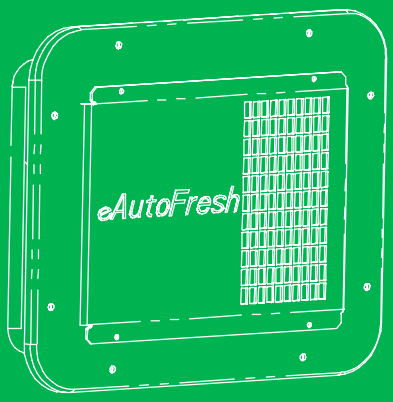
Carrier® Container Refrigeration



TECHNICAL SUPPLEMENT
for
eAutoFresh™
Container Refrigeration Unit
On-Demand Ventilation System

T-342 Rev A

Carrier

TRANSICOLD

TECHNICAL SUPPLEMENT

for

eAutoFresh™

Container Refrigeration Unit
On–Demand Ventilation System

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SAFETY SUMMARY

GENERAL SAFETY NOTICES

The following general safety notices supplement the specific warnings and cautions appearing elsewhere in this manual. They are recommended precautions that must be understood and applied during operation and maintenance of the equipment covered herein. The general safety notices are presented in the following three sections labeled: First Aid, Operating Precautions and Maintenance Precautions. A listing of the specific warnings and cautions appearing elsewhere in the manual follows the general safety notices.

FIRST AID

An injury, no matter how slight, should never go unattended. Always obtain first aid or medical attention immediately.

OPERATING PRECAUTIONS

Always wear safety glasses.

Keep hands, clothing and tools clear of the evaporator and condenser fans.

No work should be performed on the unit until all circuit breakers, start-stop switches are turned off, and power supply is disconnected.

Always work in pairs. Never work on the equipment alone.

In case of severe vibration or unusual noise, stop the unit and investigate.

MAINTENANCE PRECAUTIONS

Beware of unannounced starting of the evaporator and condenser fans. Do not open the condenser fan grille or evaporator access panels before turning power off, disconnecting and securing the power plug.

Be sure power is turned off before working on motors, controllers, solenoid valves and electrical control switches. Tag circuit breaker and power supply to prevent accidental energizing of circuit.

Do not bypass any electrical safety devices, e.g. bridging an overload, or using any sort of jumper wires. Problems with the system should be diagnosed, and any necessary repairs performed, by qualified service personnel.

When performing any arc welding on the unit or container, disconnect all wire harness connectors from the modules in the control box. Do not remove wire harness from the modules unless you are grounded to the unit frame with a static safe wrist strap.

In case of electrical fire, open circuit switch and extinguish with CO_2 (never use water).

SPECIFIC WARNING AND CAUTION STATEMENTS

To help identify the hazards presented on the unit labels and explain the level of awareness each one carries, an explanation is given with the appropriate consequences:

DANGER - means an immediate hazard that WILL result in severe personal injury or death.

WARNING - means to warn against hazards or unsafe conditions that COULD result in severe personal injury or death.

CAUTION - means to warn against potential hazard or unsafe practice that could result in minor personal injury, product or property damage.

The statements listed below are applicable to the refrigeration unit and appear elsewhere in this manual. These recommended precautions must be understood and applied during operation and maintenance of the equipment covered herein.

WARNING

Before servicing unit, make sure the start-stop switch (ST) is in the OFF position. Unit circuit breakers (CB-1 and CB-2) and external power sources are turned OFF and tagged to prevent accidental energizing of circuits.

SECTION 1

INTRODUCTION

1.1 INTRODUCTION

This Technical Supplement contains information specific to the Carrier Transicold eAutoFresh™ on-demand ventilation option, and is to be used in conjunction with the separately bound Operation and Service Manual and Service Parts List for your particular model.

Carrier Transicold's exclusive eAutoFresh™ option provides an energy saving alternative to the practice of continuously venting refrigerated containers. It can also increase shelf life and enable longer cargo routes for certain high-respiring, perishable commodities.

SECTION 2

DESCRIPTION

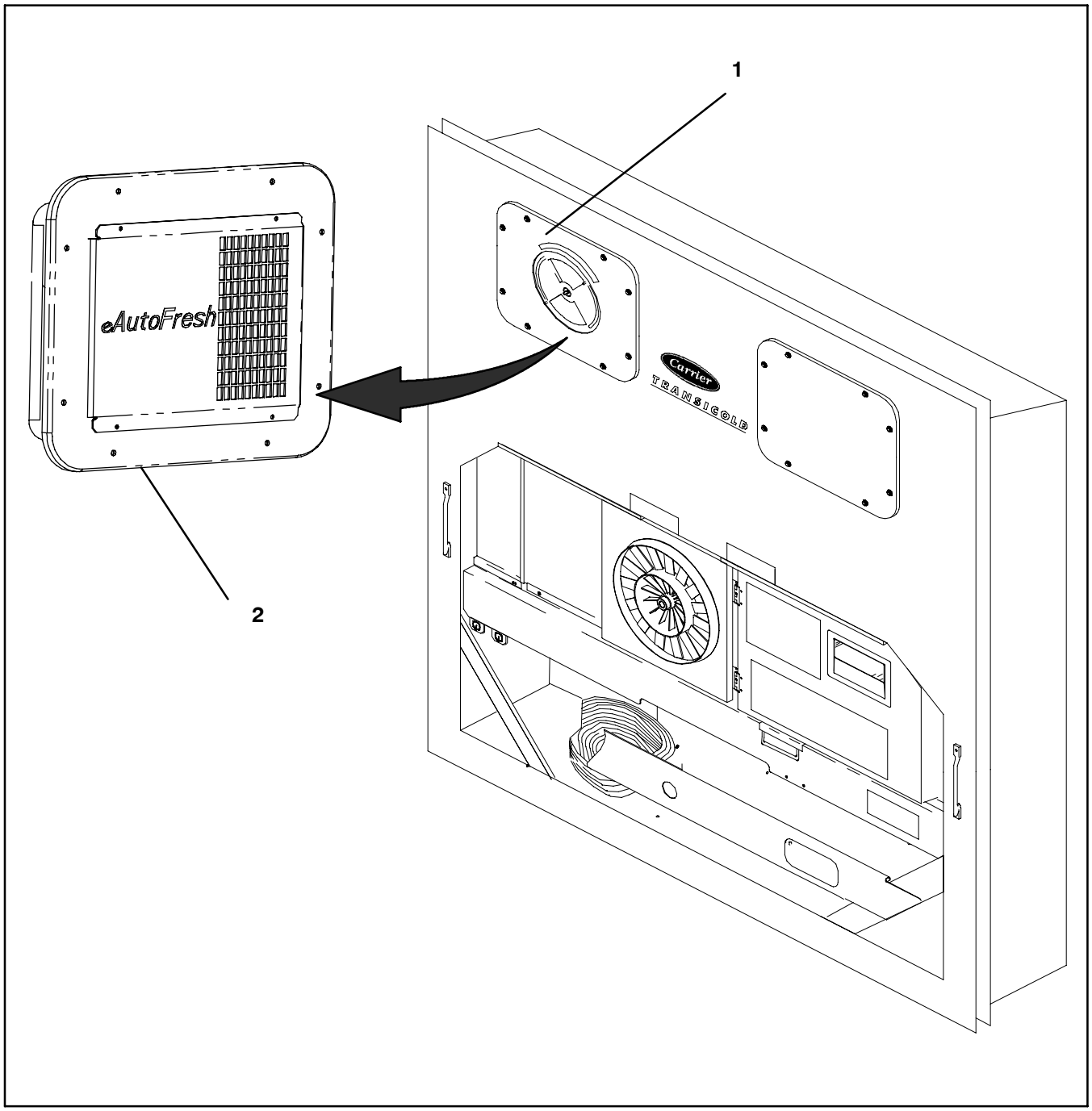
2.1 GENERAL DESCRIPTION

2.1.1 Refrigeration Unit - Front Section

The unit is designed so that the majority of the components are accessible from the front, see Figure 2-1. The upper left access panel contains the vent slide and motor assembly. It may be removed to allow entry into the evaporator section where the CO_2 sensor and drive pack are located.

2.1.2 Fresh Air Makeup

The function of the eAutoFresh vent system is to moderate the atmospheric level in the container in response to cargo respiration. Control is accomplished by the microprocessor controller and user defined parameters. When transporting frozen cargo loads the vent will be closed.



