

Case Management System Installation Instructions

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Introduction

The Case Management System (CMS) is a component of Novar’s Spectrum® Advanced Refrigeration Control System. It consists of two elements:

The Control Module (Figure 1) is designed to be mounted in a convenient location on the display case or in the kick panel area. It is a dedicated input module that continually monitors the operating conditions of display case and walk-in cold-rooms and relays the data to the Refrigeration Controller (RC2XE) for processing.

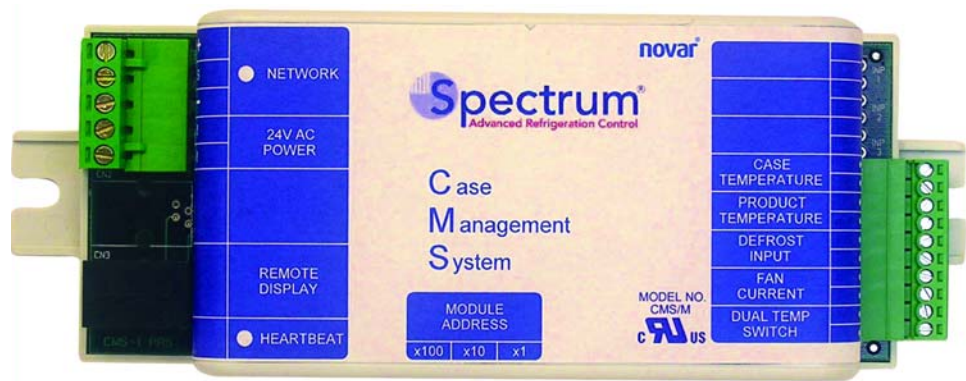


Figure 1. CMS Control Module (CMS/M)

The Display Module (Figure 2) can be mounted remotely to give the store staff an at-a-glance view of actual case temperature and operating status. During normal operation, the display shows the case (discharge-air) temperature (the default display). During a defrost cycle, drain down, and recovery periods, a “dEF” message is displayed.



Figure 2. CMS Display Module (CMS/D)

Two buttons on the front of the display can be used to display the simulated product probe temperature or, during a defrost cycle, to display the product or discharge-air temperature. Once the buttons have been used, if there is no intervention within a 10-second period, the display reverts to the default.

The CMS/D also has three miniature status LED's to the right of the two buttons. These operate independently from the main display. Their operation is also non-exclusive—all could be displayed simultaneously.

This document provides instructions for wiring and mounting the module and displays.

Specifications

Agency Approvals

Recognized component:	CUL/UL E134292
Standards used:	UL 873 Temperature-Indicating and Temperature-Regulating Equipment CSA C22.2, No. 24-93, Temperature-Indicating and Temperature-Regulating Equipment

NOTE!



The Case Management System has not been investigated for safety or limiting applications.

CSM/M- Power Requirements

Voltage:	24 VAC
Maximum Consumption:	12 VA Supply

CSM/M- Operating Environment

Temperature:	32° to 104°F (0° to 40°C)
Humidity:	0 to 95% Relative, non-condensing

CSM/D- Operating Environment

Temperature:	-15° to 122°F (-26° to 50°C)
Humidity:	0 to 95% Relative, non-condensing

CSM/M- Physical Dimensions

Width: tabs	7.65 inches (195 mm) with mounting
Height:	2.8 inches (71 mm)
Depth:	1.55 inches (40mm)
Weight:	4 ounces (550 grams)

CSM/M- Inputs

The Case Management system is capable of controlling temperatures and generating alarms within a temperature range of – 40° to 90°F.

NOTE!

The CMS is not designed to read Novar's diode sensors Part No. 733002000 (high temperature) or 733000000 (low temperature).

A CMS/M is received from the factory with the five inputs already configured. Table 1 provides the following information:

- Factory-configured inputs (defined in the software)
- Points read by the inputs
- Input type
- Factory configuration
- Factory-configured alarm values

The factory configuration remains in effect until the unit is connected to a properly programmed RC2XE. At that time, the RC2XE will download user-defined values. Until that time, display alarm light-emitting diodes (LEDs) might occur as described in Table 1.

