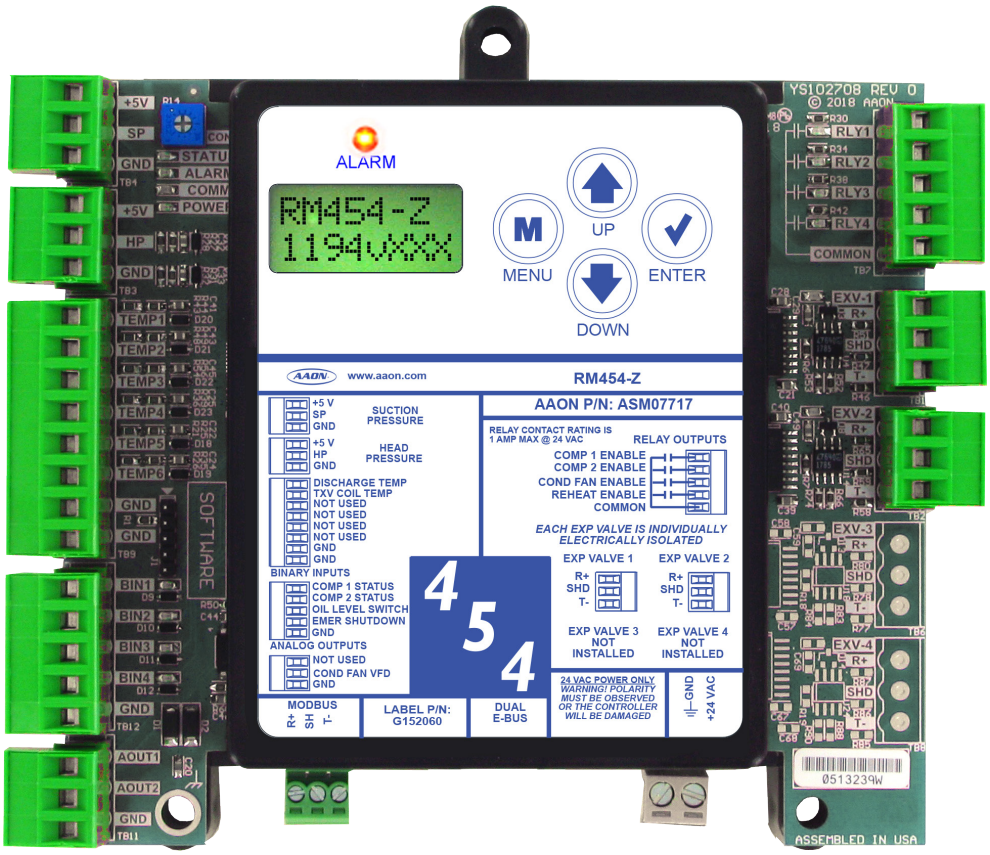
Compatible with
VCCX-454
Series

RM454-Z
Technical Guide

ASM02351
Software SS1194



RM454-Z REVISION LOG	
REVISION & DATE	**CHANGE**
Rev. A, September 27, 2024	Original

RM454-Z PARTS REFERENCE	
PART DESCRIPTION	**PART NUMBER**
RM454-Z Module	ASM07717
VCCX-454 Controller	ASM07503
RM454-SC (Subcool Monitor)	ASM07719
Reheat Expansion Module	ASM01687
E-BUS Cable Assembly E-BUS Power & Comm 1.5 ft., 3 ft., 10 ft., 25 ft., 50 ft., 75 ft., 100 ft., 150 ft., 250 ft., and 1000 ft. Spool	G029440 (1.5 ft.), G012870 (3 ft.), G029460 (10 ft.), G045270 (25 ft.), G029510 (50 ft.), G029530 (75 ft.), G029450 (100 ft.), G029470 (150 ft.), V36590 (250 ft.), G018870 (SPOOL)
E-BUS Adapter Hub with 1.5 ft.. E-BUS Cable	ASM01635
E-BUS Adapter Board	ASM01878

www.aaon.com

This manual is available for download from www.aaon.com

AAON, Inc.
2425 South Yukon Ave.
Tulsa, OK 74107-2728
Factory Technical Support Phone: 918-382-6450
Controls Support Phone: 866-918-1100
All rights reserved. © September 2024 AAON, Inc.

It is the intent of AAON to provide accurate and current product information. However, in the interest of product improvement, AAON reserves the right to change pricing, specifications, and/or design of its product without notice, obligation, or liability.

Rev. A
AAON® is a registered trademark of AAON, Inc., Tulsa, OK. BACnet® is a registered trademark of ASHRAE Inc., Atlanta, GA. BITZER® is a registered trademark of BITZER Kühlmaschinenbau GmbH. Danfoss VFD® is a registered trademark of Danfoss Commercial Compressors, S.A., Tallahassee, FL

TABLE OF CONTENTS

GENERAL INFORMATION 6
- Overview and System Requirements 6
- Dimensions 7

INSTALLATION AND WIRING 8
- Electrical and Environmental Requirements 8

INPUTS AND OUTPUTS 9
- Input/Output Maps 9

WIRING 10
- RM454-Z Inputz Wiring - Modules 1, 2, 4, and 5 10
- RM454-Z Output Wiring - Modules 1, 2, 4, and 5 11
- RM454-Z Input Wiring - Modules 3 and 6 12
- RM454-Z Output Wiring - Modules 3 and 6 13
- Reheat Expansion Module 14
- RM454-SC (Subcool Monitor) Module 15

SEQUENCE OF OPERATIONS 16
- Modes of Operation 16
- Alarms 17
- Alarm Faults 18
- Alarm Lockouts 19
- Subcool Monitor Module Operation 20

LCD SCREENS 21
- Display Screen and Navigation Keys 21
- RM454-Z Screens Map 22
- RM454-Z Screen Descriptions 23
- RM454-Z Alarms, Faults, and Lockouts 25
- RM454-Z Danfoss Screens 27
- RM454-SC (Subcool Monitor) Screens Map 28
- RM454-SC (Subcool Monitor) Module Screen Descriptions 29

APPENDIX A: TROUBLESHOOTING 31
- RM454-Z LED Diagnostics 31
- RM454-SC (Subcool Monitor) LED Diagnostics 32
- Reheat Expansion Module LED Diagnostics 33
- Temperature Sensor Testing 34
- Suction Pressure Transducer Testing 35
- Liquid Line and Head Pressure Transducer 36

APPENDIX B: DANFOSS VFD 37
- Parameter Configurations 37

APPENDIX C: SYSTEM CONFIGURATION 38
- Module and Condenser Configuration in Prism 2 38

TABLE OF FIGURES

FIGURES

Figure 1: RM454-Z Dimensions **7**
Figure 2: RM454-Z Inputs Wiring - Modules 1, 2, 4, and 5 ..... **10**
Figure 3: RM454-Z Outputs Wiring - Modules 1, 2, 4, and 5 ..... **11**
Figure 4: RM454-Z Inputs Wiring - Modules 3 and 6 ..... **12**
Figure 5: RM454-Z Outputs Wiring - Modules 3 and 6 ..... **13**
Figure 6: Reheat Expansion Module #1 or #2 Wiring **14**
Figure 7: Subcool Monitor Module Wiring **15**
Figure 8: LCD Display and Navigation Keys **21**
Figure 9: RM454-Z LED Locations **31**
Figure 10: Subcool Monitor LED Locations **32**
Figure 11: Reheat Expansion LED Locations and Descriptions **33**
Figure 12: RM454-Z Module Configuration **38**
Figure 13: Prism 2 RM454-Z Configuration Page **38**

TABLE OF TABLES

TABLES

Table 1: Electrical and Environmental Requirements **8**
Table 2: RM454-Z Inputs and Outputs **9**
Table 3: Subcool Monitor Inputs and Outputs **9**
Table 4: Reheat Expansion Module Outputs **9**
Table 5: Navigation Key Functions **21**
Table 6: RM454-Z Main Screens **23**
Table 7: RM454-Z System Status Screens **23**
Table 8: RM454-Z Sensor Status Screens **24**
Table 9: RM454-Z Setpoint Status Screens **24**
Table 10: RM454-Z Alarms Screens **25**
Table 11: RM454-Z Faults Screens **25**
Table 12: RM454-Z Lockouts Screens **26**
Table 13: RM454-Z Danfoss Screens **27**
Table 14: RM454-SC Main Screens **29**
Table 15: RM454-SC Circuit Status Screens **29**
Table 16: RM454-SC Main Screens **30**
Table 17: RM454-SC Circuit Status Screens **30**
Table 18: STATUS LED Blink Codes **31**
Table 19: Reheat Expansion Module ALARM LED Blink Codes **33**
Table 20: 0-5V Temperature Sensor - Voltage and Resistance for Type III Sensors **34**
Table 21: Suction Pressure Transducer Chart for R454-B Refrigerant **35**
Table 22: 0-667 psi Transducer Chart **36**
Table 23: Danfoss VFD Parameter Configurations **37**

RM454-Z Features & Applications

CAUTION: This module is intended to only function with units operating with R-454B refrigerant.

The Refrigerant System Module for VFD Compressors (RM454-Z) monitors and controls one refrigeration circuit of the HVAC unit. The RM454-Z is used on RZ units and on RN-E units with Danfoss compressors.

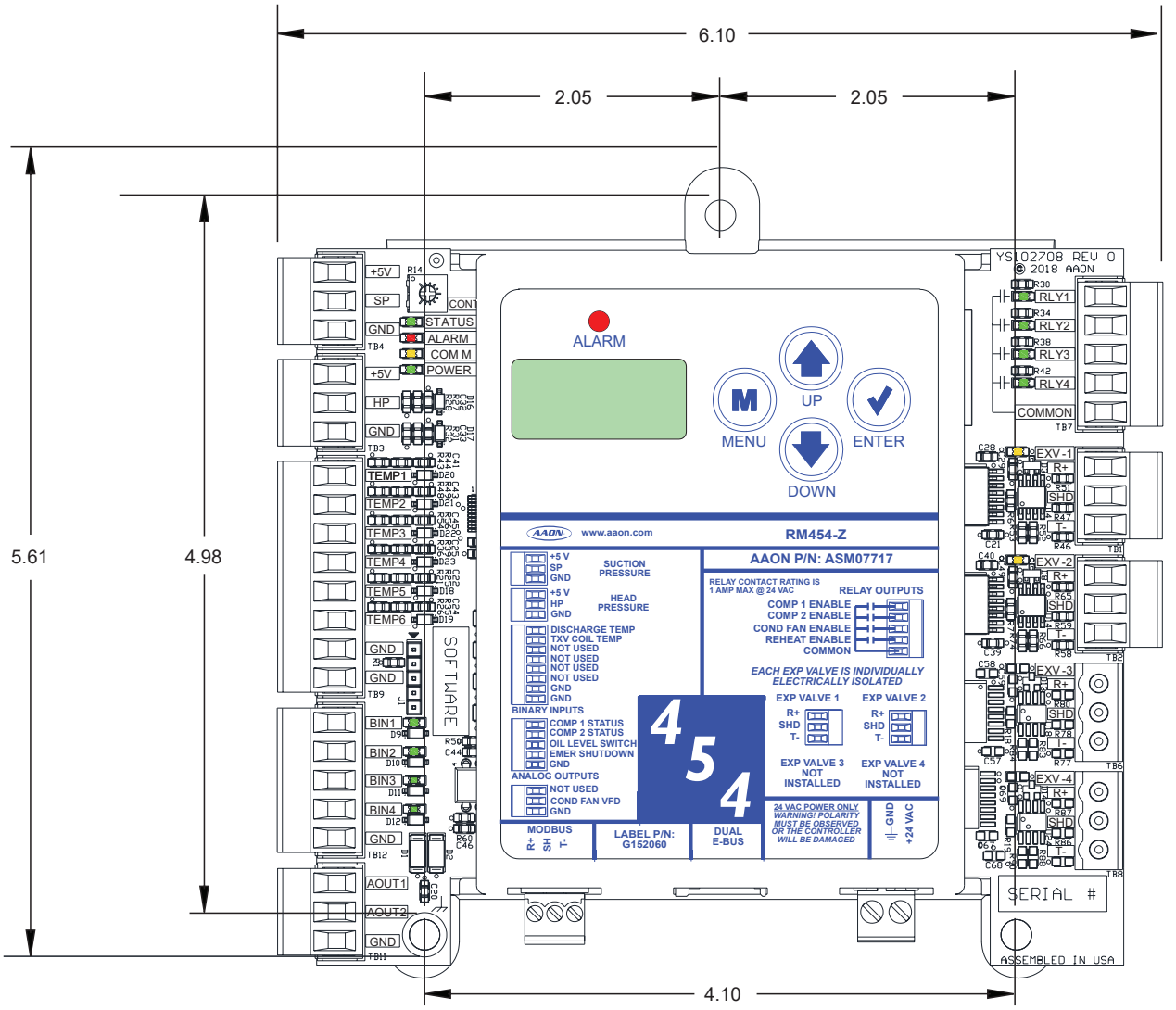
The RM454-Z is connected to an AAON unit controller. Three or six RM454-Z Modules can be connected, depending on the size of the system. There are two E-BUS expansion ports which allow the use of communicating sensors and the E-BUS Modules. There is a MODBUS terminal block which allows wiring to the Reheat Expansion Module or VFD Compressor.

The RM454-Z provides four analog inputs, four binary inputs, four relays, and two analog outputs. See **Figures 2 through 5, pages 9 through 12** for wiring.

