

ENGINEERING
TOMORROW

Danfoss

User Guide

MCX-RTU

Rooftop unit



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Document history

Version	Init.	Date	Description
1.00	FF	12/01/15	Initial MCX-RTU User Guide
1.04	FF	7/31/2018	Firmware v1.04 Update

Product Introduction



The MCX-RTU controller is a complete solution for controlling a small to medium sized commercial rooftop unit. The controller provides energy efficient control of the rooftop while maintaining designed comfort levels and safety of the controlled space. It is also designed to complement the Danfoss full store control via the connection to the AK-SM 800 series front end.

Ordering

Type	Function	Application	Code no.
MCX-RTU	Controller for small to medium sized rooftops	Rooftop Controller	080G0304
MCX08M2	Optional additional IO for MCX-RTU	IO Expansion	080G0307
MMIGRS2	Optional Remote Display	Remote Display	080G0294

Specifications

Supply Voltage

85 – 265 V AC, 50/60 Hz Maximum power consumption: 27 W, 48 VA insulation between power supply and the extra-low voltage: reinforced

Modbus

It is important that the installation of the data communication cable be installed correctly. Remember to terminate each end of the bus. EIA485 Rated cable must be used. See separate literature No. RC8AC902.

DO - Digital outputs, 15 pcs. DO1 – DO15

DO1 - DO15, all are mechanical relays, no solid state relays

AO - Analog output, 6 pcs. AO1 – AO6

Outputs are 0 – 10 V DC by default

AI - Analog Inputs, 14 pcs. AI1 – AI14

All temperature sensors default to PT1000, Pressure transducers default to .5 – 4.5 V DC ratiometric with 5 V DC supply. All other inputs are 0 – 5 V DC by default

DI - Digital switch inputs DI1 – DI17

All Dry contacts except DI17 (24 V AC or 230 V AC driven)

AK-SM 800 Firmware required to interface with the MCX-RTU must be VG8.033 or greater and StoreView Desktop version 1.13 or greater must be used for remote access.

Approvals

EU Declaration of Conformity

This product is in conformity with the following directive(s), standard(s) or other normative document(s), provided that the product is used in accordance with our instructions.

EMC directive 2014/30/EU

By fulfilling the requirements in the following standards

EN 61000-6-4: 2007 + A1: 2011 Generic standards. Emissions standard for industrial environments

EN 61000-6-2: 2005 Generic standards. Immunity for industrial environments

and

LVD directive 2014/35/EU

By fulfilling the requirements in the following standards

EN60730-1: 2011 Automatic electrical controls for household and similar use. General requirements

EN60730-2-9: 2010 Particular Requirements for Temperature Sensing Controls

and

RoHS Directive 2011/65/EU

By fulfilling the requirements in the following standards

EN 50581:2012

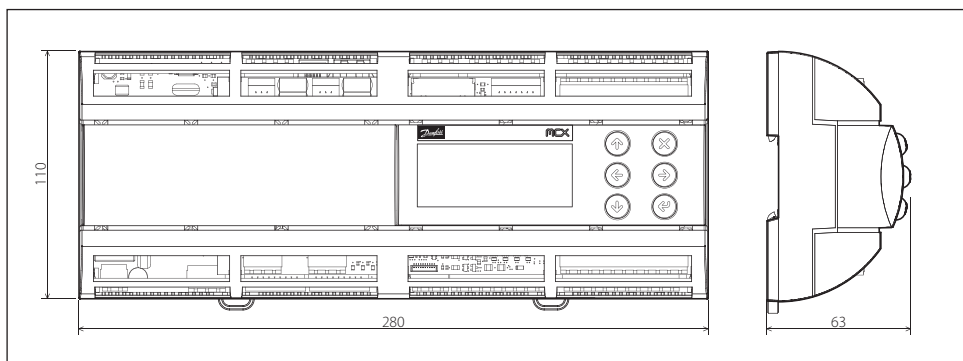
UL Approval

UL file: E31024

Installation

The MCX-RTU is mounted on a DIN rail with enough room to easily connect power and other interface wires.

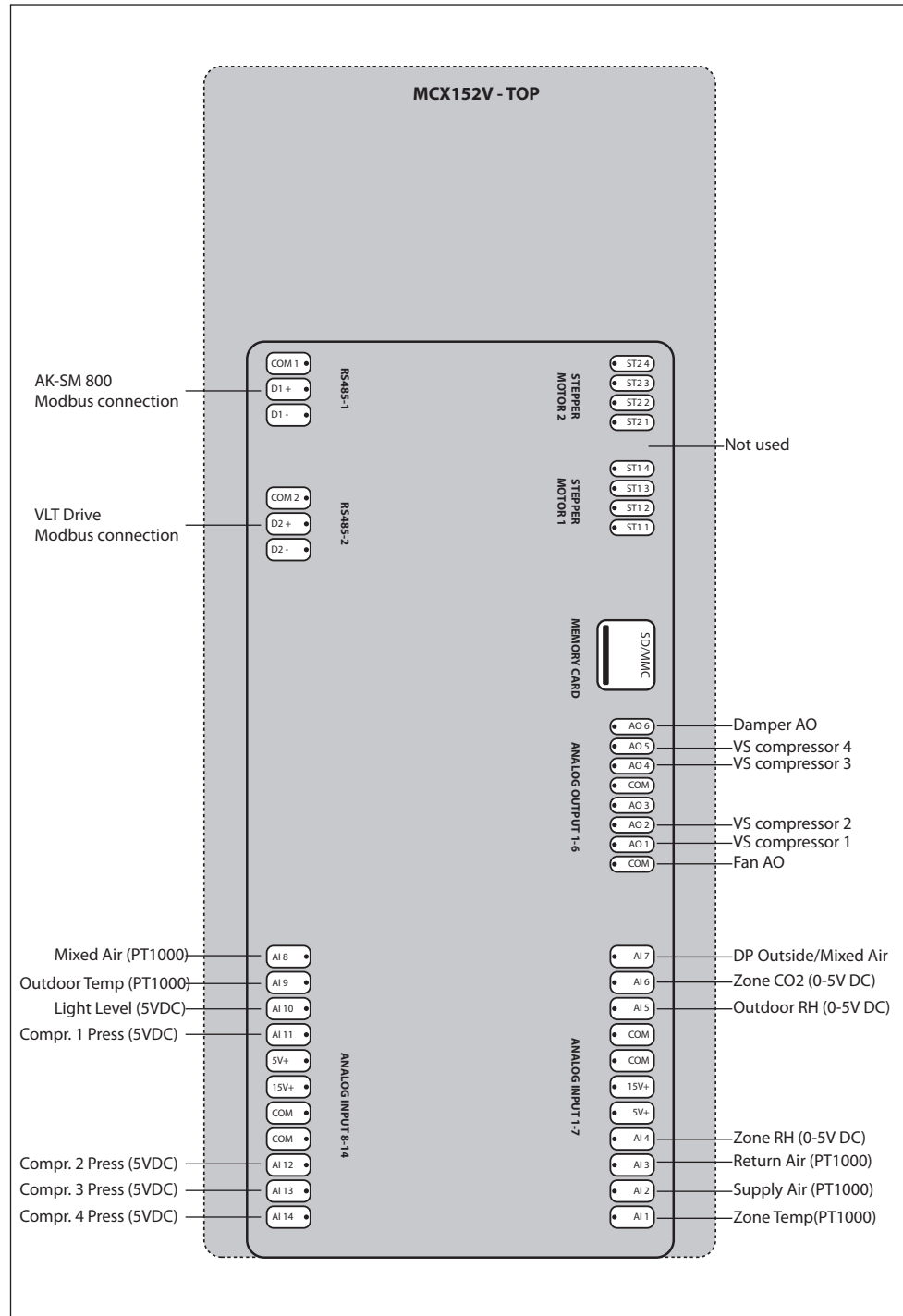
This image provides the dimensions of the MCX-RTU controller for determining space for mounting. Make sure that you allow enough space for easy routing of the required interface cables for power, inputs and outputs.



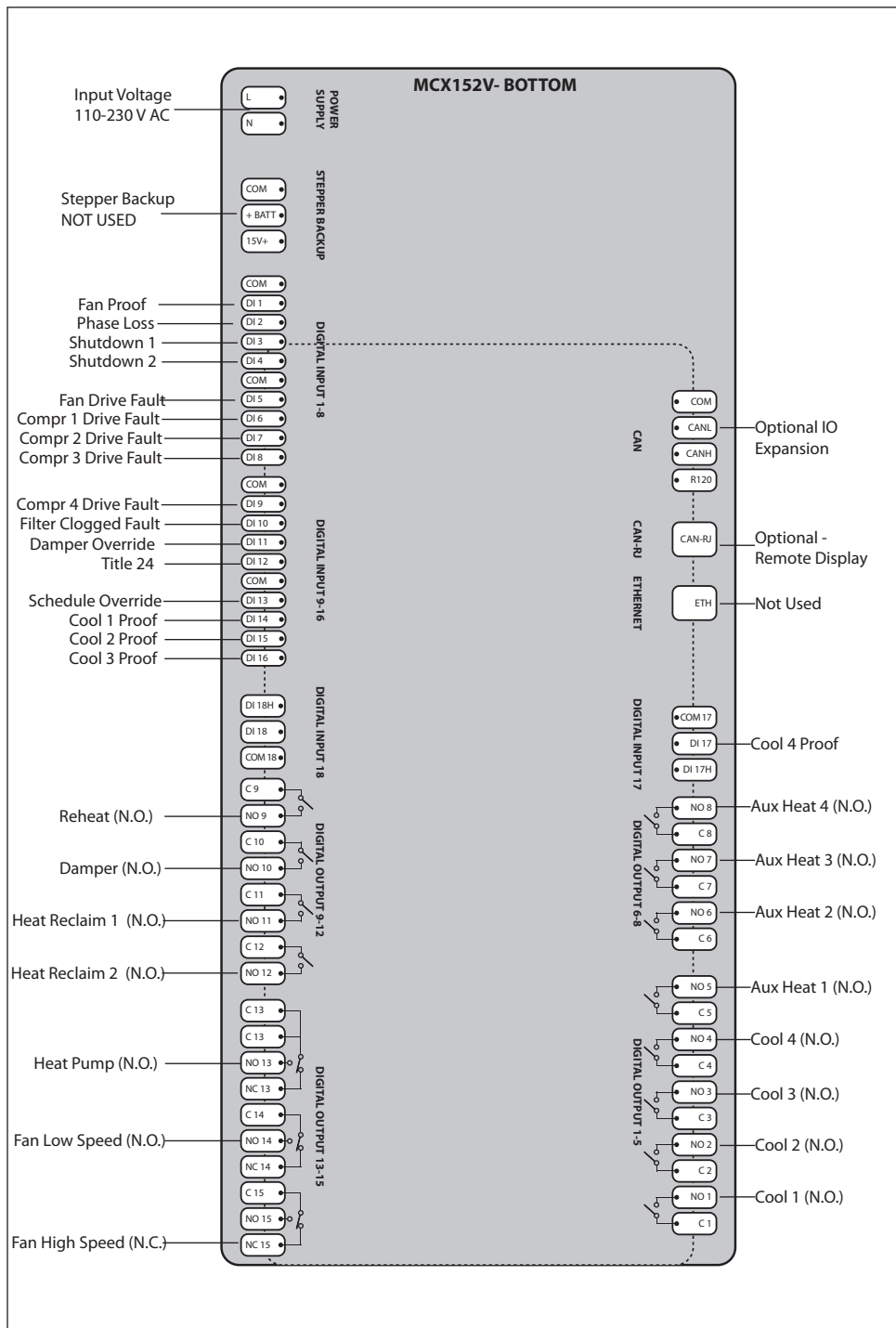
The MCX-RTU must be mounted in a space that meets the environmental standards named in the specification section of this document.

