EMERSON

Application Engineering

COPELAND

BULLETIN

AE8-1424 **October 2017**

CoreSense™ Diagnostic Modules for Copeland Scroll™ Refrigeration Compressors

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Safety Instructions

CoreSense™ Diagnostics modules for Copeland Scroll™ refrigeration compressors are manufactured according to the latest U.S. and European Safety Standards. Emphasis has been placed on the user's safety. Safety icons are explained below and safety instructions applicable to the products in this bulletin are grouped on Page 3. These instructions should be retained throughout the lifetime of the compressor. **You are strongly advised to follow these safety instructions.**

Safety Icon Explanation

⚠ DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	NOTICE is used to address practices not related to personal injury.
CAUTION	CAUTION, without the safety alert symbol, is used to address practices not related to personal injury.

Instructions Pertaining to Risk of Electrical Shock, Fire, or Injury to Persons

⚠WARNING	**ELECTRICAL SHOCK HAZARD** • Disconnect and lock out power before servicing. • Discharge all capacitors before servicing. • Use compressor with grounded system only. • Molded electrical plug must be used when required. • Refer to original equipment wiring diagrams. • Electrical connections must be made by qualified electrical personnel. • Failure to follow these warnings could result in serious personal injury.
⚠WARNING	**PRESSURIZED SYSTEM HAZARD** • System contains refrigerant and oil under pressure. • Remove refrigerant from both the high and low compressor side before removing compressor. • Never install a system and leave it unattended when it has no charge, a holding charge, or with the service valves closed without electrically locking out the system. • Use only approved refrigerants and refrigeration oils. • Personal safety equipment must be used. • Failure to follow these warnings could result in serious personal injury.
⚠WARNING	**BURN HAZARD** • Do not touch the compressor until it has cooled down. • Ensure that materials and wiring do not touch high temperature areas of the compressor. • Use caution when brazing system components. • Personal safety equipment must be used. • Failure to follow these warnings could result in serious personal injury or property damage.
⚠CAUTION	**COMPRESSOR HANDLING** • Use the appropriate lifting devices to move compressors. • Personal safety equipment must be used. • Failure to follow these warnings could result in personal injury or property damage.

Safety Statements

- Refrigerant compressors must be employed only for their intended use.
- Only qualified and authorized HVAC or refrigeration personnel are permitted to install commission and maintain this equipment.
- Electrical connections must be made by qualified electrical personnel.
- All valid standards and codes for installing, servicing, and maintaining electrical and refrigeration equipment must be observed.

Introduction

The CoreSense™ Diagnostics module for Copeland Scroll™ refrigeration compressors (referred to as 'the CoreSense module' in this document) is a breakthrough innovation for monitoring and protecting the compressor as well as alerting the contractor to refrigeration system faults. It also can perform digital unloading, liquid injection control, and can detect the cause of system related issues by monitoring the discharge line temperature and current.

A flashing LED indicator communicates the alert code and guides the service technician more quickly and accurately to the root cause of a problem. The CoreSense module is factory installed in the electrical box of all Copeland Scroll 7.5-15 HP ZB*K5 & ZF*K5 refrigeration compressors. Please refer to **AE4-1383** bulletin for further information on the 7.5-15 HP ZB*K5 & ZF*K5 scroll compressors. It is also offered as a panel mount for an aftermarket solution from Emerson Distribution Services for the (ZB*KC & ZF*K4/KV & ZS*K4)) compressors Refer to **Table 5** for Copeland Scroll model number identification. The CoreSense modules offered on the different compressor families are not interchangeable due to different current operating ranges of the compressors.

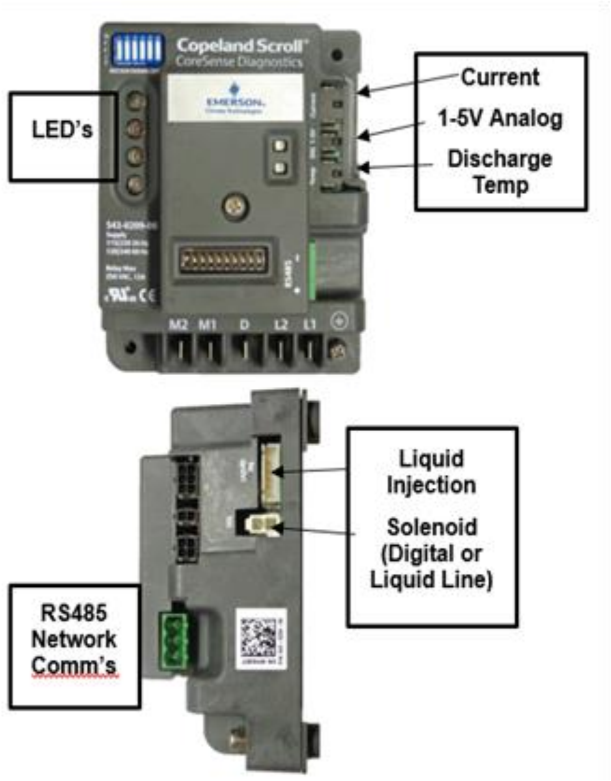


Figure 1: CoreSense Diagnostics Module

CoreSense Diagnostics Module Overview

Current Signal Input

This connector is where the current transducer (CT) is plugged into the CoreSense module. In Error! Reference source not found., this input is labeled 'Current'. For 7.5 -15 HP ZB*K5 & ZF*K5 models, the minimum compressor running current is 3 Amps, and for the (ZB*KC & ZF*K4/KV& ZS*K4)) 2 – 7.5HP compressors, it is 1 Amp. This input is used to tell the CoreSense module the running state of the compressor. Compressor protective alert codes, injection, and modulation control will only be active when the current transducer is plugged in and current is sensed through the CT.

1-5V Analog Input

1-5V analog input supplied from a separate device, controller, etc. for digital modulation. This would utilize the input labeled 'DIG 1-5V'. A separate demand input is not required if this input is used. Digital modulation can also be performed via communication and would eliminate the need for a separate 1-5 V analog input.

Discharge Temperature Input

In Error! Reference source not found., the discharge temperature thermistor input is labeled 'Temp'. CoreSense can utilize both discharge line temperature probes and top cap probes for various compressor applications. When the probe is plugged into the thermistor input, the CoreSense module identifies the probe type (line or top cap) based on pin locations. Refer to **Tables 2 & 3** for specific probe part numbers.

RS485 Network Communication

Digital modulation commands are communicated via RS485 network communications to the CoreSense module. If you are controlling through network communications, 1-5V and demand inputs are not used for this configuration.

Unloading capacities for Copeland Scroll refrigeration compressors are as follows:

ZB*KC & ZF*K4/KV& ZS*K4)

2 -7.5 HP:	10 to 100%

ZB*K5 & ZF*K5

7.5-15 HP Low Temp:	30 to 100%
7.5-15 HP Med Temp:	10 to 100%

Liquid Injection Output

The CoreSense module can also provide liquid injection for Low Temp scroll compressors. This connector is a 12VDC output to a stepper motor that drives the EXV that is plumbed to the compressor. In Error! Reference source not found., this output is l abeled 'LIQUID INJ'.

Please note that the EXV for the compressor families are not interchangeable due to different orifice sizes.

ZB*KC & ZF*K4/KV
4 -7.5 HP: 1.3 mm EXV

****2-4 HP ZF*K4 low temp models are not yet approved for use with the CoreSense Diagnostics Liquid Injection.**

ZB*K5 & ZF*K5
7.5-15 HP: 1.8 mm EXV

Refer to **Table 3** for EXV, stepper motor, and extension cable part numbers.

Solenoid Output

The solenoid output labeled 'SOL' on the CoreSense module can be used for either digital capacity control or liquid line solenoid. For digital compressors (ZFD/ZBD), Emerson recommends using this output for digital capacity control vs. liquid line solenoid. For digital low temperature, compressors using liquid injection (ZFD*K5 or K4), use a current sense relay for the liquid line solenoid.

a. Digital Solenoid
This is a 110VAC/220VAC solenoid output (labeled 'SOL') which is used to control the digital operation.

b. Liquid Line Solenoid
For fixed capacity compressors, the liquid line solenoid can also be controlled by the CoreSense module, by using the 'SOL' output. This eliminates the need for a separate relay to control the liquid line solenoid supplying the liquid injection EXV.

NOTE: Refer to **Table 3** for kit details and extension cables for remote mount 4-7.5 HP models.

CoreSense Module LED Overview

The CoreSense module has four LED's, green, yellow, red, and blue, that are on the face of the module. These LED's will flash compressor codes or stay solid depending upon the code that is being annunciated by the CoreSense module.

The CoreSense module can shut down the compressor if an abnormal condition is detected. This is performed by opening M1-M2 relay on the CoreSense which is wired in series with the compressor contactor coil. For a list of protective alerts and features, see **Figure 11**.

There are different categories of flashing codes that the CoreSense Module can annunciate - (Green) normal operation, (Yellow) tripped condition, (Red) lockout, and (Blue) demand error codes and unloading status.

The CoreSense module will trip the compressor 'OFF' when any of the following severe alert conditions (Codes 1, 2, 4, 6, 7 or 9) are detected. Refer to **Table 2** for Fault Code Identification. Alert code 7, reverse phase detection, is the only severe alert code that defaults to a lockout and cannot be configured. A trip condition is when the CoreSense pilot circuit relay interrupts the contactor which results in stopping the compressor motor. A trip condition will automatically allow the compressor to run once the trip condition is satisfied and a protective off time has elapsed.

A lockout event results in the CoreSense module shutting down the compressor and not allowing it to restart until the situation is corrected and the module is manually reset. A manual reset is done by cycling power to the module. Other codes can be configured to lockout, these codes include high discharge temperature, locked rotor and phase loss. See **Error! R eference source not found.**for more information on the default number of consecutive trips before a lockout. These default values can be configured through the E2 or PCIF.

Error! Reference source not found. indicates how to r ead the LED's codes. If an alert code is present, the CoreSense module will continue to annunciate the code until the condition is cleared or module power is cycled.

Green LED:
SOLID: Normal compressor operation
FLASHING: Alert codes that do NOT have a protective shutdown associated with them.

Yellow LED:
FLASHING: Alerts of an abnormal system condition via alert codes.
SOLID: Demand is present but no current is detected. All protective shutdowns will auto reset once tripped

condition is satisfied and a protective off time has elapsed.

Red LED:
FLASHING: Indicates the CoreSense module is locked out on the flashing alert code. Manual power cycle reset is required to clear the lockout and restart the compressor

Blue LED:
FLASHING: Indicates demand error codes.
SLOW FLASHING: Indicates digital unloader is energized. This time varies based on capacity request (2-20 seconds).

For an explanation of each code and troubleshooting tips, refer to **Table 2** at the end of this document.

CoreSense Diagnostics Part Number & Compressor Applications

There are two different CoreSense module part numbers for refrigeration scroll compressors: p/n 543-0209-00 for the ZB*K5 & ZF*K5 and p/n 543-0223-00 for the ZB*KC & ZF*K4/KV & ZB*KC & ZS*K4 compressor families. This is due to the difference in the compressor operating current ranges. It is **important** to select the correct part number per the compressor family to avoid nuisance trips.

2 -7.5 HP (ZB*KC & ZF*K4/KV & ZS*K4)

CoreSense P/N 543-0223-00 (Panel Mounted)

The CoreSense module is not accurate below 1 Amp. If the current drawn by the compressor during operation falls below 1 Amp, the module may indicate a nuisance trip.

7.5-15 HP (ZB*K5 & ZF*K5)

CoreSense P/N 543-0209-00 (T-Box Mounted)

The CoreSense 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 trip.

NOTE: In low current applications, it is applicable for both modules to loop the power leads through the current sensor twice. This will double the current value the CoreSense module reads and eliminate the low current nuisance trip.

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, 50-60 Hz
CoreSense Compressor Amperage Detection Range:

ZB*KC & ZF*K4/KV& ZS*K4

1-76 Amps	2 - 7.5HP

ZB*K5 & ZF*K5

3-200 Amps	7.5 - 15HP

Maximum continuous contactor coil current is 2A with a max inrush current of 20A. The CoreSense module connections are ¼ in male terminals.

CoreSense Module Mounting

2 -7.5 ZF*KC/KV & ZB*KC & ZS*K4

CoreSense is offered as a **panel mounted** solution for the 2-7.5 HP Copeland Scroll refrigeration compressors. These kits are offered through Emerson Distribution Services. See **Table 3**, for kit number information. Error! Reference source not found. shows t he panel mounted solution for a refrigeration application. It should be noted that the module is not IP rated and requires an electrical enclosure for protection from the elements. Care should be taken to place the module in a location where it will not get wet.

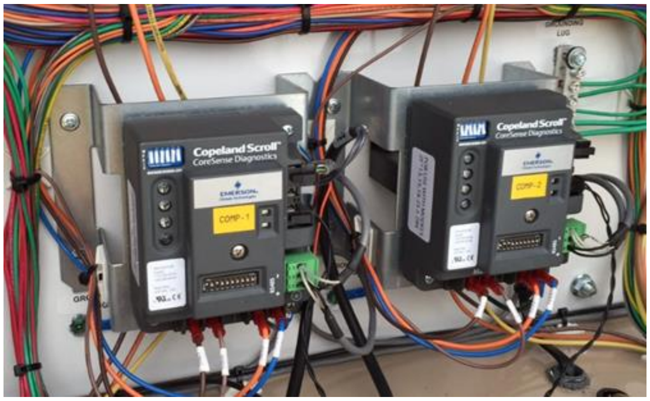

Copeland Scroll CoreSense Diagnostics
COMP-1
Copeland Scroll CoreSense Diagnostics
COMP-2

Figure 2: Panel Mount CoreSense Module

7.5-15 HP (ZB*K5 & ZF*K5)

The CoreSense module will come pre-mounted inside the compressor terminal box from the factory. The module is mounted so all LEDs are in front of the light pipes in the terminal covers so codes are visible when the terminal box cover is installed. The CoreSense module is installed inside the terminal box with a torque of 8 inch pounds. See **Figure 3**.

