LG
Life's Good

MULTI V™

HYDRO KIT ENGINEERING MANUAL

Variable Refrigerant Flow Indoor Units

86,000 to 107,500 Btu/h

PROPRIETARY DATA NOTICE

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About LG Electronics, Inc.

LG Electronics, Inc. is a global leader and technology innovator in consumer electronics, mobile communications, and home appliances. LG Electronics, Inc. comprises five business units—Home Entertainment, Mobile Communications, Air Conditioning, Business Solutions, and Home Appliance. LG is one of the world's leading producers of flat panel televisions, audio and video products, mobile handsets, air conditioners, and washing machines. LG's commercial air conditioning business unit was established in 1968 and has built its lineup of residential and commercial products to include VRF, Multi F, duct-free split systems, packaged terminal air conditioners (PTACs), and room air conditioners. In 2011, the air conditioning and energy solutions business unit grew to include LED lighting and solar products. For more information visit www.lg.com.

Variable Refrigerant Flow (VRF) Technology

In the early 1980s, VRF technology was introduced to the world as an alternative method of cooling and heating in commercial structures, and is designed to minimize utility consumption. VRF systems have become the system of choice for designers internationally because these systems offer better comfort at lower costs when compared to traditional boiler/chiller/Variable Air Volume (VAV) air handler systems. Today, VRF is gaining popularity in the United States.

LG systems offer the opportunity to eliminate ductwork in the same configuration. The system offer zoning without the need for zone damper systems. Advanced controls provide exceptional building dehumidification and temperature control, and can rapidly adapt system operating parameters to the ever-changing building load.

LG systems are easy to design, install, and maintain. The modular design allows occupants to control their environmental condition, providing individualized control of the set-point temperature and allowing occupants to condition only the occupied zones.

Quality Commitment

provide industry leading technical support during installation and commissioning. LG offers a variety of classes designed for installers and servicers to ensure that every system installation is completed successfully.

Classes are conducted at LG's training centers and in field locations at various times throughout the year and upon special request.

TABLE OF CONTENTS

TABLE OF SYMBOLS

⚠ **WARNING**	*This symbol indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.*
Note	*This symbol indicates additional helpful information such as an explanation, a comment, or a clarification about the subject.*
✓	*This symbol indicates a recommendation or tip. Recommendations instruct the user to apply the suggested practice to ensure the best operating results in order to achieve the maximum benefit of the product. Tips contain practical information that may help the user solve a problem or describe actions that may save time.*

INTRODUCTION

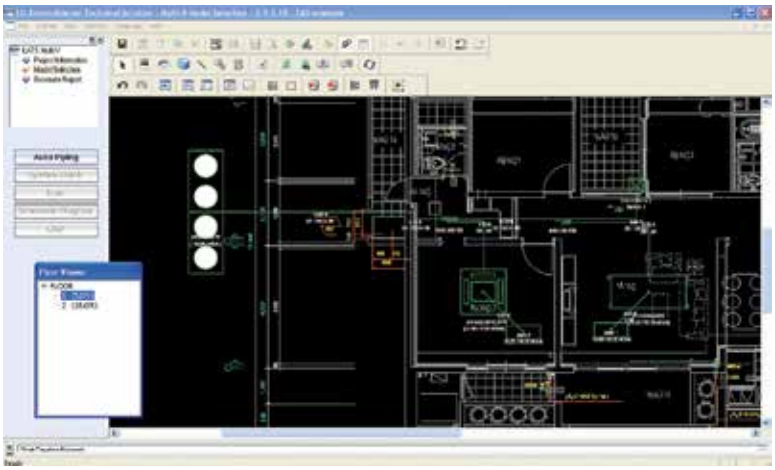
“Engineer’s Advantage” on page 6

ENGINEER'S ADVANTAGE

MULTI V HYDRO KIT

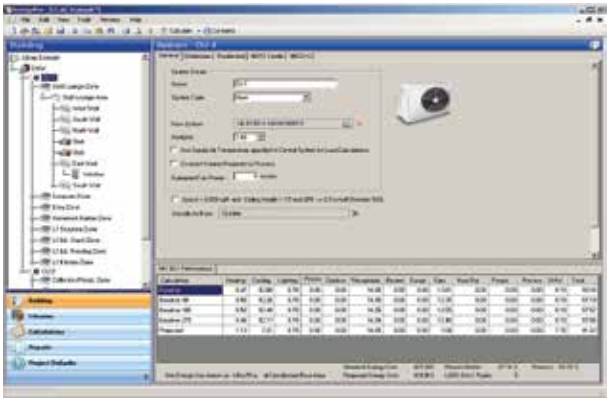
Intuitive Design

The LATS (LG Air Conditioning Technical Solution) Multi V design and layout software provides an intuitive, quick, and simple method to design a Multi V refrigerant pipe system. LATS Multi V checks piping length elevations and it assists with the sizing of indoor and outdoor units by calculating component capacity based on design conditions. LATS Multi V is the industry's only VRF modeling software that can import AutoCAD® drawings and lay out the Multi V system to scale. When the designer finishes the AutoCAD® system layout, all of the piping lengths will be calculated, and a drawing file with the Multi V system will be available for export and integration into the building drawing set.



Energy Modeling

LG stands behind efficiency and performance. You will find Multi V equipment libraries available for conducting building energy modeling using Trane TRACE 700™, EQuest®, and Energy Pro™ so you can generate the necessary documentation to compare your building design against the ASHRAE 90.1 baseline model. Use the results to see how Multi V VRF stacks up against traditional systems making it easier to earn LEED® Energy and Atmosphere (EAc-1) credits.



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PRODUCT DATA

Hydro Kit Wall Mounted Controller

Every Hydro Kit is shipped with a Hydro Kit controller.

Versatile Control Strategies

The Hydro Kit operation can be controlled based on the temperature of the leaving water, hot water tank temperature, or the temperature of the conditioned space. The Hydro Kit interfaces with a wide selection of field provided thermostats and sensors. To control the Hydro Kit operation based on conditioned space temperature, LG provides the designer connectivity for one of 4 types of sensing devices; field provided 208-230 VAC, 24 VAC thermostats, LG remote wall mounted room sensor or field provided Mechanical-type thermostats. The 24 VAC thermostat cannot be used with the High Temperature Heating model (K3 chassis).

User Functions

- On/Off
- Set water storage tank temperature
- Set leaving water temperature.
- Set freeze protection temperature
- Diagnostics error code displayed
- Schedule override: User interface provides a button that makes water tank storage heating a priority over comfort heating.
- Celsius or Fahrenheit display
- Hydronic heat circulating pump test run/enable/disable

Outdoor Air Temperature Reset

The Hydro Kit controller can monitor changes in the outside ambient air temperature and reset the temperature of the water circulating through the cooling/heating system to lower system operating cost and maintain room temperature.

Scheduling

This energy saving feature can be used to control the Hydro Kit's hours of operation and system priority. The Hydro Kit wall mounted controller has a convenient 7-day scheduling program that provides the system user with the flexibility to assign which days and hours of a week Hydro Kit operation is enabled/disabled. The user can also assign which days, or hours of each day, storage tank hot water heating has priority and which hours conditioned space heating (K2,K3) or cooling (K2 model only) has priority.

Multi V Equipment Compatibility

The Hydro kit controller shares the same communications buss with other Multi V Indoor Units. The Hydro Kit is compatible with all 3-phase LG Multi V generation III or newer VRF air conditioning systems and related central control products including AC EZ, AC Smart, AC Smart Premium, and LG's Advanced Control Platform (ACP).

BMS System Integration

Operating data is passed to the BMS host computer through the LG BACNet or LONWorks gateway products sold separately. All LG BMS gateway devices are IP addressable and may be accessed via the internet from any Windows(R) based computer.

Convenient Terminal Strip

The Hydro Kit's third party accessories terminal strip provides the installer with screw terminals for connecting field supplied accessories such as circulating pumps, isolation and flow control valves.

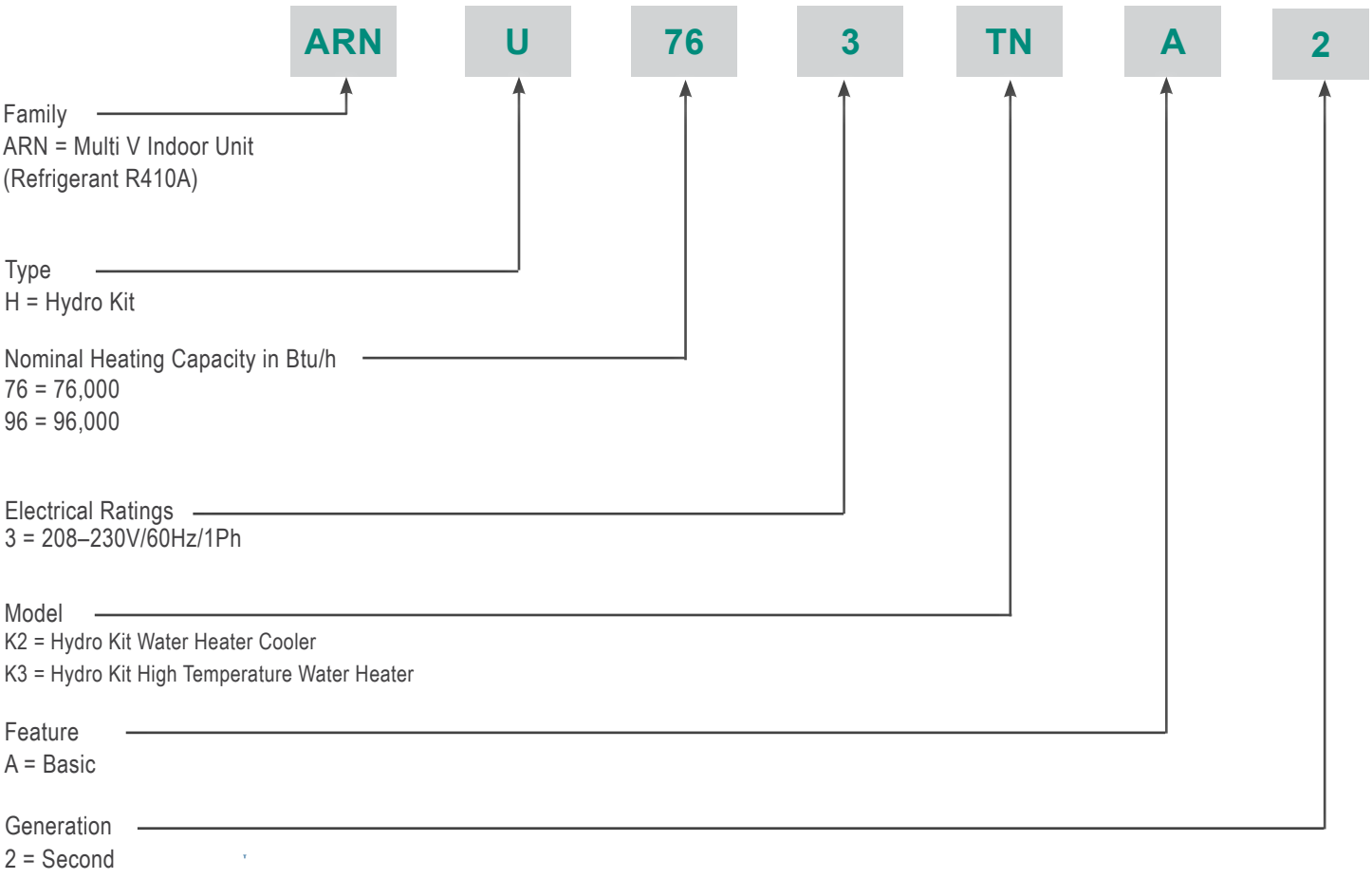
Heat Exchanger with Strainer

Each unit is provided with a heavy duty, compact, brazed-plate and frame stainless steel heat exchanger. With a waterside working pressure rating of 640 psig, concerns related to the working pressure are virtually eliminated.

LG provides a 50# mesh strainer for field installation with each Hydro Kit, so customers can be assured the exchanger is properly protected against large particulate build up blocking the heat exchanger channels. The strainer core is completely serviceable.

LG

UNIT NOMENCLATURE



GENERAL DATA

Features & Benefits

Hydro Kit Compatibility

The Hydro Kit is fully compatible with Multi V III, Multi V IV and Multi V Water IV units. The Hydro Kit is 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 or any duct-free split products.

