-METASYS®

Zone Terminal

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Code No. LIT-6363014

Introduction

The Zone Terminal is a hand-held or wall-mounted person/machine interface for the Metasys® Application Specific Controller (ASC). It has the versatility to connect to a controller in several ways, and allows the user to monitor or adjust setpoints and time scheduling within a specific zone.

Application Details

The Zone Terminal is used to monitor or adjust setpoints and for time scheduling of occupied, warmup/cooldown, or shutdown of zone conditions. It connects to:

- a VAV/UNT through a TE-6100 Zone Sensor or CBLCON-0
- an AHU directly
- an AHU through a Function Module Kit or a CBLCON at the Relay Kit
- an AHU or UNT through an M100C Actuator

Theory of Operation

The Zone Terminal is designed as an easy-to-use hands-on device with which you can:

- quickly identify an alarm and its location
- monitor and adjust up to 18 analog points
- monitor 18 binary points
- extend a daily time schedule using Occupied Extend
- add or modify daily, holiday, and temporary time schedules

For specific theory of operation details, refer to the *Zone Terminal* section of the *HVAC PRO for Windows™ User's Manual.*

Displays

The Zone Terminal uses a Liquid Crystal Display (LCD) divided into three sections from top to bottom. Each display includes:

- five, 7-segment digits
- decimal points
- colon

To the left of the display are 18 cursors (●) and triangles (▲), 6 per display. The cursors indicate current position in the respective display. When flashing, the triangles indicate an alarm condition in the corresponding analog points.

The right side of the ZT display includes 18 pairs of binary indicators--a bar (|) for On, and a circle (❍) for Off. These symbols flash when the respective binary point is in alarm.

Five LED's located in the bottom panel include four green Mode Indicators and one red Alarm Indicator. The Alarm Indicator LED flashes when any analog or binary point is in alarm.

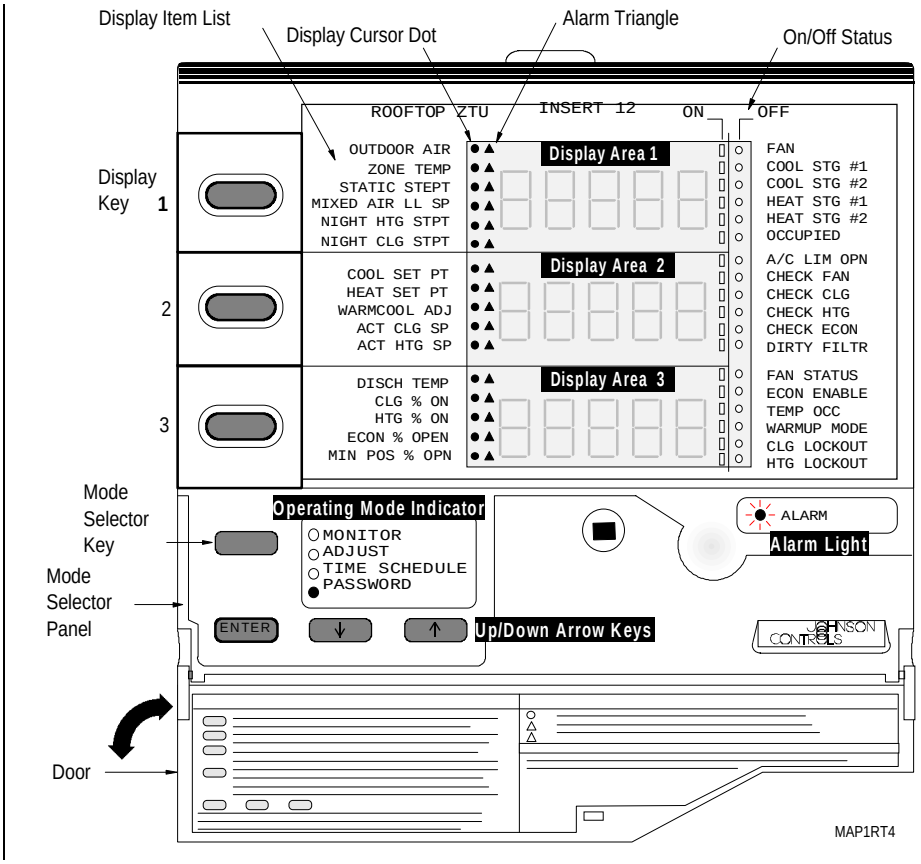

Figure 1: The Zone Terminal

Keys

Refer to Figure 1 to locate each of the seven ZT keys.

Table 1: ZT Keys

Key	Description
Display Key 1, 2, 3	Moves the cursor through left insert items
Operating Mode Selector	Moves the LED to the desired operating mode: Monitor, Adjust, Time Schedule, Password
(↑) or (↓)	Adjust Up or Down changes the numbers in the displays
Enter	Commits adjustments

Required Hardware for Operation

- AHU, UNT, or VAV controller with 24 VAC transformer
- ZTU100 Zone Terminal comes with a 6-pin coiled cord. Also included are four inserts: one Time Schedule Overlay (remove the paper backing), and three clear inserts with setpoint labels (remove protective plastic backing).

Note: The UNT/VAV inserts match common configurations right out of the box. The ZT matches the most-used AHU configuration: Mixed Air Single Path.

Optional Hardware for Operation

- TE-6400 Metastat™
- TE-6100 Zone Sensor
- FMK102 Function Module Kit
- RLY100/RLY050/RLY002 Relay Kit with CBLCON-0
- M100C Actuator
- ZTUWMB Wall Mount Base
- ENC100 Enclosure for ZTUUMB
- ZTUUMB Utility Mounting Base with Screws
- ZTUBAG Carrying Case
- EN-WIN101 Window for UPM Enclosure

Required for Downloading

- CBLPRO-1 or later
- IBM® compatible computer or laptop
- WS-SWHPRO-3 HVAC PRO™ Release 3 or later
- clear overhead transparency film for the customized inserts
- CBLCON-0 or AHU103/AHU100 and FMK102

CAUTION: The ZT must be plugged into a **6-pin** telephone-type jack. Plugging the ZT into an 8-pin jack destroys the 8-pin receptacle and prevents the ZT from powering up.

Note: CBLPRO-**1** or later must be used to download the ZT. CBLPRO-**0** is not compatible for downloading.

