EMERSON Climate Technologies

Application Engineering

Copeland brand products

B U L L E T I N

AE8-1347 R2

March, 2009

Copeland PerformanceAlert™ Diagnostic Module

INDEX **PAGE**

1. Introduction

The Copeland PerformanceAlert™ diagnostic module (referred to as “the module” in this document) is a breakthrough innovation for troubleshooting refrigeration system faults. The module can be installed in the electrical box of the condensing unit near the compressor contactor or in the electrical panel of a refrigeration rack system. By monitoring and analyzing data from the Copeland® brand compressors, the module can accurately detect the cause of electrical and system related issues. A flashing LED indicator communicates the ALERT code and guides the service technician more quickly and accurately to the root cause of a problem. See **Table 7**.

The module can provide both compressor protection and lockout capability. Compressor protection means that the module will trip the compressor when any of the following severe alert conditions (codes 1,4,6,7 or 9) are detected (refer to **Table 8**). A trip condition is when the protector on a compressor opens and stops current flow into the compressor motor. As a result, the compressor shuts down. A trip condition will reset after short cycle time and when trip condition is not present. See **Table 4**. For 543-0057-xx and 543-0055-xx if lockout is enabled and a preset number of alarm events happen, the module will not allow the compressor to start until the situation is corrected and the module is manually reset (see Lockout Configuration in **Section 12.3.6.4**, Jumper Settings).

Suggested applications, subject to module specifications, include: Supermarket, walk-in unit, and reach-in coolers/freezers.

NOTE: The Copeland PerformanceAlert diagnostic module, under severe conditions, has the ability to shut down the compressor if the protection is wired through the compressor contactor coil.

Table 1
Copeland PerformanceAlert™ Part Numbers

OEM P/N	Service P/N	Application
543-0053-xx	943-0053-00	1-phase
543-0057-xx	943-0057-00	3-phase Scroll
543-0055-xx	943-0055-00	3-phase Recip

2. Application Restrictions

The Copeland PerformanceAlert™ diagnostic module **can not** be used with variable speed compressor drives. In most cases the module is **not** compatible with A-Model compressors but consult compressor current draw to further clarify.

3. Product Specifications

Operating Temp: -40° to 150°F (-40° to 65°C)

Storage Temp: -40° to 175°F (-40° to 80°C)

Power Supply Range: 85-265VAC, 48-62 Hz

Working amperage for module; 3.0-200A.

Note: The module is not accurate below 3 Amps. If the current drawn by the compressor during operation falls below 3 Amps, the module may indicate a nuisance fault condition and alarm. See Section 5.4 for wiring suggestions.

Note: If at any time during normal operation of the compressor, the current is between the minimum 3 Amps and 6 Amps, nuisance alarms are possible. To avoid nuisance alarms, "doubling the current sensed by the module" is recommended. Wrap the T1 wire up and over the module and back through the T1 hole a second time to double the current reading. Wrap the T3 wire up and over the module and back through the T3 hole a second time to double the current reading.

Maximum wire size for wiring into the module terminals is 14 gauge stranded.

Maximum contactor coil current is 5 amps.

4. Module Dimensions

A. 1.85 in (47 mm)
B. 2.44 in (62 mm)
C. 1.46 in (37 mm)
D. 4.40 in (112mm)
E. 2.44 in (62 mm)

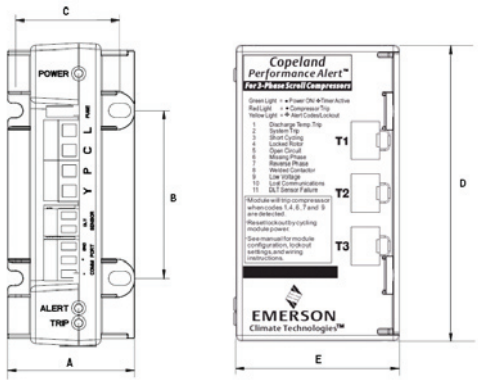


Figure 1

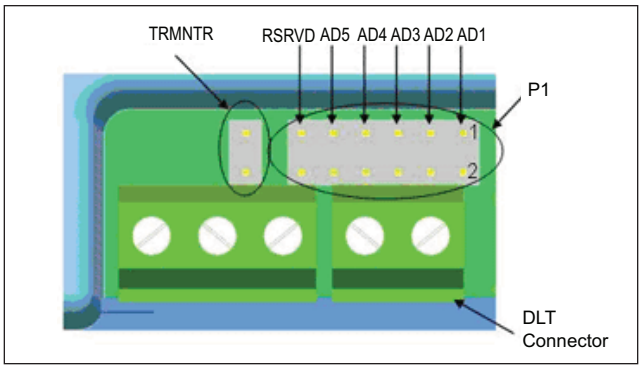


Figure 2

5. Hardware Installation

Warning! Hazardous voltage inside refrigeration system. Disconnect power before installing or servicing module. Module must be installed and serviced only by qualified personnel.

5.1. Jumper Settings

The module has a 7-position header with 6 jumper positions that are user configurable where jumpers can be set. These jumpers are used to configure the modules address to select network termination. The module comes with all jumpers in place.

Jumpers AD1 thru AD5 are used for module address selection. Valid module addresses are from 1 to 30 (31 external LED). Address 0 is invalid and occurs when all jumpers are left open; with this setting no communication may be possible with the device.

Note: When there is only one module, any address in the valid range can be selected. In a network application, each address can only be used once. Each module should have a different address when communicating in a network/daisy chain.

Table 2 Jumper Settings

Address	AD5	AD4	AD3	AD2	AD1
01	-	-	-	-	Jumper
02	-	-	-	Jumper	-
03	-	-	-	Jumper	Jumper
04	-	-	Jumper	-	-
05	-	-	Jumper	-	Jumper
06	-	-	Jumper	Jumper	-
07	-	-	Jumper	Jumper	Jumper
08	-	Jumper	-	-	-
09	-	Jumper	-	-	Jumper
10	-	Jumper	-	Jumper	-
11	-	Jumper	-	Jumper	Jumper
12	-	Jumper	Jumper	-	-
13	-	Jumper	Jumper	-	Jumper
14	-	Jumper	Jumper	Jumper	-
15	-	Jumper	Jumper	Jumper	Jumper
16	Jumper	-	-	-	-
17	Jumper	-	-	-	Jumper
18	Jumper	-	-	Jumper	-
19	Jumper	-	-	Jumper	Jumper
20	Jumper	-	Jumper	-	-
21	Jumper	-	Jumper	-	Jumper
22	Jumper	-	Jumper	Jumper	-
23	Jumper	-	Jumper	Jumper	Jumper
24	Jumper	Jumper	-	-	-
25	Jumper	Jumper	-	-	Jumper
26	Jumper	Jumper	-	Jumper	-
27	Jumper	Jumper	-	Jumper	Jumper
28	Jumper	Jumper	Jumper	-	-
29	Jumper	Jumper	Jumper	-	Jumper
30	Jumper	Jumper	Jumper	Jumper	-
Remote/External LED Blink	Jumper	Jumper	Jumper	Jumper	Jumper
Invalid Address	-	-	-	-	-

The jumper labeled RSRVD is currently not used. The Jumper labeled TRMNTR is used to terminate each end of the buss in a network application.

Jumpers should be set before mounting the module.

5.2. Compressor Lead Wiring

The compressor leads are routed through the holes in the module marked “T1”, “T2”, and “T3.” The hole sizes are .33” x .47” (8.4mm x 12mm).

The wiring should be set to monitor only the compressor and not any extra load, for example condenser fan or head fan. **Figure 3a** shows the module monitoring only the compressor. **Figure 3b** shows the preferred way to connect any extra load, represented by a fan.

