



# ESP+ Intuitive Evaporator Control Technology

## OPERATING INSTRUCTIONS

Bulletin T30-ESP-OM  
Part # 1107522

|  |   |       |
|--|---|-------|
|  | PRODUCT SUPPORT   | scan: |
|  | web: <a href="http://t-rp.com/esp">t-rp.com/esp</a>       |       |
|  | email: <a href="mailto:evaps@t-rp.com">evaps@t-rp.com</a> |       |
|  | call: 1-844-893-3222 x520                                 |       |

For Pre-Assembled Evaporators:  
includes factory installed Adaptive  
Defrost Control Board, EEV, Liquid Line  
Solenoid Valve and Remote Display



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**IMPORTANT NOTE:** Your ESP+ Intuitive Evaporator Control is pre-programmed at the factory and will begin operating as soon as power is applied using the following **default settings** : ROOM TEMP (R5) = -10 °F (freezer) or 35 °F (cooler), REFRIGERANT (RF1) = R-404A, DEFROST TYPE (DF1) = Defrost Type (Air or Electric). Use this manual to make any adjustments you require.

## Navigation Using the Basic Display



- Indicator lights
- Red light - critical Alarm (system not running)
  - Yellow light - non-critical alarm (system running)
  - Green light - compressor on
  - Green flashing - compressor waiting on timer to start/stop

- Access Setpoint mode by pressing and holding the **ENTER** button until tS (temperature setpoint) displays on the screen
- Use the **▲** up and **▼** down arrows to scroll through the available setpoints.
- Press **ENTER** to view the current setting.
- Use the **▲** up and **▼** down arrows to change the setpoint. Press **ENTER** to move between the digits to accelerate the changes.
- Press **ENTER** and hold to confirm each setpoint change.
- Press **BACK** to escape.

### User Interface

The ESP+ board has multiple methods of user input. Most controllers ship with the Basic Display. This display uses a familiar menu structure to allow service technicians to change the major setpoints. The setpoints may also be accessed using the controller's webpages.

The **▲** and **▼** arrows move the user through the available options for the Variables Menu. If alarms are present, they will be displayed and can be viewed using the up and down arrows.

### Basic Menu:

Pressing and holding the **ENTER** button enters the **Basic Setpoints** menu. See page 3 for details.

### Advanced Menu:

Pressing and holding the **BACK** button enters the **Advanced Setpoints** menu. See page 3 for details

The **ENTER** button is used to save an input option when it has been changed. **The ENTER button must be held for 3 seconds, to prevent accidental changes.** Changes may be discarded by waiting, to allow the controller to time-out and return to default screen, or by pressing the **BACK** button. The **BACK** button is used to return to the previous screen. Pressing the **BACK** button several times will return the controller to the default view.

### Additional Setpoints

For the majority of users, the Basic Display will provide the necessary parameters to setup the controller.

From the default display, pressing the **▲** and **▼** arrows will cycle through the **Variables** menu. The **ENTER** button will toggle between the variable name and value.

### Changing Setpoints

Pressing and holding the **ENTER** button will enter the **Basic Setpoints** menu. Press **ENTER** button to toggle between setpoint and value.

Pressing and holding the **BACK** button will enter the **Advanced Setpoints** menu. Press **ENTER** button to toggle between setpoint and value.

When the parameter value is displayed it may be changed by using **▲** and **▼** arrows, and **ENTER** buttons. The **▲** and **▼** arrows will increase or decrease numerical values, and will scroll through the available options, on the non-numerical setpoints.

Press and hold the **ENTER** button for 3 seconds to save the displayed value.

To abort changes, press the **BACK** button to return the parameter abbreviation.

### Manual Valve Control

Press and hold the **BACK** button & **▼** arrow to put the EEV in **Manual Control** mode. **▲** and **▼** arrows will control the valve opening. **ENTER** will advance to the next digit, and **BACK** will exit this mode.

### Manual Defrost

Pressing and holding the **BACK** and **ENTER** buttons will put the controller into **Defrost (next mode)**.

### Diagnostics Mode

The ESP+ has been programmed with a diagnostics mode. When activated, the controller energizes each relay for 60 seconds. When the compressor relay is on the EEV will regulate to the Superheat setpoint.

### Display Firmware

Pressing and holding all 4 buttons (**▲** **▼** **BACK** and **ENTER**) will show the display's firmware revision (**dir - Display Revision**)

### Display Options

Simultaneously pressing and holding the **▲** and **▼** arrows will show the address of the display (reserved for future versions).

**BASIC Setpoints Menu** Press and hold the **ENTER** button for 3 seconds to enter the **Basic Setpoints** menu.

| ABR. | REMOTE DISPLAY | DASHBOARD DISPLAY | FULL NAME          | MIN      | MAX     | DEFAULT         | DESCRIPTION  |
|------|----------------|-------------------|--------------------|----------|---------|-----------------|--|
| tS   |                | ROOM TEMP         | Room Temp Setpoint | -50.0 °F | 90.0 °F | -10 °F or 35 °F | Walk-in freezer (-10 °F) or cooler (35 °F) room temp to be maintained  |
| rFG  |                | REFRIGERANT       | Refrigerant        | N/A      | N/A     | R-404A          | Type of refrigerant used: see table below  |
| dtY  |                | DEFROST TYPE      | Defrost Type       | N/A      | N/A     | Air or Electric | Type of Defrost for Evap: ELE for Electric/ Ai for off time/ HGn for hot gas w/comp on/ HGF for hot gas w/comp off |

