



LG AIR-COOLED COOLING ONLY INVERTER SCROLL CHILLER

INSTALLATION AND OWNERS MANUAL



Cooling Only
20 Tons, 460V Model

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Content familiarity is required for proper installation.**

The instructions included in this manual must be followed to prevent product malfunction, property damage, injury, or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described by the summary list of safety precautions on page 4.

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SAFETY PRECAUTIONS


The instructions below must be followed to prevent product malfunction, property damage, injury or death to the user or other people. Incorrect operation due to ignoring any instructions will cause harm or damage. The level of seriousness is classified by the symbols described below.


TABLE OF SYMBOLS


 DANGER	<i>This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</i>
 WARNING	<i>This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</i>
 CAUTION	<i>This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</i>
Note:	<i>This symbol indicates situations that may result in equipment or property damage accidents only.</i>
	<i>This symbol indicates an action that should not be performed.</i>

INSTALLATION


DANGER

 **Do not store or use flammable gas or combustibles near the chiller.**
There is risk of fire, explosion, and physical injury or death.

 **Do not install the chiller in an environment with oil, steam, sulfuric smoke, etc.**
There is risk of fire, explosion, and physical injury or death.

 **Do not supply power to the chiller until all wiring and piping are completed or reconnected and checked.**
There is risk of physical injury or death due to electric shock.


WARNING

 **Do not allow the end user to install or remove the chiller. The dealer or a trained technician must install the chiller.**
Improper installation will result in fire, explosion, electric shock, physical injury or death.

The information contained in this manual is intended for use by an LG trained service technician.
Failure to carefully read and follow all instructions will result in fire, electric shock, explosion, physical injury or death.

For replacement of an installed unit, always contact an LG trained service provider.
There is risk of fire, electric shock, explosion, and physical injury or death.

Wear protective gloves when handling equipment. Sharp edges will cause personal injury.

 **Do not change the settings of the protection devices.**
If the protection devices have been bypassed or are forced to operate improperly, or parts other than those specified by LG are used, there is risk of fire, electric shock, explosion, and physical injury or death.


Replace all control box and panel covers.
If cover panels are not securely installed, dust, water, and animals will enter the outdoor unit, causing fire, electric shock, and physical injury or death.

Always check for system refrigerant leaks after the unit has been installed or serviced.
Exposure to high concentration levels of refrigerant gas will lead to illness or death.

If the chiller is installed in a small space, take measures to prevent the refrigerant concentration from exceeding safety limits in the event of a refrigerant leak.
Consult the latest edition of American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 15. If the refrigerant leaks and safety limits are exceeded, it could result in personal injuries or death from oxygen depletion.

Dispose of the packing materials safely.
 • *Packing materials, such as nails and other metal or wooden parts, will cause puncture wounds or other injuries.*
 • *Tear apart and throw away plastic packaging bags; there is a risk of suffocation and death.*

Install the chiller in a safe location where nobody can step on, fall onto it, or place objects on it.
It will result in an accident that causes physical injury or death.

When installing or if moving the chiller to another site,  do not charge it with a different refrigerant from the one specified.
If a different refrigerant is used, or if air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the product may be damaged.

SAFETY PRECAUTIONS

⚠ WARNING

Properly install and insulate the drain piping to ensure water is drained away properly.

Improper installation can cause water to leak, generating a slippery surface that risks physical injury.

Install the unit considering the potential for strong winds or earthquakes.

Improper installation will cause the unit to fall over, resulting in physical injury or death.

⚠ CAUTION

Be very careful when transporting the product. There is a risk of the product falling and causing physical injury.

- Use appropriate moving equipment (forklift, spreader bar, etc.) to transport each chiller; ensure the equipment is of the correct material and capable of supporting the weights listed.
- Some products use polypropylene bands for packaging. Ⓞ Do not use polypropylene bands to lift the unit.
- Support the chiller at specified positions to avoid slipping out of the rigging apparatus. Ensure that the load of the chiller is evenly distributed and level during the move.
- Ⓞ Do not touch the heat exchanger fins during transport; there is a risk of physical injury.

Note:

The Limited Warranty will be null and void, and LG Electronics will not be responsible and will have no liability to any customer or third party to the extent any of the following occur: acts, omissions, and conduct of any and all third parties including, but not limited to, the installing contractor and any repairs, service or maintenance by unauthorized or unqualified personnel.

The information contained in the manual is intended for use by a qualified service technician familiar with safety procedures and equipped with the proper tools and test instruments. Failure to carefully read and follow all instructions in this manual can result in equipment malfunction, and / or property damage.

Ⓞ Do not install the chiller where it is exposed directly to ocean winds.

Sea salt in the air will cause the product to corrode. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

Ⓞ Do not install the chiller where there is an obstruction immediately above the unit. See installation clearances in this manual.

If there is an obstruction immediately above the chiller, it can deflect the discharge air, where it can be re-circulated into the condenser coil inlet, causing operation malfunction.

Properly install and insulate the drain piping to ensure water is drained away properly.

Improper installation can cause water to leak, causing a slippery surface condition and / or water damage.

Always check for system refrigerant leaks after the unit has been installed or serviced.

Low refrigerant levels will cause product failure.

Ⓞ Do not make refrigerant substitutions. Use only the refrigerant specified in this manual.

If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and damage will occur.

Ⓞ Do not store or use flammable gas/ combustibles near the unit.

There is a risk of product failure.

Ⓞ Do not install the chiller in an environment with oil, steam, sulfuric smoke, etc.

There is risk of a reduction in performance, malfunction, and / or product damage.

Ⓞ Do not use the chiller for mission critical or special purpose applications such as preserving foods, works of art, or other precision air conditioning applications. The equipment is designed to provide comfort cooling and heating.

There is risk of property damage.

Keep the chiller level / upright during installation to avoid vibration and / or water leaks.

When installing the chiller near a hospital, mechanical room, or similar electromagnetic field (EMF) sensitive environment, provide sufficient protection against electrical noise.

Inverter equipment, power generators, high-frequency medical equipment or radio communication equipment will cause the chiller to operate improperly. The chiller will also affect such equipment by creating electrical noise that disturbs medical treatment or image broadcasting.

Ⓞ Do not touch the heat exchanger fins; there is a risk of product damage and malfunction.

When connecting refrigerant piping, remember to allow for pipe expansion.

Improper piping installation will cause system malfunction.

Ⓞ Do not install the chiller in a noise-sensitive area, or where hot air could damage surrounding structures.

Install the chiller in a safe location where no one can step on or fall onto it. Ⓞ Do not install the unit on a defective stand.
There is a risk of unit and property damage.

Install the drain hose to ensure adequate drainage.
There is a risk of water leakage and property damage.

SAFETY PRECAUTIONS

WIRING


DANGER

High voltage electricity is required to operate chiller. Adhere to the U.S. National Electric Codes (NEC) and these instructions when wiring.


Improper connections and inadequate grounding can cause accidental injury or death.



Always ground the unit following local, state, and NEC codes.
There is risk of fire, electric shock, and physical injury or death.

Turn the power off before servicing the chiller. Ensure the power is completely off and out of all components.
Electrical shock can cause physical injury or death.

 Do not supply power to the unit until all electrical wiring, controls wiring, piping installation, and refrigerant system evacuation are completed.
There is risk of fire, electric shock, and physical injury or death.

Properly size all circuit breakers, fuses and power wiring.
There is risk of fire, electric shock, explosion, physical injury or death if the electrical components are too small.

 Do not share the electrical circuit with other devices. Ensure the chiller(s) has/have dedicated circuit(s) and breaker(s).
There is risk of fire, electric shock, and physical injury or death due to heat generation.

 Do not use damaged or loose power wiring.  Do not modify or extend the chiller's power wiring. Ensure that the power wiring will not be pulled nor weight be placed on the power wiring during operation.
There is risk of fire, electric shock, and physical injury or death.

WARNING

The information contained in this manual is intended for use by an industry-qualified, experienced, trained electrician familiar with the NEC who is equipped with the proper tools and test instruments.
Failure to carefully read and follow all instructions in this manual can result in personal injury or death.

All field wiring and component installation must be performed by a licensed electrician and conform to local building codes or, in the absence of local codes, with the NEC, and the instructions and wiring diagrams given in this manual.


If the power source capacity is inadequate or the electric work is not performed properly, it will result in fire, electric shock, physical injury or death.

Refer to local, state, and federal codes, and use power wires of sufficient current capacity and rating.
Wires that are too small will generate heat and cause a fire, and physical injury or death.


Secure all field wiring connections with appropriate wire strain relief.
Improperly securing wires will create undue stress on equipment power connections. Inadequate connections will generate heat, cause a fire, and physical injury or death.

Ensure the system is connected to a dedicated power source that provides adequate power.
If the power source capacity is inadequate or the electric work is not performed properly, it will result in fire, electric shock, physical injury or death.

Properly tighten all power connections.
Loose wiring will overheat at connection points, causing a fire, physical injury or death.

 Do not change the settings of the protection devices.
If the protection devices have been bypassed or is forced to operate improperly, or parts other than those specified by LG are used, there is risk of fire, electric shock, explosion, and physical injury or death.

Note:

 Do not supply power to the unit until all electrical wiring, controls wiring, piping installation, and refrigerant system evacuation are completed.
The system will malfunction.

The information contained in this manual is intended for use by an industry-qualified, experienced, licensed electrician familiar with the NEC who is equipped with the proper tools and test instruments.
Failure to carefully read and follow all instructions in this manual can result in equipment malfunction and property damage.

OPERATION

⚠ DANGER

Service on this equipment is to be performed by an industry-qualified, experienced, trained technician familiar with operation, routine checks, maintenance, cleaning, safety hazards, and troubleshooting procedures.

Failure to follow all instructions can result in personal injury or death.

⊘ Do not allow unauthorized personnel to operate, clean, and maintain the chiller. Keep unauthorized and / or untrained personnel away from the chiller.

There is risk of fire, explosion, and physical injury or death.

⊘ Do not provide power to or operate the unit if it is flooded or submerged.

There is risk of fire, electric shock, physical injury or death.

Use a dedicated breaker for this product.

There is risk of fire, electric shock, physical injury or death.

⊘ Do not operate the disconnect switch with wet hands.

There is risk of fire, electric shock, physical injury or death.

Periodically verify that the equipment mounts nor the installation area have not deteriorated.

If the mounts or area collapse, the chiller could fall and cause physical injury or death.

Use inert (nitrogen) gas when performing leak tests or air purges. ⊘ Do not use compressed air, oxygen, or flammable gases. Using these substances will cause fire, explosion, and physical injury or death.

If refrigerant leaks, ventilate the area before operating the unit.

If the chiller is mounted in an enclosed, low-lying, or poorly ventilated area, and it develops a refrigerant leak, it will cause a fire, electric shock, explosion, physical injury or death.

⚠ WARNING

⊘ Do not allow water, dirt, or animals to enter the unit.

There is risk of fire, electric shock, physical injury or death.

⊘ Do not operate the chiller with the panel(s) or protective cover(s) removed; keep fingers and clothing away from moving parts.

The rotating, hot, cold, and high-voltage parts of the unit can cause physical injury or death.

⊘ Do not touch the refrigerant piping during or after operation, or when checking the valves.

It can cause burns or frostbite.

⊘ Do not open the inlet or touch the electrostatic filter (if so equipped) during operation.

There is risk of electric shock, physical injury or death.

⊘ Do not insert hands or other objects in the air inlets or outlets while power is supplied to the chiller.

Chiller has sharp and moving parts that will cause physical injury.

Qualified personnel must provide water circuit freeze protection. Follow industry standards and local, state, and federal when choosing and handling an antifreeze additive.

If the water circuit freezes, the piping may burst and cause physical injury or death.

⚠ CAUTION

To avoid physical injury, use caution when cleaning or servicing the chiller.

There is risk of electric shock, physical injury or death.

Note:

Service on this equipment is to be performed by an industry-qualified, experienced, trained technician familiar with operation, routine checks, maintenance, cleaning, safety hazards, and troubleshooting procedures.

Failure to follow all instructions can result in product malfunction.

Clean up the site after servicing is finished, and check that no metal scraps, screws, or bits of wiring have been left inside or surrounding the chiller.

⊘ Do not use the product for mission critical or special purpose applications such as preserving food, works of art, or other precision air conditioning applications. The equipment is designed to provide comfort cooling and heating.

There is risk of property damage.

⊘ Do not allow water, dirt, or animals to enter the unit.

There is risk of unit failure.

⊘ Do not open the inlet or touch the electrostatic filter (if so equipped) during operation.

There is risk of unit failure.

⊘ Do not operate the chiller with the panel(s) or protective cover(s) removed; keep fingers and clothing away from moving parts.

Non-secured covers can result in malfunction due to dust or water.

Provide power to the chiller at least six (6) hours before operation begins.

Starting operation immediately after turning on the main power switch will result in severe damage to internal components. Keep the power switch on during the operational season.

⊘ Do not turn off the main power switch immediately after operation has been stopped.

Wait at least five (5) minutes before turning off the main power switch, otherwise it will result in product malfunction and / or damage.

If re-operating the chiller after it has been in low temperature condition for an extended period, the touch function temporarily may not work. Wait, and after time, the product will function normally.

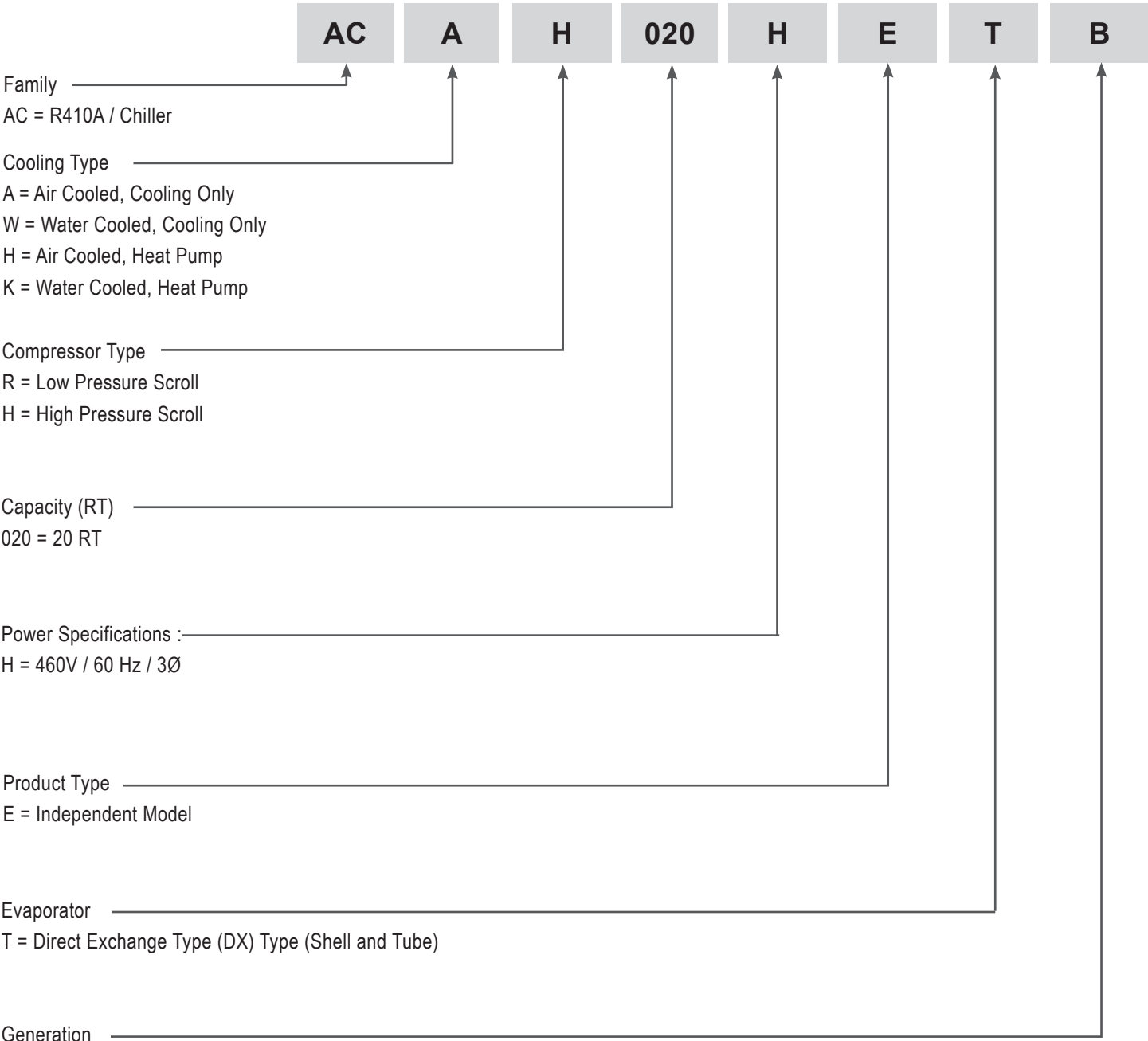
⊘ Do not block the inlet or outlet.

Chiller will malfunction.

Qualified personnel must provide water circuit freeze protection. Follow industry standards and local, state, and federal when choosing and handling an antifreeze additive.

If the water circuit freezes, it can cause product damage. Also, an improper antifreeze additive can damage copper piping.

UNIT NOMENCLATURE



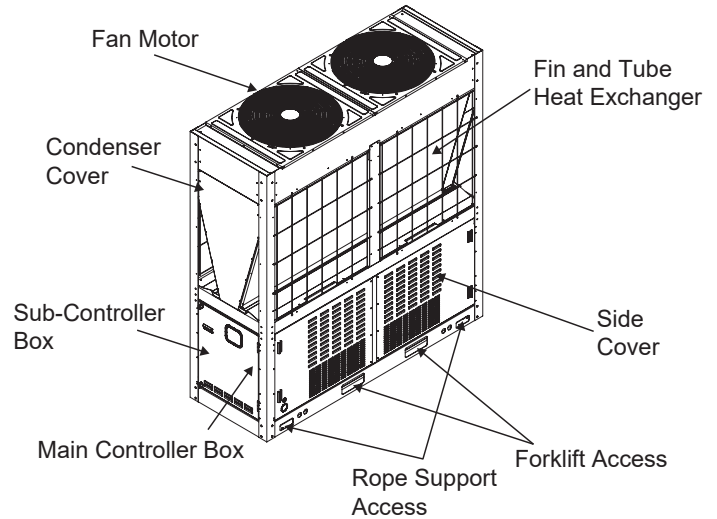
General Information

LG Electronic's Inverter Scroll Chillers provide chilled water for cooling-only, commercial air conditioning systems using air-handling units, fan coil units, etc. The single frame 20-ton ACAH chiller uses R410A refrigerant, applies air-cooled condenser technology; includes scroll compressors, electronic expansion valves, evaporator, and LG Human Machine Interface (HMI); and is designed for outdoor installation.

The ACAH chiller series includes two (2) scroll compressors to form two (2) refrigerant cycles. Up to five (5) chillers can be interlocked through LG's CH3 A and B 2-wire control bus.

LG includes inverter technology in its scroll compressors and air-cooled condenser fan motors to provide efficient operation at high loads and in all operating areas. ACAH chillers also feature electronic expansion valves, evaporators with shell-and-tube heat exchangers (connected to the chilled water side), and condensers with air-cooled fin-and-tube heat exchangers. Each refrigerant cycle includes check valves, electronic expansion valves, refrigerant check valves, and strainers. Human Machine Interface (HMI) controllers, built within the ACAH chiller itself, applies LG's unique control logic to monitor all parameters controlling the operation. These parameters can be controlled to improve operational efficiency, and can continuously supply chilled water by adjusting to the environment.

Figure 1: Example of an LG Chiller.



Cooling Cycle

ACAH chillers feature high-pressure type scroll compressors. The suction vapor is separated from the high-pressure discharge area, and the motor is installed on the low-pressure vapor area. The motor and refrigerant storage are located in the low-pressure vapor area to increase liquid compression reliability.

Because the suction refrigerant vapor cools the motor and flows onward to the compressor, a separate device to cool the compressor is not required. Inside the system, oil to lubricate the compressor is mixed with the refrigerant, and both the oil and refrigerant discharges during operation. Discharged compressor oil can reduce the heat transfer efficiency if a thick layer builds up on interior walls of the condenser and evaporator, so a device to prevent the refrigerant and oil to be discharged together is installed.

This lubrication system ensures longer life for the compressor, improves compression sealing, and provides lower sound operation. The condenser is designed with a V-shaped heat exchanger, and an electronic expansion valve is used for efficient control in all load conditions. The controller in the chiller is an LG exclusive, and monitors the different sensors installed to provide product protection.

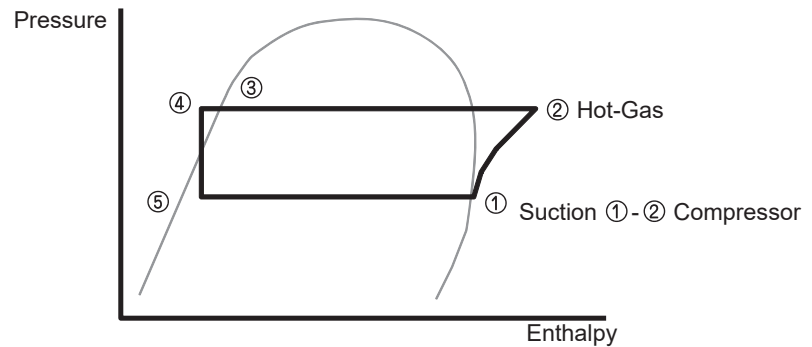
For continuous supply of water, LG chillers are equipped with maximum continuous operation functions, and also provide precision control to supply the targeted water volumes. Protection devices will immediately stop the chiller if the operation malfunctions, or a condition limit is reached. In case of an operation malfunction, the chiller controller will display error codes to the authorized LG service provider.

INTRODUCTION

Cooling Cycle Description

The cooling cycle of ACAH series can be described using the following pressure–enthalpy chart. ①, ②, ③, ④, and ⑤ in the following chart shows the conditions of the refrigerant. The refrigerant comes into the compressor motor and cools the motor, and becomes overheated and moves to the suction inlet of the compressor. The oil inside the compressor seals the gap between the compressor scrolls and provides lubrication for the bearing to help the compression of the refrigerant. During this time, the refrigerant is compressed and is discharged to the air cooled condenser. (②) The compressed refrigerant passes through the air cooled condenser and exchanges the heat with the outdoor air. The condensed refrigerant then passes the condenser to be overcooled. (② → ③ → ④). The refrigerant that passed through the condenser expands in the electronic expansion valve to flow to the evaporator. (④ → ⑤). The refrigerant is evaporated in the shell and tube type heat exchanger, the evaporator. (⑤ → ①). Liquid refrigerant of low temperature pressure passes through the evaporator to cool the water flowing into the evaporator and the refrigerant itself receives the heat to evaporate to gas condition. (①) The refrigerant continues to change the phase and continuously repeats the cooling cycle.

Figure 2: LG Chiller Pressure-Enthalpy Diagram.



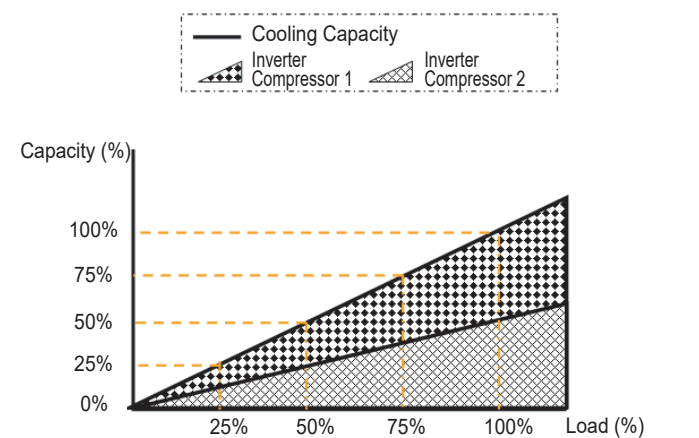
Lubrication System

Oil is efficiently separated inside the scroll compressor, and even when the cycle operates, most of the oil remains inside. Only a part of the oil will mix with the refrigerant to be circulated within the cycle.

Partial Load Operation

Each cooling cycle operates independently; one (1) cooling cycle includes two (2) inverter compressors as shown in the diagram. Two (2) inverter compressors increase the rpm after initial start to gradually increase the cooling capacity. The user can operate the chiller smoothly, at optimal conditions, by setting the cooling capacity based on the linear control of LG chiller controller. LG chillers have efficient partial load performance at any load.

Figure 3: Partial Load Operation Diagram.



SPECIFICATIONS

Table 1: Specification Data for Single 460V Cooling Only Chiller.

Inverter Scroll Chiller	Model No.	ACA020HETB
	Type	Cooling Only
	Configuration	Single
Power	V, Lines, Phase	460, 3, 3
Capacity	Btu/h	221,780
	Refrig. Ton	18.5
Input Power	kW	21.5
Efficiency	Btu/Wh	10.32
IPLV	Btu/Wh	17.06
Sound Pressure	dB(A)	64
Compressor		
Type x No.		Inverter Scroll x 2
Oil Type		PVE
Oil Charge	cc	1,400 Each Circuit
Sump Heater	W	60 Each Circuit
Refrigerant		
Type		R410A
Factory Charge	lbs.	14.3 x 2
Evaporator		
Type		Shell and Tube
Pressure drop	psi	5.6
Operating Max. Pressure (Refrigerant / Water)	psi	609 / 145
Water Flow Rate (Standard)	gpm	49
Water Flow Rate (Min. / Max.)	gpm	34 / 64
Water Pipe (Inlet / Outlet Dia.)	Inch	2 / 2
Fan Motor		
Type		Brushless Digitally Controlled
No. of Fans	Each	2
No. of Vanes (per Fan)	Each	6
Air Flow Rate	cfm	8,687 x 2 @1,000 rpm
Motor Power	W	900 x 2
Other		
Expansion Unit		Electronic Expansion Valve
Weight	lbs.	1,235
Dimensions (W x H x D)	Inch	30-1/8 x 86-5/8 x 84-13/16
Footprint	ft² / RT	0.958
High / Low Pressure Protection Device		√
Anti-frost Protection Device		√
Remote Control		Modbus®
Outlet Temperature	°F	39.2 ~ 68
Ambient Air Temperature	°F	5 ~ 118.4
Load Capacity Range		20% ~ 100%

LG Chillers are certified under AHRI Standard 550 / 590.

Capacities and Inputs are based on the following conditions: Cooling: Outdoor Air Temp. 95°F, Water Inlet Temp. 54°F, Water Outlet Temp. 44°F

To choose the correct chiller for the application, use the LATS ISC Selection Software. (For the latest version of LATS ISC Software, go to www.ahridirectory.org.)

Modbus® is a registered trademark of Schneider Electric USA, Inc.

ELECTRICAL DATA

Table 2: Electrical Data for Single 460V Cooling Only Chiller.

