

Becon HVAC Solution

Central Controller

MFL61741654

LG

**TOTAL HVAC
SOLUTION
PROVIDER**

ENGINEERING PRODUCT DATA BOOK

BECONTM HVAC Solution

- 1. General Information**
- 2. Central Controller**

BECONTM HVAC Solution

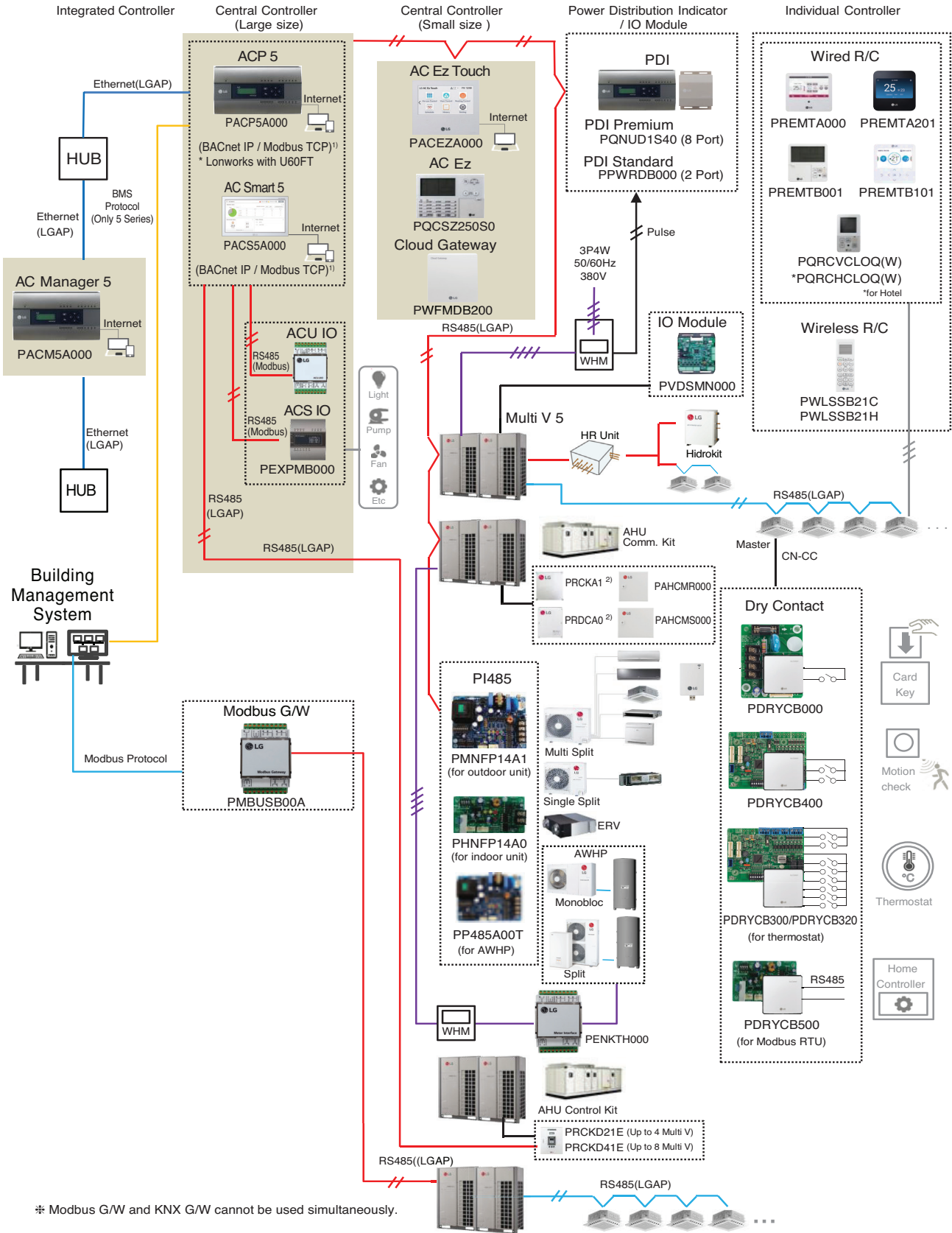
1. General Information

1.1 Solution Overview

1.2 Control System List

1.3 Nomenclature






1.1 Solution Overview



* Modbus G/W and KNX G/W cannot be used simultaneously.

1) It is available 5 series controllers(ACP 5(PACP5A000), AC Smart 5(PACS5A000)) only.
 * If more details, please refer to the manual of its product.
 2) This product is discontinued.

1.2 Control System List

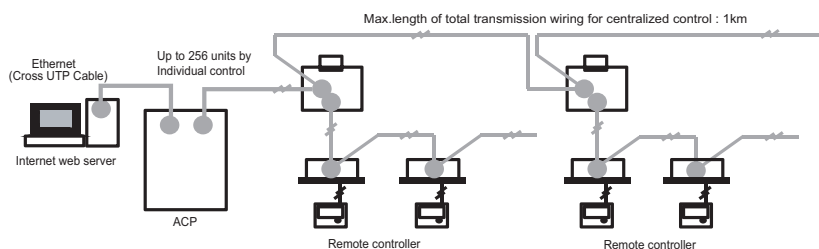
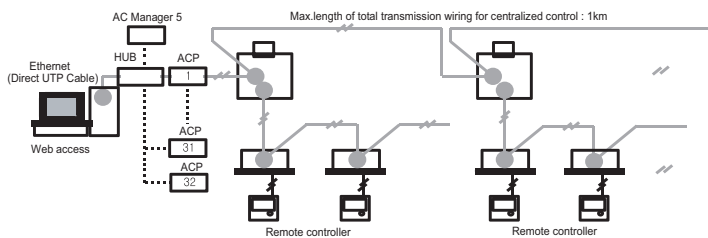
Category	Controller name	Model name	Compatible Product	Dimensions (W x H x D, mm)	Feature
Central controller	AC Manager 5	<p>PACM5A000</p> 	All IDU ERV ¹⁾ ERV DX Heating AHU ³⁾ Chiller	270 x 155 x 65	<ul style="list-style-type: none"> • PC Access Controller • 12 V== Adaptor • Max 8,192 indoor unit control (Supports 32 ACP 5 or AC Smart 5) • 1,260 I/O Point Control • Chrome browser is recommended for web control.
	ACP 5	<p>PACP5A000</p>  <p>↑ USB Connect (Use USB 5V)</p>  <p>↑ FT-10 Lonworks</p> 	All IDU ERV ¹⁾ ERV DX Heating AHU ³⁾ Chiller	270 x 155 x 65	<ul style="list-style-type: none"> • PC Access Controller • 12 V== Adaptor • Max 256 indoor unit control • RS485 : 6 channels CH1~4 : Indoor unit ²⁾ CH5 : LGAP(AHU) or Modbus(AHU, Chiller, ACS IO) CH6 : Modbus(AHU, Chiller, ACS IO) • DI 10EA, DO 4EA (DI1 : Emergency stop Only) • In case of ACP 5, Chrome browser is recommended for web control. • For using Lonworks Protocol, ACP 5 provides interface for BMS integration. And it need to U60FT Module between ACP 5 and BMS System.
	AC Smart 5	<p>PACS5A000</p> 	All IDU ERV ¹⁾ ERV DX Heating AHU ³⁾ Chiller	253.2 x 167.7 x 28.9	<ul style="list-style-type: none"> • 10 inch type color Display • Touch Screen • 12 V== Adaptor • Max 128 indoor unit control • RS485 : 2 channels CH1 : - LGAP(AHU) or - Modbus (AHU, Chiller, ACS IO) or - Indoor unit ²⁾ (AC Smart 5 only ⁴⁾) CH2 : Indoor unit ²⁾ • DI 2EA, DO 2EA (DI1 : Emergency stop Only) • In case of AC Smart 5, Chrome browser is recommended for web control.

- 1) ERV : Energy Recovery Ventilation
- 2) Indoor unit : IDU, ERV, DX ERV, Heating
- 3) AHU Control Kit, AHU Comm. kit(For AHU Comm. kit, please refer to Comm. kit PDB)
- 4) In case of using AC Smart IV or AC Smart BACnet, can't use CH1 for Indoor unit.
- If you need more detail, please refer to the manual of product. (<http://partner.lge.com>: Home> Doc.Library> Manual)

1.2 Control System List

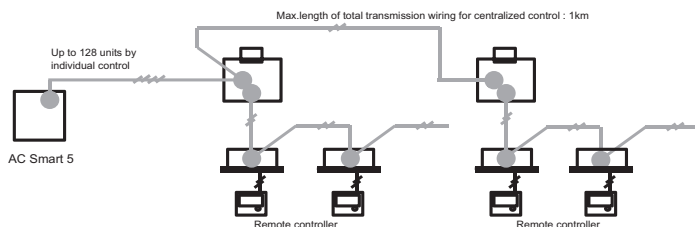
Outline of system

► When using a HUB, use Direct UTP Cable.



- Max. the number of connected node* in one RS485 Line : 32

- Communication cable
 - Types : shielding wire
 - Use wires of size : over 0.75 ~ 1.5 mm²
 - Max. allowable temperature of cable : 60°C
 - Max. length of total transmission wiring (End to End) : 1 km









- Communication cable
 - Types : shielding wire
 - Use wires of size : over 0.75 ~ 1.5 mm²
 - Max. allowable temperature of cable : 60°C
 - Max. length of total transmission wiring (End to End) : 1 km

- Node : (Multi V Outdoor count * 2) + PI485 count + Central controller count ≤ 32
- Ex) ACP 1ea + AC Smart 2ea + Multi V Outdoor unit 6ea = 1 + 2 + (6 x 2) = 15 nodes

* The number of 32 nodes includes the central controller.

• If you need more detail, please refer to the manual of product. (<http://partner.lge.com>: Home> Doc.Library> Manual)

1.2 Control System List

Category	Controller name	Model name	Compatible Product	Dimensions (W x H x D, mm)	Feature
Central controller	AC Ez Touch	<p>PACEZA000</p> 	All IDU ERV ¹⁾ ERV DX Heating	137x 121 x 25	<ul style="list-style-type: none"> • 5inch color Display • Touch Screen • 12 V===Adaptor • Max 64 indoor unit control • RS485 : 1 channel • DI 1EA (Emergency stop Only)
	AC Ez	<p>PQCSZ250S0</p> 	All IDU ERV ¹⁾ ERV DX	190 x 120 x 20	<ul style="list-style-type: none"> • TN Mono Display & 18 LED • Button Control • 12 V=== • Max 32 indoor unit control • RS485 : 1 channel
	PDI Premium	<p>PQNUD1S40</p> 	All IDU ERV DX Heating	<p>[Controller] 270 x 155 x 65</p> <p>[Power Module] 120 x 155 x 65</p>	<ul style="list-style-type: none"> • EHP ODU 8EA (GHP 4EA) • 128 EHP Indoor Units (64 GHP Indoor Units) • 220-240 V~ Power Input • 8port Pulse Input
	PDI Standard	<p>PPWRDB000</p> 	All IDU ERV DX Heating	<p>[Controller] 270 x 155 x 65</p> <p>[Power Module] 120 x 155 x 65</p>	<ul style="list-style-type: none"> • EHP ODU 2EA (GHP 1EA) • 128 EHP Indoor Units (64 GHP Indoor Units) • 220-240 V~ Power Input • 2port Pulse Input
	Cloud Gateway	<p>PWFMDB200</p> 	All IDU ERV ²⁾ ERV DX ²⁾ Heating ²⁾	120 x 120 x 29	<ul style="list-style-type: none"> • 12 V=== • Max 16 indoor units • RS485 : 1 channel (LGAP) • Wired/Wireless LAN
Interface Device	ACS IO Module	<p>PEXPMB000</p> 	ACP 5 AC Smart 5	126 x 155 x 65	<ul style="list-style-type: none"> • 24 V~ Power Input • AO 4EA (Voltage) • UI 4EA (Voltage, Current, NTC 10k, PT1000, Ni1000, Dry Contact) • DI 3EA (Dry Contact) • DO 3EA (Relay Output / Normal Open) • RS485 : 1 channel(Modbus)

1) ERV : Energy recovery ventilation

• If you need more detail, please refer to the manual of product. (<http://partner.lge.com>: Home > Doc.Library > Manual)

2) Only for BECON cloud

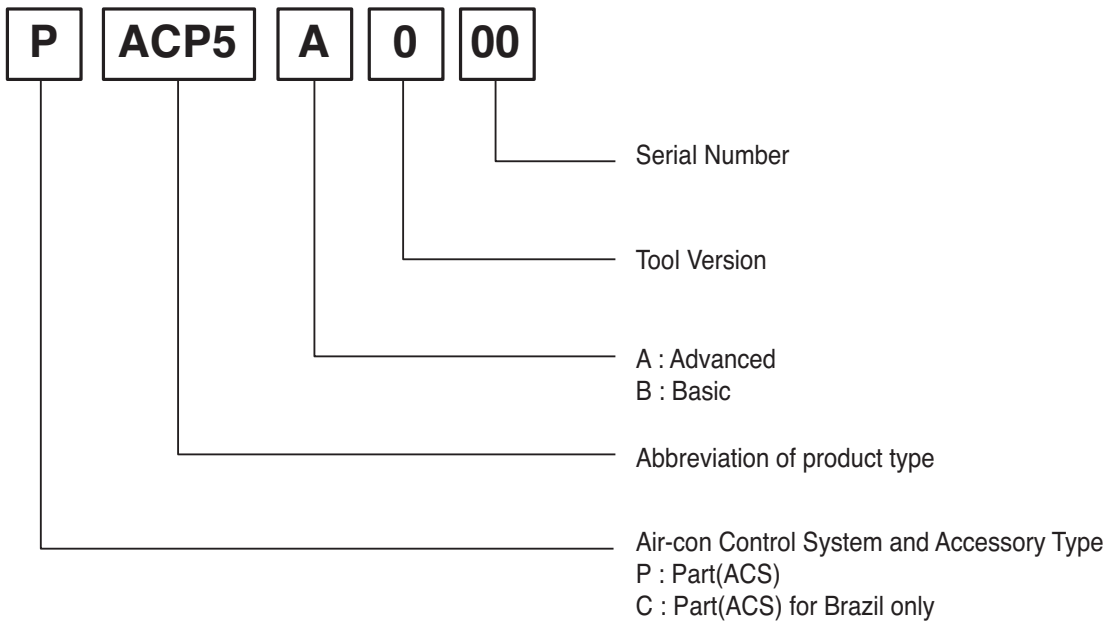
1.2 Control System List

Outline of system

<p>Up to 64 units by individual control</p> <p>AC Ez Touch</p> <p>Remote controller</p> <p>Remote controller</p> <p>Max.length of total transmission wiring for centralized control : 1km</p>	<ul style="list-style-type: none"> • Communication cable <ul style="list-style-type: none"> - Types : shielding wire - Use wires of size : over 0.75 ~ 1.5 mm² - Max. allowable temperature of cable : 60°C - Max. length of total transmission wiring (End to End) : 1 km
<p>Up to 32 units by individual control</p> <p>AC Ez</p> <p>Remote controller</p> <p>Remote controller</p> <p>Max.length of total transmission wiring for centralized control : 1km</p>	<ul style="list-style-type: none"> • Communication cable <ul style="list-style-type: none"> - Types : shielding wire - Use wires of size : over 0.75 ~ 1.5 mm² - Max. allowable temperature of cable : 60°C - Max. length of total transmission wiring (End to End) : 1 km
<p>Power In single phase 220~240 V~, 50/60 Hz</p> <p>Power In 3 phase 4 wire 380~400 V~, 50/60 Hz</p> <p>Wattmeter</p> <p>Pulse signal</p> <p>RS485 (LGAP)</p> <p>Power cable of indoor unit</p> <p>(00) (01) (02) (03)</p> <p>(70) (71) (72) (73)</p> <p>AC MANAGER ACP</p> <p>RS485 (LGAP)</p>	<ul style="list-style-type: none"> • Communication cable <ul style="list-style-type: none"> - Types : shielding wire - Use wires of size : over 0.75 ~ 1.5 mm² - Max. allowable temperature of cable : 60°C - Max. length of total transmission wiring (End to End) : 1 km • Pulse cable <ul style="list-style-type: none"> - Types : shielding wire - Use wires of size : over 0.75 ~ 1.5 mm² - Max. allowable temperature of cable : 60°C - Max. length of total transmission wiring (End to End) : 50 m
<p>Up to 16 units by individual control</p> <p>Cloud Gateway</p> <p>Remote controller</p> <p>Remote controller</p> <p>Max.length of total transmission wiring for centralized control : 1km</p>	<ul style="list-style-type: none"> • Communication cable <ul style="list-style-type: none"> - Types : shielding wire - Use wires of size : over 0.75 ~ 1.5 mm² - Maximum allowable temperature: 60°C - Max. length of total RS485 transmission wiring (End to End) : 1 km
<p>ACS IO Module</p> <p>ACS IO Module</p> <p>DI DO UI AO 3EA 3EA 4EA 4EA</p> <p>DI DO UI AO 3EA 3EA 4EA 4EA</p> <p>ACP 5</p> <p>AC Smart 5</p>	<ul style="list-style-type: none"> • ACP 5 : Up to 16 ACS IO Modules* • AC Smart 5 : Up to 9 ACS IO Modules* • Communication cable <ul style="list-style-type: none"> - Types : shielding wire - Use wires of size : over 0.75 ~ 1.5 mm² - Max. allowable temperature : 60°C - Max. length of total transmission wiring for centralized control : 1km - Max. length of I/O wiring : 100m

* The maximum quantity of connected indoor unit is different depending on the quantity of connected I/O modules
 * If you need more detail, please refer to the manual of product. (<http://partner.lge.com>: Home> Doc.Library> Manual)

1.3 Nomenclature



- * The product images and descriptions included in this PDB are stated based on basic model (Model Name: PXXXXXXXX).
- * Some old models may not be applied.

2. Central Controller

2.1 Product Feature

2.1.1 Function List

2.1.2 Function Description

2.1.3 Compatibility List

2.2 Example of installing

2.3 Product Description

2.3.1 AC Ez

2.3.2 AC Ez Touch

2.3.3 AC Smart 5/ACP 5

2.3.4 AC Manager 5






2.3.5 PDI

2.3.6 ACS IO Module

2.3.7 Cloud Gateway

2.1 Product Feature

2.1.1 Function List

Model				AC Manager 5	ACP 5	AC Smart 5	AC Ez Touch	AC Ez	
Image									
Function									
Level1	Level2	Level3	Level4	PACM5A000	PACP5A000	PACS5A000	PACEZA000	PQCSZ250S0	
Function	Control	Schedule	-	●	●	●	●	●	
		Interlocking	-	●	●	●	X	X	
		Continuous operation time limit	-	●	●	●	X	X	
	Energy	Energy Usage	Run time	-	●	●	●	X	X
			Electricity	-	●	●	●	●	X
			Gas	-	●	●	●	X	X
			TOE	-	●	●	●	X	X
			CO ₂	-	●	●	●	X	X
		Energy Navigation	-	X	●	●	X	X	
		Peak control	Priority Control	-	●	●	●	▲ ¹⁾	X
			Outdoor Unit Capacity Control	-	●	●	●	X	X
	Energy unit cost	-	X	●	●	X	X		
	Save to PC/USB (Excel)	-	PC	PC	PC/USB	X	X		
	History	Operation history	-	●	●	●	X	X	
		Error history	-	●	●	●	●	X	
		Filter/Oil replacement ⁴⁾ alarm history	-	Filter/Oil	Filter/Oil	Filter/Oil	Filter/Oil	X	
		Energy navigation history	-	●	●	●	X	X	
		Operation trend	-	●	●	●	X	X	
		Cycle	-	●	●	●	X	X	
		Save to PC/USB (Excel)	-	PC	PC	PC/USB	X	X	
	Added Function	Celsius 0.5 degree control ²⁾	-	●	●	●	●	●	
		Set the lowest temperature for Cool/Heat (16°C) ³⁾	-	●	●	●	X	X	
		2SET (Dual Setpoint)	-	●	●	●	●	X	
		Auto Change Over	-	●	●	●	●	X	
		Setback	-	●	●	●	●	X	
		CO ₂ concentration	-	●	●	●	X	X	
		Comfort	-	●	●	●	X	X	
		Air Purify	-	●	●	●	●	X	
		UV Nano	-	X	●	●	●	X	
		Slave controller lock	-	X	●	●	X	X	
		E-mail error notice	-	●	●	●	X	X	
		Dashboard	-	●	●	●	X	X	
		Drawing View	-	●	●	●	X	X	
		Daylight Saving time	-	●	●	●	●	X	
		AI Driving Status	-	X	●	●	X	X	
		Outdoor Unit Oil-Return Operation	-	X	●	●	X	X	
		User Authority	-	●	●	●	Password	X	
	PC Access	-	●	●	●	●	X		
	3rd party connection	BACnet	-	X	●	●	X	X	
		Modbus	-	X	●	●	X	X	
Lonworks		-	X	● ⁵⁾	X	X	X		

● : Applied, x : Not Applied

1) Energy save mode



2) Only for 0.5 degree Celsius controllable product

3) Not support for ENCXUAE suffix

4) Oil replacement : GHP products only

5) Lonworks with U60FT module




2.1 Product Feature

Product	Model		AC Manager 5	ACP 5				
	Image		 PACM5A000	 PACP5A000				
Function			Local	Local	BACnet (IP)	Modbus (TCP)	Lonworks	
Air conditioner	Basic Function	Operation ON/OFF	-	●	●	●	●	●
		Mode	-	●	●	●	●	●
		Current temperature	-	●	●	●	●	●
		Fan speed	-	●	●	●	●	●
		Swing	-	●	●	●	●	●
		Oil replacement ¹⁾ alarm	-	●	●	X	X	X
		Filter replacement alarm	-	●	●	●	X	X
		Hard Lock	-	●	●	●	●	●
		Mode Lock	-	●	●	●	●	●
		Fan Lock	-	●	●	●	●	●
	Temperature Lock	-	●	●	X	●	●	
	Peak demand control	-	●	●	●	X	●	
	Central Controller 2Set Auto Mode	Set temperature	Disable when setting 2SET	●	●	●	●	●
		Set temperature range		●	●	●	●	●
		AutochangeOver		●	●	X	X	X
		Setback		●	●	X	X	X
	IDU 2Set Auto Mode	Occupied	Disable when setting 1SET	●	●	●	X	X
		Set temperature (cool/heat)		●	●	●	X	X
		Set temperature range (Cool/heat)		●	●	●	X	X
	Option	Air Purify	-	●	●	●	X	X
		Comfortable power saving	-	●	●	●	X	X
		PM10/PM2.5/PM1.0	-	●	●	●	X	X
		Humidity	-	●	●	●	X	X
		Comfort	-	●	●	X	X	X
		Smartcare	-	X	●	X	X	X
		Uvnano	-	X	●	X	X	X
		Uvnano LED status	-	X	●	X	X	X
	Cooperative control	-	X	●	X	X	X	
	Human detection	On/Off power saving	-	●	●	●	X	X
		Temperature power saving	-	●	●	●	X	X
Unoccupied time setting		-	●	●	●	X	X	
Direct wind		-	●	●	●	X	X	
Indirect wind		-	●	●	●	X	X	
Error information	Error	-	●	●	●	●	●	

● : Applied, X : Not Applied

1) Oil replacement : GHP products only



2.1 Product Feature

Product	Model		AC Smart 5			AC Ez Touch	AC Ez	
	Image		 PACS5A000			 PACEZA000	 PQCSZ250S0	
	Function		Local	BACnet (IP)	Modbus (TCP)	Local	Local	
Air conditioner	Basic Function	Operation ON/OFF ¹⁾	-	●	●	●	●	●
		Mode	-	●	●	●	●	●
		Current temperature	-	●	●	●	●	●
		Fan speed	-	●	●	●	●	●
		Swing	-	●	●	●	●	●
		Oil replacement ¹⁾ alarm	-	●	X	X	●	●
		Filter replacement alarm	-	●	●	X	●	●
		Hard Lock	-	●	●	●	●	●
		Mode Lock	-	●	●	●	●	X
		Fan Lock	-	●	●	●	●	X
	Temperature Lock	-	●	X	●	●	X	
	Peak demand control	-	●	●	X	X	X	
	Central Controller 2Set Auto Mode	Set temperature	Disable when setting 2SET	●	●	●	●	X
		Set temperature range		●	●	●	●	X
		AutochangeOver		●	X	X	●	X
		Setback		●	X	X	●	X
	IDU 2Set Auto Mode	Occupied	Disable when setting 1SET	●	●	X	●	X
		Set temperature (cool/heat)		●	●	X	●	X
		Set temperature range (Cool/heat)		●	●	X	●	X
	Option	Air Purify	-	●	●	X	●	X
		Comfortable power saving	-	●	●	X	●	X
		PM10/PM2.5/PM1.0	-	●	●	X	●	X
		Humidity	-	●	●	X	X	X
		Comfort	-	●	X	X	X	X
		Smartcare	-	●	X	X	X	X
		Uvnano	-	●	X	X	●	X
		Uvnano LED status	-	●	X	X	X	X
	Cooperative control	-	●	X	X	X	X	
	Human detection	On/Off power saving	-	●	●	X	X	X
		Temperature power saving	-	●	●	X	X	X
Unoccupied time setting		-	●	●	X	X	X	
Direct wind		-	●	●	X	X	X	
Indirect wind		-	●	●	X	X	X	
Error information	Error	-	●	●	●	●	●	

● : Applied, X : Not Applied




1) Oil replacement : GHP products only

2.1 Product Feature

Product	Model		AC Manager 5		ACP 5			
	Image							
	Fuction		Local	Local	BACnet (IP)	Modbus (TCP)	Lonworks	
ERV	Basic Function	Operation ON/OFF	-	●	●	●	●	●
		Mode	-	●	●	●	●	●
		Fan speed	-	●	●	●	●	●
		Humidity	-	●	●	●	●	X
		Quick	-	●	●	●	●	●
		Drift	-	●	●	●	●	X
		Heater	-	●	●	●	●	●
		Hard Lock	-	●	●	●	●	●
	ERVDX Function	Filter replacement alarm	-	●	●	●	●	X
		Set temperature	-	●	●	●	●	●
		Co-Airconditioner	-	●	●	X	●	●
		Temperature Lock	-	●	●	X	X	X
		Mode Lock	-	●	●	●	X	X
	Error information	Fanspeed Lock	-	●	●	●	X	X
Set temperature range		-	X	●	●	X	X	
Option	Error	-	●	●	●	●	●	
	CO ₂ concentration (Level)	-	●	●	X	X	X	
	CO ₂ PPM	-	●	●	X	X	X	
		Night Time Free Cooling (NTFC)	-	●	●	X	X	
AHU	Basic Function	Operation ON/OFF	-	●	●	●	●	●
		Mode	-	●	●	●	●	●
		Current temperature	-	●	●	●	X	●
		Set temperature	-	●	●	●	●	●
		CO ₂ Concentration	-	●	●	●	●	●
		Automatic Ventilation	-	●	●	●	●	●
		OA temperature	-	●	●	●	●	●
		OA humidity	-	●	●	●	●	●
		SA static pressure	-	●	●	X	X	X
		SA humidity	-	●	●	●	●	●
		MIX temperature	-	●	●	●	●	●
		MIX humidity	-	●	●	X	X	●
		Humidification	-	●	●	●	●	●
		Set humidity	-	●	●	●	●	●
		OA damper opening	-	●	●	●	●	●
		MIX damper opening	-	●	●	●	●	●
		EA damper opening	-	●	●	●	●	●
		Lock	-	●	●	●	●	●
		Fire alarm	-	●	●	●	●	●
	Filter replacement alarm	-	●	●	●	X	●	
	Multi-Fan AHU Function	Reheater	-	●	●	●	●	●
		CO ₂ goal setting	-	●	●	X	X	X
		Fan control standard	-	●	●	●	●	X
Fan speed		-	●	●	●	●	X	
Error information	Error	-	●	●	X	X	●	



● : Applied, X : Not Applied

2.1 Product Feature

Product	Model			AC Smart 5			AC Ez Touch	AC Ez
	Image							
	Function			Local	BACnet (IP)	Modbus (TCP)	Local	Local
ERV	Basic Function	Operation ON/OFF	-	●	●	●	●	●
		Mode	-	●	●	●	●	●
		Fan speed	-	●	●	●	●	●
		Humidity	-	●	●	●	X	X
		Quick	-	●	●	●	X	X
		Drift	-	●	●	●	X	X
		Heater	-	●	●	●	X	X
		Hard Lock	-	●	●	●	●	●
	Filter replacement alarm	-	●	●	●	●	●	
	ERVDX Function	Set temperature	-	●	●	●	●	●
		Co-Airconditioner	-	●	X	●	●	●
		Temperature Lock	-	●	X	X	X	X
		Mode Lock	-	●	●	X	X	X
		Fanspeed Lock	-	●	●	X	X	X
	Set temperature range	-	●	●	X	X	X	
Error information	Error	-	●	●	●	●	●	
Option	CO ₂ concentration (Level)	-	●	X	X	X	X	
	CO ₂ PPM	-	●	X	X	X	X	
	Night Time Free Cooling (NTFC)	-	●	●	X	X	X	
AHU	Basic Function	Operation ON/OFF	-	●	●	●	X	X
		Mode	-	●	●	●	X	X
		Current temperature	-	●	●	X	X	X
		Set temperature	-	●	●	●	X	X
		CO ₂ Concentration	-	●	●	●	X	X
		Automatic Ventilation	-	●	●	●	X	X
		OA temperature	-	●	●	●	X	X
		OA humidity	-	●	●	●	X	X
		SA static pressure	-	●	X	X	X	X
		SA humidity	-	●	●	●	X	X
		MIX temperature	-	●	●	●	X	X
		MIX humidity	-	●	X	X	X	X
		Humidification	-	●	●	●	X	X
		Set humidity	-	●	●	●	X	X
		OA damper opening	-	●	●	●	X	X
		MIX damper opening	-	●	●	●	X	X
		EA damper opening	-	●	●	●	X	X
		Lock	-	●	●	●	X	X
		Fire alarm	-	●	●	●	X	X
		Filter replacement alarm	-	●	●	X	X	X
	Reheater	-	●	●	●	X	X	
	CO ₂ goal setting	-	●	X	X	X	X	
	Multi-Fan AHU Function	Fan control standard	-	●	●	●	X	X
		Fan speed	-	●	●	●	X	X
	Error information	Error	-	●	X	X	X	X

● : Applied, X : Not Applied




2.1 Product Feature

Product	Model		AC Manager 5	ACP 5				
	Image		 PACM5A000	 PACP5A000				
	Function		Local	Local	BACnet (IP)	Modbus (TCP)	Lonworks	
AHU (DOAS)	Basic Function	Operation ON/OFF	-	●	●	X	X	X
		Mode	-	●	●	X	X	X
		Current temperature	-	●	●	X	X	X
		Set temperature	-	●	●	X	X	X
		OA temperature	-	●	●	X	X	X
		OA humidity	-	●	●	X	X	X
Heating	Basic Function	Occupancy	-	●	●	X	X	X
		Operation ON/OFF	-	●	●	●	●	●
		Mode	-	●	●	●	●	●
		Water inlet temperature	-	●	●	●	●	●
		Water outlet temperature	-	●	●	●	●	●
		Current temperature	-	●	●	●	●	●
		Set temperature	-	●	●	●	●	●
		Hot water ON/OFF	-	●	●	●	●	●
	Hot water current temperature	-	●	●	X	X	●	
	Hot water set temperature	-	●	●	●	●	●	
Error information	Error	Hard Lock	-	●	●	●	●	●
		Solar heat temperature	-	●	●	●	●	●
Chiller	Basic Function	Error	-	●	●	●	●	●
		ON/OFF	-	●	●	● ¹⁾	X	X
		Remove Alarm	-	●	●	● ¹⁾	X	X
		Mode	-	●	●	● ¹⁾	X	X
		Cool set temperature	-	●	●	● ¹⁾	X	X
		Heat set temperature	-	●	●	● ¹⁾	X	X
		Ice set temperature	-	●	●	● ¹⁾	X	X
		Outdoor air temperature	-	●	●	● ¹⁾	X	X
		Chilled Water Leaving Temperature	-	●	●	● ¹⁾	X	X
		Chilled Water Entering Temperature	-	●	●	● ¹⁾	X	X
		Entire operation current	-	●	●	● ¹⁾	X	X
		Start standby time	-	●	●	● ¹⁾	X	X
		Motor current limit	-	●	●	X	X	X
		Control valve upper limit	-	●	●	X	X	X
	Demand limit ratio	-	●	●	X	X	X	
Max operation frequency	-	●	●	X	X	X		
Error information	Error description		-	●	●	X	X	X
			-	●	●	X	X	X
DI	Basic Function	Status	-	●	●	X	X	X
DO	Basic Function	Operation	-	●	●	X	X	X
Exp. DI	Basic Function	Status	-	●	●	●	X	X
	Error information	Error	-	●	●	●	X	X
Exp. DO	Basic Function	Operation	-	●	●	●	X	X
	Error information	Error	-	●	●	●	X	X
Exp. AI	Basic Function	Status	-	●	●	X	X	X
	Error information	Error	-	●	●	X	X	X
Exp. AO	Basic Function	Operation	-	●	●	X	X	X
	Error information	Error	-	●	●	X	X	X

● : Applied, X : Not Applied

1) ISC2 (inverter scroll Chiller 2) only



2.1 Product Feature

Product	Model			AC Smart 5			AC Ez Touch	AC Ez
	Image							
	Function			Local	BACnet (IP)	Modbus (TCP)	Local	Local
AHU (DOAS)	Basic Function	Operation ON/OFF	-	●	X	X	X	X
		Mode	-	●	X	X	X	X
		Current temperature	-	●	X	X	X	X
		Set temperature	-	●	X	X	X	X
		OA temperature	-	●	X	X	X	X
		OA humidity	-	●	X	X	X	X
		Occupancy	-	●	X	X	X	X
Heating	Basic Function	Operation ON/OFF	-	●	●	●	●	X
		Mode	-	●	●	●	●	X
		Water inlet temperature	-	●	●	●	●	X
		Water outlet temperature	-	●	●	●	●	X
		Current temperature	-	●	●	●	●	X
		Set temperature	-	●	●	●	●	X
		Hot water ON/OFF	-	●	●	●	●	X
		Hot water current temperature	-	●	X	X	●	X
	Hot water set temperature	-	●	●	●	●	X	
			Hard Lock	-	●	●	●	X
		Solar heat temperature	-	●	●	●	X	X
	Error information	Error	-	●	●	●	●	X
Chiller	Basic Function	ON/OFF	-	●	● ¹⁾	X	X	X
		Remove Alarm	-	●	● ¹⁾	X	X	X
		Mode	-	●	● ¹⁾	X	X	X
		Cool set temperature	-	●	● ¹⁾	X	X	X
		Heat set temperature	-	●	● ¹⁾	X	X	X
		Ice set temperature	-	●	● ¹⁾	X	X	X
		Outdoor air temperature	-	●	● ¹⁾	X	X	X
		Chilled Water Leaving Temperature	-	●	● ¹⁾	X	X	X
		Chilled Water Entering Temperature	-	●	● ¹⁾	X	X	X
		Entire operation current	-	●	● ¹⁾	X	X	X
		Start standby time	-	●	● ¹⁾	X	X	X
		Motor current limit	-	●	●	X	X	X
		Control valve upper limit	-	●	●	X	X	X
	Demand limit ratio	-	●	●	X	X	X	
Max operation frequency	-	●	●	X	X	X		
	Error information	Error description	-	●	●	●	●	X
DI	Basic Function	Status	-	●	X	X	●	X
DO	Basic Function	Operation	-	●	X	X	X	X
Exp. DI	Basic Function	Status	-	●	●	X	X	X
	Error information	Error	-	●	●	X	X	X
Exp. DO	Basic Function	Operation	-	●	●	X	X	X
	Error information	Error	-	●	●	X	X	X
Exp. AI	Basic Function	Status	-	●	X	X	X	X
	Error information	Error	-	●	X	X	X	X
Exp. AO	Basic Function	Operation	-	●	X	X	X	X
	Error information	Error	-	●	X	X	X	X

● : Applied, X : Not Applied




1) ISC2 (inverter scroll Chiller 2) only

2.1 Product Feature

Product	Model			AC Manager 5		ACP 5		
	Image			 PACM5A000		 PACP5A000		
	Fuction			Local	Local	BACnet (IP)	Modbus (TCP)	Lonworks
Outdoor unit	Basic Function	Outdoor unit capacity control	-	●	●	X	X	X
		Smart load control(SLC) setting	-	●	●	X	X	X
		Low noise mode	-	●	●	●	X	X
		Defrost mode	-	●	●	●	X	X
		ODU Refrigerant Noise Reduction setting	-	●	●	●	X	X
		Priority operation mode	-	X	●	●	X	X
		Cycle monitor	-	●	●	●	X	X
Air purifier	Basic Function	Operation ON/OFF	-	●	●	●	X	X
		Mode	-	●	●	●	X	X
		Speed	-	●	●	●	X	X
		Operation Lock	-	●	●	●	X	X
		Air quality sensor level	-	●	●	X	X	X
		Filter repacement alarm	-	●	●	X	X	X
		Filter remain	-	●	●	X	X	X
	Error information	Error	-	●	●	X	X	X

● : Applied, X : Not Applied

2.1 Product Feature

Product	Model		AC Smart 5			AC Ez Touch	AC Ez	
	Image		 PACS5A000			 PACEZA000	 PQCSZ250S0	
	Fuction		Local	BACnet (IP)	Modbus (TCP)	Local	Local	
Outdoor unit	Basic Function	Outdoor unit capacity control	-	●	X	X	X	X
		Smart load control(SLC) setting	-	●	X	X	X	X
		Low noise mode	-	●	●	X	X	X
		Defrost mode	-	●	●	X	X	X
		ODU Refrigerant Noise Reduction setting	-	●	●	X	X	X
		Priority operation mode	-	●	●	X	X	X
		Cycle monitor	-	●	●	X	X	X
Air purifier	Basic Function	Operation ON/OFF	-	●	●	X	X	X
		Mode	-	●	●	X	X	X
		Speed	-	●	●	X	X	X
		Operation Lock	-	●	●	X	X	X
		Air quality sensor level	-	●	X	X	X	X
		Filter repacement alarm	-	●	X	X	X	X
		Filter remain	-	●	X	X	X	X
	Error information	Error	-	●	X	X	X	X

● : Applied, X : Not Applied

2.1 Product Feature

2.1.2 Function Description

Function	Description
Schedule	Schedule is the function to designate the device operation in advance and let the device perform the operation reserved at certain time. When you use this function, you can efficiently manage the device operation in time unit for excellent energy saving effect.
Interlocking	Interlocking is a function which interlocks more than one device and then controls output movements when the input conditions are met. In order to operate interlocking, you shall arrange the devices to be interlocked in a single pattern and then apply the control setting.
Time limit control	The time-limit operation is to limit the amount of time the devices are running individually. By setting the device operation time in advance, you can control for how long a device works and have it stop automatically.
Energy Usage	It describes the method to check the device's operation time, electricity usage amount, electricity usage amount(total amount over time), gas usage amount, TOE, and CO ₂ with values and graph.
Energy Navigation	Energy Navigation is the function that can control [ODU capacity]/[IDU Operation Rate]/[IDU] for each level according to the power usage amount forecast and current power usage amount to be able to manage the monthly power usage amount below the target amount.
Peak control	Peak control is a function to set the target operation rate to limit the maximum power usage and to control total power usage not to exceed the target operation rate. To prevent total power usage from exceeding target operation rate, cooling mode is automatically converted to wind only mode according to the priority and heating mode automatically stops, so the power usage amount can be saved.
Operation history	You can view user/automatic control's operation history and the connected device's status change or error status.
Energy navigation history	You can view history of Energy Navigation alarm and control operation.
Operation trend	By providing a change in the past state of the device, it can help you plan a reasonable site operation.
Cycle	You can view indoor/outdoor unit's cycle information.
2SET (Dual Setpoint)	User can set two different Set temperature, for Cooling and Heating, so as to keep the proper room temperature, by switching the operation mode automatically.
AutochangeOver	It is a function to automatically switch to cooling operation if indoor temperature exceeds upper limit temperature, to heating operation if it is less than lower limit temperature, and to wind only operation if it is between upper limit temperature and lower limit temperature. (supported only in outdoor unit with both cooling/heating)
Setback	It is a function to maintain the temperature of the space where the device is installed in certain boundary. (Only supported by cooling/heating simultaneous type outdoor unit)
Occupied	It is a function to set the space with the corresponding indoor unit as occupied or empty.
SmartCare	You can check the number of indoor units in smart care operation and the monthly energy saving rate through the AI operation status.
Comfortable power saving	The comfort power saving is the function to automatically control the cooling strength to maintain the pleasant feeling without turning off the product after the indoor temperature reached the desired temperature. (Only when indoor unit is in cooling operation, Comfortable Power Saving control is possible.)
Human detection	<p><Wind direction></p> <p>1) Direct : Direct wind operation based on human detection. 2) Indirect : Indirect wind operation based on human detection.</p> <p><Saving operation></p> <p>1) ON/OFF learned power saving : If it is not detected for setting time, the product is turned off for power saving. 2) Temperature power saving : If it is not detected for setting time, the product controls the desired room temperature for power saving.</p> <p>* "On/Off learning power saving" and "Temperature power saving" cannot be used at the same time * "Human detection Direct wind" and "Human detection indirect wind" cannot be used at the same time (Only for human detection mode supporting indoor unit)</p>
Outdoor temperature combination operation	Activates/deactivates control based on outdoor temperature. (Supported for certain indoor and outdoor units only)
CO ₂ concentration	It shows the CO ₂ concentration information of the registered total ventilation.
Comfort	It shows the comfort level information of all registered indoor units.
Air Purify	It shows the total state information of Air Purify of all registered indoor units and air purifiers.
UV Nano	UVnano is a function that sterilizes fans or filters using UV LEDs at regular intervals during air conditioning operation.
Slave controller lock	set whether slave controller control is possible for indoor unit with all lock set.
e-mail error notice	it is a function to send the error occurred device's address and error No. through e-mail.
Drawing View	It is a function that can efficiently manage the system by matching the device with the actual drawing of the site.
Daylight Saving time	By setting the start and end dates for Daylight Saving Time application, if the current date is within the period, the current time is adjusted by -1 hour, and if it is outside the period, the current time is adjusted by +1 hour.
Outdoor Unit Oil-Return Operation	Set whether to run Outdoor Unit Oil-Return Operation Set outdoor unit oil recovery to Concurrent/Sequential operation. - Concurrent operation: Operates outdoor unit oil recovery at the same time. - Sequential operation: Operates outdoor unit oil recovery sequentially at a 10-minute interval

2.1 Product Feature

2.1.3 Compatibility List

■ Compatibility between Controllers

Slave (B) Master (A)	AC Ez	AC Ez Touch	AC Smart 5	ACP 5	PDI	Cloud Gateway
AC Ez	●	X	X	X	X	X
AC Ez Touch	●	●	X	X	●	X
AC Smart 5	●	●	●	X	●	X
ACP 5	●	●	●	X	●	X
PDI	X	X	X	X	X	X
Cloud Gateway	●	X	X	X	X	X

■ Compatibility with Integrator

Controller Integrator	AC Ez	AC Ez Touch	AC Smart 5	ACP 5	PDI	Cloud Gateway
AC Manager 5	X	X	●	●	X	X

■ Connectable Indoor units count

Product	Max. No. of IDUs	Possible IDU Address	Max. No. of ERV Units	Possible ERV Address	Max. No. of A/C+ERV	Max. No. of AHU	Possible AHU Address	Max. No. of Chiller
AC Ez	32	00-FF	32	00-FF	32	NA	-	NA
AC Ez Touch	64	00-FF	64	00-FF	64	NA	-	NA
AC Smart 5	128	00-FF	128	00-FF	128	16	00-1F	5 ¹⁾
ACP 5	256 ²⁾	00-FF	256 ²⁾	00-FF	256 ²⁾	16	00-1F	10 ¹⁾
PDI Standard	128	00-FF	-	-	128	NA	-	NA
PDI Premium	128	00-FF	-	-	128	NA	-	NA
Cloud Gateway	16	00-0F	-	-	16	NA	-	NA







1) It is not supporting BMS.

2) It is recommended to connect up to 64 units to one RS-485 port.

Communication speed delay may occur if connecting more than 128 units to one RS-485 port.

2.1 Product Feature

■ Compatibility with Product

Model				AC Ez	AC Ez Touch	AC Smart 5	ACP 5	AC Manager 5	Cloud Gateway	
Image										
Function										
Level1	Level2	Level3	Level4	PQCSZ250S0	PACEZA000	PACS5A000	PACP5A000	PACM5A000	PWFMDB200	
Device	Air conditioner	-	-	●	●	●	●	●	●	
	Ventilation	ERV	-	●	●	●	●	●	●	
		ERV DX	-	●	●	●	●	●	●	
		Floor mounted vent	-	X	X	●	●	X	X	
	Heating	-	-	X	●	●	●	●	● ²⁾	
	AHU	Normal	-	X	X	●	●	●	●	X
		All outside air device	-	X	X	●	●	●	●	X
		Multi-fan general	-	X	X	●	●	●	●	X
		Multi-fan all outside air unit	-	X	X	●	●	●	●	X
		DOAS(AR-DE)	-	X	X	●	●	●	●	X
		DOAS(AR-DR)	-	X	X	●	●	●	●	X
		DOAS(AR-ND)	-	X	X	●	●	●	●	X
		Comm. Kit(SA)	-	X	X	●	●	●	X	X
		Split DOAS (ARND/DB)	-	X	X	●	●	●	X	X
		Split DOAS (ARND/DC)	-	X	X	●	●	●	X	X
	Chiller	scroll Chiller (Air Cooling)	-	X	X	●	●	●	●	X
		scroll Chiller (Water Cooling)	-	X	X	●	●	●	●	X
		Turbo Chiller	-	X	X	●	●	●	●	X
		Absorption Chiller	-	X	X	●	●	●	●	X
		Screw Chiller	-	X	X	●	●	●	●	X
	IO Module	ACS IO	-	X	X	●	●	●	●	X
		ACU IO	-	X	X	●	●	●	●	X
	Digital Output	The number of ports	-	X	X	2	4	X	X	
	Digital Input	The number of ports	-	X	1	2	10	X	1	
Commercial Air purifier	-	-	X	X	●	●	X	X		

● : Applied, x : Not Applied

1) Energy save mode

2) Only for Therna V

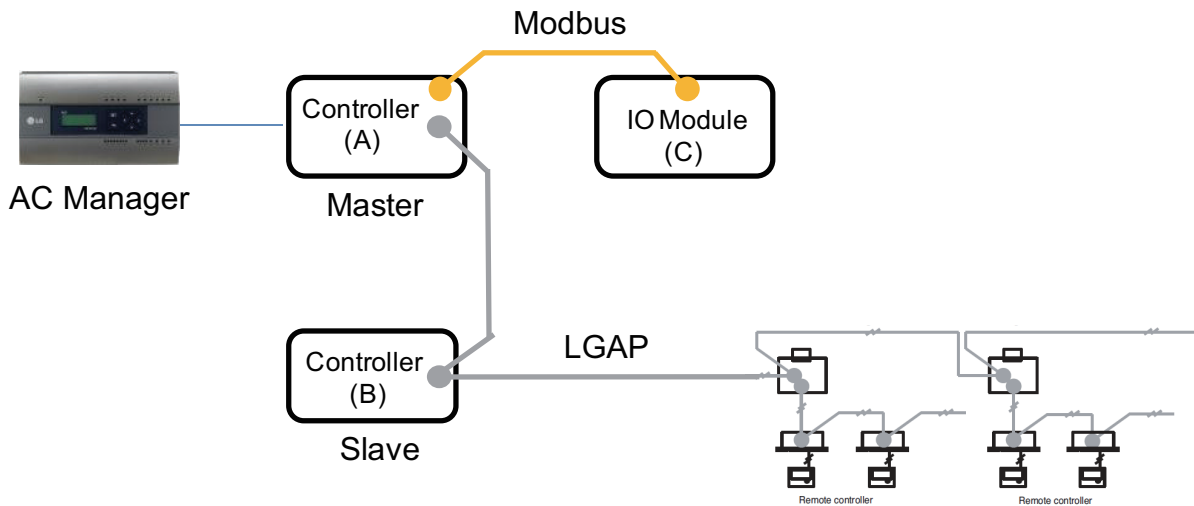
2.1 Product Feature

■ Compatibility with ACS IO Module

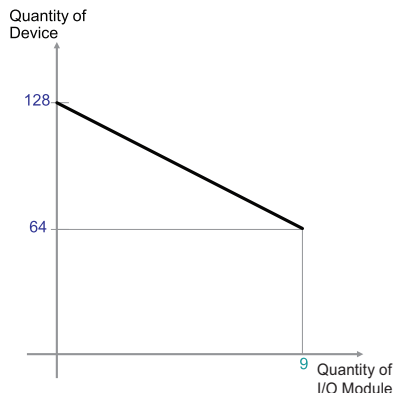
1) ACS IO Module linkable

Controller \ IO Module (C)	AC Ez	AC Ez Touch	AC Smart 5	ACP 5	Cloud Gateway
ACS IO Module	X	X	●	●	X

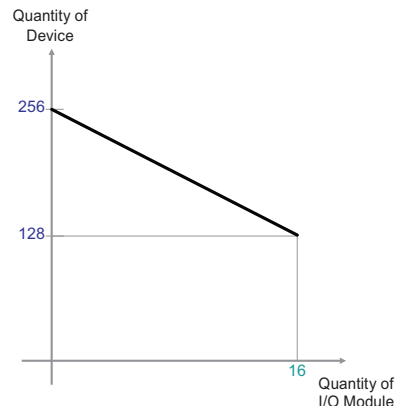
● : Applied, X : Not Applied



2) Maximum number of linkable devices



<AC Smart>



<ACP>

* Devices: Indoor units, Heating, ERV, DI/DOs, DOKITs, AHUs

※ If more details, please refer to the manual of its product.

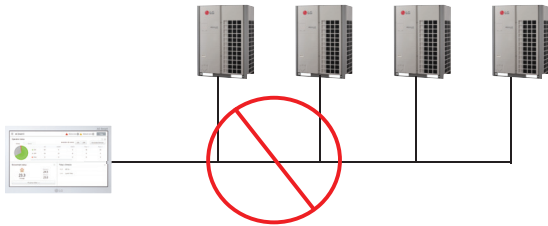
2.2 Example of installing

■ BUS wiring

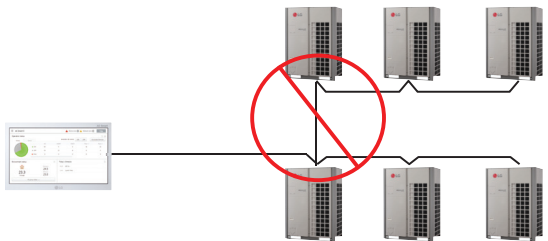
- BUS wiring is required for LGAP communication

Wrong wiring (Star Wiring)

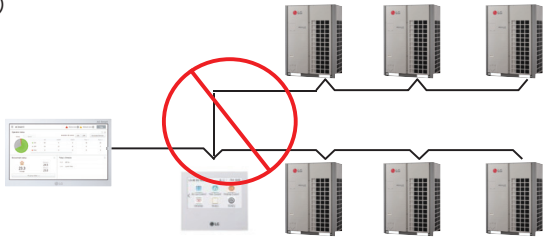
①



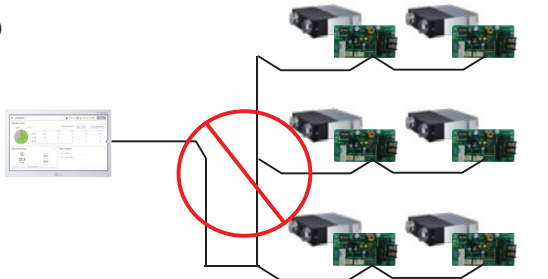
②



③

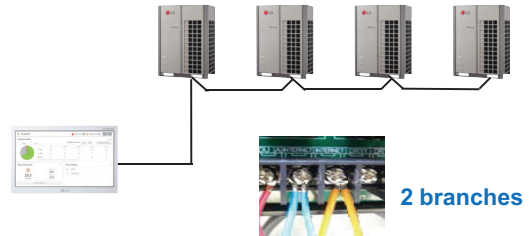


④

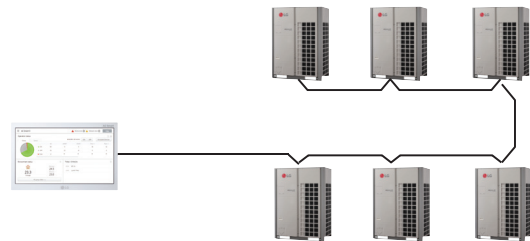


Right Wiring (Bus Wiring)

①



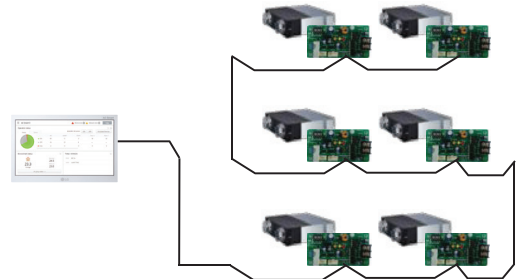
②



③



④

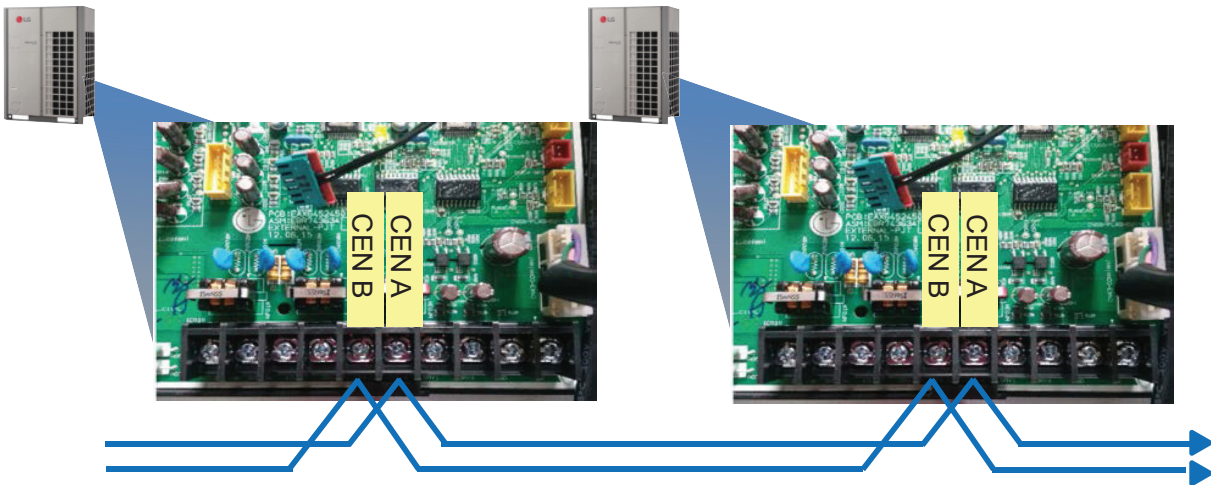


2.2 Example of installing

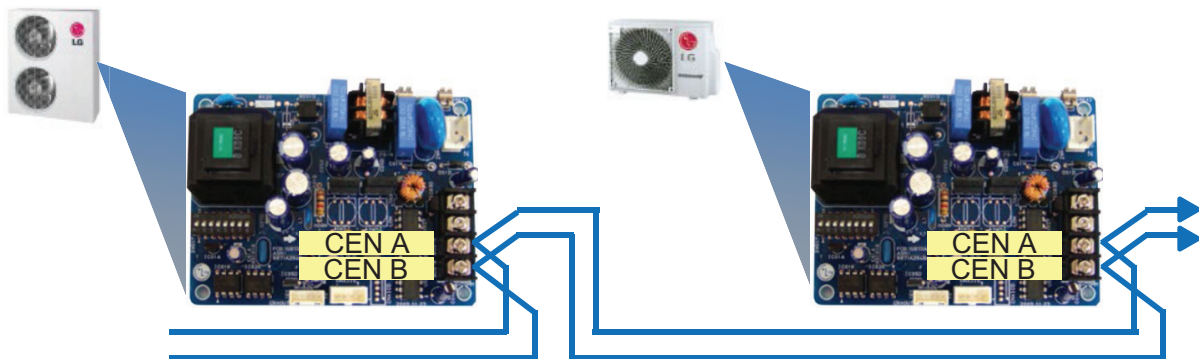
■ 485 Communication Port

- BUS wiring is required for LGAP communication
- Checking disconnection/short/polarity of cable
- PI485 G/W Setting for Multi/Single & ERV
- ※ Be careful not to confuse the CEN A and B terminals.

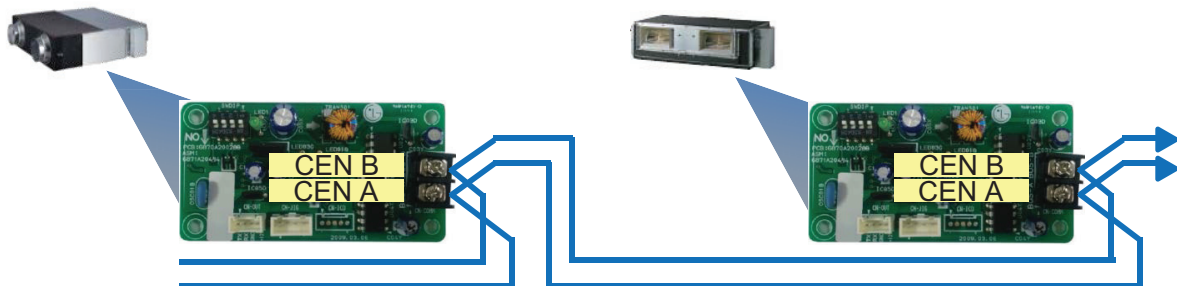
Multi V



Multi/Single(ODU connection type)



ERV/Single(IDU connection type)

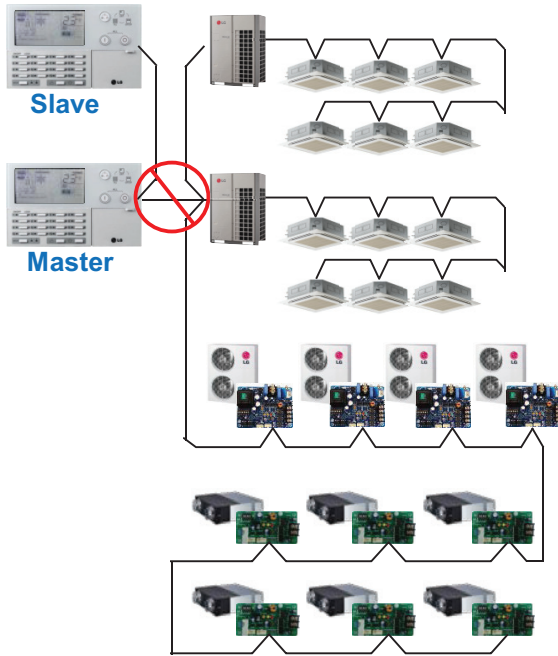


2.2 Example of installing

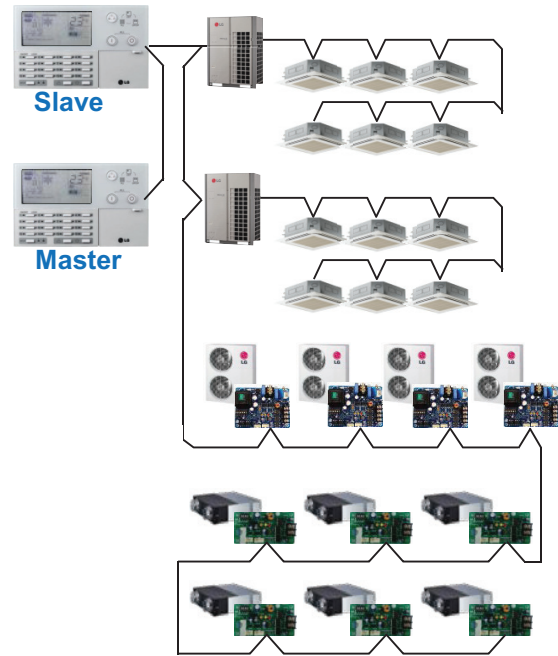
■ Comm. wiring case - AC Ez + AC Ez

BUS wiring is required for RS485 communication.

