



# ***MULTI V***<sup>TM</sup>

## **HYDRO KIT MEDIUM TEMPERATURE (K2) INSTALLATION MANUAL**



42,000 to 96,000 Btu/h

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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

 <b>DANGER</b>	<i>This symbol indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.</i>
 <b>WARNING</b>	<i>This symbol indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.</i>
 <b>CAUTION</b>	<i>This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.</i>
<b>Note:</b>	<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 unit.  
*There is risk of fire, explosion, and physical injury or death.*


 Do not supply power to the unit 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 install or remove the unit by yourself (end user). Ask the dealer or an LG trained technician to install the unit.  
*Improper installation by the user will result in fire, explosion, electric shock, physical injury or death.*

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

 Do not handle Hydro Kit units without the use of eye wear, gloves, and protective clothing. The unit could have sharp edges.  
*There is a risk of personal injury.*

 Do not change the settings of the protection devices. If the pressure switch, thermal switch, or other protection device is shorted and 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 after completing work.  
*Failure to do so will result in dust or water infiltration, 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.*

Provide sufficient electrical system protection against lighting strikes.  
*There is a risk of electric shock, which can result in physical injury or death.*

Periodically check that the frame and mounts are not damaged.  
*There is a risk of explosion, physical injury, or death.*


If the air conditioner 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 ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) Standard 15. If the refrigerant leaks and safety limits are exceeded, it will result in personal injuries or death from oxygen depletion.

The Hydro Kit must be installed indoors;  do not install the unit outside or in a highly humid environment.  
*There is risk of fire, electric shock, explosion, and physical injury or death.*

#### Dispose 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 so that children will not play with them and risk suffocation and death.

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.*

Install the unit in a safe location where nobody can step, fall onto it, or place objects on it.  Do not install the unit on a defective or wheeled stand.  
*It will result in an accident that causes physical injury or death.*

## ⚠ WARNING

**Properly insulate all cold surfaces when installing this product.** Cold surfaces such as uninsulated piping can generate condensate that could drip, causing a slippery surface that creates a risk of slipping, falling, and personal injury.

**Always use tools designed for R410A refrigerant.**

*Improper installation will result in refrigerant leaks, frostbite, suffocation, physical injury, and or death.*

**The Hydro Kit water circuit could require antifreeze. Always ask the dealer or an LG trained technician to install the water circuit.** Antifreeze is toxic; there is a risk of physical injury or death.

**Follow manufacturer's instructions when performing leak and evacuation tests.** ⚠ Do not use compressed air, oxygen, or flammable gases.

*There is a risk of fire or explosion which will result in physical injury or death.*

**When installing refrigerant piping, consider pipe expansion.**

*Improper pipe installation will lead to pipe fatigue / failure, a rapid release of refrigerant, frostbite, suffocation, physical injury, and or death.*

**Only use the parts included or approved for the product.**

*Improper installation will result in physical injury or death.*

## ⚠ CAUTION

**Be very careful when transporting the unit.**

- Hydro Kit weight and size preclude one person carrying the unit. Use two or more people to transport the unit because there is a risk of personal injury. Keep the unit upright.
- Some products use polypropylene bands for packaging. ⚠ Do not use polypropylene bands to lift the unit.
- Suspend the from the base at specified positions. Support the unit a minimum of four points to avoid slippage from rigging apparatus.

## Note:

**LG Electronics U.S.A., Inc., is not responsible for any piping calculations, refrigerant leaks, degradation of performance, or any other potential problems or damages as a result of interconnecting piping, their joint connections, isolation valves, introduced debris inside the piping system, or other problems caused by the interconnecting piping system.**

**This product is engineered to be used for comfort cooling / heating. It is not to be used in applications that require precision cooling or heating such as data centers, food preservation, wine coolers, refrigeration and / or freezer applications.** *There is risk of property damage.*

**Provide sufficient protection against the effects of electromagnetic fields (EMF) and electrical noise.**

*Inverter equipment, private power generators, high-frequency medical equipment, or radio communication equipment will cause the air conditioner to malfunction.*

⚠ **Do not install this product in a location that is noise sensitive. Provide additional acoustical treatment as needed.** *Occupants could be disturbed by the operation noise.*

⚠ **Do not install the product where it is exposed directly to ocean winds.**

*Sea salt in the air will cause the product to corrode. Corrosion will cause product malfunction or inefficient operation.*

**Periodically check that the frame is not damaged.**

*There is a risk of equipment damage.*

**The Hydro Kit must be installed indoors; ⚠ do not install the unit outside and / or in a highly humid environment.**

*There is risk of product malfunction, failure and property damage.*

**Install the unit 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.*

**When installing the unit in a low-lying area, or a location that is not level, use a raised concrete pad or concrete blocks to provide a solid, level foundation.**

*This prevents water damage and abnormal vibration.*

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

*Low refrigerant levels will cause product failure.*

**Properly insulate all cold surfaces to prevent "sweating."**

*Cold surfaces such as uninsulated piping can generate condensate that will drip and cause a slippery surface condition and / or water damage to walls.*

**The Hydro Kit must be kept in an upright and level position during installation.**

*To avoid oil migration from the onboard compressor, vibration, and water leaks.*

**Verify the piping system has been properly evacuated, and the system's refrigerant charge is correct before commissioning and after any repair is made.**

*Improper system evacuation and / or an improper refrigerant charge will cause product malfunction.*

# SAFETY PRECAUTIONS

**MULTI V™**  
**HYDRO KIT**

## Note:

**When installing refrigerant piping, consider pipe expansion.** Improper pipe installation will lead to pipe fatigue / failure and a rapid release of refrigerant, which results in product malfunction.

**Follow manufacturer's instructions when performing leak and evacuation tests.** ⚠ Do not use compressed air, oxygen, or flammable gases.

*There is a risk of product malfunction due to refrigerant leaks from improper installation procedures.*

⚠ Do not store or use flammable gases near the unit.  
*There is a risk of product failure.*

⚠ Do not make refrigerant substitutions. Use R410A only.  
*If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and damage will occur.*

**Take appropriate actions at the end of HVAC equipment life to recover, recycle, reclaim, or destroy R410A refrigerant according to applicable U.S. Environmental Protection Agency (EPA) rules.**

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

## WIRING

### ⚠ DANGER

**High voltage electricity is required to operate this system. Only a qualified, experienced electrician must wire this system. Adhere to the local, state, and U.S. National Electric Codes (NEC) and these instructions when wiring.**  
*Improper connections, inadequate power source capacity, and inadequate grounding will cause fire, electrical shock, physical injury or death.*

**Properly size all circuit breakers or fuses.**  
*There is a risk of fire, electric shock, physical injury or death.*

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

**Turn the power off at the nearest disconnect before servicing the equipment. Use appropriate meters and equipment to verify the power is off.**  
*Electrical shock can cause physical injury or death.*

⚠ Do not use damaged or loose power wiring. ⚠ Do not modify or extend the Hydro Kit's power wiring. Ensure that the power wiring will not be pulled, nor weight be placed on the power wiring.  
*There is a risk of fire, electric shock, physical injury or death.*

### ⚠ WARNING

**The information contained in this manual is intended for use by a qualified, LG trained service technician who is familiar with the NEC, safety procedures and equipped with the proper tools and test instruments.**  
*Failure to carefully read and follow all instructions in this manual will result in personal injury or death.*

**All electric work 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 given in this manual.**  
*If the power source capacity is inadequate or the electric work is not performed adequately, it will result in fire, electric shock, physical injury, or death.*

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

**Properly secure power wires and communications cables at connectors, and provide slack in cable to eliminate wire strain.**  
*Inadequate connections will generate heat or cause a fire, resulting in physical injury or death.*

**Use a properly sized circuit protective device.**  
*There is risk of fire, electric shock, explosion, physical injury or death.*

**Always use lock-out, tag-out procedures!**  
*Ensure the electrical power is off and the disconnect is locked and tagged prior to working on the Hydro Kit. There is a risk of fire, electric shock, physical injury or death.*

⚠ Do not place a heat source near the wiring.  
*There is a risk of fire, electric shock, physical injury or death.*



## WARNING

⊘ Do not supply power to the unit until all electrical wiring, controls wiring, piping, installation, and refrigerant system evacuation are completed, AND the commissioning agent has provided the authorization.

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

**Provide sufficient electrical system protection against lighting strikes.**

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

**Turn the power off at the nearest disconnect before servicing the equipment.**

*Electrical shock will cause physical injury or death.*

## Note:

The information contained in this manual is intended for use by a qualified, experienced service technician who is familiar with safety procedures and equipped with the proper tools and test instruments.

*Failure to carefully read and follow all instructions in this manual will result in equipment malfunction and / or property damage.*

**Provide field-installed electrical isolation devices to protect sensitive equipment sharing a power source with this product.**

*There is a risk of equipment damage or malfunction.*

**Use a properly sized circuit protective device.**

*There is risk of equipment malfunction.*

**Verify all power, ground, and communications wires and cables are properly terminated before applying power to the product. Securely tighten all wire terminations.**

*Improper and / or loose wire and communications cable terminations will cause product damage and malfunction.*

## OPERATION AND MAINTENANCE

### DANGER

⊘ Do not provide power to or operate the unit if it is flooded or submerged. Contact the supplier or an LG trained technician.

*There is risk of fire, electric shock, 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.*

**Check for refrigerant gas leaks. If a refrigerant gas leak is detected, leave the room immediately!**

*Refrigerant gas in sufficient quantity in an enclosed area can cause suffocation and death.*

**Verify all power, ground, and communications wires and cables are properly terminated before applying power to the product. Securely tighten all wire terminations.**  
*Improper and / or loose wire and communications cable terminations will cause fire, physical injury or death.*

⊘ Do not place a heater or other appliances near the power cable.

*There is risk of fire or electric shock.*

⊘ Do not allow water to access the electrical components.

*There is risk of fire, failure of the unit, or electric shock.*

⊘ Do not supply power to the unit until all electrical wiring, controls wiring, piping, installation, and refrigerant system evacuation are completed AND the commissioning agent has provided authorization.

*There is a risk of warranty loss, product damage, and / or complete product loss.*

**Provide sufficient electrical system protection against lighting strikes.**

*There is a risk of warranty loss, product damage, and / or complete product loss.*

**Always use lock-out, tag-out procedures!**

*Ensure the electrical power is off and the disconnect is locked and tagged prior to working on the Hydro Kit. There is a risk of warranty loss and / or product damage.*

⊘ Do not operate unit or disconnect switch with wet hands.

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

**Verify the piping system has been properly evacuated, and the system's refrigerant charge is correct before commissioning and after any repair is made.**

*Improper system evacuation and / or an improper refrigerant charge will cause product malfunction.*

**Periodically check that the frame and mounts are not damaged.**

*There is a risk of the unit falling and causing a fire, explosion, physical injury, or death.*

**If abnormal sounds or smells, or smoke comes from unit, shut off the power supply at the breaker / disconnect.**

*There is risk of fire, electrical shock, physical injury and / or death.*

# SAFETY PRECAUTIONS

**MULTI V™**  
**HYDRO KIT**

## ⚠ WARNING

⊘ Do not allow water, dirt, or animals to enter the (Hydro Kit) unit.

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

⊘ Do not operate the unit 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 will cause physical injury or death.*

⊘ Do not touch the refrigerant piping during or after operation.

*It will cause burns or frostbite.*

Use a soft cloth to clean the unit. ⊘ Do not use harsh detergents, solvents, etc.

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

Ensure that power cable cannot be pulled out or damaged during operation.

*There is risk of fire, electrical shock, physical injury and / or death.*

⊘ Do not place anything on the power cable.

*There is risk of fire, electrical shock, physical injury and / or death.*

⊘ Do not disconnect the power supply during operation.

⊘ Do not disconnect the power supply of the Hydro Kit if operation needs to be stopped. Always turn Hydro Kit off using the wired remote controller.

*The plate heat exchanger will burst if the communication between Hydro Kit and the outdoor unit is disconnected. There is risk of fire, electric shock, physical injury and / or death.*

⊘ Do not place a heater or other appliances near the power cable.

*There is risk of fire, electrical shock, physical injury, and / or death.*

Turn the power off at the breaker or disconnect when cleaning, maintaining the unit, and before opening the unit to check or repair electrical parts and wiring.

*There is risk of electrical shock, physical injury, and / or death.*

Periodically ventilate the unit when operating it together with a stove, etc.

*There is risk of fire, electrical shock, physical injury, and / or death.*

## ⚠ CAUTION

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

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

Use a stable ladder or stool when cleaning or maintaining the unit.

*A fall could occur, resulting in physical injury.*

## Note:

If the unit is not used for long time, ⊘ do not switch off the power supply to the unit.

*Water in the Hydro Kit will freeze, resulting in product malfunction or damage.*

⊘ Do not allow water, dirt, or animals to enter the (Hydro Kit) unit.

*There is risk of unit damage and operation failure.*

⊘ Do not make substitutions if a refrigerant recharge is necessary. Use the refrigerant listed on the nameplate of the unit.

*If a different refrigerant is used, or air mixes with original refrigerant, the unit will malfunction and be damaged.*

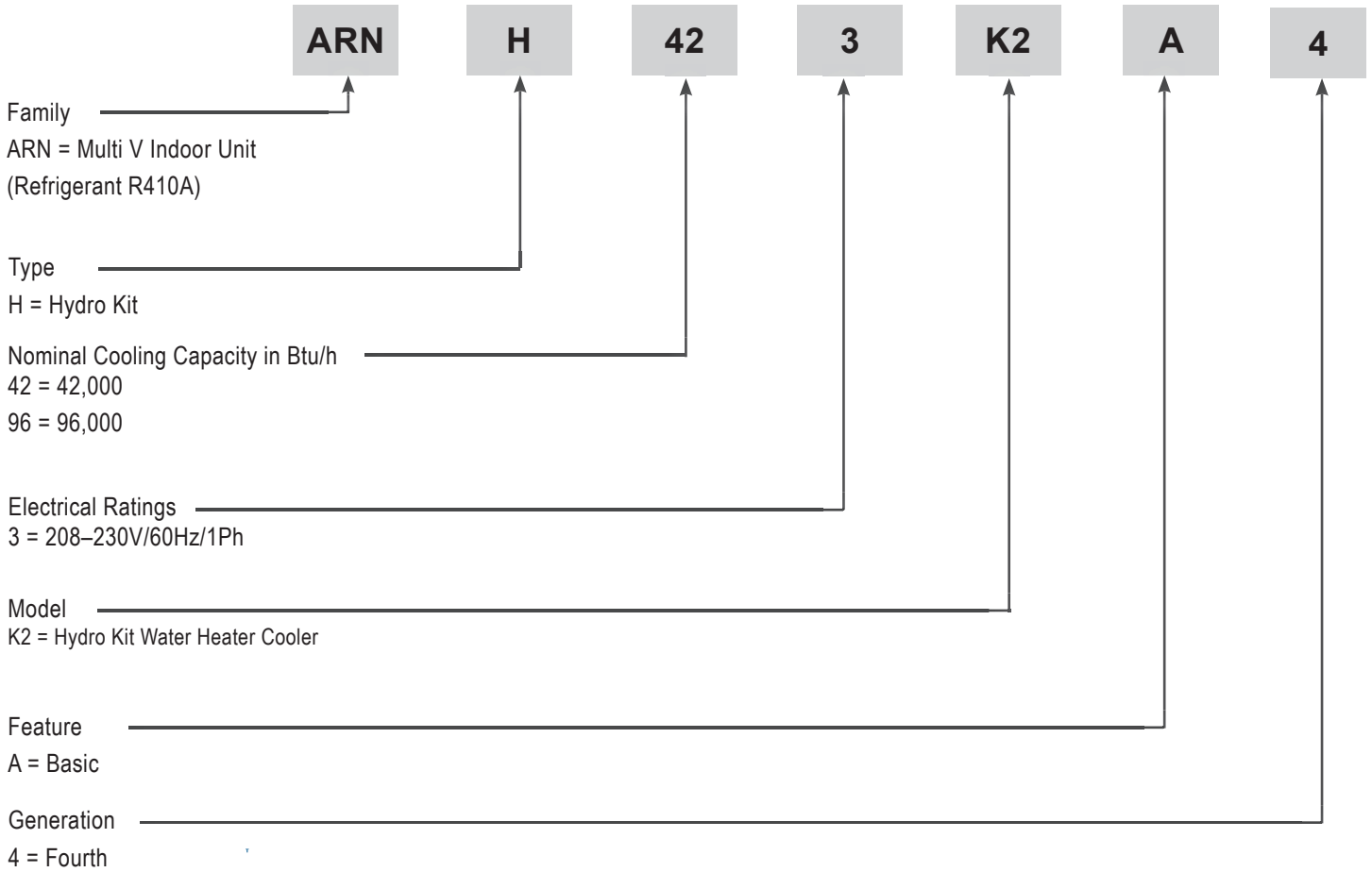
Use a soft cloth to clean. ⊘ Do not use harsh detergents, solvents, etc.

*Any plastic parts of the unit will be damaged.*

Periodically check that the frame and mounts are not damaged.

*There is a risk of product damage.*





# GENERAL DATA

## Introduction

**MULTI V™**  
**HYDRO KIT**

### Hydro Kits

This manual describes how to install the LG Hydro Kit, Medium Temperature units for Multi V Variable Refrigerant Flow (VRF) heat pump and heat recovery systems. The table below lists the available models. Refer to LG's Hydro Kit Engineering Manual for complete detailed engineering data and selection procedures.

### Safety

Safety of personnel is the primary concern during all procedures. Read and understand the safety summary at the front of this manual. Read and understand this installation procedure before beginning installation. Use the appropriate tools and accessories during installation. Plan the work and ⚠ do not work alone, if possible. Know how to obtain emergency medical and fire fighting assistance.

### Installation Personnel

This equipment is intended for installation by personnel trained in the required construction, mechanical, electrical, and/or other disciplines.

### ⚠ WARNING

- Installation work must be performed by trained personnel and in accordance with national wiring standards and all national, state, local or other applicable codes. Improper installation can result in fire, electric shock, physical injury, or death.
- Install these unit(s) in the location(s) specified by the design engineer, HVAC system layout drawings and project specifications. Perform the installation according to the procedures in this manual. Improper installation will result in injury to or death of personnel.

### Note:

- Install these unit(s) in the location(s) specified by the design engineer, HVAC system layout drawings and project specifications. Perform the installation according to the procedures in this manual. Become familiar with the unit's components and connections, and the order of installation. Incorrect installation can degrade or prevent proper operation. Improper installation will result in equipment malfunction and / or property damage.
- A more in-depth technical and performance information on these units is available in the Multi V™ Hydro Kit Engineering Manual at [www.lghvac.com](http://www.lghvac.com).

Table 1: Hydro Kit Model Numbers and Capacities.

Unit	Model Number	Capacity	V, Hz, Phase
Hydro Kit Medium Temperature	ARNH423K2A4	Cooling: 42,100 Btu/h; Heating: 47,200 Btu/h	208-230, 60, 1
	ARNH963K2A4	Cooling: 95,900 Btu/h; Heating: 107,500 Btu/h	208-230, 60, 1

### Required Tools (field provided)

- Level
- Screwdriver
- Electrical lineman pliers
- Electric drill
- Holesaw
- Drill
- Flaring tool set
- Tubing cutter
- Tube/pipe reamer
- Torque wrenches
- Allen wrench
- Gas-leak detector
- Thermometer

### Required Parts (field provided)

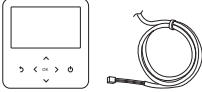


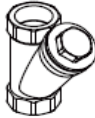
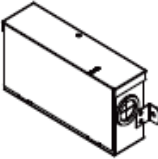
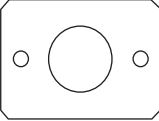
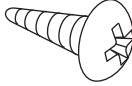
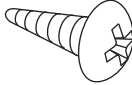
- Connecting cable (power and control)
- Pipes - vapor line and liquid line, with insulation
- Condensate piping

Figure 1: Hydro Kit Medium Temperature.



Parts (Factory Provided)

Table 2: Parts and Accessories Provided for Each Hydro Kit.

Description	Quantity	Image
Remote Controller and Cable	1	
Indirect Hot Water Storage Tank Sensor Well	1	
Indirect Hot Water Storage Tank Sensor	1	
Strainer	1	
Independent Power Module	1	
Conduit Mounting Plate	2	
Screws for Remote Controller Installation	4	
Screws for the Conduit Mounting Plate	4	

**Note:**  
See Accessories on pages 18-20 for a list of compatible Hydro Kit optional LG and third-party accessories (sold separately).

# GENERAL DATA

## R410A Refrigerant

**MULTI V™**  
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### R410A Refrigerant



R410A refrigerant has a higher operating pressure in comparison to R22 refrigerant. All piping system materials installed must have a higher resisting pressure than the materials traditionally used in R22 systems.

R410A refrigerant is an azeotrope of R32 and R125, mixed at 50:50, so the ozone depletion potential (ODP) is 0.

#### **WARNING**

 Do not place the refrigerant cylinder in direct sunlight. Refrigerant cylinder will explode causing severe injury or death.

#### **Note:**

- Because R410A is a combination of R32 and R125, the required additional refrigerant must be charged in its liquid state. If the refrigerant is charged in its gaseous state, its composition changes and the system will not work properly.
-  Do not heat piping more than necessary during installation. Piping will become soft and fail when pressurized.
-  Do not use any piping that has not been approved for use in high-pressure refrigerant systems. Piping wall thickness must comply with the applicable local, state, and federal codes for the 551 psi design pressure of R410A. Inadequate piping will fail when pressurized.

### Hydro Kit Compatibility

ARNH-K2A4 Hydro Kit models are fully compatible with Multi V 5 (by March 1, 2019), Multi V Water IV (by March 1, 2019), and Multi V S (except 24K unit; after December 2019). ARNH-K2A4 Hydro Kit models are compatible with Multi V IV Air-Source units, but without Gen4 features.

### Note:

The ARNH-K2A4 Hydro Kits can be used with outdoor units manufactured after April 2019 communicating at a baud rate of 9,600 bps (Gen4 features are operational). Before April 2019, outdoor units communicate at a baud rate of 1,200 bps. For more information, review the specific outdoor unit Engineering and Installation Manuals, or contact your LG Sales Representative.

ARNH-K2A4 Hydro Kit models ARE NOT compatible with Multi V Mini, Multi V Plus II, Multi V Sync II, Multi V Space, Multi V Water II, Multi V Water Mini, single-zone, or multi-zone products.

See pages 18 to 20 for a list of LG included, optional, and third-party accessories and controllers that can be used with the Hydro Kits.

Table 3: Hydro Kit Functions.

Features		ARNH423K2A4	ARNH963K2A4
Unit Controller Based Functions	Self Diagnosis	√	√
	Auto Start	√	√
	Manual or Auto Restart <sup>1</sup>	√	√
	Child Lock	√	√
	Group Control <sup>2</sup>	√	√
	Timer (on/off)	√	√
	Timer (weekly)	√	√
BMS Integration	Hydro Kit Wall Mounted Controller	√	√
	Network Solution (LGAP)	√	√
	Remote Enable/Disable via LG Dry Contact <sup>3</sup>	PDRYCB300 / PDRYCB100	PDRYCB300 / PDRYCB100
	Power Distribution Indicator (PDI) Interface	√	√
Options	Remote Temperature Sensor <sup>3</sup>	ZRTBS01	ZRTBS01
	Solar Heating Circuit Interface <sup>3</sup>	PHLLA	PHLLA
Hydro Kit Based Functions	Hydronic Circuit Isolation	√	√
	Water Pump ON/ OFF Control	√	√
	Factory Mounted Flow Switch	√	√
	Conventional line voltage (208-230V) Thermostat Interface <sup>2</sup>	√	√
	Conventional 24 VAC Thermostat Interface <sup>2</sup>	√	√
	Conventional Mechanical Thermostat Interface <sup>2</sup>	√	√
	Wi-Fi Module <sup>3</sup>	PWFMD200	PWFMD200
	Indirect Tank Water Pre-Heating	√	√
	Third Party Solar Heating System Flow Control	√	√
	Storage Tank Heating Operation Timer	√	√
	Water Temperature Reset	√	√
	Overheating Protection	√	√
	Emergency Heating Operation	√	√

<sup>1</sup>Manual restart is not available when the Hydro Kit is configured for conditioned space control, using a conventional thermostat.

<sup>2</sup>Each Hydro Kit unit group must be connected to the same outdoor unit. Hydro Kit units within the same group must have the same DIP switch settings. The only DIP switch that

**Key:** √: Available.

can differ is the group control setting switch, where one Hydro Kit will be the master and the remaining Hydro Kit units will be slaves.

<sup>3</sup>Sold separately and field installed.

# GENERAL DATA

## Specifications



Table 4: Hydro Kit Specifications Table.

	Hydro Kit	
	ARNH423K2A4	ARNH963K2A4
Capacity Index	42	96
<b>Cooling Mode Performance</b>		
Rated Capacity <sup>1</sup> (Btu/h)	42,100	95,900
Entering Water Temp Range (°F)	50 - 95	50 - 95
Leaving Water Temp Range (°F)	41 - 77	41 - 77
Indoor Air Temp Setpoint Range (°F)	64 - 86	64 - 86
<b>Heating Mode Performance</b>		
Rated Capacity <sup>1</sup> (Btu/h)	47,200	107,500
Entering Water Temp Range (°F)	50 - 122	50 - 122
Leaving Water Temp Range (°F)	68 - 122	68 - 122
Indoor Air Temp Setpoint Range (°F)	64 - 86	64 - 86
Hot Water Tank Setpoint Range (°F)	86 - 122	86 - 122
<b>Unit Data</b>		
Refrigerant Type	R410A	R410A
Refrigerant Control	EEV	EEV
Sound Pressure <sup>2</sup> dB(A) Cooling/Heating	26	26
Net Unit Weight (lbs)	67	77
Shipping Weight (lbs)	79	89
Heat Rejected to Equipment Room (Btu/h)	Negligible	Negligible
Oil Type	---	---
<b>Heat Exchanger</b>		
Material/Type	316 Stainless / Brazed Plate	316 Stainless / Brazed Plate
Rated Water Flow (GPM)	10.4	24.3
Rated Pressure Drop <sup>3</sup> (ft-wg)	13.7	23.1
Range of Flow (GPM)	5.3 - 10.4	8 - 24.3
Waterside Volume (US Gallons)	0.31	0.58
Water Side Design Pressure (psig)	640	640
<b>Piping</b>		
Liquid Line (in, OD)	3/8 Braze	3/8 Braze
Vapor Line (in, OD)	5/8 Braze	7/8 Braze
Condensate Line (in, ID)	1-MPT	1-MPT
Water Inlet/Outlet (in, ID)	1-MPT	1-MPT

<sup>1</sup>All capacities are net with a Combination Ratio between 95–100%.

<sup>2</sup>Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

<sup>3</sup>Water only (no antifreeze).

<sup>1</sup>The combination ratio range for dedicated use (all Hydro Kit units) is 50% - 100%. The combination ratio range for mixed use (Hydro Kit mixed with indoor units) is 50% - 130%.

## Electrical Data

Table 5: Hydro Kit Unit Electrical Data.

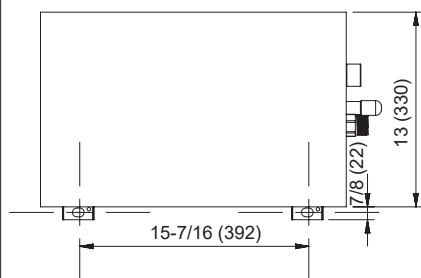
Model	Voltage Range	MCA	MOP	Rated Amps (A)	Power Supply			Power Input (kW)	
					Hz	Volts	Phase	Cooling	Heating
ARNH423K2A4	187-253	0.1	15	0.08	60	208-230	1	0.01	0.01
ARNH963K2A4									

MCA = Minimum Circuit Ampacity MOP = Maximum Overcurrent Protection

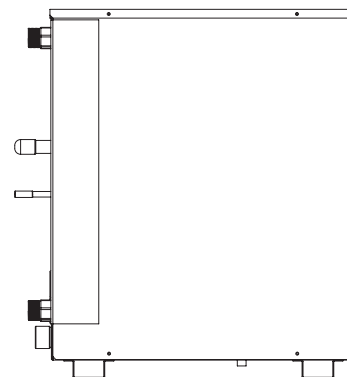
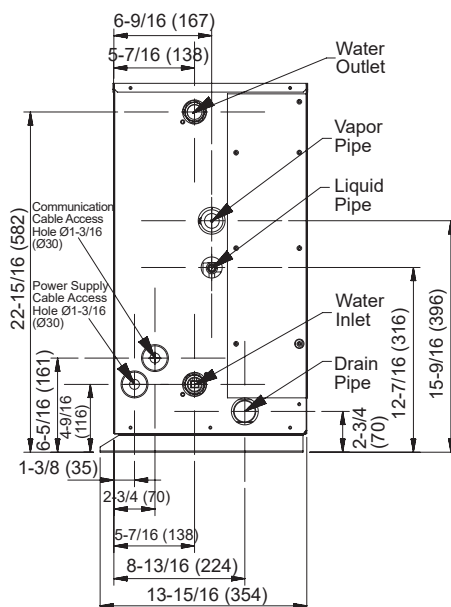
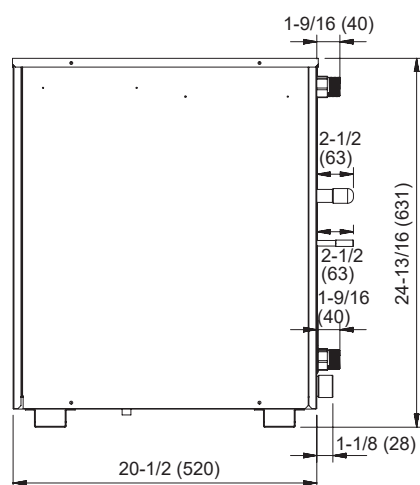
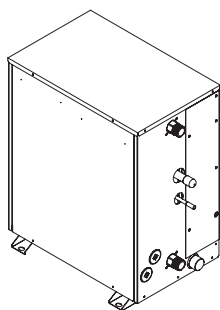
Power wiring cable is field provided and must comply with the applicable local and national codes.



Unit: Inches (mm)



### 3D View

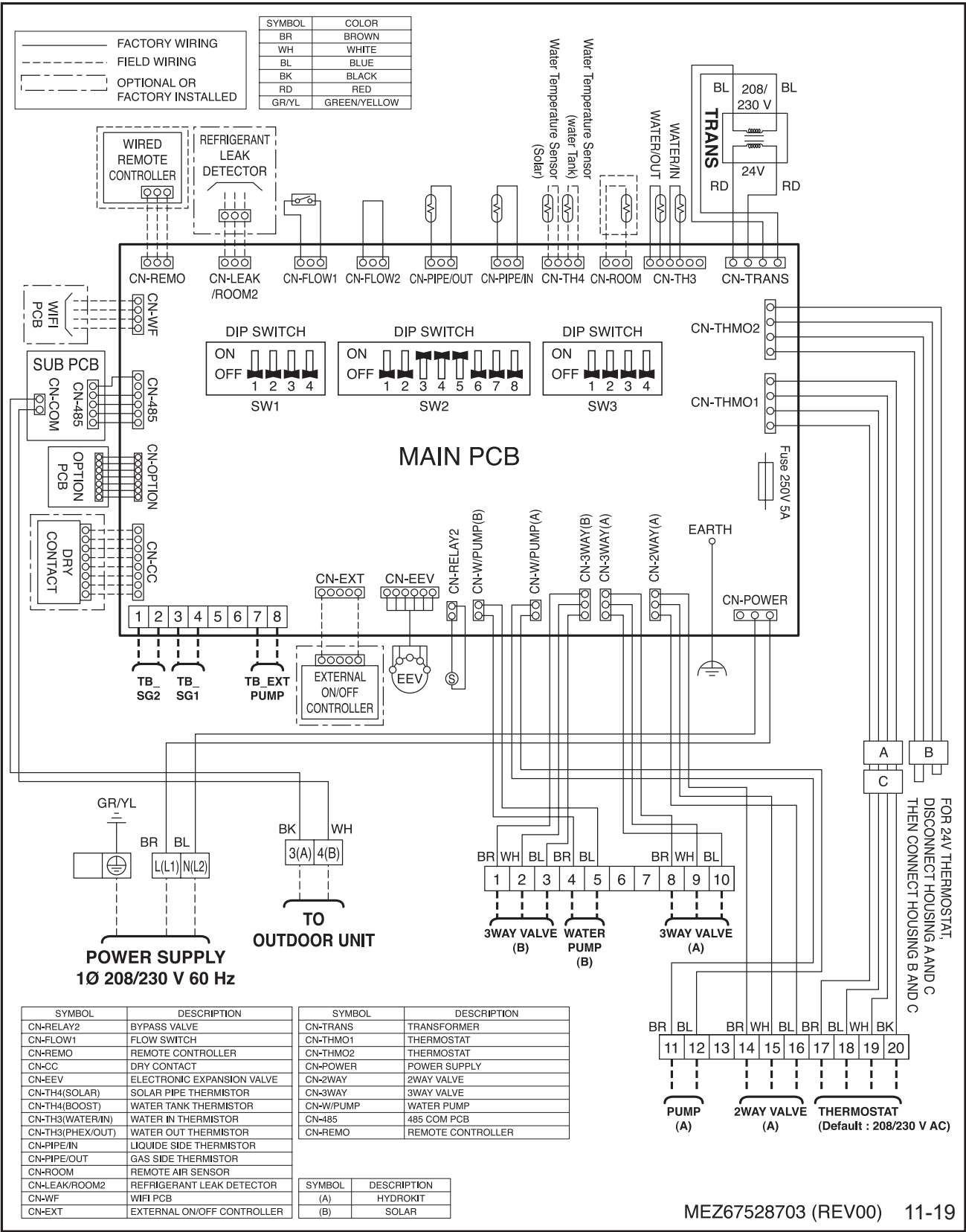


**Note:**

1. The unit must be installed in compliance with the installation manual.
2. Power to the unit must be grounded in accordance with all applicable state, local, and national regulations and codes.
3. All field-supplied electrical components and materials must comply all applicable state, local, national, and international regulations and codes.

GENERAL DATA

Wiring Diagram — ARNH423K2A4, ARNH963K2A4



MEZ67528703 (REV00) 11-19



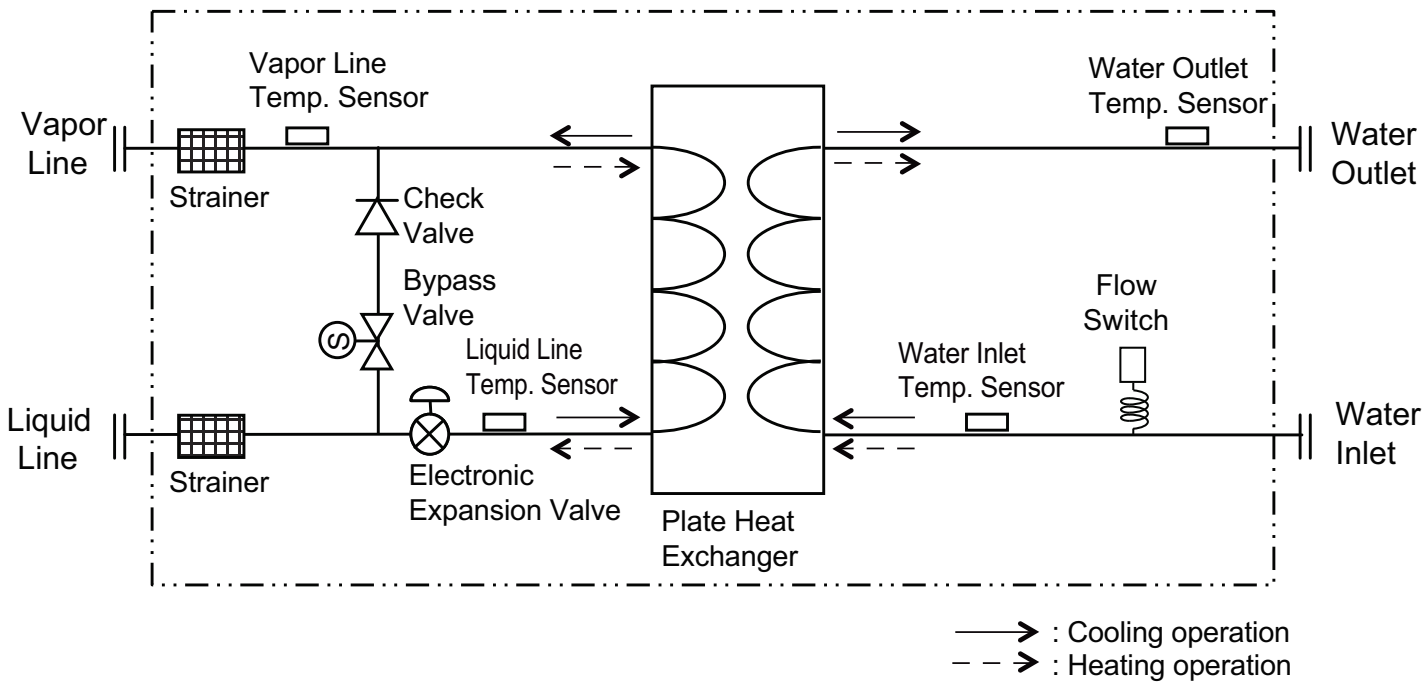


Table 6: Hydro Kit Piping Schematic Legend.

Description	PCB Socket	Remarks
Vapor Line Temperature Sensor	CN_PIPE/OUT	Multi V refrigerant cycle
Liquid Line Temperature Sensor	CN_PIPE/IN	Multi V refrigerant cycle
Water Inlet Temperature Sensor	CN_TH3	Water Inlet and Water Outlet sensors are connected to 4 pin connector CN_TH3
Water Outlet Temperature Sensor		

\*Air Temperature sensor is an optional accessory and is sold separately based on design requirements.

Table 7: LG Included Accessories.