Table 1: Hydro Kit General Data

	Features	ARNH963K2A2	ARNH763K3B2
Unit Controller Based Functions	**Self diagnosis**	√	√
	Auto Start	√	√
	***Manual or Auto Restart**	√	√
	Child Lock	√	√
	Group Control[1]	√	√
	Timer (on/off)[2]	X	√
	Timer (weekly)[2]	X	√
BMS Integration	**Hydro Kit Wall Mounted Controller**	√	√
	Network Solution (LGAP)	√	√
	Remote Enable/Disable via LG Dry Contact[3]	PQDSB-1	PQDSB-1
	Power Distribution Indicator (PDI) Interface	X	√
Options	**Remote Temperature Sensor[3]**	PQRSTA0	PQRSTA0
	Solar Heating Circuit Interface[3]	PHLLA	X

	Features	ARNH963K2A2	ARNH763K3B2
Hydro Kit Based Functions	**Hydronic Circuit Isolation**	√	X
	Water Pump ON/ OFF Control	√	√
	Factory Mounted Flow Switch	√	√
	Conventional line voltage (208-230° v) Thermostat Interface[1]	√	√
	Conventional 24 vac Thermostat Interface[1]	√	X
	Conventional Mechanical Thermostat Interface[1]	√	√
	Indirect Tank Water Pre-Heating	√	√
	3rd Party Solar Heating System Flow Control	√	X
	Storage Tank Heating Operation Timer	√	√
	Water Temperature Reset	√	√
	Overheating Protection	√	√
	Emergency Heating Operation	√	√

[1]Hydro Kit models (i.e. K2 and K3 chassis) cannot be mixed within the same group. 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 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.

[2]Manual restart is not available when the Hydro Kit is configured for conditioned space control, using a conventional thermostat.

[3]Sold separately and field installed.

KEY:

√: Available

X: Not available

GENERAL DATA

Hydro Kit Unit Specifications

Table 2: Hydro Kit General Data

	Hydro Kit	
	ARNH963K2A2	ARNH763K3A2
Cooling Mode Performance		
Rated Capacity[1] (Btu/h)	95,900	-
Entering Water Temp Range (°F)	50-95	-
Leaving Water Temp Range (°F)	42-77	-
Indoor Air Temp Setpoint Range (°F)	64-86	-
Heating Mode Performance		
Rated Capacity[1] (Btu/h)	107,500	86,000
Entering Water Temp Range (°F)	41-113	53-167
Leaving Water Temp Range (°F)	68-122	86-176
Indoor Air Temp Setpoint Range (°F)	60-86	60-86
Hot Water Tank Setpoint Range (°F)	86-122	86-176
Unit Data		
Refrigerant Type (Primary/Secondary)	R410A/---	R410A/R134A
Refrigerant Control	EEV	EEV
Factory Charge[2](lbs)	---	6.51
Sound Pressure[3] dB(A) Cooling/Heating	26	43
Net Unit Weight (lbs)	77	207
Shipping Weight (lbs)	89	219
Heat Rejected to Equipment Room (Btu/h)	Negligible	512
Oil Type	---	PVE (FVC68D)
Heat Exchanger		
Material/Type	316 Stainless/Brazed Plate	316 Stainless/Brazed Plate
Rated Water Flow (GPM)	24.3	9.5
Rated Pressure Drop[4] (ft-wg)	23.1	6.7
Range of Flow (GPM)	8-24.3	5-19
Waterside Volume (US Gallons)	0.58	0.58
Water Side Design Pressure (psig)	640	640
Compressor		
Type	---	Twin Rotary
Operating Range (Hz)	---	20-95
Piping		
Liquid Line (in, OD)	3/8 Braze	3/8 Braze
Vapor Line (in, OD)	7/8 Braze	3/4 Braze
Condensate Line (in, ID)	1-MPT	Bottom Panel Hole Only
Water Inlet/Outlet (in, ID)	1-MPT	1-MPT

[1]All capacities are net with a Combination Ratio between 95–100%.

[2]Internal second stage refrigerant circuit.

[3]Sound pressure levels are tested in an anechoic chamber under ISO Standard 3745.

[4]Water only (no antifreeze).

The combination ratio range for mixed use (Hydro Kit units mixed with indoor units) is 50% - 100%. The combination ratio range for dedicated use (all Hydro Kit units) is 50 – 130%.

ELECTRICAL & ACOUSTIC DATA

Table 3: Hydro Kit Unit Electrical Data

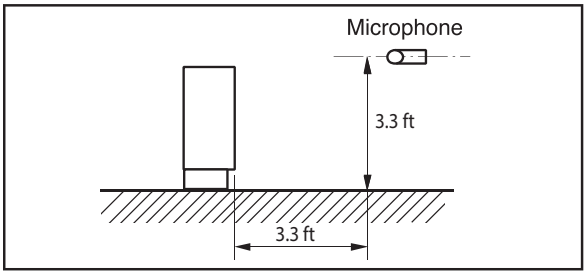
Model	Voltage Range	MCA	MOP	Rated Amps (A)	Power Supply			Power Input (kW)	
					Hz	Volts	Phase	Cooling	Heating
ARNH963K2A2	187-253	0.06	15	0.05	60	208-230	1	0.01	0.01
ARNH763K3A2		28.8	50	23.0				-	5

MCA = Minimum Circuit Ampacity MOP = Maximum Overcurrent Protection

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

Table 4: Hydro Kit Unit Acoustic Data

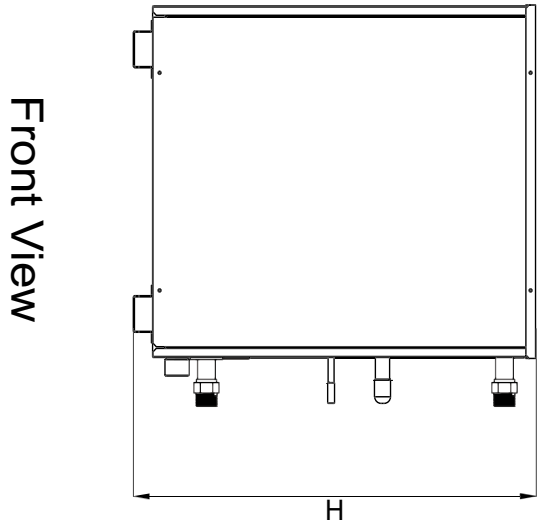
Hydro Kit Models	
Model	dB (A)
ARHN963K2A2	26
ARNH763K3A2	43

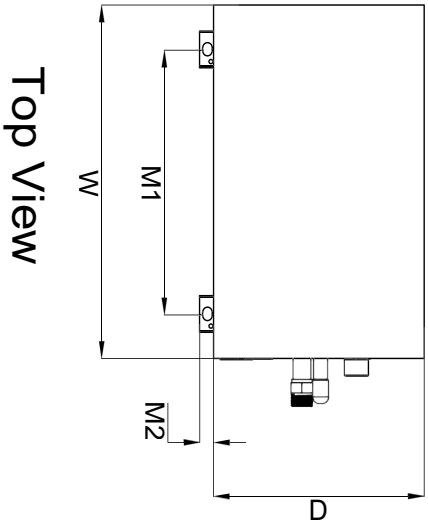


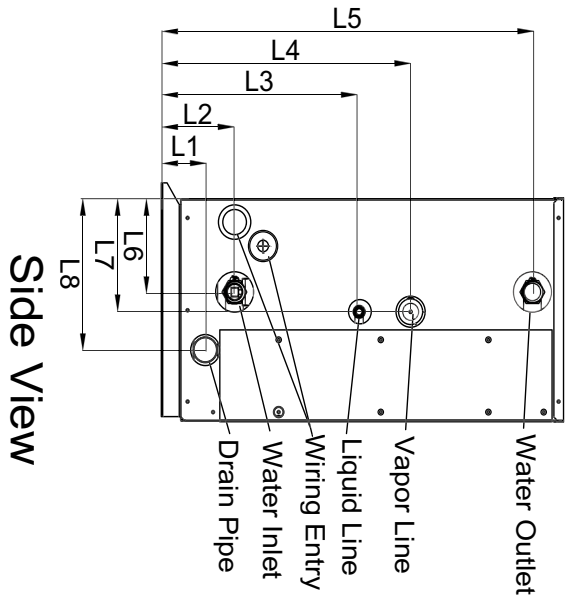
- Measurement taken 3.3' above finished floor, and at a distance of 3.3' from face of unit.
- Measurements taken with no attenuation and units operating at full load normal operating condition.
- Sound level will vary depending on a range of factors such as construction (acoustic absorption coefficient) of particular area in which the equipment is installed.
- Sound power levels are measured in dB(A)±3.
- Tested in anechoic chamber per ISO Standard 3745.

DIMENSIONS

K2 Chassis



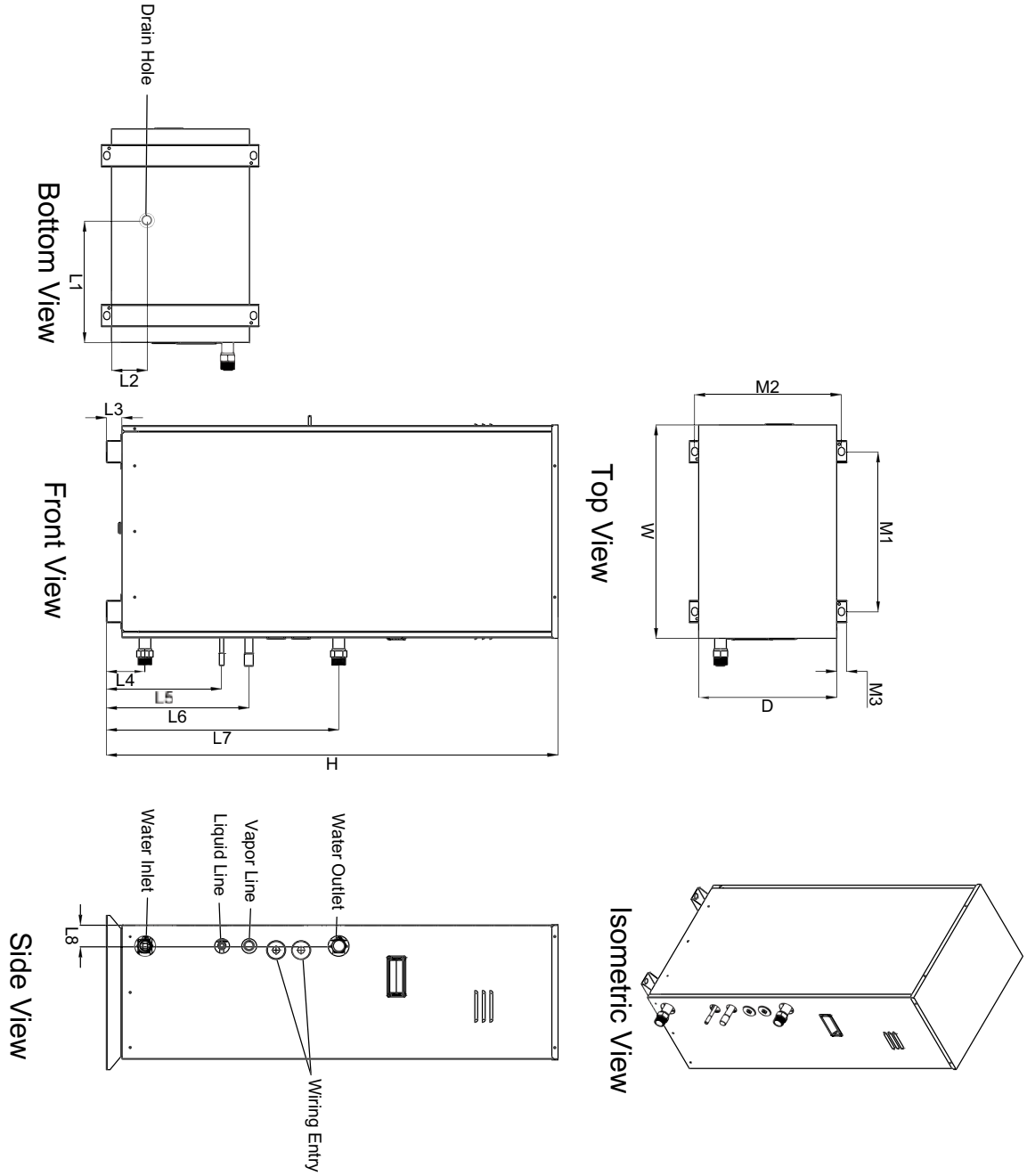




W	D	H	L1	L2	L3	L4	L5	L6	L7	L8	M1	M2
20-5/8"	13-1/8"	24-7/8"	2-3/4"	4-9/16"	12-7/16"	15-9/16"	22-7/8"	5-7/16"	6-9/16"	8-3/4"	15-7/16"	7/8"

DIMENSIONS

K3 Chassis



W	20-5/8"
D	13-1/8"
H	42-1/2"
L1	10-3/4"
L2	3-1/2"
L3	1-1/4"
L4	3-7/16"
L5	10-3/4"
L6	13-1/4"
L7	21-3/4"
L8	2-1/16"
M1	15-7/16"
M2	13-15/16"
M3	1/2"

CLEARANCE REQUIREMENTS

Figure 1: Clearance Requirements (Plan View)