Table 1. Factory-Configured Inputs

Input	Designation	Type	Factory Configuration	Factory-Configured Alarm Values				
				Low Temperature Operation		Medium or High Temperature Operation		Alarm Response Delay
				Low Point Alarm	High Point Alarm	Low Point Alarm	High Point Alarm	Alarm Response Delay
Case Temperature	Discharge air from evaporator coil or return-air temperature	Novar Thermistor ^A	10K Thermistor	-20°F	0°F	16°F	40°F	60 min.
Product Temperature	Simulated product temperature	Novar Thermistor ^A	10K Thermistor	-10°F	10°F	30°F	50°F	60 min.
Defrost Input	Defrost termination temperature (or thermostat as defined in setup)	Novar Thermistor ^A / Bimetal Switch	10K Thermistor	-21°F	70°F	-21°F	70°F	60 min.
Evaporator Fan Current	Evaporator fan current	Novar Fan Current ^A Sensor	Fan current	0 Amps	5 Amps	0 Amps	5 Amps	10 min.
Dual Temperature Switch	Key switch or similar	Universal	Dual temperature switch	N/A	N/A	N/A	N/A	N/A

* ^ANovar sensor part numbers are provided in the "Model and Part Numbers" section of this document.

Mounting Control Module

The Control Module should be mounted in a convenient location on the display case (e.g., behind a kick plate or canopy). Figure 3 shows the mounting dimensions for the CMS/M.

NOTE!



The location and position of the module within a display case should allow service technicians the ability to access the network address switches using a 6 inch or shorter screw driver. Please be sure to provide adequate clearance.

The following procedure should be used to mount the module.

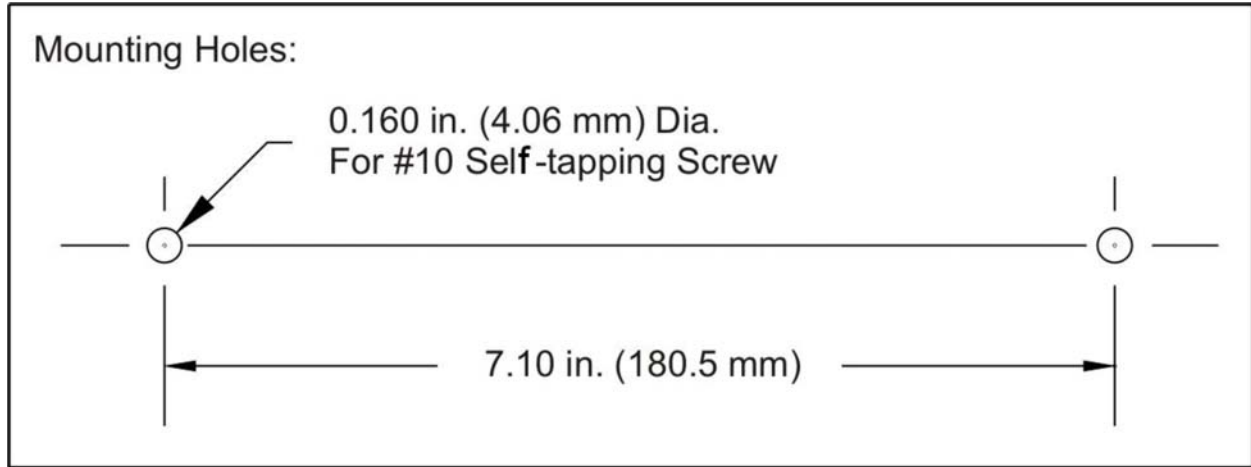


Figure 3. CMS/M mounting dimensions

Step Table

Step	Procedure
1	Position the module against the mounting surface and mark the surface to show the location of the mounting holes at each end of the module.
2	Drill holes in the locations marked.
3	Place the module against the mounting surface and insert and tighten the mounting screws to secure the module.

Wiring Control Module

The wiring connections are located on the sides of the module (Figure 4). All connections are made with two-part connectors to facilitate installation and wiring.