Figure 3c is an example of a non desirable connection for any extra load (e.g. fan.) The extra load should never be connected between T1 and T3, because it can lead to nuisance code 6 alarms.

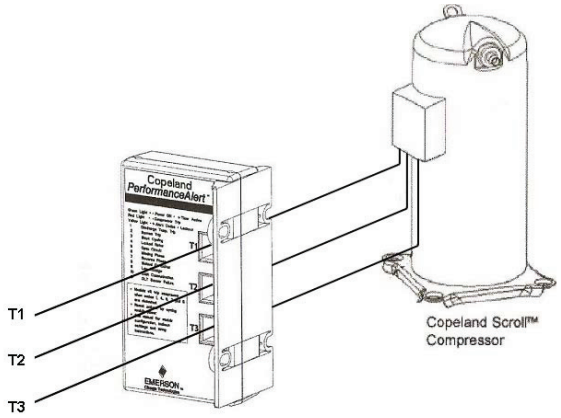


Figure 3a

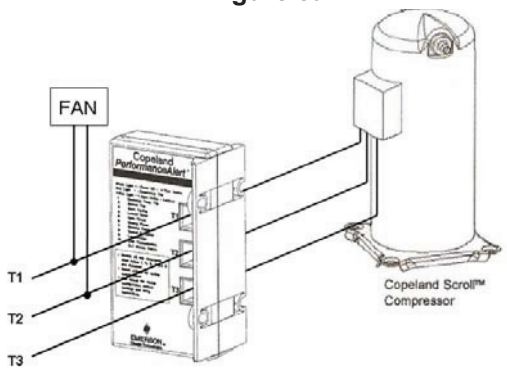


Figure 3b

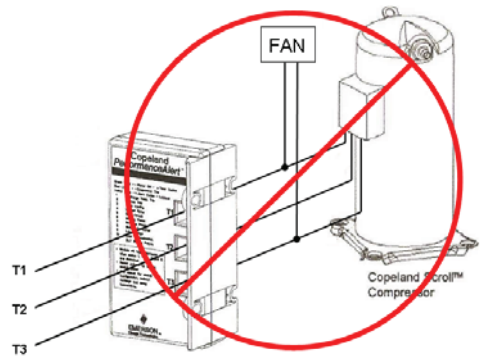


Figure 3c

5.3. Module Mounting

Four #8 or #10 self drilling or sheet metal screws, at least ½” (12mm length), are required for installation of the module. Locate the module near the compressor contactor (wire routing for compressor leads will be easier in this position). Mount the module so all LEDs are visible from a comfortable viewing position. The module will operate in any mounting orientation.

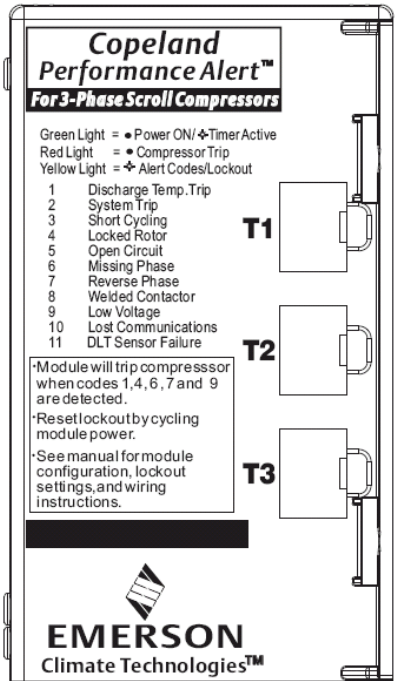


Figure 4

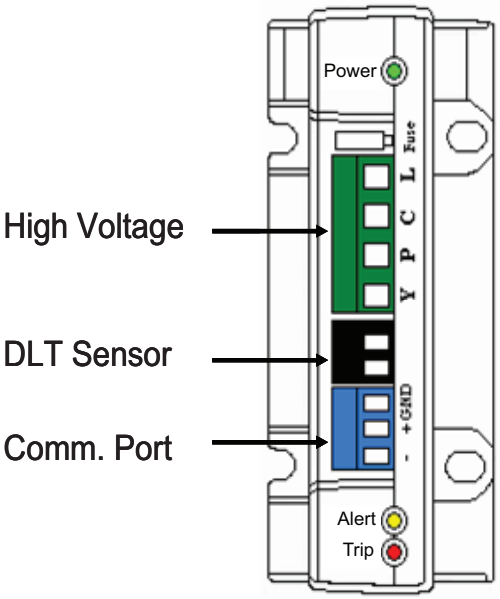


Figure 5

c UL us

UL File #E253322

5.4. 110-220VAC Module Power Wiring

The module requires 110-220VAC power between L and C terminals. The module should remain powered through all states of operation. Refer to wiring schematic in **Figures 6, 7 and 8.**

Schematic Abbreviation Descriptions:

L	Line
C	Common
P	Protection/Contactor Control
Y	Demand Signal Input (Electrical call for cooling)
HPCO	High Pressure Cut Out Switch
LPCO	Low Pressure Cut Out Switch
CNTR	Compressor Contactor Coil
CPA	Copeland PerformanceAlert module
DLT	Discharge Line Temperature

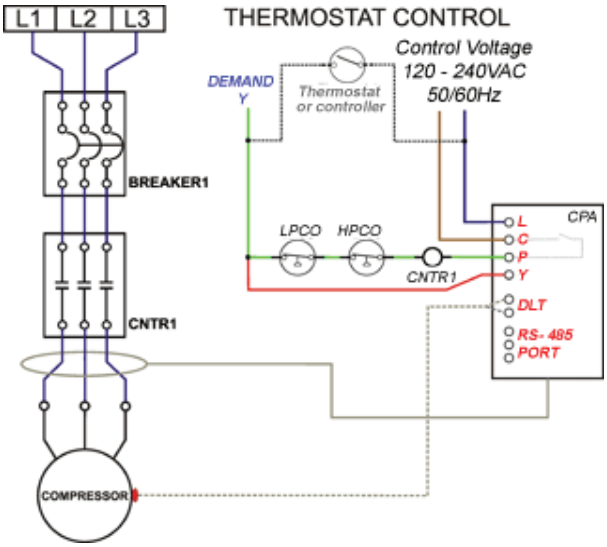


Figure 6

5.5. Demand Wiring

The module requires a demand signal to operate properly. The demand signal input, labeled Y on the module, should always be connected to the compressor demand so that the demand signal input is 110 or 220VAC with respect to Common (C). When the coil is not energized, the demand signal input should be less than 0.5VAC. See **Figures 6, 7 and 8** for proper wiring diagrams. Choose the appropriate diagram depending on how the demand signal will be fed to the module.