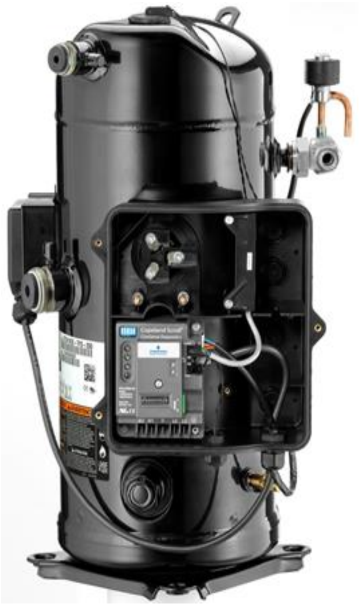


Figure 3: Terminal Box Mount CoreSense Diagnostics

Network DIP Switch Configuration

Error! Reference source not found. shows the two DIP switch panels. The brown DIP switch panel has 10 positions and is located near the center of the CoreSense module. The blue DIP switch panel has 6 positions and is in the upper left corner of the CoreSense module.

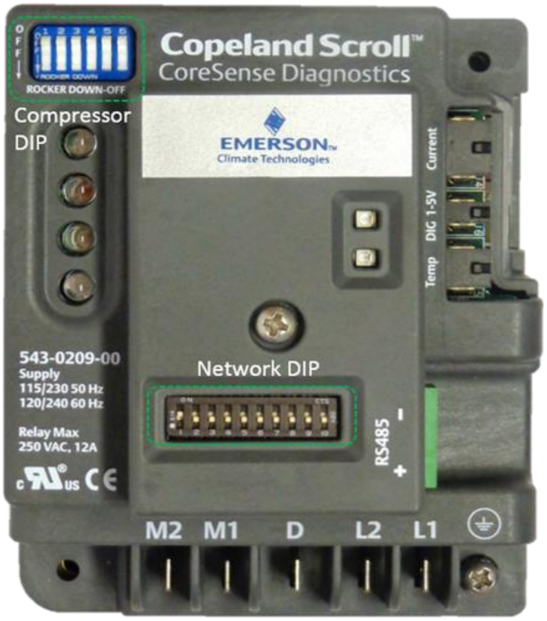

Copeland Scroll™
CoreSense Diagnostics
ROCKER DOWN-OFF
Compressor DIP
EMERSON Climate Technologies
Current
DIG 1-5V
Temp
543-0209-00
Supply
115/230 50 Hz
120/240 60 Hz
Relay Max
250 VAC, 12A
Network DIP
RS485
-
+
M2
M1
D
L2
L1

Figure 4: CoreSense Diagnostics DIP Switches

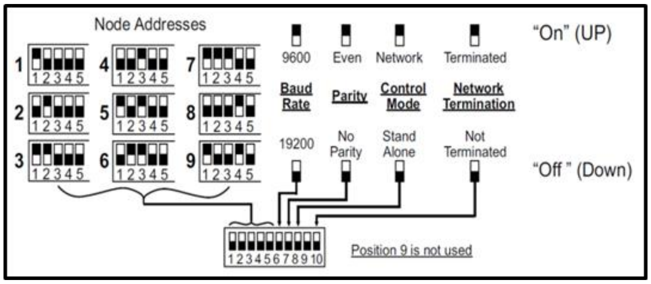

Node Addresses
1
2
3
4
5
6
7
8
9
12345
9600
Baud Rate
19200
Even
Parity
No Parity
Network
Control Mode
Stand Alone
Terminated
Network Termination
Not Terminated
"On" (UP)
"Off" (Down)
12345678910
Position 9 is not used

Figure 5: CoreSense Diagnostics DIP Switches

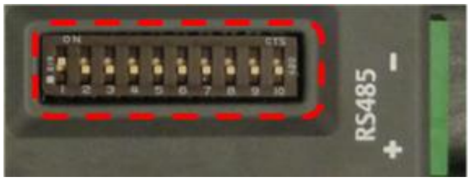
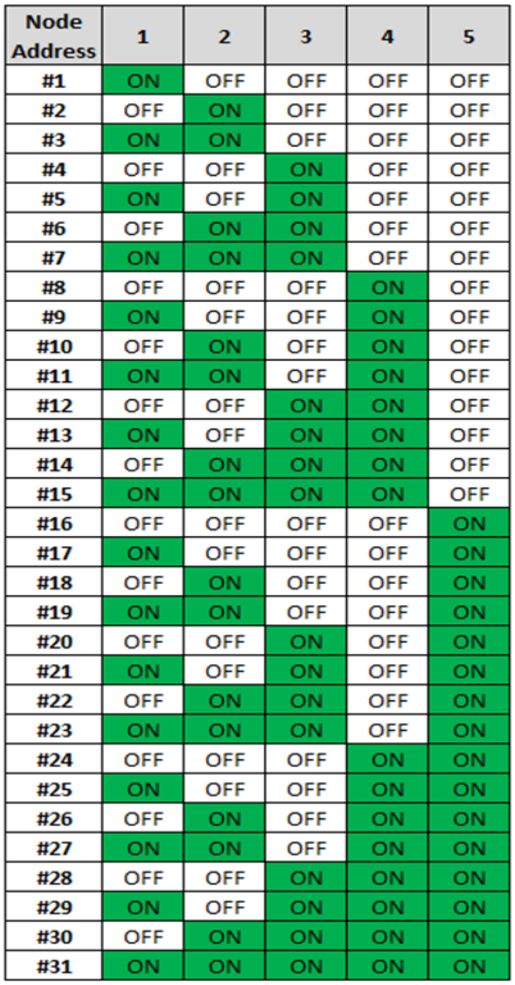


Figure 6: Brown 10 Position

Switches 1-5

Switches 1 through 5 are used for setting the node address for each CoreSense module. The CoreSense module uses a binary addressing for switches 1-5. The unique combination of these switches will define the node address 1 -31. Use **Table 1** as a reference to setting node addresses.

Table 1: Node Address DIP Switch Configurations



Node Address	1	2	3	4	5
#1	ON	OFF	OFF	OFF	OFF
#2	OFF	ON	OFF	OFF	OFF
#3	ON	ON	OFF	OFF	OFF
#4	OFF	OFF	ON	OFF	OFF
#5	ON	OFF	ON	OFF	OFF
#6	OFF	ON	ON	OFF	OFF
#7	ON	ON	ON	OFF	OFF
#8	OFF	OFF	OFF	ON	OFF
#9	ON	OFF	OFF	ON	OFF
#10	OFF	ON	OFF	ON	OFF
#11	ON	ON	OFF	ON	OFF
#12	OFF	OFF	ON	ON	OFF
#13	ON	OFF	ON	ON	OFF
#14	OFF	ON	ON	ON	OFF
#15	ON	ON	ON	ON	OFF
#16	OFF	OFF	OFF	OFF	ON
#17	ON	OFF	OFF	OFF	ON
#18	OFF	ON	OFF	OFF	ON
#19	ON	ON	OFF	OFF	ON
#20	OFF	OFF	ON	OFF	ON
#21	ON	OFF	ON	OFF	ON
#22	OFF	ON	ON	OFF	ON
#23	ON	ON	ON	OFF	ON
#24	OFF	OFF	OFF	ON	ON
#25	ON	OFF	OFF	ON	ON
#26	OFF	ON	OFF	ON	ON
#27	ON	ON	OFF	ON	ON
#28	OFF	OFF	ON	ON	ON
#29	ON	OFF	ON	ON	ON
#30	OFF	ON	ON	ON	ON
#31	ON	ON	ON	ON	ON

NOTE: Each connected CoreSense Diagnostics device must have its own unique node address.

Switch 6

CoreSense Diagnostics Modbus® communication baud rate setting is configurable to either 19200 or 9600 through DIP switch 6 on the 10 position dip switch.

ON = 9600
OFF = 19200 (Default)

The baud rate for each of the CoreSense devices should be set to match the rack controller. To determine the baud rate in the E2, follow these steps:

- From the main menu select 7 (System Configuration)
- Press 3 (System Information)
- Press 1 (General Controller Info)
- Access the Serial Communications Tab by pressing CTRL + 3
- Use the Page Down button or scroll down to view the settings for COM4

Switch 7

CoreSense Diagnostics Modbus® communication parity is user configurable (even or no parity) through DIP switch number 7

ON = even parity
OFF = no parity (default)
The parity setting must match the parity setting of the rack controller.

Switch 8

Switch 8 is used to set the module to be in network mode or standalone.

ON = Network Mode
OFF = Standalone (Default)

Network mode will generate a communications error if the rack controller fails to communicate with the device. For standalone mode, no communications are expected so the communication error is blocked. The CoreSense Diagnostics module can communicate with a rack controller using Modbus® protocol. The communication cable is wired from the rack controller to the first compressor. Additional compressors are wired in a daisy chained configuration. A shielded, twisted pair cable such as Belden #8761 (22AWG) should be used for the communication wiring. Passing the communications wire through the grommet in the plastic housing will help reduce abrasion to the wiring. Appropriate strain relief is recommended.

Modules using a communications network must be commissioned as part of the E2 rack controller setup. The commissioning process uploads compressor asset information (model and serial number) into the rack controller for future reference. Once the commissioning process is completed, the controller will supervise and communicate with the module unless the node is deleted. Refer to **AE1383** section titled **Modbus® Communication to CoreSense Diagnostics for K5 Compressors or an E2 manual** for more details on commissioning scroll compressors with an Emerson Retail Solutions E2 rack controller.

NOTE: For digital capacity using an E2 controller,

an enhanced suction group must be enabled.

More information: The E2 jumpers on the Network Interface Board should be set for 'terminated'.

NOTE: The RS485 is polarity sensitive. **+** wires must connect to other **+** terminals, and **-** wires must connect to other **-** terminals. The shield wire is connected to the center terminal, or **0 volt** position.

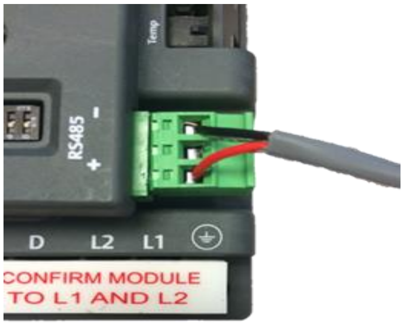

Temp
RS485
-
+
D
L2
L1
CONFIRM MODULE
TO L1 AND L2

Figure 7: CoreSense Modbus Connections

* These guidelines are based on E2 firmware version 3.0 and are subject to change. Contact your Emerson representative or refer to the operation manual for more details on configuring an E2 module.

Switch 9

Switch 9 is NOT used.

Switch 10

The last compressor in the daisy chain must be 'terminated' by setting DIP switch 10 to the 'on' position. For all other compressors, switch 10 should remain in the 'off' position.

Compressor DIP Switch Configuration

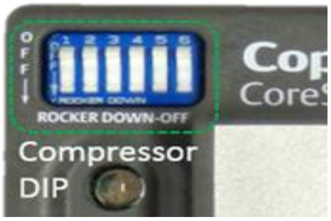

OFF
1 2 3 4 5 6
ROCKER DOWN-OFF
Compressor
DIP
Cop
Core

Figure 8: Blue 6 Position

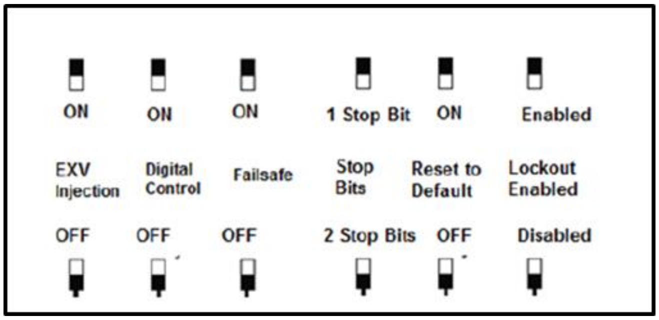

ON
ON
ON
1 Stop Bit
ON
Enabled
EXV Injection
Digital Control
Failsafe
Stop Bits
Reset to Default
Lockout Enabled
OFF
OFF
OFF
2 Stop Bits
OFF
Disabled

Figure 9: CoreSense Compressor DIP Switch Settings

Switch 1

Switch 1 is used to enable liquid injection EXV control. The 'on' position enables the EXV control via the CoreSense module.

Switch 2

Switch 2 is used to enable digital capacity control. The 'on' position enables digital capacity control via the CoreSense Module.

ZB*KC & ZF*K4/KVE& ZB*K5
10 -100 % Capacity for 4-7.5 HP compressors & Medium Temp 7-15HP K5 compressors

ZF*K5
30 -100% Capacity for Low Temp 7-15 HP K5 compressors

Switch 3

Switch 3 is used for failsafe mode. The 'ON' position will allow the compressor to run at full load if communications between the CoreSense module and the rack controller is lost. If in the 'off' position, the compressor turns off if communication is lost between the two devices.

Switch 4

Switch 4 affects standard Modbus®. For applications using IPRO™ or XWeb™ (Dixell) 'non-standard Modbus®' turn switch 4 'on'. For standard Copeland™ Modbus, the DIP switch orientation doesn't matter. For all other standard Modbus®, DIP switch 4 should be in the 'off' position.