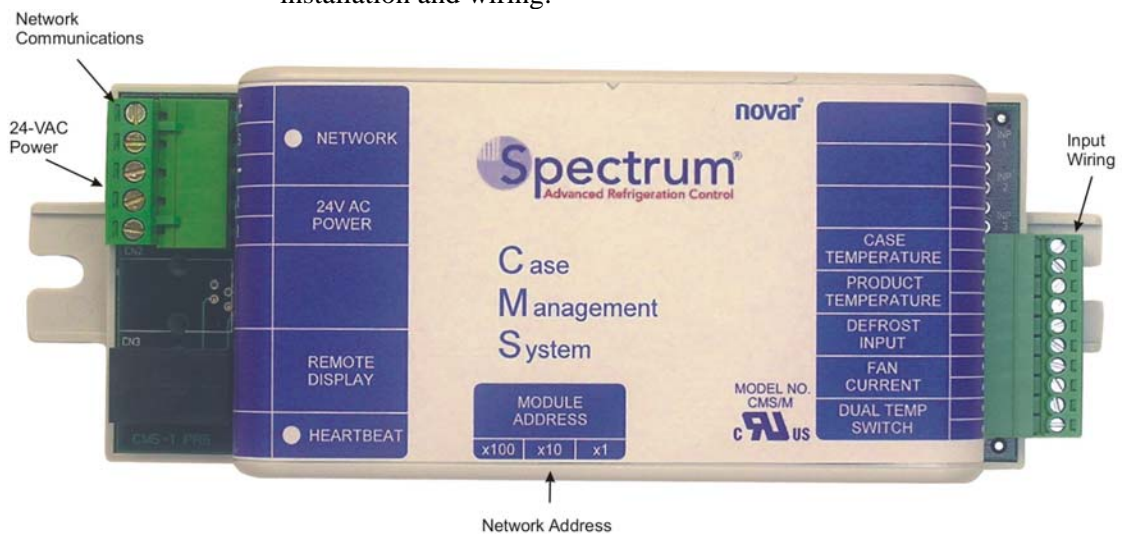


Figure 4. CMS Control Module wiring connections

The connections should be made as indicated in the following sections.

Network Communications

A two-conductor shielded cable (Novar WIR-1010, Belden 8761, or equivalent) should be used to make the Network Communications connections from the RC2XE to the two-part Network Communications terminals marked + (positive), S (Shield), and – (negative) on the left side of the Control Module.

The network should originate from the main RC2XE and be wired in daisy chain format (Figure 5) between CMS controllers. Stubs or branches off the main daisy chain should be avoided if possible. If stubs are used, however, the length of each should be limited to 6 feet. A single network can accommodate up to 111 devices.

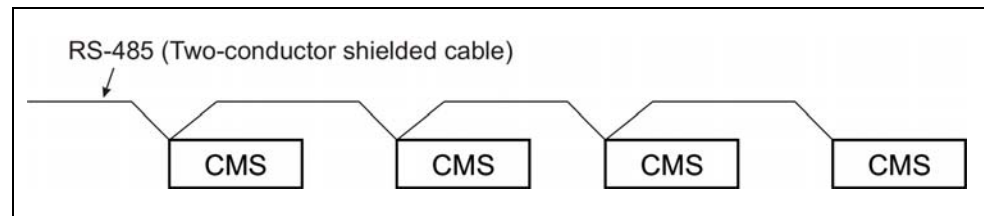


Figure 5. Network wired in daisy chain format

Power Connection

The controller requires a single 24-VAC power supply (such as Novar's 24-VAC Transformer, Part No. 730090000). It should be connected to the power connection terminals on the left side of the controller.

Input Connections

The following input connections should be terminated into the two-part connector on the right side of the controller. All thermistor sensors are detachable to facilitate replacement (i.e., the entire cable does need to be removed).

Temperature inputs

The CMS uses a temperature sensor that is not compatible with the original Novar diode sensors. This new sensor has been designed specifically for refrigeration application environments. It is not polarity sensitive. (Figure 6)

Torpedo (typically used to sense case air temperature input)