Accessory	Model No.	Connection	Description	Use
Hydro Kit Unit Controller <sup>1</sup>	AKB74855309	CN-REMO	Remote wall mounted controller	Schedules, sets operational parameters and monitors system
Standby Power Module <sup>1</sup>	PRIPO	CN-WRITE & CN-EEV	Backup power to close EEV valve if power failure occurs during Multi V defrost or oil return	Closes EEV if power outage occurs during defrost or oil return
Indirect Water Storage Tank Sensor Well	MEG61846102	Indirect Heating Tank Wall	Mounting for the indirect water tank storage temperature sensor complete with 39 feet of cable with plug connector	
Hot Water Storage Tank Sensor <sup>1,2</sup>	EBG61325701	CN-TH4*	Water storage tank sensor	Monitors the Hydro Kit indirect water storage tank temperature
Water Circuit Strainer <sup>3</sup>	MJC57132402	Inlet Pipe	50 Mesh; install on inlet pipe to heat exchanger	Keeps large particulate from entering the heat exchanger

<sup>1</sup>Must use LG provided communications cable.

<sup>2</sup>Must have contacts rated for 208-230/60/1.

<sup>3</sup>1" FPT both ends.

\*CN-TH4 connection can be used with either the Hot Water Storage Tank Sensor (LG Included Accessory; see table above) OR the Solar Heating System Interface Kit with its sensor (LG Optional Accessory; see table below). Both accessories CANNOT be connected to CH-TH4 at the same time.

Table 8: LG Optional Accessories (sold separately).

Accessory	Model No.	Connection	Description	Use
Wired Remote Extension Cable <sup>1</sup>	PZCWRC1	---	33 foot extension cable assembly	Extends the length of the Hydro Kit Unit Controller communications cable beyond 33 feet (cannot be used to extend tank sensor cable length)
Solar Heating System Interface Kit	PHLLA	CN-TH4 (Solar)*	Kit includes solar heating system tank sensor/cable and tee fitting sensor well.	Operates the Hydro Kit with a water storage tank.
Ancillary (Solar) Heating System Tank Replacement Sensor <sup>1,2,3</sup>	MEG61846102	CN-TH4 (Solar)*	Solar heating water storage tank sensor with 33 feet of cable and plug connector	Monitors the solar heating system water circuit temperature
Remote Temperature Sensor	ZRTBS01	CN-ROOM	Sensor with 50 foot communications cable and plug connector	Monitors and/or controls (optional) the Hydro Kit based on air temperature
Dry Contact	PDRYCB300 / PDRYCB100	CN-CC	Mounts inside the unit cabinet and provides a external binary signal control interface	Enables/disables operation from an external signal
Wi-Fi Module	PWFMD200	CN-WF	Connect for Wi-Fi capabilities	Enables Wi-Fi capabilities.

<sup>1</sup>Must use LG provided communications cable.

<sup>2</sup>Field supplied thermal paste required.

<sup>3</sup>This sensor is included when ordering the PHLLA Solar Heating Interface Kit.

\*CN-TH4 connection can be used with either the Hot Water Storage Tank Sensor (LG Included Accessory; see table above) OR the Solar Heating System Interface Kit with its sensor (LG Optional Accessory; see table below). Both accessories CANNOT be connected to CH-TH4 at the same time.

## Note

Maximum combined current draw of all connected accessories must be equal to or less than 5 Amps@ 208-230/60/1. Refer to wiring diagrams for detailed terminal block information.

Table 9: Third-Party Accessories (Sold Separately).

Accessory	Connections	Voltage Options	Description	Use
Hydro Kit Circuit Water Pump Interlock	TB-11,12	208-230/60/1	Hydro Kit water circuit circulating pump interlock (use a field-provided pilot relay)	Provides pump On / Off control based on Hydro Kit control logic
Solar Heating Circuit Water Pump Interlock <sup>1,2</sup>	TB-4,5	208-230/60/1	Solar heating circuit circulating pump interlock (use a field-provided pilot relay)	Provides pump On / Off control based on Hydro Kit control logic.
208-230/60/1 Conventional Thermostat <sup>3</sup>	TB-17,18,19,20 & Harness Plug C to A	208-230/60/1	Single stage heating / cooling manual changeover	Monitors and / or controls (optional) the Hydro Kit based on the conditioned space temperature.
24 VAC Conventional Thermostat <sup>3</sup>	TB-17,18,19,20 & Harness Plug C to B	24 VAC	Single stage heat/cool, must be manual changeover model	Monitors and / or controls (optional) the Hydro Kit based on the conditioned space temperature.
Mechanical Thermostat	TB-17,18,19,20 & Harness Plug C to A	---	Single stage heating only	Monitors and / or controls (optional) the Hydro Kit based on the conditioned space temperature.
Hydro Kit Circuit 3-Way Diverting Valve	TB-8,9,10	208-230/60/1	Valve (A) 208-230/60/1 3-wire SPDT	Diverting valve - circulates water to / from the comfort conditioning equipment and the Hydro kit water storage tank.
Hydro Kit Circuit 2-Way Isolation Valve	TB-14,15,16	208-230/60/1	Valve (A) 208-230/60/1 2-wire NO or NC	Partial circuit water Isolation valve-prevents condensate from forming on floors containing in-floor heating pipe while operating in the cooling mode.
Solar Heating Circuit 3-Way Diverting Valve	TB-1,2,3	208-230/60/1	Valve (B) 208-230/60/1 3-wire SPDT	Diverting valve circulates water to / from the ancillary heating circuit and the Hydro kit heating circuit.

TB = Terminal Block NO = Normally Open  
NC = Normally Closed SPDT = Single Pole Double Throw

<sup>1</sup>Must have contacts rated for 208-230/60/1.

<sup>2</sup>1" FPT both ends.

<sup>3</sup>Must have contacts rated for 24VAC.

**Note**

Maximum combined current draw of all connected accessories must be equal to or less than 5 Amps@ 208-230/60/1. Refer to wiring diagrams for detailed terminal block information.

Table 10: LG Optional Controllers (Sold Separately).

Controller	Model No.
LG MultiSITE <sup>TM</sup> Communications Manager	PBACNBTR0A
AC Smart <sup>TM</sup> 5	PACS5A000
ACP 5	PACP5A000
ACP LonWorks <sup>®</sup>	PLNWKB100



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## Selecting the Best Location

### **⚠ DANGER**

To avoid the possibility of fire, ⚠ do not install the unit in an area where combustible gas will generate, flow, stagnate, or leak. Failure to do so will cause serious bodily injury or death. Before beginning installation, read the safety summary at the beginning of this manual.

Select a location for installing Hydro Kits that meets the following conditions:

#### **Do's**

- Install the Hydro Kit inside.
- Where the floor is solid and has enough structural strength to bear four times the weight of the Hydro Kit.
- Use a level indicator to ensure the unit is installed on a level plane.
- Place the Hydro Kit where drainage can be obtained easily, and to minimize the length of the condensate drain piping.
- Include enough space for service access.
- Locate the Hydro Kit in a location where it can be easily connected to the outdoor unit / heat recovery unit.

#### **⚠ Do Not's**

- Do not install the unit near high-frequency generators.
- Do not install the unit where it will be subjected to direct thermal radiation from other heat sources.
- Do not install the unit in a location where acidic solution and spray (sulfur) are often used.
- Do not use the unit in environments where sulfuric gas is present.
- Do not install the unit near a heat or steam source, or where considerable amounts of oil, iron powder, or flour are used. (These materials will generate condensate, cause a reduction in heat exchanger efficiency, or the drain to malfunction. If this is a potential problem, install a ventilation fan large enough to vent out these materials.)
- Do not install the unit near a doorway.

**The unit will be damaged, will malfunction, and / or will not operate as designed if installed in any of the conditions listed.**

### **Note:**

- Hydro Kits must not be placed in an environment where the Hydro Kits will be exposed to harmful volatile organic compounds (VOCs) or in environments where there is improper air make up or supply or inadequate ventilation. If there are concerns about VOCs in the environment where the Hydro Kits are installed, proper air make up or supply and/or adequate ventilation must be provided. Additionally, in buildings where Hydro Kits will be exposed to VOCs, consider a third party factory-applied epoxy coating to the coils for each Hydro Kit where the entire coil is dipped, not sprayed.
- If the unit is installed near a body of water, the installation parts are at risk of corroding. Appropriate anti-corrosion methods must be taken for the unit and all installation parts.

# INSTALLING THE HYDRO KIT

Unpack / Inspect, Transporting / Lifting

**MULTI V™**  
**HYDRO KIT**

## Unpack the Hydro Kit / Inspect for Damage

### Note:

After opening, if the unit is damaged, repack the unit as it was shipped to you. **RETAIN ALL PACKING MATERIALS.** In general, freight damage claims will be denied if the original packing materials are not retained for the claims adjuster to inspect. Call your supervisor on how to proceed with filing a freight claim and to order a replacement unit.

1. Before opening, check the unit model number on the box. Verify it is the correct capacity, unit type and voltage. Refer to the Nomenclature Chart in this manual.
2. Place the box on a solid surface right side up.
3. Cut the white reinforced nylon straps.
4. Open the top of the box and fold back all four flaps.
5. Remove the protective cardboard.
6. The walls and top panels are not attached to the bottom of the box. Lift the cardboard carton by the flaps and remove the box walls and top and place it to the side.
7. Remove the moisture barrier plastic bonnet.
8. Check the unit nameplate data and model number. Verify the unit voltage, and capacities are correct before proceeding.
9. Remove and retain the installation manual. It is located under the unit, on top of the unit, or taped and inserted inside the unit cabinet.
10. Lift the unit (not by refrigerant piping) and inspect for freight damage. If damage is found, repack the unit as it was received in the original container.

### Note:

⊘ Do not lift the unit by the refrigerant piping. Use the hanger brackets or the unit case only to lift the unit. Damage to the piping components will occur.

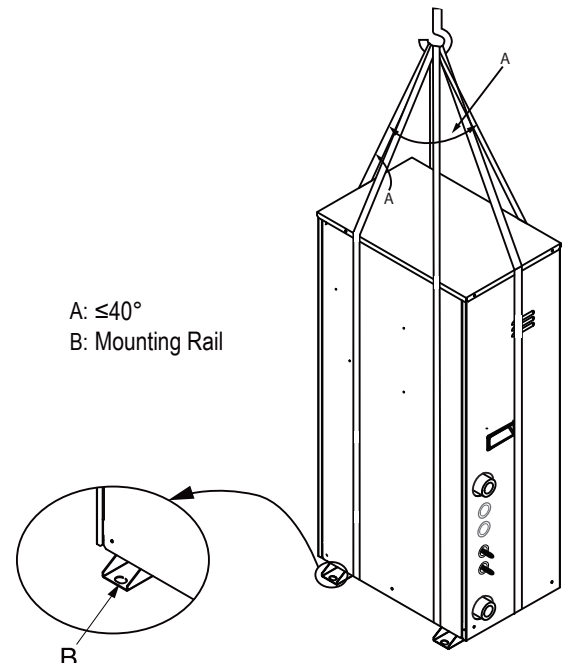
## Transporting / Lifting

- Refer to the table below for accurate weights before transporting or lifting.
- When lifting the unit, use lifting straps and place around the unit as shown.
- Always lift the unit using properly sized lifting straps rated to carry the unit weight.
- Ensure the straps are long enough to maintain a maximum of a 40° angle as shown at "A".

Table 11: Hydro Kit Chassis Net and Shipping Weights.

Chassis	Net Weight (lbs.)	Shipping Weight (lbs.)
ARNH423K2A4	67	79
ARNH963K2A4	77	89

Figure 2: Proper Transportation of Unit.



## Transporting / Lifting, continued.

### ⚠ WARNING

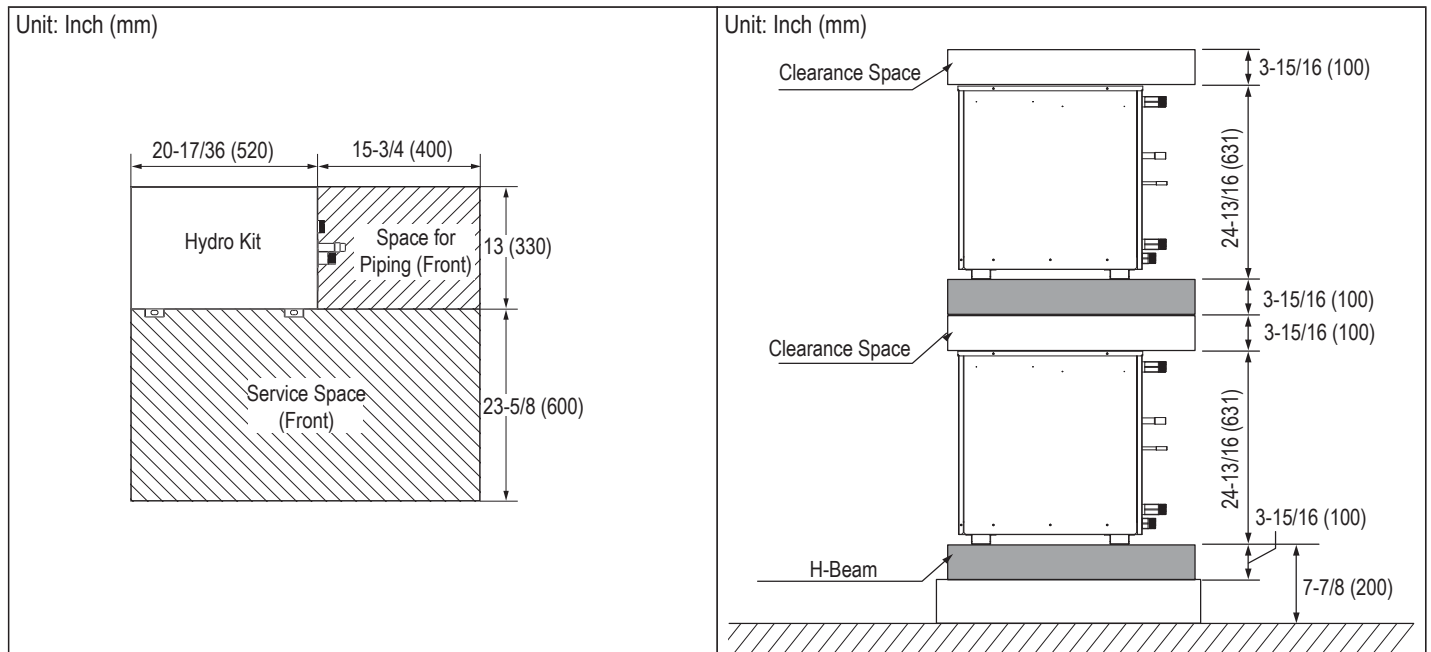
- Use appropriate moving equipment to transport each frame; ensure the equipment is capable of supporting the weights listed above. If the equipment is not properly secured, it will result in an accident that causes physical injury or death.
- Wear protective gloves when handling equipment. Sharp edges will cause personal injury.
- Some products include polypropylene bands around the unit for packaging. Ⓢ Do not use polypropylene bands to lift the unit. There is a risk of the product falling and causing physical injury.
- Tear apart and throw away plastic packaging bags so that children will not play with them and risk suffocation and death.
- Consider the unit's center of gravity is before lifting. Hoist the unit with the center of gravity centered among the lifting straps. There is a risk of the product falling and causing physical injury.
- Lift the outdoor unit from the base at specified locations. Support the outdoor unit at a minimum of six (6) points to avoid slippage from the rigging apparatus, and use a minimum of three (3) lifting straps. There is a risk of the product falling and causing physical injury.
- Use caution when using forklift to transport an unpackaged unit. Ⓢ Do not drop the unit when carrying it with a forklift. There is a risk of the product falling and causing physical injury.

### Note:

Place a protective cloth or other soft material at the locations where the casing comes in contact with the lifting straps to prevent damage to painted surfaces.

## Clearance Requirements

Figure 3: Clearance Requirements.



# INSTALLING THE HYDRO KIT

## Foundation and Mounting Requirements, Anchoring



### General Foundation / Mounting Requirements

Securely attach the Hydro Kit to a concrete pad, base rails, H-beam, mounting platform anchored to the building structure, or other acceptable support structure designed by a structural engineer. Refer to dimensional drawing in this manual, and follow the applicable local codes for clearance, mounting, anchor, and vibration attenuation requirements. Noise and vibration could transfer to the floor or walls, so install rubber anti-vibration isolation pads between the mounting feet and the base chosen by the acoustics engineer. The base pad must be more than 8 inches (200 mm). Secure the feet to the base using washers and nuts.

#### ⚠ WARNING

- Ensure that the floor / chosen location has enough strength to support the weight of the Hydro Kit. If it does not have sufficient strength, the Hydro Kit will fall and cause physical injury or death.
- Ensure the Hydro Kit is firmly attached to the foundation. Any deficiency in installation will cause unit to fall, resulting in physical injury or death.

#### ⚠ CAUTION

- ⊘ Avoid placing the unit in a low lying area where water will accumulate and freeze on sidewalks or driveways.. Water could freeze, causing an unsafe condition.

#### Note:

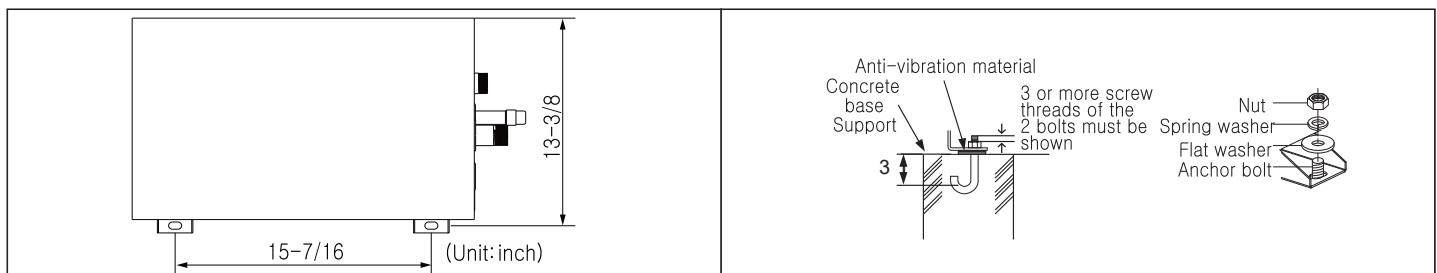
- Ensure that the floor / chosen location has enough strength to support the weight of the Hydro Kit. If it does not have sufficient strength, the Hydro Kit will fall and cause damage to the unit.
- Ensure that the floor / chosen location has enough space for pipes and wiring, the condensate drain connection, and the floor drain. Improper installation can result in unit malfunction.
- Ensure the Hydro Kit is firmly attached to the foundation. Any deficiency in installation will cause unit to fall, resulting in damage to the unit.

### Anchoring the Hydro Kit Unit

The figure below shows the proper location and mounting of the anchor bolts for the Hydro Kit.

- Securely fasten the Hydro Kit to the supporting base.
- If not otherwise directed by the structural engineer or local codes, Use 7/16 inch or 1/2 inch diameter J-bolts. Use a hexagon nut with a spring washer.
- Include enough space for refrigerant piping and electrical wiring when installing through the bottom of the unit.

Figure 4: Foundation Requirements and Anchoring.



#### ⚠ WARNING

Always install per mounting instruction and details provided by the design or structural engineer. Hydro Kit will fall, causing physical injury or death.

#### Note:

- Always install per mounting instruction and details provided by the design or structural engineer. Hydro Kit will fall, causing product damage
- All referenced materials are to be field-supplied. Images are not to scale, are for reference only, and are not intended to be used for design purposes.

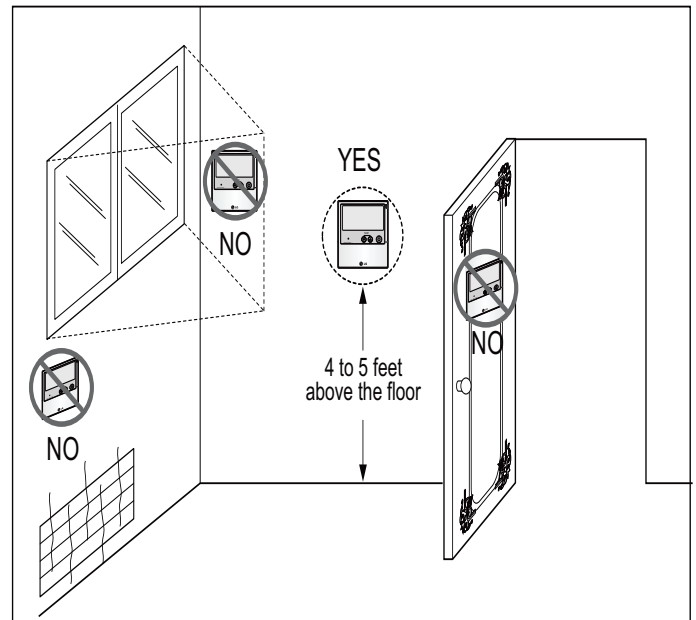
### Placing the Hydro Kit Controller

Hydro Kits include a factory-supplied controller (with integral temperature sensor), but also can be used with remote temperature sensors and third-party thermostats (optional; sold separately). If the Hydro Kit's water flow will be controlled by monitoring the conditioned space temperature, proper Hydro Kit operation depends on the location of the controller (sensor, thermostat). A good location will be to protect the controller (sensor, thermostat) away from direct sunlight, high humidity, water vapor, and where it could be directly exposed to cold air. Controller (sensor, thermostat) must be installed four (4) to five (5) feet above the floor where its display can be read easily (if regulations of the American Disability Act [ADA] do not require a lower mounting height), in an area with good air circulation, and where it can detect an average room temperature.

⊘ Do not install the controller (sensor, thermostat) where it can be impacted by the following:

- Drafts or dead spots behind doors and in corners
- Hot or cold air from ducts
- Radiant heat from sun or appliances
- Concealed pipes and chimneys
- Uncontrolled areas such as an outside wall behind the remote controller

1. Pull cable between the controller handy box (if used) and the Hydro Kit.
2. Store a minimal amount of cable in the handy box.
3. If the cable between the controller (sensor, thermostat) and the Hydro Kit is too long, ⊘ do not cut. Coil any spare communications cable, tie-wrap it, and leave it next to the Hydro Kit location.



### Note:

- It may be necessary to use a handy box that is sized in metric units, depending on the model. Check with the LG representative to verify which size of handy box is needed for the controller (sensor, thermostat) in question.
- ⊘ Do not route power wiring and communications cables in the same conduit. Routing power wiring and communications cables together will cause communication errors and unit malfunction.
- Maintain at least the minimum distance required between the communications cable and power wiring. The minimum required space between the two depends on the voltage of the power wiring. See the Wiring section in this manual for more information.
- ⊘ Do not cut any quick-connect plugs off or adjust the length of the cable.
- Keep the communications cable away from high voltage wires and electromagnetic field (EMF) producing equipment. It will result in communication errors and unit malfunction.

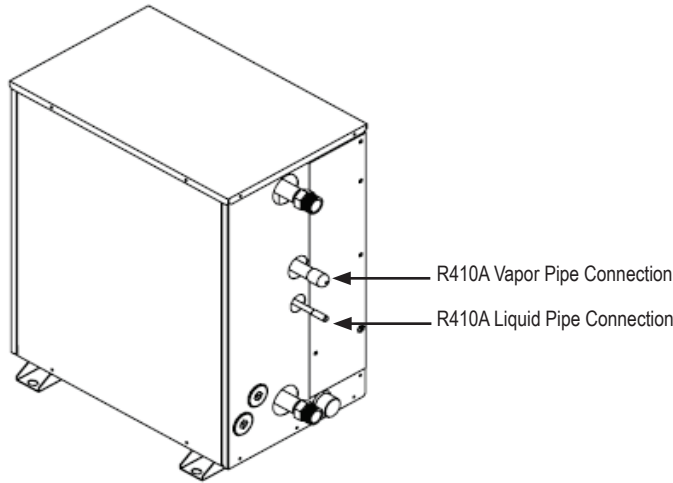
# INSTALLING THE REFRIGERANT PIPING

**MULTI V™**  
**HYDRO KIT**

## Refrigerant Piping Connections / Refrigerant Piping Materials and Handling


### Hydro Kit Refrigerant Piping Connections

Figure 5: Hydro Kit Refrigerant Piping Connections.

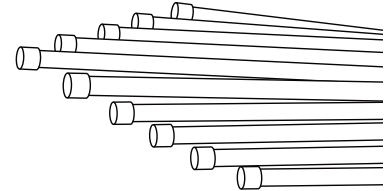


### Refrigerant Piping Materials and Handling

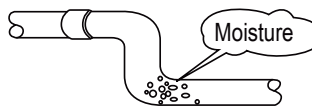

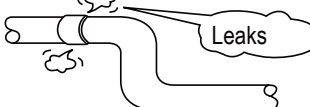

Pipes used for the refrigerant piping system must include the specified thickness, and the interior must be clean.

While handling and storing,  do not bend or damage the pipes, and take care not to contaminate the interior with dust, moisture, etc.

Keep Pipes Capped While Storing.



Keep refrigerant pipe dry, clean, and airtight.

	Dry	Clean	Airtight
	No moisture should be inside the piping. 	No dust should be inside the piping. 	No leaks should occur. 
<b>Possible Problems</b>	<ul style="list-style-type: none"> <li>- Significant hydrolysis of refrigerant oil.</li> <li>- Refrigerant oil degradation.</li> <li>- Poor insulation of the compressor.</li> <li>- System does not operate properly.</li> <li>- EEVs, capillary tubes are clogged.</li> </ul>	<ul style="list-style-type: none"> <li>- Refrigerant oil degradation.</li> <li>- Poor insulation of the compressor.</li> <li>- System does not operate properly.</li> <li>- EEVs and capillary tubes become clogged.</li> </ul>	<ul style="list-style-type: none"> <li>- Refrigerant gas leaks / shortages.</li> <li>- Refrigerant oil degradation.</li> <li>- Poor insulation of the compressor.</li> <li>- System does not operate properly.</li> </ul>
<b>Solutions</b>	<ul style="list-style-type: none"> <li>- Remove moisture from the piping.</li> <li>- Piping ends should remain capped until connections are complete.</li> <li>-  Do not install piping on a rainy day.</li> <li>- Connect piping properly at the unit's side.</li> <li>- Remove caps only after the piping is cut, the burrs are removed, and after passing the piping through the walls.</li> <li>- Evacuate system to a minimum of 500 microns and insure the vacuum holds at that level for 1 hour.</li> </ul>	<ul style="list-style-type: none"> <li>- Remove dust from the piping.</li> <li>- Piping ends should remain capped until connections are complete.</li> <li>- Connect piping properly at the side of the unit.</li> <li>- Remove caps only after the piping is cut and burrs are removed.</li> <li>- Retain the cap on the piping when passing it through walls, etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Test system for air tightness.</li> <li>- Perform brazing procedures that comply with all applicable standards.</li> <li>- Perform flaring procedures that comply with all applicable standards.</li> <li>- Perform flanging procedures that comply with all applicable standards.</li> <li>- Ensure that refrigerant lines are pressure tested to 550 psig and hold for 24 hours.</li> </ul>



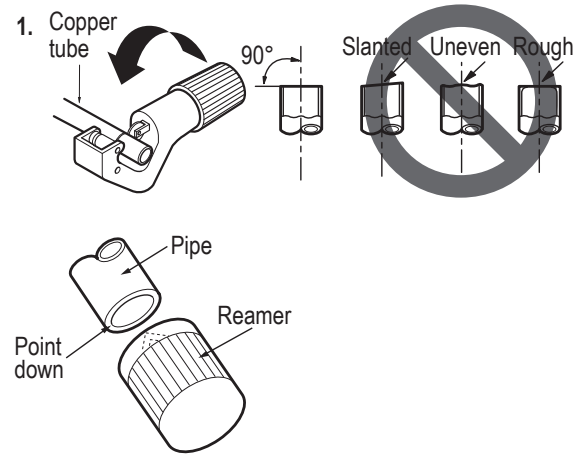
### Cutting the Refrigerant Piping

Cut the pipe to length.

- Measure the distance between the indoor unit and the outdoor unit.
- Cut the pipes a little longer than measured distance.

Remove the burrs.

- Completely remove all burrs from pipe ends.
- When removing burrs, point the end of the copper pipe down to avoid introducing foreign materials in the pipe.



### Brazing Procedure

One of the main causes of refrigerant leaks is a defective connection. Hydro Kits have brazed connections.

#### ⚠ WARNING

⊘ Do not braze in an enclosed location. ⊘ Do not allow the refrigerant to leak during brazing. Always test for gas leaks before and after brazing.

*If the refrigerant combusts, it generates a toxic gas that will cause physical injury or death.*

#### Note:

- During installation, it is imperative to keep the piping system free of contaminants and debris such as copper burrs, slag, or carbon dust.
- ⊘ Do not use kinked pipe caused by excessive bending in one specific area on its length.

1. Multi V refrigeration system components contain very small capillary tubes, small orifices, electronic expansion valves, oil separators, and heat exchangers that can easily become blocked. Proper system operation depends on the installer using best practices and utmost care while assembling the piping system.

2. Store pipe stock in a dry place; keep stored pipe capped and clean.

3. Blow clean all pipe sections with dry nitrogen prior to assembly.

4. Use adapters to assemble different sizes of pipe.

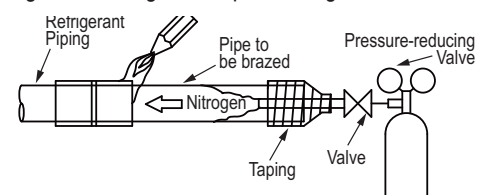
5. Always use a non-oxidizing material for brazing. ⊘ Do not use flux, soft solder, or anti-oxidant agents. If the proper material is not used, oxidized film will accumulate and clog or damage the compressors. Flux can harm the copper piping or refrigerant oil.

6. Use a tubing cutter, ⊘ do not use a saw to cut pipe. De-bur and clean all cuts before assembly.

7. Brazing joints:

- Use a dry nitrogen purge operating at a minimum pressure of three (3) psig and maintain a steady flow.
- Use a 15% silver phosphorous copper brazing alloy to avoid overheating and produce good flow.
- Protect isolation valves, electronic expansion valves, and other heat-sensitive control components from excessive heat with a wet rag or heat barrier spray.

Figure 6: Refrigerant Pipe Brazing.



#### ⚠ WARNING

- ⊘ Do not allow the refrigerant to leak during brazing; if the refrigerant combusts, it generates a toxic gas. There is risk of fire, explosion, and physical injury or death.
- ⊘ Do not braze in an enclosed location, and always test for gas leaks before / after brazing. There is risk of fire, explosion, and physical injury or death.

# INSTALLING THE REFRIGERANT PIPING

**MULTI V™**  
**HYDRO KIT**

## Pipe Supports

### Pipe Supports

A properly installed pipe system must be adequately supported to avoid pipe sagging. Sagging pipes become oil traps that lead to equipment malfunction.

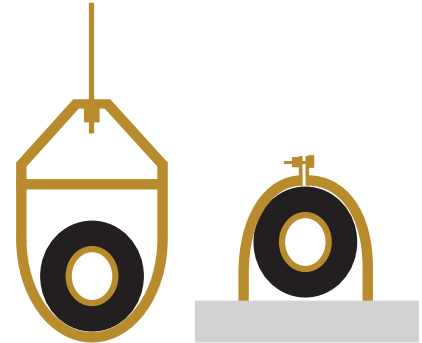
Pipe supports must never touch the pipe wall; supports must be installed outside (around) the primary pipe insulation jacket. Insulate the pipe first because pipe supports must be installed outside (around) the primary pipe insulation jacket. Clevis hangers must be used with shields between the hangers and insulation. Field provided pipe supports must be designed to meet local codes. If allowed by code, use fiber straps or split-ring hangers suspended from the ceiling on all-thread rods (fiber straps or split ring hangers can be used as long as they do not compress the pipe insulation). Place a second layer of insulation over the pipe insulation jacket to prevent chafing and compression of the primary insulation in the confines of the support clamp.

A properly installed pipe system will have sufficient supports to avoid pipes from sagging during the life of the system. As necessary, place supports closer for segments where potential sagging could occur. Maximum spacing of pipe supports must meet local codes. If local codes do not specify pipe support spacing, pipe must be supported:

- Maximum of five (5) feet on center for straight segments of pipe up to 3/4 inches outside diameter size.
- Maximum of six (6) feet on center for pipe up to one (1) inch outside diameter size.
- Maximum of eight (8) feet on center for pipe up to two (2) inches outside diameter size.

Wherever the pipe changes direction, place a hanger within twelve (12) inches on one side and within twelve (12) to nineteen (19) inches of the bend on the other side.

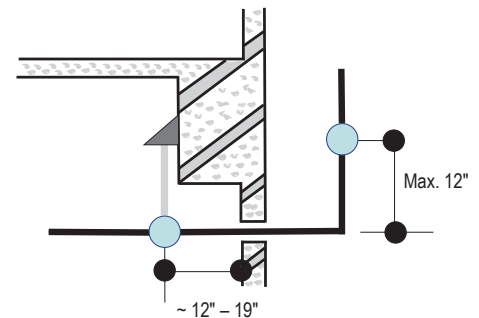
Figure 7: Pipe Hanger Details.



#### Note:

Use a 4" x long sheet curved sheet metal saddles between hanger bracket and insulation to promote linear expansion/contraction.

Figure 8: Typical Pipe Support Location—Change in Pipe Direction.



### Heat Recovery Unit Refrigerant Piping Connections

- The 96k Hydro Kit requires the use of two ports twinned together when connected to a Heat Recovery Unit. Use LG Y-Branch Kit ARBLN03321 for this application.
- If the capacity of the Hydro Kit and other indoor units connected to the Heat Recovery Unit are similar, install the Hydro Kit on Ports 1 and 2.

#### Note:

- Ports are numbered right-to-left on the new PRHR\*3A heat recovery units.
- Refer to the specific Air-Source / Water-Source Installation Manual for detailed information about Heat Recovery Unit installation.

Figure 9: Hydro Kit Refrigerant Pipe Connections on a Heat Recovery Unit.

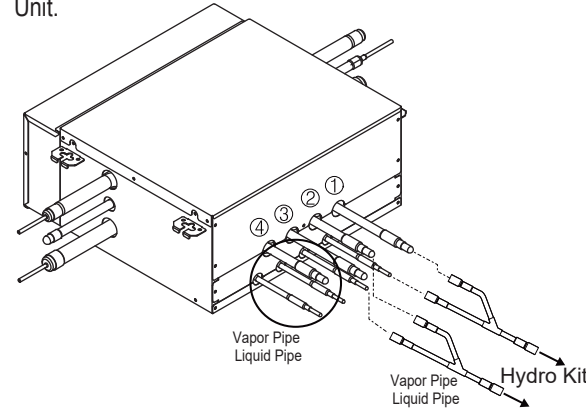


Figure 10: Y-Branch Kit for Twinning Heat Recovery Ports.

Unit: Inch

Kit Model No.	Vapor Pipe Dimensions	Liquid Pipe Dimensions
ARBLN03321	<p> I.D. 7/8 (22.2) I.D. 3/4 (19.05) I.D. 5/8 (15.88) I.D. 1/2 (12.7)  I.D. 1 (25.4) I.D. 3/4 (19.05) I.D. 5/8 (15.88) I.D. 1/2 (12.7)  15-3/8 (390) 16-1/4 (413)  3-1/4 (83)  I.D. 7/8 (22.2) I.D. 28.58 (1-1/8) I.D. 7/8 (22.2)  O.D. 3/4 (19.05) O.D. 1 (25.4) O.D. 3/4 (19.05) I.D. 1 (25.4)  2-3/4 (70) 3-1/8 (80) 4-5/16 (110) </p>	<p> I.D. 3/8 (9.52) I.D. 1/2 (12.7) I.D. 3/8 (9.52) I.D. 1/4 (6.35)  I.D. 1/2 (12.7) I.D. 3/8 (9.52) I.D. 1/2 (12.7) I.D. 1/4 (6.35)  12-5/8 (321) 13-1/16 (332)  2-15/16 (74) </p>
	AJR54072930	AJR54072928

### When Pre-Commissioning / Addressing Systems with Hydro Kits

- The pipe numbers of the connected vapor and liquid pipes must be the same.
- Ensure that there is flow of water during the auto addressing / valve port detection procedure.
- Each indoor unit (including Hydro Kits) is assigned a unique address and is detected by the outdoor unit while performing the auto addressing / valve port detection process.

#### Auto Addressing / Valve Port Detection with Hydro Kits

- Choose the "Mode" according to the water temperature.
  - Use "Mode 1" if the water temperature is higher than 86°F (30°C).
  - Use "Mode 2" if the water temperature is lower than 86°F (30°C).
- Ensure that there is flow of water (the water pump is operating) during the auto addressing / valve port detection process.
  - If water circulation is not detected by water flow switch, a "CH14" error will occur.

#### Note:

- An auto addressing / valve port detection process error will occur if the Hydro Kit piping temperature does not increase.
- For detailed information on Pre-Commissioning, Addressing, Valve Port Detection procedures, review the installation manual for the specific outdoor unit / water-source unit.

# INSULATION

## Refrigerant Piping System Insulation

**MULTI V™**  
**HYDRO KIT**

### Refrigerant Piping System Insulation

All refrigerant piping from the outdoor unit to the Hydro Kits / indoor units / heat recovery units must be insulated correctly for safety and usage. Y-branch connections, header branch connections, refrigerant piping, field-provided isolation ball valves (if present), service valves, and elbows must be properly and completely insulated using closed cell pipe insulation (up to the indoor unit piping connections). To prevent heat loss / heat gain through the refrigerant piping, all refrigerant piping including liquid lines and vapor lines must be insulated separately. Insulation must be a minimum 1/2 inches thick, and thickness will need to be increased based on ambient conditions and local codes. Table on next page lists minimum wall thickness requirements for Ethylene Propylene Diene Methylene (EPDM) insulation.

All insulation joints must be glued with no air gaps. Insulation material must fit snugly against the refrigeration pipe with no air space between it and the pipe. Insulation passing through pipe hangers, inside conduit, and/or sleeves must not be compressed. Protect insulation inside hangers and supports with a second layer. All pipe insulation exposed to the sun and outdoor elements must be properly protected with PVC, aluminum vapor barrier, or alternatively placed in a weather-resistant enclosure such as a pipe rack with a top cover; and meet local codes. LG-provided Y-branches are shipped from the factory with pre-formed peel-and-stick foam insulation jackets, with a 1.84 lb./ft.<sup>3</sup> density, 1/2 inch thickness, and meet UL94 MF-1 flammability.

