

AP-TMZ1600 Room Sensor with LCD Display

Application

The TMZ is compatible with Unitary (UNT) controller and Variable Air Volume (VAV) (Revision D or later) controller and with the VAV for Modular Assembly (VMA1400 Rev. C00 or later and all VMA1200s). Use HVAC PRO Release 8.01 or later to configure the UNT, VAV, and VMA for use with the TMZ. See the *Technical Data* section for details.

The TMZ connects to the controller via an 8-pin phone jack cable assembly that provides Zone Bus, sensor, and power supply connections.

When the TMZ is used with a compatible Johnson Controls® digital controller, verify proper system operation using a Zone Terminal Unit (ZTU), a laptop computer with CBLPRO and HVAC PRO software, or a Palm™ compatible handheld interface with VMA Balancing Tool (VBT) software.

Both the ZTU and CBLPRO plug into the 6-pin phone jack on the bottom of the TMZ to access the Zone bus.

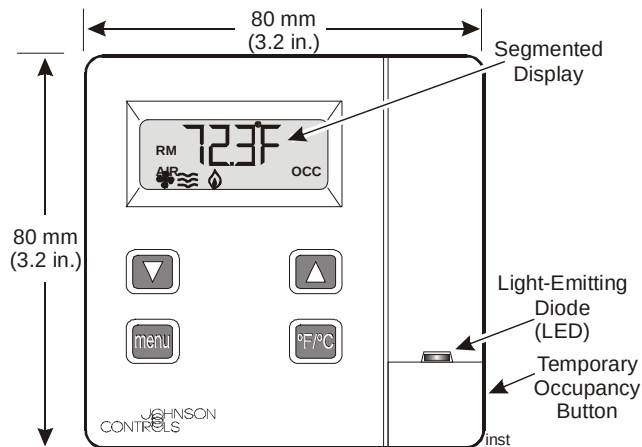


Figure 1: AP-TMZ1600

Installation

Install the TMZ in an accessible location where the temperature is representative of general room conditions. Avoid mounting the TMZ near cold or warm air drafts, radiant heat, or direct sunlight.

IMPORTANT: Prevent any static electric discharge to the TMZ1600 Room Sensor. Static electric discharge can damage the room sensor and void any warranties.

Note: Do not mount the module on an exterior wall.

Parts Included

The following parts are included with the TMZ:

- AP-TMZ1600 Room Sensor with Liquid Crystal Display (LCD)
- surface base
- wallbox mount base (wallplate) with cover screw (for vertical or horizontal 2 x 4 in. wallbox mounting)
- endcaps (2)
- hollow plastic wall anchors (2)
- No. 8 x 1-1/4 in. slotted pan-head sheet metal screws (2), for surface base
- No. 6-32 x 1/2 in. flat-head machine screws (2), for wallplate

Special Tools Needed

For a typical installation, you need the following:

- 1.5 mm (1/16 in.) Allen wrench or stat adjustment tool
- 1/4 in. flat-blade screwdriver
- 8 mm (5/16 in.) drill bit and drill

Mounting

The TMZ accommodates both surface and 2 x 4 in. wallbox mounting (horizontal or vertical). To mount the TMZ, first remove the base.

Removing the Base

To remove the base from the TMZ:

1. Insert a 1.5 mm (1/16 in.) Allen wrench in the hole located in the top of the TMZ, in the center.
2. Press down gently on the Allen wrench while carefully pulling the mounting base apart from the TMZ.
3. Proceed to the *Surface Mounting* or *Wallbox Mounting* section.

Surface Mounting

To mount the TMZ using the surface base:

1. Pull the wiring through the wall.
2. Place the surface base against the wall with the arrow pointing up, and mark the screw holes using the base as a template. Use the top and bottom holes for mounting (Figure 2).