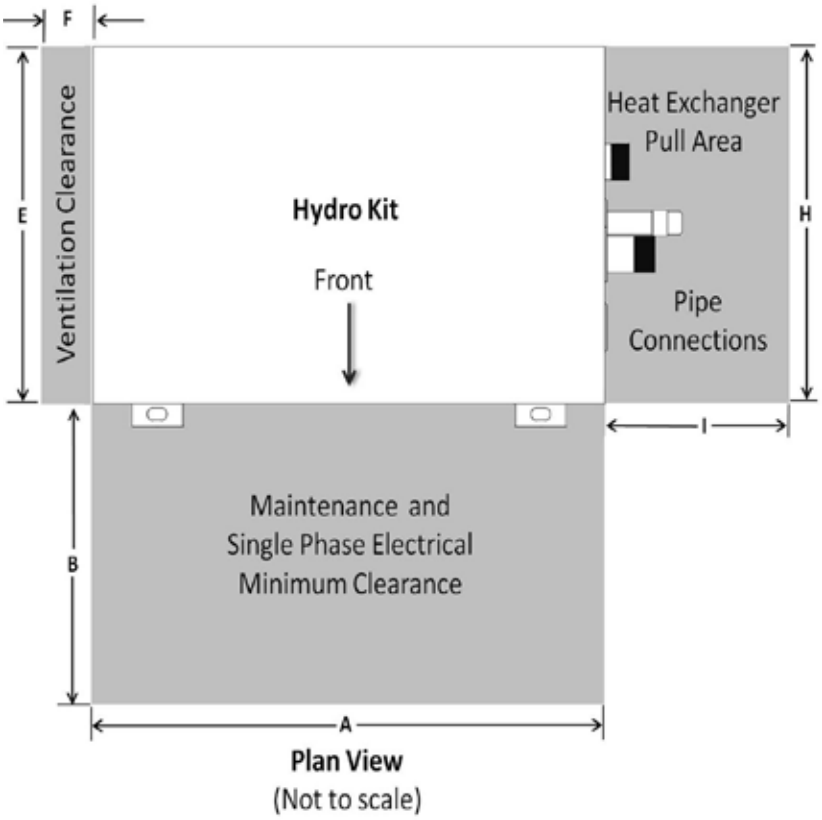


Figure 2: Clearance Requirements (Elevation View)

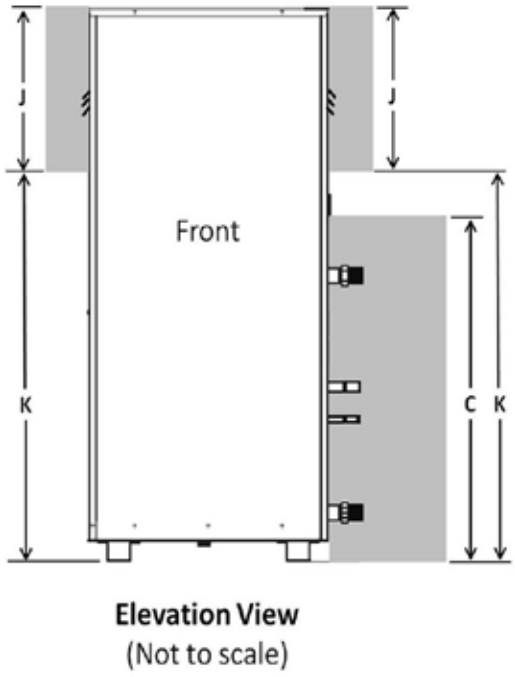


Table 5: Hydro Kit Minimum Clearance Dimensions (inches)

Model	Maintenance			Ventilation				Piping/Heat Exchanger Pull		
	A	B	C	E	F	G	H	I	J	K
ARNH963K2A2	20-1/2	24	-	-	-	-	-	13-1/2	8	25
ARNH763K3A2	20-1/2	24	41-1/2	13-1/2	3-1/2	10-1/2	32	13-1/2	14	27

PIPING DIAGRAMS

K2 Chassis

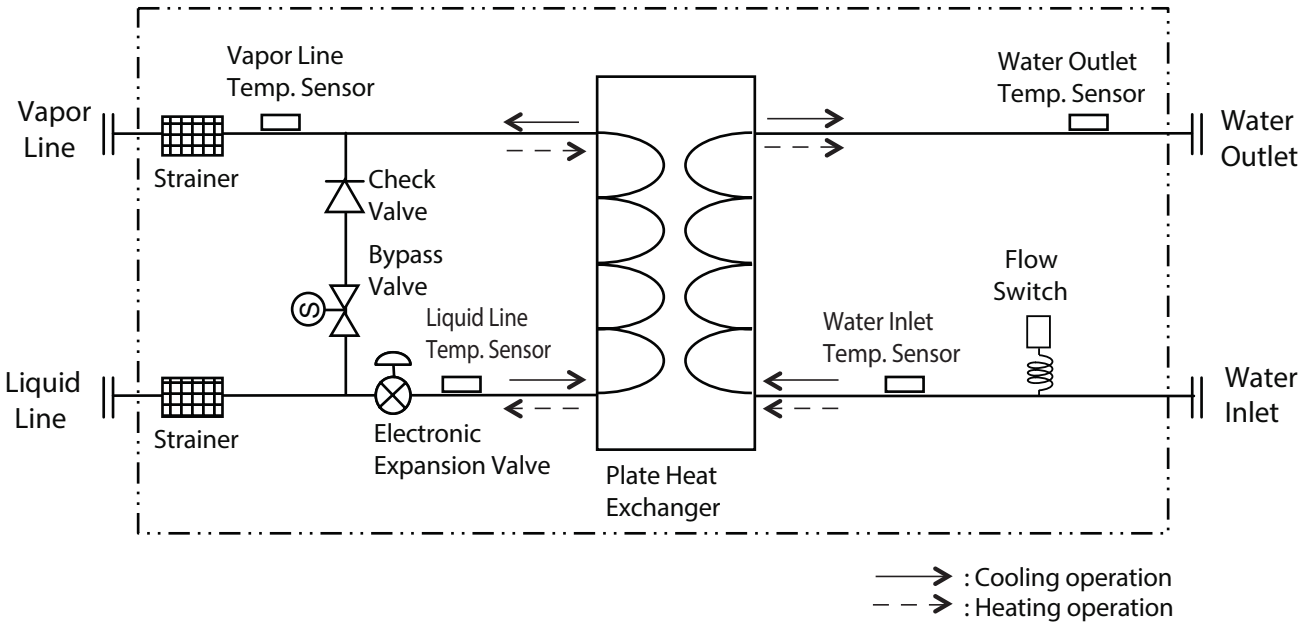


Table 6: K2 Chassis Hydro Kit Piping Schematic Legend

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		

PIPING DIAGRAM

K3 Chassis

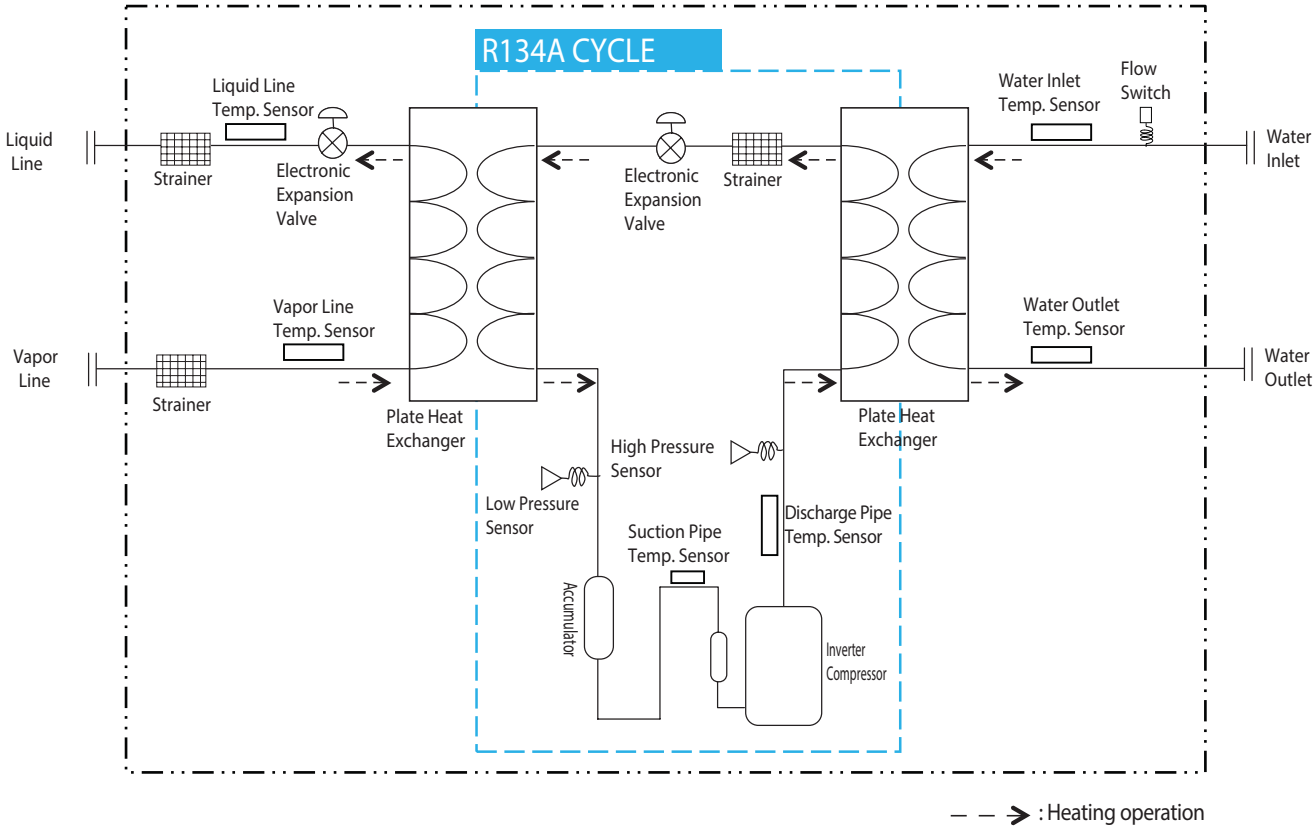
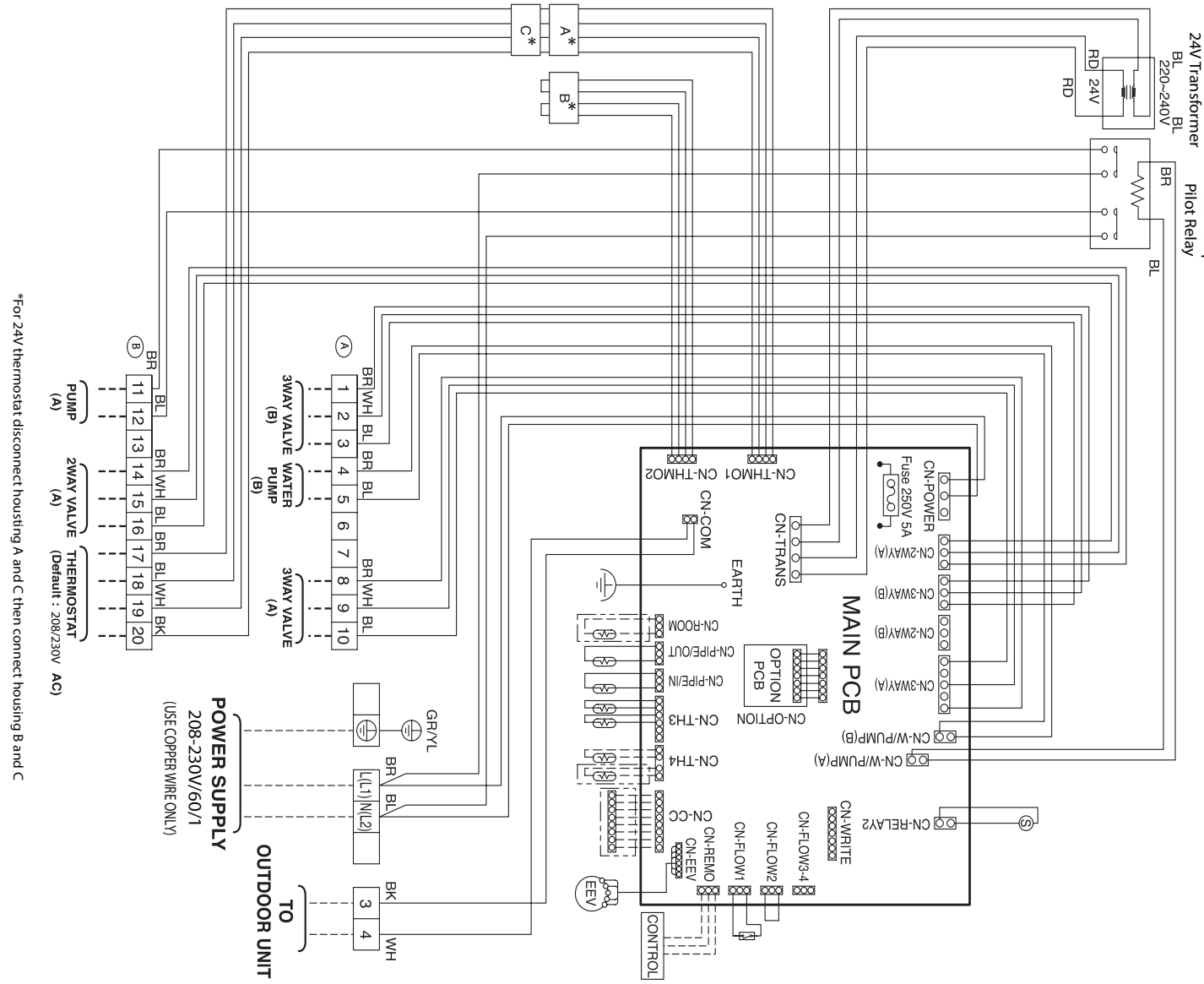


