EC3-D72 with TCP/IP Communication Capability

EC3-D72 is the superheat controller with TCP/IP connection for step- 

per motor driven Electrical Control Valves EX4...EX6 and is optimized 

to operate with the Copeland Digital Scroll series utilising a 0-10V input 

from a third party controller. The controller synchronises the PWM digital 

compressor solenoid valve with the superheat controlled by the electrical 

control valve; EX series.

Note: This document contains short form instructions for experienced users.

SAFETY INSTRUCTIONS

• Read installation instructions thoroughly. Failure to comply can result in 

device failure, system damage or personal injury.

• The product is intended for use by persons having the appropriate 

knowledge and skills.

• Disconnect all voltages from system before installation.

• Do not operate system before all cable connections are completed.

• Comply with local electrical regulations when wiring.

Note: The EC3-D72 series contains a lead, acid gel rechargeable bat-

tery. The battery must NOT be disposed of with other commercial waste. 

Instead, it is the user’s responsibility to pass it to a designated collection 

point for the safe recycling of batteries (harmonised directive 98/101/ 

EEC). For further information contact your local environmental recycling 

center.

TECHNICAL DATA

Power supply ................. 24VAC ±10%; 50/60Hz; 1A
Power consumption .............. 25VA max. including EX4 ... EX6
Plug-in connector ............... Removable screw terminals wire size 0,14 .. 1,5 mm²
Grounding ..................... 6,3 mm spade earth connector
Protection class .............. IP20
COM, TCP/IP connection ...... RJ45 Ethernet
Connection to optional ........ ECC-N30 or CAT5 cable with RJ45 connectors
local ECD-002
Digital Input; .................. 0/24VAC/DC for stop/start function. EX valve closes
Cooling demand ............... during stop command. Typically thermostat or third
party controller.
Digital Input; .................. 0/24VAC/DC typically connected to auxiliary connection.
Comp2 running ............... EX valve control loop remains active when input is 24V 

and the digital scroll is idle.

NTC input; Coil-out .............. Emerson temperature sensor ECN-N60 or ECN-P60

temperature sensor
4-20 mA Analog input ......... Emerson PT5-07M / PT5-18M / PT5-30M

4-20 mA Analog output ........ For connection to any 3rd party controller with 12/24VDC
Deviation from input signal power supply and appropriate burden ±8% max
Output alarm relay............... SPD contact 24V AC/DC, 2 Amp inductive load
(if L2 = 1)........... Activated; During normal operation (no alarm condition)

Deactivated; During alarm condition or power supply is OFF
Output pump down relay........ SPD contact 24V AC/DC, 2 Amp inductive load
(if L2 = 1) ........... Activated; During normal operation

Deactivated; All other conditions

WARNING: If the output relays are not utilized, the user must ensure appropriate safety 

precautions are in place to protect the system against damage caused by a power failure.

Output Digital Scroll...........24V or 230V AC output to activate PWM valve on Digital Scroll
1 Triac
Stepper motor output ............. Maximum current 0,6A with nominal 24VDC operating voltage 

for EX4...EX6
Ambient temperature .......... 32 – 140°F 

range 34 – 77°F (for best battery life time) 

> 95°F; battery life time < 2 years

In order to provide system protection in the event of power loss, it is recommended to 

change the battery annually.

MOUNTING

• The EC3-D72 is designed to be mounted onto a standard DIN rail.

ELECTRICAL INSTALLATION

• Refer to the electrical wiring diagram for electrical connections.

• Do not apply voltage to the controller before completion of wiring.

• Ground the metal housing with a ½” spade connector.

• Important: Keep controller and sensor wiring well separated from 
mains wiring. Minimum recommended distance 1.2”

WARNING: Use a class II category transformer for 24VAC power supply. 

Do not ground the 24VAC lines. We recommend using individual transform-

ers for EC3 controller and for 3rd party controllers to avoid possible 

interference or grounding problems in the power supply. Connecting any 

EC3 inputs to mains voltage will permanently damage the EC3.