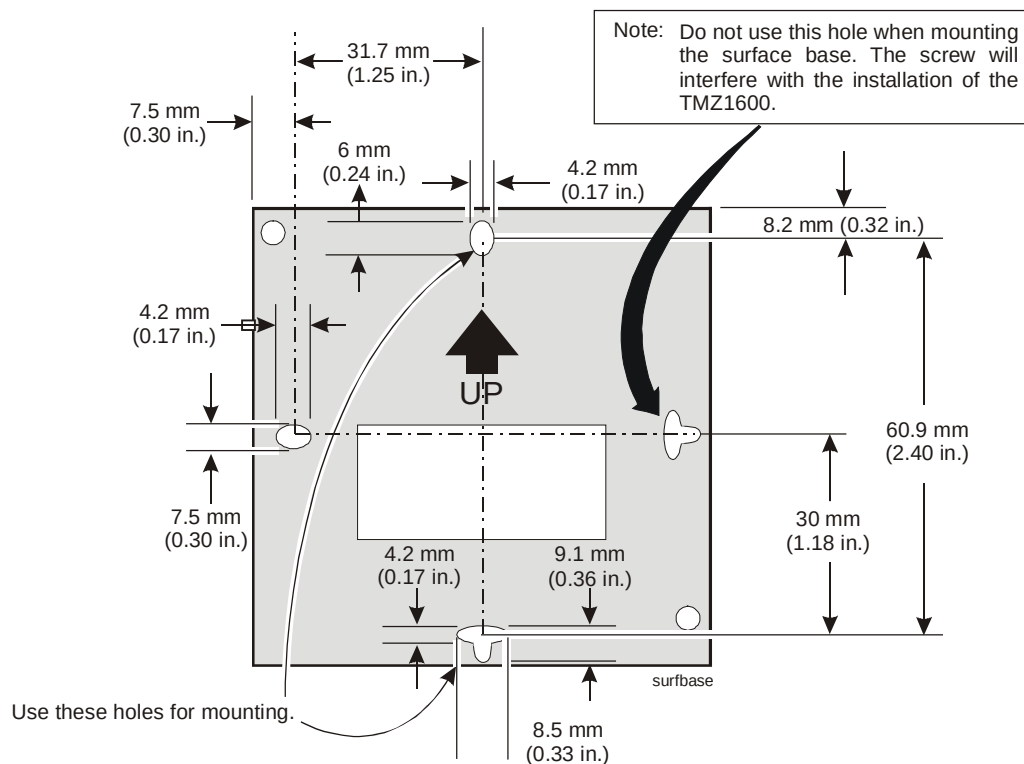


Figure 2: Surface Base

3. Drill two 8 mm (5/16 in.) holes at the locations you marked.

Note: An ACC-INSL-1 surface mounting pad may be used between the mounting base and the dry wall to accommodate uneven mounting surfaces or block wall drafts.

4. Insert the anchors in the drilled holes, pull the wiring through the surface base, position the surface base, and drive the screws (Figure 3).

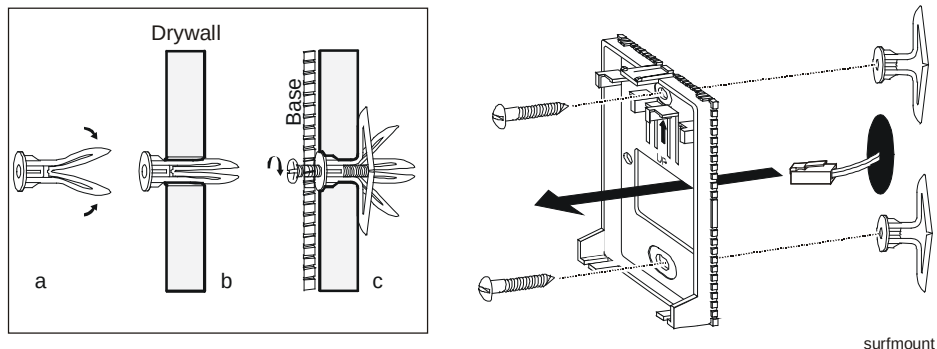


Figure 3: Mounting the Surface Base

5. Wire the TMZ (refer to the *Wiring* section in this document).
6. Reattach the TMZ to the surface-mount base.

Wallbox Mounting

To mount the TMZ using the wallplate and a standard 2 x 4 in. wallbox:

1. Remove the cover screw from the wallplate (Figure 4).
2. Pull the wiring through the wallplate.
3. Position the wallplate so that one of the arrows points up, and fasten the wallplate to the wallbox using the screws provided.

Note: An ACC-INSL-0 wallbox mounting pad may be used between the mounting base and the dry wall to accommodate uneven mounting surfaces or block wall drafts.

4. Wire the TMZ (refer to the *Wiring* section in this document).
5. Attach the TMZ to the wallplate, and replace and tighten the cover screw with a 1.5 mm (1/16 in.) Allen wrench or stat adjustment tool.
6. Install the endcaps provided by snapping them onto the wallplate.

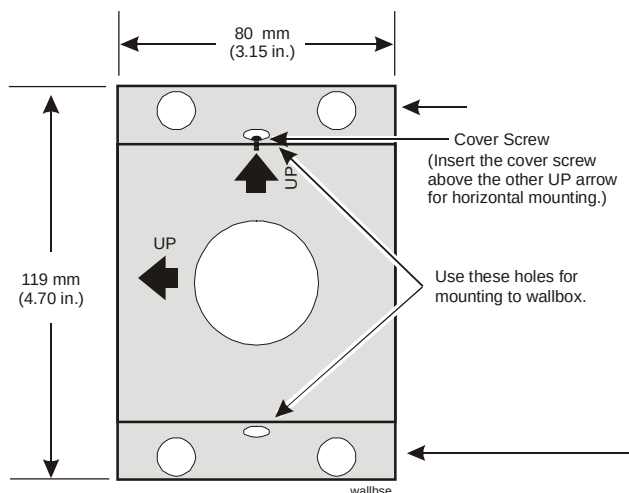


Figure 4: Wallplate (Shown Vertical)

Wiring



CAUTION: Risk of Property Damage.

Do not run low voltage cable in the same conduit or wiring troughs with high voltage wires. Running low and high voltage wires in the same conduit or wiring troughs may damage the equipment or cause system malfunction.

MISE EN GARDE: Risque de dégâts matériels.

