

Scan Alarm

USER MANUAL

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PRODUCT WARRANTY

Analytical Technology, Inc. (Manufacturer) warrants to the Customer that if any part(s) of the Manufacturer's products proves to be defective in materials or workmanship within the earlier of 18 months of the date of shipment or 12 months of the date of start-up, such defective parts will be repaired or replaced free of charge. Inspection and repairs to products thought to be defective within the warranty period will be completed at the Manufacturer's facilities in Oaks, PA. Products on which warranty repairs are required shall be shipped freight prepaid to the Manufacturer. The product(s) will be returned freight prepaid and allowed if it is determined by the manufacturer that the part(s) failed due to defective materials or workmanship.

This warranty does not cover consumable items, batteries, or wear items subject to periodic replacement including lamps and fuses.

Gas sensors, except oxygen sensors, are covered by this warranty, but are subject to inspection for evidence of extended exposure to excessive gas concentrations. Should inspection indicate that sensors have been expended rather than failed prematurely, the warranty shall not apply.

The Manufacturer assumes no liability for consequential damages of any kind, and the buyer by acceptance of this equipment will assume all liability for the consequences of its use or misuse by the Customer, his employees, or others. A defect within the meaning of this warranty is any part of any piece of a Manufacturer's product which shall, when such part is capable of being renewed, repaired, or replaced, operate to condemn such piece of equipment.

This warranty is in lieu of all other warranties (including without limiting the generality of the foregoing warranties of merchantability and fitness for a particular purpose), guarantees, obligations or liabilities expressed or implied by the Manufacturer or its representatives and by statute or rule of law.

This warranty is void if the Manufacturer's product(s) has been subject to misuse or abuse, or has not been operated or stored in accordance with instructions or if the serial number has been removed.

Analytical Technology, Inc. makes no other warranty expressed or implied except as stated above.

Safety

Analytical Technology has made every effort to ensure the reliability and safety of the C14 Scanner and to recommended safe uses in systems applications. Note that in any application failures can occur.

Good engineering practices, electrical codes, and insurance regulations require that you use independent external safety devices to prevent potentially dangerous or unsafe conditions. Assume that the scanner can fail or that other unexpected conditions can occur.

For additional process safety, program process control computer, to automatically reload your desired operating parameters after a power failure. This safety feature however does not eliminate the need for other external, independent safety devices in dangerous conditions.



WARNING

The Scanner should never be used as a safety shutdown device. It should only be used with other approved independent safety shutdown devices.

Analytical Technology also includes ANASCAN®, software package for IBM-compatible computers. In the event of a Scanner reset, ANASCAN will reload the Scanner with the current values in computer memory. The user must ensure that this reset will be safe for the process. Again, use of ANASCAN does not eliminate the need for appropriate external, independent safety devices.

Contact Analytical Technology immediately if you have any questions about system safety of system operation.

Introduction

The C14 Scanner is a modular monitoring system with 16 fully independent inputs. It can function as a stand-alone system. The Scanner front panel has a Liquid Crystal Display (LCD) and touch keypad for local display and local parameter entry. You can also use it as the key element in a computer supervised data acquisition system; the Scanner can be locally or remotely controlled via an RS-485 serial communications interface, or over telephone lines by modem.

Features Include:

Automatic Scaling for Linear Analog Inputs: The Scanner automatically scales linear inputs used with other industrial process sensors. Simply enter two measurement points. For example, to scale a gas sensor enter the endpoints: Low PV is 0 PPM. While High PV is 100 PPM. All other values for that channel will automatically be in PPM.

Flexible Alarm Outputs: Independently set alarms for each channel. Alarms can activate an output by themselves, or they can be grouped with other alarms to activate an output.

Alarm Outputs: You can specify alarm setpoints to operate outputs as latched or unlatched functions.

Global Alarm: When any alarm is triggered, the Global Alarm Output is also triggered, and it stays on until you acknowledge it.

System Fault: The Scanner system fault output notifies you of microprocessor failure. Use it to hold a relay closed while the system is running, so it notifies you of scanner failure.

AC Fail: If the battery backup option is installed, "AC FAIL" led lights to indicate power has failed, and the Scanner is operating on battery backup.

Front Panel or Computer Operation: Set up and run the Scanner from the front panel; or from a local or remote computer. Analytical Technology includes ANASCAN software you can use to operate the Scanner. ANASCAN has these features:

- Process Overviews
- Parameter Setup
- Graphic Trend Plotting
- Data Logging

Multiple Job Storage: Store up to 8 Jobs in protected memory, and access them locally by entering a single job number or remotely via digital inputs. Each job has a set of alarm conditions.

Specifications

This section contains specifications for inputs, outputs, serial interface, system power requirements, environmental specifications, and physical dimensions.

Analog Inputs

Number of Analog Inputs: 16 (4-20mA) single-ended / common ground. Other ranges are available on special order.

Input Switching: Solid state multiplexer switching.

Input Sampling Rate: 1.5x/second (667 ms) at 60 Hz; 1.25x/second (800 ms) at 50 Hz.

Analog Over Voltage Protection: ± 20 V referenced to ground. Inputs are protected against overcurrent.

Common Mode Rejection: ± 5 V, >60 dB dc to 1 kHz and 120 dB at selected line frequency.

A/D Converter: Integrates voltage to frequency.

Digital Inputs

Number: 4

Configuration: Optically isolated. 3 inputs select job number, one remote reset input. Ground line to use input.

Digital Outputs

Number: 36

Operation: Open collector output; ON state sinks to ground.

Function: 34 Outputs selectable as alarm latched / unlatched, 1 global output, one System Fault output.

Off State Leakage Current: <.01 mA to DC common.

Maximum Current: 60 mA for each output.

Maximum Voltage Switched: 18 Vdc.

System Fault / Power Fail Output

Number: 1

Function: Monitors the Scanner microprocessor, and AC Power

Global Alarm Output

Number: 1

Function: Monitors any combination of Alarms, Warnings, and Trouble.

Digital Outputs – Zone Indicators

Number: 12

Function: Monitors any combination of Alarms, Warnings, and Trouble.

Table 1

ZONE	DIGITAL OUTPUT
1A	1
1B	2
1C	3
2A	4
2B	5
2C	6
3A	7
3B	8
3C	9
4A	10
4B	11
4C	12

Miscellaneous Specifications

Serial Interface

Type: RS-485 4 wire.

Baud Rate: 2400 or 9600, user selectable.

Error Check: BCC or CRC, user selectable.

Number of Systems: 32 with RS-485 communications

Maximum Number of Channels: 512

Protocol: Form of ANSI X3.28-1976 (D1, 171), compatible with Allen Bradley PLC, full duplex, or ModBus.

System Power Requirements

Voltage: 90-264 VAC universal, 47 to 63 Hz, 65 watts.

Battery Backup: Optional 12VDC

Environmental Specifications

Storage Temperature: -20 to 60°C

Operating Temperature: 0 to 40°C

Humidity: 10 to 95% Non-Condensing.

Physical Dimensions

Scanner: Panel Mount 9.70"x4.00"x9.10"(246mm x 102mm x 230mm)
Wall Mount 10.0"x21.3"x9.5"(254mm x 541mm x 241mm)

Installation

This chapter describes how to install the Scanner. Installation of the Scanner involves the following procedures:

- Determining the best location for the Scanner
- Mounting the Scanner
- Power Connection
- Input Wiring
- Communications Wiring (RS-485)
- Output Wiring

Safety



DANGER

Ensure that power has been shut off to your entire process before you begin installation of the Scanner.

Analytical Technology has made every effort to ensure the reliability and safety of this product. In addition, we have provided recommendations that will allow you to safely install and maintain the Scanner.



WARNING

In any application, failures can occur. These failures can result in the occurrence of output failures, which can cause damage to the Scanner, or to the equipment or process connected to the Scanner. Therefore, always follow good engineering practices, electrical codes, and insurance regulations when installing and operating this equipment.

External Safety Devices

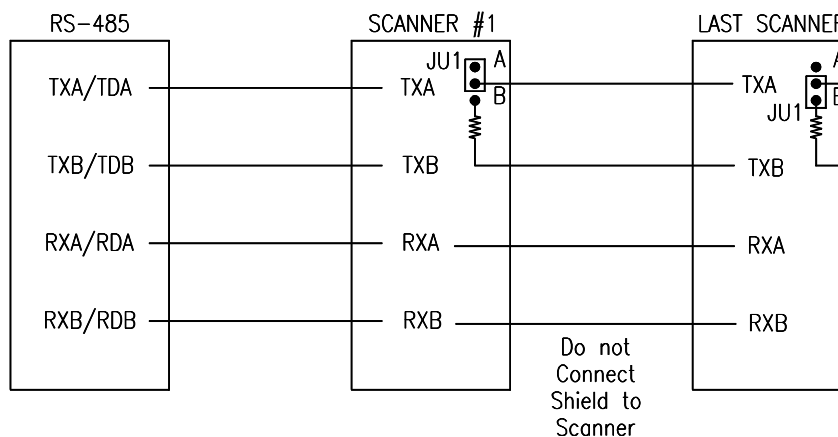
External safety devices should be used to prevent potentially dangerous and unsafe conditions upon equipment failure. Always assume that this device can fail with outputs full on, or full off, by the occurrence of an unexpected external condition.

RS-485 Interface

You can communicate with up to 32 Scanners on a single common loop. Wire equipment in a single “daisy chain” using twisted shielded pairs for the RS-485 cables. Don’t use “octopus”, or “spurs”, or “star” patterns.

Use the internal 200 Ohm terminating resistor on the RX line of the last Scanner in the system. (If you have only one scanner, it is the last scanner in the system). Use jumper JU1 to select the terminating resistor; place it in B position for termination and A position for non-termination.

Connect the shields to earth ground only at the computer or other R485 interface. Do not connect the shield to the Scanner.



NOTE

If you connect RS-485 communications and they do not function properly, or if you have measurement problems when communications lines are connected, request additional technical information from our Technical Service Department.

Mechanical Installation

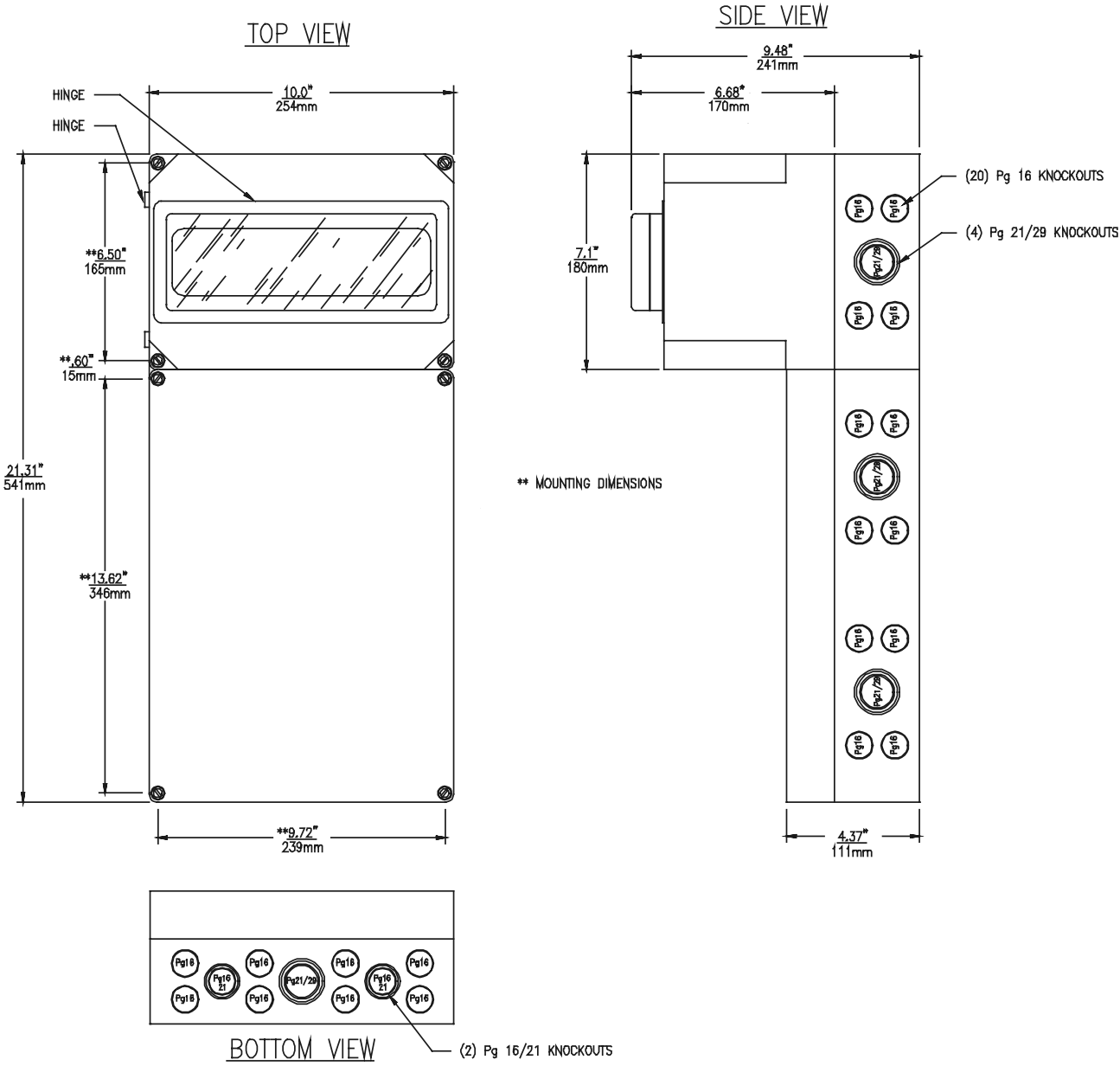


Figure 1: Wall Mount Enclosure Dimensions (ATI-0247)

