

### ULTRA-ZONE<sup>®</sup> Forced Air Zone Controls

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The One of a Kind UT3000 Zone Control System provides intelligent control of a communicating HVAC system or 24volt legacy HVAC system at a maximum of five zones using 24volt motorized dampers and any off-the-shelf 24volt thermostat or compatible communicating thermostat. The UT3000 is 100% plug and play when connected to a communicating HVAC system and network thermostats. The UT3000 includes features such as Modulating and Staged Operation, Automatic Equipment Recognition, Dual Fuel Functions and Precise Control of Supply Air Target & Limit set-points. EWC<sup>®</sup> Controls raises the bar again and sets another new standard for Residential and Light Commercial HVAC Air Zoning.

#### Zone Capacity

Controls 2 or 3 air zones with 24vac Power Open/Close or Spring Assisted motorized dampers. *Can be expanded to 5 zones by twinning 2 UT3000's together.*

#### Compatible HVAC Systems

Control any Communicating HVAC system based on the ClimateTalk™ Open Protocol. *Or any 24volt legacy 2 Heat / 1 Cool Gas/Electric system or 2 Heat / 1 Cool conventional or DF Heat Pump.*

#### Compatible Thermostats

The UT3000 is compatible with any Communicating Thermostat that operates on the ClimateTalk™ Open Standard. Also compatible with any off-the shelf 24v single stage Heat/Cool Thermostat or 2 Heat/1Cool Heat Pump Thermostat.

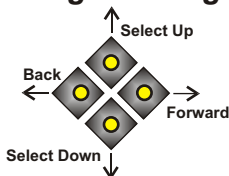
#### Automatic Heat / Cool Changeover

The UT3000 features automatic mode changeover from any zone thermostat, allowing for individual zone comfort from the HVAC system.

#### Status LCD

OUTSIDE TMP 32

#### 4 Button LCD Programming



#### System LED's

The Liquid Crystal Display scrolls to show each zone thermostat demand input and the HVAC system demand output. The outside & supply air temperatures are also displayed. In addition, all UT3000 programming is performed at the LCD.

Four buttons are provided just below the LCD screen. The buttons are used to scroll thru the Menu on the LCD and make your selections. Program the UT3000 and select the features you like. Non-volatile memory maintains your settings even after a prolonged power failure.

In addition to the LCD, a total of 5 colored LED's provide visual indication of the HVAC system status & mode of operation.

#### Damper LED's

A total of 3 green LED's labeled Zone 1 thru Zone 3, are also provided to indicate which dampers are energized to Open.

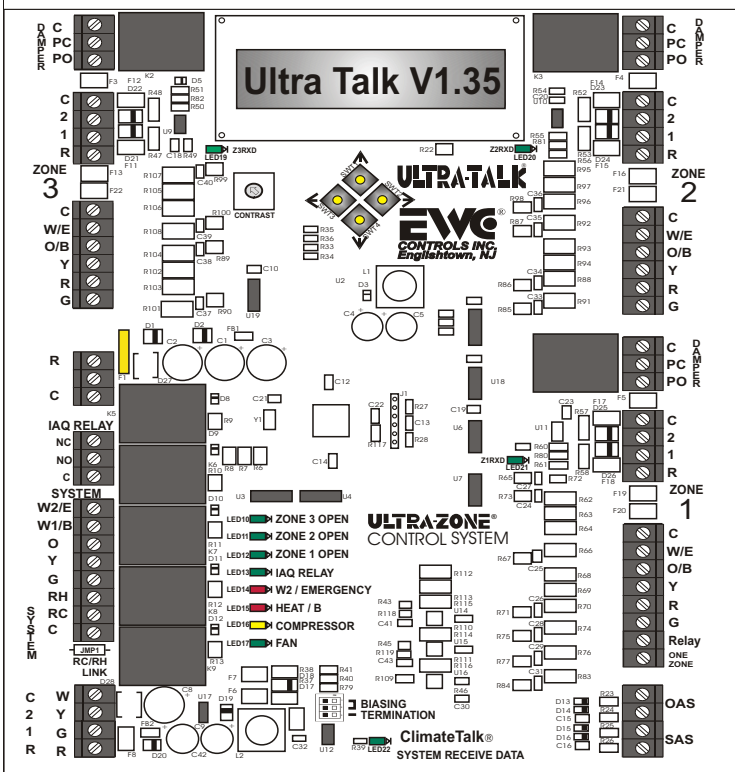


Figure 1. UT3000 panel

#### Communicating LED's

A total of 4 green Pulsing LED's are provided to indicate a Comm Link has been established with each Communicating T-stat and/or the Communicating HVAC system. A series of Rapid & Random Pulses indicate successful comm-link and data transmission. Otherwise, each Comm LED will blink On & Off slowly for non-communicating devices.

#### Fault Free Programming & Intuitive Temperature Control

The UT3000 comes pre-loaded with Default Operating Parameters (See Table 1) for Zoned HVAC Systems. The Default Program Settings free the Technician from Programming but also allows Fine Tuning of the System to Optimize Performance and Personal Preference. The UT3000 operates in Staged and Modulating mode at all times. Multi-Stage and Modulating Equipment will be operated in a manner that maximizes efficiency, maximizes temperature control & improves system performance.

#### Ancillary IAQ Dry Relay Provided

The UT3000 includes a SPDT Indoor Air Quality Dry Relay, with a digital & 24v Input Trigger. It can be used to interlock and control Ancillary IAQ functions:

- \* Fresh Air Damper
- \* Whole House Humidifier
- \* Energy Recovery Ventilator
- \* Ultra-Violet Lamp

The UT3000 must detect a fan request from one or more communicating zone thermostats or legacy non-communicating zone thermostats, before the IAQ relay will energize. This ensures the zone that requested IAQ function actually receives it.

# INSTALLATION INSTRUCTIONS

## MOUNT:

Choose a suitable location to mount the UT3000 housing. Likely locations are the Return Duct, a Nearby Wall or Convenient Studs where plywood can be installed to support the housing. Avoid mounting the UT3000 on the Supply duct. Do not mount the UT3000 directly to any Air-Handler, Furnace, Hot Water Coil or Evaporator Cabinet to avoid damage to these devices. Follow National and/or Local Mechanical Code.

## POWER:

EWC always recommends to install a separate transformer to power the UT3000. Follow NEC and/or Local Electrical Code.

## WIRE:

Connect the Power Supply to the UT3000 and wire-up thermostats and dampers. Use the knock-outs provided on the housing as the wire entry-way. Strip the cable jacket back to the point where the cable enters the housing. That reduces bulk and allows easy routing of the individual wires for a professional looking install.

## 4 Wire Communicating Network:

Whenever possible, adhere to the Climate Talk™ Color code. RED, GREEN, YELLOW, WHITE. Doing so reduces the possibility of mis-wiring components.

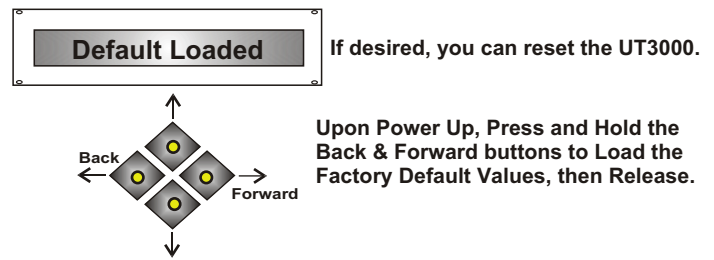
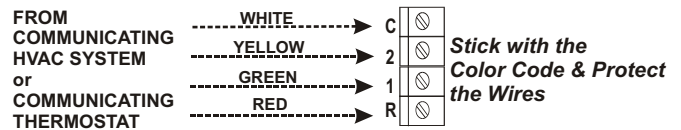
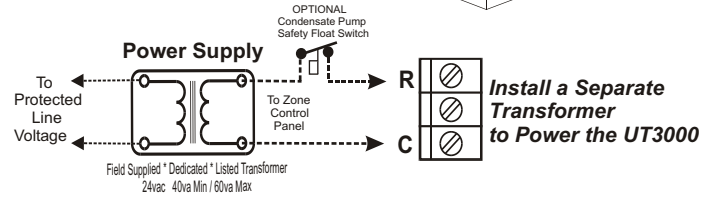
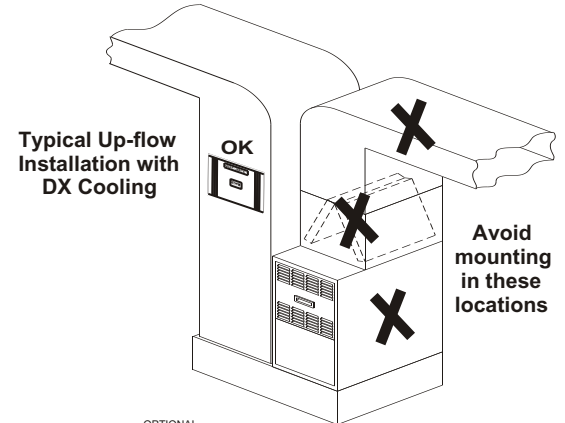
## PROGRAM:

**When connected to a Fully Communicating HVAC system, programming is not required.** The UT3000 will automatically configure the entire system and start running as soon as thermostat demands are detected. Allow at least 1-2 minutes for all Thermostats and the HVAC system to fully configure on the network. The Default Supply air temperature Targets and off-set Limits will be used. Other unique features can be selected and/or you can adjust the default settings to the values you prefer in order to achieve the desired staging and system operation.

When connected to a Conventional 24v HVAC system, you simply scroll thru the LCD menu and select the type of HVAC system you have and the type of thermostats you want to use. The Default Supply Air Temperature Targets and Off-Set Limits will be used, or you can adjust your own settings.

## FINISH:

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 and the Bypass Damper for proper operation. Balance the System and Adjust the Feature Range Values as necessary.