Tons	Model No.	Voltage	Frequency (Hz)	Voltage Tolerance (Min. ~ Max.)	MCA	MFA	Compressor		Chiller Fan Motor		Input Power kW
							MSC	RLA	kW	FLA	
20	ACAH020HETB	460	60	414 ~ 506	31	40	9.7	24.9	1.8	5	21.5

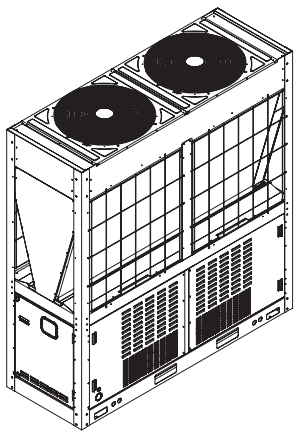
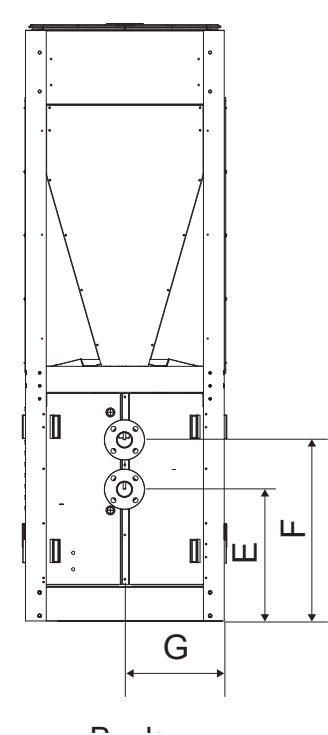
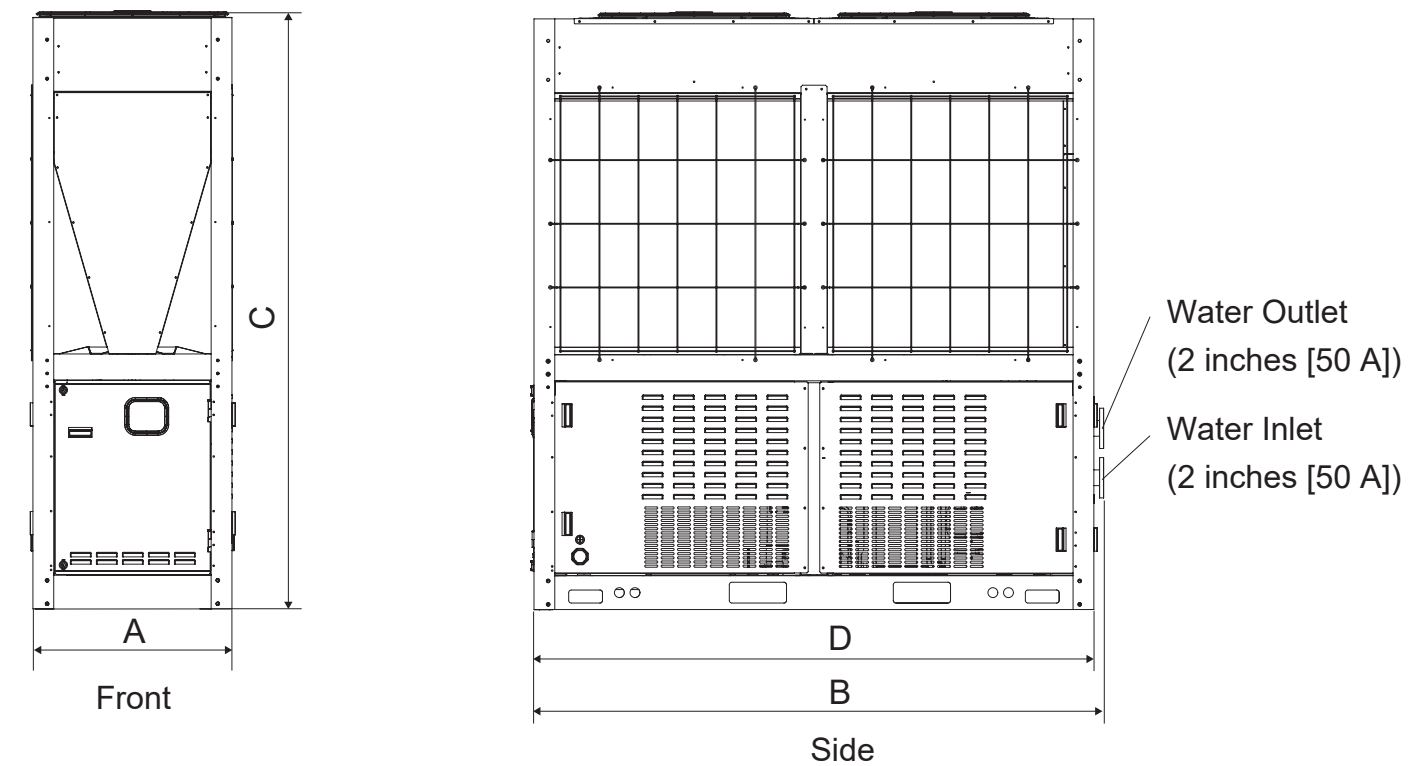
Voltage Range: Power supplied to the chiller must fall within the voltage minimum to maximum range listed in the table above. The chiller will not operate normally if the power supply voltage falls below or above the tolerance range.
 Maximum allowable voltage variance permitted between phases is 2%.

MCA: Minimum Circuit Ampacity (A) (Criteria used to select the wiring standard).
 MFA: Maximum Fuse Amps (A) (Criteria used to select circuit breaker and ground error circuit breaker [electricity leakage circuit breaker]).
 MSC: Maximum Start Current (A)
 RLA: Rated Load Amps (A) (Current required when operating under the following conditions—Cooling: Outdoor Air Temperature: 8°1F DB / 66°F WB; Water Inlet / Outlet Temperature: 54°F / 44°F).
 FLA: Full Load Amps (A).



DIMENSIONS

Figure 4: Dimensions for Single 460V Cooling Only Chiller..



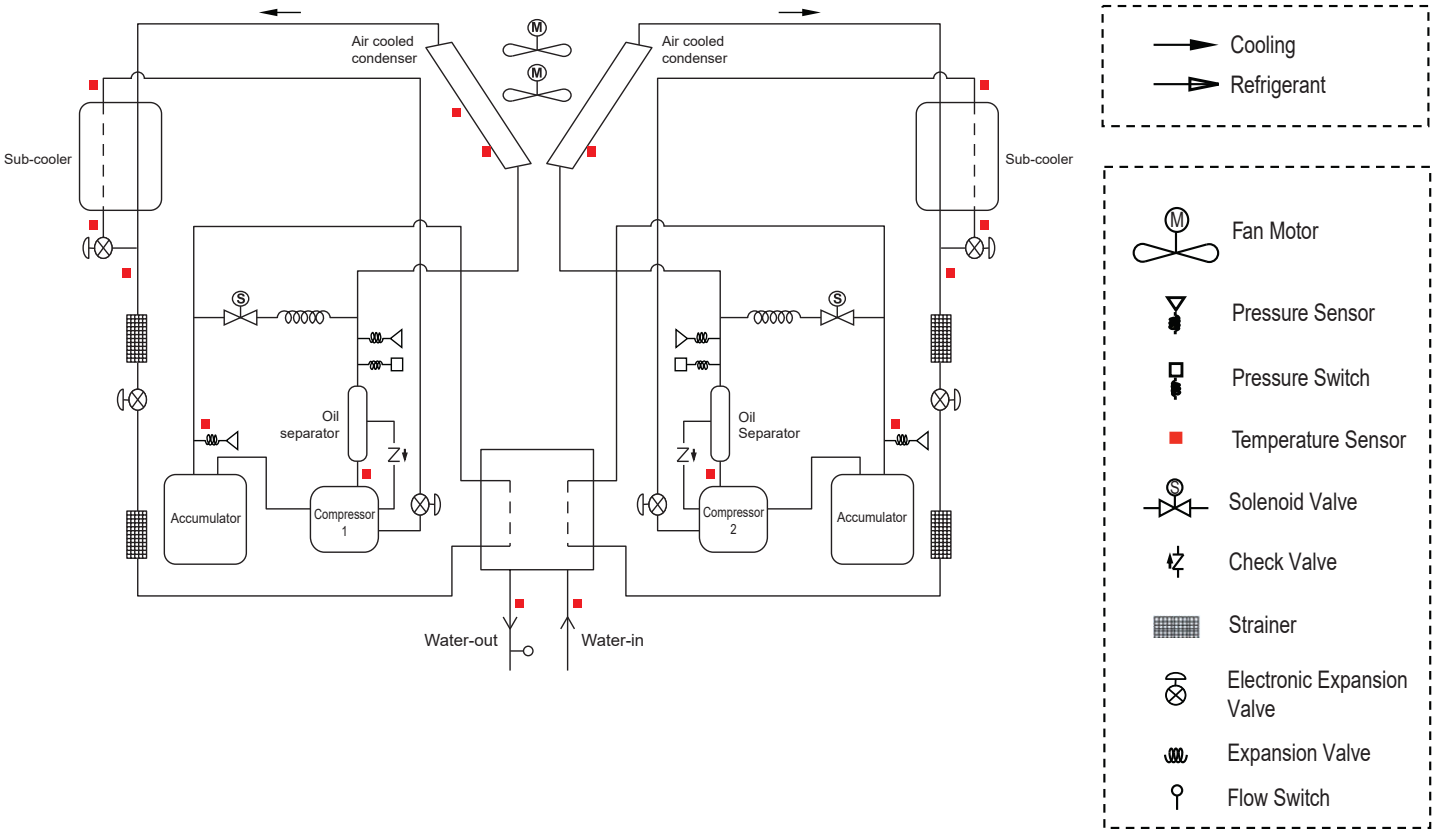
(Unit: Inch)

Label	Dimensions
A	30-1/8
B	86-17/32
C	86-5/8
D	84-13/16
E	19-31/32
F	27-9/16
G	15-1/8

REFRIGERANT PIPING AND SENSOR DIAGRAM / OPERATION RANGE AND LIMIT

Refrigerant Piping and Sensor Diagram

Figure 6: Single Chiller Refrigerant Piping and Sensor Location Diagram (ACAH020HETB).



Operation Range and Limit

The table and the diagram shows the operation range of the product.

Note:

Do not operate the exceed the operation range of the chiller.

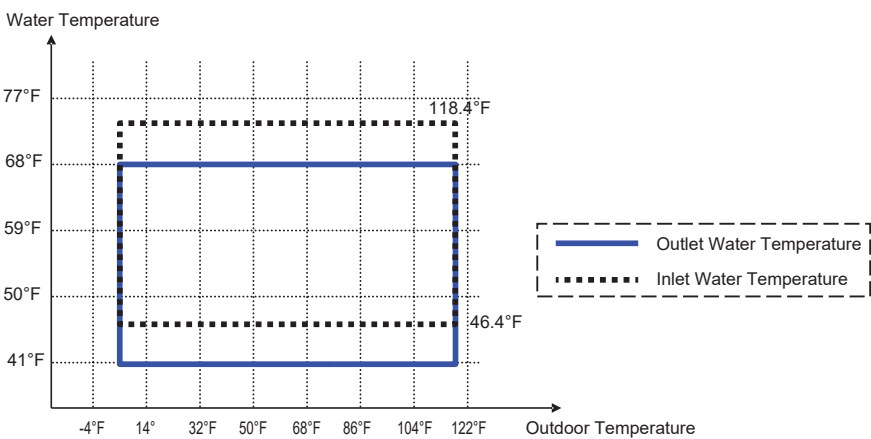
Table 3: Operation Range and Limit Table.

Operation Range	Cold Water Inlet Temperature	46.4°F or above
	Cold Water Outlet Temperature	39.2°F to 68°F
	Outdoor Temperature	5°F to 118.4°F

Note:

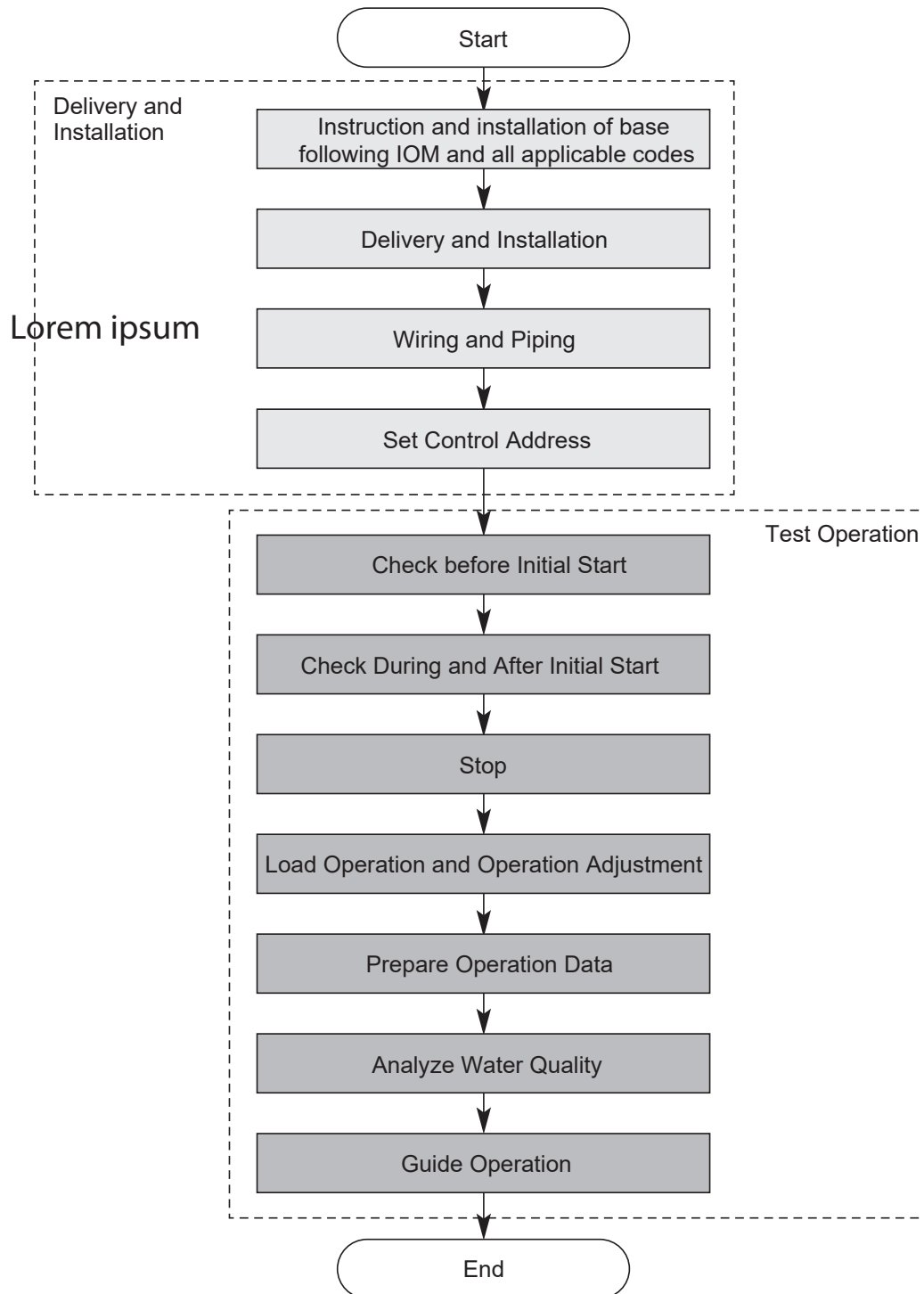
- If outside temperature is below 14°F, depending on inlet temperature, the chiller will not operate normally, or will run for an extended time if in cooling mode. If this is the case, increase the inlet temperature by circulating the load water, and then operate in cooling.
- Add antifreeze if the chiller is to operate in ambient air temperatures below 41°F (the water in the pipes could freeze).

Figure 5: Cooling Mode Operation Range Diagram.



INSTALLATION TO TEST RUN FLOWCHART







Figure 7: Installation to Test Run Flowchart.



PLACEMENT CONSIDERATIONS

Selecting the Best Location for the Chiller

DANGER

-  Do not install the chiller in an area where oil, steam, or emulsified gas are present; these will cause bodily injury or death.
-  Do not install the chiller in an area where flammable gas could generate or flow; this condition could cause a fire, which will cause bodily injury or death.
-  Do not install the chiller in an area where corrosive gases could generate, flow, stagnate, or leak (coolant could leak from corroded pipes). These conditions could cause a fire, resulting in bodily injury or death.
-  Do not install the chiller in an area where high levels of carbon fiber or dust are present; these could cause a fire, resulting in bodily injury or death.
-  Do not install the chiller in an area where acidic or alkali solutions may be present; these could corrode the pipes if added to the water, causing antifreeze to leak, and resulting in bodily injury or death.
-  Install the chiller where its weight is sufficiently supported, and where it will not fall over from strong winds or earthquakes. If the installation location is insufficient, the chiller could fall, causing physical injury or death.

WARNING





Install a fence or barricade around the chiller to prevent animals and / or unauthorized individuals from accessing it. Install a boundary or danger sign if necessary. Damage to the components could cause fire, explosion, physical injury, or death.

Do's

Select a location for installing the chiller that meets the following conditions:

- Where it is flat and there is enough strength to support the weight of and vibration from the chiller.
- In an area that allows for optimum airflow at both inlet and outlet sides; enough space for wiring, and piping; and is easily accessible for installation, inspection, maintenance, and service.
- If the chiller is installed in a highly humid environment (near an ocean, lake, etc.), ensure the site is well-ventilated with a lot of natural light (Example: Install on a rooftop).
- If the chiller is not going to operate during winter, add antifreeze to the water supply.

Do Not's

-  Do not install the chiller where it will be subjected to direct thermal radiation from other heat sources, or in an area that would expose the chiller to heat or steam like discharge from boiler stacks, chimneys, steam relief ports, air conditioning units, kitchen vents, plumbing vents, and other sources of extreme temperatures.
-  Do not install the chiller in an area where high-frequency electrical noise / electromagnetic waves will impact operation.
-  Do not install the chiller in an area where its operating sound will disturb inhabitants of surrounding buildings.
-  Do not install the chiller in an area where it will be exposed to direct, strong winds. Verify that seasonal winds do not impact only one side of the chiller.

PLACEMENT CONSIDERATIONS

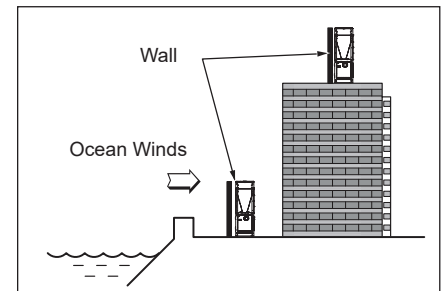
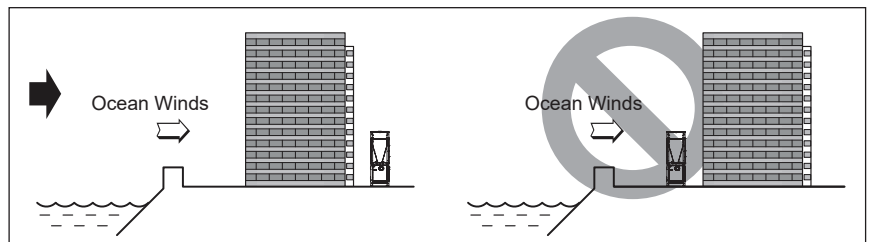
Oceanside Installation Precautions

- ⚠ Avoid installing the chiller where it would be directly exposed to ocean winds.
- Install the chiller on the side of the building opposite from direct ocean winds (so the building can block the winds).
- Select a location with good drainage.

Note:

If the chiller is installed in an area where it would be directly exposed to ocean winds, additional anti-corrosion treatment will need to be applied to the chiller condenser. Ocean winds will cause corrosion, particularly on the condenser, which, in turn could cause product malfunction or inefficient performance.

If the chiller must be placed in a location where it would be subjected to direct ocean winds, install a concrete (or similar material) windbreaker. The windbreaker wall height and width must be at least one and a half (1-1/2) times larger than the chiller, and must provide at least 40 inches clearance to allow for airflow.



PLACEMENT CONSIDERATIONS

Clearance Requirements

Follow the ventilation (suction and discharge air flow) and service requirements as shown below and on the next page when choosing a chiller installation area.

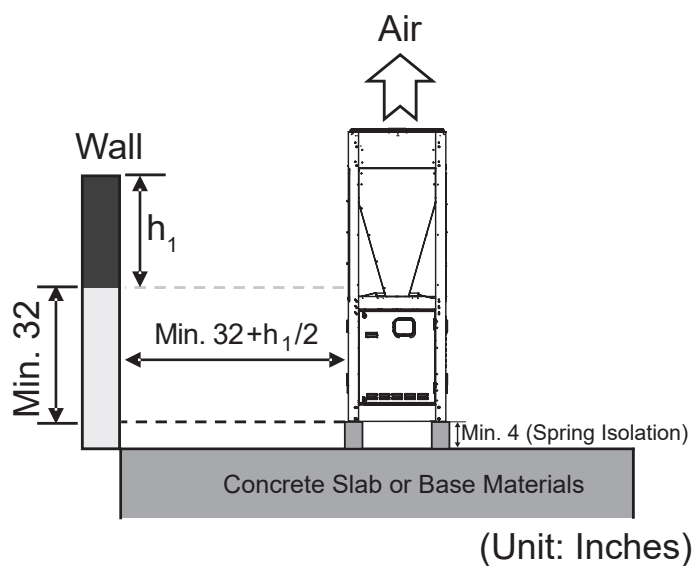
Ventilation Clearance Requirements

Air-cooled chillers must be installed in an open space or must have appropriate ventilation. If the chiller must be installed near one wall or under a ceiling, there must be enough space for ventilation.

Installing Near One Wall

- If one side of the chiller is near a wall, and the height of the wall is less than 32 inches, the clearance space between the chiller and the wall must be a minimum of 32 inches.
- If one side of the chiller is near a wall, and the height of the wall is greater than 32 inches, the clearance space between the chiller and the wall must be a minimum of 32 inches plus half of h_1 (difference between 32 inches and the total wall height).

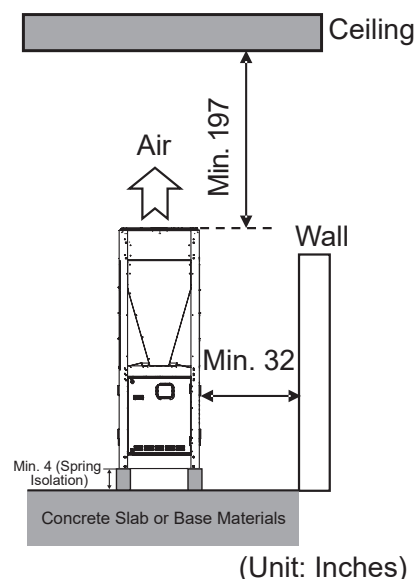
Figure 8: Ventilation Clearance Requirements When Installing the Chiller Along One Wall.



Installing Under a Ceiling

- If the chiller is installed under a ceiling, the clearance space between the top of the chiller and the ceiling must be a minimum of 197 inches.
- If the front or back of the chiller is near a wall, the clearance space between the chiller and the wall must be a minimum of 32 inches.

Figure 9: Ventilation Clearance Requirements When Installing the Chiller Under a Ceiling.



Note:

Minimum height of spring isolation should be at least 4 inches, or use a larger spring isolation that follows applicable local, NEC, or other codes.

PLACEMENT CONSIDERATIONS

Service Clearance Requirements

Ensure there is enough space around the chiller for maintenance and service. See the figures below for minimum dimensions.

Figure 10: Service Clearance Requirements for One Chiller.

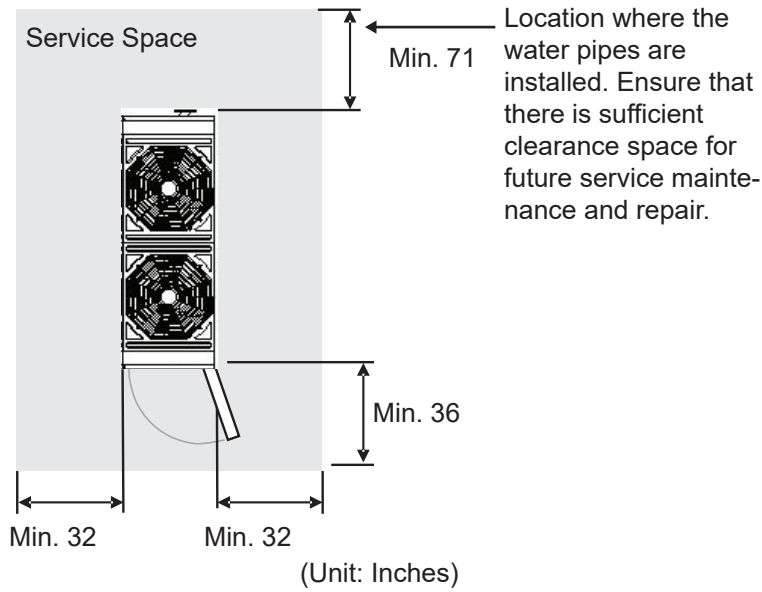
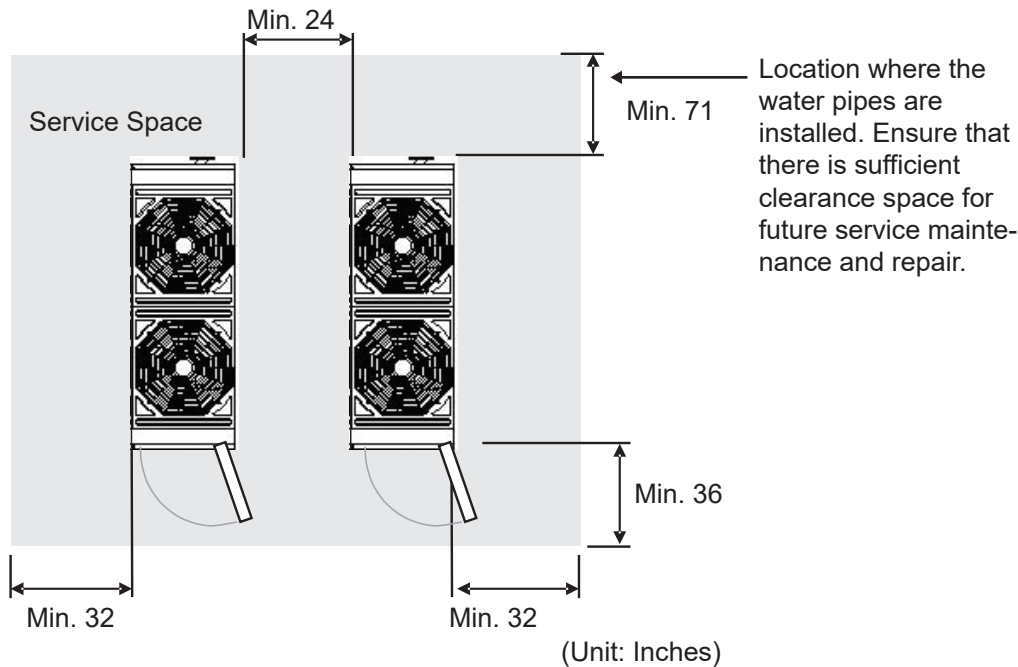


Figure 11: Service Clearance Requirements for Two Chillers.



Note:

See images above for minimum clearances, or increase clearance space based on NEC or other applicable service or safety codes.

PLACEMENT CONSIDERATIONS

Seasonal Wind and Winter Installation Precautions

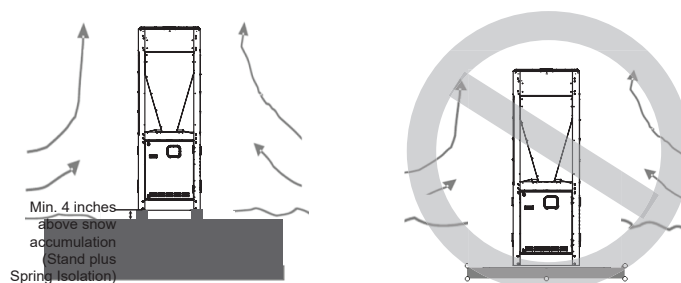
To ensure the chiller operates properly, certain measures are required in locations where strong cold winds, heavy snowfall, and freezing temperatures could occur.

Note:

Consider chiller fan operation when installing in snow-prone areas. If the chiller fan is installed below a certain level, it could trigger a high pressure error within the circuit and cause operation malfunction.