The design engineer must perform calculations to determine if the factory-supplied insulation jackets are sufficient to meet local codes and avoid sweating. Add additional insulation if necessary. Check the fit of the insulation jacket after the header fitting and all run-out pipes are installed. Mark all pipes at the point where the insulation jacket ends. Remove the jacket. Install field provided insulation on the run-out and main trunk pipes first. Install the LG-provided insulation plugs on the ends of all unused header ports. Peel the adhesive glue protector slip from the insulation jacket and install the clam-shell jacket over the fitting.

### Note:

- Do not insulate gas and liquid pipes together as this can result in pipe leakage and malfunction due to extreme temperature fluctuations.
- Always properly insulate the piping. Insufficient insulation will result in condensation, reduced heating/cooling performance, etc. Also, if the pipes aren't insulated properly, condensation could potentially cause damage to building finishes. Pay special attention to insulating the pipes installed in the ceiling plenum.
- Fully insulate the piping connections.
- Follow local codes and the designer's instructions when selecting ethylene propylene diene methylene (EPDM) insulation wall thickness.

Figure 11: Typical Pipe Insulation, Power Wire and Communications Cable Arrangement.

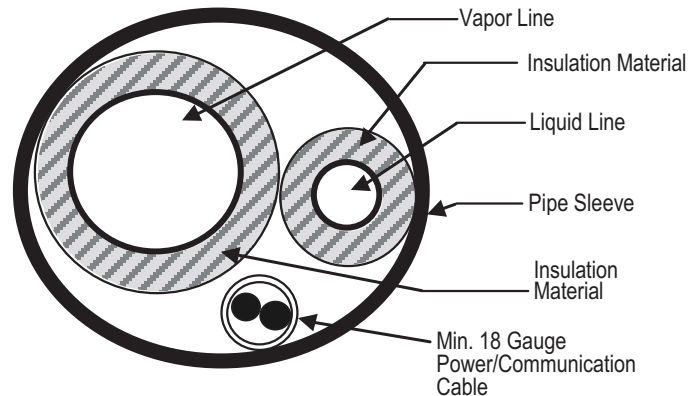


Figure 12: Hydro Kit Refrigerant Piping Insulation Close Up.

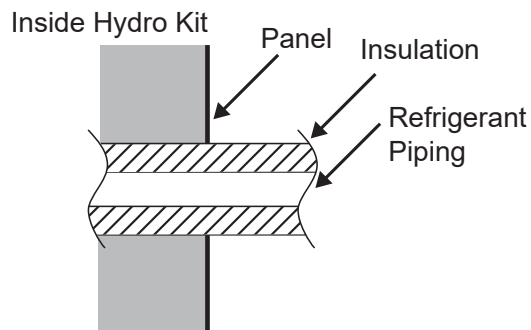


Table 12: Minimum Refrigerant Pipe EPDM Insulation Wall Thickness Requirements.<sup>1</sup>

Classification / Piping O.D.		Air-conditioned location		Non-air conditioned location		
		1. Typical Conditioned Location	2. Special Conditioned Location	3. Typical Unconditioned Location	4. Special Unconditioned Location	
Liquid pipe	ø1/4 inches	>1/2 inches	>1/2 inches	>1/2 inches	>1/2 inches	
	ø3/8 inches					
	≥ø1/2 inches	>1/2 inches	>1/2 inches	>1/2 inches	>1/2 inches	
Vapor pipe	ø3/8 inches	>1/2 inches	>3/4 inches	>3/4 inches	>1 inch	
	ø1/2 inches					
	ø5/8 inches					
	ø3/4 inches					
	ø7/8 inches					
	ø1 inch					
	ø1-1/8 inches	>3/4 inches	>1 inch	>1 inch		
	ø1-1/4 inches					
	ø1-3/8 inches					
	ø1-1/2 inches					
	ø1-3/4 inches					

<sup>1</sup>The thickness of the above insulation material is based on heat conductivity of 0.61 Btu/in/h/ft<sup>2</sup>/°F.

### 1. Typical Conditioned Location

A building plenum or space that contains conditioned air that does not exceed 80°F DB.

### 2. Special Conditioned Location

- When the location is air conditioned, but there is severe temperature/humidity difference due to high ceilings.
  - Church, auditorium, theater, lobby, etc.
- When the location is air conditioned, but internal temperature/humidity are high.
  - Bathroom, swimming pool, locker room, etc.

### 3. Typical Unconditioned Location

An unconditioned space inside a building.

### 4. Special Unconditioned Location: If conditions 1 and 2 below are present.

- An unconditioned space or plenum of a building.
- An area where there is an elevated humidity level.

### 5. Additional Insulation for Hydro Kits / Indoor Units Will be Required in Humid Environments.

The air conditioner factory insulation has been tested according to "ISO Conditions with Mist," and it satisfies the requirements. If the system has been operating for a long time in a high humidity environment (dew point temperature: more than 73°F), condensate is likely to form. If this happens, install 3/8 inch thick EPDM insulation that is plenum-rated with a heat-resistance factor of more than 248°F.

## Hydro Kit Condensate Piping Connection

Figure 13: Hydro Kit Condensate Piping Connection.

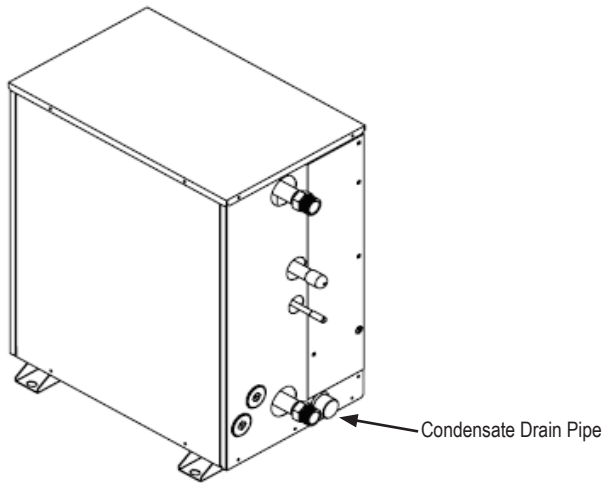
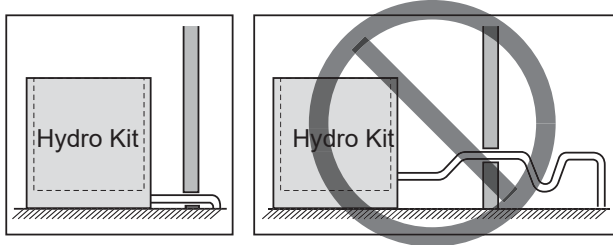



Figure 14: Proper and Improper Condensate Piping Installation.



- Hydro Kits do not include internal drain pumps, the units use gravity drains to remove condensate. If a condensate pump is required, it is field-provided and installed external to the Hydro Kit frame.
- The condensate drain connection is 1.0" MPT. For the drain piping size, use the same diameter as the product connected or larger.
- Condensate piping must slope about 1/50 to 1/100 downward, and not include any traps, therefore allowing gravity to push any condensation down and away from the Hydro Kit.
- Properly vent the condensate piping per industry standard practices.

### Note:

-  Do not install the condensate piping up or with a trap. Installing condensate piping in an up direction or if the piping run includes a trap, any condensate will back flow into the Hydro Kit, causing product damage and operation malfunction.
- When installing the piping connections, support the pipe to avoid placing force on the drain. Internal damage will occur.
- Follow all applicable local, state, and federal codes if / when insulating Hydro Kit condensate piping.

## Installing a Drip Pan (Optional, Field Supplied)

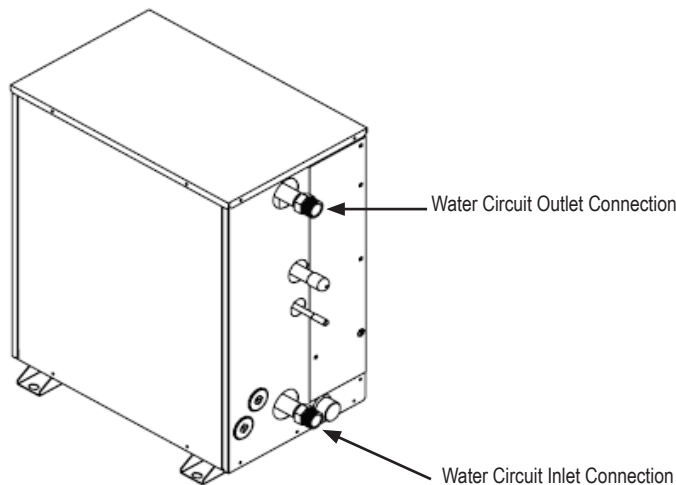
Depending on the location of the Hydro Kit, an optional drip pan could be necessary. The factory has installed insulation on all cold surfaces, but the Hydro Kit still generates condensate. The unit has a 1.0" MPT condensate pipe connection on the right side, and is equipped with a base pan drain hole to drain water that could enter the unit during maintenance and service.



The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

## Hydro Kit Water Circuit Connections

Figure 15: Hydro Kit Water Circuit Connections.



### Note:

The Hydro Kit has a factory-installed, internally mounted Flow Switch.

## General Guidelines

### ⚠ WARNING

Ensure the power is not connected or on when adding or changing the water to the water circuit. There is a risk of electric shock, which will cause physical injury or death.

### Note:

Install the Hydro Kit and the water circuit in a secure location where it cannot be accessed without authorization.

- Follow all applicable local, state, and federal codes if / when insulating the Hydro Kit water circuit.
- Clean the water piping and connections with water.
- Include enough installation and service space for an external water pump.
- Use anticorrosive copper pipe for the water piping.
- During piping installation, keep the end closed with a cap to prevent dust and other impurities from entering the piping.
- To prevent the piping connections from mechanically failing, apply industry-standard tools and follow local, state, and federal codes regarding installation methods.
- Ensure all piping connections (L-shaped elbows, T-shaped fittings, diameter reducers) are tight and free from water leaks. Seal all piping connections with Teflon® tape, sealant, joint compound, rubber bushings, etc.
- Insulate the piping to prevent heat loss, and to avoid generating condensate.
- Operation time of flow valves (examples: three-way valve or two-way valve) must be less than 90 seconds.

## Water Quality

Water quality must comply with local or national codes. Read all cautions and warnings before adding antifreeze to the Hydro Kit water circuit.

### Note:

- Clean all water piping to remove sludge and scale. If the Hydro Kit is to be installed on an already existing water circuit, clean out the water pipes first to remove any existing sludge and scale. Sludge and scale will degrade performance.
- ⚠ DO NOT charge or operate the Hydro Kit water circuit without the strainer installed. Installing a strainer in the water loop is very important to prevent performance degrade.
- Perform chemical treatment to prevent rust. Any chemical treatment to prevent rust must be performed by a trained technician.

# INSTALLING THE WATER CIRCUIT

## Antifreeze Additives

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Antifreeze Additives

At locations where water temperatures can drop below 59°F (15°C), or if the water flowing through the Hydro Kit heat exchanger has the potential to freeze, an antifreeze agent such as methanol, ethylene glycol, or propylene glycol must be added to the water circuit. Consult the Hydro Kit system design engineer and all applicable local, state, and federal codes.

To add the right amount of antifreeze:

- Calculate the approximate volume of water in the system.
- Add antifreeze solution to the Hydro Kit water circuit.

Table 13: Antifreeze Type and Minimum Temperature for Freeze Protection

Type	Minimum Temperature for Freeze Protection				
	59°F - 23°F (+15°C to -5°C)	14°F (-10°C)	5°F (-15°C)	-4°F (-20°C)	-13°F (-25°C)
Methanol	6%	12%	16%	24%	30%
Ethylene Glycol	12%	20%	30%	-	-
Propylene Glycol	17%	25%	33%	-	-

The antifreeze will reduce the ability of the Hydro Kit to exchange heat energy, and this reduction must be taken into account. See tables below for cooling and heating capacity and water pressure drop correction factors. See also the Hydro Kit Engineering Manual.

Table 14: Cooling Capacity Correction by % Antifreeze Chart.

Type	Antifreeze Concentration Level (% by Weight)				
	10%	20%	30%	40%	50%
Methanol	0.998	0.997	0.995	0.993	0.992
Ethylene Glycol	0.996	0.991	0.987	0.983	0.979
Propylene Glycol	0.993	0.987	0.980	0.974	0.968

Table 15: Heating Capacity Correction by % Antifreeze Chart.

Type	Heating Antifreeze Concentration Level (% by Weight)				
	10%	20%	30%	40%	50%
Methanol	0.995	0.990	0.985	0.979	0.974
Ethylene Glycol	0.993	0.985	0.977	0.969	0.961
Propylene Glycol	0.966	0.973	0.960	0.948	0.935

Table 16: Water Pressure Drop Correction Factors.

Type	Antifreeze Concentration Level (% by Weight)				
	10%	20%	30%	40%	50%
Methanol	1.023	1.057	1.091	1.122	1.160
Ethylene Glycol	1.024	1.068	1.124	1.188	1.263
Propylene Glycol	1.040	1.098	1.174	1.273	1.405

### ⚠ WARNING

- Follow all warnings before adding antifreeze to the Hydro Kit water circuit. Follow all local, state, and federal laws pertaining to the use and handling of antifreeze. If not, it will result in physical injury due to toxic exposure.
- ⚡ Do not touch the antifreeze during installation or operation. It will result in physical injury due to toxic exposure.

### Note:

- Follow all notes in this section before adding antifreeze to the Hydro Kit water circuit. Follow all local, state, and federal laws pertaining to the use and handling of antifreeze.
- Use only one of the listed antifreeze solutions.
- Pressure drop and performance decreases when antifreeze is used.
- Corrosion can still occur when using antifreeze. Add corrosion inhibitor.
- Periodically check antifreeze concentration to maintain the correct percentage levels.
- ⚡ If the Hydro Kit is to be used in cooling applications, antifreeze must be added to the water circuit to prevent freezing and burst pipes. After the antifreeze is added to the water circuit, set DIP Switch No. 2 to ON (on the Hydro Kit PCB DIP Switch Group 3), and disconnect the Short Key. See the Hydro Kit DIP Switch setting pages in the Pre-Commissioning section for information.

*The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.*

### Water Circuit Components (For Illustration Purposes Only)

#### Note:

*For the water circuit, use the closed loop type. An open loop type circuit will allow impurities into the water circuit, which will damage the Hydro Kit.*

1. Select parts that exceed the water pressure specifications needed for the Hydro Kit.
2. See the "Condensate Piping" section for guidance on the drain connection and piping (1).
3. To replace the connected device easier if it warrants it in the future, install a dielectric union fitting where "dissimilar" pipe materials are used. If similar pipe materials are used, install a standard union joint (2).
4. Install service ports to clean the heat exchanger at each inlet and outlet of the water pipe (3).
5. Always install the 50 mesh water circuit strainer (provided with the Hydro Kit) on a horizontal run of the water inlet piping (4). For specific installation steps, see the "Strainer Installation" section on page 37. If a replacement strainer is necessary, see the "Accessories" section in this manual.

#### Note:

⊘ *Do not allow water to directly flow into the water pipe during Hydro Kit operation without the strainer installed. If the strainer is not installed, dirt, rust, and other debris can infiltrate the water circuit, corrode Hydro Kit components, and cause the unit to malfunction. After a new system has been operating for two (2) weeks, clean the strainers and any filters to remove dirt that has entered the water circuit during installation.*

6. Install an air vent / air separator (5) in the section of the water pipe with the highest elevation. This prevents air bubbles from forming in the pipe system that would impede water flow.

#### ⚠ WARNING

*If there is a lot of air in the water circuit and the water flow drops, Error Code CH14 appears on the Hydro Kit Controller display. If the water flow drops, there is the potential for the heat exchanger to burst, causing physical injury and / or death.*

#### Note:

*If there is a lot of air in the water circuit and the water flow drops, Error Code CH14 appears on the Hydro Kit Controller display. If the water flow drops, there is the potential for the heat exchanger to burst, causing product damage and damage to the surrounding location.*

7. Install thermometers (6) and pressure meters (7) at the inlet and outlet of the water circuit.
8. Install a drain valve (8) that can be used when replacing a part or providing service.
9. Install shut-off valves (9) on the inlet pipe upstream of the strainer, and to the outlet pipe of the heat exchanger. Use when a part needs replaced, and for heat exchanger and strainer cleaning / maintenance.
10. In applications such as bivalent systems, flow check valves can be installed at each outlet water pipe.
11. Install an expansion tank based on the volume of the water circuit.
12. A balancing valve (with flow meter) can be installed to ensure 100% of nominal flow.
13. Install a circulation pump that meets system water flow specifications detailed in the Hydro Kit Engineering Manual.

# INSTALLING THE WATER CIRCUIT

## Water Circuit Components

**MULTI V™**  
**HYDRO KIT**

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

14. Install a pressure relief valve that meets or exceeds the design water pressure (10).

### Note:

The pressure relief valve helps to prevent Hydro Kit or water circuit damage if the pressure increases inside the water circuit system.

15. Install insulation to the water circuit system to prevent condensation. Use proper size insulation as outlined by insulation manufacturer and by the design engineer.

### Note:

Circulate or drain out the water completely if the water circuit isn't going to be used for an extensive period. This is to prevent sludge or dirt from settling and damaging the piping or system components.

Figure 16: Illustration of a Hydro Kit Water Circuit.

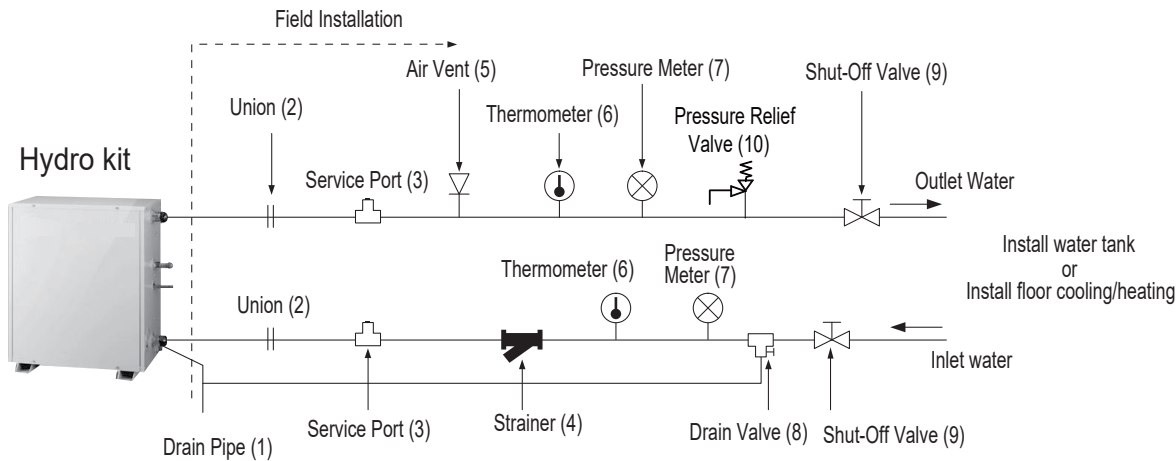
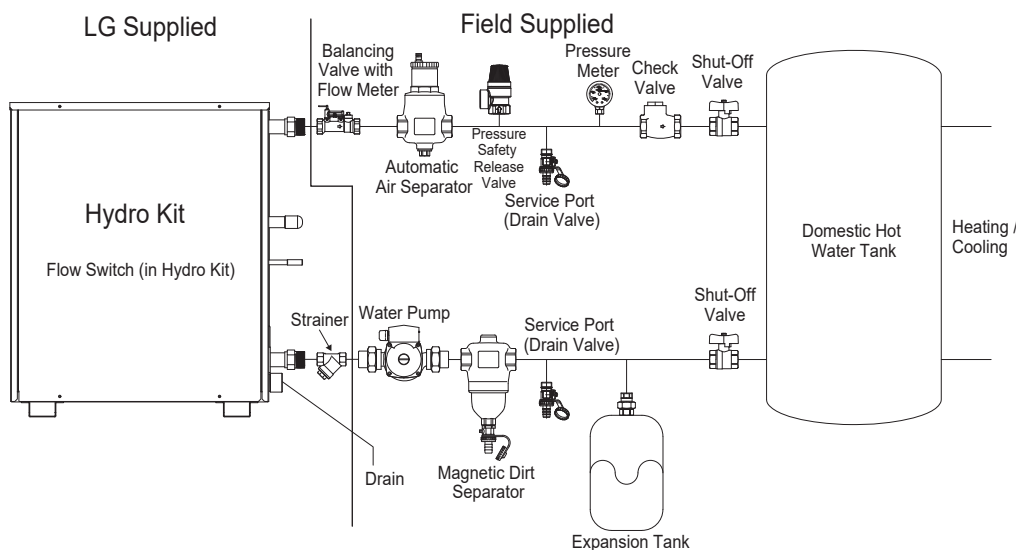


Figure 17: Another Illustration of a Hydro Kit Water Circuit.



The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

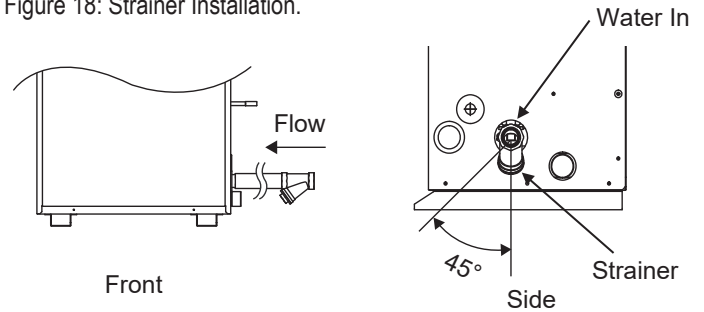
### Installing the Strainer

(Included with the Hydro Kit; Replacement Part No. MJC57132402; For All Applications)

#### Note:

- Thoroughly flush the water circuit (if present and / or in use) before installing the strainer.
- Continue flushing period until water circuit is clean.
- After installation, periodically check and clean the strainer. See the Maintenance section for guidelines.

Figure 18: Strainer Installation.



1. Install the 50 mesh strainer provided with the Hydro Kit.
2. Check the strainer direction and install on the inlet side of the heat exchanger (see image).
3. Treat the threads on the water pipe with joint compound, or wrap the water pipe threads thoroughly with Teflon tape.
4. Service access port must be installed downward within 45 degrees of the vertical plane.
5. Check for leaks on the connection.

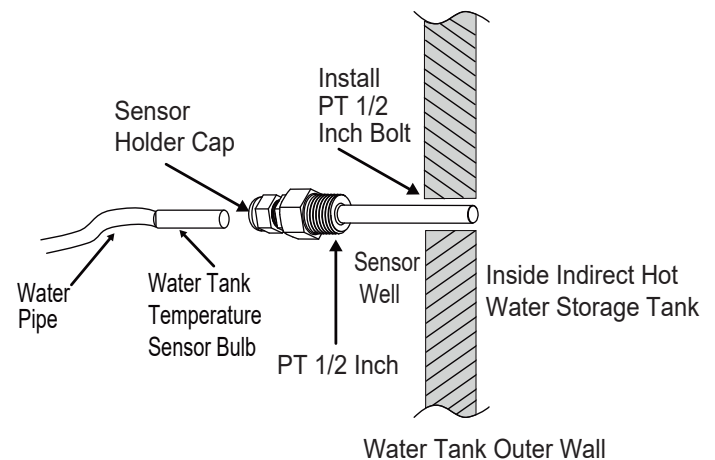
### Installing the Indirect Water Storage Tank Sensor Well

(Included with the Hydro Kit; Model No. MEG61846102; For Those Applications With An Indirect Water Storage Tank)

#### Note:

If the indirect water storage tank includes an existing sensor well that can accommodate the LG factory-provided sensor (see next page), use it and skip this procedure.

Figure 19: Indirect Water Storage Tank Sensor Well Installation.



1. Drill and thread a 1/2" FPT hole in the tank wall at the tank manufacturer's recommended location.
2. Remove cap and sensor from the well and place in a secure location.
3. If welding the sensor well to the tank, insert it into the threaded hole and rotate until the threads on the neck bottom out. Weld the sensor well to the tank and pressure test as necessary.
4. If not welding, wrap the threads of the sensor well about eight (8) times with Teflon tape. Insert the sensor well into the threaded hole in the tank wall. Turn clockwise until secure, and then finalize tightening using a socket or open-end wrench.

# INSTALLING THE WATER CIRCUIT

**MULTI V™**  
**HYDRO KIT**

## Water Circuit Components

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Installing the Indirect Water Storage Tank Sensor

(Included with the Hydro Kit; Replacement No. EBG61325701; For Those Applications With An Indirect Water Storage Tank)

#### ⚠ WARNING

- Always shut the power off before installing the sensor. There is a risk of electric shock, physical injury and / or death.
- ⚡ Never operate the Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. There is a risk of electric shock, fire, physical injury and / or death.
- ⚡ Never touch wiring or install the sensor with wet hands. There is a risk of electric shock, physical injury and / or death.
- ⚡ Do not install the sensor if the indirect hot water storage tank contains water. If the indirect water storage tank has water in it, isolate the water circuit by closing the shutoff valves, and drain the tank until empty. There is a risk of electric shock, physical injury and / or death.

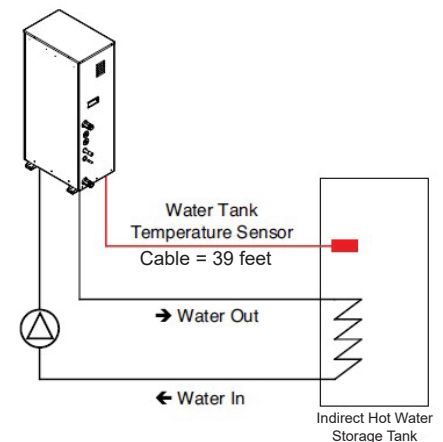
#### Note:

- ⚡ Never operate the Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. There is a risk of product malfunction and / or damage.
- The sensor is not necessary if the Hydro Kit will be used in an application that does not include an indirect hot water storage tank.
- Locate the indirect hot water storage tank so that the 39 foot cable of the sensor reaches both the Hydro Kit PCB board and the sensor well.
- Ensure the sensor cable has a proper routing path; the sensor cable path must be at least two (2) inches away from any power wiring. Depending on the current draw of nearby wiring, the minimum clearance distance will have to be increased. For more information regarding power wiring / communications cable clearances, see the Wiring section.

#### Sensor Installation (See Previous Page for Sensor Well Installation)

1. If the indirect hot water storage tank includes an existing sensor well that can accommodate the 1/2" MPT connection sensor, use it. If it does not include a sensor well, see the sensor well installation instructions on the previous page.
2. Remove the sensor and cable from the well. Loosen and remove the keeping nut at the entry of the well housing, and remove the sensor from the well by gently pulling on the sensor cable. Slide the keeping nut up the sensor wire so it will not get misplaced. Threads must face the sensor bulb.
3. Apply a generous portion of thermal paste to the sensor and in the well. Use enough to fill the spaces between the sensor head and the sensor well walls.
4. Insert the sensor all the way into the well until it bottoms out. Completely fill any remaining air gaps with thermal paste.
5. Slide the keeping nut down the sensor cable and thread it on the sensor well.

Figure 20: Indirect Hot Water Storage Tank Temperature Sensor Diagram.





The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Sensor Cable Installation (See also the Wiring section)

1. Choose a route for the cable (use the 39 foot [12 m] cable included with the sensor well) from the sensor well to the Hydro Kit PCB so that the cable is protected from damage, foot traffic, and extreme weather and temperature conditions.

#### ⚠ WARNING

- Damage to the sensor cable will result in electric shock, fire, physical injury, and / or death.
- Before installing the cable, verify that the power is OFF. If not, it will result in electric shock, physical injury, and / or death.

2. Loosely secure the cable about every three (3) feet with cable ties. To avoid damaging the sensor cable, ⚠ do not pull the ties too tight.

#### ⚠ WARNING

Damage to the sensor cable will result in electric shock, fire, physical injury and / or death.

3. Route the sensor cable through the Hydro Kit frame and into the control panel area. If the cable passes through an access hole with sharp edges, install field-supplied protective grommets to avoid damage to the cable.
4. Find the red CN-TH4 connector on the Hydro Kit PCB. Inspect the leads and pins of the sensor cable plug, looking for bent pins and loose connections between the wire leads and the metal pins. If not damaged, insert the sensor cable plug into CN-TH4.

#### ⚠ WARNING

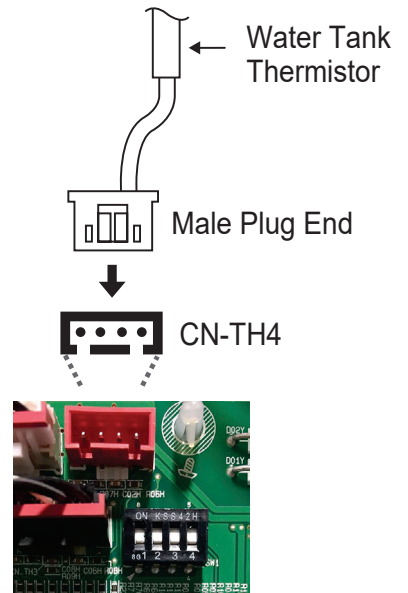
If a damaged sensor cable plug is installed, it will result in electric shock, fire, physical injury and / or death.

5. Verify the connection is secure.

### Note:

- If the application includes an indirect hot water storage tank, and an indirect hot water storage tank sensor is not connected, Error Code CH08 will appear.
- The indirect hot water storage tank / sensor is not necessary if the application is for only floor heating.

Figure 21: Water Tank Sensor Well and Sensor Connection.





# INSTALLING THE WATER CIRCUIT

## Water Circuit Components

**MULTI V™**  
**HYDRO KIT**

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Installing the Solar Heating System Interface Kit

(Optional, Sold Separately by LG; Model No. PHLLA; For Those Applications With A Third-Party Solar Heating System)

#### ⚠ WARNING

- Always shut the power off before installing the accessories. There is a risk of electric shock, physical injury and / or death.
- ⚡ Never operate the Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. There is a risk of electric shock, fire, physical injury and / or death.
- ⚡ Never touch wiring or install the sensor with wet hands. There is a risk of electric shock, physical injury and / or death.

#### Note:

- ⚡ Never operate the Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. There is a risk of product malfunction and / or damage.
- Ensure the sensor cable has a proper routing path; the sensor cable path must be at least two (2) inches away from any power wiring. Depending on the current draw of nearby wiring, the minimum clearance distance will have to be increased. For more information regarding power wiring / communications cable clearances, see the Wiring section.

Refer to the figure below when installing the Solar Heating System Interface Kit. For more detailed information, see the Solar Heating System Interface Kit Installation Manual for specific installation procedures.

1. Check the diameter of the pre-installed pipes (A and B).
2. If the diameter of the pre-installed pipes is different from diameter of solar heating kit, it is necessary to reduce or increase the diameter of the pipe.
3. Connect the pipe and solar heating system interface kit.
4. If a water tank sensor is already connected to CN-TH4 on the Hydro Kit PCB, disconnect it first, and then connect the solar heating sensor to CN-TH4.

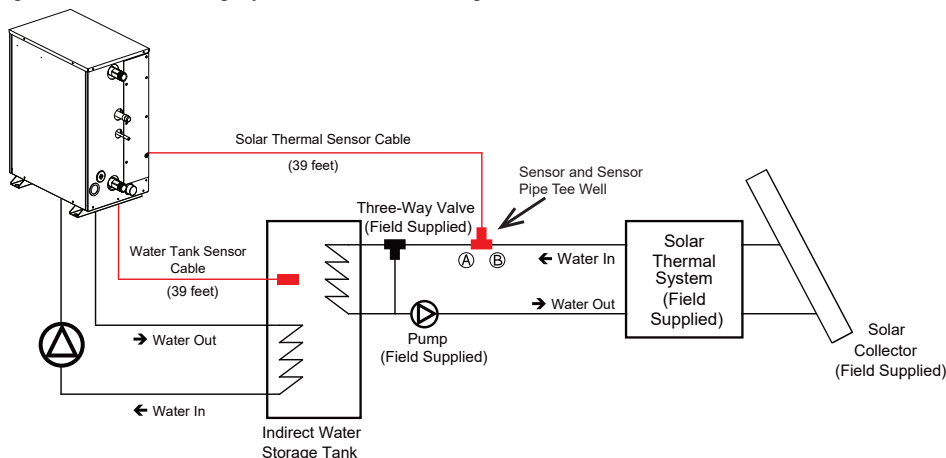
#### Note:

CN-TH4 connection can be used with either the Indirect Water Storage Tank Sensor OR the Solar Heating System Interface Kit with its sensor. Both accessories CANNOT be connected to CH-TH4 at the same time.

### Solar Heating System Sensor and Well (Included with Solar Heating System Interface Kit Model No. PHLLA [but sold separately from the Hydro Kit])

Install the solar heating system well, sensor, and sensor cable similar to the procedure for the indirect water storage tank sensor (see the previous pages and the Wiring section).

Figure 22: Solar Heating System Interface Kit Diagram.



The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.


### Installing Third-Party Accessories

For Hydro Kit terminal connection information on third-party valves, relays, and other control devices like thermostats, see the Wiring section. Also, review the instructions provided with the third-party components.

#### Domestic Hot Water Tank

##### Note:

When selecting a water tank, ALWAYS use an INDIRECT tank where the Hydro Kit water circuit is isolated from the domestic water system. Failure to follow instructions will result in product malfunction.

- The domestic hot water tank is for sanitary applications and uses the indirect heat exchange method for heating;  do not add antifreeze like ethylene glycol to its water.
- The tank must be installed at a level location.
- Water quality must comply with all local, state, and federal requirements.
- The water supply and drain must be located near the domestic hot water tank for easy access and maintenance.
- To remove any impurities and ensure clean hot water, thoroughly wash out the inside of the domestic hot water tank before and after installation.

When using the Hydro Kit in domestic hot water tank applications, a recirculation pump is recommended for install. A recirculation pump helps prevent cold water at the end of the hot water supply from infiltrating the water piping, and stabilize the water temperature inside the tank.

The recirculation pump must operate before there is a demand for domestic hot water and not during; therefore, install an external timer to determine when the recirculation pump must turn on and off.

Calculate the Operating Duration of the Recirculation Pump as follows:

$$\text{Duration Time (minute)} = k * V / R$$

k: 1.2 ~ 1.5 is recommended. (If the distance between the pump and tank is long, choose the higher number.)

V: Volume of the Domestic Hot Water Tank (gallon [liter])

R: Water Flow Rate of Pump (gallon per minute [liter per minute]), which is determined by the pump performance curve.

#### Three-Way Valve - for Diverting Hot Water Between Domestic Hot Water and Space Heating / Cooling or Floor Heating

Refer to valve manufacturer's installation instructions.

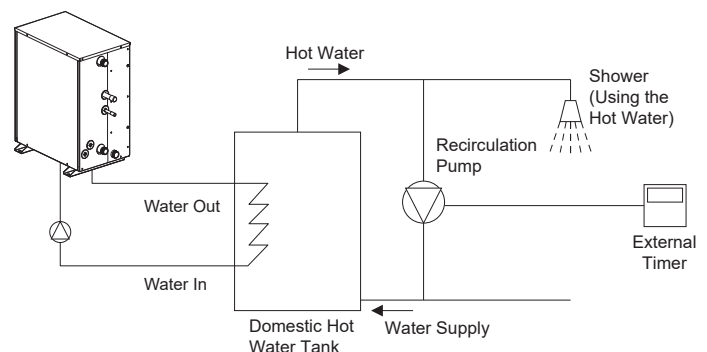
#### Two-Way Isolation Valve - for Floor Heating

Refer to valve manufacturer's installation instructions.

#### Three-Way Valve (Solar Heating Kit) - for Diverting Hot Water Between Domestic Hot Water and Space Heating / Cooling or Floor Heating

Refer to valve manufacturer's installation instructions.

Figure 23: Recirculation Pump with Domestic Hot Water Tank.



# INSTALLING THE WATER CIRCUIT

**MULTI V™**  
**HYDRO KIT**

## Water Circuit Components

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Freeze Protection Flow Switch (Optional)

Flow switch must be rated for 208-230V and be normally closed. Select a flow switch following the pressure specifications of the water supply system.

#### Note:

The flow switch will perform as the first protection device when there is little to no water flow. If the required water level is not present after installing the flow switch, the Hydro Kit will display a CH24 error code and will stop operating.

When setting the flow switch, use the default set value of the Hydro kit to satisfy the minimum flow rate:

- Minimum Flow Rate Range: 50%

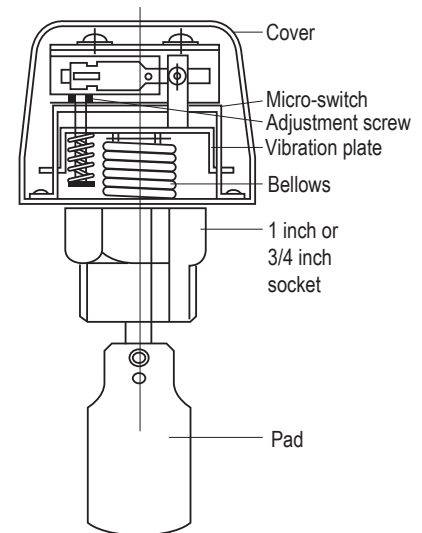
#### Note:

- If the set value does not satisfy the minimum flow rate, or if the set value is changed arbitrarily, it can result in performance deterioration or system failure.
- If the water supply is hard, the plate type heat exchanger of the Hydro Kit could become damaged or system failure could occur.
- If the Hydro Kit displays a CH24 or CH180 error code, it is possible that the interior of the plate-type heat exchanger is partially frozen. If this occurs, resolve the partial freezing issue and then operate the Hydro Kit again. (Causes of partial freezing: Insufficient heat water flow rate, water not supplied, insufficient coolant, foreign particles inside plate-type heat exchanger.)

### Valve Orientation

Refer to valve manufacturer's installation instructions.

Figure 24: Flow Switch Diagram.

