

## **ULTRAZONE®** Forced Air Zone Controls

The patented UT3000 Zone Control System has been enhanced to provide intelligent zone control of the Daikin®, Amana® & Goodman® ComfortNet™ R410 & R32 communicating HVAC systems. Create 2 or 3 air zones with a single panel or "twin" two UT3000's together to create a 4 or 5 zone system. Use EWC 24volt PO/PC type motorized dampers and compatible communicating thermostats. Features like Automatic Equipment Recognition, Modulating and Staged BTU capacity control, Dual Fuel functions, Energy Saving features and Precise Control of Supply Air Target & Limit set-points still come standard. The LCD display has been enhanced to include easy to read "System Status" messages. EWC Controls raises the bar again and sets a new standard for Residential communicating and proportional HVAC Air Zoning.

| Zone<br>Capacity                                    | Control 2 or 3 air zones with 24vac Power<br>Open/Close EWC zone dampers. Twinning<br>two UT3000's together, allows 4 or 5 zones.   |
|---|---|
| Compatible<br>HVAC<br>Systems                       | Control Communicating HVAC systems<br>based on the ClimateTalk <sup>™</sup> communicating<br>open protocol. Or any 24volt <u>legacy</u> 2 Heat<br>1 Cool Gas/Electric system or 2 Heat / 1<br>Cool conventional or DF Heat Pump.  |
| Compatible<br>Thermostats                           | The UT3000 is compatible with the Daikin<br>One+, Daikin or Amana Touch communicating<br>thermostats. The UT3000 is also compatible<br>with legacy (non-communicating) 24v single<br>stage Heat/Cool thermostats or 2 stage Heat<br>1 stage Cool Heat Pump style thermostats. |
| Automatic<br>Heat / Cool<br>Changeover              | The UT3000 is compatible with "automatic changeover" thermostat settings, which allows for individual zone comfort from the HVAC system.  |
| Status LCD<br>System COOL 25%                       | The Liquid Crystal Display scrolls to show<br>each zone thermostat demand input and the<br>HVAC system demand output. The outside<br>& supply air temperatures are also<br>displayed. In addition, all UT3000 menu<br>programming is performed at the LCD.                    |
| 4 Button LCD<br>Programming<br>Select Up<br>Forward | 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 long power failure.      |
| ¥   | In addition to the LCD, a total of 5 colored  |

Se

System LED's

LED's provide visual indication of the HVAC system status & mode of operation.

A total of 3 green LED's labeled Zone 1 Damper LED's thru Zone 3, are also provided to indicate which zone dampers are energized to Open. LEAVE THIS BULLETIN ON THE JOB SITE FOR FUTURE REFERENCE



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Communicating Zone Control System U.S. Patent No. 9,253,260

ITRA-TALK®3000

LED's

ECH

**Communicating** 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 Tstat Comm LED will remain Off for non-communicating T-stats.

## Fault Free Programming & Intuitive Temperature Control

The UT3000 comes pre-loaded with Default Operating Parameters (See Page 2, Table 1) for Zoned HVAC Systems. The Default Programing means less work for the Installer, 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 (IAQ Relay), with a digital & 24v Input Trigger. It can be used to interlock and control Ancillary IAQ functions:

\* Fresh Air Damper \* Whole House Humidifier

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\* Energy Recovery Ventilator

The UT3000 must detect a Fan, Heat or Cool demand from one or more communicating zone thermostats or legacy non-communicating zone thermostats, before the IAQ relay will energize.

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Figure 1. UT3000 panel

## INSTALLATION INSTRUCTIONS - See Start-up Guide #090376A0194

**MOUNTING:** Choose a suitable location to mount the UT3000 housing. Suitable locations are on the Return Duct, a Nearby Wall or Convenient Studs where plywood can be installed to support the housing. <u>Avoid mounting the UT3000 on the Supply duct.</u> **Do not** mount the UT3000 directly to any Air-Handler, Furnace, Hot Water Cabinet or Evaporator Cabinet to avoid damaging these devices. Unless code permits, **Do not** mount the UT3000 in the "open" return air stream. Follow all National and/or Local Mechanical & Building Codes.

**POWER SUPPLY:** The UT3000 requires a dedicated 24vac transformer. 40va minimum - 60va maximum. <u>Follow National Electrical Code and/or Local</u> <u>Electrical Code</u>.

WIRING: In most cases standard 18awg solid copper multi-conductor cable works fine. In rare cases 18awg (4 wire) cable may be needed on long outdoor wire runs (= > 100ft) or short wire runs picking up electrical interference. Use two wires for each data circuit, rather than one. Connect the 24vac Power Supply to the UT3000 and wire-up thermostats and dampers. Use the knock-outs provided on the housing as the wire entry-way. Stripping the cable's jacket back to the point where the cable enters the housing, reduces bulk and allows easy routing of the individual wires for a professional looking installation.