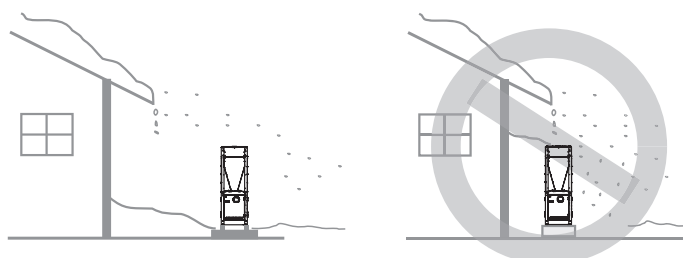
1. Snow could access the air discharge outlet of the condenser and freeze inside the chiller; in areas with potentially high snowfall amounts, install a cover over the chiller to prevent snow accumulation on its top.
2. The interior of the chiller could freeze if the air inlet becomes clogged with snow. Install the chiller in such a way that snow drifts do not blow into the air inlet, and install a hood to block the unit from heavy snow. Clear the area of snow around the chiller heat exchanger.

Figure 12: Installing the Chiller on a High Base For Optimum Airflow.



3. Install the concrete slab or base materials (plus spring isolation) so that the chiller is 4 inches (102 mm) higher than the accumulated snow (the chiller is to be installed 4 inches [102 mm] above the average accumulated snowfall for the geographical area).
4. If more than 4 inches (102 mm) of snow has accumulated on top of the chiller, remove the snow, and then operate the unit.
5. ⓧ The height of the concrete slab or base materials (plus spring isolation) should not exceed the width of the chiller.
6. ⓧ Do not install the chiller in an area where heavy snow accumulation could negatively impact chiller operation. Position the chiller in such a way that the side with the air heat exchanger does not face the direction of the snow (ensure the side with the air heat exchanger is parallel to snowfall direction). Add a wall high enough to prevent any snow accumulation from being drawn up into the coil side of the chiller (field installed).
7. If seasonal winds are strong and blow predominately from one direction, chiller capacity could be reduced or load imbalance could occur; therefore, install the chiller so that the product cycle is not impacted. If that isn't possible, install a windbreaker, hood, etc. In locations with strong seasonal winter winds (especially near coastal areas), install a hood, taking into consideration wind direction, that doesn't block the suction inlet of the chiller. If the chiller will be directly exposed to seasonal winter winds, field-install a wind baffle (in addition to the hood).
8. ⓧ Do not install the chiller near an edge of a rooftop or overhang. Snow can fall off the roof or overhang and into the chiller. ⓧ Do not allow snow to accumulate between the outside wall and the chiller. If snow accumulates in this location, chiller operation will malfunction due to reduced airflow.

Figure 13: Installing the Chiller Away from Rooftops and Overhangs.



Transporting / Lifting

⚠ WARNING

- Take extreme care when transporting the chiller. Use a forklift or (required) spreader bar, and follow the directions in this manual. There is a risk of the product falling and causing physical injury or death.
- ⚠ Do not touch the heat exchanger with bare hands. It is very sharp and can cause physical injury.
- Tear apart and dispose the plastic (vinyl) packaging so that children do not play and risk suffocation and death.
- Lift and support the chiller at specified locations (at least four [4] points) to avoid slipping from the rigging apparatus, and the appropriate length (26.1 feet [8.7 yd.]) and number of lifting straps. There is a risk of the product falling and causing physical injury.
- Use caution when using forklift to transport the chiller.. ⚠ Do not drop the unit when carrying it with a forklift. There is a risk of the product falling and causing physical injury.

Precautions When Moving the Chiller With the Forklift

- Keep the chiller as level as possible.
- Verify the weight of the forklift, and make sure that the forklift has sufficient capacity to handle the weight.
- Measure the transportation grooves at the bottom of the chiller, and make sure to use a fork that fits the grooves.
- ⚠ The forklift cannot lift the chiller from the back. Always lift the chiller on the side where the transportation grooves are located.

⚠ WARNING

Failure to follow precautions when transporting the chiller can result in physical injury or death.

Precautions When Lifting the Chiller

- Keep the chiller as level as possible.
- ⚠ Do not tilt the chiller more than 15 degrees.
- Pass the lifting straps through the support access holes located at the bottom of the chiller.
- Always connect the straps to at least four (4) supports when lifting the chiller.
- Must use a steel spreader bar so that the straps do not transfer tension to, and / or damage, the chiller coil and the top of the frame. (Spreader bar must be larger than the size of the chiller and is field supplied).

Note:

- ⚠ Do not allow the spreader bar to come in contact with the chiller. It can cause product damage.

Figure 14: Using the Forklift (For Illustrative Purposes Only; Appearances Will Vary Depending on Model).

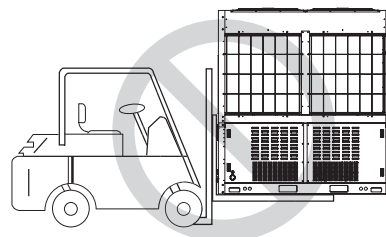
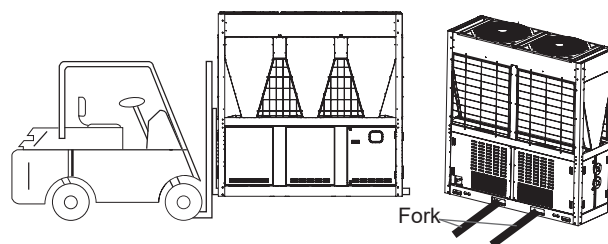
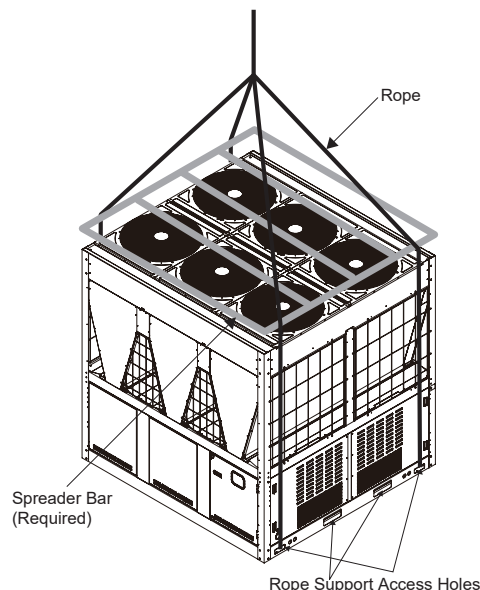


Figure 15: Lifting the Chiller (For Illustrative Purposes Only; Appearances Will Vary Depending on Model).



STORING THE CHILLER / INSTALLING ANTI-VIBRATION AND ANCHOR BOLTS

Storing the Chiller

If the chiller must be stored at the construction site before installation / operation, ⚠ do not allow dirt or moisture inside, and ⚠ do not expose it to humidity. Place a protective cover on the chiller until ready for installation.

Installation Considerations

- As soon as the chiller is delivered, check for any damages. If there are damages, immediately contact the shipping company.
- Install in a location where it is flat and there is enough strength to support the weight of and vibration from the chiller.
- Install in an area that allows for optimum airflow at both inlet and outlet sides; enough space for wiring, and piping; and is easily accessible for installation, inspection, maintenance, and service. See the specification table, dimensions, and wiring diagram for clearance requirements, net weight, etc.
- Inspect the field-installed base, and resolve any issues before installing the chiller.
- Install the chiller so that it will not fall over due to strong winds or earthquakes.
- If installing the chiller in a coastal area where it is impacted by ocean winds, additional anti-corrosive treatment must be applied to the condenser.
- If combining multiple chillers, it is best to ensure all are at the same level so that the water pipes can be easily connected.

⚠ WARNING

Improper installation will cause the unit to fall over, resulting in physical injury or death.

Note:

Improper installation can cause product malfunction and damage.

Installing Anti-Vibration

- Use field-supplied anti-vibration and install before placing the chiller on the base or its installation area.
- Anti-vibration is required and is to be specified and selected properly based on weight and local wind code requirements. All fasteners to be properly specified by a professional.
- See image for guidance on where to install the anti-vibration on the chiller.
- Anti-vibration is required and is to be specified and selected properly based on weight and local wind code requirements. All fasteners are to be properly specified by a professional.

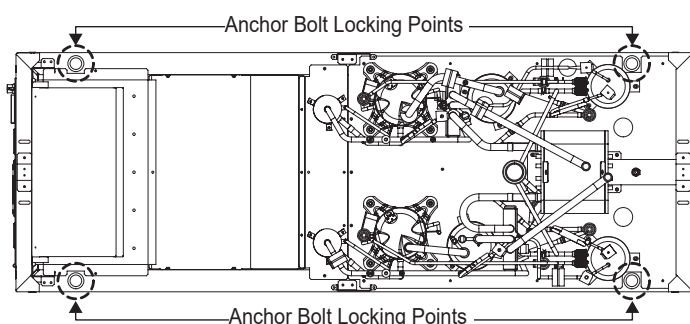
Figure 16: Location of Anti-Vibration.



Installing Anchor Bolts (Field-Supplied)

- The wooden shipping pallet at the bottom of the chiller must be removed before installation and tightening the anchor bolts.
- Use anchor bolts to firmly attach the chiller to the installation area / base.
- Tighten the bolts so that the chiller does not fall over from strong winds or earthquakes. Must be engineered by local professional.
- Noise and operation vibration from the chiller can be transferred to the floor or wall of the installation area. Add anti-vibration material to reduce its impact.
- Follow all local, state, and federal codes for securing chiller and base design.
- Open the left / right panels of the chiller, find the anchor bolt locking points, check anchor bolt attachment hole, and lock the anchor bolts so the bolts are at right angles to the chiller.

Figure 17: Anchor Bolt Locking Points on the Chiller.



Water pipe system installation is an important part of the chiller system. Any defect in the water pipe system can lead to chiller malfunction. When designing the water pipe system, consider future service and maintenance, and install the field-supplied water pipe system components as detailed below.

Water Pipe System

Note:

Water circulation that has temperature difference of 6°F to 18°F between the outlet water temperature of the hot and cold water is required. If the water circulation temperature differential is insufficient, the chiller will malfunction, will not be able to operate properly, and product life will be reduced.

- Ensure that all installed components comply with the design water pressure (or higher).
- Ensure that the water circulation complies with product specifications. Even when the water circulation complies with the product specification, install a bypass circuit on the first side on the water piping system. If water flow is reduced during a low load, it can cause issues such as excessive and frequent compressor operation, and frozen components during cooling operation or if the operation stops.
- Maintain a constant water circulation flow as much as possible.

Expansion Tank

Expansion tanks receive and expel the excess water, and simultaneously remove air in the water pipe system. Choose an expansion tank with a capacity from 2 to 2-1/2 times of the water expansion amount. Generally, the expansion tank capacity is 3% to 5% of the entire water pipe system capacity. Check with local, state, and federal guidelines regarding expansion tank requirements and size.

Pipe Slope and Air Vent Valve

If air remains in the water pipes, water pipe system resistance increases, and / or the amount of circulating water is reduced significantly. If air remains in the pump during operation, it can result in chiller malfunction or shutdown. Install an air vent valve where there could be a chance of air remaining in the water pipe system. Include 1/200 of slope on the air vent valve side to reduce the likelihood of air remaining in the pipe.

Water Piping

- Install the water pipe system so that the connections to the chiller are correct, tight, and without leaks.
- Permitted water pressure resistance of the water pipe system is 145 psi (1 MPa).
- Add insulation to the water system pipes to prevent any external heat loss, or to prevent condensate from forming during cooling operation. Follow local, state, and federal guidelines on insulation.
- Add pressure gauges and thermometers on the water inlets and outlets to check chiller operation.
- Include a strainer with minimum 50 mesh on the water inlet to filter particles that could enter the heat exchanger. Install the strainer on a horizontal pipe.
- Before supplying water, clean inside the pipe system to remove particles that will damage the chiller.

Note:

If sand, debris, or rust are present in the water pipe system, these materials can corrode metallic parts and cause chiller operation failure.

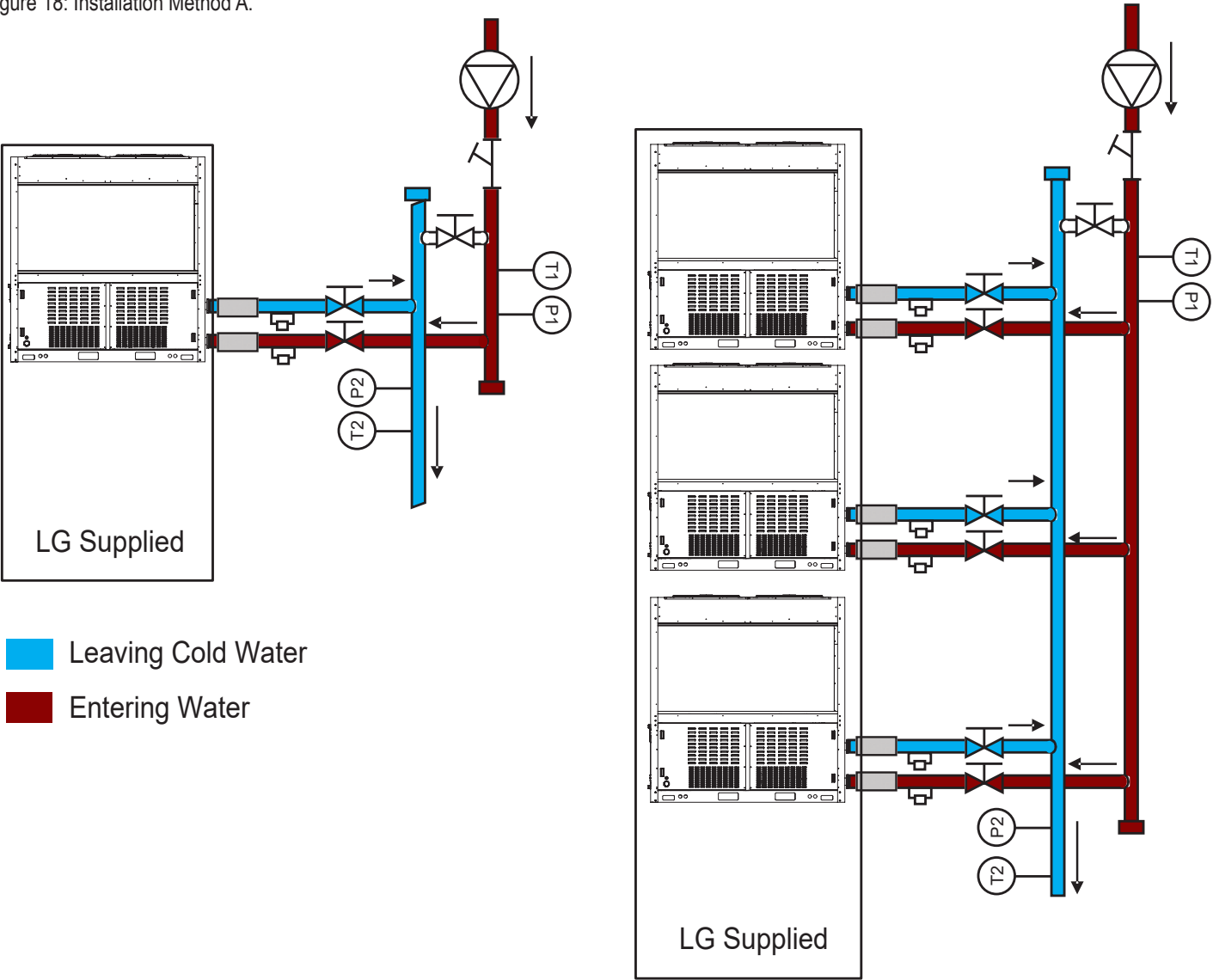
- Install the on / off valve on the cold water inlet / outlet and bypass pipe on the pipe direction on the device side.
 - Install a pipe system bypass on the initial segment of the chiller water pipe system. A bypass circuit can help when cleaning the pipes before chiller installation, and during annual water pipe system cleaning.
 - On / off valves can prevent water from backflowing into chillers that are not operating; also reduce power to the pump(s). Review site requirements for on / off valve installation.
- Include flexible joints at the inlet / outlet pipes that reduce any vibration imparted to the water pipe system and chiller. Flexible joints help prevent water leaks caused by operation vibration.

WATER PIPE SYSTEM / PIPING

Installation Method A (Recommended)

Independent product installation.

Figure 18: Installation Method A.



Symbol	Description	Symbol	Description (Provided by Others)
*	Valve (100% Flow)	T1 or T2	Optional Temperature Sensor (1: Inlet, 2: Outlet)
*	Strainer (50 Mesh)	P1 or P2	* Pressure Gauge (1: Inlet, 2: Outlet)
*	Flexible Joint		Cold Water Pump (Pump Sized to Meet Minimum to Maximum Flow for LG Chiller)
*	Service Port for Cleaning		

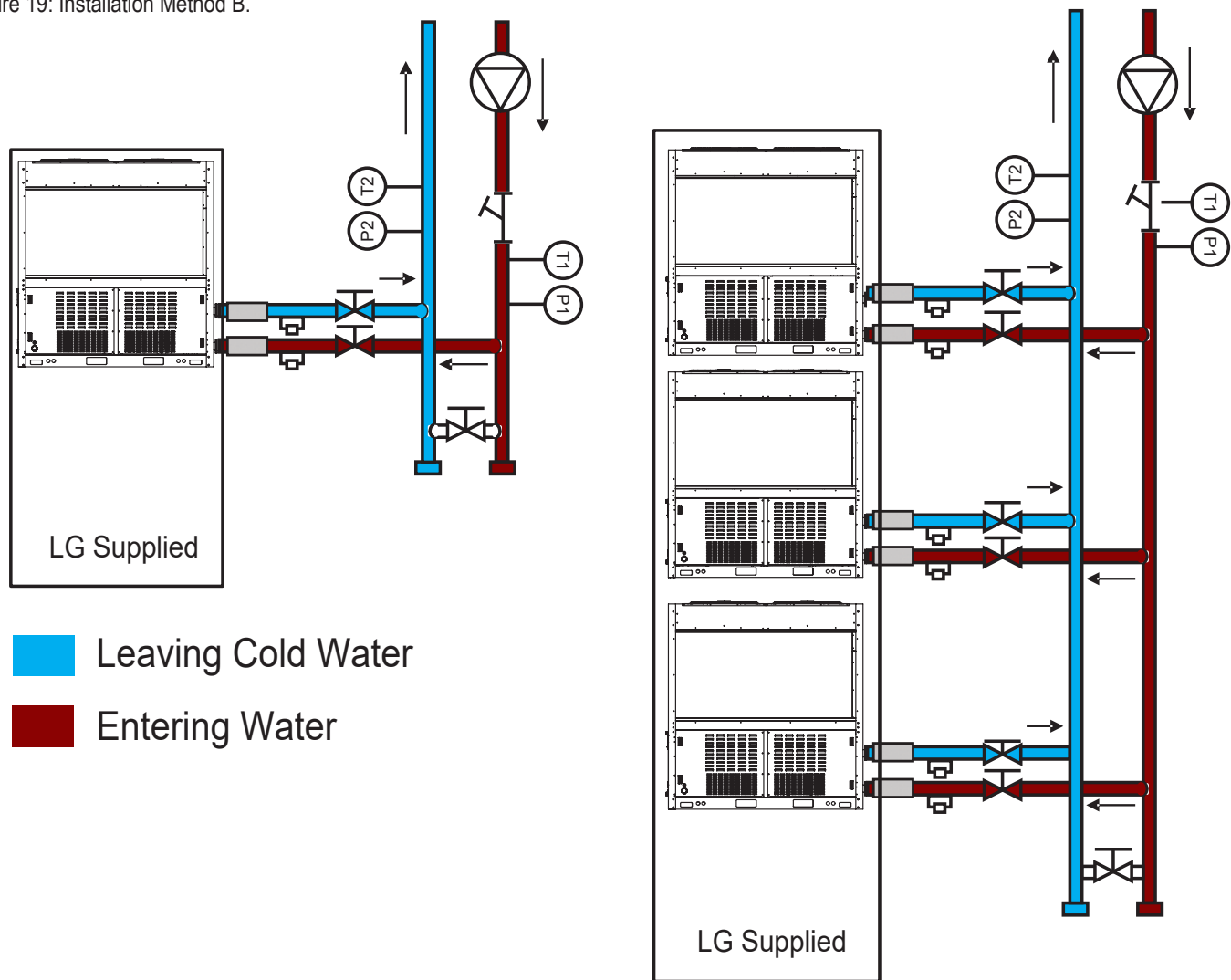
* Required

WATER PIPE SYSTEM / PIPING






Installation Method B

Independent product installation.

Figure 19: Installation Method B.



Water Piping System Installation

Symbol	Description	Symbol	Description (Provided by Others)
* 	Valve (100% Flow)	T1 or T2	Optional Temperature Sensor (1: Inlet, 2: Outlet)
* 	Strainer (50 Mesh)	P1 or P2	* Pressure Gauge (1: Inlet, 2: Outlet)
* 	Flexible Joint		Cold Water Pump (Pump Sized to Meet Minimum to Maximum Flow for LG Chiller)
* 	Service Port for Cleaning		

* Required

FREEZING PRECAUTIONS

Freezing Precautions

Note:

Installing in Areas Where Winter Outdoor Ambient Air Temperatures Could Fall Below 32°F (≤0°C)

If winter outdoor ambient air temperatures could fall below 32°F (≤0°C), take the measurements detailed below to prevent the pipes from freezing, and help prevent damage to the heat exchanger.

- Circulation water can freeze if the outdoor ambient air temperature is low (≤32°F [≤0°C]), and the chiller is not operating. When the outdoor ambient air temperature is ≤32°F (≤0°C), turn the water pump on and circulate water.
- If the chiller will not be operating for an extended period during winter season, drain the circulation water out of the system.
- Add anti-freeze to prevent the circulation water from freezing during the winter season (if design temperature is below 41°F).
- Maintain water flow following design specifications to reduce damage from rusting, scaling, and corrosion.
- LG is not responsible for any chiller damage resulting from poor water quality management or improper water processes.

Inlet Water Pipe To Be Installed Level

The inlet water pipe is to be installed level so that no water remains in the pipe after draining through the drain hole. If it is not level, water will remain in the pipe, which could freeze and damage the pipe / chiller components. Add a drain hole at the bottom of the pipe.

Figure 20: Inlet Water Pipe with Drain Hole.

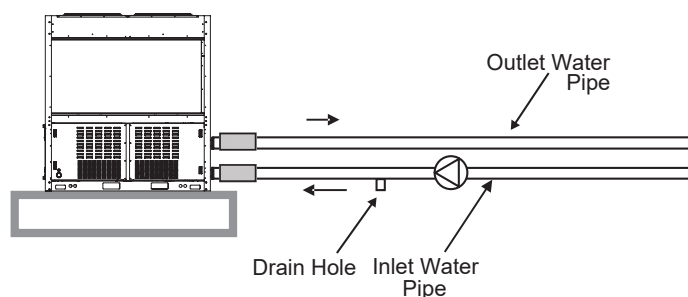
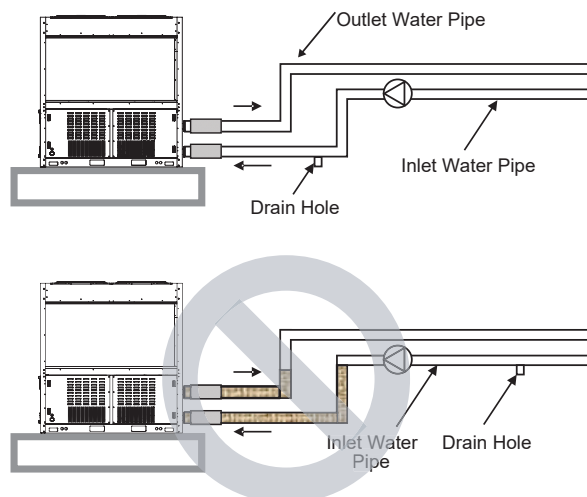


Figure 21: Positioning the Drain Hole When Bends or Traps are Unavoidable.



Note:

If the leaving water line does not sufficiently drain into the entering water line, additional drain holes may be required.

WATER PIPE INSTALLATION / PUMP CONTROL / QUALITY MANAGEMENT

Water Pipe Installation

- Appropriate pressure of the pipe flange connection is ≤ 145 psi (1 MPa).
- Water pipe size must be the same or larger than that of the chiller.
- To prevent the water pipe connections from sagging due to the load, install appropriate pipe supports.
- Position the water inlet pipe at the bottom of the water pipe system, and position the outlet pipe at the top of the water pipe system.
- If there is a risk of condensation, install insulation on the cold water outlet pipe.
- To prevent the connected pipe from freezing during winter season, install the drain valve at the bottom of the pipe system.

Water Pump Control

If the water pumps do not operate for an extended period, internal corrosion is more likely.

Water Quality Management

Impurities in the water can influence chiller performance and life expectancy. The water must be tested and treated using a local water treatment professional, and water quality must not fall below the standards listed in the table.

Table 4: Chiller Water Standards.

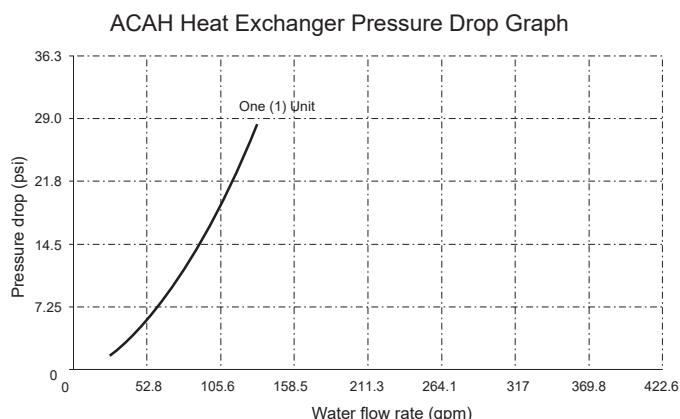
Particles	Water	
	Circulating Water	Cold Water
pH (77°F [25°C])	6.5 - 8.0	6.5 - 8.0
Conduction Rate (77°F [25°C] $\mu\text{s/cm}$)	500 or below	200 or below
Alkali Level (ppm)	100 or below	50 or below
Hardness (ppm)	100 or below	50 or below
Chlorine Ion (ppm)	100 or below	50 or below
Lactic Acid Ion (ppm)	100 or below	50 or below
Iron (ppm)	0.1 or below	0.3 or below
Sulfur Ion (ppm)	Must not be detected	Must not be detected
Ammonium Ion (ppm)	0.5 or below	0.2 or below
Silica (ppm)	50 or below	30 or below

Maximum Operating Pressure / Pressure Drop

Table 5: System Maximum Pressure and Water Pressure Drop Specifications.

Model No.	Operating Maximum Pressure (psi)	Water Pressure Drop (psi)
ACAH020HETB	Refrigerant: 597; Water: 142	5.63

Figure 22: Cold Water Head Loss Curve.

