

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 This instruction applies to the DE-1500 controller. For help locating subjects in this document, a section index is provided - see page 18.
- 1.2 The controller system consists of two main parts: Display Module DE-1500, Power/Terminal Module 691142-1. Cable 693115-1 connects the two modules together.
- 1.3 The Altronic DE-1500 controller system is a dedicated electronic microprocessor-based system designed to sense specific analog (12-bit resolution) and digital input points to control and monitor the desired process or equipment function. The system is configurable for various applications using a PC (personal computer) and the supplied DE-1500 terminal program, and contains a non-volatile memory to store the setup. RS-485 serial communications, using a Modbus RTU protocol, provide an interface to PCs, PLCs, modems and satellite uplinks for remote communication, if desired. A backlit 4x20 LCD character display shows system status, programmed controller parameters and user-assigned channel labels. A front-mounted keypad serves as the local user interface. The DE-1500 provides for the control of one or two user-defined PID LOOPS with industry standard 4-20 mA outputs (12-bit resolution). Additionally, a PULSED OUTPUT control strategy can be implemented for solenoids controlling a slide valve or for direct control of motor valves. Digital output #8 allows for a simple interface to other Altronic Annunciators such as the DD-40 series or DE-2000 system. The DE-1500 provides for remote data acquisition and supervisory control in a compact, low cost package specifically designed for industrial engine and compressor applications.

2.0 DE-1500 DISPLAY MODULE

- 2.1 The Display Module serves as the user interface for the DE-1500 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.

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 USE.

- 2.3 The LCD has a user configured “home screen” that displays a status line and three USER selected analog channel values. Pressing the VIEW CHANNEL key displays the channel number, its timer status, analog value (if applicable), and the corresponding 20-character user label. 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.
- 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 after 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/TERMINAL MODULE

- 3.1 The Power/Terminal Module is rail mounted and is the interface to the DE-1500 Display Module and to other systems. It also is the point of interface between the field sensor wiring terminal strip and the DE-1500 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 4 normally open or normally closed switches as well as 8 analog transducers. The 4 discrete sensor inputs are numbered in typical annunciator format as 10-13. The 8 analog inputs are numbered 20-27.
- 3.2 The Power/Terminal Module has eight solid state output switches. The output switches provide a means of using the DE-1500 controller system to operate relays and solenoid valves. The output switches will be in the open (de-energized) condition when the unit is unpowered. If 12-24 Vdc is lost to the DE-1500 system, the output switches will go to an open state. The LEDs will be ON when the switches are ON, and OFF when the switches are OFF. Output 8 functions as an indicator for the status of SAFETY SHUTDOWN setpoints assigned to the analog inputs and will normally be OFF unless one or more setpoint is violated.
- 3.3 The 12-24 Vdc power for the DE-1500 system is applied to the power supply terminals marked (+) and (-) 12-24 VDC INPUT POWER. A 6 amp replaceable, slow-blow fuse protects the system from over-currents.

4.0 MOUNTING

- 4.1 Mount the controller in a panel 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 or process equipment being controlled.

5.0 SYSTEM WIRING (SEE WIRING DIAGRAMS)

- 5.1 The Terminal Module is made to be rail mounted and is the point of interface between the field sensor wiring and the DE-1500 controller system. A removable dual terminal strip is used for connection of the system to the equipment mounted discrete sensors which may consist of up to 4 normally open or normally closed switches as well as 8 analog transducers. The discrete sensor inputs are similar to previous Altronic annunciator systems and are numbered in the typical annunciator format as 10-13. The 8 analog inputs are numbered 20-27 and accept industry standard transducer signals in the range of 0-5 VDC. Connections from this Module to the Display Module are made using the 693115-x series Cable Assembly.
- 5.2 The DE-1500 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.
- 5.3 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 "Metri-Pack" connector. The ranges available are 0-100, 300, 500, 1000, 2000, and 5000 PSIG for the 691201-x and 0-50, 100, 300, 500 PSIA for the 691204-x, 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.
- 5.4 TEMPERATURE TRANSDUCER - The temperature transducers, Altronic P/N 691202-300, 691203-300 with a temperature measurement range of +5 to 300°F and the 691212-450, 691213-450 with a temperature range of -40 to +450°F are packaged in a sealed, stainless steel housing with a 5/8"-18 UNF threaded body, and a Packard "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.
- 5.5 THERMOCOUPLE INPUTS - The Terminal Module also accepts industry standard type "J" or "K" thermocouples on inputs 20-27. Automatic cold junction compensation is built-in. The units can be configured to °F or °C. Both a high and low setpoint is associated with each channel. The monitor can read type J thermocouples between -76°F and +1382°F (-60°C and +750°C) and type K thermocouples between -76°F and +1472°F (-60°C and +800°C).
- 5.6 GENERAL PRECAUTIONS FOR ALL SENSOR WIRING - In addition to the specific guidance given for each type of sensor, it is essential that the following practices be adhered to for all sensor wiring:
- 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. 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 through the DE-1500 sensor leads may damage the device. In addition, the area should be tested as non-hazardous before such testing commences.

5.7 ANALOG SENSOR WIRING - For each analog monitored point (inputs 20-27), 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. An internal 5 volt sensor supply is available to power the transducers; see wiring diagrams. Take care not to damage the insulation when installing and take precautions against later damage from vibration, abrasion, or liquids in conduits.

5.8 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 ensure 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.

5.9 DISCRETE SENSOR WIRING - Any discrete 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.

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.

5.10 POWER WIRING - The power wiring for the DE-1500.

- A. Connect the supply power wires to the 12-24 Vdc input power terminals on the Terminal Module, 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.

