THERMA V™

LG
Life's Good

APPLICATION GUIDE_2025

September, 2025
HQ Heating Oversea Sales Team

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★ Summary of changes

- ✓ Updated the 'Application Summary by Product' (3 page)
- ✓ Added New Product (R32 Monobloc S II, R290 Monobloc – Control & Combi Units, R32 Monobloc 51kW, R290 Monobloc – Cascade Control Unit)
- ✓ Added Strainer and Magnetic Filter
- ✓ Updated Multi-zone Control & 2nd circuit diagram
- ✓ Added Wiring Diagram with 3rd party Back-up Heater
- ✓ Updated Auxiliary Boiler Functions
- ✓ Added Power Limitation Function
- ✓ Added LG Cascade Solution
- ✓ Updated Open MODBUS (Map updated)

Application Summary by Product *

* Please make sure to check the availability of old product models not indicated in this table through the PDB or manual.

Contents

As of Sep. 2025

	Line-up	Individual - Monobloc				Individual - Hydrosplit		Individual - Split				Collective	
		R32 Monobloc S II	R290 Monobloc Control Unit	R290 Monobloc Hydro Unit	R290 Monobloc Combi Unit	R32 Hydrosplit Hydro Unit (NK1)	R32 Hydrosplit Combi Unit	R32 Split Hydro Unit	R32 Split Hydro Unit	R32 Split Combi Unit	R32 Split Combi Unit	R290 Monobloc Cascade	R32 Monobloc 51kW
	Capa. Range	5-16 kW	7-16 kW	7-16 kW	7-16 kW	12-16 kW	12-16 kW	4-6 kW	5-9 kW	4-6 kW	5-9 kW	up to 8 units	51 kW
	ODU model names	HM***MRS U*4	HM***HF UB*0			HU1**MRB UI30	HU1**MRB UI30	HU0*1MR U20	HU0*1MR U44	HU0*1MR U20	HU0*1MR U44	HM***HF UB*0	HM513MR UXC0
	IDU model names	-	PHCS0 ENCXLEU	HN16**HC NK0	HN16**HY NK0	HN1600MC NK1	HN1616Y NB1	HN0613M NK5	HN091MR NK5	HN0613T NB0	HN0913T NB0	PHCM0 ENCXLEU	PHCSL0 ENCXLEU
1	Temp. Control methods [1]	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L / E / A / A+W	L	L / E
2	Room Thermostat (CN_THMO)	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW	H / C / DHW
3	Dry Contact	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320)	O (PDRYCB320	O (PDRYCB320
4	Programmable Digital Input Operation (CN_EXT)	O	X → O (TBD [2])	X → O (TBD [2])	O	O	O	O	O	O	O	X → O (TBD [2])	O
5	Seasonal Auto Mode	O	O	O	O	O	O	O	O	O	O	O	O
	logic using Outdoor air sensor	O (PHATS0)	O (PHATS0)	O (PHATS0)	O (PHATS0)	X	X	X	X	X	X	O (PHATS0)	O (PHATS0)
6	Strainer	O (Loose Supply)	O (Loose Supply)	O (Loose Supply)	O (Loose Supply)	O (Integrated)	O (Integrated)	O (Integrated)	O (Integrated)	O (Integrated)	O (Integrated)	O (Loose Supply)	Δ (Field Scope)
7	Buffer Tank	Δ	Δ	Δ	Δ	Δ	O	Δ	Δ	Δ	Δ	Δ	Δ
	logic using Buffer tank sensor	O (PHRSTA0)	O (PHRSTA0)	O (PHRSTA0)	O (PHRSTA0)	X	X	X	X	X	X	X	O (PHRSTA0)
8	Water Pump Modulation	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (4 Options [3])	O (Pump Capacity)	X (On/Off signal)
9	External Water Pump control	O	O	O	O	O	O	O	O	O	O	O	O
10	Heating & Cooling using 2way valve	O	O	O	O	O	O	O	O	O	O	O	O
11	Multi-Zone control	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
12	2nd Circuit control	O	O	O	O	O	O	O	O	O	O	O	O
	Flexible use of room devices	O	O	O	O	X	X	X	X	X	X	X	X
13	Anti-freeze solution	O	O	O	O	O	O	O	O	O	O	O	O
14	Drain Pan for Cooling	N/A	N/A	O (PHDPC)	O	O (PHDPC)	O	O (PHDPC)	O (PHDPC)	O	O	N/A	N/A
15	DHW Tank	O (OSHW-*00F*)	O (OSHW-*00F*)	O (OSHW-*00F*)	O	O (OSHW-*00F*)	O	O (OSHW-*00F*)	O (OSHW-*00F*)	O	O	Δ	Δ
16	3-way valve	O (OSHA-3V)	O (OSHA-3V)	O (OSHA-3V)	O	O (OSHA-3V)	O	O (OSHA-3V)	O (OSHA-3V)	O	O	Δ	Δ
17	Booster Heater	O (PHLTB)	O (PHLTA)	O (PHLTA)	O [4]	O (PHLTA)	O [4]	O (PHLTA)	O (PHLTA)	O [4]	O [4]	Δ	Δ
18	DHW Re-circulation control	O	O	O	O	O	X	O	O	O	O	O	O
19	Solar-Thermal control	O [5]	O [5]	O [5]	X	O	X	O [5]	O	X	X	O [5]	O [5]
20	Backup Heater	O (HA0**M E2) / Δ	O (HA0**M E2) / Δ	O	O [4]	O (HA06*C.E1) / Δ	O [4]	O	O	O [4]	O [4]	Δ	Δ
21	3rd Party Boiler Interlocking	O	O	O	O	O	O	O	O	O	O	O	O
	Updated Boiler Functions [6]	O	X → O [7]	X → O [7]	X → O [7]	X → O (TBD [2])	X	X → O (TBD [2])	X → O (TBD [2])	X → O (TBD [2])	X → O (TBD [2])	X	X → O (TBD [2])
22	Power Limitation (230V Input)	X → O [7]	X → O [7]	X → O [7]	X → O [7]	X	X	X	X	X	X	X → O (TBD [2])	X → O [7]
	Power Limitation (Modbus)	X → O [7]	O [8]	O [8]	X → O [7]	X	X	X	X	X	X	X → O (TBD [2])	X → O [7]
23	Energy Monitoring (Self-calculation)	O	O	O	O	O	X	O	O	O	O	O	O
24	SVC Menu with Actuator Test and Signal Monitoring	O	O	O	O	X	X	X	X	X	X	O	O
25	LG ThinQ (Wi-Fi modem)	O	O	O	O	O	O	O	O	O	O	O	O
26	LG BECON cloud service	O (PWFMDB200)	O (PWFMDB200)	O (PWFMDB200)	O (PWFMDB200)	O (PP485A00T + PWFMDB200	X	O (PP485A00T + PWFMDB200	O (PP485A00T + PWFMDB200	O (PP485A00T + PWFMDB200	O (PP485A00T + PWFMDB200	O (PWFMDB200)	X
	Remote Installer Setting	O	O	O	O	X	X	X	X	X	X	O	X
27	LG Cascade Solution	X	X	X	X	X	X	X	X	X	X	O	X
28	LG Central Controller (BECON)	O	X → O (TBD [2])	X → O (TBD [2])	X → O (TBD [2])	O	O	O	O	O	O	X	X → O (TBD [2])
29	Open Modbus (3rd party)	O	O	O	O	O	O	O	O	O	O	O	O
	Comp. Modulation via Modbus	O	O	O	O	O	X	O	O	O	O	X	X

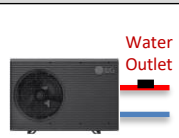
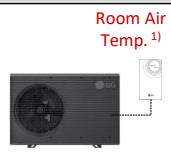
O = Available / integrated / LG-accessory
Δ = 3rd-party accessory
X = Not available, N/A = not applicable

1) L=Leaving water temp. / E=Entering water temp. / A=Air temp. / A+W=Water+Air temp.
2) Planned, but the detailed implementation schedule has not been decided
3) Pump Capacity, Fixed Flow Rate, Fixed ΔT, Optimal Flow Rate
4) Integrated heater used for both - Space and DHW heating
5) Improved function (Dual-tank sensor, no valve)
6) Bivalent-parallel, Boiler control by Room temp. option, External Pump Option during Boiler activated
7) To be available for products produced after Oct. 1st of 2025
8) Available for products Produced after Dec, 1st of 2024

1 Temperature Control Options

LG Therma V can be controlled with various temperature control options for the User's comfort and convenience.

▪ Available Temperature Control Options

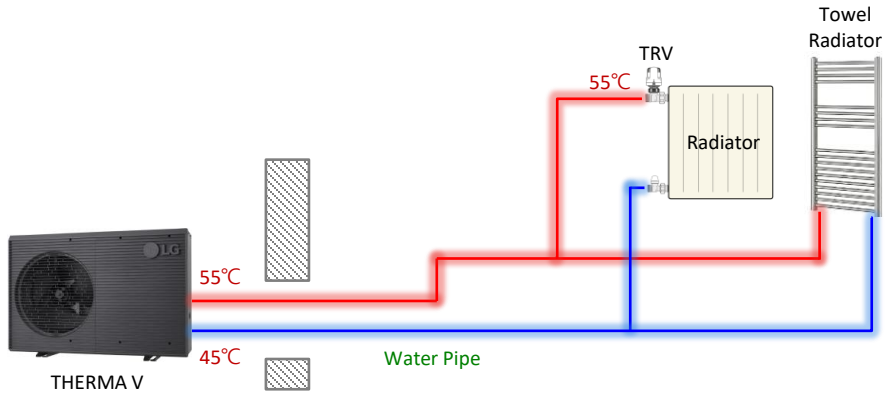
Description	Leaving water Temperature	Entering water temperature	Room Air Temperature	Room Air + Water Temperature
Thermo On/Off Control				
	Based on the water temp. measured at water outlet side	Based on the water temp. measured at water inlet side	Based on the room air temp. measured by the remote controller or the remote room Air Temp. sensor	Based on both room air temp. and water temp.3)
Application	Useful with buffer tank or 3rd party thermostat		Without 3rd party thermostat	
Products				
R290 Monobloc - Hydro, Control, Combi Units	O	O	O	O
R32 Monobloc S II	O	O	O	O
R32 Split - Hydro & Combi Units	O	O	O	O
R32 Hydrosplit - Hydro & Combi Units	O	O	O	O
R290 Monobloc - Cascade Control Unit	O	X	X	X
R32 Monobloc 51kW	O	O	X	X

Note :
1) Based on the room air temp. measured by the remote controller or the remote room Air Temp. sensor
2) Water Inlet temperature or water outlet temperature
3) Thermo on : When both air temperature and water temperature are in Thermo on condition
Thermo off : When either air temperature or water temperature is in Thermo off condition

Operation based on Water Temperature

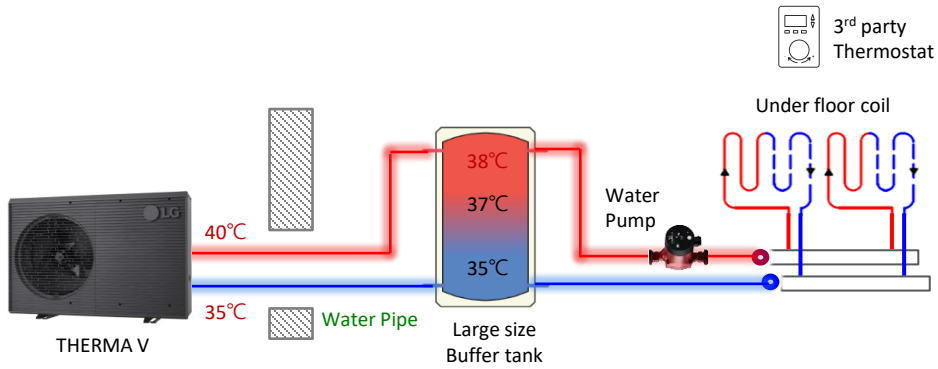
▪ Schematic Diagram #1

- Therma V is operating based on the Leaving Water Temperature



▪ Schematic Diagram #2

- Therma V is operating based on the Entering Water Temperature



1 Temperature Control Options

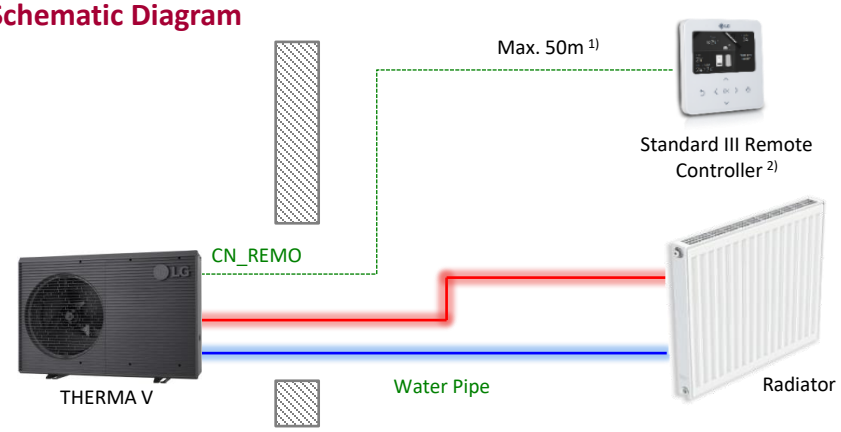
LG Therma V can be controlled with various temperature control options for the User's comfort and convenience.

Operation based on Room Air Temperature

➢ The remote controller that air temp. sensor is embedded or the remote room air temperature sensor should be installed in a space where heating / cooling is applied continuously (e.g. living room)

Option 1 - Using Air Temp. Sensor embedded in Remote Controller

▪ **Schematic Diagram**



Note :
1) Extension wire for remote controller (PZCWRC1) is required for Max. 50m connection.
2) In case of 2nd circuit, the Remote controller can be used for the High-temp circuit only except for R290 Monobloc and R32 Monobloc S II. (refer to "2nd circuit" contens of this document)

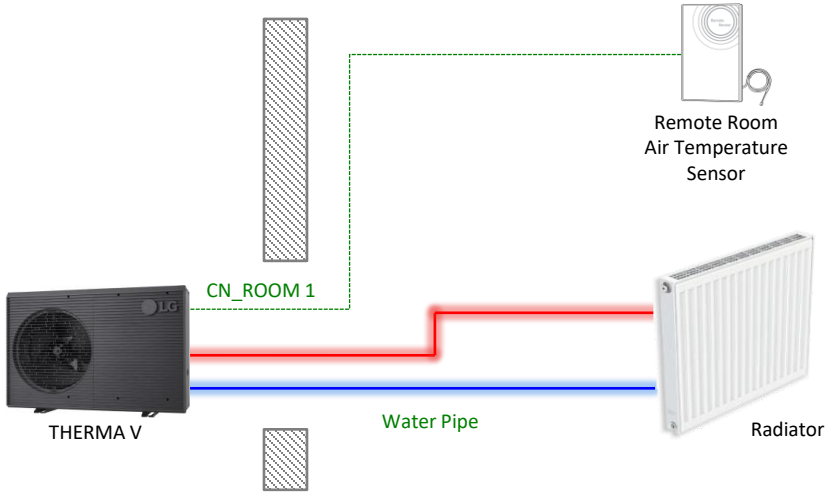
※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

Option 2 - Using Remote Room Air Temp. Sensor 1)

▪ **Required Accessory**

Model Name	Model Number	Figure	Feature
Remote Room Air Temperature Sensor	PQRSTA0		• Max. Wire Length : 15m

▪ **Schematic Diagram**



Note :
1) To use a remote room air temperature sensor, it is required to activate it in the Installer settings ("Select Temperature Sensor" resp. "Select room devices"). In older models, it is necessary to change the DIP switch setting for "Remote Room air sensor" to On.

※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

2 Room Thermostat

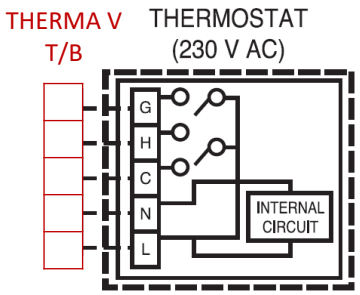
The 3rd party room thermostat can be connected to Built-in Thermostat Port in the product to control operation mode and status(on/off) of Therma V. It would be operated when it receives “ON” signal from room thermostat.

▪ Available Thermostat Type (3rd Party Accessory)

Type	Figure	Power	Operating Mode	Supported
Mechanical		230 V AC	Heating Only	Yes
			Heating / Cooling	Yes
			Heating / Cooling / DHW Heating	Yes
Electrical		230 V AC	Heating Only	Yes
			Heating / Cooling	Yes
			Heating / Cooling / DHW Heating	Yes

* Not available for Split High Temp.

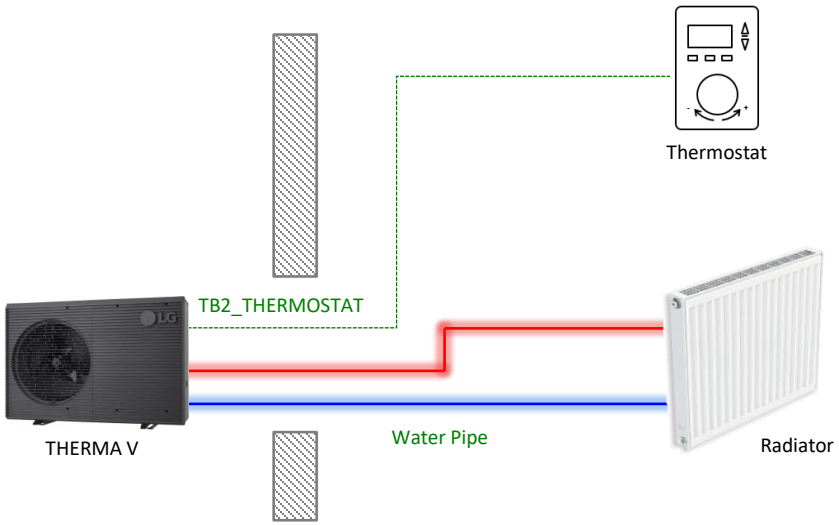
▪ Operation Logic



Space Heating & Cooling		
Input		Operation
Heat (H)	Cool (C)	
Off	Off	Off
On	Off	On (Heating)
Off	On	On (Cooling)

Hot Water Heating *	
Input	DHW Enable
DHW (G)	
Off	Off
On	On

▪ Schematic Diagram



Note :

※ *To use a room thermostat connected to Built-in Thermostat Port in the product, it is mandatorily required to change dip SW setting for “Thermostat”.*

※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

※ *If a wireless Thermostat is used, the signal receiver should be connected to Built-in Thermostat Port.*

※ *Therma V will be operated by considering both the signal from the Thermostat and the ”Thermo On” condition of the remote controller.*

Thermo On/Off Condition		Product
Thermostat	Remote Controller	
Thermo Off	Thermo Off	Thermo Off
Thermo Off	Thermo On	Thermo Off
Thermo On	Thermo Off	Thermo Off
Thermo On	Thermo On	Thermo On

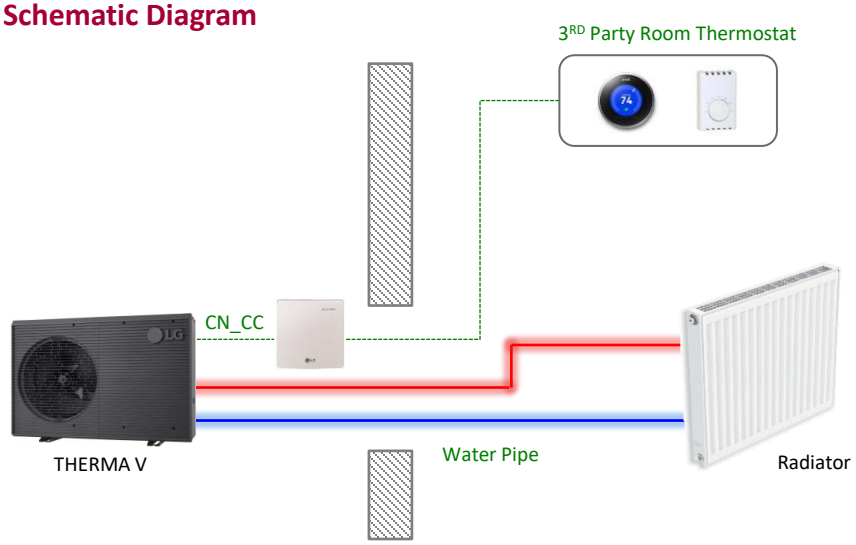
3 Dry Contact

Dry contact is available to connect 3rd party controller(24V Thermostat) to Therma V. For example, if you want to use “Google Nest” thermostat, you need to connect it through Dry Contact.

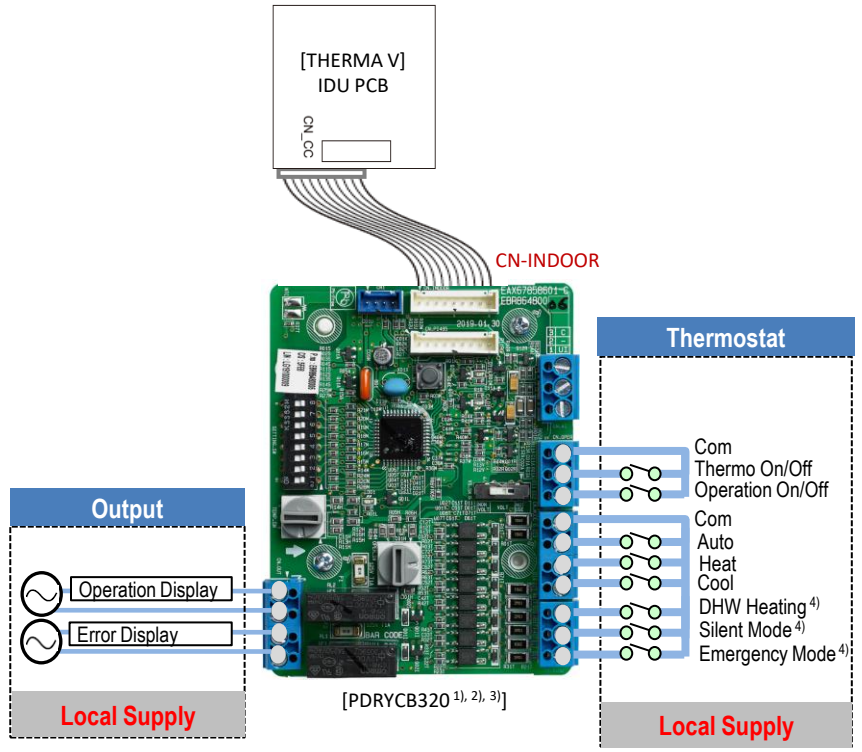
▪ Specification of Dry Contact

Description		Simple Dry Contact	Dry Contact for Thermostat
		PDRYCB000 	PDRYCB320 
Control	Input Port	1	8
	Operation On / Off	○	○
	Thermo On / Off	-	○
	Operation Mode	-	Auto, Heating, Cooling
	DHW On / Off	-	○
	Silent Mode	-	○
	Emergency Mode	-	○
Output	Operation Status	○	○
	Error	○	○

▪ Schematic Diagram



▪ Wiring Diagram



Note :

1) For Therma V Application with Dry Contact(PDRYCB320), TEMP_SW and OPER_SW should be “F” and “0”, respectively.
2) If there is no external power input, VS_SW should be “NON VOLT”.
3) When PDRYCB320 is connected by Therma V, there is no OPER_SW setting that each input signal is disabled.
4) If the signal for DHW Heating, Silent Mode, Emergency Mode is not provided by the thermostat, these operations will be stopped, even though these functions are activated by the remote controller.