**ADVANCED Setpoints Menu** Press and hold the **BACK** button to enter the **Advanced Setpoints** menu.

| ABR. | REMOTE DISPLAY | DASHBOARD DISPLAY         | FULL NAME                      | MIN       | MAX        | DEFAULT         | DESCRIPTION   |
|------|----------------|---------------------------|--------------------------------|-----------|------------|-----------------|---|
| tS   |                | ROOM TEMP                 | Room Temp Setpoint             | -50.0 °F  | 90.0 °F    | -10 °F or 35 °F | Walk-in freezer (-10 °F) or cooler (35 °F) room temp to be maintained   |
| dtY  |                | DEFROST TYPE              | Defrost Type                   | N/A       | N/A        | Electric        | Type of Defrost for Evap: ELE for Electric/ Ai for off time/ HGn for hot gas w/comp on/ HGF for hot gas w/comp off  |
| Edt  |                | VALVE TYPE                | Expansion Valve Device Type    | N/A       | N/A        | Carel           | Type of valve used on system: mechanical, pre-configured electric, custom EEV configuration   |
| rFG  |                | REFRIGERANT               | Refrigerant                    | N/A       | N/A        | R-404A          | Type of refrigerant used: see table below   |
| ind  |                | DEFROST MODE              | Defrost Initiation Mode        | N/A       | N/A        | Demand          | Mode to initiate a defrost: dnd=demand / SCH=Schedule / rnt=comp run time   |
| dPd  |                | DEFROSTS / DAY            | Defrosts per day               | 0         | 8          | 4               | If DEFROST MODE = SCH: Number of evenly spaced defrosts per day the controller will initiate.   |
| dtP  |                | DEFROST TERM TEMP         | Defrost Term Temp              | 35.0 °F   | 90.0 °F    | 50.0 °F         | The temperature the coil sensor(s) must exceed in order to terminate defrost. The controller's defrost mode is complete at this point.  |
| dEF  |                | DEFROST PARAMETER         | Defrost Parameter              | 0         | 90         | 30              | if DEFROST MODE = DEMAND: Coefficient to factory Defrost algorithm  |
| dtL  |                | MAX DEFROST TIME          | Max Defrost Time               | 0 min     | 90 min     | 45 min          | If DEFROST MODE = SCH: The maximum amount of time the defrost relay will be energized. (Not available if DEFROST MODE = DEMAND)   |
| drn  |                | DRAIN TIME                | Drain Time                     | 0 min     | 15 min     | 2 min           | Time to be in drain mode (drip time)  |
| Stt  |                | SUPERHEAT                 | Superheat                      | 5.0 °F    | 30.0 °F    | 8.0 °F          | Target superheat value. Not available on Basic Display  |
| LPt  |                | LOW PRESSURE CUT OUT TIME | Low Pressure Cut Out Time      | 0 min     | 15 min     | 0 min           | Only applies when non-mechanical valve selected; 0=Disabled   |
| LPC  |                | LOW PRESSURE CUT OUT      | Low Pressure Cut Out           | -5.0 psig | 138.0 psig | 8.0 psig        | Displays when LOW PRESSURE CUTOFF TIME (LPI) is greater than zero. And only applies if non-mechanical valve is selected   |
| LPd  |                | PRESS DIFF FOR LPCO       | Pressure Differential for LPCO | 1.0 psig  | 20.0 psig  | 15.0 psig       | Displays when LOW PRESSURE CUTOFF TIME (LPI) is greater than zero. And only applies if non-mechanical valve is selected   |
| rnt  |                | COMP RUN TIME             | Compressor Run Time            | 0 hrs     | 24 hrs     | 6 hrs           | When rnt selected, number of hours of cooling before starting defrost   |
| Htn  |                | ELECTRIC DEFROST MODE     | Electric Defrost Mode          | N/A       | N/A        | Pulse           | If DEFROST TYPE = ELE: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm. PUL = Pulse, Prn = Permanent                         |
| HAo  |                | HIGH TEMP ALARM OFFSET    | High Temp Alarm Offset         | 0 °F      | 99.9 °F    | 10.0 °F         | The number of degrees above ROOM TEMP for a HIGH TEMP ALARM condition.  |
| HAd  |                | HIGH TEMP ALARM DELAY     | High Temp Alarm Delay          | 0 min     | 120 min    | 60 min          | Minutes the room temperature must remain above ROOM TEMP + HIGH TEMP ALARM OFFSET before issuing a HIGH TEMP ALARM  |
| LAo  |                | LOW TEMP ALARM OFFSET     | Low Temp Alarm Offset          | 0 °F      | 20.0 °F    | 4.0 °F          | The number of degrees below ROOM TEMP for a LOW TEMP ALARM condition.   |
| LAd  |                | LOW TEMP ALARM DELAY      | Low Temp Alarm Delay           | 0 min     | 30 min     | 10 min          | Minutes the room temp must remain below ROOM TEMP-LOW-TEMP ALARM OFFSET before issuing a LOW TEMP ALARM   |
| dAd  |                | DOOR ALARM DELAY          | Door Alarm Delay               | 0 min     | 180 min    | 30 min          | If AU IN (1, 2 and/or 3) MODE = dor The amount of time, in minutes, before an alarm condition is initiated, if door is open & room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF |
| AU1  |                | AUX IN 1 MODE             | Aux Input 1 mode               | N/A       | N/A        | Coil Temp       | See Auxilliary Input Modes table  |
| A1A  |                | AUX IN 1 STATE            | Aux Input 1 state              | N/A       | N/A        | Closed          | oPn= active if input is an open / CLo=active if input is shorted  |
| AU2  |                | AUX IN 2 MODE             | Aux Input 2 mode               | N/A       | N/A        | Disabled        | See Auxilliary Input Modes table  |
| A2A  |                | AUX IN 2 STATE            | Aux Input 2 state              | N/A       | N/A        | Closed          | oPn= active if input is an open / CLo=active if input is shorted  |
| AU3  |                | AUX IN 3 MODE             | Aux Input 3 mode               | N/A       | N/A        | Sys Off         | See Auxilliary Input Modes table  |
| A3A  |                | AUX IN 3 STATE            | Aux Input 3 state              | N/A       | N/A        | Closed          | oPn= active if input is an open / CLo=active if input is shorted  |
| tS2  |                | ROOM TEMP                 | 2nd room temp SP               | -50.0 °F  | 90.0 °F    | -50.0 °F        | If AU IN (1, 2 and/or 3) MODE = (t2n) 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the digital input is active   |
| Unt  |                | TEMP UNITS                | temperature units              | N/A       | N/A        | Fahrenheit      | Units for temperature's display in °F or °C: FAH = Fahrenheit, CEL = Celsius  |
| EdF  |                | EXTREME TEMP DIFF         | Extreme Temp Diff.             | 0 OF      | 99.9 °F    | 20.0 °F         | ADVANCED TOPIC: Call factory for assistance   |
| CLA  |                | CLEAR ALARMS              | Clear Alarms                   | N/A       | N/A        |                 | Press and hold to clear all active alarms   |
| PAS  |                | WEB PASSWORD RESET        | Web password reset             | N/A       | N/A        |                 | Press and hold to reset the web password to the factory default   |
| SA   |                | SMART ACCESS              | Smart Access                   | N/A       | N/A        | Disabled        | Turn Smart Access on or off: EnA to enable smart access / diS to disable Smart Access (CONTACT FACTORY)   |
| dHC  |                | DHCP                      | DHCP Mode                      | N/A       | N/A        | Enabled         | Turn DHCP mode on or off: EnA to enable DHCP mode / diS to disable DHCP mode  |