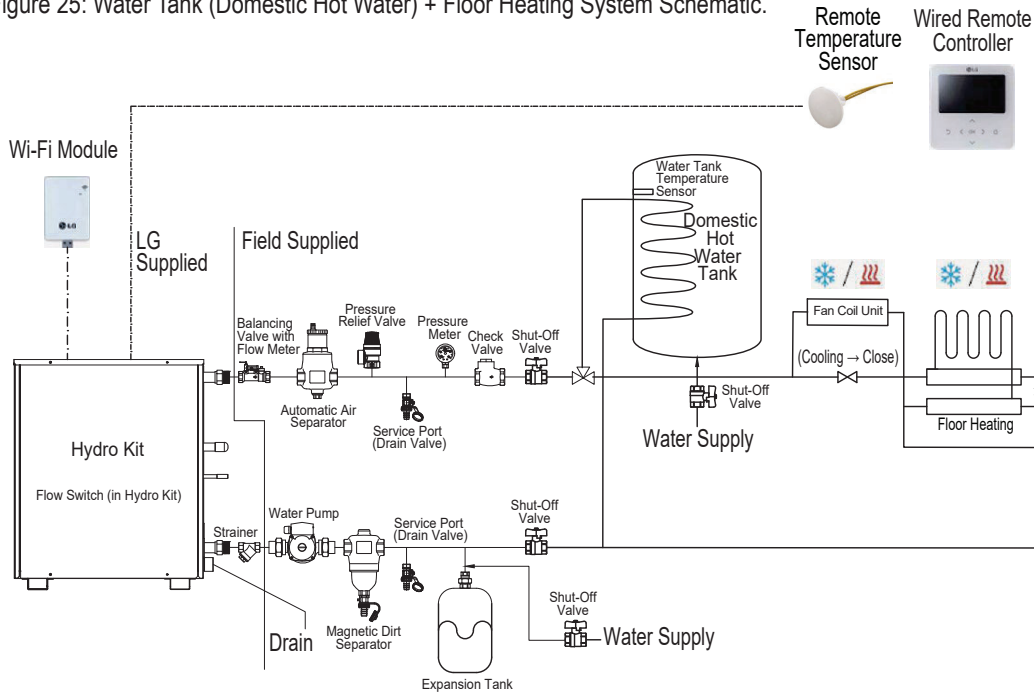


*The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.*

## Application Options

### Water Tank (Domestic Hot Water) + Floor Heating (Factory Default Setting)

Figure 25: Water Tank (Domestic Hot Water) + Floor Heating System Schematic.



**Note:**

- When selecting a water tank, ALWAYS use an INDIRECT tank where the Hydro Kit water circuit is isolated from the domestic water system. Failure to follow instructions will result in product malfunction.
- The heating operation mode of the water tank (domestic hot water) is not a mode selection using the remote controller. The heating operation mode switches the three-way valve operation to the water tank operation based on the water tank temperature.
- It is impossible to operate water tank (domestic hot water) during cooling mode.

**Note:**


- Verify that Hydro Kit PCB DIP Switch Group 2 is set correctly for water tank (domestic hot water) + floor heating installation applications (this application is the factory default setting). (Refer to the Hydro Kit DIP Switch Settings pages in the Pre-Commissioning section.)
- The domestic hot water tank is for hot water applications and uses the indirect heat exchange method for heating;  do not add anti-freeze like ethylene glycol to its water.
- For sensing air temperature at a specific area, choose a remote temperature sensor or a wired remote controller, depending on the Hydro Kit PCB DIP Switch Group 3 setting. (Refer to the Hydro Kit PCB DIP Switch Settings pages in the Pre-Commissioning section.)
- When installing a floor heating system, to measure room temperature, use the Hydro Kit controller or a remote temperature sensor (sold separately).
- See the Indirect Water Storage Tank Sensor Well and Sensor Installation information. To prevent condensation from forming in floor cooling applications, set minimum / maximum cooling temperatures.
- For three-way valve and / or two-way valve control, see the Wiring section.

Table 17: Three-Way Valve and Two-Way Valve Control Application.

Mode	Description	Three-Way Valve Operation	Two-Way Valve Operation
Cooling	Fan Coil Unit - Not Use	Floor Heating	Open
	Fan Coil Unit - Use	Floor Heating	Close
Heating	Priority - Water Tank (Domestic Hot Water)	Water Tank (Domestic Hot Water)	No Control
	Priority - Floor Heating	Floor Heating	No Control

# INSTALLING THE WATER CIRCUIT

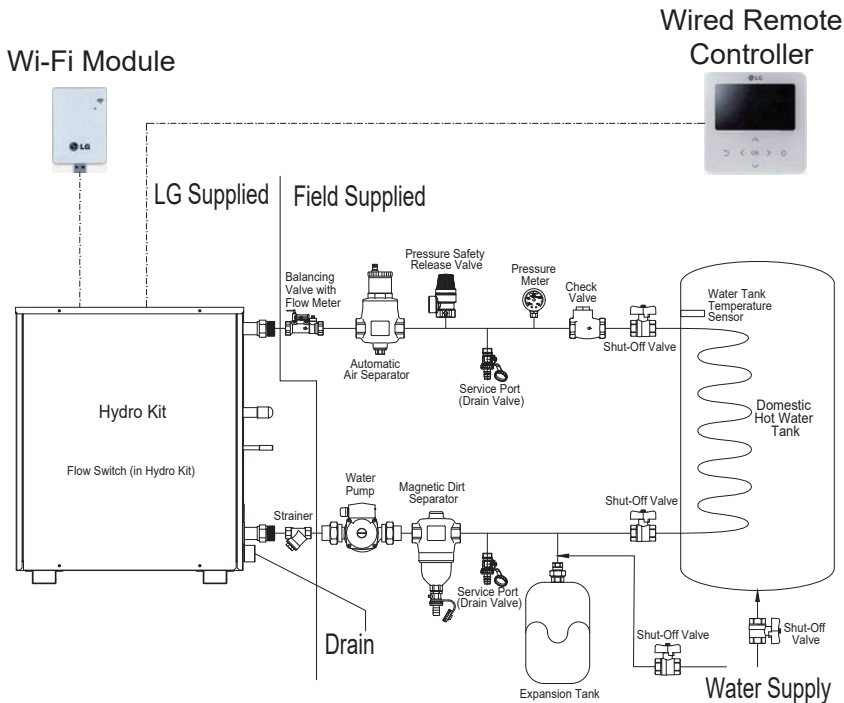
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## Application Options

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Water Tank (Domestic Hot Water)

Figure 26: Water Tank (Domestic Hot Water) System Diagram.



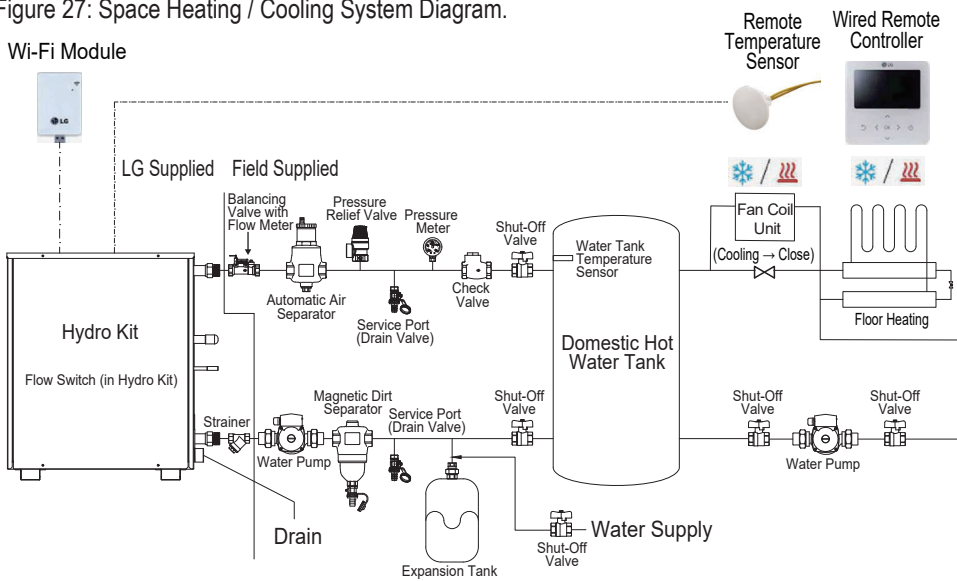
### Note:

- Hydro Kit PCB DIP Switch Group 2 must be set correctly for water tank (domestic hot water) applications. (Refer to the Hydro Kit DIP Switch Settings pages in the Pre-Commissioning section.)
- The domestic hot water tank is for hot water applications and uses the indirect heat exchange method for heating; Ⓢ do not add anti-freeze like ethylene glycol to its water.
- See the Indirect Water Storage Tank Sensor Well and Sensor Installation information.

The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

Space Heating / Cooling

Figure 27: Space Heating / Cooling System Diagram.



**Note:**  
Install a balancing valve with a flow meter (recommended) to ensure that nominal water flow remains near 100%. If the water flow rate is too low or too high, the plate heat exchanger could freeze and burst, or system capacity could be reduced.

Note:

- Hydro Kit PCB DIP Switch Group 2 must be set correctly for space heating / cooling applications. (Refer to the Hydro Kit PCB DIP Switch Settings pages in the Pre-Commissioning section.)
- For sensing air temperature at a specific area, choose a remote temperature sensor or a wired remote controller, depending on the Hydro Kit PCB DIP Switch Group 3 setting. (Refer to the Hydro Kit PCB DIP Switch Settings pages in the Pre-Commissioning section.)
- When installing a floor heating system, to measure room temperature, use the Hydro Kit controller or a remote temperature sensor (sold separately).
- See the Indirect Water Storage Tank Sensor Well and Sensor Installation information.
- To prevent condensation from forming in floor cooling applications, set minimum / maximum cooling temperatures.
- For two-way valve control, see the Wiring section.

Table 18: Two-Way Valve Control Application.

Mode	Description	Two-Way Valve Operation
Cooling	Fan Coil Unit - Not Use	Open
	Fan Coil Unit - Use	Close
Heating	None	No Control

# INSTALLING THE WATER CIRCUIT

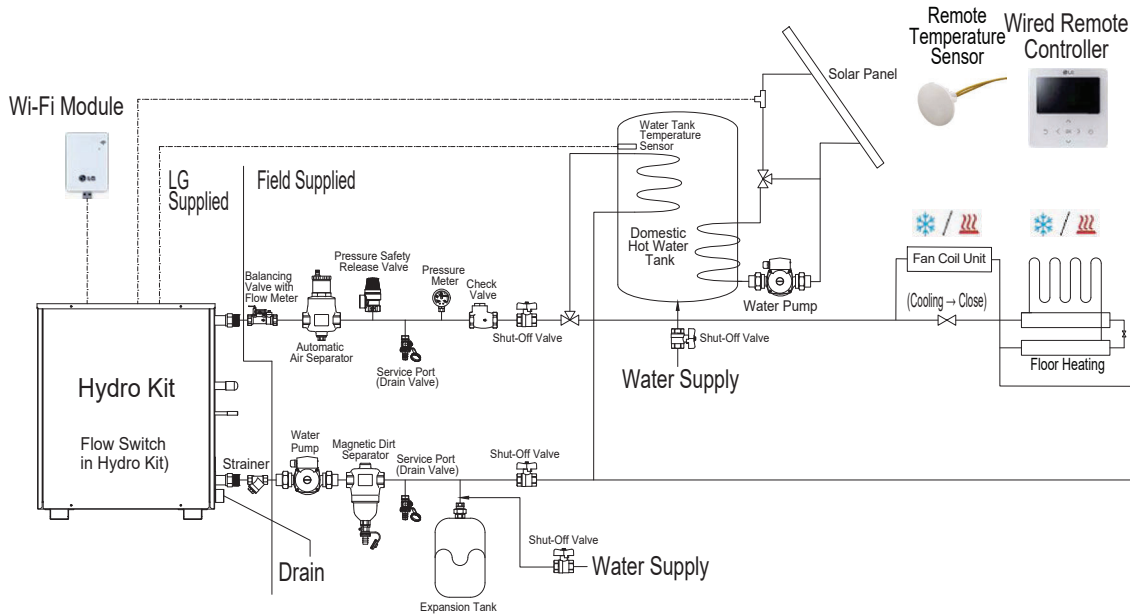
## Application Options

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The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

### Water Tank (Domestic Hot Water) + Floor Heating + Solar Panel Installation

Figure 28: Water Tank (Domestic Hot Water) + Floor Heating + Solar Panel System Schematic.



### Note:

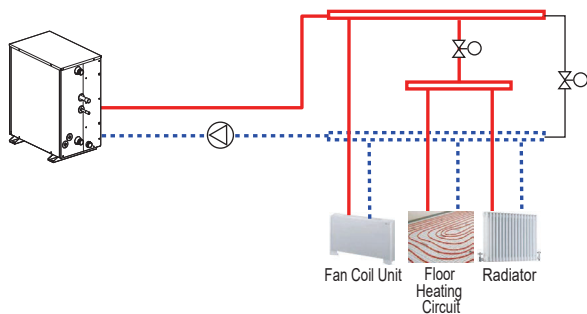
- Hydro Kit PCB DIP Switch Group 2 must be set correctly for water tank (domestic hot water) + floor heating + solar panel installation applications. (Refer to the Hydro Kit PCB DIP Switch Settings pages in the Pre-Commissioning section.)
- The domestic hot water tank is for sanitary applications and uses the indirect heat exchange method for heating; ⚠ do not add antifreeze like ethylene glycol to its water.
- For sensing air temperature at a specific area, choose a remote temperature sensor or a wired remote controller, depending on the Hydro Kit PCB DIP Switch Group 3 setting. (Refer to the Hydro Kit PCB DIP Switch Settings pages in the Pre-Commissioning section.)
- When installing a floor heating system, to measure room temperature, use the Hydro Kit controller or a remote temperature sensor (sold separately).
- See the Indirect Water Storage Tank Sensor Well and Sensor Installation information.
- To prevent condensation from forming in floor cooling applications, set minimum / maximum cooling temperatures.
- For three-way valve and / or two-way valve control, see the Wiring section.



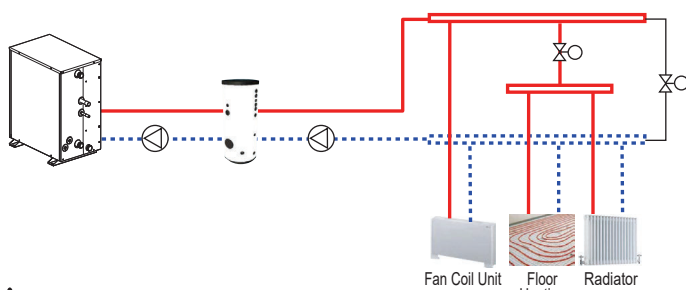
The water circuit guidelines and diagrams are for illustrative purposes and are to be used for references only; not all components and accessories are listed or shown. When installing the water circuit, follow specifications, drawings, and details provided by the system designer, as well as any local, state, and federal codes.

Figure 29: Other Application Options.

### Floor Heating Only (Without Mixing Tank)



### Floor Heating Only (With Mixing Tank)



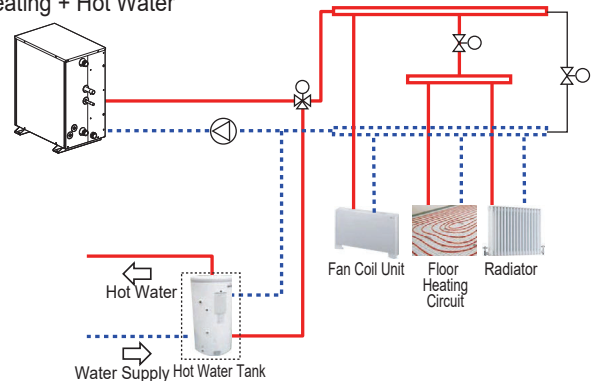
### ⚠ WARNING

If the application combines the Hydro Kit with a mixing tank, one water pump must be installed between the Hydro Kit and the mixing tank, another water pump must be installed between the mixing tank and indoor components (floor heating, radiator, etc.). These pumps must interface with the Hydro Kit and always must operate simultaneously to protect the mixing tank. If not, the mixing tank will freeze and burst, resulting in physical injury and / or death.

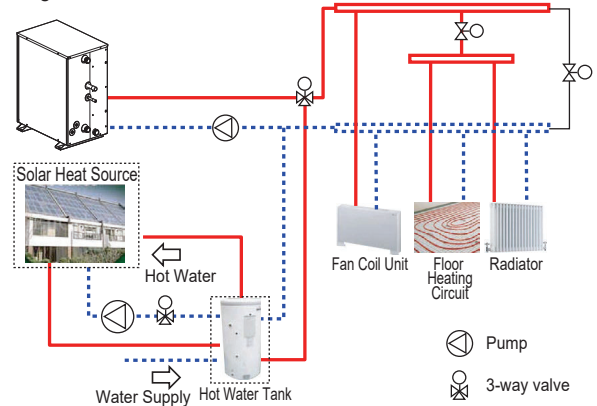
### Note:

If the application combines the Hydro Kit with a mixing tank, one water pump must be installed between the Hydro Kit and the mixing tank, another water pump must be installed between the mixing tank and indoor components (fan coil units, floor heating, radiator, etc.). These pumps must interface with the Hydro Kit and always must operate simultaneously to protect the mixing tank. If not, the mixing tank will freeze and burst, resulting in system malfunction and damage.

### Floor Heating + Hot Water



### Floor Heating + Hot Water + Solar Thermal



- Pump
- 3-way valve
- 2-way valve
- Bypass valve

# WIRING

## General Information / Separating Wiring and Cables

### ⚠ 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.
- 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.
- 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.
- ⓧ 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.
- Undersized wiring will lead to unacceptable voltage at the unit and will cause a fire, which will cause bodily injury or death.
- Properly ground all outdoor units, indoor units, and Hydro Kits. 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 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.
- ⓧ 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 electric shock, physical injury or death.

### Note:

- The information contained in this manual is intended for use by a trained electrician familiar with applicable local codes and the U.S. National Electric Code (NEC), and 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 or property damage.
- Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.
- Properly ground all outdoor units, indoor units, and Hydro Kits. Ground wiring must always be installed by a qualified technician. Improperly ground wire can cause communication problems from electrical noise, and motor current leakage.
- If there is a possibility of reversed phase, phase loss, momentary blackout, or the power goes on and off while the system is operating, install a field-supplied phase loss protection circuit. If the system operates in reversed phase, etc., 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.

## Separating Power Wiring and Communication Cables

- ⓧ Avoid running the power wiring and communication cable alongside each other; there is a strong likelihood of operation malfunction due to electrostatic and electromagnetic interference. ⓧ Do not run both in the same conduit.
- If running the power wiring and communication cable alongside each other cannot be avoided, see the table below for minimum required distances.

Table 19: Power Wire and Communications Cable Minimum Required Separation Allowable Distances.

Capacity of Power Supply Wiring (current)		Minimum Required Distance <sup>1,2</sup>
100V or more	10A	12 inches
	50A	20 inches
	100A	40 inches
	Exceeding 100A	60 inches

<sup>1</sup>The figures above are based on parallel lengths up to 328 feet long. For lengths in excess of 328 feet, the distances will have to be recalculated in direct proportion to the additional line lengths involved.

<sup>2</sup>If the power supply waveform continues to exhibit some distortion, the space between the power wiring and communication cable must be increased.

### Note:

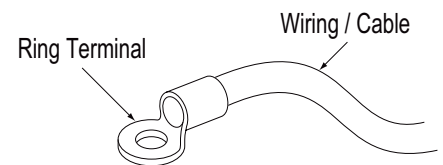
- ⓧ Do not secure the power wiring and communication cables together. It will result in equipment malfunction.
- ⓧ Do not run the power wiring and the communication cable in the same conduit. It will result in equipment malfunction.

### Power Wiring / Communication 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.

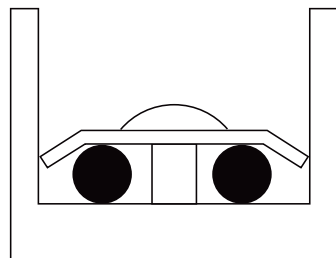
Figure 30: Close up of a Typical Ring Terminal.



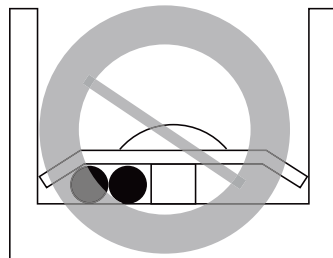
If ring terminals or fork terminals are not available, then:

- ⚡ 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.

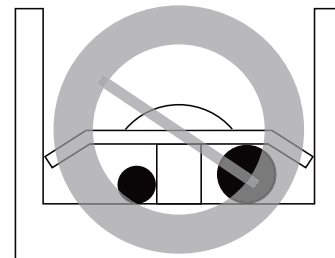
Figure 31: Proper and Improper Power Wiring Connections.



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.

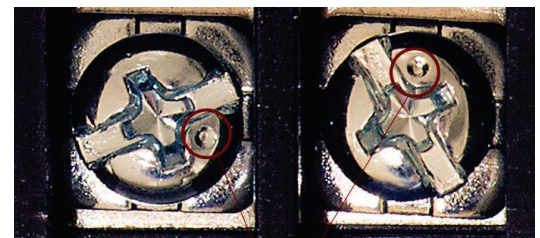
### Terminal Connections

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, hydro kit 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 32: JIS Screws.



JIS DIMPLES

### Power Supply / Power Wiring Specifications

Outdoor unit(s) and Hydro Kits must be provided power from separate breakers. For detailed information, see the Multi V Outdoor Unit Engineering and Installation Manuals on [www.lghvac.com](http://www.lghvac.com).

#### Hydro Kits

- Hydro Kits require 1Ø, 208-230V, 60Hz power (maximum acceptable power fluctuation range is 187V to 253V), but each unit draws minimal power. See Hydro Kit Electrical Data table at right.
- Where permitted by NEC and local codes, multiple Hydro Kits (and indoor units / heat recovery units) can be powered from a single breaker.
- Service switches typically must be installed for each Hydro Kit (and each indoor unit / each heat recovery unit).
- Ground each Hydro Kit (and indoor unit / heat recovery unit) separately to a solid earth ground source per NEC and local code requirements.

Table 20: Hydro Kit Unit Electrical Data.

Model	MCA	MOP	Rated Amps (A)	Power Supply		
				Hz	Volts	Phase
ARNH423K2A4	0.1	15	0.08	60	208-230	1
ARNH963K2A4						

MCA = Minimum Circuit Ampacity

MOP = Maximum Overcurrent Protection

Power wiring cable is field provided and must comply with the applicable local and national codes.

#### ⚠ WARNING

- All power wiring installation must be performed by trained service providers working in accordance with local, state, and 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.
- Use specified wiring for connections, and ensure that external force is not imparted to terminal connections. If connections firmly attached, it will generate heat and / or cause a fire, resulting in physical 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 will include some amount of direct current. Using an oversized breaker or fuse will result in electric shock, physical injury or death.
- Use the appropriate type of overcurrent protection. Generated overcurrent will include some amount of direct current, and if the appropriate type of overcurrent protection is not installed, there is a risk of fire, electric shock, and physical injury or death.
- Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⓧ Do not connect the ground line to the pipes. There is risk of fire, electric shock, explosion, physical injury or death.
- Install a main shutoff switch that interrupts all power sources simultaneously. There is risk of fire, electric shock, explosion, physical injury or death.

#### Note:

- 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 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 National Electrical Code-approved earth ground can result in property damage and equipment malfunction.

## Communications Cable Specifications From Outdoor Unit to Hydro Kits (and Indoor Units / Heat Recovery Units)

- Communication cable from Master Outdoor Unit to Hydro Kits (and Indoor Units / Heat Recovery Units) is to be 18 AWG, 2-conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Master Outdoor Unit chassis only. ⚡ Do not ground the Outdoor Unit to Hydro Kits (and Indoor Units / Heat Recovery Units) communication cable at any other point. Wiring must comply with all applicable local and national codes.
- Cable shields between the connected devices must be tied together and continuous from the master outdoor unit to the last component connected.
- Start the communication cable at the master outdoor unit and route to the hydro kits (and indoor units / heat recovery units) in a daisy chain configuration. ⚡ Do not install in a starburst configuration.
- Hydro Kits (and Indoor Unit / Heat Recovery Unit) Communication Bus: The communication terminals are labeled differently among the components, depending on type (currently for Hydro Kits: 3[A] / 4[B]; indoor units: A / B, 3[A] / 4[B], or 3 / 4; for heat recovery units: A / B). Refer to the wiring diagram schematic found in the Hydro Kit itself, or to the Hydro Kit wiring diagram in the Engineering Manual. Match IDU A and B terminals on outdoor unit to Hydro Kit 3[A] / 4[B] terminals, and A (3) and B (4) terminals on indoor units / heat recovery units.
- Insulation as required by NEC and local codes.
- Rated for continuous exposure of temperatures up to 140°F.
- Maximum allowable communication cable length between the outdoor unit and the Hydro Kit is 3,281 feet (1,000 m).
- Maximum allowable communication cable length between the Hydro Kit and the LG Hydro Kit Controller (included with the Hydro Kit) or third-party thermostat (sold separately) is 164 feet (50 m).
- Maximum allowable communication cable length between the Hydro Kit and the LG manufactured water storage tank sensor is 39 feet (12 m) (use factory-provided sensor cable).
- Maximum allowable communication cable length between the Hydro Kit and the LG manufactured dry contact (sold separately) is 164 feet (50 m).

### ⚠ WARNING

- Ground wiring is required to prevent accidental electrical shock during current leakage, communication problems from electrical noise, and motor current leakage. ⚡ Do not connect the ground line to the pipes. There is risk of fire, electric shock, explosion, physical injury or death.
- ⚡ Never ground the shield of the communications cable to the Hydro Kit frame or other grounded entities of the building. Inadequate connections will generate heat, cause a fire, and physical injury or death.

### Note:

- Always verify the communication cable is connected to a communications terminal on the outdoor unit(s). ⚡ Never apply line voltage power to the communication cable connection. If contact is made, the PCBs will be damaged.
- ⚡ Never use a common multiple-core communications cable. Each communications bus must be provided a separate cable (i.e., between outdoor unit(s) and Hydro Kits, outdoor units and central controller(s)). If communications cables of separate systems are wired using a common multiple-core cable, it will result in a poor communications signal and unacceptable system operation.

Figure 33: Correct Master Outdoor Unit to Hydro Kit / Indoor Unit / Heat Recovery Unit Communication Wiring—Daisy Chain Configuration.

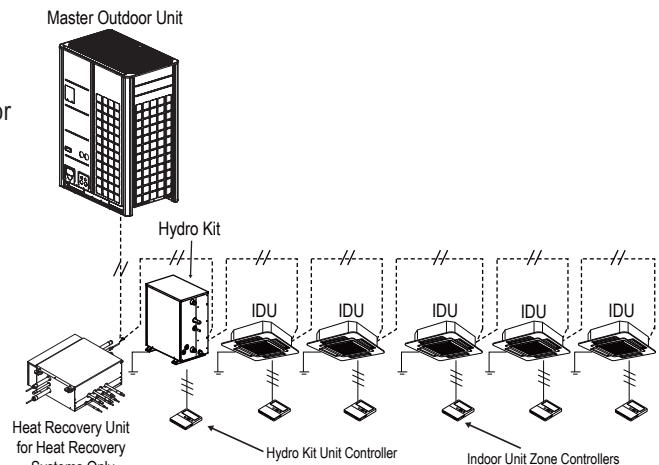
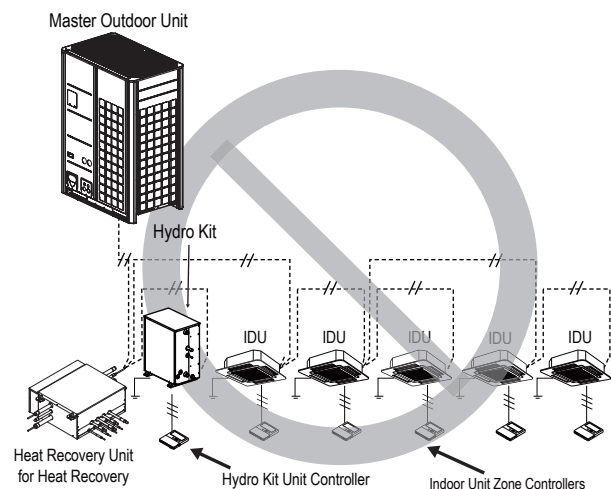


Figure 34: Incorrect Master Outdoor Unit to Hydro Kit Indoor Unit / Heat Recovery Unit Communication Wiring—Starburst Configuration.





# WIRING

## Connecting the Wiring and Cables



### Connecting the Power Wiring and Communications Cables From the Outdoor Unit to the Hydro Kits

#### ⚠ WARNING

All power wiring and communications 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 and specifications in this manual. Failure to do so will lead to electric shock and bodily injury or death.

#### Note:

Refer to all electrical data and power wiring / communications cable specifications before proceeding. Incorrect installation will lead to product malfunction and damage.

1. Remove the cabinet access panel from the Hydro Kit.
2. Remove the two knock-out plugs from the cabinet access panel.
3. To prevent wiring / cable chafing, field-install plastic or rubber grommets on both access holes.
4. If using conduits, connect the conduits to the unit cabinet. Use field-provided fittings, and follow best practice procedures. Use separate conduits for the power wiring and communications cables.
5. Provide enough slack at (each) Hydro Kit to connect to the terminal block without tension on the wiring or cables.
6. Remove the control box cover.
7. Route the power wiring and communications cable inside the control box.

Figure 35: Hydro Kit Power Wiring / Communications Cables Access Holes.

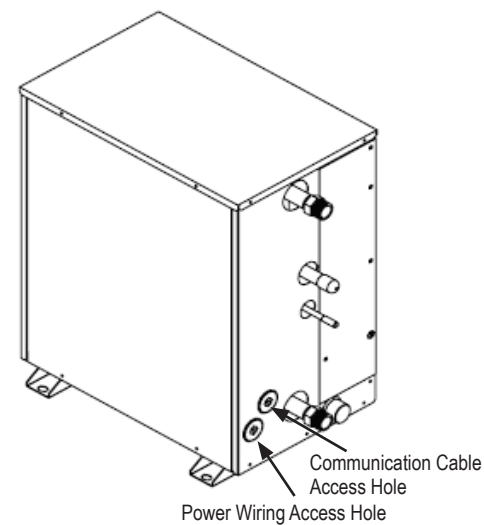


Figure 36: Hydro Kit Wiring / Cable Path sand Terminal Location.

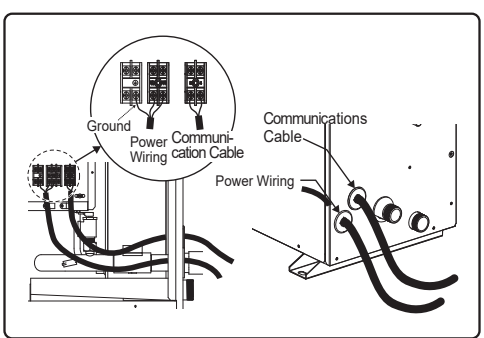
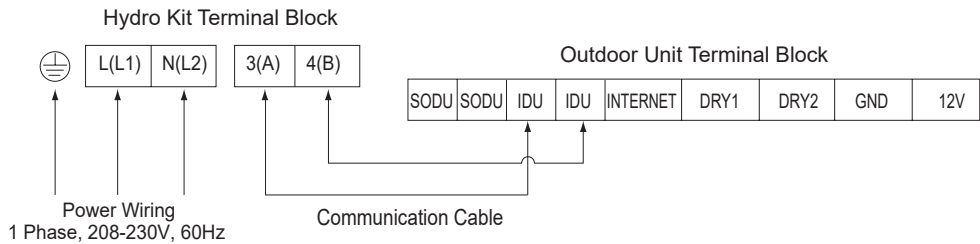


Figure 37: Simplified Diagram of the Hydro Kit Terminal Block, Power Wiring, and Communications Cable Connections.



### Note:

Maintain a minimum of two (2) inches between power wiring and communications / controller cables. Operation malfunction can occur due to electrostatic and electromagnetic interference. The minimum distance required between power wires and the communications cable is voltage/ amperage dependent and in cases where either are relatively high, the minimum distance will need to be more than two (2) inches. See "Separating Wiring and Cable" earlier in the Wiring section.

8. Secure the wiring and cable separately to the inside of the cabinet with a field-provided nylon clamp.
9. Attach and securely tighten the power wiring and communications cable connectors to the proper terminals.

### ⚠ WARNING

- ⓧ Do not install the breaker in a location that is wet or moist. A wet or moist environment will cause a short circuit, electric shock, physical injury and / or death.
- ⓧ Do not connect power wiring to the communications terminals [3(A) and 4(B)]. Before applying power, verify that the power wiring and communications cable is properly installed. Improper wiring will cause electric shock, fire, physical injury or death.
- The shield of the communications cable connecting the outdoor unit(s) to the Hydro Kit(s) (and indoor units / heat recovery units) must be grounded only to the outdoor unit(s) frame(s). ⓧ Never ground the shield of the communications cable to the Hydro Kit indoor unit frame, or other grounded entities of the building. Failure to properly provide a NEC-approved earth ground will result in electric shock, physical injury or death.
- ⓧ Never connect the Hydro Kit controller or other central controllers such as AC Smart, PDI, or the LG building management system gateway products to the communications cable between the Hydro Kit and outdoor unit. Improper communications cable connections will result in property damage and equipment malfunction.

### Note:

- ⓧ Do not connect power wiring to the communications terminals [3(A) and 4(B)]. Line voltage power applied to the communications terminals will damage the Hydro Kit PCB.
- The shield of the communications cable connecting the outdoor unit(s) to the Hydro Kit(s) and other indoor units must be grounded only to the outdoor unit(s) frame(s). ⓧ Never ground the shield of the communications cable to the Hydro Kit indoor unit frame, or other grounded entities of the building. Failure to properly provide a NEC-approved earth ground will result in property damage and equipment malfunction.
- ⓧ Never connect the Hydro Kit controller or other central controllers such as AC Smart, PDI, or the LG building management system gateway products to the communications cable between the Hydro Kit and outdoor unit. Improper communications cable connections will result in property damage and equipment malfunction.
- Each communications bus must have a separate cable (i.e., between outdoor unit[s] and indoor units; outdoor units and central controller[s]). If communications cables of separate systems are wired using a common multiple-core cable, it will result in a poor communications signal and unacceptable system operation.



# WIRING

## Connecting Included Hydro Kit Accessories

**MULTI V™**  
**HYDRO KIT**

### Connecting the Hydro Kit Accessories

#### ⚠ 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.
- 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.

#### Note:

- The information contained in this manual is intended for use by a trained electrician familiar with applicable local codes and the U.S. National Electric Code (NEC), and 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 or property damage.
- Consider ambient conditions (temperature, direct sunlight, inclement weather, etc.) when selecting, installing, and connecting the power wiring.
- Ⓢ Do not connect accessories that do not follow specifications. It will lead to product malfunction.

Hydro Kits include many factory-provided accessories, as well as can be used with optional LG-manufactured accessories (sold separately), and field-supplied third-party accessories. Systems that include Hydro Kits can vary greatly, so follow the design engineer's requirements, manufacturers' specifications, as well as local, state, and federal codes when installing any accessory.

- Check each accessory carefully before installing.
- Verify the labels on the Hydro Kit PCB and terminal block before connecting all accessory wiring / cables.
- Field-supplied third-party thermostats, valves, and pumps must follow LG Hydro Kit system requirements. Follow manufacturers' installation instructions.
- See the guidelines for installing an LG supplied dry contact in the manual that shipped with the dry contact.
- When connecting a pump to the Hydro Kit system, select a suitable relay for pump capacity. Use a 208-230V pump with a maximum operation current of 4A or less.

Table 21: Terminal Block Connections.

Three-Way Valve (B)			Water Pump, Solar (B)		N/A		Three-Way Valve (A)		
1	2	3	4	5	6	7	8	9	10
L	L1	N	L	N	N / A	N/A	L	L1	N
BR	WH	BL	BR	BL			BR	WH	BL
Hydro Kit Water Pump (A)			Two-Way Valve (A)			Thermostat (Default: 208/230V AC)			
11	12	13	14	15	16	17	18	19	20
L	N	N/A	L1	L2	N	L	N	L1	L2
BR	BL	N/A	BR	WH	BL	BR	BL	WH	BK

Figure 38: Hydro Kit PCB.

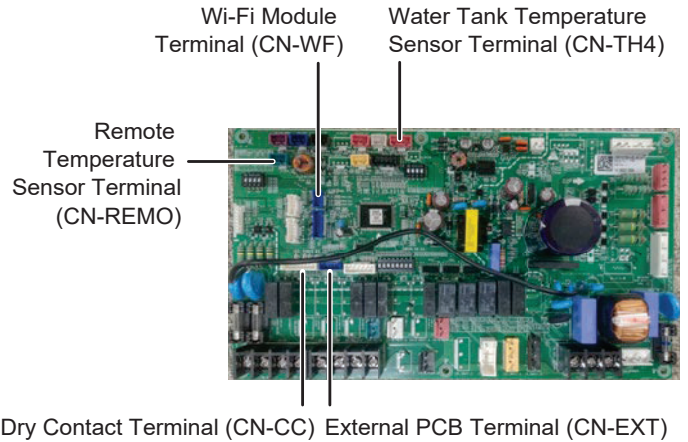
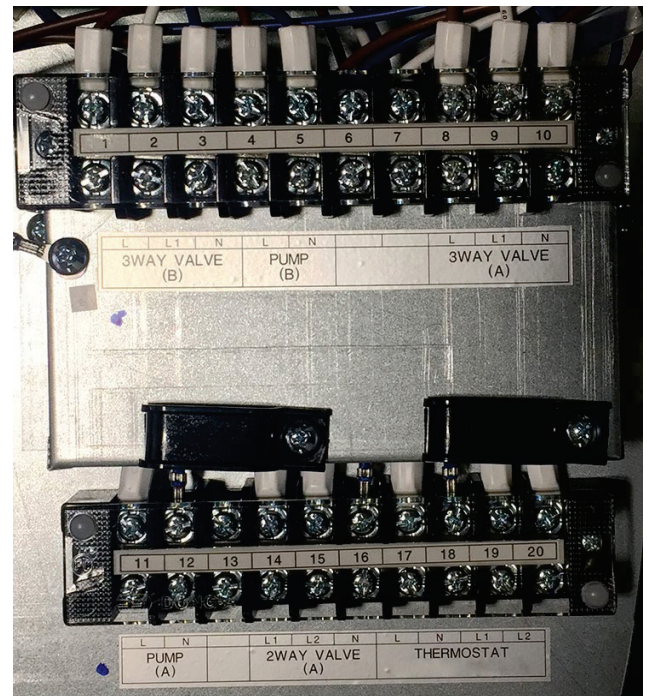


Figure 39: Hydro Kit Terminal Block.