## UT3000 Version 1.35 SPECIFICATIONS and MENU ITEMS:

**NUMBER OF ZONES:** 2 or 3 Zones per control panel. Expandable to 5 zones.

### COMPATIBLE EQUIPMENT:

**Climate Talk™ based Communicating HVAC systems** - ComfortNet™ or Comfort Control2™ Up to 4 stages of heat & up to 2 stages of cooling. (Inverter driven AC or HP) (Modulating Gas).  
**Non-Comm. Gas/Electric/Hydronic systems** - Up to 2 Stage Heating and 1 Stage Cooling.  
**Non-Comm. Heat Pump or Dual Fuel systems** - Up to 2 Stage Heating and 1 Stage Cooling.

### COMPATIBLE THERMOSTATS:

Any Climate Talk™ based Communicating HVAC Thermostat.  
 Any 24vac single stage Heat/Cool Thermostat.  
 Any 24vac 2 Stage Heat, 1 Stage cool Heat Pump Thermostat.

### COMPATIBLE DAMPERS:

EWC® Ultra-Zone® Models URD, ND, RSD and SID, or Any Competitor's 24vac 3 Wire or 2 Wire damper.

### MAX. DAMPERS PER ZONE:

Up to 18 ND, URD, or SID Dampers Per Zone @ 26mA per damper. Total 54.  
 Only 1 Spring Type Damper Per Zone @ 400mA per damper. Total 3.

### OVER-CURRENT (Auto-Reset) PROTECTION:

2.5Amp main circuit board protection.  
 500mA on each Damper Motor Terminal Block.  
 140mA on each Communicating Thermostat and HVAC System Terminal Block.  
 140mA on each Regular 24v Thermostat Terminal Block.

UT3000 MAXIMUM CURRENT DRAW = 1.75 Amp.

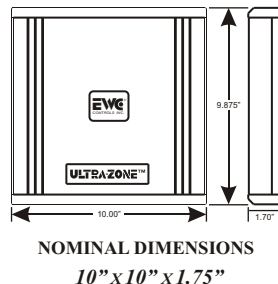
POWER REQUIREMENT = 24Vac min.40Va max.60Va 50/60 Hz.

### AMBIENT OPERATING CONDITIONS:

TEMPERATURE: -4° to 158°F (-20° to 70°C).  
 HUMIDITY: 0% - 95% Rh Non-Condensing.

### ANCILLARY IAQ DRY RELAY FUNCTIONS:

Control a Whole House Humidifier.  
 Interlock an ERV or HRV  
 Interlock a Fresh Air Damper or UV lamp.



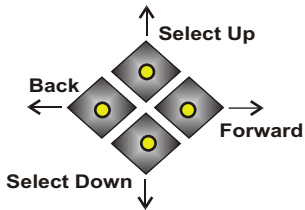
### ACCESSORIES:

Model SAS - Supply Air Sensor (Included).  
 Model OAS - Outdoor Air Sensor (Optional) Communicating systems provide OA value.  
 Model CPLS - Coil Protection Lockout Switch (Optional/Recommended).

TABLE 1

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	OFF	OFF or 7° to 42° F
O.T. Offset	12° F	5° to 20° F
U.T. Offset	7° F	5° to 12° F
SAS HP TGT	108° F	90° to 120° F
SAS Gas TGT	143° F	120° to 170° F
SAS Cool TGT	47° F	40° to 60° F
SAS RSP DLY	22s	10seconds - 180seconds
W2 Threshold	95%	65% - 99% (Adj. in 5 point increments)
PURGE FAN	25%	25% - 100% (Adj. in 25 point increments)
Zone 1 Weight	70%	0% to 100%
Zone 2 Weight	15%	0% to 100%
Zone 3 Weight	15%	0% to 100%
Total Zones	3	2 or 3 zones per panel
Limit SAS PID	N	Yes or No
DMP DFLT	Open	Open or Close
W2 lockout	99° F	20° to 99° F

# LCD Screen Programming



## 4 Button LCD Programming

Remember, if you are installing a Communicating HVAC system, this programming is done for you! **There is no need to perform the Programming steps below.** You can still program certain detail functions i.e. (24v T-stat Type). Select only the functions you want or need. Your changes will take effect in real time and the UT3000 will remember your settings even after a power failure. When the power is restored, the UT3000 will re-configure the network automatically.

Use the *Forward* & *Back* buttons to navigate thru the Menu Features. Use the *Up* & *Down* buttons to change or adjust the options available in that feature. **Place a check mark next to each selection in the box for future reference!**

**Step 1**

Heat Pump System

OR

Heat Cool System

Select either **Heat Pump** or regular **Heat/Cool** system. *If you have a Heat Pump and a Gas/Oil Furnace, you should still select Heat Pump.*

**Step 2**

Dual Fuel System

OR

Non- Dual Fuel

**IMPORTANT**  
On ComfortNet™ Dual Fuel communicating systems, thermostat models CTK01, CTK02 & CTK04ab are compatible with the UT3000.

Contact EWC Controls Technical Support for assistance.

If you selected a Heat Pump system in Step 1, select whether your Heat Pump has a **Furnace** back-up system **or Electric Heat** back-up. *You can still operate any Heat Pump in a restricted mode by using the OAS-SP feature.*

**Step 3**

Heat Pump 'Stats'

OR

Heat / Cool 'Stats'

Select the type of 24v (**Non-Communicating**) thermostat you want to use. You may have a Communicating thermostat in Zone 1 and Regular 24v thermostats in the other zones. **So you must select which type are in the other zones.**

*You cannot mix non-communicating HP and HC type thermostats. All 24v T-stats must be Wired and/or Programmed for HC or HP Operation. **Conflicting Zone Demands due to mis-wiring or incorrect programming will not be recognized!***

**Step 4**

HP Stat Type 'B'

OR

HP Stat Type 'O'

**IMPORTANT**  
*This selection is important when using non-communicating HP T-stats. You must Wire and/or Program your HP T-stats to match this selection!*

If you selected a Heat Pump system in Step 1 and Heat Pump Thermostats in Step 3, then select the type of Reversing Valve Operation.

**Step 5**

Fan Mode Hydro

OR

Fan Mode Gas

Select how you want the Indoor Fan to operate during Heating Operations. Select HYDRO if you have an Air-Handler with Hot Water Coil or an Electric Furnace. Select GAS if your system is a Gas/Oil Furnace with A/C. *If you selected a Heat Pump system in Step 1, the Fan Mode is set for you, in which case you'll see the screen*

Fan Mode N/A

**Step 6**

OAS SP OFF

If you are using the Outside Air Data to Lock-Out the Heat Pump, select that **Set-Point** Temperature right here. *If you do not want to use Outside Air Data to lock-out the heat Pump, adjust the OAS SP (Set-Point) value down to the OFF position and the UT3000 will display the screens to the right.*

OAS SP OFF

OAS Sensor N/A

**Step 7**

O.T. Offset: 12°

AND

U.T. Offset: 7°

**Examples:**  
SAS HP Target = 108°F  
O.T. Offset + 12°F  
HP Heat Limit = 120°F

SAS Cool Target = 47°F  
U.T. Offset - 7°F  
Cooling Limit = 40°F

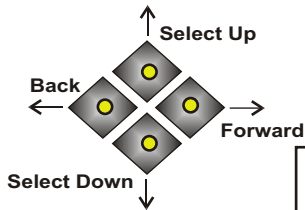
SAS Gas Target = 143°F  
O.T. Offset + 12°F  
Gas Heat Limit = 155°F

If the Supply Air Temperature exceeds any Target Set-Point, (Plus or Minus the Off-Set), the resulting value becomes the **Over Temperature Condition**. Choose an **Off-Set** value that will provide a safe operating limit for your HVAC equipment. *The UT3000 will cycle the system off-line for 3 minutes, allowing the discharge air temperature to moderate while displaying the Over or Under Temp Condition (OTC or UTC) screen, depending on the mode of operation.*

Supply OTC\* 156

Supply UTC\* 39

# LCD Screen Programming



## 4 Button LCD Programming

Use the *Forward & Back* buttons to navigate thru the Menu Features. Use the *Up & Down* buttons to change or adjust the options available in that feature. **Place a check mark next to each selection or write the value in the box for future reference!**

The UT3000 staging process is very unique. The difference between the Target Set-point and the Actual Supply Air temperature along with the SAS Response Delay determines how fast or slow the UT3000 will stage the HVAC system. Via the UT3000's advanced staging logic, (see the next page) the UT3000 will stage or modulate the System's BTU capacity to match the discharge air set-point target, for each mode of operation.

Step 8

SAS HP TGT 108°

Select the desired **HP** Heating Supply Air Sensor Temperature Target that the UT3000 will demand from the HVAC system. The UT3000 will automatically stage the HVAC system Up or Down to maintain this value.

Step 9

SAS GAS TGT 143°

Select the desired **GAS** Heating Supply Air Sensor Temperature Target that the UT3000 will demand from the HVAC system. The UT3000 will automatically stage the HVAC system Up or Down to maintain this value.

Step 10

SAS COOL TGT 47°

Select the desired **COOLING** Supply Air Sensor Temperature Target that the UT3000 will demand from the HVAC system. The UT3000 will automatically stage the HVAC system Up or Down to maintain this value.

Step 11

SAS RSP DLY 22s

Select how often the UT3000 will force an increase or decrease to (Stage up or Stage Down) the SYSTEM (SYS) Heat or Cool Demand Output. **The UT3000's PI Control constantly monitors and wants to match the supply air temperature in the duct, to the active operational target set-point. The UT3000 achieves this by increasing or decreasing the SYSTEM (SYS) demand output, trying to match the Supply Air Temperature delivered from the HVAC system, to the active Cool Target, Gas Target or HP Target Set-Point. The SAS Response Delay allows the user to control how fast this function is allowed to occur.** The Default value to Stage Up or Down is once every 22 seconds. **HEAT MODE:** If the Heating Supply Air is below the Heat Target, the UT3000 will increase the **SYS** Heat Output by 1% every 22 seconds. If the Heating Supply Air is above the Heat Target, it will decrease the **SYS** Heat Output by 2% every 22 seconds. **Continued on the next column**

**COOL MODE:** If the Cooling Supply Air Temperature is above the Cooling Target, the UT3000 will increase the **SYS** Cool Output by 1% every 22 seconds. If the Cooling Supply Air Temperature is below the Cooling Target, the UT3000 will decrease the **SYS** Cool Output by 2% every 22 seconds.

