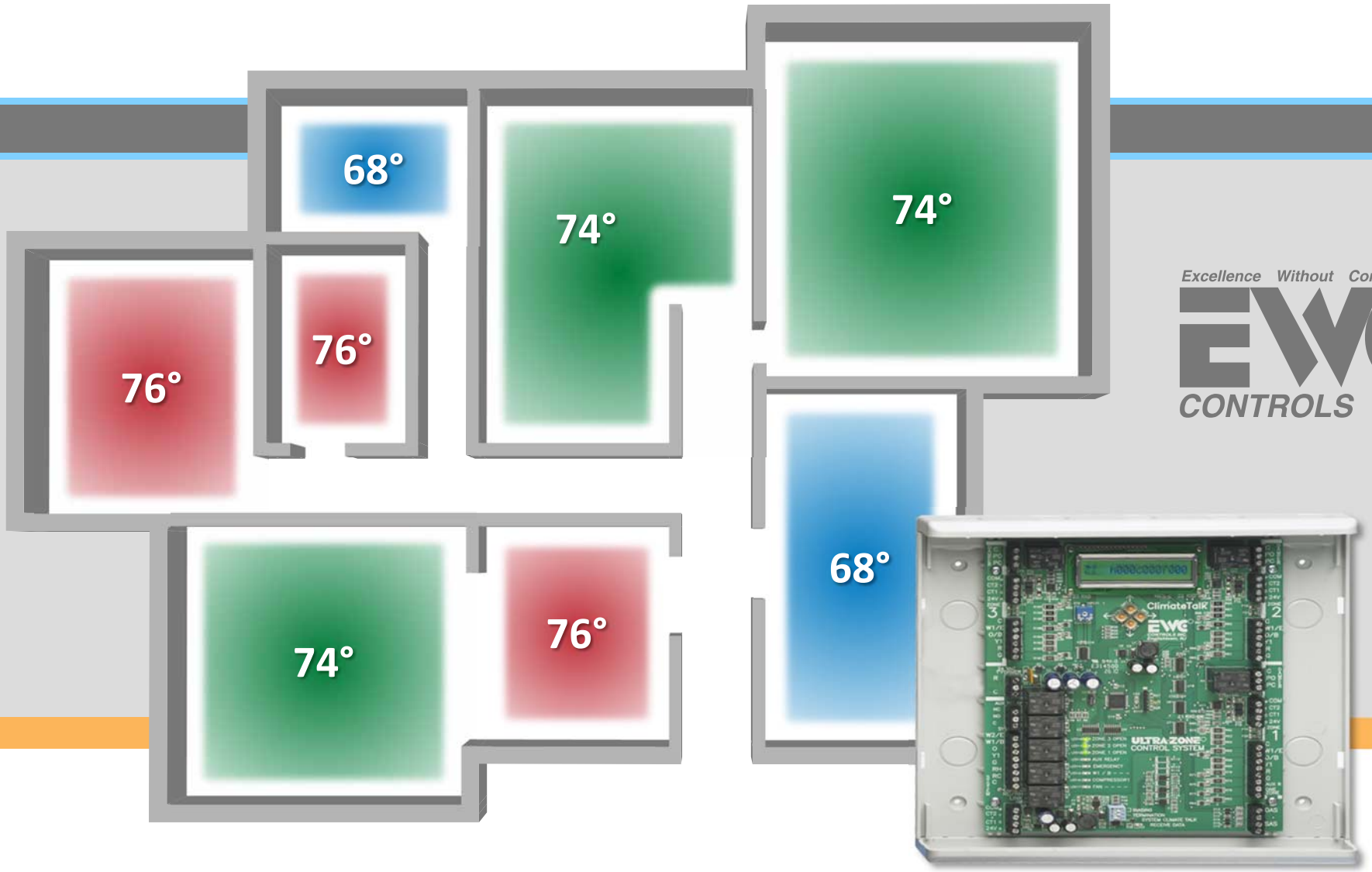
UT-3000 Zoning Control



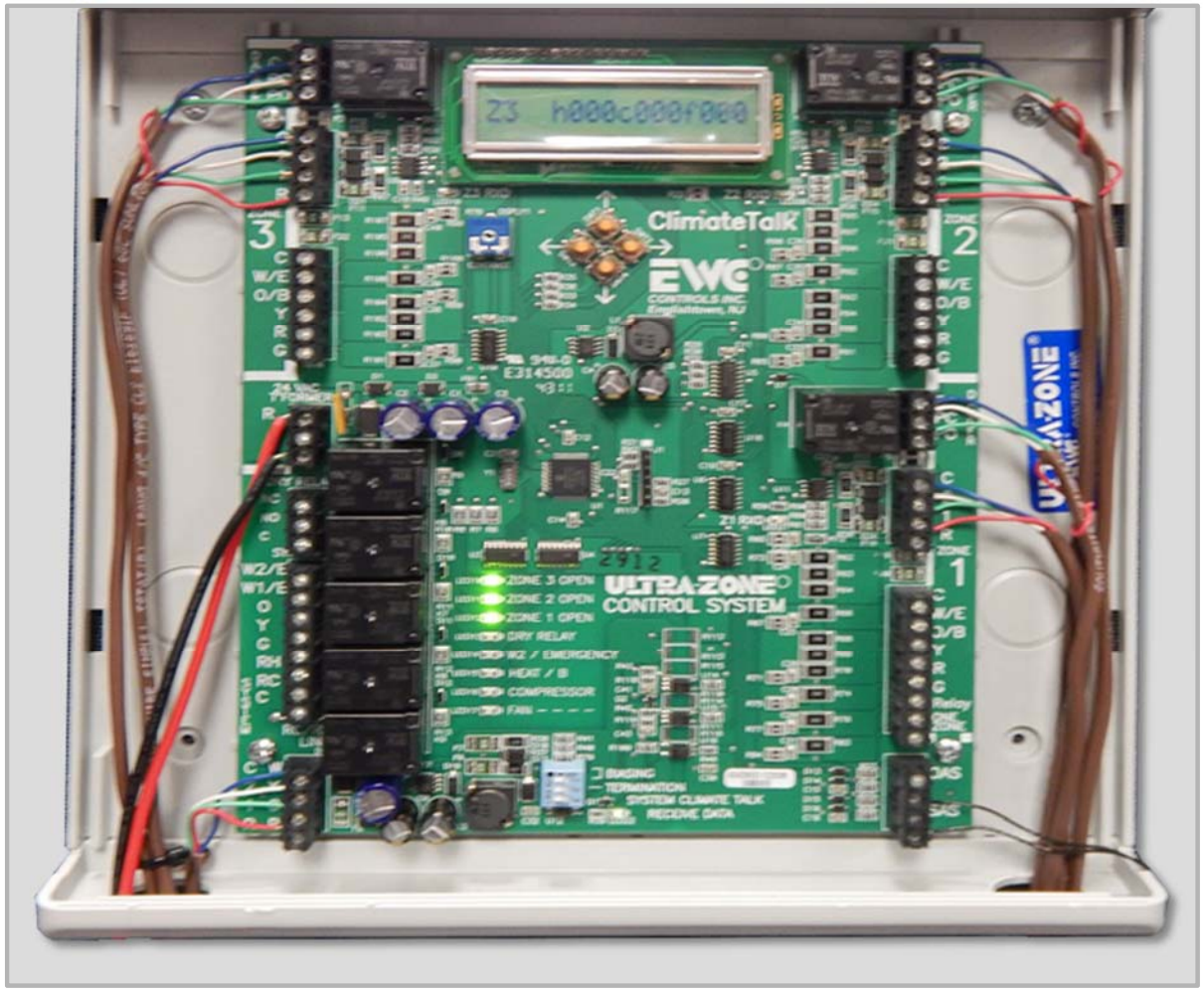
Excellence Without Compromise

EWC® CONTROLS INC.

Agenda

- **Zone Control Features**
- Installation
- Programming and Set-up
- LCD Screens
- Troubleshooting and Bias Data Voltages

Zone Control Features



- Provides intelligent control of communication or 24V legacy HVAC systems.
- Up to five zones using 24V motorized dampers.
- 100% plug and play when connected to communicating HVAC system and network thermostats.
- Modulating and staged operation, auto equipment recognition, and dual fuel functions.
- Precise control of supply air target and limit set points.

Zone Control Features

Climate Talk

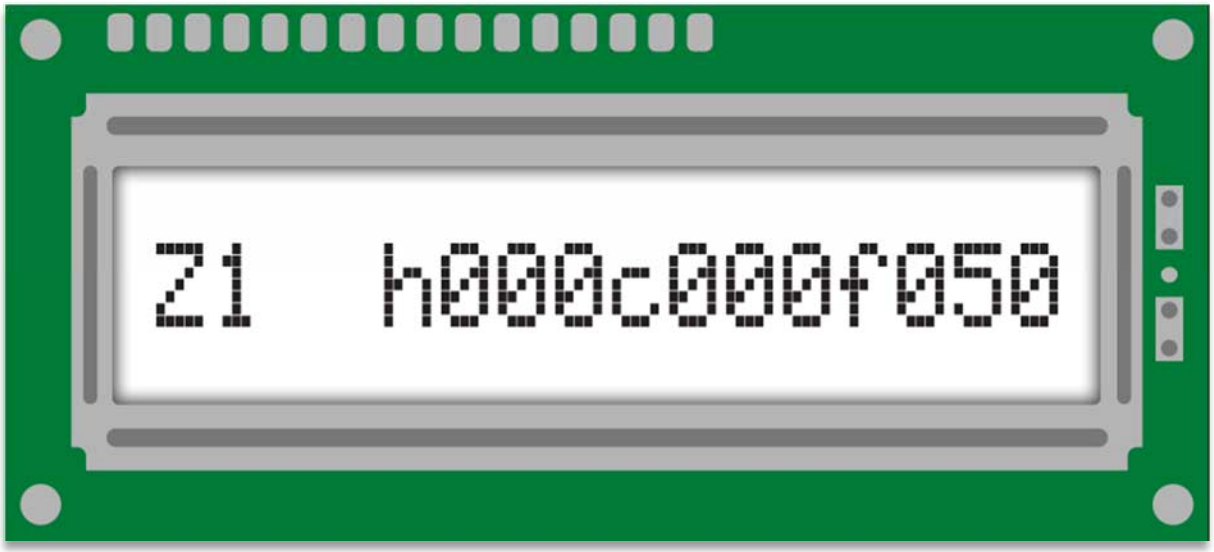
- Controls 2- 3 zones with 24Vac power open/ close or spring assisted motorized dampers.
- Can be expanded to five (5) zones by **twinning** two (2) UT 3000 controls together. (refer to EWC TB-241 for instructions on twinning)
- Controls any communicating HVAC system based on Climate Talk open protocol, or any:
  - 24V 2 heat/ 1 cool gas/ electric system.
  - 24v 2 heat/ 1 cool conventional or dual fuel heat pump.

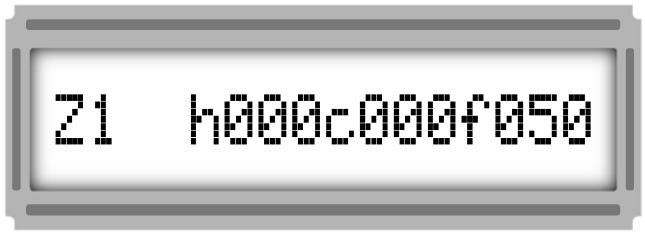
ClimateTalk™ ALLIANCE

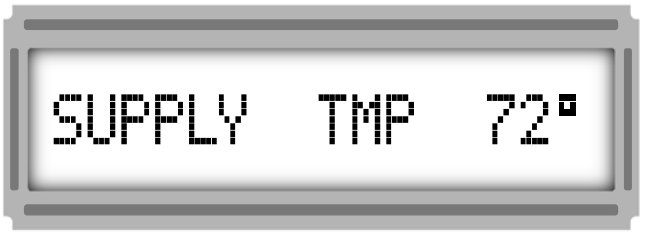
Zone Control Features

Liquid Crystal Display

The liquid crystal display rotates to show each zones demand.







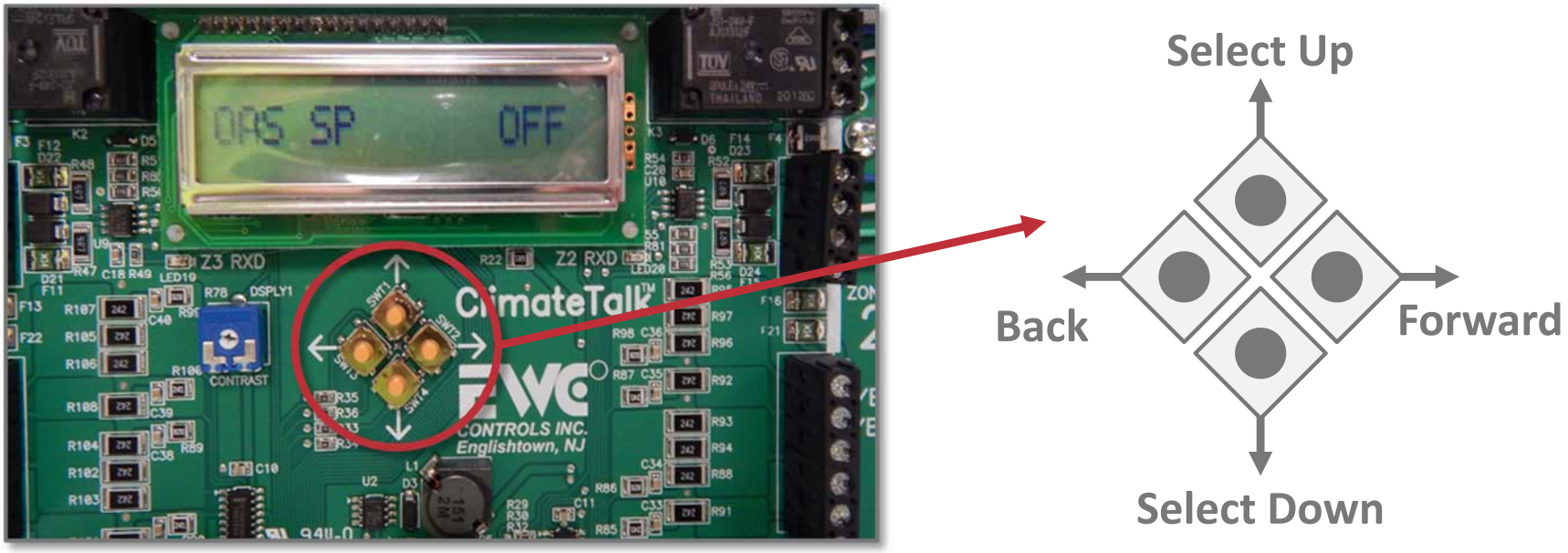
The display will show the **thermostat demand input**, and the **HVAC system output**.

The outside and supply air temperatures are also displayed.