Ne pas faire courir un câble basse tension dans les mêmes gaines ou goulottes électriques que des câbles haute tension. L'installation de fils basse tension et haute tension dans les mêmes gaines ou goulottes électriques risque d'endommager l'équipement ou de provoquer des dysfonctionnements du système.

Note: All terminals are power limited. Electrical wiring must conform to local codes and should be done by certified personnel only.

To connect the TMZ to a UNT, VAV, or VMA controller, connect an 8-pin phone jack cable assembly from the 8-pin phone jack on the TMZ (Figure 5) to the 8-pin phone jack on the controller.

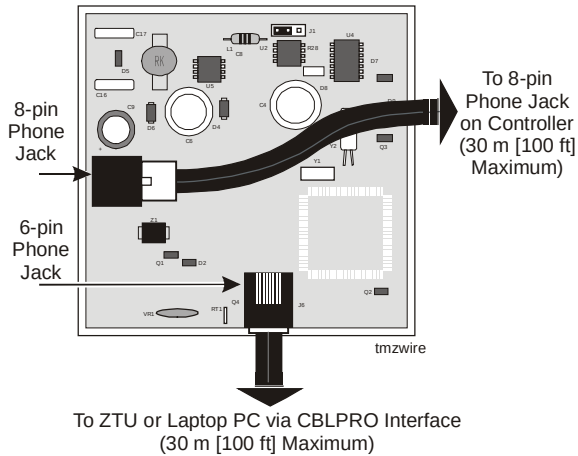


Figure 5: TMZ1600 Cable Connections



CAUTION: Risk of Property Damage.

Do not insert a 6-pin connector or anything other than an RJ-45 8-pin connector into the 8-pin jack on the back of the TMZ to prevent damaging the phone jack.

MISE EN GARDE: Risque de dégâts matériels.

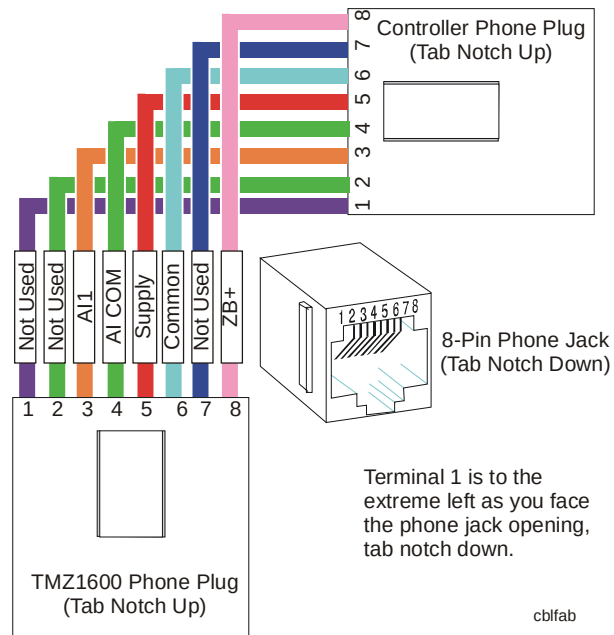
Ne pas insérer un connecteur à 6 broches ou tout connecteur autre qu'un connecteur RJ-45 à 8 broches dans la fiche à 8 broches située à l'arrière de l'TMZ afin d'éviter d'endommager la fiche téléphonique.

Table 1 describes the pinouts for each phone jack on the TMZ.

Table 1: TMZ Phone Jack Pinouts

8-Pin Phone Jack on TMZ		6-Pin Phone Jack on TMZ	
Pin	Signal	Pin	Signal
1	Not Used	1	Not Used
2	Not Used	2	Supply: 24 VAC
3	AI1, Zone Temperature Sensor	3	Supply/Zone Bus Common
4	AI1, Sensor Common	4	Not Used
5	Supply: 24 VAC	5	Zone Bus
6	Supply/Zone Bus Common	6	Not Used
7	Not Used		
8	Zone Bus		

Figure 6 illustrates the cable and phone jack pinouts used to connect the TMZ to a controller:



Note: This may not be typical of prefabricated phone cable. A telephone system cable is wired opposite of the zone sensor requirements.

Figure 6: Cable and Phone Jack Pinouts

Operation

Basic Operation

The TMZ1600 has five control buttons. Their basic functions are described in Table 2.

Table 2: TMZ1600 Button Functions

Button	Function
Menu	Cycles through the following display options: room air temperature, outdoor air temperature, comfort setpoint temperature, and fan operation. In Password mode*, cycles through these additional display options: comfort setpoint temperature access status, fan access status, Temporary Occupancy duration, heating setpoint temperature, and cooling setpoint temperature.
Down Arrow 	Displays the comfort setpoint temperature if pushed while room air temperature is displayed. Lowers the setpoint temperature when setpoint is displayed and blinking. Toggles fan operation mode between On and Auto when the fan mode is displayed and blinking. In Password mode*, sets user access to UnLK.
Up Arrow 	Displays the comfort setpoint temperature if pushed while room air temperature is displayed. Raises the setpoint temperature when the setpoint is displayed and blinking. Toggles fan operation mode between On and Auto when the fan mode is displayed and blinking. In Password mode*, sets user access to LOCK.
°F/°C	Toggles temperature display between degrees Fahrenheit (°F) and degrees Celsius (°C).
Temporary Occupancy	Toggles the controller between Standby or Unoccupied mode and Temporary Occupancy mode. The Light-Emitting Diode (LED) above this button lights when Temporary Occupancy mode is active.