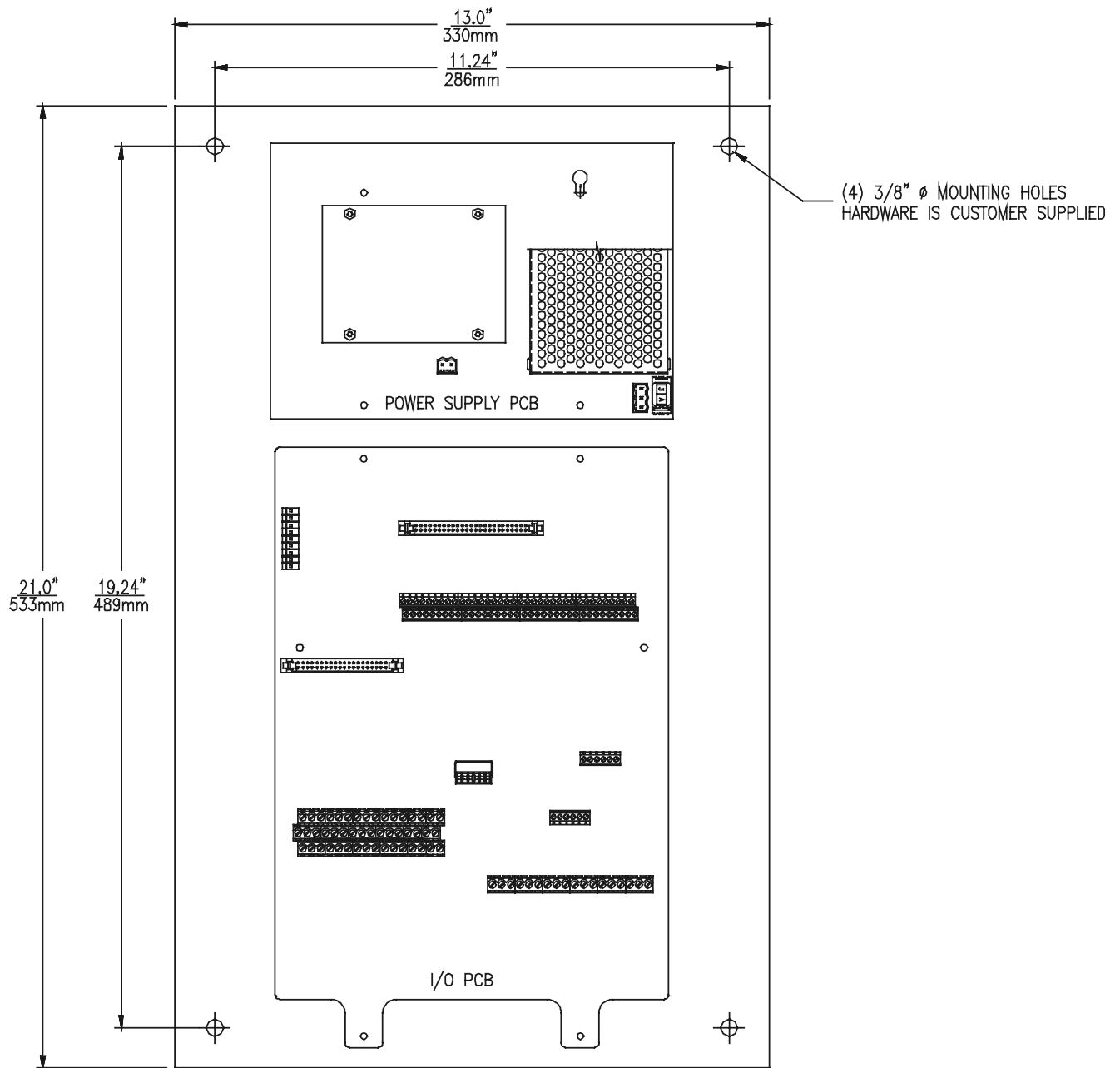
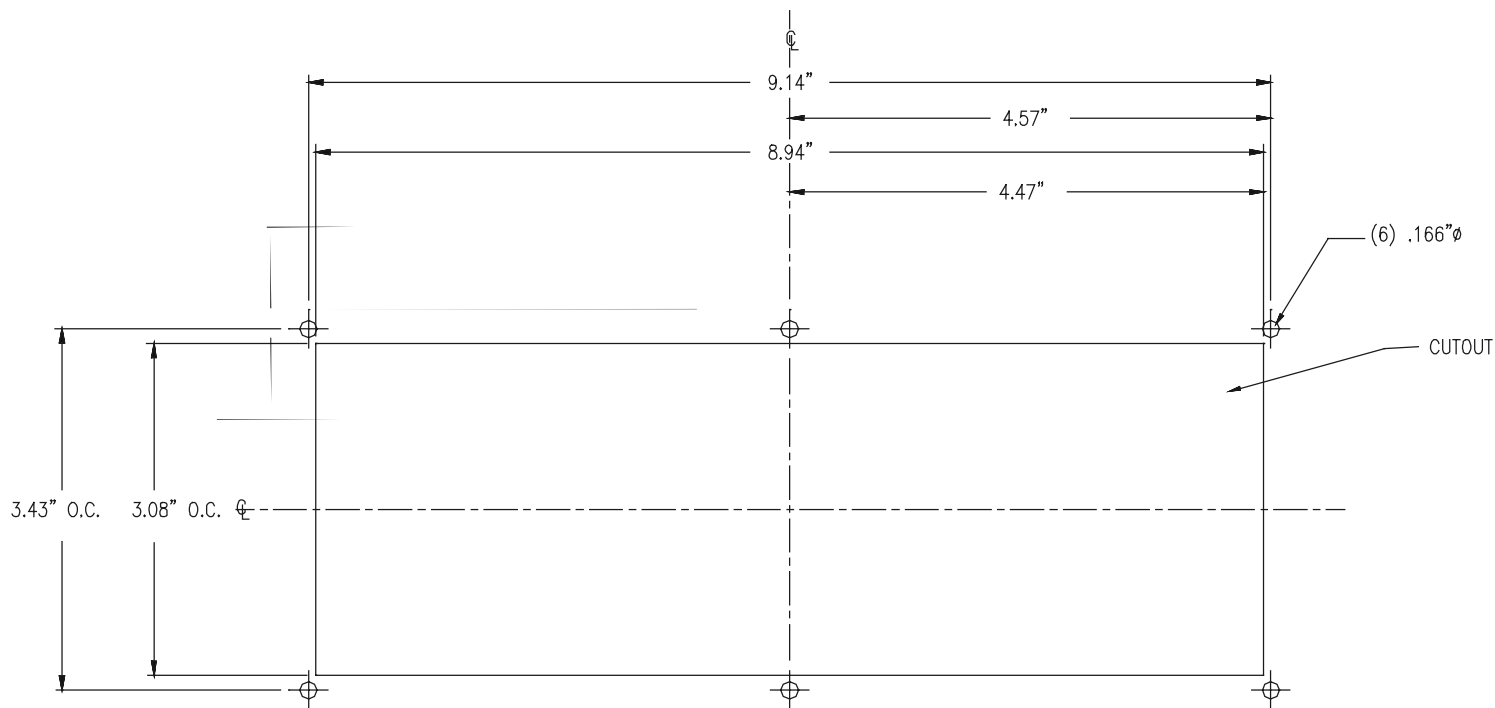
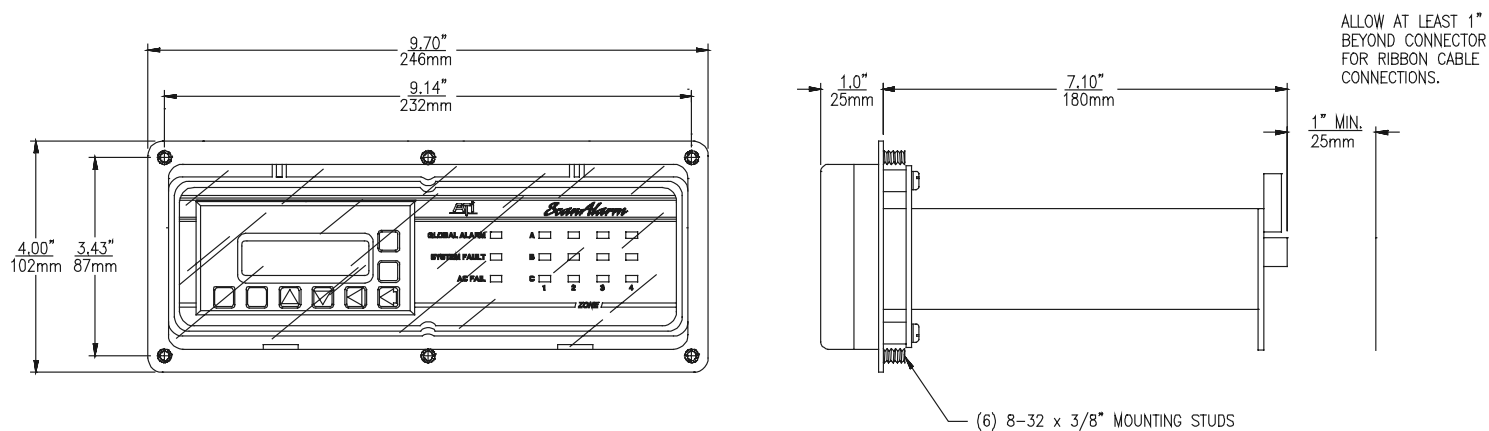


Figure 2: Panel Mount Mounting Dimensions (ATI-0257)