CoreSense™ Diagnostics Modbus communication stop bits is user configurable to either be 1 or 2 stop bit.

DIP switch number 4 on the main DIP switch board is used to configure stop bit.

ON = 1 stop bits
OFF = 2 stop bits (Default)

Switch 5

Switch 5 is used to return module to factory defaults. By resetting the module all configurations and module history will be erased. To reset, switch 5 must transition from ‘off’ to ‘on’ within 5 seconds of module power up.

Switch 6

Switch 6 is used to enable/disable lockouts. The ‘on’ position will enable lockouts for the following codes: high discharge temperature, missing phase, and locked rotor. Reverse phase is automatically a lockout and cannot be configured. If this switch is ‘on’ each of these lockouts can be individually configured to a specific number of trips before a lockout. This is done over communications or via the PCIF Software (available at **Emerson.com/OPI**).

CoreSense Diagnostics Wiring

Current Transducer (P/N 543-0159-00)

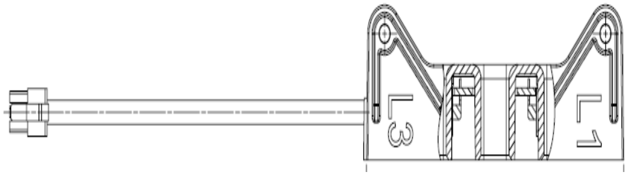


Figure 10:

A current transducer(CT) is used in conjunction with the CoreSense module to detect the running state of the compressor. The compressor power wires T1, T2, and T3 must be routed from the contactor through the CT L1, L2, and L3, respectively, to detect the running state of the compressor. It is important that the compressor power wires are routed in respect to the markings on the current transducer. For 7-15 HP K5 compressors, the CT is mounted in the terminal box. For 4-7.5 HP applications, the CT is mounted in the panel near the CoreSense module. An extension cable is available for 4-7.5 HP applications if needed.

NOTE: Only the compressor lead wires should be placed through the CT module. If the compressor lead wires do not match the L1, L2, and L3 Current Transducer holes, the compressor current measurement will be incorrect.

110-230VAC CoreSense Module Power Wiring

The CoreSense module requires 110-230VAC power between to the L1 and L2 terminals on the module. The module should remain powered through all states of compressor on/off operation. Refer to wiring schematic examples shown in the following section.

Module Wiring Diagrams

There are 3 basic applications that require specific wiring schematics and DIP switch configurations.

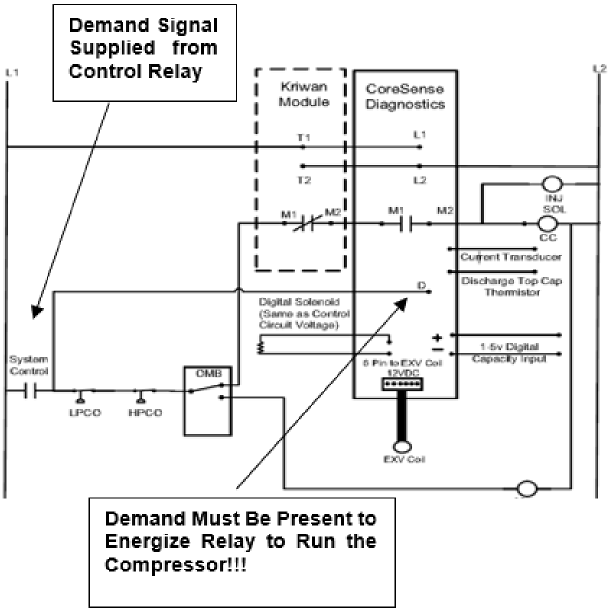
1. Fixed Capacity using the Demand Input (**Figure 11**)
2. Digital Compressors using Analog Input for the modulation (**Figure 12**)
3. Digital or Non-Digital compressors using control via communications (**Figure 13**)

It should be noted that CoreSense modules with p/n 543-0209-00 and 543-0223-00 have a *normally open* M1-M2 relay and that will only close when the demand is present. This eliminates the need for a cycling device to be supplied externally from the module. On a detected tripped or lockout condition, the CoreSense module will de-energize the M1-M2 relay to stop the motor from running.

1. Fixed Capacity Using Demand Input

Figure 11 shows the wiring diagram for a fixed capacity compressor using a demand signal. The demand signal must be supplied from a control relay and wired to the ‘D’ terminal of the module. It is preferred the demand wired upstream of any other device in the pilot circuit.

NOTE: Referring to **Figure 11**, the Blue DIP Switch #2 is ‘OFF’ for fixed capacity.



Demand Signal Supplied from Control Relay

Demand Must Be Present to Energize Relay to Run the Compressor!!!

Figure 11: Fixed Capacity Using Demand Input

2. Digital Compressors Using Analog Input for Modulation

Figure 12 shows the wiring for Digital Compressors using analog input for the modulation. The network dip switch #8 must be in the ‘OFF’ position for the digital control when using a 1-5V analog input. A demand wire is not required to be run to the ‘d’ terminal. The 1-5V analog signal for the digital will close the module relay from normally open to closed when the compressor is called to run.

NOTE: Referring to **Figure 6**, Brown DIP Switch #8 is ‘OFF’ for Digital Operation with Analog Input. Also, referring to **Figure 8**, Blue DIP Switch #2 is ‘ON’ for Digital Operation.

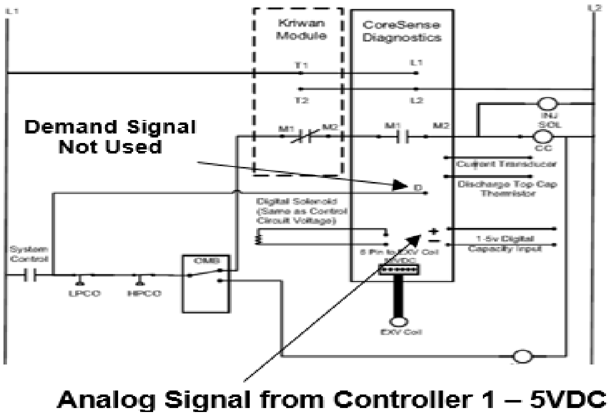

L1
L2
Kriwan Module
CoreSense Diagnostics
T1
L1
T2
L2
M1
M2
M1
M2
INJ SOL
CC
Demand Signal Not Used
Current Transducer
Discharge Top Cap Thermistor
D
Digital Solenoid (Same as Control Circuit Voltage)
+
−
1-5v Digital Capacity Input
6 Pin to EXV Coil 12VDC
System Control
OMB
LPCO
HPCO
EXV Coil
Analog Signal from Controller 1 – 5VDC

Figure 12: Digital Compressors Using Analog Input for Modulation

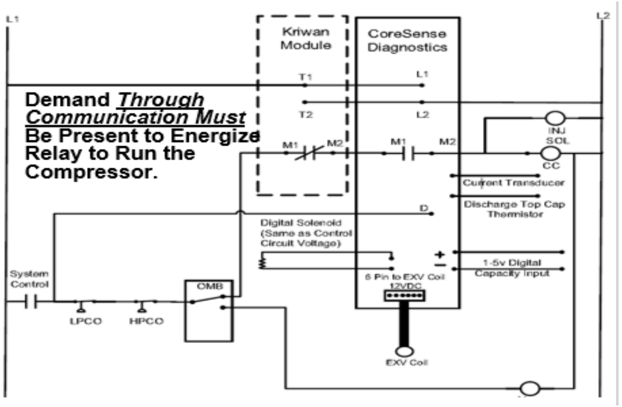
3. Digital and Non-Digital Compressors Using Control Via Communications

Figure 13 shows the wiring diagram for a digital or non-digital application using an E2 controller. Demand is supplied via communications and a wire is not required to be run to the ‘d’ terminal. The communications must be hooked up to the E2, and the module brown dip switch #8 must be ‘ON’ and the blue dip switch #2 must be ‘ON’ for the digital control to work. There is no 1-5 V analog input used to control the digital in this arrangement because **digital control is provided via the E2.** This is the easiest way of wiring for digital control if an E2 is present.

NOTE: Referring to **Figure 6**, Brown DIP Switch #8 is ‘ON’ for Digital Operation via Communications. Also, referring to **Figure 8**, Blue DIP Switch #2 is ‘ON’ for Fixed Capacity

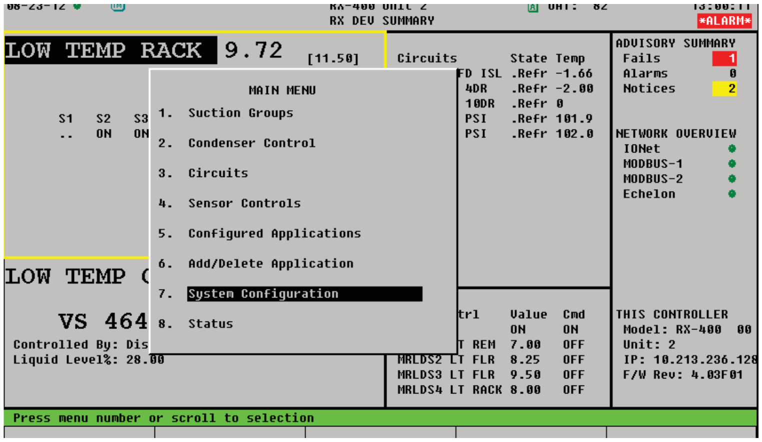
For E2 commissioning plese refer to the following instructions.

. Figure 13: Compressors Using Control via Communications

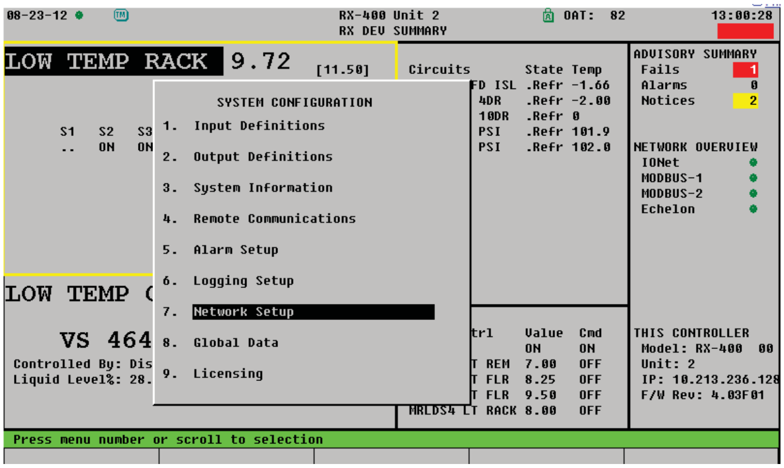

L1
L2
Kriwan Module
CoreSense Diagnostics
T1
L1
T2
L2
Demand Through Communication Must Be Present to Energize Relay to Run the Compressor.
M1
M2
M1
M2
INJ SOL
CC
Current Transducer
Discharge Top Cap Thermistor
D
Digital Solenoid (Same as Control Circuit Voltage)
+
−
1-5v Digital Capacity Input
6 Pin to EXV Coil 12VDC
System Control
OMB
LPCO
HPCO
EXV Coil

CoreSense Diagnostics E2 Programming Instructions

1. Press Menu to enter the Main Menu.
Select 7. System Configuration.
2. From the System Configuration Menu select 7. Network Setup


08-23-12
RX-400 Unit 2
RX DEV SUMMARY
OAT: 82
13:00:11
ALARM
LOW TEMP RACK 9.72 [11.50]
Circuits State Temp
ADVISORY SUMMARY
Fails 1
Alarms 0
Notices 2
MAIN MENU
1. Suction Groups
2. Condenser Control
3. Circuits
4. Sensor Controls
5. Configured Applications
6. Add/Delete Application
7. System Configuration
8. Status
NETWORK OVERVIEW
IONet
MODBUS-1
MODBUS-2
Echelon
LOW TEMP C
VS 464
Controlled By: Dis
Liquid Level%: 28.00
THIS CONTROLLER
Model: RX-400 00
Unit: 2
IP: 10.213.236.128
F/W Rev: 4.03F01

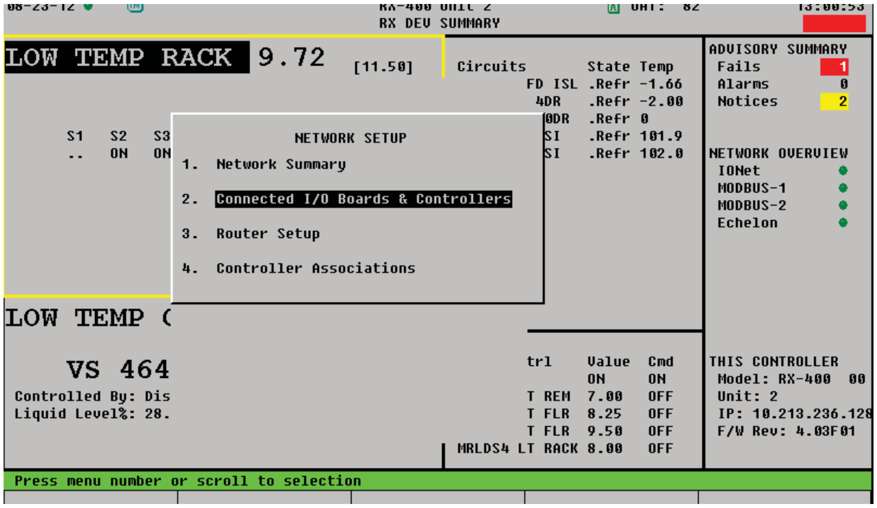
Press menu number or scroll to selection