Zone Control Features

4 Button LCD Programming

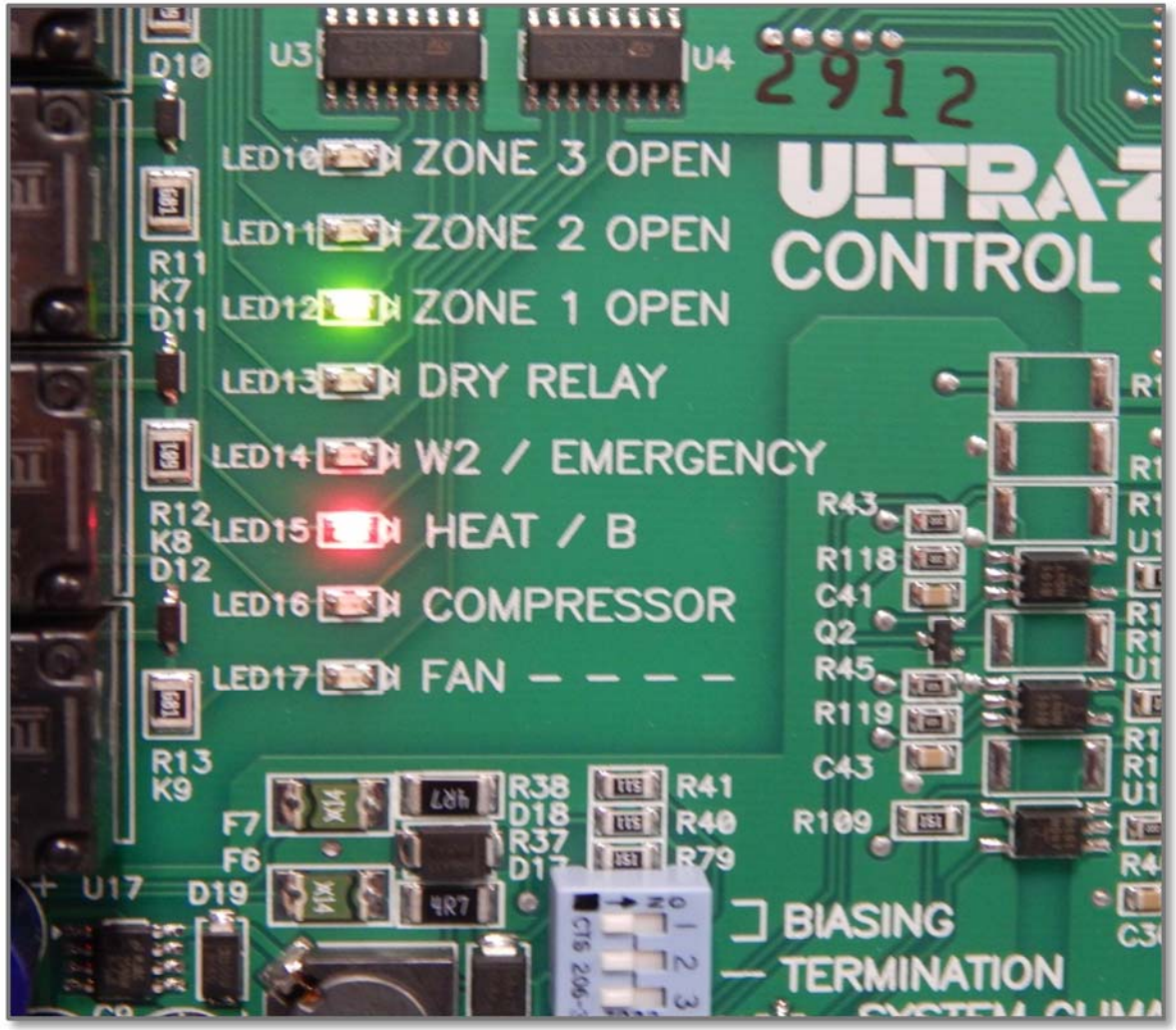
- Four buttons are provided just below the LCD screen.
- The buttons are used to scroll through the menu on the LCD and make your selections.
- Also, used to program the UT-3000 and select the features you like.



Zone Control Features

System LED's and Damper LED's

- System LED's provide visual indication of the HVAC system status and current mode of operation.
- A total of three (3) green **damper** LED's labeled **zone 1** through **zone 3,** indicate which dampers are energized to open.
- **Zone 1**= LED 12, **Zone 2**= LED 11, and **Zone 3**= LED 10.



Zone Control Features

Communicating LED's

- A total of four (4) green pulsing LED's are provided to indicate if a communication link has been established between each communicating t-stat, and the communicating HVAC system.
- A series of **rapid** and **random** pulses indicate a successful **comm-link** and data transmission.
  (LED's 19, 20, 21, and 22)

Zone Control Features

Fault Free Programming & Intuitive Temperature Control

- The UT-3000 comes pre-programmed with default operating parameters for zoned HVAC systems.
- The default program settings free the technician from programming, and allows fine tuning of the system to optimize its performance.
- The UT-3000 operates in staged and modulating mode at all times.
- Minimizes blower speed, maximizes temperature control, and improves system performance.

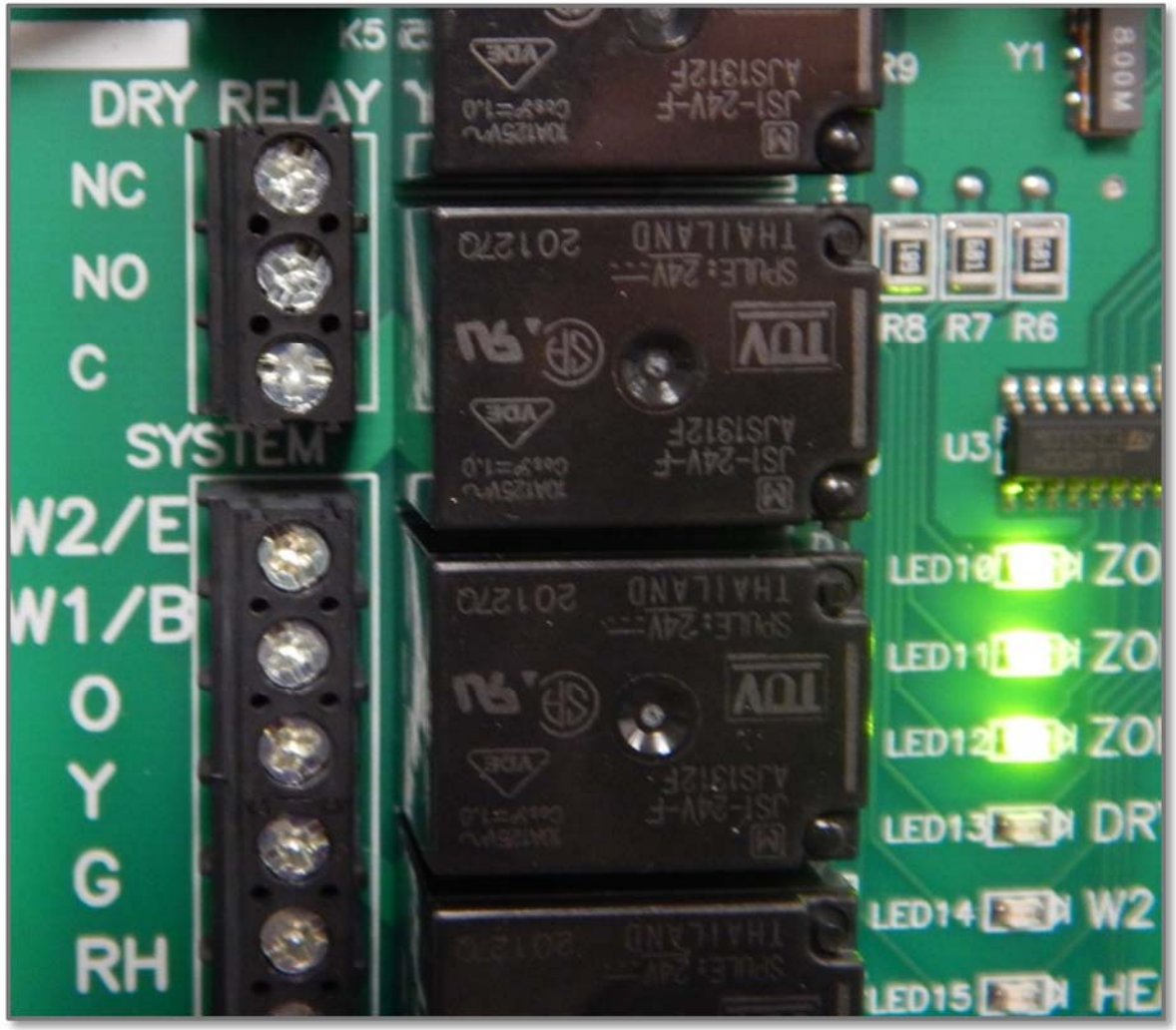
Table 1. From EWC Controls Technical Bulletin: TB-241

Feature	Default	Range to Select
System Type	Heat/Cool	Heat Pump or Heat/Cool
HP Type	NON Dual Fuel	Dual Fuel or Non-Dual Fuel
T-Stat Type	Heat/Cool	Heat Pump or Heat/Cool
Rev Valve	RV 'O'	'O' Type RV or 'B' Type RV
Fan Mode	Gas	GAS or HYDRO (Electric)
OAS SP	15°	OFF or 7° to 42°F
O.T. Offset	15°	5° to 20°F
U.T. Offset	8°	5° to 10°F
SAS HP TGT	100°	90° to 120°F
SAS Gas TGT	130°	120° to 170°F
SAS Cool TGT	50°	42° to 60°F
SAS RSP DLY	30s	10s – 180s
W2 Threshold	80%	65-100% (Adj. in 5 point increments)
PURGE FAN	25%	25-100% (Adj. in 25 point increments)
Legacy DMD	50%	25%, 50%, 75%, or 100%
Total Zones	3	2 or 3 zones
Limit SAS PID	N	Yes or No

Zone Control Features

Ancillary IAQ Dry Relay Provided

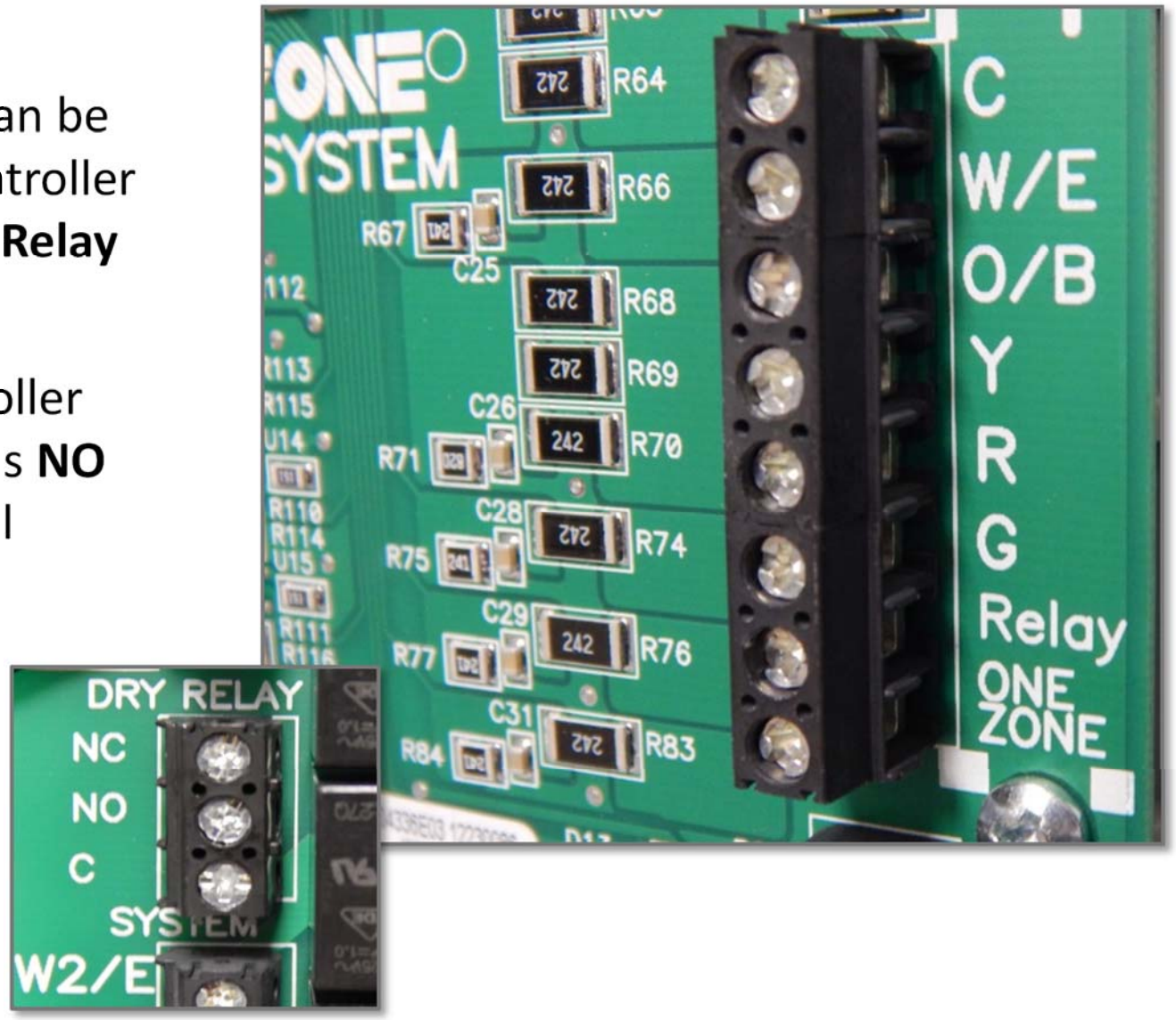
- The UT-3000 control board includes a SPDT indoor air quality (IAQ) **dry relay**.
- This relay has a digital or 24v input trigger that can be used to interlock and control ancillary devices.
  - Fresh air damper
  - Whole house humidifier
  - Whole house dehumidifier (via the ComfortNet system)
  - Energy recovery ventilator



Zone Control Features

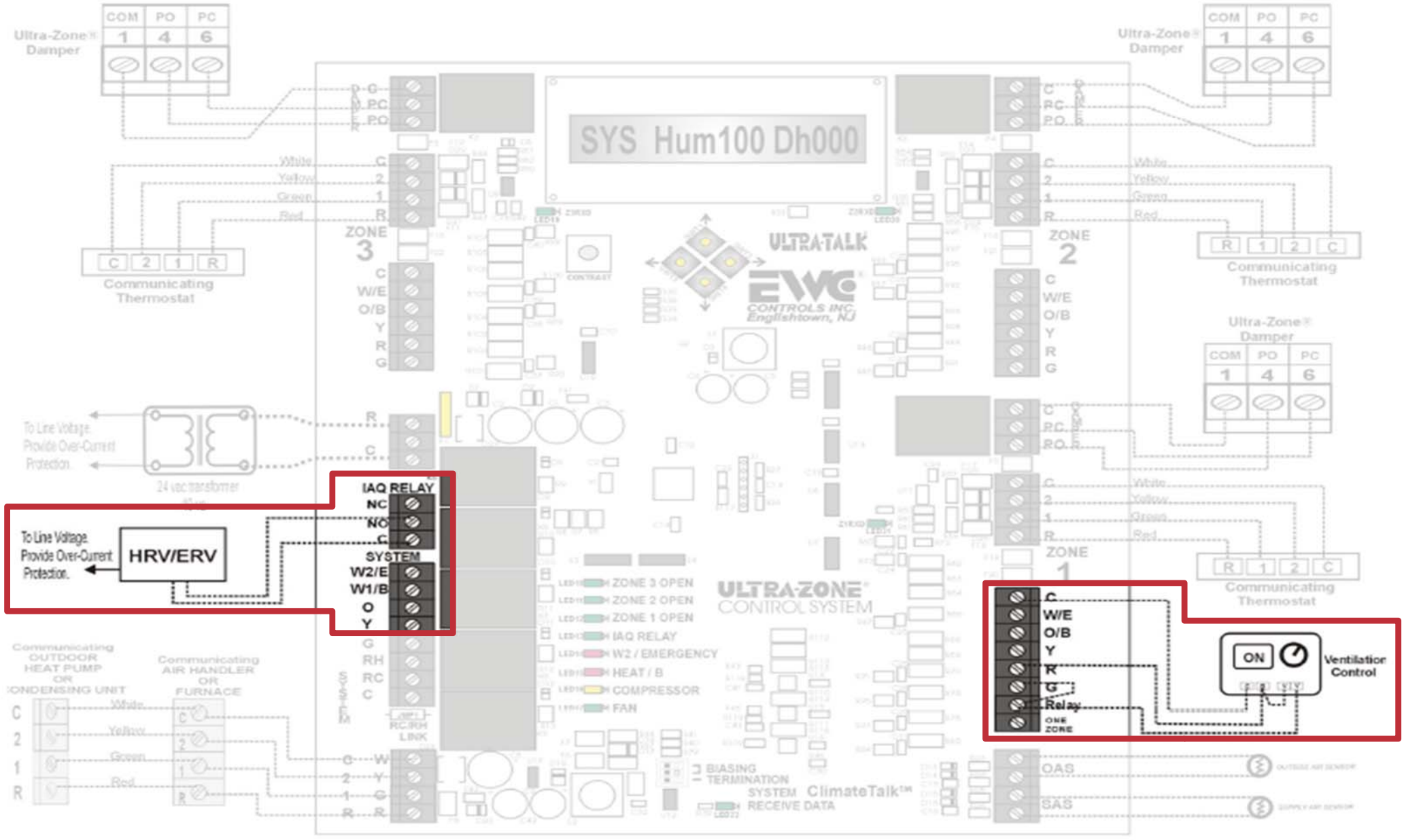
Ancillary IAQ Dry Relay Operation

- The dry relay operation can be utilized via a auxiliary controller attached to the **R, C,** and **Relay** terminals in **zone 1.**
- When the auxiliary controller initiates the call, terminals **NO** and **C** on the dry relay will close.
- This connection will bring on your ancillary IAQ device.



