



READ AND SAVE THESE INSTRUCTIONS

# ***“EC” Series***

## ***Wall Unit Humidifier***

# ***Controller Operation Manual***



- SEASONAL DRAIN
- SAFETY CIRCUIT OPEN
- POWER
- FILL VALVE OPEN
- WATER LEVEL FULL
- COOL DOWN CYCLE
- DRAIN VALVE OPEN
- HEATER ENERGIZED

Model EC Series

*Our results are comforting*

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# LOGIC CONTROLLER FOR THE EC/ECDDR WALL UNIT

## **System Description**

The UT2000 solid state logic control board is a multi-function controller used on PURE Humidifier Co.'s "EC" & "ECDDR" Series Wall Mount Humidifiers. The controller features LED indicators for system control monitoring and troubleshooting.

## **Water Level Control ("EC" Series only)**

When used in conjunction with PURE Humidifier's Tri-Probe Level Sensor, the UT2000 maintains water level between the middle and top level probes by opening the water fill valve as necessary. The "WATER LEVEL FULL" indicator will remain ON as long as this level is maintained. Power will be shut off to the heaters if the water level falls below the bottom probe, and turned back on automatically when water level reaches the top probe.

## **Automatic Drain Operation ("EC" Series only)**

The UT2000 contains three programmable timer circuits. The **Duration** of the drain cycle is field-adjustable from 2 to 30 minutes in 2 minute increments. The **Interval** between the drain cycles is field-adjustable from 10 to 150 hours in 10 hour increments. Also, the amount of cold water **Tempering** can be adjusted from 2 to 6 minutes in 2 minute increments. NOTE: A minimum of a 10 hour drain interval must be selected for proper operation of the drain timer circuit.

## **User Function Switches ("EC" Series only)**

### **1. (Normal/Standby/Flusher) Switch:**

**Normal Position:** This position allows the humidifier to be automatically controlled by the humidifier control system; this is the **operating position**.

**Standby Position:** This position shuts down the humidifier control system. NOTE: **MAIN POWER STILL EXISTS** within the control panel.

**Flusher Position:** This position will automatically flush the humidifier by energizing the fill valve for approximately 6 to 10 minutes. NOTE: The drain valve should be electrically or manually opened if this position is selected.

### **2. (Auto Drain/Manual Drain) Switch:**

**Auto Drain Position:** When "Auto" is selected, the humidifier will automatically drain after the preset time interval has accumulated.

**Manual Drain Position:** When in the "Manual" position, the drain valve is electrically opened and the power to the heaters is removed.

**NOTE: Auto Drain feature is turned OFF by the removal of Factory Test Jumper "J1".**

### 3. 10-Position DIP Switch:

**Switches 1 thru 4:** Switches 1 thru 4 set the ***Duration*** of the Automatic Drain Cycle. The switches are for 2 minutes, 4 minutes, 8 minutes, and 16 minutes, respectively. Switching the appropriate switch to the **RIGHT** selects that amount of time, and any combination of switches can be selected adding up to the desired time. Adjustable range is 2 to 30 minutes in 2 minute increments.

**Switches 5 thru 8:** Switches 5 thru 8 set the time ***Interval*** between the Automatic Drain Cycles. The switches are for 10 hours, 20 hours, 40 hours, and 80 hours respectively. Switching the appropriate switch to the **RIGHT** selects that amount of time, and any combination of switches can be selected adding up to the desired time. Adjustable range is 10 to 150 hours in 10 hour increments.

**Switches 9 and 10:** Switches 9 and 10 are for the ***Cool Down Tempering*** cycle. The cool down cycle allows the fill valve to open for a selected time prior to the drain valve opening, lowering the water temperature. The switches are for 2 minutes and 4 minutes respectively. Switching the appropriate switch to the **LEFT** selects that amount of time, and either one or both switches may be selected adding up to the desired time. NOTE: Having both switches in the **RIGHT** position turns the cool down option OFF. Adjustable range is 2 to 6 minutes in 2 minute increments.