Table 7: K3 Chassis Hydro Kit Piping Schematic Legend

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		

WIRING DIAGRAMS

K2 Chassis



Hydro Kit Engineering Manual

Sockets and Connections

SYMBOL	DESCRIPTION
CN-2WAY (A)	To terminal strip B, screws 14, 15, 16
CN-2WAY (B)	Not used
CN-3WAY (A)	To terminal strip B, screws 8, 9, 10
CN-3WAY (B)	To terminal strip A, screws 1, 2, 3
CN-CC	Optional LG Dry Contact connection
CN-COM	Multi V communication to outdoor or water source unit
CN-EEV	R410A EEV value
CN-FLOW1	Factory mounted flow switch
CN-FLOW2	Not used
CN-FLOW3-4	Not used
CN-OPTION	Option card interface
CN-PIPEIN	Heat exchanger - refrigerant pipe-in temperature
CN-PIPEOUT	Heat exchanger - refrigerant pipe-out temperature
CN-POWER	AC power to PCB
CN-REMO	Hydro Kit unit controller
CN-ROOM	LG Remote Temperature Sensor (optional)
CN-TH3(TOP/LEFT)	Heat exchanger - inlet water temperature sensor
CN-TH3(BOTTOM/CENTER)	Heat exchanger - outlet water temperature sensor
CN-TH4(TOP)	Temperature sensor - Solar heating circuit temperature sensor (optional)
CN-TH4(BOTTOM)	Temperature sensor - Hot water storage tank sensor (field mounted)
CN-THMO1	3rd Party 208-230/60/1 thermostat (option)
CN-THMO2	3rd Party 24VAC thermostat (option)
CN-TRANS	24 VAC power to PCB
CN-W/PUMP (A)	To terminal strip B, screws 11, 12: Solar heating system circulating pump
CN-W/PUMP (B)	To terminal strip A, screws 4,5: Solar heating system circulating pump
CN-WRITE	Not used
EARTH	Earth Ground
L	Line (+) power connection 208-230/60/1
N	Neutral (-) power connection 208-230/60/1
	Ground
	Thermistor
	Fuse

Field Connections - LG Sourced Accessories

SYMBOL	DESCRIPTION
CN-ROOM	LG remote temperature sensor (optional)
CN-REMO	Remote mounted Hydro Kit unit controller
CN-CC	LG Dry Contact PCB interface (3rd party binary signal) enable/disable
CN-TH4 (TOP)	LG Solar kit temperature sensor for secondary heated water storage tank
CN-TH4 (BOTTOM)	LG provided hot water tank temperature sensor
CN-EEV	5-wire harness from power module accessory (CN-EEV) MAIN to CN-EEV on the Hydro Kit MAIN PCB
CN-WRITE	Single-wire from power module accessory CN-WRITE to Hydro Kit MAIN PCB CN-WRITE
CN-EEVLOAD	Wire harness from power module accessory to Hydro Kit EEV valve

Field Supplied Connections

TERMINAL STRIP	SCREW TERMINALS
(A)	1, 2, 3
(A)	4, 5
(A)	6, 7
(A)	8, 9, 10
(B)	11, 12
(B)	13
(B)	14, 15, 16
(B)	17, 18, 19, 20

NOTE: If a 24 volt thermostat will be used, adjust wiring harness configuration

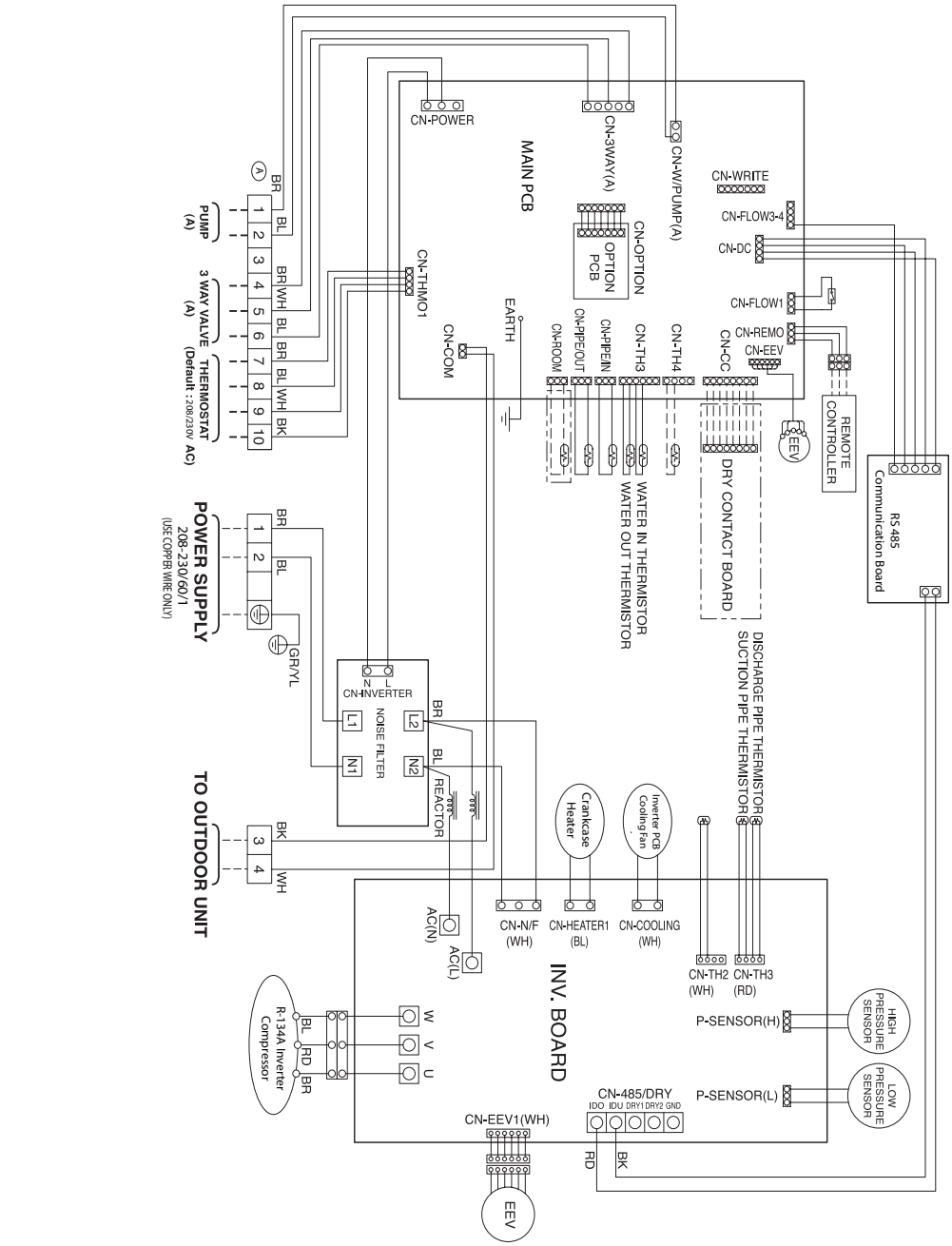
Wire Harness A	PCB interface 208-230/60/1 or mechanical conventional thermostat
Wire Harness B	PCB interface for 24VAC conventional thermostat
Wire Harness C	Wire harness Plug C to conventional thermostat terminals 18, 19, 20

Wire Color Legend

SYMBOL	COLOR
BK	Black
BL	Blue
BR	Brown
GR	Green
RD	Red
YL	Yellow
WH	White

WIRING DIAGRAM

K3 Chassis



Sockets and Connections - Main PCB

SYMBOL	DESCRIPTION
CN-3WAY (A)	Terminal strip A screws 4,5,6
CN-CC	Optional LG Dry Contact connection
CN-COM	Multi V communication to outdoor or water source unit
CN-CC	Optional LG Dry Contact connection
CN-COM	Multi V communication to outdoor or water source unit
CN-EEV	R410A EEV value
CN-FLOW1	Factory mounted flow switch
CN-FLOW3-4	Power to RS-484 communications PCB
CN-OPTION	Option card interface
CN-PIPEIN	Heat exchanger - refrigerant pipe in temperature
CN-PIPEOUT	Heat exchanger - refrigerant pipe out temperature
CN-POWER	AC power to PCB
CN-REMO	Hydro Kit unit controller
CN-ROOM	LG Remote temperature Sensor (optional)
CN-TH3(TOP/LEFT)	Heat exchanger+inlet water temperature sensor
CN-TH3(BOTTOM/ CENTER)	Heat exchanger+outlet water temperature sensor
CN-TH4(TOP)	Not used
CN-TH4(BOTTOM)	Hot water storage tank sensor (field mounted)
CN-THMO1	To terminal strip A, screws 7,8,9,10
CN-WRITE	Not used
EARTH	Earth Ground
CN-DC	Communications link with inverter board

Sockets and Connections - Inverter and Other PCB's

SYMBOL	DESCRIPTION
CN-COOLING	Inverter PCB cooling fan
CN-Heater1	R134A compressor crankcase heater
CN-N/F	Filtered power to inverter
AC (N)	Line power neutral
AC (L)	Line power 208~230/60/1
W, U, V	Inverter compressor connection
CN-EEV1	R134A socket EEV
CN-485/DRY	Communications link
P-SENSOR(L)	R134A low pressure sensor
P-SENSOR(H)	R134A high pressure sensor
CN-TH3	R134A compressor discharge pipe thermistor
CN-TH2	R134A compressor suction pipe thermistor
CN-INVERTER	Power to noise filter
	Ground
	Thermistor
	Fuse

Field Connections - LG Sourced Accessories

SYMBOL	DESCRIPTION
CN-ROOM	LG remote temperature sensor (optional)
CN-REMO	Remote mounted Hydro Kit Unit Controller
CN-CC	LG Dry Contact PCB interface (3rd party binary signal enable/disable
CN-TH4 (BOTTOM)	Temperature sensor: hot water storage tank sensor (field mounted)

Field Supplied Connections

TERMINAL STRIP	SCREW TERMINALS
Ⓐ	1,2
Ⓐ	3
Ⓐ	4,5,6
Ⓐ	7,8, 9, 10

Wire Color Legend

SYMBOL	COLOR
BK	Black
BL	Blue
BR	Brown
GR	Green
RD	Red
YL	Yellow
WH	White

SELECTION PROCEDURE

“Operation Limits” on page 22
“Applying Correction Factors” on page 24

OPERATION LIMITS

Cooling Mode

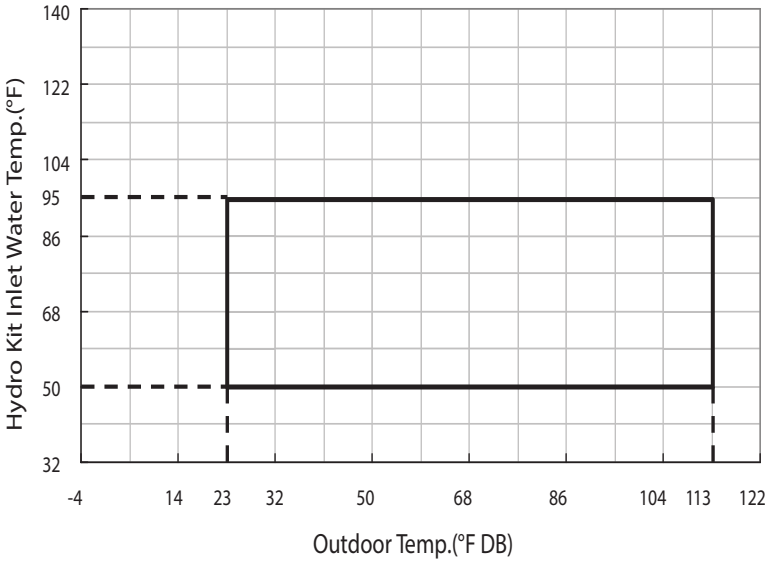
Note

The Hydro Kit's outdoor ambient (or condenser circuit water) temperature operational limitations are defined by the Multi V Outdoor or Water Source Model serving the system.