※*Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

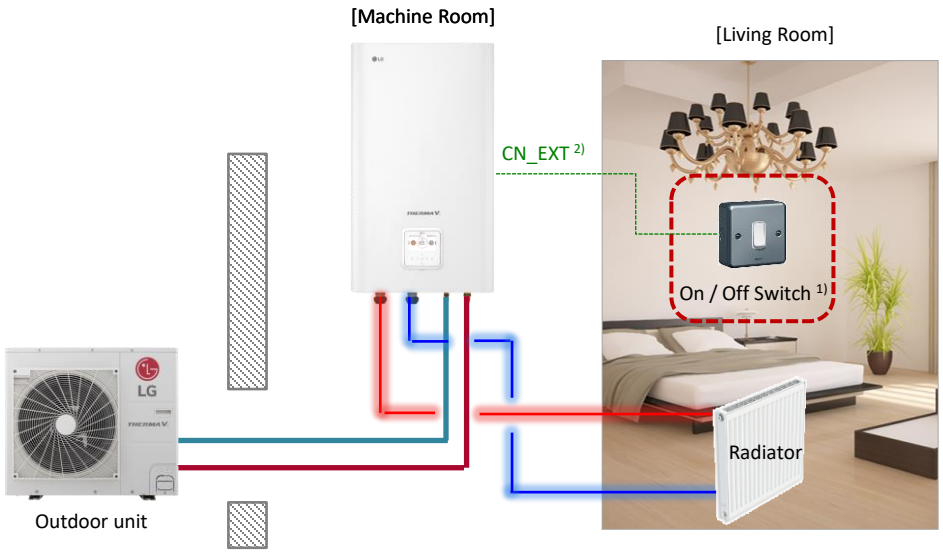
4 Programmable Digital Input (CN_EXT)

Thermal V has a port to receive external input signal, and the product would be operated according to the mode selected by the installer setting and input signal.

▪ Available Products

Availability	Available Products
Available	R290 Monobloc –Combi Unit R32 Monobloc S II R32 Split - Hydro & Combi Units R32 Hydrosplit - Hydro & Combi Units R32 Monobloc 51kW
Not Available	R290 Monobloc – Hydro Unit, Control: X → O (TBD) R290 Monobloc - Cascade Control Unit : X → O (TBD)

▪ Schematic Diagram



Note :
1) If the length between Port for CN_EXT and ON/OFF Switch is more than 10m, it should be connected through the relay.
2) Adapter Cable (0.5m) for CN_EXT is provided with product.

▪ Detailed Operation

CN_EXT Mode	Input Signal *	Operation **
Not Use (Default)	-	Not Used
Simple operation (On / Off) ***	Open	"Operation Off"
	Close	"Operation On"
Simple Dry contact	Open	Operation Off with dry contact lock setting ※ In this case, "Operation on" is possible only with the Central controller.
	Close	Release dry contact lock setting and "operation on" is possible depend on dry contact auto setting **** - Auto Mode : Change as "Operation on" condition automatically - Manual Mode : Keep on "operation off" condition, but "operation on" is possible by remote controller manually
Single Emergency Stop (Forced Stop)	Open	Forced operation stop with forced lock setting ※ In this case, "Operation on" is impossible with any other controller.
	Close	Release forced lock and keep on "operation off" condition, but "operation on" is possible by remote controller manually

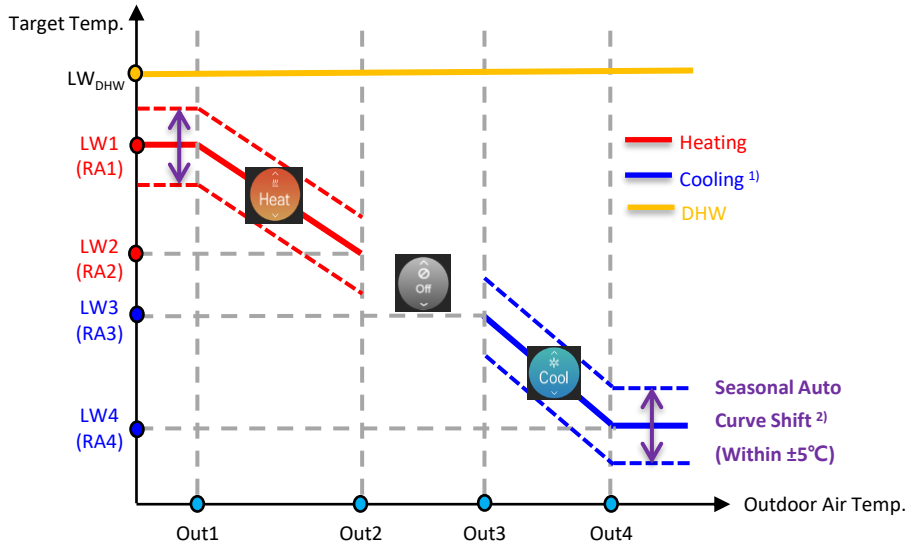
* This signal is recognized only when status is changed.
** This operation on / off means remote controller of / off for heating & cooling.
*** In case of simple operation, operation on/off is possible as per both the remote controller and external input signal.
**** It can be selected in "Dry Contact Mode" menu of the Installer Setting.

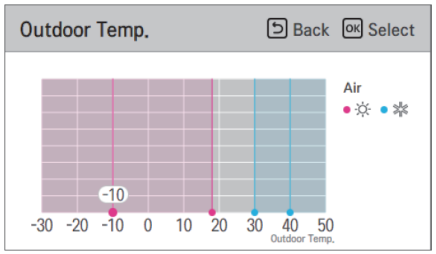
※To use the Programmable Digital Input operation, it is mandatorily required to change options of "CN_EXT" in the Installer Setting.
※Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

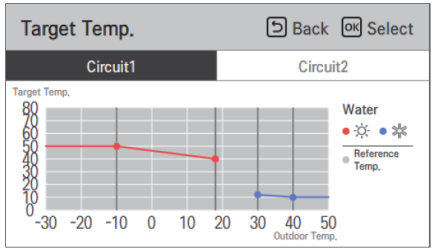
5 Seasonal Auto Mode

For energy saving and comfortable operation, Therma V has a function to change the target temperature and operating mode automatically according to the outdoor temperature. Moreover, now this function can be used in 2nd circuit application and the customer can conveniently set it up using visualized graphics.

Seasonal Auto Mode







Note :
1) When operated with “Heating only”, the setting range is limited to heating operation.
2) Detailed Settings can be done in the form of a graph in the installer settings, and the user can only shift the pre-set curve up or down within a range of 5K.

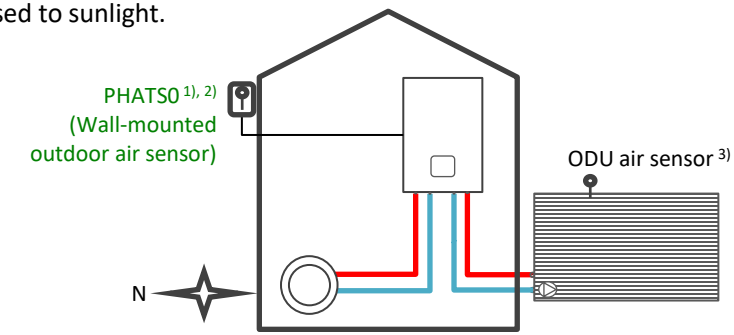
※ Since the temperature setting range is different for each product, please refer to the installation manual for each product.

Wall-mounted outdoor air sensor

➢ Seasonal auto mode can be operated based on pre-installed air sensor at outdoor unit or dedicated outside sensor.

Products	Availability of Seasonal Auto Mode	
	By air sensor at ODU	By PHATS0 1)
R290 Monobloc - Hydro, Control, Combi Units	O	O
R32 Monobloc S II	O	O
R32 Split - Hydro & Combi Units	O	X
R32 Hydrosplit - Hydro & Combi Units	O	X
R290 Monobloc - Cascade Control Unit	O	O
R32 Monobloc 51kW	O	O

Installer Setting ‘**Configuration / Select outdoor air sensor’** defines if the pre-installed air sensor (mounted at grille of outdoor unit) or a dedicated outside sensor (wall-mounted / accessory) is used for weather-dependent operation (Auto mode). It is highly recommended to use wall-mounted outdoor air sensor because more reliable seasonal auto operation would be possible based on a more accurate temperature – especially when the outdoor unit is exposed to sunlight.

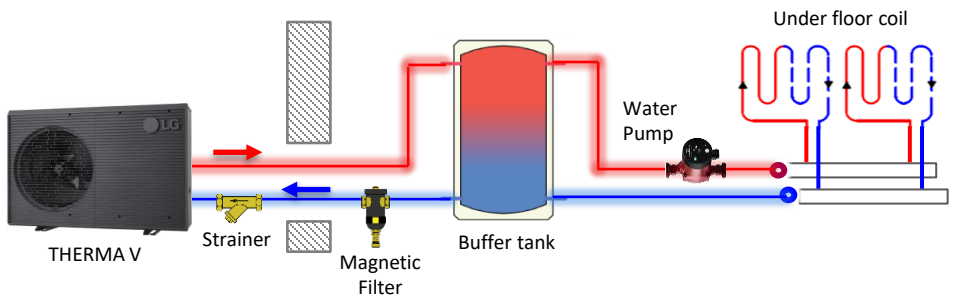


Note :
1) To select ‘Wall-mounted air sensor’, a dedicated accessory (PHATS0) is required.
2) The connection wire between sensor and product is not provided.
3) Even if wall-mounted outdoor air sensor is used, the sensor at outdoor unit must NOT be dis-connected, as it is still used to control the refrigerant cycle!

6 Strainer & Magnetic Filter

To protect the products and prevent clogging of the heat exchanger, strainer must be installed in the inlet water lines of individual products. Furthermore, to remove iron particles from products that are in liquid or slurry form, LGE strongly recommends to install a magnetic filter.

Schematic Diagram



Strainer

Some products come with a strainer pre-installed inside the product, while others require external installation. For external installations, LGE strongly recommends using the strainer loose supplied with product. However, if this is not feasible due to space constraints or other reasons, LGE can also accommodate a third-party screen mesh type strainer with equivalent mesh specifications.

Products	Figure	Strainer	Mesh Size
R290 Monobloc – Hydro, Control, Combi Units R32 Monobloc S II R290 Monobloc – Cascade Control Unit		Loose Supply [1] (External installation required for each ODU)	Min. 30 Mesh
R32 Split - Hydro & Combi Units R32 Hydrosplit - Hydro & Combi Units		Integrated in the IDU	Min. 30 Mesh
R32 Monobloc 51kW		Field Scope [1] (External installation required)	Min. 30 Mesh

Magnetic Filter

To remove iron particles from products that are in liquid or slurry form, LGE strongly recommends to install a magnetic filter.

Model Name	Model Number	Figure	Feature
Magnetic Filter	Field Scope		• Magnetic Dirt Separator • Horizontal or Vertical Type

Note :
1) If installation of the strainer loose supplied with product is not feasible due to space constraints or other reasons, installation of a 3rd party screen mesh type strainer is also possible when it meets the same mesh specifications. Available strainers include:


[Y-type Filter Ball Valve]


[Filter Ball Valve]


[Valve Assembly with filter]

7 Buffer Tank

In most applications, installation of buffer tank is normally required for the various reasons.

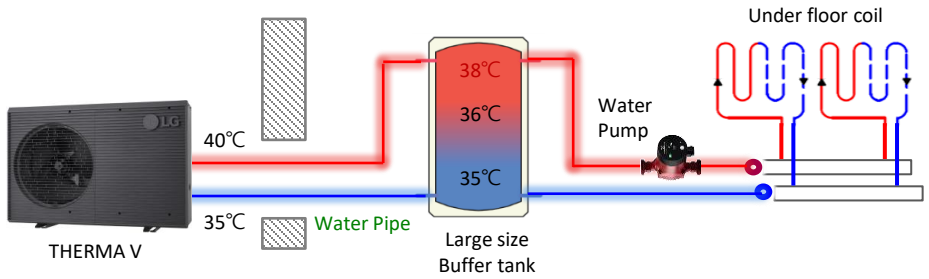
Purpose of installing Buffer tank

1) Energy Buffer during defrost / DHW operation duration
2) Energy Storage using cheaper electricity cost
3) Preventing short cycle (frequent on/off)
4) Improving system operating efficiency

Description	Parallel buffer tank (Hydronic separator)	Serial buffer tank
Ensure enough heat for defrosting	Yes	Yes
Reduce cycling of AWHP	Yes	Yes
Ensure min. flow rate inside primary circuit (No risk of CH14 error)	Yes	No
Bypass when all heat emitters not used	Not required	Mandatory
Reduce flow noise inside secondary circuit [1)]	Yes	No
Simultaneous control of air temperature and water temperature	Comprehensive Solution	Partial Solution [2)]
Buffer can be used as air and mud trap	Yes	Yes
Need for secondary pump	Mandatory	Not required
Hydronic balancing of secondary circuit	Yes	No

Note :
1) This is not so important in new-built; but mainly in renovations, when diameter of piping is very small.
2) Even if the air temperature is not satisfied, there is some case that unit is thermo-off because the water temperature is satisfied.

Schematic Diagram



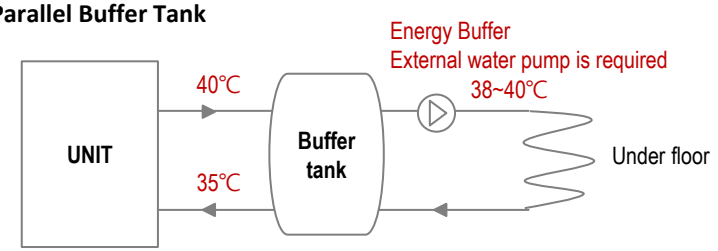
Required Accessory

Model Name	Model Number	Figure	Feature
Buffer Tank	Field Scope		• 50-120 Liter * • Floor standing or wall mountable • Insulated • 4-ports or 2-ports • Equipped with Air-Vent and Drain Valve

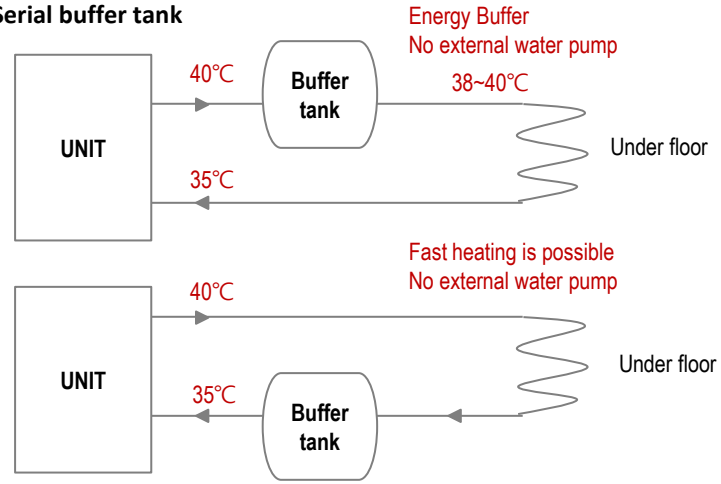
* Buffer tank size may vary depending on product capacity and installation condition.
(For Single Family House, min. 5L / kW is required and 10L / kW is recommended.)

Various Applications

✓ **Parallel Buffer Tank**



✓ **Serial buffer tank**



7 Buffer Tank

In most applications, installation of buffer tank is normally required for the various reasons.

Buffer Tank Sensor

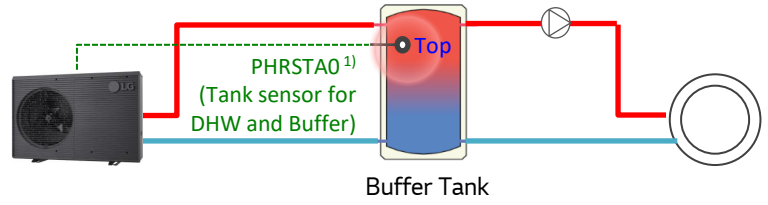
➢ New function [1)] has been introduced to control cooling and heating operation based on the temperature measured in the buffer tank. This function allows more precise control when a buffer tank is installed.

Availability	Available Products
Available	R290 Monobloc - Hydro, Control, Combi Units R32 Monobloc S II R32 Monobloc 51kW
Not Available	R32 Split - Hydro & Combi Units R32 Hydrosplit - Hydro & Combi Units R290 Monobloc - Cascade Control Unit

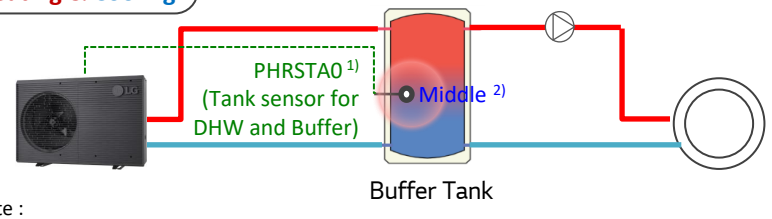
Heating operation is performed by comparing the desired target water temperature (as set by User or defined by weather-dependent function) with the buffer tank temperature. Basically, it supports the same set temperature range and cycle operation as the water temperature control function. In addition, a dedicated hysteresis can be set - separate setting from existing air or water temperature control hysteresis.

▪ Location of Buffer Tank Sensor

Heating only



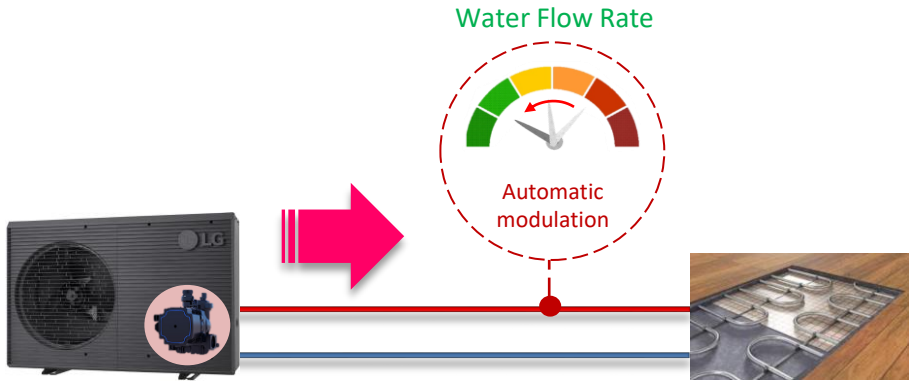
Heating & Cooling

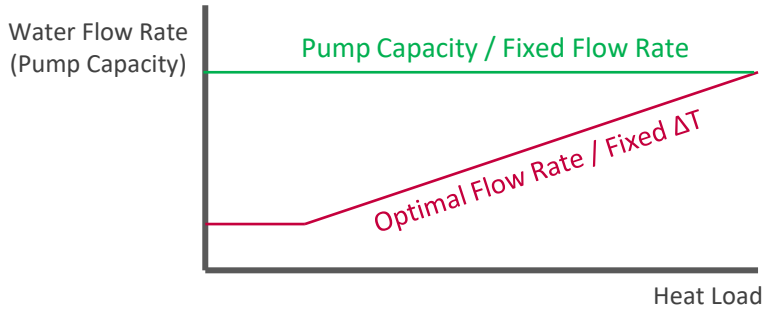


Note :
1) To use this function, a dedicated accessory (PHRSTA0) is required.
(PHRSTA0 is the water tank sensor, it can be used as buffer tank sensor only for available products)
The function can be activated in menu Configuration>Buffer tank sensor: Use.
2) In case of cooling operation, it should be positioned at the bottom, but when used for both heating and cooling, the middle position is recommended. (For more details, please refer to page 15)

8 Water Pump Modulation

Various pump control options are available for the user's convenience. Now, water flow rate can be changed according to the heat load condition, therefore making it more energy efficient under low load conditions.





Available Products

Product	Available Pump Control Options
R290 Monobloc - Hydro, Control, Combi Units	Pump Capacity, Fixed Flow Rate, Fixed ΔT, Optimal Flow Rate
R32 Monobloc S II	
R32 Split - Hydro & Combi Units	
R32 Hydrosplit - Hydro & Combi Units	
R290 Monobloc - Cascade Control Unit	Pump Capacity
R32 Monobloc 51kW	No Water Pump (On/Off signal)

Available Control Methods

Options	Description	Water Flow Change as per load condition
Pump Capacity	It operates with the capacity set for the water pump. (Range 10 ~ 100%)	No
Fixed Flow Rate [1)]	Automatically controlled to maintain the set flow rate. Range - 4/6 kW Models : 7 ~ 18 LPM - 5/7/9 kW Models : 8 ~ 26 LPM - 12/14/16 kW Models : 17 ~ 46 LPM	No
Fixed ΔT* [1)]	Automatically controlled to maintain the set ΔT. (Range 5 ~ 13℃)	Yes
Optimal Flow Rate [1)] (Default)	ΔT is changed as per Target Temp.	Yes

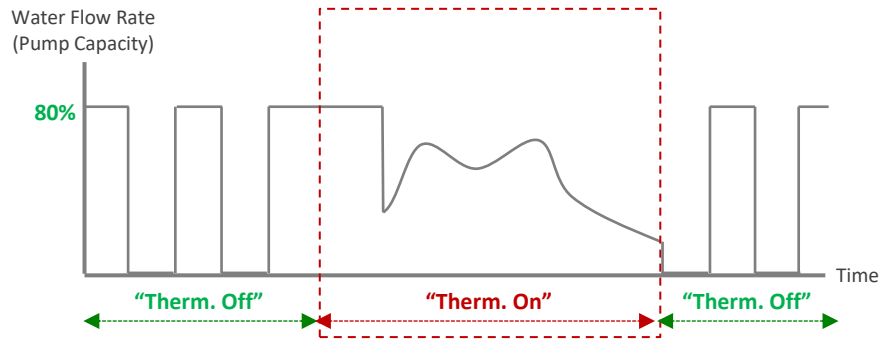
*ΔT = temperature difference between inlet and outlet water temperature

Note :

1) Even though the control method is set as Fixed Flow Rate, Fixed ΔT, or Optimal Flow Rate, it would operate based on the capacity set in Pump Capacity during Therm. Off condition.