Zone Control Features

Ancillary IAQ Dry Relay Locations on UT-3000



Zone Control Features

Configurations and Types of Thermostats Used

UT- 3000	+	Communicating T-Stats in all zones
UT- 3000	+	(1) Communicating T-stat, (2) 24v T-Stats
UT-3000	+	24v T-stats in all zones

Agenda

- Zone Control Features
- Installation
- Programming and Set-up
- LCD Screens
- Troubleshooting and Bias Data Voltages

Installation

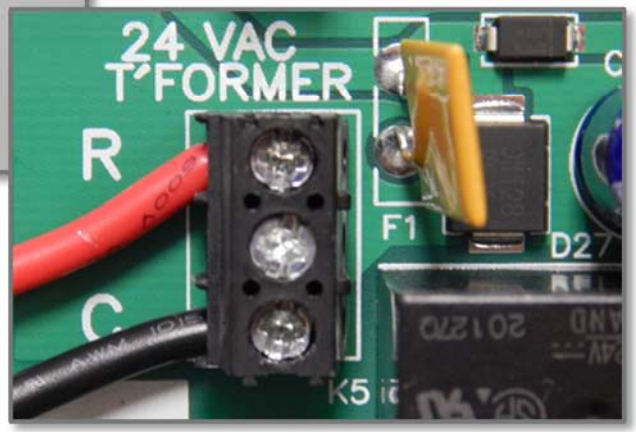
Mounting Control Board

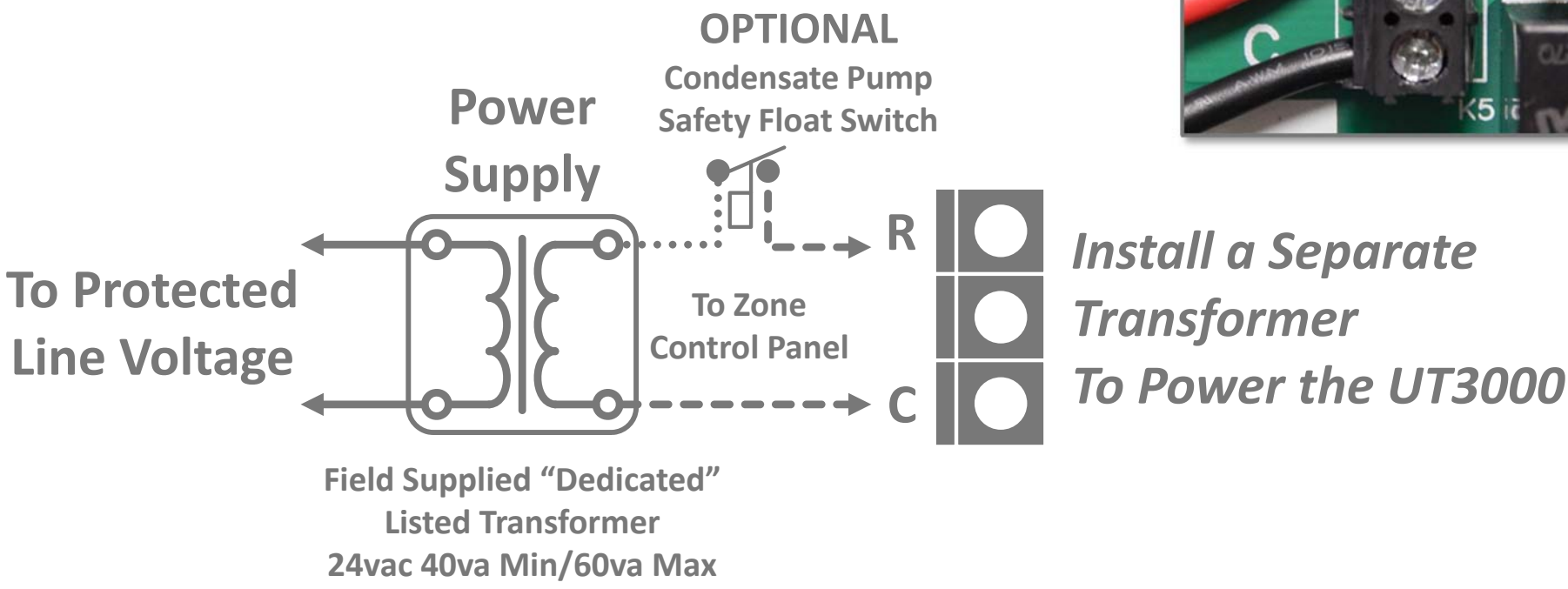
- Choose a suitable location to mount the UT-3000 housing.
- **Preferred** locations would be a return duct, nearby wall, or convenient studs where plywood can be installed to support the housing.
- **AVOID**: Supply duct, air handler, furnace housing, evaporator housing, or hot water coils of any type.
- **Follow national and/ or local electrical codes.**

Installation

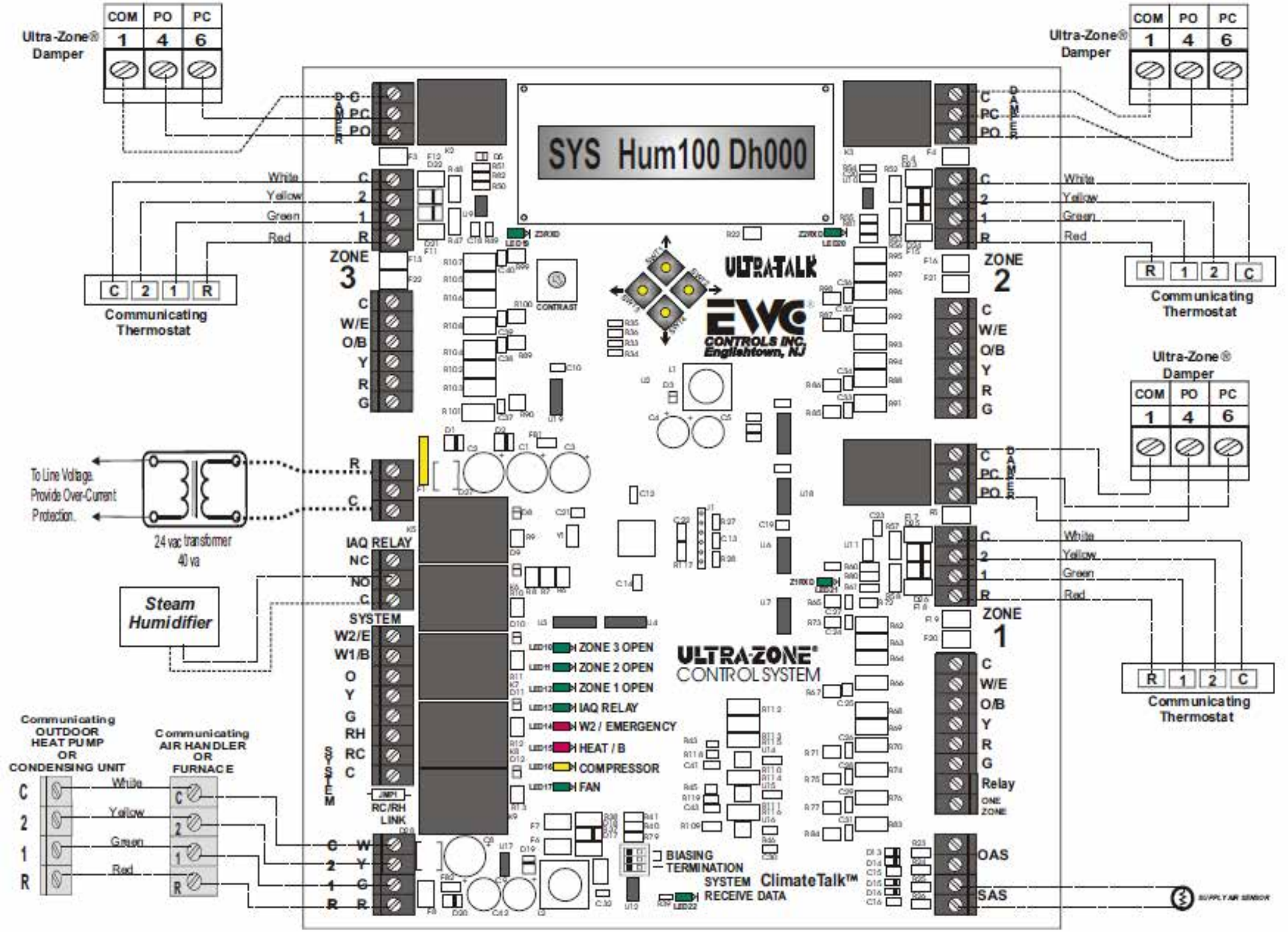
Power and Wiring

- EWC always recommends to install a separate transformer to power the UT-3000.
- **Follow NEC and/ or local electrical codes.**





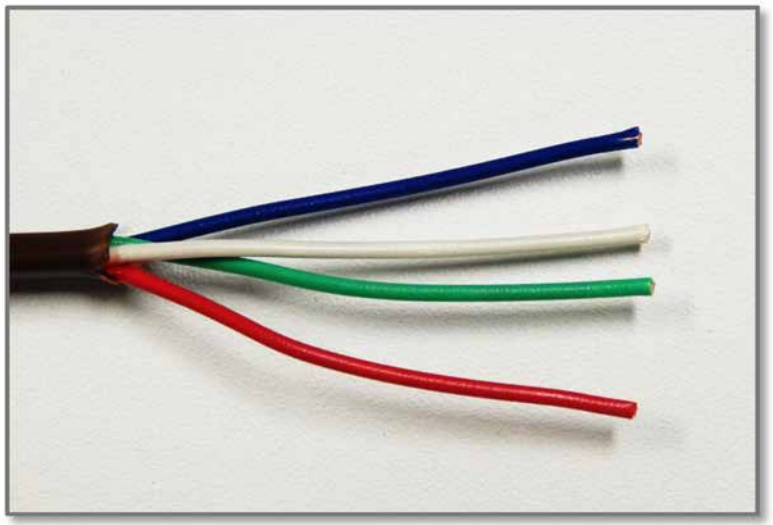
Install a Separate Transformer To Power the UT3000

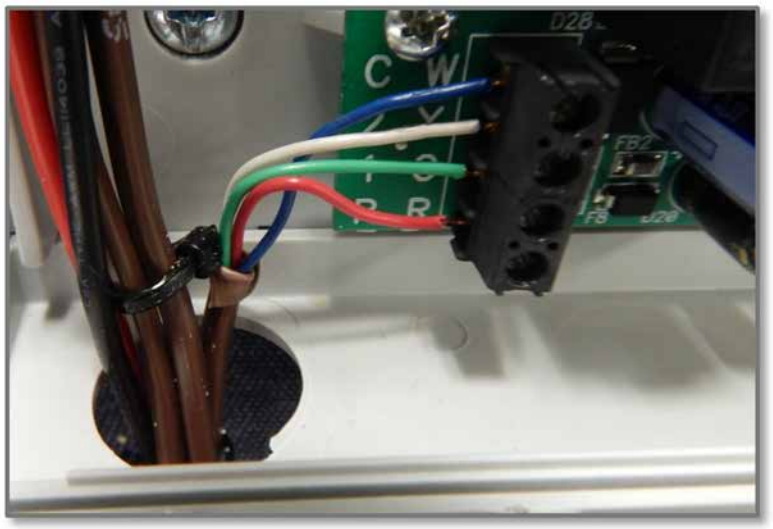

Ultra-Zone® Damper
COM
PO
PC
1
4
6
SYS Hum100 Dh000
ULTRA-TALK
EWC CONTROLS INC. Englishtown, NJ
ZONE 3
ZONE 2
ZONE 1
C
W/E
O/B
Y
R
G
White
Yellow
Green
Red
2
1
Communicating Thermostat
CONTRAST
To Line Voltage. Provide Over-Current Protection.
24 vac transformer 40 va
Steam Humidifier
IAQ RELAY
NC
NO
SYSTEM
W2/E
W1/B
O
Y
G
RH
RC
JMP1
RC/RH LINK
ZONE 3 OPEN
ZONE 2 OPEN
ZONE 1 OPEN
IAQ RELAY
W2 / EMERGENCY
HEAT / B
COMPRESSOR
FAN
ULTRA-ZONE® CONTROL SYSTEM
BIASING TERMINATION
SYSTEM RECEIVE DATA
ClimateTalk™
Communicating OUTDOOR HEAT PUMP OR CONDENSING UNIT
Communicating AIR HANDLER OR FURNACE
Relay
ONE ZONE
OAS
SAS
SUPPLY AIR SENSOR

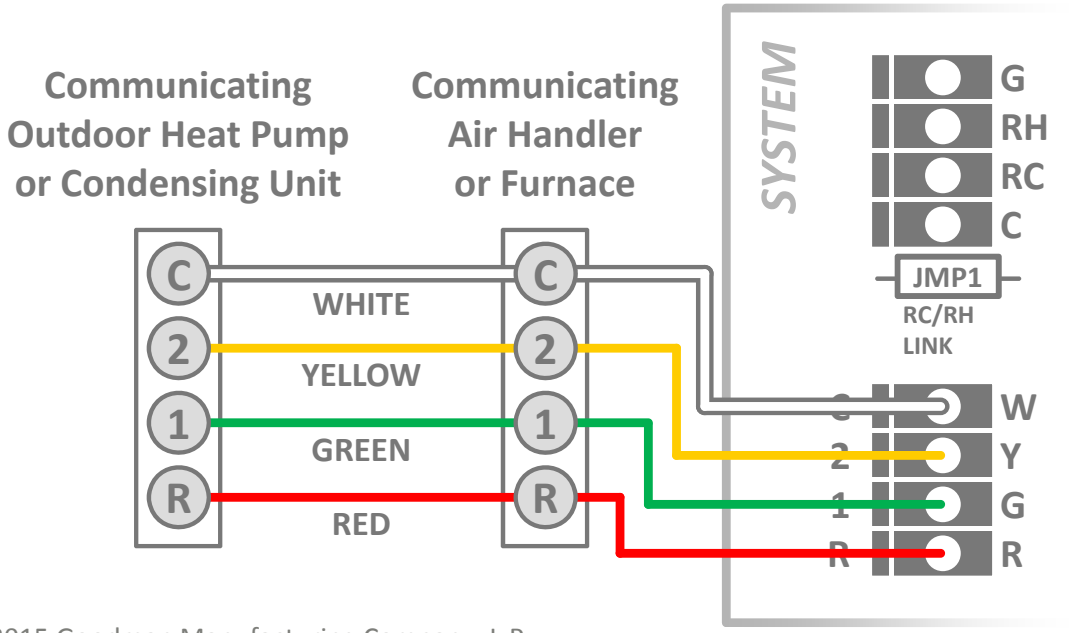
Installation

Power and Wiring

- When possible, try to adhere to the Climate Talk color code. (red, green, yellow, white)
- However, if you use standard 18/4 wiring, it might have slightly different colors.
- Choose your color codes, and stick with that same code throughout installation.