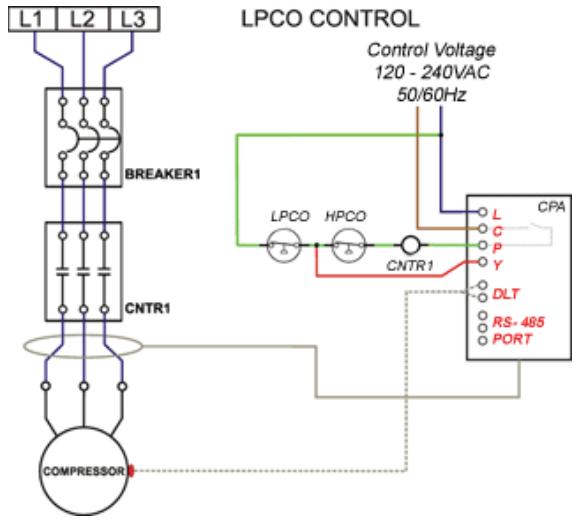


Figure 7

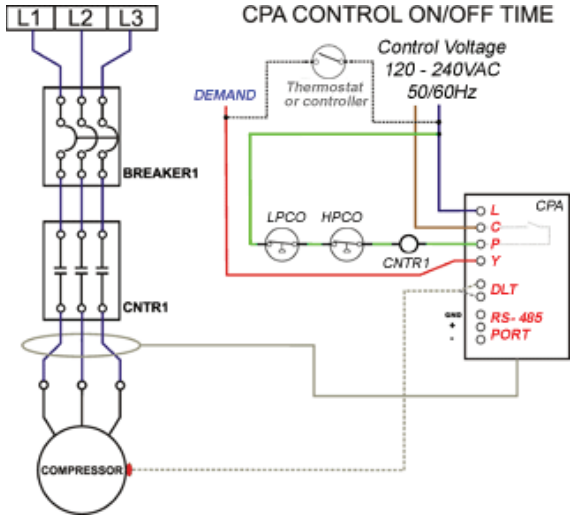


Figure 8

NOTE: After the demand signal is connected, verify 110/220V across Y and C when demand is present. The demand threshold is 65VAC, however low voltage is detected when the supply is at or below 85VAC for 110V and 170VAC for 220V.

5.6. Protection/Contactor Control Wiring

In order for protection to operate properly, the Copeland PerformanceAlert™ diagnostic module requires the return side of the contactor coil to be connected to the protection terminal labeled P on the module; see **Figure 7**. With this configuration, the module has the capability to open the contactor which will trip the compressor. During the codes 1, 4, 6, 7, and 9, the module will trip the compressor. **See Table 7 for Code description.** Also, protection must be connected for minimum off time and lockout to work.

5.7. Discharge Line Thermistor Installation

The nominal resistance of the discharge line thermistor is 100,000 Ohms at 77° F / 25° C. The discharge line thermistor has a negative temperature coefficient. This means that the resistance of the thermistor drops as temperature increases, and vice versa.

To detect the temperature of the discharge line, the DLT has to be connected to the discharge line not farther than 6 inches from the cylinder head. Straps from the single pack are available to connect the Discharge Line Thermistor to the discharge line. **See Table 6 for part numbers.**

When connecting the discharge temperature probe to the module, the length of the wire may need to be extended. When doing this it is best practice to solder the extension wires to the leads of the probe. If a soldering iron is not available a barrel wire splice is acceptable.

When extending the length of the discharge temperature probe, shielded wire must be used. The shield of the wire has to be connected to ground in the electrical panel as close to the module as practical. It is best not to make the wire any longer than what is required, and the wire must never be bundled with high voltage wire

5.8. External LED or Communication Wiring

The remote LED flashes the alert code in unison with the alert LED on the module. In order to communicate to the module using a PC, the user must connect the PC to the module using an RS 485 adapter. See **Figure 11.**

Note: External/remote LED and the communications cable can not be connected and used at the same time.

5.8.1. External/Remote LED Wiring

An external/remote LED is available for use in the single pack kit; see **Table 6** for the part number. The external/remote LED should be connected to the Communications Port, to pins Data + and Ground. D31, all jumpers must be in place to use the external/ remote LED; for jumper settings refer to **Table 2.**

6. Installation Verification
To verify the installation of the module is correct, a functional test should be performed:

Disconnect power from the compressor and force a call for cooling. The Trip LED (red) should turn on indicating a compressor trip as long as demand of 110VAC or 220VAC is present at the Y terminal. If the Trip LED (red) does not function as described, refer to **Table 3** to verify the wiring.

7. Installation Troubleshooting
Depending on the system configuration, some ALERT Flash codes may not be active. The presence of safety switches affects which system alerts are detected by the module. Refer to **Figures 6 or 7** for wiring with a safety switch.

NOTE: Miswiring the Copeland PerformanceAlert™ module will cause false Alert codes. Table 3 describes LED operation when the module is miswired and what troubleshooting action is required to correct the problem. Miswiring the module may cause damage to the module or the system, and will not provide protection.

NOTE 1: The correct module must be matched to the compressor for which it is applied, refer to Table 1. If the wrong module is installed, the ALERT Flash Codes for system faults will function incorrectly: the module may indicate system faults that are not present or fail to indicate system faults that are present.

8. Module LED Descriptions
POWER LED (Green): Indicates voltage is present at the power connection of the module.

When flashing, the Power LED (Green): Indicates that the module is holding the compressor in the off state for the duration set in the minimum off time menu.

ALERT LED (Yellow): Communicates an abnormal system condition through a unique flash code, see **Section 9**.

TRIP LED (Red): Indicates there is a demand signal but no current to the compressor is detected by the module. The TRIP LED typically indicates the compressor protector is open or may indicate missing supply power to the compressor.

9. Interpreting the Diagnostic LEDs
When an abnormal system condition occurs, the module displays the appropriate ALERT and/or TRIP LED. The ALERT LED (yellow) will flash a number of times consecutively, pause and then repeat the process. To identify a Flash Code number, count the number of consecutive flashes. Detailed descriptions of specific ALERT Flash Codes are shown in **Table 8**. The module will continue to display the alert code until the condition returns to normal or if module power is cycled from the module.

One long flash of the Yellow LED (before a flash code) indicates that the module is in LOCKOUT condition.

Table 3 – Miswiring

Miswired Module Indication	Recommended Troubleshooting Action
Power LED (Green) is not on, module does not power up	1. Determine if both C and L module terminals are connected. 2. Verify line voltage is present at module's C and L terminals. 3. Review wiring diagram.
Power LED (Green) intermittent, module powers up only when compressor runs	1. Determine if L and Y terminals are wired in reverse. 2. Verify module's C and L terminals have constant source from line side of contactor.
Trip LED (Red) is on but system and compressor check OK	1. Verify that the demand is connected to the Y terminal. 2. Review wiring diagram.
Trip LED (Red) and ALERT LED flashing together	1. Verify C and L module terminals are supplied with 85-265VAC. 2. Check if contactor coil terminal is connected to P.
Compressor does not run	1. Check if P and Y cables are swapped 2. Review wiring Diagram
Compressor runs when it should be off	1. Review wiring diagram for P connection. 2. Check if P and C are shorted 3. Review wiring Diagram
No communication with module	1. Check if communications wiring is right 2. Check module address setting. It should not be 0 or 15
Check sum error during communications	1. Check if data+ and data- wires are swapped

Every time the module powers up, the last ALERT Flash Code that occurred prior to lose of power is displayed for one minute.

10. Resetting Alert Codes
Alert codes can be reset manually and automatically. The manual method to reset an Alert code is to cycle the power to the module off and on. For automatic reset, the module continues to monitor the compressor and system after an Alert is detected. If conditions return to normal, the Alert code is turned off automatically.

11. Communications
The Copeland PerformanceAlert™ module can indicate an alert in two ways:

11.1. Digital:

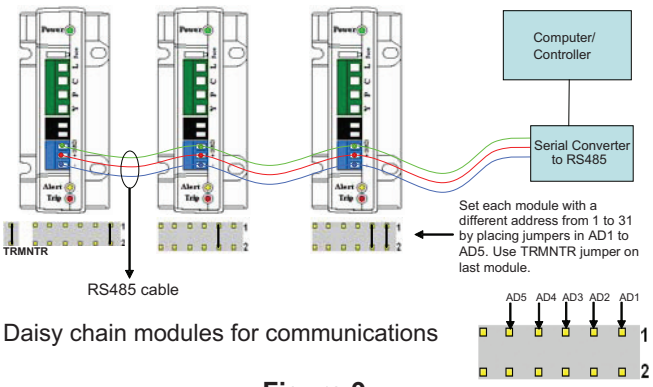
11.1.1 Computer:
Using the module communications port and the USB adaptor, the module can communicate to a computer.