The RM454-Z Module provides the following:

- Modulates the compressors to satisfy the Suction Coil (Saturated) Temperature. The Suction Coil (Saturated) Temperature Setpoint is reset by the AAON unit controller to maintain the Supply Air Temperature during Cooling Mode. During Dehumidification Mode, it controls the compressors to the Suction (Saturation) Temperature Setpoint.
- Modulates the condenser fan or valve to maintain the Head Pressure Setpoint.
- Monitors the performance of the superheat controller to maintain the Superheat Setpoint of each evaporator coil.
- Provides alarms and safeties for the compressor and condenser operation.
- Provides a 2 x 8 LCD character display and four buttons that allow for status of system operation, system setpoints, system configurations, sensors, alarms, and to change the module's address, if necessar

Dimensions



Note: All Dimensions are in inches.

Note: Depth is 1.50 inches.

Figure 1: RM454-Z Dimensions

Electrical and Environmental Requirements

General

Correct wiring of the AAON unit controller and its modules is the most important factor in the overall success of the controller installation process. The AAON unit controller and modules are installed and wired at the AAON factory. Some of the following information may not apply to your installation if it was pre-wired at the factory. However, if troubleshooting of the controller or modules is required, it is a good idea to be familiar with the system wiring.

Wiring

The modules must be connected to an 18-30 VAC power source of the proper size for the calculated VA load requirements. All transformer sizing should be based on the VA ratings listed in Table 1, this page.

Control Device	Voltage	VA Load	Operating Temperature	Humidity (Non-Condensing)
RM454-Z, Subcool Monitor, and Reheat Expansion Modules	18-30 VAC	18	-22°F to 158°F -30ºC to 70ºC	0-95% RH
	Inputs		Resistive Inputs require 10KΩ Type III Thermistor	
			24 VAC Inputs provide 4.7kΩ Load	
	Outputs		Relay Outputs: 1 amp maximum per output.	

Table 1: Electrical and Environmental Requirements

NOTE: If the temperature at the module is below -22ºF (-30ºC), the display refresh rate could be less responsive.

WARNING: When using a single transformer to power more than one controller or expansion module, the correct polarity must always be maintained between the boards. Failure to observe correct polarity will result in damage to the unit controller, RM454-Z, and any associated module.

Please carefully read and apply the following information when wiring the unit controller, RM454-Z, and any associated module.

1. All wiring is to be in accordance with local and national electrical codes and specifications.
2. All 24 VAC wiring must be connected so that all ground wires remain common. Failure to follow this procedure can result in damage to the controller and connected devices.
3. Minimum wire size for 24 VAC wiring should be 18-gauge.
4. Minimum wire size for all sensors should be 24-gauge. Some sensors require two-conductor wire and some require three-or four-conductor wire.
5. Minimum wire size for 24 VAC thermostat wiring should be 22-gauge.
6. Be sure that all wiring connections are properly inserted and tightened into the terminal blocks. Do not allow wire strands to stick out and touch adjoining terminals which could potentially cause a short circuit.
7. When communication wiring is to be used to interconnect AAON unit controllers together or to connect to other communication devices, all wiring must be plenum-rated, minimum 18-gauge, two-conductor, twisted-pair with shield. AAON can supply communication wire that meets this specification and is color coded for the network or local loop. Please consult your AAON distributor for information. If desired, Belden #82760 or equivalent wire may also be used.
8. Before applying power to the AAON unit controller, RM454-Zs, and any associated modules, be sure to recheck all wiring connections and terminations thoroughly.

Powering Up

When the controller and modules are first powered up, the POWER LED should light up and stay on continuously. If it does not light up, check to be sure that you have 24 VAC connected to the controller, that the wiring connections are tight, and that they are wired for the correct polarity. The 24 VAC power must be connected so that all ground wires remain common. If after making all these checks, the POWER LED does not light up, please contact AAON Controls Support for assistance.

Input/Output Maps

See **Table 2, this page** for the RM454-Z Module inputs and outputs, **Table 3, this page** for Subcool Monitor Module inputs and outputs, and **Table 4, this page** for the Reheat Expansion Module inputs and outputs.

RM454-Z MODULE	
Analog Inputs	
1	Suction Pressure Transducer (SP)
2	Head Pressure Transducer (HP)
3	Discharge Temperature Sensor (TEMP1)
4	TXV Coil Temp (TEMP2)
Binary Inputs	
1	Compressor 1 Status (BI1)
2	Compressor 2 Status (BI2)
3	Oil Level Switch (BI3)
4	Emergency Shutdown (BI4)
Analog Outputs (0-5 VDC)	
1	Not Used (AO1)
2	Condenser Fan VFD (AO2)
Relay Outputs (24 VAC)	
1	Compressor 1 Enable (RLY1)
2	Compressor 2 Enable (RLY2)
3	Condenser Fan Enable (RLY3)
4	Reheat Enable (RLY4)
Superheat Controller Communication Terminals	
1	Expansion Valve 1 (EXV-1)
2	Expansion Valve 2 (EXV-2)
3	Not Installed (EXV-3)
4	Not Installed (EXV-4)
Communication Terminals	
DUAL E-BUS	2 EBC E-BUS Ports
MODBUS	MODBUS Communication Terminal Block

Table 2: RM454-Z Inputs and Outputs

SUBCOOL MONITOR MODULE	
Analog Inputs	
1	Liquid Line Pressure Transducer 1 (SP-1)
2	Liquid Line Pressure Transducer 2 (HP-1)
3	Liquid Line Pressure Transducer 3 (SP-2)
4	Not Used
Temperature Inputs	
1	Liquid Line Temperature 1 (TEMP1)
2	Liquid Line Temperature 2 (TEMP2)
3	Liquid Line Temperature 3 (TEMP3)
Communication Terminals	
DUAL E-BUS	2 E-BUS Ports

Table 3: Subcool Monitor Inputs and Outputs

REHEAT EXPANSION MODULE	
Analog Output	
1	HGR Valve
Binary Input (24 VAC)	
1	Reheat Enable Input
Communication Terminals	
COM	Communication Terminal Block

Table 4: Reheat Expansion Module Outputs

RM454-Z Inputz Wiring - Modules 1, 2, 4, and 5

RM454-Z Input Wiring

The RM454-Z monitors and controls one refrigeration circuit of the HVAC unit. The RM454-Z is used on RZ units and on RN-E units with Danfoss compressors. The module is designed for R410-A refrigerant.

The RM454-Z is connected to the AAON unit controller. Three or six RM454-Z Modules can be connected, depending on the size of the system. There are two E-BUS Expansion Ports which allow the use of communicating sensors and E-BUS Modules. There is a MODBUS terminal block which allows wiring to the Reheat Expansion Module or VFD Compressor.

The RM454-Z must be connected to an 18-30 VAC power source. When wiring the RM454-Z, its relay outputs must be wired as wet contacts (connected to 24 VAC). See **Figure 2, this page** for RM454-Z input wiring for modules 1, 2, 4, and 5.

NOTE: The Suction Pressure Transducer and TXV Line Temperature sensor are only needed if TXVs are installed instead of EXVs.

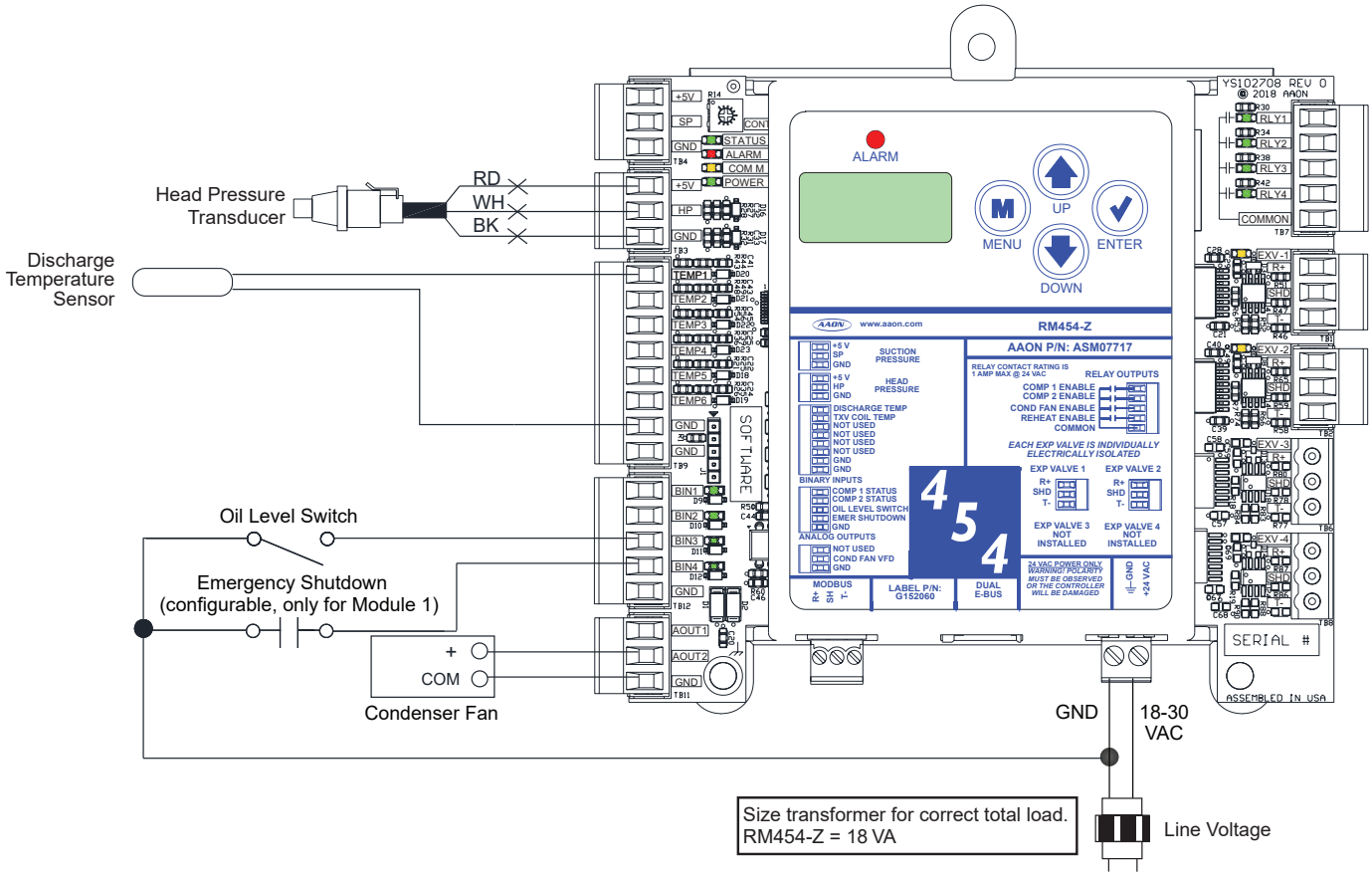


Figure 2: RM454-Z Inputs Wiring - Modules 1, 2, 4, and 5

RM454-Z Output Wiring - Modules 1, 2, 4, and 5

RM454-Z Output Wiring

See **Figure 3, this page** for RM454-Z outputs wiring for modules 1, 2, 4, and 5.

WARNING: Observe Polarity! All boards must be wired with GND-to-GND and 24 VAC-to-24 VAC. Failure to observe polarity will result in damage to one or more of the boards.

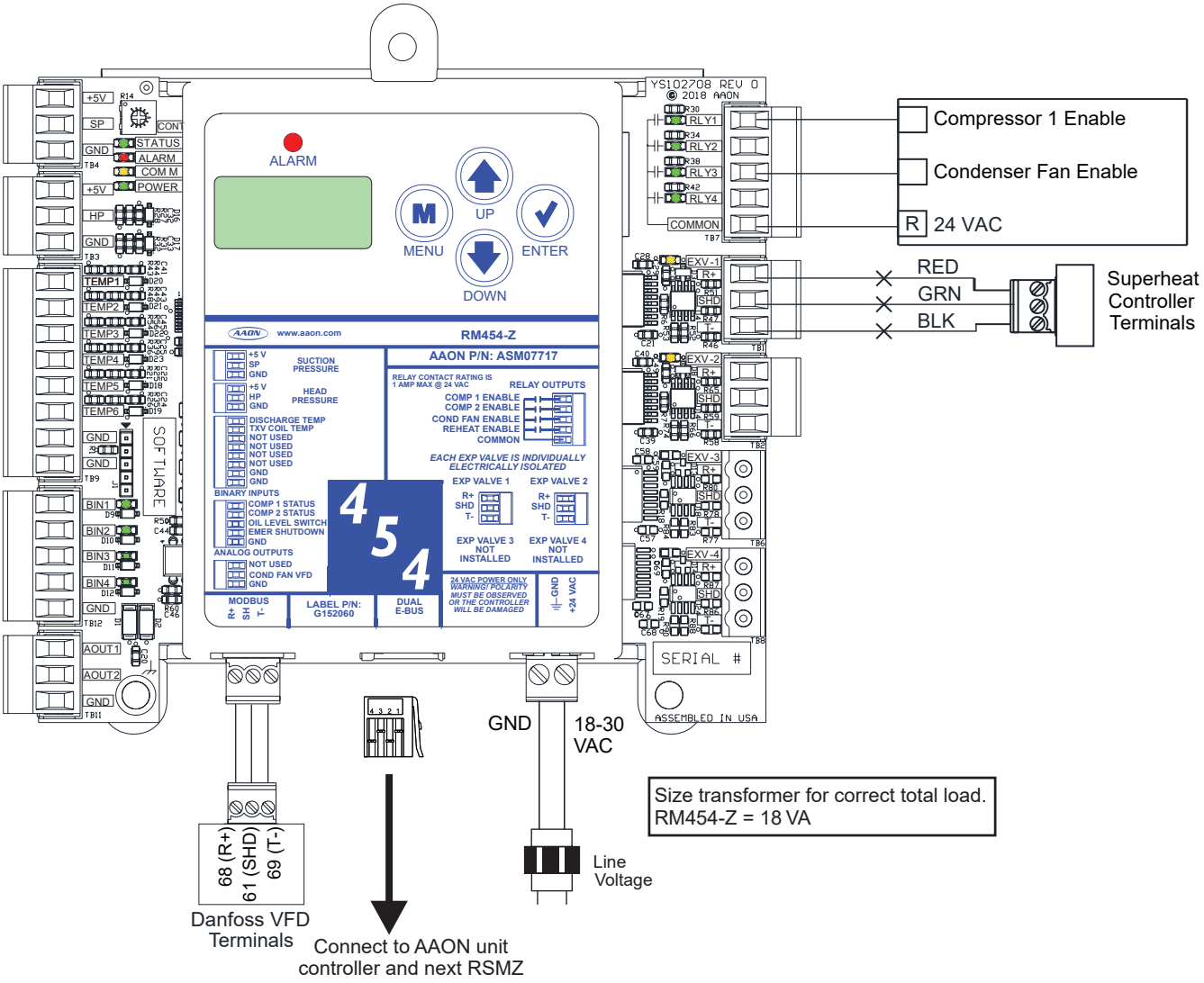


Figure 3: RM454-Z Outputs Wiring - Modules 1, 2, 4, and 5

RM454-Z Input Wiring - Modules 3 and 6

RM454-Z Input Wiring

See **Figure 4, this page** for RM454-Z outputs wiring for modules 3 and 6.

