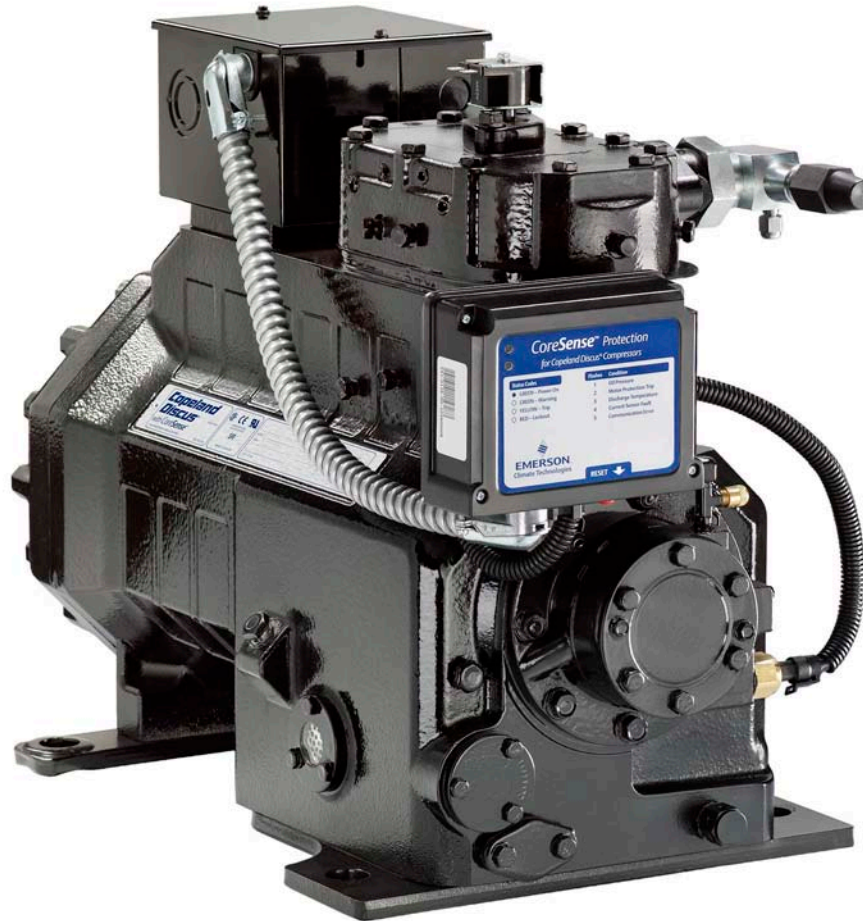


Copeland Discus™ With CoreSense™ Protection

Jan 2011

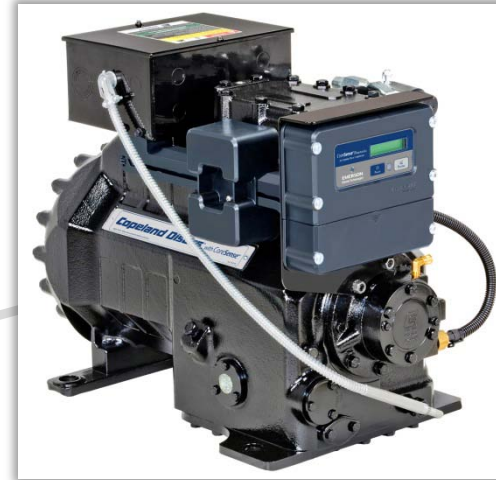


Copeland Discus with CoreSense Technology Provides Higher Value

Value



- Copeland Discus With CoreSense Protection
- Basic Protection And Diagnostics
 - Oil & Standard Motor Protection
- Communication On Every Discus

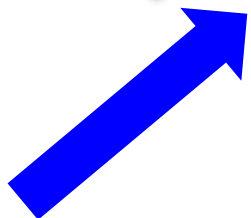


- Copeland Discus With CoreSense Diagnostics
- Applied Cost Savings
 - Integration Of Traditional Accessories
 - Reduced Wiring
 - Reduced Assembly Labor
- Advanced Diagnostics
- Improved Reliability
 - Reduced Warranty Costs
- Communications