6.0 KEYPAD DESCRIPTION

- 6.1 The DE-1500 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 fault output #8 and control outputs go to the programmed condition.
- 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 the 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 the control screen, F1 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: RUNNING, TIMERS ACTIVE, FAULT AL, 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 DE-1500, 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 any programmed delay timers for Class “B” or “C” inputs expire. After the time delay is completed, the home screen will display the controller 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

STATUS TIMERS ACTIVE
 CHAN 20 42.3 PSIG
 CHAN 21 9.0 PSIG
 SPEED 1200 RPM

Appears after RESET when no faults are detected and the programmed delay timers are active

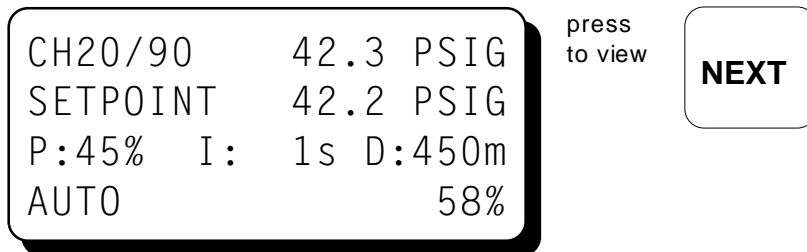
STATUS RUNNING
 CHAN 20 42.3 PSIG
 CHAN 21 9.0 PSIG
 SPEED 1200 RPM

Appears when all timers are expired, all faults are clear and all safety shutdown values are within the normal range

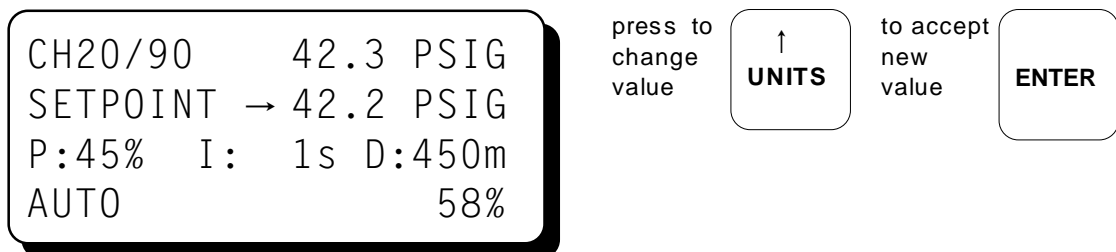
STATUS MANUAL STOP
 CHAN 20 42.3 PSIG
 CHAN 21 9.0 PSIG
 SPEED 1200 RPM

Appears when the USER has activated the MANUAL STOP

7.3 From the home screen, the CONTROL LOOP #1 screen is accessed by pressing the NEXT key once. CONTROL LOOP #1 is a closed loop PID controller which is assigned to the analog value measured by channel 20. This can be virtually any pressure, temperature, valve position or other equipment parameter which can be expressed as an analog value from 0 to 5 volts. Some typical controlled values would be the discharge pressure of a compressor, the intake manifold pressure of an engine, the temperature of a cooling system or the chemical composition of a process output. The first line of the display will indicate the input channel/output channel and the current value of the controlled parameter. The next line shows the desired value, or setpoint, of the controlled parameter. The third line shows the current settings of the loop tuning values; the P: 45% indicates a proportional band setting of 45%, the I:1s indicates an integral term of 1 second, and the D:450m indicates a derivative value of 450 minutes.



The current values of the control loop can be viewed at any time, however, to change these values, a specific key sequence must be entered first. **To unlock the control loop values, press the keys F2, F1, and ENTER in that order.** A small arrow will appear next to the value to be changed. Use the arrow keys to change the value and the ENTER key to accept the new value. As the ENTER key is pressed the controller will begin controlling to that value and advance to the next value. To disable the optional automatic control and force the controller output to a particular value after unlocking the control, 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 setpoint value.



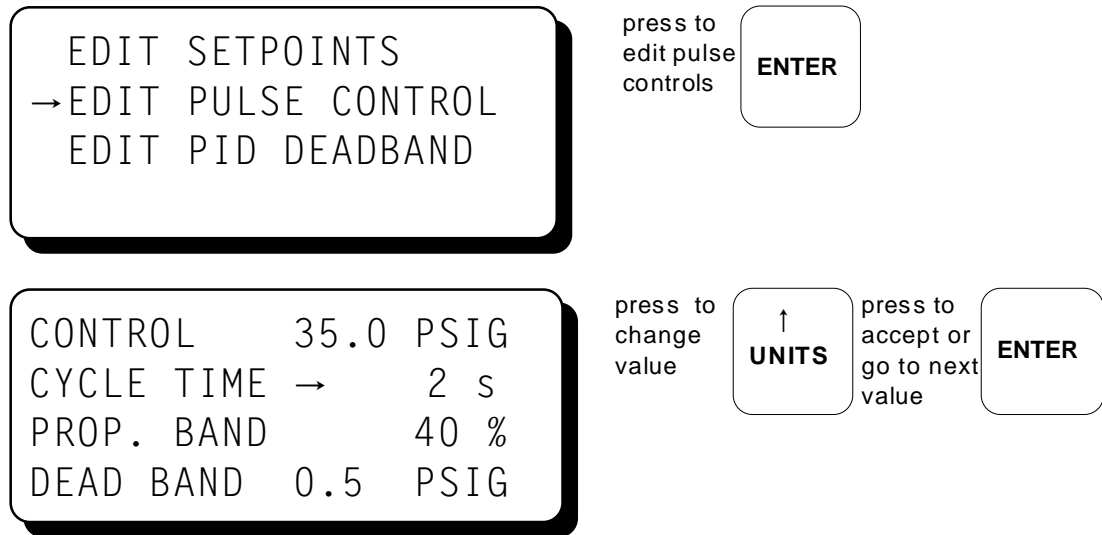
CH20/90 42.3 PSIG SETPOINT 42.2 PSIG P:45% I: 1s D:450m MANUAL → 58%	press to change mode	F1	press to change value	↑ UNITS
---	----------------------------	-----------	-----------------------------	-------------------

7.4 The second control loop, CONTROL LOOP #2, is accessed by pressing the NEXT key twice from the HOME screen. CONTROL LOOP #2 is a second independent PID loop (like LOOP #1) and can be programmed to control based upon the analog input of Channel 21. In addition to controlling the 4-20 mA output, based upon the channel 21 analog voltage, a closed loop control of the input frequency being measured by the RPM input Channel 30 is also possible. The selection of which channel acts as the control input is made when programming the unit from the PC Terminal program. In order to change the tuning values for LOOP #2 from the LOOP #2 screen, the same key sequence as for LOOP #1 is used. The screens which will appear for LOOP #2, depending upon which program option is used, are shown below.