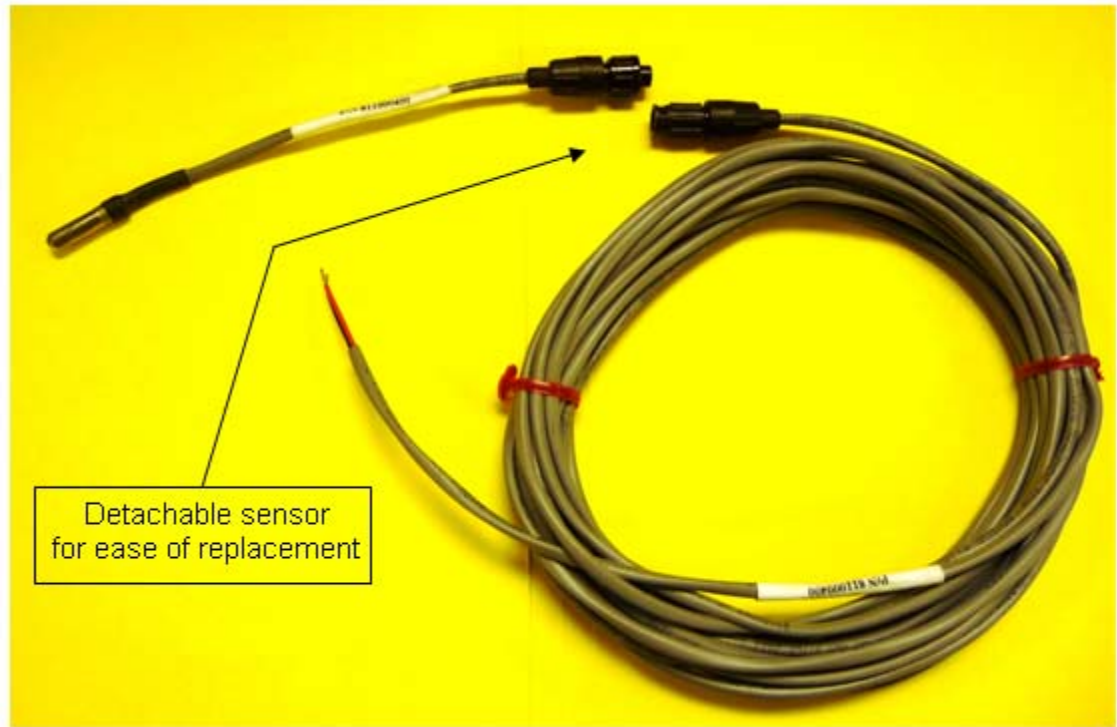


Figure 6. Torpedo temperature sensor

Defrost input

The defrost input is universal; it can accept a Novar Thermistor temperature sensor or a dry contact digital input from a thermostatic bimetal switch. Novar recommends using a sensor because it will provide a true analog measured value that can be configured for continual monitoring. The defrost termination set-point can be modified accordingly. However, the user might also choose to fit a defrost termination bimetal switch for this input.

Depending on the initial configuration, the defrost termination can be determined by the use of this input; therefore, positioning of this sensor is crucial and typically dictated by the case's OEM.

The change of mode of operation is performed during initial load configuration through the ESS32 configuration tool.

Dual temperature switch

The dual temperature switch input is used to determine which temperature control range is used by the RC2XE. In systems where a low-temperature only application is required, a small length of wire should be placed across these terminals to short this input. This will represent a closed switch and place the CMS into continual low-temperature operation. Where the load

is configured for use with dual temperature ranges, this input should be wired across a pair of dry contacts (such as a key switch).

Mounting Display

NOTE!



Before the display is mounted, the power/communications cable should be routed to the display from behind (through the hole) and plugged into the display.

Either of two methods can be used to mount the display module:

- Through-hole DIN box-style mounting (Figure 7)

If the display module is mounted in a cutout hole in the canopy or fascia of the display case, it is simply pushed into the hole. The mounting hole size and unit dimensions are shown in Figure 7.

NOTE!



If the hole ends up being too large, the display can be mounted via surface mounting, use of a spacer on the back with the display flush-mounted, or adhesive.