All 2D, 3D, 4D & 6D Copeland Discus Compressors Have CoreSense Technology On Board

Copeland Discus With CoreSense Protection vs. CoreSense Diagnostics Feature Comparison

Additional Functionality Available With CoreSense Diagnostics



Integrated I/O Board



Integrated HPCO / LPCO



Digital Control



Adv. Motor Prot & Measurement

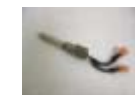


Optional Field Retrofit



DLT Protection

DLT Protection



Standard



Comm. & Diagnostics

Comm. & Diagnostics

Oil Protection

Oil Protection

Motor Protection

Motor Protection

CoreSense Protection

CoreSense Diagnostics



Copeland Discus With CoreSense Protection - Features

- 1 Oil Protection
- 2 Motor Protection
- 3 Low Oil Pressure Warning
- 4 Manual Reset
- 5 Compressor “Jog” Feature
- 6 External Alarm Relay Contact
- 7 Oil Warning & Lockout Notification
- 8 Motor Trip Notification (4D/6D Only)
- 9 Modbus Communication
- 10 Remote Reset
- 11 Compressor Run Status (Proofing)
- 12 Asset Information
- 13 Fault And Run History
- 14 Optional Feature
 - Discharge Line Temp Protection

More Information

Quick, accurate identification

Reliability and cost savings

Freedom to refocus time and money



CoreSense Protection Functionality Comes Standard On All Copeland Discus Compressors

Copeland Discus With CoreSense Protection - Features

1 Oil Protection

■ *Functionality*

- Module Will Shut Down The Compressor When Oil Pressure Falls Below 7-9 PSID For 2 Minutes

■ *Features*

- Precise Electronic Control Module To Monitor Oil Pump Differential Pressure Switch
- Oil Trip Triggered By 2 Minutes Of No Positive Oil Pressure
- Provides Alarm Indication Via LED Status Display
- Communications
- External Alarms

2 Motor Protection

■ *Functionality*

- Temperature Based PTC Sensors Provide Protection Against High Motor Temps
- Temperature And Low Voltage Conditions

■ *Features:*

- PTC Temperature Sensor Based Motor Protection
- Communications
- External Alarms

Copeland Discus With CoreSense Protection - Features

3 *Low Oil Pressure Warning*

- CoreSense Protection Will Issue A Warning When Oil Pressure Falls Below 7-9 PSID
 - Green LED Will Flash Once As Warning

4 *Manual Reset*

- Red Button On Bottom Of Module Can Be Pressed To Reset The Module
- Alternately, Power To The Module Can Be Cycled

5 *Compressor Jog Feature*

- The Compressor Will Stop As Long As The Reset Button On The Bottom of The CoreSense Protection Module Is Held In.
- This Can Be Used For Clearing Liquid During A Start-up.
- After The CoreSense Protection Re-boots (Approx 3 Seconds) The Compressor Will Resume Operation If Demand Is Still Present.
- The Reset Button May Be Pushed As Necessary To Stop The Compressor.

External Alarm Relay Contact

- ### **6**
- CoreSense Protection Provides a N.C. Auxiliary Alarm Contact

Copeland Discus With CoreSense Protection - Features

7 *Oil Warning & Lockout Notification*

- New Communication Feature
- CoreSense Protection Module Will Shut Down The Compressor When Oil Pressure Falls Below 7-9 PSID For 2 Minutes
- The Oil Pressure Lockout May Be Reset Through The E2, Remotely Through Ultrasite™, Or Other Software If The Reset Option Is Enabled.

8 *Motor Trip Notification*

- New Communication Feature
- When A Motor Trip Occurs It Is Communicated to the E2 or 3rd Party Rack Controller If Equipped.

