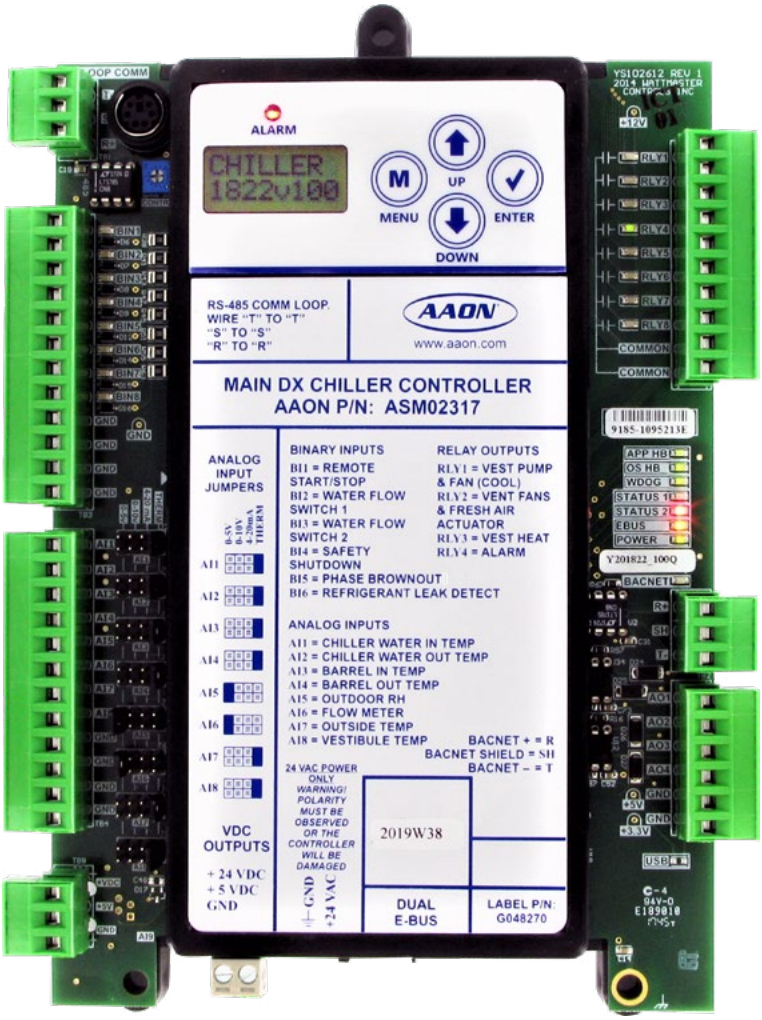
DX Chiller Controller Technical Guide

DX Chiller Controller Code: Version 1.00 and later



WARNING

QUALIFIED INSTALLER

IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE, OR MAINTENANCE CAN CAUSE PROPERTY DAMAGE, PERSONAL INJURY, OR LOSS OF LIFE. INSTALLATION AND SERVICE MUST BE PERFORMED BY A TRAINED, QUALIFIED INSTALLER. A COPY OF THIS MANUAL SHOULD BE KEPT WITH THE UNIT AT ALL TIMES.

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AAON P/N: G054280, Rev. 01B

DX CHILLER CONTROL SYSTEM TECHNICAL GUIDE	
REVISION & DATE	**CHANGES**
Rev. 01B, January 6, 2020	Revised BACnet Parameters: Revised AI:7 & AI:8 names . Removed WSE Inlet and Outlet Heat Exchange setpoints. Added new BI:6 & new BI:20 Revised BI:9 & BI:10 names. Multi-State Value changed to Multi-State Input.
Rev. 01B, January 9, 2020	Change to Chiller Run Mode sequence p.7, Cooling Mode Sequence p.9. Added new alarm sequence, Low Ambient Protection, p.10. Change to Evaporative Condenser Control Sequence p.11. Change to Low Sump Temp alarm p.12.
Rev. 01B, January 9, 2020	Chiller WSE Module - AIN1: Valve Outlet Temp Mixed Temperature verbage added. AIN2: Outlet Temperature verbage added. p.17 in table and p.26 in wiring.
Rev. 01B, January 9, 2020	Chiller WSE LCD screen changes, pp.54 & 56. Evaporative Condenser LCD screen change, p.58.
Rev. 01B, February 3, 2020	Multi-State Inputs changed from 0-6 to 1-7, p.68.

DX CHILLER CONTROL SYSTEM	
PART DESCRIPTION	**AAON P/N**
Main DX Chiller Controller	ASM02317
Chiller Refrige A Module	ASM02312
Chiller Refrige B Module	ASM02313
Chiller Diagnostic Module	ASM02314
Evaporative Condenser Module	ASM02318
Waterside Economizer Module	ASM02333
E-BUS Horizontal Outdoor Air Temp & RH Sensor	ASM01836
Prism 2 Software	N/A
CommLink 5	ASM01874
IP Module Kit	ASM01902
USB-Link 2	ASM02244
EBC 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 Foot 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. EBC Cable	ASM01635
E-BUS Adapter Board	ASM01878

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Features & Applications

Control System Features & Applications

The Main DX Chiller Controller is only used with non-Turbocor® Compressors in Chiller Operation. The Controller provides control of the Leaving Water Temperature for a DX Chiller.

The Main DX Chiller Controller has an on-board BACnet® port for connection to a BACnet® MS/TP BAS network. There are also (2) E-BUS Expansion Ports which allow for the connection of the Chiller Refrigerant Modules, Chiller Diagnostic Module, and Evaporative Condenser Module, and Chiller WSE Module via EBC E-BUS cables.

In addition, the Controller and its associated modules contain a 2 x 8 LCD character display with 4 buttons that allow for status and alarm display and BACnet® configuration for the Main Controller.

Manual Overview

This guide will lead you through each section of the *DX Chiller Controller Technical Guide*. Below is a quick overview of each section of this manual.

Section 1: Sequence of Operations - Page 7—This section contains the sequence of operations for the DX Chiller Controller and its modules.

Section 2: Wiring - Page 15—This section contains the inputs, outputs, and wiring for the controller and modules.

Section 3: Troubleshooting - Page 29—This section contains sensor testing charts and controller LED diagnostics.

Appendices A,B,C,D,E: LCD Display Screens - Page 42—These appendices describe the controller and module LCD screens.

Appendix F: BACnet® Configuration - Page 62—This section lists BACnet® parameters, definitions, and ranges, if applicable.

Appendix G: PRISM 2 User Interface - Page 69—This section gives a brief overview of the Prism 2 user interface of the DX Chiller Control System.

Chiller Mode of Operation

The chiller mode of operation shall be controlled based off the Chilled Water Out Temperature. There are 2 operational modes for the Chiller system:

1. Off Mode
2. Chiller (Run) Mode

Power Up Delay

Once power is applied to the unit, the control algorithm will not start until 30 (adjustable) seconds has expired.

Chiller Run/Stop Commands

Binary Input #1 on the Main DX Chiller Board must have 24VAC applied to it for the Chiller to Run. If this input is not energized, then no other remote run request will be honored.

The Run command is sent from a BMS via BACnet. It can also be commanded to run from an internal schedule when the internal schedule calculates it should be in the run mode.

Run/Stop commands from BMS (via BACnet) or User Interface have the following values:

0 = Auto which means Chiller would use Internal Schedule.

1 = Chiller Run Command

2 = Chiller Stop Command

Internal Schedule

The internal Schedule's default is 24/7 operation. This way if the Remote Unit Start/Stop binary input is being used, the Chiller will be enabled when input is active.

If Schedule is Required

1. Chiller will be On when schedule is between Start and Stop time periods.
2. Chiller will be Off when schedule is between Stop and Start time periods.

Vestibule Cooling

Chiller is Running

If the vestibule temperature is above the Vestibule Cool Setpoint the controller will energize the Vestibule Cool Relay.

The Vestibule Cool Relay turns on the Vestibule Pump and the Vestibule Cool 1 Fan.

Chiller is Not Running (Off Mode)

If the vestibule temperature is above the Vestibule Cool Setpoint, the controller will energize the Vestibule Vent and Fresh Air Actuator Relay.

Vestibule Heating

Heating is manually controlled by switches in the Vestibule and is not affected by the Main Board operations.

Chiller Off Mode

1. Shut off all compressors once minimum runtimes are satisfied.
2. Set Water Side Economizer Module to Off Mode.
3. Set Evaporative Condenser Module to Off Mode.

Chiller Run Mode

Once a valid command to Run is received or calculated from the internal schedule, the system will enter the Run Mode. An external device is controlling the main water loop so the Water Proof of Flow input is monitored and is given 10 seconds to validate water flow before timing out and generating an alarm and shutting down the Chiller and all expansion modules.

Once water flow is proven, the decision is made as to the first source of cooling. If the outdoor air temperature is below the Chilled Water In by an adjustable Water Side Economizer enable deadband, the Water Side Economizer is enabled for operation and begins its control operations.

If the outdoor air is not below the Chilled Water In, the Compressors are enabled to operate and the Water Side Economizer is not used unless the Outdoor Air Temperature drops below the Chilled Water In by the Side Economizer enable deadband.

The purpose of the Water Side Economizer and/or Compressors is to maintain the Leaving Water Temperature.

If the mechanical cooling is not locked out due to the outdoor air temperature being below the cooling lockout setpoint, the compressor modules are enabled to operate and control the leaving water temperature to setpoint.

DX Chiller Controller Operation

Controlling Sensor Input Alarms

Alarms indicate a problem with a sensor; it is either shorted or open.

The following sensors related to the entire system are tested:

Chilled Water In Temperature
If failed, then Lock Out the system.

Chilled Water Out Temperature
If failed, then Lock Out the system.

Ambient (Outdoor) Temp Sensor
If failed, then Lock Out the system.

Vestibule Temp Sensor Lock Out
Turn on the Vent Fan if the Ambient is above 40°F. If the Ambient is below 40°F, shutdown any active cooling or venting of the vestibule.

Phase Brownout (PBO) Alarm

The Phase Brownout binary input requires a continuous 24VAC applied to indicate normal operation. If this 24VAC signal is lost, it indicates an issue with the supply voltage and a special Lockout State is entered.

When this Lockout State is entered, all compressors will shut down immediately without regard for pump down or minimum runtimes. If the 24VAC is restored to the PBO input, normal operations will resume if there are no other conditions preventing the restart of the Chiller. The 30 second startup delay period will once again be required to complete before any control operations commence.

Safeties & Faults

Proof of Water Flow Alarm
Proof of Flow (POF) is the base operational control. The system is inactive until POF is made. Once running, if POF is lost for more than 10 seconds, the system will shutdown immediately with no pump down or minimum runtime delays.

High Leaving Water Temperature
If the Leaving Water Temperature is higher than the Entering Water Temperature by 4°F for 60 seconds (adjustable), a High Leaving Water Temperature Alarm will be generated and the Chiller will be locked out until a manual reset is received. The lockout will immediately shutdown all operations.

Low Leaving Water Temperature
If the Leaving Water Temperature drops below 35°F (adjustable) for more than 5 seconds, the system will shutdown and remain locked out until the Leaving Water Temperature rises 5°F above the adjustable low limit setpoint.

Power Up Delay

Once power is applied to the unit, the control algorithm will not start until 30 seconds has expired. **NOTE:** 100% valve position equals max valve position that can be less than full open.

Cooling Mode

WSE Cooling

1. If the ambient temperature is below the Chilled Water In by the WSE Enable deadband of 2°F (adjustable), then the WSE will be used as the primary source of cooling.

   1.1. If the Mixed Water Temperature Out (MWTO) is above the MWTO setpoint, then the 3-way valve will start modulating open until the MWTO reaches the MWTO setpoint. The modulation rate will be adjustable.

   1.2. If the 3-way valve is at 100% and MWTO is above setpoint, then the WSE VFD controlled fans are turned on at minimum speed, and the 3-way valve will modulate until the MWTO reaches the MWTO setpoint.

   1.3. If the 3-way valve is at 100% and the WSE VFD controlled fans are at minimum speed and the MWTO is above the MWTO setpoint, the WSE fans shall modulate up until the MWTO reaches the MWTO setpoint. The time when the 3-way valve is at 100% and the WSE VFD controlled fans are at minimum speed will be adjustable. The fan modulation rate will be adjustable.

   1.4. The WSE fans will modulate up until the MWTO reaches the MWTO setpoint.

   1.5. If the WSE fans reaches 100% and the MWTO is still above the MWTO setpoint, then Compressor Cooling will be enabled.

   1.6. The WSE fans and the 3-way valve will stay at 100% when Compressors are running.

2. If Compressor Cooling is active and the ambient temperature drops below the the Chilled Water In by the WSE Enable deadband, the WSE should be enabled.

   2.1. The WSE Fans will start at 100%.

   2.2. The 3-way valve should modulate open over a field adjustable time from 1-30 minutes.(default is 30 min). This allows the Compressors to respond to the reduced entering water temp without tripping.

   2.3. The WSE Fans and 3-way valve should stay at 100% until the compressors stage off.

   2.4. Once compressors are off, the WSE fans can modulate to maintain the MWTO setpoint.

   2.5. If the WSE Fans are at minimum and the MWTO is below setpoint, the WSE Fans will de-energize.

   2.6. The 3-way valve will then modulate to maintain the MWTO setpoint.

3. If the WSE and Compressor Cooling is active and the ambient temperature rises above the Chilled Water In minus the WSE Enable deadband, the WSE will be disabled.

   3.1. The 3-way valve should modulate closed over a field adjustable time from 1-30 minutes.(default is 1 minute). This allows the Compressors to respond to the increased entering water temp without tripping.

   3.2. The WSE Fans will stay at 100% while 3-way valve is closing.

   3.3. Once the 3-way valve is closed, then WSE Fans will de-energize.

WSE Controller Operation

Controlling Sensors

The following sensors are needed:

WSE Outlet Temperature

Measures the temperature of the water coming out of the WSE.

WSE Valve Outlet Mixed Temperature

Measures the temperature of the water after the 3-way mixing valve.

Alarms & Faults

WSE VFD Fault

1. If the VFD is indicating a fault:
   1.1. An alarm will indicate the VFD fault.
   1.2. Operations will continue as if the VFD were operational.

Freeze Protection

1. If the WSE Outlet Temperature drops below the freeze protection temperature setpoint:
   1.1. An alarm will indicate the WSE is in freeze protection operation.
   1.2. The WSE Fans will be disabled.
   1.3. The 3-way mixing valve will open to pass 100% water to the WSE coils.
2. If the WSE Outlet Temperature rises 5°F above the freeze protection temperature setpoint:
   2.1. The freeze protection alarm will clear.

Low Ambient Protection

1. If the WSE is disabled and the Outdoor Air Temperature drops 2°F below the WSE Outlet Temperature:
   1.1. Open the 3-way mixing valve 15%.

WSE Valve Outlet Mixed Temperature Sensor Failure

1. An alarm will indicate the sensor failure.
2. If the Leaving Water Temperature (LWT) for the chiller is available to the WSE controller:
   2.1. Normal operations will continue substituting the LWT for the primary mixing valve outlet temperature in the control sequences.
   2.2. **NOTE:** It will be up to the controller commanding the WSE operation to make any operate/don't operate decisions or to adjust target temperatures to cause operation to continue in conjunction with chiller operations which will also be affecting LWT.
3. If the Leaving Water Temperature for the chiller is not available to the WSE controller:
   3.1. The WSE is forced to the off mode condition.
   3.2. An additional alarm is set indicating the WSE is not operating.

Evaporative Condenser Control

Heat Rejection using Evaporative Condenser as First Stage

1. If the Outside Air (OA) Temperature is above the Evaporative Condenser first stage toggle setpoint, (adjustable between 35°F and 110°F), the Evaporative Pump is the first stage of heat rejection.
   1.1. Configurable to use Wetbulb instead of Drybulb if OA Humidity Sensor is connected.
2. First stage of heat rejection.
   2.1. The Condenser Pump cycles to maintain the Head Pressure setpoint of the circuit with the highest Head Pressure.
3. Second stage of heat rejection.
   3.1. If the pumps are on and any head pressure is above setpoint by the head pressure deadband, start the Condenser Fans.
   3.2 The Condenser Fan ECM's modulate to maintain head pressure setpoint on their circuit.
   3.3. **NOTE:** The condenser fans can drop to 0, thus exiting the second stage operation.

Heat Rejection using Condenser Fans as First Stage

1. If the Outside Air (OA) Temperature is above the Evaporative Condenser first stage toggle setpoint, the Condenser Fans are the first stage of heat rejection.
2. First stage of heat rejection.
   2.1. The Condenser Fan ECM's modulate to maintain head pressure setpoint on their circuit.
3. Second stage of heat rejection.
   3.1. If any Condenser Fan ECM's is at 100% speed and the head pressure is above setpoint by the head pressure deadband, start the Condenser Pump.
   3.2 The Condenser Fan ECM's modulate to maintain head pressure setpoint on their circuit.
   3.3. If the Condenser Fans drop below the pump off limit of 30%, turn the condenser pumps off, thus exiting the second stage operation.

Evaporative Condenser Pump Lockout

1. If the Outside Air (OA) Temperature below 35°F (adjustable 35°F to 50°F), the evaporative condenser will be locked out.
2. The OA Temperature needs to rise above 35°F to be able to use the evaporative condenser.

Sump Control

1. Up to (3) Sump Temperature Sensors can be installed.
2. If any of the Sump temps drop below the Sump Heater Enable Temperature setpoint (default 50°F, adjustable), then turn on the Sump Heater relay.
3. The Heater stays on until the lowest sump temperature is a Sump Heat Dead band (adjustable) above the Sump Heater Enable setpoint.

Sump Drain Valve/Disable Makeup Water Relay

1. This relay can be controlled via a BACnet® point.
2. When it is active, it will disable the Makeup water controller.
3. 24 VAC will also be sent to the Drain Valve Low Voltage terminal block when the relay is active.

Evaporative Condenser Control Operation

Alarms & Faults

Low Sump Level

If the Low Sump contact closes, then the Evaporative Condenser and Sump Heater are disabled.

Low Sump Temp

This alarm will generate when the Low Sump Temperature is below 35°F. The Drain/Makeup Water relay will activate and the Evaporative Condenser and Sump Heater will be disabled. This alarm stays active until power is cycled or if the Drain/Makeup Water relay is commanded on via BACnet®.

Condenser Pump Pressure

If the Condenser Pumps turn on and there is no signal at the Pump Pressure Binary Input for 15 seconds, then the Condenser Pump 1 Pressure alarm will be active.

1. The Pump is disabled when alarm occurs.
2. Will retry 3 times then shut off until power is reset.
3. The Evaporative Condenser will be disabled and the Condenser Fans will be used.

Condenser Pump Current Fault

If the Condenser Pump turns on and there is no increase of current at the Condenser Pump Amps
Analog Input for 15 seconds, then the Condenser Pump 1 Fault alarm will be active.

1. The Pump is disabled when alarm occurs.
2. The Evaporative Condenser will be disabled and the Condenser Fans will be used.

Condenser Pump High Current Fault

If the Condenser Pump is on and the current is above the Max Current setpoint for 5 seconds, then the Condenser Pump 1 High Current Fault Alarm will occur.

1. The Pump is disabled when alarm occurs.
2. The Evaporative Condenser will be disabled and the Condenser Fans will be used.

Condenser Pump High Current Fault

If the condenser fan fault opens and the head pressure is not being controlled by Condenser Pump, the Chiller compressor operations will be disabled until Fault is cleared.

Power Up Delay

Once power is applied to the unit, the control algorithm will not start until 30 seconds has expired.

Chiller Mode

1. When the Chilled Water Out Temperature sensor is above the Chilled Water Target Setpoint, the cooling capacity will be started. If the WSE is operating at maximum capacity and the Chiller Leaving Water Temperature is still above the setpoint, then mechanical cooling should be enabled (as long as the Outside Air Temperature is above the lockout setpoint).

2. Mechanical cooling will be disabled if the ambient temperature is below the Ambient Compressor Lockout Setpoint (adjustable to 0°F). Default value is 25°F.

Mechanical Cooling

1. Turning Compressors On/Off

1.1. If a compressor is allowed to run and capacity control logic asks for it, the compressor will be started. The flow switch should always be evaluated to allow mechanical cooling to run. If the flow switch input is lost, then all compressors should shut off immediately, regardless of minimum run time.

1.2. For variable capacity compressors, they will be started at 100% for 15 seconds. This will be done through the VFD, then released at minimum speed, and modulated from there to maintain the target Leaving Water Temperature.

2. Staging on Fixed Capacity Compressors

2.1. Variable capacity compressor needs to be at 100% for a stage up delay.

2.2 The Leaving Water Temperature must be above the Leaving Water Setpoint.

3. Staging off Fixed Capacity Compressors

3.1. Variable capacity compressor needs to be at 0% for a stage down delay.

3.2 The Leaving Water Temperature must be below the Leaving Water Setpoint.

4. Compressor Envelope Protection

4.1 The controller will try to keep the compressor within its operating envelope to prevent damage to the compressor.

5. Compressor Modulation

5.1. Modulate the compressors to achieve the Leaving Water Temperature Setpoint.

5.1.1 If the Leaving Water Temperature is above the setpoint, the compressor modulation signal will increase.

5.1.2. If the Leaving Water Temperature is below the setpoint, the compressor modulation signal will decrease.

5.1.3. The modulation interval rate is adjustable.

6. Alarm Setpoints - (Will have glycol % selection to automatically adjust low suction)

6.1. Low Suction 105 PSI (default)

6.1.1 Adjustable time delay (default 1 minute)

6.1.2. Adjustable setpoint (this will be automatically adjusted based on glycol % configured)

6.1.3. Must rise above Low Suction Setpoint to retry.

6.1.4. Alarm lockout circuit after 3 tries in 2 hours

6.2. Unsafe Suction 20 PSI

6.2.1 5 second time delay (non-adjustable)

6.2.2. Must rise above Low Suction Setpoint to retry.

6.2.3. Alarm lockout circuit after 3 tries in 2 hours

6.3. Chiller VFD Circuit Pump down

6.3.1 Before the refrigerant circuit's compressor are both off, a pump-down sequence is performed.

6.3.2. For a pump-down, close EXVs and run compressors at current speed until PSI drops below 95 or 30 seconds has elapsed.

7. Condenser Fan Modulation to Maintain Discharge Pressure

7.1. Condenser Fan Configurations

7.1.1 One fan output per module

7.1.1.1. Discharge pressure from each module controls output on each module.

7.2. Controlling Discharge pressure sensors based on configuration

7.2.1 Controlling sensor is always discharge pressure sensor on each module. Each Control bank control from the highest of the pressure readings.

7.3. Modulation sequence in cooling

7.3.1 Fans control to PID based off head pressure.

7.3.1.1. Fan starts at Starting Condenser Fan Speed setpoint.

7.3.2. Fan modulates using PID to maintain head pressure setpoint

7.3.2.1 Head pressure setpoint is sent from main controller.

7.3.2.2. Default is 315 psi

7.3.3. If head pressure exceeds 425psig (Evap Cond only), fan is forced to 100%

7.3.3.1 If still high, back down compressors.

7.3.3.2. Turn off one compressor if discharge pressure reaches 475psig.

7.3.3.3. Mechanical Trip at 500psig

7.4 Setpoints

7.4.1. Starting Condenser Fan Speed 21%

7.4.1.1. Adjustable %.

7.4.2. Condenser target PSI 315 psi

7.4.2.1. Adjustable setpoint

7.4.3 Condenser minimum speed 10%

7.4.3.1 Adjustable setpoint

7.4.4. Low discharge PSI 200 PSI

7.4.4.1 Adjustable time delay

7.4.4.2 Adjustable setpoint

7.4.4.3 Alarm lockout circuit

7.4.5. High discharge temperature 225 degrees

7.4.5.1 Adjustable setpoint

7.4.5.2 Alarm lockout circuit

8. Electronic Expansion Valve (EEV) Control

8.1. Electronic Expansion Valves

8.1.1. 2500 step Sporlan Valves driven from 0 – 10-volt analog output signal to MCS battery backed module.

8.2. EEV Configuration

8.2.1. One EXV per module

8.3. Superheat Calculation

8.3.1. Superheat A = Suction Line Temperature Sensor A – Saturation Temperature Calculated from Suction Pressure Sensor A

8.3.2. Superheat B = Suction Line Temperature Sensor B – Saturation Temperature Calculated from Suction Pressure Sensor B

8.4. Modulation sequence in Cooling

8.4.1. EEV initialize to a starting position for a starting duration

8.4.2. EEVs will modulate using a PID algorithm.

8.5 Setpoints

8.5.1. Superheat target 12 degrees

8.5.1.1. Adjustable setpoint (10 degrees is min)

8.5.1.2 Adjustable PID

8.5.2. Minimum EEV position 5%.

8.5.2.1. Adjustable setpoint

8.5.2.2 Adjustable PID

8.5.3 Maximum EEV position 100%

8.5.3.1 Adjustable setpoint

8.5.4. Low superheat 4 degrees

8.5.4.1 Adjustable time delay until alarm occurs.

8.5.4.2 Adjustable temperature (4 degrees is min)

8.5.5. EEV startup time is 30 seconds

8.5.5.1 Adjustable time

8.5.6. EEV Startup position 30%

8.5.6.1 Adjustable setpoint

8.5.7. High suction superheat 40 degrees

8.5.7.1 Adjustable setpoint

8.5.7.2 Time period 1 minute

8.5.7.3 Alarm

9. Discharge Superheat

9.1. Discharge Superheat is currently calculated for information purpose only.

9.2. Measures Discharge Pressure and Discharge Line Temperature and calculates Discharge Superheat.

10. Subcooling

10.1. Subcooling is currently calculated for information purpose only.

10.2. Measures Liquid Line Pressure and Liquid Line Temperature to calculate Subcooling.

Main DX Chiller Controller & Refrigerant Module A Input/Output Maps

Input/Output Maps

See **Table 1** for the Main DX Chiller Controller Inputs/Outputs and **Table 2** for the Chiller Refrigerant A Module Inputs/Outputs.