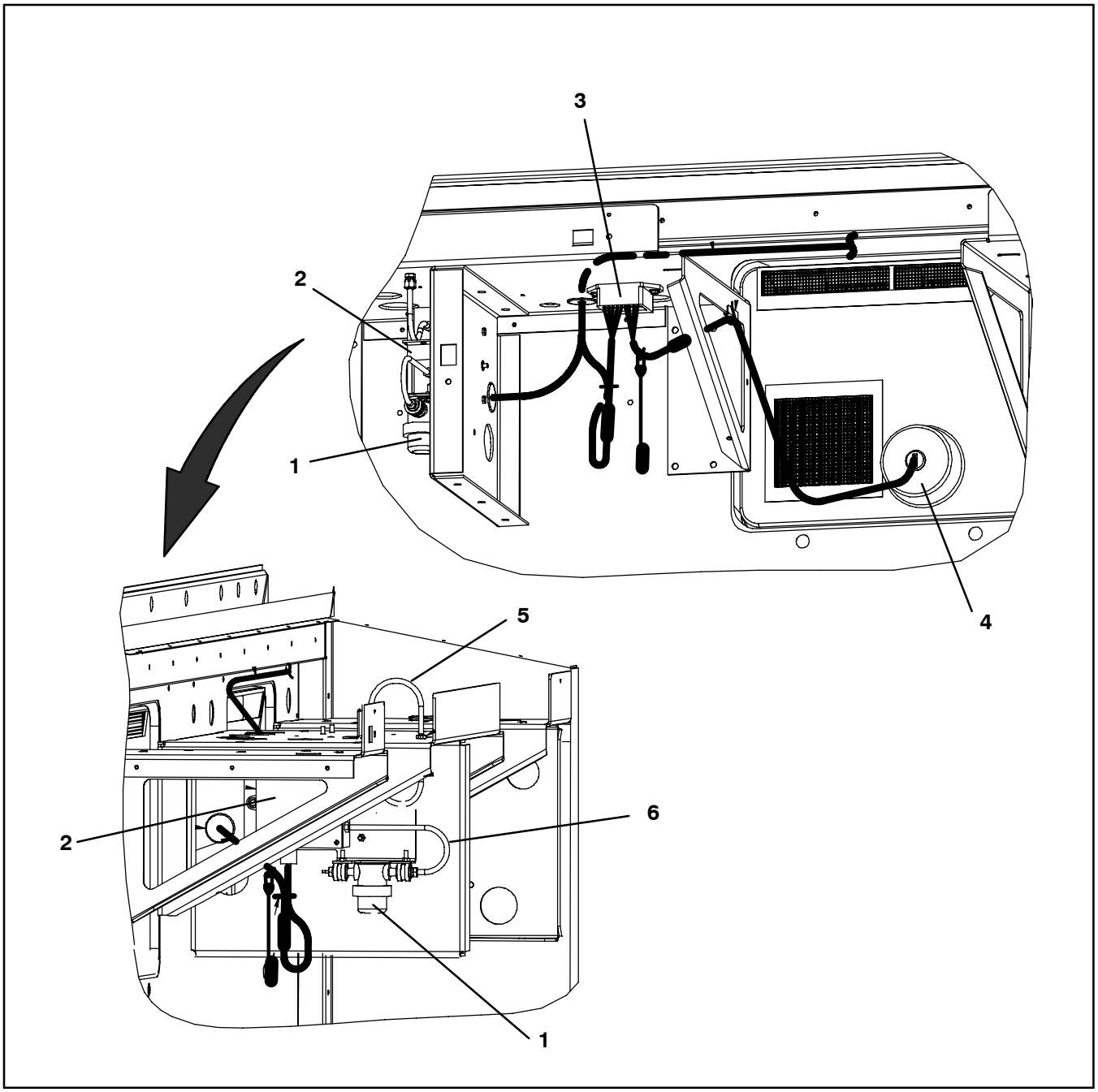
1. Evaporator Section Access Panel - Standard or with Manual Vent
2. eAutoFresh (Automatic Vent) Panel

Figure 2-1. Refrigeration Unit - Front

2.1.3 Evaporator Section

Components of the eAutoFresh system are mounted in the evaporator in addition to the standard refrigeration unit components. These components include (see Figure 2-2) the air filter, CO_2 sensor, stepper motor drive and CO_2 sensing lines.

Air from within the container is passed through the filter to the CO_2 sensor. Data is then supplied to the controller. The controller calculates CO_2 and changes the position of the vent slide as required to maintain the preset value.



1. Air Filter
2. CO_2 Sensor (COS)
3. Stepper Motor Drive (SD)
4. Stepper Motor (AF)
5. CO_2 Sensor Outlet Line
6. CO_2 Sensor Sensing Line

Figure 2-2 Evaporator Section Components

SECTION 3
MICROPROCESSOR

3.1 TEMPERATURE CONTROL MICROPROCESSOR SYSTEM

The temperature control Micro-Link 3 microprocessor system (see Figure 3-1) consists of a key pad, display module, the control module (controller) and interconnecting wiring. The controller houses the temperature control software and the DataCORDER software. The temperature control software functions to operate the unit components as required to provide the desired cargo temperature and humidity. The DataCORDER software functions to record unit operating parameters and cargo temperature parameters for future retrieval. Refer to the Operation and Service manual for your particular unit for overall control descriptions. Control descriptions for the eAutoFresh option are contained herein.

The key pad and display module serve to provide user access and readouts for the eAutoFresh system. The functions are accessed by key pad selections and viewed on the display module.

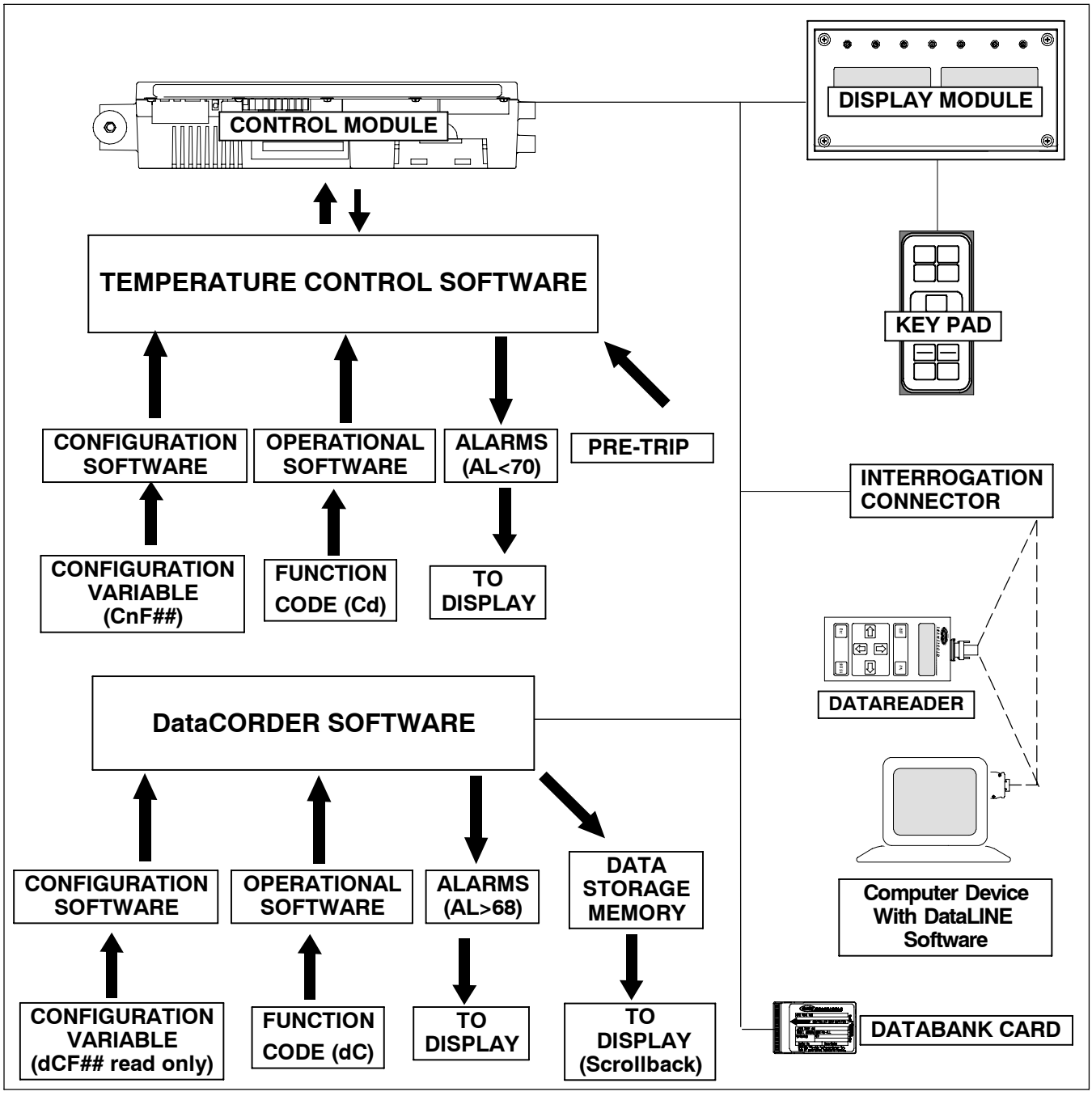
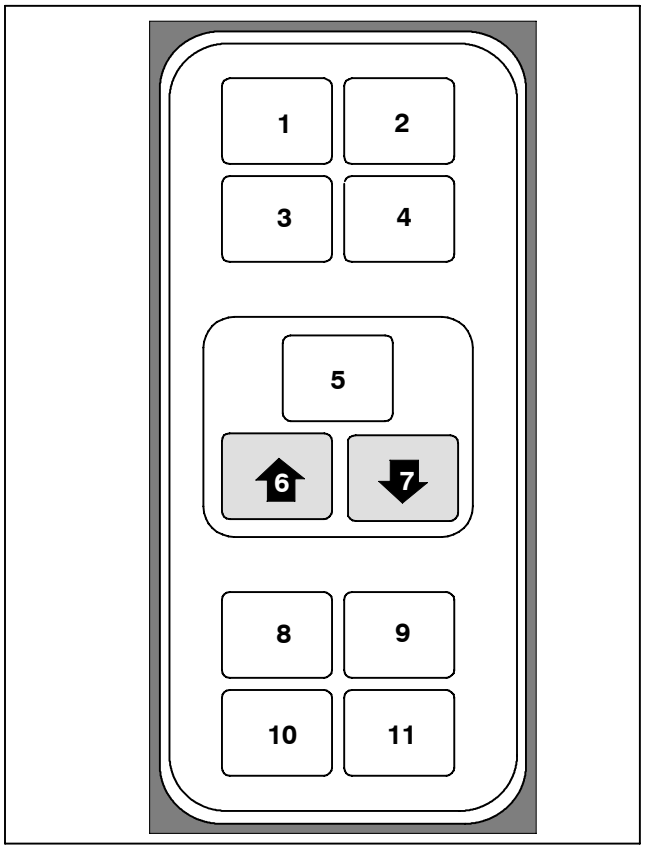


Figure 3-1 Temperature Control System

3.1.1 Key Pad

The key pad (Figure 3-2) is mounted on the right-hand side of the control box. The key pad consists of eleven push button switches that act as the user's interface with the controller. Descriptions of the switch functions are provided in Table 3-1.



