DVM
Technical Data Book

Control Systems

DVM S™
DIGITAL VARIABLE MULTI

SAMSUNG

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1 External contact interface module

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Ethernet

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Control layer

Set layer

Max.16 Controllers (Includes DMS2, PIM)
Max.16 outdoor units
Max. 128 indoor units (Includes ERV, MCU)

Max. 80 units (Max. 64 Indoor units, Max 16 MCU, Max.16 ERV)

Max.16 Controllers

F1F2

R1R2

CH1   On/Off controller (MCM-A202DN)   Outdoor units

R1R2

Indoor units

F3F4

On/Off controller (MCM-A202DN)

Wired RC (MWR-WE10N)

Local layer   Max.2 Wired RC
Max.16 indoor units

CH2   On/Off controller (MCM-A202DN)   Outdoor units

CH3   On/Off controller (MCM-A202DN)   Outdoor units

CH4   On/Off controller (MCM-A202DN)   Outdoor units

- Set Layer (F1F2)- Communication channel of Outdoor(Main) unit, Indoor unit and Set layer controller(On/Off controller)

- Control Layer(R1R2) - Communication channel of Outdoor(Main) unit and Control layer controller(On/Off controller, DMS2)

- Local Layer(F3F4) - Communication between indoor unit and Wired remote controller

CH5   Max. 8 PIMs

PIM (MIM-B16)

- Case 1 > When DVM S be connected to conventional system

S-NET3 (MST-P3P)

DMS2 (MIM-D00A)

On/Off controller (MCM-A202D)

Interface module (MIM-B13E)

MIM-N00

DVM+4

DVM S

Conventional communication system   **New communication System**
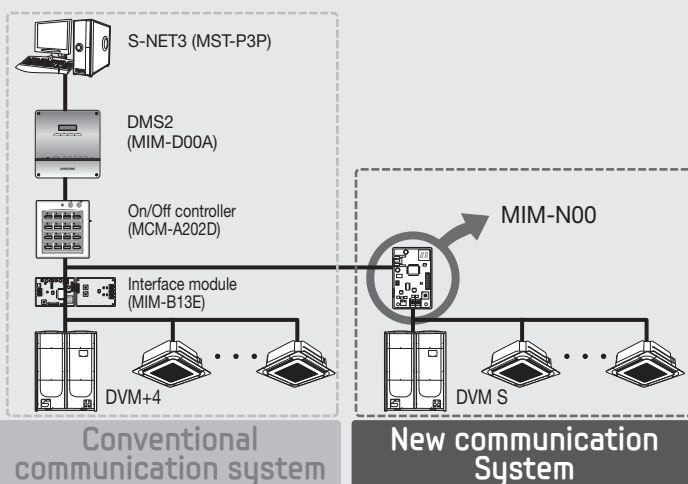
- Case 2 > When DVM+4 be connected to new system

S-NET3 (MST-P3P)

On/Off controller (MCM-A202DN)

DMS2 (MIM-D00AN)

New interface module (After July. 2013)

DVM S

DVM+4

New communication System   **Conventional communication system**
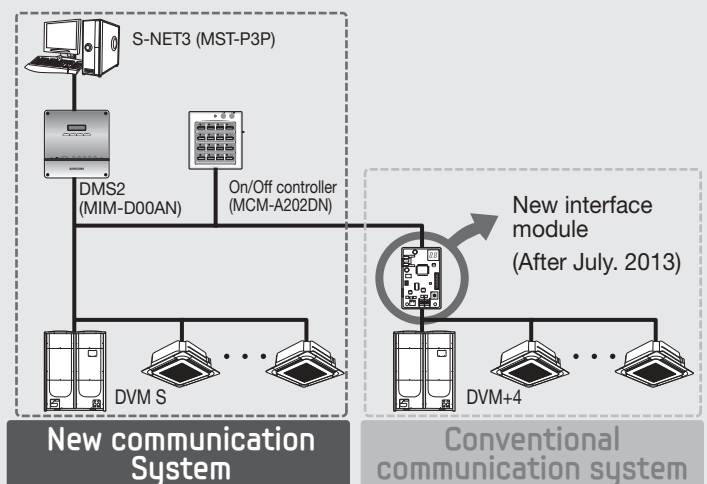
DVM CONTROL SYSTEMS

I. Individual Control Systems

INDIVIDUAL
CONTROL SYSTEM

I Individual control system

1. Receiver & Display unit

❏ *MRK-A10N*

1) Features

(Unit : mm)
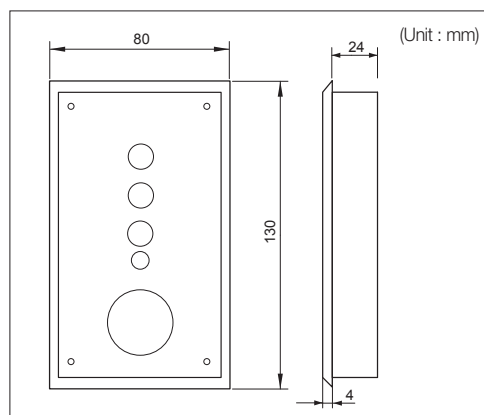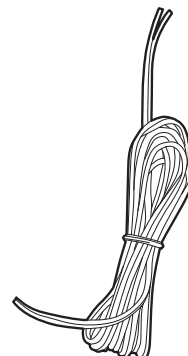
▶ *Receiver wire*

Receiver & Display Unit
- Concealed wireless signal receiver
- Filter replacement sign
- Fan operation display

- Operation Timer setting display
- Operation On/Off button
- Operation On display LED (blue)
- Defrost operation display LED (red)

2) Wiring
- Connect one end of the receiver wire with the Receiver & Display unit PCB.
- Connect the other end of the receiver wire with the duct type indoor unit PCB.

Indoor unit PCB

Connector : 13Pin

Receiver & Display unit PCB
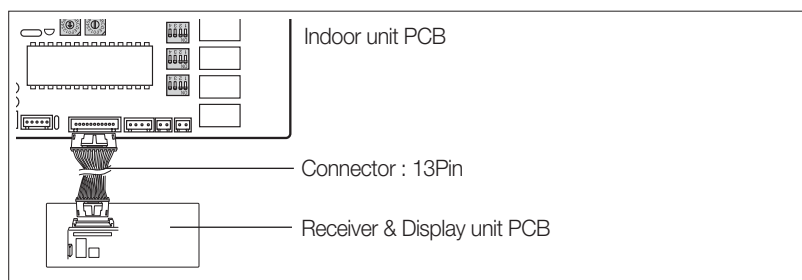
☑ *Note*
- ◆ Wire length: 10m
- ◆ Receiver & Display unit is only available for a duct type indoor unit.

2. Wireless remote controller

❏ *MR-DH00*

1) Features

Easy and convenient operation control
- Operation ON/OFF control
- Fan speed control
- Operation temperature setting
- Filter replacement alarm reset
- Air swing control
- Simple On/Off timer
- Indoor unit option code setting

(Unit : mm)

2) Description of parts

✳ ②, ⑥-1, ⑥-2, ⑧, ⑬-2, ⑳, ㉒ is only supported and available in certain indoor units.

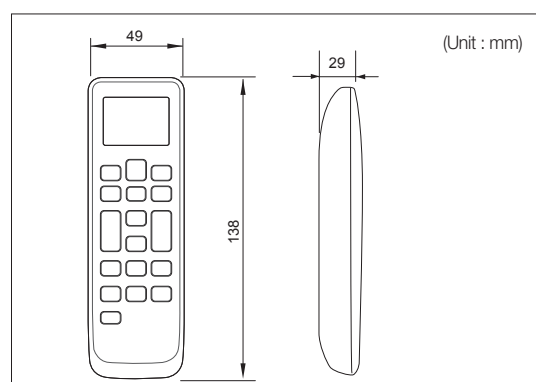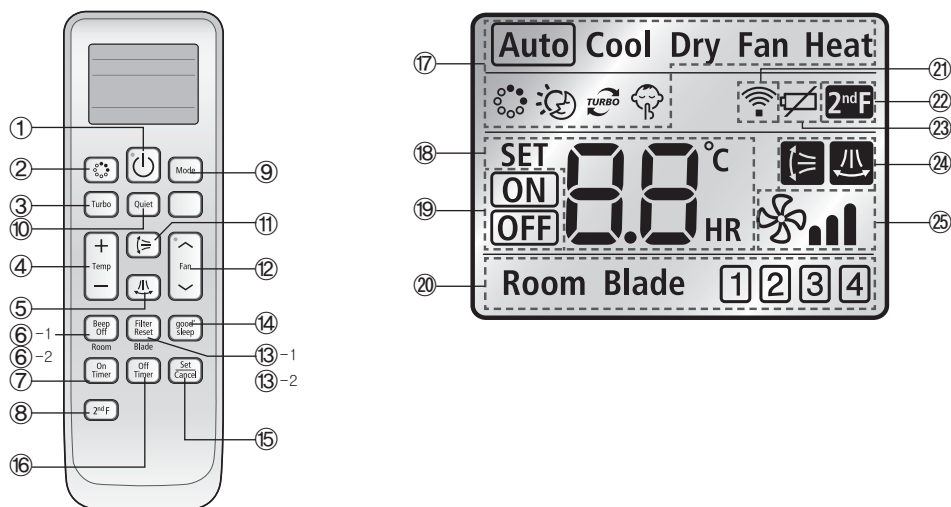| No	Name	Description
①	On/Off button	Press this button to turn on/off the indoor unit.
②	S-Plasma ion button	Press this button to turn on/off the S-Plasma ion.
③	Turbo button	Press this button to cool your room quickly and powerfully.
④	Temp + - button	Press this button to increase/decrease the set temperature by 1°C.
⑤	Horizontal air swing button	Press this button to activate/deactivate horizontal air flow movement.
⑥-1	Beep Off button	Press this button to mute the beep sounds that occurs when pressing the button.
⑥-2	Room button	Press the 2nF function button and press this button to control individual indoor unit or all indoor units at once.
⑦	On timer button	Press the button to set the On Timer on.
⑧	2ndF button	Press this button to select the function printed under the button. (Room, Blade function)
⑨	Mode button	Press this button to select one of the 5 operation modes. (Auto, Cool, Dry, Fan, Heat)
⑩	Quiet button	Press this button to select quiet mode.
⑪	Vertical air swing button	Press this button to activate/deactivate vertical air flow movement. (Not applicable to Duct type model)
⑫	Fan ∧ ∨ button	Press this button to select one of the fan speeds. (Auto, Low, Medium and High.)
⑬-1	Filter Reset button	Press this button to turn off the filter indicator light.
⑬-2	Blade button	Press the 2nF function button and press this button to control individual blade unit or all blades at once.
⑭	good'sleep button	Press this button to set the good'sleep mode on.
⑮	Set/Cancel button	Press this button to set or cancel the On/Off Timer and good'sleep mode.
⑯	Off Timer button	Press this button to set the Off Timer on.
⑰	Operation mode indicator	Indicates the operation mode.
⑱	Set temperature & On/Off set time indicator	Basic – Indicates the set temperature. Timer setting – Indicates the On/Off set time.
⑲	On/Off timer indicator	Indicates the On/Off timer setting.
⑳	Room & Blade selection indicator	1) When [Beep off/Room] button is pressed after pressing the 2nF button, "Room" indicator will be displayed with the selected indoor unit number. 2) When [Filter Reset/Blade] button is pressed after pressing the 2nF button, "Blade" indicator will be displayed with the selected blade number.
㉑	Transmission indicator	Indicates when wireless signal is received (by pressing any buttons).
㉒	2ndF indicator	Indicates when 2nF button is pressed. You can select the second function (Selecting Room/ Blade)
㉓	Low battery indicator	Indicates the battery life.
㉔	Air swing indicator	Indicates when vertical or horizontal air flow movement.
㉕	Fan speed indicator	Indicates the fan speed settings.

I Individual control system

2. Wireless remote controller
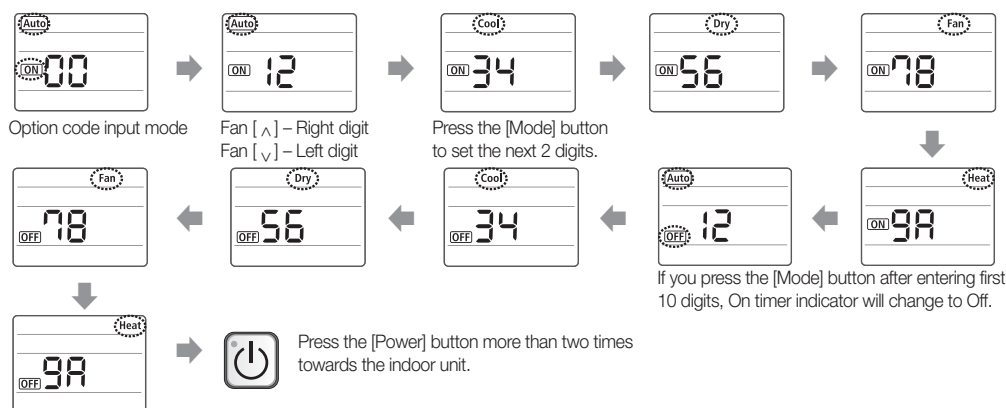
❏ *MR-DH00*

3) Additional function

(1) Option code setting

❶ Remove the batteries from the remote controller.

❷ Press the Temp [+] and [-] button at the same time and insert the batteries.

❸ Set the 2 digits of option code.
   If you press the Fan [∧] button, you can change the right digit.
   If you press the Fan [∨] button, you can change the left digit.

❹ Press the [Mode] button to set the next 2 digits of option code.
   Input 20 digits in total.

❺ Press the ⏻ button more than twice to set the indoor unit option code.
   (When indoor unit option code is set, a beep will sound. When the setting is incorrect, all the LED on the indoor unit panel will flicker.)

※ Option code is composed with total of 24 digits including page number. From the wireless remote controller, enter the option code without page number.

Setting Ex.) Option code: 012345 – 16789A – 212345 – 36789A
↑ Page 0   ↑ Page 1   ↑ Page 2   ↑ Page 3

Option code input mode

Fan [∧] – Right digit
Fan [∨] – Left digit

Press the [Mode] button to set the next 2 digits.

If you press the [Mode] button after entering first 10 digits, On timer indicator will change to Off.

Press the [Power] button more than two times towards the indoor unit.

3. Wired remote controller

❑ MWR-WE10N

1) Features
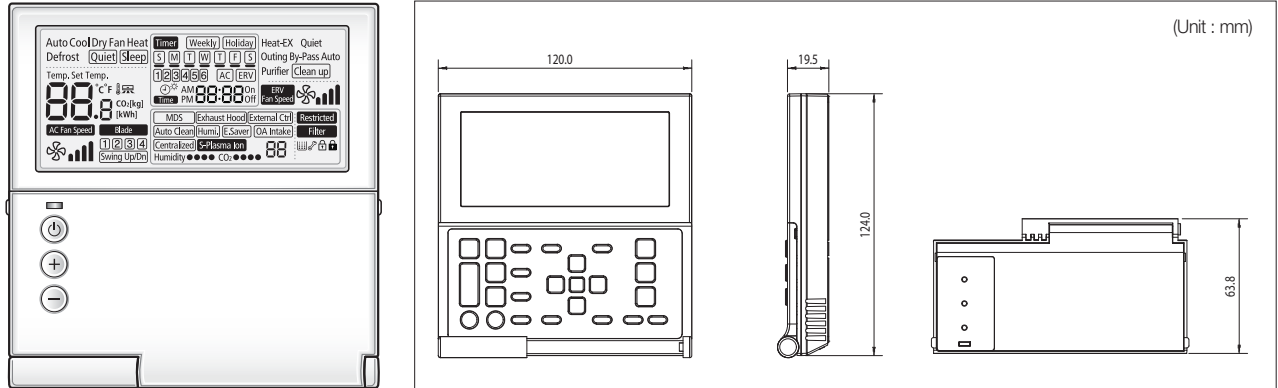
(Unit : mm)

(1) Air conditioner / ERV control (ERV cannot be connected to MWR-WE10N until end of 2013)
- AC operation ON/OFF control
- AC operation mode, setting temperature, fan speed, air flow direction setting
- AC individual blade control and occupancy detection
  (Function is available when indoor units support any of above functions)
- ERV operation ON/OFF control
- ERV operation mode, fan speed setting
- AC/ERV error monitoring
- Filter cleaning alert and reset alert time
- Individual/group control, indoor unit/ERV interlocking control
- Energy saving control
- Control maximum 16 "Indoor unit + ERV" in group with single wired remote controller

(2) Energy saving operation
- Upper/Lower temperature limit setting
- Automatic operation stop : Automatically stops the operation, when it is not used for certain period of time set by user

(3) Weekly operation schedule setting
- Weekly operating schedule (A/C only, ERV only, A/C+ERV)
- Able to set desired AC operation mode, setting temperature and fan speed to operate based on weekly reservation
- Able to apply schedule exception day for fluid management

(4) User convenience function
- Child lock
- Different button permission levels
  (Opertion mode, temperature setting, ON/OFF, fan speed)
- Real-time clock : Displays current time, day (Summer time support)
- Built-in room temperature sensor
- Service mode support
  - Indoor unit cycle data monitoring
  - Indoor unit option code setting and monitoring
  - Indoor unit address and option setting and monitoring

2) Product specification

Power Supply	DC12V
Power Consumption	2W
Operating Temperature range	0°C~40°C
Operating Humidity range	30%RH~90%RH
Communication	2-wire PLC

✴ Compatible product
- **Indoor unit :** Only DVM S Series indoor unit
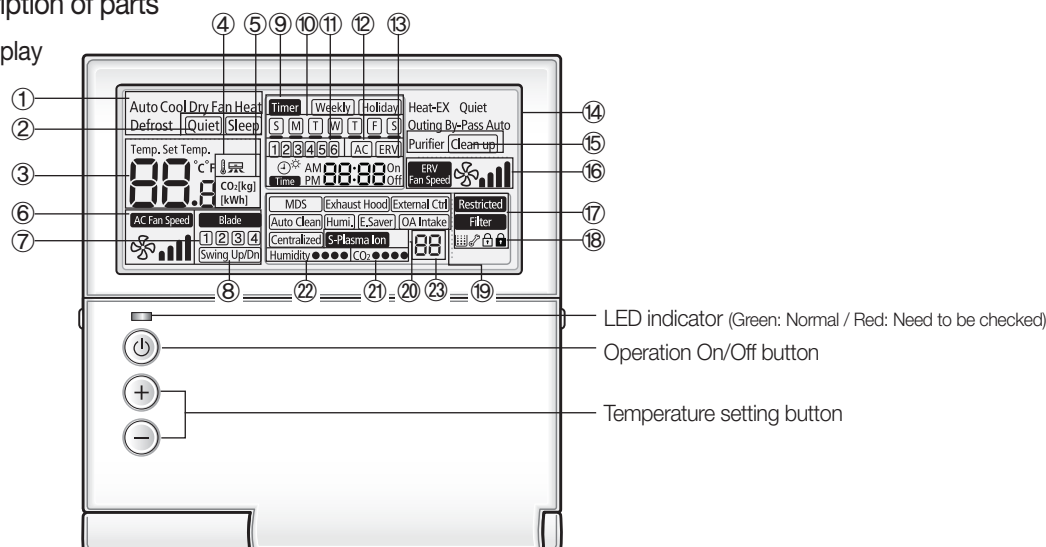- **ERV :** Not support (Until end of 2013)

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Ⅰ Individual control system

3. Wired remote controller

❑ *MWR-WE10N*

3) Description of parts

(1) Display

LED indicator (Green: Normal / Red: Need to be checked)
Operation On/Off button
Temperature setting button

Classification		Indication	Function
Air conditioner related information	①	Auto Cool Dry Fan Heat Defrost	Displays air conditioner operation
	②	Quiet Sleep	Displays Quiet/Sleep operation
	③	Temp. Set Temp. 88.8 °C°F	Displays Indoor temperature/Set temperature
	④		Displays discharge temperature control
	⑤	88.8 °C CO₂[kg] [kWh]	Displays CO_2 /power consumption
	⑥	AC Fan Speed	Displays AC fan speed
	⑦	Blade 1234	Displays Blade selection
	⑧	Swing Up/Dn	Displays Air swing(Up/Dn)
Schedule related information	⑨	Timer Weekly Holiday	Weekly schedule/Holiday setting displays
	⑩	S M T W T F S	Displays Current day(□) or scheduled day(_)
	⑪	1 2 3 4 5 6	Displays Schedule number
	⑫	AC ERV	Displays Scheduled device selection
	⑬	AM 88:88 On Time PM Off	Displays Current time/daylight saving time/scheduled time
Ventilator (ERV) related information	⑭	Heat-EX Quiet Outing By-Pass Auto Purifier	Displays Ventilator(ERV) operation
	⑮	Clean up	Displays Clean up
	⑯	ERV Fan Speed	Displays Ventilator(ERV) fan speed
Common function related information	⑰	Restricted Filter	Displays Invalid operation /Filter cleaning (filter cleaning period)
	⑱		Displays Dust box cleaning alert/check/part lock / All lock
	⑲	MDS Exhaust Hood External Ctrl Auto Clean Humi. E.Saver OA Intake Centralized	Displays Motion detect sensor/Exhaust hood/External interconnection control/Auto clean/ Humidifying/Energy saving/Outdoor air supply intake/Centralized control
	⑳	S-Plasma Ion	Displays S-Plasma Ion
	㉑	CO₂ ●●●●	Displays Indoor CO_2 density
	㉒	Humidity ●●●●	Displays Indoor humidity
	㉓	88	Displays remaining time of the auto stop time / ERV delay time - Solid : Hour unit, Blinking : Minute unit

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✳ ERV cannot be connected to MWR-WE10N until end of 2013
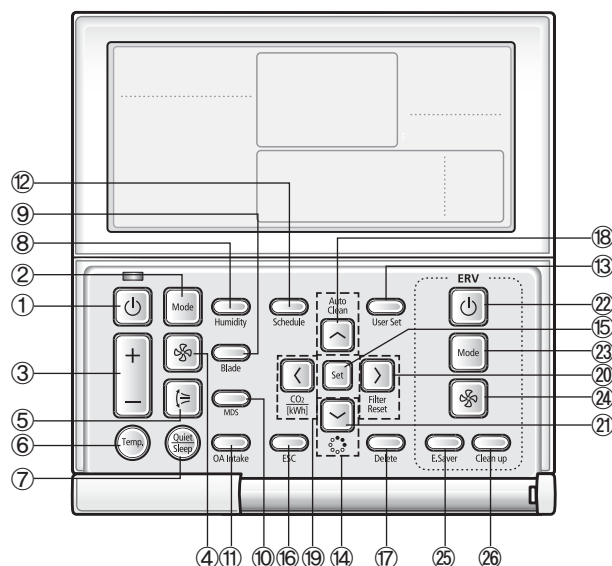
(2) Buttons

| Classification		Button	Function	
Air conditioner related button	①	⏻	Operation On/Off button	Turn the air conditioner power On/Off
	②	Mode	Mode button	Selects the desired air conditioner operation
	③	+／−	Temperature setting button	Sets the desired temperature
	④	❈	Fan speed button	Changes the air conditioner's fan speed
	⑤	⫸	Air swing button	Changes the air flow direction to move upward or downward
	⑥	Temp.	Temp. button	Checks the indoor temperature
	⑦	Quiet Sleep	Quiet/Sleep button	Selects quiet or sleep operation for the air conditioner
	⑧	Humidity	Humidity button	Turns the AHU humidifying function On/Off
	⑨	Blade	Blade button	Selects a blade for individual control
	⑩	MDS	MDS button	Set the power to automatically turn off if there is nobody in the room
	⑪	OA Intake	Outdoor air intake	Select the AHU Outdoor intake function
Common function related button	⑫	Schedule	Schedule Button	Select the schedule setting function
	⑬	User Set	User Set Button	Select the detailed setting function
	⑭	⟨ ⟩ ∧ ∨	Navigational buttons	Move between items or change the item value
	⑮	Set	Set button	Save new setting
	⑯	ESC	ESC button	Return to general mode from schedule and detailed setting screens
	⑰	Delete	Delete button	Cancel the schedule setting
	⑱	Auto Clean ∧	Auto Clean button	Use the auto cleaning function for your air conditioner
	⑲	⟨ CO_2 [kWh]	CO_2/[kWh] button	Display the amount of CO_2 and the power consumption
	⑳	⟩ Filter Reset	Filter Reset button	Turn off the filter cleaning displays (filter using time reset)
	㉑	∨	S-Plasma Ion button	Choose the S-Plasma ion function
Ventilator (ERV) related buttons	㉒	⏻	Operation On/Off button	Turn the Ventilator(ERV) On/Off
	㉓	Mode	Mode button	Select the desired operation for the Ventilator(ERV)
	㉔	❈	Fan speed button	Change the fan speed for your Ventilator(ERV)
	㉕	E.Saver	E. Saver button	Begin Energy Saving Operation
	㉖	Clean up	Clean up button	Select air purification through the in/out load controls

✳ ERV cannot be connected to MWR-WE10N until end of 2013

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I Individual control system

3. Wired remote controller

☐ *MWR-WE10N*

3) Description of parts

(3) PCB
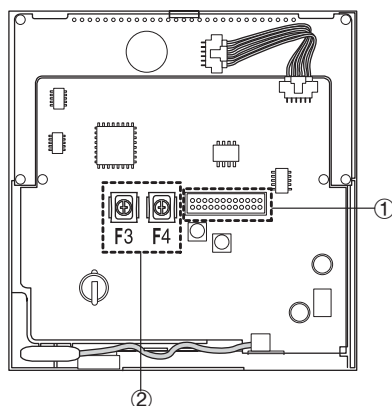
| No.	Name	Description
①	Software upgrade connector	It is used to upgrade the software
②	Communication and power wiring terminal	Connection with indoor unit (F3/F4)

✻ MWR-WE10N uses 2-wire power line communication.

4) Option function

User setting mode

Main menu	Sub menu	Function			SEG Used	Default	Range	Unit
1		Auto stop time setting/checking			1,2	0	0~12 hours	1 hour
2		Temp limits [°C(°F)]	Lowest temperature		1,2	16 (61)	16~30°C (61~86°F)	1°C(1°F)
			Highest temperature		3,4	30 (86)	18~30°C (65~86°F)	1°C(1°F)
3		All lock			1	0	0 – Unlock, 1 - Lock	-
		Lock of partial button	On/Off button		2	0	0 – Unlock, 1 – Lock	-
			Mode button		3	0	0 – Unlock, 1 – Lock	-
			Temperature button		4	0	0 – Unlock, 1 – Lock	-
			Fan speed button		5	0	0 – Unlock, 1 – Lock	-
			Schedule button		6	0	0 – Unlock, 1 – Lock	-
4	1	Current Temperature Setting (Year, Month, Date)			1,2/3,4/5,6	10/01/01	00~99/1~12/1~31	YY/MM/DD
	2	Current Time Setting (Day, Hour, Minute)			Day/Am,Pm/1,2/3,4	Friday/PM/12/00	Sun~Sat/AM~PM/0~12/0~59	Day/Hour/Minute
5	1	Summer Time Use and Setting Methods	Use of summer time (Y/N)		1	0	0 – No use, 1 – Use	-
			Summer Time Application Method		2	0	0 – Weekly, 1 – Daily	-
	2	Summer time use (Weekly) Start (? Month, ? th Sunday)			1,2/4	03/F	1~12th month / 1~4,F (last week)th week	-
	3	Summer time use (Weekly) End (? Month, ? th Sunday)			1,2/4	10/F	1~12th month / 1~4,F (last week)th week	-
	4	Summer time use (Daily) Start (? Month, ? th Sunday)			1,2/3,4	03/22	Jan~Dec /1~31th day	Month, date
	5	Summer time use (Daily) End (? Month, ? th Sunday)			1,2/3,4	09/22	Jan~Dec / 1~31th day	Month, date
6		Backlight Time Setting/Checking			1,2	5	0~30 sec	1sec
		Use of LED(Green) (Y/N)			3	1	0 – No use, 1 – use	-
		Use of LED (Red) (Y/N)			4	1	0 – No use, 1 – use	-
7		Ventilator (ERV) delay time setting/checking [When using Ventilator (ERV) interlocking control]	Ventilator(ERV) Delay Application (Y/N)		1	0	0 – No use, 1 – use	-
			Delay Time		3,4	30	30~60 minutes	1 minute
	0	Reset to user mode defaults (except the current time)			1	0	0 – No use, 1 – Reset	-

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✻ ERV cannot be connected to MWR-WE10N until end of 2013

▶ How to set the user mode

SEG Used

Main menu   Sub-menu   1 2 3 4   5 6

ERV
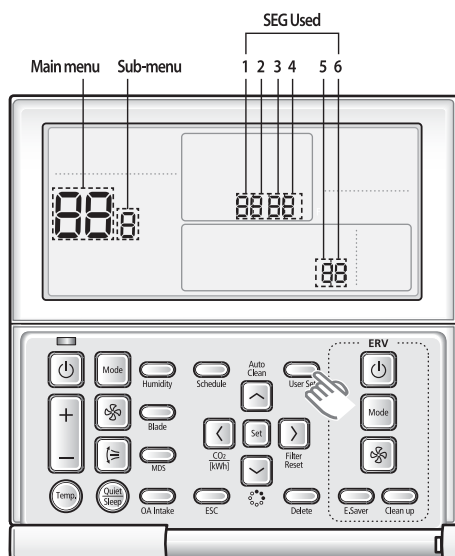
(1) If you want to set the detailed settings, press the [User Set] button.
 • You will enter the User Set mode, and the [Main Menu] will be displayed.

(2) Refer to the Wired Remote Controller's User Set list on the next page to select the desired menu.
  • Using the [∧]/[∨] buttons, select a main menu number and press the [>] button to enter the sub-menu setting screen.
  • Using the [∧]/[∨] buttons, select a sub-menu number and press the [>] button to enter the data setting screen.
  • Once you have entered the setting screen, the current setting will be displayed.
  • Refer to the chart for data setting.
  • Using the [∧]/[∨] buttons, change the settings and press the [>] button to move to the next setting.
  • Press the Set button to save the setting and exit to the sub-menu setting screen.
 • Press the Esc button to exit to general mode.

☑ *Note*
  ◆ While setting the data, you can use the [∧]/[∨] buttons to set the range of SEG used.
  ◆ While configuring the setting, press the [Esc] button to exit to the sub-menu setting screen without saving the setting.
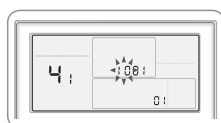
▶ Current time setting (Example)
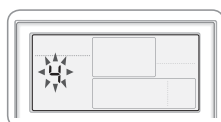
(1) Press the [User Set] button.
  • (Main Menu) will be displayed, and you can press the [∧]/[∨] buttons to select No.4, which will set the current time.
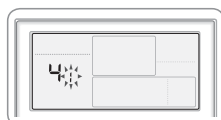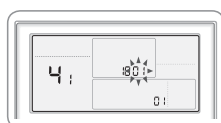
(2) Press the [>] button to select 'Year, Month, Date' in the [Sub-menu].
  • Press the [∧]/[∨] buttons to select No. 1. You can modify the year/month/date setting.

(3) Press the [>] button to select the 'Year'.
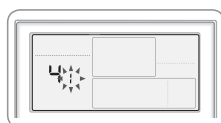 • Press the [∧]/[∨] buttons to select the year ('00~'99).

(4) Press the [>] button to select the 'Month'.
  • Press the [∧]/[∨] buttons to select month(01~12).

(5) Press the [>] button to select the 'Day'.
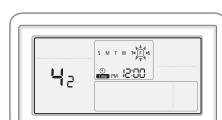 • Press the [∧]/[∨] buttons to select day(01~31).

(6) Press the [Set] button to complete your setting of 'Year, Month, Day'.
  • The setting changes will be applied and you can exit to the sub-menu.

(7) In the sub-menu, select 'day, AM/PM, hour, minute'.
  • Press the [∧]/[∨] buttons to select no. 2. You can set the 'day, AM/PM, hour, minute'.

(8) Press the [>] button to select the 'Day'.
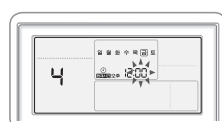 • Press the [∧]/[∨] buttons to select day (Sun~Sat).

(9) Press the [>] button to select 'AM or PM'.
  • Press the [∧]/[∨] buttons to toggle between AM and PM.

(10) Press the [>] button to select the 'Hour'.
  • Press the [∧]/[∨] buttons to select the hour (01~12).

(11) Press the [>] button to select the 'Minute'.
  • Press the [∧]/[∨] buttons to select minute (00~59).

(12) Press the [Set] button to complete the current time setting.
  • The setting changes are applied and you can exit to general mode.

(13) Press the [Esc] button to exit to general mode.

I Individual control system

3. Wired remote controller

❏ *MWR-WE10N*

4) Option function

■ Service mode

Main menu	Sub menu	Function		SEG Used	Default	Range	Unit
1	1	Wireless remote controller Option setting / checking (1)	Cooling / Heating selection	1	0	0-Cooling/Heating, 1-Cooling only	-
			Use of wireless remote controller	2	1	0-No use, 1-Use	-
			MAIN / SUB wired remote controller	3	0	0-MAIN, 1-SUB	-
			Temperature unit	4	0	0 – Celsius(°C), 1 – Fahrenheit(°F)	
	2	Wireless remote controller Option setting / checking (2)	Temperature sensor selection	1	0	0–Indoor unit, 1–Wired remote controller	-
			Use of average temperature	2	0	0-No use, 1-Use	-
			Use of Auto mode	3	1	0-No use, 1-Use	-
			Temperature display	4	0	0–Set temperature,1-Room temperature	-
			AC On/Off button function	5	0	0–Indoor unit+ERV, 1–Indoor unit only, 2–ERV only	-
	3	Blade setting / checking	Lock blade 1	1	0	0- Unlock, 1- Lock	-
			Lock blade 2	2	0	0- Unlock, 1- Lock	-
			Lock blade 3	3	0	0- Unlock, 1- Lock	-
			Lock blade 4	4	0	0- Unlock, 1- Lock	-
	4	ERV option Setting / checking	Use of By-pass mode	1	0	0-No use, 1-Use	
			Use of Auto mode	2	0	0-No use, 1-Use	
			Use of air purification mode	3	0	0-No use, 1-Use	
			Use of external control	4	0	0-No use, 1-Use	
	5	Room temperature compensation	Current room temperature	1, 2, 3	-	-9 ~ 40(°C)	0.1(°C)
			Temperature compensation value	4,5,6	-	-9.9 ~ 9.9(°C)	0.1(°C)
	6	number of connected indoor units	Number of indoor units	1,2	0	0~16	-
			Number of ERVs	3,4	0	0~16	-
	7	Temperature increment/decrement unit (°C only)		1	-	0-1°C, 1-0.5°C, 2-0.1°C	-
	0	Factory option setting		1	-	0-Unchanged, 1-Factory setting	-
2	1	Software code		1~6	-	Software code	-
	2	Software version		1~6	-	Software version	-
3	1	Indoor unit room temperature		1,2,3	-	Room temperature	°C
	2	Indoor unit EVA IN temperature		1,2,3	-	EVA IN temperature	°C
	3	Indoor unit EVA OUT temperature		1,2,3	-	EVA OUT temperature	°C
	4	Indoor unit EEV step		1,2,3	-	EEV step	-
	5	Indoor unit option checking(1)	Use of central control	1	-	0-No use, 1-Use	-
			Use of drain pump	2	-	0-No use, 1-Use	-
			Use of electric heater	3	-	0-No use, 1-Use	-
			Use of hot water coil	4	-	0-No use, 1-Use	-
	6	Indoor unit option checking(2)	Use of external control	1	-	0-No use, 1-Use	-
			Use RPM compensation	2	-	0-No use, 1-Use	-
			Filter time	3	-	0-2000 hours, 1-1000 hours	-
			Heating temperature compensation	4	-	0-2°C, 1-5°C	-
			EEV stop step in heating	5	-	0-0/80 step, 1- 80 step	-
4	1	Indoor unit option setting 2)*	Indoor unit main address	1, 2	-	Main address (00H~4FH)	-
			Indoor unit setup address (Manual setting main address)	3, 4	-	Main address (00H~4FH)	-
			Indoor unit RMC address	5, 6	-	Main address (00H~FEH)	-
	2		Indoor unit BASIC option code	1)*	-	Indoor unit option code	-
	3		Indoor unit INSTALL option	1)*	-	Refer to the indoor unit installation manual for details	-
	4		Indoor unit INSTALL option(2)	1)*	-		-

| Main menu	Sub menu	Function		SEG Used	Default	Range	Unit
5	1	AHU setting/ checking	Setting/checking the different value	1, 2	-	0~30	1
			RPM setting /checking	3, 4	-	0~25	1RPM
			Filter performance	5	-	0- Pre, 1-Medium performance, 2-High performance	-
			Humidity setting / checking	6	-	0-30, 1-40, 2-50	-
	2	Indoor unit, AHU discharge temperature setting /checking	Use of discharge temperature control	1	-	0-No use, 1-Use	-
			Cooling discharge temperature	3, 4	-	8~18°C	1°C
			Heating discharge temperature	5, 6	-	30~43°C	1°C
	3	Fresh Duct discharge temperature checking	Cooling discharge temperature	1, 2	-	13~25°C	1°C
			Heating discharge temperature	3, 4	-	18~30°C	1°C
6	1	ERV Plus setting / checking	Use of cold air prevention	1	-	0-No use, 1-Use	-
			Use of humidification	2	-	0-No use, 1-Use	-
			Use of fan operation in defrost	3	-	0-No use, 1-Use	-
			Use of humidification	4	-	0-No use, 1-Use	-
	2	ERV Plus temperature setting /checking	Cooling	1, 2	-	15~30°C	1°C
			Heating	3, 4	-	15~30°C	1°C
	3	ERV Plus Auto mode temperature setting /checking	Set temperature	1, 2	-	15~30°C	1°C
			Set temperature difference	3, 4	-	5~15°C	1°C
	4	Setting/checking the compensation temperature A under the Heating EEV control for ERV Plus		1, 2	-	0~10°C	1°C
		Checking the compensation temperature B under the Heating EEV control for ERV Plus		3, 4	-	0-Non use humidifier(0°C) 1-Use humidifier(10°C)	-
	5	ERV	Air supply RPM	1, 2	-	10~27RPM	1 RPM
7	1	Master setting/ checking (F3F4 line Indoor unit master)	Indoor unit master setting/ checking	1, 2,3, 4,5,6	-	Address	-
	2		ERV unit master setting/ checking	1, 2,3, 4,5,6	-	Address	-
	3	Mode master indoor unit setting/ checking (F1F2 line Indoor unit master) 3)*	Mode master indoor unit checking	1, 2,3, 4,5,6	-	Address	-
	4		Mode master indoor unit setting	1	-	0-No use, 1-Use, 2-Release	-
0	1	Reset	Factory setting	1	0	0-No use, 1-Reset	-
	2		Power master reset 4)*	1	0	0-No use, 1-Reset	-
	3		Addressing reset	1	0	0-No use, 1-Reset	-

1)* SEG1 means option setting page/ SEG2~6 means option code.