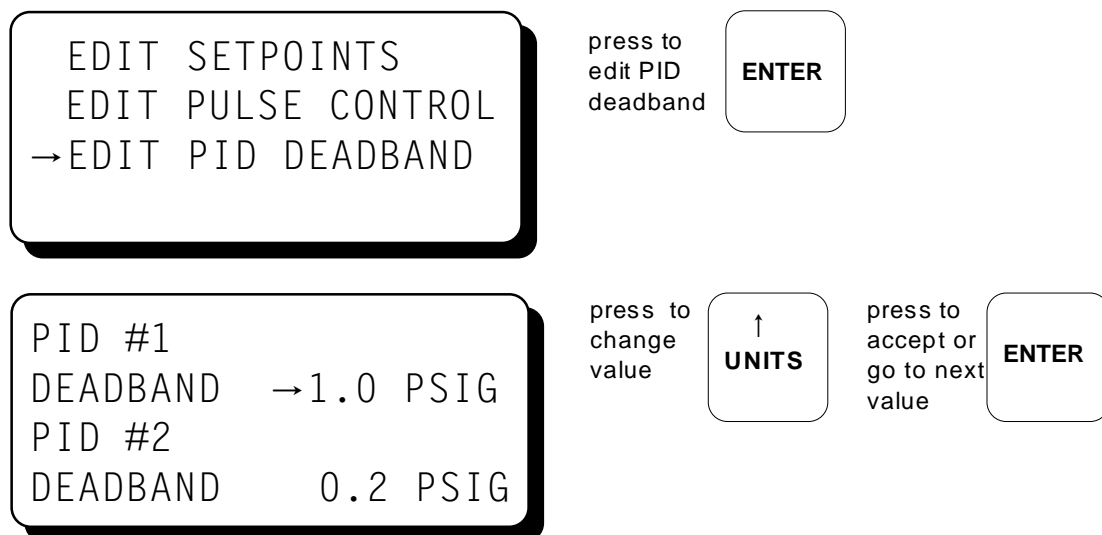
CH21/91 42.3 PSIG SETPOINT 42.2 PSIG P:45% I: 1s D:450m AUTO 58%	press twice to view	NEXT	or
---	---------------------------	-------------	----

CH30/91 1199 RPM SETPOINT 1200 RPM P: 45% I: 1s D:450m AUTO 58%	press twice to view	NEXT
---	---------------------------	-------------

7.5 In addition to the two 4-20 mA analog control loop outputs, the DE-1500 offers a pulsed digital output control option on Digital outputs #1 and #2 for use with solenoid valves or motor valves. This option is referred to as PULSE CONTROL and allows for closed loop control of the variable measured by the analog voltage measured by input channel 22. When PULSE CONTROL is used, Digital output #1 is used to open a valve or to increase the output when it is "ON". Digital output #2 is used to close a valve or decrease the output when it is turned "ON". A decision of which output to activate and for how long is made once per cycle. A maximum "ON" time limit is selected when programming the unit from the PC Terminal Program. To change the control variables for PULSE OUTPUTS, 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 PULSE CONTROL".



7.6 On some applications, in addition to all of the standard PID control tuning, it may be desirable to allow for a small controller deadband in order to promote system stability. To set or edit the PID deadband value, select this function from the Menu as shown.



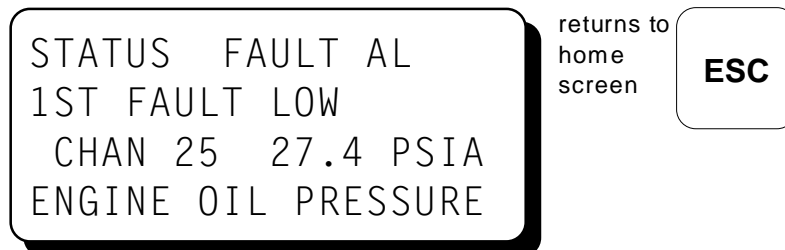
7.7 In addition to the three possible control loops, the DE-1500 controller continuously monitors the system for two different levels of USER-selected setpoints on every analog input. The first group is called control setpoints, and when violated, cause the control actions programmed into the unit by the PC terminal to be temporarily implemented until the operating conditions change. The violation of these setpoints may occur readily in normal operation of the system, and the unit does not require any USER intervention to resume standard operation when these clear. A variety of programmed actions are possible as listed below:

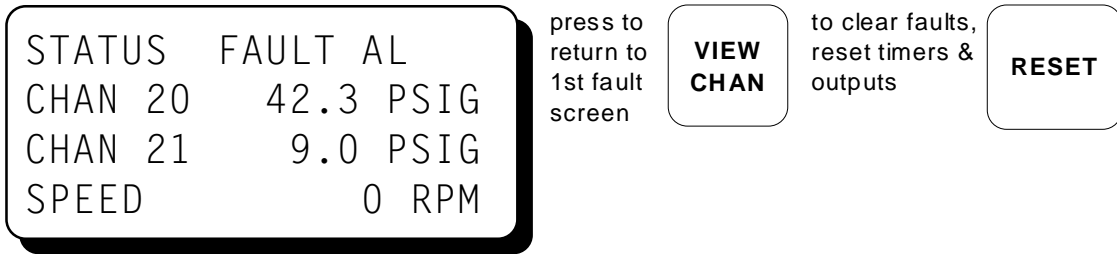
- Trip a controller digital output - One or more of the digital outputs (# 1-7) can be set to trip for each control setpoint of each channel. Five outputs are available (# 3-7), if the Pulse control option is used. These outputs can be used to activate solenoid valves or relays directly or to interface to additional equipment.
- Inhibit an output increase - The output of one or more of the control loops can be limited in the increasing direction only, while allowing the assigned output to freely decrease.
- Inhibit an output decrease - The output of one or more of the control loops can be limited in the decreasing direction only, while allowing the assigned output to freely increase.
- Force an output increase - The output of one or more of the control loops can be forced to increase even if the primary control loop requires a different action.
- Force an output decrease - The output of one or more of the control loops can be forced to decrease even if the primary control loop requires a different action.

In addition to these actions being assignable to the analog inputs, they are also assignable to the analog outputs. This allows for the output of one control loop to interact with the other according to a programmed priority. For example, the output of loop #2 can be inhibited until a certain output value of Loop #1 is reached.

Finally, all of these control actions can be programmed to occur on the basis of a discrete input monitored by channels 10 to 13. This facilitates a convenient interface to existing manual controls or to discrete outputs of other equipment.

7.8 The second level of monitored setpoints are the safety shutdowns. When any of these setpoints are violated, even momentarily, the digital output #8 will activate and will NOT change until a USER initiated RESET is received. When one of the safety shutdown setpoints has been violated, the digital output #8 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. 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.



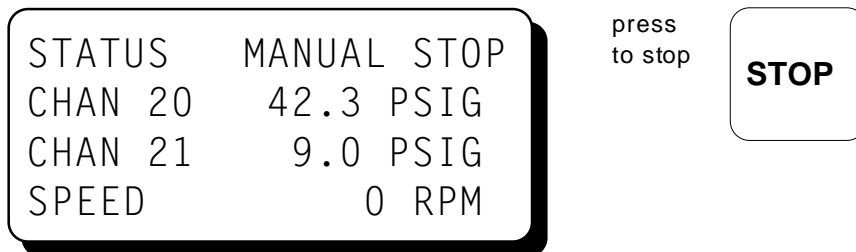


When a fault occurs on an analog channel 20-27, a “HIGH” or “LOW” indication will additionally be displayed as to whether the point faulted on a high or low setpoint.