* Press and hold the Menu and °F/°C buttons simultaneously for 10 seconds to access Password mode.

LCD Display Symbols

Figure 7 shows the relative size and location of the LCD Display symbols:

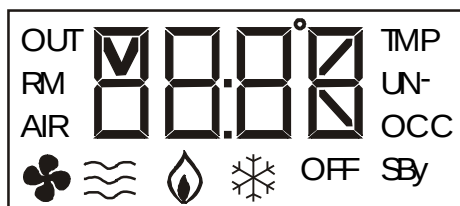


Figure 7: LCD Display Symbols

During power up, the full range of LCD Display symbols appears for approximately 10 seconds or more, followed by Err6 if the controller has not started communication yet. The TMZ repeats this sequence until the default display (RM AIR) appears.

Table 3 describes the LCD display symbols.

Table 3: LCD Display Symbol Descriptions

Symbol	Description
RM AIR	Room Air: indicates the room air (zone) temperature is displayed. The room air temperature value is not adjustable. The LCD defaults to this display if no button is pressed for more than 30 seconds.
OUT AIR	Outdoor Air: indicates the outdoor air temperature is displayed. The outdoor air temperature value is not adjustable.
TMP OCC	Temporary Occupancy: indicates controller is in Temporary Occupancy mode. In Password mode, indicates that Temporary Occupancy duration is displayed.
UNOCC	Unoccupied: indicates controller is in Unoccupied mode.
OCC	Occupied: indicates controller is in Occupied mode.
SBy	Standby: indicates controller is in Standby mode. This is an energy conservation mode of the controller.
OFF	Off: indicates heating and cooling equipment is off (Shutdown mode).
	Comfort Setpoint Temperature: indicates the comfort setpoint temperature is displayed (7 to 32°C [45 to 90°F] maximum range). In Password mode, indicates comfort setpoint temperature access status (UnLK or LOCK) is displayed. Comfort setpoint temperature access status can be changed if segmented display is blinking.
	Heating Mode (flame symbol): indicates heating equipment is on. In Password mode, indicates the heating setpoint temperature is displayed (4.5 to 31.1°C [40 to 89°F] maximum range). The heating setpoint temperature value is adjustable if the segmented display is blinking. (Dual setpoint applications only. Field is skipped for single setpoint applications.)
	Cooling Mode (snowflake symbol): indicates cooling equipment is on. In Password mode, indicates the cooling setpoint temperature is displayed (7.8 to 35°C [46 to 95°F] maximum range). The cooling setpoint temperature value is adjustable if the segmented display is blinking. (Dual setpoint applications only. Field is skipped for single setpoint applications.)
	Fan: indicates fan is on. In Password mode, indicates fan access status (UnLK or LOCK) is displayed. Fan access status can be changed if segmented display is blinking.
	Fan On: indicates fan is on. Fan status can be changed if segmented display is blinking.
	Fan Auto: indicates fan is automatically controlled (turned on or off) by the controller. Fan status can be changed if segmented display is blinking.
	Fan Off: indicates fan is off. Fan status can be changed if segmented display is blinking. Also indicates that Password mode has been exited. Note: The user cannot set Fan operation to Off. If fan is off, the fan symbol does not appear on the room air temperature display.
	Degrees Fahrenheit
	Degrees Celsius
	Password Mode: indicates Password mode is active.
	Error: indicates an error is detected. The specific error is identified by an accompanying number (0 through 6). Refer to Table 5 for specific error message descriptions.

Room Air Temperature

The room air temperature is the default display for the TMZ. If no button is pressed for 30 seconds, the LCD defaults to the room air temperature. Various symbols appear along the right side and bottom of the display to indicate the current mode of the controller and the status of connected equipment (Figure 8). Refer to Figure 7 and Table 3 for a description of these symbols.

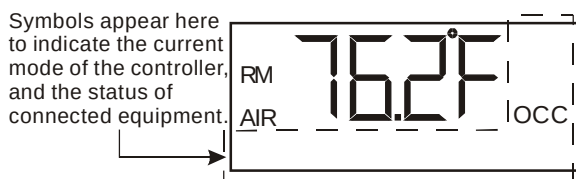


Figure 8: Room Air Temperature Display

Outdoor Air Temperature

To view the outdoor air temperature, press the Menu button once while the room air temperature is displayed. OUT AIR appears on the LCD display to indicate that the outdoor air temperature is displayed. If the controller is not configured for outdoor air, this screen does not appear.

Comfort Setpoint Temperature

In the single setpoint application, the comfort setpoint temperature is the controller common setpoint.

In the dual setpoint application, the comfort setpoint temperature is the average of the heating and cooling setpoint temperatures. Raising or lowering the comfort setpoint temperature raises or lowers the occupied heating and cooling setpoint temperatures by the same number of degrees. When the actual room temperature falls below the heating setpoint temperature, or rises above the cooling setpoint temperature, heating or cooling equipment is activated. To individually adjust the heating and cooling setpoints, refer to the *Password Mode* section of this document.