2)* If you enter Main menu #4, you must select the targeted indoor unit address and then select the sub menu.

3)* Master indoor unit : The indoor unit which can decide the operation mode. Other indoor unit follows Master indoor unit's operation mode.

4)* Power master reset : Setting for finding the most stable power supply indoor unit.

▶ To set 24 digit option

Option Setting Page ─┐ ┌─ Option Code
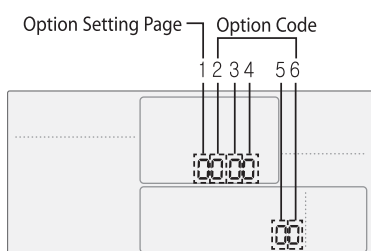
| Page	Option Setting	How to move between pages
Page1	1~5th digit option	Press the [>] button to go to Page2.
Page2	6~10th digit option	Press the [>] button to go to Page3.
Page3	11~15th digit option	Press the [>] button to go to Page4.
Page4	16~20th digit option	Press the [>] button to go to Page5.
Page5	21~24th digit option	-

I Individual control system

3. Wired remote controller

☐ *MWR-WE10N*

4) Option function

■ Service mode

▶ How to set the service mode

SEG Used

Main menu Sub-menu 1 2 3 4 5 6
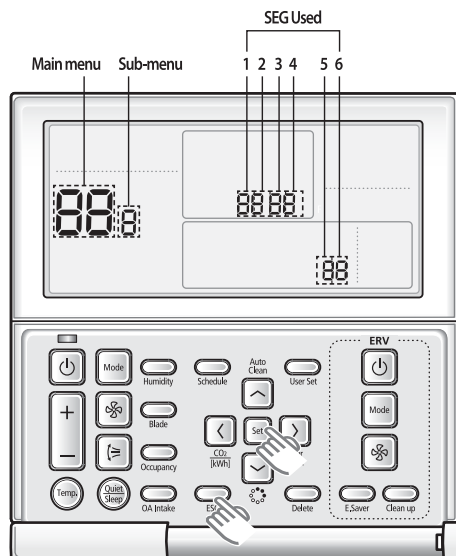
(1) If you want to use the various additional functions for your Wired Remote Controller, press the [Set] and [Esc] buttons at the same time for more than three seconds.
   • You will enter the additional function settings, and the [main menu] will be displayed.

(2) Refer to the list of additional functions for your Wired Remote Controller on the next page, and select the desired menu.
   • Using the [∧]/[∨] buttons, select a main menu number and press the [>] button to enter the sub-menu setting screen.
   • Using the [∧]/[∨] buttons, select a sub-menu number and press the [>] button to enter data setting screen.
   • When you enter the setting stage, the current setting will be displayed.
   • Refer to the chart for data settings.
   • Using the [∧]/[∨] buttons, select the settings. Press the [>] button to move to the next setting.
   • Press the [Set] button to save the settings and exit to the sub-menu setting screen.
   • Press the [Esc] button to exit to normal mode.

☑ *Note*

♦ While setting the data, you can use the [∧]/[∨] buttons to set the range of SEG
♦ While configuring the setting, press the [Esc] button to exit to the setting sub-menu without saving your changes.

▶ Example method of setting wired remote controller option

(1) Press the [Set] and [ESC] buttons at the same time for more than 3 seconds.
   • When(Main menu) is displayed press the [∧]/[∨] button to select no.1.

(2) Press the [>] button to select the number you will set.
   • Press the [∧]/[∨] button and select no.1

(3) Press the [>] button to enter the data setting stage.
   • When you enter the setting stage, the current setting value will be displayed.
      ▶ Example of data setting stage display

Data bit

1 2 3 4
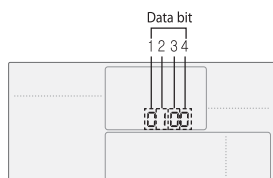
SEG1: Heat pump indoor unit
SEG2: Use wireless remote controller
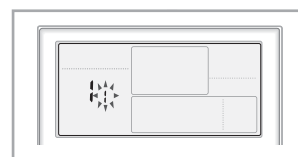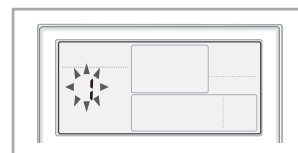SEG3: Master wired remote controller
SEG4: Temperature display – Celsius (°C)

(4) Press the [<]/[>] button to select the desired Data1.
   • Press the [∧]/[∨] button to select no.1.
   • The wired remote controller option is set from both cooling and heating to cooling only.

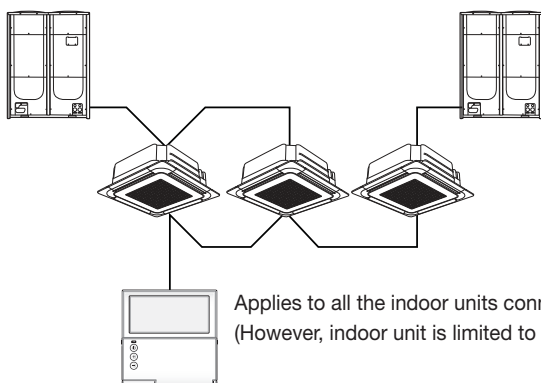(5) Press [Set] button to complete the option setting.
   • Save the setting value and exit to sub menu.

(6) Press [Esc] button to exit to normal mode.
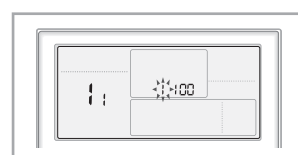
Built-in temperature sensor of wired remote controller

▶ Temperature control with built-in temperature sensor


Applies to all the indoor units connected within a group.
(However, indoor unit is limited to DVM S series)

✸ Check the setting of the wired remote controller built-in sensor from the service menu.

Main menu	Sub menu	Function		Used SEG	Factory setting	Description	Unit
1	1	Wireless remote controller Option setting / checking (1)	Cooling / Heating selection	1	0	0-Cooling/Heating, 1-Cooling only	-
			Use of wireless remote controller	2	1	0-No use, 1-Use	-
			MAIN / SUB wired remote controller	3	0	0-MAIN, 1-SUB	-
			Temperature unit	4	0	0 – Celsius(°C), 1 – Fahrenheit(°F)	
	2	Wireless remote controller Option setting / checking (2)	Temperature sensor selection	1	0	0–Indoor unit, 1–Wired remote controller	-
			Use of average temperature	2	0	0-No use, 1-Use	-
			Use of Auto mode	3	1	0-No use, 1-Use	-
			Temperature display	4	0	0–Set temperature,1-Room temperature	-
			AC On/Off button function	5	0	0–Indoor unit＋ERV, 1–Indoor unit only, 2–ERV only	-

▶ Heating mode temperature compensation
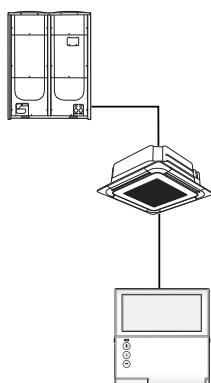
Indoor unit INSTALL option setting (Refer to indoor unit intallation manual)

SEG	Function	Value
21	Heating setting temperature compensation	1 – 2°C 2 - 5°C

☑ *Note*

♦ When built-in sensor of the wired remote controller is used, heating mode temperature compensation (+2°C or +5°C) will be reset to 0°C.

✸ If there is no option switch on the indoor unit PCB, check the setting of the heating temperature compensation from the service menu.

| Main menu	Sub menu	Function	Used SEG	Factory setting	Description	Unit
3	6	Indoor unit option checking(2)				
		Use of external control	1	-	0-No use, 1-Use	-
		Use RPM compensation	2	-	0-No use, 1-Use	-
		Filter time	3	-	0-2000 hours, 1-1000 hours	-
		Heating temperature compensation	4	-	0-2°C, 1-5°C	-
		EEV stop step in heating	5	-	0-0/80 step,1-80 step	-

I Individual control system

3. Wired remote controller

❑ *MWR-WE10N*

4) Option function

■ Built-in temperature sensor of wired remote controller

▶ When communication error or power failure occurs while using built-in temperature sensor
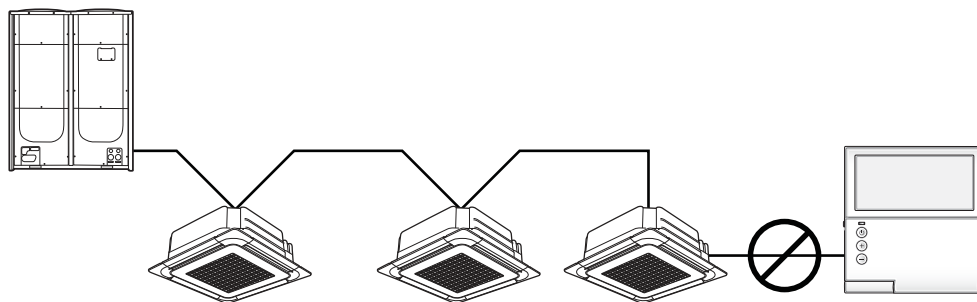

(1) When communication error occurs over 3 minutes,
- Indoor unit ignores the built-in temperature sensor and use indoor unit temperature sensor.
- Ignores the temperature compensation setting on the wired remote controller and use the compensation value set on indoor unit instead.

(2) When communication resumes,
- Built-in temperature use is recovered.
- Setting must be done again to use the temperature compensation.

■ Energy saving operation mode

N(ERV) : N(Indoor unit)
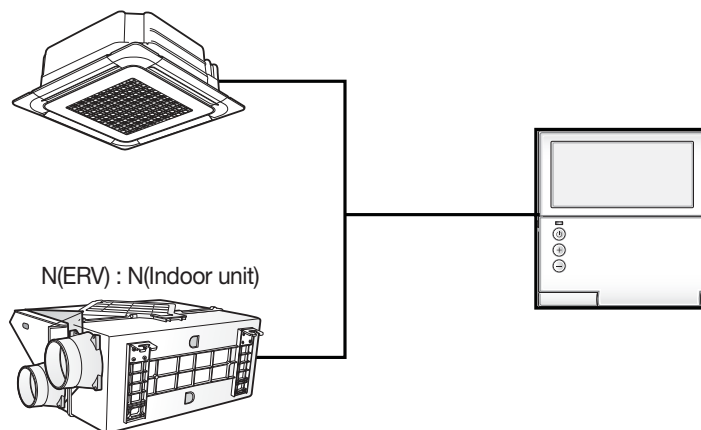
　✳ Energy saving operation mode is available only when there is at least one indoor unit and ERV is connected.

- By comparing indoor room temperature, setting temperature and outdoor temperature, wired remote controller changes ERV operation mode and fan speed to minimize unnecessary outdoor unit operation.
- Energy saving operation is not available when ERV is not connected.
- Energy saving operation is not available when 'Centralized control' is set.
- Energy saving operation will not be executed when ERV is set to Outing mode or set in external interlocking mode.
- Temperature measurement is set as indoor unit temperature sensor as default, and it can be changed depending on the wired remote controller option setting.

　✳ ERV cannot be connected to MWR-WE10N until end of 2013

5) Display

■ Erro display

Error codes for the Wired Remote Controller and the product connected to the Wired Remote Controller will be displayed in the LCD display.

LCD Display

▶ When an Error Occurs in Your Indoor/Outdoor Units (Product Group Display : A)
- The product address for the error will be displayed, followed by the error code.

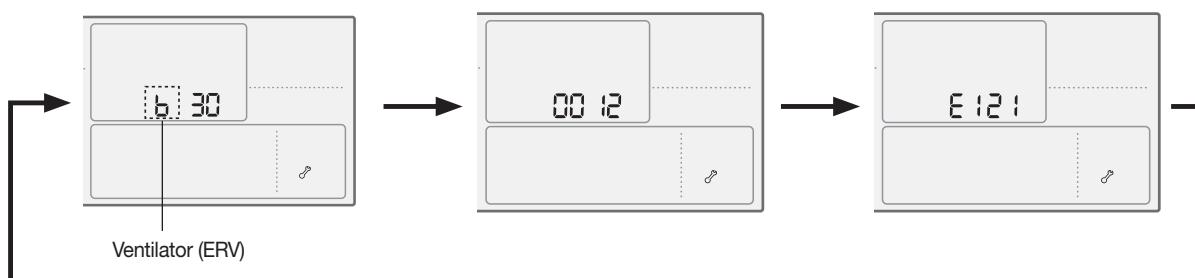Example : Error 101 occurs for Indoor Unit No. 200012.
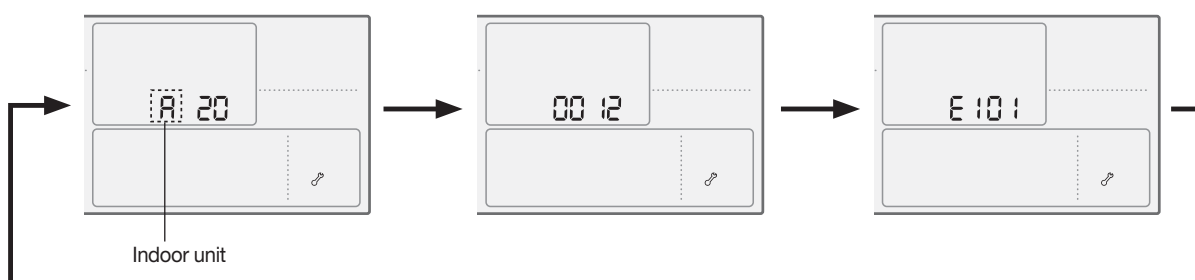
Indoor unit

▶ When an Error Occurs in Your Ventilator(ERV) (Product Group Display : B)
- The product address for the error will be displayed, followed by the error code.

Example : Error 121 has occurred at ventilator(ERV) No. 300012.

Ventilator (ERV)

▶ When an Error Occurs in Your Wired Remote Controller
- Only an error code will be displayed. (No address will be displayed.)

Example : Error 601 has occurred at your Wired Remote Controller.
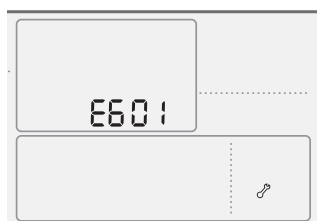
I Individual control system

3. Wired remote controller

❑ *MWR-WE10N*

5) Display

█ired remote controller error codes

Display	Description	Remarks
601	Communication error between wired remote controller and indoor/ERV units after successful communication	
602	No communication between Master (Main) and Slave(Sub) wired remote controllers	
604	No communication between wired remote controller and indoor/ERV units	
606	Wired remote controller is connected on F1/F2 channel	
607	Two or more wired remote controllers are set as Master (Main)	When using Master remote controller
608	No ERV unit installed for interlocking function	Detection available from both Master/Slave wired remote controller
609	No indoor unit installed for interlocking function	When external interlocking control is in use
618	Over 16 indoor/ERV indoor units installed	
619	Indoor units of different temperature setting (°C/°F) connected to same wired remote controller	Detection available in Master wired remote controller
620	Wired remote controller(s) has different temperature unit setting with indoor unit(s)	
653	Temperature sensor Open/Short error	Detection available in models with temperature sensor
654	• Memory error • No damper feedback	

✴ ERV cannot be connected to MWR-WE10N until end of 2013

☑ *Note*

◆ For the error codes for your indoor/outdoor units and ventilator (ERV), refer to the installation manual of each device.

6) Communication diagram

Individual control (1)	Control 1 indoor unit with 1 wired remote controller
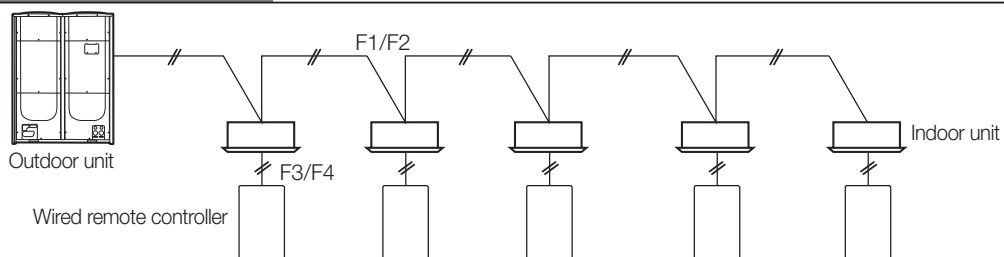
Control	All connected indoor units
Display	Operation status of the connected indoor unit

Group control (1)	Control multiple indoor units with 1 wired remote controller
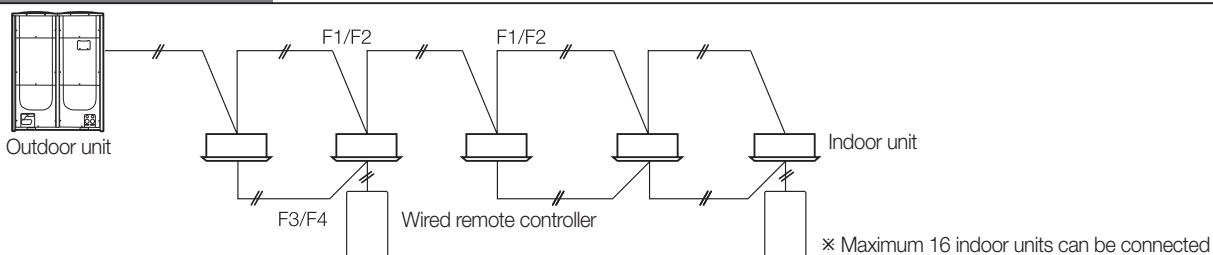
※ Maximum 16 indoor units can be connected

Control	All connected indoor units
Display	Priority 1. Display the status of master indoor unit Priority 2. Display the status of indoor unit which has the earliest Main address

Group control (3)	Control multiple indoor units connected to different outdoor units with 1 wired remote controller
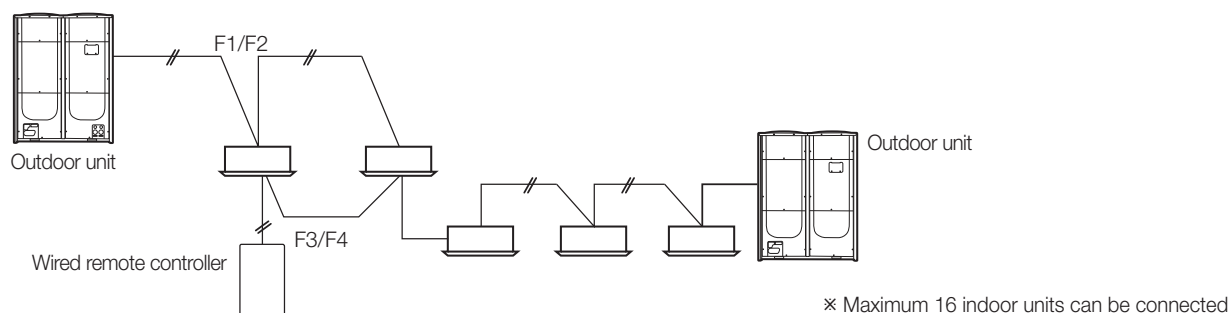
※ Maximum 16 indoor units can be connected

Control	All connected indoor units
Display	Priority 1. Display the status of master indoor unit Priority 2. Display the status of indoor unit which has the earliest Main address

I | Individual control system

3. Wired remote controller

❑ *MWR-WE10N*

6) Communication diagram

| Group control (5) | Control 1 or multiple indoor units with 2 wired remote controllers |

Outdoor unit

F1/F2

F3/F4

Wired remote controller

Master   Slave   Master   Slave   Indoor unit

※ Maximum 16 indoor units can be connected

Control	All connected indoor units
Display	Priority 1. Display the status of master indoor unit Priority 2. Display the status of indoor unit which has the earliest Main address ✳ Two wired remote controllers identically display the operation status of the indoor unit according to above priority.

| Group control (6) | Control multiple indoor units connected to different outdoor units with 2 wired remote controller |

F1/F2

Outdoor unit

Indoor unit

Outdoor unit

Wired remote controller

F3/F4

Master   Slave

※ Maximum 16 indoor units can be connected

Control	All connected indoor units
Display	Priority 1. Display the status of master indoor unit Priority 2. Display the status of indoor unit which has the earliest Main address ✳ Two wired remote controllers identically display the operation status of the indoor unit according to above priority.

Max. distance between the farthest indoor unit and wired remote controller : 100m
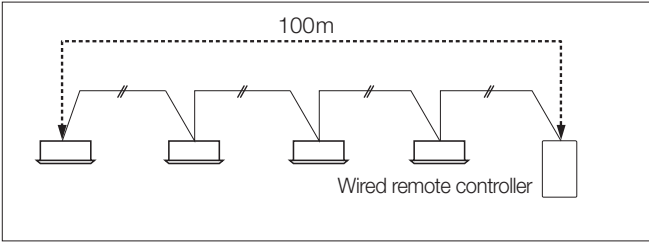
100m

Wired remote controller

II. Centralized control systems

CENTRALIZED
CONTROL SYSTEM

II Centralized control system

1. Interface module

❏ *MIM-N00*

1) Features
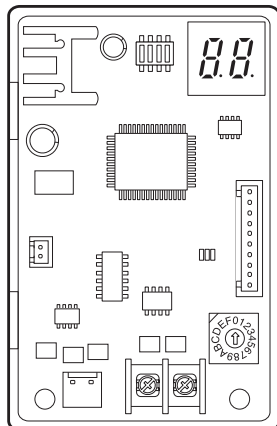
Interface module that supports DVM S series outdoor unit

- Communication transmitter between DVM S series outdoor unit and conventional communication upper level controllers as below.
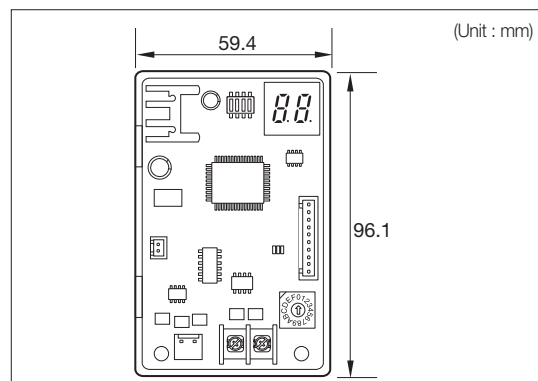 **(1) On/Off controller : MCM-A202D, MCM-A202B,**
  (2) DMS2 : MIM-D00A
  (3) BACnet Gateway : MIM-B17
  (4) Lonworks Gateway : MM-B18
- 1 interface module for 1 outdoor unit
- Individual control – Max.64 indoor units
- Group control – 16 groups

(Unit : mm)
59.4
96.1

2) Product specification

Power Supply	DC12V
Power Consumption	2.4 W
Operating Temperature range	-10°C~50°C
Operating Humidity range	10%RH~90%RH
Communication	RS485 x 2
Max.Communication Length	1000M
Maximum number of connection	F1/F2 – 1 outdoor unit R1/R2 – 1 upper level controller

✳ Compatibiliy : Only DVM S series outdoor unit can be connected.

Compatible Models

Outdoor unit	DVM S series only
Upper level controller	① On/Off controller : MCM-A202D ② DMS2 : MIM-D00A ③ BACnet Gateway : MIM-B17 ④ Lonworks Gateway : MM-B18

3) Description of parts
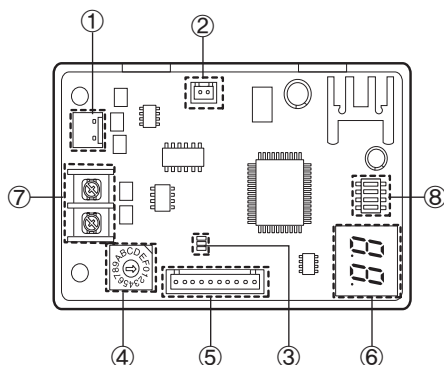
No.	Name	Description
①	F1/F2 communication connector	Communication connector that connects to outdoor unit / F1/F2
②	Power connector	DC 12V
③	Communication LED	Check communication with upper level controllers (**Left :** No function **Center :** Blinks while communicating with upper level controller **Right :** Blinks while communicating with outdoor unit and indoor unit.)
④	Address setting switch	Sets the address of interface module
⑤	Software update connector	Using this connector, Interface module software can be updated
⑥	7-segment	Displays the communication status between interface module and outdoor unit/ERV
⑦	Upper level controller communication channel	Communication connection channel to upper level controller R1/R2
⑧	DIP switch	See left table

SW1	SW2	SW3	SW4	Description
Off	Off	Off	Off	Outdoor unit (New communication) ↔ Upper controller (Conventional communication)
On	Off	Off	Off	Outdoor unit (Conventional communication)↔ Upper controller (New communication) * Not available function until July.2013

4) Wiring

Connecting with On/Off controller

MCM-A202D

R1 R2

C2 C1 R2 R1
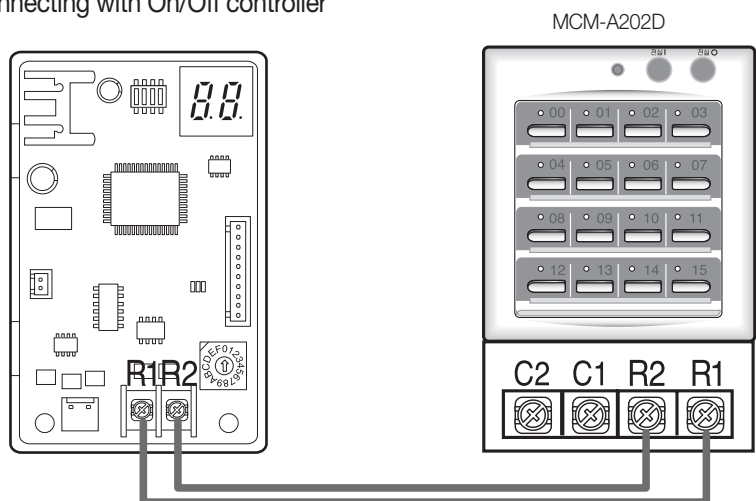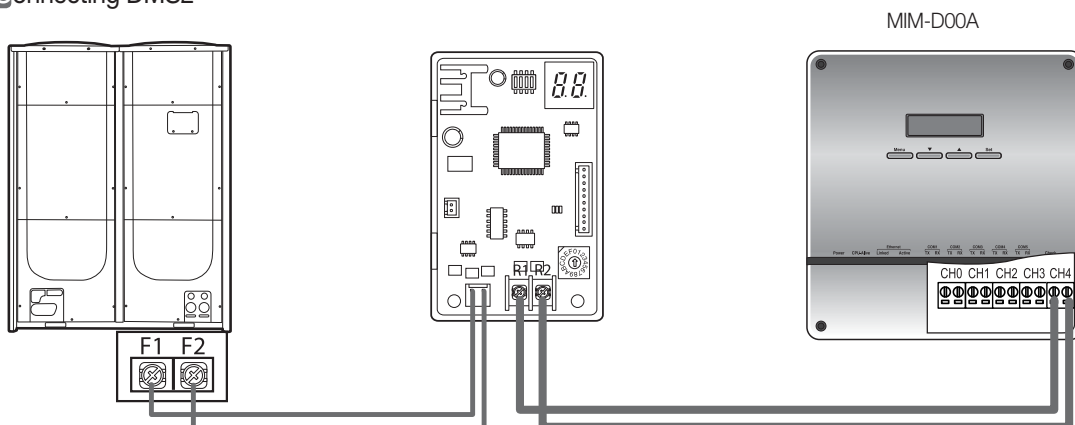
▶ 1 On/Off controller connection is supported

• Connect to R1/R2 : 16 groups can be controlled with On/Off controller.

☑ *Note*

♦ When DVM S series outdoor unit connect to On/Off controller (MCM-A202DN), do not need to connect MIM-N00.

Connecting DMS2

MIM-D00A

F1 F2

CH0 CH1 CH2 CH3 CH4

▶ 1 DMS2 connection is supported

• Connect to R1/R2 : All the indoor units will be controlled.

☑ *Note*

♦ When DVM S series outdoor unit connect to DMS2 (MIM-D00AN), do not need to connect MIM-N00.

II Centralized control system

1. Interface module

❏ *MIM-N00*

5) Display

Operation display

$$\boxed{88} \rightarrow \boxed{88} \rightarrow \boxed{00} \leftrightarrow \boxed{23}$$

| Display software version after power input | Before detecting Outdoor unit | Outdoor unit detection during tracking | After tracking completed, displays indoor unit address |
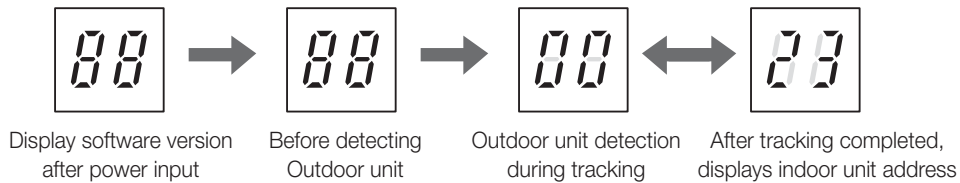
Error display

▶ Communication error between outdoor unit and interface module

$$\boxed{Er} \longleftrightarrow \boxed{E1}$$
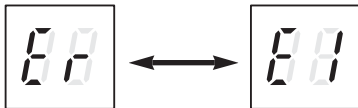
▶ Communication error between On/Off controller and interface module after tracking has been completed

$$\boxed{Er} \longleftrightarrow \boxed{E2}$$
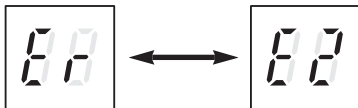
    ※ When E1 and E2 error occurs simultaneously, only E1 will be displayed.

▶ Interface module tracking failure
  • IDU quantity recognized by outdoor unit ≠ IDU quantity recognized by I/M.

$$\boxed{Er} \longleftrightarrow \boxed{E3}$$
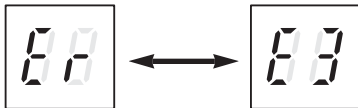
▶ Indoor unit communication checking
  a. No indoor unit response.
    (During the normal communication mode after tracking process. Outdoor unit and interface module communicate normally)
  b. When all indoor units are set as "Centralized control disable status".

$$\boxed{FF}$$

2. On/Off controller

□ *MCM-A202DN*

1) Features
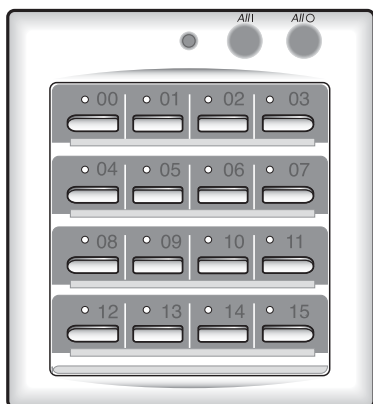
- Maximum 16-group controller (Max. 128 units)
- Whole/Group/Individual indoor unit control (On/Off)
- Restriction on the use of wireless/wired remote controllers and external contact control
- Cooling and heating mode control
- Indoor unit error display
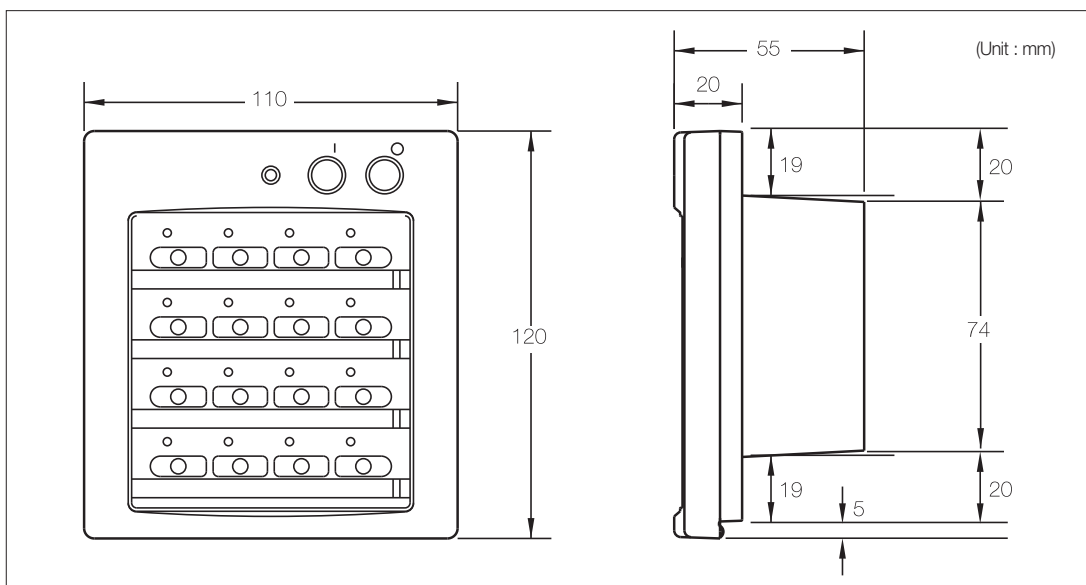
2) Product specification

Power supply		AC200V~240V, 50/60Hz
Power consumption		66W
Operating Temperature range		0°C~40°C
Operating Humidity range		30%RH~90%RH
Communication		RS485 x 1 (R1/R2)
Max. Communication length		1000m
Compatibility	Outdoor unit	DVM S Series outdoor unit only
	Controller	▪ On/off controller (MCM-A202DN) ▪ DMS2 (MIM-D00AN)
Max. connectable device number	Set layer	▪ Device : 80 (Max.64 Indoor units, Max.16 ERVs, Max.16 MCUs) ▪ Outdoor unit : 1 ▪ On/Off controller : 16
	Control layer	▪ Outdoor unit : 16 ▪ On/Off Controller : 16 (In case of DMS2 connection, 15) ▪ DMS2 : 1 ▪ Control layer can control 128 units. (Indoor unit, ERV, MCU)

✳ Interface module MIM-B13D, MIM-B13E, MIM-B04A cannot connect.