#### 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:** The UT3000 will automatically identify the HVAC system and start running as soon as thermostat demands are detected. Allow 8 - 10 minutes for all Thermostats and the zoned HVAC system to fully configure, depending on the number of zones. The Default Supply air Sensor temperature Targets and off-set Limits will be used. You can adjust the menu default settings to the values you prefer.

When connected to a <u>Conventional 24v HVAC system</u>, scroll thru the LCD menu and select the type of HVAC system you have and the type of thermostats you want to use. Accept the default settings or adjust them as you prefer.

FINISH: When the Installation is complete, it may be necessary to operate the system in "Test Mode" or "Charging Mode" first! Afterwards, run the system thru it's paces and observe the HVAC system in all possible modes of operation. Check the Zone Dampers and the Bypass Damper for proper operation. Balance the duct work and adjust the Menu Settings as you prefer.

### UT3000 Version 1.85 SPECIFICATIONS and MENU ITEMS:

NUMBER OF ZONES: 2 or 3 zones per control panel. 4 or 5 zones by twinning. See Start-Up & Commission Guide #090376A0194 Rev C & Addendum Sheet #090376A0180 Rev V.

#### COMPATIBLE COMMUNICATING EQUIPMENT:

Climate Talk<sup>™</sup> HVAC systems - Daikin<sup>™</sup>, Amana<sup>™</sup>, Goodman<sup>™</sup> COMFORTNET<sup>™</sup> systems. Up to 4 stages of heat & up to 2 stages of cooling. (Inverter driven AC or HP) (Modulating Gas). Non-Communicating Gas/Electric/Hydronic systems – Up to 2 Stage Heating and 1 Stage Cooling. Non-Communicating Heat Pump or Dual Fuel systems – Up to 2 Stage Heating and 1 Stage Cooling.

#### COMPATIBLE / RECOMMENDED COMMUNICATING THERMOSTATS:

Climate Talk<sup>™</sup> (Daikin One+, Daikin Touch & Amana Touch Thermostats). Non-communicating 24vac single stage Heat/Cool or 2 Stage Heat, 1 Stage cool HP Thermostats. Warning: Non-communicating thermostats cannot demand De-Humidification or Proportional Control.

#### COMPATIBLE / RECOMMENDED DAMPERS:

EWC® Ultra-Zone® Models URD, ND, and SID with MA-ND5 or MA-15S motors. Spring Type Dampers (2 or 3 wire type) are not compatible due to high current draw!

Spring Type Dampers (2 or 3 wire type) are not compatible due to high curren

#### MAXIMUM NUMBER OF DAMPERS PER ZONE:

Up to 3 ND, URD, or SID Dampers Per Zone @ 26mA per damper. Total 9

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

2.5Amp main circuit board protection.
100mA on each Damper Motor Terminal Block.
350mA on each Communicating Thermostat Terminal Block.
140mA on each Regular 24v Thermostat and HVAC System 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, HRV/ERV or a Fresh Air Motorized Damper.

#### **RECOMMENDED ACCESSORIES:**

Model SAS – Supply Air Sensor (Included/ Required for proportional equipment control). Model DAPC – Airflow & Static Pressure Management (Optional/Highly Recommended), or Model SBD2 – Airflow & Static Pressure Management (Optional/Recommended). Model OAS – Outdoor Air Sensor (Optional) Unnecessary for communicating outdoor units. Model CPLS – Coil Protection Lockout Switch (Optional/Recommended).

EWC

ULTRAZONE"

NOMINAL DIMENSIONS

10"x10"x1.75"







If desired, you can reset the UT3000.



Upon Power Up, Press and Hold the Back & Forward buttons to Load the Factory Default Values, then Release.

### **TABLE 1**

| FEATURE          | DEFAULT          | RANGE TO SELECT                          |
|------------------|------------------|--|
| System Type      | Heat/Cool        | Heat Pump or Heat/Cool                   |
| НР Туре          | NON<br>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 $1^{\circ}$ to $42^{\circ}$ F     |
| O.T. Offset      | 8° F             | 5° to 20° F                              |
| U.T. Offset      | 7° F             | 5° to 12° F                              |
| SAS HP TGT       | 105° F           | 90° to 120° F                            |
| SAS Gas TGT      | 142° F           | 120° to 170° F                           |
| SAS Cool TGT     | 47° F            | 40° to 60° F                             |
| SAS RSP DLY      | 30s              | 10seconds - 180seconds                   |
| W2 Threshold     | 95%              | 65% - 99% (Adj. in 5 point increments)   |
| PURGE FAN        | 50%              | 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<br>PID | N                | Yes or No                                |
| DMP DFLT         | Open             | Open or Close                            |
| W2 lockout       | 99° F            | 5°F to 99°F                              |

# **LCD Screen Programming**



# LCD Screen Programming



SAS RSP DLY 30s

DEFAULT

Step 11

Select how fast the UT3000 will "Add Points" to increase the "HVAC system" BTU capacity level, above the basic "Weight x Zone Demand" calculation. The screen above specifies that the UT3000 will add one point (to the active system demand) every 30seconds. This determines how fast the UT3000 will increase the BTU output of the HVAC system.