**The PI control functions in response to the Supply Air Sensor actual temperature value, as compared to the Target Set-point including a 1°F differential. Select a lower value (10 - 20 seconds) to Stage Faster. Select a higher value (60 - 90 seconds) to Stage Slower.**

Step 12

W2 Threshold 95%

Select the value at which the Auxiliary (W2) or Back-up system energizes. The Range is 65% - 99% and the default value is 95% of System (SYS) Output. Setting the value low means the Auxiliary system will operate more often. Setting a high value means the Auxiliary system operates less often. There is a 5% differential added to the value selected which prevents short cycling. **Setting the W2 threshold to 99% effectively turns it OFF.** The reason for this is the differential. So, a value of 94% actually trips at 99%. Thus, a value of 99% would require the System Output to reach 104% which is impossible. **Use the 99% value if you want the Auxiliary system to Energize on the Outside Air Set-point only.** If desired, you can use the Outside Air Set-point **and** set the W2 Threshold to maximum 94%. That would require the System (SYS) Output Percentage to reach 100% demand **or** the Outside Air temperature has to drop low enough, to warrant energizing the Auxiliary system.

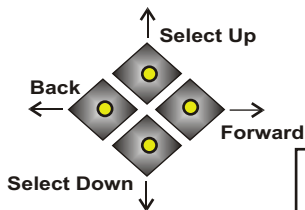
Step 13

Purge - Fan 25%

Select how fast you want the Indoor Fan to run at the end of a cycle, to Purge the last of the hot or cool air into the last zone calling. You may select 25%, 50%, 75% or 100%. The default value is 25%. **Note 1:** Fan Only operations using 24v T-stats on all zones will operate at the Fan Purge Setting. **Note 2:** Fan Only operations using 24v T-stats on zone 2 & 3 with a Communicating T-stat in zone 1 will operate at whatever speed is selected on the Zone 1 T-stat. Simply operate the communicating Zone 1 T-stat in Fan Only mode for a minimum of 20 minutes.

**Important Note:** Review all of these Programming Features carefully and call EWC Controls if you have any questions. With years of experience Zoning HVAC systems, we have plugged in the default values that should work fine for the majority of the jobs you will encounter. If desired, you can still adjust the settings to your own preference. When doing so, wait patiently and observe the effect of those changes before changing them again. The UT3000's SYS output (PI Control) to the HVAC equipment will vary and change depending on numerous factors such as: Internal Load, External Load, SAS Response Delay Setting, Supply Air Target set-point, Thermostat Type, Thermostat Set-point versus actual zone temperature.

# LCD Screen Programming



## 4 Button LCD Programming

The UT3000 staging process is very unique. The difference between the Target Set-point and the Actual Supply Air temperature along with the SAS Response Delay determines how fast or slow the UT3000 will stage the HVAC system. Via the System (**SYS**) Output screen, (see the next page) the UT3000 will increase or decrease the System Output value so it can match the Target set-point. When the target is matched, the UT3000 will stop staging, unless the x3 staging range stops it first.

Use the *Forward & Back* buttons to navigate thru the Menu Features. Use the *Up & Down* buttons to change or adjust the options available in that feature. **Place a check mark next to each selection or write the value in the box for future reference!**

The UT3000 utilizes a zone weighting feature. You can select the weight for each zone independently. For example, if zone 1 has more heat loss/gain than zone 2 or zone 3, you can now assign it more weight, which is a big advantage over the old "Legacy DMD" demand feature.

Z1 WEIGHT 70%

Step 14

Select the Weight value that will be applied to Zone 1 Thermostat. You may select from a range of 0% to 100%. The factory default value is 70%. The sum of all the zones weights can add up to 100% or less.

Z2 WEIGHT 15%

Step 15

Select the Weight value that will be applied to Zone 2 Thermostat. You may select from a range of 0% to 100%. The factory default value is 15%. The sum of all the zones weights can add up to 100% or less.

Z3 WEIGHT 15%

Step 16

Select the Weight value that will be applied to Zone 3 Thermostat. You may select from a range of 0% to 100%. The factory default value is 15%. The sum of all the zones weights can add up to 100% or less.

Total ZONES = 3

Step 17

Select the total number of zones you have connected to each UT3000. You may select two zones or three zones. The factory default value is 3 zones. The field assigned weights of all selected zones **may or may not** total 100%.

LIMIT SAS PID N

Step 18

Select "N" for NO, if you want the UT3000 to Stage the HVAC system Up & Down, in an effort to achieve the programmed Supply Air Temperature Targets for HP heat, Gas heat or Cool operations. The PID Loop is allowed to operate within the range of the zone weight demand totals x3. *This is the Default mode of system operation.* The System (SYS) demand value is based upon the sum of the demand(s) times the weight of each active calling zone. **See page 13 for more details.**

LIMIT SAS PID Y

Step 19

Select "Y" for YES, if you want the UT3000 to ignore the Supply Air Temperature Targets. **Simply stated, the UT3000 will not increase or decrease the System (SYS) demand values in an effort to match the programmed Supply Air Targets!** This will limit the HVAC system demand based purely on the number of zones calling and the sum of the demand weight from each calling zone. **See page 14 for more details.**

DMP DFLT OPEN

Step 20

Change the default position of the zone dampers when the HVAC system is idle. The factory default is to OPEN all dampers when idle. Select CLOSE if desired but first make sure the HVAC system's purge cycle is set for no longer than 90 seconds. Always select "CLOSE" on Panel "B" when twinning.

W2 LOCKOUT 99°

Step 21

W2 Lockout feature allows the installer to prevent Auxiliary Heat from energizing above a selected outside temperature. An energy savings code requirement in some states.

Ultra Talk V 1.35

Finish

The final program screen displays the code version of your UT3000. *It may be different than shown above.* No further action is required. Leave the buttons alone for 10 seconds and the LCD screen will resume scrolling. The programming is complete and the UT3000 will store all settings into permanent memory.

# LCD Screen Scrolling Displays

Once the programming is complete and the System is running, the LCD screen will scroll and display the following data screens continuously. The HVAC system mode of operation is displayed including Supply Air and Outdoor Air temperature, Auxiliary and Emergency mode including IAQ Functions. The UT3000 LCD will continuously Scroll data as to which Zones are actively calling for a Heating, Cooling or Fan Operation. By watching the LCD display you can observe all system functions as they occur. If desired, you can lock the LCD on a single screen by pushing the Program Up button one time. Then select the screen you want to watch using the Up or Down button. The LCD will stay locked on that screen for 10 minutes then resume scrolling, or you can unlock the screen by pushing the Forward button one time.

*Below are LCD data screen examples:*



Communicating Thermostats are capable of providing a proportional heat or cool demand signal.

Zone 1 is calling for Heat @30%. This indicates the presence of a Communicating Thermostat in Zone 1 whose demands are given a weighted value due to it's proportional capability. (0% - 30% - 60% - 85% - 100% - etc.)



24v HP Thermostats cannot provide a proportional heat or cool demand signal. ie: Heat demand = 50% - 100% (Y with Aux) Cool demand = 100% (Y alone)

Zone 2 is calling for Heat @50%. This indicates the presence of a Regular 24v HP T-stat (Calling for 1st stage heat) in Zone 2.



24v HC Thermostats cannot provide a proportional heat or cool demand signal. Heat demand = 100% (W) Cool demand = 100% (Y)

Zone 3 is calling for Cooling @100%. This indicates the presence of a Regular 24v H/C Thermostat in Zone 3.

**IMPORTANT NOTE:** You cannot mix 24V HP Thermostats with 24V Heat/Cool Thermostats. A Typical installation may have a Communicating T-stat in Zone 1 and the rest may be 24v Legacy type.

### Acceptable UT3000 Thermostat Combinations:

Zone 1 = Communicating  
Zone 2 = Communicating  
Zone 3 = Communicating

Zone 1 = Communicating  
Zone 2 = 24v H/C  
Zone 3 = 24v H/C

**NOTE:** The Comm T-stat could be in any Zone! But to make 24v fan operations behave like the Communicating T-stat, keep the Comm T-stat in Zone 1.

Zone 1 = Communicating  
Zone 2 = 24v HP  
Zone 3 = 24v HP

**NOTE:** The Comm T-stat could be in any Zone! But to make 24v fan operations behave like the Communicating T-stat, keep the Comm T-stat in Zone 1.

Zone 1 = 24v H/C  
Zone 2 = 24v H/C  
Zone 3 = 24v H/C

Zone 1 = 24v HP  
Zone 2 = 24v HP  
Zone 3 = 24v HP

Refer to Page 10 for Sample Thermostat Diagrams

**SYS h035c000f035**

This screen displays the SYSTEM (SYS) Output percentage to the HVAC Equipment. In this Heat Pump Example, the UT3000 is demanding 35% heating capacity and 35% fan capacity. That means 1st stage heat (Y1) is active. If the HP Target set-point is not satisfied before reaching 51% SYS Output, Y2 will energize. If the HP target set-point is still not satisfied before reaching the W2 threshold value, W2 will energize.

**01% - 50% Output = Y1HP or Y1A/C or W1Gas**

**51% - 65% Output = Y2HP or Y2A/C**

**W2 Threshold 65% - 95% = W2HP or W2Gas**

Note: The UT3000 may interpret a Zone Thermostat input as 100% demand but it may not Output a 100% System Demand. The UT3000 will demand only as much System Capacity as is necessary, to satisfy the Active Supply Air Target Set-Point or, it stops staging due to the zone weighting system.

**SYS Aux100 Em100**

**SYS IAQ000 Dh015**

This screen displays the System Percentage demand from the Auxiliary and/or the Emergency system. The **Aux** will display a value during Auxiliary mode. Both screens will display values during Emergency mode. The next screen displays the System Percentage demand to Humidify or De-humidify. Humidify or IAQ demands may come from a Communicating thermostat or 24v Control. The UT3000 honors De-Humidify demands from Communicating thermostats with Communicating HVAC systems only.