Software

ZT configuration and downloading are done with a software program called ZT PRO, which is part of the HVAC PRO software, Release 3 or later. This easy-to-use tool configures, commissions, and downloads the ZT's data base. The program runs on an IBM PC/XT/AT, PS/2®, or any 100% compatible computer. Figure 2 is an overview of the ZT configuration and downloading process. Refer to the *HVAC PRO for Windows User's Manual (FAN 637.5)* for specific information on configuration and downloading the Zone Terminal.

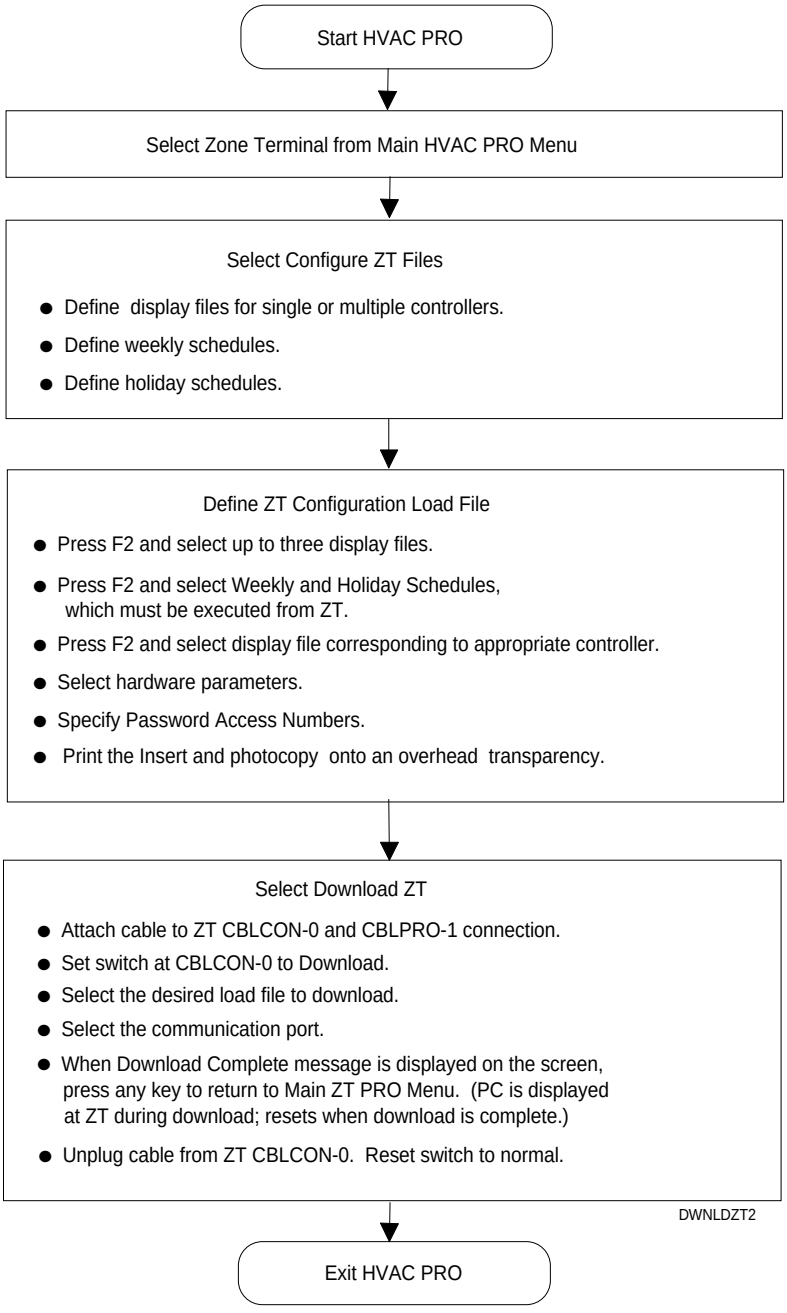

Figure 2: Overview--Configuring and Downloading the ZT

> **CAUTION:** Any changes in the configuration of the AHU and UNT/VAV must be updated in the Zone Terminal. Failure to download the ZT after configuration changes to the AHU and UNT/VAV prevents access to the ZT Operating Modes.

Downloading Options

The following section presents four options available for hardware connections necessary to complete the downloading process. Select one. The section includes:

- Using CBLCON-0
  or
- Job Site Downloading with a UNT or VAV (Using CBLCON-0)
  or
- Job Site Downloading without CBLCON-0
  or
- Downloading without an ASC Controller

Using CBLCON-0

Use CBLCON-0 for multiple connections of related equipment. To download, slide the switch on the CBLCON-0 to the download position. The red LED is indication of 24 VAC power. The green LED shows Zone Bus transmissions from the controller. If this LED is off, the Zone Bus wire is open. If this LED is on solid, the Zone Bus is shorted to COMMON.

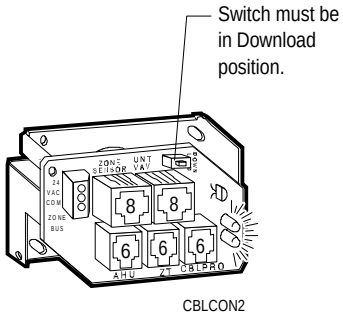

Figure 3: CBLCON-0

Although the program reminds you to put the CBLCON-0 switch in the correct position, if the switch is in the wrong position, or if the wrong CBLPRO is used, downloading does not occur. You must use CBLPRO-**1** or later. The following error prompt appears on the screen.

```
                  ZT PRO - Version 05.10
   Building Object File to Download
   ZT Establishing Communication

   ZT error (18) -- Invalid or No response from ZT

   ZT Download Failed, Strike 1 - Trying Again
   ZT Establishing Communication

   ZT error (18) -- Invalid or No response from ZT

   ZT Download Failed, Strike 2 - Trying Again
   ZT Establishing Communication

   ZT error (18) -- Invalid or No response from ZT

   ZT Download Failed, Strike 3 - You're Out

   Return Switch on CBLCON to Normal Position
   Press any key to Continue

<Esc>Cancel             <F7>View
```

Figure 4: Error Prompt Screen

Option 1: Job Site Downloading with UNT/VAV Using CBLCON-0

To download a ZT for a VAV/UNT through the TE-6100 Zone Sensor (Figure 5), use a CBLCON-0, CBLPRO-1 or later, and a laptop.

