



LG CHILLER TO LG MULTISITE EDGE10 MODBUS INTEGRATION USER MANUAL



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**Please read carefully and store in a safe place for future reference.
Content familiarity required for proper installation.**

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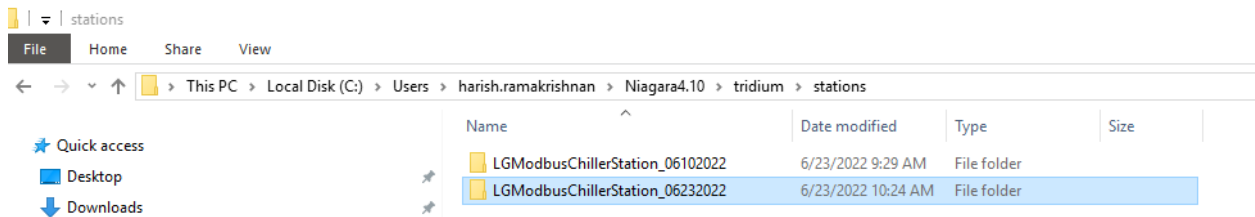
LG CHILLER MODBUS INTEGRATION INTO LG MS-E10 CONTROLLER

Scope & Target Audience

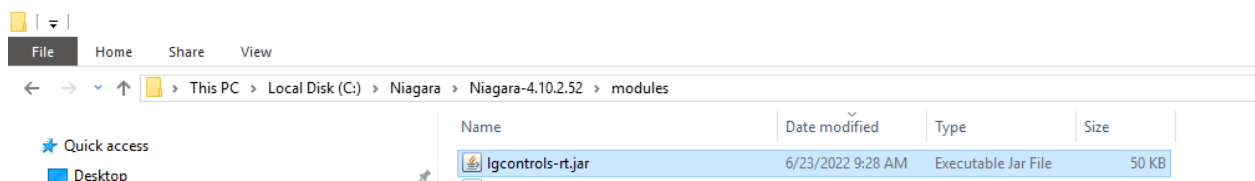
This document is intended to serve as a quick guide for experienced LG Niagara Systems Integrator and Controls engineers to install the LG Modbus Chiller Device into LG MultiSITE Edge10 (PBASE10) controller.

SECTION I: INSTALLATION

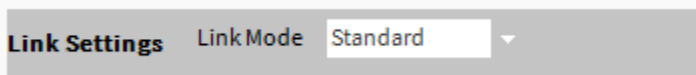
1. Obtain a copy of LG's MultiSITE Supervisor 4.10 install pack from your authorized representative.
2. Unzip the Zip file provided and copy the station folder beginning with name LGModbusChillerStation to your Niagara station USER HOME as shown below. Note: Chiller Station version may be different than shown in image.



3. Save the Jar files into Modules folder of your MultiSITE Supervisor 4.10 install as shown below.



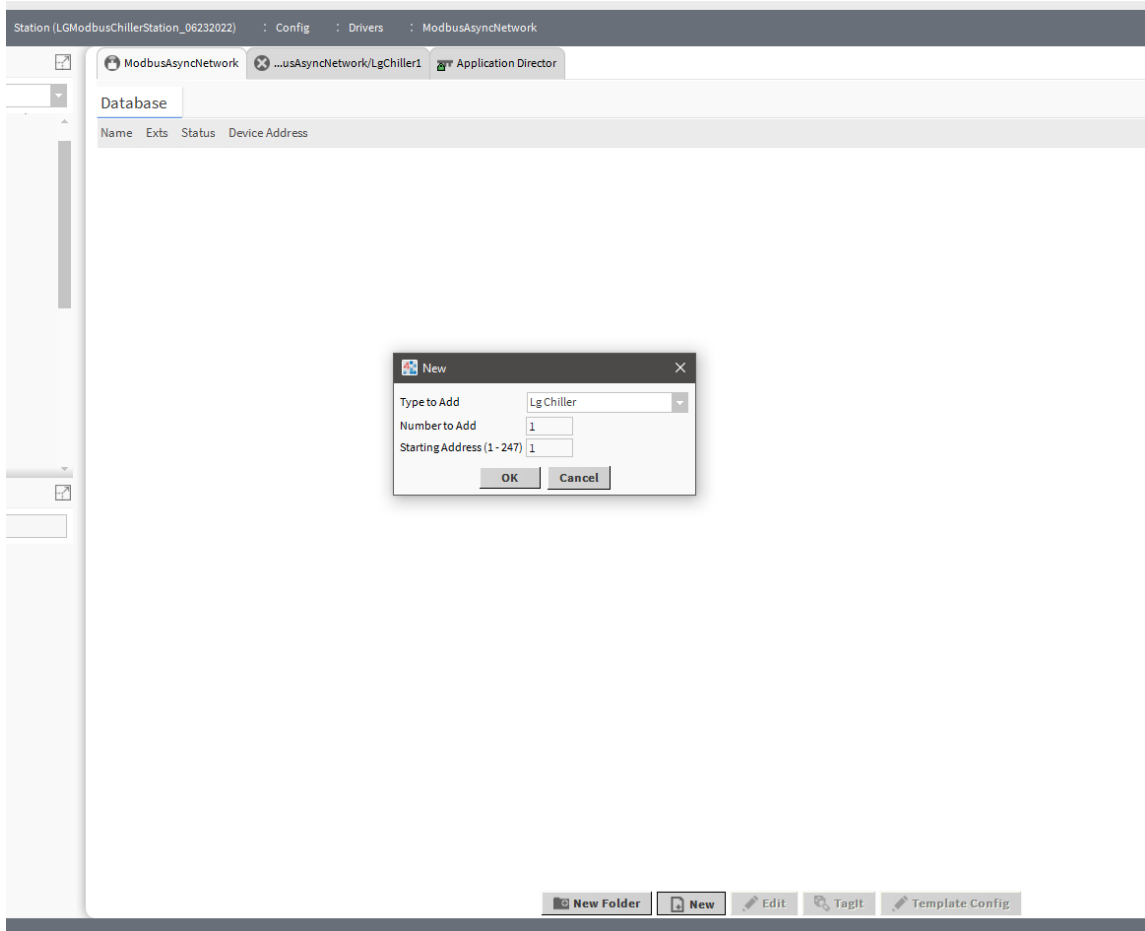
4. Establish platform connection and then go to TCP/IP settings and change the LinkSettings to Standard if it not as already set (Applicable to Edge10 only).



5. Commission the controller to current Niagara version.
6. Copy the provided station template LGModbusChillerStation to the target device during commissioning. You will be required to enter the station's passphrase in order to copy the station. The passphrase is ControlsLab123!
7. Make sure to select lgcontrols Jar file(s) during commissioning.
8. Watch the commission finish and station restart.
9. Login to the station using the credentials supplied. The station default username is system_admin and the default password is digital21.
10. Navigate to the ModbusAsync network and notice there is one LG Chiller already pre-added with Modbus address 1. Note that this Chiller device is fully populated with Max Number of registers (supported by Edge10) pre-added.
11. Add additional devices as needed using the New button on ModbusAsync Network.

SECTION II: LG CHILLER MODBUS DEVICE NAVIGATION AND FEATURES

1. If you are using the Template station, it should already have one LG Chiller Modbus pre-added in the Modbus Device Manager.
2. From the Modbus Device Manager, adding a new device creates a new device with very basic frozen points that cannot be deleted and also adds some dynamic points that can be deleted by the user. Here is the workbench view to add a new LG Chiller device.
 - 2.1. In the Type to Add, leave as LgChiller.
 - 2.2. Number to Add specifies the number of LG Chiller devices to be added.
 - 2.3. Starting Address specifies the Modbus device address of the first device.



3. The newly added device would contain basic points without the cycle points.
 - 3.1. **Poll Setting** – All Modbus registers are set to Normal polling except for three (3). Registers that are set to “Fast” poll scheme are FailureCode, RefrigerantFailureInfo & CycleFailureInfo. These points are set to fast polling scheme because when an error occurs, on certain conditions the Chiller PLC Controller keeps the error code only for three (3) seconds, after which the Chiller PLC clears the error code and puts the Chiller in special sequence per safety design requirements. In order to capture error codes before they are cleared by

Chiller PLC Controller, they are assigned to fast poll scheme. History logs are automatically added to these alarm points when the user invokes “exportToBacnet” action described later in this document.

- 3.2. **Cycle Setting** - Go to the property sheet of the newly added Modbus device. Changing the cycle setting will appropriately add or delete respective cycle points. If the Cycle information is changed from 20 Ton to 40 or 60 Ton and vice-versa, then the additional cycle points will be added or removed as applicable.

ig : Drivers : ModbusAsyncNetwork : LgChiller1

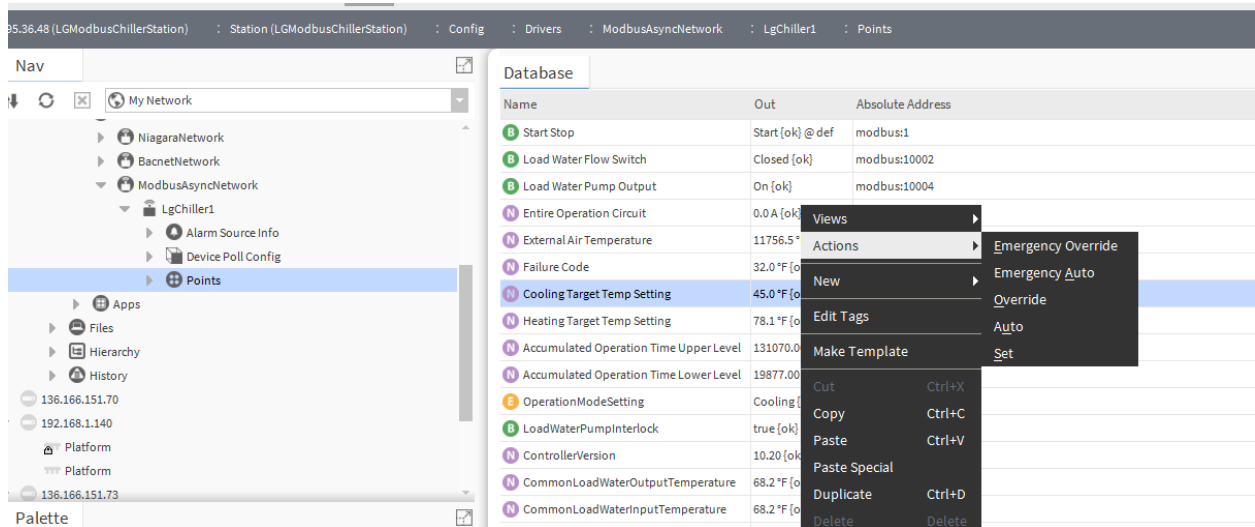
LgChiller1
LgChiller1

Property Sheet

LgChiller1 (Lg Chiller)