**Supply TMP 127**

**! SAS Sensor Bad !**

This screen shows the supply air temperature at the location of the supply air sensor in real time. The UT3000 monitors and compares the Actual Supply Air Temperature to the HP Target, Cooling Target or Gas Target Set-points. The UT3000 will increase (by 1% increments) or decrease (by 2% increments) the SYS 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 "Timed Mode" staging until the Zone T-stat demands are satisfied. If the UT3000 observes the supply air temperature exceed any Target set-point plus or minus the OT or UT off-set, the UT3000 will display one of these screens.

**Supply OTC\* 156**

**Supply UTC\* 38**

**Outside TMP 32**

**! OAS Sensor Bad !**

This screen shows the real time outside air temperature at the location of the outside air sensor. This OA value could be from the Communicating HVAC system or from a Sensor connected to the UT3000. If the OAS sensor fails or is disconnected, the UT3000 will display the "Bad Sensor" screen and will default to emergency mode. If you do not want to use an OAS Sensor to stage the system, adjust the OAS SP (Set-Point) value down to the OFF position and the UT3000 will display the screen to the right.

**OAS Sensor N/A**

### Built-In Delay Timer Settings

The UT3000 has built-in Delay Timers that insure safe HVAC system operation.

EWC recommends that you turn off all thermostat time delays and let the UT3000 built-in Delay Timers protect the HVAC system.

- \*Purge Delay Timer 180 seconds, fixed.
- \*Short Cycle Timer 2 minutes, fixed.
- \*Supply Air Limit Delay 3 minutes, fixed.
- \*Changeover Timer 4 minutes, fixed.
- \*Opposing System Service Timer 20 minutes, fixed.

### TIMER DEFINITIONS

#### Purge Delay Timer

At the end of any cooling or heating operation, the UT3000 will hold the last calling zone open for 180 seconds.

#### Short Cycle Timer

When all Zones are satisfied, the UT3000 will not restart the same call for a minimum of 2 minutes.

#### Supply Air Limit Timer

If a Heating or Cooling operation cycles down due to excessive Supply Air temperature, the UT3000 will not restart the HVAC system for 3 minutes.

#### Changeover Timer

At the end of a call, a 4 minute timer is started and the UT3000 will not switch to the opposite mode of system operation until the timer has expired.

#### Opposing System Service Timer

A 20 minute delay must expire, or the active zone(s) must satisfy, before the UT3000 will honor a thermostat demand to changeover to the opposite mode of system operation.

#### One Zone Mode Feature

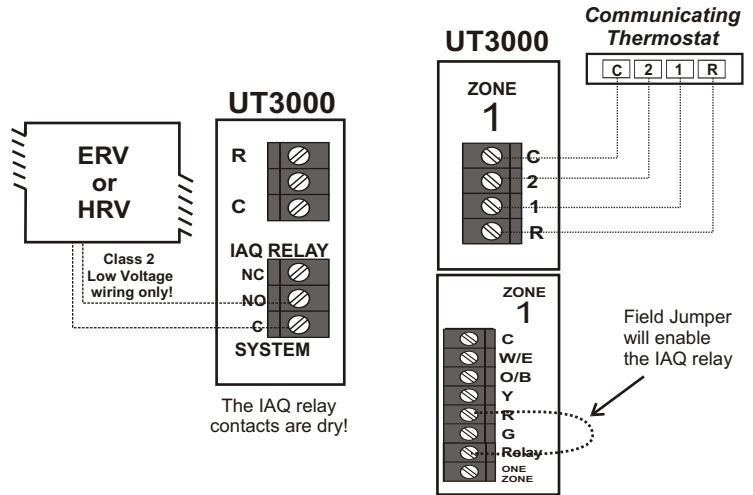
The UT3000 includes the ONE ZONE feature that allows a Commercial Grade Thermostat or Time Clock to Force the UT3000 into the ONE ZONE MODE during Setback Periods. In compliance with California Title 24, when the One Zone Terminal is energized, the UT3000 ignores all Zone T-stat demands except for Zone 1. All Zone Dampers are Forced Open. When the One Zone terminal is de-energized, the UT3000 will resume Zoning Operations.

#### Ancillary IAQ Dry Relay Functions

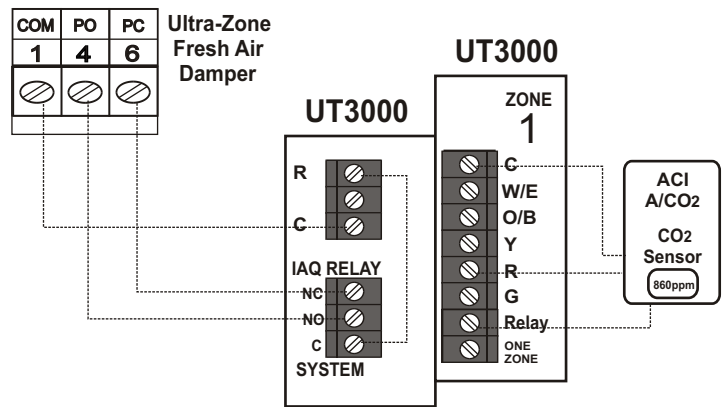
The UT3000 includes a SPDT Indoor Air Quality dry relay with a digital or 24v input Trigger. The IAQ relay can be used to Interlock and Control various IAQ devices. The Indoor Fan will operate automatically, whenever the Relay is Triggered.

**A Fan call must accompany the IAQ demand before the IAQ relay will trigger. You must program your thermostat(s) to force a fan call during Humidify demands, or set the thermostats to Constant or Circulate mode.**

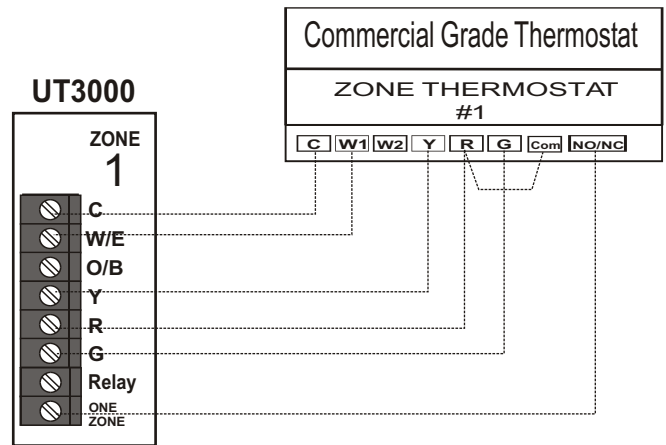
The Following Diagrams reflect ways to utilize the IAQ Dry Relay and ONE ZONE Mode to your advantage. **For Clarity, other wire connections are not shown.**



**Interlock a Ventilator. Use a jumper to enable the IAQ relay. Any call for conditioned air will trigger the IAQ relay and start the Ventilator.**

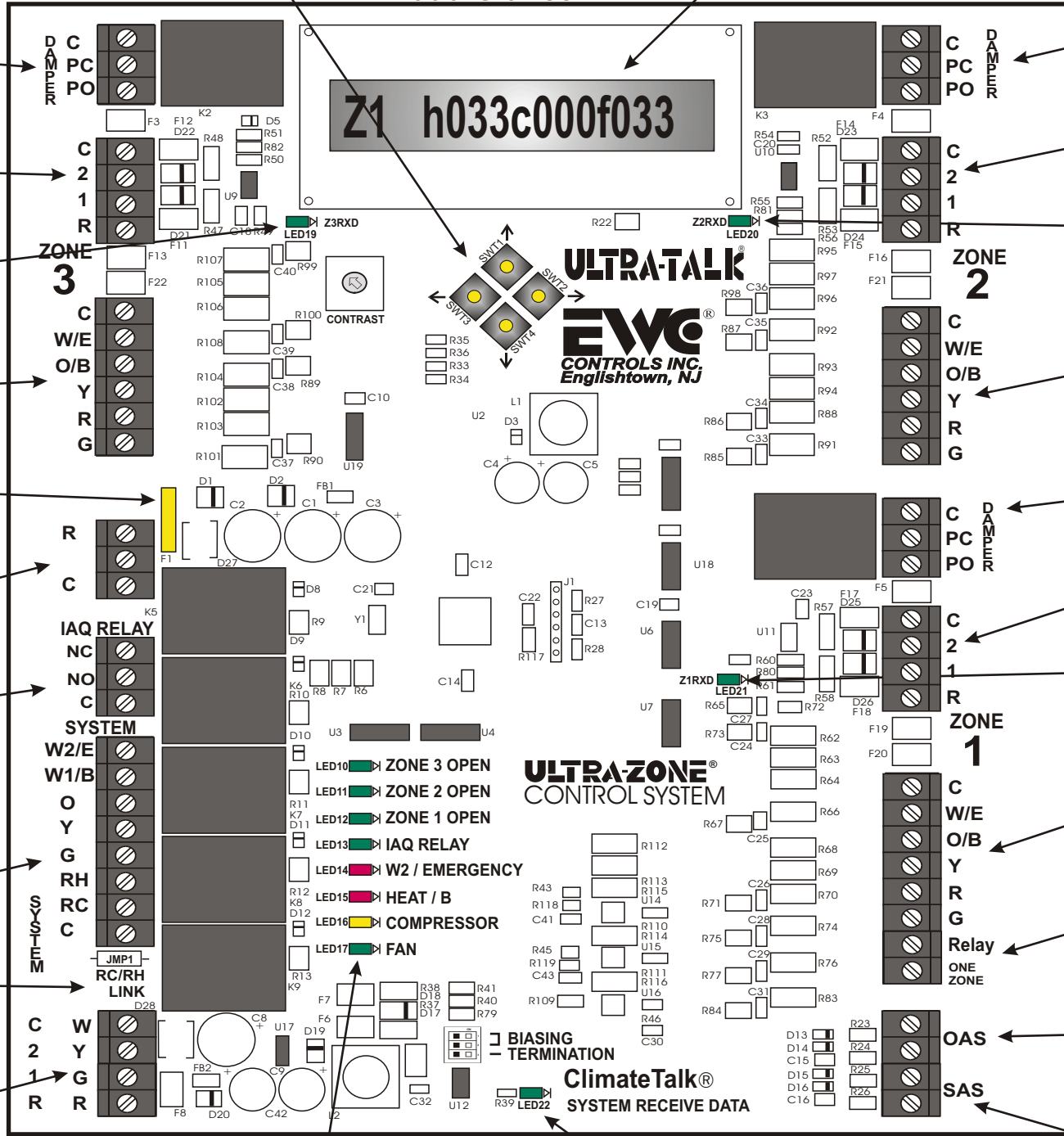


**Fresh Air IAQ Solution using a Field Supplied CO2 Monitor**  
(The IAQ relay will activate when it detects a "Fan" call from any zone)



**Setback "One Zone" Solution using a Commercial Grade Thermostat.** If you prefer, you can use a Part # VAC Manual Vacation Switch, or your own Time Clock. Call EWC Controls for assistance with your Setback solution.