✳ ERV cannot be connected until end of 2013

II Centralized control system

2. On/Off controller

☐ *MCM-A202DN*

3) Description of parts
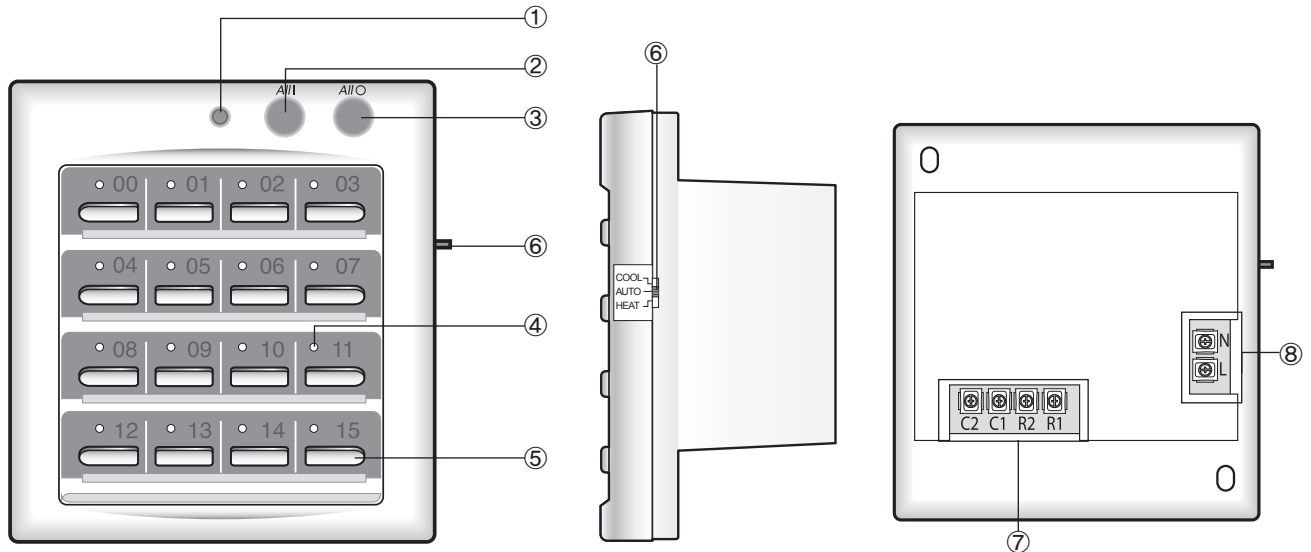
No.	Name	Description
①	Indoor unit operation LED	▪ It lights on when more than one indoor unit operates. ▪ It flickers during indoor unit tracking process after power reset.
②	All ON button	Press All ON button to turn on all the indoor units.
③	All OFF button	Press All OFF button to turn off all the indoor units.
④	Group indoor unit operation LED	▪ It lights on when one indoor unit of the group is operating. ▪ It also flickers when indoor unit has an error. ▪ During tracking indoor units, LED whose number is equivalent to indoor unit RMC(2) address flickers.
⑤	Indoor unit control button	Press each indoor unit button to control the equivalent unit operation.
⑥	Operation mode selection switch	Set operation mode selection switch to a certain mode and press indoor unit control button to control operation mode. Whenever pressing any button on the controller, set operation mode is delivered to the indoor unit.
⑦	Communication terminal	▪ C1 C2 : No function ▪ R1 R2 : Connect to Outdoor unit, DMS2, On/Off controller
⑧	Power terminal	AC200V~240V connection

☑ *Note*

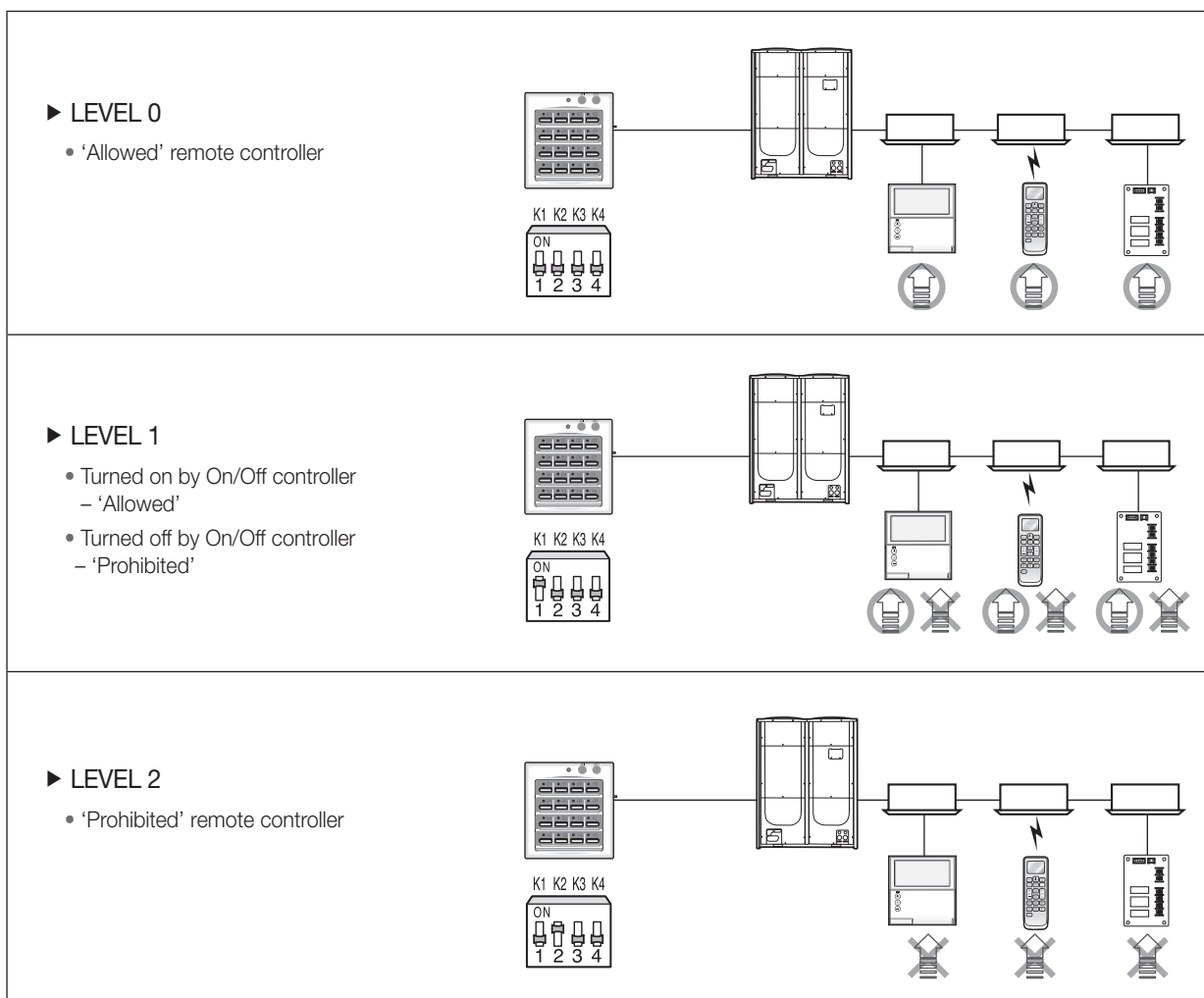◆ Press button 11 and button 15 together for 5 seconds to reset the On/Off controller.

Address & option switch

K1 K2 K3 K4

Option switch

Indoor unit RMC(1)
matching address
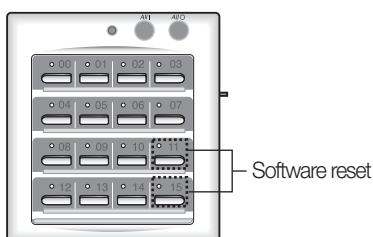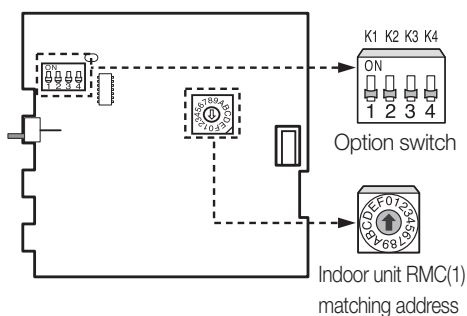
DIP SW		Description
K1	K2	Restriction setting on wired/wireless remote control use
OFF	OFF	Wired/Wireless remote control use is allowed all the time. Level 0
ON	OFF	Wired/Wireless remote control use is allowed only if indoor unit is ON by the On/Off controller. When indoor units are OFF by the On/Off controller, remote control use is prohibited. Level 1
OFF	ON	The use of wireless/wired remote controllers and external contact control is prohibited. Level 2
ON	ON	No function
K3		• OFF : On/Off controller use • ON : Not use On/off controller (All buttons don't work)
K4		No function

4) Optional function

Remote control restriction

▶ LEVEL 0
• 'Allowed' remote controller

K1 K2 K3 K4

▶ LEVEL 1
• Turned on by On/Off controller
  – 'Allowed'
• Turned off by On/Off controller
  – 'Prohibited'

K1 K2 K3 K4

▶ LEVEL 2
• 'Prohibited' remote controller

K1 K2 K3 K4

II Centralized control system

2. On/Off controller

❏ *MCM-A202DN*

4) Optional function

Operation mode selection switch

It is mainly used to set indoor unit operation mode to Cooling, Heating or Auto.
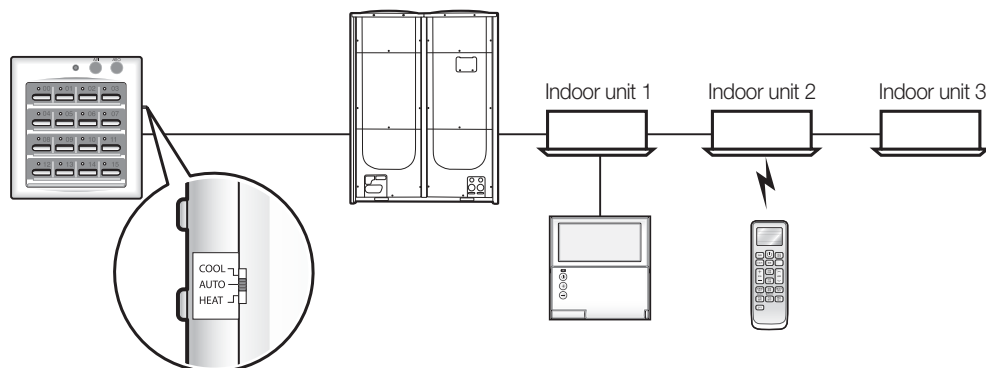
Indoor unit operation

- Cooling mode set → Cooling operation in last cooling set temperature, fan speed and fan direction
- Heating mode set → Heating operation in last heating set temperature, fan speed and fan direction
- Auto mode set → Indoor units keep their current operation mode, set temperature, fan speed and fan direction.

  ※ Operation mode selection switch doesn't lock the indoor unit operation mode.

5) Connection diagram

Connection with DVM S series outdoor unit

(1) Set layer
- When on/off controller controls 1 DVM S outdoor unit, then it can be connected to outdoor unit's F1/F2 line.
- Max.16 Controller can be connected to F1/F2 line.
  ✳ Controller : On/Off controller - MCM-A202DN
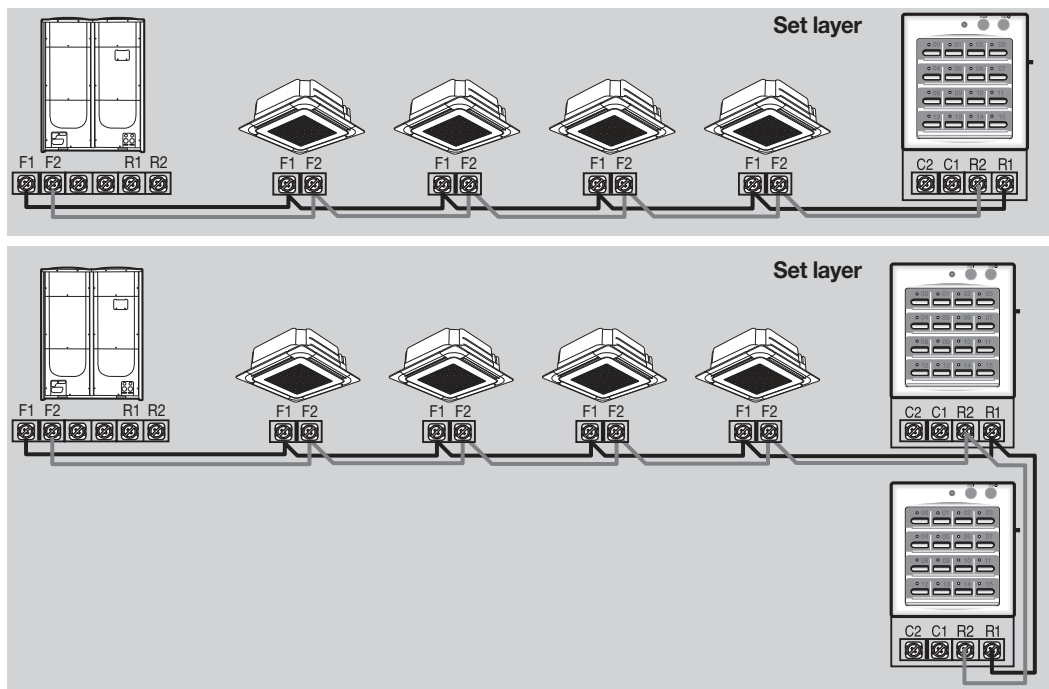
(2) Control layer

- When on/off controller control multiple DVM S outdoor units, then it should be connected to R1/R2 line of outdoor units.
- Max.16 Controllers can be connected to R1/R2 line.
  - ✳ Controller : ▪ On/Off controller - MCM-A202DN
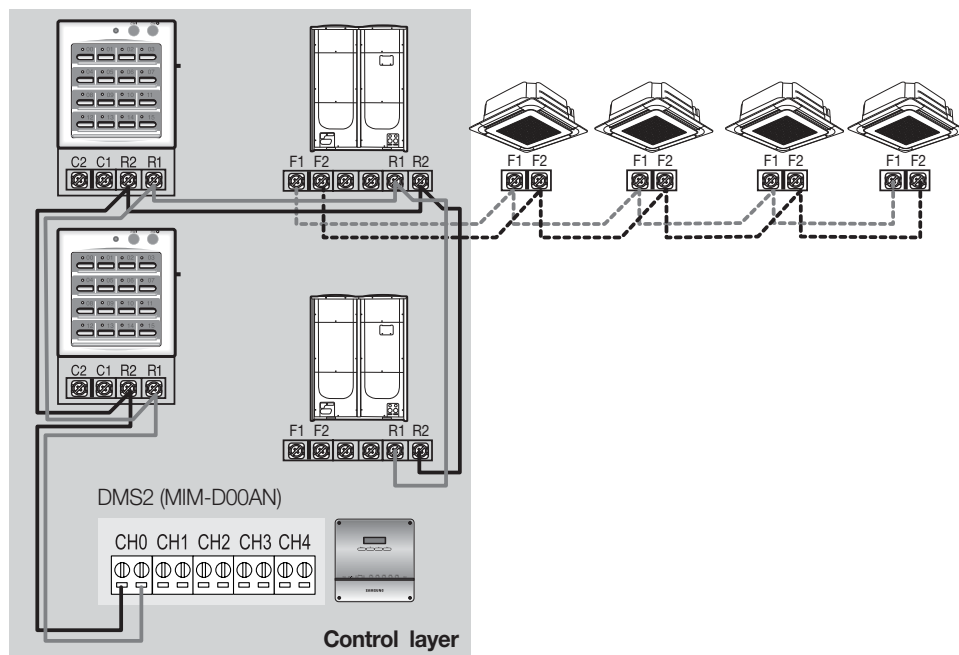   - ▪ DMS2 - MIM-D00AN (only 1 DMS2 can be connected)
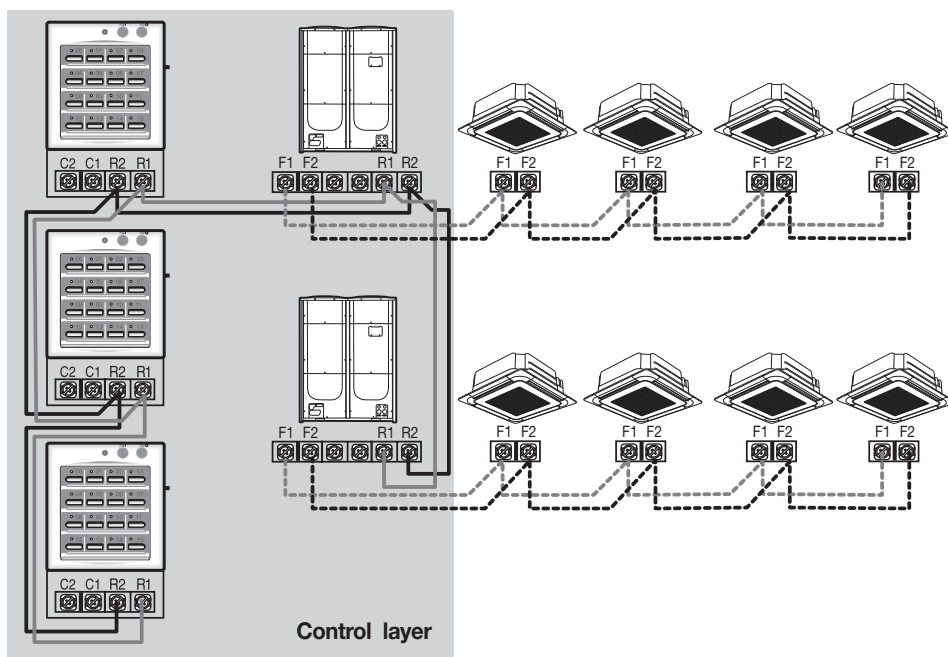
Control layer

C Connection with DMS2 (MIM-D00AN)

(1) Control layer

- DMS2(MIM-D00AN) should connect to R1/R2 line.
- Max.16 Controllers can be connected to R1/R2 line.
  - ✳ Controller : ▪ On/Off controller - MCM-A202DN
    - ▪ DMS2 - MIM-D00AN (only 1 DMS2 can be connected)

▶ Case1

DMS2 (MIM-D00AN)

CH0 CH1 CH2 CH3 CH4

Control layer

II Centralized control system

2. On/Off controller

❑ *MCM-A202DN*

5) Connection diagram

Connection with DMS2 (MIM-D00AN)

▶ Case2
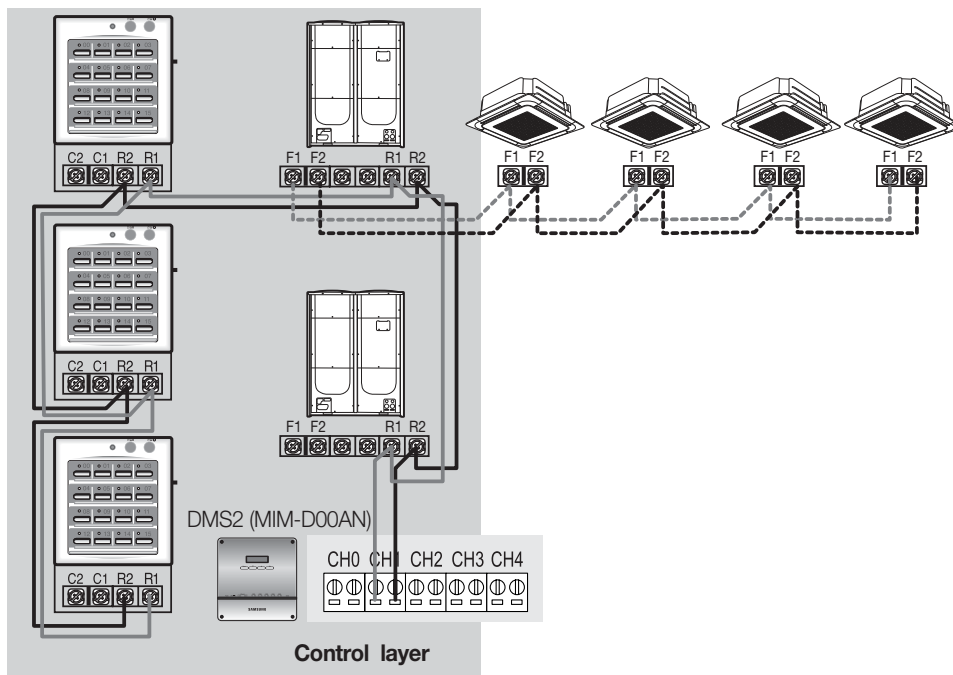
▶ Caution
 • If on/off controller is connected to outdoor unit's F1/F2 line, DMS2 cannot connect to on/off controller's R1/R2.
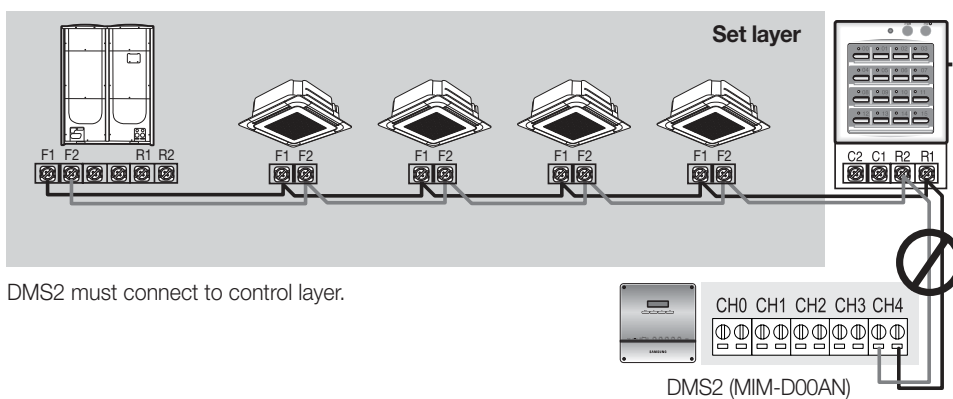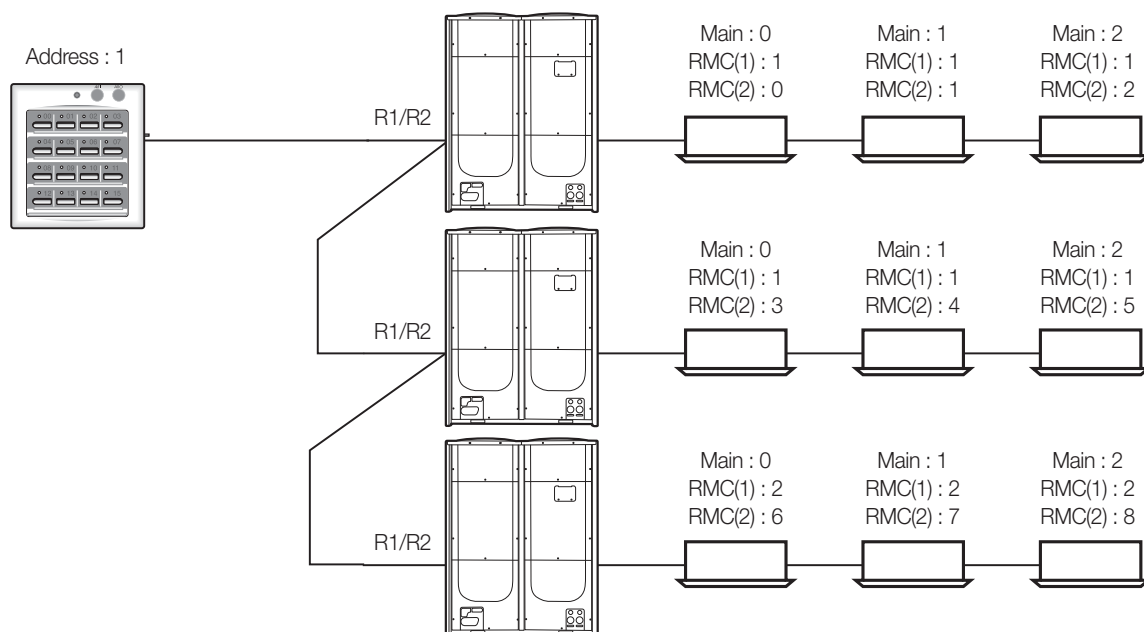

DMS2 must connect to control layer.

6) Display

Various LED display

After power reset to the On/Off controller, it carries out indoor unit tracking process.

(1) On/Off controller only communicate with indoor units which has same RMC(1) address with On/off controller's address.

(2) During tracking indoor units, LED whose number is equivalent to indoor unit RMC(2) address flickers.
   • In LED 00 → LED 01 → LED 02 → LED 03 → LED 04 → LED 05 order
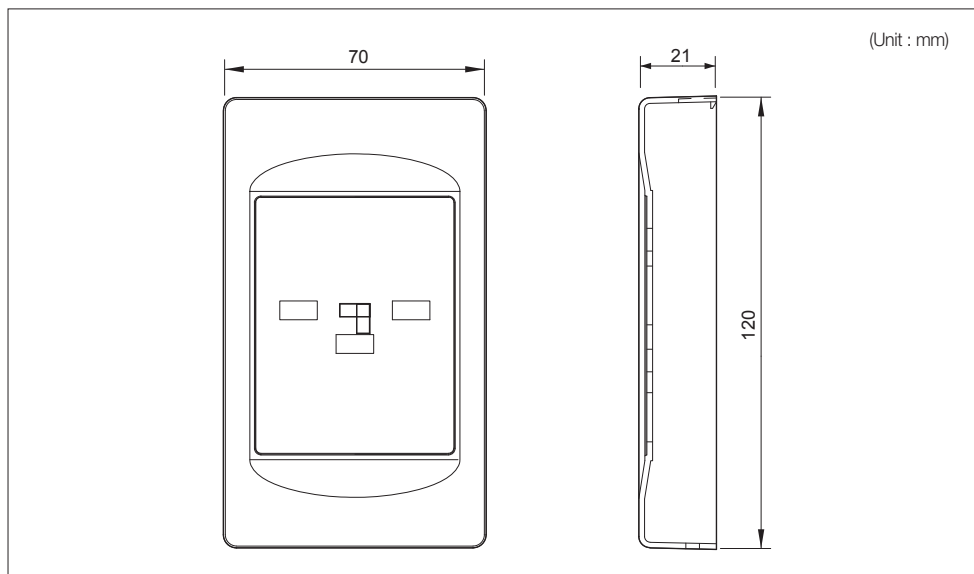
II Centralized control system

3. Operation mode selection switch

❑ *MCM-C200*

1) Features
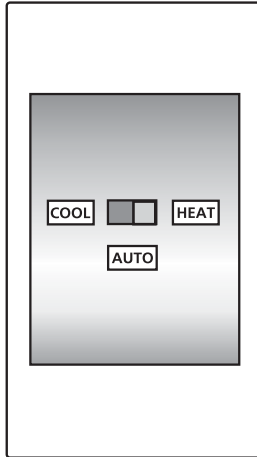
Operation mode selection switch

• Outdoor unit operation mode selection (Cooling, Heating or Auto)

※ Mixed operation mode protection
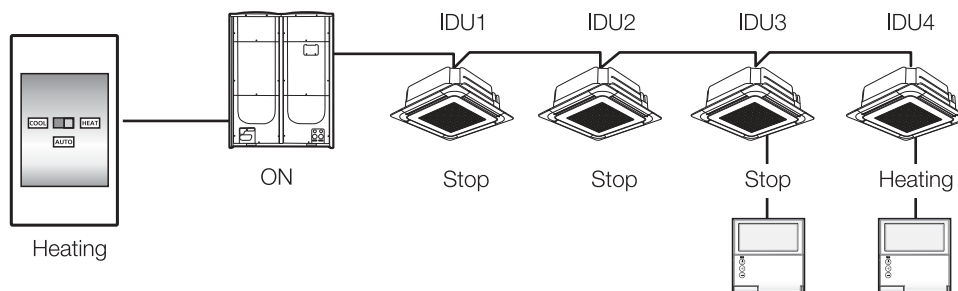

2) Installation

• 1 operation mode selection switch must be connected to 1 outdoor unit.

※ Max. distance between the outdoor unit PCB and the MCM-200: 100m
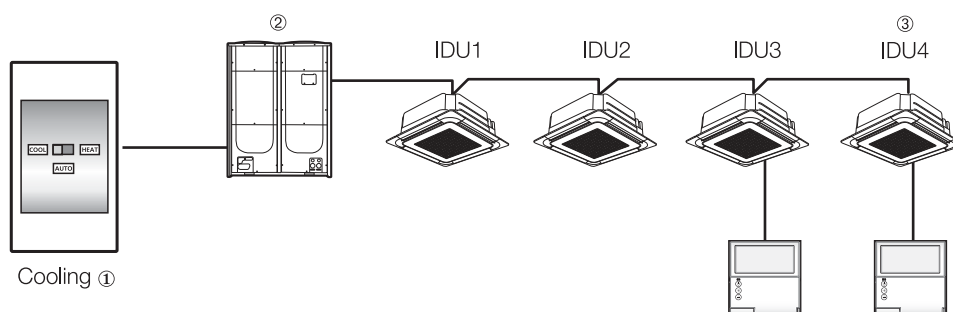
3) Control example

| **Initial condition** |
- Cool/Heat Selector : Heating position
- IDU1, 2, 3 : Stop mode, IDU4 : Heating mode
- Compressor ON

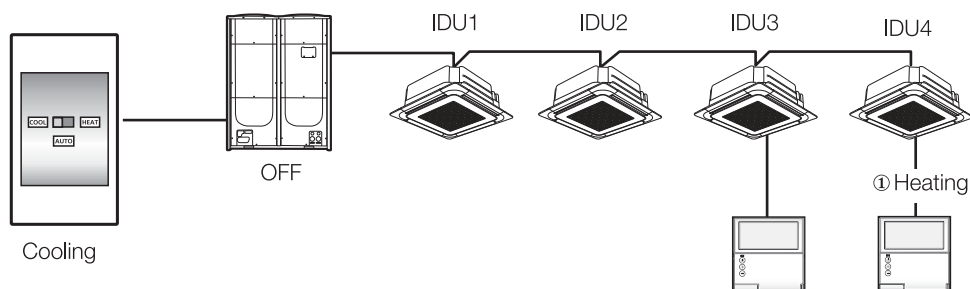| **Sequence 1** | Set the Cool/Heat selector to the Cooling position |

Result	① Change Cool/Heat Selector to Cooling
	② Automatically compressor OFF
	③ Running IDU4 stops

| **Sequence 2** | Set IDU4 to Heating with Remote controller |

| Result | ① • IDU4 ignores Heating command |
| | • IDU4 keeps OFF status. |

☑ *Note*

♦ Operation mode selection switch fixed indoor unit operation mode.
→ Indoor unit ignores opposite operation mode. (It will not accept the command and it will just beep shortly)

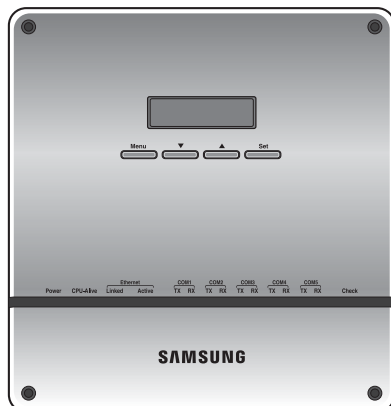# DVM CONTROL SYSTEMS

III. Integrated management systems

INTEGRATED
MANAGEMENT SYSTEM
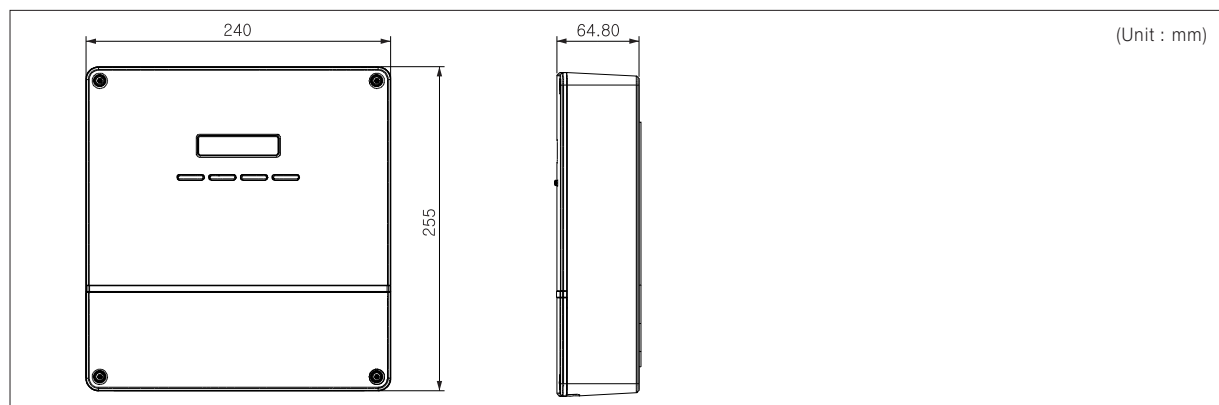
III Integrated management system

1. DMS2

☐ *MIM-D00AN*

1) Features

• Built-in web server for PC-independent management and remote access control
• Multiple upper-layer control access (S-NET 3, Web-client)
• Weekly/Daily schedule control
• Power distribution function
• Current time management even during power failure (for 24 hours)
• Emergency stop function with simple contact interface
• Individual/Group control of up to 256 indoor units and ERV, AHU
• User editable control logic
• Accessible level management
• Dynamic security management
• Operation & error history management
• Data storage in non-volatile memory & SD memory

(Unit : mm)

240 / 64.80 / 255

2) Product specification

Power	Source	DC Adaptor
	Input	100~240V AC (+-10%), 50/60Hz
	Output	12V 3A
Operating temperature range		-10℃ ~ 50℃
Operating humidity range		10%RH ~ 90%RH
Communication method		▪ Lower level : RS485 (Outdoor unit / On/Off controller, PIM) ▪ Upper level : Ethernet 100 Base-T (S-NET3, Web Browser)

Compatible devices

Type		Model	Maximum device connection	Remarks
Outdoor unit		DVM S series only	▪ Each communication channel : 16 units (Max. 128 indoor units) ▪ Max. 80 outdoor units (Max. 256 indoor units)	Can not connect interface module (ex. MIM-B13D, MIM-B13D, MIM-B04A)
Controller	On/Off controller	MCM-A202DN	▪ Each communication channel : 15 units ▪ Max. 75 controllers	Can not connect interface module (ex. MCM-A202D, MCM-A202B, MCM-A202A, MCM-A202)
	PIM	MIM-B16	8 units	-
Upper level controller		S-NET3	-	To use multiple number of upper level controllers, HUB or other network environment must be established
Watt-meter		Pulse-type	Connected with PIM Pulse width:20~400(ms) Pulse :1~10000(Wh/pulse)	-

✳ ERV cannot be connected until end of 2013

3) Description of parts

Front
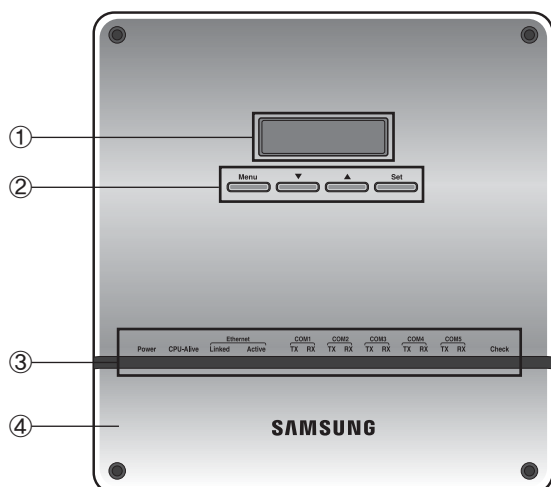
No	Name	Function
①	LCD display	Shows current time and IP address. Various messages will be displayed depending on button input.
②	LCD operation button	There are 4 buttons (Menu, ▼(Down), ▲(Up), Set) and you can access to menu and move, check the menu.
③	LED Indicator	Check 15 LED status such as Power, CPU-Alive, Ethernet-Linked/Active, COM1~5-TX/RX and Check
④	DMS2 Bottom cover	Unfasten 2 screws on the bottom and separate the bottom cover from DMS2. Then check cable connection part.