1. Code Select
2. Pre-Trip
3. Alarm List
4. Manual Defrost/ Interval
5. ENTER
6. UP Arrow
7. DOWN Arrow
8. Return/Supply
9. Celsius/Fahrenheit
10. Battery Power
11. Alt. Mode

Figure 3-2 Key Pad

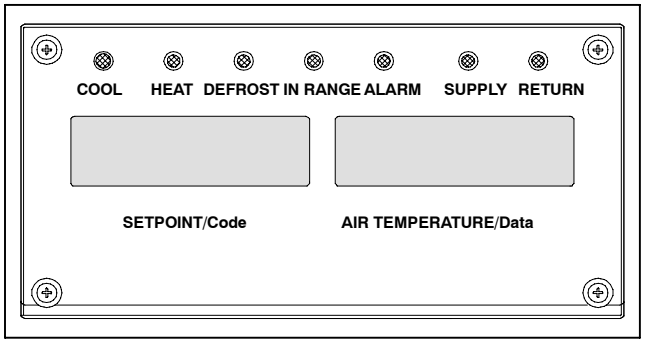


Figure 3-3 Display Module

3.1.2 Display Module

The display module (Figure 3-3) consists of two five digit displays and seven indicator lights.

Table 3-1 Key Pad Function

KEY	FUNCTION
Code Select	Accesses function codes.
Pre-Trip	Displays the pre-trip selection menu. Discontinues pre-trip in progress.
Alarm List	Displays alarm list and clears the alarm queue.
Manual Defrost/ Interval	Displays selected defrost mode. Depressing and holding the Defrost interval key for five (5) seconds will initiate defrost using the same logic as if the optional manual defrost switch was toggled on.
Enter	Confirms a selection or saves a selection to the controller.
Arrow Up	Change or scroll a selection upward Pre-trip advance or test interruption.
Arrow Down	Change or scroll a selection downward. Pre-trip repeat backward.
Return/ Supply	Displays non-controlling probe temperature (momentary display).
Celsius / Fahrenheit	Displays alternate English/Metric scale (momentary display). When set to F, pressure is displayed in psig and vacuum in "/hg." "P" appears after the value to indicate psig and "i" appears for inches of mercury. When set to C, pressure readings are in bars. "b" appears after the value to indicate bars.
Battery Power	Initiate battery backup mode to allow set point and function code selection if AC power is not connected.
ALT. Mode	This key is pressed to switch the functions from the temperature software to the DataCORDER Software. The remaining keys function the same as described above except the readings or changes are made to the DataCORDER programming.

3.1.3 Controller

The Micro-Link 3 controller is a dual module microprocessor. It is fitted with test points, harness connectors and a software card programming port.

3.2 CONTROLLER SOFTWARE

The controller software is a custom designed program that is subdivided into configuration software and operational software.

3.2.1 Configuration Software (Variables)

The configuration software is a variable listing of the components available for use by the operational software. The configuration variable for eAutoFresh is CNf44.

NOTE

If the present controller software does not contain eAutofresh data, the controller must be updated with the correct model number (i.e 69NT40-551-114) using the PCMCIA programming card.

To activate eAutofresh, configuration CNf44 must be turned "on". The selection options are "Out", "Lo", or" Up". To turn "on" eAutoFresh, code is set to "Up".

3.2.2 Operational Software (Function Codes)

The operational software is the actual operation programming of the controller which activates or deactivates components in accordance with current unit operating conditions and operator selected modes of operation.

The function codes for eAutoFresh are Cd43 and Cd44.

Cd43 is used to select the mode of operation and the associated parameters, OFF, USER, DELAY, TEST and GASLM.

Cd44 displays the eAutoFresh values, unless the CO_2 sensor is disconnected. The values displayed are CO2, O2, CO2LM and O2LM.

For instructions on setting the eAutoFresh system, refer to Section 4.

3.3 MODES OF OPERATION

The operation fo the refrigeration system is unchanged by the eAutoFresh system except the ventilation slide will open and close as required during perishable mode operation.

3.4 CONTROLLER ALARMS

Alarm display is an independent controller software function. If an operating parameter is outside of the expected range or a component does not return the correct signals back to the controller an alarm is generated. The eAutoFresh alarms are AL10 and AL29.

Alarm AL10 "CO2 Sensor Failure" is a display only alarm triggered anytime the CO_2 sensor reading is outside of the normal operation range, after an initial signal was detected.

Alarm AL29 "AutoFresh Alarm" is activated whenever the CO_2 or O_2 levels are outside of the upper or lower limits respectively, for more than 90 minutes after the vent has fully opened. The alarm is triggered off when the levels return to within the normal range.

3.5. UNIT PRE-TRIP DIAGNOSTICS

Pre-Trip Diagnostics is an independent controller function that suspends normal refrigeration controller activities and provide preprogrammed test routines. The test routines include Auto Mode testing, which automatically performs a pre programmed sequence of tests, or Manual Mode testing, which allows the operator to select and run any of the individual tests.

Pre-trip testing of the eAutoFresh system is performed during Pre-Trip test P0. Operation of the system may be observed during this test.

Upon initiation of Pre-Trip P0, the current state will be saved and the vent will fully close. This will be followed by two sequences of opening to 100% and returning to the closed position. No other eAutoFresh mode of operation will be available until the two cycles of opening and closing have completed. Upon termination of all tests, the vent will return to normal operation.

If the last mode was gASLM, the vent will open to the preset FLO setting, the controller will start taking new readings and control based on those readings.

SECTION 4

OPERATION

4.1 INTRODUCTION

This section addresses the additional operating requirements for the eAutoFresh System. No operating parameters change except “Adjust Fresh Air Makeup Vent”. The operator will set the parameters of operation for eAutoFresh, rather than manually adjust the vent. For information pertaining to the operation of the refrigeration system, refer to the Operation and Service Manual for your particular model.

4.2 OPERATION

The eAutoFresh system allows the opening and closing of the mechanical air vent slide. The opening and closing of the slide is determined by the mode selected through function code Cd43. The vent uses the same control mechanism as a stepper suction modulating valve.

4.3 eAutoFresh INITIALIZATION

Upon power up the controller will fully close the eAutoFresh air vent. 90 seconds after power up the controller will check to see if there is a carbon dioxide sensor connected. When a CO_2 sensor is detected the controller will enable access to the Gas Limit mode of operation. If no sensor is detected the only modes of operation available will be Test, User, and Delay. The controller will then resume operation in the last mode of operation before power interruption.

4.4 PRE-TRIP INSPECTION

Pre-trip testing of the eAutoFresh system is performed during Pre-Trip test P0. Operation of the system may be observed during this test.

Upon initiation of Pre-Trip P0, the current state will be saved and the vent will fully close. This will be followed by two sequences of opening to 100% and returning to the closed position. No other eAutoFresh mode of operation will be available until the two cycles of opening and closing have completed. Upon termination of the test, the vent will open to the previous state and operation will return to the previous mode.

If the last mode was gASLM, the vent will open to the preset FLO setting, the controller will start taking new readings and control based on those readings.

4.5 SYSTEM START-UP PROCEDURE

To start the system, do the following:

a. Press the “CODE SELECT” key (see Figure Figure 3-2).

b. Press the “UP or DOWN“ arrow key until “CD43“ is displayed, then press “ENTER”.

c. Press the “UP or DOWN“ arrow key to access the desired mode of operation. When the mode operation is displayed press the enter key to access the submenu parameters.

4.6 eAutoFresh OPERATION

The modes of operation are: OFF, USER, TEST, DELAY, and GASLIMIT. Within each of these modes of operation are submenus that have selectable parameters. Not all parameters are available in each submenu.

4.6.1 Operational Parameters

FLO – Opening to which the slide will move based on the stored value in CMH (in increments of 5) or CFM depending on the selection of Cd46 (Airflow display units), Cd28 (Metric/Imperial) or the pressing of the deg C/F key. CFM displayed as “CF“, CMH displayed as “CM“.

tIM – Time delay prior to the door opening. The time range is from 1 to 72 hrs in 1 hr increments.

CO2LM – is the maximum level of carbon dioxide that is allowed for the cargo. The range is from 0% to 19% in 1% increments, the default setting is 10.

O2LM – is the minimum level of O_2 that is allowed for the cargo. The range is from 2% to 20% in 1% increments, the default setting is 10.

Rtn – Is an offset value used to expand the return air temperature value to compensate for the fresh air entering the container. The allowable range is from 0.6°C to 2.8°C or 1.0°F to 5.0°F in 0.1° increments the default setting is 2.8°C (5°F).