# UT3000 Features at a Glance



Zone Damper #3

Communicating T-stat #3

Communicating Zone #3 LED Indicator

Regular T-stat #3

Over-Current Breaker 2.5 amp

24vac Power Input

Ancillary Dry (IAQ) Relay Output

Standard Dry Relay HVAC System Output

Rc/Rh Jumper

Communicating HVAC System Output

Color Coded SYSTEM Function LED's

Communicating HVAC SYSTEM LED Indicator

Zone Damper #2

Communicating T-stat #2

Communicating Zone #2 LED Indicator

Regular T-stat #2

Zone Damper #1

Communicating T-stat #1

Communicating Zone #1 LED Indicator

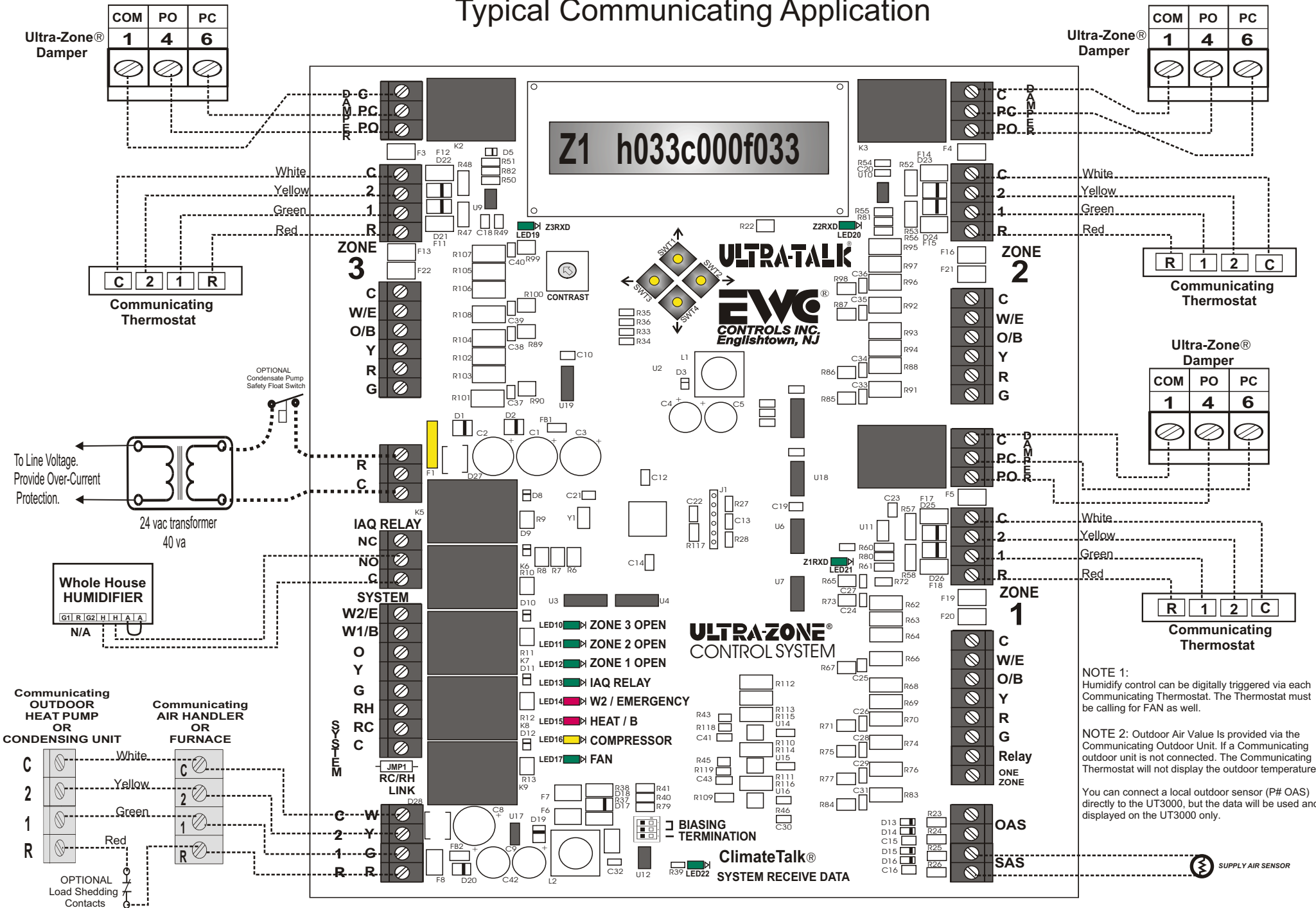
Regular T-stat #1

One Zone & Ancillary IAQ Function Inputs

Outdoor Air Sensor Terminals

Supply Air Sensor Terminals

# Typical Communicating Application



NOTE 1:  
Humidify control can be digitally triggered via each Communicating Thermostat. The Thermostat must be calling for FAN as well.

NOTE 2: Outdoor Air Value Is provided via the Communicating Outdoor Unit. If a Communicating outdoor unit is not connected. The Communicating Thermostat will not display the outdoor temperature.

You can connect a local outdoor sensor (P# OAS) directly to the UT3000, but the data will be used and displayed on the UT3000 only.

# WIRING INSTRUCTIONS

**WARNING: THESE PANELS ARE DESIGNED FOR USE WITH 24VAC. DO NOT USE OTHER VOLTAGES! USE CAUTION TO AVOID ELECTRIC SHOCK OR EQUIPMENT DAMAGE. ALL WORK SHOULD BE PERFORMED TO LOCAL AND NATIONAL CODES AND ORDINANCES. USE 18 AWG SOLID COPPER, COLOR-CODED, MULTI-CONDUCTOR THERMOSTAT CABLE.**

## Thermostat Wiring

Communicating thermostats can be used on all zones for all applications. You can also mix Communicating thermostats with 24v thermostats, or use 24v thermostats in all zones (exceptions apply). You cannot mix 24v Single stage heat/cool thermostats with 24v Heat Pump thermostats. A Comm LED is provided at each Communicating Terminal Block to indicate a "link" has been established with each communicating network. (Z1, Z2, Z3 and SYSTEM). Each Comm LED will pulse rapidly (at random intervals) to indicate the "link" is active. Otherwise, the Comm LED will blink slowly to indicate a loss of communication or the presence of a non-communicating thermostat. Be patient and allow sufficient time for the entire Zoned Communicating HVAC system to discover the network, and all Communicating Thermostats to finish their configuration process. Usually no more than 4 minutes.

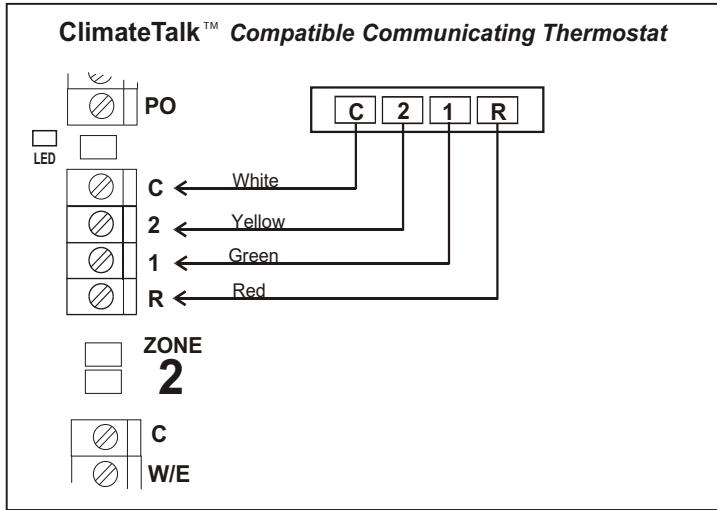


Figure 2a **OEM Mfr's Communicating Thermostat.** See thermostat instructions for further details. You can use communicating thermostats on every zone. Or use a communicating thermostat in Zone 1 and less expensive 24v thermostats in Zone 2 and Zone 3.

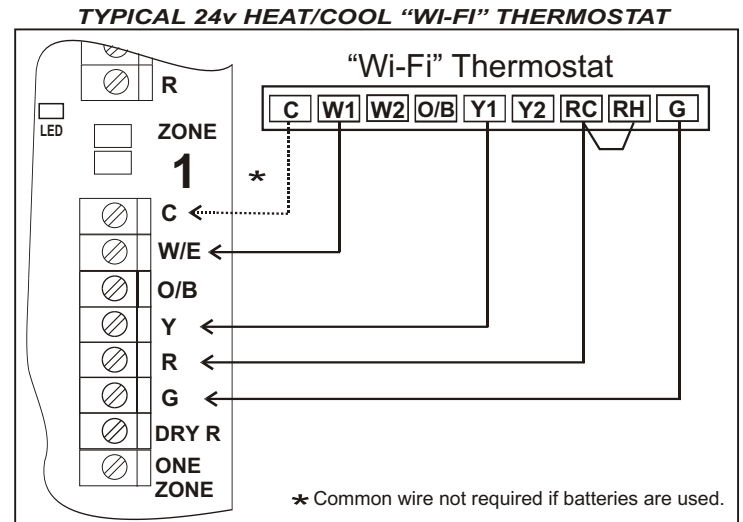


Figure 2c **Typical "Wi-Fi" Thermostat Configured for 1 heat & 1 cool.** See thermostat instructions for details.