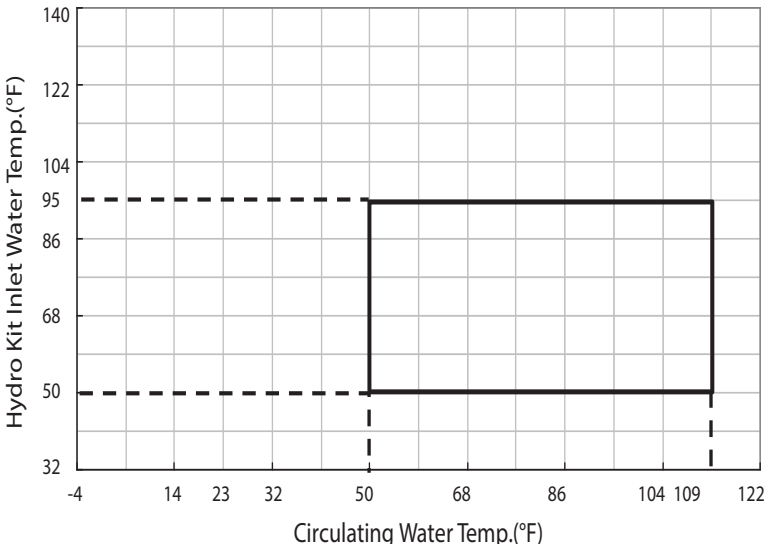
Combination Ratio Limits

When Hydro kits and indoor units are connected to the same outdoor unit, the cooling mode combination ratio must be between 50% and 130%. If a Multi V outdoor unit only serves Hydro Kits the combination ratio must fall between 50% and 100%. In all cases, the heating mode combination ratio must fall between 50% and 100%. For more information on combination ratio, refer to a Multi V Outdoor Unit Engineering Manual.

Air Source Units



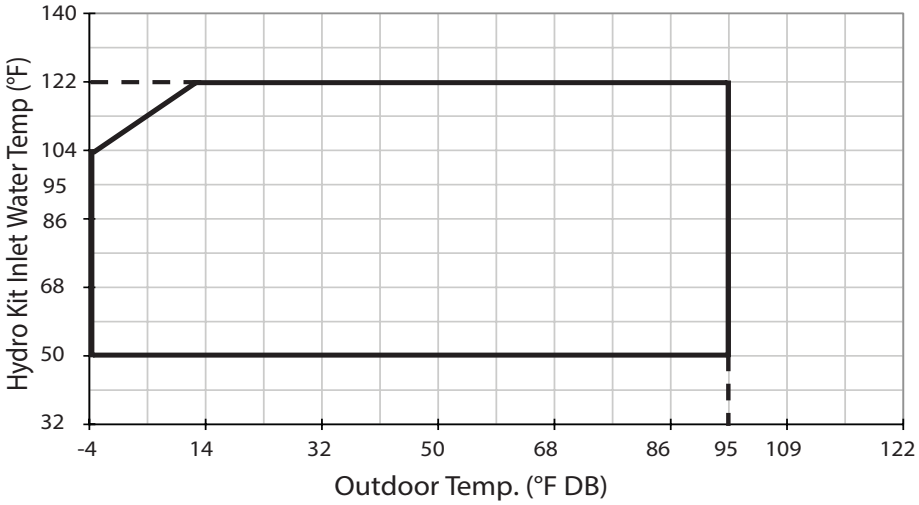
Wate Source Units



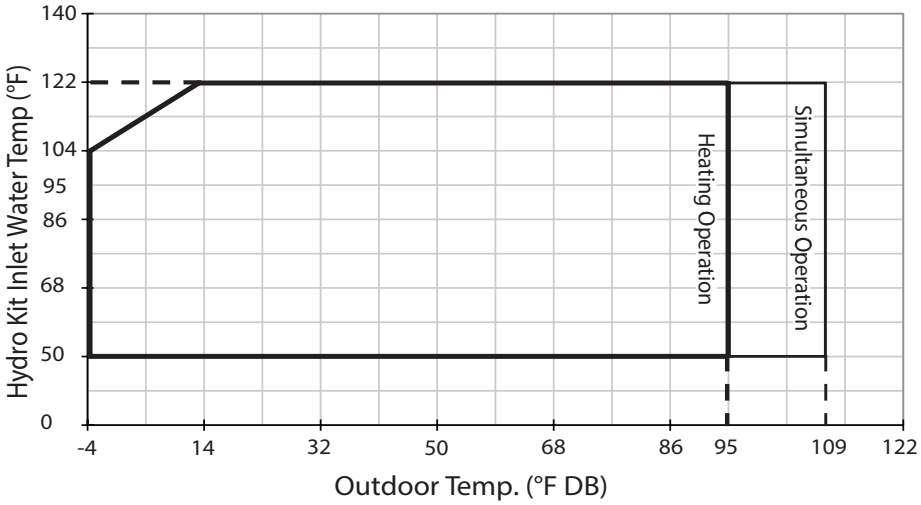
OPERATION LIMITS

Heating Mode

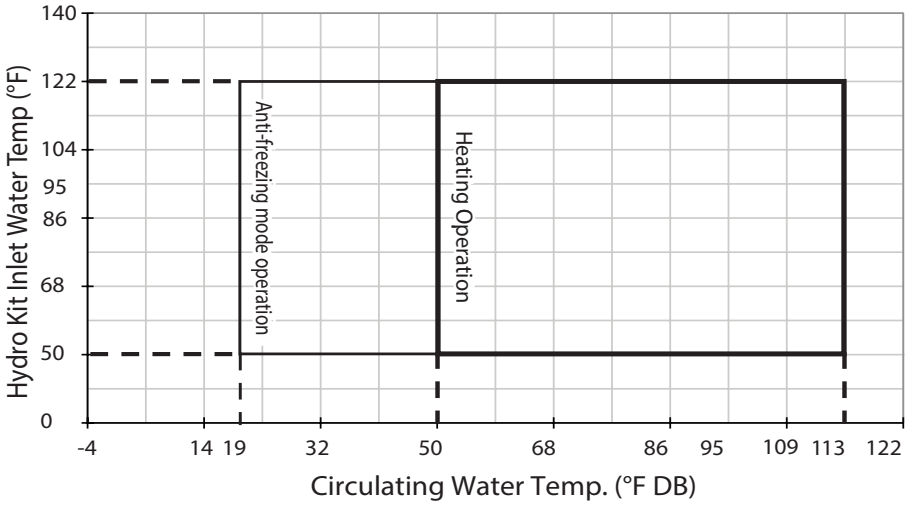
Heat Pump Air Source Units



Heat Recovery Air Source Units



Water Source Units



SELECTION PROCEDURE

Applying Correction Factors

Hydro Kit Water Heater Cooler (K2 Chassis)

The designer needs to know the corrected cooling, and/or heating capacity (Btuh), the associated power input (kW), and water pressure drop through the heat exchanger (ft-wg).The procedure to calculate these values is the same for both the Hydro Kit Water Heater Cooler (K2 chassis) and the Hydro Kit High Temperature Water Heater (K3 chassis). The only differences are how the outdoor ambient air temperature, inlet water temperature heating capacity correction factor and the heating power input correction factor are determined.

Calculating Corrected Cooling Capacity

Note

Skip this section when selecting a Hydro Kit High Temperature Water Heater (K3 chassis). Continue the selection procedure with "Calculating Corrected Heating Capacity" on page 27.

To obtain the corrected cooling capacity at design conditions, use the following equation:

Corrected Cooling Capacity (BtuH)=Rated Capacity (BtuH) x (factor A) x (factor B) x (factor C).

- Factor A = Outdoor ambient air DB temp (°F)/Inlet water temp (°F) cooling capacity correction factor
- Factor B = Water flow rate (GPM) cooling capacity correction factor
- Factor C = Antifreeze additive (% by wt) cooling capacity correction factor

Look up the Hydro Kit's Rated Cooling Capacity

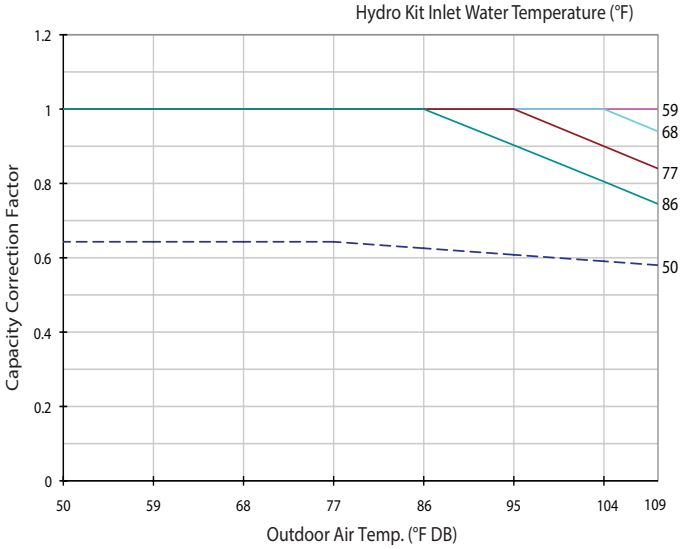
Refer to Table 1, Hydro Kit General Data and find the rated cooling capacity.

Determine Capacity Correction Factor A

Apply a correction factor that will account for variations to the outdoor ambient air temperature and the Hydro Kit's inlet water temperature.

1. For projects with a design outdoor ambient air temperature above 50°F, refer to Figure 1 and find the cooling design outdoor air (condenser water) temperature on the X-axis.
2. Draw a vertical line up the chart at this point. Among the horizontal lines printed on the chart, identify the lines that are closest to the Hydro Kit design inlet water temperature.
3. If necessary, extrapolate between the lines provided. At the point where the vertical line crosses the design inlet water temperature, draw a horizontal line.
4. Lookup the outdoor air/inlet water temperature cooling capacity correction factor on the Y-axis. This is correction factor "A".

Figure 3: Cooling Cycle Capacity Correction Factor by Temperature

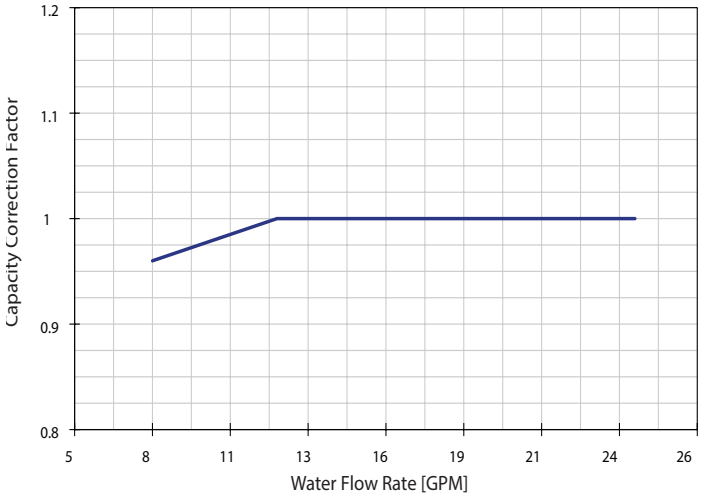


Determine Capacity Correction Factor B

Apply a correction factor for the Hydro Kit cooling design water flow rate.

1. Using Figure 2, look up the Hydro Kit cooling design water flow rate (GPM) on the X-axis.
2. At the design flow rate value, draw a vertical line upward until it intersects with the line on the table.
3. At the point where these two lines intersect, draw a horizontal line over to the Y-axis.
4. On the Y-axis, lookup the water flow cooling capacity correction factor. This is correction factor "B"

Figure 4: Cooling Cycle Capacity Correction Factor by Water Flow Rate



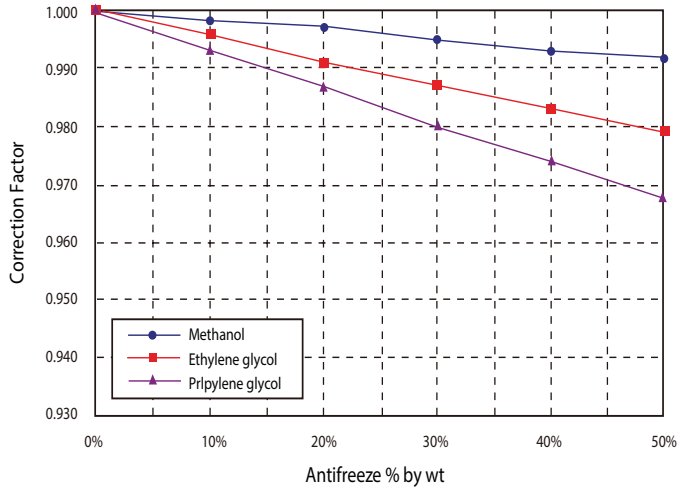
Determine Capacity Correction Factor C

If the water flowing through the Hydro Kit heat exchanger has the potential of freezing, the designer may want to specify the addition of an antifreeze agent such as ethylene glycol, propylene glycol, or methanol to the water circuit. In this situation, the water/glycol solutions ability to exchange heat energy will be reduced and designers must account for this reduction. Use Figure 3 to calculate the antifreeze cooling capacity correction factor.

1. Find the percentage of antifreeze by using the weight on the X-axis and draw a vertical line at that value.
2. At the point where the vertical line drawn crosses the line associated with the type of antifreeze chosen, draw a horizontal line between this intersection and the Y-axis.
3. Record the antifreeze cooling capacity correction factor at the point of intersection with the Y-axis. This is correction factor "C".

Apply Factors A,B and C in the equation provided above to obtain the corrected cooling capacity.

Figure 5: Cooling Cycle Capacity Correction Factor by % Antifreeze



Calculating Corrected Cooling Power Input

To obtain the corrected cooling power input, use the following equation:

Corrected Cooling Power Input (kW)=Rated Capacity (kW) x (factor D) x (factor E).