Wrong wiring



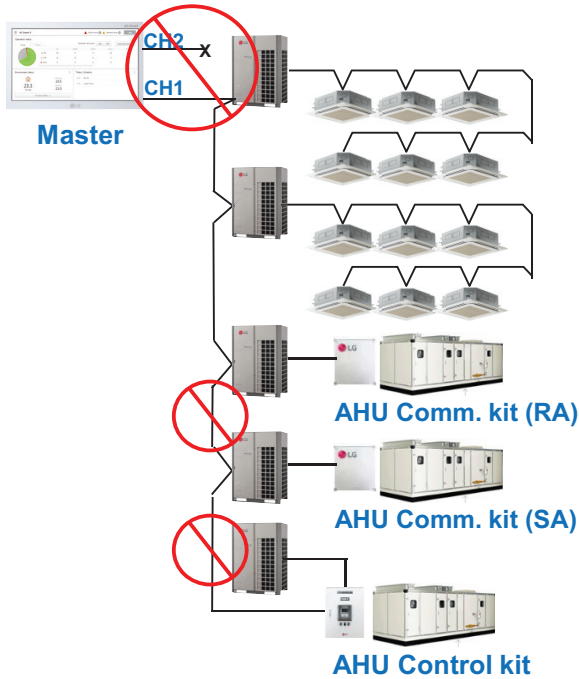
Right Wiring



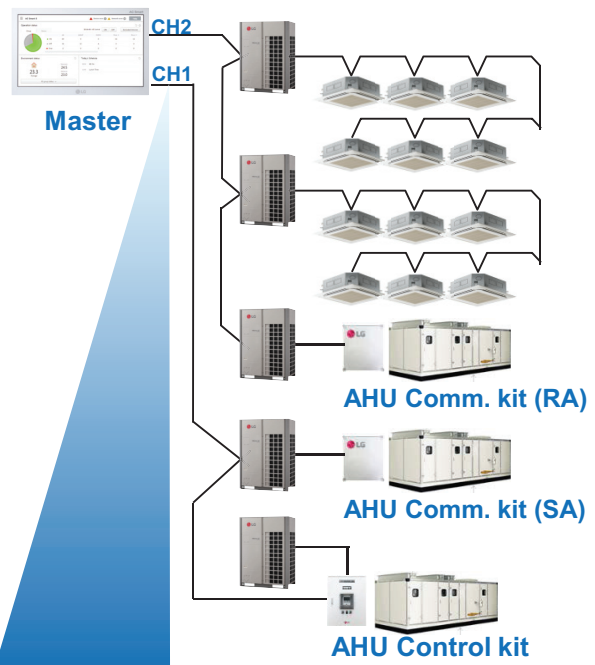
■ Installation case - AC Smart 5 with AHU

LGAP and Modbus communication lines should be separated.

Wrong wiring



Right Wiring



- CH1 : LGAP(AHU) or Modbus(AHU Comm. Kit(SA), AHU, Chiller, ACS IO)
- CH2 : IDU, ERV, DX ERV, Hydro kit, AHU Comm. Kit(RA)

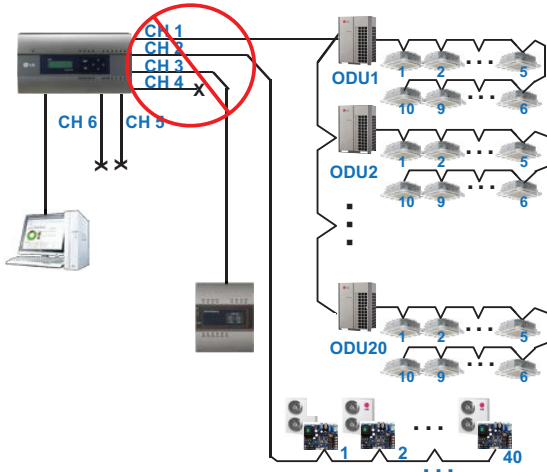
2.2 Example of installing

Installation case - ACP 5 + ACS IO

Modbus communication lines should not be connected to ports 1-4.

Wrong wiring

CH1 : 20 ODU x 10 IDU
CH2 : 40 PI485(Single)

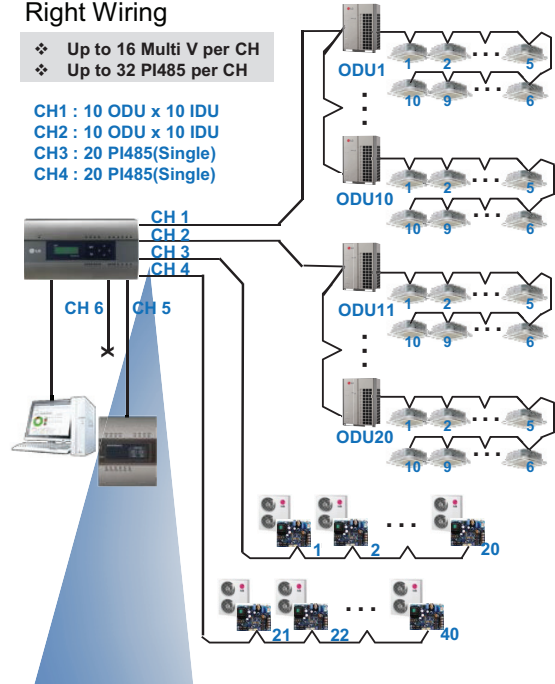


- As the number of ACS IO modules increases, the number of controllable units decreases.

Right Wiring

❖ Up to 16 Multi V per CH
❖ Up to 32 PI485 per CH

CH1 : 10 ODU x 10 IDU
CH2 : 10 ODU x 10 IDU
CH3 : 20 PI485(Single)
CH4 : 20 PI485(Single)



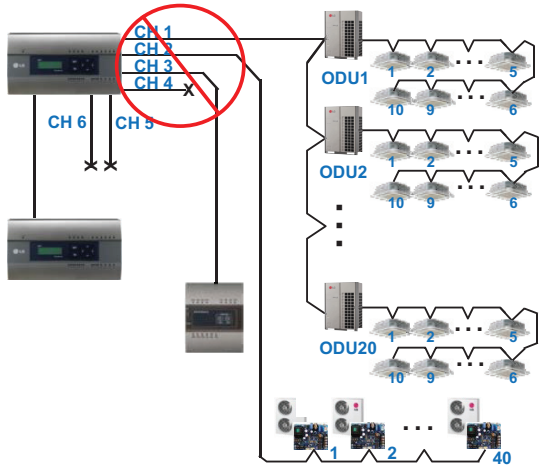
- CH1-4 : IDU, ERV, DX ERV, Hydro kit
- CH5 : LGAP(AHU) or Modbus(AHU, Chiller, ACS IO)
- CH6 : Modbus(AHU, Chiller, ACS IO)

Installation case - AC Manager 5 + ACP 5 + ACS IO

Do not connect too many products to one port of RS485 communication line.

Wrong wiring

CH1 : 20 ODU x 10 IDU
CH2 : 40 PI485(Single)

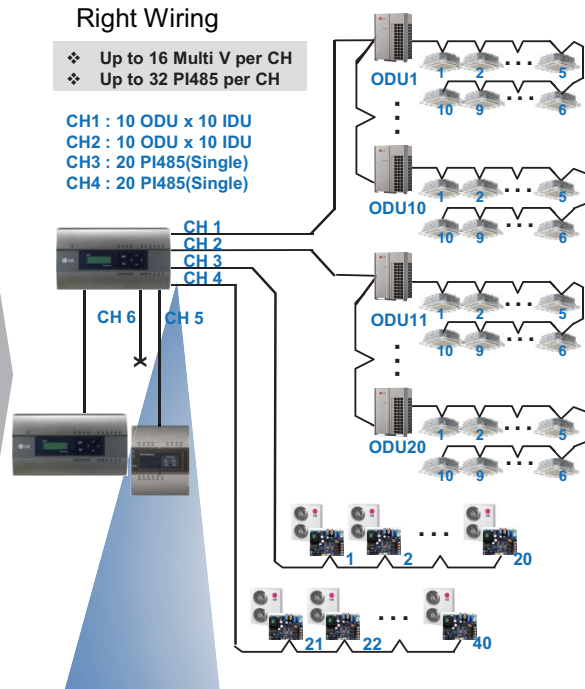


- As the number of ACS IO modules increases, the number of controllable units decreases.

Right Wiring

❖ Up to 16 Multi V per CH
❖ Up to 32 PI485 per CH

CH1 : 10 ODU x 10 IDU
CH2 : 10 ODU x 10 IDU
CH3 : 20 PI485(Single)
CH4 : 20 PI485(Single)



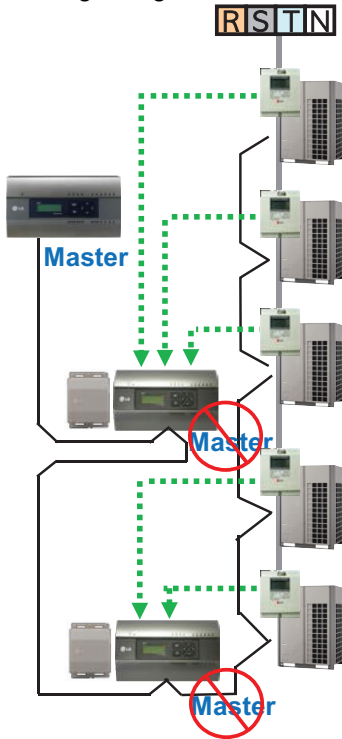
- CH1-4 : IDU, ERV, DX ERV, Hydro kit
- CH5 : LGAP(AHU) or Modbus(AHU, Chiller, ACS IO)
- CH6 : Modbus(AHU, Chiller, ACS IO)

2.2 Example of installing

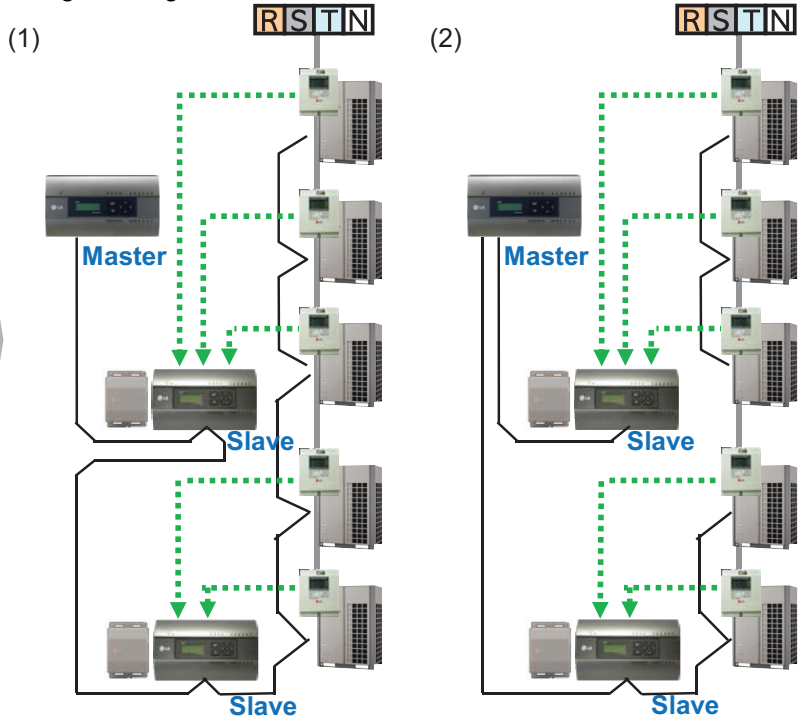
Installation case - ACP 5 + PDI + PDI

There should be only one master controller for one RS485 communication line.

Wrong wiring



Right Wiring

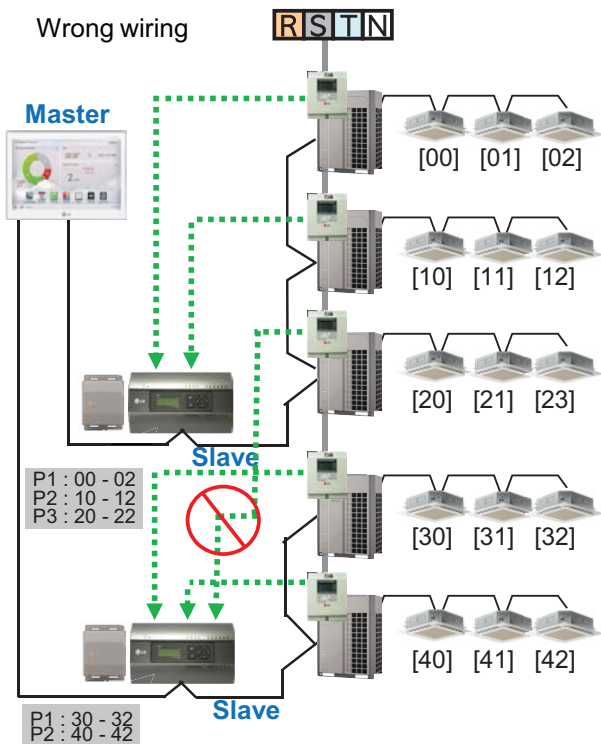


❖ Separate the channels properly. Communication performance is improved.

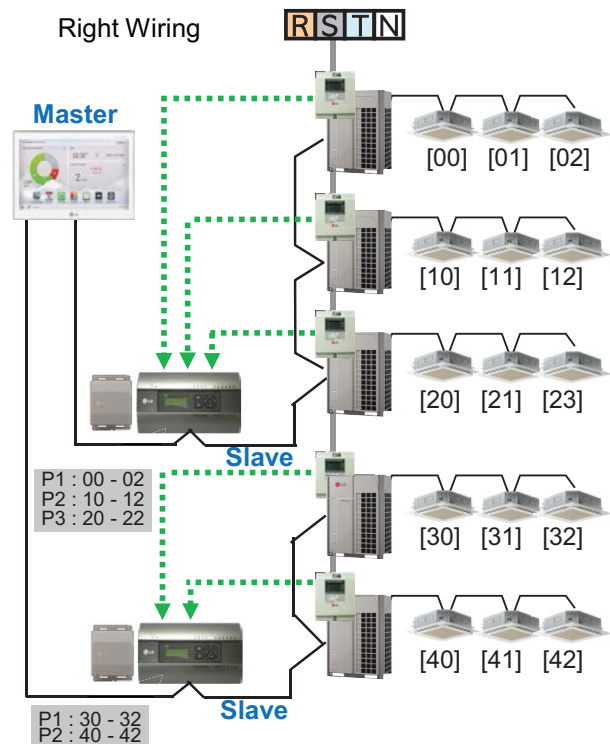
Installation case - AC Smart 5 + PDI + PDI

RS485 communication line and watt-hour meter of the same outdoor unit should be connected to the same PDI.

Wrong wiring



Right Wiring

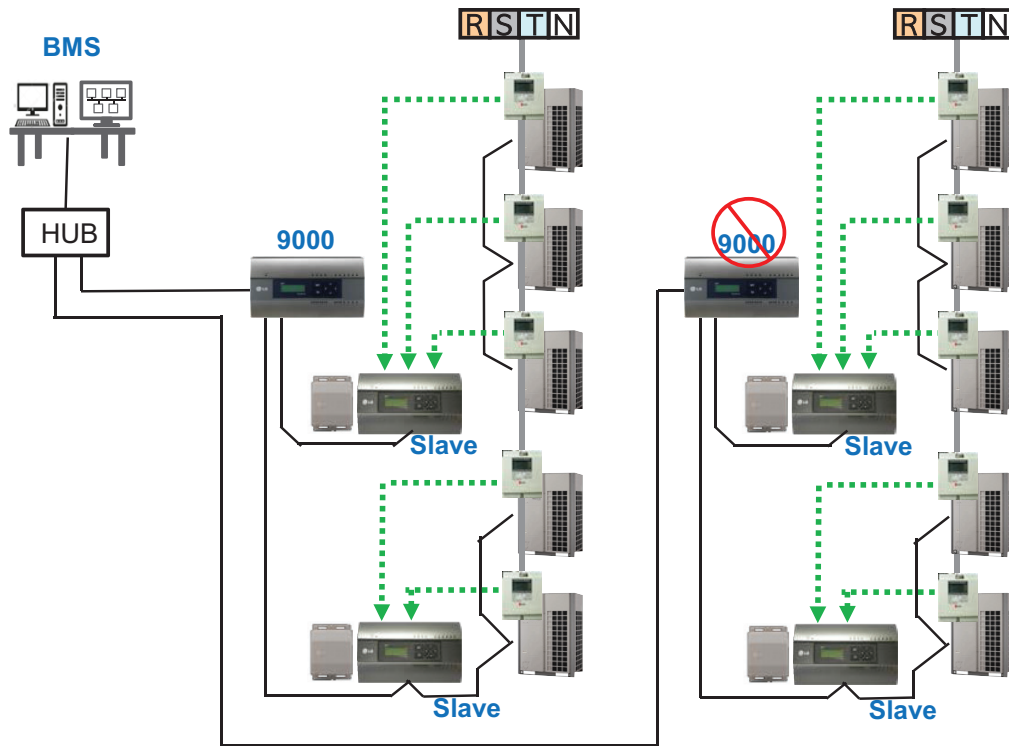


2.2 Example of installing

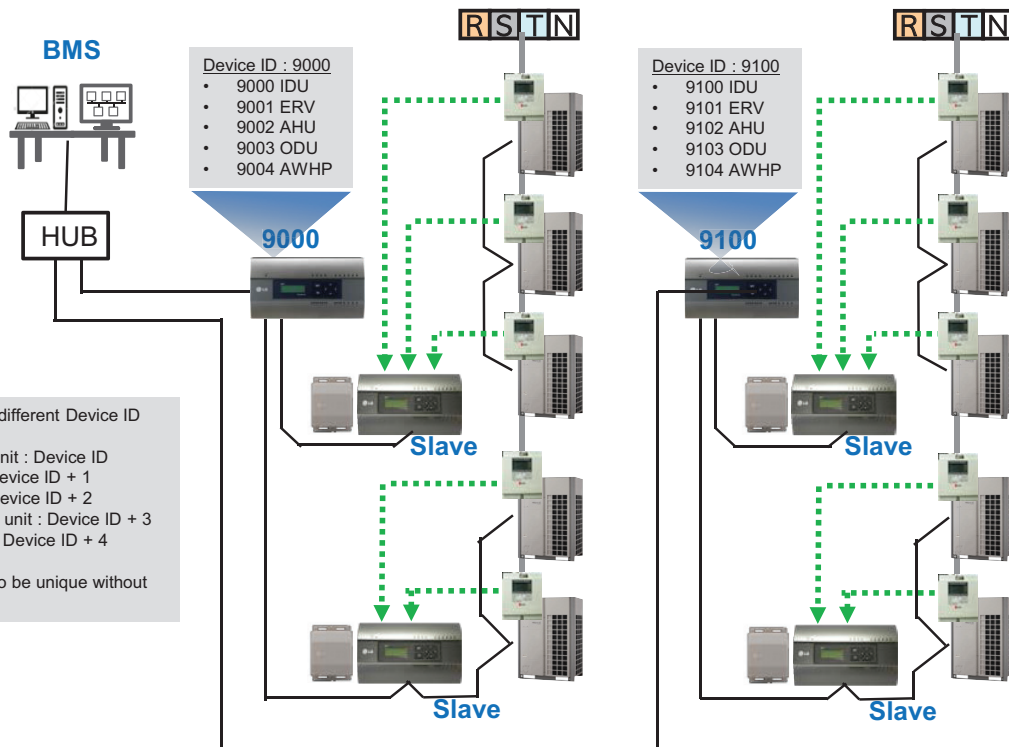
■ Installation case - BMS + ACP 5 + PDI

When multiple ACPs connect to the BMS, they must have different Device IDs.

Wrong wiring



Right Wiring



- ❖ Each Unit type has different Device ID (Default 9000)
 - Indoor unit : Device ID
 - ERV : Device ID + 1
 - AHU : Device ID + 2
 - Outdoor unit : Device ID + 3
 - AWHP : Device ID + 4
- ❖ Change Device ID to be unique without duplication.

2.3 Product Description

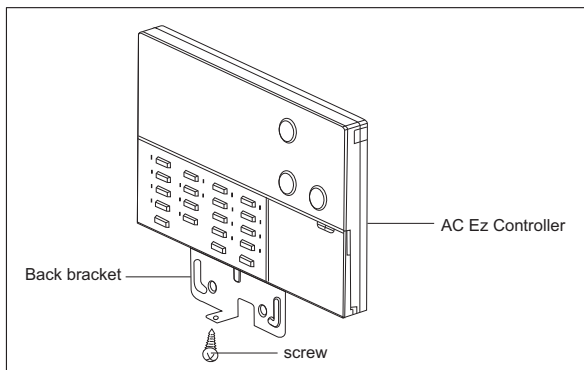
2.3.1 AC Ez

Model name : PQCSZ250S0

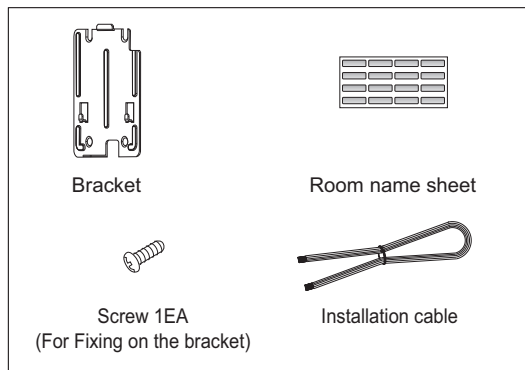
- Apart from On/Off control, operation mode, fan speed, scheduling, additional functions can be displayed and easily controlled.
- Mode control, temperature control etc and monitoring of up to 32 units (Indoor unit & ERV) is possible by Group/Unit.
- Linked control is possible total 8 AC Ez controller can be connected together.
(Max 256 indoor units can be controlled in same time)
- Schedule(8 events per day) function is possible by Group/Unit.

2.3.1.1 Specifications & Dimensions

■ Features



■ Accessory

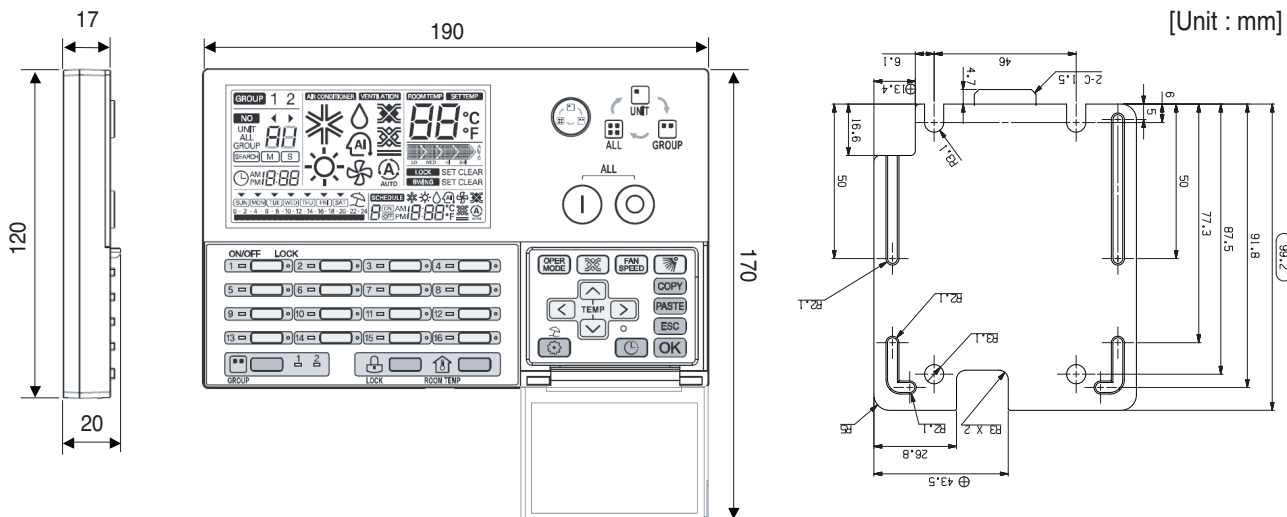


■ Product Specifications

Categories	Specifications
Max. Indoor unit to control	32 indoor units
Individual Control	On,Off / Operation Mode / Fan Speed / Temp. Control
Lock function	Central
Mode change	Cooling / Heating / Fan / Dehumidifications / Auto
Schedule	8 event schedules / day
Ventilation control	On,Off / Ventilation Mode / Fan Speed
Display (All Indoor status indication)	Operation / Set Temp. / Room Temp. / Schedule
Dimensions (mm)	190 x 120 x 17
Power Source	12 V _{DC} , 1A

2.3 Product Description

■ Dimensions



2.3.1.2 Function

Display LCD Screen

- Display the present operation status by each unit
- Operation status/schedule information

Lock status display LED by each unit

On/Off display LED (TOTAL 16EA)

- Display the present operation state by each unit.
- Cool/Dry/Fan : Green.
- Heat : Orange
- Error mode : Red
- Stop : Off

Control Range button

- UNIT : Individual indoor unit
- GROUP : Connected indoor units of corresponding group
- ALL : Connected indoor units of all groups (same type product only)

Detail Control & Setting Panel

- Mode/Fan/Ventil mode control
- Installation / Schedule / Time setting

Group Select button
Change control and display group

Individual On/Off button

Lock Set/Clear button

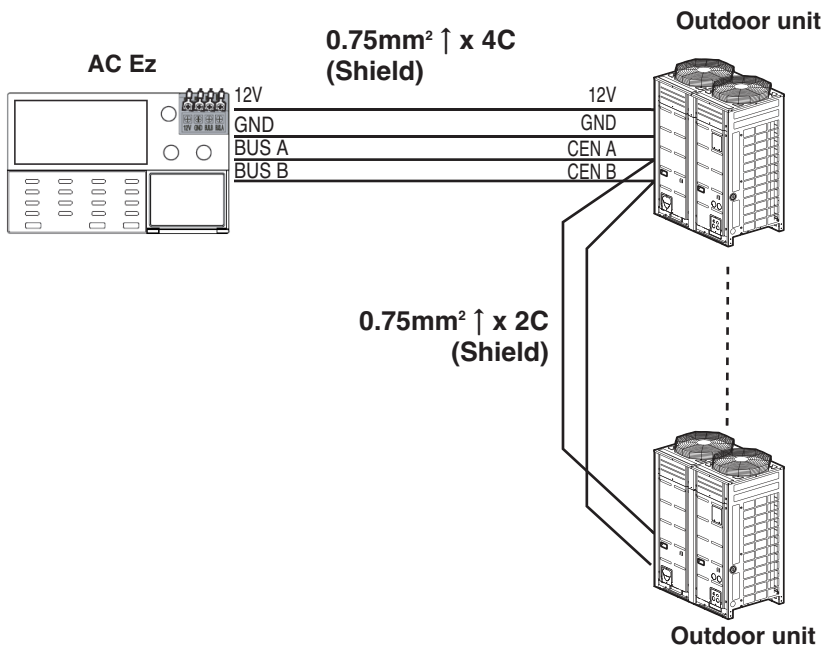
Room Temp. Display button

2.3 Product Description

Control panel	Display screen	Description
		Control select button : Adjusts selected indoor unit range.
		Total On/Off button : Turns the power on/off condition of selected indoor units.
		Individual On/Off button : Turns the power on/off condition of individual indoor unit.
		Group selection button : Change control and display group
		Lock set/clear button : Turns the lock set/clear
		Room temperature button : Display the room temperature
		Operation mode button : Change operation mode of air conditioner
		Ventilation mode button : Change ventilation mode of ventilator
		Fan speed button : Change fan speed
		Air flow button : Turns swing set/clear of air flow
		Set temperature button : Change desired operation temperature of air conditioner
		Indoor select button : Select desired indoor unit to control
		Function setting button : Enter installation mode to installation setup
		Current time setting button : Setup the current time
		Schedule setting button : Enter the schedule setup mode to setup desired schedule
		Schedule copy button : Copy former set schedule
		Schedule paste button : Paste copied schedule
		Esc button : Cancel the changed content
		OK button : Setup the changed content
		Holiday setting button : Turns holiday schedule application set/clear

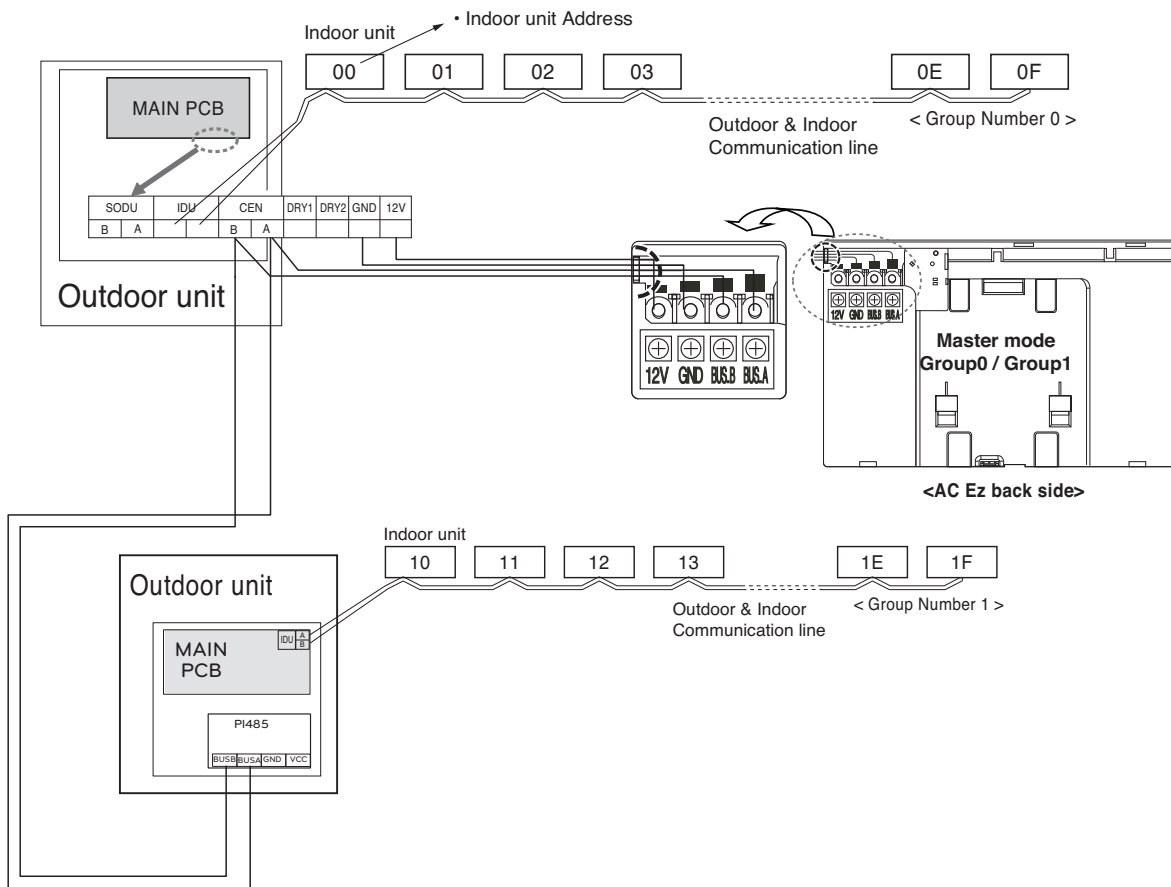
2.3 Product Description

2.3.1.3 Field Wiring Diagram



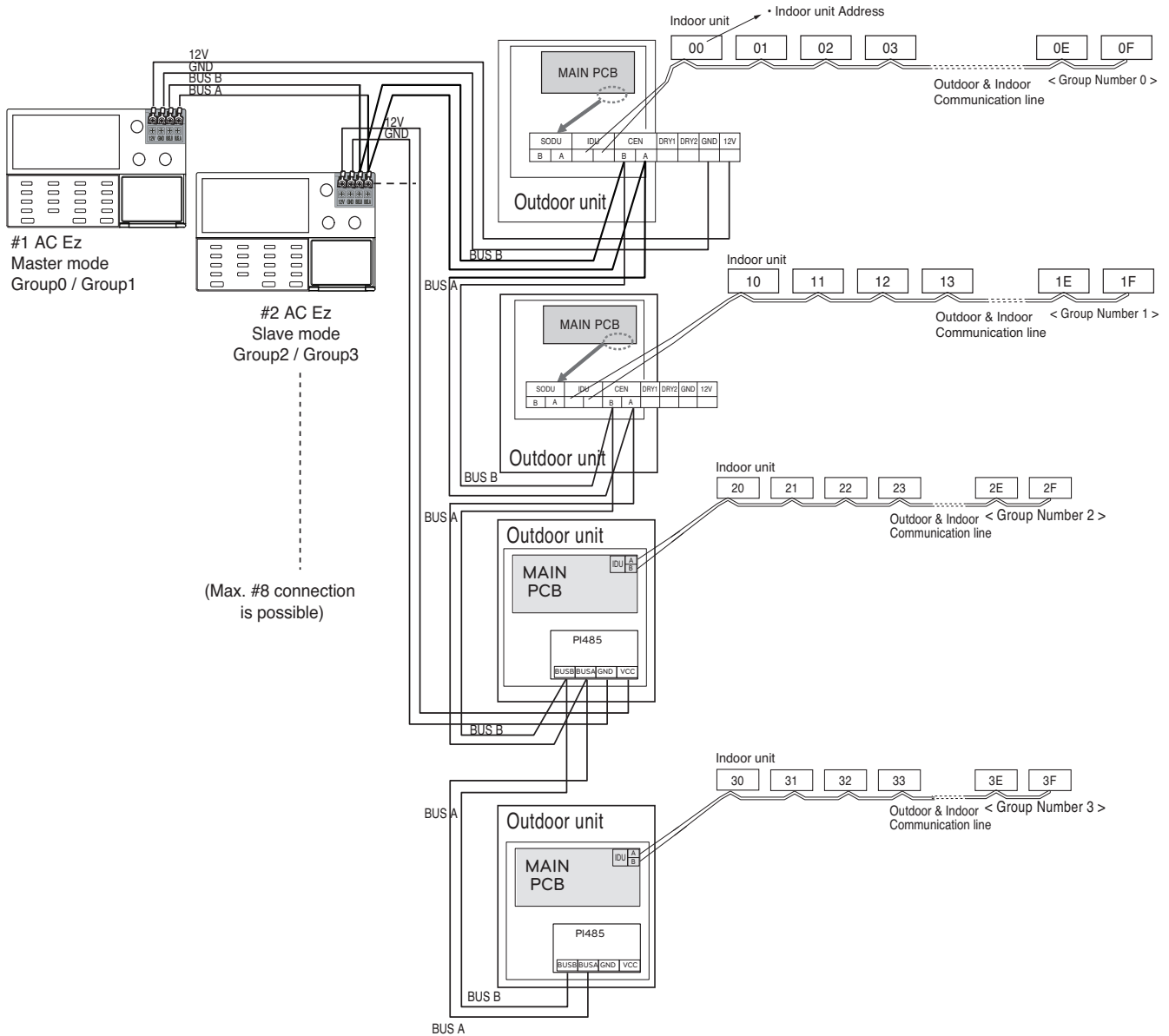
- 32 indoor units at maximum can be connected to one AC Ez.
- When there are many outdoor units to connect, connect the outdoor units with the BUS form. Otherwise, the simple central controller may cause the malfunction.
- The following figure shows the example for connecting with the BUS form.

■ One AC Ez Connection



2.3 Product Description

■ 2 or more AC Ez Connection



2.3 Product Description

Installer Setting Code Table

No.	Function	Code	Value
1	Master/Slave Setting	1	<input type="checkbox"/> M : Master <input type="checkbox"/> S : Slave
2	Group 1 product Select	2	Air conditioner / Ventilator
	Group Number Setting		0~F : Group Address - : No use of this group
3	Group 2 product Select	3	Air conditioner / Ventilator
	Group No. Setting		0~F : Group Address - : No use of this group
4	Indoor units searching (Master controller only)	4	Indoor unit searching
5	°C / °F setting	5	°C : Celsius
			°F : Fahrenheit

! NOTE

In each installation mode, if you press the **OK** button, it is operated or saved current setting condition. If you press the **ESC** button, it is returned before setting condition and exits from installation mode.

	Item	Control	Schedule
Air conditioner	ON/OFF	0	0
	Operation mode	0	0
	Set temp	0	0
	Fan speed	0	-
	Swing	0	-
	Lock	0	-
Ventilation (ERV/ERV DX)	ON/OFF	0	0
	Mode	0	0
	Co-Air conditioner	0	0
	Set temp	0	0
	Fan speed	0	-
	Lock	0	-

2.3 Product Description

Schedule display

By setting schedule day, it indicates schedule overview of the day and executed next schedule time as same as following figure.



Schedule Priority

If two more schedules are setup at the same time, it operates higher priority schedule. Lower number schedule has higher priority.



Ex) In case of the same schedule time of schedule 1 and 2, as the schedule time of schedule 1 has higher priority than schedule 2, corresponding indoor unit will stop the operation at AM 11:00.

Schedule caution

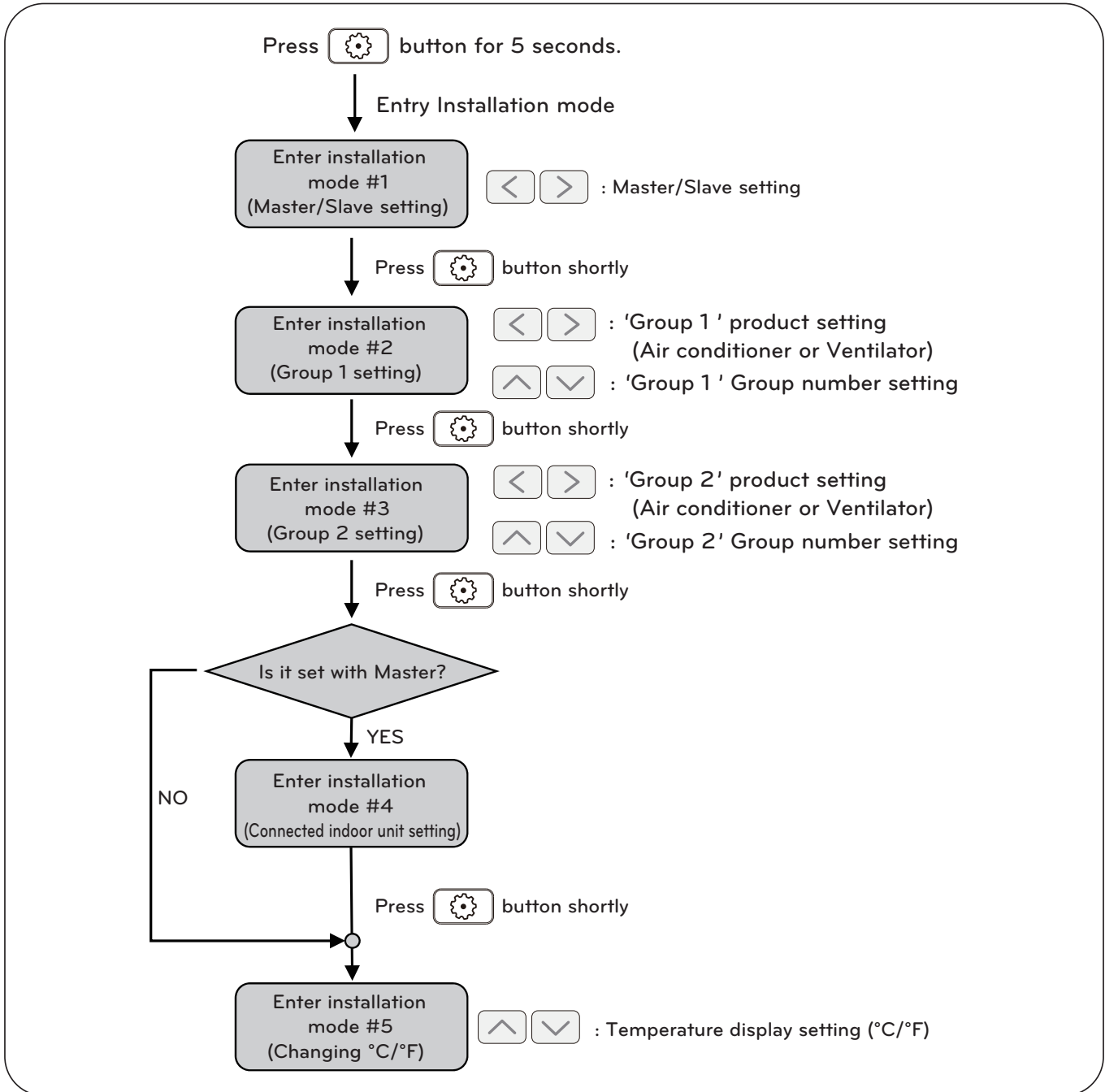
During executing schedule(s), Indoor units doesn't take any other command for several minutes (Remote controller and AC Ez may not operate normally during this period.)

During the Blackout

1. If a blackout lasts longer than 2 hours, the already set schedule will not be executed after the blackout. (The current time must be set again.)
2. During the blackout, the set schedule will not be executed.

2.3 Product Description

Flow chart for Installer setup mode



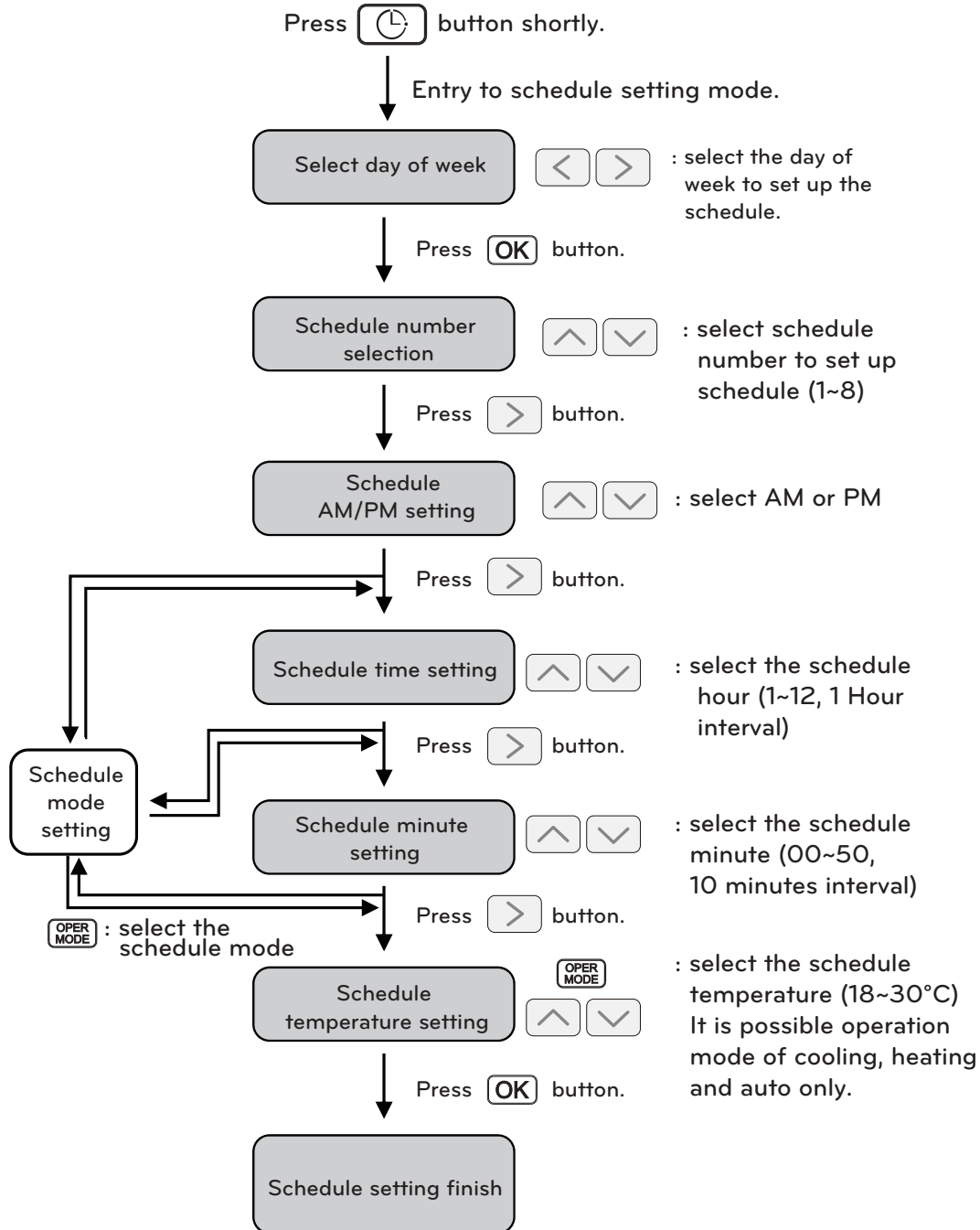
NOTE

In each installation mode, if you press the **OK** button, it is operated or saved current setting condition. If you press the **ESC** button, it is returned before setting condition and exits from installation mode.

2.3 Product Description

Flow chart for schedule setting

• Schedule setting



NOTE

• If you press button, the schedule setting condition is changed back to previously configured condition and it exits from schedule setting mode.

2.3 Product Description

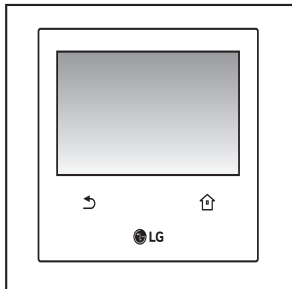
2.3.2 AC Ez Touch

Model name : PACEZA000

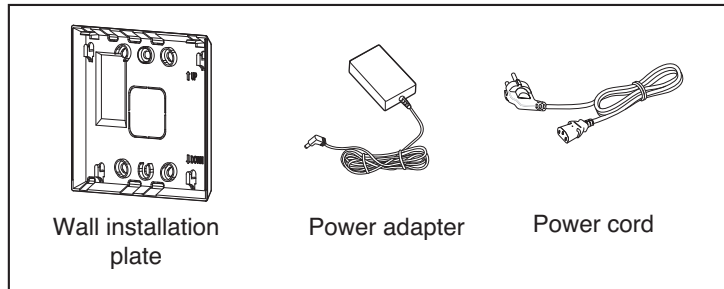
- AC Ez Touch is a central controller installed in the management with 5 inch TFT LCD and touch screen for small site.
- Mode control, temperature control etc and monitoring of up to 64 units (Indoor unit, ERV & Hydro kit) is possible by Group/Unit.

2.3.2.1 Specifications & Dimensions

■ Features



■ Accessory



■ Product Specifications

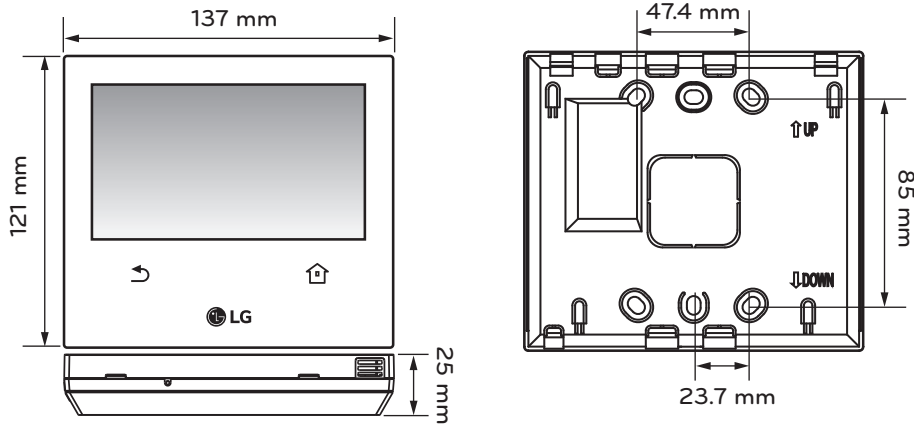
Item	Specification	Etc
Power	12 V _{DC} (Adapter)	-
MCU	ARM® Cortex™-A8 600MHZ	-
RAM	DDR3 2GBIT	-
Flash	2GBIT	-
LCD	5 inch color LCD	-
Touch	C-Type Touch Panel	-
LAN	1Port	100 Mbps
DI/DO	DI 1EA	Max 100 m Dry contact (N/O) For Emergency
RS485	1EA	Max 1 km
Keyboard	Korean/English/Number	-
Size(mm)	137 * 121 * 25	-
OS	Linux	-
IP rating	IP20	-

! NOTE

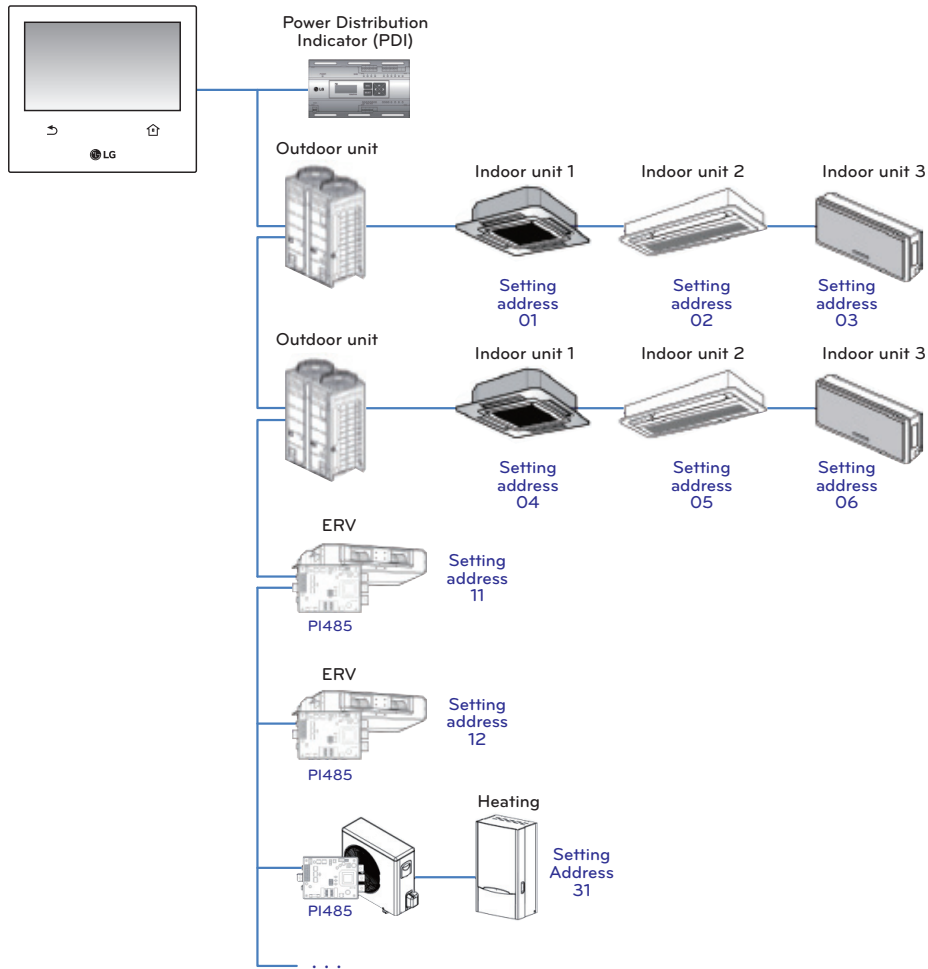
Product specifications may be different depending on the S/W version.

2.3 Product Description

■ Dimensions



2.3.2.2 Field Wiring Diagram



2.3 Product Description

2.3.2.3 Function

■ Access rights for each menu

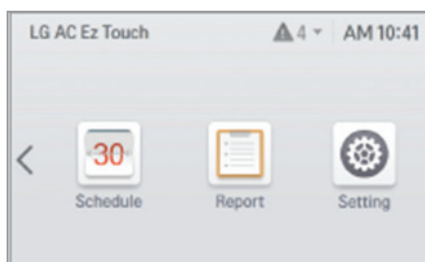
User	Menu
General User	Aircon control, Vent control, Heating Control, Schedule, Report
Manager & Install	Aircon control, Vent control, Heating Control, Schedule, Report, Setting

! NOTE

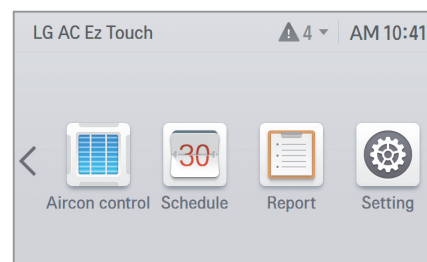
Manager and installer: When it enters the setting, the manger and installer are verified by password.

■ Menu screen

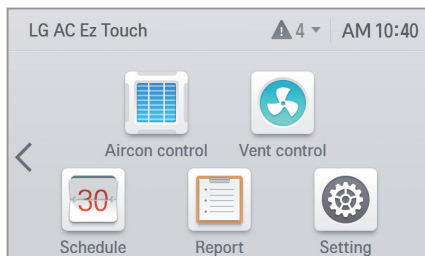
- In case of the menu screen, the location of the menu changes according to the connected product.



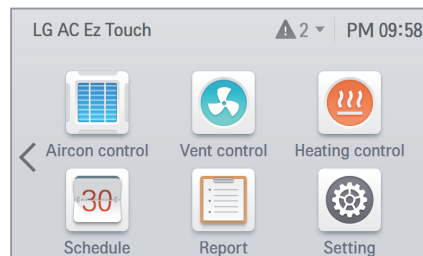
<Empty device>



<In case when Only air conditioner is connected>



<When air conditioner and ventilation are connected>



< When air conditioner, ventilation, Heating are connected>

■ Control screen

Item	Description
Group	On state(Yellow), Off state(Gray)
Individual Air conditioner	Cool(blue), Heat(orange), Fan(green), Dry(dark blue), Auto(purple), Off(Gray)
Individual Ventilation(ERV/ERV DX)	Normal(blue), HEX(orange), Auto(purple), Off(Gray)
Individual Heating device	Cool(blue), Heat(orange), Auto(purple), Off(Gray)

2.3 Product Description

■ Product specification

Product		AC	ERV	DX ERV
Mode		Heat, Cool, Dry, Fan, Auto	Heat exchange, Normal, Auto	Heat exchange, Normal, Auto
Fan speed		Low, Mid, High, Auto	Very High, High, Low, Auto	Very High, High, Low, Auto
Swing		Auto, Cancel	-	-
Lock	Entire	All	All	All
	Individual	Temperature, Mode, Fan speed	-	-
Temperature setting		18~30 °C	-	18~30 °C
		Upper: 16~30 °C Lower: 18~30 °C	-	-
Humidifier setting		-	-	-
Additional function		Function to cancel filter alarm	Power save, Quick, Heater	Power save, Quick, Heater, Humidifier
Air Conditioner		-	-	Cool, Heat, Auto, Off

Product		HEATING			
		AWHP	Heating only	Hydrokit	Cascade
Mode		Heat, Cool, Auto	Heat, Auto	Heat, Cool, Auto	Heat, Auto
Lock	Entire	O	O	O	O
	Individual	X	X	X	X
Hot water		O	O	O	O
Set temperature	Room temp	Cool(18~30 °C, Optionally 16 °C) Heat(16~30 °C)	Heat(16~30 °C)	Cool(18~30 °C, Optionally 16 °C) Heat(16~30 °C)	Heat(16~30 °C)
	Outlet water temp	Cool(5~27 °C) Heat(15~65 °C)	Heat(15~55 °C)	Cool(6~25 °C) Heat(20~50 °C)	Heat(30~80 °C)
	Inlet water temp	30~80°C	30~80 °C	30~50 °C	30~80 °C
Etc		-	-	Hot water + Heating + Cooling	Hot water+Heating

2.3 Product Description

■ Max character

Item	Max character(alphabet/numeric)
Group name	20
Schedule name	50
Indoor unit name	20
Controller of AC Ez Touch name	20
Password	10~16

! NOTE

Allowed special character are. (period) and – (hyphen)

■ Schedule

Item	Description
Maximum schedule number	200
Schedule control setting information	Name, date, time, repeat setting, device, control command

■ Report

Item		Description
Reported information		Error, filter / oil change alarm, energy
Error	Report error history	Supporting view each error report of Air conditioner/ERV/Heating
	Maximum error history storage count	5000
	Maximum error checkable period	1 year
	Error history contents	Date / time / device name / error code / message
Change alarm	Report error history	Supporting view each alarm(filter/oil change) report
	Maximum alarm history storage count	5000
	Maximum alarm history checkable period	1 year
	Alarm history contents	date / time / device name / message
Energy	Report energy history	Supporting power consumption of group / individual equipment.
	Maximum energy history checkable period	4 month
	Energy history contents	Group name(Indoor unit name)/power consumption/accumulated power consumption

2.3 Product Description

■ Energy save mode

The air conditioner energy save mode is turned on, and it repeats the operation state change control in sequence according to the set energy save mode cycle.



[Energy save mode OFF]



[Energy save mode ON]

When [Energy save mode] icon in the Air conditioner control screen is pressed, the energy save mode becomes on.

When the energy save mode is on, the [Energy save mode] icon is lighted in green, and the operation state change control is repeated according to the setting of energy save mode cycle.

* Energy save mode operates the air conditioner only.

- In cooling operation: Cool ↔ Fan, lock all
- In heating operation: Heat ↔ OFF, lock all

- Setting : time setting(5min / 10min / 15min)

Ex) Set 15 min



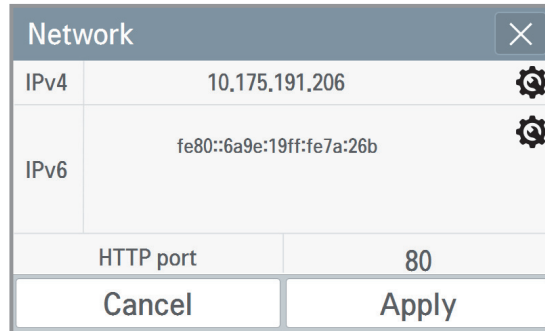
! NOTE

In slave state, you cannot use each equipment's lock setting, set temp range, 2set point, IDU 2set, auto search device function, energy report and energy save mode.

2.3 Product Description

■ Network setting

In this screen, you can save or change the network setting information to use when you wish to connect to ethernet.



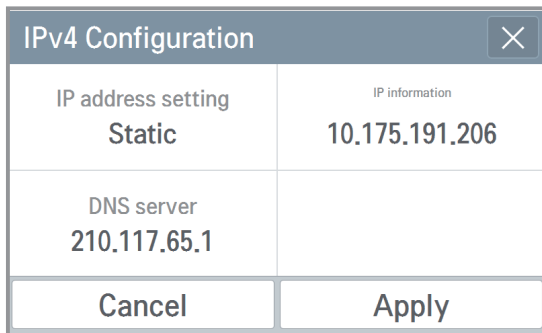
The 'Network' dialog box contains the following information:

IPv4	10.175.191.206	⚙️
IPv6	fe80::6a9e:19ff:fe7a:26b	⚙️
HTTP port		80
Cancel		Apply

1. IPv4 setting

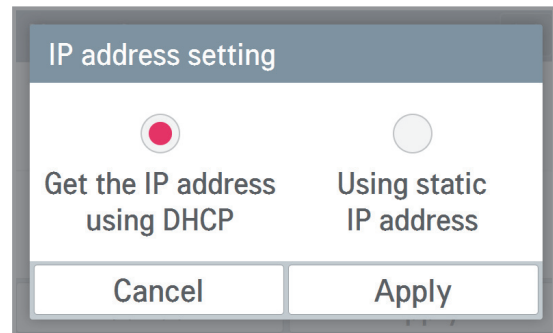
• IP address setting

IP address setting methods are using DHCP to get IP address and designating IP address.