LED indicator

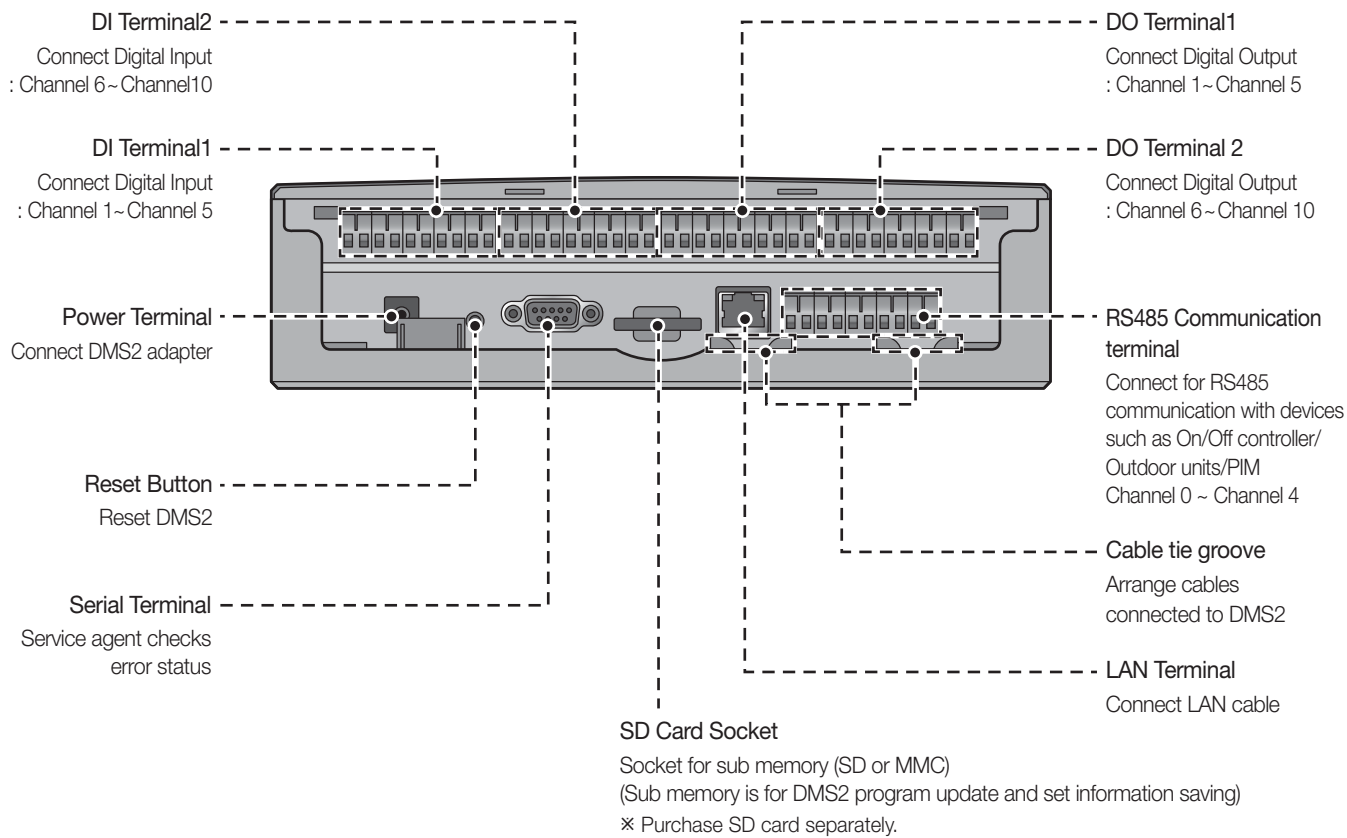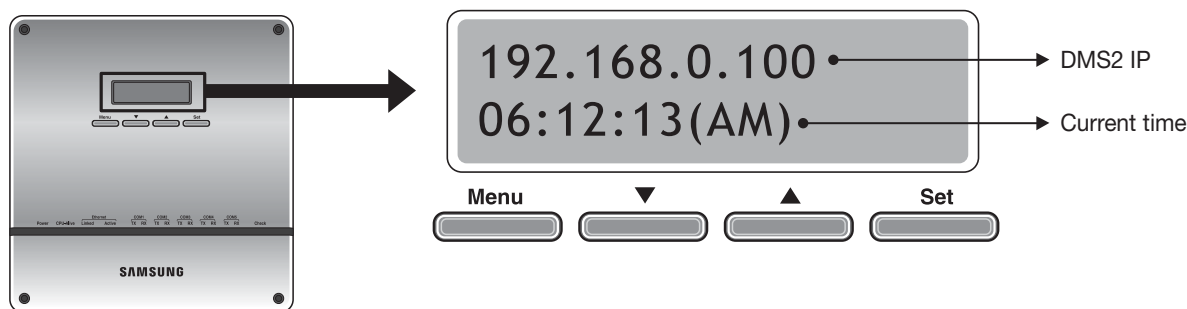| Item	Name	Status
Power	Power indicator	Turns blue when the power is supplied
CPU Alive	CPU operation indicator	Blinks in orange with 1 second intervals during normal operation
Ethernet - Linked	Internet connection indicator	Turns green during normal connection
Ethernet - Active	Internet data transmission/ reception indicator	Blinks in orange during normal transmission/ reception
COM1~5 - TX	On/Off controller/Outdoor unit data transmission indicator	Blinks in green during normal transmission
COM1~5 - RX	On/Off controller/Outdoor unit data reception indicator	Blinks in green during normal reception
Check	Indoor/outdoor unit/ error check indicator	Turns green when there is an error on more than one indoor/outdoor unit or in communication

III Integrated management system

1. DMS2

❑ *MIM-D00AN*

3) Description of parts

Bottom

DI Terminal2
Connect Digital Input
: Channel 6~Channel10

DI Terminal1
Connect Digital Input
: Channel 1~Channel 5

Power Terminal
Connect DMS2 adapter

Reset Button
Reset DMS2

Serial Terminal
Service agent checks
error status

DO Terminal1
Connect Digital Output
: Channel 1~Channel 5

DO Terminal 2
Connect Digital Output
: Channel 6~Channel 10

RS485 Communication
terminal
Connect for RS485
communication with devices
such as On/Off controller/
Outdoor units/PIM
Channel 0 ~ Channel 4

Cable tie groove
Arrange cables
connected to DMS2

LAN Terminal
Connect LAN cable

SD Card Socket
Socket for sub memory (SD or MMC)
(Sub memory is for DMS2 program update and set information saving)
※ Purchase SD card separately.

Menu and display

192.168.0.100 → DMS2 IP
06:12:13(AM) → Current time

Menu   ▼   ▲   Set

SAMSUNG

Button	Detail description
LCD display	▪ General display : Displays IP address of the DMS2 and current time ▪ In Menu : Displays menu information and set value
Menu	▪ Access menu and select main menu ▪ Cancel menu setting
▼	▪ Move between menu ▪ Change the menu settings
▲	▪ Move between menu ▪ Change the menu settings
Set	▪ Access sub menu ▪ Save the change of menu settings

4) Connection diagram

▶ MIM-B16(PIM) should be connected separately with outdoor unit or controllers.
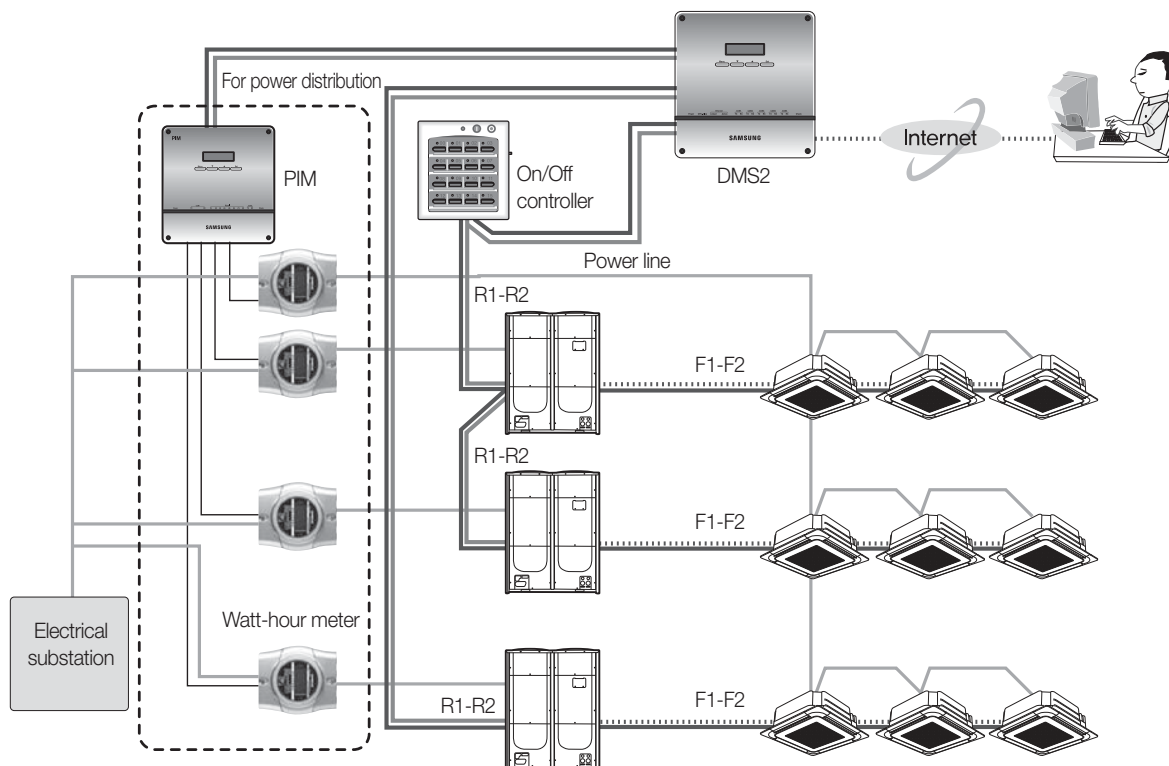
5) Wiring
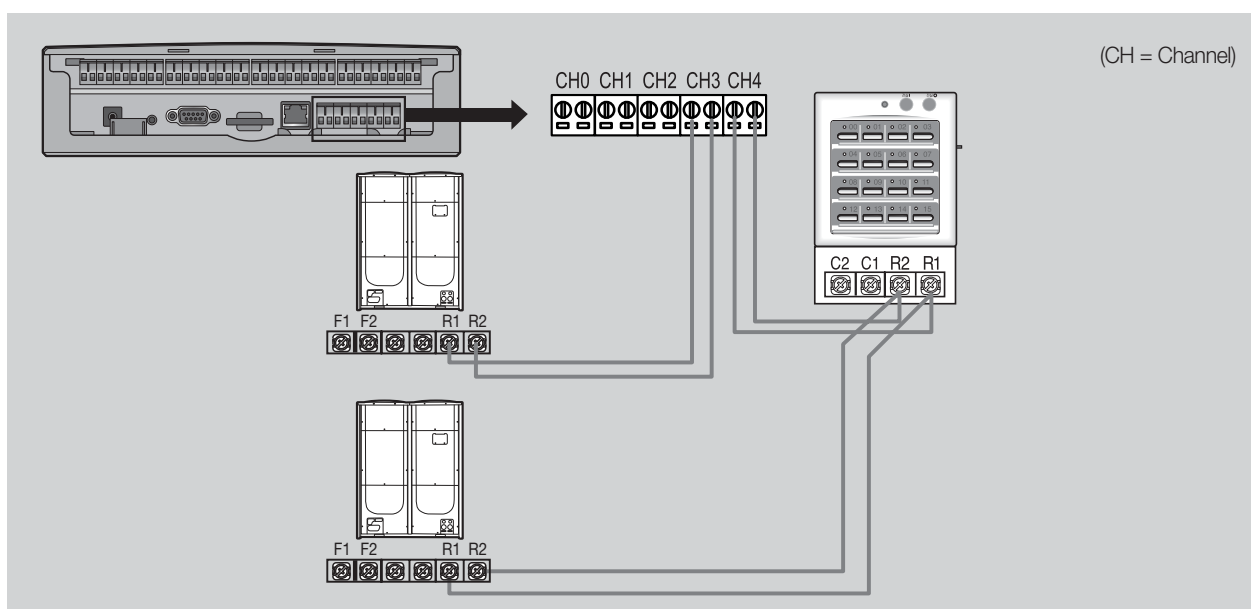
(CH = Channel)

(1) Connecting outdoor unit directly

• Maximum 16 outdoor units can be connected to each channel
• Total 80 outdoor units can be connected

(2) Connecting On/Off controller

• Maximum 15 On/Off controller can be connected to each channel
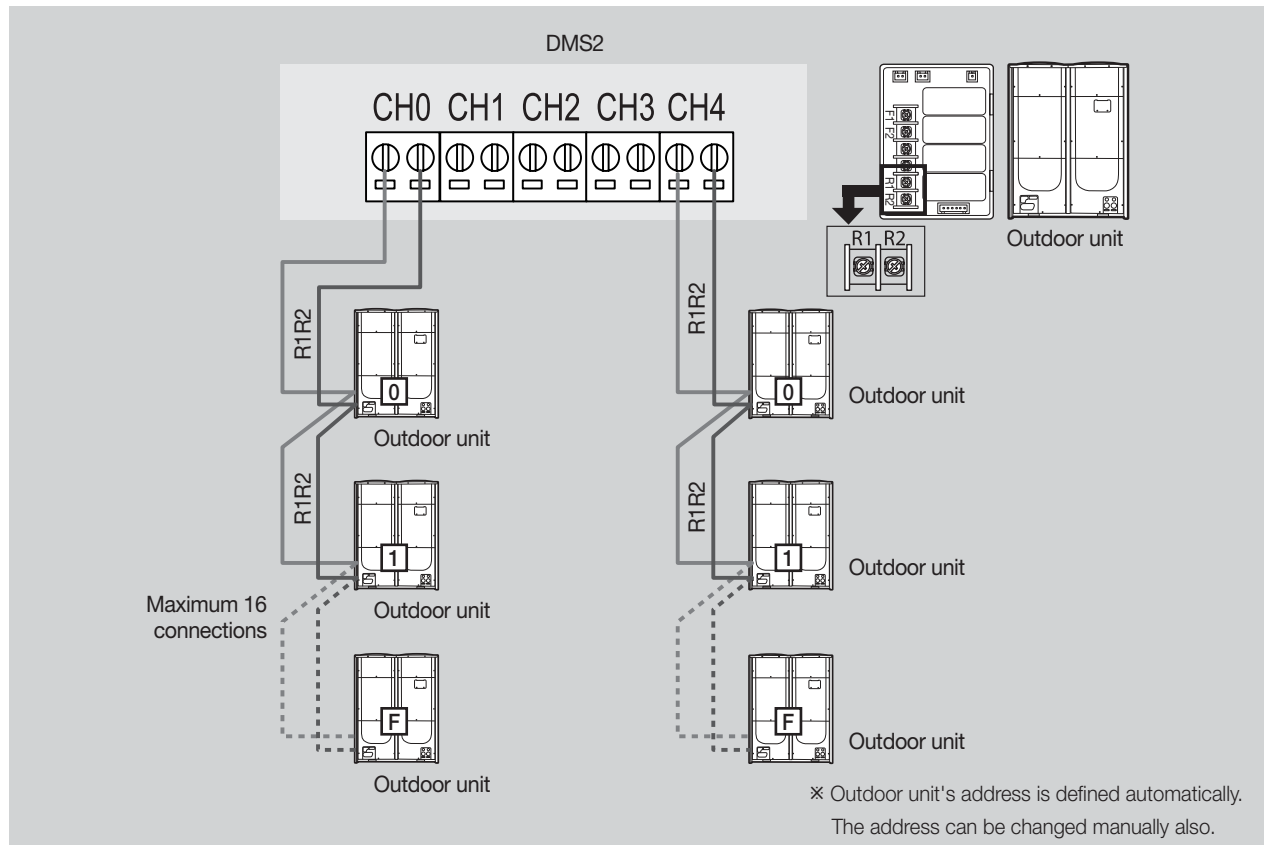
☑ *Note*

◆ DMS2 can connect outdoor unit and On/Off controller at the same time.
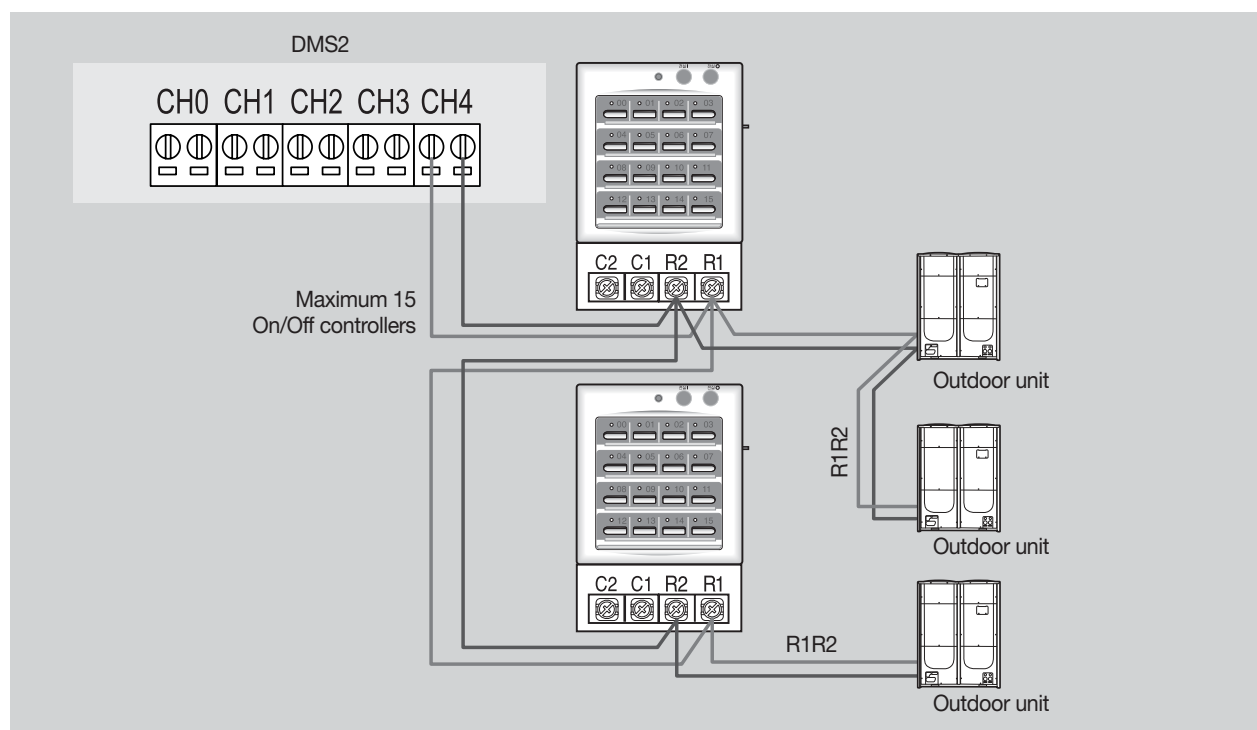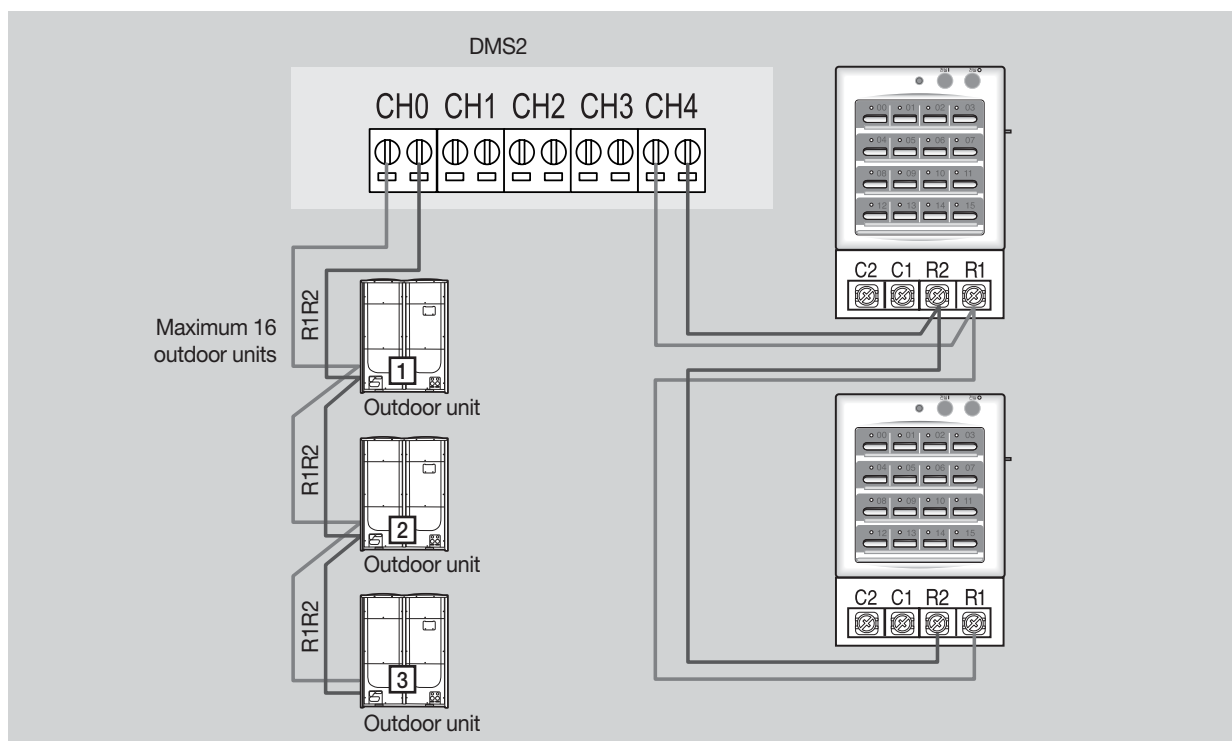◆ Outdoor unit and On/Off controller can be connected to 1 communication channel at the same time.

III Integrated management system

2. DMS2

❏ *MIM-D00AN*

5) Wiring

Connecting with outdoor unit

DMS2

CH0 CH1 CH2 CH3 CH4

R1R2

R1R2

Outdoor unit

0

Outdoor unit

R1R2

1

Outdoor unit

Maximum 16 connections

F

Outdoor unit

R1R2

0

Outdoor unit

R1R2

1

Outdoor unit

F

Outdoor unit

※ Outdoor unit's address is defined automatically.
The address can be changed manually also.

Connecting with On/Off controller

DMS2

CH0 CH1 CH2 CH3 CH4

Maximum 15
On/Off controllers

C2 C1 R2 R1

C2 C1 R2 R1

Outdoor unit

R1R2

Outdoor unit

R1R2

Outdoor unit

Connecting with outdoor unit and on/off controller

DMS2

CH0 CH1 CH2 CH3 CH4

Maximum 16 outdoor units

R1R2

1
Outdoor unit

R1R2

2
Outdoor unit

R1R2

3
Outdoor unit

C2 C1 R2 R1

C2 C1 R2 R1

Wiring distance

ⓐ

ⓑ

ⓒ

ⓓ

ⓔ

Network radius

Maximum 15 On/Off controllers and 16 outdoor units can be connected to 1 channel of the DMS2

▶ Distance between DMS2 and On/Off controller/outdoor unit
- Distance from the DMS2 to the furthest device cannot exceed 1000m.
- ⓒ + ⓓ + ⓔ ≤ *1000m*

▶ Distance between DMS2 and upper level controller
- Since DMS2 supports 100 Base-T Ethernet, first repeater or upper level controller from the DMS2 cannot be further than 100m (IEEE 802.3). Therefore, maximum network radius is restricted to 500m.

ⓐ, ⓑ, ⓒ, ⓓ, ⓔ = *100m*

ⓐ   ⓑ   ⓒ   ⓓ   ⓔ

HUB
Repeater

ⓐ 500m

Maximum number of repeaters = 4

45
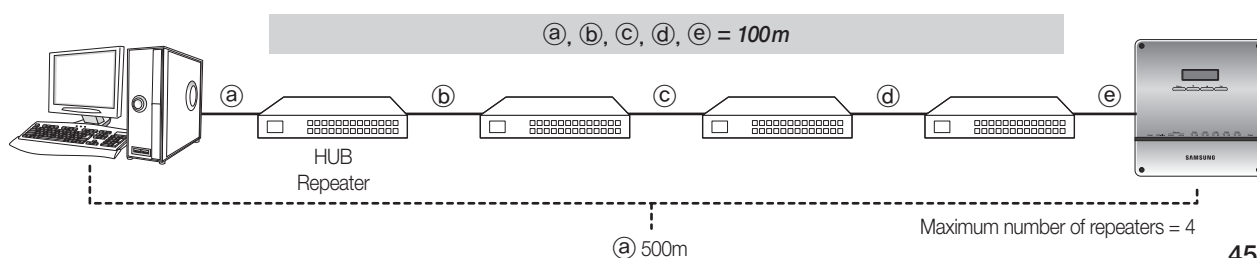
III Integrated management system

1. DMS2

❑ *MIM-D00AN*

6) Function

Tracking

▶ Tracking is an operation that finds devices which are connected to DMS2.
Through tracking operation, devices which are connected to DMS2 can recognize if they are connecting to DMS2.
To supervise and control system air conditioner using DMS2, tracking should be done first.
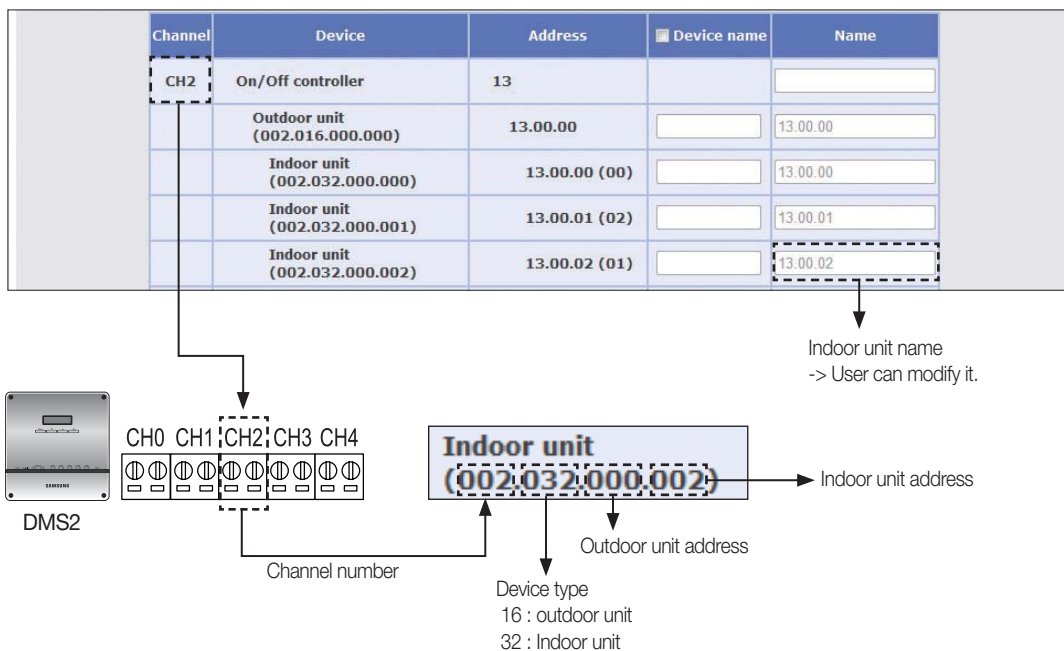

- When outdoor unit or controller is connected to channel, set as "NEW"
- When PIM(MIM-B16) is connected to channel, set as "IM"
- PIM should be connected separately with outdoor unit or controllers.

▶ You can check the number of installed devices, address of the devices or rename the indoor unit after tracking is completed.

Indoor unit name
-> User can modify it.

Indoor unit address

Outdoor unit address

Device type
16 : outdoor unit
32 : Indoor unit

Channel number

DMS2

Control & monitoring

▶ DMS2 can control and monitor Max 256 devices. (Indoor unit, ERV, AHU)

And it also controls and monitors external contact point (8 Digital input, 6 Digital output.)

Monitoring
Indoor unit, ERV, AHU
External contact point

Control
Variable web remote controllers
depends on device type.

Multiple language support

▶ DMS2 (MIM-D00AN) supports 12 languages

Set silent contol

▶ DMS2(MIM-D00AN) can contol indoor unit without operation beeping sound using below setting option.

• Control and Monitoring: Select this if you want to control silently in 'Control and Monitoring' screen of DMS2.

• Schedule : Select this if you want to perform 'Schedule' silently.

• Control logic : Select this if you want to perform 'Control logic' silently.
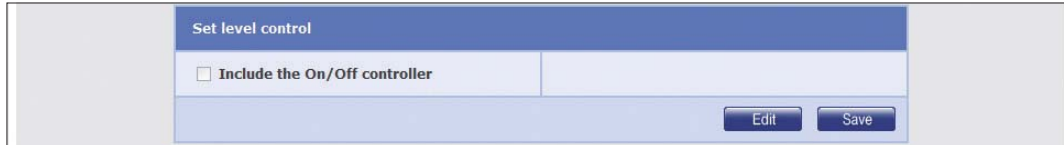
III Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

On/Off controller restriction

▶ DMS2 (MIM-D00AN) can restrict on/off controller usage.

Set level control	
☐ **Include the On/Off controller**	
	Edit Save

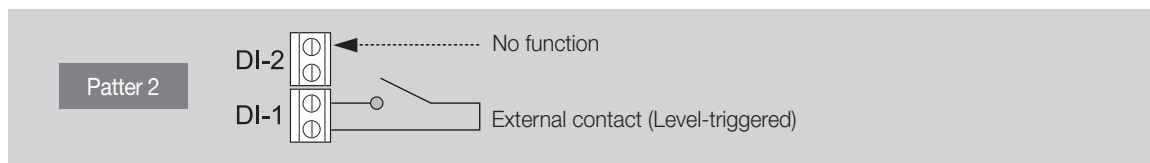• Select this if you want to restrict controlling from On/Off controllers when you disable RC from the DMS2.

Contact point control

▶ You can select emergency operation pattern

| Select the contact control pattern			
◉ **Pattern1**	○ **Pattern2**	○ **Pattern3**	○ **Pattern4**
			Edit Save

(1) Pattern 2

▶ Short external contact : Emergency stop
- Turns off all the indoor units when there is an ON signal input
- All the remote control use is disabled
- Control from S-NET3 is unavailable
- Disable schedule control

▶ Open external contact : Resume operation
- After Emergency stop, the indoor units stay in the current OFF states.
- All the remote control use is restored to the previous state.
- Schedule control is enabled again.

(2) Pattern 3
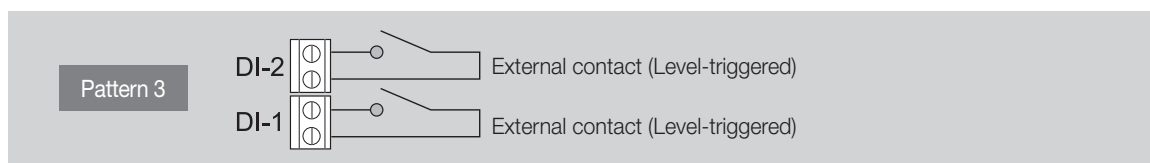
▶ External contact input to DI-1
- Short contact : Starts all indoor unit operation.
- Open contact : Stops all indoor unit operation.

※ Schedule control is not interrupted in Pattern 3.

▶ External contact input to DI-2
- Short contact : Disables the use of all wired/ wireless remote controllers.
- Open contact : Enables the use of all wired/ wireless remote controllers.

(3) Pattern 4
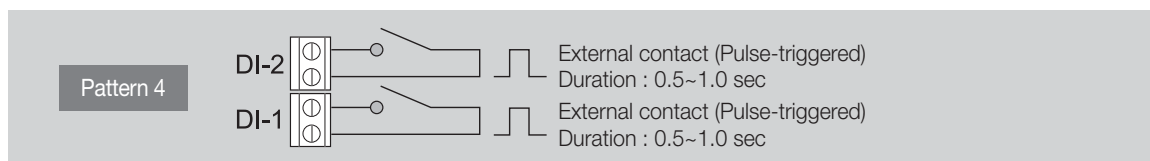
▶ External contact pulse input to DI-1
- Short pulse-triggered : Starts all indoor unit operation.

▶ External contact pulse input to DI-2
- Short pulse-triggered : Stops all indoor unit operation.

※ Schedule control is not interrupted in Pattern 4.

General external contact point control

DMS2 has Digital input/output ports to check the external device status or turn them On/Off through contact point.
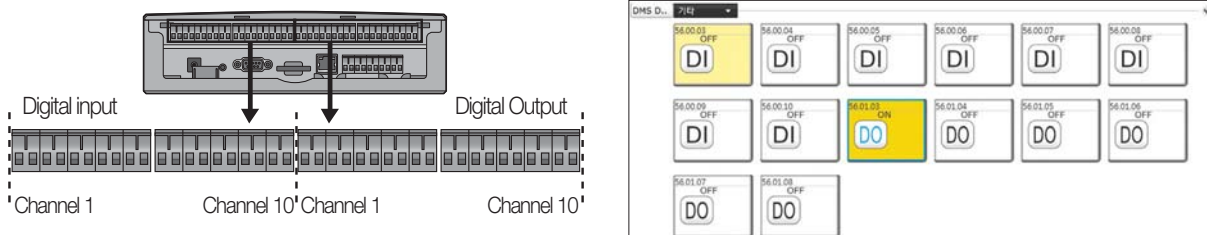
▶ DI : Voltage free contact signal input (Open / Short)

• Channel 1, Channel 2 is occupied with [Emergency stop] function.
• Channel 3~Channel 10 : DMS2 can monitor the contact signal input state of each channel

▶ DO : Contact signal output (DC 12V)

• Channel 1, Channel 2, Channel 9 and Channel 10 is occupied with other functions.
• Channel 3~Channel 8 : DMS2 can control contact signal output.

☑ *Note*

♦ DI 1, 2/ DO 1, 2, 9, 10 will be excluded from control and monitoring since it is being used by internal function of DMS2.
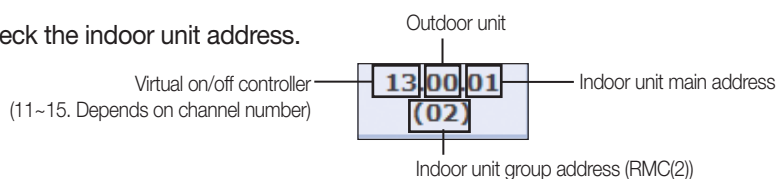

Indoor unit usage restriction

• Operation limit : To prevent the wrong operation mode setting, it can limit the operation mode of indoor unit.
• Temperature limit : It can set the lower temperature limit in Cool mode and the upper temperature limit in Heat mode.

➊ Indoor unit address
➋ Operation mode restriction
➌ Control mode
➍ Setting Upper temperature limit in Heating, Lower temperature limit in Cooling

➊ Check the indoor unit address.

Outdoor unit
Virtual on/off controller (11~15. Depends on channel number)
Indoor unit main address
Indoor unit group address (RMC(2))

➋ Select the Limit mode

• Indoor units within same outdoor unit must be set in same limit mode.
• All indoor units of one outdoor unit set same operation mode restriction automatically.