WIRING

EC3-D72
Digital input status is dependent to operation of compressor/0-10V input

<table>
<thead>
<tr>
<th>System Operating Condition</th>
<th>Digital Inputs</th>
<th>0-10V Input from Third Party Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comp. 1 &amp; Comp. 2 in stop mode</td>
<td>“Cooling demand” open (0V) &amp; “Comp 2 Running” open (0V)</td>
<td>ECV remains closed irrespective of voltage input value</td>
</tr>
<tr>
<td>Comp. 1 in run &amp; Comp. 2 in stop mode</td>
<td>“Cooling demand” closed (24V) / “Comp 2 Running” open (0V)</td>
<td>ECV active Input =0V: digital valve capacity at 10% default capacity. When the digital comp. is in by-pass the ECV will: Close when capacity is &lt;70%. Be inhibited when the capacity is &gt;70%</td>
</tr>
<tr>
<td>Comp. 1 &amp; Comp. 2 in run mode</td>
<td>“Cooling demand” closed (24V) / “Comp 2 Running” closed (24V)</td>
<td>ECV active The ECV will always modulate even when the digital compressor is in by-pass mode.</td>
</tr>
<tr>
<td>Comp. 1 in stop &amp; Comp. 2 in run mode starts</td>
<td>“Cooling demand” open (0V) / “Comp 2 Running” closed (24V)</td>
<td>ECV remains closed irrespective of voltage input value.</td>
</tr>
</tbody>
</table>

Digital comp. should always be regarded as base load; compressor 1

**PREPARATION FOR START-UP**
- Vacuum: the entire refrigeration circuit.

**WARNING:** Electrical Control Valves EX4...EX6 are delivered at half open position. Do not change system before closure of valve.
- Apply supply voltage 24V to EC3 while the cooling demand digital input is 0V (open). The valve will be driven to close position.
- After closure of valve, start to charge the system with refrigerant.

**POSSIBILITIES OF CONNECTING EC3-D72 TO A NETWORK OR PC**
A TCP/IP Controller Readme file is available on the www.emersonclimate.eu website to provide detailed information about TCP/IP Ethernet connectivity. Please refer to this file if you need information beyond the contents of this instruction sheet.

1) Connect the EC3-D72 using the optional ECC-N30 cable assembly or a standard CAT5 network cable with RJ45 plugs assembly to a network or router that enables the controller to receive a dynamic TCP/IP address or address or
2) Connect the EC3-D72 to a computer using a crossover cable plugged directly into the Ethernet port. In this case, the TCP/IP address of the computer must be manually modified to be compatible with the default address of the controller. Refer to the TCP/IP Controller-Readme file for more details.

**SETTING AND VISUALIZING DATA: WEBPAGES (RECOMMENDED METHOD)**
**Important:** Make sure that cooling demand input is 0V (open). Turn the power supply ON.

Four parameters i.e. refrigerant type (u0), pressure sensor type (uP), valve type (ut) and control mode can be set only when cooling demand digital input is open (0V) and the power supply is ON (24V). This feature is for added safety to prevent accidental damage of compressors and other system components. All other parameters can be modified at any time.

The EC3-D72 has a TCP/IP Ethernet communication interface enabling the controller to be directly connected to a network or a PC via the standard Ethernet port. The EC3-D72 controller has embedded WebPages to enable the user to visualise the parameter lists using real text labels. To view WebPages on the PC, a standard WebBrowser like Internet Explorer® or Mozilla Firefox and JRE Java Runtime Environment is needed. JRE can be downloaded at no charge from the www.java.com website. Open the Internet browser program on the computer and, if EC3-D72 is connected directly to PC with a crossover cable enter the default TCP/IP address of the controller (192.168.1.101) into the address line, or the dynamic address from the DHCP server from network/Router. Refer to the TCP/IP Controller-Readme file if a specific port is required. It is possible to identify the dynamic TCP/IP address assigned by DHCP of the Router or network, refer to the TCP/IP Controller-Readme file. After a few moments, the default monitoring page should be displayed. If the browser does not open the default page or display active data, the user should check the Internet browser “Option” configuration. Refer to the TCP/IP Controller-Readme file.

**ALTERNATIVE PROCEDURE FOR PARAMETER MODIFICATION USING ECD-002**
**Note:** Some of the functions/parameters (manual control and TCP/IP configuration) cannot be modified when using ECD-002 comparing to a set-up by PC via TCP/IP. **Warning:** All alarms are disabled during manual control. We do not recommend unattended operation of system during manual control.