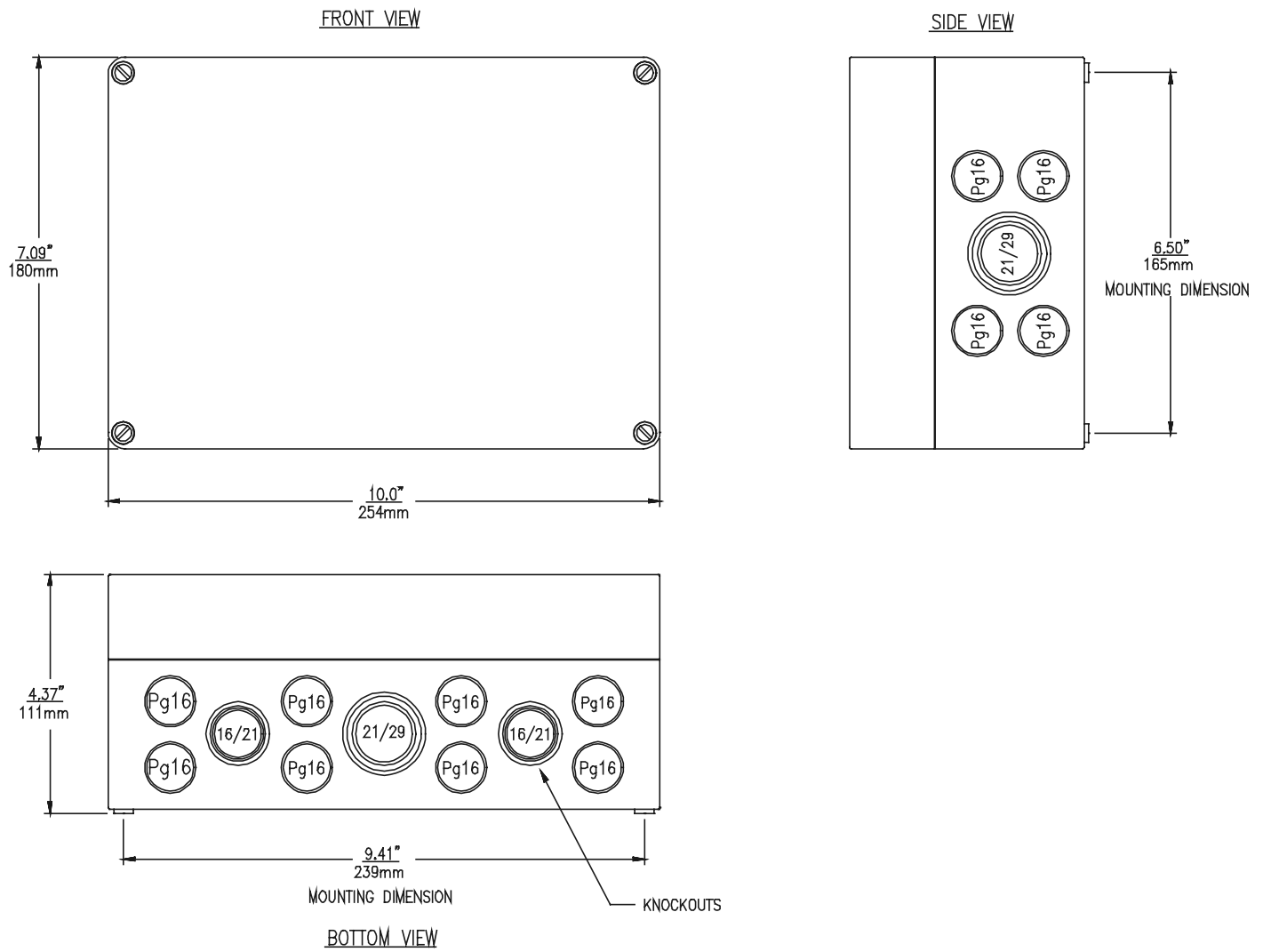
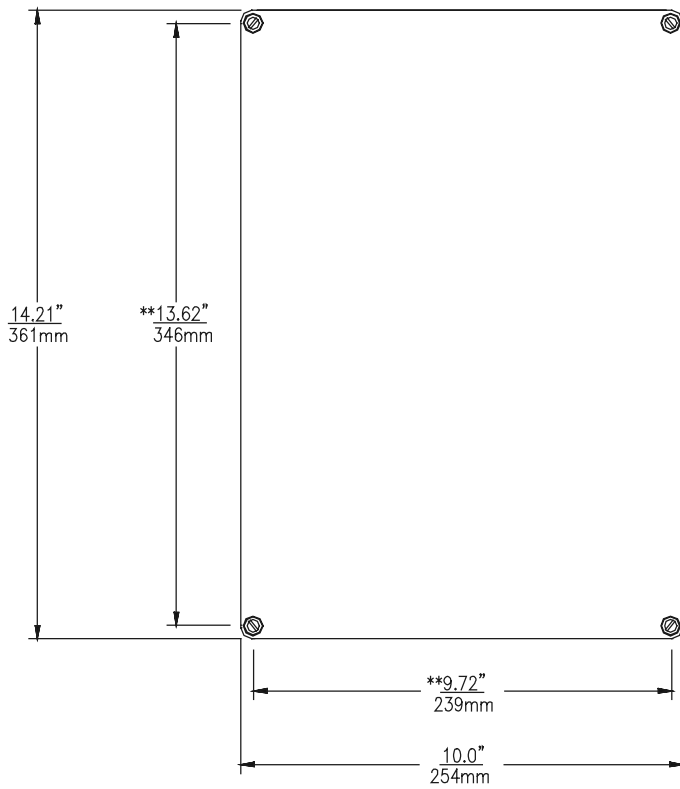
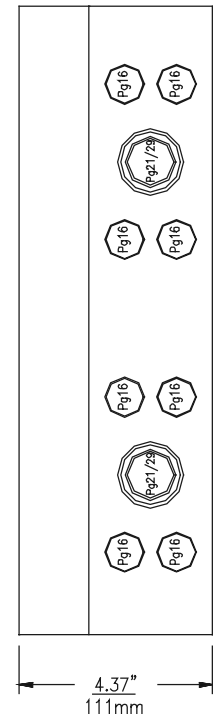


Figure 5: 2 Relay Module, Enclosure Dimensions (80-0040)

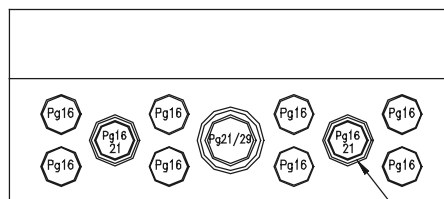
TOP VIEW



SIDE VIEW



** MOUNTING DIMENSIONS



(2) Pg 16/21 KNOCKOUTS

BOTTOM VIEW

Figure 6: 4 Relay Module, Enclosure Dimensions (80-0036)

Electrical Connections

**SEE APPENDIX 1 IN THE BACK OF THE MANUAL
FOR THE GENERAL CONNECTION DIAGRAM**

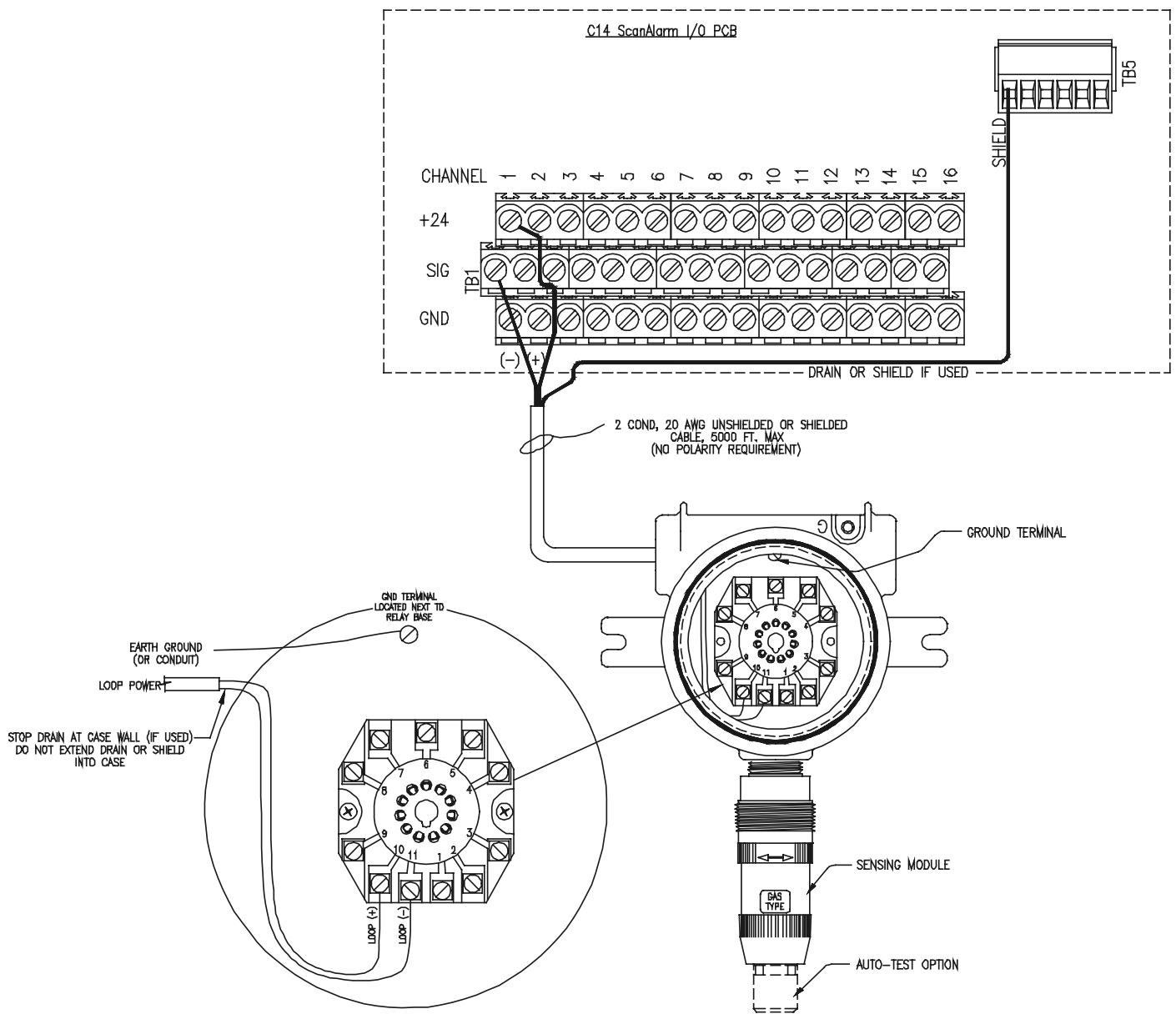


Figure 7, A12 UniSens Connection (ATI-0256), CHANNEL 1 SHOWN

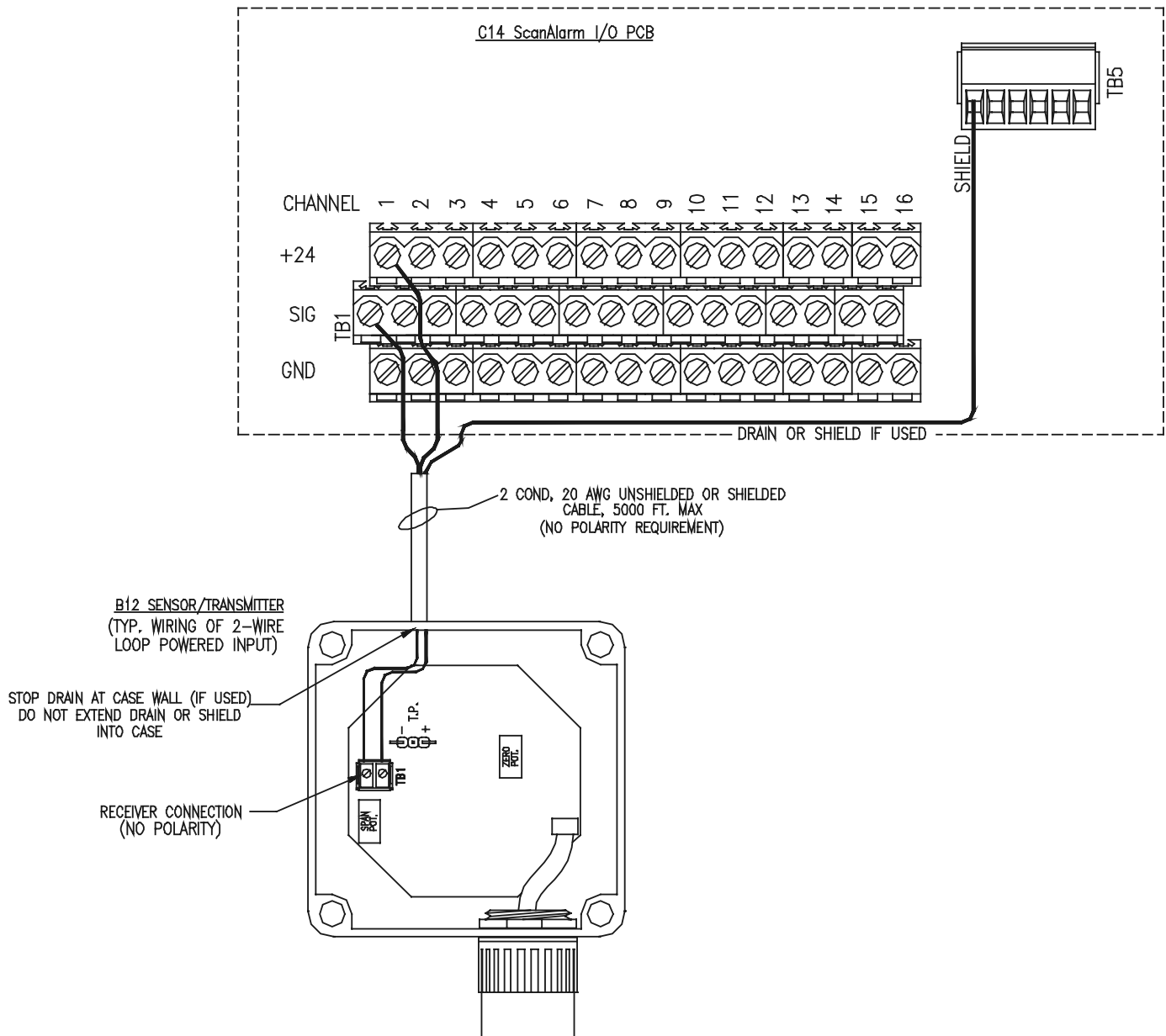


Figure 8, B12 2 Wire Connections (ATI-0249)