- Factor D = Outdoor ambient air DB temp (°F)/Inlet water temp (°F) cooling power input correction factor
- Factor E = Water flow rate (GPM) cooling power input correction factor

Look up the Hydro Kit's Rated Power Input

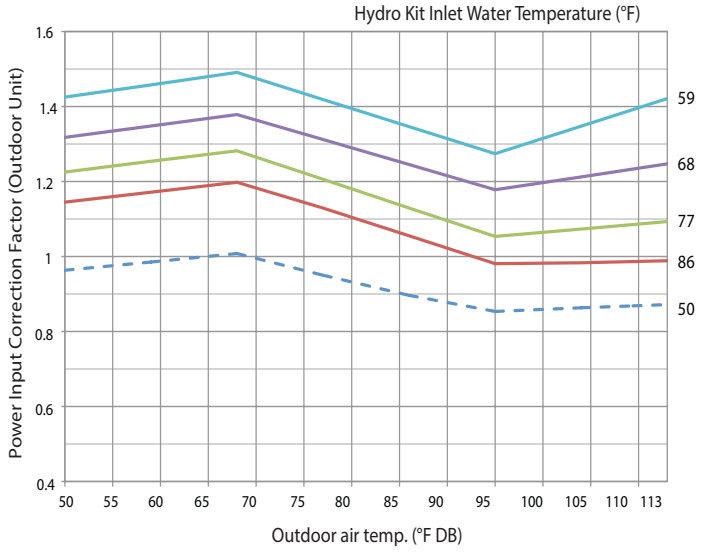
Refer to Table 3, Hydro Kit Unit Electrical Data, and find the rated cooling power input value.

Determine Cooling Power Input Correction Factor D

Adjust the rated power input for the ambient air (or condenser water) temperature.

1. Using Figure 4, find the design outdoor ambient temperature on the X-axis.
2. Draw a vertical line on the chart at this point. Among the horizontal lines provided, identify the one or two that are close to the Hydro Kit cooling design inlet water temperature. Extrapolate if necessary.
3. At the point where the vertical line crosses the selected cooling inlet water temperature, draw a horizontal line between this intersection and the Y-axis.
4. Where this horizontal line intersects the Y-axis, record the Cooling Power Input correction factor. This is correction factor "D".

Figure 6: Cooling Power Input Correction Factor by Temperature



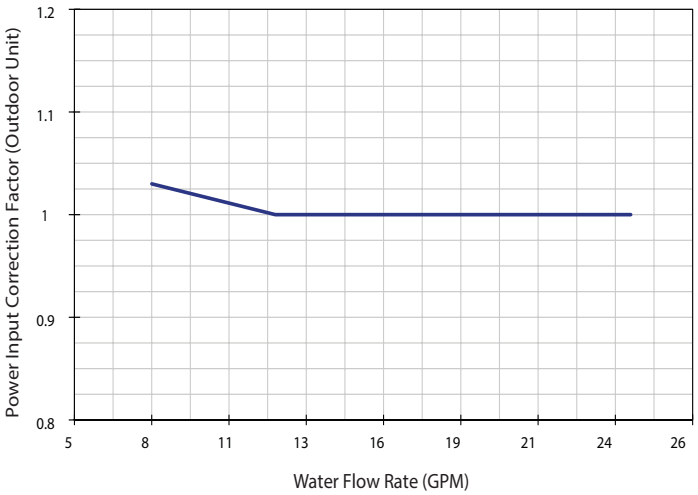
Determine Cooling Power Input Correction Factor E

Adjust the rated power input for the water flow rate.

1. Using Figure 5, lookup the cooling design water flow rate (GPM) on the X-axis.
2. At the cooling design flow rate, draw a vertical line at the point where the vertical line intersects with the line on the chart, draw a horizontal line over to the Y-axis..
3. Where the horizontal line intersects the Y-axis, record the Cooling Water Flow Rate Power Input correction value. This is correction factor "E".

Apply Factors D and E in the equation provided above to obtain the corrected cooling power input.

Figure 7: Cooling Power Input Correction Factor by Water Flow Rate



LG

Calculating Corrected Heating Capacity

To obtain the corrected heating capacity at design conditions, use the following equation:

Corrected Heating Capacity (BtuH) = Rated Capacity (BtuH) x (factor F) x (factor G) x (factor H) x (factor J).

- Factor F = Outdoor Unit Coil Frost Accumulation heating capacity correction factor (air source models only)
- Factor G = Outdoor ambient air DB temp (°F)/Inlet water temp (°F) heating capacity correction factor
- Factor H = Heating water flow rate (GPM) heating capacity correction factor
- Factor J = Antifreeze additive (% by wt) heating capacity correction factor

Look up the Hydro Kit's Rated Heating Capacity

Refer to Table 1, Hydro Kit General Data and find the Rated Heating Capacity.

Determine Capacity Correction Factor F

To determine the impact outdoor unit frost accumulation has on the Hydro Kit's heating capacity follow the steps below.

Table 8: Outdoor Unit Frost Accumulation Capacity Correction Factor

Coil Inlet Air Temp DB (°F)	19.4	23.0	26.6	32.0	37.4	41.0	44.6
Capacity Correction Factor	0.98	0.95	0.93	0.86	0.93	0.96	1.0

1. Calculate the Frost Accumulation Correction Factor using Table 8, (air-cooled system only) apply to all models of the Hydro Kit.
2. On the first row, lookup the ambient air dry bulb temperature entering the outdoor unit coil. Choose the corresponding correction factor from the row below. This is correction factor "F".

Determine Capacity Correction Factor G

Apply a correction factor accounting for variations to the outdoor ambient air (or condenser water) temperature and the Hydro Kit's inlet water temperature.

1. Using Figure 6 (K2 chassis), Figure 7 (K3 chassis), find the heating design outdoor air (or condenser water) temperature on the X-axis.
2. Draw a vertical line from this point.
3. Among the horizontal lines printed on the chart, identify the one or two that are close to the Hydro Kit design inlet water temperature.
4. Extrapolate between the lines provided if necessary. At the point where the vertical line crosses the Hydro Kit design inlet water temperature, draw a horizontal line.
5. Lookup the outdoor air/inlet water temperature heating capacity correction factor on the Y-axis. This is correction factor "G".

Figure 8: K2 Heating Cycle Capacity Correction Factor by Temperature

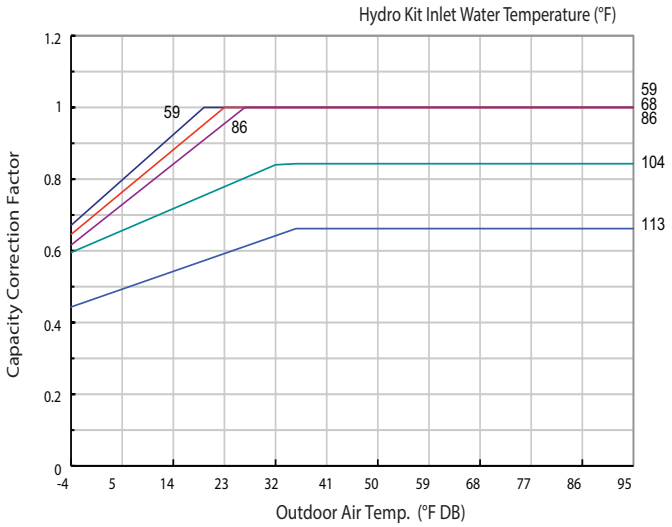
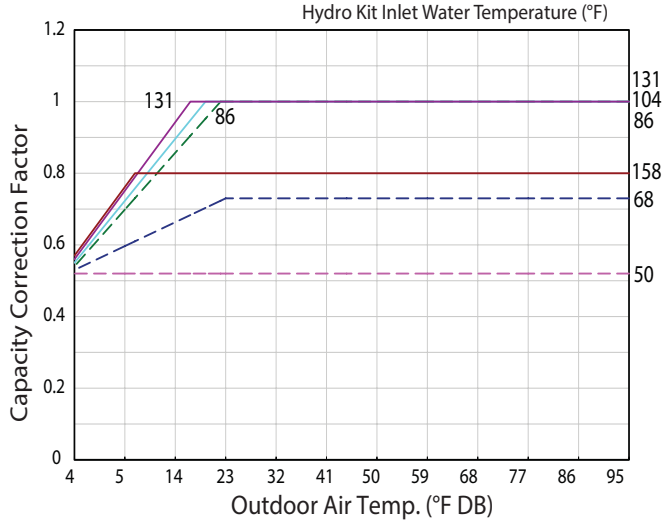


Figure 9: K3 Heating Cycle Capacity Correction Factor by Temperature



SELECTION PROCEDURE

Applying Correction Factors

All Models

Determine Capacity Correction Factor H

Apply a correction factor for variations to the heating design water flow rate.

1. Using Figure 10 (K2) or Figure 11 (K3), and look up the heating design water flow rate (GPM) on the X-axis.
2. At the design flow rate value, draw a vertical line upward until it intersects with the preprinted line on the chart.
3. At the point where these two lines intersect, draw a horizontal line over to the Y-axis.
4. On the Y-axis, lookup the water flow heating capacity correction factor. This is correction factor "H".

Figure 10: K2 Heating Capacity Correction Factor by Water Flow Rate

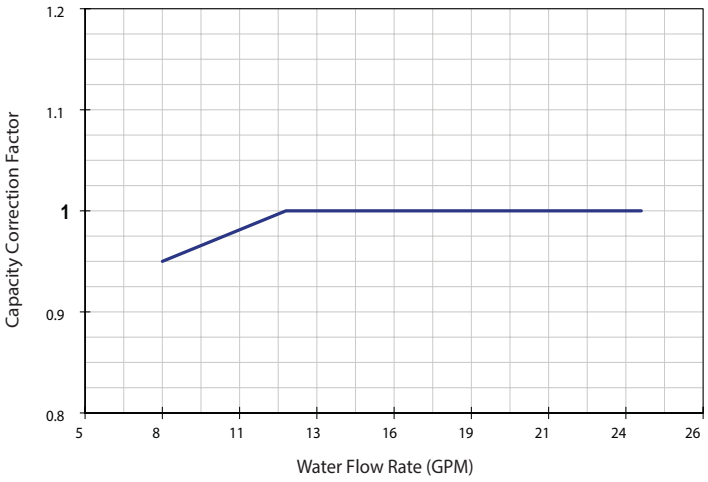
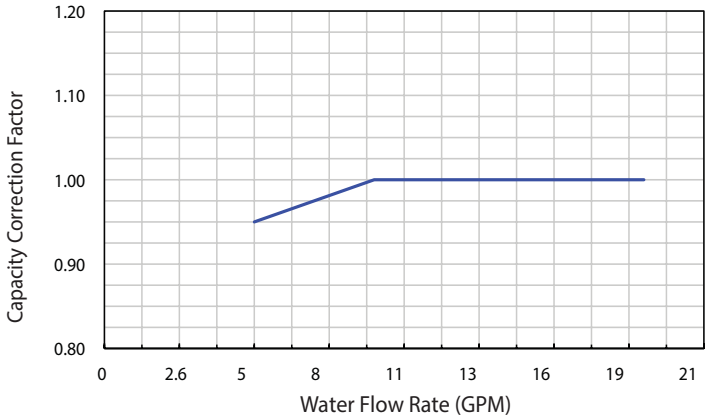


Figure 11: K3 Heating Capacity Correction Factor by Water Flow Rate



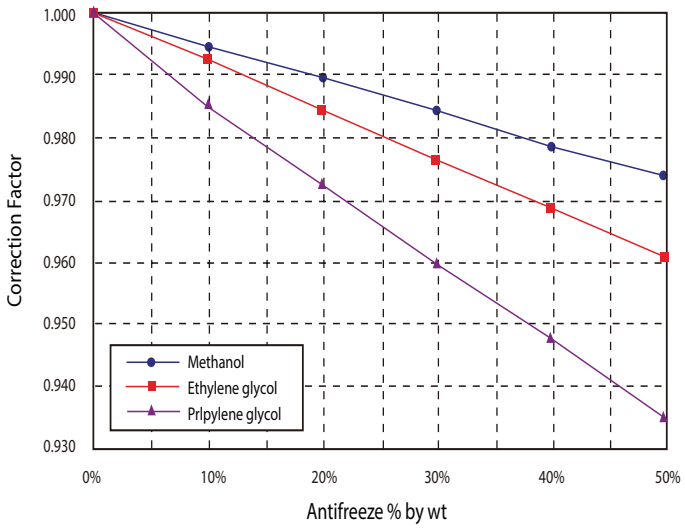
Determine Capacity Correction Factor J

If the water flowing through the Hydro Kit heat exchanger has the potential of freezing, the designer may want to specify the addition of an antifreeze agent such as ethylene glycol, propylene glycol, or methanol to the water circuit. In this situation, the water/glycol solutions ability to exchange heat energy will be reduced and must be accounted for. Use Figure 12 to calculate the antifreeze heating capacity correction factor.

Note

The Hydro Kit High Temperature Water Heater (*K3 chassis) model operation does not require antifreeze.*

Figure 12: Heating Capacity Correction Factor by Water Flow Rate



1. Find the percentage of antifreeze by weight on the X-axis and draw a vertical line at that value.
2. At the point where the vertical line drawn crosses the line associated with the type of antifreeze chosen, draw a horizontal line.
3. Record the antifreeze heating capacity correction factor at the point of intersection with the Y-axis. This is correction factor "J".