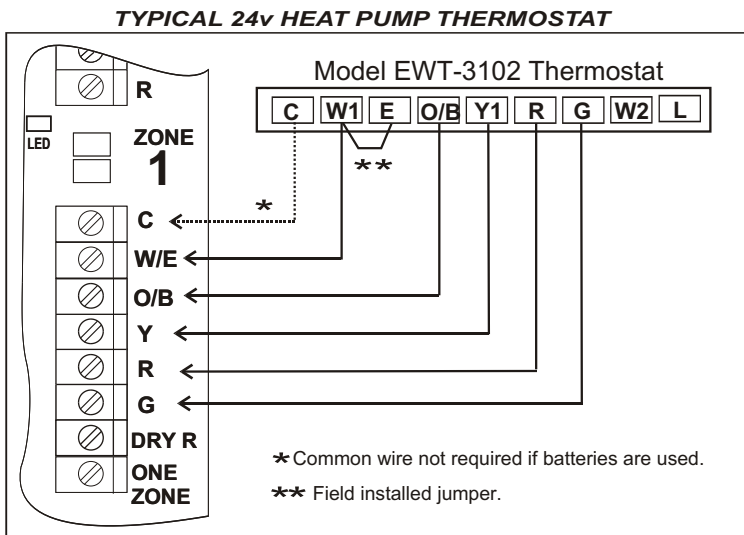


Figure 2b **Model EWT-3102 Thermostat Configured for 2 heat & 1 cool (HP1 mode).** See thermostat instructions for details.

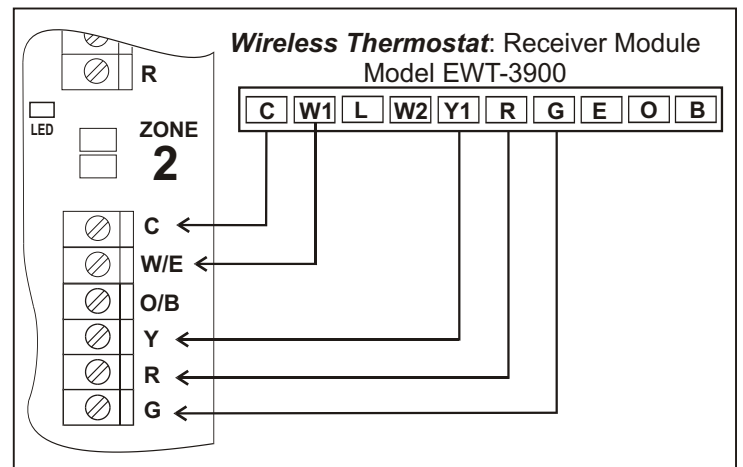


Figure 2d **Model EWT-3900 Wireless Thermostat.** Configured for 1 heat 1 cool (SS1 mode). Can be configured for heat pump also. See thermostat instructions for details. Use Wireless thermostats in Zone 2 and/or Zone 3. Always use a hard wired type thermostat for Zone 1.

**NOTE: The UT3000 allows the user to install Communicating Thermostats on all zones. Communicating thermostats can also be used in combination with 24v thermostats. You may also use regular Heat/Cool type thermostats or Heat Pump thermostats on all zones. This design simplifies the thermostat selection process and allows the installer to easily adapt the UT3000 to most any residential application.**

**NOTE: Regardless of the type of 24v thermostats used, the W2 Threshold feature or the OAS Set-Point will control the auxiliary system. Once the W2 Threshold is crossed or the Outdoor Air Set-Point is reached, Auxiliary Heat will energize. Auxiliary demands from each thermostat are only used to determine increased demand from that zone, rather than immediately activating Auxiliary operations.**

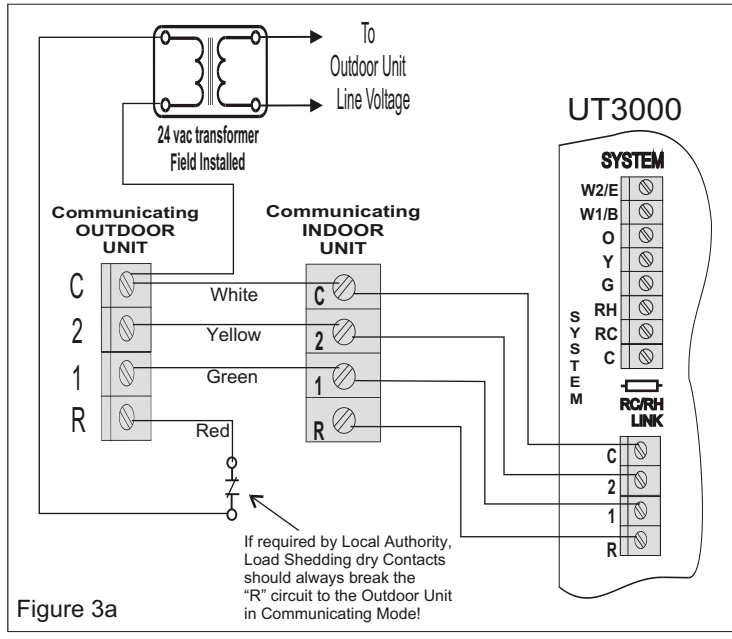
**Note: High fire on a two stage furnace is controlled by the W2 Threshold. Modulating furnaces are not affected by the W2 threshold setting.**

## System Wiring

The UT3000 panel was designed to be Plug and Play! We have provided several typical field wiring diagrams for your reference. Your actual field wiring may vary but in most cases will match these diagrams. In full communicating mode, four wires are all that is required from each thermostat and to the HVAC system. The UT3000 will "Talk" to the HVAC system and "Talk" to the thermostats in order to automatically setup and start operating the HVAC system. Your new communicating heat pump may have a non-communicating backup/auxiliary system, or your new communicating furnace still uses the non-communicating condensing unit outside. In all of these cases, the UT3000 is compatible.

### Communicating Heat Pump or A/C System

Four wires are all that is required to each component. Plug & Play



### Communicating INVERTER Electric/Fuel System

Three or four wires are all that is required to each HVAC component.

Plug & Play

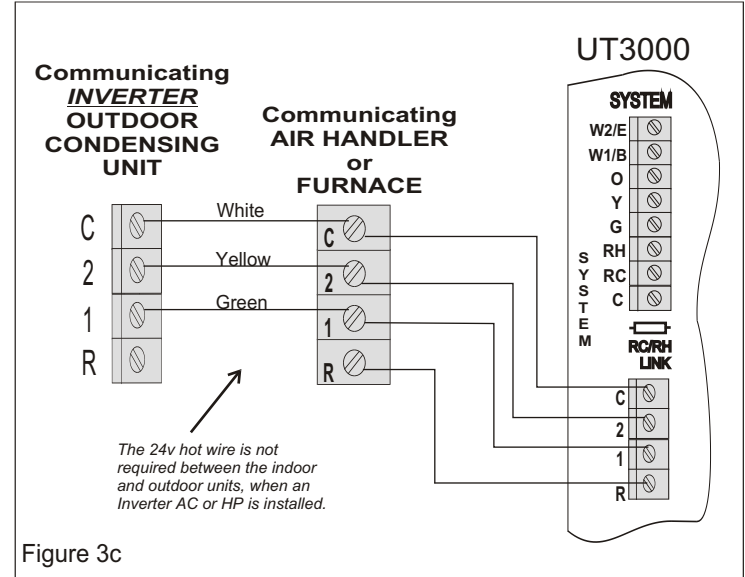


Figure 3c

### Communicating Furnace with 24v Legacy Air Conditioner

Four wires are required from the UT3000 to the Communicating furnace. Two wires are required to the 24v air conditioner. The 2 wires can come from the UT3000 or the Furnace. This diagram shows the wires coming from the furnace.

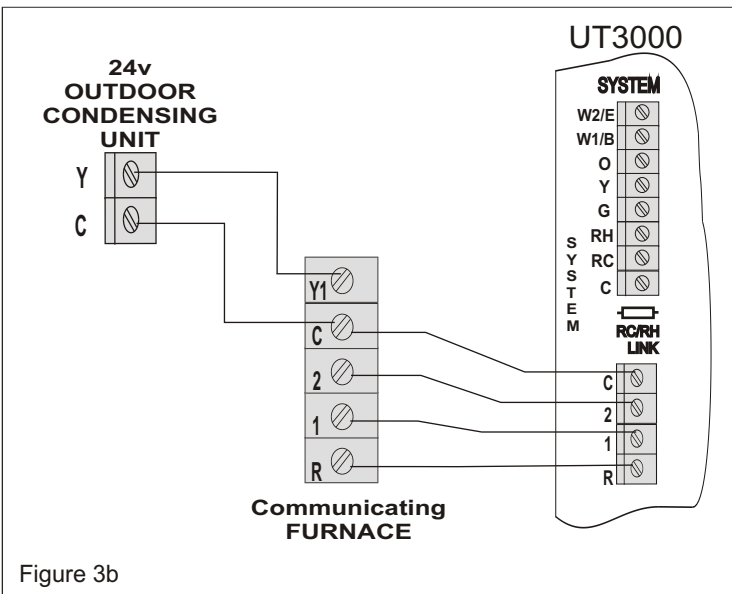


Figure 3b

### Existing Boiler with New HP System

You may have a new Communicating Heat Pump but want to use your Old Boiler as the Auxiliary backup rather than electric resistance heat. Connect the T&T circuit from your boiler control panel to the Rh and W2/E terminals on the UT3000. Plug & Play