11.1.2 CPC Rack Controller:
Using the communications port, the module can communicate directly with an E2 rack controller or via a gateway board to CPC rack controllers RMCC, or Einstein. For third party controller communications, the Controller must have modbus mapping capability. The gateway board is Emerson Climate Technologies, Inc part number 943-3730-00, and includes complete documentation on installation and configuration. The gateway can be configured to pass only an "Alarm On" signal to all three generations of controllers (Condensed Mode), or can be configured to pass detailed alarm status and data to Einstein or E2 controllers (Expanded Mode).

When several modules are present and communications is needed, it is possible to daisy chain the communications ports of all modules and establish communication between a computer/controller and the modules as can be seen in the **Figure 9**.

Note: In a daisy chain connection, make sure address assigned to each module is different from any other component address connected to the E2.

Note: In a daisy chain connection the module in the extreme that is not connected to the computer/ controller has to have the jumper TRMNTR placed to terminate the communication bus (See Figure 2 and Figure 9).



Daisy chain modules for communications

Figure 9

11.2. Visual:
The module can display a visual alert through two methods:

11.2.1 ALERT LED:
The module's ALERT LED (yellow) will display the alert code. In some installations it is possible that the LED will not be visible. In these cases an EXTERNAL LED should be mounted on the outside of the installation place to view the alarm codes.

11.2.2 External/Remote LED:
When installed (See **Section 5.8.1**), the EXTERNAL LED will function in the same manner as the module ALERT LED.

When connecting the discharge temperature probe to the module, the length of the wire may need to be extended. When doing this it is best practice to solder the extension wires to the leads of the probe. If a soldering iron is not available a barrel wire splice is acceptable.

When extending the length of the discharge temperature probe, shielded wire must be used. The shield of the wire has to be connected to ground in the electrical panel as close to the module as practical. It is best not to make the wire any longer than what is required, and the wire must never be bundled with high voltage wire

12. Diagnostic Software
The module can be connected to a desktop or laptop computer for diagnostic purposes, changing default settings, and accessing previously logged data as well as the current status of the compressor, see **Section 12.3**. A detailed User Manual is available on the PC Software CD.

12.1. Software Installation

12.1.1 Minimum Hardware and Software Requirements

Windows 2000/XP
Pentium III, 300MHz processor
Internet Explorer 5.1
Windows installer 3.1
microsoft.net framework 2.0

12.1.2 Dependency Software Installation:

Install the Windows Installer and the DotNetFramework which are pre-requisite software packages before installing the Copeland PerformanceAlert™ interface software.

12.1.3 Installation CD

To install the software, close all applications running on your computer. Insert the CD in the CD-ROM drive.

The software can be installed in two ways.

12.1.3.1 Auto Run:

Auto runs the CD and starts the setup automatically.

12.1.3.2 Manual Installation:

If user does not run the setup through Auto Run feature, they can install it manually also.

For manual installation,

- Open/Explore the contents of the CD.
- Double click the "Copeland PerformanceAlert PC Communication Software" icon and the setup starts. OR
- Click the Start button on the Windows task bar and then choose Run. In the Run dialog box, type **"D:\ Copeland PerformanceAlert PC Communication Software"**, where D is the name of your CD-ROM drive. Click OK.

Follow on-screen installation directions.

The software will be installed in **"C:\Program Files\ Copeland PerformanceAlert PC Communication Software"** directory by default. You can specify another directory, if desired. Upon successful installation, an icon will be placed on your desktop (computer monitor) along with a shortcut in the **"Start Menu"** for **"Copeland PerformanceAlert PC Communication Software"**.

12.2 Connecting Module to Computer

Emerson Climate Technologies, Inc. has a USB device for communications between the module and a computer. The device converts the module's RS-485 to the computer's USB. This device is a user

Figure 10

friendly converter and includes Windows drivers for easy installation and configuration. The Emerson Communication Kit part number is 943-0143-00. The module's communication pin out is shown in **Figure 5** under Comm. Port.

12.2.1 Communication Wiring (RS485)

The D+ terminal of the adapter should be connected to the – terminal of the port on the module. The D- terminal of the adapter should be connected to the + terminal of the port on the module. The Gnd terminal of the adapter should be connected to the Gnd terminal of the port on the module. See **Figure 11.**

Note: Some vendors use reverse polarity on their adapters. If communication does not work, reverse the – and + connection terminals on the module.

Figure 11 depicts how to connect the Copeland PerformanceAlert™ module to the computer, using USB to RS-485 converter, where the user can directly connect the module to the converter and the converter USB cable to the USB port of the computer.

Note: User may need to install drivers for the USB to Serial Converter if the user wishes to make use of the USB to serial converter.

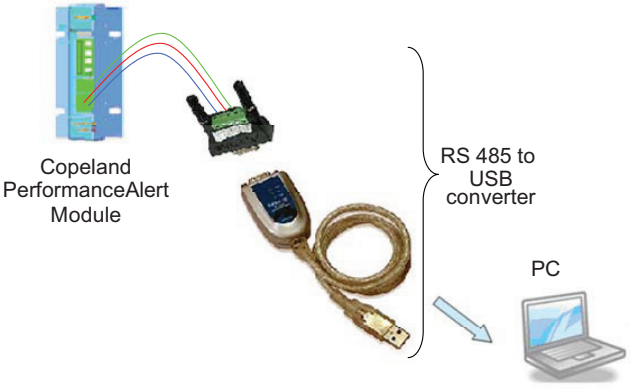


Figure 11

12.3 How to Use the Software

To use the software, make sure that proper connections are made between the module and the computer. Open the program by double clicking on the Copeland PerformanceAlert™ icon. The software will automatically scan to find all modules connected to the network.

Once all the connected modules are found the user may stop scanning, otherwise the software will continue searching through all available addresses which may take 30 seconds. To manually select a single module, stop the scanning and select the desired module, from the drop down module provided in the configuration window as shown in **Figure 12**.

12.3.1 Configuration Screen

Default Settings have been provided for Parity (NONE), Baud Rate (9600 & 19.2k) and Port Number (User selectable) at the initial Run. **Figure 12** shows the list of modules found in the network or added manually using 'Add Module to the List' button. It also shows the status of the device during each data polling.

If proper communication is established between the module and the computer, the response status column will be 'Response Received' in Green color. If there is a problem in the communication, the Response status column will show 'Error: No Response Received' marked in Red color.

12.3.2 Main Status Screen

The status screen **Figure 13** shows the status of the compressor using analog data, digital data, warnings and code alerts.

The program retrieves the diagnostics information from the module every 10 seconds (Default Polling Interval). The program displays updated Active Alarm and Warning Messages every 10 seconds. The polling interval can be changed by clicking on the clock icon on the tool bar. The range is from 5 seconds to 20 minutes.

12.3.3 History Screen

The History Screen **Figure 15** displays the last 7 days Alarm History, Weekly Total and Cumulative Total of Compressor Starts and Run Time and Cumulative Total for each alert code event. User can save the history information using the "Save History" button. Information can be saved in an Excel file for history comparison and off-site review.

This Excel file contains all the information i.e. Analog Data, Module Configuration, Device Information, Ten Most Recent Alarms, etc. User can track analog values from this Excel file.

The history information can be found in the second sheet of the downloaded Excel file in a single row format. If a specific compressor installation is to be monitored, the history from each visit can be added as rows which can be used for analysis and troubleshooting.