	Status	<input style="width: 100%;" type="text" value="{ok}"/>
	Enabled	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border-radius: 50%; margin-right: 5px;"></div> <input checked="" style="width: 20px; height: 20px;" type="checkbox"/> true </div>
	Fault Cause	<input style="width: 100%;" type="text"/>
	Health	Ok [27-Jun-22 3:00 PM EDT]
	Alarm Source Info	Alarm Source Info
	Device Address	<input style="width: 100%;" type="text" value="1"/> [1 - 247]
	Modbus Config	false:order3210
	Ping Address	Hex <input style="width: 100%;" type="text" value="0"/>
	Ping Address Data Type	Integer Type
	Ping Address Reg Type	Holding
	Poll Frequency	Normal
	Input Register Base Address	Hex <input style="width: 100%;" type="text" value="0"/>
	Holding Register Base Address	Hex <input style="width: 100%;" type="text" value="0"/>
	Coil Status Base Address	Hex <input style="width: 100%;" type="text" value="0"/>
	Input Status Base Address	Hex <input style="width: 100%;" type="text" value="0"/>
	Device Poll Config	Device Poll Config Table
	Points	Lg Chiller Points
	Modbus Data Mode	Use Network Data Mode
	Auto Add Dynamic Points On Start	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: green; border-radius: 50%; margin-right: 5px;"></div> <input checked="" style="width: 20px; height: 20px;" type="checkbox"/> true </div>
	Cycle Setting	<div style="display: flex; align-items: center;"> <input style="width: 100%;" type="text" value="Cycle1_20 Tons"/> </div> <div style="border: 1px solid #ccc; margin-top: 5px; padding: 5px;"> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #ccc; border-radius: 50%; margin-right: 5px;"></div> Cycle1_20 Tons </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #444; border-radius: 50%; margin-right: 5px;"></div> Cycle2_40 Tons </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: #ccc; border-radius: 50%; margin-right: 5px;"></div> Cycle3_60 Tons </div> </div>

4. **Auto Add Dynamic Points on Start (True/False)** – This property specifies the behavior upon station start in regard to adding/checking for standard driver defined dynamic points.
 - 4.1. If the user decides to delete all or some of the dynamic points, then this property must be set to “false” prior to re-starting the station after making necessary additions/deletions.
 - 4.2. If this property is set to true and station restarted, the driver automatically adds certain dynamic points.
5. Navigating to Modbus Points Manager. Right clicking on writable points and adjusting the value to the desired value initiates a write action that is sent to the LG Chiller. Example below.



6. A frozen action slot named “addDynamicPoints” is displayed on the slot sheet of the LG Chiller Modbus Device. This is a frozen action slot type. If a user deletes some or all of the driver defined dynamic points, then by invoking this action, those dynamic points can be added back into the driver without having to go through a station re-start.

Slot	#	Name	Display Name	Definition	Flags	Type
Property	0	status	Status	Frozen	rtd	baja:Status
Property	1	enabled	Enabled	Frozen		baja:Boolean
Property	2	faultCause	Fault Cause	Frozen	rtd	baja:String
Property	3	health	Health	Frozen	rd	driver:PingHealth
Property	4	alarmSourceInfo	Alarm Source Info	Frozen		alarm:AlarmSourceInfo
Action	5	ping	Ping	Frozen	a	void (void)
Action	6	ackAlarm	Ack Alarm	Frozen	h	baja:Boolean (alarm:AlarmRecord)
Action	7	upload	Upload	Frozen	h	void (driver:UploadParameters)
Action	8	download	Download	Frozen	h	void (driver:DownloadParameters)
Property	9	deviceAddress	Device Address	Frozen		baja:Integer
Property	10	modbusConfig	Modbus Config	Frozen		modbusCore:ModbusConfig
Property	11	pingAddress	Ping Address	Frozen		modbusCore:FlexAddress
Property	12	pingAddressDataType	Ping Address Data Type	Frozen		modbusCore:DataTypeEnum
Property	13	pingAddressRegType	Ping Address Reg Type	Frozen		modbusCore:RegisterTypeEnum
Property	14	pollFrequency	Poll Frequency	Frozen		driver:PollFrequency
Property	15	inputRegisterBaseAddress	Input Register Base Address	Frozen		modbusCore:FlexAddress
Property	16	holdingRegisterBaseAddress	Holding Register Base Address	Frozen		modbusCore:FlexAddress
Property	17	coilStatusBaseAddress	Coil Status Base Address	Frozen		modbusCore:FlexAddress
Property	18	inputStatusBaseAddress	Input Status Base Address	Frozen		modbusCore:FlexAddress
Property	19	devicePollConfig	Device Poll Config	Frozen		modbusCore:DevicePollConfigTal
Property	20	points	Points	Frozen		modbusCore:ModbusClientPoint
Property	21	modbusDataMode	Modbus Data Mode	Frozen		modbusCore:DeviceDataModeEn
Property	22	autoAddDynamicPointsOnStart	Auto Add Dynamic Points On Start	Frozen		baja:Boolean
Property	23	cycleSetting	Cycle Setting	Frozen		lgcontrols:LgChillerCapacity
Action	24	exportToBacnet	Export To Bacnet	Frozen	o	void (void)
Action	25	addDynamicPoints	Add Dynamic Points	Frozen	h	void (void)

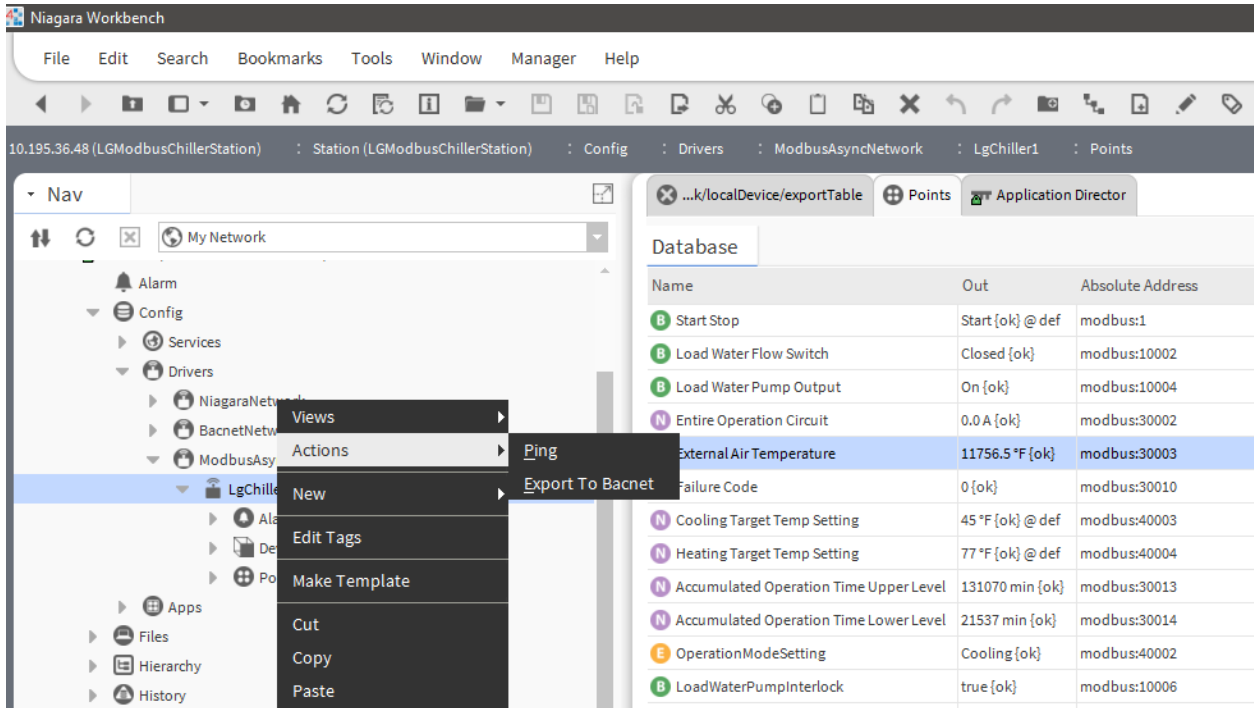
6.1. The slot must be unhidden first and then the action can be invoked from the Nav tree as shown below.

6.2. Even if the **Auto Add Dynamic Points on Start** property is set to “False” and this action invoked manually by the user, the driver adds the dynamic points. The use case for this may be in instances where the user may want to keep some of the dynamic objects and delete the rest. In lieu of the ones deleted, the SI may choose to add some custom registers and at all times maintain the global point capacity.

6.3. When the **Auto Add Dynamic Points on Start** property is set the false, the driver will no longer attempt to add any dynamic points on start, and thereby now has maximum flexibility to not only use standard registers from the driver but also add custom registers.

SECTION III: LG CHILLER BACNET EXPORT

1. The LG Modbus Chiller application in MultiSITE Supervisor offers out-of-the-box and on-demand functionality to export the Modbus registers as BACnet objects. These BACnet objects can then be read/written to by a third party BMS Controller or supervisor.
2. From the Nav tree view of the LG Chiller device, right click and then go to Actions→Export To BACnet.