The point adding process starts after the UT3000 calculates the sum of one or more zone weight values, multiplied by the demand value input coming from each active zone thermostat.

Points are added if the PID loop is enabled. Note: The PID loop is enabled by default. The PID Loop is allowed to boost (triple) the sum of one or more zone weight values, multiplied by each active zone thermostat's (momentary) demand value.

Note: The point adding process will stop, if the UT3000 detects a condition where the actual supply air temperature matches the "active" target set-point (+ - 1°F). (Cool Target, Gas Target or HP Target).

Example: The UT3000 will stop adding points if the actual supply air temperature is 49°F, 50°F or 51°F, and the Cool Target has been set to 50°F. Continued on the next column.

Cooling Target (> 1°F), the UT3000 will increase the SYS Cool output by 1 point every 30 seconds. If the Cooling Supply Air Temperature is below

Heating Target (> 1°F), the UT3000 will decrease the SYS Heat output by

temperature target (+ - 1°F). The point adding/deducting process will stop under this condition.

energizes. The Range is 65% - 99% and the default value is 95% you want the Auxiliary system to energize on the Outside Air 100% demand *or* the Outside Air temperature drop low enough, to energize Auxiliary heat.



Step 13

DEFAULT

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 50%. Note 1: Typically, the HVAC system's own purge function (speed and duration) supercedes the zone system's purge function. Note 2: Fan Only speed demands from communicating T-stats can be changed by the end user (Low, Medium or High). Fan Only speed demands from Non-communicating T-stats are interpreted as High. Note 3: Fan Only speed demands are multiplied by that zone's assigned weight value before being sent on to the HVAC system. Important Note: Review all Programming Features carefully and call EWC Controls if you have questions. With years of experience Zoning HVAC systems, we have plugged in default values that should work fine for the majority of the jobs you will encounter. If desired, you can 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 depending on factors such as the Internal & External Load, SAS Response Delay Setting, Supply Air Target set-point, Thermostat type and the Thermostat demand value.

# **LCD Screen Programming**



4 Button LCD

Programming

The UT3000 wants to match the Actual Supply Air temperature to the Cool or Heat Target Set-point. The SAS Response Delay determines how fast the UT3000 will ramp the HVAC system. Via the UT3000's advanced staging logic, (see the next pages) the UT3000 will ramp (add points) to the System output demand (increasing BTU capacity) in an effort to match the Actual Supply Air temperature to the Cool or Heat Target Set-point. Ramping will stop if the point adding process triples the sum of the zone weight multiplied by the zone demand, regardless of the supply air temperature.

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. <u>Place a check mark next to each</u> selection or write the value in the box for <u>future reference!</u>

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. Three zone default weight values are 70/15/15. Two zone default weight values are 60/40.



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.

Step 15

DEFAULT

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.



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.



Step 17 DEFAULT

Select the total number of zones (thermostats) you have connected to each UT3000. You may select 2 zones or 3 zones. The factory default value is 3 zones. It may be necessary to assign very low weight values to some or all zones zones, in order to avoid air noise issues. The total assigned weight values do not have to equal 100%, but going above 100% is not permitted. LIMIT SAS PID N

Step 18 DEFAULT

Select "N" for NO, *if you want the UT3000 to boost* the BTU capacity of the HVAC system, above the active zone(s) calculated demand. *See page 16*. The PID Loop is allowed to boost (triple) the sum of one or more zone weight values, multiplied by the observed demand value of each active zone. The UT3000 System (SYS) demand output value, is based on the sum of one or more zone assigned weight values, multiplied by the observed demand values of each active zone. *This is the recommended setting for Daikin communicating Inverter AC/HP & gas Modulating systems. Note: The PID boost process (point adding) can be interrupted. See page 4, Step 11.* 



Select "Y" for YES, *if you do not want the UT3000 to boost* the BTU capacity of the HVAC system, above the active zone(s) calculated demand. **See page 17**. This will limit the UT3000 System (SYS) demand output value, to the base sum of one or more zone weight values, multiplied by the observed demand value of each active zone. Basically, the UT3000 will not boost (triple) the sum of the zone demands. *This is the recommended setting for communicating two stage systems.* 

DMP DFLT OPEN

Step 20 DEFAULT

Change the default position of the zone dampers when the HVAC system is idle. The factory default is to "OPEN" all zone dampers when idle. Select "CLOSE" if desired and make sure the HVAC system's purge cycle is set for no longer than 90 seconds. Setting "CLOSE" on a sub-panel will only apply to the zone dampers connected to that specific sub-panel.