#### SCR Modulation

SCR Modulation provides optimum humidifier control by infinitely modulating the heater output from 0-100%. Optimum control and quiet operation make this an unbeatable combination. "Zero Adj" control is provided for fine tuning the input signal. Cycle rate is preset for optimum performance.

**Range Changing:** Range changes can easily be made in the field by configuring the "Sensor Range Jumpers". Six (6) standard ranges are available and one (1) user specified range can be ordered.

#### Available Ranges:

1-18 vdc (Jumpers on B-G-K)  
1-5 vdc (Jumpers on C-H-L)  
2-10 vdc Control (Jumpers on E-H-L)  
6-9 vdc (Jumpers on D-I-M)  
4-20 mA dc (Jumpers on C-H-L-O)  
3 wire Resistive (Jumpers on C-H-L-P)  
User Specified, special order (Jumpers on A-F-J)

#### NOTE:

- SCR Operation (Jumper on "N" Position)
- For 4-20 mA Operation (Jumper on "O" Position) for single input models only. Refer to wiring diagram for dual input systems.
- Jumper Positions "Q" and "R" are for jumper storage only, and do not affect operation or calibration.

### **Season Drain (option)**

The seasonal drain option is designed to provide End-of-Use seasonal drain of the humidifier reservoir. The time before the system will automatically go into an End-of-Use mode is field adjustable from 40, 80, or 120 hours.

The End-of-Use option continually monitors the input signal from the humidistat. If this signal falls below a preset threshold, a countdown timer is initiated that has a selectable delay of 40, 80, or 120 hours. Once the countdown timer has expired, the humidifier reservoir is automatically drained. The humidifier will return to normal operation when RH demand occurs.

### **Dual Input Auto-Selector (option)**

This option is designed to provide accurate modulating control for critical Variable Air Volume (VAV) air handling systems. In a VAV System, the maximum allowable humidity load will vary proportionately with the amount of air (cfm) that is moving through the air handling system. Therefore, it is important to modulate the humidity output from the humidifier to prevent saturation within the duct.

The Dual Input Auto-Selector allows a modulating room humidistat and a modulating duct high-limit humidistat to be used together to control the humidifier. By slowly modulating down the humidifier output (rather than completely shutting off the humidifier), the dual input option will prevent the duct from becoming saturated and will still accurately maintain the humidity level within the room.

With the dual input auto-selector option, the control board features primary and secondary LED indicator lights. The LED which represents the lowest of the two input signals will illuminate and produce an output signal equal to the lowest input signal.

SYSTEM = 2-10 volt signal

**Example:**                      Primary input = 8 vdc (from the controlling room humidistat)  
                                      Secondary input = 3 vdc (from the high-limit humidistat)

In the above situation the secondary input indicator will illuminate and the humidifier modulator will operate from a signal equal to the secondary humidistat.

**NOTE: IF YOU ARE NOT USING INPUT NO. 2 FOR VAV OPERATION, TERMINALS 4 AND 5 MUST BE JUMPED.**

### **Humidistat Settings:**

It is very important to adjust the duct humidistat set point to the proper relative humidity level. If the duct air temperature is different from the room air temperature, the duct relative humidity will also be different i.e. Colder air cannot hold as much moisture, thus the air will have a higher relative humidity. A psychrometric chart should be referenced to determine the proper relative humidity setting for the duct high-limit humidistat (based on the room wet bulb/dry bulb conditions and duct dry bulb conditions).

## **LED Indicators:**

### **Front Panel Display:**

**SEASONAL DRAIN (RED)** (Optional): When illuminated indicates that the system shutdown has occurred (End-of-Use mode). Drain valve is in open position. Humidifier will return to normal operation automatically when a call for humidity is detected.