3. Resultant exported objects should be displayed as in the figure below. Full list of supported BACnet objects for one LG Chiller with Modbus device address exported to BACnet is listed in Appendix I.

fig

Drivers

BacnetNetwork

Local Device






























Export Table

Export Table

LgChiller1

Application Director

Exported Objects

Target Name	Object Name	Object Type	Inst Num	Value	Export	BACnet Writable
 startStop	LgChiller1_startStop	Binary Output	1911	Start [ok] @ def	[ok]	in1,in2,in3,in4,in5,in6,in7,in8,in9,in10,in11,in12,in13,in14
 loadWaterFlowSwitch	LgChiller1_loadWaterFlowSwitch	Binary Input	1912	Closed [ok]	[ok]	no
 loadWaterPumpOutput	LgChiller1_loadWaterPumpOutput	Binary Input	1913	On [ok]	[ok]	no
 entireOperationCircuit	LgChiller1_entireOperationCircuit	Analog Input	1914	0.0 A [ok]	[ok]	no
 externalAirTemperature	LgChiller1_externalAirTemperature	Analog Input	1915	11756.5 °F [ok]	[ok]	no
 failureCode	LgChiller1_failureCode	Analog Input	1916	0 [ok]	[ok]	no
 coolingTargetTempSetting	LgChiller1_coolingTargetTempSetting	Analog Value	1918	45 °F [ok] @ def	[ok]	in1,in2,in3,in4,in5,in6,in7,in8,in9,in10,in11,in12,in13,in14
 heatingTargetTempSetting	LgChiller1_heatingTargetTempSetting	Analog Value	1919	77 °F [ok] @ def	[ok]	in1,in2,in3,in4,in5,in6,in7,in8,in9,in10,in11,in12,in13,in14
 accumulatedOperationTimeUpperLevel	LgChiller1_accumulatedOperationTimeUpperLevel	Analog Input	1920	131070 min [ok]	[ok]	no
 accumulatedOperationTimeLowerLevel	LgChiller1_accumulatedOperationTimeLowerLevel	Analog Input	1921	21560 min [ok]	[ok]	no
 OperationModeSetting_BacExp	LgChiller1_OperationModeSetting_BacExp	Multi State Input	1917	Cooling [ok] @ def	[ok]	no
 LoadWaterPumpInterlock	LgChiller1_LoadWaterPumpInterlock	Binary Input	1120	true [ok]	[ok]	no
 ControllerVersion	LgChiller1_ControllerVersion	Analog Input	1121	10.20 [ok]	[ok]	no
 CommonLoadWaterOutputTemperature	LgChiller1_CommonLoadWaterOutputTemperature	Analog Input	1122	68.2 °F [ok]	[ok]	no
 CommonLoadWaterInputTemperature	LgChiller1_CommonLoadWaterInputTemperature	Analog Input	1123	68.2 °F [ok]	[ok]	no
 RefrigerantFailureInfo	LgChiller1_RefrigerantFailureInfo	Analog Input	1124	0 [ok]	[ok]	no
 CycleFailureInfo	LgChiller1_CycleFailureInfo	Analog Input	1125	0 [ok]	[ok]	no
 ControlModeSetting_BacExp	LgChiller1_ControlModeSetting_BacExp	Multi State Input	1126	Remote [ok] @ def	[ok]	no
 RemoteModeSetting_BacExp	LgChiller1_RemoteModeSetting_BacExp	Multi State Input	1127	Modbus [ok] @ def	[ok]	no
 CoolingTypeSetting_BacExp	LgChiller1_CoolingTypeSetting_BacExp	Multi State Input	1128	Normal [ok] @ def	[ok]	no
 MaxOperatingFrequency_BacExp	LgChiller1_MaxOperatingFrequency_BacExp	Multi State Input	1129	90 [ok] @ def	[ok]	no
 MaxOperatingFrequency_C	LgChiller1_MaxOperatingFrequency_C	Analog Value	1129	4 [ok] @ def	[ok]	in1,in2,in3,in4,in5,in6,in7,in8,in9,in10,in11,in12,in13,in14
 Cycle1_4WayValve1	LgChiller1_Cycle1_4WayValve1	Binary Input	1111	false [ok]	[ok]	no
 Cycle1_InverterComp1Op	LgChiller1_Cycle1_InverterComp1Op	Binary Input	1112	true [ok]	[ok]	no
 Cycle1_InverterComp2Op	LgChiller1_Cycle1_InverterComp2Op	Binary Input	1113	true [ok]	[ok]	no
 Cycle1_EvapTemp_Left	LgChiller1_Cycle1_EvapTemp_Left	Analog Input	1114	41.0 °F [ok]	[ok]	no
 Cycle1_EvapTemp_Right	LgChiller1_Cycle1_EvapTemp_Right	Analog Input	1115	41.0 °F [ok]	[ok]	no
 Cycle1_Inverter_Comp1_Freq	LgChiller1_Cycle1_Inverter_Comp1_Freq	Analog Input	1116	90 Hz [ok]	[ok]	no
 Cycle1_Inverter_Comp2_Freq	LgChiller1_Cycle1_Inverter_Comp2_Freq	Analog Input	1117	90 Hz [ok]	[ok]	no

- Invoking that action will export of ALL frozen slot type registers. In addition, if there are other Modbus registers that are dynamic slot built-in as part of the LG Chiller Modbus driver, these registers are also exported.
- Only those Modbus objects that are user added will not be exported to BACnet.
- If many changes are made to dynamic points or cycle information, it is recommended to perform a new BACnet export by deleting the export objects from the export table and re-invoking “Export To BACnet” action from the LG Chiller device.
- In addition, the three error code points named FailureCode, RefrigerantFailureInfo, and CycleFailureInfo will attach BACnet compliant Numeric Cov Trend logs to them when the exportToBacnet action is invoked. The corresponding BACnet objectIDs for one LG Chiller are shown below. These can be seen on the ExportTable by accessing Bacnet Niagara Log Export Manager. These logs can then be imported on a BACnet capable BMS controller. The user may need to apply appropriate execution rates to periodically retrieve the log entries into the BMS controller.

5102022)	Config	Drivers	BacnetNetwork	Local Device	Export Table	Bacnet Niagara Log Export Manager
Exported Objects						3 objects
Target Name	Object Name	Object Type	Inst Num	History Type	Export	
Datalog	LgChiller1_failureCode_Hist	Trend Log	0	Bacnet Numeric Cov Trend Log Ext	[ok]	
Datalog	LgChiller1_RefrigerantFailureInfo_Hist	Trend Log	1	Bacnet Numeric Cov Trend Log Ext	[ok]	
Datalog	LgChiller1_CycleFailureInfo_Hist	Trend Log	2	Bacnet Numeric Cov Trend Log Ext	[ok]	

SECTION IV: TCP/IP DEFAULTS

1. LAN1 Adapter is usually set to DHCP to be accessible on the company network or remotely. As mentioned in Section I, the link type must be set to “Standard” for Edge10 devices.
2. LAN2 is set to local as shown below. Example controller is set to 192.168.1.48 (Interface2) as seen from TCP/IP Configuration on the EDGE10 platform.

Interfaces

Interface 2 ▲

ID	en1
Description	Onboard Ethernet Adapter en1
Physical Address	00:01:F0:08:3F:9D
Adapter Enabled	<input checked="" type="checkbox"/> Enabled

IPv4 Settings **IPv6 Settings**

DHCPv4	<input type="checkbox"/> Enabled
IPv4 Address	192.168.1.48
IPv4 Subnet Mask	255.255.255.0
DHCPv4 Server	
DHCPv4 Lease Granted	
DHCPv4 Lease Expires	

SECTION V: BACNET NETWORK DEFAULTS

1. The LG Chiller Modbus Station template is pre-added with BACnet Network with factory defaults as shown below. Settings in bold are part of the factory station template. The others are platform settings which must be set during commissioning.
 - 1.1. Default BACnet IP Address of Edge10 Controller – 192.168.1.48
 - 1.2. Subnet Mask – 255.255.255.0
 - 1.3. BACnet Device ID – 9001
 - 1.4. BACnet adapter set to “en1” i.e., LAN2 port

The screenshot displays the ModbusMaster software interface. On the left, the 'Nav' pane shows a project tree with the following structure:

- 10.195.36.48 (LGModbusChillerStation)
 - Platform
 - Station (LGModbusChillerStation)
 - Alarm
 - Config
 - Services
 - Drivers
 - NiagaraNetwork
 - BacnetNetwork** (selected)
 - Local Device
 - Bacnet Comm
 - Monitor
 - Tuning Policies
 - ModbusAsyncNetwork
 - Apps

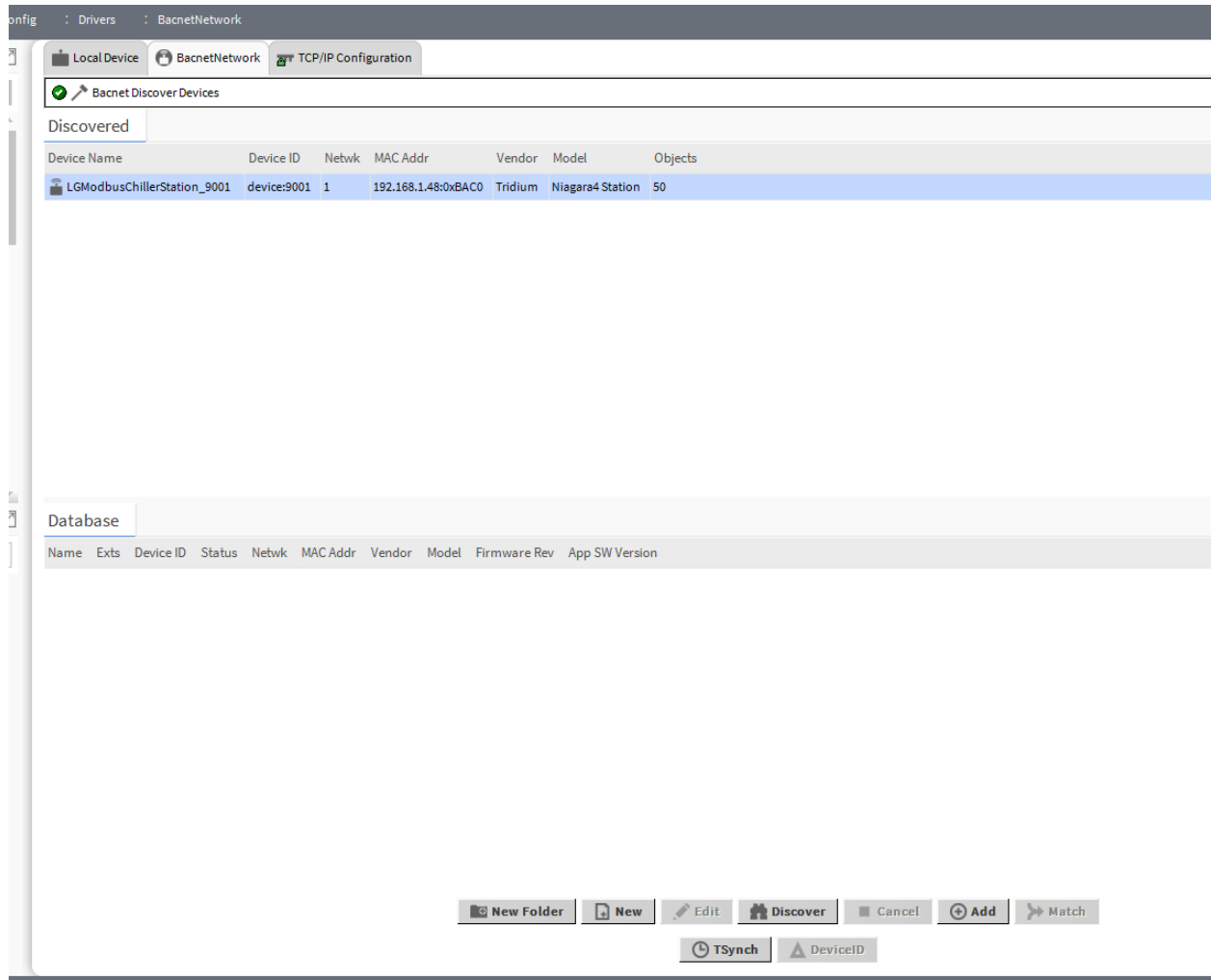
The 'Files' pane at the bottom left is empty. The right pane shows the 'Property Sheet' for the selected 'Local Bacnet Device [device:9001]'. The 'TCP/IP Configuration' tab is active, displaying the following settings:

- Monitor**: Ping Monitor
- History Policies**: History Network Ext
- Bacnet Comm**: Bacnet Stack
 - Comm Control**: Enable
 - Client**: Bacnet Client Layer
 - Server**: Bacnet Server Layer
 - Transport**: Bacnet Transport Layer
 - Network**: Bacnet Network Layer
- Router Table**: Bacnet Router Table
- Ip Port**: NetworkPort: id=1 net=1 enabled max=2...
 - Network Number**: 1
 - Link**: B/IP (192.168.1.48:0xBAC0) Standard
 - Adapter**: en1
 - Ip Address**: 192.168.1.48
 - Udp Port**: 0xBAC0
 - Ip Device Type**: Standard
 - Bbmd Address**: null
 - Registration Lifetime**: +000000h 15m 00s
 - Broadcast Distribution Table**: BDT: 0 entries
 - Foreign Device Table**: Foreign Device Table
 - Bbmd Debug**: false
 - Status**: {ok}
 - Fault Cause**:
 - Poll Service**: BacnetMultiPoll
 - Max Devices**: max
 - Enabled**: true
 - Port Id**: 1
 - Port Info**: Annex J IP
 - Routing Enabled**: true
 - Maintain Routing Enabled**: false
 - Minimum Router Update Time**: 500 ms
 - Router Discovery Timeout**: 5000 ms
 - Termination Time Value**: 120 s

The bottom status bar indicates 'Local Device Local Bacnet Device [device:9001]'.

SECTION VI: DISCOVERING THE LG CHILLER MODBUS EDGE10 FROM BMS OR BACNET SUPERVISOR

1. All steps in this section are applicable for a Niagara based BMS controller but the SI is not limited from integrating the LG EDGE10 Chiller device into any BMS system that supports BACnet/IP.
2. A BMS controller or supervisor capable of speaking BACnet/IP may be utilized to communicate with this LG EDGE10 running LGChillerModbusStation. Upon discovery of BACnet/IP devices from the BMS Controller, LG EDGE10 BACnet device is displayed. The example below is from a controller's BACnet network.



3. Add the device to the database.

Config Drivers BacnetNetwork

Local Device BacnetNetwork TCP/IP Configuration

Bacnet Discover Devices

Discovered

Device Name	Device ID	Netwk	MAC Addr	Vendor	Model	Objects
LGModbusChillerStation_9001	device:9001	1	192.168.1.48:0xBAC0	Tridium	Niagara4 Station	50

Database

Name	Exts	Device ID	Status	Netwk	MAC Addr	Vendor	Model	Firmware Rev	App SW Version
LGModbusChillerStation_9001		device:9001	{ok}	1	192.168.1.48:0xBAC0				

4. Go to Points and initiate BACnet discovery as shown below.

Config Drivers BacnetNetwork LGModbusChillerStation_9001 Points

Local Device Points TCP/IP Configuration

Bacnet Discover Points













Discovered

Object Name	Object ID	Property ID	Index	Value	Description
LGModbusChillerStation_9001	device:9001	systemStatus		Operational	Local BACnet Device object
LgChiller1_startStop	binaryOutput:1911	presentValue		Active	
LgChiller1_loadWaterFlowSwitch	binaryInput:1912	presentValue		Active	
LgChiller1_loadWaterPumpOutput	binaryInput:1913	presentValue		Active	
LgChiller1_entireOperationCircuit	analogInput:1914	presentValue		0.00	
LgChiller1_externalAirTemperature	analogInput:1915	presentValue		11756.48	
LgChiller1_failureCode	analogInput:1916	presentValue		0.00	
LgChiller1_coolingTargetTempSetting	analogValue:1918	presentValue		44.96	
LgChiller1_heatingTargetTempSetting	analogValue:1919	presentValue		77.00	
LgChiller1_accumulatedOperationTimeUpperLevel	analogInput:1920	presentValue		131070.00	
LgChiller1_accumulatedOperationTimeLowerLevel	analogInput:1921	presentValue		22914.00	
LgChiller1_OperationModeSetting_BacExp	multiStateInput:1917	presentValue		1	

Database

Name	Out	Object ID	Property ID	Index	Read	Write
------	-----	-----------	-------------	-------	------	-------

5. Add the points to the database using correct Write permissions as shown below.

Database						
Name	Out	Object ID	Property ID	Index	Read	Write
 LgChiller1_startStop	Start {ok} @ 14	binaryOutput:1911	Present Value	-1	Polled	OK
 LgChiller1_coolingTargetTempSetting	48 °F {ok} @ 14	analogValue:1918	Present Value	-1	Polled	OK
 LgChiller1_heatingTargetTempSetting	79 °F {ok} @ 14	analogValue:1919	Present Value	-1	Polled	OK
 LgChiller1_MaxOperatingFrequency_C	3 {ok} @ 14	analogValue:1129	Present Value	-1	Polled	OK
 LgChiller1_loadWaterFlowSwitch	Closed {ok}	binaryInput:1912	Present Value	-1	Polled	readonly
 LgChiller1_loadWaterPumpOutput	On {ok}	binaryInput:1913	Present Value	-1	Polled	readonly
 LgChiller1_entireOperationCircuit	0.0 A {ok}	analogInput:1914	Present Value	-1	Polled	readonly
 LgChiller1_externalAirTemperature	11756.5 °F {ok}	analogInput:1915	Present Value	-1	Polled	readonly
 LgChiller1_failureCode	0 {ok}	analogInput:1916	Present Value	-1	Polled	readonly
 LgChiller1_accumulatedOperationTimeUpperLevel	131070 min {ok}	analogInput:1920	Present Value	-1	Polled	readonly
 LgChiller1_accumulatedOperationTimeLowerLevel	23078 min {ok}	analogInput:1921	Present Value	-1	Polled	readonly
 LgChiller1_OperationModeSetting_BacExp	Cooling {ok}	multiStateInput:1917	Present Value	-1	Polled	readonly

6. Writable points can now be commanded at the correct priority level. Supported priority levels are 1 through 14.

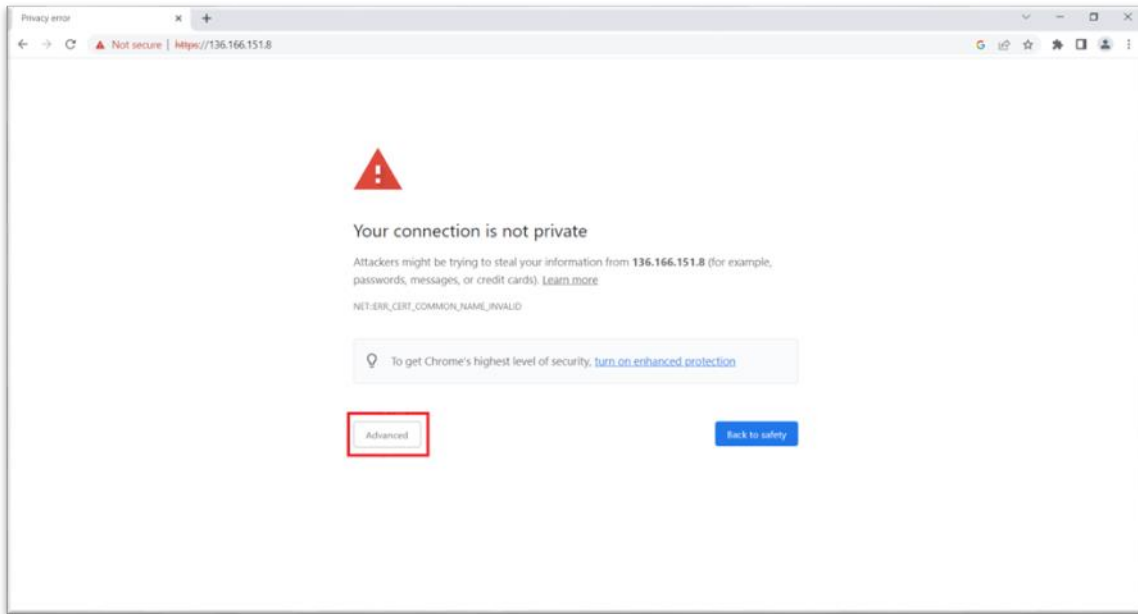
SECTION VII: CHILLER DASHBOARD GRAPHICAL INTERFACE

Introduction

The LG MultiSITE Edge10 Chiller Station v1.1 includes a Dashboard graphical interface accessible through a web browser. The Dashboard allows users to view live operation data as well as issue control commands. Chrome web browser is the recommended browser for using the Dashboard graphical interface. The following guide for using the dashboard assumes Chrome is being used. Other browsers may differ slightly in appearance or function.