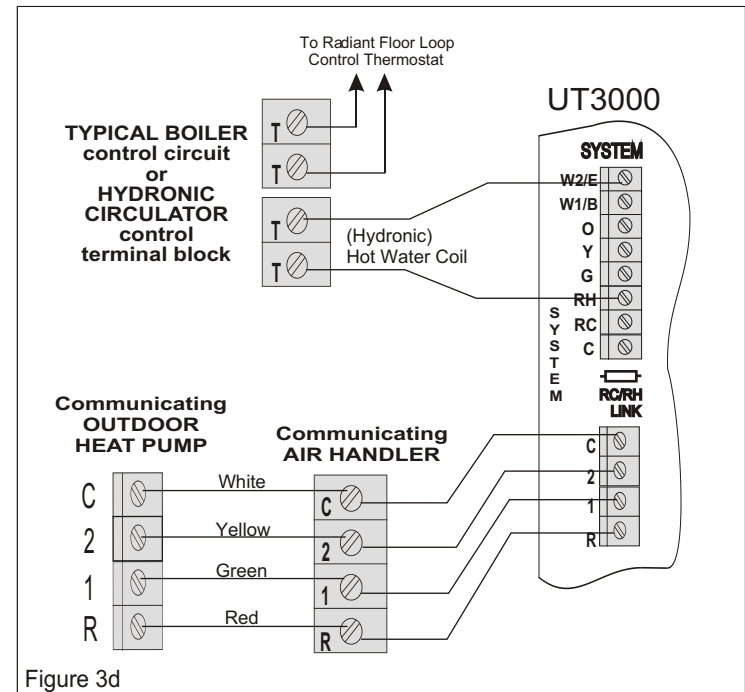


Figure 3d

**Contact EWC Controls Technical Support for assistance on these and other Equipment Wiring Solutions.**

# DAMPER WIRING

**Note:** The 500mA Damper Auto-Reset Circuit Breaker may trip, if too many *Spring Type* dampers are connected to a single zone!... You can connect only one (1) Model RSD or any other competitor's Spring type damper to a single terminal block (depending on current draw) without tripping the breaker. You can connect up to eighteen (18) Model ND, URD, or SID type dampers to a single terminal block without tripping the breaker.

**Note:** You can select all zone dampers to default "OPEN" or "CLOSE" after all zone demands are satisfied, and no HVAC demands are detected, from any zone thermostats.

## ZONE DAMPER MOTOR TERMINAL BLOCK DESIGNATION & FUNCTION

- Terminal PC 24vac Power to Close a Damper
- Terminal PO 24vac Power to Open a Damper
- Terminal C 24vac Common (Neutral)

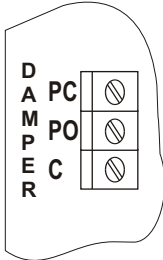


Figure 4

## Genuine ND, URD & SID Damper Wiring

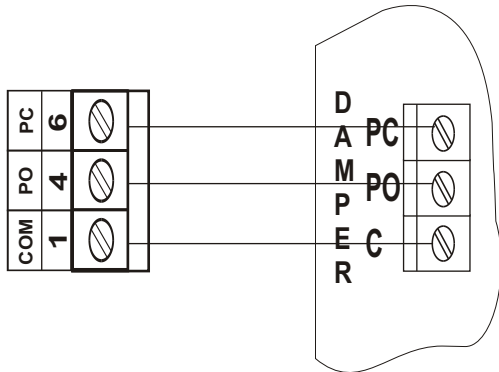
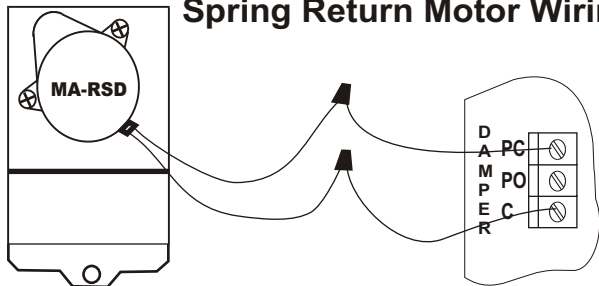


Figure 5a

**On all these dampers and most older style dampers, including competitor's dampers, always wire up number to number or by terminal designations.** (C to Com)(PO to PO)(PC to PC) (1-1) (4-4) (6-6)

## EWC Controls Typical Spring Return Motor Wiring

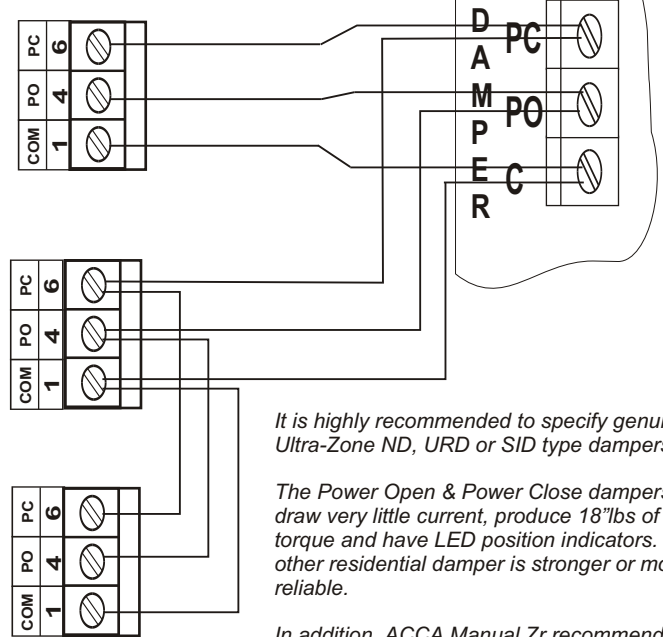


Any Spring Open Damper is wired to C & PC  
Any Spring Close Damper is wired to C & PO

Figure 5b

Current Draw for a ND, URD, or SID Type Damper = 26mA  
Current Draw for a typical Spring Type Damper = 400mA

## Three or More ND, URD, SID Dampers on a Single Zone Terminal Block No Isolation is Required

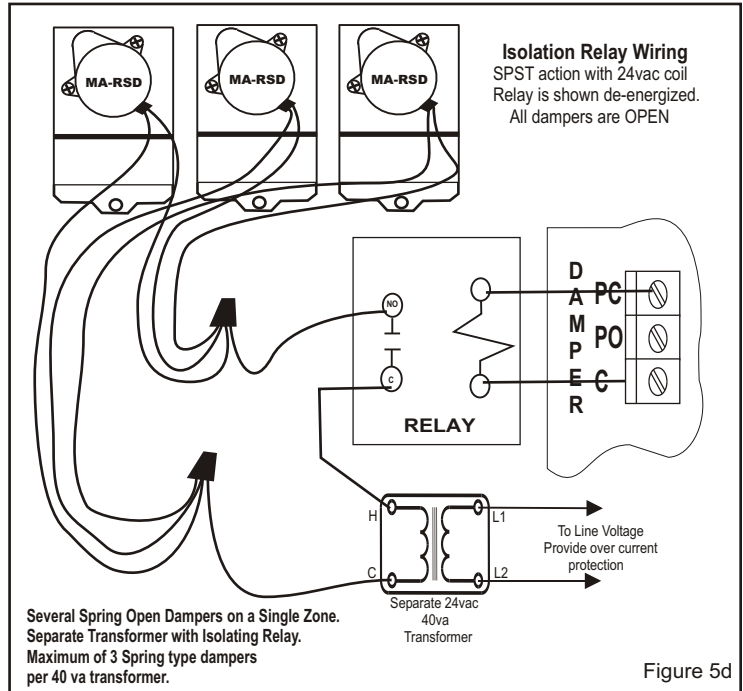


It is highly recommended to specify genuine Ultra-Zone ND, URD or SID type dampers.

The Power Open & Power Close dampers draw very little current, produce 18"lbs of torque and have LED position indicators. No other residential damper is stronger or more reliable.

In addition, ACCA Manual Zr recommends slower moving PO/PC dampers over Spring or Pneumatic type dampers.

Figure 5c



Isolation Relay Wiring  
SPST action with 24vac coil  
Relay is shown de-energized.  
All dampers are OPEN

Several Spring Open Dampers on a Single Zone.  
Separate Transformer with Isolating Relay.  
Maximum of 3 Spring type dampers per 40 va transformer.

Figure 5d

**DO NOT overload the UT3000's Damper Motor Circuit Breakers. If you need to connect more than one (1) Spring Type Damper to a single terminal block, use figure 5d to separate and isolate those dampers.**

# NEW ZONE WEIGHTING FEATURE

The UT3000 utilizes a zone weighting feature. You can select the weight for each zone independently. For example, if zone 1 has more heat loss/gain than zone 2 or zone 3, you can now assign it more weight, which is a big advantage over the old "Legacy DMD" demand feature. Here are some examples on how this new feature works.

## LIMIT SAS PID "N" = PID LOOP ACTIVE

The equation for calculating the "SYSTEM" starting and final demand when active zones are calling is the following:

$$\frac{\text{WEIGHT X DEMAND}}{100} = \text{"SYS" OUTPUT (Starting System Demand)}$$

$$\text{"SYS" OUTPUT (x3)} = \text{"SYS" Final System Demand}$$

\*Unless Thermostat(s) Demand Changes

### EXAMPLE 1 :

<u>Assigned Weight</u>		<u>Thermostat Demand</u>	=	<u>System Demand</u>		<u>Calculated Starting Demand</u>		<u>Final System Demand</u>
Zone 1 = 70%	x	30%(.30)*	=	21%		36%	x3	100%*
Zone 2 = 15%	x	100%(1.0)*	=	15%				
Zone 3 = 15%				36%				