Connections

Wiring Diagram MCX 152V - top and bottom



Wiring Diagram MCX 152V - top and bottom



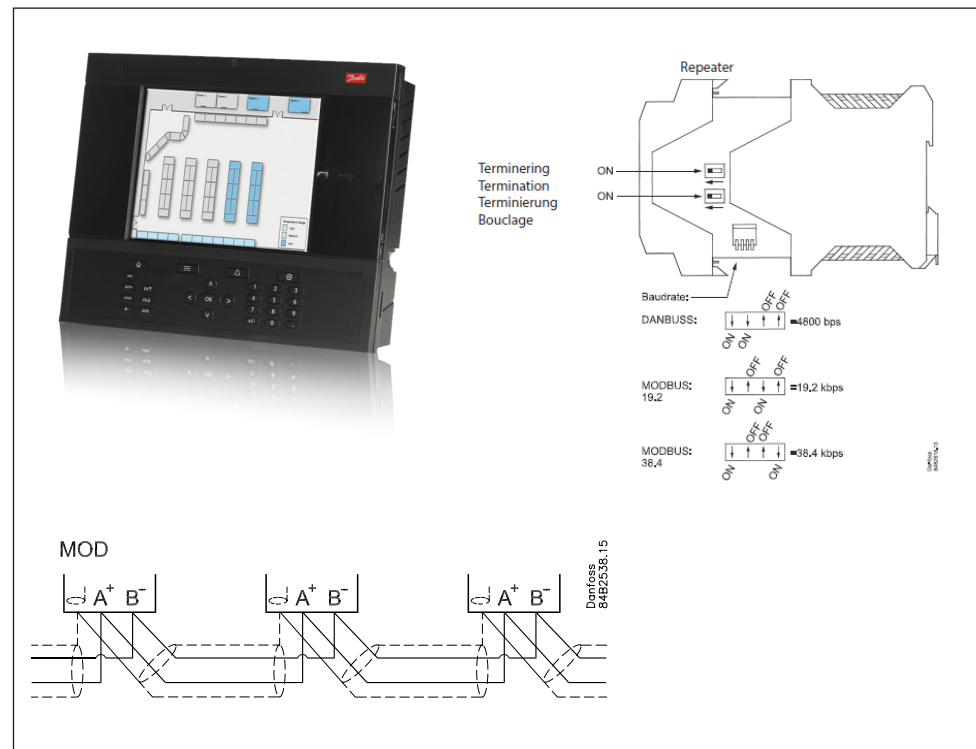
Network Topology

The network cable must be EIA485 rated. The cable is connected from controller to controller, and no branches (stars) are allowed on the cable. If the cable length exceeds 1200 meters (1312 yards) a repeater must be inserted. One repeater must be added for every 32 controllers. If the data communication cable runs through an electrically noisy environment which impairs the data signal, one or more repeaters must be added to stabilize the signal. When configuring Modbus devices on the control bus, the highest device address that can be used is 120 (max 120 Modbus control devices in total). The wires are looped from device to device and must observe polarity. A is connected to A and B is connected to B. The shield must be connected and complete a path from the device, all controllers, any repeaters finally landed on the ground/shield terminal at the AK-SM 800. The shield must not be connected to earth ground except at the AK-SM 800. At the AK-SM 800 the shield must be attached to the shield terminal and then extended to an external earth ground. See AK-SM 800 User Guide for system 485 wiring instructions. The maximum number of MCX-RTU is dependent on which AK-SM 800 is used.

The AK-SM 880 (080Z4008 and 080Z4009) may use a maximum of 45 MCX-RTU controllers.
The AK-SM 820 (080Z4004) may use a maximum of 10 MCX-RTU controllers.

The AK-SM 800 User Manual can be found at:
<http://food-retail.danfoss.com/knowledge-center/software/ak-sm-800/>

Be sure to configure the Modbus repeater AKA 222 (code#084B2240) to the correct baud rate. MCX-RTU baud rate must be set to 38.4 K when used with the AK-SM 800. MCX-RTU cannot be on the same 485 bus with SLVs.



Sequence of Operation

Cooling Mode

The Controller is in Cooling Mode when the Zone Temperature is above Cool1 Target minus two times the programmed Cool Range. At this point Free Cooling will be active if the Damper and Free Cooling are enabled. The Damper will modulate to maintain the Supply Air or Mixed Air target temperature. Free Cooling is enabled when Zone Enthalpy is above Outdoor Enthalpy and the above conditions are met. Free Cooling will lockout if the Outdoor Enthalpy, Temperature or Relative Humidity are above their specific lockout values.

The Cooling stages will become active when the Zone Temperature is above Cool1 Target minus the Cool Range. Before any cooling stages are activated, the fan must be proofed by either a digital input or analog input to insure the fan is operational. The method of operation depends on the Cooling stages configuration. It is required for the previous stage of Cooling be ON prior to the next stage activating.

If all Cooling stages are configured to use Relay Outputs, then the stages will turn on at Cool Target plus the Range and off at Cool Target minus the Range. Each stage has a Target, PreDelay and PostDelay. PreDelay is the delay period once the conditions have been met for the stage to activate. PostDelay is the period the output will stay on once the conditions have been met for the stage to deactivate.

If any cooling stages are configured to use an Analog Output, the sequence of operation changes. All stages that use an Analog Output must precede stages that use Relay Outputs. In this configuration, the first stage will start when the Zone Temperature reaches the Cool 1 Target minus the Range. The Analog Output will be set to the Min Compr1 Speed. The speed ramps to 100% when the Zone Temperature reaches the Cool 1 Target plus the Range. When Zone Temperature reaches the Cool 2 Target minus the Range the second stage activates, and the first stage reduces to Min Compr1 Speed. If the second stage uses an Analog Output, then the output will use the same value used by Cool Stage 1. If there are more than 2 stages, Min Compr Speed will adjust so the total cooling capacity will equal the maximum capacity of the previous cooling stage. All the Cooling Analog Outputs will always be in sync as they rise.

Fan control during Cooling Mode depends on the type of fan controlled. For Single Speed Fan, the fan will be ON whenever there is a demand for cooling. If the fan is configured for continuous operation, then the fan runs all the time. For Two Speed Fan, the fan will be on high speed whenever there is a demand for cooling. If the fan is configured for continuous operation, the fan will switch to Low Speed with no demand for cooling. If the fan is configured for On Demand, the fan switches off when there is no demand for cooling. For Variable Speed Fan, the fan modulates to maintain the Cooling Supply Air Target with a demand for cooling. If the fan is configured for continuous operation the fan modulates to the Cool Min Fan Speed with no demand for cooling. If the fan is configured for On Demand, and there is no demand for cooling, the fan either modulate to Cool Min Fan Speed or turns OFF, depending on setting of the Fan Control Demand parameter.

Note: On DOAS units with more than 2 stages of cooling, the first two stages turn ON together. With the balance of the stages turning ON sequentially.

Heating Mode

The Controller is in Heating Mode when the Zone Temperature is below Cool1 Target minus 2x the Cool Range. Before any heating stages are activated, the fan must be proofed by either a digital input or analog input to insure the fan is operational.

The first type of heating is Heat Reclaim. The first stage of Heat Reclaim will turn on when the Zone Temperature is below Heat Reclaim 1 Target minus the Heat Reclaim Range. The first stage of Heat Reclaim will turn off when the Zone Temperature is above Heat Reclaim 1 Target plus the Heat Reclaim Range. This occurs for each stage of Heat Reclaim. Each stage has their own Target, PreDelay and PostDelay. PreDelay is the delay period once the conditions have been met for the stage to activate. PostDelay is the period the output will stay on once the conditions have been met for the stage to deactivate. It is required that the previous stage of Heat Reclaim be ON prior to the next stage activating.

The first type of heating is the Aux Heat. The first stage of Aux Heat will turn on when the Zone Temperature is below Aux Heat 1 Target minus Aux Heat Range. The first stage of Aux Heat will turn off when the Zone Temperature is above Aux Heat 1 Target plus Aux Heat Range. This will occur for each stage of Aux Heat. Each stage has its own Target, PreDelay and PostDelay. PreDelay is the period the output delays once the conditions have been met for the stage to activate. PostDelay is the period the output will stay on once the conditions have been met for the stage to deactivate. It is required that the previous stage of Aux Heat be ON prior to the next stage activating.

Fan control during Heating Mode depends on the type of fan being controlled. For Single Speed Fan, the fan will be on whenever there is a demand for heating. If configured for continuous operation, then the fan will run all the time. For Two Speed Fan, the fan will be on high speed whenever there is a demand for heating. If the fan is configured for continuous operation, the fan switches to Low Speed when there is no demand for heating. If the fan is configured for On Demand, the fan will switch OFF when there is no demand for heating. For Variable Speed Fan, the fan modulates to maintain the Aux Heat Supply Air Target when there is a demand for heating. If the fan is configured for continuous operation the fan modulates to the Heat Reclaim/Aux Heat Min Fan Speed with no demand for heating. If the fan is configured for On Demand, and there is no demand for heating the fan either modulates to Heat Reclaim/Aux Heat Min Fan Speed or turns OFF depending on the setting of the Fan Control Demand parameter.

Dehumidification Mode

The Controller is in Dehumidification Mode when the Zone RH or Dewpoint is above Dehumidification 1 Target plus the Dehumidification Range. Before any dehumidification stages are activated, the fan must be proofed by either a digital input or analog input to insure the fan is operational.

If all Cooling stages are configured to use Relay Outputs, then the Dehumidification stages turn on when the Zone Relative Humidity or Zone Dewpoint is above the Dehumidification Target plus the Range and off at Dehumidification Target minus the Range. Each stage has its own Target, PreDelay and PostDelay. PreDelay is the delay period once the conditions have been met for the stage to activate. PostDelay is the period the output stays on once the conditions have been met for the stage to deactivate.