W2 OT LOCKOUT 50°

**Ultra Talk** 

Step 21

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

V 1.87

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.

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# **LCD System Messages**

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 typical LCD data screen examples:* 



6

# **NEW LCD System Messages**





This screen displays the SYSTEM **(SYS)** Output percentage to the HVAC Equipment. *In this example, the UT3000 is demanding 75% cooling capacity. That means 2nd stage cool* (Y2) *is active, or the outdoor Inverter is operating at 75% BTU cooling capacity.* 

NOTE: During Cooling & Heating operations, delivered CFM is controlled by the HVAC system! The only time the indoor fan operates at the UT3000's demand is during Fan Only.



! SAS Sensor Bad !

This screen shows the duct temperature at the location of the supply air sensor in real time. The UT3000 monitors and compares the Actual Supply Air Temperature to the selected HP Target, Cooling Target or Gas Target Setpoints.

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 value, the UT3000 will display the screens shown below.



This screen shows the outside air temperature in real time, at the location of the outside air sensor. This OA value could be from the Communicating outdoor unit or from a sensor (#OAS) 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 or high heat for all heating demands.

**NOTE:** The !OAS Sensor Bad! screen is also a reliable indication that the UT3000 is not communicating with the outdoor HP or AC unit! *Review the troubleshooting chart for corrective action.* 

## SYS h000c000f030

## System FAN 30%

This screen displays the SYSTEM **(SYS)** Output percentage to the HVAC Equipment. *In this example, the UT3000 is demanding 30% Fan Only capacity.* 

NOTE: The only time the indoor fan operates at the UT3000's demand is during Fan Only functions. During Cooling & Heating operations, delivered CFM is controlled by the HVAC system!



The Zone 1 & Zone 2 screens above (left) each show heating demands of 50% and 100% respectively.

The Zone 3 screen above (right) shows a cooling demand of 30%. All calls are active at the same time but the Zone 1 & Zone 2 heating calls were detected first, so the UT3000 honored Zone 1 & Zone 2 by running the heating system and closing the Zone 3 damper.

The UT3000 will delay (postpone) the Zone 3 cooling demand until Zone 1 & 2 satisfy OR the 20 minute "Opposite Mode" clock expires.

The 20 minute "Opposite Mode" clock has now expired because both heating demands did not satisfy during the allotted 20 minutes. Zone 1 and/or Zone 2 heating demands may still be present, but the UT3000 will now service the cool demand in Zone 3, and restart the 20 minute "Opposite Mode" clock again.

The UT3000 will display one of the screens above, depending on whether the change-over is from Heat to Cool (HC) or from Cool to Heat (CH). The display is your indication that "Opposing Demands" from the zone thermostats are occurring.



The UT3000 will receive an alarm signal from the Daikin FIT communicating equipment through the system wiring. The UT3000 will display the **"R32 Call Service"** message. There is No Need to use any other device for this feature to work. The UT3000 will shut off your equipment, open all zones and turn the fan on to ventilate the area. If this occurs immediately contact a qualified HVAC professional to diagnose and repair any issues.

| Built-In   |
|------------|
| Delay Time |
| Settings   |

## The UT3000 has built-in Delay Timers

| Delay Timer  | that insure safe HVAC system operation.  |  |  |  |
|--|--|--|--|--|
| Settings   | *Purge Delay Timer 210 seconds, fixed.   |  |  |  |
| EWC recommends<br>that you turn off all<br>thermostat time<br>delays and let the<br>UT3000 built-in Delay<br>Timers protect the<br>HVAC system | *Short Cycle Timer 2 minutes, fixed.   |  |  |  |
|  | *Supply Air Limit Delay 3 minutes, fixed.  |  |  |  |
|  | *Changeover Timer 4 minutes, fixed.  |  |  |  |
| -  | *Opposing System 20 minutes, fixed.<br>Service Timer   |  |  |  |
|  | TIMER DEFINITIONS  |  |  |  |
| Purge<br>Delay<br>Timer  | At the end of any cooling or heating operation, the UT3000 will hold the last calling zone open for 210 seconds.   |  |  |  |
| Short Cycle<br>Timer   | When all Zones are satisfied, the UT3000 will not restart the same call for a minimum of 2 minutes.  |  |  |  |
| Supply Air<br>Limit Timer  | If a Heating or Cooling operation cycles<br>down due to excessive Supply Air<br>temperature, the UT3000 will not re-<br>start the HVAC system for 3 minutes.   |  |  |  |
| Changeover<br>Timer  | At the end of a call, a 4 minute timer is<br>started and the UT3000 will not switch to<br>the opposite mode of system operation<br>until the timer has expired.  |  |  |  |
| Opposing<br>System<br>Service<br>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<br>Mode<br>Feature  | The UT3000 includes the ONE ZONE<br>feature that allows a Commercial Grade<br>Thermostat or Time Clock to Force the<br>UT3000 into the ONE ZONE MODE during<br>Setback Periods. In compliance with<br>California Title 24, when the One Zone<br>Terminal is energized, the UT3000 ignores<br>all Zone T-stat demands except for Zone 1.<br>All Zone Dampers are Forced Open. When<br>the One Zone terminal is de-energized, the<br>UT3000 will resume Zoning Operations. |  |  |  |