Example Case

In case that Pump Capacity is set as 80%, and "Optimal Flow Rate" selected



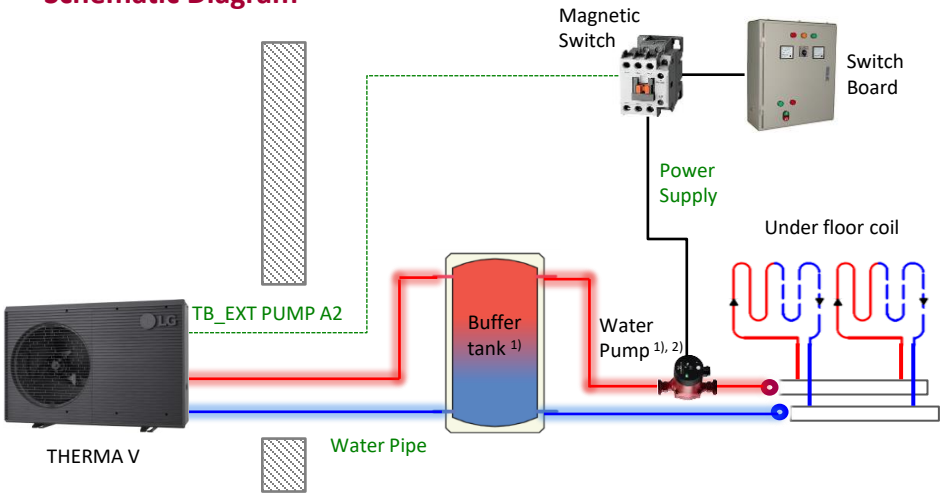
9 External Water Pump

There are many case that external water pump is required, and especially when a parallel type buffer tank is installed, external water pump must be installed in the secondary circuit.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Water Pump	Field Scope		• 1Φ, 230V AC • Self-Controlled is recommended

▪ Schematic Diagram



Note :
1) If hydronic separator or buffer tank is installed, water pump in the secondary circuit must be installed.
2) In the case of water pumps in secondary circuits, they are often operated by interlocking with a thermostat or wiring center rather than the Therma V. In particular, when a self-controlled pump is installed, it is often set to “always power on” because the pump output is reduced when all valves on the heating emitter side are closed.

※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

In case that Synchronized with Therma V

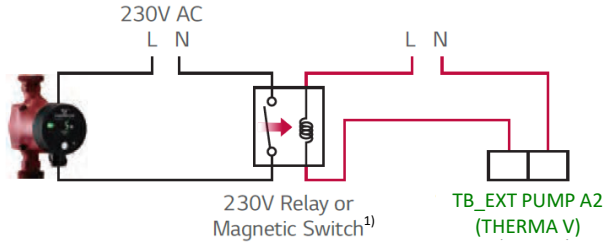
➢ LG Therma V can provide contact signal (Non-Voltage) to external water pump in accordance with Pump operation situation.

▪ Available Options

One of three options can be selected in the Installer Setting.

Option	External Pump Operation
Heat & Cool & DHW	Operation when main water pump is operating
Heating & Cooling	Operation only for space heating or cooling
Circuit 1	Used for Circuit 1 in case of 2nd circuits

▪ Wiring of External Water Pump



Note :
1) Direct connection without relay or Magnetic Switch is not recommended.

※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

10 Heating & Cooling using 2way valve

Contents

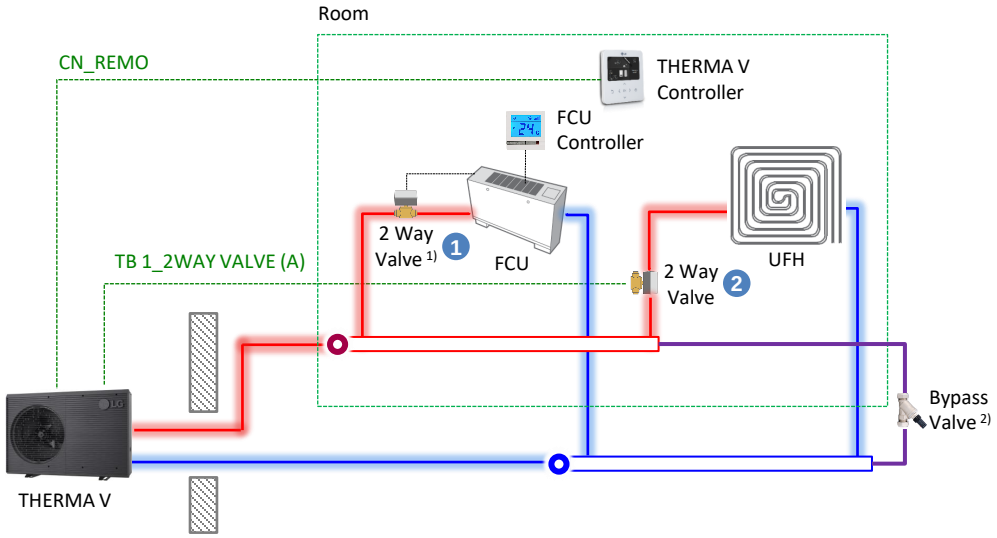
SPACE HEATING AND COOLING

This 2way valve terminal can be used in various applications because it is compatible with 3way and 4way valves and provides different signals depending on the cooling and heating operation mode.

For Under Floor Heating

➢ If the fan coil unit and underfloor heating coil are installed in the same system, a 2way valve 2 is used to prevent underfloor side condensation during cooling operation.

▪ Schematic Diagram



Note :
1) This 2 way valve is built into the FCU or operates by receiving a signal from the FCU. Only during FCU operation, the 2 way valve is open. On the other hand, when the FCU is not running, the valve is closed.
2) There is the case where the water pump operates while all valves are closed, so a bypass valve must be installed.

※ *For cooling operation, it is mandatorily required to change dip SW setting for "Cycle" as a "Heating & Cooling".*

※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

▪ Operation

Type	Terminal Unit	Main Controller by End User	FCU	Underfloor Coil
Heating	by UFH	THERMA V Controller	X (2 Way Valve 1 : Close as per FCU Non-operation)	O (2 Way Valve 2 : Open)
	by UFH & FCU	THERMA V and FCU Controller	O (2 Way Valve 1 : Open as per FCU Operation)	O (2 Way Valve 2 : Open)
Cooling *	by FCU	FCU Controller	O (2 Way Valve 1 : Open as per FCU Operation)	X (2 Way Valve 2 : Close)

* Therma V and FCU are operating independently. Therma V is operating based on Pre-set Target Water Temp, while FCU is operating based on Room Air Temp. measured by FCU controller.

▪ Required Accessory

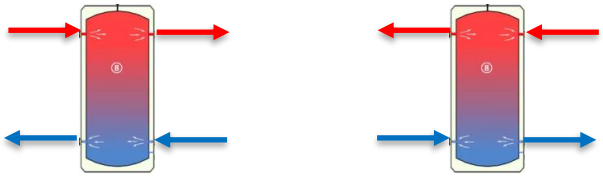
Model Name	Model Number	Figure	Feature
2 Way Valve	Field Scope		• 1Φ, 230V AC

10 Heating & Cooling using 2way valve

This 2way valve terminal can be used in various applications because it is compatible with 3way and 4way valves and provides different signals depending on the cooling and heating operation mode.

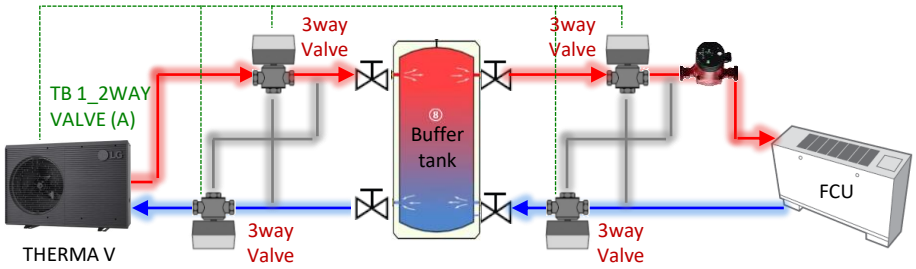
For Buffer Tank

➢ For better heating and cooling performance, it is recommended to changer water flow direction through buffer tank.

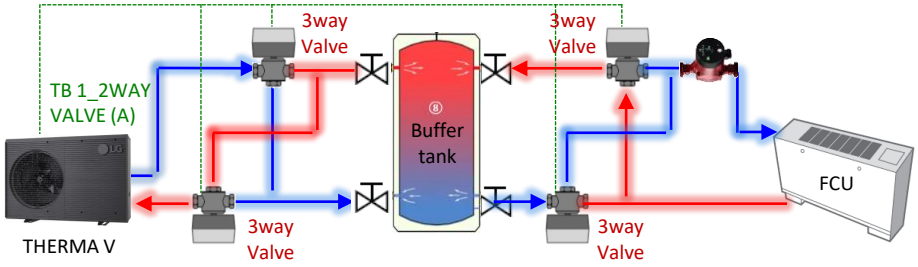


▪ Connection with 3way valve

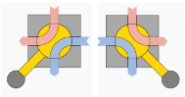
✓ **Heating**



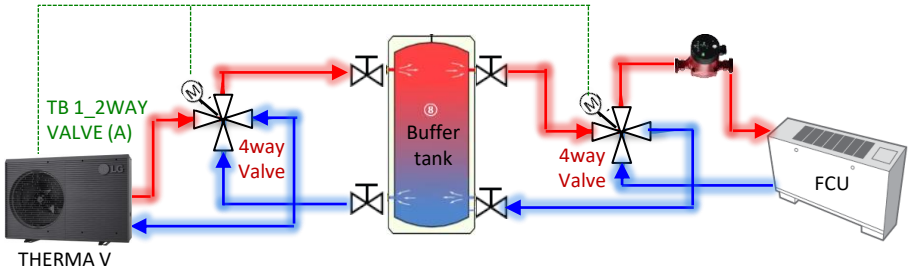
✓ **Cooling**



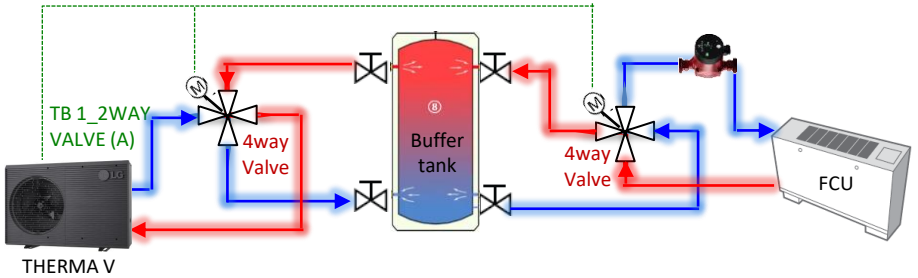
▪ Connection with 4way valve



✓ **Heating**



✓ **Cooling**

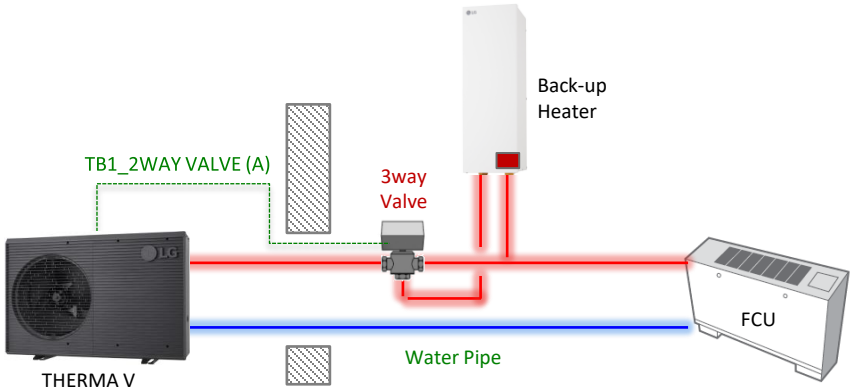


10 Heating & Cooling using 2way valve

This 2way valve terminal can be used in various applications because it is compatible with 3way and 4way valves and provides different signals depending on the cooling and heating operation mode.

For back-up heater

- During cooling operation, condensation may occur inside of back up Heater. In order to protect formation of condensation, cooling water should be bypassed.



11 Multi-Zone Control

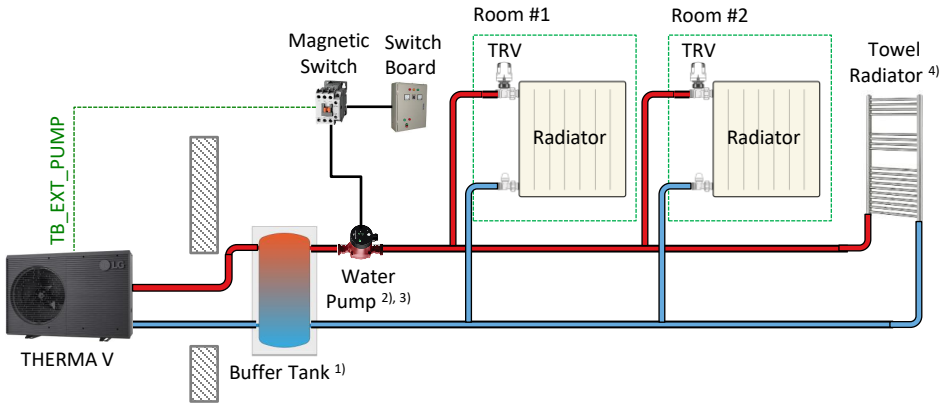
If individual control for multiple rooms is required with one heat pump, LG Therma V can provide the necessary solution in conjunction with the thermostats, valves, etc.

Case 1 – Application with Thermostatic Radiator Valve (TRV) - Applicable for Radiator

▪ Operation

1) Therma V and Thermostatic Radiator Valve (TRV) are operating independently.
2) Therma V is operating based on Pre-set Target Water Temp.
3) The operation of radiator is regulated by the Thermostatic Radiator Valve (TRV).

▪ Schematic Diagram



Note :
1) There is the case where the water pump operates while all valves are closed, so one of the hydronic separator, buffer tank, and bypass valve must be installed.
2) If hydronic separator or buffer tank is installed, water pump in the secondary circuit must be installed.
3) When a self-controlled pump is installed, it is often set to “always power on” because the pump output is reduced when all valves on the heating emitter side are closed.
4) Bypass line (or valve) should be considered in the secondary circuit in case all valves are closed, if water pump is not self-controlled.

※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Thermostatic Radiator Valve (TRV)	Field Scope		
Buffer Tank	Field Scope		• 50-120 Liter * • Floor standing or wall mountable • Insulated • 4-ports or 2-ports • Equipped with Air-Vent and Drain Valve
Water Pump	Field Scope		• 1Φ, 230V AC • Self-Controlled is recommended
Towel Radiator (Optional)	Field Scope		• Hot Water Type

* Buffer tank size may vary depending on product capacity and installation condition.
(For Single Family House, min. 5L / kW is required and 10L / kW is recommended.)

11 Multi-Zone Control

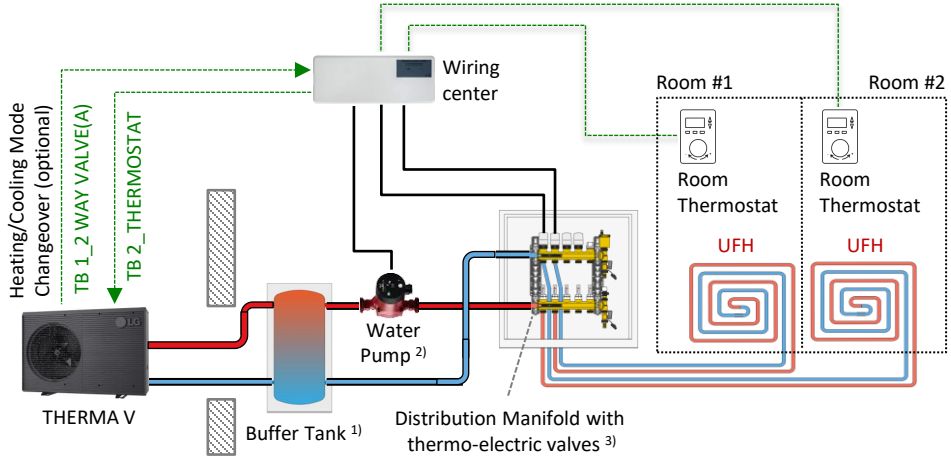
If individual control for multiple rooms is required with one heat pump, LG Therma V can provide the necessary solution in conjunction with the thermostats, valves, etc.

Case 2 – Application with Thermo-electric valves and Wiring Center - Applicable for UFH

▪ Operation

1) The wiring center is connected to each individual thermo-electric valve and room thermostat.
2) Therma V is operating based on Pre-set Target Water Temp only while receiving the Thermostat signal from the wiring center.
3) The operation of thermo-electric valves is controlled by the Thermostat signal.
4) The operation of External Water pump is controlled by the Thermostat signal.

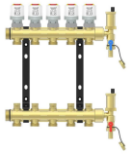
▪ Schematic Diagram



Note :
1) There is the case where the water pump operates while all valves are closed, so one of the hydronic separator, buffer tank, and bypass valve must be installed.
2) If hydronic separator or buffer tank is installed, water pump in the secondary circuit must be installed. The water pump is controlled by the Wiring center to operate only with some valves open. If not, self-controlled water pump must be used.
3) 0 - 10 V (DDC), 24 V and 230 V versions available on the market - continuous (PWM) or discontinuous.

※Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Wiring center	Field Scope		• Providing Thermostat-output (“Boiler signal“) to stop heat pump when no heating is needed
Distribution Manifold with thermo-electric valves	Field Scope		• 0 - 10 V (DDC), 24 V and 230 V versions available on the market • Continuous (PWM) or discontinuous
Room Thermostat	Field Scope		
Buffer Tank	Field Scope		• 50-120 Liter * • Floor standing or wall mountable • Insulated • 4-ports or 2-ports • Equipped with Air-Vent and Drain Valve
Water Pump	Field Scope		• 1Φ, 230V AC • Self-Controlled is recommended

* Buffer tank size may vary depending on product capacity and installation condition. (For Single Family House, min. 5L / kW is required and 10L / kW is recommended.)

11 Multi-Zone Control

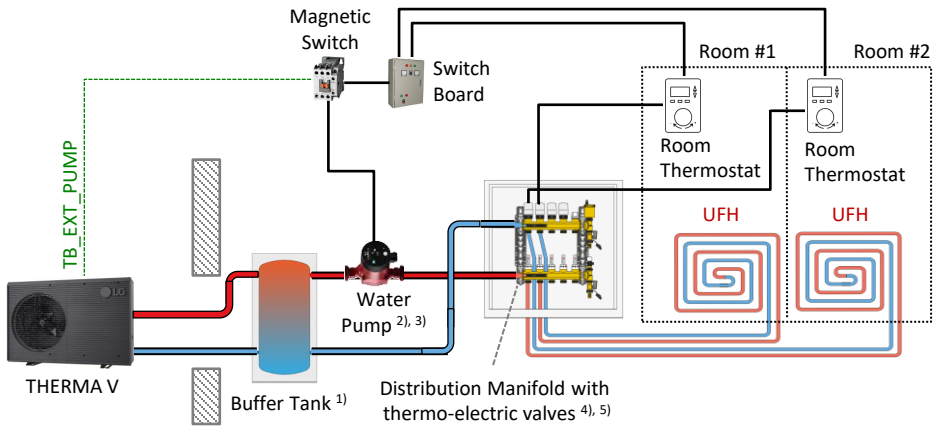
If individual control for multiple rooms is required with one heat pump, LG Therma V can provide the necessary solution in conjunction with the thermostats, valves, etc.

Case 3 – Application with Thermo-electric valves and Room thermostat - Applicable for UFH or Radiator

▪ Operation

1) Therma V and Thermo-electric valves are operating independently.
2) Therma V is operating based on Pre-set Target Water Temp.
3) The operation of Thermo-electric valves is controlled by the Room Thermostats.

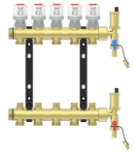
▪ Schematic Diagram



Note :
1) There is the case where the water pump operates while all valves are closed, so one of the hydronic separator, buffer tank, and bypass valve must be installed.
2) If hydronic separator or buffer tank is installed, water pump in the secondary circuit must be installed.
3) When a self-controlled pump is installed, it is often set to “always power on” because the pump output is reduced when all valves on the heating emitter side are closed.
4) 0 - 10 V (DDC), 24 V and 230 V versions available on the market - continuous (PWM) or discontinuous.
5) Bypass line (or valve) should be considered in the secondary circuit in case all valves are closed, if water pump is not self-controlled.

※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Distribution Manifold with thermo-electric valves	Field Scope		• 0 - 10 V (DDC), 24 V and 230 V versions available on the market • Continuous (PWM) or discontinuous
Room Thermostat	Field Scope		
Buffer Tank	Field Scope		• 50-120 Liter * • Floor standing or wall mountable • Insulated • 4-ports or 2-ports • Equipped with Air-Vent and Drain Valve
Water Pump	Field Scope		• 1Φ, 230V AC • Self-Controlled is recommended
Bypass valve (Optional)	Field Scope		

* Buffer tank size may vary depending on product capacity and installation condition.
(For Single Family House, min. 5L / kW is required and 10L / kW is recommended.)

11 Multi-Zone Control

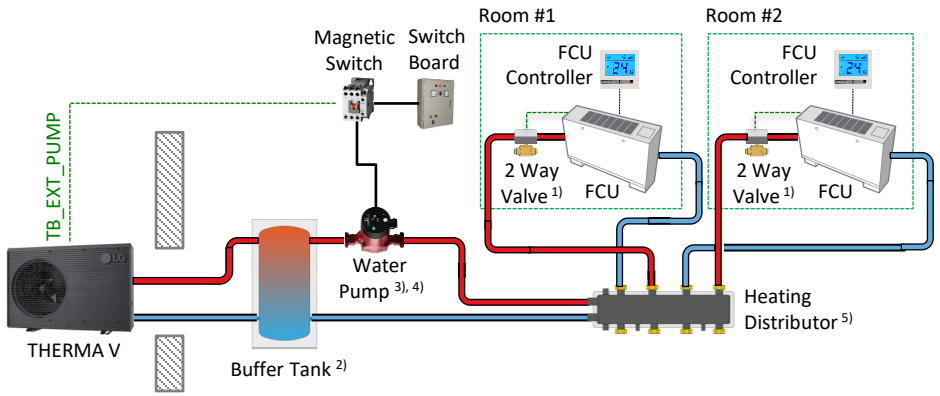
If individual control for multiple rooms is required with one heat pump, LG Therma V can provide the necessary solution in conjunction with the thermostats, valves, etc.

Case 4 – Application with Fan Coil Unit(FCU) and 2 Way Valve - Applicable for FCU

▪ Operation

1) Therma V and FCU are operating independently.
2) Therma V is operating based on Pre-set Target Water Temp.
3) FCU is operating based on Room Air Temp. measured by each FCU controller.