08-23-12
RX-400 Unit 2
RX DEV SUMMARY
OAT: 82
13:00:28
LOW TEMP RACK 9.72 [11.50]
Circuits State Temp
ADVISORY SUMMARY
Fails 1
Alarms 0
Notices 2
SYSTEM CONFIGURATION
1. Input Definitions
2. Output Definitions
3. System Information
4. Remote Communications
5. Alarm Setup
6. Logging Setup
7. Network Setup
8. Global Data
9. Licensing
NETWORK OVERVIEW
IONet
MODBUS-1
MODBUS-2
Echelon
LOW TEMP C
VS 464
Controlled By: Dis
Liquid Level%: 28.
THIS CONTROLLER
Model: RX-400 00
Unit: 2
IP: 10.213.236.128
F/W Rev: 4.03F01

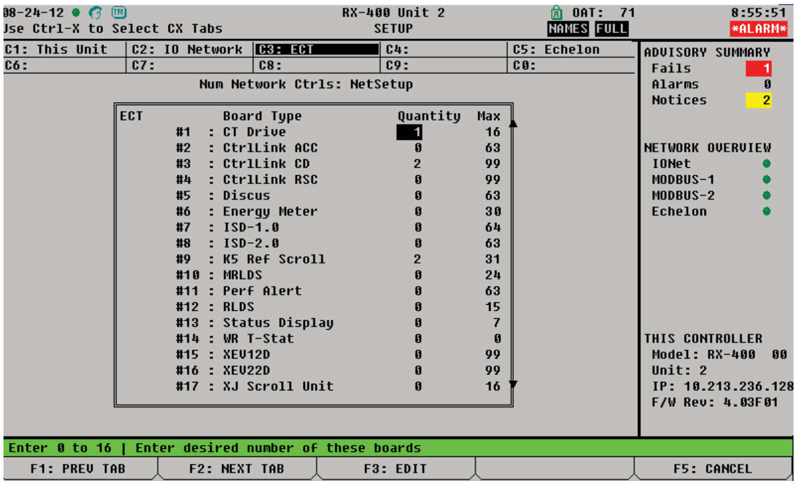
Press menu number or scroll to selection

3. From the Network Setup Menu select 2. Connected I/O Boards and Controllers
4. From the Setup Screen go to the C3: ECT Tab (Press Ctrl + 3)
5. In Option #9, enter the number of K5 compressors being controlled by the E2.

Press Menu ***to save changes and return to the previous screen.***

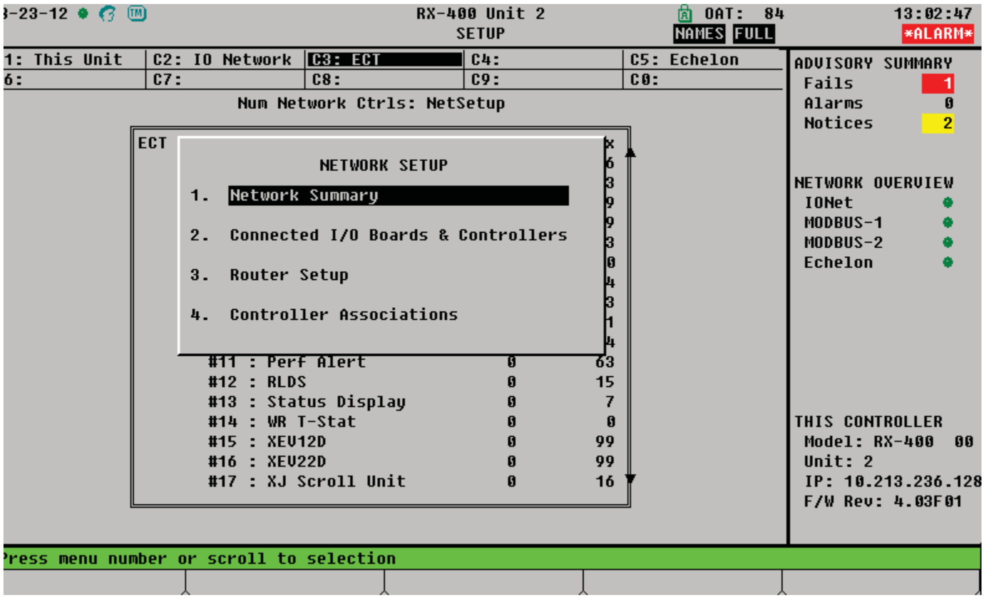


```
08-23-12                       RX-400 Unit 2          OAT:  82        13:00:53
                               RX DEV SUMMARY
LOW TEMP RACK 9.72  [11.50]   Circuits     State Temp     ADVISORY SUMMARY
                                   FD ISL .Refr -1.66      Fails          1
                                    4DR   .Refr -2.00      Alarms         0
                                    0DR   .Refr 0          Notices        2
    S1   S2   S3         NETWORK SETUP       SI   .Refr 101.9
    ..   ON   ON  1.  Network Summary        SI   .Refr 102.0  NETWORK OVERVIEW
                                                             IONet
                  2.  Connected I/O Boards & Controllers     MODBUS-1
                                                             MODBUS-2
                  3.  Router Setup                           Echelon

                  4.  Controller Associations

LOW TEMP (

                                  trl      Value  Cmd      THIS CONTROLLER
    VS 464                                 ON     ON        Model: RX-400   00
  Controlled By: Dis              T REM    7.00   OFF       Unit: 2
  Liquid Level%: 28.              T FLR    8.25   OFF       IP: 10.213.236.128
                                  T FLR    9.50   OFF       F/W Rev: 4.03F01
                          MRLDS4 LT RACK   8.00   OFF
 Press menu number or scroll to selection
```

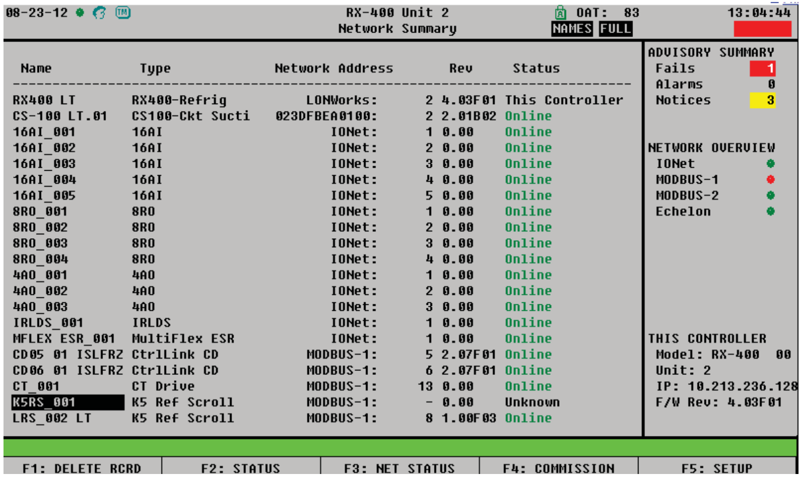


```
08-24-12                        RX-400 Unit 2         OAT:   71        8:55:51
Use Ctrl-X to Select CX Tabs       SETUP              NAMES FULL       *ALARM*
C1: This Unit | C2: IO Network | C3: ECT | C4:    | C5: Echelon   ADVISORY SUMMARY
C6:           | C7:            | C8:     | C9:    | C0:              Fails          1
                    Num Network Ctrls: NetSetup                       Alarms         0
                                                                      Notices        2
          ECT          Board Type            Quantity   Max
               #1  : CT Drive                    1       16
               #2  : CtrlLink ACC                0       63     NETWORK OVERVIEW
               #3  : CtrlLink CD                 2       99      IONet
               #4  : CtrlLink RSC                0       99      MODBUS-1
               #5  : Discus                      0       63      MODBUS-2
               #6  : Energy Meter                0       30      Echelon
               #7  : ISD-1.0                     0       64
               #8  : ISD-2.0                     0       63
               #9  : K5 Ref Scroll               2       31
               #10 : MRLDS                       0       24
               #11 : Perf Alert                  0       63
               #12 : RLDS                        0       15
               #13 : Status Display              0        7
               #14 : WR T-Stat                   0        0     THIS CONTROLLER
               #15 : XEV12D                      0       99      Model: RX-400   00
               #16 : XEV22D                      0       99      Unit: 2
               #17 : XJ Scroll Unit              0       16      IP: 10.213.236.128
                                                                 F/W Rev: 4.03F01
Enter 0 to 16 | Enter desired number of these boards
  F1: PREV TAB  |  F2: NEXT TAB  |  F3: EDIT  |            |  F5: CANCEL
```

6. From the Network Setup Menu select 1. Network Summary
7. The CoreSense™ K5 devices should be present on the Network. Select the CoreSense K5 module to be commissioned. Press F4: Commission



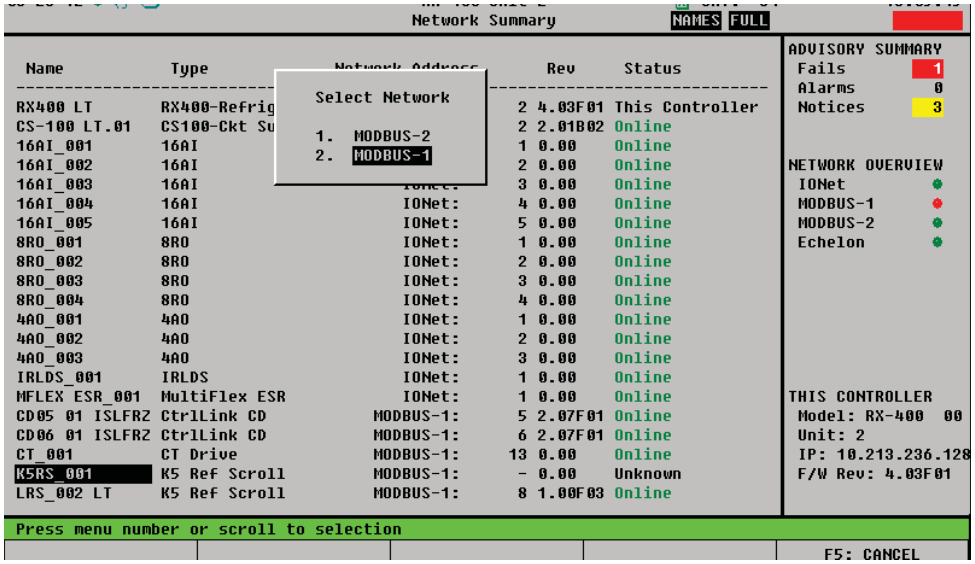
```
3-23-12                      RX-400 Unit 2            OAT:  84        13:02:47
                                 SETUP                NAMES FULL       *ALARM*
1: This Unit   | C2: IO Network | C3: ECT  | C4:      | C5: Echelon | ADVISORY SUMMARY
6:             | C7:            | C8:      | C9:      | C0:         |  Fails          1
                  Num Network Ctrls: NetSetup                        |  Alarms         0
                                                                     |  Notices        2
              ECT                                                    |
                      NETWORK SETUP                                  | NETWORK OVERVIEW
               1.  Network Summary                                   |  IONet
                                                                     |  MODBUS-1
               2.  Connected I/O Boards & Controllers                |  MODBUS-2
                                                                     |  Echelon
               3.  Router Setup

               4.  Controller Associations

                 #11 : Perf Alert                  0       63
                 #12 : RLDS                        0       15
                 #13 : Status Display              0        7
                 #14 : WR T-Stat                   0        0        | THIS CONTROLLER
                 #15 : XEV12D                      0       99        |  Model: RX-400  00
                 #16 : XEV22D                      0       99        |  Unit: 2
                 #17 : XJ Scroll Unit              0       16        |  IP: 10.213.236.128
                                                                     |  F/W Rev: 4.03F01
ress menu number or scroll to selection
```



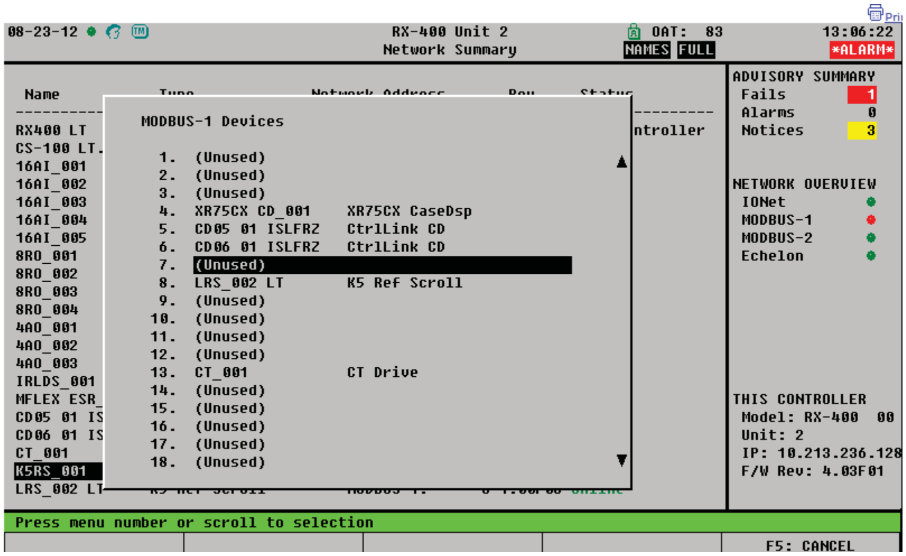
```
08-23-12                     RX-400 Unit 2            OAT:  83        13:04:44
                            Network Summary           NAMES FULL

 Name            Type            Network Address     Rev       Status        | ADVISORY SUMMARY
--------------------------------------------------------------------------   |  Fails         1
RX400 LT        RX400-Refrig          LONWorks:     2 4.03F01 This Controller |  Alarms        0
CS-100 LT.01    CS100-Ckt Sucti   023DFBEA0100:     2 2.01B02 Online          |  Notices       3
16AI_001        16AI                     IONet:     1 0.00    Online          |
16AI_002        16AI                     IONet:     2 0.00    Online          | NETWORK OVERVIEW
16AI_003        16AI                     IONet:     3 0.00    Online          |  IONet
16AI_004        16AI                     IONet:     4 0.00    Online          |  MODBUS-1
16AI_005        16AI                     IONet:     5 0.00    Online          |  MODBUS-2
8RO_001         8RO                      IONet:     1 0.00    Online          |  Echelon
8RO_002         8RO                      IONet:     2 0.00    Online          |
8RO_003         8RO                      IONet:     3 0.00    Online          |
8RO_004         8RO                      IONet:     4 0.00    Online          |
4AO_001         4AO                      IONet:     1 0.00    Online          |
4AO_002         4AO                      IONet:     2 0.00    Online          |
4AO_003         4AO                      IONet:     3 0.00    Online          |
IRLDS_001       IRLDS                    IONet:     1 0.00    Online          |
MFLEX ESR_001   MultiFlex ESR            IONet:     1 0.00    Online          | THIS CONTROLLER
CD05 01 ISLFRZ  CtrlLink CD           MODBUS-1:     5 2.07F01 Online          |  Model: RX-400  00
CD06 01 ISLFRZ  CtrlLink CD           MODBUS-1:     6 2.07F01 Online          |  Unit: 2
CT_001          CT Drive              MODBUS-1:    13 0.00    Online          |  IP: 10.213.236.128
K5RS_001        K5 Ref Scroll         MODBUS-1:     - 0.00    Unknown         |  F/W Rev: 4.03F01
LRS_002 LT      K5 Ref Scroll         MODBUS-1:     8 1.00F03 Online          |

F1: DELETE RCRD | F2: STATUS | F3: NET STATUS | F4: COMMISSION | F5: SETUP
```

