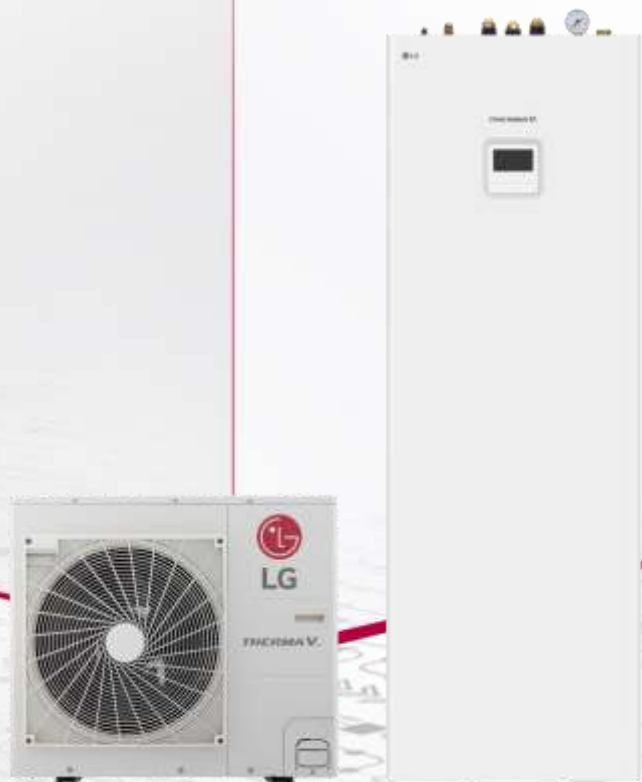




# ***Therma V IWT(Integrated Water Tank)***

Product Introduction



AWHP Task  
August, 2020

# CONTENTS

Therma V R32 IWT Product Introduction

## 1 Overview

Intro. | Key Feature | Line-up

## 2 What's different – Therma V R32 IWT

### A Excellent Performance

R1 Compressor | Black Fin | Fan | High Energy Efficiency |  
Wide Operation Range | Reduced Noise Level

### B User Convenience

Wi-fi | LG ThinQ | 2 Zone Temperature |  
3<sup>rd</sup> Party Boiler | Meter Interface | Modbus RTU

### C Easy Installation & Maintenance

Integrated Water Components | Insertable Buffer tank  
Mobile LG MV | Black Box for Emergency

#### *Note*

\* All technical data and specification can be changed without prior notice

# Overview

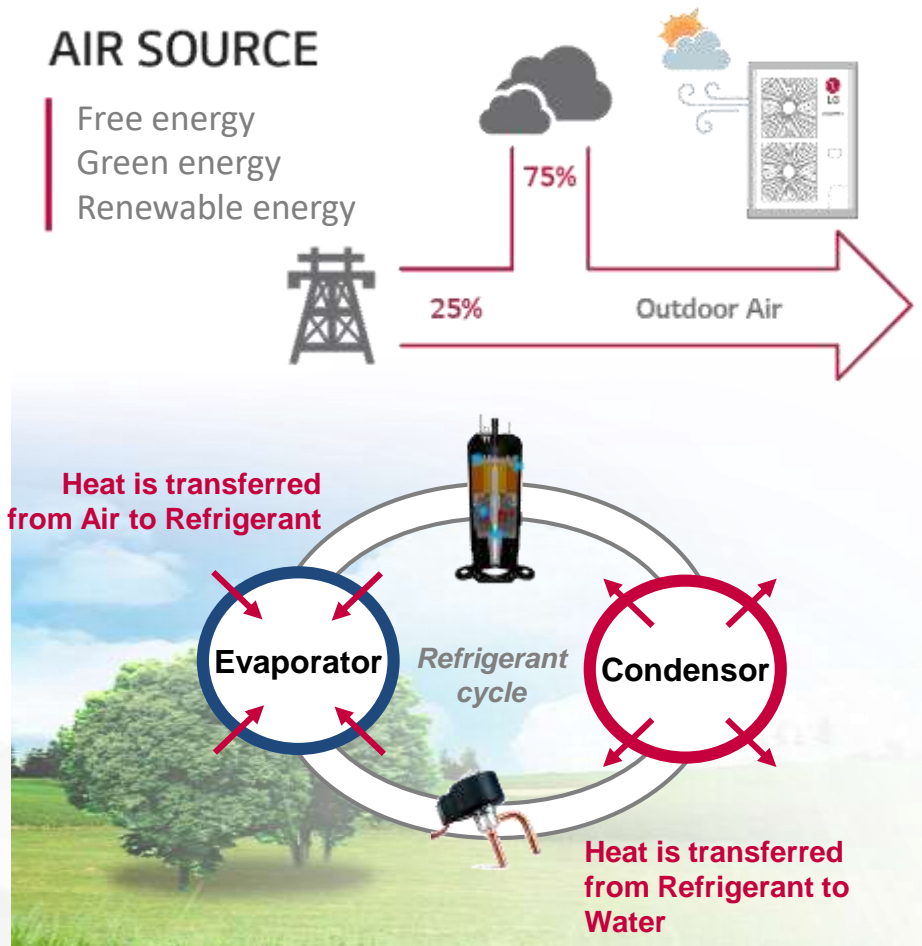


# What is AWHP(Air to Water Heat Pump)?

Intro

**AWHP system** can provide various heating solutions from floor heating to hot water supply with multiple heat sources. It is 4 times more energy efficient than the conventional system.

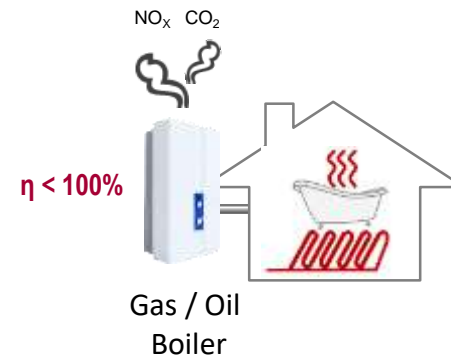
## Air to Water Heat Pump



## Conventional System

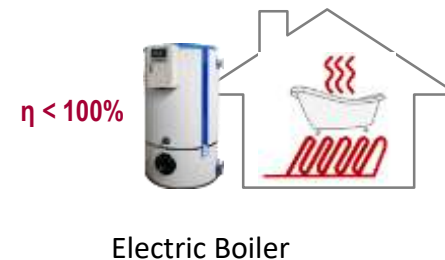
### Gas/Oil Boiler

: Emissions of environmentally hazardous substances.



### Electric Boiler

: High energy consumption



# How to use AWHP(Air to Water Heat Pump)?

Intro

New approach and design for recent residential are required to create a comfortable living environment

- ***High-efficiency***
- ***Eco-friendly***
- ***Cost efficient investment***
- ***Low Noise***



Space Heating/Cooling

- Radiant
- Convection



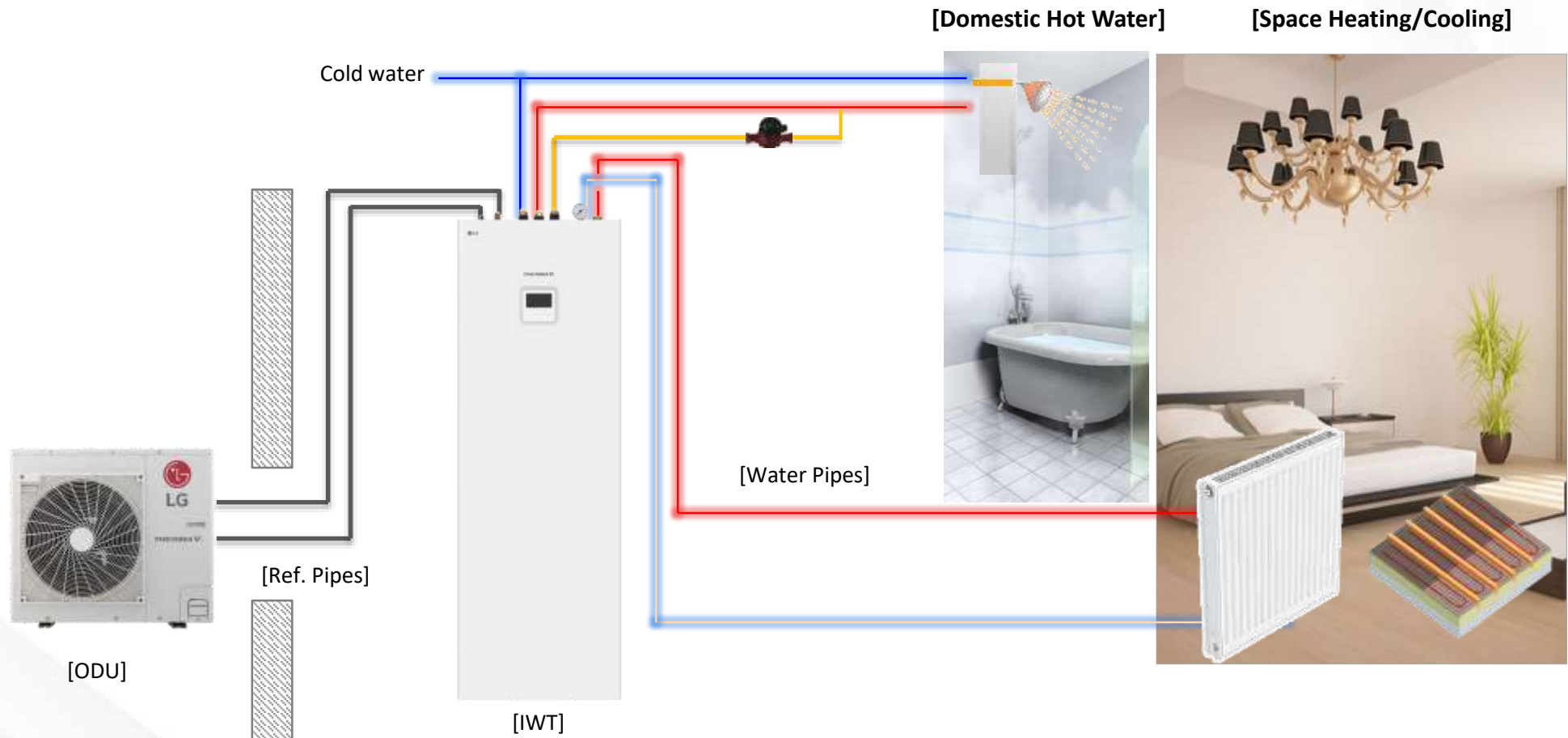
Domestic Hot Water

- Shower & Washing
- Kitchen sink

# What is THERMA V?

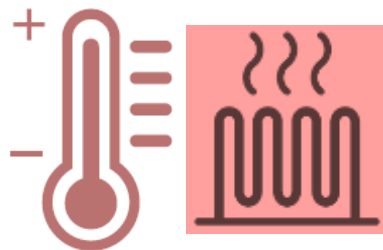
Intro

**THERMA V** is LG's AWHP brand. It can be used as a multi-purpose heating solution ranging from space heating to hot water supply.



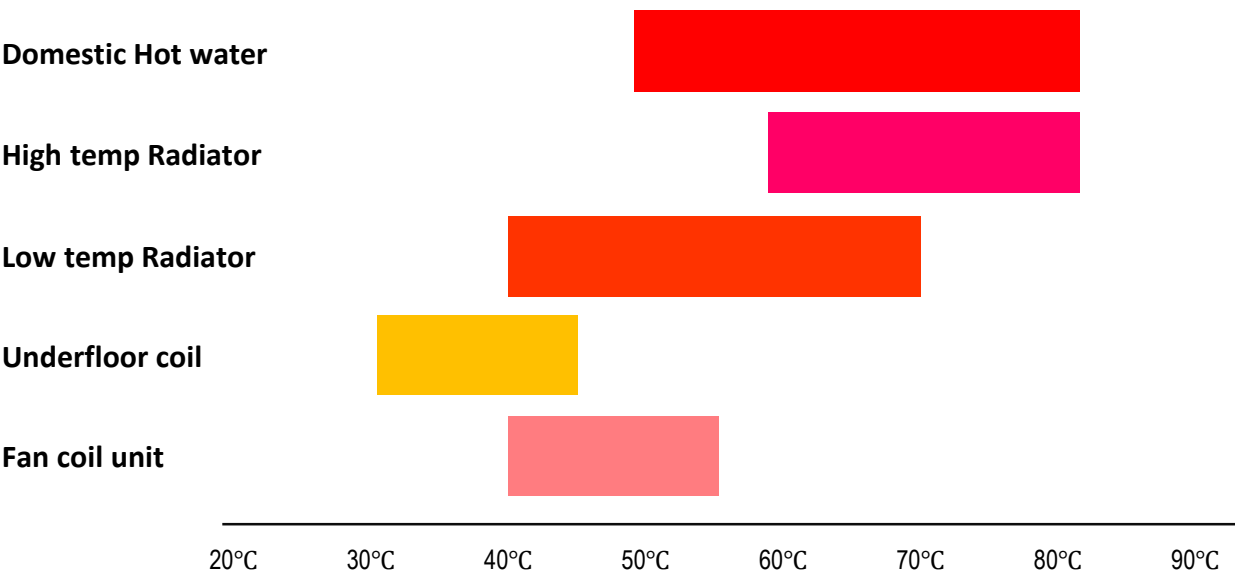
# Wide operation range

Intro



R32 Therma V Products are providing  
Cool water outlet temperature is 5~27°C,  
Hot water outlet temperature is 15~65°C

Therma V High temp is providing  
Hot water outlet temperature is 25~80°C



Purpose of use	Temperature range (°C)
Bath, shower	42~45
Wash-up, dish-washing	35~40
Kitchen	45~45
Swimming pool	25~28 (winter season 30)



# Low GWP Refrigerant R32

Key Feature

What is R32 Refrigerant ?

Low GWP, Zero ODP, Higher efficiency, Easy to recycle

## GWP

Global Warming Potential

R410A

2088

R32

675

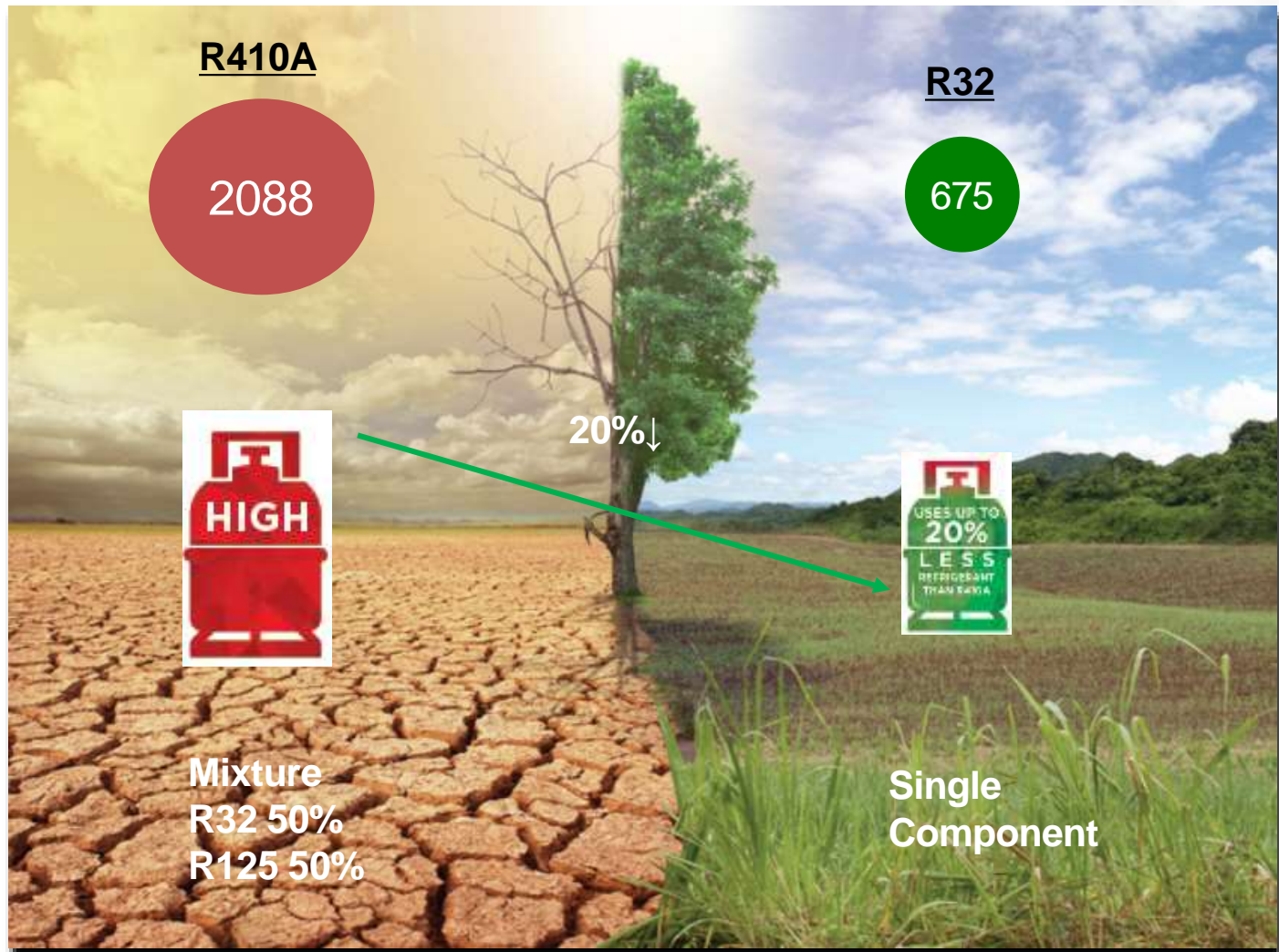
Less amount  
Charge

20%↓

Composition



































Mixture  
R32 50%  
R125 50%

Single  
Component





\*(Heating Capa.)

Product		Water Temperature (C/H)	Refrigerant	Power	Capacity (kW)						
					5	7	9	12	14	16	25
Therma V Monobloc		5°C / 65°C	R32	1ø 230V							
				3ø 400V							
				1ø 230V							
Therma V Silent Monobloc											
Therma V Spilt	Hydro Box Type	5°C / 65°C	R32	1ø 230V							
	Integrated Water Tank	5°C / 65°C	R32	1ø 230V							
	Hydro Box Type	5°C / 57°C	R410A	1ø 230V							
				3ø 400V							
	Integrated Water Tank	7°C / 58°C		1ø 230V							
				3ø 400V							
Therma V High temp	High Temp (Heating only)	80°C	R410A + R134a	1ø 230V							

# LG Air to Water Heat Pump

Line-up

## THERMA V™ - R32 Monobloc



**Capacity range : 1P 5/7/9/12/14/16kW  
3P 12/14/16kW**

- Supply water up to 65°C for heating
- Supply water up to 5°C for cooling
- Radiant system design
- Space heating / cooling design with FCU
- Hot water system
- Water components included
- No refrigerant piping work

## THERMA V™ - R32 Split



IWT / Wall-hung

**Capacity range : 1P 5/7/9 kW**

- Supply water Up to 65°C for heating
- Supply water Up to 5°C for cooling
- Radiant system design
- Space heating / cooling design with FCU
- Hot water system
- Water components included
- Black fin in outdoor unit

## THERMA V™ - R410A Split



**Capacity range : 1P 12/14/16kW  
3P 12/14/16kW**

- Supply water up to 57°C for heating
- Supply water up to 5°C for cooling
- Radiant system design
- Space heating / cooling design with FCU
- Hot water system
- Water components included

## THERMA V™ - R32 Silent Monobloc



**Capacity range : 1P 9 kW**

- Supply water up to 65°C for heating
- Supply water up to 5°C for cooling
- Radiant system design
- Space heating / cooling design with FCU
- Hot water system
- Water components included
- No refrigerant piping work

## THERMA V™ - High temp



**Capacity range (Single) : Outdoor 1P 16 kW  
Indoor 1P 16kW**

- Supply water up to 80°C for High temp heating
- Radiant system design
- Space heating / cooling design with FCU
- Hot water system

## THERMA V™ - IWT (Integrated water tank)



**Capacity range : 1P 9/12/14/16kW  
3P 12/14/16kW**

- Supply water up to 58°C for heating
- Supply water up to 7°C for cooling
- Integrated water tank (All in one)
- Radiant system design
- Space heating design with FCU
- Hot water system