## Connecting the Hydro Kit Wired Remote Controller

(Included with the Hydro Kit; Part No. AKB74855309; See the Installation Section for Placement Information; See the Controller Section for Operation Information)

### ⚠ WARNING

- Always have power off before installing the controller.
- ⚡ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications.
- ⚡ Never touch wiring or install accessories with wet hands.
- When drilling holes for the communication cable and the screws, take care not to damage wiring that is routed through the wall. There is risk of fire, electric shock, explosion, and physical injury or death.

### Note:

- See the Installation section for guidelines on where to place the controller.
- The controller is designed to be surface mounted. Recessing the controller will damage the temperature sensor, and cause it to misread the zone temperature.

1. If not already done so, separate the Hydro Kit controller from its installation plate.
- To separate, insert a small screwdriver into one of the two holes at the bottom of the installation plate. Gently turn clockwise.
- Repeat for the remaining hole, and then gently pull on the bottom of the controller body.

### ⚠ WARNING

- ⚡ Do not damage the controller components when separating. There is risk of fire, electric shock, and physical injury or death if the electrical components are damaged.

2. Determine how the factory-provided Hydro Kit communications cable (female socket) will be routed to the controller. Choose either through the back, using the top groove, or using right groove.
- If using the top or right groove, use needle nose pliers to carefully break off the tab.
- If using the back, route the communications cable through the handy box or wall, and through the large hole in the installation plate.

### Note:

- Use the LG-provided communications cable and the LG Hydro Kit Controller (controller and cable included with the Hydro Kit).
- If the distance between the controller and the Hydro Kit is more than 32 feet (9.75 m), use an LG Cable Extension Kit (sold separately).
- The maximum length of the cable cannot exceed 164 feet (50 m). Communication errors will occur.
- Ensure the cable connections are male to female. If the communications cable is not routed properly with the connections facing the right direction, connections cannot be made.

3. Attach the controller installation plate to the wall or handy box using the factory-provided screws. Ensure the plate is level and securely attached to the wall.

### Note:

- ⚡ Do not overtighten the screws and bend the installation plate. It damage the controller PCB.

Figure 40: Routing the Communications Cable.

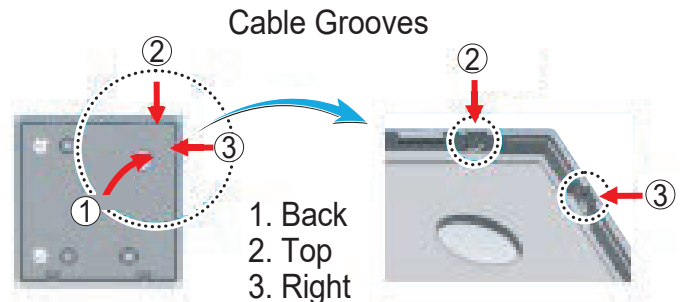


Figure 41: Hydro Kit Controller Communications Cable Termination Detail.

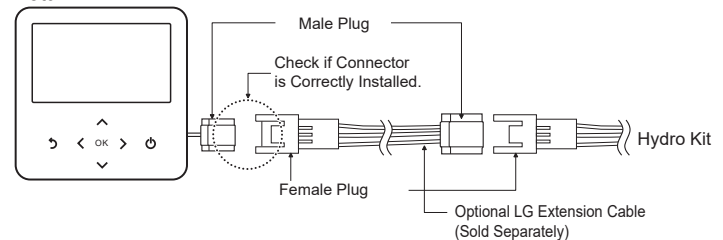
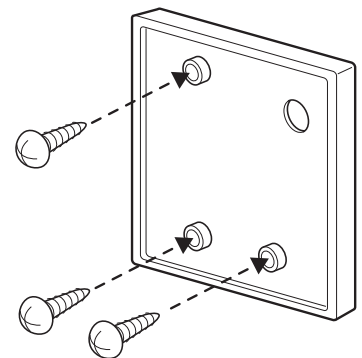


Figure 42: Location of the Controller Installation Plate Screws.



# WIRING

## Connecting Included Hydro Kit Accessories

**MULTI V™**  
**HYDRO KIT**

### Connecting the Hydro Kit Wired Remote Controller, continued.

- Seal all gaps or holes behind the installation plate before mounting. If mounting the controller over a handy box, seal the holes in the handy box with insulation material approved by all applicable codes.
- Attach the top of the controller to the top of the installation plate. Verify that the controller is level and secure.
- Plug the male connection on the controller into the female end of the communications cable.
- Connect the male end of the Hydro Kit controller cable to terminal CN-REMO on the Hydro Kit PCB.
- Guide the bottom of the controller to the bottom of the installation plate. Gently push on the controller along the bottom edge until it snaps onto the plate. Verify that it is properly seated with no gaps between the controller and the installation plate.

Figure 43: Location of the Controller Installation Plate Screws.

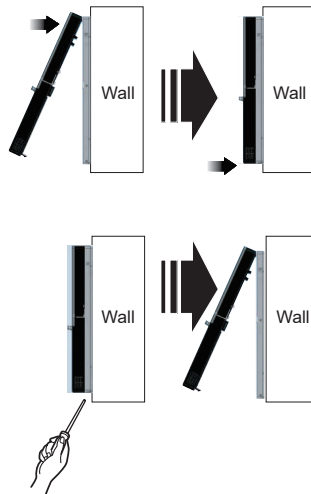
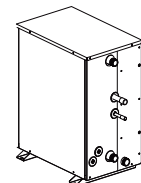
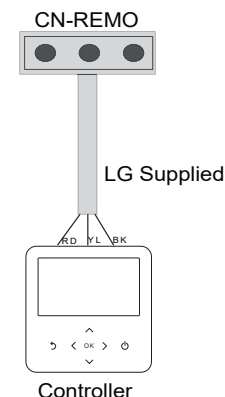


Figure 44: Communication Cable - Single Hydro Kit to One Controller.



On All Hydro Kit Models



### Connecting Multiple Hydro Kits to One Remote Controller (Group Control)

If any Hydro Kits are to operate together in a group (one wired remote controller controlling multiple Hydro Kits), use one (or multiple) Group Control Cable Kits (sold separately). Group Control Cable Kits consist of three (3) cables:

- One pigtail cable
- One Y-cable
- One 39 foot (12 m) long extension cable

Use one (1) Group Control Cable Kit for each Hydro Kit in the group (a pigtail cable is not required at the last Hydro Kit Slave unit in the group). Group control is used for operation, stop, mode, and set temperature functions; other functions are not possible. Contact an LG representative for more details.

#### Note:

- Up to 16 Hydro Kits can be controlled as a group from a single wired remote controller; however, all Hydro Kits must be the same model type.
  - ⊗ Do not mix the K2 models with discontinued version K3 models.
- Each Hydro Kit group must be connected to the same outdoor unit.
- Hydro Kits within the same group must have the same DIP Switch settings. The only DIP switch that can differ is the group control setting switch, where one Hydro Kit will be the Master and the remaining Hydro Kits will be Slave.
- If any Hydro Kit has an operation error, the error code will display on the wired remote controller. With the exception of the Hydro Kit in operation error, each Hydro Kit still can be controlled individually.
- If Group Control is not installed properly, and the Hydro Kit DIP Switches are not set correctly for Master and Slave units, the system will malfunction.
- Group control is not possible with a mixed group of Hydro Kits and indoor units.
- ⊗ NEVER splice, cut, or extend cable length with field provided cable. If the length needs to be extended, use one (or more) 33 foot (10 m) LG Cable Extension Kit (sold separately).
- The maximum length of the cable from the outdoor unit to all grouped Hydro Kits cannot exceed 3,281 feet (1,000 m).

### Connecting Multiple Hydro Kits to One Remote Controller (Group Control), continued.

1. Verify power is OFF.
2. Choose which Hydro Kit will be the “Master” unit of the group. Set DIP Switch No. 1 on DIP Switch Bank No. 2 to OFF.
3. For all the Hydro Kits designated as Slave units, set DIP Switch No. 1 on DIP Switch Bank No. 2 to ON.
4. Starting with the Hydro Kit Master unit, plug in the male end of the pigtail cable into the CN-REMO socket.
5. Plug the male end of the extension cable from the previous Hydro Kit unit into the CN-REMO socket.
6. Plug the Y-cable into the pigtail at each Hydro Kit, except for the last Slave Hydro Kit in the group (Y-cable is not necessary).
7. Connect two extension cable segments to each Y-cable, except for the Y-cable connected to the Master Hydro Kit.
8. At the Master Hydro Kit, connect one extension cable and the communications cable from the controller to the Y-cable.

### Note:

- A wireless remote controller can be used at the same time as Group Controller.
- A Dry Contact and a Central Controller also can be connected at the same time, but only the address of the Master Hydro Kit can be recognized (Slave Hydro Kits cannot be individually controlled by the Dry Contact or Central Controller; these will follow Master Hydro Kit operation).
- Some remote controllers cannot operate with a Dry Contact and Central Controller; contact an LG representative for more information.
- When multiple Hydro Kits are connected to one controller, it is necessary to only connect the temperature sensor to the Master Hydro Kit and not the Slave Hydro Kit(s).

Figure 45: Master / Slave Hydro Kit PCB DIP Switch Settings.

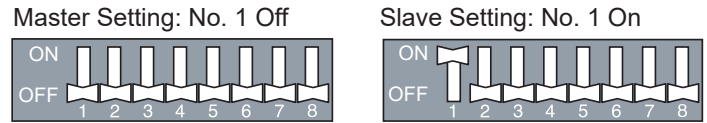


Figure 46: Connecting Group Controlled Hydro Kits.

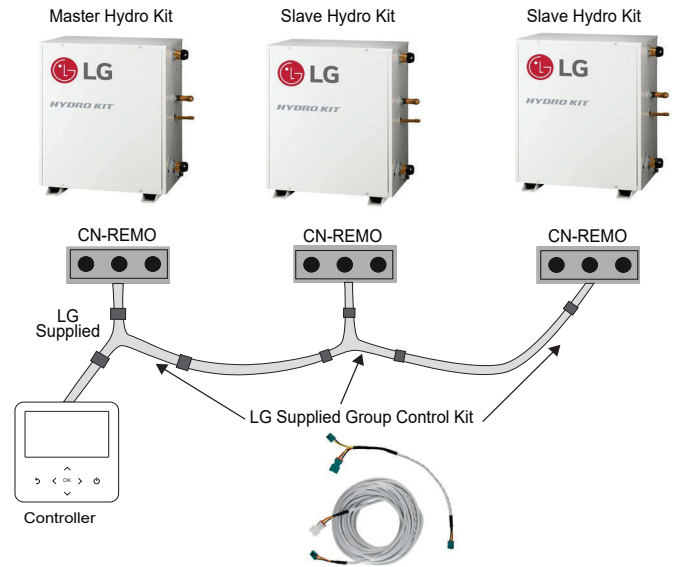
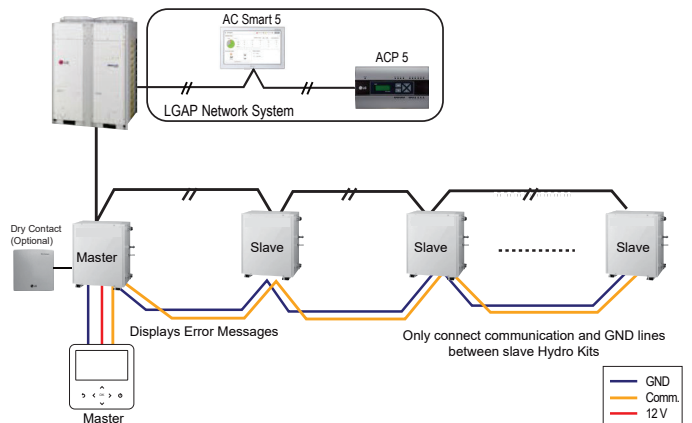


Figure 47: Example of Central and Dry Contact Controllers with Group Controlled Hydro Kits.





### Connecting the Independent Power Module

(Included with the Hydro Kit; Model No. PRIPO)

The Independent Power Module is supplied with the Hydro Kit and is a required accessory. The Independent Power Module is used as backup power to close the EEV in case of power failure during an outdoor unit oil return or defrost cycle. The Independent Power Module protects from a plate heat exchanger burst. If a power outage occurs during normal operation, a plate heat exchanger burst could happen during oil-return and defrost cycle in cooling mode.

#### ⚠ WARNING

- Incorrect wiring will lead to fire, electric shock, bodily injury and / or death.
- The Hydro Kit and the Independent Power Module must be installed in an interior space. Exposure to weather will damage the wiring and will lead to fire, electric shock, bodily injury and / or death.

#### Note:

- Incorrect wiring will lead to independent power module malfunction or damage.
- If the Independent Power Module is not installed, it will cause serious damage to the Hydro Kit heat exchanger when electricity cut off during product operation.
- The Hydro Kit and the Independent Power Module must be installed in an interior space. Exposure to weather will damage the wiring and will lead to product malfunction.
- Maintain twenty (20) minutes of continuous power to the power module kit to ensure that the EEV is fully charged and can close properly. Refer to the Independent Power Module Installation Manual for more detailed information.

#### Wiring Pre-Check

- Verify power wiring and communications cables are all properly terminated.
- Test the line voltage wiring insulation. Conduct a Mega-ohm test reaching a value of 2.0M  $\Omega$  or higher. Test the insulation resistance between the Hydro Kit power wiring terminal block and ground using a DC mega-ohm tester (DC 500V).

1. Turn power off at the circuit breaker.
2. Open the Hydro Kit front panel / control box cover.
3. Assemble the cover of the Independent Power Module. Secure the Independent Power Module to the outside of the Hydro Kit control panel with bolts.
4. Route the Independent Power Module wiring through an opening in the bottom of the Hydro Kit.
5. Disconnect the EEV cable harness plug from the socket labeled CN-EEV on the Hydro Kit.
6. Connect the Independent Power Module wire harness No. 1 labeled CN-EEV/LOAD to the Hydro Kit EEV valve.
7. Connect the Independent Power Module dual plug wiring harness No. 2 labeled CN-EEV/MAIN) to the Hydro Kit's PCB terminals labeled CN-EEV and CN-WRITE.
8. Replace the Hydro Kit control box cover and front panel.

Figure 48: Securing Power Module to the Hydro Kit.

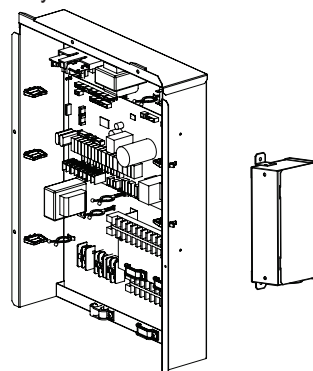


Figure 49: Routing Power Module Wiring.

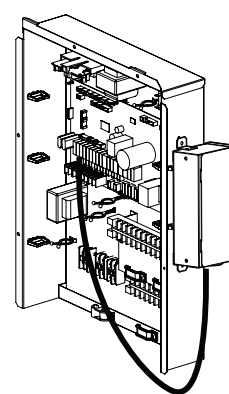
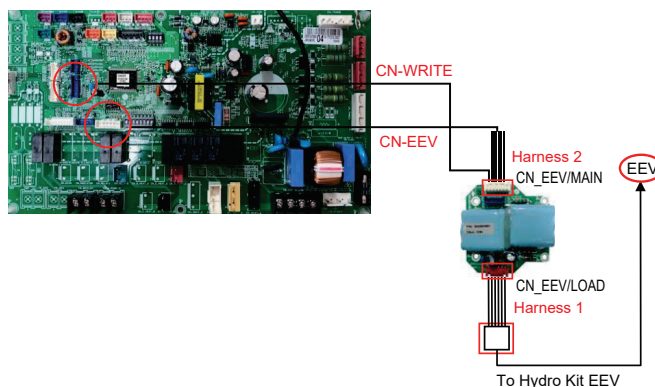


Figure 50: Power Module Wiring Termination Detail (Terminal Location May Vary).



## Connecting the Indirect Hot Water Storage Tank Sensor Well and Sensor

(Included with the Hydro Kit; Replacement No. EBG61325701; See the Piping Section for Installing the Well and Sensor to the Tank)

### ⚠ WARNING

- Damage to the sensor cable will result in electric shock, fire, physical injury, and / or death.
- Before installing the cable, verify that the power is OFF. If not, it will result in electric shock, physical injury, and / or death.

1. Choose a route for the cable (use the 39 foot [12 m] cable included with the sensor well) from the sensor well to the Hydro Kit PCB so that the cable is protected from damage, foot traffic, and extreme weather and temperature conditions.
2. Loosely secure the sensor well cable about every three (3) feet with cable ties. To avoid damaging the sensor well cable, Ⓞ do not pull the ties too tight.

### ⚠ WARNING

Damage to the sensor cable will result in electric shock, fire, physical injury and / or death.

3. Route the sensor well cable through the Hydro Kit frame and into the control panel area. If the cable will pass through an access hole with sharp edges, install field-supplied protective grommets to avoid damaging the cable.
4. Find the red CN-TH4 connector on the Hydro Kit PCB. Inspect the leads and pins of the sensor well cable plug, looking for bent pins and loose connections between the wire leads and the metal pins. If not damaged, insert the sensor cable plug into CN-TH4.

### ⚠ WARNING

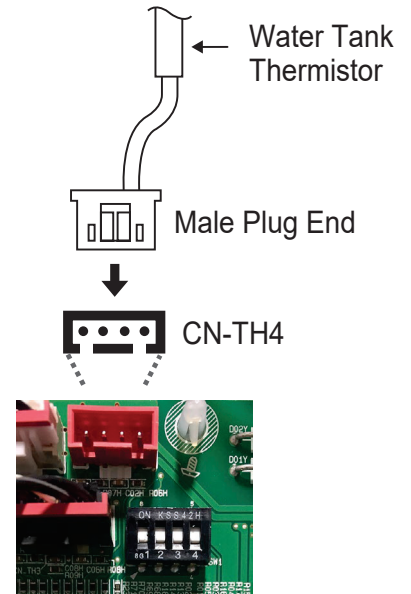
If a damaged sensor well cable plug is installed, it will result in electric shock, fire, physical injury and / or death.

5. Verify the connection is secure.

### Note:

- If the indirect hot water storage tank sensor is not connected, Error Code CH08 will appear.
- The indirect hot water storage tank / sensor is not necessary if the application is for only floor heating and a tank is not included.

Figure 51: Water Tank Sensor Well and Sensor Connection.



### Connecting the Remote Temperature Sensor

(LG Manufactured; Model No. ZRTBS01; Optional, Sold Separately)

The optional Remote Temperature Sensor is used in applications where it is desired to control the Hydro Kit based on space temperature instead of leaving water temperature. It is a Type 3, NTC temperature sensor, suspended in a round enclosure that measures less than an inch in diameter.

For placement considerations, see "Placing the Hydro Kit Controller" in the Installation Section. Guidelines also apply to the Remote Temperature Sensor.

Figure 52: Remote Temperature Sensor.



#### ⚠ WARNING

- Always power off the Hydro Kit before installing the accessories. There is risk of fire, electric shock, explosion, and physical injury or death.
- ⚠ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. There is risk of fire, electric shock, explosion, and physical injury or death.
- ⚠ Never touch wiring or install accessories with wet hands. There is risk of fire, electric shock, explosion, and physical injury or death.

#### Note:

- Use the LG-supplied 50 foot (15 m) communications cable with quick-connect plugs that is shipped with the Remote Temperature Sensor. A communications error will occur if any other cables are used.
- After installation, the sensor is difficult to remove. Removing an installed sensor will damage the wall.
- ⚠ Do not cover the sensor with wall paper. The sensor will not be able to detect temperature properly.
- If the communications cable between the sensor and the Hydro Kit is too long, ⚠ do not cut. Coil any spare cable, tie-wrap it, and leave it near the Hydro Kit.
- If the distance between the Remote Temperature Sensor and the Hydro Kit is more than 50 feet (15 m), use one or more 33 foot (10 m) LG Extension Cable (sold separately). The maximum length of the cable cannot exceed 164 feet (50 m).
- ⚠ Do not damage the quick connect plugs. ⚠ Do not remove and then re-splice the quick connect plugs. Communication errors will occur.
- Connect the male end of the communication cable at the Hydro Kit PCB terminal.
- ⚠ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. There is a risk of malfunction.
- See the Pre-Commissioning section for function codes and instructions on accessing Installer mode that will be needed to set up Hydro Kit accessories.

1. Ensure the wall interior is insulated behind the sensor. In-wall drafts can affect the temperature reading.

#### ⚠ WARNING

Interior walls can contain high-voltage electrical wires. Ensure there are no electrical wires in the wall at the selected drilling location. Drilling into electrical wires can result in severe injury or death.

#### Note:

Interior walls can contain water pipes, metal structural elements and other obstacles. Ensure there are no water pipes or other obstacles in the wall at the selected drilling location. Drilling into water pipes or other obstacles can result in wall damage.

2. Drill a 7/16" hole at the sensor mounting location.
3. Carefully pull the sensor cable through the hole.
4. Remove the cover of the mounting tape on the back of the sensor rim and push the sensor firmly into the 7/16" hole until the tape adheres firmly to the wall.

Figure 53: Remote Temperature Sensor Installation.

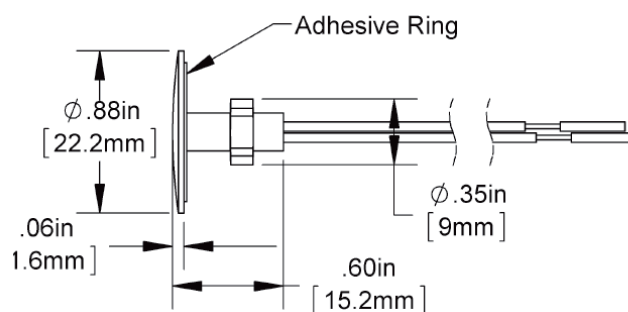
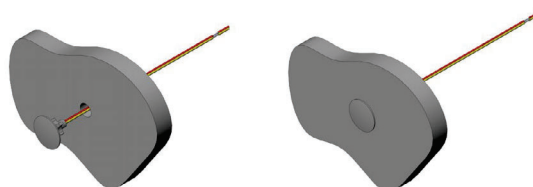


Figure 54: Flush the Remote Temperature Sensor to the Wall.





## Connecting Optional LG Hydro Kit Accessories

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5. Turn power off at the circuit breaker.
6. Open the Hydro Kit front panel / control box cover.
7. Route the Room Temperature Sensor cable through an opening in the bottom of the Hydro Kit. ⚠ Do not use the same access hole as the power input cable. ⚠ Do not cut the sensor cable. If the cable is longer than necessary, coil and secure excess cable.
8. Insert the connector of the remote temperature button sensor cable into the CN-ROOM connector on the PCB.
9. Use a cable tie or other method to secure the remote temperature button sensor cable inside the Hydro Kit. ⚠ Do not allow strain on the cable.
10. Reinstall the Hydro Kit front panel / control box cover, and apply power.
11. See the Controller and Pre-Commission sections for instructions on how to properly set the function code. For more information on the remote temperature sensor, see the submittal and the installation manual on [www.lghvac.com](http://www.lghvac.com).

# WIRING

## Connecting Optional LG Hydro Kit Accessories

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### Connecting the Wi-Fi Module

(LG Manufactured; Model No. PWFMD200; Optional; Sold Separately)

LG Wi-Fi Modules enable remote Hydro Kit (K2A4 models) operation for functions such as ON / OFF, operation mode, domestic hot water heating, temperature setup, weekly scheduling, etc. The Wi-Fi Module must be connected to CN-WF on the Hydro Kit PCB, and the user must download, install, register, and use the free app. One Wi-Fi Module must be installed for each Hydro Kit. For more information about the LG Wi-Fi Module, see [www.lghvac.com](http://www.lghvac.com).

#### Connecting the Wi-Fi Module

1. Verify that the power to the Hydro Kit is OFF.
2. Remove the front panel and control box cover to the Hydro Kit.
3. Locate CN-WF on the main PCB of the Hydro Kit.
4. Route the Wi-Fi USB cable through the bottom of the control panel, and insert its plug into CN-WF. If a longer cable is necessary, add a 32-13/16 foot (10 m) cable (PWYREW000; sold separately).
5. Re-install the Hydro Kit control box cover and front panel.
6. Connect the USB cable to the Wi-Fi Module.
7. See the Control section for Wi-Fi Pairing steps. Wi-Fi Pairing uses the Hydro Kit Controller Installer Setting Mode to activate the AP mode function of the Wi-Fi Module connected to its Hydro Kit.

#### Note:

See the Pre-Commissioning section for function codes and instructions on accessing Installer mode that will be needed to set up other Hydro Kit accessories.

Figure 55: Wi-Fi Module Components.

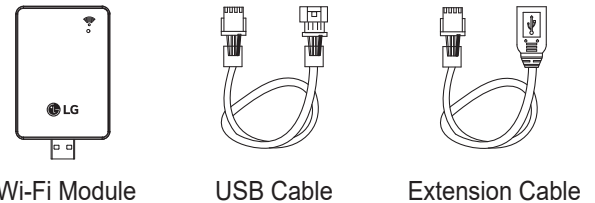
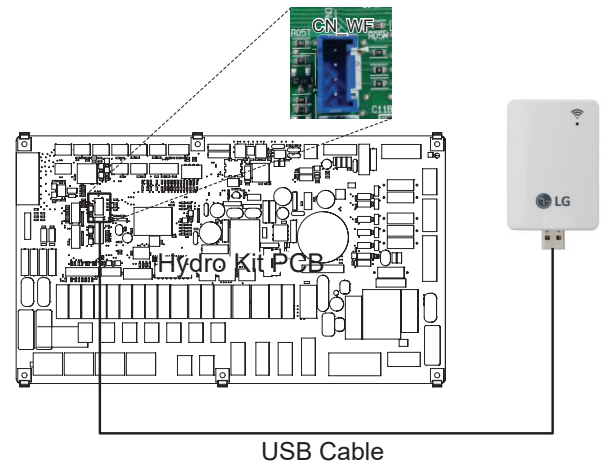


Figure 56: Locating CN-WF on the Hydro Kit Main PCB.



## Connecting the Dry Contact

(LG Manufactured; Model Nos. PDRYCB100 and PDRYCB300; Optional; Sold Separately)

The Dry Contact unit is designed to enable or disable normal Hydro Kit operations, or determine occupancy for setback temperature setting through a binary input. A binary output indicates if a system malfunction occurred. A field-supplied binary signal could be triggered using a timer, keycard switch, door switch, motion detector, or an occupancy sensor.

To install a Dry Contact, see the Dry Contact submittals and / or installation manuals on [www.lghvac.com](http://www.lghvac.com), or contact your LG representative.

### Note:

- Connect the Dry Contact to Terminal CN-CC on the Hydro Kit PCB.
- See the Pre-Commissioning section for function codes and instructions on accessing Installer mode that will be needed to set up Hydro Kit accessories.

Figure 57: PDRYCB100 Connect to CN\_DRY (Apply Power Source Through PCB).

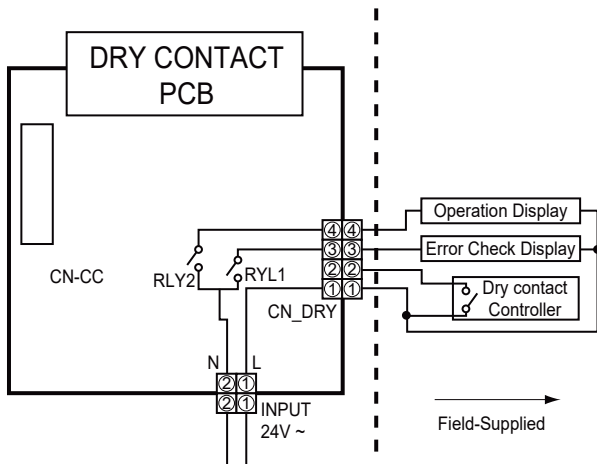


Figure 59: PDRYCB300 Installation for Input Contact Closure Only (No Power Input).

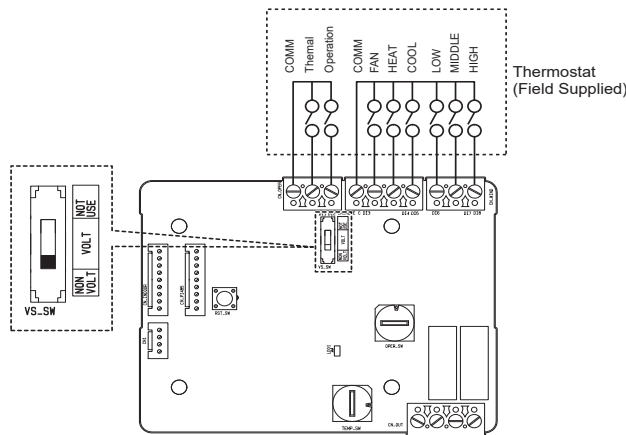


Figure 58: PDRYCB100 Connect to CN\_DRY (Apply Power Source Directly to External Source).

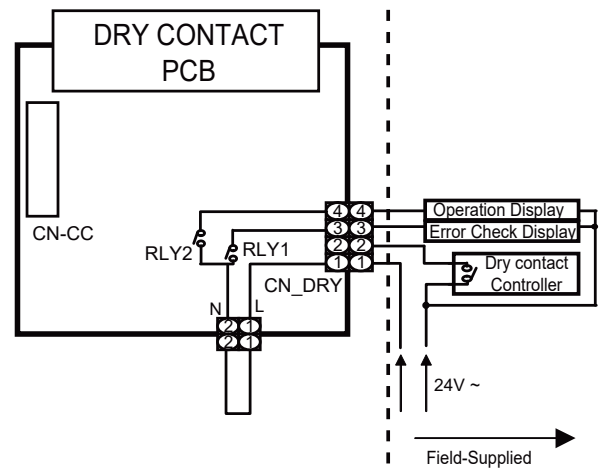
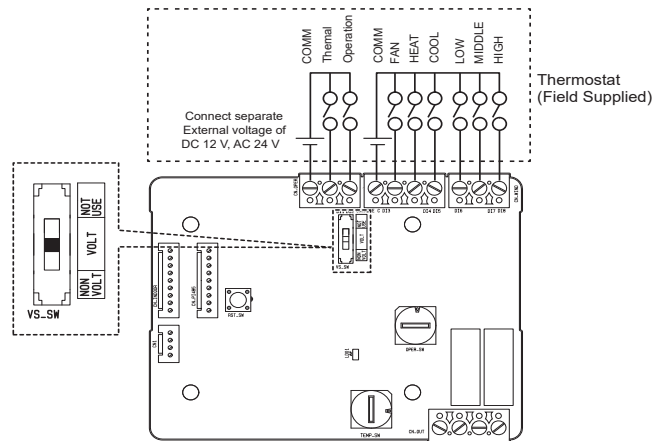


Figure 60: PDRYCB300 Installation for Input Contact Voltage: DC 12 V, 24 V~.



### Connecting an External Controller

Use the CN\_EXT connection if the application requires automatic operation control depending on an external input signal (ON / OFF) with preset mode. Connect the external controller cable to CN\_EXT, and set its function on the Hydro Kit controller (included with the Hydro Kit) through the Installer Setting Mode.

Choose from set values 0 ~ 3 (CN\_EXT port setting).

- 0: Not Used (Default)
- 1: Simple Operation
- 2: Simple Dry Contact Operation
- 3: Single Emergency Stop

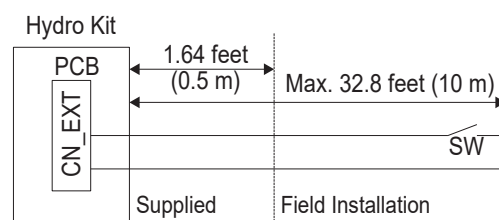
See the Pre-Commissioning section for detailed information.

#### Installation Option No. 1

SW: Single Pole Switch

- Select a component with contacts for extremely low amperage.
- DC 5 V ~ 12 V is used at the contact point.
- Switch load is approximately 0.5 ~ 1 mA.
- Use a field-supplied communications cable that is maximum 32.8 feet (10 m) (see local, state, and federal requirements for AWG size).

Figure 61: SW: Single Pole Switch.



#### Installation Option No. 2

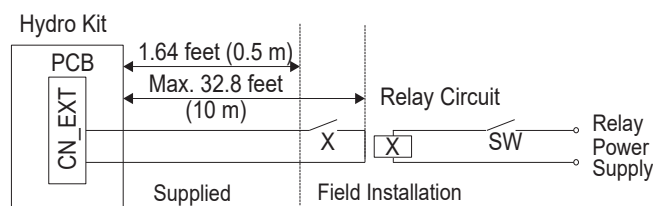
X: Relay (A point of contact with a fixed DC 0.5 ~ 1 mA)

SW: Distant ON / OFF Switch

Control Cable (Hydro Kit to Relay Circuit)

- Use a field-supplied communications cable that is maximum 32.8 feet (10 m) (see local, state, and federal requirements for AWG size).

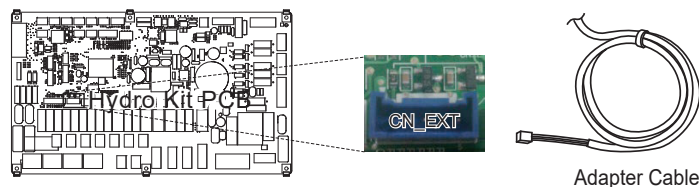
Figure 62: X: Relay.



### Connecting the External Controller

1. Verify that the power to the Hydro Kit is OFF.
2. Remove the front panel and control box cover to the Hydro Kit.
3. Locate CN\_EXT on the main PCB of the Hydro Kit.
4. Route the external controller cable through the bottom of the control panel, and insert its plug into CN\_EXT
5. Re-install the Hydro Kit control box cover and front panel.
6. Connect the cable to the external controller.
7. System needs to be set to recognize that an external controller is installed. Enter installer setting mode on the Hydro Kit controller, and set the function code.

Figure 63: Connecting the External Controller.



### Note:

See the Pre-Commissioning section for function codes and instructions on accessing Installer mode that will be needed to set up other Hydro Kit accessories.

## Connecting Third-Party Accessories to the Hydro Kit Terminal Block

### ⚠ WARNING

- Ensure 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, physical injury, and / or death.
- ⚡ Do not work with wet hands. To do so will cause bodily injury or death.
- ⚡ Do not connect accessories that do not follow specifications. To do so will cause bodily injury or death.
- Follow manufacturers' installation instructions for the field-supplied (sold separately) third-party components such as valves, thermostats, and pumps. Check each accessory carefully before installing. Improper installation will lead to fire, electric shock, physical injury, and / or death.
- Check the labels on the Hydro Kit PCB and terminal blocks before connecting all accessory wiring / cables. Ensure connections are properly made. Improper installation will lead to fire, electric shock, physical injury, and / or death.
- Total current draw of all third-party devices cannot exceed 5A. Excessive draw will lead to fire, electrical shock, physical injury, and / or death.

### Note:

- ⚡ Do not connect accessories that do not follow specifications. It will lead to product malfunction.
- Follow manufacturers' installation instructions for the field-supplied (sold separately) third-party components such as valves, thermostats, and pumps. Check each accessory carefully before installing. Improper installation will lead to product malfunction and damage.
- Check the labels on the Hydro Kit PCB and terminal blocks before connecting all accessory wiring / cables. Ensure connections are properly made. Improper installation will lead to product malfunction and failure.
- Total current draw of all third-party devices cannot exceed 5A. Excessive current draw will lead to product failure.
- See the Pre-Commissioning section for function codes and instructions on accessing the Installer mode that will be needed to set up Hydro Kit accessories.

Most third-party accessory connections to the Hydro Kit occur on the one (1) through twenty (20) terminal block, and not on the Hydro Kit PCB.

Review the terminal block labels at right, in the table below, and on the Hydro Kit PCB and terminal block itself. Ensure the third-party accessories are connected to the correct terminal(s).

The next pages will present an overview on how to connect third-party accessories; also review the manufacturers' installation manuals. For more information on third-party accessory specifications and installation information, contact your LG representative.

Figure 64: Hydro Kit Terminal Block.

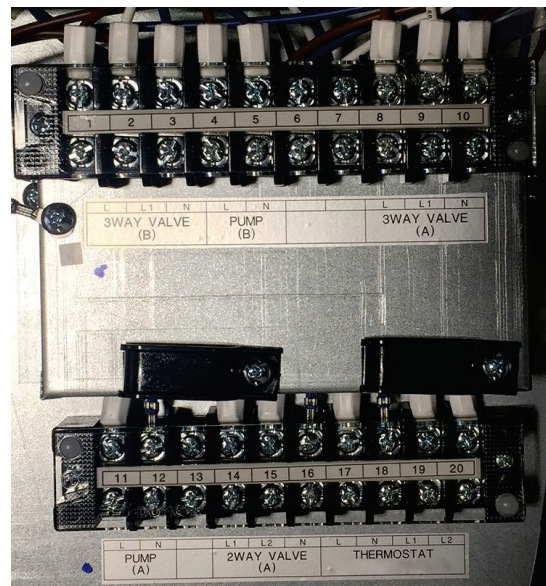


Table 22: Terminal Block Connections.

Three-Way Valve (B)			Water Pump, Solar (B)		N/A		Three-Way Valve (A)		
1	2	3	4	5	6	7	8	9	10
L	L1	N	L	N	N / A	N/A	L	L1	N
BR	WH	BL	BR	BL			BR	WH	BL
Hydro Kit Water Pump (A)			Two-Way Valve (A)			Thermostat (Default: 208/230V AC)			
11	12	13	14	15	16	17	18	19	20
L	N	N/A	L1	L2	N	L	N	L1	L2
BR	BL	N/A	BR	WH	BL	BR	BL	WH	BK



# WIRING

## Connecting Third-Party Accessories

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### Connecting the Three-Way Diverting Valve

#### ⚠ WARNING

- Always have power off before installing accessories. Failure to do so will cause electric shock, physical injury, and / or death.
- ⚡ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. Failure to do so will cause electric shock, physical injury, and / or death.
- ⚡ Never touch wiring or install accessories with wet hands. To do so will cause bodily injury or death.

#### Note:

- ⚡ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. Failure to do so will cause product malfunction and damage.
- See the Pre-Commissioning section for function codes and instructions on accessing the Installer mode that will be needed to set up Hydro Kit accessories.