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

> NOTE: The UT3000 must observe a Heating, Cooling or Fan demand from any one of the zone thermostats, in addition to the IAQ relay input, before the IAQ relay will trigger!

The Diagrams shown below reflect different ways to utilize the IAQ Dry Relay to your advantage. Other wiring is not shown for clarity.



The communicating thermostat can send a digital signal to humidify, but the wiring method shown above is now preferred (best practice) and works consistently! You must have at least one spare wire!

Powered (Steam) Humidifiers just need a dry contact to start. Connect the H & H humidifier terminals to "C" and "NO" at the IAQ relay terminal block as shown above. Refer to Wiring diagram 090512A0519-A if your humidifier is not self-powered or call EWC Tech Support.

It is advised to use Zone 1 as the "only" humidifier control. However, other zone thermostats can be wired in the same manner resulting in two or three wires connected to the "relay" terminal

1. Access the thermostat's advanced menu (Dealer Edit)

"Add" the humidifier to the Equipment Folder of the thermostat.
 Select "On with Heat" or "On with Heat and Hum".

4. Select Fan speed at 75% to 100% in order to move sufficient airflow to properly humidify.



NOTE: If the IAQ relay is used for fresh air, it cannot be used for humidifier control.



NOTE: If the IAQ relay is used for fresh air, it cannot be used for humidifier control.





## WIRING INSTRUCTIONS

*WARNING:* THESE PANELSARE 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.

**EWC highly recommends using Daikin ONE communicating thermostats in all zones!** Enhanced de-humidification (via the FIT HVAC system) cannot be achieved without a communicating thermostat. Communication LEDs (LED19, 20, 21 & 22) are provided at each "communicating terminal block" to indicate that a "link" has been established with each communicating network. (Z1, Z2, Z3 & SYSTEM). Each Comm LED will pulse (at random intervals) to indicate the "link" is active. Otherwise, the Comm LED will blink slowly to indicate "no network detected". The Comm LED will remain OFF (by zone) when non-communicating thermostats have been detected. Be patient and allow sufficient time (10 - 15 minutes) for the UT3000 to discover the HVAC network, and for all communicating thermostats to finish their configuration process, which includes equipment identification, menus and outside temperature conditions. Ideally, all zone thermostats should be set to OFF during this process.





Figure 2b

Typical Heat Pump Thermostat configured for 2 heat & 1 cool. Refer to Mfr's instructions.



Figure 2d WiFi thermostat configured for 1 heat & 1 cool. Refer to Mfr's instructions. Nest or Ecobee brand Thermostats are also compatible.

**NOTE:** The UT3000 allows the user to install Communicating Thermostats in all zones! EWC highly recommends using communicating thermostats in all zones! System commissioning & maintenance functions are accessed via the zone 1 communicating thermostat only! Enhanced de-humidification is achieved via the communicating thermostats. The Daikin One+ thermostat MUST be connected to Zone 1 for "Daikin Cloud Inverter Menu" access. Communicating thermostats can be used in combination with 24v non-communicating thermostats if desired.

**NOTE:** Regardless of the type of thermostats used, the W2 Threshold feature, W2 Lockout feature and/or the OAS Set-Point feature, will control the Auxiliary/Backup heat in non-emergency mode. Once the W2 Threshold is crossed, the W2 Lockout set-point is reached or the Outdoor Air Set-Point is reached, Auxiliary Heat will energize. *Auxiliary demands from each thermostat simply increase the observed (input) demand from that zone, which may or may not activate Auxiliary heat operations, based on the use and settings of the above mentioned features.* 

**NOTE:** High fire (W2) on a 2 stage communicating furnace occurs at 51% system demand, similar to Y2 HP Heating or Cooling. The W2 Threshold setting has no affect on a 2 stage or modulating furnace. The W2 Threshold setting only affectsAuxiliary/Backup on heat pump systems.