The parameters can be accessed via the 4-button keypad. The configuration parameters are protected by a numerical password. The default password is “12”.

1. To select the parameter configuration:
   - Press the PRG button for more than 5 seconds
   - A flashing 0 is displayed
   - Press 0 or 9 until the password is displayed (default 12).
   - If the password was changed, select the new password
   - Press SEL to confirm password
   - Press or to show the code of the parameter that has to be changed;
   - Press SEL to display the selected parameter value;
   - Press or to increase or decrease the value;
   - Press SEL to temporarily confirm the new value and display its code; Repeat the procedure from the beginning "press or to show..."

2. To exit and save the new settings:
   - Press PRG to confirm the new values and exit the parameters modification procedure.

3. To exit without modifying any parameters:
   - Do not press any button for at least 60 seconds (TIME OUT).
### LIST OF PARAMETERS IN SCROLLING SEQUENCE BY PRESSING 

<table>
<thead>
<tr>
<th>Code</th>
<th>Parameter description and choices</th>
<th>Min</th>
<th>Max</th>
<th>Factory setting</th>
<th>Field setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>HS</td>
<td>Password</td>
<td>1</td>
<td>199</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>u0</td>
<td>System refrigerant</td>
<td>0</td>
<td>7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = R22; 1 = R134a; 2 = R507; 3 = R404A; 4 = R407C;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = R410A; 6 = R124; 7 = R744 (subcritical application)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>uP</td>
<td>Installed pressure sensor type</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = P5-07M (for R22/R134a/R507/R404A/R407C/R124)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = P5-18M (for R410A)</td>
<td>2</td>
<td>30</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(for R744, subcritical)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ut</td>
<td>Installed valve type</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = EX4; 2 = EX5; 3 = EX6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>uu</td>
<td>Start valve opening (%)</td>
<td>10</td>
<td>100</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>uO</td>
<td>Start opening duration (second)</td>
<td>1</td>
<td>30</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>uL</td>
<td>Low superheat alarm function</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = disable (for flooded evaporator)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 = enable auto reset</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = enable manual reset</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>U5</td>
<td>Superheat set-point (°F)</td>
<td>5.4</td>
<td>54</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If ul enabled (auto or manual)</td>
<td>0.9</td>
<td>54</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>If ul disabled</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>u2</td>
<td>MOP function</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>u3</td>
<td>MOP set-point (°F) saturation temperature</td>
<td>*</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Factory setting is according to selected refrigerant (u0):</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+5°F for R22; +59°F for R134a; +45°F for R507;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+45°F for R404A; +59°F for R407C; +59°F for R410A;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>+12°F for R124 and +23°F for R744</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r1</td>
<td>Value to show</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = Measured superheat (°F); 1 = Measured evaporator pressure (psig);</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 = Valve opening (%); 3 = Measured cool-out temp. (°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 = Calculated evaporating temperature (°F) from the pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 = Compressor capacity in %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>u4</td>
<td>Superheat control mode</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = Standard, 1 = Slow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>uH</td>
<td>High superheat alarm function</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = disable, 1 = enable auto reset</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>au</td>
<td>High superheat alarm setpoint</td>
<td>16</td>
<td>40</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>ud</td>
<td>High superheat alarm delay, min.</td>
<td>1</td>
<td>15</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>Freeze protection cut-out, °F</td>
<td>-40</td>
<td>104</td>
<td>-32</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>Freeze protection cut-out, °F</td>
<td>-35</td>
<td>109</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>Freeze protection alarm function</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = disable, 1 = enable auto-reset, 2 = enable manual reset</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>Freeze protection alarm delay, sec.</td>
<td>5</td>
<td>199</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>P6</td>
<td>Pump-down function</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>P7</td>
<td>Pump-down cut-out, psig</td>
<td>-7.3</td>
<td>261.1</td>
<td>7.2</td>
<td></td>
</tr>
<tr>
<td>P8</td>
<td>Pump-down time delay, sec.</td>
<td>0</td>
<td>199</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>P9</td>
<td>Low pressure alarm function</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 = disable, 1 = enable auto-reset, 2 = enable manual reset</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>Low pressure alarm cut-out, psig</td>
<td>-11.6</td>
<td>256.7</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PD</td>
<td>Low pressure alarm delay, sec.</td>
<td>5</td>
<td>199</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low pressure alarm cut-out, psig</td>
<td>-7.3</td>
<td>261.1</td>
<td>4.3</td>
<td></td>
</tr>
</tbody>
</table>

