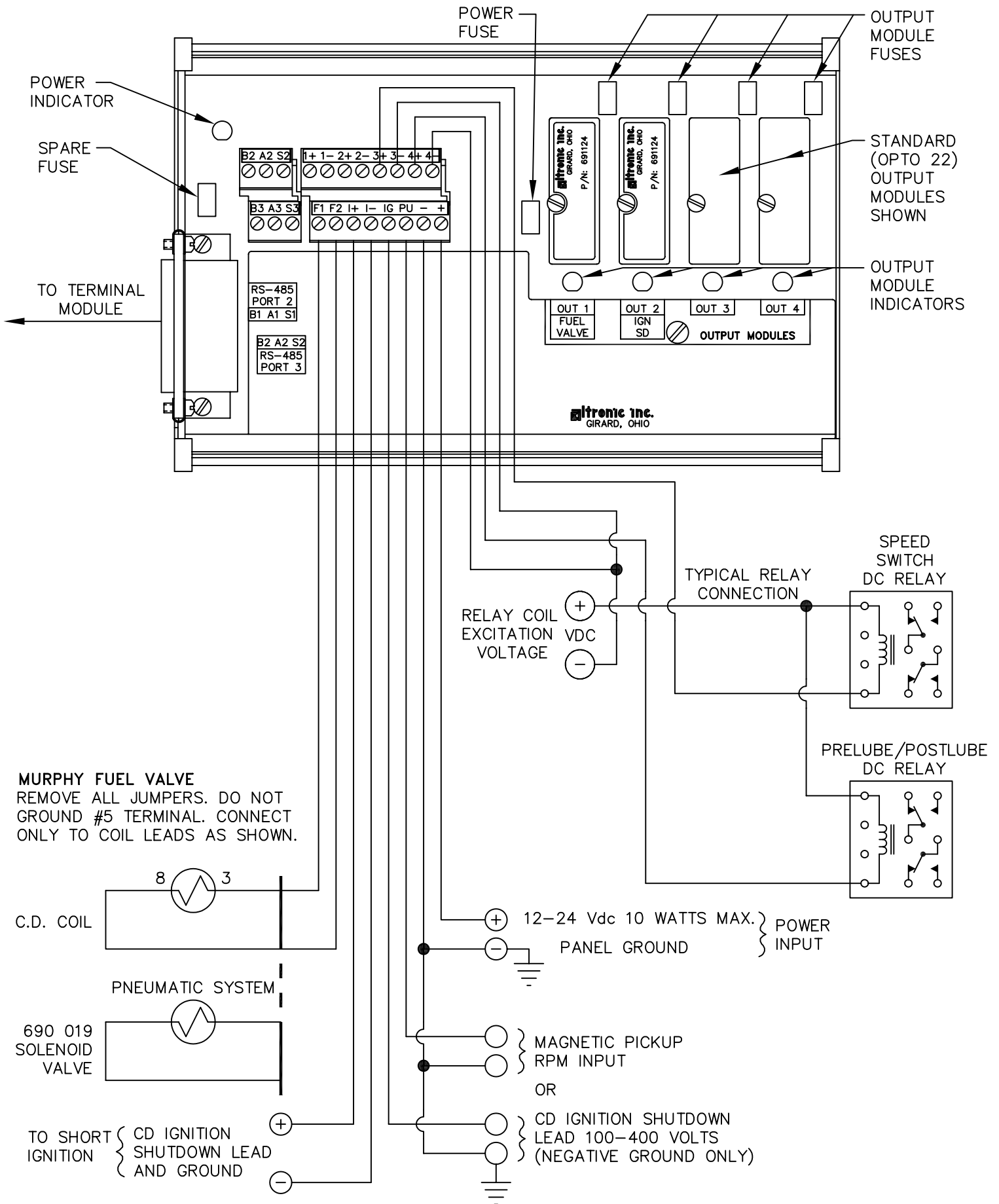
SCAN RATE: SCANS ALL DISCRETE SWITCHES PLUS REMOTE RESET AND
STOP 15 TIMES/SECOND.
SCANS ALL 14 ANALOG INPUTS 1.6 TIMES/SECOND.

OPERATING TEMPERATURE RANGE: –35°C TO +80°C (–31°F TO 176°F).