Note: Setpoint adjustments only affect the setpoints for the Occupied mode of operation.

To view or change the current comfort setpoint temperature:

1. Press the down or up arrow once while the room air temperature is displayed, or press the Menu button until the comfort setpoint temperature appears (Figure 9).



Figure 9: Comfort Setpoint Temperature Display

2. Press the down arrow to lower the comfort setpoint temperature (this will also lower heating and cooling setpoint temperatures). Press the up arrow to raise the comfort setpoint temperature (this will raise heating and cooling setpoint temperatures). The maximum comfort setpoint temperature range is 7 to 32°C (45 to 90°F). The HVAC PRO program, however, can set comfort value high limits and low limits (in the HVAC PRO program, these are called High Setpoint Limit and Low Setpoint Limit, respectively) for a TMZ thermostat. The default range is 18 to 26°C (65 to 78°F).

Note: The comfort setpoint temperature can be changed only if the segmented display is blinking. If the segmented display does not blink, refer to the *Jumper Lockout* and *Password Mode* sections of this document.

Fan Operation

The fan operation display indicates the current fan operation mode (Off, On, or Auto). If the controller is not configured for fan control, this screen does not display. To view or change the current fan operation mode:

1. Press the Menu button until the fan operation display appears (Figure 10).



Figure 10: Fan Operation Display

2. Press the arrow buttons to toggle between On and Auto. On indicates that the fan is always on. Auto indicates that the fan is automatically controlled (turned on or off) by the controller.
3. If the Auto fan speed is selected, On or Off appears on the fan operation display to show the fan status. The fan does not display Auto, but does operate in automatic mode.

Note: The fan operation mode can be changed only if the segmented display is blinking. If the segmented display does not blink, refer to the *Jumper Lockout* and *Password Mode* sections of this document. Fan operation cannot be changed when the TMZ is connected to a VAV controller.

Note: The user can override N2 overrides to the fan at the TMZ.

Temporary Occupancy

The Temporary Occupancy button toggles between the current controller mode (Standby or Unoccupied) and Temporary Occupancy mode. Temporary Occupancy mode maintains the same comfort settings as Occupied mode for a predetermined time period (0-4 hours) called the Temporary Occupancy duration. The HVAC PRO controller configuration must be set for 30 minutes or greater to enable a timed override command. If the Temporary Occupancy button is pressed again during the Temporary Occupancy duration, the controller immediately reverts to the previous mode. For information on setting the Temporary Occupancy duration, refer to the *Password Mode* section of this document.

Note: The Temporary Occupancy button does not function if the controller is in Occupied or Off (Shutdown) mode, if the Temporary Occupancy feature is not selected in the controller, or if the Temporary Occupancy duration is set to zero.

Note: Boost mode is not used with the TMZ. The LED above the Temporary Occupancy button lights immediately, and TMP OCC appears on the LCD after several seconds, when Temporary Occupancy mode is active.

Note: The Temporary Occupancy Button will not function if the jumper on the TMZ is set to the locked position or if the controller password setting is locked.

Password Mode

Password mode is a discrete mode that allows comfort setpoint temperature and fan control to be blocked from user access. The Temporary Occupancy duration, occupied heating setpoint temperature, and occupied cooling setpoint temperature are also set in Password mode. The occupied heating and cooling setpoint temperatures are displayed only with dual setpoint applications.

Note: The Password mode menu items can be changed only if the segmented display is blinking. If the segmented display does not blink, refer to the *Jumper Lockout* section of this document. If no buttons are pressed for 30 seconds, Password mode is exited automatically.

To enter Password mode and set the five Password mode menu items:

1. Press and hold the Menu and °F/°C buttons simultaneously for approximately 10 seconds until PASS appears. The comfort setpoint temperature access status appears (Figure 11).



Figure 11: Comfort Setpoint Temperature Access Status

2. Press the arrow buttons to toggle between UnLK and LOCK. UnLK allows a user to change the comfort setpoint temperature; LOCK prevents a user from changing the comfort setpoint temperature.
3. Press the Menu button once. The fan access status appears (Figure 12).



Figure 12: Fan Access Status

Note: If the controller is not configured for fan control, this screen is skipped.

Note: When the TMZ is used with the VMA1400 controller, both the comfort setpoint temperatures access status and the fan access status are reset to UnLK if the power resets, if communication with the Zone Bus is lost, or if a download occurs. When the TMZ (Firmware Rev. AO7 or later) is used with the VAV, UNT, or VMA1200 controllers and HVAC PRO Release 8.01, the fan and setpoint temperature access status are retained at the last condition (LOCK or UnLK) after a controller reset, TMZ reset, or a power failure. The fan and setpoint temperature access status are set to UnLK after a controller download.

4. Press the arrow buttons to toggle between UnLK and LOCK. UnLK allows a user to control the fan; LOCK prevents a user from controlling the fan.

- Press the Menu button once. The Temporary Occupancy duration appears (Figure 13).