▪ Schematic Diagram



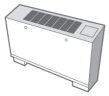
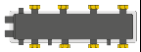
Note :

1) This 2 way valve is built into the FCU or operates by receiving a signal from the FCU. Only during FCU operation, the 2 way valve is open. On the other hand, when the FCU is not running, the valve is closed.
2) There is the case where the water pump operates while all valves are closed, so one of the hydronic separator, buffer tank, and bypass valve must be installed.
3) If hydronic separator or buffer tank is installed, water pump in the secondary circuit must be installed.
4) When a self-controlled pump is installed, it is often set to “always power on” because the pump output is reduced when all valves on the heating emitter side are closed.
5) Bypass line (or valve) should be considered in the secondary circuit in case all valves are closed, if water pump is not self-controlled.

※For cooling operation, it is mandatorily required to change dip SW setting for “Cycle” as a “Heating & Cooling”.

※Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

▪ Required Accessory

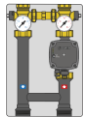
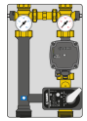
Model Name	Model Number	Figure	Feature
FCU (Fan Coil Unit)	Field Scope		• Including FCU Controller • Available for “Heating only“ or “Heating and Cooling“ • Built-in 2 way valve or Providing signal for 2 way valve
2 Way Valve	Field Scope		• Optional; In case the FCU does not have a built-in 2-way valve
Buffer Tank	Field Scope		• 50-120 Liter * • Floor standing or wall mountable • Insulated • 4-ports or 2-ports • Equipped with Air-Vent and Drain Valve
Water Pump	Field Scope		• 1Φ, 230V AC • Self-Controlled is recommended
Heating Distributor	Field Scope		
Bypass valve (Optional)	Field Scope		

* Buffer tank size may vary depending on product capacity and installation condition. (For Single Family House, min. 5L / kW is required and 10L / kW is recommended.)

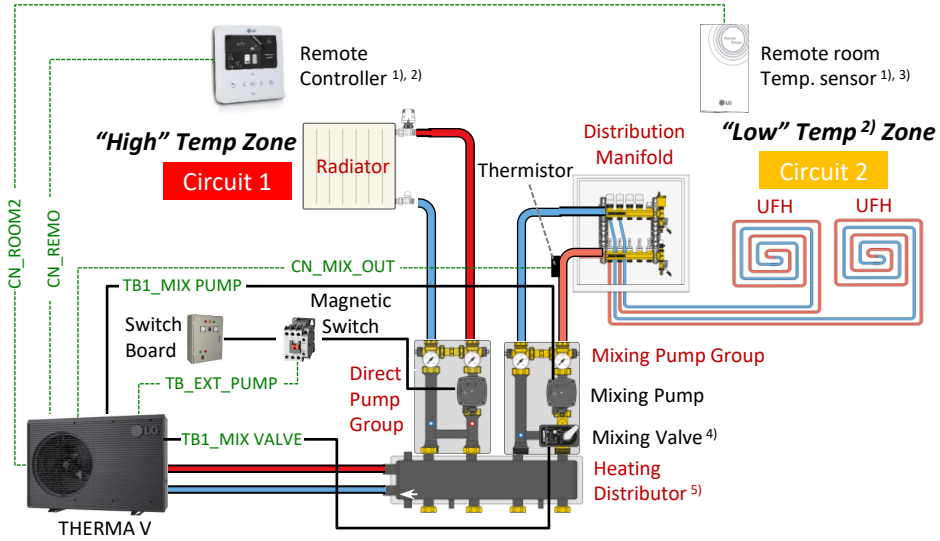
12 2nd Circuit

LG Therma V can provide the solution to control two different set temperatures for two circuits. In this case, the circuit 2 (Low Temp. zone) will have the remote room sensor and the circuit 1 (High Temp. zone) will have the remote controller except for R290 Monobloc and R32 Monobloc S II.

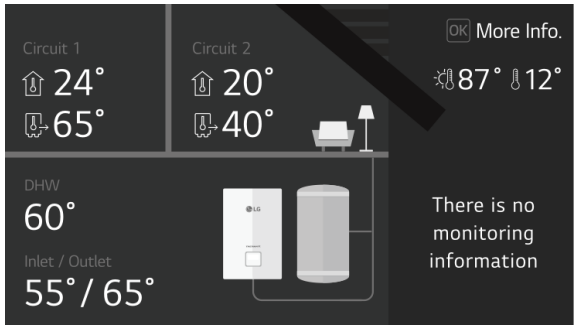
Required Accessory

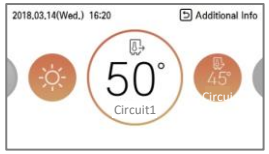
Model Name	Model Number	Figure	Feature
Direct Pump Group	Field Scope		**Direct Pump** • 1Φ, 230V AC
Mixing Pump Group	Field Scope		**Mixing Pump** • 1Φ, 230V AC (Max. 1.05A) **Mixing Valve** • 1Φ, 230V AC • Full Open Time (60~999, Default 240s)
Heating Distributor	Field Scope		• Integrated Bypass system
Thermistor for 2nd Circuit	PRSTAT5K10		• 5kΩ thermistor, 10m
Remote Room Air Temperature Sensor [1]	PQRSTA0		• Max. Wire Length : 15m

Schematic Diagram

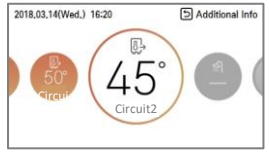


Remote Controller UI





Set Temperature of Circuit 1



Set Temperature of Circuit 2

Note :
1) If each circuit is controlled only by Water Temperature, it is an optional item.
2) The Remote controller can be used for the High-temp circuit only (Except for R290 Monobloc and R32 Monobloc S II).
3) The Remote room sensor (PQRSTA0) can be used for both – low and high-temperature circuits.
4) The temperature of the circuit 2 is controlled by the mixing valve and it can be set below the circuit 1 temperature.
5) There is the case where the water pump operates while all valves are closed, so one of the hydronic separator, buffer tank, and bypass valve must be installed.

※ *Both Water Temp. Base Control and Air Temp. Base Control is available for 2nd circuit application.*
※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

12 2nd Circuit

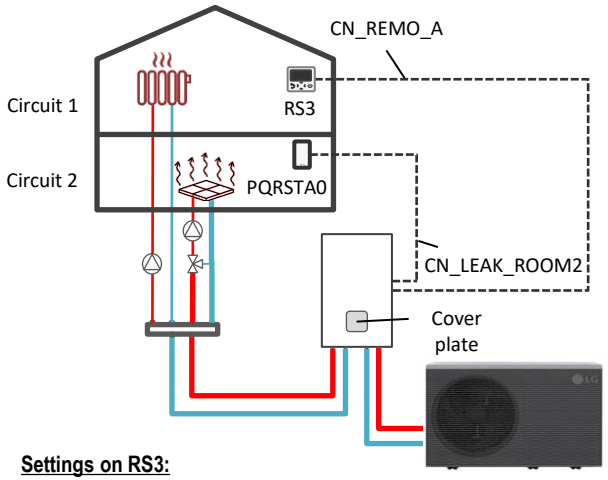
LG Therma V can provide the solution to control two different set temperatures for two circuits. In this case, the circuit 2 (Low Temp. zone) will have the remote room sensor and the circuit 1 (High Temp. zone) will have the remote controller except for R290 Monobloc and R32 Monobloc S II.

Flexible use of Room devices (Only for R290 Monobloc and R32 Monobloc S II*)

In case of R290 Monobloc and R32 Monobloc S II, Various room devices can now be flexibly used in 2nd circuit applications. In addition to a combination of a remote controller and a room sensor in Circuit 1 and Circuit 2, both remote controllers options or both thermostats options could be also used.

Case #1

- Circuit 1: Remote controller
- Circuit 2: Room Sensor (PQRSTA0)

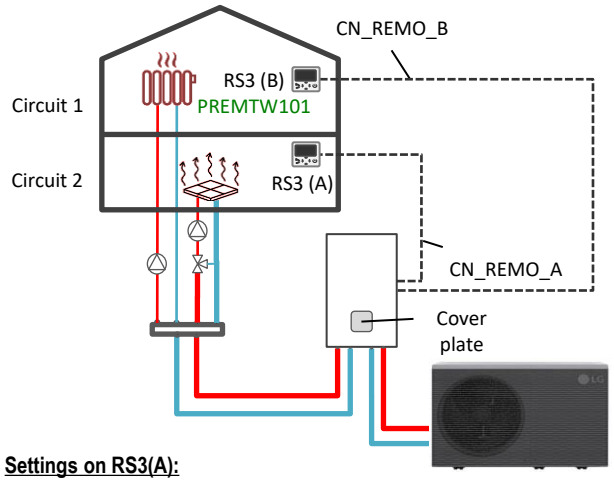


Settings on RS3:

- Configuration/Control method: Air or Air+Water
- Configuration/Select room devices/RMC linked to: Circuit1&2
- Configuration/Select room devices/Circuit 1/Room air sensor option: Remote controller
- Configuration/Select room devices/Circuit 2/Room air sensor option: Room Sensor

Case #2

- Circuit 1: Remote controller (B) (PREMTW101)
- Circuit 2: Remote controller (A)



Settings on RS3(A):

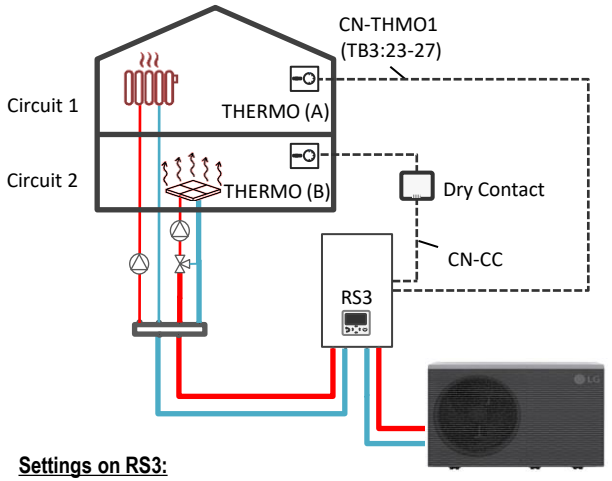
- Configuration/Control method: Air or Air+Water
- Configuration/Select room devices/RMC linked to: Circuit1&2
- Configuration/Select room devices/Circuit 1/Room air sensor option: Remote controller
- Configuration/Select room devices/Circuit 2/Room air sensor option: Remote controller

Settings on RS3(B):

- Configuration/Select room devices/RMC linked to: Circuit1

Case #3

- Circuit 1: 3rd party Room Thermostat (A)
- Circuit 2: 3rd party Room Thermostat (B)



Settings on RS3:

- Configuration/Control method: Water
- Configuration/Select room devices/RMC linked to: Circuit1&2
- Configuration/Select room devices/Circuit 1/Digital input/CN-THMO
- Configuration/Select room devices/Circuit 2/Digital input/CN-CC

* In the case of the R290 Monobloc and R32 Monobloc S II, the heating or cooling functions of Circuit 1 and Circuit 2 can be turned on and off individually.

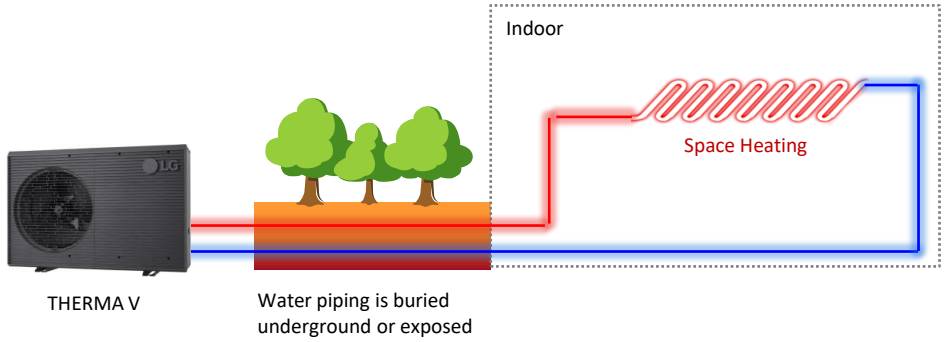
13 Anti-freeze Solution

Contents

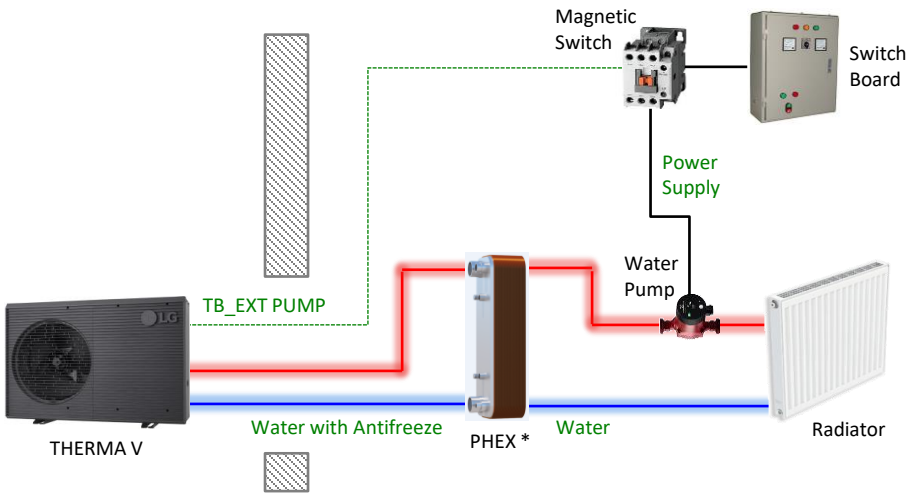
SPACE HEATING ONLY

When concerning about freezing in water system, antifreeze (glycole) can be added to the heating water in order to prevent the water from freezing.

▪ Schematic Diagram



▪ Advanced Application



* Since some antifreeze agents might be harmful to materials used in the heating circuit, it is recommended to use an indirect circuit by installing a suitable plate-heat-exchanger.
This is also able to reduce the amount of antifreeze.

▪ Available Antifreezes

Antifreeze Type	Antifreeze mixing ratio (by volume)					
Freezing Temp. 1)	0℃	-5℃	-10℃	-15℃	-20℃	-25℃
Methanol	0%	6%	12%	16%	24%	30%
Ethylene glycol	0%	12%	20%	30%	-	-
propylene glycol	0%	17%	25%	33%	-	-

Note :

1) By mixing antifreeze with water, the Freezing Temp. of the water is lowered. Therefore, the temperature at which the freeze protection logic starts must be adjusted accordingly in the installer's setting. Furthermore, it is mandatorily required to change dip SW setting for “Antifreeze” and remove bridge at CN_ANTI_SW on indoor PCB.

※Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

※If an Anti-freeze is used, pressure drop and capability degradation of the system can occur.

※Please check the concentration of the Anti-freeze periodically to keep the same concentration.

14 Drain Pan

Contents

COOLING ONLY

When Therma V operates in cooling mode, condensed water is generated in the indoor unit. In this regard, for the Hydro-box type indoor unit, a drain pan must be installed to collect the condensed water.

▪ Required Accessory

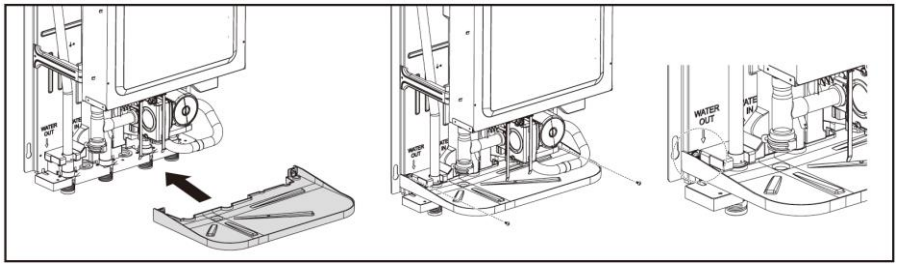
Model Name	Model Number	Figure	Feature
Drain Pan	PHDPC		• Including Insulators * • Available for R32 Hydrosplit Hydro Unit, R32 Split Hydro Unit (NK5), R290 Monobloc Hydro Unit (NK0)
Drain Hose	Field Scope		

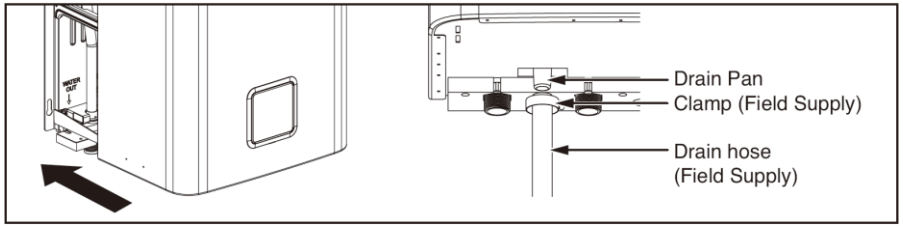
* The enclosed insulators must be installed around the Hydro Unit unit to prevent the formation of condensed water on the surface of it.

▪ Drain Pan Accessory as per Product

Products	Drain Pan
R32 Split - Combi Unit R32 Hydrosplit - Combi Unit R290 Monobloc - Combi Unit	Drain Pan is included in the Product
R32 Split - Hydro Unit (NK5) R32 Hydrosplit - Hydro Unit R290 Monobloc - Hydro Unit (NK0)	PHDPC

▪ Installation of Drain Pan

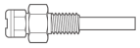
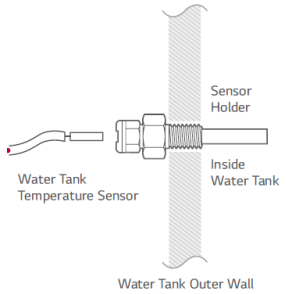




15 DHW Tank

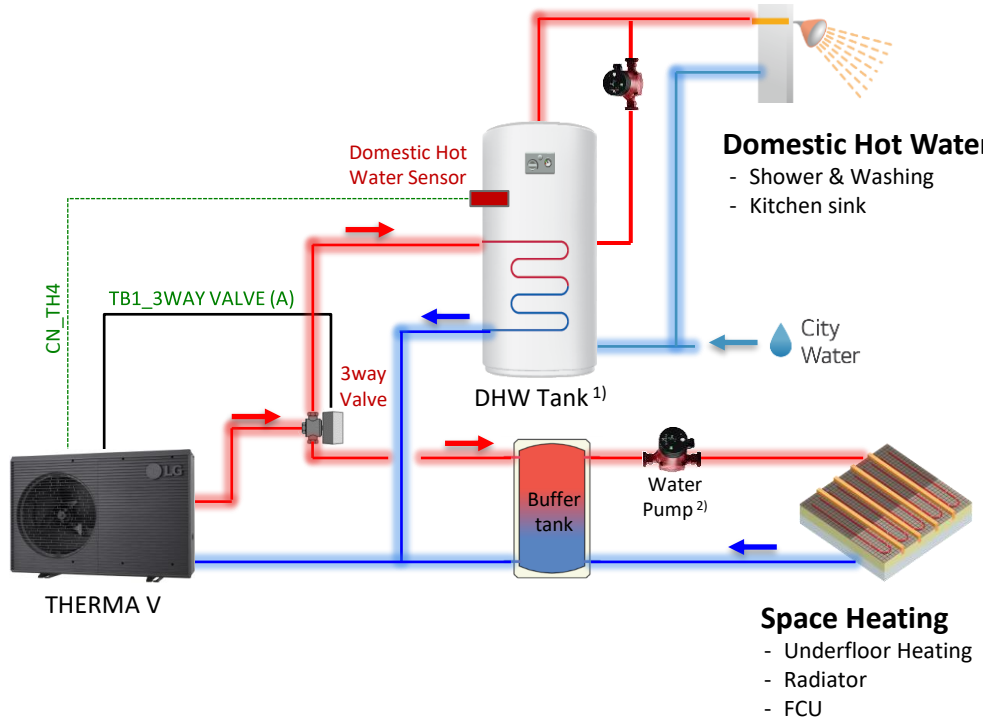
Therma V can be used not only for space heating, but also for hot water supply. For hot water supply application, basically DHW Tank, 3 way valve, and DHW Sensor are required.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Domestic Hot Water Tank * (Single Coil)	OSHW-200F OSHW-300F OSHW-500F		• Storage volume : 200L / 300L / 500L • Type : Internal single coil • Material : Stainless steel • Capacity of booster heater : 2.4 kW
Domestic Hot Water Tank * (Double Coil)	OSHW-300FD		• Storage volume : 300L • Type : Internal double coil • Material : Stainless steel • Capacity of booster heater : 2.4 kW
3 Way Valve	OSHA-3V or Field Scope		• 1Φ, 230V AC
Domestic Hot Water Sensor	PHRSTA0		• 5kΩ thermistor • Length : 12m
Temperature Sensor Holder	Field Scope**	 	

* 3rd party Domestic Hot Water Tank is also available
** included in OSHW- models

▪ Schematic Diagram (with buffer tank)



Note :
1) When both Therma V and DHW Tank are installed, it is mandatorily required to change dip SW setting for "Accessory installation information" to "Heat Pump + DHW Tank".
2) If hydronic separator or buffer tank is installed, water pump in the secondary circuit must be installed.

※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

16 3 Way Valve

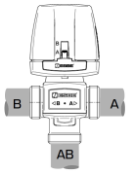
This design employs a 3way valve to switch between hot water supply and space heating operations.

Required Accessory

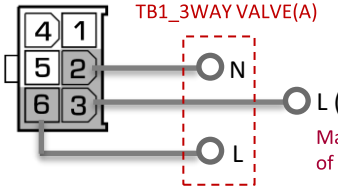
Model Name	Model Number	Figure	Feature
3 Way Valve	OSHA-3V or Field Scope *		• 1Φ, 230V AC • Size : DN 20 G 1" connection, male threaded

* 3rd-party 3-way valve can be used, too.