A three-way (TB 8, 9, 10) diverting water valve is required to alternate the flow of heated water from the Hydro Kit (or Solar Heating System Interface; TB 1, 2, 3) between the indirect hot water storage tank, and the water loop serving radiant floor heating. Follow the valve manufacturer's instructions for wiring connections at the valve.

Table 23: Three-Way Valve Specifications.

Type	Power	Operating Mode	Supported
SPDT Three-Wire (1)	1~ 230 V	Select "Flow A" Between "Flow A" and "Flow B" (2)	Yes
		Select "Flow B" Between "Flow A" and "Flow B" (3)	Yes

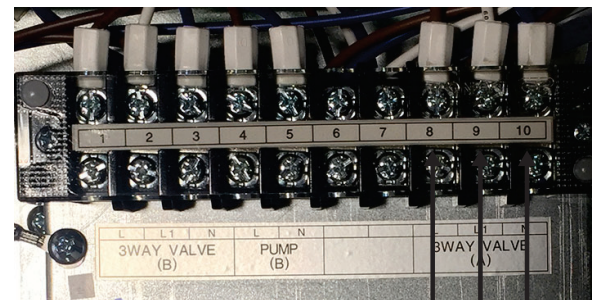
1. SPDT = Single Pole Double Throw. Three wires consist of Live (for selecting Flow A), Live 1 (for selecting Flow B), and Neutral (for common).
2. Flow A = Water flow from the Hydro Kit unit to domestic water tank.
3. Flow B = Water flow from the Hydro Kit unit to the floor water circuit.

1. Follow manufacturer's instructions for terminating wires at the valve.
  2. Remove front panel and control box cover off of the Hydro Kit.
  3. Locate terminal block and connect wires as shown in the figures at right.
- For three-way diverting valve water tank heating applications, power is to be supplied to wire (W) and wire (N).
  - For three-way diverting valve floor heating applications, power is to be supplied to wire (U) and wire (N).
4. Re-install the control box cover and front panel.

Before the system is fully functioning, check the flow direction and for noise or water piping vibration while the three-way valve is operating.

1. Flow direction.
  - Water must flow from water outlet of the Hydro Kit to the domestic tank water inlet when domestic tank heating is selected.
  - To verify the flow direction, check the temperatures at the water outlet of the Hydro Kit and water inlet of the domestic water tank.
  - If correctly wired, these temperatures must be nearly identical if water piping insulation is installed properly.
2. Noise or water pipe vibration when the three-way valve is operating.
  - Noise or vibration can occur from surging or the cavitation effect.
  - Check if the water circuit (both floor and water tank applications) has enough water. If not, add more water to support the application.
  - A valve that operates quickly yields noise and vibration. An appropriate valve operating time is between sixty (60) and ninety (90) seconds.

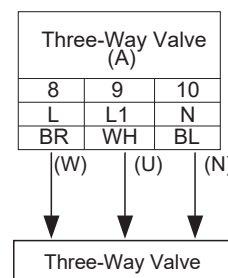
Figure 65: Three-Way Valve Terminal Connections.



Wire to Terminals 8 to 10

Three-Way Valve

Figure 66: Simplified Close Up Diagram of the Three-Way Valve Connections.



(W): Live signal (Water tank heating) from PCB to three-way valve.

(U): Live signal (Floor heating) from PCB to three-way valve.

(N): Neutral signal from PCB to three-way valve.

## Connecting the Circuit Water Pump Interlock

### ⚠ WARNING

- Always have power off before installing accessories. Failure to do so will cause electric shock, physical injury, and / or death.
- ⚡ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. Failure to do so will cause electric shock, physical injury, and / or death.
- ⚡ Never touch wiring or install accessories with wet hands. To do so will cause bodily injury or death.

### Note:

- ⚡ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. Failure to do so will cause product malfunction and damage.
- See the Pre-Commissioning section for function codes and instructions on accessing the Installer mode that will be needed to set up Hydro Kit accessories.

1. Verify the pump being installed was sized correctly considering the system's design flow rate and static head pressure. Refer to Hydro Kit rated flow rate information and inlet / outlet temperature difference in the Engineering Manual.
2. If not already completed, install the pump and connect it to the piping system.
3. Select a suitable relay for the pump capacity and with a coil rated for 208-230/60/1 service.
4. Connect appropriately sized wiring per local, state, and NEC code between the pump starter, the relay, and the Hydro Kit terminal.
5. Connect the relay to terminals 11 and 12 on the Hydro Kit.

### Note:

Make sure to provide external power to the pump.

Figure 67: Water Pump Interlock Terminal Connections.

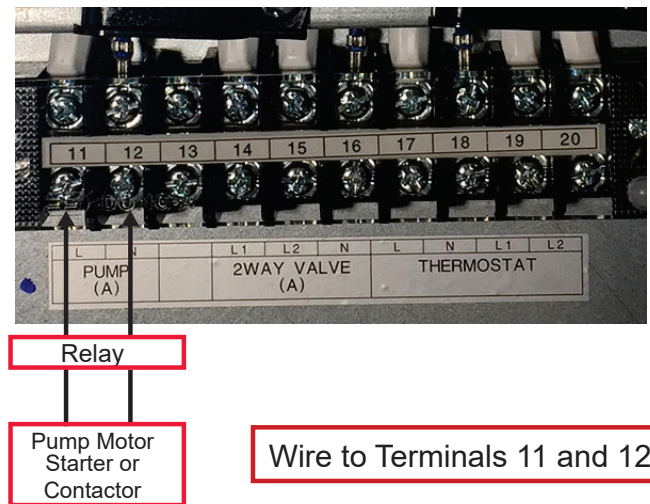
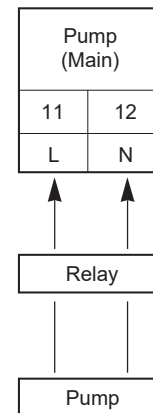


Figure 68: Simplified Close Up Diagram of the Water Pump Interlock Connections.





# WIRING

## Connecting Third-Party Accessories

### Connecting the Two-Way Isolation Valve

#### ⚠ WARNING

- Always have power off before installing accessories. Failure to do so will cause electric shock, physical injury, and / or death.
- ⓧ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. Failure to do so will cause electric shock, physical injury, and / or death.
- ⓧ Never touch wiring or install accessories with wet hands. To do so will cause bodily injury or death.
- Incorrect wiring can lead to condensate on the floor or other surfaces if the Hydro Kit operates in cooling mode and creates chilled water. If a radiator is connected to the floor heating water loop, the radiator surface can generate condensate. Condensate on a foot path causes an unsafe condition that will result in physical injury.

#### Note:

- ⓧ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications. Failure to do so will cause product malfunction and damage.
- See the Pre-Commissioning section for function codes and instructions on accessing the Installer mode that will be needed to set up Hydro Kit accessories.

A two-way isolation valve is required to stop the water flow to portions of the Hydro Kit's water piping system when the Hydro Kit operates in cooling mode. Chilled water flow will damage building materials, if condensate was allowed to form on the surfaces.

Table 24: Two-Way Isolation Valve Specifications.

Type	Power	Operating Mode	Supported
NO Two-wire (1)	230 V AC	Close water flow	Yes
		Open water flow	Yes
NC Two-wire (2)	230 V AC	Close water flow	Yes
		Open water flow	Yes

1. Normally Open (NO) Type. When electric power is NOT supplied, the valve is OPEN. When electric power is supplied, the valve is closed.

2. Normally Closed type. When electric power is NOT supplied, the valve is CLOSED. When electric power is supplied, the valve is open.

1. Follow manufacturer's instructions for terminating wires at the valve.
2. Remove front panel and control box cover off of the Hydro Kit.
3. Locate terminal block and connect wires as shown in the figures at right.

- For Normally Open (NO) Type two-way valve applications (close valves in cooling operation), power is to be supplied to wire (NO) and wire (N).

4. Re-install the control box cover and front cover.

Before the system is fully functioning, check the flow direction.

- ⓧ Water must NOT flow into the floor heating application water loop when the system is operating in cooling mode.
- To verify the flow direction, check the temperature at the water inlet of the floor heating application water loop. If the two-way valve is installed correctly, the temperature at the water inlet must not approach 42°F (6°C) in cooling mode.

Figure 69: Two-Way Valve Terminal Connections.

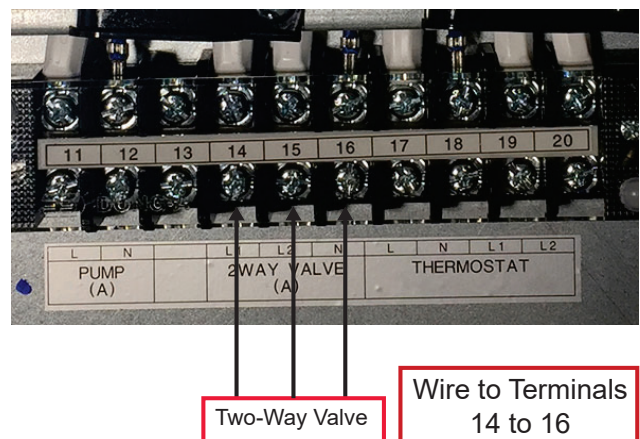
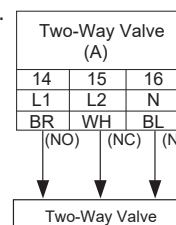


Figure 70: Simplified Close Up Diagram of the Two-Way Valve Connections.



(NO): Live signal (for Normally Open type) from PCB to two-way valve.  
 (NC): Live signal (for Normal| Closed type) from PCB to two-way valve.  
 (N): Neutral signal from PCB to two-way valve.

### Third-Party Thermostats

Hydro Kit supports following thermostat types:

Table 25: Hydro Kit Thermostats.

Controller Type	Power	Operating Mode	Supported
Mechanical (1)	1~ 230 V	Heating Only (3)	Yes
		Heating / Cooling (4)	Yes
	1~ 24 V	Heating Only (3)	Yes
		Heating / Cooling (4)	Yes
Electrical (2)	1~ 230 V	Heating Only (3)	Yes
		Heating / Cooling (4)	Yes
	1~ 24 V	Heating Only (3)	Yes
		Heating / Cooling (4)	Yes

1. Thermostat does not have an internal electrical circuit, and a power supply is not required.
2. Thermostat has electric circuits such as display, LED, alarm etc., and a power supply is required.
3. Thermostat displays "Heating ON" or "Heating OFF" signal according to the set heating target temperature.
4. Thermostat displays both "Heating ON" or "Heating OFF" and "Cooling ON" or "Cooling OFF" signal according to set heating and cooling target temperatures.

### Choosing a Heating / Cooling Thermostat

#### Note:

- Heating / Cooling Thermostats must have a "Mode Selection" feature to determine operation mode.
- Heating / Cooling Thermostat must feature a manual changeover design and be able to assign separate heating and cooling temperature setpoints.

If the chosen thermostat does not have both of the features listed above, the Hydro Kit will not operate properly.

#### Note:

- Heating / Cooling Thermostat must be able to send cooling and heating signals immediately when the temperature condition is met. There can be no delay in trigger timing.
- Some electromechanical thermostats have an internal time delay to protect the compressor. If the chosen electromechanical thermostat has an internal time delay, a mode change could take longer than expected. Review the thermostat manual carefully for workarounds if the product does not respond quickly.
- The thermostat set temperature range can be different than that of the Hydro Kit and its included controller. Choose heating and cooling set temperatures to coincide with the set temperature ranges of the Hydro Kit.
- ⚠ Do not use the thermostat terminals to power external loads such as contactors, relays, or any other type of control or electrical device. Doing so will damage the unit control board.
- See the Pre-Commissioning section for function codes and instructions on accessing the Installer mode that will be needed to set up Hydro Kit accessories.

### Wiring the Third-Party Thermostat

#### Note:

Set the Hydro Kit PCB DIP Switch No. 8 to ON, otherwise the Hydro Kit will not recognize the thermostat. The Hydro Kit Controller will display "thermostat text," and temperature control adjustment through the Hydro Kit Controller is disabled.

1. Disconnect power to the Hydro Kit.
2. Remove front cover of the unit and open the control box.

# WIRING

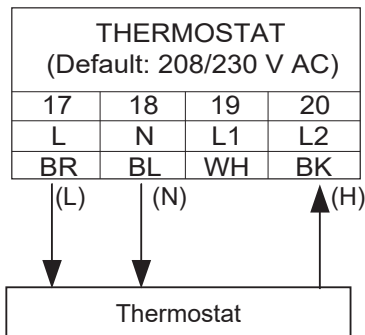
## Connecting Third-Party Accessories

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### Wiring the Third-Party Thermostat, continued.

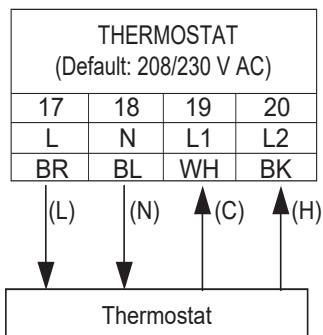
- Identify the power specification of the thermostat to install.
  - If installing a 208-230 V thermostat, go to steps 6 and 7.
  - If installing a 1~24 V thermostat, go to steps 4, 5, and 7.
- Locate connecting cable A and C and disconnect.
- Connect cable B and C.
- Locate the terminal block in the Hydro Kit and connect the control wiring from the thermostat, terminals 17-20.
  - If installing a mechanical thermostat, ⚡ do not connect wire N. Mechanical thermostats do not require power supply.
  - If installing a heating only electrical thermostat, connect wires L, N, and H.
  - If installing a heating / cooling electrical thermostat, connect wires L, N, C, H.
- If the DIP Switch hasn't been set yet, set the Hydro Kit PCB DIP Switch No. 8 to ON.

Figure 73: Wiring for the Heating Only Thermostat.



(L): Live signal from PCB to Thermostat  
 (N): Neutral signal from PCB to Thermostat  
 (H): Heating signal from Thermostat to PCB

Figure 74: Wiring for the Heating / Cooling Thermostat.



(L): Live signal from PCB to Thermostat  
 (N): Neutral signal from PCB to Thermostat  
 (C): Cooling signal from Thermostat to PCB  
 (H): Heating signal from Thermostat to PCB

Figure 71: Hydro Kit Control Box Connections for Third-Party 1-24 V Thermostats.

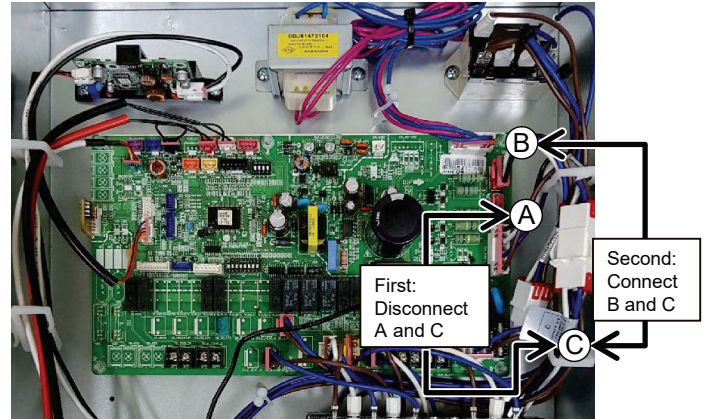
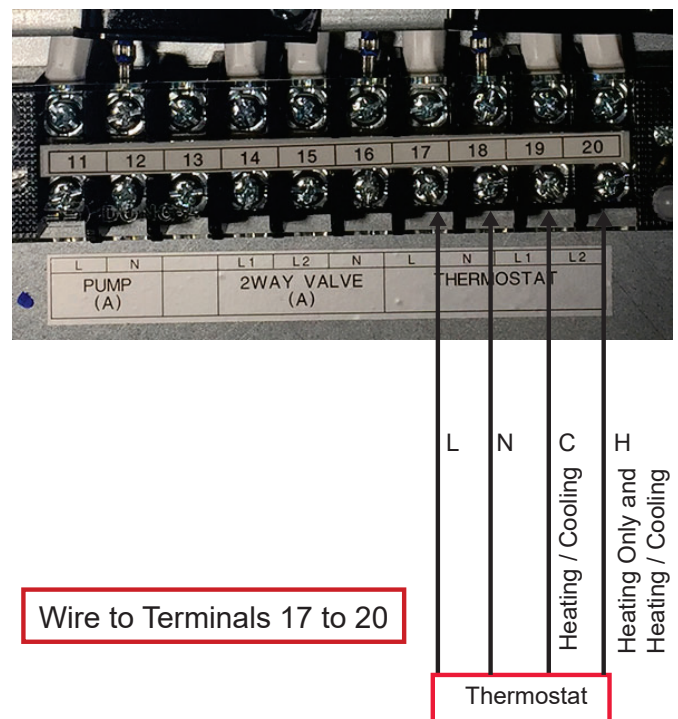


Figure 72: Hydro Kit Terminal Connections for Third-Party 208-230 V Thermostats.



### Note:

- Wires (L) and (N) must be used only for electrical thermostats.
- ⚡ Never connect external electric loads such as valves, fan coil units, etc. If connected, it will seriously damage the main PCB assembly.

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## Resistance Test

### **⚠ WARNING**

*Test the power wiring and communications cable for incorrect wiring before any power is applied. If power wiring and communications cable connections are swapped / improperly installed, it will cause electric shock, fire, physical injury or death.*

### **Note:**

*Test the power wiring and communications cable for incorrect wiring before any power is applied. The power wiring and communications cable connections are swapped / improperly installed, the Hydro Kit will be damaged.*

Using a multimeter, measure the resistance across power terminals L and N

- Correct Resistance Value of a Normal Connection: 1 MΩ or more
- Incorrect Resistance Value: 500 mΩ or less

## Hydro Kit Wired Remote Controller Installation

(Included with the Hydro Kit)

### ⚠ WARNING

- Always have power off before installing the controller.
  - ⓧ Never operate Hydro Kit outside of the operational parameters as outlined in this manual and the product specifications.
  - ⓧ Never touch wiring or install accessories with wet hands.
  - When drilling holes for the communication cable and the screws, take care not to damage wiring that is routed through the wall.
- There is risk of fire, electric shock, explosion, and physical injury or death.

### Note:

- See the Installation section for guidelines on where to place the controller.
- The controller is designed to be surface mounted. Recessing the controller will damage the temperature sensor, and cause it to misread the zone temperature.

1. If not already done so, separate the Hydro Kit controller from its installation plate.
  - To separate, insert a small screwdriver into one of the two holes at the bottom of the installation plate. Gently turn clockwise.
  - Repeat for the remaining hole, and then gently pull on the bottom of the controller body.

### ⚠ WARNING

ⓧ Do not damage the controller components when separating. There is risk of fire, electric shock, and physical injury or death if the electrical components are damaged.

2. Determine how the Hydro Kit communications cable (female end) will be routed to the controller. Choose either through the back, using the top groove, or using right groove.
  - If using the top or right groove, use needle nose pliers to carefully break off the tab.
  - If using the back, route the communications cable through the handy box or wall, and through the large hole in the installation plate.

### Note:

- If the distance between the controller and the Hydro Kit is more than 32 feet (9.75 m), use an LG Extension Cable (sold separately).
- ⓧ Do not install a cable longer than 164 feet (50 m). Communication errors will occur.
- Ensure the cable connections are male to female. If the communications cable is not routed properly with the connections facing the right direction, connections cannot be made.

3. Attach the controller installation plate to the wall or handy box using the factory-provided screws. Ensure the plate is level and securely attached to the wall.

### Note:

- ⓧ Do not overtighten the screws and bend the installation plate. It damage the controller PCB.

Figure 75: Routing the Communications Cable.

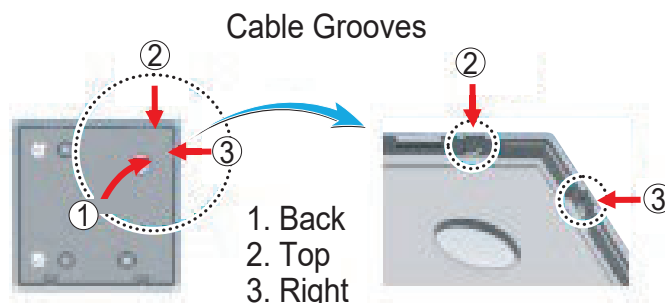


Figure 76: Hydro Kit Controller Communications Cable Termination Detail.

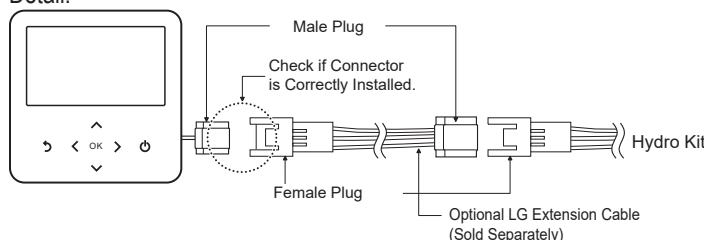
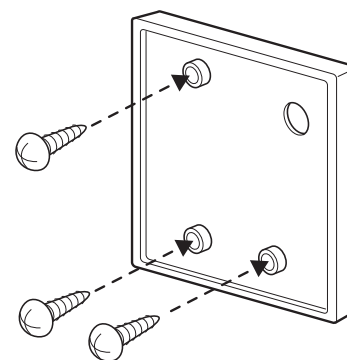


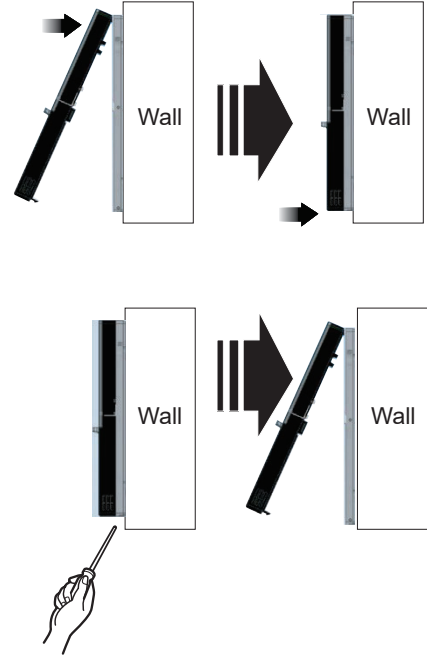
Figure 77: Location of the Controller Installation Plate Screws.





4. Seal all gaps or holes behind the installation plate before mounting. If mounting the controller over a handy box, seal the holes in the handy box using spray foam or similar insulation material approved by all applicable codes.
5. Attach the top of the controller to the top of the installation plate. Verify that the controller is level and secure.
6. Plug the male connection on the controller into the female end of the communications cable.
7. Connect the Hydro Kit controller cable to terminal CN-REMO on the Hydro Kit PCB.
8. Guide the bottom of the controller to the bottom of the installation plate. Gently push on the controller along the bottom edge until it snaps onto the plate. Verify that it is properly seated with no gaps between the controller and the installation plate.

Figure 78: Location of the Controller Installation Plate Screws.



# CONTROLLER OPERATION

## Hydro Kit Controller Operation

Table 26: Controller Main Screen Display.

Controller Component	Function
Operation Display Window	Displays Operation and Set Status
Back Button	Returns to the Previous Stage from the Menu's Set Stage
Up / Down / Left / Right Button	Changes the Menu's Set Value
OK Button	Saves the Menu's Set Value
On / Off Button	Turns the Hydro Kit ON / OFF

## Operation Settings

### Operation Mode

The desired operation mode can be easily controlled. From the main screen, press the Left < and Right > buttons to select the operation mode, home, or hold category. Press the Up ^ and Down v buttons to set the operation mode.

### Note:

Some products may not support some operation modes.

### AI / Auto Operation

AI / Auto Operation applies only to heating. To save energy and provide high comfort levels, the set temperature will follow outside temperature. If the outdoor temperature decreases, heating capacity for the room will increase automatically to maintain the temperature. All parameters must be set by the trained service provider during start-up, and must be adapted to the environment of the installation site.

1. Select AI / Auto Mode.
2. Select the desired temperature category.
3. Adjust the desired temperature by pressing the Up ^ and Down v buttons.

Figure 80: Select AI / Auto Mode.

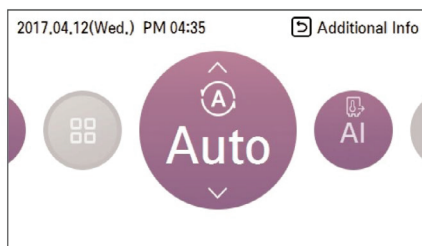


Figure 81: Select the Temperature Category.

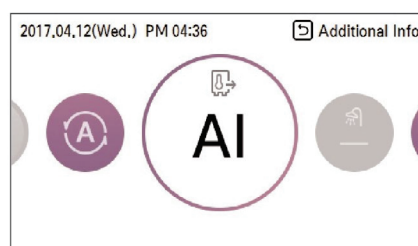
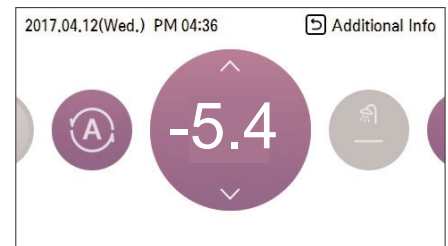


Figure 82: Select the Temperature.



### Note:

Decreasing temperature by 5.4°F (3°C) (based on room air temperature)

<Temperature Adjustment Steps (Unit: °F [°C])

-9°F (-5°C), -7.2°F (-4°C), -5.4°F (-3°C), -3.6°F (-2°C), -1.8 (-1°C), 0 (0), 1.8°F (1°C), 3.6°F (2°C), 5.4°F (3°C), 7.2°F (4°C), 9°F (5°C)

<Cold

Hot >

Figure 79: Controller Main Screen Display.

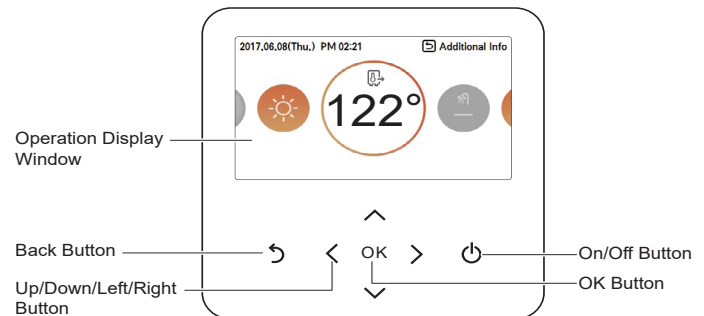


Table 27: Operation Modes.

Mode	Description
Cool	Hydro Kit provides cool water to use for desired application.
Heat	Hydro Kit provides hot water to use for desired application (example: floor heating or domestic hot water).
AI / Auto	Heating setpoint is automatically determined by a pre-defined temperature profile.



## Temperature Setting

Easily control the system for the desired temperature.

1. On the main screen, press the Left < and Right > buttons to select the desired temperature category.
2. Press the Up ^ and Down v buttons to set the desired temperature.
3. Controlling the system for the desired temperature is possible for the Cooling, Heating, and AI / Auto modes.

Figure 83: Temperature Setting Screen.

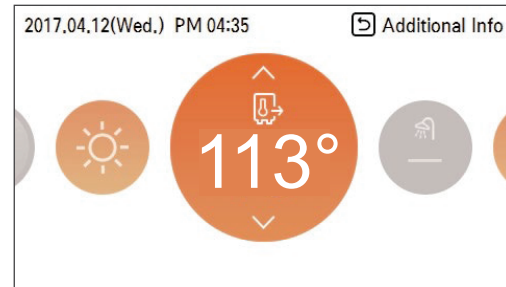


Table 28: Temperature Setting Options.

Mode	Description
Room Temperature	Room Temperature setting is available when a remote room air sensor (sold separately) is installed.
Leaving Water Temperature	If the desired temperature is lower than the water temperature, heating operation will not be performed. Set the desired temperature higher than the water temperature.
Domestic Hot Water Tank Temperature	Domestic hot water tank temperature setting is available if a domestic hot water tank is installed.

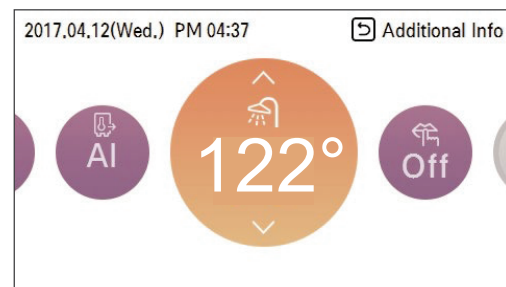
## Domestic Hot Water Heating Operation

Sets the function to use or not to use an installed domestic hot water tank.

### Note:

- This function is not used when the domestic hot water tank is not installed.
- For more information, see the domestic hot water function in the installation section.

Figure 84: Domestic Hot Water Heating Operation Screen.



## View Temperature

Use to check the current temperature. From the main screen, enter the monitoring screen by pressing the Back button.

Figure 85: View Temperature Screen.

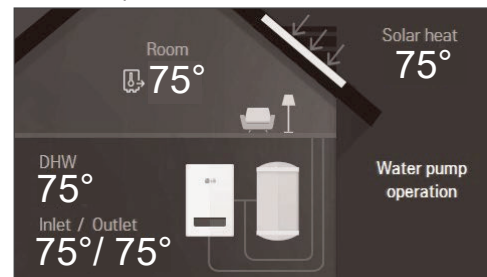


Table 29: View Temperature Options.

Mode	Description
Room Temperature	View room temperature
Inlet Temperature	View inlet temperature
Outlet Temperature	View outlet temperature
DHW Temperature	View DHW temperature (only displayed when an installed DHW is in heating mode)
Solar Heat Temperature	View solar power temperature (only displayed when an installed DHW is in water heating mode)

# CONTROLLER OPERATION



## Low Noise Mode

Low Noise Mode allows the Hydro Kit to function at a lower capacity to reduce operation sound.

1. On the main menu screen, press the Left < and Right > buttons to select the desired setting category.
2. Press the OK button to select the setting list screen.
3. On the setting list screen, press the Up ^ and Down v buttons to turn the Low Noise Mode On or Off.
4. Press the Left < and Right > buttons to select the parts; press the Up ^ and Down v button to adjust the time.

Figure 86: Main Menu Screen to the Setting List Screen.

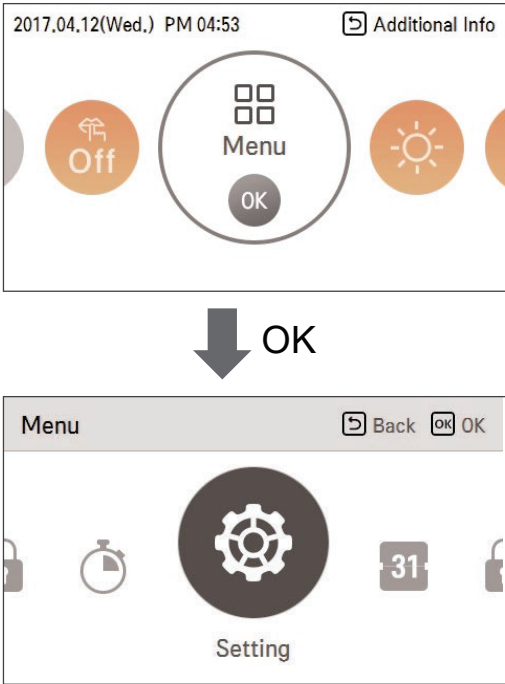


Figure 87: Turning Off Low Noise Mode.

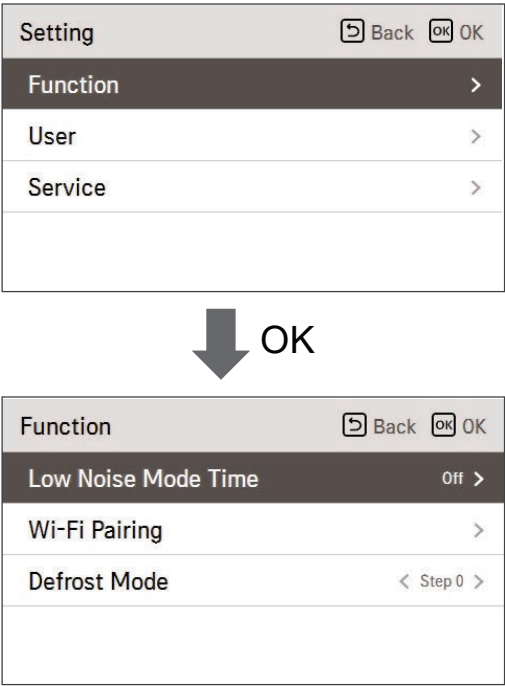
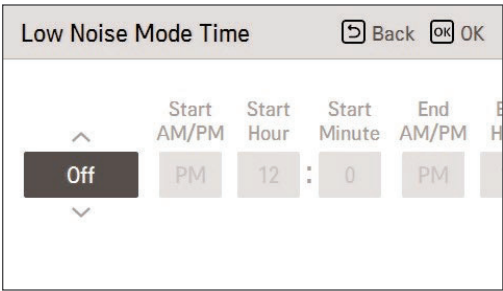


Figure 88: Adjusting Low Noise Mode Time (Start / End).



### Note:

- Because Low Noise Mode allows the Hydro Kit to function at a lower capacity, the heating or cooling operation will also be reduced. Be aware of this when a certain level of heating or cooling is required.
- Low Noise Mode may not function if the Hydro Kit is operating in defrost mode, anti-freeze mode, etc.



## Wi-Fi Pairing (Connection)

Wi-Fi Pairing is only available on some products. Wi-Fi Pairing activates the AP mode function of the Wi-Fi Module connected to the Hydro Kit.

1. On the main menu screen, press the Left < and Right > buttons to select the desired setting category.
2. Press the OK button to select the setting list screen.
3. On the setting list screen, press the Up ^ and Down V buttons to turn Wi-Fi Pairing On or Off.

Figure 89: Main Menu Screen to the Setting List Screen.

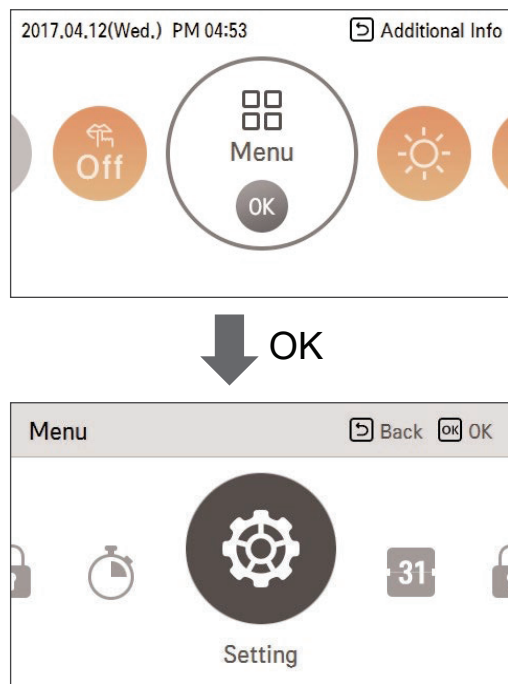
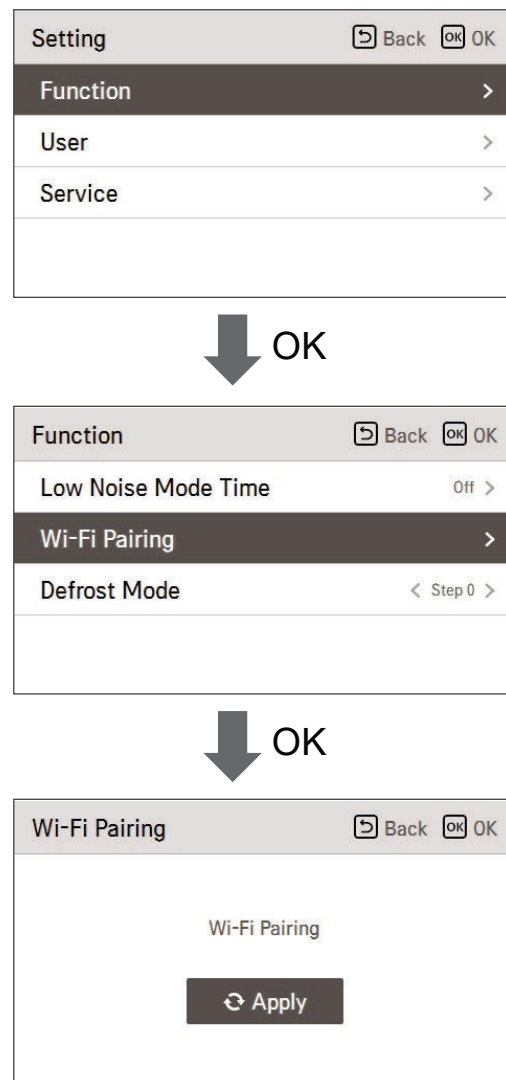


Figure 90: Accessing the Wi-Fi Pairing Function.



Defrost Mode

Sets the function codes that causes the defrost operation for the outdoor unit.

- 1. On the main menu screen, press the Left < and Right > buttons to select the desired setting category.
- 2. Press the OK button to select the setting list screen.
- 3. On the setting list screen, press the Up ^ and Down V buttons to turn Defrost Mode On or Off.

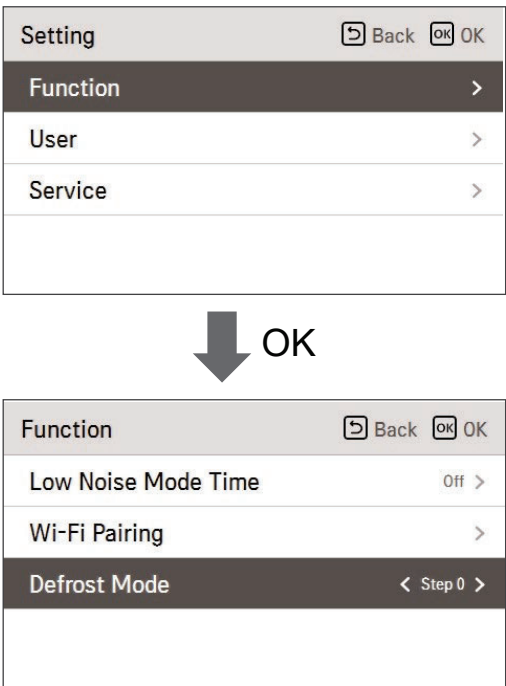
Setting Values:

- STEP0 = Defrost Mode Not Used
- STEP1 = Forced Snow Removal
- STEP2 = Fast Defrost Setting
- STEP3 = Forced Snow Removal + Fast Defrost

Figure 91: Main Menu Screen to the Setting List Screen.