The 'IPv4 Configuration' dialog box contains the following information:

IP address setting	IP information
Static	10.175.191.206
DNS server	
210.117.65.1	
Cancel	Apply



The 'IP address setting' dialog box contains the following information:

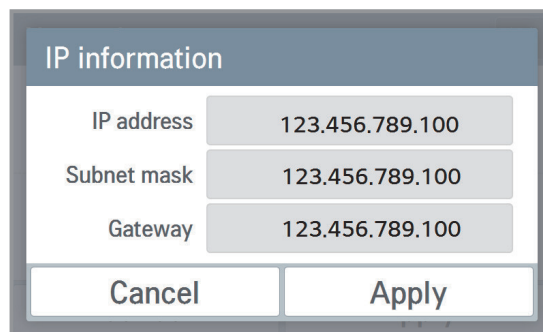
<input checked="" type="radio"/>	<input type="radio"/>
Get the IP address using DHCP	Using static IP address
Cancel	Apply

- Get the IP address using DHCP

You can use DHCP to automatically set dynamic IP in the currently connected internet network. (If it is DHCP, IP information setting category is deactivated.)

- Using static IP address

You can set the network using the user input IP information. If you select the IP address designation, IP information is activated, and you can input the IP information.



The 'IP information' dialog box contains the following information:

IP address	123.456.789.100
Subnet mask	123.456.789.100
Gateway	123.456.789.100
Cancel	Apply

2.3 Product Description

- **DNS server designation**

You can set main DNS / sub DNS address.

The screenshot shows a dialog box titled "DNS Server". It contains two input fields: "Main DNS" and "Sub DNS", both containing the IP address "123.456.789.100". At the bottom, there are two buttons: "Cancel" and "Apply".

2. IPv6 setting

- **IP address setting**

You can assign the IPv6 address using Auto Configuration, DHCPv6, or Manual Setup. When you modify the IP address setting, please contact your Network Administrator.

The screenshot shows a dialog box titled "IPv6 Configuration" with a close button (X) in the top right corner. It is divided into two sections: "IP address setting" and "IP information". Under "IP address setting", there are two options: "Auto Configuration" (selected) and "DNS server". Under "IP information", the IPv6 address "fe80:c6a9e:19ff:fe7a:26b" is displayed. At the bottom, there are two buttons: "Cancel" and "Apply".

The screenshot shows a dialog box titled "IP address setting". It contains three radio button options: "Auto Configuration" (selected), "DHCPv6", and "Manual Setup". At the bottom, there are two buttons: "Cancel" and "Apply".

- **DNS server designation**

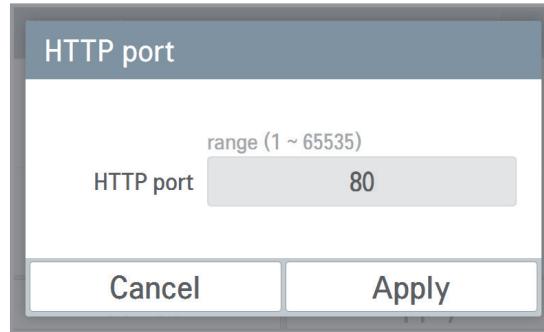
You can set main DNS / sub DNS address.

The screenshot shows a dialog box titled "DNS server". It contains two input fields: "Main DNS" and "Sub DNS", both of which are currently empty. At the bottom, there are two buttons: "Cancel" and "Apply".

2.3 Product Description

3. HTTP port designation

You can change HTTP port setting information for the ethernet connection (for service).
User can freely set HTTP port according to the network environment.
(Input boundary is 1~65535.)



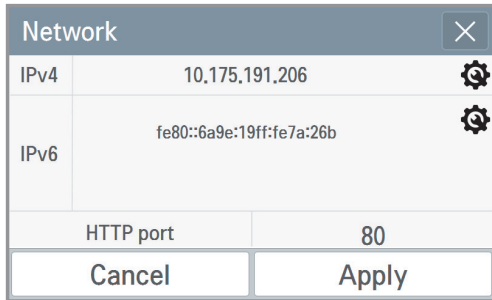
The image shows a dialog box titled "HTTP port". Inside the dialog, there is a text input field labeled "HTTP port" with the value "80" entered. Above the input field, the text "range (1 ~ 65535)" indicates the valid range for the port number. At the bottom of the dialog, there are two buttons: "Cancel" and "Apply".

2.3 Product Description

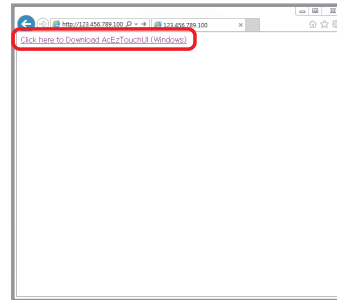
■ PC Access

It supports the function that you can control and monitor connected devices via the web application.

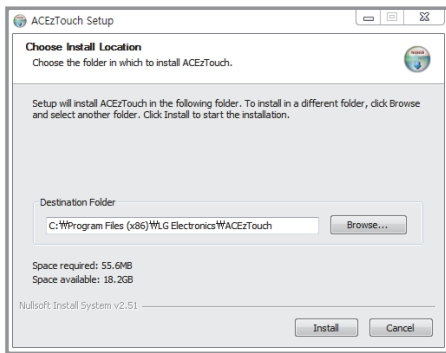
1) Set the IP in the network setting screen.



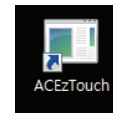
2) Connect by entering the IP set in the web browser. Click the download link.



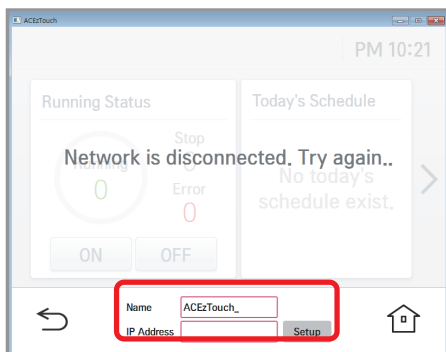
3) Install the program.



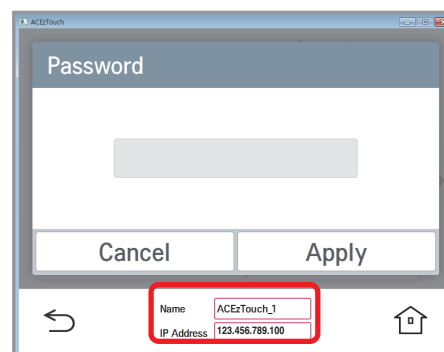
4) Run the installed program.



5) Enter the Name and IP. Click on the "Setup" button.
(Enter the name after 'ACEzTouch_')



6) Connected.



<Requirements>

Hardware	
CPU	Dual core 2.4GHz or more
Main memory	4GB or more
Hard disk	At least 1GB of free space on the disk
Main OS	Windows XP/7/8/8.1/10 (32/64bits)

2.3 Product Description

■ Language setting

GUI

Supporting Korean, English, Italian, Spanish, Portuguese, Russian, French, German, Turkish, Polish, Chinese, Czech.



Keyboard

Korean/English/Number

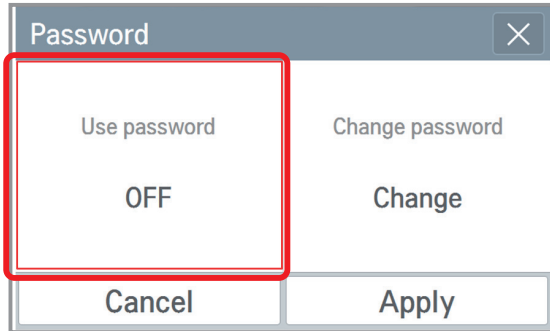
2.3 Product Description

■ Password setting

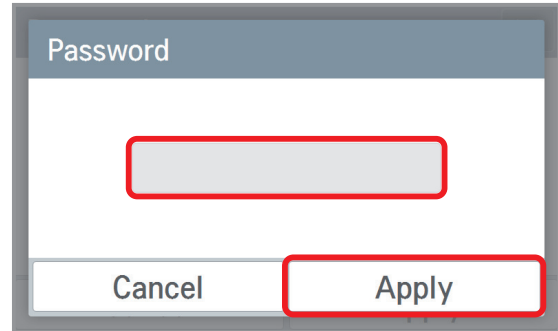
In this screen, you can initialize or change the password, and when you enter the setting screen, you can set whether to use password.

1. If password is used

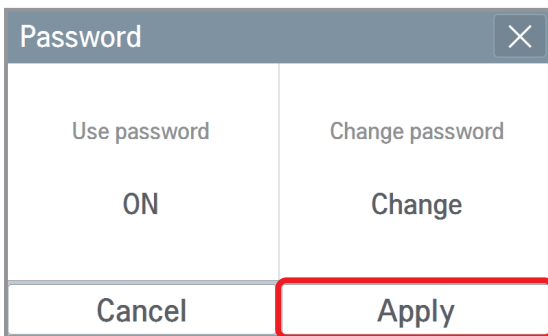
1) Select to use the password.



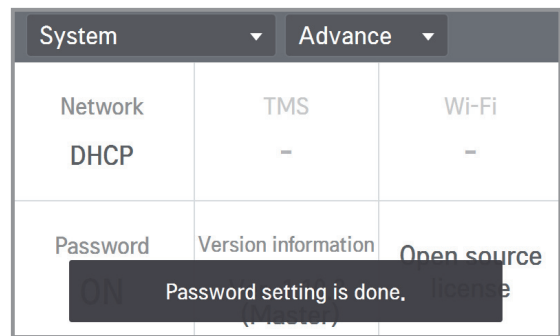
2) Input the previously set password, and press button.



3) It displays that the password is set, and the password is displayed as used. You need to press button to finally apply the set password.



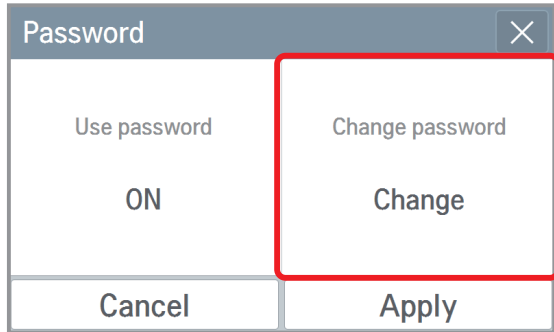
4) It displays that the password set-up is completed.



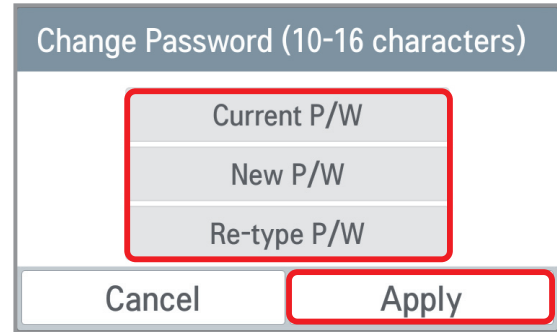
2.3 Product Description

2. When you change the password

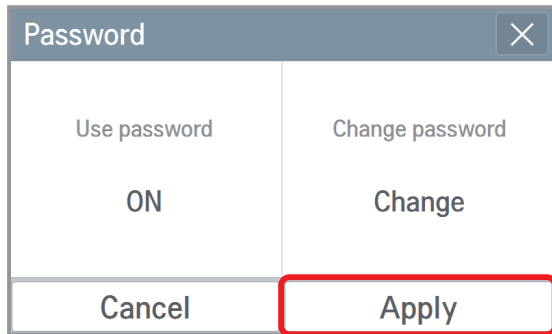
1) Select password change.



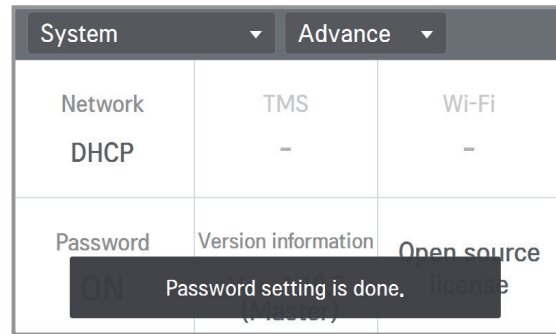
2) Input the current password and the new password, and press button.



3) It displays that the password is set, and the password is displayed as used. You need to press button to apply the changed password.



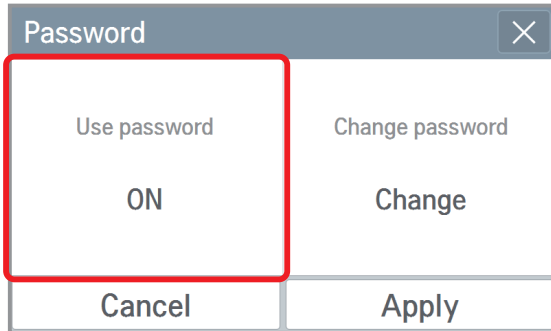
4) It displays that the password set-up is completed.



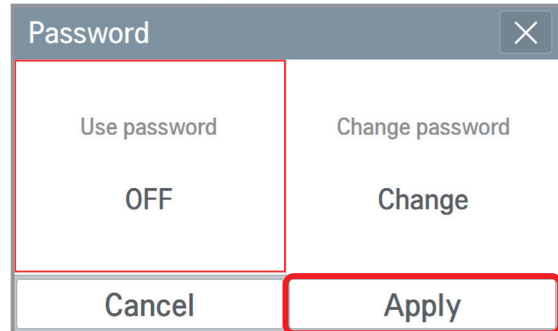
2.3 Product Description

3. If you do not use the password

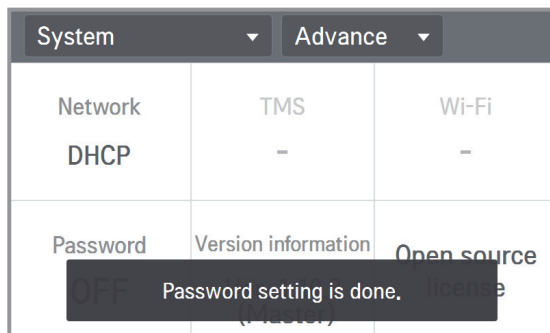
1) Select password usage.



2) It displays that the password is cleared, and the password is displayed as not used. You need to press button to apply password not used.



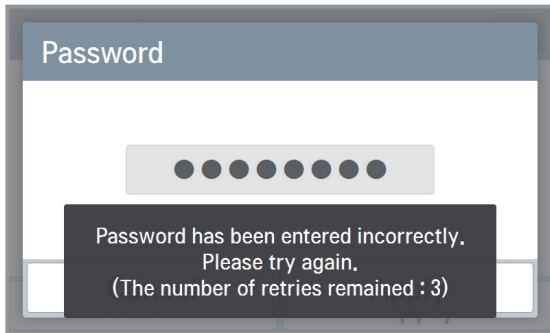
3) It displays that the password set-up is completed.



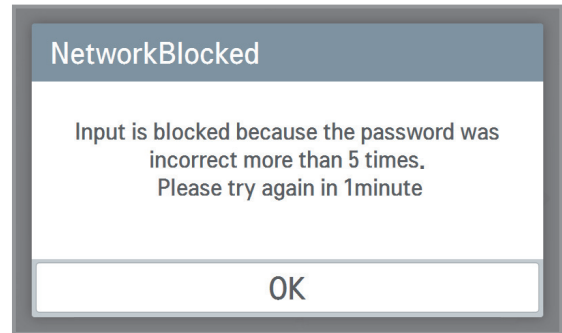
2.3 Product Description

4. In case of wrong password input

- 1) In case of wrong password input, it displays the phrase saying that the password input is wrong as follows.
- 2) In case of 5 repeated wrong password input, the message that the input was blocked due to incorrect password lasts for 1 minute.

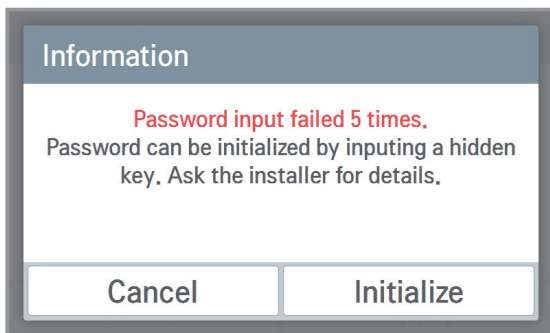


<In case of wrong password input>

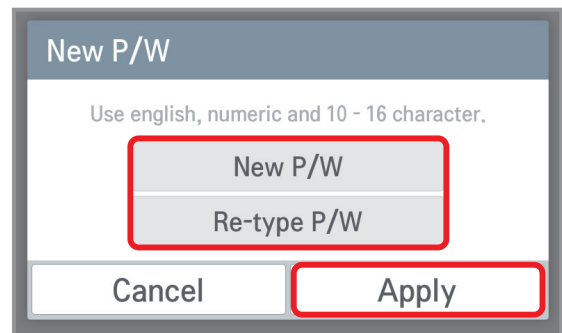


<In case of 5 repeated wrong password input>

- 3) After 1 minute, it verifies whether to initialize the password.(Only in device)
When you press button, the password input screen appears again.
* For the password initialization, please contact the installation store or service center.



< After 1minutes block in Ez Touch Device>

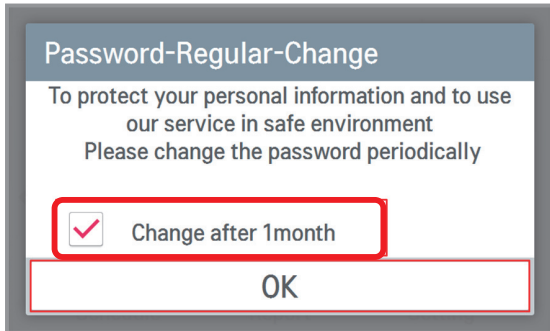


<In case of register new password>

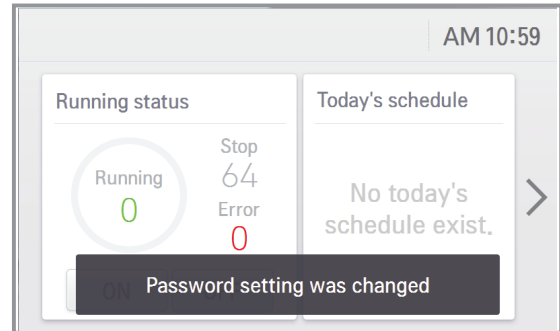
2.3 Product Description

5. Your password is expired about every three month. If you want to extend your password for one month

1) Select the checkbox and press the OK button.

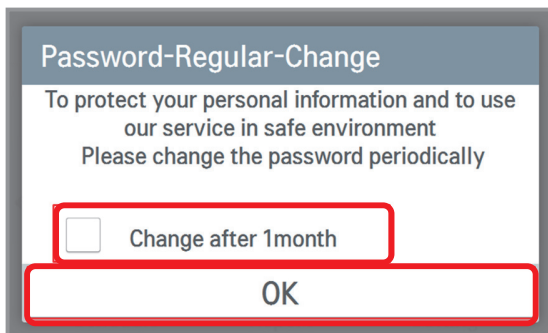


2) It displays that the password extension is completed.

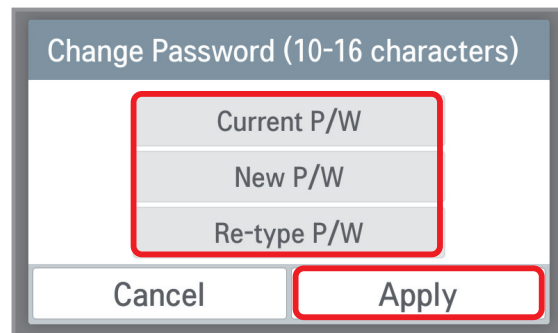


6. If you want to change your password immediately

1) Do not select the checkbox and press the OK button.



2) Input the current password and the new password, and press button.



2.3 Product Description

2.3.3 AC Smart 5/ACP 5

- AC Smart 5 products can link up to 128 indoor units. It is equipped with a 10-inch touch LCD and can be directly controlled.
- ACP 5 products can link up to 256 indoor units. It has a built-in web server, so it can be easily controlled in the Internet environment.

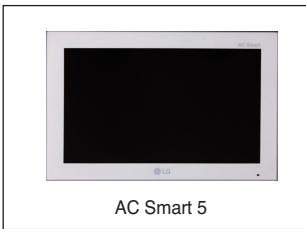
2.3.3.1 AC Smart 5

Model name : PACS5A000

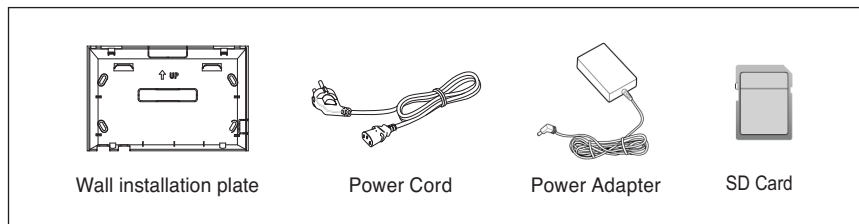
- AC Smart is a central controller installed in the management office of a building, or in the administration office of a school, to monitor and operate, via touch screen or Web access, the indoor units, ERV (ERV: Energy Recovery Ventilator, ERV DX: Direct Expansion Energy Recovery Ventilator), Heating, DI/DOs, DOKITs, AHUs and I/O Modules installed inside the building.
- AC Smart can manage, collectively or individually, the indoor units, ERV, Heating, DI/DOs, DOKITs and AHUs for up to 128 devices. (Or the indoor units, ERV, Heating, DI/DOs, DOKITs and AHUs for up to 64 devices and 9 I/O Modules)

1) Specifications & Dimensions

■ Features



■ Accessory



■ Product Specifications

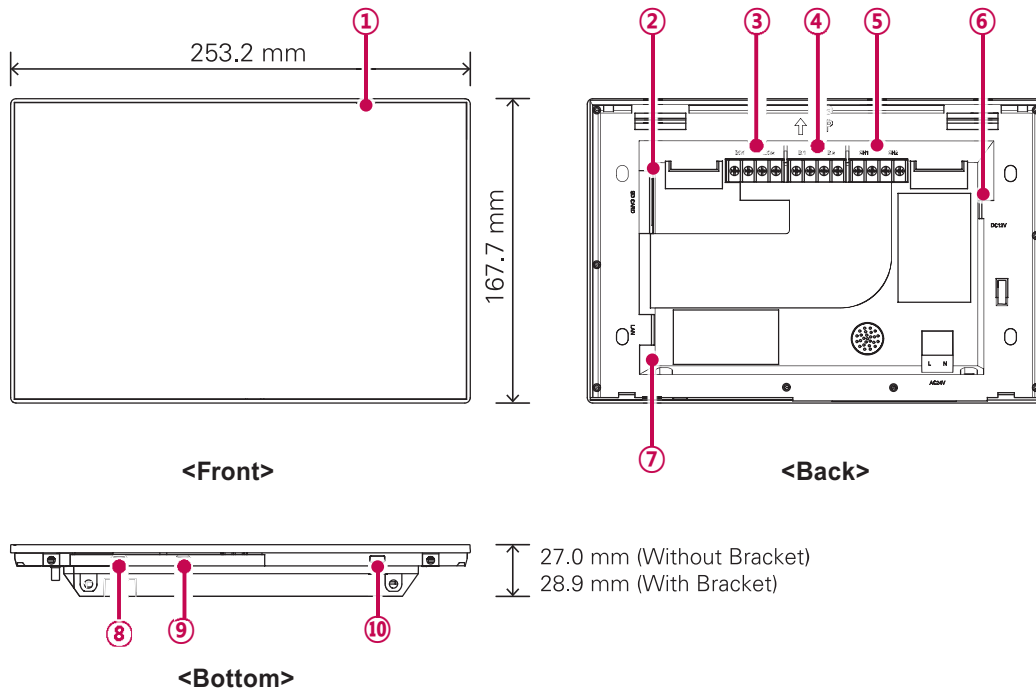
Item	Specifications
LCD	10 inch type WSVGA (1024 x 600) TFT LCD
Speaker	MONO 300 mW
RS485	2 Ports
USB/SD	<ul style="list-style-type: none"> • MICRO USB 1EA (for external USB memory, for service) • MINI USB 1EA • SD Card 1EA
DI	2 Ports
DO	2 Ports
Touch Screen	C-Type Touch Panel
Button Key	Less than 9 seconds (LCD POWER ON/OFF), 10 seconds (SYSTEM RESET)
Power Adapter	12 V _{DC} (3.33 A)
OS	Linux
IP rating	IP20

! NOTE

Product specifications may be different depending on the S/W version.

2.3 Product Description

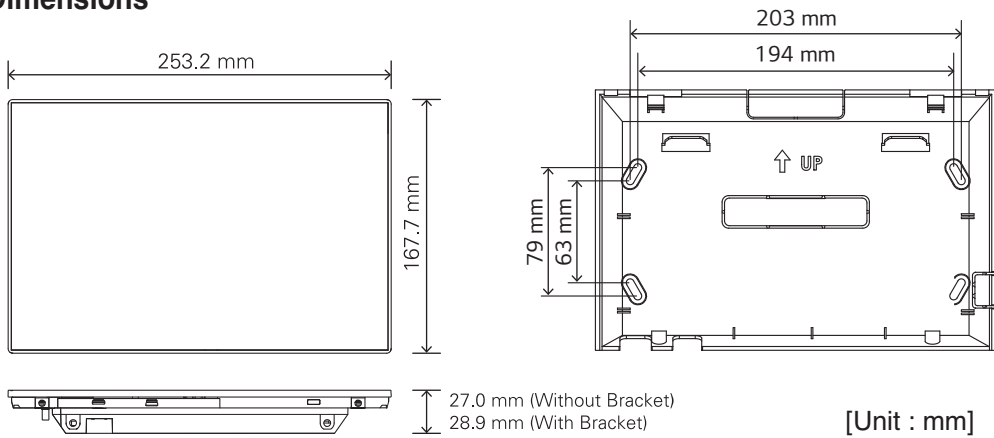
2) Name and Functions



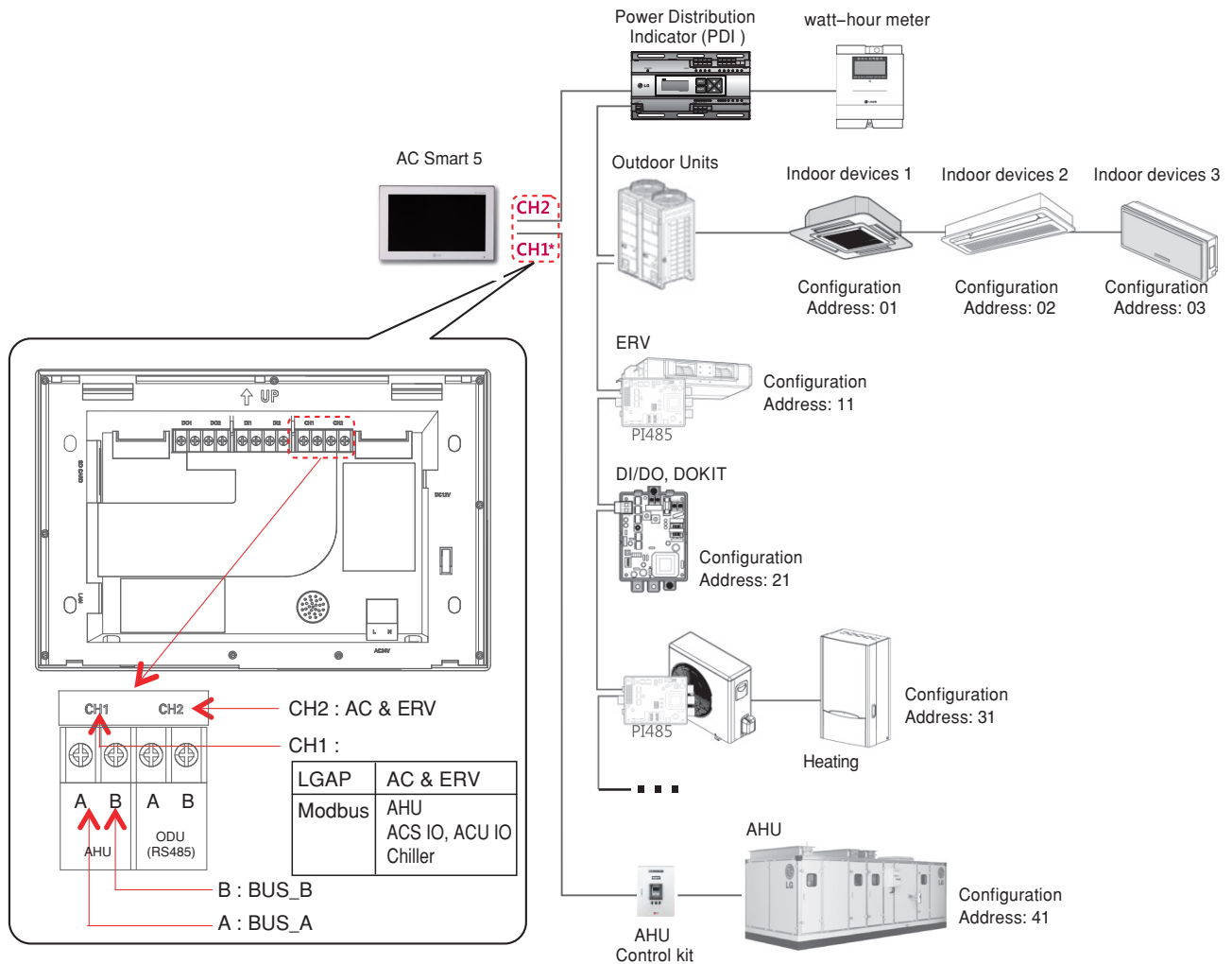
Number	Item	Description
①	Touch Screen	<ul style="list-style-type: none"> • 10 inch type LCD control panel • AC Smart control and information display
②	SD Memory Slot	SD card memory slot
③	DO Port	2CH DO port
④	DI Port	2CH DI port
⑤	485 Port	<ul style="list-style-type: none"> • 2CH 485 port (CH1: AHU, CH2: devices other than AHU) • CH1 default setting : LGAP_AHU / CH2 default setting : LGAP I • To change default setting, refer to the contents of 'Device Setting - AC Smart 5 Editing' in the user manual provided in [Help] category. • CH1 setting : LGAP / LGAP_AHU / Modbus_9600 / MODBUS_19200 - LGAP: for indoor unit, ERV, ERV DX, and Heating connection - LGAP_AHU: for AHU (general, all fresh air, waste heat recovery) connection - MODBUS_9600 / MODBUS_19200: for AHU (modular air conditioner, modular all fresh air, DOAS), Exp.I/O, and chiller connection
⑥	12 VDC Input Port	12 VDC power input port
⑦	LAN Port	LAN cable port for Ethernet connection (100Mbps/10Mbps)
⑧	Micro USB Port (for service)	Port for upgrading software and storing floor plans, reports, statistics, etc. (It needs cable to connect USB memory sticks, supporting USB 2.0 or later)
⑨	Mini USB Port	PC port for debugging software
⑩	Power ON/OFF	<ul style="list-style-type: none"> • Push less than 9 seconds to control AC Smart LCD backlight. • Push 10 seconds to reset AC Smart. • If you are not going to use AC Smart for a long time, it is recommended that the product be turned off to prolong the LCD backlight's life.

2.3 Product Description

■ Dimensions



3) Field Wiring Diagram



! NOTE

* AC Smart 5 can be linked with AC & ERV in CH1 according to the setting.

2.3 Product Description

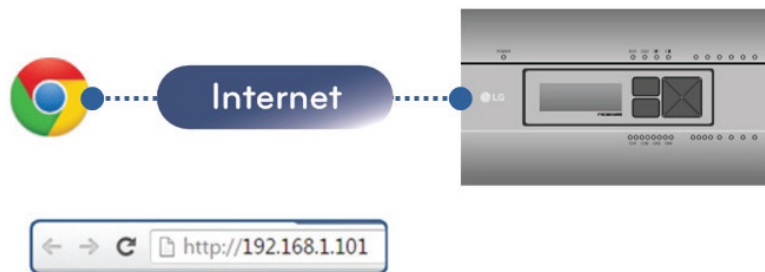
2.3.3.2 ACP 5

Model name : PACP5A000

ACP is the central controller that can manage up to 256 equipments in one space individually or as combined. ACP can monitor or control the equipments installed in each room of the building from the places such as the management office of a building or the administration office of a school.

■ Embedded web server function

Without an installation of a separate PC program, when IP address of ACP is input in the address window using Internet Explorer, the central control program in ACP is web server is automatically run, and the functions of various contents can be used.



Controlling of up to 256 air conditioner indoor units (ACS IO Interlocking : Control up to 128 indoor units and 16 I/O modules)

- Monitoring of error and operation status
- Controlling the peak power / demand power
- System setting function
- Up to 16 AHU can be interlocked

■ Devices that can interface with ACP 5

Device	ACP 5
AC Ez	O
AC Smart 5	O
AC Manager 5	O
Air Conditioner	O
ERV	O
Heating	O
Remote Shutdown	O
Demand Controller	O
Chiller	O
AHU	O
ACS IO	O
IP rating	IP20

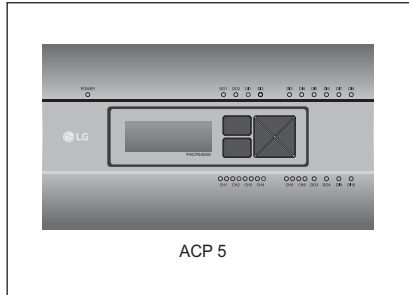
! NOTE

Product specifications may be different depending on the S/W version.

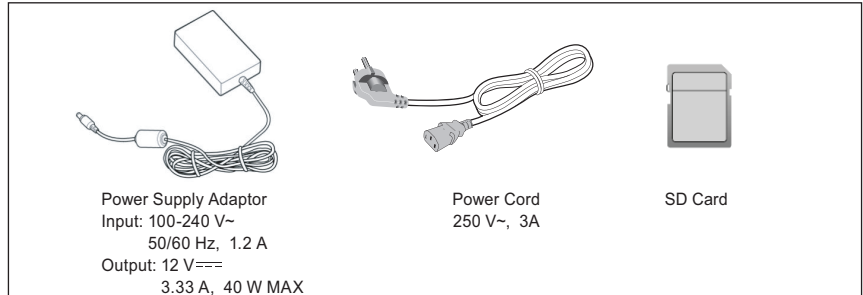
2.3 Product Description

1) Specifications & Dimensions

■ Features



■ Accessory



! NOTE

Components or options may differ from the actual product picture.

■ Product Specifications

Categories	Description
Boundary of usage temperature	0°C~40°C
Communication ports	- Ethernet 10 / 100 BASE-T - USB : USB Host (SW upgrade, data backup) mini USB Device (Debug) - RS485 communication ports 6EA - SD card slot (RS485 communication logging)
External input/output ports	- DI 10EA-Dry contact(N/O), DO 4EA-Relay Output(N/O, Max 30 V=== / 1A)
LED	27EA (RS communication status, Ethernet communication status, power status, operation status)
LCD	20 x4 Character-LCD (network environment setting and information display)

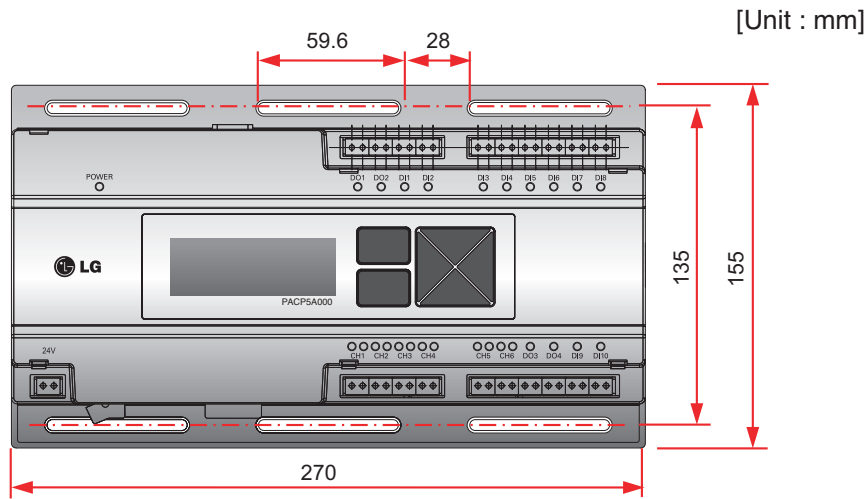
! NOTE

License policy

This product follows GPL (General Public License) for the use of Embedded Linux.

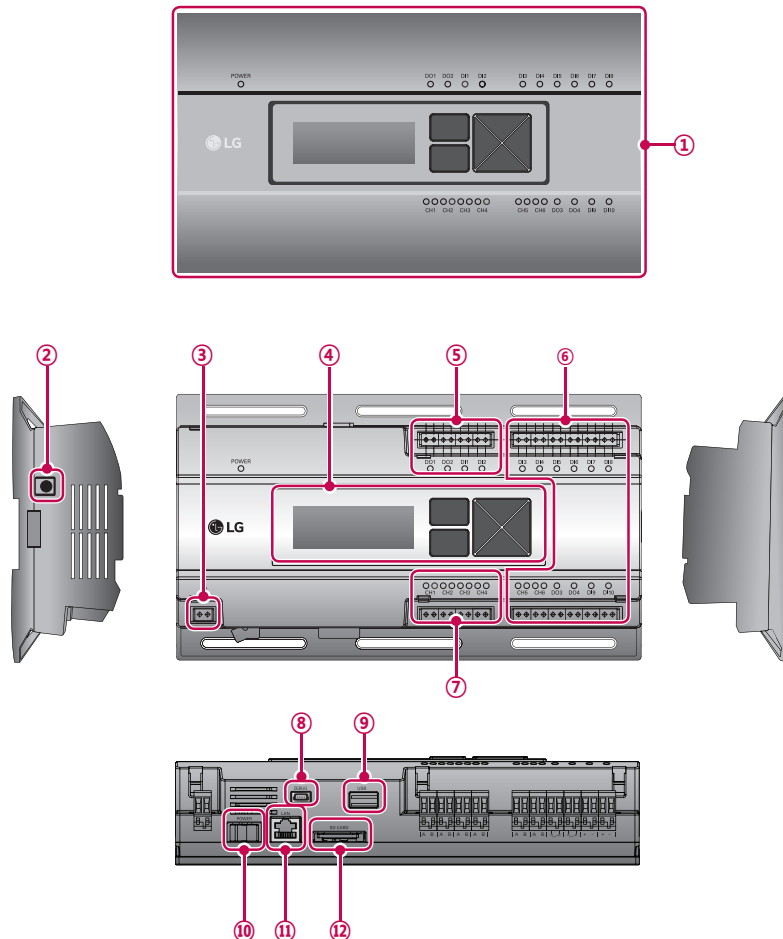
2.3 Product Description

■ Dimensions



* Detailed figures are slightly different, depending on each Model.

■ Names of each part of ACP



2.3 Product Description

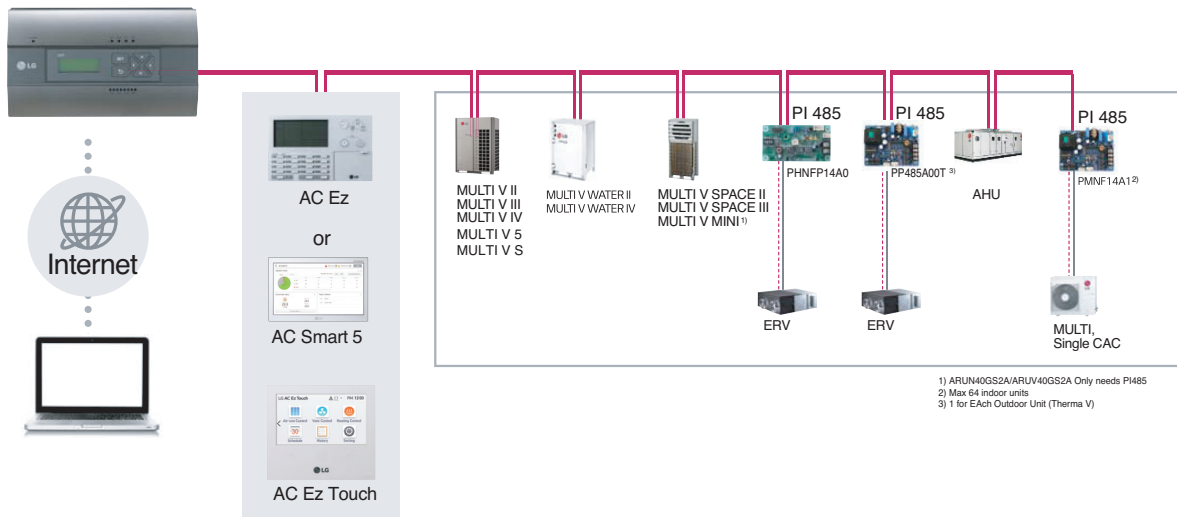
Number	Item	Description
①	Cover	Front cover of the ACP
②	Adaptor connection jack	Jack for 12 V _{DC} to connect to the power supply adaptor
③	Power port	24 V _{AC} port for power connection (not supported by 12 V _{DC} model)
④	Buttons and LCD	Buttons and LCD to set network environment and to display other information
⑤	Basic external input/output signal connectors	Connection ports to connect to external input/output signals (DI:2, DO:2)
⑥	Optional input/output and RS485 communication port.	8 DI's & 2 DO's are available to connect external I/O. CH5 & CH6 are Modbus Channels (Not used in US)
⑦	RS485 communication port	RS485 communication ports to connect to air conditioner and ERV equipment (4 in total)
⑧	Mini USB port	USB to Serial port for software debugging
⑨	USB port	For software update and data backup and Lonworks Commission with U60FT module
⑩	Power switch	Switch to turn on or off the power of the ACP
⑪	Ethernet port	Ethernet port to connect to internet and AC Manager
⑫	SD card slot	For RS485 communication data backup.

NOTE

Product specifications may be different depending on the S/W version.

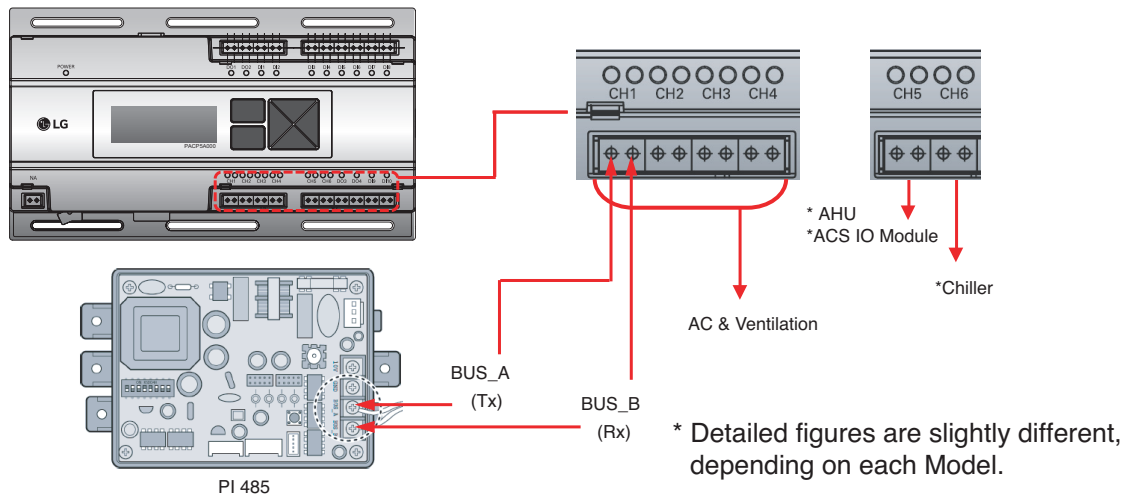
2.3 Product Description

2) Field Wiring Diagram



Connecting RS485 cable to the ACP

Up to 16 outdoor units can be connected to one RS485 port of the ACP, and up to 256 indoor units can be connected to one ACP. If there are many outdoor units to connect, the outdoor unit connections shall be appropriately connected to CH1 to CH4 in BUS format. Otherwise, the ACP may malfunction.



- RS485 communication cable connection
There is a polarity in RS485 communication cable connection, so be careful not to reverse the connection of the two cables. Do not let the length of RS485 communication cable exceed total of 1 km. RS485 communication cable must be connected with BUS type.
- IP address of the ACP
IP address of the ACP, address of Gateway, and Net mask must be requested to the person in charge of the network of the corresponding site.

NOTE

Product specifications may be different depending on the S/W version.

2.3 Product Description

2.3.3.3 AC Smart 5/ACP 5 Function List

Category1	Category2	ACP 5	AC Smart 5
	Recommended browser	Chrome	
	Maximum the number of concurrent users	10	
Permissions per account	Administrator	authority : All Group and menu You can add secondary manager and general user.	
	Secondary manager	authority : Provides authority assigned group and menu You cannot change the information of other accounts, you can only change the information of the logged-in user.	
	General user	authority : Provides only indoor unit simple controls Central control functions such as locking, automatic switching, and temperature limit time limit cannot be used.	
	Password	Max. 20 characters, 10 or more characters, 2 or more combinations Decline if 100% match with ID Password change pop-up notice after 90 days	
Installing setting	Outdoor unit name	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Outdoor unit Model	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Outdoor unit capacity	1~99,999	
	Indoor unit name	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Indoor unit Model	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Indoor unit capacity	1~99,999	
Group setting	subgroup	Up to Depth 10	
	Group name	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Maximum unit per group	256	40
System setting	Maximum characters of Title	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Maximum characters of exception date Name	Max. 20 characters	
	Language	12 languages (한국어, English, Español, Português, Italiano, Deutsch, Türkçe, Русский, Polski, Français, 中文, Čeština)	
Error notice setting	Error e-mail title	Max. 20 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	e-mail address	Max. 320 characters special characters (^), ('), (.), (""), (l), (n) cannot be used.	
	Sending cycle when error occurs	10~60min. in 10min. increments	
	Automatic daily error notification mail	Set whether to send e-mail at 00:05 AM every day even if no error occurs	
	Repeat sending when error occurs	- Once : Transmit only once for the same error - Repeat : Repeat transmission every cycle for the same error	
	transmission information	Information sent to error notification emails - Error occurrence information: device name, device type, error code, time - Error clearing information: device name, device type, error code, time	
	Maximum Receiving e-mail address	20	
Additional user setting	Maximum characters of User ID	32	
Schedule	Maximum schedule number (Recommended specification)	100 (50)	
	Schedule period setting	Time, period, repeat program, select day, exception date	
Event log	Maximum period to get error log	1 day	
	Maximum period to get control log	1 day	

2.3 Product Description

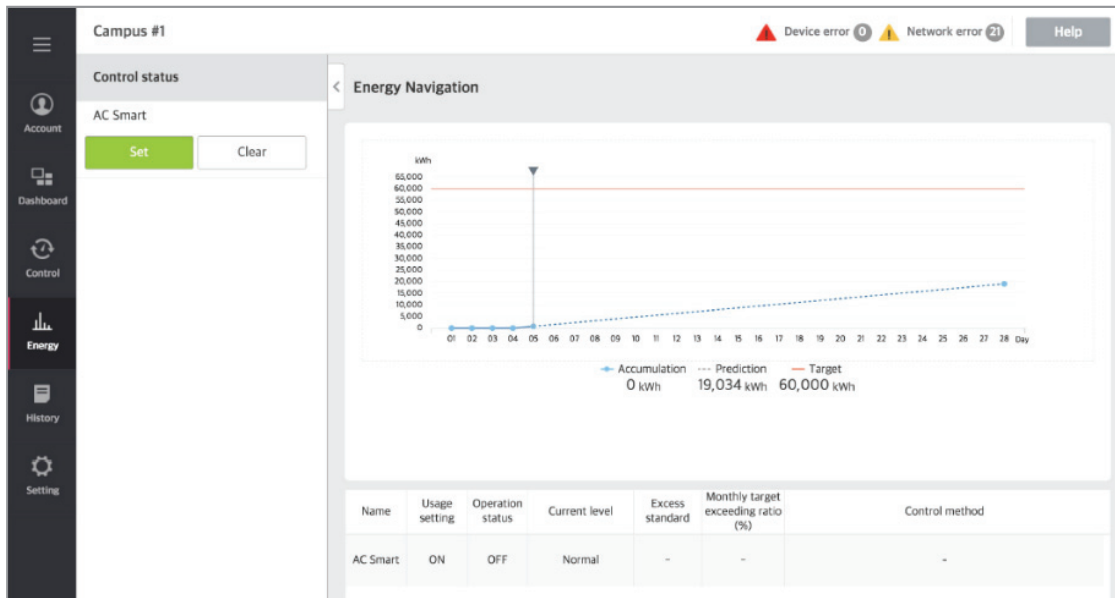
Category1	Category2	ACP 5	AC Smart 5
Operation Trend	Maximum period to get operation trend	1 week from the start date	
Energy Report	Maximum period to get power history	3 month from the start date	
	Maximum period to get gas history	3 month from the start date	
	Maximum period to get runtime history	3 month from the start date	
Peak control	Priority	0~100% (1% degree)	
	Outdoor unit capacity	9 step (0, 40, 45, 50, 60, 70, 80, 90, 100) %	
Demand control	Priority	0~100% (1% degree)	-
	Outdoor unit capacity	9 step (0, 40, 45, 50, 60, 70, 80, 90, 100) %	-
Time limit	Setting time	30 min, 1 hour, 2 hour, 3 hour, 4 hour	
Interlocking	Maximum pattern number (Recommended specification)	40 (20)	
Energy navigation	Control level	7 levels	
	Control type	Indoor unit operation rate, outdoor unit capacity control, indoor unit operation control	
	Control type setting	Auto/Manual	

2.3 Product Description

2.3.3.4 AC Smart 5/ACP 5 Function

■ Energy navigation

Energy navigation is the function to set the target usage amount to limit the monthly power consumption and to control so that the total accumulated power consumption does not exceed the target usage amount. It performs total of 7 control levels with the estimated/actual usage amount exceeding ratio compared to the monthly target usage amount. For the control method, there are indoor unit operation ratio, outdoor unit capacity control, and indoor unit operation control.



[Control Level]

Supports the level of the set control level, exceeding condition, monthly target exceeding ratio (%), and control method

- Level: maximum of 7 levels
- Excess standards
 - Predicted usage amount: estimated period usage amount of 1 month starting from the base date
 - Actual usage amount: actual period usage amount until today from the base date
- Monthly target excess (%)
 - Ratio of the excess standard compared to the monthly target usage amount (%)
 - You can set in the unit of 10% from minimum 70% to maximum 130%
- Control type
 - IDU Operation Rate: Set the 0~100% target operation ratio and control peak according to the priority of the group
 - ODU capacity: Set the 0~100% target operation ratio and control peak according to the outdoor unit capacity operation ratio
 - IDU: Control according to the indoor unit control setting (refer to Indoor unit operation control setting)

2.3 Product Description

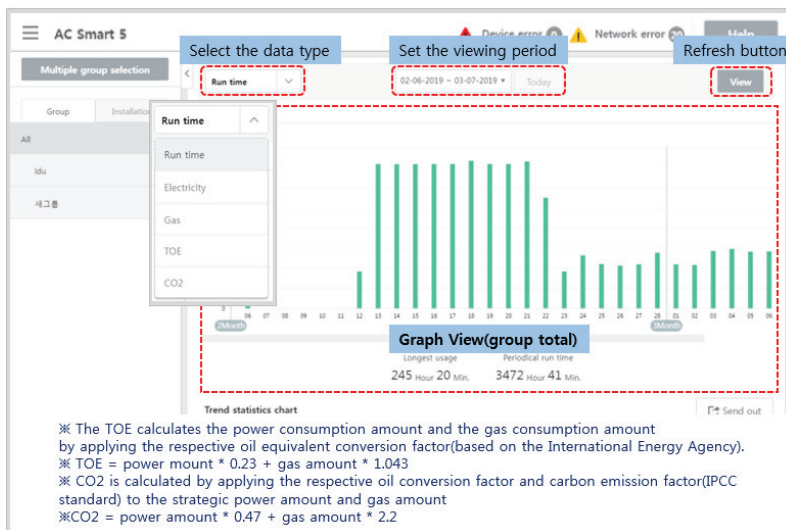
■ Energy Usage

Energy usage sets the target usage to control the energy navigation and checks the device's power usage and operation time with graph and table.

[How to read the energy usage graph]

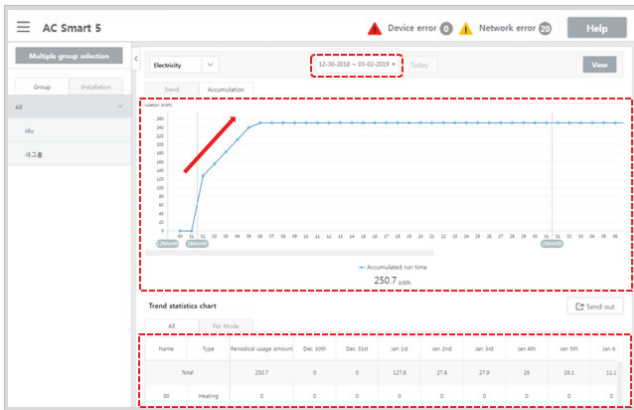
The method to read the energy usage graph is as follows.

1. In the main menu, click (touch) [Energy] > [Energy Usage] menu.
 - Energy usage amount screen is displayed.
2. In the viewing period setting area, click (touch) period setting area to set the viewing period corresponding to the current month.
 - The start date is set as the base date.
3. To view the set contents, click [View] button.
 - Energy usage amount of the set period is displayed.
4. In the energy usage information display area, check the energy usage contents.
 - You can check the daily usage and periodical usage amount.
 - Read the daily value at the left side of the daily usage.
 - To check the accumulated value, click (touch) [Accumulation] tab.



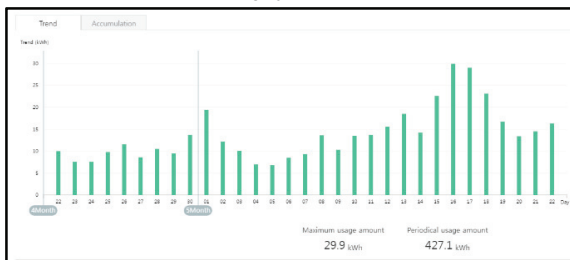
2.3 Product Description

■ Energy Report



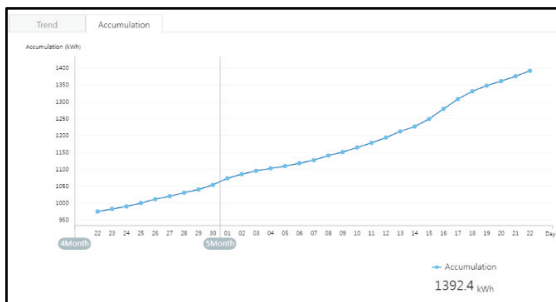
• Graph Types

Trend



Daily or hourly Usage

Accumulation

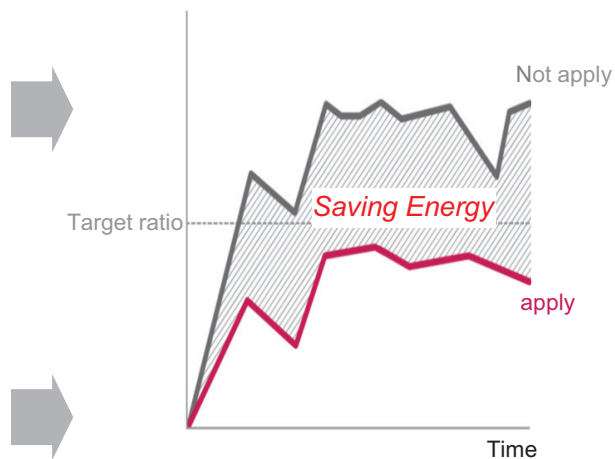
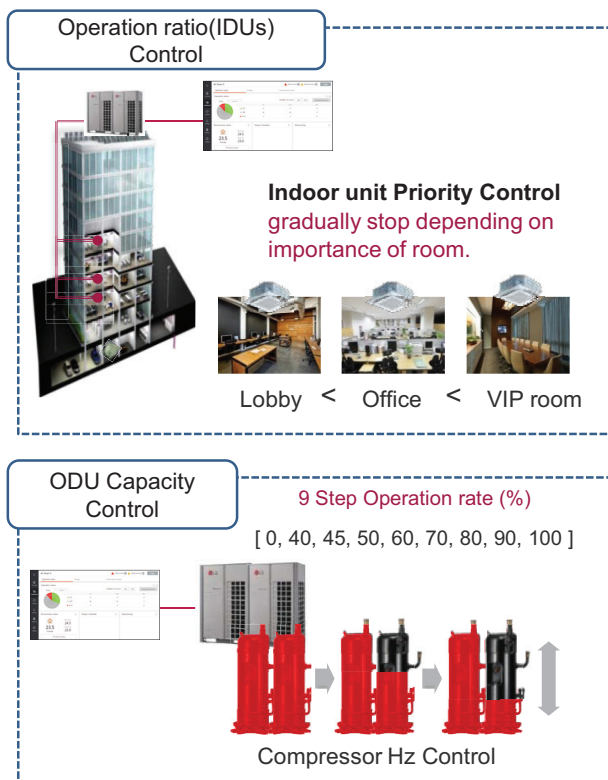


Accumulated usage transition

2.3 Product Description

■ Peak control

Peak control limits peak power consumption. You can set the target operating rate so that total power consumption does not exceed the set limit. To prevent power consumption from exceeding the limit, the system will switch automatically between cooling and fan modes. Also it will limit heating operation by switching automatically between Heat and OFF modes.



[Control Configuration]

- 1) Priority Control
Control based on group priority. Refer to below for detail behavior.
 - Switched between cooling and fan modes by priority.
 - Switched between Heat and OFF modes by priority.
 - Cycles every set time.
- 2) Outdoor Unit Control
Controls based on outdoor unit capacity limit.

2.3 Product Description

■ 2 Setpoint

• **Auto Changeover**

Set the auto change over function to switch the operation mode automatically to keep the proper room temperature. When Room Temp. > Upper, request Cool operation mode. When Room Temp. < Lower, requests Heat operation mode. When Room Temp. ≤ (Upper - Temperature difference) or Room Temp. ≥ (Lower + Temperature difference), requests Fan operation mode.

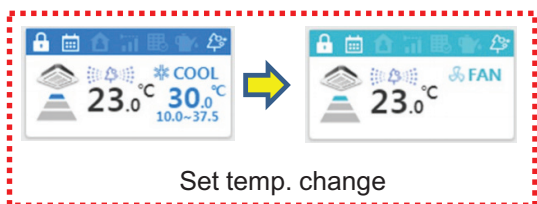
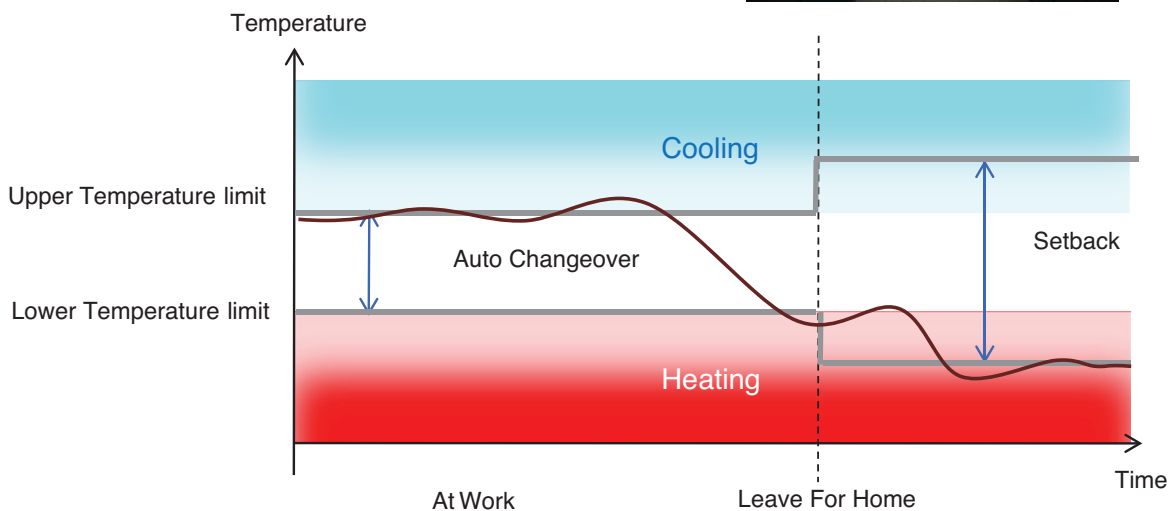
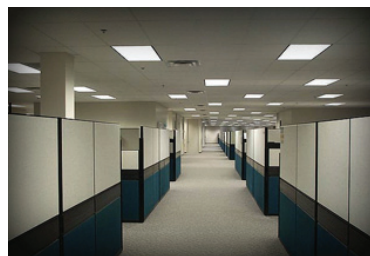
• **Setback**

Set the setback function to control the proper room temperature when the indoor unit is turned off.