9 *Modbus Communication*

- Open MODBUS Communication Protocol
- Modbus Protocol Is A Messaging Structure Used To Establish Client-Server Communication Between Intelligent Devices

Copeland Discus With CoreSense Protection - Features

10 Remote Reset

- Enables Restart of Compressors Without Traveling To The Site By Using Ultracite™ or Other Software If The Remote Reset Option Is Enabled
- Enables Restart Of Compressors
- The Service Contractor And End User Policies Need To Be Considered When Deciding Whether To Enable Or Disable The Oil Pressure Remote Reset Feature



11 Compressor Run Status (Proofing)

- Proofing Verifies That The Compressors Is Running As Commanded By The Suction Group Requirements



Copeland Discus With CoreSense Protection - Features

12 Compressor Asset Information

- The Commissioning Process Uploads Compressor Asset Information (Model And Serial Number) Into The Rack Controller For Future Reference
- Useful For Asset Tracking And Service Documentation
- Remotely Check The “Name Plate” For Service Replacements

13 Compressor Fault History

- Compressor Events Are Recorded Within The CoreSense Protection Module
 - Last 10 Alarm Codes
 - 7 Day Alarm Table
 - Total Count Of Each Alarm Code
- E2 7 Day Alarm Table For CoreSense Protection Shown Below

```
04-01-06 RX-400 Unit 1
Use Ctrl-X to Select CX Tabs  DETAILED STATUS  NAMES FULL
C1: Inputs      C2: Outputs    C3: Discus Outs  C4: Alarm Out  C5: SensorModul
C6: History     C7: 7 Day      C8: Alarm Hist   C9: Alarm Table C0: MORE

Discus: DISCUS_001

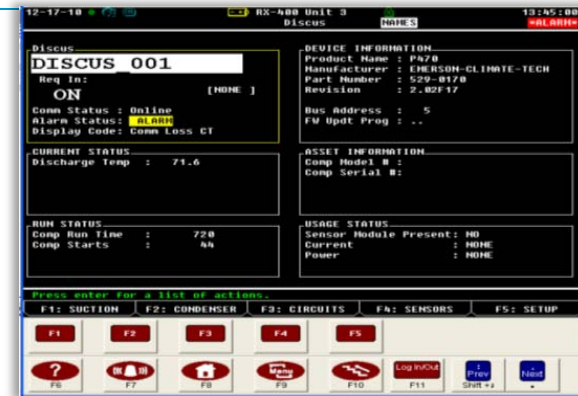
Alrn Table  Type                1 2 3 4 5 6 7 8      Count
#1 : Fault Disch Temp      Y N N N N N N N      2
#2 : Comm Loss CT          Y N N N N N N N      1
#3 : Low Oil Prs Warning   Y N N N N N N N      3
#4 : Config Mismatch       Y N N N N N N N      2
#5 : No Communications E2   N N N N N N N N      0
#6 : Disch Temp Trip       Y N N N N N N N      1
#7 : Comp Low Voltage Trip  Y N N N N N N N      0
#8 : Motor Temp Trip       Y N N N N N N N      8
#9 : Low Oil Prs Lockout   Y N N N N N N N      1
#10 : Disch Temp Lockout   N N N N N N N N      NONE
#11 : Comp Module Failure  N N N N N N N N      NONE
#12 : Unused                N N N N N N N N      0
#13 : Unused                N N N N N N N N      0
#14 : Unused                N N N N N N N N      0
#15 : Unused                N N N N N N N N      0
#16 : Unused                N N N N N N N N      0
#17 : Unused                N N N N N N N N      0

Press enter for a list of actions.
F1: PREV TAB  F2: NEXT TAB
```

Copeland Discus With CoreSense Protection - Features

14 Compressor Run History

- Compressor Run History Is Recorded Within The CoreSense Protection Module Displayed on E2
 - Accumulated Runtime Hours
 - Runtime Without Good Oil Pressure
 - Number of Compressor Starts



