

**CTI Model 5250-TI4
CTI Model 5251-TI4
Access Modules**

INSTALLATION AND OPERATION GUIDE

Version 4.0

CTI Part #062-00101

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PREFACE

This ***Installation and Operation Guide*** provides installation and operation instructions for the CTI Model 5250-TI4 and Model 5251-TI4 Access Modules for SIMATIC TI405 series programmable controllers. The two models function identically with differences only in the data display technology. The Model 5250-TI4 has a Liquid Crystal Display (LCD), while the Model 5251-TI4 contains a Vacuum Fluorescent Display (VFD).

This document assumes familiarity with the operation of SIMATIC TI405 series programmable controllers. Refer to the appropriate SIMATIC TI user documentation for specific information on the SIMATIC TI405 series programmable controllers and I/O modules.

This ***Installation and Operation Guide*** contains two main parts:

- I. **Access Module Installation and Operation** gives an overview of the Access Module, provides installation instructions, and covers operation (Chapters 1-3).
- II. **Configuration Program Installation and Operation** provides instructions for the use of the Software Configuration Program.

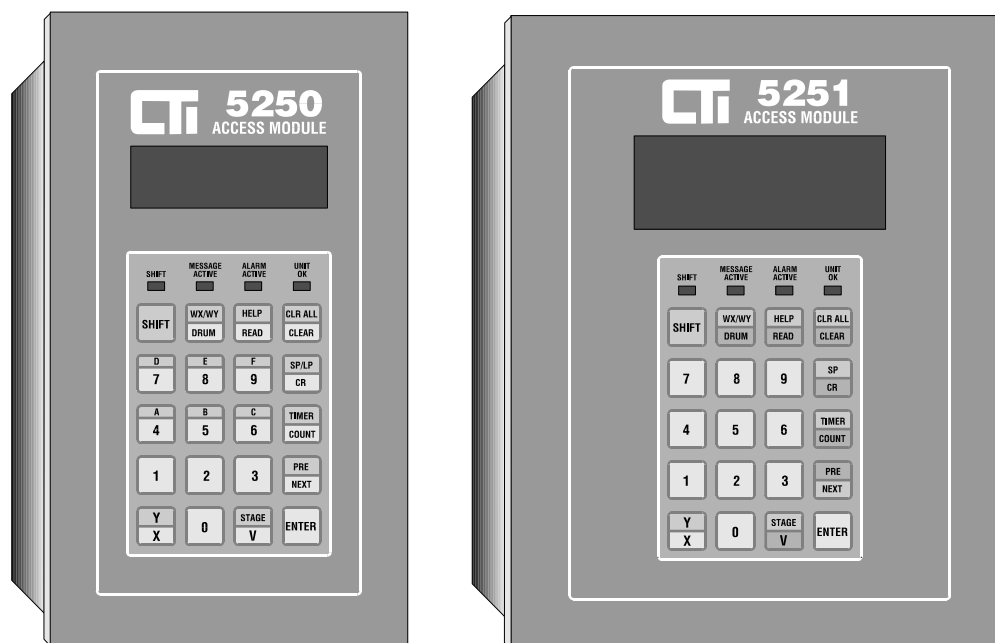


Figure 1 *The 5250-TI4 and 5251-TI4 Access Modules*

USAGE CONVENTIONS

NOTE:

Notes alert the user to special features or procedures.

CAUTION:

Cautions alert the user to procedures which could damage equipment.

WARNING:

Warnings alert the user to procedures which could damage equipment and endanger the user.


KEY SEQUENCE	SHIFT LED	DISPLAY
<div>SHIFT</div>		
<div>STAGE V</div> Select Stage		<div>S 0</div>
<div>1</div> Enter number		<div>S 1</div>
<div>HELP READ</div> Read the state		<div>S 00001 OFF</div>

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CHAPTER 1. DESCRIPTION

The Model 5250-TI4 and Model 5251-TI4 Access Modules provide a simple, yet flexible, interface to the SIMATIC TI405 Series Programmable Controllers. The Access Modules are designed to monitor and (optionally) modify Discrete I/O (X/Y), Control Relays (CR), Special Relays (SP), Stage Memory, Timers/Counters Preset and Current values, and V-Memory (V). PLC memory locations are continuously monitored to detect internal PLC errors and user configured alarms and event messages.

The Access Modules provide a rugged, compact panel for the operator, technician, and engineer who need to access PLC memory locations without using a VPU or TISOFT. This interface provides the ease of use and flexibility needed for numerous operation, diagnostic, and maintenance applications.

Included with each module is a menu-driven software configuration program which runs on IBM-compatible computers. (The configuration package is covered in Chapter 4 of this *Installation and Operation Guide*.) By following simple command prompts, users can assign custom tag names to PLC memory locations, define alarms and messages, select operator password, designate read-only memory locations, and specify V memory locations for the transfer of real-time clock data. Once created, the configuration file can be transferred to or from the battery-backed memory in the Access Module.

1.1 Features

- Compact, industrial panel mount design including NEMA 4 rated (water-tight) front panel and convenient plug-in communications and power cables

- Access to SIMATIC TI405 PLC memory locations by address or tag names

- Password protection for individual memory locations prevents unauthorized changes while allowing all monitoring functions

- Read-only option prevents altering critical data

- Flexible alarm handling permits selection of partial or complete display interruption, alarm storage, and event logging

- Context-sensitive Help screens

- Real time clock that can be transferred to user-specified V memory locations

- Displays and dynamically updates PLC memory locations (tag names) embedded in user defined messages

1.2 Theory of Operation

The executable program and commands which allow the Access Module to interact with the SIMATIC TI405 Series controllers are permanently stored in internal ROM (Read Only Memory). Custom configuration parameters, including user-assigned tag names, alarms, and messages, are stored in battery-backed RAM.

The Access Module software provides two command sets for the operator. The primary command set allows the user to monitor PLC status and monitor/change Discrete I/O, Control relays, Special Relays, Stage Memory, Timers, Counters, and V-Memory locations. The auxiliary command set displays the status of the Access Module, display and edit the Real Time Clock, create a screen to dynamically display four (4) data points, set PLC communications baud rate, and upload/download a configuration file to/from a PC running the TI4 Configuration Software program. Additionally, the Model 5251-TI4 permits the user to specify the time delay before the VFD Screen Saver is activated.

Procedures for using each of these commands are described in the Chapter 3.

1.3 Battery Replacement

The Access Module is equipped with an internal 3.6V Lithium battery that should provide memory backup for approximately 8 years when operated in normal environments. Battery life can diminish if the unit is subjected to extreme temperatures or frequent temperature cycles.

It is recommended that the unit be returned to CTI for service when battery replacement is required. However, a qualified technician can access the battery by removing the rear panel. A replacement battery can be ordered from CTI (Part #075-00009).

1.4 Front Panel Description

The Access Module front panel contains a data display (LCD or VFD), 20 key membrane keypad, and four (4) status LEDs, as shown below.

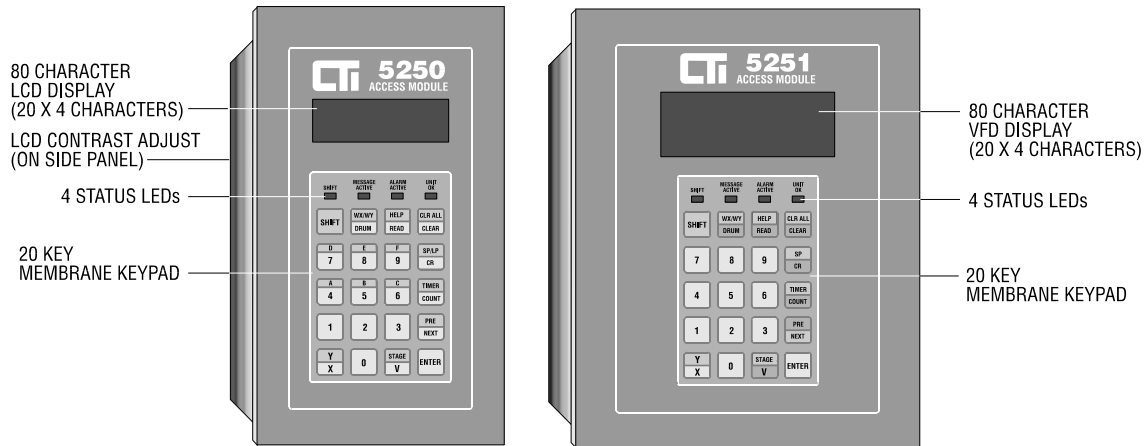


Figure 2 *Front Panel Description*

An 80 character (4 Line by 20 Characters) **Data Display** is provided with each unit. Model 5250-TI4 contains a 1" by 3" LCD with wide viewing angle. Model 5250-TI4 includes a VFD with 5mm by 3mm character size.

The **Keypad** is used to access PLC memory locations, edit values, and specify the Auxilliary Command set (described in Section 3.5).

The **"SHIFT" LED** is illuminated when the "SHIFT" mode is active. The next key pressed causes the alternate (Blue-labelled) function to be called.

The **"MESSAGE ACTIVE" LED** is illuminated when an Event Message appears on one or more lines of the data display. An Event Message is a special type of alarm that interrupts the data display but does not create an entry in the Alarm Storage Queue. See Section 3.8 for details on Event Messaging.

The **"ALARM ACTIVE" LED** is illuminated whenever one or more "unacknowledged" alarm messages exist in the Alarm Storage Queue. Alarm Queue messages are created when the Access Module detects an alarm condition configured for this action. See Section 3.7 for a description of alarms.

The **"UNIT OK" LED** indicates that the Access Module is properly powered and operating normally. If this LED is ON steady, the unit is communicating with the PLC. If the PLC is not responding, this LED is flashing.

1.5 LCD Brightness Control

The Model 5250-TI4 Access Module contains an adjustment screw that allows contrast control for the Liquid Crystal Display (LCD). This contrast control is located in the left side panel below the LCD.

A small screwdriver of approximately 1/8 inch diameter may be used to adjust the contrast setting. The range of control is slightly less than one full turn with factory setting about 50%. **DO NOT PUSH** on the adjustment screw with the screwdriver.

1.6 Communications

1.6.1 Access Module to Personal Computer

The Access Module communicates with an IBM-compatible PC to provide upload/download of custom configuration files to/from the PC. The PC must be running the TI4 Configuration Program provided with the unit.

A cable must be connected between the Access Module PROGRAM Port on the rear panel and a serial port (COM1 or COM2) on the PC. Communication cables may be purchased from CTI or constructed according to the specifications described in Chapter 4 of this manual.

1.6.2 Access Module to PLC

The Access Module can be connected directly to SIMATIC TI405 Series PLC Programming Port via a standard communications cable. The required cables are available from CTI or can be constructed as described in Section 2.3.

The Access Module can communicate to the PLC through the PROGRAM Port by either RS-232 or RS-422. This choice is determined by the selection of the proper communication cable. No internal switching is required to select RS-232 or RS-422 operation.

PLC Communications Baud Rate can be set through the TI4 Configuration Program as well as directly from the keypad using an auxiliary command function. Choices are 9600 or 19.2K baud. The other communication parameters (7 data bits, odd parity, 1 stop bit) are fixed and cannot be altered.

If communications with the PLC is disconnected or interrupted by excessive noise, the Access Module UNIT OK LED flashes approximately once per second to indicate the problem.

1.6.3 Access Module Output through AUX Port

The AUX Port on the Access Module rear panel can be used for a second serial connection to a log printer or message display. The pinout for this port is described in Section 2.4.

The AUX Port is configured as RS-232 DTE (Data Terminal Equipment) operation. This port can be used for output only; serial input is not supported. AUX Port communications settings are fixed at 9600 baud, 8 data bits, no parity, 1 stop bit and cannot be altered.

CHAPTER 2. INSTALLATION

2.1 Access Module Mounting

To comply with NEMA 4 specifications, the Access Module must be installed in a NEMA 4 rated enclosure according to the following procedure:

- Step 1. Ensure that there is adequate panel and depth clearance in the NEMA 4 enclosure where the module is to be mounted. Refer to the following figure for overall clearances.
- Step 2. Cut an opening and drill 10 mounting holes in the enclosure panel as shown in the figure below.
- Step 3. Line up the studs on the module with the holes in the enclosure panel. Do not remove the gasket from the studs. Insert the module into the cut-out through the front of the panel. The gasket should be between the module and the front of the panel.
- Step 4. Remove the nuts from the packing envelope and install them onto the studs from the rear of the panel. Tighten the nuts in the sequence and to the torque specifications shown in the figure below.