➌ Control mode will be set automatically depends on the seleceted restricted mode

• Ex) When the restricted mode is set to [Cool-only] and then [Control mode] is set to [Cool] automatically
   If user set [Heating mode] using remote controller → Indoor unit ignores the command.

➍ Set the Upper temperature limit in Heating and Lower temperature limit in Cooling.

• Upper temperature limit in Heating and Lower temperature limit in Cooling can be set differently for each indoor unit.
   (Cooling：18℃~30 ℃, Heating：16 ℃~30 ℃)

III Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

Logic control

What is logic control?

User can control the air conditioner, ERV, AHU and digital output depending on the conditions, such as room temperature and outdoor temperature, set by the user. Input condition can be used with parameter and it will be calculated with arithmetic equation. Schedule function executes operation by time but logic control executes operation according to the conditions that set by the user.

Examples of utilizing the logic control

Case 1) Government regulates the lowest room temperature to be 26ºC in public places. When the room temperature is lower than 26ºC, administrator must turn off all the air conditioners in the area. Is there any way for the air conditioner to turn off automatically depending on the certain room temperature?

Case2) During spring and fall, it is cold in the morning and warm in the afternoon. Therefore, I'm using the air conditioner in heating mode in the morning and cooling mode in the afternoon. Can I set the air conditioner to change operation mode automatically depending on the outdoor temperature?

Case 3) I'm using air conditioner with ERV. In the days with the outdoor temperature relatively lower than the indoor, I want to use ERV instead of the air conditioner to ventilate and minimize the air conditioner use. Is there any way to set the air conditioner or ERV to operate appropriately and automatically depending on the temperature?

Input	Output
1. Select the factor to input condition ▪ Device, factor 2. Edit the condition ▪ Compound factor ▪ Comparison operator ▪ Standard value ▪ Duration	1. Select output factor ▪ Device, factor 2. Edit output ▪ Create control

Edit factor		
Single factor	Power Current temp. Desired temp. Outdoor temp. Mode Fan speed Air flow Enable/Disable RC	
Arithmetic factor	+ -	Current temp. Desired temp. Outdoor temp.
Function factor	Average	Current temp. Desired temp. Outdoor temp.

Compound factor
AND
OR

Comparison operator
=
=>
=<
>
<
≠

Command
Power
Desired temp.
Mode
Fan speed
Air swing
Enable/Disable RC

(1) Editing input factor

① Click "Select a factor".	➡	② Select type of the factor	➡	③ Click "Select a device"
				⬇
⑥ Click "Apply".	⬅	⑤ Select a detail item	⬅	④ Select the device from the list.
⬇				
⑦ Select the comparison operator	➡	⑧ Select a standard value	➡	⑨ Select the duration

▶ Single factor : 1 device and 1 factor.

▶ Arithmetic : It means 2 devices are connected by arithmetic operator.

▶ Function : Use average value of various conditions from the device and create it as a factor.

Ⅲ Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

Logic control

(1) Editing input factor

Compound factor		Factor	Comparison operator	Standard value		Duration (minute)
		00.00.00.Outside temp.	= ▼	⦿ ☐	○ Select a factor	⦿ Cancel ○ Apply 1 ▼
☐	AND ▼	Select a factor	= ⁄ => ⁄ =< ⁄ < ⁄ > ⁄ ≠	⦿ None ▼	○ Select a factor	⦿ Cancel ○ Apply 1 ▼
☐	AND ⁄ OR	Select a factor		⦿ None ▼	○ Select a factor	⦿ Cancel ○ Apply 1 ▼

- Compound factor : AND, OR, No selection
   Ex) Apply 'AND' or 'OR' to 3 factors
      → (input 1) And (input 2) OR (input 3)

- Comparison operator : =, =>, =<, <, >, ≠

- Standard value : Standard value of the factor
   Ex) When the factor is "Outdoor temperature of the indoor unit number 00", then standard value is value of the "Outdoor temperature".
      → "Outdoor temperature of the indoor unit number 00" > 20

- Duration : Duration can be set between 1~60 min.

Item	Comparison operator	Standard value
Power	=, ≠	On, Off
Current temp	=, =>, =<, <, >, ≠	Temperature value (number)
Desired temp	=, =>, =<, <, >, ≠	Temperature value (number)
Outside temp	=, =>, =<, <, >, ≠	Temperature value (number)
Mode	=, ≠	Auto, Cool, Dry, Fan, Heat
Fan speed	=, ≠	Auto, Low, Med, High
Air flow	=, ≠	Vertical, Horizontal, All, None
Enable RC	=, ≠	ON, OFF, Level 1

(2) Editing output factor

① Click "Select a factor".	→	② Click "Select a device".	→	③ Select the device from the list.
				↓
⑥ Select "Command".	←	⑤ Click "Apply".	←	④ Select a detail item to control.
↓				
⑦ Click "Save".				

(3) Control example – Setting

Ex) Set the ERV to turn off together when the indoor unit turns off

❶ Click [Control logic management] → [Setting control logic] from DMS2 menu. Click [Register] to create new control logic.

❷ Enter Name, period/day and time for new control logic.

❸ **Create input condition :** Click [Select a factor] from the 'Input' window.

INTEGRATED
MANAGEMENT SYSTEM

III Integrated management system

1. DMS2
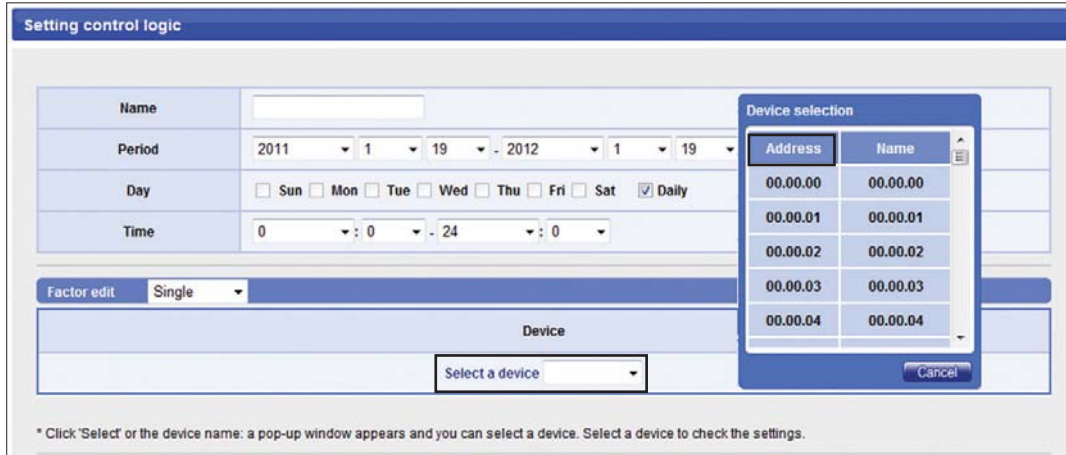
❏ *MIM-D00AN*

6) Function

Logic control

(3) Control example – Setting

❹ Click [Select a device], then [Device selection] window will pop up.
Select a indoor unit to apply the new control logic.
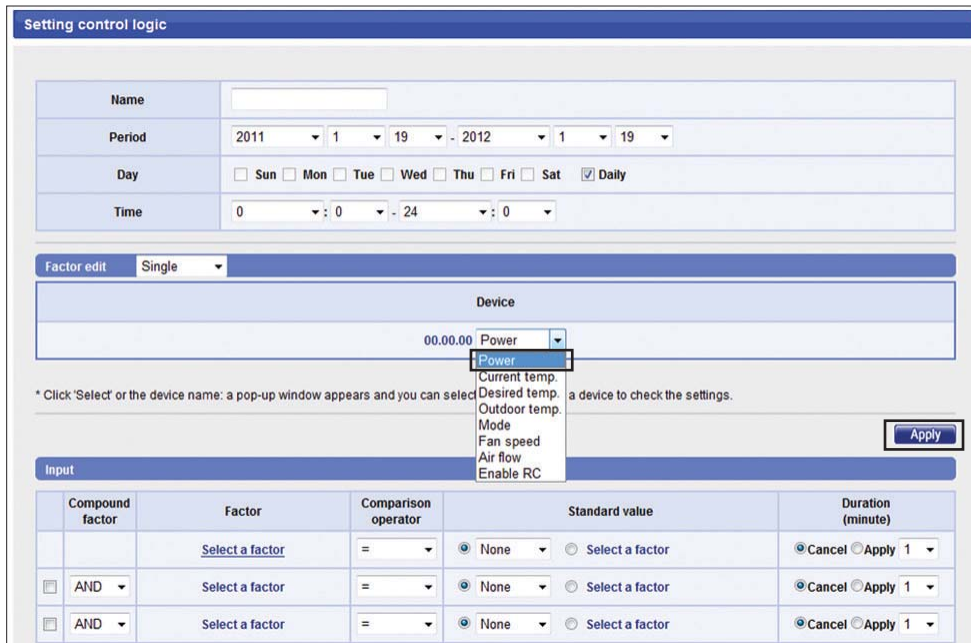
❺ **Create input condition :** When the device is selected, click [Power] and click [Apply].
※ [Power] means the operation state (On/Off).

❻ **Create input condition :** Select '=' as a comparison operator and select "Off" as a standard value.
• Meaning: Execute output control when 00.00.00 device is off.

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❼ **Create output :** From the output window, select the device to apply the control when input condition is satisfied.
Click [Apply] when selection is completed.

❽ **Create output :** Select "Power" as a factor of the selected device and click [Apply].

❾ **Create output :** From the output window, select the control to be executed when input condition is satisfied.

• Turn off the ERV no. 0

❿ Click [Save] when the setting is completed.

⓫ To apply the new logic control, select the created logic and click [Apply].

III Integrated management system

1. DMS2

❑ *MIM-D00AN*

6) Function

Logic control

(4) Control example – Control logic

Ex) Control logic 1 : Turn on 4 indoor units when outdoor temperature is 30°C or higher.
Control logic 2 : Turn off 4 indoor units when outdoor temperature is 26°C.

Control logic 1

Name	PowerOn_Temp30
Period	2010 ∨ 3 ∨ 23 ∨ – 2011 ∨ 3 ∨ 23 ∨
Day	☐ Sun ☑ Mon ☑ Tue ☑ Wed ☑ Thu ☑ Fri ☐ Sat ☐ Daily
Time	8 ∨ : 0 ∨ – 18 ∨ : 0 ∨

Input

	Compound factor	Factor	Comparison operator	Standard value		Duration (minute)
		00.00.00.Outdoor temp.	=> ∨	⊙ 30	○ Select a factor	○ Cancel ⊙ Apply 5 ∨
☐	AND ∨	Select a factor	= ∨	⊙ None ∨	○ Select a factor	⊙ Cancel ○ Apply 1 ∨
☐	AND ∨	Select a factor	= ∨	⊙ None ∨	○ Select a factor	⊙ Cancel ○ Apply 1 ∨

Output

☑	Factor	Command
	00.00.00.Power	⊙ On ∨ ○ Select a factor
☑	00.00.01.Power	⊙ On ∨ ○ Select a factor
☑	00.00.02.Power	⊙ On ∨ ○ Select a factor
☑	00.00.03.Power	⊙ On ∨ ○ Select a factor

❶ Input : When outdoor temperature is 30°C or higher. ❷ When condition 1 lasted for 5 miniute. ❸ Output : Turn on 4 indoor units.

Control logic 2

Name	PowerOff_Temp26
Period	2010 ∨ 3 ∨ 23 ∨ – 2011 ∨ 3 ∨ 23 ∨
Day	☐ Sun ☑ Mon ☑ Tue ☑ Wed ☑ Thu ☑ Fri ☐ Sat ☐ Daily
Time	8 ∨ : 0 ∨ – 18 ∨ : 0 ∨

Input

	Compound factor	Factor	Comparison operator	Standard value		Duration (minute)
		00.00.00.Outdoor temp.	=< ∨	⊙ 26	○ Select a factor	⊙ Cancel ○ Apply 1 ∨
☐	AND ∨	Select a factor	= ∨	⊙ None ∨	○ Select a factor	⊙ Cancel ○ Apply 1 ∨
☐	AND ∨	Select a factor	= ∨	⊙ None ∨	○ Select a factor	⊙ Cancel ○ Apply 1 ∨

Output

☑	Factor	Command
	00.00.00.Power	⊙ Off ∨ ○ Select a factor
☑	00.00.01.Power	⊙ Off ∨ ○ Select a factor
☑	00.00.02.Power	⊙ Off ∨ ○ Select a factor
☑	00.00.03.Power	⊙ Off ∨ ○ Select a factor

❶ Input : When outdoor temperature is 26°C or lower. ❷ Output : Turn off 4 indoor units.

Register control logic

Setting control logic

☑	No.	Name	Period	Days	Time	Apply	Run
☑	1	PowerOn_Temp30	2011-01-19 ~ 2012-01-19	Daily	00:00 ~ 24:00	No	No
☑	2	PowerOff_Temp26	2011-01-19 ~ 2012-01-19	Daily	00:00 ~ 24:00	No	No

❶ Click

[Register] [Edit] [Delete] [Copy] [Apply] [Not apply]

❷ Click

Control logic applied

Setting control logic

☐	No.	Name	Period	Days	Time	Apply	Run
☐	1	PowerOn_Temp30	2011-01-19 ~ 2012-01-19	Daily	00:00 ~ 24:00	Yes	No
☐	2	PowerOff_Temp26	2011-01-19 ~ 2012-01-19	Daily	00:00 ~ 24:00	Yes	No

[Register] [Edit] [Delete] [Copy] [Apply] [Not apply]

Application completed

III Integrated management system

1. DMS2

☐ *MIM-D00AN*

6) Function

■ Power distribution

• Where does power consumption occurs?

Air-conditioning system

Outdoor unit fan

Compressor   Outdoor unit PCB   Indoor unit PCB   Indoor unit fan

System power consumption includes:
1. **Main power -** Compressor operation power
2. **Fan power** - Indoor/Outdoor unit fan operation
3. **Stand-by power** - Preheating coil power, Indoor/Outdoor PCB power
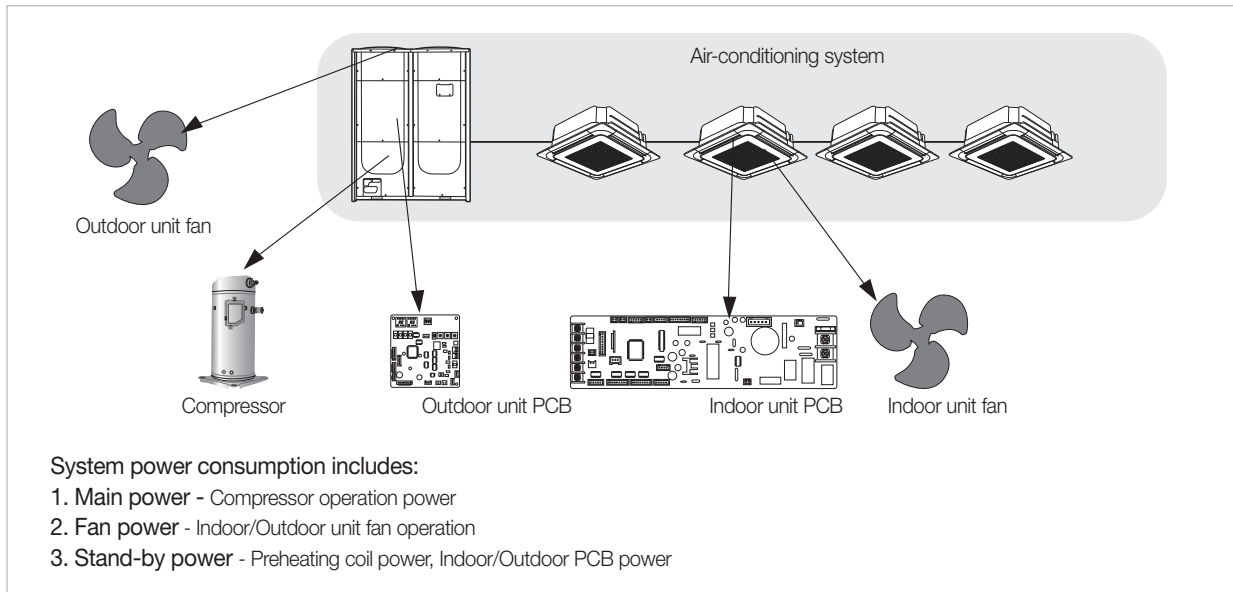
(1) DMS2 power distribution theory

All the system information of power and indoor/outdoor operation is always monitored by the DMS2 for power distribution calculation.

IDU: Indoor unit

Through PIM

Measured power consumption

Operation information
1. Outdoor/Indoor unit operation
2. Indoor unit fan operation
3. Stand-by operation

Through On/Off controllers and interface modules

IDU A   IDU B

IDU C

IDU D

Power distribution result

$$\text{IDU A's electric power consumption} = \text{Total power consumption} \times \frac{\text{Demand capacity of IDU A}}{\text{Total demand capacity of all IDUs}}$$

Here, Demand capacity = Main capacity + Fan capacity + Stand-by capacity

☑ *Note*

♦ Demand capacity means the value that parameters of different units like required power and refrigerant amount are transformed into as a common number to make easy algebraic calculation.

(2) Main capacity

This is determined dynamically with the combination of various refrigerating parameters such as difference between room and set temperature or evaporator input/output temperature.

These parameters, as a result, determine the refrigerant amount flowing into the indoor unit by controlling EEV steps.

(3) Fan capacity

This is constant value for indoor unit models. It differs depending on indoor units of different capacity.

When the indoor unit starts Cooling, Heating, Auto and Fan modes, fan capacity values of the indoor units are always monitored by the DMS2. DMS2 gathers capacity of zero value when they stop operating.

(4) Stand-by capacity

Stand-by capacity is constant for all indoor units regardless of their operations. Since stand-by power is consumed all the time by PCBs and preheating coils in the outdoor unit, whose value is monitored with the same fraction which is relatively small compared to main capacity or fan capacity.

(5) What if the room temperature begins to reach the set temperature?

If the room temperature begins to reach the set temperature, the indoor unit does not have to extract the full refrigerant amount to keep the set condition. Capacity from the indoor unit goes down to indicate the outdoor unit that it does not need refrigerant at the full capacity state.

When the room temperature has reached the set temperature, there is no need to pump the refrigerant into the indoor unit. Indoor unit goes into the thermally OFF state and sends capacity of zero value to the outdoor unit and the DMS2, which results in fan or stand-by power distribution only.

(6) Capacity accumulation and power distribution

DMS2 gathers power consumption and capacity values during one-day.
At midnight, 1-day power consumption is distributed to the indoor units using the gathered information.

During 24 hours,
1. Reads every indoor unit operation
2. Reads watt-hour meter value
3. Accumulates 3 capacity values

1. Calculates consumed power for 1 day.
2. Calculates accumulated capacity values
3. Distributes 1-day power consumption
4. Clears accumulated capacity values
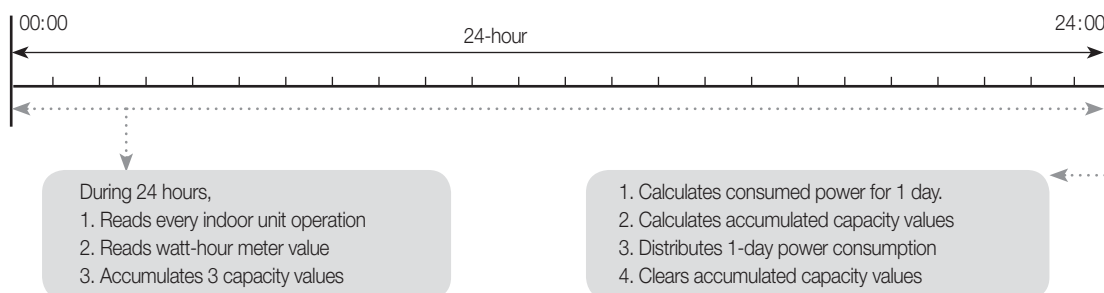
(7) Undesirable situation protection

Even when there occurred communication error between the DMS2 and PIM or DMS2 can no longer gather power consumption, DMS2 stores power distribution ratio for all indoor units. As soon as communication between them resumes and power information is transmitted to the DMS2, power distribution during the interrupted period is recovered as normal condition.

(8) Not equal stand-by power distribution (In case all the indoor units are stopped)

Since there always exists error in each power consumption amount, distributed stand-by power may not be equal for different air-conditioning system. But the difference is so small that it is negligible.

$B = C, D = E$
$B \neq D$
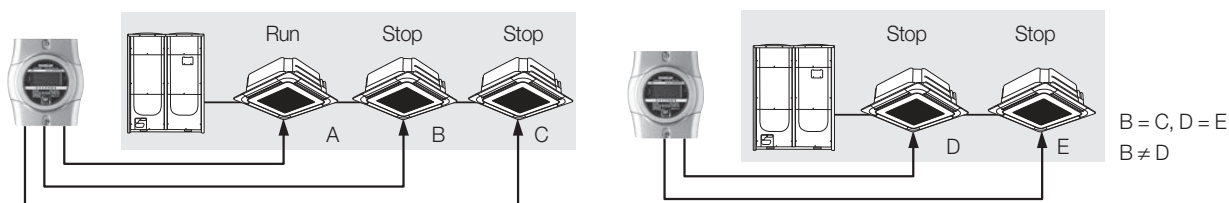
III Integrated management system

1. DMS2

❑ *MIM-D00AN*

6) Function

Power distribution

Power distribution equation
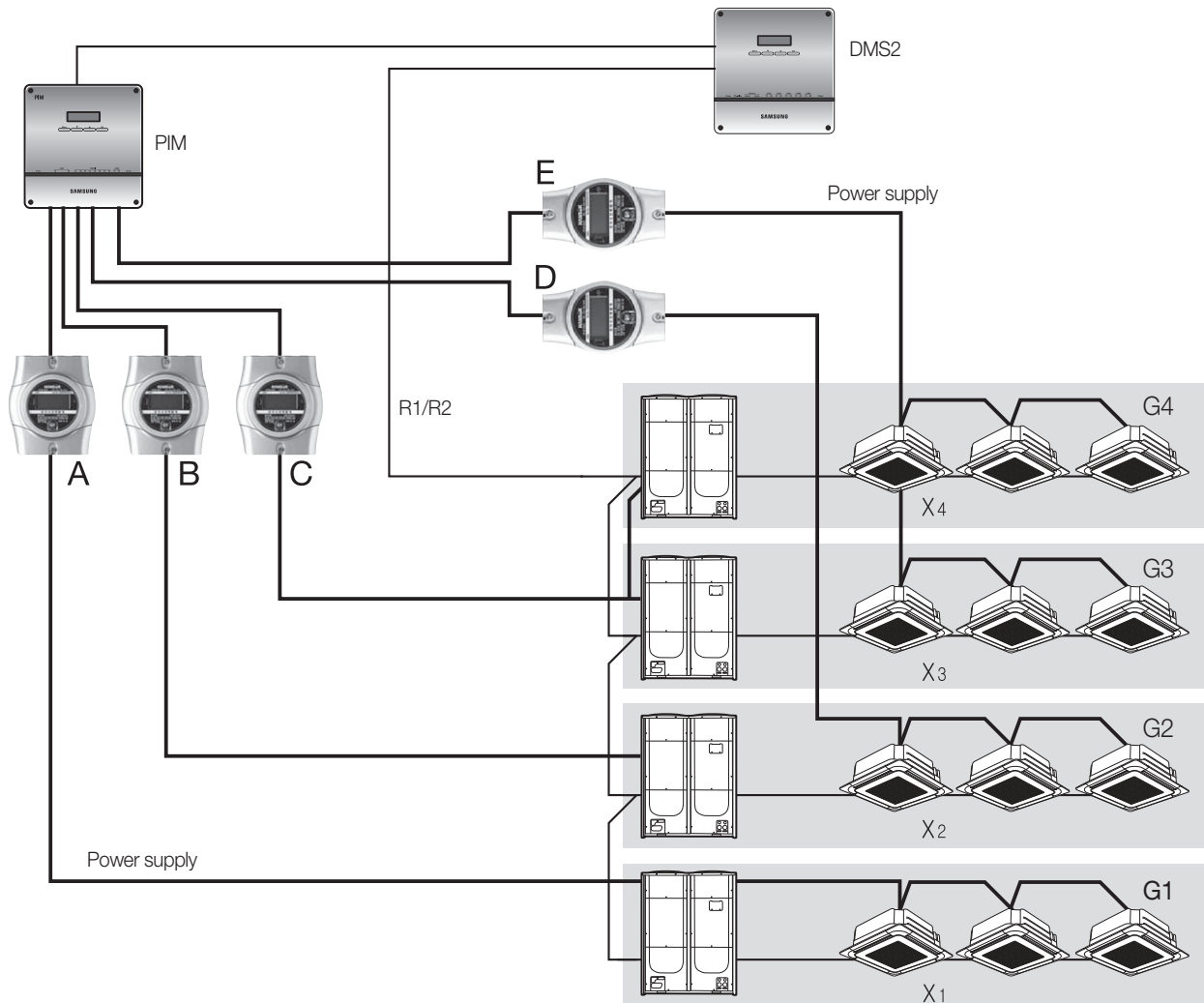
▶ When configuring the DMS2 and the whole system, mapping of watt-hour meters for indoor/outdoor units must be precisely assigned for correct power distribution.

Indoor unit power X in G1 = Watt-hour A x $\dfrac{\text{Main + Fan + Stand-by capacity of indoor unit X}}{\text{Total capacity of G1}}$

Indoor unit power X in G2 = Watt-hour B x $\dfrac{\text{Main + Fan + Stand-by capacity of indoor unit X}}{\text{Total capacity of G2}}$

+ Watt-hour D x $\dfrac{\text{Fan + Stand-by capacity of indoor unit X}}{\text{Total Fan/Stand-by capacity of G2}}$

Indoor unit power X in G3+G4 = Watt-hour C x $\dfrac{\text{Main + Fan + Stand-by capacity of indoor unit X}}{\text{Total capacity of G3 + G4}}$

+ Watt-hour E x $\dfrac{\text{Fan + Stand-by capacity of indoor unit X}}{\text{Total Fan/Stand-by capacity of G3 + G4}}$

Example

Suppose capacity values accumulated at 24:00 during one whole day is as follows.

360kWh consumed
(outdoor + indoor)

Strong cooling

A

Main capacity =105
Fan capacity = 20
Stand-by capacity = 5
Sum = 130

Week cooling

B

Main capacity = 60
Fan capacity = 20
Stand-by capacity = 5
Sum = 85

Fan mode

C

Main capacity = 0
Fan capacity = 20
Stand-by capacity = 5
Sum = 25

Stop

D

Main capacity = 0
Fan capacity = 0
Stand-by capacity = 5
Sum = 5
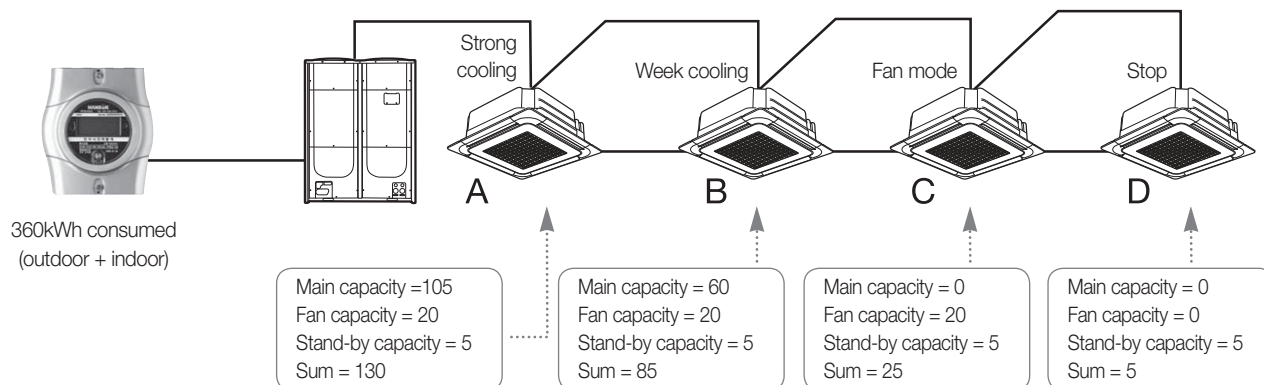
$$\text{Pd of Indoor unit A} = \frac{\text{Indoor unit capacity}}{\text{Total capacity}} \times \text{Total kWh} = \frac{130 \times 360}{130 + 85 + 25 + 5} = 192.020 \text{ kWh}$$

$$\text{Pd of Indoor unit B} = \frac{85 \times 360}{130 + 85 + 25 + 5} = 124.900 \text{ kWh}$$

$$\text{Pd of Indoor unit C} = \frac{25 \times 360}{130 + 85 + 25 + 5} = 36.735 \text{ kWh}$$

$$\text{Pd of Indoor unit D} = \frac{5 \times 360}{130 + 85 + 25 + 5} = 7.347 \text{ kWh}$$

III Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

Power distribution

Installation example (Allowed)
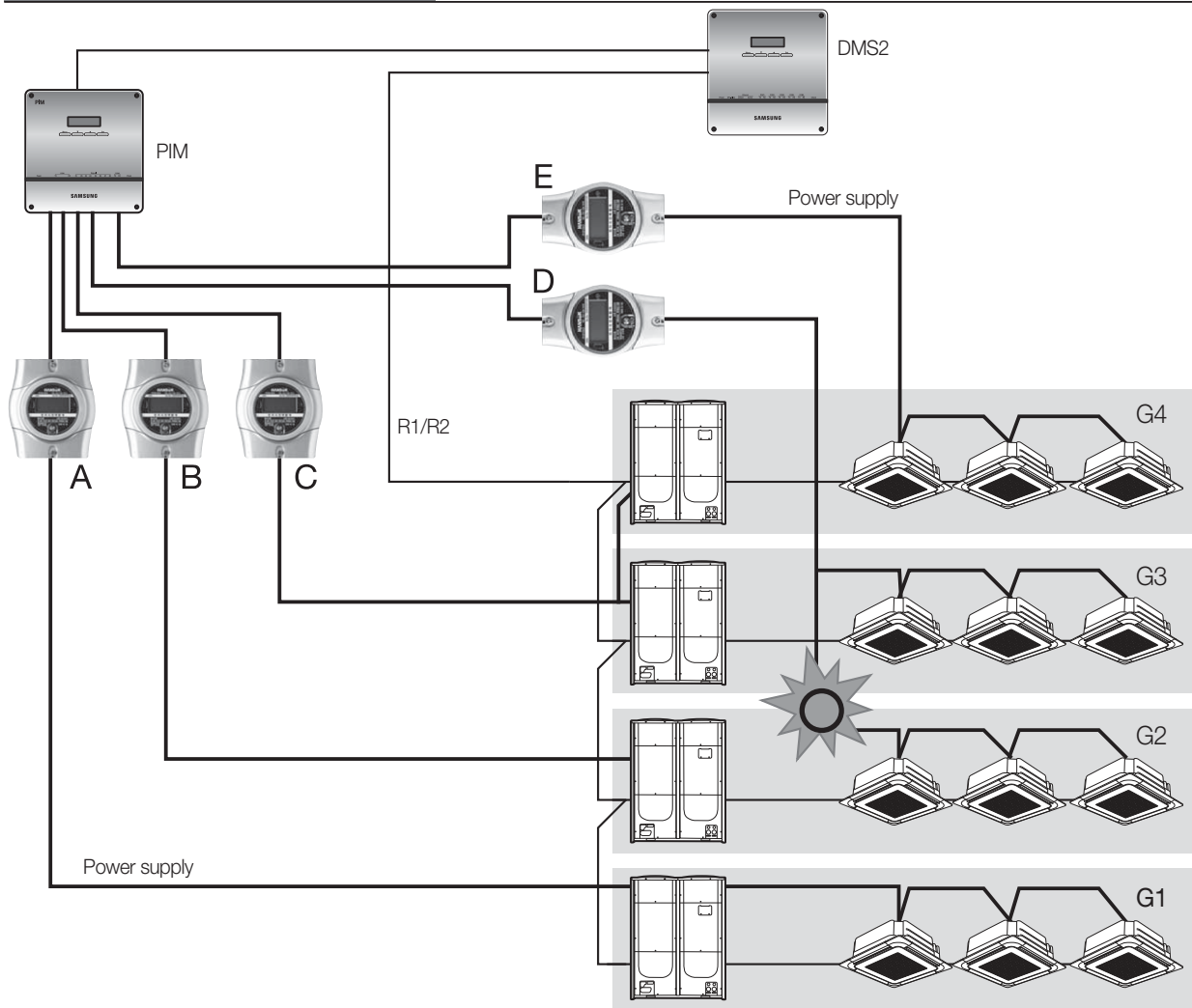
Mapping watt-hour meters to indoor/outdoor units

• Watt-hour meter A is mapped to all indoor/outdoor units in G1.

• Watt-hour meter B is mapped to the outdoor unit in G2.

• Watt-hour meter C is mapped to the outdoor units in G3 and G4.

• Watt-hour meter D is mapped to the indoor units in G2 + G3.

• Watt-hour meter E is mapped to the indoor units in G4.

※ Installation above is allowed with proper mapping configuration.

☑ *Note*

◆ Watt-hour meter can be shared to the multiple indoor/outdoor systems.

Installation example (Not allowed)

DMS2

PIM

E

D

Power supply

R1/R2

A   B   C

G4

G3

G2

Power supply

G1
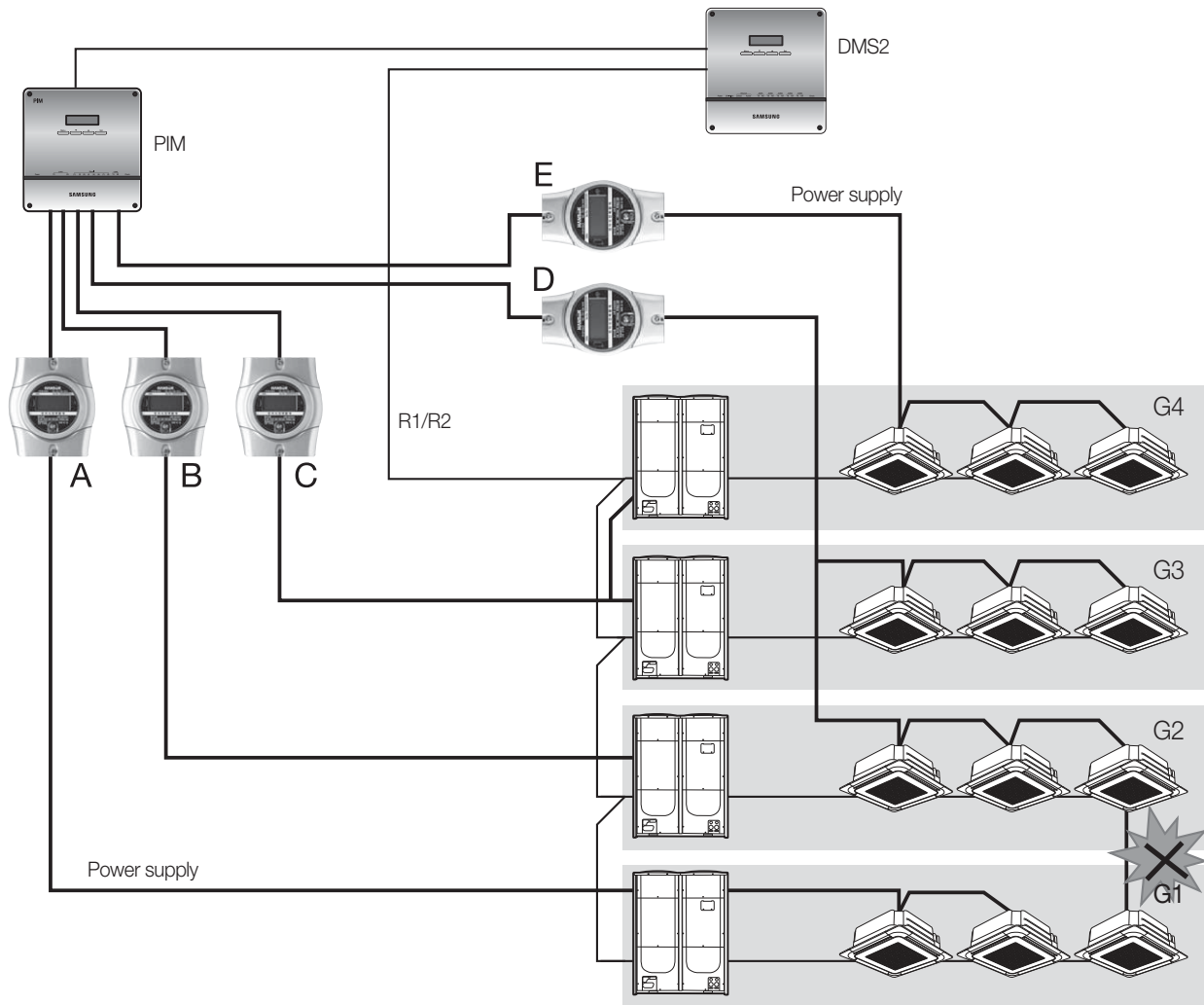
All indoor units in one outdoor unit must have the same power source.