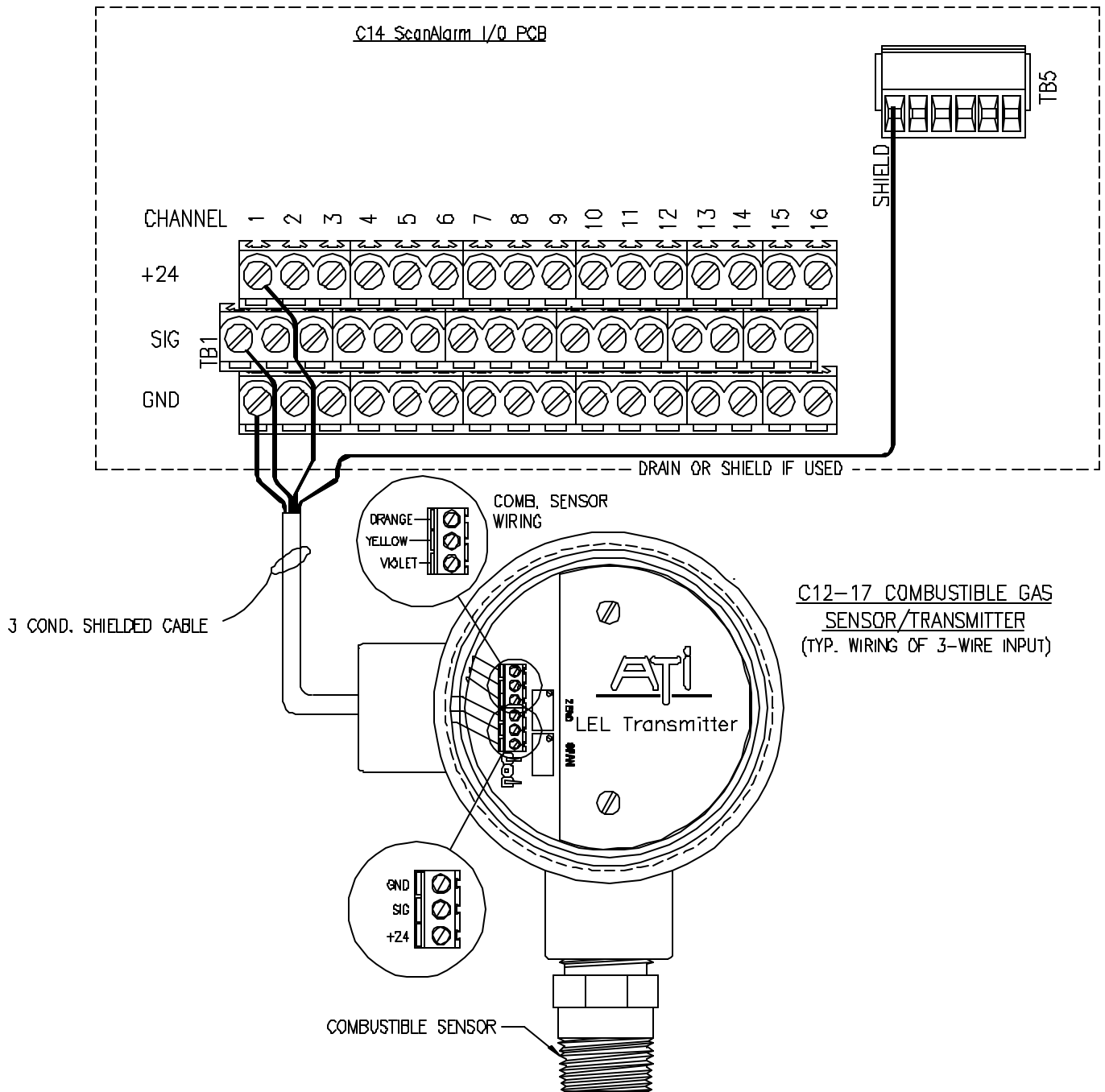


Figure 9, C12-17 Combustible Transmitter Connections (ATI-0251)

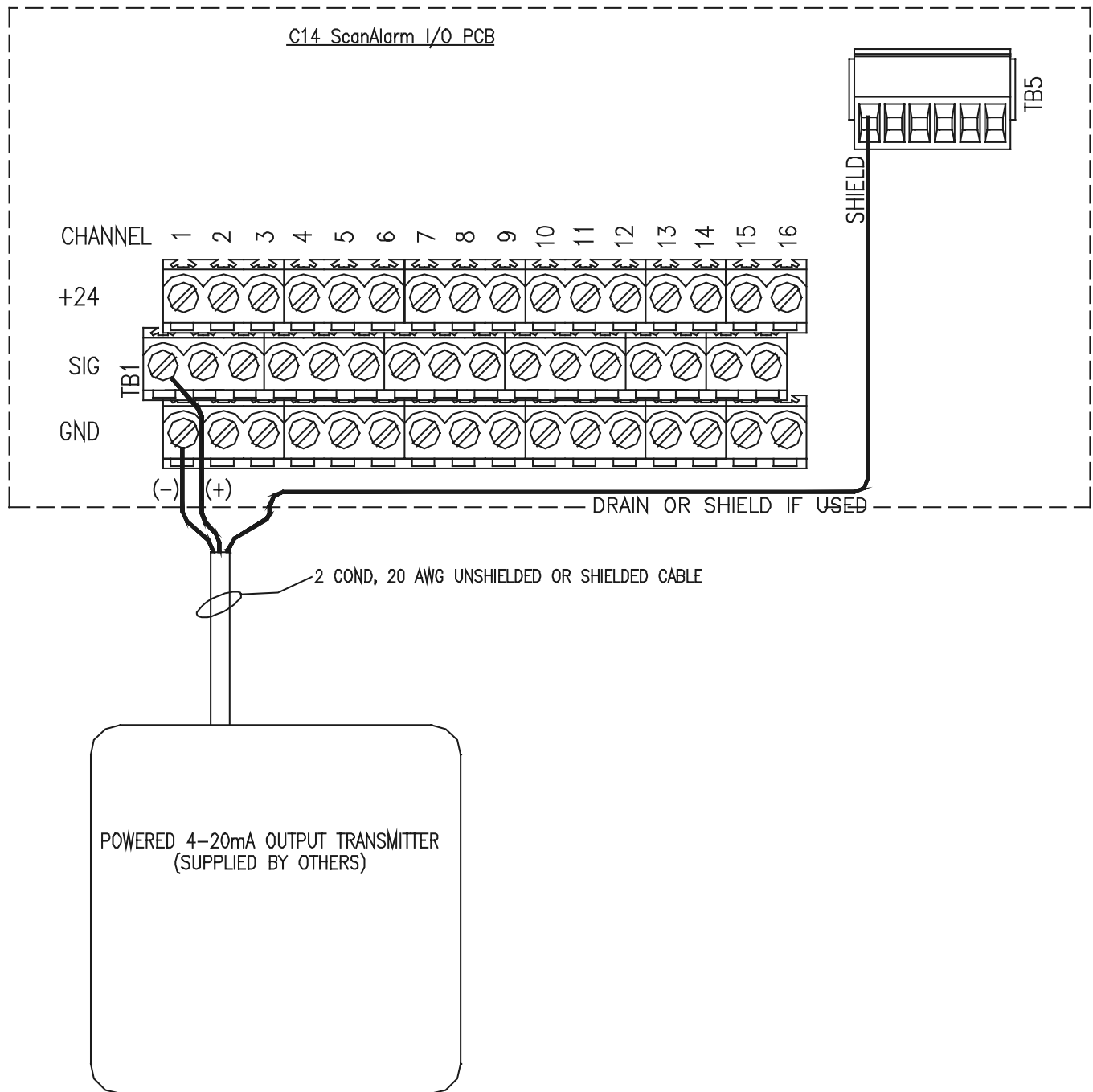


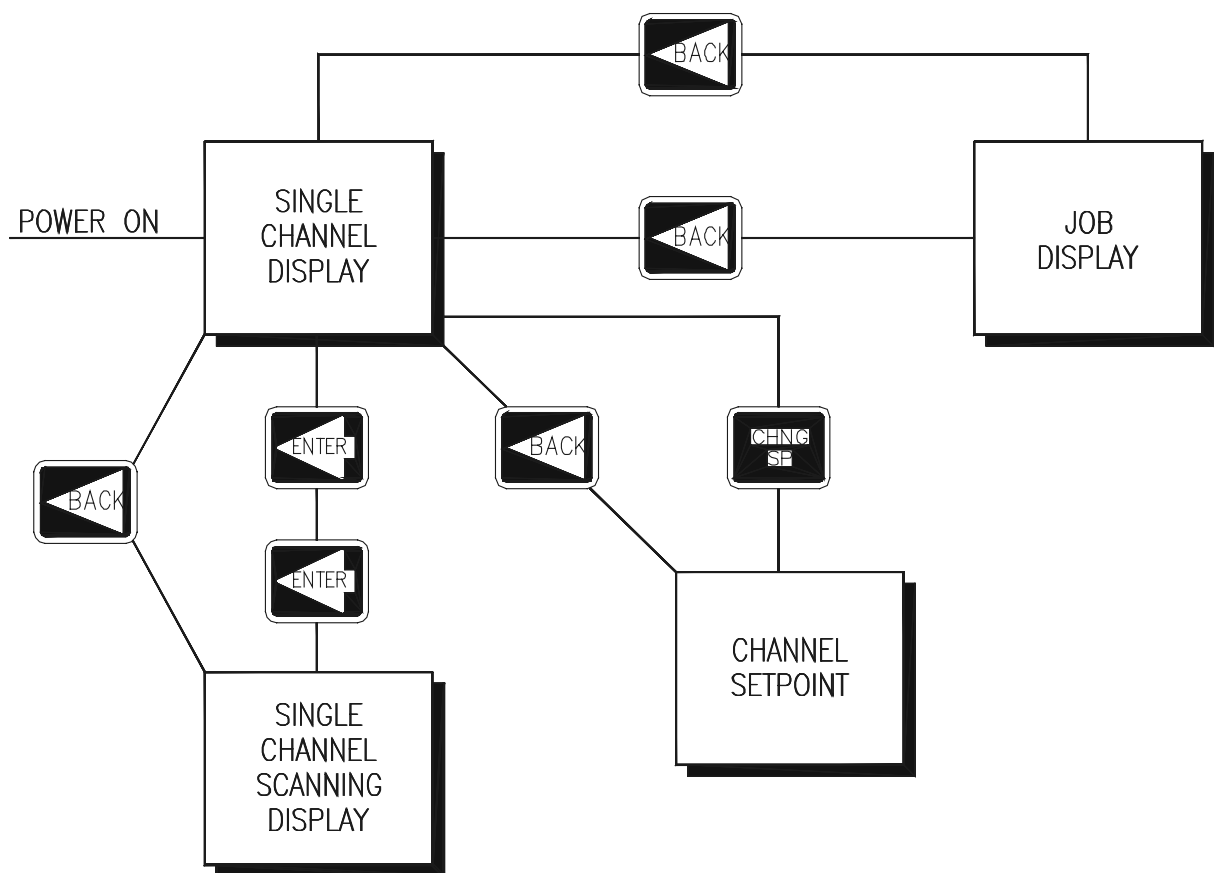
Figure 10, Powered 4-20mA Input Transmitter Connections (ATI-0250)

**See Appendix 2 in back of manual for
The Relay Module Wiring Diagram**

Using the C14 Scanner

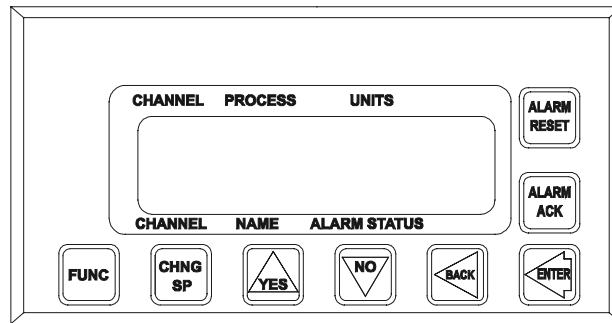
Introduction

This chapter will show you how to operate the Scanner from the front panel. (If you are using ANASCAN, please see the ANASCAN User's Guide.) The next diagram shows how to reach the operator menus from Single Channel Display. (To change global parameters, channel inputs, and alarms from the setup menus, you must enter a special sequence of keys. To learn how, see Setup.