WARNING: Observe Polarity! All boards must be wired with GND-to-GND and 24 VAC-to-24 VAC. Failure to observe polarity will result in damage to one or more of the boards.

NOTE: The Suction Pressure Transducer and TXV Line Temperature sensor are only needed if TXVs are installed instead of EXVs.

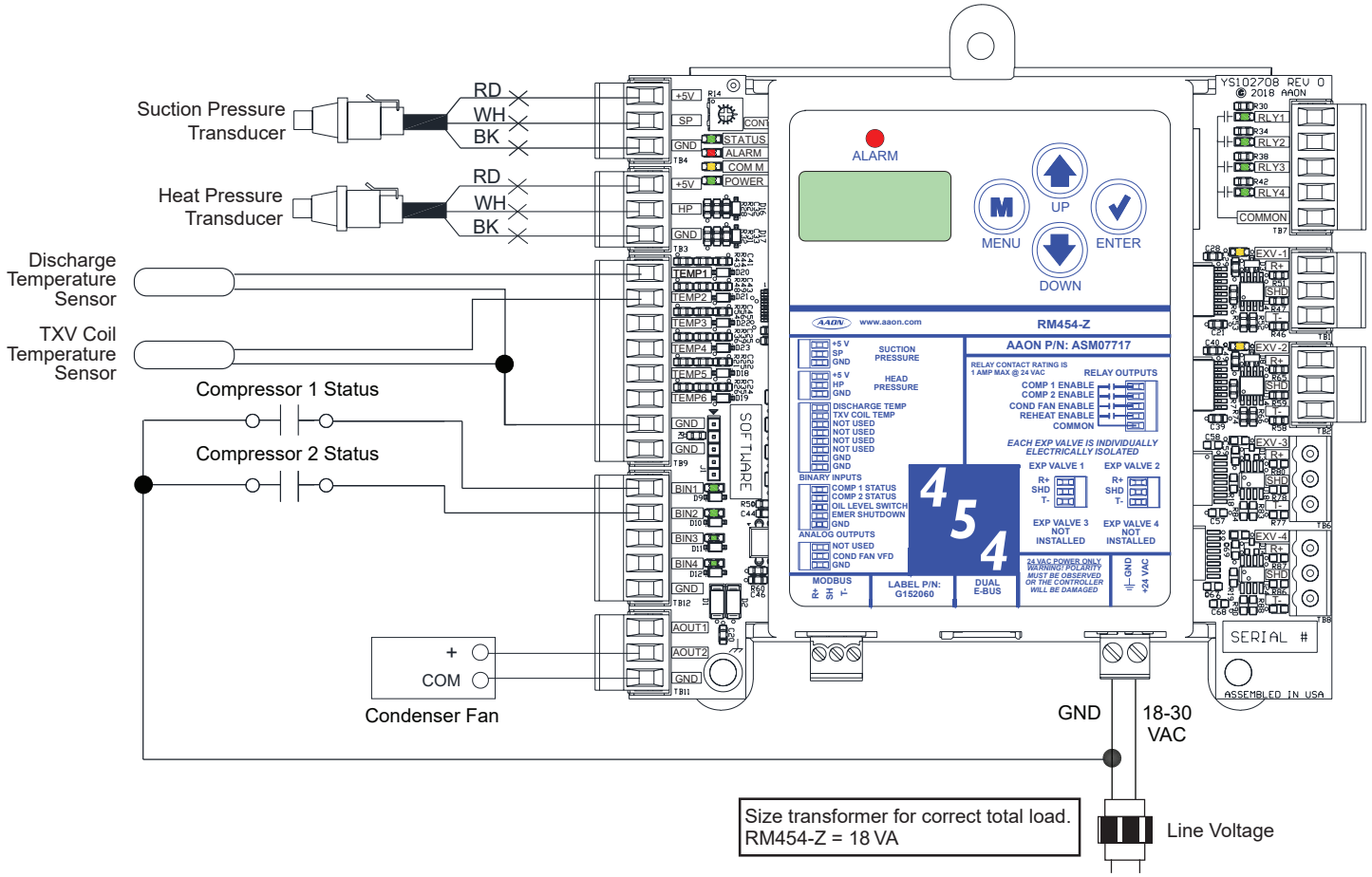


Figure 4: RM454-Z Inputs Wiring - Modules 3 and 6

RM454-Z Output Wiring - Modules 3 and 6

RM454-Z Output Wiring

See **Figure 5, this page** for RM454-Z outputs wiring for modules 3 and 6.

WARNING: Observe Polarity! All boards must be wired with GND-to-GND and 24 VAC-to-24 VAC. Failure to observe polarity will result in damage to one or more of the boards.

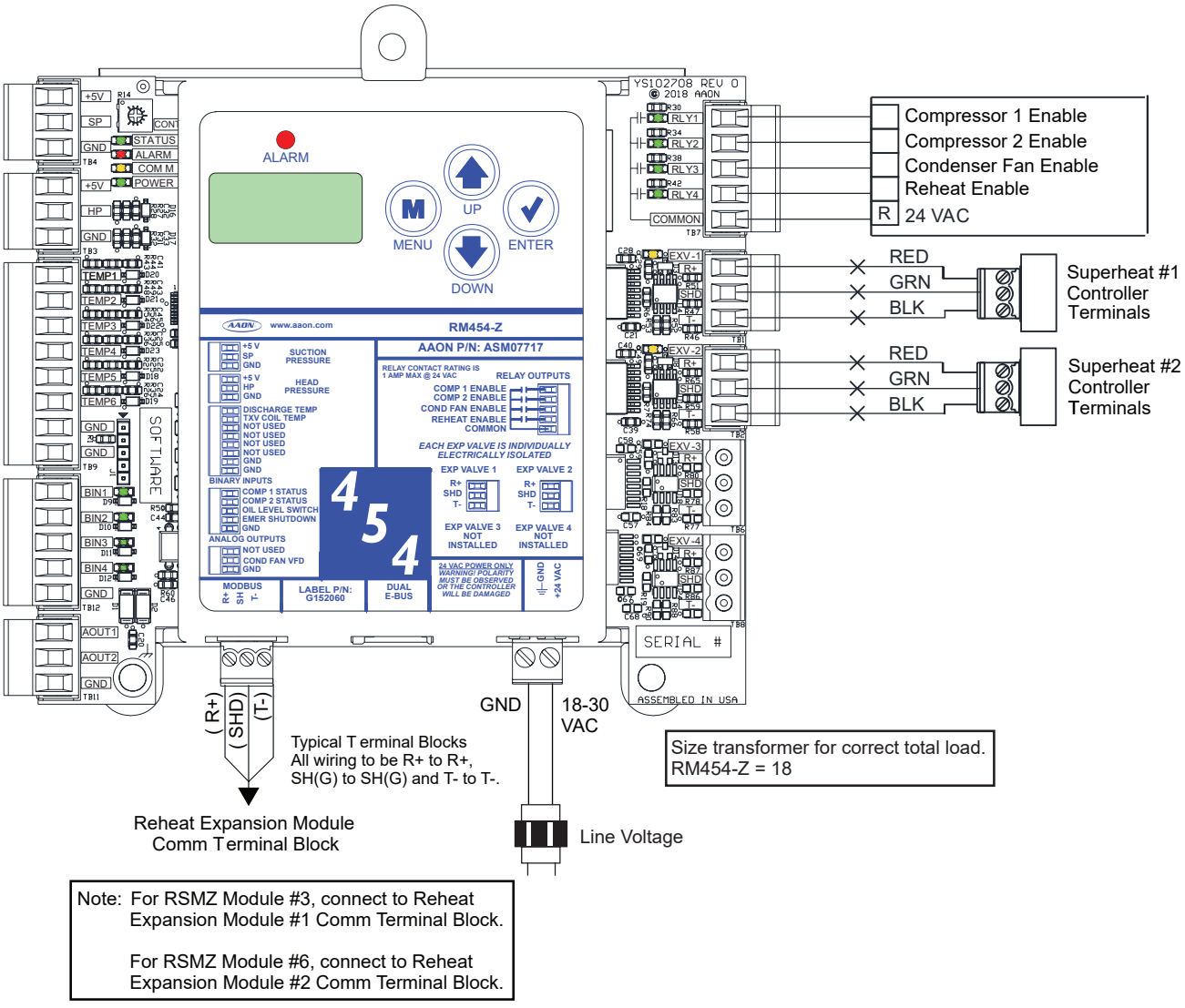


Figure 5: RM454-Z Outputs Wiring - Modules 3 and 6

Reheat Expansion Module

Reheat Expansion Module Wiring

The Reheat Expansion Module connects to the RM454-Z Communication Terminal Block. One or two Reheat Expansion Modules are used per system.

The Reheat Expansion Module must be connected to an 18-30 VAC power source. See **Figure 6, this page** for wiring.

NOTE: Please refer to the *MHGRV-X Technical Guide* for more information.

WARNING: Observe Polarity! All boards must be wired with GND-to-GND and 24 VAC-to-24 VAC. Failure to observe polarity will result in damage to one or more of the boards.

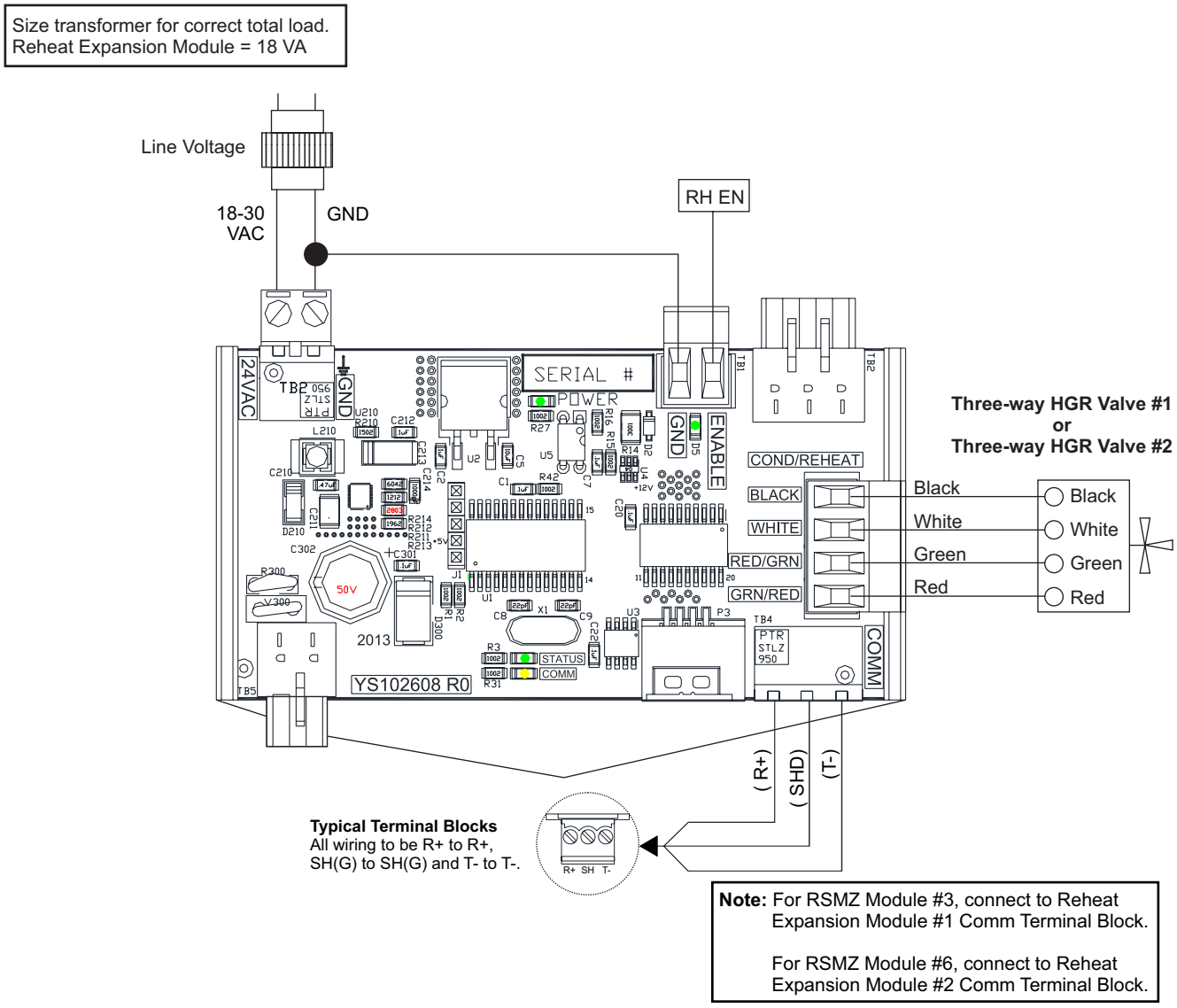


Figure 6: Reheat Expansion Module #1 or #2 Wiring

Wiring

The use of the RM454-SC is optional. The module reads the Liquid Line Temperature Sensors to calculate subcooling. This module can be configured to work with R454-B refrigerant.