Figure 13: Temporary Occupancy Duration

- Use the arrow buttons to set the time value in 1/2-hour increments up to a maximum of 4 hours. This value determines the length of time that Temporary Occupancy mode is maintained after the Temporary Occupancy button is pressed. Setting the Temporary Occupancy duration to zero prevents user access to this feature.
- Press the Menu button once. The heating setpoint temperature appears (Figure 14).

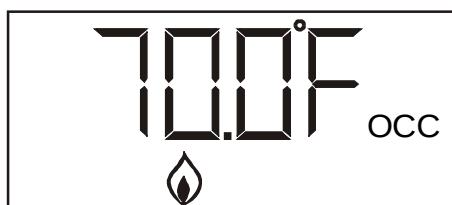


Figure 14: Heating Setpoint Temperature

Note: If the controller is configured for a single setpoint, this screen is skipped.

- Use the arrow buttons to adjust the heating setpoint temperature. The minimum heating setpoint temperature is 4.5°C (40°F). The maximum setpoint temperature is one degree less than the High Setpoint Limit (also known as comfort value high limit), which is defined with the HVAC PRO program (the HVAC PRO program allows a maximum High Setpoint Limit of 32°C [90°F]; the default limit is 24.6°C [78°F]).
- Press the Menu button once. The cooling setpoint temperature appears (Figure 15).



Figure 15: Cooling Setpoint Temperature

Note: If the controller is configured for a single setpoint, this screen is skipped.

- Press the arrow buttons to adjust the cooling setpoint temperature. The minimum cooling setpoint temperature is one degree greater than the Low Setpoint Limit (also known as comfort value low limit) defined in the HVAC PRO program (the HVAC PRO program allows a minimum Low Setpoint Limit of 7°C [45°F]; the default limit is 18°C [65°F]). The maximum cooling setpoint temperature is 35°C (95°F).
- Press the Menu button to cycle through the Password mode menu items again, or press the Menu and °F/°C buttons simultaneously to exit Password mode. OFF appears on the display while exiting Password mode.

Outdoor Air Setup

To set up the TMZ for outdoor air, do the following:

- Open the Inputs screen of the HVAC PRO program.
- To display the outdoor air temperature on the TMZ, select any unused AI and define the Long Name to Outdoor Air Temp.
- Change the Sensor Type field to match the remote sensor type.
- Select OK.
- Connect the outdoor air sensor to the AI selected for Outdoor Air Temp.

Remote Sensing

To use a remote sensor instead of using the physical TMZ sensor, do the following:

- Open the Inputs screen of the HVAC PRO program.
- Double-click AI1 Zone Temp.
- In the upper left corner of the Zone Temp screen, change AI1 to another unused AI (such as AI2). This moves Zone Temp to the selected AI.

Note: The TMZ displays any AI as Room Air Temp when the Long Name field is set as Zone Temp.

- Change the Sensor Type field to match the remote sensor type.
- Select OK.
- Connect the remote sensor to the AI selected for Zone Temp. The TMZ now displays the remote sensor value.

Power Failure

When the TMZ is used with a VMA1400 and experiences a power failure, all set values are not affected except the comfort setpoint temperature access

status and fan access status. The comfort setpoint temperature access status and fan access status always default to UnLK after a power failure. When the TMZ is used with a VAV, UNT, or VMA1200, all set values are not affected after a reset or power failure.

Jumper Lockout

The jumper on J1 of the TMZ (Figure 16) has two positions: UnLK and LOCK. If the jumper is set to UnLK (Pins 1 and 2), the User and Password mode menu items function normally.

If the jumper is set to LOCK (Pins 2 and 3), the control functions of the TMZ (including the Temporary Occupancy button) are disabled. All menu items display as usual, but none of the settings can be changed.

Note: The default jumper position from the factory is the UnLK position.