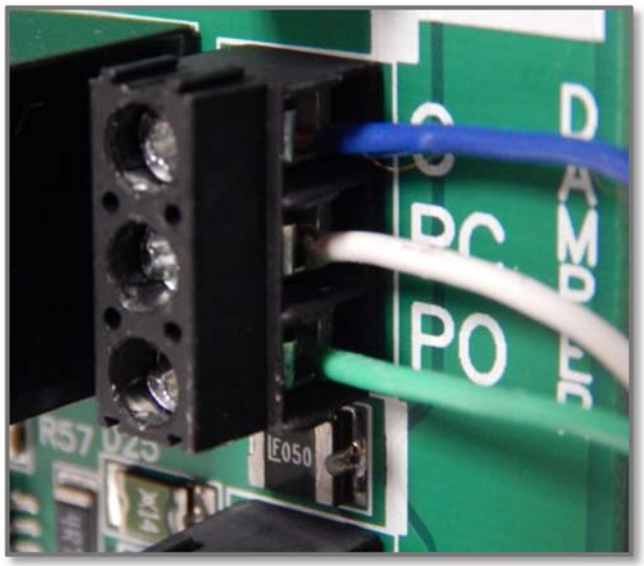


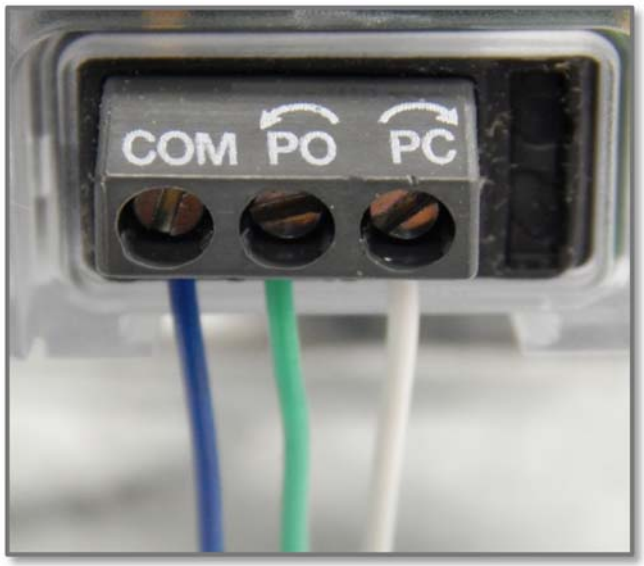


Installation

Wiring Dampers to Board- Terminal Block Designation & Function

- Standard 24vac damper control. (2 or 3 wire)
  - Terminal **PC**- 24vac power to **close** the damper.
  - Terminal **PO**- 24vac power to **open** a damper.
  - Terminal **C**- 24vac common. (neutral)

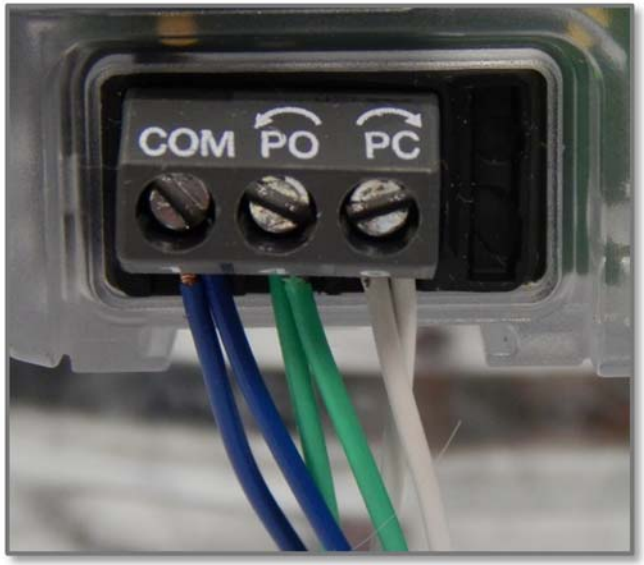


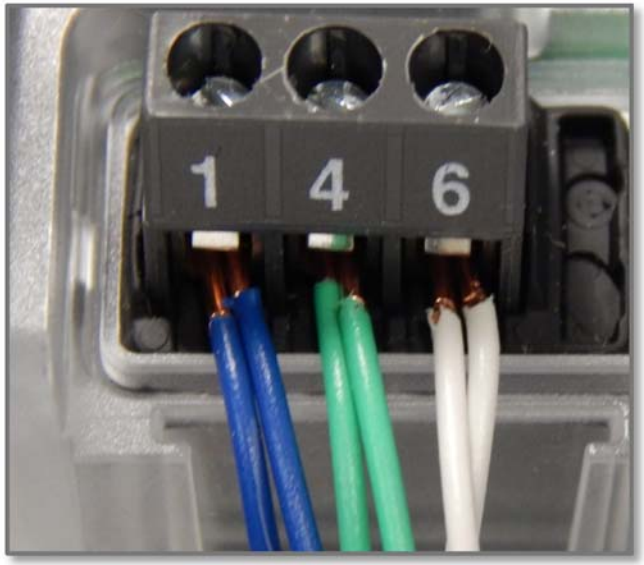


Installation

Wiring Multiple Dampers Into One Damper Terminal on the UT-3000

- You can connect up to **eighteen** (18) genuine ND, URD, or SID dampers to a single terminal block before relay isolation is required.
- You can **only** connect **one** (1) RSD or competitor's **spring** type damper to a **single** terminal block.
- **Three** sets of damper wires can terminate (piggyback) into **one** damper terminal. (two shown here)

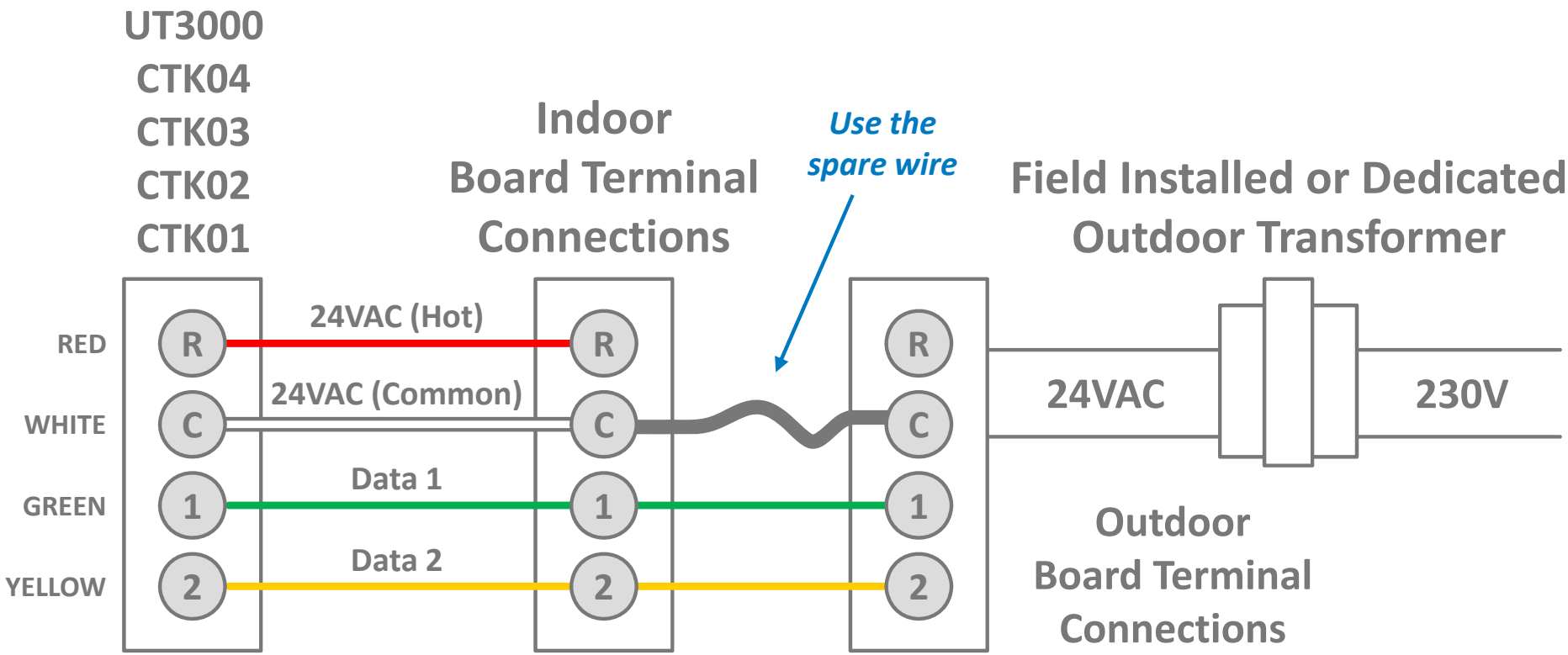




Installation

Thermostat Wire Between All Units

When the outdoor unit has a transformer and there are 3 wires available, use the 3rd (spare) wire to connect the two 24v commons together. That will ensure both 24v commons are at the same ground potential



Agenda

- Zone Control Features
- Installation
- **Programming and Set-up**
- LCD Screens
- Troubleshooting and Bias Data Voltages

Zone Control Set-up

Program- Communication HVAC System

- When connected to a fully **communicating** HVAC system, programming is **not** required. (plug and play)
- The UT3000 will **automatically** configure the entire system and start running as soon as thermostat demands are detected.
- Allow at least 2-4 minutes for all thermostats and the HVAC system to fully configure on the network.

Zone Control Set-up

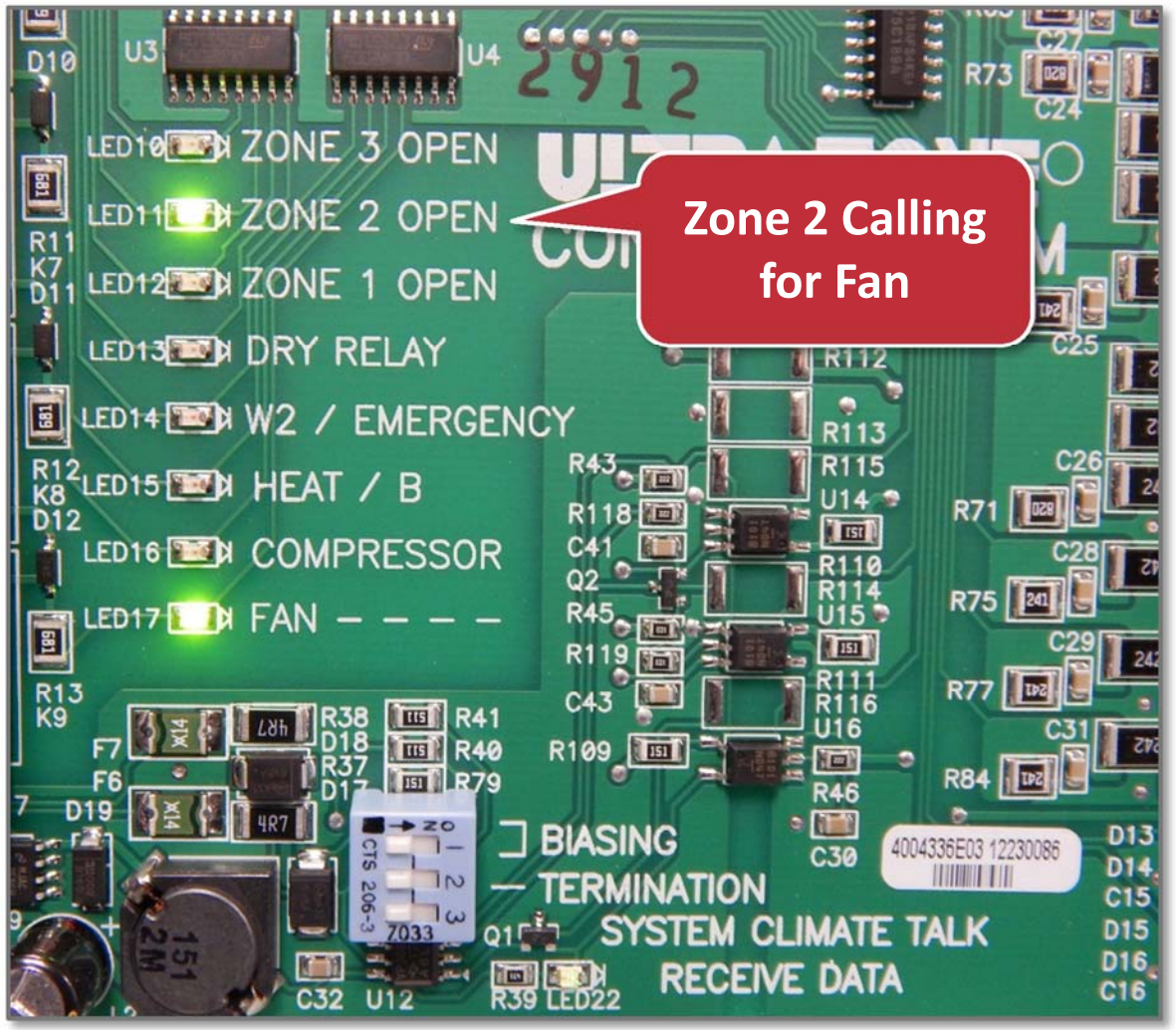
Program- Conventional HVAC System (Pg. 3 in EWC TB-241)

- When connected to a **conventional** 24v HVAC system, you simply scroll thru the LCD menu and select the type of HVAC system you have.
- Then select the type of thermostats you would like to use.
- The Default Supply air temperature targets and offset limits will be used, or you can adjust your own settings.

Zone Control Set-up

Finish- Observe Zone System in Operation

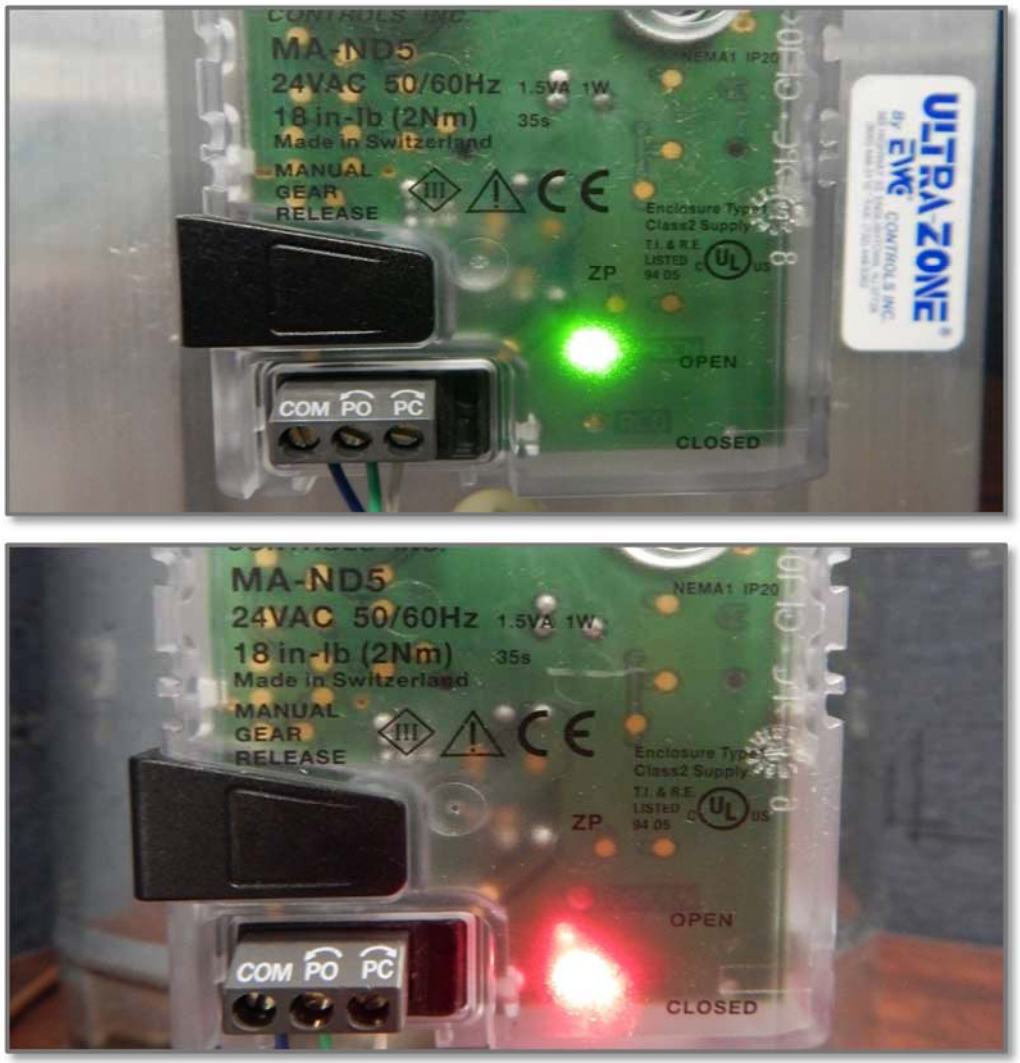
- When the Installation is complete, run the system thru it's paces and **observe** the operation of the HVAC system in **all** possible modes of operation.
- Check the zone dampers for proper operation.
- **Example**: Zone 2 is calling for fan, and the remaining zones are idle.