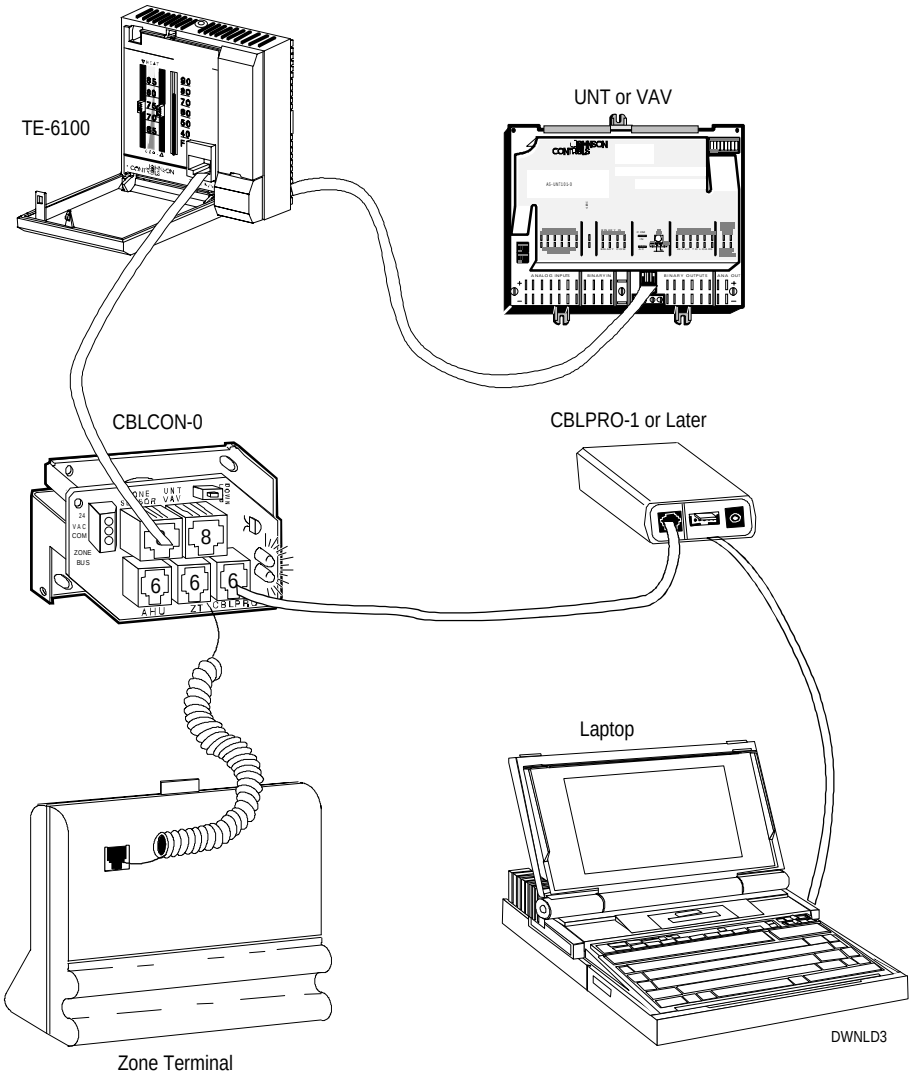

Figure 5: Job Site Downloading with UNT/VAV Using CBLCON-0

Notes: It is assumed that 24 VAC power has been applied to the controller.

The CBLCON-0 switch must be in the Download position.

Option 2: Job Site Downloading without CBLCON-0

To download the ZT *without* an CBLCON-0, use the AHU101-1, AHU103 without AHU102 or AHU100 boards. When downloading through an AHU motherboard, the AHU102 Logic Board must be removed. It is assumed that 24 VAC power has been applied from a transformer.

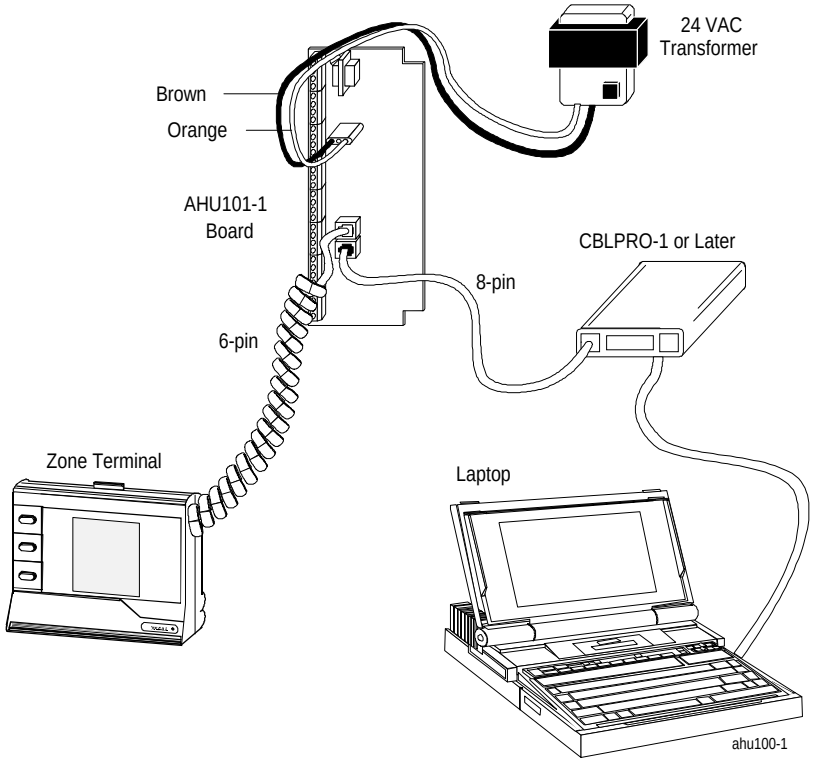

Figure 6: Job Site Downloading without CBLCON-0

Option 3: Downloading: without an ASC Controller

When downloading the ZT without a controller, 24 VAC power must be accessed from a transformer. Where power is accessed through an XFR100 transformer, splice the wire coming from the transformer according to the illustration below. This is only required when you do *not* have an AHU, VAV, or UNT available. Other hardware connections for downloading are as shown.