Logging in to the Chiller Dashboard

1. To log into the Chiller Dashboard, navigate to the IP address of the MSE10 controller in the Chrome web browser.
2. The first time connecting to the dashboard the user will be prompted with a privacy warning. This prompt is displayed because the dashboard uses a secure connection, but the security certificate is not registered with a Certificate Authority. This warning may be ignored by clicking "Advanced," then "Proceed to <IP address of MSE10> (unsafe)." See images below.



- At the login screen, enter the station default user and password (user: system_admin, password: digital21).

LGModbusChillerStation_08122022

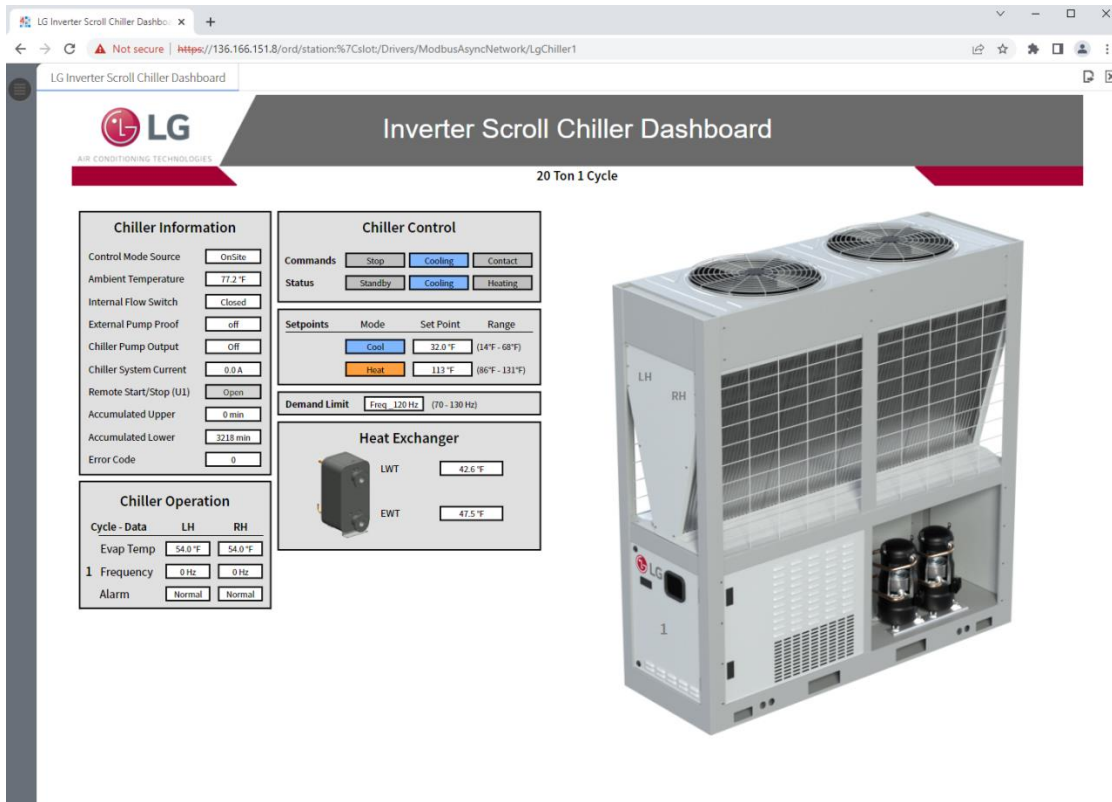
 Username:

[Change User](#)

Password:

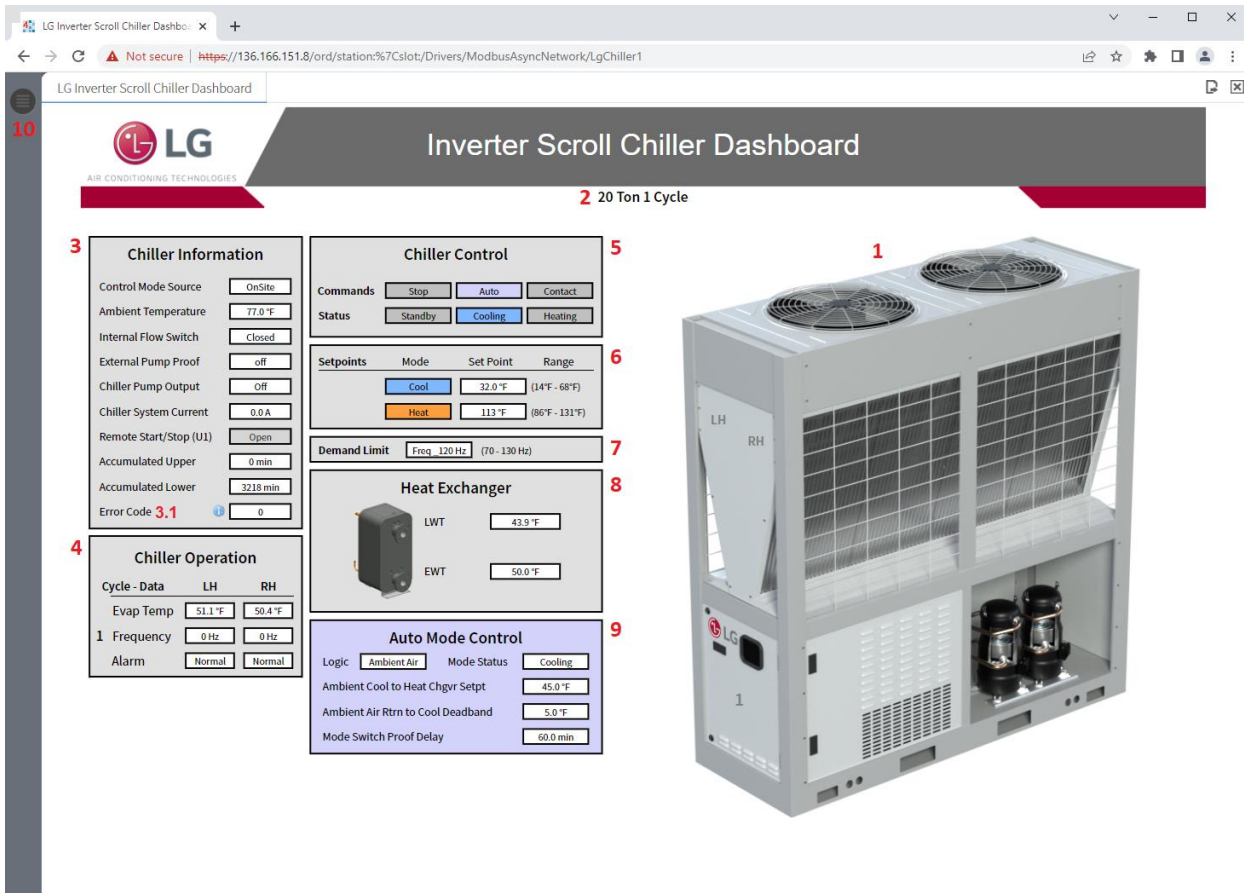
[Login](#)

- After successful login, the main dashboard graphic is displayed. See below.
Note: the chiller displayed in the graphic may be a 20 Ton, 40 Ton, or 60 Ton. Chiller size was initially set in Section 2, Step 3.2 (Cycle Setting).

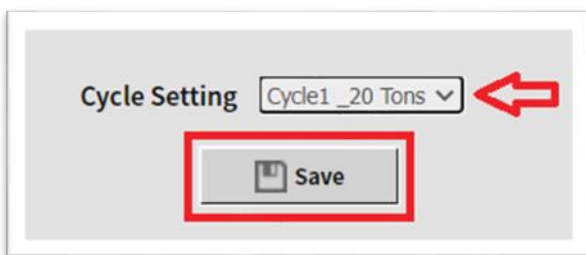


Chiller Dashboard Graphical Features and Functions

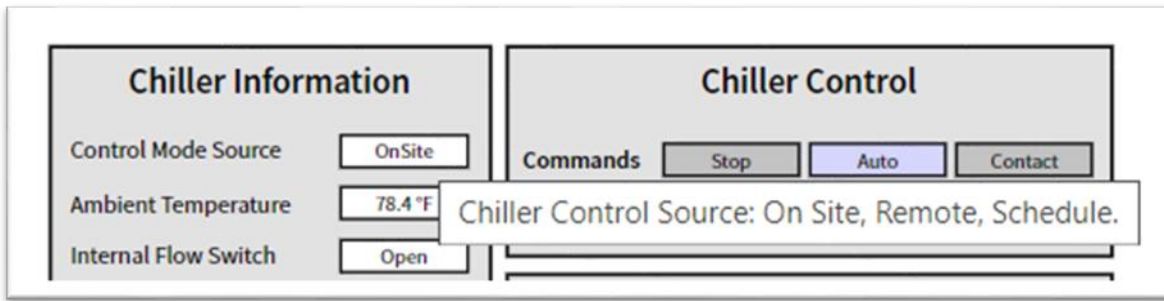
The Chiller Dashboard has many features and functions. Each feature is numbered in red in the image below. See corresponding description number for details on each feature and function.



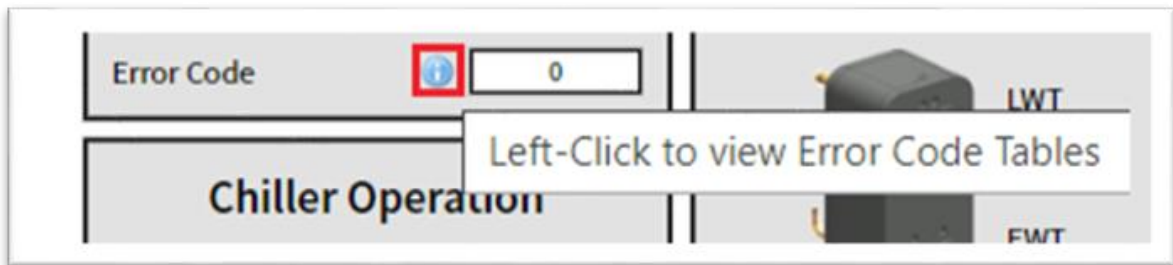
- 1. Animated Graphic:** Chiller image will vary based on the selected size (20 Ton 1 Cycle, 40 Ton 2 Cycle, 60 Ton 3 Cycle). Chiller image fans and compressors will animate based on chiller operation.
- 2. Chiller Size Title Bar:** Displays currently selected chiller size. To change chiller size, left-click on the current size in the title bar. In the resulting pop-up window select the size, then click "Save." See images below.