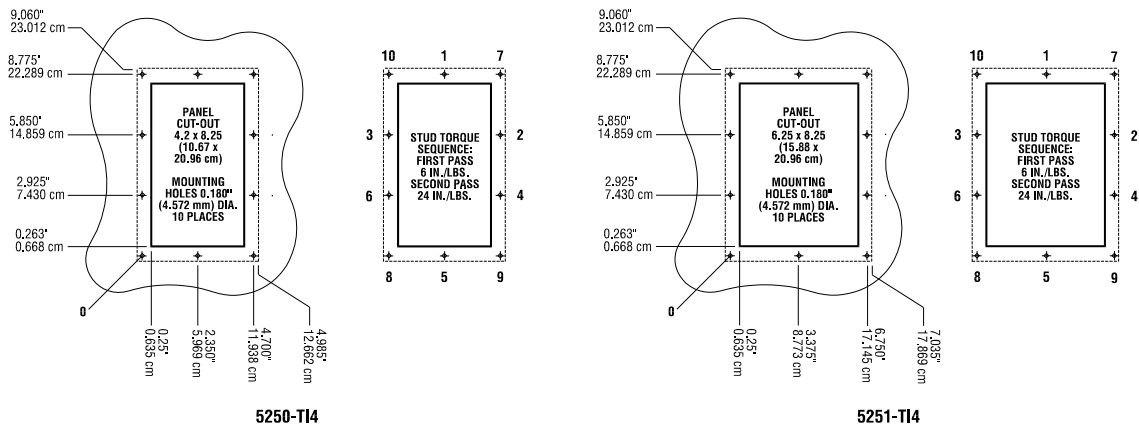


Figure 3 Panel Cut-out and Stud Torque Sequence

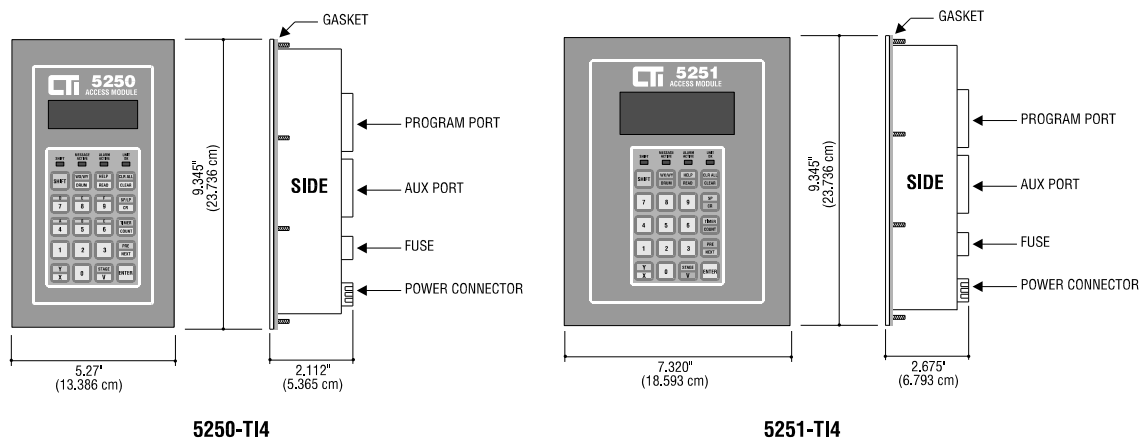


Figure 4 *Module Outside Dimensions*

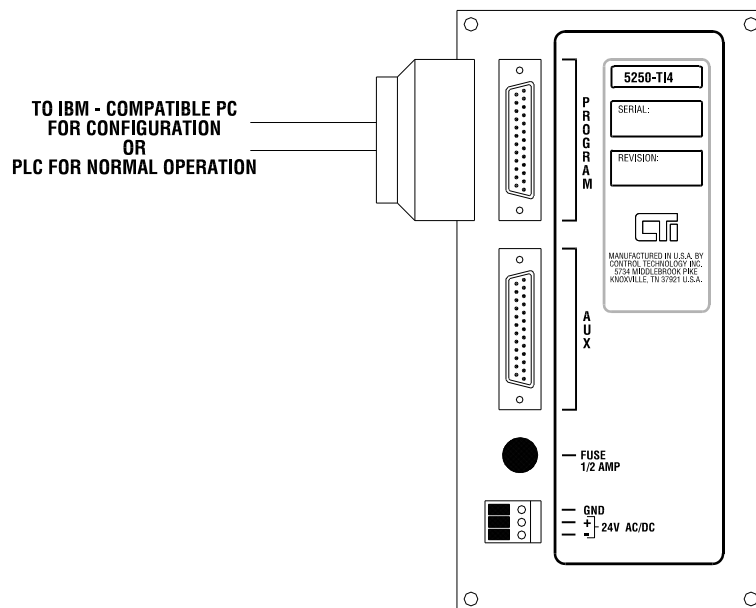


Figure 5 *Rear View of Access Module*

2.2 Connecting Power to the Access Module

Model 5250-TI4 and Model 5251-TI4 Access Modules are powered by 24VAC or 24 VDC. Power is supplied to the unit by connecting the appropriate lines to the screw terminals of the power connector located on the rear panel. The screw terminal connector is a two-piece part that can be removed from the unit to assist in wiring. This connector supports wire sizes ranging from 14 to 18 AWG.

WARNING:

Ensure that the GND pin (top pin on the 3 pin connector) is connected to a suitable ground to prevent personal injury.

WARNING:

Ensure that line power is OFF when connecting the supply wires to the screw terminals to prevent personal injury.

24VAC/DC powered modules are protected by a 0.5 Amp fuse located directly above the power supply screw terminal connector. To remove the fuse, insert a flat-blade screwdriver into the fuse holder and turn counter-clockwise. The replacement fuse should be Schurter #034.3904 5mm x 20mm Surge Proof Fuse (CTI Part #080-00061). Fuse replacement is accomplished by inserting a new fuse in the holder, placing the fuse and holder into the fuse hole, and turning clockwise using a flat-blade screwdriver.

Power voltages other than 24VAC/DC are available by special request. Contact CTI for special voltage requirements.

2.3 Connecting the Access Module to a Series 405 PLC

The Access Module can attach to the Series 405 PLC through the 15-pin MIU Programmer Port or 25-pin Serial Interface Port on the front of the CPU. A cable should be connected from the PROGRAM Port on the Access Module and one of the CPU ports based on the following considerations:

- at
- (1) The MIU Programmer Port (top port on the CPU) operates only with RS-232 signals at 9600 baud. Use of this port permits the simultaneous connection of a PC running TISOFT to the Serial Interface Port on the same CPU.
 - (2) The Serial Interface Port (lower CPU port) supports connection of either RS-232 or RS-422 signals and can be set to operate at 9600 or 19.2K baud. The RS-422 interface allows the Access Module to be placed at an extended distance (up to 4000 cable feet) from the CPU.

The Access Module PROGRAM Port communication parameters are set as follows:

Baud Rate:	9600 (MIU Programmer Port) 9600 or 19,200 (Serial Interface Port)
Data Bits:	8
Parity:	Odd
Stop Bits:	1

Setting of the "PLC Communications Baud Rate" for the Access Module can be performed through the TI4 Configuration Program or directly from the keypad using an Auxiliary Command function (SHIFT, 6).

Standard cables are available from CTI (see Figure 6), or custom length cables can be constructed as described in Figures 7 and 8.

Cable length for RS-232 connections should be limited to 50 feet (15 meters) or less. Belden 8771 or equivalent cable is recommended for assembly of RS-232 cables.

Cable length for RS-422 connections can extend to a maximum of 4000 feet (1200 meters). Belden 8723 or equivalent cable should be used for RS-422 electrical interface. The cable shield (drain) should be attached to pin 1 of the Access Module side of the cable only.

405 CPU PORT	ELECTRICAL INTERFACE	
	RS-232	RS-422
MIU PROGRAMMER PORT	5250-CBT4	N/A
SERIAL INTERFACE PORT	5200-C232	CALL CTI

PC COM PORT	CONFIGURATION CABLE
9 PIN PORT	5250-CBAT
25 PIN PORT	5250-CBXT

Figure 6 *Cable Matrix*

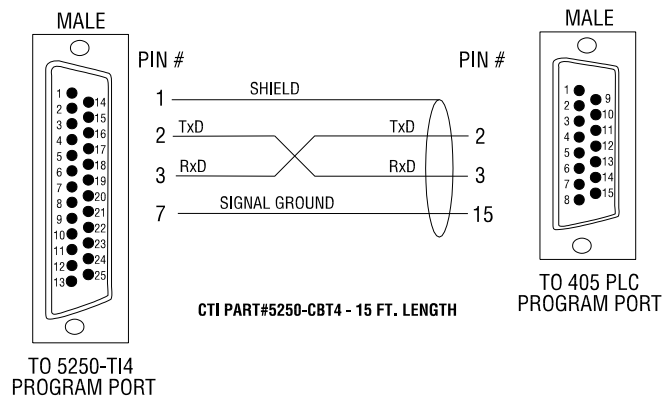


Figure 7 *RS-232 to 405 MIU Programmer Port*

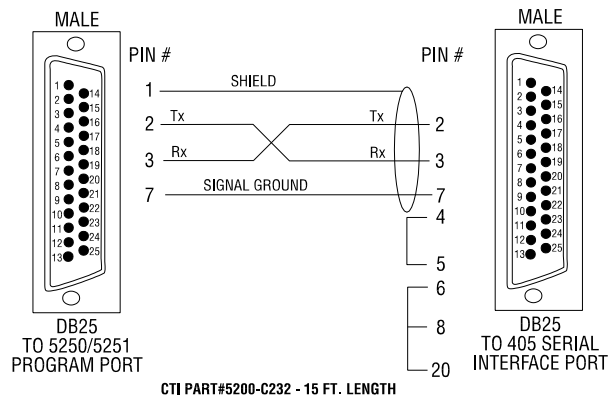


Figure 8 RS-232 to 405 Serial Interface Port

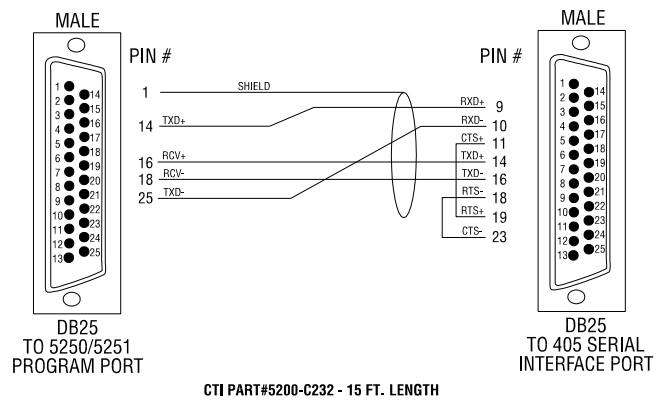


Figure 9 RS-422 to 405 Serial Interface Port

2.4 Connecting the AUX Port to a Serial Device

The AUX Port provides an additional RS-232 serial connection to an event printer or message display. This port can be used for data output only. The AUX Port communications parameters are set as follows:

Baud Rate: 9600
Data Bits: 7
Parity: Odd
Stop Bits: 1

NOTE: All AUX Port communication parameters are fixed.

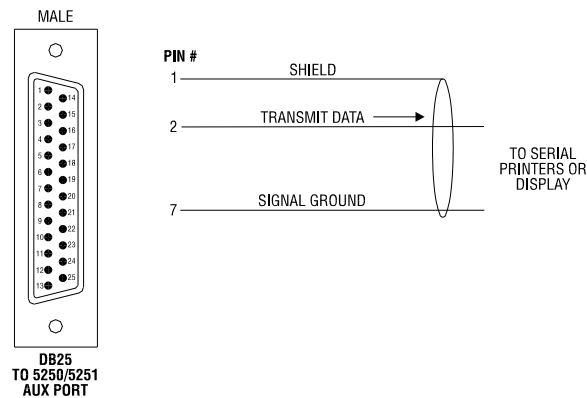


Figure 10 Auxiliary Port Pin-out

2.5 Cleaning the Front Panel

When dirt obscures the keypad or display window, the front panel should be carefully cleaned. The use of a mild soap and water solution or a mild ammonia base window cleaning agent such as Windex (TM) is recommended. Clean the front panel with a soft cloth or sponge using vertical strokes. Wipe off excess cleaner to prevent water spots.

CAUTION:

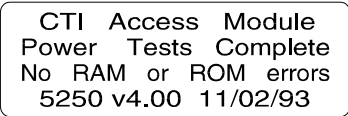
To avoid damage to the laminated plastic front panel, do not clean with abrasive, alkaline, or solvent cleaners. Do not scrape the front panel with razor blades, squeegees or other sharp instruments.

CHAPTER 3. OPERATION

3.1 Initial Power Up

There are four (4) different screens that may be displayed at power-up based on Access Module status:

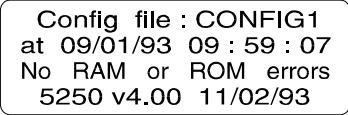
- (1) The normal power-up screen without configuration file and with properly operating battery.



```
CTI Access Module
Power Tests Complete
No RAM or ROM errors
5250 v4.00 11/02/93
```

Figure 11 *Power-Up Screen A*

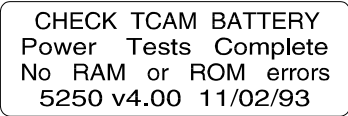
- (2) The power-up screen with configuration file loaded.



```
Config file : CONFIG1
at 09/01/93 09 : 59 : 07
No RAM or ROM errors
5250 v4.00 11/02/93
```

Figure 12 *Power-Up Screen B*

- (3) The power-up screen with a previously disconnected or discharged battery.



```
CHECK TCAM BATTERY
Power Tests Complete
No RAM or ROM errors
5250 v4.00 11/02/93
```

Figure 13 *Power-Up Screen C*

- (4) If power is interrupted while a user-defined screen is in memory, that screen is displayed when power is returned to the unit. See Section 3.5.3 for a details on user-defined screens.