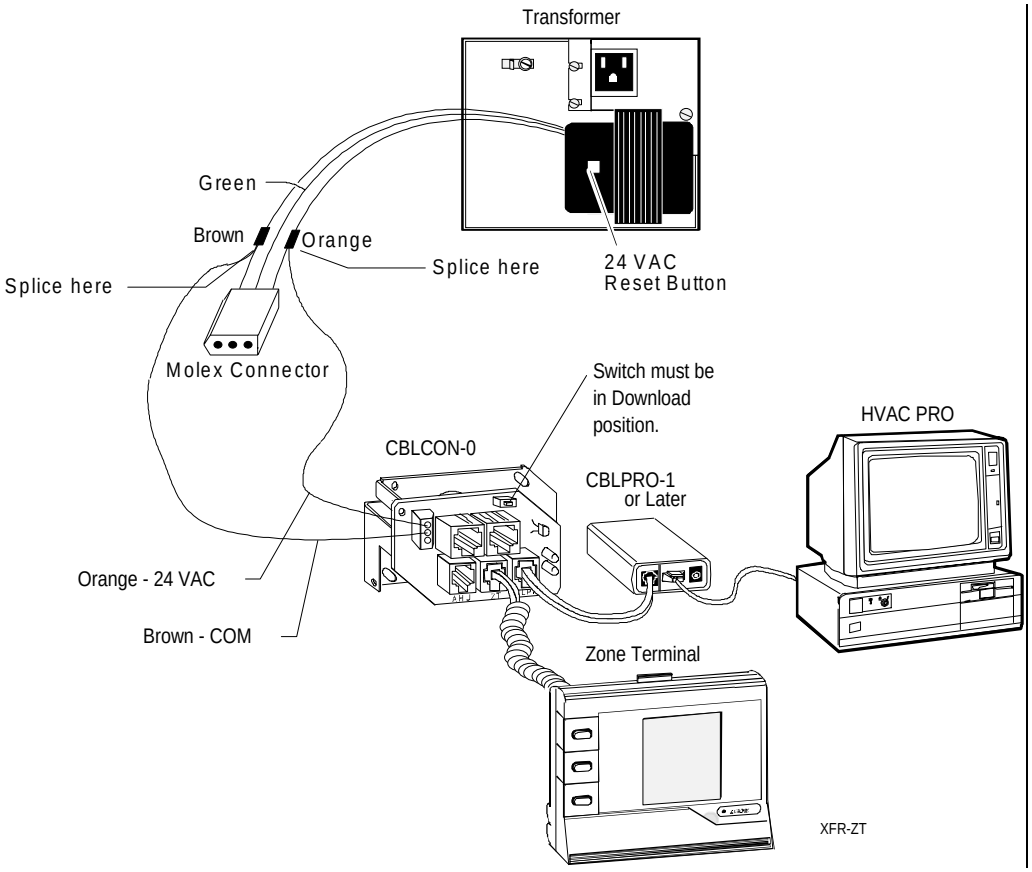

Figure 7: Downloading without an ASC Controller

> ⚠ CAUTION: Connect only one transformer at a time into the CBLCON-0.
>
> Connecting more than one controller or transformer at a time may cause a short circuit.
>
> The ZT must be plugged into a **6-pin** telephone-type jack. Plugging the ZT into an 8-pin jack destroys the 8-pin receptacle and prevents the ZT from powering up.

Installation Procedures

Tools Needed

- flat-head screwdriver
- needle-nose pliers
- drill

Physical Dimensions

The ZT unit measures 6.88 x 7.31 x 1.52 inch (175 x 186 x 39 mm), and weighs 1.25 lb (0.57 kg). A coiled, 6-pin telephone-type cord is included. The cord is 17 inches long and stretches to 5 feet. The ZT contains a 5-year lithium battery.

The Wall Mount Base with ZT measures 6.94 x 7.44 x 2.00 (176 x189 x 51 mm).

The Utility Mount Base with ZT measures 6.94 x 7.44 x 6.00 (176 x 189 x 152 mm) when mounted on the ENC100.

Environmental Information

Installation of the Zone Terminal must meet the following standards:

- Ambient operating conditions: 32 to 122°F (0 to 50°C)
- 10 to 90% non-condensing relative humidity
- 86°F (30°C) maximum dew point

Notes: Do not mount the Zone Terminal in a vibration area.

The atmosphere must be free of corrosive chemical vapors, which may damage electronic equipment.

Cleaning of ZT Surfaces

- Use mild soap and water with a soft cloth to wipe surfaces of the ZT clean.
- **Do not** immerse the ZT unit in water.
- Wipe clean with pure isopropyl alcohol, if surface becomes excessively dirty.

Installing the Inserts

Before you mount the ZT or connect it to a controller, the clear plastic insert that describes the displayed values must be in place.

1. Lay the ZT flat and press the white tab on the top of the ZT while pulling the front cover towards you.
2. Align the insert to the lower left front of the ZT.
3. Press the pieces back together.

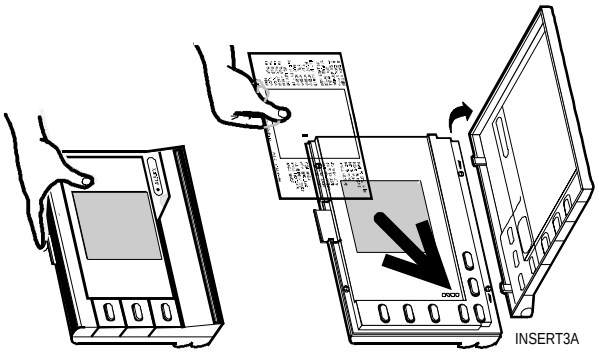

Figure 8: Template Installation

Connecting the Zone Terminal

Prior to final connection, the ZT must be downloaded using the ZT PRO software tool which is part of the *HVAC PRO Rev. 3.0 or later.* Refer to the *HVAC PRO for Windows User's Manual, Zone Terminal* section.

Wiring Considerations

If ZT is connected 50 feet or less from the controller, install 24 AWG (6-conductor) telephone cable between the controller and the ZT.

If ZT is connected up to 500 feet from the controller, install 18 AWG wire. The ZT requires 24 VAC, Common, and Zone Bus. The Zone Bus and Common should be twisted pair.

The ZT can be connected directly to the:

- Air Handling Unit (AHU)
- Function Module Kit (FMK)
- Relay Kit (RLY) through a CBLCON-0
- Actuator (M100C)
- Zone Sensor (TE-6100 or TE-6410)

Figure 9 shows you where to locate the telephone-style plugs in each of these components.