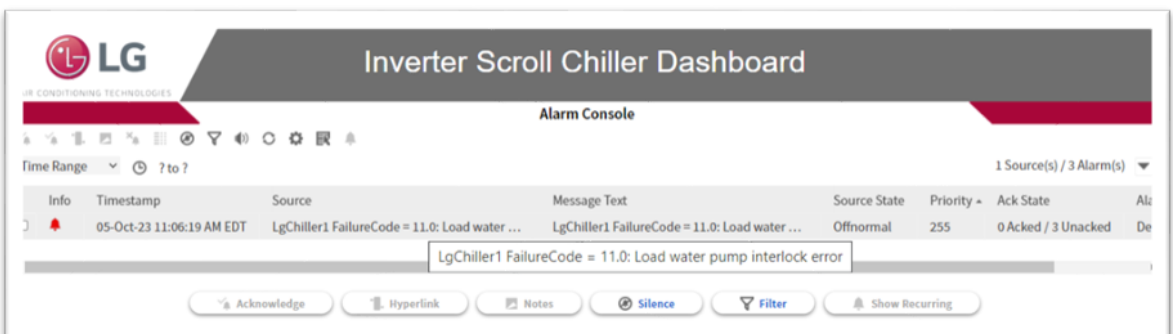
- 3. Chiller Information:** Displays chiller general status data. Hovering over a status point displays an informational pop up. Some informational pop ups include functional instruction. See images below.



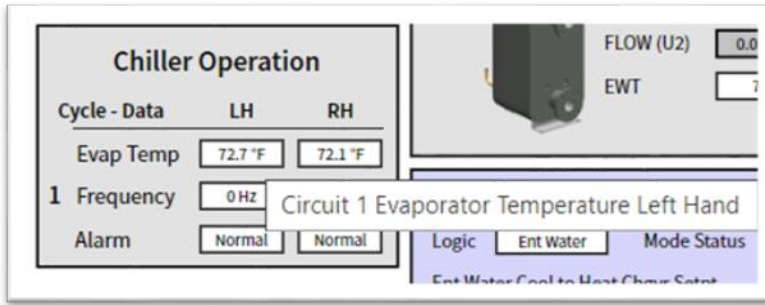
- 3.1. Error Code:** Displays error codes that are reported by the chiller. See notes and images below for error code features.
- a) Left-click the information button to open a table that displays all error codes and descriptions for each. See image below.



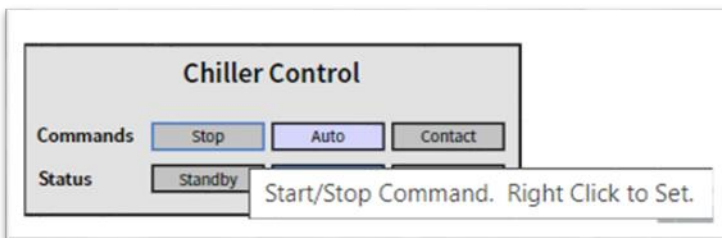
- b) Hover over the Error Code box to display an informational pop up that includes the error code description. Left-click on the error code box to navigate to the Alarm Console. Error codes recorded in the Alarm Console will also include the Error Code description. See images below.



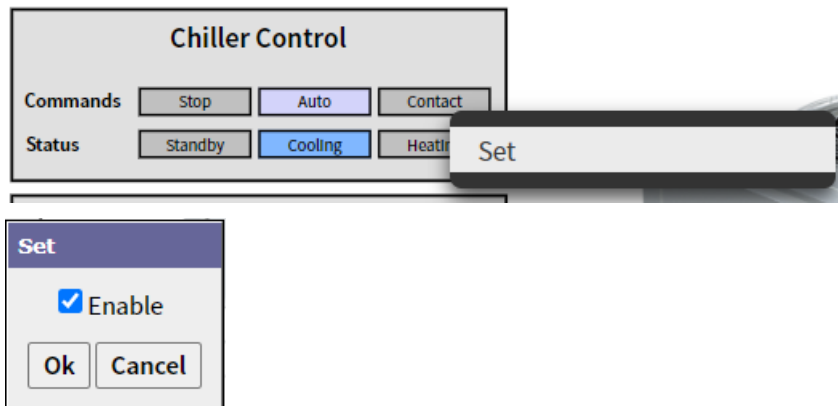
- 4. Chiller Operation:** Displays chiller cycle specific operation data. Hovering over a status point displays an informational pop up. Informational pop ups specify Left or Right side circuit operation data. See image below. See chiller graphic for detail on how to find Left and Right sides of the circuit.

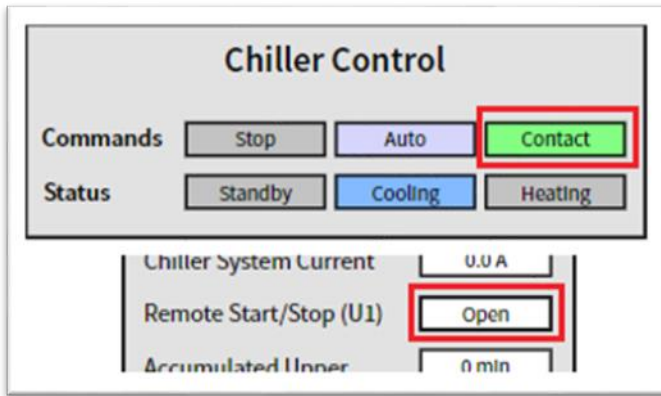


5. **Chiller Control:** Displays chiller command point control for Start/Stop, Mode, and Remote Contact. Hovering over a status point displays an informational pop up. Informational pop ups give more detailed descriptions and include instructions on how to adjust a command point or enable a function. When command points are enabled, background color of the control point changes from gray (disabled) to colored (enabled). See image below.

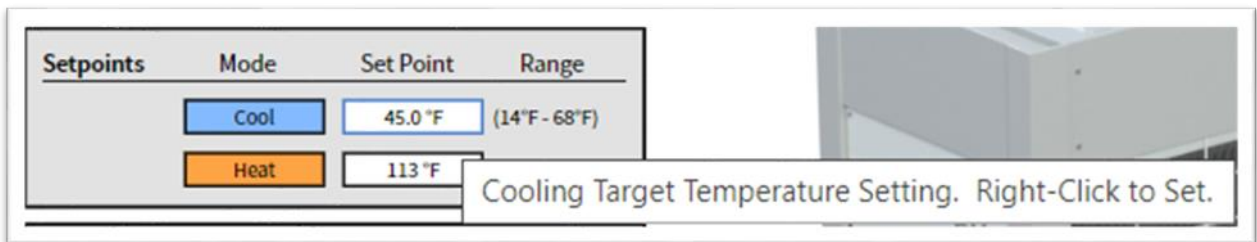


- 5.1. **Remote Contact Mode:** The Chiller MSE10 controller can accept a remote contact signal (dry contact) from a third party BMS wired to UI1. When the contact is closed, the chiller is commanded to “Start.” When the contact is open, the chiller is commanded to “Stop.” To enable this feature, right click on the “Contact” button, set to “Enable,” then click “Ok.” When Remote Contact Mode is Enabled, the background color changes to green and the status point in Chiller Status changes from gray to white background. See images below.

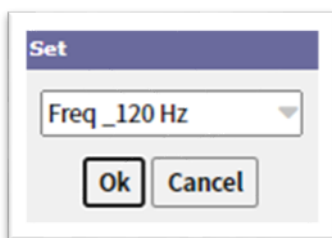
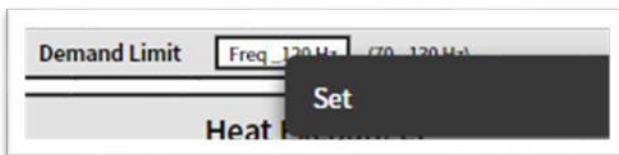




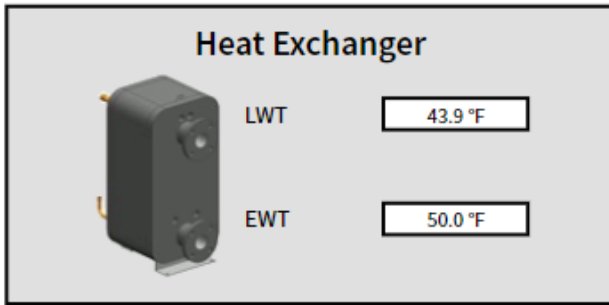
6. **Setpoints:** Displays setpoint control for Cooling Target Temperature and Heating Target Temperature. Hovering over a setpoint control button displays an informational pop up. Right click to change setpoint(s). See image below.



7. **Demand Limit:** Displays maximum operating frequency set in the chiller. Right-Click to change setpoint. See images below.

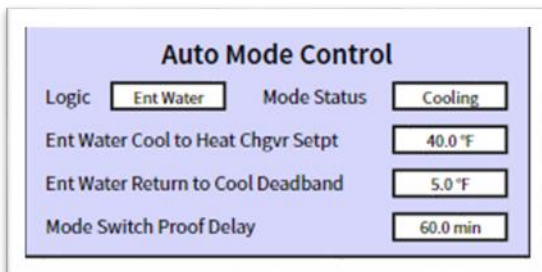
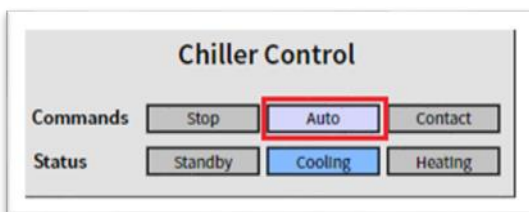
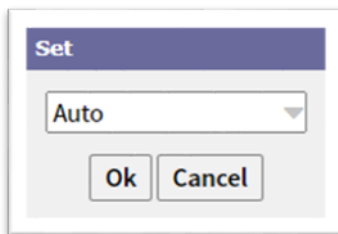
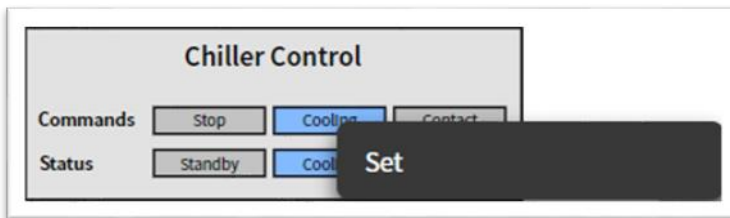


8. **Heat Exchanger:** Displays heat exchanger information including Leaving Water Temperature (LWT) and Entering Water Temperature (EWT). See image below.