If any of the Cooling stages are configured to use Analog Outputs, then the Dehumidification stages use a modulating capacity method. The Dehumidification Mode is enabled when the Zone RH or Dewpoint is above Dehumidification 1 Target plus the Dehumidification Range. Once the Dehumidification Mode is enabled the first stage compressor turns on and modulates to maintain the Compressor 1 Target Pressure. Each stage has its own Target and Range used to enable that stage of Dehumidification. If the compressor uses an Analog Output, then the compressor modulates to the compressor target pressure. If the compressor uses a Relay Output, then the compressor is turned ON while the stage is enabled. The Dehumidification PreDelay and PostDelay is only used to determine when the Dehumidification Stage is enabled. It does not control the compressors directly.

Fan control during Dehumidification Mode depends on the type of fan being controlled. For Single Speed Fan, the fans ON whenever there is a demand for dehumidification. If the fan is configured for continuous operation, the fan will run all the time. For Two Speed Fan, the fans on high speed whenever there is a demand for dehumidification. If the fan is configured for continuous operation, the fan switches to Low Speed with no demand for dehumidification. If the fan is configured for On Demand, the fan switches OFF when there is no demand for dehumidificati-

on. For Variable Speed Fan, the fan will run at Cooling Max Fan Speed until all stages of dehumidification are running at 100% capacity for the time specified in the Max Capacity Period setting. Once this occurs, the fan modulates trying to lower the compressor capacity to 98%. If the fan is configured for continuous operation the fan modulates to the Cool Min Fan Speed with no demand for dehumidification. If the fan is configured for On Demand, and there is no demand for dehumidification, the fan will either modulate to Cool Min Fan Speed or turn OFF depending on the setting of the Fan Control Demand parameter.

CO2 Mode

The CO2 Mode is for health and safety of everyone in the facility. CO2 Mode has priority over all other modes. And there are no lockouts to effect operation.

CO2 control requires an Analog Output to control the damper. The damper activates when the Zone CO2 level reaches CO2 Target minus the CO2 Range. The damper modulates proportionally between the CO2 Target minus the CO2 Range and CO2 Target plus the CO2 Range.

DOAS Mode

DOAS Mode is a combination of all the above modes.

DOAS Mode is controlled by the value for C23 under Setup Options. If set to yes, then the operation is as follows.

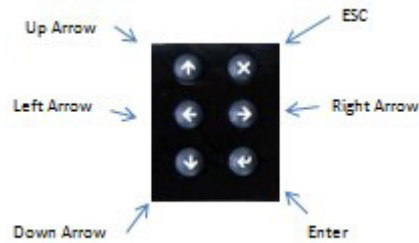
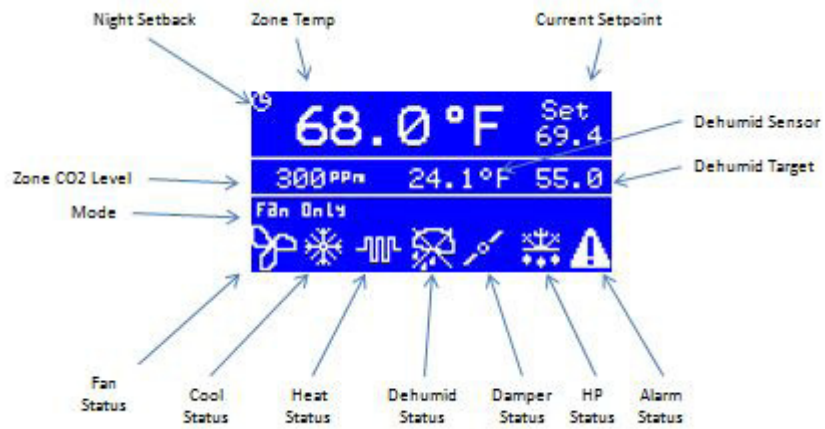
Fan Speed is fixed to the value set by parameter FN7 – OvrdfanSpeed(Parameters->Fan)

Outdoor Temperature and Outdoor Relative Humidity are used in place of both the Zone Temperature and Zone Relative Humidity for the Cooling/Heating/Dehumidification modes.

The Damper is set to the DM0(Damper Ovrdfan Value) value and does not modulate. This value will typically be set to 80%. Note that if this value is less than 100%, and CO2 Mode is calling for the Damper to open more, then the Damper will open to the value requested by the CO2 mode.

Status Screens

Main Status Screen



What the keys do on the Main Status Screen

- Enter – Parameter Screen
- ESC – Current Alarms
- Down Arrow – Current Sensor Values
- Left Arrow – Broadcast Sensor Values Received

Access Current Sensor Values from Main Status Screen using the Down Arrow button.

Current Sensor Screen

ZNTP	68.0	ZNRA	51.6
ZNRH	20.0	OTTP	16.0
ZNET	27.4	OTRH	7.0
ZNDP	24.1	OTET	21.0
ZNC2	300	OTDP	25.0
ZNSA	75.7	OCO2	2000
ZNMA	62.8	Cmp1	119.0

Sensor Error Values

- 20000 = Sensor Open
- 20001 = Sensor Short
- 20002 = Broadcast Value Not Updating
- 20003 = Sensor Disabled

ZNTP – Zone Temp
 ZNRH – Zone RH
 ZNET – Zone Enthalpy
 ZNDP – Zone Dewpoint
 ZNC2 – Zone CO2 Level
 ZNSA – Supply Air Temp
 ZNMA – Mixed Air Temp

ZNRA – Return Air Temp
 OTTP – Outdoor Temp
 OTRH – Outdoor RH
 OTET – Outdoor Enthalpy
 OTDP – Outdoor Dewpoint
 OCO2 – Outdoor CO2
 Cmp1 – Compr 1 Suction Pressure

Access Broadcast Sensor Values from the Main Status Screen using the Left Arrow button.

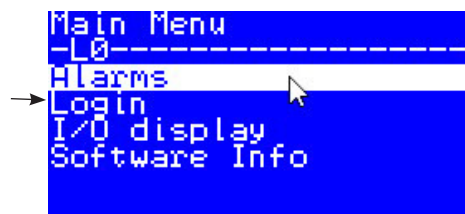
Broadcast Sensor Screen



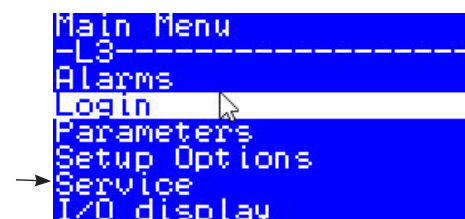
This screen shows the values that have been received via the broadcast from the AK-SM 800. The sensors that start with RH and CO2, are just that. Then you have the three outdoor sensors. The two values at the bottom right are SCHED(Schedules – bit mask) and LDSH(Load Shed Value)

Configuration

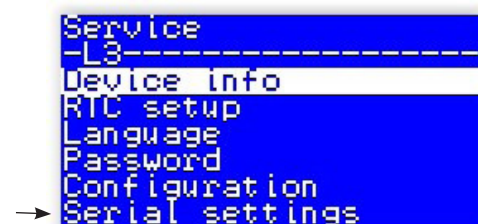
The configuration screens are accessed by pressing the Enter button (lower right button) on the controller.



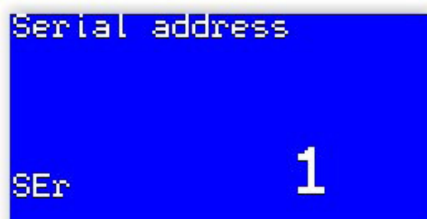
Select Login and enter the password(default: 300) for the following screen. Note that every time the Main Status Screen is visible the password entered is cleared and must be reentered to access the password protected items.



Select Service and then Serial Settings to edit the communication Address of the control.



Press enter to put controller in Edit mode, then use the Up/Down arrows to edit. Press enter to save.



To configure the controller, go to the Setup Options menu and make selections for your installation. Below is a list of the Setup Options along with their definitions.

OPT	Setup Options	Function	Default	Units
C01	Fan Type	Select Fan Type – Single Speed, Two Speed or VariSpeed	VS Fan	
C02	Fan Control Open	Select fan operation during Open periods – Continuous or on Demand	Continuous	
C03	Fan Control Closed	Select fan operation during Closed periods – Continuous or on Demand	Demand	
C04	Fan Proof	Select Disable, DI or CT	DI	
C05	Monitor phase loss	Select No or Yes	Yes	
C06	Cool Stages	Select number of cooling stages(0-4)	2	
C07	CL1 Stage Size	Set size of cooling stage(0.0 – 2000.0)	1000.0	
C08	CL1 Stage Type	Select RO or AO	AO	
C09	CL2 Stage Size	Set size of cooling stage(0.0 – 2000.0)		
C10	CL2 Stage Type	Select RO or AO	RO	
C11	CL3 Stage Size	Set size of cooling stage(0.0 – 2000.0)		
C12	CL3 Stage Type	Select RO or AO	RO	
C13	CL4 Stage Size	Set size of cooling stage(0.0 – 2000.0)		
C14	CL4 Stage Type	Select RO or AO	RO	
C15	Heat Reclaim Stages	Select number of Heat Reclaim Stages(0-4)	2	
C16	Aux Heat Stages	Select number of Aux Heat Stages(0-4)	2	
C17	Use Gas Heat	Does Aux Heat use Gas Heat(Yes/No)	Yes	
C18	Enable Dehumidification	Enable Dehumidification(Yes/No)	Yes	
C19	Control Dehumid on	Select Control Dehumidification with RH sensor or CalcDP	CalcDP	
C20	Reheat Cntl	Reheat Control(No, AuxRly,HeatReclaim,Both)	HtRclm	
C21	Reheat Cntrl Sensor	Select Reheat Control Sensor(SupplyAir/Zone-Temp)	SplyAir	
C22	Enable Damper	Enable Damper using(Disable, DO, or AO)	AO	
C23	Enthalpy Cntl	Enable Enthalpy Control(Yes/No)	Yes	
C24	Free Cooling	Enable Free Cooling(Disable/Enable)	Enable	
C25	CO2 Option	Select CO2 Damper Control(Disable, Monitor, Control)	Control	
C26	Damper Cntrl Sensor	Select Damper control sensor(SupplyAir/MixedAir)	SplyAir	
C27	Enable HP Valve	Enable Heat Pump Valve in None, Heat or Cool Mode	None	
C28	Fan Control Demand	For VS Fan, set fan to Off or Min when no demand	Min	
C29	Fan AO Type	Select AO Range for Fan(0-5,1-5,0-10,2-10,Custom)	0-10	vdc
C30	Compr1 AO Type	Select AO Range for Cool1(0-5,1-5,0-10,2-10,Custom)	1-5	vdc
C31	Compr2 AO Type	Select AO Range for Cool2(0-5,1-5,0-10,2-10,Custom)	1-5	vdc