4.6.2 Modes of Operation

NOTE

When setting any mode of operation, the entire process must be completed to ensure all parameters are set.

a. OFF

A setting of “OFF“ will disable all automatic venting operations. The eAutoFresh vent will be driven fully closed and the eAutoFresh opening set to 0 CMH in function code Cd44. This will be the default mode anytime a frozen mode of operation has been selected. Whenever a frozen setpoint is selected the current eAutoFresh setting will be saved. The vent position will be restored when a perishable setpoint is selected.

b. USER

The function of “USER” mode is to provide ventilation for commodities that require fresh air circulation. The flow rate can be accessed through the submenu provided a perishable setpoint has been selected. To set the flow rate, press the ENTER key to activate the selection mode. When “FLO“ appears in the left hand window, use the UP or DOWN arrow key to scroll to the desired opening. The range is from 0 to 220CM (0 to 129CF) in increments of 5. Press the ENTER key to set the value and begin operation.

c. TEST

“TEST” mode allows the operator to test the movement of the mechanical slide air vent and calibrate the carbon dioxide sensor.

tESt – When "tESt" appears in the left window, press the ENTER key to begin the test. The eAutoFresh slide will open fully and then return to the closed position. The test may be observed by the operator to ensure proper operation of the vent. After completion of the TEST, the unit will return to the previous mode of operation.

NOTE

It is recommended that the calibration procedure only be performed during pre-trip or when the container has been fully vented.

CAL – will attempt to calibrate the carbon dioxide sensor. When "CAL" mode is selected the display will flash "CAL". The operator is to hold the "ENTER" key for 5 seconds. The display will stop flashing and read "CAL" for 5 seconds. The microprocessor will read the CO_2 value, and then compare that value to a known zero value. If the sensor is within the calibration parameter range, the microprocessor will determine the appropriate offset for the sensor. If the sensor is outside of this range, for example if the container is loaded or has a high level of CO_2, the controller will flash "NOCAL" for 5 seconds then revert back to the previous mode of operation.

d. DELAY

In "DELAY" mode the operation of the eAutoFresh system will be delayed for a set amount of time. This allows time for the cargo to reach setpoint. In "DELAY" mode the eAutoFresh vent will open to the stored (FLO) value when the return air temperature sensor is at or below setpoint plus the return offset value (rtn) or the delay time (tIM) whichever comes first. The eAutoFresh vent will be fully closed when return air temperature sensor is greater than the setpoint plus the offset temperature (rtn).

To set the unit in Delay mode scroll until "DELAY" appears in the left window, press the ENTER key to activate the submenu. The first selection is the amount of time (tIM) for the delay. Select the amount of time for the delay by using the UP and DOWN arrow keys. The range is from 1 to 72 hours in 1 hour increments. Press the ENTER key to set the value and move to the "FLO" rate. Use the UP or DOWN arrow key to scroll to the desired "FLO" rate. The range is from 0 to 220CM (0 to 129CF) in increments of 5 and 3 respectively. Press the ENTER key to set the value and move to the return temperature offset. Use the UP or DOWN arrow key to scroll to the desired "rtn" rate. The range of offset is from 0.6°C to 2.8°C (1.0°F to 2.8°F) in 0.1° increments. Press the ENTER key to set the value and begin operation.

e. GAS LIMIT (gASLM)

In "GAS LIMIT" mode access to the submenu is available provided a perishable setpoint has been selected, and a valid reading is detected from the carbon dioxide sensor. In "Gas limit" mode the microprocessor will monitor and limit the amount of carbon dioxide within the container by opening and closing the eAutoFresh vent. The vent will open to the (FLO) setting once the unit has completed initial temperature pull down or if the cargo temperature is within 5°C of setpoint and the carbon dioxide level has reached the max limit or if the Oxygen level has reached the lower limit. After the first 15 minutes of the vent opening the controller will again evaluate the level of CO_2, and/or O_2 levels. If after the first 15 minutes the gas limit values are satisfied the vent will close, if either gas limit has not been satisfied within 15 minutes the air exchange vent will open in 10 CMH increments every 15 minutes until both gas concentrations are satisfied. Once all limits are satisfied the vent will return to the closed position. If conditions are not met with slide open 100% for 90 minutes Alarm 29 will be activated.

To operate in Gas Limit mode scroll until "gASLM" appears in the left window, press the ENTER key to activate the submenu. The first selection is the maximum carbon dioxide (CO2LM). Select the max level by using the UP and DOWN arrow keys. The range is from 0 to 19% in 1% increments. Press the ENTER key to set the value and move to the minimum Oxygen level (O2LM). The range is from 2 to 20% in 1% increments. Press the ENTER key to set the value and move to the "FLO" rate. Use the UP or DOWN arrow key to scroll to the desired "FLO" rate. The range is from 0 to 220CM (0 to 129CF) in increments of 5 and 3 respectively. Press the ENTER key to set the value and begin operation.

SECTION 5

TROUBLESHOOTING

CONDITION	POSSIBLE CAUSE	REMEDY/REFERENCE SECTION
5.1 ALARM		
AL10	Check CO_2 sensor	Check wiring, 4.6.2
AL29	Check slide operation	Run Pre-Trip P0
	Check CO_2 sensor	Check wiring, 4.6.2
	Stepper drive defective	6.3
	Stepper motor defective	6.3
5.2 eAutoFresh NOT OPERATING		
Vent Not Opening	Unit not Configured for eAutoFresh Operation	3.2.1
	Code 43 in Off mode	4.5
	Wiring disconnected	Check wiring
	Stepper drive defective	6.1
	Stepper motor defective	6.1
	Unit operating in frozen mode	4.6.2.a
Gas Limit mode Unavailable	CO_2 sensor not enabled	4.6.2
	Check CO_2 sensor	4.6.2
	Wiring disconnected	Check wiring
	Unit operating in frozen mode	4.6.2.a
Unable to calibrate CO_2 sensor	"Enter" Key not held for sufficient time	4.6.2
	CO_2 outside of acceptable levels	Check
	Check CO_2 sensor	4.6.2
Code 44 displays "----"	Unit not Configured for eAutoFresh Operation	3.2.1
	Check CO_2 sensor	4.6.2

SECTION 6

SERVICE

WARNING

Before servicing unit, make sure the start-stop switch (ST) is in the OFF position. Unit circuit breakers (CB-1 and CB-2) and external power sources are turned OFF and tagged to prevent accidental energizing of circuits.

NOTE

Prior to performing service work, a thorough review and understanding of this supplement and the Operation & Service manual for your particular unit is recommended.

6.1 MAINTENANCE SCHEDULE

UNIT		OPERATION
ON	OFF	
a. Inspection - Annually		
	X	Inspect top and bottom rails (Items 10 & 11, Section 8.5) and slide plate assembly (Item 13, Section 8.5). Clean as required.
	X	Replace air filter element. Refer to Section 6.2.

6.2 AIR FILTER

a. Removing the Air Sample Filter Element

When replacing the air sample filter element it can be accessed in two ways: through the eAutoFresh side evaporator access panel (Item 2, Figure 2-1) or through the inside of the container by lowering the upper evaporator panel

a. By hand, unscrew and remove the filter cup from the bottom of the air sample filter assembly (item 16, Section 8.4).

b. Remove the filter element from the filter assembly.

b. Replacing the Air Sample Filter Element

1. Install the air sample filter element by reversing the above steps.

6.3 DRIVE SYSTEM

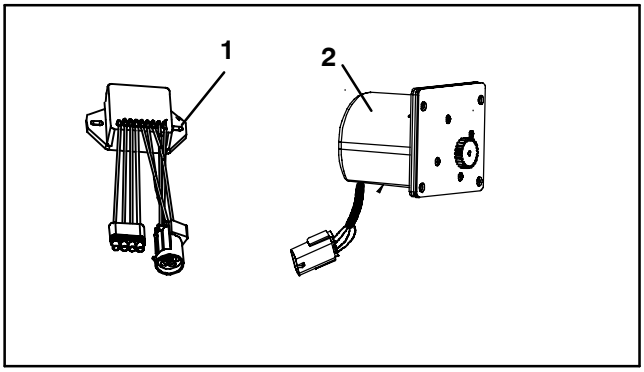
6.3.1 Checking the Auto slide

a. Checking with ohmmeter, disconnect the four pin connector to the stepper motor. With a reliable digital ohmmeter, check the winding resistance. In normal ambient, the motor should have 72 to 84 ohms measured on the red/green (a-b terminals) and on the white/black (c-d terminals) leads. If an infinite or zero reading occurs, check connections or replace the motor. If near normal or normal reading occurs, proceed to section 6.3.3 to check out the controller.

b. Checking with SMA-12 portable stepper drive tester The SMA-12 portable stepper drive tester (Carrier Transicold P/N 07-00375-00) is a battery operated stepper drive which will open and close the auto slide, which allows a more thorough check of the motor.

To check operation:

1. Stop the unit, disconnect the four pin connector from the stepper drive to the stepper motor (see Figure 6 -1.) and attach the SMA-12 stepper drive to the connector going to the motor.



1. Stepper Motor Drive (AF)
2. Stepper Motor (AF)

Figure 6 -1. Stepper Components

2. Set the SMA-12 pulse per second (PPS) to one PPS and either open or close valve. Each LED should light sequentially until all four are lit. Any LED failing to light indicates an open on that leg which indicates a poor connection or an open coil. Repair or replace as required to achieve proper operation.
3. Set the step rate to 200 PPS on the SMA-12. Press open or close while watching slide mechanism for movement, this is an indication that the motor is working.
4. If the slide moves in the above procedure but fails to move when connected in the unit (refer to Section 6.3.2)

6.3.2 Checking the Drive Module

a. Turn unit OFF.

b. Disconnect the four pin connector to the motor.

c. With voltmeter set to read 24 volts AC, attach the positive lead to the drive module outlet pin "A" (wire 1A) of the four pin connector and the negative lead to the "B" pin (wire 1B).

d. Turn ON unit, and watch the volt meter. After a short delay, the reading should rise to approximately 12 volts.

e. Repeat for pins “C” and “D” (wires 2 A and 2 B).

f. If only one set of pins reads a voltage, check connections and retest.

g. If the retest reads out the same, the drive module or controller is faulty.

h. If no voltage is present in any step, the output from the controller to the drive module may be faulty, and will require checking the connections and wires from the controller to the drive module. Refer to section 6.3.3

i. To replace the drive module, disconnect all connectors, unscrew from mounting, and replace with a NEW drive module in reverse order.