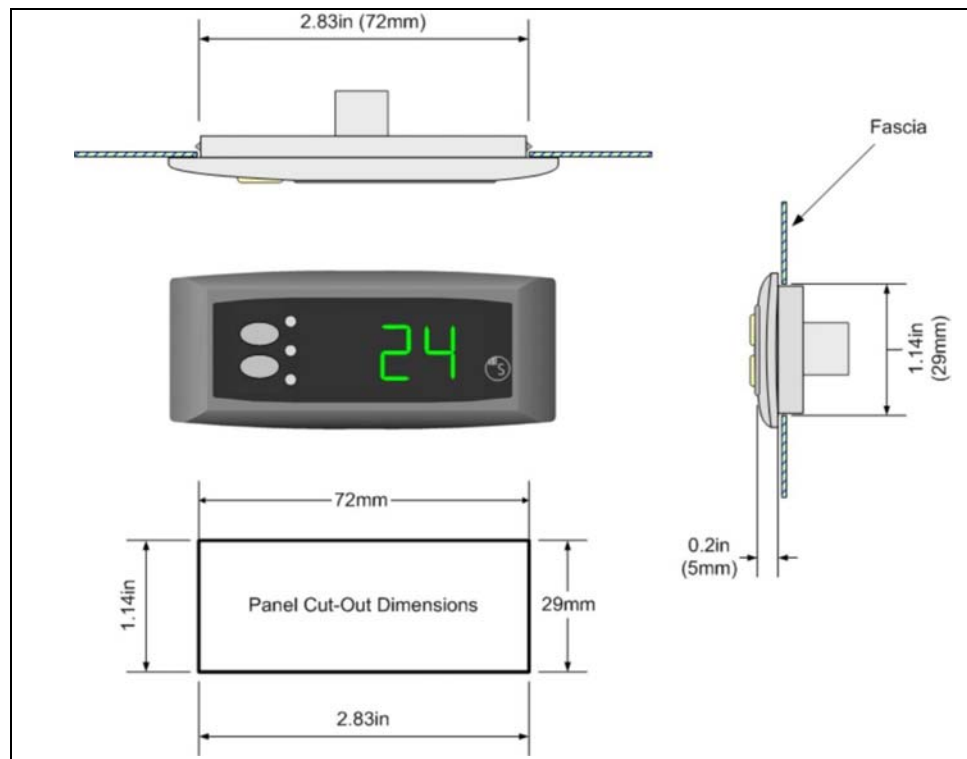


Figure 7. Through-hole mounting the display

NOTE!

Because of its wider operating temperature range, the display module may be mounted inside the display case or walk-in cold room.

- Surface mounting (Figure 8)

If the display must be mounted in a location where making a rectangular cut out is impractical, the display can be surface-mounted. This method requires the use of a plastic spacer. The following procedure should be used. Refer to Figure 8, as necessary.

Step Table

Step	Procedure
1	Drill a hole (at least 0.88-inch diameter) through the spacer and the mounting surface.
2	Position the spacer against the mounting surface, insert a screw at each end of the spacer, and tighten the screws to secure the spacer.
3	Snap the display into the spacer.

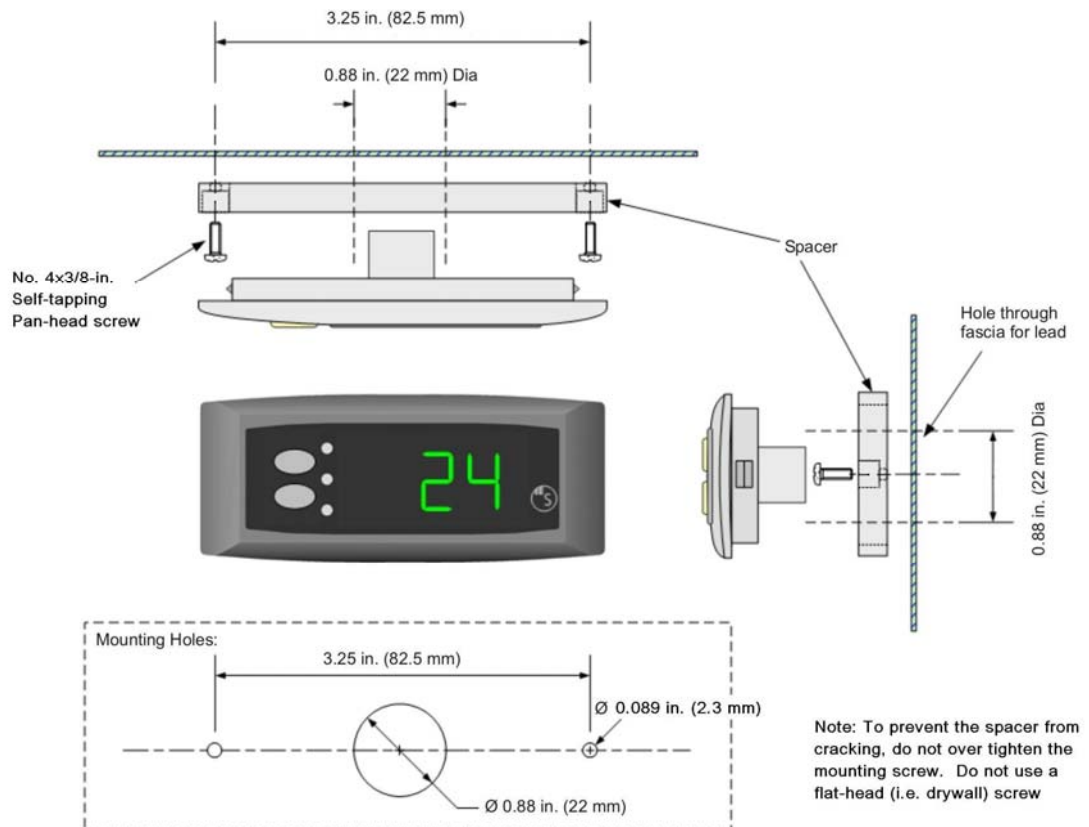


Figure 8. Surface-mounting the display

Wiring Display

The display connects to the lower left corner of the CMS controller (see Figure 9) via a single pre-manufactured RJ-11 lead, which carries the data and power.