8. Select the Modbus® that the CoreSense device is connected to. (If only Modbus® network is connected, this step will automatically complete itself, skip to step 9)

9. From the Modbus® Device Menu select an unused space that matches the DIP switch Address of the CoreSense device and press Enter.

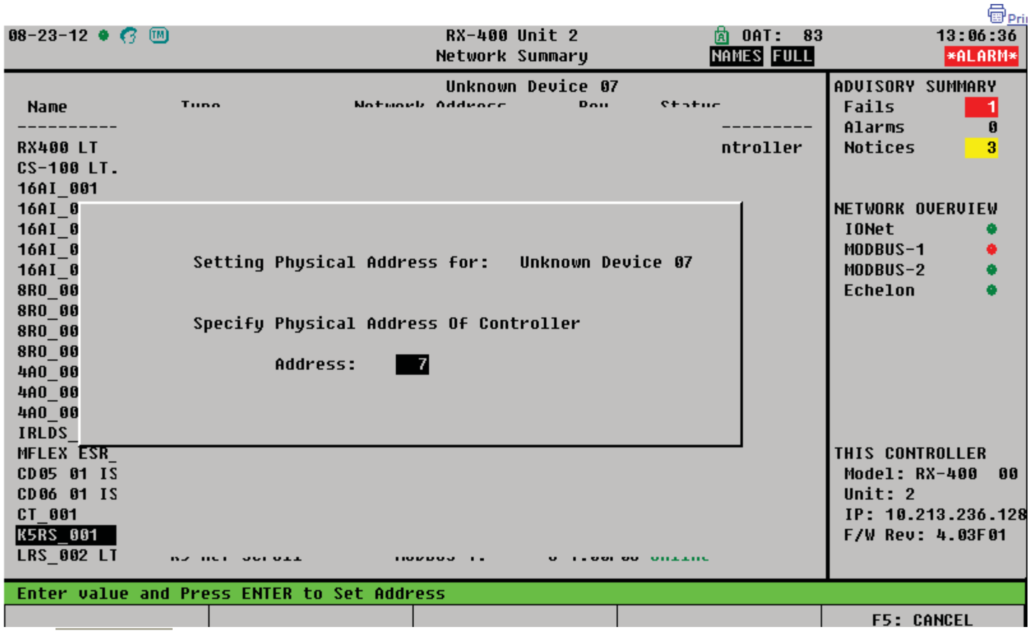


```
                                      Network Summary            NAMES FULL

 Name           Type                  Network Address     Rev     Status           ADVISORY SUMMARY
-------------------------------                      ------------------------------  Fails          1
RX400 LT       RX400-Refrig       Select Network      2 4.03F01 This Controller      Alarms         0
CS-100 LT.01   CS100-Ckt Su                           2 2.01B02 Online               Notices        3
16AI_001       16AI                1.  MODBUS-2       1 0.00    Online
16AI_002       16AI                2.  MODBUS-1       2 0.00    Online             NETWORK OVERVIEW
16AI_003       16AI                                   3 0.00    Online               IONet          ●
16AI_004       16AI                      IONet:       4 0.00    Online               MODBUS-1       ●
16AI_005       16AI                      IONet:       5 0.00    Online               MODBUS-2       ●
8RO_001        8RO                       IONet:       1 0.00    Online               Echelon        ●
8RO_002        8RO                       IONet:       2 0.00    Online
8RO_003        8RO                       IONet:       3 0.00    Online
8RO_004        8RO                       IONet:       4 0.00    Online
4AO_001        4AO                       IONet:       1 0.00    Online
4AO_002        4AO                       IONet:       2 0.00    Online
4AO_003        4AO                       IONet:       3 0.00    Online
IRLDS_001      IRLDS                     IONet:       1 0.00    Online
MFLEX ESR_001  MultiFlex ESR             IONet:       1 0.00    Online             THIS CONTROLLER
CD05 01 ISLFRZ CtrlLink CD            MODBUS-1:       5 2.07F01 Online               Model: RX-400   00
CD06 01 ISLFRZ CtrlLink CD            MODBUS-1:       6 2.07F01 Online               Unit: 2
CT_001         CT Drive               MODBUS-1:      13 0.00    Online               IP: 10.213.236.128
K5RS_001       K5 Ref Scroll          MODBUS-1:       - 0.00    Unknown              F/W Rev: 4.03F01
LRS_002 LT     K5 Ref Scroll          MODBUS-1:       8 1.00F03 Online
Press menu number or scroll to selection
                                                                                  F5: CANCEL
```



```
08-23-12                           RX-400 Unit 2              OAT:   83          13:06:22
                                  Network Summary          NAMES FULL            *ALARM*

 Name                                                                         ADVISORY SUMMARY
----------     MODBUS-1 Devices                                                 Fails          1
RX400 LT                                                        ntroller        Alarms         0
CS-100 LT.       1.  (Unused)                                                   Notices        3
16AI_001         2.  (Unused)
16AI_002         3.  (Unused)                                                 NETWORK OVERVIEW
16AI_003         4.  XR75CX CD_001    XR75CX CaseDsp                            IONet          ●
16AI_004         5.  CD05 01 ISLFRZ   CtrlLink CD                               MODBUS-1       ●
16AI_005         6.  CD06 01 ISLFRZ   CtrlLink CD                               MODBUS-2       ●
8RO_001          7.  (Unused)                                                   Echelon        ●
8RO_002          8.  LRS_002 LT       K5 Ref Scroll
8RO_003          9.  (Unused)
8RO_004         10.  (Unused)
4AO_001         11.  (Unused)
4AO_002         12.  (Unused)
4AO_003         13.  CT_001           CT Drive
IRLDS_001       14.  (Unused)
MFLEX ESR_      15.  (Unused)                                                 THIS CONTROLLER
CD05 01 IS      16.  (Unused)                                                   Model: RX-400   00
CD06 01 IS      17.  (Unused)                                                   Unit: 2
CT_001          18.  (Unused)                                                   IP: 10.213.236.128
K5RS_001                                                                        F/W Rev: 4.03F01
LRS_002 LT
Press menu number or scroll to selection
                                                                                  F5: CANCEL
```

10. Verify the address matches the address assigned by the CoreSense module’s DIP switch settings and press Enter.

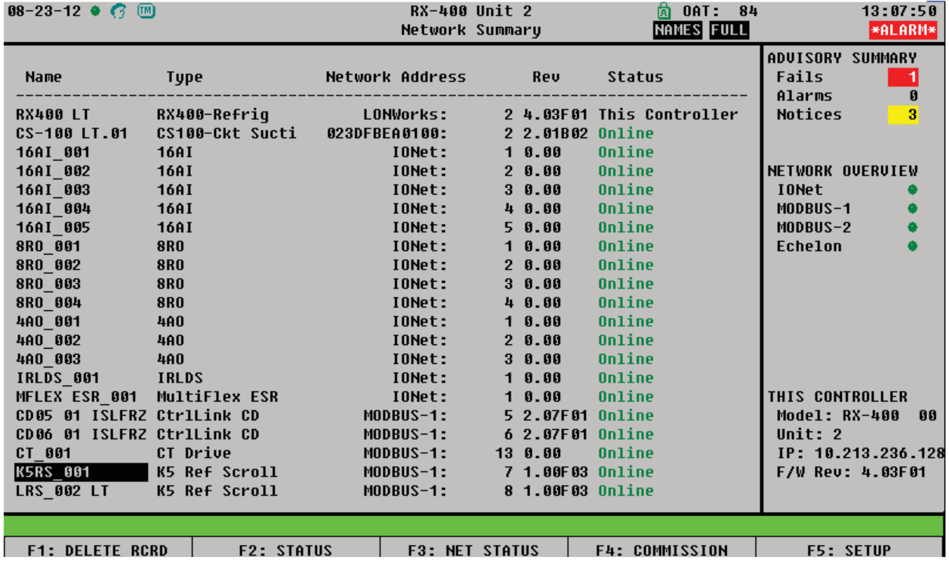


```
08-23-12                      RX-400 Unit 2             OAT:  83        13:06:36
                              Network Summary        NAMES FULL         *ALARM*
                          Unknown Device 07                        ADVISORY SUMMARY
 Name                                                               Fails        1
----------                                              ---------   Alarms       0
RX400 LT                                                ntroller    Notices      3
CS-100 LT.
16AI_001                                                           NETWORK OVERVIEW
16AI_0                                                              IONet
16AI_0                                                              MODBUS-1
16AI_0      Setting Physical Address for:   Unknown Device 07      MODBUS-2
16AI_0                                                              Echelon
8RO_00
8RO_00      Specify Physical Address Of Controller
8RO_00
8RO_00               Address:      7
4AO_00
4AO_00
4AO_00
IRLDS_
MFLEX ESR_                                                         THIS CONTROLLER
CD05 01 IS                                                          Model: RX-400   00
CD06 01 IS                                                          Unit: 2
CT_001                                                              IP: 10.213.236.128
K5RS_001                                                            F/W Rev: 4.03F01
LRS_002 LT
Enter value and Press ENTER to Set Address
                                                                      F5: CANCEL
```

11. Press to return to the Network Summary screen. The device should now be ‘Online’.

Repeat steps 8-10 to address the remaining CoreSense K5 modules.

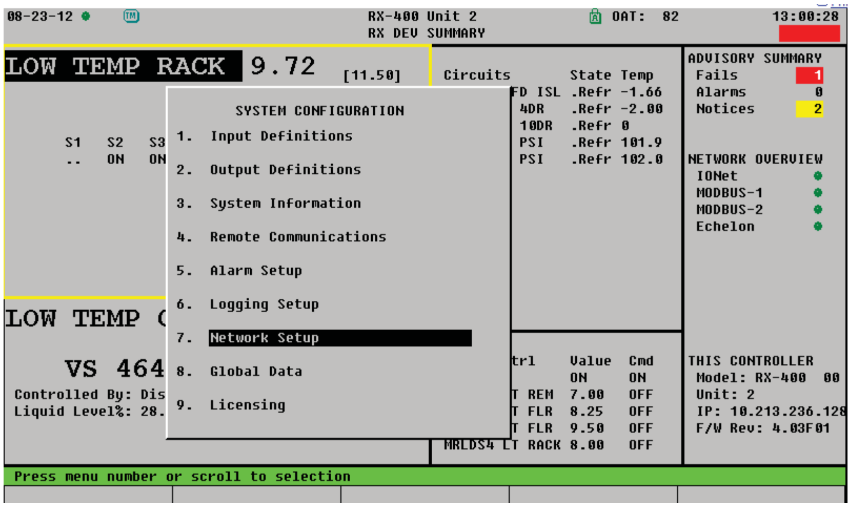
12. Once all the devices are addressed, press to save changes and exit the Network Summary.