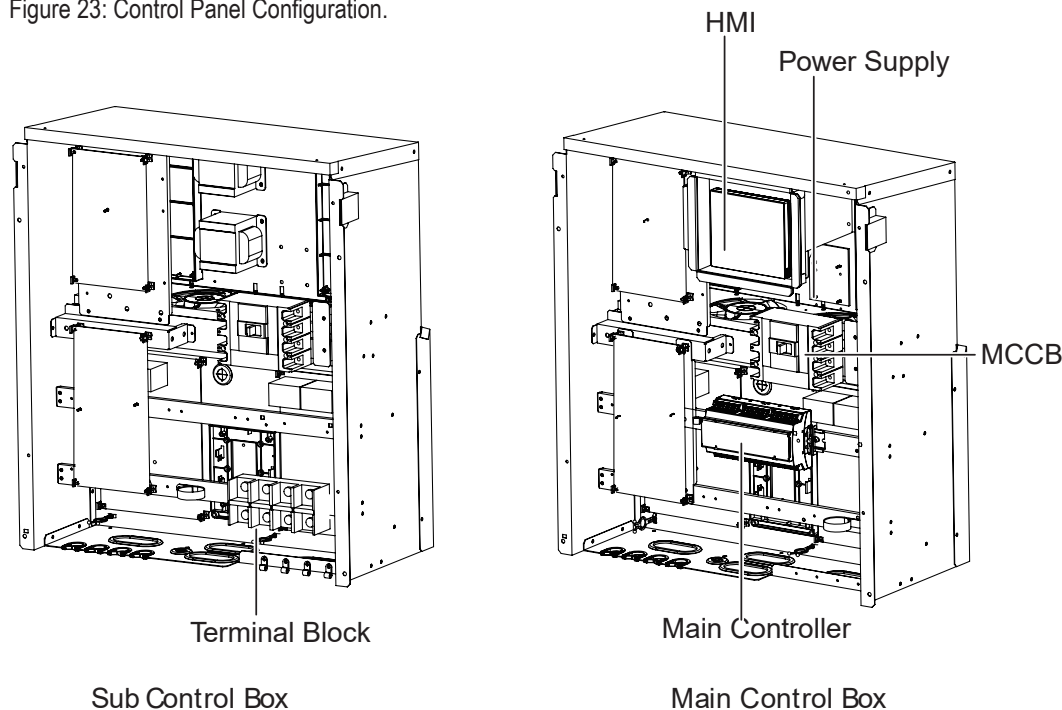


* GPM : Gallon Per Minute

CONTROL PANEL CONFIGURATION

Control Panel Configuration

Figure 23: Control Panel Configuration.



Human Machine Interface (HMI)

Use for basic product setting and commands; displays product information, and information for each cycle.

Main Controller

Controls the input / output port and communicates with each cycle.

Power Supply

Supplies power to the HMI.

MCCB (Molded Case Circuit Breaker (MCCB))

Shuts off the overcurrent.

Line or High Voltage Terminal Block

The terminal block that receives the external main power.

BUTTON LOCATIONS AND FUNCTIONS

Button Locations and Functions

The controller includes the buttons described below to set the functions listed in the table without using the HMI.

Figure 24: Button Locations.

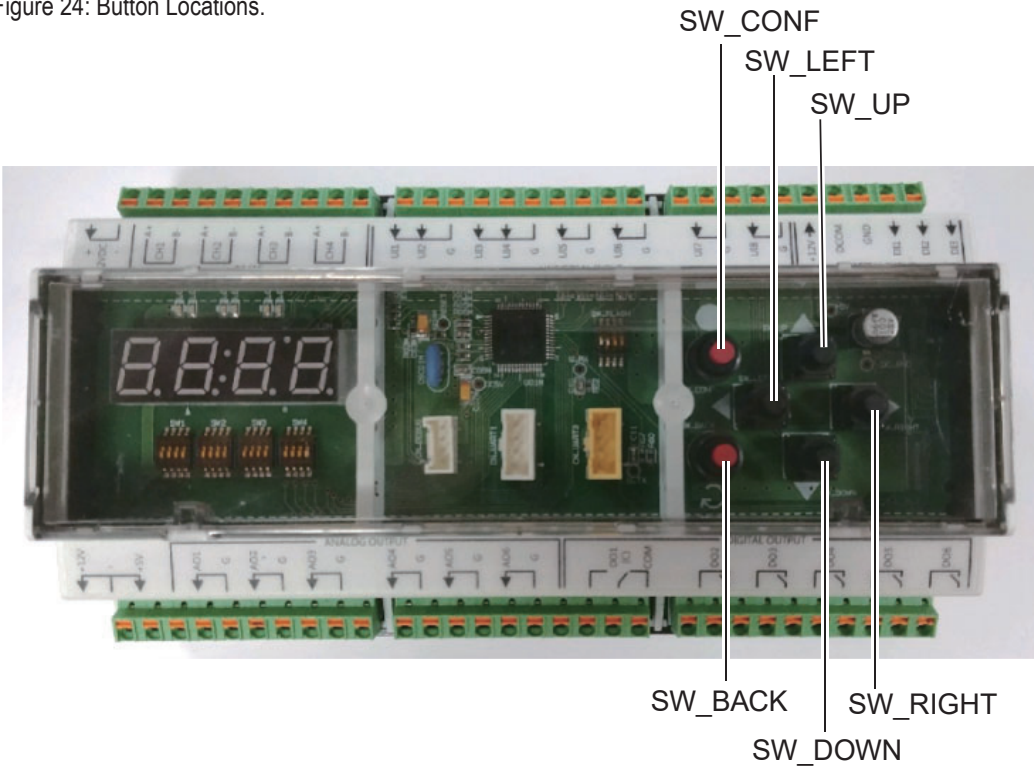


Table 6: Button Function Table.

Button Name	Description
SW_RIGHT	Changes the Setting.
SW_LEFT	
SW_UP	
SW_DOWN	Moves the Screen.
SW_CONF	Sets the Selected Function.
SW_BACK	Returns to the Previous Step.

OPTIONAL SETTINGS

Optional Settings

1. Press the SW_CONF button to move to the 0 level screen on the SSD.
2. Press the up or down (▲, ▼) buttons to find the desired function.
3. When the desired function displays, press the SW_CONF button. The screen changes to the 1 level screen on the SSD.
4. Press the left or right (◀, ▶) buttons to find desired function on the SSD. When the desired function displays, press the SW_CONF button to set.
5. To return to the previous screen, press SW_BACK button.

Figure 25: Option Setting Button Locations.



SSD



Optional Setting Buttons

Figure 26: Option Setting Button Table.

No.	Setting Description	Screen Display (0 Level)				Screen Display (1 Level)			
1	Start / Stop	O	P	E	R	-	R	U	N
						S	T	O	P
2	Heating / Cooling	C	Y	C	L	H	E	A	T
						C	O	O	L
3	Cooling Setpoint Temperature	C	-	T	E	-	-	-	7
4	Heating Setpoint Temperature	H	-	T	E	-	-	4	5
5	Control Mode	S	Y	S	1	-	L	O	C
						D	I	S	T
						S	C	H	E
6	Remote Mode	S	Y	S	2	C	O	N	T
						-	B	U	S
7	Central Control Address	A	D	D	R	-	-	-	1
8	Maximum Operation Frequency	H	I	-	R	1	1	0	
9	Product Capacity	H	P	4	0	-	-	-	-
		C	O	4	0	-	-	-	-
10	Version	-	-	1	0	-	-	-	-
		S	V	1	0	-	-	-	-

Figure 27: Option Detail Table.

Description	Screen Display (1 Level)	Details
Start / Stop	RUN / STOP	Set RUN to operate the chiller, and STOP to stop the operation.
Heating / Cooling	HEAT/COOL	Sets the cooling / heating operation mode. COOL selects cooling mode, and HEAT selects heating mode.
Cooling Setpoint Temperature	7	Sets cooling target temperature. (39.2°F~ 68°F)
Load Outflow Water Temperature	-	Shows the temperature value of load outflow water. (Specified in 0 level)
Control Mode	LOC / DIST / SCHE	Sets the product's control mode. In LOC, chiller control is available through the HMI and the chiller controller. DIST refers to the remote control mode. In SCHE, the chiller is controlled following the schedule set at the HMI.
Remote Mode	CONT / BUS	Determines how to set in remote mode. CONT enables the chiller's operation mode by simple switch contacts. BUS enables the control on the entire chiller through communication from other communication devices.
Central Control Address	1	The chiller address can be set for communication with other communication devices. The address can be determined by selecting values from 1 to 247.
Maximum Operation Frequency	110	Sets the maximum operation frequency (70Hz~126Hz).
Product Capacity	-	Shows the current capacity of product. (Specified in 0 level)
Version	-	Shows the program version information of the chiller controller installed. Version information is subjected to change for product performance or quality improvement. (Specified in 0 level)

CHILLER ADDRESS SETTINGS

Chiller Address Settings

Set the chiller address settings from HMI and main controller. If the two (2) addresses do not match, and HMI communication error will occur.

Setting the Address on the Main Controller

- 1. Press the down and right buttons (▼ , ►) simultaneously.
- 2. When “FN02” appears, press SW_CONF button.
- 3. Select the desired address using the left or right (◀ , ▶) buttons. When the desired function displays, press SW_CONF button to set.
- 4. To cancel, press the SW_BACK button.

Figure 28: Setting the Address on the Main Controller.

No.	Description	Screen Display (0 Level)				Screen Display (1 Level)			
1	Chiller Address	F	N	0	2	-	-	-	1

Note:

If the main controller address does not match the HMI address, an error will occur.

HMI SCREENS

HMI Screens

The “HMI Screen” section details the composition, functions, and operation methods of each HMI screen.

Logging in to the HMI

When power is applied to the HMI, the HMI operates automatically. When the HMI initiates, the home screen appears.

Note:

When HMI is installed indoors, the communication distance maximum is 1,641 feet (547 yards). When connected indoors, however, the end resistance (100 to 200Ω) must be installed at the terminal connected to HMI for smooth communication.

Introduction to the HMI Menu - HMI Main Screen Configuration

After logging into the HMI, the system view screen displays the typical information of the chiller.

Figure 29: HMI Main Screen Configuration.

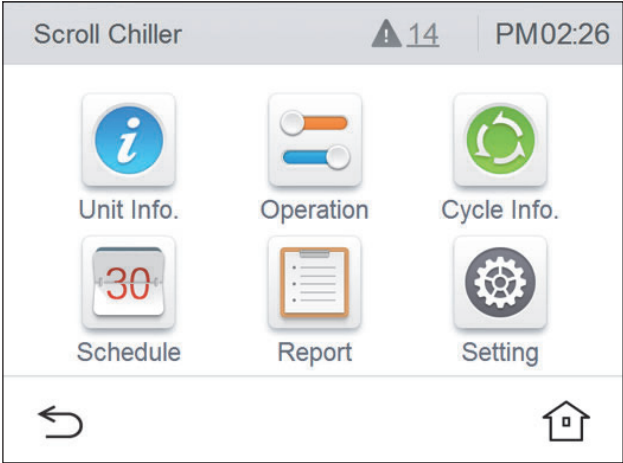


Table 7: HMI Main Screen Configuration.

Icon	Description
	Displays the load water temperature, pump / flow amount status, and system information.
	Sets the Start / Stop, set temperature, operation mode (heat pump model only), control mode, and maximum operating frequency are set.
	Checks the individual cycle's operation information.
	Checks the set schedule.
	Checks the error history.
	Sets the installer setting, screen setting, and system setting.
	Return to the previous menu.
	Access the Home Screen.

View Chiller Information - Load Water Temperature Screen

Chiller information includes load water temperature, pump / flow amount status, and, system information.

Table 8: Load Water Temperature Screen Table.

Icon	Description
E.W.T	Displays the common load entering water temperature value.
L.W.T	Displays the common load leaving water temperature value.

Figure 30: Load Water Temperature Screen.

Unit Info.		
Load Water Temp.		
E.W.T	0.0°C	↑
L.W.T	0.0°C	1/3
		↓

View Chiller Information - Pump / Flow Amount Status Screen

Figure 31: Pump / Flow Amount Status Screen.

Unit Info.		
Pump / Flow Status	Load Water	
Pump Output	OFF	↑
Pump Interlock	OFF	2/3
Flow Switch	OFF	
Capacity	20RT	↓

Table 9: Pump / Flow Amount Status Screen Table.

Icon	Description
Pump Output	If it is in operation, it always maintains an ON state. When the chiller operation stops, the freeze and burst prevention mode is applied, and operates as follows: According to the outdoor air temperature condition, the load water pump repeats operation ON and OFF. Outdoor Air Temperature < 33.8°F → Always "ON" 33.8°F ≤ Outdoor Air Temperature < 41°F → two (2) minute operation and eighteen (18) minute stop Outdoor Air Temperature ≥ 41°F → Operation "OFF" The freeze and burst prevention mode is possible when the pump is connected. To interface with the pump, the pump output connect is to be installed. To verify that the pump operates, the pump interlock connector is to be installed. (For installation, see the connection diagram.)
Pump Interlock	Receives the status of the load water pump output through the external signal contact point of the pump. (When the chiller is in operation, the pump output maintains an "ON" state, otherwise, an alarm will occur.)
Flow Switch	Displays the current load water's flow amount switch status value. (When the chiller is in operation, the pump output maintains an "ON" state, otherwise, an alarm will occur.)
Capacity	Displays the capacity of the device.

HMI SCREENS

View Chiller Information - System Information Screen

Table 10: Pump / Flow Amount Status Screen Table.

Icon	Description
Setting Temp.	Displays the set temperature for the current operation mode.
Outdoor Temp.	Displays the current outdoor air temperature value.
Operation Current	Displays the operation compressor's overall operation current value.
Starting Delay	Displays the time of the standby state before starting the chiller.

Figure 32: System Information Screen.

Unit Info.		
System Information		⬆
Setting Temp.	25.5°C	3/3
Outdoor Temp.	0.0°C	
Operation Current	0A	
Starting Delay	0sec	
		⬇

Operation Information - Chiller Control

Sets the Start / Stop (On / Off), Set Temperature, Operation Mode (Only for Heat Pump Models), Control, and Maximum Operating Frequency.

Figure 33: Chiller Control Screen.

Operation		
Setting Temp. 35°C ⬆ 0°C	Mode Heat	Control Mode Local
⏻ OFF		Max. Operating Frequency 80Hz

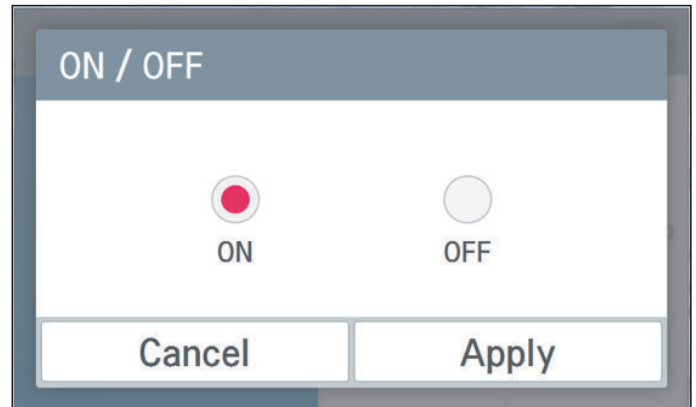
Table 11: Chiller Control Screen.

Icon	Description
⏻ ON	Selects the start and stop signal command of the chiller.
Setting Temp.	Sets the target temperature value for the current operation mode (Cooling: 39.2°F ~ 68°F).
Control Mode Local	Selects the control mode of the signal command method for the chiller control.
Max. Operating Frequency 80Hz	Max. Operating Frequency could save energy by limiting the operation capacity up to the frequency set by the user. (Setting Range : 70 Hz ~ 126 Hz) The standard set value for the Maximum Operating Frequency is 120 Hz. The setting unit for the Maximum Operating Frequency is 10 Hz.

Operation Information - Chiller Control, ON / OFF

After the ON area is pressed, a pop up window to select ON / OFF appears.

Figure 34: ON / OFF Screen.



Operation Information - Chiller Control, Setting Temperature

After the area where the chiller control's set temperature display is pressed, a pop up window to input the setting temperature appears.

In the temperature setting pop up window, change the temperature using the up / down arrows. After the temperature setting display area is pressed, input the setting temperature input using the numeric keyboard.

After changing the temperature setting, press Apply to reflect the set value. Press Cancel to maintain the previous setting.

Figure 35: Setting Temperature Screen.

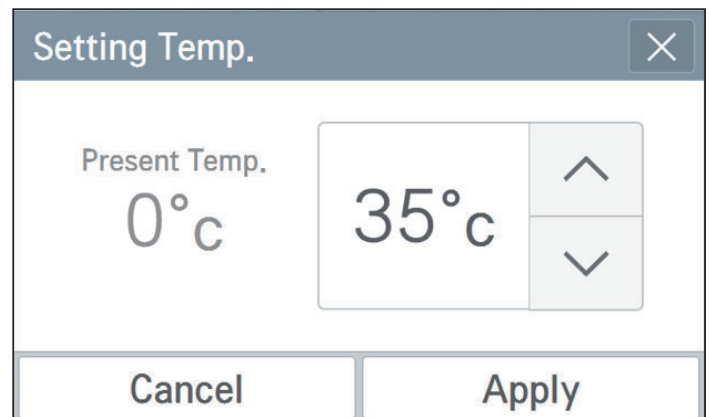
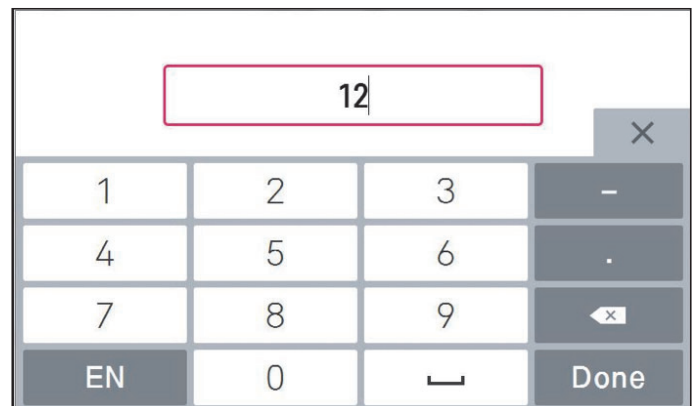


Figure 36: Setting Temperature Screen Numeric Keyboard.



HMI SCREENS

Operation Information - Chiller Control, Control Mode

After the chiller control's control mode area is pressed, a pop up window to set the control mode appears.

After selecting the desired control mode, press Apply to set mode. Press Cancel to maintain the previous setting.

Figure 37: Control Mode Screen.

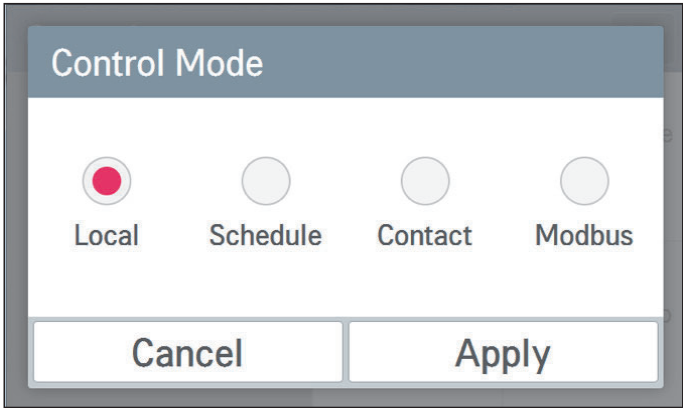






Table 12: Control Mode Screen Table.

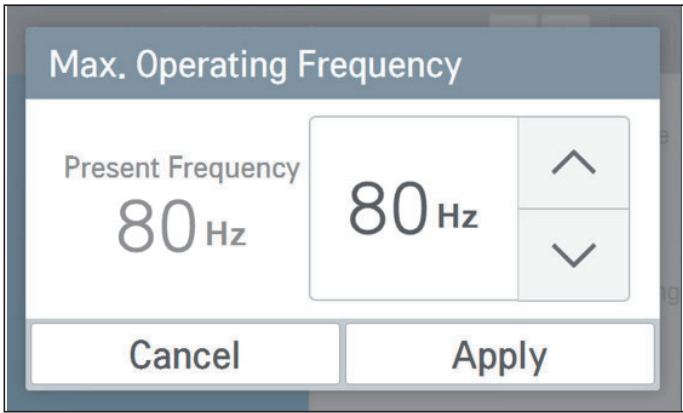
Icon	Description
 Local	Manual control mode through HMI.
 Schedule	If the schedule mode is set, manual and remote control are not possible, and only the start / stop by the schedule is possible.
 Contact	ON/OFF is only possible by the chiller controller's "Remote Start" signal.
 Modbus	ON/OFF is only possible by the external MODBUS communication.

Operation Information - Chiller Control, Maximum Operating Frequency

After the Maximum Operating Frequency area is pressed, a pop up window to input the Maximum Operating Frequency is displayed.

The Maximum Operating Frequency can be adjusted by pressing the up / down arrows in the pop up window.

Figure 38: Maximum Operating Frequency Screen.



Cycle Information Screen Composition

To enter the cycle information screen, press the Cycle Information button in the HMI Main Screen.

Figure 39: Cycle Information Screen.

Cycle #1 ▾	Info. ▾		
Cycle Info._Chiller 1	A	B	^
Hot-gas Valve	OFF	ON	1/3
Sump Heater	OFF	OFF	
			▽

Table 13: Cycle Information Screen Table.

Icon	Description
Cycle #1 ▾	Displays the currently selected cycle.
Info. ▾	Selects the cycle information and the cycle temperature.
Hot-gas Valve	Displays the hot gas valve status.
Sump Heater	Shows the sump heater status.

Cycle Information Screen Composition - Current Cycle Screen

Figure 40: Current Cycle Screen.

Cycle #1 ▾	Info. ▾		
Cycle Info._Chiller 1	A	B	^
Inverter Comp.	0Hz	0Hz	2/3
EEV status	0pls	0pls	
High Pressure	0kPa	0kPa	
Low Pressure	0kPa	0kPa	▽

Table 14: Current Cycle Screen Table.

Icon	Description
Inverter Comp.	Displays the inverter compressor's operation frequency value.
EEV status	Displays the current EEV pulse signal value.
High Pressure	Displays the current high pressure value.
Low Pressure	Displays the current low pressure value.

HMI SCREENS

Cycle Information Screen Composition - Current Cycle Operating Screen

Table 15: Current Cycle Operating Screen Table.

Icon	Description
Operating Current	Displays the operating current value of the current cycle compressor.
Operating Hours	Displays operation time.

Cycle Information Screen Composition - Current Cycle Temperature Screen, Part 1

Table 16: Current Cycle Temperature Screen, Part 1 Table.

Icon	Description
Load W	Displays cycle individual outlet temperature value.
Load Source.	Displays cycle individual inlet temperature value.
Sat. Condensing	Displays cycle condensation temperature value.
Sat. Evaporating	Displays cycle evaporation temperature value.

Cycle Information Screen Composition - Current Cycle Temperature Screen, Part 2

Table 17: Current Cycle Temperature Screen, Part 2 Table.

Icon	Description
Discharge	Displays cycle compressor discharge temperature value.
Suction	Displays cycle compressor suction temperature value.
Hex Temp	Displays cycle HEX temperature value.
Liquid Temp	Displays cycle liquid line temperature value.

Figure 41: Current Cycle Operating Screen.

Cycle #1	Info.	<	>
Cycle Info._Chiller 1	A	B	^
Operating Current	0.0A	0.0A	
Operating Hours	2hr	3hr	3/3
			v

Figure 42: Current Cycle Temperature Screen, Part 1.

Cycle #1	Temp.	<	>
Cycle Temp._Chiller 1	A	B	^
Load W	0.1°C	0°C	
Load Source.	0.1°C	0.0°C	1/2
Sat. Condensing	0°C	0.0°C	
Sat. Evaporating	0.0°C	0.0°C	v

Figure 43: Current Cycle Temperature Screen, Part 2.

Cycle #1	Temp.	<	>
Cycle Temp._Chiller 1	A	B	^
Discharge	23.5°C	23.5°C	
Suction	23.5°C	23.5°C	2/2
Hex Temp	23.5°C	23.5°C	
Liquid Temp	23.5°C	23.5°C	v

Schedule Menu Composition

Use the schedule menu to operate the chiller schedule.

In Home screen, if you press the schedule icon, the schedule screen appears.

To enter the schedule screen, press the Schedule button in the HMI Main Screen.

Figure 44: Schedule Menu - Month.

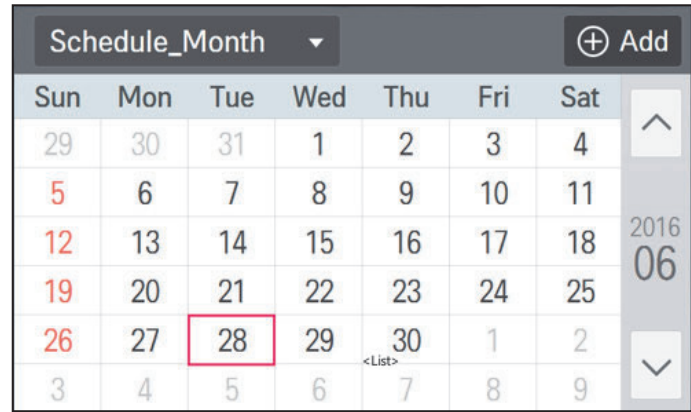


Figure 45: Schedule Menu - Week.

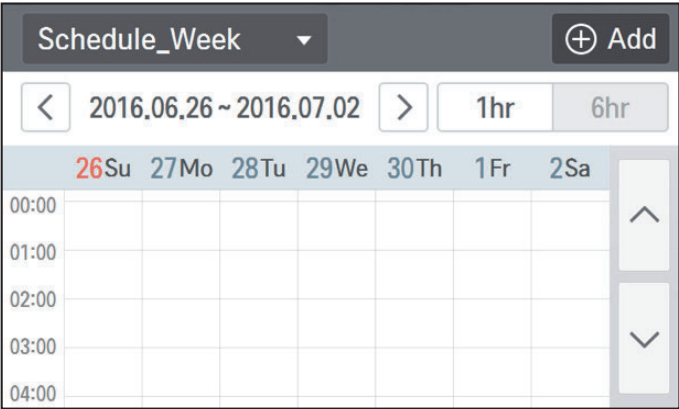


Figure 46: Schedule Menu - List.

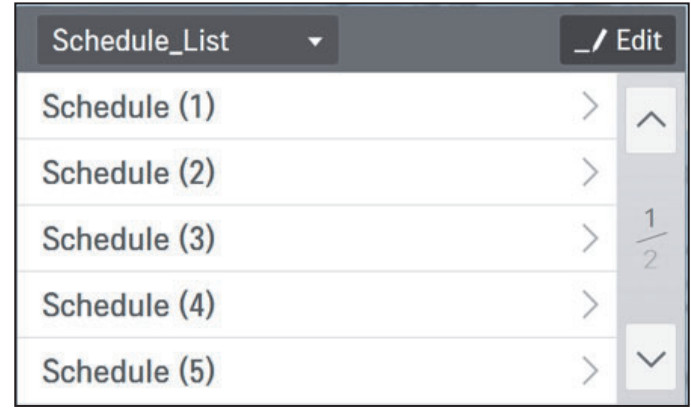
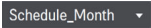
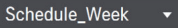
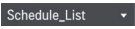


Table 18: Schedule Menu Table.

Icon	Description
	Checks the monthly set schedule at a glance.
	Checks the start time of the schedule and the set operation mode.
	Check the set schedule in a list.

HMI SCREENS

Schedule Menu Composition - Add Schedule

1. In the Schedule Menu screen, press the "Schedule Month" button.
2. Press the Add button. When the Add screen appears, input the basic schedule information:
 - Press the Name area, and a pop up window to input the schedule name appears. Input the name, and press the Apply button to set. If the Cancel button is pressed, the previous setting is maintained.
 - Press the Date area, and a pop up window to set the date appears. Set the start and end dates to use the schedule operation function, and the press Apply button. If the Cancel button is pressed, the previous setting is maintained.
 - Press the Time area, an a pop up window to set the time appears. Set the time to use the schedule operation function, and press the Apply button. If Cancel button is pressed, the previous setting is maintained.
 - Press the Days of Week selection area, and a pop up window to select the day of week appears. Select the day of week to use the schedule operation function, and press the Apply button. If the Cancel button is pressed, the previous setting is maintained.

Figure 49: Name Screen.

Name Setting(50 Letter)

Schedule (8)

Cancel

Apply

Figure 51: Time Screen.

Time Setting

^

AM

∨

^

12

∨

^

00

∨

Hours

Minutes

Cancel

Apply

Figure 47: Schedule Month Screen.

Schedule_Month

⊕ Add

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	31	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1	2	3	4	5	6

2016

01

Figure 48: Add Screen.

Add

Next ▶

✕

Phase1. Input basic schedule information.