Up to two displays can be connected to a single CMS controller—the leads require multiplexing by the addition of an RJ-11 “Y” splitter. These can be fitted at the control module or the display (Figure 9). The maximum total cable length between the master controller and any display is 25 feet.

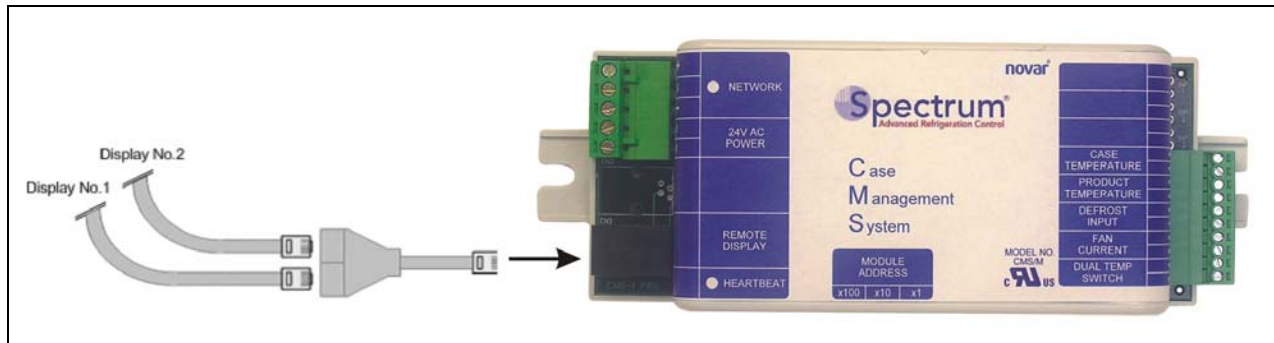


Figure 9. “y” connector fitted at the control module

Setting Module Address

Each module in a Spectrum Advanced Refrigeration Control System must be assigned a unique address for the RC2XE to identify it. Module addresses are assigned in Novar’s Engineering and Support Systems (ESS32) software when a module is configured. To operate properly, the CMS/M must be assigned an unassigned address ranging from 16 through 126.

NOTE!



The address assigned in ESS32 must match the address set on the module. An incorrectly addressed module will not be able to communicate and can cause communication faults with other modules on the network.

The address is set via three rotary switches (Figure 10) located on the bottom of the module. A small screwdriver should be inserted to rotate the dials to the designated number.

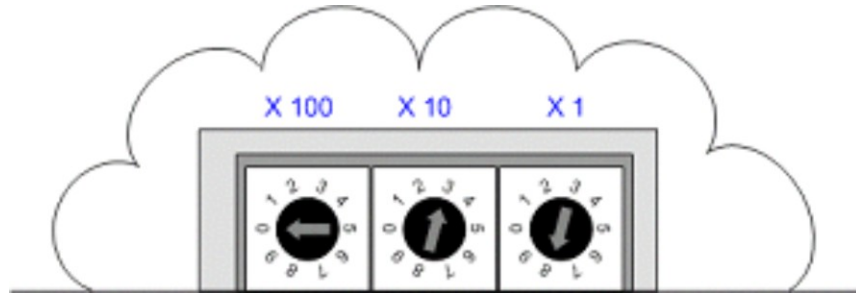


Figure 10. CMS address switches

The switches are designated for 100's, 10's and 1's. Where the address is less than 100, the hundreds switch (X 100) should be set to zero. In Figure 10, the module address has been set to 38.

Checking Installation

When the installation has been completed, the wiring should be checked to make sure it is correct and secure. If the wiring checks out properly, power can be supplied to the unit.

Light-emitting diodes (LED's) on the CMS/M and CMS/D reveal the status of various functions (Table 2).

Table 2. CMS/D Light-emitting Diode (LED) Functions

LED Color	Condition
Green on	Simulated product temperature is currently displayed.
Green off	Case temperature is currently displayed
Yellow on	<ul style="list-style-type: none"> ▪ If the display digits are blanked out, there is a communications failure between the CMS/M and the CMS/D. ▪ If dashes or temperature data are displayed, there is a communications failure between the RC2XE and the CMS/M.
Yellow off	No communication faults exist.
Red on	There is a sensor failure or a high/low limit alarm on any installed sensor except the case temperature sensor.
Red off	No sensor alarms exist.
Red flashing	The case temperature sensor has failed or is in a high/low limit alarm condition.