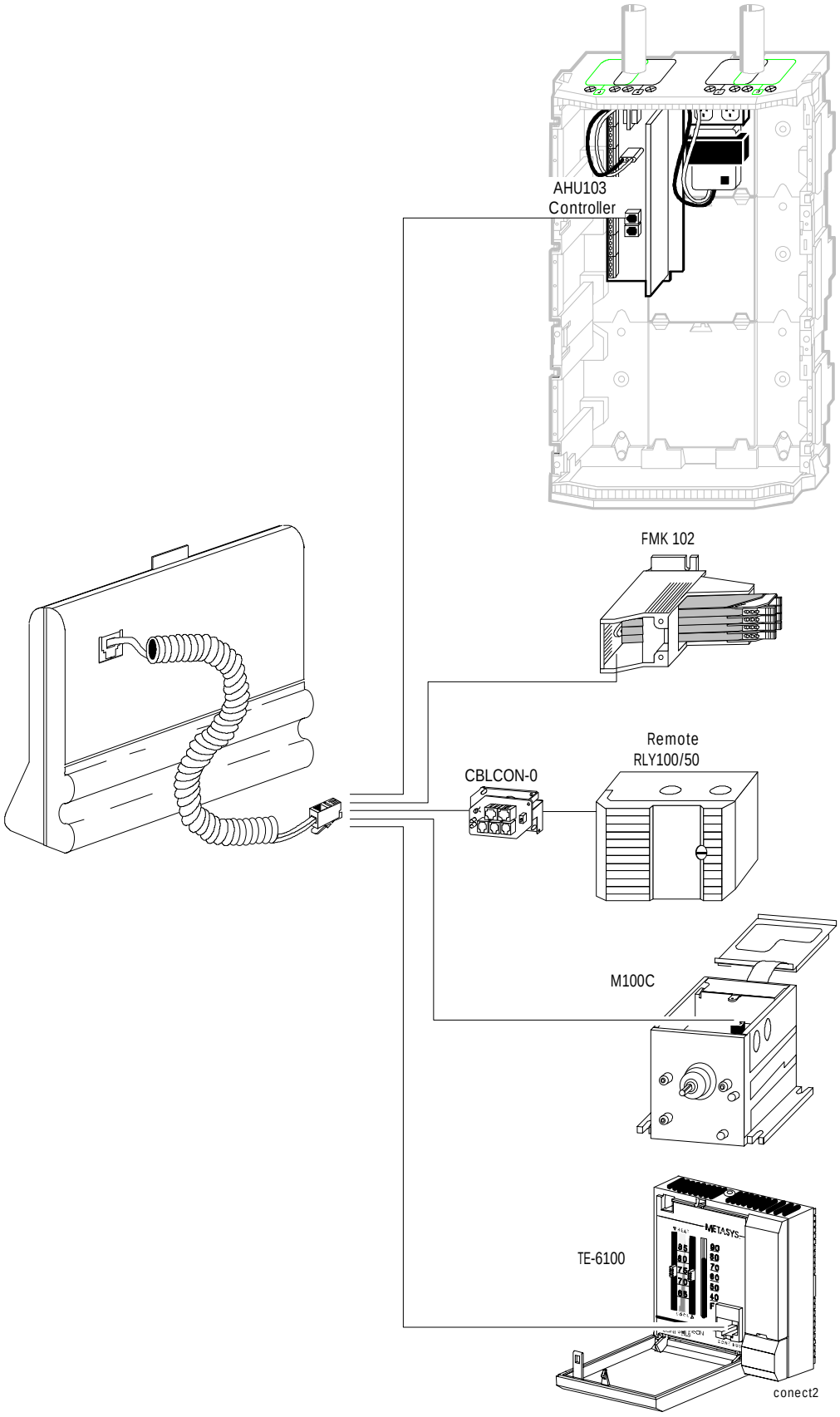

Figure 9: Connecting the Zone Terminal

Other remote connections include permanently connecting to a UNT or VAV using the CBLCON-0 and TE-6100 Zone Sensor (Figure 10).

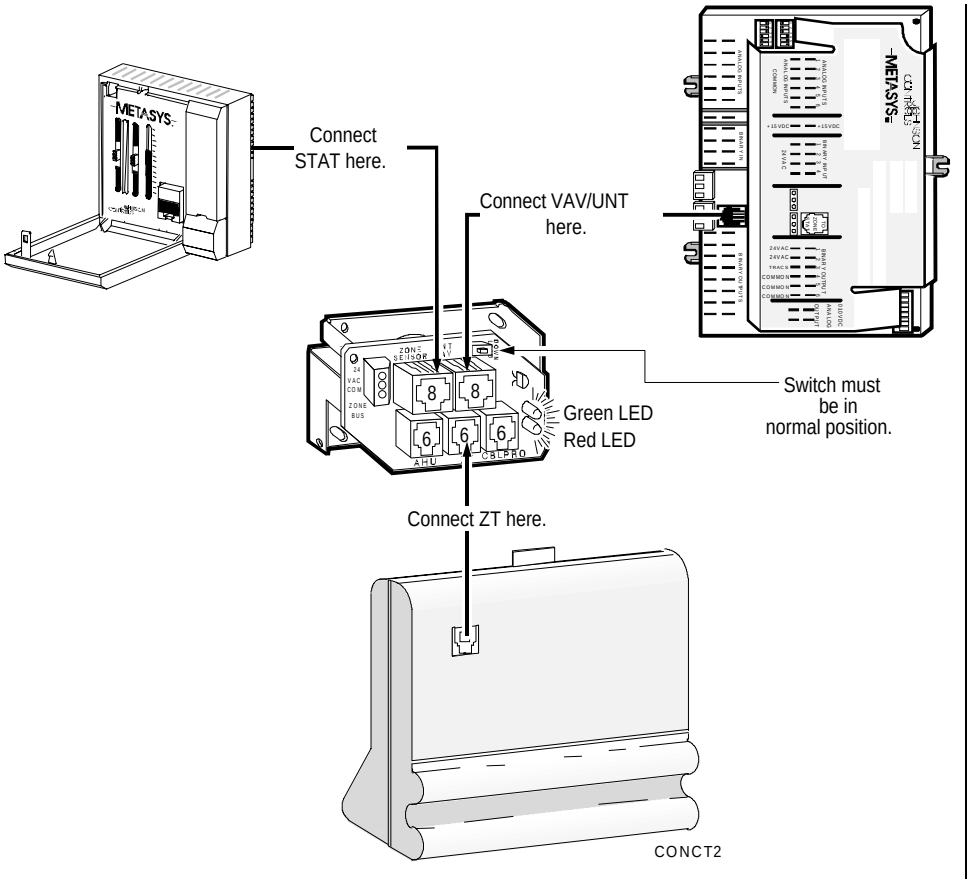

Figure 10: Connecting Remote ZT to UNT/VAV with CBLCON-0 and Zone Sensor

The Zone Terminal can be connected directly to a VAV/UNT through a Zone Sensor without the use of the CBLCON-0 (Figure 11). This is a portable application.