Name (50)

Schedule (8)

Period

2016.06.28 ~ 2066.06.28

Time

AM 12:00

Repeat

Everyday

Figure 50: Date Screen.

Date Setting

From

^

2016

∨

^

6

∨

^

28

∨

~

To

^

2066

∨

^

6

∨

^

28

∨

Year

Month

Day

Year

Month

Day

Cancel

Apply

Figure 52: Days of Week Screen.

Days Select

Select

✓

MON

✓

TUE

✓

WED

✓

THU

✓

FRI

✓

SAT

✓

SUN

Cancel

Apply

Schedule Menu Composition - Add Schedule, continued.

- After the basic information is input, press the Next button, and a screen to set detailed Operation information appears.
- Press the Mode area, and a pop up window to select the mode is displayed. Select the operation mode to use the schedule operation function, and press the Apply button. If the Cancel button is pressed, the previous setting is maintained.
- Press the Setting Temperature area, and a pop up window to input the temperature setting appears. Set the temperature, and press the Apply button. If the Cancel button is pressed, the previous setting is maintained.
- Press the ON / OFF area, and a pop up window to select ON / OFF appears. Choose ON or OFF for the schedule operation function, and press the Apply button. If the Cancel button is pressed, the previous setting is maintained.
- Press the Maximum Operating Frequency area, and the pop up window to access the Maximum Operating Frequency window appears. Select a value to set, and then press the Apply button. If the Cancel button is pressed, the previous setting is maintained.

Figure 53: Operation Screen.

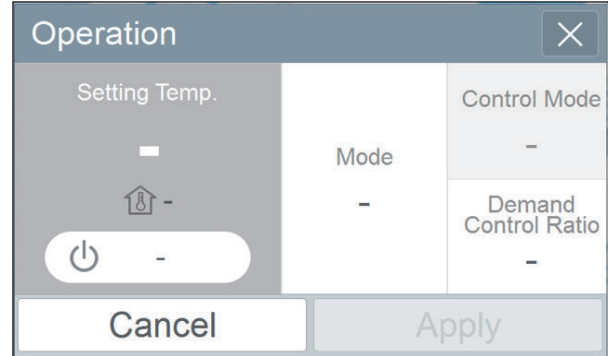


Figure 54: Mode Screen.

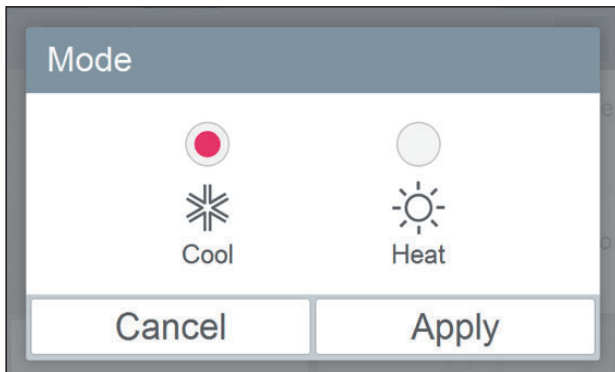


Figure 55: Setting Temperature Screen.

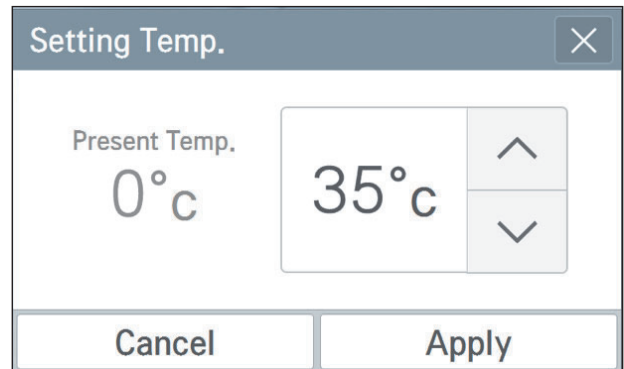


Figure 56: ON / OFF Screen.

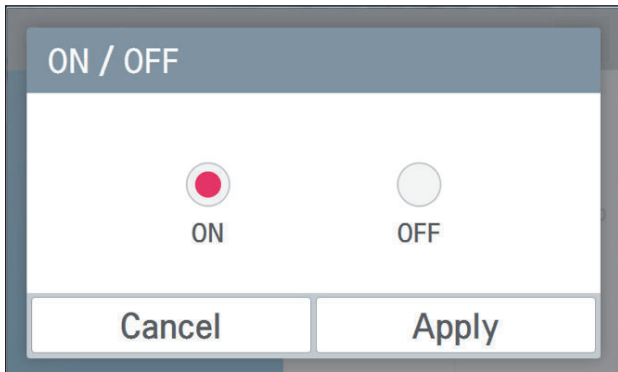
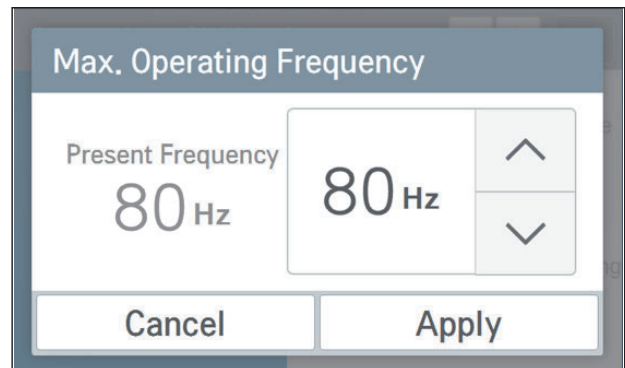


Figure 57: ON / OFF Screen.

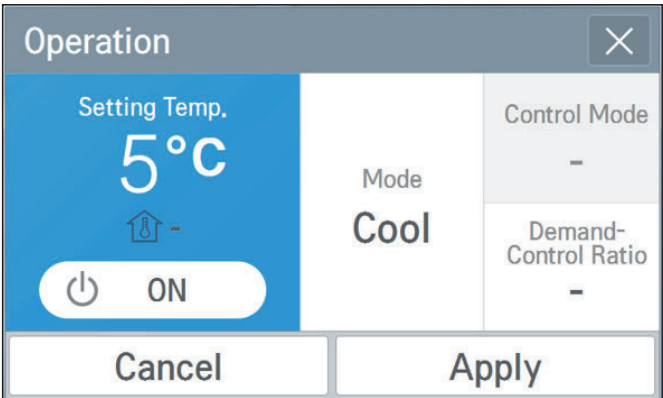


HMI SCREENS

Schedule Menu Composition - Add Schedule, continued.

- After the detailed information is input, press the Apply button of the Chiller Control, and the Add Schedule information is complete. If the Cancel button is pressed, the previous setting is maintained.

Figure 58: Operation Screen After Information is Set.



Schedule Menu Composition - Edit Schedule

- In the View Schedule _ List screen, select the schedule to edit.
- After the pop up window of the selected schedule appears, press the buttons listed in the table below to set.

Figure 59: Schedule_List Screen.

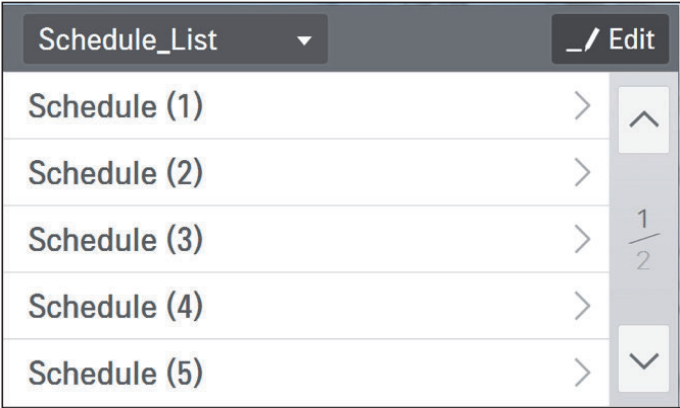


Figure 60: Schedule_List Pop Up Screen.

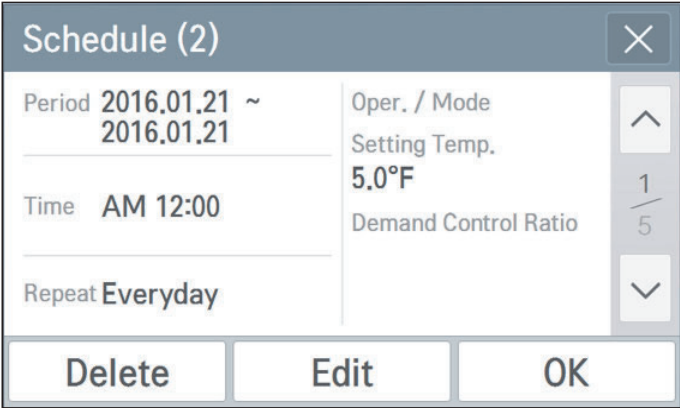


Table 19: Schedule_List Pop Up Screen Table.

Icon	Description
	Pop up window stating "Do you want to delete the selected schedule?" appears, and when the Apply button is pressed, it is deleted from the list.
	A pop up window to edit appears, and is set with the same method as the Add Schedule procedure.
	It maintains the current setting, and the pop up window disappears.

Schedule Menu Composition - Schedule List Edit

- 1. In the View Schedule _ List screen, press the Edit button at the top right side.
- 2. When the Edit screen appears, edit and delete the schedule addition and lists as necessary.

Figure 61: Schedule_List Screen.



Figure 62: Edit Schedule_List Screen.

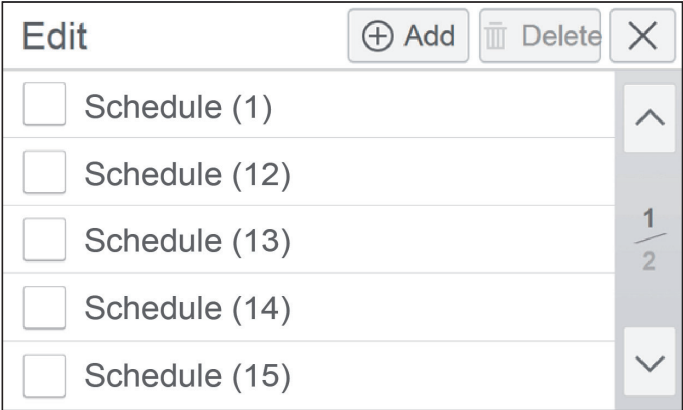


Table 20: Edit Schedule_List Screen Table.

Icon	Description
	When the Add button is pressed, the Schedule Addition screen appears.
	Select a list to active the Delete button. After the Delete button is activated, and when the Delete button is pressed, the selected list will be removed.

HMI SCREENS

Report Menu Composition

Use the Report Menu to access the record of events that trigger errors.

Report Menu Composition - Error Screen

Error history is stored chronologically; errors can be viewed by selecting day, week, and month.

Report Menu Composition - Detail Information

Select a history to view in detail, and the Detail Information pop up window appears. The date, time, address, code, and the information of the error code appears. When OK is pressed, the pop up window disappears.

Report Menu Composition - Delete History

When the Clear button at the top side of the Error Screen is pressed, a pop up window to input the password appears.

Input the password, and after the Apply button is pressed, all error histories will be deleted.

Figure 63: Error Screen.

ErrorClear

<

2016.6.28

>

Day

Week

Month

Date	Time	Address	Code	Detail Info.
2015-09-21	04:19:07	1	14	
2015-09-16	06:02:13	1	3	
2015-09-03	00:47:19	1	14	
2015-09-03	00:47:19	1	1	

^

1 / 2

v

Figure 64: Detail Information Screen.

Detail Information×

Date	2015-09-21	Addr.	1
Time	04:19:07	Code	14
Info.			

OK

Figure 65: Password Screen.

Password

Cancel

Apply

Figure 66: Error Screen Where the Errors Have Been Deleted.

ErrorClear

<

2016.6.28

>

Day

Week

Month

No report

View Setting Menu Composition

Describes the View Setting Menu screen, and the setting procedure required for chiller operation.

View Setting Menu Composition - Setting Screen

From the Main Menu screen, press the Setting button. Input the password to access the Setting screen (the screen at right appears) (Initial password: digital21.)

View Setting Menu Composition - Device

From the Setting Screen, press the Device Icon, and the Device Screen appears.

Figure 67: Setting Screen.

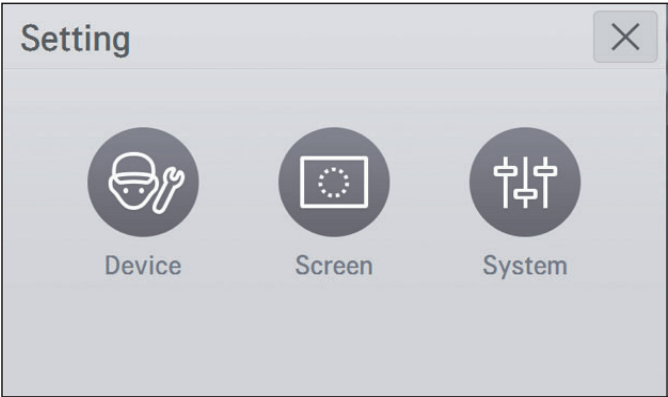


Figure 68: Setting Screen.

Device		
Edit Unit Address	Cooling Type Low Temp.	System Password ****
Temp offset correction	Thermo On offset correction	

Table 21: Setting Screen Table.

Icon	Description
Edit Unit Address	Sets chiller address and number of chiller units. Initial chiller address and number is one (1). For automatic control (or ACP), MODBUS communication, and HMI interface, if the chiller's Main PCB address is changed, the chiller's HMI address must changed (set as the same value).
System Password	Selects whether to change and use password. (Initial password : digital21.)
Temperature Offset Correction (Common Water Out Temperature Offset Correction)	Service function; restricted.
Thermo On Offset Correction (Value)	Service function; restricted.

HMI SCREENS

View Setting Menu Composition - Device, Edit Unit Address

While in Device mode, press the Edit Unit Address area, and the Edit Unit Address window appears.

After the Edit Unit Count area is pressed, a window to set the number of chillers appears.

Select from 1 to 5 (number of chillers to interface), and press the Apply button. If the Cancel button is pressed, the previous setting is maintained.

Note:

- Default value is one (1), the maximum number to set and use is five (5).
- Setting the chiller address: The chiller address must match in both the main PCB of the chiller, and the HMI. If the two addresses do not match, it will cause an HMI communication error.
- If the HMI address is reset while the chiller is operating, a communication error will occur, and the chiller will stop operating. Reset the address only after the chiller completely stops operating.

In the Edit Unit Address screen, press the Chiller 1 area, and the Edit Unit Address window appears. Input the desired address and press the Apply button to set. If the Cancel button is pressed, the previous setting is maintained.

Note:

If two (2) or more units are selected, an input address is necessary for each unit.

Figure 69: Edit Unit Address Screen.

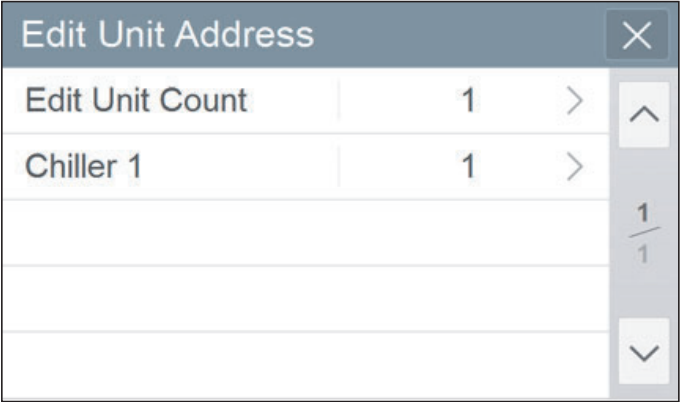


Figure 70: Edit Unit Count Screen.

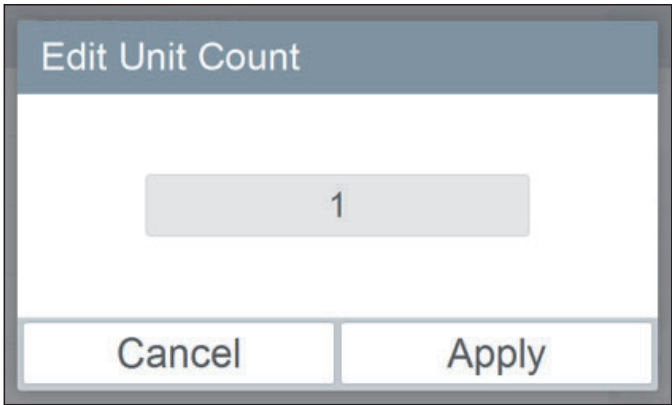
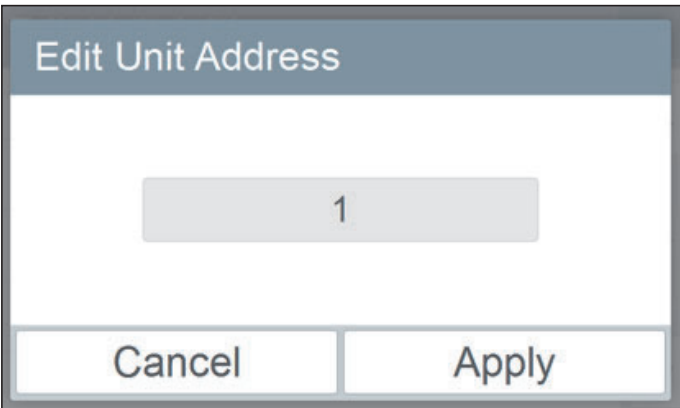


Figure 71: Edit Unit Address Screen.



View Setting Menu Composition - Device, Password

While in Device mode, press the System Password area, and the Password window appears.

1. Keep password.

- When the Use ON area is pressed, it changes to Use OFF.
- Press the Apply button to set. If the Cancel button is pressed, the previous setting is maintained.

Note:

"Use" is the default. If it is necessary to apply "Use" again, press Use OFF, input password, and then press the Apply button. (Initial password: digital21.)

2. Change password.

- When the Change Password area is pressed, the Change Password window appears.
- Input Current P/W, New P/W, and Re-type P/W, and press the Apply button.

Note:

If the wrong password is inputted five (5) times, check whether to initialize the password. If the Cancel button is pressed, the password input screen appears again. For password initialization, an LG representative.

Figure 74: Canceling Use Screen.

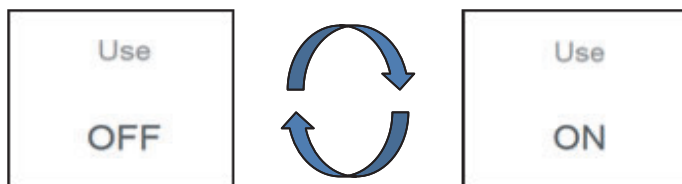


Figure 76: Change Password Screen.

The screenshot shows the 'Change Password' screen. It has a title bar 'Change Password' and a close button. Below the title bar are three input fields: 'Current P/W', 'New P/W', and 'Re-type P/W'. At the bottom of the screen are two buttons: 'Cancel' and 'Apply'.

Figure 72: Password Screen.

The screenshot shows the 'Password' screen. It has a title bar 'Password' and a close button. Below the title bar are two buttons: 'Use' and 'Change Password'. Below these are two buttons: 'ON' and 'Change'. At the bottom of the screen are two buttons: 'Cancel' and 'Apply'.

Figure 73: Changing ON to OFF Screen.

The screenshot shows the 'Password' screen. It has a title bar 'Password' and a close button. Below the title bar are two buttons: 'Use' and 'Change Password'. Below these are two buttons: 'OFF' and 'Change'. At the bottom of the screen are two buttons: 'Cancel' and 'Apply'.

Figure 75: Accessing the Change Password Screen.

The screenshot shows the 'Password' screen. It has a title bar 'Password' and a close button. Below the title bar are two buttons: 'Use' and 'Change Password'. Below these are two buttons: 'ON' and 'Change'. At the bottom of the screen are two buttons: 'Cancel' and 'Apply'.

Figure 77: Password Input Fail Screen.

The screenshot shows the 'Password Input Fail' screen. It has a title bar 'Information'. Below the title bar is a red message: 'Password input failed 5 times'. Below the message is a text box: 'Password can be initialized by inputting a hidden key. Ask the installer for details.' At the bottom of the screen are two buttons: 'Cancel' and 'Init Password'.

HMI SCREENS

View Setting Menu Composition - Device, Setting 2

Select Setting 2 on the Setup_Installer Mode screen, and the following screen will appear.

Figure 78: Setting 2 Screen.

Device ▾	Setting2 ▾
High Tempressure	Condensing Temp (Water Spray)
HE Frozen error	Outdoor Temp (Water Spray)

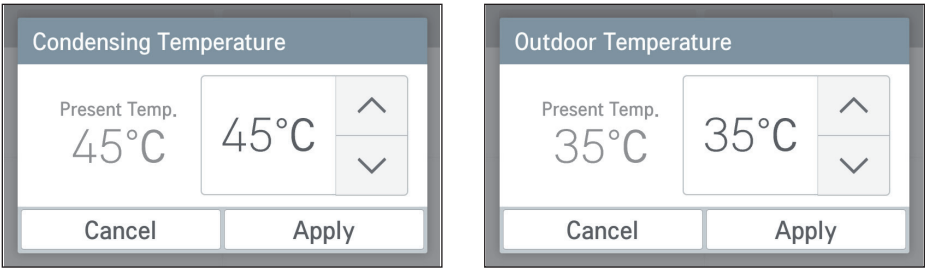
Table 22: Setting 2 Screen Table.

Icon	Description
High Tempressure	Function used only for on-site inspection for models with a legal freezing capacity of 20RT or higher.
HE Frozen error	Function used only for on-site inspection for models with a legal freezing capacity of 20RT or higher.
Condensing Temp (Water Spray)	Set the condensation temperature at which the spray function works.
Outdoor Temp (Water Spray)	Sets the outdoor (air) temperature at which the spray function works.

Press the Condensing Temperature (Water Spray) or the Outdoor (Air) Temperature (Water Spray) icons to display the screens below.

- Range of condensing temperature settings: 72°F to 108°F (40°C to 60°C).
- Range of outdoor (air) temperature settings: 36°F to 108°F (20 to 60°C).

Figure 79: Condensing and Outdoor Temperature Screens.



View Setting Menu Composition - Screen

In the Setting Menu screen, press the Screen Icon to access the Screen window.

Figure 80: Screen Window.

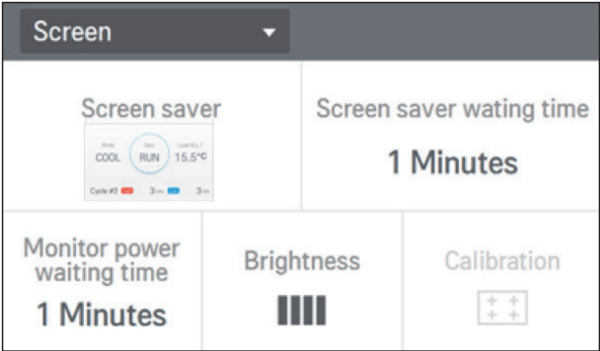


Table 23: Screen Window Table.

Icon	Description
	Applies or doesn't apply the screen saver.
	Sets the wait time for screen saver display.
	Sets the time to change to the minimum brightness of the screen when touch input is not available.
	Adjusts the screen brightness according to the ambient illumination intensity.

View Setting Menu Composition - Screen, Screen Saver

Press the Screen Saver area on the Screen window to display the Screen Saver window.

1. Press the area on the left side to Use or Not Use the screen saver. Whenever that area is pressed, the selected value is changed.
2. Select Use to activate the screen saver preview. When the activated area is pressed, the set screen saver can be viewed in advance.
3. When the Apply button of the screen saver is pressed, the selected setting is applied. If the Cancel button is pressed, the previous setting is maintained.

Figure 81: Screen Saver Window.

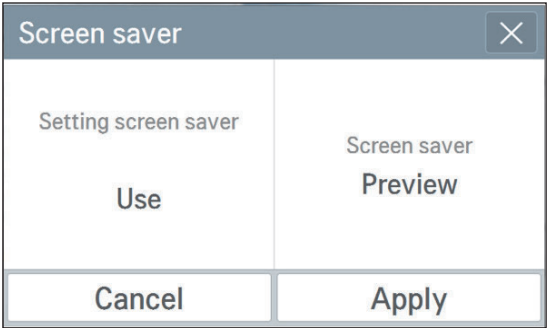


Figure 82: Canceling Screen Saver.

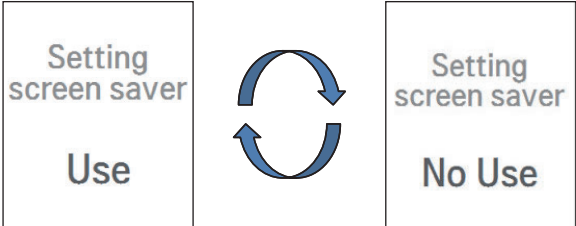
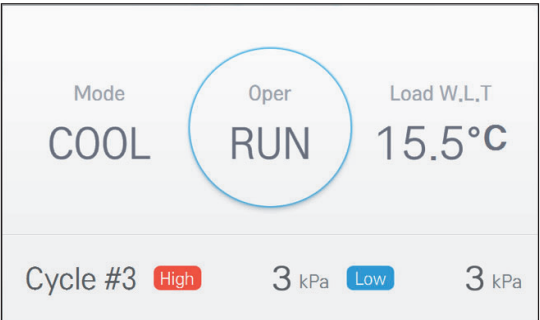


Figure 83: Set Screen Saver.

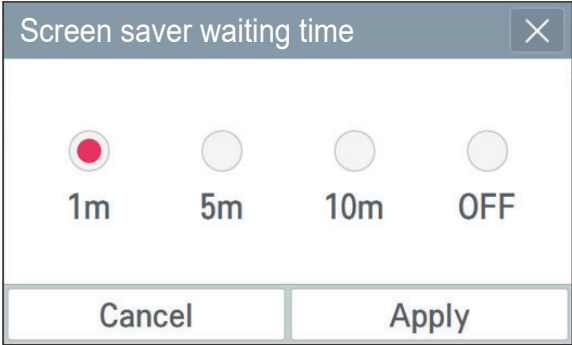


HMI SCREENS

View Setting Menu Composition - Screen, Screen Saver Waiting Time

When the Screen Saver Standby area is pressed, the Screen Saver Standby window appears. Select the wait time, and then press the Apply button. If the Cancel button is pressed, the previous setting is maintained.

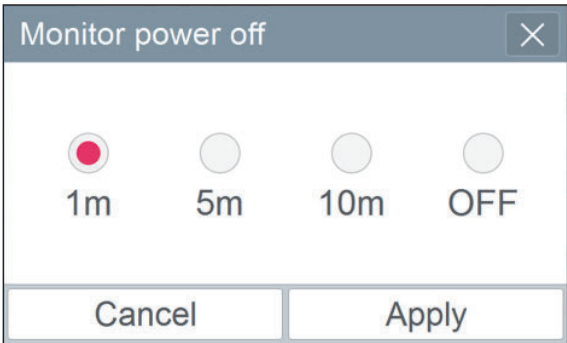
Figure 84: Screen Saver Wait Time Window.



View Setting Menu Composition - Screen, Monitor Power Off

When the Screen Power Saving area is pressed, the Screen Power Saving window appears. Select the time, and then press the Apply button. If the Cancel button is pressed, the previous setting is maintained.

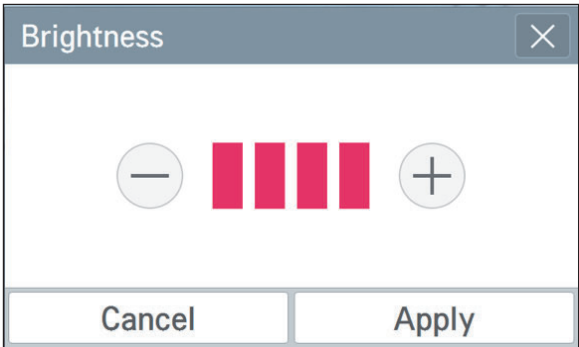
Figure 85: Monitor Power Off Screen.