<Occupied : Auto Changeover>



<Unoccupied : Setback>



- **Temperature Range**
 - **Auto Changeover**
: 18°C~30°C / 64°F~86 °F
 - **Setback**
 - Cooling Start : 21°C~40 °C / 70°F~104 °F
 - Heating Start : 1°C~20 °C / 34°F~68 °F

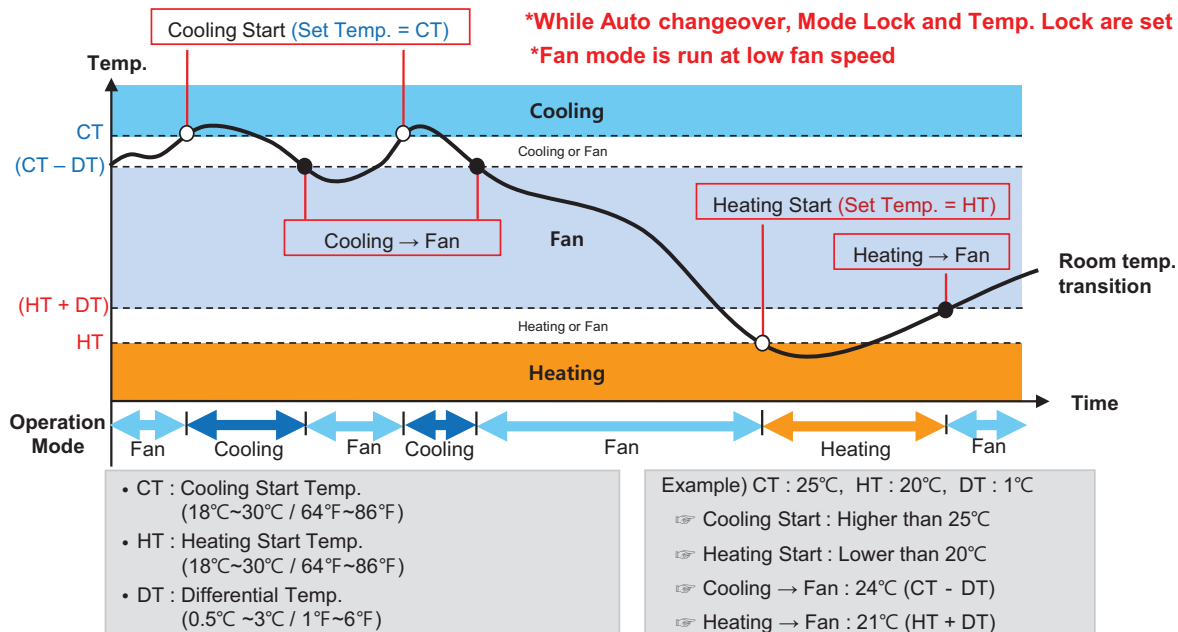
Central Controller

! NOTES

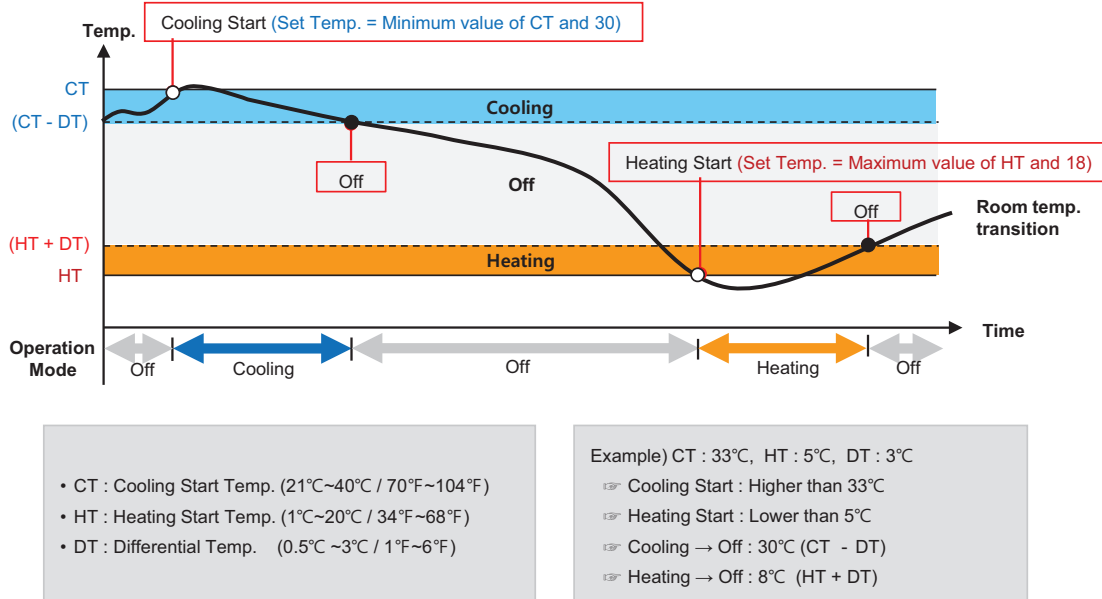
This function is for Heat Recovery system or Single heat pump. Otherwise correctly working is not guaranteed.

2.3 Product Description

• Auto Changeover



• Setback

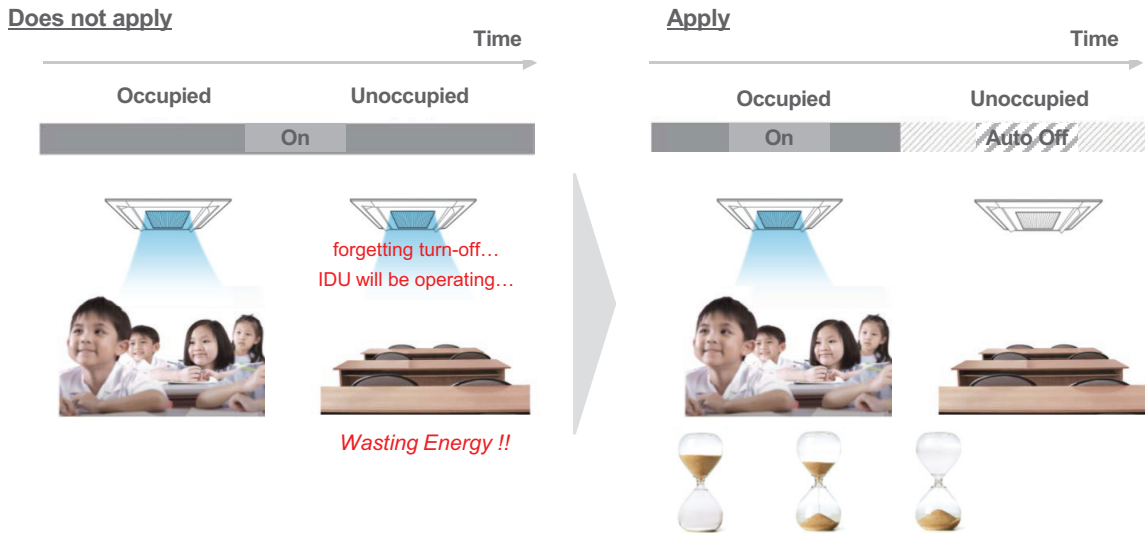


*This logic could be different depending on the S/W version

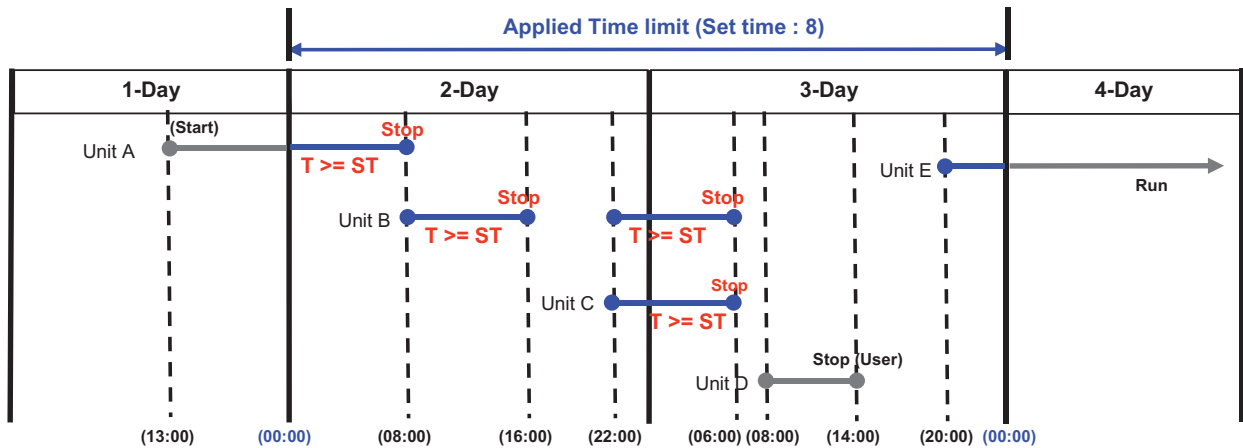
2.3 Product Description

■ Time-limit Operation

The time-limit operation is to limit the amount of time the devices (indoor unit, Heating, ERV, DOKIT, and some AHU) are running individually. By setting the device operation time in advance, you can control for how long a device works and have it stop automatically.



- Hours to Off(Hour)
 - Select the operation time limit of an operation group. The devices included in the group operate for the selected time then stop automatically.
- Days: Select which day(s) of the week to run the time-limit operation.



! NOTES

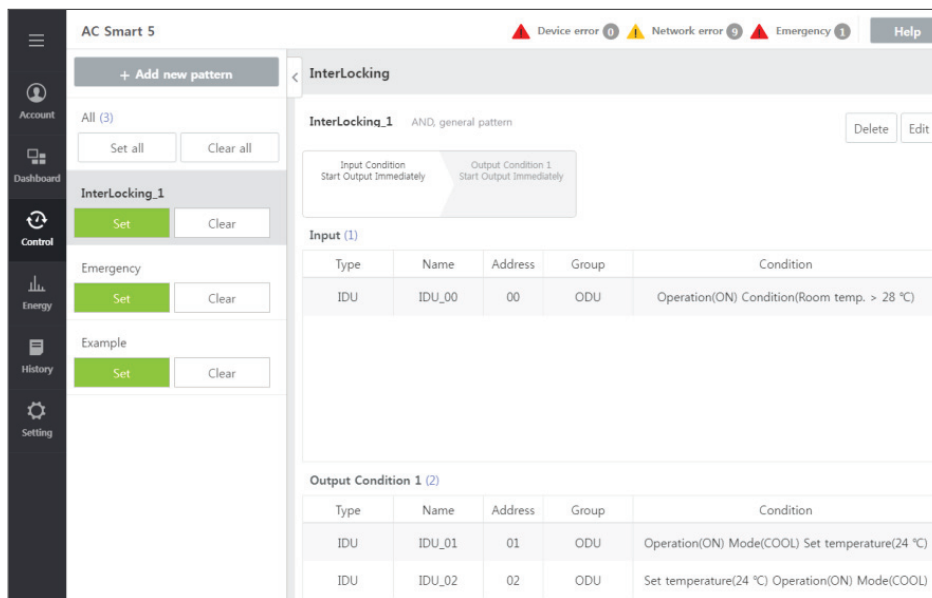
For the time-limit operation, you cannot register chiller, AHU(Modular Fresh Air, Modular Heat Recovery, DOAS), DI/DO, Expansion I/O.

2.3 Product Description

■ Interlocking

Associated device control is a function which interlocks more than one device and then controls output movements when the input conditions are met.

In order to operate associated device control, you shall arrange the devices to be interlocked in a single pattern and then apply the control setting. It is described here how to create and manage a pattern and then proceed with associated device control.



Pattern type

Category	Description
General pattern	<ul style="list-style-type: none"> The pattern that output control command is executed when the input condition is satisfied
Copy pattern	<ul style="list-style-type: none"> The pattern that the output device follows the input device's status (Some control functions may not be copied.) You can add only 1 device to input condition, and only the device with the same attribute with the added input device is registered to the output device
Emergency pattern	<ul style="list-style-type: none"> The pattern that it recognizes as emergency situation when input condition is satisfied When the input condition is satisfied, it tells the alarm with screen and sound
1:1 program	<ul style="list-style-type: none"> Pattern to conveniently register many devices if input device is the same as output device

! NOTES

Recommended specification

- Equipment interface control : No. of patterns is 20, No. of input devices is 500, and No. of output devices is 1000
- If it is set to be over the recommended specification, performance degradation may occur.

2.3 Product Description

Input / Output Condition

1) Input Condition

Category	Description
Status	AND : all device conditions match OR : one or more device conditions match NAND : one or more device conditions do not match NOR : no condition matches
Maintaining time	If it is set, while all input conditions are met, output condition control after maintaining time. Press [▼] button to select maintaining time(1~ 60 min.).
IDU	Error(Error/Normal), Operation(On/Off), Mode(Cool/Heat/Fan/Dry/Auto), Room temp., Humidity, PM10, PM2.5, PM1.0 (= / > / ≥ / < / ≤), Fan Speed(Low/Med/High/Auto), Swing(Setting/Cancel), Occupancy(Occupied, Unoccupied), specific error (Max. 5ea)
ERV	Error(Error/Normal), Operation(On/Off), Mode(Normal, Hex, Auto), Room temp., CO ₂ concentration (= / > / ≥ / < / ≤), Fan Speed(Low/High/Super/Auto), specific error (Max. 5ea) Co-Airconditioner(COOL/HEAT/AUTO/OFF)
Heating	Error(Error/Normal), Operation(On/Off), Mode(Cool, Heat, Auto), Current temp., Water inlet temp., Water outlet temp., Hot Water temp., (= / > / ≥ / < / ≤), Hot water (On/Off), Hard Lock(Set/Clear), specific error (Max. 5ea)
AHU	Error(Error/Normal), Operation(On/Off), Mode(Cool/Heat/Fan/Dry/Drift), Current Temp., (= / > / ≥ / < / ≤), specific error (Max. 5ea)
DOAS AHU	Error(Error/Normal), Operation(On/Off), Mode(Cool/Heat/Fan/Dry/Off)
Split AHU	Operation(On/Off), Occupancy(Occupied, Unoccupied)
DI	Error(Error/Normal), Operation(On/Off)
Exp. IO (DI)	Error(Error/Normal), Condition
Exp. IO (AI)	Error(Error/Normal), Condition (= / > / ≥ / < / ≤)
ODU	Error(Error/Normal), Mode(OFF/HEAT/COOL), Priority operation mode(AUTO, GAS(GHP), Electricity(EHP)

2.3 Product Description

2) Output Condition

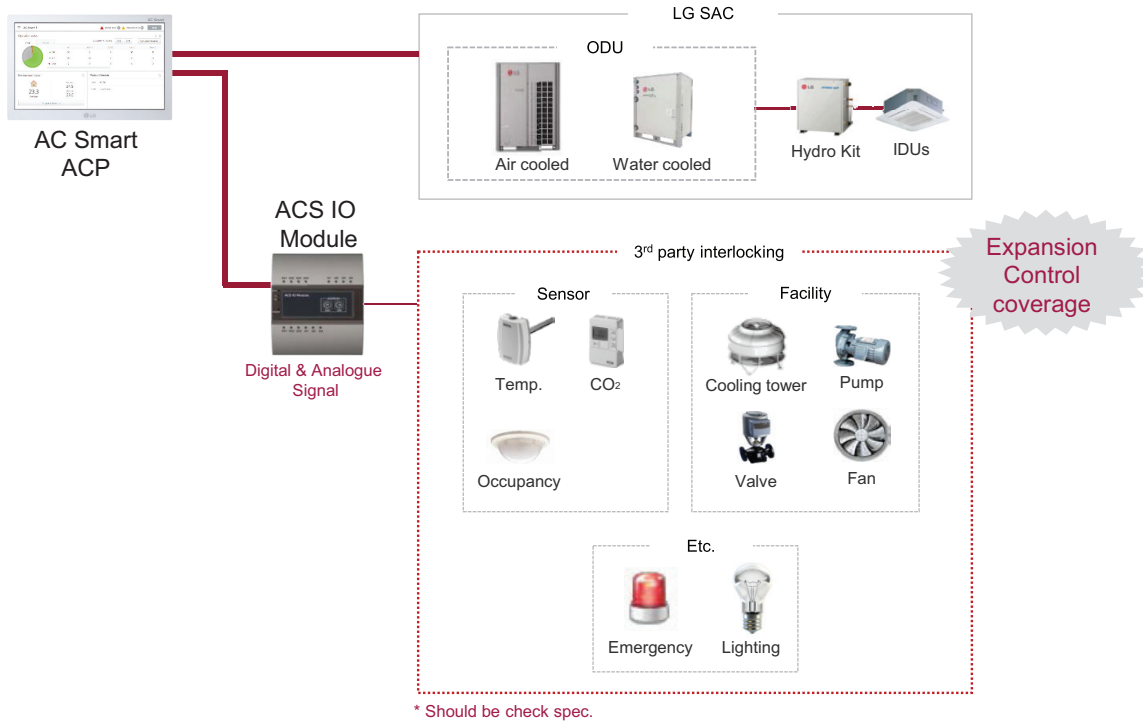
Category	Description
Status	AND : all device conditions match OR : one or more device conditions match NAND : one or more device conditions do not match NOR : no condition matches
Maintaining time	If it is set, while all input conditions are met, output condition control after maintaining time. Press [▼] button to select maintaining time(1~ 60 min.).
Send e-mail	When check box is selected, if the corresponding event is executed in ACP, whether event occurred is sent to the e-mail set in Setting > error notice setting > receiving e-mail address ACP shall be connected to internet network that can send e-mail.
Delay time	If it is set, when input condition is met, output condition is controlled after the registered delay time Press [▼] button to select delay time (1~60 min.). If input condition is met, even if it becomes a status that does not meet the input condition during the delay time, output condition is controlled after delay time.
IDU	Operation(On/Off), Mode(Cool/Heat/Fan/Dry/Auto), Air Purify(Set/Clear), Set temp., Fan Speed(Low/Med/High/Auto), Swing(Set/Clear) Occupied(Occupied/Unoccupied) 2set temperature setting(Set/Clear), Lowest/Highest Limits for Cooling/Heating
ERV	Operation(On/Off), Mode(Normal, Hex, Auto), Set temp.(ERV DX), Fan Speed(Low/High/Super/Auto), Air conditioner(Cool/Heat/Auto/OFF), Humidify(Set/Clear) Co-Airconditioner(COOL/HEAT/AUTO/OFF)
Heating	Operation(On/Off), Mode(Cool, Heat, Auto), Air set temp. , Hot water(On/Off), Hot water temp., Hard Lock(Set/Clear)
AHU	Operation(On/Off), Mode(Cool/Heat/Fan/Dry/Drift), Set temp.
DOAS AHU	Operation(On/Off), Set temp.
Split AHU	Operation(On/Off), Set temp.
DO	Operation(Short/Open)
Exp. IO (DO)	Condition
Exp. IO (AO)	Condition
ODU	Unit capacity control, Smart load control(SLC) setting, Low noise mode, Defrost mode, ODU Refrigerant Noise Reduction, Priority operation mode

2.3 Product Description

General pattern

IF "CONSTANT < AI(temperature, etc...) < CONSTANT" THEN "Control command"

Ex) Interlocking with 3rd party equipment (Sensors, Fans, Switches...)



How to set)

Pattern 1: IF "AI < 5" THEN "AO = 0"

Pattern 2: IF "5 <= AI < 10" THEN "AO = 15"

Pattern 3: IF "10 <= AI < 15" THEN "AO = 30"

Pattern 4: IF "15 <= AI < 20" THEN "AO = 45"

Pattern 5: IF "20 <= AI < 25" THEN "AO = 60"

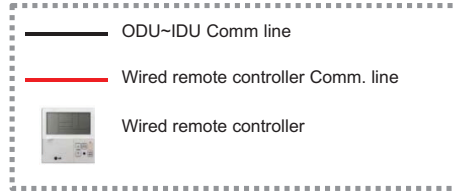
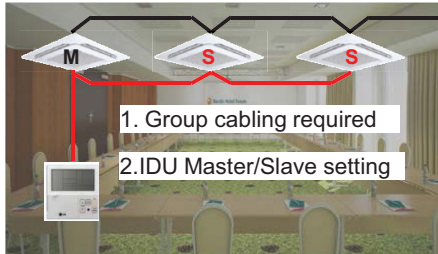
2.3 Product Description

Copy pattern

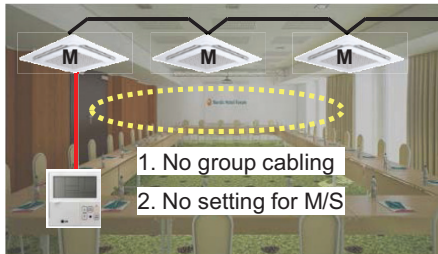
Pattern that output device follows the input device state as it is.

Ex)

Current group control



Group Clone interlocking of ACS 5



How to set)

Name	Address	Group	Condition	Batch
DXHRV_UNE...	02	서그룸		Condition

*For Group Clone, only one unit can be Input device

NOTES

In this case, output device can control by input devices only.

2.3 Product Description

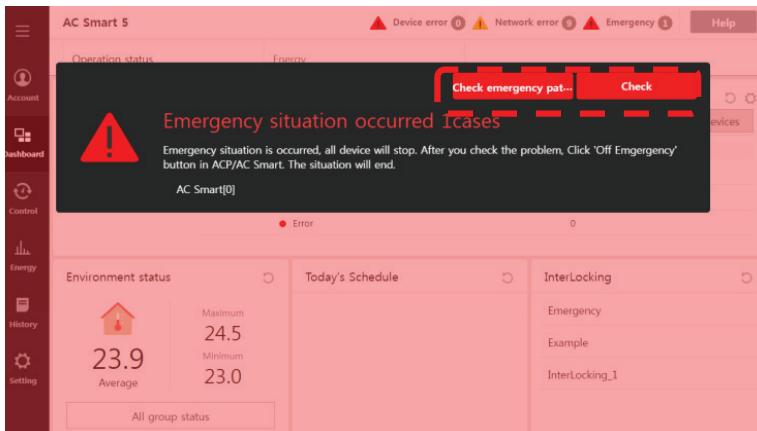
Emergency pattern

When emergency condition is occurred, building manager can take action quickly.

- When pre-set emergency pattern is occurred, red alert is appeared at main page.
- Output condition of Emergency pattern will be executed and No one can control before emergency clear.

Ex) If a situation set as emergency pattern occurs, entire home screen turns red for alarm, and other control signals are blocked.

- * You can set only 1 emergency pattern.
- * Emergency situation notice may be generated again until the cause of emergency situation is removed.



How to set)

+ Add new pattern

All (4)

Set all Clear all

InterLocking_1

Set Clear

Emergency

Set Clear

Example

Set Clear

Emergency pattern

Set Clear

InterLocking

Emergency pattern AND, emergency pattern Delete Edit

Input Condition Start Output Immediately Output Condition 1 Start Output Immediately

Input (1)

Type	Name	Address	Group	Condition
IDU	IDU_00	00	ODU	Operation(ON) Fan speed(LOW)

Output Condition 1 (3)

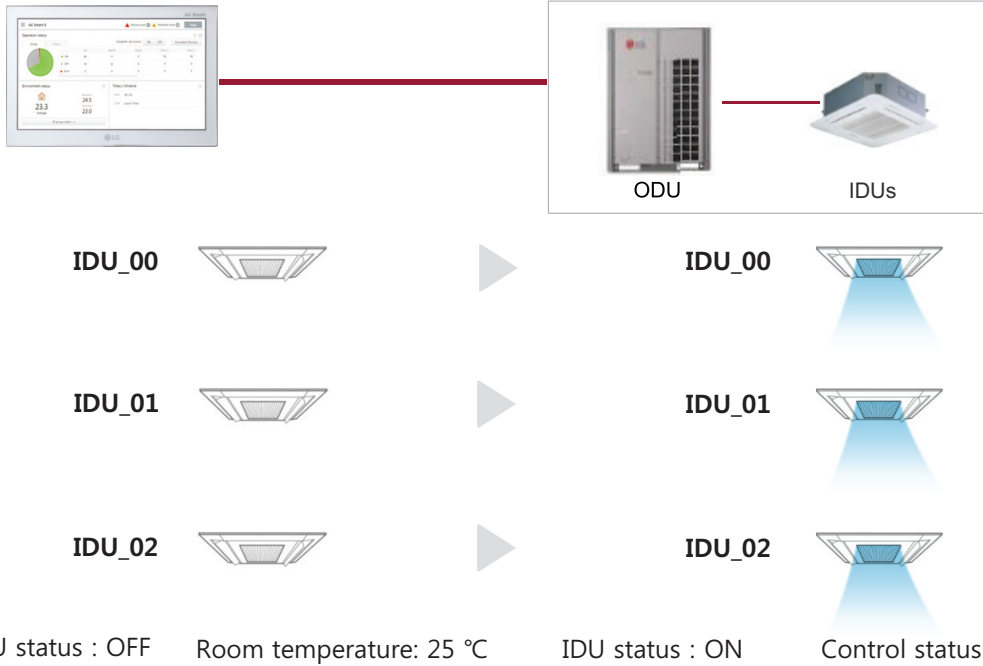
Type	Name	Address	Group	Condition
IDU	IDU_00	00	ODU	Operation(ON) Fan speed(HIGH)
IDU	IDU_01	01	ODU	Operation(ON) Fan speed(HIGH)
IDU	IDU_02	02	ODU	Operation(ON) Fan speed(HIGH)

2.3 Product Description

1:1 Program

Program to set output device same to input device.

- Ex)** IF Indoor unit 0's room temperature is upper 25 °C, THEN set Indoor unit 0 to turn on and cooling
- IF Indoor unit 1's room temperature is upper 25 °C, THEN set Indoor unit 1 to turn on and cooling
- IF Indoor unit 2's room temperature is upper 25 °C, THEN set Indoor unit 2 to turn on and cooling



How to set)

Name: Interlocking

1:1 Program The input device is the same as the output device. AND/OR/NAND/NOR and the lasting time of the input conditions as well as the delay time of the output conditions are not applied. Permit user control

Input Condition: Start Output Immediately Output Condition 1: Start Output Immediately

Status: and OR NAND NOR

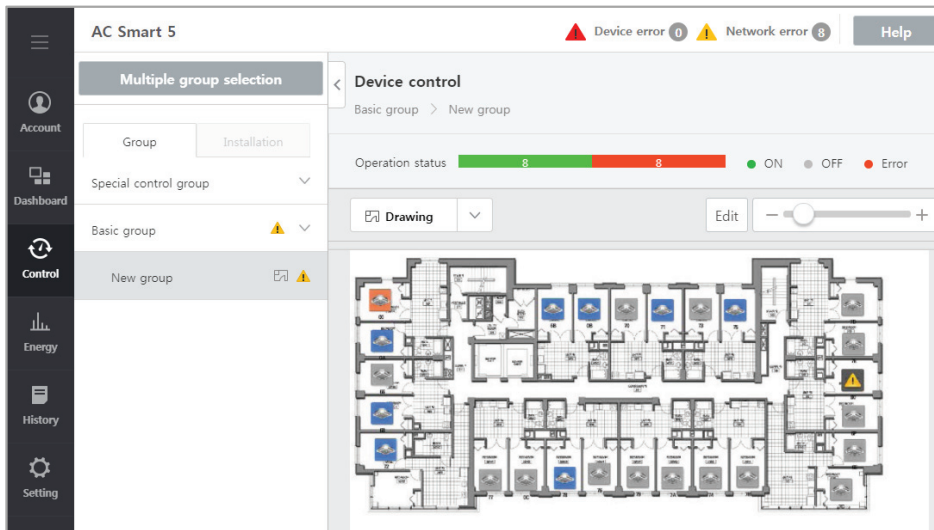
Maintenance Time: Cancel Setting 1Min.

Air purifier (2)

Name	Address	Group	Condition	Batch
aircare_00	00	Idu		Condition
aircare_01	01	Idu		Condition

2.3 Product Description

■ Map Viewing (Visual Navigation)



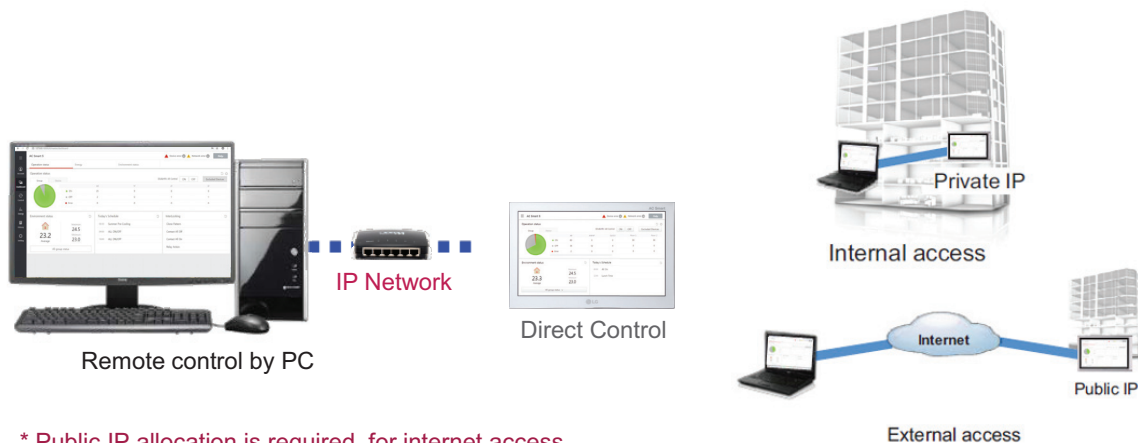
* In case of AC Smart 5 and ACP 5, it is possible to Edit floor plan only in the Web browser.

Feature	Description
Zoom in and out of drawing	0.5~4 times
drawing image	1478x1000(pixel) or less
drawing File format	jpg, png, bmp
drawing Max size	10MB
Text	Max. 40 characters special characters (^), ('), (,), ("), (l), () cannot be used.

2.3 Product Description

■ Remote Access by web

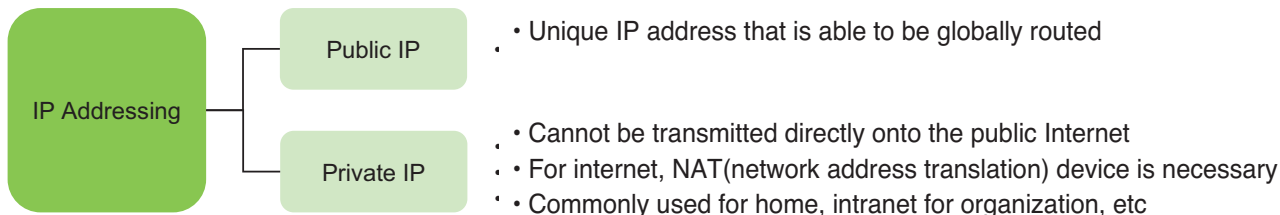
Chrome browser is recommended for accessing AC Smart 5 / ACP 5



* Public IP allocation is required for internet access

• IP Network

For external access to central controller through internet, basically public IP network is necessary



• Private IP

- Definition

These addresses are characterized as private because they are not globally delegated, meaning they are not allocated to any specific organization, and IP packets addressed by them cannot be transmitted onto the public Internet.

- Private IP address spaces (IPv4)

RFC1918 name	IP address range	number of addresses	classful description	largest CIDR block (subnet mask)	host id size
24-bit block	10.0.0.0 – 10.255.255.255	16,777,216	single class A	10.0.0.0/8 (255.0.0.0)	24 bits
20-bit block	172.16.0.0 – 172.31.255.255	1,048,576	16 contiguous class Bs	172.16.0.0/12 (255.240.0.0)	20 bits
16-bit block	192.168.0.0 – 192.168.255.255	65,536	256 contiguous class Cs	192.168.0.0/16 (255.255.0.0)	16 bits

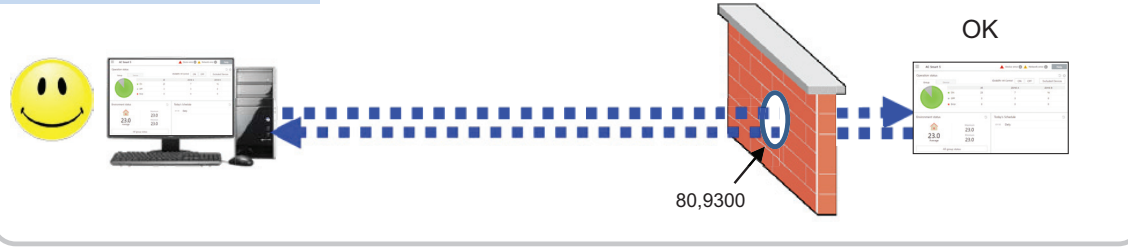
! NOTES

IP address/Subnet mask/Gateway is activated when IP address allocation type is Using Static IP address.

2.3 Product Description

TCP Port used for AC Smart 5/ACP 5 : 80, 9300

Right case : Port opened

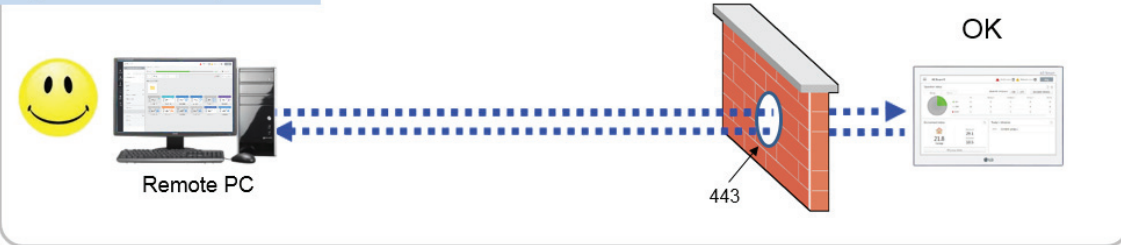


Wrong case : Port blocked



TCP Port used for AC Smart 5 / ACP 5 : HTTPS port 443 (it can be modified)

Right case : Port opened



Wrong case : Port blocked

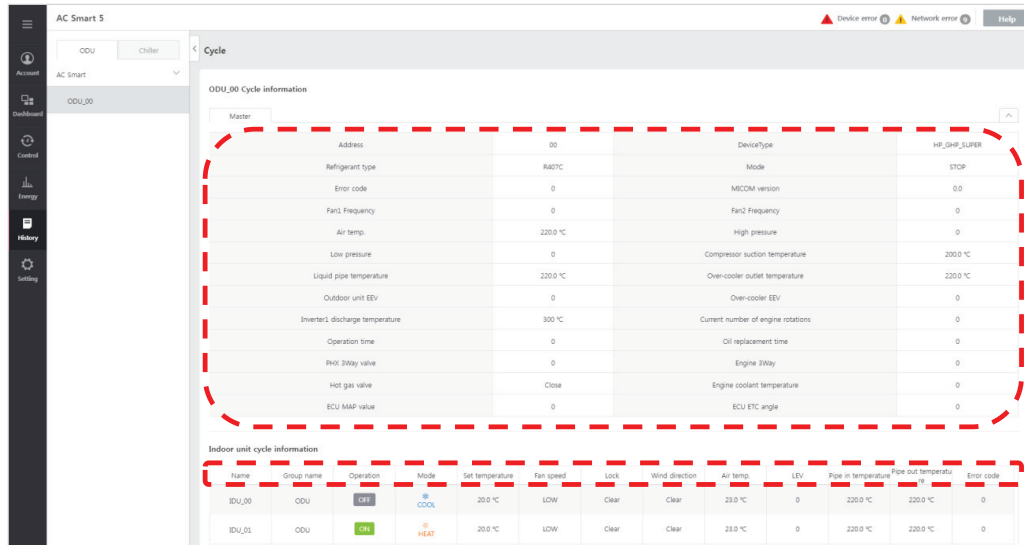


* If the essential ports are blocked because of the security policy, it's necessary to ask network administrator in the building to open them

2.3 Product Description

■ Cycle Monitoring

For Outdoor unit : Master/slave outdoor unit information is displayed.



For Indoor unit : Information on all indoor units connected to the outdoor unit is displayed

! NOTES

Some categories of the corresponding menu may not be displayed or menu name may be different according to the function of the product.

! NOTES

A central control address value is a number between 00 and FF. You can use only 1 device per address.

2.3 Product Description

■ Support IPv6

Advanced network accessibility

AC Smart 5 reflects the state of the art of network technology trend.

IPv6 (Internet Protocol version 6), which is the most recent version of the Internet Protocol, provides accessibility to the IPv6 compatible network environment HTML5 makes the web access to AC Smart 5 easier and look good on all devices, especially for mobile.



! NOTES

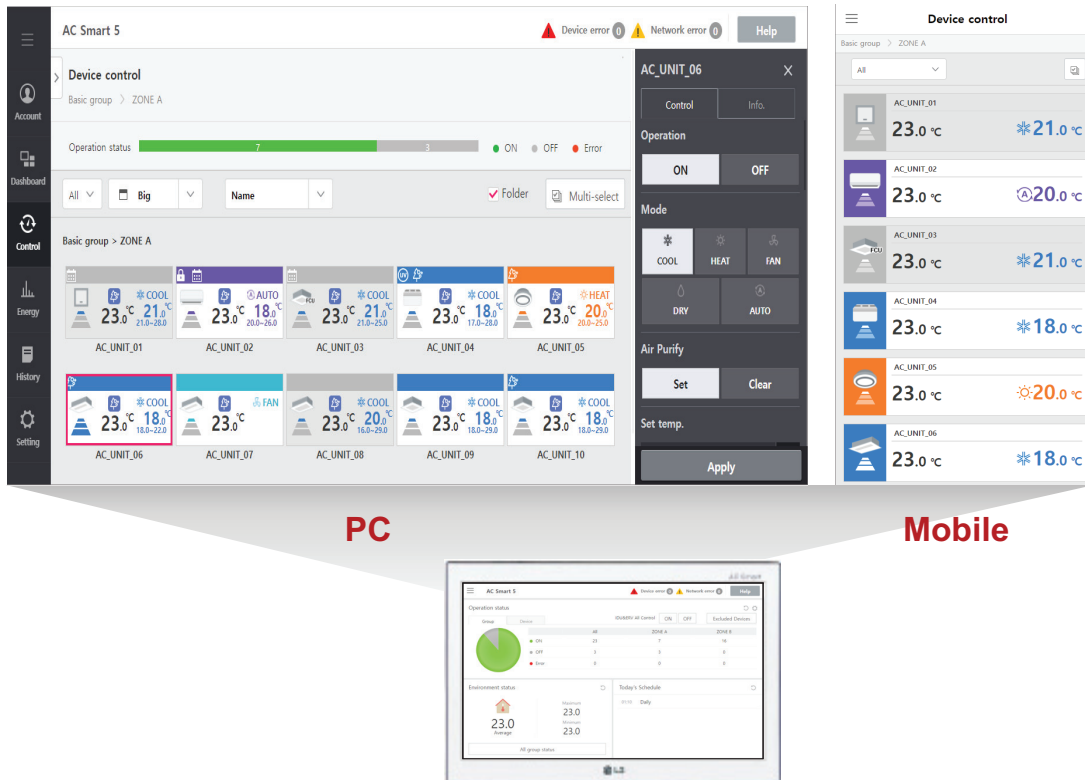
What is the IPv6 ?

Internet Protocol version 6 (IPv6) is the most recent version of the Internet Protocol (IP), the communications protocol that provides an identification and location system for computers on networks and routes traffic across the Internet.

2.3 Product Description

Smart Management (Control/Monitor)

You can compose the groups according to the site composition to comfortably check device operation status and use major functions of the product.



PC

Mobile

1. Multi level group composition

You can freely apply layer structure such as building, floor, zone, etc. and set the group as the same as the site composition to control and monitor the devices.

2. Special control group

You can additionally compose frequently used groups such as VIP Room, executive room, etc. regardless of the building structure.

3. Web control

If PC or smart phone is connected to the same network as AC Smart 5 or if AC Smart 5 is connected to internet line that can be accessed from outside, it can be connected from any place in the world.

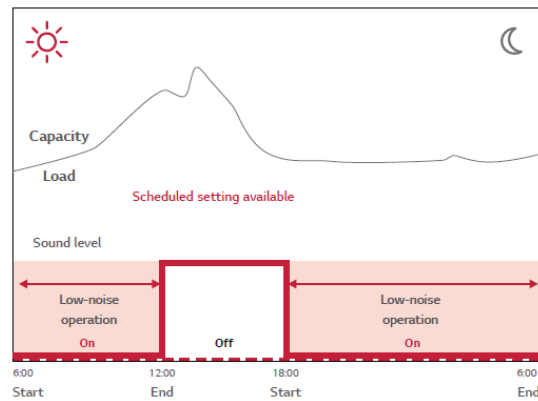
2.3 Product Description

■ Advanced function for ODU

Support to various function for ODU application

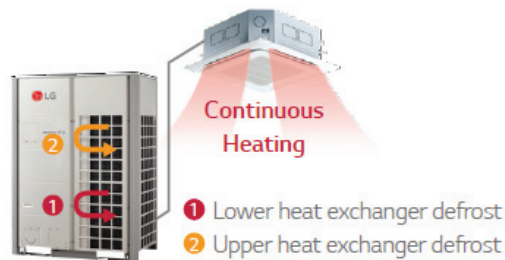
1. Low noise operation

It provides the function regardless of the time at the noise sensitive areas from AC Smart 5/ACP 5.



2. Outdoor unit defrost Mode

There are 3 defrost mode stage for defrost of Outdoor unit. (0 stage, 1 stage, 2 stage, 3 stage)



2.3 Product Description

■ Advanced function for IDU

Support to various function for IDU application

1. Comport cooling

Without cooling operation stopping, this function allows MULTI V 5 to maintain operation at mild cooling mode.



* Available setting on each Indoor Unit

2. Human detect sensor

It can save the energy to detect human, also offers comfort ability.

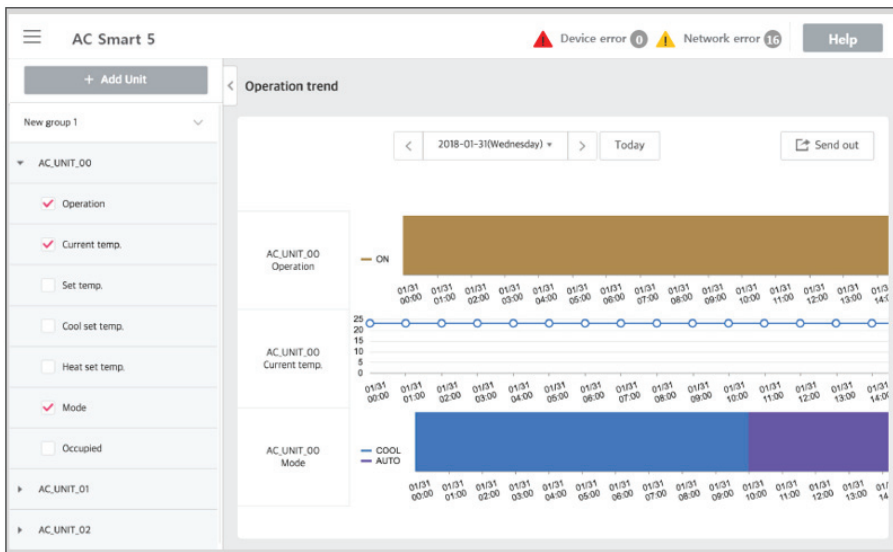


2.3 Product Description

■ Operation Trend

Support to analysis the operation trend

Changed unit's operation status in the past can be traced to help establishing reasonable operation plan of the site.



Status Condition

Category	Description
Indoor unit	operation, current temperature, set temperature, cooling set temperature, heating set temperature, operation mode, occupancy, PM10, PM2.5, PM1.0
ERV	operation, mode, current temperature (only for ERV DX), set temperature (only for ERV DX)
AHU	operation, mode, set temperature, air supply temperature, air supply humidity, ventilation temperature, ventilation humidity
Heating	Operation, Water inlet temperature, Water outlet temperature, Hot water temperature, Set temperature, Hot water set temp., Mode, Hot water operation
Chiller	Operation, Water inlet temperature, Water outlet temperature, Mode
DI	Operation
DO	Operation
DI (Expansion IO)	Operation
DO (Expansion IO)	Operation
UI (Expansion IO)	Value
AO (Expansion IO)	Value
Air purifier	Operation, Odor, PM 10, PM 2.5, PM 1.0

2.3 Product Description

■ Air quality management function

The central controller interlocks new functions of indoor unit and ventilation products, enabling efficient air quality management.

Item	Function	Detailed specifications	Remark
IDU	Air Purify	ON/OFF	
	Air quality level	PM10, 2.5, 1.0 concentrations and state	Dashboard : Environment status
	Comfortable Power Saving	ON/OFF, 1~3 steps	
	Comfort	Comfort degree using room temperature/humidity, winter/summer information (Good, Normal, Bad)	Dashboard : Environment status
ERV	CO ₂	4-step state display (Good, Normal, Bad, very bad)	Dashboard : Environment status
	NTFC	Night Time Free Cooling : Energy saving control by outdoor air cooling at night	
	Individual locking	Temperature/Mode/Fan/Address lock	ERV DX Only

Air quality content can be displayed on the dashboard to check the current state intuitively.

The screenshot shows the ACP 5 dashboard interface. At the top, there are status indicators for 'Device error' (0) and 'Network error' (1), along with a 'Help' button. The main navigation bar includes 'Smart Driving Status', 'Energy', and 'Environment status' (which is currently selected). The dashboard is divided into three main monitoring panels:

- CO₂ Monitoring:** Shows a 'Good' status with a blue smiley face icon. Below the icon, it lists counts: Good: 10EA, Normal: 0EA, Bad: 0EA, and Severe: 0EA. A 'View by Device' button is at the bottom.
- Comfort Level Monitoring:** Shows a 'Bad' status with an orange frowny face icon. Below the icon, it lists 'Average Comfort 10' and counts: Good: 0 EA Group, Normal: 0 EA Group, Bad: 10 EA Group. A 'View by Group' button is at the bottom.
- Air Quality Level:** Shows a 'Moderate' status with a yellow warning icon. Below the icon, it shows 'Overall Air Quality 35.9' and counts: Good: 0 EA, Moderate: 52 EA, Unhealthy: 12 EA, and Poor: 0 EA. A 'View by Device' button is at the bottom.

 On the left side, there is a vertical navigation menu with icons for 'Account', 'Dashboard', and 'Control'.

! NOTES

In order to use additional functions, check the indoor unit, outdoor unit, ventilation date or version and install a separate kit.

Product	Function	Version
MultiV 5 outdoor unit	Air Purify, Air quality level, Comfort power saving, Comfort (humidity)	Version 1.12 or higher
MultiV indoor unit cassette		Since product number October 2017
MultiV 5 outdoor unit	CO ₂ , NTFC, Individual lock	Version 1.9 or higher
ERV DX		Since product number May 2017
ERV	CO ₂ , NTFC	Since product number December 2017
Ventilation PI485		Since product number October 2017

2.3 Product Description

■ Air quality level status display standard

Select the reference country for the Air quality level display (Korea(한국)/Global/USA/China(中国)/India)

• Korea(한국)

Display classification : PM10, PM2.5, PM1.0

	Good	Normal	Bad	Very Bad
Color	Blue	Green	Orange	Red
PM10	0~30	31~80	81~150	151~
PM2.5	0~15	16~35	36~75	76~
PM1.0	0~15	16~35	36~75	76~
Text(Korea)	좋음	보통	나쁨	매우나쁨

• China(中国)/India

Display classification : PM10, PM2.5, PM1.0

	Good	Moderate	Unhealthy	Poor	Very Poor	Severe
Color	Green	Yellow	Orange	Red	Pink	Violet
PM10	0~50	51~150	151~250	251~350	351~420	421~
PM2.5	0~35	36~75	76~115	116~150	151~250	251~
PM1.0	0~35	36~75	76~115	116~150	151~250	251~
Text(China)	优	良	轻度污染	中度污染	重度污染	严重污染
Text(India)	Good	Moderate	Unhealthy	Poor	Very Poor	Severe

• US/Global

Display classification : PM10, PM2.5, PM1.0

	Good	Moderate	Unhealthy	Poor
Color	Green	Yellow	Orange	Red
PM10	0~54	55~154	155~254	255~
PM2.5	0~12	13~35	36~55	56~
PM1.0	0~12	13~35	36~55	56~
Text (US)	Good	Moderate	Unhealthy	Poor
Text (Global) (Translation to system language setting)	Good	Moderate	Unhealthy	Poor

! NOTES

If you select the global in Air quality index standard, and select Korean or Chinese, the US standard is displayed in air quality index.

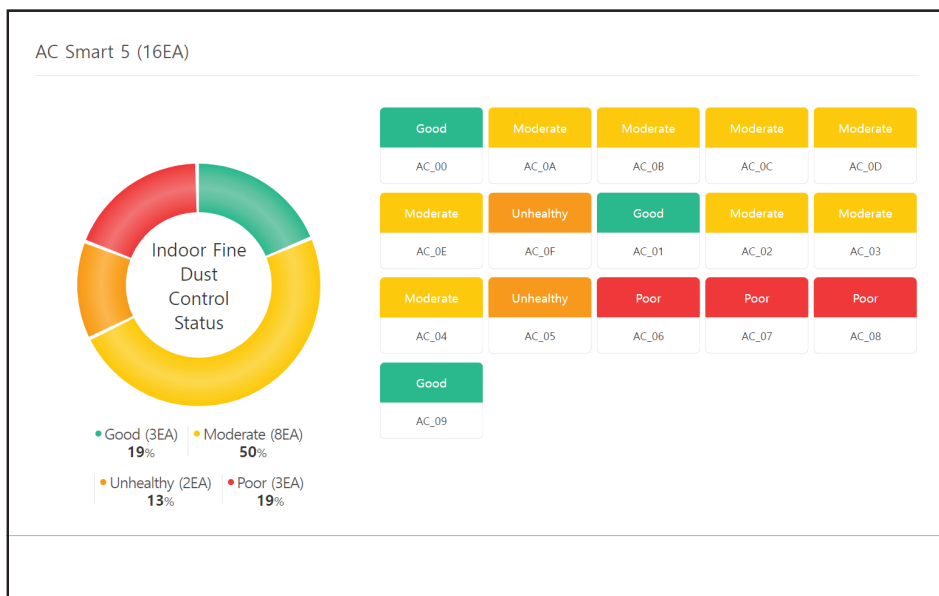
2.3 Product Description

■ Air quality level visualization

• How to set the visualization of Air quality level

- ① [Settings] > [Administrator Settings] > Check [Indoor Fine Dust Monitoring] in [Menu Settings] button Press to activate.
- ② After executing step ①, [Menu] > [Settings] > [Fine dust monitoring settings] On the screen, click [Add] Select the button to set Air quality level visualization.
- ③ How to access the dedicated screen for Air quality level visualization
Go to the login screen > Enter ID/PW > [Indoor Fine Dust Monitoring] Select button > Fine dust monitoring After checking the items, select the [Start] button.

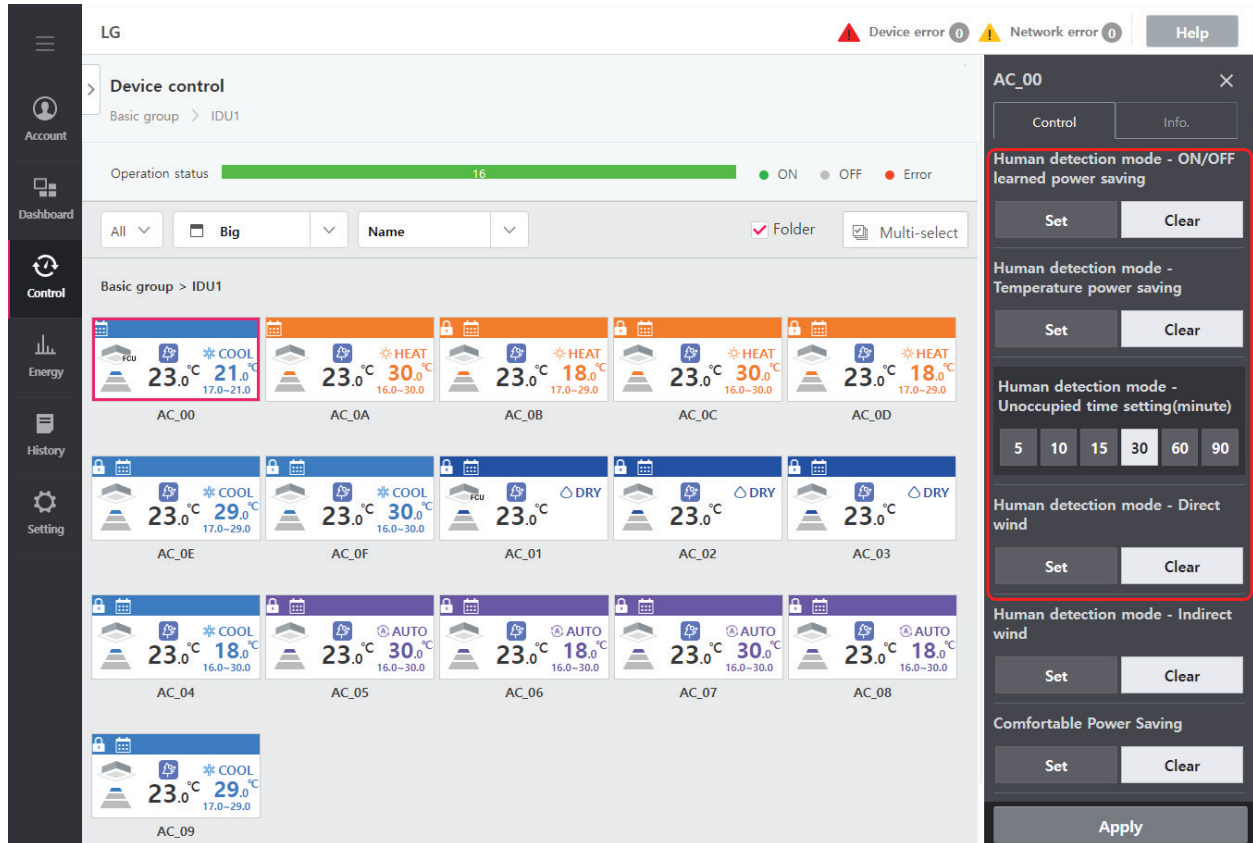
• Air quality level visualization screen



2.3 Product Description

■ Human detection mode

Only the indoor unit that supports human body sensing has been added to control the human body sensing.



1) Human body sensing power-saving operation

- On/Off power-saving: If no movement is sensed, the operation is turned off and the power-saving operation is performed.
- Temperature power-saving: If no movement is sensed, power saving operation is performed by controlling the desired temperature.

! NOTES

- The absence judgment time can be set to 5, 10, 15, 30, 60, and 90 minutes.
- Human body sensing power-saving operation can vary depending on model, capacity, and environment.

2) Human body sensing wind direction

- Human body sensing direct wind: After the movement is detected, the wind is automatically adjusted to reach the movement.
- Human body sensing indirect wind: After the movement is detected, the wind is automatically adjusted not to reach the movement.

! NOTES

- "On/Off power-saving" and "Temperature power-saving" cannot be used at the same time.
- "Human body sensing indirect wind" and "Human body sensing direct wind" cannot be used at the same time.