If the "UNIT OK" LED flashes after power-up, communications has not been established with the PLC. Ensure that the communication cable is the correct type, and that it is installed properly. Also ensure that the PLC Baud Rate is set to the same value as configured in the Access Module.

3.2 Keypad Entry

Operation of the Access Module is controlled through the keypad. Included on the keypad are digits 0 - 9 for entering PLC memory addresses and data, and special function keys which access the various features provided by the Access Module.

3.2.1 SHIFT Key

The blue SHIFT key works in conjunction with the dual function keys with blue and white labels (i.e., V/STAGE and HELP/READ keys). When the SHIFT key is pressed, the SHIFT LED lights and the alternate (blue) mode is enabled. If a dual function key is pressed with SHIFT mode enabled, the alternate (blue-labelled) function is activated.

The SHIFT function remains active only until the next key is pressed (even if that key does not have a dual function). The one exception is the use of the PRE/NEXT key, where the SHIFT function remains active until the SHIFT key is pressed again.

The following example demonstrates the use of the SHIFT key.

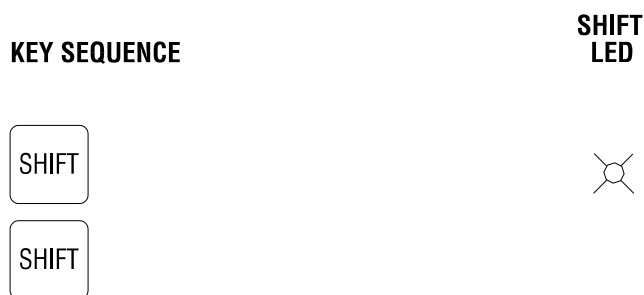


Figure 14 *SHIFT Key*

The following example selects an Input (X), clears the display, and then selects an Output (Y).

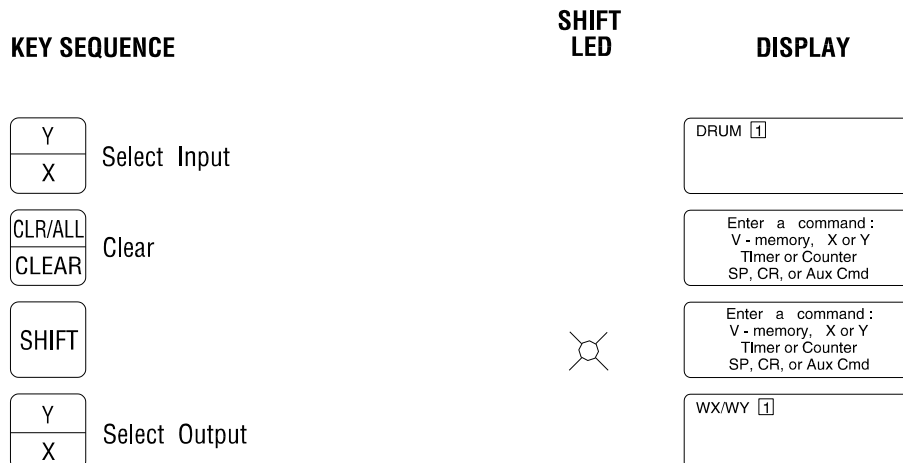


Figure 15 *Use of SHIFT Key to Select Input (X) and Output (Y)*

The Access Module executes only "valid" key entries. HELP messages are used extensively to prompt the operator as to the expected key sequence. When an invalid key is pressed, it results in the display of a HELP message or is simply ignored. An invalid keypress will not result in corrupted memory or program violation within the Access Module.

3.2.2 PRE/NEXT Key

The PRE/NEXT key is used to access tag names of similar memory type, scroll through HELP Screens, scroll through alarms, and move to the next editable field. The NEXT function allows the operator to scroll through the variables which have been defined by tag names. When the desired tag is displayed, pressing the READ key selects it. The PRE (Previous) key, selected with the SHIFT function, works like the NEXT key except that it allows scrolling in reverse order.

The following are examples of the PRE/NEXT key. The tag names used here are for example only, actual tag names are created during the configuration of the Access Module.

NEXT Key Operation:

KEY SEQUENCE	SHIFT LED	DISPLAY
<div>Y</div> <div>X</div> <div>Select Input</div>		<div>X 0</div> <div>CONVEYR0</div>
<div>PRE</div> <div>NEXT</div> <div>Advance to the next assigned tag name.</div>		<div>X 00001</div> <div>CONVEYR1</div>
<div>PRE</div> <div>NEXT</div> <div>Advance to the next assigned tag name.</div>		<div>X 00002</div> <div>CONVEYR2</div>
<div>PRE</div> <div>NEXT</div> <div>Advance to the next assigned tag name. In this example, the tag for X3 was not defined.</div>		<div>X 00004</div> <div>CONVEYR4</div>

Figure 16 NEXT Key

PRE (Previous) Key Operation:

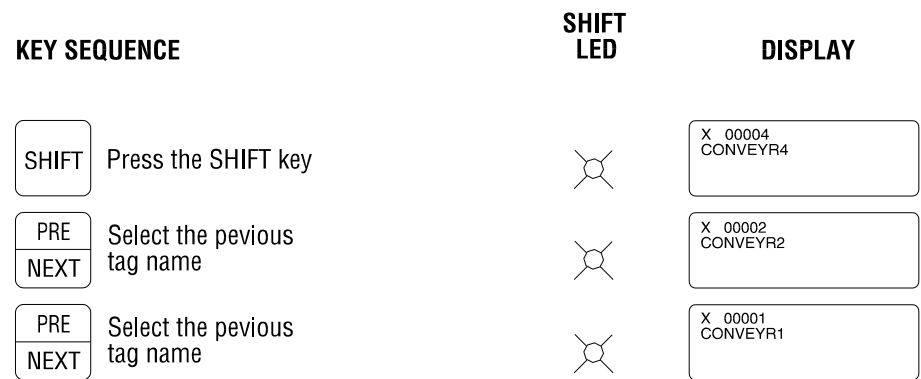


Figure 17 PRE Key

In this example, the SHIFT function remains enabled until pressed a second time or until the CLEAR key is pressed.

3.3 Reading PLC Memory Locations

The following sections outline the two methods which can be used to access, monitor, and edit PLC memory locations. Examples of both methods are outlined in detail for each memory variable type.

3.3.1 Direct Memory Address Number

The Access Module allows all supported memory types to be accessed using the PLC memory address number (V1658, CR52, X7, etc). This method can be used whether or not a configuration file has been downloaded to the unit.

Memory variable limits are determined by installed PLC type, PLC configuration (set via TISOFT), and Access Module limits (set by TI4 Configuration Program). If the Access Module is used without a configuration file, it attempts to establish memory variable limits based on attached PLC configuration. Default limits are used on some older PLC's.

If a configuration file has been downloaded, the Access Module permits monitoring and editing only those memory locations within the limits set in the TI4 Configuration Program.

3.3.2 Accessing Memory by Tag Names

A memory location can be accessed by tag name if a configuration file has been downloaded to the Access Module. This allows an operator to access memory variables without having to know the PLC memory address. For instance, "PROX 203" refers to "X12" and "TANK VOL" references address "V243".

To access memory locations using tag names, use the following general steps:

- (1) Use the keypad to select the memory type, (i.e. X, Y, CR, SP, Stage, Timer, and Counter. Note that the selection of Y, SP, Stage, and Timer requires the use of the SHIFT key first.
- (2) Scroll through the user defined tag names for the selected variable type using the PRE/NEXT key. Scrolling order for each variable type is based on the order that they were defined in the TI4 Configuration File.
- (3) Press READ to display the data for that memory location.

Example:

Assume that the following tags are assigned to V memory. Tags are listed in the order that they were created in the configuration file.

V17 = TEMP1
V300 = TANK VOL
V6 = TIME SEC
V120 = SPEED

When scrolling through these tags using the NEXT key, they are accessed in tag name alphabetic order according to memory type. This is demonstrated in the following example:

KEY SEQUENCE	SHIFT LED	DISPLAY
<div>STAGE V</div> Select V Memory		V <input type="checkbox"/>
<div>PRE NEXT</div> Next Tag		V 00120 SPEED IPS
<div>PRE NEXT</div> Next Tag		V 00300 TANK VOL
<div>PRE NEXT</div> Next Tag		V 00017 TEMP1 DEG
<div>PRE NEXT</div> Next Tag		V 00006 TIME SEC

Figure 18 *Scrolling Sequence*

Press the PRE key (SHIFT,PRE/NEXT) to scroll backwards through the tags for the selected memory type.

After READ key is pressed, other tags of the same memory type can be monitored by pressing the PRE/NEXT key to continue scrolling starting from the last selected tag name. See Figure 19 for an example.

If CLEAR is pressed, monitoring of current location is stopped. Scrolling restarts at the initial tag name displayed for the current variable type. To access a different variable type, press CLR ALL (SHIFT, CLR ALL/CLEAR) to exit the current mode and follow the general steps listed above for selecting a new memory location.

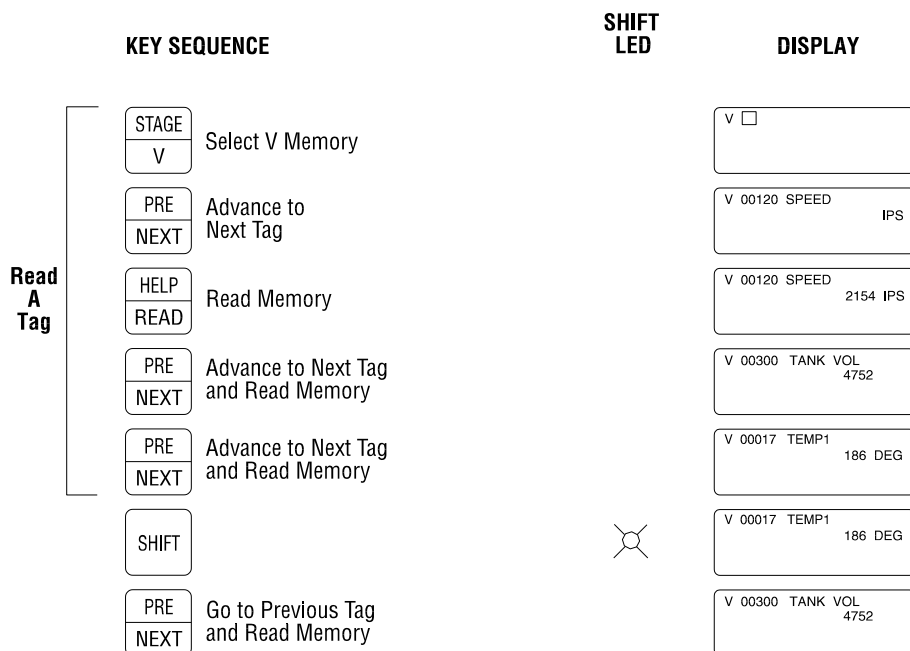


Figure 19 *Accessing Memory by Tag Name*

3.3.3 Discrete Inputs (X)

The status of a discrete Input (X) can be read by direct memory address or tag name. The key sequences are shown in the following figures.

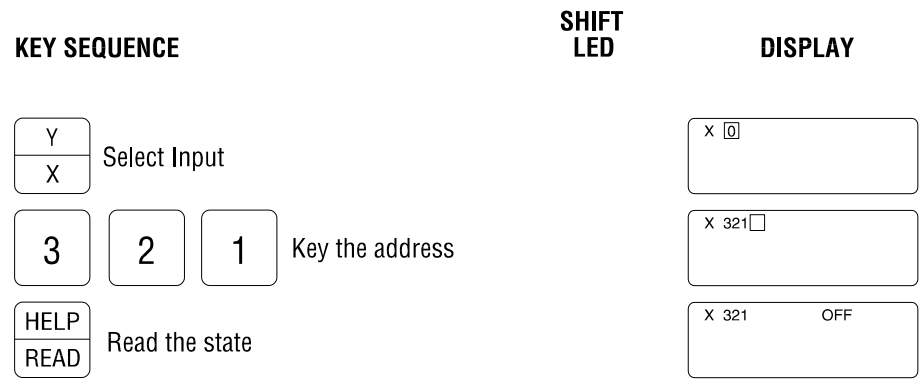


Figure 20 Reading a Discrete Input by PLC Address

The current state of the Input is displayed as "ON" or "OFF".