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on these and other Equipment Wiring Solutions.

## System Wiring

The UT3000 panel was designed to be <u>Plug and Play</u>! 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. Other non-communicating application wiring diagrams and solutions are available. Contact EWC Controls Technical Support for .





## Existing Boiler with New HP System

You may have a new Communicating Heat Pump but want to use your Boiler (Hot Water Coil) as the Auxiliary backup rather than electric resistance heat. Connect the T&T circuit from your boiler control panel to a field relay installed in the Air handler. Wire as shown.

**Note:** You *must* specify the KW electric heat rating (HW coil BTU equivalent) in the Air Handler's "ClimateTalk User Menu" (or Dip Switch settings) to achieve the correct/desired airflow!

Figure 3d

Install the Relay in the Air Handler and connect the T&T circuit from your boiler control panel to the Normally Open contacts on the "field" Relay. Wire to T & T Circuit Communicating OUTDOOR AIR CONDITIONER UT3000 Svstem Communicating 0110 R1 RELAY or HEAT PUMP AIR HANDLER Block SPDT W/ 24V. COIL White c ⊘⁻ CØ С Yellov 20 Yellov 20 2 0 Green Green 0 10 10 1 Red R RØ R |WIRE NUT WIRE NUT Factory 24V Factory 24V White (W1) Blue (Common) in Air Handler in Air Handler MBVC' MBVC\* Existing Wiring Field Wiring **Note:** Set the Air Handler Dip Switches for the desired KW Heater Kit. Typically 7.5kw - 15kw. Measure the temperature rise and if needed, adjust the Air Handler KW setting to achieve the desired Delta T.

## 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.

**Note:** You *must* specify the tonnage of the non-communicating outdoor unit, inside the Furnace equipment *User Menu*, in order to achieve the correct airflow!



## DAMPER WIRING and AIRFLOW MANAGEMENT using Model DAPC

Note: The 100mA Damper *Auto-Reset* Circuit Breaker (protecting each zone damper output) may trip, if too many dampers are connected to a single zone! In particular if the UT3000 is located in a hot attic.

You can connect up to three (3) Model ND, URD, or SID type dampers to a single terminal block without tripping the breaker, regardless of the ambient temperature.

**Note:** You can select all zone dampers to default "OPEN" or "CLOSE" during IDLE periods.

## Idle periods are defined as:

\* The HVAC system is idle and not running.

\* Caution: Inverter based "Oil Return "mode runs without a zone thermostat demand!

\* All Fan/Purge functions have timed out.

\* All zone thermostat demands are satisfied.

\* No zone thermostat demands are detected.

## Zone thermostat demands are defined as:

- \* Heating
- \* Cooling
- \* Fan Only / Circulate
- \* Humidification / De-humidification

## ZONE DAMPER MOTOR TERMINAL BLOCK DESIGNATION & FUNCTION

Terminal PO24vac Power to Open a DamperTerminal PC24vac Power to Close a DamperTerminal C24vac Common (Neutral)



Figure 4

# Genuine ND, URD & SID Damper Wiring with MA-ND5 or MA-15S motors

## PARALLEL versus SERIES wiring

Resist the urge to wire damper motors in series, jumping from motor to motor to motor. Wiring multiple motors in parallel (as shown below in Figures 5b and 5c) reduces the possibility of loose connections, high resistance and voltage drop.

On these dampers and most older style dampers, always wire up number to number or by terminal designations. PAY ATTENTION TO YOUR WIRING!

(C to Com)(PO to PO)(PC to PC) (C=1) (PO=4) (PC=6)