MAIN DX CHILLER CONTROLLER	
Analog Inputs	
1	Chiller Water In Temperature (AI1)
2	Chiller Water Out Temperature (AI2)
3	Barrel In Temperature (AI3)
4	Barrel Out Temperature (AI4)
5	Outdoor Air Humidity (AI5)
6	Flow Meter (AI6)
7	Outside Air Temperature (AI7)
8	Vestibule Temperature (AI8)
Binary Inputs	
1	Remote Start/Stop (BIN1)
2	Water Flow Switch 1 (BIN2)
3	Water Flow Switch 2 (BIN3)
4	Safety Shutdown (BIN4)
5	Phase Brownout (BIN5)
6	Refrigerant Leak Detect (BIN6)
Binary Outputs (24 VAC)	
1	Vestibule Pump & Fan (Cool) (RLY1)
2	Vent Fans & Fresh Air Actuator (RLY2)
3	Vestibule Heat (RLY3)
4	Alarm (RLY4)
Communication Terminals	
BAC-NET	Communication Terminals Block
DUAL E-BUS	2 EBC E-BUS Ports
Additional Inputs	
NOTE: The following E-BUS sensor could be connected to the Main DX Chiller Controller via E-BUS port or E-BUS adapter: 1. E-BUS Horizontal Outdoor Air Temperature & RH Sensor	

Table 1: Main DX Chiller Controller Inputs & Outputs

CHILLER REFRIGERANT A MODULE	
Analog Inputs	
1	Suction Line Pressure A (0-5VDC) (AIN1)
2	Discharge Line Pressure A (0-5VDC) (AIN2)
3	Suction Line Temperature Sensor A (AIN3)
4	Discharge Line Temperature Sensor A (AIN4)
5	Not Used (AIN5)
6	Liquid Line Pressure A (0-5VDC) (AIN6)
7	Liquid Line Temperature Sensor A (AIN7)
Binary Inputs	
1	Compressor A1 Status (BIN1)
2	Compressor A2 Status (BIN2)
3	Compressor A1 VFD Fault (BIN3)
4	Circuit A Disable (BIN4)
5	Condenser Fan Faults (BIN5)
Analog Outputs (0-5 VDC)	
1	Compressor A1 VFD (AO1)
2	Condenser A Fans (AO2)
3	Expansion Valve A (AO3)
Binary Outputs (24 VAC)	
1	Compressor A1 Enable (RLY1)
2	Compressor A2 Enable (RLY2)
3	Condenser A Fans Enable (RLY3)
Communication Terminals	
E-BUS	(2) E-BUS Ports

Table 2: Chiller Refrige A Module Inputs & Outputs

Refrigerant Module B & Evaporative Condenser Module I/O Maps

Input/Output Maps

See **Table 3** for the Chiller Refrigerant B Module Inputs/Outputs and **Table 4** for the DX Chiller Evaporative Condenser Module Inputs/Outputs.

CHILLER REFRIGERANT B MODULE	
Analog Inputs	
1	Suction Line Pressure B (0-5VDC) (AIN1)
2	Discharge Line Pressure B (0-5VDC) (AIN2)
3	Suction Line Temperature Sensor B (AIN3)
4	Discharge Line Temperature Sensor B (AIN4)
5	Not Used (AIN5)
6	Liquid Line Pressure B (0-5VDC) (AIN6)
7	Liquid Line Temperature Sensor B (AIN7)
Binary Inputs	
1	Compressor B1 Status (BIN1)
2	Compressor B2 Status (BIN2)
3	Not Used (BIN3)
4	Circuit B Disable (BIN4)
Analog Outputs (0-5 VDC)	
1	Compressor B1 VFD (AO1)
2	Condenser B Fans (AO2)
3	Expansion Valve B (AO3)
Binary Outputs (24 VAC)	
1	Compressor B1 Enable (RLY1)
2	Compressor B2 Enable (RLY2)
3	Condenser B Fans Enable (RLY3)
Communication Terminals	
E-BUS	(2) E-BUS Ports

Table 3: Chiller Refrige B Module Inputs & Outputs

DX CHILLER EVAPORATIVE CONDENSER MODULE	
Analog Inputs	
1	Condenser Pump 1 Amps (SP)
2	Condenser Pump 2 Amps (HP)
3	Sump Temperature Sensor 1 (TEMP1)
4	Sump Temperature Sensor 2 (TEMP2)
5	Sump Temperature Sensor 3 (TEMP3)
6	Low Sump (Dry Contact) (TEMP4)
Binary Inputs	
1	Pump 1 Pressure (BIN1)
2	Pump 2 Pressure (BIN2)
3	Condenser Pump 1 VFD Fault (BIN3)
4	Condenser Pump 2 VFD Fault (BIN4)
Binary Outputs (24 VAC)	
1	Condenser Pump 1 Enable (RLY1)
2	Condenser Pump 2 Enable (RLY2)
3	Sump Heat Enable (RLY3)
4	Drain Valve / Disable Make-Up Water (RLY4)
Communication Terminals	
DUAL E-BUS	2 EBC E-BUS Ports

Table 4: DX Chiller Evaporative Condenser Module Inputs & Outputs

Input/Output Maps

See **Table 5** for the Chiller Diagnostics Module Inputs/Outputs and **Table 6** for the DX Chiller WSE Module Inputs/Outputs.

CHILLER DIAGNOSTICS MODULE	
Analog Inputs (0-5 VDC)	
1	Compressor A1 Amps (AIN1)
2	Compressor A2 Amps (AIN2)
3	Condenser Fan A1 Amps (AIN3)
4	Condenser Fan A2 Amps (AIN4)
5	Compressor B1 Amps (AIN5)
6	Compressor B2 Amps (AIN6)
7	Condenser Fan B1 Amps (AIN7)
8	Condenser Fan B2 Amps (AIN8)
Communication Terminals	
E-BUS	(2) E-BUS Ports

Table 5: Chiller Diagnostics Module Inputs & Outputs

DX CHILLER WSE MODULE	
Analog Inputs - 10K @ 77 Deg F Type 3 Thermistors	
1	Primary Mixing Valve Outlet Temperature Sensor (AIN1) (Valve Outlet Mixed Temperature)
2	Primary Mixing Valve Feed Temperature Sensor (AIN2) (Outlet Temperature)
3	Heat Exchanger Secondary Side Inlet Temperature Sensor (AIN3)
4	Heat Exchanger Secondary Side Outlet Temperature Sensor (AIN4)
Binary Inputs	
1	VFD Fault (BIN1)
Analog Outputs	
1	VFD Speed (AO1)
2	Primary 3-Way Mixing Valve Actuator (AO2)
3	Secondary 3-Way Mixing Valve Actuator (AO3)
Binary Outputs (24 VAC)	
1	Fan 1 Enable (RLY1)
2	Fan 2 Enable (RLY2)
3	Fan 3 Enable (RLY3)
4	Not Used (RLY4)
5	Not Used (RLY5)
6	Not Used (RLY6)
7	Not Used (RLY7)
8	Pump Enable (RLY8)
Communication Terminals	
E-BUS	(2) E-BUS Ports

Table 6: DX Chiller WSE Module Inputs & Outputs

Main DX Chiller Controller Input Wiring

Main DX Chiller Controller Input Wiring

The Main DX Chiller Controller provides control of the Leaving Water Temperature for a DX Chiller.

The Controller is designed with 8 analog inputs, 4 analog outputs, 8 binary inputs, and 8 relay outputs.

The Controller has an on-board BACnet® port for connection to a BACnet® MS/TP network. There are also 2 E-BUS Expansion Ports which allow the connection of communicating sensors and future E-BUS Modules via modular cable assemblies.

The Controller contains a 2 x 8 LCD character display and 4 buttons that allow for status and alarm display as well as BACnet® configuration.

See **Figure 1** below for input wiring.

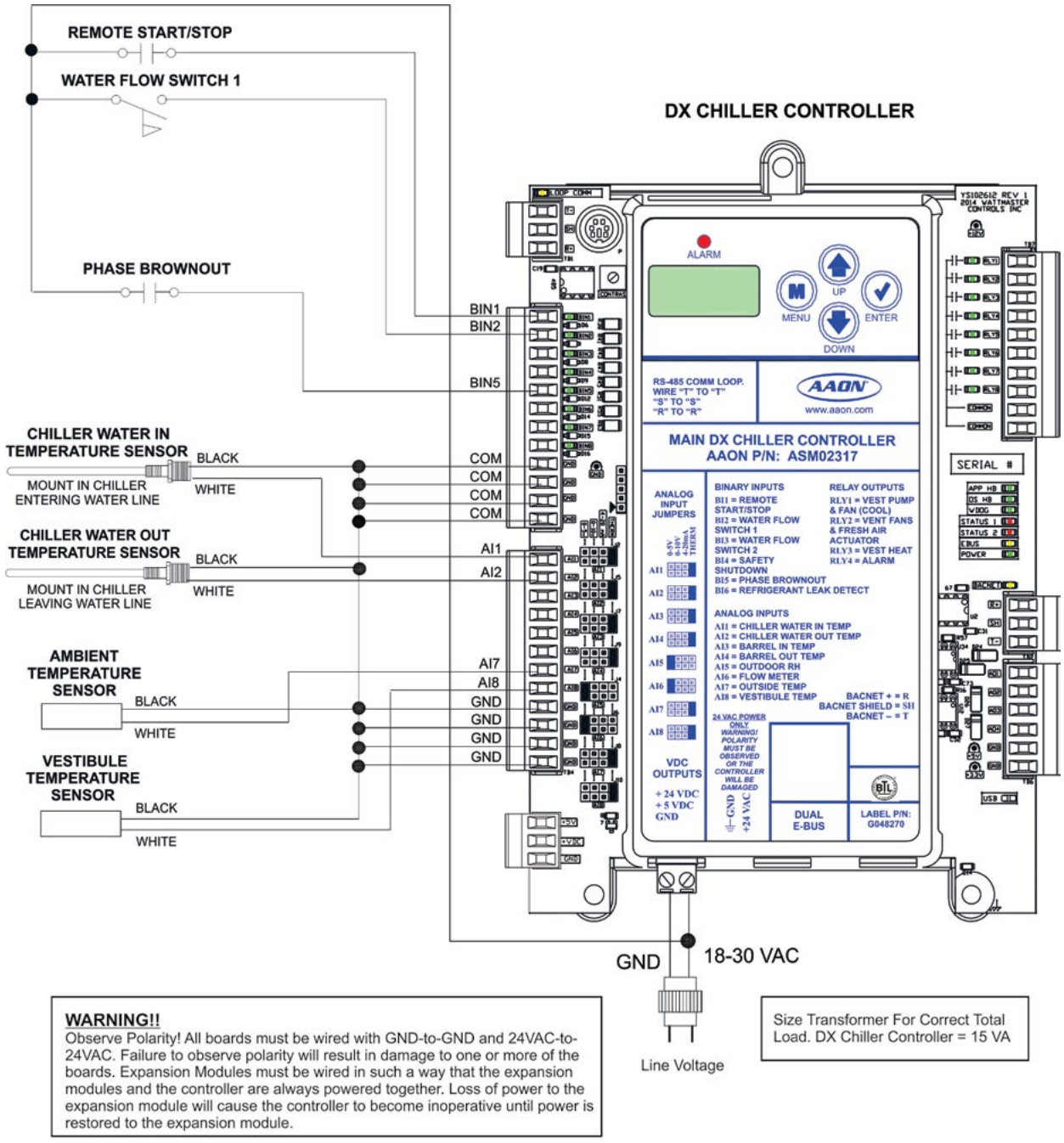


Figure 1: Main DX Chiller Controller Input Wiring

Main DX Chiller Controller Output Wiring

The DX Chiller Controller has (2) E-BUS Expansion Ports which allow for the connection of the Chiller Refrigeration Modules, the DX Chiller Evaporative Condenser Module, the DX Chiller Diagnostic Controller, and the DX Chiller WSE Controller via EBC E-BUS Cables.

The DX Chiller Controller must be connected to a 18-30 VAC power source. Please see **Table 11, page 41** for correct VA requirements to use when sizing the transformer(s) used for powering the Controller and its associated modules.

Also, please note that when wiring the DX Chiller Controller, its contacts must be wired as wet contacts (connected to 24 VAC).

See **Figure 2** below for output wiring.

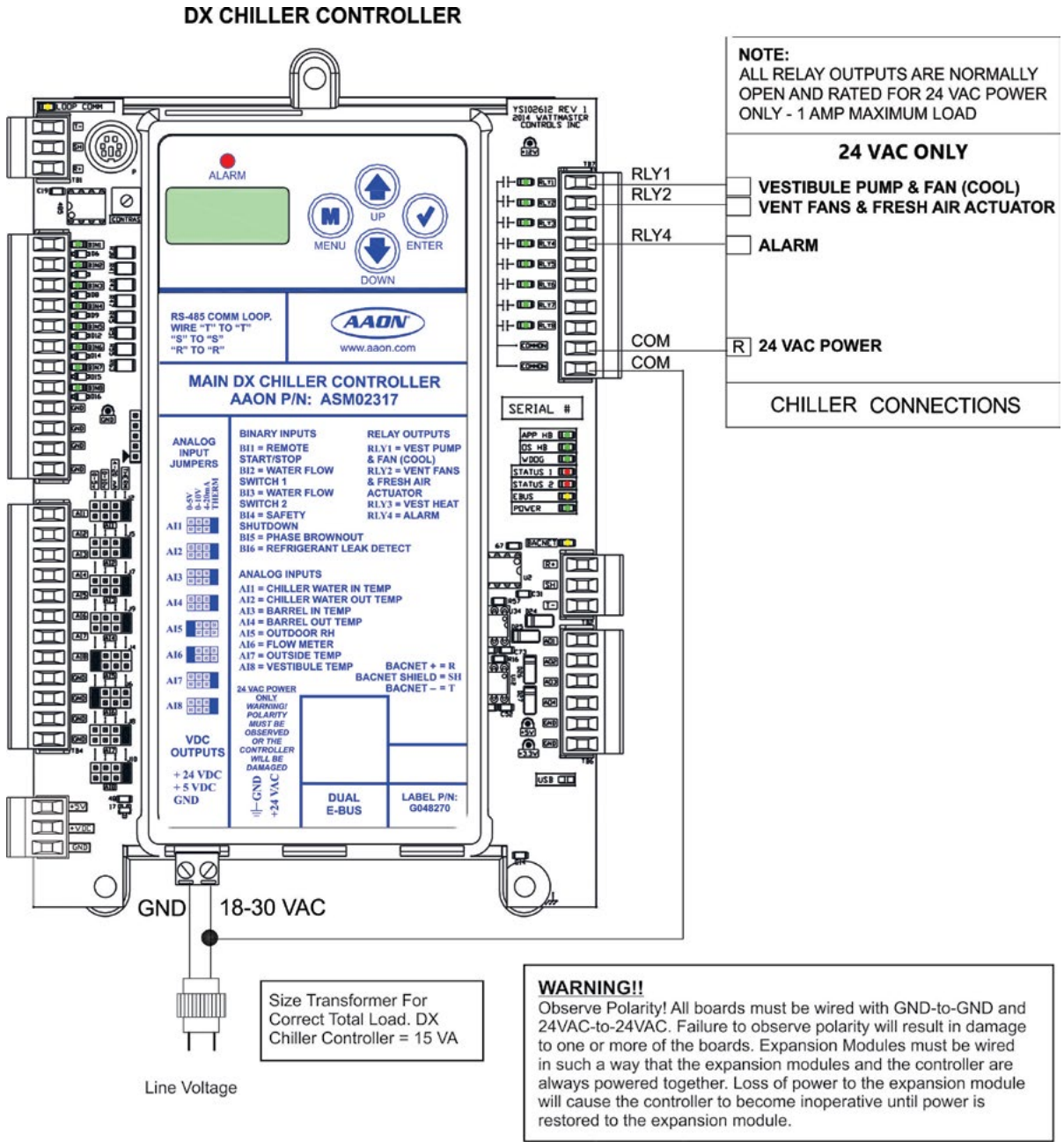


Figure 2: Main DX Chiller Controller Output Wiring

Chiller Refrigeration A Module Input Wiring

Chiller Refrigeration A Module Input Wiring

The Chiller Refrigerant A Module provides control of the compressors and condenser fans on a DX Chiller.

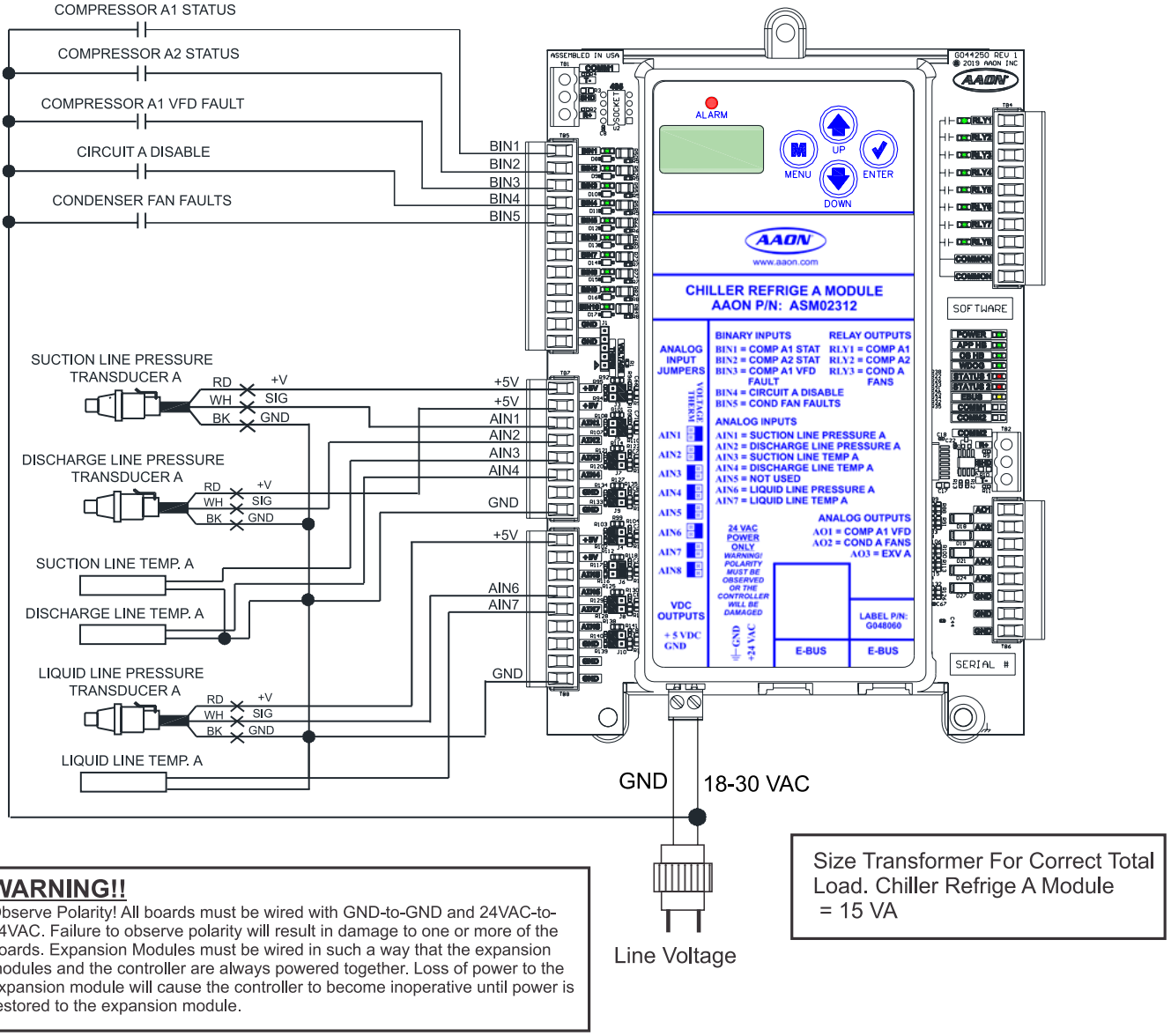
The Module is designed with 8 analog inputs, 5 analog outputs, 10 binary inputs, and 8 relay outputs.

The Module has 2 E-BUS Expansion Ports which allow the connection of communicating sensors and future E-BUS Modules via modular cable assemblies.

The Module contains a 2 x 8 LCD character display and 4 buttons that allow for status and alarm display.

The Chiller Refrigerant Module must be connected to an 18-30 VAC power source. When wiring the Refrigerant Module, its relay outputs must be wired as wet contacts (connected to 24 VAC).

See **Figure 3** below for input wiring.



WARNING!!
Observe Polarity! All boards must be wired with GND-to-GND and 24VAC-to-24VAC. Failure to observe polarity will result in damage to one or more of the boards. Expansion Modules must be wired in such a way that the expansion modules and the controller are always powered together. Loss of power to the expansion module will cause the controller to become inoperative until power is restored to the expansion module.

Size Transformer For Correct Total Load. Chiller Refrige A Module = 15 VA

Figure 3: Chiller Refrigeration A Module Input Wiring

Chiller Refrigeration A Module Output Wiring

See **Figure 4** below for output wiring.

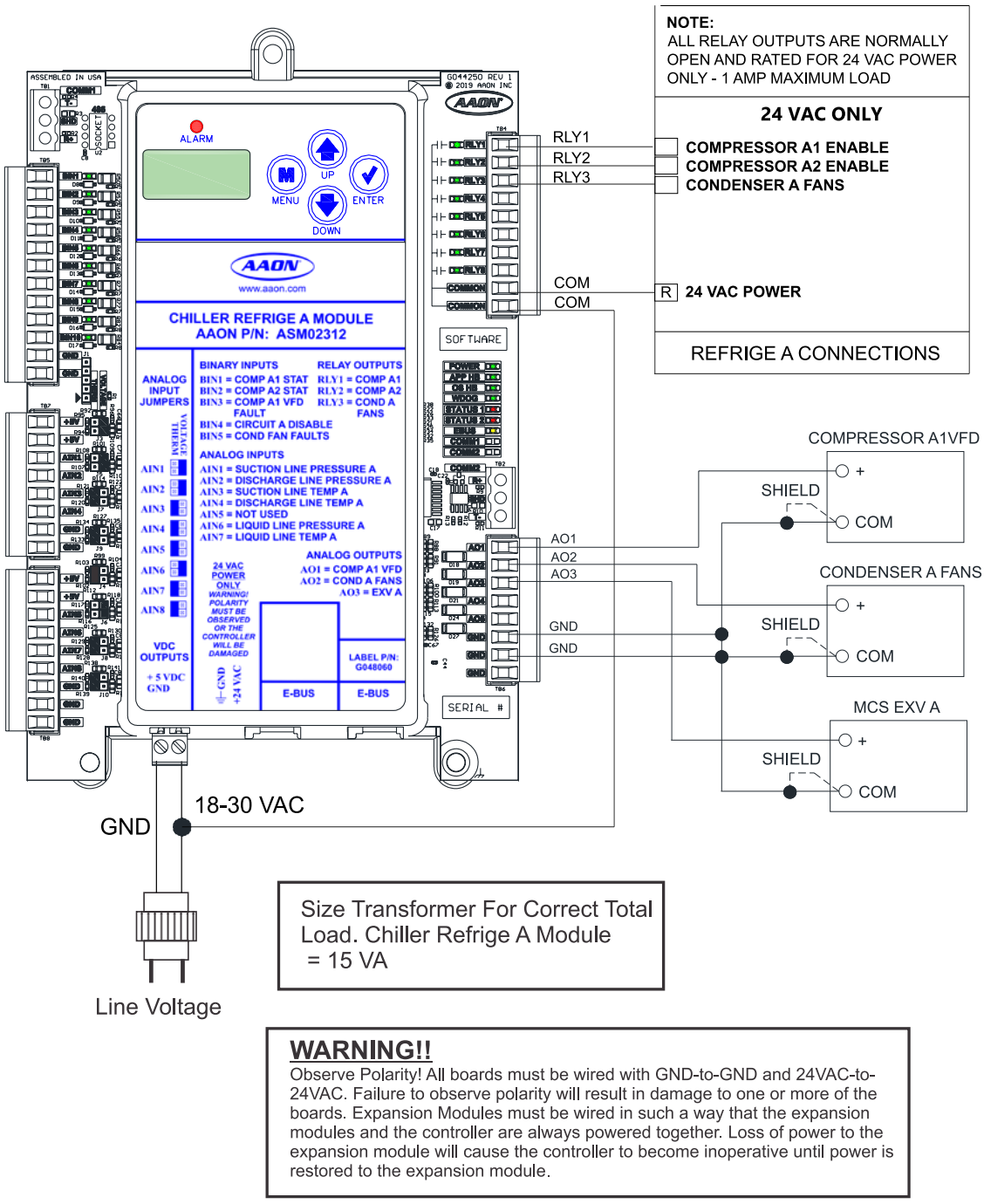


Figure 4: Chiller Refrigeration A Module Output Wiring

Chiller Refrigeration B Module Input Wiring

Chiller Refrigeration B Module Input Wiring

The Chiller Refrigerant B Module provides control of the compressors and condenser fans on a DX Chiller.

The Module is designed with 8 analog inputs, 5 analog outputs, 10 binary inputs, and 8 relay outputs.

The Module has 2 E-BUS Expansion Ports which allow the connection of communicating sensors and future E-BUS Modules via modular cable assemblies.

The Module contains a 2 x 8 LCD character display and 4 buttons that allow for status and alarm display.

The Chiller Refrigerant Module must be connected to an 18-30 VAC power source. When wiring the Refrigerant Module, its relay outputs must be wired as wet contacts (connected to 24 VAC).

See **Figure 5** below for input wiring.

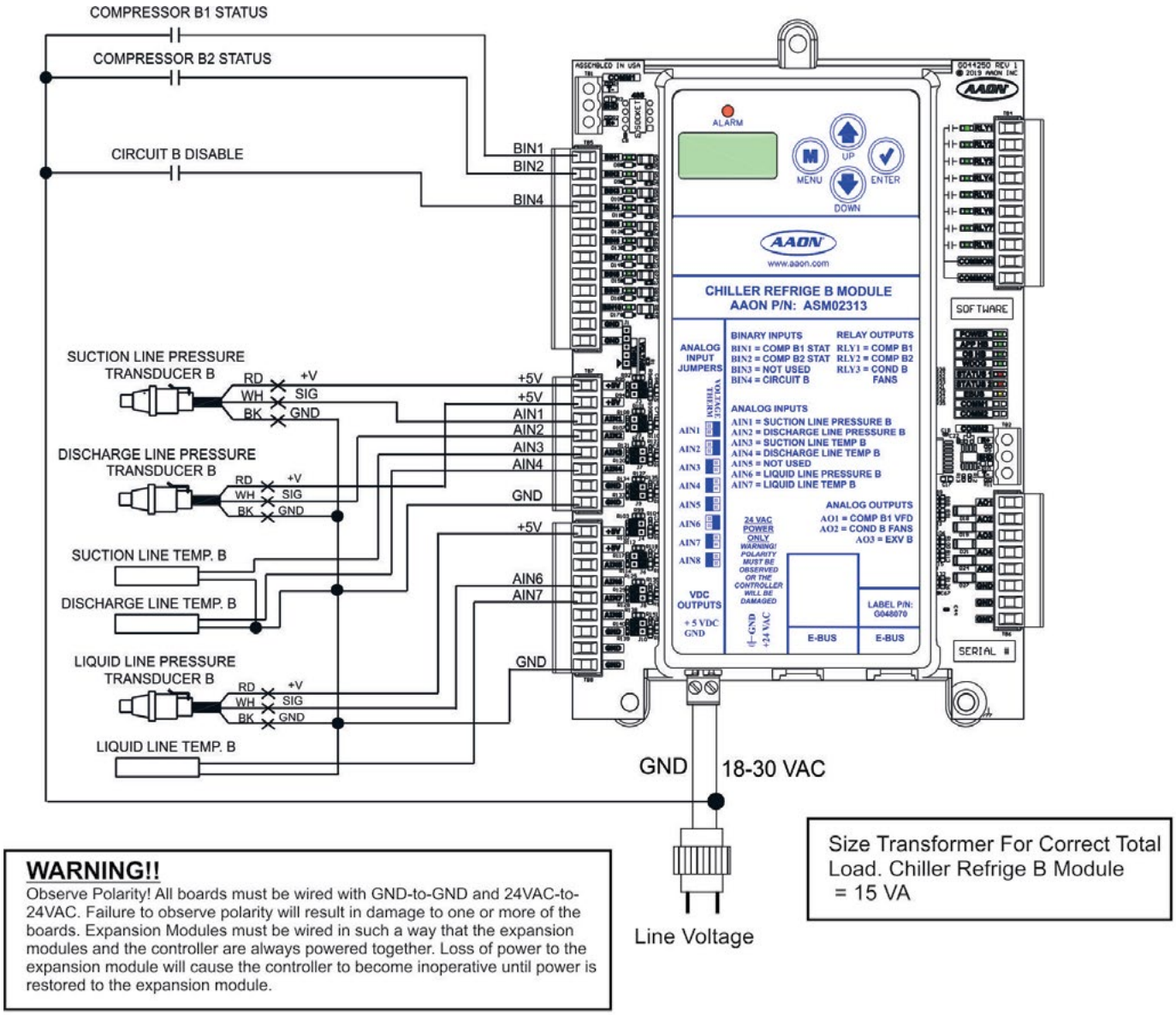


Figure 5: Chiller Refrigeration B Module Input Wiring

Chiller Refrigeration B Module Output Wiring

See **Figure 6** below for output wiring.