View Setting Menu Composition - Screen, Brightness

When the Screen Brightness area is pressed, the Screen Brightness window appears. Set the desired brightness by pressing the “-” or the “+” buttons at the left or right side of the screen, and then press the Apply button. If the Cancel button is pressed, the previous setting is maintained. Choose the screen brightness from 25%, 50%, 75%, and 100%.

Figure 86: Brightness Screen.



View Setting Menu Composition - System (Normal)

On the Setting Screen, press the System area to access the System screen. The System menu is divided into normal and advance. Press the top right corner to access the normal or advance screens. When the Normal screen is chosen, the screen at the right appears.

Figure 87: System Screen.

System		Normal
Date	Time	Controller name
2016.06.28	PM 07:27	Scroll Chiller
Speaker	Temperature display	Language
OFF	°F	English

Table 24: Normal Screen Table.

Icon	Description
Date 2016.06.28	Selects the base value of the date recognized by the chiller. The date display and the schedule interface date, etc., operate based on the set date.
Time PM 07:27	Selected the base value of the time recognized by the chiller. The time display and the schedule interface time, etc., operate based on the set time.
Controller name Scroll Chiller	Input and edit the controller's name. The applied name is displayed at the top left side of Main Screen.
Speaker OFF	Selects whether to use touch sound.
Temperature display °F	Selects the temperature unit to be displayed on the controller. Select from °C or °F.
Language English	Selects the language displayed on the controller. Select from Korean or English.

View Setting Menu Composition - System (Normal), Date

On the System (Normal) screen, press the Date area. The Date window to set the date appears. Select the date by pressing the up / down buttons, and then press the Apply button to set. If the Cancel button is pressed, the previous setting is maintained.

Figure 88: Date Screen.

Date

^

2016

▼

^

6

▼

^

28

▼

Year

Month

Day

Cancel

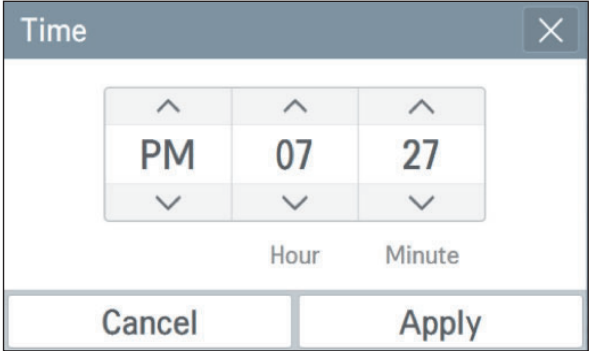
Apply

HMI SCREENS

View Setting Menu Composition - System (Normal), Time

On the System (Normal) screen, press the Time area. The Time window to set the time appears. Select the time by pressing the up / down buttons, and then press the Apply button to set. If the Cancel is button pressed, the previous setting is maintained.

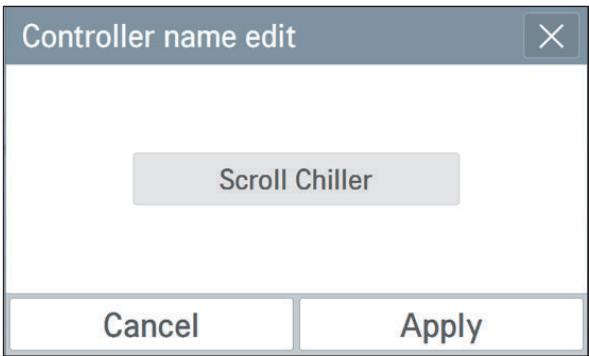
Figure 89: Time Screen.



View Setting Menu Composition - System (Normal), Controller Name Edit

On the System (Normal) screen, press the Controller Name Edit area. The Controller Name Edit window appears. Input the desired controller name, and then press the Apply button to set. If the Cancel is button pressed, the previous setting is maintained.

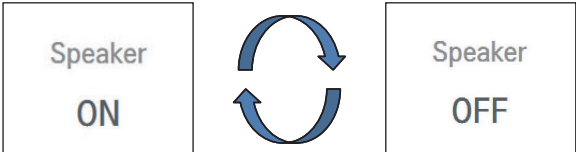
Figure 90: Controller Name Edit Screen.



View Setting Menu Composition - System (Normal), Speaker

On the System (Normal) screen, when the Speaker area is pressed, it switches between On and Off. Separate Apply and Cancel buttons are not necessary.

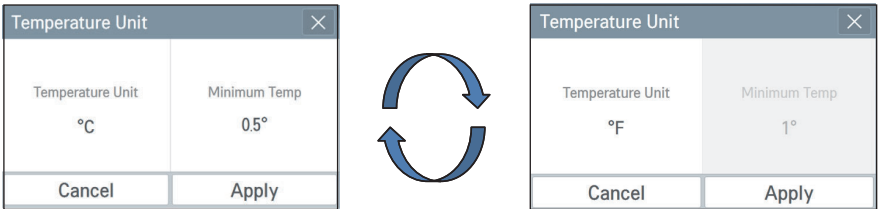
Figure 91: Speaker On / Off.



View Setting Menu Composition - System (Normal), Temperature Unit

On the System (Normal) screen, press the Temperature Unit area to access the pop up window. Press the Temperature Unit area in the pop up window to change the temperature unit. In the Celsius unit, the minimum temperature unit can be selected between 1°F and 0.5°F. Press the Apply button to set. If the Cancel is button pressed, the previous setting is maintained.

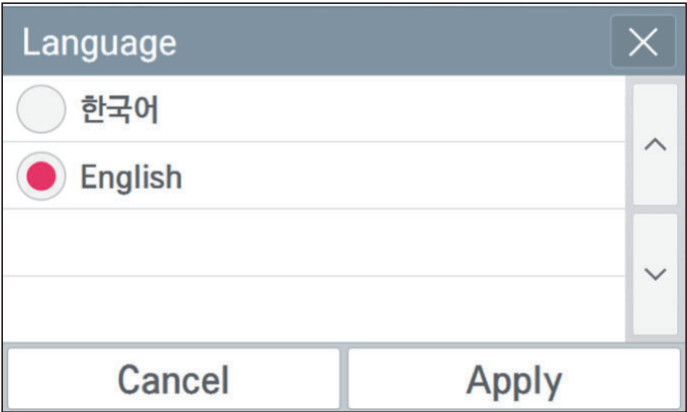
Figure 92: Temperature Unit Change.



View Setting Menu Composition - System (Normal), Language

On the System (Normal) screen, press the Language Setting area. The Language window to set the language appears. Select the desired language, and press the Apply button to set. If the Cancel is button pressed, the previous setting is maintained.

Figure 93: Language Screen.



View Setting Menu Composition - System (Advance)

On the Setting Screen, press the System area to access the System screen. The System menu is divided into normal and advance. Press the top right corner to access the normal or advance screens. When the Advance screen is chosen, the screen at the right appears.

Figure 94: Advance Screen.

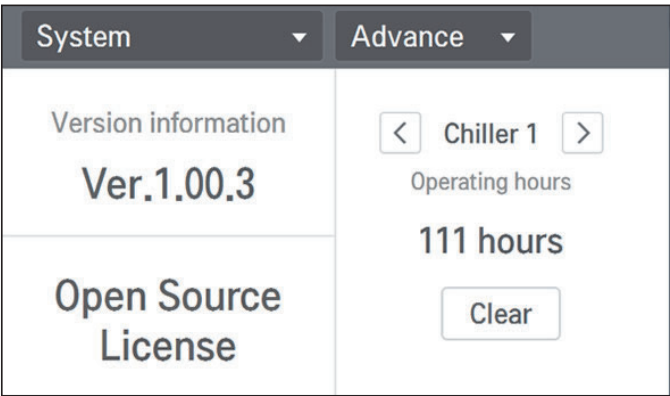


Table 25: Advance Screen Table.

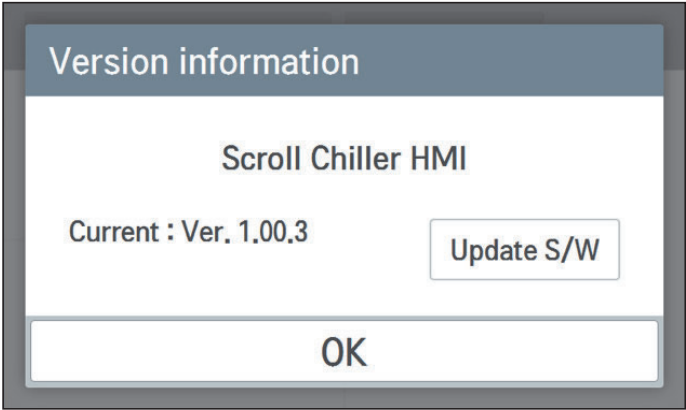
Icon	Description
Version information Ver.1.00.3	Displays the software version of the controller.
Open Source License	Displays the open source contents.
Operating hours 1 hours Clear	Displays the overall operation time of the chiller. The Clear function is for trained service technicians only; end user use is restricted.

HMI SCREENS

View Setting Menu Composition - System (Advance), Version Information

On the System (Advance) screen, press the Version Information area. A pop up window that displays the version information appears. Press the OK button to close the pop up window.

Figure 95: Version Information Screen.



View Setting Menu Composition - System (Advance), Open Source License

On the System (Advance) screen, press the Open Source License area to read the contents.

Note:

The Clear function is for trained service technicians only; the password will not be provided end users.

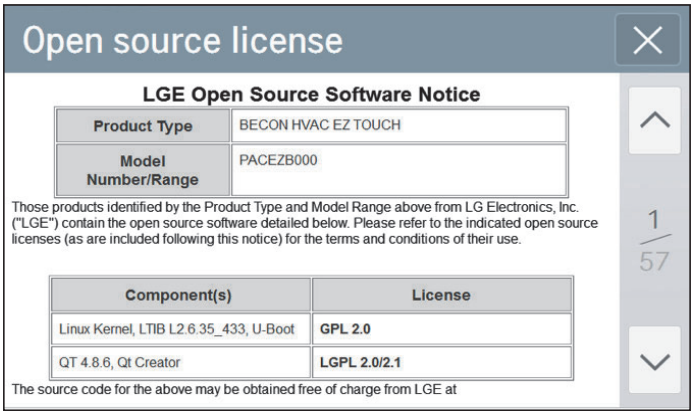
Customer Information about Open Source Licenses

Visit <http://opensource.lge.com> to obtain the open source codes developed under GPL, LGPL, MPL, or other open source licenses installed in this chiller.

The open source codes, as well as the contents of all applicable licenses, copyright notice, and warranty disclaimers are downloadable.

Request the open source codes for the software installed in this product by sending an e-mail to opensource@lge.com within three (3) years after the purchase of this chiller, the code will be provided on a CD-ROM. A minimum fee will be charged to cover the cost of materials and shipping.

Figure 96: Open Source License Screen.



Chiller Interface Control

The HMI can interface up to five (5) chillers, and can control and monitor up to five (5) chillers as one (1).

In the Device screen, press the Edit Unit Address setting area to set the number and addresses of the chiller(s). For details, refer to the “Edit Unit Address” section.

Chiller Interface Control, Unit Information

Press the left / right direction buttons to check the information for each interfaced chiller.

Chiller Interface Control, Operation Total

Through the Chiller Operation_Total screen, the same operation condition can be set for all the chillers.

For individual control, press the left / right direction buttons, but Control Mode or Run Mode cannot be changed.

Chiller Interface Control, Cycle Information

The cycle information can be viewed in the Cycle Information Screens.

Chiller Interface Control, Error

The entire error history of the interfaced chillers can be viewed in the Error Screen.

Note:

Individual schedule and settings are not supported.

Figure 97: Unit Information Screen.

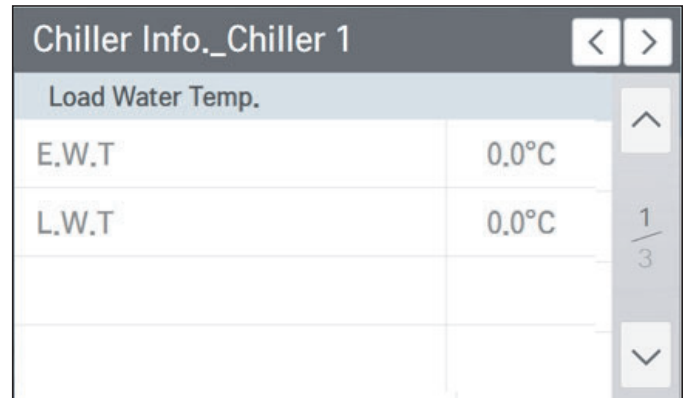


Figure 98: Chiller Operation_Total Screen.

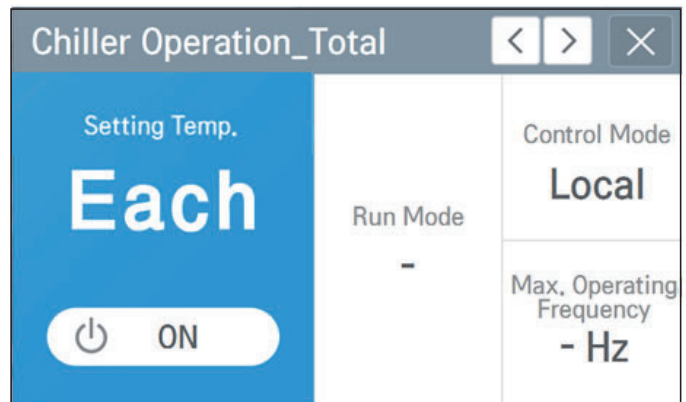


Figure 99: Cycle Information Screen.

Cycle #1	Info.	
Cycle Info._Chiller 1	A	B
4-Way Valve	ON	OFF
Hot-gas Valve	OFF	ON
Sump Heater	OFF	OFF

Figure 100: Error Screen.

Error

Clear

< 2016.6.28 >

Day

Week

Month

Date	Time	Address	Code	Detail Info.
2015-09-21	04:19:07	1	14	
2015-09-16	06:02:13	1	3	
2015-09-03	00:47:19	1	14	
2015-09-03	00:47:19	1	1	

1/2

ELECTRICAL

Specifications

General Precautions

⚠ WARNING

- All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and National Electrical Code (NEC) regulations related to electrical equipment and wiring, and following the instructions in this manual. Failure to do so will lead to electric shock and bodily injury or death.
- Undersized wiring will lead to unacceptable voltage and will cause a fire, which will cause bodily injury or death.
- Ensure that all power wiring / communication cables are properly terminated and firmly attached. If power wires and communication cables are not properly terminated and firmly attached, there is risk of fire, electric shock, and physical injury or death.
- ⚡ Do not install the wiring in reversed phase or missed phase. Connect all wires appropriately. If the system operates in reversed phase or missed phase, it will result in a fire, electric shock, and will cause physical injury and / or death.
- Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent could include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.
- Familiarize yourself with the location of the circuit breaker. Be sure that a circuit breaker or some other emergency power cutoff device is in place before any power wiring is done to the system. Failure to do so will cause bodily injury or death.
- Be sure that main power to the unit is completely off before proceeding. Follow all safety and warning information outlined at the beginning of this manual. Failure to do so will cause electric shock and bodily injury.
- ⚡ Never touch any power lines or live cables before all power is cutoff to the system. To do so, will cause bodily injury or death.
- Properly ground the / all chillers. Ground wiring must always be installed by a qualified technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.
- Properly ground the chillers. ⚡ Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Ground wiring must always be installed by a qualified technician. Failure to properly provide a NEC-approved earth ground can result in electric shock, physical injury or death.

Note:

- Properly ground the / all chiller/s. Ground wiring must always be installed by a qualified technician. Improperly ground wire can cause communication problems from electrical noise, and motor current leakage.
- ⚡ Do not install the wiring in reversed phase or missed phase. Connect all wires appropriately. If the system operates in reversed phase or missed phase, it will damage the compressors and other components.
- Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent will include some amount of direct current. Using an oversized breaker or fuse will result in equipment malfunction and property damage.
- ⚡ Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Failure to properly provide a NEC-approved earth ground can result in property damage and equipment malfunction.
- Verify the power imbalance is no greater than 2% between phases at each unit. Power imbalances will damage the compressors and other components.

Chiller Electrical Data

Table 26: Electrical Data for Single 460V Cooling Only Chiller.

Tons	Model No.	Voltage	Frequency (Hz)	Voltage Tolerance (Min. ~ Max.)	MCA	MFA	Compressor		Chiller Fan Motor		Input Power kW
							MSC	RLA	kW	FLA	
20	ACA020HETB	460	60	414 ~ 506	31	40	9.7	24.9	1.8	5	21.5

Voltage Range: Power supplied to the chiller must fall within the voltage minimum to maximum range listed in the table above. The chiller will not operate normally if the power supply voltage falls below or above the tolerance range.

Maximum allowable voltage variance permitted between phases is 2%.

MCA: Minimum Circuit Ampacity (A) (Criteria used to select the wiring standard).

MFA: Maximum Fuse Amps (A) (Criteria used to select circuit breaker and ground error circuit breaker [electricity leakage circuit breaker]).

MSC: Maximum Start Current (A)

RLA: Rated Load Amps (A) (Current required when operating under the following conditions—Cooling: Outdoor Air Temperature: 8°F DB / 66°F WB; Water Inlet / Outlet Temperature: 54°F / 44°F).

FLA: Full Load Amps (A).

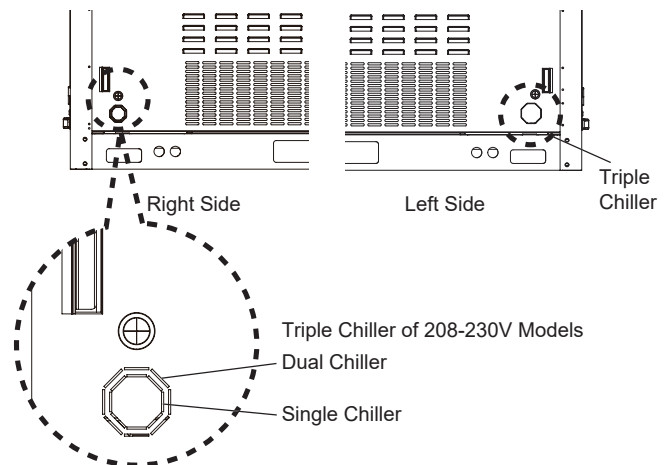
⚠ WARNING

- All power wiring and communication cable installation must be performed by authorized service providers working in accordance with local, state, and National Electrical Code (NEC) regulations related to electrical equipment and wiring, and following the instructions in this manual. Failure to do so will lead to electric shock and bodily injury or death.
- Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.
- Install appropriately sized breakers / fuses / overcurrent protection switches and wiring in accordance with local, state, and NEC regulations related to electrical equipment and wiring, and following the instructions in this manual. Generated overcurrent could include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.

Access Holes / Paths

1. Power wiring and communication cable access holes and connections will be different depending on the chiller model and volume.
2. Single Chillers use the connection terminals located at the right (when viewing from the front).
3. Install the power wiring and communication cables separately so that communication is not impacted by electric noise (Use conduits for the power wiring and communication cable, but ⓧ do not pass through the same conduit.)

Figure 101: Chiller Wiring / Cable Access Holes.



⚠ WARNING

- Properly ground the chillers. ⓧ Do not connect ground wire to refrigerant, gas, or water piping; to lightning rods; to telephone ground wiring; or to the building plumbing system. Ground wiring must always be installed by a qualified technician. Ground wiring is required to prevent accidental electrical shock during current leakage, which will cause bodily injury or death.
- Install the power wiring only after the ring terminal is connected. Improper connections can generate a fire, electric shock, physical injury and / or death.

Note:

- Install the power wiring only after the ring terminal is connected. Improper connections can damage electrical components.
- Verify the power imbalance is no greater than 2% between phases at each unit. Power imbalances will damage the compressors and other components.

ELECTRICAL

Wiring / Cable Connections

Wiring / Cable Connections

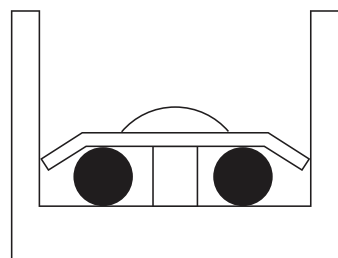
Best practice dictates using solderless ring or fork terminals at all power wiring and communication cable terminations. Use copper bearing ring or fork terminals; ⚡ do not use galvanized or nickel plate over steel. Use appropriate crimping tool to attach the ring or fork terminals at all power wiring and control cable terminations. To install:

- Firmly attach the wire; secure in a way to prevent external forces from being imparted to the terminal block.
- Use an appropriately sized screwdriver for tightening the terminals.
- ⚡ Do not overtighten the connections; overtightening will damage the terminals.

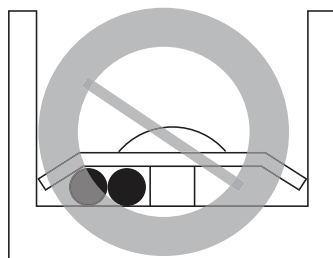
If ring terminals or fork terminals are not available, then:

- ⚡ Do not terminate different gauge wires to the power terminal block. (Slack in the wiring will generate heat.)
- When terminating wires of the same thickness, follow the instructions demonstrated in the figures below.

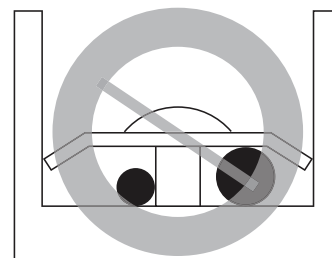
Figure 103: Proper and Improper Power Wiring Connections.



Terminate multiple power wires of the same gauge to both sides.



⚡ Do not terminate two wires on one side.



⚡ Do not terminate different gauge wires to a terminal block.

● :Copper Wire

⚠ WARNING

If power wires are not properly terminated and firmly attached, there is risk of fire, electric shock, and physical injury or death.

Note:

- ⚡ Never apply line voltage power to the communications cable terminal block. If contact is made, the PCBs will be damaged.
- Always include some allowance in the wiring length when terminating. Firmly attach the wiring or cable, but provide some slack to facilitate removing the electrical panels while servicing, and to prevent external forces from damaging the terminal block.

Terminal Connections

LG uses a "JIS" type of screw for all terminals; use a JIS screwdriver to tighten and loosen these screws and avoid damaging the terminal. ⚡ Do not overtighten the connections — overtightening will damage the terminals — but firmly and securely attach the wiring in a way to prevent external forces from being imparted to the terminal block.

Note:

- The terminals labeled "GND" are NOT ground terminals. The terminals labeled ⚡ ARE ground terminals.
- Polarity matters. Always connect "A" to "A" and "B" to "B."
- Always create a wiring diagram that contains the exact sequence in which all the indoor units and heat recovery units are wired in relation to the outdoor unit.
- ⚡ Do not include splices or wire nuts in the communication cable.

Figure 102: Close up of a Typical Ring Terminal.

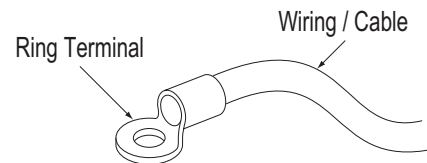
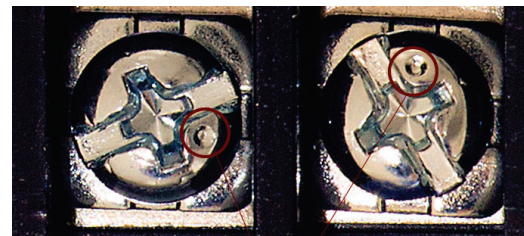


Figure 104: JIS Screws.



JIS DIMPLES



ELECTRICAL

Wiring / Cable Installation

Communication Cable Installation

1. Use 18 AWG two-conductor, twisted, stranded, shielded cable for communication. Ensure the communication cable shield is properly grounded to the Chiller chassis only. If one-conductor cable is used, it will result in poor communication quality.
2. Use only the regulated communication cable.

Note:

-  Do not use multiple lines. It can cause communication errors.
-  Do not install the communication cable parallel to the power wiring. It can cause communication errors.

Power Wiring / Installation


⚠ WARNING

- Power must be completely shut off during chiller installation. There is a risk of fire, electric shock, physical injury and / or death.
- Because there may be more than one (1) cutoff switch, attach warning labels to all cutoff switch locations so that power is not turned on until all installation work is complete. There is a risk of fire, electric shock, physical injury and / or death.
- Power supplied to the chiller must fall within the voltage minimum to maximum range listed in the Electrical Data tables, and on the product nameplates. Refer to the electrical data tables, and the wiring diagrams for information. Improper power supply can cause fire, electric shock, physical injury and / or death.

1. Power.

The power supply must be within the specifications of the chiller's nameplate. Supplied voltage must fall within listed minimum and maximum limits.

2. Power Wiring and Connections.

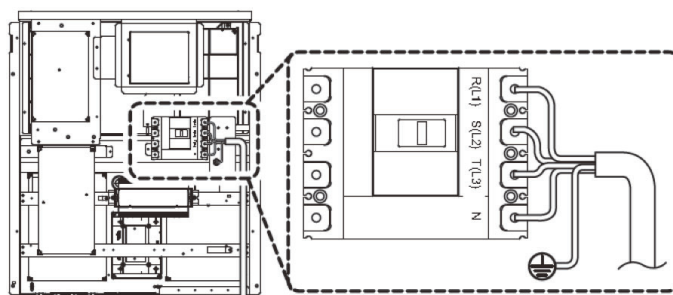
- For information on how to connect the power wiring, refer to the wiring diagrams in the technical manuals, or on the chiller access covers.
- Connect R, S, T, and N of the power wiring separately to the circuit breaker if installing one (1) chiller.
- All power wiring must comply with applicable federal, state, and local regulations.
-  Do not shut off the power unless the chiller will not be used or will not be operating for an extended period. Power must be turned on approximately six (6) hours before operating the chiller. If power is not provided to the crankcase heater to warm the oil on the bottom of the compressor, it can result in a damaged and / or an inoperable system.

3. Control Power.

Table 27: Power Wiring Specifications.

Model No.	Tons	Power Wiring Specifications (AWG x No.)
		460V
ACAH020HETB	20	10 × 4

Figure 105: R, S, T, and N Power Wiring and Connections.



All control power used as a part of potential operation and approved internal bus wiring is provided inside the unit.

4. Additional Wiring / Cable Connections.

ELECTRICAL

Wiring / Cable Installation

Refer to the wiring diagram for field-installed wiring. Only the main panel (HMI installed panel) requires wiring at the site. The control box is shipped fully wired from the factory.

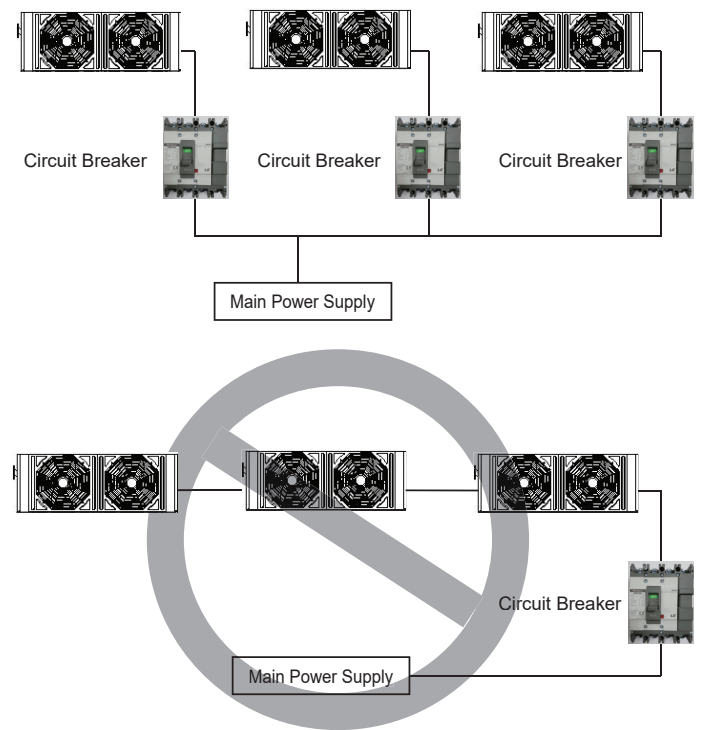
5. Circuit Breaker and Power Wiring Connections.