Front Panel

The front panel provides a convenient interface with the scanner system. You can program and operate the scanner with the front panel keys shown below, or you can use ANASCAN, a program designed specifically for the Scanner.



Front Panel Keys



Yes

Press Yes to:

- Select a menu
- Answer Yes to Yes/No questions.
- Increase a number or choice you're editing.



No

Press No to:

- Skip a menu you don't want to edit, when the prompt is blinking.
- Answer No to Yes/No questions.
- Decrease a number or choice when editing.
- Perform a Manual System reset on power-up.



WARNING

A Manual System Reset clears the system's memory and reinitializes the Scanner factory defaults. To do a Manual System Reset, power down the Scanner, press and hold the No key during power up. This is required during installation, after changing the EPROM, or when troubleshooting. If using ANASCAN you may need to set the communications baud rate, and protocol before communication can be established.

***Back***

The Back key works like an "Escape" key. Press it to:

- Abort editing.
- Return to a previous menu.
- Switch between single channel and job control displays.

***Enter***

Press the Enter key to:

- Store data or menu choices after editing and go to the next menu.
- Start scanning mode (if pressed twice).

***Alarm Ack***

Press Alarm Ack to:

- Acknowledge an alarm condition, and reset the global alarm.
- Stop the scanning display.

***Alarm Reset***

Press Alarm Reset to:

- Clear an alarm when the process is in a no-alarming state.
- Acknowledge an alarm if the process is in an alarming state.

***Change SP***

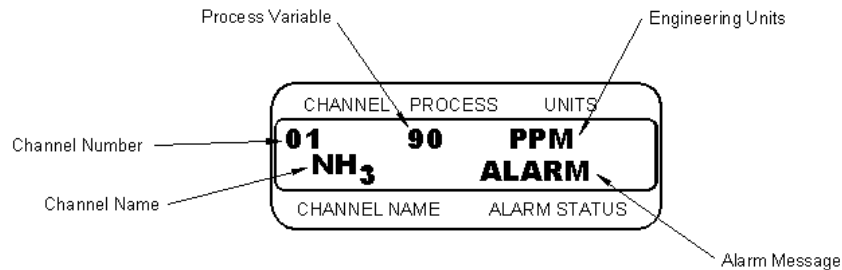
Press Change SP to change the setpoints.

***Func***





The FUNC key is not used in normal operation. It is reserved for future enhancement.

Single Channel Display

Single channel Display (below) shows detailed information for one channel.



From Single Channel Display,

- Press  to go to the next channel.
- Press  to go to the previous channel.
- Press  key once to go to job display (if it is enabled).
- Press  twice to start Channel Scanning Display. (The Channel Scanning Display shows information for each channel for one second.)
- Press any key to stop scanning mode.

Job Display

Job display appears only if:

- You have turned on the Remote Job Select function. (This function is explained in Setup)
- You have selected a job from the job load menu.

When you load a job, Job display shows you this screen.



If you remotely loaded the job, Job display looks like this:




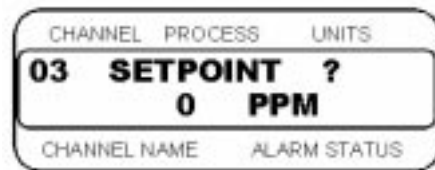
If you modify a job's parameters while job is running, you'll see this message:









If an alarm occurs, the controller switches to Single Channel Display.

Change Setpoint

To change the setpoint, go to the Single Channel Display of the channel you want to change, and press the  key (the setpoint is the desired value for the process). You should see a display like this:

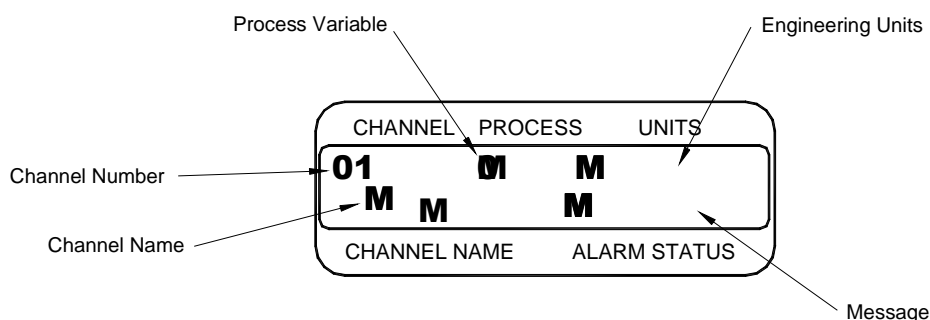


- Press  to change the setpoint.
- Then press  or  to change the setpoint value.
- When you are satisfied with the setpoint value you have chosen, press  To save your changes, and return to Single Channel Display; or
- To return to Single Channel Display without saving your changes, press  or .

Alarms


If alarm warning or trouble alarms occur, an eight character message is displayed in the lower-right section of the display.


These messages are shown in the table below.




Message
Alarm
Warning
Trouble

Acknowledging an Alarm

Press the  key to acknowledge an alarm. If there are other channels with alarm conditions, the Alarm display switches to the next channel in alarm. Acknowledge all alarms to clear the global alarm.

The  key operates differently in latched and unlatched mode, an alarm can only be cleared when the process is in a non-alarming state, and the Alarm Reset key is pressed. In un-latched mode, the alarm clears automatically when the Alarm Acknowledge key is pressed and the system is in a non-alarming state.

Resetting an Alarm

Pressing the  key clears an alarm only if the system is in a non-alarming state. Otherwise, the key will operate the same as the Alarm Acknowledge key.

Setup

Scanner Menus

The Setup menus let you change detailed configuration information.

How to Enter the Setup Menus

1. In Single Channel Display, select the channel you wish to edit.
2. While still in Single Channel Display, enter the pass sequence below: Press









3. The first setup menu appears.



NOTE

If you are in the Setup menu, and you don't make any changes for three minutes, the Scanner reverts to Single Channel Display for your protection.

- Press  to select the menu or  to advance to the next menu.
- Press  or  to toggle between the option in your menu.
- Press  to store the value you have selected.
- If you decide not to edit the menu, press  to stop editing, and return to the main menu.

Each display contains the default value for that specific menu, and below each display, you will see the range of choices for that menu.

The following sections tell more about the submenus for each of the four main menus. The next page shows the setup menus accessible from Single Channel Display.

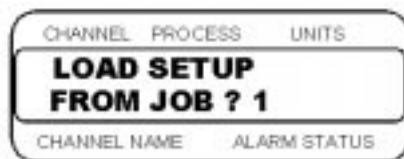
**See Appendix 3 in the back of the manual
For the Scanner Software Flowchart Diagram**

Setup Global Parameters Menu

The Setup Global Parameters menu looks like this.



Load a Job



Selectable values: 1 to 8

The following parameters are loaded as part of a job:

- Setpoints and spread values.
- Alarm functions (Off and Alarm), setpoints, high/low process setpoints, high/low deviation setpoints, and deadband settings, and channel alarm delay.

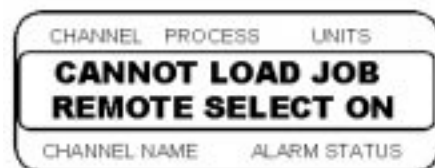


WARNING

All current job settings will be overwritten if you select a job from memory. Save your current programming to a job number if you want to keep it.

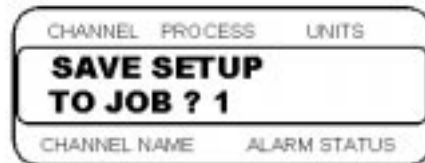
If a remote job has been selected by enabling remote jobs, the following message will appear on the display.

Deselect the remote job if local job selection is desired.



Save Setup to Job

Use this menu to save job information for every channel, to one of eight job in the Scanner battery-backed RAM.



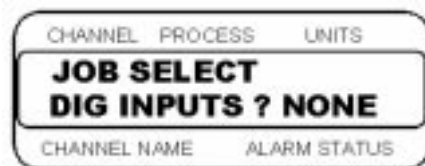
If a remote job has been selected by enabling remote jobs, the following message will appear on the display.



Deselect the remote job if local job selection is desired.

Job Select Inputs

Use this menu to run up to 8 jobs remotely. It lets you set the number of job select inputs. The Scanner uses these inputs as a binary.



Selectable values: 1, 2, 3 inputs, or NONE. These choices have the following effect.

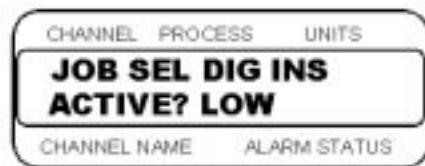
Setting	Enables
1 Input	Jobs 1-2
2 Inputs	Jobs 1-4
3 Inputs	Jobs 1-8
NONE (No Inputs)	Remote Select <u>Disabled</u>

Below is the truth table that tells you which input states select which jobs.

Digital Input 3	Digital Input 2	Digital Input 1	Job #
F	F	F	1
F	F	T	2
F	T	F	3
F	T	T	4
F	F	F	5
T	F	T	6
T	T	F	7
T	T	T	8

Job Select Input Polarity

This menu lets you set the polarity of the digital inputs used for job selection. You can set the active state to closed (low) or open (high).



Selectable values: High or Low


Startup Alarm Delay

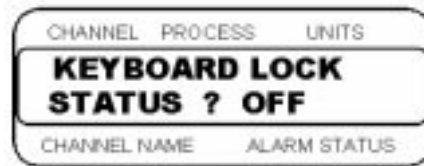
Use this menu to set a startup delay for process and deviation alarms for all channels. The Scanner does not report these alarm conditions for the specified number of minutes after the Scanner powers up. (The Scanner will always report failed sensor alarms, no matter what startup delay you set.)



Selectable values: 0 – 60 minutes.

Keyboard Lock Status

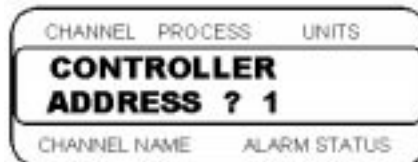
This selection lets you lock the front panel operator function key,  , so that pressing this key has no effect. If you want to use this function, turn off the Keyboard Lock.



Selectable values: On or Off

Scanner Address

This menu allows you to set the Scanner address. The Scanner address is used for multiple Scanner communications on a single RS-485 cable, so each Scanner must have a different address. Begin with address 1 for the first Scanner, and assign each subsequent Scanner the next higher address.



Selectable values: 1 – 32

Communications Error Checking

This selection allows you to set the data check algorithm used in the communications protocol to Block Check Character (BCC) or to Cyclic Redundancy Check (CRC). CRC is a more secure error checking algorithm than BCC, but it requires more calculation time and slow communications. BCC ensures a high degree of communications integrity, so we recommend that you use BCC unless your application specifically requires CRC. Also, if using ANASCAN, ensure that the same error checking algorithm has been set through the 'SCANINST' program.



Selectable values: BCC or CRC.

Communications Baud Rate

This menu allows you to set the Communications Baud Rate. If using ANASCAN, ensure that the program has the same baud rate set through the 'SCANINST' program.