▪ Control Module

Turn on the power and check the status light-emitting diodes (LED's) on the front of the Control Module (Figure 11).

- The red Network status LED (upper left corner) should flash when network communications are operational.
- The green heartbeat LED (lower left corner) should flash on and off in a 1-second interval when the processor is

operating properly.

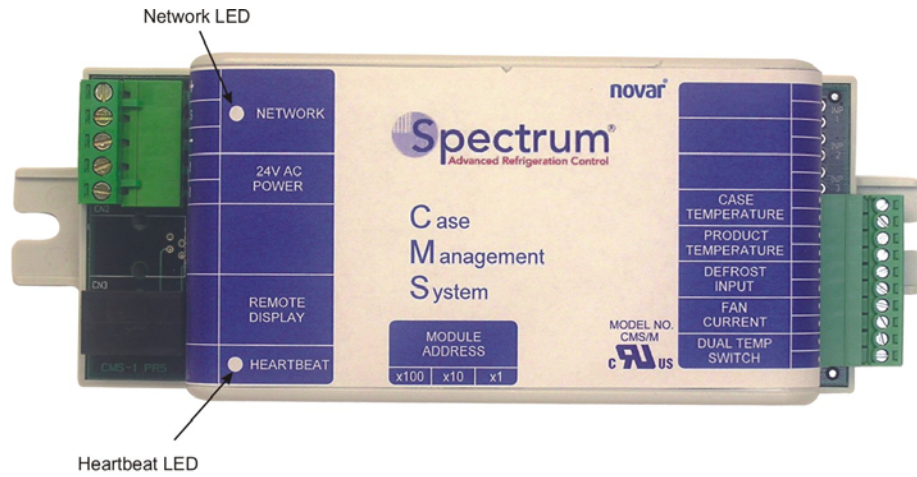


Figure 11. CMS Control Module LEDs

▪ Display Module

At power up, each segment on the display module will illuminate in a test pattern. Make sure the case temperature is displayed (Figure 12). The green LED should be off. If the green LED is on, refer to Table 2.

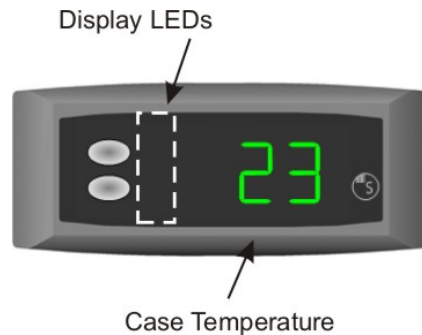


Figure 12. Default display

If the CMS is unable to read the temperature from a sensor, the display will show dashes. If this is an alarm condition, the red LED (Figure 13) will be displayed. See Table 2 for more information.

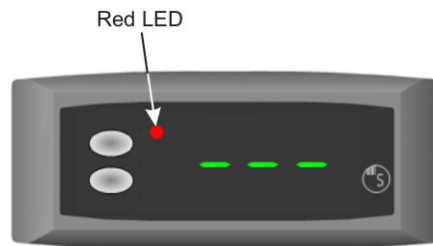


Figure 13. Red alarm LED and dashes

Press one of the buttons on the front of the display. The display should show the product temperature and display the green LED (Figure 14). With no intervention, the value will revert to the default after 10 seconds.

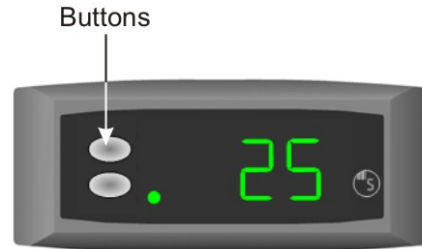


Figure 14. Product probe temperature

Check the display during a routine defrost cycle, drain down, or recovery period. A “dEF” message (Figure 15) should be displayed. When the condition terminates and the temperature returns to normal, the display should revert to the default (case temperature).



Figure 15. Display during defrost, drain down, or recovery

Check the operation of the display’s push buttons during a defrost mode.

NOTE!



During defrost mode, a button must be pressed for approximately 3 seconds to see a display change.

Press either button to display the simulated product temperature (as shown in Figure 16). If there is no intervention (for example, if neither of the buttons is pushed), the module will revert to the defrost display after 10 seconds.

If a button is pressed before the 10 seconds is up, the discharge-air temperature will be displayed (as shown in Figure 16).