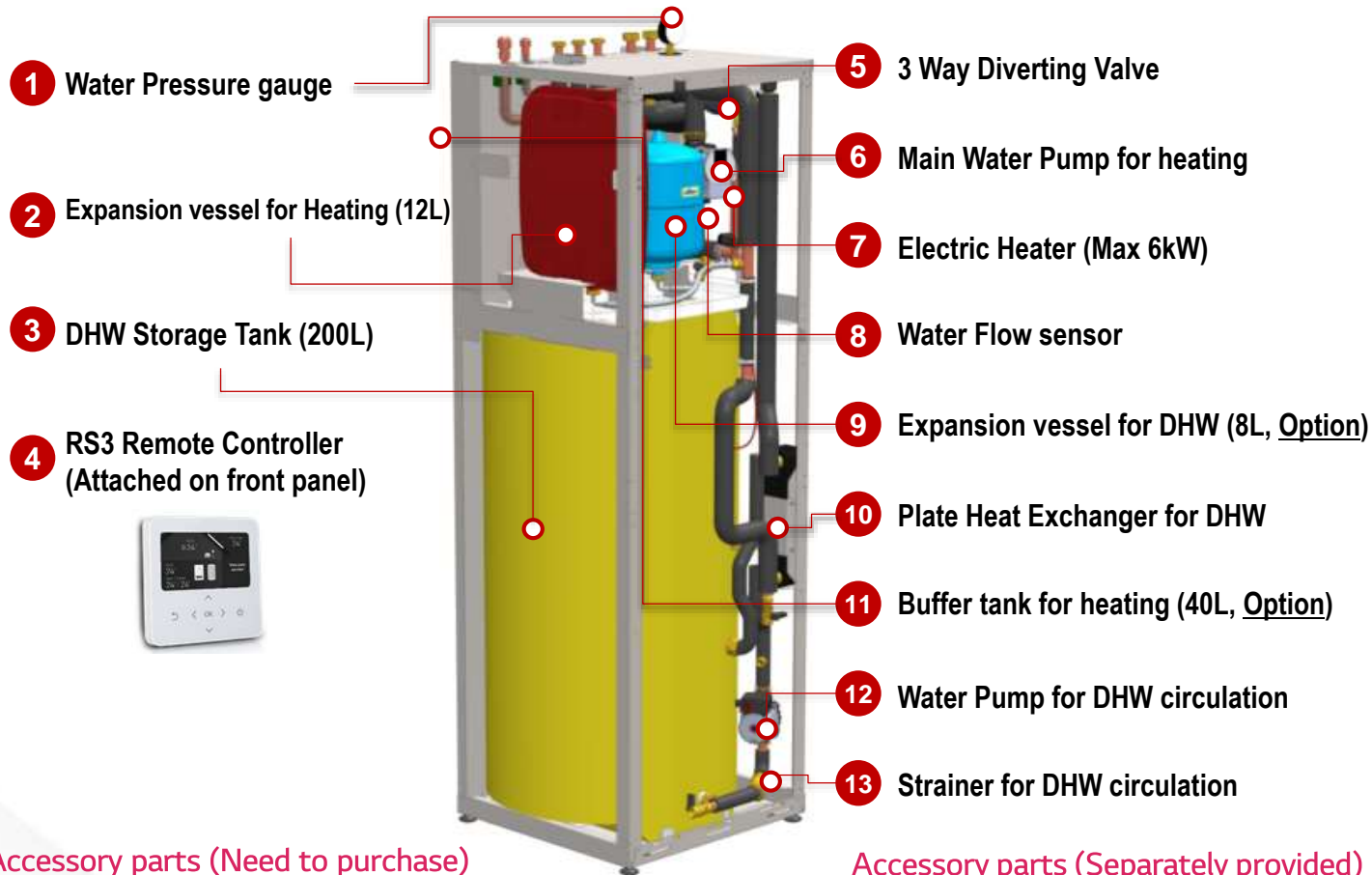
# What's different – R32 IWT



# Major Components

All in One solution for DHW, hydronic heating and cooling

[Indoor unit]



Accessory parts (Need to purchase)



Accessory parts (Separately provided)



[Outdoor unit]

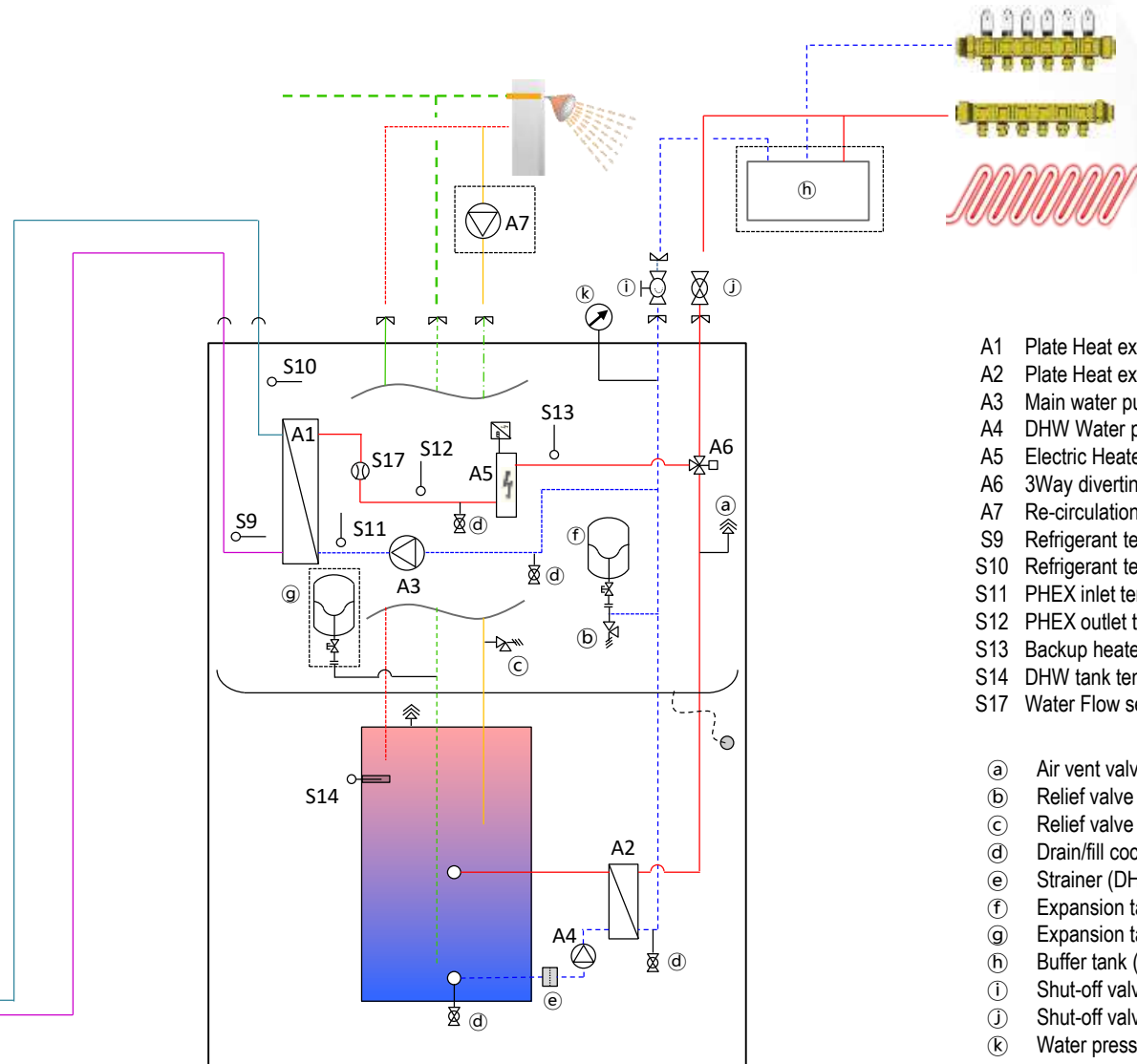


# System scheme

- Heating water – outlet
- - - Heating water – inlet
- Refrigerant gas (5/8 ")
- Refrigerant liquid (3/8 ")
- - - Domestic hot water (DHW)
- DHW re-circulation
- - - Domestic cold water



[ODU]



[IWT]

- A1 Plate Heat exchanger (Ref-Water)
- A2 Plate Heat exchanger (DHW)
- A3 Main water pump
- A4 DHW Water pump
- A5 Electric Heater
- A6 3Way diverting valve
- A7 Re-circulation pump (Field)
- S9 Refrigerant temp. (Gas)
- S10 Refrigerant temp. (Liquid)
- S11 PHEX inlet temp. (Water)
- S12 PHEX outlet temp. (Water)
- S13 Backup heater outlet temp. (Water)
- S14 DHW tank temp. (Water)
- S17 Water Flow sensor

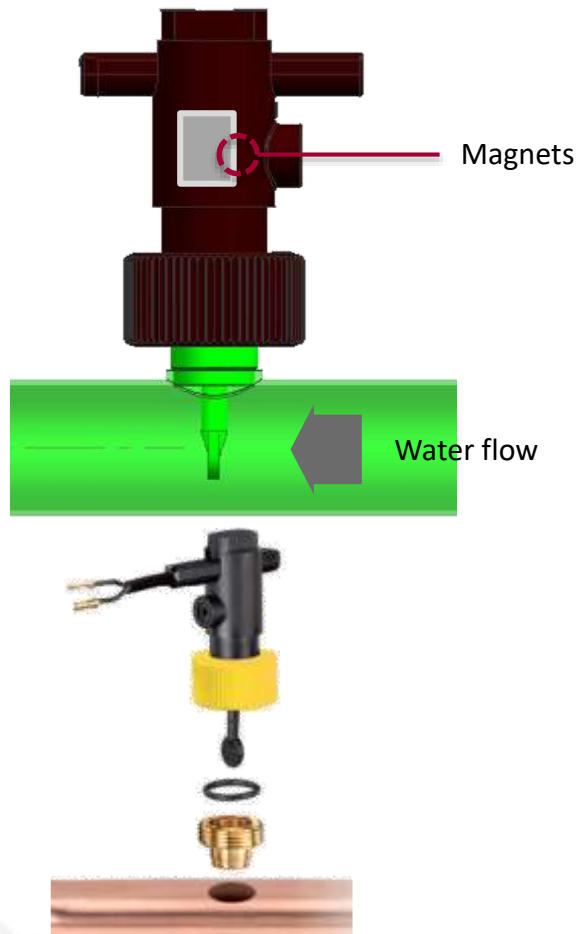
- (a) Air vent valve
- (b) Relief valve (Heating)
- (c) Relief valve (DHW)
- (d) Drain/fill cock
- (e) Strainer (DHW)
- (f) Expansion tank (Heating)
- (g) Expansion tank (DHW) - Option
- (h) Buffer tank (Heating/Cooling) - Option
- (i) Shut-off valve with Strainer (Inlet)
- (j) Shut-off valve (Outlet)
- (k) Water pressure gauge

Field scope

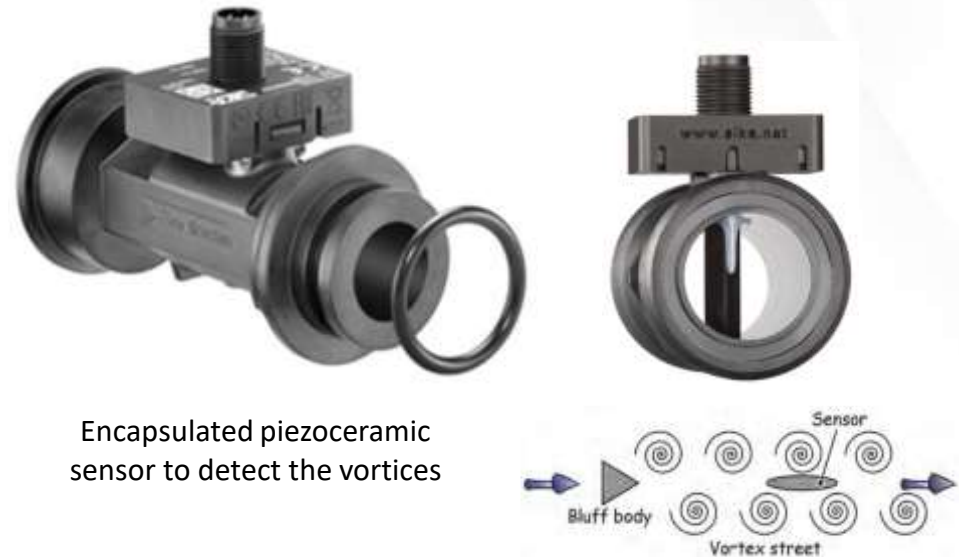
# 1 Flow Sensor

Flow sensor provides the actual flow rate information in RS3 remote controller.

R410A IWT - Flow Switch



R32 IWT - Sika Flow Sensor



Encapsulated piezoceramic sensor to detect the vortices

Model			SIKA VVXC9SNBUC00252P
Measuring Range	Min. ~ Max.	LPM	<b>5 ~ 80</b>
Flow (Trigger point)	Min.	LPM	<b>7</b>
Measuring duration	Sec		<b>1</b>



## 2 Water pump

Wilo water pumps are integrated in the unit for better reliability.

### R410A IWT - Water pump



Technical Specifications	Heating
Pump Maker	Wilo
Pump Type	Canned type
Model	Yonos Para 25/7
Motor Type	PWM AC Inverter
Energy Efficiency Index(EEI)	≤ 0.20
Steps of Pumping Performance	13~100%
Power input (W)	3~45

### R32 IWT - Water pump



- Pump Capacity Control by RS3
- Setting up water pump PWM : 10 ~ 100 %

Technical Specifications	Heating	DHW
Pump Maker	Wilo	Wilo
Pump Type	Canned type	Canned type
Model	KU 25-130/8-75/12 iPWM1	ZRS 15/6-3 KU
Motor Type	BLDC	Asynchronous
Energy Efficiency Index(EEI)	≤ 0.21	≤ 0.20
Steps of Pumping Performance	10~100%	3 steps
Power input (W)	2~75	45~85

### 3 New Controller

Easy look and settings are available by new stylish controller.

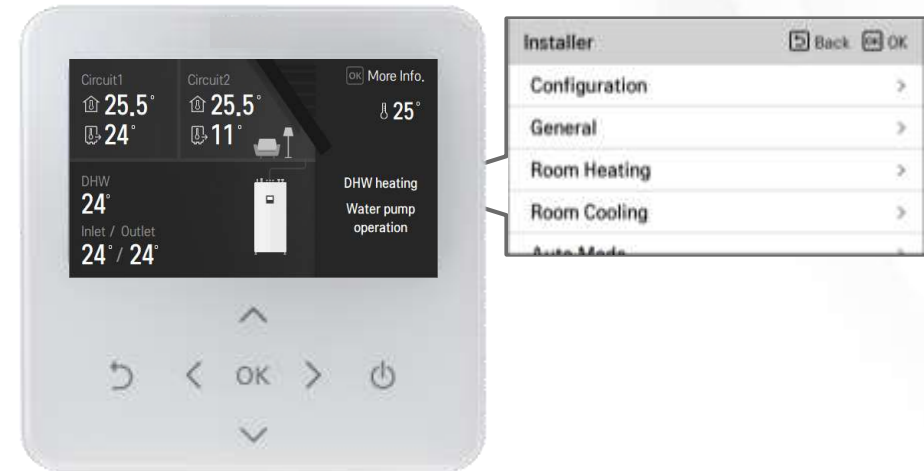
R410A IWT – Controller



- 4 lines LCD Screen
- The functions are displayed with short words

**Necessary** to use the manual for understanding the function menu

R32 IWT – RS3 Controller



- 4.3 Inch Full color LCD Screen
- Easy monitoring with graphical UI
- Easy Menu structure (Installer menu)
- The functions are displayed as word.

**No need** to use the manual and function code table for setting

## 4 Electric Heater

Flexible design is possible in accordance with specific climate condition.  
Electric heater can assist either space heating or domestic hot water.

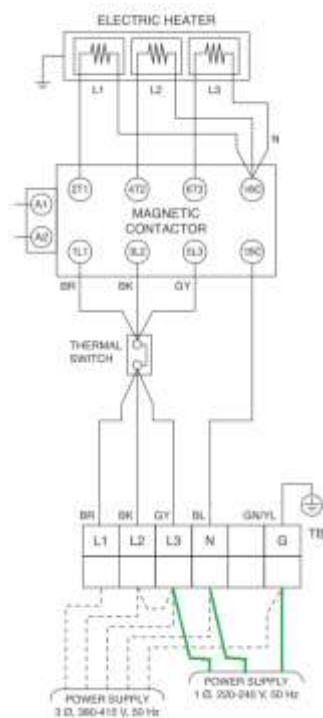
**R32 IWT / R410A IWT**



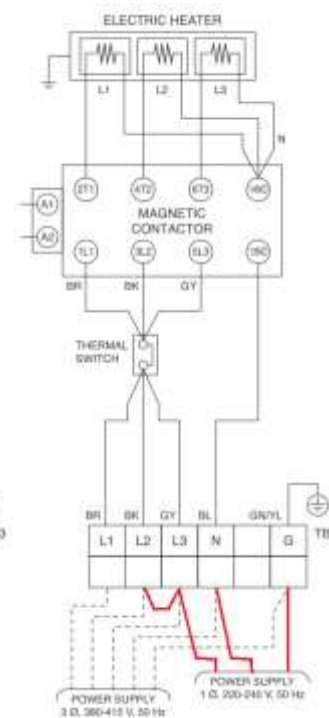
Electric heater	Capacity	kW	2	4	6
	Power Supply	V, $\phi$ , Hz	220-240, 1, 50	220-240, 1, 50	380-415, 3, 50
	Rated Current	A	8.7	17.4	8.7
Safety thermostat	Tripping temperature	°C	85	85	85

\* Wiring works required to adjust the capacity of back-up heater

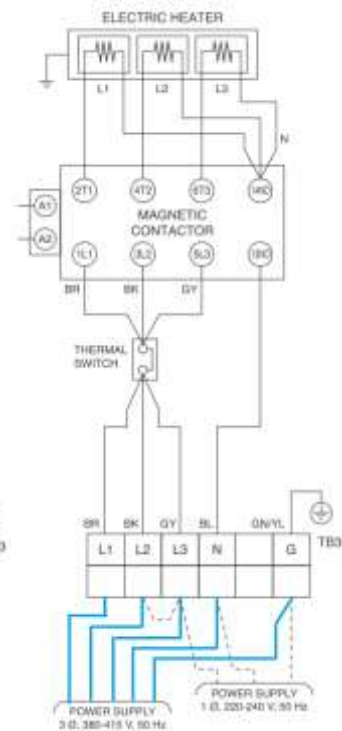
2 kW / 230V



4 kW / 230V



6 kW / 400V

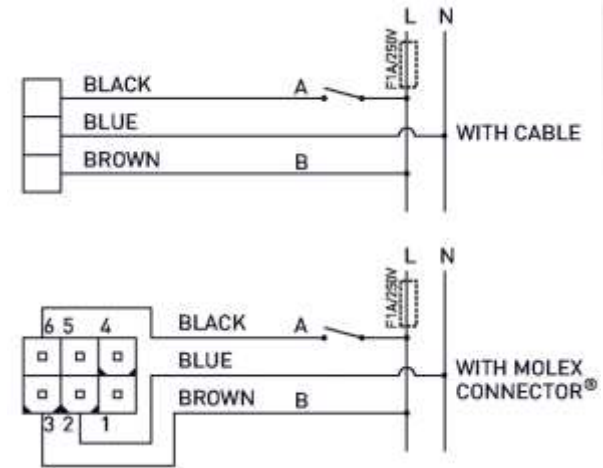


\* Wiring works in Field required

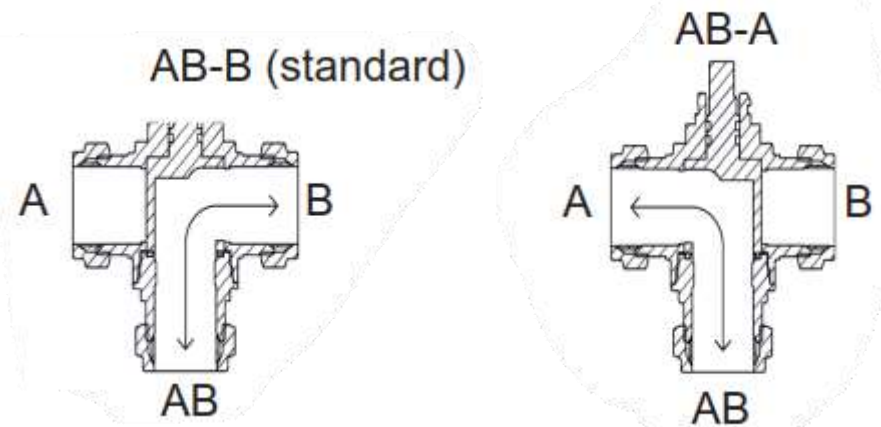
## 5 3Way diverting valve

Heating/Cooling and DHW operation is possible through diverting direction of 3way valve.