■ AI,AO data display formula

1) Analog Input

I/O Type BI VOL CUR PT1000 NTC10K NI1000

Signal boundary ①

Usage
 Temperature Humidity Opening Water level Operation ratio Concentration Pressure

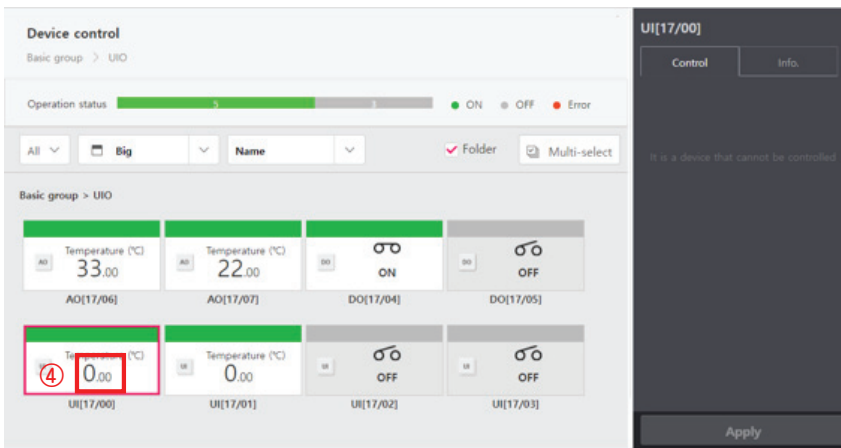
Unit symbol
 °C °F

Display boundary ②

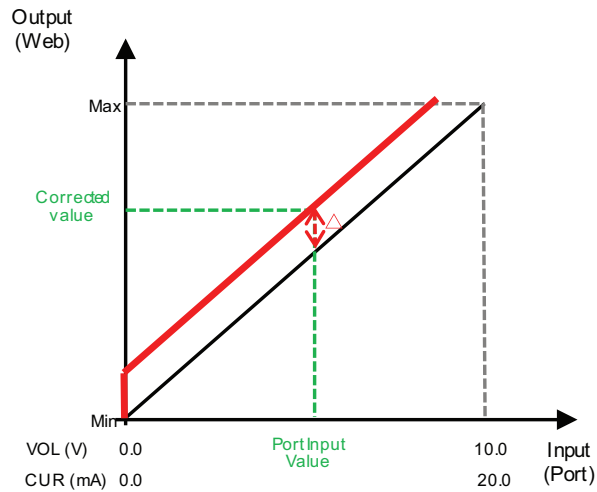
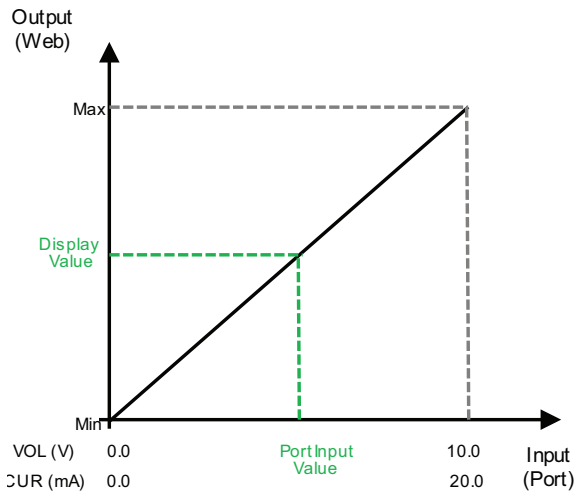
Min: 0 Max: 100

Correction value ③

0



- ① Signal boundary : Port input value
- ② Display boundary : Max./Min. value input (-9000 ~ 9000)
- ③ Correction value : Correction value (△) (-9000 ~ 9000)
- ④ Display value : Input display Value (Changing unit : 0.01)



$$\text{Input Display Value} = \frac{\text{Port Input Value} * (\text{Max.} - \text{Min. Display boundary})}{10} + \text{Min. Display boundary} + \text{Correction value}$$

2.3 Product Description

2) Analog Output

I/O Type VOL

Signal boundary 0~10V ①

Usage
 Temperature Humidity Opening Water level Operation ratio Concentration Pressure

Unit symbol
 °C °F

Display boundary
 Min Max ②

Correction value
 ③

Device control
Basic group > UIO

Operation status ON OFF Error

All Name Multi-select

Basic group > UIO

④ 33.00 AO[17/06]	22.00 AO[17/07]	ON DO[17/04]	OFF DO[17/05]
0.00 UI[17/00]	0.00 UI[17/01]	OFF UI[17/02]	OFF UI[17/03]

AO[17/06]

Control Info

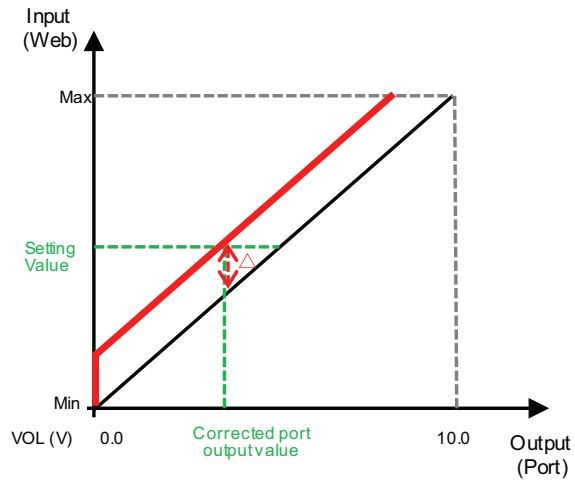
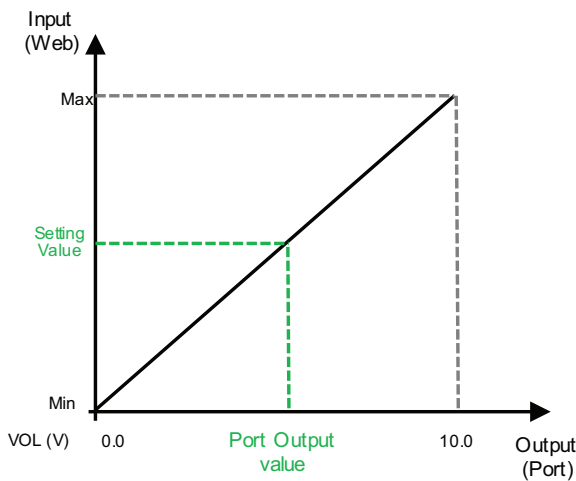
Temperature (°C)

33.00

Min 0 ~ Max 100

Apply

- ① Signal boundary : Port Output value
- ② Display boundary : Max./Min. value Output (-9000 ~ 9000)
- ③ Correction value : Correction value (Δ) (-9000 ~ 9000)
- ④ Setting Value : Output Setting value (Changing unit : 0.01)



$$\text{Output Value} = \frac{\text{setting Value} - \text{Correction value} - \text{Min. Display boundary}}{\text{Max.} - \text{Min. Display boundary}} * 10$$

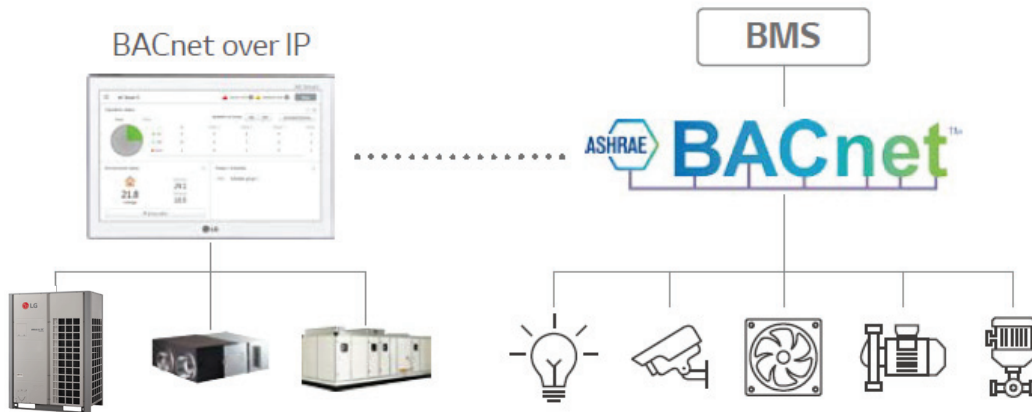
2.3 Product Description

2.3.3.5 BACnet/Modbus Function

BMS Integration (BACnet IP and Modbus TCP)

It is available to expanded control with other BMS Company

Without additional device, AC Smart 5 and ACP 5 provides BACnet IP and Modbus TCP interface for BMS(Building Management System) integration as well as its own management function.



- Interface between BACnet IP BMS and LG HVAC unit
- Modbus TCP support
- Product list offering BMS Points

Unit type	BACnet IP	Modbus TCP
IDU	○	○
ERV, DX ERV	○	○
ODU	Monitoring Only	X
Heating	○	○
AHU	○	○
EXP.I/O	○	X
Scroll-Air-Inv-Gen2	○	X
Air purifier	○	X

2.3 Product Description

■ Applicable Unit

BACnet IP		Modbus TCP
- Indoor Unit	- Heating	- Indoor Unit
- ERV, ERV DX	- Exp. IO	- ERV
- AHU	- Scroll-Air-Inv-Gen2	- AHU
- Outdoor Unit	- Air purifier	- Heating

■ Switch between using BACnet and Modbus?

- They function simultaneously, so there is no specific setting to switch between them.

■ BACnet/Modbus Setting

Category	Description
BACnet enable	BACnet enable Set/Clear
Temperature unit setting	Select temperature unit type (°C/°F)
Device ID setting	Device ID setting to designate Device Instance Number <ul style="list-style-type: none"> • Air conditioner: Device ID • ERV: Device ID + 1 • AHU: Device ID + 2 • Outdoor unit cycle information: Device ID + 3 • Heating: Device ID + 4 • Normal : Device ID + 5
Network Number Setting	Network Number Setting
Register as Foreign Device	Foreign Device Set/Clear
Only Monitoring setting	Only Monitoring Set/Clear
BACnet Port setting	BACnet Port setting * BACnet Port setting * BMS Port setting
BACnet Type setting	BACnet Type selection (A/B/C)
Time sync setting	Time sync setting Set/Clear
Modbus TCP enable	Modbus TCP enable Set/Clear
Vnet Number setting	Vnet Number setting to use Modbus TCP function Set Vnet Number value operates as Modbus TCP's Slave ID Address

! NOTES

Guide on BTL authentication

You need to set BACnet to Type C to make the devices operate using the functions authenticated by BTL. BACnet Type A/B exists to maintain compatibility with existing products. If you set BACnet to Type A/B, the devices may use the functions not authenticated by BTL, making them to operate differently from the standard.

Operation method according to BACnet type

- Type A: It creates multiple devices, and the objects are included in the device of each equipment. Multiple devices respond using the same MAC address for their physical addresses.
- Type B: It creates multiple devices, and the objects are included in the device of each equipment. Devices respond with unique physical addresses.
- Type C: It creates only one device, which includes all objects.

! CAUTION

If you change the type, the device number may be changed, making it necessary to perform additional engineering with the BMS.

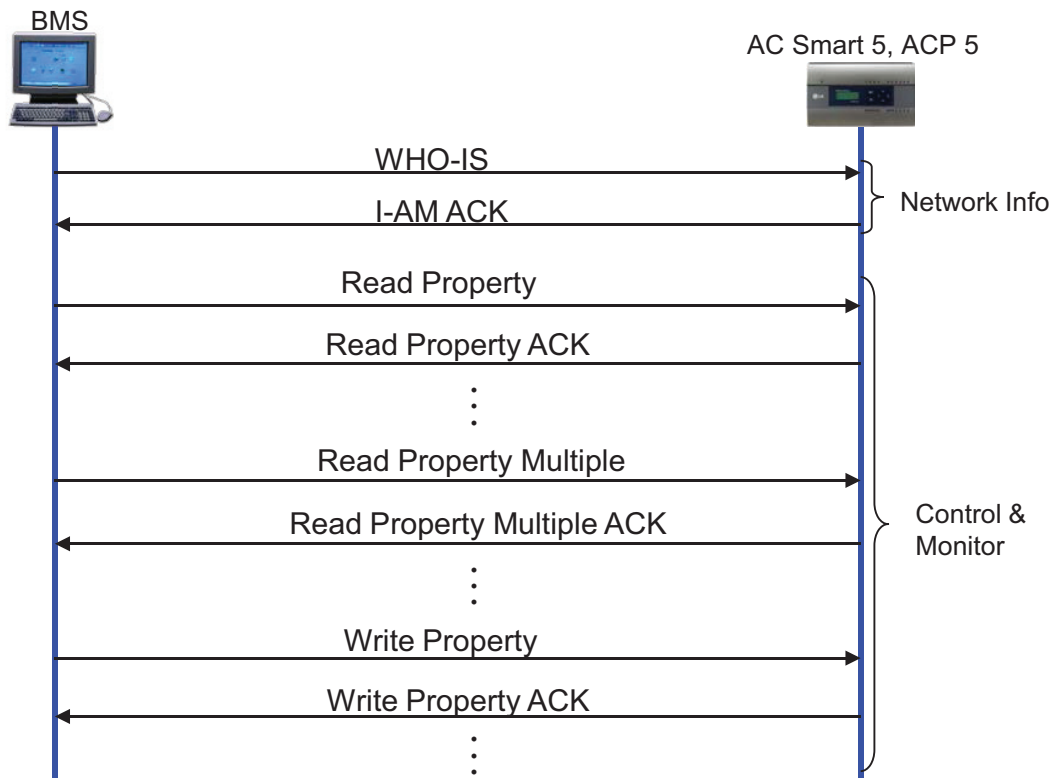
2.3 Product Description

■ Preparation – BACnet Service

• Main services of AC Smart 5, ACP 5

Service	Contents
Who-Is Service	Used to determine the device object identifier and network addresses of all devices on the network
I-Am Service	Used to respond to Who-Is service requests (device number)
ReadProperty	Request the value of one property of one BACnet Object
ReadPropertyMultiple	Request the values of one or more specified properties of one or more BACnet objects.
WriteProperty	Modify the value of a single specified property of a BACnet object
WritePropertyMultiple	Modify the value of one or more specified properties of a BACnet object.

• Sequence

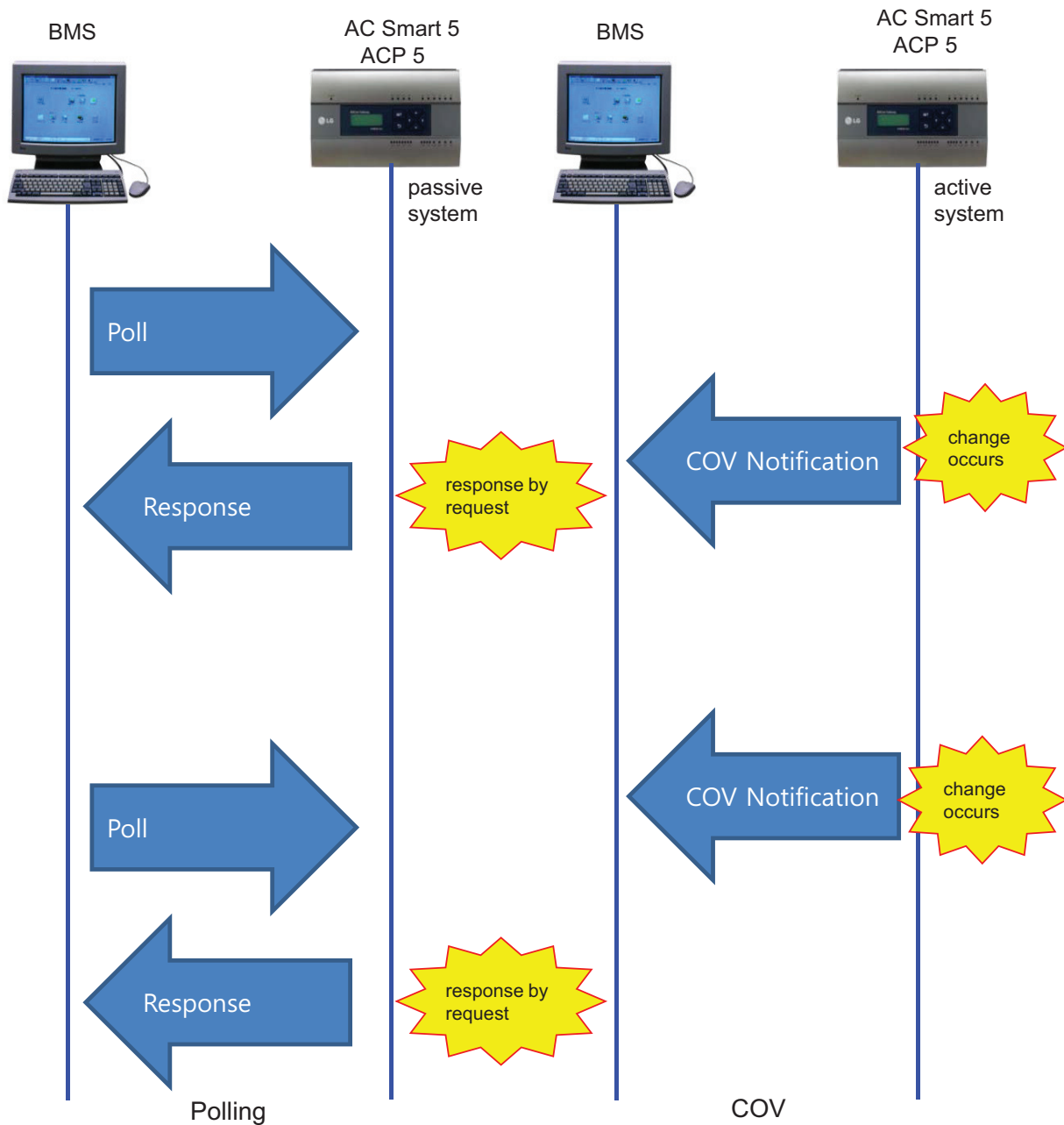


2.3 Product Description

■ Preparation – BACnet Communication

• **Data transmission type : Polling vs COV (Change of Value) AC Smart 5, ACP 5**

- Polling : ACP BACnet waits passively for BMS to poll them for data, and only then do the respond
- COV : When a value change has occurred, BACnet G/W sends notifications to the subscribers(BMS)



2.3 Product Description

■ Commissioning Step

1. Check all of LG unit status by using Web server S/W

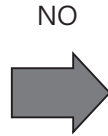
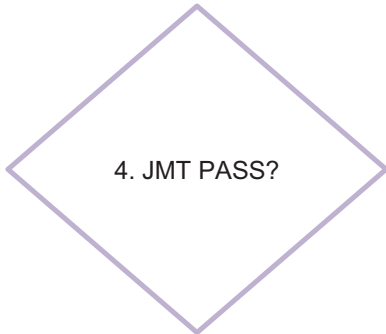


2. Offering information of BACnet points to BMS

Name	Object Name	Unit	Unit	Unit	Unit	Unit	Unit	Unit
1. Chiller Setting	ChillerControlSet	00	00	00	00	00	00	00
2. Chiller Status	ChillerStatus	00	00	00	00	00	00	00
3. Load Setting	LoadControlSet	00	00	00	00	00	00	00
4. Load Status	LoadStatus	00	00	00	00	00	00	00
5. Filter Set	FilterSet	00	00	00	00	00	00	00
6. Filter Set user	FilterSetUser	00	00	00	00	00	00	00
7. Temperature Setting	TemperatureControlSet	00	00	00	00	00	00	00
8. Temperature Status	TemperatureStatus	00	00	00	00	00	00	00
9. Spring Setting	SpringControlSet	00	00	00	00	00	00	00
10. Spring Status	SpringStatus	00	00	00	00	00	00	00
11. Fan Speed Setting	FanSpeedControlSet	00	00	00	00	00	00	00
12. Fan Speed Status	FanSpeedStatus	00	00	00	00	00	00	00
13. Air Flow Temperature	AirFlowTemperature	00	00	00	00	00	00	00



3. Mapping BACnet points with BMS S/W (BMS job)



Troubleshoot

- Check setting
- Device Instance no.
- IP address
- Get the advice from HQ



END

Central Controller

2.3 Product Description

■ Certification & PICS

Link → <http://www.bacnetinternational.net/btl/index.php?m=97>



Global Testing for the Global BAS Standard



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BTL Listing of Tested Products [| Return to Main Page |](#)

LG Electronics

kic.lgeaircon.com



BACnet Advanced Operator Workstation (B-AWS)

Product	Model	Version	PICS	BTL Listing	Certificate
LG BECON Manager	All models	2.4			

BACnet Operator Workstation (B-OWS)

Product	Model	Version	PICS	BTL Listing	Certificate
LG Building Management	VCQ-A1Q15	1.5	PICS not provided		

BACnet Building Controller (B-BC)

Product	Model	Version	PICS	BTL Listing	Certificate
LG Building Controller	VDQ-00QA2	2.0			
LG Building Controller	VDQ-00QA1	2.1.1	PICS not provided		

BACnet Advanced Application Controller (B-AAC)

Product	Model	Version	PICS	BTL Listing	Certificate
LG Smart Lighting Manager	9LH00N5VVX1	3.5			

BACnet Application Specific Controller (B-ASC)

Product	Model	Version	PICS	BTL Listing	Certificate
MultiSITE Remote Controller	PREMTBVC2, PREMTBVC3, PREMTBVC4	2.4.0	PICS not provided		
AC Smart 5	PACS5A000	1.53.4 (BACnet 1.30.2f)			
ACP 5	PACP5A000	1.80.3			
AC Smart BACnet	PBACNA000	4.01.2c			
ACP BACnet	PQNF817C2, PQNF817C1, PQNF817C0, PNF-B17C0	5.08.1 (Tested 3.0.1f)			
BNU-BAC (BACnet Gateway)	PQNF817B0	4.0			

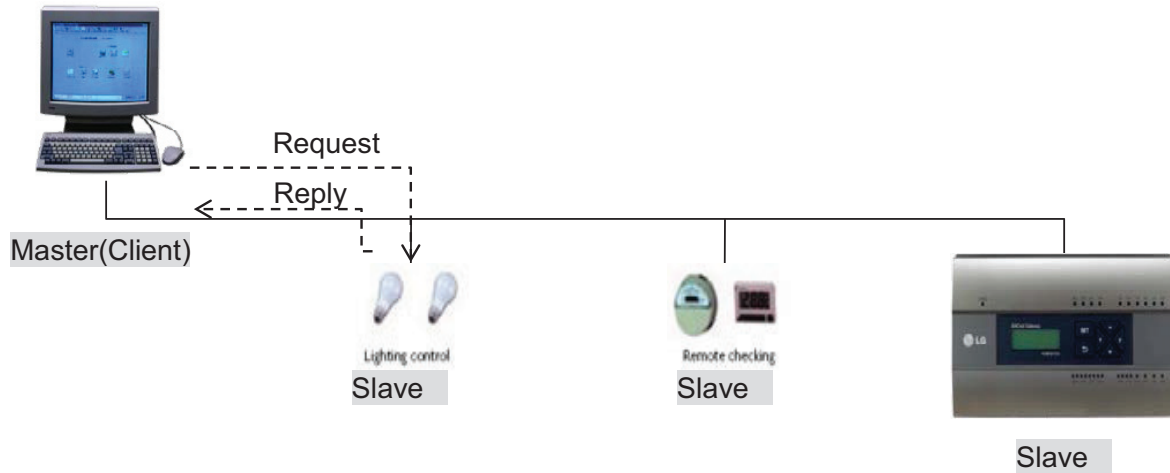


Central Controller

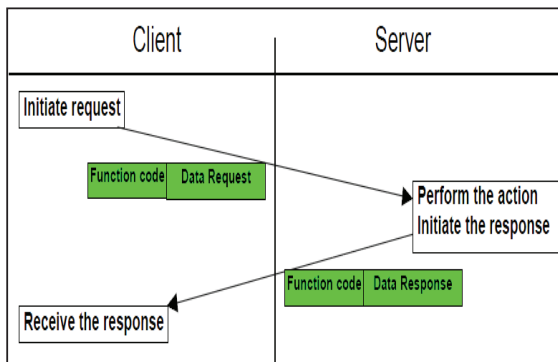
2.3 Product Description

■ Preparation – Modbus Concept

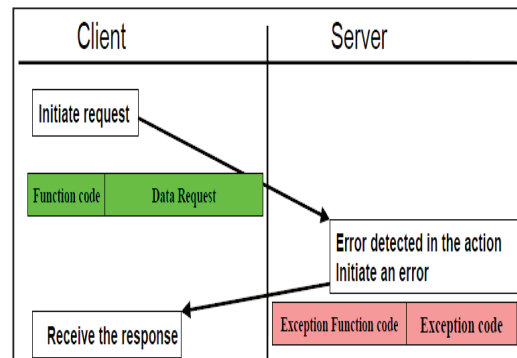
- Master / Slave Communication Architecture



- Modbus transaction



Modbus transaction (error free)

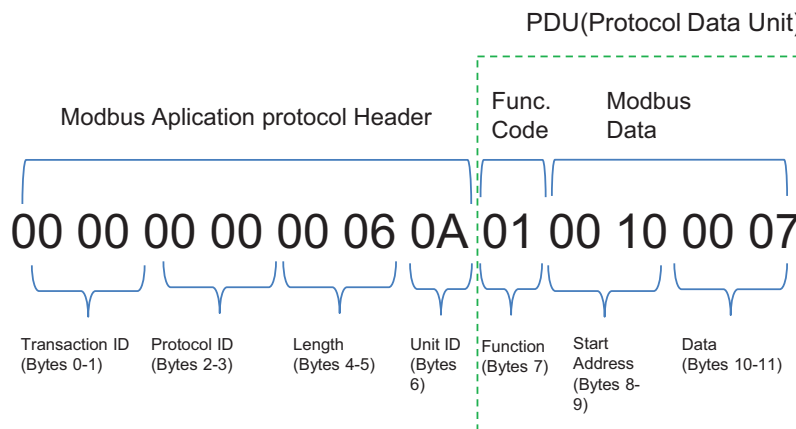


Modbus transaction (error response)

2.3 Product Description

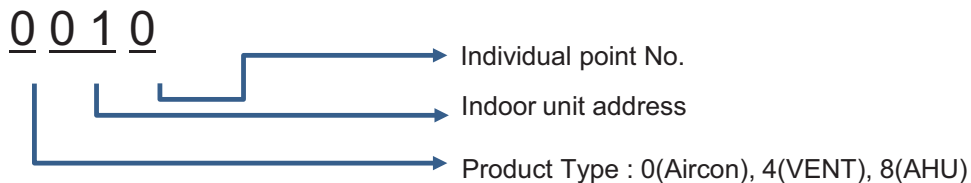
■ Message Frame

• Request



* Protocol ID : 0 (fixed) / Length : remaining bytes in this frame

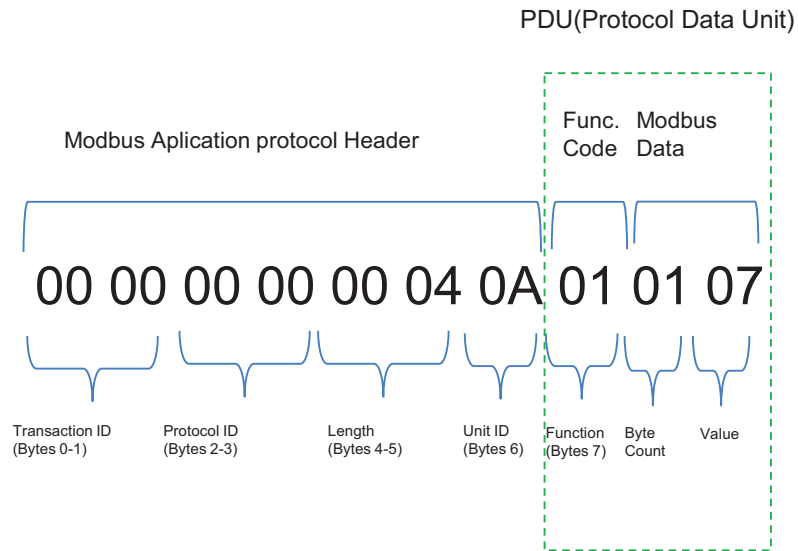
1. Unit ID : 'Vnetno' setting value (default:10 (0x0A))
2. Function Code
 - 01 : Read Coils,
 - 03 : Read Holding Register,
 - 05 : Write Single Coils,
 - 06 : Write Single Register
3. Starting Address structure



4. Data : Count to read
 - ex) 00 07 : read 7 points
 - In case of Read Coils (Function Code : 01), up to 2000 addresses can be read at a time
 - In case of Read Holding Registers (Function Code : 03), up to 125 addresses can be read at a time

2.3 Product Description

- Response



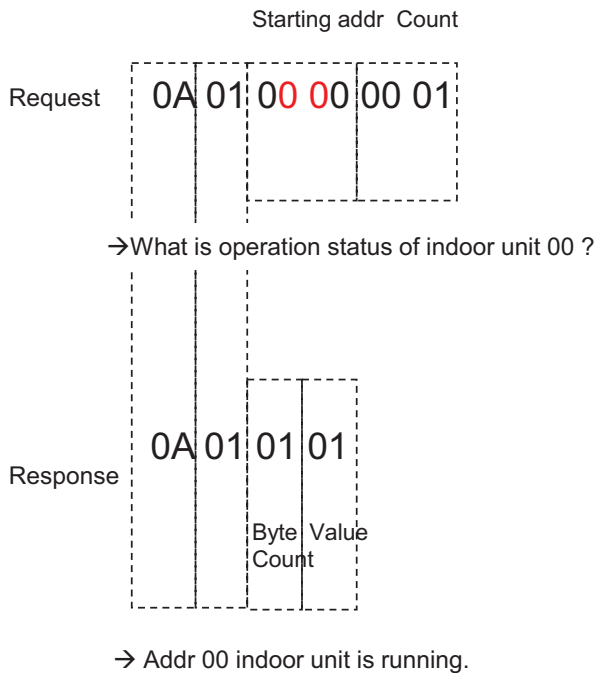
* Protocol ID : 0 (fixed) / Length : remaining bytes in this frame

1. Unit ID : 'Vnet no' setting value (default : 10 (0x0A))
2. Function Code
 - 01 : Read Coils,
 - 03 : Read Holding Register,
 - 05 : Write Single Coils,
 - 06 : Write Single Register
3. Byte Count : bytes to read
4. Value

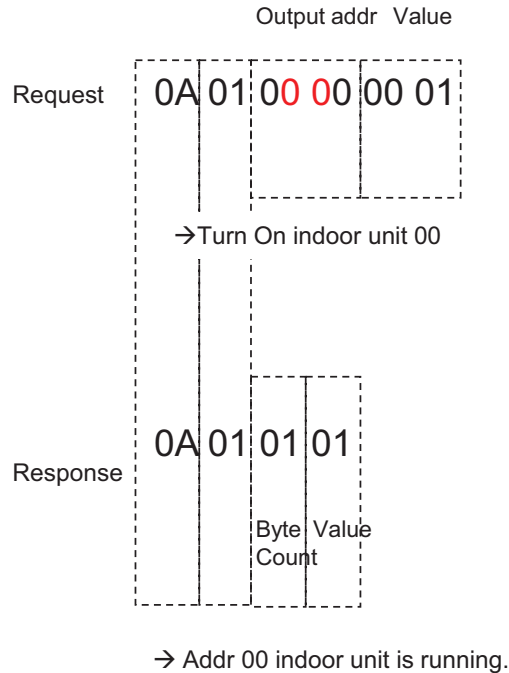
2.3 Product Description

• **Example**

Read Coils(0x01)



Write single Coils(0x05)



■ BACnet Type Setting

Guide on BTL authentication

You need to set BACnet to Type C to make the devices operate using the functions authenticated by BTL. BACnet Type A/B exists to maintain compatibility with existing products. If you set BACnet to Type A/B, the devices may use the functions not authenticated by BTL, making them to operate differently from the standard.

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⚠ CAUTION

If you change the type, the device number may be changed, making it necessary to perform additional engineering with the BMS.

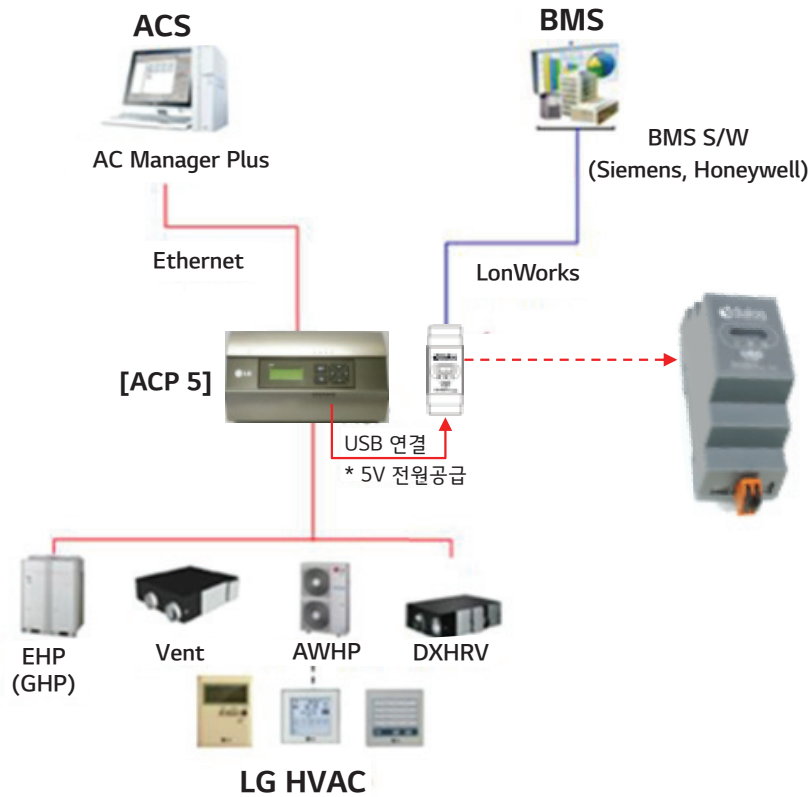
2.3 Product Description

2.3.3.6 LonWorks Function

BMS Integration (LonWorks)

It is available to expanded control with other BMS Company

Without additional device, ACP 5 provides LonWorks interface for BMS(Building Management System) integration as well as its own management function.



- Interface between LonWorks BMS and LG HVAC unit
- Product list offering BMS Points
- Up to 64 equipments(AC, ERV, ERV DX, Heating)

2.3 Product Description

■ Applicable Unit

- AC, ERV, ERV DX, Heating(AWHP)

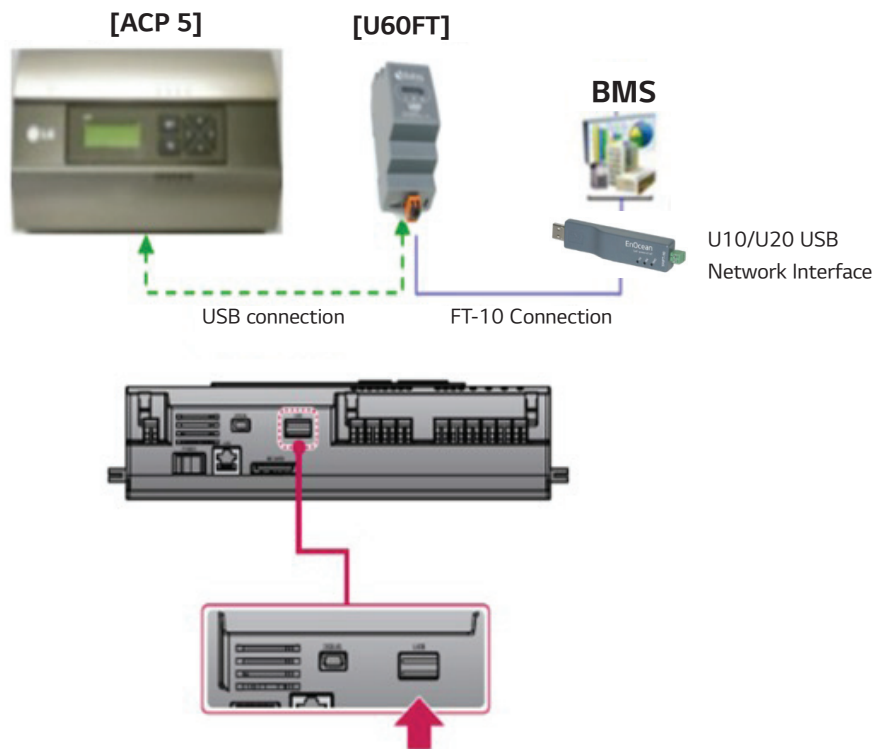
■ Addressing Range is '00~FF'

- For LonWorks BMS, only 64 units are allowed
- It chooses the units from lowest unit address to higher unit address up to 64 units
- All addresses don't need to be continuous number

■ Preparation

The first process linking the BMS system with ACP 5 is called commission

1. After installing ACP 5, use the web function to check the operation status of the linking device before connecting to the BMS system.
2. After preparing the U60FT communication module, connect USB with the FT-10 communication line as shown in the image.
3. In [Setting] > [BACnet/Modbus/Lonworks Setting], set [Use Lonworks] and [Temperature Unit] and press the Apply button to activate [SVC pin Setting].
4. When the SVC Pin press request screen appears on the BMS engineering screen, if the connection between BMS and communication is normal, click the "Connect" button to activate.



2.3 Product Description

■ Commissioning

Commissioning with XIF file

Commissioning is to get device information of Lonworks G/W

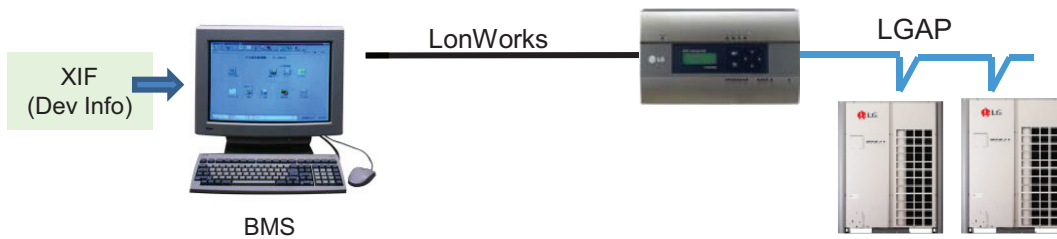
There are 2 commissioning methods

- One is “upload from device”, the other one is using “XIF file”

1) Using “Upload from device”




2) Using “XIF File” for pre-engineering



2.3 Product Description

■ LonWorks Certification

URL : <https://www.lonmark.org/products/acp5/>



ACP5

Technical data

Media channel: Free Topology - TP/FT10

Certified: yes

Documents

[DOWNLOAD XIF](#)

[DOWNLOAD DATASHEET](#)

Contact data

Manufacturer: LG Electronics, Inc.

Contact person: Seok Hyun Jun

E-mail: seokhyun.jun@lge.com

Address: R&D Campus, 327-23 Seoul Korea

Phone number: +82552693075

If you forget the link

- 1) Select 'LG Electronics, Inc'
- 2) Select 'HVAC Gateway'
- 3) Press 'SEARCH' button

※ Use LonWorks certification when working with BMS companies.
LonWorks certification contains information required when connecting to LON BMS.

2.3 Product Description

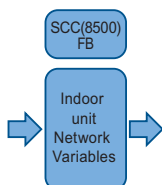
■ Air conditioner Function Block

Control	
On/Off	Operation Mode
Lock	Set Temperature
Fan Speed	Swing
Mode Lock	Fan Lock
Temp Lock	Lower Limit Temperature
Upper Limit Temperature	PeakShiftTime
Peak Target Ratio	Temperature Unit
Total Temperature Lock	Total On/Off
Total Setting Temperature	

Monitoring	
On/Off	Operation Mode
Lock	Set Temperature
Fan Speed	Swing
Mode Lock	Fan Lock
Temp Lock	Lower Limit Temperature
Upper Limit Temperature	Product Type
Product Address	Current Temperature
Alarm	Power
PeakShiftTime	Peak Target Ratio
Temperature Unit	Peak Current Running Ratio
Total Accumulated Power	Outdoor Unit Defrost

① Standard Function Block

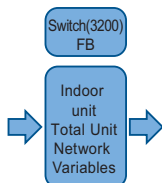
Standard Function Block	
SNVT_switch	nviOnOff
SNVT_hvac_mode	nviHeatCool
SNVT_switch	nviLock
SNVT_temp_p	nviSetTemp
SNVT_switch	nviFanSpeed
SNVT_switch	nviSwing_Heater
SNVT_switch	nviModlok
SNVT_switch	nviFanlok
SNVT_switch	nviTmplok_Humid
SNVT_temp_p	nviLow_HW_Tmp
SNVT_temp_p	nviUp_Tmp



Standard Function Block	
SNVT_switch	nvoOnOff
SNVT_hvac_mode	nvoHeatCool
SNVT_switch	nvoLock
SNVT_temp_p	nvoSetTemp
SNVT_switch	nvoFanSpeed
SNVT_switch	nvoSwing_Heater
SNVT_switch	nvoModlok
SNVT_switch	nvoFanlok
SNVT_switch	nvoTmplok_Humid
SNVT_temp_p	nvoLow_HW_Tmp
SNVT_temp_p	nvoUp_Sol_Tmp
SNVT_count	nvoPType
SNVT_count	nvoPAddr
SNVT_temp_p	nvoSpaceTemp
SNVT_hvac_status	nvoUnitStatus
SNVT_elec_kwh_l	nvoAccuPw

② General Function Block

General Function Block	
SNVT_count	nviPeakSwTime
SNVT_lev_percent	nviPeakTgtRate
SNVT_switch	nviTempUnit
SNVT_switch	nviAllTemplock
SNVT_switch	nviTotalOnOff
SNVT_temp_p	nviTotalTemp



General Function Block	
SNVT_count	nvoPeakSwTime
SNVT_lev_percent	nvoPeakTgtRate
SNVT_switch	nvoTempUnit
SNVT_lev_percent	nvoPeakCurRate
SNVT_elec_kwh_l	nvoTotalAccuPw
SNVT_state_64	nvoDefrost

2.3 Product Description

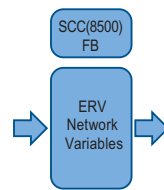
■ ERV Function Block

Control	
On/Off	Operation Mode
Lock	Fan Speed
Heater	User Mode
Total On/Off	

Monitoring	
On/Off	Operation Mode
Lock	Fan Speed
Heater	User Mode
Device Type	Device address
Alarm	

① Standard Function Block

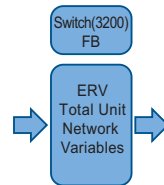
Standard Function Block	
SNVT_switch	nviOnOff
SNVT_hvac_mode	nviHeatCool
SNVT_switch	nviLock
SNVT_switch	nviFanSpeed
SNVT_switch	nviSwing_Heater
SNVT_count	nviUsrmod



Standard Function Block	
SNVT_switch	nvoOnOff
SNVT_hvac_mode	nvoHeatCool
SNVT_switch	nvoLock
SNVT_switch	nvoFanSpeed
SNVT_switch	nvoSwing_Heater
SNVT_count	nvoUsrmod
SNVT_count	nvoPType
SNVT_count	nvoPAddr
SNVT_hvac_status	nvoUnitStatus

② General Function Block

General Function Block	
SNVT_switch	nviTotalOnOff



2.3 Product Description

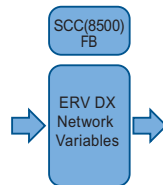
■ ERV DX Function Block

Control	
On/Off	Operation Mode
Lock	Set Temperature
Fan Speed	Heater
Humidify	User Mode
AC operation	AC Mode
Temperature Unit	Total On/Off
Total Setting Temperature	

Monitoring	
On/Off	Operation Mode
Lock	Set Temperature
Fan Speed	Heater
Humidify	User Mode
AC operation	AC Mode
Device Type	Device address
Alarm	Master/Slave
Temperature Unit	

① Standard Function Block

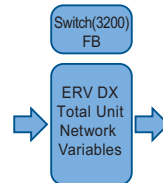
Standard Function Block	
SNVT_switch	nviOnOff
SNVT_hvac_mode	nviHeatCool
SNVT_switch	nviLock
SNVT_temp_p	nviSetTemp
SNVT_switch	nviFanSpeed
SNVT_switch	nviSwing_Heater
SNVT_switch	nviTmplug_Humid
SNVT_count	nviUsrmod
SNVT_switch	nviIDUrun_HWEEn
SNVT_hvac_mode	nviIDUmod



Standard Function Block	
SNVT_switch	nvoOnOff
SNVT_hvac_mode	nvoHeatCool
SNVT_switch	nvoLock
SNVT_temp_p	nvoSetTemp
SNVT_switch	nvoFanSpeed
SNVT_switch	nvoSwing_Heater
SNVT_switch	nvoTmplug_Humid
SNVT_count	nviUsrmod
SNVT_switch	nviIDUrun_HWEEn
SNVT_hvac_mode	nviIDUmod
SNVT_count	nvoPType
SNVT_count	nvoPAddr
SNVT_hvac_status	nvoUnitStatus
SNVT_switch	nvoMS_HWmod

② General Function Block

General Function Block	
SNVT_switch	nviTempUnit
SNVT_switch	nviTotalOnOff
SNVT_temp_p	nviTotalTemp



General Function Block	
SNVT_switch	nvoTempUnit

2.3 Product Description

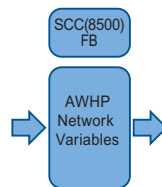
■ AWHP(Heating) Function Block

Control	
On/Off	Operation Mode
Lock	Set Temperature
Hot Water Temperature	HotWater On/Off (setting)
Temperature Unit	Total On/Off
Total Setting Temperature	

Monitoring	
On/Off	Operation Mode
Lock	Set Temperature
Hot Water Temperature	Solar Temperature Status
Air/Water In/Out Temperature	HotWater On/Off (Status)
Device Type	Device address
Current Temperature	Alarm
Hot Water Only Mode	Water Tank Temperature Status
Pipe Inlet Temperature Status	Pipe Outlet Temperature Status
Temperature Unit	

① Standard Function Block

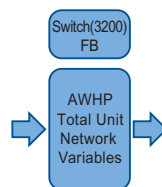
Standard Function Block	
SNVT_switch	nviOnOff
SNVT_hvac_mode	nviHeatCool
SNVT_switch	nviLock
SNVT_temp_p	nviSetTemp
SNVT_temp_p	nviLow_HW_Tmp
SNVT_switch	nviIDUrun_HWEn



Standard Function Block	
SNVT_switch	nvoOnOff
SNVT_hvac_mode	nvoHeatCool
SNVT_switch	nvoLock
SNVT_temp_p	nvoSetTemp
SNVT_temp_p	nvoLow_HW_Tmp
SNVT_temp_p	nvoUp_Sol_Tmp
SNVT_switch	nvoFilt_Tmpsel
SNVT_switch	nvoIDUrun_HWEn
SNVT_count	nvoPType
SNVT_count	nvoPAddr
SNVT_temp_p	nvoSpaceTemp
SNVT_hvac_status	nvoUnitStatus
SNVT_temp_p	nvoTankTmp
SNVT_temp_p	nvoInTmp
SNVT_temp_p	nvoOutTmp
SNVT_switch	nvoMS_HWmod

② General Function Block

General Function Block	
SNVT_switch	nviTempUnit
SNVT_switch	nviTotalOnOff
SNVT_temp_p	nviTotalTemp



General Function Block	
SNVT_switch	nvoTempUnit

2.3 Product Description

2.3.4 AC Manager 5

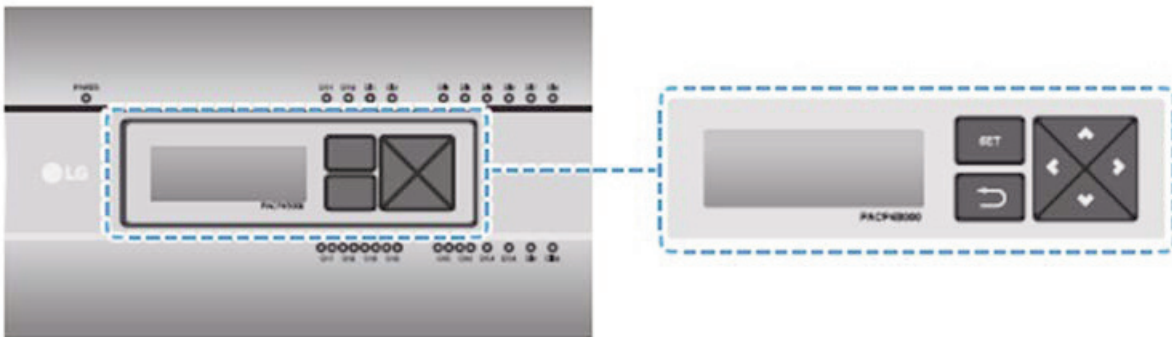
AC Manager 5 is a central controller that can manage individual or group of maximum of 8,192 units in one space.

AC Manager 5 can monitor or control the units installed in each room of a building from a place such as building management office or school administration office.

■ Environment Setting Function using External Buttons

AC Manager 5 can set the following functions using the externally mounted buttons.

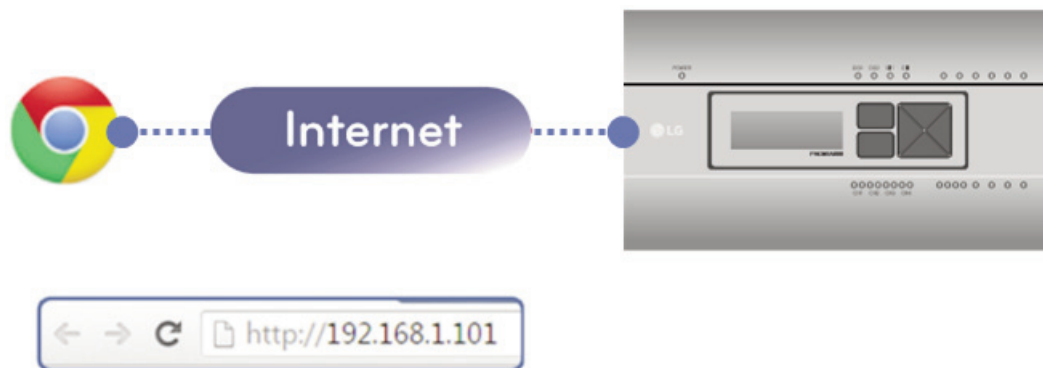
- Network Environment (IP Address, Netmask, Gateway) Setting
- SW Upgrade Function
- Data Backup Function
- Data Recovery Function



■ Web Server Embedded Function

Without installing a separate program, you can use web browser to input IP address of AC Manager 5 in the address window to access AC Manager 5 web server for device control and monitoring.

- Control of Max. of 8,192 air conditioner units (32 central controllers)
- Error and Operation Status Monitoring
- Peak/Demand Power Control
- System Setting Function



2.3 Product Description

■ Devices that can be interfaced

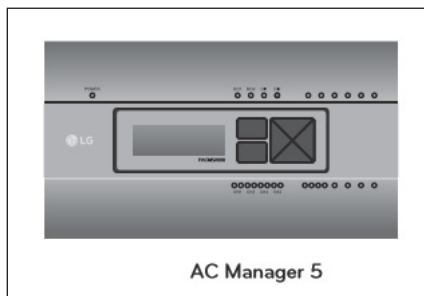
The devices of AC Manager 5 that can be interfaced are as follows.

Product type	Interfacing product	Remark
Central controller	ACP Standard	It shall be connected to AC Manager 5 through TCP/IP
	ACP Premium	It shall be connected to AC Manager 5 through TCP/IP
	ACP IV, ACP 5	It shall be connected to AC Manager 5 through TCP/IP
	AC Smart Premium	It shall be connected to AC Manager 5 through TCP/IP
	AC Smart IV, AC Smart 5	It shall be connected to AC Manager 5 through TCP/IP
	ACP BACnet	It shall be connected to AC Manager 5 through TCP/IP
Remote control	PC	Needs web browser supporting HTML5
	Tablet PC	Needs web browser supporting HTML5
	Smart Phone	Needs web browser supporting HTML5

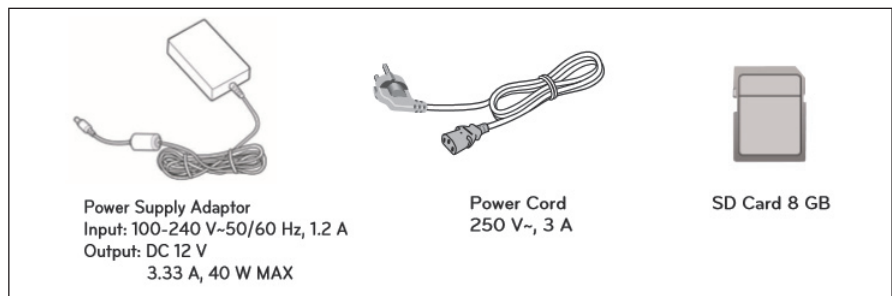
■ Components

The components of the following figure are included in AC Manager 5 package box. Open the package box, and check if all corresponding components are included.

■ Features

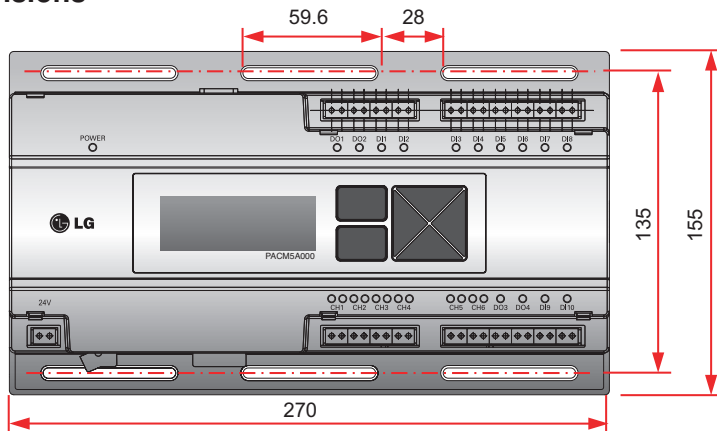


■ Accessory



2.3 Product Description

■ Dimensions

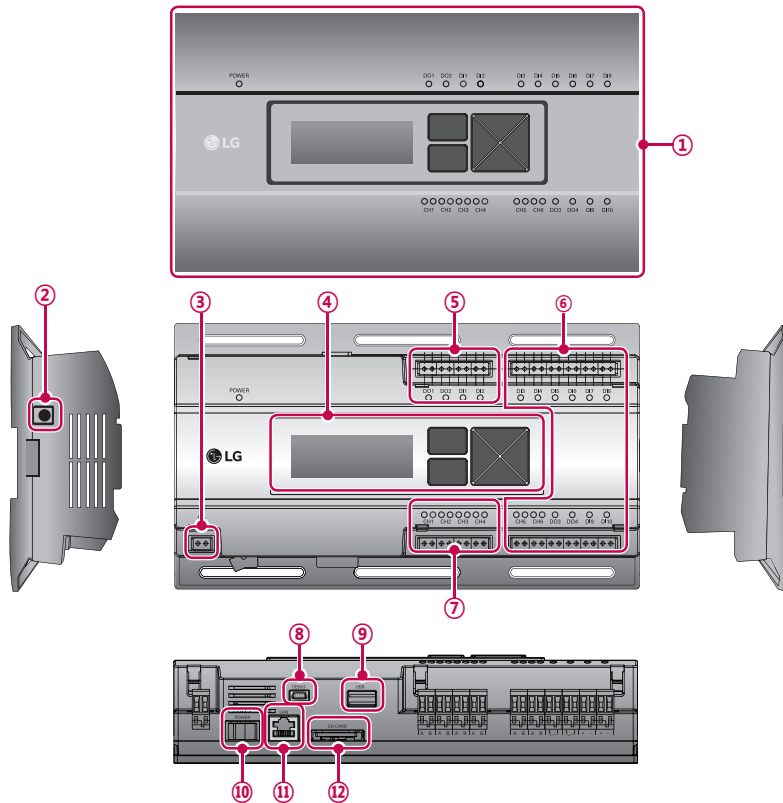


[Unit : mm]

* Detailed figures are slightly different, depending on each Model.

■ Name of Each Part

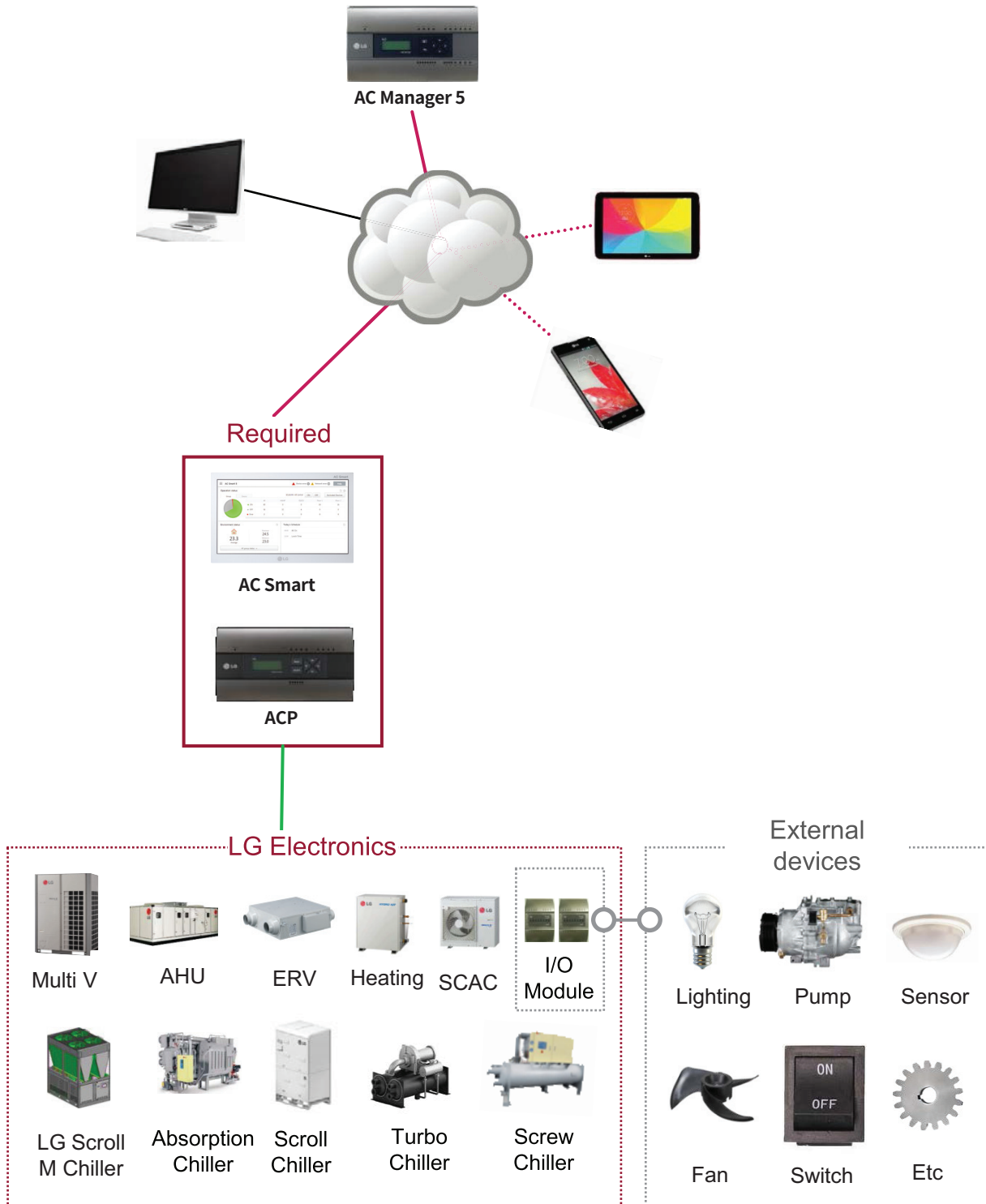
AC Manager 5 is composed as the following form.



Number	Interfacing product	Remark
①	Cover	Front cover of AC Manager 5
②	Adaptor connection jack	Jack for 12 V --- to connect to the power supply adaptor
③	Power port	24 V \sim port for power connection (not supported by 12 V --- model)
④	Buttons and LCD	Buttons and LCD to set network environment and to display other information
⑧	Mini USB port	USB to Serial port for software debugging
⑨	USB port	For software update and data backup
⑩	Power switch	Switch to turn on or off the power of AC Manager 5
⑪	Ethernet port	Ethernet port to connect to internet
⑫	SD card slot	For data backup

2.3 Product Description

■ System Structure



2.3 Product Description

■ Hardware Specification

Category	Description
Boundary of usage temperature	0°C~40°C
Rated Voltage	12 V _{DC}
Rated Current	Max 2.3A
Communication ports	<ul style="list-style-type: none"> • Ethernet 10 / 100 BASE-T • USB : USB Host (SW upgrade, data backup) • SD card slot (RS485 communication logging)
LED	13 EA (Power and communication status) 14 EA (Reserved)
LCD	20 ×4 Character-LCD (network environment setting and information display)

■ Order of Installation

To use AC Manager 5, it shall be installed in the following order.

STEP 1. AC Manager 5 Installation and Cable Connection

Install AC Manager 5 and connect network and other cables.

STEP 2. AC Manager 5 Network Address Setting

Set network address to be able to access AC Manager 5 through internet.

STEP 3. Central Controller (ACP, AC SMART) Information Input

Input and save device information in Web GUI, which is AC Manager 5 operating program.

STEP 4. Check Web GUI Control/Monitoring

Access to Web GUI, which is AC Manager 5 operating program, and check if control/monitoring are properly carried out.

! NOTE

• AC Manager 5 Installation

AC Manager 5 installation work requires specialized technique. Therefore, the installation contents mentioned in this chapter must be carried out by installation technician with qualification.

For questions and requests with regard to the installation, please contact the service center or installation specialty store approved by LG.

2.3 Product Description

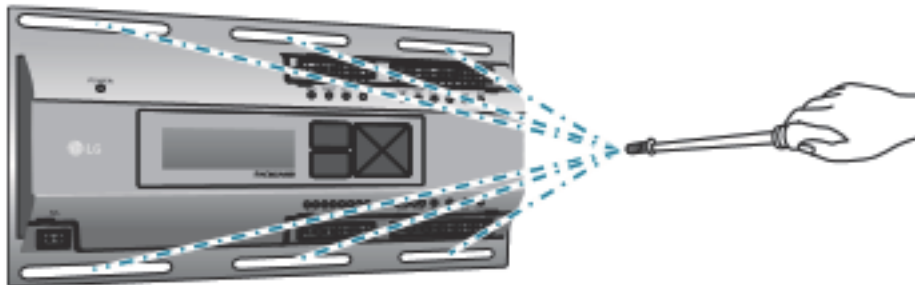
■ Fixing to Wall

AC Manager 5 can be installed by fixing to the wall.

To install AC Manager 5 in adequate place, proceed according to the following instructions.

Here, it describes the installation method of AC Manager 5 with the example of installing AC Manager 5 on the wall.