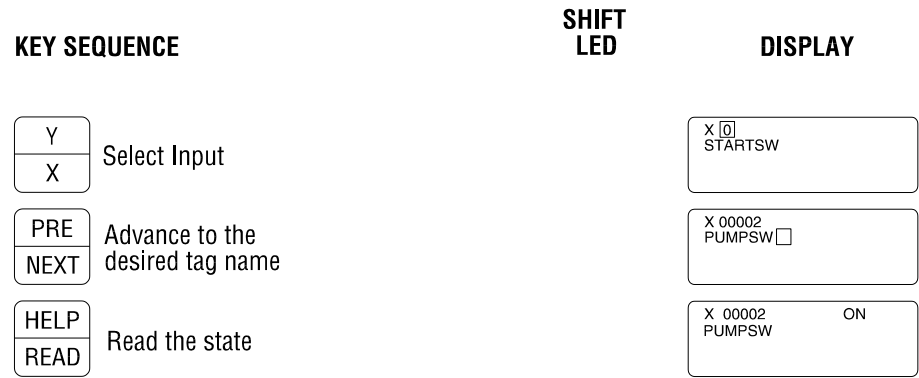


Figure 21 Reading a Discrete Input by Tag Name

"PUMPSW" shows the tag name assigned to Input 2 (X2). The current state of the input is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program.

3.3.4 Discrete Outputs (Y)

The status of a discrete Output (Y) can be read by direct memory address or tag name. The key sequences are shown in the following figures.

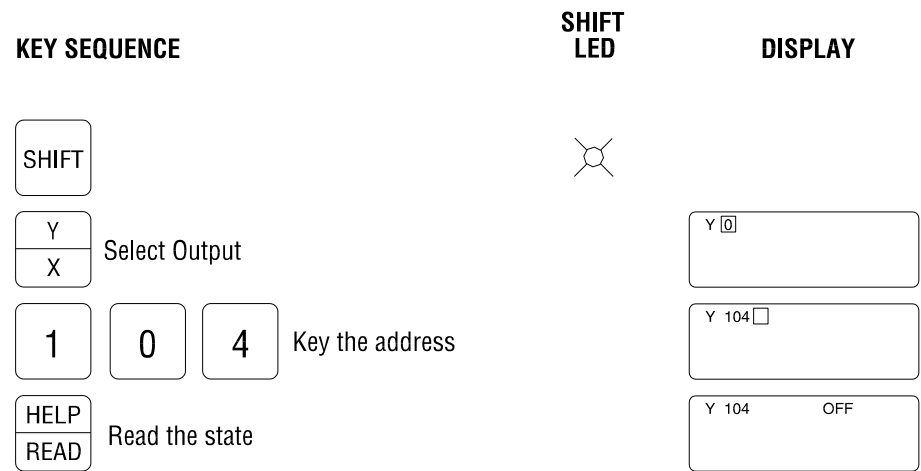


Figure 22 Reading a Discrete Output by PLC Address

The current state of the Output is shown as "ON" or "OFF".

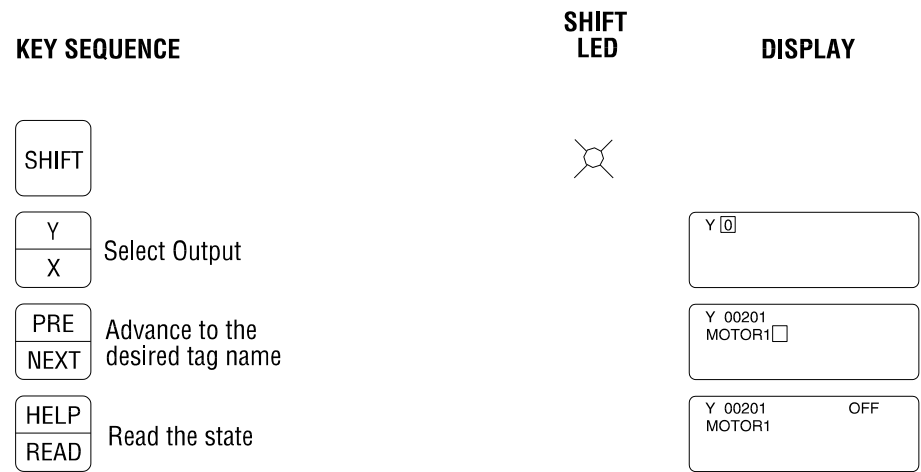


Figure 23 Reading a Discrete Output by Tag Name

"MOTOR1" shows the tag name assigned to Output 1 (Y1). The current state of the Output is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program.

3.3.5 Control Relays (CR)

The status of Control Relays can be read by direct memory address or tag name. The key sequences are shown in the following figures.

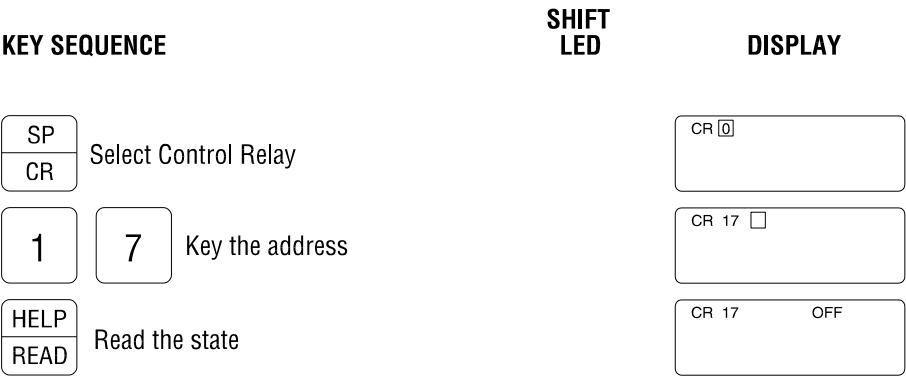


Figure 24 Reading Control Relay Status by PLC Address

The current state of the relay is displayed as "ON" or "OFF".

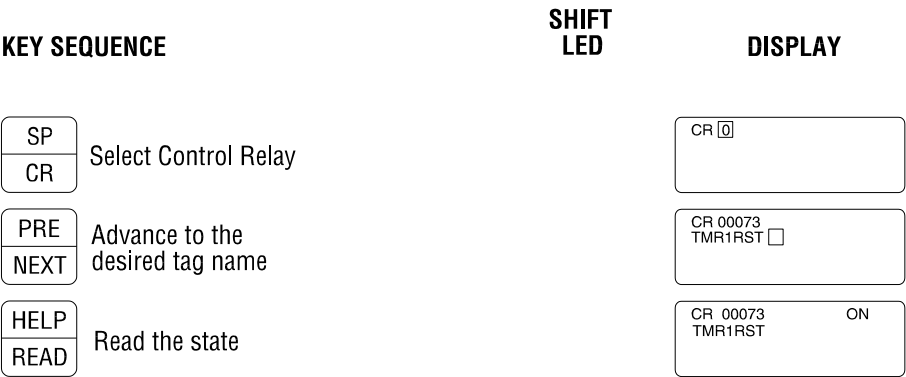


Figure 25 Reading Control Relay Status by Tag Name

"TMR1RST" shows the tag name assigned to the selected memory location. The current state of the CR is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program.

3.3.6 Special Relays (SP)

The status of Special Relays can be read by direct memory address or tag name. The key sequences are shown in the following figures.

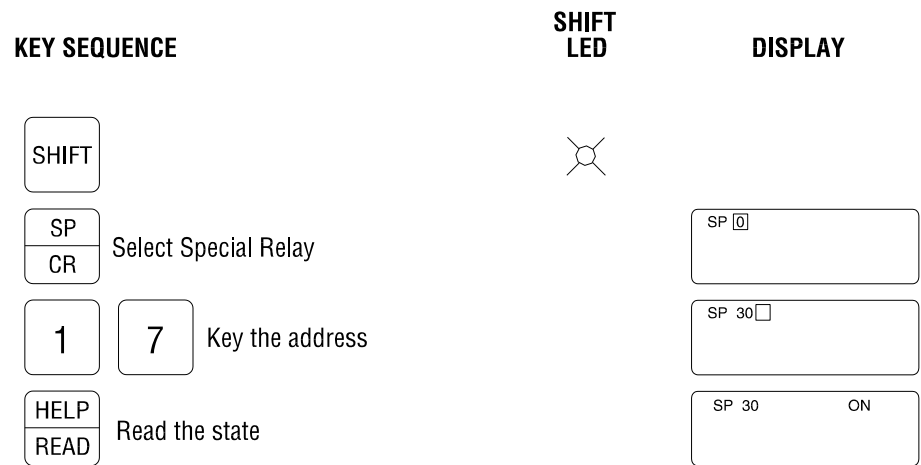


Figure 26 Reading Special Relay Status by PLC Address

The current state of the relay is displayed as "ON" or "OFF".

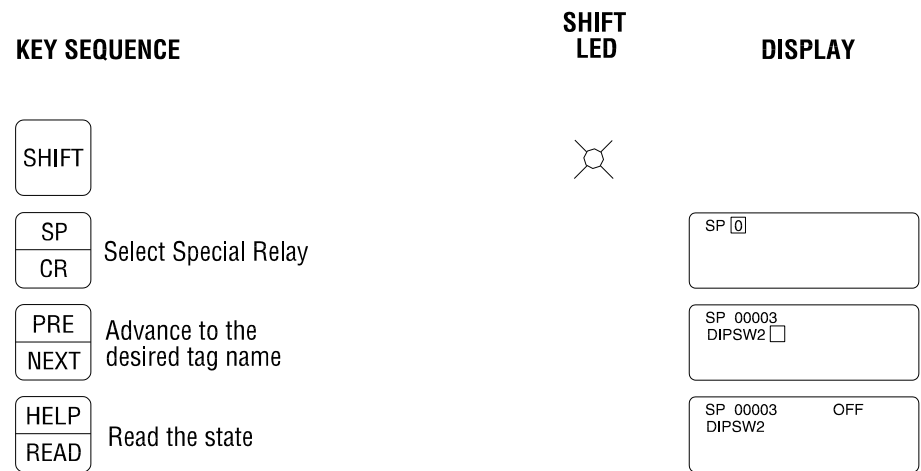


Figure 27 Reading Special Relay Status by Tag Name

"TMR1RST" shows the tag name assigned to the selected memory location. The current state of the SP is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program.

3.3.7 Counter

Counter Preset and Current values can be read by direct memory address or tag name. Counter displays also indicate whether the Preset value is stored in V-memory (V) or stored as a constant in PLC program memory (K). The key sequences are shown in the following figures.

KEY SEQUENCE	SHIFT LED	DISPLAY
<div>TIMER</div> <div>COUNT</div> Select Counter		CTR 0
<div>1</div> <div>5</div> Key the address		CTR 15
<div>HELP</div> <div>READ</div> Read the state		CTR 15 OFF CUR 0 PRE 100K

Figure 28 Reading Counter by PLC Address

The state of the Counter Relay is shown as "ON" or "OFF". The "K" following the Preset value indicates that the Preset is stored as a constant in PLC program memory.

KEY SEQUENCE	SHIFT LED	DISPLAY
<div>TIMER</div> <div>COUNT</div> Select Counter		CTR 0
<div>PRE</div> <div>NEXT</div> Advance to the tag name		CTR 00013 WIDGETS
<div>HELP</div> <div>READ</div> Read the state		CTR 00013 ON WIDGETS CUR 100 PRE 150 K

Figure 29 Reading a Counter by Tag Name

The state of the Counter Relay is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program. "WIDGETS" is the tag name assigned to the selected memory location. The Preset (PRE) and Current (CUR) values for the selected Counter are shown, and Preset storage is indicated as constant (K) value.

3.3.8 Timer

Timer Preset and Current values can be read by direct memory address or tag name. Timer displays also indicate whether the Preset value is stored in V-memory (V) or stored as a constant in PLC program memory (K). The key sequences are shown in the following figures.

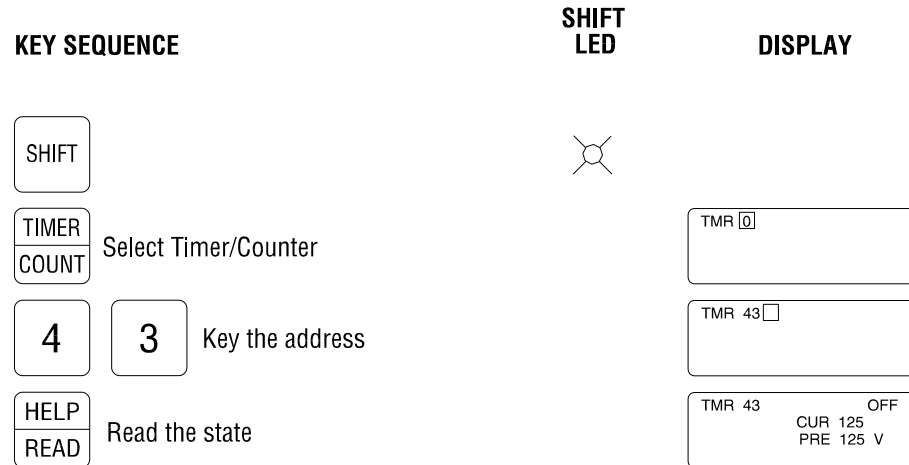


Figure 30 *Reading Timer by PLC Address*

The Preset (PRE) and Current (CUR) values for the selected Timer are displayed. The state of the Timer Relay is shown as "ON" or "OFF". The "V" following the Preset value indicates that the Preset is stored in V-memory.