CHANNEL	PROCESS	UNITS
COMMUNICATIONS BAUD RATE ? 9600		
CHANNEL NAME		ALARM STATUS

Selectable values: 2400 or 9600

Communications Protocol

This menu is located under the Setup Global Parameters main menu. It allows you to select the Communications Protocol.

CHANNEL	PROCESS	UNITS
COMMUNICATIONS PROTOCOL ? ANA		
CHANNEL NAME		ALARM STATUS

Selectable values: Anafaze (ANA), Allen Bradley (AB), ModBus RTU (MOD)

AC Line Frequency

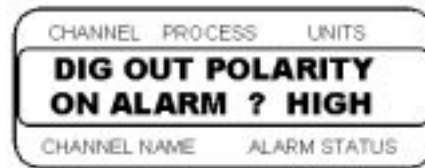
This menu lets you configure the Scanner to match an AC Line frequency of 50 or 60 Hz. (This function is provided for international users who require 50 Hz lines). Since the Scanner reduces the effect of power line noise on the analog measurement by integrating the signal over the period of the AC Line frequency, the Scanner's noise rejection will suffer if the line frequency is not set correctly. Cycle power to enable this change.

CHANNEL	PROCESS	UNITS
AC LINE FREQ. ? 60 HERTZ		
CHANNEL NAME		ALARM STATUS

Selectable values: 50 or 60 Hz.

Digital Output Polarity


This menu lets you set the polarity of the digital outputs used for alarms.



Selectable values: High or Low

External Alarm Acknowledge Input

An external alarm reset or acknowledge button can be wired to the Scanner.

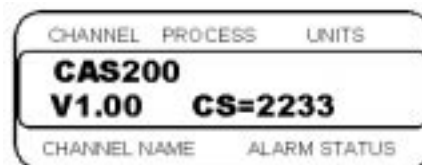
When activated, it performs the same function as if the  key was pressed.



Selectable values: High or Low

EPROM Information

This view only display shows the Scanner's Eprom version and checksum.



Setup Channel Inputs

The Setup Channel Input main menu lets you access menus which change parameters related to the channel input:

- Input type
- Input units
- Input scaling and calibration
- Input filtering

The next section explains how to use the Input menus to configure your Scanner.

CHANNEL	PROCESS	UNITS
SETUP CHANNEL 02		
INPUT ?		
CHANNEL NAME		ALARM STATUS

Input Type

This is the first menu of the Setup Channel Inputs menu, it lets you configure the input sensor for each channel as one of these input types.

- Linear Inputs
- Skip (an input type available for unused channels.) The Scanning display doesn't show channels you've set to skip.

CHANNEL	PROCESS	UNITS
01 M		
MM		
CHANNEL NAME		ALARM STATUS

Input Type	
Linear	See the Linear Scaling section (this chapter) and Appendix 4
Skip	Channel is not scanned or displayed.



NOTE

If you set the input type to Skip, you won't see any of the other submenus in the Setup Channel Input Menu. If you set the input type to Linear, you will see the Input Scaling submenus.

Channel Name

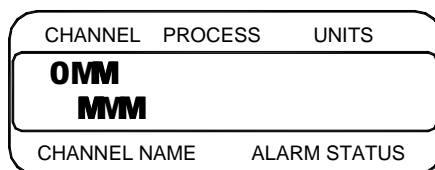
This menu lets you enter a channel name (up to seven characters) from this menu. If no name is entered, the Channel name will default to the current channel number.

A screenshot of a menu titled 'CHANNEL NAME ?'. The menu has a header with 'CHANNEL', 'PROCESS', and 'UNITS'. The main display area shows '01 CHANNEL NAME ?'. At the bottom, there are labels 'CHANNEL NAME' and 'ALARM STATUS'.

Input Units

The Input Units menu lets you choose a three-character description of the channel's engineering units.

- If you have selected a linear input type, you can choose any available character for each character position. For example, you can use PPM or PPB for a linear input's units.

A screenshot of a menu titled 'INPUT UNITS'. The menu has a header with 'CHANNEL', 'PROCESS', and 'UNITS'. The main display area shows '0MM' and 'MM'. At the bottom, there are labels 'CHANNEL NAME' and 'ALARM STATUS'.

The table below shows the character set for input units.

Input	Character Sets for Units
Linear	0-9, A-Z, %, /, °, space

Linear Scaling Menus

The linear scaling menus appear under the Setup Channel Inputs main menu. Linear scaling is available for linear inputs only. It lets you scale the “raw” input readings to the engineering units of the process variable.

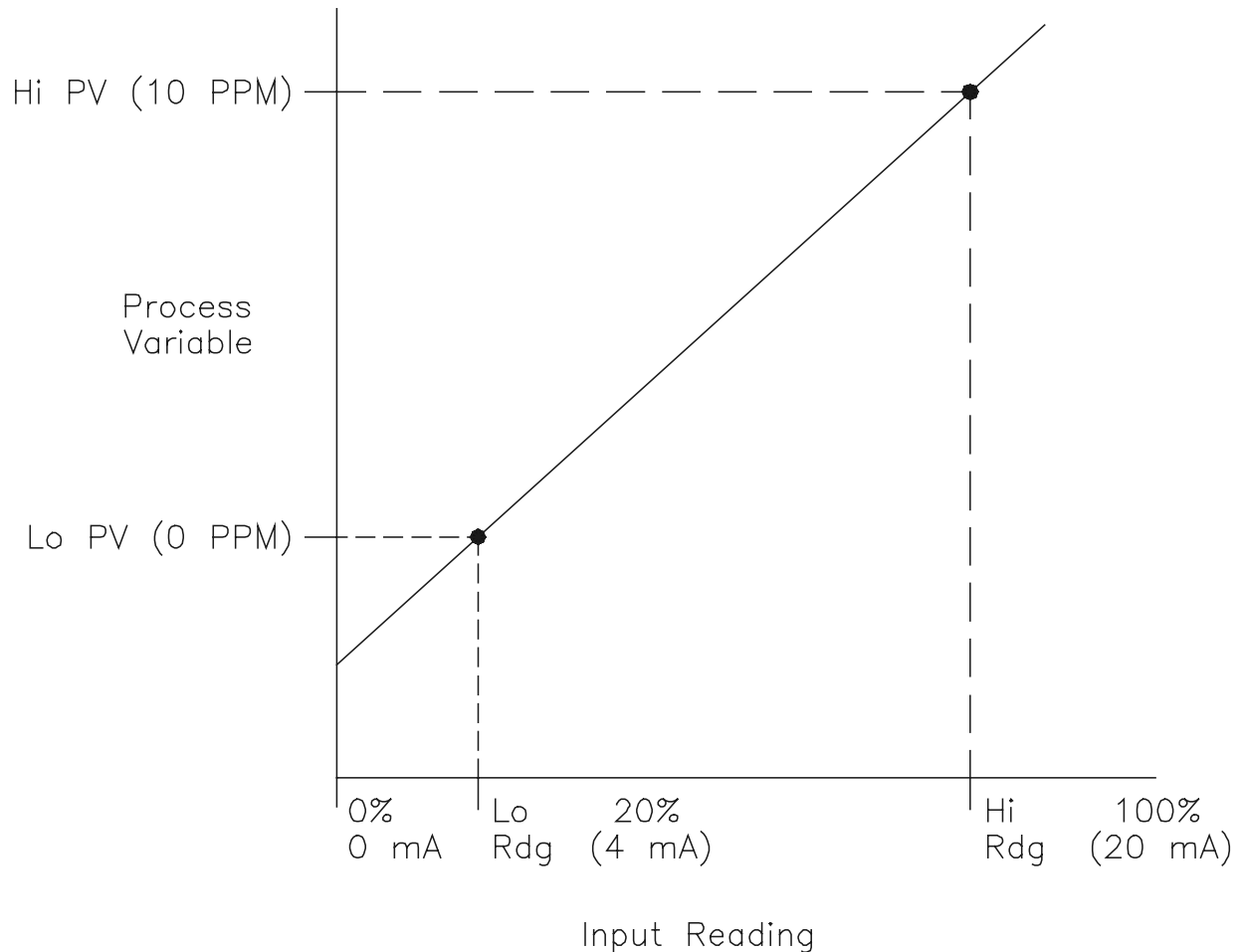


NOTE

The Linear Scaling Menus will only be present if you set the channel's input type to Linear.

For Current Loop Linear Inputs, the input reading is in percent (0% to 100%) representing the 0mA to 20mA input range of the Scanner. The Scaling function is defined by two points on a conversion line, the High Process Variable (PV), and the low Process Variable (PV). High PV is the high end of the input in engineering units, and the low PV is the low end. The engineering units of the process variable can be any arbitrary units.

The example below shows a high PV of 10 PPM, and a low PV of 0 PPM. The high reading is the high end of the input signal (where 20 mA = 100%).



Before you enter the values that determine the two points for the conversion line, you must choose an appropriate display format. The Scanner has six characters available for process variable display; select the setting with the desired number of decimal places before and after the decimal point. Use a display format that matches the range and resolution of the process variable. The display format you choose is used for the setpoint, alarms, deadband, and alarm deviation.

The Process Variable range for the scaled input is between the PV values that correspond to the 0% and 100% input readings. This PV range defines the limits for the setpoint and alarms.



NOTE

For example Linear Scaling calculations See *Appendix 4: Linear Scaling*.

Display Format

This menu lets you select a display format for a linear input. Choose a format appropriate for your input range and accuracy. (You will only see the Display Format menu if you are editing a linear input.)

CHANNEL	PROCESS	UNITS
01 DISP FORMAT ?		
-999 to 3000		
CHANNEL NAME	ALARM STATUS	

The Scanner has several available display formats; the display format you choose determines the default values for the rest of the Linear Scaling Menus.

Display Format	Default High PV	Default Low PV
-9999 to +30000	10000	0
-999 to + 3000	1000	0
-99.9 to +3000.0	1000.00	.0
-99.99 to +300.00	100.00	.00
-9.999 to +30.000	10.000	.000
-.9999 to +3.0000	1.0000	.0000

High Process Value

From this menu, you can enter a high value. The process value and the high reading value together define one of the points on the Linear Scaling function's conversion line.

Selectable values: The Scanner displays the process value based on the above table.

Input Scaling High Reading

CHANNEL	PROCESS	UNITS
01 MM		
MM MM M		
CHANNEL NAME		ALARM STATUS

Use this menu to enter the input level that corresponds to the high process value you entered in the previous menu. For Linear Inputs, the high reading is a percentage of the full scale input range.

The 100% full scale input value is 20 mA for the linear input type.

CHANNEL	PROCESS	UNITS
01 MM		
MM100MM		
CHANNEL NAME		ALARM STATUS

Selectable values: -99.9 to 999.9

Input Scaling Low Process Value

Use this menu to set a low process value for Input Scaling purposes. The low process value and the low reading value together define one of the points on the Linear Scaling function's conversion line.

CHANNEL	PROCESS	UNITS
01 MM		
MM MM M		
CHANNEL NAME		ALARM STATUS

The default low PV is determined by the display format you selected (refer to the *Display Format Table*).

Input Scaling Low Reading

This menu appears under the Setup Channel Inputs main menu. Use it to enter the input level that corresponds to the low process value you selected in the previous menu. For Linear Inputs, the low reading is a percentage of the full scale input range.

Selectable values: -99.9 to 999.9

Input Filter

The Scanner has two different types of input filters:

- A noise rejection filter that rejects high frequency input signal noise. This filter keeps a “Trend Log” of input readings. If a reading is outside the filter’s “acceptance band”, and later readings are within the acceptance band, the Scanner ignores the anomalous reading. For Linear Inputs the acceptance band is 0.5% above and 0.5% below the input reading trend. If later readings are also outside the acceptance band, the Scanner accepts the anomalous reading and calculates a new acceptance band, (You cannot adjust this input filter).
- A standard resistor-capacitor (RC) filter that lets you damp the input response if inputs change unrealistically or change faster than the system can respond. If the input filter is enabled, the process variable responds to a step change by going to 2/3 of the actual within the number of scans you set.

If all input channels are enabled, none of them set to SKIP, the Scanner will scan 1.5 channels per second when set to 1 scan, and 4.5 channels per second when set to 3 scans.



Selectable Values: 0 to 255 Scans.

Setup Channel Alarms


The Setup Channel Alarms menu lets you access menus which change alarm function parameters for the current channel. The main menu alarms menu looks like this:



The Scanner has two different kinds of alarms: global alarms, and process alarms.