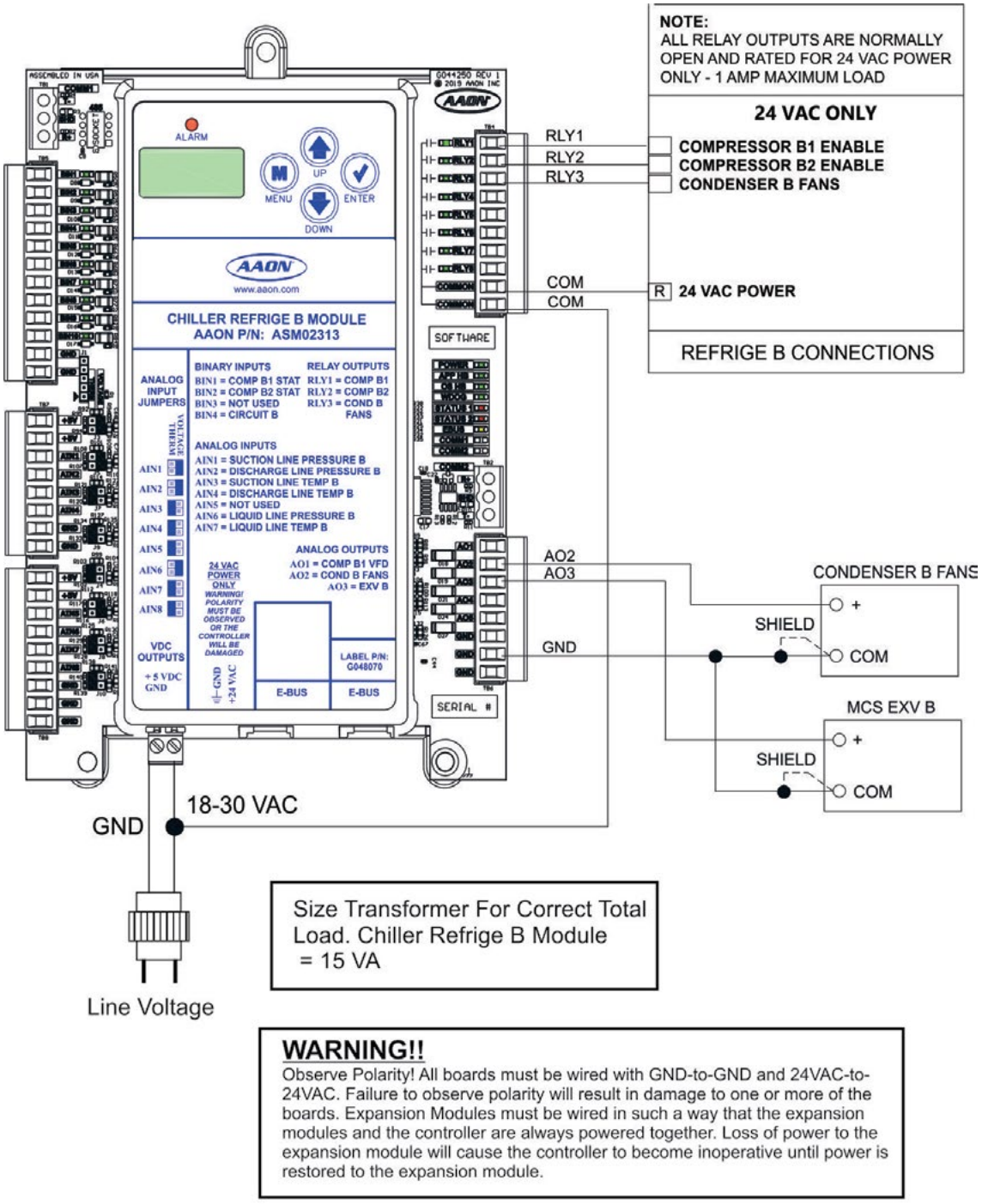


Figure 6: Chiller Refrigeration B Module Output Wiring

DX Evaporative Condenser Module Input Wiring

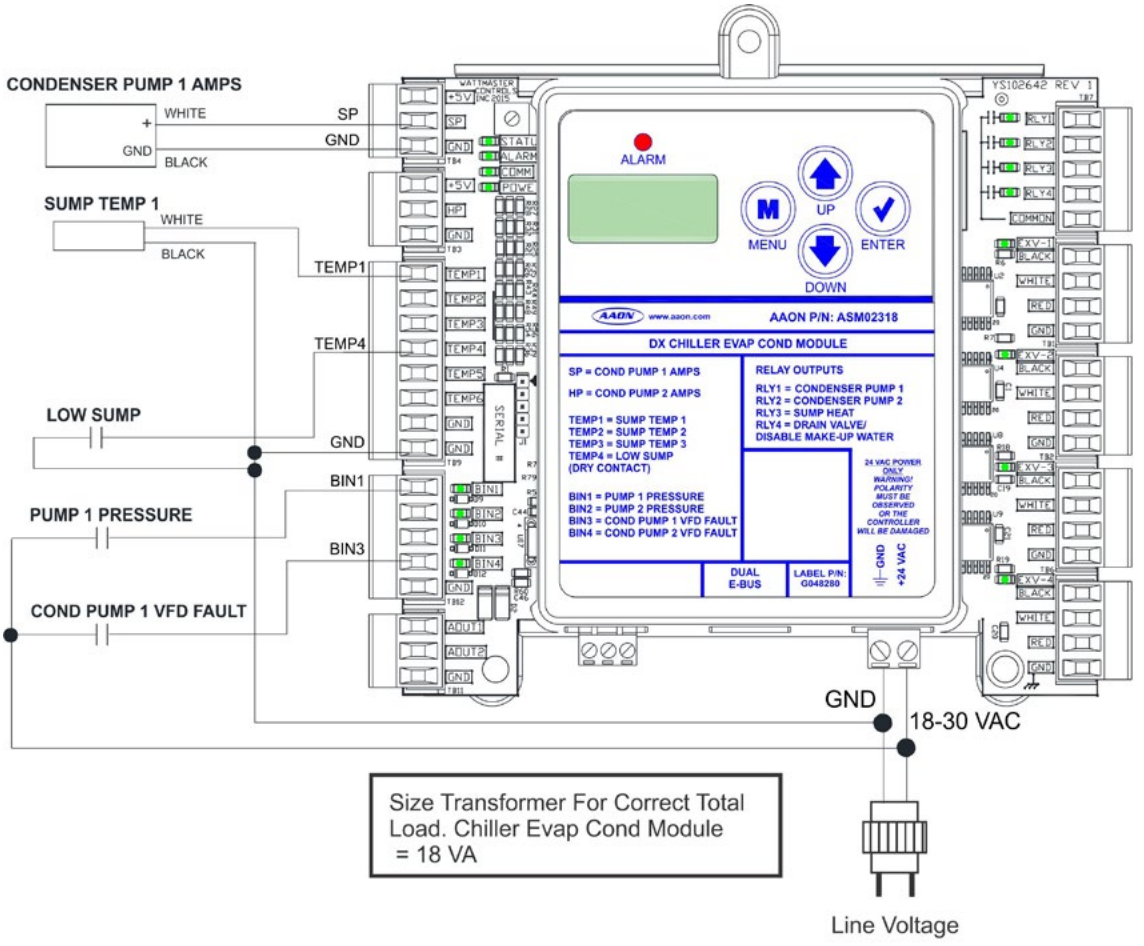
DX Evaporative Condenser Module Input Wiring

The DX Evaporative Condenser Module controls the Evaporative Condenser of the Chiller to help control the Head Pressure. The module is designed for R410-A refrigerant.

The DX Evaporative Condenser Module is connected to the Main DX Chiller Controller. Only (1) module can be connected.

The DX Evaporative Condenser Module provides a 2 x 8 LCD character display and 4 buttons that allow for status of system operation, system setpoints, system configurations, sensors, and alarms, and to change the module's address, if necessary.

See **Figure 7** below for input wiring.

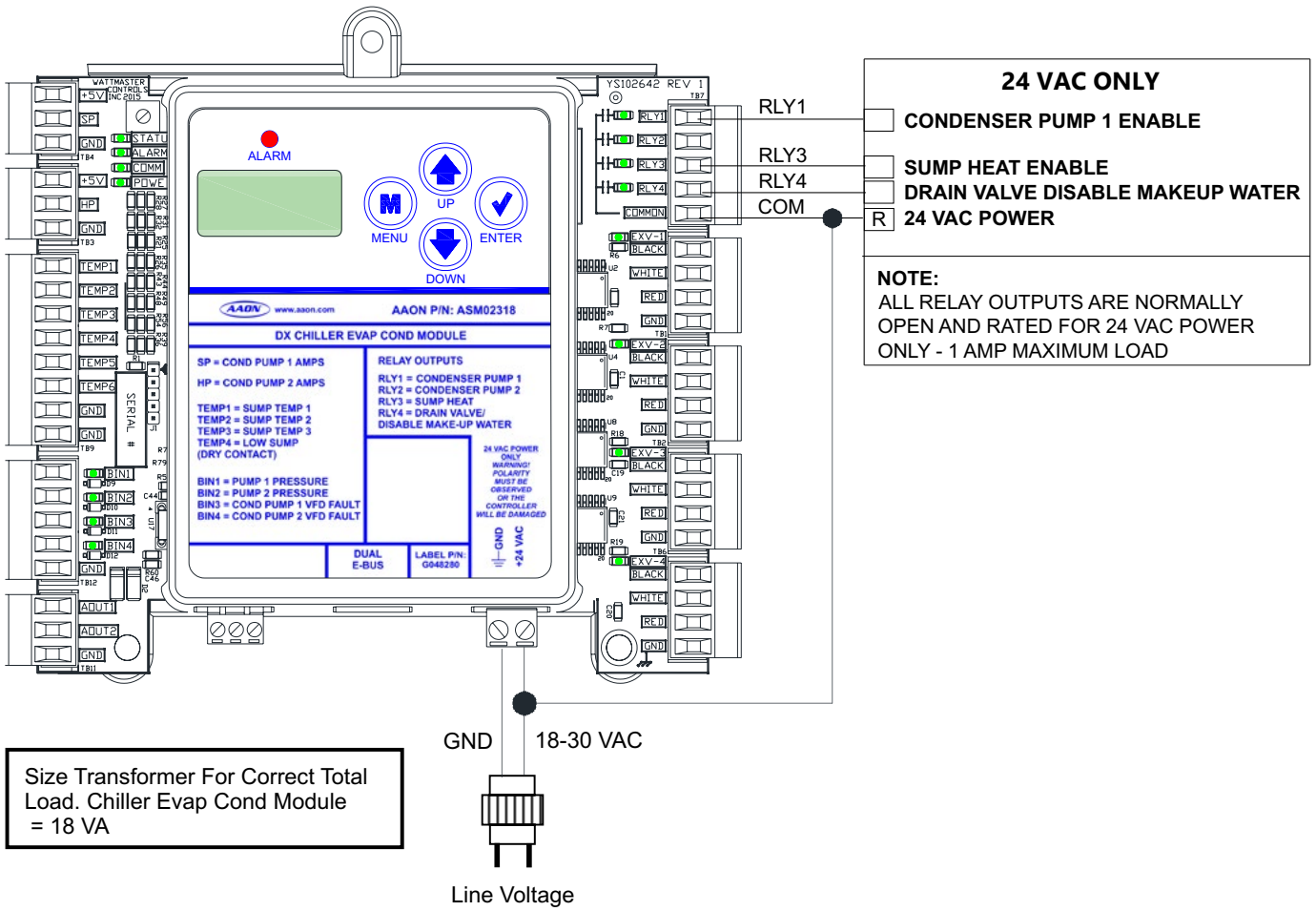


WARNING!!
Observe Polarity! All boards must be wired with GND-to-GND and 24VAC-to-24VAC. Failure to observe polarity will result in damage to one or more of the boards. Expansion Modules must be wired in such a way that the expansion modules and the controller are always powered together. Loss of power to the expansion module will cause the controller to become inoperative until power is restored to the expansion module.

Figure 7: DX Evaporative Condenser Module Input Wiring

DX Evaporative Condenser Module Output Wiring

See **Figure 8** below for output wiring.



WARNING!!
Observe Polarity! All boards must be wired with GND-to-GND and 24VAC-to-24VAC. Failure to observe polarity will result in damage to one or more of the boards. Expansion Modules must be wired in such a way that the expansion modules and the controller are always powered together. Loss of power to the expansion module will cause the controller to become inoperative until power is restored to the expansion module.

Figure 8: DX Evaporative Condenser Module Output Wiring

Chiller WSE Module Input Wiring

Chiller WSE Module Input Wiring

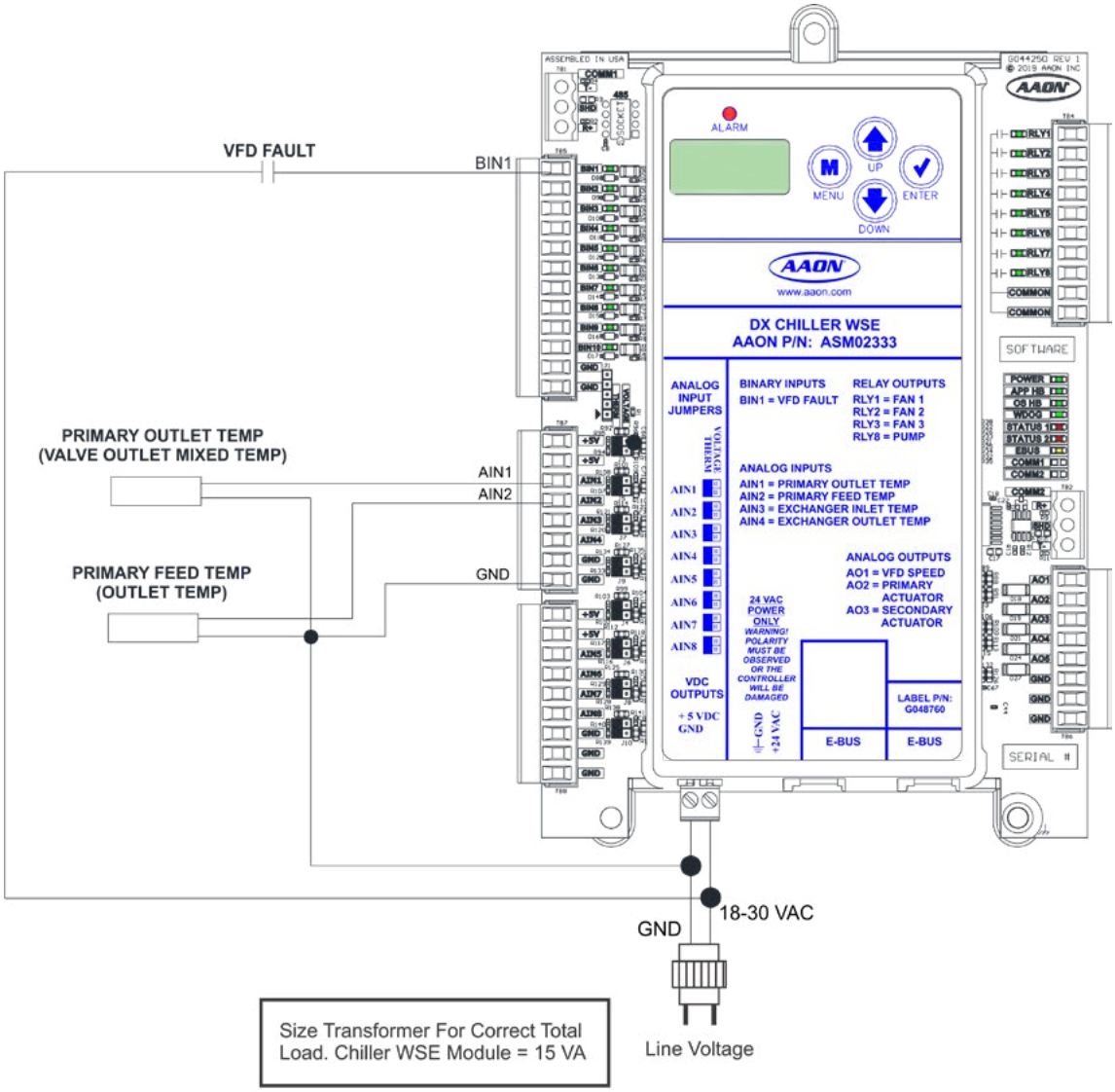
The DX Chiller Waterside Economizer (WSE) Module controls the Waterside Economizer of a DX Chiller.

The Module is designed with 8 analog inputs, 5 analog outputs, 10 binary inputs, and 8 relay outputs.

The Module has 2 E-BUS Expansion Ports which allow the connection of communicating sensors and future E-BUS Modules via modular cable assemblies.

The Module contains a 2 x 8 LCD character display and 4 buttons that allow for status and alarm display.

See **Figure 9** below for input wiring.

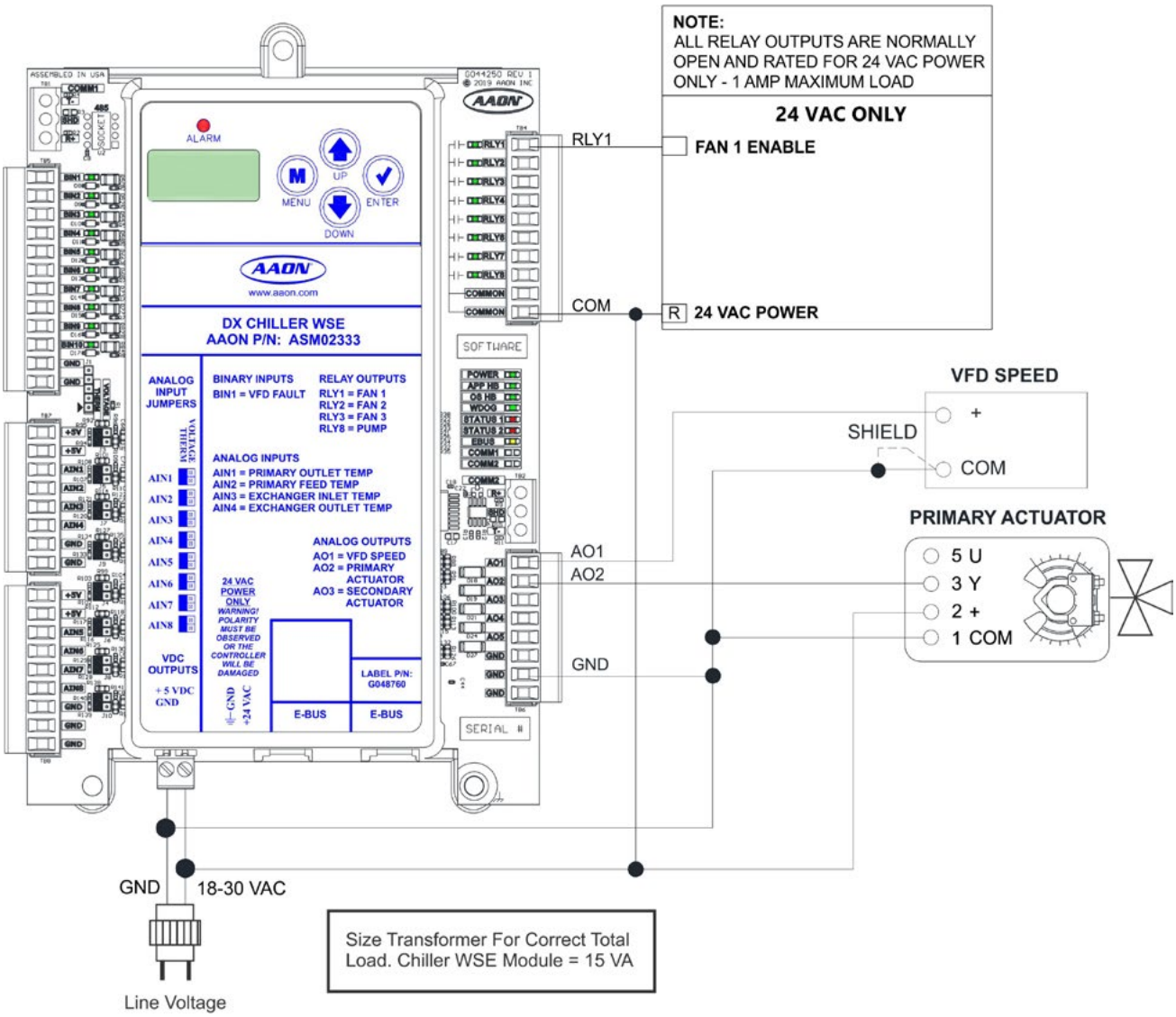


WARNING!!
Observe Polarity! All boards must be wired with GND-to-GND and 24VAC-to-24VAC. Failure to observe polarity will result in damage to one or more of the boards. Expansion Modules must be wired in such a way that the expansion modules and the controller are always powered together. Loss of power to the expansion module will cause the controller to become inoperative until power is restored to the expansion module.

Figure 9: Chiller WSE Module Input Wiring

Chiller WSE Module Output Wiring

See **Figure 10** below for output wiring.



WARNING!!
Observe Polarity! All boards must be wired with GND-to-GND and 24VAC-to-24VAC. Failure to observe polarity will result in damage to one or more of the boards. Expansion Modules must be wired in such a way that the expansion modules and the controller are always powered together. Loss of power to the expansion module will cause the controller to become inoperative until power is restored to the expansion module.

Figure 10: Chiller WSE Module Output Wiring

Chiller Diagnostic Module Wiring

Chiller Diagnostic Module Wiring

The Chiller Diagnostic Module provides current readings for the Compressors and Condenser Fans used on a DX Chiller.

The Module is designed with 8 analog inputs, 5 analog outputs, 10 binary inputs, and 8 relay outputs.

The Module has 2 E-BUS Expansion Ports which allow the connection of communicating sensors and future E-BUS Modules via modular cable assemblies.

The Module contains a 2 x 8 LCD character display and 4 buttons that allow for status and alarm display.

See **Figure 11** below for wiring.

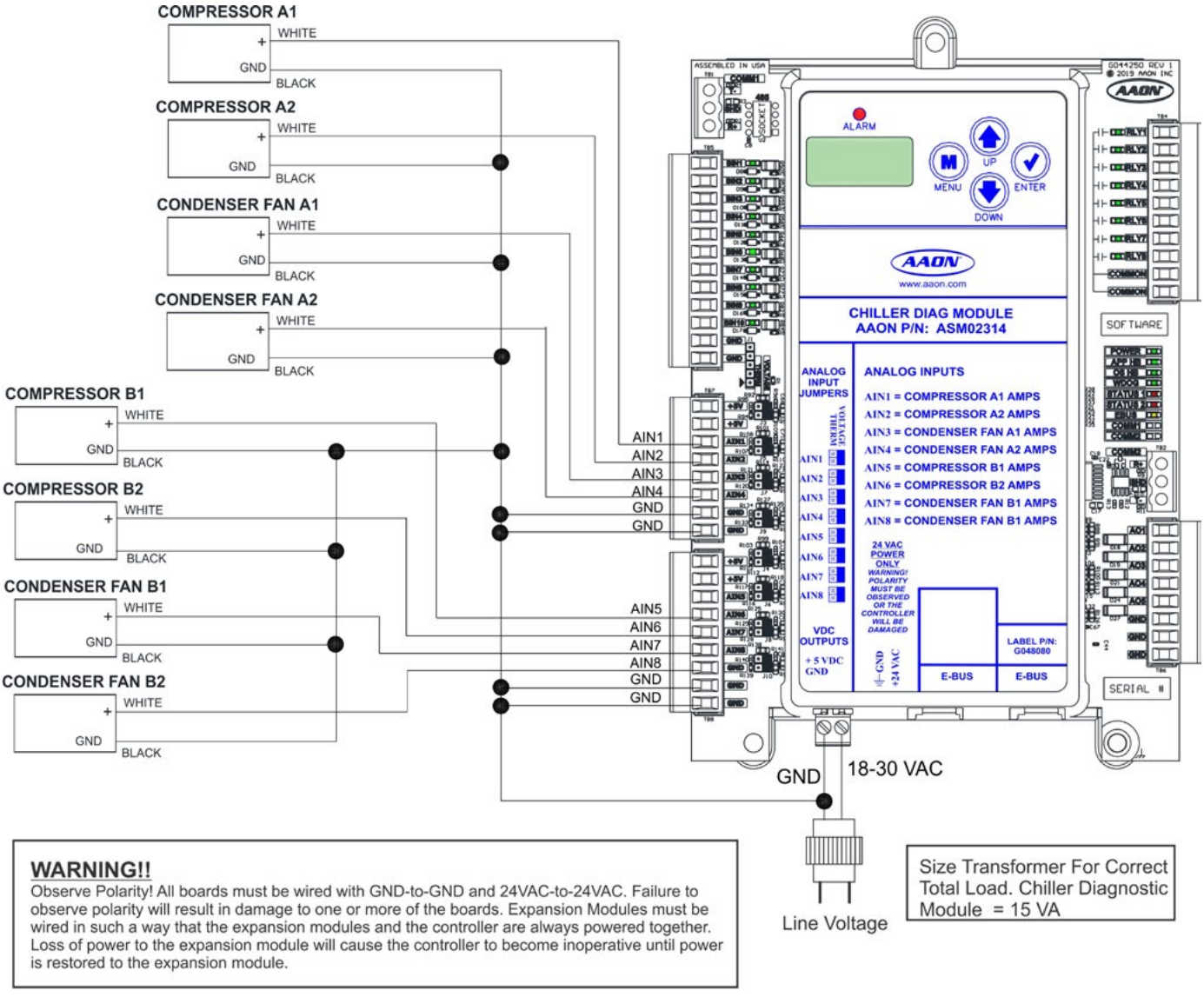


Figure 11: Chiller Diagnostic Module Wiring

DX Chiller Diagnostic Module LEDs

The DX Chiller Diagnostic Module is equipped with LEDs that can be used to verify operation and perform troubleshooting. There are LEDs for communication, operation modes, and diagnostic codes. See **Figure 12,** below 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 - Factory Troubleshooting

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

APP HB - This green LED will light up and blink continuously to indicate the application software is working properly.