R32 IWT / R410A IWT



Maker	LK Armatur
Model	LK 525 MultiZone 3W
Voltage	230V AC, 50 Hz
Protection class	IP40
Operating time	8 sec
Operating temperature	Min. 5 °C / Max. 80 °C



## 6 Water Tank

Less heat loss by high insulation



Description	R410A IWT	R32 IWT
Volume	200 liter	200 liter
Material	Enameled steel	Enameled steel
Anode bar	Mg	Mg
Insulation	Polyurethane foam 50mm	Polyurethane foam 50mm
Max operating pressure	10 bar	10 bar
Heat loss	<b>1.67kWh/24h</b>	<b>1.46kWh/24h</b>

\* Mg Anode should be checked every 2 years considering water quality  
Designed for 15 years lifespan

# Key Changes in Specification

## Differences between R410A IWT and R32 IWT

Categories	Items		R410A IWT	R32 IWT	Remark
General	Refrigerant		R410A	R32	Lower GWP application
	Line up		1Ph : 9, 12, 14, 16kW 3Ph : 12, 14, 16kW	1Ph : 5, 7, 9kW	Compact Line up
Efficiency	SCOP (@ LWT 35°C) / Class		4.04 / A++ (9kW)	4.46 / A+++ (9kW)	Improved efficiency
	Water Heating / Class		98% / A (9kW)	125% / A+ (9kW)	
Performance	Operation Range (Heating)		-20 ~ 35°C	-25 ~ 35°C	Wider Range
	Leaving water temperature		Max. 58°C	Max. 65°C	
	Heating performance (@ LWT 35°C)		84% @ -7°C (9kW) 77% @ -15°C (9kW)	100% @ -7°C (All range) 87% @ -15°C (9kW)	Improved Low Ambient Performance
	Sound Power Level for ODU (Heating / Rated)		9kW : 65dB(A) / 12,14,16kW: 66dB(A)	5kW : 60dB(A) / 7,9kW : 61dB(A)	
Component	ODU	Compressor	Rotary	R1 Compressor	New Tech Application
		Heat Exchanger	Gold Fin	Black Fin	Highly corrosion resistant
		Weight	9kW : 59kg / 12,14,16kW : 94kg	5,7,9kW : 60kg	-
		Dimension W x H x D (mm)	9kW : 950 x 834 x 330 12,14,16kW : 950 x 1,380 x 330	5,7,9kW : 950 x 834 x 330	-
	IDU	DHW Tank	200L (Enameled steel)	200L (Enameled steel)	-
		Buffer Tank	Included as default (40L)	Optional Accessory (40L)	
		Expansion Tank	N / A	12L for Heating Circuit (8L for DHW is optional Accessory)	Easy Installation
		Pump (Brand)	WILO (1EA)	WILO (2EA)	DHW Charging pump is added
		Electric Heater	Internal & Default (2kW, 4kW, 6kW)	Internal & Default (2kW, 4kW, 6kW)	
		Flow Detector	Flow Switch	SIKA Flow Sensor	Water flow rate monitoring
		Dimension W x H x D (mm)	607 x 2,079 x 725	602 x 1,810 x 680	Compact Size
		Weight	228 kg	140 kg	39% Weight Reduction
		Interface (Controller)	Kronoterm Controller	RS3 Controller	Interface change



# Key Features of R32 IWT

## A Excellent Performance

- ✓ High Energy Efficiency (Energy label rating A+++ @ 35°C LWT)
- ✓ Excellent Performance at Low Ambient Temperature (100% @ -7 °C, OAT -25 ~ 35°C)
- ✓ Wide Operation Range (Heating LWT 15 ~ 65°C)
- ✓ Reduced Noise Level (60 ~ 61 dB(A) Sound Power Level for ODU)
- ✓ Revolutionary Scroll Compressor (R1 Compressor)
- ✓ Flash gas injection Technology

## B User Convenience & Functions

- |                                                  |                                               |
|--------------------------------------------------|-----------------------------------------------|
| ✓ New Interface (RS3 Controller)                 | ✓ LG central Control                          |
| ✓ LG own Wi-Fi Solution (LG ThinQ)               | ✓ Google Voice control                        |
| ✓ 2nd Heating Circuit                            | ✓ Modbus                                      |
| ✓ External water pump                            | ✓ Interlock with 3 <sup>rd</sup> party boiler |
| ✓ Smart Grid (SG)                                | ✓ Energy monitoring (Meter Interface)         |
| ✓ Various Temperature control (Water, Air, both) | ✓ Dry contact                                 |

## C Easy Installation & Maintenance

- ✓ New Menu structure (Separate category for installer mode)
- ✓ Compact Size & Small Footprint
- ✓ Integrated Hydronic components
  - Water Tank (200L)
  - Water Pumps (2EA)
  - Electric heater
  - Flow Sensor
  - Strainer
  - 3 Way Valve
  - Relief Valve
  - Buffer Tank (Option, 40L for heating)
  - Air Vent
  - Expansion tanks (12L for heating / Option, 8L for DHW)



**THERMAV**  
**IWT (Integrated**  
**Water Tank)**

# A Excellent Performance



# R1 Compressor

LG R1 Compressor is more stable and simple compressing structure with low-vibration characteristics



\*Hybrid Scroll Shape Design



Extended Operation  
Range (max 150Hz)

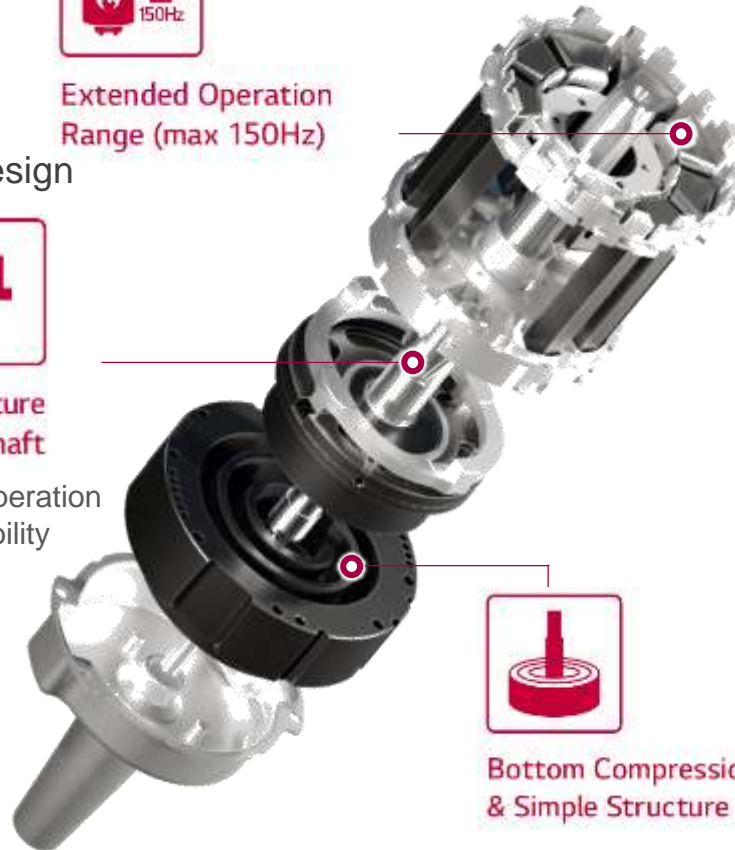


Shaft-through Structure  
& Support both ends of shaft

- Solid compressor operation  
assuring higher durability



Centrifugal oil return  
& Oil separating guide  
for oil discharge reduction



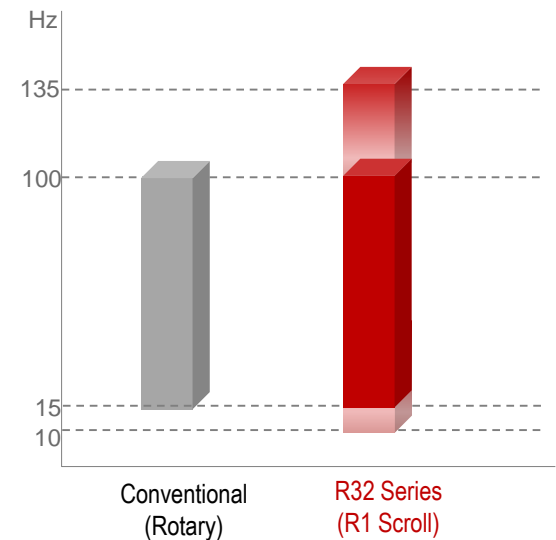
Bottom Compression  
& Simple Structure

- Lower Noise & Vibration  
\*\*Max 4dB(A) ↓
- Less Weight  
\*\*20% ↓
- Superior Reliability



COOLING  
EFFICIENCY 20% UP

HEATING  
EFFICIENCY 13% UP

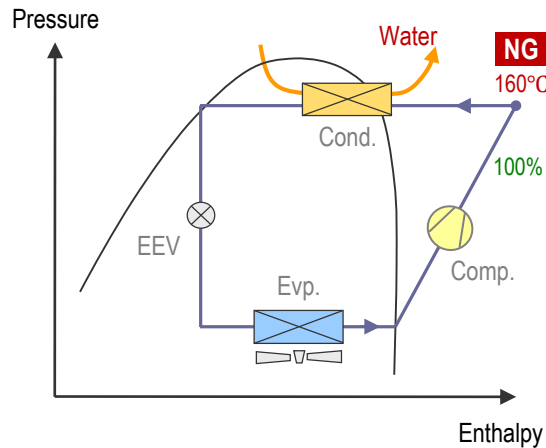


# R1 Compressor - Flash gas injection

Technology for expanding outside temperature and hot water temperature in heating mode

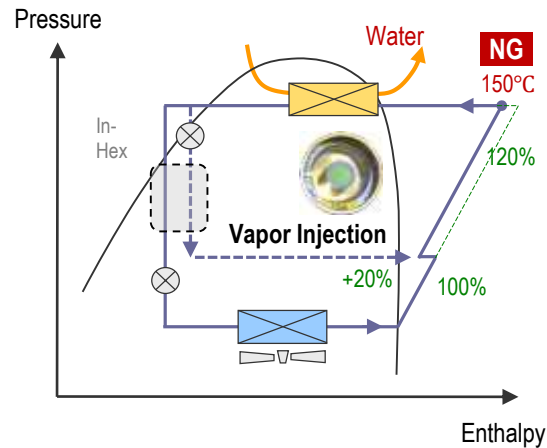
## Normal cycle (with R32)

Refrigerant discharge temperature rise and poor control  
(More severe in heating low temperature and high temperature watering conditions)



## Cycle with Vapor Injection

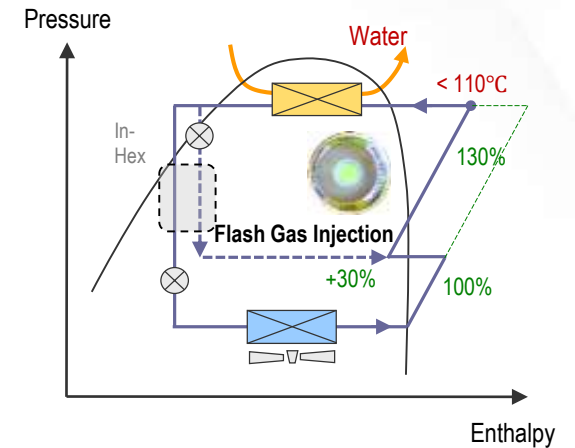
The existing technology lacks cooling effect of discharge refrigerant, Target refrigerant flow rate is insufficient



R32 SPLIT / R32 Mono / R32 IWT

## Cycle with Flash Gas Injection

Secure appropriate refrigerant flow and reliability



For Internal Hex  
R32 Mono : Applied, R32 Split : Not applied

Description		R410A	R32		
			No Injection	Vapor Injection	Flash Gas Injection
Operation Limit	Ambient Temp. (°C)	-20	-10	-15	-25
	Comp. Discharge Temp. (°C)	100	160	150	< 110
Performance	Max. LWT @ 7°C	57	50	55	65
	Heating Capacity @ -7°C (%)	77	77	85	> 100

# Black fin

The black coating with enhanced epoxy resin is applied for strong protection from various corrosive external conditions such as salt contamination and air pollution including fumes from factories. This improvement in durability prolongs the product's lifespan and lowers both the operational and maintenance costs.

 **Longer Lifespan, Lower Operational Costs**  **Strengthened corrosion resistant coating**

## Black Fin

### Hydrophilic Film(Water flow)

The Hydrophilic coating minimizes moisture buildup on the fin.

### Acryl + Epoxy + Melamine resin (Corrosion resistant)

The Black coating provides strong protection from corrosion

Aluminum fin



## \* Test result of corrosion resistance

Conventional



SST 1,000hr  
CCT 500hr

Blank



SST 1,950hr (95% ↑)  
CCT 1,300hr (160% ↑)

\* Test condition

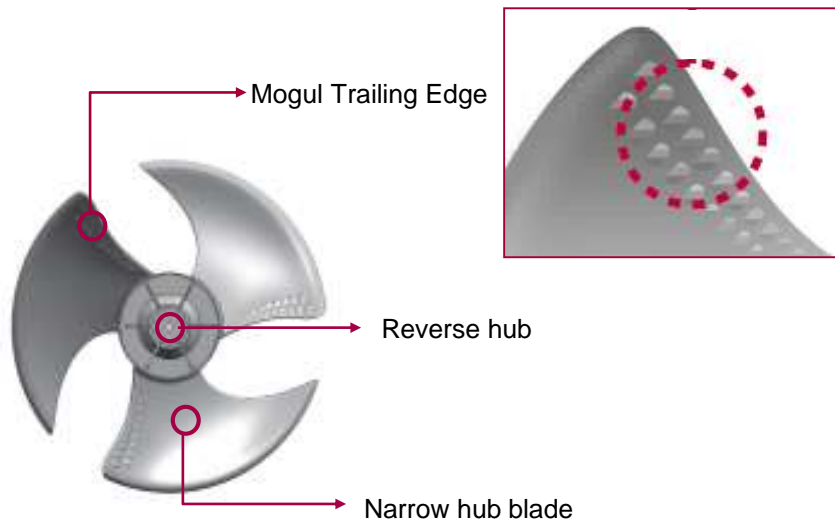
- SST (Salt Spray Test) : NaCl aqueous solution (5%), Fog (35°C, 24hr) → Repeat test
- CCT (Cyclic Corrosion Test) : NaCl aqueous solution (5%), Fog (35°C, 2hr) / Dry (70°C, 2hr) / Wet (50°C, 2hr) → Repeat test

※ This result can be different depending on actual environment

# Advanced Technology for Fan

High performance has been achieved by adopting BLDC inverter motor and improved fan & Orifice.

## Conventional

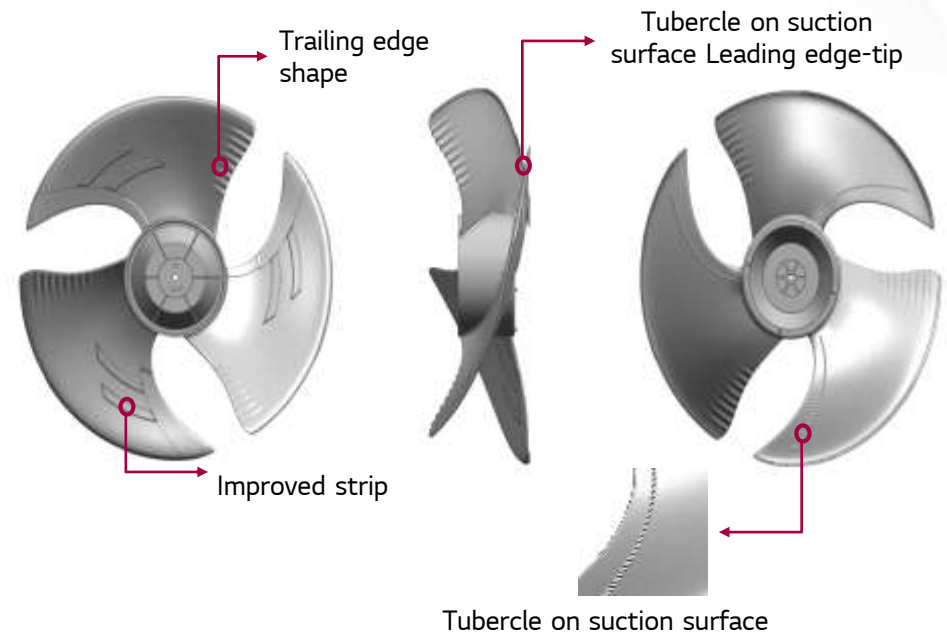


\* Only for Fan itself

Case			Conventional	New
ODU	Air flow	CMM	62.8	62.8
	Noise	dB(A)	-	2 ↓
	Power Consumption	W	82.6	72.5
	Improve	%	-	10 % ↓

## Improved Fan

- These new design provides a high efficiency, low noise as well as improving the air flow rate.



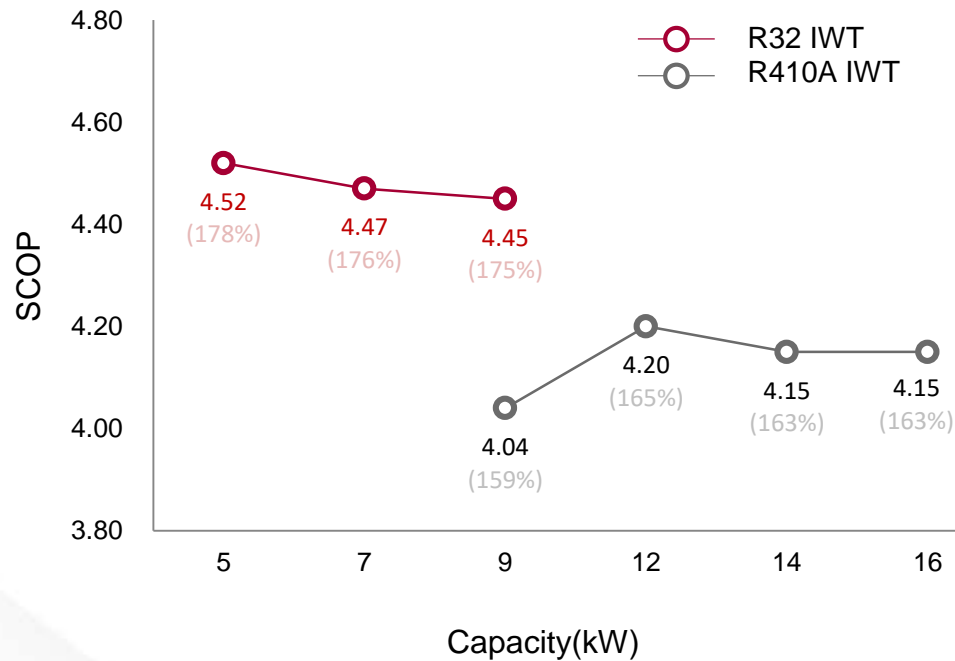


# High Energy Efficiency

The ErP directive is a key factor of selecting heating device in Europe heating market.  
The R32 IWT has an energy label rating A+++ <sup>1)</sup> in ErP energy labelling regulation.

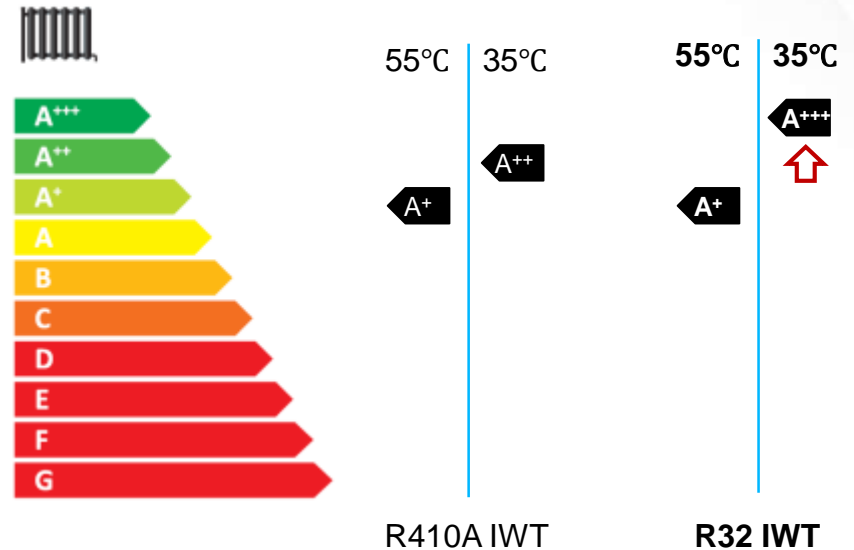
## SCOP

### SCOP improvement



## ErP Energy Labeling

### Space Heating



1) Seasonal space heating efficiency class at Average LWT 35°C condition based on EN14825.

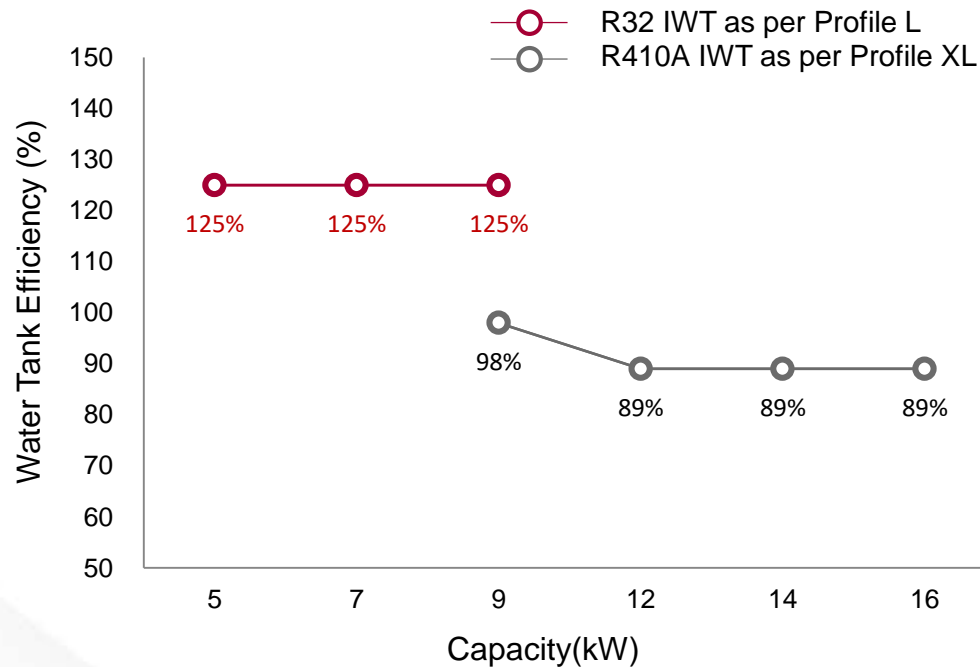
2) Please make sure to check PDB (Product Data Book), as data in the PDB takes precedence if there is any conflict.

# High Energy Efficiency

As all new buildings in EU countries to be nearly Zero-Energy Building(nZEB) by the end of 2020, Water Heating Efficiency is getting more important. The R32 IWT has an A<sup>+</sup><sup>1)</sup> water heating efficiency class at Declared load profile L.

## Water Heating Efficiency

### Efficiency improvement



## ErP Energy Labeling

### Water Heating



R410A IWT

R32 IWT



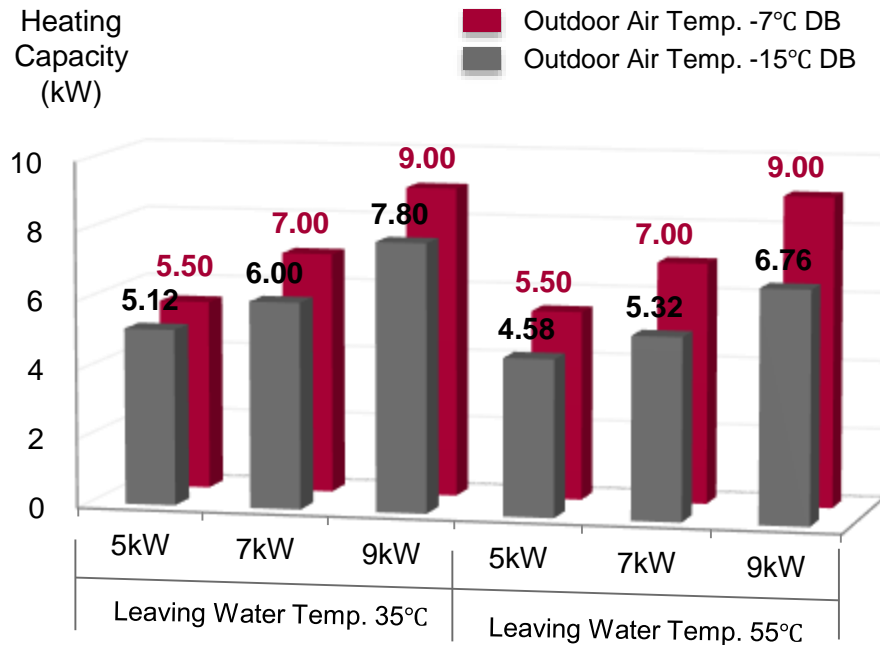
1) Water heating efficiency class based on Profile L in accordance with EN16147.