### SPECIAL FUNCTIONS

**Special Functions can be activated by:**

- Press **and** together for more than 5 seconds.
  - A flashing 0 is displayed.
- Press **or** until the password is displayed (default = 12).
  - If password was changed, select the new password.
- Press **SEL** to confirm password
  - A 0 is displayed and the Special Function mode is activated.
- Press [SEL] or [SEL] to select the function. The number of special functions is dynamic and controller dependent. See list below.
- 0%: Reset controller to factory settings (this action is possible only when digital input is 0V i.e. open)
  - 1: Displays the current TCP/IP address
  - 2: Assign temporary 192.168.1.101 as TCP/IP address if EC3-D72 has different address
- Press **SEL** to activate the function without leaving the special function mode.
- Press **PRG** to activate the function and leave the special function mode.

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<th>Field setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>L2</td>
<td>Output logic</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>b1</td>
<td>Battery error management,</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>when battery is defective, see below:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Value</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm display</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm relay</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Valve</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reset possibility after</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>recovery/replace</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### LIST OF PARAMETERS IN SCROLLING SEQUENCE BY PRESSING **

<table>
<thead>
<tr>
<th>Code</th>
<th>Parameter description and choices</th>
<th>Min</th>
<th>Max</th>
<th>Factory setting</th>
<th>Field setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>f8</td>
<td>Show decimal point; 0 = yes, 1 = no</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>A6</td>
<td>Maximum discharge temperature; °F</td>
<td>212</td>
<td>284</td>
<td>266</td>
<td></td>
</tr>
<tr>
<td>A7</td>
<td>Discharge temp. alarm delay, sec.</td>
<td>0</td>
<td>199</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>F2</td>
<td>Minimum capacity; %</td>
<td>10</td>
<td>100</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>Maximum capacity; %</td>
<td>10</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>F6</td>
<td>Scroll Valve; PWM cycle time, sec.</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>t3</td>
<td>Monitor discharge temperature</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>sensor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ru</td>
<td>0-10V input filtering</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### Control (Valve) Start-Up Behavior

**Parameter uu and u9**

- **EX4/5/6 ≤ 1.5 seconds**

### PUMP DOWN FUNCTION (IF P6=1 AND L2=1)

<table>
<thead>
<tr>
<th>Demand Status</th>
<th>Alarm Condition</th>
<th>Pump Down Relay</th>
</tr>
</thead>
<tbody>
<tr>
<td>24V (ON)</td>
<td>NO</td>
<td>Activate</td>
</tr>
<tr>
<td>0V (OFF)</td>
<td>NO</td>
<td>Deactivate when pressure drops below P7 and after elapsed time P8</td>
</tr>
<tr>
<td>0V or 24V</td>
<td>YES</td>
<td>Deactivate instantaneously</td>
</tr>
</tbody>
</table>

### START-UP

Start the system and check the superheat and operating conditions. The EC3-D72 is fully functional without connected PC or keypad/display unit. ECD-002.

### MOUNTING OF ECD-002

ECD-002 can be installed at any time also during operation.
- **ECD-002** can be mounted in panels with 2.8 x 1.1 inch cutout
- Push controller into panel cut-out (1)
- Make sure that mounting lugs are flush with outside of controller housing
- Insert Allen key into front panel holes and turn clockwise. Mounting lugs will turn and gradually move towards panel (2)
- Turn Allen key until mounting lug barely touches panel. Then move other mounting lug to the same position (3)
- Tighten both sides very carefully until keypad is secured.

Do not overtighten as mounting lugs will break easily.

- Insert Allen key into front panel holes and turn clockwise. Mounting lugs will turn and gradually move towards panel (2)
- Turn Allen key until mounting lug barely touches panel. Then move other mounting lug to the same position (3)
- Tighten both sides very carefully until keypad is secured.