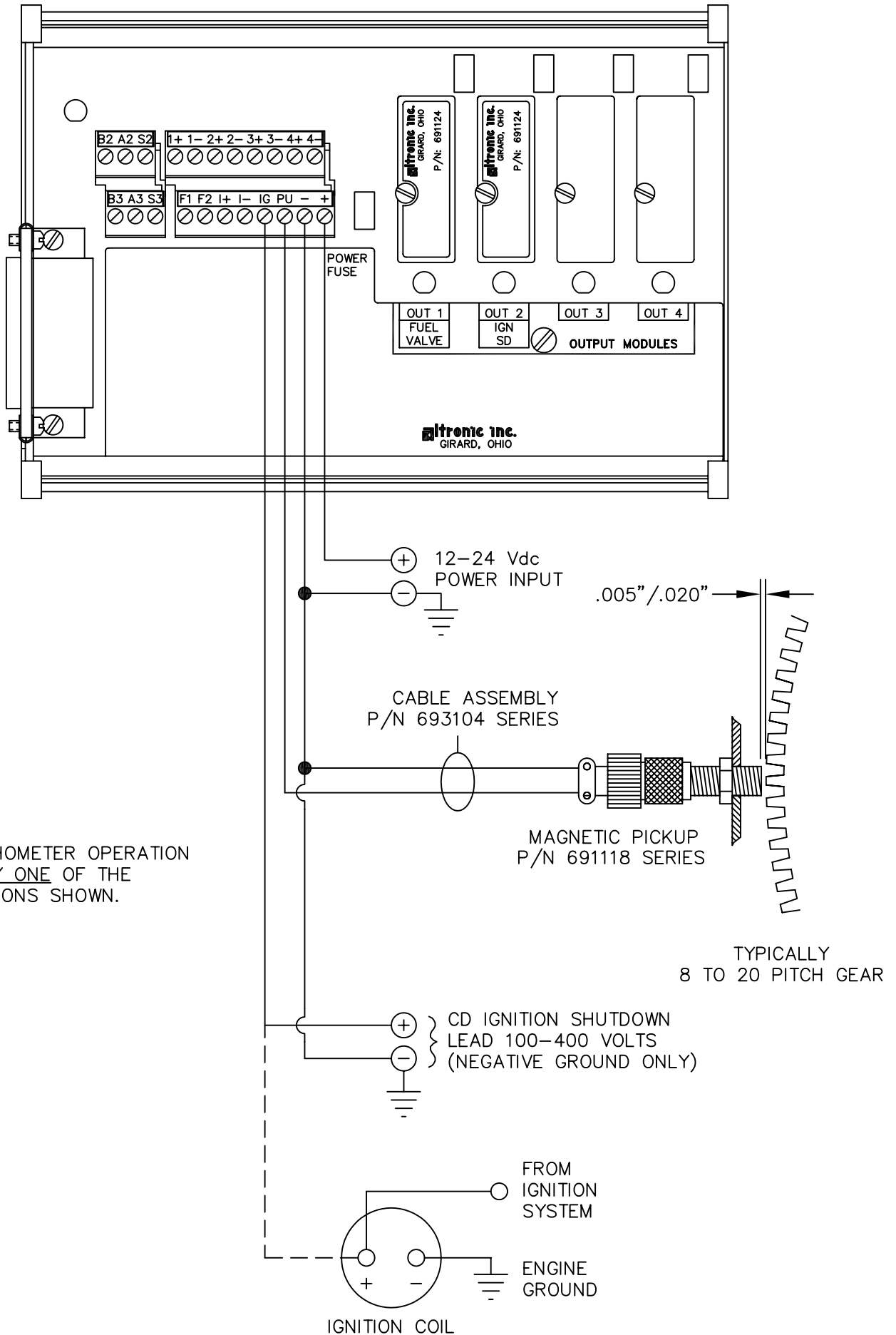
COMMUNICATIONS: 2 EACH RS–485, CONNECTION ON POWER SUPPLY.
1 EACH RS–232, CONNECTION ON DISPLAY MODULE.

HAZARDOUS AREA CLASSIFICATION: CLASS 1, GROUP C, D, DIV. 2, T4.