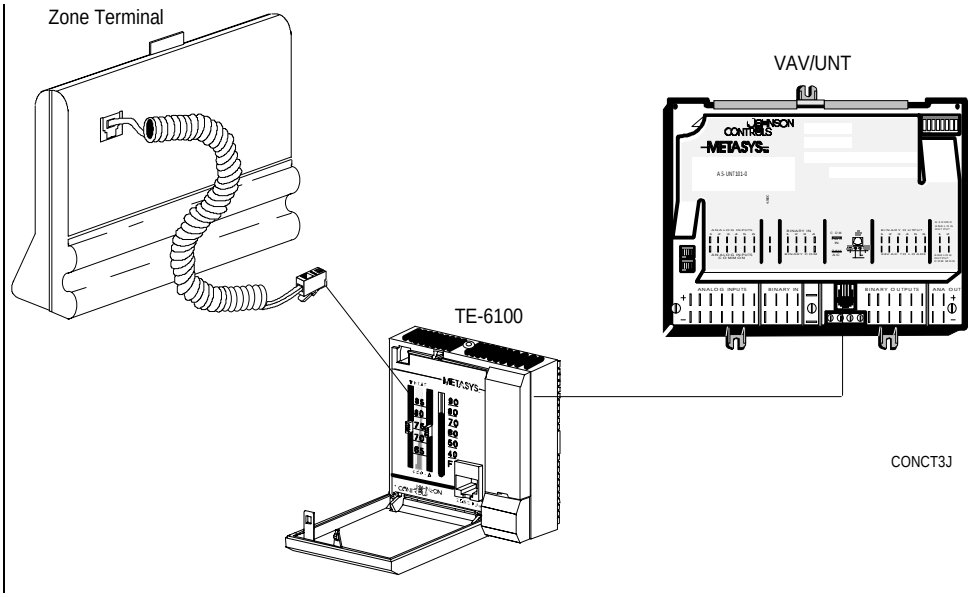

Figure 11: Remote Connect ZT to VAV/UNT Through the Zone Sensor

> ⚠ CAUTION: The ZT must be plugged into a **6-pin** telephone-type jack. Plugging the ZT into an 8-pin jack destroys the 8-pin receptacle and prevents the ZT from powering up.

Physical Installation of Wall Mountings and Bases

For optimum viewing, mount the ZT 65 inches from the floor to the top of the ZT unit.

Enclosure Kit and Base Installation

Before attaching the Enclosure Kit (ENC100-0) to the wall, remove the rectangular knockouts at either the top or the bottom, depending on which end the wires will run through.

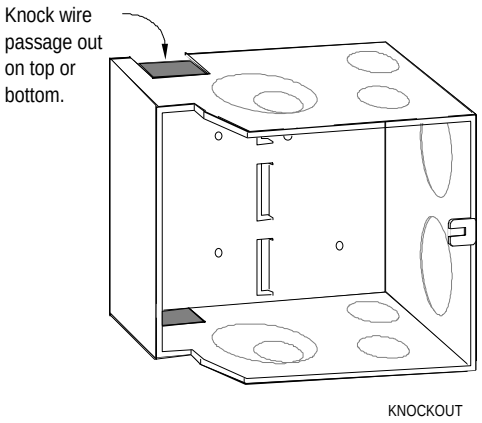

Figure 12: Remove Knockouts

Attach the Enclosure Kit (ENC100-0) to a flat surface or wall for direct connection of the ZT to an application specific controller. Pull wire through before attaching standoffs and screws for the plastic base.

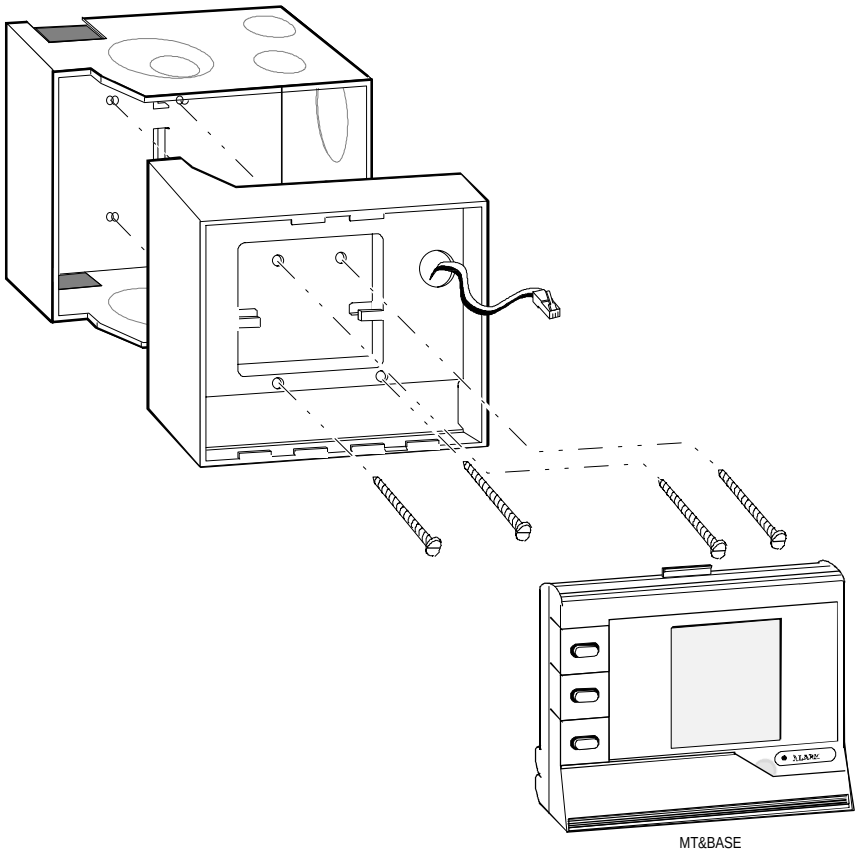

Figure 13: Attaching the Enclosure Kit and Utility Mounting Base

Attach the base, pulling the telephone jack type cord through the opening as shown below. Plug the cord into the back of the ZT, and snap the ZT into position.