The Subcool Monitor Module is connected to the AAON unit controller. One or two Subcool Monitor Modules can be connected, depending on the size of the system.

The Subcool Monitor Module contains a 2 x 8 LCD character display and four buttons that allow for status and alarm display.

The Subcool Monitor Module must be connected to an 18-30 VAC power source.

See **Figure 7, this page** for wiring.

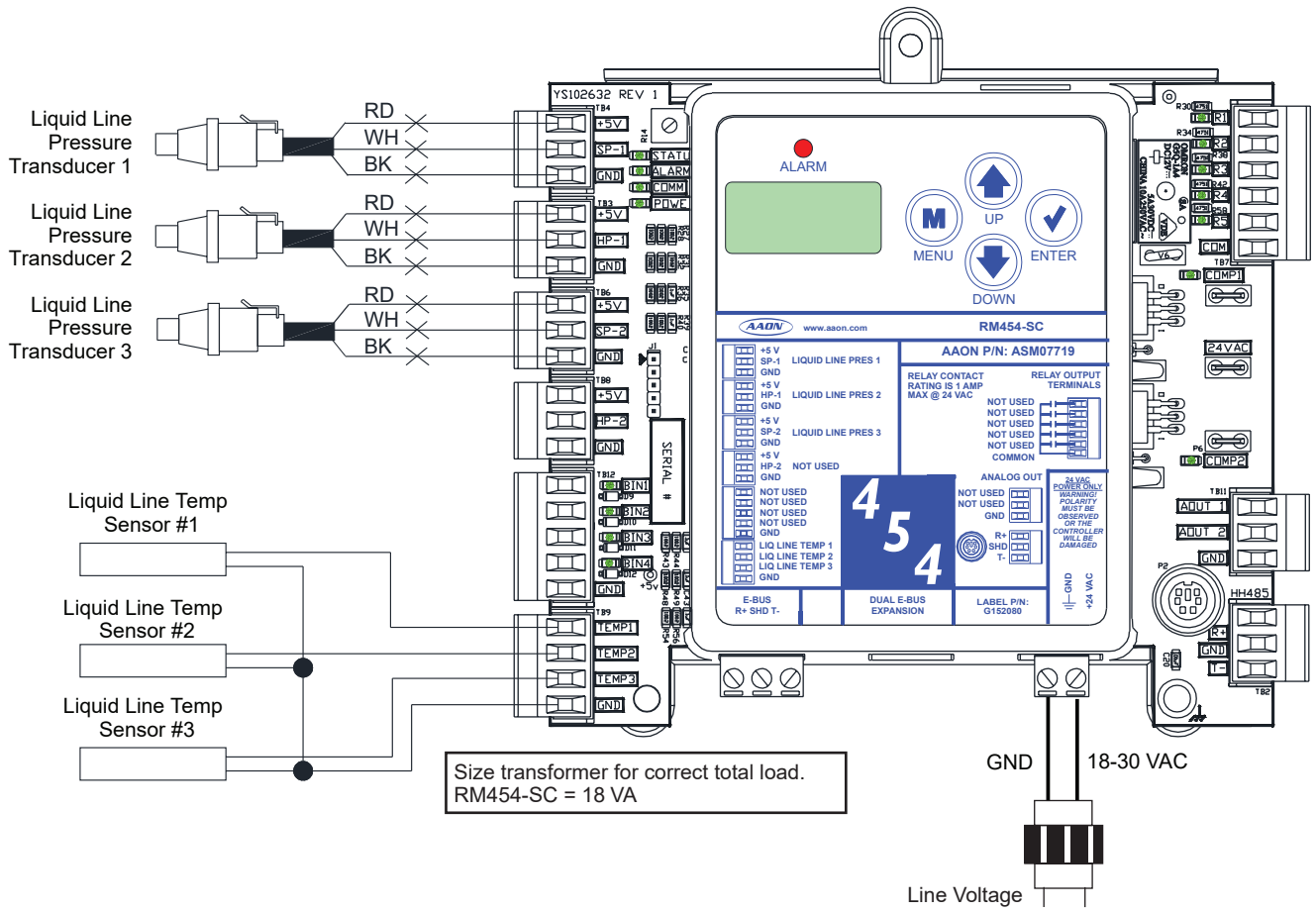


Figure 7: Subcool Monitor Module Wiring

Modes of Operation

Overview

The RM454-Z may be configured to operate as any one of six possible modules in the control system. This configuration automatically adjusts depending on the address of each module. All systems will consist of either three modules or six modules.

RM454-Z control is a three or six circuit cooling system with Reheat. The six circuit system is effectively two, three-circuit systems operating in parallel. There is some overlap of controls to ensure that the two systems operate in the same mode.

Modules at addresses 1, 2, 4, and 5 will each control a variable speed circuit (single Danfoss scroll compressor) and represent half of the evaporative face. Superheat is controlled by a Superheat Controller, and there is no Reheat.

Modules at addresses 3 and 6 have two tandem fixed compressors, full evaporative face through two parallel evaporators interlaced with the variable compressor-controlled circuits. Each Evaporator Superheat is independently controlled by a Superheat Controller. These circuits also have parallel Reheat with a three-way valve to Control Feed to the Reheat coils or the condenser. 100% Reheat is possible.

Sequencing depends on the particular operation—Cooling Mode or Dehumidification Mode.

Modes of Operation

There are three basic modes of operation for this module:

- Off Mode
- Cooling Mode
- Dehumidification Mode

When changing modes, the mode will first be commanded to RM454-Z Module 1 and that module will then share the mode change with the other RM454-Z Modules so that all modules will operate in the same mode. If RM454-Z Module 1 goes off line for any reason, then DX coil operations will be stopped for the entire unit.

Off (Stop) Mode

During Emergency Off Mode, all compressor(s) will immediately stop, regardless of run time.

During regular Off Mode, all compressor(s) will turn off after they have met their minimum run times. The condenser fan will then be disabled and condenser fan control output will be set to 0V. The DX staging sequence will stop and the module status will change to off.

During Off Mode, monitoring continues to provide status information and alarms remain activated unless otherwise indicated.

Cooling Mode

During startup of the Cooling Mode, the RM454-Z receives communication from the AAON unit controller to indicate Cooling Mode which is then used to stage on cooling.

In Cooling Mode, the variable speed compressors are staged on together. If additional cooling is needed, the compressors on the tandem circuit will stage on.

Dehumidification Mode

During startup of Dehumidification Mode, the RM454-Z receives communication from the unit controller to indicate Dehumidification Mode which is used by the compressor staging sequence.

If the current state is “all compressors are off” for RM454-Z Module 3 or 6, dehumidification will begin once the minimum off time has been met for module 3’s or 6’s first compressor (E1/F1), the condenser fan will modulate to the minimum condenser fan output value. Compressor E1/F1 for module 3 or 6 will then be enabled.

If the current state is “compressors A, B, C, and D are active” for modules 1, 2, 4, or 5, the compressors will modulate to the minimum position, wait for the minimum run time to be met, and then will turn off. The compressors will then be disabled and turn off. Once the minimum off time has been met for modules 3 or 6 first compressor (E1/F1), the condenser fan will modulate to the minimum condenser fan output value. Compressor E1/F1 for module 3 or 6 will then be enabled.

If the current state is “all VFD”, and E1/F1 are active, module 3 or module 6 will wait for the minimum off time to be met for module 3 or 6 compressor E2/F2. Compressor E2/F2 will then be enabled.

Alarms

Alarm Detection and Reporting

The RM454-Z continuously performs self diagnostics during normal operation to determine if any operating failures have occurred. These failures (alarms) will be reported to the AAON unit controller which allows them to be monitored via a BACnet® Building Automation System or with a user interface.

The following are the available alarm designations with detailed descriptions for the RM454-Z.

Alarm Warnings

Low Suction Pressure Warning

Low Suction Pressure will be ignored for the first minute of initial compressor operation. If Suction Pressure is below 77 psig for 20 seconds, the VFD compressor will modulate down 1% per second. This warning will clear once the Suction Pressure rises above 95 psig.

Low Suction Pressure – Startup Warning

The initial compressor on the circuit cannot start unless the Suction Pressure reaches a minimum PSIG depending on the outdoor air temperature.

- Above 75ºF = 108 PSIG
- Above 50ºF = 50 PSIG
- Above 25ºF = 62 PSIG
- Above 0ºF = 33 PSIG
- Above -25ºF = 18.5 PSIG

High Discharge Pressure – Level 1 Warning

If the Discharge Pressure rises above 540 psig, the condenser fan will be forced to 100%. The VFD compressor will limit the minimum and maximum RPM limits from 1800 rpm to 5400 rpm, according to envelope protection.

High Discharge Pressure – Level 2 Warning

If the Discharge Pressure rises above 575 psig, the VFD compressor will modulate down 1% per second until the Discharge Pressure drops below 475 psig.

Discharge Pressure Not Detected Warning

If the Discharge Pressure Transducer is not detected and a compressor is running, the condenser fan will be forced to 100%.

Danfoss VFD Alarms Warning

If an alarm occurs from the VFD compressor, the Danfoss Alarm Menu screens will show information on what the alarm code is.

The screens break up the alarms into bytes. If a display is not installed on the VFD, these alarm bytes will aid in knowing which specific alarm has occurred.

- Parameter 16-90 Alarm Word 1
  "DNFSALM1"
- Parameter 16-90, alarm bits 0 – 7
  "DNFSALM1", "B1 ###"
- Parameter 16-90, alarm bits 8 – 15
  "DNFSALM1", "B2 ###"
- Parameter 16-90, alarm bits 16 – 23
  "DNFSALM1", "B3 ###"
- Parameter 16-90, alarm bits 24 – 31
  "DNFSALM1", "B4 ###"
- Same with Parameter 16-91 Alarm Word 2
  "DNFSALM2"

There are two alarm parameters from the VFD 16-90 and 16-91. Each contain 32 different alarms as a binary bitfield, each bit is a specific alarm. Refer to Danfoss "Operating Instructions" "VLT Compressor Drives CDS 302/CDS 303" that is provided with the unit.

High Superheat Warning

A high superheat warning will occur if a compressor is active and the superheat is above 25ºF for two minutes or longer.

High Discharge Line Temperature

This sensor is installed for modulating VFD compressors only. If the Discharge Line Temperature rises above 220ºF, the VFD compressor will modulate down 1% per second until the Discharge Line Temperature drops below 220ºF.

Compressor 1 False Active Warning

This warning will occur if Compressor 1 is not activated and the running verification signal is active for at least 45 seconds. For Danfoss VFD compressors, the running verification is sent from Modbus Communications. For fixed On/Off compressors, the running verification is a binary input signal to the module.

Compressor 2 False Active Warning

This warning will occur if Compressor 2 is not activated and the running verification signal is active for at least 45 seconds. For Danfoss VFD compressors, the running verification is sent from Modbus Communications. For fixed On/Off compressors, the running verification is a binary input signal to the module.

Discharge Line Temp Sensor Not Detected

This warning will occur if the Discharge Line Temperature Sensor is not detected by the module.

Alarm Faults

Low Suction Pressure Fault

Low Suction Pressure will be ignored for the first minute of initial compressor operation. If Suction Pressure is below 85 psig for one minute, the compressor will be turned off and will be retried after five minutes.

Compressor 2 Low Suction Pressure Fault

Low Suction Pressure will be ignored for the first minute of initial compressor operation. For tandem circuits, if both compressors are running and Suction Pressure is below 77 psig for one minute, the second compressor will be turned off and will be retried after five minutes.

Unsafe Suction Pressure Fault

Unsafe Suction Pressure Detection will be ignored for the first 30 seconds of initial compressor operation. If the Suction Pressure drops below 44 psig for five seconds, the compressor(s) will be turned off and will be retried after five minutes.

High Discharge Pressure Fault

On a single compressor circuit, if the Discharge Pressure rises above 600 psig, the compressor will be turned off and will be retried after five minutes. The compressor will not be reactivated until the pressure rises above 475 psig.

Compressor 2 High Discharge Pressure Fault

On a tandem compressor circuit, if the Discharge Pressure rises above 575 psig and both compressors are running, the second compressor will be turned off and will be retried after five minutes.