OS HB - This green LED will light up and blink continuously to indicate the operating system is working properly.

WDOG - This green LED will light up and stay lit to indicate the operating system is working properly.

Diagnostic LEDs

ALARM - This red LED is a diagnostic blink code LED. It will light up and stay lit when there is an alarm present. The type of alarm will display on the LCD display.

STATUS 1 - This red LED is a diagnostic blink code LED. Under normal operation, it should not be blinking. If the LED is blinking non-stop along with Status 2 LED, the controller is resetting factory defaults.

STATUS 2 - This red LED is a diagnostic blink code LED. If the software is running, this LED should blink at a rate of 1 blink every 10 seconds. If there is an override, the LED will blink 2 times every 10 seconds. And finally, if one of the outputs is in force mode, the LED will blink 3 times every 10 seconds.

Communication LED

EBUS - This yellow LED will blink to signal E-BUS communications.

COMM1 - When Comm1 is communicating, this yellow LED will blink continuously to signal communications.

COMM2 - When Comm2 is communicating, this yellow LED will blink continuously to signal communications.

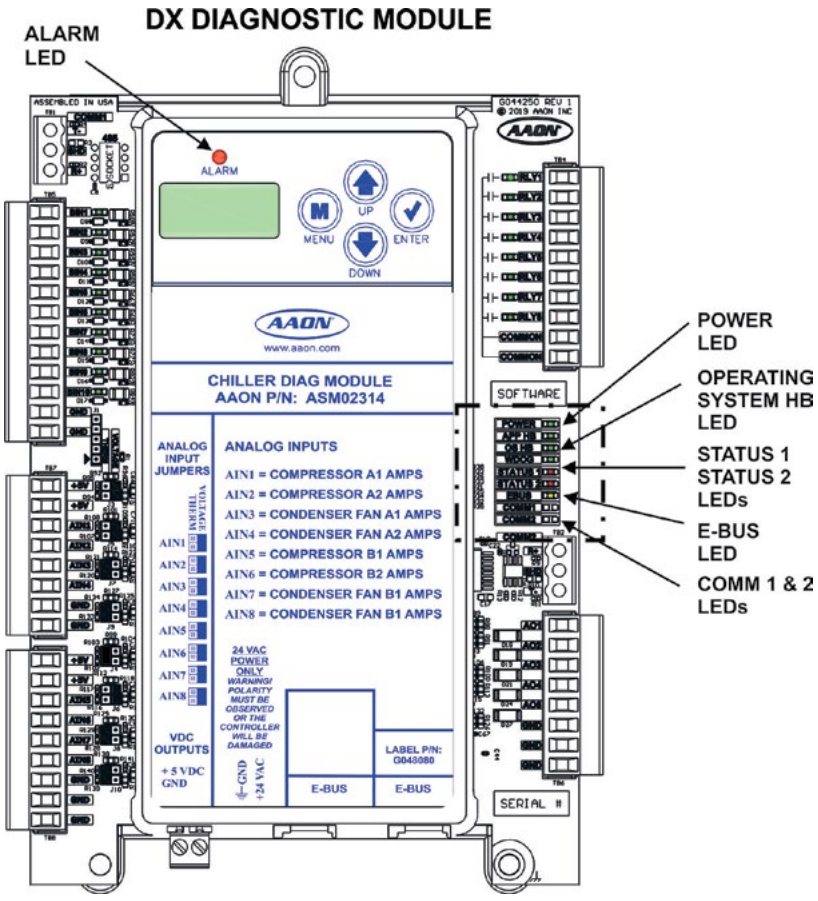


Figure 12: DX Chiller Diagnostics Module LED Locations

DX Main Chiller Controller LED Diagnostics

DX Main Chiller Controller LEDs

The DX Main Chiller Controller is equipped with LEDs that can be used to verify operation and perform troubleshooting. There are LEDs for communication, operation modes, and diagnostic codes. See **Figure 13, page 31** 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 - Factory Troubleshooting

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

APP HB - This green LED will light up and blink continuously to indicate the application software is working properly.

OS HB - This green LED will light up and blink continuously to indicate the operating system is working properly.

WDOG - This green LED will light up and stay lit to indicate the operating system is working properly.

Diagnostic LEDs

ALARM - This red LED is a diagnostic blink code LED. It will light up and stay lit when there is an alarm present. The type of alarm will display on the LCD display.

STATUS 1 - This red LED is a diagnostic blink code LED. Under normal operation, it should not be blinking. If the LED is blinking non-stop along with Status 2 LED, the controller is resetting factory defaults or there is an output force mode active.

STATUS 2 - This red LED is a diagnostic blink code LED. If the software is running, this LED should blink at a rate of 1 blink every 10 seconds. If the LED is blinking non-stop along with Status 1 LED, the controller is resetting factory defaults or there is an output force mode active.

Communication LEDs

EBUS - This yellow LED will blink to signal E-BUS communications.

BACNET - This yellow LED will light up and blink continuously to indicate BACnet® communications.

Relay LEDs

RLY1, RLY2, RLY4 - These green LEDs will light up when the relays are enabled and will stay lit as long as they are active.

Binary Input LEDs

BIN1 - This green LED will light up when the Remote Start/Stop contact is closed.

BIN2 - This green LED will light up when the Water Flow Switch 1 is closed.

BIN5 - This green LED will light up when the Phase Brownout contact is closed.

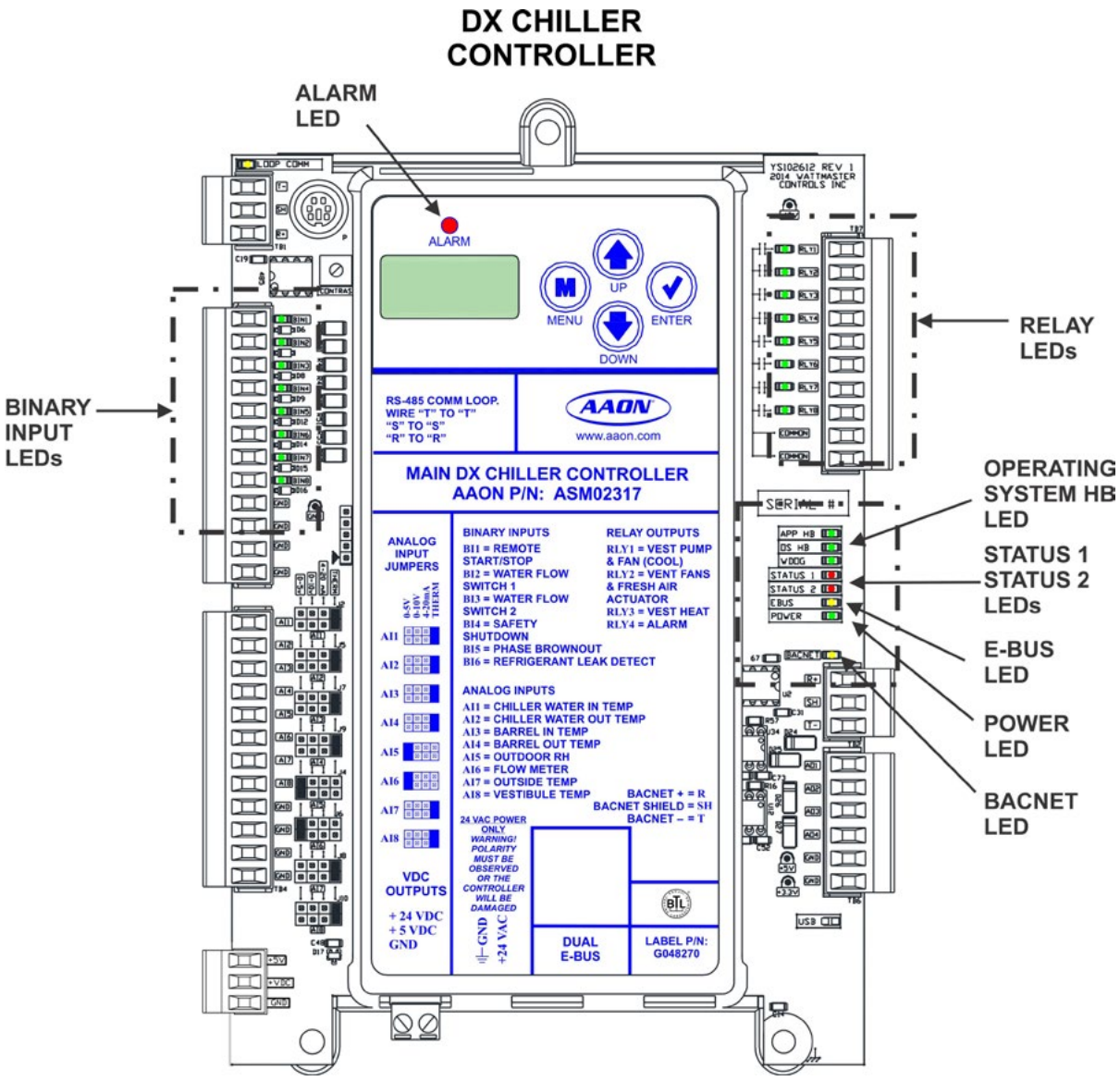


Figure 13: DX Chiller Controller LED Locations

Refrigerant A & B Module LED Diagnostics

Refrigerant A & B Module LEDs

The Chiller Refrigerant A & B Modules are equipped with LEDs that can be used to verify operation and perform troubleshooting. There are LEDs for communication, operation modes, and diagnostic codes. See **Figure 14, page 33** 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 - Factory Troubleshooting

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

WDOG - This green LED is currently not used.

Diagnostic LEDs

ALARM - This red LED is a diagnostic blink code LED. It will light up and blink when there is an alarm present. The type of alarm will display on the LCD display.

STATUS 1 - This red LED is a diagnostic blink code LED. If the LED is blinking at a rate of 1 blink every 10 seconds, the module is in the Off mode. If the LED is blinking 2 blinks every 10 seconds, the module is in the Cool mode.

STATUS 2 - This red LED is not used.

Communication LED

EBUS - This yellow LED will blink to signal E-BUS communications.

COMM1 - This yellow LED is not used.

COMM2 - This yellow LED is not used.

Relay LEDs

RLY1 - **RLY3** - These green LEDs will light up when the relays are enabled and will stay lit as long as they are active.

Refrigerant A Module Binary Input LEDs

BIN1 - This green LED will light up when the Compressor A1 Status Switch 1 is closed.

BIN2 - This green LED will light up when the Compressor A2 Status Switch 1 is closed.

BIN3 - This green LED will light up when the Compressor A1 VFD Fault contact is closed.

BIN4 - This green LED will light up when the Circuit A Disable Switch is closed.

BIN5 - This green LED will light up when the Condenser Fan Faults contact is closed.

Refrigerant B Module Binary Input LEDs

BIN1 - This green LED will light up when the Compressor B1 Status Switch 1 is closed.

BIN2 - This green LED will light up when the Compressor B2 Status Switch 1 is closed.

BIN3 - Not Used

BIN4 - This green LED will light up when the Circuit B Disable Switch is closed.

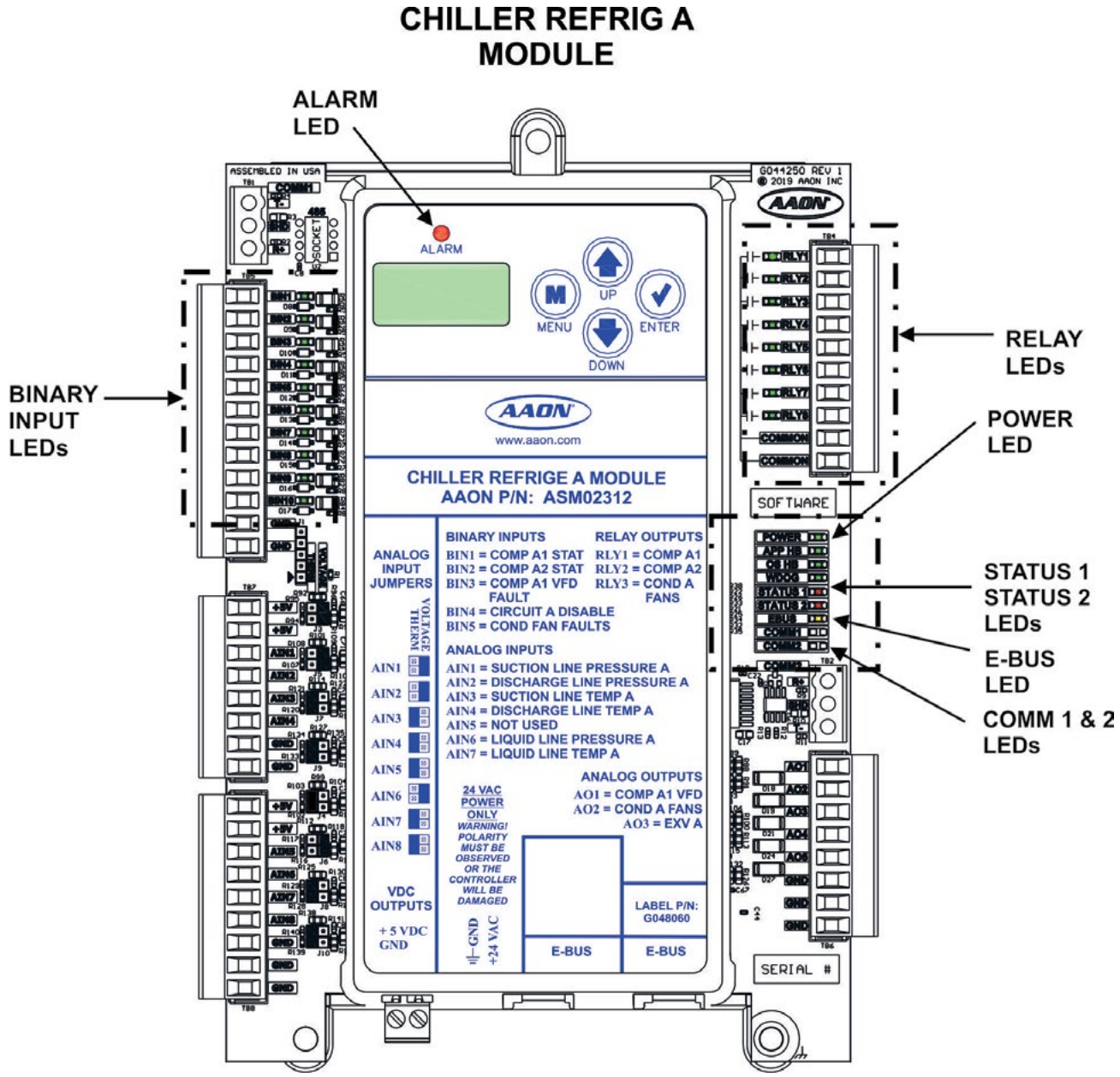


Figure 14: Refrigerant A & B Module LED Locations (Refrig A Module Shown)

DX Chiller WSE Controller LED Diagnostics

DX Chiller WSE Controller LEDs

The DX Chiller WSE Controller is equipped with LEDs that can be used to verify operation and perform troubleshooting. There are LEDs for communication, operation modes, and diagnostic codes. See **Figure 15, page 35** 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 - Factory Troubleshooting

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

APP HB - This green LED will light up and blink according to what mode the controller is in. See **Table 7**.

No. of Blinks	APP HB LED
1	Off Mode
2	Economizer Mode
3	Freeze Mode

Table 7: APP HB LED Blink Codes

OS HB - This green LED will light up and blink continuously to indicate the operating system is working properly.

WDOG - This green LED will light up and stay lit to indicate the operating system is working properly.

Diagnostic LEDs

ALARM - This red LED is a diagnostic blink code LED. It will light up and blink the number of alarms present when there is an alarm(s) present. The type of alarm will display on the LCD display.

STATUS 1 - This red LED is not used.

STATUS 2 - This red LED is not used.

Communication LED

EBUS - This yellow LED will blink to signal E-BUS communications.

COMM1 - When Comm1 is communicating, this yellow LED will turn on to indicate an error condition, either forced on or forced off.

COMM2 - When Comm2 is communicating, this yellow LED will turn on to signal economizer max out.

Relay LEDs

RLY1 - This green LED will light up when the relay is enabled and will stay lit as long as it is active.

Binary Input LEDs

BIN1 - This green LED will light up when the VFD Fault Switch 1 is closed.

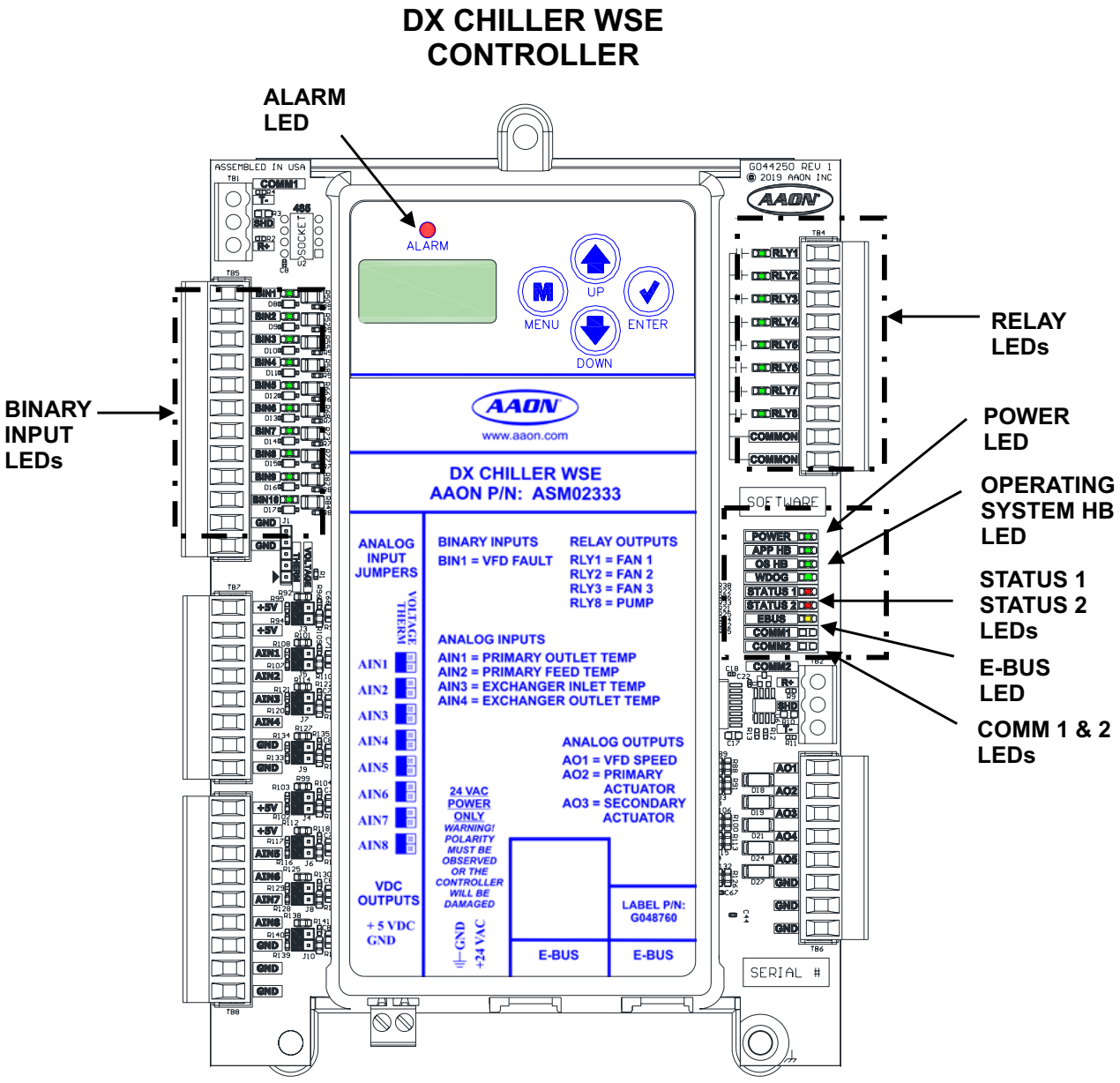


Figure 15: DX Chiller WSE LED Locations

DX Evaporative Condenser Module LED Diagnostics

DX Evaporative Condenser Module

The DX Evaporative Condenser Module is equipped with LEDs that can be used to verify operation and perform troubleshooting. See **Figure 16** below 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:

Diagnostic LEDs

STATUS - If the software is running, this LED should blink at a rate of 1 blink per second.

ALARM (on board) - This red LED will light up and stay lit 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.

ALARM (above LCD display) - This red LED will light up and stay lit 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 DX Chiller 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 controller.

Binary Input LEDs

BIN1 - This green LED will light up when the Pump 1 Pressure contact is closed.

BIN3 - This green LED will light up when the Condenser Pump 1 VFD Fault contact is closed.

Relay LEDs

RLY1, RLY3, RLY4 - These green LEDs will light up when the relays are enabled and will stay lit as long as they are active.

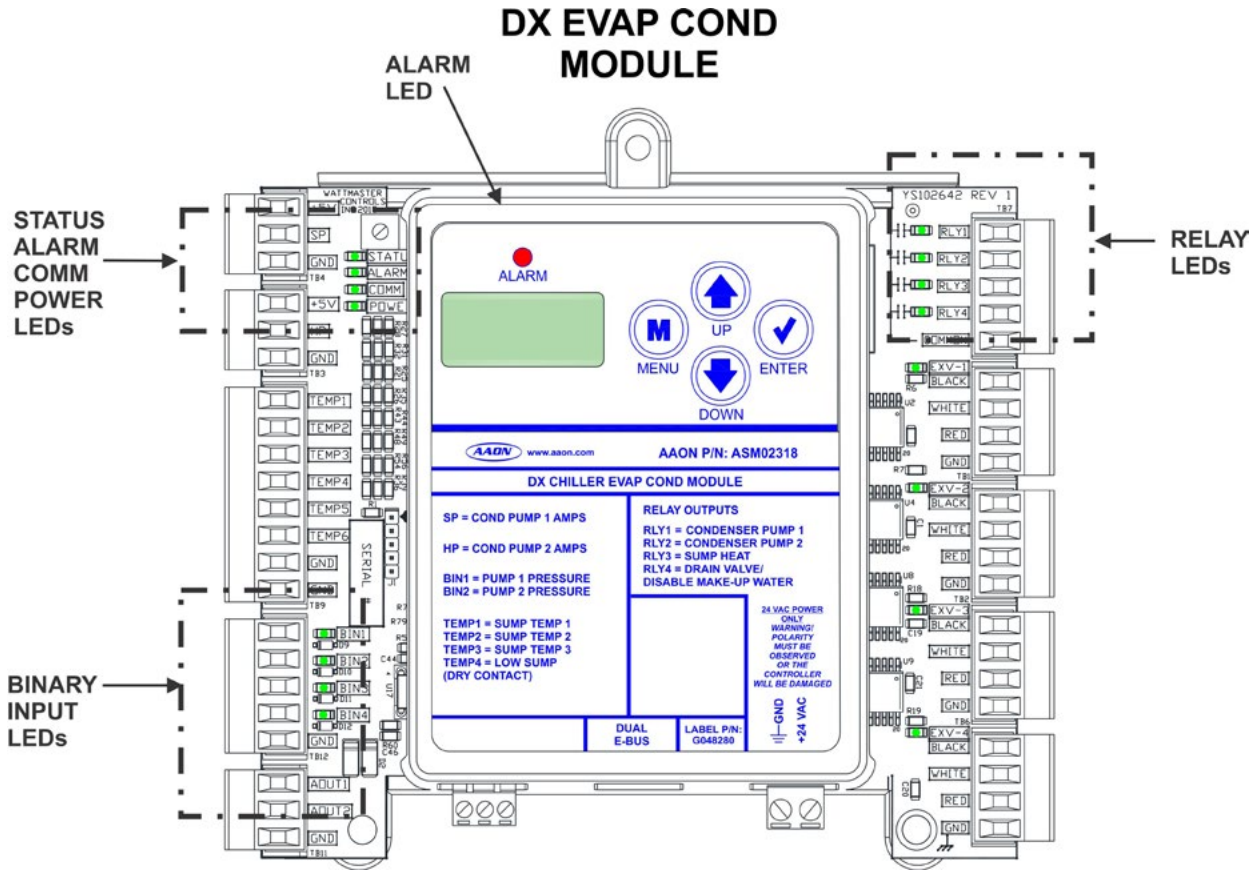


Figure 16: DX Evaporative Condenser Module LEDs

Temperature/Resistance for Thermistor Sensors

The following sensor voltage and resistance table is provided to aid in checking sensors that appear to be operating incorrectly. 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 – Resistance – Voltage for Type III 10 K Ohm Thermistor Sensors			
Temp (ºF)	Temp (ºC)	Resistance (Ohms)	Voltage @ Input (VDC)
-10	-23.33	93333	4.51
-5	-20.55	80531	4.45
0	-17.77	69822	4.37
5	-15	60552	4.29
10	-12.22	52500	4.2
15	-9.44	45902	4.1
20	-6.66	40147	4.002
25	-3.88	35165	3.891
30	-1.11	30805	3.773
35	1.66	27140	3.651
40	4.44	23874	3.522
45	7.22	21094	3.39
50	10	18655	3.252
52	11.11	17799	3.199
54	12.22	16956	3.143
56	13.33	16164	3.087
58	14.44	15385	3.029
60	15.55	14681	2.972
62	16.66	14014	2.916
64	17.77	13382	2.861
66	18.88	12758	2.802
68	20	12191	2.746
69	20.55	11906	2.717
70	21.11	11652	2.691
71	21.66	11379	2.661
72	22.22	11136	2.635
73	22.77	10878	2.605

Table 8: Temperature/Resistance for Type III 10K Ohm Thermistor Sensors

Temperature – Resistance – Voltage for Type III 10 K Ohm Thermistor Sensors			
Temp (ºF)	Temp (ºC)	Resistance (Ohms)	Voltage @ Input (VDC)
74	23.33	10625	2.576
75	23.88	10398	2.549
76	24.44	10158	2.52
77	25	10000	2.5
78	25.55	9711	2.464
80	26.66	9302	2.41
82	27.77	8893	2.354
84	28.88	8514	2.3
86	30	8153	2.246
88	31.11	7805	2.192
90	32.22	7472	2.139
95	35	6716	2.009
100	37.77	6047	1.884
105	40.55	5453	1.765
110	43.33	4923	1.65
115	46.11	4449	1.54
120	48.88	4030	1.436
125	51.66	3656	1.339
130	54.44	3317	1.246
135	57.22	3015	1.159
140	60	2743	1.077
145	62.77	2502	1.001
150	65.55	2288	0.931

Table 8, cont.: Temperature/Resistance for Type III 10K Ohm Thermistor Sensors

Thermistor Sensor Testing Instructions

Use the resistance column to check the thermistor sensor while disconnected from the controllers (not powered).