WIRING DIAGRAM – POWER SUPPLY MODULE

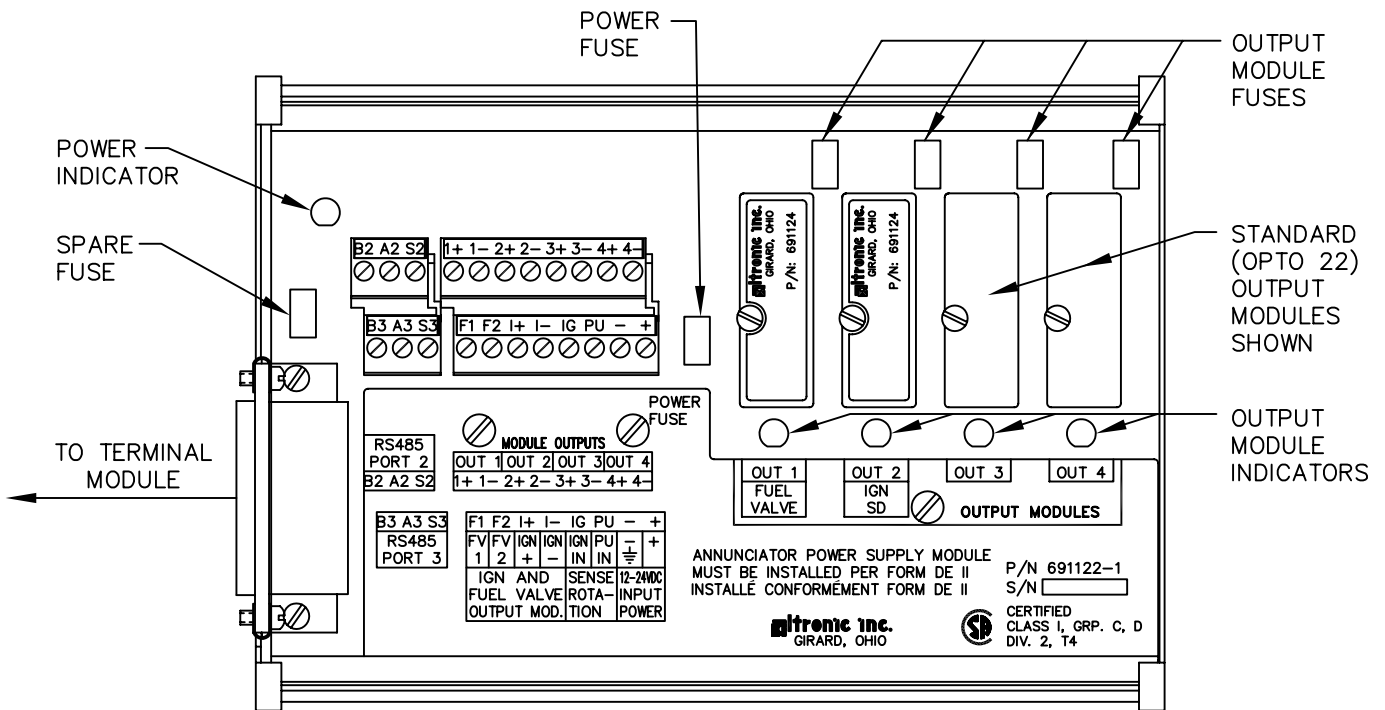


WIRING DIAGRAM – TACHOMETER INPUT



NOTE:
FOR TACHOMETER OPERATION
USE ONLY ONE OF THE
APPLICATIONS SHOWN.

POWER SUPPLY LED AND OUTPUT MODULE LOCATIONS



FUSES: FUSES ARE REPLACEABLE 6.3 AMP, P/N 601653.

OUTPUT MODULES: 691124 – THIS CUSTOM MODULE HAS TWO USES: CONNECTION TO A MURPHY FUEL VALVE AND DIRECTLY GROUNDING A C.D. IGNITION SYSTEM.

- USE IN POSITION OUT 1 TO CONNECT TO A C.D. IGNITION TYPE MURPHY FUEL VALVE.
- USE IN POSITION OUT 2 TO DIRECTLY GROUND–OUT (STOP) A C.D. IGNITION SYSTEM.

691125 – THIS STANDARD MODULE IS RATED FOR 5–48 Vdc, 5.0 A. AND MAY BE USED IN ANY OF THE FOUR OUTPUT SLOTS OUT 1 THROUGH OUT 4.

691056 – THIS STANDARD MODULE IS RATED FOR 5–60 Vdc, 2.0 A. AND MAY BE USED IN ANY OF THE FOUR OUTPUT SLOTS OUT 1 THROUGH OUT 4.