Figure 5a

## **DAMPER WIRING and AIRFLOW MANAGEMENT with Model DAPC**



# **ZONE WEIGHTING FEATURE**

| The HVAC system's momentary BTU capacity level, is determined by multiplying one or more zone weight assignment values by the proportional (or fixed) thermostat demand value, coming from each respective zone. If the PID loop is active, the UT3000 will "boost" the HVAC system's BTU capacity above the base sum of zone weight(s) multiplied by zone demand(s). |  |                                    |  |
|---|--|------------------------------------|--|
| LIMIT SAS PID "N  | I" = PID LOO   | ΡΑCΤΙVΕ                            |  |
| The equation for calculating the "SYSTEM" calling is the following:   | Initial and Maximum dem                              | and when active zones are          |  |
| Zone WEIGHT x Tstat <u>DEMAND</u> = (Initial System Demand)<br>100  |  |                                    |  |
| Initial System Den  | nand (x3) = (Boost Systen                            | n Demand)                          |  |
| EXAMPLE 1 :   |  |                                    |  |
| Assigned <u>Thermostat</u> Sys<br><u>Weight</u> <u>Demand</u> <u>Dem</u>  | tem <u>Calculated</u><br>nand <u>Initial Demano</u>  | <u>Max System</u><br><u>Demand</u> |  |
| Zone 1 = 70% x $30\% (.30)^* = 2$   | 21% 36%  | x3 = 100% <sup>*</sup><br>▲        |  |
| Zone 2 = 15% x 100% (1.0) <sup>*</sup> = 1  | <u>15%</u>   |                                    |  |
| Zone 3 = 15% 3  | 6%   | PID Loop<br>Boost Value            |  |
| * Unless Thermostat(s) Demand Changes   |  |                                    |  |
| EXAMPLE 2 :   |  |                                    |  |
| AssignedThermostatSysWeightDemandDenZone 1 = 65%  | <u>item Calculated</u><br>nand <u>Starting Demar</u> | Max System<br>nd <u>Demand</u>     |  |
| Zone 2 = $35\%$ x $30\%$ (.30) <sup>*</sup> = 1 <sup>2</sup>  | 1% 11%   | x3 = 33%*<br>♠                     |  |
| * Unless Thermostat(s) Demand Changes Boost Value   |  |                                    |  |
| UT 3000 SYSTEM HEAT/COOL STAGING SCALE  |  |                                    |  |
| HP: Y2 (Cool)   |  |                                    |  |
| OFF         HP: Y1 (Heat or Cool)           0%         H/C: W1 (Heat) / Y1 (Cool)   | HP: Y2 (Heat)  | <b>HP:</b> W2 (Aux)                |  |
| 10% 5   | 51% 8  | 5% 100%                            |  |
| HP= HEAT PUMP SYSTEM<br>HC= HEAT/COOL SYSTEM (F   | (2 & W2HPesholdThreeFixed)(Ad)<br>65%                | eshold<br>iustable<br>% - 99%      |  |

# **ZONE WEIGHTING FEATURE**

| The HVAC system's momentary BTU capacity level, is determined by multiplying one or more zone weight assignment values by the proportional (or fixed) thermostat demand value, coming from each respective zone. If the PID loop is inactive, the UT3000 <i>will not "boost"</i> the HVAC system's BTU capacity above the base sum of zone weight(s) multiplied by zone demand(s). |                                     |                      |           |                                     |                  |                            |                |
|--|-------------------------------------|----------------------|-----------|-------------------------------------|------------------|----------------------------|----------------|
| LIMIT SAS PID "Y" = PID LOOP INACTIVE  |                                     |                      |           |                                     |                  |                            |                |
| The equation for calcu calling is the following  | lating the "SYS<br>J:               | STEM" s              | starting  | and final demand                    | l when ac        | tive zones                 | are            |
| Zone WEIGHT x Tstat <u>DEMAND</u> = (Initial System Demand)<br>100   |                                     |                      |           |                                     |                  |                            |                |
| EXAMPLE 1 :  |                                     |                      |           |                                     |                  |                            |                |
| <u>Assigned</u><br><u>Weight</u>   | <u>Thermostat</u><br><u>Demand</u>  | <u>Syste</u><br>Dema | em<br>and | Calculated<br>Initial Demand        |                  | <u>Max Syste</u><br>Demand | <u>em</u><br>[ |
| Zone 1 = 70% x   | 30% (.30)*                          | = 21                 | %         | 36%                                 | =                | 36%*                       |                |
| Zone 2 = 15% x   | 100% (1.0)*                         | = <u>15</u>          | <u>5%</u> | Î                                   |                  |                            |                |
| Zone 3 = 15%   |                                     | 36                   | % —       |                                     |                  |                            |                |
| * Unless Thermostat(s) Dei   | mand Changes                        |                      |           |                                     |                  |                            |                |
| EXAMPLE 2 :  | nunu onungoo                        |                      |           |                                     |                  |                            |                |
| <u>Assigned</u><br><u>Weight</u><br>Zone 1 = 65%   | <u>Thermostat</u><br><u>Demand</u>  | <u>Syste</u><br>Dema | em<br>and | <u>Calculated</u><br>Starting Deman | <u>d</u>         | <u>Max Syst</u><br>Deman   | <u>em</u><br>d |
| Zone 2 = 35% x   | 30% (.30)*                          | = 11                 | %         | 11%                                 | =                | 11%*                       |                |
| * Unless Thermostat(s) Demand Changes  |                                     |                      |           |                                     |                  |                            |                |
| UT 3000 SYSTEM HEAT/COOL STAGING SCALE   |                                     |                      |           |                                     |                  |                            |                |
| . HP: Y2 (Cool)  |                                     |                      |           |                                     |                  |                            |                |
| OFF  |                                     |                      |           |                                     | ( )              |                            |                |
| <b>0%</b> HP: Y<br><b>H/C</b> : W  | 1 (Heat or Cool<br>1 (Heat) / Y1 (C | )<br>ool)            | н         | P: Y2 (Heat)                        | HP: W            | 2 (Aux)                    |                |
| 10%  |                                     | 51                   | %         | 8                                   | 5%               | 100                        | )%             |
|  | !                                   | HC: Y2               | 2 & W     | 2 <b>HP</b>                         | : W2             |                            |                |
| HP= HEAT PUMP SYSTEMThresholdThresholdHC= HEAT/COOL SYSTEM(Fixed)(Adjustable)  |                                     |                      |           |                                     |                  |                            |                |
|  |                                     | ,                    | ,         | 65%                                 | 5 <b>- 99%  </b> |                            |                |