OPT	Setup Options	Function	Default	Units
C32	Compr3 AO Type	Select AO Range for Cool3(0-5,1-5,0-10,2-10,Custom)	1-5	vdc
C33	Compr4 AO Type	Select AO Range for Cool4(0-5,1-5,0-10,2-10,Custom)	1-5	vdc
C34	Damper AO Type	Select AO Range for Damper(0-5,1-5,0-10,2-10,Custom)	2-10	vdc
C35	Custom AO Min	Set Min VDC for Custom AO(0.0-10.0vdc)	1.5	vdc
C36	Custom AO Max	Set Max VDC for Custom AO(0.0-10.0vdc)	5.0	vdc
C37	Ovrd Night Set-back	If Yes, then Night Setback can be overridden(Yes/No)	No	
C42	Invert Fan AO	Invert Fan AO(Normal/Invert)	Normal	
C43	Invert Compr 1 AO	Invert Compr1 AO(Normal/Invert)	Normal	
C44	Invert Compr 2 AO	Invert Compr2 AO(Normal/Invert)	Normal	
C45	Invert Compr 3 AO	Invert Compr3 AO(Normal/Invert)	Normal	
C46	Invert Compr 4 AO	Invert Compr4 AO(Normal/Invert)	Normal	
C47	Invert Damper AO	Invert Damper AO(Normal/Invert)	Normal	
C48	Zone RH	Select Sensor for Zone RH(Disable,Local,GlobalRH1-5,Avg)	Local	
C49	Zone CO2	Select Sensor for Zone CO2(Disable,Local,GlobalCO2-1-5)	Local	
C50	Outdoor Temp	Select Sensor for Outdoor Temp(Disable,Local,Global)	Local	
C51	Outdoor RH	Select Sensor for Outdoor RH(Disable,Local,Global)	Local	
C52	Outdoor CO2	Select Sensor for Outdoor CO2(Disable,Local,Global)	Disable	
C40	Supply Air Sensor	Select Sensor for Supply Air(Disable,Local)	Local	
C39	Return Air Sensor	Select Sensor for Return Air(Disable, Local)	Local	
C38	Mixed Air Sensor	Select Sensor for Mixed Air(Disable, Local)	Local	
C41	Zone Cntl Sensor	Zone Control uses the Zone or Return Air sensor	Zone	
C53	HT/CL Ctrl Mode	Select HT/CL Ctrl Mode(Standard/Supply Air)	Standard	
C54	Fan VLT Modbus	Enable Fan VLT Modbus Control(Disable/Enable)	Disable	
C55	HTReset AO Type	Select AO Range for HTReset AO(0-5,1-5,0-10,2-10,Custom)	0-10	
C56	Invert HTReset AO	Invert HTReset AO(Normal/Invert)		
C57	Zone Control	Zone Sensor Config(Single;Average;High;Low)	Single	
C58	BldPress Sensor	Select Sensor for Building Pressure Control(Disable;Local;Global)	Local	
C59	Condenser Cntl	Enable AO Condenser Control(No/Yes)	No	

Next go to the Parameters menu for the screen below.



The table below shows all the parameters available to edit along with their definitions.

GEN	Parameters > General	Function	Default	Units
y01	ON/OFF	Master Switch (Off/On)	On	
y05	Temperature Units	Select Temperature/Pressure Units (C/F) Also sets pressure to BAR when C used, PSI when F used.	F	
y06	Reset Runtime/Cycle	Reset Runtime/Cycle values (No/Yes), resets to No once values are cleared	No	
y07	Reset to Default	Resets all settings to default values (No/Yes), resets to No once values are set to default	No	
y08	Night Setback	Can be used to put unit into night setback if Select Schedule is zero. (Day/Night)	Day	
y27	Load Shed Value	Current Load Shed value from front end. (Read Only)	--	
y28	Load Shed Set	If Load Shed Value is above this setting, unit is placed in Load Shed Mode (0-4, zero disables load shed)	0	
y26	Select Schedule	If Load Shed Value is above this setting, unit is placed in Load Shed Mode (0-4, zero disables load shed)	0	
y29	Select Title24	Select which schedule in the front end the unit will use for night setback.(0-16, zero disables using front end schedule)	0	
y09	Enable Alarms	Master Alarm Enable (No/Yes)	Yes	
y10	Changeover Delay	Set delay time between switching between Heat and Cool mode. (0-60)	5	m
y02	Enable Expansion	Enable Expansion Module (No/Yes)	No	
y11	Enable AI Filters	Enable AI Filters (No/Yes)	Yes	
y12	Global AI Filter	Set Global AI Filter Value (0, 2, 4, 16) How many samples are used to average an AI sensor.	16	
y13	Startup Delay	Set power up delay before control starts. (5-600)	600	s
y14	MorningStartup-Period	Delay between Night Setback and Normal Mode(0-360)	360	m
y15	Sensors Broadcast	Number of sensors to broadcast (Read Only)		
y16	Broadcast Sensor 1	Select which sensor to broadcast as sensor 1 None/ZnRH1-ZnRH5/ZnCO21-ZnCO25/OtdTp/OtdRH/OtdCO2	None	
y17	Broadcast Sensor 2	Select which sensor to broadcast as sensor 2 None/ZnRH1-ZnRH5/ZnCO21-ZnCO25/OtdTp/OtdRH/OtdCO2	None	
y18	Broadcast Sensor 3	Select which sensor to broadcast as sensor 3 None/ZnRH1-ZnRH5/ZnCO21-ZnCO25/OtdTp/OtdRH/OtdCO2	None	
y19	Broadcast Sensor 4	Select which sensor to broadcast as sensor 4 None/ZnRH1-ZnRH5/ZnCO21-ZnCO25/OtdTp/OtdRH/OtdCO2	None	
y20	Broadcast Sensor 5	Select which sensor to broadcast as sensor 5 None/ZnRH1-ZnRH5/ZnCO21-ZnCO25/OtdTp/OtdRH/OtdCO2	None	

GEN	Parameters > General	Function	Default	Units
y21	Avg RH1	Select RH1 sensor for Average(None/Local/Glbl1-5)	None	
y22	Avg RH2	Select RH2 sensor for Average(None/Local/Glbl1-5)	None	
y23	Avg RH3	Select RH3 sensor for Average(None/Local/Glbl1-5)	None	
y24	Not Used	Not Used		
y25	Not Used	Not Used		
y30	SelectExhaustFan	Select Exhaust Fan Schedule(0-16)	0	
y31	Aux RO 1 Schedule	Select Aux RO 1 Schedule(0-16)	0	
y32	Aux RO 2 Schedule	Select Aux RO 2 Schedule(0-16)	0	
y33	Aux RO 3 Schedule	Select Aux RO3 Schedule(0-16)	0	
y34	Aux RO 4 Schedule	Select Aux RO4 Schedule(0-16)	0	
y35	Enable Broadcast	Enable Broadcast feature(No/Yes)	Yes	
y36	Night Shutdown	Night Shutdown(No/Yes)	No	
y37	Enable Logging	Enable Logging(No/Yes)	No	
y38	Logging Interval	Set Logging Interval	1	m

FAN	Parameters > Fan	Function	Default	Units
FN1	Fan Off Delay	Fan Off Delay (0-30)	2	m
FN2	Fan Proof Value	Fan Proof Value (0.0-100.0) Used with the Fan CT AI . If AI is above this value the is ON	2.0	a
FN3	Min Fan Speed	Min Fan Speed when in Fan Only Mode (0.0-100.0)	30.0	%
FN4	Fan PI Gain	Fan PI Gain Value (0.0-100.0)	5.0	
FN5	FanPIIntegrationTime	Fan PI Integration Time (6-1000)	60	
FN6	Building Press Target	Building Pressure Target(-1.00-1.00)	0.00	
FN7	OvrdFanSpeed	Stage One Fan Speed if exhaust fan one enabled		
FN8	OvrdFanHigh	Stage Two Fan Speed if exhaust fan two enabled		
FN9	Cond Target 1	Condenser Target	350 PSI	bar/psi
FNA	Cond Target 2	Condenser Target if Reheat enabled	400 PSI	bar/psi

COL	Parameters > Cool	Function	Default	Units
Ct1	CL1 Target	Cool 1 Target Temperature (10.0-40.0°C)	40.0	°C/°F
Cb1	CL1 PreDelay	Cool 1 Pre Delay (0-240)	0	m
Ca1	CL1 PostDelay	Cool 1 Post Delay (0-240)	0	m
Ct2	CL2 Target	Cool 2 Target Temperature (10.0-40.0°C)	40.0	°C/°F
Cb2	CL2 PreDelay	Cool 2 Pre Delay (0-240)	240	m
Ca2	CL2 PostDelay	Cool 2 Post Delay (0-240)	240	m
Ct3	CL3 Target	Cool 3 Target Temperature (10.0-40.0°C)	40.0	°C/°F
Cb3	CL3 PreDelay	Cool 3 Pre Delay (0-240)	240	m
Ca3	CL3 PostDelay	Cool 3 Post Delay (0-240)	240	m
Ct4	CL4 Target	Cool 4 Target Temperature (10.0-40.0°C)	40.0	°C/°F
Cb4	CL4 PreDelay	Cool 4 Pre Delay (0-240)	240	m
Ca4	CL4 PostDelay	Cool 4 Post Delay (0-240)	240	m
CLr	CL Range +/-	Cool Range +/- (0.0-10.0K)	0.5	K/F
CL1	CL Ambient Lockout	Cool Mode Ambient Lockout (0.0-85.0°C)	15.6	°C/°F
CL2	CL Lockout Range +/-	Cool Mode Ambient Lockout Range +/- (0.0-10.0K)	1.1	K/F
CnS	CL Night Setback	Cool Mode Night Setback (0.0-30.0K)	0.6	K/F
Cs1	CL SupplyAir	Cool Mode Supply Air Target for VS Fan (0.0-100.0°C)	15.0	°C/°F
Cm1	CL Min Fan Speed	Cool Mode Min Fan Speed (0.0-100.0)	50.0	%
Cm2	CL Max Fan Speed	Cool Mode Max Fan Speed (0.0-100.0)	75.0	%
CC1	CL Min Compr 1 Speed	Cool Min Compressor 1 Speed (0.0-100.0)	5.0	%
CC2	CL Min Compr 2 Speed	Cool Min Compressor 2 Speed (0.0-100.0)	30.0	%
CC3	CL Min Compr 3 Speed	Cool Min Compressor 3 speed (0.0-100.0)	30.0	%
CC4	CL Min Compr 4 Speed	Cool Min Compressor 4 speed (0.0-100.0)	30.0	%
CLi	PI Integ Time		120	
CLg	PI Gain		8.0	
Cns	CL Neutral SA		20.0	°C/°F
Rt1	HR1 Target	Heat Reclaim 1 Target Temperature (10.0-40.0°C)	22.2	°C/°F