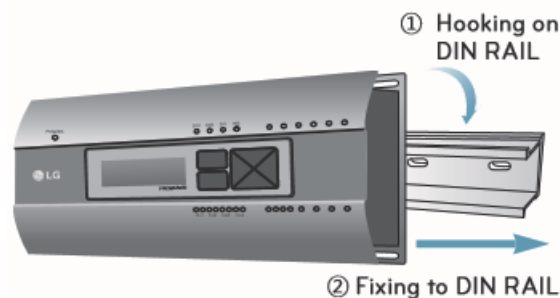
- Decide the space to install AC Manager 5.
Before installing AC Manager 5, check if it is an adequate place for the connection of AC Manager 5, power, and LAN cable.
- Use driver to fix on the wall. According to the installation location, you can fix it as in the following figure.



■ Mounting on DIN RAIL

AC Manager 5 can be installed in DIN RAIL with width 35 mm and height 7.5 mm. To install AC Manager 5 in adequate place, proceed according to the following instructions. Here, it describes the installation method with the example of installing on DIN RAIL.

- Decide the space to install AC Manager 5.
Before installing AC Manager 5, check if it is an adequate place for the connection of AC Manager 5, power, and LAN cable.
- Install DIN RAIL.
- Hook the top part of AC Manager 5 on DIN RAIL.
- Push the main body of AC Manager 5 until you hear the sound of installation.
- Pull AC Manager 5 to check if it is fixed.



! NOTE

- After installing to DIN RAIL, do not fix to the wall using screws. AC Manager 5 may be damaged.
- DIN RAIL fixing screw spec: M3, screw head height 1.75 ~ 2.0 mm, screw head diameter 5.5~7.0 mm.

2.3 Product Description

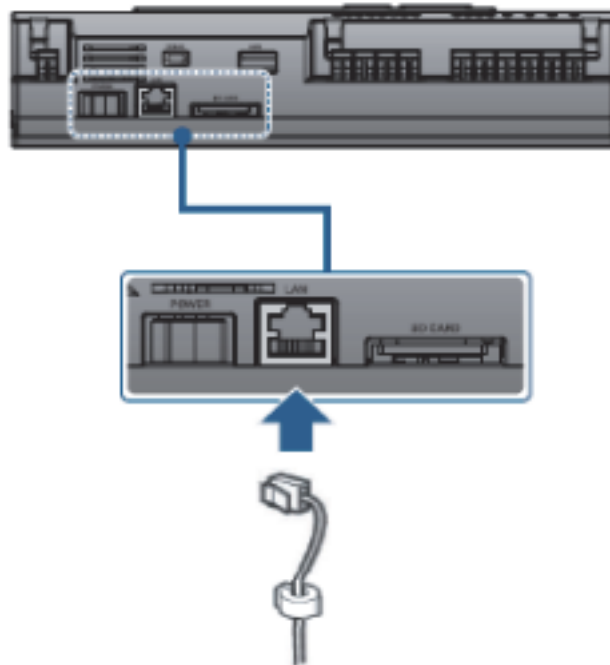
■ Connecting Ethernet Cable (LAN cable)

You need to connect Ethernet cable to AC Manager 5. AC Manager 5 can be connected to hub or ACP through Ethernet cable.

It is the case of connecting AC Manager 5 to the basic internet network installed at the site, and it is connected to general hub. Use Ethernet cable to connect to AC Manager 5's LAN port.







For this initial Ethernet connection, you can use either:

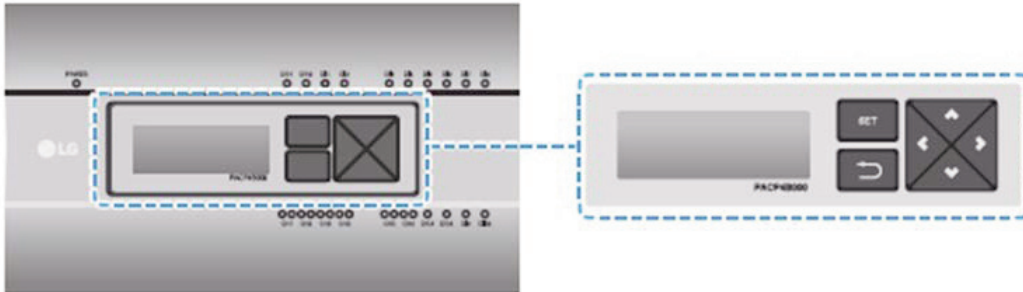
- An Ethernet patch cable connected directly between your PC and the AC Manager 5 (if your PC Ethernet port is not “auto-sensing”, you will need an Ethernet crossover cable), or
- A normal LAN connection, meaning that both your PC and the AC Manager 5 are physically connected to the same Ethernet hub or switch.



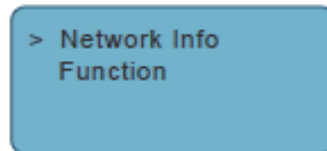
2.3 Product Description



■ LCD Environment Setting

The network environment of AC Manager 5 can be set by the LCD and the buttons at the front side of AC Manager 5. The current AC Manager 5 information and the menu are displayed on the LCD, and you can press ,  button and , , ,  buttons to change and select menu.

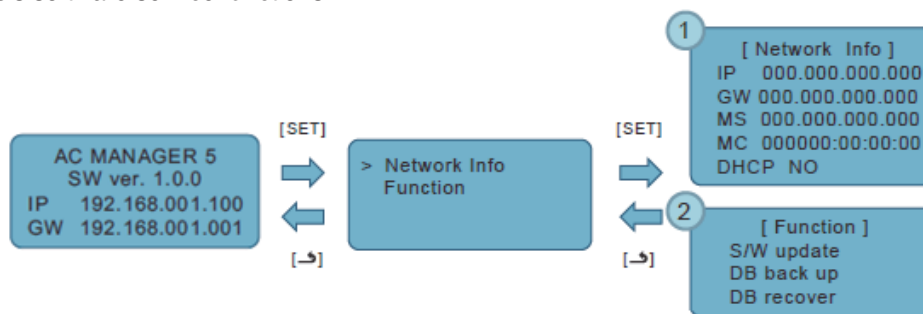


When you press AC Manager 5's [SET] button, it enters Environment Setting mode. When you press [SET] button for the first time, the menu to set the IP address is displayed as shown below.



Press ,  button to locate the arrow on the desired function.

- Select [Network Info], and press [SET] button to enter No.1 menu in the following figure. In [Network Info] menu, input the network information such as AC Manager 5's IP address.
- Select [Function], and press [SET] button to enter No.2 menu in the following figure. In [Function] menu, it supports AC Manager 5's software service functions.



NOTE

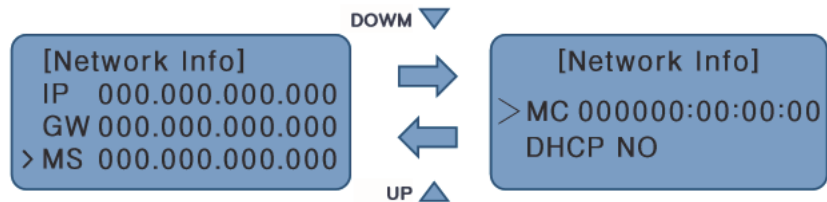
- [Function] menu is used by the system air conditioner service technician, and user shall not use this function. If this function is used incorrectly, it may cause failure of AC Manager 5.

2.3 Product Description

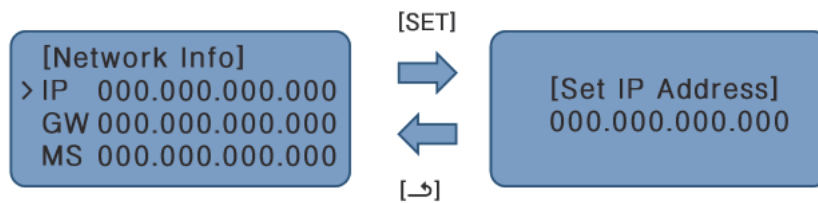
■ Network Address Setting Method

In [Network Info] menu, select the category to set using [▲], [▼] button.

In the first screen on [Network Info] menu, IP, Gateway, and Netmask settings are displayed, and you can use [▼] button to check MAC address and DHCP setting.



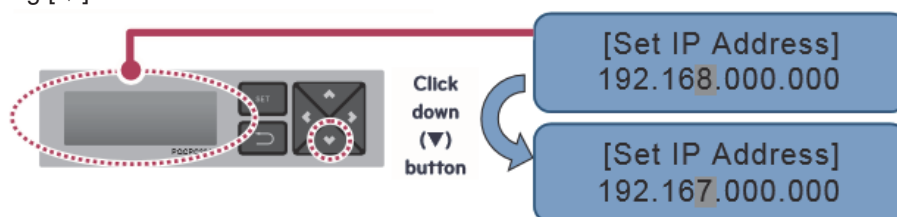
To change the network setting, locate the arrow on the corresponding setting position and press [SET] button to enter the corresponding setting screen.



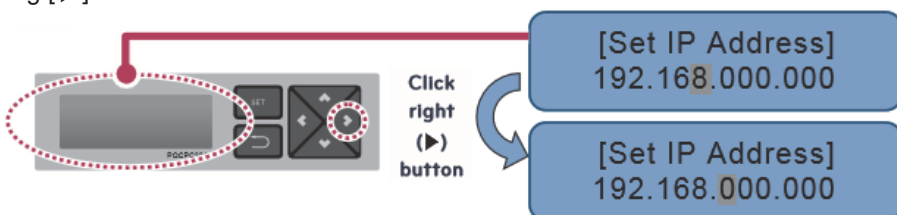
The network address consists of four 3-digit numbers. In case of setting the network address, the name of the related address is displayed on the LCD of AC Manager 5, and you need to press [▲], [▼], [◀], [▶] button for the setting.

When you press [▲], [▼] button, the number of the digit where cursor is on increases/decrease, and when you press [◀], [▶] button, it moves to the left/right digit of the network address.

Example of pressing [▼] button



Example of pressing [▶] button



2.3 Product Description

! NOTE

- Network Address Setting
The network address can be separated to 4 digits based on '.', and each number shall be 255 or less. Number exceeding 255 may not be input.

! NOTE

Assigning Network Address

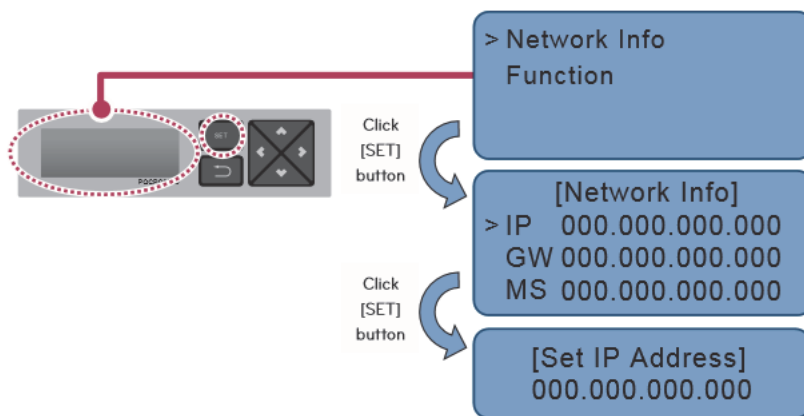
- Network shall be assigned by the person in charge of the network of the corresponding site. (IP address, Gateway address, Netmask)
- AC Manager 5 can use both fixed IP type and dynamic IP type, but fixed IP type is recommended, and if dynamic IP type is used, it may cause inconvenience to the user.
- When fixed IP type is used, you need to receive network (IP address, gateway address, Netmask) from the person in charge of the network of the corresponding site.

■ IP Address Setting

For user to use the functions of AC Manager 5 through the web, a unique IP address may be assigned to AC Manager 5 or dynamic IP setting may be used.

The next is how to set fixed IP address. Please proceed according to the order.

1. Press AC Manager 5's [SET] button. The following menu screen will be displayed.
 - When you press [SET] button again, [Network Info] setting screen is displayed.



2. While IP is selected, if you press [SET] button, screen to input IP address is displayed.



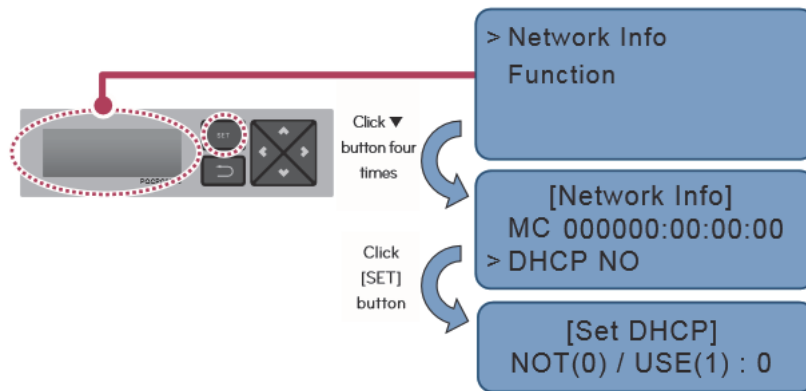
2.3 Product Description

■ Using Dynamic IP with DHCP

For user to use the functions of AC Manager 5 through the web, a unique IP address may be assigned to AC Manager 5 or dynamic IP setting may be used.

The next is how to set dynamic IP address. Please proceed according to the order.

1. Press AC Manager 5's [SET] button. The following menu screen will be displayed.
 - When you press [SET] button again, [Network Info] setting screen is displayed.
 - While DHCP is selected, if you press [SET] button, you can input whether to use DHCP function.



2. Use [▲], [▼] button to set whether to use DHCP function.

When you press [▲] button, DHCP function is set to use, and when you press [▼] button, DHCP function is set to no-use.

3. To use dynamic IP, set to use DHCP function.



! NOTE

- When dynamic IP type is used, the IP in use is returned to DHCP server, and you may not be able to access AC Manager 5. In such case, you can check newly set IP address in the front LCD of AC Manager 5.

2.3 Product Description

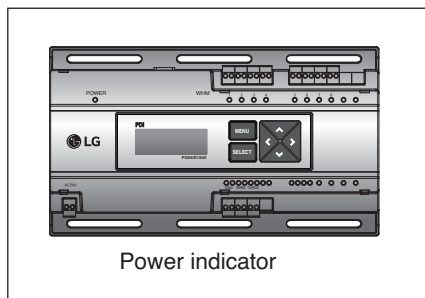
2.3.5 PDI

When using an air conditioner outdoor unit at the efficiency apartment or multipurpose building in common, power consumption of each air conditioner indoor unit can be displayed for efficiency management.

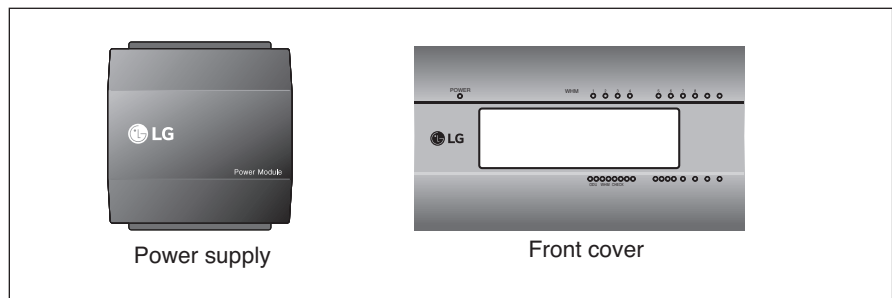
2.3.5.1 Specifications & Dimensions

- Model name : PQNUD1S40 (PDI Premium)
PPWRDB000 (PDI Standard)

■ Features



■ Accessory



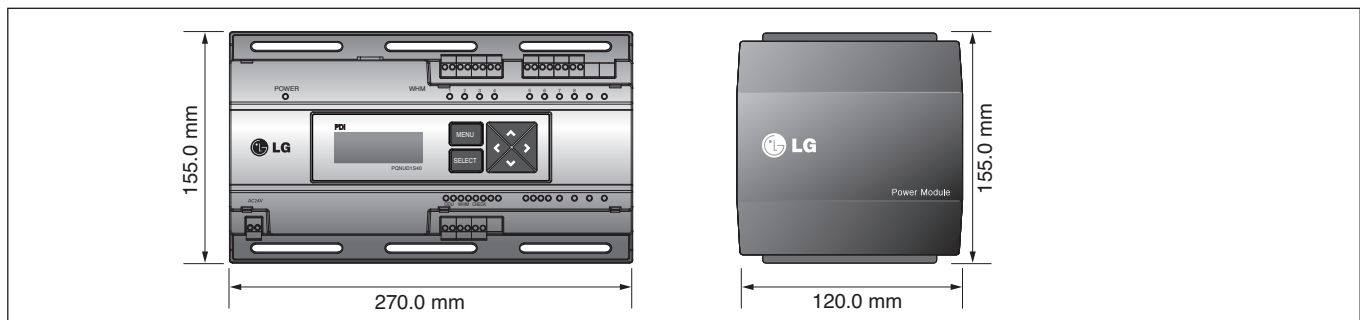
■ Product Specifications

Categories	PDI Premium	PDI Standard
Power Supply	220-240 V~ 50/60 Hz 1Ø	220-240 V~ 50/60 Hz 1Ø
Max IDUs	128EA (EHP ODU), 64EA (GHP ODU)	128EA (EHP ODU), 64EA (GHP ODU)
Max ODU	8EA (EHP ODU) / 4EA (GHP ODU)	2EA(EHP ODU)/1EA(GHP ODU)
Controlled Product type	Air Conditioner, ERV DX, Hydro-kit	Air Conditioner, ERV DX, Hydro-kit
Connectable Wattmeter (gas meter included)	Pulse : 8 / 485 type : 1	Pulse : 2
LCD Display	4 Lines	4 Lines
LED Display	Power/Comm./Pulse status	Power/Comm./Pulse status
IP rating	IP20	IP20

! NOTE

* 485 type wattmeter can be only used in the Korea market.

■ Dimensions



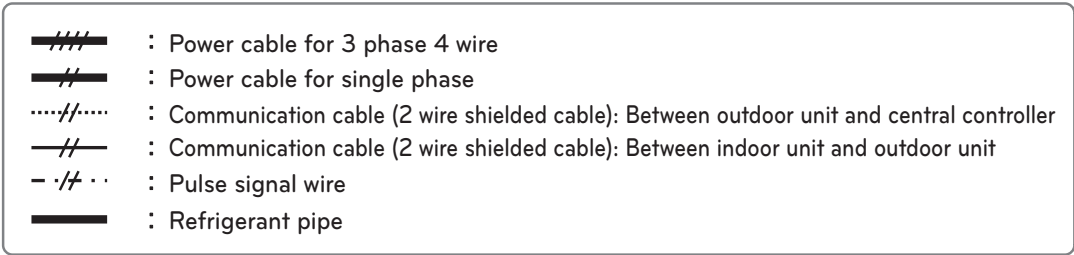
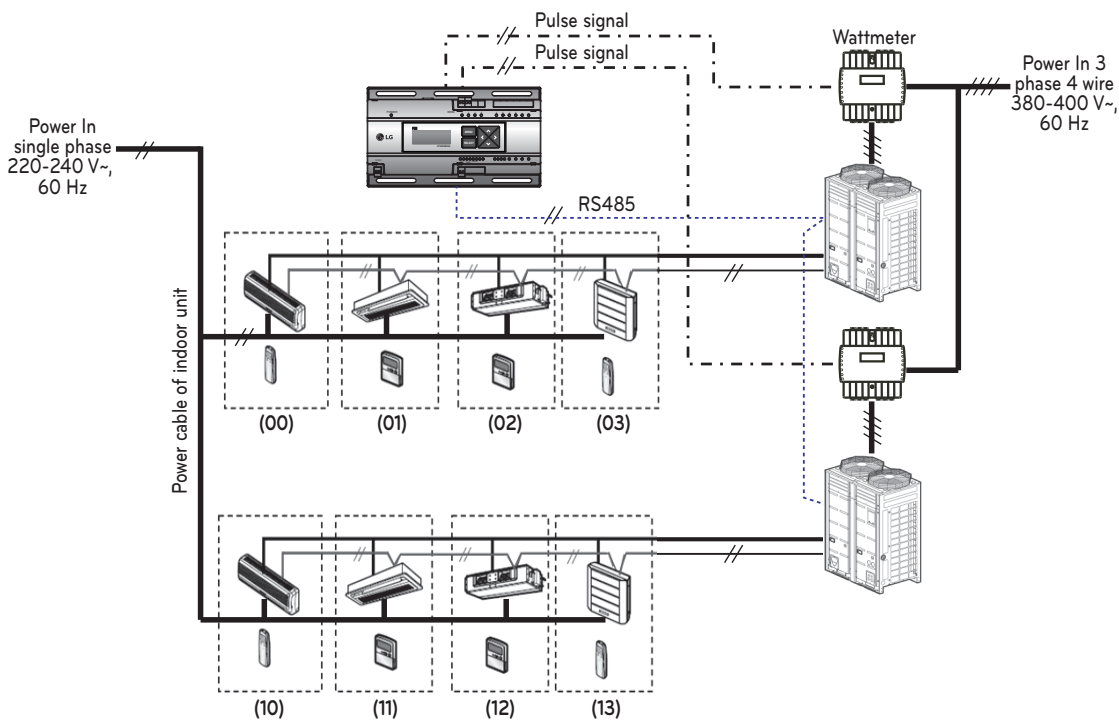
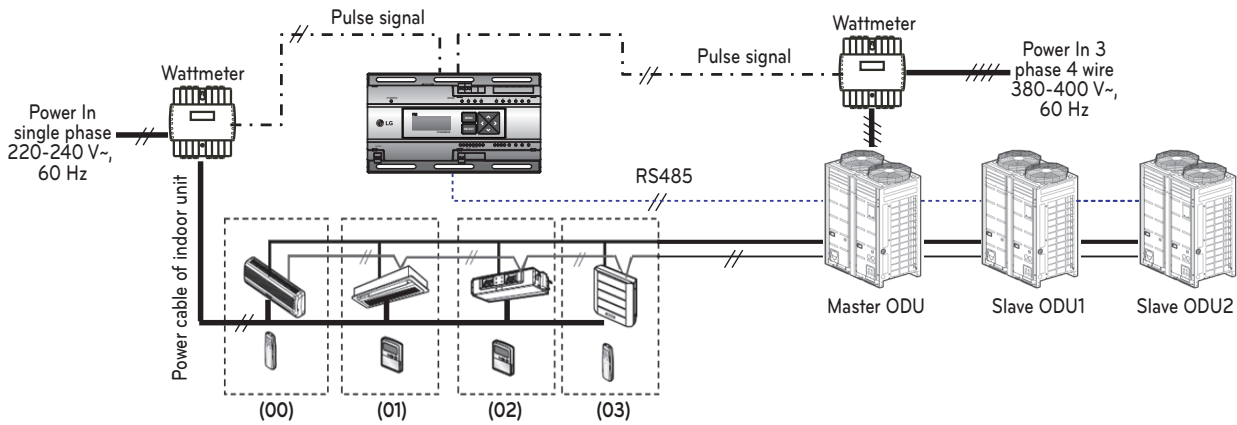
2.3 Product Description

2.3.5.2 Field Wiring Diagram

When interlocked to pulse type wattmeter

• **When interlocked to EHP product**

- Independent Operation of Power Indicator (interlocked to EHP products)



2.3 Product Description

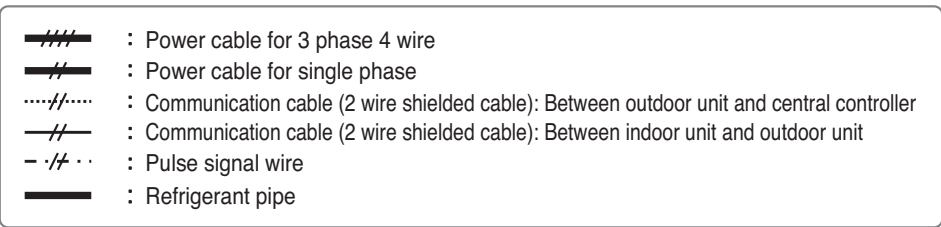
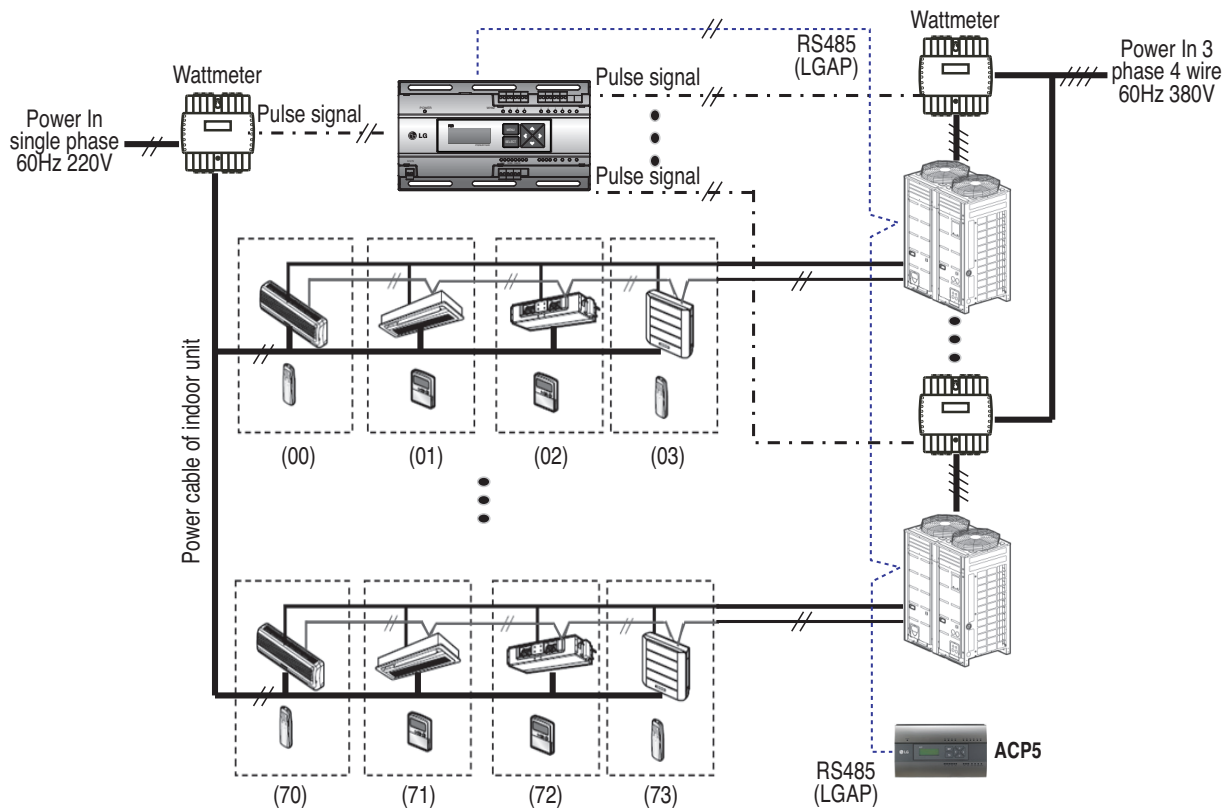
⚠ CAUTION

- Depending on the electric power, use the wattmeter for remote reading by sending the pulse signal.
- Use the wattmeter with the pulse width of 50 - 400 ms.
- The wattmeter pulse must be able to sink at least 3mA or more of current in the power indicator.
- Use the wattmeter of 1W/pulse, 2W/pulse, 4W/pulse, 6W/pulse, 8W/pulse, 10W/pulse, 100W/pulse and PT/CT (1-50,000).
- When setting the wattmeter, set it to Master Mode.
- Maximum of 8 wattmeters(PQNUD1S40) or 2 wattmeteres(PPWRDB000) can be installed.
- The distance between power indicator and wattmeter should be shorter than 50m in normal circumstance.
- When electrical or mechanical noise is expected, more shorter wiring is needed.

* EHP (Electric Heat Pump): It is an electric air conditioner to drive the compressor by electric power.

2.3 Product Description

• **Interlocked Operation with Central Controller (interlocked to EHP product)**



CAUTION

- Depending on the electric power, use the wattmeter for remote reading by sending the pulse signal.
- Use the wattmeter with the pulse width of 50 - 400 ms.
- The wattmeter pulse must be able to sink at least 3mA or more of current in the power indicator.
- Use the wattmeter of 1W/pulse, 2W/pulse, 4W/pulse, 6W/pulse, 8W/pulse, 10W/pulse, 100W/pulse and PT/CT (1-50,000).
- When setting the wattmeter, set it to Slave Mode.
- Maximum of 8 wattmeters(PQNUD1S40) or 2 wattmeteres(PPWRDB000) can be installed.
- The distance between power indicator and wattmeter should be shorter than 50m in normal circumstance.
- When electrical or mechanical noise is expected, more shorter wiring is needed.

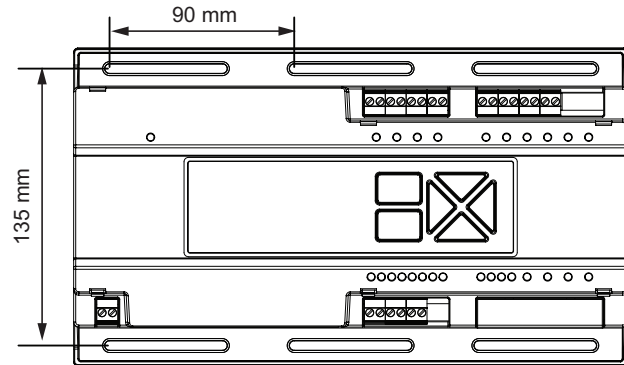
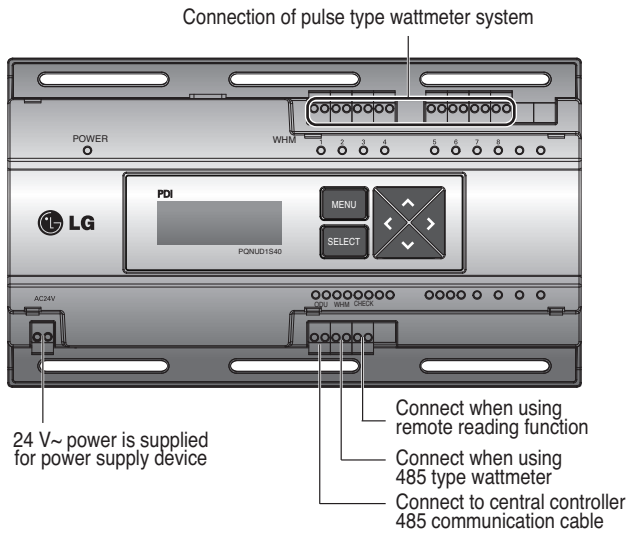
Central Controller

2.3 Product Description

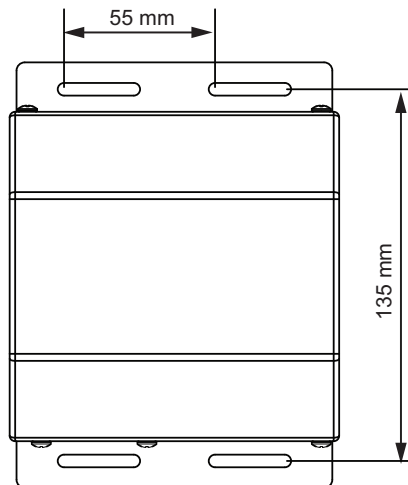
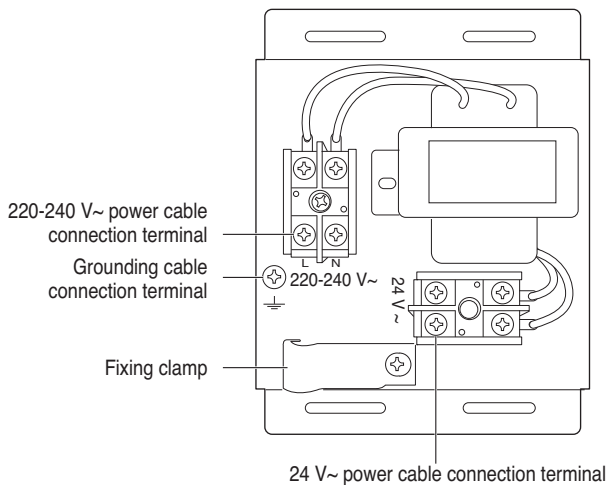
2.3.5.3 Installation

How to wire the product (when EHP product is connected)

Wiring Power Indicator



Wiring Power Supply



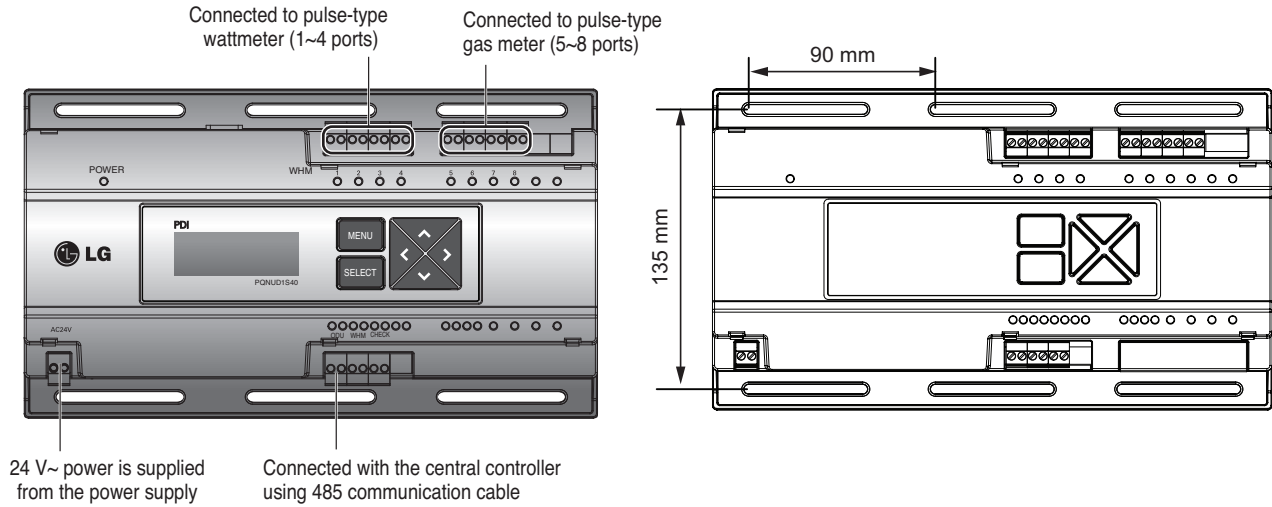
⚠ CAUTION

- Power must be turned on after the product is wired completely.

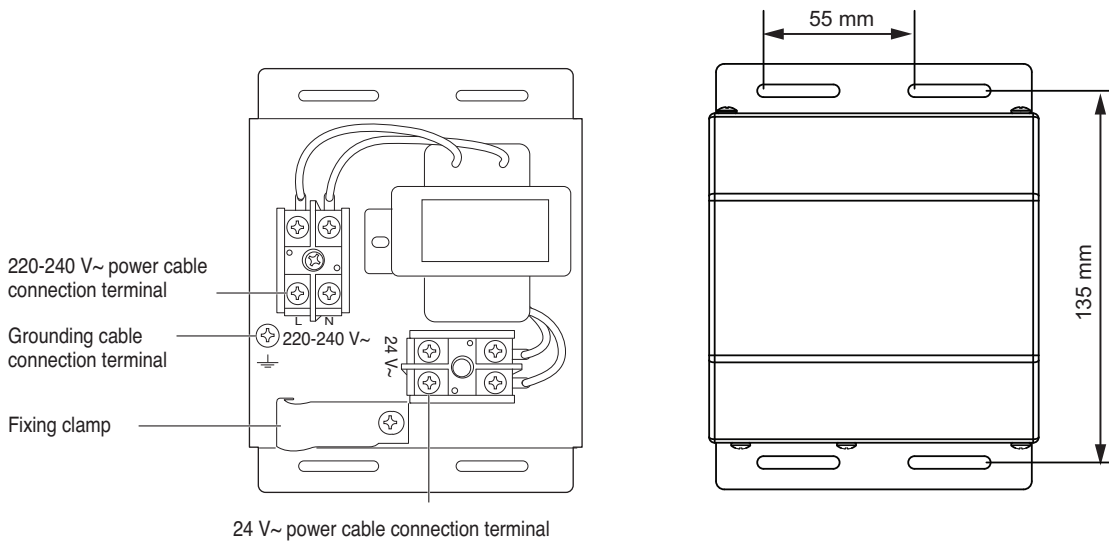
2.3 Product Description

How to wire the product (when GHP product is connected)

Wiring Power Indicator



Wiring Power Supply



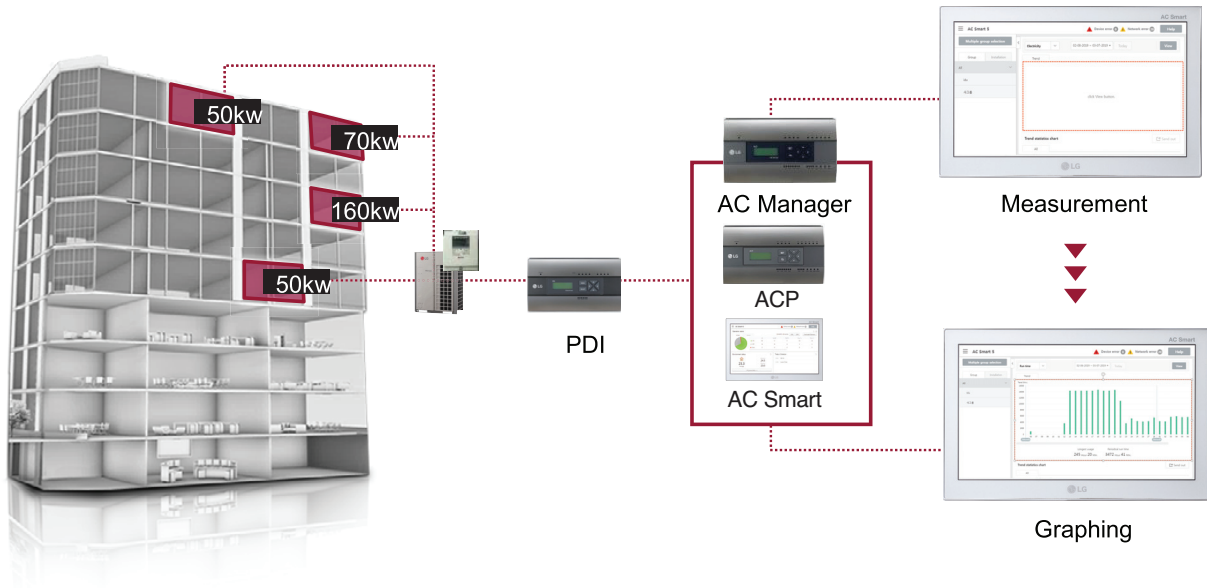
⚠ CAUTION

- Power supply must be applied after wiring the product is completed, if applicable.

2.3 Product Description

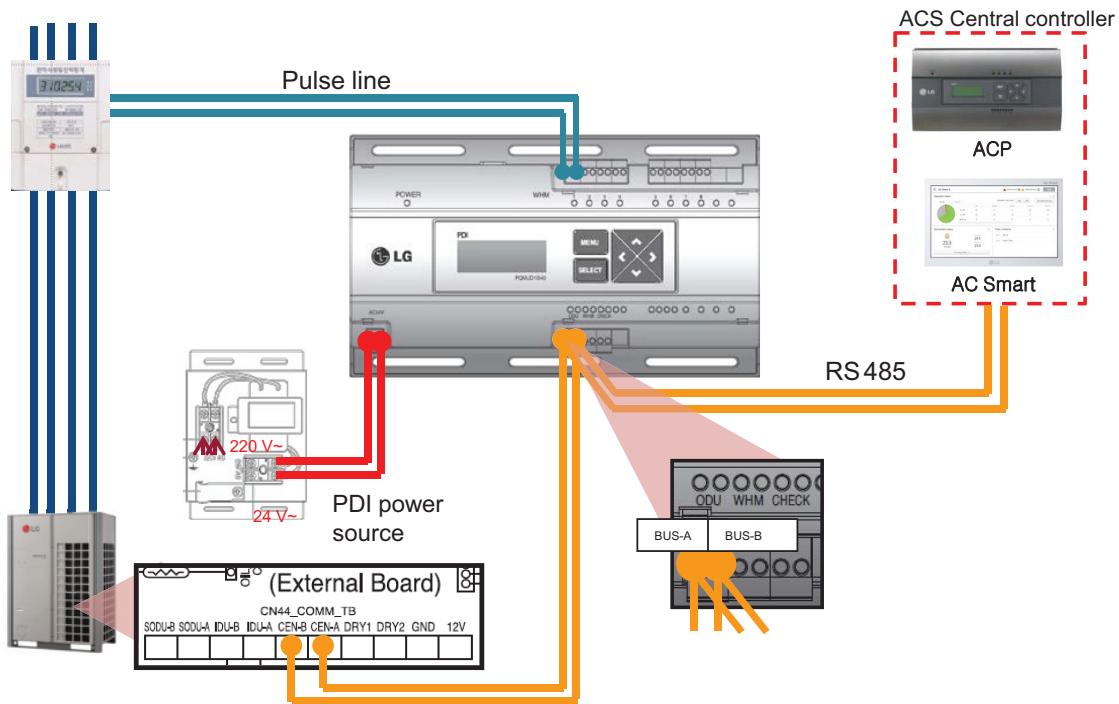
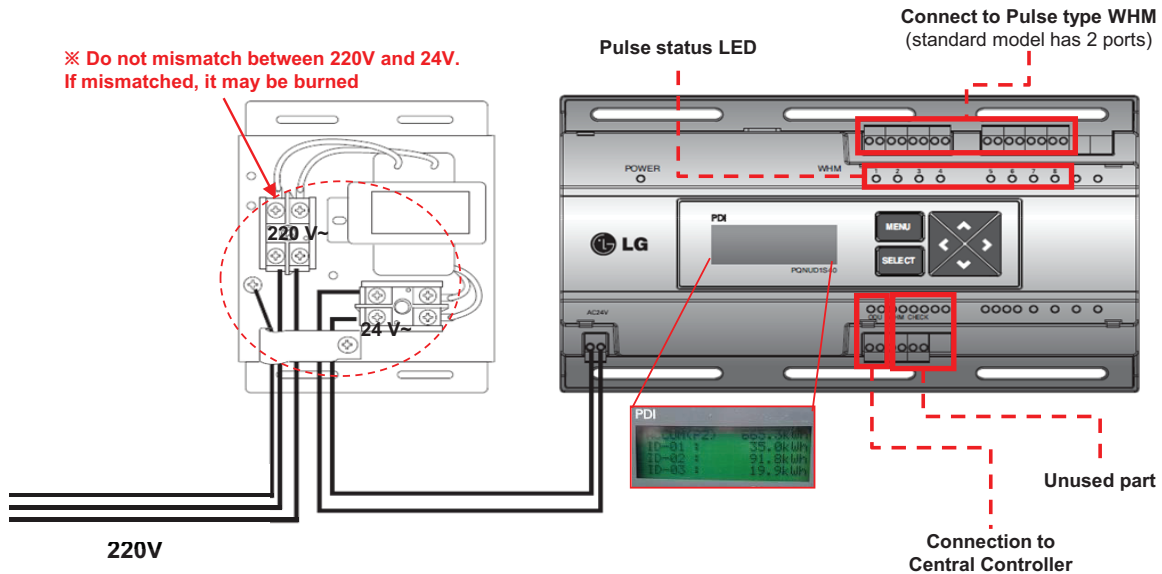
■ Overview

PDI(Power Distribution Indicator) calculates power consumption of each unit connected to the central controller. Collected data is displayed on the central controller GUI as a report and graph.



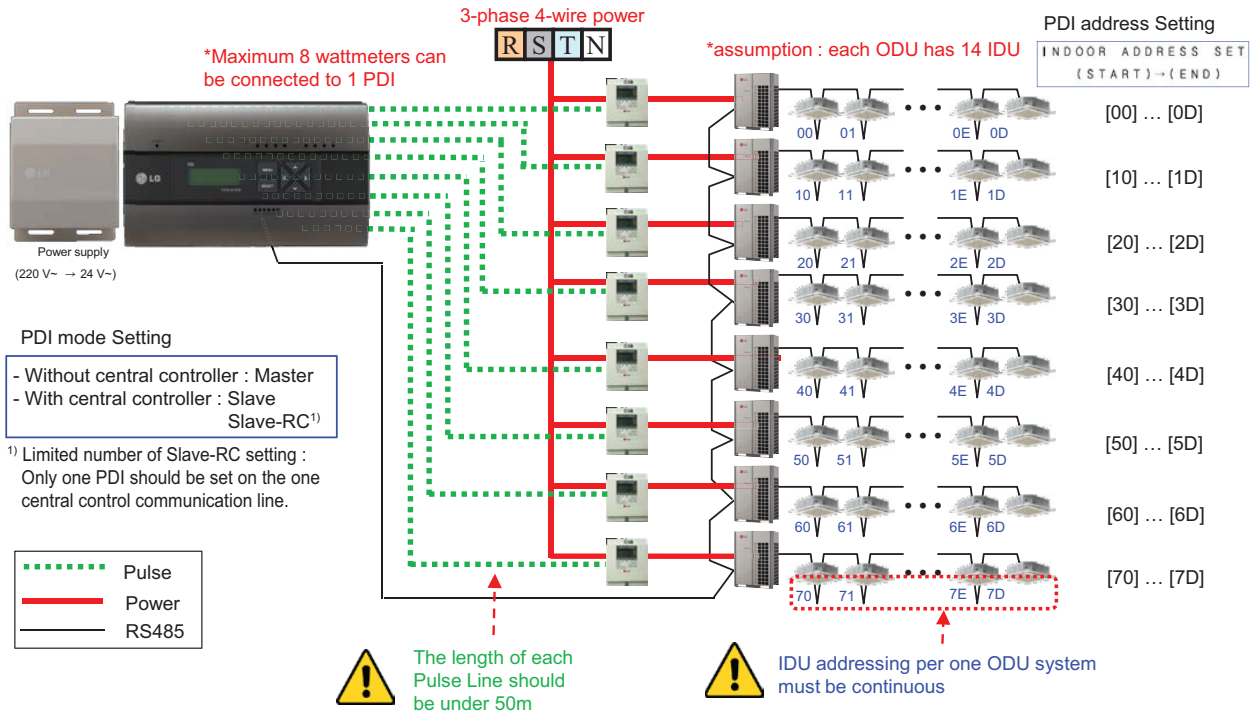
2.3 Product Description

■ Components

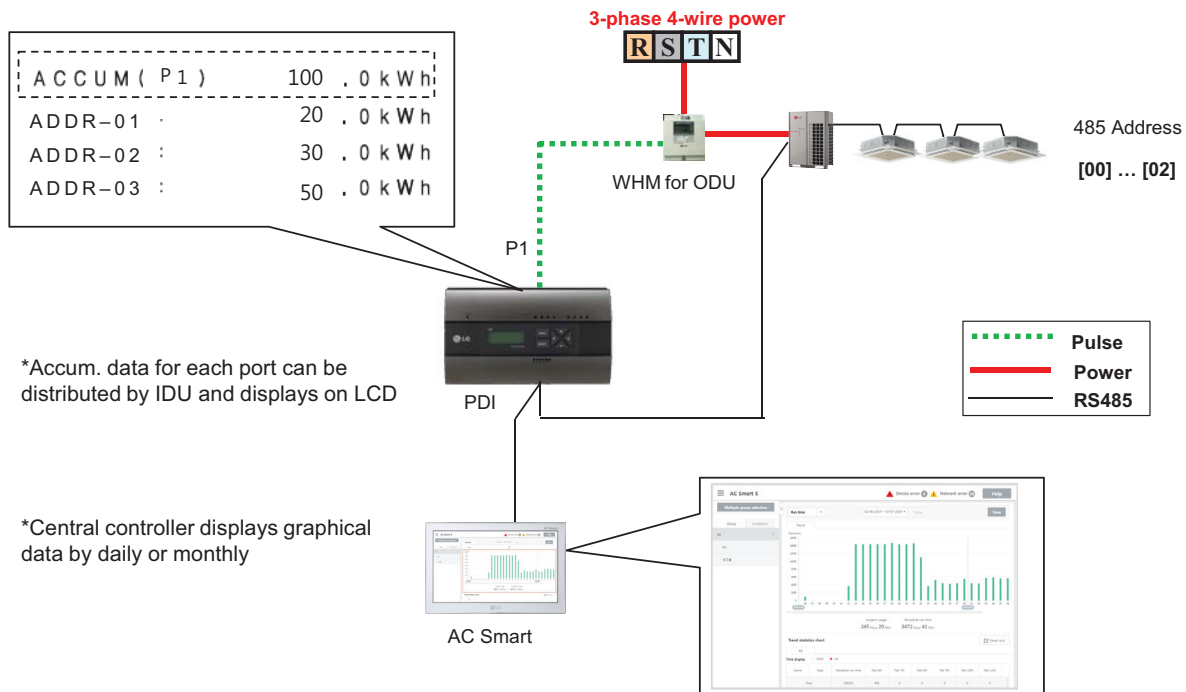


2.3 Product Description

■ Installation – Multiple WHM



■ Power Distribution display

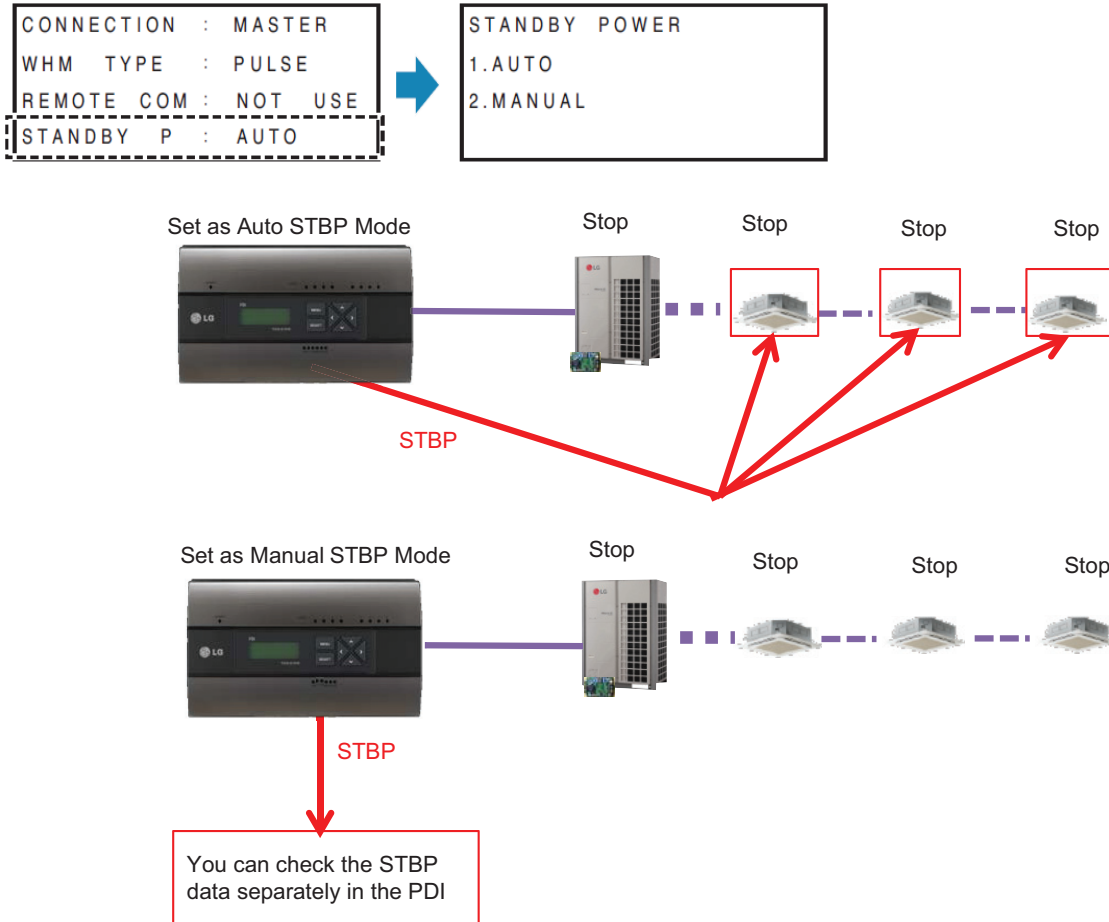


Central Controller

2.3 Product Description

■ Power Distribution – STBP(Stand-by Power)

- Auto STBP : In this mode, PDI distributes the STBP to the each IDU unit equally
- Manual STBP : In this mode, PDI saves separately the STBP in PDI STBP's page



2.3 Product Description

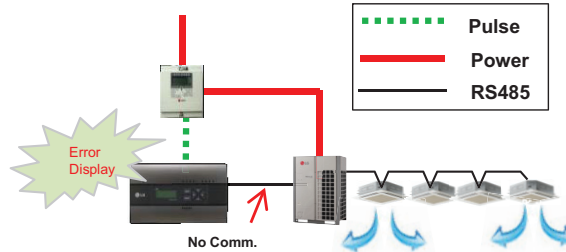
■ Error Display

```

ERROR-01
NO COMMUNICATION
WITH AIRCONDITIONER
IDU ADDRESS [00-07]
    
```

<Communication error display>

- If there is no communication signal from ODU~IDU for 3 minutes, this error is displayed

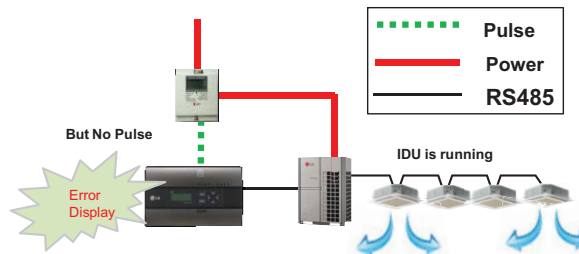


```

ERROR-02
NO SIGNAL FROM WHM1
    
```

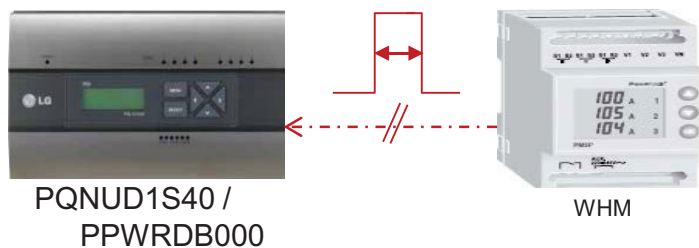
<No signal from Wattmeter error>

- If there is no pulse signal from the wattmeter even while IDU is running, this error is displayed



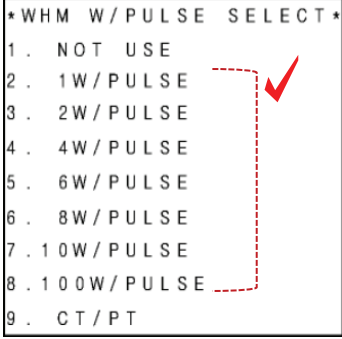
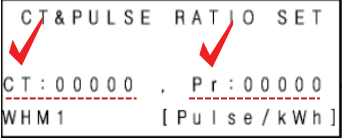
■ Requirement for WHM

- Use the WHM(Watt Hour Meter) for remote reading by sending the pulse signal.
 - Pulse width : 50~400 ms
 - Minimum sink current capability from power indicator : 3mA
 - 1W/pulse, 2W/pulse, 4W/pulse, 6W/pulse, 8W/pulse, 10W/pulse, 100W/pulse and PT/CT (1-50,000)

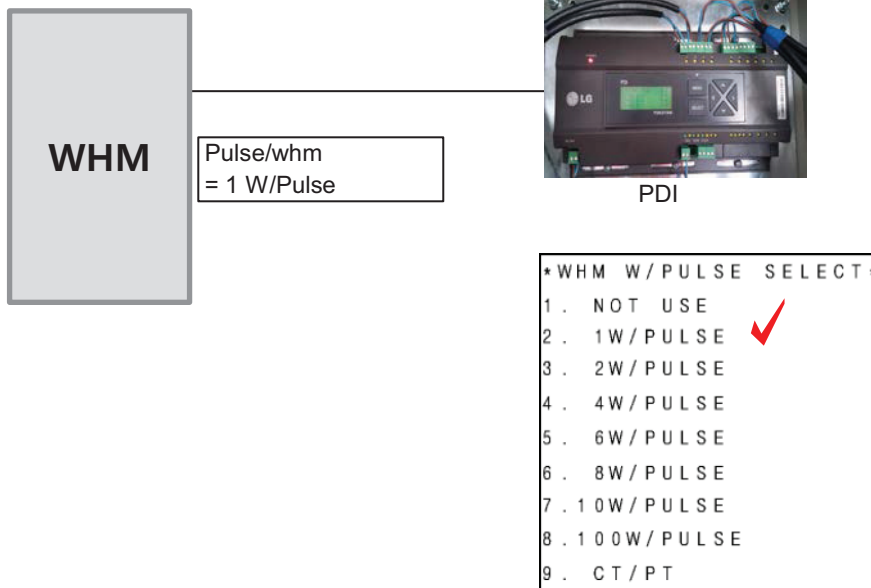


2.3 Product Description

■ Pulse/CT Type setting

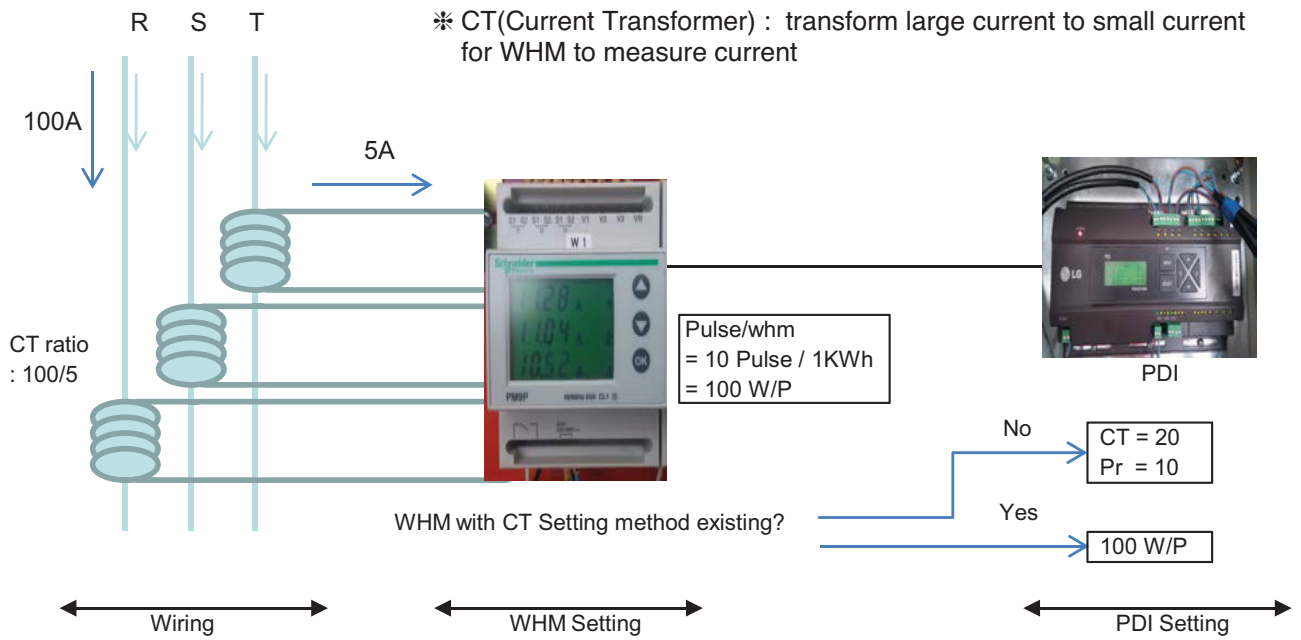
Pulse type	CT(Current Transformer) type
<p>◆ WHM W/PULSE SELECT</p> <ul style="list-style-type: none"> • Enter the value displayed on the wattmeter as power consumption per pulse. 	<p>◆ Set CT and device constant value</p> <ul style="list-style-type: none"> • CT : As the device to reduce the current so that the measuring device can take the measurement, enter the rate indicated on the product to the CT item. → When using 100:5 CT, enter 20 to the CT item. • Pr : As the device constant value, it is displayed as ratio of output pulse per power consumption of WHM. → When using 2500 Pulse/kWh WHM, enter 2500 to Pr item. → When using 1 W/P WHM, enter 1000 to Pr item.  <p>* CAUTION : If CT ratio is already set by WHM, Please set as Pulse type.</p>

- Example) Pulse Type



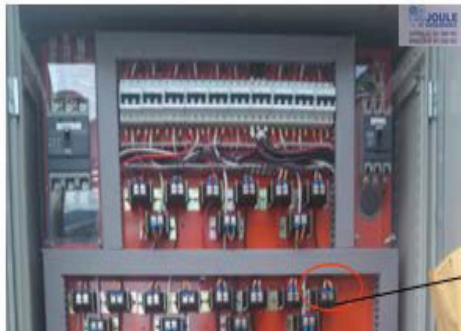
2.3 Product Description

- Example) CT Type



* each phase (R,S,T) have CT

* CT has a ratio spec.