• Installation above cannot be available for the reason that one indoor unit in G1 has different power source from the other indoor units.
In this case, fractional power of D consumed by the separate-powered indoor unit in G1 is distributed to the indoor units in G2 and G3.

Ⅲ Integrated management system

1. DMS2

❑ *MIM-D00AN*

6) Function

■ Power distribution

(10) Setting the inspection section

If you want to check the distribution result by time period, set the time section.
You must use S-NET3 to check the distribution result by time period.

(11) Setting the power distribution environment

This is important task for checking precise energy consumption of the outdoor/indoor unit. Each watt-hour meter connected to outdoor unit must be checked for which channel of the PIM interface module it is connected.
Then PIM channel must be set according to the outdoor unit.

Indoor units must be checked which watt-hour meter it is connected to and then PIM channel of the corresponding watt-hour meter must be set according to indoor unit PIM channel as shown below.

Channel setting by indoor unit								
Indoor unit address	Indoor unit name	Outdoor unit SIM / PIM channel				Indoor unit SIM / PIM channel	Outdoor unit virtual channel	Indoor unit virtual channel
		Channel1	Channel2	Channel3	Channel4			
13.00.00	13.00.00	16.1				16.3		
13.00.01	13.00.01	16.1				16.3		
13.00.02	13.00.02	16.1				16.3		
13.01.00	13.01.00	16.2				16.4		
13.01.01	13.01.01	16.2				16.4		
13.01.02	13.01.02	16.2				16.4		

Example of watt hour meter installation ❶   Installing watt-hour meter to outdoor/ indoor unit

Main circuit breaker

PIM

Address 0

Watt-hour meter A ➡ CH1
Watt-hour meter B ➡ CH2
Watt-hour meter C ➡ CH3
Watt-hour meter D ➡ CH4

A/B

R1/R2

A   B   C   D

1 phase power

0   1   2

F1/F2

Pipe connection

R1/R2

0   1   2

F1/F2

Pipe connection

3 phase power

Channel setting by indoor unit								
Indoor unit address	Indoor unit name	Outdoor unit SIM / PIM channel				Indoor unit SIM / PIM channel	Outdoor unit virtual channel	Indoor unit virtual channel
		Channel1	Channel2	Channel3	Channel4			
13.00.00	13.00.00	16.1				16.3		
13.00.01	13.00.01	16.1				16.3		
13.00.02	13.00.02	16.1				16.3		
13.01.00	13.01.00	16.2				16.4		
13.01.01	13.01.01	16.2				16.4		
13.01.02	13.01.02	16.2				16.4		

※ Connect appropriate watt-hour meter to outdoor/ indoor unit.

III Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

Power distribution

Example of watt hour meter installation ❷	Installing 1 watt-hour meter to all indoor units

Main circuit breaker

PIM

Address 0

Watt-hour meter A ➜ CH1
Watt-hour meter B ➜ CH2
Watt-hour meter C ➜ CH3
Watt-hour meter D ➜ CH4

A/B

R1/R2

R1/R2

1 phase power

0   1   2

F1/F2

Pipe connection

0   1   2

F1/F2

Pipe connection

3 phase power

Channel setting by indoor unit							
Indoor unit address	Indoor unit name	Outdoor unit SIM / PIM channel				Indoor unit SIM / PIM channel	Outdoor unit virtual channel	Indoor unit virtual channel
		Channel1	Channel2	Channel3	Channel4			
13.00.00	13.00.00	16.1				16.3		
13.00.01	13.00.01	16.1				16.3		
13.00.02	13.00.02	16.1				16.3		
13.01.00	13.01.00	16.2				16.3		
13.01.01	13.01.01	16.2				16.3		
13.01.02	13.01.02	16.2				16.3		

Since all indoor units are connected to 1 watt-hour meter, PIM channel address of all indoor units is same.

Example of watt hour meter installation ❸   Using CT watt-hour meter to and outdoor unit

Main circuit breaker

PIM
Address 0

R1/R2

R S T N

5 : 1
5 : 1
5 : 1

CT-type watt-hour meter

3 phase 4 wire voltage

Watt-hour meter A → CH1
Watt-hour meter B → CH2
Watt-hour meter C → CH3
Watt-hour meter D → CH4

R1/R2

A   B   C   D

1 phase power

0   1   2

F1/F2

Pipe connection

0   1   2

F1/F2

R1/R2

Pipe connection

3 phase power

Setting and checking watt-hour meter			Kilowatthour history
SIM / PIM Channel	**Name**	**CT proportion**	**Watt-hour meter value (kWh)**
16.1	16.1	5	100.0
16.2	16.2	5	100.0
16.3	16.3	1	100.0
16.4	16.4	1	100.0
16.5	16.5	1	100.0
16.6	16.6	1	100.0
16.7	16.7	1	100.0
16.8	16.8	1	100.0

[Setting and checking watt-hour meter]
From the menu, CT proportion of the CT watt-hour meter must be entered.

☑ *Note*

• After entering CT proportion of the CT watt-hour meter, watt-hour meter must be set to correct outdoor/indoor units from the [Channel setting by indoor unit] window.

III Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

■ Power distribution

Checking the watt-hour meter connection

Kilowatthour history of the watt-hour meter, connected to each PIM interface module, can be checked.
Maximum 365 days worth of Kilowatthour history can be checked.

Setting and checking watt-hour meter			Kilowatthour history
SIM / PIM Channel	Name	CT proportion	Watt-hour meter value (kWh)
16.1	16.1	5	100.0
16.2	16.2	5	100.0
16.3	16.3	1	100.0
16.4	16.4	1	100.0
16.5	16.5	1	100.0
16.6	16.6	1	100.0
16.7	16.7	1	100.0
16.8	16.8	1	100.0

SIM / PIM Address 16   Kilowatthour setting & inquiry
2011 1 15 ~ 2011 1 18   Check

Date	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8
2011-01-15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011-01-16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011-01-17	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2011-01-18	1940.9	240.4	3199.7	299.9	0.0	0.0	0.0	0.0

Setting virtual watt-hour meter

When watt-hour meter or PIM interface module is not installed to a watt-hour meter channel, virtual channel can be used to manually distribute the power distribution

Setting and checking virtual channel

Virtual Channel	Name
24.1	24.1
24.2	24.2
24.3	24.3
24.4	24.4
24.5	24.5
31.11	31.11
31.12	31.12
31.13	31.13
31.14	31.14
31.15	31.15
31.16	31.16

[Edit] [Save]

- Maximum 128 virtual channel can be used.
- Address of the virtual channel will be displayed as following.
  (24~31).(1~16)

Channel setting by indoor unit

Indoor unit address	Indoor unit name	Outdoor unit SIM / PIM channel				Indoor unit SIM / PIM channel	Outdoor unit virtual channel	Indoor unit virtual channel
		Channel1	Channel2	Channel3	Channel4			
13.00.00	13.00.00						24.1	24.3
13.00.01	13.00.01						24.1	24.3
13.00.02	13.00.02						24.1	24.3
13.01.00	13.01.00						24.2	24.4
13.01.01	13.01.01						24.2	24.4
13.01.02	13.01.02						24.2	24.4

☑ *Note*

- When PIM interface module is not installed, PIM channel of the outdoor/indoor unit will be inactive.

Ⅲ Integrated management system

1. DMS2

❑ *MIM-D00AN*

6) Function

Power distribution

Caution

Power distribution function is only supported to air conditioners and AHU. ERV is not supported.

Only applies to indoor unit

User authorization management

- • **Admin (Administrator) :** Can access all menus, accessible menu cannot be changed
- • **Manager :** Default setting – Can access all menus, accessible menu can be changed.
- • **Regular user :** Default setting – Can access [Control and monitoring] menu only.

Editing user authorization

- • Accessible menu authorization of manager is editable.
  Select/deselect the checkbox of the function and save the setting to change the authorization.

Ⅲ Integrated management system

1. DMS2

❑ *MIM-D00AN*

6) Function

U ser management

▶ You can add or delete the user who access DMS2 through web.

▶ Authorization of the added user can be set from [Admin], [Manager], [Regular user].

Zone management

• Zone edit: User can arrange the indoor units for convenient management.

• Setting the user authorization: Can restrict accessible indoor units depending on the user ID.
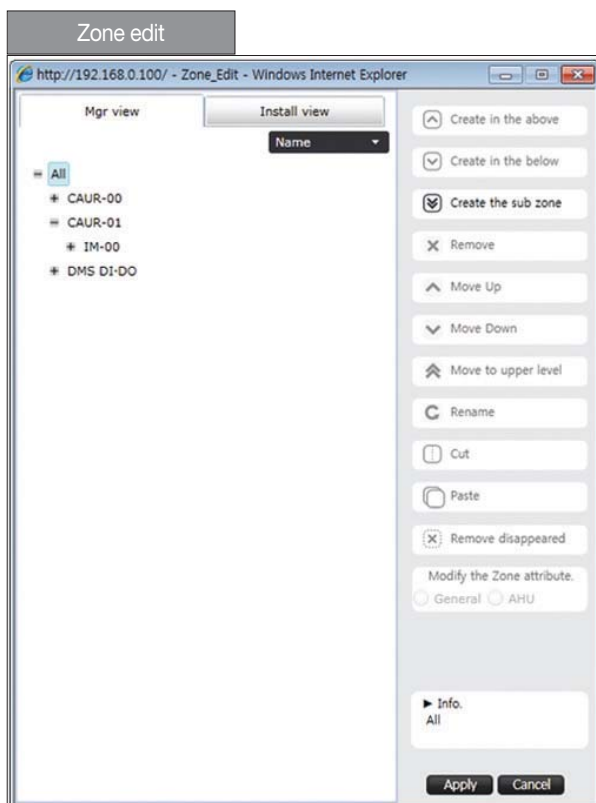
Zone edit

Initial setting
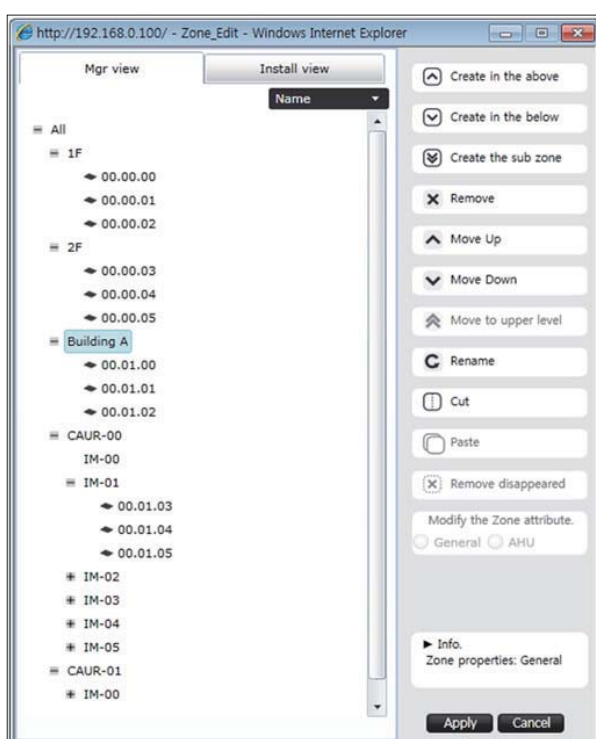
Zone edit :
▪ Add, delete zone
▪ Change name
▪ Move indoor unit

III Integrated management system

1. DMS2

❏ *MIM-D00AN*

6) Function

Setting the user authorization

Zone Setting & Edit

▶ Authorization to control and monitor a zone of indoor units can be assigned according to User ID

❶ Select the zone and select a user ID who can access the zone.
  • Access authorization can be set by zone.

❷ After setting, click [Save] to complete the authorization setting.

▶ User access authorization applies to all indoor units of the zone in same manager.

2. S-NET3

❏ *MST-P3P*

1) Features
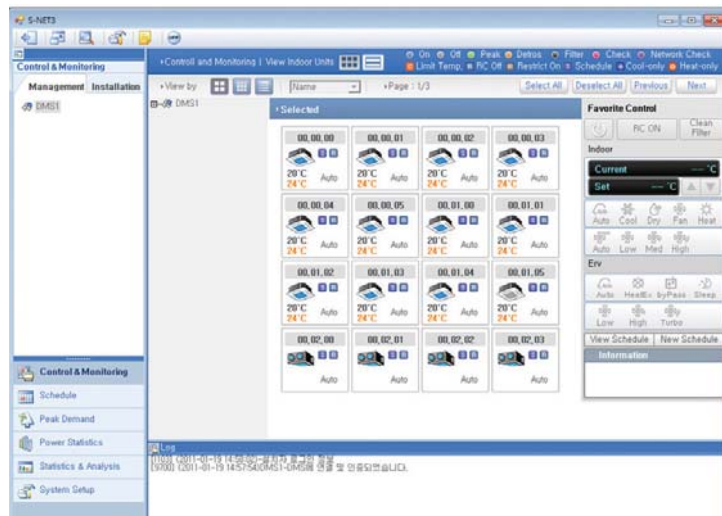
PC program designed to manage system air conditioners in a large site.

- Max. 16 DMS2 connection
- Max. 4,096 indoor unit controlling and monitoring
- Integrated management of indoor units, ventilators and AHU
- Manages operation and error history
- Check indoor/outdoor unit cycle data
- Integrated management of peak control in single program

2) PC specifications

Item	Model	Details
PC	CPU	Pentium 4 or above
	Memory	More than 512MB
	HDD	More than 1Gbyte space available
	Network	10/100M
OS	-	Windows NT, Windows 2000, Windows XP, Windows VISTA, Windows 7

☑ *Note*

Model	MST-P3P
Number of connection	Max. 16 DMSs

3) System connection
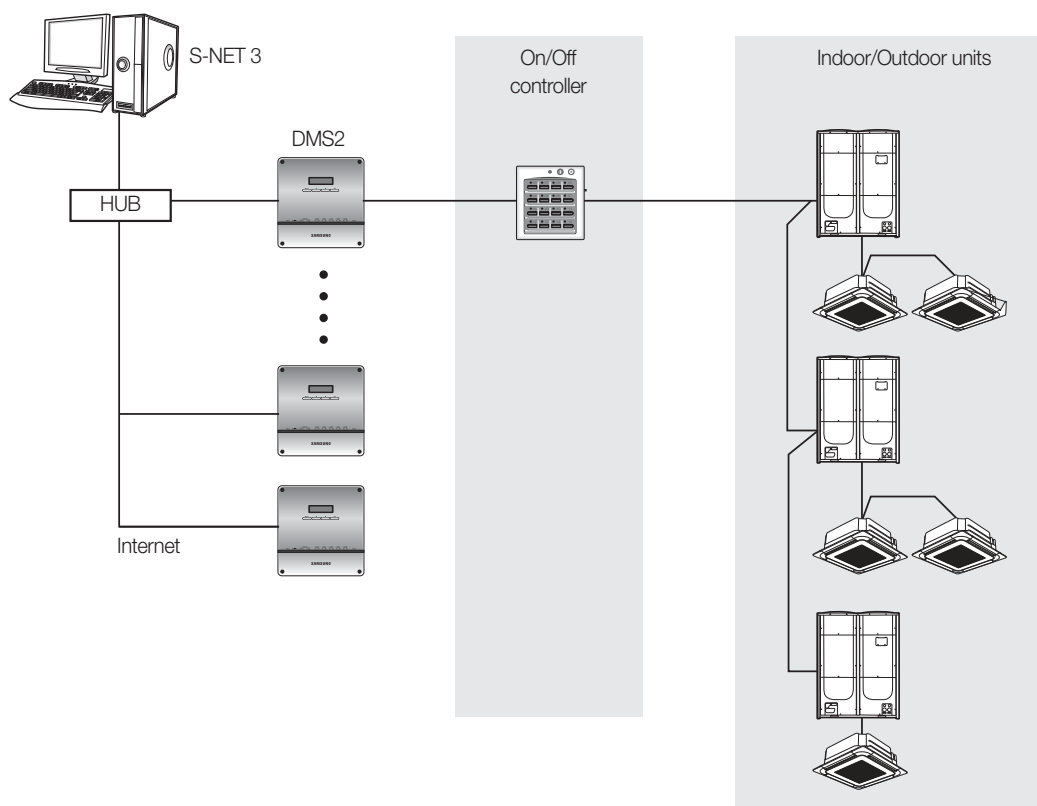
III Integrated management system

2. S-NET3

❏ *MST-P3P*

4) Function

(1) S-NET3 function description

Control & Monitoring	View the management structure	Control and monitor the indoor units (max. 4,096 units).
	View the installation structure	Check and refer the state of various devices such as indoor/outdoor units, On/Off controller, and I/M.
	Indoor unit/ERV control	Set the operation mode, temperature, fan speed, and fan Control & Monitoring direction of indoor unit/ERV.
	Indoor unit/ERV monitoring	Monitor the status of indoor unit/ERV.
	View outdoor unit	Check the outdoor unit's cycle data and the cycle data of the linked indoor units.
	View DMS2	Check the status data of the control unit linked to DMS2.
Schedule	Create new schedule	Set new schedule.
	View schedule	Check the schedule of the selected indoor unit.
	Start/Stop schedule	Start/Stop schedule application.
	Store/Call schedule	Store/Call a prepared schedule.
	View daily schedule	Confirm each schedule by date.
	Set common exception date	Set the date which schedule operation is not applied on.
Usage time and power	Usage time and power	Check the usage time and power for total, group, and individual indoor units.
	Power consumption report	For preparing the report on the power consumption by each indoor unit for the period set.
	Power distribution management group edition	Edit an indoor unit's power management structure
	Set the electricity rate section	Set up to 3 sections for electricity billing management.
Statistics and analysis	Indoor unit status	Check the status of indoor unit operation / temperature setting per period.
	Usage time and power	Check the usage time and power for total, group, and individual indoor units.
	Indoor unit usage	The usage ratio of all indoor units for a specific period.
System management	Set environment	Set the environment related to S-NET3 (password, language, temperature unit).
	Set DMS2	Set the DMS2 to connect with S-NET3.
	Refer event log	Refer the warning, error, data of indoor units.
	Renew installed device information	Modify S-NET3 data if installation data has been changed.
	DMS2 backup/restore	Backup the data of DMS2 connected to S-NET3.
	S-NET3 backup/restore	Backup the data of S-NET3.

(2) User functions

Manage a range of functions accessible to different types of users such as regular user, administrator and installer.

	User	Administrator	Installer
View the total indoor unit	O	O	O
Structure editing	X	O	O
The list of installed devices	X	O	O
Whole indoor unit stop	O	O	O
Indoor unit/ERV control/Monitoring	O	O	O
View the management structure	O	O	O
View the installation structure	X	O	O
View outdoor units, DMS2	X	O	O
Schedule	X	O	O
Indoor unit operation setting	X	X	O
Usage time and power	X	O	O
Power consumption report	X	O	O
Power distribution management group edit	X	O	O
Power distribution section setting	X	X	O
Statistics/Analysis	X	O	O
S-NET3 setting	X	O	O
DMS2 setting	X	X	O
Event log reference	X	O	O
Tracking	X	X	O
DMS2 restoration	X	X	O
DMS2 backup	X	O	O
S-NET3 restoration/backup	X	O	O

5) Detail function description

(1) S-NET3 display

Log-in
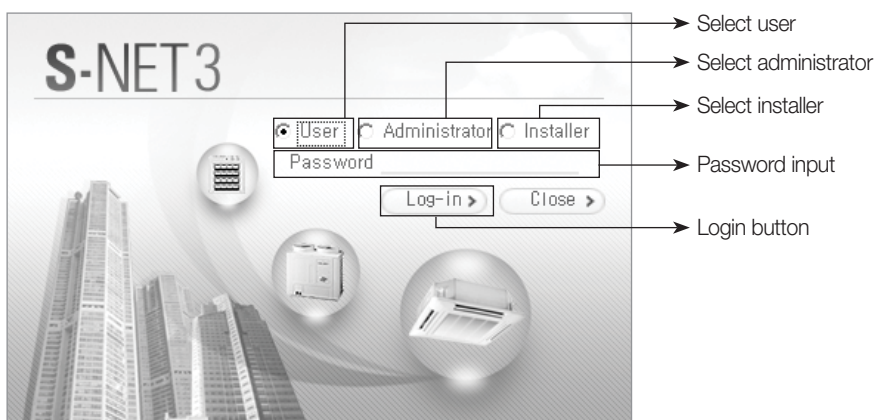
➤ Select user
➤ Select administrator
➤ Select installer
➤ Password input
➤ Login button

III Integrated management system

2. S-NET3

❑ *MST-P3P*

5) Detail function description

(1) S-NET3 display

Control and monitoring

Management structure
monitoring window

Control monitoring window

Management
structure/Installation
structure display
window

Move to Indoor
unit control
window

Indoor unit
control

ERV control

Main menu
window

Log/error display
window
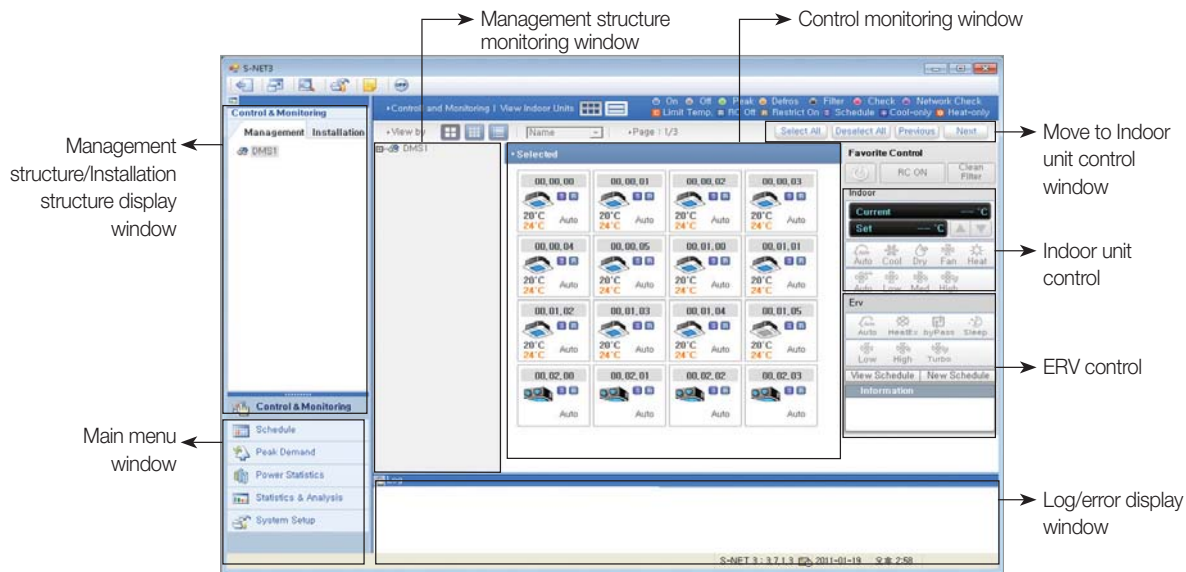
Installation structure window

Select the installation structure tab then select DMS2 connected to S-NET3; it is possible to see the program version, status of the selected DMS2, the program version and communication status of On/Off controller.

If indoor or outdoor unit is selected at the installation structure, it is possible to check the hardware information of the selected device.
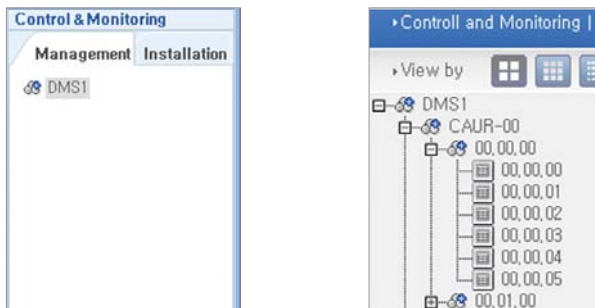
Selecting management structure

Selecting installation structure

▶ When DMS2 & On/Off controller are selected.
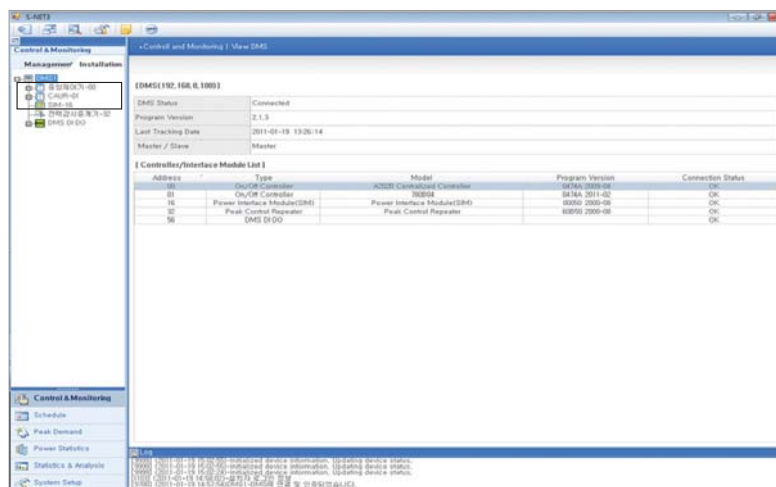
• DMS2 status, DMS2 program version, last tracking date and Master/Slave setting state.

• Displays model name, software version, communication state of centralized controller, PIM.

▶ When outdoor unit is selected

Comp 1	Start	Comp 2	Start	Comp 3	Start
Defrost status information	--	Suction temperature	20℃	Operation Status	On standby
Oil temperature	10℃	Low pressure data	3kgf/㎠	Operation Mode	On standby
Condenser temperature	0℃	High pressure data	17kgf/㎠	Discharge temperature	22℃
Oil balancing	--	Oil recovering	--	Operation Status (start-up)	-
Condenser outlet temperature	33℃	Outdoor temperature	25℃	Error	
Outdoor main expansion valve step	300 STEP	Sum of operating IDU capacity	0.5 kW	Rate of operating IDU capacity (Heating)	0.00%
Outdoor Model	DVM+3 or 4 HeatPump	Outdoor Version		Double tube temperature	30℃
I/M Model	B13B Interface Module	I/M Version	0676B 2009-03	Outdoor Fan Step	30STEP
Discharge-2 temperature	22℃	Discharge-3 temperature	22℃	Outdoor Option Data	10HP
Running currents (Comp. 1)	10A	Running currents (Comp. 2)	10A	Running currents (Comp. 3)	10A
Main cooling valve	On	EVI bypass valve	On	4way valve	On
Hot gas valve	On	Liquid bypass valve	On	Loading time	5Sec
EVI EEV (Liquid EEV)	300STEP	HR EEV(Gas Liquid EEV)	300STEP	Accumulator CCH	On
Crank case heater 1	On	Crank case heater 2	On	Crank case heater 3	On

Temperature:℃ Pressure:kgf/㎠
(DMS : DMS1-00.00 - Master)

[Outdoor]

• Outdoor unit cycle data, outdoor unit model, interface module model and interface module program version is displayed.

▶ When indoor unit is selected

• Indoor unit operation status, indoor unit cycle data and indoor unit model code is displayed.

III Integrated management system
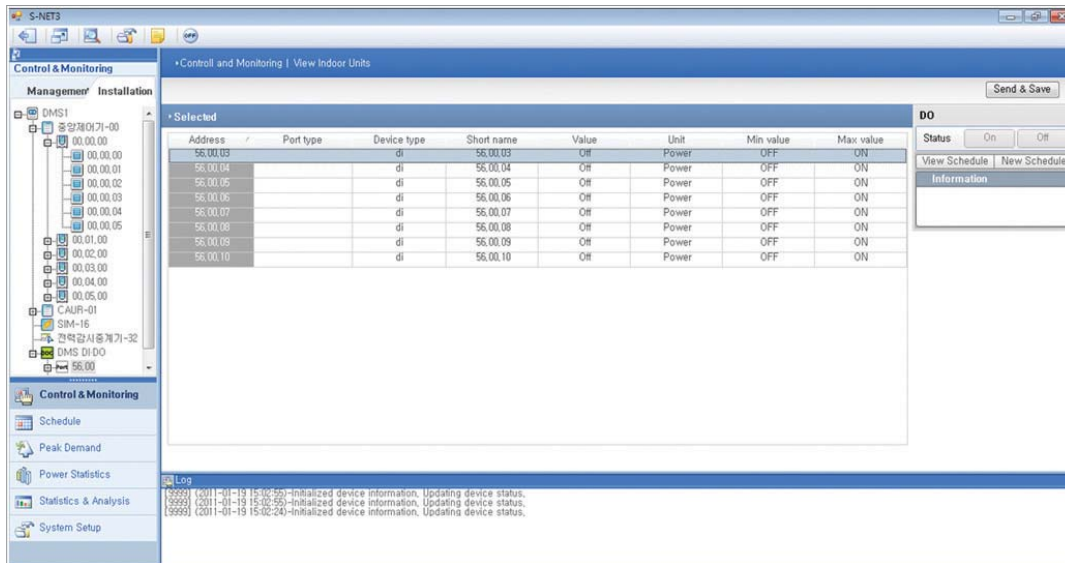
2. S-NET3

❏ *MST-P3P*

5) Detail function description

(1) S-NET3 display
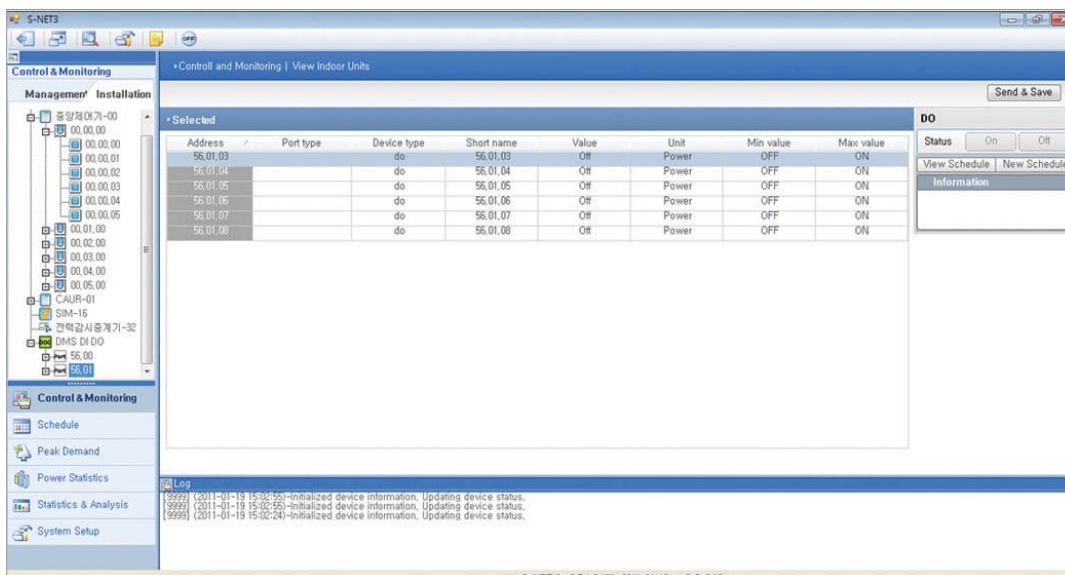
Installation structure window

▶ When DI is selected

▶ When DO is selected

Control

- Control indoor unit/ERV through the control window that appears on the screen.
- Control total indoor units, the operation mode of indoor units, multiple selection, temperature, fan speed, and fan direction.
- Set Upper/Lower temperature limit so that temperature cannot be set outside of the limited temperature range.
- Enable/disable remote control usage.
- Check the schedule of the selected indoor unit.

▶ Deselect device

▶ Selecting indoor unit and ERV together
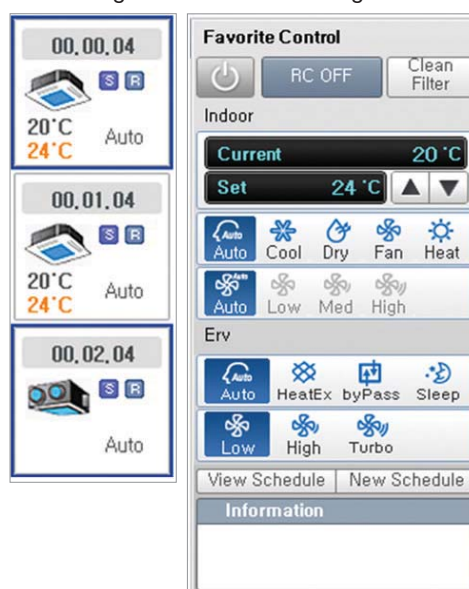
▶ Selecting indoor unit

▶ Selecting ERV
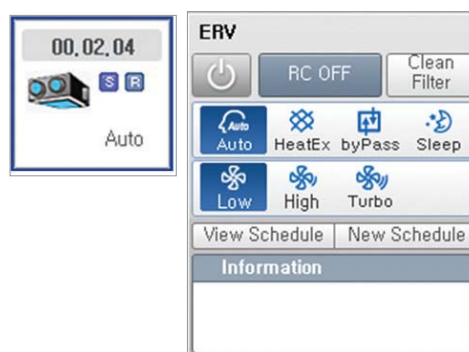
III Integrated management system

2. S-NET3

❏ *MST-P3P*

5) Detail function description

(1) S-NET3 display

Schedule control

❶ Schedule setting
  • Able to set a schedule to control indoor units and ERVs. (creating, modifying, deleting).
  • Able to set weekly, daily, one day schedule.
  • Able to control the operation mode, temperature setting, fan speed, fan direction during the schedule control.

Schedule list window

Schedule display window
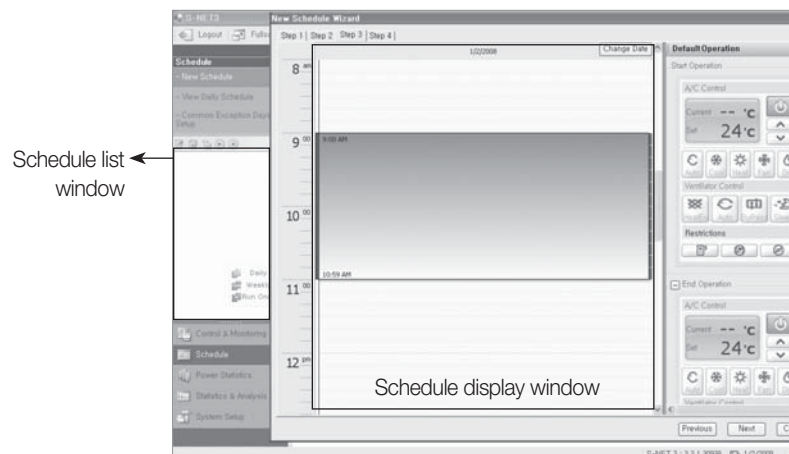
※ Easy schedule control for user with the wizard method (step-by-step setting).