2) Please make sure to check PDB (Product Data Book), as data in the PDB takes precedence if there is any conflict.

# High Energy Efficiency

The R32 IWT provides excellent heating performance – especially at Low Ambient Temperature.

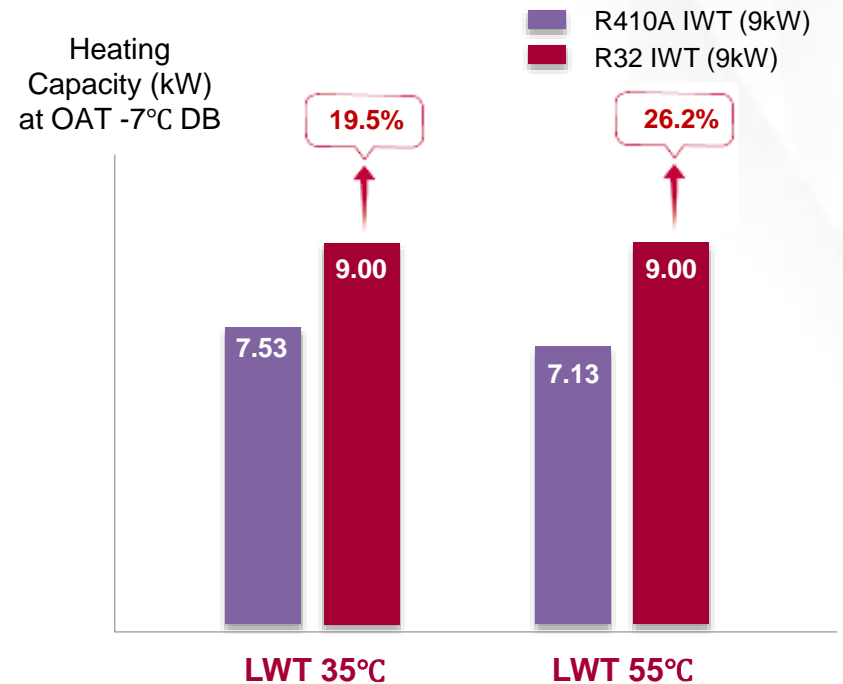
## Heating Capacity of R32 IWT



### Heating Capacity of R32 IWT at Low Ambient Temperature

- OAT -7°C DB & LWT 35°C : 100% of Normal Capacity<sup>1)</sup>
- OAT -7°C DB & LWT 55°C : 100% of Normal Capacity<sup>1)</sup>
- OAT -15°C DB & LWT 35°C : More than 85% of Normal Capacity<sup>1)</sup>
- OAT -15°C DB & LWT 55°C : More than 75% of Normal Capacity<sup>1)</sup>

## Comparison with Previous Model



### Comparison with R410A IWT

Heating capacity of R32 IWT at Low Ambient Temperature (OAT -7°C DB) is improved almost 20% compared to R410A IWT.

1) Normal : Outdoor air temperature 7°C DB / 6°C WB, Water outlet temperature 35°C

2) LWT : Leaving Water Temperature, OAT : Outdoor Ambient Temperature

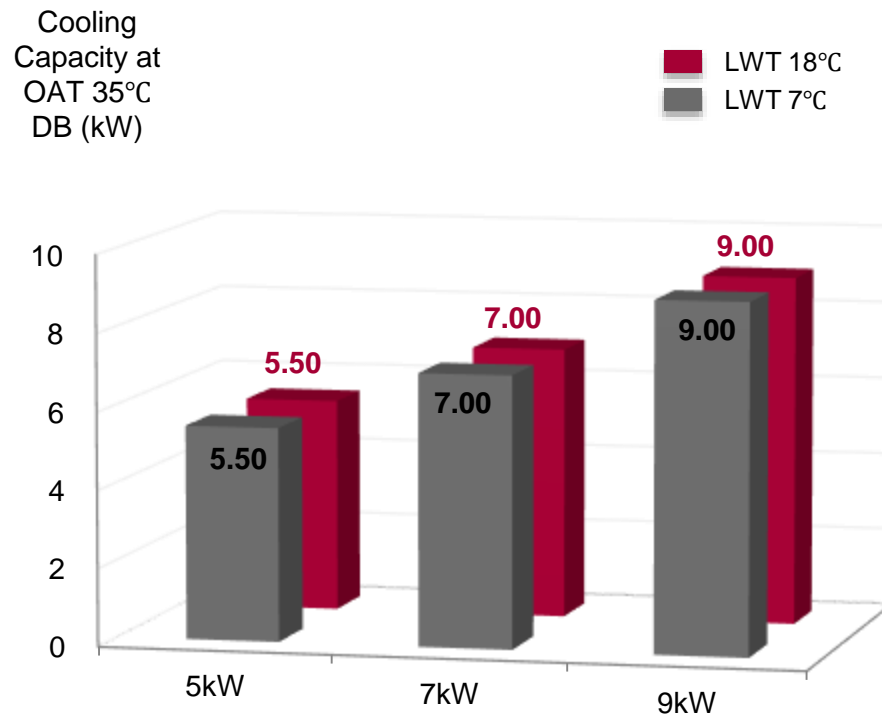
3) Performances are in accordance with EN14511.

4) Please make sure to check PDB (Product Data Book), as data in the PDB takes precedence if there is any conflict.

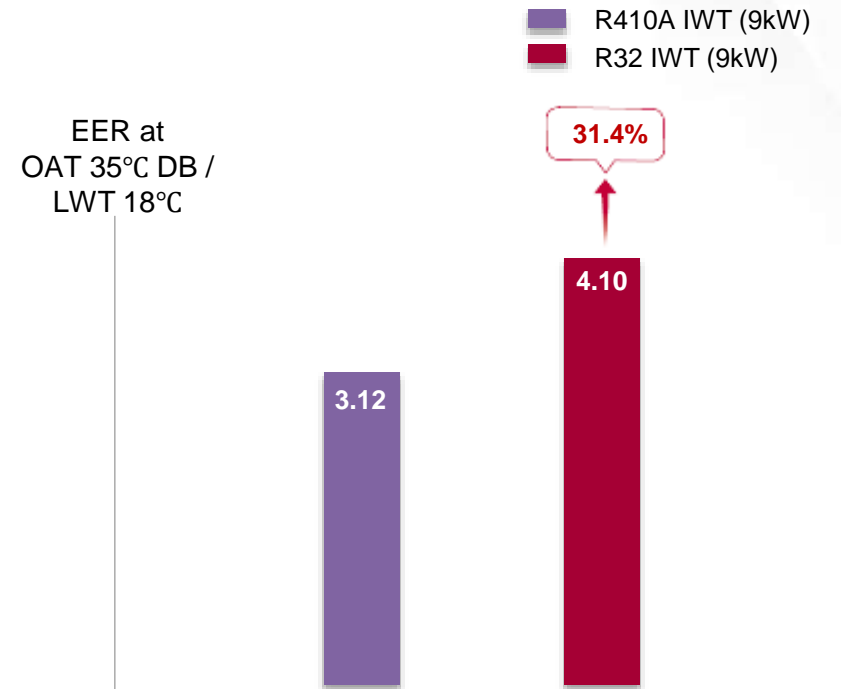
# High Energy Efficiency

The R32 IWT produces excellent cooling performance at LWT 7°C same as rated <sup>2)</sup> condition and improves cooling efficiency compared to previous model, as well.

## Cooling Capacity of R32 IWT



## EER



1) LWT : Leaving Water Temperature, OAT : Outdoor Ambient Temperature

2) Cooling Rated Condition : Outdoor air temperature 35°C DB / 24°C WB, Water outlet temperature 18°C

3) Performances are in accordance with EN14511.

4) Please make sure to check PDB (Product Data Book), as data in the PDB takes precedence if there is any conflict.

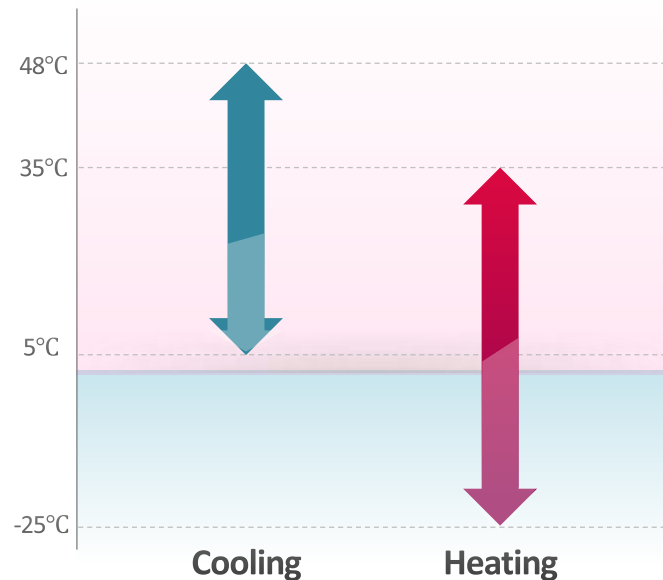
# Wide Operation Range

R32 IWT Wide Operation Range

- ✓ 100% Heating performance at -7°C
- ✓ 48°C of Water outlet temperature at -25°C    55°C at -15°C

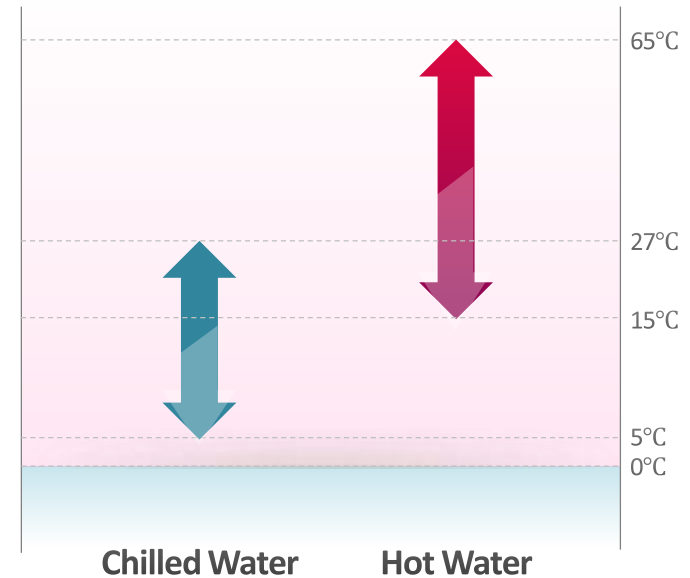
Cooling operation range is 5 ~ 48°C,  
Heating operation range is -25 ~ 35°C

## Operating range



Chilled water outlet temperature is 5 ~ 27°C,  
Hot water outlet temperature is 15 ~ 65°C

## Water Outlet Temperature

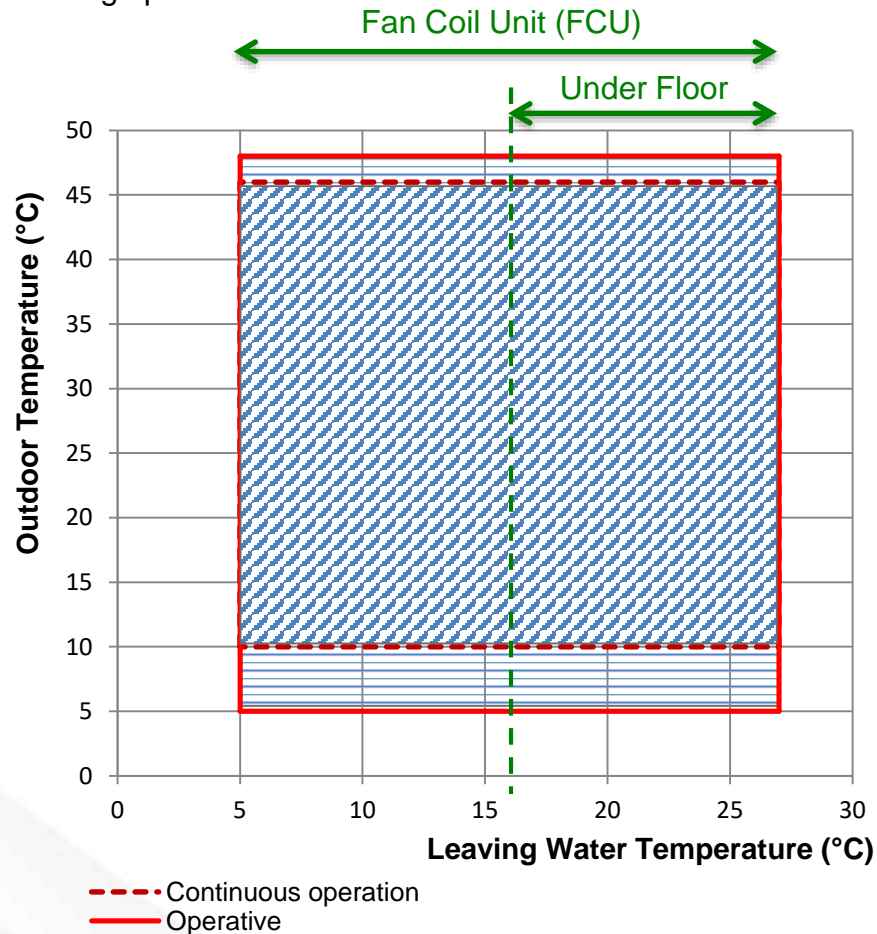


# Wide Operation Range

Due to the wide operation range, it's suitable to provide hot water stably in spite of extreme cold condition.

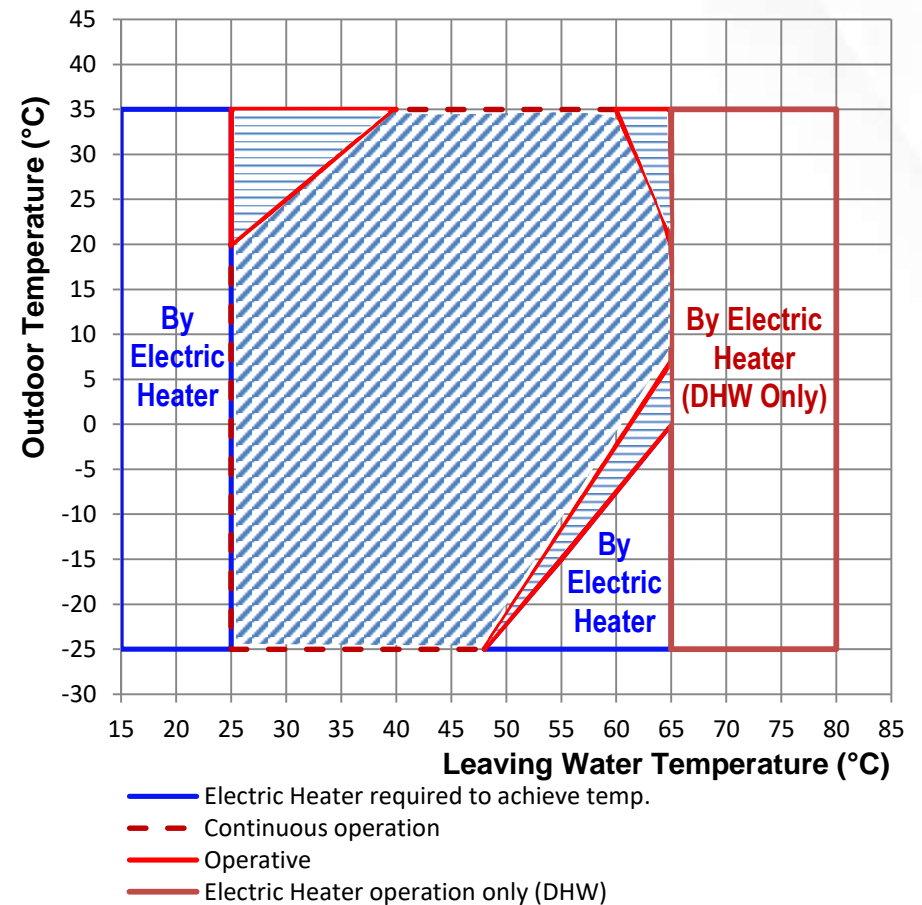
## Cooling Mode

- Cooling operation area



## Heating Mode

- Heating operation area





# Reduced Noise Level

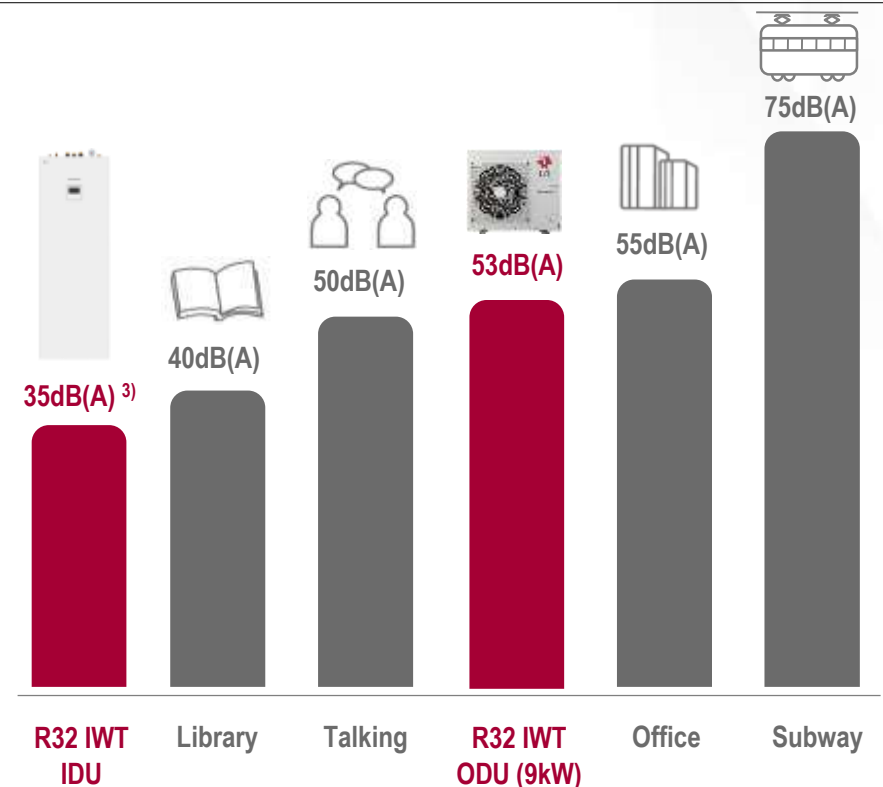
The R32 IWT reduces noise level of outdoor unit compared to previous models, while it creates a calm and restfulness indoor environment.

## Operation Noise for Outdoor Unit

(Unit : dB(A))

Number of Fan		1 Fan			2 Fans		
Line up (kW)		5	7	9	12	14	16
R410A IWT	Sound Power Level (Heating / Rated) <sup>1)</sup>	-	-	65	66	66	66
	Sound Pressure Level (Heating / Rated) <sup>2)</sup>	-	-	57	58	58	58
R32 IWT	Sound Power Level (Heating / Rated) <sup>1)</sup>	60	61	61	-	-	-
	Sound Power Level (Heating / Low Noise)	58	58	58	-	-	-
	Sound Pressure Level @ 1m (Heating / Rated) <sup>2)</sup>	52	53	53	-	-	-

## Sound Pressure Level Comparison



1) Sound Power Level is measured on the rated condition in the reverberation rooms by ISO 3741 Standard.

These Sound Power Level values are rated value declared by Manufacturer and more than actual tested values.

2) Sound Pressure Level is converted values from Sound Power Level as per distance.

3) Sound Pressure Level of IDU is converted values at 1m distance from Sound Power Level (43dB(A)).

4) Please make sure to check PDB (Product Data Book), as data in the PDB takes precedence if there is any conflict.