12.3.4 Module Device Information Screen

The Device Information Screen **Figure 16** is to show the Copeland PerformanceAlert™ Model (Three Phase Scroll or Three Phase Recip), Communication Settings in the module, Lockout Settings (Based on jumper) and Firmware Version.

12.3.5 Module Data Logging Screen

The Data Logging Screen **Figure 17** is to log the digital status (like Demand Present is 1 or Demand absent is 0) and analog data on a periodic basis (set by the polling interval). This real-time information can be used to trouble-shoot the system.

12.3.6 Module Configuration Screen

With the help of **Figure 14**, the user can program the module for various parameters in the following sections: Compressor Asset Information, Module Configuration and Lockout Configuration. Detailed information about the setting is provided in the Help file.

Note: Modifications to the lock out settings will be activated when the module is powered off then on.

12.3.6.1 Default Settings

Default Settings have been provided for Module Configuration parameters and Lockout Configuration parameters on the first Module power-up. User is able to change the settings as per his configuration after the initial run of the software.

12.3.6.2 Compressor Asset Information

This information can be configured during compressor installation:

Compressor Model Number - Max. 17
Alphanumeric Characters

Compressor Serial Number - Max. 10
Alphanumeric Characters

Identification Number - Number from 0 to 255

Date Of Installation - MM/DD/YYYY format

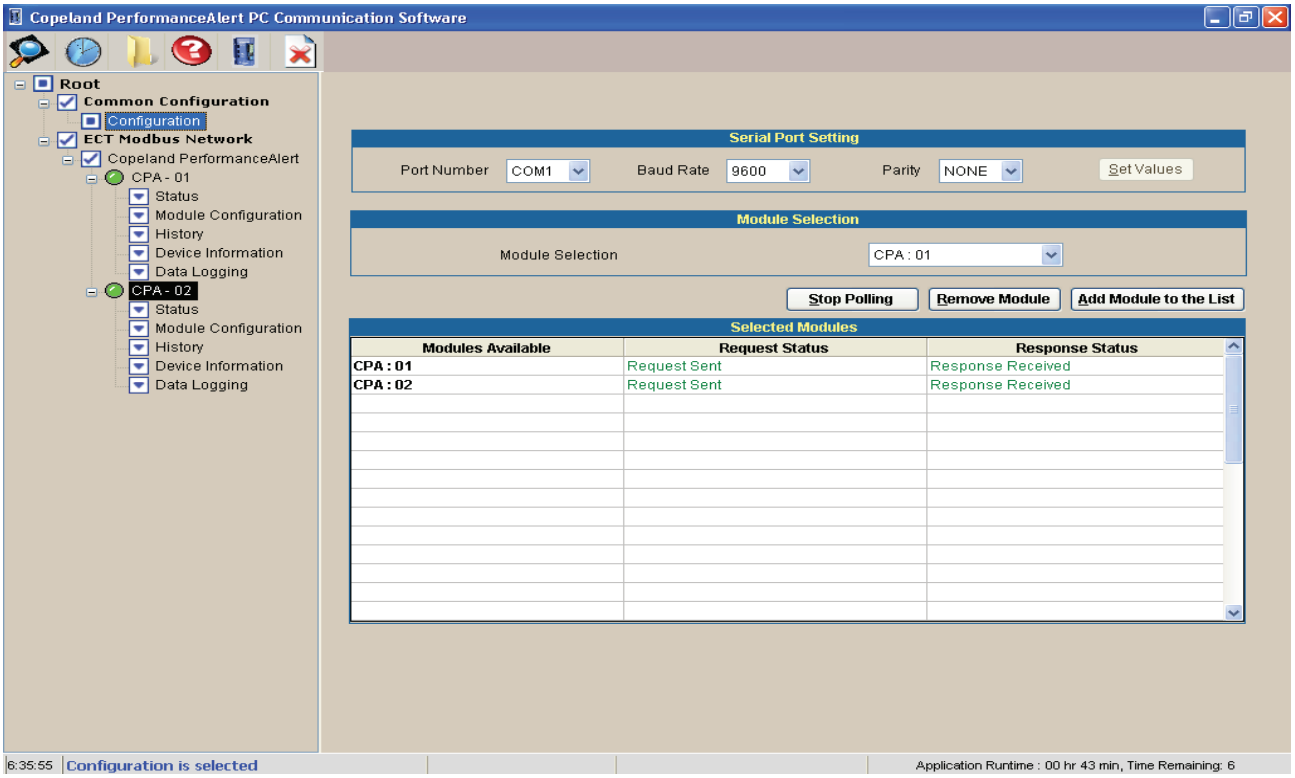


Figure 12

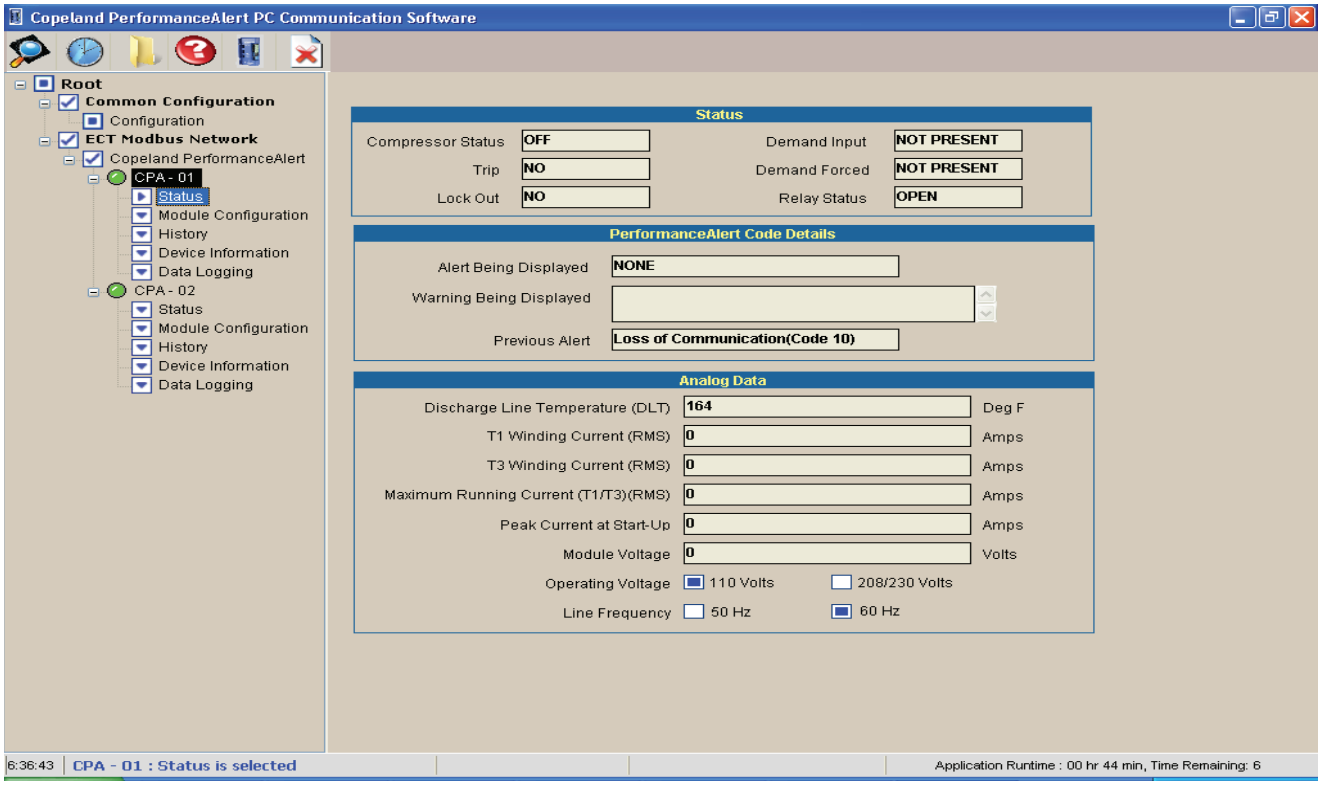


Figure 13

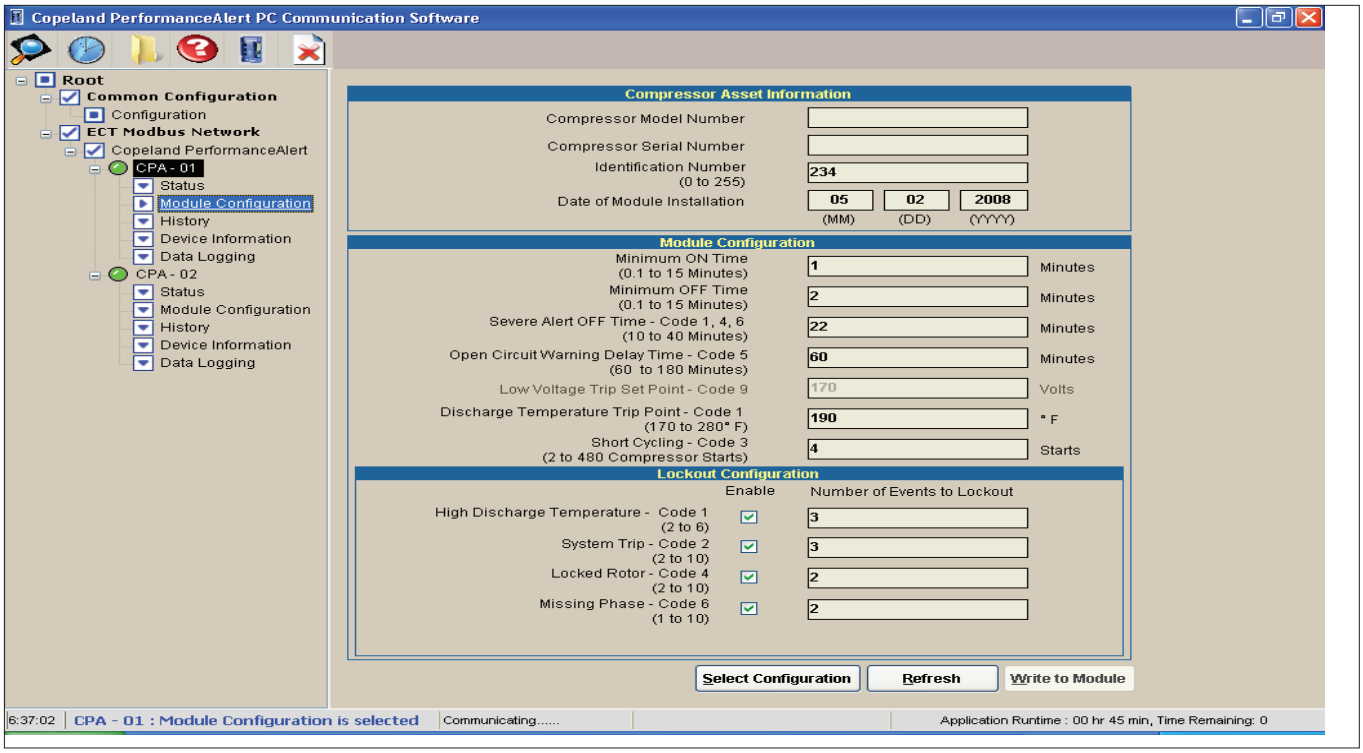


Figure 14

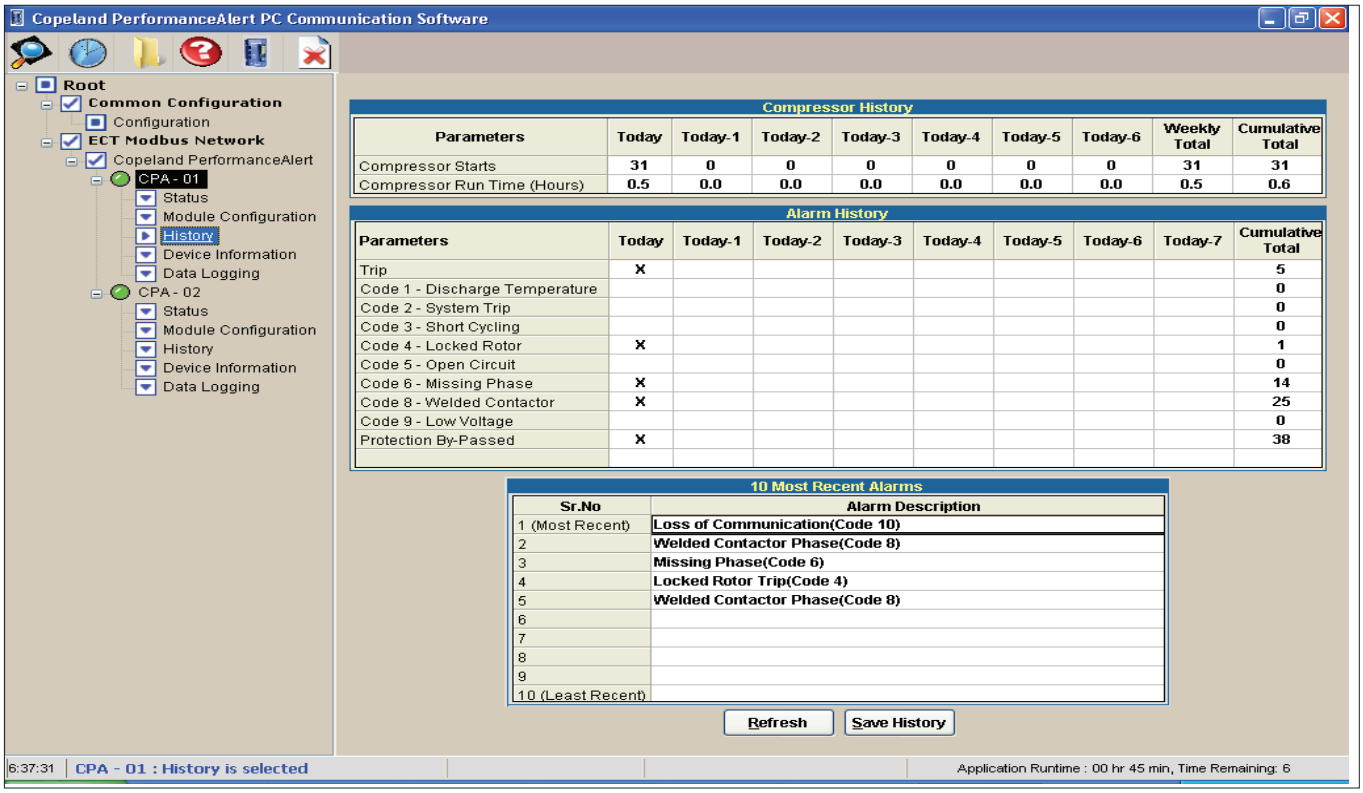


Figure 15

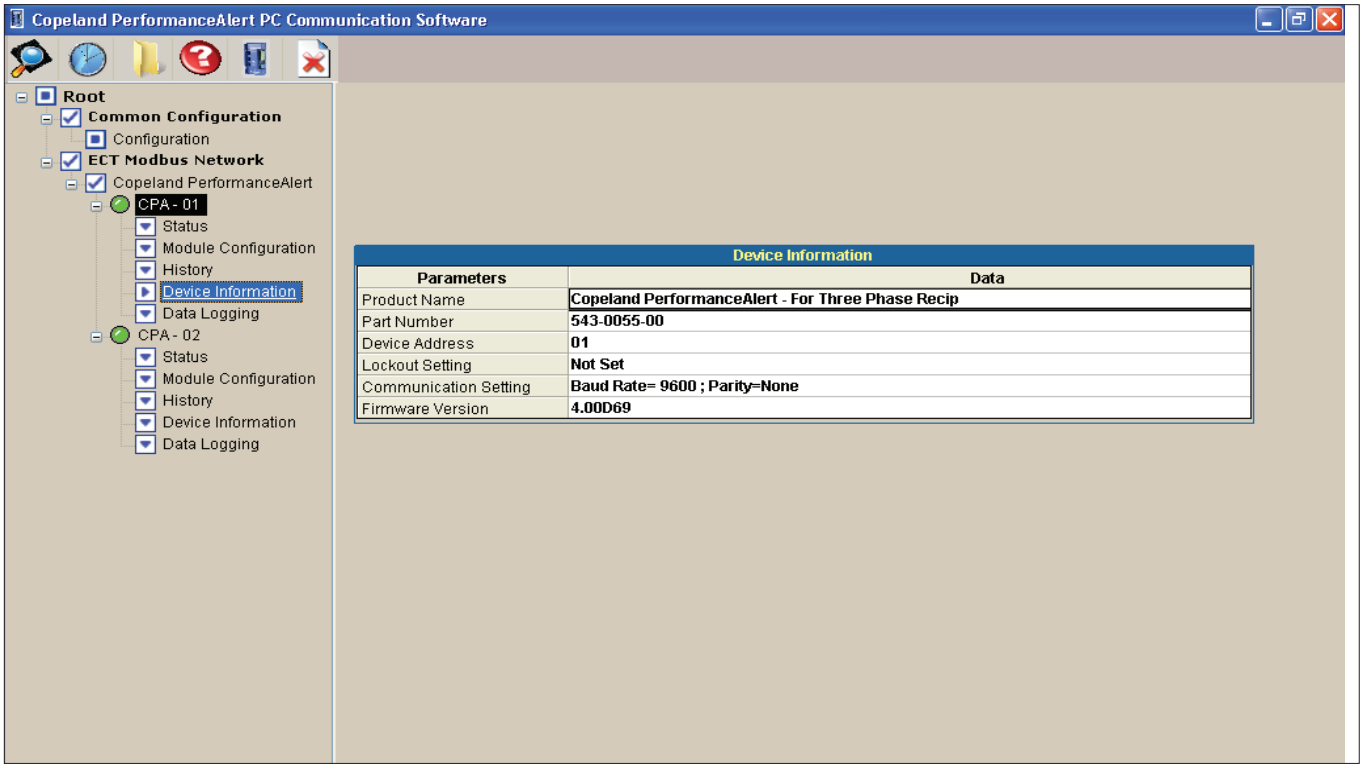


Figure 16

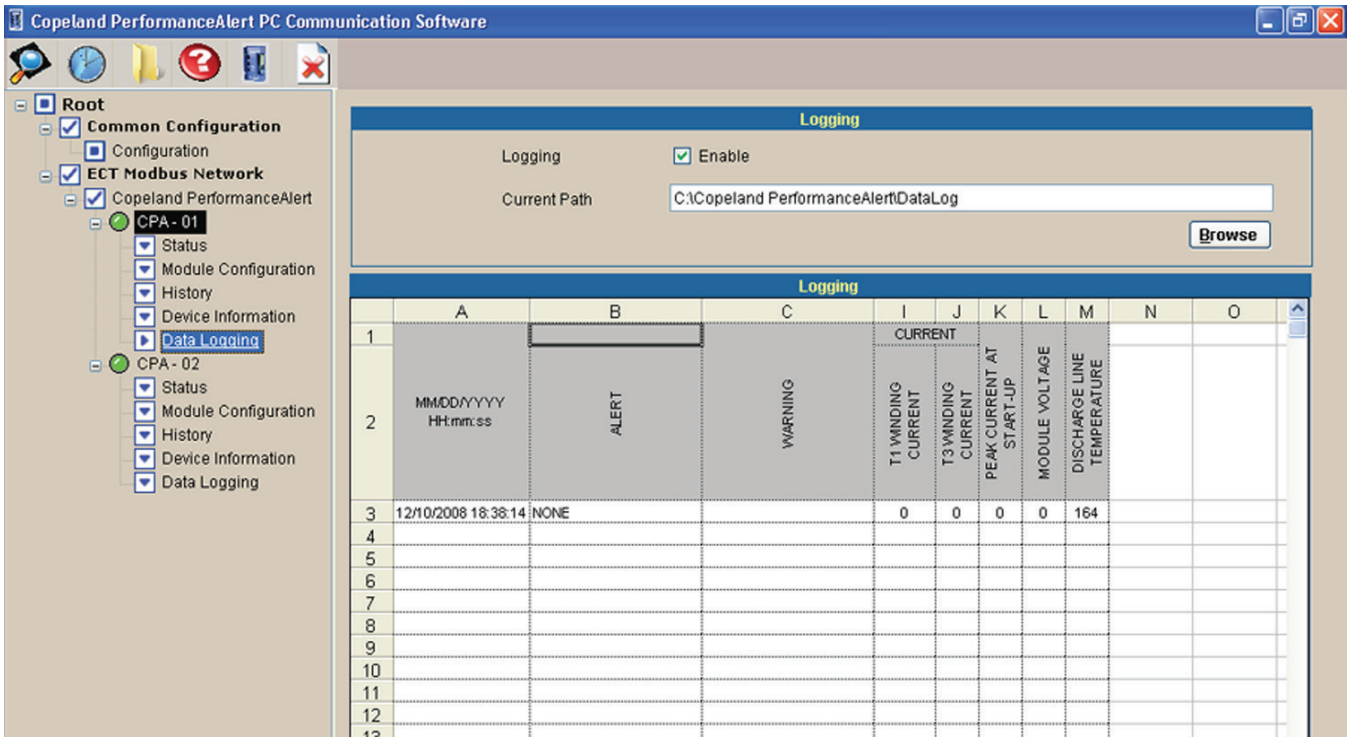


Figure 17

12.3.6.3 Module Configuration

Table 4 below shows the minimum, maximum and default settings for the module configuration parameters.

Table 4

Module Configuration	Minimum	Default	Maximum
Minimum On Time	0.1 Minutes	0.1 Minutes	15 Minutes
Minimum Off Time	0.1 Minutes	0.1 Minutes	15 Minutes
Severe Alert Off Time	10 Minutes	20 Minutes	40 Minutes
Open Circuit Warning Delay Time	60 Minutes	90 Minutes	180 Minutes
Discharge Temp Trip Point	170F/76.7C	230F/110C	280F/137.8C
Short Cycling (Even Numbers Only)	2 Starts per Day	240 Starts per Day	480 Starts per Day

12.3.6.4 Lockout Configuration

Lockout features are initially disabled in the module configuration. Each of the alert lockouts can be individually enabled or disabled based on application requirement. See **Figure 14**. On enabling the lockout, the user can also enter the number of events before compressor lockout. The Lockout feature has to be enabled using the software. **See Table 5 for lockout configuration**. Power to the module must be cycled to activate lockout.

Note: If lockout is enabled and a preset number of alarm events happen, the module will not allow the compressor to start until the situation is corrected and the module is manually reset (see Lockout Configuration in Section 5.1 Jumper settings).