6.3.3 Checking the Controller

a. Turn the unit OFF.

b. Disconnect the six pin connector to the stepper drive from the controller.

c. With the voltmeter set to read 50 volts DC, attach the positive lead to outlet pin “A” of the six pin connector, and the negative lead to pin “B” or TP–9 of the controller.

d. Turn ON the unit for 40 seconds, and watch the voltmeter. There should be approximately 24 to 32 VDC shown on pin “A”.

e. There should be zero volts on pin “B”.

f. After a short delay, the reading should rise to approximately 24 to 32 VDC on pin “E”.

g. Pins “C” and “D” will have zero to 5 volts transistor logic (TTL) signals present, however, this can only be checked with the connector assembled as this is an open collector type circuit.

By checking the outputs on “A,” “B,” and “E” it can be verified that the controller is supplying power to the drive module. To be thorough, and if it is desired, the signals on pins “C” and “D” can be checked as follows:

1. Install a jumper assembly (Carrier part number 07--00408--00) to connect the drive module and controller connectors as shown in Figure XX.

2. Connect the positive lead of the voltmeter to test connector socket “C” and negative lead to socket “B,” and run as before by resetting unit.

3. Repeat for sockets “D” and “B.”

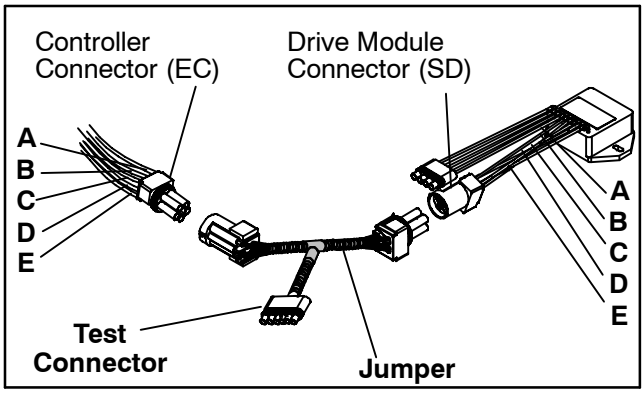


Figure 6 -2. Jumper Assembly

There should be approximately five volts DC on sockets “C” and “D” (S1 and S2) when measured as above. If not the connections or controller is faulty. If any of these pins are not consistent, the connections or controller is suspect. Check and replace as required.

6.1 REPLACING CUP (DRIVE MOTOR) ASSEMBLY

To replace the drive motor assembly, do the following:

a. Remove bolts holding eAutoFresh Panel (3, Figure 6 -3.) to the front of the unit. Reach in and cut tie wrap (2) and disconnect motor connector (1). Bring panel to work area.

b. Remove four screws (12) fastening the grille (11).

c. Remove six screws (9) fastening the rails (6 & 7), the slide plate (8) and the gasket plate (10). Set components aside for reassembly.

d. Remove the four screws (5) fastening the motor cup (4) to the panel. Cut sealer on outside and inside of motor cup assembly. Push out the motor cup assemble from the rear of the panel.

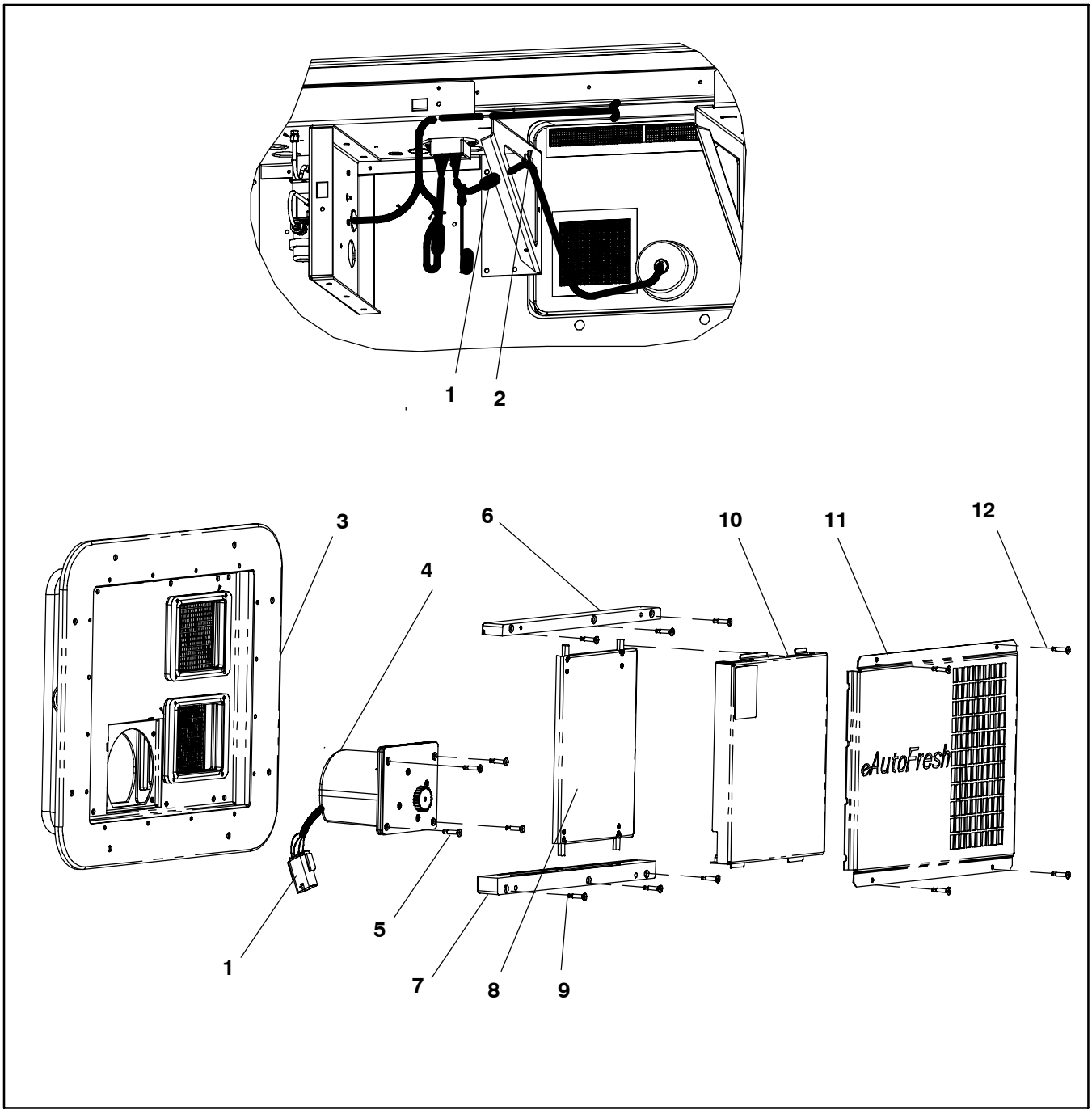
e. Mount replacement motor cup assembly in the panel using original screws. Torque screws to 0.29 MKG (25 +/- 1 Inch pounds)

f. Reapply sealer to inside and outside of motor cup assembly.

g. Mount upper & lower rails, slide plate and gasket plate using original hardware. Apply thread sealant and torque screws to 0.29 MKG (25 +/- 1 Inch pounds)

h. Mount grille assembly using original hardware. Apply thread sealant and torque screws to 0.29 MKG (25 +/- 1 Inch pounds)

i. Carry out functional test. Refer to section 4.6.1 step c.



1. Connector
2. Tie Wrap
3. eAutoFresh Panel
4. Cup, Motor
5. Motor Cup Screws
6. Rail, Top
7. Rail, Bottom
8. Plate, Slide
9. Rail Screws
10. Plate, Gasket
11. Grille
12. Grill Screws

Figure 6 –3. Motor Cup Replacement

SECTION 7

ELECTRICAL WIRING SCHEMATIC AND DIAGRAMS

7.1 INTRODUCTION

This section contains an Electrical Schematics and Wiring Diagrams for a basic unit with eAutoFresh.

The components fitted for an eAutoFresh system include

1. CO_2 Sensor = COS, found at coordinates R15 in the schematic.
2. Stepper Motor Drive = SD, found at coordinates B23 in the schematic.
3. eAutoFresh Stepper Motor = AFS, found at coordinates A23 in the schematic.

Refer to the Operation and Service manual for your paticular unit for actual schematic and wiring diagram information on components outside the eAutofresh system..