## Product Certifications

LG R32 IWT certified KEYMARK, EHPA, Eurovent

**KEYMARK (Certified)** : Supporting for Pan-Europe including France (NF-PAC)



Certified Model		Registration Number	Valid until
R32	5/7/9 kW	011-1W0407	2030-09-30

**EHPA (Certified)** : Supporting for Austria, Germany & Swiss



Certified Model		Certificate ID	Valid until
Austria	Will be updated		
Germany			
Swiss			

**Eurovent (Certified)**

Supporting for Pan-Europe



**THERMA V**

*IWT (Integrated Water Tank)*

# **B** Convenience & Functions



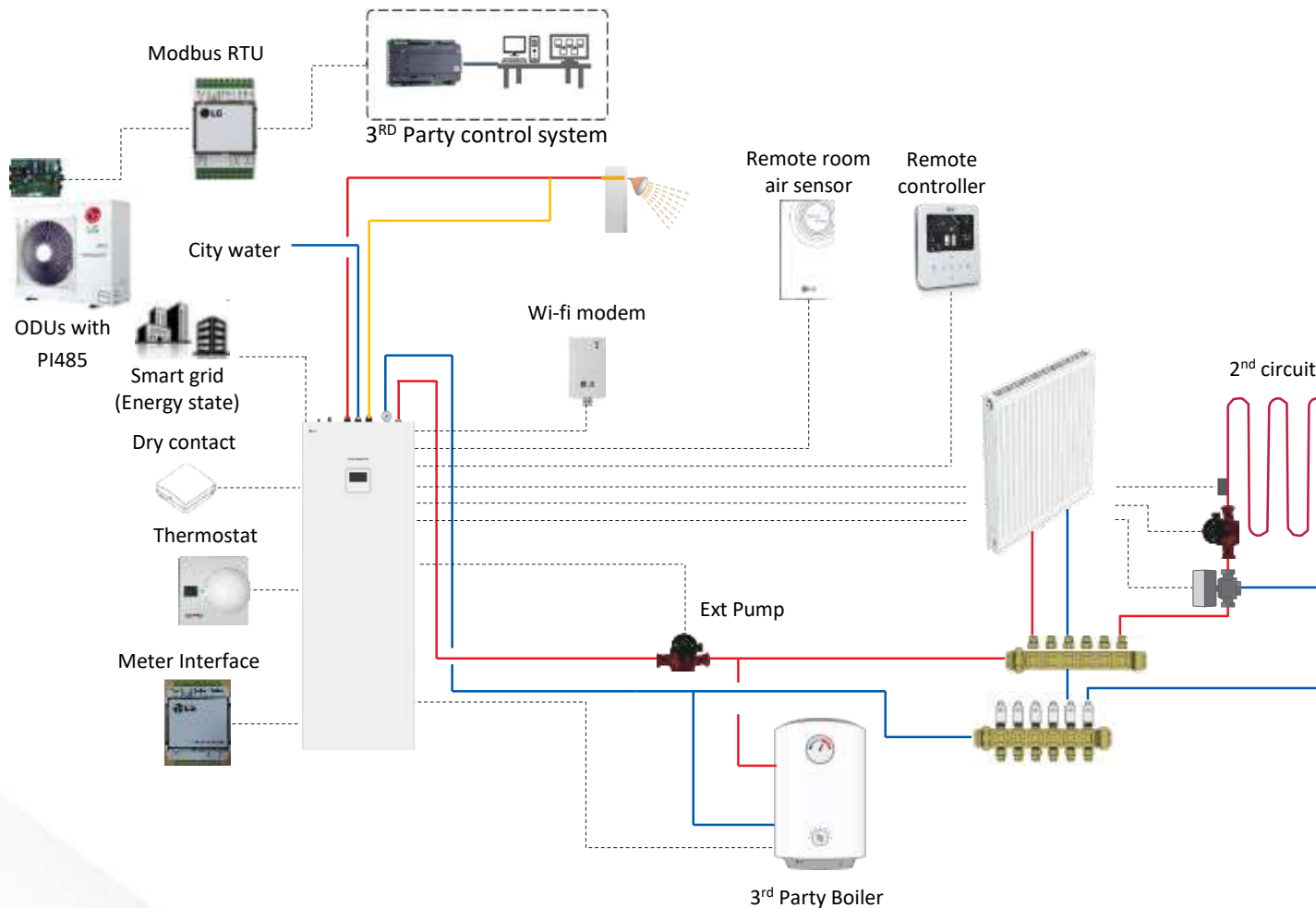
# Key features & functions

Features	Description
<b>1 RS3 Remote Controller</b>	New Modern design 4.3 inch color LCD display based on text, Integrated Air temp sensor
<b>2 Convenient scheduler</b>	Individual setting by mode
<b>3 Temperature control</b>	Leaving / Entering water temperature, Room Air, Combination of Air and water
<b>4 Seasonal Auto Mode</b>	Operation depended on the weather
<b>5 2<sup>nd</sup> Circuit</b>	2 different temperature zones (Low / High temp zone)
<b>6 Energy Monitoring</b>	Power Consumption and Heat provided by the AWHP can be measured and monitored
<b>7 2 Remocon (RS3)</b>	Additional RS3 can be installed
<b>8 Wi-Fi / Voice Control</b>	Convenient remote control using LG ThinQ App with Wi-fi modem and Google Voice
<b>9 3<sup>rd</sup> party heat source</b>	Control auxiliary heat source
<b>10 Modbus RTU</b>	Modubus communication with Modbus RTU
<b>11 Low noise mode</b>	Operation with less noise

\* More functions.. Water pump capacity changeable, External pump control, Smart Grid SG, Dry contact / Programmable Digital Input

# Key functions – Integrated PCB

One integrated PCB makes all functions



- ✓ **Wi-Fi Control**
- ✓ **Control by room air temp sensor**
- ✓ **Temperature Control Definition**
- ✓ **Weather dependent operation**
- ✓ **Air purge operation**
- ✓ **DHW Tank Anti-Legionella Operation**
- ✓ **Pump setting**
- ✓ **LG Heating Configuration**
- ✓ **2<sup>nd</sup> circuit**
- ✓ **External water pump**
- ✓ **3<sup>rd</sup> party boiler**
- ✓ **Meter interface**
- ✓ **Smart Grid (Energy State)**
- ✓ **LG Central controller**
- ✓ **Dry Contact Mode**
- ✓ **Screed drying**
- ✓ **Programmable Digital Input Operation**

# 1 RS3 Remote Controller

The R32 IWT is equipped with standard remote controller (RS3).

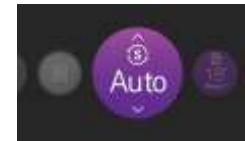


## Premium Design

New Modern design 4.3 inch color LCD display  
Capacitive touch button (especially on/off button turn on LED)

## Intuitive Interface

Information displayed with simple graphic, icon & text  
Navigation button, easy to use



## Integrated Air temp. sensor

Embedded Air temperature sensor in remote controller

## More energy contents

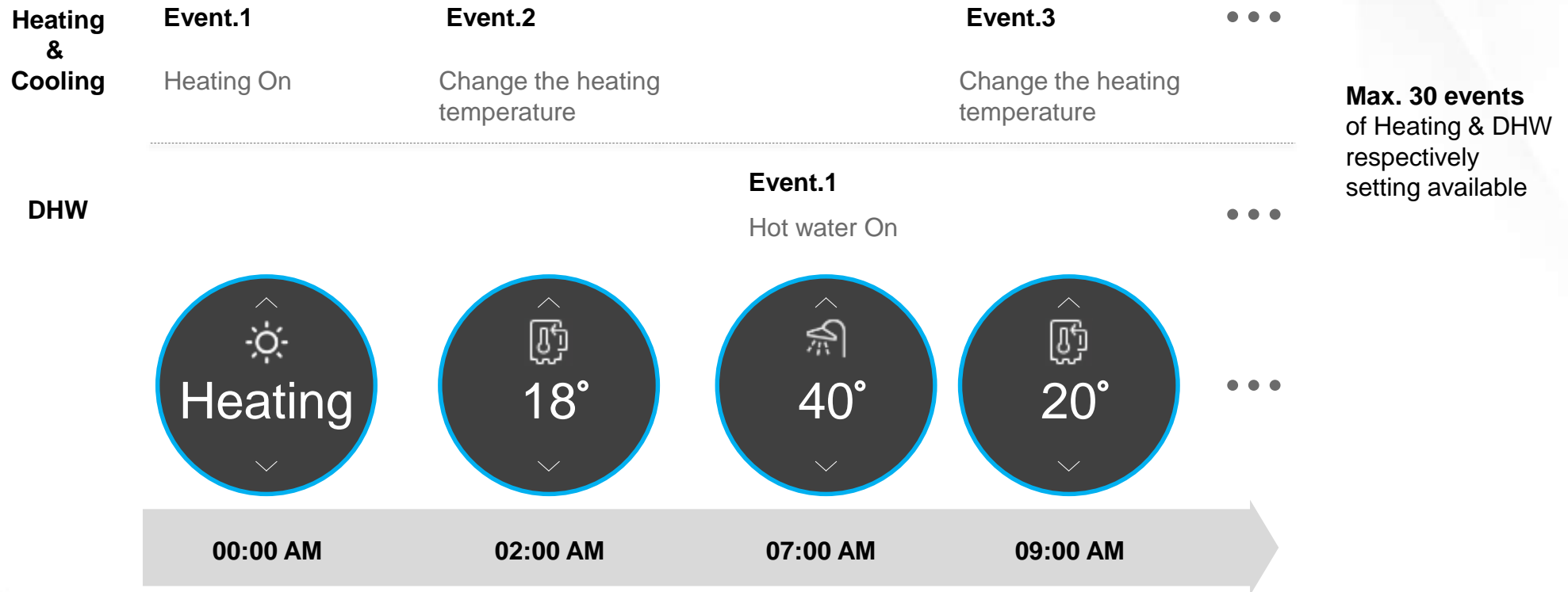
Auto controlled by weather and time

## Convenient Functions

Optimize schedule setting logic  
- Set the period, date, on/off time, operation mode, target temp.  
Easy installation setting ( as-is : numeric code , to-be : word )

## 2 Convenient Scheduler

Using the new controller, Up to 30 events of each heating & DHW can be set according to user's purpose. This function is introduced for more convenience and energy saving.





### 3 Temperature control

Various Temperature Control Options are possible for the User's comfort and convenience.

**Leaving water Temperature**



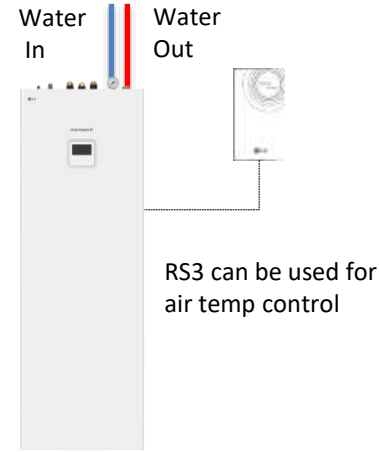
- Operation is on water out side
- Target Temp. Range : 15 ~ 65°C

**Entering water temperature**



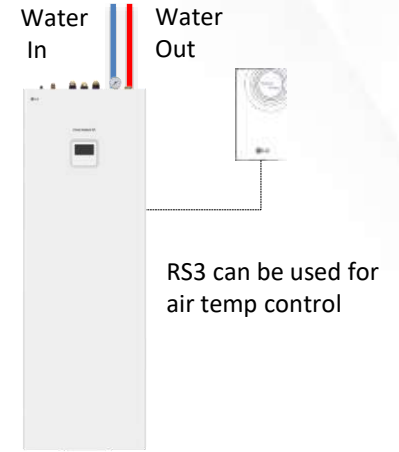
- Operation is on water In side
- Target Temp. Range : 15 ~ 55°C

**Room Air Temperature**



- Operation is on air temp in RS3 or remote room sensor
- Target Temp. Range : 16 ~ 30°C

**Room Air + Water Temperature**

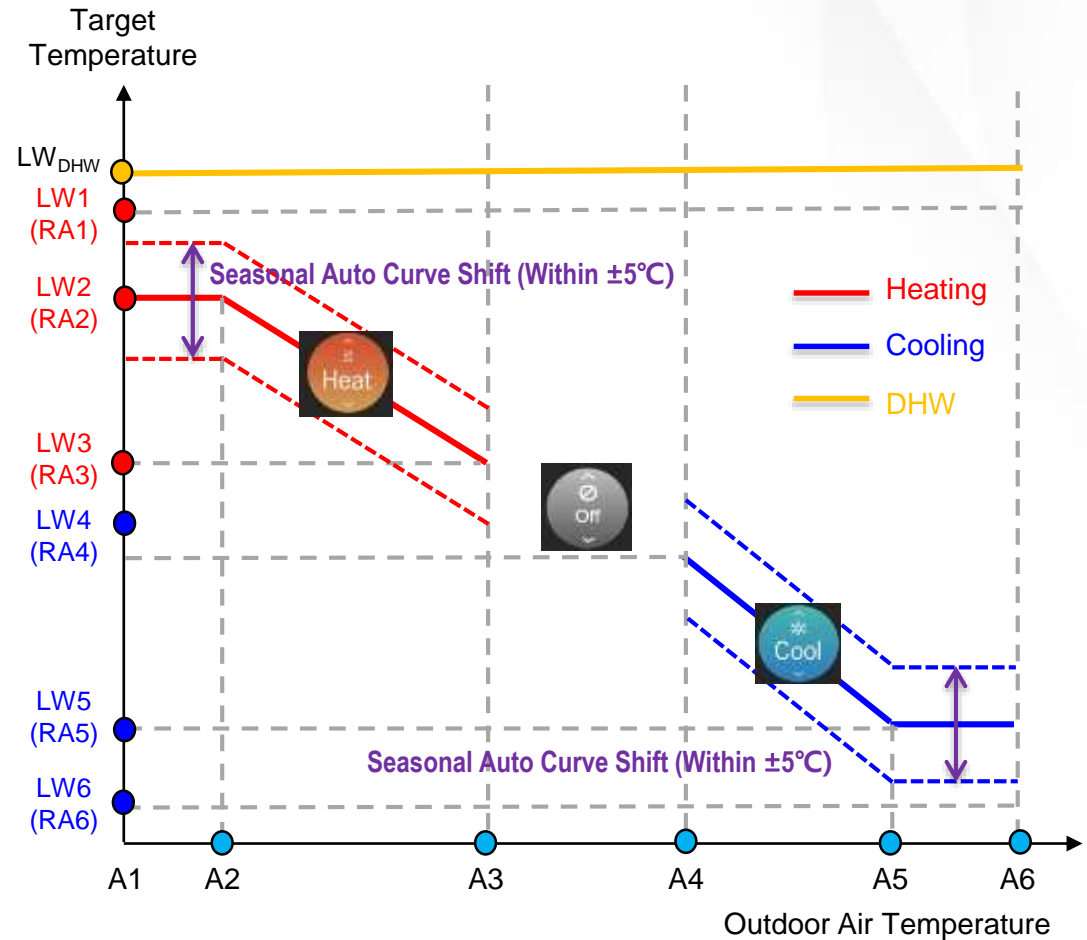


- Operation is on air temp and water temperature

## 4 Seasonal Auto Mode

In this mode, the target temperature will vary according to the outdoor temperature automatically in order to save energy and give higher comfort.

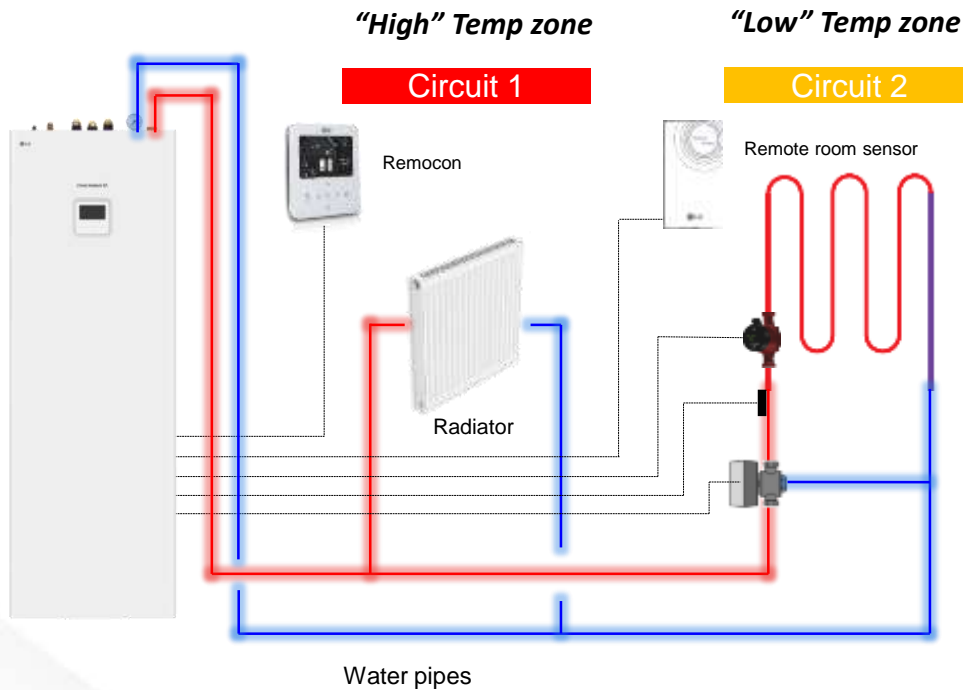
Setting	Description	Range (°C)	Default (°C)
A1	Lowest Ambient Temp.	Fix	-25
A2	Heating Lower Ambient Temp.	-25 ~ 35	-10
A3	Heating Higher Ambient Temp.		16
A4	Cooling Lower Ambient Temp.	10 ~ 46	30
A5	Cooling Higher Ambient Temp.		40
A6	Highest Ambient Temp.	Fix	46
LW1	Heating Highest Water Temp.	15 ~ 65	65
LW2	Heating Higher Water Temp.		35
LW3	Heating Lower Water Temp.		28
LW4	Cooling Higher Water Temp.	5 ~ 27	20
LW5	Cooling Lower Water Temp.		18
LW6	Cooling Lowest Water Temp.		18
RA1	Heating Highest Air Temp	16 ~ 30	30
RA2	Heating Higher Air Temp.		30
RA3	Heating Lower Air Temp.		26
RA4	Cooling Higher Air Temp.		22
RA5	Cooling Lower Air Temp.		18
RA6	Cooling Lowest Air Temp.		18



## 5 2<sup>nd</sup> Circuit

2 different temperature zones are available by mixing control logic.  
Therma V will run based on either Water temp basis or Air temp basis.

### ❑ 2<sup>nd</sup> Heating Circuit Diagram



### ❑ RS3 UI



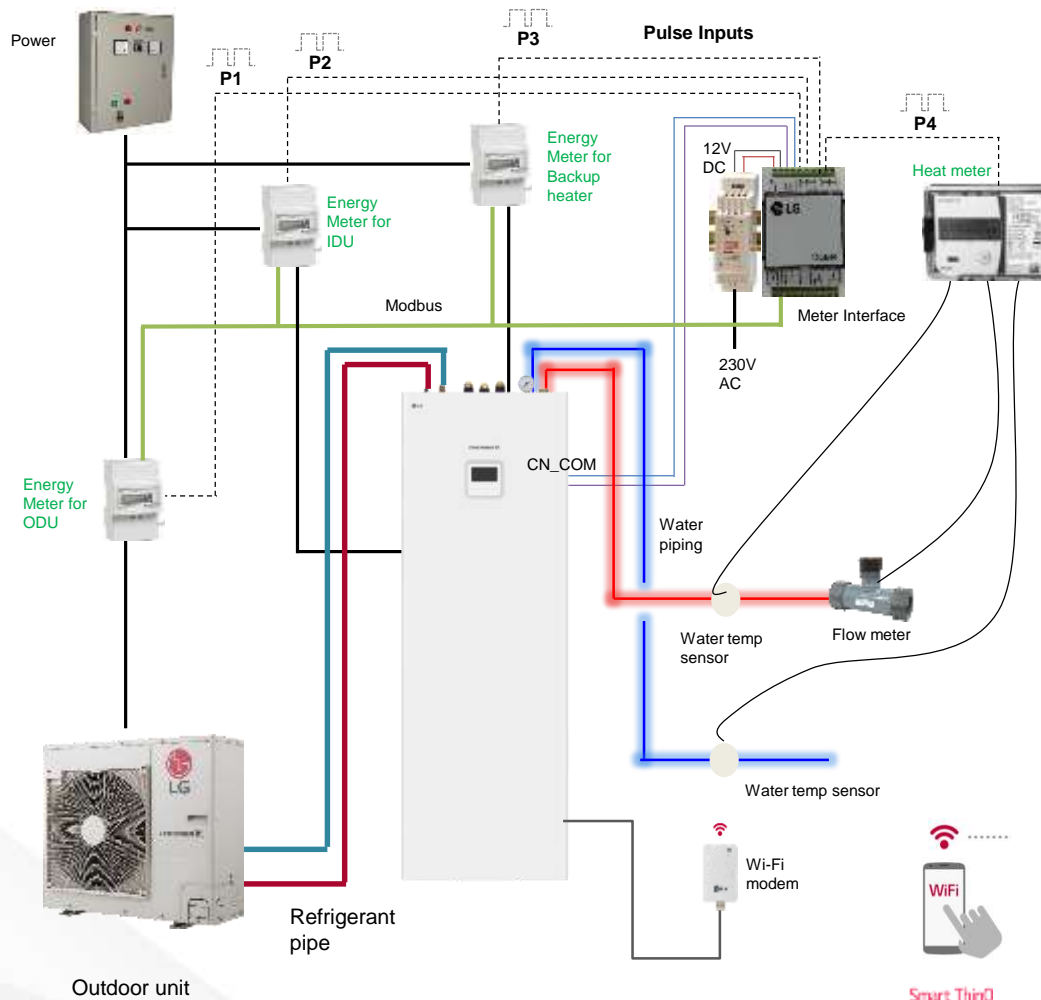
Set Temperature of Circuit 1



Set Temperature of Circuit 2

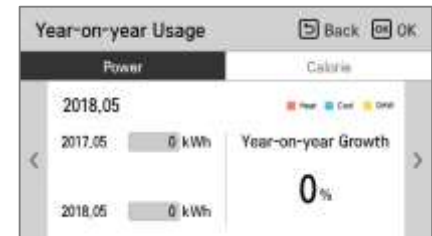
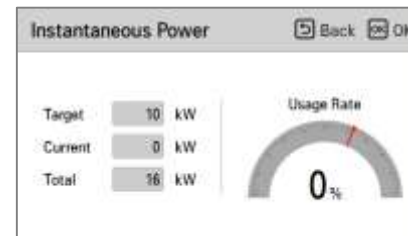
## 6 Energy Monitoring

Power Consumption and Heat provided by the AWHP can be measured and monitored on the Remoter Controller using Meter Interface Module.



### Monitoring

- Instant power consumption
- Power consumption and heat generation by period
- 24month data storage for Yearly Trend

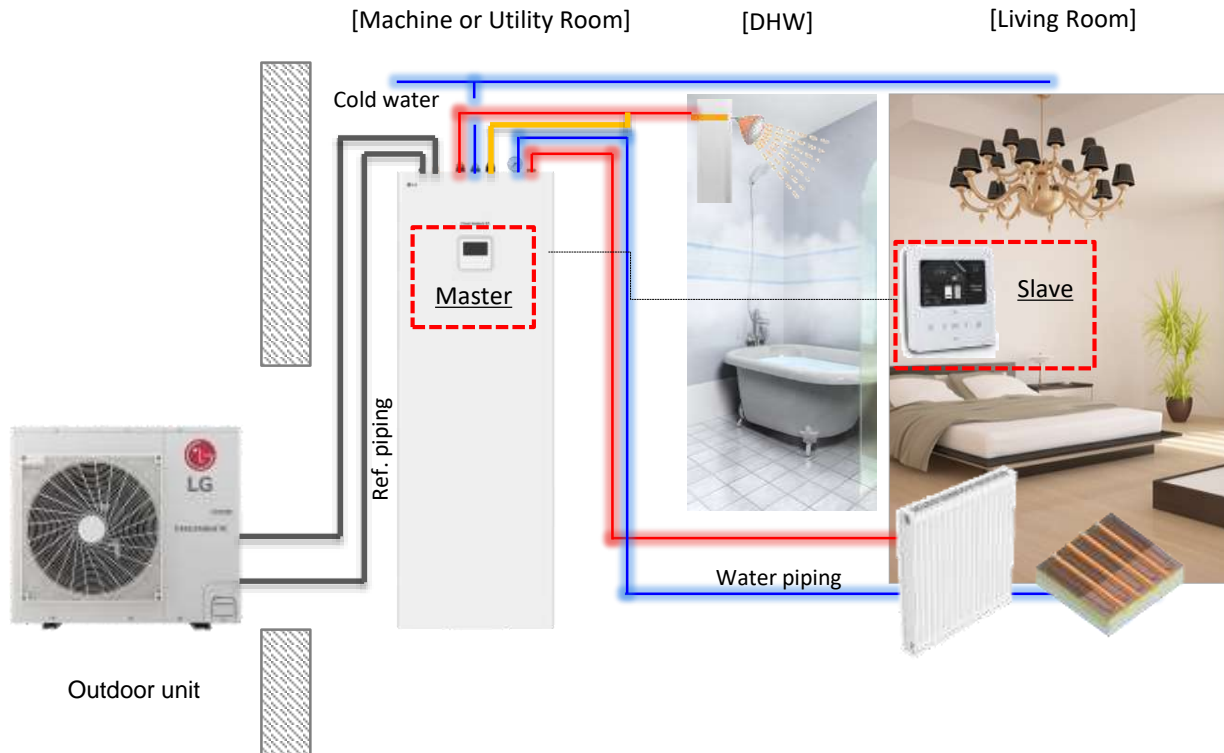


**Mandatory Accessory: PENKTH000 (Meter Interface)**

## 7 2 Remocons

Convenient control by installing additional RS3 remote controller at living room.