**SAFETY CIRCUIT OPEN (RED):** When illuminated indicates that the humidifier has detected an open circuit in the safety loop. The safety loop circuit consists of any device (such as airflow switch, high-limit RH switch, etc.) that is connected across user terminals 7 and 8, **or** the reservoir Over-Temperature Switch. If the reservoir Over-Temperature Switch has opened, this will also illuminate the red LED on the main control board tagged as "Over Temp".

**POWER (GREEN):** When illuminated indicates that 24 vac power is being supplied to the control board and that MAIN POWER EXISTS in the control cabinet.

**FILL VALVE OPEN (AMBER):** When illuminated indicates that the 24 vac fill valve is energized.

**WATER LEVEL FULL (GREEN):** When illuminated indicates that the water level is between the top and middle probes of the Tri-Probe assembly. Heaters will be energized on demand if the safety loop circuits are also satisfied.

**COOL DOWN CYCLE (AMBER):** When illuminated indicates that the humidifier has automatically gone into an auto drain cycle. Cool down cycle allows water temperature to drop before the drain valve opens.

**DRAIN VALVE OPEN (AMBER):** When illuminated indicates that the 24 vac drain valve is energized.

**HEATER ENERGIZED (GREEN):** When illuminated indicates that power **IS** being supplied to the heating elements.

### **Control Board LED Indicators:**

**LOW DEMAND (AMBER)** (Optional): When illuminated indicates that the humidifier is in low demand and the seasonal drain time (End-of-Use) is operating. After the present time of 40, 80, or 120 hours humidifier will shut down and the reservoir will drain. NOTE: Timer resets every time humidity demand occurs.

**RH INPUT SELECTOR "PRI" (GREEN)** (Optional): When illuminated indicates that the humidifier is operating off of the primary input signal (example: room humidistat).

**RH INPUT SELECTOR "HIGH-LIMIT" (RED)** (Optional): When illuminated indicates that the humidifier is operating off of the secondary input signal (example: high-limit duct humidistat).

**CONTROL "CTR" (GREEN)** (Optional): When illuminated indicates that the SCR control function is operating normally. NOTE: Does not indicate power to the heating elements unless all safety loop circuits are closed and water level is satisfied.

**OVER TEMP (RED):** When illuminated indicates that the reservoir Over-Temp switch has opened indicating a failed condition. This switch must be manually reset before the humidifier will re-energize. NOTE: Before resetting switch, make every effort to find the cause of the Over-Temperature condition. Visually check water level and water supply. Check operation of the fill cycle.

**OPEN FUSE (RED):** When illuminated indicates the control fuse has opened. Find cause of overload and replace with no larger than a 2 amp fuse. **CAUTION: MAIN POWER STILL EXISTS** in the control cabinet.

### **UT2000 Control Board Installation/Replacement:**

Before installing or replacing the control board, make sure that the MAIN POWER has been disconnected then proceed as follows:

#### **REMOVAL:**

1. Open both front and side panel doors.
2. From the front door panel, remove the cover plate from the octagon junction box located on the backside on the UT2000 control board disconnecting the 12-pin connector (P1) located inside.
3. From the side door, disconnect the two (2) 9-pin connectors on the front side of the UT2000 control board marked P2 and P3.
4. Loosen the three mounting screws and lift the UT2000 control board up and out.

#### **INSTALLATION:**

Reverse the removal procedure.

NOTE: Before reconnecting power to the humidifier, check all the configuration jumpers for the proper range and operation.

NOTE: All plugs are keyed for one position and direction only.