**ADVANCED Setpoints Menu - Available Only On Dashboard**

| DASHBOARD DISPLAY   | FULL NAME                         | MIN   | MAX         | DEFAULT      | DESCRIPTION   |
|---------------------|-----------------------------------|---|-------------|--------------|---|
| MOTOR TYPE          | Motor Type                        | Unipolar or Bipolar                             |             | Unipolar     | Unipolar if unipolar stepper used, Bipolar if bipolar stepper used  |
| MOTOR STEP RATE     | Motor Step Rate                   | 30  | 400         | 40           | Motor Step rate for custom valve. Not available on Basic Display  |
| MAX VALVE STEPS     | Max Valve Steps                   | 200   | 6400        | 500          | Full stroke steps for custom valve. Not available on Basic Display  |
| MAX OPERATING PRES  | Max Operating Pres                | 10.0 psi  | 150.0 psi** | 150.0 psi**  | **Max operating pressure. Max is 300 when R-410A selected and 500 when R-744 selected   |
| FAN SPEED           | Fan Speed                         | -100.0%   | 100.0%      | 0.0%         | Fan speed %. Not available on Basic Display   |
| MIN COMP RUN TIME   | Min Comp Run Time                 | 0 min   | 15 min      | 2 min        | Minimum Compressor Run Time. Not available on Basic Display   |
| MIN COMP OFF TIME   | Min Comp Off Time                 | 0 min   | 15 min      | 5 min        | Minimum Compressor Off Time. Not available on Basic Display   |
| REFRIG FAN MODE     | Refrigeration Fan Mode            | Manage, Permanent, ON with Compressor, Title 24 |             | Permanent    | Managed = manage fans during refrigeration cycle; Permanent = fans ON permanent during refrigeration cycle; On with Compressor = manage fans in OFF then ON in refrigeration; Title 24 = cycle fans based on Title 24 regulations |
| 1ST DEFROST DELAY   | 1st Defrost Delay                 | 0 min   | 240 min     | 120 min      | First Defrost Delay. Not available on Basic Display   |
| DEFROST FAN STATE   | Defrost Fan State                 | ON or OFF                                       |             | OFF(E)/ON(A) | OFF = fans off during defrost; ON = fans ON during defrost  |
| FAN DELAY TEMP      | Fan Delay Temp                    | -40.0 °F  | 35.0 °F     | 20.0 °F      | Fan delay temp. Not available on Basic Display  |
| MAX FAN DELAY TIME  | Max Fan Delay Time                | 0 min   | 20 min      | 2 min        | Max fan delay time. Not available on Basic Display  |
| PUMP DOWN TIME      | Pump Down Time                    | 0 min   | 90 min      | 0 min        | Minimum amount of time between de-energizing the liquid line solenoid/compressor relay and energizing the defrost relay.  |
| MULTI AIR TEMP CTRL | Multi Air Temp Control            | Warmest or Average                              |             | Warmest Air  | Warmest air = use the warmest air temp from bonded controls; Average air = use the average air temp from bonded controls  |
| MULTI EVAP COOL     | Multi Evap Cooling                | Synchronized or Independent                     |             | Synchronized | Synchronized = synchronize bonded controller in refrigeration mode; Independent = bonded controllers control temperature independently in refrigeration mode.   |
| MULTI EVAP DEFROST  | Multi Evap Defrost                | Synchronized or Independent                     |             | Synchronized | Synchronized = synchronize bonded controller in defrost mode; Independent = bonded controllers defrost independently  |
| MULTI EVAP SENSOR   | Multi Evap Sensor                 | Shared or Unshared                              |             | Shared       | Shared = share sensor readings from bonded controllers; Unshared = use local sensor readings only   |
| SUCT PRES OFFSET    | Suct Pres Offset                  | -5.0 °F   | 5.0 °F      | 0.0 °F       | An offset added or subtracted from the suction line pressure transducer reading, if needed  |
| SUCT TEMP OFFSET    | Suct Temp Offset                  | -5.0 °F   | 5.0 °F      | 0.0 °F       | An offset added or subtracted from the suction temperature sensor reading, if needed  |
| COIL TEMP OFFSET    | Coil Temp Offset                  | -5.0 °F   | 5.0 °F      | 0.0 °F       | An offset added or subtracted from the coil temperature sensor reading, if needed   |
| AIR TEMP OFFSET     | Air Temp Offset                   | -5.0 °F   | 5.0 °F      | 0.0 °F       | An offset added or subtracted from the room temperature sensor reading, if needed   |
| AUX 1 OFFSET        | AUX1 Temp Offset                  | -5.0 °F   | 5.0 °F      | 0.0 °F       | When Aux1, Aux2, or Aux 3 are used as a temperature sensor, an offset is added or subtracted from the reading.  |
| AUX 2 OFFSET        | AUX2 Temp Offset                  | -5.0 °F   | 5.0 °F      | 0.0 °F       |   |
| AUX 3 OFFSET        | AUX3 Temp Offset                  | -5.0 °F   | 5.0 °F      | 0.0 °F       |   |
| PROPORTIONAL        | Proportional                      | 0   | 255         | 3            | A coefficient to the valve control algorithm that increases valve responsiveness as the value increases   |
| INTEGRAL            | Integral                          | 0   | 255         | 5            | A coefficient to the valve control algorithm that increases valve responsiveness as the value increases   |
| DERIVATIVE          | Derivative                        | 0   | 255         | 3            | Should not be adjusted unless instructed by factory   |
| AIR TEMP DIFF       | Air Temp Differential             | 0.1   | 5.0         | 1.0 °F       | The number of degrees above ROOM TEMP before the controller will go into REFRIGERATION mode   |
| DEFROST FAN STATE   | Defrost Fan State                 | Off   | Off         | On           | Fan state during the defrost cycle  |
| MULTI AIR TEMP CTRL | Multi Evaporator Air Temp Control | Average   | Warmest     | Warmest      | Select control method to use with multiple room temperature sensors   |
| MULTI EVAP COOL     | Multi Evaporator Cool Control     | Sync  | Independent | Sync         | Select type of multi evaporator control - options are synchronous or independent  |
| MULTI EVAP DEFROST  | Multi Evaporator Defrost Control  | Sync  | Independent | Sync         | Select whether to have all bonded controllers initiate defrost mode at the same time or independently.  |
| MULTI EVAP SENSOR   | Multi Evaporator Sensor Sharing   | Shared  | Not Shared  | Not Shared   | Select whether or not to share room temperature, coil temperature and suction pressure sensor data with bonded controllers.   |

## System Modes

| ABR. | REMOTE DISPLAY | DASHBOARD DISPLAY | FULL NAME / DESCRIPTION          |
|------|----------------|-------------------|----------------------------------|
| rEF  |                | REFRIGERATE       | Refrigeration                    |
| ddF  |                | DEFROST DELAY FAN | Defrost Delay Fans               |
| dEF  |                | DEFROST           | Defrost                          |
| drn  |                | DRAIN TIME        | Drain Time                       |
| FdL  |                | FAN DELAY         | Fan Delay                        |
| SoF  |                | SYSTEM OFF        | System Off (External System Off) |
| oFF  |                | OFF               | Off (Satisfied on Temperature)   |

## Refrigerants

| ABBREVIATION | FULL NAME |
|--------------|-----------|
| R22          | R-22      |
| 134          | R-134a    |
| 42d          | R-422D    |
| 42A          | R-422A    |
| 40C          | R-407C    |
| 40A          | R-407A    |
| 507          | R-507     |
| 404          | R-404A    |
| 513          | R-513A    |
| 450          | R-450A    |
| 449          | R-449A    |
| 448          | R-448A    |
| 744          | R-744     |
| 410          | R-410A    |
| 407          | R-407F    |
| 409          | R-409A    |
| 408          | R-408A    |
| 438          | R-438A    |
| 717          | R-717     |
| 452          | R-452A    |