| SYMPTOM  | SOLUTIONS   |
|--|---|
| Cooling will not run at all. Zone<br>thermostat displays E11 fault code.<br>LCD & LED's are responding<br>properly.  | Some HVAC systems require a "System Test" prior to normal operation.<br>Access the Zone 1 thermostat and perform the System Startup Test.<br>Clear all fault codes in the Outdoor and Indoor unit diagnostic menu folders.<br>Access the Zone 1 thermostat and initiate System Charge mode.   |
| HVAC system does not always<br>respond properly. Periodic faults are<br>displayed on thermostats. Cannot<br>achieve 0.6vdc BIAS on the system<br>data wires. | Check BIAS DC voltages: Data 1 to C = 2.8 & Data 2 to C = 2.2 or Data 1 to C = 1.9 & Data 2 to C = 1.3.<br>Combination of CAPE coil and 2 stage furnace will read Data 1 to C = 2.3 & Data 2 to C = 1.7.<br><u>BIAS dip switches (#1 &amp; #2) at the bottom of the UT3000, should be set to ON.</u><br>Clear all fault codes in the Outdoor and Indoor unit diagnostic menu folders. |
| LCD & LED's function and HVAC<br>system functions normally but<br>dampers do not respond.  | Check damper motor wiring for proper connections. Too many or (incompatible) dampers connected to a single zone. Check damper motor 24volt output. Test wires for Continuity/Shorts. Check damper motor wiring for shorts/miswiring. Refer to Page 15 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.<br>Check HVAC & UT3000 system 24vac transformer voltage/fuse/breakers.<br>Test all wires for Continuity, shorts to 24v Common or shorts to earth ground.<br>Check HVAC & UT3000 system wiring for shorts and miswiring   |
| Time Delay is Active<br>and won't allow Heat<br>or Cool to Function.   | When Troubleshooting, Simultaneously Press the Back & Forward buttons for 1 second to Bypass any Active Time Delay.   |

## **CHECK YOUR WIRING**

| DETECTING 24vac SHORTS   | SYMPTOM: Entire Panel or a Single Zone appears to be dead!  |
|--|---|
| 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 terminals.  |
| One or more thermostats will not power up and/or show a display.   | <b>SOLUTIONS:</b> Remove wires from thermostat terminal blocks and allow 140 or 350mA circuit breaker to cool! Find and repair short(s) in thermostat field wiring. Restore 24 vac power.   |
| ISOLATING 24vac SHORTS<br>140mA, 350mA & 100mA circuit<br>breakers protect the UT3000 and<br>react to a short in the Thermostat or<br>Damper Motor field wiring. | <b>SOLUTIONS:</b> Disconnect the wire(s) from the 'R' <i>terminals on the UT3000 thermostat terminal blocks</i> , and the " <i>C/PO/PC</i> " <i>terminals</i> 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 (F1)breaker is tripped it will get hot to the touch! The LCD and the LED's will not illuminate!

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, 350mA or 100mA 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 shorted wires or device 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 a non- communicating thermostat is connected and a short occurs on the 24v wires, the thermostat will not power up and 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.ewccontrols.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.



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# If you have questions pertaining to this product, contact EWC Technical Support at 800-446-3110. You can also Email us at tech@ewccontrols.com.

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For an easy start-up using the UT3000 to commission the HVAC system, see Start-Up & Commission guide #090376A0194.

For installation guidance and wiring diagrams on "twinning" applications (4 and 5 zone) systems, see Addendum sheet #090376A0180

This Technical Bulletin and Addendum sheet are available in Spanish. Download #090375A0249 and #090376A0188 at www.ewccontrols.com

This Technical Bulletin, Start-Up Guide and Addendum sheet are available for download at *www.ewccontrols.com*.

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