CT Ratio : 20



100:5

2.3 Product Description

■ PDI Installation (How to select WHM)

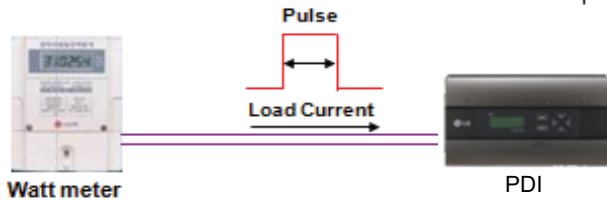
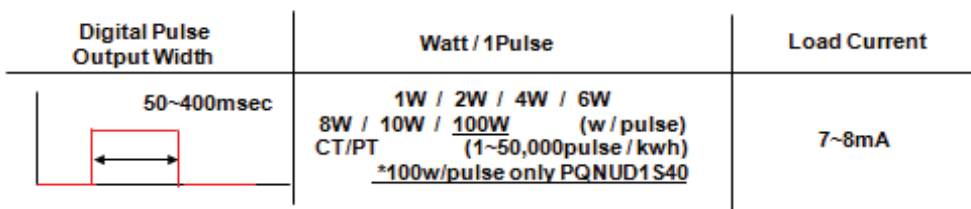
Recommended WHM which is noticed on T/B(B-179)

Global WHM(Watt-Hour Meter)

No	Maker	Spec				Image	Reference Site	
		Model	Type	A (Max Current)	Pulse Output			
					Width			W/Pulse
1	Schneider Power Logic PM200P	3P4W	6A(CT Type)	10, 50, 100, 300, 500, or 1000ms	0.1, 1, 10, 100, 1000, 10000, or 100000kWh/P		May, 2012 Brazil	
2	Schneider PM9P	3P4W	6A(CT Type)	50, 100, 200, 300ms	0.1, 1, 10, 100kWh/P		May, 2012 Brazil	
3	ABB (Sweden) OD4165	3P4W	65A	100ms	100P/kWh (10W/P)		Oct, 2010 Czech	
4	XIZI DTS 601	3P4W	40A	-	200P/kWh (5W/P)		June 2013 China (singapore tech)	
5	Kohler AEL TF 10	3P4W	100A	-	1000P/kWh (1W/P)		April, 2013 Turkey	
6	Sala-burgess AAE3D5F10 PR3A00, ALE3D5F10	3P4W	65A	50ms	1W/P, 10W/P		Jun, 2013 Swiss	
7	Ziegler 3430	3P4W	5A(CT Type)	60ms, 100ms or 200ms	Programmable		May, 2015 Iran	
8	ABB B24	3P4W	6A(CT Type)	Programmable: 10-990ms	Programmable		May, 2015 Kenya	
9	ABB A43	3P4W	80A	Programmable: 10-990ms	Programmable		Feb, 2014 Singapore	

If have to use WHM the other Brand from WHM on T/B. The WHM should be satisfied with below specification.

• Specification of WHM(Watt Meter) interlocked to PDI



Outputs	
Current	2 - 100 mA
Voltage	5 - 240 V AC/DC. For meters with only 1 output, 5 - 40 V DC.
Pulse output frequency	Programmable: 1 - 999999 imp/kWh
Pulse length	Programmable: 10 - 990 ms
Terminal wire area	0,5 - 1 mm ²
Recommended tightening torque	0,25 Nm

< Example of Watt meter Specification >

2.3 Product Description

■ PDI Installation

(How to select WHM : The WHM Model Selection Capacity Wise)

The WHM model should be chosen which cover the corresponding ELCB capacity.
If exceed the Max current, have to use CT and CT Type WHM.

	A41	A42	A43	A44
Voltage/current inputs				
Nominal voltage	230 V AC		3x230/400 V AC	
Voltage range	57.7 - 288 V AC (-20% - +15%)		3x57.7/100 ... 288/500 V AC (-20% - +15%)	
Power dissipation voltage circuits	0.8 VA (0.8 W) total			
Power dissipation current circuits	0.007 VA (0.007 W) at 230 VAC	0.001 VA (0.001 W) at 230 VAC	0.007 VA (0.007 W) per phase at 230 VAC and I _n	0.001 VA (0.001 W) per phase at 230 VAC and I _n
Base current I _b	5 A		5 A	
Rated current I _n	-	1 A		1 A
Reference current I _{ref}	5 A		5 A	
Transitional current I _t	0.5 A	0.05 A	0.5 A	0.05 A
Maximum current I _m	80 A	16 A	80 A	16 A
Minimum current I _{min}	0.25 A	0.02 A	0.25 A	0.01 A
Starting current I _{st}	< 20 mA	< 1 mA	< 20 mA	< 1 mA
Terminal wire area	1 - 25 mm ²	0.5 - 10 mm ²	1 - 25 mm ²	0.5 - 10 mm ²
Recommended tightening torque	3 Nm	1.5 Nm	3 Nm	1.5 Nm
Communication				
Terminal wire area	0.5 - 1 mm ²		0.5 - 1 mm ²	
Recommended tightening torque	0.25 Nm			
Transformer ratios				
Configurable voltage ratio (VT)	-	1/999 - 999999/1		1/999 - 999999/1
Configurable current ratio (CT)	-	1/9 - 9999/1		1/9 - 9999/1
Pulse indicator (LED)				
Pulse frequency	1000 imp/kWh	5000 imp/kWh	1000 imp/kWh	5000 imp/kWh
Pulse length	40 ms	40 ms	40 ms	40 ms
General data				
Frequency	50 or 60 Hz ± 5%			
Accuracy Class	B (Cl.1) or Reactive Cl. 2	B (Cl.1), C (Cl. 0,5 S) or Reactive Cl. 2	A (Cl.2), B (Cl.1) or Reactive Cl. 2	B (Cl.1), C (Cl. 0,5 S) or Reactive Cl. 2

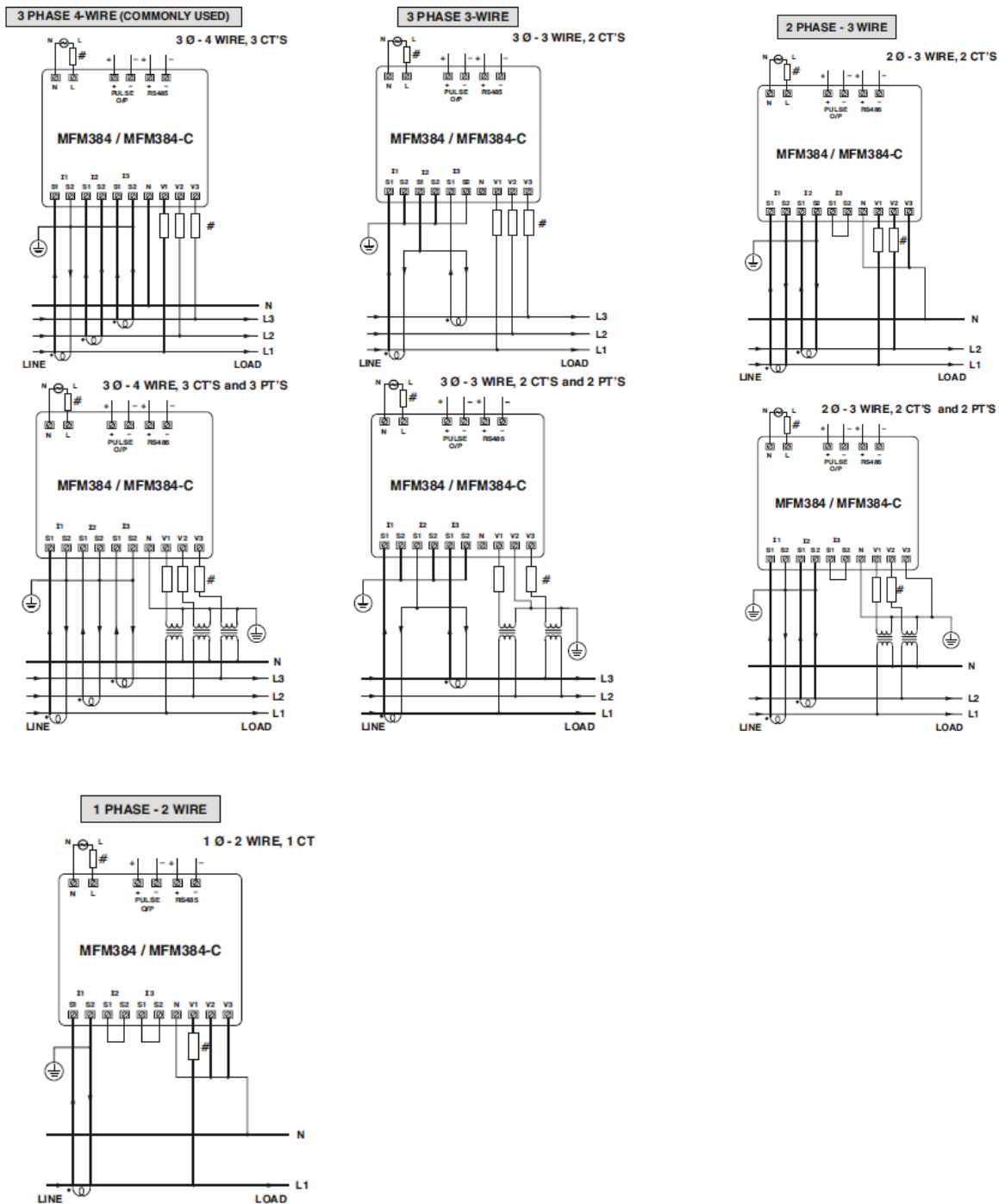
2.3 Product Description

■ PDI Installation (How to WHM Select : Installation of WHM)

Refer to the wiring diagram of WHM manual.

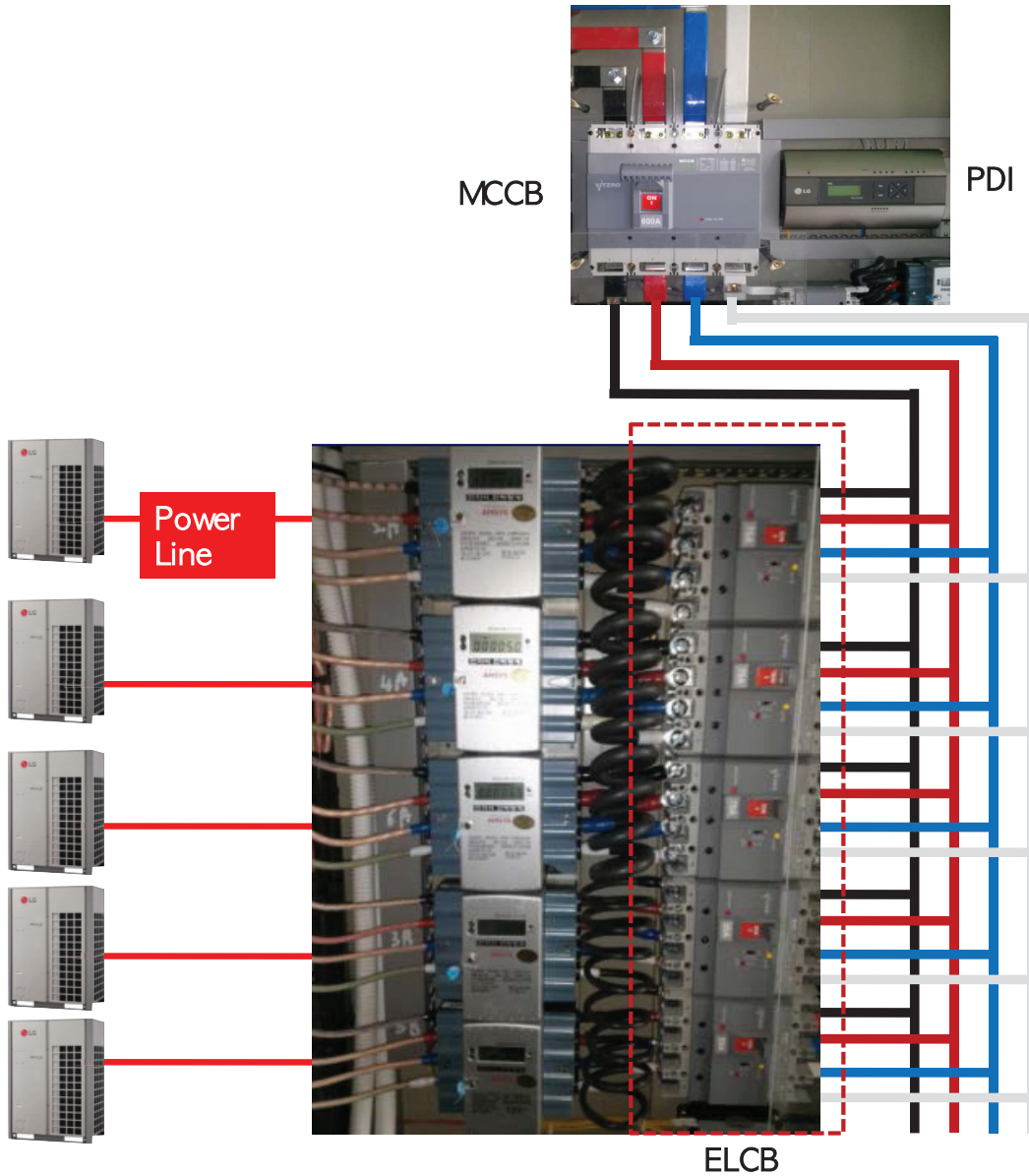
After installation, It is mandatory to be check if it operate correctly by WHM manufacturer.

Example) “Select” WHM Installation Manual



2.3 Product Description

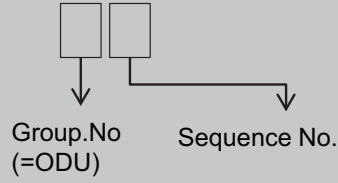
■ PDI Installation (How to WHM Select : Actual Photo)



2.3 Product Description

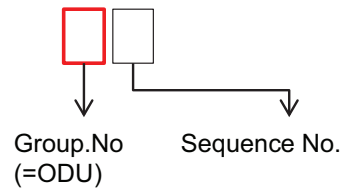
■ PDI Installation (IDU Addressing Setting)

*Structure of IDU Address
for using Central Control

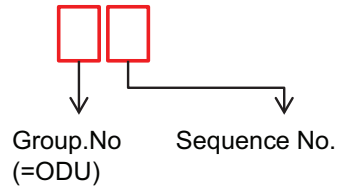


1. Set and Put the IDU Address on floor plan

1. Set the Group. Number to each ODU System



2. Set IDU Address according to ODU Group. No.



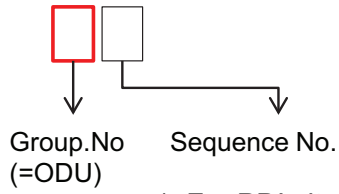
3. Put the IDU Address to floor plan.

2. Set the Address to IDU

4. Set the address to IDU according to the Floor plan address map. (Using Remote Controller).

2.3 Product Description

1. Set the Group. Number to **each** ODU System

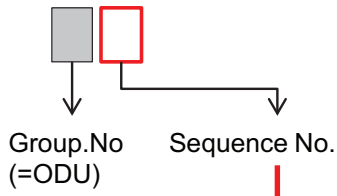


1. For PDI site, please make address table on the floor plan, not to make any mistake
2. Do not omit Number in the middle

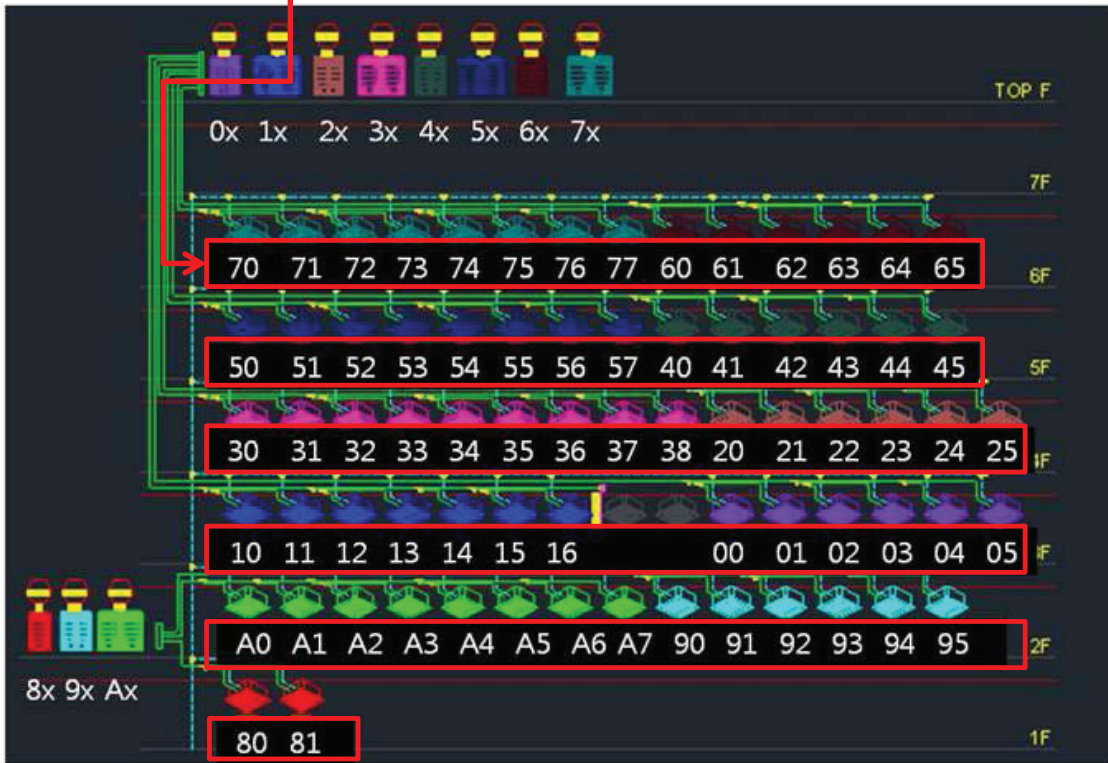


2.3 Product Description

2. Set IDU Address according to ODU Group. Number

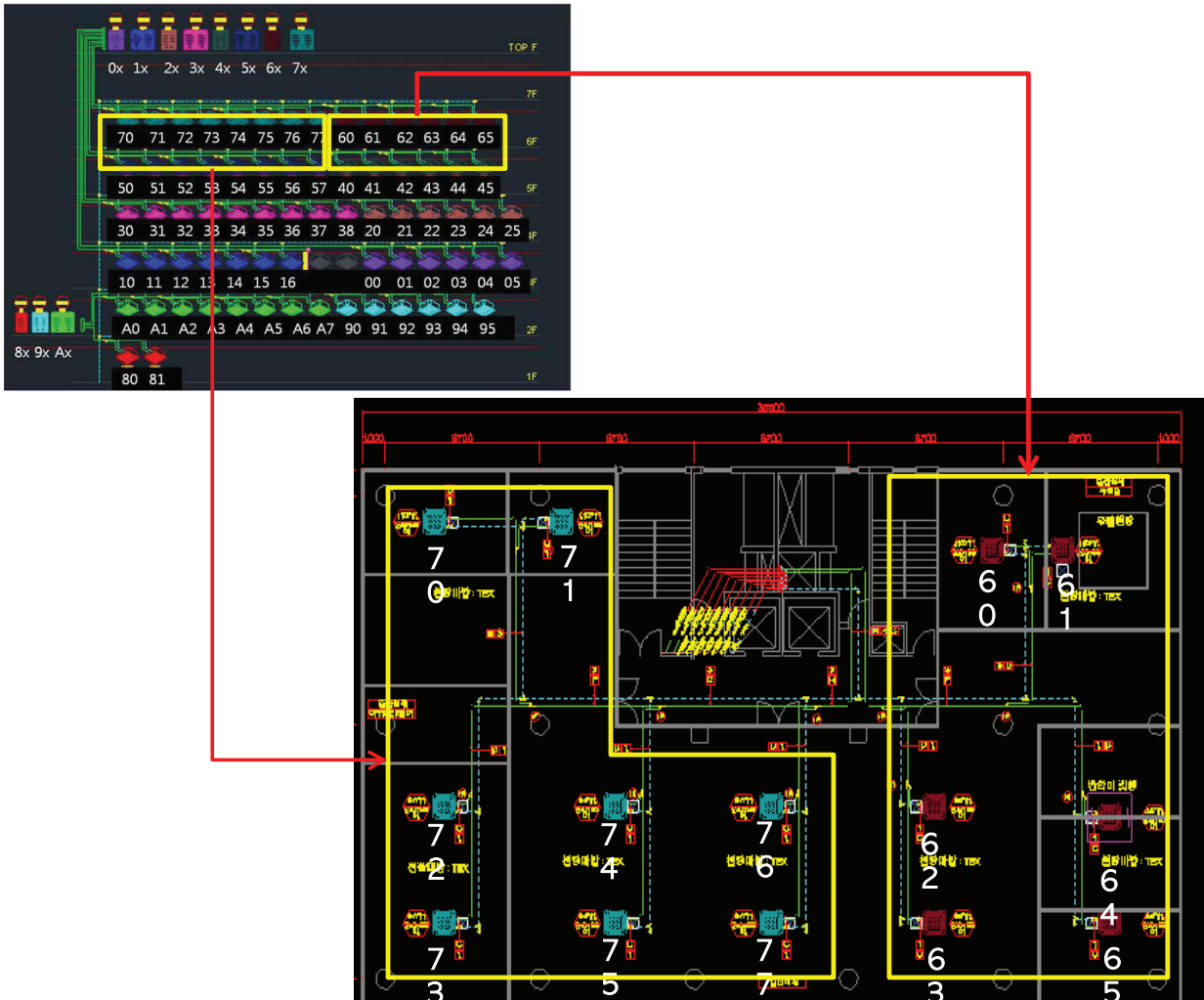


1. Set the Sequence Number to each ODU Group. Number
ex. 0X → 00, 01, 02, ~
1X → 10, 11, 12, ~
2. Do not omit Number in the middle



2.3 Product Description

3. Put the IDU Address to floor plan : ex. 7th Floor



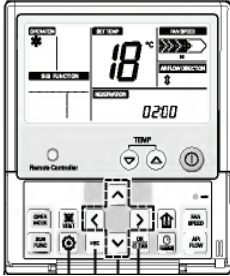
→ As following this process, you will be able to avoid the wattage error that is happen when you are setting omit address or duplicate address



2.3 Product Description

4. Set the IDU address according to the Floor plan address map. (Using Remote Controller).

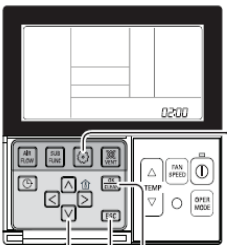
※ Do not set the same address to different IDUs connected to the same Central Controller



Wired Standard(Old)



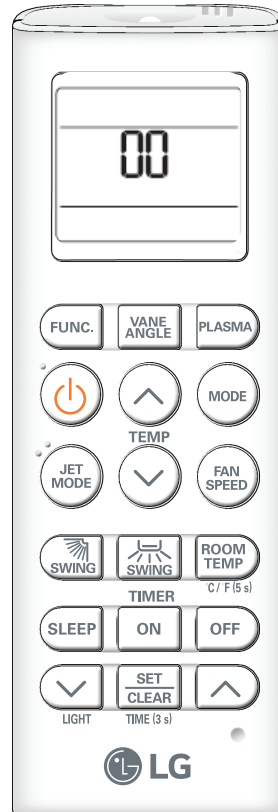
- Press  button(3 s)
- Repeat Pressing  button
- (Function code 02 : XX)
- Set address with Up/Down
- Press ok/Clear
- (saved)
- Press ESC

Wired Standard



- Press  button(3 s)
- Repeat Pressing  button
- (Function code 02 : XX)
- Set address with Up/Down
- Press ok/Clear
- (saved)
- Press ESC

Wireless



- ※ For Checking Address
- Press Set + Reset
- Set address with Up/Down
- Run/Stop Button (Saved)
- Press Reset (Exit)



- ※ For Checking Address
- Press Plasma+Reset
- (Toward the IDU)
- Press Start/Stop button
- (count the number of blinking)
- Press Reset (Exit)

2.3 Product Description

■ PDI Installation (PDI Wiring : Connection Reminders)

1. Pulse Line Connection

- Length Limit : Under 50m From WHM to PDI
- Polarity Limit : WHM's (+/-) & PDI's (+/-) Polarity match

2. Communication Line(RS485) Connection

- Length Limit : Between ODU → Under 200 m, Total Under 1 km
- Polarity Limit : ODU's (A/B) & PDI's (A/B) & ACP's (A/B) Polarity match
 - * All Polarity A/B between ODU and ACP should be matched
- Node(Connect) Limit : Max 32 EA
 - Including Slave central controller & (Multi V ODU * 2) & PI485, the number of device connected between central control device and ODU should not exceed 32 EA

Cf. Total Number of IDU that you can control : 128 EA

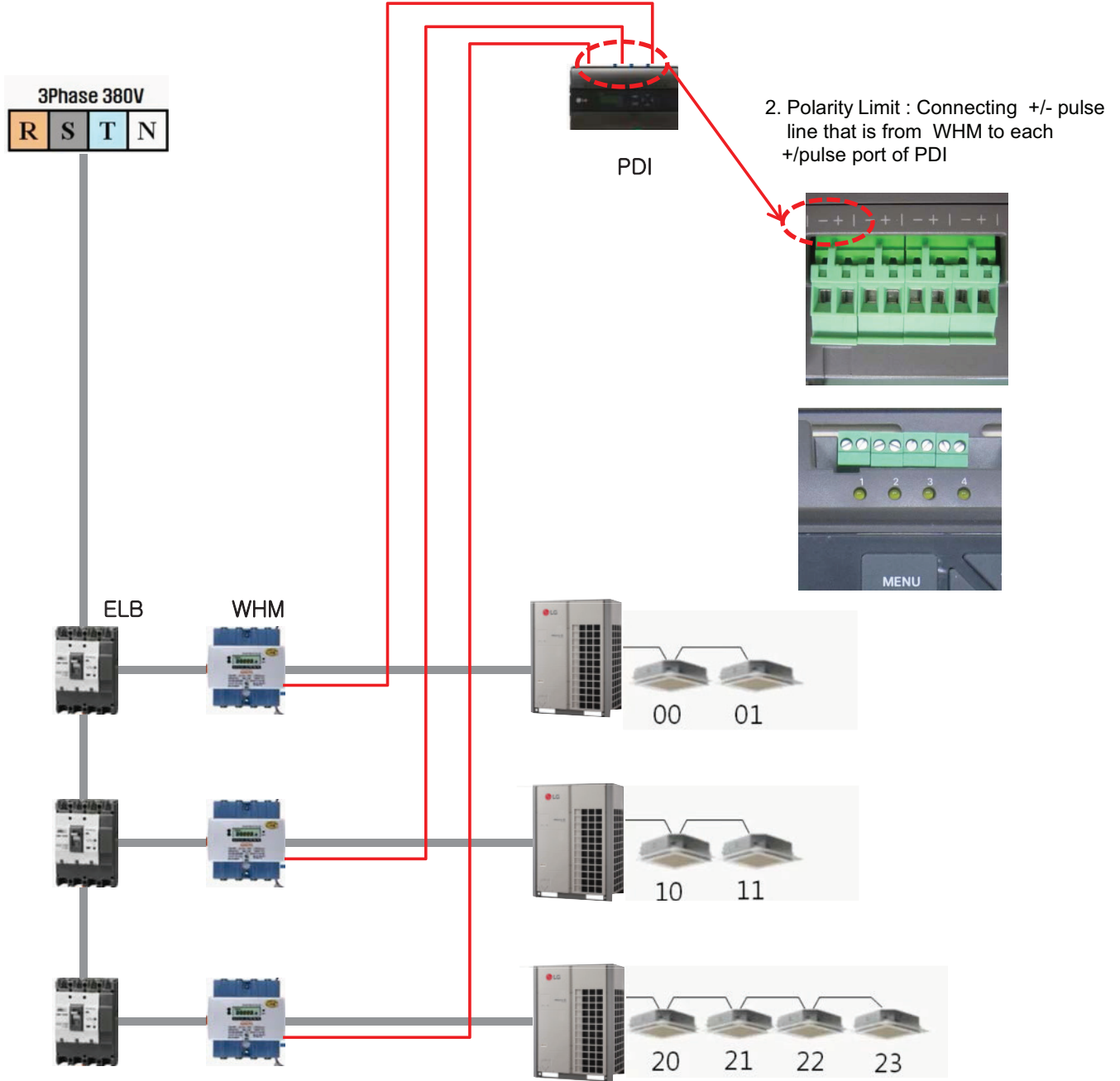
2.3 Product Description

■ PDI Installation (PDI Wiring : Pulse line Connecting Method & Reminders)



1. Length limit : The length of Each Pulse Line should be under 50m

2. Polarity Limit : Connecting +/- pulse line that is from WHM to each +/-pulse port of PDI

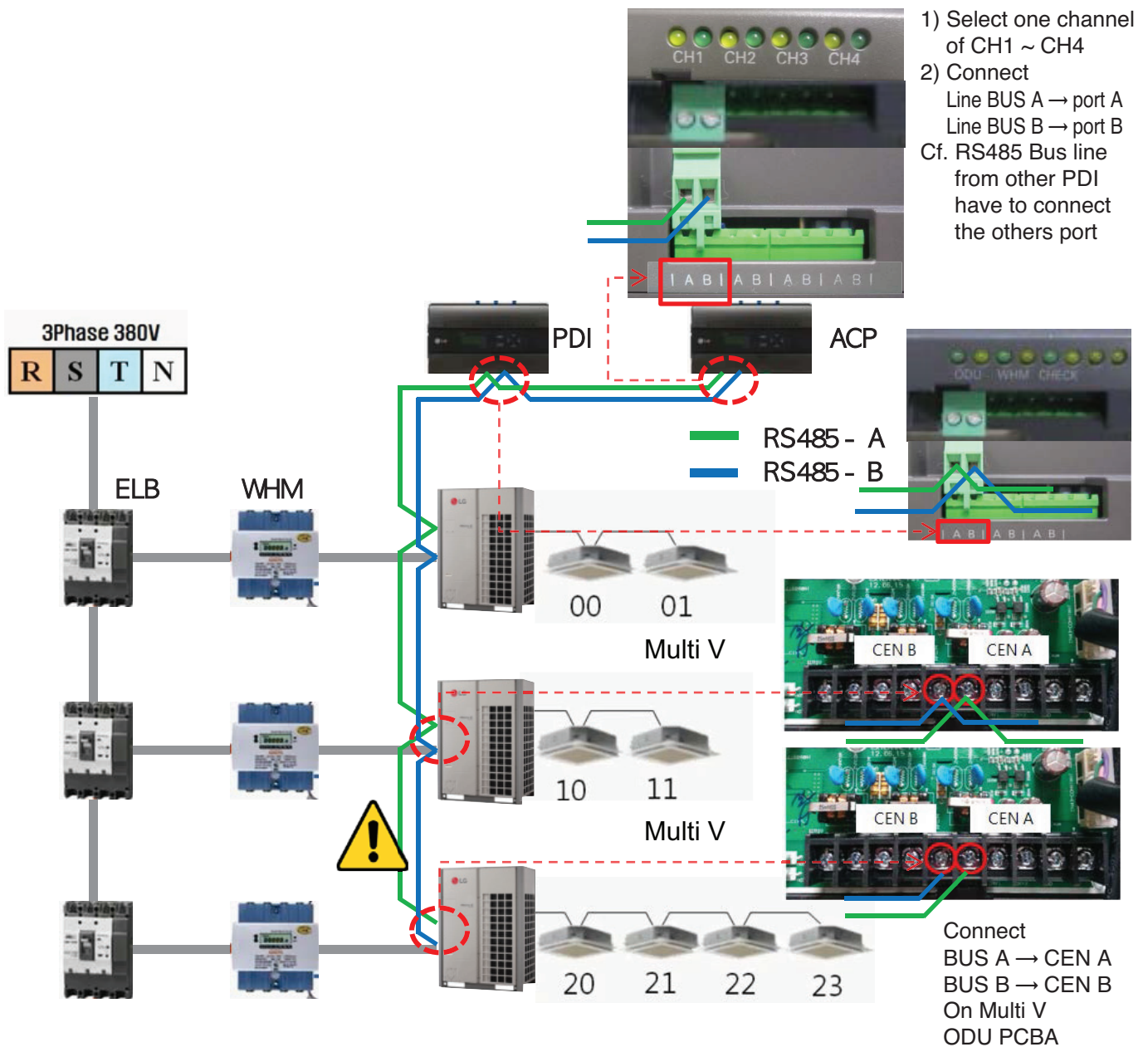


2.3 Product Description

■ PDI Installation (PDI Wiring : Pulse line Connecting Method & Reminders)



1. Length limit
 - The length of between each Outdoor unit ≤ 200 m
 - Maximum Length of 1 RS485 Line ≤ 1 km
2. Node limit
 - Maximum node of 1 RS485 Line ≤ 32
 - (Multi V Outdoor count * 2) + PI485 count + Slave central controller count ≤ 32
3. RS485 A/B Polarity Limit
 - When connecting RS485 line(Communication) all lines should be matched to each A/B port



Central Controller

2.3 Product Description

■ PDI Installation (PDI Setting method)



You have to set in 20 minutes after turning power on.

* Description of button function

Use for change display showing that : Main → instant power → Accumulative

Use for entering applicable set menu and saving

MENU

SELECT

Direction button

1

PRODUCT TYPE

1. EHP

2. GHP

CHANGE SETTING INFO!

• Using up&down direction button, select product type

2

MENU

SELECT

• After select product type, Press the 'SELECT' button

3

CONNECTION : MASTER

STANDBY P : AUTO

WHM1 : NOT USE

WHM2 : NOT USE

MENU

SELECT

4

CONNECTION TYPE

1. MASTER

2. SLAVE

3. SLAVE-RC

MENU

SELECT

* Master : When using without central control Unit
 * Slave : When using with central control Unit
 * SLAVE-RC: When using with central control Unit.
 If the master is stopped, This mode can be operated as a single master.

5

CONNECTION : SLAVE

STANDBY P : AUTO

WHM1 : NOT USE

WHM2 : NOT USE

MENU

SELECT

6

STANDBY POWER

1. AUTO

2. MANUAL

MENU

SELECT

* AUTO : Automatically distribute the standby power
 * MANUAL : Does not distribute the standby power

7

• Select Port of PDI connected WHM
 ex. WHM Connected Port 1 of PDI → Select WHM1

CONNECTION : SLAVE

STANDBY P : AUTO

WHM1 : NOT USE

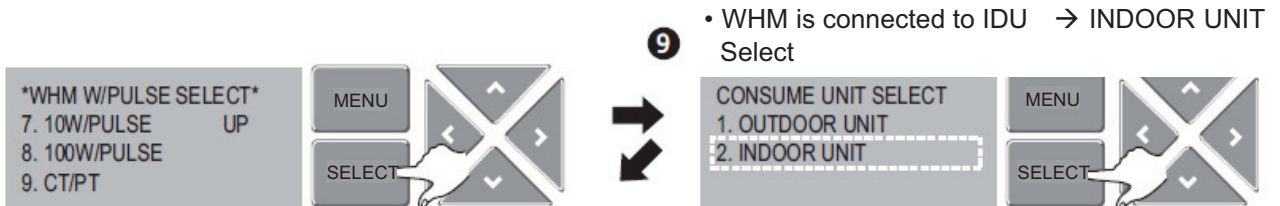
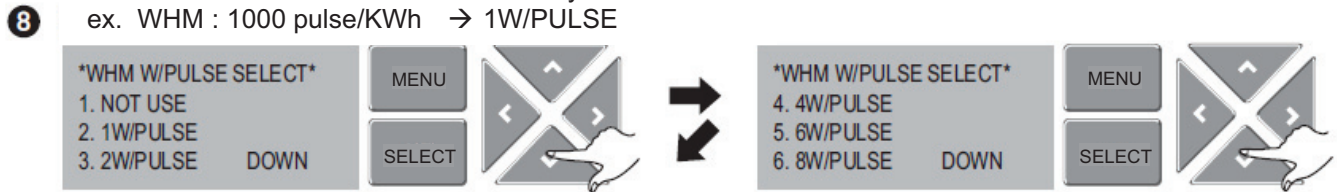
WHM2 : NOT USE

MENU

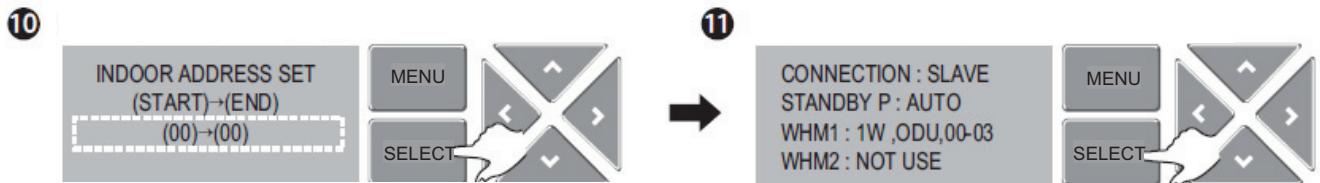
SELECT

2.3 Product Description

- Select value that should be calculated by WHM info.
ex. WHM : 1000 pulse/KWh → 1W/PULSE



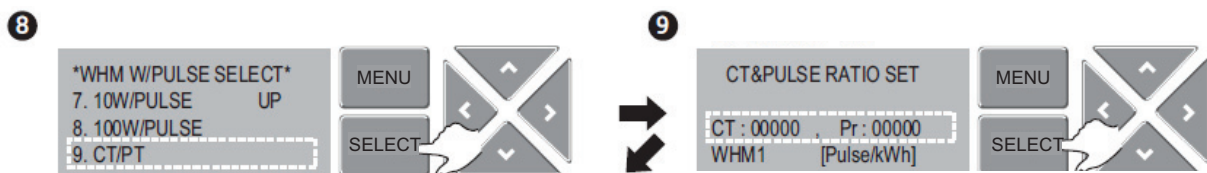
- If WHM is CT Type,
→ select CT/PT & move to other page



- Setting the start & end address of IDU
- Detail method is described in other page

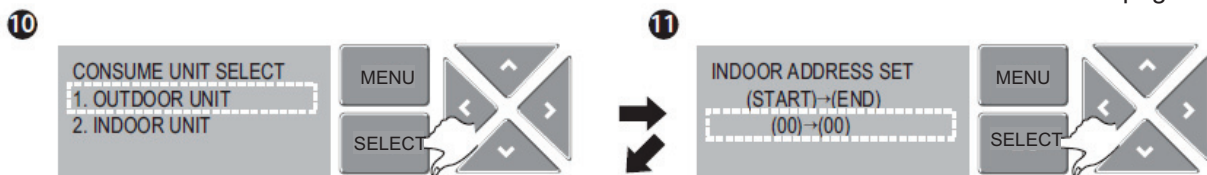
- After finishing the setting,
Press the “MENU” Button for getting back

■ PDI Installation (PDI Setting method, When using CT Type WHM)



- If WHM is CT Type, select CT/PT

- Setting the CT & Pr value
- Detail method is described in next page



- If WHM is connected to IDU
→ Select INDOOR UNIT

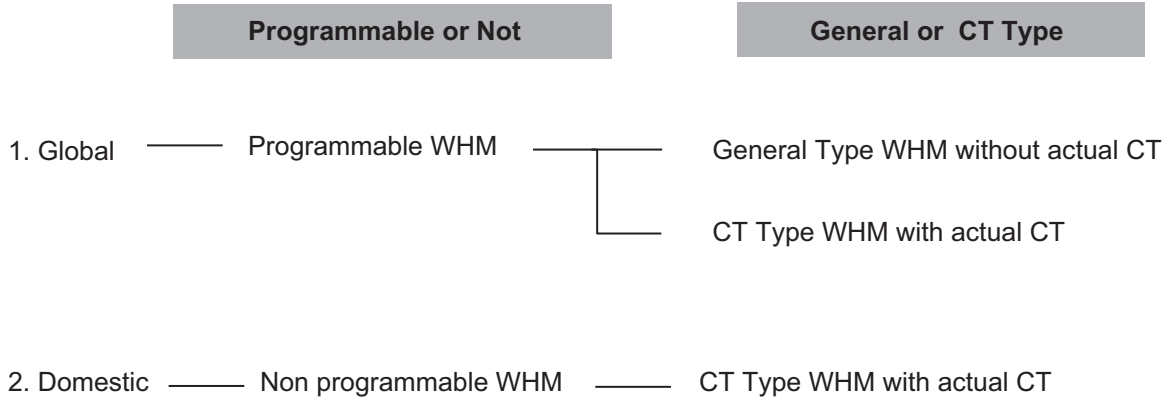
- Setting the start & end address of IDU
- Detail method is described in other page



- After finishing the setting,
Press the “MENU” Button for getting back

2.3 Product Description

■ PDI Installation (PDI Setting method, When using General Type or CT type WHM)



Why use the CT TYPE WHM(purpose)

: When the WHM model doesn't cover the ELCB capacity, turn down the current
(100A → 5A, CT Ratio=20=100/5)

2.3 Product Description

■ PDI Installation (PDI Setting method, Case 1(Global) : Programmable & General Type WHM)

1. Put CT Ratio to WHM

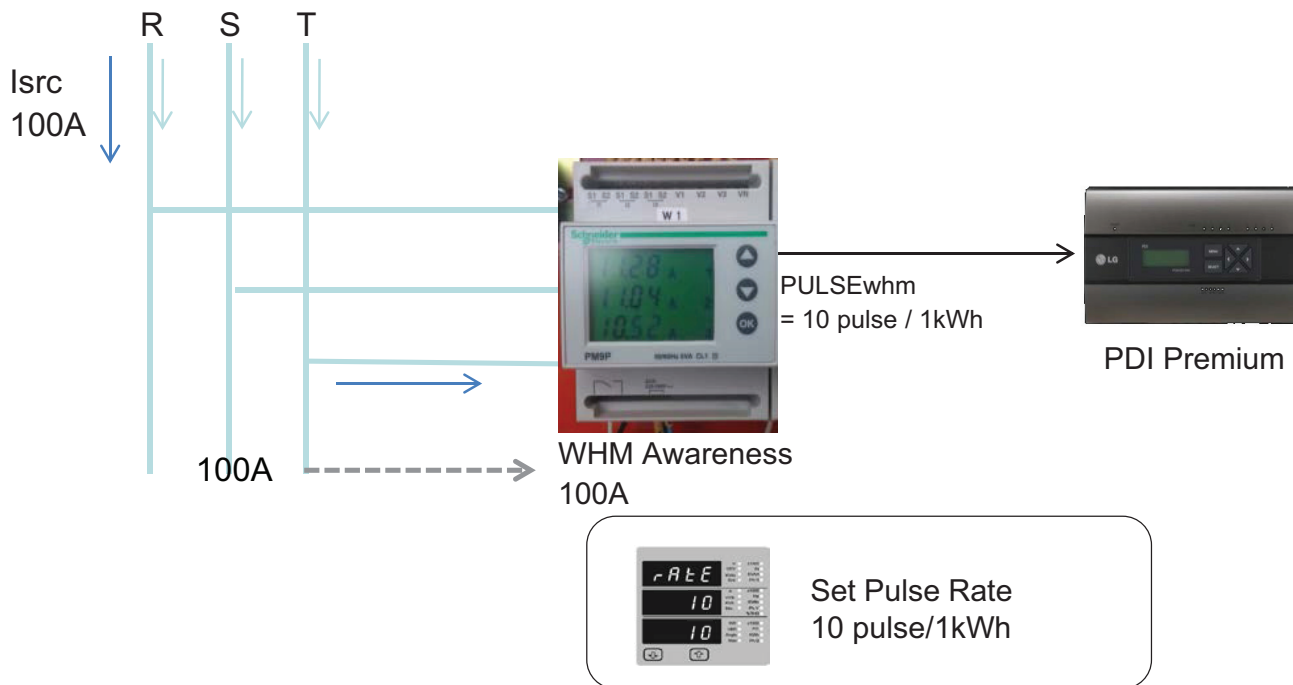
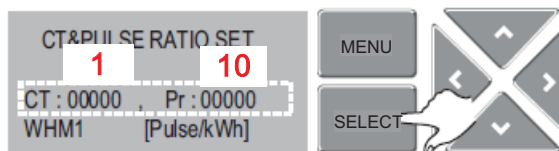
- ① Putting CT Set value
= primary : secondly = 1 : 1

2. Set & Put the Pulse Ratio to WHM

- ② Setting the Pulse Ratio
→ You can set this value within the WHM Spec
. ex WHM Spec = 1~99999 impulses
if you choice 10 pulse/1kWh
- ③ Putting Pulse Ratio : 10

3. PDI Setting

- ④ Putting CT ratio =1
& Pulse value



Isrc(current) : large current (difficult to measure)

2.3 Product Description

■ PDI Installation (PDI Setting method, Case 2(Global) : Programmable & Need to install actual CT)

1. Set CT Ratio

- ① Set Actual CT Ratio
 - * Cover WHM capacity (ex. 5A)
 - (EX. 5A= Isrc/CT ratio =100A/20=5A)
 - Set Actual CT :
 - = primary : secondly = 1 : 1 =100:5

2. WHM Setting

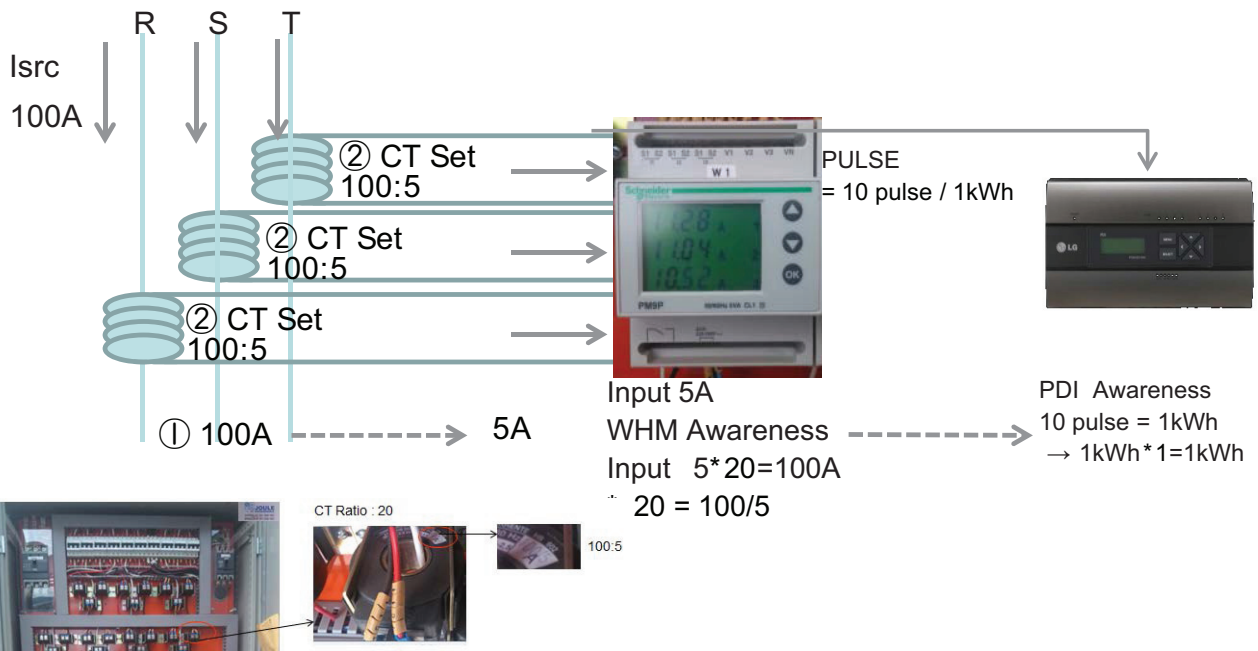
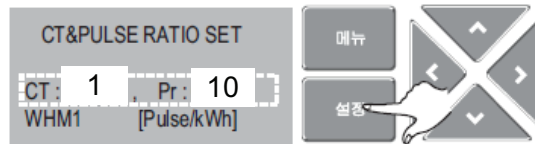
- ② Putting CT Set value
 - = primary : secondly = 1 : 1 = 100 : 5
- ③ Setting & Putting Pulse value : 10
(if you set 10 pulse/1kWh)



※ Set "1" in CT : []
Because CT Ratio was already reflected In Programmable WHM (100:5)
If you set the CT Ration(CT=20) in PDI, Consumption data is x 20

3. PDI Setting

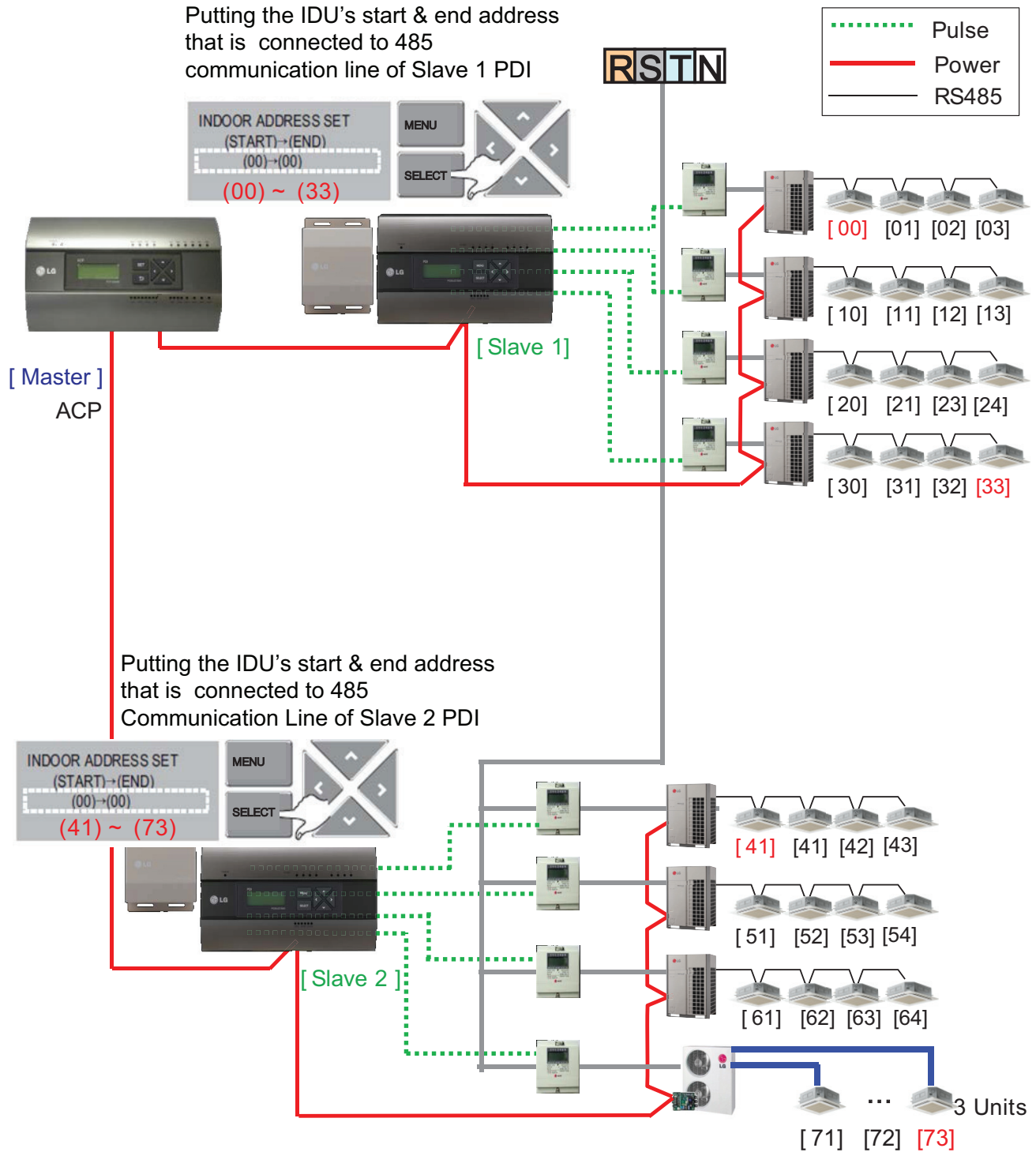
- ④ Putting CT ratio & Pulse value



Isrc(current) : large current (difficult to measure)

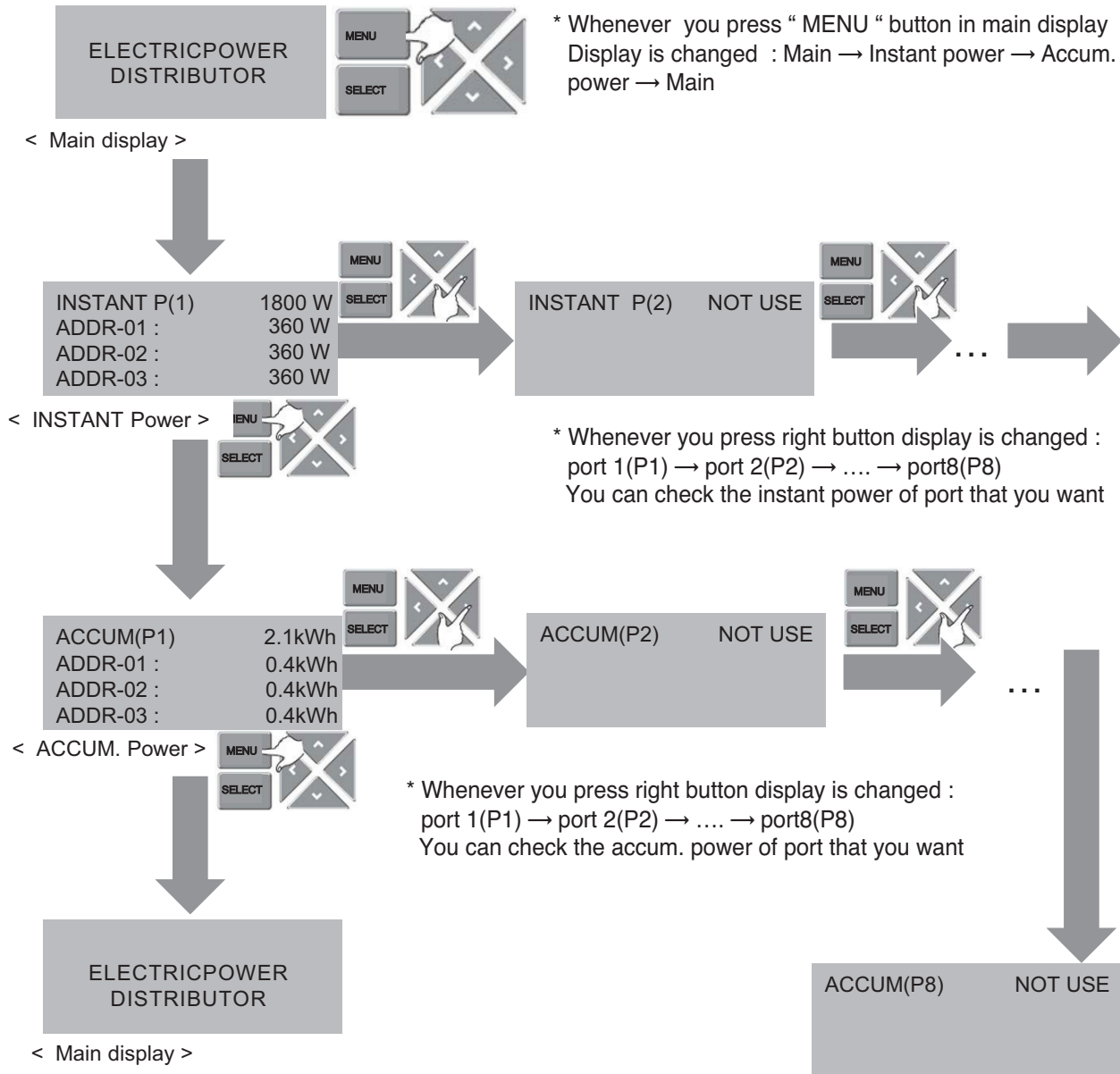
2.3 Product Description

■ PDI Installation (PDI Setting method, Addressing setting method)



2.3 Product Description

■ PDI Installation (PDI Setting method, Power consumption check _In PDI)



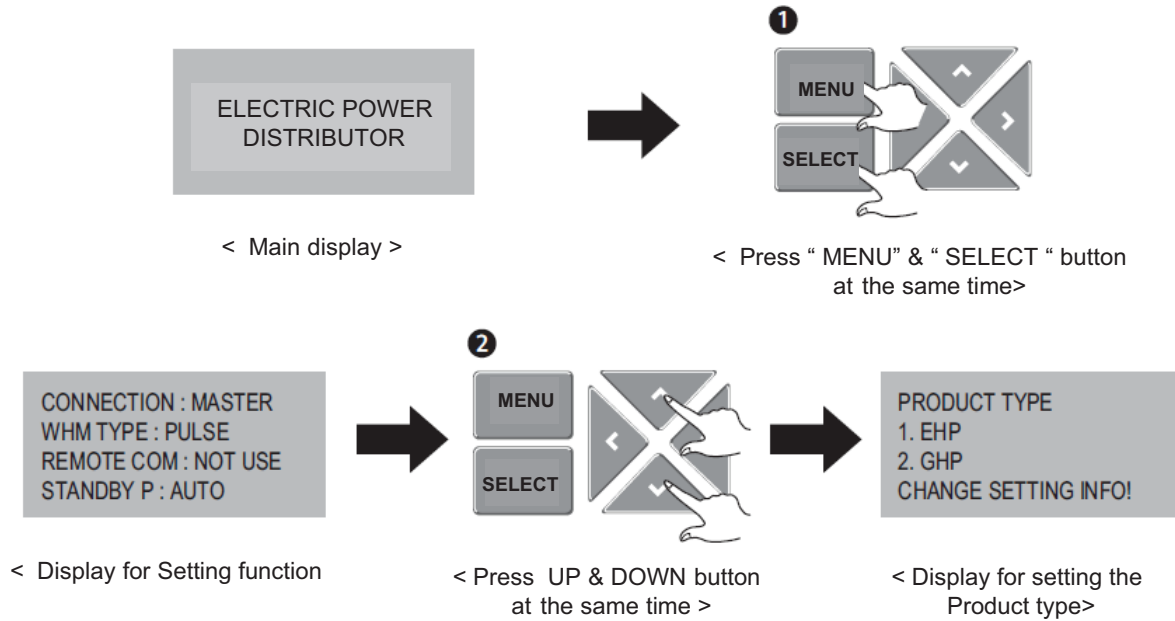
Central Controller

2.3 Product Description

■ PDI Installation (PDI Setting method, Method to change product type)