Use the voltage column to check sensors while connected to powered controllers. Read voltage with meter set on DC volts. Place the "-" (minus) lead on GND terminal and the "+" (plus) lead on the sensor input terminal being investigated.

If the voltage is above 4.88 VDC, then the sensor or wiring is open. If the voltage is less than 0.05 VDC, then the sensor or wiring is shorted.

Suction Pressure Transducer Testing

0 - 250 PSI Suction Pressure Transducer Testing for R410A Refrigerant

The Evaporator Coil Temperature is calculated by converting the Suction Pressure to Temperature. The Suction Pressure is obtained by using the 0 - 250 PSI Suction Pressure Transducer, which is connected into the Suction Line of the Compressor.

Use the voltage column to check the Suction Pressure Transducer while connected to the Refrigeration Module(s). The DX Chiller Controller and the Refrigeration Module(s) must be powered for this test. Read voltage with a meter set on DC volts. Place the positive lead from the meter on the +5V terminal located on the Module(s) terminal block. Place the negative lead from the meter on the ground (GND) terminal located adjacent to the +5V terminal terminal on the Module(s) 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 +5V and GND terminals and compare it to the appropriate chart depending on the refrigerant you are using. If the temperature/voltage or pressure/voltage readings do not align closely with the chart, your Suction Pressure Transducer is probably defective and will need to be replaced.

See the 0 - 250 PSI Suction Pressure Transducer, Pressure, Temperature, and Voltage Chart for R410A Refrigerant testing. The charts show a temperature range from 20°F to 80°F. For troubleshooting purposes, the DC Voltage readings are also listed with their corresponding temperatures and pressures.

0 - 250 PSI Suction Pressure Transducer Coil Pressure – Temperature – Voltage Chart for R410A Refrigerant

Temperature °F	Pressure PSI	Signal DC Volts	Temperature °F	Pressure PSI	Signal DC Volts
21.19	80.94	1.8	59.03	168.10	3.2
24.49	87.16	1.9	61.17	174.32	3.3
27.80	93.39	2.0	63.19	180.55	3.4
30.99	99.62	2.1	65.21	186.78	3.5
33.89	105.84	2.2	67.23	193.00	3.6
36.80	112.07	2.3	69.24	199.23	3.7
39.71	118.29	2.4	71.15	205.46	3.8
42.30	124.52	2.5	72.95	211.68	3.9
44.85	130.75	2.6	74.76	217.91	4.0
47.39	136.97	2.7	76.57	224.14	4.1
49.94	143.2	2.8	78.37	230.36	4.2
52.23	149.42	2.9	80.18	236.59	4.3
54.50	155.65	3.0			
56.76	161.88	3.1			

Table 9: Coil Pressure/Voltage/Temp for 0-250 PSI Suction Pressure Transducers - R410A Refrigerant

Discharge Pressure Sensor Testing 0-667 PSI

The Discharge Pressure is obtained by using the Discharge Pressure Sensor, which is connected into the Discharge Line of the Compressor.

Use the voltage column to check the Discharge Pressure Sensor while connected to the Refrigeration Module(s). 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 +5V input terminal located on the Module. Place the negative lead from the meter on the ground terminal located adjacent to the +5V terminal on the Module. Use a refrigerant gauge set to measure the suction line pressure near where the Discharge Pressure Sensor is connected to the discharge line. Measure the Voltage at the terminals +5V 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 Discharge Pressure Sensor is probably defective and will need to be replaced.

Discharge Pressure Transducer Pressure – Voltage Chart for R410A Refrigerant 0-667 PSI			
Pressure PSI	Signal DC Volts	Pressure PSI	Signal DC Volts
20	0.62	360	2.66
40	0.74	380	2.78
60	0.86	400	2.9
80	0.98	420	3.02
100	1.1	440	3.14
120	1.22	460	3.26
140	1.34	480	3.38
160	1.46	500	3.5
180	1.58	520	3.62
200	1.7	540	3.74
220	1.82	560	3.86
240	1.94	580	3.98
260	2.026	600	4.1
280	2.18	620	4.22
300	2.3	640	4.34
320	2.42	660	4.46
340	2.54		

Table 10: Discharge Pressure/Voltage for Discharge Pressure Sensors

Important Wiring Considerations

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 DX Chiller Controller and its associated modules.

Please carefully read and apply the following information when wiring the Main DX Chiller Controller and its associated modules.

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 2-conductor wire and some require 3-or 4-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 Main DX Chiller Controllers together or to connect to other communication devices, all wiring must be plenum-rated, minimum 18-gauge, 2-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 Main DX Chiller Controller and its associated modules, be sure to recheck all wiring connections and terminations thoroughly.

General

Correct wiring of the Main DX Chiller Controller and its modules is the most important factor in the overall success of the controller installation process. The Main DX Chiller Controller and Modules are factory 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 is required, it is a good idea to be familiar with the system wiring.

Wiring

The Main DX Chiller Controller and associated 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 rating listed in **Tables 11**, **12 & 13**.

Control Device	Voltage	VA Load	Operating Temperature	Humidity (Non-Condensing)
Main DX Chiller Controller	18-30VAC (25%/-15%), Class 2	15	-30°F to 150°F	0-95% RH
	Inputs		Resistive Inputs require 10KΩ Type 3 Thermistor	
			24VAC Inputs provide 4.7kΩ Load	
	Outputs		Relay Outputs: 1 Amp maximum per output	

Table 11: DX Chiller Controller Electrical and Environmental Requirements

Control Device	Voltage	VA Load	Operating Temperature	Humidity (Non-Condensing)
Chiller Refrigerant A & B Modules, Chiller Diagnostic Module, and Chiller WSE Module	18-30VAC (25%/-15%), Class 2	15	-30°F to 150°F	0-95% RH
	Inputs		Resistive Inputs require 10KΩ Type 3 Thermistor	
			24VAC Inputs provide 4.7kΩ Load	
	Outputs		Relay Outputs: 1 Amp maximum per output	

Table 12: Chiller Refrigerant A & B Modules, Chiller Diagnostic Module, and Chiller WSE Module Electrical and Environmental Requirements

Control Device	Voltage	VA Load	Operating Temperature	Humidity (Non-Condensing)
Chiller Evaporative Condenser Module	18-30VAC (25%/-15%), Class 2	18	-30°F to 150°F	0-95% RH
	Inputs		Resistive Inputs require 10KΩ Type 3 Thermistor	
			24VAC Inputs provide 4.7kΩ Load	
	Outputs		Relay Outputs: 1 Amp maximum per output	

Table 13: Chiller Evaporative Condenser Module Environmental Requirements

LCD Display, Navigation Keys & Editing Keys

LCD Display Screen & Navigation & Editing Keys

The LCD display screens and buttons allow you to view status and alarms, enable force modes, and make BACnet® configuration changes. See **Figure 17, below** and refer to **Table 14** for Navigation Key functions. The keys also have editing functions. Refer to **Table 15** for Editing functions.

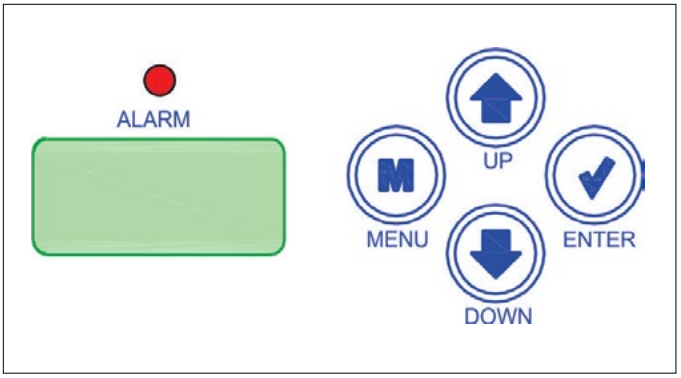


Figure 17: LCD Display and Navigation/Editing Keys

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 14: Navigation Key Functions

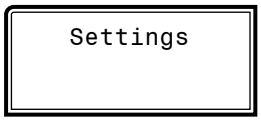
EDITING KEY	FUNCTION
UP or DOWN	Use the UP or DOWN key to enter editing mode on a user-adjustable screen. Edit Mode is indicated by the underscore appearing on the screen. **NOTE:** Entering Edit Mode will also adjust the value up one (UP key) or down one (DOWN key), so you may have to readjust the value.
ENTER	Use the ENTER key to move through the digits in the screen when editing a numeric value. An extended press of the ENTER key saves your edits no matter the location of the editing cursor within the digits. Press the ENTER key to save a non-numeric value - such as Hi Speed Network.
MENU	The MENU key cancels editing when in Edit Mode. The screen you were editing will return to its original value and the under-score will disappear. A second press of the MENU key will return you to the Main Menu.

Table 15: Editing Key Functions

DX Chiller Controller Main Screens Map

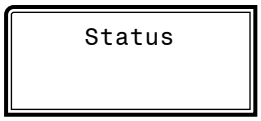
Refer to the following map when navigating through the *Main DX Chiller Controller Screens*. The first screen is an initialization screen. To scroll through the rest of the screens, press the **<MENU>** button.

Press (M) to go to the *Settings Screen*.



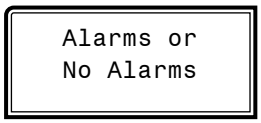
Press (✓) to scroll through the *Settings Screens*.

Press (M) to go to the *Status Screen*.



Press (✓) to scroll through the *Status Screens*.

Press (M) to go to the *Alarms Screen*.



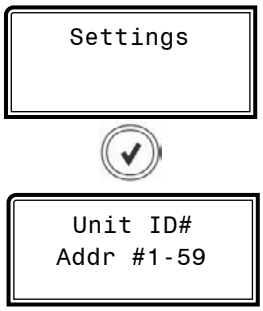
Press (✓) to scroll through the Alarms.

Press (M) to return to the first *Main Menu Screen*.

Settings Screens

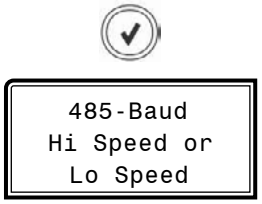
Settings Screens

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



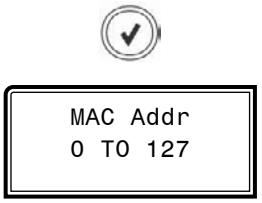
UNIT ADDRESS

Unit address. Valid range is 1-59. Default is 1.



BAUD RATE SPEED

485 baud rate speed. Valid range Hi Speed or Lo Speed. Default is Hi Speed.



BACnet® - CURRENT MAC ADDRESS

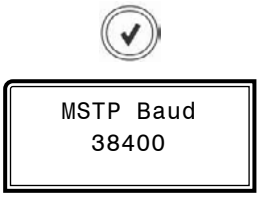
Valid range is 0 to 127. Default is 1.

The **<ENTER>** key moves the cursor between the digit fields starting with the ones field. Once the cursor is under a field, use the **<UP>** & **<DOWN>** arrow keys to select a number between 0 and 9.

BACnet® - CURRENT DEVICE ID

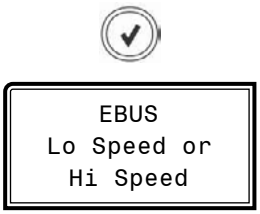
A Device ID of up to 7 digits can be entered.

The **<ENTER>** key moves the cursor between the digit fields starting with the ones field. Once the cursor is under a field, use the **<UP>** & **<DOWN>** arrow keys to select a number between 0 and 9.



BACnet® - CURRENT BAUD RATE

9600, 19200, 38400, 57600, 76800. Default is 38400.

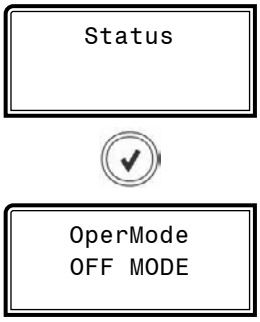


E-BUS COMMUNICATIONS

Hi Speed or Lo Speed. Default is Hi Speed.

Status Screens

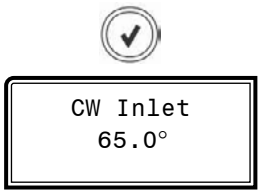
Refer to the following map when navigating through the Status Screens. From the *Status Screen*, press **<ENTER>** to scroll through the screens.



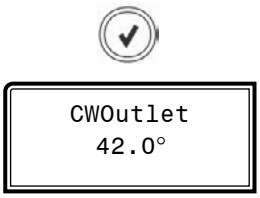
OPERATION MODE

This screen displays the current mode of operation. Options are:

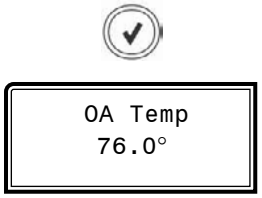
- OFF MODE
- RUN MODE



CHILLER WATER INLET TEMPERATURE



CHILLER WATER OUTLET TEMPERATURE



OUTDOOR AIR TEMPERATURE

VESTIBULE TEMPERATURE

Alarm Screens

If there are no Alarms, the *Alarm Screen* will display "No Alarms." If there are alarms present, the screen will display, "Alarms." You can press **<ENTER>** to scroll through the alarms or you can let the alarms automatically scroll on the screen.

NO ALARMS

This will be shown if there are no current alarms.

ACTIVE ALARMS!

This will display if there are active alarms.

Inlet SENSOR: The chiller water inlet temperature sensor has failed.

Outlet SENSOR: The chiller water outlet temperature sensor has failed.

OAT SENSOR: The outdoor air temperature sensor has failed.

Vestibul SENSOR: The vestibule temperature sensor has failed.

PHASE LOSS: A phase loss has occurred.

EMG SHUTDOWN: An emergency shutdown has occurred.

SEC OUT NO SENSE: The secondary heat exchanger outlet temperature sensor has failed.

H2OProof ALARM: Water flow switch 1 or 2 has been disabled.

CWOutlet TOO HIGH: The chiller water outlet temperature has risen above the chiller water temperature setpoint.

CWOutlet CUTOFF: The chiller water outlet temperature has risen above the chiller water temperature cutoff setpoint.

REFRIG 1 MISSING: Refrigeration Module 1 is not communicating.

REFRIG 2 MISSING: Refrigeration Module 2 is not communicating.

REFRIG 3 MISSING: Refrigeration Module 3 is not communicating.

REFRIG 4 MISSING: Refrigeration Module 4 is not communicating.

REFRIG 5 MISSING: Refrigeration Module 5 is not communicating.

REFRIG 6 MISSING: Refrigeration Module 6 is not communicating.

EVAP Mod MISSING: The Chiller Evaporative Condenser Module is not communicating.

GPM Mod MISSING: The Chiller Diagnostics Module is not communicating.

WSE Mod MISSING: The Chiller WSE Module is not communicating.

UNKNOWN ALARM: There is an unknown alarm.

Main Screens Map

Refer to the following map when navigating through the LCD Main Screens. To scroll through the screens, press the **<MENU>** button.

CHILLER
1118vXXX

Press ✓ to scroll through CHILLER REFRIG Screens.

Press M to go to STATUS MENU Screen.

STATUS
MENU

Press ✓ to scroll through STATUS MENU Screens.

Press M to go to SENSOR MENU Screen.

SENSOR
MENU

Press ✓ to scroll through SENSOR MENU Screens.

Press M to return to the SETPOINT STATUS Screen.

SETPOINT
STATUS

Press ✓ to scroll through SETPOINT STATUS Screens.

Press M to go to ALARM WARNINGS Screen.

ALARM
WARNINGS

Press ✓ to scroll through ALARM WARNINGS Screens.

Press M to go to ALARM FAULTS Screen.

ALARM
FAULTS

Press ✓ to scroll through ALARM FAULTS Screens.

Press M to return to the ALARM LOCKOUTS Screen.

ALARM
LOCKOUTS

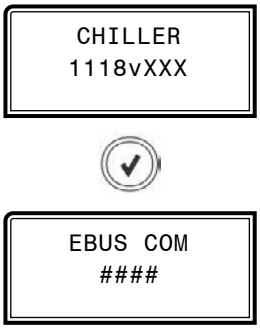
Press ✓ to scroll through ALARM LOCKOUTS Screens.

APPENDIX B - REFRIG A & B MODULE LCD SCREENS

Module & Status Menu Screens

Module Screens

Refer to the following map when navigating through the Chiller Refrig Module Screens. From the CHILLER Main Screen, press **<ENTER>** to scroll through the screens.



E-BUS COMMUNICATION DIAGNOSTICS

Number of COMM packets received.

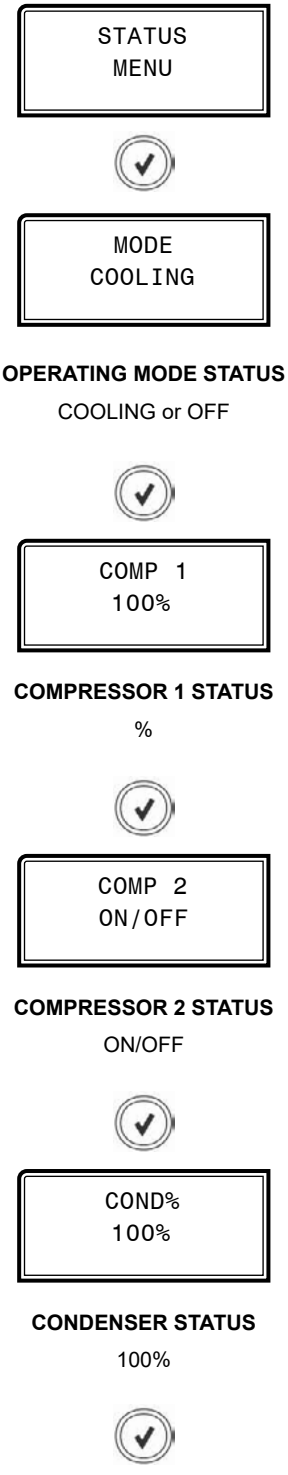
CURRENT BOARD ADDRESS

Configure the address according to which board address this module represents—1, 2, 3, 4, 5, 6

Number in parentheses is E-BUS address.
Module 1 is 160, Module 2 is 161, Module 3 is 162,
Module 4 is 163, Module 5 is 164, Module 6 is 165

Status Menu Screens

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



OPERATING MODE STATUS

COOLING or OFF

COMPRESSOR 1 STATUS

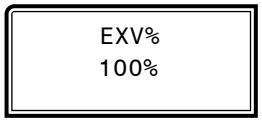
%

COMPRESSOR 2 STATUS

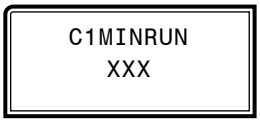
ON/OFF

CONDENSER STATUS

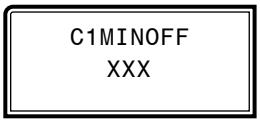
100%



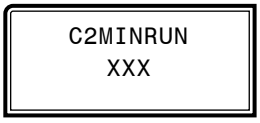
EXPANSION VALVE STATUS



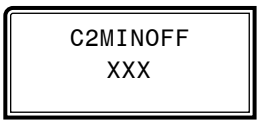
COMPRESSOR 1 MINIMUM RUN TIME IN SECONDS



COMPRESSOR 1 MINIMUM OFF TIME IN SECONDS



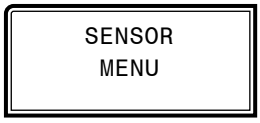
COMPRESSOR 2 MINIMUM RUN TIME IN SECONDS

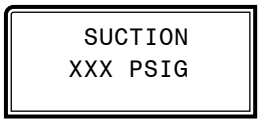


COMPRESSOR 2 MINIMUM OFF TIME IN SECONDS

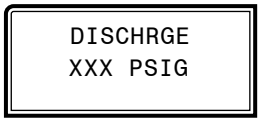
Sensor Menu Screens

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

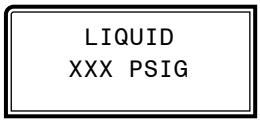




SUCTION PRESSURE READING FROM INPUT



DISCHARGE PRESSURE READING FROM INPUT

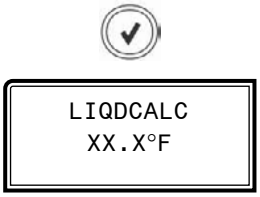


LIQUID LINE PRESSURE READING FROM INPUT

SATURATION TEMPERATURE CALCULATION

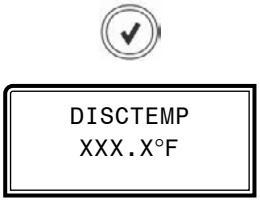
DISCHARGE TEMPERATURE SENSOR CALCULATION

Sensor Menu & Setpoint Status Screens



LIQUID LINE TEMPERATURE SENSOR CALCULATION

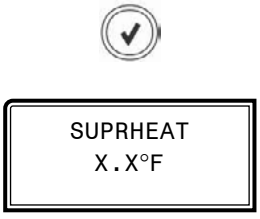
EVAPORATION TEMPERATURE READING FROM INPUT



DISCHARGE TEMPERATURE READING FROM INPUT

LIQUID LINE TEMPERATURE READING FROM INPUT

LEAVING WATER TEMPERATURE

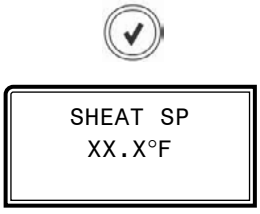


SUPERHEAT TEMPERATURE

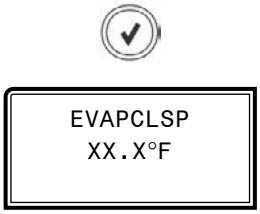
Setpoint Status Screens

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

LEAVING WATER TEMPERATURE SETPOINT



SUPERHEAT SETPOINT



SATURATION TEMPERATURE SETPOINT

Alarm 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.

NO WARNINGS

This will be shown if there are no current warnings.

WARNINGS!

This will display if there are active warnings.

LOW SUCT PRESSURE: Low Suction Pressure

LOW SUCT PRESSURE: Low Suction Pressure Startup

HIGH DISCHPSI: High Discharge Pressure

DISCHPSI NODETECT: Cannot detect Discharge Pressure

DLTSENSR NODETECT: Cannot detect Discharge Line Temperature Sensor

LIQD PSI NODETECT: Cannot detect Liquid Line Pressure

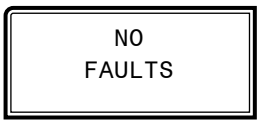
LIQDLINE NODETECT: Cannot detect Liquid Line Temperature Sensor

HIGH SUPRHEAT: High Superheat

FANFAULT INPUT: Condenser Fan Fault Input

COND1 OVERAMPS: Condenser 1 Over Current

COND2 OVERAMPS: Condenser 2 Over Current



NO FAULTS

This will be shown if there are no current faults.

FAULTS!

This will display if there are active faults.

LOW SUCT PRESSURE: Low Suction Pressure

UNSAFE SUCT PSI: Unsafe Suction Pressure

HIGH PSI TRIP: High Discharge Pressure Trip

DISCHPSI NODETECT: Cannot detect Discharge Pressure

C1 NO START: Compressor 1 not running

C2 NO START: Compressor 2 not running

EVAPTEMP NODETECT: Cannot detect Suction Line Temperature Sensor

LIQDLINE NODETECT: Cannot detect Liquid Line Temperature Sensor

LOW SUPRHEAT: Low Superheat

HIGH DISCTEMP: High Discharge Temperature

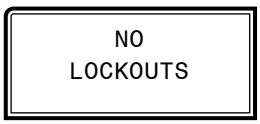
C1 FALSE ACTIVE: Compressor 1 False Active

C2 FALSE ACTIVE: Compressor 2 False Active

SUCT PSI NODETECT: Cannot detect Suction Pressure Temperature Sensor

EMERGNCY SHUTDOWN: Emergency Shutdown

COMM TIMEOUT: Modbus Slave Communication Time Out



NO LOCKOUTS

This will be shown if there are no current lockouts.

LOCKOUTS!

This will display if there are active lockouts.

SUCT PSI LOCKOUT: Suction Pressure Lockout

COMP 1 LOCKOUT: Compressor 1 Lockout

COMP 2 LOCKOUT: Compressor 2 Lockout

LOW DISC LOCKOUT: Low Discharge Pressure Lockout

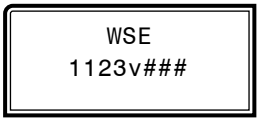
C1 AMPS LOCKOUT: Compressor 1 Over Current Lockout

C2 AMPS LOCKOUT: Compressor 2 Over Current Lockout

Main Screen Map & Module Screens

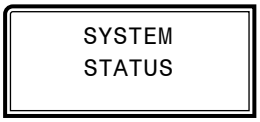
Main Screens Map

Refer to the following map when navigating through the LCD WSE Main Screens. To scroll through the screens, press the **<MENU>** button.



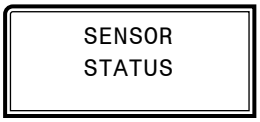
Press ✓ to scroll through WSE Screens.

Press M to go to SYSTEM STATUS Screen.



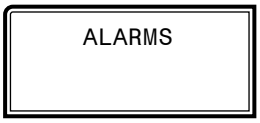
Press ✓ to scroll through SYSTEM STATUS Screens.

Press M to go to SENSOR STATUS Screen.



Press ✓ to scroll through SENSOR STATUS Screens.

Press M to go to ALARMS Screen.



Press ✓ to scroll through ALARMS Screens.

Press M to go to ALARM HISTORY Screen.

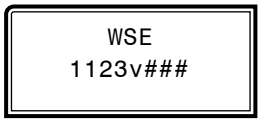
Press ✓ to scroll through ALARM HISTORY Screens.

Press M to go to the SETPOINT STATUS Screen.

Press ✓ to scroll through SETPOINT STATUS Screens.

Module Screens

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

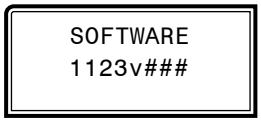


✓

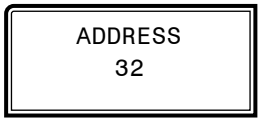
E-BUS COMMUNICATION DIAGNOSTICS

Number of COMM packets received.