Compressor 1 Not Running Fault

If Compressor 1 has been activated for at least 45 seconds and the running verification signal is not active, the compressor signal will be turned off and will be retried after five minutes. For Danfoss VFD compressors, the running verification is sent from Modbus Communications. For fixed On/Off compressors, the running verification is a binary input signal to the module.

Compressor 2 Not Running Fault

If Compressor 2 has been activated for at least 45 seconds and the running verification signal is not active, the compressor signal will be turned off and will be retried after five minutes. For fixed On/Off compressors, the running verification is a binary input signal to the module.

Low Superheat Fault

The low superheat detection will be ignored for the first two minutes of initial compressor operation. If the superheat drops below 4ºF for two minutes, the compressor signal will be turned off and will be retried after five minutes.

High Discharge Line Temperature

This sensor is installed for modulating VFD compressors only. If the Discharge Line Temperature rises above 220ºF, the VFD compressor will modulate down 1% per second until the Discharge Line Temperature drops below 220ºF.

If the compressor modulates down to 1800 rpm, the compressor will be turned off and will be retried if the Discharge Line Temperature drops below 150ºF and five minutes has lapsed.

EXV Sensor Not Detected Fault

If the superheat controller is not detected through Modbus communications for one minute, the compressor(s) will be turned off. This fault will be cleared when communication is reestablished.

Communications Loss Fault

If E-BUS communications are lost for at least 15 seconds, the compressor(s) will be turned off. If the module is controlling a Danfoss VFD compressor and the Modbus communication to the Danfoss VFD compressor is lost for at least 15 seconds, the compressor will be turned off. This fault will be cleared when communication is reestablished.

High Superheat Fault

If a compressor is active and the superheat is above 30ºF for 10 minutes or longer, the compressor(s) will be turned off and will be retried after five minutes.

High Evaporator Saturation Temperature Fault

On a tandem circuit, both compressors have to be running to trigger a fault. A modulating VFD compressor has to be at 100% to trigger a fault. If the Evaporator Saturation Temperature rises above 59ºF for the stage up delay plus two minutes, the compressor will be turned off and will be retried after five minutes.

Alarm Lockouts

Low/Unsafe Suction Pressure Lockout

If a low Suction Pressure fault or unsafe Suction Pressure fault occurs three times in a two-hour time period, the circuit will be disabled and locked out until the module is reset.

Low Refrigerant Oil Level Lockout

If an oil boost cycle is performed and the oil level is not detected for one minute, the circuit will be disabled and locked out until the module is reset.

High Discharge Pressure Lockout

If a high Discharge Pressure fault occurs three times in a two-hour time period, the circuit will be disabled and locked out until the module is reset.

Low Superheat Lockout

If a low superheat fault occurs three times in a two-hour time period, the circuit will be disabled and locked out until the module is reset.

High Superheat Lockout

If a high superheat fault occurs three times in a two-hour time period, the circuit will be disabled and locked out until the module is reset.

High Evaporating Temperature Lockout

If a high evaporating temperature fault occurs three times in a two-hour time period, the circuit will be disabled and locked out until the module is reset.

High Discharge Line Temperature Lockout

If a high Discharge Line Temperature fault occurs three times in a two-hour time period, the circuit will be disabled and locked out until the module is reset.

RM454-SC (Subcool Monitor) Module Operation

Operation

The RM454-SC Module is a monitoring-only module. It is capable of monitoring the subcooling for up to three circuits, simultaneously. The use of the RM454-SC is optional.

Subcooling Sequence

The RM454-SC reads and scales all of its six inputs and calculates the saturated suction and subcooling for each configured circuit.

LCD Display Screen and Navigation Keys

The LCD display screens and buttons allow viewing of status and alarms, and enable force modes. See **Figure 8, this page,** and refer to **Table 5, this page,** for descriptions.

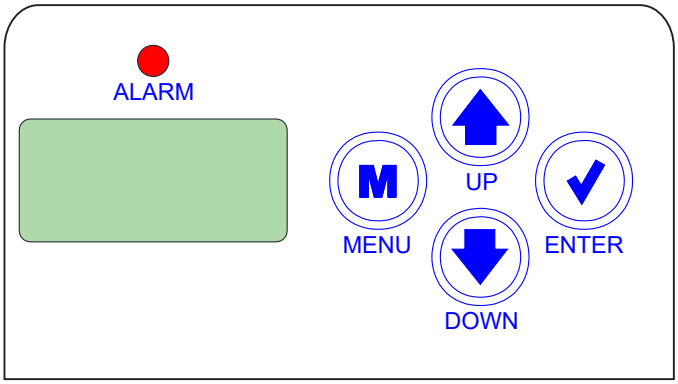
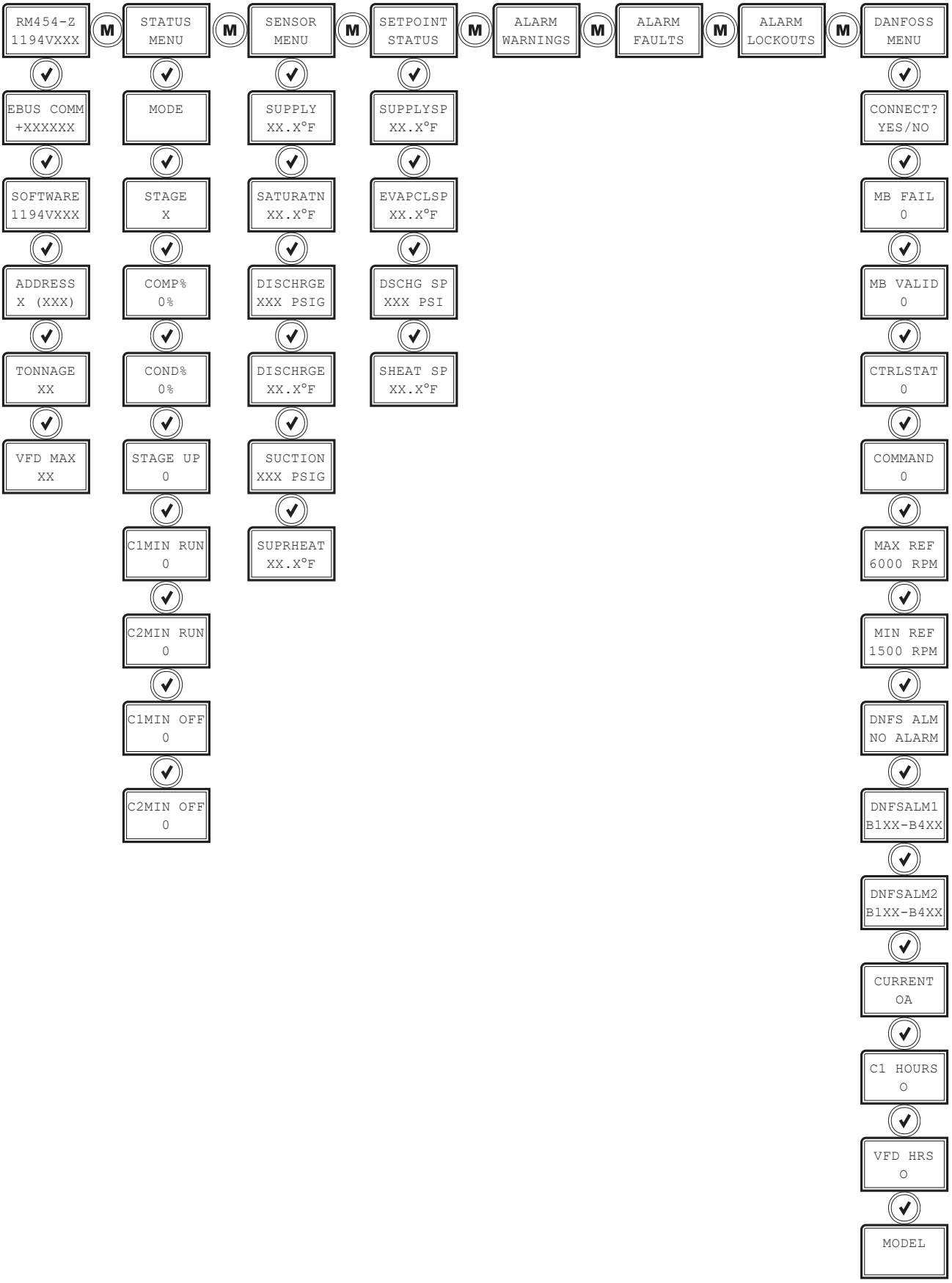


Figure 8: LCD Display and Navigation Keys

NAVIGATION KEY FUNCTIONS	
Navigation Key	**Key Function**
MENU	Use the MENU key to move through screens within Main Menu categories and return to the Main Menu while at other screens.
UP	Use this key to adjust setpoints and change configurations.
DOWN	Use this key to adjust setpoints and change configurations.
ENTER	Use the ENTER key to navigate through the Main Menu Screen categories.

Table 5: Navigation Key Functions

RM454-Z Screens Map



RM454-Z Screen Descriptions

Main Screens

Refer to the following table when navigating through the LCD Main Screens.

Press the **<MENU>** button to navigate between the top level screens. Press the **<ENTER>** button to scroll through the next level screens,

MAIN SCREENS	
Screen Text	**Description**
RM454-Z 1194vXXX	Refrigeration module screens. The second line shows the software number and its version.
EBUS COMM	Number of COMM packets received.
SOFTWARE 1194vXXX	Software version
ADDRESS X (XXX)	Configure the address according to which circuit this module represents. If three RM454-Z modules 1=A, 2=B, 3=C If six RM454-Z modules 1=A, 2=C, 3=E, 4=B, 5=D, 6=F Number in parentheses is E-BUS address. Module 1's address is 177, Module 2's address is 178, Module 3's address is 179, Module 4's address is 180, Module 5's address is 181, Module 6's address is 182
TONNAGE XX	Unit tonnage
VFD MAX XX	Maximum speed based on unit tonnage

Table 6: RM454-Z Main Screens

System Status Screens

Refer to the following map when navigating through the System Status Screens. From the SYSTEM STATUS Screen, press **<ENTER>** to scroll through the screens.

SYSTEM STATUS SCREENS	
Screen Text	**Description**
STATUS MENU	System status screens
MODE	System mode. Options are: • MIN RUN • OFF • COOLING • HEATING • DEHUM • FORCED
STAGE X	Number of stages
COMP% 0%	Compressor status
COND% 0%	Condenser status
STAGE UP 0	Stage up status
C1MIN RUN 0	Compressor 1 minimum run time
C2MIN RUN 0	Compressor 2 minimum run time
C1MIN OFF 0	Compressor 1 minimum off time
C2MIN OFF 0	Compressor 2 minimum off time

Table 7: RM454-Z System Status Screens

RM454-Z Screen Descriptions

Sensor Status Screens

Refer to the following map when navigating through the Sensor Status Screens. From the SENSOR STATUS Screen, press **<ENTER>** to scroll through the screens.

SENSOR STATUS SCREENS	
Screen Text	**Description**
SENSOR STATUS	Sensor status screens
SUPPLY XX.XºF	Supply air temperature reading from input
SATURATN XX.XºF	Saturation temperature reading from input
DISCHRGE XXX PSIG	Discharge pressure reading from input
DISCHRGE XX.X°F	Discharge temperature reading from input
SUCTION XXX PSIG	Suction pressure reading from input
SUPRHEAT XX.XºF	Superheat reading from temperature sensor input

Table 8: RM454-Z Sensor Status Screens

Setpoint Status Screens

Refer to the following map when navigating through the Setpoint Status Screens. From the SETPOINT STATUS Screen, press **<ENTER>** to scroll through the screens.

SETPOINT STATUS SCREENS	
Screen Text	**Description**
SETPOINT STATUS	Setpoint Status screens
SUPPLYSP XX.XºF	Supply temperature setpoint
EVAPLSP XX.XºF	Evaporator coil temperature setpoint
DSCHG SP XXX PSI	Discharge pressure setpoint
SHEAT SP XX.XºF	Superheat setpoint

Table 9: RM454-Z Setpoint Status Screens

Lockouts Screens

If an alarm, fault, or lockout is present, the ALARM LED above the LCD display lights up red and blinks. The alarms, faults, and lockouts scroll automatically from their respective screen when more than one message is present.

ALARMS SCREENS	
Screen Text	**Description**
ALARM WARNINGS	Alarm Status screens
NO WARNINGS	This is shown if there are no current alarms.
WARNINGS!	This is shown if there are active alarms.
LOW SUCT PRESSURE	Low suction pressure.
LOW SUCT NO START	Low suction pressure at startup
HIGH DISCHPSI	High discharge pressure
DISCHPSI NODETECT	Discharge pressure no detected
VFD ALARM	Danfoss VFD alarms
HIGH SUPRHEAT	High superheat
HIGH DISCTEMP	High discharge line temperature
C1 FALSE ACTIVE	Compressor 1 false active
C2 FALSE ACTIVE	Compressor 2 false active
DLT NODETECT	Discharge line temperature sensor not detected

Table 10: RM454-Z Alarms Screens

FAULTS SCREENS	
Screen Text	**Description**
ALARM FAULTS	Alarm Faults screens
NO FAULTS	This is shown if there are no current alarms.
FAULTS!	This is shown if there are active faults.
LOW SUCT PRESSURE	Low suction pressure.
UNSAFE SP	Unsafe suction pressure
HIGH PSI TRIP	High discharge pressure trip
HIGH PSI TRIP C2	Compressor 2 fail from high discharge pressure
C1 NO START	Compressor 1 not running
C2 NO START	Compressor 2 not running
LOW SUPRHEAT	Low superheat
HIGH DISCTEMP	High discharge line temperature
EXV NODETECT	EXV sensor not installed
COMM TIMEOUT	Communications loss
C2 OFF LOW SUCT	Compressor 2 failed from low suction pressure
HIGH SUPRHEAT	High superheat
HIGH EVAPTEMP	High evaporator saturation temperature

Table 11: RM454-Z Faults Screens

Lockouts Screens

If an alarm, fault, or lockout is present, the ALARM LED above the LCD display lights up red and blinks. The alarms, faults, and lockouts scroll automatically from their respective screen when more than one message is present.