▶ The 1st step (select a schedule mode)

One day only	Repeat daily	Repeat weekly
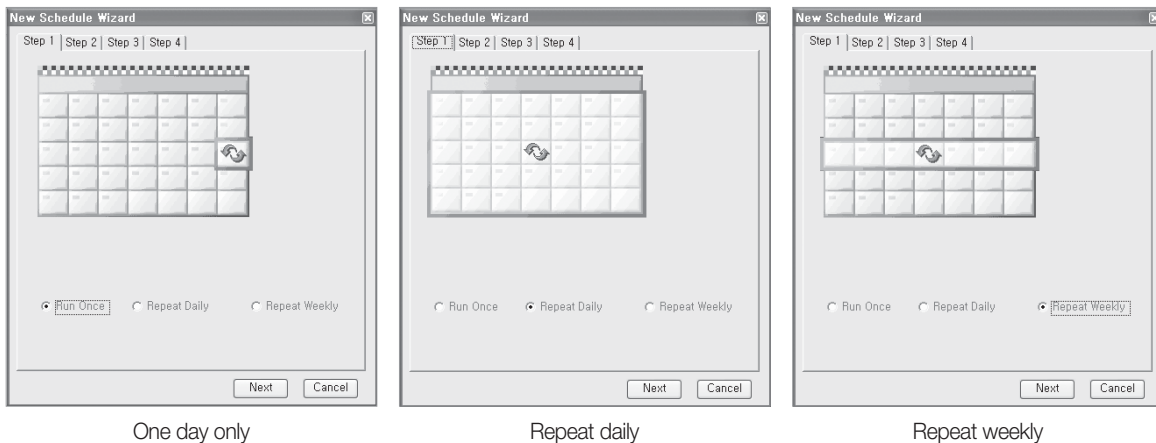
▶ The 2nd step (select the indoor units to apply a schedule to)
  • Display the total indoor units in S-NET3.
  • Able to select individual indoor units, On/Off controller, DMS2.
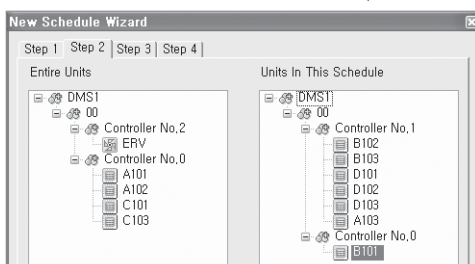
Schedule control

▶ The 3rd step (schedule operation setting)

 • Set up time by dragging on the time table.
 • Set the schedule with the control panel on the right. (Operation mode. temperature setting, fan speed, fan direction and remote control use).
 • Click the schedule time setup window to display a schedule modification window (able to modify a schedule time, operation mode and temperature setting).

Control panel

Time modification
(based on minutes)

Temperature setting

Operation mode

Remote control use

Click twice

Time setting by dragging
(based on 30-min. unit)

Schedule modification panel
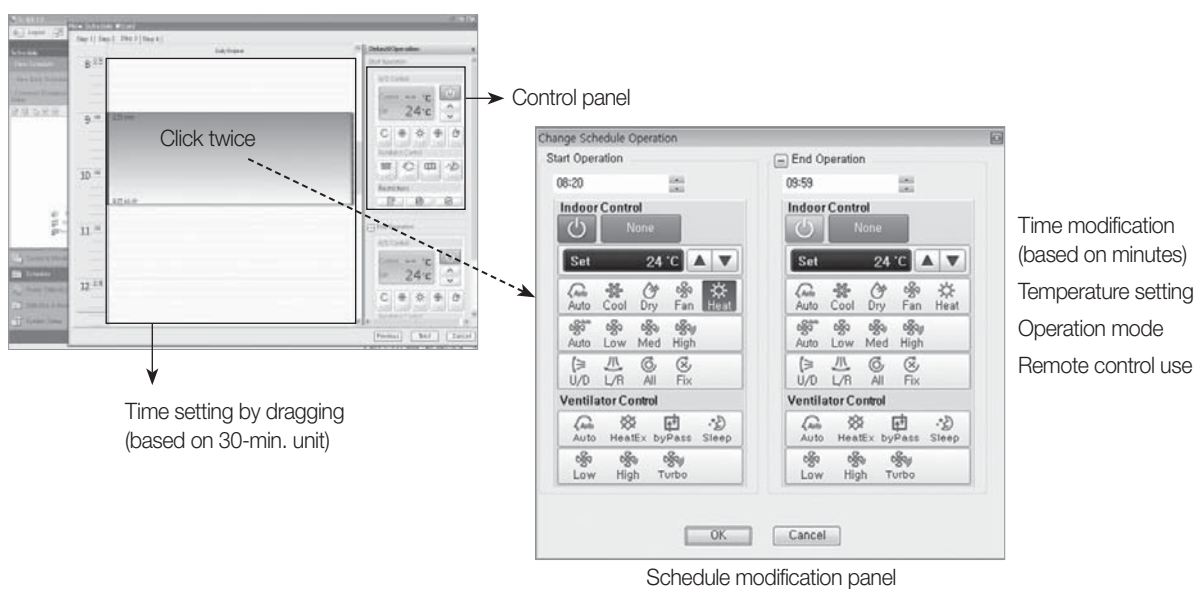
▶ The 4th step (Schedule period and exception date setting)

 • Click the date on the calendar to set the date (once selected, the designated date is displayed in red).

Schedule name

Schedule period setting

Schedule exception
date setting
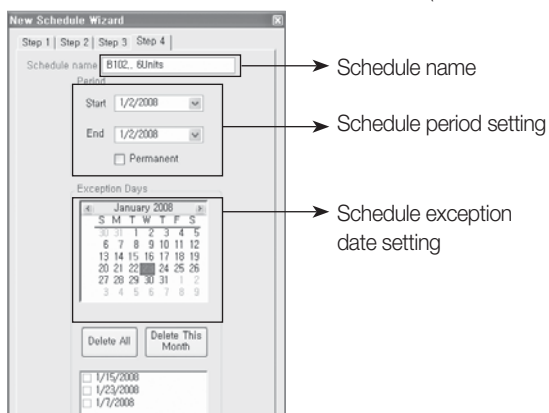
▶ Schedule setting completion

 • Displays a schedule list to be automatically
   applied to the schedule

Display the name of
set schedule.

Display set schedule

Ⅲ Integrated management system

2. S-NET3

❑ *MST-P3P*

5) Detail function description

(1) S-NET3 display

Schedule control

❷ Schedule modification

- Click the set schedule display window twice to display the modification panel.
  Then it is possible to modify various functions such as schedule time, operation mode and temperature setting.
- Able to carry out various functions such as a schedule name change, schedule delete, indoor unit addition and deletion with the icons on the left menu window.

➤ Add/ Delete indoor unit for schedule control.

➤ Delete a set schedule.

➤ Modify a schedule name.

Usage time and power consumption

❶ Usage time and power

- Able to search for the power consumption and usage time by different conditions including the total indoor units applied to S-NET3, On/Off controller, individual indoor unit.On/Off controller, individual indoor unit.
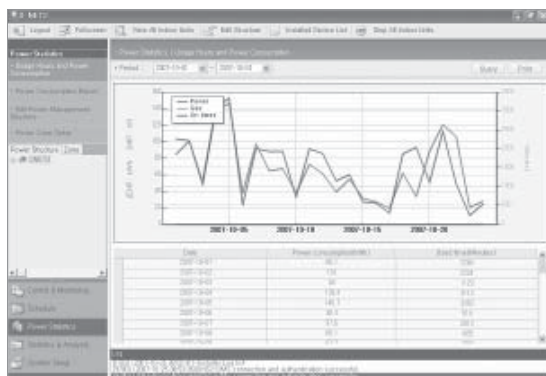
Total indoor unit usage reference
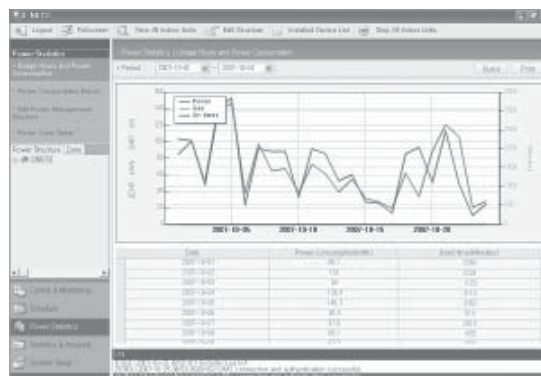
Individual indoor unit usage reference

❷ Power consumption report

- Able to print out the amount of power consumed for a specific period of time in the form of report.
- The applicable formats include PDF, TXT, HTML, CSV, MHT, EXCEL, graphic documents.
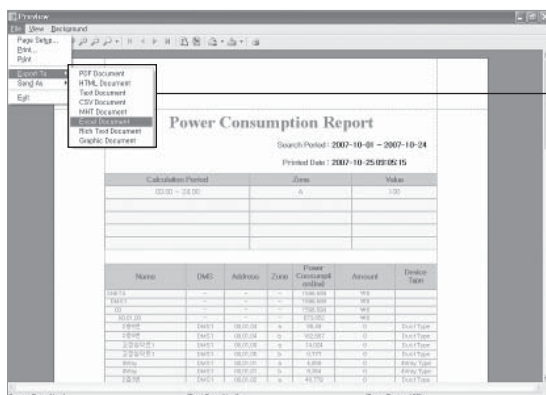
➤ Types of document to be stored

Usage time and power consumption

❸ Power management structure editing
- Just as the structural editing at the monitoring, power management can be restructured to ensure greater convenience for administrators.
- Once the power management structure is edited, power consumption report and usage can be referred in the edited formats.

 → Power structure editing menu

→ Power structure editing window
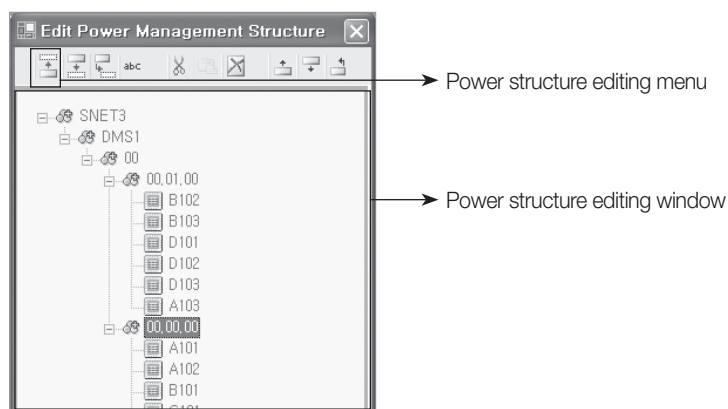
❹ Power section setting
- It can be referred and divided into max. 3 sections for power consumption reference.
- It is possible to refer or prepare reports for usage time and power consumption by dividing section by each hour.

	00 01 02 03 04 05 06 07	08 09 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24
	A	B	A
Start Date	0	8	16
End Date	8	16	24
Weight	100	100	100

Able to adjust the sections by inputting relevant time.

Ⅲ Integrated management system

2. S-NET3

❏ *MST-P3P*

5) Detail function description

(1) S-NET3 display

Statistics and analysis

❶ Indoor unit status
  • Able to see the operation status of selected indoor units and room temperature for the present and the past.
  • Able to refer to the operation status for the last two days. If the reference day is out of range, an error message window will appear.

Select indoor unit

Hourly indoor unit operation and temperature display

Display errors if the wrong period has been set
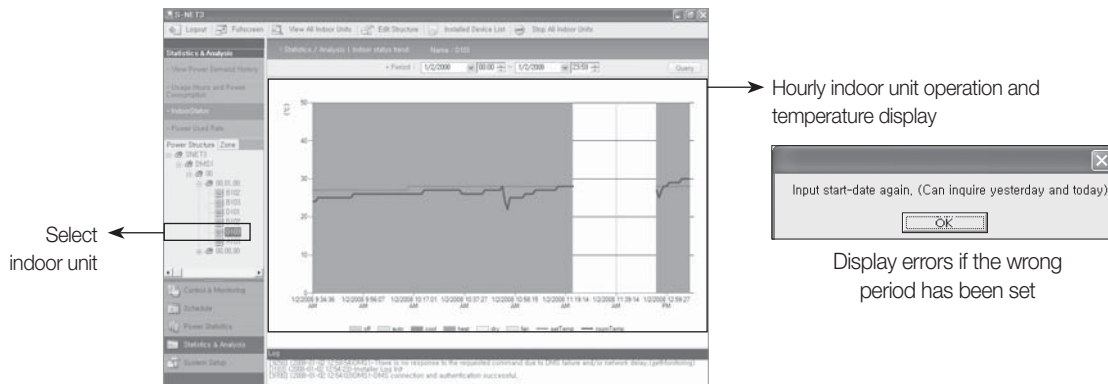
❷ Power consumption of indoor units
  • Displays the use time and power consumption ratios for the indoor units connected to each DMS2.

DMS2 selection

Period reference
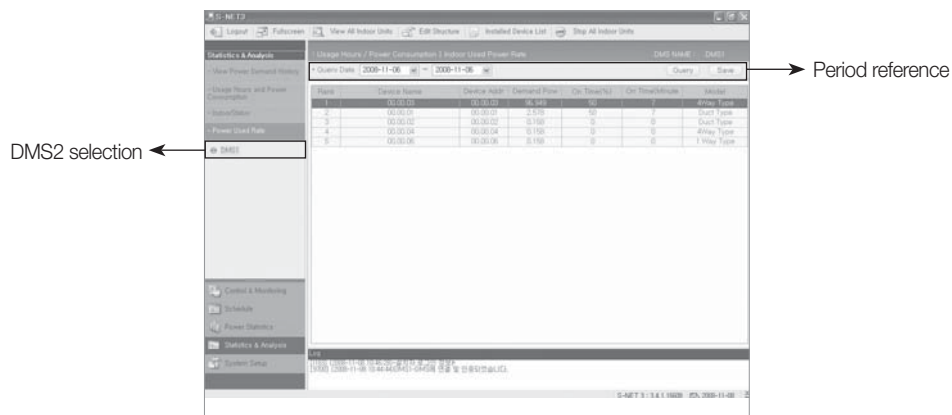
System management

❶ Environment setting

- Set the environment of S-NET3.
- Set administrator password, language, temperature unit, default value for indoor unit, etc.
- Determine if peak power will be displayed or not in the menu setting (Korean market only).
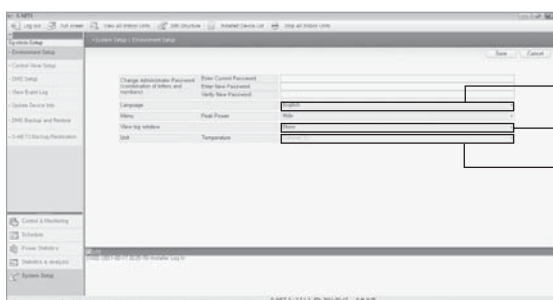
→ Language setting

→ Log date view setting

→ Temperature unit setting : It is set automatically
depending on indoor unit.

❷ DMS2 setting

- Set the DMS2 to connect with S-NET3.
- Click 'save' after inputting IP and passwords (1) and it will attempt to make communication with S-NET3 and DMS2 then display normal when communication is made.

→ DMS2 setup window

When a DMS2 to connect with
S-NET3 is added

DMS2 time setting

Password input

DMS2's access IP input
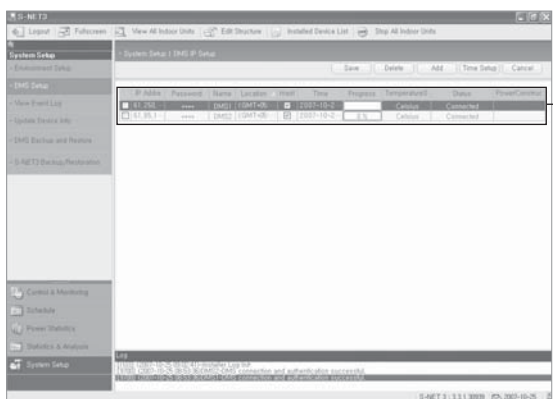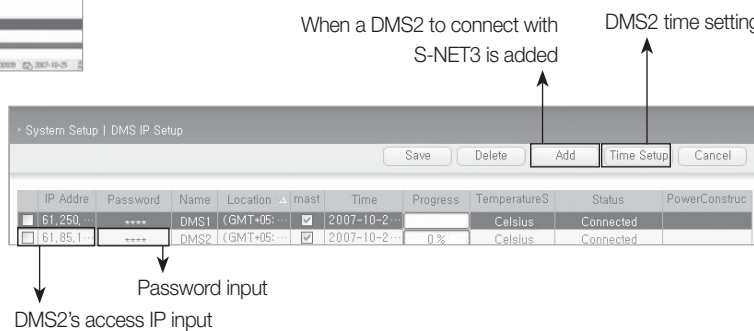
☑ *Note*

- DMS2 has two passwords. One is a password needed to connect to a DMS2 web client (set at the user management), the other is necessary to make access to S-NET3 (set at the system environment).
- When the wrong password for S-NET3 is input, a message indicating DMS2 – account recognition failure appears.

Ⅲ Integrated management system

2. S-NET3

❑ *MST-P3P*
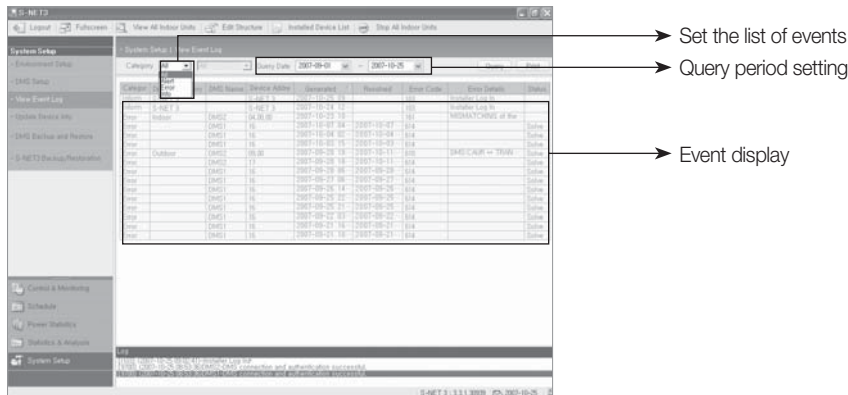
5) Detail function description

(1) S-NET3 display

System management

❸ View event log
- Able to check various information such as indoor/outdoor units connected to S-NET3, control device error/warning, information details by date.
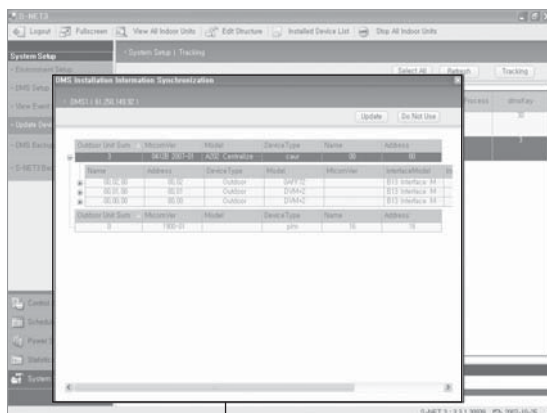
➤ Set the list of events
➤ Query period setting
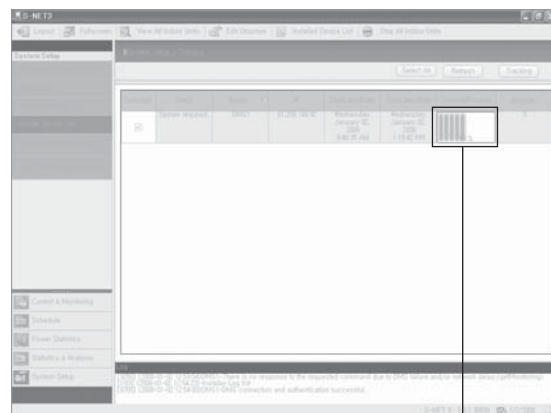
➤ Event display

❹ Information update of the installed device
- Able to carry out information update or tracking for the installed device.
- Tracking involves receiving data from DMS2 after tracking it so as to renew data, whereas data renewal involves correcting data from DMS2 after receiving data without DMS2 tracking.

List of control devices connected to DMS2

Tracking is under way

❺ DMS2 backup and restoration

- Able to backup and restore the DMS2 data connected to S-NET3.
- Backup refers to activities of storing data in the data folder in PC.

➤ Select all DMS2s

➤ Backup

➤ Restoration

➤ Indicate a backup file including the directory path

➤ Indicate a backup date

❻ S-NET3 backup and restoration

- Able to backup and restore data of S-NET3.
- Backup involves in backing up all data in S-NET3. Thus, if backup data is restored in a PC where S-NET3 is installed, it will produce the same environment that is previously used.

III Integrated management system

2. S-NET3

❑ *MST-P3P*

5) Detail function description

(2) S-NET3 log information

Log	Contents
E9000	Connection impossible
E9001	Connection denied
E9002	Connection finished
E9010	WINK denied
E9011	DMS2 password authentication failure
E9012	Serial exchange failure
E9100	General error on instruction transmission
E9150	Attempt to transmit to a DMS2 not in connection
E9151	Attempt to transmit to a DMS2 not registered
E9200	General error on response acceptance
E9250	There is no response to the requested command due to DMS2 failure and/or network delay
E9300	XML generating
E9400	XML parsing
E9401	Installation information on S-NET3 and DMS2 does not match, check tracking information
E9999	Initialized device information updating device status
I101	Common user log in
I102	Administrator user log in
I103	Installer log in
I104	Log in
I105	Log out
I201	Tracking
I202	Request to tracking
I301	Request to schedule change
I801	Insert DMS2
I802	Delete DMS2
I803	DMS2 time setting
I9700	DMS2 connection and authorization successful
I9701	Reconnection
I9801	Emergency stop

IV. Power distribution system

Ⅳ Power distribution system

1. Electricity meter interface module

❏ *MIM-B16*

1) Features
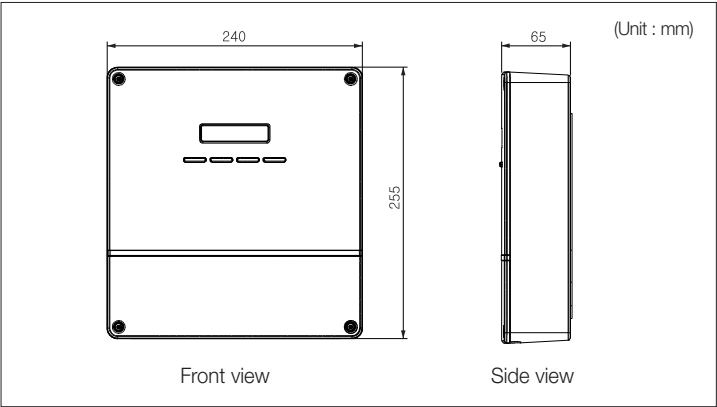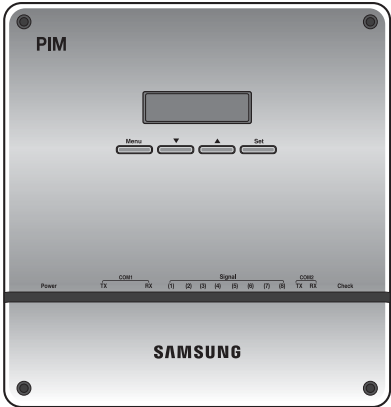
- Pulse output electricity meter interface unit (max. 8 meters)
- 8-channel energy consumption display in real time
- System configuration with button manipulation
- Various text messages in LCD
- Current communication state indication

Front view　　　　　Side view

(Unit : mm)

Power supply (adapter)	Input : 100~240V AC, 50/60Hz, 1.0A Output : 12V DC, 3.0A
Operating temperature range	-10℃ ~ 50℃
Operating humidity range	10%RH~90%RH
Maximum wiring length	DMS2 : 1000m Electricity meter : 200m
Number of interfaces	Electricity meter : max. 8 units DMS2 : 1 unit

2) Display and buttons
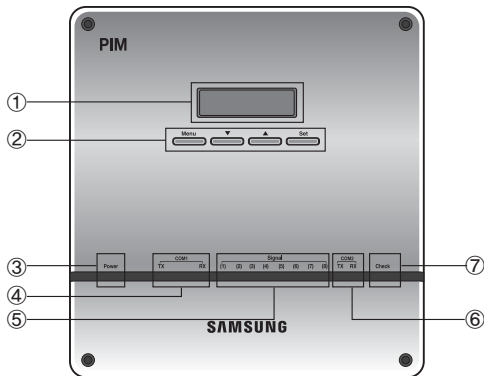
No.	Name	Description
①	LCD window	Information on current electricity readings, settings and operation state is displayed (16 character x 2 line LCD).
②	Menu button	Various menus are selected to monitor current electricity readings, to make configuration settings for electricity meters, and to check the error/settings.
③	Power (blue)	It's ON when power is supplied normally.
④	Communication (orange)	It blinks when communication between DMS2 and MIM-B16 normally works.
⑤	Pulse input (orange)	Each of the 8 LEDs blinks whenever a pulse from an electricity meter is detected.
⑥	Communication (orange)	Reserved
⑦	Check	It's ON when errors occur in communication or pulse input from electricity meters.

3) Connectors
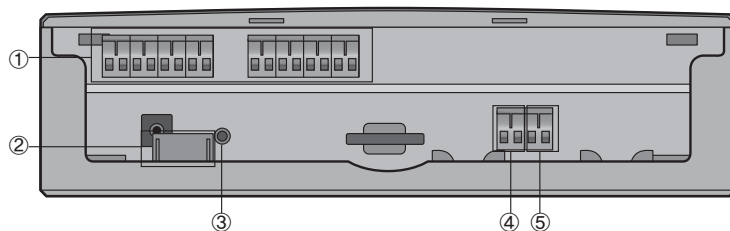
No.	Name	Description
①	Pulse input terminals	8 terminals are allocated to interface pulse-type electricity meters. Each terminal is seen with a dedicated address on DMS2.
②	Power input	Power supply via the power adapter.
③	Reset button	Press the button to reset the MIM-B16.
④	COM1	Connection terminal for RS485 communication with DMS2.
⑤	COM2	Reserved

4) Address & option switches
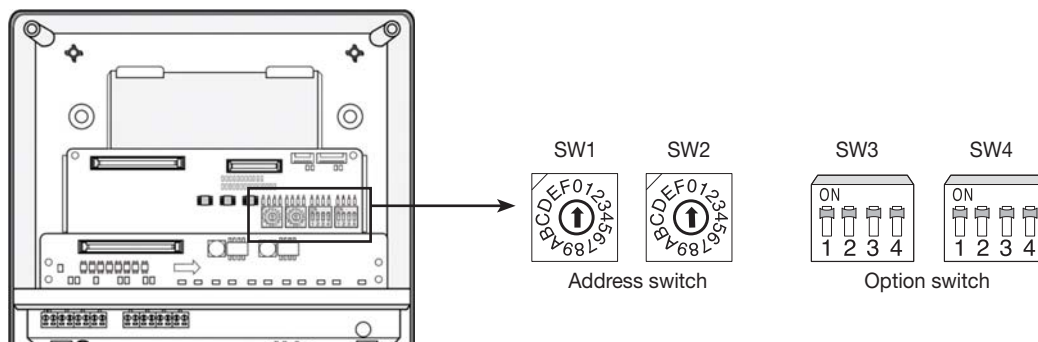
No	Name	Description
1	SW1	No function
2	SW2	MIM-B16 address switch. Address greater than 7 (8~F) is not recognized.
3	SW3	No function
4	SW4	No function

Ⅳ Power distribution system

1. Electricity meter interface module

❏ *MIM-B16*

5) Specifications on electricity meter

- **Current flow on output :** Current-sinking
- **Pulse rate :** 1 ~10000 Wh/pulse (no decimal pulse rate allowed)
- **Pulse width :** 20 ~ 400ms with +/- 5% tolerance (no decimal pulse rate allowed)
- **Time interval between pulses :** min. 3ms
- **Allowable current sinking :** min. 15mA
- **Withstanding voltage :** min. 15V DC
- **Interface circuitry :** Electronic isolation circuitry recommended, no voltage output
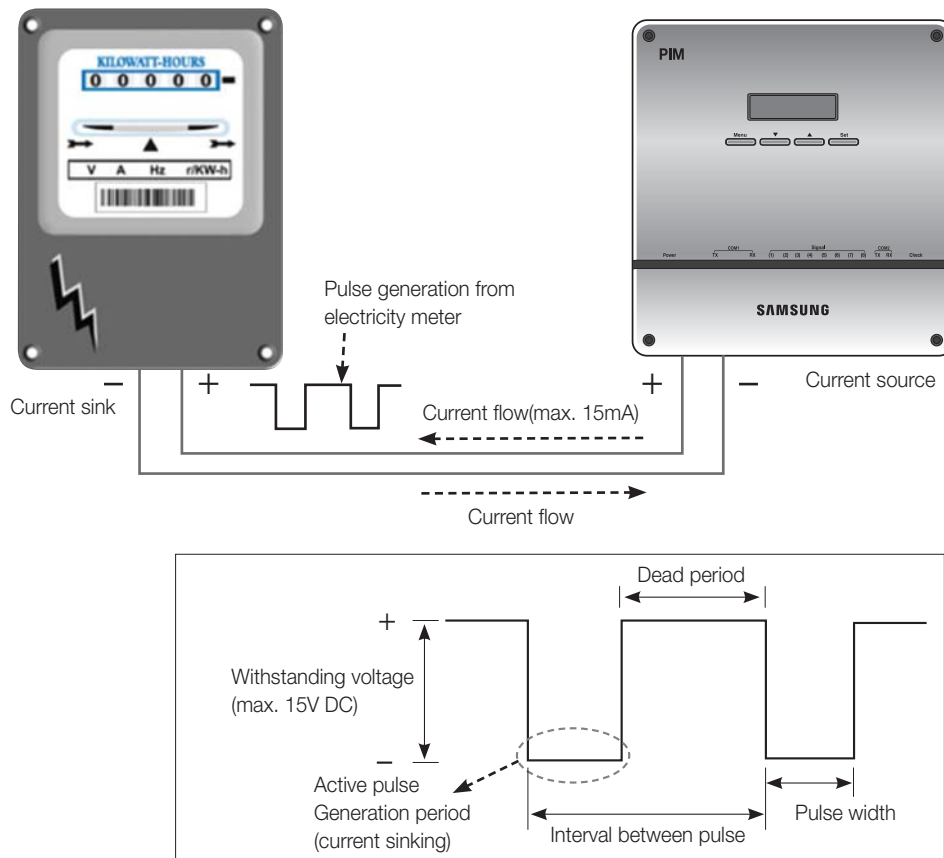
☑ *Note*

- ◆ Interface circuitry of an electricity meter has to withstand min. 15mA and min. 15V DC, both of which are applied by MIM-B16.
- ◆ Even though MIM-B16 interface circuitry is realized with electric isolation components, it's highly recommended that interface circuitry of an electricity meter be designed with isolation to ensure robustness from contact spike or electric interference during wiring.

6) Installation

MIM-B16 must not be installed in a way that power to MIM-B16 is off when one of the over-current circuit breakers is switched off. Power supply to MIM-B16 must be off only when all the power supplies to refrigerant systems whose power consumptions are monitored by the MIM-B16 are cut off. This is because every pulse from electricity meters of some alive refrigerant systems must be sensed normally even if power supplies to other refrigerant systems have troubles.

• Example 1) When the circuit breaker, CM1 is switched off for some reason while the others are still on, pulses from the electricity meters, EM1, EM2 and EM3 are not calculated by MIM-B16, whose power is off by the CM1. This installation could lead to errors in electricity billing function when power interruption in local areas occurs.
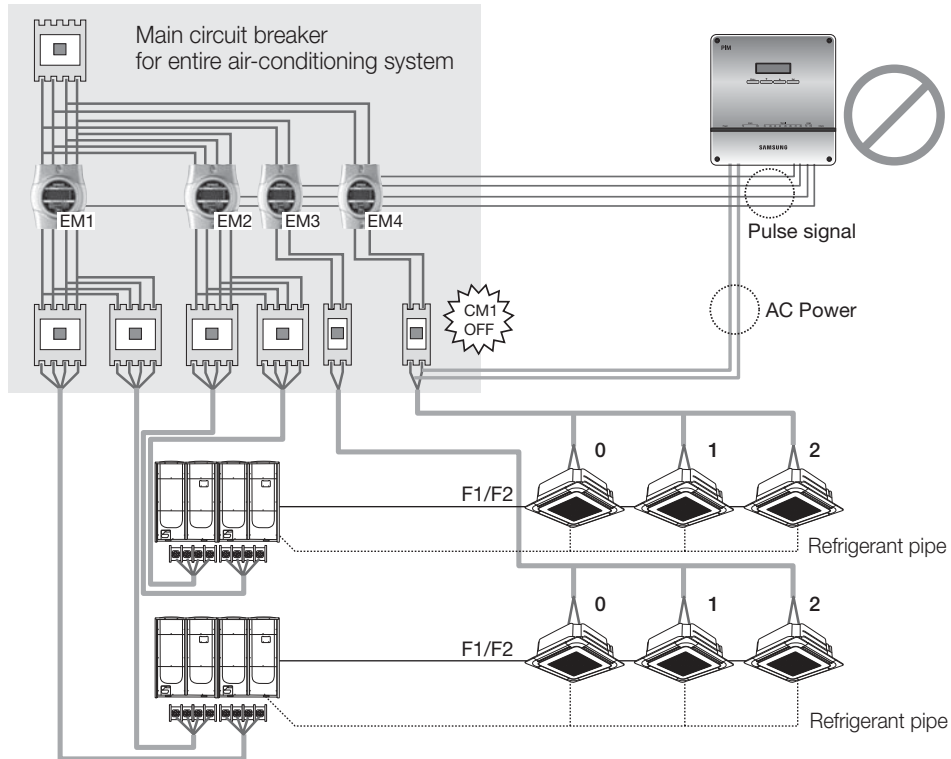
• Example 2) Even when the circuit breaker, CM1 is switched off while the others are on, pulses from the electricity meters, EM1, EM2 and EM3 are still calculated by MIM-B16, whose power is not interrupted by CM1.
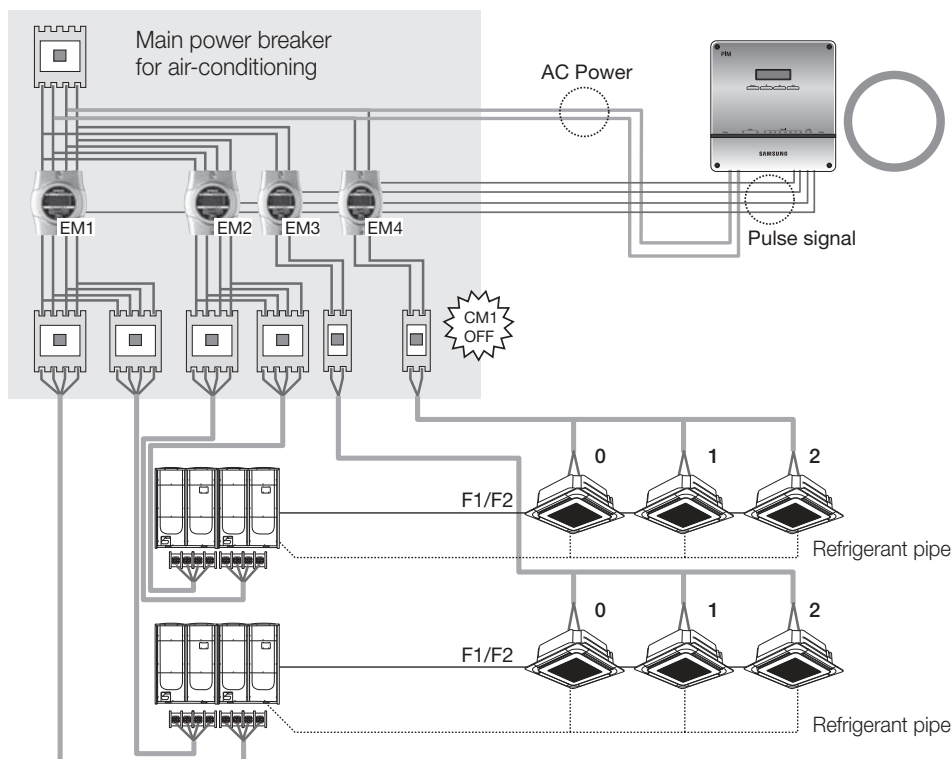
IV Power distribution system

1. Electricity meter interface module

❏ *MIM-B16*

7) Wiring

▶ Wiring to electricity meter

- Attention must be paid to make polarized connection between an electricity meter and MIM-B16 with correct specifications on wires.