## Variables Menu

| ABR. | REMOTE DISPLAY | DASHBOARD DISPLAY | FULL NAME         | DESCRIPTION   |
|------|----------------|-------------------|-------------------|---|
| rtP  |                | ROOM TEMP         | Room Temp         | Room Temperature as measured by controller                          |
| CLt  |                | COIL TEMP         | Coil Temp         | Coil Temperature as measured by controller                          |
| SYS  |                | SYSTEM MODE       | System Mode       | Current operating status  |
| SHt  |                | SUPERHEAT         | Superheat         | Superheat as calculated by the controller                           |
| PrS  |                | SUCTION PRESSURE  | Suction Pressure  | Suction Pressure as measured by controller                          |
| SUt  |                | T1 SUCTION TEMP   | Suction Temp      | Suction Temperature as measured by controller                       |
| SAt  |                | SATURATION TEMP   | Saturation Temp   | Saturation Temperature as calculated by controller                  |
| oPn  |                | VALVE % OPEN      | Valve% Open       | Percentage EEV is open  |
| Cor  |                | COMPRESSOR RELAY  | Compressor Relay  | Current status of LLS/compressor relay                              |
| dEr  |                | DEFROST RELAY     | Defrost Relay     | Current Status of Defrost relay                                     |
| FAR  |                | FAN RELAY         | Fan Relay         | Current Status of Fan relay   |
| AU1  |                | DIG 1 STATUS      | Aux Input 1       | Current Status/Temperature as measured by controller at Aux input 1 |
| AU2  |                | DIG 2 STATUS      | Aux Input 2       | Current Status/Temperature as measured by controller at Aux input 2 |
| AU3  |                | DIG 3 STATUS      | Aux Input 3       | Current Status/Temperature as measured by controller at Aux input 3 |
| iP1  |                | IP OCTET 1        | IP Address Part 1 | First 3 digits of IP address  |
| iP2  |                | IP OCTET 2        | IP Address Part 2 | Second 3 digits of IP address                                       |
| iP3  |                | IP OCTET 3        | IP Address Part 3 | Third 3 digits of IP address  |
| iP4  |                | IP OCTET 4        | IP Address Part 4 | Fourth 3 digits of IP address                                       |
| Fir  |                | FIRMWARE VERSION  | Firmware Version  | Current Version of firmware on controller                           |

## Alarm Status Menu

| ABR. | REMOTE DISPLAY | DASHBOARD DISPLAY   | FULL NAME               | DESCRIPTION  |
|------|----------------|---------------------|-------------------------|--|
| PSA  |                | PRESSURE SENSOR     | Pressure Sensor Alarm   | Suction pressure sensor is shorted, open or pressure out of range  |
| SSA  |                | SUCTION TEMP SENSOR | Suction Sensor Alarm    | Suction temperature sensor is shorted or open  |
| ASA  |                | AIR TEMP SENSOR     | Air Sensor Alarm        | Return air temperature sensor is shorted or open   |
| CSA  |                | COIL TEMP SENSOR    | Coil Sensor Alarm       | Coil temperature sensor is shorted or open   |
| HSH  |                | HIGH SUPERHEAT      | High Superheat Alarm    | Superheat above upper limit  |
| LSH  |                | LOW SUPERHEAT       | Low Superheat Alarm     | Superheat below lower limit  |
| HtA  |                | HIGH AIR TEMP       | High Temperature Alarm  | Room temperature is above ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET for longer than HIGH TEMP ALARM DELAY |
| LtA  |                | LOW AIR TEMP        | Low Temperature Alarm   | Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY                   |
| EdF  |                | EXCESS DEFROST      | Excess Defrost Alarm    | 32 defrosts or more within 48 hours  |
| dtT  |                | DEFR TERM ON TIME   | Defr Term on Time Alarm | Defrost terminated on time instead of temperature for two consecutive cycles                                       |
| dor  |                | DOOR SWITCH         | Door Open Alarm         | If door is open and room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF for DOOR ALARM DELAY time        |
| CoA  |                | COMMUNICATION ERROR | Communication Error     | ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more                           |
| EA1  |                | EXTERNAL ALARM 1    | External Alarm 1        | If AU1 IN MODE = EXT ALARM: The digital input is in an active state  |
| EA2  |                | EXTERNAL ALARM 2    | External Alarm 2        | If AU2 IN MODE = EXT ALARM: The digital input is in an active state  |
| EA3  |                | EXTERNAL ALARM 3    | External Alarm 3        | If AU3 IN MODE = EXT ALARM: The digital input is in an active state  |
| EFL  |                | EMAIL FAILURE       | Email Failure Alarm     | Email alert was not confirmed by email server provided after seven consecutive attempts                            |
| A1A  |                | AUX1 SENSOR         | AU1 Temp sensors Alarm  | AU1 temperature sensor is shorted or open  |
| A2A  |                | AUX2 SENSOR         | AU2 Temp sensors Alarm  | AU2 temperature sensor is shorted or open  |
| A3A  |                | AUX3 SENSOR         | AU3 Temp sensors Alarm  | AU3 temperature sensor is shorted or open  |
| PdT  |                | PUMPDOWN TIMEOUT    | Pump Down Timeout       | Max time for LPCO pumpdown exceeded  |
| SCC  |                | SHORT COMP CYCLE    | Short Compressor Cycle  | Compressor is started an excessive number of times to maintain suction pressure                                    |
| LPA  |                | LOW PRESSURE        | Low Pressure Alarm      | Suction pressure dropped below expected point excessive number of times  |
| PrF  |                | N/A                 | Process Failure         | Basic Display is not communicating to the controller   |

Connecting The ESP+ To A LAN (Local Area Network)

1. Connect Ethernet (Cat5) cable to the ESP+ controller and to an open port on a network switch.



2. Use the controller display to enable DHCP setpoint.

- a. Hold the **BACK** button for 3 seconds to access the set point menu.
- b. Use the **▲** and **▼** arrows to find the dHC setpoint.
- c. Press and release the **ENTER** button to display the current setting.
- d. Use the **▲** and **▼** arrows to Enable (EnA).
- e. Press and hold the **ENTER** button for 3 seconds to confirm the setting and Enable DHCP.

3. Press the **BACK** button a few times to return to the default display.

4. Use the **▲** and **▼** arrows to scroll through the controller variables until the IP settings are found.

5. Record the four IP (iP#) values.

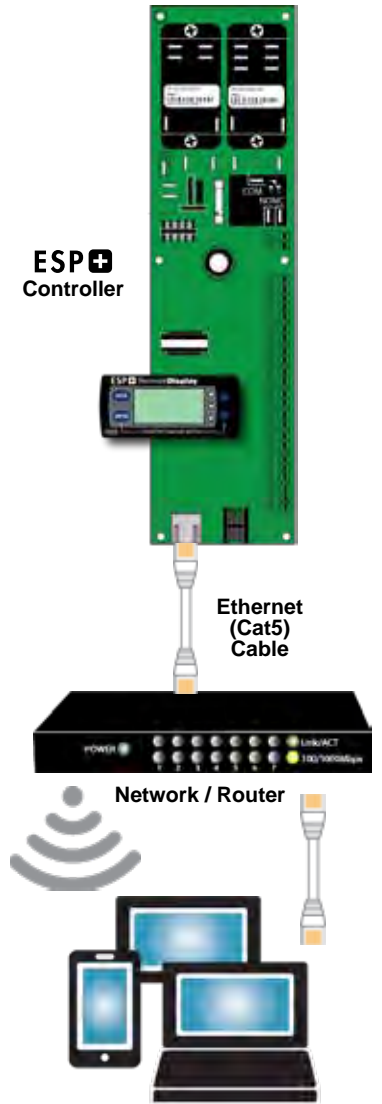
IP = **10 . 0 . 0 . 12** (Example)  
 iP1 iP2 iP3 iP4