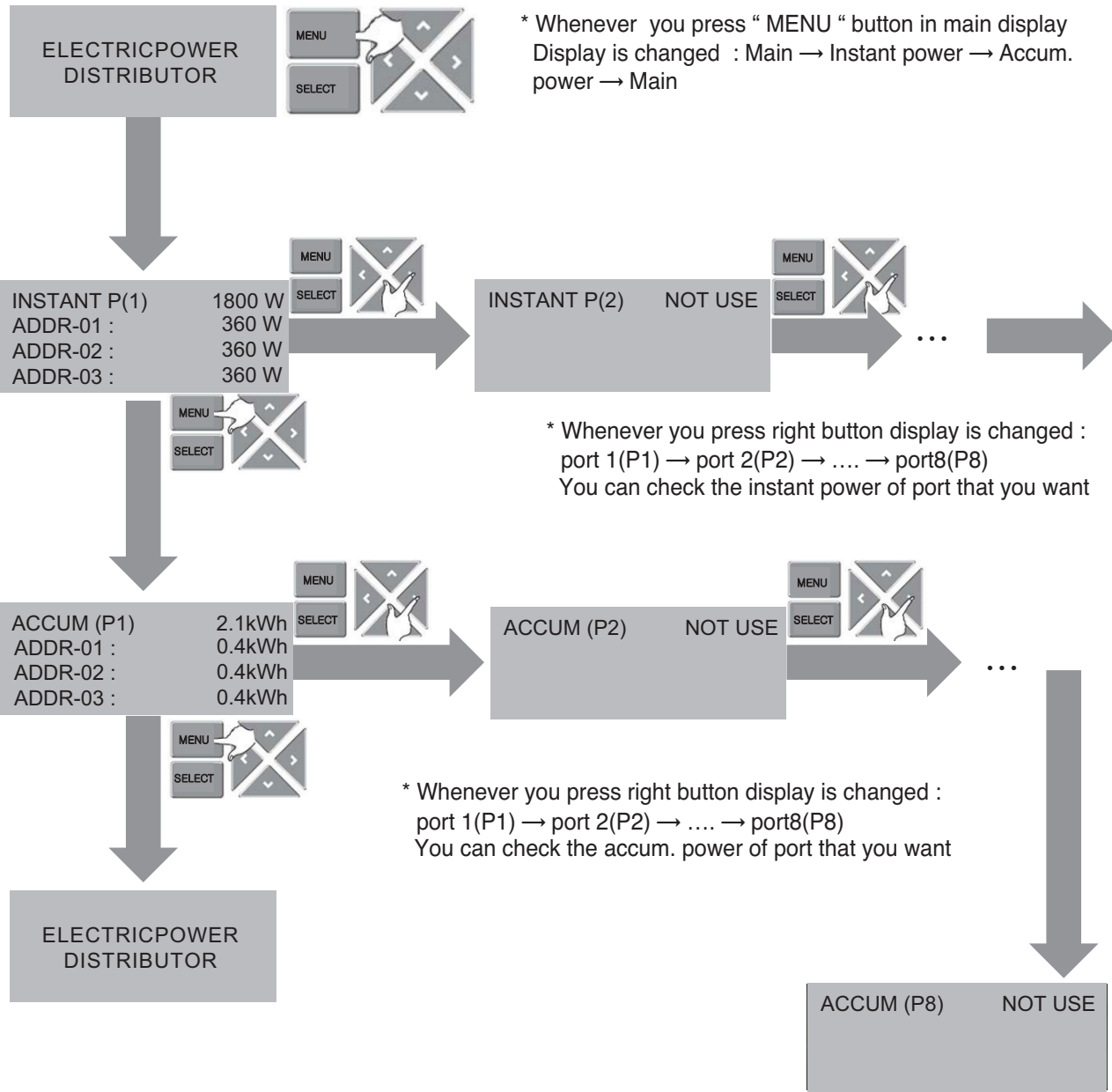
You have to set in 20 minutes after turning power on

→ So. You should turn PDI off and on to change the product type



2.3 Product Description

■ PDI Installation (Power consumption check)

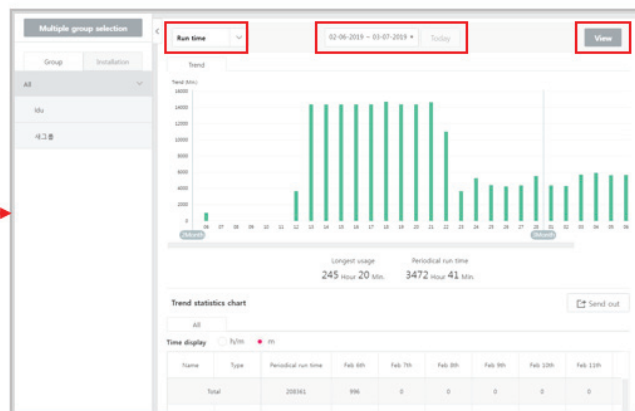
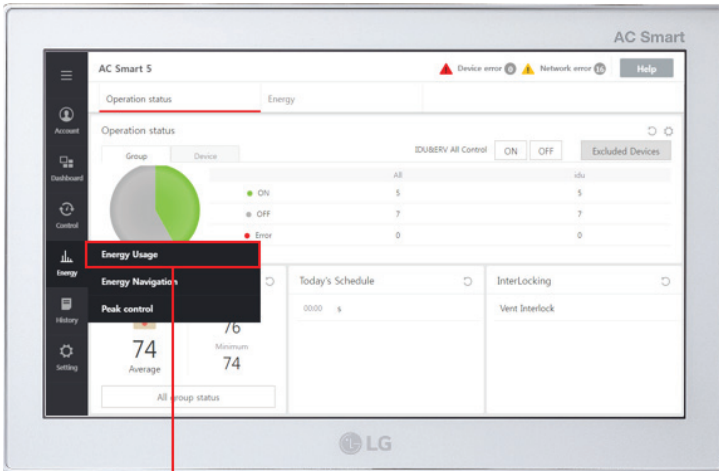


Central Controller

2.3 Product Description

■ PDI Installation (Power consumption check in ACP)

1. Main GUI → Click Energy Report
2. Click “Power”, “Daily”, “ View All “
3. Setting the month that you need to confirm
→ After this process, you can watch the power data(kWh)



2.3 Product Description

■ Major Logic (STBP - Standby Power Consumption)

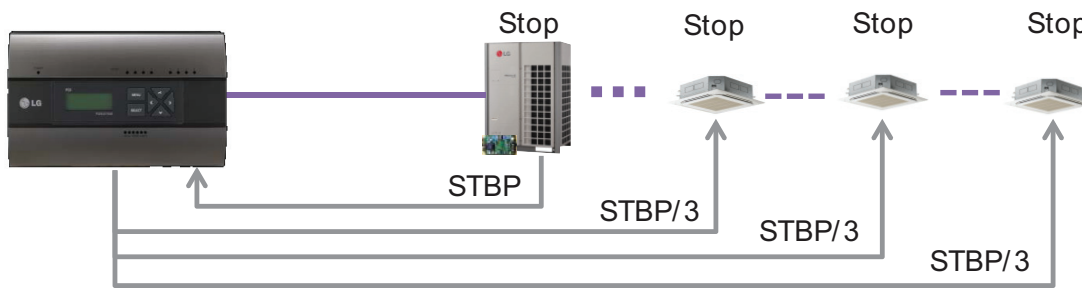
1) Set as AUTO : In this mode, PDI distributes the STBP to the each IDU unit

① Mode setting



* In 20 minutes after turning on

② STBP operating



③ Check result



2.3 Product Description

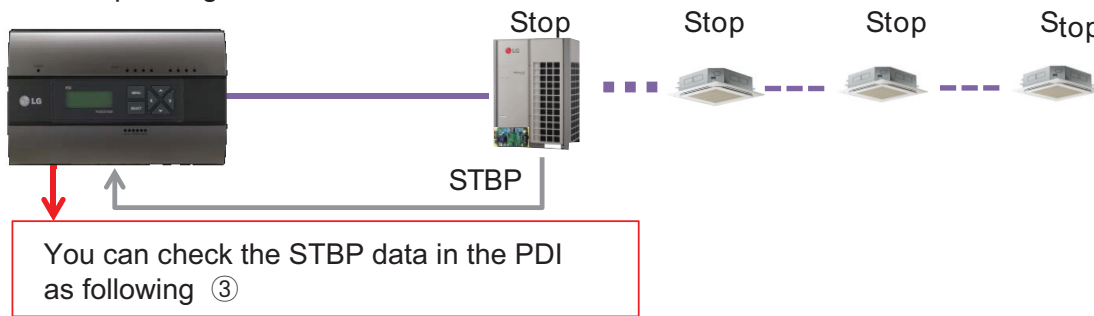
2) Set as Manual : In this mode, PDI saves the STBP in PDI STBP's page , do not distribute to each IDU

① Mode setting

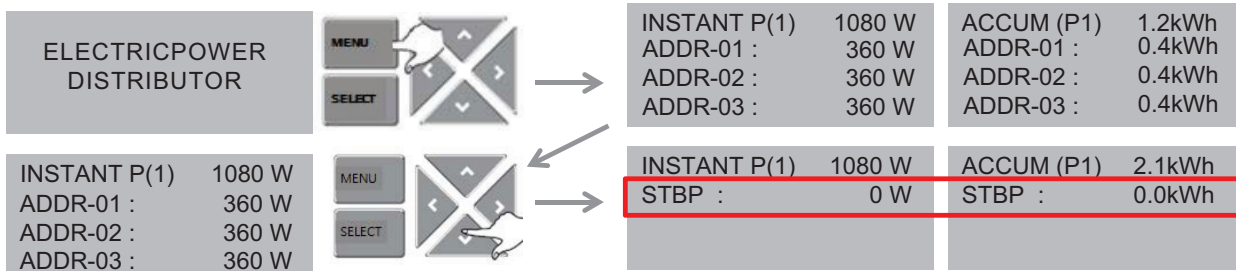


* In 20 minutes after turning on

② STBP operating

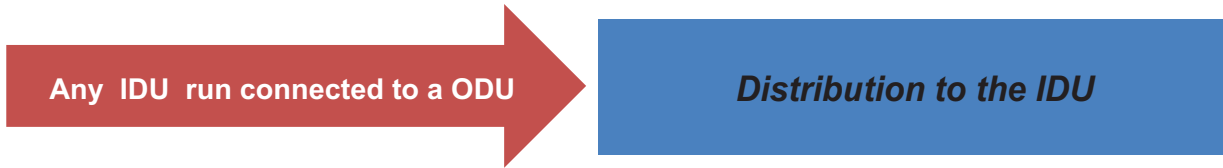


③ Check result



2.3 Product Description

■ PDI Distribution Logic for power consumption of ODU



• **Distribution Factors**

Operation, Capacity of IDU, Thermal on/off of IDU, Fan speed

• **Power Consumption of each IDU**

$$= \text{Power Consumption of ODU} \times \frac{\text{Weighting Power of each IDU}}{\text{Weighting Power of total Indoor Units}}$$

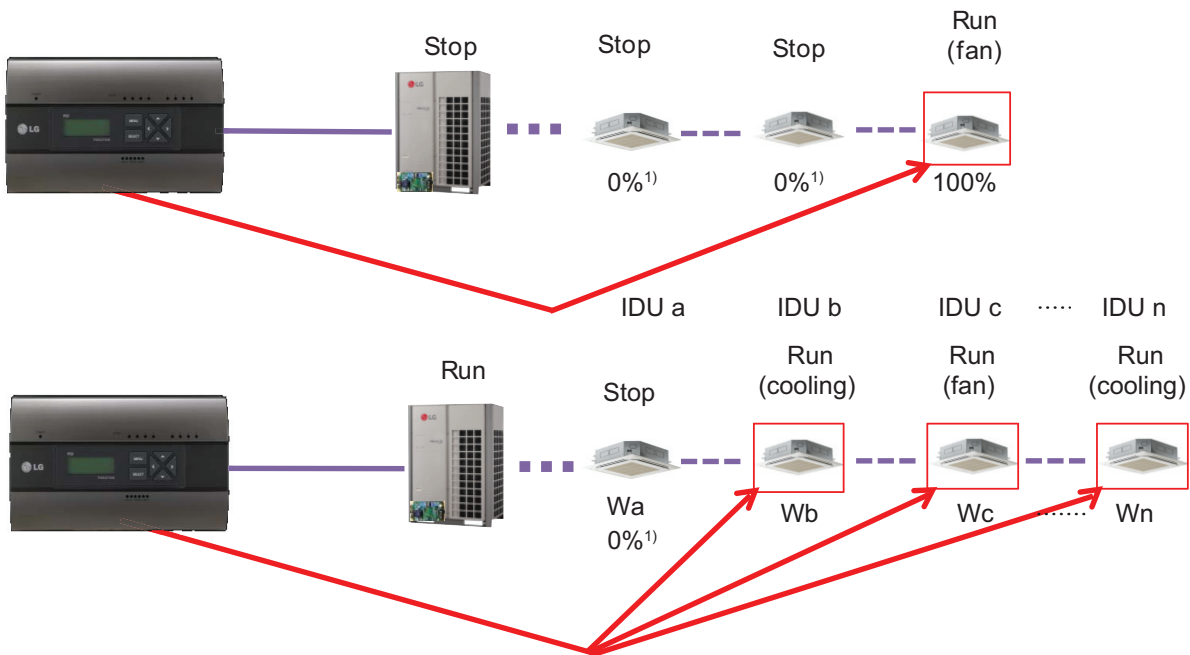
• **Weighting Power of each Indoor Unit**

Operation (On/Off) x Capacity of IDU [Thermal on/off * Xa* + Fan step of IDU * Xb*]

* Xa, Xb : Correction factors for distribution

* This distribution logic has no legal basis.

Central Controller



1) If some IDUs are turned off while other IDUs are running, the weighing power for these turned off IDUs will be 0.

* Wa, Wb, ... , Wn : Weighting power of each indoor unit

2.3 Product Description

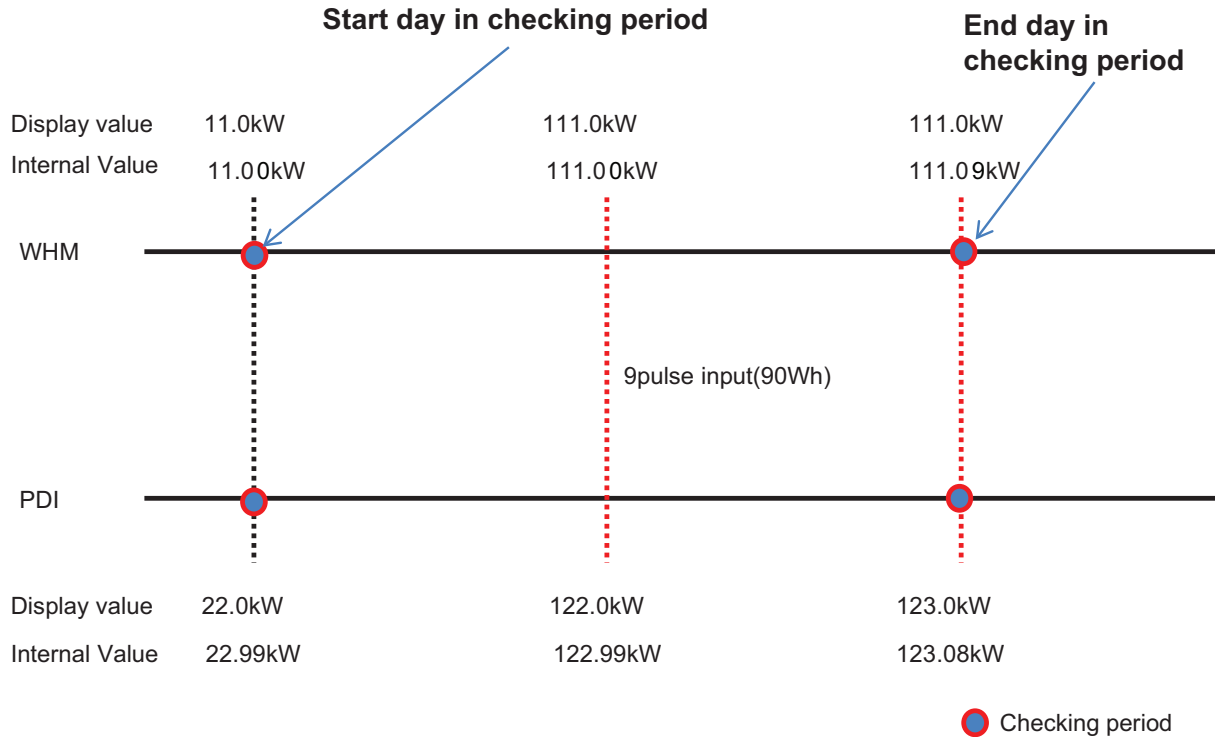
■ Major Logic (Difference due to WHM Displaying Logic)

WHM's minimum displayable value is 0.1kW(100W)

In case of 100pulse/1kWh(10W/P) setting, last digit(marked with red color) is not be shown on WHM LCD panel.

It can cause maximum 1kwh difference in checking period.

The actual value is counted and memorized internally (the checking period is extended, it doesn't increase)



Internal Count Value

= Power of End day – Power of start day

$$\text{WHM} = 111.09 - 11.00 = 100.09$$

$$\text{PDI} = 123.08 - 22.99 = 100.09$$

→ Same value!

LCD Display

= Power of End day – Power of start day

$$\text{WHM} = 111.0 - 11.0 = 100$$

$$\text{PDI} = 123.0 - 22.0 = 101$$

→ 1kw Difference.

2.3 Product Description

■ Major Logic (Error display Logic)

1. ERROR - 01 : Central controller 485 communication error
 - It happen when PDI can't communicate with IDU set as IDU address
 - For 3 minutes
 - It displayed with IDU address of IDU that get problem

2. ERROR - 02 : Pulse line no signal error
 - Error is displayed when there is no signal from the pulse detection in the option-set wattmeter(WHM1~8).
 - For 3 minutes(even when 1 or more unit doors are operating with thermal on)
 - When Pulse width is over the spec (25 ms ~ 500 ms)

3. Error display Sequence
 - ① When two or more error is happened
 - ② PDI display the Error that was happened early in that mix
 - ③ When the first error is terminated, the other error is displayed

■ When IDU is off vs. shut down ?

- 1) When IDU is off
(ex. using the Run/Stop button of Remote Controller)
 - PDI is communicating with IDU that is off, and PDI aware that IDU's status is off, so
 - ① when some IDU is On : Power is distribute to IDU that is On
 - ② when all IDUs is Off : Change the mode from distribution to STBP(Standby Power Consumption), If STBP is set 'AUTO'.

- 2) When the power of IDU is shut down
 - PDI doesn't communicate with IDU, so PDI aware that there is no IDU
 - PDI will be piling up the power that ODU is using
 - when Power is recovered, the value piled up is distributed to each IDU

2.3 Product Description

2.3.6 ACS IO Module

The module can be connected with ACS controller if additional control points are needed other than not only DI/DO but also AI/AO port of ACS controller unit.

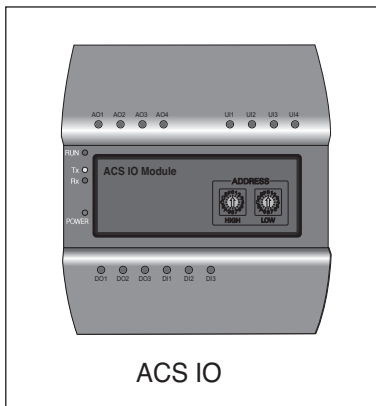
ACS controller can control 3rd party device as pump, security, lighting and so on through DI/O and AI/O.

※ ACS Controller : AC Smart IV, AC Smart 5, ACP IV, ACP 5

- Model name : PEXPMB000

2.3.6.1 Specifications & Dimensions

■ Features

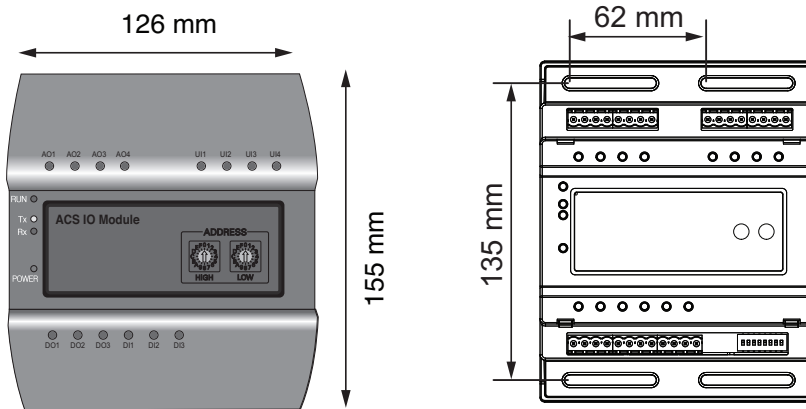


■ Product Specifications

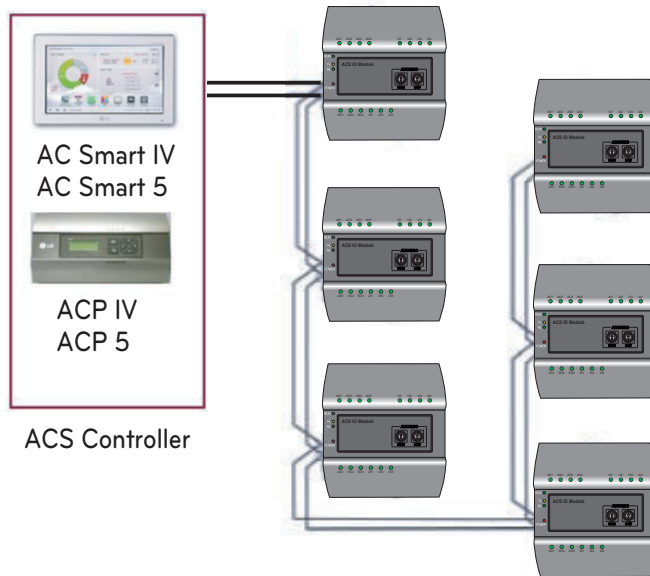
Item	Description
Rotary Switch	2EA (ACS IO Address creation)
Dip Switch	1EA (Not used)
LED	18EA (485 communication status x2, power source status x1, operation status x1, IO input status x14)
Product size and weight	155 x 126 x 64.8(width x length x height mm), 250 g
DIN Rail Specifications	Standard size width 35 mm DIN Rail
Communication port	1 channel RS485 communication, 1 channel CAN communication
External input/output port	DI x 3EA, DO x 3EA, UI x 4EA, AO x 4EA
Rated voltage	24 V~, 60 Hz / 500 mA
Range of service temperature	-20 ~ 60 °C

2.3 Product Description

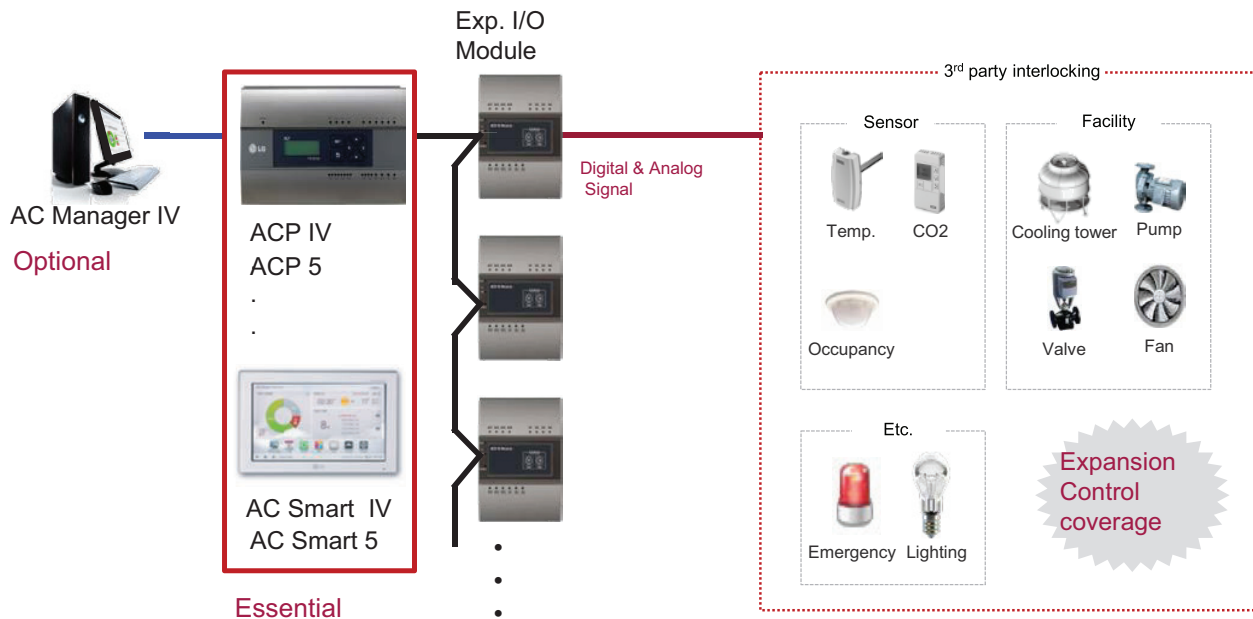
■ Dimensions



2.3.6.2 Field Wiring Diagram



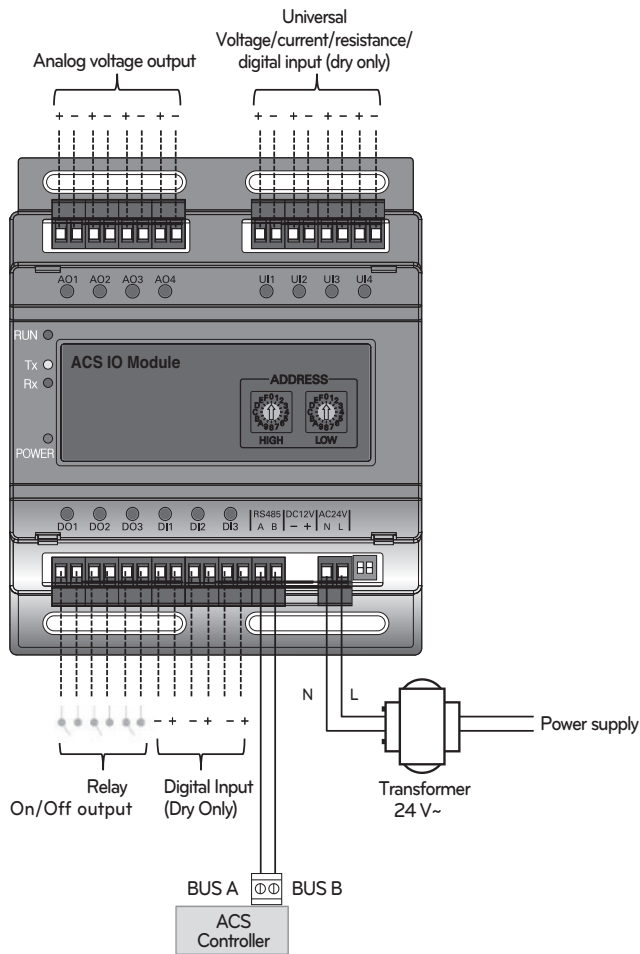
Central Controller



2.3 Product Description

Connecting the product

The illustration below shows all the cable connections of the ACS IO.



< Illustration of ACS IO cable connections >

CAUTION

- Be careful not to plug in the wrong cord when connecting to the various input/output sockets. The product may be damaged an improper +/- connection is made.

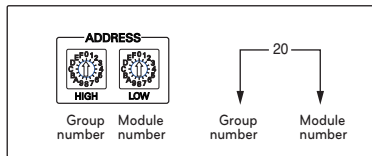
2.3 Product Description

Address creation

When one ACS Controller(AC Smart IV, AC Smart 5, ACP IV, ACP 5) is connected to multiple ACS IO, to classify each module a unique address must be used by selecting rotary switches.

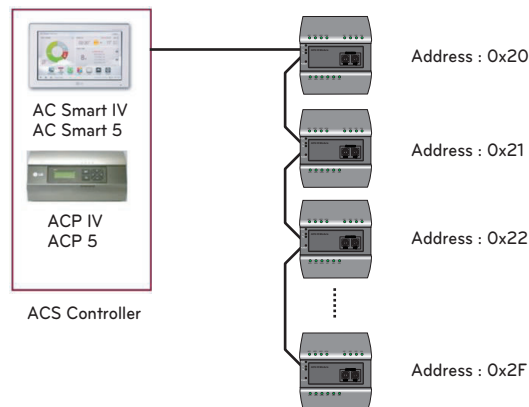


Using the ACS IO rotary switch a 16 digit between 01~F7 can be created.
 (00 addresses may not be created because they are used for broadcasting at MODBUS communications.)
 Numbers 20~2F are recommended for creating an ACS IO address.
 A maximum of 16 ACS IO can be connected.



Recommended address

- Recommended address range : 20~2F
- Valid address range : 01~F7

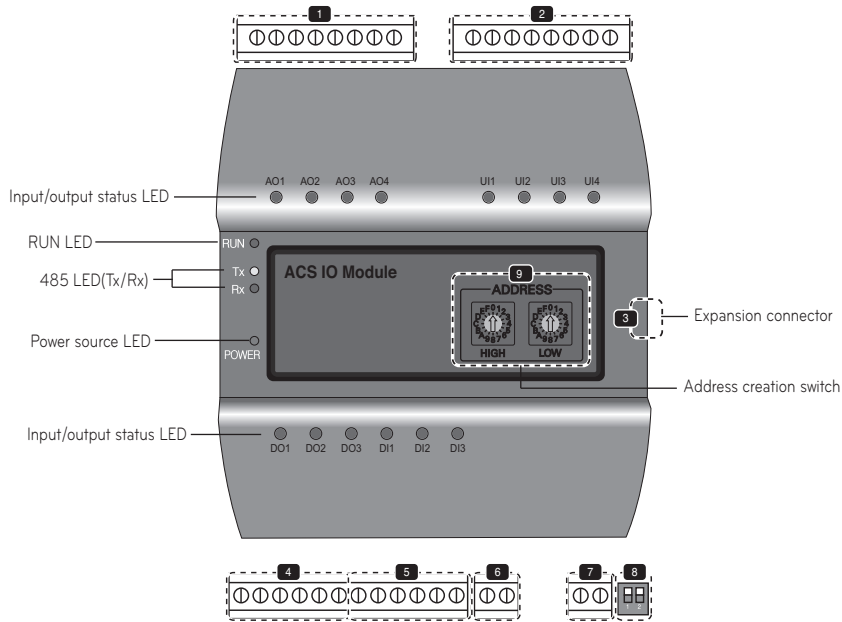


CAUTION

- Please create a unique address for each module.
- Do not create an address with 00.
 (00 addresses may not be created because they are used for broadcasting MODBUS communications.)
- After changing the address be sure to cycle power.

2.3 Product Description

2.3.6.3 Name and Functions



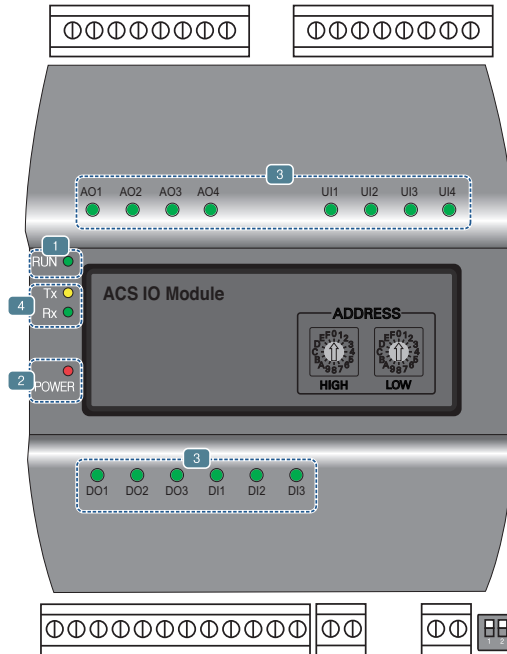
- | | |
|--|--|
| <ul style="list-style-type: none"> ❶ AO Port (control signal interconnect) ❷ UI Port (control signal interconnect) ❸ Expansion connector (Not used) | <ul style="list-style-type: none"> ❹ DO Port (control signal interconnect) ❺ DI Port (control signal interconnect) ❻ RS485 Communication unit ❼ 24 V~ Power input port ❽ Dip Switch (Not used) ❾ Rotary Switch (ACS IO address creation) |
|--|--|

⚠ CAUTION

When expanding on the product using a connecting product, check the shape of the expansion connector head before attempting to connecting the cord. Connecting the wrong cord can results in damage and a malfunction of the product.

2.3 Product Description

■ LED Status



- 1** RUN LED : This is used to confirm that normal operations have been established after connecting to ACS IO.
 - Under normal conditions.
Under normal conditions flashes 5 times per second when a power source is applied.
 - When an error occurs
When an error occurs between the ACS Controller and the ACS IO, it will be flash twice in 2 seconds.
When error occurs in ACS IOs 2 though 16, it will flash 3 times every 2 seconds.
- 2** Power source LED : This is used to confirm the condition of the power source supply.
 - LED is ON while power is applied.
 - Otherwise LED is OFF.
- 3** This is used to label the status of each port. (Refer to port descriptions for details of each of the lights.)
- 4** 485 communication LED(Tx/Rx) : This is used to confirm of the operation of RS485 communication.
 - It will flash according to the communication condition of 485 Tx/Rx.

2.3 Product Description

2.3.6.4 PORT Description

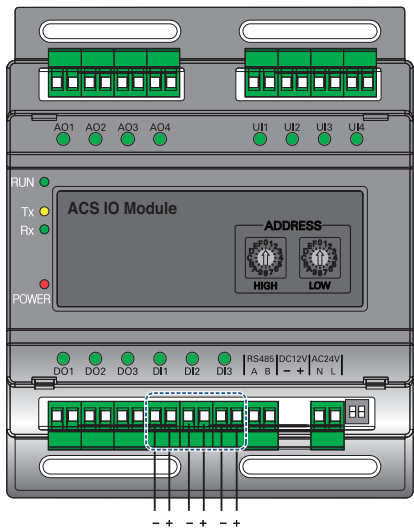
■ Connecting to an external device (DI port)

The dry contact input method is provided for DI ports.

Do not apply external power to DI ports.

Damage will occur and warranty will be voided.

There are a total of 3 DI ports.



+ : Input
- : GND

LED status (DI port)

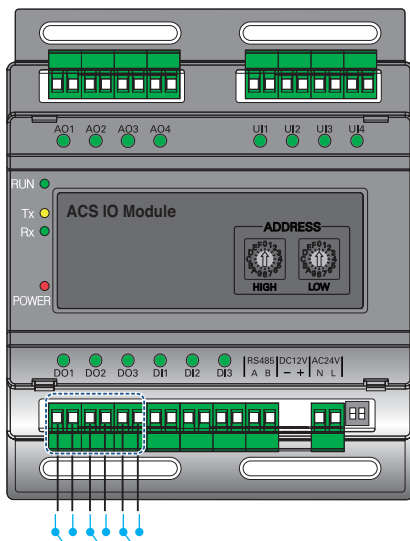
The input status LED will light up under the following circumstances.

- When there is an input value : ON
- When no input value is present : OFF

■ Connecting to an external device (DO port)

As for the DO port, this is a contact output port.

There are a total of 3 DO ports.



LED status (DO port)

The input status LED will light up under the following circumstances.

- When output shorts : ON
- When output opens : OFF

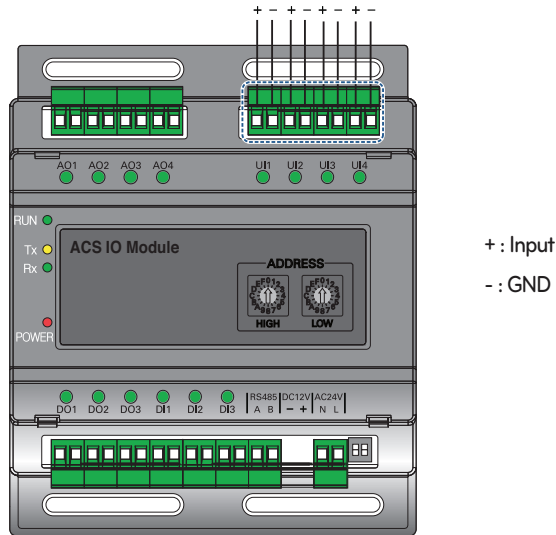
⚠ CAUTION

- The maximum output possible for switching through digital output is 30 V_{DC} / 30 V_{AC} and the maximum current is 2 A.
- Deviating from the intended range can cause the product to be damaged.

2.3 Product Description

■ Connecting to an external device (UI port)

Each of four UI ports can be configured for use as analog in or digital in only. There are a total of 4 UI ports.



The table below shows the valid configuration values for each of four UI ports.

Types of input		Minimum value	Maximum value
Analog Input	NTC 10k	0.68 kΩ	177 kΩ
	PT 1000	803 Ω	1573 Ω
	Ni 1000	871.7 Ω	1675.2 Ω
	DC(Voltage)	0 V	10 V
	DC(Current)	0 mA	20 mA
Digital Input	Binary(Dry contact)	-	-

⚠ CAUTION

- Using input other than the conditions of use list above can cause product damage and malfunction.
- Polarity matters in DC voltage and current configuration, you must follow external 3rd party device wiring to be sure that polarity is applied correctly.

LED status (UI port)

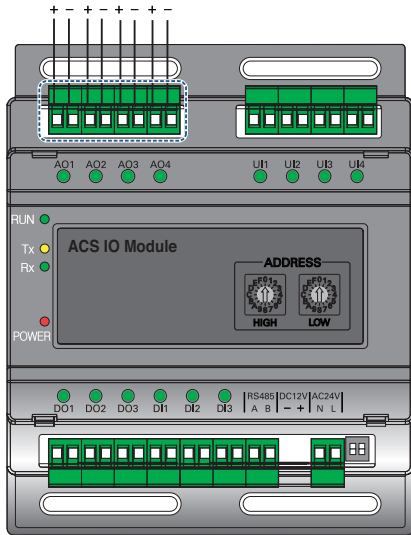
The input status LED will light up under the following circumstances.

Types of LED input		Minimum value
Analog Input	NTC 10k	OFF
	PT 1000	OFF
	Ni 1000	OFF
	DC(Voltage)	OFF
	DC(Current)	OFF
Digital Input	Binary(Dry contact)	When there is an input value, ON

2.3 Product Description

■ Connecting to an external device (AO Port)

Each of four analog output ports will provide between 0 and 10 V_{rms} depending on central controller configuration.



+ : Output
- : GND

LED status (AO port)

The input status LED will light up under the following circumstances.

- When creating port output from the ACS Controller : ON
- When creating as port reserves from the ACS Controller : OFF

⚠ CAUTION

- Connecting the wrong size cable results in damage and a malfunction of the product.
- Check the size of the connector head before attempting to terminate wiring.
- The maximum output current is 20 mA.

	Minimum	Maximum
Voltage	0 V	10 V

2.3 Product Description

2.3.7 Cloud Gateway

- Model name : PWFMDB200 (LG Wi-Fi云网关*)

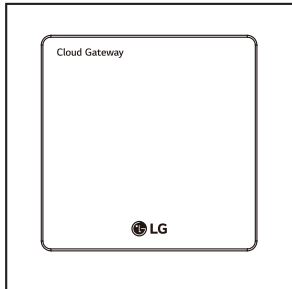
It is a communication gateway that enables remote control/monitoring and maintenance by linking the product to the ThinQ server and BECON cloud server through wired/wireless LAN.

You can conveniently remote control/monitoring up to 16 indoor units through the ThinQ app.

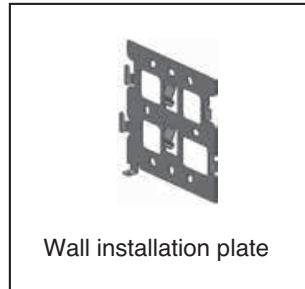
* This name is only sold and used in China.

2.3.7.1 Specifications & Dimensions

■ Features



■ Accessory



■ Product Specifications

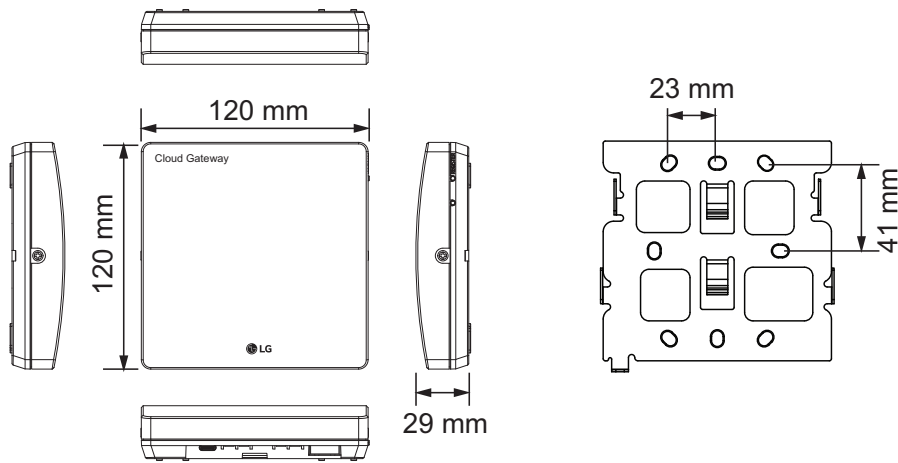
Item	Specification	Etc
Power Supply	12 V	Max. 50 m (Use of the output power of the outdoor unit.)
Power consumption	5W	
Operating temperature	0~40°C	
Storage temperature	-20~60°C	
Communication	Ethernet	1EA
	Wi-Fi	1EA
	RS485	1EA
Size	120 x 120 x 29	mm

■ Wireless standard

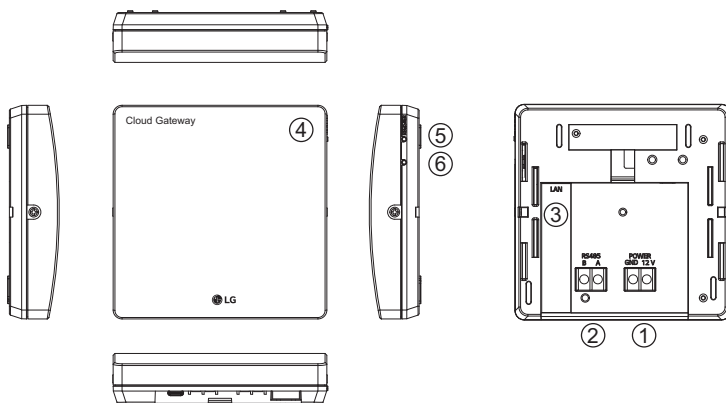
1. EU : CE RED
2. India : WPC
3. Vietnam : VNNTA not applicable (Power below 60mW(17dBm))

2.3 Product Description

■ Dimensions



2.3.7.2 Port and Function



Number	Classification	Specifications	Other types
①	Power	12 V ---	Use of the output power of the outdoor unit.
②	Communication	RS485	Max. 1 km
③		Ethernet	10/100 Mbps
		Wi-Fi	2.4 GHz
④	LED	2ea	Left (Product mode, red) / Right (Power, green)
⑤	Switch	Change product mode	Registration (LED dimming) ↔ Use (LED lighting)
⑥		Reset the power	-
	Temperature Spec.	0 °C ~ 40 °C	Use Temperature
	Storage Temperature	-20 °C ~ 60 °C	Storage Temperature

2.3 Product Description

2.3.7.3 Function List

Function	Description	ThinQ	TMS (LG BECON Cloud) ¹⁾
Interlocking products	Multi V	●	●
	GHP	●	●
	Multi	●	●
	Single	●	●
	ERV	X	●
	Heating	X	● ²⁾
Remote control	Operation Start/Stop	●	●
	Operation Mode	●	●
	Target Temperature	●	●
	Fan speed	●	●
	Swing	●	●
	Air Purify	●	●
etc	Schedule	●	X
	Electricity Monitoring	X	●
	History	X	●
Maintenance	Smart Diagnosis	●	X
	Cycle monitoring	X	●

* ● : Applied, x : Not Applied

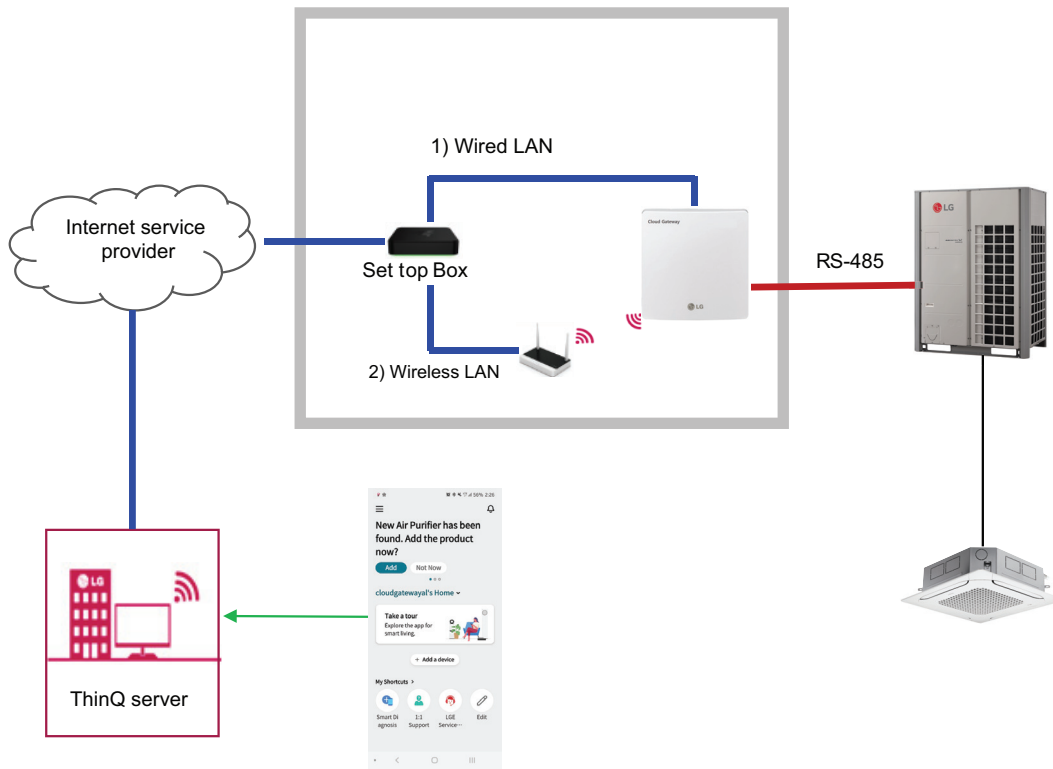
1) Depending on the region, TMS may not be available. Please contact to TMS administrator for checking availability.(BECONcloud-biz@lge.com)

2) Only for Therma V

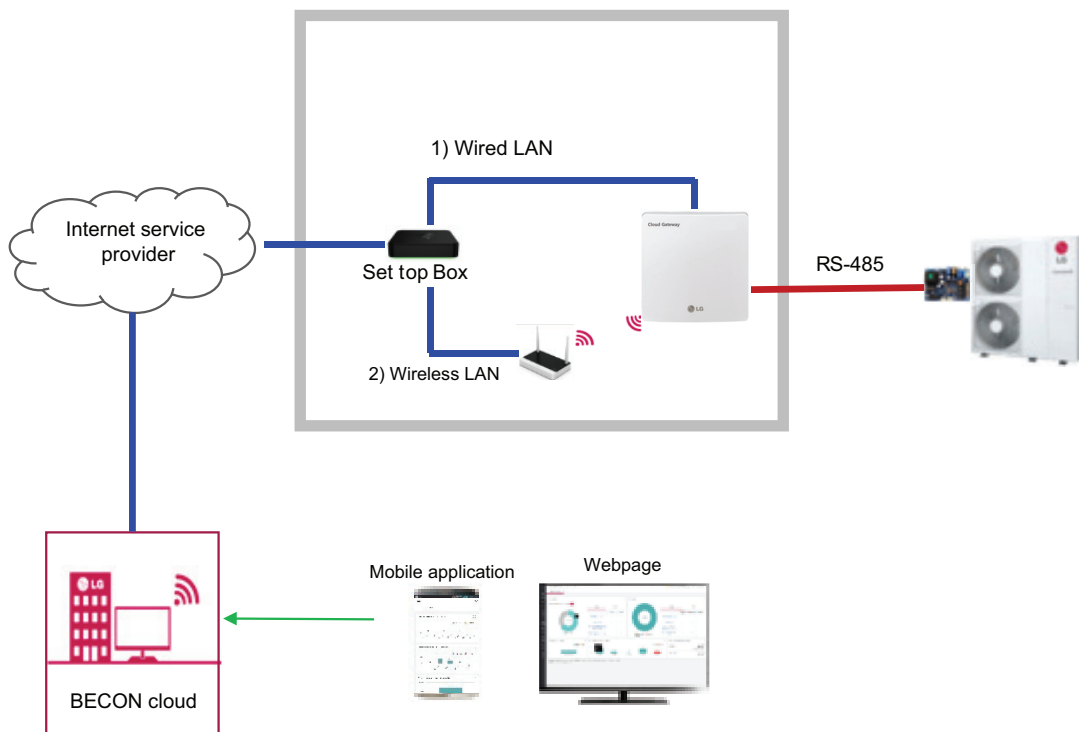
2.3 Product Description

2.3.7.4 Field Wiring Diagram

■ For ThinQ connection



■ For BECON cloud connection



Central Controller

2.3 Product Description

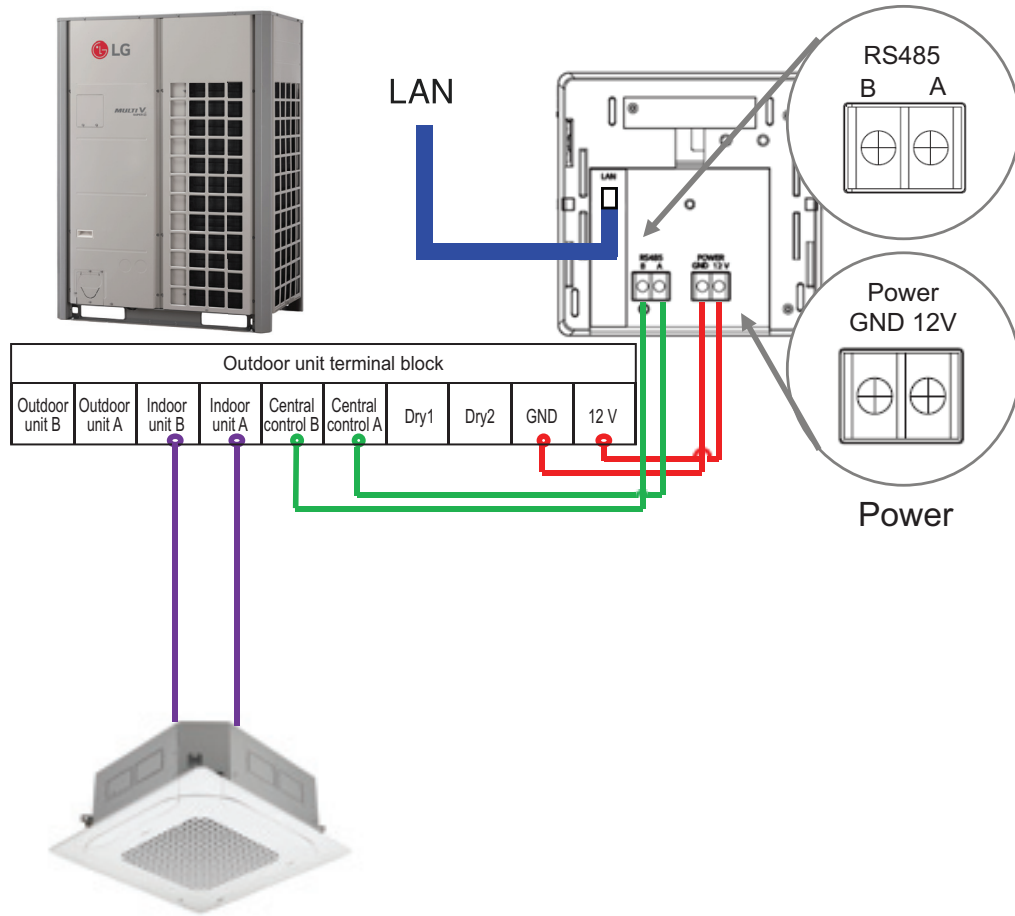
NOTE

- The Wi-Fi name and password are on the wireless router. Wi-Fi should only select 2.4 GHz. The modem mounted on the home appliance does not support 5 GHz and cannot connect the home appliance to the wireless router.
- WPA2 is recommended for the type of authentication and encryption of the wireless router.
- Wireless network connection quality can be affected by the surrounding wireless environment. If a failure occurs, contact internet service provider.
- When you can't connect home appliance's modem to wireless router, use the following methods to solve.
 - When a firewall is set on the wireless router, proceed after registering or releasing exceptions.
 - When the Wi-Fi name is in Korean or special characters, set it as English or numeric, or combination of English and numeric characters.
When the name contains Korean or special characters, you cannot connect.
- When the distance between the product and the wireless router is too far, the signal strength is weakened. A weak signal can take a lot of time or fail to register the product.
- When changing the wireless router, internet service provider, or password, delete the registered product in LG ThinQ and re-register it.
- The content of this manual may vary depending on the version of the LG ThinQ application and may change without notifying the user.
- If there is no 485 communication port on the outdoor unit, PI485 should be prepared.

2.3 Product Description

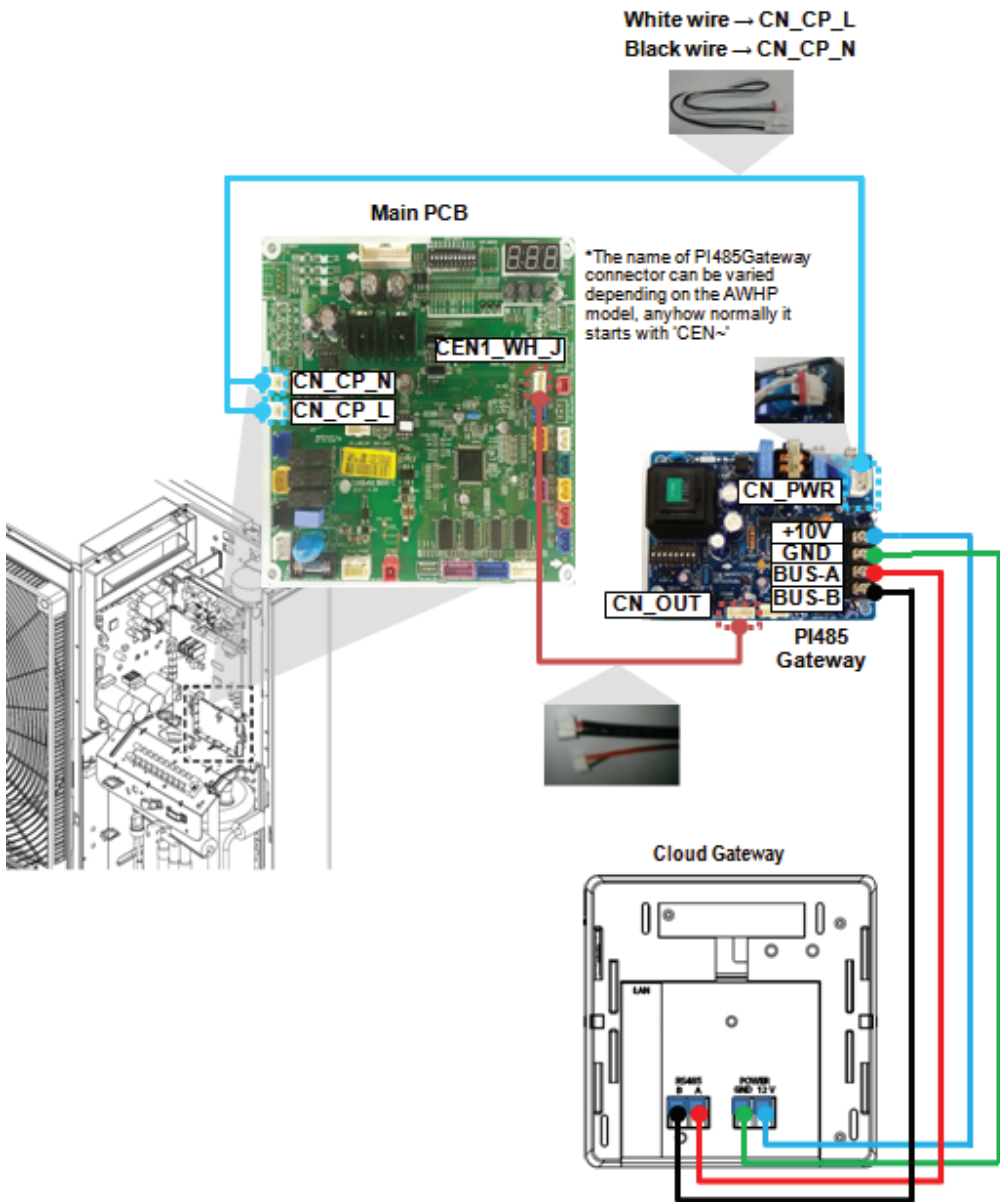
2.3.7.5 Connecting

■ For ThinQ connection



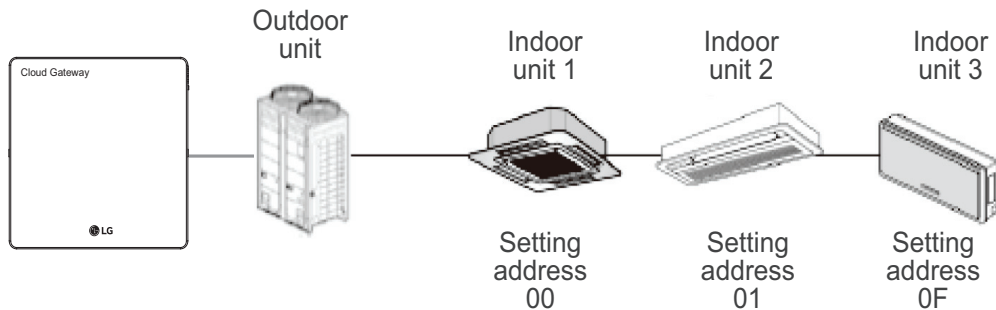
2.3 Product Description

- For BECON cloud connection
(Only for Therma V)



2.3 Product Description

■ Installation environment inspection and equipment address setting



NOTE :

- The maximum allowable communication length guaranteed by LG Electronics is 1000m. In other words, the controller and the farthest installed device must be installed within the distance of 1000m.
- It is recommended to use the communication cable which is more than 0.75 mm².
- Set the address that does not overlap within the same device type.
- When multiple different wireless LAN equipment are connected to the router to which you are connecting the controller, the wireless LAN malfunction may be caused (Such as delayed operation speed, disconnected, etc.) In this case, it is recommended to use a separate router to connect the controller.

■ Connection of RS485 communication line

One unit of controller can connect up to 16 indoor units. When multiple devices are connected, they must be connected in a BUS format. Otherwise, the controller may cause malfunction.



<Correct example : RS485 BUS format connection>



<Incorrect example : RS485 STAR format connection>

2.3 Product Description

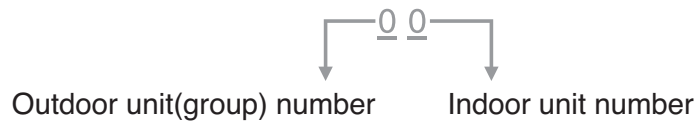
■ Indoor unit central control address setting

First, you need to grant address that does not overlap to each equipment (indoor unit, ventilation equipment) considering the entire installation composition connected to one controller.

The address of the device must be set within the range of 00~0F.

Note : Granting outdoor unit and indoor unit number

If the outdoor unit product is Multi V, it is recommended to set the first digit of the address as the outdoor unit number, and classify the second digit as the indoor unit number, so that the system composition and division can be easily identified during the address setting.



Note : Setting method of indoor unit central control address

The central control address setting method may be different according to the indoor unit product or remote controller type, so proceed the address setting by referring to the indoor unit product or wired remote controller manual.



Air Conditioner

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