Apply Factors F, G, H and J to the Rated Heating Capacity using the equation provided above to obtain the corrected heating capacity.

Calculating Corrected Heating Power Input

To obtain the corrected heating power input, use the following equation:

Corrected Heating Power Input (kW)=Rated Capacity (kW) x (factor K) x (factor L- [K3 chassis only]) x (factor M) x (factor N-[K3 chassis only]).

- Factor K = Outdoor ambient air DB temp (°F)/Inlet water temp (°F) heating power input correction factor for the outdoor unit
- Factor L = Outdoor ambient air DB temp (°F)/Inlet water temp (°F) for the Hydro Kit (R134A circuit)
- Factor M = Water flow rate (GPM) power input correction factor
- Factor N = Water flow rate (GPM) R-134a circuit power input correction factor

Look up the Hydro Kit's Rated Power Input

Refer to Table 3, Hydro Kit Unit Electrical Data, and lookup the Rated Heating Power Input value.

Determine Heating Temp Power Input Correction Factor's K and L

1. Using Figure 13 (K2 chassis) or Figure 14 (K3 chassis), find the design outdoor ambient temperature on the X-axis.
2. Draw a vertical line on the chart at this point. Among the horizontal lines provided, identify the one or two that are close to the Hydro Kit heating design inlet water temperature. Extrapolate if necessary.
3. At the point where the vertical line crosses the selected heating inlet water temperature, draw a horizontal line between this intersection and the Y-axis.
4. Where this horizontal line intersects the Y-axis, note the Heating Power Input (outdoor unit) correction value. This is correction factor "K".
5. For the High Temperature Heating model (K3 chassis) only, an additional correction factor needs to be applied to obtain the Hydro Kit's R134A circuit power input correction factor.

Figure 13: K2 Heating Power Input Correction Factor Water Temp

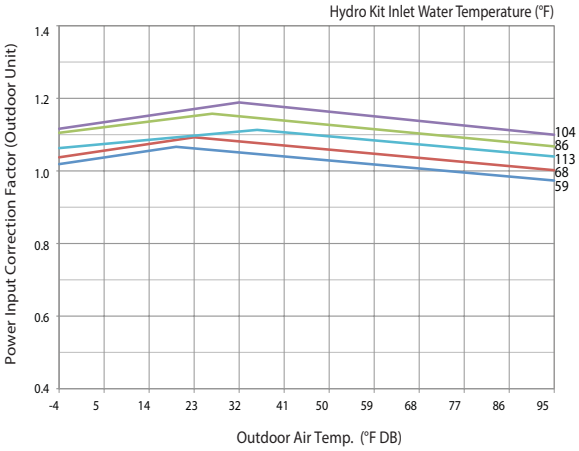


Figure 14: K3 Outdoor Unit Power Input Correction Factor by Temp

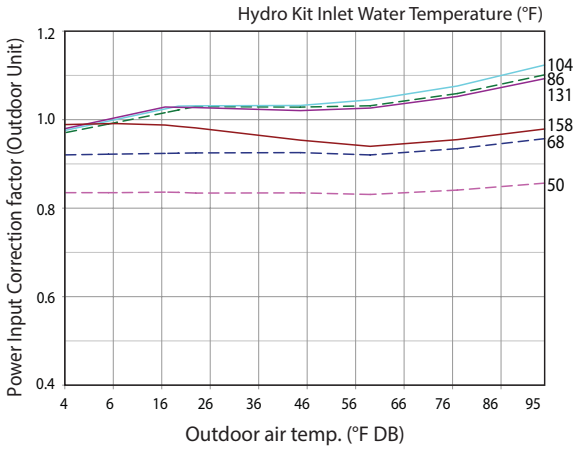
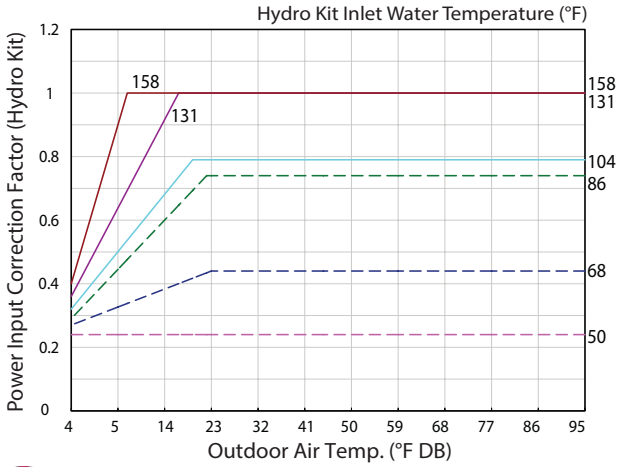


Figure 15: K3 R-134A Circuit Power Input Correction Factor by Temp



SELECTION PROCEDURE

Applying Correction Factors

All Models

Determine Heating Water Flow Power Input Correction Factor's M and N

1. Apply a power input correction factor for the heating design water flow rate.
2. Using Figure 16 (K2) or Figure 17 (K3), lookup the heating design water flow rate (GPM) on the X-axis.
3. At the heating design flow rate value, draw a vertical line. At the point where these two lines intersect, draw a horizontal line.
4. Where this horizontal line intersects the Y-axis, note the Heating Water Flow Rate Power Input correction value. This is correction factor "M".
5. For the High Temperature Heating model (K3 chassis) only, an additional correction factor needs to be applied to obtain the Hydro Kit's R134A flow rate based power input correction factor and use Figure 18 to obtain Correction Factor "N".

Figure 18: K2 Outdoor Unit Power Input Correction Factor by Temp

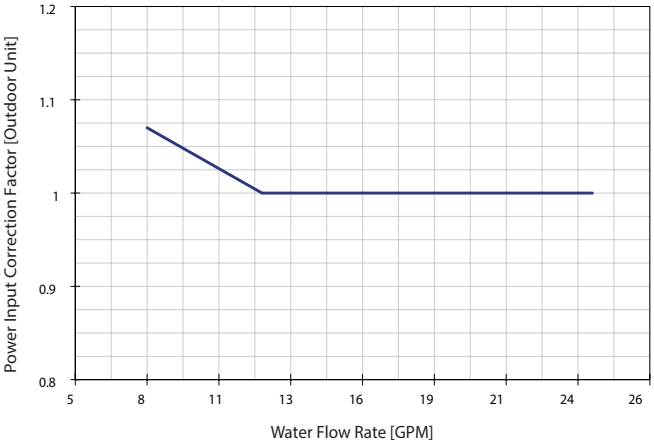


Figure 16: K3 Outdoor Unit Power Input Correction Factor by Water Flow Rate

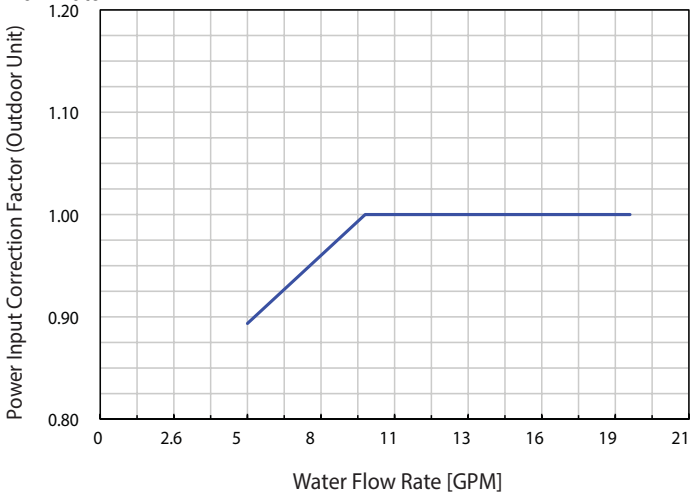
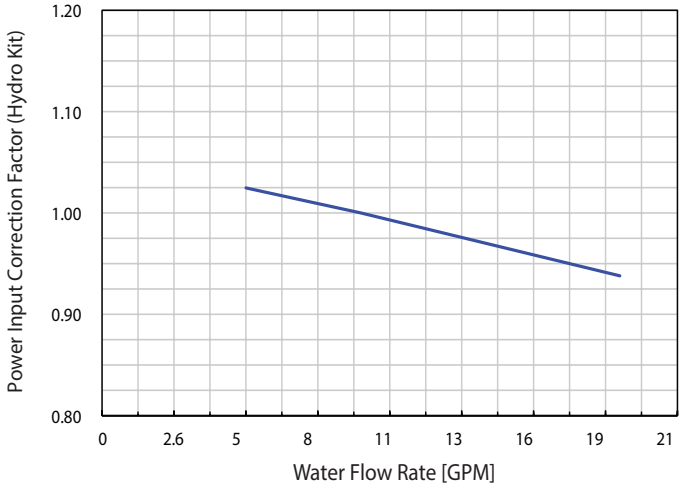


Figure 17: K3 R-134A Circuit Power Input Correction Factor by Water Flow Rate



Calculating the Heat Exchanger Water Pressure Drop

To obtain the Hydro Kits Heat Exchanger Waterside Pressure Drop using an antifreeze additive mixed with water, use the following equation:

Antifreeze/Water Solution Heat Exchanger Waterside Pressure Drop (ft-wg) = (heat exchanger water pressure drop) x (factor P)

- Factor P = antifreeze additive (%by weight) waterside pressure drop correction factor

Determine the system design water flow rate through the Hydro Kit. Since the pump will need to be sized for the worst case scenario, when using the K2 Heating Cooling model, choose the highest flow rate through the heat exchanger - cooling or heating mode.

1. Using Figure 19 for the Cooling/Heating model and Figure 20 for the High Temperature Heating Only model, find the system design cooling/heating flow rate on the X-axis.
2. Draw a vertical line at this point. Where the line intersects the curve, draw a horizontal line to the Y-axis. Where the horizontal line intersects with the Y-axis is the waterside pressure drop through the heat exchanger using water without any antifreeze additives. If no additives are required, this is the waterside pressure drop through the exchanger in feet of water.
3. If the fluid contains antifreeze additives, apply an antifreeze pressure drop correction factor found in Table 9.
4. Find the type of antifreeze additive and lookup the percentage of antifreeze (by weight) for the solution.
5. Locate the “pressure drop” row in the table and find the corresponding antifreeze correction factor. This is correction factor “P”.
6. Multiply the waterside pressure drop for water using Figure 19 (K2) and Figure 20 (K3) by correction factor “P”. The resultant is the corrected pressure drop through the heat exchanger considering flow rate and viscosity of the water/antifreeze solution.

Table 9: 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

Figure 19: K2 Hydro Kit Heat Exchanger Water Pressure Drop

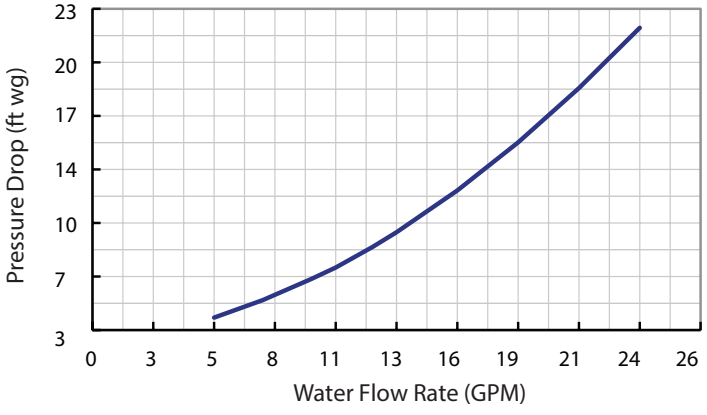
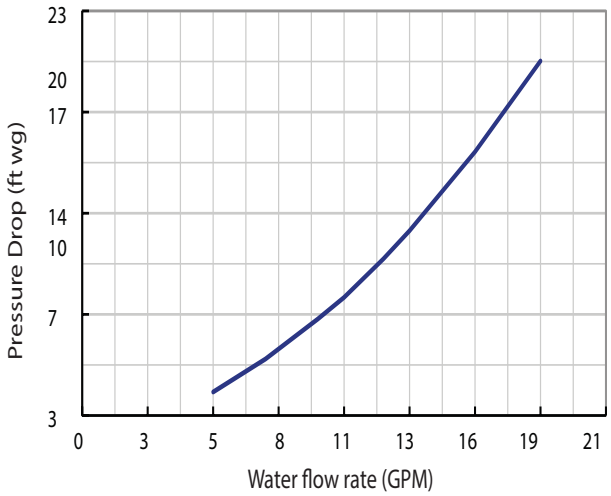


Figure 20: K3 Hydro Kit Heat Exchanger Water Pressure Drop



TECHNICAL DATA

HYDRO KIT ACCESSORIES

Table 10: LG Included Accessories

Accessory	Model No.	Applicable Models	Connection	Description	Use
Hydro Kit Unit Controller[1]	AKB73355703	All	CN-REMO	Remote wall mounted controller with 33 foot communications cable	Schedules, sets operational parameters and monitors system
Standby Power Module[1]	PRIPO	K2 Chassis	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	All	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[1,3]	EBG61325701	All	CN-TH4 (Boost)	Water storage tank sensor	Monitors the Hydro Kit indirect water storage tank temperature
Water Circuit Strainer[4]	MJC57132402	All	Inlet Pipe	50 Mesh; install on inlet pipe to heat exchanger	Keeps large particulate from entering the heat exchanger

[1] Must use LG provided communications cable (included).