✓

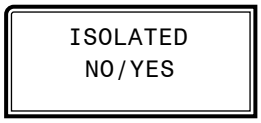


✓



CURRENT EBUS ADDRESS

✓

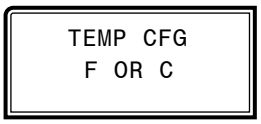


ISOLATED GLYCOL LOOP

Yes if the module is configured to control an isolated (glycol) loop.

✓

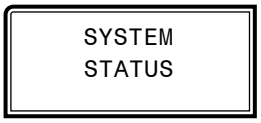
NUMBER OF FANS CONFIGURED

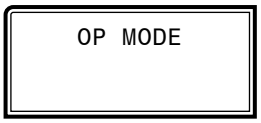


FAHRENHEIT OR CELSIUS

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.

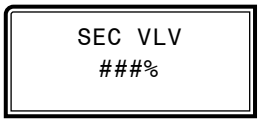




CURRENT OPERATING MODE

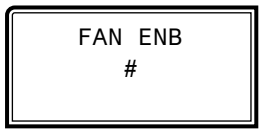
Possible choices are
OFF, ECONO, or FRZ PROT

PRIMARY 3-WAY VALVE POSITION

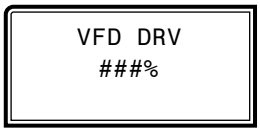


SECONDARY VALVE POSITION

This screen will only display if the module is configured for isolated operation.



NUMBER OF CURRENTLY RUNNING FANS

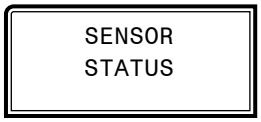


CURRENT VFD DRIVE LEVEL

Sensor Status Screens

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.



PRIMARY MIXING VALVE OUTLET TEMPERATURE

PRIMARY MIXING VALVE FEED TEMPERATURE

HEAT EXCHANGER SECONDARY SIDE INLET TEMPERATURE

This screen will only display if the module is configured for isolated operation.

HEAT EXCHANGER SECONDARY SIDE OUTLET TEMPERATURE

This screen will only display if the module is configured for isolated operation.

OUTDOOR AIR TEMPERATURE READING FROM MAIN CONTROLLER

LEAVING WATER TEMPERATURE READING FROM MAIN CONTROLLER

Alarms Screen & Alarm History Screen

Alarms Screen

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.

NO ALARMS

This will be shown if there are no current alarms.

ACTIVE ALARMS!

This will display if there are active alarms.

WSE NOT OPERATE: The WSE is not operating.

COMP BIN DISABLED: This indicates the compressor enable signal binary input is no longer active. This input is connected to the specific compressor circuit enable/disable switch on the front panel access door.

IN FRZ PROTECT: In Freeze Protection Mode.

PRIM OUT NO SENSE: The primary mixing valve outlet temperature sensor has failed.

PRIM IN NO SENSE: The primary mixing valve feed temperature sensor has failed.

SEC IN NO SENSE: The secondary heat exchanger inlet temperature sensor has failed.

SEC OUT NO SENSE: The secondary heat exchanger outlet temperature sensor has failed.

VFD FAULT: VFD Fault detected.

COMM FAULT: Communications have failed. For testing purposes, the comm fault trigger can be disabled. The disable is not stored and self-clears when power is removed.

Alarm History Screen

The ALARM HISTORY screen will display the last occurrence of the given alarm in minutes if the last occurrence was 60 minutes or less, hours if the last occurrence was 72 hours or less, days if the last occurrence was 30 days or less and 0 if the last occurrence was over 30 days or the alarm has not been triggered since power up. Alarm histories are only kept as long as the unit is powered; they clear on loss of power.

This screen will only display if there are alarms that have occurred in the past 30 days.

The name of the alarm will appear along with how long it has been since it last occurred in number of minutes, hours, or days. 0 indicates more than 30 days or the alarm has not been triggered since power up.

NO OP & time: Last occurrence of WSE not operating.

FRZ PROT & time: Last occurrence of Freeze Protection Mode alarm.

PRIM OUT & time: Last occurrence of primary mixing valve outlet temperature sensor failure.

PRIM IN & time: Last occurrence of primary mixing valve feed temperature sensor failure.

SEC IN & time: This screen will only be present if the module is configured for isolated operation. It shows the last occurrence of a secondary heat exchanger inlet temperature sensor failure.

SEC OUT & time: This screen will only be present if the module is configured for isolated operation. It shows the last occurrence of a secondary heat exchanger outlet temperature sensor failure.

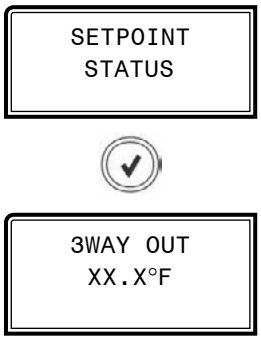
VFD FLT & time: Last occurrence of a VFD fault.

COMM FLT & time: Last occurrence of a communications fault

Setpoint Status Screens

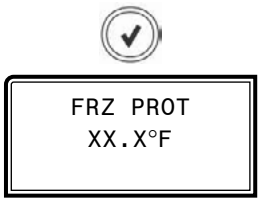
Setpoint Status Screens

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



PRIMARY MIXING VALVE OUTLET TEMPERATURE TARGET SETPOINT

0.0 to 70.0°F

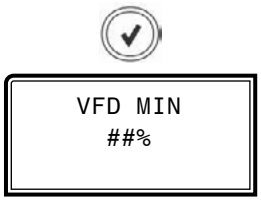


FREEZE PROTECT SETPOINT FOR THE PRIMARY FEED SENSOR

0.0 to 50.0°F

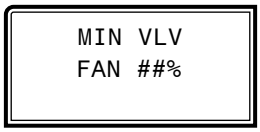
FAN STAGE UP DELAY SETPOINT

0 to 30 seconds



VFD FAN OPERATING SPEED IN PERCENT

10 to 50%

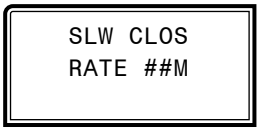


MINIMUM CONTROLLING MIXING VALVE POSITION BELOW WHICH FANS DISABLE

0 to 95%

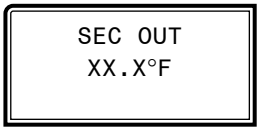
PRIMARY MIXING VALVE SLOW OPENING RATE USED IN BRINGING WSE ON-LINE WITH COMPRESSORS RUNNING

1 to 30 minutes



PRIMARY MIXING VALVE SLOW CLOSING RATE USED IN BRINGING WSE OFF-LINE WITH COMPRESSORS RUNNING

1 to 30 minutes



HEAT EXCHANGER SECONDARY SIDE OUTLET MINIMUM TEMPERATURE SETPOINT

0.0 to 70.0°F

NOTE: This screen will only be present if the module is configured for isolated operation.

HEAT EXCHANGER SECONDARY SIDE INLET MINIMUM TEMPERATURE SETPOINT

0.0 to 50.0°F

NOTE: This screen will only be present if the module is configured for isolated operation.

Main Screen Map & Module Screens

Main Screens Map

Refer to the following map when navigating through the LCD Main Screens. To scroll through the screens, press the **<MENU>** button.

EVAPCOND
1120vXXX

Press ✓ to scroll through EVAPORATIVE CONDENSER Screens.

Press M to go to STATUS MENU Screen.

STATUS
MENU

Press ✓ to scroll through STATUS MENU Screens.

Press M to go to SENSOR MENU Screen.

SENSOR
MENU

Press ✓ to scroll through SENSOR MENU Screens.

Press M to go to ALARMS Screen.

ALARMS

Press ✓ to scroll through ALARMS Screens.

Press M to return to the SETPOINT STATUS Screen.

SETPOINT
STATUS

Press ✓ to scroll through SETPOINT STATUS Screens.

Module Screens

Refer to the following map when navigating through the Evaporative Condenser Screens. From the EVAP COND Screen, press **<ENTER>** to scroll through the screens.

EVAPCOND
1120vXXX

✓

COM MODE
+###

E-BUS COMMUNICATION DIAGNOSTICS

Number of COMM packets received.

✓

SOFTWARE
1120vXXX

CURRENT SOFTWARE VERSION

✓

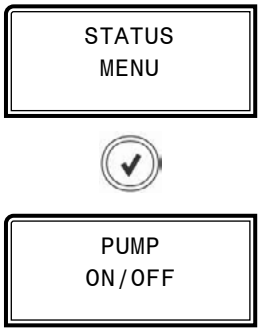
ADDRESS
1(159)

CURRENT BOARD ADDRESS

Status Menu & Sensor Menu Screens

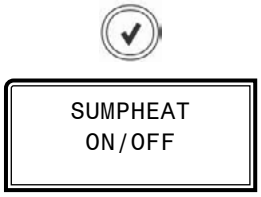
Status Menu Screens

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



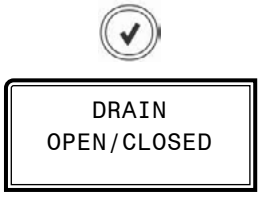
PUMP OPERATING STATUS

ON/OFF



SUMP HEAT STATUS

ON/OFF

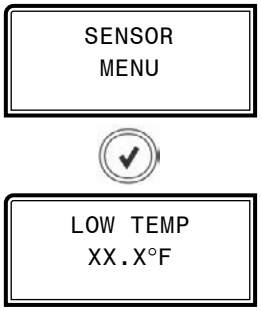


DRAIN STATUS

OPEN/CLOSED

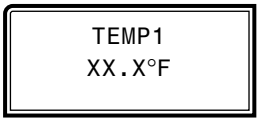
Sensor Menu Screens

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

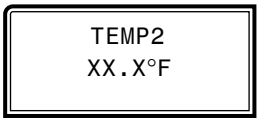


LOW TEMP

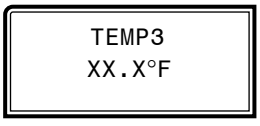
NOTE: This screen wiill only appear if more than 1 temp sensor is configured.



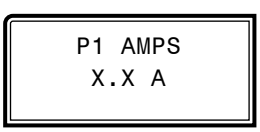
TEMPERATURE SENSOR 1



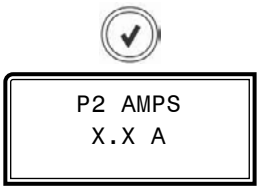
TEMPERATURE SENSOR 2



TEMPERATURE SENSOR 3



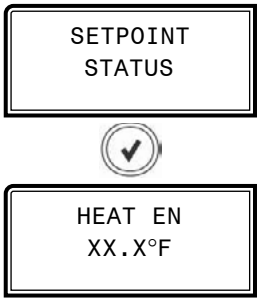
PUMP 1 AMPS



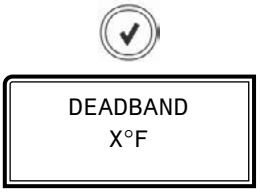
PUMP 2 AMPS

Setpoint Status Screens

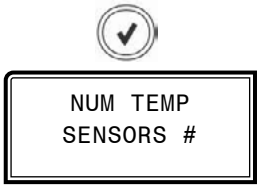
Refer to the following map when navigating through the Setpoint Status Screens. From the SETPOINT STATUS Screen, press **<ENTER>** to scroll through the screens.



HEAT ENABLE READING

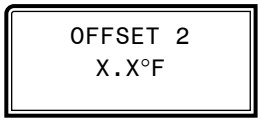


DEADBAND

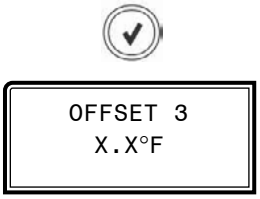


NUMBER OF TEMPERATURE SENSORS

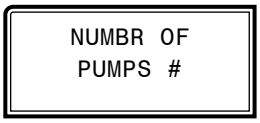
TEMPERATURE 1 SENSOR OFFSET



TEMPERATURE 2 SENSOR OFFSET



TEMPERATURE 3 SENSOR OFFSET



NUMBER OF PUMPS

Alarms Screen

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.

NO ALARMS

This will be shown if there are no current alarms.

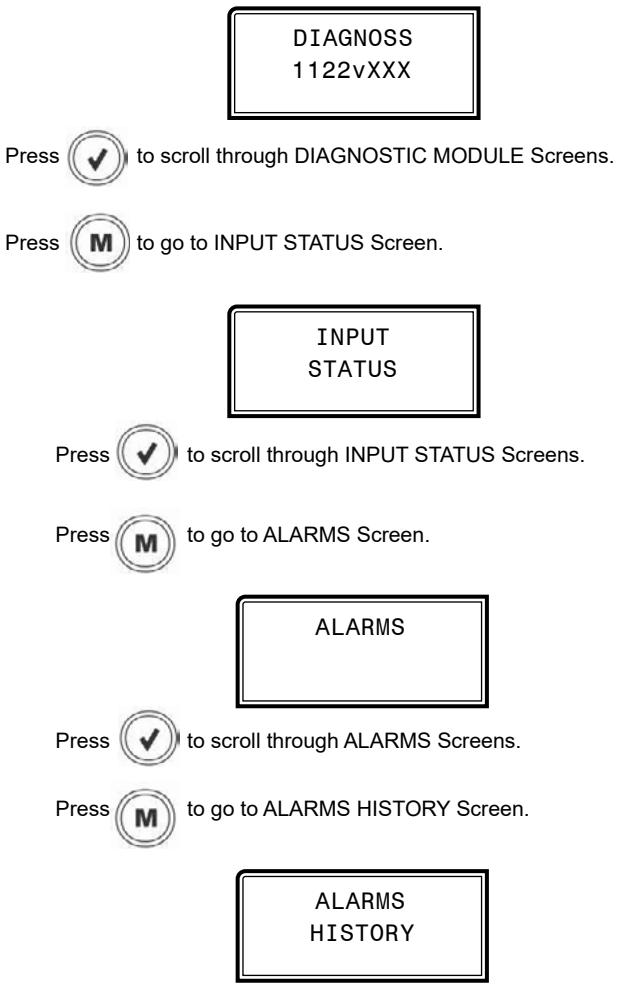
ACTIVE ALARMS!

This will display if there are active alarms.

Main Screen Map & Module Screens

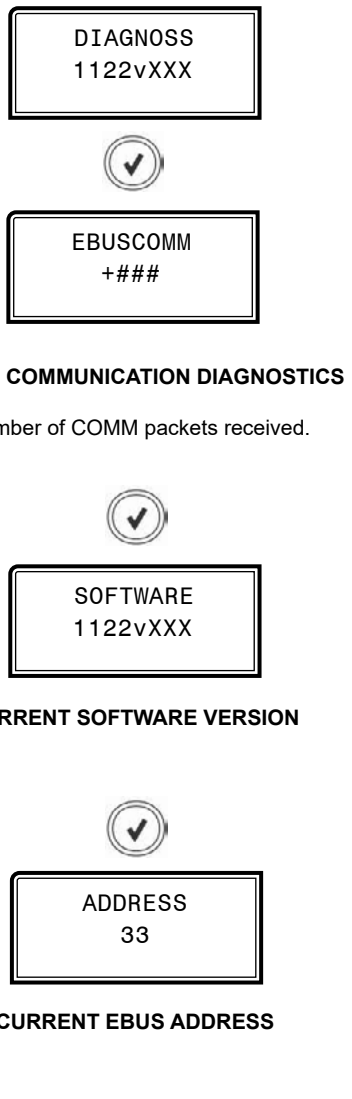
Main Screens Map

Refer to the following map when navigating through the LCD Main Screens. To scroll through the screens, press the **<MENU>** button.



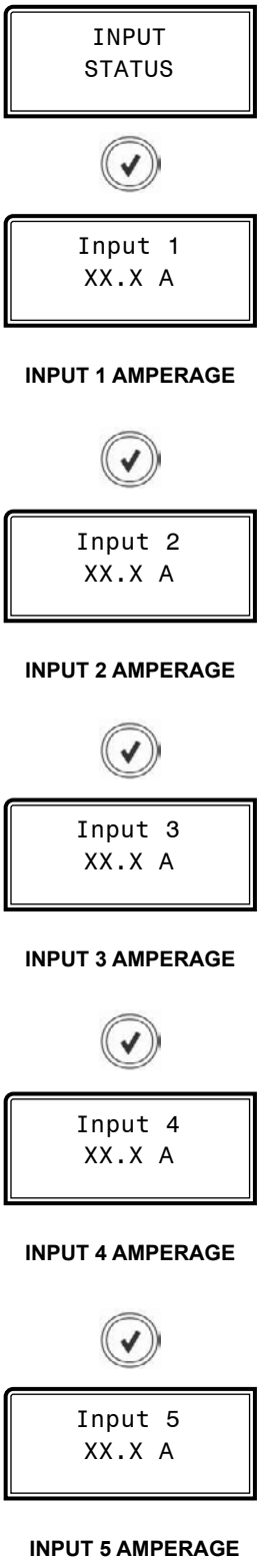
Module Screens

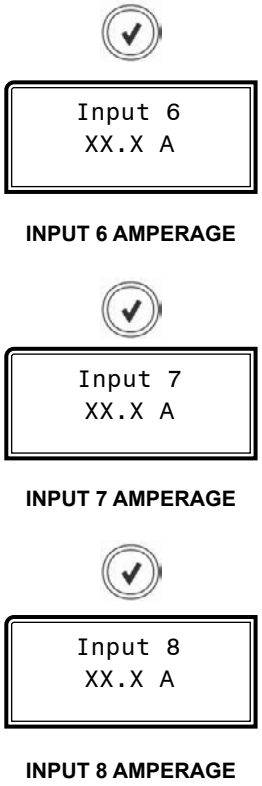
Refer to the following map when navigating through the Diagnostic Module Screens. From the DIAGNOSS Screen, press **<ENTER>** to scroll through the screens.



Input Status Screens

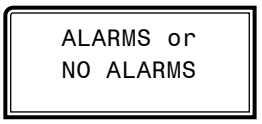
Refer to the following map when navigating through the Input Status Screens. From the INPUT STATUS Screen, press **<ENTER>** to scroll through the screens.





Alarms & Alarms History Screen

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.



There is only one alarm for this module—COMM FAULT.

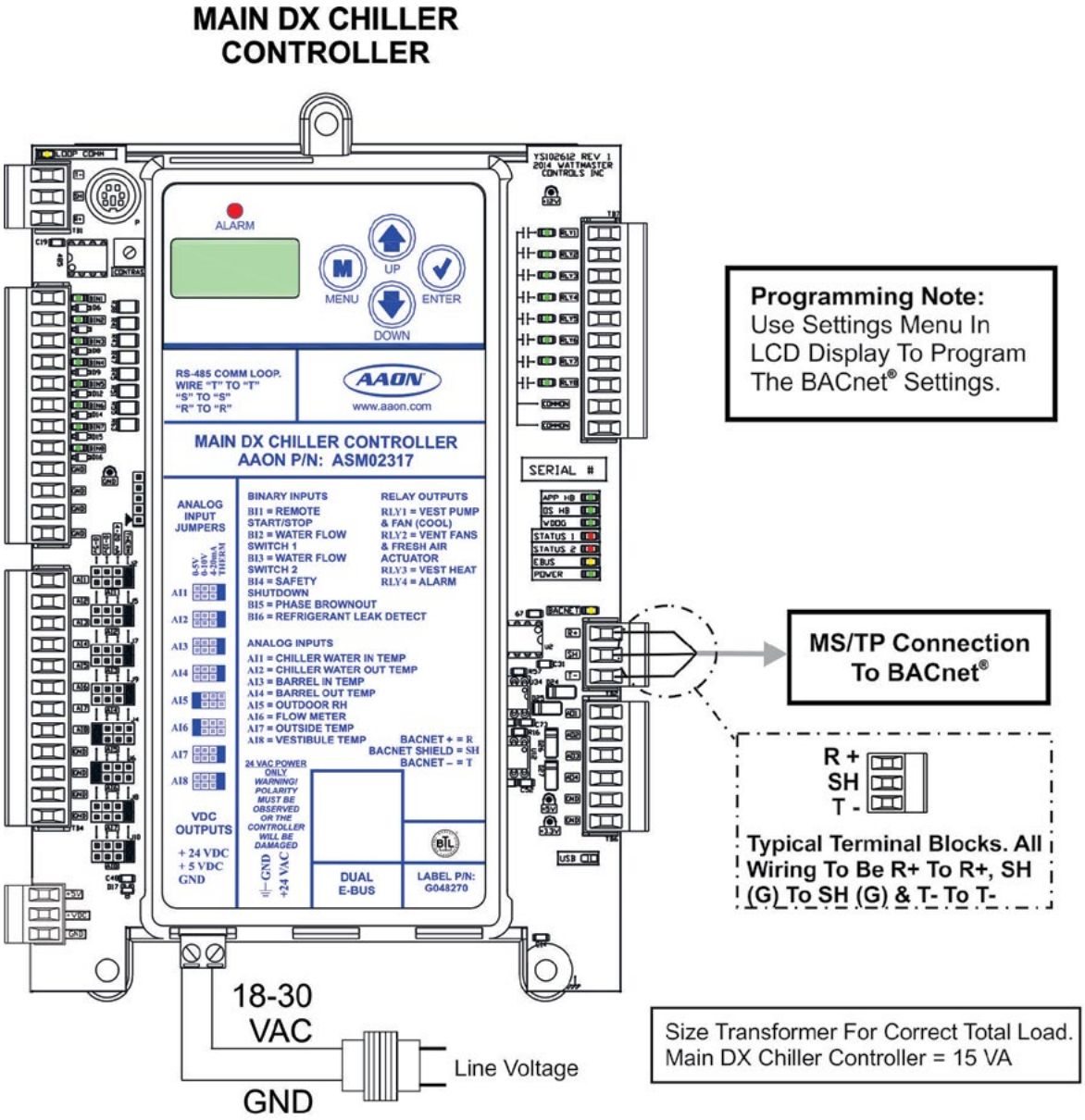
NO ALARMS

This will be shown if there are no current alarms.

ALARMS HISTORY

This will be shown if the COMM FAULT alarm has occurred.

BACnet® Connection To MS/TP Network



Wiring Notes:

1.) All wiring to be in accordance with local and national electrical codes and specifications.

2.) All communication wiring to be 18 gauge minimum, 2 conductor twisted pair with shield. Use Belden #82760 or equivalent.

Figure 18: BACnet® Connection to MS/TP Network

ANALOG INPUTS		
Point Type	**Number**	**BACnet® Point Name**
AI	1	Application Version
AI	2	Chilled Water In Temperature
AI	3	Chilled Water Out Temperature
AI	4	Chilled Water Out Setpoint
AI	5	Outdoor Air Temperature
AI	6	Vestibule Temperature
AI	7	WSE Outlet Temperature
AI	8	WSE Valve Outlet Mixed Temperature
AI	9	WSE Primary 3-Way Valve
AI	10	WSE VFD Speed
AI	11	EVAP Sump Temperature
AI	12	EVAP Pump Amps
AI	13	Superheat Setpoint
AI	14	Head Pressure Setpoint
AI	15	A-Suction Pressure
AI	16	A-Discharge Pressure
AI	17	A-Liquid Line Pressure
AI	18	A-Calculated Saturation Temperature
AI	19	A-Calculated Discharge Temperature
AI	20	A-Calculated Liquid Line Temperature
AI	21	A-Suction Line Temperature
AI	22	A-Discharge Line Temperature
AI	23	A-Liquid Line Temperature
AI	24	A-Superheat Temperature
AI	25	A-Discharge Superheat Temperature
AI	26	A-Sub-Cooling Temperature
AI	27	A-Compressor A1 Percentage
AI	28	A-Compressor A2 Percentage
AI	29	A-Condenser Percentage
AI	30	A-EXV Position

Table 16: BACnet® Analog Inputs

ANALOG INPUTS		
Point Type	**Number**	**BACnet® Point Name**
AI	31	A-Compressor A1 Current
AI	32	A-Compressor A2 Current
AI	33	A-Condenser A1 Current
AI	34	A-Condenser A2 Current
AI	35	B-Suction Pressure
AI	36	B-Discharge Pressure
AI	37	B-Liquid Line Pressure
AI	38	B-Calculated Saturation Temperature
AI	39	B-Calculated Discharge Temperature
AI	40	B-Calculated Liquid Line Temperature
AI	41	B-Suction Line Temperature
AI	42	B-Discharge Line Temperature
AI	43	B-Liquid Line Temperature
AI	44	B-Superheat Temperature
AI	45	B-Discharge Superheat Temperature
AI	46	B-Sub-Cooling Temperature
AI	47	B-Compressor B1 Percentage
AI	48	B-Compressor B2 Percentage
AI	49	B-Condenser Percentage
AI	50	B-EXV Position
AI	51	B-Compressor B1 Current
AI	52	B-Compressor B2 Current
AI	53	B-Condenser B1 Current
AI	54	B-Condenser B2 Current

Table 16, continued: BACnet® Analog Inputs

BACnet® Analog Values

BACnet® Analog Values			
BACnet® Point Type	**Number**	**Limit Range**	**BACnet® Point Name**
AV	1	35° - 75°	Chilled Water Target Temperature
AV	2	25° - 45°	Low Chilled Water Out Cutoff Temp
AV	3	-30° - 40°	Ambient Temperature Lockout
AV	4	35° - 60°	High Coil Setpoint Reset Limit
AV	5	35° - 60°	Low Coil Setpoint Reset Limit
AV	6	30° - 90°	Vestibule Cooling Setpoint
AV	7	0.1° - 10°	Vestibule Cooling Setpoint Deadband
AV	8	1° - 30°	Superheat Setpoint
AV	9	1° - 30°	Compressor Stage Above Window
AV	10	1° - 30°	Compressor Stage Below Window
AV	11	-100° - 100°	Inlet Water Sensor Calibration Offset
AV	12	-100° - 100°	Outlet Water Sensor Calibration Offset
AV	13	-100° - 100°	Outdoor Air Sensor Calibration Offset
AV	14	-100° - 100°	Vestibule Sensor Calibration Offset
AV	15	150 PSI – 475 PSI	Head Pressure Setpoint
AV	16	5 Sec - 60 Sec	High Outlet Water Temp Failure Time
AV	17	38° - 80°	Sump Heater Enable Setpoint
AV	18	1° - 10°	Sump Heater Setpoint Deadband
AV	19	0 Amps – 100 Amps	EVAP Maximum Rated Amps
AV	20	0° - 200°	EVAP Discharge Control Stage Above
AV	21	0° - 200°	EVAP Discharge Control Stage Below
AV	22	35° - 110°	1st Stage Pump/Evap Ambient Enable SP
AV	23	0° - 75°	Waterside Economizer Enable Deadband
AV	24	0° - 75°	WSE Freeze Protection Setpoint
AV	25	0 Sec – 300 Sec	WSE Fan Staging Delay
AV	26	0 Sec – 300 Sec	WSE Startup Delay
AV	27	10% - 50%	WSE Minimum VFD Speed
AV	28	0% - 95%	WSE Minimum Mixing Valve
AV	29	1 Min – 60 Min	WSE Primary 3-Way Valve Slow Start
AV	30	1 Min – 60 Min	WSE Primary 3-Way Valve Slow Stop
AV	31	0 = Log 1 = Reset History	WSE Reset Alarm History { 1 = Reset }
AV	32	1 Sec – 60 Sec	Compressor Modulation Rate
AV	33	0 = Run 1 = Reset Lockout	Reset Unit Lockout { 1 = Reset }
AV	34	0 – 2 = Auto/Run/Off	Auto/Run/Off Command