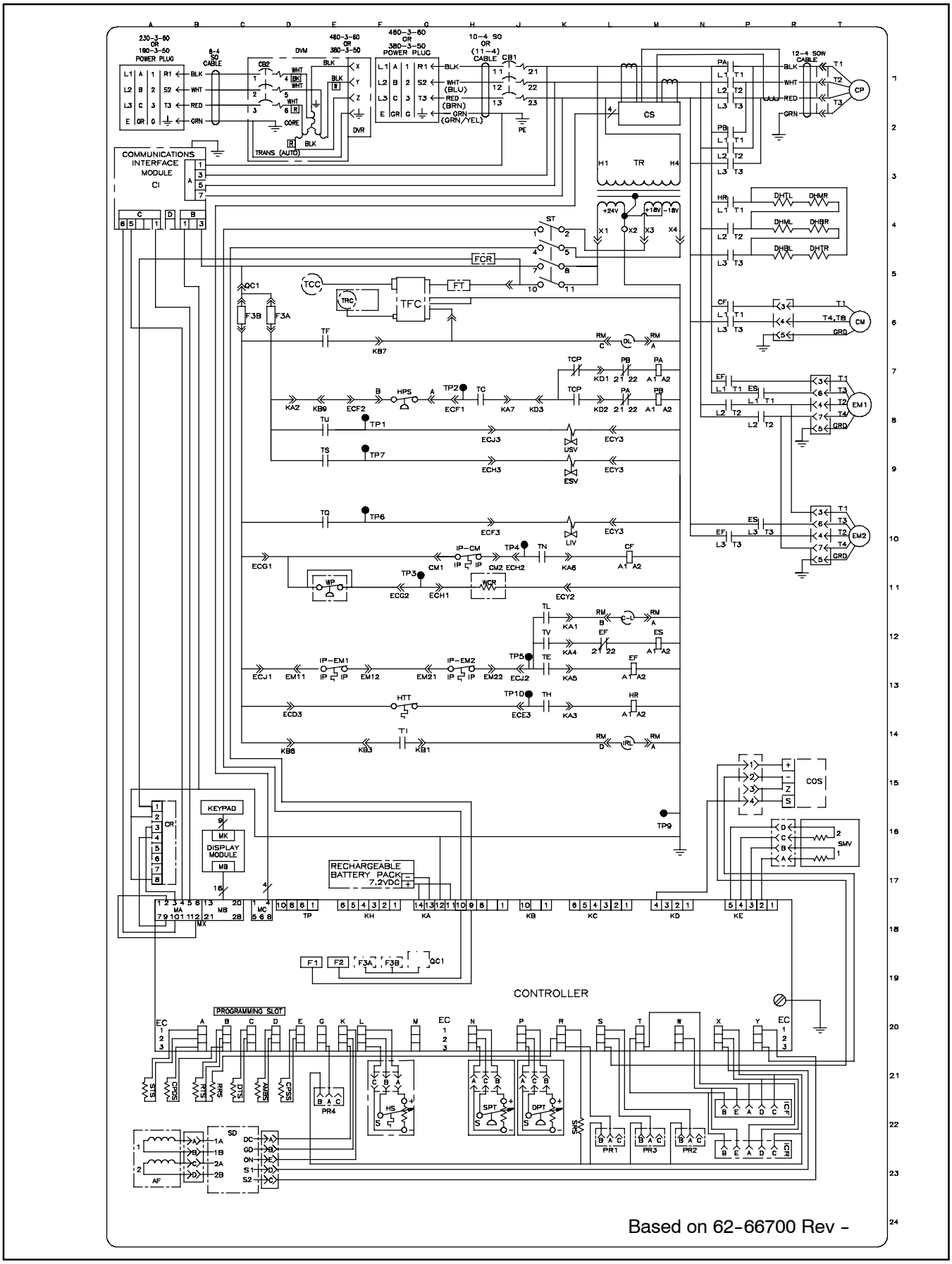
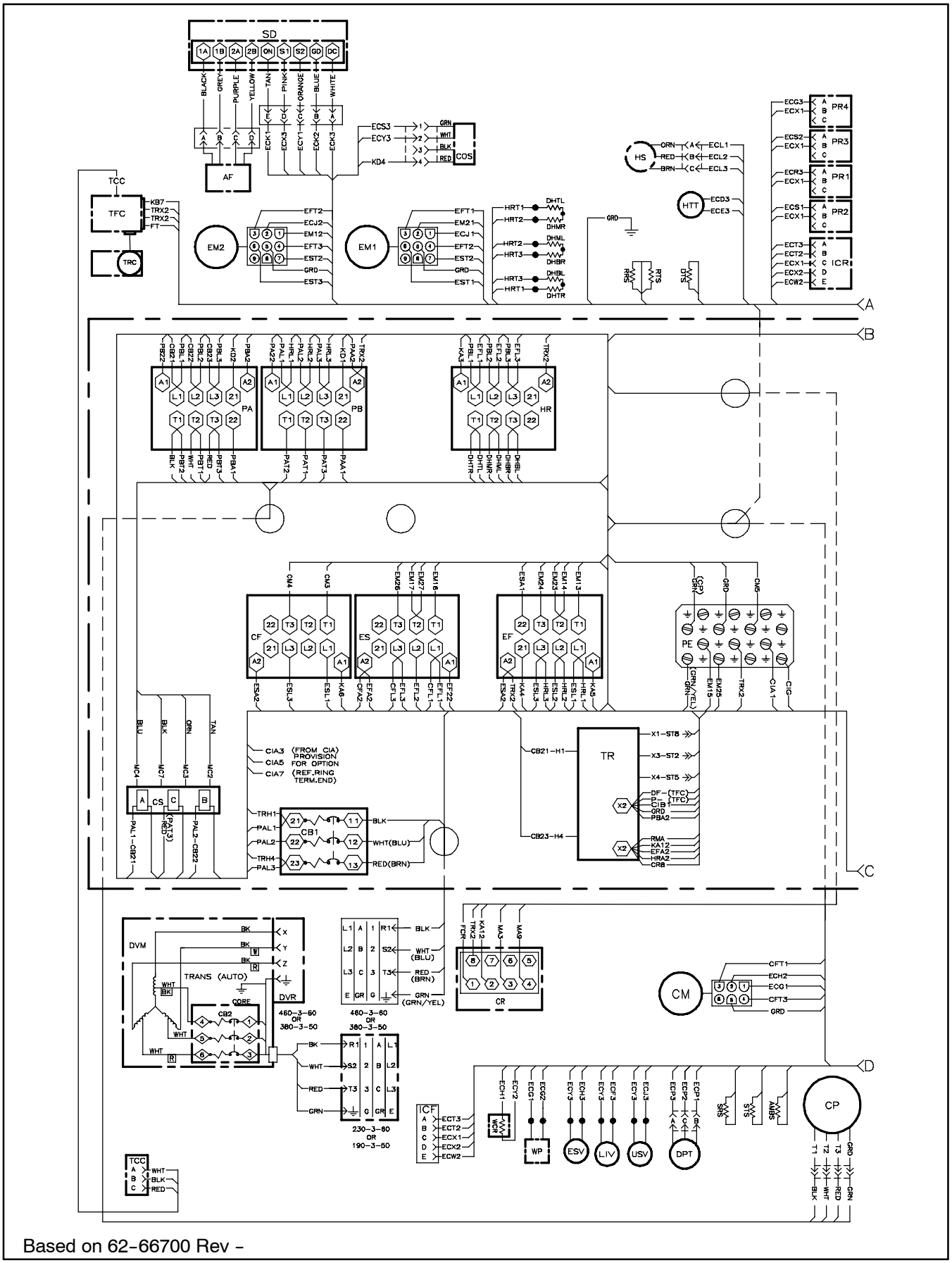