Table 29: Field-Installed Wiring / Cable Connections.

Index	Signal Type	Location	Remarks
Power	DC Power	12 V DC	Required
Central Control Communication	Communication	CH2 A, B	Required
HMI Communication	Communication	CH3 A, B	Required
Modbus	Communication	CH4 A, B	Optional (Field Installed)
Ambient Thermistor	DI	UI1, G	Required
Flow Switch	DI	UI5, G	Factory Installed
Pump Interlock	DI	UI6, G	Required Closed Contact from Pump During Flow
Remote On / Off	DI	DI1, GND	Optional (Field Installed)
Remote CO / HP	DI	DI2, GND	Optional (Field Installed)
Remote Alarm	DI	DI3, GND	Optional (Field Installed)
Alarm Status	DO	DO1, COM	Optional (Field Installed)
On / Off Status	DO	DO2	Optional (Field Installed)
Pump Output	DO	DO3	Optional (Field Installed)
Heater Output	DO	DO5	Optional (Field Installed)

- Each chiller must have its own circuit breaker and direct power wiring.
- ⓧ Do not install one circuit breaker for multiple chillers. ⓧ Do not daisy chain the power wiring from the main power supply to multiple chillers.
- Always label each circuit breaker and its connected chiller.
- Refer to the specification and electrical data when selecting circuit breaker capacities. Follow all state, local, and NEC guidelines when choosing and installing circuit breakers and power wiring.

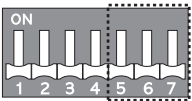
Table 28: Power Wiring System to Multiple, Grouped Chillers.



Setting the Control Box Address (Set Cycle PCB Address)

- 1. Select the address by turning DIP switches Nos. 5, 6, and / or 7 on SW01B at the top right corner of the PCB to ON / OFF.
 - If there is only one (1) cycle PCB connected to the chiller's main controller, use only Cycle Address No. 1 (see table below).
- 2. After selecting the cycle address using the DIP switches, always press the Reset button to complete the setting.

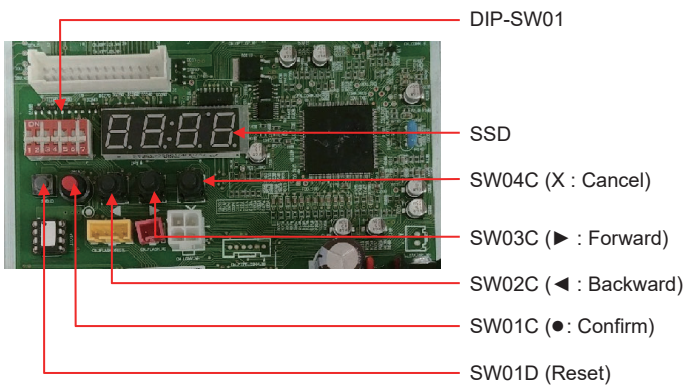
Table 30: Setting the Control Box Address.

Cycle Address	SW01B DIP Switch Setting
Cycle Address No. 1 DIP Switches Nos. 6 and 7 to OFF	SW01B 

Note:

- If there is only one (1) cycle PCB connected to the chiller's main controller, Cycle Address No. 1 must be used or the chiller will not operate.
- When replacing the cycle PCB, always run the automatic address setting procedure again. Automatic address setting procedure must be performed with all connected cycle PCBs and HMI PCB connected. If it is not performed, it will result in operation error.
- When setting the address, check and change other control box PCB address within the chiller. PCB address for replacements is set to 1. If the control box PCB address is duplicated, the chiller will not operate.
- Control box PCB addresses are set to 1 as factory default.

Figure 106: Cycle PCB (Appearances May Differ).



ELECTRICAL

Installing the HMI Indoors

Installing the HMI Indoors

Note:

- The HMI can be installed on an interior wall. See below for instructions. Use a drill to add pilot holes before installing the screws.
 - Communication cable for indoor installation is field-supplied. Communication cable from chiller to HMI is to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the chiller chassis only. ⚡ Do not ground the communication cable at any other point.
1. Choose the location in which to install the HMI. Verify that it is an appropriate location to connect the communication cable and power wiring to the HMI, and that its distance from the chiller falls below maximum wiring / cable length requirements.
 2. Use the drier and the M4 screw on the top wall of the communication cable to attach the back panel of the HMI. See diagram at right. It can be attached as shown, depending on the installation location.
 3. Pull the communication cable through the hole on the back of the panel.
 4. Connect the cable to the communication port located on the back of the HMI.

⚠ WARNING

- Different polarities exist on the communication cable; ⚡ do not mix! It will result in a fire, electric shock, and will cause physical injury and / or death.
- To prevent improper connections, mark "A" and "B", it is recommended to mark A and B on the communication cable. Improper wiring will result in a fire, electric shock, and will cause physical injury and / or death.
- Use the ring or fork terminals to connect the communication cable to the control box terminals. See "Control Panel Configuration" for the location of the HMI control box. Improper wiring will result in a fire, electric shock, and will cause physical injury and / or death.

Note:

- Different polarities exist on the communication cable; ⚡ do not mix! It will result in a fire, electric shock, and will result in damage to the compressors and other components.
- To prevent improper connections, mark "A" and "B", it is recommended to mark A and B on the communication cable. Failure to do so will result in a communication malfunction.
- Use the ring or fork terminals to connect the communication cable to the control box terminals. See "Control Panel Configuration" for the location of the HMI control box.

5. Connect the factory-supplied power adapter to the power terminal located on the back of the HMI.
6. Assemble the main body of the HMI to the wall panel. Position the hole at the top of the main HMI unit on the top of the back panel. Push the bottom of the HMI to the back panel to lock into place.
7. Plug in the power adapter to the HMI and the power supply.

Note:

If the power adapter power cord and the HMI power wiring must be installed together, it is necessary to separate the power cable to the HMI from the communication cable to the HMI to avoid communication problems from electrical interference.

Figure 107: Attaching the Back Panel of the HMI to the Wall.

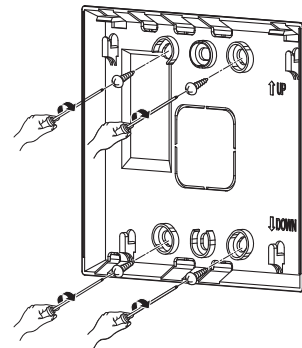


Figure 108: Pulling the Communication Cable Through the Back of the Panel.

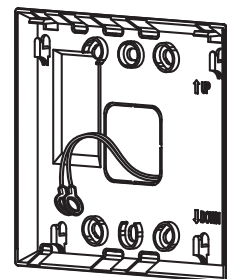


Figure 109: HMI Terminal.

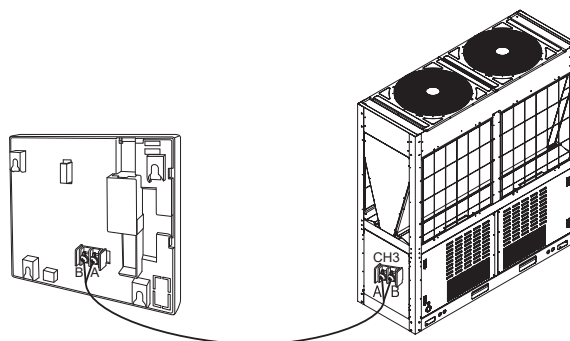
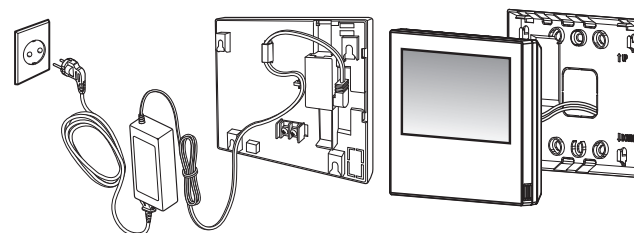


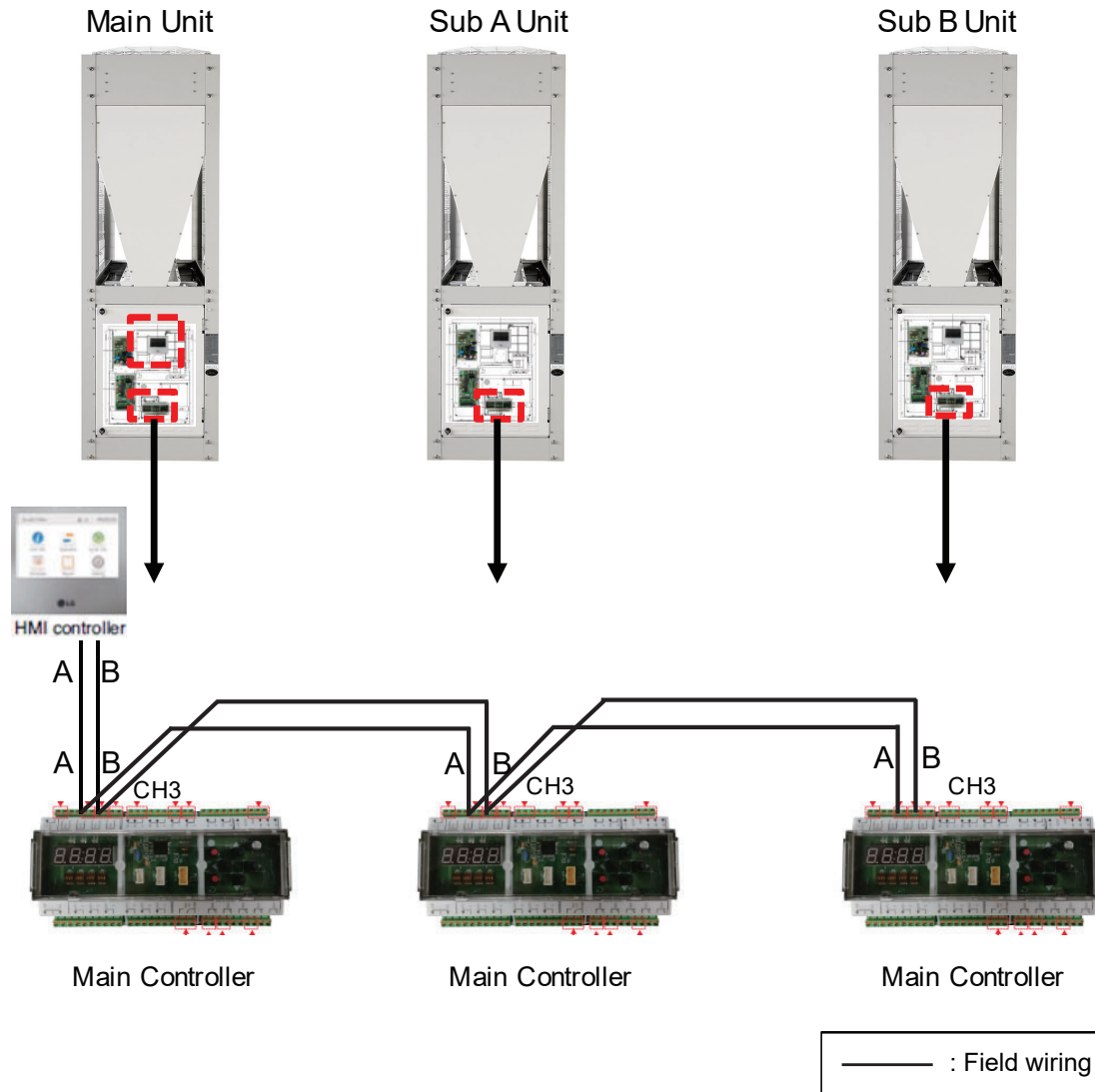
Figure 110: HMI Terminal.



ELECTRICAL

Unit Combination Setup

Figure 111: Unit Combination Setup.



1. Communication cable is daisy chained from the Main Chiller Main Controller on CH3 to the Sub Chiller(s) Main Controller(s) on CH3. Always Match A to A, and B to B.
2. Communication cable is connected from the HMI Controller to the Main Controller. Always Match A to A, and B to B.
3. Communication cable from chiller to HMI is to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the chiller chassis only. ⚠ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.
4. Install the communication cable and power wiring separately so that communication cable is not impacted by any electric noise generated from power wiring. ⚠ Do not install the power wiring and the communication cables in the same conduit.
5. Up to five (5) chillers can be combined using the A-B CH3 bus.

Note:

- If the interlocked chiller number and address are not set from the HMI, a communication error will occur. (Refer to the Control > Freezer Interlock Control about HMI Address Settings in the Chiller Installation and Operation Manual.)
- If Main Controller address does not match the HMI address, a communication error will occur. (Refer to the Control > Freezer Address Setting about the Controller Address Settings in the Chiller Installation and Operation Manual.)

MODBUS PROTOCOL

Note:

If the chiller enters the Modbus remote mode, all the information can only be monitored through the HMI. Actual operation control (start / stop or changing the set temperature) can only be performed through the external controller. To control from the HMI, change the control mode to “Local”.

Note:

Remote communication error CH10009 will occur when the communication is disconnected between the HMI and external controllers. When communication is recovered, it will automatically resume. If the remote Modbus connection is not used, reset the power of the main PCB of the chiller to cancel the alarm.

Modbus Interlock Protocol Details

The protocol details for Modbus interlock of external devices are:

- Physical layer: RS-485 serial line
- Baud rate: 9,600
- One (1) stop bit
- Mode: Modbus RTU mode
- Parity: None parity
- Applied function codes

Figure 112: Applied Function Codes.

Function Code	Sub-function	Function Name	Start Address From Main Device
0x01	None	Read Coil Register	Address-1
0x02	None	Read Discrete Input	Register Address-10001
0x03	None	Read Holding	Register Address-40001
0x04	None	Read Input	Register Address-30001
0x05	None	Write Single Coil	Register Address-1
0x06	None	Write Single Holding	Register Address-40001
0xF1~FF	Reserved for Exception Code	-	-

Note:

See the Modbus protocols in the following pages.

MODBUS PROTOCOL REGISTERS

Modbus Protocol Registers

Coil Register

Table 31: Coil Register.

Register Address	Description
1	0: Product Stop, 1: Operation Start

Discrete Registers

Table 32: Discrete Registers.

Register Address	Description
10001	Reserve
10002	0 : Load Water Flow Switch Off
	1 : Load Water Flow Switch On
10003	Reserve
10004	0 : Load Water Pump Output Off
	1 : Load Water Pump Output On
10005	Reserve
10006	0 : Load Water Pump Interlock Off
	1 : Load Water Pump Interlock On
10007 ~ 10104	Reserve
10105	0 : 4 Way Valve 1 Off of Cycle 1
	1 : 4 Way Valve 1 On of Cycle 1
10106	0 : 4 Way Valve 2 Off of Cycle 1
	1 : 4 Way Valve 2 On of Cycle 1
10107	0 : Hot gas1 Off of Cycle 1
	1 : Hot gas1 On of Cycle 1
10108	0 : Hot gas2 Off of Cycle 1
	1 : Hot gas2 On of Cycle 1
10109	0 : Sump Heater 1 Off of Cycle 1
	1 : Sump Heater 1 On of Cycle 1
10110	0 : Sump Heater 2 Off of Cycle 1
	1 : Sump Heater 2 On of Cycle 1
10111~10118	Reserve
10119	0 : Inverter Compressor 1 Off of Cycle 1
	1 : Inverter Compressor 1 On of Cycle 1
10120	0 : Inverter Compressor 2 Off of Cycle 1
	1 : Inverter Compressor 2 On of Cycle 1
10121~10208	Reserve
10209	0 : 4 Way Valve 1 Off of Cycle 2
	1 : 4 Way Valve 1 On of Cycle 2
10210	0 : 4 Way Valve 2 Off of Cycle 2
	1 : 4 Way Valve 2 On of Cycle 2

MODBUS PROTOCOL REGISTERS

Table 33: Discrete Registers, continue.

Register Address	Description
10211	0 : Hot gas1 Off of Cycle 2
	1 : Hot gas1 On of Cycle 2
10212	0 : Hot gas2 Off of Cycle 2
	1 : Hot gas2 On of Cycle 2
10213	0 : Sump Heater 1 Off of Cycle 2
	1 : Sump Heater 1 On of Cycle 2
10214	0 : Sump Heater 2 Off of Cycle 2
	1 : Sump Heater 2 On of Cycle 2
10215~10222	Reserve
10223	0 : Inverter Compressor 1 Off of Cycle 2
	1 : Inverter Compressor 1 On of Cycle 2
10224	0 : Inverter Compressor 2 Off of Cycle 2
	1 : Inverter Compressor 2 On of Cycle 2
10225~10312	Reserve
10313	0 : 4 Way Valve 1 Off of Cycle 3
	1 : 4 Way Valve 1 On of Cycle 3
10314	0 : 4 Way Valve 2 Off of Cycle 3
	1 : 4 Way Valve 2 On of Cycle 3
10315	0 : Hot gas1 Off of Cycle 3
	1 : Hot gas1 On of Cycle 3
10316	0 : Hot gas2 Off of Cycle 3
	1 : Hot gas2 On of Cycle 3
10317	0 : Sump Heater 1 Off of Cycle 3
	1 : Sump Heater 1 On of Cycle 3
10318	0 : Sump Heater 2 Off of Cycle 3
	1 : Sump Heater 2 On of Cycle 3
10319~10326	Reserve
10327	0 : Inverter Compressor 1 Off of Cycle 3
	1 : Inverter Compressor 1 On of Cycle 3
10328	0 : Inverter Compressor 2 Off of Cycle 3
	1 : Inverter Compressor 2 On of Cycle 3
10329~10416	Reserve

MODBUS PROTOCOL REGISTERS

Input Registers

Table 34: Input Registers.

Register Address	Description
30001	Chiller Controller Version
30002	Entire Operation Current
30003	External Air Temperature
30004	Common Load Water Output Temperature (Average Value of Individual Load Water Outputs)
30005	Common Load Water Input Temperature (Average Value of Individual Load Water Inputs)
30006~30007	Reserve
30008	Information of Refrigerator Failure (1~5)
30009	Cycle Failure Information (0 : Common System Error, 1~10 : Error of Corresponding Cycle)
30010	Failure Code
30011	Start Waiting Time
30013	Product's Accumulated Operation Time Upper Level
30014	Product's Accumulated Operation Time Lower Level
30015~30100	Reserve
30101, 30102	Load Water Output Temperature of Cycle 1
30103, 30104	Load Water Input Temperature of Cycle 1
30105~30108	Reserve
30109	Condensation Temperature (Left) of Cycle 1
30110	Condensation Temperature (Right) of Cycle 1
30111	Evaporation Temperature (Left) of Cycle 1
30112	Evaporation Temperature (Right) of Cycle 1
30113	Inverter Compressor 1 Frequency of Cycle 1
30114	Inverter Compressor 2 Frequency of Cycle 1
30115	High Pressure (Left) of Cycle 1
30116	High Pressure (Right) of Cycle 1
30117	Low Pressure (Left) of Cycle 1
30118	Low Pressure (Right) of Cycle 1
30119	Operation Current (Left) of Cycle 1
30120	Operation Current (Right) of Cycle 1
30121	Main EEV's Status Value of Cycle 1 (Left)
30122	Main EEV's Status Value of Cycle 1 (Right)
30123~30124	Reserve
30125	Discharge Temperature of Inverter Compressor 1 of Cycle 1
30126	Discharge Temperature of Inverter Compressor 2 of Cycle 1
30127	Intake Temperature of Inverter Compressor 1 of Cycle 1
30128	Intake Temperature of Inverter Compressor 2 of Cycle 1

MODBUS PROTOCOL REGISTERS

Table 35: Input Registers, continued.

Register Address	Description
30129	Liquid Pipe Temperature (Left) of Cycle 1
30130	Liquid Pipe Temperature (Right) of Cycle 1
30131	Hex Temperature (Left) of Cycle 1
30132	Hex Temperature (Right) of Cycle 1
30133~30144	Reserve
30145	Accumulated Operation Time of Inverter Compressor 1 of Cycle 1 (Upper Level)
30146	Accumulated Operation Time of Inverter Compressor 1 of Cycle 1 (Lower Level)
30147	Accumulated Operation Time of Inverter Compressor 2 of Cycle 1 (Upper Level)
30148	Accumulated Operation Time of Inverter Compressor 2 of Cycle 1 (Lower Level)
30149~30200	Reserve
30201, 30202	Load Water Output Temperature of Cycle 2
30203, 30204	Load Water Input Temperature of Cycle 2
30205~30208	Reserve
30209	Condensation Temperature (Left) of Cycle 2
30210	Condensation Temperature (Right) of Cycle 2
30211	Evaporation Temperature (Left) of Cycle 2
30212	Evaporation Temperature (Right) of Cycle 2
30213	Inverter Compressor 1 Frequency of Cycle 2
30214	Inverter Compressor 2 Frequency of Cycle 2
30215	High Pressure (Left) of Cycle 2
30216	High Pressure (Right) of Cycle 2
30217	Low Pressure (Left) of Cycle 2
30218	Low Pressure (Right) of Cycle 2
30219	Operation Current (Left) of Cycle 2
30220	Operation Current (Right) of Cycle 2
30221	Main EEV's Status Value of Cycle 2 (Left)
30222	Main EEV's Status Value of Cycle 2 (Right)
30223~30224	Reserve
30225	Discharge Temperature of Inverter Compressor 1 of Cycle 2
30226	Discharge Temperature of Inverter Compressor 2 of Cycle 2
30227	Intake Temperature of Inverter Compressor 1 of Cycle 2
30228	Intake Temperature of Inverter Compressor 2 of Cycle 2
30229	Liquid Pipe Temperature (Left) of Cycle 2
30230	Liquid Pipe Temperature (Right) of Cycle 2
30231	Hex Temperature (Left) of Cycle 2
30232	Hex Temperature (Right) of Cycle 2
30233~30244	Reserve
30245	Accumulated Operation Time of Inverter Compressor 1 of Cycle 2 (Upper Level)
30246	Accumulated Operation Time of Inverter Compressor 1 of Cycle 2 (Lower Level)
30247	Accumulated Operation Time of Inverter Compressor 2 of Cycle 2 (Upper Level)
30248	Accumulated Operation Time of Inverter Compressor 2 of Cycle 2 (Lower Level)
30249~30300	Reserve

MODBUS PROTOCOL REGISTERS

Table 36: Input Registers, continued.

Register Address	Description
30301, 30302	Load Water Output Temperature of Cycle 3
30303, 30304	Load Water Input Temperature of Cycle 3
30305~30308	Reserve
30309	Condensation Temperature (Left) of Cycle 3
30310	Condensation Temperature (Right) of Cycle 3
30311	Evaporation Temperature (Left) of Cycle 3
30312	Evaporation Temperature (Right) of Cycle 3
30313	Inverter Compressor 1 Frequency of Cycle 3
30314	Inverter Compressor 2 Frequency of Cycle 3
30315	High Pressure (Left) of Cycle 3
30316	High Pressure (Right) of Cycle 3
30317	Low Pressure (Left) of Cycle 3
30318	Low Pressure (Right) of Cycle 3
30319	Operation Current (Left) of Cycle 3
30320	Operation Current (Right) of Cycle 3
30321	Main EEV's Status Value of Cycle 3 (Left)
30322	Main EEV's Status Value of Cycle 3 (Right)
30323~30324	Reserve
30325	Discharge Temperature of Inverter Compressor 1 of Cycle 3
30326	Discharge Temperature of Inverter Compressor 2 of Cycle 3
30327	Intake Temperature of Inverter Compressor 1 of Cycle 3
30328	Intake Temperature of Inverter Compressor 2 of Cycle 3
30329	Liquid Pipe Temperature (Left) of Cycle 3
30330	Liquid Pipe Temperature (Right) of Cycle 3
30331	Hex Temperature (Left) of Cycle 3
30332	Hex Temperature (Right) of Cycle 3
30333~30344	Reserve
30345	Accumulated Operation Time of Inverter Compressor 1 of Cycle 3 (Upper Level)
30346	Accumulated Operation Time of Inverter Compressor 1 of Cycle 3 (Lower Level)
30347	Accumulated Operation Time of Inverter Compressor 2 of Cycle 3 (Upper Level)
30348	Accumulated Operation Time of Inverter Compressor 2 of Cycle 3 (Lower Level)
30349~39997	Reserve
39998	Product Group Info.
39999	Product Type Info.

Holding Registers

Table 37: Holding Registers.

Register Address	Description
40001	Reserve
40002	Operation Mode Setting (0 : Cooling, 4 : Heating)
40003	Cooling Target Temperature Setting (41°F ~ 68°F)
40004	Heating Target Temperature Setting (104°F ~ 134.6°F)
40005	Control Mode Setting (On-site/Remote/Scheduled)
40006	Remote Mode Setting (Contact / Modbus)
40007	Cooling Type Setting (0 : Normal)
40008	Max. Operating Frequency Setting: (0 : 120, 1 : 130, 2 : 110, 3 : 100, 4 : 90, 5 : 80, 6 : 70)
40009~40022	Reserve

TEST RUN

Test Run

Checks Before Test Run

Before starting the chiller, check the supplementary devices such as the water circulation, water pump, air handler unit, etc. (see manufacturer's directions for operation information). Verify that all parts are installed properly and accurately; check if the wiring is installed correctly. Refer to the wiring diagrams.

- Check the flow switch for appropriate operation; verify if the sensor is functioning properly.
- For cooling, fill the water circuit with clean water. Purge the air so no air remains inside the water circuit. If the outdoor temperature is expected to drop below 32°F, add anti-freeze to the water circuit to prevent freezing. The water circuit must be cleaned before connecting it to the chiller.
- Check and inspect all water piping. Check if the water is flowing in the correction direction, and if it is properly connected to the evaporator. Open all flow valves to the evaporator.
- Turn on the water pump. Measure the decrease in overall water pressure to check whether the flow is accurate. Compare it to the designed flow rate.
- Check all electric connections in the control panel. Verify all parts are tightly assembled with good contact conditions. Although the control panel connections are inspected at the factory, these can become loose from vibration during transportation.
- Check and inspect all fuses. All fuses in the power panel / control panel must be installed at an appropriate location.

Initial Operation

- Check if the load is operating on the air processing device (or any other device) on the water supply side to the chiller. If the temperature of the water is too high, the initial operation of the load device can be delayed.
- If the chiller auto control is not working, check if the water circulation pump is operating.
- Voltage variance must be within $\pm 10\%$. Check that the phase voltage imbalance is not exceeding 5% between phases. Check whether the power and capacity is appropriate for processing the load.
- Check the power phase order.
- Check / inspect the voltage monitoring meter in the power panel. The meter should not display any error codes.
- Use the HMI device to check the water outlet temperature and water output temperature setting.
- Set the start menu on the HMI device. Water circulation flow must be within the permitted range to control the temperature appropriately.

Checks During Initial Operation

After the test run, operate the chiller to verify the product is functioning properly. If there are any issues, immediately stop operation, and follow the "Troubleshooting" process.

- Check the rotation of the condenser fan motor.
- Verify if the water outlet temperature matching the set temperature.
- Through the HMI device, check if all of the sensors display the appropriate values. Temperature sensor detects the compressor discharge temperature, compressor suction temperature, condenser outlet temperature and cold water inlet/outlet temperature.
- Verify if the operating current, operation sound, and vibration matches the product specifications.