The DE-1500 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.



7.9 The “MANUAL STOP” message will supersede all of the above home screens if the STOP key is pressed.



8.0 VIEW CHANNEL STATUS SCREENS

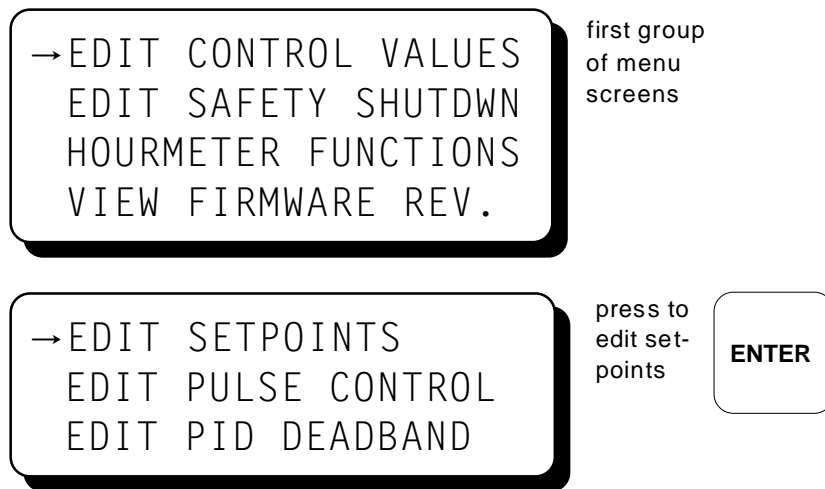
8.1 Use the VIEW CHAN key to enter the view channels screens. Once in the VIEW CHAN mode, the user can view any channel’s details. Upon pressing the view channel key, channel 10 will be shown. The UNITS and TENS keys allow the user to quickly navigate through the controller channels. Use the ↑ UNITS 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, 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 in 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 23. Use arrow keys as shown to select desired channels. Use ENTER key as shown to select LO or HI setpoint.



```
→CHAN 20
LO SP      20 PSIG
HI SP      60 PSIG
SUCTION PRESSURE
```

To select
Chan 23
press 3
times

↑
UNITS

```
→CHAN 23
LO SP      29 PSIG
HI SP      95 PSIG
INTERSTAGE PRESSURE
```

press to
edit LO
setpoint

ENTER

```
CHAN 23
LO SP      → 29 PSIG
HI SP      95 PSIG
INTERSTAGE PRESSURE
```

press to
change
LO value

↑
UNITS

accept
and go to
HI value

ENTER

9.5 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
EDIT INPUT CLASS
MORE MENUS
```

second group
of menu
screens

press to
go to next
screen

ENTER

```
CHAN →20
LO SP      10 PSIG
HI SP      80 PSIG
SUCTION PRESSURE
```

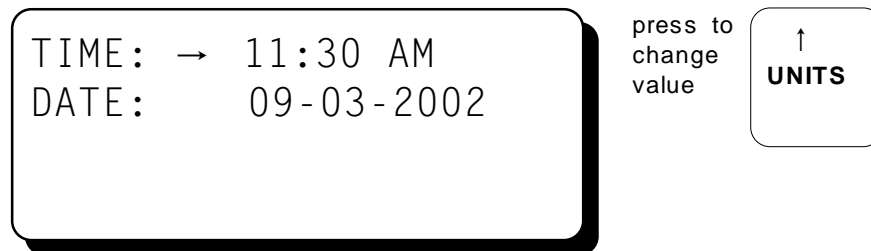
press to
go to LO
setpoint

ENTER

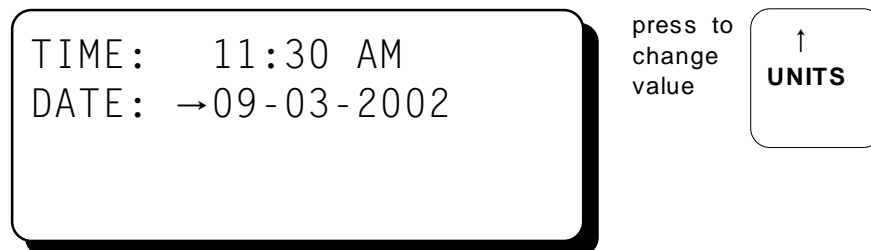
- 9.6 To view or edit the time and date, select “EDIT SAFETY SHUTDOWN” from the main menu. Select “MORE MENUS” from the following menu. Finally, select “EDIT TIME AND DATE” from the last menu.



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.



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.



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