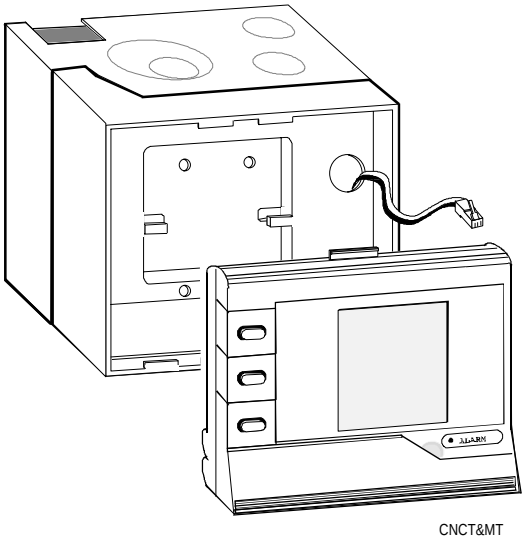

Figure 14: Connecting and Mounting the ZT

Wall Mount Installation

For office or other types of remote connections, attach the Wall Mount to a flat surface or wall. Use three screws and plastic anchors (not provided). For easy reading, mount the ZT at least 65 inches from the floor to the top of the ZT.

1. Position the Zone Terminal Wall Mounting Base on the wall.
2. Mark the three mounting hole locations and remove the base.
3. Drill three holes for No. 6 anchors (not included) and install the anchors for mounting the base.
4. Thread the ZTU cable through the access hole in the back of the base.
5. Secure the Wall Mounting Base to the wall with three No. 6 screws.
6. Plug the ZTU cable in the back of the ZTU, and snap the ZTU into the base.

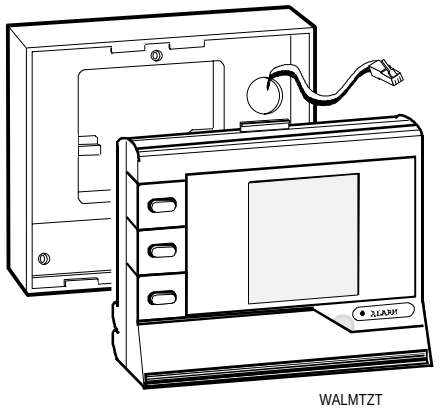

Figure 15: Attaching ZT and Wall Mount

Mounting the ZTU Externally on the UPM

Using the wall mounting base, follow the instructions below to mount the Zone Terminal on a UPM.

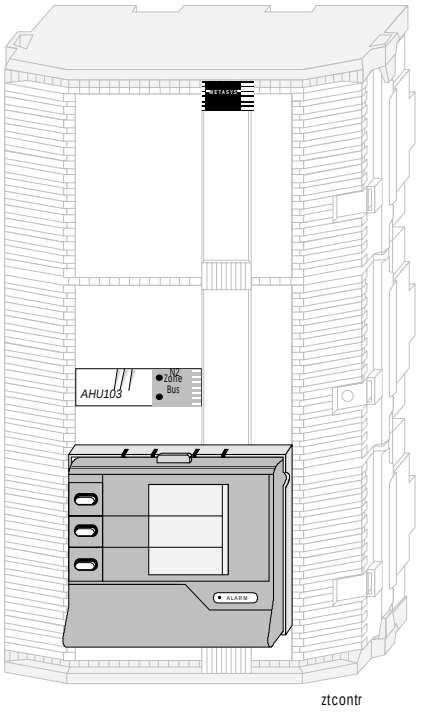

Figure 16: Mounting the Zone Terminal on a UPM

1. Position the Zone Terminal Wall Mounting Base flush on the cover at eye level (approximately 65 inches to top of ZT).
2. Mark mounting holes.
3. Mark cable hole.
4. Drill three size 3/32 inch pilot holes for mounting the base.
5. Drill 5/8 to 1 inch hole for cable.
6. Mount the base to the UPM cover using three No. 6 thread forming or sheet metal screws. Use a No. 6 x 3/4 inch screw for the top hole and two No. 6 x 1/2 inch screws for the bottom screws.

Mounting the ZT Behind a Window Enclosure in the UPM

The Panel Unit in Poteau, Oklahoma has a bracket available for mounting the ZT behind a window that allows control equipment to be mounted behind the ZT, thereby maximizing the use of the UPM. Contact the Panel Unit for more information.

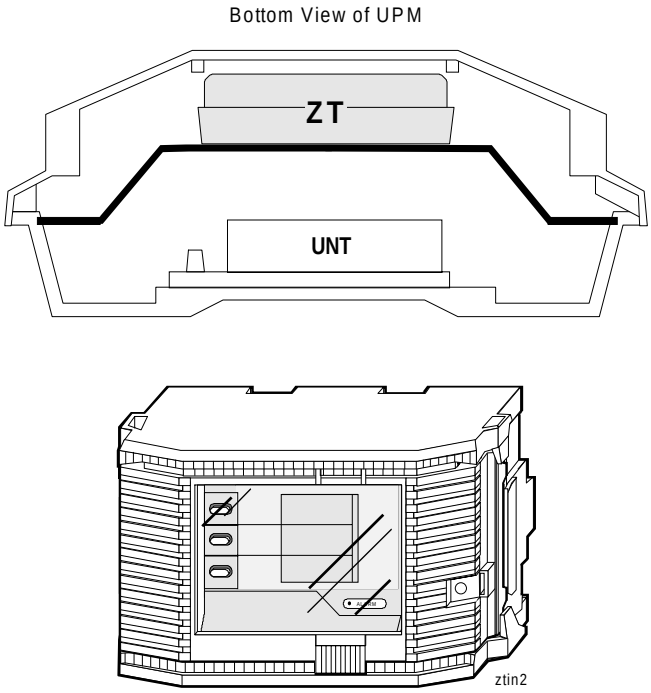

Figure 17: Bracket for Mounting the ZTU Internally in the UPM

Removing a Mounted ZT

Use a large flat-head screwdriver and insert it in the bottom where the ZT and mounting base come together. Gently pry the ZT out of the mounting base. As you push the screwdriver in, the ZT slides up and then out.