6. On a computer connected to the same network, open any browser (Chrome, Firefox, Edge etc.).

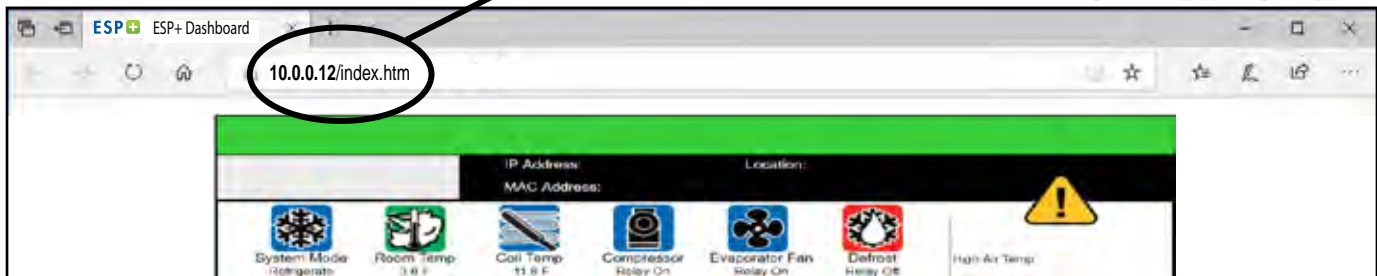
7. Enter the Controller IP Address into the address bar of the browser and press enter.

The controller Home page should be displayed.

If the controller webpage does not load, additional setup support or IT support may be required



**10 . 0 . 0 . 12**  
(Example)



ESP+ can be used in a variety of remote monitoring scenarios:

On site



At home



On the go



At work

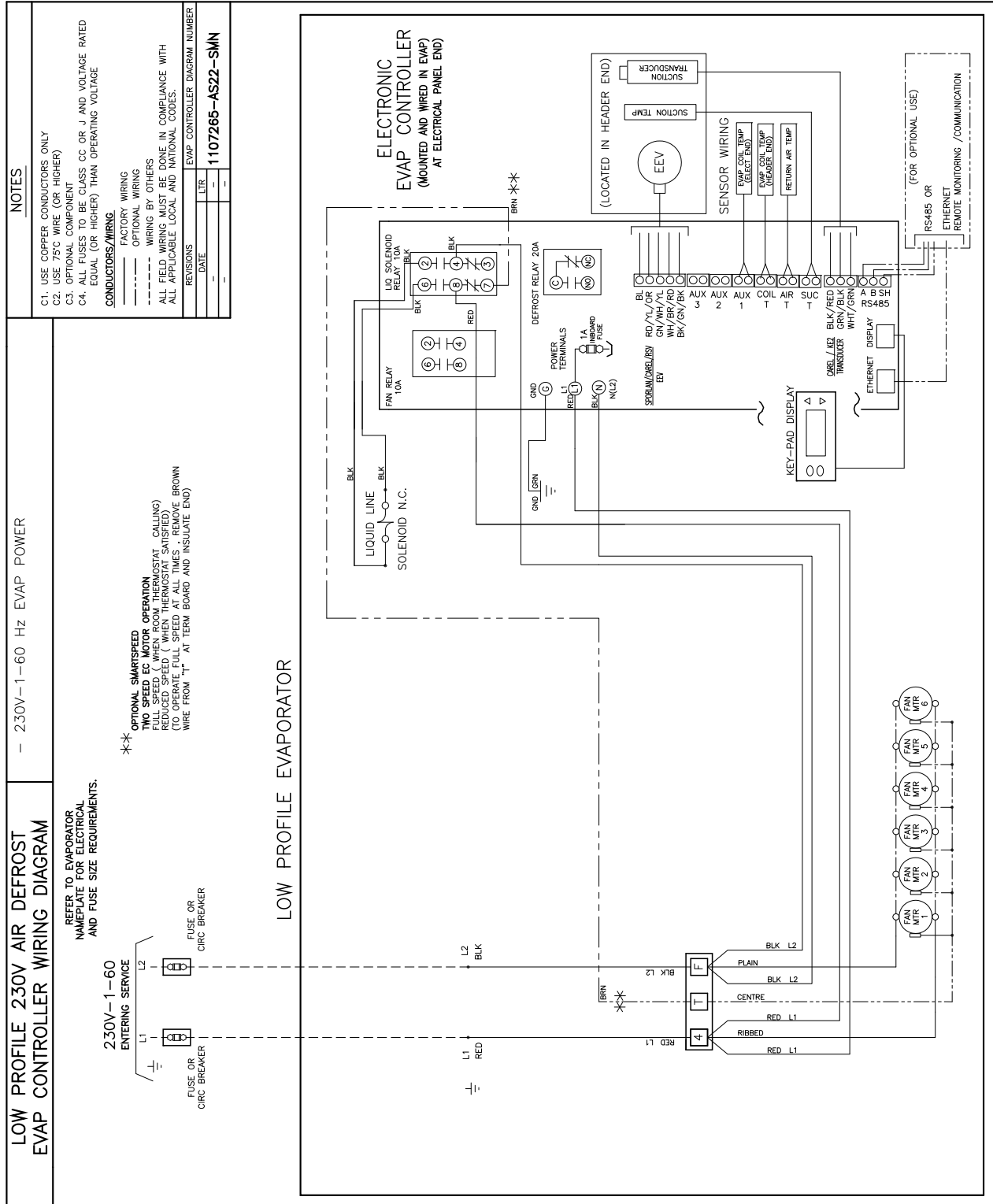


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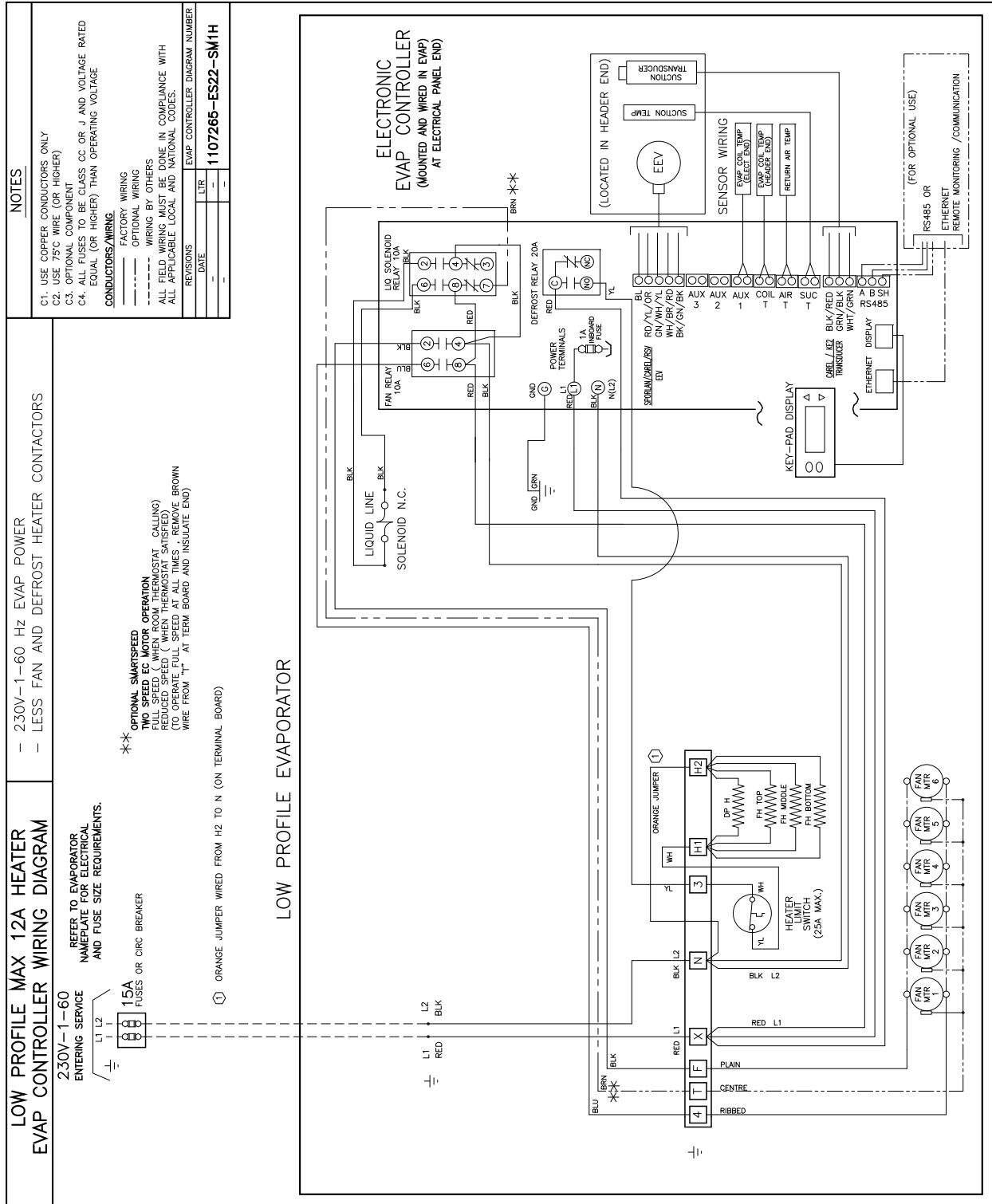
SAMPLE ONLY:

Refer to Product Data and Installation for details specific to your unit



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Alphabetical List of Abbreviations

| ABR. | REMOTE DISPLAY | FULL NAME                             | TYPE            | DESCRIPTION  |
|------|----------------|---------------------------------------|-----------------|--|
| A1A  |                | Aux Input 1 state                     | Setpoint        | oPn= active if input is an open / CLo=active if input is shorted   |
| A1A  |                | AU1 Temp sensor Alarm                 | Alarms          | AU3 temperature sensor is shorted or open  |
| A2A  |                | Aux Input 2 state                     | Setpoint        | oPn= active if input is an open / CLo=active if input is shorted   |
| A2A  |                | AU2 Temp sensor Alarm                 | Alarms          | AU2 temperature sensor is shorted or open  |
| A3A  |                | Aux Input 3 state                     | Setpoint        | oPn= active if input is an open / CLo=active if input is shorted   |
| A3A  |                | AU3 Temp sensor Alarm                 | Alarms          | AU3 temperature sensor is shorted or open  |
| Ad   |                | Air Defrost w/Mechanical valve        | Type of Control | System operates with default values for Air Defrost and Mechanical Valve   |
| AdE  |                | Air Defrost w/EEV                     | Type of Control | System operates with default values for Air Defrost and Electric Valve   |
| Ai   |                | Air Defrost (Off time)                | Setpoint        | Option for evaporator Defrost Type (dtY) - Air Off time Defrost is used; other options Electric (ELE), Hot Gas w Compressor On (HGN),or Hot Gas with Compressor Off  |
| ASA  |                | Air Sensor Alarm                      | Alarms          | Return air temperature sensor is shorted or open   |
| AU1  |                | Aux Input 1                           | Variables       | Current status/temperature as measured by controller at Aux1 input   |
| AU1  |                | Aux Input 1 mode                      | Setpoint        | Options for configuring the Auxiliary Input, see Auxiliary Input Modes table   |
| AU2  |                | Aux Input 2                           | Variables       | Current Status/Temperature as measured by controller at Aux2 input   |
| AU2  |                | Aux Input 2 mode                      | Setpoint        | Options for configuring the Auxiliary Input, see Auxiliary Input Modes table   |
| AU3  |                | Aux Input 3                           | Variables       | Current Status/Temperature as measured by controller at Aux3 input   |
| AU3  |                | Aux Input 3 mode                      | Setpoint        | Options for configuring the Auxiliary Input, see Auxiliary Input Modes table   |
| AUt  |                | Defrost Interlock -Heaters Normal     | Auxiliary Input | Inactive = defrost heaters normal  |
| AUt  |                | Defrost Lockout - Defrost Normal      | Auxiliary Input | Inactive = defrost will occur by normal controller logic   |
| CEL  |                | Celsius                               | Setpoint        | Option for the units for the temperature display in degrees - Celsius or Fahrenheit (FAH)  |
| CLA  |                | Clear Alarms                          | Setpoint        | Press and hold to clear all active alarms  |
| CLo  |                | Closed                                | Setpoint        | Option under Auxiliary Input State   |
| CLt  |                | Coil Temp                             | Variables       | Coil temperature (TCoil Sensor) as measured by the controller  |
| CLt  |                | Coil Temp                             | Auxiliary Input | Coil Temp as measured by Aux input   |
| CoA  |                | Communication Alarm                   | Alarms          | ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more   |
| Cor  |                | Compressor Relay                      | Variables       | Current state of liquid line solenoid/compressor relay   |
| CRl  |                | Carel                                 | Valve Type      | Carel valve with 500 steps   |
| CSA  |                | Coil Sensor Alarm                     | Alarms          | Coil temperature sensor is shorted or open   |
| dAd  |                | Door Open Alarm Delay                 | Setpoint        | If AU IN (1, 2 and/or 3) MODE = dor The amount of time, in minutes, before an alarm condition is initiated if door is open and room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF   |
| dCL  |                | Door Switch - Door Closed             | Auxiliary Input | Door switch indicates door is closed   |