```
EDIT CONTROL VALUES
EDIT SAFETY SHUTDOWN
→HOURMETER FUNCTIONS
VIEW FIRMWARE REV.
```

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-1500 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 the RS-485 port (port 3).

- 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-1500 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-1500

- 12.1 The DE-1500 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 95/98/2000/ME/NT/XP, 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\Altronic DE-1500\Terminal Program**. After the install completes, you can run the program from the Windows Start button, Programs Menu, Altronic DE-1500 system, and select the DE-1500 menu selection.

- 12.3 **CONFIGURE KEY** - The DE-1500 needs to be initially programmed using the DE-1500 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 and is typically used for PC monitoring or SCADA/PLC systems. The connection can be via a modem or direct connection to the RS232 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-1500. 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.

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.

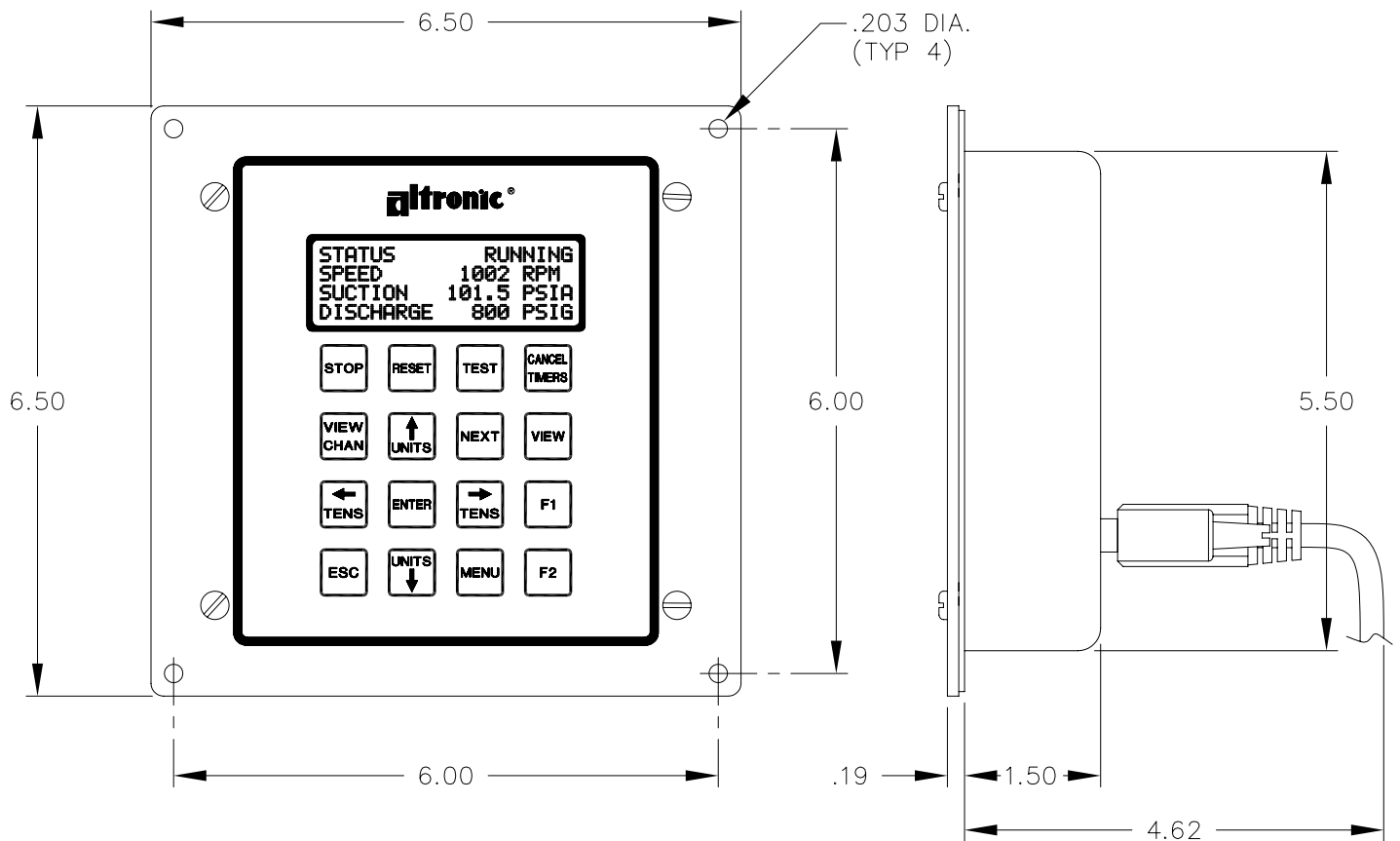
12.6 EXIT KEY - Exits the DE-1500 PC Terminal Program.

INDEX BY SECTION:

- 1.0 OVERVIEW
- 2.0 DISPLAY MODULE
- 3.0 POWER/TERMINAL MODULE
- 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

DE-1500 CONTROLLER

MOUNTING DIMENSIONS AND SPECIFICATIONS



SPECIFICATIONS:

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

INPUTS: 4 DISCRETE SWITCH INPUTS EITHER NORMALLY OPEN OR NORMALLY CLOSED.

8 ANALOG INPUTS 0-5 VOLTS AND/OR J OR K TYPE THERMOCOUPLES.

RPM INPUT: .5 - 500 PPR

OUTPUTS: UP TO 8 DEDICATED DIGITAL OUTPUTS FOR COMPRESSOR OR PROCESS CONTROL.

2 AUXILIARY 4-20mA OUTPUTS.

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

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

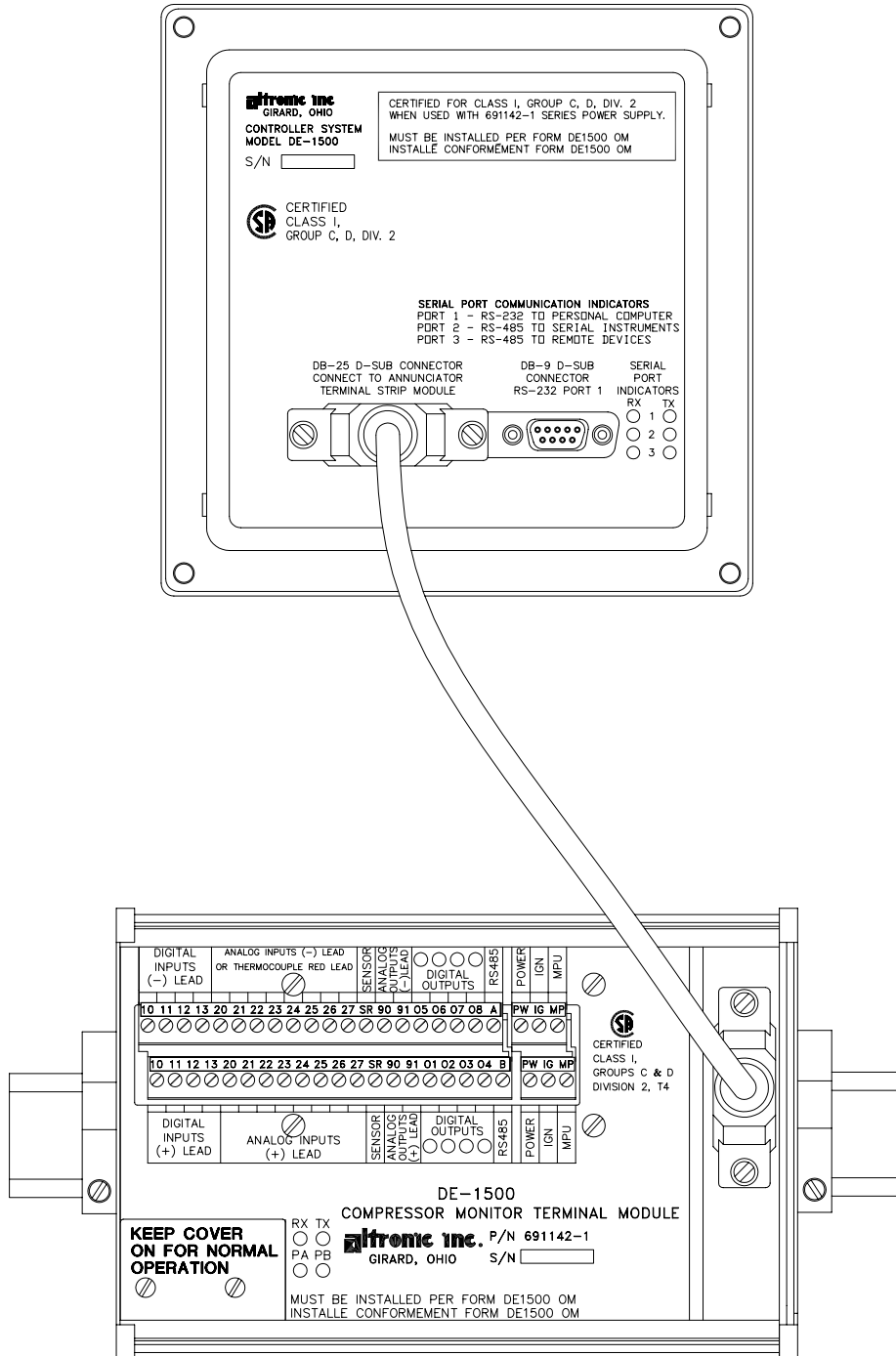