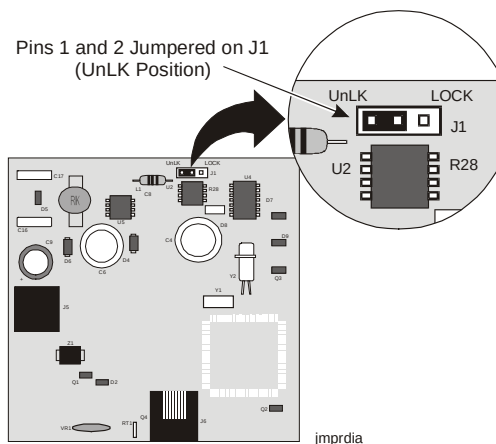


Figure 16: Jumper Block J1 on TMZ1600

Troubleshooting

Table 4: Basic Problems and Solutions

Problem	Solution
Some menu items do not display.	If the controller is not configured for certain features (such as outdoor air temperature or fan control), the corresponding menu items do not display.
Display does not default to preferred units (°F or °C).	To change the default temperature units to either degrees Fahrenheit (°F) or degrees Celsius (°C), use the HVAC PRO program to change the default units in the controller.
Temporary Occupancy button does not operate.	Verify the controller is not in Occupied or Off mode. Also verify the Temporary Occupancy feature is enabled in the controller configuration, the Temporary Occupancy duration is not set for fewer than 30 minutes, and the OCC OVRD time is not overridden by HVAC PRO. Verify the TMZ jumper setting is in the unlocked position and the controller password setting is unlocked.
The ZTU reads FAIL or does not respond when connected to the 6-pin phone jack.	Disconnect the ZTU. Press the Menu button on the TMZ so that the room air temperature is not displayed (any other display is acceptable). Reconnect the ZTU while the room air temperature is not displayed. The ZTU should function properly, but the room air temperature display remains blank until the ZTU is disconnected.
The TMZ room air temperature does not update while the ZTU is connected.	The TMZ cannot communicate on the Zone Bus while the ZTU is connected. Disconnect the ZTU.
Setpoint limits are too high or too low, or comfort value adjustment range is too large or too small, or the cooling/heating setpoint ranges are too small.	In the Define Remote AI Points section of the HVAC PRO Q&A session, select TMZ Digital Room Sensor. The default low setpoint limit is 18°C (65°F), and the default high setpoint limit is 26°C (78°F). To change these limits, select Params in the HVAC PRO program. Select TMZ Setpoint Range parameter. Double-click either High or Low Setpoint Limit. Change the Value field to the desired setting. Save the file, then download the file to the controller. Commission the configuration and verify that the High/Low setpoints are correct. Note: TMZ Firmware Revision A07 and earlier supported narrower setpoint ranges. To take full advantage of the wider setpoint ranges described in this literature, TMZ Firmware Revision A08 or later is required along with HVAC PRO Release 8.04 or later.
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Problem (Cont.)	Solution
Displayed room temperature does not appear to be correct.	Use the HVAC PRO program to verify AI1 (Zone Temp) Sensor Type is set to Resistive Nickel (R-NI). Also, verify that Zone Temp is located at AI1. If this fails to correct the problem, the connection to the TMZ may be faulty. Verify that the cable connections are correct.
Setpoints display incorrectly.	Check to see if the HVAC PRO program is overriding the Occ Htg Setpt and Occ Clg Setpt to settings that force the comfort setpoint temperature outside the range defined for the Low Setpoint Limit and High Setpoint Limit parameters. If so, release the overrides.
Standby BI is not working.	Check to make sure that Both with BI backup is not selected as the answer to the Define Standby mode question in the HVAC PRO Q&A session.
RM AIR value does not match the actual room air temperature.	Several factors may affect the accuracy of the TMZ sensor, including cable length and controller offsets. An offset to compensate can be set through the HVAC PRO program. The sensor should be stabilized to room ambient temperature prior to calibration.
Comfort Setpoint Temperature Access Status and Fan Access Status Reset to UnLK.	This reset occurs when a VMA1400 controller is connected to the TMZ1600 and any of these events occur: a power failure, a download of a controller, or a Zone Bus communication failure. This UnLK condition also occurs in a VAV, UNT, or VMA1200 after a download. To reverse this UnLK condition, enter TMZ Password mode and set the Lock condition for the comfort setpoint and fan status. If a more permanent solution is needed to restrict user access to setpoint or fan adjustments, position the jumper on J1 to lock user access to any adjustments.
Fan speed cannot be changed or unlocked.	The fan speed cannot be changed, and the fan access status defaults to LOCK when the TMZ is connected to a VAV controller.
Occupied Heating and Cooling Setpoint deadband changes to +/-5°F when low or high setpoint limits are changed in HVAC PRO Commission mode. (Dual setpoint applications only)	The TMZ comfort setpoint is not initially within the new high and low TMZ setpoint limits. This forces the TMZ to write a +/-5°F occupied cooling/heating setpoint deadband back to the controller. The TMZ comfort setpoint is then moved into the new setpoint range, and the +/-5°F deadband is based on the new TMZ comfort setpoint. To correct the problem, go to HVAC PRO configuration mode, set the desired setpoint limits and occupied cooling/heating setpoints. Save this configuration and re-download the application.

Error Messages

Table 5 describes the error messages that may appear on the LCD.

Table 5: Error Message Descriptions and Solutions (Err3 not used)