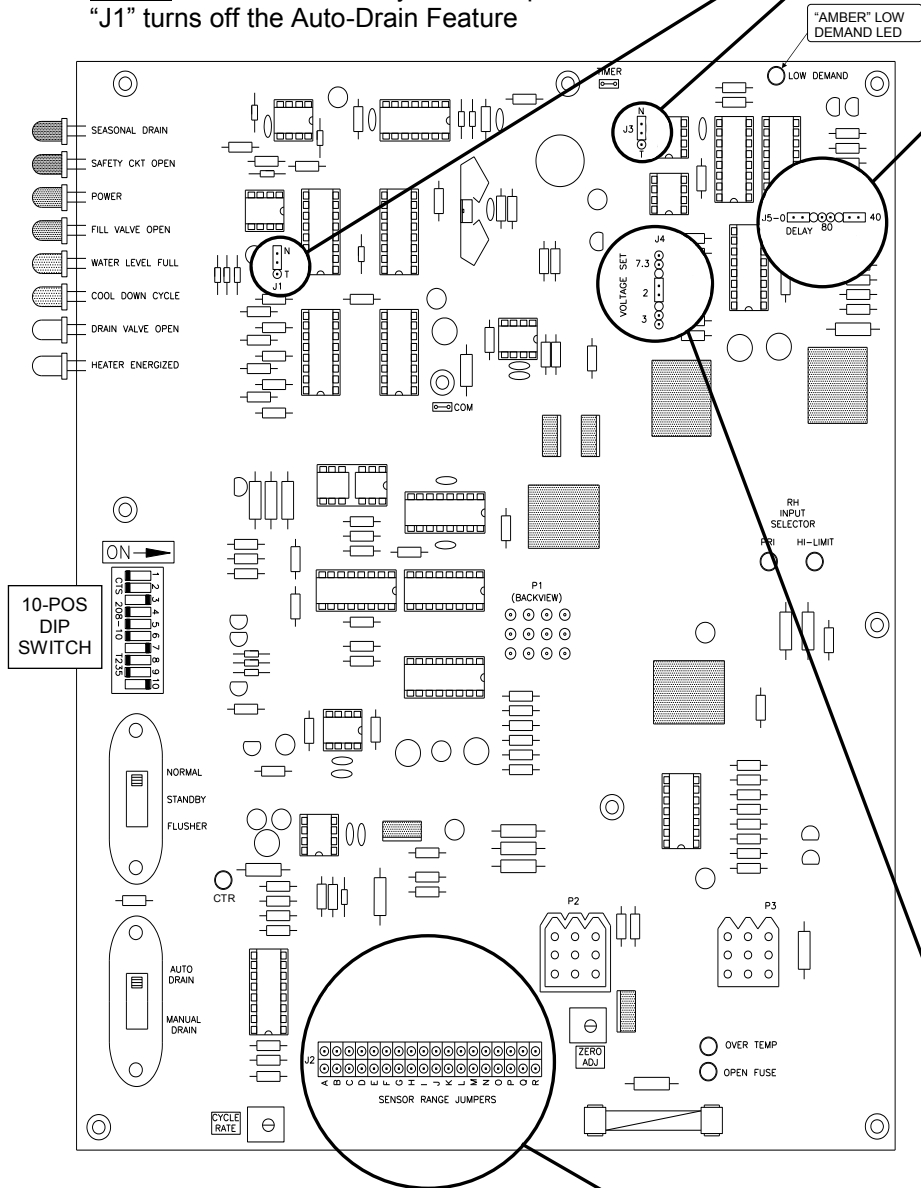
# UT2000 Control Board ("EC" Series)

## Program Jumper Configurations

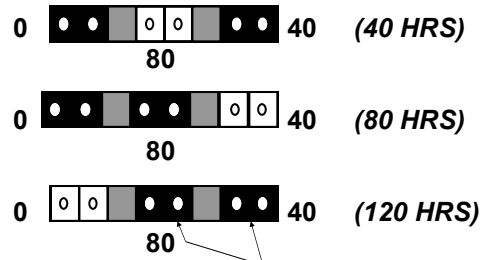
### FACTORY "TEST" JUMPERS (J1 & J3):

For factory use only. For proper operation, both jumpers should be left in the "N" (NORMAL) positions.