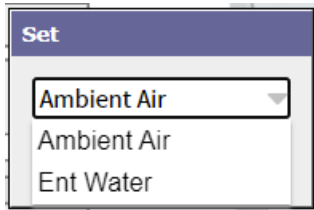


9. **Auto Mode Control:** The Chiller MSE10 controller can automatically change the chiller control mode from Cooling to Heating when control mode is set to “Auto” in the Chiller Control panel. To enable Auto Mode Control, right click on the Mode button in Chiller Control, set to “Auto,” then click “Ok.” When Auto mode is enabled, the Mode button in Chiller Control changes to light purple and the Auto Mode Control panel displays. See images below.

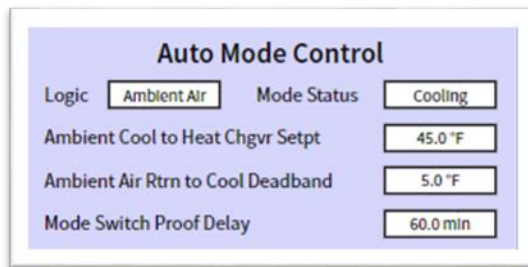
Note: Auto Mode Control panel is hidden when chiller is in normal Cooling or Heating modes.



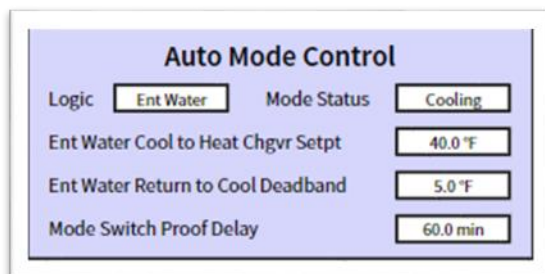
- 9.1. Auto Mode Control Panel:** Auto Mode Control has two control options: Entering Water Temperature and Ambient Air Temperature. To set the control mode, right click on the Logic control button, set the mode, then click “Ok.” See image below.



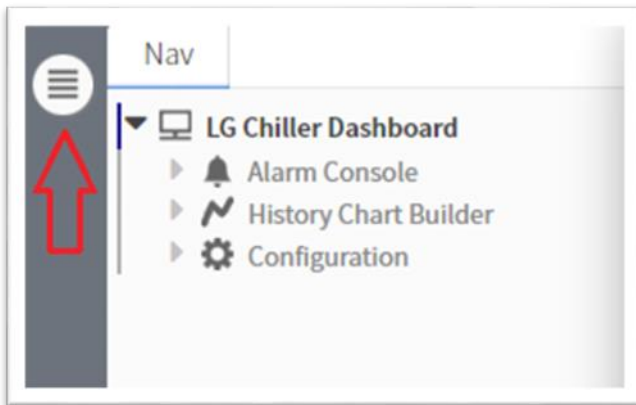
- 9.2. Ambient Air Control:** When Auto Mode Control is set to “Ambient Air,” the chiller automatically changes over from Cool mode to Heat mode when Outside Air Temperature is less than “Ambient Cool to Heat Changeover Setpoint” (default = 45°F) for the “Mode Switch Proof Delay” time delay setpoint (default 60 minutes). Example: Outside Air Temperature < 45°F for 60 minutes, Heating Mode Enable. Chiller returns to Cooling Mode (from Heating Mode) when Outside Air Temperature rises above the “Ambient Cool to Heat Changeover Setpoint” plus deadband (Ambient Air Return to Cool Deadband = 5°F default). Example: Outside Air Temperature > 50°F (45°F + 5°F). See image below.



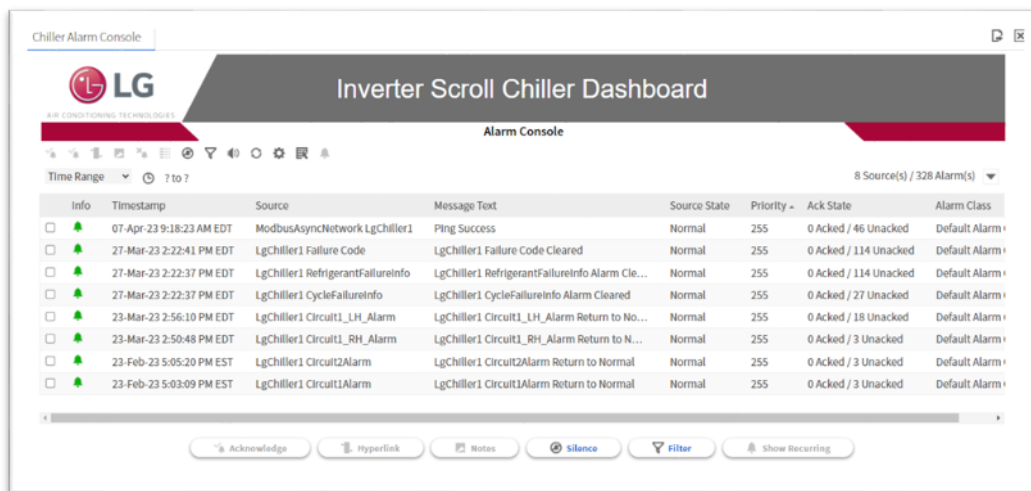
- 9.3. Entering Water Control:** When Auto Mode Control is set to “Ent Water,” the chiller automatically changes over from Cool mode to Heat mode when chiller Entering Water Temperature is less than “Ent Water Cool to Heat Chgvr Setpt” (default = 40°F) for the “Mode Switch Proof Delay” time delay setpoint (default 60 minutes). Example: Chiller Entering Water Temperature < 40°F for 60 minutes, Heating Mode Enable. Chiller returns to Cooling Mode (from Heating Mode) when Entering Water Temperature rises above the “Ent Water Cool to Heat Chgvr Setpt” plus deadband (Ent Water Return to Cool Deadband = 5°F default). Example: Chiller Entering Water Temperature > 45°F (40°F + 5°F). See image below.



- 10. Navigation Menu:** Opens the Dashboard Navigation Menu. Click on the circle with four lines icon in the top left corner of the Dashboard to access. Within the Navigation Menu, there are Alarm Console, History Chart Builder, and Configuration icons. Double click an icon to access the menu item. See image below.



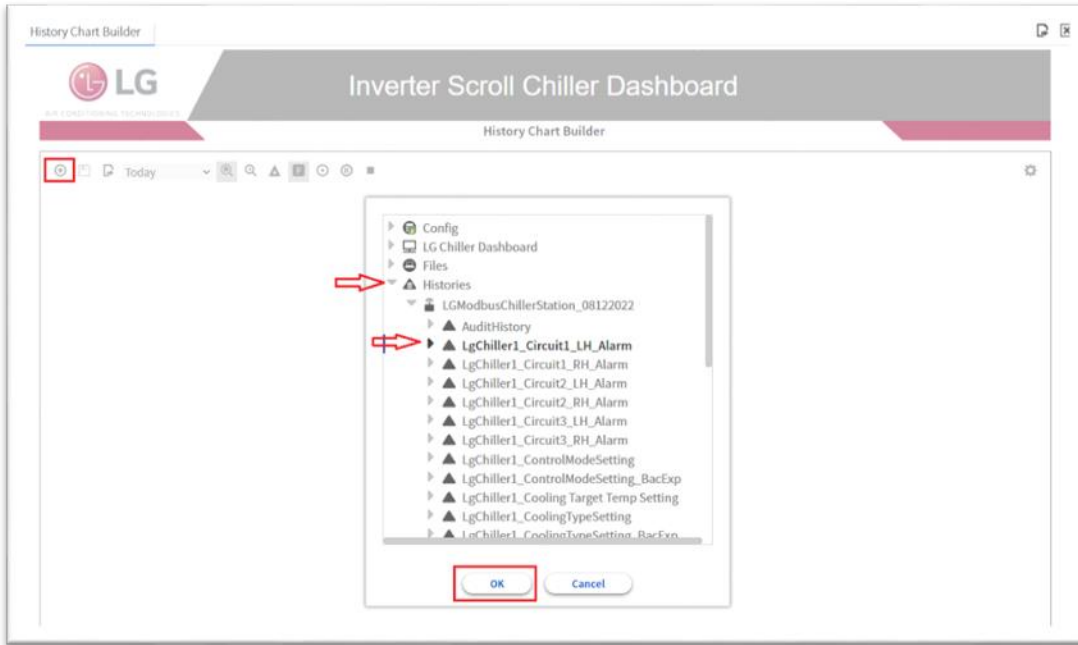
- 10.1. Alarm Console:** Displays current and historical alarm data. Provides an interface for users to manage alarm data in the chiller station. See image below.



- 10.2. History Chart Builder:** Provides an interface for users to create history charts and view historical data for chiller data points with history extensions. To create a history chart, add points by clicking the plus (+) button in the top left-hand corner, navigate to the Histories directory, select a history point, then click “OK.” For more information on History Charts, see Niagara Help Document “[Using Web Charts.](#)” See history points list and chart builder image below.