LOCKOUTS SCREENS	
Screen Text	**Description**
ALARM LOCKOUTS	Alarm Lockouts screens
NO LOCKOUTS	This is shown if there are no current lockouts.
LOCKOUTS!	This is shown if there are active lockouts.
SUCT PSI LOCKOUT	Low or unsafe suction pressure
LOW OIL LOCKOUT	Low refrigerant oil level
HIGHDISC PSI L/O	High discharge pressure
LOW SH LOCKOUT	Low superheat
HIGH SH LOCKOUT	High superheat
HIGHEVAP LOCKOUT	High evaporating temperature
HIGHDISC TEMP L/O	High discharge line temperature

Table 12: RM454-Z Lockouts Screens

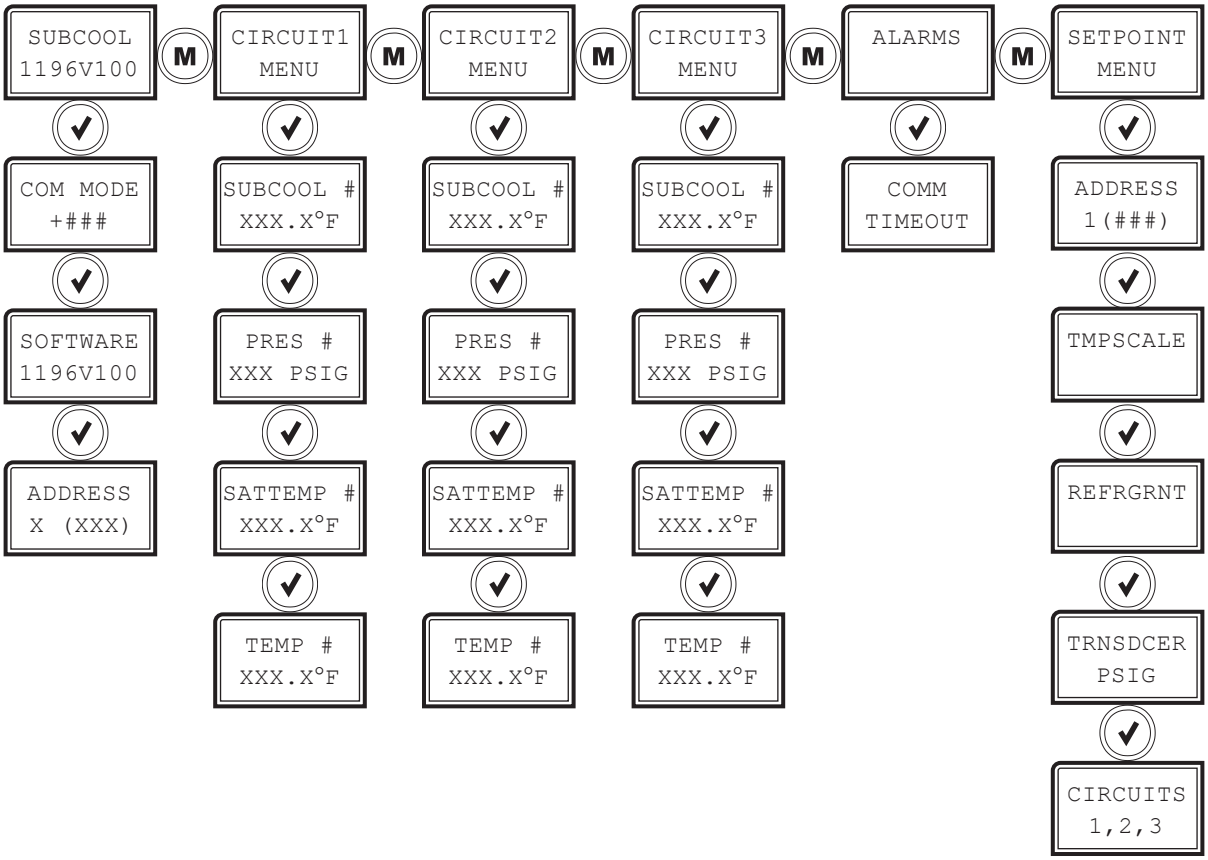
Danfoss Menu Screens

Refer to the following map when navigating through the Screens. From the DANFOSS MENU Screen, press **<ENTER>** to scroll through the screens.

FAULTS SCREENS	
Screen Text	**Description**
DANFOSS MENU	Danfoss Screens menu
CONNECT? YES/NO	Danfoss connection status
MB FAIL 0	MB fail
MB VALID 0	BC valid
CTRL STAT	Control Status The following status message may be displayed in the second line: • DRV STAT • ENABLED? • TRIP ERR • ALT ERR • TRIPLOCK • WARNING? • SPDvsREF • BUS CTRL • FREQ LIM • IN OPER? • STP/AUTO • VOLT LMT • TORQ LMT • TIME LMT
COMMAND 0	Command status. Command speed to VFD. Range 0-100%
MAX REF 6000 RPM	Max ref RPM
MIN REF 1500 RPM	Min ref RPM
DNFS ALM NO ALARM	Notifies if there is a Danfoss alarm present
DNFSALM1 B1XX-B4XX	Danfoss 1 alarms. B1-B4 codes
DNFSALM2 B1XX-B4XX	Danfoss 2 alarms. B1-B4 codes
CURRENT OA	Current OA
C1 HOURS 0	Compressor 1 hours
VFD HRS 0	VFD hours
MODEL	Danfoss model part number

Table 13: RM454-Z Danfoss Screens

RM454-SC (Subcool Monitor) Screens Map



RM454-SC (Subcool Monitor) Module Screen Descriptions

Main Screens

Refer to the following table when navigating through the LCD Main Screens.

Press the **<MENU>** button to navigate between the top level screens. Press the **<ENTER>** button to scroll through the next level screens,

MAIN SCREENS	
Screen Text	**Description**
RM454SC 1196vXXX	RM454-SC home screen
COM MODE +###	EBUS communications diagnostics. Number of packets received.
SOFTWARE 1196vXXX	Software version installed on this module.
ADDRESS X (XXX)	If there is only one Subcool module the address needs to be set to 1. If there are two Subcool modules then board address 1 is for the first 3 circuits and address 2 is for the second 3 circuits Number in parentheses is E-BUS address. Module 1's address is 169, Module 2's address is 170.

Table 14: RM454-SC Main Screens

Circuits 1,2, and 3 Status Screens

Refer to the following map when navigating through the Circuit Status Screens. From the CIRCUIT MENU Screen, press **<ENTER>** to scroll through the screens.

SYSTEM STATUS SCREENS	
Screen Text	**Description**
CIRCUIT # MENU	Circuit Menu. # represents which circuit current being viewed.
SUBCOOL # XXX.X°F	Current subcool temperature
PRESS X XXX PSIG	Liquid line reading from input
SATTEMP # XXX.X°F	Saturated liquid temperature
TEMP # XXX.X°F	Liquid line temperature

Table 15: RM454-SC Circuit Status Screens

RM454-SC (Subcool Monitor) Module Screen Descriptions

Alarms Screens

If an alarm is present, the ALARM LED above the LCD display will light up red and blink. The Alarms will display and scroll automatically from the ALARMS screen when alarms are present.

MAIN SCREENS	
Screen Text	**Description**
ALARMS	Alarms are present
NO ALARMS	No alarms are present
COMM TIMEOUT	This alarm will display if the Subcool Monitor is not communicating with the AAON unit controller.

Table 16: RM454-SC Main Screens

Setpoint Screens

Refer to the following map when navigating through the Setpoint Screens. From the SETPOINT MENU Screen, press **<ENTER>** to scroll through the screens.

SYSTEM STATUS SCREENS	
Screen Text	**Description**
SETPOINT MENU	Subcool Monitor Setpoint Menu
ADDRESS X (XXX)	Unit address. Valid range is 1-59. Default is 59
TMPSCALE	Temperature scaling. Fahrenheit or Celsius
REFRGRNT	Refrigerant type. 410-A, 134a, or R22
TRNSDCER PSIG	Transducer PSIG. 250, 500, or 667
CIRCUITS X	Number of circuits, 1-3

Table 17: RM454-SC Circuit Status Screens

RM454-Z LED Diagnostics

Using RM454-Z LEDs to Verify Operation

The RM454-Zs are equipped with LEDs that can be used to verify operation and perform troubleshooting. See Figure 9, this page for the LED locations. The LEDs associated with these inputs and outputs allow you to see what is active without using a voltmeter. The LEDs and their uses are as follows:

STATUS - If the software is running, this LED will blink according to what mode the RM454-Z is in. See **Table 7, this page**.

No. of Blinks	STATUS LED
1	Off Mode
2	Cool Mode
3	Heat Mode
4	Reheat Mode
5	Force Mode
Fast Blink	Emergency Shutdown

Table 18: STATUS LED Blink Codes

ALARM (on board and above LCD display) - This red LED will blink when there is an alarm present. The type of alarm will display on the LCD display. The ALARM LED also blinks when the expansion valve is initializing at startup.

COMM - Every time the module receives a valid E-BUS request from the AAON unit controller, this LED will blink on and then off, signifying that it received a valid request and responded.

POWER - This LED will light up to indicate that 24 VAC power has been applied to the module.

Binary Input LEDs

BIN1 - This green LED will light up when Compressor 1 Status contact is closed.

BIN2 - This green LED will light up when Compressor 2 Status contact is closed.

BIN3 - This green LED will light up when the Oil Level Switch is closed.

BIN4 - This green LED will light up when the Emergency Shutdown contact is closed.

Relay LEDs

RLY1 - RLY4 - These green LEDs will light up when the relays are enabled and will stay lit as long as they are active.

RM454-Z Stepper Motor Valve LEDs

EXV-1 - This yellow LED will blink to indicate communication to the Superheat Controller. If the LED is on solid that indicates no communication to the superheat controller.

EXV-2 - This yellow LED will blink to indicate communication to the Superheat Controller. If the LED is on solid that indicates no communication to the superheat controller.

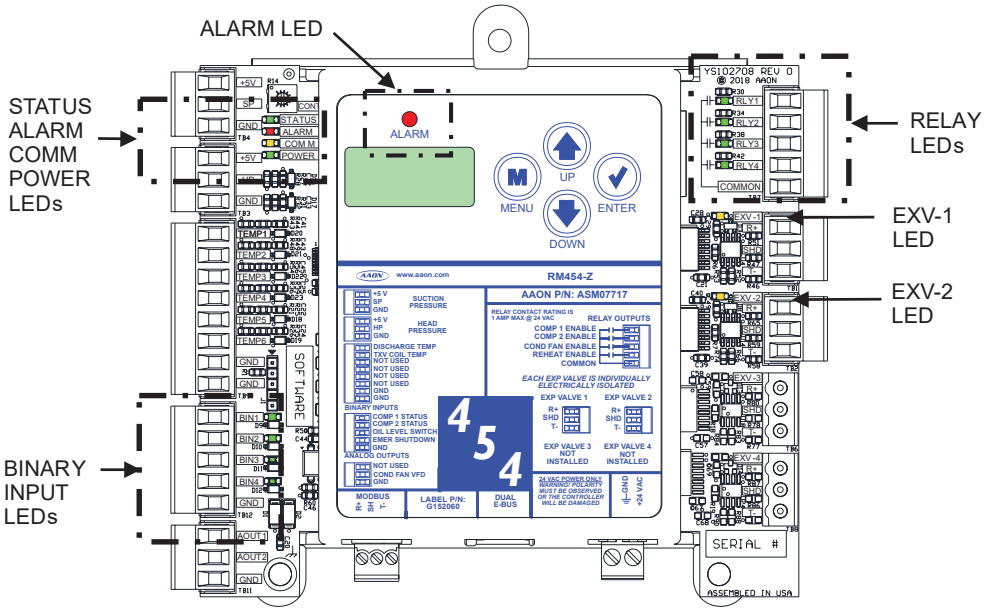


Figure 9: RM454-Z LED Locations

RM454-SC (Subcool Monitor) LED Diagnostics

Using RM454-SC LEDs to Verify Operation

The RM454-SC is equipped with LEDs that can be used to verify operation and perform troubleshooting. See **Figure 10, this page** for the LED locations. The LEDs and their uses are as follows:

POWER - This LED will light up to indicate that 24 VAC power has been applied to the module.

COMM - Every time the module receives a valid E-BUS request from the AAON unit controller, this LED will blink on and then off, signifying that it received a valid request and responded.

STATUS - If the software is running, this LED should blink once every 10 seconds.

ALARM (on board) - If the module does not receive communications for more than one minute, this LED will blink.

ALARM (above LCD display) - This red LED will light up and blink when there is an alarm present. The type of alarm will display on the LCD display.