Table 17: BACnet® Analog Values

BACnet® Analog Values			
BACnet® Point Type	**Number**	**Limit Range**	**BACnet® Point Name**
AV	35	0 = Off 1 = On	Enable/Disable EVAP Drain Valve
AV	36	0 = Off 1 = On	Enable/Disable Main Relay #5
AV	37	0 = Off 1 = On	Enable/Disable Main Relay #6
AV	38	0 = Off 1 = On	Enable/Disable Main Relay #7
AV	39	0 = Off 1 = On	Enable/Disable Main Relay #8

Table 17, continued: BACnet® Analog Values

BACnet® Binary Inputs

BINARY INPUTS			
BACnet® Point Type	Number	BACnet® Description	Value Type
BI	1	Run/Stop Input Command	Status
BI	2	Proof of Water Flow	Status
BI	3	Phase Loss	Status
BI	4	WSE Fan Run Status	Status
BI	5	WSE at Maximum Capacity	Status
BI	6	Active System Alarm Status	Alarm
BI	7	WSE Alarm Not Operating	Alarm
BI	8	WSE Alarm Freeze Protection	Alarm
BI	9	WSE Alarm Valve Outlet Mixed Sensor	Alarm
BI	10	WSE Alarm Outlet Sensor	Alarm
BI	11	WSE Alarm Heat Exchange Inlet	Alarm
BI	12	WSE Alarm Heat Exchange Outlet	Alarm
BI	13	WSE Alarm VFD Fault	Alarm
BI	14	EVAP Low Sump Input Status	Status
BI	15	EVAP Pump Pressure Status	Status
BI	16	EVAP Condenser Pump	Status
BI	17	EVAP Sump Heater	Status
BI	18	EVAP Drain Valve	Status
BI	19	EVAP Alarm Low Sump Level	Alarm
BI	20	EVAP Alarm Low Sump Temperature	Alarm
BI	21	EVAP Alarm No Pump Pressure Signal	Alarm
BI	22	EVAP Alarm Pump VFD Fault	Alarm
BI	23	EVAP Alarm Sump Temp Sensor	Alarm
BI	24	EVAP Alarm Condenser Lockout	Alarm
BI	25	EVAP Alarm Pump Low Current	Alarm
BI	26	EVAP Alarm Pump High Current	Alarm
BI	27	A-Fault Low Suction	Fault
BI	28	A-Fault Unsafe Suction	Fault
BI	29	A-Fault Trip High Discharge Pr.	Fault
BI	30	A-Fault Compressor A1 Not Running	Fault
BI	31	A-Fault Compressor A2 Not Running	Fault
BI	32	A-Fault No Suction Line Temp Sensor	Fault
BI	33	A-Fault Low Superheat	Fault
BI	34	A-Fault High Discharge Temp	Fault
BI	35	A-Fault Compressor A1 False Active	Fault
BI	36	A-Fault Compressor A2 False Active	Fault
BI	37	A-Fault No Suction Pr. Sensor	Fault
BI	38	A-Fault Emergency Shutdown	Fault
BI	39	A-Fault MODBUS Slave Timeout	Fault

Table 18: BACnet® IP Parameter Binary Inputs

BINARY INPUTS			
BACnet® Point Type	**Number**	**BACnet® Description**	**Value Type**
BI	40	A-Warning Low Suction Pressure	Warning
BI	41	A-Warning Low Suction Pr. Startup	Warning
BI	42	A-Warning High Discharge Pr.	Warning
BI	43	A-Warning No Discharge Pr. Sensor	Warning
BI	44	A-Warning No Discharge Temp Sensor	Warning
BI	45	A-Warning No Liquid Line Pr. Sensor	Warning
BI	46	A-Warning No Liquid Line Temp Sensor	Warning
BI	47	A-Warning High Superheat	Warning
BI	48	A-Warning Condenser Fault	Warning
BI	49	A-Warning Condenser A1 Over Current	Warning
BI	50	A-Warning Condenser A2 Over Current	Warning
BI	51	A-Lockout Suction Pressure	Lockout
BI	52	A-Lockout Compressor A1	Lockout
BI	53	A-Lockout Compressor A2	Lockout
BI	54	A-Lockout Low Discharge Pressure	Lockout
BI	55	A-Lockout Compressor A1 Over Current	Lockout
BI	56	A-Lockout Compressor A2 Over Current	Lockout
BI	57	B-Fault Low Suction	Fault
BI	58	B-Fault Unsafe Suction	Fault
BI	59	B-Fault Trip High Discharge Pr.	Fault
BI	60	B-Fault Compressor B1 Not Running	Fault
BI	61	B-Fault Compressor B2 Not Running	Fault
BI	62	B-Fault No Suction Line Temp Sensor	Fault
BI	63	B-Fault Low Superheat	Fault
BI	64	B-Fault High Discharge Temp	Fault
BI	65	B-Fault Compressor B1 False Active	Fault
BI	66	B-Fault Compressor B2 False Active	Fault
BI	67	B-Fault No Suction Pr. Sensor	Fault
BI	68	B-Fault Emergency Shutdown	Fault
BI	69	B-Fault MODBUS Slave Timeout	Fault
BI	70	B-Warning Low Suction Pressure	Warning
BI	71	B-Warning Low Suction Pr. Startup	Warning
BI	72	B-Warning High Discharge Pr.	Warning
BI	73	B-Warning No Discharge Pr. Sensor	Warning
BI	74	B-Warning No Discharge Temp Sensor	Warning
BI	75	B-Warning No Liquid Line Pr. Sensor	Warning
BI	76	B-Warning No Liquid Line Temp Sensor	Warning
BI	77	B-Warning High Superheat	Warning

Table 18, continued: BACnet® IP Parameter Binary Inputs

BACnet® Binary Inputs & Multi-State Input

BINARY INPUTS			
BACnet® Point Type	Number	BACnet® Description	Value Type
BI	78	B-Warning Condenser Fault	Warning
BI	79	B-Warning Condenser B1 Over Current	Warning
BI	80	B-Warning Condenser B2 Over Current	Warning
BI	81	B-Lockout Suction Pressure	Lockout
BI	82	B-Lockout Compressor B1	Lockout
BI	83	B-Lockout Compressor B2	Lockout
BI	84	B-Lockout Low Discharge Pressure	Lockout
BI	85	B-Lockout Compressor B1 Over Current	Lockout
BI	86	B-Lockout Compressor B2 Over Current	Lockout

Table 18, continued: BACnet® IP Parameter Binary Inputs

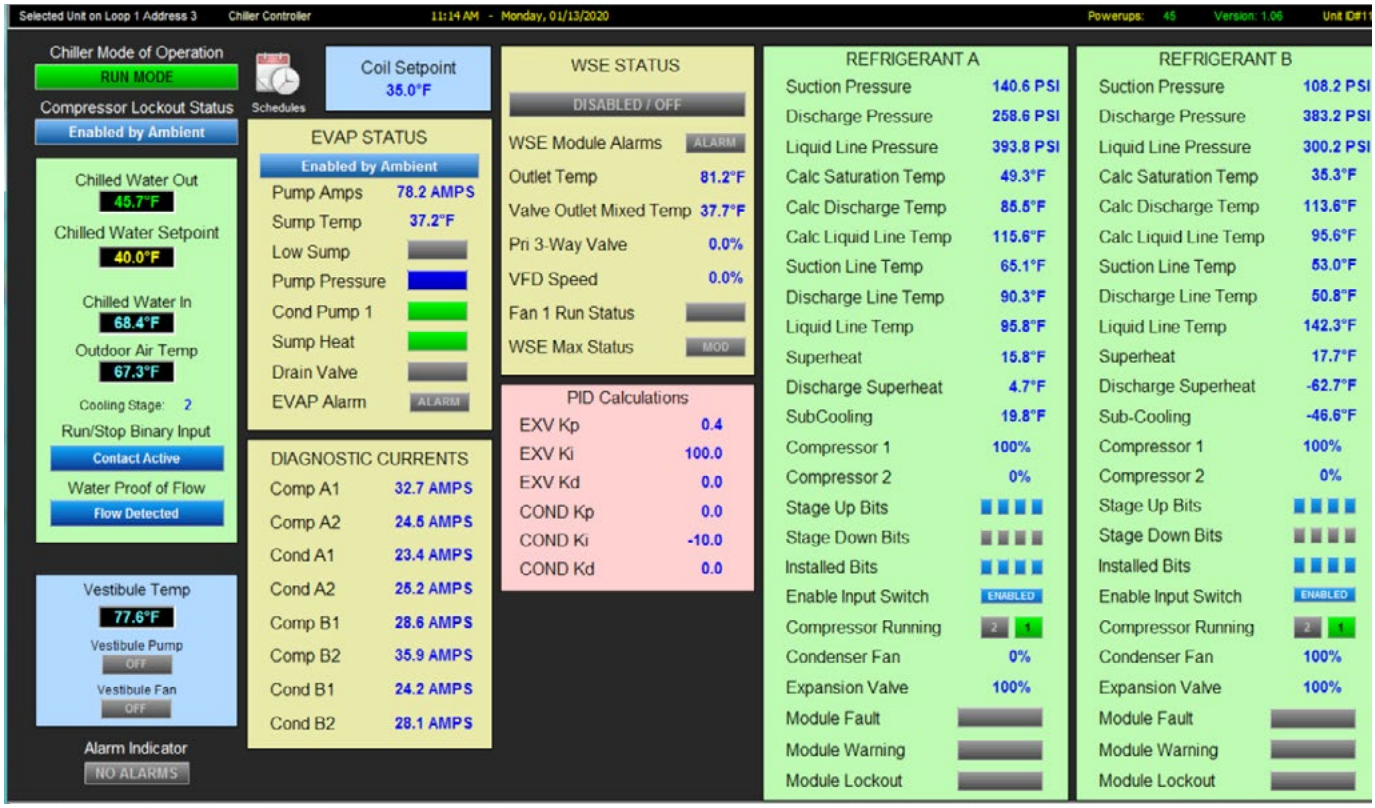
MULTI-STATE INPUT			
BACnet® Point #	BACnet® Point Name	BACnet® Description	Limits
MI: 1	Operating Status	Current Unit Mode	1 = OFF_MODE 2 = RUN MODE 3 = Holiday OFF MODE 4 = Holiday RUN MODE 5 = Startup Delay 6 = Emergency Shutdown 7 = High Leaving Water

Table 19: BACnet® IP Parameter Multi-State Input

Prism2

Operator Interface Overview

Prism 2 Software: Version 4.9.2 and later
DX Chiller Controller Code: Version 1.0 and up



Prism 2 Requirements

PLEASE NOTE

This appendix gives a brief overview of the Prism 2 software. For more information, refer to the *Prism 2 Technical Guide*, the *CommLink 5 Technical Guide*, the *IP Module Technical Guide*, the *USB-Link 2 Technical Guide,* and/or the *MiniLink PD 5 Technical Guide*. All can be found on the AAON website at www.aaon.com/controlsmanuals.

Prism 2 is a complete Windows®-based graphical interface controls and management program that allows you to interact with your digital controls. The program provides standard, easy-to-understand status, setpoint, and configuration screens for the DX Chiller Controller and other controllers in your system.

Prism 2 allows you to access trend logs and alarm conditions. The program can be configured for direct on-site installation or TCP/IP Internet connection.

Feature Summary

Prism 2 provides a broad set of features:

- Easy to use
- On-site or TCP/IP communications
- User programmable description for every piece of equipment and user-defined custom screens
- Automatic retrieval of trend logs and export capability to spreadsheet and database programs
- Alarm Logs maintained on disk
- Alarm E-mail /texting capability when using a CommLink
- Encrypted History Logs

System Requirements

To use Prism 2 you must have a computer that meets or exceeds the following requirements:

Operating System

- Microsoft® Windows® 10
  NOTE: Prism 2 is not intended for a server/client environment nor for any version of Windows Server.

Minimum Hardware

- Windows® compatible computer
- CommLink 5 or USB Link 2 for direct, on-site connection
- IP Module for remote connection
- Prism is NOT supported in a server environment. It does not support client/server systems. Prism is a LAPTOP/DESKTOP ONLY system.

WARNING: Older operating systems, while they still might be capable of running Prism, are not recommended due to security updates being obsoleted by Microsoft®. We also do not support troubleshooting of any version of Windows® operating the Prism program. Some new models of laptops running the latest release of Windows® 10 have also experienced issues running Prism, and we cannot troubleshoot customer computer issues.

Software License

Prism 2 does not require any license agreement and may be freely copied and distributed.

Support Information

AAON Controls provides Prism 2 installation and configuration support. Call (866) 918-1100 for free, direct telephone support or (816) 505-1100 to talk to a Controls Support Representative. Support for all telephone services is available Monday through Friday, 7:00 AM to 5:00 PM central standard time.

NOTE: AAON Controls Support cannot troubleshoot internal PC and/or Windows®-based operating system problems.

NOTE: AAON Controls Support cannot troubleshoot firewalls, routers, and/or problems on a customer's internal or external network. An IT professional may need to be consulted.

Prism 2 Technical Guide Overview

The *Prism 2 Technical Guide* will lead you through each step in configuring Prism 2—from entering passcodes to searching and selecting units for troubleshooting. Below is a quick overview of each step of the guide that pertains to the DX Chiller Control System.

Step 1: Installing Prism 2—This section explains how to install the Prism 2 software, initiate communications, navigate the program, and enter and edit passcodes.

Step 2: Setting Up Job Sites—This section provides instructions for setting up each job site's name, port, or IP address, CommLink type and configuration, alarm notification, and custom screen designation.

Step 3: Configuring Prism 2—This section describes how to have Prism 2 automatically restart after a power failure and broadcast time to all controllers. It also explains how to set up the main screen display picture.

Step 4: Setting Up Communications—This section explains how to establish communications via TCP/IP connection through your CommLink.

Step 5: Searching for Installed Units—This section explains how to perform a unit search per job-site.

Step 6: Selecting and Renaming Loops and Units—This section explains how to select and rename loops and units.

Step 7: Configuring Units—This section describes how to configure controller setpoints. It also explains how to configure units while off-line.

Appendices—The appendices include examples of status and setpoint screens, instructions for DEMOMODE, and a list of controllers, E-BUS modules, and other devices that can be updated using Prism 2.

Controller Status Screen

Controller Status Screen

After successful Prism 2 installation and job-site setup, you will be able to access the DX Chiller Controller Status Screen. See **Figure 19** below.

Besides displaying the current operating status and inputs and outputs, from this screen you can set schedules, force modes, run BACnet® commands, view alarms, print status reports, chart modules, and access and change setpoints and configurations.

NOTE: Only the Administrator and top level users can access and change setpoints and schedules.

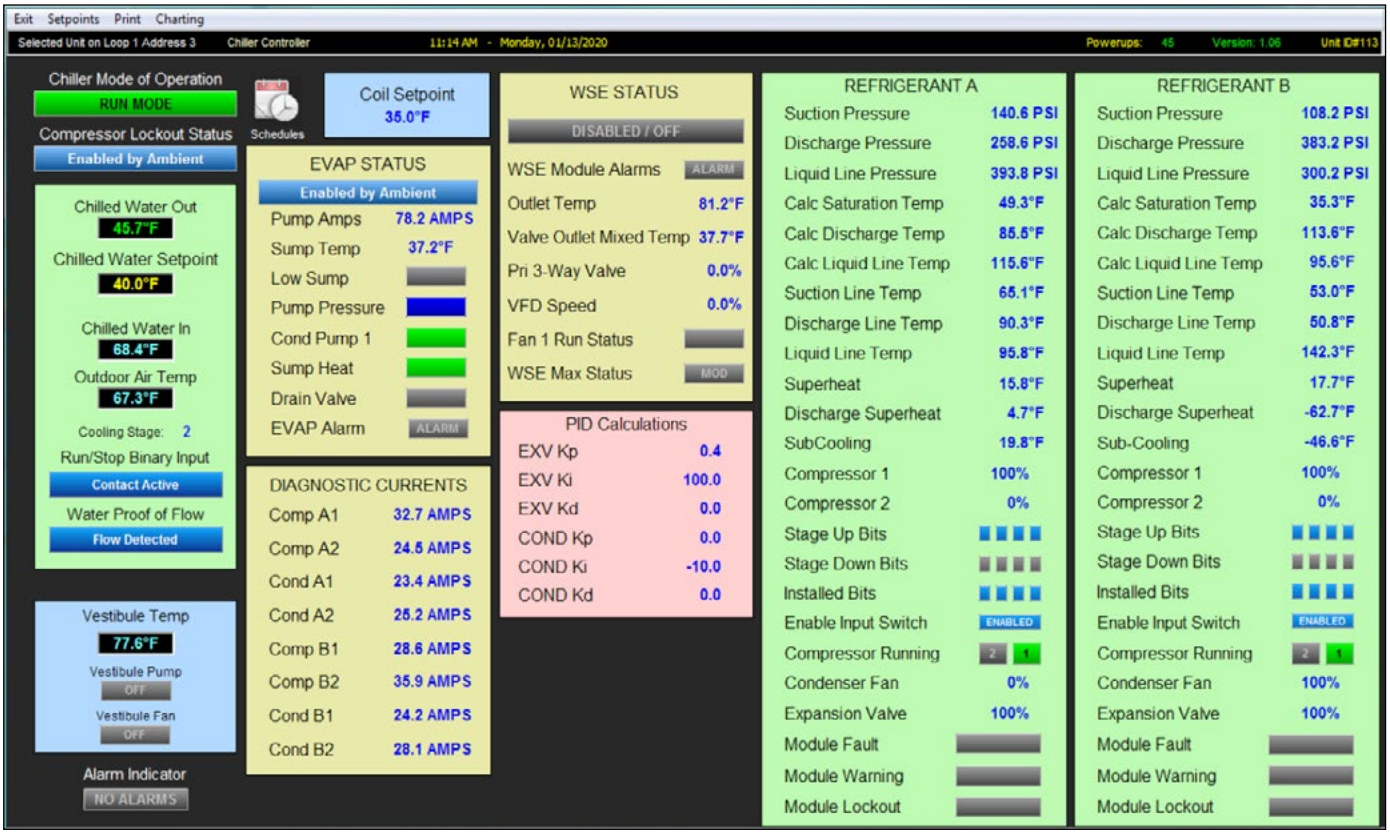


Figure 19: DX Chiller Controller Status Screen

Controller Setpoint Screens

Setpoints are accessed by *clicking* on **<Setpoints>** at the top left of the *DX Chiller Controller Status Screen* (**Figure 19, page 72**). The *Temperature Setpoints Screen* will display. See **Figure 20**, below.

At the bottom of any *Setpoints Screen*, you can access all other *Setpoint Screens* by clicking the icons, **Temperatures**, **Staging Delays**, **Miscellaneous**, **Calibration, Configuration**, **RSM Module**, **WSE Module**, and **Evap Module**.

The figures that follow show the rest of the screens available under Setpoints.