**NOTE:** Removal of Factory Test Jumper "J1" turns off the Auto-Drain Feature



### J5



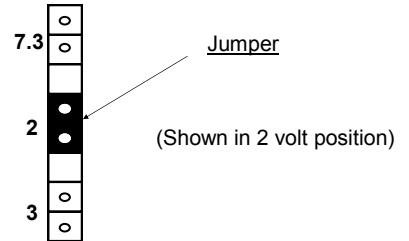
### Jumpers

### SHUTDOWN TIMER:

Three (3) time settings are available: 40, 80, and 120 hours. (Shown above in all available configurations)

Timer starts when there is LOW or NO demand for humidification as indicated by Amber "LOW DEMAND" LED. Once the timer has timed out, the humidifier reservoir will automatically drain. The humidifier will return to normal operation when RH demand occurs. NOTE: Timer resets every time "LOW DEMAND" LED goes out.

### J4



### TIME-OUT THRESHOLD:

Check your input range ---

IF 0-10, 1-5, 1-18, 4-20 mA (JUMPER ON "2")  
IF 2-10 (JUMPER ON "3")  
IF 6-9 (JUMPER ON "7.3")

The threshold voltage is the starting point at which the shutdown timer begins.

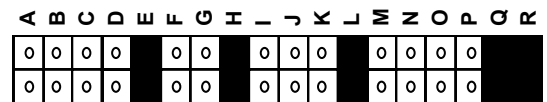
### ADJUSTMENTS:



ZERO  
ADJ

Fine tune sensor adjustment (ZERO). NOTE: should be checked after range change has been made.

### J2

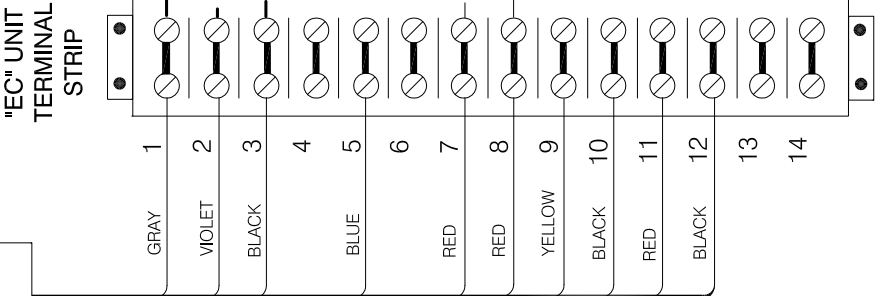


### INPUT RANGES AVAILABLE:

- 1-18 VDC (Jumpers on: B-G-K)
- 1-5 VDC (Jumpers on: C-H-L)
- 2-10 VDC Control (Jumpers on: E-H-L)
- 6-9 VDC (Jumpers on: D-I-M)
- 4-20 mA (Jumpers on: C=H=L=O)
- 3-Wire Resistive (Jumpers on: C-H-L-P)
- User Specified (Jumpers on: A-F-J)
- Jumper on "N" for SCR operation only.
- Jumper positions "Q" and "R" are for jumper storage only and do not affect operation or calibration.