Installation Guide of OSHA-3V

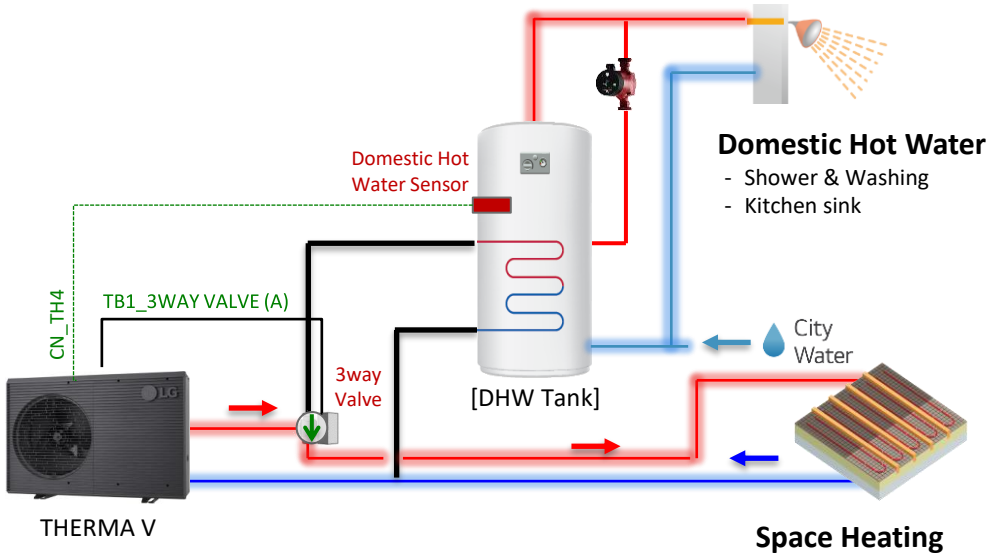


Install the valve as follows:
A: DHW tank
B: Heating/Cooling circuit
AB: Heat pump outlet



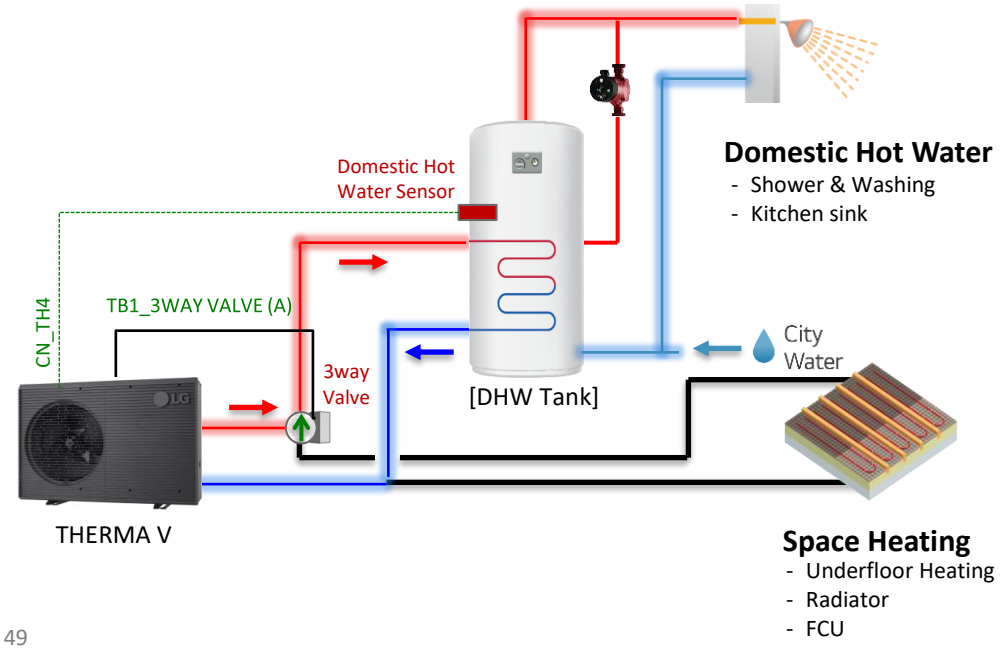
Space Heating Mode

1) 3way valve is switched to space heating direction.
2) During space heating mode, hot water supply is possible using the hot water stored in the DHW tank.



DHW Mode

1) 3way valve is switched to DHW Tank direction.
2) During DHW mode, space heating operation is not possible unless a buffer tank is installed.



17 Booster Heater

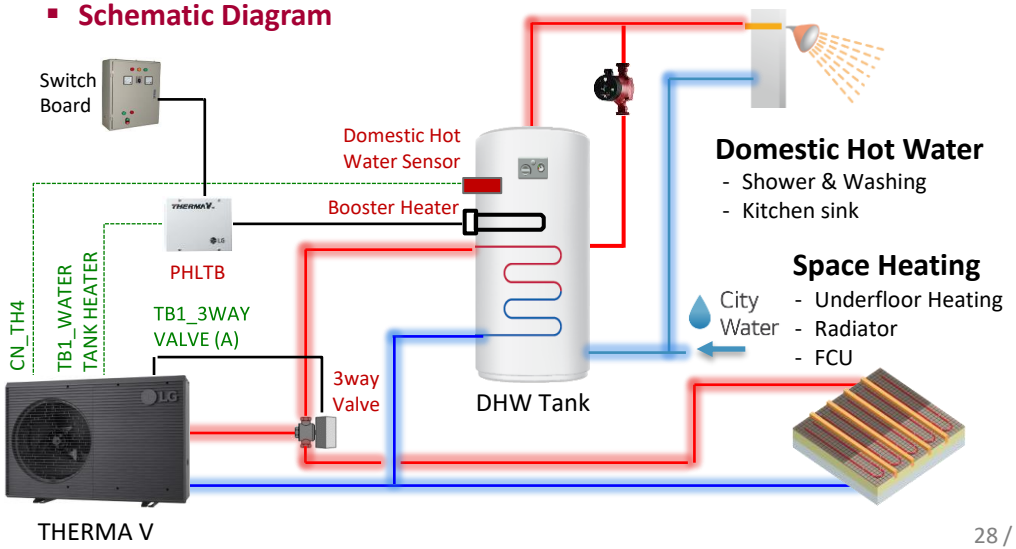
When hot water of 55℃ [1] or higher is required or anti-legionella operation is needed, hot water operation using Booster heater must be installed.

Required Accessory

Model Name	Model Number	Figure	Feature
Domestic Hot Water Tank Kit *	PHLTA ** (For Hydro Unit and Control Unit)		• Parts included : DHW tank sensor (Thermistor), Circuit breaker, Relay
	PHLTB ** (For Monobloc)		• Parts included : DHW tank sensor (Thermistor), Circuit breaker, Relay, Multi harness
Electric. Heater Element ***	Field Scope		• Capacity : Max. 3 kW (1Φ)

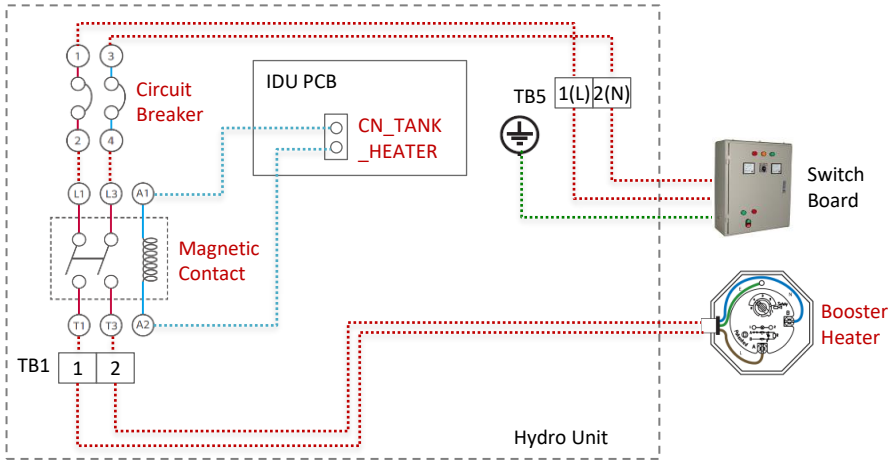
* Domestic Hot Water Tank Kit is including Domestic Hot Water Sensor (PHRSTA0).
** Due to circuit breaker size limitations, these accessories cannot be applied to R32 Monobloc 51kW and Cascade Control Unit. In this case, 3rd party wires, circuit breakers, relays, etc. that meet the specifications should be used.
*** In case of OSHW-200F, OSHW-300F, OSHW-500F, and OSHW-300FD, 2.4kW booster heater is integrated inside of tank.

Schematic Diagram

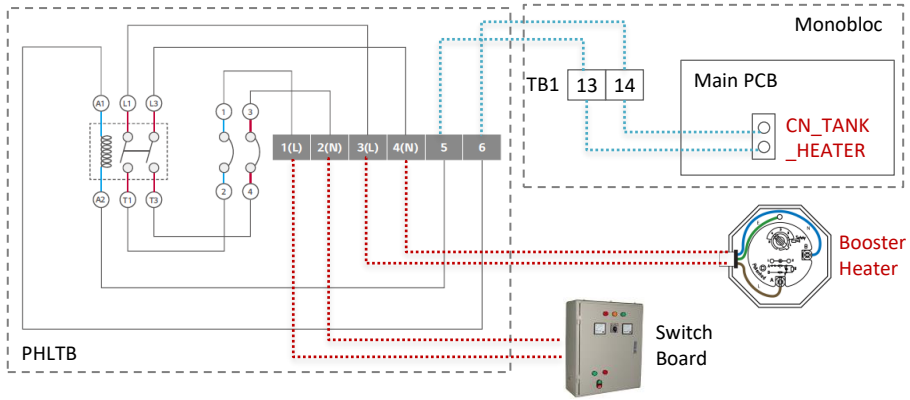


Wiring Diagram

1) Hydro Unit & Control Unit / PHLTA



2) Monobloc S / PHLTB



Note :
1) In case of R290 Monobloc, 65℃
※Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

18 DHW Re-circulation Pump

If a DHW Recirculation Pump is installed, a power terminal for that pump is provided. Furthermore, recirculation time setting and scheduler functions are also provided.

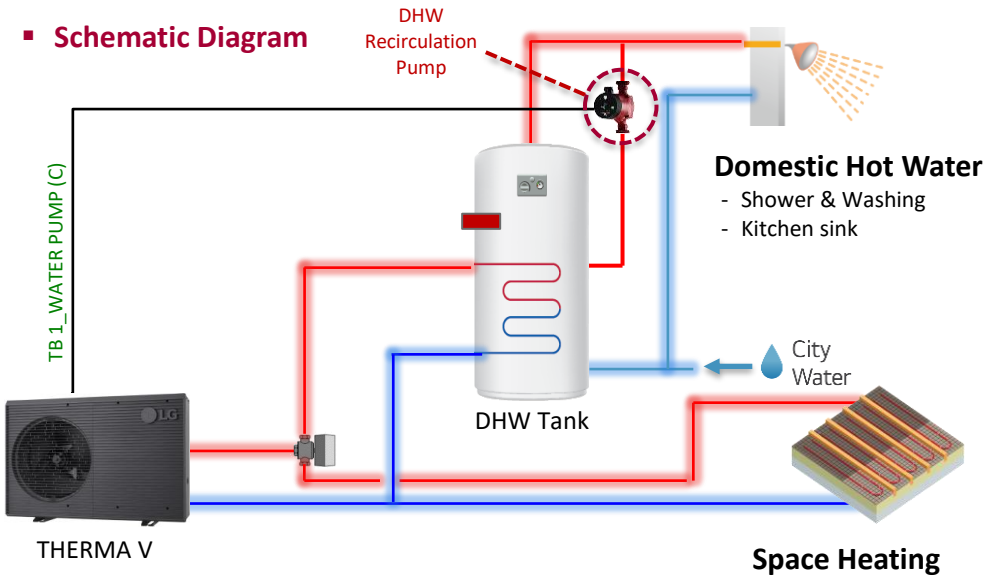
▪ Available Product

Availability	Available Products
Available	R290 Monobloc - Hydro, Control, Combi Units R32 Monobloc S II R32 Split - Hydro & Combi Units R32 Hydrosplit - Hydro Unit R290 Monobloc - Cascade Control Unit R32 Monobloc 51kW
Not Available	R32 Hydrosplit - Combi Unit

▪ Required Accessory

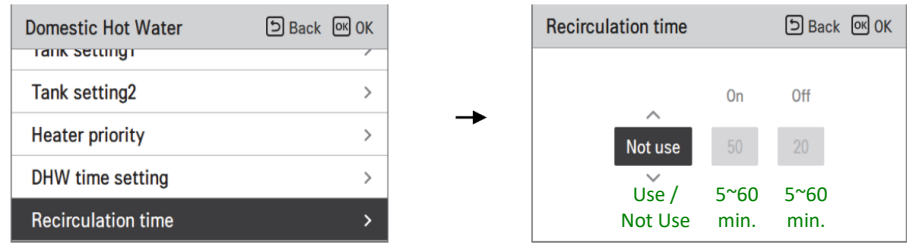
Model Name	Model Number	Figure	Feature
DHW Recirculation Pump	Field Scope		• 1Φ, 230V AC (Max. 1.05A)

▪ Schematic Diagram

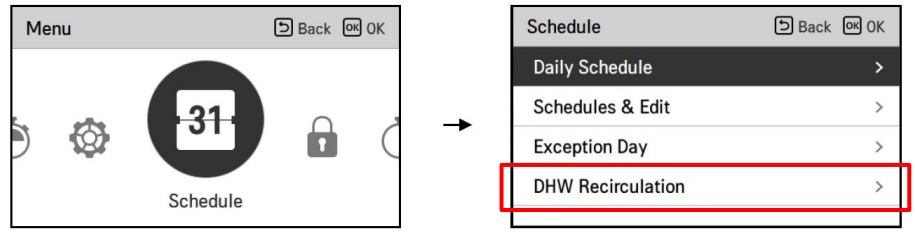


▪ Time Setting & Scheduler

1) Recirculation Time [1)]



2) Scheduler [1)]

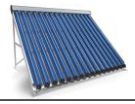


Note :
1) Both settings (Recirculation time and Schedule) must be applied to activate the function.
※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

19 Solar Thermal System

When Therma V is used with the DHW tank, the solar thermal system can be combined with the DHW tank to support producing hot water.

▪ Required Accessory

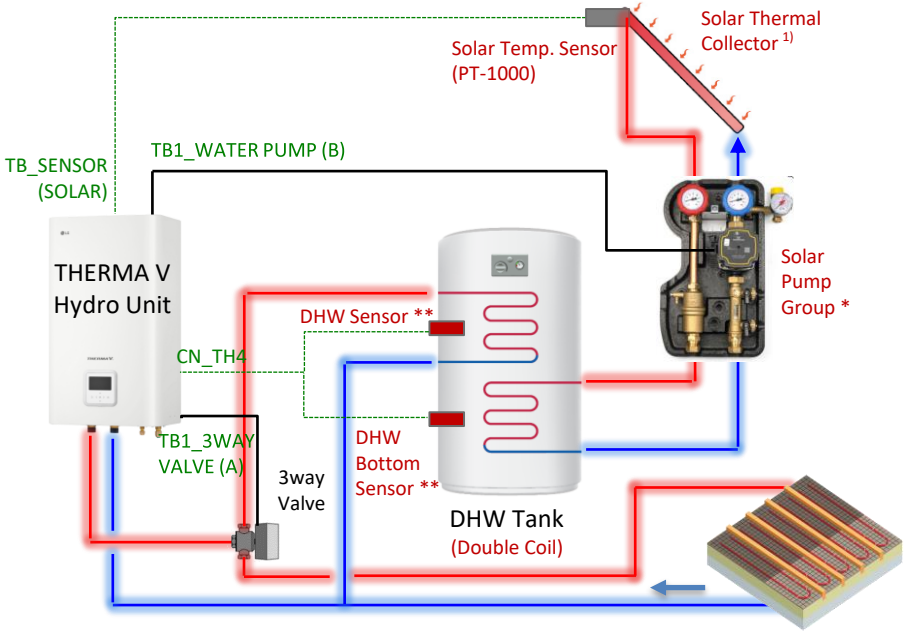
Model Name	Model Number	Figure	Feature
Domestic Hot Water Tank * (Double Coil)	OSHW-300FD		• Storage volume : 300L • Type : Internal double coil • Material : Stainless steel • Capacity of booster heater : 2.4 kW
Solar Pump Group	Field Scope		• 1Φ, 230V AC (Max. 1.05A) • Including Check Valve and Pressure Relief Valve, Flow meter, and fill & drain valves
Solar Temp. Sensor	Field Scope		• PT-1000
Solar Thermal Kit	PHLLA **		• Parts included : T Pipe, Sensor Holder, Dual Thermistors
Solar Thermal Collector ***	Field Scope		
Solar Pump ****	Field Scope		• 1Φ, 230V AC (Max. 1.05A)
3 Way Valve ****	OSHA-3V or Field Scope		• 1Φ, 230V AC
Domestic Hot Water Sensor	PHRSTA0 ****		• 5kΩ thermistor • Length : 12m

* 3rd party Domestic Hot Water Tank is also available.
** This is a common accessory and only Dual Thermistors included in PHLLA is used for this application.
*** Thermal Collector is different from Solar Photovoltaic (PV) panel. Solar Thermal collector absorbs sunlight and heats water using that energy. On the other hand, a solar PV panel is one where the light hits a solar panel and is turned into electricity.
**** These items are required instead of Solar Pump Group and PHLLA for R32 Split Hydro Unit(5/7/9 kW), R32 Hydrosplit Hydro Unit

Operation based on Dual Thermistors

▪ Schematic Diagram

Available Proudcts : R290 Monobloc - Hydro & Control Units
R32 Split - Hydro Unit(4/6 kW)
R32 Monobloc S II
R290 Monobloc – Cascade Control Unit
R32 Monobloc 51kW



* Including all hydronic components and Expansion tank must be connected for the solar thermal system. PWM-pump is not supported!
** For Dual Thermistors, PHLLA should be purchased.

Space Heating
- Underfloor Heating
- Radiator
- FCU

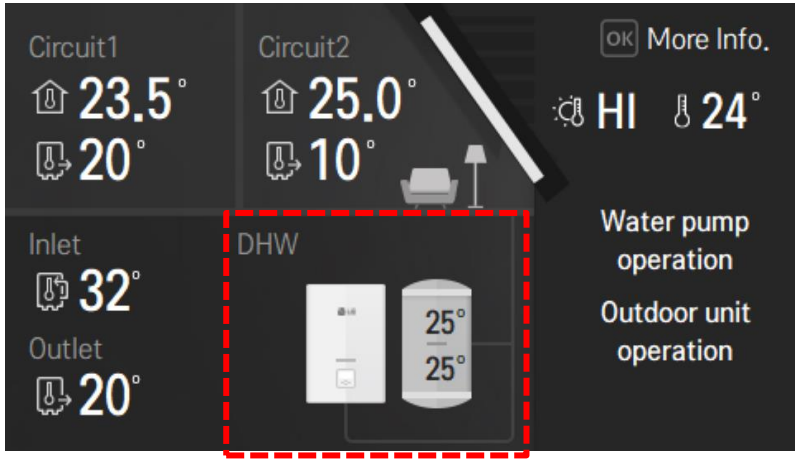
Note :
1) When operating the DHW tank in conjunction with the solar thermal system, it is mandatorily required to change dip SW setting for "DHW Tank" to "Heat Pump + DHW Tank + Solar Thermal System".
※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

19 Solar Thermal System

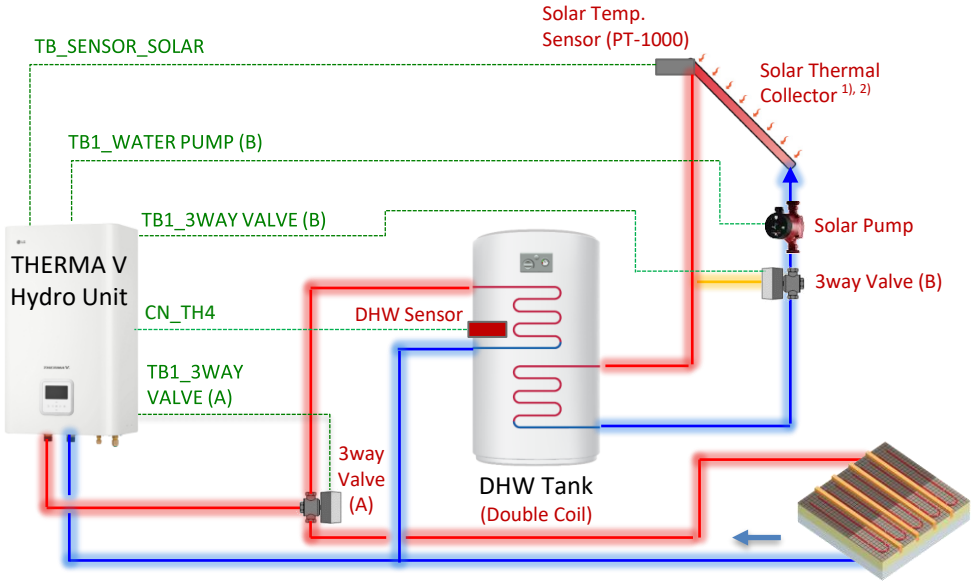
When Therma V is used with the DHW tank, the solar thermal system can be combined with the DHW tank to support producing hot water.

Operation based on single Thermistor

- **Remote Controller UI**



- **Schematic Diagram** Available Proudct : R32 Split Hydro Unit(5/7/9 kW)
  R32 Hydrosplit Hydro Unit



Space Heating
- Underfloor Heating
- Radiator
- FCU

Note :
1) When operating the DHW tank in conjunction with the solar thermal system, it is mandatorily required to change dip SW setting for "DHW Tank" to "Heat Pump + DHW Tank + Solar Thermal System".
2) Regarding the Solar Thermal System, not only the Solar Collector, Solar Pump, and 3-way valve, but also the expansion tank, pressure relief valve, Air vent, check valve, drain valve, and anti-freeze system should be considered.

※ *Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

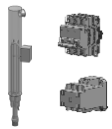
20 Back-up Heater

Contents

COMBINED WITH BACK UP HEATING

The back-up heater is sometimes required to manage back-up or emergency operation. Some units do not include back-up heater, so installer should install it separately, if required.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Electric Back-up heater * (For R32 Monobloc S II and R290 Monobloc - control unit)	HA031M E2		• Heater capacity : 3 kW • Number of heating coil : 1 ea (3.0kW) • Size (W x H x D) : 210 x 607 x 217 • Power : 220-240 V, 1Φ
	HA061M E2		• Heater capacity : 6 kW • Number of heating coil : 2 ea (3.0 + 3.0kW) • Size (W x H x D) : 210 x 607 x 217 • Power : 220-240 V, 1Φ
	HA063M E2		• Heater capacity : 6 kW • Number of heating coil : 3 ea (2.0 + 2.0 + 2.0kW) • Size (W x H x D) : 210 x 607 x 217 • Power : 380-415 V, 3Φ
Electric Back-up Heater * (For R32 Hydrosplit - Hydro Unit)	HA061C E1 **		• Heater capacity : 6 kW • Number of heating coil : 2 ea (3.0 + 3.0kW) • Power : 220-240 V, 1Φ
	HA063C E1 **		• Heater capacity : 6 kW • Number of heating coil : 3 ea (2.0 + 2.0 + 2.0kW) • Power : 380-415 V, 3Φ
Thermistor for 3rd party backup heater	PRSTAT5K10 ***		• 5kΩ thermistor, 10m

* 3rd party back-up heater such as immersion heater also can be also connected.
** These back-up heaters are internal accessories, so they can be installed inside of product in field, if required.
*** When 3rd party backup heater is connected, PRSTAT5K10 should be installed.

Note :

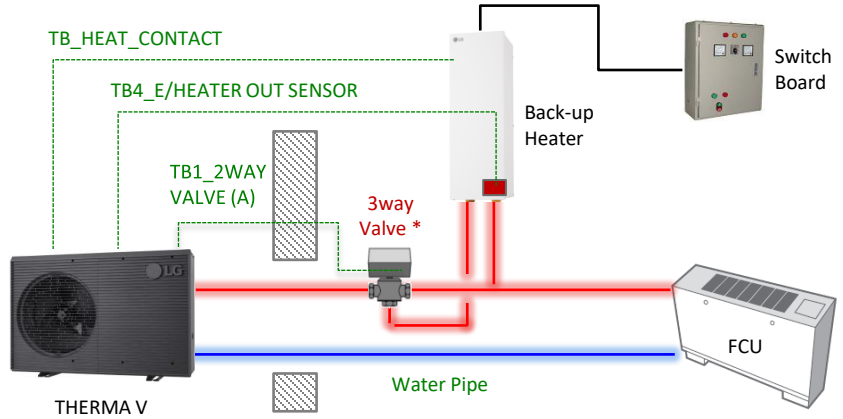
※ To add back-up heater, it is mandatorily required to change dip SW setting for "Back-up Heater Capacity".

※ Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

※ The Backup heater is already integrated in case of Split (Hydrobox and Combi Unit) and Hydrosplit (Combi Unit).

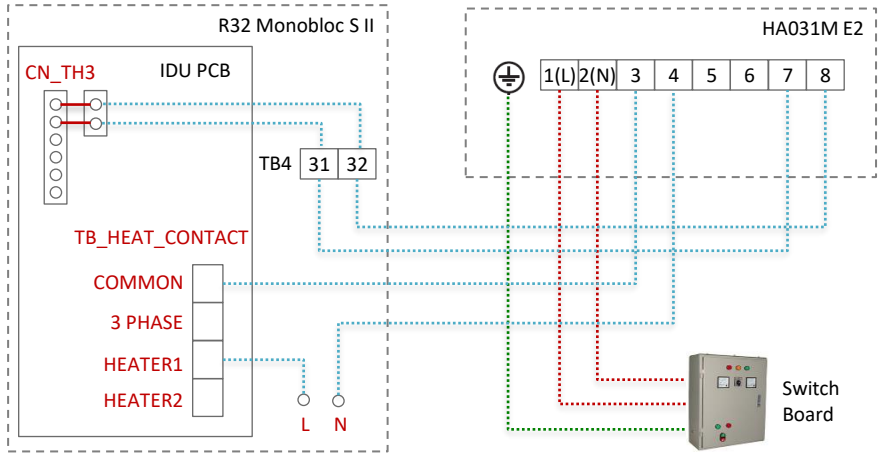
Operation with LG Back-up heater accessory

▪ Schematic Diagram (For R32 Monobloc S II with LG Back-up heater)



* During cooling operation, condensation may occur inside of back up Heater. In order to protect formation of condensation, please install 3 Way valve for bypass.

▪ Wiring Diagram (For HA031M E2)



20 Back-up Heater

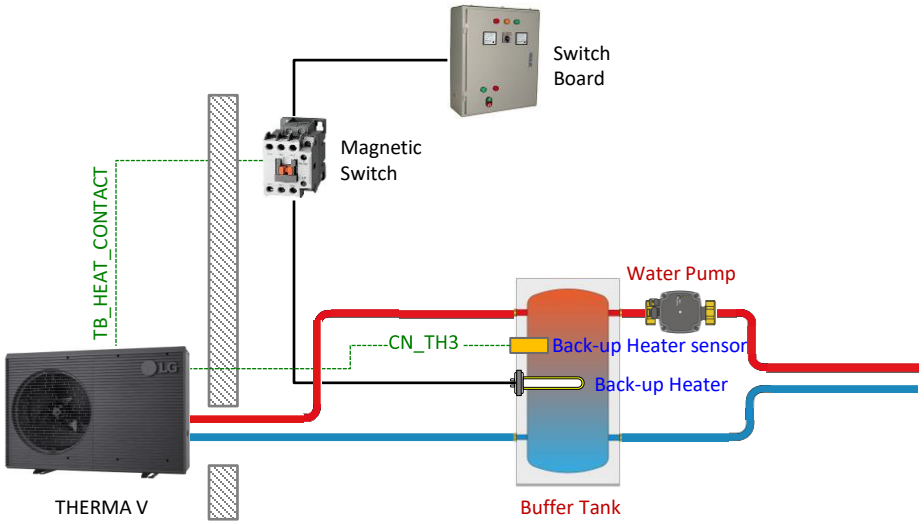
Contents

COMBINED WITH BACK UP HEATING

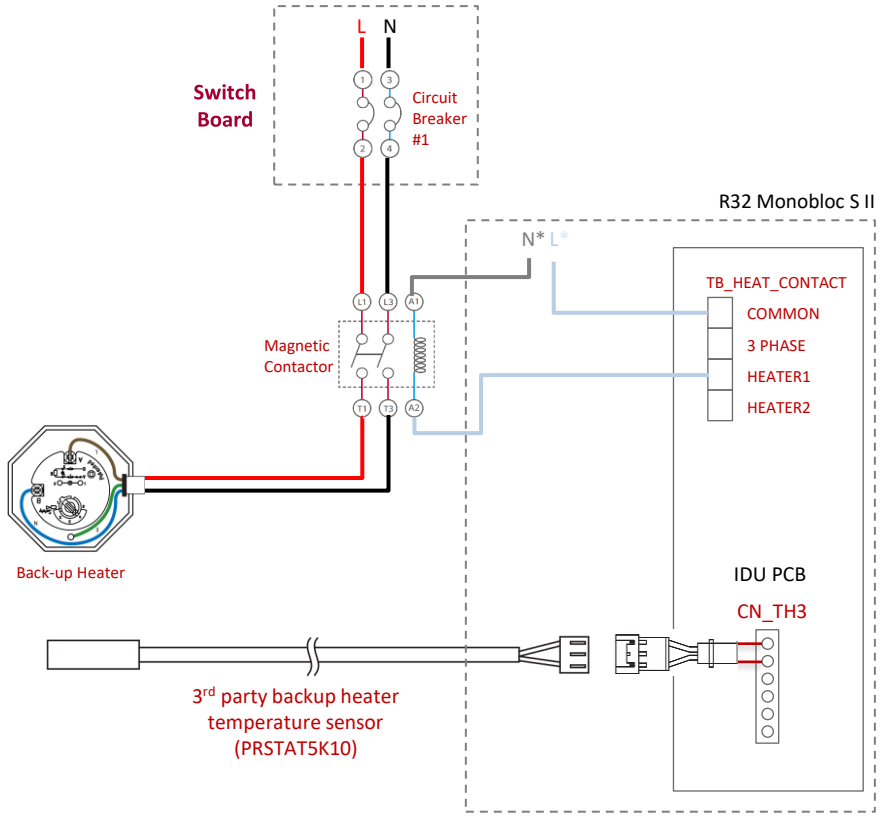
The back-up heater is sometimes required to manage back-up or emergency operation. Some units do not include back-up heater, so installer should install it separately, if required.

Operation with 3rd party Back-up heater

- **Schematic Diagram (For R32 Monobloc S II with immersion heater)**



- **Wiring Diagram (For R32 Monobloc S II with LG Back-up heater)**



* To be Connected to the power line for R32 Monobloc S II

21 Auxiliary Boiler

Contents

COMBINED WITH BACK UP HEATING

As the ambient temperature drops, the heat pump capacity may decrease or the product may stop due to being out of operation range. In this case, if an auxiliary boiler is installed, interlocking operation with the heat pump is possible. Therma V does not control the boiler; only provides a contact signal (Non voltage) to enable/disable the boiler.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Auxiliary Boiler	Field Scope		• Auxiliary Boiler should have an integrated water pump.
Check Valve	Field Scope		

▪ Available Product

Products	Availability of Boiler Hybrid Functions	
	- Bivalent-alternative (As-was "Auto")	- Bivalent-parallel - Boiler control by Room temp. option * - External Pump Option during Boiler activated
R290 Monobloc – Hydro, Control, Combi Units	O	X → O 1)
R32 Monobloc S II	O	O
R32 Split - Hydro & Combi Units	O	X → O (TBD)
R32 Hydrosplit - Hydro & Combi Units	O	X → O (TBD)
R290 Monobloc – Cascade Control Unit	O	X
R32 Monobloc 51kW	O	X → O (TBD)

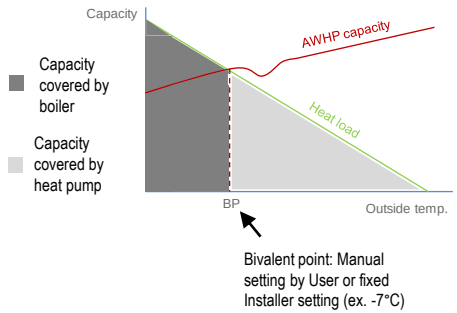
* Only available for Bivalent-alternative mode

Note :
1) To be available for products produced after Oct. 1st of 2025

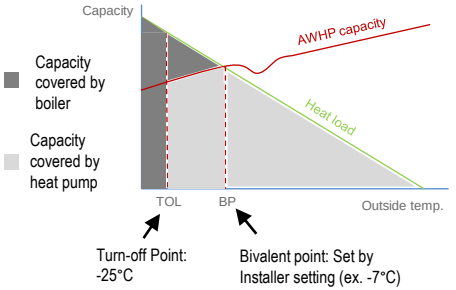
▪ Operation

Operation Mode	Setting
Mode	**Manual** : User-defined boiler operation (start/stop)
	Bivalent-alternative (As-was "Auto") : When the set outside temperature (BP: bivalent temp.) falls below AWHP stops operating and only the boiler operates.
	Bivalent-parallel : When the outside temperature (BP) falls below the set temperature during AWHP operation, the boiler operates together when the target temperature cannot be reached by AWHP operation
Temp.	Boiler operating outside temperature (BP: Bivalent Temperature) **Range : -25 ~ 25℃ (Default : -7℃)**
Hysteresis	**Range : 2 ~ 10K (Default : 4℃)** ex) 'Temp.' = -7°C, 'Hysteresis' = 4K → Boiler is enabled at -7°C and disabled at -3°C outdoor temp.

✓ Bivalent-alternative



✓ Bivalent-parallel New



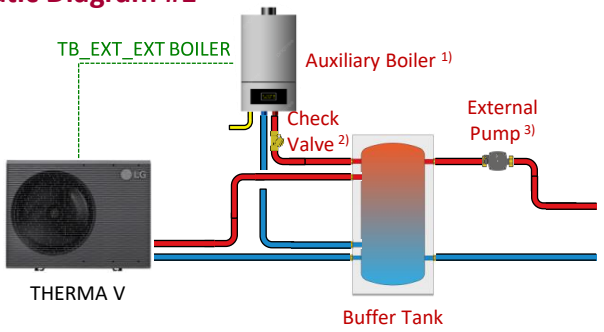
21 Auxiliary Boiler

Contents

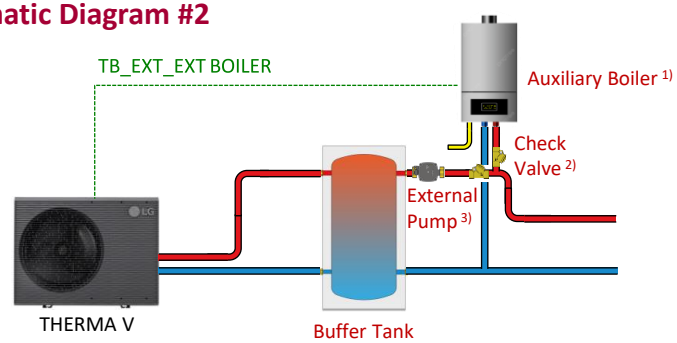
COMBINED WITH BACK UP HEATING

As the ambient temperature drops, the heat pump capacity may decrease or the product may stop due to being out of operation range. In this case, if an auxiliary boiler is installed, interlocking operation with the heat pump is possible. Therma V does not control the boiler; only provides a contact signal (Non voltage) to enable/disable the boiler.

Schematic Diagram #1



Schematic Diagram #2



Note :

※Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

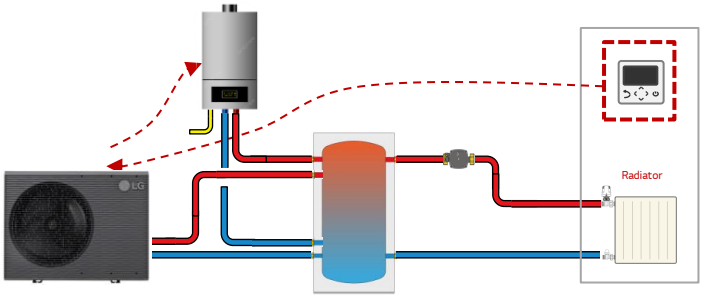
1) The Auxiliary boiler should have an integrated water pump or the circulating pump should be installed separately.
2) To prevent water from crossing between the boiler and the heat pump, a check valve should be installed.
3) For the R32 Monobloc S II, an installer setting is provided to control whether the external pump will run when the boiler operation is enabled.
4) In case of Bivalent-alternative mode, there is no need to install a separate room controller either, because LG room controller is enough!

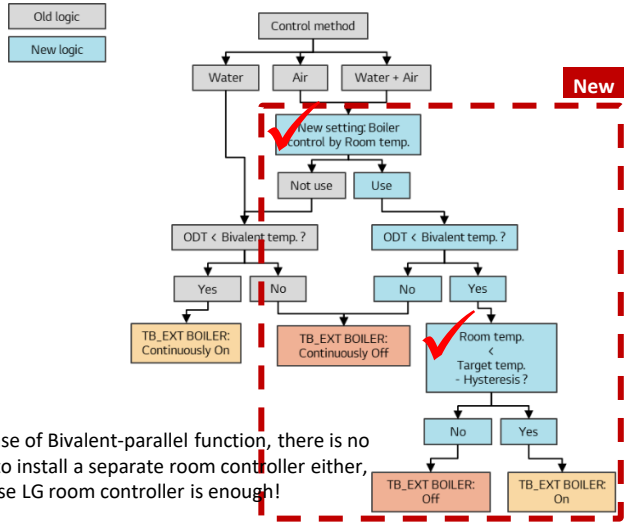
New

Boiler control by Room temp. option

✓ **Only available for Bivalent-alternative mode[4)]**

LG Remote controller can be used to give thermo-on/off signal to boiler, in case of “Air+Water” setting. No need to duplicate Room thermostats.





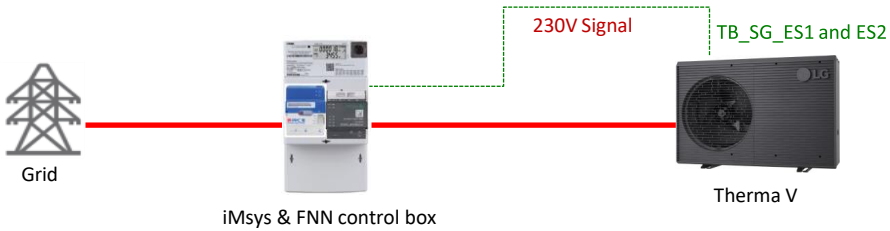
* In case of Bivalent-parallel function, there is no need to install a separate room controller either, because LG room controller is enough!

22 Power Limitation

Therma V provides the function to operate under limited power consumption during peak times, and this function is provided through the 230V input(SG Ready) or Modbus.

▪ Using 230V input(SG Ready) Signal

✓ **Under Direct Control from Utility Company**



✓ Required Installer Setting (Energy State)

Description	Setting
Connection	LG ESS / SG Ready
Signal Type	Not use / 230V inputs / Modbus / ThinQ
Power Limitation setting	0.1 ~ 25.0 kW (Default 4.2kW)

ES1	ES2	SG-Ready standard [1]	Operation
1	0	Power limitation	Turn off and lock electric heaters and Operated under limited power
0	0	Normal operation	Normal Operation
0	1	Turn-on recommendation	Operation by raising the target temperature (Heating +2℃, DHW +5℃)
1	1	Omitted (same as 1:0)	

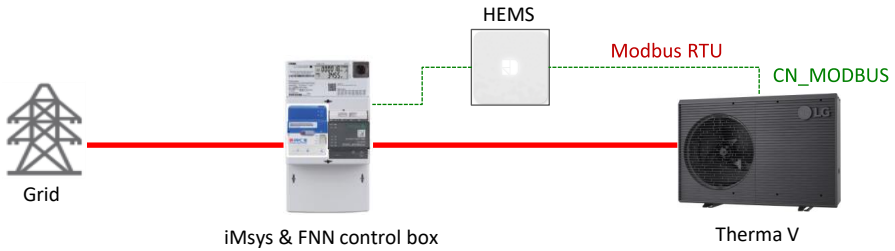
✓ Available Product

R290 Monobloc – Hydro, Control, Combi Units (Produced after Oct, 1st of 2025)
R32 Monobloc S II (Produced after Oct, 1st of 2025)
R32 Monobloc 51kW (Produced after Oct, 1st of 2025)

Note :
1) Based on SG-Ready v1.1
※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

▪ Using Modbus Signal

✓ **Under In-direct Control via HEMS**



✓ Required Installer Setting (Energy State)

Description	Setting
Connection	LG ESS / SG Ready
Signal Type	Not use / 230V inputs / Modbus / ThinQ
Power Limitation setting	0.1 ~ 25.0 kW (Default 4.2kW)

Coil Register (0x01)

Register	Description	Value explanation
00037	Activate Power limitation	0 : Not used / 1: Limit power acc. Reg. 40040

Holding Register (0x03)

Register	Description	Value explanation
40040	Power limitation value	0.1 kW ~ 25.0 kW

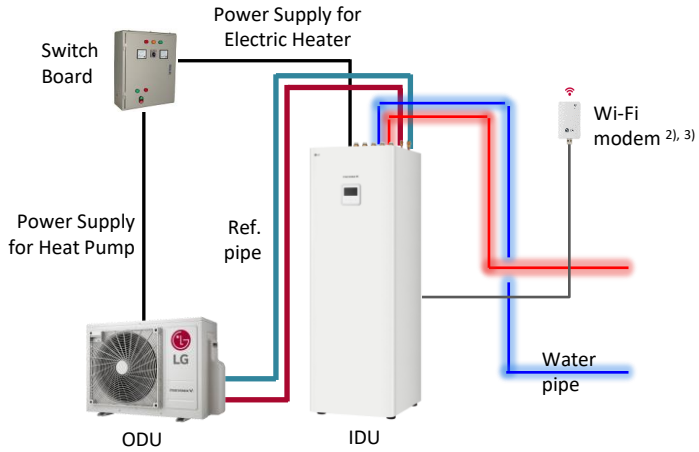
✓ Available Product

R290 Monobloc – Hydro, Control Units (Produced after Dec, 1st of 2024)
R290 Monobloc – Combi Unit (Produced after Oct, 1st of 2025)
R32 Monobloc S II (Produced after Oct, 1st of 2025)
R32 Monobloc 51kW (Produced after Oct, 1st of 2025)

23 Energy Monitoring

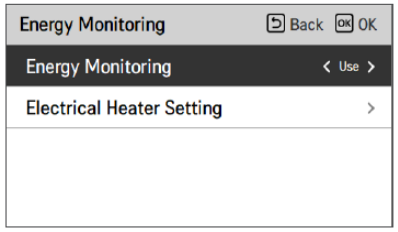
Energy monitoring for AWHP is mandatorily required in some countries. Now estimated power consumption and thermal energy through self-calculation [1] can be monitored on both the remote controller and LG ThinQ.

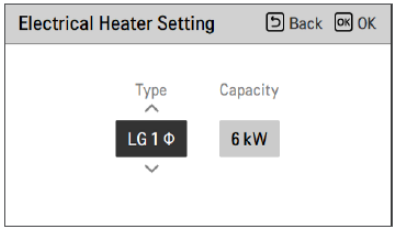
▪ Schematic Diagram



Note :
1) The accuracy of the power consumption and heat output are not guaranteed due to the error of the sensor and some of the predictions.
2) If a Wi-Fi modem or cloud gateway is installed, Energy monitoring information can be indicated on LG ThinQ and LG BECON Cloud, respectively.
※ *Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.*

▪ Installer Setting





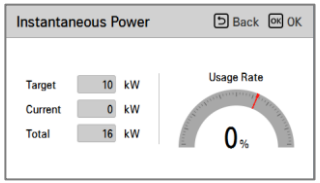
Description		Range
Energy Monitoring		Use/Not Use
Electric Back-up Heater Setting	Type	LG 1Ø / LG 3Ø / EXTERNAL
	Heater Capacity	1 kW ~ 10 kW

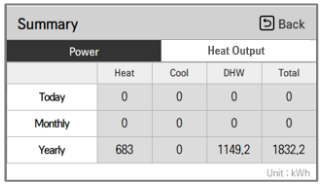
▪ Available Product

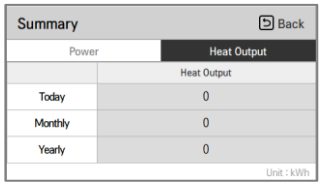
Availability	Available Products
Available	R290 Monobloc – Hydro, Control, Combi Units R32 Monobloc S II R32 Split - Hydro & Combi Units R32 Hydrosplit – Hydro Unit R290 Monobloc – Cascade Control Unit R32 Monobloc 51kW
Not Available	R32 Hydrosplit - Combi Unit

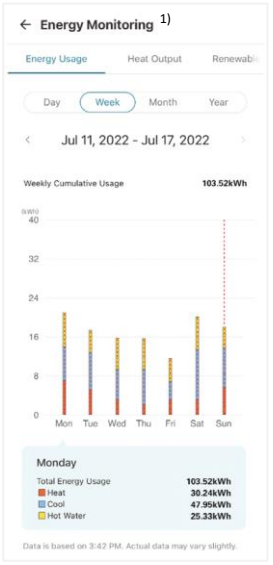
▪ Monitoring Information

- Instant power consumption
- Power consumption by period (Daily, Weekly, Monthly, Yearly) : Categorized as Heat, Cool, and DHW
- Produced heat output by period (Daily, Weekly, Monthly, Yearly) [4]
- Renewable energy by period (Daily, Weekly, Monthly, Yearly) [4], [5]









Note :
3) To use LG ThinQ, LG Wi-Fi modem (PWFMDD200) is required.
4) When using antifreeze, it will not be available.
5) Renewable energy information is only available with LG ThinQ in Spain.

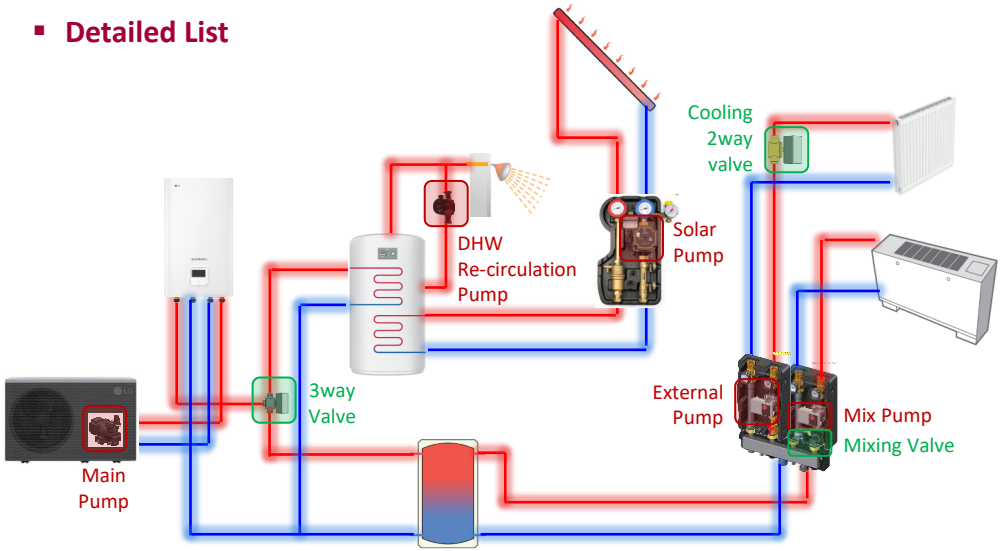
24 Service Menu with Actuator Test and Signal Monitoring

Service convenience has been improved by adding actuator test function for Pumps and Valves and monitoring function for sensor values and I/O signals.