HRC	Parameters > Heat Reclaim	Function	Default	Units
Rb1	HR1 PreDelay	Heat Reclaim 1 Pre Delay (0-240)	240	m
Ra1	HR1 PostDelay	Heat Reclaim 1 Post Delay (0-240)	240	m
Rt2	HR2 Target	Heat Reclaim 2 Target Temperature (10.0-40.0°C)	22.2	°C/°F
Rb2	HR2 PreDelay	Heat Reclaim 2 Pre Delay (0-240)	240	m
Ra2	HR2 PostDelay	Heat Reclaim 2 Post Delay (0-240)	240	m
Rt3	HR3 Target	Heat Reclaim 3 Target Temperature (10.0-40.0°C)	20.0	°C/°F
Rb3	HR3 PreDelay	Heat Reclaim 3 Pre Delay (0-240)	240	m
Ra3	HR3 PostDelay	Heat Reclaim 3 Post Delay (0-240)	240	m
Rt4	HR4 Target	Heat Reclaim 4 Target Temperature (10.0-40.0°C)	19.4	°C/°F
Rb4	HR4 PreDelay	Heat Reclaim 4 Pre Delay (0-240)	240	m
Ra4	HR4 PostDelay	Heat Reclaim 4 Post Delay (0-240)	240	m
HRr	HR Range +/-	Heat Reclaim Range +/- (0.0-10.0K)	0.2	K/F
HR1	HR Ambient Lockout	Heat Reclaim Mode Ambient Lockout (0.0-85.0°C)	37.8	°C/°F
HR2	HR Lockout Range +/-	Heat Reclaim Mode Ambient Lockout Range +/- (0.0-10.0K)	1.1	K/F
RnS	HR Night Setback	Heat Reclaim Mode Night Setback (0.0-30.0K)	2.8	K/F
HRs	HR SupplyAir	Heat Reclaim Mode Supply Air Target for VS Fan (0.0-100.0°C)	30.6	°C/°F
Rm1	HR Min Fan Speed	Heat Reclaim Mode Min Fan Speed (0.0-100.0)	50.0	%
Rm2	HR Max Fan Speed	Heat Reclaim Mode Max Fan Speed (0.0-100.0)	75.0	%
HET	Parameters > Aux Heat	Function	Default	Units
Ht1	HT1 Target	Aux Heat 1 Target Temperature (10.0-40.0°C)	20.8	°C/°F
Hb1	HT1 PreDelay	Aux Heat 1 Pre Delay (0-240)	240	m
Ha1	HT1 PostDelay	Aux Heat 1 Post Delay (0-240)	240	m
Ht2	HT2 Target	Aux Heat 2 Target Temperature (10.0-40.0°C)	20.3	°C/°F
Hb2	HT2 PreDelay	Aux Heat 2 Pre Delay (0-240)	240	m
Ha2	HT2 PostDelay	Aux Heat 2 Post Delay (0-240)	240	m
Ht3	HT3 Target	Aux Heat 3 Target Temperature (10.0-40.0°C)	18.9	°C/°F
Hb3	HT3 PreDelay	Aux Heat 3 Pre Delay (0-240)	240	m
Ha3	HT3 PostDelay	Aux Heat 3 Post Delay (0-240)	240	m
Ht4	HT4 Target	Aux Heat 4 Target Temperature (10.0-40.0°C)	18.3	°C/°F
Hb4	HT4 PreDelay	Aux Heat 4 Pre Delay (0-240)	240	m
Ha4	HT4 PostDelay	Aux Heat 4 Post Delay (0-240)	240	m
HTr	HT Range +/-	Aux Heat Range +/- (0.0-10.0K)	0.5	K/F
HT1	HT Ambient Lockout	Aux Heat Mode Ambient Lockout (0.0-85.0°C)	37.8	°C/°F
HT2	HT Lockout Range +/-	Aux Heat Mode Ambient Lockout Range +/- (0.0-10.0K)	1.1	K/F

HnS	HT Night Set-back	Aux Heat Mode Night Setback (0.0-30.0K)	0.0	K/F
Htd	Gas Fan Delay Off	Gas - Fan Delay Off (0-600)	60	s
HTs	HT SupplyAir	Aux Heat Mode Supply Air Target for VS Fan (0.0-100.0°C)	30.6	°C/°F
Hm1	HT Min Fan Speed	Aux Heat Mode Min Fan Speed (0.0-100.0)	50.0	%
Hm2	HT Max Fan Speed	Aux Heat Mode Max Fan Speed (0.0-100.0)	75.0	%
HTi	HT PI Integ Time			
HTg	Heat PI Gain			
HUM	Parameters > Dehumd	Function	Default	Units
Dt1	DH1 Target	Dehumidification 1 Target Temperature (10.0-40.0°C)	100.0	
Db1	DH1 PreDelay	Dehumidification 1 Pre Delay (0-240)	240	m
Da1	DH1 PostDelay	Dehumidification 1 Post Delay (0-240)	240	m
Dt2	DH2 Target	Dehumidification 2 Target Temperature (10.0-40.0°C)	100.0	
HUM	Parameters > Dehumd	Function	Default	Units
Db2	DH2 PreDelay	Dehumidification 2 Pre Delay (0-240)	240	m
Da2	DH2 PostDelay	Dehumidification 2 Post Delay (0-240)	240	m
Dt3	DH3 Target	Dehumidification 3 Target Temperature (10.0-40.0°C)	100.0	
Db3	DH3 PreDelay	Dehumidification 3 Pre Delay (0-240)	240	m
Da3	DH3 PostDelay	Dehumidification 3 Post Delay (0-240)	240	m
Dt4	DH4 Target	Dehumidification 4 Target Temperature (10.0-40.0°C)	100.0	
Db4	DH4 PreDelay	Dehumidification 4 Pre Delay (0-240)	240	m
Da4	DH4 PostDelay	Dehumidification 4 Post Delay (0-240)	1000	m
DHr	DH Range +/-	Dehumidification Range +/- (0.0-10.0K)	10.0	
DH1	DH Ambient Lockout	Dehumidification Mode Ambient Lockout (0.0-85.0°C)	100.0	°C/°F
DH2	DH Lockout Range +/-	Dehumidification Mode Ambient Lockout Range +/- (0-10.0K)	10.0	K/F
DnS	DH Night Set-back	Dehumidification Mode Night Setback (0.0-30.0K)	30.0	
DrT	DH Reheat Target	Dehumidification Reheat Target (0.0-40.0°C)	40.0	°C/°F
DrR	DH Reheat Range +/-	Dehumidification Reheat Range +/- (0.0-30.0K)	30.0	K/F
DH3	Max_Capacity Period	Period for compressors at max capacity before VS Fan will modulate. (0-60)	2	m
Dp1	Cp1 Press Target	Dehumidification Compr 1 Pressure Target (0.0-100.0)	8.2	bar/psi

HUM	Parameters > Dehumd	Function	Default	Units
Dp2	Cp2 Press Target	Dehumidification Compr 2 Pressure Target (0.0-100.0)	8.2	bar/psi
Dp3	Cp3 Press Target	Dehumidification Compr 3 Pressure Target (0.0-100.0)	8.2	bar/psi
Dp4	Cp4 Press Target	Dehumidification Compr 4 Pressure Target (0.0-100.0)	8.2	bar/psi
Gn1	Cp1 PI Gain	Dehumidification Compr 1 PI Gain (0.0-100.0)	10.0	
It1	Cp1 Integ Time	Dehumidification Compr 1 Integration Time (5-1000)	120	
Gn2	Cp2 PI Gain	Dehumidification Compr 2 PI Gain (0.0-100.0)	10.0	
It2	Cp2 PI Integ Time	Dehumidification Compr 2 Integration Time (5-1000)	120	
Gn3	Cp3 PI Gain	Dehumidification Compr 3 PI Gain (0.0-100.0)	10.0	
It3	Cp3 PI Integ Time	Dehumidification Compr 3 Integration Time (5-1000)	120	
Gn4	Cp4 PI Gain	Dehumidification Compr 4 PI Gain (0.0-100.0)	10.0	
It4	Cp4 PI Integ Time	Dehumidification Compr 4 Integration Time (5-1000)	120	
DMP	Parameters > Damper Config	Function	Default	Units
DM1	DAM Min Open	Damper Min Open (0.0-100.0)	7.0	%
DM2	DAM Max Open	Damper Max Open (0.0-100.0)	100.0	%
DM3	DAM Air Target	Damper Free Cooling Supply/Mixed Air Target (0.0-40.0)	18.0	°C/°F
DM4	High Amb Temp Lockout	Damper Free Cooling High Ambient Lockout (0.0-100.0)	25.0	°C/°F
DM5	High Otdr RH Lockout	Damper Free Cooling High Outdoor RH Lockout (0.0-100.0)	80.0	%
DM6	High Otdr Enthalpy Lockout	Damper Free Cooling High Enthalpy Lockout (0.0-100.0)	60.0	
DM7	DM Min Fan Speed	Damper Min Fan Speed (0.0-100.0)	30.0	%
DM8	DM Max Fan Speed	Damper Max Fan Speed (0.0-100.0)	75.0	%
DMa	Damper PI Gain	Damper Free Cooling Pi Gain (0.0-100.0)	5.0	
DMi	Damper PI Integ Time	Damper Free Cooling PI Integration Time (5-1000)	60	
Dc1	CO2 Target	Damper CO2 Target (0-2000)	900	ppm
Dc2	CO2 Range +/-	Damper CO2 Range +/- (0-200)	50	ppm
DM0	Ovrd Value		80.0	%
ALM	Parameters > Alarm Config	Function	Default	Units
S01	Fan Proof Delay	Fan Proof Alarm Delay (0-15)	5	s
S02	Zone - High Temp	Zone Temp High Alarm (0.0-40.0)	30.0	°C/°F

ALM	Parameters > Alarm Config	Function	Default	Units
S03	Zone - Low Temp	Zone Temp Low Alarm (0.0-40.0)	5.0	°C/°F
S04	Zone - Delay	Zone Temp Delay (0-240)	240	m
S05	CO2 - High Level	CO2 High Alarm (0-2000)	1000	ppm
S06	CO2 - Delay	CO2 Alarm Delay (0-240)	15	m
S07	Fan High Runtime	Fan High Daily Runtime (0-1500)	1500	m
S08	Fan High Cycle	Fan High Daily Cycles (0-1000)	1000	
S09	Cool1 High Runtime	Cool 1 High Daily Runtime (0-1500)	1500	m
S10	Cool1 High Cycle	Cool 1 High Daily Cycles (0-1000)	1000	
S11	Cool2 High Runtime	Cool 2 High Daily Runtime (0-1500)	1500	
S12	Cool2 High Cycle	Cool 2 High Daily Cycles (0-1000)	1000	
S13	Cool3 High Runtime	Cool 3 High Daily Runtime (0-1500)	1500	m
S14	Cool3 High Cycle	Cool 3 High Daily Cycles (0-1000)	1000	
S15	Cool4 High Runtime	Cool 4 High Daily Runtime (0-1500)	1500	m
S16	Cool4 High Cycle	Cool 4 High Daily Cycles (0-1000)	1000	
S17	Heat1 High Runtime	Heat 1 High Daily Runtime (0-1500)	1500	m
S18	Heat1 High Cycle	Heat 1 High Daily Cycles (0-1000)	1000	
S19	Heat2 High Runtime	Heat 2 High Daily Runtime (0-1500)	1500	m
S20	Heat2 High Cycle	Heat 2 High Daily Cycles (0-1000)	1000	
S21	Heat3 High Runtime	Heat 3 High Daily Runtime (0-1500)	1500	m
S22	Heat3 High Cycle	Heat 3 High Daily Cycles (0-1000)	1000	
S23	Heat4 High Runtime	Heat 4 High Daily Runtime (0-1500)	1500	m
S24	Heat4 High Cycle	Heat 4 High Daily Cycles (0-1000)	1000	

Overrides

Overrides OV1 and OV2, are used to enable Night Setback and Title24 modes. Overrides OV3 – OV8 are used to place the specific features (as shown below) in manual operation. The override value will be displayed by stage, %, OFF, ON, etc. For analog outputs a value of zero shuts down the feature and 100 will enable 100% of the feature overridden.