SCAN RATE: SCANS ALL DISCRETE SWITCHES 8 TIMES/SECOND.

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

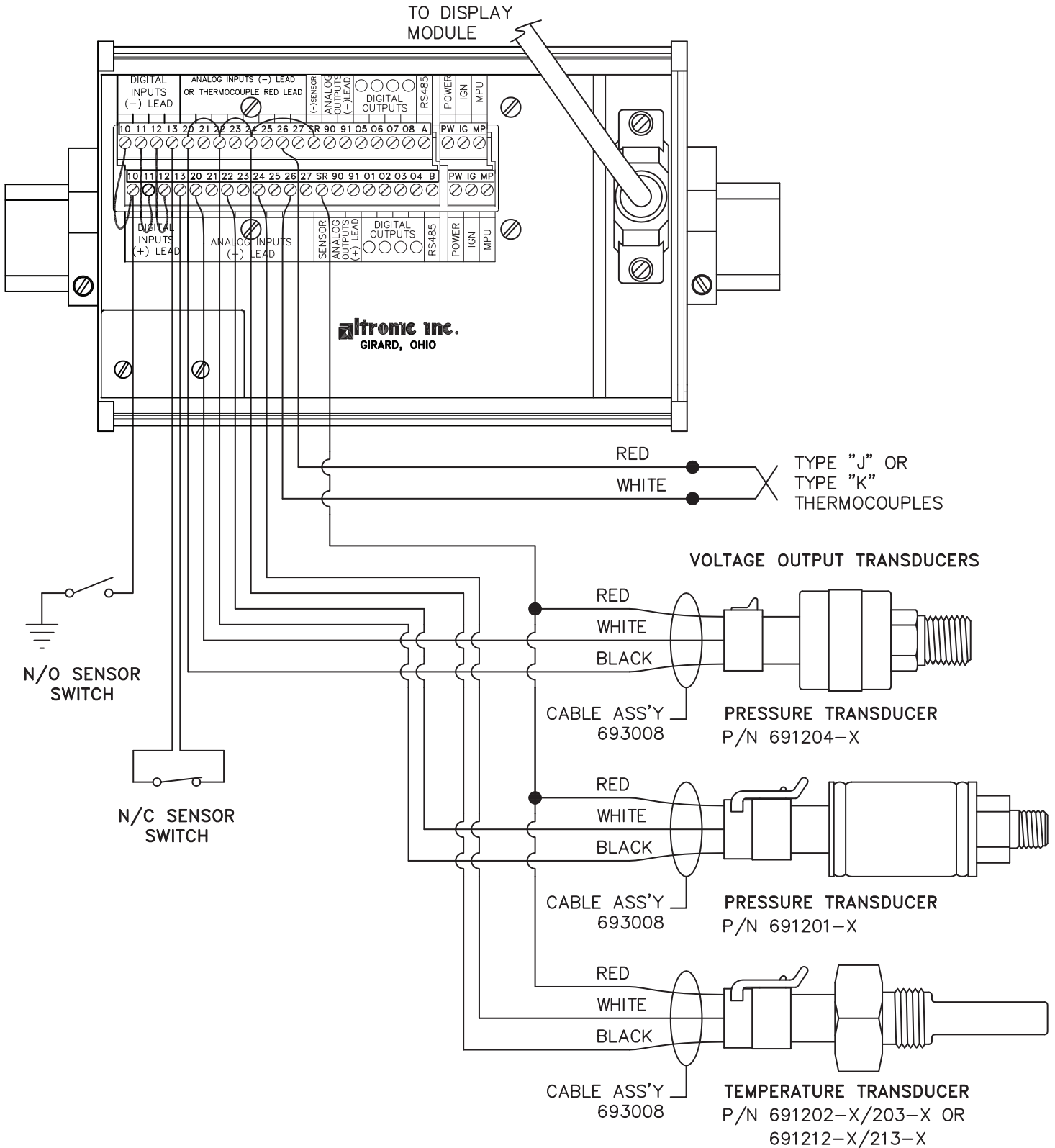
COMMUNICATIONS: 1 EACH RS-485, CONNECTION ON TERMINAL MODULE.
1 EACH RS-232, CONNECTION ON DISPLAY MODULE.

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

WIRING DIAGRAM – GENERAL HOOK-UP

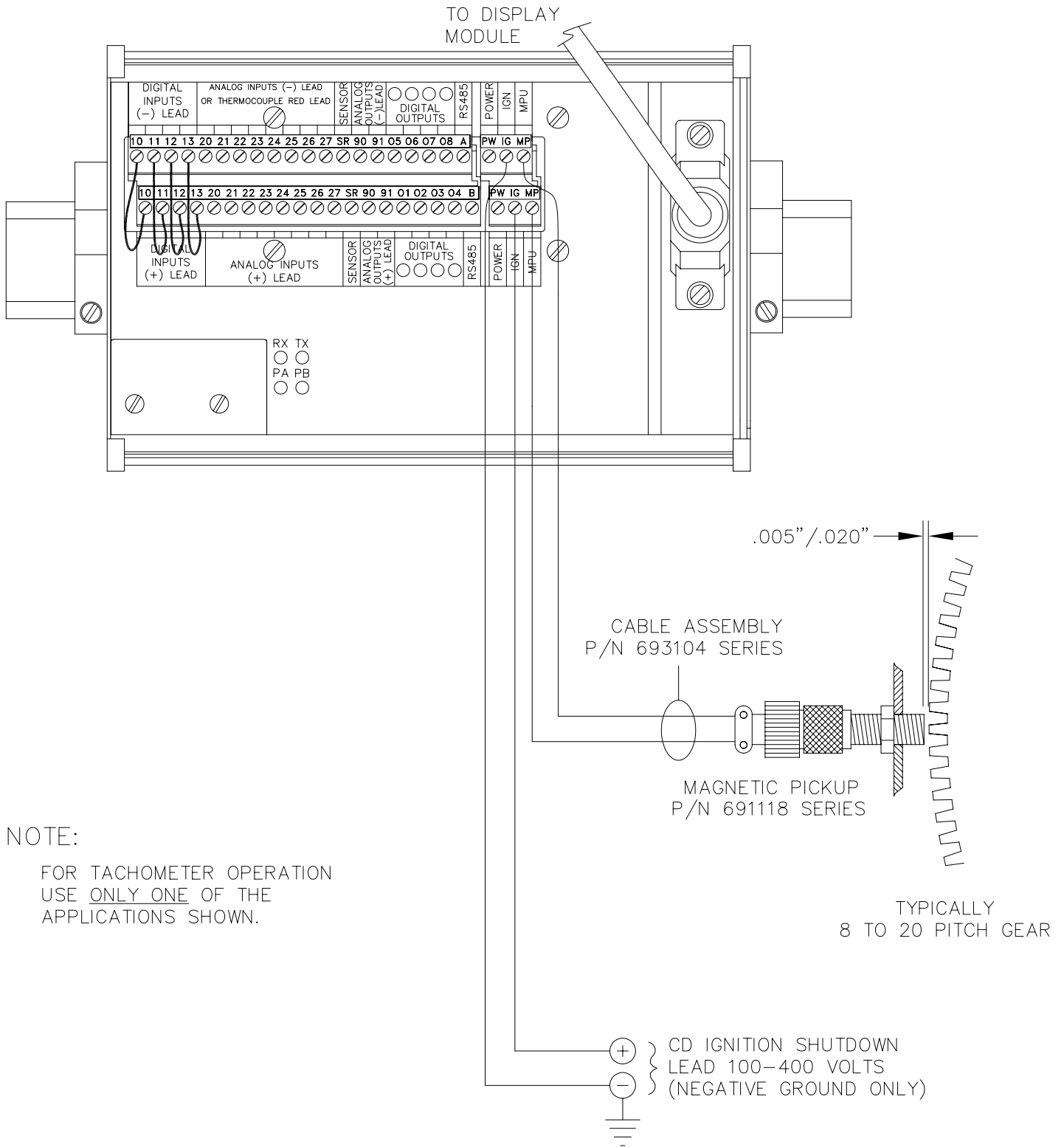


WIRING DIAGRAM – SENSOR AND TRANSDUCER INPUTS



- NOTE: 1. N/O SENSOR SWITCH MUST HAVE JUMPER IN PLACE BETWEEN TOP ROW AND BOTTOM ROW OF TERMINAL BLOCK. POWER SUPPLY MINUS AND SENSOR GROUND MUST BOTH BE AT GROUND.
2. N/C SENSOR SWITCH, REMOVE JUMPER AND PLACE SWITCH WIRES, ONE IN TOP ROW OTHER IN BOTTOM ROW.
3. ALL UNUSED INPUTS MUST HAVE JUMPER WIRE IN PLACE.
4. THE +5VDC INTERNAL SUPPLY OUTPUT IS LIMITED TO 500 mA MAXIMUM. IF THIS SUPPLY EXITS THE PANEL, IT MUST BE FUSED WITH A 0.5 AMPERE FUSE. BOTH +5VDC TERMINALS ARE ELECTRICALLY CONNECTED TOGETHER. TWO TERMINALS ARE PROVIDED FOR WIRING CONVENIENCE ONLY.