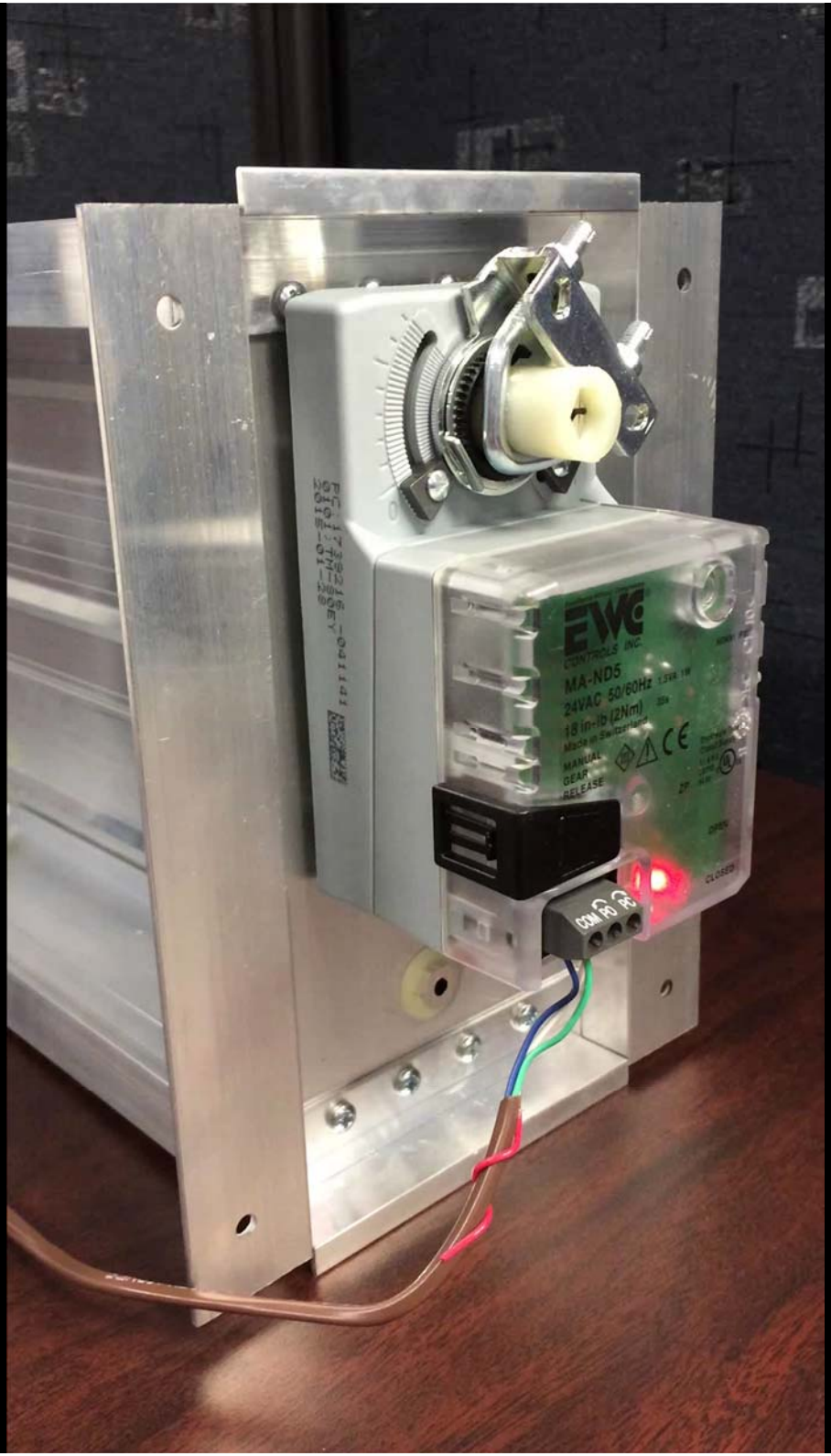
Zone Control Set-up

Finish- Default Operation of Dampers

- All dampers will be **open** when the HVAC system is idle, and **no** zones are calling.
- When a zone calls, the dampers for that zone will remain open and will have a **green** **light** illuminated on those damper motors.
- The remaining zone dampers (that aren't calling) will start to close, and a **red** **light** will illuminate when they are fully **closed**.



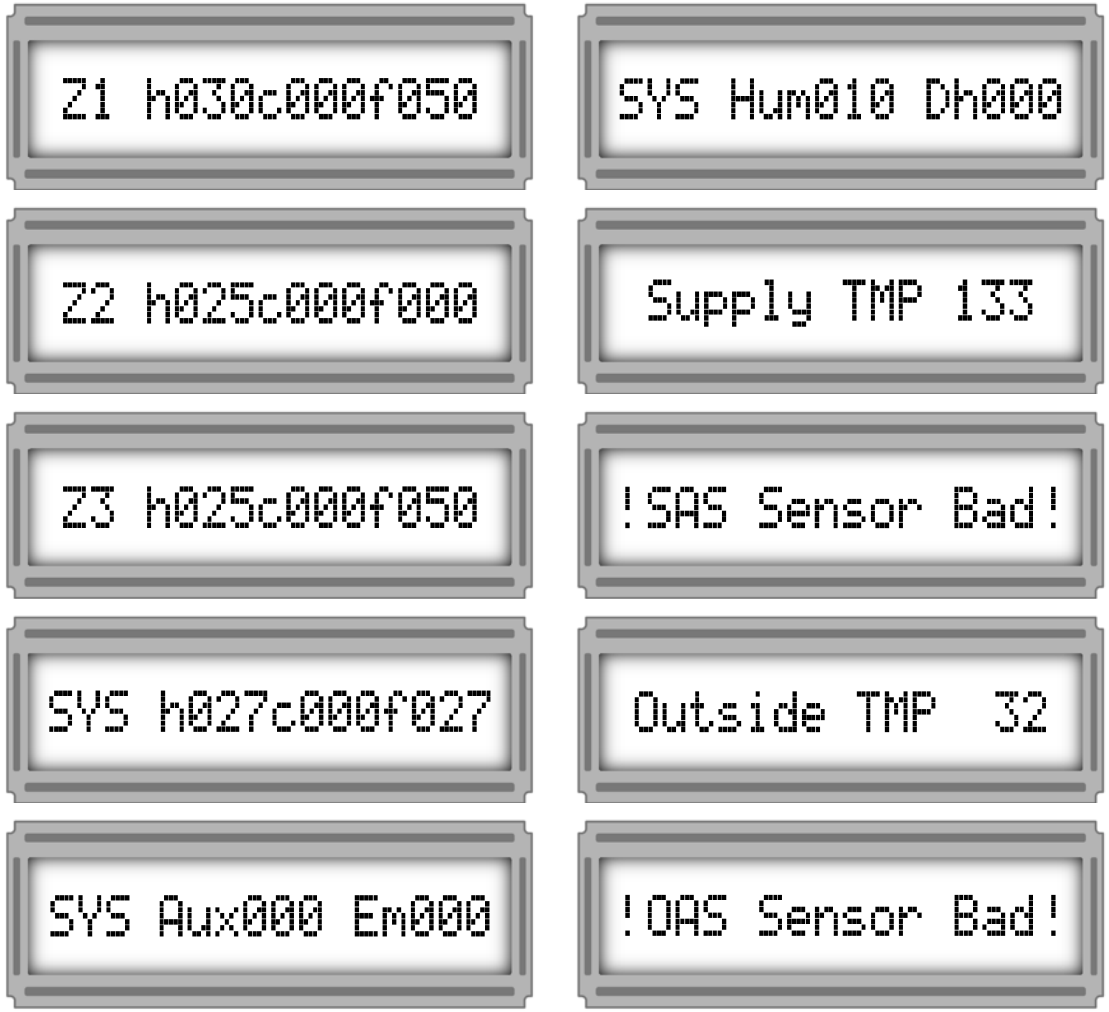
5/8
MA-ND5
24VAC 50/60Hz
18 in-lb (2Nm)
MANUAL
GEAR
RELEASE
COM
PO
PC
OPEN
CLOSED


EWC
CONTROLS INC.
MA-ND5
24VAC 50/60Hz
18 in-lb (2Nm)
MANUAL
GEAR
RELEASE
COM
CLOSED

Zone Control Set-up

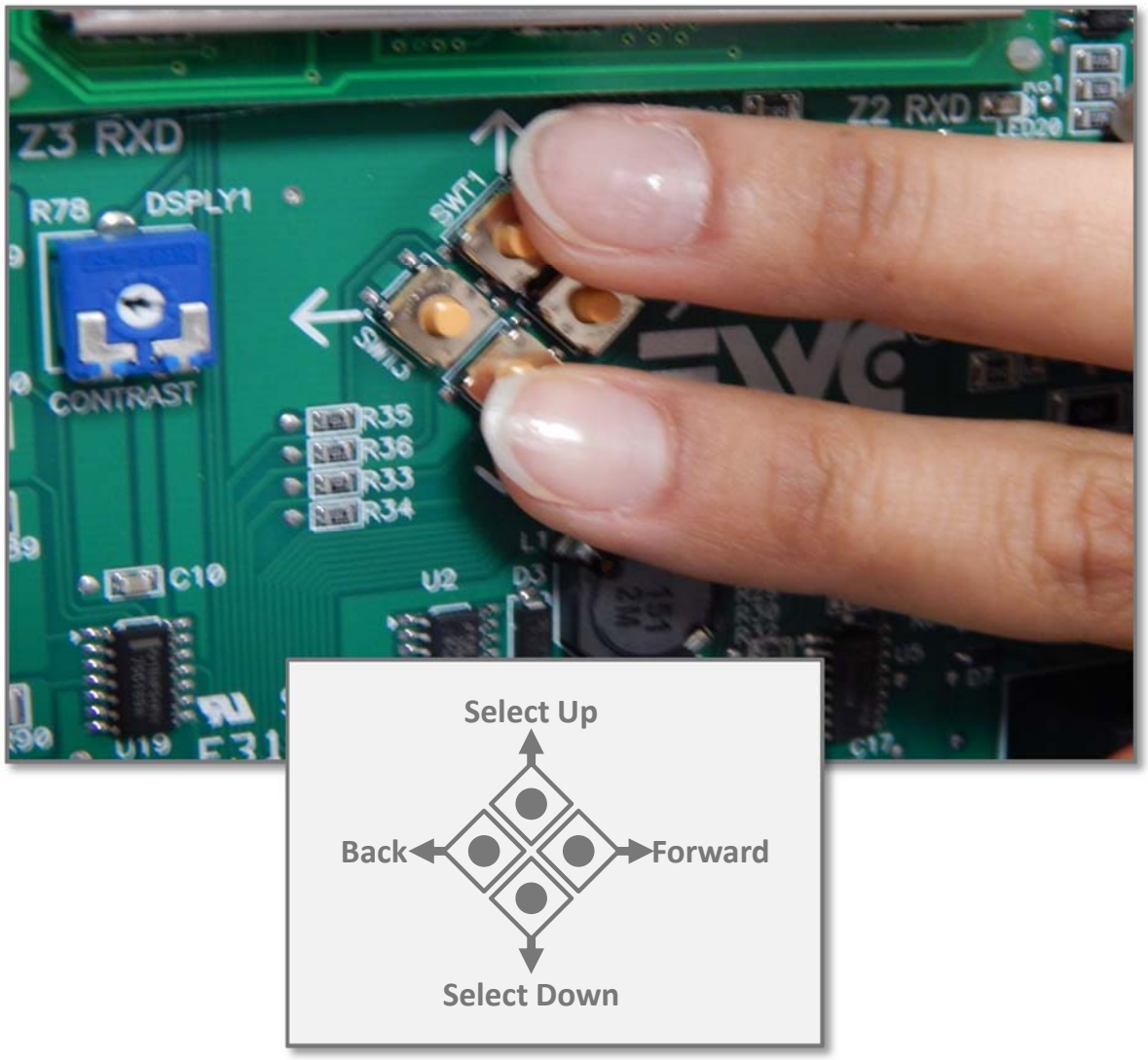
Programming Options

- Once you are up and running, you can still program certain functions.
- Your program changes take effect in real time, and will remain even after a power failure.
- Refer to **EWC TB-241** for all programming options and instructions.



Zone Control Set-up

Programming Options



- Use the **forward** and **back** buttons to navigate through the menu features until you reach your selection.
- Once you reach the desired feature, use the **up** or **down** buttons to change that feature.
- When the LCD resumes scrolling, the change will take effect.