| ddF  |                | Defrost Delay Fan                     | System Mode     | At defrost, but prior to the defrost heaters turning on, the fans will continue running for several minutes, using stored cooling in the coil. Once the coil reaches room temp, the fans will stop, and the heaters will turn on and begin the electric defrost. |
| dEF  |                | Defr Parameter                        | Setpoint        | if DEFROST MODE = DEMAND: Coefficient to factory Defrost algorithm   |
| dEF  |                | Defrost                               | System Mode     | Controller is performing a defrost cycle   |
| dEr  |                | Defrost Relay                         | Variables       | Current state of the defrost relay   |
| dFi  |                | Defrost Interlock Switch              | Auxiliary Input | Inactive=Defrost Heaters normal (AUT)/Active=Defrost Heaters Off (OFF)   |
| dFL  |                | Defrost Lockout Switch                | Auxiliary Input | Inactive=Defrost Normal (AUT)/Active=Defrost Not Allowed (dLO)   |
| dHC  |                | DHCP                                  | Setpoint        | Turn DHCP mode on or off: EnA to enable DHCP mode / DiS to disable DHCP mode   |
| diA  |                | Diagnostics Mode                      | Setpoint        | Energizes each relay individually for 60 seconds: fan relay, defrost relay, compressor relay   |
| diS  |                | Disabled                              | Auxiliary Input | Input is not used by the controller  |
| dLo  |                | Defrost Lockout - Defrost not allowed | Auxiliary Input | Active = Defrost not allowed while signal is active  |
| dnd  |                | Demand Defrost                        | Setpoint        | Option for Defrost Initiation Mode (ind) - when Demand Defrost (dnd) selected, system defrosts only when dictated by decrease in evaporator efficiency; other options for (Ind) are Scheduled (SCH) or Compressor Run Time (rnt)                                 |
| don  |                | Door Switch - Door Open               | Auxiliary Input | Door switch indicates door is open   |
| dor  |                | Door Switch                           | Auxiliary Input | Inactive=Door Closed (dCL)/Active=Door Open (don)  |
| dor  |                | Door Open Alarm                       | Alarms          | If door is open and room temperature is 5 degrees above ROOM TEMP + AIR TEMP DIFF for DOOR ALARM DELAY time  |
| dPd  |                | Defrosts per day                      | Setpoint        | If DEFROST MODE = SCH: The number of evenly spaced defrosts per day the controller will initiate.  |
| drn  |                | Drain Time                            | Setpoint        | Time to be in drain mode (drip time)   |
| drn  |                | Drain                                 | System Mode     | Time after defrost to allow moisture to drain from coil  |
| dtL  |                | Max Defrost Time                      | Setpoint        | If DEFROST MODE = SCH: The maximum amount of time the defrost relay will be energized. (Not available if DEFROST MODE = DEMAND)  |
| dtP  |                | Defr Term Temp                        | Setpoint        | The temperature the coil sensor(s) must exceed in order to terminate defrost. The controller's defrost mode is complete at this point.   |
| dtT  |                | Defr Term on Time Alarm               | Alarms          | Defrost terminated on time instead of temperature for two consecutive cycles   |
| dtY  |                | Defrost Type                          | Setpoint        | Type of Defrost for Evap: ELE for Electric/ Ai for off time/ HGN for hot gas w/comp on/ HGF for hot gas w/comp off   |
| EA1  |                | External Alarm Switch                 | Auxiliary Input | Active=EAo / Inactive=EAF  |
| EA1  |                | External Alarm 1                      | Alarms          | If AU1 IN MODE = EXT ALARM: The digital input is in an active state  |
| EA2  |                | External Alarm 2                      | Alarms          | If AU2 IN MODE = EXT ALARM: The digital input is in an active state  |
| EA3  |                | External Alarm 3                      | Alarms          | If AU3 IN MODE = EXT ALARM: The digital input is in an active state  |
| EAo  |                | External Alarm Switch Active          | Auxiliary Input | External Alarm switch is receiving Active signal   |
| EAF  |                | External Alarm Switch Inactive        | Auxiliary Input | External Alarm switch is not receiving external signal   |
| Ed   |                | Electric Defrost w/Mech. valve        | Type of Control | System operates with default values for Electric Defrost with Mechanical Valve   |
| EdE  |                | Electric Defrost w/EEV                | Type of Control | System operates with default values for Electric Defrost with Electric Valve   |