### Jumpers

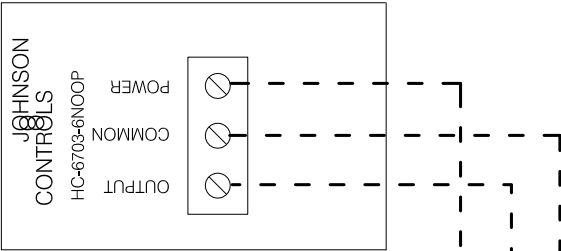
TO CONTROL BOARD  
P3 CONNECTOR



0-10 VDC SIGNAL

OPTIONAL  
AIR FLOW  
PROVING SWITCH

OPTIONAL  
HI-LIMIT DUCT  
STAT



Title: EC HUMIDIFIER CONTROL WIRING DIAGRAM  
JOHNSON HC-6703 DUCT

Scale: No Scale	Date: Oct 22, 2010	Drwn: MWA	Dwg. No. JOHNSON-HC-6703 DUCT WIRING
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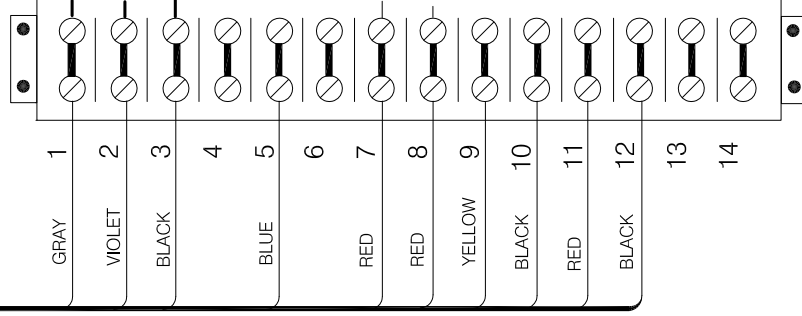
HUMIDISTAT  
BACK

HUMIDISTAT  
FRONT

TO CONTROL BOARD  
P3 CONNECTOR

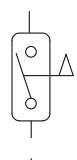


"EC" UNIT  
TERMINAL  
STRIP

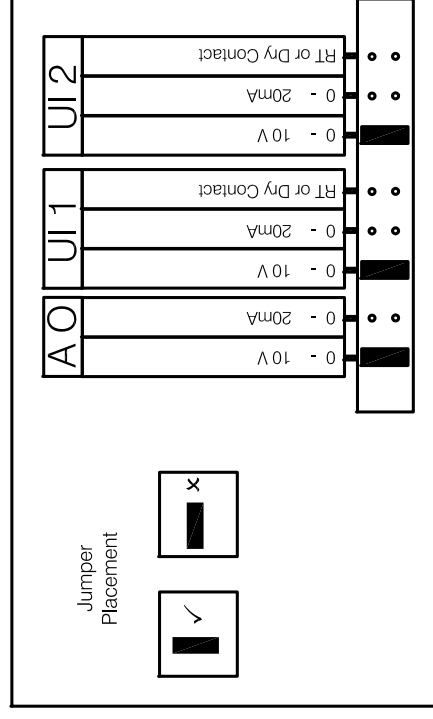
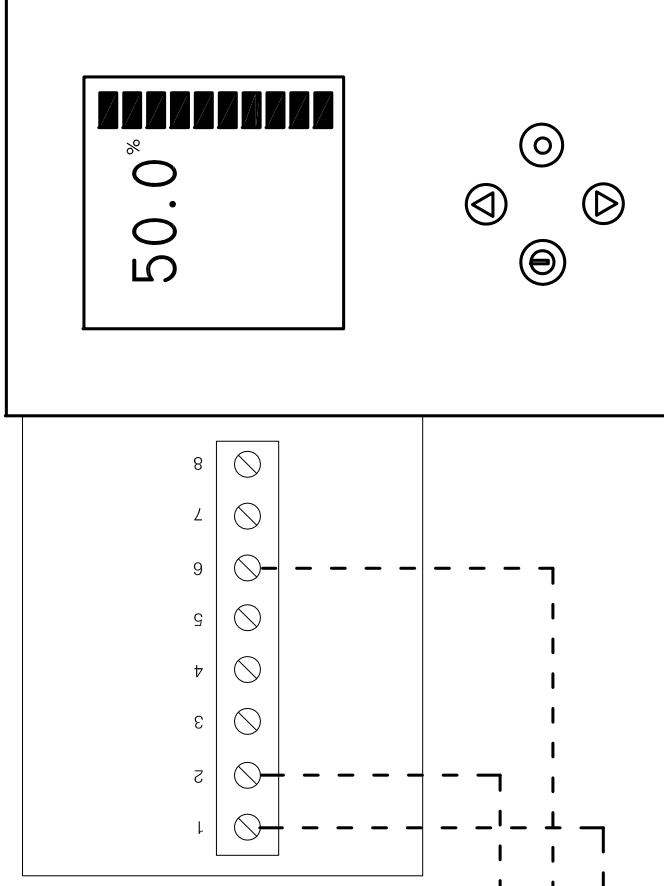
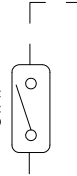