Figure 92: Accessing the Defrost Mode Screen.



Lock Setting

Lock Settings – All, On/Off, Mode, DHW Lock

Use this function to lock the buttons on the remote controller so that unauthorized individuals cannot use it without permission. Lock Setting can also be used to limit the desired temperature range that can be set through the wired remote controller.

- 1. On the main menu screen, press the Left < and Right > buttons to find the Lock Setting.
- 2. Press the OK button to select the Lock Setting.
- 3. On the Lock Setting list, press the Up ^ and Down v buttons to turn the corresponding lock function On or Off.

Figure 93: Main Menu Screen to the Lock Setting Screen.

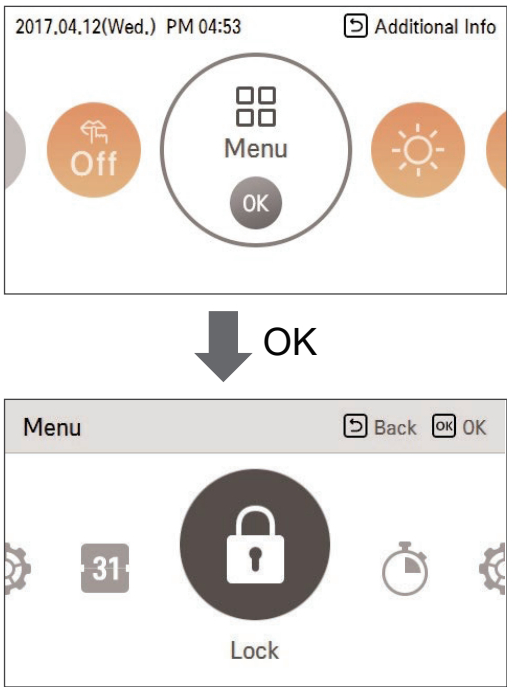
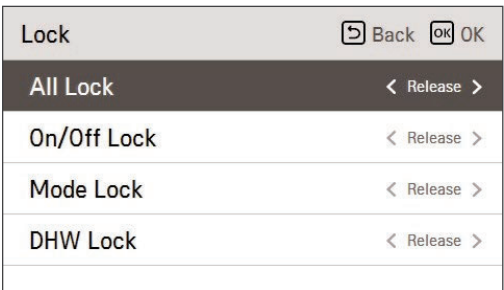


Table 30: Lock Setting Options.

Mode	Description
All Lock	Locks all button operation of the remote controller.
On / Off Lock	Locks the On / Off button operation of the remote controller.
DHW Lock	Locks the DHW On / Off button operation of the remote controller.
Mode Lock	Locks the operation mode button operation of the remote controller.

Figure 94: Lock Setting Options.



# CONTROLLER OPERATION

## Date Setting

Sets the date displayed on the remote controller.

1. In the user setting list, select the date category.
2. Press the OK button to access the date detail screen.
3. After setting the date, press the OK button to save the selection and return to the previous screen.

Figure 95: Accessing the Date Setting Screen.

User	Back OK OK
External Device	
<b>Date</b>	2016.5.18(Wed.) >
Time	PM 02:02 >
Summer Time	Off >
Password	Off >



Date	Back OK OK
<div> <div>2016</div> <div>Month 5</div> <div>Day 18</div> </div>	

## Timer Settings

### Time Setting

Sets the time displayed on the remote controller.

1. In the user setting list, select the time category.
2. Press the OK button to access the time detail screen.
3. After setting the time, press the OK button to save the selection and return to the previous screen.

Figure 96: Accessing the Time Setting Screen.

User	Back OK OK
External Device	
Date	2016.5.18(Wed.) >
<b>Time</b>	PM 02:04 >
Summer Time	Off >
Password	Off >



Time	Back OK OK
<div> <div>PM</div> <div>Hour 2</div> <div>Minute 5</div> </div>	

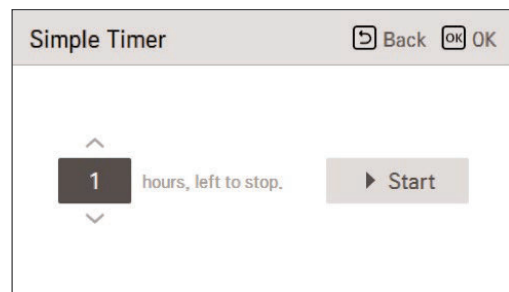
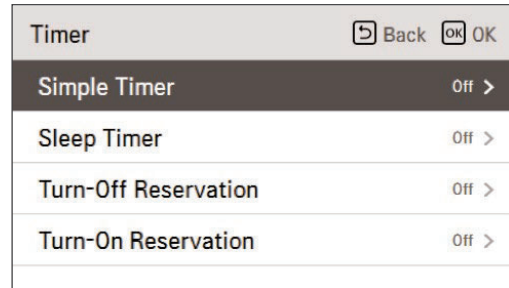


## Simple Timer

Timer can be easily set ranging one (1) to seven (7) hours in increments of one (1) hour.

- If product operation is On, the simple timer turns Off the operation after the corresponding setting.
- If product operation is Off, the simple timer turns On the operation after the corresponding setting.
- If the simple timer operation is turned On / Off before timer setting operation begins, the timer setting will be removed.

Figure 97: Accessing and Setting the Simple Timer.

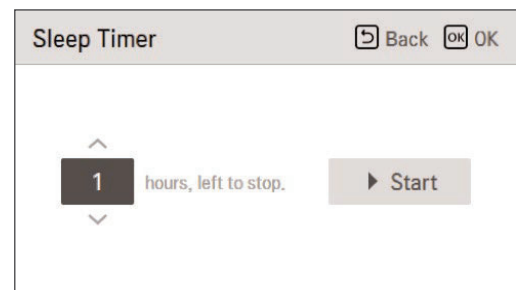
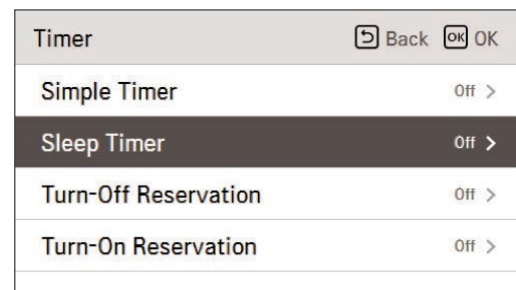


## Sleep Timer

Sleep Timer operates the Hydro Kit before shutting off (sleep mode) for the set amount of time.

- Sleep timer can be set while the Hydro Kit is operating.
- If the sleep timer operation is turned on before timer operation, the timer setting will be removed.

Figure 98: Accessing and Setting the Sleep Timer.



# CONTROLLER OPERATION

**MULTI V™**  
**HYDRO KIT**

## Turn-Off Reservation

Hydro Kit automatically turns Off at the time set.

If Turn-Off Reservation operation is turned on or off after the setting begins but before the timer operates, the timer setting will not disappear.

Figure 99: Accessing and Setting Turn-Off Reservation

Timer	Back OK OK
Simple Timer	Off >
Sleep Timer	Off >
Turn-Off Reservation	Off >
Turn-On Reservation	Off >



Turn-Off Reservation	Back OK OK
^ Hour Minute	
AM	1 : 0
Start	
v	

## Turn-On Reservation

Hydro Kit automatically turns On at the time set.

If Turn-On Reservation operation is turned on or off after the setting begins but before the timer operates, the timer setting will not disappear.

Figure 100: Accessing and Setting Turn-On Reservation

Timer	Back OK OK
Simple Timer	Off >
Sleep Timer	Off >
Turn-Off Reservation	Off >
Turn-On Reservation	Off >



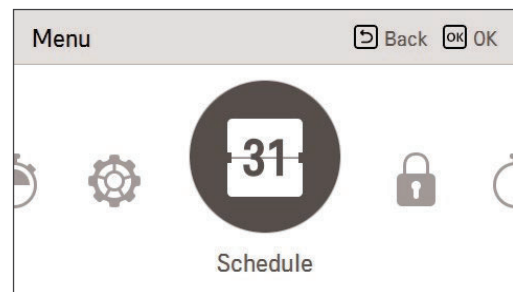
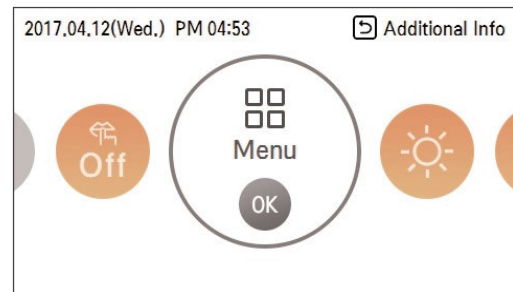
Turn-On Reservation	Back OK OK
^ Hour Minute	
AM	1 : 0
Start	
v	

## Schedule Setting

### How to Enter the Schedule Setting Menu

1. On the main menu screen, press the Left < and Right > buttons to select the desired setting category.
2. Press the OK button to select the schedule setting list screen.
3. On the schedule setting list screen, press the Up ^ and Down V buttons to select the menu to set.
4. Press the OK button to access the detail screen.

Figure 101: Main Menu Screen to the Schedule Setting Menu Screen.



### Daily Schedule

Use the Daily Schedule function to check the status of the timer (schedule) saved in the remote controller.

1. On the schedule list, select daily schedule status.
2. Press the OK button to access the detail daily schedule status screen.
3. Press the Left < and Right > buttons to check the timer information for other dates.
4. Press the Up ^ and Down V buttons to check the corresponding date's other timer information.
5. Select the timer information, and press the OK button to access the corresponding timer's edit screen.

### Schedules and Edit

The status of the timer (schedule) saved in the remote controller can be checked in the Schedules and Edit function.

1. On the schedule list, select daily schedule status.
2. Press the OK button to access the daily schedule status detail screen.
3. Press the Left < and Right > buttons to check timer information for other dates.
4. To edit timer information for saved schedules:
  - Press the Up ^ and Down V buttons to select the schedule to edit, and then press the OK button to access the edit screen.
  - Select the timer information, and press then press the OK button to access the edit screen of the corresponding timer

### Schedules and Edit – Add Schedule

- Stage 1 sets the period to perform the timer.
- Stage 2 sets the day of week to perform the timer. Select from Everyday / Weekend / Weekdays / Individual.
- Stage 3 sets the start time for the timer.
- Stage 4 sets the timer operation information.

If Stop is selected, mode / temperature / fan speed cannot be set.

When Stages 1 through 4 are complete, the message "Schedule is Added" and the controller returns to the view and edit schedule screen.

## Exception Day

Automatically stops the operation on the set day.

1. On the schedule list, select the exception day category.
2. Press the OK button to access the exception day designation detail screen. Exception day information saved in the remote controller can be checked, added, changed, and deleted.
  - To add an exception day, through the exception day registration detail screen, designate the year / month / day, and then press the OK button to save.
  - To edit an exception day, press the Up  $\wedge$  and Down  $\vee$  button to select the specific exception day, and then press the OK button to access the edit screen. In the exception day edit screen, the corresponding exception day setting contents can be checked, deleted, and changed.
  - After the exception day information is changed, it needs to be saved.

## DHW Tank Heating and DHW Tank Heater Operation

Function schedules DHW tank heating and DHW tank heater operation. There are two (2) schedule programs for DHW tank heating; there are two (2) schedule programs for tank heater operation.

## Using a Third-Party Thermostat

The term “thermostat” used in this manual refers to a third-party accessory. LG Electronics does not supply thermostats; obtain a thermostat from a third-party manufacturer. Room thermostats can be used for easy, efficient, correct and convenient control. See below and the Wiring section for information regarding third-party thermostat connections.

### **Note:**

1. *Some electromechanical thermostats have an internal time delay to protect the compressor. If the chosen electromechanical thermostat has an internal time delay, a mode change could take longer than expected. Review the thermostat manual carefully for workarounds if the product does not respond quickly.*
2. *The thermostat set temperature range can be different than that of the Hydro Kit and its included controller. Choose heating and cooling set temperatures to coincide with the set temperature ranges of the Hydro Kit.*

## How to Operate the Third-Party Thermostat

For information on how to turn the thermostat on and off, set target temperature, change operating mode, etc, review the operating / owner's manual from the third-party manufacturer.

### Hydro Kit DIP Switch Settings

The Hydro Kit can be used for various applications, therefore, it is important to set up the system and the DIP switches properly. See tables below for DIP switch settings to functions.

#### ⚠ WARNING

- Always turn off electric power before setting the DIP switches. There is a risk of electric shock, physical injury, and / or death.
- ⚡ Do not operate the Hydro Kit unit in Antifreeze Operation Mode until after the proper amount of antifreeze is added to the water circuit. The product will freeze and burst, causing physical injury and / or death.

#### Note:

- ⚡ Do not add any antifreeze during Hot Water Mode operation.
- If the Hydro Kit is not configured precisely, it will operate improperly or the performance will be degraded.
- When the DIP switch is in the UP position, it is ON; when the DIP switch is in the DOWN position, it is OFF.

Figure 102: Hydro Kit DIP Switch PCB Locations.

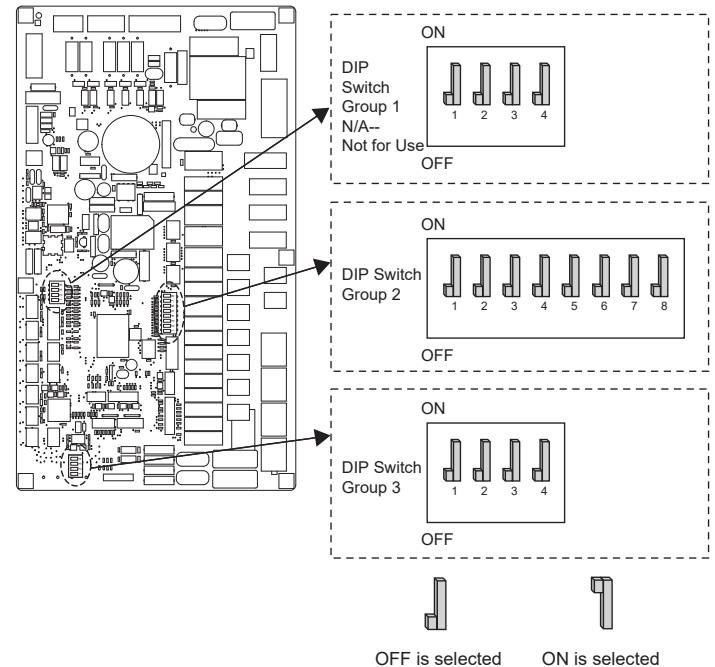


Table 31: Hydro Kit DIP Switch Group 2 Settings and Descriptions.

Description	DIP Switch Group 2 Settings								Function	Default
	1	2	3	4	5	6	7	8		
Group Control	X								Main	✓
	•								Sub	
Installation Application		X	X						Floor Heating Only	
		•	X						Water Tank (Domestic Hot Water) + Floor Heating + Solar Panel	
		X	•						Water Tank (Domestic Hot Water) + Floor Heating	✓
		•	•						Water Tank (Domestic Hot Water) Only	
Operation Mode Setting				X					Heating Only	✓
				•					Heating / Cooling	
Flow Switch Detection					X				Always	
					•				While Water Pump is On	✓
Electric Heater Setup						X	X		Not Use	✓
						X	•		Reserved (⚡ Don't Select)	
						•	X			
						•	•			
Thermostat Connection								X	Thermostat NOT Installed	✓
								•	Thermostat Installed	

• = On

X = Off

# PRE-COMMISSIONING

## Hydro Kit DIP Switch Settings / Enter Installer Mode

Table 32: Hydro Kit DIP Switch Group 3 Settings and Descriptions.

Description	DIP Switch Group 3 Settings				Function	Default
	1	2	3	4		
Sensor Selection	X				Air Sensor in Hydro Kit (RS3)	√
	•				Air Sensor (ZRTBS01)	
Antifreeze Operation Mode		X			Not Use (Connect Short Key*)	√
		•			Use (Disconnect Short Key*)	

• = On

X = Off

### ⚠ WARNING

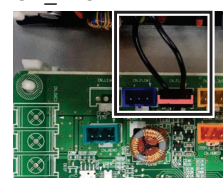
Do not operate the Hydro Kit unit in Antifreeze Operation Mode until after the proper amount of antifreeze is added to the water circuit. The product will freeze and burst, causing physical injury and / or death.

### Note:

Do not operate the Hydro Kit unit in Antifreeze Operation Mode until after the proper amount of antifreeze is added to the water circuit. The product will freeze and burst, causing product damage.

Figure 104: Short Key\*.

CN\_FLOW2



## How to Enter Installer Setting Mode

The Installer Setup Mode must be used to set the functionality of the remote controller, and to customize the Hydro Kit settings.

### ⚠ WARNING

Failure to correctly configure functionality through the Installer Setup could cause user injury. Configuration must be done by a trained technician.

### Note:

Failure to correctly configure functionality through the Installer Setup could cause problems to the unit, or property damage. Configuration must be done by a trained technician. Non-certified technical tampering will be the responsibility of the installer, and will result in voiding of warranty to the unit.

1. On the menu screen, press the < Left / > Right buttons to select the setting category.
2. Press and hold the ^ Up button for three (3) seconds to access the password input screen for the installer screen.
3. Input the password and press the OK button to access the installer setting list.

### Installer Setting Mode Password

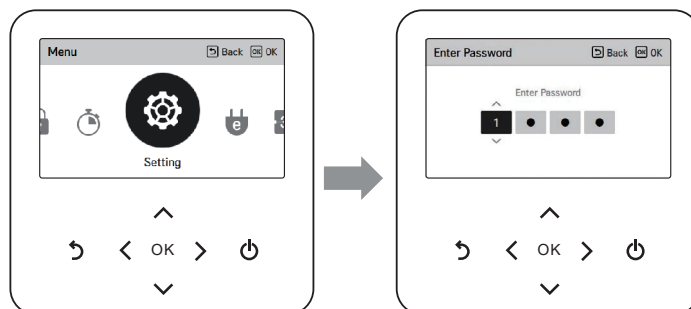
Go to Main Screen → Menu → Setting → Service → RMC Version Information → SW Version

Example: IF SW Version is 1.00.1 a, then the password would be 1001.

### Note:

Some categories on the Installer Setting Menu may not be available, depending on the product function. Menu name could also be different.

Figure 103: Entering Installer Setting Mode.





### Functions

The tables below and on the next pages outline the functions available to the Hydro Kit.

#### Note:

Region altitude might impact Hydro Kit's ability to reach stated temperatures. Unit capability is rated at sea level.

Table 33: Hydro Kit User Functions.

Function	Range		Description
Test Run	Cooling Test Run		Test run operates Multi V systems in cooling mode for a maximum of 18 minutes.
3 Minute Delay	N / A		Only for factory testing; cannot change standby timer compressor restart after thermo-off.
Select Temperature Sensor	Control Standard • Air Temperature (Air) • Leaving Water Temp. (Water) (Default)	Sensor Location • Remote Control • Indoor Unit	Selects the reference sensor (air / water) for control.
Dry Contact Mode	• Manual • Auto (Default)		Selects the initial state of the Hydro Kit when a dry contact signal is input.
Central Control Address	Hexadecimal address • 00~FF (Default: 00)		Use for address assigning when a Central Controller is installed.
Override Master / Slave	• Master • Slave (Default)		Prevents the Hydro Kit operating in a different mode. If a Hydro Kit is set as Slave, it cannot switch to the opposite operating mode (cooling / heating).
Pump Test Run	Test Run		Checks if water circulation is normal.
Air Cooling Set Temp.	• Upper Limit: 75°F~86°F (24°C~30°C) (Default: 86°F [30°C]) • Lower Limit: 61°F~72°F (16°C~22°C) (Default: 64°F [18°C])		Adjusts range of the "Setting Air Temperature" for cooling mode.
Water Cooling Set Temp.	Fan Coil Unit is NOT Installed • Upper Limit: 68°F~77°F (20°C~25°C) (Default: 75°F [24°C]) • Lower Limit: 61°F~68°F (16°C~20°C) (Default: 61°F [16°C]) Fan Coil Unit IS Installed • Upper Limit: 68°F~77°F (20°C~25°C) (Default: 75.2°F [24°C]) • Lower Limit: 41°F~68°F (5°C~20°C) (Default: 41°F [5°C])		Adjusts range of the "Setting Leaving Water Temperature" for cooling mode.
Air Heating Set Temp.	• Upper Limit: 75°F~86°F (24°C~30°C) (Default: 86°F [30°C]) • Lower Limit: 61°F~71.6°F (16°C~22°C) (Default: 61°F [16°C])		Adjusts range of the "Setting Air Temperature" for heating mode.
Water Heating Set Temp.	• Upper Limit: 95°F~122°F (35°C~50°C) (Default: 122°F [50°C]) • Lower Limit: 68°F~93.2°F (20°C~34°C) (Default: 68°F [20°C])		Adjusts range of the "Setting Heating Flow Temperature" for heating mode.
DHW Set Temp.	• Upper Limit: 122°F (50°C) (Default: 122°F [50°C]) • Lower Limit: 86°F~104°F (30°C~40°C) (Default: 104°F [40°C])		Adjusts range of the "Setting DHW Tank Heating Flow Temperature" in hot water tank heating mode.
Cooling / Heating Only Mode	Set • Release (Default) • Oil Recovery Options: Type 0, 1 (Default: Type 0)		Sets the operation mode lock function.
Water Supply Off Temp. During Cooling	Water Stop Temperature • 61°F~77°F (16°C~25°C) (Default: 61°F [16°C]) • Fan Coil Unit Use / Not Use (Default: Use)		When operating in floor cooling, it is necessary to stop the supply of cold water to prevent condensation.

\* Deadband is the difference between the upper and lower limit setpoints.

# PRE-COMMISSIONING

## Functions

Table 34: Hydro Kit User Functions, continued.

Function	Range	Description
Outdoor Temp. for Auto Mode	<ul style="list-style-type: none"> <li>Upper Limit: 50°F~68°F (10°C~20°C) (Default: 59°F [15°C])</li> <li>Lower Limit: -4°F~+41°F (-20°C~+5°C) (Default: 14°F [-10°C])</li> </ul>	Sets the outdoor minimum / maximum temperature for auto mode.
Indoor Air Temp. for Auto Mode	<ul style="list-style-type: none"> <li>Upper Limit: 68°F~86°F (20°C~30°C) (Default: 70°F [21°C])</li> <li>Lower Limit: 61°F~66.2°F (16°C~19°C) (Default: 61°F [16°C])</li> </ul>	Sets the indoor minimum / maximum temperature for auto mode.
LWT for Auto Mode	<ul style="list-style-type: none"> <li>Upper Limit: 95°F~122°F (35°C~50°C) (Default: 122°F [50°C])</li> <li>Lower Limit: 68°F~93.2°F (20°C~34°C) (Default: 68°F [20°C])</li> </ul>	Sets the heating flow minimum / maximum temperature for auto mode.
Tank Setting 2	<ul style="list-style-type: none"> <li>00: Perform hot water</li> <li>01: Perform floor heating</li> </ul>	Sets heating demand priority.
DHW Time Setting	<ul style="list-style-type: none"> <li>Operation Holding Time: 5 min.~95 min. (Default: 30 min.)</li> <li>Stop Holding Time: 0 min.~600 min. (Default: 180 min.)</li> </ul>	Sets the hot water maintenance / suppression time.
Pump Frequency Setting (g/min. [l/min.])	5.3 g/min.~24.3 g/min. (20 l/min.~92 l/min.) (Default: 12.2 g/min. [46 l/min.])	Sets the water flow rate in the water piping.
TH On / Off Variable, Heating Air	Type: 0, 1, 2, 3 (Default: 0)	The temperature of the heating air can be adjusted according to the field environment preparing for heating claims.
TH On / Off Variable, Heating Water	Type: 0, 1, 2, 3 (Default: 0)	The temperature of the heating water can be adjusted according to the field environment preparing for heating claims.
TH On / Off Variable, Cooling Air	Type: 0, 1, 2, 3 (Default: 0)	The temperature of the cooling air can be adjusted according to the field environment preparing for cooling claims.
TH On / Off Variable, Cooling Water	Type: 0, 1, 2, 3 (Default: 0)	The temperature of the cooling water can be adjusted according to the field environment preparing for cooling claims.
TH On / Off Variable, DHW	Type: 0, 1, 2, 3 (Default: 0)	Set the step value to adjust the hot water temperature thermal on / off according to the field environment.
Heating Temp. Setting	<ul style="list-style-type: none"> <li>00: Outlet / Leaving (Default)</li> <li>01: Inlet / Entering</li> </ul>	Sets the water pipe temperature control standard for heating in accordance with the field environment.
Cooling Temp. Setting	<ul style="list-style-type: none"> <li>00: Outlet / Leaving (Default)</li> <li>01: Inlet / Entering</li> </ul>	Sets the water pipe temperature control standard for cooling in accordance with the field environment.
Pump Setting in Heating	<ul style="list-style-type: none"> <li>Type: Time, Always (Default: Always)</li> <li>OFF Time: 1 min.~60 min. (Default: 1 min.)</li> <li>ON Time: 1 min.~60 min. (Default: 2 min.)</li> </ul>	Sets water pump operation / delay time option for heating.
Pump Setting in Cooling	<ul style="list-style-type: none"> <li>Type: Time, Always (Default: Always)</li> <li>OFF Time: 1 min.~60 min. (Default: 1 min.)</li> <li>ON Time: 1 min.~60 min. (Default: 2 min.)</li> </ul>	Sets water pump operation / delay time option for cooling.
Forced Operation	<ul style="list-style-type: none"> <li>Value 1: ON, OFF (Default: On)</li> <li>Value 2 Forced Period: 20~180 hr, (Default: 20 hr.)</li> <li>Value 3 Pump Operating Time: 1~10 min. (Default: 10 min.)</li> </ul>	Deactivates the logic that drives the water pump itself.

\* Deadband is the difference between the upper and lower limit setpoints.

Table 35: Hydro Kit User Functions, continued.

Function	Range	Description
CN_CC	<ul style="list-style-type: none"> <li>• D/C (Dry Contact) Automatic (Default)</li> <li>• D/C (Dry Contact) Not installed</li> <li>• D/C (Dry Contact) Installed</li> </ul>	Must be set correct depending on optional dry-contact.
Data Logging	N/A	Displays the error history of the connected Hydro Kit.
Password Initialization	N/A	If the user setting password is forgotten, it can be initialized in the installer settings.
IDU Address Verification	N/A	Checks the result of the outdoor unit Auto Addressing using the remote controller.
CN_EXT	Choose from set values 0 ~ 3 (CN_EXT port setting). <ul style="list-style-type: none"> <li>• 0: Not Used (Default)</li> <li>• 1: Simple Operation</li> <li>• 2: Simple Dry Contact Operation</li> <li>• 3: Single Emergency Stop</li> </ul>	Sets external input and output control. Depends on DI / DO set by customer using dry contact port of the Hydro Kit.
ODU Function Master	<ul style="list-style-type: none"> <li>• Master</li> <li>• Slave (Default)</li> </ul>	Sets the outdoor unit function to Master / Slave.
Low Noise Mode Priority	<ul style="list-style-type: none"> <li>• ODU (Default)</li> <li>• RMC</li> </ul>	Sets the low noise mode control subject.
ODU Cycle Priority	<ul style="list-style-type: none"> <li>• Not Use (Default)</li> <li>• Use</li> </ul>	Enables or disables the standby mode of the Hydro Kit.
Use External Pump	<ul style="list-style-type: none"> <li>• Not Use (Default)</li> <li>• Use</li> </ul>	Set the external water pump control.
Pump Prerun / Overrun	<ul style="list-style-type: none"> <li>• Prerun: 1 min.~10 min. (Default: 1 min.)</li> <li>• Overrun: 1 min.~10 min. (Default: 1 min.)</li> </ul>	Circulates the heating water with a water pump before heat exchange, and sets it to reach the appropriate flow rate.
Estimated Energy Display	<ul style="list-style-type: none"> <li>• Clear (Default)</li> <li>• Set</li> </ul>	Wired remote control The function to set whether to display the estimated amount of power calculated by the product on the screen.
Pump Operation Time	N/A	Indicates the operation time of the water pump installed in the indoor unit, and measures the life of the motor.
IDU Operation Time	N/A	Display the operating time and to measure the life of the product.

# PRE-COMMISSIONING

## Functions



### Common Functions

#### Test Run Mode

Test run must be performed if charging additional refrigerant is required. The unit must operate in Cooling mode when the refrigerant is being charged. Test run instantly makes the unit operate in Cooling mode for eighteen (18) minutes.

#### Note:

- If any button is pressed, Test Run Mode will stop.
- After the unit operates in Test Run Mode for 18 minutes, the mode will turn off automatically.

#### Three (3) Minute Delay

Factory use only.

#### Remote Sensor Active

If a remote air sensor is connected to control the product by room air temperature, the product is notified of the connection information.

#### Note:

If the remote air sensor is connected but the Remote Sensor Active function is not set correctly, the product cannot be controlled by room air temperature.

#### Temperature Sensor Selection

The product can be operated using air temperature or leaving water temperature. The Temperature Sensor Selection mode is used to determine the setting temperature as air temperature or leaving water temperature.

#### Note:

Air temperature can be used as the setting temperature ONLY if a Remote Air Sensor is installed, enabled, and the Remote Air Sensor Connection is set as Air Temperature. After selecting Air Temperature, select Remote Control and Hydro Kit.

#### Dry Contact

This function allows the Dry Contact / Hydro Kit connection to operate under Auto Run mode or Manual mode with remote control panel.

Use the Dry Contact function for contact point signal input when the hotel card key, movement detection sensor, etc. are interfacing with the air conditioner. Added system functionality by using external inputs (dry contacts and wet contacts). For dry contact related details, refer to the individual dry contact manual.

#### Central Control Address

When Central Controller is installed, assigning the addresses is set using this function.

Set Value: 00 ~ FF (Hex)

- First two digits: Central control group number
- Last two digits: Central control Hydro Kit unit number

#### Override Main / Sub

Override main / sub selection function is used to prevent the unit operating in a different mode. If the unit is set as the sub, the mode blocks a change of opposite operating mode (cooling / heating).

#### Note:

Override Main / Sub function is only possible when the Hydro Kit units are connected in series to the outdoor unit.

#### Pump Test Run

The Pump Test Run tests water pump operation. It can also be used for air vents, flow sensors, and more. After the water piping is installed and finalized, the Pump Test Run function must be operated to verify water circulation is normal.

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## Temperature Range Settings

### Air Cooling Set Temperature

Use to determine cooling setting temperature range when air temperature is selected as setting temperature.

#### **Note:**

*Setting is only available when Remote Air Temperature Sensor is installed and set properly.*

### Water Cooling Set Temperature

Use to determine cooling setting temperature range when leaving water temperature is selected as setting temperature.

#### **Note:**

##### **Moisture on the Floor Can Occur**

- Keep the "Leaving Water Temperature" higher than 60°F (16°C) when unit is operating in cooling mode. If not, condensation will form on the floor.
- If floor is in a humid environment, Ⓢ do not set leaving water temperature below 64°F (18°C).

#### **⚠ CAUTION**

*Condensate will cause a slippery condition, which can result in a fall and subsequent physical injury.*

#### **Note:**

*Condensate could damage floors and walls.*

### Air Heating Set Temperature

Use to determine heating setting temperature range when air temperature is selected as setting temperature.

#### **Note:**

*Setting is only available when Remote Air Temperature Sensor is installed and set properly.*

### Water Heating Set Temperature

Use to determine heating setting temperature range when leaving water temperature is selected as setting temperature.

### Domestic Hot Water Set Temperature

Use to determine heating mode set temperature range of the leaving water when a domestic hot water tank is installed.

#### **Note:**

- Setting is only available when the domestic hot water tank temperature sensor is installed.
- Install the domestic hot water tank AND the domestic hot water tank kit.
- Set DIP Switches No. 2 and No. 3 on DIP Switch Group 2 properly.

### Cooling / Heating Only Mode

Use to set the operation mode lock when the indoor unit is used only in cooling in summer, and Hydro Kit is used only in heating for winter.

### Temperature Control Parameter Settings

#### Water Supply Off Temperature During Cooling

Use to determine leaving water temperature when the product is turned off. This function is used for preventing condensation from generating and pooling on the floor when the unit is in cooling mode.

- Stop Temperature: Cut-off temperature. Stop Temperature is valid when an Fan Coil Unit is installed.
- Fan Coil Unit: Use to determine if an Fan Coil Unit is installed or not.

Example: If Stop Temperature is set as "10" and Fan Coil Unit is "Use", but actually Fan Coil Unit is NOT installed in the water loop, the unit will stop operation in cooling mode when the leaving water temperature is below 50°F (10°C).

Example : If Stop Temperature is set as "10" and Fan Coil Unit is "Not Use", but actually Fan Coil Unit is installed in the water loop, the Stop Temperature setting is not used and the unit does NOT stop operation in cooling mode when the leaving water temperature is below 50°F (10°C).

#### Note:

##### Fan Coil Unit Installation

- If Fan Coil Unit is used, a 2-way valve must be installed in the water circuit and connected to the Hydro Kit PCB.
- If Fan Coil Unit is set as "Not Use", but if the Fan Coil Unit or 2-way valve is NOT installed, unit will not operate correctly.

### Tank Settings 2

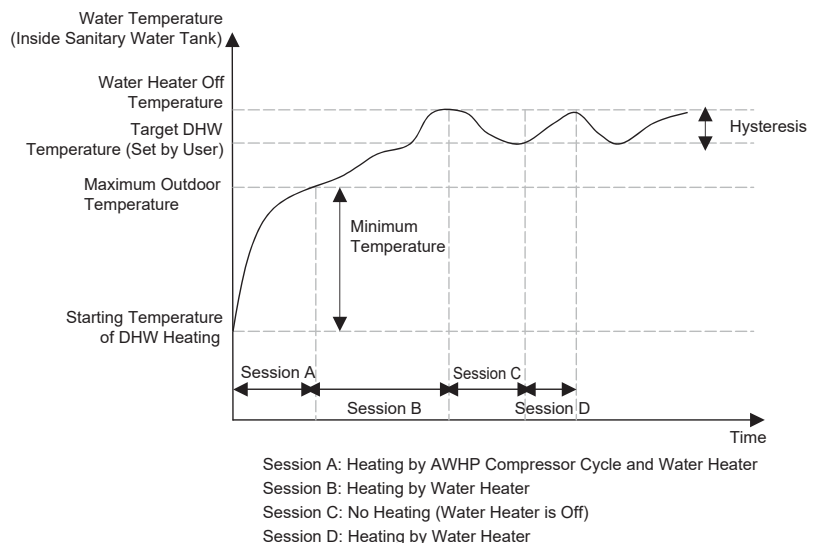
Tank Settings 2 include the parameters below:

- Minimum Temperature: Temperature difference from Maximum Outdoor Temperature.
- Maximum Outdoor Temperature: Maximum temperature generated by the compressor cycle.

Example: If Minimum Temperature is set as "5" and Maximum Outdoor Temperature is set as "48", then Session A (see figure at right) will start when the water tank temperature is below 113°F (45°C). If temperature is above 118°F (48°C), then Session B will start.

- Hysteresis: Temperature difference from target domestic hot water temperature. This value is required for frequent On and Off water tank heater operation.
- Heating Priority: Determining heating demand priority between domestic hot water tank heating and floor heating.

Figure 105: Tank Setting Parameters.



Example: If the target temperature is set as "70" and Hysteresis is set as "3", then the water tank heater will be turned OFF when the water temperature is above 163°F (73°C). The water tank heater will be turned ON when the water temperature is below 158°F (70°C).

Example: If Heating priority is set as "DHW", that means heating priority is on domestic hot water heating, domestic hot water is heated by the compressor cycle and water heater. In this case, the floor heating can not operate during domestic hot water heating. Conversely, if the Heating priority is set as "Floor heating", that means the floor heating is the priority, domestic hot water tank is ONLY heated by water heater. In this case, the floor heating does not stop operation while the domestic hot water is heated.

#### Note:

- Domestic hot water heating does not operate when it is disabled.
- Hydro Kit only performs the heating priority function.



### Nighttime Power Setting

Function used to determine power-on time for nighttime operation.

Table 36: Nighttime Power Settings.

Setting	Range
0	0 Hour
1	2 / 8 Hour
2	7 Hour
3	24 Hour (This function is selectable when receiving night power timer function from indoor unit)

### DHW Time Setting

Use to determine operation time of domestic hot water tank heating, stop time of domestic hot water tank heating, and delay time of domestic hot water tank heater operation.

- Operation Holding Time: Defines how long the domestic hot water tank heating can continue.
- Stop Holding Time: Defines how long the domestic hot water tank heating can be stopped. It is also regarded as time gap between domestic hot water tank heating cycle.

### TH On / Off Variable, Heating Air

Setting thermal on / off air temperature difference for heating mode.

Table 37: TH On / Off Variable, Heating Air Settings.

Setting	TH On	TH Off
0	-9°F (-0.5°C)	2.7°F (1.5°C)
1	-1.8°F (-1°C)	3.6°F (2°C)
2	-3.6°F (-2°C)	5.4°F (3°C)
3	-5.4°F (-3°C)	7.2°F (4°C)

### TH On / Off Variable, Heating Water

Setting thermal on / off water temperature difference for heating mode.

Table 38: TH On / Off Variable, Heating Water Settings.

Setting	TH On	TH Off
0	-3.6°F (-2°C)	3.6°F (2°C)
1	-5.4°F (-3°C)	5.4°F (3°C)
2	-7.2°F (-4°C)	7.2°F (4°C)
3	-1.8°F (-1°C)	1.8°F (1°C)

### TH On / Off Variable, Cooling Air

Setting thermal on / off air temperature difference for cooling mode.

Table 39: TH On / Off Variable, Cooling Air Settings.

Setting	TH On	TH Off
0	0.9°F (0.5°C)	-9°F (-0.5°C)
1	1.8°F (1°C)	-1.8°F (-1°C)
2	3.6°F (2°C)	3.6°F (-2°C)
3	5.4°F (3°C)	-5.4°F (-3°C)

### TH On / Off Variable, Cooling Water

Setting thermal on / off water temperature difference for cooling mode.