From here, both buttons scroll between the three screens shown in Figure 16 in order. If no intervention take place for 10 seconds, the display will revert to the defrost display.

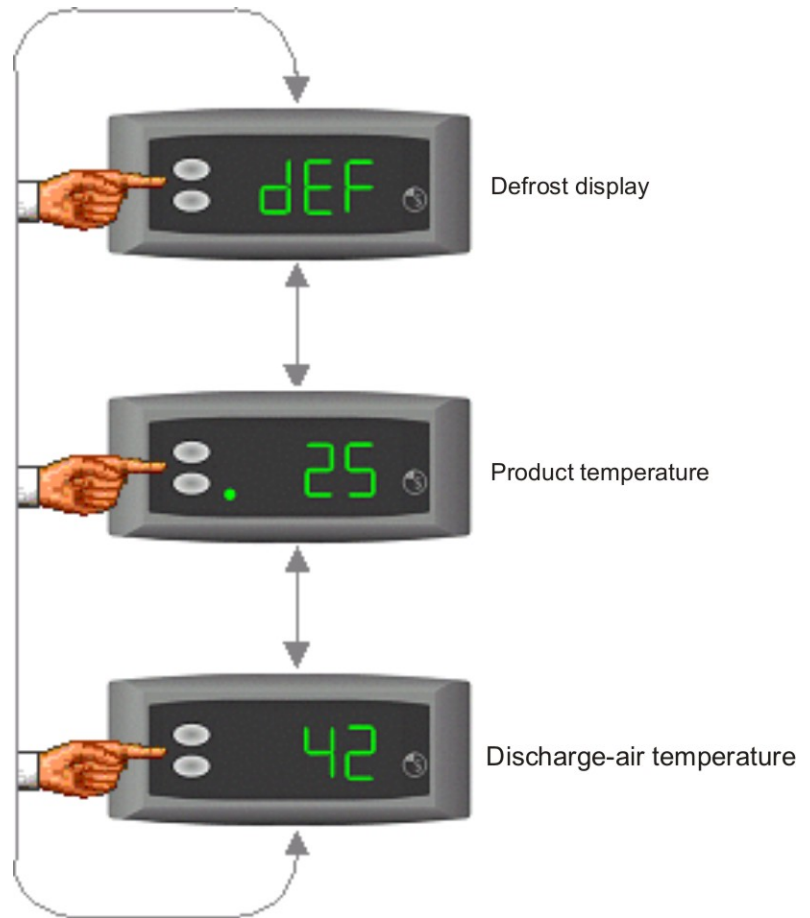


Figure 16. Cycling through defrost, product temperature, discharge-air temperature

Model & Part Numbers

The part numbers shown in Table 3 should be used to order Novar parts.

Table 3. Novar Part Numbers

Product	Model No.	Part No.
Case Management System Control Module	CMS/M	718001200
Case Management System Display	CMS/D	718001300
Four-conductor cable with RJ-11 connectors (25-ft, connectors on both ends)	—	709015000
Two-conductor shielded cable, RS-485 (Belden 8761 equivalent)	WIR-1010	709031000
Spacer (for CMS display)	—	37x0301
Refrigeration Temperature Sensor (Torpedo) with 8 meters of cable (detachable)	—	811000400
24-VAC Transformer (40 VA)	24V-XFR	730090000
Plenum Cable	—	709002000

Regulatory Compliance

This device has been tested and found to be in compliance with the requirements set forth in UL 873, Temperature-Indicating and Regulating Equipment, and is recognized by Underwriters Laboratories, Inc., for installations in the United States.

This device has been tested and found to be in compliance with the requirements set forth in C22.2, No. 24-93, Temperature-Indicating and Regulating Equipment, and is recognized by Underwriters Laboratories, Inc., for installations in Canada.

Federal Communications Commission (FCC)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE!



This device has been tested and found to comply with the limits established for Class A digital devices. It is intended to be used in a commercial environment. Operation of this equipment in residential environments may cause harmful interference, in which case the user may be required to correct the interference at his own expense.

CAUTION!



Any changes or modifications not expressly approved by Novar could void your authority to operate this equipment.

Canadian Department of Communications (DOC)

NOTE!



This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled Digital Apparatus, ICES-003, of Industry Canada.

NOTE!



Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouiller: *Appareils Numériques*, NMB-003, édictée par l'Industrie Canada.

Waste Electrical & Electronic Equipment

NOTE!



Customers are advised to dispose of this product at the end of its useful life according to applicable local laws, regulations, and procedures.

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