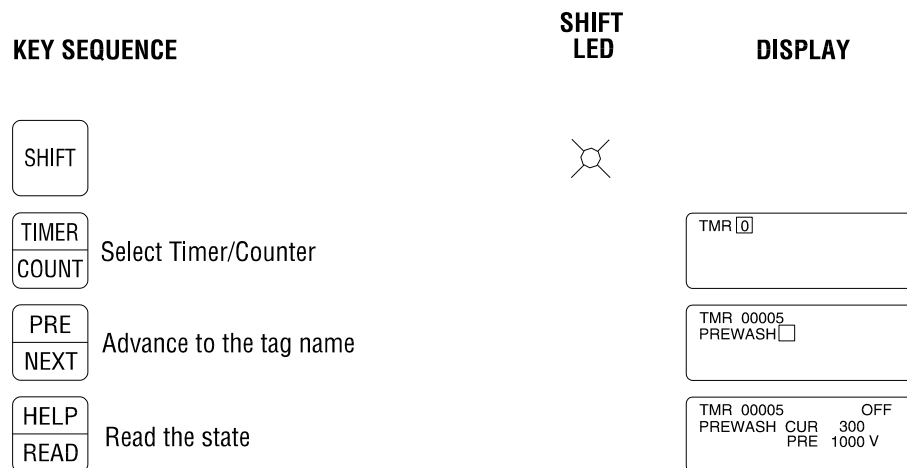


Figure 31 *Reading Timer by Tag Name*

The state of the Timer Relay is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program. "PREWASH" is the tag name assigned to the selected memory location. The Preset (PRE) and Current (CUR) values for the selected Timer are shown, and Preset storage is indicated as V-memory value (V).

3.3.9 Variable (V) Memory

The value of V-Memory locations can be read by direct memory address or tag name. In the 405 PLC, several areas of V-Memory are not accessible. For a list of the valid V-Memory areas, press the HELP key when V-Memory is selected. The key sequences for monitoring V-Memory are shown in the following figures.

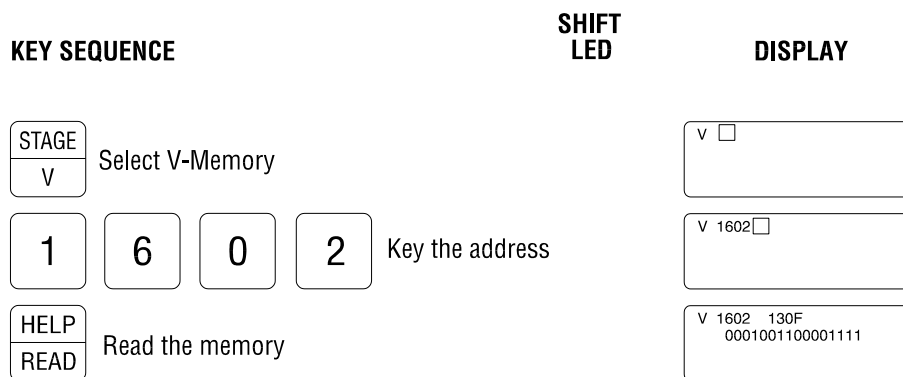


Figure 32 Reading V-Memory by PLC Address

Because all types of PLC memory are "mapped" into V-Memory locations, the Access Module displays the monitored value so that individual bits as well as the entire "word" value are shown. The current value is displayed in Hexadecimal format on Line 1 and Binary format on Line 2.

When a tag name is assigned to a V-Memory address, that location is specified as an "Analog" or "Discrete" variable tag name. "Analog" tag types are defined when the entire word value is important. "Discrete" tag types are used when the V-Memory location contains 16 digital points (X, Y, CR, SP, Stage) as allowed by the Series 405 address mapping. The display format is dependent on the V-Memory tag type as shown in the following figure:

KEY SEQUENCE	SHIFT LED	DISPLAY
<div>STAGE</div> <div>V</div> <div>Select V-Memory</div>		<div>V <input type="checkbox"/></div>
<div>PRE</div> <div>NEXT</div> <div>Advance to tag name (Analog tag type)</div>		<div>V 02107 TEMP1</div> <div>DEG</div>
<div>HELP</div> <div>READ</div> <div>Read the memory</div>		<div>V 02107 TEMP1</div> <div>00186 DEG</div>
<div>PRE</div> <div>NEXT</div> <div>Read next tag name (Discrete tag type)</div>		<div>V 40400 50A2</div> <div>0101000010100010</div> <div>X0-X17</div>

Figure 33 *Reading V-Memory by Tag Name*

V-Memory locations defined as "Analog" tag types are displayed so that the specified tag name ("TEMP1") appears on Line 1 and the decimal value for the entire word is shown on Line 2. The display format for "Discrete" V-Memory tag types includes the associated tag name ("X1-X17") on Line 3, and the word value is displayed in Hexadecimal format on Line 1 and Binary format on Line 2.

3.3.10 Stage

Stage memory can be read by direct memory address or tag name. The sequences are described below.

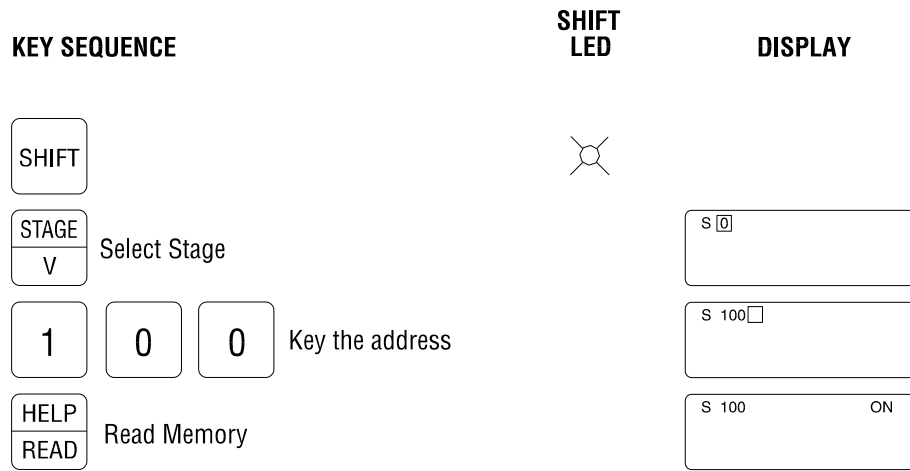


Figure 34 *Reading Stage Memory by PLC Address*

The current state of the selected Stage is displayed as "ON" or "OFF".

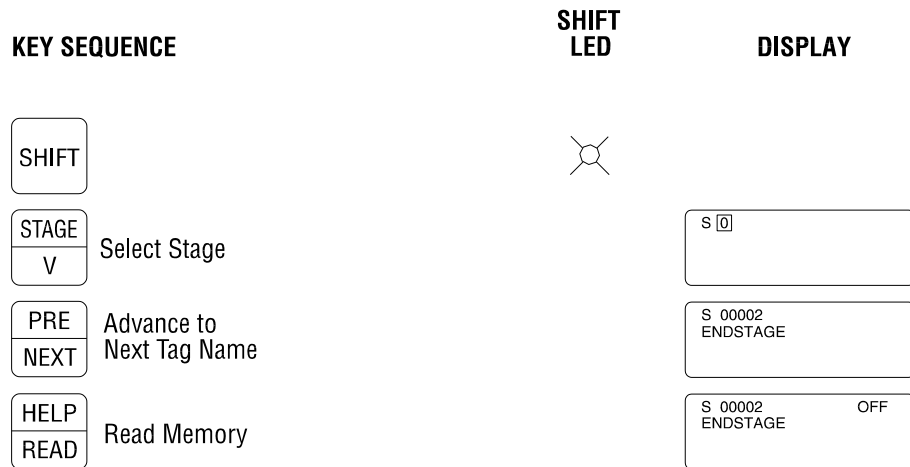


Figure 35 *Reading Stage Memory by Tag Name*

The Stage state is displayed as "ON" or "OFF" message. The actual message text is defined with the TI4 Configuration Program. "ENDSTAGE" is the tag name assigned to the selected memory location.

3.4 Editing a PLC Memory Location

The Access Module can be used to change memory locations and variables in the Series 405 PLC memory. The general procedure for altering memory locations is described below.

- (1) Display the desired memory location by PLC Address or Tag Name as shown in Section 3.3.
- (2) Press ENTER to edit the data. If the location is configured as "READ ONLY" (as set in configuration file), the message "Write not allowed" is displayed.
- (3) Use PRE/NEXT to move the cursor to the desired field. Some variables have more than 1 field that can be edited.
- (4) Enter new data to be written via the keypad. To change a state of a discrete point (X, Y, CR, SP, Stage), press 1 key for "ON" and press 0 for "OFF".
- (5) Press ENTER when entry of new data is complete.

If this location does not require a Password (as specified in configuration file), the new value is written to the PLC. In this case, Step (6) is skipped.

- (6) The "PASSWORD?" prompt appears. Key in the 4-digit Password followed by ENTER (default Password is 5250).
- (7) If the correct password is entered, the new value is written to the PLC. The Access Module then returns to the previous screen and begins to read the selected memory location.
- (8) Once a password has been entered for a location, the module will not ask for another Password until a new variable is selected or no keys have been pressed for approximately 4.25 minutes (254 seconds).

NOTE:

"READ ONLY" locations cannot be changed from the Access Module keypad. Addresses specified as READ ONLY include the System Parameters area (V07400-V07777), Special Relays (V41200-V41230), and any tagged locations defined as "READ ONLY" in the configuration file downloaded to the Access Module.

3.4.1 Negative Numbers (Signed Integers)

The SIMATIC TI405 Series PLC does not support Signed Integer variables. However, the 5250/5251-TI4 Access Modules can interpret V-Memory values as Signed Integers under the following conditions:

Use TI4 Configuration Program to create Tag name for specified V-Memory location.
Select "V Memory-Analog" as the Variable Type.
Select "Signed Integer" as the Analog Data Type.

When configured as "Signed Integers", operators can assign negative values to these V-memory locations by following this procedure:

- (1) Display V-Memory location by tag name as described in Section 3.3.9.
- (2) Go into Edit mode and enter new value as described in Section 3.4. In order to change value to a negative number, the entire number must be re-entered.
- (3) When new value is entered (and cursor is located to the right of the number), press SHIFT ENTER to force the displayed number to be assigned a "negative value". This action results in a minus sign being displayed in front of the entered number.
- (4) Pressing SHIFT ENTER again removes the minus sign and treats the edited value as a "positive number".
- (5) Press ENTER to accept the displayed value.

3.4.2 V-Memory BCD Values

The Model 5250-TI4 and Model 5251-TI4 Access Modules can interpret V-Memory values as Binary Coded Decimal (BCD) numbers under the following conditions:

Use TI4 Configuration Program to create Tag name for specified V-Memory location.
Select "V Memory-Analog" as the Variable Type.
Select "BCD Decimal" as the Analog Data Type.

It is important that the V-Memory location contain only valid BCD values when that address has been designated as "BCD Data Type". If a memory location designated as BCD contains an invalid BCD number when read by the Access Module, the data value is displayed as "????". In addition, an alarm condition is created whenever a non-BCD value is read from a memory location defined as "BCD Data Type".

3.4.3 Variable Minimum/Maximum Limits

The Access Module attempts to prevent the entry of invalid data by assigning minimum and maximum limits according to variable type as listed below:

Discrete (X, Y, CR, SP, Stage)	0 to 1
Timer or Counter Preset	0 to 9999
Timer or Counter Current	0 to 9999
V Memory (Signed Integer)	-32767 to 32767
V Memory (Unsigned Integer)	0 to 65535
V Memory (BCD)	0 to 9999

In addition, minimum and maximum limits can be specified for each location that is assigned a tag name using the TI4 Configuration software. If the operator attempts to enter a number which is outside the limits, the display will default to the closest limit.

Example 1: If the operator attempts to enter 70000 into V-Memory location designated as "Unsigned Integer", the display defaults to 65535 (maximum value allowed).

Example 2: If the operator attempts to enter -40000 into V-Memory location designated as "Signed Integer", the display defaults to -32767 (minimum value allowed).

3.4.4 Changing a Discrete Variable (X, Y, CR, SP, Stage)

The value and/or "forced" state of a discrete variable can be changed by following the sequence described below. Editing of each parameter can be permitted or disallowed for each data point via the TI4 Configuration Program. Figure 36 shows editing of the memory location value.