OV0	Service > Overrides	Function	Default	Units
OV1	Override Night-Setback	Override Night Setback – Enables Night Setback(Off/On)	Off	
OV2	Override Title24	Override Title24 – Enables Title24(Off/On)	Off	
OV3	Override Fan	Override Fan(Auto/Override)	Auto	
OV4	Override Fan %	Sets Speed of Fan when in Override(0.0 – 100.0)	0.0	%
OV5	Override Damper	Override DamperAuto/Off/25%/50%/75%/100%)	Auto	
OV6	Override Cooling	Override Cooling(Auto/Off/Stg1/Stg2/Stg3/Stg4/All On)	Auto	
OV7	Override Heat Reclaim	Override Heat Reclaim(Auto/Off/Stg1/Stg2/Stg3/Stg4/All On)	Auto	
OV8	Override Aux Heat	Override Aux Heat(Auto/Off/Stg1/Stg2/Stg3/Stg4/All On)	Auto	
OV9	Override Time-out	Override Timeout – Removes override after so much time (0-30)	0	m

Schedule Enable

How it works

On the AK-SM 800, select the MCX-RTU to assign a schedule and select the Schedule tab.
 (Note: it is preferred to set up schedules under configuration -> Refrigeration -> Schedules – see page 28)

If no schedule has been setup, you will see a screen, similar to the one below. If there is no schedule the MCX-RTU will follow the configuration of the unit.

Status	Settings	Manual Operation	Schedule
Summary		Schedule	
	Schedule usage	On/Off Schedule	
	Num of schedules	0	
Schedules			

To add a schedule, double click on the “Num of schedules” and set the number of schedules. Each schedule allows programming a Start and Stop time.

Status	Settings	Manual Operation	Schedule
Summary		Schedule	
	Schedule usage	On/Off Schedule	
	Num of schedules	1	
Schedules			
	Type 1	Standard	
	Start 1	09:45 AM	
	Stop 1	12:00 AM	
	Days 1	SMTWRFA	
	Holidays 1	12345678	

This On/Off Schedule will completely shutdown the MCX-RTU between midnight and 9:45 AM.

Status	Settings	Manual Operation	Schedule
Summary		Schedule	
	Schedule usage	Eco/Com Schedule	
	Num of schedules	1	
Schedules			
	Type 1	Standard	
	Start 1	10:00 PM	
	Stop 1	06:45 AM	
	Days 1	SMTWRFA	
	Holidays 1	12345678	

This Eco/Com Schedule will place the MCX-RTU in night setback from 10:00pm to 6:45am.

Backup / Restore

Purpose

Allows the user to backup/restore the parameters in the MCX-RTU to a SD card.

How it works

The Backup/Restore feature menu items are located in the Service Menu.

Backup - After you have inserted a SD card into the MCX-RTU, go to the Service Menu and select Backup. Allow a minute for the backup to complete. The backup file is saved to the SD card with the Modbus address of the MCX-RTU as part of the name.

Restore – Insert a SD card that has a backup file on the card. Go to the Service Menu and select Restore. Allow a minute for the restore to complete.

Note: There is no indication when the backup/restore are complete.

Using More Than One Zone Sensor

To use more than one zone sensor for a MCX-RTU, use parameter C57(Zone Control).

The allowed settings for this parameter are

Single – Only uses a single sensor for control

Average – Uses the average of 2 to 3 sensors for control

Low – Uses the lowest value of 2 to 3 sensors for control

High – Uses the highest value of 2 to 3 sensors for control

To add sensors to the configuration change the function of an unused analog input to either Zone Temp 2 or Zone Temp 3. To change the function, go to Service->IO Config located in the MCX-RTU menu. Then select an unused AI point and edit the FUNC to “Zone Temp 2” or “Zone Temp 3” and set sensor type/min/max values to PT1000/-22.0/338.0.

Data Logging

How it works

Logs the list of points below using the logging interval. The parameter is located at Parameters->General. Set y37(Logging Interval) to the frequency of logging and y36(Enable Logging). to Yes to start the logging.

Data Log Points

1.	Zone 1	Zone 1 Sensor
2.	Zone 2	Zone 2 Sensor(if used)
3.	Zone 3	Zone 3 Sensor(if used)
4.	ZoneTemp	Zone Temp used for control
5.	ZoneRH	ZoneRH(may be local or global sensor)
6.	ZoneDewpoint	Calculated Zone Dewpoint
7.	SupplyAir	Supply Air Sensor
8.	ReturnAir	Return Air Sensor
9.	MixedAir	Return Air Sensor
10.	OutdoorAir	Outdoor Air Sensor(may be local or global sensor)
11.	OutdoorRH	Outdoor RH Sensor(may be local or global sensor)
12.	OutdoorDewpoint	Calculated Outdoor Dewpoint
13.	GlobalSchedules	Bit map of the first 16 refrigeration schedules
14.	AlarmStatus	Alarm Status
15.	Mode	MCX-RTU Mode
16.	EffSetp	Calculated Setpoint(heat or cool setpoint depending on mode)
17.	FanOut	Fan Control Output
18.	FanFail	Fan Proof not on when FanOut is ON.
19.	PhaseLoss	On means PhaseLoss is good
20.	ShutdownFlag	One of the shutdown DI's is active
21.	CoolHeatModeGlobal	What is the control mode(0 = Cool, 1 = Heat)
22.	NightSetback	Night Setback is active
23.	SystemOnOff	Master Switch Status
24.	CoolStatus1	Cool 1 Status
25.	CoolStatus2	Cool 2 Status
26.	CoolStatus3	Cool 3 Status
27.	CoolStatus4	Cool 4 Status
28.	AuxHeatStatus1	Aux Heat Status 1
29.	AuxHeatStatus2	Aux Heat Status 2
30.	FanStatusAO	Fan AO Status – 0-100%
31.	DamperStatusAO	Damper AO Status – 0-100%
32.	GlobalOutdoorTemp	Value of Global Outdoor Temp

The Data Log file may be converted to an Excel file by using the DecodeLog converter program. The program can be requested from Danfoss Tech Support.

Broadcast Configuration

How it works

The AK-SM 800 scans all the MCX-RTU controllers once a minute for any sensors setup to broadcast to all the controllers. If YES the AK-SM 800 requests the current sensor values from the MCX-RTU controllers. Then the SM 800 broadcasts up to 14 sensor values to all the MCX-RTU controllers in one message. Along with the sensor values a Load Shed Value and status for the 16 Schedules are broadcasted twice a minute. All the broadcast settings are within the MCX-RTU parameters, there are no AK-SM 800 settings for this feature.

Configure Sensors

Select the Sensors to Broadcast. On each controller go to Parameters -> General. Then use parameters y16, y17, y18, y19 and y20 to select the sensors that you want to share with the other controllers. Note that each broadcast value may only be used once.

Select the Broadcast Sensors to use on each MCX-RTU controller. On each controller go to Setup Options, then set parameters C48, C49, C50, C51 and C52. These parameters tell the controller whether to use the Local sensor or the Global sensors. You can also use these parameters to disable the sensors.

Configure Schedules

The schedules used by the MCX-RTU are setup on the AK-SM 800. The schedule status of the first 16 schedules are broadcasted to all the MCX-RTU controllers. There is no assignment of individual MCX-RTU at the AK-SM 800. The schedule assignments are only configured in the MCX-RTUs. The schedules at the AK-SM 800 are setup at Configuration->Control->Refrigeration->Schedules. Even though the AK-SM 800 allows for a max of 100 schedules, only the first 16 schedules are broadcast to the MCX-RTU controllers.

To select Schedule for Night Setback at the MCX-RTU go to Parameters->General. Edit setting y26 to the schedule number to control Night Setback.

To select Schedule for Title24, go to Parameters->General. Edit setting y29 to the schedule number you wish to use to control the Title24 option. The Title24 schedule places the controller in Night Setback.

Configure Load Shed

To set Load Shed Setting, go to Parameters->General.

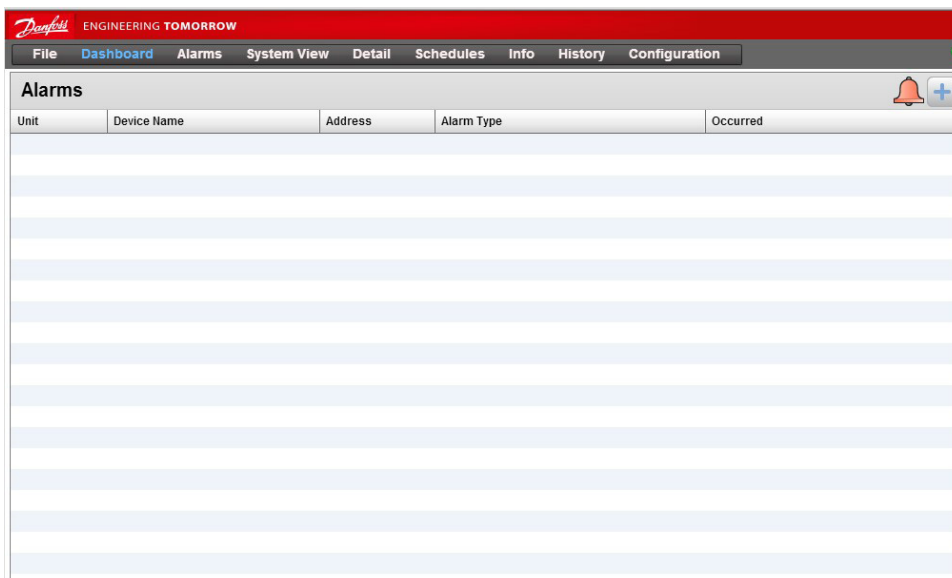
Edit settings y28 to the Load Shed value. If the Load Shed value that is broadcast from the AK-SM 800 is greater than this value, the controller will use Night Setback settings.