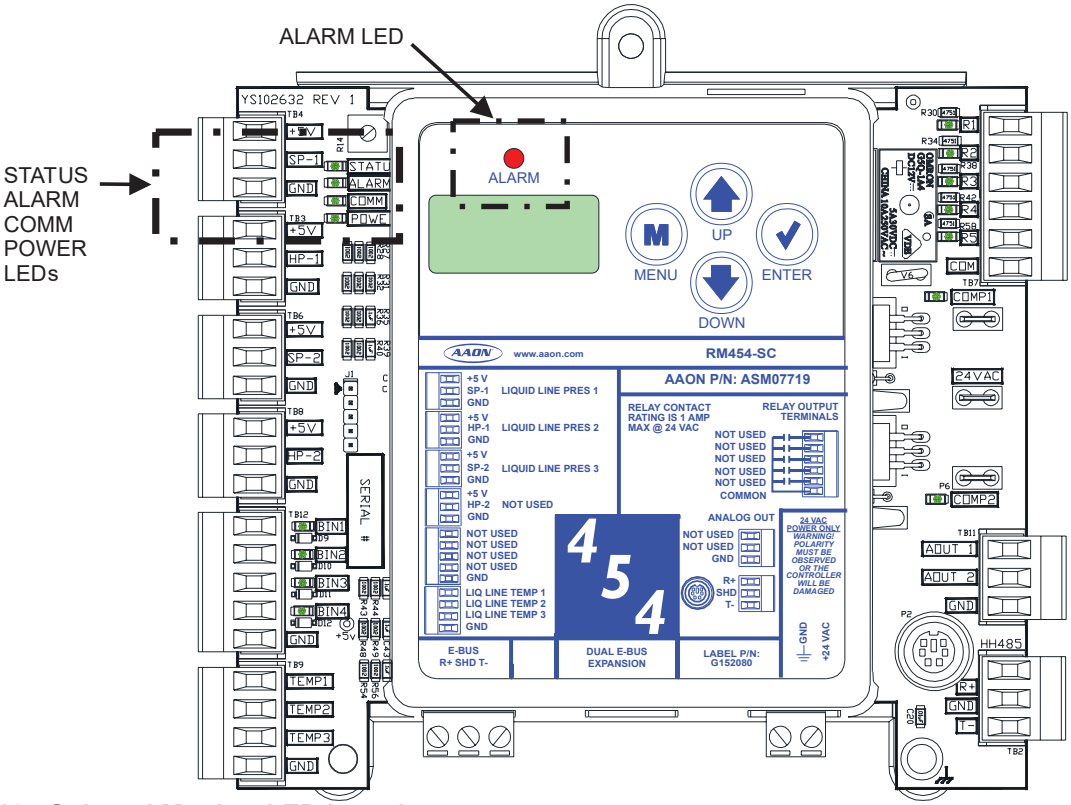


Figure 10: Subcool Monitor LED Locations

Reheat Expansion Module LED Diagnostics

LED Diagnostics

The Reheat Expansion Module is equipped with four LEDs that can be used to verify operation and perform troubleshooting.

See **Figure 10, this page** for the LED locations. The LEDs associated with these inputs and outputs allow you to see what is active without using a voltmeter. The LEDs and their uses are as follows:

Operation LEDs

POWER - This green LED will light up to indicate that 24 VAC power has been applied to the Expansion Module.

STATUS - This green LED will light up and blink every 10 seconds according to valve position. One blink per 10%. Example: valve position is 67%. STATUS LED will blink six times every 10 second cycle. The STATUS LED will stay on solid during the two-minute flush cycle. See **Table 19, this page**.

No. of Blinks	STATUS LED
1-10	Per 10% valve position
Solid	During two-minute flush cycle

Table 19: Reheat Expansion Module ALARM LED Blink Codes

Communication LED

COMM - This amber LED will light up and blink once for every good packet received. Packets should be sent once every second, so the COMM LED should blink the same, once every second. The COMM LED should blink simultaneously on all modules.

Binary Input LED

COMPRESSOR ENABLE - This green LED will light up when the Reheat is enabled.

LED Troubleshooting

"POWER" LED - When the Reheat Expansion Module is powered up, the POWER LED should light up and stay on continuously. If it does not light up, check to be sure that the power wiring is connected to the board, the connections are tight, and the transformer is powered. If after making all these checks, the POWER LED does not light up, the board is probably defective.

"STAT" LED - When the board is first powered up, the STAT LED will do the following:

- On for 10 seconds
- Blinks 30 times
- Status code repeatedly blinks the indicated valve position every ten seconds

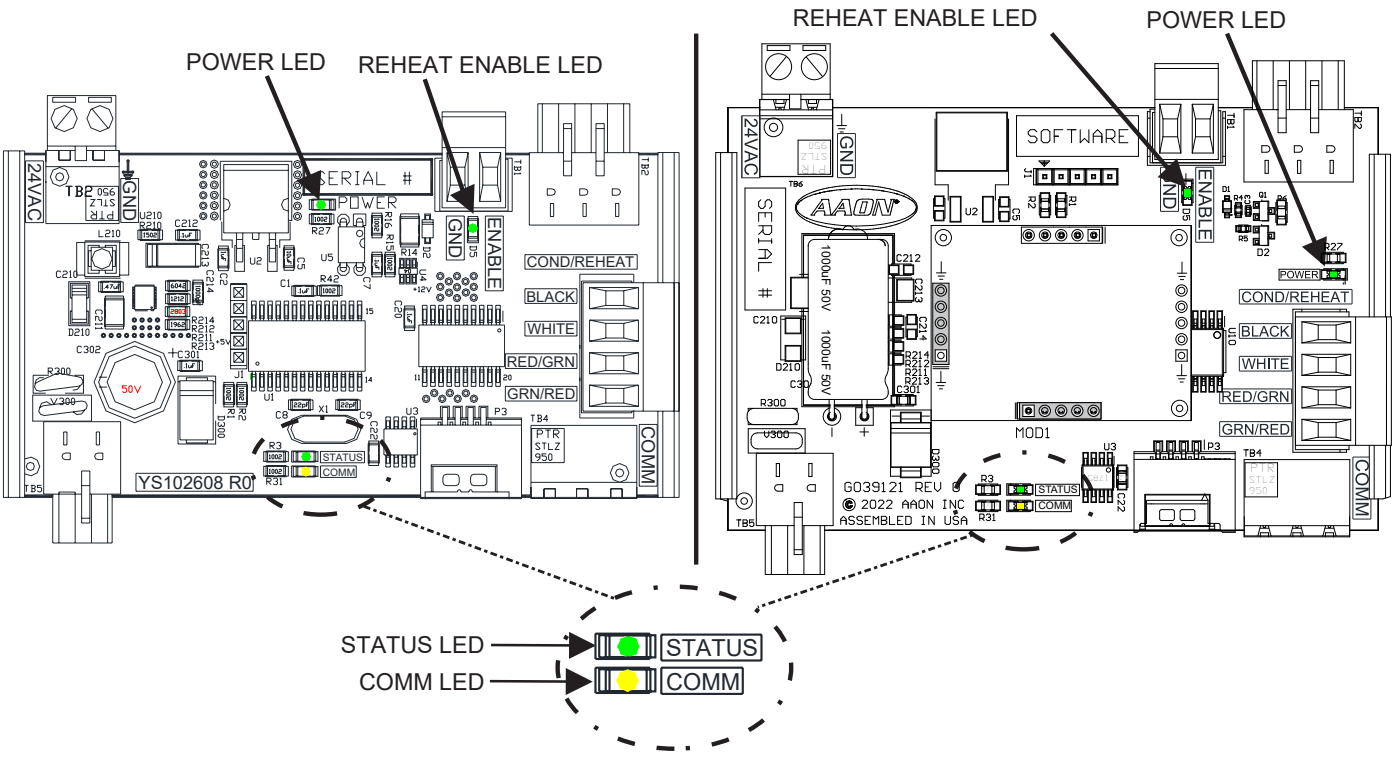


Figure 11: Reheat Expansion LED Locations and Descriptions

Temperature Sensor Testing

Sensor Voltage and Resistance

The following sensor voltage and resistance table is provided to aid in checking sensors that appear to be operating incorrectly. See **Table 20, this page**. Many system operating problems can be traced to incorrect sensor wiring. Be sure all sensors are wired per the wiring diagrams in this manual.

If the sensors still do not appear to be operating or reading correctly, check voltage and/or resistance to confirm that the sensor is operating correctly per the tables. Please follow the notes and instructions that appear after the chart when checking sensors.

TEMPERATURE TO RESISTANCE/VOLTAGE CHART

Temp (°F)	Temp (°C)	Resistance (Ohms)	Voltage @ Input (VDC)	Temp (°F)	Temp (°C)	Resistance (Ohms)	Voltage @ Input (VDC)
-10	**-23.3**	93333	4.620	**72**	**22.2**	11136	2.695
-5	**-20.6**	80531	4.550	**73**	**22.8**	10878	2.665
0	**-17.8**	69822	4.474	**74**	**23.3**	10625	2.635
5	**-15**	60552	4.390	**75**	**23.9**	10398	2.607
10	**-12.2**	52500	4.297	**76**	**24.4**	10158	2.577
15	**-9.4**	45902	4.200	**78**	**25.6**	9711	2.520
20	**-6.6**	40147	4.095	**80**	**26.7**	9302	2.465
25	**-3.9**	35165	3.982	**82**	**27.8**	8893	2.407
30	**-1.1**	30805	3.862	**84**	**28.9**	8514	2.352
35	**1.7**	27140	3.737	**86**	**30**	8153	2.297
40	**4.4**	23874	3.605	**88**	**31.1**	7805	2.242
45	**7.2**	21094	3.470	**90**	**32.2**	7472	2.187
50	**10**	18655	3.330	**95**	**35**	6716	2.055
52	**11.1**	17799	3.275	**100**	**37.8**	6047	1.927
54	**12.2**	16956	3.217	**105**	**40.6**	5453	1.805
56	**13.3**	16164	3.160	**110**	**43.3**	4923	1.687
58	**14.4**	15385	3.100	**115**	**46.1**	4449	1.575
60	**15.6**	14681	3.042	**120**	**48.9**	4030	1.469
62	**16.7**	14014	2.985	**125**	**51.7**	3656	1.369
64	**17.8**	13382	2.927	**130**	**54.4**	3317	1.274
66	**18.9**	12758	2.867	**135**	**57.2**	3015	1.185
68	**20**	12191	2.810	**140**	**60**	2743	1.101
69	**20.6**	11906	2.780	**145**	**62.7**	2502	1.024
70	**21.1**	11652	2.752	**150**	**65.6**	2288	0.952
71	**21.7**	11379	2.722				

Note: If the voltage is above 5.08 VDC the sensor or wiring is “open.” If the voltage is less than 0.05 VDC, the sensor or wiring is shorted.

Table 20: 0-5V Temperature Sensor - Voltage and Resistance for Type III Sensors

Suction Pressure Transducer Testing for R454-B Refrigerant

The evaporator coil temperature is calculated by converting the suction pressure to temperature. The suction pressure is obtained by using the Suction Pressure Transducer, which is connected to the suction line of the compressor.

Use the voltage column to check the Suction Pressure Transducer while connected to the RM454-Z Module. The VCCX-454 and the RM454-Z Module must be powered for this test. Read voltage with a meter set on DC volts. Place the positive lead from the meter on the SP1/SP2 terminal located on the RM454-Z Module terminal block. Place the negative lead from the meter on the ground (GND) terminal located adjacent to the SP1/SP2 terminal on the RM454-Z Module terminal block. Use a refrigerant gauge set and/or an accurate electronic thermometer to measure the temperature or suction line pressure near where the Suction Pressure Transducer is connected to the suction line. Measure the voltage at the SP1/SP2 and GND terminals and compare it to the appropriate chart depending on the refrigerant in use. If the temperature/voltage or pressure/voltage readings do not align closely with the chart, the Suction Pressure Transducer is probably defective and needs to be replaced.

See **Table 21, this page.** The chart shows a temperature range from 21.19°F to 80.18°F. For troubleshooting purposes, the DC voltage readings are also listed with their corresponding temperatures and pressures.

SUCTION PRESSURE TRANSDUCER CHART FOR R454-B REFRIGERANT

Temperature (°F)	Temperature (°C)	Pressure (psi)	Signal DC Volts
23.27		80.94	1.8
27.80		87.16	1.9
30.17		93.39	2.0
33.40		99.62	2.1
36.49		105.84	2.2
39.46		112.07	2.3
42.33		118.29	2.4
45.10		124.52	2.5
47.78		130.75	2.6
50.35		136.97	2.7
52.86		143.20	2.8
55.29		149.42	2.9
57.65		155.65	3.0
59.94		161.88	3.1
62.17		168.10	3.2
64.34		174.32	3.3
66.46		180.55	3.4
68.52		186.78	3.5
70.54		193.00	3.6
72.51		199.23	3.7
74.43		205.46	3.8
76.31		211.68	3.9
78.15		217.91	4.0
79.95		224.14	4.1
81.72		230.36	4.2
83.45		236.59	4.3

Table 21: Suction Pressure Transducer Chart for R454-B Refrigerant

Liquid Line Pressure Transducer and Head Pressure Transducer Testing 0-667 psi

Liquid Line Pressure Transducer Testing

The Liquid Line Pressure is obtained by using the Liquid Line Pressure Transducer, which is connected into the Liquid Line of the compressor.