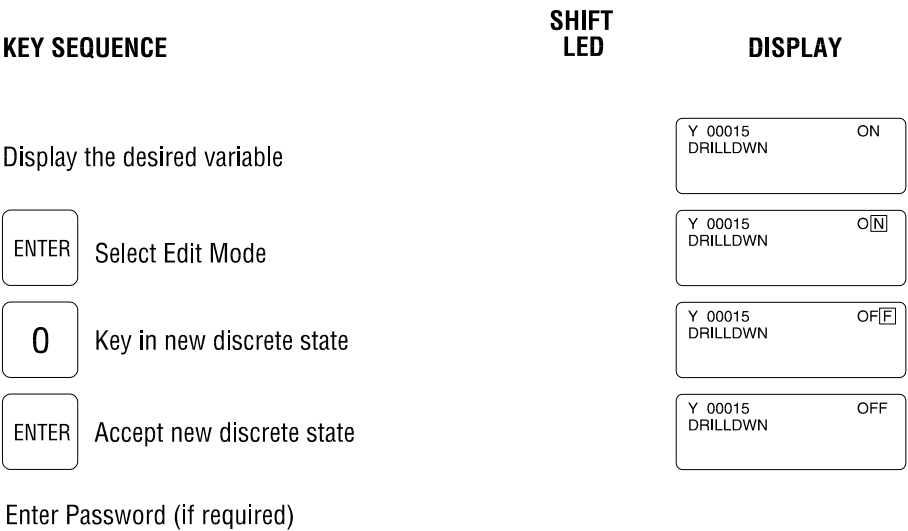


Figure 36 Changing Discrete Variable Value

NOTE:
Any changes made to Input or Output (X, Y) discrete variable will be overwritten by the RLL program within one PLC scan unless the data point is "forced" to a specific state. Changes to Control Relays (CR), Special Relays (SP), or Stage Memory will also be overwritten by the RLL program if the state is set by a rung output.

3.4.5 Changing a Timer or Counter

The Access Module allows the state of the Timer/Counter Relay, Current value, and Preset value to be changed as shown in the following examples.

Figure 37 describes the editing of the Timer/Counter Relay state.

KEY SEQUENCE	SHIFT LED	DISPLAY
Display the desired variable		TMR 00015 OFF CUR 0 PRE 0100 K
<div>ENTER</div> Select Edit Mode		TMR 00015 OFF F CUR 0 PRE 0100 K
<div>1</div> Key in "on" state		TMR 00015 ON N CUR 0 PRE 0100 K
<div>ENTER</div> Accept new state		TMR 00015 ON CUR 0 PRE 0100 K
Enter Password (if required)		

Figure 37 Changing Timer/Counter Relay State

The following key sequence changes the "Current" value:

KEY SEQUENCE	SHIFT LED	DISPLAY
Display the desired variable		CTR 00003 OFF CUR 0010 PRE 0050 V
<div>ENTER</div> Select Edit Mode		CTR 00003 OFF F CUR 0010 PRE 0050 V
<div>PRE NEXT</div> Move cursor to "Current" field		CTR 00003 OFF CUR 001 0 PRE 0050 V
<div>2</div> <div>0</div> Key in new "Current" value		CTR 00003 OFF CUR 0020 V PRE 0050 V
<div>ENTER</div> Accept new "Current" value		CTR 00003 OFF CUR 0020 V PRE 0050 V
Enter Password (if required)		

Figure 38 Changing Timer/Counter CURRENT Field

Timer/Counter Presets in TI405 Series PLCs can be located in Variable (V) memory or Constant (K) memory. The Access Module automatically determines the location of the Preset value and displays the memory type (as "V" or "K") on Line 3 of the display. This Preset is alterable under the following conditions:

- (a) The PLC is in "RUN" mode and the key switch is set to "TERM" position. If a Preset edit is not allowed because the key switch is not in the proper position, a "SET KEY TO TERM" error message is displayed.
- (b) A Preset value stored in "K" memory can be changed if the PLC program is not "Write Protected" (i.e., stored in EPROM or in a write protected memory cartridge). If an attempt is made to alter a "K" Preset in write protected PLC memory, a "MEMORY CARTRIDGE WRITE FAIL" message is displayed.

The key sequence used to edit the "Preset" value is shown below:

KEY SEQUENCE	SHIFT LED	DISPLAY
Display the desired variable		CTR 00003 OFF CUR 0020 PRE 0050 V
<div>ENTER</div> Select Edit Mode		CTR 00003 OFF <input type="checkbox"/> CUR 0020 PRE 0050 V
<div>PRE NEXT</div> Move cursor to "Current" field		CTR 00003 OFF CUR 002 <input type="text"/> PRE 0050 V
<div>PRE NEXT</div> Move cursor to "Preset" field		CTR 00003 OFF CUR 0020 PRE 005 <input type="text"/> V
<div>1</div> <div>0</div> <div>0</div> Key in new "Preset" value		CTR 00003 OFF CUR 0020 PRE 0100 <input type="text"/> V
<div>ENTER</div> Accept new "Preset" value		CTR 00003 OFF CUR 0020 PRE 0100 V
Enter Password (if required)		

Figure 39 *Changing Timer/Counter PRESET Field*

3.4.6 Changing V-Memory

Variable (V-Memory) locations are displayed as Analog (Integer) values or Discrete (Hex/Binary) values depending on the "Variable Type" selected during tag definition. If V-Memory location does not have an assigned tag name, it is displayed as an Analog value. The following figures describe the key sequence used to edit both types of V-Memory.

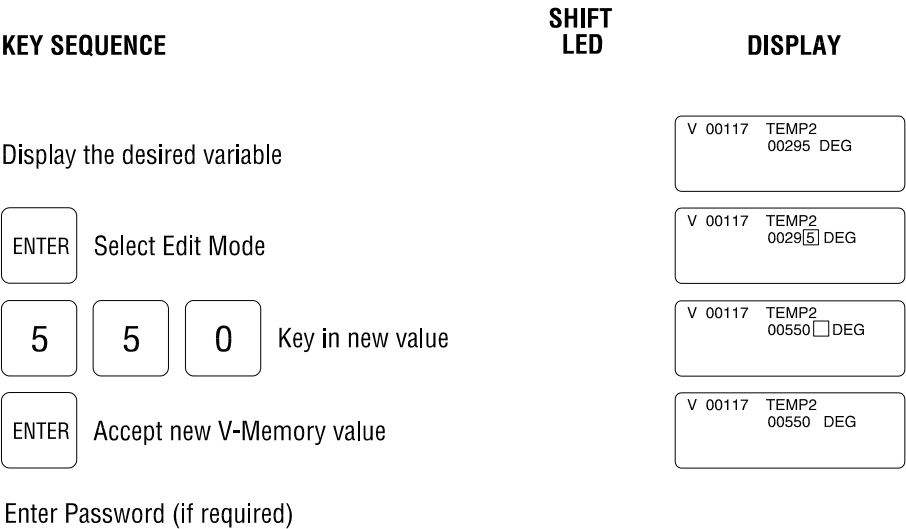


Figure 40 Changing V-Memory (Analog) Values

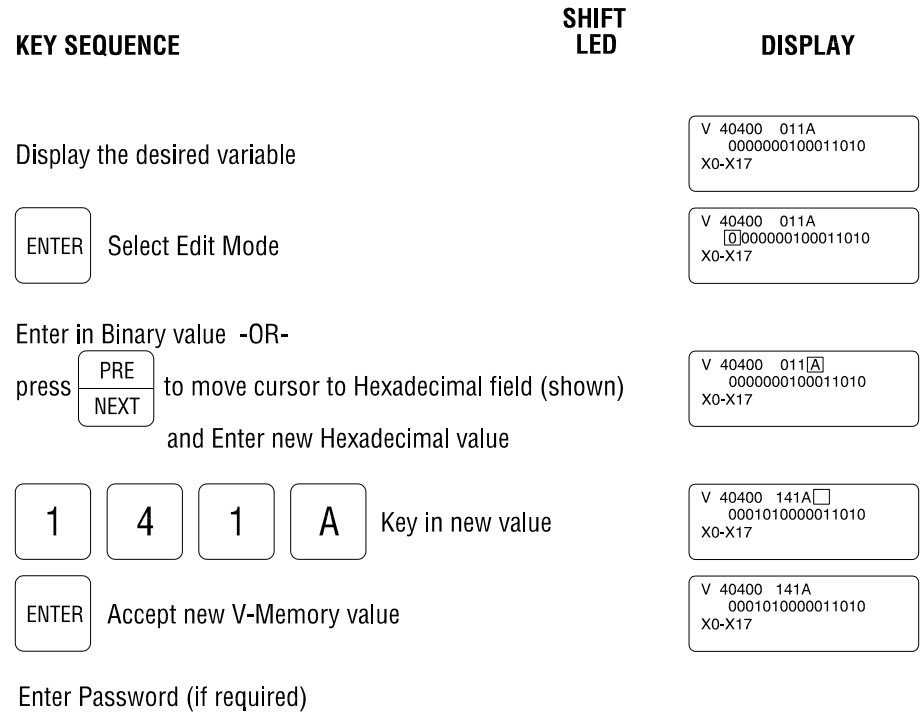


Figure 41 Changing V-Memory (Discrete) Values

3.5 Auxiliary Commands

The Access Module supports an Auxiliary Command set allows access to internal status information and custom features. Auxiliary Commands can be initiated from the Main Menu as described in the following sections. The operator can return to the Main Menu from any screen by pressing SHIFT CLRALL.

3.5.1 Status Display - *SHIFT 0*

The 5250/5251 Status Screen is accessed by pressing SHIFT 0.

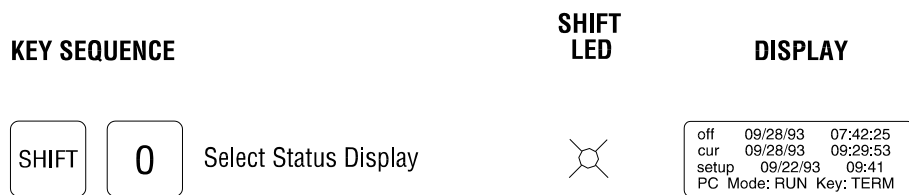


Figure 42 5250/5251 Status Screen

This Status Screen displays the following information:

- Line 1: Last occurrence (Date and Time) that power was removed from the Access Module.
- Line 2: Current Date (MM/DD/YY) and Time (HH:MM:SS)
- Line 3: Date and Time Configuration Program was loaded into Access Module
- Line 4: PLC Mode (PGM/RUN/TEST) and Key Position (STOP/TERM/RUN)

3.5.2 Date/Time Set - *SHIFT 1*

The Access Module contains an internal Real Time Clock that can be set from the keypad. The RTC Date/Time Edit Screen displayed by pressing SHIFT 1.

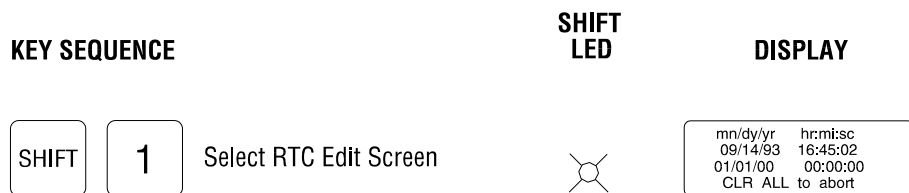


Figure 43 5250/5251 Real Time Clock Edit Screen

Current Date and Time is displayed on Line 2. Cursor is positioned on Line 3 where new Date/Time is entered.

Validity checks are performed on data entry as follows:

Month:	01-12
Day of Month:	01-31
Year:	00-99
Hour:	00-23
Minute:	00-59
Second:	00-59

Press CLEAR key to erase the previous data entry and allow data to be re-entered. Press ENTER to accept new Date/Time as displayed. This function can be aborted (without setting new Date/Time) by pressing SHIFT CLRALL.

3.5.3 Custom 4-Variable Screen - SHIFT 2

The Access Module permits the creation of a custom screen that displays up to four (4) different PLC memory locations at one time. Each variable is dynamically updated to show current value and can be edited as required. Any memory location can be selected, with the only restriction being that the variable must have a Tag Name assigned (via the TI4 Configuration Program) before it can be included.

Key operations used to create the Custom 4-Variable Screen:

- (1) From Main Menu, Press SHIFT 2 to enter Custom Screen Mode.
- (2) Press ENTER to select the line for variable display. Cursor is initially placed on Line 1, and each subsequent press of ENTER moves the cursor position down one line. One variable can be displayed on each line.
- (3) Press Variable Type key (X, Y, CR, SP, STAGE, TIMER, COUNTER, V)) to select memory type. Use PRE/NEXT key to "scroll" through defined tags in that variable type.

Alternately, the PRE/NEXT key can be used exclusively to select a memory location. If variable type is not chosen, the NEXT key "scrolls" through tags in the following order. (The PRE function "scrolls" in reverse order):

- Timers
- Counters
- Inputs (X)
- Outputs (Y)
- Control Relays
- Stage
- Special Relay
- V-Memory Discrete
- V-Memory Analog

- (4) Press READ to select tag and begin reading selected location.

The following keystroke sequence demonstrates the creation of a Custom Screen to display 4 different variables on one screen.