See the AK-SM 800 User Manual for details on configuring the AK-SM 800 for Load Shedding.

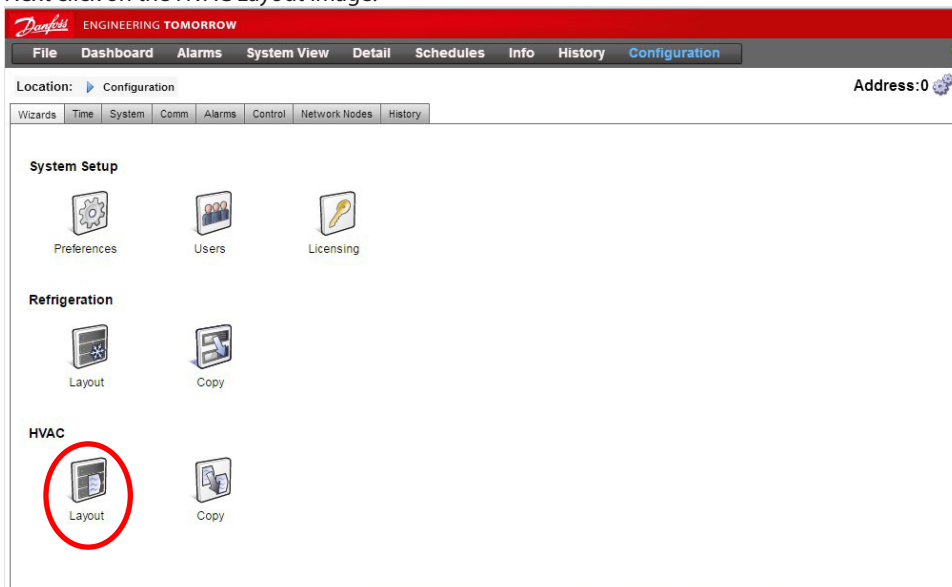
AK-SM 800 MCX-RTU Commission

To commission a MCX-RTU controller on a AK-SM 800, use the following steps.

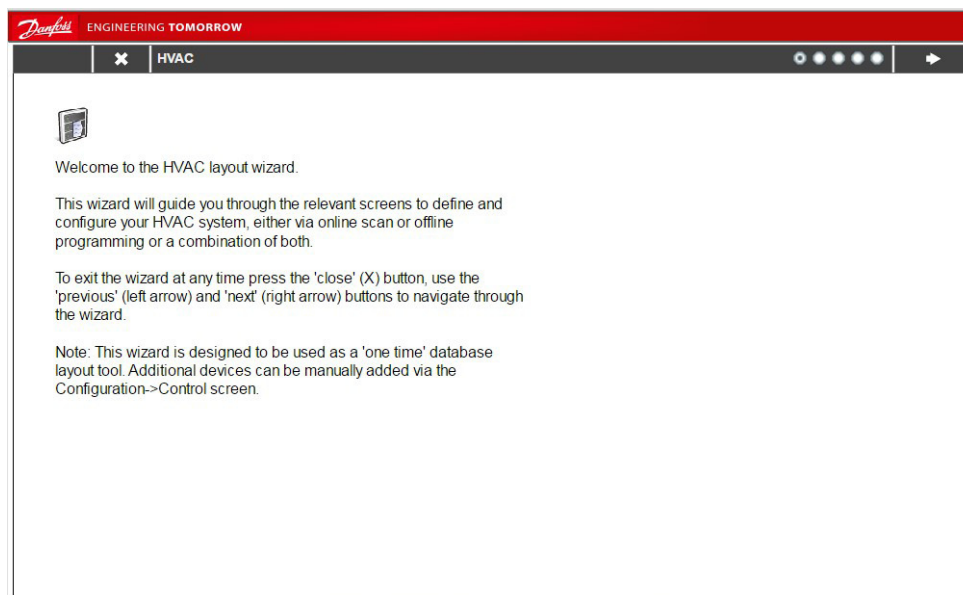
Connect to the AK-SM 800 using Storeview Desktop or a web browser and log in. Next go to Configuration.



Next click on the HVAC Layout image.

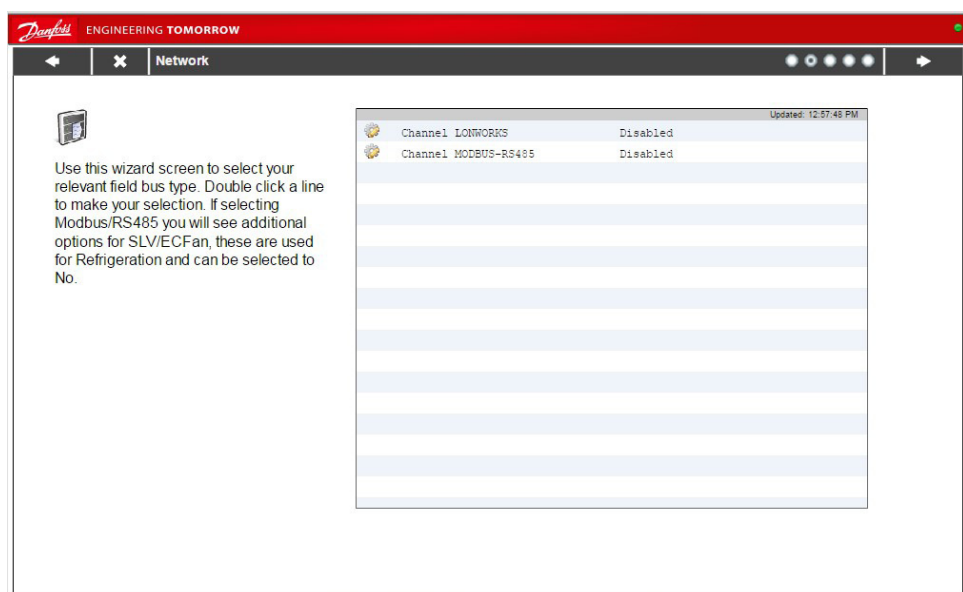


This starts the Layout wizard. Click the Right Arrow on the upper right corner.

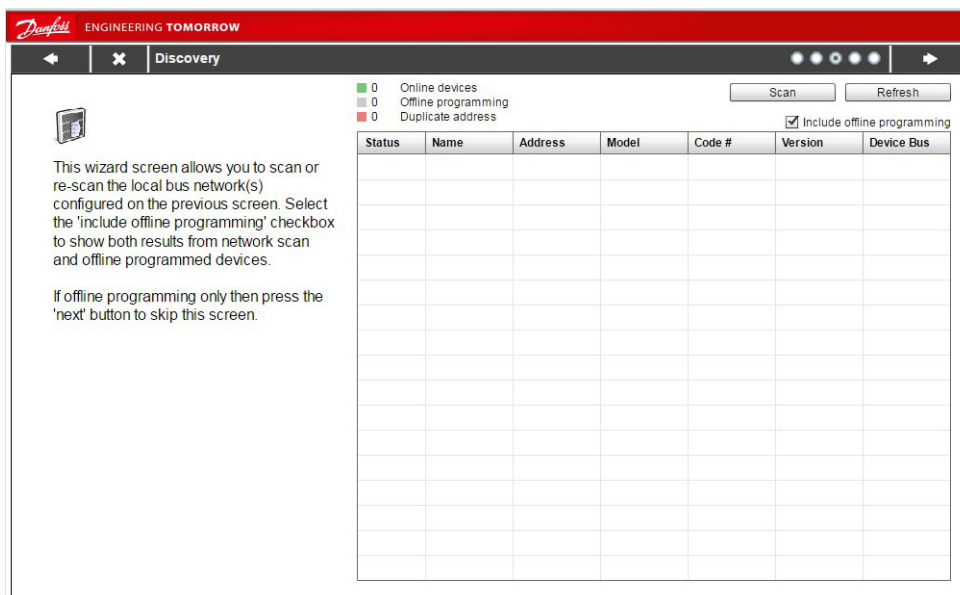


Enable the MODBUS-RS485 channel by selecting Disabled next to MODBUS-RS485 and change to Enabled.

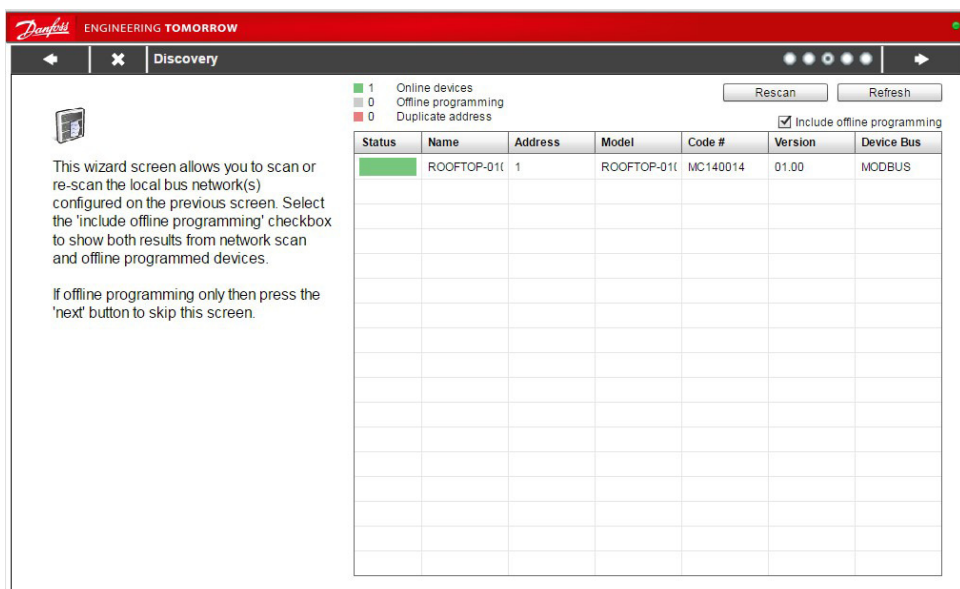
Click the arrow to advance to next screen



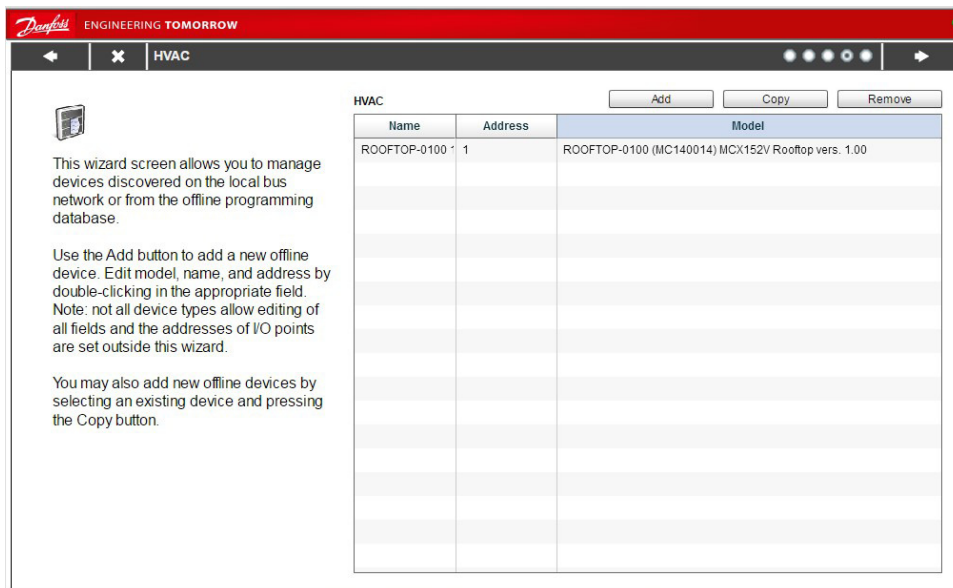
Click the Scan button to start the scanning process.