Global Alarms

Global alarms occur when a channel alarm is active and unacknowledged. (If an alarm occurs, the Scanner front panel displays an appropriate alarm message, see *Chapter 4: Using the Scanner*). Even if the alarm condition goes away, the

global alarm stays on until you use the front panel  key (or ANASCAN) to acknowledge it.

Process Alarms

Process alarms include Alarm, Warning and Trouble alarms. You can set each of these alarms to Off, Latched or Unlatched.

Function	Description
Off	No Alarm
Latched	Digital output activates on alarm. Alarm is only cleared if it is in a Non-Alarming state, and the  key is pressed. If  has not been previously pressed, the  will acknowledge the global alarm as well.
Unlatched	Digital output activates on alarm, and deactivates when channel is in a Non-Alarming state. The  key must be pressed to shut off the global alarm.

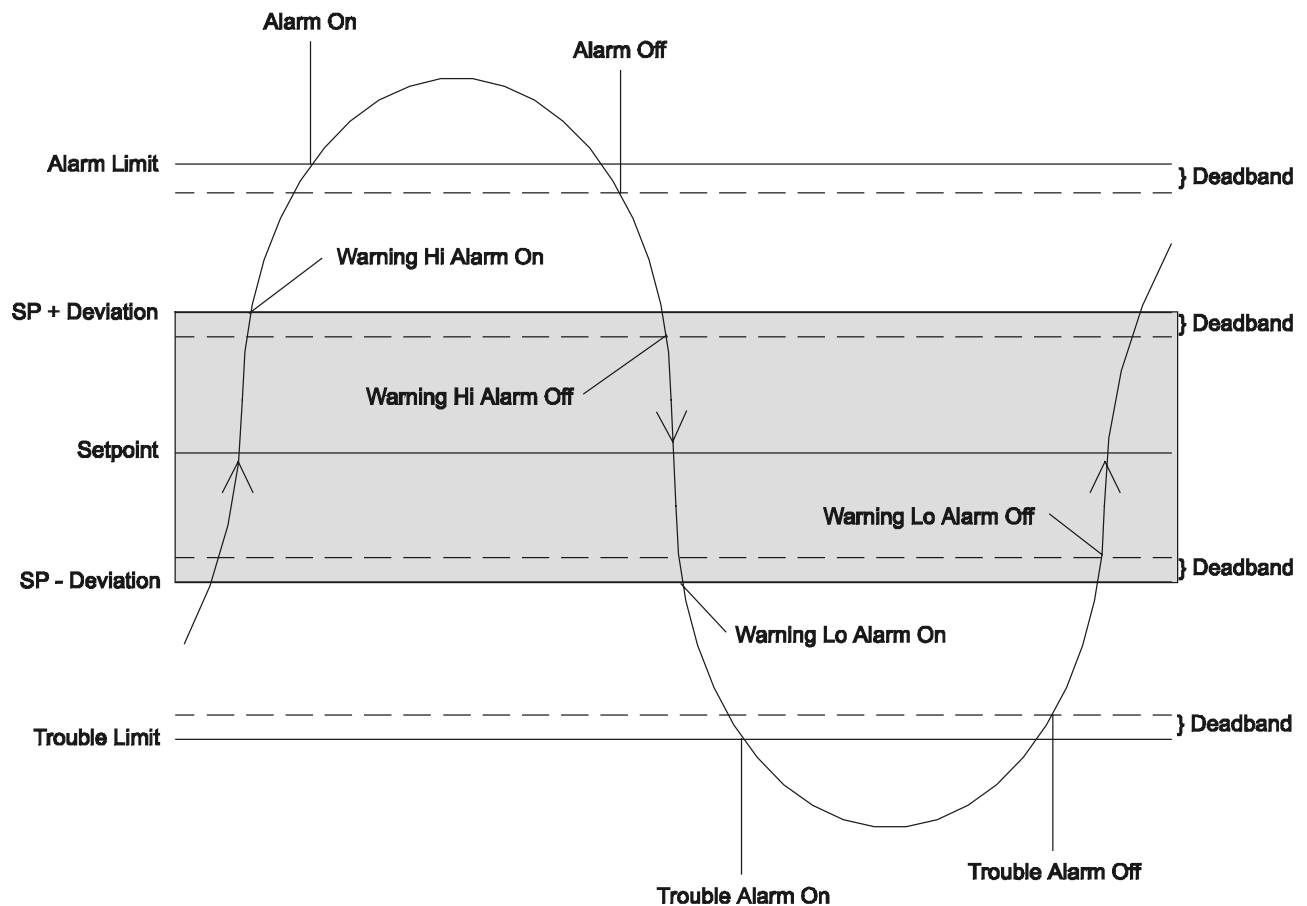
- Alarm and Warning activates when the process variable goes above a value you set. They remain active until the process variable goes below that value minus the deadband. (See the diagram below.)
- Any digital output can be assigned to one or more process variable alarms. The output is active if any of its alarms are active. All alarm outputs are active Low or active High, depending on the global alarm output polarity setting.
- Trouble activates, when the process variable goes below a value you set. It remains active until the process variable goes above that value plus the deadband. (The diagram below shows these alarms.)



NOTE

When the Scanner power up, or the setpoints changes, deviation alarms do not activate until the process goes inside the deviation alarm band, preventing Deviation alarms during a cold start.

Use menus to set the following process alarm parameters for each channel:



Use menus to set the following process alarm parameters for each channel:

- Alarm Warning and Trouble, setpoint, and digital output.
- Alarm deadband
- Alarm delay

The setpoints, deviation alarm values, and deadband all use the same decimal format as the channel's process variable.

Alarm Delay

You can set the Scanner to delay normal alarm detection and alarm reporting. There are two kinds of alarm delay:

- Startup alarm delays detection of process alarms for all channels for a time period you set in the **Setup Global Parameters main menu**.
- Channel alarm delay, delays process alarms for one channel until the alarm condition is continuously present for longer than the channel alarm delay time you set.

Alarm Setpoint

This menu lets you select the setpoint (value within the scaled sensor range) at which the Alarm activates. The Alarm activates when the process variable (PV) goes above the Alarm setpoint. It deactivates when the PV goes below the Alarm setpoint minus the deadband value, if you have set a deadband value.

CHANNEL	PROCESS	UNITS
01 M MMW		
CHANNEL NAME	ALARM STATUS	

Selectable Values: Any point within the scaled sensor range

Alarm Type

This menu lets you turn off the Alarm or set it to one of the alarm functions. (See the previous description for an explanation of these choices.)

CHANNEL	PROCESS	UNITS
01 ALARM TYPE ? LATCHED		
CHANNEL NAME	ALARM STATUS	

Selectable values: Off, Latched, Unlatched

Alarm Output Number

This menu lets you choose the digital output that activates when the channel is in Alarm. You can use this output to activate a second alarm horn or other process control function.

CHANNEL	PROCESS	UNITS
01 ALARM OUTPUT ? 1		
CHANNEL NAME	ALARM STATUS	

Selectable Values: 1 to 34, None



NOTE

All digital outputs are combined. Therefore you can assign more than one alarm to the same output number, and the output will be On if any of those alarms is On.

Warning Value

This menu lets you set the Warning band width, a positive and negative warning point relative to the setpoint. If the setpoint changes, the warning points also change. You can assign separate digital outputs to Hi and Lo Warnings.

CHANNEL	PROCESS	UNITS
01 WARNING VALUE ? .1 PPM		
CHANNEL NAME	ALARM STATUS	

Selectable Values: 0 to 255, 35.5, 2.55, .255 or .0255, depending on the way you set up the Input menus.

Warning High

This menu lets you disable the warning Hi function or set it to the alarm functions. (The Warning Hi activates if the process value (PV) rises above the deviation band value, and remains active until the PV goes below the deviation band value minus the deadband value.)

CHANNEL	PROCESS	UNITS
01 WARNING HI TYPE ? LATCHED		
CHANNEL NAME	ALARM STATUS	

Selectable Values: Latched, Unlatched, or Off

Warning High Output Number

This menu assigns a digital output which activates when the channel is in high deviation alarm. The digital output only activates if you have set the high deviation alarm to On.

CHANNEL	PROCESS	UNITS
01 WARNING HI OUTPUT ? 2		
CHANNEL NAME	ALARM STATUS	

Selectable Values: 1 to 34, None



NOTE

All digital outputs are combined. Therefore you can assign more than one alarm to the same output number, and the output will be On if any of those alarms is On.

Warning Low

This menu turns off Warning Low or sets it to the alarm function.

CHANNEL	PROCESS	UNITS
01 WARNING Lo		
TYPE ? OFF		
CHANNEL NAME		ALARM STATUS

Selectable Values: Off, Latched, Unlatched

Warning Low Output Number

This menu is used to assign a digital output that activates when the channel is in Warning Low

CHANNEL	PROCESS	UNITS
01 WARNING Lo		
OUTPUT ? NONE		
CHANNEL NAME		ALARM STATUS

Selectable Values: 1 to 34, None



NOTE

All digital outputs are combined. Therefore you can assign more than one alarm to the same output number, and that output will be On if any of those alarms is On.

Trouble Setpoint

This menu is used to set a Trouble Setpoint. (Trouble activates when the process variable goes below the Trouble setpoint. It deactivates when the process variable goes above the setpoint plus the deadband.)

CHANNEL	PROCESS	UNITS
01 TROUBLE		
SETPT ? -2 PPM		
CHANNEL NAME		ALARM STATUS

Selectable Values: Any value within the input sensor's range

Trouble Type

This menu lets you turn off the Trouble Alarm, or set it to the Alarm Function.

CHANNEL	PROCESS	UNITS
01 TROUBLE TYPE ? LATCHED		
CHANNEL NAME		ALARM STATUS

Selectable Values: Off, Latched, Unlatched

Trouble Output Number

This menu lets you assign the digital output that activates when the channel is in Trouble.

CHANNEL	PROCESS	UNITS
01 TROUBLE OUTPUT ? 3		
CHANNEL NAME		ALARM STATUS

Selectable Values: None, 1 to 34



NOTE

All digital outputs are combined. Therefore you can assign more than one alarm to the same output number, and that output will be On if any of those alarms is On.

Alarm Deadband

This menu lets you set an alarm deadband. This deadband value applies to the high process, low process, high deviation, and low deviation alarms for the channel you are editing.

The alarm deadband sets the hysteresis of the alarm action which is used to avoid intermittent alarms as the PV returns to a normal state.

CHANNEL	PROCESS	UNITS
01 ALARM DEAD BAND ? .5		
CHANNEL NAME		ALARM STATUS

Selectable Values: 0 to 255, 25.5, 2.55, .255, or .0255 depending on your input menu setup.

Alarm Delay

This menu sets a Channel Alarm Delay. There are two types of Alarm Delay: the Startup Alarm Delay, and Channel Alarm Delay. Startup Alarm Delay (which you can set in the **Setup Global Parameters** main menu), delays process alarms for all channels for a specified time after the Scanner powers up.


The Channel Alarm Delay, in contrast, is set separately for each channel. It delays process alarms until the alarm condition has been continuously present for longer than the alarm delay time.

CHANNEL	PROCESS	UNITS
01 ALARM DELAY ?		
5 SECONDS		
CHANNEL NAME		ALARM STATUS

Selectable Values: 0 to 255 seconds.

Manual I/O Test

CHANNEL	PROCESS	UNITS
MANUAL I/O		
TEST ?		
CHANNEL NAME		ALARM STATUS

Press  at this prompt to see menus which can help you test the digital inputs, digital outputs, and the Scanner keypad.

CHANNEL	PROCESS	UNITS
DIGITAL INPUTS		
HLLHHHH		
CHANNEL NAME		ALARM STATUS

Digital Input Testing

This is a read-only menu that shows the logic state of the 8 digital inputs as H (High- the input is at 5 volts or is not connected) or L (Low – the input is at zero volts). Inputs 1 to 8 are displayed from left to right. Since inputs are pulled High when they are not connected, test an input by shorting it to controller common and making sure this menu shows the correct state for that input.

Digital Output Selection



This menu lets you select one of the Digital Alarm Outputs, to test in the next menu.