KEY SEQUENCE	SHIFT LED	DISPLAY
<div>SHIFT</div> <div>2</div> Select user defined screen		<div><input type="checkbox"/></div>
<div>PRE</div> <div>NEXT</div> <small>SEE NOTE</small>		HEATER
<div>HELP</div> <div>READ</div>		HEATER OFF
<div>ENTER</div> <small>SEE NOTE</small>		HEATER OFF <input type="checkbox"/>
<div>PRE</div> <div>NEXT</div>		HEATER OFF CONVYR
<div>HELP</div> <div>READ</div>		HEATER OFF CONVYR MOVING
<div>ENTER</div> <small>SEE NOTE</small>		HEATER OFF CONVYR MOVING <input type="checkbox"/>
<div>PRE</div> <div>NEXT</div>		HEATER OFF CONVYR MOVING SPEED
<div>HELP</div> <div>READ</div>		HEATER OFF CONVYR MOVING SPEED 00036 IPS
<div>ENTER</div> <small>SEE NOTE</small>		HEATER OFF CONVYR MOVING SPEED 00036 IPS <input type="checkbox"/>
<div>PRE</div> <div>NEXT</div>		HEATER OFF CONVYR MOVING SPEED 00036 IPS TEMP
<div>HELP</div> <div>READ</div>		HEATER OFF CONVYR MOVING SPEED 00036 IPS TEMP 00062 DEG

NOTE: At this point, a variable type (V, X, Y, CR, etc.), may be selected to display the first tag of that type in the configuration file.

Figure 44 Custom 4-Variable Screen Definition

Once defined, other screens can be called by pressing a Command key or Auxiliary Command while preserving the screen. The Custom Screen is displayed by returning to default screen (by continually pressing CLEAR key or pressing SHIFT CLRALL unless "ALARM ACTIVE LED" is ON). Monitoring of the selected locations starts immediately when this screen is displayed.

The key sequence for editing the Custom Screen is shown below:

NOTE: At this point a variable type (V, X, Y, CR , etc.), may be selected to display the first tag of that type in the configuration file.

If power is interrupted or a PLC Communication Error occurs after a Custom Screen has been defined, the Custom Screen is displayed when power is returned to the unit or PLC communications is restored.

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3.5.4 Download Configuration File - *SHIFT 3*

This function prepares the Access Module to accept a Configuration File download from an IBM-compatible PC running the CTI 5250/5251-TI4 Configuration Program. The "File Download" operation transfers the selected user configuration file to the Access Module and replaces any previously downloaded file.

The Download Configuration File function is initiated by pressing SHIFT 3. As the file transfer progresses, the screen is updated to indicate percent complete.



Figure 46 *Configuration File Download*

This function can be aborted by pressing SHIFT CLRALL.

3.5.5 Version Information - *SHIFT 4*

The current hardware, firmware, and Configuration Program version in the Access Module is displayed by pressing SHIFT 4.

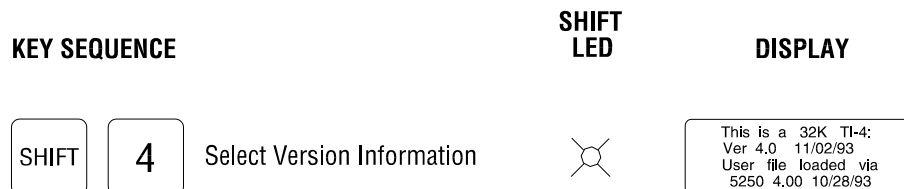


Figure 47 *5250/5251 Version Information*

This screen displays the following information:

- Line 1: Access Module memory size
- Line 2: Firmware version and release date
- Lines 3-4: Configuration file version and Date downloaded to Access Module.

NOTE:
Only Configuration Files Version 4.0 or later can be uploaded from the Access Module to PC.

3.5.6 Upload Configuration File - SHIFT 5

This function initiates a user configuration file transfer from the Access Module to an IBM-compatible PC running the CTI 5250/5251-TI4 Configuration Program. This "File Upload" operation can be used to recreate a configuration file on disk or compare a disk file against the configuration actually in operation. The configuration file in the Access Module is not destroyed by this function.

The Upload Configuration File function is initiated by pressing SHIFT 5. As the file transfer progresses, the screen is updated to indicate percent complete. This function can be aborted by pressing SHIFT CLRALL.

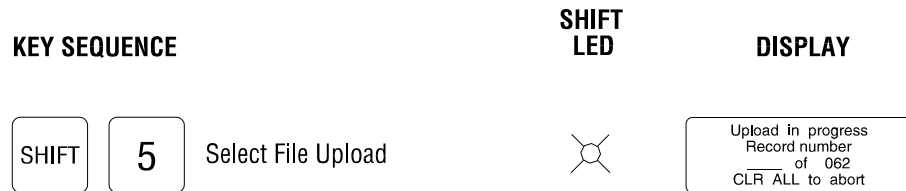


Figure 48 Configuration File Upload

NOTE:
Only Configuration Files Version 4.0 or later can be uploaded from the Access Module to PC.

3.5.7 PLC Communication Baud Rate - SHIFT 6

This Auxiliary Command allows the baud rate used for communications between the Access Module and attached PLC to be changed. This function overrides the "default" baud rate set in the TI4 Configuration Program.

The Access Module can communicate at 9600 and 19200 baud. When the "PLC Communication Screen" is displayed, pressing "1" immediately toggles the baud rate to the new value. Press CLEAR to abort operation and maintain the current baud rate selection.

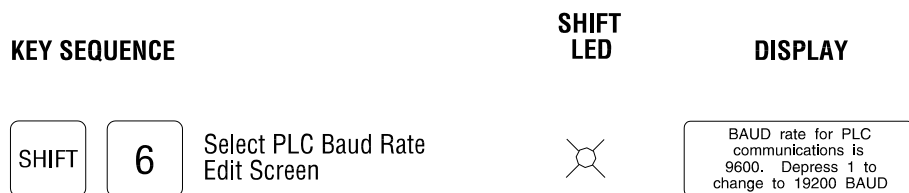


Figure 49 *PLC Communication Baud Rate Edit Screen*

NOTE:

Using this function to alter baud rate requires set up for the PLC Programming Port (or equivalent) as well as the Access Module. This operation affects the Access Module port only.

3.5.8 VFD Screen Saver Setup - *SHIFT 7 (5251-TI4 only)*

The Model 5251-TI4 includes a screen-saving feature to extend the life and prevent "burn-in" of the Vacuum Fluorescent Display (VFD). This function specifies the time delay before the screen saver is activated provided no keypad input is detected.

The Screen Saver can be set to be activated from 2 to 9 hours after the last keypad entry was made. The Access Module actually enables the Screen Saver "on the hour" according to the internal Real Time Clock. If the keypad was last pressed at 8:45 when Screen Saver delay is set to 2 hours, the Screen Saver is activated at 10:00.

If "0" is entered, the Screen Saver is disabled.

When the Screen Saver is active, the message "CTI 5251" scrolls across the display. The operator can

press any key to return to the previous display screen.

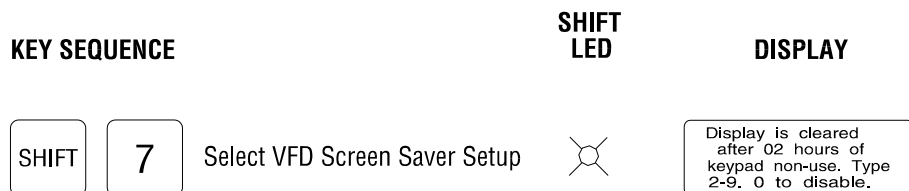


Figure 50 *VFD Screen Saver Setup*

3.6 Using the *HELP* Key

The Access Module includes a context-sensitive "Help" system to guide operators through the expected key entry sequence in order to display and edit PLC memory locations. The HELP key may be pressed at any time to display help information about the procedure currently being performed.

The following example shows how the HELP key may be used to obtain detailed information about a procedure. In this example, the operator is prompted for a password while editing a V-memory location. The operator then presses HELP for more information.

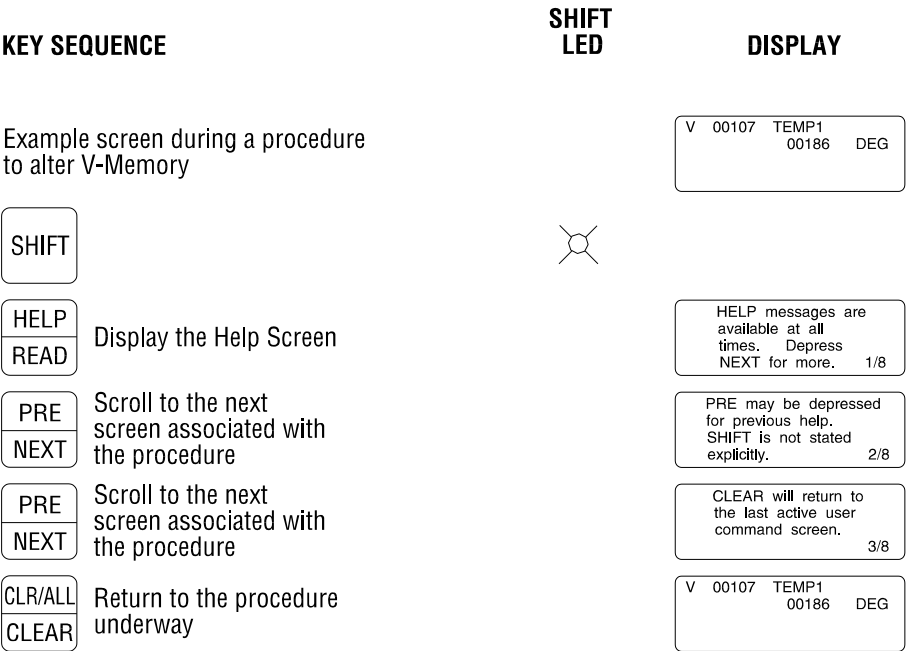


Figure 51 Using *HELP* Function

When a HELP screen is displayed, the "current" and "total" number of Help screens pertaining to this operation is displayed in the lower right corner. In this example, "1/8" indicates that the first of eight Help screens is displayed, while "2/8" indicates the second of eight Help screens. The next Help screen is displayed by pressing the NEXT key.

The HELP mode permits an operator to scroll through all of the Help messages using the PRE/NEXT key. The CLEAR key may be pressed at any time to exit from the Help mode and return to previous screen.

3.7 Alarms

The Access Module continually monitors all PLC memory locations that are associated with an alarm condition as configured using the TI4 Configuration Program and downloaded into the unit. These PLC memory locations are read "in the background" and values compared against the alarm limits specified. The Access Module can read and evaluate approximately 5-6 PLC addresses for alarms each second. Alarms are reported as they occur as well as when they clear.

An event is identified as an "alarm" if it is specified to be added to the Alarm Queue (as defined in the Configuration Program). If the event is not added to the Alarm Queue, it is considered an Event Message. (See Section 3.8 for description of Event Messaging.) Alarms (as well as Event Messages) can cause the active screen to be interrupted by a custom message, and/or message transmission out of the AUX Port. Specific procedures for configuring the Access Module to recognize and report alarms are included in the HELP system of the Configuration Software.

The messages entered into the Alarm Queue are created by the Access Module when the alarm is detected. The information contained in each message depends on the "variable type" assigned to the tag that went into (or out of) alarm. An example of an alarm message for each "variable type" is shown in the following figure:

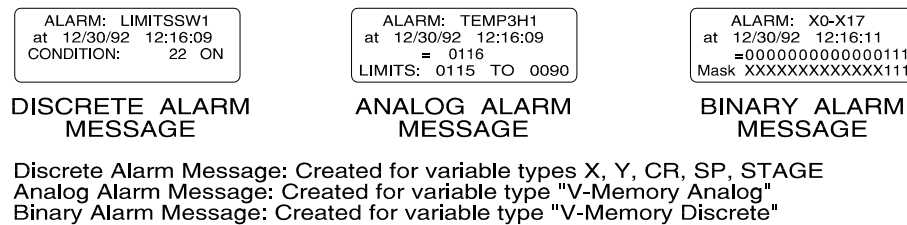


Figure 52 Alarm Queue Messages

When an alarm is detected, the "ALARM ACTIVE" LED is illuminated. This LED remains ON until all alarms have been acknowledged by an operator. The following procedure is used to view and acknowledge alarms in the Alarm Queue:

- (1) When "ALARM ACTIVE" LED is ON, Press SHIFT CLRALL to display the oldest pending (unacknowledged) alarm in the Alarm Queue. The Alarm Queue can not be displayed unless an alarm is pending.
- (2) Press CLEAR to acknowledge the displayed alarm. If this is the only alarm pending, the "ALARM ACTIVE" LED will extinguish. Pressing CLEAR again exits the Alarm Queue display and returns to the previous screen.
- (3) If other alarms are pending, the next oldest is displayed when the first is acknowledged (by pressing CLEAR). As alarms are acknowledged, the display continues to display newer alarms. When all alarms are acknowledged, the "ALARM ACTIVE" LED goes OFF.