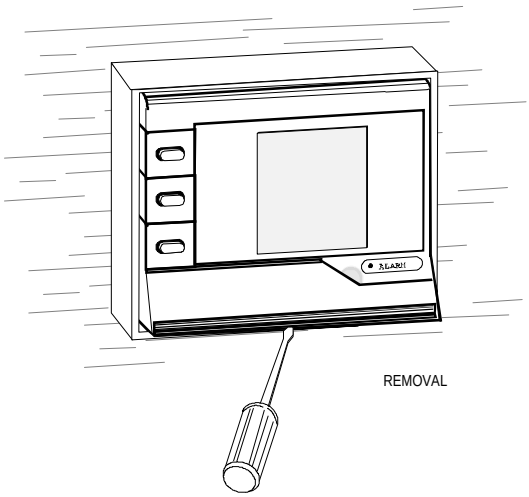

Figure 18: Removing Mounted ZT

Troubleshooting Procedures

Troubleshooting Chart

Table 2: Troubleshooting

Problem	Solution
Displays remain blank after ZT is connected	No power is getting to the ZT--check for appropriate connections.
Displays show only dashes - - - - -	ZT unit is operational, but not communicating with the controller. Check the Zone Bus wire/controller. If no wiring errors are found, download the AHU w/HVAC PRO, Release 3 or newer.
Displays show all dots . . .	Download in ZT does not match connected controller, or download is invalid. Select correct download (ZT load file) and re-load the ZT.
Displays show 99999	An entered number is too large to display.
Displays show -9999	An entered number is too small to display.
Displays show Err 01	Internal RAM/Processor Error*
Displays show Err 02	External RAM Error*
Displays show Err 03	E^2 PROM Error*
Displays show Err 04	ROM (Code) Error*
Displays show Err 05	Battery Bad**
Displays show Err 06	Battery-backed RAM Error*
Cannot enter Adjust Mode	Has proper Password been entered? Do you have Password access to this mode?
Cannot enter Time Scheduling Mode	Has proper Password been entered? Do you have Password access to this mode? Is the ZT plugged into the controller selected for Time Scheduling?
ZT reverts back to Monitor Mode	ZT has timed-out. Re-enter your Password and begin again.
One minute lapse in time scheduling has occurred at Midnight	Enter 24:00 to cross the day boundary in HVAC PRO.
Numbers in the display do not relate to the items listed on the insert	The insert is not the correct one for this ZT and Controller. Verify the insert number by entering Password mode.

* For Errors 1, 2, 3, 4, and 6--Repower device two or three more times. If error still exists, disconnect ZT and run diagnostics by holding the Display Key 1 and Adjust Down (↓) Key when the phone jack is plugged in. The word `DIAG` appears on Display 1 at the start, and all display segments light up for "Pass." When all segments light, push Display Key 1 two times, and then follow the prompts.

** For Error 5--This is only a warning and indicates the battery-backed data, specifically Time Scheduling, has been lost. If you press Enter, the ZT loads the default time schedule and you may continue. Replace the battery at your earliest convenience. Use a Panasonic® lithium or Ray-O-Vac®--battery number BR2325.

Internal Diagnostic Error

The figure below explains what the ZT is reporting in the event it fails its internal diagnostic. The digit "1" appears in displays 2 and 3 indicating where the error has occurred.

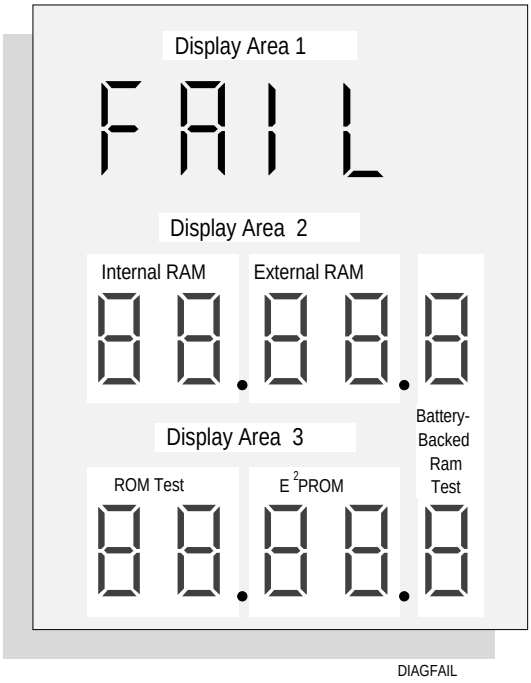

Figure 19: Internal Diagnostics

Ordering Information

The Zone Terminal includes the ZT, three inserts, one time schedule overlay, and one 6-pin coiled telephone style cord.

The Zone Terminal can be ordered from the nearest Johnson Controls branch office or wholesale distributor.

Accessories

Table 3: Accessories

Product Code Series	Description
AS-ZTUBAG-0	ZT Carrying Case for Portable Applications
AS-ZTUUMB-0	Utility Mounting Base w/Screws; Mounts on a Standard ENC100
AS-ZTUWMB-0	Wall mount--Base Only
FAN 633.5	*Zone Terminal User's Manual*
AS-CBLCON-0	Telephone Style Plug Cable Connector for Downloading the ZT
EN-WIN101	Window Section

Specifications

Table 4: Specifications

Product	Zone Terminal AS-ZTU100-1
Power Requirements	Power supplied from the AHU/VAV/UNT, 24 VAC at 0.05 A (1.2 VA)
Ambient Operating Conditions	32 to 122°F (0 to 50°C) 10 to 90% Non-condensing Relative Humidity 86°F (30°C) Maximum Dew Point
Ambient Storage Conditions	-40 to 158°F (-40 to 70°C) 5 to 95% Non-condensing Relative Humidity 86°F (30°C) Maximum Dew Point
Dimensions (H x W x D)	6.88 x 7.31 x 1.52 inch (175 x 186 x 39 mm)
Shipping Weight	1.25 lb (0.57 kg)
Agency Compliance	FCC Part 15 Subpart J - Class A
Agency Listings	UL916 Listed and CSA Certified
Plastic Rating	UL-5V Flammability: UL 94-5V Flame Spread: 52-68 (ASTM E 162) Oxygen Index 30 (ASTM D 2863)
Wire Length	500 ft, No. 18 AWG Twisted Pair 50 ft, No. 24 AWG Phone Cable
Termination	6-pin RJ12 Telephone Style Jack
Baud Rate	1200 Baud Asynchronous, Half Duplex
Displays	Continuous, 5-digit LCD Display of 3 Analog Inputs/Outputs or Setpoints, plus 18 Binary Status/Mode Points
Timekeeping	7-day, 24-hour Battery-backed Clock
Battery Backup	All timekeeping and scheduling stored in RAM under AC power or 5-year lithium battery without AC.
Time Scheduling	Occupied, Warmup, Shutdown for 7 Weekdays, 10 Holidays, 1 Self-canceling Temporary Schedule plus Occupied Extend

The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

JOHNSON CONTROLS

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