Use the voltage column to check the Liquid Line Pressure Transducer while connected to the Subcool Monitor Module. The module must be powered for this test. Read voltage with a meter set on DC volts. Place the positive lead from the meter on the SIG input terminal located on the module. Place the negative lead from the meter on the ground (GND) terminal located adjacent to the SIG terminal on the module. Use a refrigerant gauge set to measure the suction line pressure near where the Liquid Line Pressure Transducer is connected to the discharge line. Measure the voltage at the SIG and GND terminals and compare it to the appropriate chart depending on the refrigerant you are using. If the pressure/voltage readings do not align closely with the chart, your Liquid Line Pressure Transducer is probably defective and will need to be replaced.

Head Pressure Transducer Testing

Use the voltage column to check the Head Pressure Transducer while connected to the RM454-Z Module. The module must be powered for this test. Read voltage with a meter set on DC volts. Place the positive lead from the meter on the HP input terminal located on the module. Place the negative lead from the meter on the ground (GND) terminal located adjacent to the HP terminal on the module. Use a refrigerant gauge set to measure the line pressure near where the Head Pressure Transducer is connected to the condenser. Measure the voltage at the HP and GND terminals and compare it to the appropriate chart depending on the refrigerant you are using. If the pressure/voltage readings do not align closely with the chart, your Head Pressure Transducer is probably defective and will need to be replaced.

0-667 PSI TRANSDUCER CHART			
Voltage	Pressure	Voltage	Pressure
0.5	0	**2.6**	350
0.6	17	**2.7**	367
0.7	33	**2.8**	384
0.8	50	**2.9**	400
0.9	67	**3.0**	417
1.0	83	**3.1**	434
1.1	100	**3.2**	450
1.2	117	**3.3**	467
1.3	133	**3.4**	484
1.4	150	**3.5**	500
1.5	167	**3.6**	517
1.6	183	**3.7**	534
1.7	200	**3.8**	550
1.8	217	**3.9**	567
1.9	233	**4.0**	584
2.0	250	**4.1**	600
2.1	267	**4.2**	617
2.2	283	**4.3**	634
2.3	300	**4.4**	650
2.4	317	**4.5**	667
2.5	334		

Table 22: 0-667 psi Transducer Chart

Parameter Configurations

DANFOSS CDS803 AND CDS303 PARAMETER SETUP			
Parameter	**Name**	**Value to Set**	**Value Description**
1-00	Configuration Mode	0	Speed Open Loop
1-13	Compressor Selection	TBD	Based on Compressor Model connected
3-10	Preset Reference	0	Must remain zero for open loop
3-14	Preset Relative Ref	0	Fixed value added to variable value
3-15	Reference Resource 1	11	Local Bus Reference
3-16	Reference Resource 2	0	No Function
3-17	Reference Resource 3	0	No Function
8-01	Control Site	2	Control word only
8-02	Control Word source	1	FC Port RS-485
8-03	Control Timeout	20	20 second timeout
8-04	Control Word T/O Function	5	Stop and Trip
28-10	Oil System Recovery	0	Disable Built-in Oil Boost
8-30	Protocol	2	Modbus RTU
8-31	Address	1	Modbus Address (1 = default)
8-32	Baud Rate	3	19200 Baud
8-33	Parity / Stop bit	0	Even Parity / 1 Stop bit
Additional CDS803 Parameters			
3-00	Reference Range	0	Min - Max
3-13	Reference Site	1	Remote
0-20	Motor Speed Unit	0	RPM (vs. Hz)
Key			
	blue = user must configure from display		
	yellow = set through communications once communications is established		
	green = default but confirm if not working		

Table 23: Danfoss VFD Parameter Configurations

Module and Condenser Configuration in Prism 2

RM454-Z Module Configuration

In Prism 2's "Configuration 1 Page", select the radio button for "Check this box for RM454-Z modules", select the radio button for "3 Circuit 1 Sub-Cool" or "6 Circuit 2 Sub-Cool", and then select the check box for "RM454-Z Has Sub-Cooling Module" if you are using it. See **Figure 12, this page**.

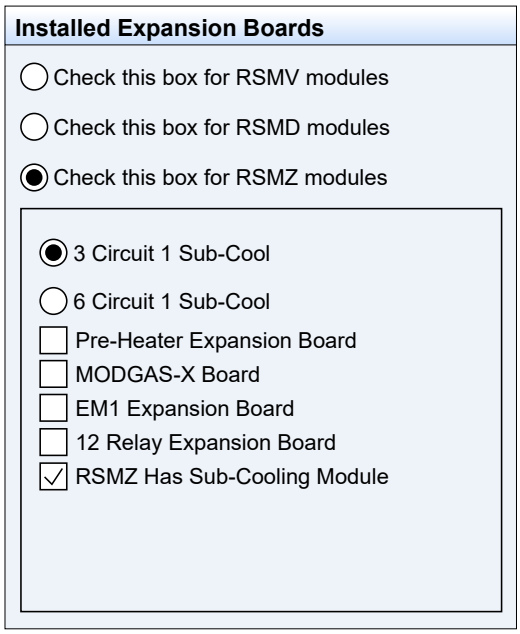


Figure 12: RM454-Z Module Configuration

RM454-Z Condenser Configuration

Select Prism 2's RM454-Z module tab selection. In "Single Condenser Per Module" wiring configuration, the Condenser Signal is wired to AO2 and the Condenser Relay (RLY3) is enabled. See **Figure 13, this page**.

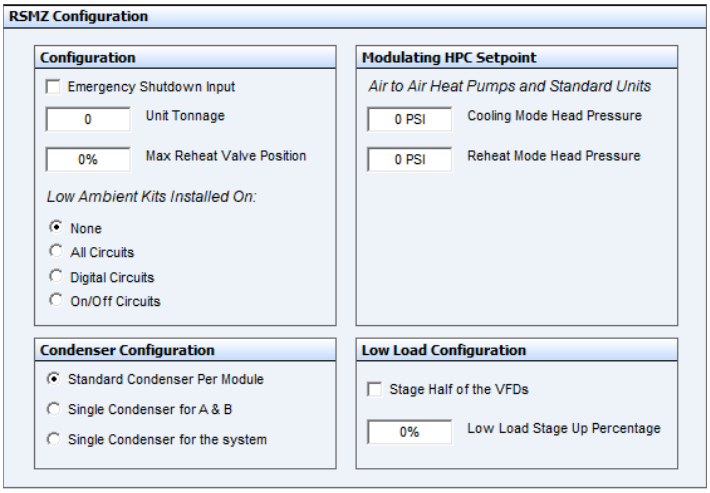
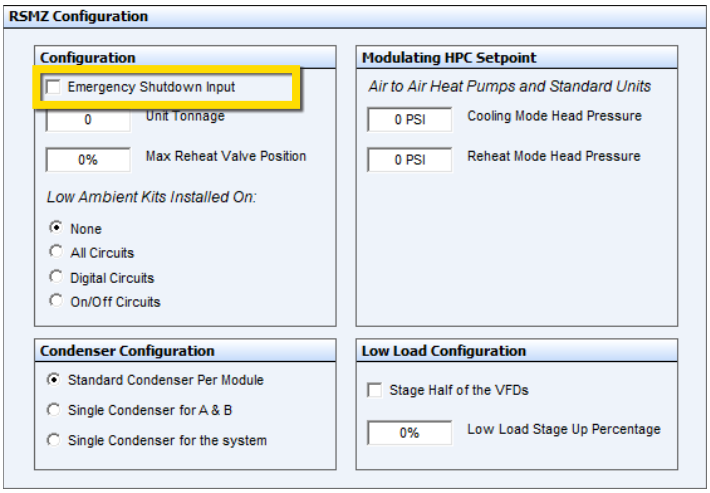


Figure 13: Prism 2 RM454-Z Configuration Page

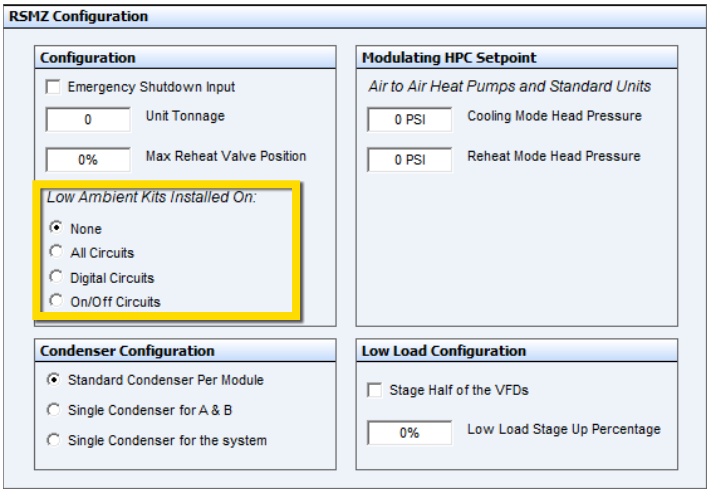
Emergency Shutdown

If the emergency shutdown input is being used on the first module this configuration will need to be selected.



Low Ambient Kits Installed On:

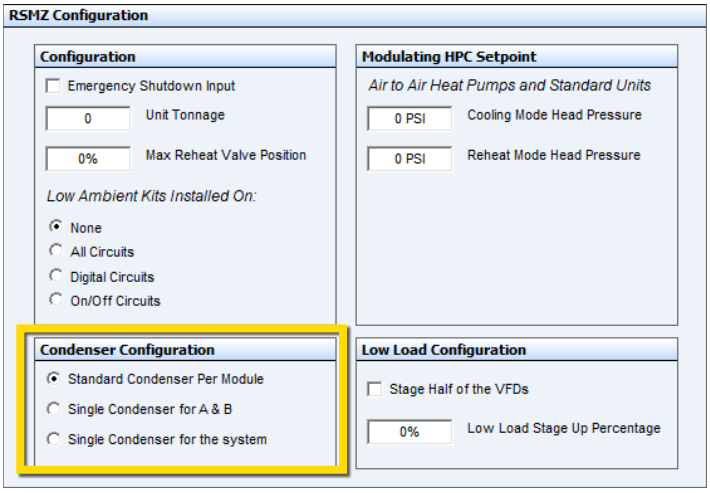
If low ambient kits are installed on the unit select which circuits they are installed on



Module and Condenser Configuration in Prism 2

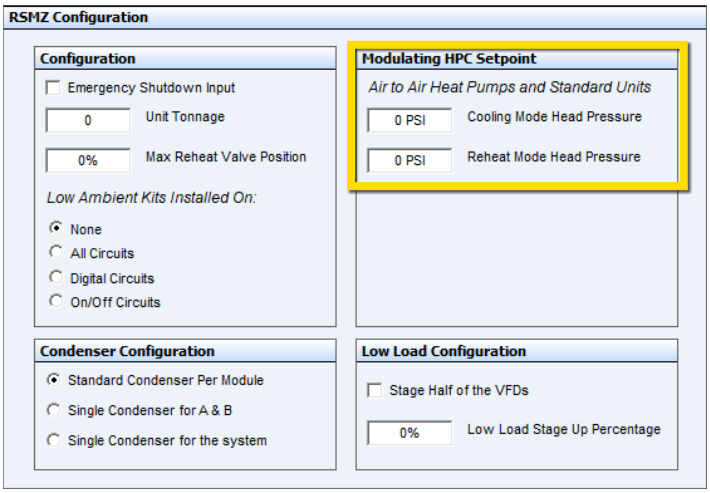
Condenser Configuration

If each module is controlling condenser fans for its circuit only select Standard Condenser Per Module. If there is single condenser control for the variable circuits and the tandem circuits have there own then select Single Condenser for A & B. If there is single condenser control for the system then select Single Condenser for the system.



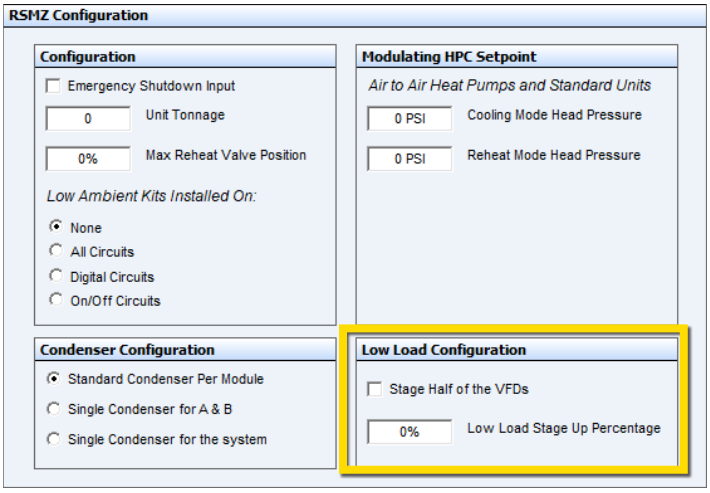
Modulating HPC Setpoint

Enter the head pressure setpoints used for cooling and dehumidication modes.



Low Load Configuration

When Stage Half of the VFDs is selected the unit will only turn on half of the VFD circuits at startup instead of all of them. Once the VFD percentage reaches the Low Load Stage Up Percentage the other VFD compressor will activate.



RM454-Z Module Technical Guide

Rev. A · 240927

AAON Controls Support:
866-918-1100
Monday through Friday, 7:00 AM to 5:00 PM Central Time

Controls Support website:
www.aaon.com/aaon-controls-technical-support

AAON Factory Technical Support:
918-382-6450 | techsupport@aaon.com

NOTE: Before calling Technical Support, please have the model and serial number of the unit available.

PARTS: For replacement parts, please contact your local AAON Representative.

2425 So. Yukon Ave • Tulsa, OK • 74107-2728
Ph: (918) 583-2266 • Fax: (918) 583-6094
Rev. A
Created in the USA • © September 2024 AAON
All Rights Reserved