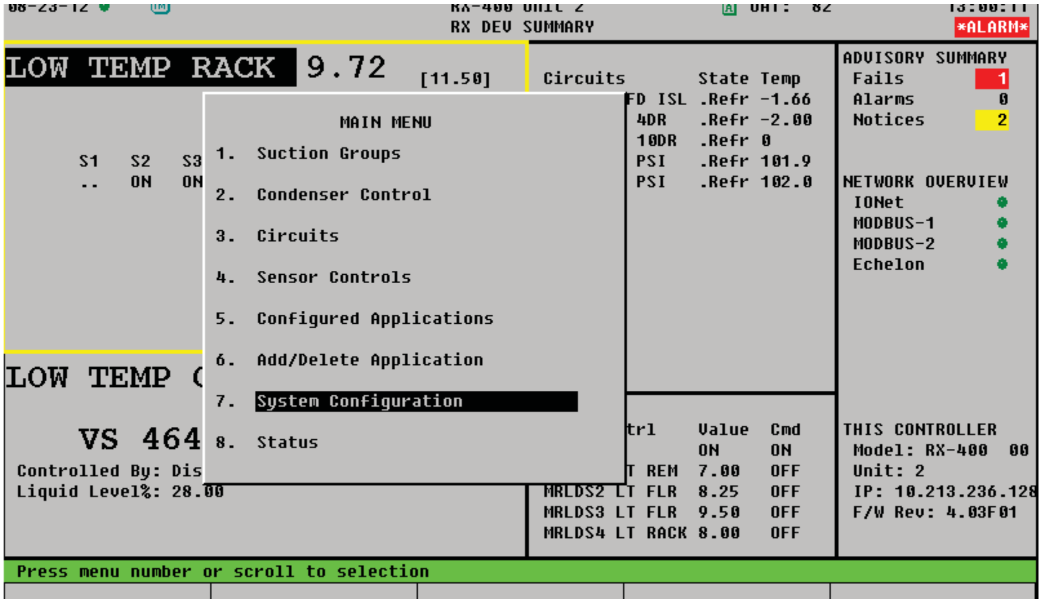
```
08-23-12                      RX-400 Unit 2               OAT:  84        13:07:50
                              Network Summary          NAMES FULL         *ALARM*
                                                                     ADVISORY SUMMARY
 Name           Type           Network Address      Rev     Status    Fails        1
----------------------------------------------------------------------   Alarms       0
RX400 LT        RX400-Refrig         LONWorks:     2 4.03F01 This Controller   Notices      3
CS-100 LT.01    CS100-Ckt Sucti  023DFBEA0100:     2 2.01B02 Online
16AI_001        16AI                    IONet:     1 0.00    Online
16AI_002        16AI                    IONet:     2 0.00    Online    NETWORK OVERVIEW
16AI_003        16AI                    IONet:     3 0.00    Online     IONet
16AI_004        16AI                    IONet:     4 0.00    Online     MODBUS-1
16AI_005        16AI                    IONet:     5 0.00    Online     MODBUS-2
8RO_001         8RO                     IONet:     1 0.00    Online     Echelon
8RO_002         8RO                     IONet:     2 0.00    Online
8RO_003         8RO                     IONet:     3 0.00    Online
8RO_004         8RO                     IONet:     4 0.00    Online
4AO_001         4AO                     IONet:     1 0.00    Online
4AO_002         4AO                     IONet:     2 0.00    Online
4AO_003         4AO                     IONet:     3 0.00    Online
IRLDS_001       IRLDS                   IONet:     1 0.00    Online
MFLEX ESR_001   MultiFlex ESR           IONet:     1 0.00    Online    THIS CONTROLLER
CD05 01 ISLFRZ  CtrlLink CD          MODBUS-1:     5 2.07F01 Online     Model: RX-400   00
CD06 01 ISLFRZ  CtrlLink CD          MODBUS-1:     6 2.07F01 Online     Unit: 2
CT_001          CT Drive             MODBUS-1:    13 0.00    Online     IP: 10.213.236.128
K5RS_001        K5 Ref Scroll        MODBUS-1:     7 1.00F03 Online     F/W Rev: 4.03F01
LRS_002 LT      K5 Ref Scroll        MODBUS-1:     8 1.00F03 Online

F1: DELETE RCRD   F2: STATUS   F3: NET STATUS   F4: COMMISSION   F5: SETUP
```

13. Press Menu ***to enter the Main Menu. Select 7. System Configuration.***

14. From the System Configuration Menu select 7. Network Setup

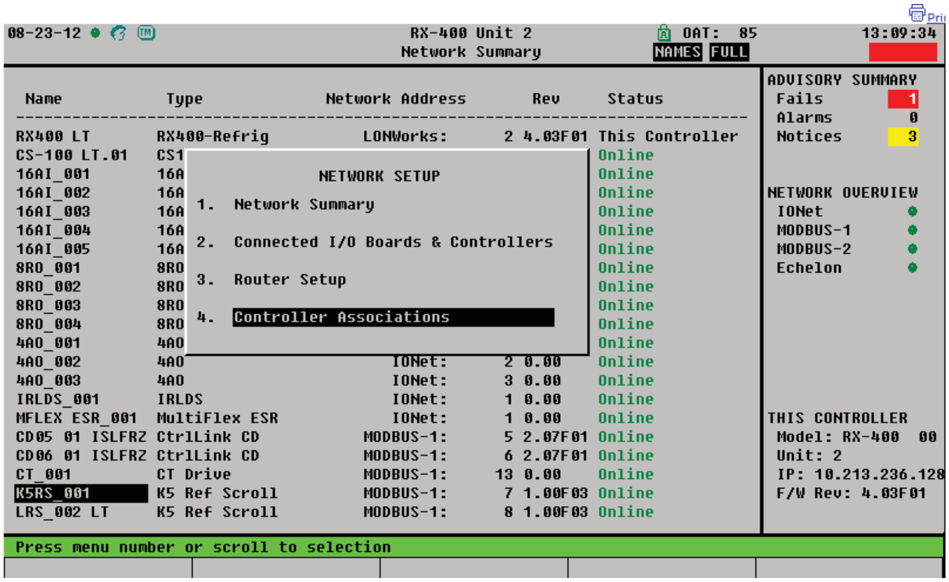


```
08-23-12                        RX-400 Unit 2                 OAT:  82        13:00:28
                                RX DEV SUMMARY
LOW TEMP RACK  9.72   [11.50]   Circuits          State Temp   ADVISORY SUMMARY
                                                               Fails           1
                         SYSTEM CONFIGURATION   FD ISL .Refr -1.66   Alarms    0
                     1.  Input Definitions      4DR    .Refr -2.00   Notices   2
  S1   S2   S3                                  10DR   .Refr 0
  ..   ON   ON       2.  Output Definitions     PSI    .Refr 101.9
                                                PSI    .Refr 102.0   NETWORK OVERVIEW
                     3.  System Information                          IONet
                                                                     MODBUS-1
                     4.  Remote Communications                       MODBUS-2
                                                                     Echelon
                     5.  Alarm Setup

                     6.  Logging Setup
LOW TEMP C
                     7.  Network Setup
                                                trl    Value  Cmd   THIS CONTROLLER
  VS 464             8.  Global Data                   ON     ON     Model: RX-400   00
Controlled By: Dis                              T REM  7.00   OFF    Unit: 2
Liquid Level%: 28.   9.  Licensing              T FLR  8.25   OFF    IP: 10.213.236.128
                                                T FLR  9.50   OFF    F/W Rev: 4.03F01
                                     MRLDS4 LT RACK    8.00   OFF
Press menu number or scroll to selection
```

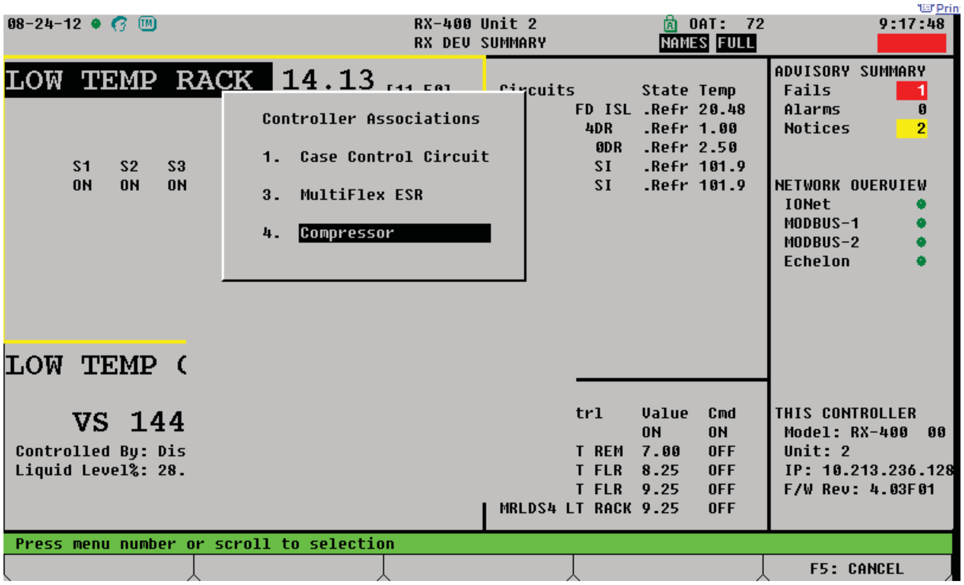


```
08-23-12                        RX-400 Unit 2                 OAT:  82        13:00:11
                                RX DEV SUMMARY                               *ALARM*
LOW TEMP RACK  9.72   [11.50]   Circuits          State Temp   ADVISORY SUMMARY
                                                               Fails           1
                         MAIN MENU              FD ISL .Refr -1.66   Alarms    0
                     1.  Suction Groups         4DR    .Refr -2.00   Notices   2
  S1   S2   S3                                  10DR   .Refr 0
  ..   ON   ON       2.  Condenser Control      PSI    .Refr 101.9
                                                PSI    .Refr 102.0   NETWORK OVERVIEW
                     3.  Circuits                                    IONet
                                                                     MODBUS-1
                     4.  Sensor Controls                             MODBUS-2
                                                                     Echelon
                     5.  Configured Applications

                     6.  Add/Delete Application
LOW TEMP C
                     7.  System Configuration
                                                trl    Value  Cmd   THIS CONTROLLER
  VS 464             8.  Status                        ON     ON     Model: RX-400   00
Controlled By: Dis                              T REM  7.00   OFF    Unit: 2
Liquid Level%: 28.00                 MRLDS2 LT FLR     8.25   OFF    IP: 10.213.236.128
                                     MRLDS3 LT FLR     9.50   OFF    F/W Rev: 4.03F01
                                     MRLDS4 LT RACK    8.00   OFF
Press menu number or scroll to selection
```

15. From the Network Setup Menu, select 4. Controller Associations .
Then Select 4. Compressor (Press Enter)

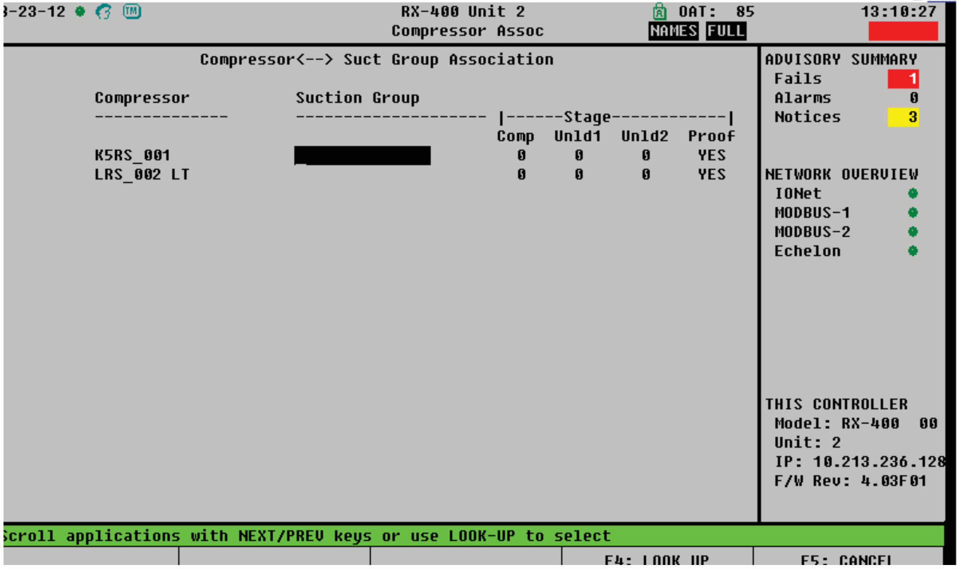


```
08-23-12                              RX-400 Unit 2              OAT:  85          13:09:34
                                     Network Summary            NAMES FULL

 Name              Type              Network Address      Rev     Status           ADVISORY SUMMARY
 -----------------------------------------------------------------------------      Fails        1
RX400 LT          RX400-Refrig         LONWorks:      2 4.03F01 This Controller      Alarms       0
CS-100 LT.01      CS1                                           Online              Notices      3
16AI_001          16A         NETWORK SETUP                     Online
16AI_002          16A                                           Online             NETWORK OVERVIEW
16AI_003          16A  1.  Network Summary                      Online              IONet        ●
16AI_004          16A                                           Online              MODBUS-1     ●
16AI_005          16A  2.  Connected I/O Boards & Controllers   Online              MODBUS-2     ●
8RO_001           8RO                                           Online              Echelon      ●
8RO_002           8RO  3.  Router Setup                         Online
8RO_003           8RO                                           Online
8RO_004           8RO  4.  Controller Associations              Online
4AO_001           4AO                                           Online
4AO_002           4AO                  IONet:         2 0.00    Online
4AO_003           4AO                  IONet:         3 0.00    Online
IRLDS_001         IRLDS                IONet:         1 0.00    Online
MFLEX ESR_001     MultiFlex ESR        IONet:         1 0.00    Online             THIS CONTROLLER
CD05 01 ISLFRZ    CtrlLink CD          MODBUS-1:      5 2.07F01 Online              Model: RX-400  00
CD06 01 ISLFRZ    CtrlLink CD          MODBUS-1:      6 2.07F01 Online              Unit: 2
CT_001            CT Drive             MODBUS-1:     13 0.00    Online              IP: 10.213.236.128
K5RS_001          K5 Ref Scroll        MODBUS-1:      7 1.00F03 Online              F/W Rev: 4.03F01
LRS_002 LT        K5 Ref Scroll        MODBUS-1:      8 1.00F03 Online

Press menu number or scroll to selection
```