691066 – THIS STANDARD MODULE IS RATED FOR 5–200 Vdc, 0.67 A. AND MAY BE USED IN ANY OF THE FOUR OUTPUT SLOTS OUT 1 THROUGH OUT 4.

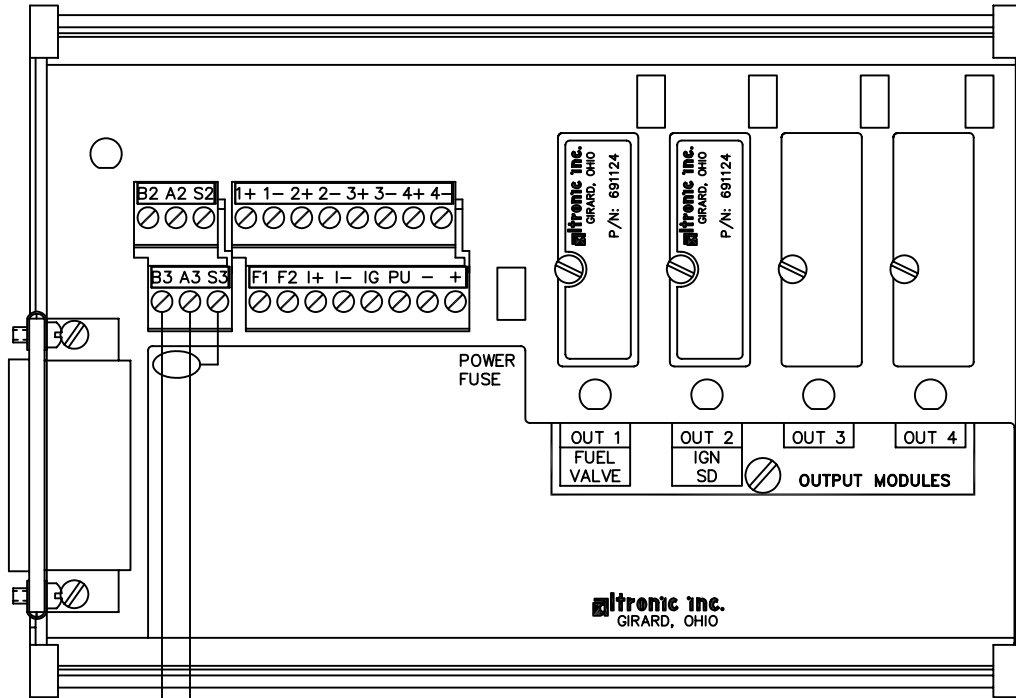
691065 – THIS STANDARD MODULE IS RATED FOR 24–280 Vac, 2.0 A. AND MAY BE USED IN ANY OF THE FOUR OUTPUT SLOTS OUT 1 THROUGH OUT 4.

NOTE: OTHER INDUSTRY STANDARD 0.6 INCH MODULES MAY BE USED AS REQUIRED.

LED OPERATION: – THE POWER LED INDICATOR LIGHTS WHEN POWER IS APPLIED TO THE SYSTEM.

- FOR THE NORMALLY CLOSED CONFIGURED OUTPUT MODULES (ENERGIZED FOR RUN), THE LED WILL BE ON IN THE NORMAL RUN STATE AND OFF FOR A FAULT CONDITION.
- FOR THE NORMALLY OPEN CONFIGURED OUTPUT MODULES, THE LED WILL BE OFF IN THE NORMAL RUN STATE AND TURN ON FOR A FAULT CONDITION.
- FOR THE ALTRONIC OUTPUT MODULES P/N 691124, THE LED WILL BE ON IN THE NORMAL RUN STATE AND OFF FOR A FAULT CONDITION.