### ❑ System Diagram



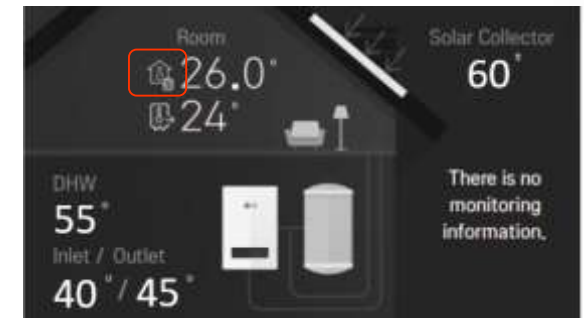
“Master” is for the installation setting  
“Slave” is for user setting

### ❑ RS3 UI

Therma V is operating based the room where additional RS3 is installed



: Symbol



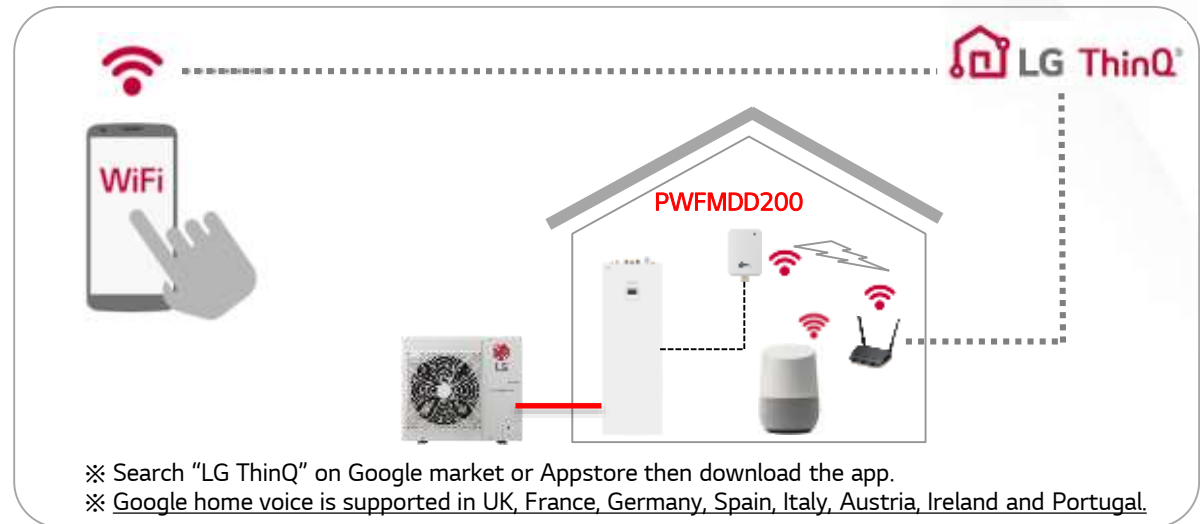
## 8 Wi-Fi / Google Voice Control

Control your LG R32 IWT via using the smart internet devices such as Android or iOS based smartphones. In addition, ThinQ works with Google assistant voice control by using Google home speaker and Wi-Fi modem



LG Wi-Fi MODEM

• Access your THERMA V anytime from anywhere



• Simple operation by ThinQ

- On/Off
- Operation Mode Selection
- Current temperature
- Set temperature
- On/Off Reservation
- Energy Monitoring

• Simple operation by Google Voice

- On/Off
- On/Off – DHW
- Operation Mode Selection

*Mandatory Accessory: PWFMD200(LG Wi-Fi Modem)*

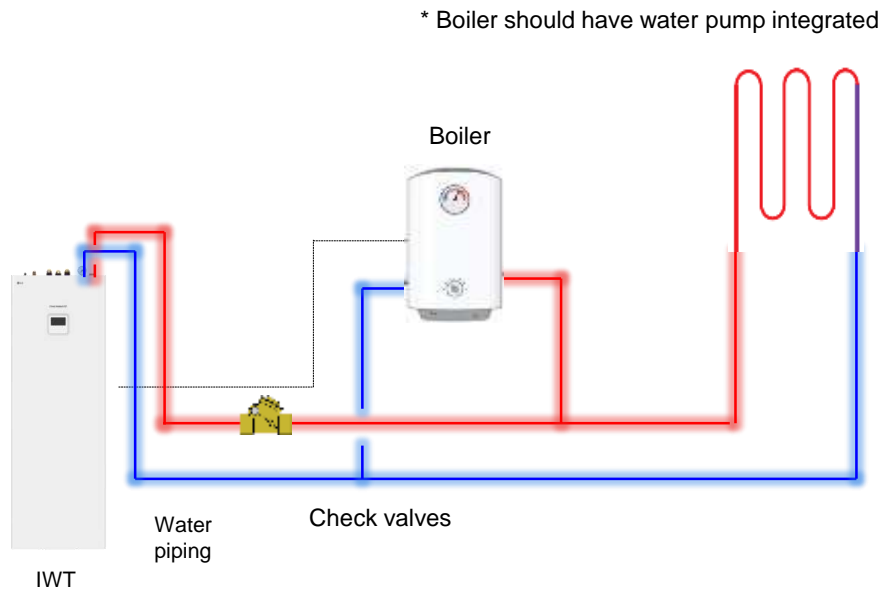
*Note : PWYREW000 (10m extension cable) may be necessary depending on installation condition.*

## 9 3<sup>rd</sup> Party heat source

3rd Party Boiler can be activated by the RS3 Controller as an auxiliary equipment of AHWP.

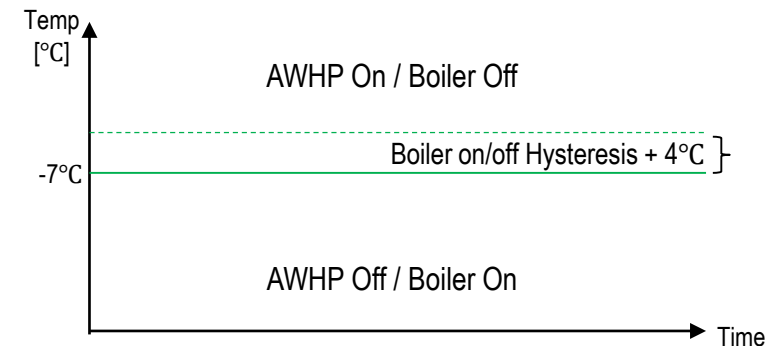
- Design Purpose : 1. In case of insufficient capacity due to the decrease of ambient temperature in winter  
2. When the allowable temperature for AHWP use in winter is frequently exceeded

### □ System diagram



### □ Control mode


Mode	Control	
Manual	Run / Stop	
Auto	Ambient Temp.	-25 ~ 25°C (Default : -7°C)
	Hysteresis	2 ~ 10°C (Default : 4°C)






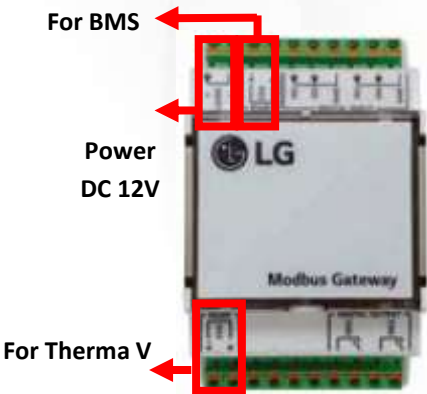
# 10 Modbus RTU

Considering the units in parallel installation, Need to think how to control them....

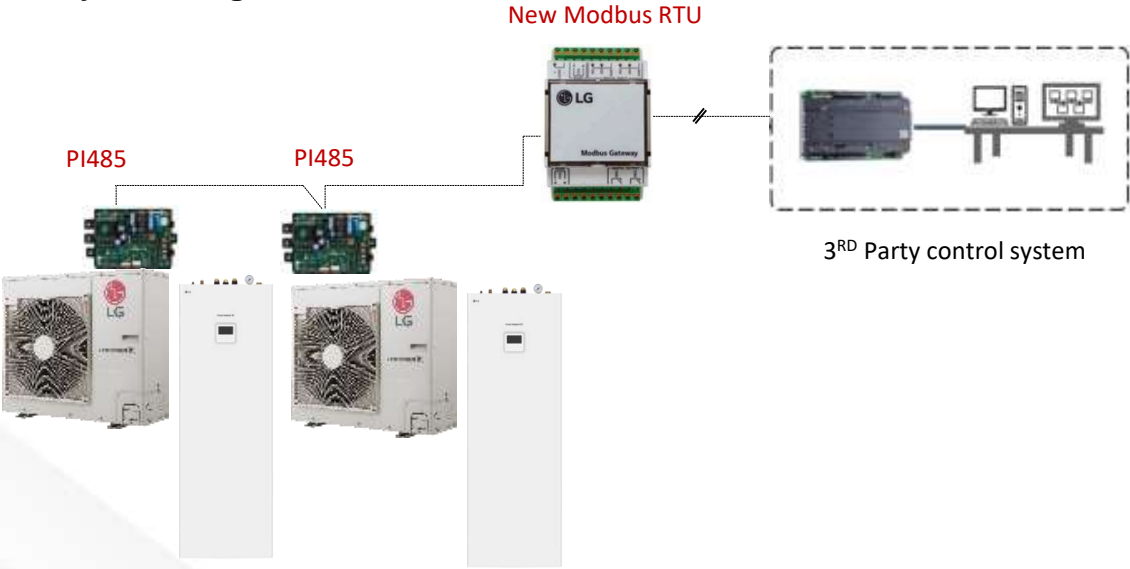


- MODBUS RTU communication with MODBUS master controller
- MODBUS RTU slave (RS485) / 9,600 bps
- Applicable for Multi V 5
- Size (W x H x D) : 53.6 x 89.7 x 60.7
- Max. 16 IDUs with single module / Max. 64 IDUs with 4 modules
- Power : DC 12V





## System diagram



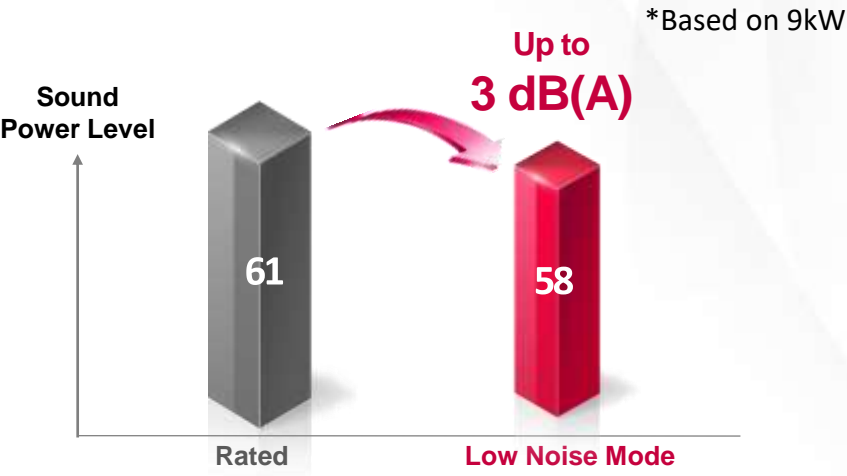
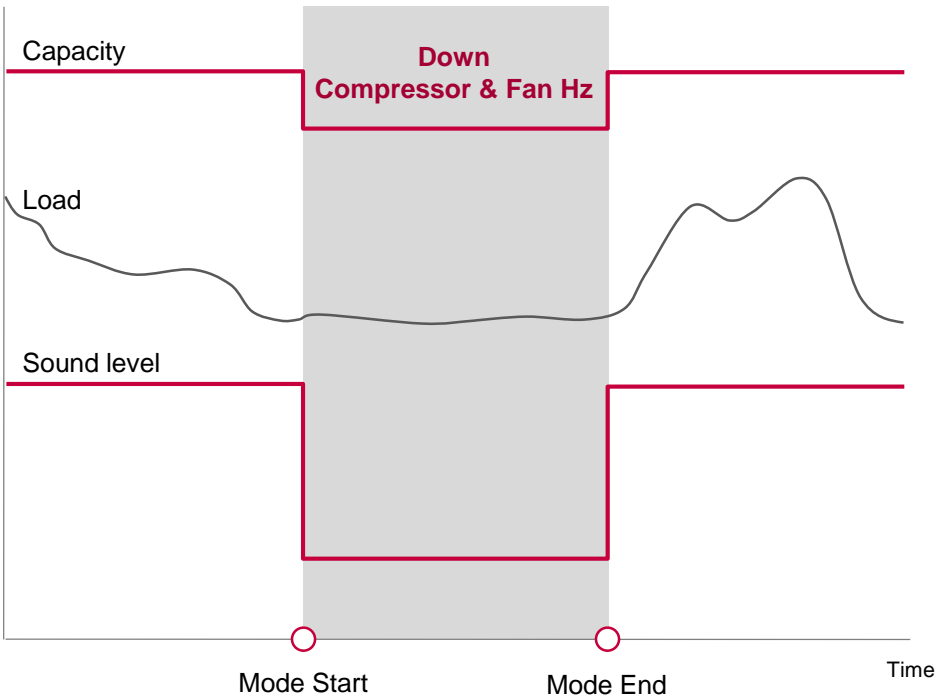
## Modbus Memory Map

Coil Register	Operate (ON/OFF)
	Hot water mode
	Lock remote controller
Discrete	Connect IDU
	Alarm
	Target temp select
Input	Error code
	Room temp
	Water inlet temp
	Water outlet temp
	Sanitary temp
Holding	Solar temp
	Operate mode
	Target temp, DHW
	Target temp

\* For more detail, refer to the appendix

# 11 Low Noise Mode & Scheduler

Low Noise mode operation can reduce the noise level of outdoor unit by remote controller and users can set the weekly On / Off schedule.



R32 IWT Line up	Sound Power Level (dB(A))	
	Rated	Low Noise Mode <sup>1)</sup>
5 kW	60	58
7 kW	61	58
9 kW	61	58

	Max.	Low Noise Mode
Compressor Hz (Max)	100	45
Fan RPM (Max)	670	440

Dip Switch No.	Description	Setting	Default
2	<b>Always Mode</b> : Maintain Low noise mode even though target temperature is not reached	2 OFF : Always Mode	○
	<b>Partial Mode</b> : Escape Low noise mode for reaching target temperature	2 On : Partial Mode	

1) Performance will be changed in accordance with compressor Hz. and Fan RPM.

# Easy Installation & Maintenance



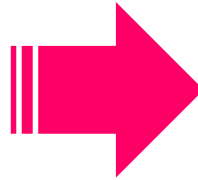
# Key features & functions

Features	Description
<b>1 Integrated Hydronic components</b>	All hydronic components integrated in IWT unit
<b>2 Installation Flexibility</b>	Easy Piping works and long refrigerant piping distance
<b>3 Footprint &amp; Weight</b>	Improve the flexibility for the installation
<b>4 Integrated shut-off(Ball) valve</b>	Easy cleaning for the strainer
<b>5 Integrated Water Pressure gauge</b>	Easy Maintenance for water side
<b>6 Insertable Buffer tank</b>	Easy installation of buffer tank inside the unit
<b>7 Insertable Expansion tank</b>	Easy installation of expansion tank for DHW circuit
<b>8 Heating Configurator</b>	Easy setting by PC and SD card
<b>9 Emergency Operation</b>	Even in case of sudden product trouble, the R32 Split allows to operate in Emergency Operation Mode
<b>10 Data logging</b>	Max. 50 events of operation and error history are stored in RS3 remote controller

\* More functions..Mobile LG MV

# 1 Integrated water components

All water components are integrated into one unit and it can reduce time and cost for preparation.



## 2 Installation Flexibility

Long piping length and 3 way piping connection enable flexible design and easy installation.

### Piping Capabilities

Up to **21.3m**

No minimum  
Floor Area  
requirement

Refrigerant Pipe length

Max. **50 m**

Elevation

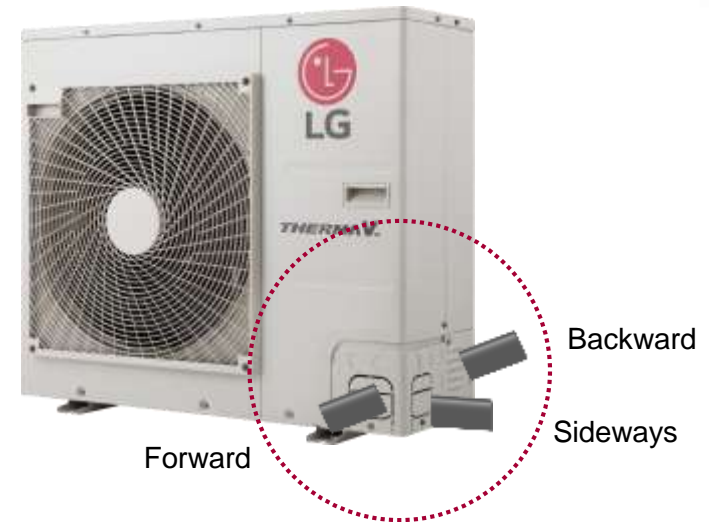
Max. **30 m**



- Refrigerant Piping Length for R32 IWT
  - D Company : Max. 30m (4kW / 6kW / 8kW)
  - M Company : Max. 30m (4kW / 6kW / 7.5kW)
  - P Company : Max. 25m (3kW / 5kW), Max. 50m (7kW / 9kW)
- IEC 60335-2-40 6th edition applied

### 3 Way Piping

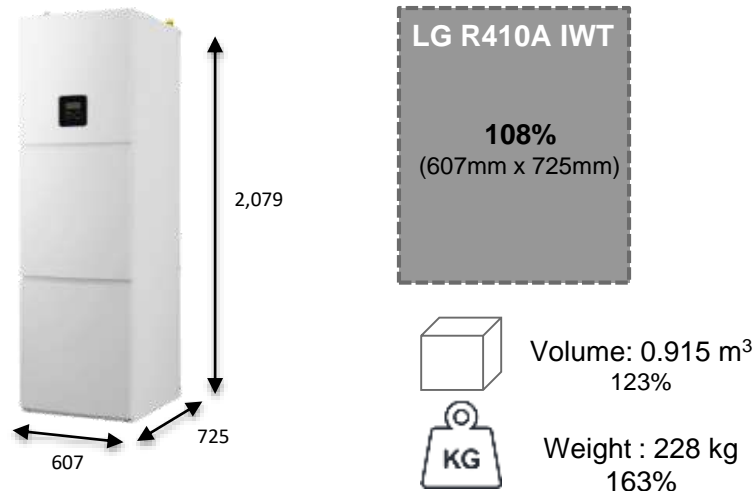
- The pipes can be connectable in 3 directions.
- Neat & easy installation by 3 way piping.



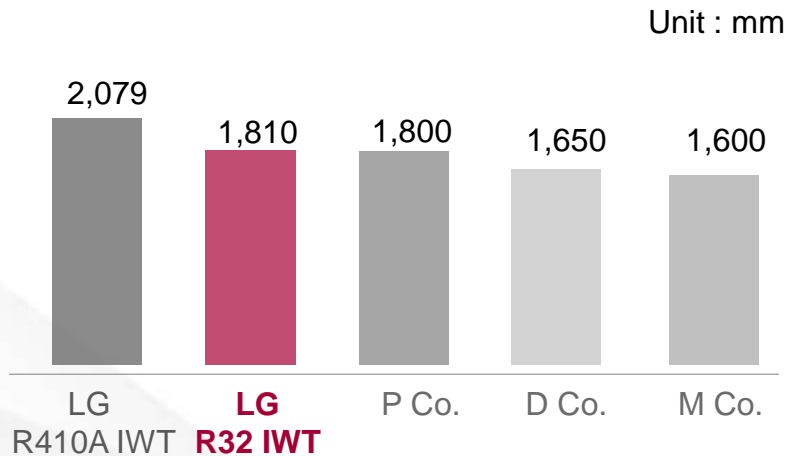
### 3 Footprint & weight

Smaller foot print and lighter weight than previous model

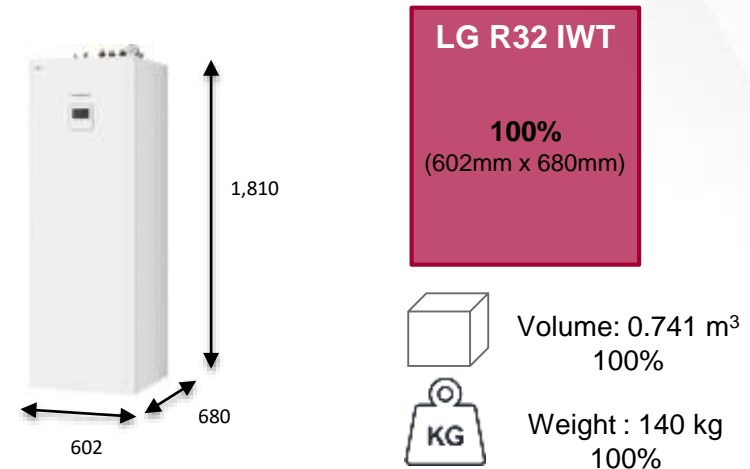
#### R410A IWT



#### Height



#### R32 IWT



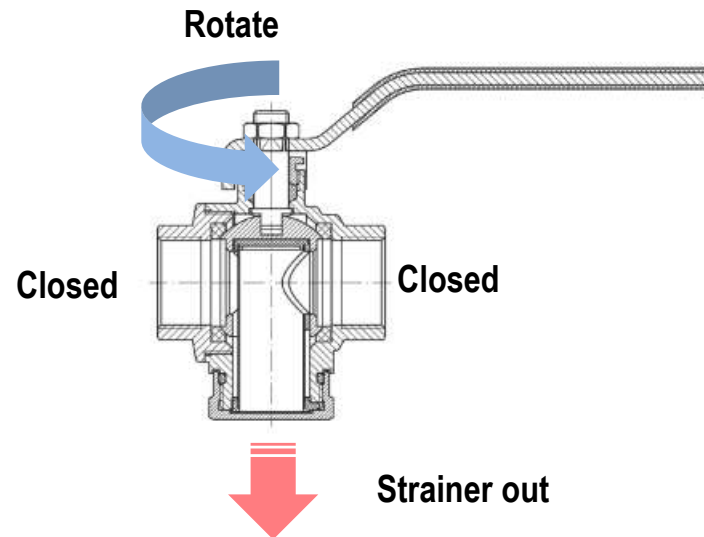
#### Volume ratio & Weight





## 4 Filter ball valve

A filter ball valve integrated with shut off valve and strainer is supplied with product and it allows easy cleaning of filter regularly by rotating the handle without installing extra shut-off valves.