Error	Description	Solution
	Error 0: indicates that the outdoor air temperature sensor is outside the -45 to 121°C (-50 to 250°F) range, or the room air temperature sensor is outside the 0 to 50°C (32 to 122°F) range.	Check the connections to the controller. If the error persists in the RM AIR display, and the actual temperature is within the specified operating range, replace the TMZ. If the error persists in the OUT AIR display, disconnect the outdoor air temperature sensor and measure resistance. If the resistance is incorrect, replace the outdoor sensor. (Refer to the appropriate literature for the outdoor sensor when determining the appropriate resistance at a measured temperature.) If resistance is correct, reconnect the sensor. If error persists, replace the controller.
	Error 1: indicates a RAM error has been detected.	Power down the TMZ, then power up again. If the error persists, replace the TMZ.
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Error (Cont.)	Description	Solution
Err2	Error 2: indicates that the value displayed on the LCD is being overridden by a device from the N2 Bus and cannot be changed.	If the value needs to be changed, cancel N2 overrides through the HVAC PRO program. Error 2 does not apply to fan overrides.
Err4	Error 4: indicates that the TMZ detects an incompatible HVAC PRO revision, or that the TMZ is connected to an AHU.	Obtain the correct Revision (Release 8.01 or later). The TMZ does not work with an AHU.
Err5	Error 5: indicates that the TMZ detects an incompatible VAV or UNT.	Purchase a new UNT or VAV with firmware Revision D or later.
Err6	Error 6: indicates that the controller has not responded to a request from the TMZ to update the LCD with current information.	The TMZ automatically resets itself to correct this error. If the error persists, check the phone jack cable connection and ensure the LED on the controller is blinking to indicate communication is in progress. Error 6 may also occur under normal conditions when a new configuration is downloaded through the HVAC PRO software. During a power up it may take several minutes to display the RM AIR screen on the TMZ display following an Err 6 message due to the Zone Bus communication speed between the controller and the TMZ. Err 6 may also appear while a ZTU is plugged into the TMZ. The controls on the TMZ cannot be used until the ZTU is disconnected. Err 6 may also appear if the VMA firmware has not been updated to Version C00.

Note: Errors 4, 5, and 6 only display for approximately 5 seconds, then the full range of LCD symbols display for 15 to 30 seconds; these displays continue alternating until the error is cleared.

Accessories

Table 6 lists the part numbers for TMZ replacement parts and accessories.

Table 6: Replacement Parts and Accessories

Product Code Number	Description
ACC-DWCLIP-0	Drywall Clip Mounting Kit (10/bag)
ACC-INSL-0*	Room Sensor Wallbox Mounting Pad (10/bag)
ACC-INSL-1*	Room Sensor Surface Mounting Pad (10/bag)
TE-6400-603	Endcaps (10/bag)
CBL-STAT25-SW/WC**	Preconfigured 8-pin cable, 7.62 m (25 ft)
CBL-STAT50-SW/WC**	Preconfigured 8-pin cable, 15.24 m (50 ft)
CBL-STAT75-SW/WC**	Preconfigured 8-pin cable, 22.86 m (75 ft)
CBL-STAT100-SW/WC**	Preconfigured 8-pin cable, 30.48 m (100 ft)
CBL-24/8NAT-SW/WC**	304.8 m (1000 ft) roll of Plenum rated cable
S100710	RJ45 modular plugs
S104012	Premium/economy crimp tool
S104020	Twisted pair easy strip

* These foam pads make installation easier when mounting a sensor on an uneven surface, and can block wall drafts.

** These parts are available from Southwest Wire (SW) or Windy City Wire (WC). Use the appropriate SW or WC suffix to order these parts through the Johnson Controls Preferred Supplier Program.

Technical Data

Product	AP-TMZ1600-0 Room Sensor with LCD Display (TMZ1600)	
Operating Environment	0 to 50°C (32° to 122°F) 10 to 90% non-condensing humidity	
Storage Environment	-40° to 60°C (-40 to 140°F) 10 to 90% non-condensing humidity	
Input (Supply) Voltage	12 to 30 VAC or 12 to 40 VDC	
Input Current Required	10 mA maximum	
Housing Material	ABS + polycarbonate, self-extinguishing UL 94-V0	
Housing Protection	IP 30 (IEC 529)	
Dimensions	80 x 80 x 32 mm (3.15 x 3.15 x 1.26 in.)	
Weight	0.15 kg (5.3 oz)	
Override Button	Momentary contact	
Mode Indicator	Red LED	
Temperature Sensor	Sensor Type:	Nickel PTC
	Range:	0 to 50°C (32 to 122°F)
	Reference Resistance:	1000 ohm at 21.1°C (70°F)
	Accuracy:	+/-0.2°C (0.3°F) at 21.1°C (70°F)
		+/-0.6°C (1°F) at 0°C to 50°C (32 to 122°F)
Software	HVAC PRO Release 8.01 or later (part of M-Tool Release 1.0 [MW-MTOOL-0]) Note: HVAC PRO Releases 8.01 through 8.03 limit the comfort setpoint range to 18-29°C (65-85°F). HVAC PRO Release 8.04 and later allows a maximum comfort setpoint range of 7-32°C (45-90°F).	
Phone Jack Cable	Cable with phone jack connectors on each end, 30 m (100 ft) maximum length	
Interface	AS-CBLPRO-1 or later, Zone Terminal Unit (ZTU)	
Tools	Stat Adjustment Tool, Part No. T-4000-119 (optional)	
Agency Compliance	UL Listed, File E107041, CCN PAZX, UL916 cUL Listed, File E107041, CCN PAZX7, CSA C22.2 No. 205-M1983 CE Compliant to EMC Directive, EN50081-1 and EN50082-1 FCC Compliant to CFR47, Part 15, Class A FCC Compliant to CFR47, Part 15, Class B (not applied for) Canadian ICES-003 Compliant RCM Compliant	

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- 1 this device may not cause harmful interference, and
- 2 this device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the users will be required to correct the interference at their own expense.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

The TMZ1600 also meets FCC Part 15, Class B, though it has not been submitted for FCC certification at those levels.

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.

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