WIRING DIAGRAM – RS-485 COMMUNICATIONS



PC or PLC

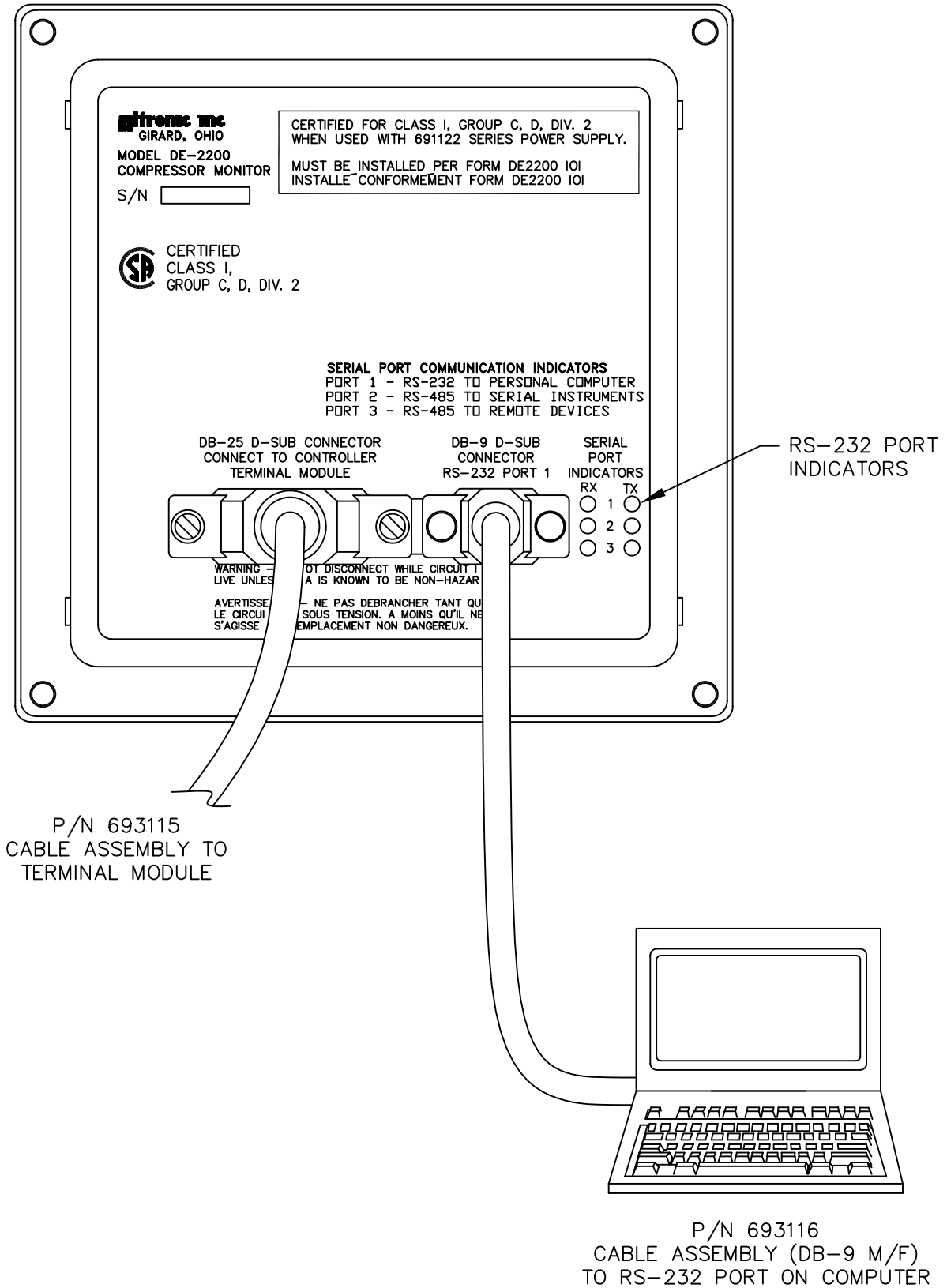
RS-485 "A"
RS-485 "B"

NOTE: CONNECT A 120Ω RESISTOR BETWEEN RS-485 "A" AND RS-485 "B" TERMINALS AT THE POWER SUPPLY MODULE FOR WIRE RUNS GREATER THAN 500 FEET TOTAL.