15 Discharge Temperature Protection (Optional)

- Provide (3) Additional Alarms
 - DLT Lockout
 - DLT Trip
 - DLT Thermistor Fault
- Discharge Temperature Protection Related Alarms are Enabled/Disabled Using A Dip Switch #10
- Uses NTC Sensor Probe To Monitor Discharge Temperature
- Default Settings:
 - Trip Value $\geq 310\text{F}$ For 2 Sec
 - Reset Value $\leq 267\text{F}$ For 2 Sec
 - Alarm : No Reset Required



Discharge Temperature Protection Thermistor

CoreSense Protection Compressor **Warning** Condition


# Flashes	Green LED - Warning Condition (The Compressor May Run With These Conditions)
1	Low oil pressure - Indicates that the device has detected low oil pressure for longer than 2 seconds. The compressor is able to run, because not enough time has elapsed without oil pressure to cause a shutdown. The warning will clear if 2 seconds of good oil pressure is detected.
2	Not used
3	Discharge Temperature Probe Open Or Disconnected - The system is not reading temperature data from the discharge temperature sensor input. The compressor is able to run when this condition is present. The condition will clear if the system reads valid temperature data from the probe for more than 2 seconds.
4	Current Sensor Disconnected - The current sensor is not connected to the system. The compressor continues to run. The condition will clear when the current sensor is connected to the module for more than two seconds.
5	Communication Error Between CoreSense Protection Module And E2 – A. The rack controller is not communicating with the CoreSense module. The compressor continues to run. The condition will clear when a valid message is received from the rack controller. B. If the E2 is configured to expect a Sensor Module and none is supplied, the module will flash Code “5”


CoreSense Protection Compressor **Trip** Condition

# Flashes	Yellow LED - Trip Condition (Compressor Stops until Condition Clear and/or Time Delay has Expired)
1	Not used
2	Motor Protector Trip - The motor temperature as measured by the PTC sensors have exceeded their trip limit. The compressor will remain off for at least 2 minutes and until the motor temperature is below the reset limit.
3	Discharge Temperature - The head temperature probe has detected a temperature greater than 310 F. The compressor will remain off for at least 2 minutes and until the compressor head is below the reset limit.
4	Not used
5	Not used

CoreSense™ Protection
for Copeland Discus® Compressors

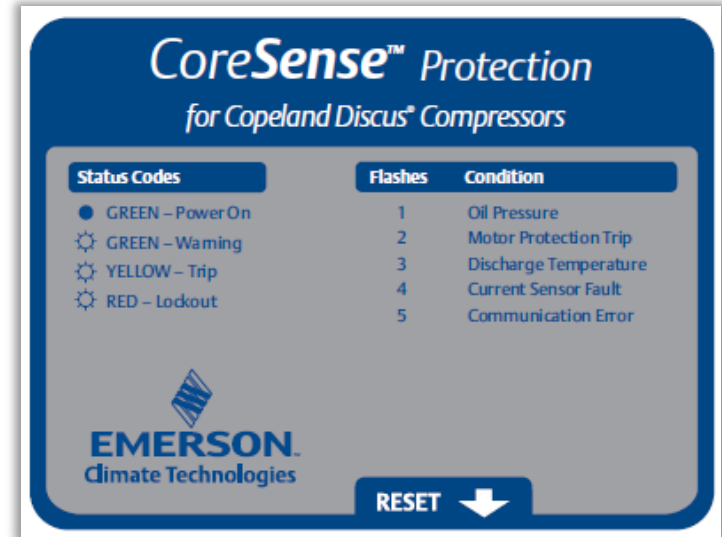
Status Codes	Flashes	Condition
● GREEN – Power On	1	Oil Pressure
⚙️ GREEN – Warning	2	Motor Protection Trip
⚙️ YELLOW – Trip	3	Discharge Temperature
⚙️ RED – Lockout	4	Current Sensor Fault
	5	Communication Error