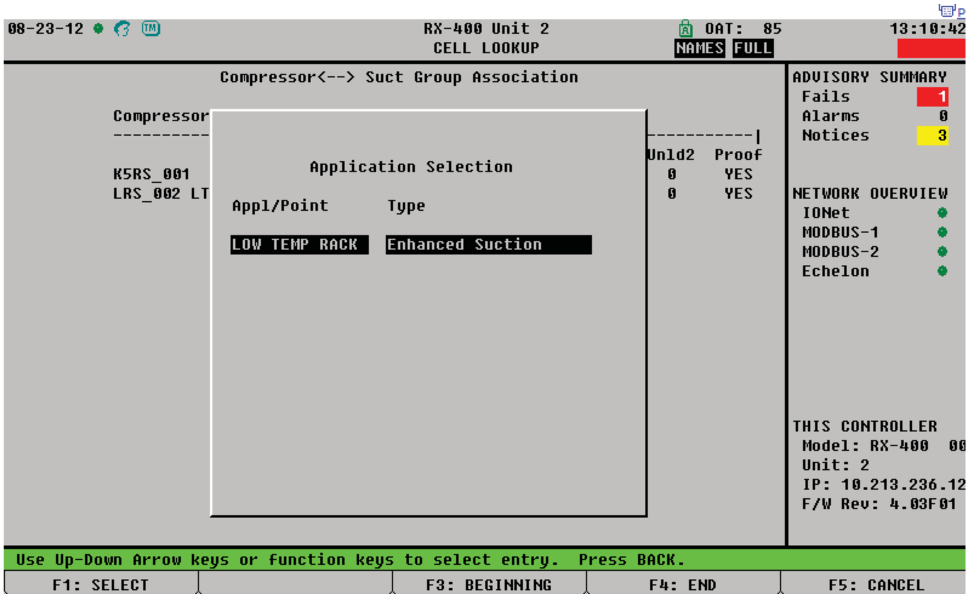


```
08-24-12                          RX-400 Unit 2            OAT:  72           9:17:48
                                  RX DEV SUMMARY          NAMES FULL

LOW TEMP RACK  14.13                                                        ADVISORY SUMMARY
                     Controller Associations   rcuits        State Temp      Fails        1
                                                FD ISL .Refr 20.48          Alarms       0
                     1.  Case Control Circuit    4DR    .Refr 1.00          Notices      2
                                                  0DR    .Refr 2.50
      S1   S2   S3   3.  MultiFlex ESR            SI     .Refr 101.9        NETWORK OVERVIEW
      ON   ON   ON                                SI     .Refr 101.9         IONet        ●
                     4.  Compressor                                          MODBUS-1     ●
                                                                             MODBUS-2     ●
                                                                             Echelon      ●
LOW TEMP (

     VS 144                                    trl       Value   Cmd        THIS CONTROLLER
Controlled By: Dis                                       ON      ON          Model: RX-400  00
Liquid Level%: 28.                             T REM     7.00    OFF         Unit: 2
                                               T FLR     8.25    OFF         IP: 10.213.236.128
                                               T FLR     9.25    OFF         F/W Rev: 4.03F01
                                        MRLDS4 LT RACK   9.25    OFF

Press menu number or scroll to selection
                                                                            F5: CANCEL
```

16. Highlight the Suction Group[2] field, select F4: Look Up (Press F4) and select the appropriate suction group for the device and press Enter.



```
-23-12                          RX-400 Unit 2          OAT:  85          13:10:27
                               Compressor Assoc       NAMES FULL
             Compressor<--> Suct Group Association                   ADVISORY SUMMARY
                                                                       Fails          1
      Compressor               Suction Group                           Alarms         0
      --------------           -------------------- |------Stage-----------|   Notices        3
                                                    Comp  Unld1  Unld2  Proof
      K5RS_001                                       0      0      0     YES   NETWORK OVERVIEW
      LRS_002 LT                                     0      0      0     YES    IONet          ●
                                                                             MODBUS-1       ●
                                                                             MODBUS-2       ●
                                                                             Echelon        ●

                                                                           THIS CONTROLLER
                                                                            Model: RX-400  00
                                                                            Unit: 2
                                                                            IP: 10.213.236.128
                                                                            F/W Rev: 4.03F01
Scroll applications with NEXT/PREV keys or use LOOK-UP to select
                                                 F4: LOOK UP       F5: CANCEL
```



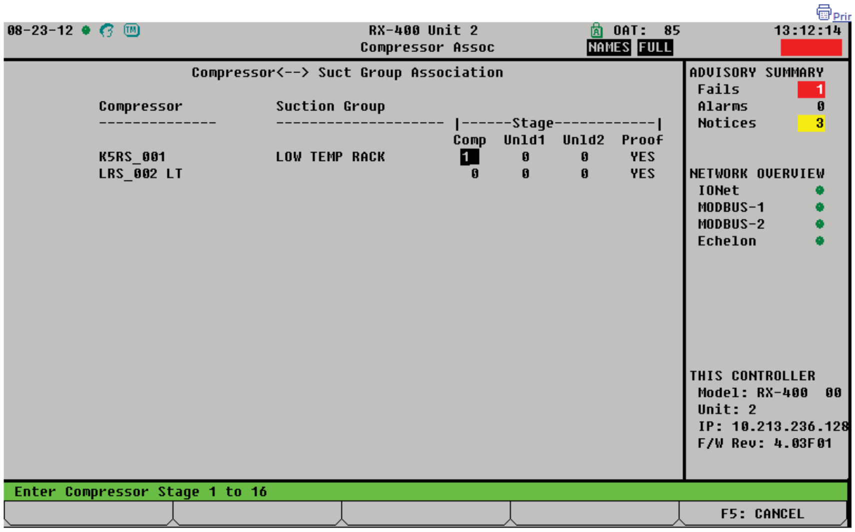
```
08-23-12                         RX-400 Unit 2          OAT:  85          13:10:42
                                  CELL LOOKUP          NAMES FULL
               Compressor<--> Suct Group Association                  ADVISORY SUMMARY
                                                                        Fails          1
       Compressor                                                       Alarms         0
       ----------                                      -----------|     Notices        3
                                                       Unld2  Proof
       K5RS_001         Application Selection           0      YES
       LRS_002 LT                                       0      YES    NETWORK OVERVIEW
                    Appl/Point       Type                               IONet          ●
                                                                        MODBUS-1       ●
                    LOW TEMP RACK    Enhanced Suction                   MODBUS-2       ●
                                                                        Echelon        ●

                                                                      THIS CONTROLLER
                                                                       Model: RX-400  00
                                                                       Unit: 2
                                                                       IP: 10.213.236.12
                                                                       F/W Rev: 4.03F01
 Use Up-Down Arrow keys or function keys to select entry.  Press BACK.
     F1: SELECT                       F3: BEGINNING     F4: END        F5: CANCEL
```

---

[2] For more information on setting up suction groups in the E2, consult your Emerson Retail Solutions representative.

17. Scroll over to the Comp Stage and type in the compressor stage. (CoreSense Protection provides proofing only on the compressor.)

NOTE: The compressor stage number should correspond to the stage numbers in the suction group setup (Step 7)



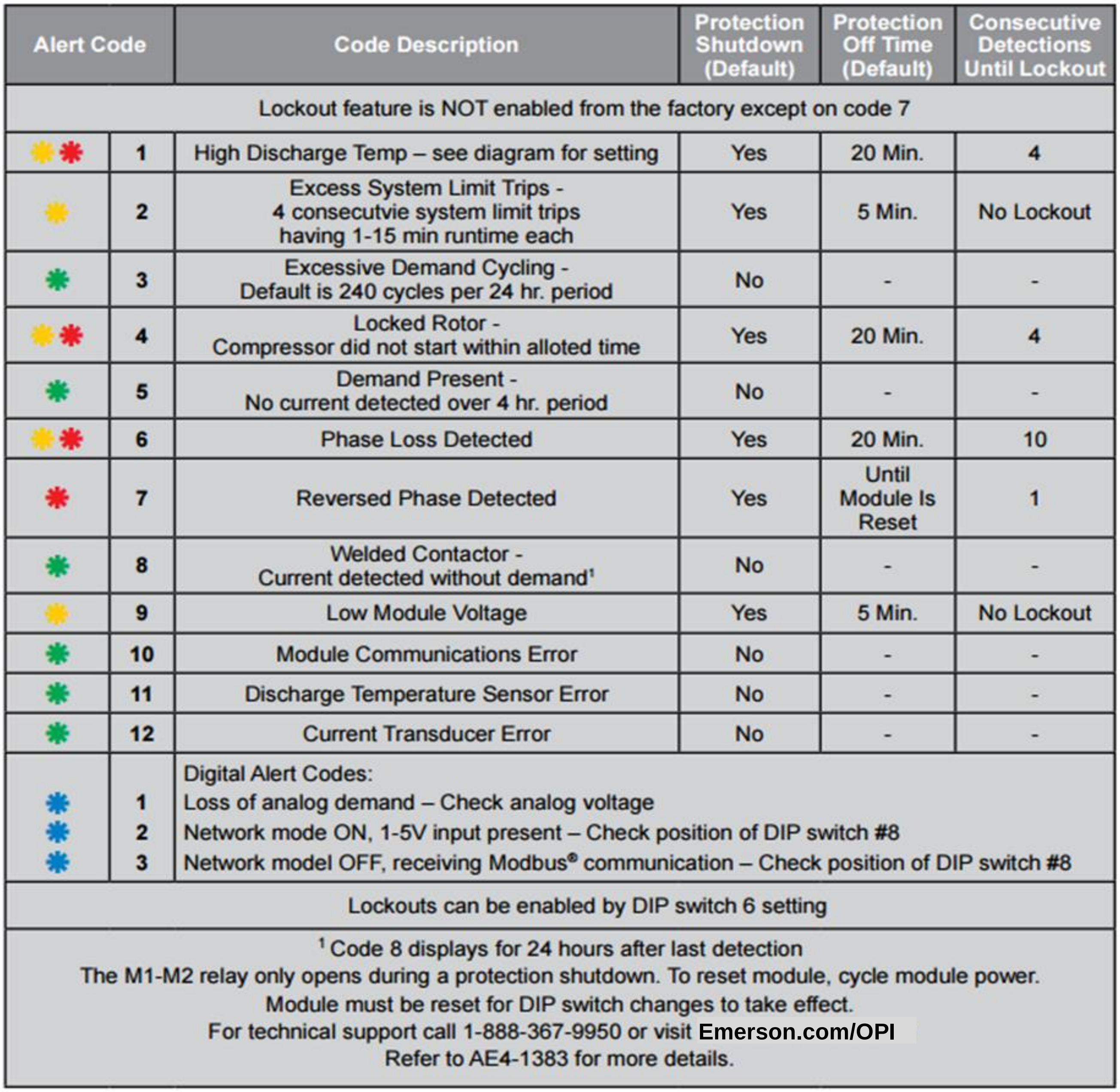
```
08-23-12                    RX-400 Unit 2            OAT:  85          13:12:14
                            Compressor Assoc         NAMES FULL
            Compressor<--> Suct Group Association                    ADVISORY SUMMARY
                                                                      Fails        1
      Compressor          Suction Group                               Alarms       0
      --------------      -------------------- |------Stage-----------|  Notices      3
                                               Comp  Unld1  Unld2  Proof
      K5RS_001            LOW TEMP RACK          1     0      0     YES
      LRS_002 LT                                 0     0      0     YES  NETWORK OVERVIEW
                                                                      IONet        ●
                                                                      MODBUS-1     ●
                                                                      MODBUS-2     ●
                                                                      Echelon      ●

                                                                     THIS CONTROLLER
                                                                      Model: RX-400   00
                                                                      Unit: 2
                                                                      IP: 10.213.236.128
                                                                      F/W Rev: 4.03F01
 Enter Compressor Stage 1 to 16
                                                                          F5: CANCEL
```

Alert Codes & Troubleshooting Tips

Table 2 is an explanation of the alert codes for the CoreSense and what the flash codes mean. It is also available on the inside of the terminal box lid on all 7-15 HP K5 compressors or as part of the 4-7.5 HP kits. **Table 3** are some trouble shooting tips for the alert codes. There are 4 colors that can flash from the module…green- all is okay, yellow … there has been a system trip, and this will auto reset once the trip has cleared, red is a lockout and will require a manual reset on the contractor’s part. This means the power must be cycled to the CoreSense. Blue is used for digital applications and will light up when the scroll set is unloaded. There are also trouble shooting tips to help identify and fix the issue.