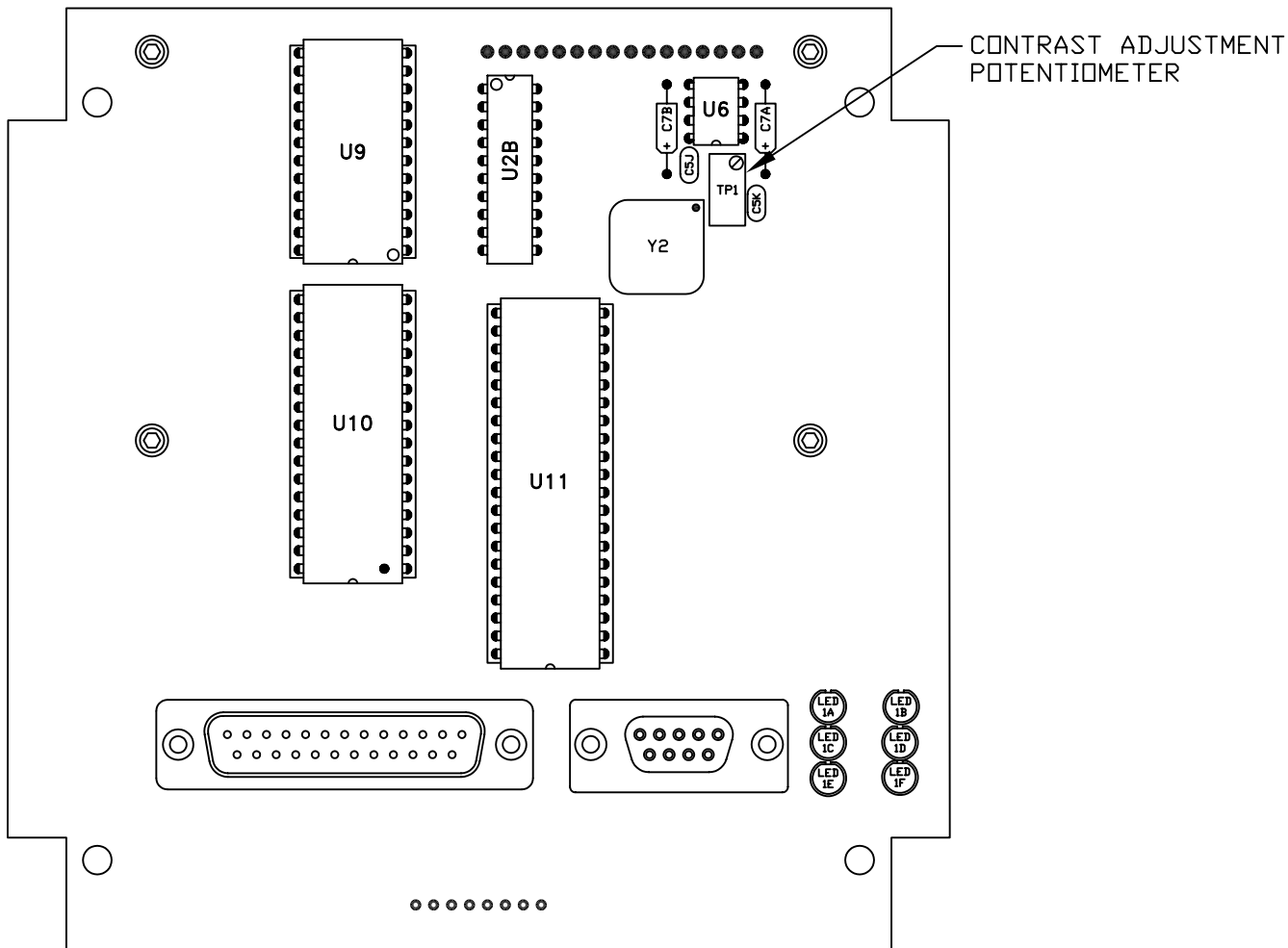
NOTES:

1. USE SHIELDED CABLE FOR RS-485 CONNECTIONS. CONNECT SHIELD AT POWER SUPPLY MODULE ONLY.
2. EACH PLC MUST HAVE A UNIQUE NODE NUMBER. MAXIMUM 32 NODES.
3. TO MINIMIZE UNWANTED REFLECTIONS ON THE RS-485 LINE, THE WIRES SHOULD BE HOOKED-UP FROM ONE INSTRUMENT TO THE NEXT IN A DAISYCHAIN FORMAT.