0-10 VDC SIGNAL

OPTIONAL  
AIR FLOW  
PROVING SWITCH



OPTIONAL  
H-LIMIT DUCT  
STAT

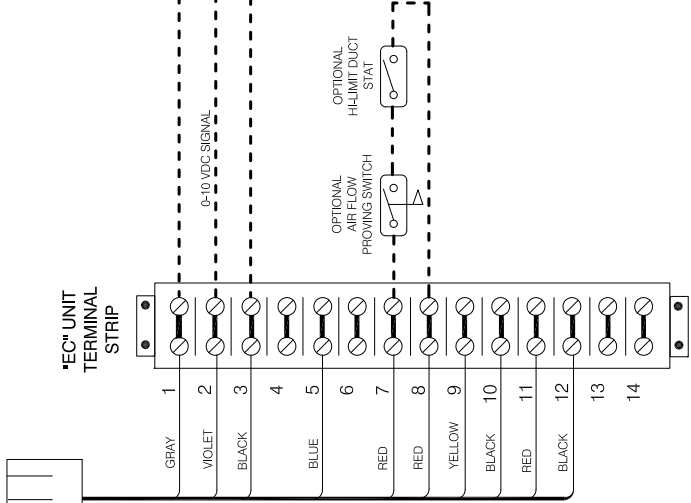


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VECTOR TCI-W22-H

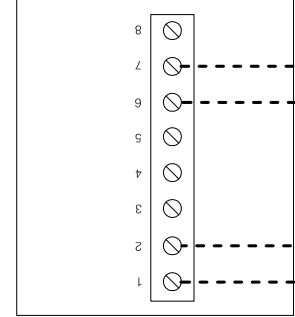
Scale:	Date:	Drwn:	Dwg. No.
No Scale	Aug. 29, 2013	MWA	VECTOR WALL STAT WIRING