Step 1



Step 2



Step 3



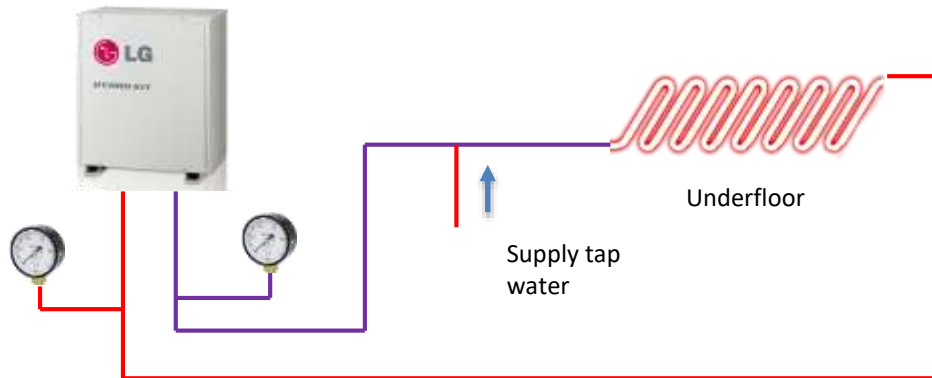
Manufacturer	IMPEL
Model	model 480
Connection	1" Internal thread
Body material	Nickel-plated brass CW617N
Strainer material	Stainless steel SS304
Mesh size	0.6 mm
Max. working pressure	16 bar
Max. operating temperature	-20 ~ 100 °C

## 5 Integrated pressure gauge

Easy to check the status of pressure in system while charging the water into system.  
And possible to know whether water volume is sufficient or not without opening the unit.

### Conventional

- Pressure gauge : Field scope



### R32 IWT

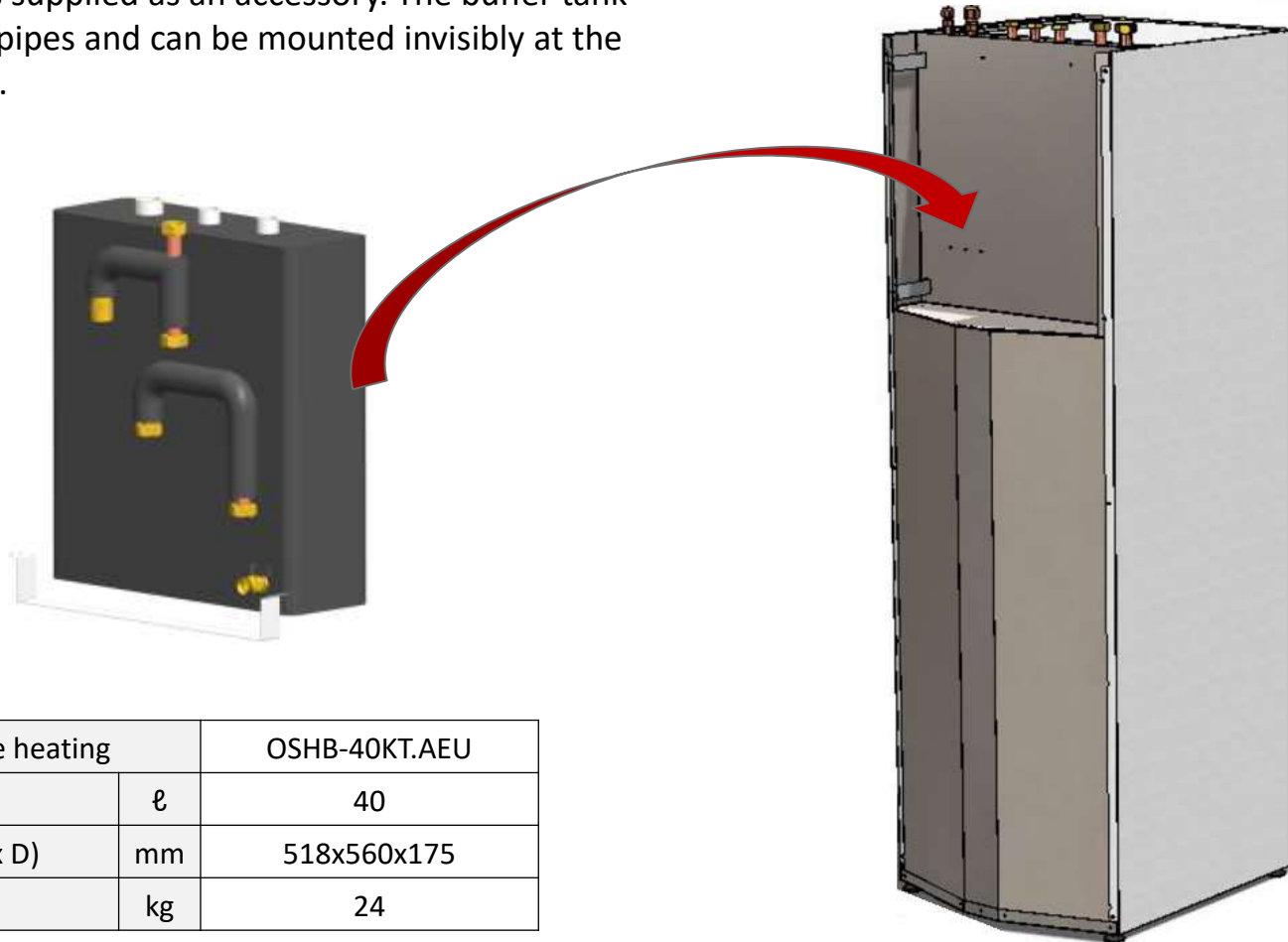
- Pressure gauge integrated



## 6 Insertable Buffer tank

Easy to install Buffer tank for space Heating/Cooling and it provides more space for customer with insertable concept in the unit.

A buffer tank (40 liter) is supplied as an accessory. The buffer tank comes with connection pipes and can be mounted invisibly at the backside of the IWT IDU.

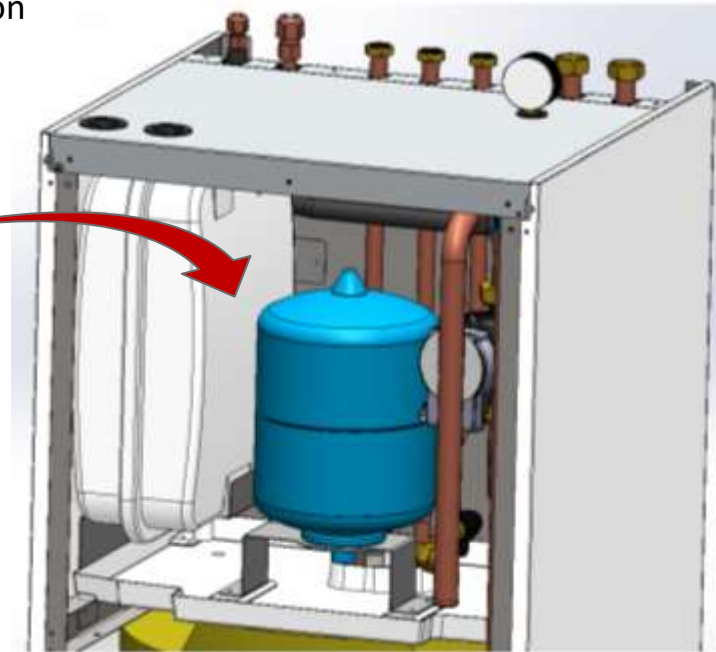


Buffer tank for space heating		OSHB-40KT.AEU
Water Volume	ℓ	40
Dimensions (W x H x D)	mm	518x560x175
Weight (w/o water)	kg	24

## 7 Expansion tank for DHW Circuit

Easy to install Expansion tank for DHW circuit and it provides more space for customer with insertable concept in the unit.

A DHW expansion vessel (8 liter) is supplied as an accessory. The vessel comes with a connection hose and can be mounted on the existing rail.

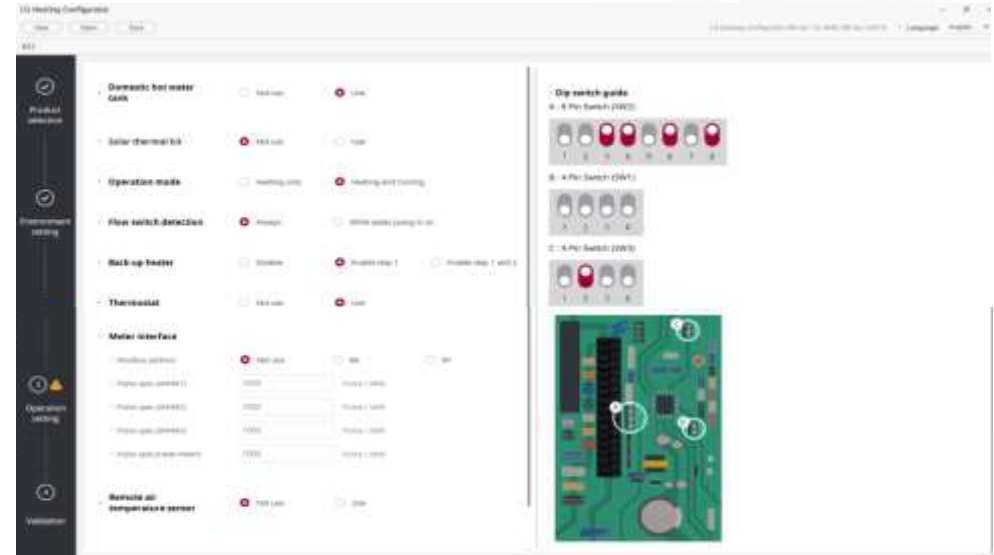


Expansion tank for DHW		OSHE-12KT.AEU
Expansion volume	ℓ	8
Connection	inch	3/4
Max. pressure	bar	10
Pre-charge	bar	3
Dimensions (W x H x D)	mm	416 x 238 x 502
Weight (w/o water)	kg	2.5

## 8 Heating Configurator

*\*Will be available for IWT in 2020*

Easy and quick commissioning is possible by using “LG Heating Configurator”.



[Configurator on PC screen]

- Installer Office
  - Download the software from our LG B2B Portal website.
  - Install the program on your PC
  - Run the program and set it according to the user conditions
  - After finishing setting, save to Micri SD Memory card

- On Site
  - ① Insert the card on back of RS3 wired remote controller
  - ② Go to configuration mode and load the saved file.

- Environment setting
- Operation setting
- Display setting of Dip s/w

The configurator consists of an install software and a language pack as excel format. You can down the packages in our LG B2B Portal  
In addition, the user can regisger and use the desired language



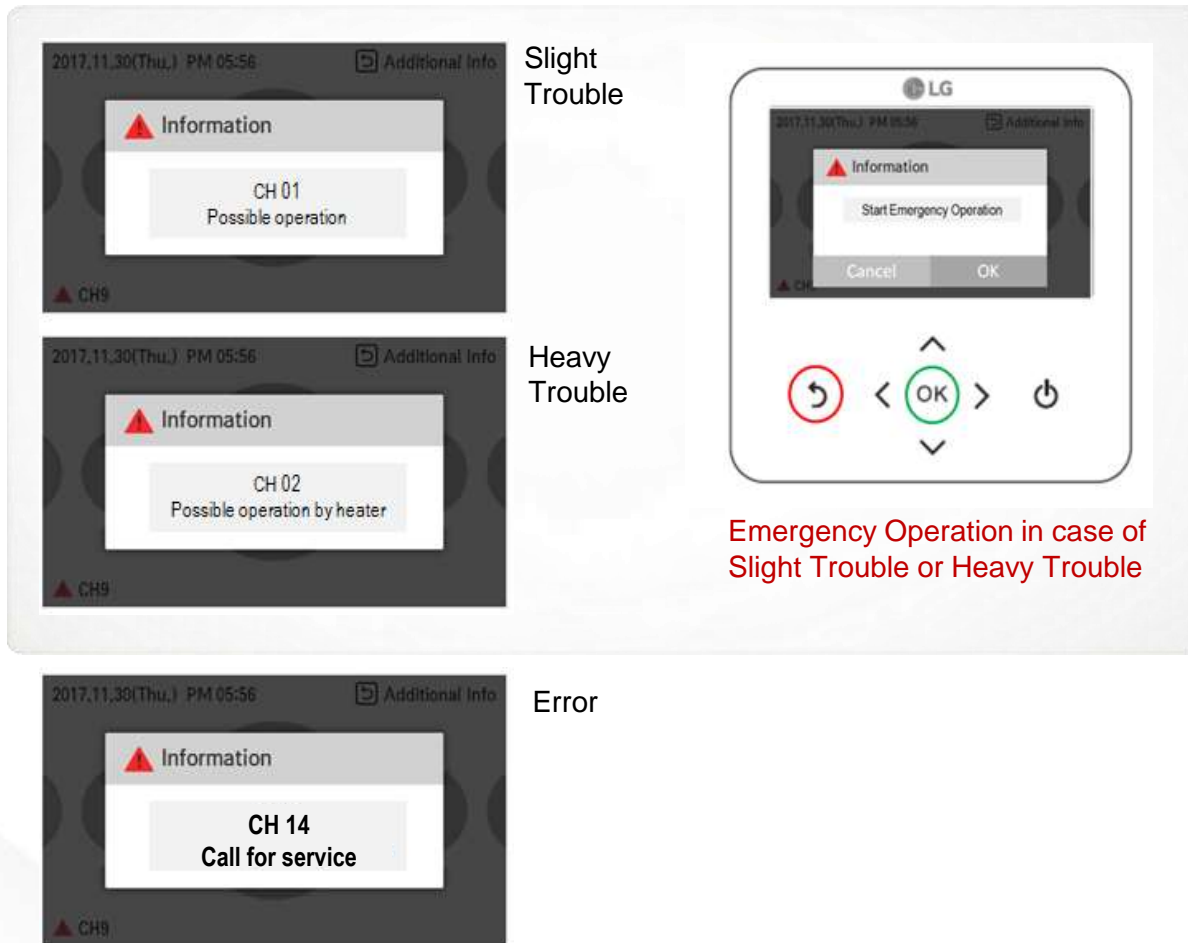
[install S/W]



[Language pack]

## 9 Emergency Operation

Even in case of sudden product trouble, the R32 IWT ensures stable heating operation by applying Emergency Operation Mode.

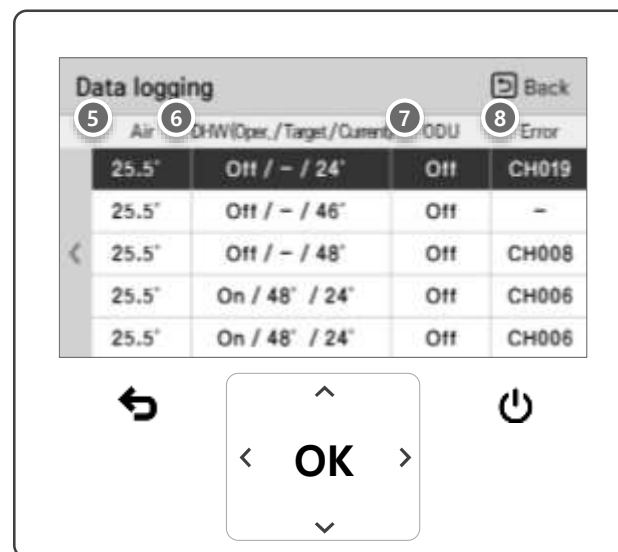
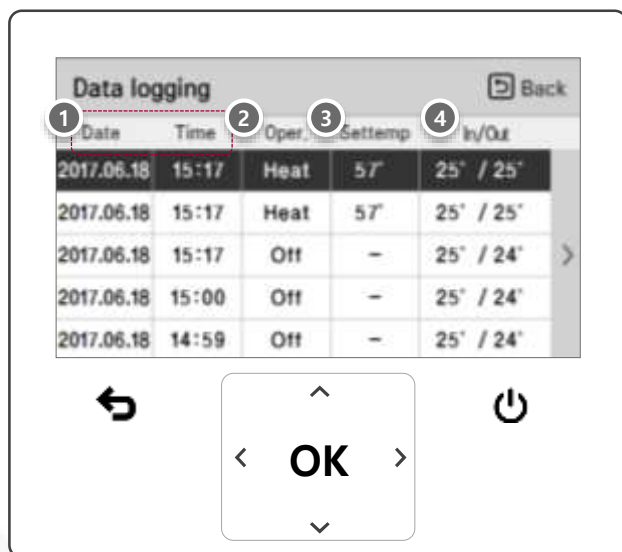


## 10 Data logging

With this function, various information (such as operation history, error history, etc.) is available to be checked on the new remote controller.

The user can check the below 8 pieces of information about operation and error history. (Max. 50 event data logging)

- ① Date and time
- ② Operation mode (Cooling, Heating, Hot Water, Auto)
- ③ Setting temperature
- ④ Inlet / Outlet temperature
- ⑤ Room air temperature
- ⑥ DHW (Operation status / Target temperature / current temperature)
- ⑦ ODU operation status
- ⑧ Error status & code

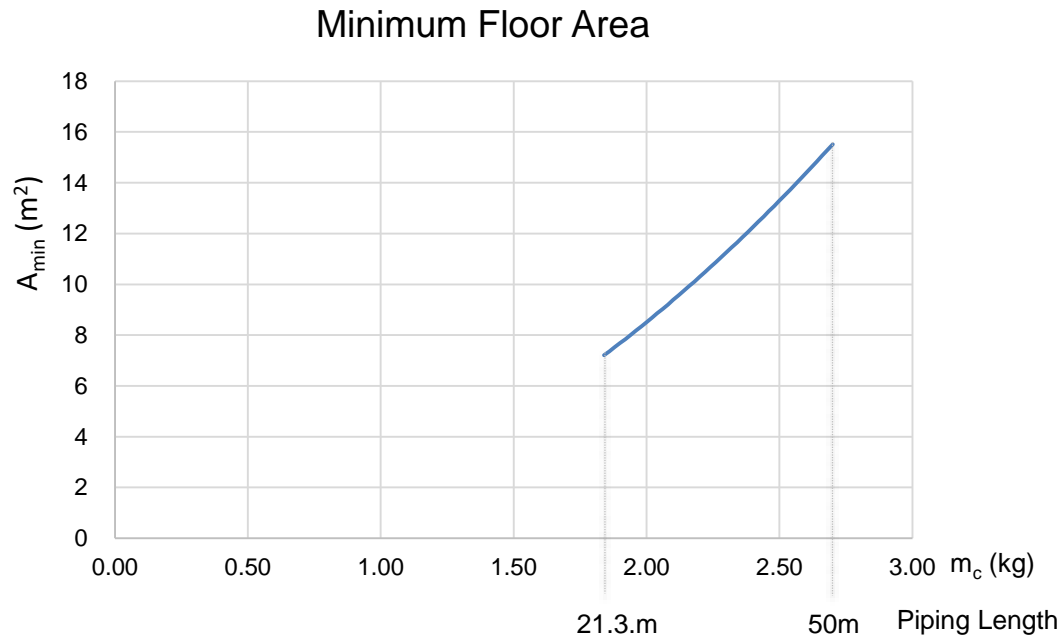




# **Appendix**

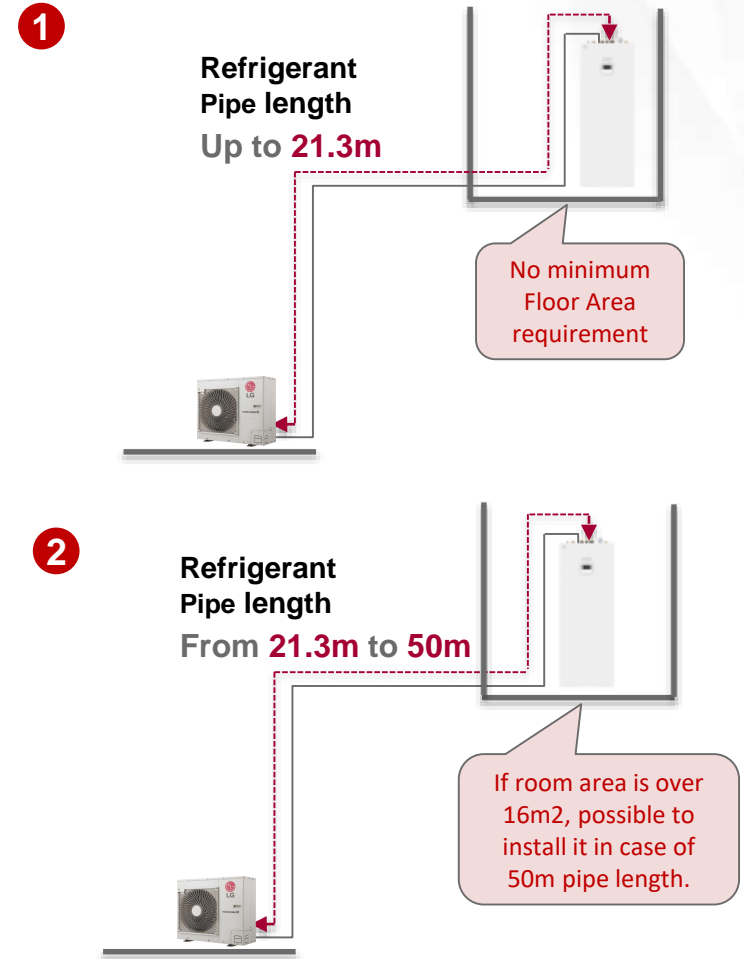
# Appendix. Minimum Floor Area Requirement

As R32 refrigerant is considered as slightly flammable gas, there is a restriction of floor area where indoor unit is located. The indoor unit should be installed, operated and stored in a room with a floor area larger than the following minimum floor area.