\* Unless Thermostat(s) Demand Changes

PID Loop Staging Range

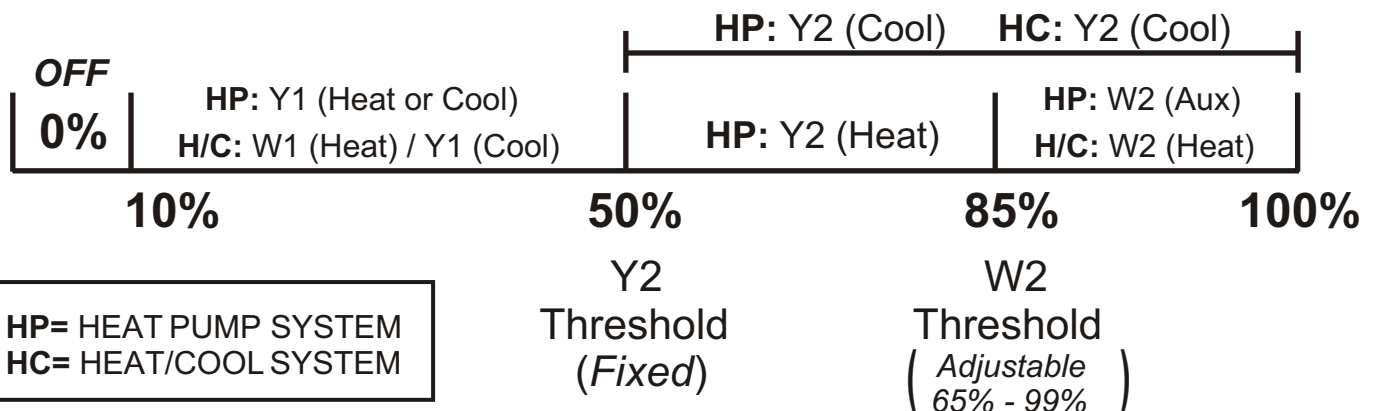
### EXAMPLE 2 :

<u>Assigned Weight</u>		<u>Thermostat Demand</u>	=	<u>System Demand</u>		<u>Calculated Starting Demand</u>		<u>Final System Demand</u>
Zone 1 = 65%								
Zone 2 = 35%	x	30%(.30)*	=	11%		11%	x3	33%*

\* Unless Thermostat(s) Demand Changes

PID Loop Staging Range

## UT 3000 SYSTEM HEAT/COOL STAGING SCALE



# NEW ZONE WEIGHTING FEATURE

The UT3000 utilizes a zone weighting feature. You can select the weight for each zone independently. For example, if zone 1 has more heat loss/gain than zone 2 or zone 3, you can now assign it more weight, which is a big advantage over the old "Legacy DMD" demand feature. Here are some examples on how this new feature works.

## LIMIT SAS PID "Y" = PID LOOP INACTIVE

The equation for calculating the "SYSTEM" starting and final demand when active zones are calling is the following:

$$\frac{\text{WEIGHT X DEMAND}}{100} = \text{"SYS" OUTPUT (Starting and Final Demand)}$$

\*Unless Thermostat(s) Demand Changes

### EXAMPLE 1 :

<u>Assigned Weight</u>	x	<u>Thermostat Demand</u>	=	<u>System Demand</u>	=	<u>Calculated Starting Demand</u>	=	<u>Final System Demand</u>
Zone 1 = 70%		30%(.30)*	=	21%		36% ↑	=	36%*
Zone 2 = 15%		100%(1.0)*	=	15%				
Zone 3 = 15%				36%				

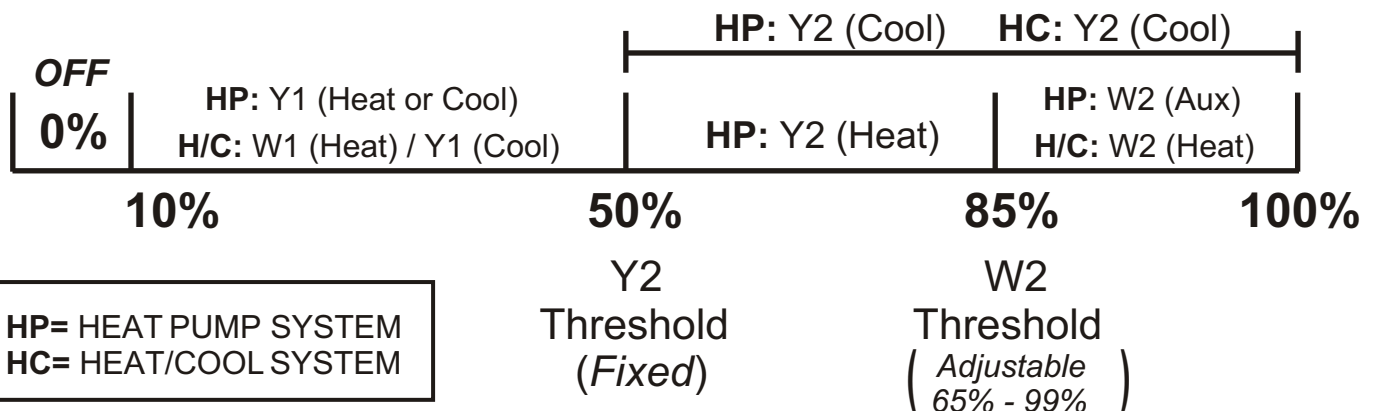
\* Unless Thermostat(s) Demand Changes

### EXAMPLE 2 :

<u>Assigned Weight</u>	x	<u>Thermostat Demand</u>	=	<u>System Demand</u>	=	<u>Calculated Starting Demand</u>	=	<u>Final System Demand</u>
Zone 1 = 65%								
Zone 2 = 35%		30%(.30)*	=	11%		11%	=	11%*

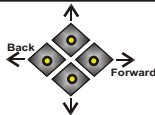
\* Unless Thermostat(s) Demand Changes

## UT 3000 SYSTEM HEAT/COOL STAGING SCALE



# TROUBLESHOOTING

SYMPTOM	SOLUTIONS
LCD & LED's are responding properly but HVAC system is malfunctioning. Communicating T-stat displays fault messages.	Check HVAC system field wiring for proper connections, continuity & shorts. Some HVAC systems require a "System Test" prior to normal operation. Connect communicating T-stat directly to HVAC system & perform System Test. Check BIAS voltages: C to Data 1 =2.8, C to Data 2 =2.2 <u>or</u> C to Data 1 =1.9vdc. C to Data 2 =1.3vdc.
Data voltages are incorrect. LCD & LED's are responding properly and/or Zone Thermostats are malfunctioning.	Check Zone system wiring for shorts/miswiring. Test wires for Continuity/Shorts. Check BIAS DC voltage: Data 1 to C = 2.8 & Data 2 to C = 2.2 <u>or</u> Data 1 to C = 1.9 & Data 2 to C = 1.3 <u>TERM / DS1 switches on the Communicating Outdoor unit should be set OFF.</u> Check HVAC equipment for faults via a Communicating T-stat & clear all faults.
LCD & LED's function and HVAC system functions normally but dampers do not respond.	Check damper motor wiring for proper connections. Check damper motor 24volt & 500mA Breaker. Test wires for Continuity/Shorts. Check damper motor wiring for shorts/miswiring. Test wires for Continuity/Shorts. Refer to Page 12 of the Technical Bulletin for Damper Wiring.
LCD & LED's do not function and HVAC system does not respond.	Check HVAC & UT3000 system transformer supply voltage. Check HVAC & UT3000 system 24vac transformer voltage/fuse/breakers. Test all wires for Continuity, shorts to 24v Common or shorts to earth ground. Check HVAC & UT3000 system wiring for shorts and miswiring.
Time Delay is Active and won't allow Heat or Cool to Function.	When Troubleshooting, Simultaneously Press the Back & Forward buttons for 1 second to Bypass any Active Time Delay.



## CHECK YOUR WIRING

<b>DETECTING 24vac SHORTS</b>	<b>SYMPTOM: Entire Panel or a Single Zone appears to be dead!</b>
HVAC system not responding and UT3000 LED's are off.	If 24vac short has occurred, 24vac will be present at the UT3000 24v Input terminals R & C; but 24vac will not be present at any Thermostat R&C.
Dampers not responding and The UT3000 LED's are off.	<b>SOLUTIONS:</b> Remove 24vac power from UT3000 and allow F1 circuit breaker to cool! Find and repair short(s) in damper and/or thermostat field wiring. Restore 24 vac power.
<b>ISOLATING 24vac SHORTS</b> <i>140mA &amp; 500mA circuit breakers protect the UT3000 and react to a short in the Thermostat/Damper component field wiring.</i>	Disconnect the wire(s) from the 'R' terminals on the UT3000 thermostat terminal blocks, and the "C/PO/PC" terminals on the UT3000 damper motor terminal blocks. Restore power. If the short is no longer present, Ohm out the thermostat and damper field wiring for continuity, shorts to common and/or shorts to earth ground. Replace or repair wires as necessary. Restore power.

### Detecting 24v shorts to common or shorts to earth ground

When the 2.5A breaker is tripped it will get hot to the touch and none of the panel LED's will illuminate. The LCD will also cease to function. To reset the breaker, locate the short by removing each hot wire connected to the panel, one at a time. When the shorted wire is removed, the panel will resume normal functions. Now you must repair or replace the shorted wire. If one or more 140mA or 500mA breakers trip, only the device(s) connected to that block will be affected. Remove each hot wire connected to that block until the voltage is restored. Find and repair the short before re-connecting the wires. If there is a short between the Data 1 & 2 wires or if the Data wires are shorted to 24v or earth ground, the Communicating thermostat on that zone will alert you by displaying "Call for Service". If no communicating thermostat is connected and a short occurs on the 24v wires, that zone will not function. Find and repair the short using the methods described above.

## TECHNICAL SUPPORT

*EWC® Controls provides superior toll free Troubleshooting Support for the UT3000 when you are on the job site!*

Call 1-800-446-3110 Monday - Friday 8am to 5pm EST. Otherwise call 1-732-446-3110 for information on the UT3000 and other ULTRA-ZONE® products. Visit our web site to download this Technical Bulletin and other related information at [www.ewcccontrols.com](http://www.ewcccontrols.com)

**When calling for Technical Support from the job-site, please have a good quality multi-meter, pocket screwdriver, and wire cutters/strippers on hand.**

## **JOB NOTES:**

**This Technical Bulletin and the UT3000 Addendum sheet are available for download at [www.ewccontrols.com](http://www.ewccontrols.com)**

**The UT3000 Addendum sheet #090376A0180 has very important and detailed information on the Daikin “ComfortNet” Inverter HVAC systems.**

**Specific “Twinning” guidance and any changes to Menu items or Default values are also detailed in the addendum.**