CHANNEL	PROCESS	UNITS
TEST DIGITAL OUTPUT ? 34		
CHANNEL NAME		ALARM STATUS

Digital Output Test

This menu lets you manually toggle a digital output On or Off to test it. (Select the output to test in the previous menu.) On may be Low or High depending on the digital output polarity you set. (All outputs are set to Off when you exit this menu.)

CHANNEL	PROCESS	UNITS
DIGITAL OUTPUT NUMBER 34 : OFF		
CHANNEL NAME		ALARM STATUS

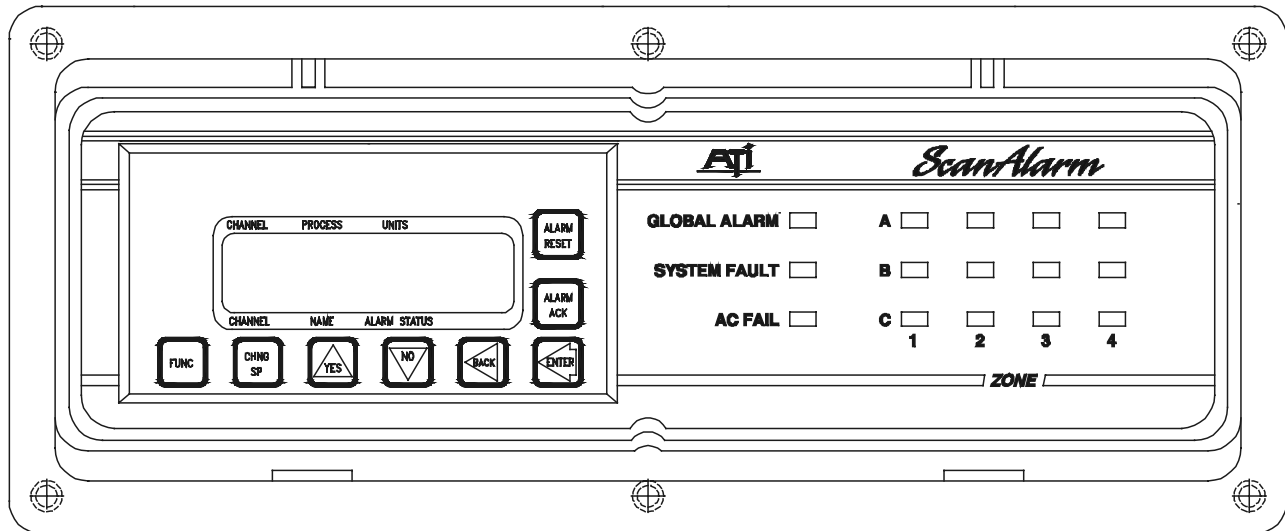
Press  or  to toggle the output state between On or Off.

Keypad Test


This menu lets you test the keypad. Press any key on the keypad to test the response. The Scanner will display the name of the key you have pressed.

CHANNEL	PROCESS	UNITS
KEYPAD TEST QUIT = "NO" + "NO"		
CHANNEL NAME		ALARM STATUS

Annunciator Panel



Global Alarm

Illuminates to indicate that one or more inputs have an **ALARM**, **WARNING** or **TROUBLE** level. All occurrences must be acknowledged by pressing  to extinguish the Global Alarm Lamp.

System Fault

Illuminates to indicate that the scanner has malfunctioned, and may need service. This fault can only be cleared by cycling power to the system. If cycling power fails to clear the **FAULT** alarm, or if this alarm is seen repeatedly, contact Analytical Technology service department.

AC Fail

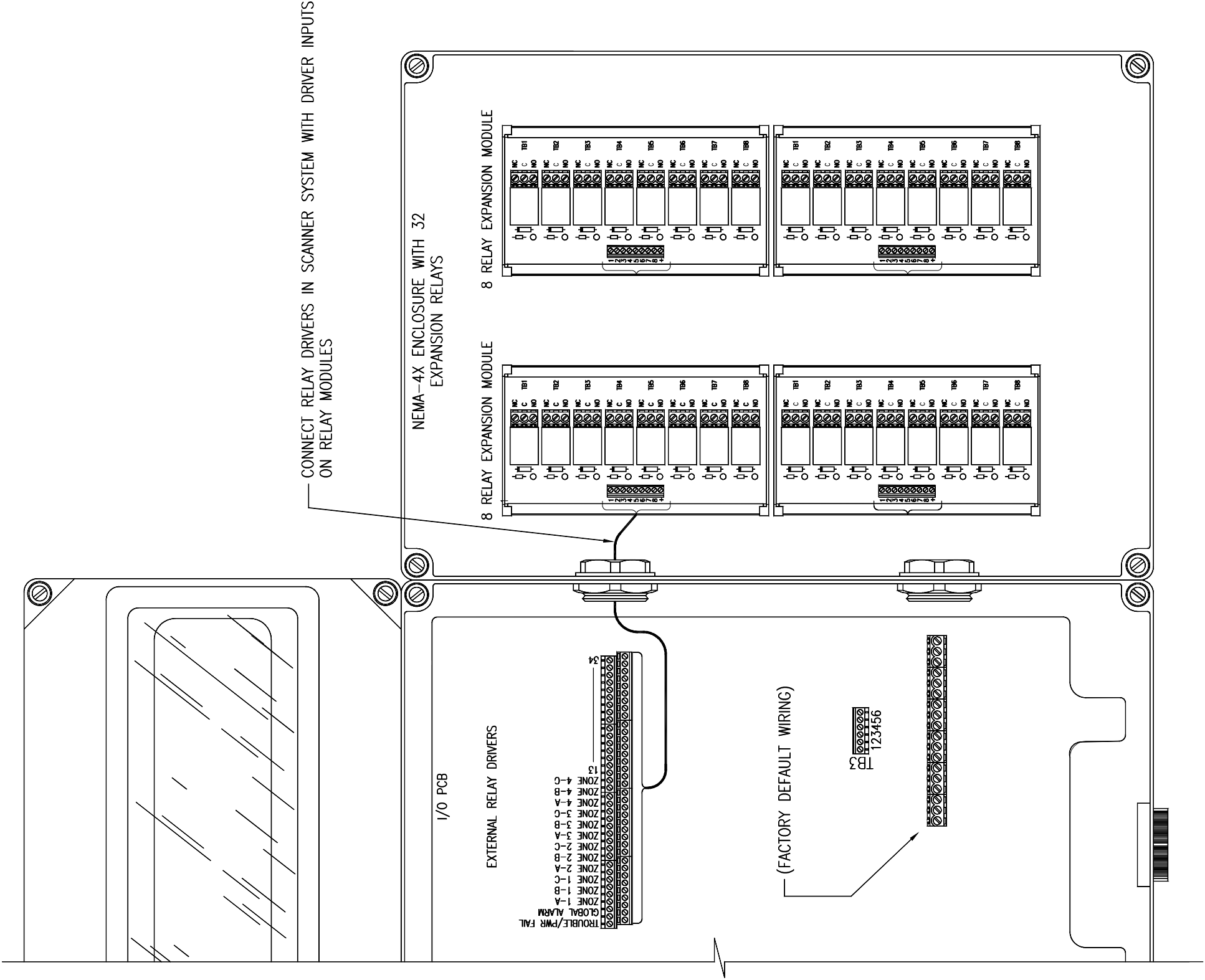
If the Scan Alarm is configured with battery backup, this lamp will illuminate to indicate that AC Power has been interrupted and the system is running on battery backup.

Zone Indicators

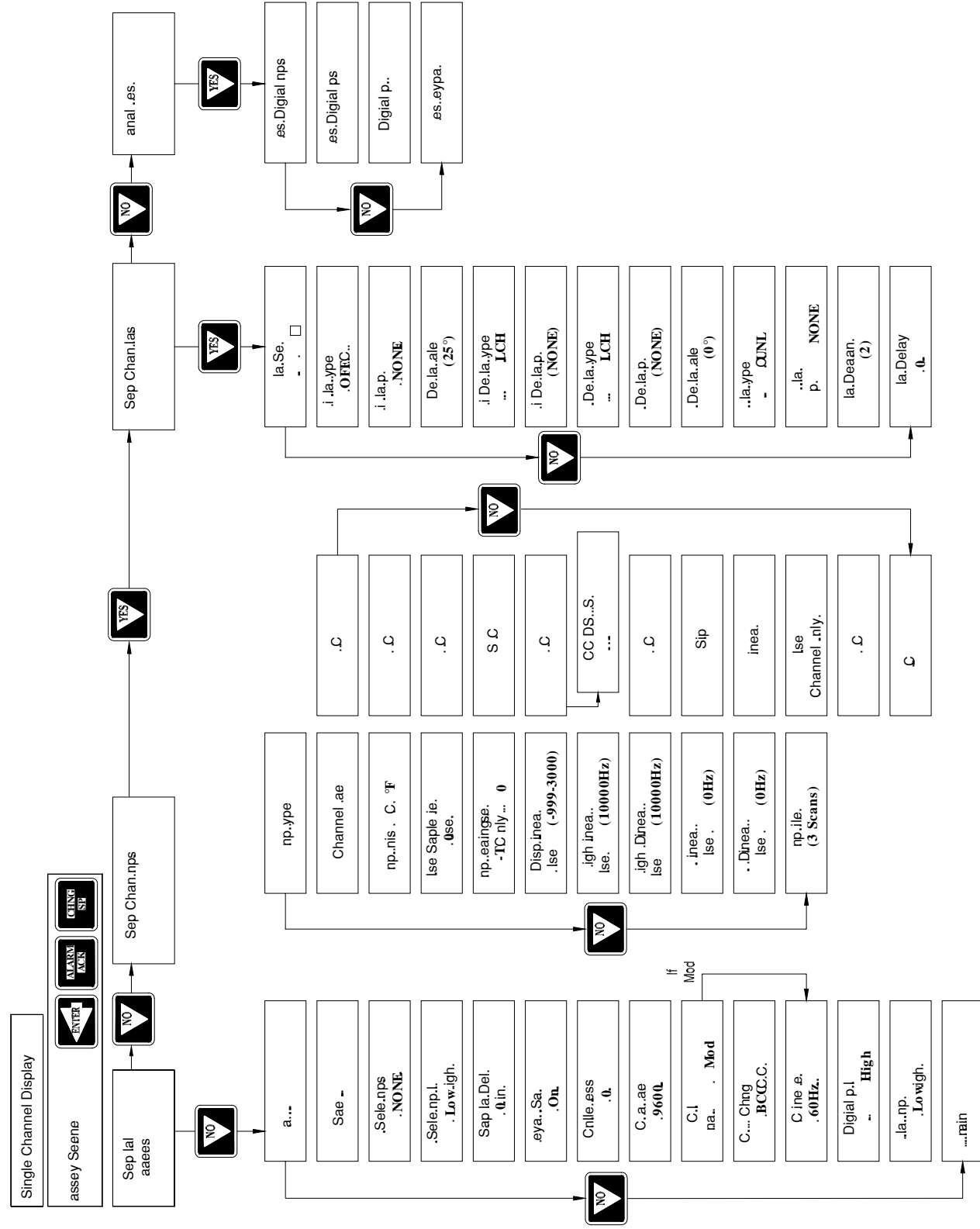
The C14 Scan Alarm provides the user with considerable flexibility in programming the zone indicators. Table 1 on page 6 tabulates digital outputs that drive these indicators.

A typical installation could designate 4 zones (1 through 4) with the **A** row indicating **ALARM** the **B** row indicating **WARNING**, and the **C** row indicating **TROUBLE**. Multiple detectors may be assigned to each zone indicator.

Appendix 2 — Relay module wiring diagram (ATI-0271)



APPENDIX 3 – Software Flowchart



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CPHOD

APPENDIX 4 — Linear Scaling Example

Situation

A gas sensor that generates a 4-20 milliamp signal is connected to the scanner. The specifications of the sensor state that it generates 4 milliamps at 0.0 PSI and 20 mA at 50.0 PPM.

Setup

The Sensor measures PPM in tenths, so the appropriate display format is -999.9 to +3000.0.

This table shows the input readings.

PV Displayed	Sensor Input	Reading (%FS)
50.0 PPM	20 mA	100%
0.0 PPM	4 mA	$100\% \times (4\text{mA}/20\text{mA}) = 20\%$

The scaling values are therefore

Parameter	Low Value	High Value
Process Value (PV)	0.0 PPM	50.0 PPM
Input Reading (RDG)	20.0%	100.0%