Actuator test for Pumps and Valves

- **Available Product :** R290 Monobloc – Hydro, Control, Combi Units
  R32 Monobloc S II, R32 Monobloc 51kW
  R290 Monobloc – Cascade Control Unit

- **Detailed List**



During test operation, air purge for the secondary circuit or solar thermal system can be easily performed, and also it is easy to check whether wiring works for pumps and valves are correctly connected.

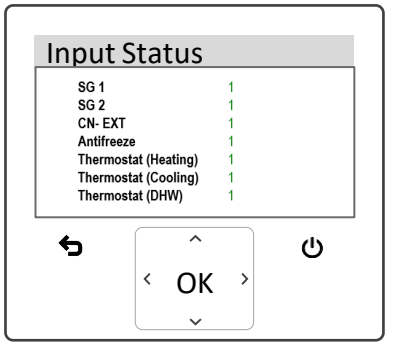
Pump test	A1 Main pump
	A2 External pump
	A3 Mix pump
	A4 Solar pump
	A15 DHW Re-circulation pump
Valve test	A5 DHW 3-way-valve
	A6 Mixing valve open
	A7 Mixing valve close
	A12 Cooling 2-way-valve

Monitoring for sensor values and I/O signals

- **Available Product :** R290 Monobloc – Hydro, Control, Combi Units
  R32 Monobloc S II, R32 Monobloc 51kW
  R290 Monobloc – Cascade Control Unit

- **Detailed List**

Connected sensor values can be checked on the remote controller without an LGMV connection, and the status of the I/O signal can be checked without amp meter, allowing quick service inspection.



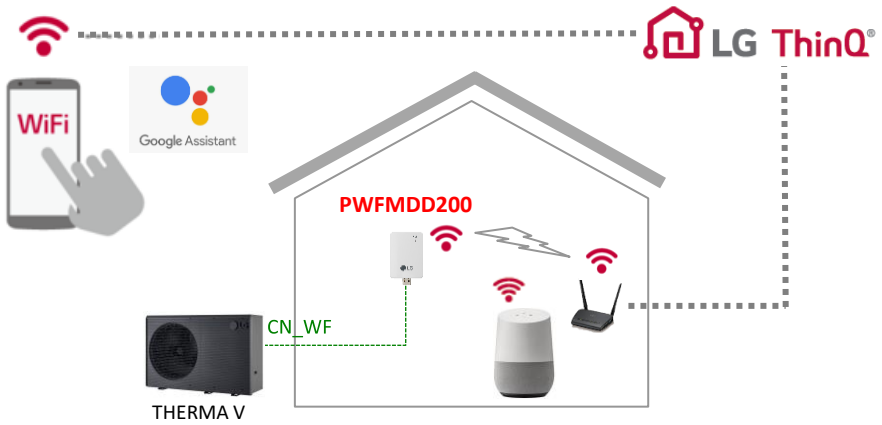
Sensor value	S9 Refrigerant gas
	S10 Refrigerant liquid
	S11 Entering water
	S12 Leaving water
	S13 Backup heater outlet
	S14 DHW tank
	S15 Solar collector
	S16 Solar tank
	S17 Water flow sensor
	S18 Mixing circuit
	S19 Water pressure
	S21 Room temp. Direct circuit
	S22 Room temp. Mixing circuit
	S24 Wall-mounted air sensor
	S25 Buffer tank sensor

Input Status	SG1
	SG2
	CN-EXT
	Antifreeze shortkey
	Thermostat (Heating)
	Thermostat (Cooling)
	Thermostat (DHW)
Output status	A1 Main pump
	A2 External pump
	A3 Mix pump
	A4 Solar pump
	A5 DHW 3-way-valve
	A6 Mixing valve (Open)
	A7 Mixing valve (Close)
	A12 Cooling 2-way-valve
	A15 DHW Re-circulation pump
	A8 Backup heater (Step 1)
	A9 backup heater (Step 2)
	A10 DHW Boost heater
	A11 External boiler

25 LG ThinQ (Wi-Fi Modem)

Therma V can be remotely controlled by smart internet devices such as Android or iOS using LG ThinQ App.
In addition, LG ThinQ works with Google assistant voice control [1] by using Google home speaker.

▪ Schematic Diagram



Note :
1) Google home voice is supported in UK, France, Germany, Spain, Italy, Austria, Ireland and Portugal.
※Search "LG ThinQ" on Google market or App Store, then download the app.
※Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
LG Wi-Fi Modem	PWFMDD200		• Frequency : 2.4GHz • IEEE 802.11b/g /n Supported
Extension cable for Wi-Fi Modem *	PWYREW000		• Length : 10 m
Google Home Speaker	Field Scope		

* PWYREW000 (10m extension cable) may be necessary depending on installation condition.

▪ Operation

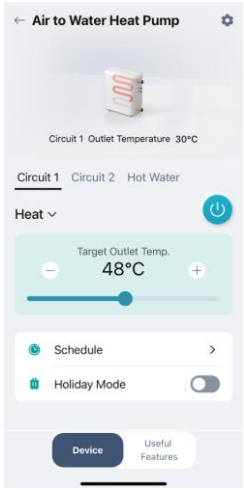
Simple operation by LG ThinQ

- On/Off
- Operation Mode Selection
- Current Temperature
- Temperature Setting
- On/Off Reservation Scheduling
- Energy Monitoring
- ESS Monitoring
- Silent Mode Reservation
- Holiday Mode
- Quick DHW Heating

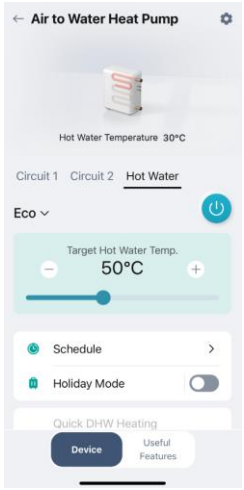
Simple operation by Google Voice

- On/Off
- On/Off - DHW
- Temperature Setting
- Operation Mode Selection
- Monitoring for current Temp. & operation Status

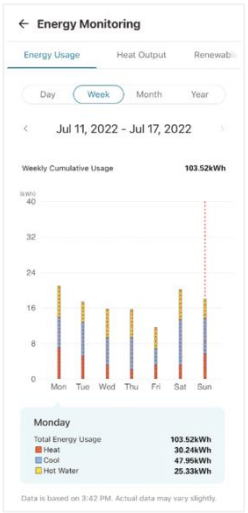
▪ UI of LG ThinQ App.



[Space Heating Control]



[Hot Water Control]



[Energy Monitoring]

26 LG BECON cloud

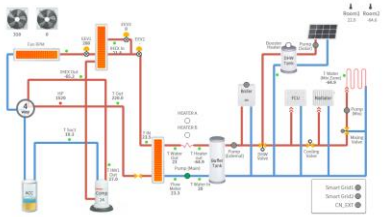
LG Therma V can be connected to LG BECON cloud, which is a cloud-based platform that remotely monitors a customer's heating system via PC, tablet or mobile anytime, from anywhere. By allowing service providers to monitor their customers' heating systems remotely, it will shorten the service's response time.

▪ Concept of LG BECON cloud service

key Features

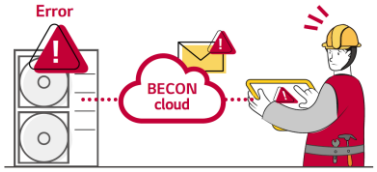
1 Remote Monitoring & Control

The operation status can be monitored and controlled by the service provider remotely.



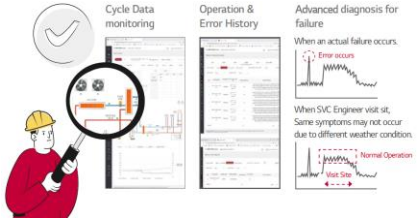
2 Error Alarm by E-mail

Providing an e-mail notification automatically when an error occurs



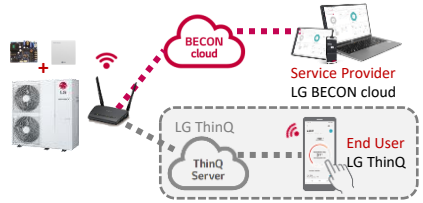
3 Advanced Diagnosis

Without access to the product, remote diagnosis of failure can be done by utilizing the error code and cycle data when an actual failure occurs.



4 LG ThinQ for End User

Without purchasing additional LG Wi-Fi Modem, End users can control LG Therma V remotely via using the smart internet devices.



▪ Availability [1)]

Item	Description
Product	- R290 Monobloc – Hydro, Control, Combi Units - R32 Monobloc S II - R32 Split - Hydro & Combi Units - R32 Hydrosplit – Hydro Unit - R290 Monobloc – Cascade Control Unit - R32 Monobloc 51kW
Browser	- Web Browser for PC, Tablet, Mobile [2)] - Mobile App. (iOS / Android)
Language	- English, Spanish, Italian, German, Polish, Greek [3)]

Note :
1) The schedule for service availability may vary by country or customer.
2) When using a web browser in the mobile, Chrome is recommended.
3) Other languages will be added continuously.

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Cloud G/W	PWFMDB200		• Power : DC 12 V terminal or C-Type Connection • Network : Ethernet / Wi-Fi • Max. 16 IDUs
PI485 G/W *	PP485A00T		• 1 for each outdoor unit • Power : supplied by outdoor unit

* In case of R32 Split and Hydrosplit, PI485 G/W (PP485A00T) is required.

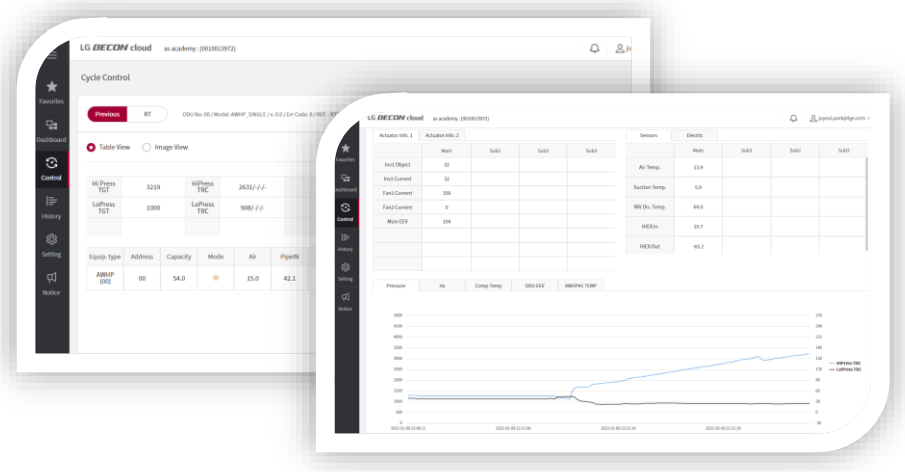
26 LG BECON cloud

LG Therma V can be connected to LG BECON cloud, which is a cloud-based platform that remotely monitors a customer's heating system via PC, tablet or mobile anytime, from anywhere. By allowing service providers to monitor their customers' heating systems remotely, it will shorten the service's response time.

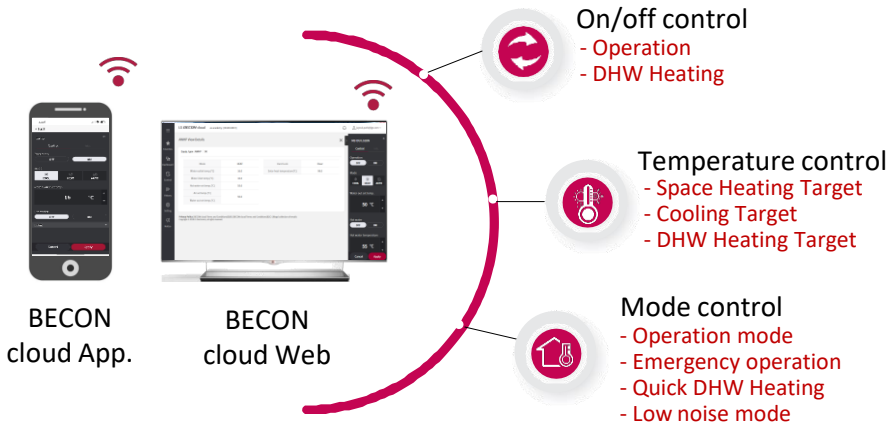
Accessible Monitoring Parameters by Service Provider

** Not all parameters are shown below.*

- Site Information
  : Product Type, Model No., Installation Date, etc.
- Operation Information
  : Operation On/Off, Mode(Heating/Cooling/Auto), DHW On/Off, Emergency operation, Silent operation, Quick DHW operation,
- Error Information
  : Error Status, Error Code
- Outdoor Unit Cycle Information
  : Ref. Pressure, Compressor Frequency, Fan RPM, EEV opening ratio, Ref. cycle temperature, current, etc.
- Water Side sensor Information
  : Inlet water Temperature, outlet water Temperature, Room Temperature, DHW Temperature, Solar Collector Temperature, Flow rate
- Water Side Actuator Operation Information
  : Water Pump, External Water Pump, Solar Pump, Mixed Pump, Back-up heater, DHW Booster Heater
- Energy Information
  : Power consumption(Categorized as Heat, Cool, and DHW) by period (Daily, Weekly, Monthly, Annual), Produced heat output by period (Daily, Weekly, Monthly, Annual)
- History
  : Operation, Error, Operating Hours



Accessible Controllable Parameters by Service Provider



Accessible Changeable Installer Settings by Service Provider *

Configuration

- **Control Method**
  - Control Standard: Water
- **Select room devices**
  - Circuit1 — Digital input: CN_CC — Room air sensor option: Remote Controller
  - Circuit2 — Digital input: CN_CC — Room air sensor option: Remote Controller
- **Refrigerant Leak Sensor**: Not Installed
- **Mixing Circuit**
  - Mixing Circuit: Not use
  - Valve Closing Time: 240 sec
- **Backup heater for DHW**: Not use
- **Select outdoor air sensor**: ODU air sensor
- **DHW boost heater**: Not Installed
- **Buffer tank sensor**: Not use
- **External pump**: Not use
- **Boiler output**: Heating Only

General

- **Pump frequency setting(LPM)**: 15 °C
- **Forced pump operation**: Use
  - Operation Cycle: 20 hours
  - Operation Time: 10
- **ODU cycle priority**
  - Mode: Not use
  - Step: Step 0
- **Pump Prerun/Overrun**
  - Prerun: 1
  - Overrun: 1
- **Water Flow Control**
  - Control Method: Optimal Flow Rate
  - Pump Capacity: 100 %
  - Fixed Flow Rate — Heat: 46 L/min — Cool: 46 L/min — DHW: 46 L/min
  - Fixed △T — Heat: 5 °C — Cool: 5 °C — DHW: 5 °C
- **Energy Monitoring**
  - Backup heater capacity — Type: LG1 Φ — Capacity: 3 kW
- **Anti-Freezing Option**: Type1
- **Backup heater release temperature**
  - Backup heater release temperature: 3 °C
- **Heating priority**
  - Heating priority: DHW
- **Buffer tank hysteresis**
  - Temp On/Off: 2 °C

* This function is only available for following products.
- R290 Monobloc – Hydro, Control, Combi Units
- R32 Monobloc S II
- R290 Monobloc – Cascade Control Unit

Accessible Changeable Installer Settings by Service Provider *

Circuit1

- **Basic settings**

Control method(Heat)	Outlet					
Control method(Cool)	Outlet					
Pump setting in heating	Type	Time setting	On	3 min	Off	3 min
Pump setting in cooling	Type	Continuous Operation	On	3 min	Off	3 min
Hysteresis water temperature(Heat)	Temp On	-2 °C	Temp Off	2 °C		
Hysteresis water temperature(Cool)	Temp On	0.5 °C	Temp Off	-0.5 °C		
Hysteresis room air(Heat)	Temp On	-0.5 °C	Temp Off	1.5 °C		
Hysteresis room air(Cool)	Temp On	0.5 °C	Temp Off	-0.5 °C		

- **Room Heating**

Air heating set temperature	Min.	16 °C	Max.	30 °C
Water heating set temperature	Min.	20 °C	Max.	75 °C

- **Room Cooling**

Air cooling set temperature	Min.	16 °C	Max.	30 °C
Water cooling set temperature	Min.	5 °C	Max.	24 °C

Circuit2

- **Basic settings**

Cut Off Temperature (Heat)	40 °C					
Cut Off Temperature(Cool)	18 °C					
Mixing Pump Operation(Heat)	Type	Time setting	On	3 min	Off	3 min
Mixing Pump Operation(Cool)	Type	Continuous Operation	On	3 min	Off	3 min
Hysteresis water temperature(Heat)	Temp On	-2 °C	Temp Off	2 °C		
Hysteresis water temperature(Cool)	Temp On	0.5 °C	Temp Off	-0.5 °C		
Hysteresis room air(Heat)	Temp On	-0.5 °C	Temp Off	1.5 °C		
Hysteresis room air(Cool)	Temp On	0.5 °C	Temp Off	-0.5 °C		
Comp. Operation	Type2					

- **Room Heating**

Air heating set temperature	Min.	16 °C	Max.	30 °C
Water heating set temperature	Min.	20 °C	Max.	65 °C

- **Room Cooling**

Air cooling set temperature	Min.	16 °C	Max.	30 °C

* This function is only available for following products.
- R290 Monobloc – Hydro, Control, Combi Units
- R32 Monobloc S II
- R290 Monobloc – Cascade Control Unit

Accessible Changeable Installer Settings by Service Provider *

Auto Mode

- **Seasonal auto temp**

Mode: Heating Only

Outdoor temperatures — Heating: Min -10 °C, Max 18 °C

Target temperatures

Circuit1 Water — Heating: Min 40 °C, Max 65 °C

Circuit2 Water — Heating: Min 40 °C, Max 65 °C

Domestic Hot Water

- **DHW temperature settings**

DHW set temp range — Min. 40 °C, Max. 65 °C

DHW hysteresis — Min. temperature 5 °C

DHW heating Hysterisis — Th On 0 °C, Th Off 0 °C

Comp. Limit temperature 65 °C

- **Thermal disinfection**

Max temp. 70 °C, Duration 10 min, Forced end time 1 hours

- **DHW heating duration**

Active time 60 min, Stop time 30 min

- **DHW electric re-heating**

Delay time 30 min

- **DHW re-circulation**

Use — On 2 min, Off 4 min

Solar Thermal System

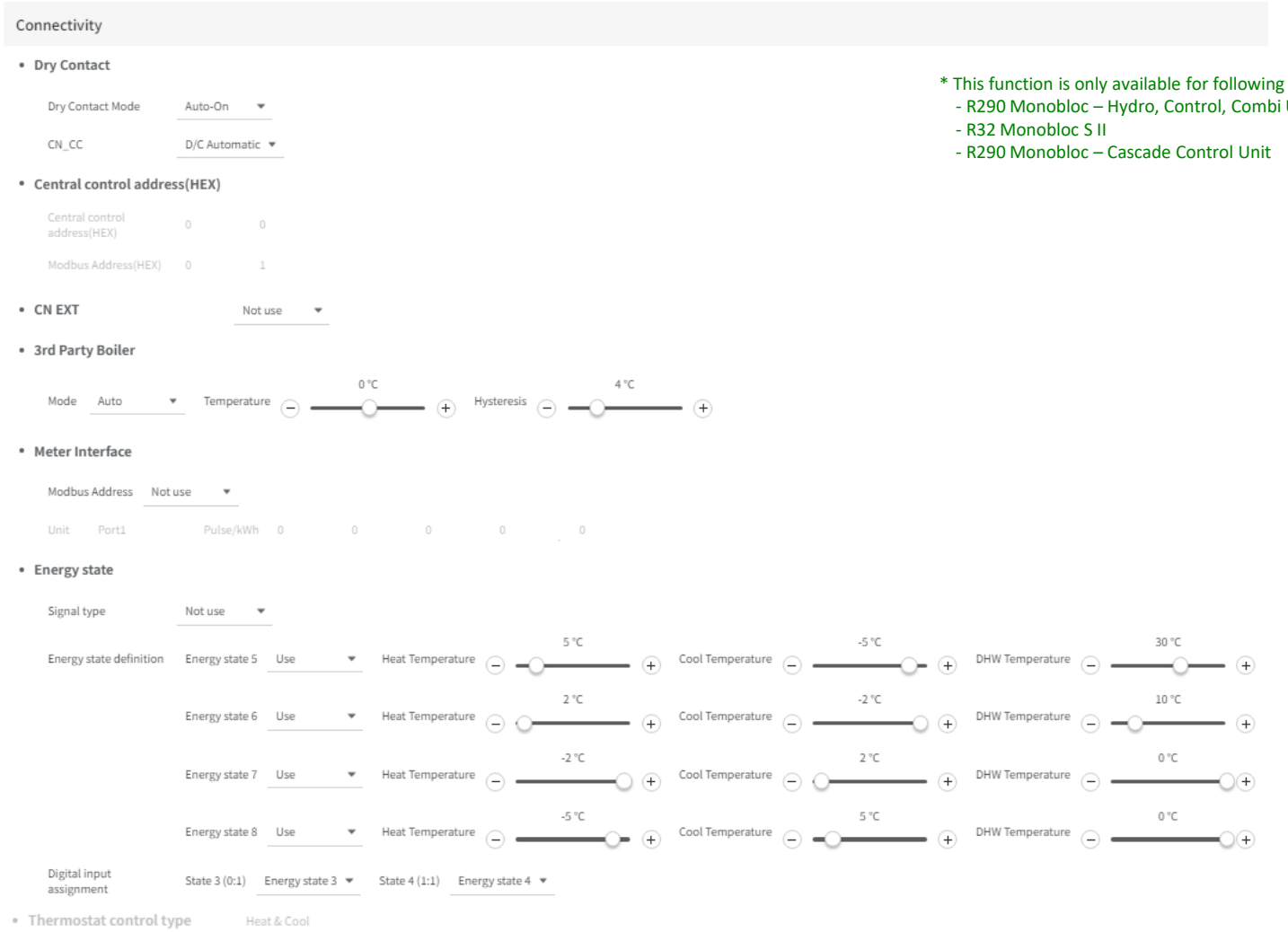
- **Solar collector operating range** — Min. 10 °C, Max. 135 °C
- **Solar tank temperature Limit** — Max. 80 °C
- **Solarthermal ΔT** — Temp On 8 °C, Temp Off 2 °C
- **DHW boost heater** — Boost Heater: Enable
- **Solar circuit flushing** — Solar pump flush setting: Operation Time 1 min, Operation Cycle 60 min

Service

- **Frost Protection Temp.** -1 °C

* This function is only available for following products.
- R290 Monobloc – Hydro, Control, Combi Units
- R32 Monobloc S II
- R290 Monobloc – Cascade Control Unit

Accessible Changeable Installer Settings by Service Provider *

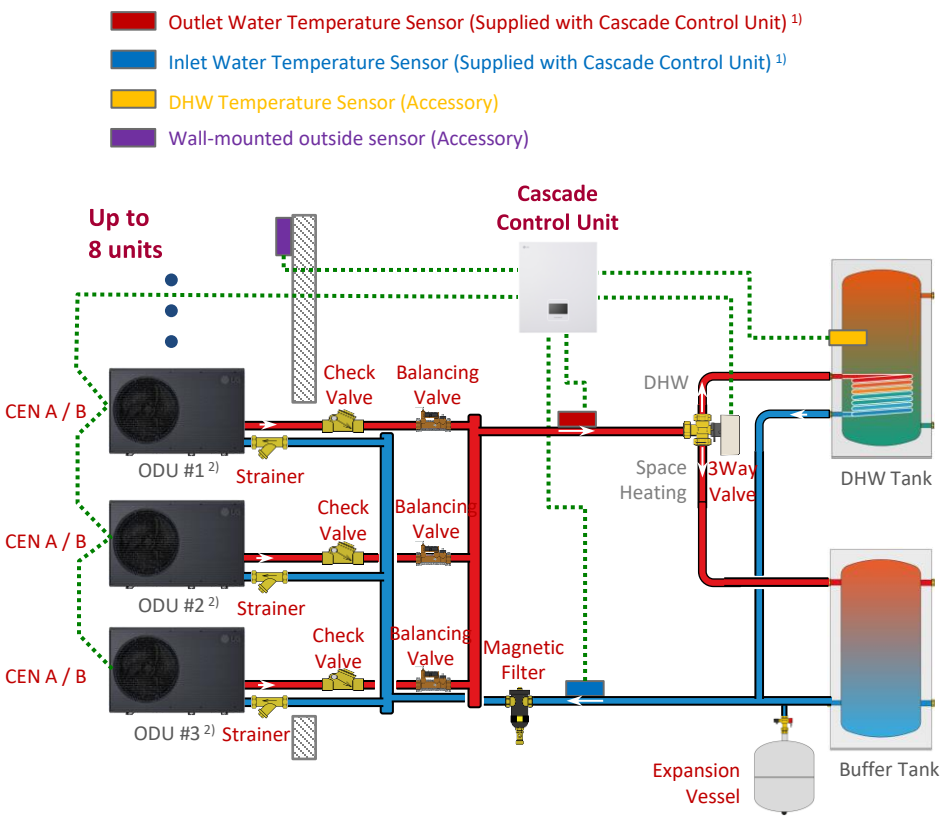


* This function is only available for following products.
- R290 Monobloc – Hydro, Control, Combi Units
- R32 Monobloc S II
- R290 Monobloc – Cascade Control Unit

27 LG Cascade Solution

LG Cascade System enables high efficient operation at all heating capacity range and also allows continuous operation at low demand condition. And also it is easy to configurate as no separate devices are required except for the cascade control unit, and wiring work with accessories and 3rd parties is easily done through the cascade control unit.