## Alphabetical List of Abbreviations (continued)

| ABR. | REMOTE DISPLAY | FULL NAME                         | TYPE            | DESCRIPTION   |
|------|----------------|-----------------------------------|-----------------|---|
| EdF  |                | Extreme Temp Diff                 | Setpoint        | ADVANCED TOPIC: Call factory for assistance   |
| EdF  |                | Excess Defrost Alarm              | Alarms          | 32 defrosts or more within 48 hours   |
| Edt  |                | Valve Type                        | Setpoint        | Type of valve used on the system: mechanical, pre-configured electric, custom EEV configuration   |
| EFL  |                | Email Failure Alarm               | Alarms          | Email alert was not confirmed by email server provided after seven consecutive attempts   |
| ELE  |                | Electric Defrost                  | Setpoint        | Option for evaporator Defrost Type (dtY) - Electric defrost heaters used; other options, Hot Gas w Compressor Off (HGF), Hot Gas with Compressor On (HGN) or Air Off time Defrost (Ai)  |
| EnA  |                | Enabled                           | Setpoint        | Enabled - Option to allow connection with Smart Access (CONTACT FACTORY)  |
| FAC  |                | Factory reset                     | Setpoint        | Press and hold to reset the controller to the factory default setpoints   |
| FAH  |                | Fahrenheit                        | Setpoint        | Option for units for the temperature display, in degrees - Fahrenheit or Celsius (CEL)  |
| FAr  |                | Fan Relay                         | Variables       | Current state of the fan relay  |
| FdL  |                | Fan Delay                         | System Mode     | Coming out of defrost, the LLS relay will be energized, and the coil will pulldown until it reaches 20°F, or 2 minutes, before the fans turn on. This allows any moisture on the coil to re-freeze, keeping it from spraying and forming ice drops on the walk-in's surfaces. |
| Fir  |                | Firmware Version                  | Variables       | Current version of the firmware on the controller   |
| HAd  |                | High Temp Alarm Delay             | Setpoint        | Minutes the room temperature must remain above ROOM TEMP + HIGH TEMP ALARM OFFSET before issuing a HIGH TEMP ALARM  |
| HAo  |                | High Temp Alarm Offset            | Setpoint        | The number of degrees above ROOM TEMP for a HIGH TEMP ALARM condition.  |
| HGF  |                | Hot Gas Defrost w. Compressor Off | Setpoint        | Option for evaporator Defrost Type (dtY) - Hot Gas defrost used with the Compressor Off; other options Electric (ELE), Hot Gas w Compressor On (HGN), or Air Off time Defrost (Ai)  |
| HGN  |                | Hot Gas Defrost w. Compressor On  | Setpoint        | Option for evaporator Defrost Type (dtY) - Hot Gas defrost used with the Compressor On; other options Electric (ELE), Hot Gas w Compressor Off (HGF), or Air Off time Defrost (Ai)  |
| HS   |                | HSV                               | Valve Type      | HSV, Hybrid Stepper Valve (CONTACT FACTORY)   |
| HSH  |                | High Superheat Alarm              | Alarms          | Superheat above upper limit   |
| HtA  |                | High Temperature Alarm            | Alarms          | Room temperature is above ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET for longer than HIGH TEMP ALARM DELAY  |
| Htn  |                | Electric Defrost Mode             | Setpoint        | If DEFROST TYPE = ELE: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm.  |
| ind  |                | Defrost Ini Mode                  | Setpoint        | Mode to initiate a defrost: dnd=demand / SCH=Schedule / rnt=comp run time   |
| iP1  |                | IP Address Part 1                 | Variables       | The first three digits of the IP address  |
| iP2  |                | IP Address Part 2                 | Variables       | The second three digits of the IP address   |
| iP3  |                | IP Address Part 3                 | Variables       | The third three digits of the IP address  |
| iP4  |                | IP Address Part 4                 | Variables       | The fourth three digits of the IP address   |
| LAd  |                | Low Temp Alarm Delay              | Setpoint        | Minutes the room temperature must remain below ROOM TEMP + LOW TEMP ALARM OFFSET before issuing a LOW TEMP ALARM  |
| LAo  |                | Low Temp Alarm Offset             | Setpoint        | The number of degrees below ROOM TEMP for a LOW TEMP ALARM condition.   |
| LPA  |                | Low Pressure Alarm                | Alarms          | Suction pressure dropped below expected point excessive number of times   |
| LPC  |                | Low Pressure Cut Out              | Setpoint        | Only applies when non-mechanical valve selected   |
| Lpd  |                | Press Diff for LPCO               | Setpoint        | Only applies when non-mechanical valve selected   |
| LPt  |                | Max Time for LPCO                 | Setpoint        | Only applies when non-mechanical valve selected   |
| LSH  |                | Low Superheat Alarm               | Alarms          | Superheat below lower limit   |
| LtA  |                | Low Temperature Alarm             | Alarms          | Room temperature is below ROOM TEMP - LOW TEMP ALARM OFFSET for longer than LOW TEMP ALARM DELAY  |
| oFF  |                | Off                               | System Mode     | System has satisfied on temperature   |
| oFF  |                | Defrost Heaters Off               | Auxiliary Input | Defrost heaters are being interrupted by external input   |
| oni  |                | Monitor Temp                      | Auxiliary Input | Monitoring Temp as measured by Aux Input  |
| oPn  |                | Valve% Open                       | Variables       | Percentage the EEV is open (only available if EEV is selected)  |
| oPn  |                | Open                              | Setpoint        | Option under Auxiliary Input State  |
| PAS  |                | Web password reset                | Setpoint        | Press and hold to reset the web password to the factory default   |
| Pdt  |                | Pump Down Timeout                 | Alarms          | Max time for LPCO pumpdown exceeded   |
| PrF  |                | Process Failure                   | Alarms          | Display is not communicating to the controller  |
| Prn  |                | Permanent                         | Setpoint        | Option when Defrost Type (dtY) is set for Electric (ELE) - Permanent (Prn) means defrost relay is energized during the entire defrost cycle; other option Pulse (PUL) uses the advanced defrost algorithm to cycle the relay  |
| PrS  |                | Suction Pressure                  | Variables       | Suction pressure as measured by the controller (only available if suction pressure transducer installed)  |
| PSA  |                | Pressure Sensor Alarm             | Alarms          | Suction pressure sensor is shorted, open or pressure out of range   |
| PUL  |                | Pulse                             | Setpoint        | Option when Defrost Type (dtY) is set for Electric (ELE) - Pulse (PUL) uses the advanced defrost algorithm to energize the defrost relay during the defrost cycle; other option Permanent (Prn)   |
| rEF  |                | Refrigeration                     | System Mode     | Indicates the system is currently in Refrigeration mode   |
| rFG  |                | Refrigerant                       | Setpoint        | Type of refrigerant used: see table below   |
| rnt  |                | Compressor Run Time               | Setpoint        | Option for Defrost Initiation Mode (ind) - when Compressor Run Time (rnt) selected, number of hours of cooling before starting defrost; other options for (Ind) are Demand Defrost (dnd) or Scheduled (SCH)   |
| rS   |                | RSV                               | Valve Type      | (RSV) Refrigeration Stepper Valve (CONTACT FACTORY)   |
| rtP  |                | Room Temp                         | Variables       | Walk-in freezer or cooler room temperature (TAir Sensor) as measured by the controller  |
| rtP  |                | Room Temp                         | Auxiliary Input | Room temp as measured by Aux Input  |
| SA   |                | Smart Access                      | Setpoint        | Turn Smart Access on or off: EnA to enable Smart Access / DiS to disable (CONTACT FACTORY)  |
| SAt  |                | Saturation Temp                   | Variables       | Saturation temperature as calculated by the controller (requires pressure transducer and T1 sensor)   |
| SCC  |                | Short Compressor Cycle            | Alarms          | Compressor is started an excessive number of times to maintain suction pressure   |
| SCH  |                | Scheduled Defrost                 | Setpoint        | Option for Defrost Initiation Mode (ind) - when Scheduled (SCH) selected, system defrosts on a programmed schedule; other options for (Ind) are Demand Defrost (dnd) or Compressor Run Time (rnt)   |

## Alphabetical List of Abbreviations (continued)

| ABR.       | REMOTE DISPLAY | FULL NAME                     | TYPE            | DESCRIPTION   |
|------------|----------------|-------------------------------|-----------------|---|
| <b>SEi</b> |                | SEI                           | Valve Type      | Sporlan Valve with 1,600 Steps  |
| <b>SEr</b> |                | SER                           | Valve Type      | Sporlan Valve with 2,500 Steps  |
| <b>SHt</b> |                | Superheat                     | Variables       | Superheat as calculated by the controller (requires suction pressure transducer and TSUC sensors)                               |
| <b>SoF</b> |                | System Off Switch             | Auxiliary Input | Inactive=System On (Son)/Active=System Off (SoF)  |
| <b>SoF</b> |                | System Off                    | System Mode     | System has been turned off by external signal   |
| <b>Son</b> |                | System Off Switch - System On | Auxiliary Input | Inactive=System On (Son)/Active=System is running normally  |
| <b>SSA</b> |                | Suction Sensor Alarm          | Alarms          | Suction temperature sensor is shorted or open   |
| <b>Stt</b> |                | Superheat                     | Setpoint        | Superheat setpoint  |
| <b>SUt</b> |                | Suction Temp                  | Variables       | Suction Temperature as measured by controller   |
| <b>SYS</b> |                | System Mode                   | Variables       | Current operating status  |
| <b>t2F</b> |                | 2nd Room Temp Setpoint Off    | Auxiliary Input | System is controlling to Room Temp setpoint   |
| <b>t2n</b> |                | 2nd Temp Switch               | Auxiliary Input | Inactive=2nd room temp SP off (t2F)/Active=2nd room temp SP on (t2n)  |
| <b>tHr</b> |                | Mechanical                    | Valve Type      | Thermostatic Expansion Valve  |
| <b>tS</b>  |                | Room Temp SP                  | Setpoint        | Walk-in freezer or cooler room temperature to be maintained   |
| <b>tS2</b> |                | 2nd room temp SP              | Setpoint        | If AU IN (1, 2 and/or 3) MODE = (t2n) 2ND ROOM TEMP: This value becomes the ROOM TEMP setpoint when the digital input is active |
| <b>Unt</b> |                | Temperature Units             | Setpoint        | Units for temperature's display in °F or °C   |

## PRODUCT SUPPORT RESOURCES


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