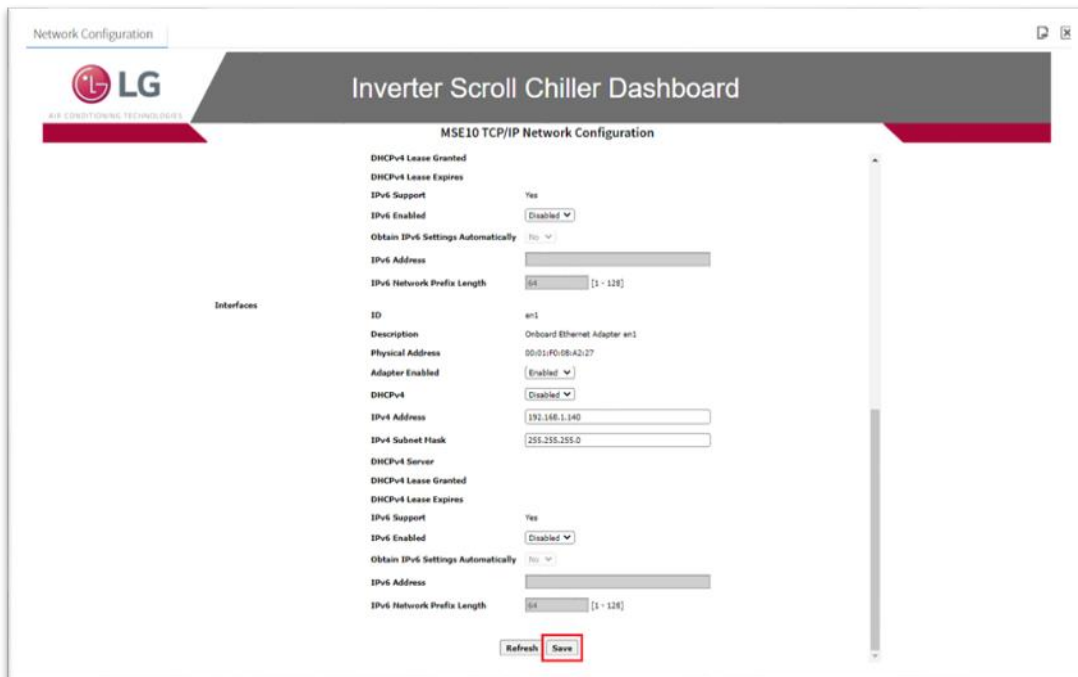
- 1) Circuit 1 LH Alarm
- 2) Circuit 1 RH Alarm
- 3) Circuit 2 LH Alarm
- 4) Circuit 2 RH Alarm
- 5) Circuit 3 LH Alarm
- 6) Circuit 3 RH Alarm
- 7) Common Load Water Input Temperature
- 8) Common Load Water Output Temperature

- 9) ControlModeSetting
- 10) ControlModeSetting_BacExp
- 11) Cooling Target Temp Setting
- 12) CoolingTypeSetting
- 13) CoolingTypeSetting_BacExp
- 14) Cycle 1 4WayValve1
- 15) Cycle1 EvapTemp Left
- 16) Cycle 1 Evap Temp Right
- 17) Cycle 1 Inverter Comp1Op
- 18) Cycle 1 Inverter Comp2Op
- 19) Cycle 1 Inverter Comp1Freq
- 20) Cycle 1 Inverter Comp2Freq
- 21) Cycle 1 Main EEV Status Left
- 22) Cycle 1 Main EEV Status Right
- 23) CycleFailureInfo_Hist
- 24) External Air Temperature
- 25) Heating Target Temp Setting
- 26) Load Water Flow Switch
- 27) Load Water Pump Output
- 28) LoadWaterPumpInterlock
- 29) MaxOperatingFrequency
- 30) MaxOperationgFrequency_BacExp
- 31) OperationModeSetting
- 32) OperationModeSetting_BacExp
- 33) OperationgModeSetting_C
- 34) RefrigerantFailureInfo_Hist
- 35) RemoteModeSetting
- 36) RemoteModeSetting_BackExp
- 37) Start Stop
- 38) failureCode_Hist



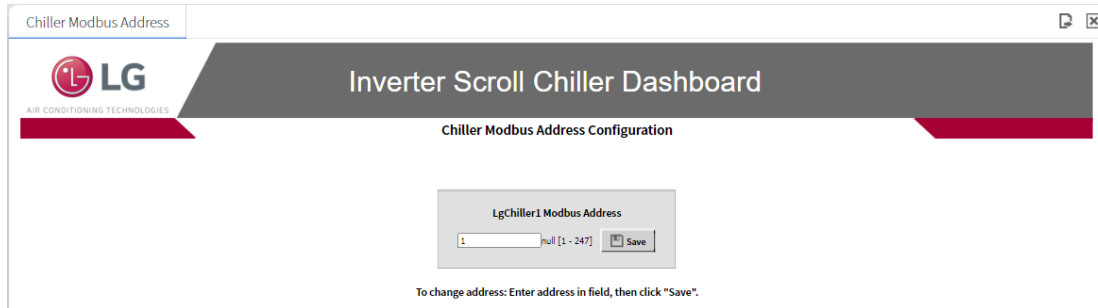
10.3. Configuration/Network Configuration: Provides an interface for users to edit MSE10 network configuration.

Note: After network settings are edited, click “Save.” Network configuration changes may require reboot. See image below.



10.4. Configuration/Chiller Modbus Address: Provides an interface for users to edit the Chiller device address in the MSE10.

Note: After the Chiller address is edited, click “Save”. See image below.



The screenshot shows a web interface titled "Inverter Scroll Chiller Dashboard". At the top left is the LG logo with "AIR CONDITIONING TECHNOLOGIES" underneath. The main heading is "Inverter Scroll Chiller Dashboard". Below this is a section titled "Chiller Modbus Address Configuration". Inside this section is a box labeled "LgChiller1 Modbus Address". It contains a text input field with the number "1", a label "null [1 - 247]", and a "Save" button. Below the box, a note reads: "To change address: Enter address in field, then click 'Save'."

APPENDIX I: BACNET EXPORT POINTS

Object Name	Object Type	Modbus Device Address(Example)	Base Assignment	BACnet Inst Num	BACnet Writable
LgChiller1_startStop	Binary Output	1	911	1911	in1 through in14
LgChiller1_loadWaterFlowSwitch	Binary Input	1	912	1912	no
LgChiller1_loadWaterPumpOutput	Binary Input	1	913	1913	no
LgChiller1_entireOperationCircuit	Analog Input	1	914	1914	no
LgChiller1_externalAirTemperature	Analog Input	1	915	1915	no
LgChiller1_failureCode	Analog Input	1	916	1916	no
LgChiller1_coolingTargetTempSetting	Analog Value	1	918	1918	in1 through in14
LgChiller1_heatingTargetTempSetting	Analog Value	1	919	1919	in1 through in14
LgChiller1_accumulatedOperationTimeUpperLevel	Analog Input	1	920	1920	no
LgChiller1_accumulatedOperationTimeLowerLevel	Analog Input	1	921	1921	no
LgChiller1_OperationModeSetting_BacExp	Multi State Input	1	917	1917	no
LgChiller1_LoadWaterPumpInterlock	Binary Input	1	120	1120	no
LgChiller1_ControllerVersion	Analog Input	1	121	1121	no
LgChiller1_CommonLoadWaterOutputTemperature	Analog Input	1	122	1122	no
LgChiller1_CommonLoadWaterInputTemperature	Analog Input	1	123	1123	no
LgChiller1_RefrigerantFailureInfo	Analog Input	1	124	1124	no
LgChiller1_CycleFailureInfo	Analog Input	1	125	1125	no
LgChiller1_ControlModeSetting_BacExp	Multi State Input	1	126	1126	no
LgChiller1_RemoteModeSetting_BacExp	Multi State Input	1	127	1127	no
LgChiller1_CoolingTypeSetting_BacExp	Multi State Input	1	128	1128	no
LgChiller1_MaxOperatingFrequency_BacExp	Multi State Input	1	129	1129	no
LgChiller1_MaxOperatingFrequency_C	Analog Value	1	129	1129	in1 through in14
LgChiller1_Cycle1_4WayValve1	Binary Input	1	111	1111	no
LgChiller1_Cycle1_InverterComp1Op	Binary Input	1	112	1112	no
LgChiller1_Cycle1_InverterComp2Op	Binary Input	1	113	1113	no
LgChiller1_Cycle1_EvapTemp_Left	Analog Input	1	114	1114	no
LgChiller1_Cycle1_EvapTemp_Right	Analog Input	1	115	1115	no
LgChiller1_Cycle1_Inverter_Comp1_Freq	Analog Input	1	116	1116	no
LgChiller1_Cycle1_Inverter_Comp2_Freq	Analog Input	1	117	1117	no
LgChiller1_Cycle1_Main_EEV_Status_Left	Analog Input	1	118	1118	no
LgChiller1_Cycle1_Main_EEV_Status_Right	Analog Input	1	119	1119	no
LgChiller1_Cycle2_4WayValve1	Binary Input	1	211	1211	no
LgChiller1_Cycle2_InverterComp1Op	Binary Input	1	212	1212	no
LgChiller1_Cycle2_InverterComp2Op	Binary Input	1	213	1213	no
LgChiller1_Cycle2_EvapTemp_Left	Analog Input	1	214	1214	no
LgChiller1_Cycle2_EvapTemp_Right	Analog Input	1	215	1215	no
LgChiller1_Cycle2_Inverter_Comp1_Freq	Analog Input	1	216	1216	no
LgChiller1_Cycle2_Inverter_Comp2_Freq	Analog Input	1	217	1217	no
LgChiller1_Cycle2_Main_EEV_Status_Left	Analog Input	1	218	1218	no
LgChiller1_Cycle2_Main_EEV_Status_Right	Analog Input	1	219	1219	no
LgChiller1_Cycle3_4WayValve1	Binary Input	1	311	1311	no
LgChiller1_Cycle3_InverterComp1Op	Binary Input	1	312	1312	no
LgChiller1_Cycle3_InverterComp2Op	Binary Input	1	313	1313	no
LgChiller1_Cycle3_EvapTemp_Left	Analog Input	1	314	1314	no
LgChiller1_Cycle3_EvapTemp_Right	Analog Input	1	315	1315	no
LgChiller1_Cycle3_Inverter_Comp1_Freq	Analog Input	1	316	1316	no
LgChiller1_Cycle3_Inverter_Comp2_Freq	Analog Input	1	317	1317	no
LgChiller1_Cycle3_Main_EEV_Status_Left	Analog Input	1	318	1318	no
LgChiller1_Cycle3_Main_EEV_Status_Right	Analog Input	1	319	1319	no
LgChiller1_OperationModeSetting_C	Analog Value	1	917	1917	in1 through in14
LgChiller1_failureCode_Hist	trendLog	1	NA	0	
LgChiller1_RefrigerantFailureInfo_Hist	trendLog	1	NA	1	
LgChiller1_CycleFailureInfo_Hist	trendLog	1	NA	2	

LG Customer Information Center, Commercial Products

1-888-865-3026 USA

Follow the prompts for commercial A/C products and parts.



LG Electronics, U.S.A., Inc.
Air Conditioning Technologies
4300 North Point Parkway
Alpharetta, Georgia 30022
www.lghvac.com

UM_Chiller_to_PBASE10_Modbus_10_23
Supersedes: UM_Chiller_to_PBASE10_Modbus_05_23
UM_Chiller_to_PBASE10_Modbus_09_22