WIRING DIAGRAM – PERSONAL COMPUTER

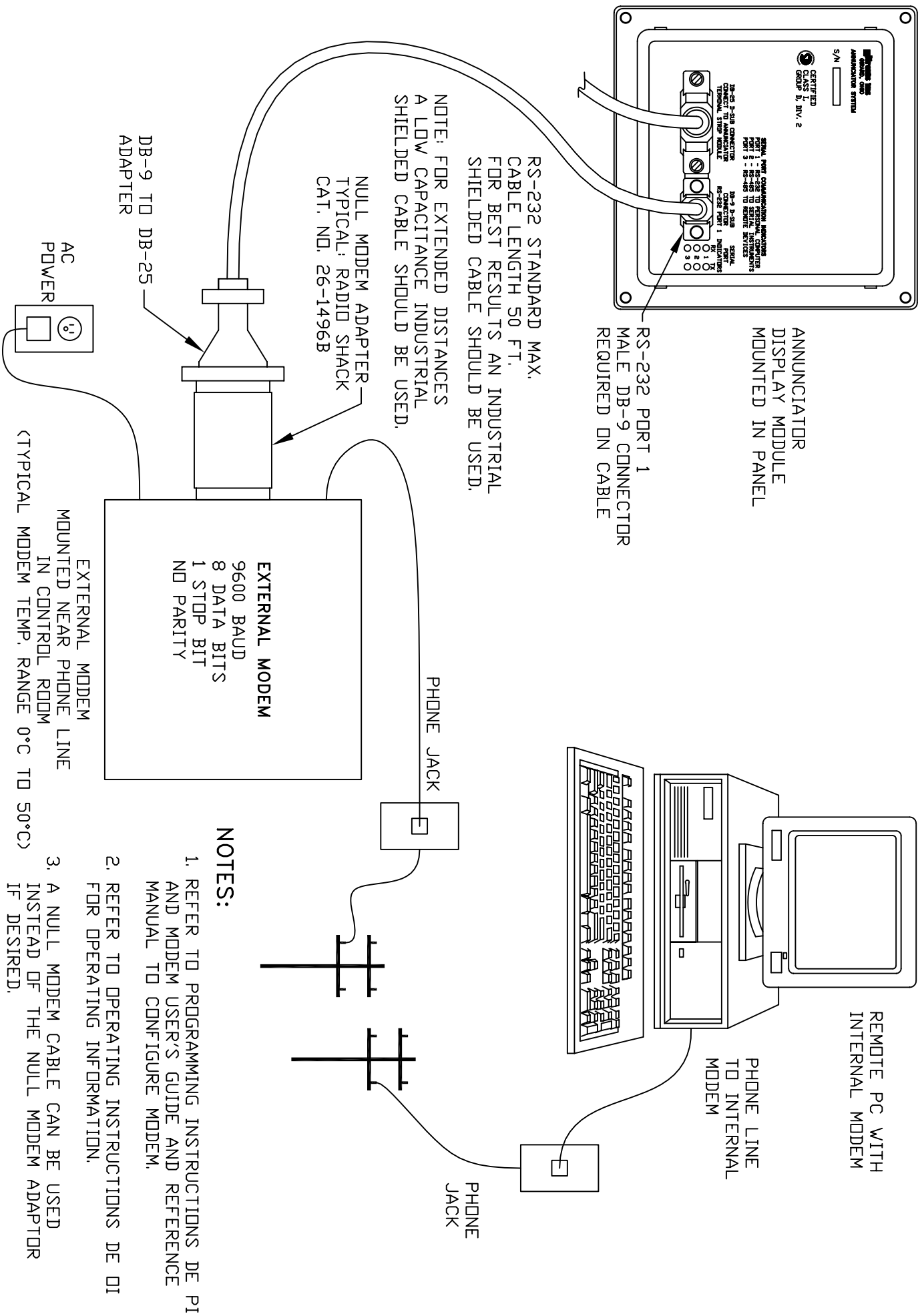


CONTRAST ADJUSTMENT AND MEMORY LOCATION



1. TO ADJUST LCD DISPLAY CONTRAST RATIO: 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 COUNTERCLOCKWISE THREE TO THREE AND ONE HALF TURNS. THE DISPLAY SHOULD THEN BE AT A DESIRABLE CONTRAST RATIO.
2. U9 IS AN EEPROM. THIS IS WHERE THE USER CONFIGURED PROGRAM RESIDES.
U10 IS A BATTERY BACKED RAM MODULE.
U11 IS A MICRO CONTROLLER CHIP. THIS IS WHERE THE FIRMWARE RESIDES.

WIRING DIAGRAM - EXTERNAL MODEM



NOTES:

1. REFER TO PROGRAMMING INSTRUCTIONS DE PI AND MODEM USER'S GUIDE AND REFERENCE MANUAL TO CONFIGURE MODEM.
2. REFER TO OPERATING INSTRUCTIONS DE OI FOR OPERATING INFORMATION.
3. A NULL MODEM CABLE CAN BE USED INSTEAD OF THE NULL MODEM ADAPTOR IF DESIRED.