Zone Control Set-up

System Cool Demand Starting Output (based on 3 zone demand input)

The UT-3000 starts the HVAC system at a capacity level based on how many zones are calling, and the weight of each zone. (Y1, Y2, W1, W2, and modulating furnaces)

T Total Zone Demand Input ÷ **Z** Total Number of Zones = **SYS** System Demand Output

Total Zone Demand Input

Z1 h000c030f000	30%	
Z2 h000c030f000	+ 30%	
Z3 h000c050f000	+ 50%	
	110%	**T** Total Zone Demand Input

System Demand Output

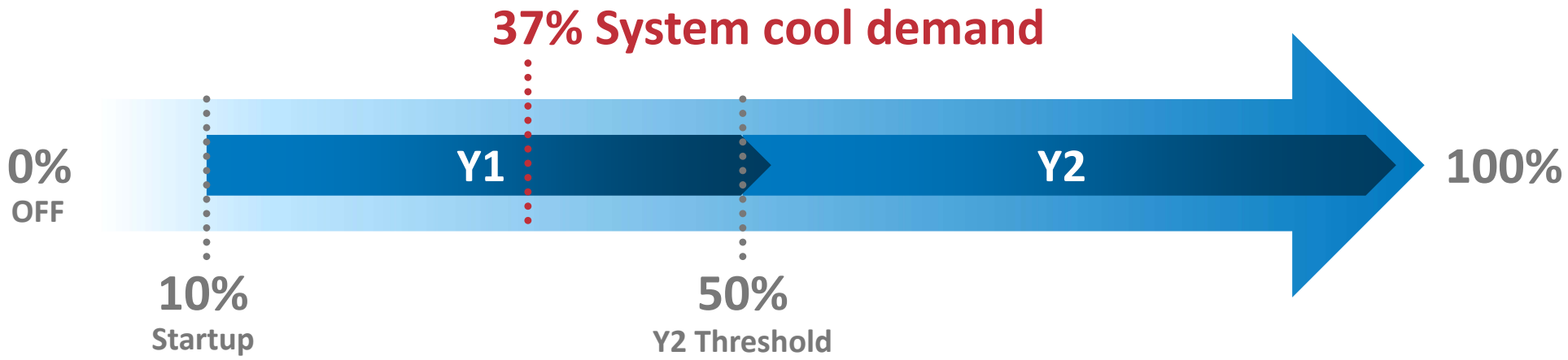
SYS h000c037f037

110 (T) / 3 (Z) = 37% (SYS) *Y1 Cool is active*

Zone Control Set-up

System Cool Staging Scale

Example: ON a 4-ton system, the inverter would start operating at **37%** capacity.
(48,000 btu's **x** 37% = 17,760 btu's **or** approximately **1.5tons** of cooling required)

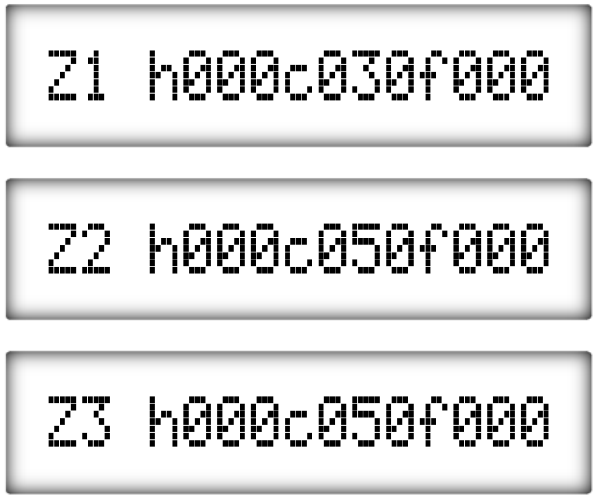


On at 4 ton system, the Inverter would start operating at 37% capacity (17,760btu = 1.5ton)

Zone Control Set-up

STUDENT EXERCISE- System Cool Staging for a 5-Ton HVAC System

1. Calculate **System Demand Output**
2. Calculate percentage of required cooling in btu's
3. Determine what threshold your HVAC system operate in on start up



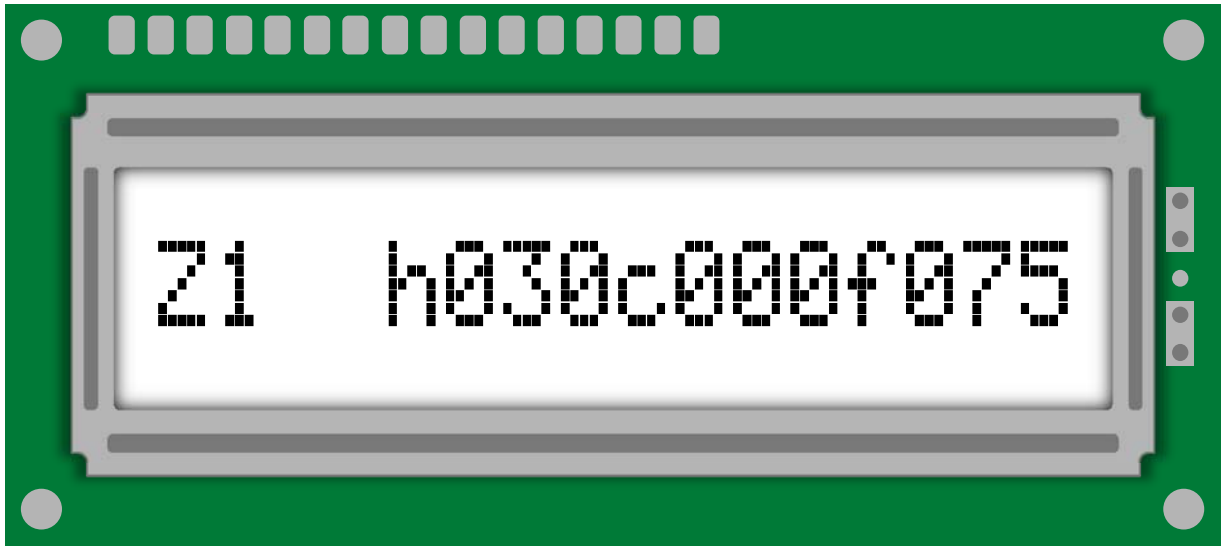
Agenda

- Zone Control Features
- Installation
- Programming and Set-up
- **LCD Screens**
- Troubleshooting and Bias Data Voltages

LED Screens

Understanding LED Screens

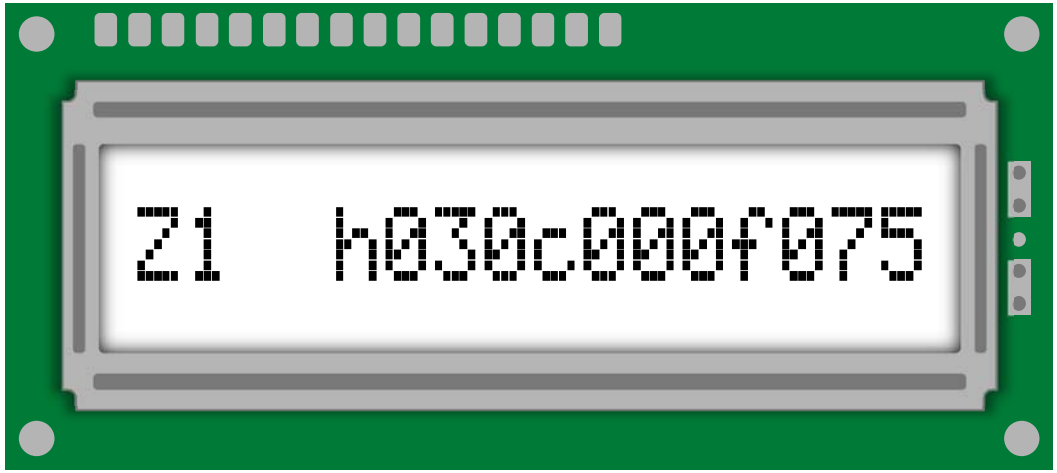
- Once the programming is complete and the system is running, the LCD screen will scroll and display data screens continuously.
- Each zone will be displayed in order.
  (zone 1, zone 2, etc.)
- The **zone screen** will present the demand for each of the following:
  - Heating demand- **h000**
  - Cooling demand- **c000**
  - Fan demand- **f000**

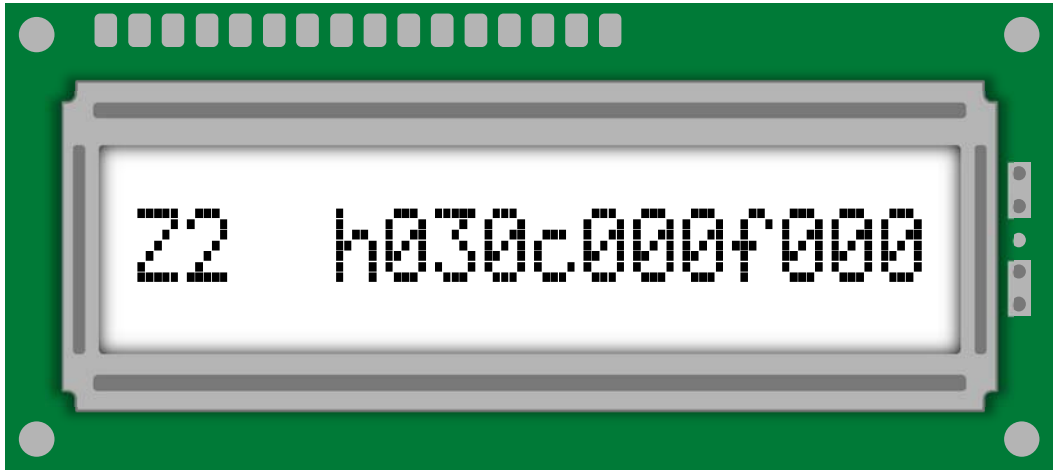


LED Screens

Understanding LED Screens

- Zone 1 is calling for heat @30%, and fan @ 75%.
- This indicates the presence of a communicating thermostat in **zone 1** whose demands are given a weighted value due to it's proportional capability.
- Communicating thermostats have demands of :
- 0%, 30%, 60%, 85%, 100%, etc
- Zone 2 is calling for heat @ 30%. (fan hasn't been energized yet)

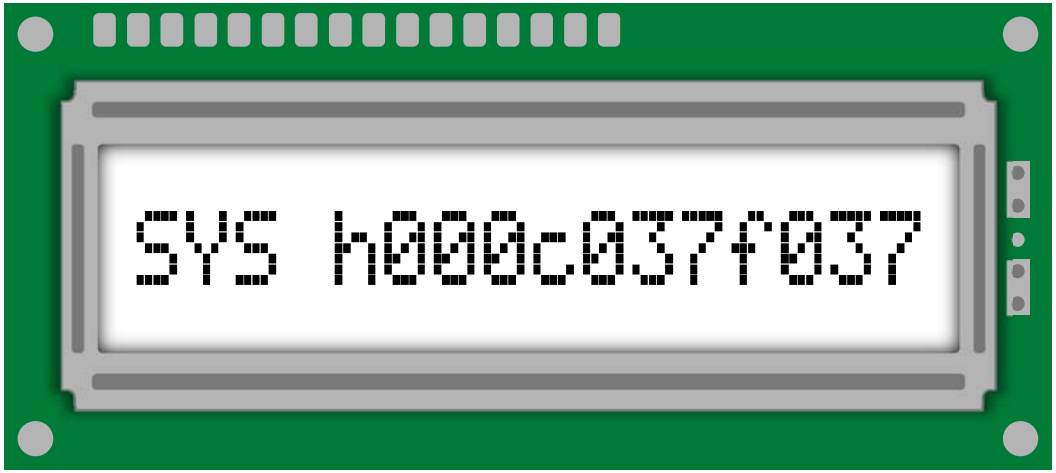




LED Screens

System Output Percentage

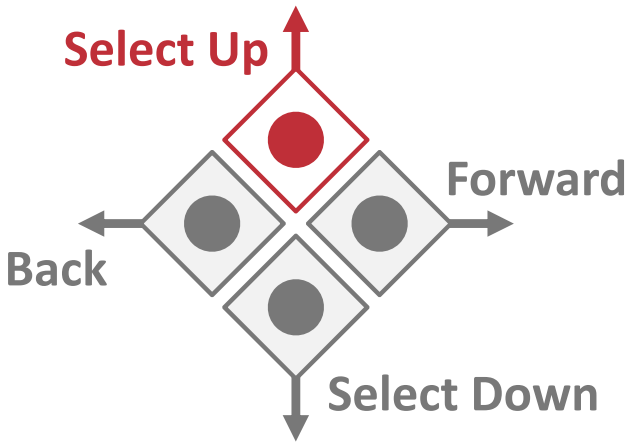
- This screen displays the **system output percentage** (SYS) to the HVAC equipment.
- In the previous **starting system cool demand output** example, the UT-3000 is demanding 37% cooling capacity and 37% fan capacity. (1st stage cooling- Y1 is active)
- If the cooling target set-point is not satisfied before reaching 51% SYS Output, Y2 will energize.

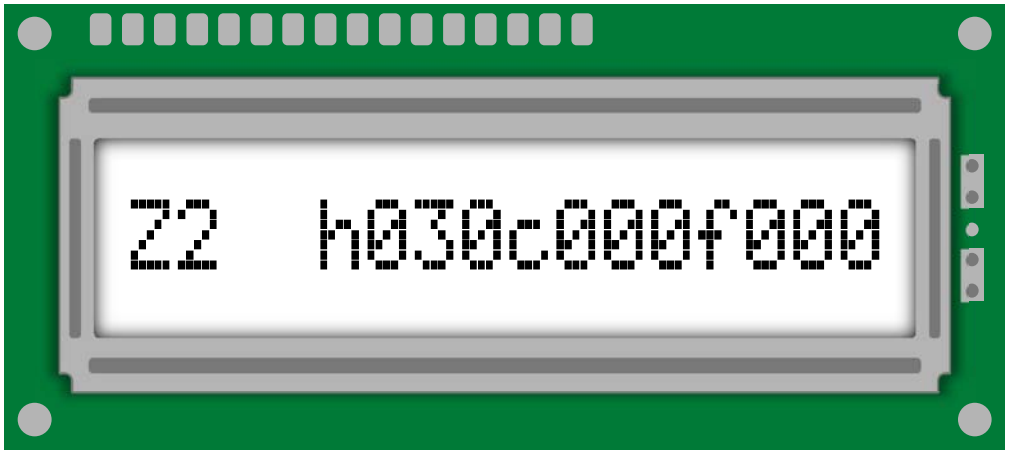


LED Screens

Lock/ Pause Screen

- You can **lock** the LCD on a single screen by pushing the program **up** button **one** time.
- Then, select the screen you want to view by using the **up** or **down** buttons.
- The LCD will stay **locked** on that screen for **10 minutes**, then resume scrolling again.
- You can **unlock** the screen by pushing the **forward** button **one** time.

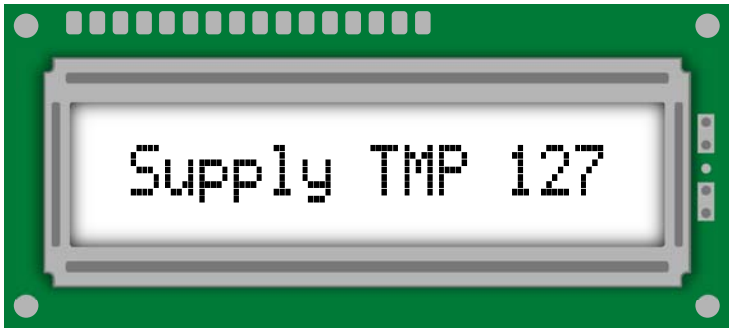


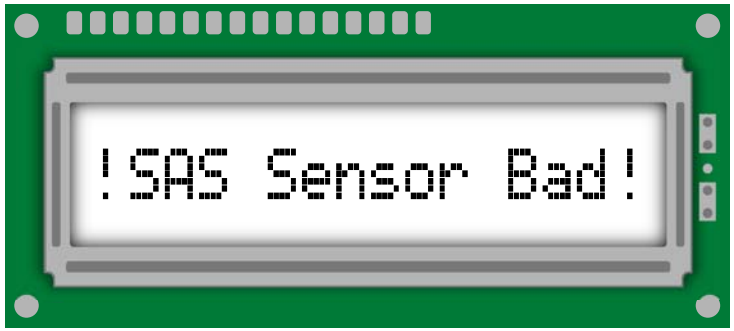


LED Screens

Supply Air Temperature

- This supply air temperature screen shows the supply air temperature at the location of the supply air sensor in **real time**.
- The UT-3000 monitors and compares the actual supply air temperature to the HVAC system target set points.
- The UT-3000 will **increase** (by 1% increments) or **decrease** (by 2% increments) the **system demand output** in order to increase or decrease HVAC system capacity.
- If the Supply Air Sensor is disconnected or fails, the UT3000 will display the **bad sensor** screen and will default to the **timed mode** staging until the zone thermostat demands are satisfied.

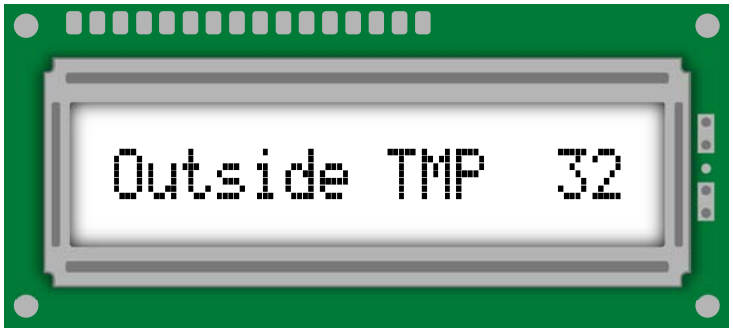


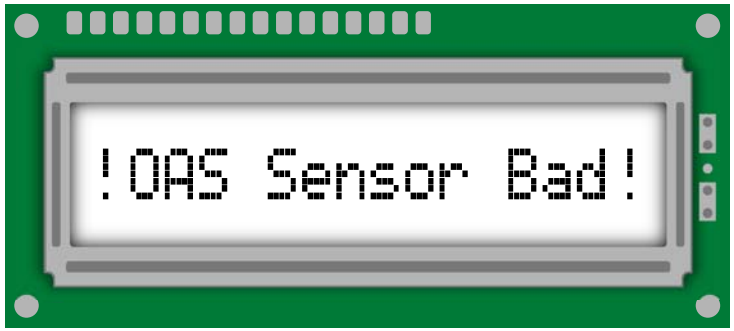


LED Screens

Outside Air Temperature

- This screen shows the **real time** outside air temperature at the location of the outside air sensor. (OAS)
- This **value** can be from the communicating HVAC system, **or** from a sensor connected to the UT-3000.
- If the OAS sensor fails or is disconnected, the UT-3000 will display the **bad sensor** screen and will default to emergency mode.
- If you do not want to use an OAS to stage the system, adjust/ disable the OAS set-point value down to the **off** position.