Figure 7–1. Electrical Schematic



Based on 62-66700 Rev -

Figure 7-2. Electrical Wiring Diagram - Sheet 1 of 2

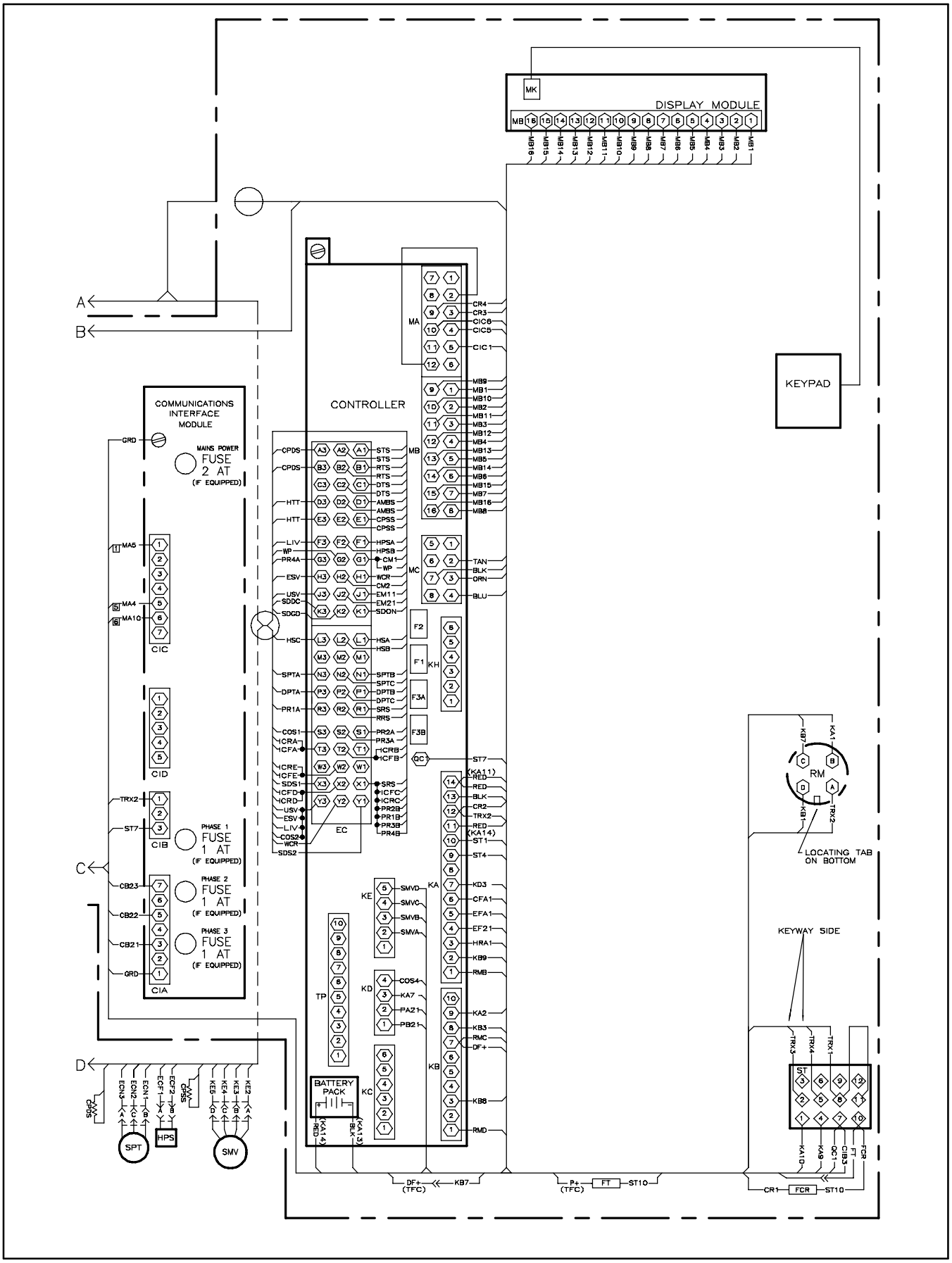


Figure 7–2. Electrical Wiring Diagram – Sheet 2 of 2

SECTION 8

SERVICE PARTS LIST

8.1 ORDERING INSTRUCTIONS

All orders and inquiries for parts must include: Parts Identification Number **(PID)**, Model Number, Unit Serial Number, Part Number, Description of part as shown on list and Quantity required. Address all correspondence for parts to the following address:

CARRIER TRANSICOLD DIVISION
Replacement Components Group, TR-20
P.O. Box 4805, Syracuse, New York 13221
or FAX to: (315) 432-3778

8.2 LETTER DESIGNATIONS

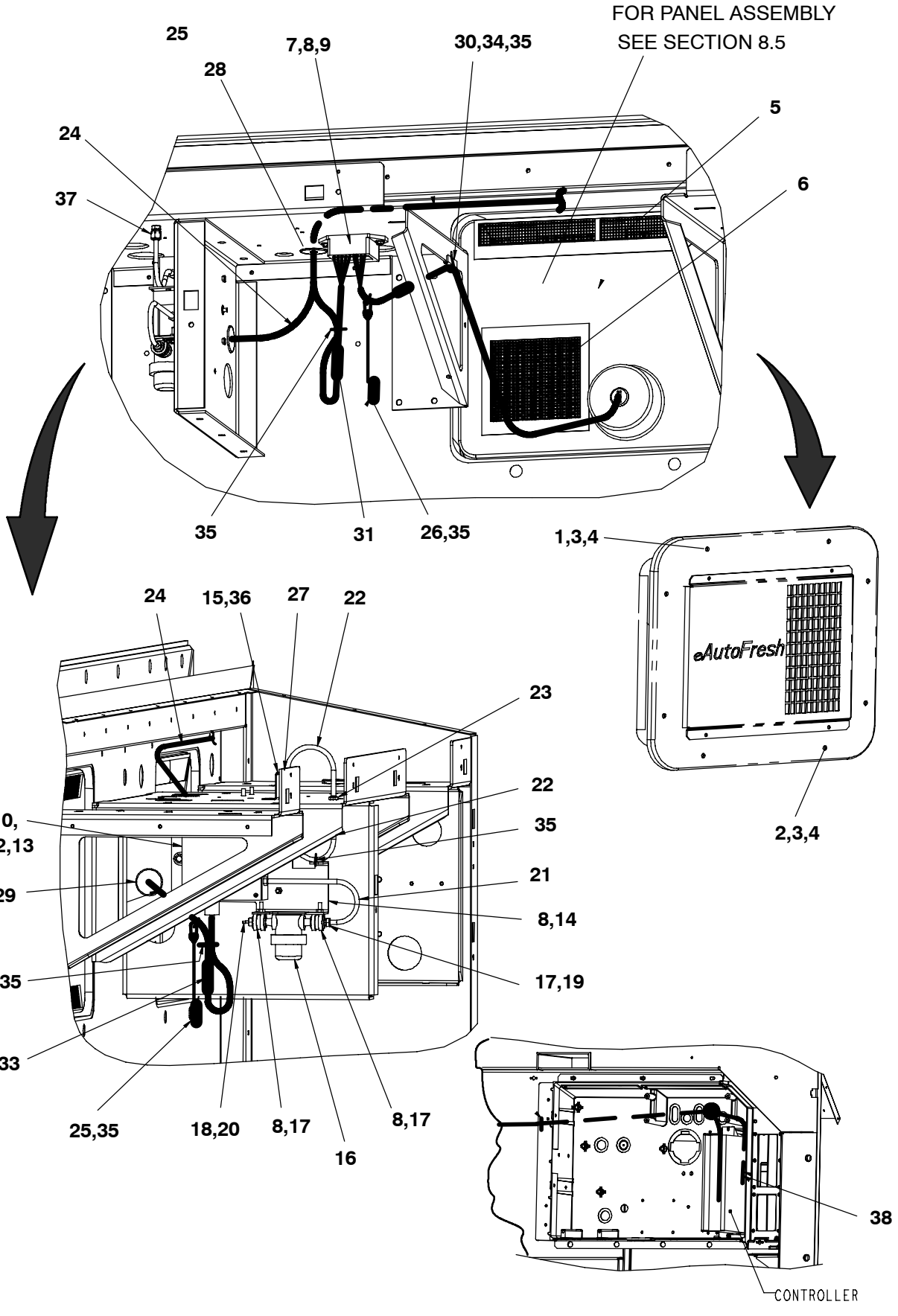
The following letter designations are used to classify parts throughout this list:

A/R = *As Required*
N/A = *Not Available*
NS = *Not shown in illustration*
NSS = *Not sold separately* – Order next higher assembly or kit
PID = *Parts Identification Number* – essential to identify unit configuration.
PL = *Purchase Locally*
SST = *Stainless Steel* – 300 Series unless otherwise specified.
SV = *Suffix SV* – added to part number designates service replacement part.

8.3 PROVISION KITS

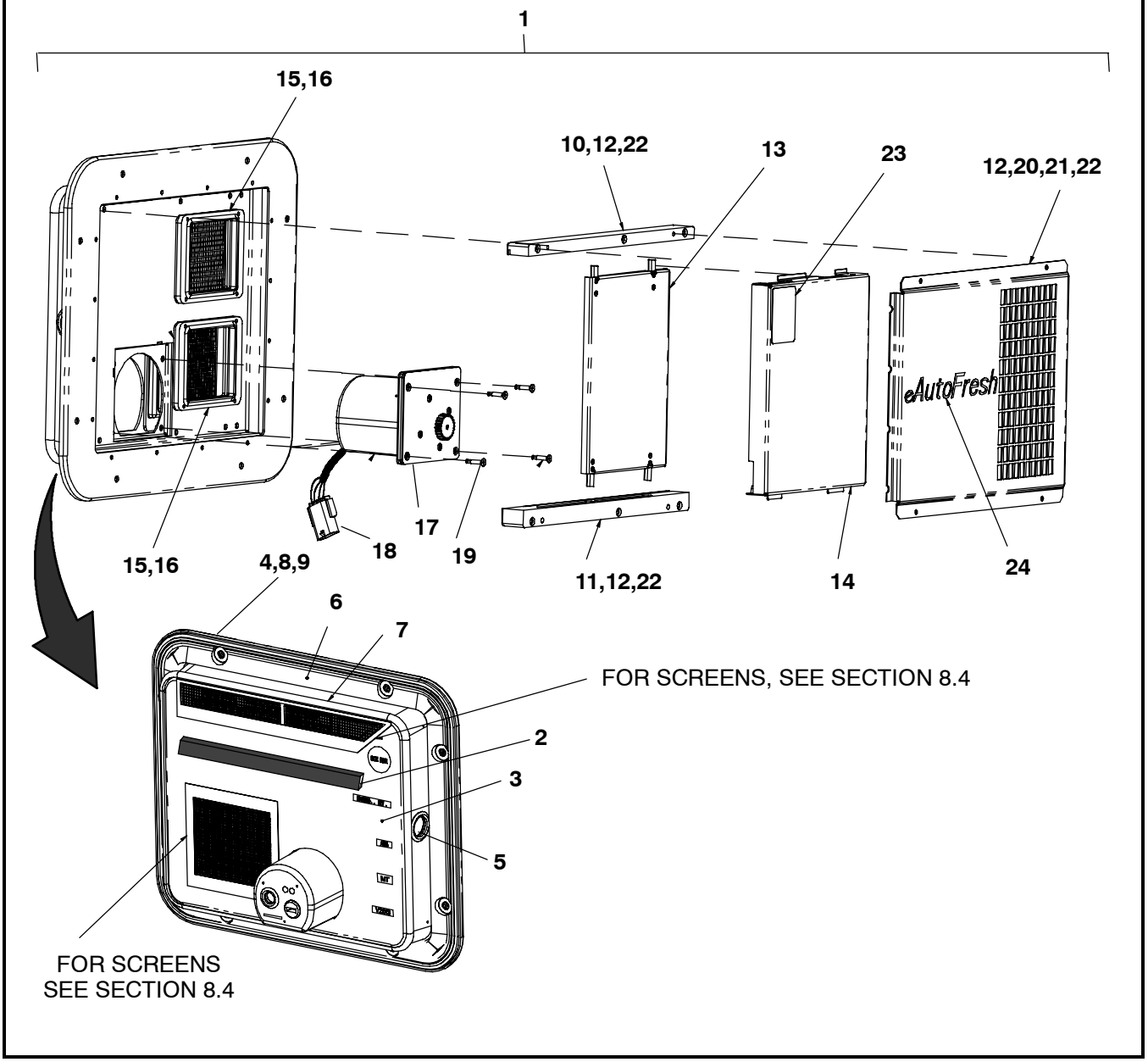
Some Carrier Transicold refrigeration units can be ordered "Provisioned For" the eAutoFresh option. Retro-fit Kits are available by ordering Carrier Transicold part number 74–66611–01 (White) or 74–66611–02 (Orange).