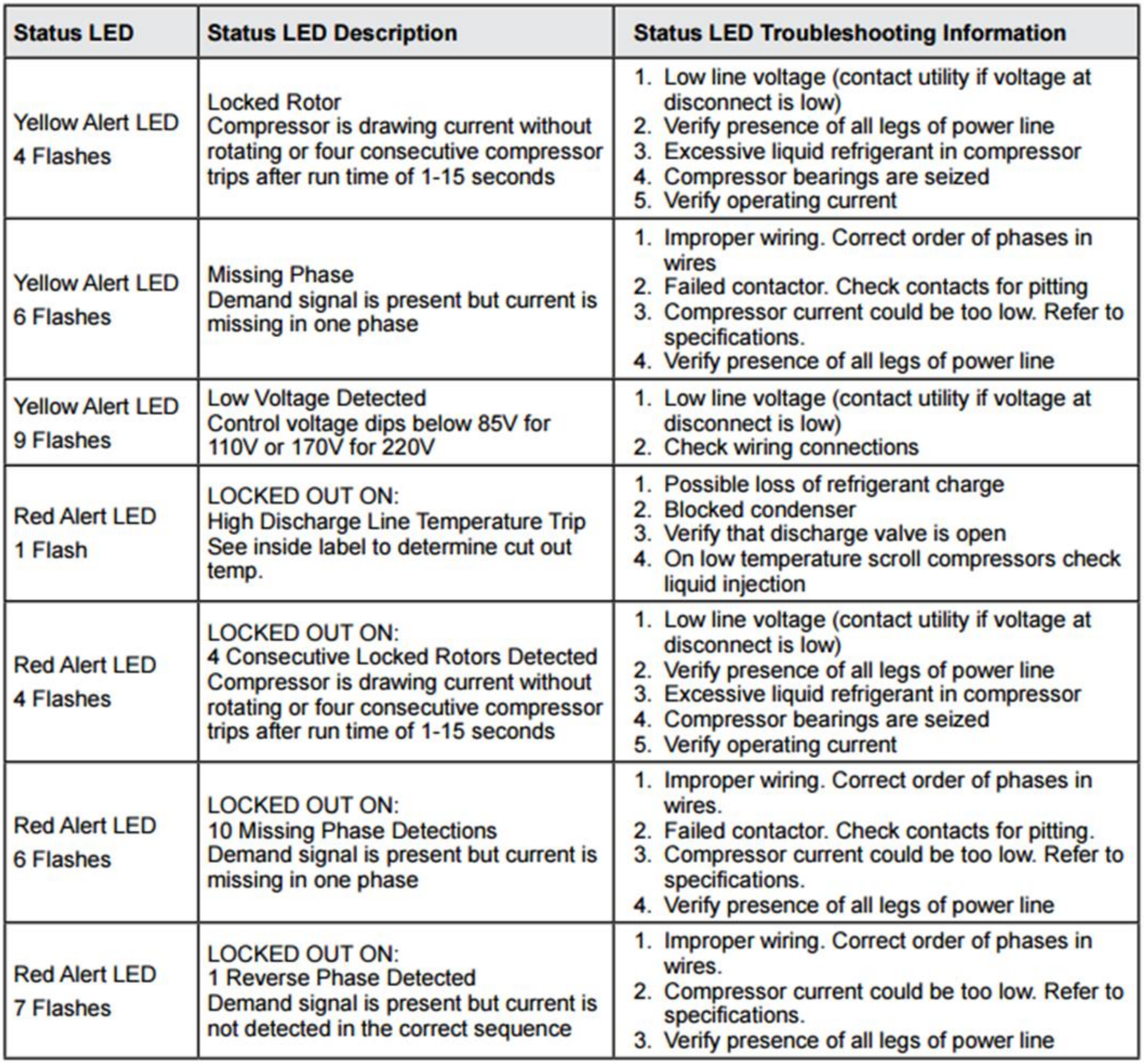
Further information and tips are also available at **Emerson.com/OPI**

Table 2: Alert Code Descriptions



Alert Code		Code Description	Protection Shutdown (Default)	Protection Off Time (Default)	Consecutive Detections Until Lockout
Lockout feature is NOT enabled from the factory except on code 7					
🟡🔴	1	High Discharge Temp – see diagram for setting	Yes	20 Min.	4
🟡	2	Excess System Limit Trips - 4 consecutvie system limit trips having 1-15 min runtime each	Yes	5 Min.	No Lockout
🟢	3	Excessive Demand Cycling - Default is 240 cycles per 24 hr. period	No	-	-
🟡🔴	4	Locked Rotor - Compressor did not start within alloted time	Yes	20 Min.	4
🟢	5	Demand Present - No current detected over 4 hr. period	No	-	-
🟡🔴	6	Phase Loss Detected	Yes	20 Min.	10
🔴	7	Reversed Phase Detected	Yes	Until Module Is Reset	1
🟢	8	Welded Contactor - Current detected without demand[1]	No	-	-
🟡	9	Low Module Voltage	Yes	5 Min.	No Lockout
🟢	10	Module Communications Error	No	-	-
🟢	11	Discharge Temperature Sensor Error	No	-	-
🟢	12	Current Transducer Error	No	-	-
 🔵 🔵 🔵	 1 2 3	Digital Alert Codes: Loss of analog demand – Check analog voltage Network mode ON, 1-5V input present – Check position of DIP switch #8 Network model OFF, receiving Modbus® communication – Check position of DIP switch #8			
Lockouts can be enabled by DIP switch 6 setting					
[1] Code 8 displays for 24 hours after last detection The M1-M2 relay only opens during a protection shutdown. To reset module, cycle module power. Module must be reset for DIP switch changes to take effect. For technical support call 1-888-367-9950 or visit **Emerson.com/OPI** Refer to AE4-1383 for more details.					

Table 3: CoreSense Diagnostics Module Troubleshooting



Status LED	Status LED Description	Status LED Troubleshooting Information
Yellow Alert LED 4 Flashes	Locked Rotor Compressor is drawing current without rotating or four consecutive compressor trips after run time of 1-15 seconds	1. Low line voltage (contact utility if voltage at disconnect is low) 2. Verify presence of all legs of power line 3. Excessive liquid refrigerant in compressor 4. Compressor bearings are seized 5. Verify operating current
Yellow Alert LED 6 Flashes	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 pitting 3. Compressor current could be too low. Refer to specifications. 4. Verify presence of all legs of power line
Yellow Alert LED 9 Flashes	Low Voltage Detected 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
Red Alert LED 1 Flash	LOCKED OUT ON: High Discharge Line Temperature Trip See inside label to determine cut out temp.	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
Red Alert LED 4 Flashes	LOCKED OUT ON: 4 Consecutive Locked Rotors Detected Compressor is drawing current without rotating or four consecutive compressor trips after run time of 1-15 seconds	1. Low line voltage (contact utility if voltage at disconnect is low) 2. Verify presence of all legs of power line 3. Excessive liquid refrigerant in compressor 4. Compressor bearings are seized 5. Verify operating current
Red Alert LED 6 Flashes	LOCKED OUT ON: 10 Missing Phase Detections 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 pitting. 3. Compressor current could be too low. Refer to specifications. 4. Verify presence of all legs of power line
Red Alert LED 7 Flashes	LOCKED OUT ON: 1 Reverse Phase Detected 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

Kits & Accessories

Kits and accessories are available through Emerson Distribution Services. Below are references for the kit part numbers you will need when ordering parts. Please note that there are different lists for 7.5-15 HP ZB*K5 & ZF*K5 and 2- 7.5 HP (ZB*KC & ZS*K4 & ZF*K4/KV) scroll compressors when searching for kit numbers. Additional information and kit numbers for 7.5-15 HP ZB*K5 & ZF*K5 scroll compressors can be found in **AE4 1383.**

Table 4: CoreSense Diagnostics Service Kits for K5 Compressors (ZB*K5 & ZF*K5)

P/N	Modules
943-0159-00	Current Sensing Module
943-0209-00	CoreSense Diagnositc Module

P/N	Crankcase Heaters
918-0047-00	120 V Crankcase Heater 90W 48" Lead Length
918-0047-01	240 V Crankcase Heater 90W 48" Lead Length
918-0047-02	480 V Crankcase Heater 90W 48" Lead Length
918-0047-03	575 V Crankcase Heater 90W 48" Lead Length
998-7029-00	Crankcase Heater Enclosure Box

P/N	Digital Components
998-0060-03	120V Digital Solenoid Coil
998-0060-04	240V Digital Solenoid Coil
998-0189-00	Closed Loop Digital Controller (Single Compressor Applications)
998-0341-00	1 - 5 V Analog Input Wire Kit
998-0342-00	Digital Solenoid Coil Wire (CoreSense Module to Digital Solenoid Coil)

P/N	Discharge Line Thermostats/Thermistors
998-0176-00	Thermistor Kit (Includes Top Cap, and DLT Themistors)
998-0229-00	Top Cap Thermistor Kit (Top Cap Thermistor Only)

P/N	Liquid Injection Components
998-0177-00	DTC Vapor Injection Adapter
998-0340-00	Electronic Liquid Injection Valve Kit
998-0359-00	Liquid Solenoid Cable Kit
998-0500-03	DTC Kit, 250F Set Point DTC With 268F Thermistor for Liquid Injection

P/N	Motor Protection
971-0641-00	External Motor Protection Module

P/N	Mounting
527-0116-00	Spacer Mounting Kit, 30-35 Durometer, 1.45" OD, 0.44" ID, 0.75" Height
527-0210-00	Spacer Mounting Kit, 55-65 Durometer, 1.62" OD, 0.44" ID, 1.75" Height
998-0178-00	Hard Mount Kit, 1.87" OD, 0.69" ID, 0.31" Height

P/N	Oil Management
65365	Oil Management Control w/ Junction Box 24V, 50/60Hz
65366	Oil Management Control w/ Series Relief Connector 24V, 50/60Hz
66652	Oil Management, OMB Adapter (One Piece)

P/N	Service Valves and Adaptors
998-0034-08	Rotalock to Stub Tube Adapter, 1 1/4"-12 Thread to 7/8" Sweat
998-0034-13	Rotalock to Stub Tube Adapter, 1 3/4"-12 Thread to 1 3/8" Sweat
998-0034-18	Rotalock to Stub Tube Adapter, 1"-14 Thread to 1/2" Sweat
998-0510-39	Service Valve Kit, 1 1/4"-12 Thread to 7/8" Sweat
998-0510-46	Service Valve Kit, 1 3/4"-12 Thread to 1 3/8" Sweat
998-5100-27	Service Valve Kit, 1 3/4"-12 Thread to 1 3/8" Sweat and 1 1/4"-12 Thread to 7/8" Sweat

Medium Temperature Kit | Part Number **943-0050-00**	Digital Available (*)	Digital Available (*)	
- Includes all parts below -	4 - 7.5 HP	2 - 4 HP	
CoreSense Module	ZBD28KC (Digital Only)	ZB12KC	ZB28KC
Current Transducer Module	ZB30KCE*	ZB15KC	ZB29KC*
Top Cap Thermistor	ZB38KCE*	ZB17KC	ZS15K4
Syringe - Dielectric Grease	ZB42KCE	ZB19KC	ZS19K4
Silicone Sealant	ZB45KCE*	ZB20KC	ZS21K4
	ZB48KCE	ZB21KC*	ZS26K4
	ZB57KCE*	ZB26KC	
Low Temperature Kit | Part Number **943-0051-00**	4 - 7.5 HP		
- Includes all parts below -			
CoreSense Module	ZF13KVE*		
Current Transducer Module	ZF18KVE*		
EXV - 1.3mm Orifice w/ 1" Rota lock	ZF25KVE*		
Stepper Motor	ZF28KVE		
Seal - Rota lock Fitting (3 Pieces)			
Tee Fitting			
Digital Solenoid Wire			
Top Cap Thermistor			
Silicone Sealant			
Low Temperature Kit | Part Number **943-0051-01**	4 - 7.5 HP		
- Includes all parts below -			
CoreSense Module	ZF13K4E		
Current Transducer Module	ZF15K4E		
Exv - 1.3mm Orifice w/ 11/16" Rota lock	ZF18K4E		
Stepper Motor	ZF25K4E		
Seal - Rota lock Fitting (3 Pieces)	ZF28K4E		
Digital Solenoid Wire			
Top Cap Thermistor			
Silicone Sealant			
Syringe - Dielectric Grease			

Digital Kits	Kit Number
110 V Solenoid	923-0058-08
220 V Solenoid	923-0058-09
Digital Tubing Kit	998-0073-00

→

For use on these 4 - 7.5 HP models

Digital Models	
ZBD30KCE-TFD	ZFD13KVE-TFD
ZBD38KCE-TFD	ZFD18KVE-TFD
ZBD45KCE-TFD	ZFD25KVE-TFD
ZBD57KCE-TFD	

Digital Kits	Kit Number
110 V Solenoid	923-0058-08
220 V Solenoid	923-0058-09
Digital Tubing Kit	998-0066-09

→

For use on these
2 - 4 HP models

Digital Models
ZBD21KC*-TFD
ZBD21KC*-TF5
ZBD29KC*-TFD
ZBD29KC*-TFD

Extension Harnesses Components	Length	Kit Number
Current Transducer Module Extension Cable	3'	529-0297-00
Current Transducer Module Extension Cable	10'	529-0297-01
EXV Extension Cable for Liquid Injection	8'	543-0253-00
EXV Extension Cable for Liquid Injection	10'	543-0253-01
EXV Extension Cable for Liquid Injection	12'	543-0253-02
EXV Extension Cable for Liquid Injection	15'	543-0253-03
EXV Extension Cable for Liquid Injection	18'	543-0253-04
EXV Extension Cable for Liquid Injection	20'	543-0253-05
Top Cap Thermistor Extension Cable	8'	529-0299-00
Top Cap Thermistor Extension Cable	10'	529-0299-01
Top Cap Thermistor Extension Cable	12'	529-0299-02
Top Cap Thermistor Extension Cable	15'	529-0299-03
Top Cap Thermistor Extension Cable	18'	529-0299-04
Top Cap Thermistor Extension Cable	20'	529-0299-05
Digital Tray Cable	8'	529-0300-00
Digital Tray Cable	10'	529-0300-01
Digital Tray Cable	12'	529-0300-02
Digital Tray Cable	15'	529-0300-03
Digital Tray Cable	18'	529-0300-04
Digital Tray Cable	20'	529-0300-05
Digital Capacity Control Cable		998-0341-00
Liquid Line Solenoid Cable (non-digital)		998-0359-00
1-5V Analog Input Wire with Butt Splice		

Miscellaneous Kits	Kit Number
CoreSense Module	943-0223-00
Current Transducer (Only contains Mounting kit)	943-0159-00
EXV Liquid Injection kit for ZF**K4/ ZB*KC/ ZS*K4 11/16" Rotalock	998-0740-00
EXV Liquid Injection kit for ZF**KVE /ZF*K5 1" Rotalock	998-0741-00

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