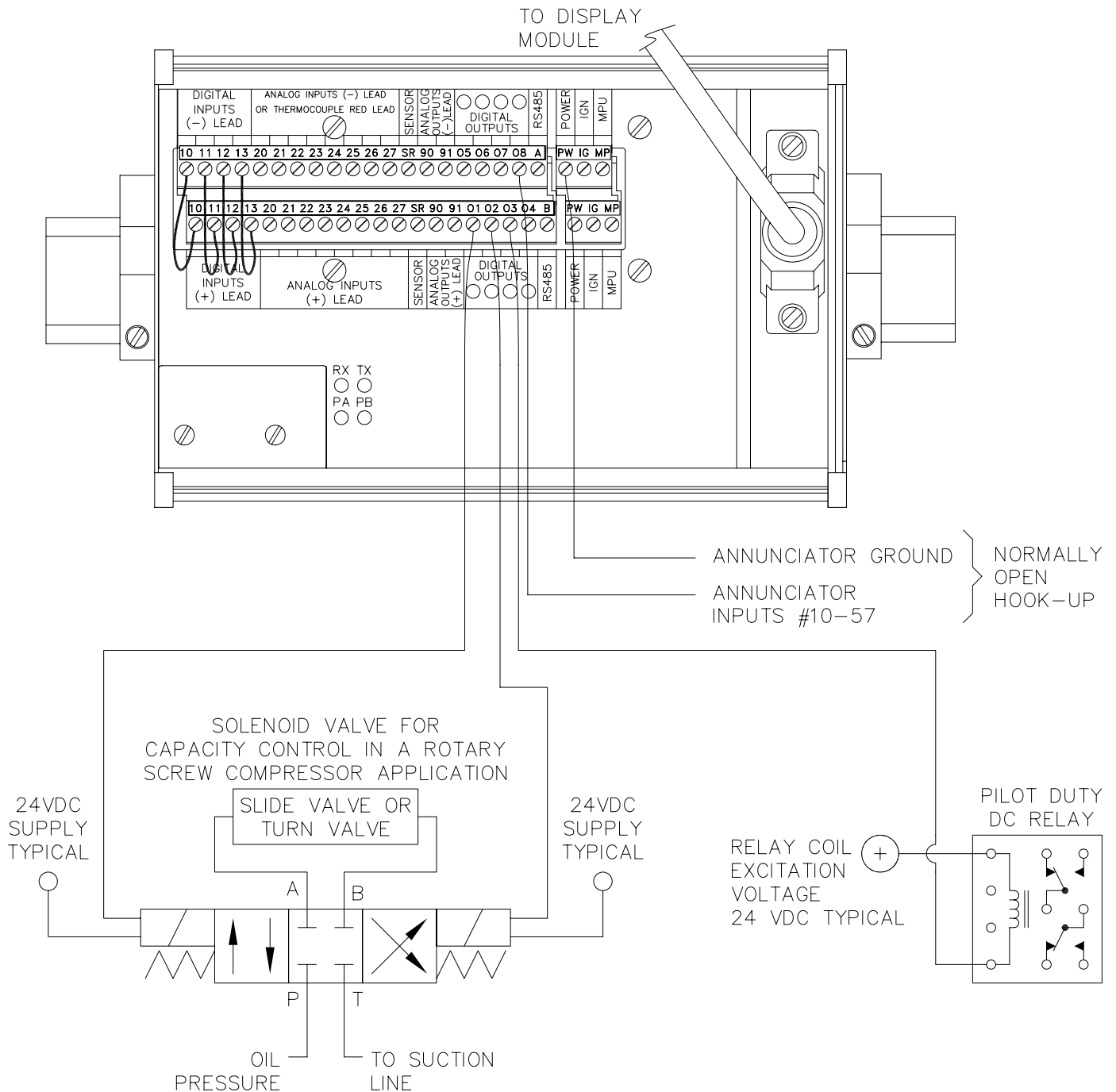
WIRING DIAGRAM – TACHOMETER INPUT



NOTE:

FOR TACHOMETER OPERATION
USE ONLY ONE OF THE
APPLICATIONS SHOWN.

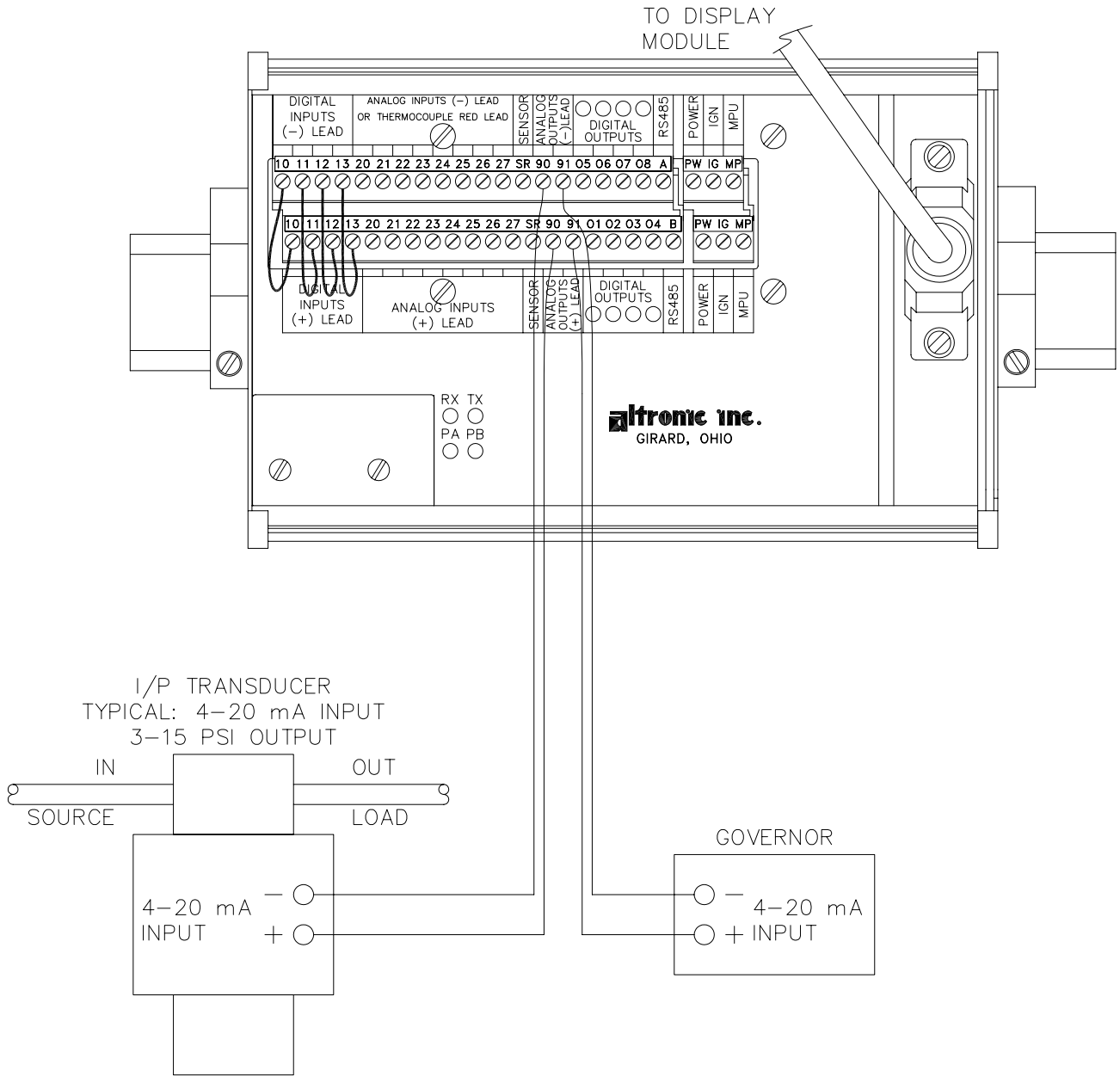
WIRING DIAGRAM – DIGITAL OUTPUT SWITCHES



NOTES:

- SOLENOID VALVE: 4 WAY SOLENOID CLOSED-CENTER TYPE. BOTH PORTS BLOCKED IN CENTER POSITION WITH BOTH SOLENOIDS DE-ENERGIZED.
- DIGITAL OUTPUT 1 ENERGIZED TO LOAD, DIGITAL OUTPUT 2 ENERGIZED TO UNLOAD, IF PROGRAMMED FOR PULSE CONTROL.
- THIS DIAGRAM SHOWS TYPICAL CONNECTIONS. FOLLOW MANUFACTURERS RECOMMENDATIONS FOR COMPLETE SYSTEM COMPONENTS AND HOOK-UP.
- USE PILOT DUTY RELAYS CONNECTED TO DIGITAL OUTPUTS TO CONTROL.
 - OIL OR WATER COOLERS
 - OIL TEMPERATURE CONTROL VALVE
 - OIL HEATERS
 - PRELUBE PUMPS AND OTHER AUXILIARY EQUIPMENT

WIRING DIAGRAM – CURRENT LOOP OUTPUTS



NOTE:

1. FOLLOW MANUFACTURERS RECOMMENDATIONS FOR MOUNTING AND MECHANICAL HOOK-UP OF CURRENT LOOP CONVERTERS.

WIRING DIAGRAM – PERSONAL COMPUTER