8.4 UPPER FRESH AIR



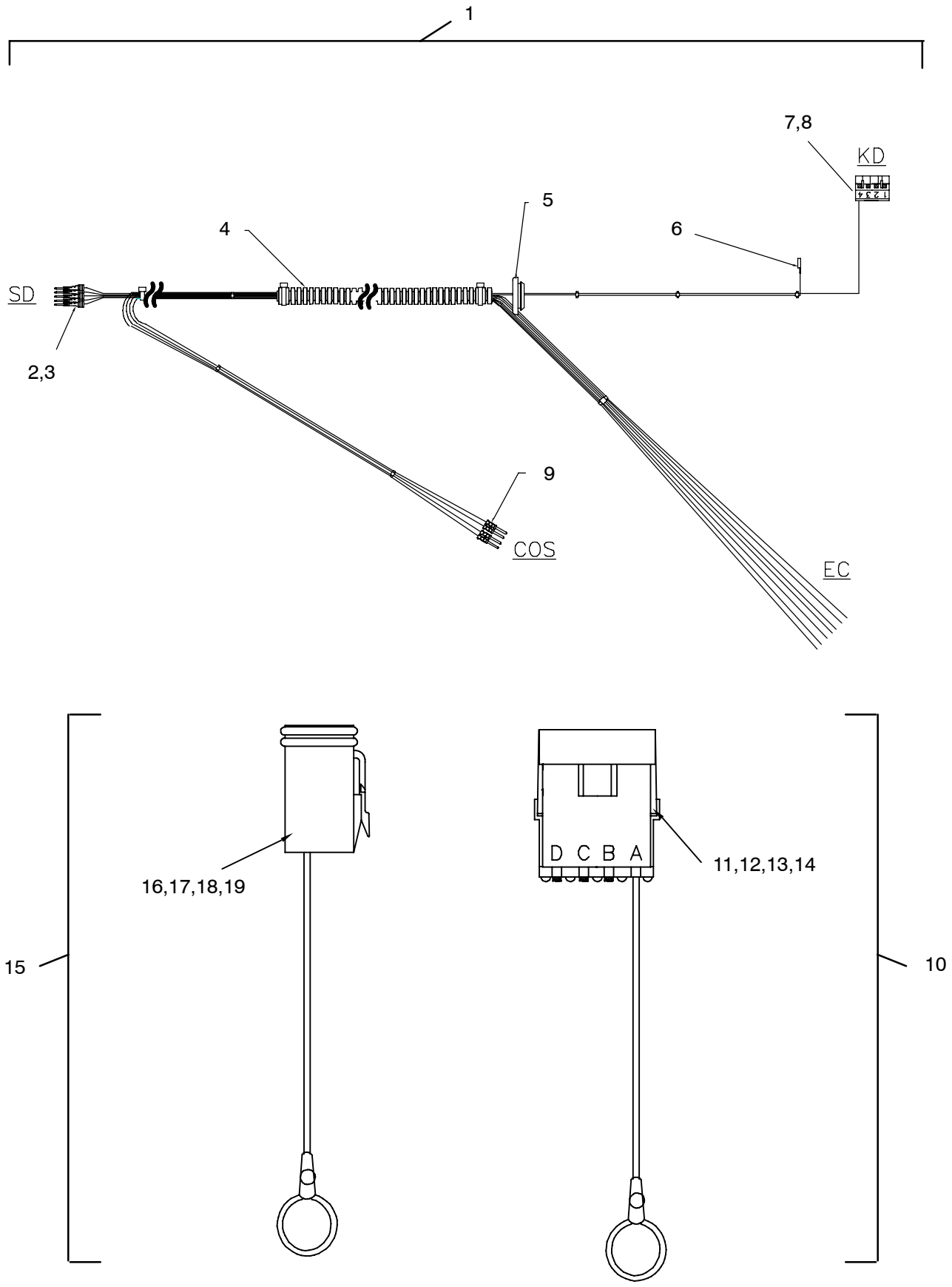
8.4 UPPER FRESH AIR - Continued			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	34-06154-00	Screw,Cap Hxhd 1/4-20 X 1.00 Tir	2
2	34-00655-08	Screw,Cap Hxhd 1/4-20 X 1.00	6
3	34-06053-13	Washer,Rtng .19Id X.80 Od(.250)	8
4	34-06212-12	Washer,Plain 1/4 N Type A	8
5	58-04251-01	Screen 16 X 16 Mesh	1
6	58-04251-02	Screen 16 X 16 Mesh	1
7	10-00388-00	Powerpack Stepper Motor	1
8	66U1-5371-6	Screw,Mach Hxhd #10-24 X .750 Sltd	10
9	66U1-5321-8	Washer,Plain #10 Type A	4
10	10-00398-00	Sensor Carbon Dioxide - Includes	1
11	22-01613-10	Plug	1
12	22-01613-11	Lock	1
13	22-06163-15	Socket	1
14	68-14738-00	Bracket,Mtg .090 Thk Alum	1
15	68-14739-00	Bracket .063 Thk Alum	1
16	30-00415-01	Filter Assy Sample Air, 1/8 Npt	1
17	34-00373-07	Clamp,Tube .62 Dia Cushion	2
18	40-00297-00	Coupling 1/8 X 1/8 Pipe Thd	2
19	KA70PP048	Fitting,Hose 1/8Id Barb X 1/8Npt	1
20	40-00108-03	Coupling Half Union	1
21	58-04497-04	Tube 1/4"O.D.X 7.75"L	1
22	58-04497-01	Tube 1/4"O.D.X 6.25"L	2
23	40-00640-00	Union,Bulkhead Dubl Brb/Comp Align	1
24	22-01713-26	Harness Eautofresh Ml3 (SEE SECTION 8.6)	1
25	22-01713-20	Harness Plug (SEE SECTION 8.6)	1
26	22-01713-21	Harness Plug (SEE SECTION 8.6)	1
27	58-00065-84	Grommet .25X.50X.187Pnl	1
28	58-00065-77	Grommet .38 Id X1.25 Od	1
29	58-00065-78	Grommet .25 Id X1.25 Od	1
30	66CH1-1172-2	Trim,Flexible 2.00 Lg	1
31	22-01835-00	Connector 5 Sokt. Weatherpack	1
32	22-01613-08	Receptacle 4 Pin	1
33	22-01613-09	Lock Secondary 4 Pin (R)	1
34	44-00361-00	Clip,Retaining .88-1.00 Wire Mtg	2
35	66U1-3882	Wire Tie 1/16-1-3/4 Selflkng	11
36	34-00928-03	Rivet,Blind .125 Dia .188-.250	2
37	40-00601-05	Tube,Support 1/4 Od X .040W	1
38	22-01777-03	Contact Socket, 20Awg	7

8.5 UPPER FRESH AIR PANEL ASSEMBLY



8.5 UPPER FRESH AIR PANEL ASSEMBLY - Continued			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	79-66643-00	eAutoFresh White Pannel Includes:	
	79-66643-01	eAutoFresh Orange Pannel Includes:	
2	66U-1-2552-185	Gasket	1
3	58-66642-00	Panel Assembly	1
4	68-11989-08	Cover, Access White	1
	68-11989-10	Cover, Access Orange	1
5	66U-1-5562-2	Plug Button	1
6	42-00296-01	Gasket	1
7	42-00327-00	Gasket	1
8	34-00928-09	Rivet,Blind	16
9	86-66704-00	Box Assembly,Recess ,White	1
	86-66704-01	Box Assembly,Recess ,Orange	1
10	58-66644-00	Rail Top	1
11	58-66645-00	Rail Bottom	1
12	66U1-6651-26	Screw,Mach Pan Head	10
13	79-66640-00	Plate Assembly - Slide	1
14	79-66642-00	Plate Assembly -Gasket	1
15	58-66640-00	Collar	2
16	34-00928-06	Rivet,Blind .	8
17	79-66641-00	Cup Assembly,White - Includes	1
	79-66641-01	Cup Assembly,Orange - includes	1
18	22-02392-03	Connector,Female	1
19	34-66642-09	Screw,Flat Head	4
20	68-14715-00	Grille, White	1
	68-14715-01	Grille, Orange	1
21	58-04026-56	Protector	7
22	34-00662-08	Washer,Plain	10
23	62-66697-00	Label Warning, E-Autofresh	1
24	62-66701-00	Label eAutoFresh	1

8.6 WIRING HARNESSES



8.5 WIRING HARNESSES - Continued			
ITEM	PART NUMBER	DESCRIPTION	QTY
1	22-01713-26	Wire Harness	1
2	22-01566-01	Terminal	5
3	22-02394-02	Seal	5
4	58-00848-37	Wire Cover	1
5	58-04706-00	Gromett	1
6	66U1-8292-01	Cap, Insulating	1
7	22-04031-00	Block	1
8	22-04032-00	Terminal	4
9	22-01613-12	Terminal	4
10	22-01713-21	Wire Harness	1
11	22-02392-03	Block	1
12	22-02393-01	Terminal	1
13	22-02394-02	Seal	1
14	22-01565-01	Plug	3
15	22-01713-20	Wire Harness	1
16	22-01613-10	Block	1
17	22-01613-13	Terminal	1
18	22-01613-11	Lock	1
19	22-01614-06	Plug	3

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