Table 40: TH On / Off Variable, Cooling Water Settings.

Setting	TH On	TH Off
0	0.9°F (0.5°C)	-9°F (-0.5°C)
1	1.8°F (1°C)	-1.8°F (-1°C)
2	3.6°F (2°C)	-3.6°F (-2°C)
3	5.4°F (3°C)	-5.4°F (-3°C)

# PRE-COMMISSIONING

## Functions



### TH On / Off Variable, Domestic Hot Water

Setting thermal on / off domestic hot water temperature difference for heating mode.

Table 42: TH Variable, DHW Settings.

Setting	TH On	TH Off
0	-3.6°F (-2°C)	3.6°F (2°C)
1	-10.8°F (-6°C)	7.2°F (4°C)
2	3.6°F (-2°C)	7.2°F (4°C)
3	-1.8°F (-1°C)	1.8°F (1°C)

### Heating / Cooling Temperature Setting

Sets the water pipe temperature control standard for heating or cooling in accordance with the field environment.

### Pump Setting in Heating / Cooling

Sets the water pump operation / delay time option for heating / cooling. This function helps the mechanical life of the water pump by life by incorporating down time in the system (pump is not operating or is delayed in operating).

### Forced Operation (Water Pump)

If the water has not been circulating in the Hydro Kit water circuit for 20 to 180 hours (default: 20 hours), this function will switch ON the pump and force the water to circulate for 1 to 10 minutes (default: 10 minutes). Forced Operation function can be used to prevent the water in the circuit from freezing, etc.

### Pump Frequency Setting (g/min. [l/min.])

Sets the value for the water flow range.

#### Note:

How the Pump Frequency Setting function is applied depends on the model. Refer to the function list or accessories compatibility table for pump frequency availability.

Table 41: Water Flow Rate Setting Value.

Setting Value	Water Flow Rate (g/min. [l/min.])	
	ARNH423K2A4	ARNH963K2A4
50	5.28~5.81 (20~22)	11.89~13.21 (45~50)
55	6.08~6.34 (23~24)	13.47~14.53 (51~55)
60	6.60~6.87 (25~26)	14.79~15.85 (56~60)
65	7.13~7.4 (27~28)	16.11~17.17 (61~65)
70	7.66~7.93 (29~30)	17.44~18.49 (66~70)
75	8.19~8.45 (31~32)	18.76~19.81 (71~75)
80	8.72~8.98 (33~34)	20.08~21.13 (76~80)
85	9.25~9.77 (35~37)	21.4~22.45 (81~85)
90	10.04~10.30 (38~39)	22.72~23.78 (86~90)
92	10.57 (40)	24.04~24.30 (91~92)

### CN\_EXT

Determines the purpose of CN\_EXT. Use the CN\_EXT connection if the application requires automatic operation control depending on an external input signal (ON / OFF) with preset mode. Connect the external controller cable to CN\_EXT, and set its function on the Hydro Kit controller (included with the Hydro Kit) through the Installer Setting Mode.

Choose from set values 0 ~ 3 (CN\_EXT port setting).

- 0: Not Used (Default)
- 1: Simple Operation
- 2: Simple Dry Contact Operation
- 3: Single Emergency Stop

Table 43: Operation On / Off Control Depending On Input Signal and Set Mode.

Preset Mode	Input Signal	Operation
Default	-	Not Used
Simple Operation	Open	Operation: Off
	Close	Operation: On
Simple Dry Contact Operation	Open	Operation Off with Dry Contact Setting
	Close	Release Dry Contact Lock and Operation On Depending On Dry Contact Auto Setting - Auto Mode: Operation on Automatically - Manual Mode: Operation on manually
Forced Stop	Open	Forced Operation Stop with Forced Lock Setting (Every controller cannot control operation on)
	Close	Release Forced Lock

### ODU Function Main

1. Setting the Main Outdoor Unit
  - Low noise operation control subject can be set
  - Low noise operation time setting
  - Defrost mode can be set
2. Setting the Sub Slave Outdoor Unit
  - No noise operation control subject setting
  - No noise operation time setting
  - No defrost mode setting

### Low Noise Mode Priority

Setting whether to control using the remote control with the Hydro Kit or through the outdoor unit.

1. Setting Low Noise Operation Using the Outdoor Unit.
  - Controlled by the outdoor unit using a DIP switch change on its PCB.
  - Function Setting: Low noise operation time menu is inactivated.
2. Setting Low Noise Operation Using the Remote Controller.
  - Low noise operation DIP switch setting on the outdoor unit PCB is ignored.
  - Function Setting: Low noise operation time menu is activated.

## Central Control

### Central Control Addresses Assignments

Gather any preferences the project has; if there are no preferences:

- Hex assignments do not have to be assigned in any particular order, or an order defined by the routing of the communications cable between the Hydro Kits. In most cases, Hex addresses can be skipped.
- All members of a Hex Group are not required to be on the same Multi V system.
- Addresses can be assigned at random, not in any particular order, and can be skipped.

### Hydro Kit / Indoor Unit Central Control Address Assignments

A central control address is made up of two hexadecimal characters.

- The first character in the central control address is the Hex Group Identifier.  
Possible Hex Group Identifiers (in order of lowest to highest) are 0-9 followed by A-F. See complete list in table at right.
- The second character in the address is the Hex Member Identifier in a Hex Group.  
Hex Member Identifiers (in order from lowest to highest) are 0-9 followed by A-F. See complete list in table at right.

### Hex Address Assignment Limitations

- There is a limit of 16 Members per Hex Group
- There is a limit of 16 Hex Groups per system.
- There is a limit of 256 possible Member Identifiers per Central Control (See Central Controller Communications Limitations).

### Setting Central Control Addresses

1. Verify power to the whole system, including indoor units and outdoor unit(s), is OFF. If not, turn OFF.
2. If not installed already, connect the communication cable from the terminals on the master outdoor unit to A and B terminals on the central controller. Polarity matters, so make sure A to A and B to B.
3. Power the whole system ON.
4. Set the group and Hydro Kits / indoor unit numbers using the wired remote controllers.
5. To control several sets of Hydro Kits / indoor units as a group, set the group I.D. settings from 0 to F.

Figure 106: Central Control Address Nomenclature.

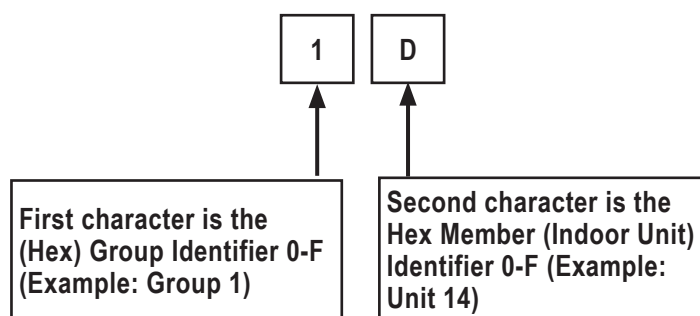


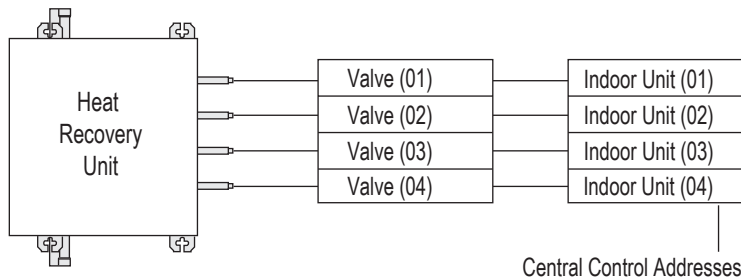
Table 44: Central Control Address Nomenclature List.

Group Control by Central Controller	
No. 0 Group (00 ~ 0F)	
No. 1 Group (10 ~ 1F)	
No. 2 Group (20 ~ 2F)	
No. 3 Group (30 ~ 3F)	
No. 4 Group (40 ~ 4F)	
No. 5 Group (50 ~ 5F)	
No. 6 Group (60 ~ 6F)	
No. 7 Group (70 ~ 7F)	
No. 8 Group (80 ~ 8F)	
No. 9 Group (90 ~ 9F)	
A Group (A0 ~ AF)	
B Group (B0 ~ BF)	
C Group (C0 ~ CF)	
D Group (D0 ~ DF)	
E Group (E0 ~ EF)	
F Group (F0 ~ FF)	

### Central Control and Indoor Units Connected to Heat Recovery Units

#### Note:

The heat recovery unit valve address and the central control address of its corresponding Hydro Kit / indoor unit must be set using the same number (in manual addressing).



### Controller Communications Limitations

Each type of Controller device is designed to communicate with a limited quantity of Hydro Kits / indoor units. The quantity of Hydro Kits / indoor units that can be connected to a single control communications cable, therefore, will be defined by the control device on that cable with the smallest Maximum Hydro Kit / Indoor Unit Quantity as shown in the tables at right.

Table 45: Central Controller Indoor Unit Connection Limitations.

Central Control Device	Maximum Hydro Kit / Indoor Unit Quantity
ACP 5	256
AC Smart™ 5	128

Table 46: Integration Solutions Indoor Unit Connection Limitations.

Integration Solutions	Maximum Hydro Kit / Indoor Unit Quantity
LG MultiSITE™ Communications Manager	128
ACP LonWorks®	64

LonWorks® is a trademark of Echelon Corporation.

### Group Number

If the building operator wants to know which Hydro Kits / indoor units are on each outdoor unit, and multiple systems serve a building:

- Assign a Group Number to each system. If there are more than 16 indoor units on a system, multiple Group Numbers will be necessary.

If the building owner wants to know which indoor units are on each floor:

- Assign a different group number for each floor. If there are more than 16 Hydro Kits / indoor units on a floor, multiple Group Numbers will be necessary.

### Member Number

Can be assigned at will or for example, can follow the room layout on each floor.

For each LG Central Controller product provided on the project, devise a central control address schedule and assign a central control address to each Hydro Kit(s) and indoor unit(s). Record this central control address for each component in the column provided on the Pre-commissioning Device Configuration Worksheet.

### Upload Central Control Address to Each Hydro Kit

For all Hydro Kits, the central control address must be assigned using the Hydro Kit controller.

### Power Up All Indoor Unit PCBs

Turn the disconnect for each indoor unit to the ON position. Ⓢ Do not turn the Hydro Kit on (ON/OFF Button remains OFF).

# PRE-COMMISSIONING

## Central Control



### Note:

During the following procedure, Ⓢ NEVER PUSH the ON / OFF (Enable operation) Button on the Hydro Kit controller.

### For Hydro Kits That ARE NOT Being Controlled as a Group

1. Verify the zone controller wiring / cable is connected properly to the Hydro Kit PCB.
2. Using the controller, go to the setup function 07.
3. Type in the Hex Central Control address that has been designated to the Hydro Kit.
4. Repeat Steps 1 through 3 for each Hydro Kit in the building.

### For Hydro Kits That ARE Being Controlled as a Group

#### For the Main Hydro Kit in a Group Setting

1. Identify which unit will be the Main Hydro Kit and which Hydro Kits are going to be the Sub(s).
2. Go to the Main Hydro Kit and access the PCB.
3. Verify the group control cable / group control wiring is installed into CN-REMO terminal. If it is not, install now.
4. Detach group control cable / wiring.
5. Attach the zone controller to the Main Hydro Kit.
6. Using the controller, go to the setup function 07. Type in the Central Control address designated for the Main Hydro Kit.
7. Disable power to the Main Hydro Kit. Ⓢ Do not restore power to the Main Hydro Kit this time. It will be restored later.
8. If the zone controller and associated communications cable has already been permanently mounted in place, reattach cable / wiring and obtain a loose zone controller with a communications cable to continue programming the Sub Hydro Kits (see procedure below).

#### For the Sub Hydro Kit(s) in a Group Setting

For grouped control Hydro Kits, using DIP Switch No. 3 to set slave units automatically sets these units to Central Control address "FF. If the application calls for central control addresses to all slave kits, follow the procedure below.

1. Go to the first Sub Hydro Kit and disconnect the cable / wiring from CN-REMO terminal.
2. Attach the zone controller communications cable into the Sub Hydro Kit. Ⓢ Do not push the ON / OFF button or enable Hydro Kit operation.
3. Using the controller, go to the setup function 07. Type in the Hex address assigned to the Hydro Kit.
4. Change DIP Switch No. 3 on the Sub Hydro Kit PCB to the "ON" position.
5. Disable power to the Sub Hydro Kit using the disconnect switch. Wait one (1) minute.
6. While power is off, detach the zone controller cable.
7. Attach the group control cable / wiring to the Sub Hydro Kit.
8. Restore power to that Sub Hydro Kit, and go to the next Slave Hydro Kit.
9. Repeat Steps 1 to 8 for each Sub Hydro Kit.
10. After all Sub Hydro Kit have addresses assigned, go back to the Main Hydro Kit and restore power.



3A Heat Recovery Unit SW01D Rotary Dial Settings for Branch / Port Group Control

The maximum capacity of each 3A Heat Recovery Unit 60,000 Btu/h. The 96 kBtu/h Hydro Kit requires that two adjacent heat recovery unit ports be connected together with an inverted Y-branch (ARBLB03321) to provide the necessary capacity. If two ports are connected together, address the ports as shown below using the SW01D rotary dial on the Main (Master) PCB only.

Note:

- It is recommended that the 96 kBtu/h Hydro Kit is connected to Branches / Ports 1 and 2.
- Ports are numbered right-to-left on PRHR\*3A heat recovery units.

Figure 107: Eight-Port 3A Heat Recovery Unit (Example of How the Ports are Numbered).

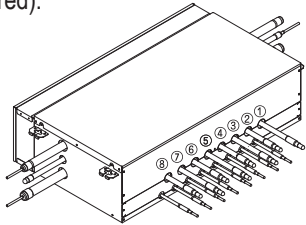


Figure 108: Example of Group Controlling Heat Recovery Unit Branches / Ports for the PRHR\*3A Heat Recovery Unit Series.

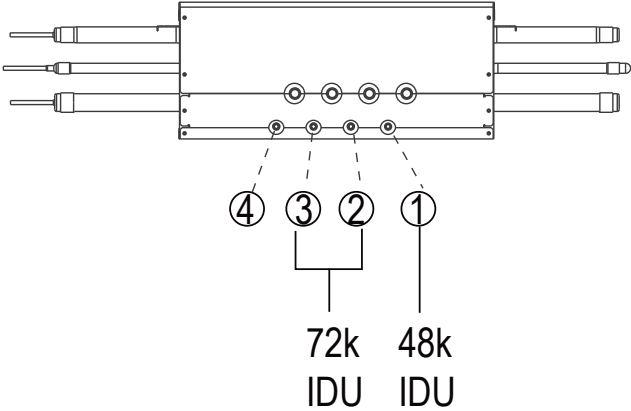
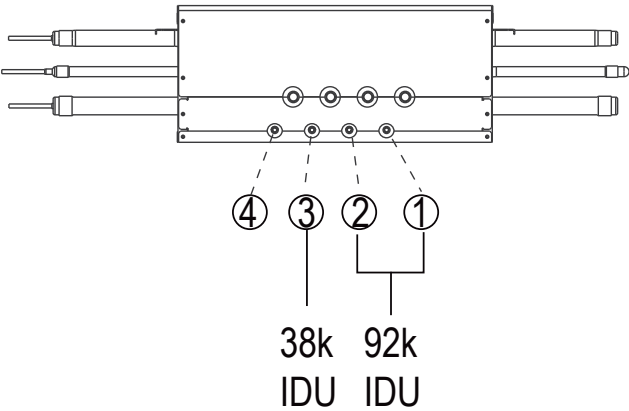


Table 47: Main PCB SW01D Branch / Port Group Control Settings for PRHR\*3A Heat Recovery Units.

Branch / Port Group Control	Main PCB SW01D Setting	Branch / Port Group	Main PCB SW01D Setting
No Grouping	0	Group Control Branches / Ports 5,6 and 7,8	8
Group Control Branches / Ports 1 and 2	1	Group Control Branches / Ports 1,2 and 5,6	9
Group Control Branches / Ports 2 and 3	2	Group Control Branches / Ports 1,2 and 7,8	A
Group Control Branches / Ports 3 and 4	3	Group Control Branches / Ports 3,4 and 5,6	B
Group Control Branches / Ports 5 and 6	4	Group Control Branches / Ports 3,4 and 7,8	C
Group Control Branches / Ports 6 and 7	5	Group Control Branches / Ports 1,2 and 3,4 and 5,6	D
Group Control Branches / Ports 7 and 8	6	Group Control Branches / Ports 1,2 and 3,4 and 6,7	E
Group Control Branches / Ports 1,2 and 3,4	7	Group Control Branches / Ports 1,2 and 3,4 and 7,8	F

Note:

For more detailed information on addressing and valve port detection procedures, refer to the specific air-source or water-source unit installation manual.

# PRE-COMMISSIONING

## Hydro Kits with Heat Recovery Units



### Valve (Port) Detection for Hydro Kits

During the pre-commissioning process, each system component is given a unique address so that the air-source or water-source unit will be able to distinguish the components from the others. Addresses are assigned either by auto or manual valve (port) detection. For Hydro Kits:

1. The numbers of the connected vapor and liquid pipes must match.
2. Ensure that water is flowing in the Hydro Kit during the Valve (Port) Detection procedure.
  - Use "Mode 1" if the water temperature is greater than 86°F (30°C)
  - Use "Mode 2" if water temperature is less than 86°F (30°C)
  - A Valve (Port) Detection procedure error will display if the temperature of the pipe does not increase.
3. If a Valve (Port) Detection procedure has not been performed, check if the Hydro Kit displays Error No. CH14, which indicates the flow switch failed to close.

#### **Note:**

*For more detailed information on addressing and valve port detection procedures, refer to the specific air-source or water-source unit installation manual.*

## Finishing the Installation

Use the checklists at the end of the installation manual to verify all tasks have been completed before calling for the Multi V Hydro Kit system to be commissioned. Place the System ID and Hydro Kit ID at the top of the page, sign, and date. Provide a copy to the company's project manager or the Multi V System Commissioning Technician.

- After completing the final checks, reinstall all internal and external covers.
- Verify power is not connected to the unit. Power will be connected at commissioning.
- If any installation items are incomplete, note the items on the checklist and make sure the supervisor is aware.
- Check the installation area for tools and debris that may have been left behind.
- If all installation items are correctly completed, the Hydro Kit is ready for power-up and commissioning.

## Water Pipe Operation Test

Before the Hydro Kit is put in use, test the water pipe operation. Before water pipe operation is tested, check:

- If water flow is appropriate.
- If the flow switch is operating properly.
- If the connection status is good.
- If the power wiring and communication cable are completely connected.
- If the insulation resistance between the terminal block and ground is 2.0mΩ or above (when measured with DC 500V mega tester).

### Note:

⊘ Never check the insulation resistance on the control board terminal. This will damage the control board.

### Flow Switch Error Troubleshooting - CH14

If the water pipe is not operating correctly, check for flow switch issues:

- Check if operation of water pump is normal.
- Check for water pipe blockage.

Table 48: Hydro Kit Error Code CH14 Troubleshooting.

Error No.	Description	Details
14	Hydro Kit flow switch error. Flow switch failed to close.	Check if water pipe operation is normal.
		Check for blocks in the water pipe: Strainer could need cleaning, valve is malfunctioning, locked, or operating in an unknown manner; air could be present in water pipe; etc.
		Check flow switch. Flow switch is malfunctioning, disconnected, etc.

1. ⊘ Do not disconnect power even if CH14 error occurs. CH14 could be due to abnormal water pipe operation.
2. To troubleshoot CH14, remove any sludge, scale; and foreign particles like dust, sand, trash, rust that formed in the water piping and on the strainer.
3. Clean the strainer completely.
4. After the water piping and the strainer are cleaned, remove CH14 by turning off the outdoor unit, and then the Hydro Kit. Disconnect power to the Hydro Kit, connect power, and restart for normal operation.

## Maintenance

The table below outlines the maintenance type and schedule that must be followed for the Hydro Kit. For detailed record keeping, make copies of the schedule, note when the maintenance occurred in the “Date Maintenance Performed” column, and store in a safe place.

Table 49: Maintenance Schedule Table.

Scheduled Time	Maintenance Procedure	Date Maintenance Performed
Monthly	Verify system water level is correct.	
	Purge any air from the system using the manual air vent.	
	Check for water leaks in the system.	
	Test the circulating water loop for proper levels of water treatment chemicals and antifreeze.	
Quarterly	Verify the strainer is clean.	
	Check the pump, valve stems, and pipe connections for leaks.	
	Check refrigerant pipe and water pipe insulation for tears or other damage that exposes cold surfaces that produce condensation.	
	Replace insulation that is wet and repair as needed.	
Annually	Verify the flow switch is operating correctly.	

### Note:

A trained service technician must perform routine maintenance to avoid Hydro Kit performance degradation.

- Service is necessary if system failure is due to strainer blockage.
- Clean the strainer as listed in the table above, and whenever CH14 error occurs.
- If the system stopped operating, and any CH error message appears, follow the procedures detailed below and in the rest of the “Maintenance and Troubleshooting” section. ⚠ Do not disconnect the Hydro Kit power.
- ⚠ Do not indiscriminately replace the water piping. There is a possibility that foreign particles and air bubbles will enter the water piping system, which will lead to the plate-type heat exchanger freezing.
- If it is essential to change the water piping, first separate the water piping from the Hydro Kit.
- Thoroughly clean the interior of the new piping to remove any foreign particles, and then connect the piping to the Hydro Kit.

### ⚠ WARNING

The Hydro Kit must be serviced immediately by a trained technician if any of the situations are occurring:

1. If a burning smell, loud noise, etc., is detected.
  2. If the main power wiring is damaged or is hot to the touch.
  3. If an error code is displayed.
  4. If the Hydro Kit is leaking.
  5. If any safety, ground, earth, etc., switches or fuses are not working properly.
- Immediately stop operation and shut the power off at the breaker. There is a risk of electric shock, fire, physical injury and / or death.

### ⚠ WARNING

- If the Hydro Kit will not be used for an extended period, ⚠ do not switch off the power supply. If power is not supplied, some special protection functions (Example: water pump anti-lock) will not operate. There is risk of product malfunction and damage.
- ⚠ Do not disconnect power to the Hydro Kit during operation. First, stop Hydro Kit operation, stop outdoor unit operation, and then disconnect the power. If power is disconnected when the Hydro Kit is still operating, the plate-type heat exchanger will freeze and burst, resulting in physical injury and / or death.

### Note:

- If the Hydro Kit will not be used for an extended period, ⚠ do not switch off the power supply. If power is not supplied, some special protection functions (Example: water pump anti-lock) will not operate. There is risk of product malfunction and damage.
- ⚠ Do not disconnect power to the Hydro Kit during operation. First, stop Hydro Kit operation, stop outdoor unit operation, and then disconnect the power. If power is disconnected when the Hydro Kit is still operating, the plate-type heat exchanger will freeze and burst, resulting in product malfunction and damage.

Table 50: Common Operation Problems / Occurrences.

Problem	Description
Hydro Kit is not operating.	Is the timer not operating or set properly?
	Has the fuse blown or has the circuit breaker been tripped?
The room has a strange odor.	Verify the odor is not from walls, carpet, furniture, or other fabric in the room.
Hydro Kit does not operate for about three (3) minutes after restart.	Three (3) minute delay is a protection function. Wait about three (3) minutes, and operation will begin.
Hydro Kit is not cooling or heating effectively.	The room could have been very hot or cold when the Hydro Kit was first turned on. Allow time for the room to cool down or heat up before reaching operation setpoint.
	Has the setting temperature been set incorrectly?
Unit operation is noisy.	Sound is from refrigerant flow. Refrigerant flow may generate sound during operation start or stop.
	Hydro Kit heat exchanger is generating sound. During cooling operation, a sound may be heard from the Hydro Kit heat exchanger if water is freezing or melting.
	Flowing water can be heard. Water flowing in the piping during operation start or stop.
	Noise can be heard from the Hydro Kit due to defrost.
Steam can be seen from the outdoor unit.	Steam is from the outdoor unit heat exchanger. During defrost operation, ice on the outdoor heat exchanger melts, resulting in steam.
Remote controller display is faint, or there is no display at all.	Has the circuit breaker been tripped?

### Troubleshooting Error Codes

Error codes will display during Hydro Kit self diagnosis, and if the Hydro Kit unit malfunctions during operation. Errors codes display using red / green LEDs (red for a fault, green for normal function) on the wired remote controller and on the outdoor unit's PCB.

- If two or more faults occur at the same time, the error code with the lower number will display first.
- If an Inverter PCB error occurs, Error Code 12 will display on the remote controller. The Inverter PCB board LED can be used to verify the nature of the error display.
- After the error is resolved, the error code will disappear from the display.

#### **Note:**

Error Codes 01, 08, 17, 18 can be operated during emergency operation (Safe Mode) and are noted accordingly in the table.

### Inverter PCB Fault LED Display

The following sequencing of the LED lights will display during a fault display. After the error code is identified based on the sequencing and color of the LED lights, refer to the Error Code Troubleshooting Table on the next page for causes and resolutions. If the sequencing code is a three digit number, those codes are based on the outdoor unit and not on the Hydro Kit.

#### **Note:**

See the outdoor unit / water source unit installation / service manuals on [www.lghvac.com](http://www.lghvac.com) for a complete list of error codes, the causes, and resolutions.

#### **How to Interpret LED Error Codes**

A blinking red LED will "count" the 10's of a code. Count the times the LED blinks to determine the code.

##### **Example:**

Three blinks of Red LED = 30 (10 + 10 + 10)

A blinking Green LED will count the single digits of a code. Count the times the LED blinks to determine the code.

##### **Example:**

Five blinks of the Green LED = 5 (1 + 1 + 1 + 1 + 1)

If the Red LED and Green LED blink simultaneously, it will count the '100's' of a code. Count the times both are blinking to determine the code.

##### **Example:**

Red and Green LED's blink twice, but both at the same time in sequence = 200 (100 + 100)

Based on the rules above, Error Code No. 115 would display as follows:

- Red and Green LED blink once at the same time (100)
- Red LED blinks one time (10)
- Green LED blinks 5 times (5)

**Total = 115 for the error code.**



**⚠ WARNING** Refer to the Safety Precautions on pages 4-8 for more details on how to prevent injury or death regarding the operation and service troubleshooting of the Hydro Kit product.

Table 51: Hydro Kit Error Code Troubleshooting.

Error Code	Error Type	Cause
01*	Air temperature sensor error.	Air temperature sensor has disconnected or shorted. (Check the wiring, connection on the Hydro Kit unit PCB, then check the thermistor.)
02	Vapor side temperature sensor error.	Temperature sensor monitoring the refrigerant system vapor line is disconnected or shorted.
03	Communication error between Hydro Kit Wall Mounted Controller and Hydro Kit.	Hydro Kit PCB is not receiving a communications signal from the Hydro Kit Wall Mounted Controller.
05	Communication error between outdoor (or water source) unit PCB and Hydro Kit PCB.	Hydro Kit PCB is not receiving signal from outdoor (or water source) unit for more than five (5) minutes. Communication cable has disconnected or shorted. Check Hydro Kit PCB for issues.
06	Liquid side temperature sensor error.	Hydro kit liquid side temperature sensor is disconnected or shorted. Values read less than -45.4°F or greater than +204.8°F (less than -43°C or greater than +96°C).
08*	Hydro Kit hot water storage tank temperature sensor error.	A malfunction with the hot water storage tank temperature sensor was detected. Pipe temperature sensor disconnected, shorted, or opened.
09	Hydro Kit EEPROM error.	Communication error occurred between the Hydro Kit PCB board and the onboard EEPROM. Check EEPROM for bent pins and improper installation. If installed properly, potential EEPROM failure.
11	Hydro Kit and outdoor unit PCB communications error.	No signal; communications error between Hydro Kit and outdoor unit PCB.
12	Inverter PCB error.	Inverter PCB is malfunctioning.
13	Hydro Kit solar heat pipe temperature sensor error.	Solar heat pipe temperature sensor disconnected, shorted, or opened.
14	Hydro Kit flow switch error. Flow switch failed to close.	Check if water pipe operation is normal. Check for water pipe blockage: Strainer could need cleaning, valve is malfunctioning, locked, or operating in an unknown manner; air could be present in water pipe; etc. Check flow switch. Flow switch is malfunctioning, disconnected, etc.
15	Hydro kit leaving water temperature has exceeded 185°F (85°C).	Temperature sensor is defective or there is hot water inflow.
16	Hydro kit indoor unit water pipe temperature and ambient temperature sensor communication error.	Water inlet and outlet pipe temperature sensors have disconnected, shorted, or opened simultaneously.
17*	Hydro Kit inlet pipe temperature sensor communication error.	Water inlet temperature sensor disconnected or shorted. Values read less than -43°C or greater than +96°C (less than -45.4°F or greater than +204.8°F). Temperature sensor disconnected, shorted, or opened.
18*	Hydro kit outlet pipe temperature sensor communication error.	Water outlet pipe temperature sensor disconnected, shorted, or opened.
187	Hydro kit HEX burst error.	Water inlet temperature is below 5 degrees or water temperature error during defrost operation.

\*Error Codes that can be operated during emergency operation (Safe Mode).

### Note:

See the outdoor unit / water source unit installation / service manuals on [www.lghvac.com](http://www.lghvac.com) for a complete list of error codes, the causes, and resolutions.

## Emergency Operation

### Definition of Terms

- **Fault:** A problem that can stop system operation, but can be resumed temporarily under limited operation without a trained service technician's assistance.
- **Error:** A problem that can stop system operation, but can be resumed **ONLY** after a trained service technician troubleshoots and fixes the error.
- **Emergency Mode:** Temporary heating operation when system is experiencing "Fault".

### Faults

- The Hydro Kit could potentially operate continuously during the winter season.
- If there is a problem in the system that is not critical to heating mode operation, the system could temporarily operate in emergency mode if the end user / building supervisor / etc. decides it is necessary.

### Fault Level Classifications

Fault is classified in two levels according to the seriousness of the problem:

- **Level One (1): Minor.** An error with the Hydro Kit. Example: Sensor problems. The outdoor unit functions under emergency operation mode, which is configured by DIP Switch No. 4 of the unit PCB.
- **Level Two (2): Major.** An error with the outdoor unit. Example: Compressor cycle problems. Emergency operation mode is performed by an optional electric heater (if installed).

Another fault that could occur is an "Option Fault", which has to do with an installed accessory (example: an operation error with the water tank). In this instance, the "Option Fault" is assumed as if it was not installed in the system.

### When an Error Occurs

#### 1. Unidentified Errors.

After an unidentified error occurs with the Hydro Kit, the system stops operation. Installer setting allows the system to activate On / Off operation. (On: Emergency operation)

- **Minor / Major Faults:** Only heating is operable.
- **Critical Faults:** Complete stop.
- **Troubleshooting Priority:** Critical > Major > Minor.

#### 2. Identifiable Errors (Error Code(s) is (are) available.

Depending on the status of the minor / major fault or error, an error code is generated.

- **Minor Fault:** Heating and cooling are operable.
- **Major Fault:** Only heating is operable.
- **Critical Fault:** Contact a trained service technician.

The system operates when the trained service technician clears the error.

### Duplicate Minor / Major Faults and Option Errors

If an Option Error is occurring simultaneously with a Minor or Major Fault, the system gives the higher priority to the Minor or Major Fault and operates as if such. Therefore, sometimes hot water heating cannot occur when the system is in emergency operation mode. If the water in the tank is not warning up during emergency operation, check if the hot water tank sensor and related wiring are properly installed.

## Emergency Operation

Under normal conditions, the system operating information is restored and automatically restarts after main electricity power is reset. Emergency operation does not automatically begin after main electricity power is reset; this is to protect the system. When the system experiences faults, operation stops until the end user / building supervisor decides on a course of action: either to call a trained technician to troubleshoot and fix the issue, or to begin emergency operation.

### Note:

*If the system is running in Emergency Operation mode, automatic re-start is disabled. If there is a loss of power during Emergency Operation; the system must be re-started manually. Under normal operating conditions, the system is designed to automatically start up after power is restored.*

To begin emergency operation, the service technician clears the error.

- Two different cycles are available for emergency operation: High Temperature and Low Temperature. See below, or the "Hydro Kit DIP Switch Settings" tables in the Pre-Commissioning section.
- The target temperature cannot be adjusted in emergency operation.

### Note:

*Emergency Operation mode function cannot operate if an electric heater is not installed.*

Table 52: Available Emergency Operation Cycles.

Cycle	DIP Switch No. 4	Target Leaving Water Temperature	Target Room Air Temperature	Target Domestic Hot Water Temperature
High Temperature	OFF	122°F (50°C)	75°F (24°C)	122°F (50°C)
Low Temperature	ON	86°F (30°C)	66°F (19°C)	122°F (50°C)

# INSTALLATION CHECKLIST

PAGE 1

**MULTI V™**  
**HYDRO KIT**

System ID No.: \_\_\_\_\_ Hydro Kit Unit ID.: \_\_\_\_\_

Checked by: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

Installation	N/A	Not Complete	Complete
Packing materials and literature located and stored in a safe location.			
Unit is properly supported – mounting bolts tight.			
Unit is canted toward gravity drain line connection (K2 only).			
Minimum service clearances followed.			
Inlet water strainer is clean and properly installed.			
Does local code require a secondary drain pan under the Hydro Kit? Is a secondary drain line connected to the pan?			
Refrigerant Piping	N/A	Not Complete	Complete
A dry nitrogen purge rate of three (3) psig was maintained during all brazing activity.			
Refrigerant pipe is properly supported to keep lateral pressure off unit connections.			
Refrigerant shutoff valves are full port design with integral Schrader port rated for R410A (option).			
Shutoff valves have the same internal pipe diameter as the connected pipe (option).			
Two shutoff valves were installed; one (1) high pressure liquid, one (1) low pressure vapor (option).			
Shutoff valves installed with Schrader port between the indoor unit and the ball of the valve (option).			
Condensate System	N/A	Not Complete	Complete
Condensate pipe is properly sized and supported to keep lateral pressure off unit connections.			
Condensate pipe horizontal segments are sloped a minimum of 1/4" per foot of pipe away from the indoor unit.			
Condensate pipe is routed and secured in place to facilitate discharge to an approved drain.			
Insulation	N/A	Not Complete	Complete
Additional housing, refrigerant and condensate pipe insulation has been supplemented to prevent sweating while operating if the Hydro Kit unit installed in abnormal environmental conditions. (Optional - job condition specific.)			
All refrigerant and chilled water pipes are independently insulated. All insulation seams and joints are air-tight. Insulation is not compressed. Double layer insulation is provided at pipe supports and wall penetrations.			
Electrical	N/A	Not Complete	Complete
Power provided is single phase, ±10% of indoor unit nameplate specifications.			
Power wires properly sized and protected per NEC and local codes. Indoor unit is properly grounded.			
Power and communications conductors are separated by the listed minimum distance.			
Terminal block screws are tight. Power wires are not in contact with terminals (3(A) and / or 4(B). Line voltage wires have spade connectors installed.			
Power wires are properly secured to the control box case to prevent wire tension at the terminal block.			
Wires are protected from chaffing at control box and conduit pipe penetrations.			
Communications cables are properly secured to the control panel case. Terminal block screws are tight and the cable is protected from sharp edges at control box case and conduit openings.			
Cables are installed at listed minimum distances from high voltage and EMF generating equipment.			
Communications cable between the outdoor (water source) unit and the Hydro kit is terminated at terminals tagged (terminals 3[A] and 4[B]).			
Communications cable is to be 18 AWG, 2 conductor, twisted, stranded, shielded. Ensure the communication cable shield is properly grounded to the Master Outdoor Unit chassis only. Ⓢ Do not ground the communication cable at any other point. Wiring must comply with all applicable local and national codes.			
Communications cable insulation material is accepted by local code enforcement.			
Ⓢ No inline splices or wire caps are present.			
Use appropriate crimping tool to attach ring or fork terminals at all power wiring and control cable terminations.			
Communications cable shield is tied back, continuous between the Hydro Kits and the other indoor units and is grounded at the outdoor (water source) unit only.			

Checklists

Hydro Kit Wall Mounted Controller Communications	N/A	Not Complete	Complete
LG factory provided Hydro Kit Wall Mounted Controller stranded, shielded (white jacket) cable was used between the Hydro Kit Wall Mounted Controller(s) and the Hydro Kit(s).			
Hydro Kit Wall Mounted Controller cable has NOT been cut, spliced, or tied together with wire caps. Factory plugs are present.			
Cable is securely plugged into the socket on the Hydro Kit Wall Mounted Controller or the three screw terminals on the Hydro Kit Unit Controller.; Yellow to "Y", Red to "R", and Black to "B".			
Hydro Kit Control Panel	N/A	Not Complete	Complete
Hydro Kit Wall Mounted Controller cable is securely plugged into the CN-REMO socket on the Hydro Kit main PCB.			
If an optional remote temperature sensor was installed, the associated cable is plugged into socket CN-ROOM.			
Hydro Kit unit DIP switches have been adjusted for application (group control-master/slave; water heating only, etc.)			
Wiring harness "Plug C" has been properly connected to either "Plug A" or "Plug B" based on the type of thermostat and/or room sensor was installed.			
All wiring harness connections have been checked and are securely connected to the plug sockets.			
Power and communications cables are properly restrained and separated.			

# LG Multi V Pre-Commissioning Device Configuration Worksheet

<b>Project Name:</b>		<b>Building ID</b>	
<b>Date:</b>		<b>System ID</b>	
AC Smart Static IP address:		<b>Page #</b>	
<b>Mech Contractor Company Name</b>		MEP Project Mng'r Name	
<b>Pre-Com Tech Name/Ph#/email</b>		Ph# / Email	

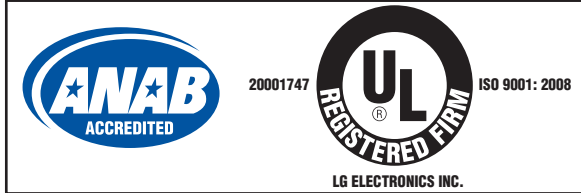
**IDU's**

[illegible]

rev 20130619.3



*Inverter*



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IM\_HydroKit\_K2A4\_5\_21  
Supersedes: IM\_HydroKit\_K2A4\_11\_19  
VRF-IM-BT-001-US\_014A06  
VRF-IM-BT-001-US\_013M20