▪ Schematic Diagram



※ Simultaneous operation of space heating / cooling and hot water using HP Cycle is not possible.
※ Although some units are designated for space heating / cooling and remaining units are designated for hot water, their simultaneous operation of space heating / cooling and hot water is currently impossible, and this function will be available from 2026 (TBD).

▪ Required Accessory

Model Name	Model Number	Figure	Feature
Cascade Control Unit	PHCM0.ENCXLEU		• Number of integrable units: Up to 8 units • Dimension (W x H x D): 420 x 490 x 141 • Weight : 7.2 kg • Color / RAL Code : Essence White / RAL 9003 • Deluxe Controller (4.3 inch full-touch and full-color display)
Balancing Valve	Field Scope		

▪ Available Product

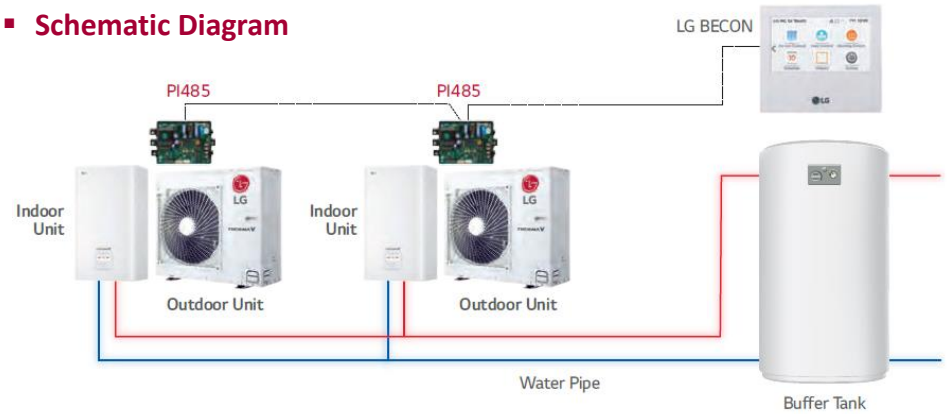
Availability	Available Products
Available	R290 Monobloc – Outdoor units (Produced after Jul, 1st of 2025)
Not Available	R32 Monobloc S II R32 Split - Hydro & Combi Units R32 Hydrosplit – Hydro Unit & Combi Units R32 Monobloc 51kW

Note :
1) Please install the inlet temperature sensor and outlet temperature sensor supplied with Cascade Control Unit at the locations where all inlet pipelines and all outlet pipelines join, respectively.
2) All outdoor units connected to Cascade Control Unit must be configured with models of the same capacity.
※ Please select the flow rate for each unit based on ΔT 5℃ and design the system so that the required flow rate is secured.
※ Since the water pump in each unit can only be set to the same capacity, make sure to configure piping arrangement with a reverse return type or use a low loss header.
※ To ensure even flow distribution and prevent backflow, please install a balancing valve and a check valve on each product.
※ It is important to design the size of combined water pipes appropriately. Please design the water pipes of sufficient size to ensure the required flow rate for each unit and reduce head loss.
※ In addition to the components listed above, please add various valves, drains, and fittings for stabilization and maintenance of the hydronic system.

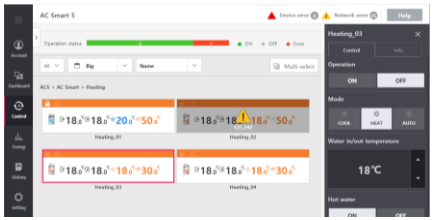
28 LG Central Controller (BECON)

In case that more than two units are installed at a single site and controlled by a central controller, LG BECON (Central Controller) can control and monitor all units.

Schematic Diagram



[AC Ez Touch]



[AC Smart 5]

You CAN	You CANNOT
- Change mode individually or by group - Change target temp. (Air or Water) individually or by group - Change hot water settings - Apply schedules and Check error codes	- Apply different hysteresis for each unit. - Access all Installer settings - Balance operating hours of units

Products	PI485 G/W (PP485A00T)	Availability of LG Central Controller		
		AC Ez Touch	AC Smart 5	ACP 5
R290 Monobloc - Hydro, Control, Combi Units	No required	X	X → O (TBD)	X → O (TBD)
R32 Monobloc S II	No required	O	O	O
R32 Split - Hydro & Combi Units	Required	O	O	O
R32 Hydrosplit - Hydro & Combi Units	Required	O	O	O
R290 Monobloc – Cascade Control Unit	No required	X	X	X
R32 Monobloc 51kW	No required	X	X → O (TBD)	X → O (Oct. '25)

LG BECON (Central Controller)

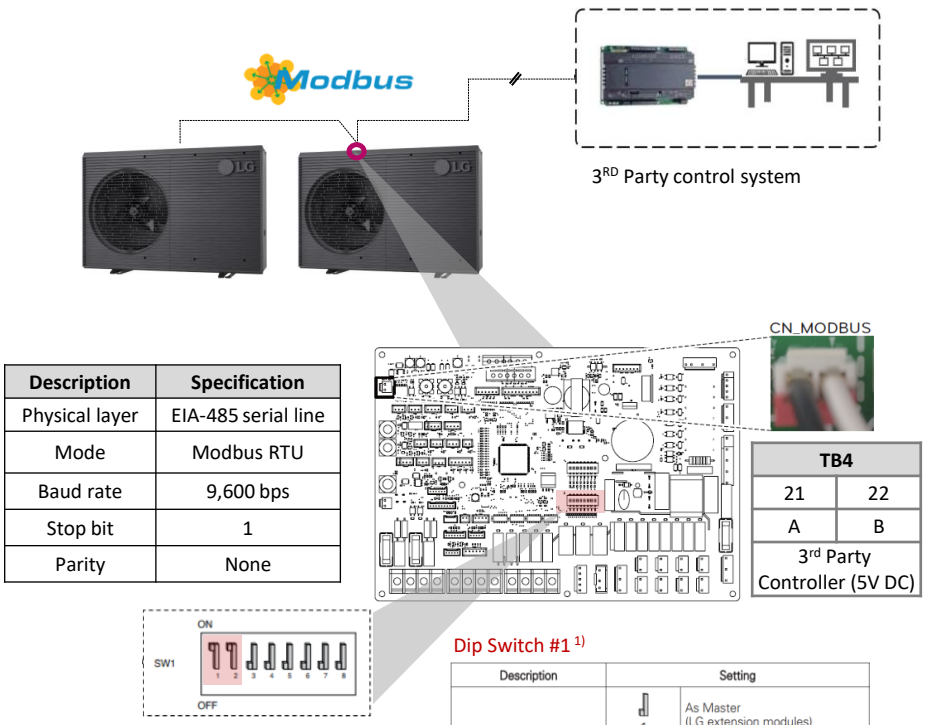
Model	Feature
AC Ez Touch PACEZA000 	• 5 inch Color Display • User-friendly control with iconographic interface (Touch screen) • Max. 32 Unit Control • Total 200 schedule events (Weekly/Monthly/Yearly/Exception day) • Operation History • Remote Controller Lock (All, Temp, Mode) • PC Access Supported (IPv6 supported) • DI 1EA (Emergency Stop Only) • Size (W x H x D) : 137 x 121 x 25
AC Smart PACS5A000 (AC Smart 5) 	• 10.2 inch Color Display • User-friendly control with iconographic interface (Touch screen) • MAX IDU 64 • Total 100 schedule events (Weekly/Monthly/Yearly/Exception day) • History /Operation Trend • Interlock with 3rd party equipment (ACS IO, ACU IO Module is needed) • Error alarm by e-mail • Remote Controller Lock (All, Temp, Mode) • Map view (Visual navigation) • Web Access Supported with HTML5 (PC, Smartphone, Tablet) • DI 2EA, DO 2EA • BACnet IP / Modbus TCP Protocol Support • Size (W x H x D) : 253.2 x 167.7 x 28.9
ACP PACP5A000 (ACP5) 	• Web Access Controller • Max. 128 Unit Control • Total 100 schedule events (Weekly/Monthly/Yearly/Exception day) • History /Operation Trend • Interlock with 3rd party equipment (ACS IO, ACU IO Module is needed) • Error alarm by e-mail • Remote Controller Lock (All, Temp, Mode) • Map view (Visual navigation) • DI 10EA, DO 4EA • BACnet IP / Modbus TCP Protocol Support • Lonworks protocol support * (max. 64 unit control) • Size (W x H x D) : 270 x 155 x 65

* For using Lonworks protocol, only ACP 5 provides interface for BMS integration, and, need to U60FT module between ACP 5 and BMS system interface between Lonworks FT-10 BMS and LG HVAC unit. U60FT should be purchased separately from 3rd party supplier. Please contact regional LG office for more detailed information.

29 Open MODBUS

Therma V can be connected and controlled by 3rd party control system using the Modbus protocol directly, without passing by Modbus RTU gateway.

▪ Schematic Diagram



Description	Specification
Physical layer	EIA-485 serial line
Mode	Modbus RTU
Baud rate	9,600 bps
Stop bit	1
Parity	None

Dip Switch #1 [1)]

Description	Setting	
MODBUS Communication Type	1	As Master (LG extension modules)
	1	As Slave (3rd party controller)
MODBUS Function	2	Unified Open Protocol
	2	No function

Note :

1) It is mandatorily required to change dip SW setting for Modbus with 3rd Party control system.
(Modbus Communication Type : As Slave (3rd party Controller), Modbus Function : Unified Open Protocol)

 # Dip SW No. and Terminal Block No. may differ depending on the product. Please refer to the PDB or manual for details.

▪ Modbus Memory Map

Range	Length	Register type	Access functions	Value type	Example
1... 10000	1 bit data	Coil Register	1 (read), 5 (write), 15 (multiple write)	binary	operation on/off
10001... 20000	1 bit data	Discrete Register	2 (read)	binary	defrost status
20001... 30000	Unused	-	-	-	-
30001... 40000	16 bits (word)	Input Register *	4 (read)	analog	DHW water tank
40001... 50000	16 bits (word)	Holding Register **	3 (read), 6 (write), 16 (multiple write)	analog	target temp.

* Device's variables that the control system can read but not modify
** Devices's variables that the control system can read and modify

Coil Register (0x01)

Register	Description	Value explanation
00001	Enable/Disable (Heating/Cooling)	0 : Operation OFF / 1 : Operation ON
00002	Enable/Disable (DHW)	0 : Operation OFF / 1 : Operation ON
00003	Silent Mode Set	0 : Silent mode OFF / 1 : Silent mode ON
00004	Trigger Disinfection operation	0 : Keep status / 1 : Operation start
00005	Emergency Stop	0 : Normal operation / 1 : Emergency stop
00006	Trigger Emergency Operation	0 : Keep status / 1 : Operation Start
00037	Active Power Limitation	0: Not used / 1: Limit power acc. Reg. 40025

R290 Monobloc – Hydro, Control, Combi Units (Produced after Dec, 1st of 2024),
R32 Monobloc S II, R32 Monobloc 51 kW (Produced after Oct, 1st of 2025)

Discrete Register (0x02)

Register	Description	Value explanation
10001	Water flow status	0 : Flow rate ok / 1 : Flow rate too low
10002	Water Pump status	0 : Water Pump OFF / 1 : Water Pump ON
10003	Ext. Water Pump status	0 : Water Pump OFF / 1 : Water Pump ON
10004	Compressor status	0 : Compressor OFF / 1 : Compressor ON
10005	Defrosting status	0 : Defrost OFF / 1 : Defrost ON
10006	DHW heating status (DHW Thermal On/Off)	0 : DHW inactive / 1 : DHW active
10007	DHW Tank disinfection status	0 : Disinfection inactive / 1 : Disinfection active
10008	Silent mode status	0 : Silent mode inactive / 1 : Silent mode active
10009	Cooling status	0 : No cooling / 1 : Cooling operation
10010	Solar pump status	0 : Solar pump OFF / 1: Solar pump ON

29 Open MODBUS

Therma V can be connected and controlled by 3rd party control system using the Modbus protocol directly, without passing by Modbus RTU gateway.

▪ Modbus Memory Map (Continued)

Discrete Register (0x02) (Continued)

Register	Description	Value explanation
10011	Backup heater (Step 1) status	0 : OFF / 1 : ON
10012	Backup heater (Step 2) status	0 : OFF / 1 : ON
10013	DHW boost heater status	0 : OFF / 1 : ON
10014	Error status	0 : no error / 1 : error state
10015	Emergency Operation Available (Space heating/cooling)	0 : Unavailable / 1 : Available
10016	Emergency Operation Available (DHW)	1 : Unavailable / 1 : Available
10017	Mix pump status	0 : Mix pump OFF / 1 : Mix pump ON

Input Register (0x04)

Register	Description	Value explanation
30001	Error Code	Error Code
30002	ODU operation Cycle	0 : Standby(OFF) / 1 : Cooling / 2 : Heating
30003	Water inlet temp.	[0.1 °C ×10]
30004	Water outlet temp.	[0.1 °C ×10]
30005	Backup heater outlet temp.	[0.1 °C ×10]
30006	DHW tank water temp.	[0.1 °C ×10]
30007	Solar collector temp.	[0.1 °C ×10]
30008	Room air temp. (Circuit 1)	[0.1 °C ×10]
30009	Current Flow rate	[0.1 LPM ×10]
30010	Flow temp. (Circuit 2)	[0.1 °C ×10]
30011	Room air temp. (Circuit 2)	[0.1 °C ×10]
30012	Energy State input	0 : Energy state 0; 1: Energy state 1....
30013	Outdoor Air temp.	[0.1 °C ×10]
30014	Water pressure	[0.1 bar x 10]
30037	ENERGY_INSTANTANEOUS_TOTAL(High)	[Wh] 1), 2), 3), 4)
30038	ENERGY_INSTANTANEOUS_TOTAL(Low)	
30039	ENERGY_ACCUMULATIVE_TOTAL(High)	[Wh] 1), 2), 3), 4)
30040	ENERGY_ACCUMULATIVE_TOTAL(Low)	
30041	ENERGY_ACCUMULATIVE_HEAT(High)	[Wh] 1), 2), 3)
30042	ENERGY_ACCUMULATIVE_HEAT(Low)	
30043	ENERGY_ACCUMULATIVE_COOL(High)	[Wh] 1), 2), 3)
30044	ENERGY_ACCUMULATIVE_COOL(Low)	
30045	ENERGY_ACCUMULATIVE_DHW(High)	[Wh] 1), 2), 3)
30046	ENERGY_ACCUMULATIVE_DHW(Low)	
39998	Product Group	0x8X (0x80, 0x83, 0x88, 0x89)
39999	Product Info.	Split : 0 / Monobloc : 3 / High Temp. : 4 / Medium Temp. : 5 / System Boiler : 6

R290 Monobloc – Hydro, Control, Combi Units (Produced after Dec, 1st of 2024), R32 Monobloc S II, R32 Monobloc 51 kW (Produced after Oct, 1st of 2025)

Except for R290 Monobloc – Cascade Control Unit, R32 Monobloc 51kW, and R32 Hydrosplit - Combi Unit

Holding Register (0x03)

Register	Description	Value explanation
40001	Operation Mode	0 : Cooling / 4 : Heating / 3 : Auto
40002	Control method (Circuit 1/2)	0 : Water outlet temp. control / 1 : Water inlet temp. control / 2 : Room air control
40003	Target temp (Heating/Cooling) Circuit 1	[0.1 °C ×10]
40004	Room Air Temp. Circuit 1	[0.1 °C ×10]
40005	Shift value(Target) in auto mode Circuit 1	1K
40006	Target temp (Heating/Cooling) Circuit 2	[0.1 °C ×10]
40007	Room Air Temp. Circuit 2	[0.1 °C ×10]
40008	Shift value(Target) in auto mode Circuit 2	1K
40009	DHW Target temp.	[0.1 °C ×10]
40010	Energy state input	0 : Not Use 1 : Forced off (equal to TB_SG1=close / TB_SG2=open) 2 : Normal operation (equal to TB_SG1=open / TB_SG2=open) 3 : On-recommendation (equal to TB_SG1=open / TB_SG2=close) 4 : On-command (equal to TB_SG1=close / TB_SG2=close) 5 : On-command step 2 (++ Energy Consumption compared to Normal) 6 : On-recommendation Step 1 (+ Energy Consumption compared to Normal) 7 : Energy Saving mode (- Energy Consumption compared to Normal) 8 : Super Energy saving mode (-- Energy Consumption compared to Normal)
40024	Compressor Modulation	0 : Not Used / 40~100 : Compressor Modulation The new maximum frequency of the compressor is determined by the compressor modulation value and the maximum compressor frequency of the existing product. i.e) Maximum compressor frequency : 100Hz Compressor modulation value : 0.4 → New maximum frequency of the compressor : 100 * 0.4 = 40Hz
40025	Power Limitation value	0.1 kW ~ 25.0 kW

Note :

1) Total energy consumption = (High) value * 2^16 + (Low) value
2) The calculated power consumption is an estimation, the accuracy cannot be guaranteed. The energy data should NOT be used for being invoiced or requested to government incentive and subsidy.
3) Power consumption of heat pump outdoor unit (Comp. & Fan only) + Entire Indoor unit (Pump and Backup Heater)
4) Total : Heat + Cool + DHW

[redacted]

September, 2025
HQ Heating Oversea Sales Team

Appendix. Line-up for THERMA V (Monobloc)

* Natural refrigerant with GWP 3

Product		Water Temp. (C / H)	Refrigerant	Power	Heating Capacity (Cooling Capacity) (Unit : kW)								
					4	5	6	7	9	12	14	16	51
NEW Therma V Monobloc 51kW 	Control Unit	5℃ / 60℃ [1]	R32	3ø 400V									O 51.0 (51.0)
Therma V Monobloc 	Control Unit	5℃ / 75℃	R290*	1ø 230V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
				3ø 400V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
	Hydro Unit 			1ø 230V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
				3ø 400V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
	Combi Unit 			1ø 230V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
				3ø 400V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
	NEW Cascade Control Unit 	5℃ / 70℃		1ø 230V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
				3ø 400V				O 7.0 (5.0)	O 9.0 (5.5)	O 12.0 (11.5)	O 14.0 (12.0)	O 16.0 (12.5)	
Therma V Monobloc S II 		5℃ / 65℃	R32	1ø 230V		O 5.5 (5.5)		O 7.0 (7.0)	O 9.0 (9.0)	O 12.0 (12.0)	O 14.0 (14.0)	O 16.0 (16.0)	
				3ø 400V						O 12.0 (12.0)	O 14.0 (14.0)	O 16.0 (16.0)	

1) Achievable 65℃ using 3rd party backup heater.

Appendix. Line-up for THERMA V (Split & Hydrosplit)

Product		Water Temp. (C / H)	Refrigerant	Power	Heating Capacity (Cooling Capacity) (Unit : kW)							
					4	5	6	7	9	12	14	16
Therma V Hydrosplit 	Hydro Unit 	5℃ / 65℃	R32	1ø 230V						O 12.0 (12.0)	O 14.0 (14.0)	O 16.0 (16.0)
				3ø 400V						O 12.0 (12.0)	O 14.0 (14.0)	O 16.0 (16.0)
	Combi Unit 			1ø 230V						O 12.0 (12.0)	O 14.0 (14.0)	O 16.0 (16.0)
				3ø 400V						O 12.0 (12.0)	O 14.0 (14.0)	O 16.0 (16.0)
Therma V Split 	Hydro Unit 	5℃ / 55℃	R32	1ø 230V	O 4.0 (4.0)		O 6.0 (6.0)					
	Combi Unit 			1ø 230V	O 4.0 (4.0)		O 6.0 (6.0)					
	Hydro Unit 	5℃ / 65℃		1ø 230V		O 5.5 (5.5)		O 7.0 (7.0)	O 9.0 (9.0)			
	Combi Unit 			1ø 230V		O 5.5 (5.5)		O 7.0 (7.0)	O 9.0 (9.0)			