- $m_c$  : Total refrigerant amount in the system  
(Factory refrigerant charge + additional refrigerant amount)
- $A_{min}$  : Minimum floor area for Indoor unit

\* IEC 60335-2-40 6th edition applied













# Appendix. Key USP by Target Group









**Product : LG Therma V R32 IWT**

INSTALLER	HOUSE BUILDER	END USER	DESIGNER
<b>INSTALLATION</b>	<b>INSTALLATION</b>	<b>TRUST</b>	<b>DESIGN SUPPORT</b>
<p>Easy to carry</p> <p>Straight-forward pipe installation</p> <p>Copy-paste configuration</p> <p>Short installation time (All-in-one)</p> <p>Compact Size for limited space</p>	<p>Copy-paste configuration</p> <p>Short installation time (All-in-one)</p>	<p>Made in EU (IDU)</p> <p>ODU from Mass-Production</p> <p>LG Brand (Warranty)</p> <p>Advanced environmental tech (R32)</p> <p>Emergency Operation</p>	<p>LATS THERMA V (PC)</p> <p>LG THERMA V Selector (Mobile)</p>
<b>SYSTEM DESIGN</b>	<b>SYSTEM DESIGN</b>	<b>CONVINIENCE</b>	<b>SYSTEM DESIGN</b>
<p>Buffer Tank integrated as option</p> <p>DHW Expansion tank integrated as option</p> <p>12L expansion vessel integrated</p> <p>Compatible with various terminal units (UFH, FCU, RAD)</p> <p>2nd Heating circuit connectable</p> <p>Small footprint / space needed</p>	<p>Small footprint / space needed</p>	<p>Easy user interface (RS3)</p> <p>Local Language</p> <p>Wi-fi &amp; Voice Control</p> <p>Higher comfort by advanced control options (Air, Water, Both)</p>	<p>Buffer Tank integrated as option</p> <p>DHW Expansion Tank integrated as option</p> <p>12L expansion vessel integrated</p> <p>Compatible with various terminal units (UFH, FCU, RAD)</p> <p>2nd Heating circuit connectable</p>
	<b>PERFORMANCE</b>	<b>PERFORMANCE</b>	<b>Small footprint / space needed</b>
	High efficiency (Heating A <sup>+++</sup> , DHW A <sup>+</sup> )	<p>Lower Operation Cost</p> <p>High efficiency (Heating A<sup>+++</sup>, DHW A<sup>+</sup>)</p> <p>Low Noise Operation (58dB(A))</p>	
		<b>DESIGN</b>	
		<p>Sleek Design</p> <p>Compact Size for limited space</p> <p>High integration (e.g. Buffer Tank)</p>	





# Appendix. Accessory & Others

Category	Model Name	Model Number	Figure	Applicable Product	Relevant Function	Purpose	Feature
Sensors	Room Temperature Sensor	PQRSTA0		All except for R410A IWT	Room Temperature Based Control	To detect room air temperature for room temperature based control	<ul style="list-style-type: none"> <li>Max. Wire Length : 15m</li> </ul>
	2nd Circuit Thermistor	PRSTAT5K10		All except for R410A IWT and High temp.	2nd Circuit (Mixing circuit)	To detect 2nd circuit temperature when using 2nd circuit function	<ul style="list-style-type: none"> <li>5kΩ thermistor, 10m</li> </ul>
	Domestic Hot Water Sensor	PHRSTA0		All except for IWT and High temp. models	Domestic Hot Water Heating	To detect DHW tank temperature	included in PHLTA kit
Valves	3 Way Valve	OSHA-3V		All except for IWT models	Domestic Hot Water Heating	To divert water flow between space heating and DHW heating	<ul style="list-style-type: none"> <li>Size : DN 20 G 1" connection, male threaded</li> </ul>
	Thermostatic Mixing Valve	OSHA-MV OSHA-MV1		Regardless of model	Domestic Hot Water Supply	To blend hot water with cold water for ensuring constant, safe shower and bath outlet temp.	<ul style="list-style-type: none"> <li>Size : 3/4" DN20, male threaded</li> <li>Size : 1" DN25, male threaded</li> </ul>
DHW Tanks	Domestic Hot Water Tank (Single Coil)	OSHW-200F		All except for IWT models	Domestic Hot Water Heating	To generate and store domestic hot water	<ul style="list-style-type: none"> <li>Storage volume : 200L / 300L / 500L</li> <li>Type : Internal single coil</li> <li>Material : Stainless steel</li> <li>Capacity of booster heater : 2.4 kW</li> </ul>
		OSHW-300F					<ul style="list-style-type: none"> <li>Storage volume : 300L</li> <li>Type : Internal double coil</li> <li>Material : Stainless steel</li> <li>Capacity of booster heater : 2.4 kW</li> </ul>
		OSHW-500F					
Installation Kits	Domestic Hot Water Tank Kit	PHLTA (1Ø, Split)		All except for IWT and High temp. models	Domestic Hot Water Heating	To operate with DHW tank	<ul style="list-style-type: none"> <li>Parts included : DHW tank sensor(Thermistor), Circuit breaker, Relay</li> </ul>
		PHLTC (3Ø, Split)					<ul style="list-style-type: none"> <li>Parts included : DHW tank sensor(Thermistor), Circuit breaker, Relay, Multi harness</li> </ul>
		PHLTB (Monobloc)					
	Solar Thermal Kit	PHLLA		All except for IWT, Hydrosplit and High temp. models	Solar Thermal Heat Utilization	To operate with solar thermal system	<ul style="list-style-type: none"> <li>Length of thermistor : 12m</li> <li>Size of tube connector (W x H x D) : 110 x 55 x 22</li> </ul>
	Electric Back up heater	AHEH036A [HA031M E1]		R32 Monobloc and R32 Silent Monobloc	Capacity back up & Emergency Operation	To supplement insufficient capacity	<ul style="list-style-type: none"> <li>Heater capacity : 3 kW</li> <li>Number of heating coil : 1 ea (3.0kW)</li> <li>Size (W x H x D) : 210 x 607 x 220</li> <li>Power : 220-240 V, 1Φ</li> </ul>
		AHEH066A [HA061M E1]					<ul style="list-style-type: none"> <li>Heater capacity : 6 kW</li> <li>Number of heating coil : 2 ea (3.0 + 3.0kW)</li> <li>Size (W x H x D) : 210 x 607 x 220</li> <li>Power : 220-240 V, 1Φ</li> </ul>
		AHEH068A [HA063M E1]					<ul style="list-style-type: none"> <li>Heater capacity : 6 kW</li> <li>Number of heating coil : 3 ea (2.0 + 2.0 + 2.0kW)</li> <li>Size (W x H x D) : 210 x 607 x 220</li> <li>Power : 380-415 V, 3Φ</li> </ul>

# Appendix. Accessory & Others

Category	Model Name	Model Number	Figure	Applicable Product	Relevant Function	Purpose	Feature
Vessel	Buffer tank for space heating	OSHB-40KT		R32 IWT	-	To provide the buffer volume of water to the heating circuit	<ul style="list-style-type: none"> <li>• volume : 40L</li> <li>• Size (W x H x D) : 518 x 560 x 175</li> </ul>
	Expansion vessel for DHW	OSHE-12KT		R32 IWT	-	To absorb the volume changes by temperature of water for the DHW circuit	<ul style="list-style-type: none"> <li>• volume : 8L</li> <li>• Connection : 3/4"</li> <li>• Max. pressure : 10 bar</li> <li>• Size (W x H x D) : 416 x 238 x 502</li> </ul>
ETC	Extension wire for wire remote controller	PZCWRC1		All except for R410A IWT	-	To extend wire between wired remote controller and indoor unit	<ul style="list-style-type: none"> <li>• Length : 10m</li> </ul>
	Extension cable for Wi-Fi Modem	PWYREW000		All except for R410A IWT	Wi-Fi Control via LG ThinQ	To extend wire between Wi-Fi modem and indoor unit	<ul style="list-style-type: none"> <li>• Length : 10 m</li> </ul>
	2-Remo Control Wire	PZCWRC2		All except for R410A IWT model	2-Remote Control	To connect two remote controller on the one indoor unit	<ul style="list-style-type: none"> <li>• Length : 0.25 m</li> </ul>
	Drain pan	PHDPB		R32 Split, R410A Split	Cooling Operation	To collect condensed water in indoor unit when cooling operation	-
		PHDPC		R32 Hydrosplit			
	Cover plate	PDC-HK10		R32 Hydrosplit, R32 Split, R410A Split	-	To fill the blank space of the indoor unit front panel when the remote controller is relocated indoors.	-

# Appendix. Controllers

Category	Model Name	Model Number	Figure	Applicable Product	Relevant Function	Purpose	Feature
Remote Controller	Wired Remote Controller	PREMTW101		All except for R410A IWT model	2-Remote Control	To control AWHP using two remote controller (additional remote controller)	<ul style="list-style-type: none"> <li>• New modern design 4.3 inch color LCD display.</li> <li>• Information displayed with simple graphic, icon &amp; text.</li> <li>• Built-in temperature sensor</li> <li>• Size (W x H x D) : 120 x 120 x 16</li> <li>• Extension cable (PZCWRC1, 10m) and 2-remo cable (PZCWRC2, 0.25m) are included.</li> </ul>
Central Controller	AC Ez Touch	PACEZA000		All except for R410A IWT model	Centralized Control	To control AWHP using LG central controller	<ul style="list-style-type: none"> <li>• 5 inch Color Display</li> <li>• User-friendly control with iconographic interface (Touch screen)</li> <li>• Max. 32 Unit Control</li> <li>• Total 200 schedule events (Weekly/Monthly/Yearly/Exception day)</li> <li>• Operation History</li> <li>• Remote Controller Lock (All, Temp, Mode)</li> <li>• PC Access Supported (IPv6 supported)</li> <li>• DI 1EA (Emergency Stop Only)</li> <li>• Size (W x H x D) : 137 x 121 x 25</li> </ul>
	AC Smart 5	<ul style="list-style-type: none"> <li>• PACS4B000 (Smart 4)</li> <li>• PACS5A000 (Smart 5)</li> </ul>					<ul style="list-style-type: none"> <li>• 10.2 inch Color Display</li> <li>• User-friendly control with iconographic interface (Touch screen)</li> <li>• (Smart 4)_MAX IDU 32, (Smart 5)_MAX IDU 64</li> <li>• Total 100 schedule events (Weekly/Monthly/Yearly/Exception day)</li> <li>• History /Operation Trend</li> <li>• Interlock with 3rd party equipment (ACS IO, ACU IO Module is needed)</li> <li>• Error alarm by e-mail</li> <li>• Remote Controller Lock (All, Temp, Mode)</li> <li>• Map view (Visual navigation)</li> <li>• Web Access Supported with HTML5 (PC, Smartphone, Tablet)</li> <li>• DI 2EA, DO 2EA</li> <li>• BACnet IP / Modbus TCP Protocol Support</li> <li>• Size (W x H x D) : 253.2 x 167.7 x 28.9</li> </ul>
	ACP	<ul style="list-style-type: none"> <li>• PACP4B000 (ACP4)</li> <li>• PACP5A000 (ACP5)</li> </ul>					<ul style="list-style-type: none"> <li>• Web Access Controller</li> <li>• Max. 128 Unit Control</li> <li>• Total 100 schedule events (Weekly/Monthly/Yearly/Exception day)</li> <li>• History /Operation Trend</li> <li>• Interlock with 3rd party equipment (ACS IO, ACU IO Module is needed)</li> <li>• Error alarm by e-mail</li> <li>• Remote Controller Lock (All, Temp, Mode)</li> <li>• Map view (Visual navigation)</li> <li>• DI 10EA, DO 4EA</li> <li>• BACnet IP / Modbus TCP Protocol Support</li> <li>• Size (W x H x D) : 270 x 155 x 65</li> </ul>

Note 1 : PI485 Gateway (PMNFP14A1) should be installed on outdoor unit to use Central controller.

# Appendix. Controllers

Category	Model Name	Model Number	Figure	Applicable Product	Relevant Function	Purpose	Feature
Gateway	ACP Lonworks	PLNWK000		All except for R410A IWT model	Centralized Control	To link with AWHP and other existing building control system	<ul style="list-style-type: none"> <li>• Web Access Controller</li> <li>• Max. 64 Unit Control</li> <li>• ACP Function Included</li> <li>• Lonworks Protocol Support</li> <li>• Size (W x H x D) : 270 x 155 x 65</li> </ul>
	Modbus RTU	PMBUSB00A		All except for R410A IWT model		To communicate and control through the central controller (providing Modbus RTU connection between AWHP and BMS)	<ul style="list-style-type: none"> <li>• Modbus RTU slave (RS485) / 9,600 bps</li> <li>• Size (W x H x D) : 53.6 x 89.7 x 60.7</li> <li>• Max. 16 IDUs with single module / Max. 64 IDUs with 4 modules</li> <li>• Power : DC 12V</li> </ul>
	PI485 Gateway	PMNFP14A1		All except for R410A IWT model		To communicate and control through the central controller (converting LG protocol to RS485 protocol)	<ul style="list-style-type: none"> <li>• 1 for each outdoor unit</li> <li>• Power : supplied by outdoor unit</li> </ul>
	PI485 Gateway	PP485B00K		R410A IWT		To communicate between outdoor unit and IWT type indoor unit	<ul style="list-style-type: none"> <li>• 1 for each outdoor unit</li> <li>• Power : supplied by outdoor unit</li> </ul>
Dry Contact	Simple Dry Contact	PDRYCB000		All except for R410A IWT model	-	To connect between the AWHP and external devices to control various functions	<ul style="list-style-type: none"> <li>• 1 Set Per 1 Unit</li> <li>• 1 Input Contact for Turning On/Off</li> <li>• Input Power : 220 ~ 240V</li> <li>• 2 Output Contacts</li> <li>- Operation Status</li> <li>- Error Status</li> </ul>
	Dry Contact for Thermostat	<b>NEW</b> PDRYCB320					<ul style="list-style-type: none"> <li>• 1 Set Per 1 Unit</li> <li>• Non Voltage or 12 ~ 24V</li> <li>• 1 Analog input for Set point</li> <li>• 8 Digital Input Contacts for Thermostat</li> <li>- On/Off, Operation Mode, DHW Heating</li> <li>- Emergency Mode, Silent Mode</li> <li>• 2 Output Contacts</li> <li>- Operation Status</li> <li>- Error Status</li> </ul>
ETC	LG Wi-Fi Modem	PWFMDD200		All except for R410A IWT model	Wi-Fi Control via LG ThinQ	To control AWHP via smartphone	<ul style="list-style-type: none"> <li>• Basic Control Function</li> <li>- On/Off, Operation Mode, Set Temp.</li> <li>- DHW Heating and Set Temp.</li> <li>• Weekly On/Off Schedule</li> <li>• Error Status Check</li> <li>• Frequency : 2.4GHz</li> <li>• IEEE 802.11b/g /n Supported</li> </ul>
	Meter Interface Module	PENKTH000		All except for R410A IWT model	Energy Monitoring	To measure production / consumption power	<ul style="list-style-type: none"> <li>• Energy Meter Interface to Monitor Electricity and Heat Energy</li> <li>- Max. 3 Watt-Hour Meter</li> <li>- Max. 1 Heat Meter</li> <li>- Pulse Width : 40ms ~ 100ms</li> <li>• Modbus RTU Comm. with THERMA V</li> <li>- 2 Wire RS485 / 9600bps</li> <li>• Power : DC 12V</li> <li>• Size (W x H x D) : 54 x 90 x 61</li> </ul>
	2 Zone Valve Controller	PZNVVB200		All except for R410A IWT model	Zone Valve Control	To control individual zone valves with room temperature sensor or room thermostat	<ul style="list-style-type: none"> <li>• Individual temperature setting possible. (To be set through wired remote control in room temperature input mode)</li> <li>• Room temperature detection (AI : 2 ports)</li> <li>• 3rd party thermostat interlock input. (DI : 2 port)</li> <li>• Can read one DI or AI for each zone.</li> <li>• Maximum number of connections : Max. 4EA (Expandable up to 8-zone)</li> <li>• Size (W x H x D) : 53.6 x 89.7 x 60.7</li> <li>• Power : DC12V for Module, AC24V for valve</li> </ul>



# Appendix. Modbus Memory Map

## Coil Register (0x01)

Register	Data Bit			Function
	Air Conditioner	Ventilator	HydroKit & AWHP	
1	Operate (On/Off)	Operate (On/Off)	Operate (On/Off)	0: Stop / 1: Run
2	Auto Swing	Aircon Operate (On/Off)	Hot Water Mode (On/Off)	0: Disable / 1: Enable
3	Filter Alarm Release	Filter Alarm Release <sup>1)</sup>	-	0: Normal / 1: Alarm Release
4	Lock Remote Controller	Lock Remote Controller	Lock Remote Controller	0: UnLock / 1: Lock
5	Lock Operate Mode	Lock Operate Mode <sup>1)</sup>	-	0: UnLock / 1: Lock
6	Lock Fan Speed	Lock Fan Speed <sup>1)</sup>	-	0: UnLock / 1: Lock
7	Lock Target Temp.	Lock Target Temp. <sup>1)</sup>	-	0: UnLock / 1: Lock
8	Lock IDU Address	Lock IDU Address <sup>1)</sup>	-	0: UnLock / 1: Lock
9	-	Quick Ventilate	-	0: Disable / 1: Enable
10	-	EnergySave	-	0: Disable / 1: Enable

\* Note <sup>1)</sup> : This register value is applied 'DX Ventilator' ONLY.

## Discrete Register (0x02)

Register	Data Bit			Function
	Air Conditioner	Ventilator	HydroKit & AWHP	
10001	Connected IDU	Connected IDU	Connected IDU	0: Disconnected / 1: Connected
10002	Alarm	Alarm	Alarm	0: Normal / 1: Alarm
10003	Filter Alarm	Filter Alarm <sup>1)</sup>	Hot Water Only <sup>2)</sup>	0: Normal / 1: Alarm HydroKit - 0: Normal / 1: Hot Water Only
10004	-	-	Target Temp Select	0: Air / 1: Water
10005	-	-	Error Division <sup>2)</sup>	0: CH type error / 1: BC type error

\* Note <sup>1)</sup> : This register value is applied 'DX Ventilator' ONLY.

\* Note <sup>2)</sup> : This register value is applied 'HydroKit' ONLY.

## Input Register (0x04)

Register	Data Bit			Function
	Air Conditioner	Ventilator	HydroKit & AWHP	
30001	Error Code	Error Code	Error Code	0 ~ 255 ※ Please refer to the product error table.
30002	Room Temp.	RA Temp.	Room Temp.	-99.0 ~ 99.0 [°C] X 10
30003	Pipe In Temp.	OA Temp. <sup>1)</sup>	Water Inlet Temp.	-99.0 ~ 99.0 [°C] X 10
30004	Pipe Out Temp.	SA Temp. <sup>1)</sup>	Water Outlet Temp.	-99.0 ~ 99.0 [°C] X 10
30005	-	Pipe In Temp. <sup>1)</sup>	Sanitary Tank Temp.	-99.0 ~ 99.0 [°C] X 10
30006	-	Pipe Out Temp. <sup>1)</sup>	Solar Temp. <sup>2)</sup>	-99.0 ~ 99.0 [°C] X 10

\* Note <sup>1)</sup> : This register value is applied 'DX Ventilator' ONLY.

\* Note <sup>2)</sup> : This register value is applied 'AWHP' ONLY.

## Holding Register (0x03)

Register	Data Bit			Function
	Air Conditioner	Ventilator	HydroKit & AWHP	
40001	Operate Mode	Operate Mode	Operate Mode	0: Cooling, 1: Dehumidify, 2: Fan, 3: Auto, 4: Heating HydroKit(Middle Temp DHW)/AWHP - 0: Cooling, 3: Auto, 4: Heating HydroKit(High Temp DHW) - 3: Auto, 4: Heating
40002	Fan Speed	Fan Speed	Target Temp. DHW <sup>2)</sup>	1: Low, 2: Mid, 3: High, 4: Auto
40003	Target Temp.	Target Temp. <sup>1)</sup>	Target Temp. <sup>2)</sup>	16.0 ~ 30.0 [°C] X 10
40004	Target Temp. Limit (Upper)	Target Temp. Limit (Upper) <sup>1)</sup>	-	16.0 ~ 30.0 [°C] X 10
40005	Target Temp. Limit (Lower)	Target Temp. Limit (Lower) <sup>1)</sup>	-	16.0 ~ 30.0 [°C] X 10
40006	-	Vent. Operate Mode	-	(0: HEX, 1: Auto, 2: Normal)

\* Note <sup>1)</sup> : This register value is applied 'DX Ventilator' ONLY.

\* Note <sup>2)</sup> : This value range can be between 0 ~ 127[°C]. And it would be limited by upper & lower value according to the setting of remote controller.



**AWHP Task**  
**August, 2020**