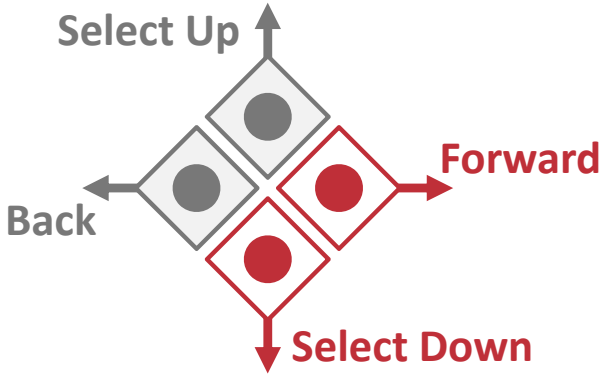


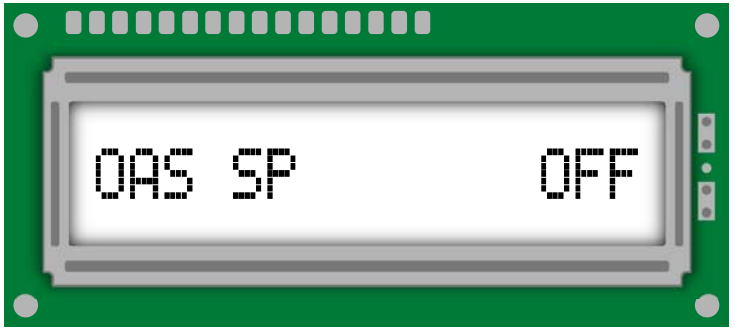
LED Screens

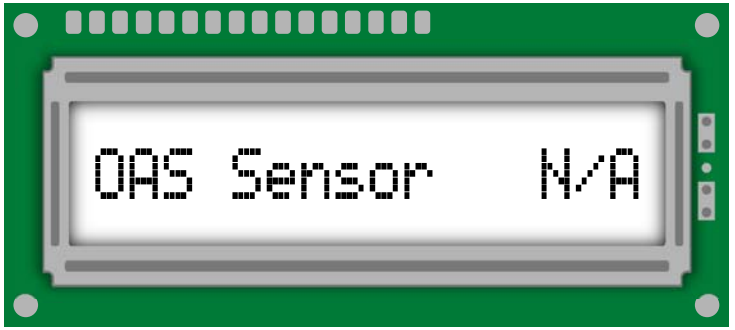
Disable Outside Air Temperature Sensor

The following steps will guide you to disable the outside air temperature sensor:

- Press the **forward** button, and scroll through the menu until you reach the **OAS SP** (outdoor air set point) screen.
- Press the **down** button until you reach the **OAS SP OFF** option.
- Select this option, and allow the screen to resume operation.
- This option is now disabled, and the next **OAS SP** screen will display **OAS Sensor N/A .**







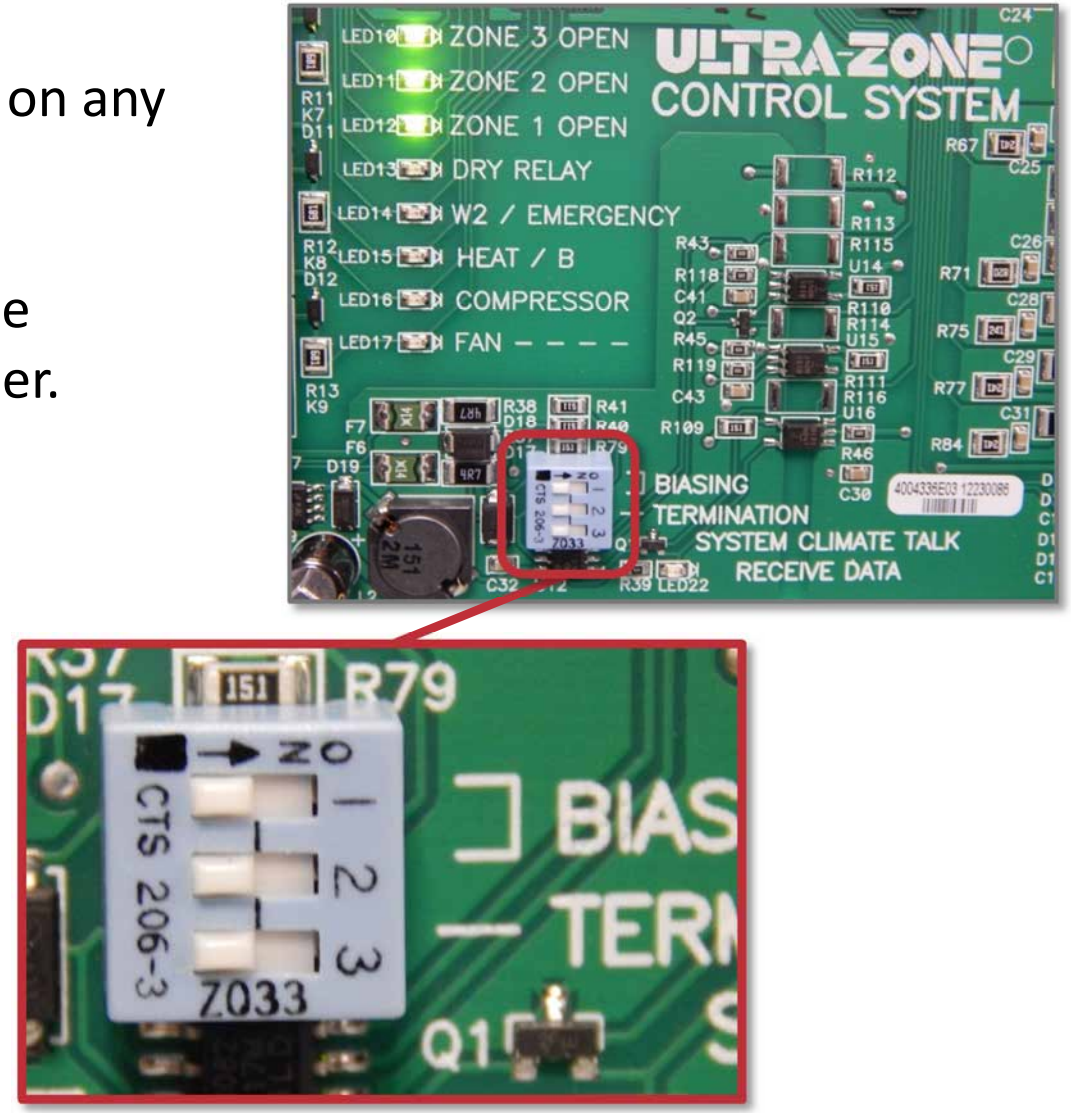
Agenda

- Zone Control Features
- Installation
- Programming and Set-up
- LCD Screens
- **Troubleshooting and Bias Data Voltages**

Troubleshooting

Bias Data Voltages

- Only **one** device should set the bias on any ComfortNet controlled system.
- **Never** move the bias switches on the communicating furnace or air handler.
- If necessary, move the bias switches on the outdoor unit.
- Never move the termination switches on the zone controller.
- The zone controller switches should remain in the **off** position.



Troubleshooting

Symptom 1

- LCD & LED’s not responding properly, and HVAC system is malfunctioning.
- Communicating thermostat may display fault messages.

Solutions

- Check HVAC system and UT-3000 24vac transformers for proper voltage.
- Check system wiring for shorts or improper wiring.
- Test damper wires for continuity/ shorts.
- Check zone thermostats for shorts/ improper wiring.
- Check BIAS DC voltages.

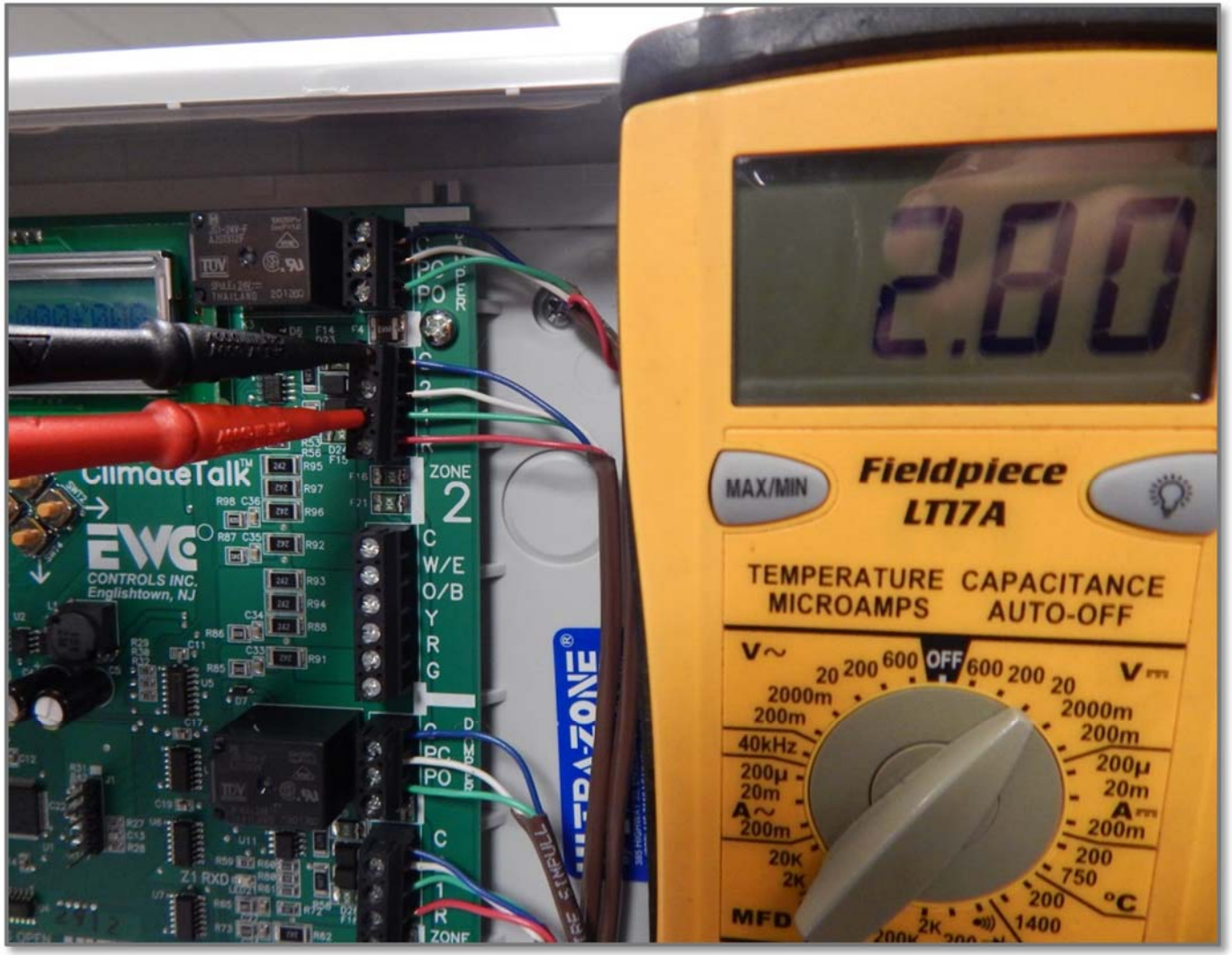
Troubleshooting

Check BIAS DC Voltages to the Thermostats

To the thermostats:

Data 1-C = 2.8 VDC

Data 2-C = 2.2 VDC



Troubleshooting

Check BIAS DC Voltages at the HVAC System Input Terminal

HVAC System Input Terminal:

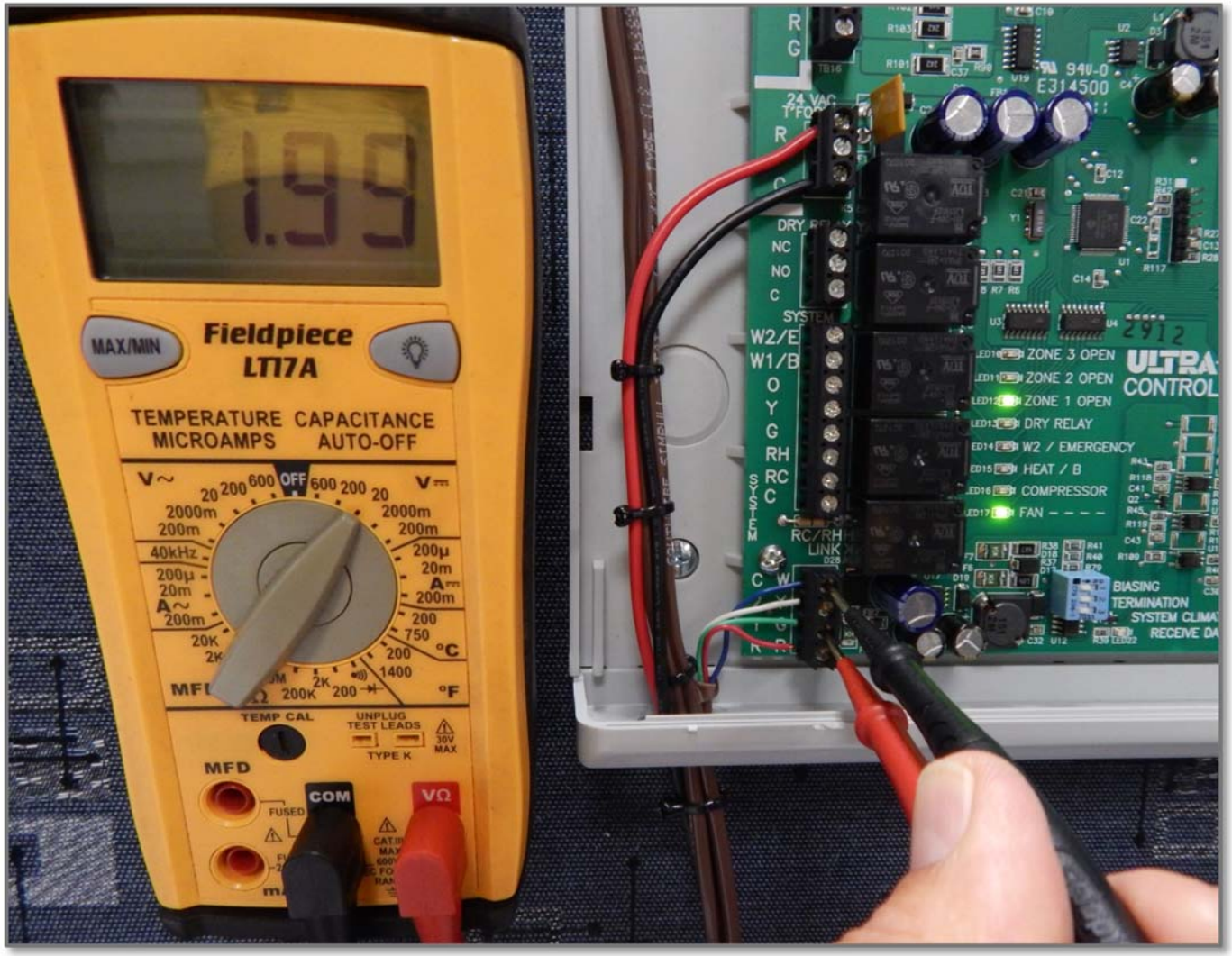
Data 1-C = 1.9 VDC

Data 2-C = 1.3 VDC

or

Data 1-C = 2.8 VDC

Data 2-C = 2.2 VDC



Troubleshooting

Symptom 2

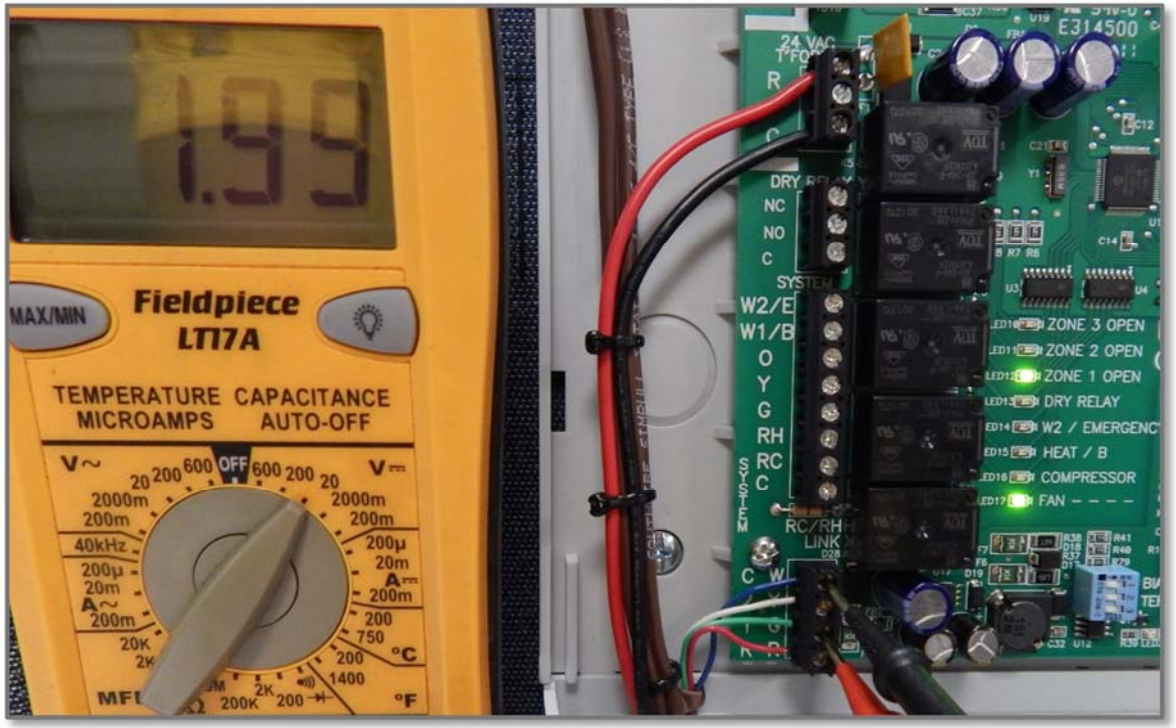
- LCD & LED's are responding properly, but HVAC system is malfunctioning.
- Bias DC voltages are incorrect.

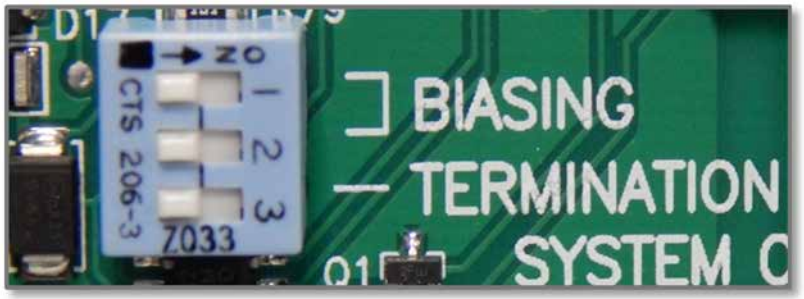
Solutions

- Check zone system wiring for shorts/ improper wiring.
- Test wires for continuity/ shorts.
- Check BIAS DC voltages.
- Ensure that BIAS/ terminal switches on the UT-3000 panel and outdoor units should be set to the off position.
- Check HVAC equipment for faults via a communicating thermostat and clear all faults.

Troubleshooting

Check BIAS DC Voltages and Set Dip Switches to Off.





- Make sure that the BIAS/ terminal switches on the UT-3000 panel and outdoor units are set to off.
- Check BIAS DC voltages:

Data 1-C = 2.8 VDC

Data 2-C = 2.2 VDC

OR

Data 1-C = 1.9 VDC

Data 2-C = 1.3 VDC

Troubleshooting

Symptom 3

- LCD & LED's function, and HVAC system functions normally but **dampers do not** respond.

Solutions

- Check damper motor wiring for proper connections.
- Check damper motor 24volt & **500mA breaker**. (auto reset/ overcurrent protection device located on board)
- Test wires for continuity/shorts.
- Check damper motor wiring for shorts/ improper wiring.
- Test wires for continuity/shorts.
- Refer to page 12 of EWC technical bulletin TB-241 for correct damper wiring.

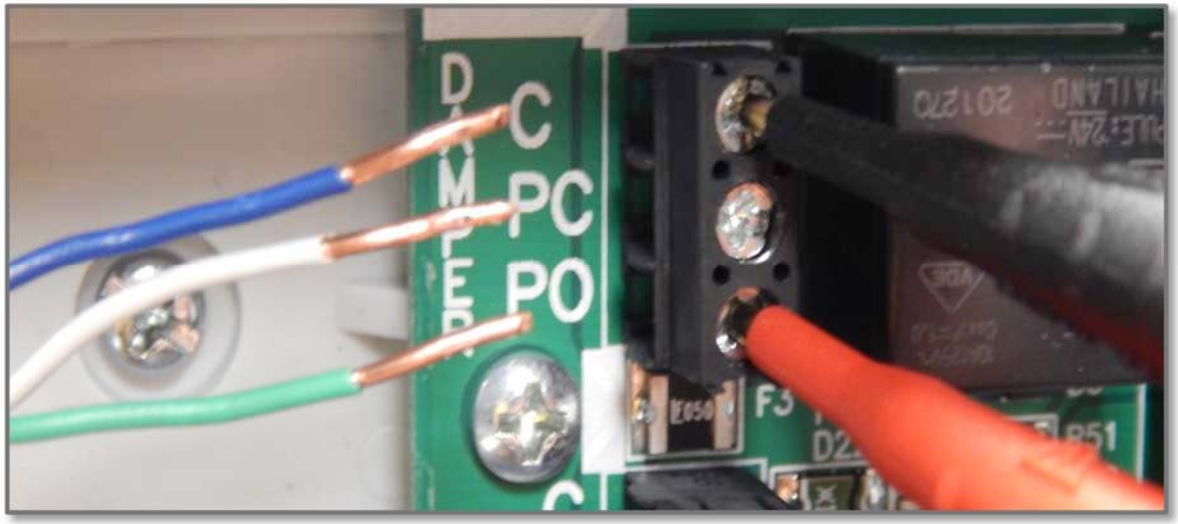
Troubleshooting

Step 1: Check Damper Motor Voltages

- Adjust thermostat in the zone with dampers not functioning, to call for cool or heat.
- Set meter to ac voltage, and test power at dampers while zone is calling.
- 24VAC should be present at **C and PO** when the dampers are opening.

Troubleshooting

Step 2: Check Power Being Supplied to Damper via Board



- Set meter to **ac voltage,** and test power at board output to the dampers not responding.
- If **no power**, the 500mA breaker could be **tripped**.
- Disconnect power to board, remove damper wires, and retest.
- If power is restored, the 500mA breaker **reset** itself.
- Check disconnected wiring back to damper for shorts.

Troubleshooting

Symptom 4

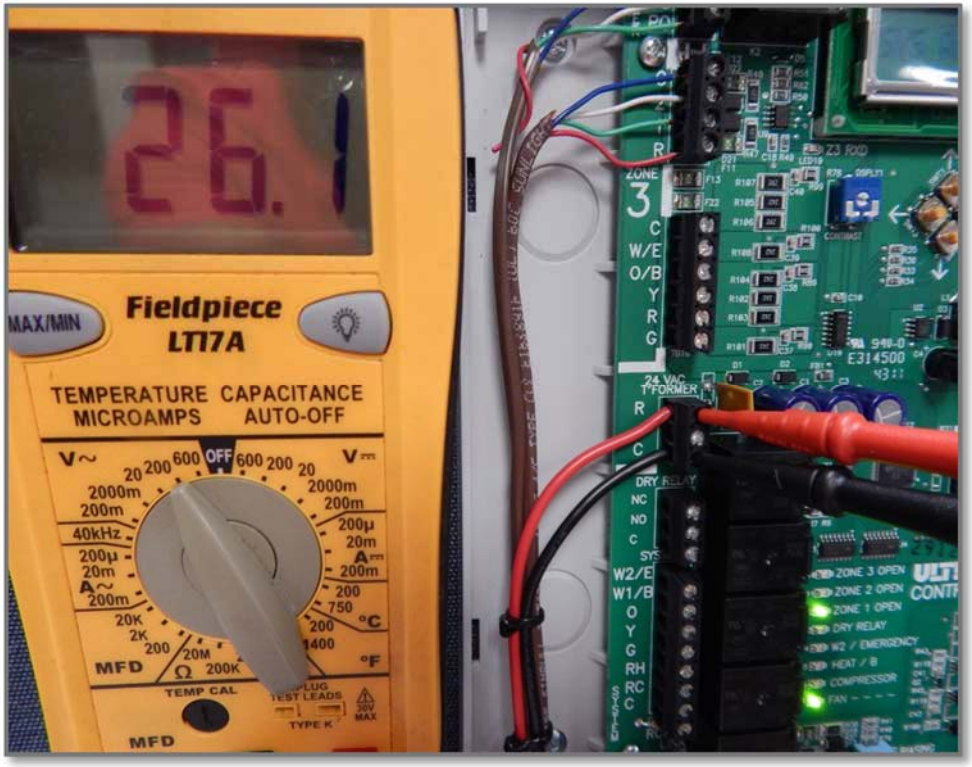
- LCD & LED’s do not function, and HVAC system doesn’t respond.

Solutions

- Check HVAC & UT-3000 system transformer supply voltage.
- Check HVAC & UT-3000 system 24vac transformer voltage, fuse, and breakers.
- Test all wires for continuity/ shorts. (shorts to common or shorts to earth ground)
- Check damper motor wiring for proper connections.
- Check HVAC & UT-3000 system wiring for shorts and improper wiring.

Troubleshooting

Check Transformer Voltage



- Set meter to ac voltage, and test power at terminals R and C on UT-3000.
- If no 24VAC present, test transformer supplying power to UT-3000.

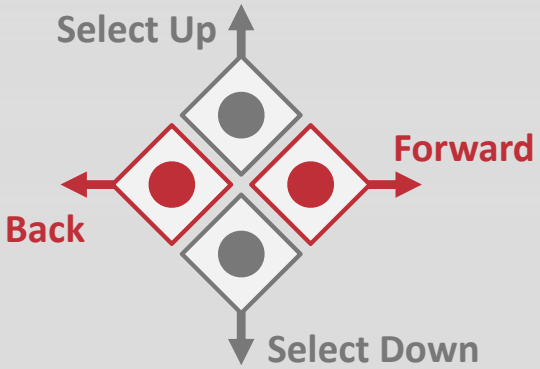
Troubleshooting

Symptom 5

- Time delay is active and won't allow heat or cool to function.

Solutions

- When troubleshooting, simultaneously press the back and forward buttons for one second to bypass any active time delays.



Troubleshooting

EWC Controls- Technical Support

- **EWC Controls** provides superior troubleshooting and assistance for the UT-3000 when you are on the job site.

EWC Controls Inc.

385 Highway 33, Englishtown, NJ 07726

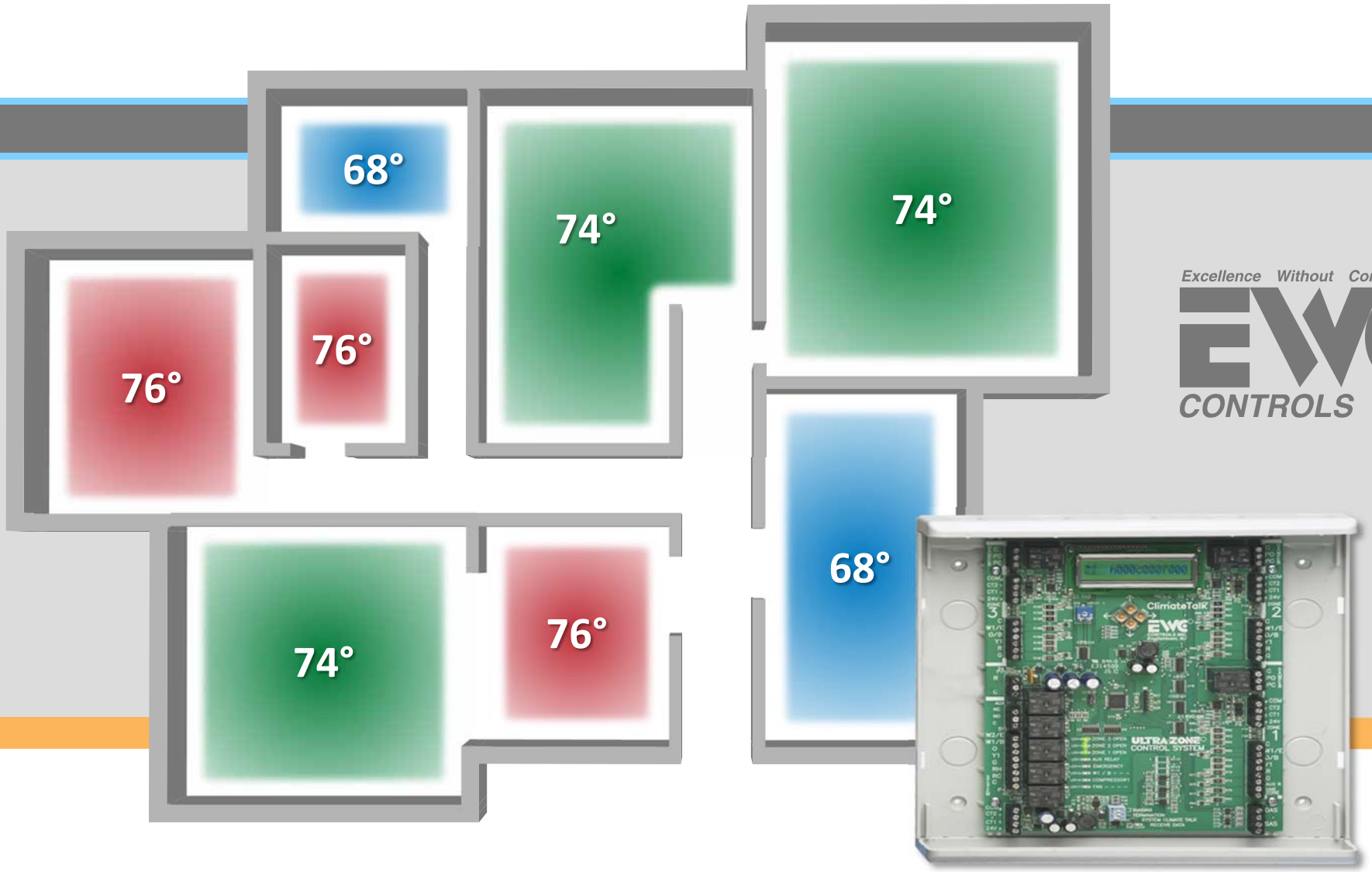
800-446-3110

Monday-Friday 8am-5pm EST.

www.ewccontrols.com

ULTRA-TALK™ 3000

QUESTIONS?



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