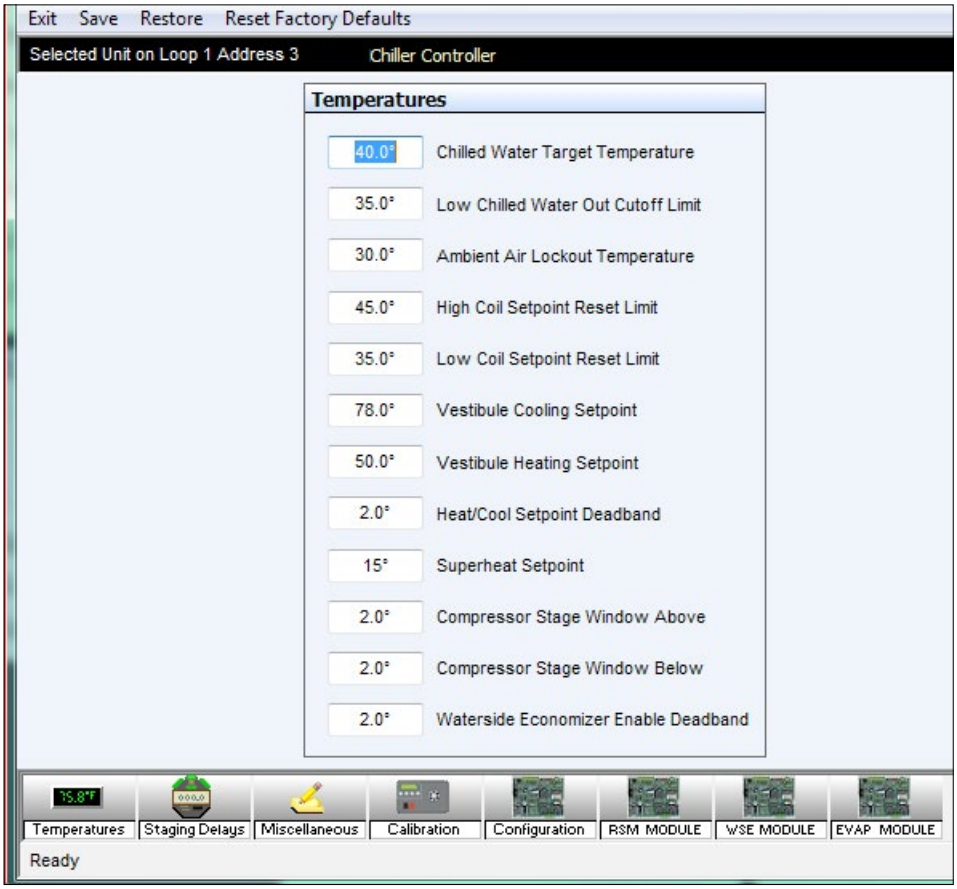


Figure 20: Temperatures Setpoints Screen

Controller Setpoint Screens

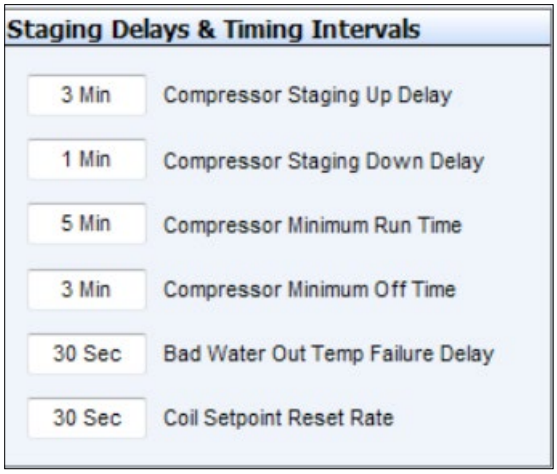


Figure 21: Staging Delays Setpoints Screen

Figure 22: Miscellaneous Setpoints Screen

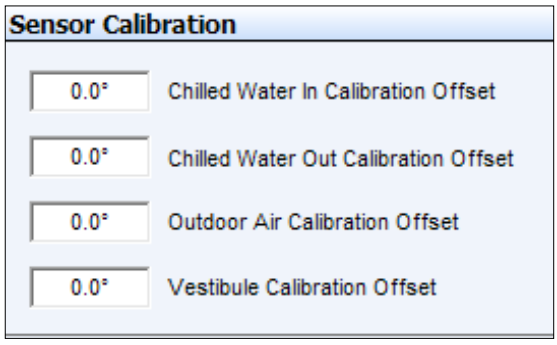


Figure 23: Calibration Setpoints Screen

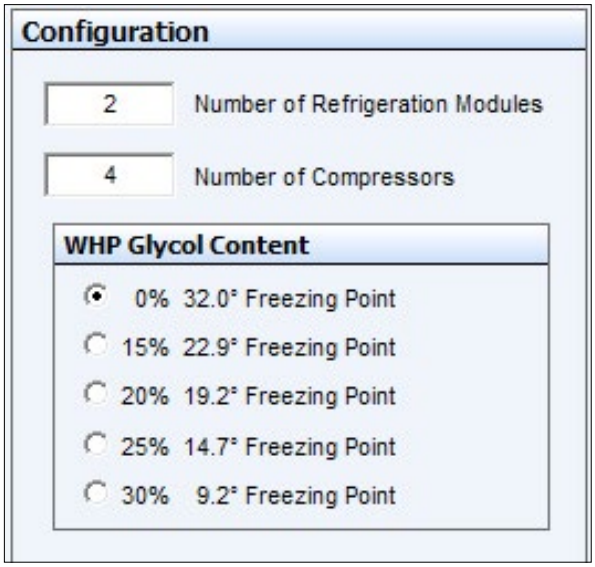


Figure 24: Configuration Setpoints Screen

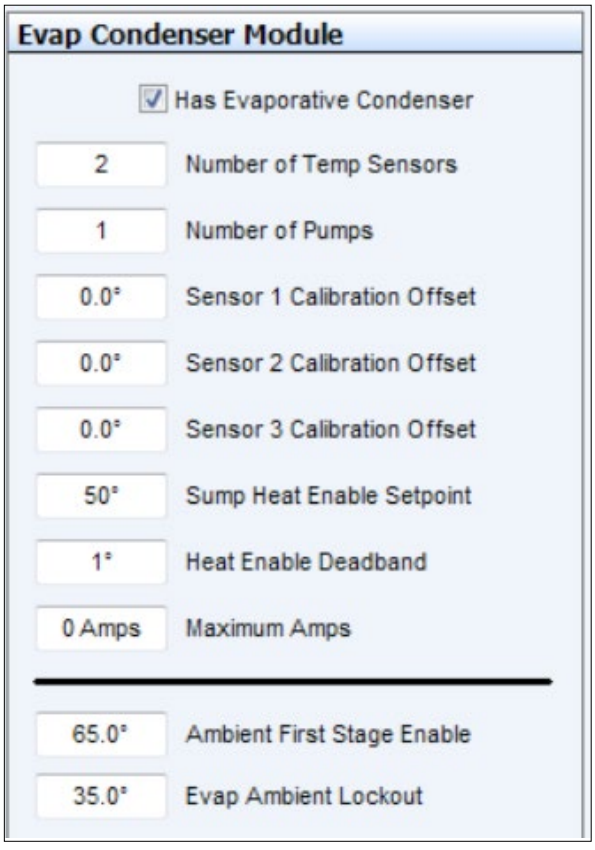


Figure 25: Evaporative Condenser Module Setpoints Screen

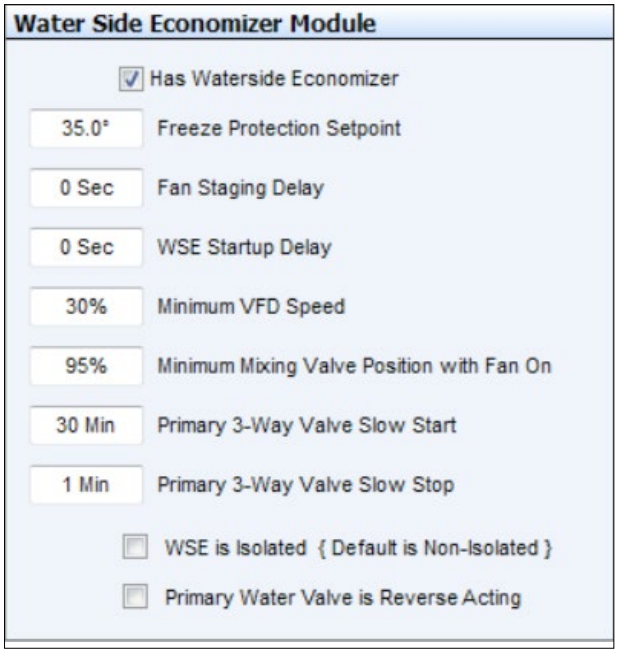


Figure 26: WSE Module Setpoints Screen

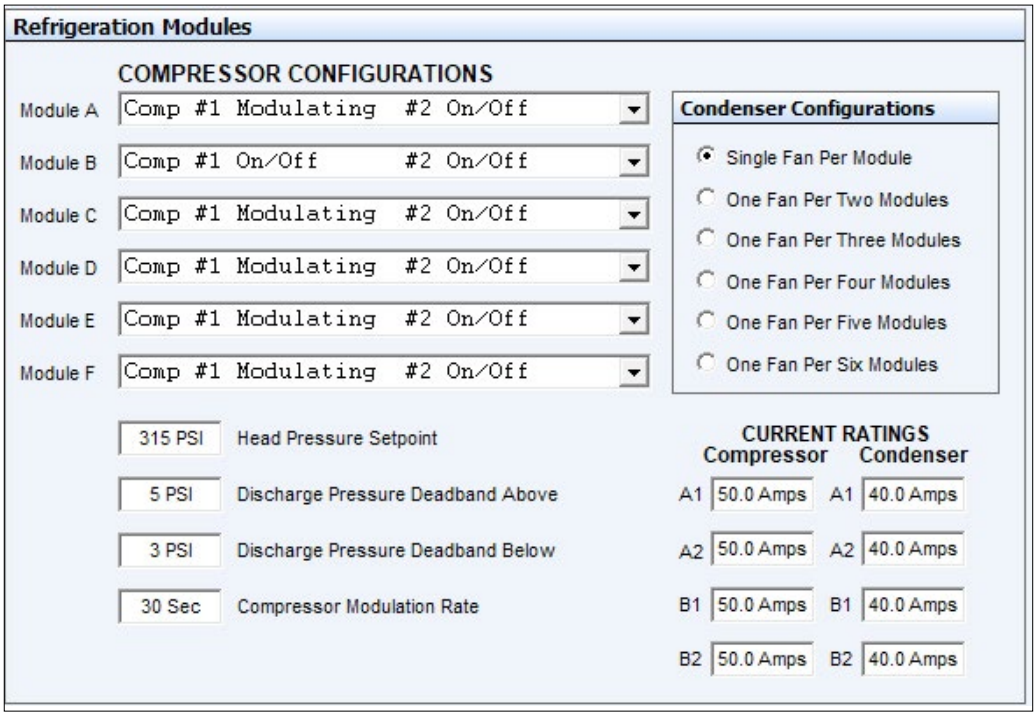
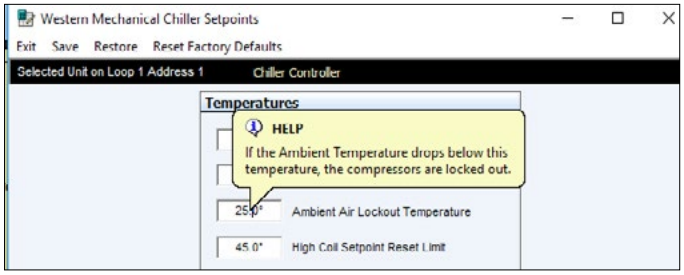


Figure 27: RSM Module Configuration Screen

Changing, Saving & Restoring Setpoints, Printing & Charting

Setpoint Help & Changing Setpoints

If you position the cursor over the top of a setpoint box, a *Help Window* will pop up indicating how that setpoint is used by the controller.



If you enter a setpoint that is either too high or too low or if you don't have Level 3 access, Prism 2 will not accept the new value and will restore the previous value in that field. When you enter a value, you must *press* **<Enter>** to have Prism 2 save the value.

Saving and Restoring Setpoints

At the top of each setpoint screen, you can *select* **<Save>** or **<Restore>**. These two functions save and copy over ALL of the setpoints for a controller, not only those on a single setpoint screen.

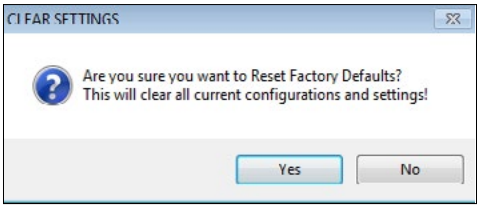
Saving all setpoints from the controller to a file on your computer for use in restoring the setpoints or for copying to another specific controller will save time in configuring your controller and save valuable time in having to reenter setpoints for another controller.

Restore Factory Defaults

To restore factory configuration and setpoint defaults for the DX Chiller Controller, *select* **<Restore Factory Defaults>** at the top of any setpoint screen.

WARNING: AAON does not assume any responsibility or liability due to misuse or misunderstanding of this feature. Restore Factory Defaults wipes out ALL current configuration and setpoints for a single controller.

The following message will display:



Select **<Yes>** to clear all configuration and settings and restore factory defaults. *Select* **<No>** to cancel this operation.

Printing & Charting

At the top of the *DX Chiller Controller Status Screen* (**Figure 19, page 72**), are the options **<Print>** and **<Charting>**.

Select **<Print>** to print a status report for the Controller for the current date. See **Figure 28**, below for an example. The printers you have set up for your computer will show in the printer selection box at the bottom of the screen.

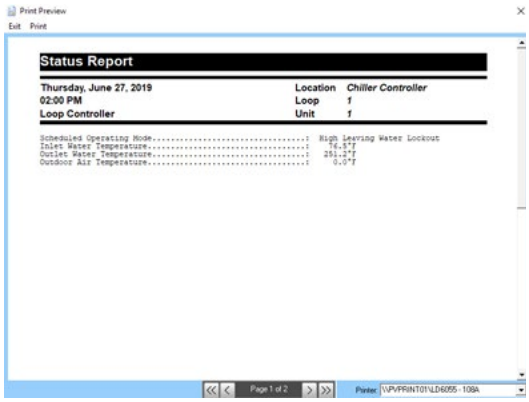


Figure 28: Status Report Screen

Select **<Charting>** to display a chart for Chiller Compressor Module #1 or #2. See **Figure 29**, below for an example. You have the option to clear the graph, chart the colors, or save the graph.

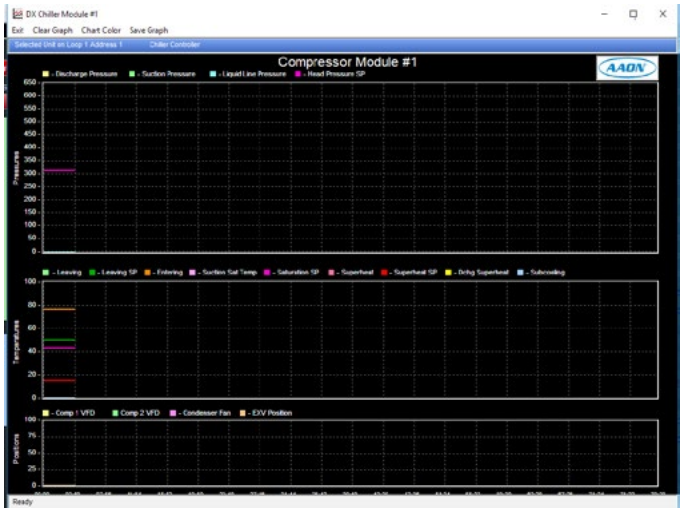
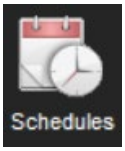


Figure 29: Module Chart

Schedules & Holidays



When you *select* the **<Schedules>** icon found on the *DX Controller Status Screen* (**Figure 19, page 72**), the *Schedules Screen* will appear. See **Figure 30**, below.

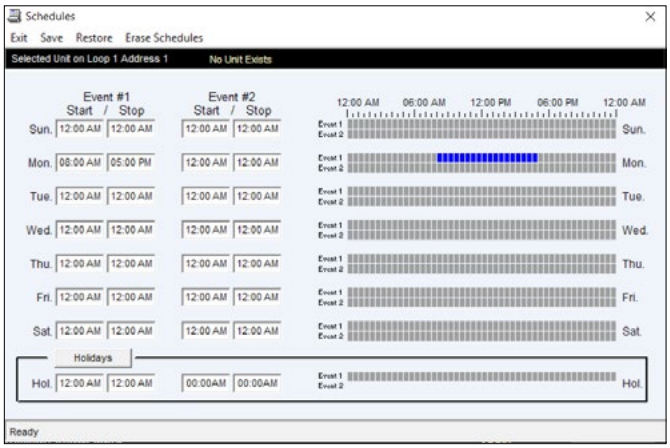


Figure 30: Schedules Screen

The Controller has two event start and stop times per day and two event start and stop times for holidays. The holiday start and stop times will override the standard operating hours.

When you enter a time in any field, you must designate AM or PM and *press* **<ENTER>**.

To schedule holidays, *press* the **<Holidays>** button. The *Holiday Schedule Screen* will appear. See **Figure 31**.

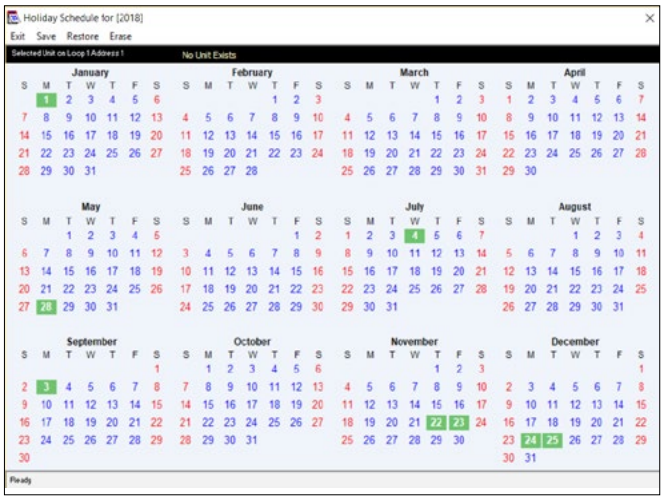


Figure 31: Yearly Holiday Schedules Screen

Click on the date to highlight it and tag it as a holiday. Days selected as holidays are indicated with a green background and white text.

There are 14 holiday periods available for each year. These holiday periods can span a single day or they can span weeks or even months.

If your job-site has days during the year when you need to override the standard operating hours to accommodate holidays or other special events, you can use this window to select the holidays.

You cannot program holidays for the next year, and holidays do not automatically adjust for the new year, so you will need to access this screen after the new year and make necessary adjustments to the days that float, such as Memorial Day.

Saving and Restoring Schedules & Holidays

While at the *Schedules Screen* (**Figure 30**), *select* **<Save>** to save your schedule. *Select* **<Restore>** to restore a previously saved schedule. *Select* **<Erase Schedules>** to completely erase the schedule appearing in the window.

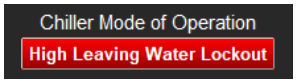
WARNING: <Erase Schedules> will clear ALL entered stop/start times, so use with caution.

While at the *Holiday Schedule Screen* (**Figure 31**), *select* **<Save>** to save the Holidays. *Select* **<Restore>** to restore previously saved Holidays. *Select* **<Erase>** to completely erase the holidays appearing in the window.

Saving all schedules from the controller to a file on your computer for use in restoring the schedules or for copying to another specific controller will save time in configuring your controller and save valuable time in having to reenter schedules for another controller.

Schedule Override & Alarms

Schedule Override



You can override the schedule mode of operations by *clicking* on the button under Chiller Mode of Operation. The *Overrides Dialog Box* will appear.

You can choose **Auto Scheduling, Force Schedule ON** or **Force Schedule OFF**.

A scheduled force override will remain in effect until cancelled. To cancel an override, *select* the **Auto Scheduling** option.

Viewing Alarm Status

The *Unit Alarm Screen* is accessed from the controller's status screen by *clicking* the **<ALARM>** button. This button will be a dull red and display **<No Alarms>** when there are no alarms present or will be bright red and display **<ALARM>** if active alarms exist.

Click the **<ALARM>** button when bright red or the **<No Alarms>** button when dull red. The *Chiller Alarm Status Screen* will appear. See **Figure 32**.

Each individual **<ALARM>** button will be bright red if an alarm exists and will be gray if no alarm exists.

Click the blue **<Manual Lockout Reset>** button at the bottom right of the screen to immediately reset an alarm once it has cleared.

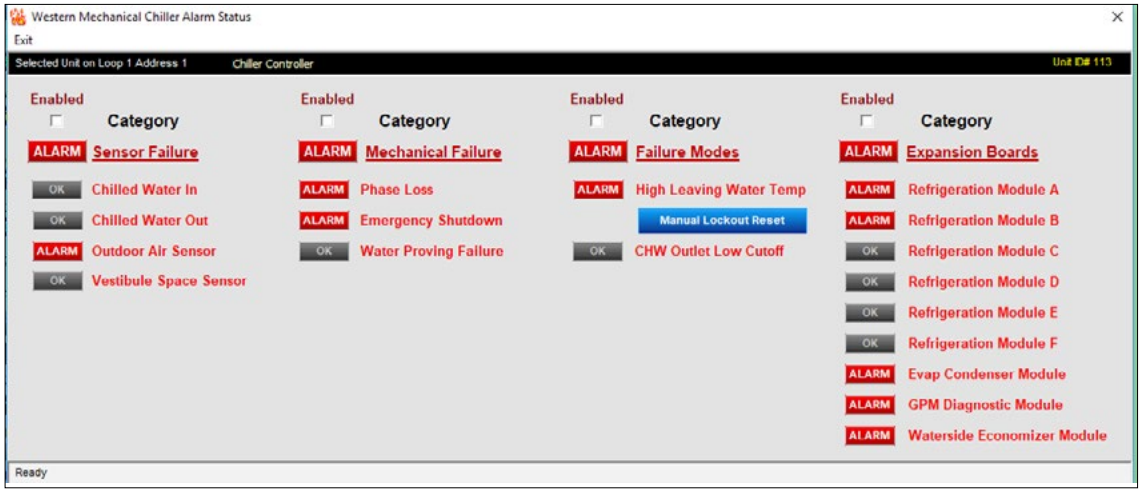


Figure 32: Unit Alarm Status Screen

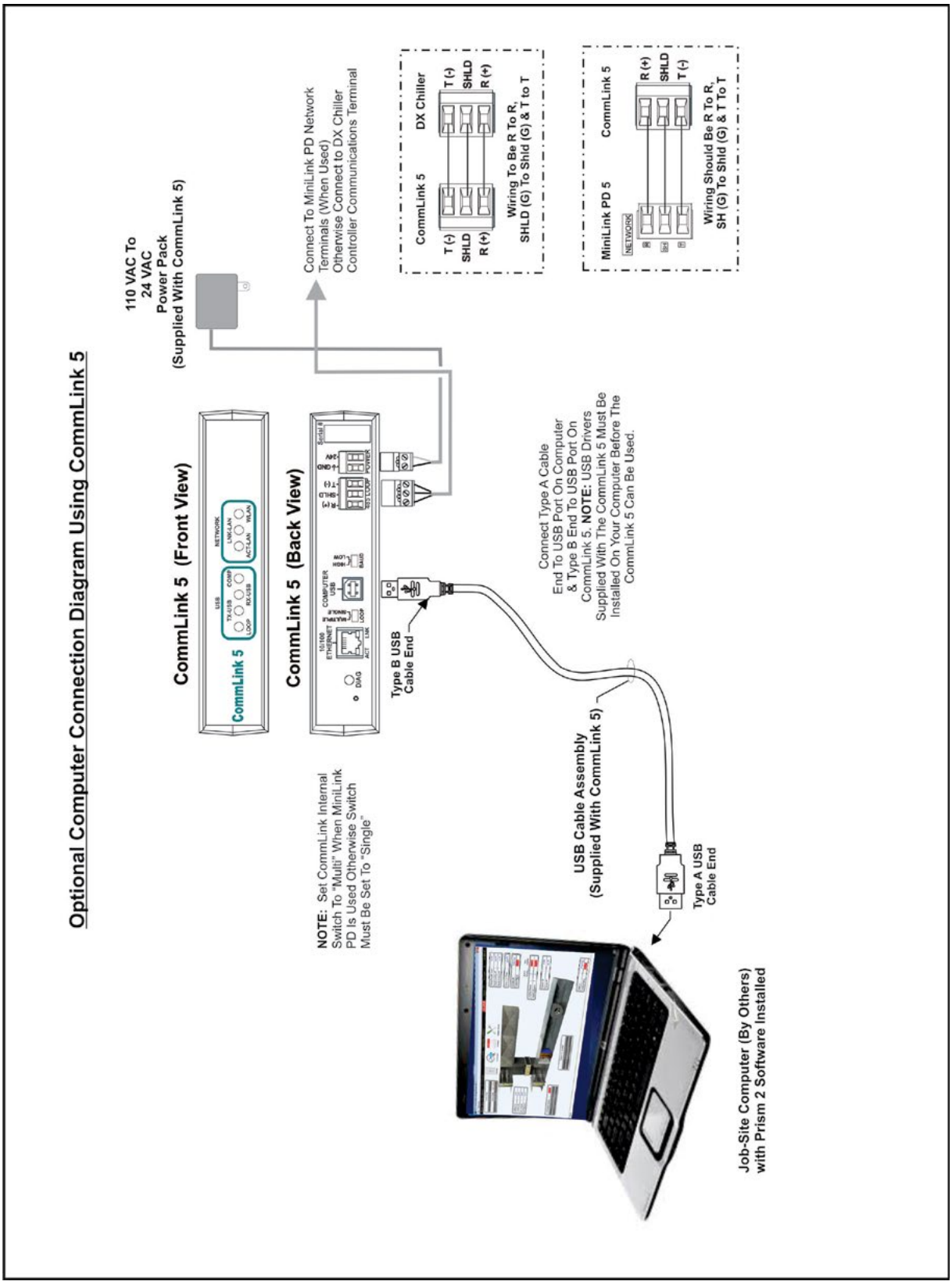


Figure 33: CommLink 5 Connection

IP Module Connection

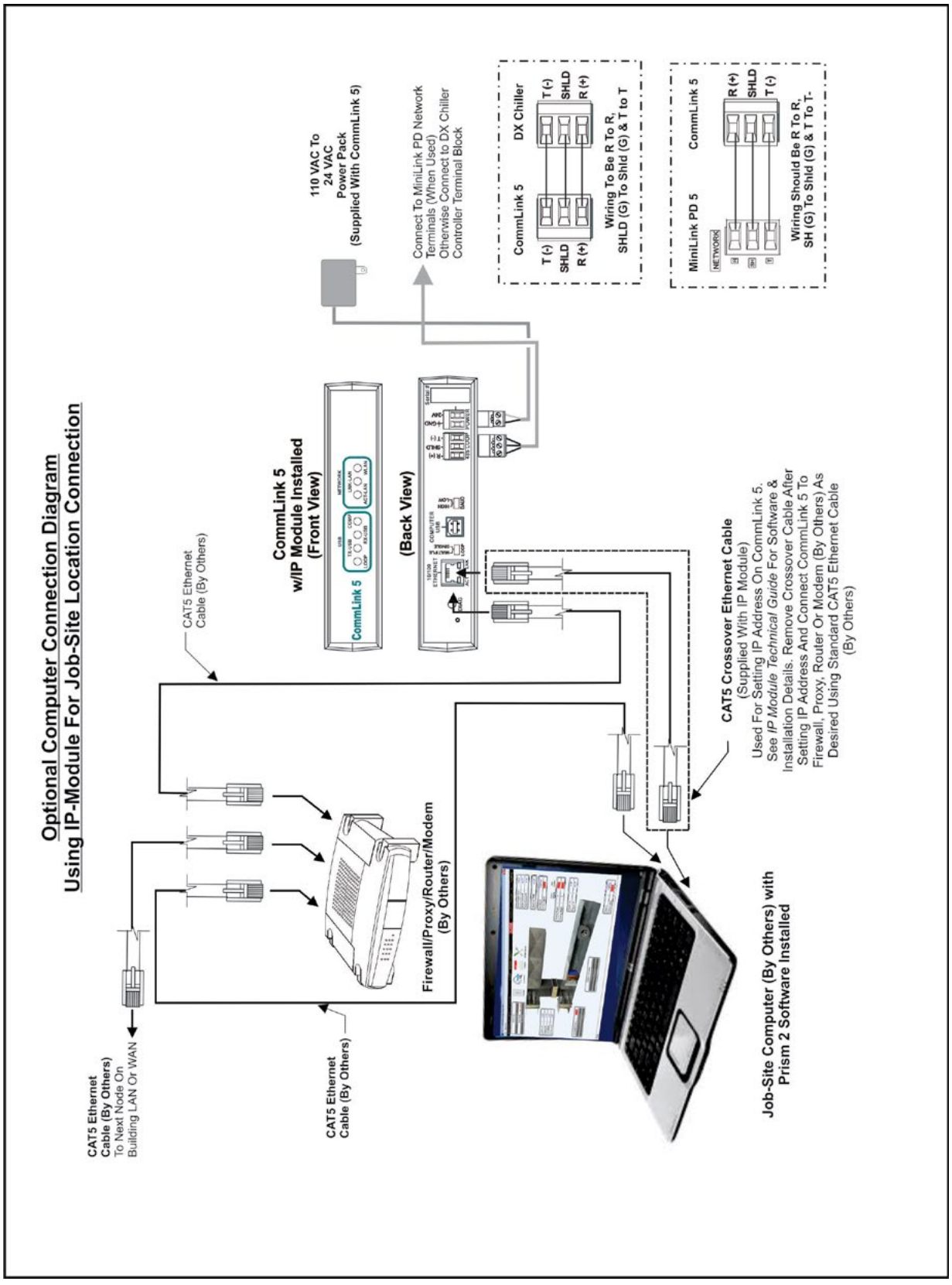


Figure 34: IP Module Connection

USB-Link 2 Connection

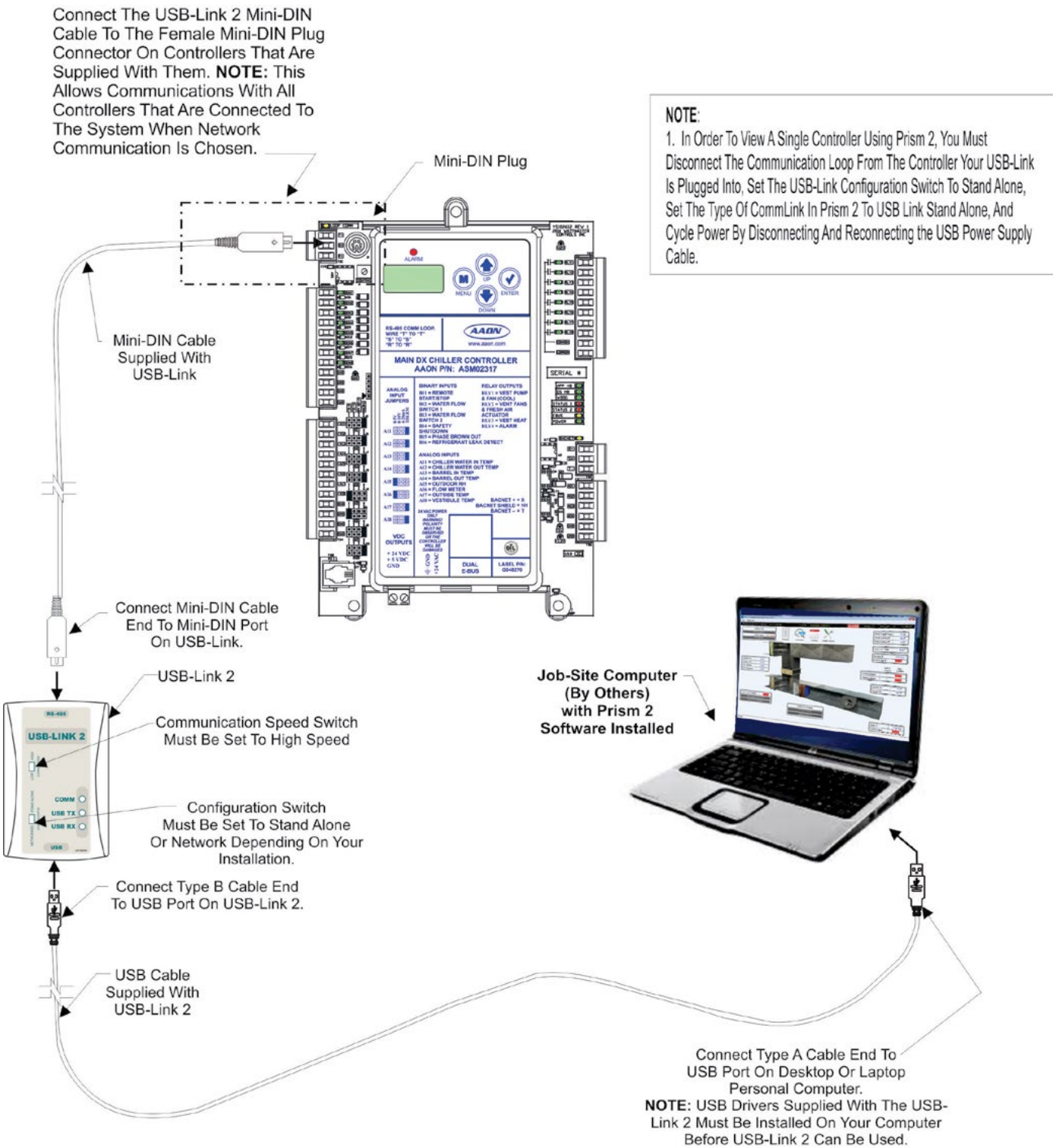


Figure 35: USB-Link 2 Connection

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

AAON Controls Support: 866-918-1100
Monday through Friday, 7:00 AM to 5:00 PM
central standard time

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.

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