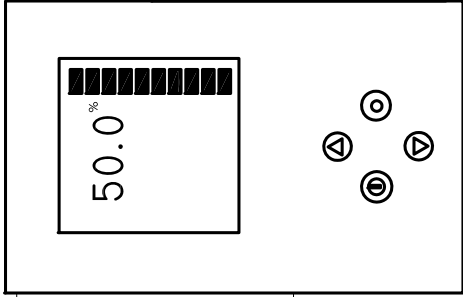
TO CONTROL BOARD  
P3 CONNECTOR



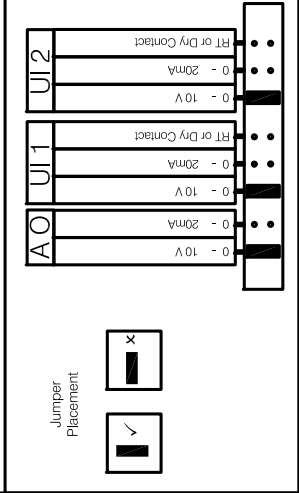
VECTOR HUMIDISTAT  
FRONT



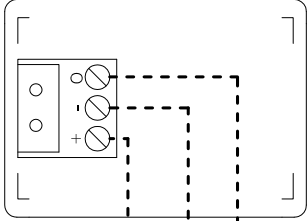
VECTOR HUMIDISTAT  
FRONT



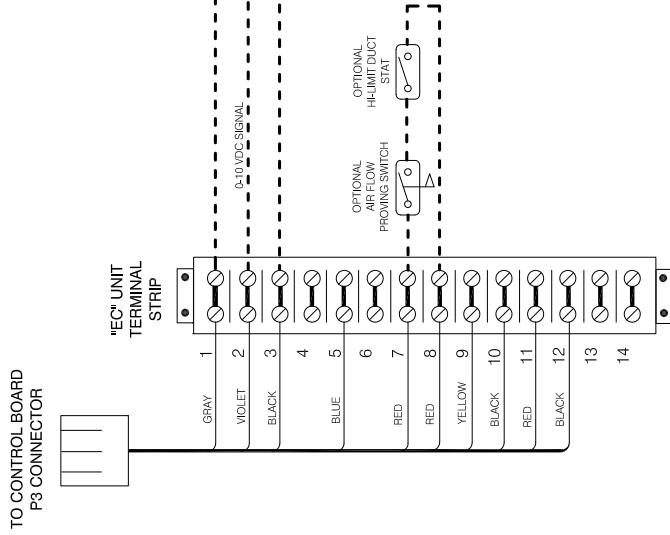
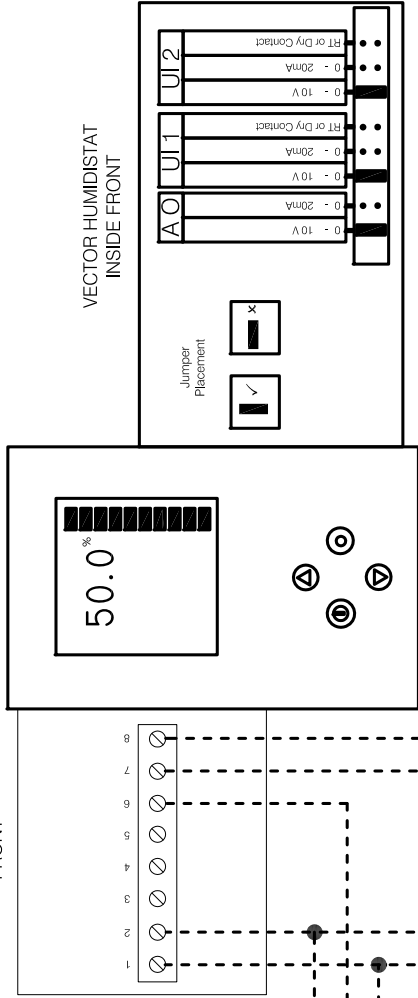
VECTOR HUMIDISTAT  
INSIDE FRONT



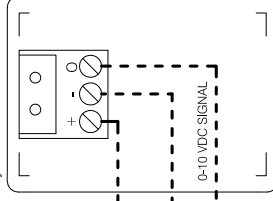
MODULATING HIGH-LIMIT  
HUMIDITY SENSOR  
By PURE Humidifier Co.



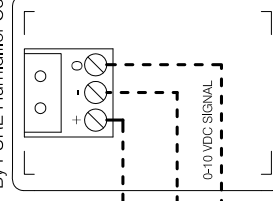
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Scale: No Scale	Date: Aug. 29, 2013	Drwn: MWA	Dwg. No. VECTOR WALL STAT VAV



SUPPLY AIR  
MODULATING HIGH-LIMIT  
HUMIDITY SENSOR  
By PURE Humidifier Co.



RETURN AIR OR ROOM  
MODULATING HUMIDITY  
SENSOR  
By PURE Humidifier Co.



Title: EC/ECDDR HUMIDIFIER CONTROL WIRING DIAGRAM  
VECTOR TCI-W22-H WITH VAV AND REMOTE SENSOR

Scale:	Date:	Dwn:	Dwg. No.
No Scale	Aug. 29, 2013	MWA	VECTOR WALL STAT VAV AND REMOTE SENSOR



**Notes:**









141 Jonathan Blvd. North  
Chaska, MN 55318  
Tel: (952) 368-9335 Fax: (952) 368-9338  
[www.purehumidifier.com](http://www.purehumidifier.com)