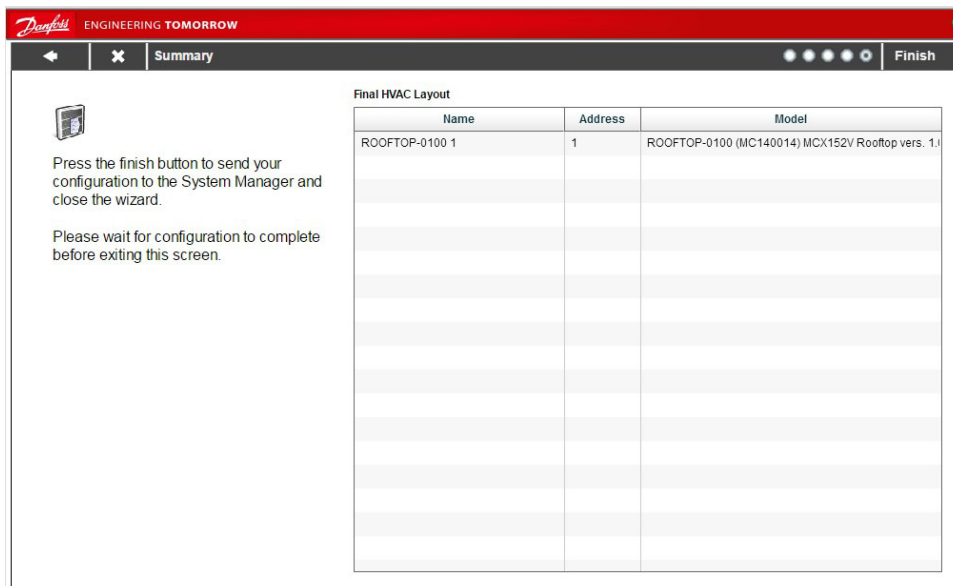
Once scanning is complete a list of the HVAC controllers are displayed. Click Right Arrow (upper right corner) to proceed.



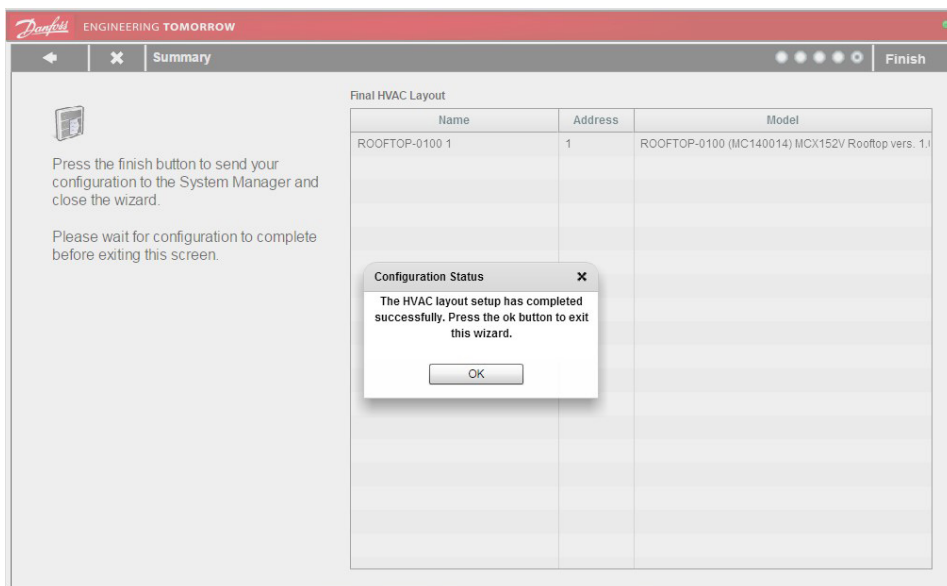
Now add additional offline controllers or proceed. To add offline controllers, follow the instructions on the screen. Click the Right Arrow (upper right corner) to proceed.



View a summary of the HVAC controllers attached to the AK-SM 800. If correct click on the Right Arrow (upper right corner) . If something is missing, click the Left Arrow (upper left corner) and make changes.



Pop Up indicating completion using HVAC Layout Wizard.



IO List

	I/O CONFIGURATION			
AI	ANALOG INPUTS	Min	Max	Type
1	Zone Temperature	-30.0°C	170.0°C	PT1000
2	Supply Air	-30.0°C	170.0°C	PT1000
3	Return Air	-30.0°C	170.0°C	PT1000
4	Zone RH	0.0 %	100.0 %	0-5 V
5	Outdoor RH	0.0 %	100.0 %	0-5 V
6	Indoor CO2	0 ppm	2000 ppm	0-5 V
7	Building Pressure	0.0	100.0	0-5 V
8	Mixed Air	-30.0°C	170.0°C	PT1000
9	Outdoor Air	-30.0°C	170.0°C	PT1000
10	Light Level	-1.00	1.00	00-5 V
11	Compr 1 Press	0.0bar	34.5 bar	0-5 V
12	Compr 2 Press	0.0 bar	34.5 bar	0-5 V
13	Compr 3 Press	0.0 bar	34.5 bar	0-5 V
14	Compr 4 Press	0.0 bar	34.5 bar	0-5 V
15	Aux AI 1 (Located on Expansion Module)	0.0	200.0	0-5 V
16	Aux AI 2 (Located on Expansion Module)	0.0	200.0	0-5 V
17	Aux AI 3 (Located on Expansion Module)	0.0	200.0	0-5 V
18	Aux AI 4 (Located on Expansion Module)	0.0	200.0	0-5 V
19	Aux AI 5 (Located on Expansion Module)	0.0	200.0	0-5 V
20	Aux AI 6 (Located on Expansion Module)	0.0	200.0	0-5 V
21	Aux AI 7 (Located on Expansion Module)	0.0	200.0	0-5 V
22	Outdoor CO2 (Located on Expansion Module)	0	2000	0-5 V
DI	DIGITAL INPUTS	Min	Max	Type
1	Fan Proof	0	1	N.O.
2	Phase Loss	0	1	N.C.
3	Shutdown 1	0	1	N.O.
4	Shutdown 2	0	1	N.O.
5	Fan Drive Fault	0	1	N.O.
6	Compr1 Drive Fault	0	1	N.O.
7	Compr2 Drive Fault	0	1	N.O.
8	Compr3 Drive Fault	0	1	N.O.
9	Compr4 Drive Fault	0	1	N.O.
10	Filter Clogged Fault	0	1	N.O.
11	Damper Override	0	1	N.O.
12	Title24 Override	0	1	N.O.
13	Schedule Override	0	1	N.O.
14	Cool 1 Proof	0	1	N.O.
15	Cool 2 Proof	0	1	N.O.
16	Cool 3 Proof	0	1	N.O.

DI	DIGITAL INPUTS	Min	Max	Type
17	Cool 4 Proof	0	1	N.O.
18	(Located on Expansion Module)	0	1	N.C.
19	(Located on Expansion Module)	0	1	N.C.
20	(Located on Expansion Module)	0	1	N.C.
21	(Located on Expansion Module)	0	1	N.C.
22	(Located on Expansion Module)	0	1	N.C.
23	(Located on Expansion Module)	0	1	N.C.
24	(Located on Expansion Module)	0	1	N.C.
25	(Located on Expansion Module)	0	1	N.C.
26	(Located on Expansion Module)	0	1	N.C.
AO	ANALOG OUTPUTS	Min	Max	Type
1	Fan AO	0 %	100 %	0-10 V
2	VS Compr 1	0 %	100 %	1-5 V
3	VS Compr 2	0 %	100 %	1-5 V
4	VS Compr 3	0 %	100 %	1-5 V
5	VS Compr 4	0 %	100 %	1-5 V
6	Damper AO	0 %	100 %	2-10 V
7	Not Available	0 %	100 %	NO
8	Not Available	0 %	100 %	NO
9	(Located on Expansion Module)	0 %	100 %	NO
10	(Located on Expansion Module)	0 %	100 %	NO
11	(Located on Expansion Module)	0 %	100 %	NO
12	(Located on Expansion Module)	0 %	100 %	NO
DO	DIGITAL OUTPUTS	Min	Max	Type
1	Cool 1	0	1	N.O.
2	Cool 2	0	1	N.O.
3	Cool 3	0	1	N.O.
4	Cool 4	0	1	N.O.
5	Aux HT 1	0	1	N.O.
6	Aux HT 2	0	1	N.O.
7	Aux HT 3	0	1	N.O.
8	Aux HT 4	0	1	N.O.
9	Reheat	0	1	N.O.
10	Damper	0	1	N.O.
11	HT RCLM 1	0	1	N.O.
12	HT RCLM 2	0	1	N.O.
13	Heat Pump	0	1	N.O.
14	Fan Low	0	1	N.O.
15	Fan High	0	1	N.C.
16	(Located on Expansion Module)	0	1	N.O.
17	(Located on Expansion Module)	0	1	N.O.
18	(Located on Expansion Module)	0	1	N.O.
19	(Located on Expansion Module)	0	1	N.O.
20	(Located on Expansion Module)	0	1	N.O.
21	(Located on Expansion Module)	0	1	N.O.
22	(Located on Expansion Module)	0	1	N.O.
23	(Located on Expansion Module)	0	1	N.O.