Stop Operation

- Follow the procedure below when stopping chiller operation.
- On the HMI, press the stop button
- Measure how long it takes for the chiller to actually stop.
- Stop the water pump.

Load Operation and Operation Adjustment

After start and stop, check the functions by operating the chiller, and adjusting if necessary. Adjust the water outlet temperature setting to adjust the load.

Prepare Operation Data

Always record the chiller operating condition; check it against the product specification and determine if it is functioning normally.

Analyze Water Quality

Analyze water quality during the test run, and save the data. Compare the water quality results after a certain period (a monthly check is recommended) against the test run data to determine when to change the water.

Additional Functions - DIP Switch Settings

See below and the next two pages for DIP switch settings to the listed functions. Change the DIP switch settings on the control box PCB.

Night Low Sound Function

Night low sound function determines the hottest time of the day during cooling operation, and reduces the fan operation sound by running it at a low RPM at night.

Figure 114: How to Set the Maximum RPM.

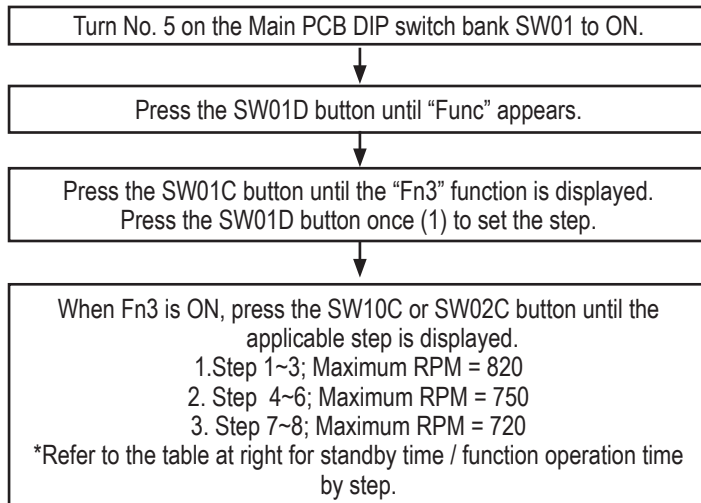


Figure 115: Starting the Night Low Sound Function (When Setting Step 1).

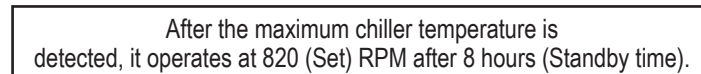
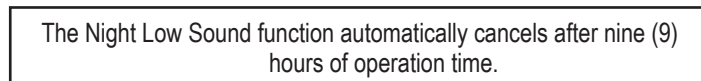


Figure 116: Stopping the Night Low Sound Function (When Setting Step 1).



Note:

- Reset the main board of the control box before operating the Night Low Sound function.
- Request the function setting to the contractor after chiller installation.
- If the function is not used, turn the DIP switch OFF and reset the power.
- If the chiller RPM is changed, the cooling capacity may be reduced.

Figure 113: DIP Switch Locations (Appearances May Vary).

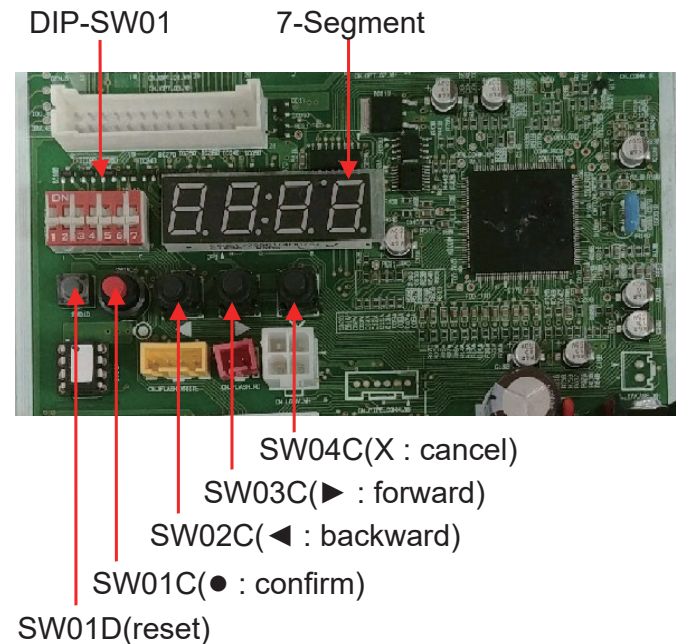


Table 38: Setting the Time and Related Sound Level.

Step		Maximum Fan RPM	Standby Time (Hour)	Function Operation Time (Hour)
1	1	820	8	9
2			6.5	10.5
3			5	12
4	2	750	8	9
5			6.5	10.5
6			5	12
7	3	720	8	9
8			6.5	10.5
9			5	12
10	-	820	0	Continuous Operation
11		750	0	Continuous Operation
12		720	0	Continuous Operation

TEST RUN

Self Diagnosis Function

This function self diagnoses the chiller, and displays the error. The error code appears in the pop up window in HMI. When the error is resolved, press the “Reset” button on HMI to close the pop up window.

OK Button

The OK Button closes the error pop up window. The error codes pop up window is closed for technician convenience from the HMI screen, but the current error code status is maintained.

Error Code

The error code is configured as below.

Figure 118: Error Code Nomenclature.

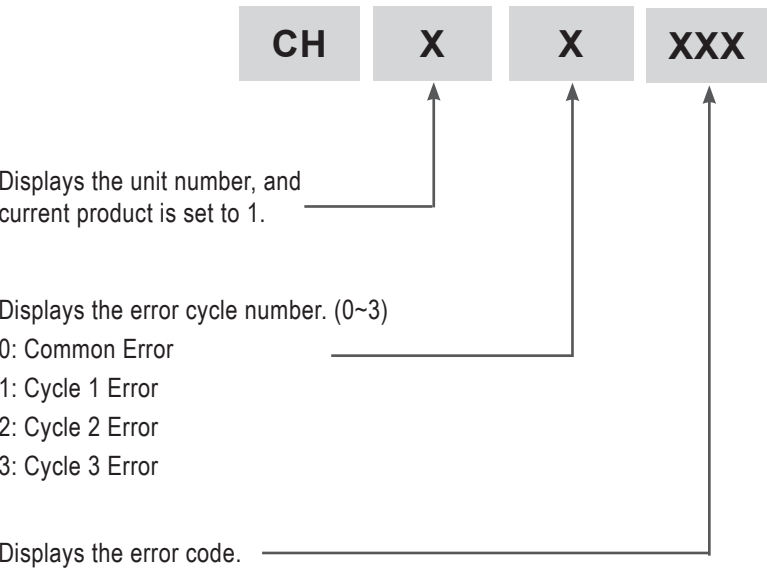
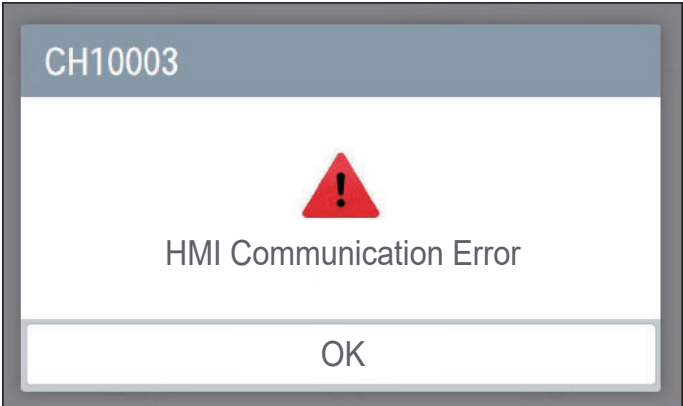


Figure 117: HMI Error Screen.



Process Alarm (Error)

Common Error

CH10XXX error stops product operation.

Error By Cycle

When the error occurs by cycle, the applicable cycle is maintained at stopped condition and normal cycles operate normally. When the cycle error is canceled, the chiller resumes normal operation.

Note:

If comprised of three (3) cycles, chiller will maintain overall operation, even when two (2) cycles are in error. The chiller will stop only when all three (3) cycles are in error.

Water Management

Troubleshooting Errors that Appear During Test Operation

Table 39: Water Source Errors.

Category	Status	Cause	Action
Water source has malfunctioned.	CH13	Error detected during flow switch connection.	Verify if the water source supply pump is operating.
		Water is not flowing, or water flow amount is insufficient. (All operation conditions)	Check if the water piping is blocked. Strainer needs cleaned, valve is locked, there is a problem with the valve, there is air in the piping, etc.
			Check for a problem with the flow switch. Flow switch is malfunctioning, unauthorized handling, flow switch is disconnected, etc.)
	CH180	Water is not flowing, or water flow amount is insufficient.	Verify if the water source supply pump is operating. Check if the water piping is blocked. Strainer needs cleaned, valve is locked, there is a problem with the valve, there is air in the piping, etc.

If CH13 or CH180 occurs during a test run, there is a possibility of the shell-and-tube heat exchanger partially freezing.

Restart the chiller after removing the cause of the partial freezing: Insufficient water flow, a blocked water supply, undercharged system refrigerant, foreign particulates inside the shell-and-tube heat exchanger.

Shell-and-Tube Heat Exchanger Maintenance

As scale accumulates, the efficiency of the shell-and-tube heat exchanger may decrease, and / or damage can occur if the flow amount decreases, causing the heat exchanger to freeze up and burst. It is necessary, therefore, to manage scale accumulation.

1. Before the cooling / heating season, check the following (one [1] time per year).

- Inspect the water quality to see if it falls within standards.
- Clean the strainer.
- Verify that the water flow amount is adequate.
- Check if operation conditions are adequate (pressure, flow amount, water outlet temperature, etc.).

2. To clean the shell-and-tube heat exchanger, follow the procedures below (one [1] time per year).

- Check if a service port is mounted on the water pipe for solvent cleaning.
- A 5% diluted formic acid, citric acid, oxalic acid (water acid), acetic acid, phosphoric acid, etc., are suitable as the solvent for scale cleaning.

Note:

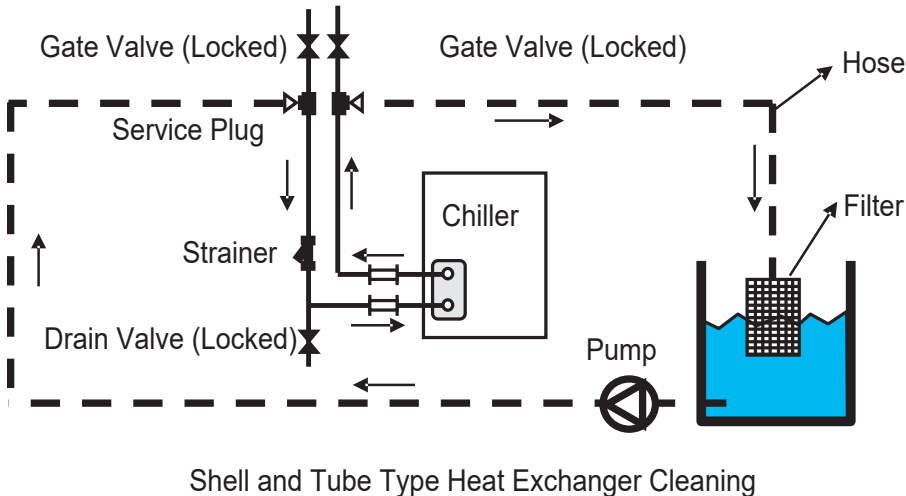
⊘ Do not use Hydrochloric acid, sulfuric acid, nitric acid, etc.. These solvents have corrosive properties that will damage the heat exchanger.

- During the cleaning process, verify that the water inlet and outlet pipe gate valves and drain pipe valves are properly shut.
- Connect the piping for cleaning through water pipe service port, fill the solvent of about 122°F~140°F in the heat exchanger, and circulate for about two (2) to five (5) hours using a pump. Circulation time may be different according to solvent temperature or amount of scale.
- Closely observe for solvent color changes to decide the circulation time.
- After the solvent circulates, completely drain it out of the heat exchanger. Add 1~2 % concentration sodium hydroxide (NaOH) or hydrocarbon sodium (NaHCO₃) and circulate for about 15 to 20 minutes to neutralize.
- Flush with clean water. Measure the pH concentration of the water to verify if the solvent is properly removed.
- If another solvent is used, verify that it does not contain any corrosive properties that will damage stainless or copper.
- Contact a local water quality specialist for information regarding cleaning solvents.

3. After cleaning is complete, operate the chiller to see if it functions properly.

WATER SYSTEM MAINTENANCE

Figure 119: Cleaning the Shell-and-Tube Heat Exchanger.



Daily Inspection Management

1. Water Quality Management

The chiller shell-and-tube heat exchanger cannot be disassembled and cleaned directly, nor can its parts be replaced. To prevent corrosion, or scale from accumulating in the shell-and-tube heat exchanger, special care must be applied to water quality management. Follow the local, state, and federal standards for water quality. If corrosion prevention solution or corrosion reduction solution is added, chemicals with no corrosive properties against stainless and copper must be used. To prevent contaminating the circulation water by outside air, periodically drain the water that is inside the water pipe, and then fill it with new water, even if the circulation water was not contaminated.

2. Water Flow Management.

If the water flow is insufficient, the shell-and-tube heat exchanger may freeze and burst. Check if the strainer is blocked or filled with air. Measure the temperature and / or pressure differences between the inlet and outlet water piping. If there is a difference of temperature or pressure above the appropriate levels, the water flow has decreased. Immediately stop chiller operation, troubleshoot, and fix the issue before restarting. (If there is air in the water, purge the system. The air inside the water piping hinders water circulation, causing the flow amount to be insufficient and the heat exchanger to freeze and burst.)

3. Anti-freeze Concentration Management.

If anti-freeze is added to the water system, use the designated type and concentration. ⚠ Anti-freeze that includes calcium chloride corrodes the shell-and-tube heat exchanger cannot be used.

If the anti-freeze is left alone, it absorbs moisture from the air, the concentration will decrease, which can lead to the shell-and-tube heat exchanger freezing and bursting. Minimize the air contacting the anti-freeze, and periodically measure the concentration of anti-freeze. Maintain the anti-freeze concentration by adding as necessary.

WATER SYSTEM MAINTENANCE

Table 40: Water System Maintenance Schedule.

Category	Period (Year)														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Chiller Operation Status	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Clean Heat Exchanger	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Clean Strainer	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Inspect Water Quality	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Inspect for Refrigerant Leaks	•														•

Note:

- The Water System Maintenance Schedule table above lists the minimum amount of time. More frequent inspections can be necessary because of environmental, operation, and / or water quality conditions.
- Before heat exchanger cleaning, remove parts such as pressure gauges or shut off the valves so that solvents cannot enter.
- Check the piping connections in advance of cleaning to prevent solvent leaks.
- Begin cleaning after the solvent and water are mixed thoroughly.
- Initiate heat exchanger cleaning in the beginning of the chiller's life cycle. If scale accumulation becomes severe, it becomes difficult to remove.
- If the region in which the chiller is installed has poor quality, more frequent cleaning can be necessary.
- Cleaning solvents are strongly acidic, flush the system completely with water to remove all traces of solvent.
- To verify if the inside is clean, remove the hose and check inside the pipe.
- Perform an air purge procedure to remove all air inside the water pipe.
- After inspection, check if the water flows properly before restarting the chiller.

TROUBLESHOOTING GENERAL ERRORS

⚠ WARNING Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Chiller product.

Troubleshooting General Errors

Note:

If the safety devices stopped chiller operation, identify and resolve the problem(s) before restart.

- If the chiller is not operating, check the power, refrigerant, configuration, and error settings.
- To troubleshoot the power supply / wiring, check the voltage connected to the chiller terminal block in the control panel. If there is no power, check if the circuit breaker has tripped.
- If the power is properly connected, check the chiller refrigerant cycle pressure to verify if it is within the normal range.
- If the chiller refrigerant cycle pressure exceeds the normal range, check for leaks within the piping system.
- Before restarting the chiller, return it the default setting.
- Check the error codes; error codes can be view using the HMI device.
- If there is /are (an) error code(s) the alarm is turned on, see the Error Code tables to troubleshoot specific errors.

Table 41: Troubleshooting General Errors.

Symptom	Cause	Solution
Chiller does not start.	Check the power.	Check over-current protection device.
		Check if fuse is disconnected or shorted out.
		Turn power on.
	Incorrect or inaccurate chiller configuration.	Check configuration.
		Check if wiring is incorrect.
	Error appears.	Check the error condition.
		Check for the error code tables to review solutions and resolve the issue.
		Follow direction.
		Check the HMI input channel to review the error input.
Evaporation pressure is low and the chiller is constantly stopping.	Entering delay time.	Verify if the compressor is in start delay time.
	Insufficient refrigerant.	Check for leaks and recharge refrigerant.
	Insufficient water.	Check water system (ensure rated flow.). - Is the water system valve closed? - Is the pressure difference between inlet and outlet of the water system appropriate? - Is the air from water system cold?
Condensation pressure is high and the chiller is constantly stopping.	Outside temperature is high.	Check if the outside temperature is within the operation condition range.
	Foreign particles accumulated on the condenser.	Clean condenser.
	Fan is defective.	Replace fan.
Chiller is vibrating.	Bolt connecting the fan motor is loose.	Check assembly and tighten bolt.
	Motor mount is loose.	Check assembly and tighten bolt.
	Fan is not balanced.	Check fan rotation range; replace fan.
	Compressor assembly bolt is loose.	Tighten assembly bolt / nut.
	Frame assembly bolt is loose.	Check assembly and tighten bolt
	Motor bearing is burned.	Check for abnormal noise in motor (noise in multiple RPM) and replace motor.

TROUBLESHOOTING GENERAL ERRORS

⚠ WARNING Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Chiller product.

Table 42: Troubleshooting General Errors, continued.

Symptom	Cause	Solution
Reverberating sound.	Rubber on the motor mount is defective.	Replace motor mount.
	Pipe vibration heard near compressor.	Replace the anti-vibration material on piping.
High frequency wave sound from front of chiller.	Fan defect in the control box.	Clean the area around the fan.
Constantly searching for cold water.	Insufficient cold water.	Check the water system (Ensure rated flow). - Is the water system valve closed? - Is the pressure difference between inlet and outlet of the water system appropriate? - Is the air of water system cold? - Is the cooling load within appropriate range?
Evaporation pressure is high.	Temporary rise in water temperature due to abnormal load increase.	This is a normal condition, but verify if the pressure falls within the operating range.

ERROR CODE TABLES

⚠ WARNING Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Chiller product.

Table 43: Error Code Table.

Error Code	Description	Reason	Chiller Status	Error Resolution
CHxx001	Outdoor temperature sensor error.	Outdoor temperature sensor is disconnected, shorted, or opened.	Stop product.	Automatically returns to normal condition.
CHxx003	HMI communication error.	When communication between HMI and chiller controller is disconnected for more than 180 seconds.	Stop product.	Automatically return to normal condition.
CHxx005	Cycle control box communication error.	When communication between chiller controller and cycle control box is disconnected for more than 30 seconds.	Stop product	Automatically return to normal condition.
CHxx009	Remote communication error.	When the Modbus communication with the external device is not established for more than 180 seconds after the initial communication with the remote Modbus condition is established.	Stop product	Automatically return to normal condition.
CHxx011	Load water pump interlock error.	When the load water pump is turned off for 3 seconds when starting or during the operation for more than 3 times within 1 hour. When turned off more than 9 seconds within 1 hour.	Stop product	Press the HMI Reset button.
CHxx013	Load water flow switch error.	When the load water flow switch is turned off for 3 seconds when starting or during the operation for more than 3 times within 1 hour. When turned off more than 9 seconds within 1 hour.	Stop product	Press the HMI Reset button.
CHxx015	Remote alarm.	When the contact point signal of hardware wiring is short when entering the remote control mode.	Stop product	Automatically return to normal condition.
CHxx021	Inverter compressor IPM fault.	Inverter compressor drive IPM defect/ inverter compressor defect	Stop applicable cycle	Automatically return to normal condition.
CHxx022	Inverter compressor input over-current.	Inverter compressor input over-current.	Stop applicable cycle	Automatically return to normal condition.
CHxx023	Inverter compressor DC link low pressure.	DC voltage charge defect.	Stop applicable cycle	Automatically return to normal condition.
CHxx024	Cycle high pressure switch operation.	High pressure switch operates due to abnormal high pressure.	Stop applicable cycle	Automatically return to normal condition.
CHxx025	High/Low voltage of input voltage.	Over/Under permitted voltage of input voltage, N.	Stop applicable cycle	Automatically return to normal condition.
CHxx026	Inverter compressor start failure error.	Initial start failure from compressor defect.	Stop applicable cycle	Automatically return to normal condition.
CHxx028	Inverter DC link high voltage error.	Defect from DC voltage and over-charge.	Stop applicable cycle	Automatically return to normal condition.
CHxx029	Inverter compressor over-current.	Exceed limit.	Stop applicable cycle	Automatically return to normal condition.
CHxx032	Surge in inverter #1,#2 compressor discharge temperature.		Stop applicable cycle	Automatically return to normal condition

ERROR CODE TABLES

WARNING Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Chiller product.

Table 44: Error Code Table, continued.

Error Code	Description	Reason	Chiller Status	Error Resolution
CHxx034	Surge in high pressure	Surge in high pressure side.	Stop applicable cycle	Automatically return to normal condition
CHxx035	Surge in low pressure	Drop in low pressure side.	Stop applicable cycle	Automatically return to normal condition
CHxx036	Low compression rate error	Low compression rate error.	Stop applicable cycle	Automatically return to normal condition
CHxx040	Inverter compressor CT sensor error	Inverter compressor CT sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx041	Inverter compressor discharge temperature sensor error	Inverter compressor discharge temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx042	Low pressure sensor error	Low pressure sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx043	High pressure sensor error	High pressure sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx045	Heat exchanger temperature sensor error	Heat exchanger temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx046	Suction temperature sensor error	Suction temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx050	Chiller 3 phase power missing phase	Chiller 3 phase power missing phase	Stop applicable cycle	Automatically return to normal condition
CHxx052	Communication error with inverter controller	Communication error with inverter controller	Stop applicable cycle	Automatically return to normal condition
CHxx053	Communication failure between indoor and chiller units.	Communication failure between indoor and chiller unit.	Stop applicable cycle	Automatically return to normal condition
CHxx054	Reversed phase on chiller unit's 3 phased power source; Reversed connection on RST.	Reversed phase on chiller unit's 3 phased power source; Reversed connection on RST.	Stop applicable cycle	Automatically return to normal condition
CHxx057	Communication error with inverter controller	Communication error with inverter controller	Stop applicable cycle	Automatically return to normal condition
CHxx059	Installation failure of series model outdoor unit	Installation failure of series model outdoor unit	Stop applicable cycle	Automatically return to normal condition
CHxx060	Inverter PCB EEPROM error	Inverter PCB EEPROM error	Stop applicable cycle	Automatically return to normal condition
CHxx062	Surge in inverter board IPM temperature	Surge in inverter board IPM temperature	Correspond cycle stop	Automatic return to a normal condition
CHxx065	Inverter IPM temperature sensor error	Inverter IPM temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx067	Fan lock	Fan locked	Stop applicable cycle	Automatically return to normal condition
CHxx075	Fan CT sensor error	Fan CT sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx077	Fan over-voltage error	Fan over-voltage	Stop applicable cycle	Automatically return to normal condition

ERROR CODE TABLES

⚠ WARNING Please refer to the Safety Precautions on pages 4-7 for more detail to prevent injury or death regarding the operation and service troubleshooting of the Chiller product.

Table 45: Error Code Table, continued.

Error Code	Description	Reason	Chiller Status	Error Resolution
CHxx077	Fan over-voltage error	Fan over-voltage	Stop applicable cycle	Automatically return to normal condition
CHxx079	Fan start failure error	Fan start failure	Stop applicable cycle	Automatically return to normal condition
CHxx086	Main PCB EEPROM error	Main PCB EEPROM access error	Stop applicable cycle	Automatically return to normal condition
CHxx087	Fan PCB EEPROM error	Fan PCB EEPROM access error	Stop applicable cycle	Automatically return to normal condition
CHxx090	Individual Inlet water temperature sensor error	Individual Inlet water temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx091	Individual Outlet water temperature sensor error	Individual Outlet water temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx104	Communication Error between units.	Communication error between units.	Stop applicable cycle	Automatically return to normal condition
CHxx105	Fan board communication error	Fan board communication error.	Stop applicable cycle	Automatically return to normal condition
CHxx106	Fan PCB IPM fault	Fan PCB IPM fault.	Stop applicable cycle	Automatically return to normal condition
CHxx107	Fan DC link low voltage error	Fan DC link low voltage.	Stop applicable cycle	Automatically return to normal condition
CHxx113	Liquid pipe temperature sensor error	Liquid temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx114	Sub cooling suction temperature sensor error	Sub cooling suction temperature sensor is disconnected, shorted, or opened.	Stop applicable cycle	Automatically return to normal condition
CHxx115	Sub cooling outlet pipe temperature sensor error	Sub cooling outlet pipe temperature sensor is disconnected, shorted, or opened.	Correspond cycle stop	Automatic return to a normal condition
CHxx145	Main Board - External Board communication Error	Main Board - External Board communication Error	Stop applicable cycle	Automatically return to normal condition
CHxx150	Liquid Compression Prevention Error	Liquid Compression Prevention Error	Stop applicable cycle	Automatically return to normal condition
CHxx151	Reversing valve switching failed	Mode switching failed	Stop applicable cycle	Automatically return to normal condition
CHxx180	Shell and tube type heat exchanger frozen.	Cooling: Individual output water temperature is maintained at 37.4°F or lower for at least 10 seconds. Heating: Individual output water temperature is maintained at 140°F or higher for at least 10 seconds. Common in heating and cooling: The difference in input and output water temperature is maintained at 44.6°F or higher for at least 30 seconds. and / or If the low pressure is maintained at less than 65.7 psi after the compressor started.	Stop applicable cycle	Automatically return to normal condition
CHxx193	Surge in fan board heat emitting plate temperature	Surge in fan board heat sink temperature	Stop applicable cycle	Automatically return to normal condition
CHxx194	Fan board heat emitting plate temperature sensor error	Fan board heat emitting plate temperature sensor is short/open	Stop applicable cycle	Automatically return to normal condition

For detailed information on how to troubleshoot each error, see the LG Chiller Service Manual on www.lghvac.com.

1. Project Information

Content	Information
Project Name:	
Address:	
Installed by:	
Sold by:	
Test run by:	

2. Model Information

Content	Information		
Product	Model Name:	Model Name:	Model Name:
	Serial:	Serial:	Serial:
Compressor A	Model Name:	Model Name:	Model Name:
	Serial:	Serial:	Serial:
Compressor B	Model Name:	Model Name:	Model Name:
	Serial:	Serial:	Serial:

3. Preparation Checklist

Content	Check	
Is there any damage?	Yes	No
Are the bolts / nuts assembled properly and firmly attached?	Yes	No
Does the power specification match the product specification?	Yes	No
Is the wiring installed accurately?	Yes	No
Is the product installed correctly?	Yes	No
Are the protective devices of the electric circuit installed correctly in accordance with specifications and codes?	Yes	No
Are all the terminal blocks connected properly?	Yes	No
Are all control plugs connected properly and seated at the terminal boards?	Yes	No

4. Check Water System

Content	Check	
Are all valves connected to the chiller open?	Yes	No
Are all pipes connected accurately?	Yes	No
Are there any clogs in the drain pipe?	Yes	No
Are there any leaks?	Yes	No
Is the air within the system completely well discharged?	Yes	No
Is the water pump operating properly?	Yes	No
Confirm UI6-G has a closed contact during pump operation (must be external signal).	Yes	No
Is the water flow switch operating?	Yes	No
Is the strainer installed on the piping to the evaporator?	Yes	No

To access additional technical documentation, visit www.lghvac.com.



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