- Do not overtighten as mounting lugs will break easily.
ERROR/ALARM HANDLING

### Alarm Code

- **E0**: Pressure transmitter error
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check wiring connection and measure the signal 4 to 20 mA
  - What to do? (Requires manual reset after resolving alarm)
  - Note: Battery error does not have enough charge to close valve in case of main power supply interruption. May occur temporarily with new controllers or after long storage but should disappear when battery is charged sufficiently (allow 10hrs). If Ab remains active even when battery is charged, battery may be defective and should be replaced. (Replacement kit: 097693).

- **E1**: Coil-out temperature sensor error
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check wiring connection and measure the resistance of sensor
  - What to do? (Requires manual reset after resolving alarm)
  - Note: When multiple alarms occur, the highest priority alarm is displayed until being cleared, then the next highest alarm is displayed until all alarms are cleared. Only then will parameters be shown again.

- **E3**: Discharge temp. sensor error
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Regulating
  - Valve: Check wiring connections and measure the resistance of sensor. Also check the status of the I/O configuration (t3)
  - What to do? (Requires manual reset after resolving alarm)

- **AI**: EX4 – EX6 electric connection error
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check wiring connection and measure the resistance of winding
  - What to do? (Requires manual reset after resolving alarm)

- **Ab**: Battery error
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Regulating
  - Valve: Check the system for cause of low pressure as insufficient load on evaporator
  - What to do? (Requires manual reset after resolving alarm)

- **AE**: Pump down action can not accomplished
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Allocate the source, which does not let suction pressure drops below desired set-point
  - What to do? (Requires manual reset after resolving alarm)

- **AF**: Freeze protection
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check the system for cause of low pressure such as insufficient load on evaporator
  - What to do? (Requires manual reset after resolving alarm)

- **AL**: Low superheat (<0.5K)
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check wiring connection and operation of valve
  - What to do? (Requires manual reset after resolving alarm)

- **AH**: High superheat
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check the system
  - What to do? (Requires manual reset after resolving alarm)

- **AP**: Low pressure
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check the system for cause of low pressure such as refrigerant loss
  - What to do? (Requires manual reset after resolving alarm)

- **Ap**: High discharge temp.
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: Signalling
  - Valve: Check the system
  - What to do? (Requires manual reset after resolving alarm)

- **Er**: Data error display – out of range
  - Description: Fully close
  - Related parameter: Signal
  - Alarm relay: -
  - Valve: Data send to the display is out of range. Check temperature and pressure sensor.
  - What to do? (Requires manual reset after resolving alarm)

### CHECKING SYSTEM OPERATING CONDITIONS USING LOCAL DISPLAY/KEYPAD ECD-002

The data to be permanently shown on the display can be selected by the user (parameter r<sup>1</sup> 1). It is possible to temporarily display these values. However this function is not available in an alarm condition.

### SERVICE/TROUBLESHOOTING

#### SYMPTOM

- Operating superheat is several degrees higher or lower than set-point
  - Cause: Incorrect signal from pressure or temperature sensors
  - Action: Check the sensors
  - Note: For optimum accuracy, please use:
    - PT5-07M for R22/R134a/R507/R404A/R407C/R124
    - PT5-18M for R410A
    - PT5-30M for R744
  - Note: Make sure the sensor cables are not installed along with other high voltage cables

- Operating superheat is too low; i.e. compressor wet running
  - Cause: Incorrect signal from pressure or temperature sensors
  - Action: Check the sensors

- Valve is not fully closed
  - Cause: Incorrect wiring of ECV
  - Action: Check the wiring

- Unstable superheat (hunting)
  - Cause: Incorrect wiring of ECV
  - Action: Check the wiring

- Valve opens when EC3 commands close and vice versa
  - Cause: Incorrect wiring between EC3-D72 and valve
  - Action: Check the wiring and obey the color coding: white/black, blue/brown

- Superheat set-point is shifting after several months of uninterrupted operation or permanent jumper of 24V digital input
  - Cause: Stepper motor driven valves require synchronization
  - Action: Do not apply permanent 24V digital input. Interrupt digital input once every week for 5 seconds if compressor never stops. This has the effect of referencing the valve to the fully closed position

### DIMENSIONS (IN INCHES)

![DIMENSIONS](image-url)