EMERSON
Climate Technologies

RESET 

CoreSense Protection Compressor **Lockout** Condition

# Flashes	Red LED - Lockout Condition (RESET Required)
1	Low Oil Pressure Lockout - The compressor has accumulated 2 minutes of run time without sufficient oil.
2	Not used
3	Discharge Temperature - The head temperature probe has detected a temperature greater than 310 F and Discharge Temperature Lockout has been enabled in the rack controller.
4	Not used
5	Not used



Copeland Discus with CoreSense Protection Benefits Summary

**LED Indicators
for Alerts, Trips, &
Lockouts**

Remote Reset

Alarm History

**Greater
Refrigeration
Uptime**

**Lower Maintenance
Costs**

Copeland Discus With CoreSense Protection Support Materials

EMERSON Climate Technologies | Application Engineering | Copeland

BULLETIN

AEB-1367 | December 2010

CoreSense™ Protection for Copeland Discus® Compressors

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2D Discus with CoreSense

3D Discus with CoreSense

4D Discus with CoreSense

6D Discus with CoreSense

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AE Bulletin – AE1367

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BULLETIN

NO: M62010CC-46
DATE: 12/22/2010
TO: Refrigeration Original Equipment Manufacturers
FROM: Emerson Climate Technology, Inc. – Refrigeration Division
SUBJECT: Launch of Copeland Discus® with CoreSense™ Protection

Emerson Climate Technologies, Inc. is pleased to announce the release of CoreSense™ Protection for Copeland Discus® compressors on 2D, 3D, 4D, and 6D platforms, starting February 2011. The CoreSense Protection module, shown in Figure 1, delivers a number of critical compressor protection and diagnostics features for oil and motor protection. The module also provides advanced capabilities such as modbus communication, diagnostics and verification for enhanced compressor and system performance.

In addition, for customers who would like to have enhanced diagnostics, control, and protection features with applied cost savings, Emerson offers Copeland Discus with CoreSense Diagnostics (formerly known as Intelligent Store Discus). Refer to Marketing Bulletin M62010CC-39 for further details.

Figure 1
CoreSense Protection Module

Figure 2
Copeland Discus with CoreSense Protection

Every Copeland Discus compressor will now feature CoreSense Protection as standard, installed from the factory. A 3D Copeland Discus compressor with CoreSense Protection is shown in Figure 2. The compressor asset information, such as the model number, serial number, and compressor configuration, is loaded into the CoreSense Protection module for access through open modbus communication protocol. The communication feature also provides compressor real time run status and remote reset capability, which requires wiring one additional wire than the conventional Sentinel® oil protection module for continuous power supply to the module. Refer to Application Engineering Bulletin AE-1367 for further product details on functionality and wiring instructions.

The CoreSense Protection module clearly indicates the status of the compressor in the form of "Normal Operation", "Warning", "Trip" and "Lockout" conditions differentiated by color and flashing LEDs. The color indicates the severity of the compressor status and the LED flash pattern identifies the specific fault.

Emerson Climate Technologies, Inc., 1675 W. Campbell Road, Sidney, OH 45385
937-498-3011 • emersonclimate.com

Marketing Bulletin

Copeland Discus® Compressors with CoreSense™ Protection



Operational savings and less downtime for commercial refrigeration users

Reduce maintenance costs.

Copeland Discus® semi-hermetic compressors have been the standard in the refrigeration industry for years, offering the most energy-efficient, reliable performance available in heavy-duty applications. Now this compressor offering has made another major advancement with CoreSense™ Protection onboard, a breakthrough technology for commercial refrigeration systems. By using the Copeland Discus compressor as a sensor, CoreSense Protection monitors and interprets system and electrical information within the compressor, shutting it down before damage occurs. Copeland Discus with CoreSense Protection alerts technicians to the most serious faults first so they can accurately and rapidly correct problems and prevent catastrophic compressor failures that could suddenly generate product spoilage.

EMERSON Climate Technologies

Brochure

www.EmersonClimate.com/CopelandDiscus