- (4) The operator may view alarms without acknowledging them by entering the Alarm Queue and scrolling through the messages by pressing PRE/NEXT. As long as CLEAR key is not pressed, the alarms remain pending and the "ALARM ACTIVE" LED remains ON.
- (5) The Alarm Queue may be exited at any time by pressing SHIFT CLRALL. Any unacknowledged alarms remain "pending" and the "ALARM ACTIVE" LED stays ON. The oldest "pending" alarm is displayed when the operator re-enters the Alarm Queue.

3.8 Event Messaging

An Event Message is created as a result of a "special" alarm point that is NOT specified to be added to the Alarm Queue for operator acknowledgement. When detected, the "MESSAGE ACTIVE" LED is illuminated (instead of "ALARM ACTIVE" LED as done with normal alarms). The "MESSAGE ACTIVE" LED goes OFF when the operator clears the display by pressing the CLEAR key.

Event Messaging is used to provide operator prompts and process status based on PLC values. Custom Event Messages can be created to interrupt the entire data display or break through to overwrite only specific lines.

Reference the HELP system in the Configuration Program for details on Messaging.

3.9 PLC Errors

The Access Module continually monitors the PLC status and reports errors when detected. The frequency that PLC errors are reported can be specified via the TI4 Configuration Program.

Appendix A contains a list of SIMATIC TI405 PLC Error Codes that are detected and reported by the 5250/5251-TI4 Access Modules (depending on the "PLC Error Display Mode" selected in the TI4 Configuration Program). If PLC error reporting is selected, the Access Module writes text message to data display and AUX Port when an error is detected.

Refer to the appropriate SIMATIC TI manual for cause and recovery from PLC errors.

CHAPTER 4. TI4 CONFIG PROGRAM SETUP AND OPERATION

4.1 Configuration Program Description

The diskette enclosed with the Access Module contains special configuration software that allows true "customizing" for each application. The system designer can use the *TI4 Configuration Program* to assign tag names to PLC memory locations, adding a level of independent external intelligence to the PLC ladder logic program. Alarm conditions and event messages can then be "linked" to these tagged PLC addresses to provide continually monitoring and reporting of operational parameters.

In addition to tags and alarms, the Configuration Program allows a convenient method for selecting various levels of protection for PLC memory - including "Read Only" flags, Password protection, and specifying minimum and maximum limits for editing values. Complete file handling is provided within the program with functions for loading from disk, saving to disk, printing, download to module, and upload from module.

The 5250/5251-TI4 Configuration Program is provided on a 720K DSDD 3.5" diskette and consists of the following files:

5250.EXE	Program executable
5250.MSG	HELP Message file
5250.NDX	HELP Index file
5250READ.ME	Compatibility file (accessed from "Utilities" menu selection)
DEMO.TCF	Example Configuration File

The Configuration Program includes a very informative "context-sensitive" HELP system that provides detailed description of operation and expected input at every cursor position. HELP is always available by pressing [F1] key.

Operation is very intuitive - just use the cursor keys to move the highlighted bar to an item and press [ENTER] to select. The "Help" selection on the MAIN MENU (displayed at program startup) provides a complete description of all menu items and features included in the current version.

4.2 Hardware Requirements

The Configuration Program will run on any IBM-PC, XT, AT, PS2, or IBM-compatible computer system running PC-DOS or MS-DOS v2.0 or higher. The computer must have a minimum of 512K of RAM, one serial port, and CGA, EGA, VGA, or Hercules monochrome display. Hard disk storage is not a requirement but is useful if multiple configuration files are generated and stored.

4.3 Program Installation

Recommended installation involves the following steps:

- (1) Insert the supplied diskette into the floppy drive and copy all files to a directory on your hard drive. If a hard drive is not available, the program can be started from the diskette.
- (2) Set Current Directory to the one where the files were copied.
- (3) Start program by typing "5250". For non-graphics monochrome monitors, enter "5250/M".

The MAIN MENU is displayed on program startup.

The Configuration Program operates on a Scrolling Light Bar Menu System. A menu selection can be made by using the LEFT/RIGHT arrow keys or pressing the first letter of the menu item. Press [ENTER] to select an item when highlighted.

Press [F1] at any time for HELP. The on-line HELP system includes a description of each prompt and expected input. The "Help" item in the MAIN MENU contains a detailed overview of the entire program and is recommended for those using this program for the first time.

On startup, three choices are valid:

- (1) Create a new file.
Select "Tags" on MAIN MENU and press [F1] for HELP in starting configuration.
- (2) Load an existing file.
Select "Load_File" from MAIN MENU.
- (3) Upload a file from Access Module.
Select "File_Transfer" from MAIN MENU.

4.4. Computer to Access Module Communications

The computer communicates with the Access Module to transfer custom configuration files to the module (download) and from the module (upload). These functions are located under the "File_Transfer" MAIN MENU selection.

A cable must be connected between a serial port (COM1, COM2, or COM3) on the computer and the Access Module PROGRAM Port. These cables may be purchased from CTI or constructed according to the following specifications:

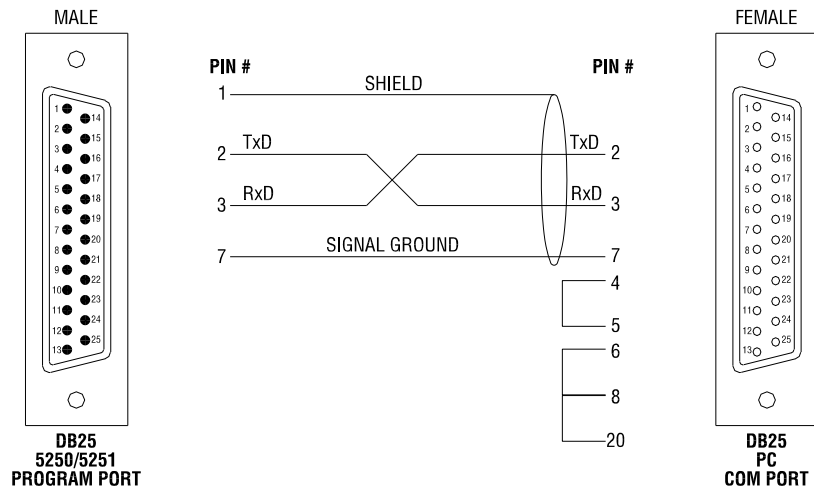


Figure 53 *PC 25-Pin COM Port to Access Module*

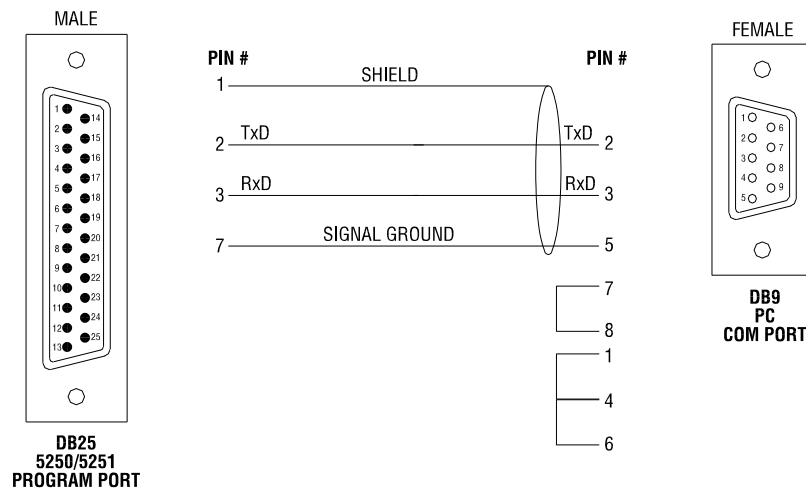


Figure 54 *PC 9-Pin COM Port to Access Module*

SPECIFICATIONS

Processor/Memory:

CPU: (5250-TI4) 80C32 @ 11 MHz
(5251-TI4) 80C32 @ 20 MHz
RAM: 32K Bytes

Power Requirements:

110/220V AC (switch selected)
35 ma nominal @ 110VAC
24VDC available by special request

Environmental:

Storage temperature: -40° to 80° C (-40° to 158°F)
Operating temperature: 0° to 60° C (32° to 140° F)
Humidity: 5% to 95% R.H. (non-condensing)
Front panel rating: NEMA 4
Fuse: 0.5 Amp (Schurter #034.3904 or equivalent)

Displays:

5250-TI4: 1" X 3" 80 character (4 Line X 20 Char) alphanumeric high temperature
backlit Supertwist LCD with wide viewing angle and contrast control.
5251-TI4: 80 character (4 Line X 20 Character) Vacuum Fluorescent Display (VFD)
with 5 mm x 3 mm character size and luminance control.

Diagnostic/Status: (4) LED's indicating UNIT OK, SHIFT, ALARM ACTIVE, and
MESSAGE ACTIVE

Keypad:

Numeric Keys: 0 through 9
SHIFT: Selects Alternate key selection
DRUM-WX/WY: (Not used on Series 405 PLCs)
READ/HELP: Selects Read Mode or (alt) Help screen
CLEAR/CLR ALL: Clears last entry or (alt) Clears display
CR/SP: Selects Control Relays or (alt) Special Relays
COUNT/TIMER: Selects Timers or Counters
NEXT/PRE: Scrolls through tag names, alarms, Help screens, and editable fields
X/Y: Selects Inputs or (alt) Outputs
V/STAGE: Selects V-Memory locations or (alt) Stage Memory
ENTER: Selects Edit Mode and enters data

Agency Approvals:

Recognized by UL and UL-Canada
Pending Approval: FM

APPENDIX A: SERIES 405 PLC ERROR CODES

The following is a list of PLC Error Codes which may be reported by the Access Module. Refer to the appropriate SIMATIC TI manual for corrective action if a PLC Error is reported.

The Access Module constantly monitors the status of the PLC and reports any errors detected by writing to the data display and AUX Port according to the setup parameters for "PLC Error Display Mode" selected in the TI4 Configuration Program (None, 1st Occurrence Only, Hourly).

<u>Error Code</u>	<u>Description</u>
E001	Fatal Error
E003	Software Watchdog Timeout
E004	Bad Instruction (435 PLC only)
E041	CPU Battery Low
E043	CPU Memory Cartridge Battery Low (435 PLC only)
E099	L Memory Exceeded
E101	CPU Memory Cartridge Failure or Missing
E104	Write Failed (Memory Cartridge Failed/Missing or Write Protect Enabled)
E151	Bad Command (Possible Memory Parity Error)
E155	RAM Memory Failure (435 PLC only)
E2**	I/O Module Error (Use AUX 42 to determine specific error)
E201	Terminal Block Disconnected
E202	Missing I/O Module
E203	Blown Fuse in Output Module
E206	User Power Supply Failure
E250	Failed I/O Base or Failed Connecting Cable
E252	I/O Arrangement Differs from 405 Configuration

LIMITED PRODUCT WARRANTY

CTI warrants that this CTI Industrial Product shall be free from defects in material and workmanship for a period of one (1) year after purchase from CTI or from an authorized CTI Industrial Distributor. This CTI Industrial Product will be newly manufactured from new and/or serviceable used parts which are equal to new in the Product.

Should this CTI Industrial Product fail to be free from defects in material and workmanship at any time during this one (1) year warranty period, CTI will repair or replace (at its option) parts or Products found to be defective and shipped prepaid by the customer to a designated CTI service location along with proof of purchase date and associated serial number. Repair parts and replacement Product furnished under this warranty will be on an exchange basis and will be either reconditioned or new. All exchanged parts or Products become the property of CTI. Should any Product or part returned to CTI hereunder be found by CTI to be without defect, CTI will return such Product or part to the customer.

This warranty does not include repair of damage to a part or the Product resulting from: failure to provide a suitable environment as specified in applicable Product specifications, or damage caused by an accident, disaster, acts of God, neglect, abuse, misuse, transportation, alterations, attachments, accessories, supplies, non-CTI parts, non-CTI repairs or activities, or to any damage whose proximate cause was utilities or utility like services, or faulty installation or maintenance done by someone other than CTI.

Control Technology Inc. reserves the right to make changes to the Product in order to improve reliability, function, or design in the pursuit of providing the best possible Product. CTI assumes no responsibility for indirect or consequential damages resulting from the use or application of this equipment.

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SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH MAY VARY FROM STATE TO STATE.

REPAIR POLICY

In the event that the Product should fail during or after the warranty period, a Return Material Authorization (RMA) number can be requested verbally or in writing from CTI main offices. Whether this equipment is in or out of warranty, a Purchase Order number provided to CTI when requesting the RMA number will aid in expediting the repair process. The RMA number that is issued and your Purchase Order number should be referenced on the returning equipment's shipping documentation. Additionally, if under warranty, proof of purchase date and serial number must accompany the returned equipment. The current repair and/or exchange rates can be obtained by contacting CTI's main office at 1-800-537-8398.

When returning any module to CTI, follow proper static control precautions. Keep the module away from polyethylene products, polystyrene products and all other static producing materials. Packing the module in its original conductive bag is the preferred way to control static problems during shipment. **Failure to observe static control precautions may void the warranty.** For additional information on static control precautions, contact CTI's main office at 1-800-537-8398.