[2] Maximum combined current draw of all (field provided) connected accessories must be equal to or less than 5 Amps @ 208-230/60/1.

[3] Must have contacts rated for 208-230/60/1.

[4] 1" FPT both ends

Table 11: LG Optional Accessories (sold separately)

Accessory	Model No.	Applicable Models	Connection	Description	Use
Wired Remote Extension Cable[1]	PZCWRC1	All	---	39' communications extension cable	Extends the length of the Hydro Kit Unit Controller communications cable beyond 39 feet (cannot be used to extend tank sensor cable length)
Solar Heating System Interface Kit	PHLLA	K2 Chassis	CN-TH4(solar)	Kit includes solar heating system tank sensor/cable and tee fitting sensor well.	Monitors a third party solar heating system's water circuit temperature and controls the flow of solar heating system water to the indirect water storage tank.
Ancillary (Solar) Heating System Tank Replacement Sensor[1,2,4]	MEG61846102	K2 Chassis	CN-TH4 (Solar)	Solar heating water storage tank sensor with 39 feet of cable and plug connector	Monitors the solar heating system water circuit temperature
Remote Temperature Sensor	PQRSTA0	All	CN-ROOM	Sensor with 50' communications cable and plug connector	Monitors and/or controls (optional) the Hydro Kit based on the conditioned space temperature
Dry Contact[3]	PQDSB1	All	CN-CC	Mounts inside the unit cabinet and provides a external binary signal control interface	Enables/disables operation from a remote generated binary signal

[1] Must use LG provided communications cable (included).

[2] Field supplied thermo paste required.

[3] Maximum combined current draw of all connected accessories must be equal to or less than 5 Amps @ 208-230/60/1.

[4] This sensor is included when ordering the PHLLA Solar Heating Interface Kit.

HYDRO KIT ACCESSORIES

Table 12: Third Party Accessories (sold separately)

Accessory	Applicable Models	Connection	Voltage Options	Description	Use
Hydro Kit Circuit Water Pump interlock[1]	K3 Chassis	TB-1,2	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
	K2 Chassis	TB-11,12			
Solar Heating Circuit Water Pump Interlock[1,2,3]	K2 Chassis	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[1,4]	K3 Chassis	TB-7,8,9,10	208-230/60/1	Single stage heating only	Monitors and/or controls (optional) the Hydro Kit based on the conditioned space temperature.
	K2 Chassis	TB-17,18,19,20 & Harness Plug C to A		Single stage heating/cooling manual changeover	
24 VAC Conventional Thermostat[4]	K2 Chassis	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[1]	K3 Chssis	TB-7,8,9,10	---	Single stage manual changeover	Monitors and/or controls (optional) the Hydro Kit based on the conditioned space temperature.
	K2 Chassis	TB-17,18,19,20 & Harness Plug C to A		Single stage heating only	
Hydro Kit Circuit 3-Way Diverting Valve[1]	K3 Chassis	TB-4,5,6	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.
	K2 Chassis	TB-8,9,10			
Hydro Kit Circuit 2-Way Isolation Valve[1]	K2 Chassis	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[1]	K2 Chassis	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

[1] Maximum combined current draw of all connected accessories must be equal to or less than 5 Amp @ 208-230/60/1.

[2]Must have contacts rated for 208-230/60/1

[3]1" FPT both ends

[4]Must have contacts rated for 24VAC

All communication cable to be minimum 18 AWG, 2-conductor, stranded, shielded, and must comply with applicable local and national codes.

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

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.

Hydro Kit Water Heater Cooler (K2 Chassis) and Hydro Kit High Temperature Water Heater (K3 Chassis)

General

The Hydro Kit may be used in conjunction with 3-phase Multi V Heat Pump and Heat Recovery outdoor and water source units. Multi V systems consist of an outdoor unit or water source unit, one or more indoor units or Hydro Kit units, integrated system controls, and an interconnecting field-provided refrigerant pipe network containing various fittings including Y-branch kits and Header kits supplied by LG. LG components are manufactured in a facility that meets or exceeds International Organization for Standardization (ISO) 9001 and 14001. The units are listed by Intertek (ETL) and bear the ETL listed mark.

Casing

The Hydro Kit case is comprised of a 14-gauge coated metal frame with 20-gauge sheet metal panels. Exterior panels are cleaned and finished with a weather resistant baked enamel finish. An easily removable front corner panel is provided to allow access to all major components and control devices. All refrigerant and water pipe connections are from the right end of the unit.

Hydro Kit Refrigerant to Water Heat Exchanger

The water heat exchanger is a stainless steel, type SUS316, refrigerant/water plate heat exchanger designed to operate at a maximum working pressure of 640 psig. The heat exchanger water-side volume is 0.58 US gallons.

Heat Exchanger Protection

- Factory provided 50-mesh strainer
- Internal, factory installed, flow switch
- Heat exchanger freeze protection algorithm
- Overheating protection algorithm

Microprocessor Controls

The Hydro Kit includes an integrated microprocessor controller capable of performing functions necessary to control Hydro Kit operations based on the leaving water and/or hot water tank temperature set-point. Entering and leaving water pipe temperature sensors are factory mounted internally to the unit case. A factory provided remote (wall-mounted) Hydro Kit Unit Controller and a hot water tank sensor/well are included for field installation. The Hydro Kit operation may be optionally controlled by sensing the conditioned space air temperature using an LG provided, Remote Temperature Sensor (sold separately) or a field provided manual changeover conventional thermostat.

Hydro Kit Controller

The remote wall-mounted Hydro Kit controller is provided with every unit. Power for the controller is provided via the communications cable from the Hydro kit unit. The controller has a white resin case with a backlit LCD screen that displays the temperature set-point, unit run-status and mode of operation (heating cooling). The touch screen control pad includes unit on/off, temperature adjustment, water tank heating on/off, mode selection and view temperature. The controller is used to program the Hydro Kit microprocessor resident operating parameters. Scheduling information resides on the controller.

Water Storage Tank Sensor and Well

The Hydro Kit is provided with a stainless steel ½ MPT hot water storage tank sensor-well that should be field installed in the wall of the indirect water storage tank. The sensor comes with a 39.4 foot cable with plug connectors.

Field Provided Components Interface

The Hydro Kit is equipped with a factory mounted terminal block with screw type connectors provided to connect waterside control devices and accessories including:

- 208-230V Pump on/off control interface
- Power/control interface for a conventional 208-230 VAC or mechanical type conditioned space temperature sensing thermostat
- Power/control interface for a 3-way valve to switch water flow duty between heating the water tank and the indirect water storage conditioned space hydronic heating/cooling equipment.

Communications Cable

All communication cable to be a minimum of 18 AWG, 2-conductor, stranded, and shielded cable (RS485). Cable insulation shall be per project requirements. Refer to the footnotes for Tables 9 and 10 to determine which cables are LG supplied.

External Control Component Connectivity

The Hydro Kit is equipped with a factory mounted terminal block with screw type connectors provided to connect waterside control devices and accessories.

- 208-230V water pump on/off interface
- Power and control interface for a conventional 208-230 VAC or mechanical type conditioned space temperature sensing thermostat
- Power and control interface for a 2-way valve to enable/disable indirect water storage tank heating operation

Control Functions

- Display: Degrees Fahrenheit or Celsius
- Auto restart
- Heating water temperature set-point
- Heating water temperature dead-band
- Indirect water storage tank heating operation timer (disable/enable adjustable from 0 to 10 hours)
- Enable/disable indirect water storage heating operation (requires a field provided 2-way valve)
- Outdoor air temperature based heating water temperature reset
- Water circuit pump on/off control
- Emergency operation (external sensor failure override)
- Group Control (up to 16 Hydro Kits may be controlled by a single Hydro Kit Controller)
- Radiant floor system condensation prevention (requires a field provided 3-way valve)
- Water pump forced operation
- Self diagnostics
- Child lock

Cooling Heating Model Only (K2 Chassis)

Cold surface insulation

All cold surfaces are insulated to minimize the possibility of condensation forming on the components of the refrigeration circuit.

Auto Changeover Operation

Auto Changeover from (heating/cooling) controlled by conditioned space temperature and requires the installation of the Hydro Kit Remote Controller and the optional LG remote sensor. Auto Changeover operation is limited when used in conjunction with a Heat Pump outdoor or water source unit. Auto changeover is not available when the conditioned space temperature is controlled using a field provided conventional thermostat.

Additional Field Provided Components Interface

- In addition to using an optional field provided 208-230VAC or mechanical thermostat to sense the conditioned space temperature, it is also permissible to use a conventional 24-volt thermostat on the K2 Heating Cooling model.
- Power/control interface for an optional, field provided, 3-way valve. The valve is used to isolate the flow of water to a portion of the water circuit where condensation may present a problem while the Hydro Kit is producing chilled water.
- Radiant Floor System Condensation Prevention (requires a field provided 2-way valve)
- Secondary heating source (i.e. solar) heating circuit water pump on/off control
- Secondary heating source (i.e. solar) heating circuit 3-way valve power/control interface

Additional Control Functions

- Outdoor air temperature based chilled water temperature reset
- Leaving chilled water temperature set-point
- Leaving chilled water dead-band
- Chilled water device condensation protection temperature set-point (cease cooling operation if the water temperature drops to/ under the set-point temperature).

Standby Power Module (IPM)

The K2 model Hydro Kit is provided with a power module designed to operate the field provided valves in the event the Hydro Kit is shut off during Multi V defrost or oil return operations.

Hydro Kit High Temperature Water Heater (K3 Chassis)

General

The High temperature heating model uses a 2-stage cascade heating system. The first stage heat is extracted from the Multi V R-410a refrigerant piping system and transferred to the Hydro Kits second stage R-134A refrigerant circuit. Energy is then transferred to/from the Hydro kit water circuit.

Noise Attenuation

The High Temperature Heating Only Hydro Kit (K3 chassis) provided with a sound adsorbing insulating blanket around the compressor. A foamed polystyrene pad is provided inside the compressor compartment cabinet. The compressor is wrapped with a heat resistant, sound attenuating blanket and mounted on rubber isolation grommets.

R134A Refrigerant Circuit

The High Temperature Heating Only Hydro Kit (K3 chassis) is equipped with a single refrigeration circuit with 6.6 pounds of refrigerant R134A. The Hydro Kit is provided with factory installed components, including a refrigerant strainer, accumulator, electronically controlled expansion valve (EEV), high and low side charging ports, and interconnecting piping.

Single Inverter/Compressor

The High Temperature Heating Only Hydro Kit (K3 chassis) is equipped with one hermetic, digitally-controlled, inverter driven, rotary compressor. The compressor is equipped with a crankcase heater. The compressor is specifically designed for the refrigerant provided and is manufactured by LG. The frequency inverter is designed by LG and is capable of providing a modulation range from 20Hz–95Hz in 1 Hz increments. The compressor motor is suction gas-cooled, and has under/over current protection. The incoming power voltage fluctuation can be ±10% of nameplate voltage.

External suction and discharge temperature and pressure sensors are provided to protect the compressor from damage caused by over/under temperature or over/ under pressure conditions. The compressor is provided with a positive displacement oil pump providing sufficient oil film on all Teflon® coated bearing surfaces across the entire inverter modulation range. The compressor is factory charged with Polyvinylether (PVE) refrigeration oil having no hygroscopic properties.

ACRONYMS

Table 13: Table of Acronyms.

AC	Air Conditioner	ISO	International Organization for Standardization
ACP	Advanced Control Platform	LGAP	LG Air Conditioner Protocol
AHRI	Air-Conditioning, Heating, and Refrigeration Institute	MBh	Thousands BTUs per hour
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning	MCA	Maximum Circuit Ampacity
AHU	Air Handling Unit	ODU	Outdoor Unit
AWG	American Wire Gauge	PDI	Power Distribution Integrator
BLDC	Brushless Digitally Controlled/Direct	PI	Power Input
Btu/h	British Thermal Units per hour	PVE	Polyvinyl Ether
CFM	Cubic Feet per Minute	LGAP	LG Air Conditioner Protocol
CR	Combination Ratio	MBh	Thousands BTUs per hour
DB	Dry Bulb	MCA	Maximum Circuit Ampacity
dB(A)	Decibels with “A” frequency weighting	ODU	Outdoor Unit
DI	Digital Input	PDI	Power Distribution Integrator
DO	Digital Output	PI	Power Input
EEV	Electronic Expansion Valve	PVE	Polyvinyl Ether
ESP	External Static Pressure	TB	Terminal Block
GND	Ground	VAV	Variable Air Volume
HVAC	Heating, , Ventilation and Air Conditioning	VRF	Variable Refrigerant Flow
IDU	Indoor Unit	WB	Wet Bulb

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