Table 5

Lockout Configuration				
Code		Minimum	Default	Maximum
1	High Discharge Temp	2	4	6
2	System Trip	2	4	10
4	Locked Rotor	2	4	10
6	Missing Phase	1	10	10
7	Reverse Phase	1	1	1

13. Warranty Information

Emerson Climate Technologies, Inc. warrants its enclosed diagnostic module to be free from defects in materials and workmanship under normal use for a period of one year from the date of purchase. During this period, Emerson will replace any defective diagnostic module without charge.

This warranty is valid for the original purchaser from the date of initial purchase and is not transferable. Keep the original sales receipt. Proof of purchase is required to obtain warranty replacement. Dealers or service centers selling this product do not have the right to alter, modify or in any way change the terms and conditions of this warranty.

This warranty does not cover normal wear of parts or damage resulting from any of the following: negligent use or misuse of the product, use on improper voltage or current, use contrary to the operating instructions, disassembly, repair or alteration by anyone other than Emerson Climate Technologies, Inc. Further, the warranty does not cover acts of God, such as fire, flood, hurricanes and tornadoes.

Units under warranty and in need of repair should be returned to an authorized wholesaler or original equipment manufacturer.

EMERSON CLIMATE TECHNOLOGIES, INC. MAKES NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE WITH RESPECT TO THE Copeland PerformanceAlert™ MODULE.

Emerson Climate Technologies, Inc. shall not be liable for any incidental or consequential damages caused by the breach of any express or implied warranty. Some states, provinces, or jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state, or province to province.

14. Support

For more information visit www.EmersonClimate.com or contact Emerson Climate Technologies, Inc. at 1-888-EMR-9950.

Table 6
Additional Part Numbers:

Item	Part Number	Tube Size (Inches)
Tube/Line Clip	032-0688-00	0.375
	032-0688-01	0.313
	032-0688-02	0.5
	032-0688-03	1.125
	032-0688-04	0.875
	032-0688-05	1.625
	032-0688-06	1.375
	032-0688-07	0.25
Discharge Temperature Probe (NTC) or Thermistor	085-0204-00	
External / Remote LED	039-0020-00	
Strap	032-0689-00	
USB kit	943-0143-00	
Connector for USB	021-0341-00	
Gateway kit	943-3730-00	

Table 7
Table of Alert Codes

Code	Three Phase Recip	Three Phase Scroll	Single Phase
1	Discharge Temperature Trip	Discharge Temperature Trip	Discharge Temperature Trip
2	System Trip	System Trip	System Trip
3	Short Cycling	Short Cycling	Short Cycling
4	Locked Rotor	Locked Rotor	Locked Rotor
5	Open Circuit	Open Circuit	Open Circuit
6	Missing Phase	Missing Phase	Open Run
7	NA	Reverse Phase	Open Start
8	Welded Contactor	Welded Contactor	Welded Contactor
9	Low Voltage	Low Voltage	Low Voltage
10	Lost communications	Lost communications	Lost communications
11	DLT Sensor Failure	DLT Sensor Failure	DLT Sensor Failure

Table 8 – Troubleshooting

Status LED	Status LED Description	Status LED Troubleshooting Information
Green "POWER"	Module has power	Supply voltage is present at module terminals
Green flashing	Module has power; demand signal is present and minimum off time is active	Once minimum off time is met compressor will start normally
Red "TRIP"	Thermostat demand signal Y is present, but the compressor is not running	1. Compressor protector is open - Check for high head pressure - Check compressor supply voltage 2. Compressor circuit breaker or fuse(s) is open 3. Broken wire or connector is not making contact 4. Safety cutout switches open (HPCO, LPCO, etc) 5. Compressor contactor has failed open 6. Module will trip compressor when codes 1,4,6,7 and 9 are present
Yellow "ALERT" Flash Code 1	High Discharge Line Temperature Trip	1. Possible loss of refrigerant charge 2. Blocked condenser 3. Verify that discharge valve is open 4. On low temperature scroll compressors check liquid injection
Yellow "ALERT" Flash Code 2	System Trip Four consecutive compressor trips after run time of 1-15 minutes	1. Excessive suction pressure or discharge pressure 2. Improper wiring 3. Defective run or start capacitor or relay
Yellow "ALERT" Flash Code 3	Short Cycling 2 to 480 run cycles in 24 hours ending with normal Shutdown Default set at 240 run cycles.	1. Check pressure or temperature control 2. Possible loss of refrigerant 3. Blocked condenser 4. High suction pressure
Yellow "ALERT" Flash Code 4	Locked Rotor Compressor is drawing current without rotating or four consecutive compressor trips after run time of 1-15 seconds	1. Run capacitor has failed (on some single-phase compressors) 2. Low line voltage (contact utility if voltage at disconnect is low) - Check wiring connections 3. Excessive liquid refrigerant in compressor 4. Compressor bearings are seized - Measure oil level in compressor 5. Verify operating current
Yellow "ALERT" Flash Code 5	Open Circuit Demand signal is present but no compressor current for four hours	1. Compressor circuit breaker or fuse(s) is open 2. Compressor contactor has failed open - Check compressor contactor wiring and connectors - Check for compressor contactor failure (burned, pitted, or open) - Check wiring and connectors between supply and compressor - Check for low pilot voltage at compressor contactor coil 3. High pressure switch is open and requires manual reset 4. Open circuit in compressor supply wiring or connections 5. Unusually long compressor protector reset time due to extreme ambient temperature 6. Compressor windings are damaged - Check compressor motor winding resistance
Yellow "ALERT" Flash Code 6	1- Phase Open Start Circuit Demand is present but current is missing in start circuit	1. Run capacitor has failed. 2. Open circuit in compressor start winding or connections: - Check wiring and connectors between supply and “S” terminal. 3. Compressor start windings are damaged: - Check compressor winding resistance. 4. Compressor current could be to low: - Refer to specifications. 5. Verify power on all legs.
	3-PHASE (Recip and Scroll) Missing Phase Demand signal is present but current is missing in one phase	1. Improper wiring. Correct order of phases in wires. 2. Failed contactor. Check contacts for piting. 3. Compressor current could be too low. Refer to specifications. 4. Verify presence of all legs of power line
Yellow "ALERT" Flash Code 7	1-Phase Open Run Circuit Demand is present but current is missing in run circuit	1. Open circuit in compressor run winding or connections: - Check wiring and connectors between supply and “R” terminal. 2. Compressor run windings are damaged: - Check compressor winding resistance. 3. Compressor current could be too low: - Refer to specifications. 4. Verify power on all legs.
	3-PHASE (Scroll only) Reverse Phase Demand signal is present but current is not detected in the correct sequence	1. Improper wiring. Correct order of phases in wires. 2. Compressor current could be too low. Refer to specifications. 3. Verify presence of all legs of power line
Yellow "ALERT" Flash Code 8	Welded Contactor No demand signal, but current has been detected in one or both phases	1. Control circuit transformer is overloaded 2. Thermostat demand signal not connected to module 3. Check wiring diagram; see figures 6, 7, and 8
Yellow "ALERT" Flash Code 9	Low Voltage Detect Control voltage dips below 85V for 110V or 170V for 220V	1. Low line voltage (contact utility if voltage at disconnect is low) 2. Check wiring connections
Yellow "ALERT" Flash Code 10	Loss of Communication Communication lost between rack controller and module for 10 minutes or more	1. Check communications wiring
Yellow "ALERT" Flash Code 11	Discharge Temperature Sensor Short or Open Circuit	1. Check discharge temperature sensor wiring and mounting

Flash Code number corresponds to a number of LED flashes, followed by a pause and then repeated.

Compressor's MPM (Motor Protector Module)	Rack controller calling compressor to run, but compressor is off. However Performance Alert does not indicate a trip.	Check for MPM presence and status.