Pulse-type electricity meter

MIM-B16

Typical interface circuitry

Cable : Unshielded 2-wire 0.75mm^2 VCTF or equivalent
Length : Max. 200m
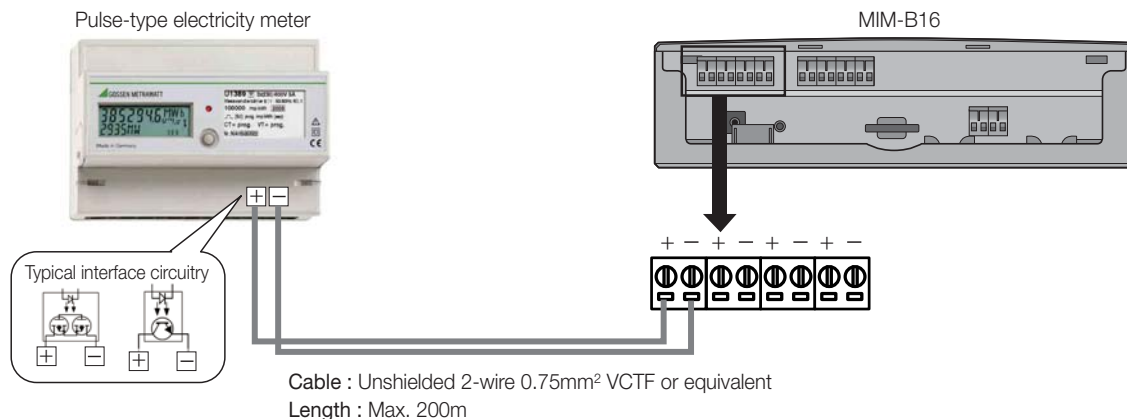
▶ Wiring to DMS2

- Make sure that communication cable is wired between DMS2 and MIM-B16 with the right polarity.

DMS2(MIM-D00AN)

MIM-B16

A B

A B

➡ to another MIM-B16

Cable : Unshielded 2-wire 0.75~1.5mm^2 VCTF or equivalent
Length : Max. 1000m
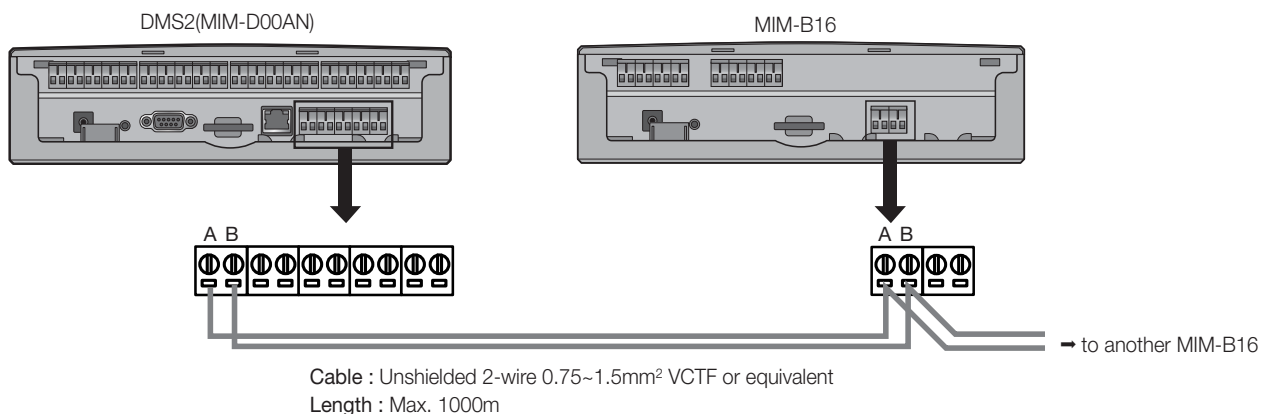
▶ Caution

- MIM-B16(PIM) should be connected to dedicated channel of DMS2 in advance
  Ex) DMS2 CH1 : PIM + Outdoor unit (X)
  PIM + On/off controller (X)

8) Address assignment

Each of the electricity meters is assigned with the dedicated address depending on MIM-B16 address setting and the position of the pulse input terminals.
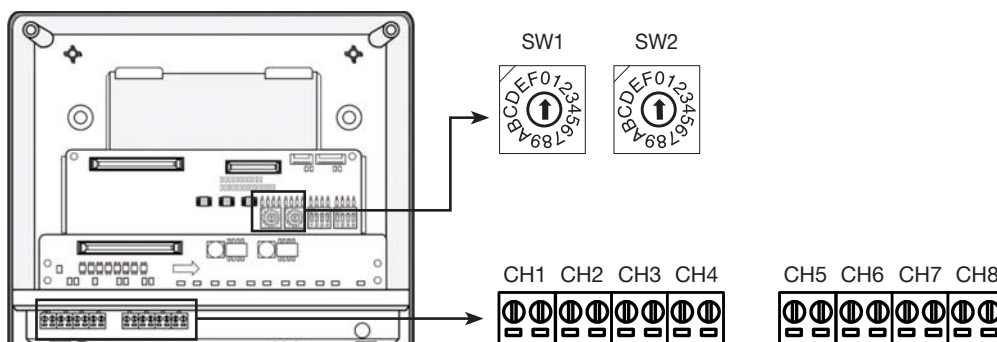
▶ Electricity meter address assignment table

SW2	Pulse input terminal							
	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
0	16.01	16.02	16.03	16.04	16.05	16.06	16.07	16.08
1	17.01	17.02	17.03	17.04	17.05	17.06	17.07	17.08
2	18.01	18.02	18.03	18.04	18.05	18.06	18.07	18.08
3	19.01	19.02	19.03	19.04	19.05	19.06	19.07	19.08
4	20.01	20.02	20.03	20.04	20.05	20.06	20.07	20.08
5	21.01	21.02	21.03	21.04	21.05	21.06	21.07	21.08
6	22.01	22.02	22.03	22.04	22.05	22.06	22.07	22.08
7	23.01	23.02	23.03	23.04	23.05	23.06	23.07	23.08
8~15	Not recognized							

9) MIM-B16 menu structure

※ Required setting
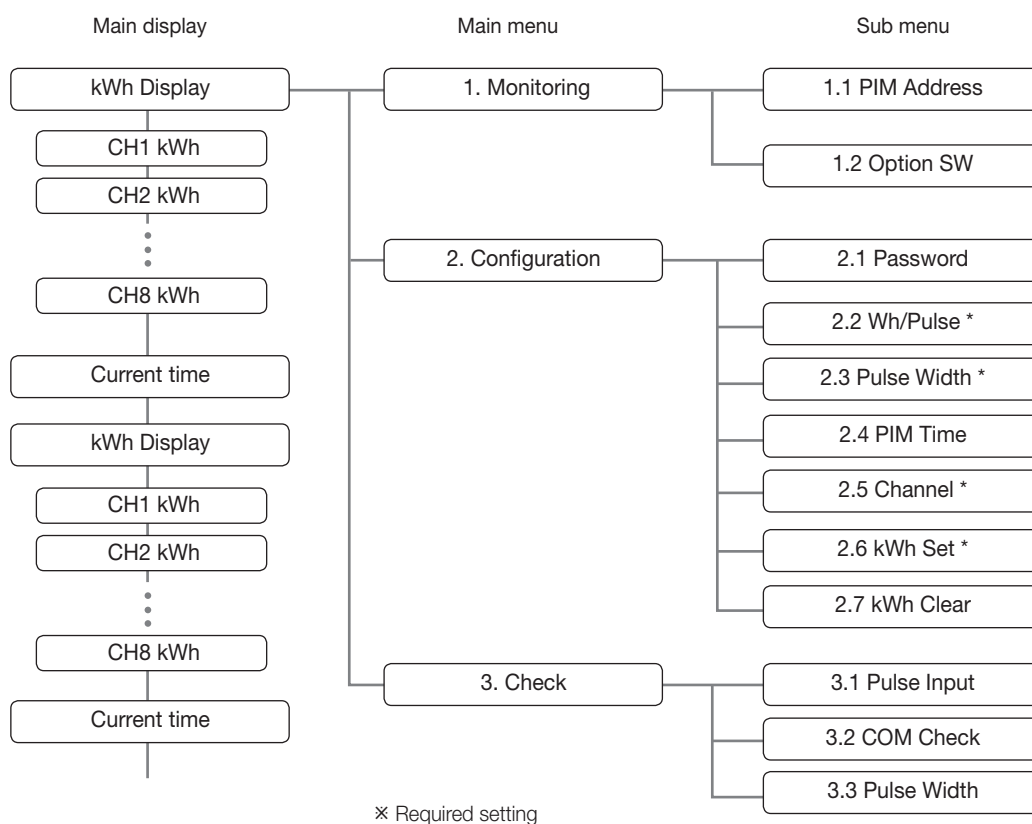
IV Power distribution system

1. Electricity meter interface module

❑ *MIM-B16*

9) MIM-B16 menu structure

Main menu	Sub menu	Description
Monitoring	PIM Address	The MIM-B16 address is displayed with the physical address SW2 added by 10H on the LCD window. Ex) | LCD	SW2 setting
---	---
10H	0
11H	1
…	…
17H	7	 1.1 PIM Address Address:10H SW1 SW2
	Option SW	Option switch setting to ON is displayed with the position number at the corresponding positions while setting to OFF is shown with the mark 'X'. Ex) 1.2 Option S/W 12345X78 ON 1 2 3 4 ON 1 2 3 4
Configuration	Password	The password, which is asked to enter to change the configuration setting, is used to prevent unauthorized persons from accessing MIM-B16. Factory setting is '0000'. Ex) Enter your P/W 0:0:0:0
	Wh/Pulse	The pulse rate of electricity meters must be set to calculate power consumption from the incoming pulse. The pulse rate in Wh/pulse must be an integer with no support of decimal numbers. The allowable range is 1~10000 Wh/pulse.
	Pulse Width	The width of the pulse from an electricity meter must be in the range between 20ms and 400ms during current sink into the meter.
	PIM Time	Current time is recommended to set for future use.
	Channel	Each of the 8 electricity meter interface channels is required to set to be enabled or disabled. Channels where electricity meters are connected must be set to be enabled.
	kWh Set	Initial electricity reader value must be set as a starting point for each of the enabled interface channels.
	kWh Clear	Each or all the initial kWh values are cleared when selected.
Check	Pulse Input	When pulse input is detected during the test period, the channel numbers are displayed. Otherwise, the character 'X' is displayed on the corresponding channel position. All Check End X2XX5X7X
	COM Check	Make a loopback connection between COM1 and COM2 to check if the DMS2 communication channel is working or not. Care must be taken for the connection polarity. When the COM1 communication channel is normal, the message 'OK' is displayed on the LCD window.
	Pulse Width	The pulse width test result is displayed with the messages "OK" or "NG" followed by the set and measured width values. CH1 Check End NG (S:020 M:000) S : set value M : measured value

10) Setting parameters on DMS2 (MIM-D00AN)

▶ The following parameters for MIM-B16 can be also set and monitored on DMS2 (MIM-D00AN)

- Current power consumption (kWh), Pulse rate, Pulse width
- Channel Enable/Disable, Current time, Password

※ DMS2 setting for MIM-B16 parameters

11) Error

Error code	Description
E613	Communication error between DMS2 (MIM-D00AN) and MIM-B16
E614	E614 occurs when the width of the pulse from an electricity meter is out of range.
E654	Memory Read/Write error

DVM CONTROL SYSTEMS

V. External contact control system

V External contact control system

1. External contact interface module

❑ *MIM-B14*

1) Features

(Unit : mm)

80

50
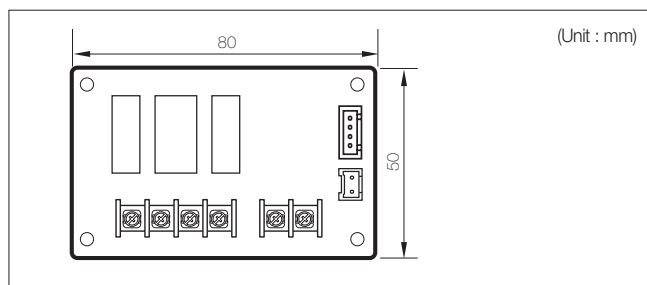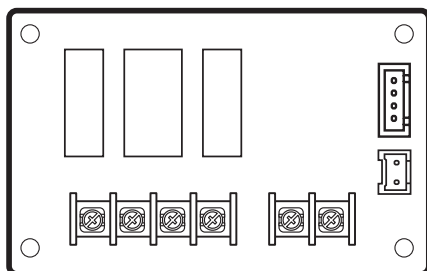
Interlock DVM air-conditioner with external controller

• Indoor unit On/Off control by the external contact (Usable equipment: Card-key, Timer, Sensor)
• Output the indoor unit thermo ON/OFF state and operation status
• Output the indoor unit error state

2) Description of parts
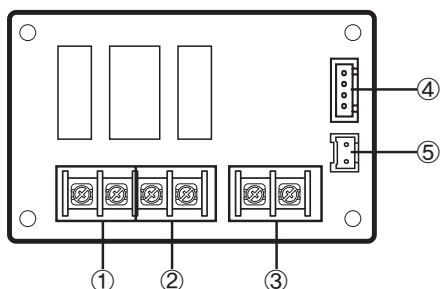
No.	Input/Output	Contact rating	Operation
①	Error state	220V AC, 3A	Normal：Close, Error：Open
②	Indoor unit Thermo On/Off or Operation State output (It depends on indoor unit's INSTALL option setting SEG 15.)	220V AC, 3A	[Output signal] SEG 15 = 0　　Thermo On/Off SEG 15 =1　　Operation On/Off (On：contact close, Off：contact open)
③	Operation signal input load	5V DC, 5mA	-
④	Connector for indoor unit	-	-
⑤	Connector for indoor unit	-	-

3) Installation

█ External contact line wiring

Indoor unit thermo ON/OFF signal

Error signal output

Voltage free contract signal input
Ex) Sensor, Card-key, Timer

220V AC, 3A

Indoor unit PCB

CN83

Connect wire

CN81
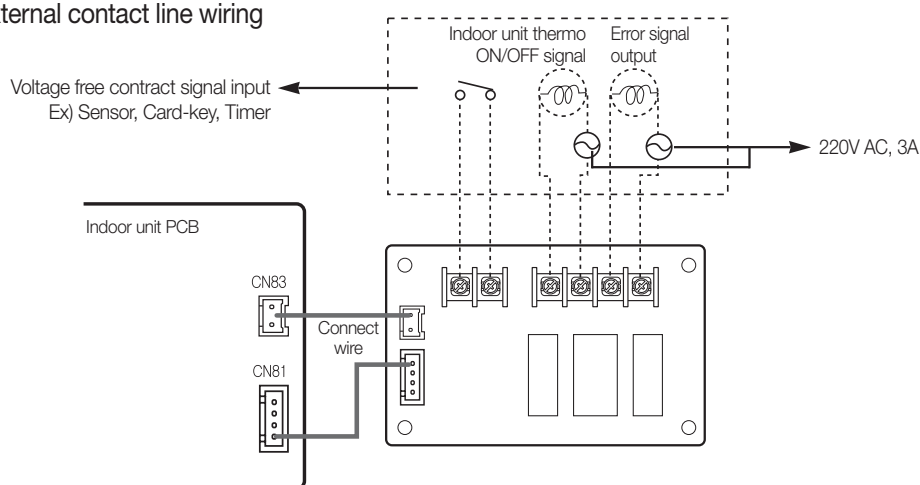
─── ☑ *Note* ─────────────────────────────

◆ External operation input load: 5V DC/5mA.
◆ The length of wiring between MIM-B14 and external control equipment is 100m max.
◆ To use external contact control system, indoor unit's INSTALL option setting is required.
(Refer to indoor unit installation manual)
✳ SEG 14 - External control setting (Default : No use)
◆ After installed, the first operation will be conducted with Auto mode, Set temp. 24°C, Auto Fan speed.
◆ If the indoor unit in OFF status is turned ON through external contact signal; it will operate in the last operation status before it was turned off.

4) Control

Timing diagram for external contact control

Ex1)
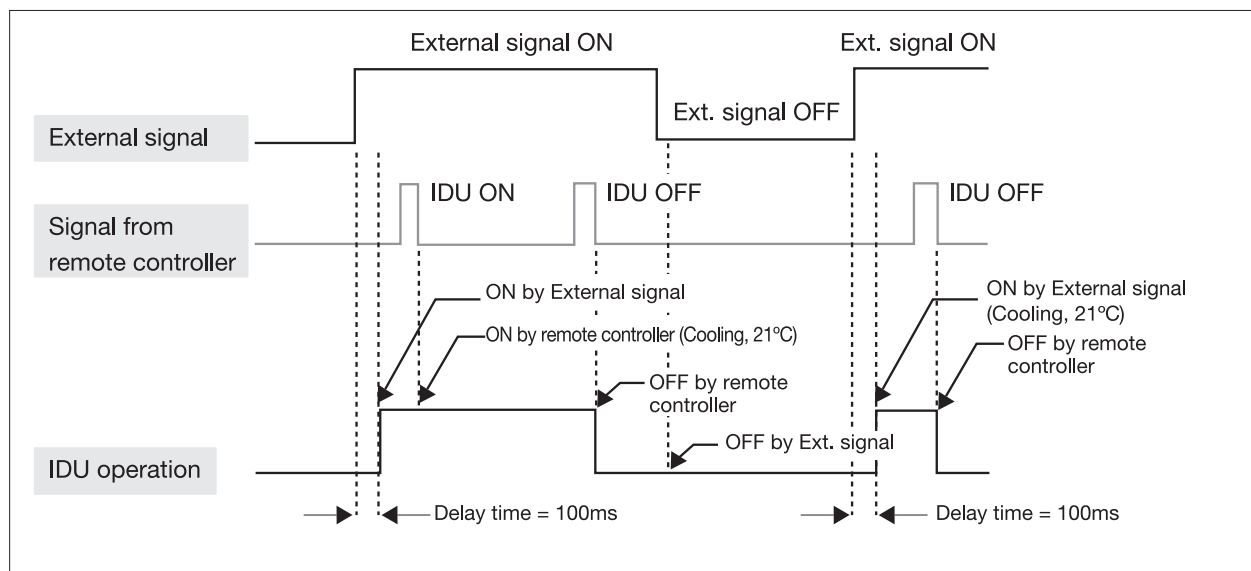
☑ *Note*

◆ IDU stands for Indoor Unit.
No prioritized operation between the R/C and the external contact I/M.

Ex2)
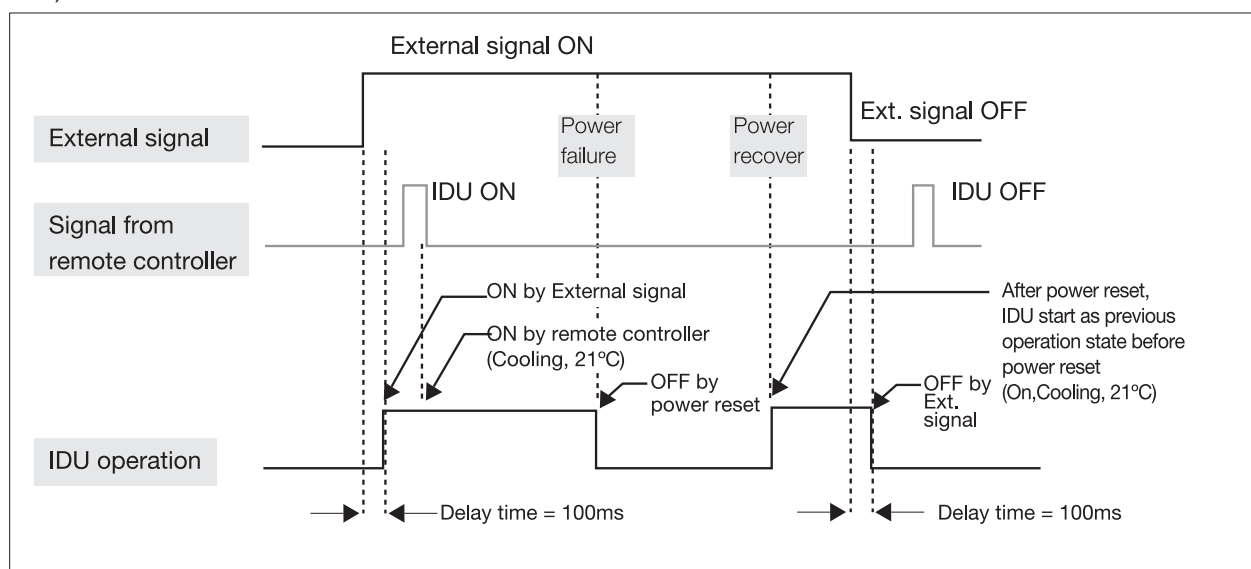
☑ *Note*

◆ IDU stands for Indoor Unit.
After power reset, indoor unit operates as previous state. (IDU has power recovery function)

EXTERNAL CONTACT
CONTROL SYSTEM

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Ⅴ External contact control system

1. External contact interface module

☐ *MIM-B14*

4) Control

Ex3)
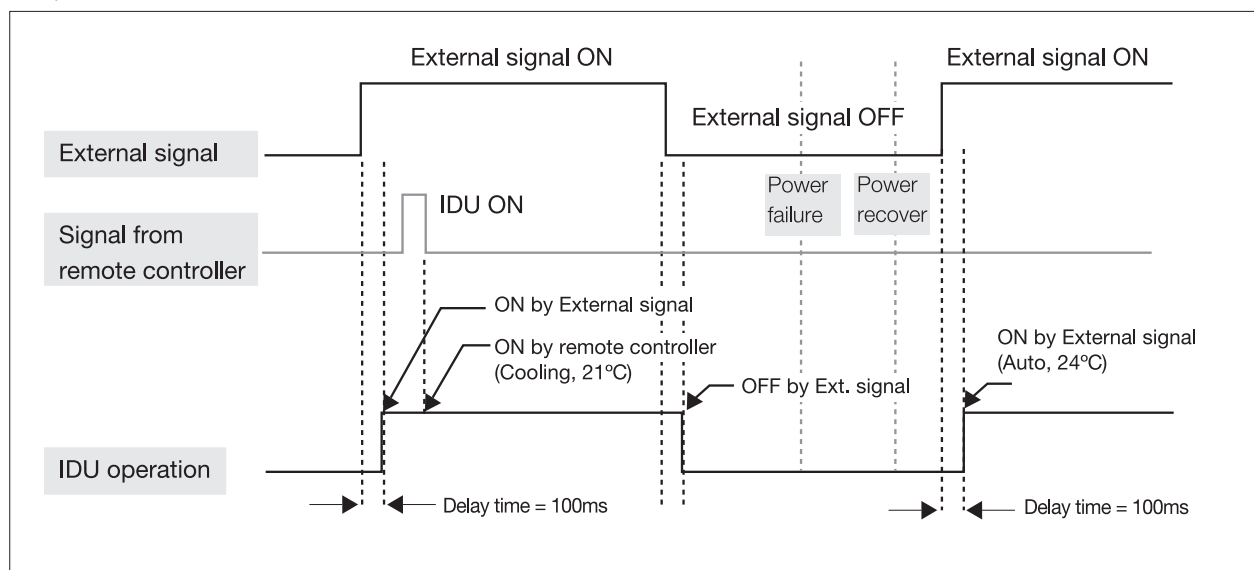
☑ *Note*
 ◆ IDU stands for Indoor Unit.
  After power reset, if IDU is turn ON by external contact, it starts as Auto mode, 24°C, Auto fan speed.

Ex4)
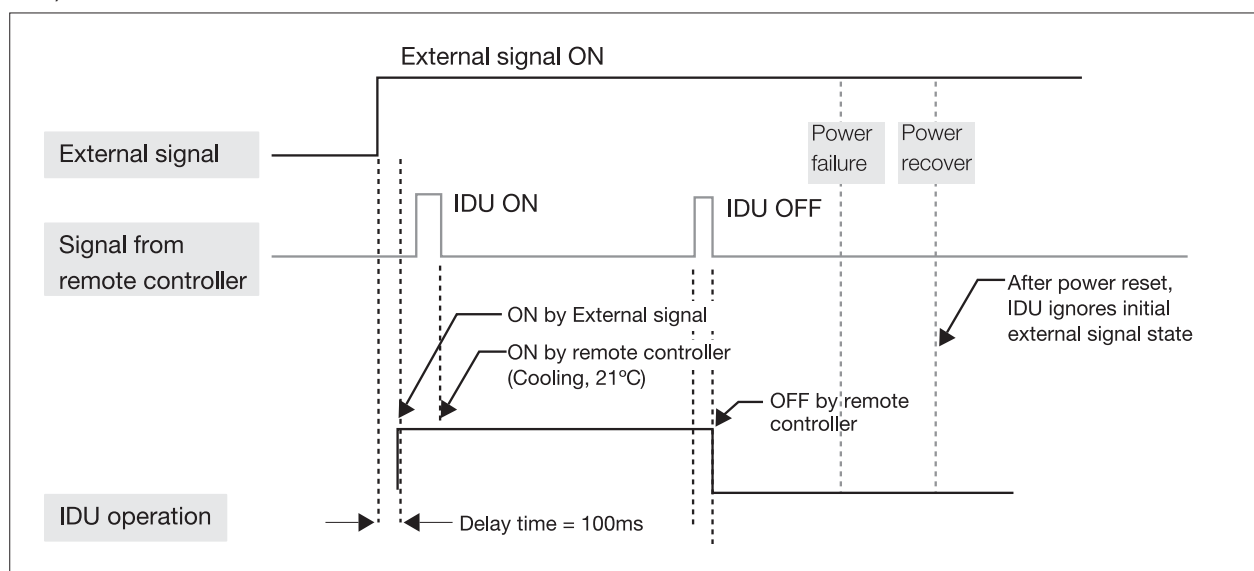
☑ *Note*
 ◆ IDU stands for Indoor Unit.
  After power reset, IDU ignores initial external signal state.

▶ Operation input

It is possible to set the method of indoor unit control by external contact signal.

• Method 1. Turn On/Off the indoor units by external contact signal
• Method 2. Set standby/Turn Off the indoor unit by external contact signal
• Method 3. Return to the last status / Turn Off the indoor unit by external contract signal

	Method 1	Method 2	Method 3
Indoor unit INSTALL option setting (Refer to inidoor unit installation manual)	SEG 14 = 1	SEG 14 = 2	SEG 14 = 3
Indoor unit operation by external contact	Short → Indoor unit On Open → Indoor unit Off	Short → Standby Open → Indoor unit Off	Short → Return to the last status of indoor unit Open → Indoor unit Off
Remote controller use	Short → Available Open → Available	Short → Available Open → Unavailable	Short → Available Open → Unavailable

▶ Operation output

	DVM S series indoor unit	
Output signal	SEG 15 = 0 SEG 15 = 1	Thermo On/Off Operation On/Off
Output signal delay time	None	
Error signal		

• Thermo off : Status where refrigerant is not flowing in either cooling/heating operation because desired temperature has been reached.

DVM CONTROL SYSTEMS

VI. Building management systems

BUILDING
MANAGEMENT SYSTEM

VI Building management system

1. LonWorks Gateway

☐ *MIM-B18N*

1) Features

(Unit : mm)

• For LonWork protocol system.
• Support DMS2 control function at the same time.

2) Product specification

Size		240 x 255 x 64.8 mm (Width x Length x Depth)
Power supply	Source	DC Adaptor
	Input	100~240VAC (±10%), 50/60Hz
	Output	12V 3A
Operating temperature range		-10°C ~ 50°C
Operating humidity range		10%RH ~ 90%RH
Communication connection		Lower layer : RS485 (Outdoor unit, On/off controller, PIM) Upper layer : Ethernet 100Base-T (S-NET3, Web Browser) LonWorks layer : TP/FT-10A(Free topology 78kbps)
Max. communication length		Lower layer : Maximum 1000m (RS485) Upper layer : 100m (for one segment without repeaters) LonWorks layer : 78 kilobits-per-second bit rate for distances up to 500 meters in free topology or 2700 meters in bus topology with double terminations

Compatible devices

Type		Model	Maximum device connection	Remarks
Outdoor unit		DVM S series only	▪ Each communication channel : 16 units (Max. 128 indoor units) ▪ Max. 80 outdoor units (Max. 128 indoor units)	Can not connect interface module (ex. MIM-B13D, MIM-B13D, MIM-B04A)
Controller	On/Off controller	MCM-A202DN	▪ Each communication channel : 15 units ▪ Max. 75 controllers	Can not connect interface module (ex. MCM-A202D, MCM-A202B, MCM-A202A, MCM-A202)
	PIM	MIM-B16	8 units	-
Watt-meter		Pulse-type	Connected with PIM Pulse width：20~400(ms) Pulse：1~10000(Wh/pulse)	-

＊ ERV cannot be connected until end of 2013

3) Description of parts

Front

No	Name	Function
①	LCD display	Displays current time or menu.
②	Menu button	Access the setting menu.
	▲/▼ button	Select function or setting item in the setting menu.
	Set button	Enter or check setting item in the setting menu.
③	Bottom cover	Unscrew 2 screws on the bottom to remove the cover and check the cable connections.

LED indicator

No.	Item	Name	Status
①	Power	Power indicator	Turns blue when the power is supplied.
②	CPU Alive	CPU operation indicator	Blinks in orange with 1 second intervals during normal operation.
③	Ethernet-Linked	Internet connection indicator	Turns green during normal connection.
④	Ethernet-Active	Internet data transmission/reception indicator	Blinks in orange during normal transmission/reception.
⑤	COM1~4-TX	Channel 1~4 On/Off controller/Interface module Data transmission indicator	Blinks in green during normal transmission.
⑥	COM1~4-RX	Channel 1~4 On/Off controller/interface module Data reception indicator	Blinks in green during normal reception.
⑦	Lon ACK	LonWorks data reception indicator	Blinks in green during normal reception.
⑧	Lon SVC	LonWorks device status indicator	Blinks in green during un-configured.
⑨	Check	Indoor/Outdoor unit communication status indicator	Turns green when there is an error on more than one indoor/outdoor unit or in communication.

VI Building management system

1. LonWorks Gateway

❑ *MIM-B18N*

3) Description of parts
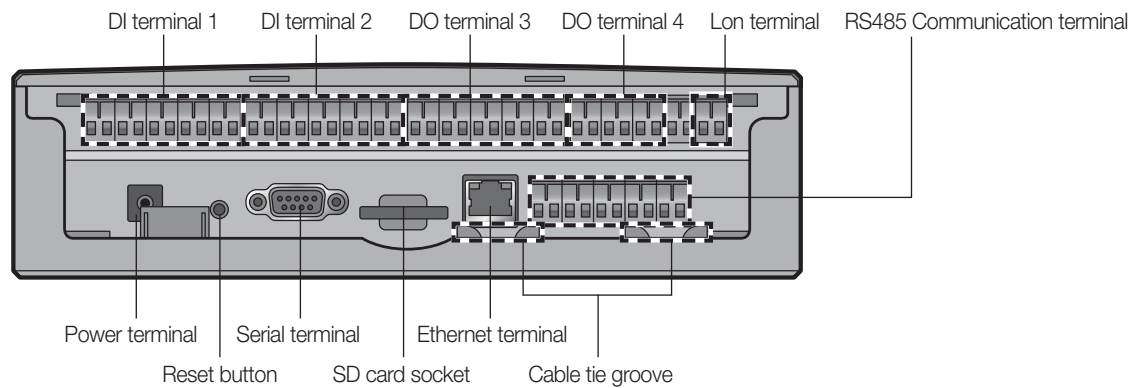
Bottom

DI terminal 1   DI terminal 2   DO terminal 3   DO terminal 4   Lon terminal   RS485 Communication terminal

Power terminal   Serial terminal   Ethernet terminal
Reset button   SD card socket   Cable tie groove

Name	Description
DI terminal 1	Digital Input connection terminal, Channel1~Channel5
DI terminal 2	Digital Input connection terminal, Channel6~Channel10
DO terminal 3	Digital Output connection terminal, Channel1~Channel5
DO terminal 4	Digital Output connection terminal, Channel6~Channel8
Lon terminal	Terminal Block for LonWorks communication (TP/FT-10)
Reset button	Reset LonWorks Gateway
Serial terminal	Service check port
SD card socket	Sub memory (for program update and set information saving) socket
RS485 communication terminal	RS485 port for communication with On/Off controller / interface module
Ethernet Terminal	Connect LAN cable
Cable tie groove	Groove for arranging cables

4) Connection diagram

▶ MIM-B16(PIM) should be connected separately with outdoor units or controllers.

5) Wiring
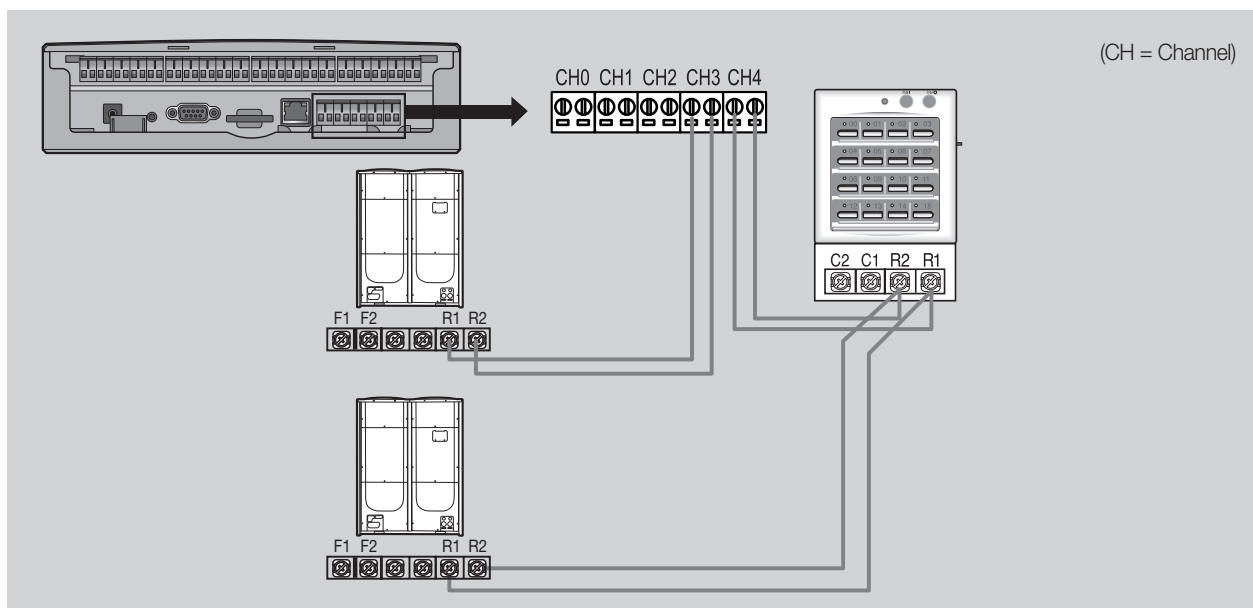
(CH = Channel)

(1) Connecting outdoor unit directly

- Maximum 16 outdoor units can be connected to each channel
- Total 80 outdoor units can be connected

(2) Connecting On/Off controller

- Maximum 15 On/Off controller can be connected to each channel

---

☑ *Note*

- ◆ LonWorks Gateway can connect outdoor unit and On/Off controller at the same time.
- ◆ Outdoor unit and On/Off controller can be connected to 1 communication channel at the same time.

Control Systems

VI Building management system

1. LonWorks Gateway

❑ *MIM-B18N*

5) Wiring

Connecting with outdoor unit

LonWorks Gateway

CH0 CH1 CH2 CH3 CH4

R1R2

R1R2

R1R2

R1R2

Outdoor unit

Outdoor unit

0

Outdoor unit

0

Outdoor unit

Maximum 16 connections

1

Outdoor unit

1

Outdoor unit

F

Outdoor unit

F

Outdoor unit

※ Outdoor unit's address is defined automatically.
The address can be changed manually also.

Connecting with On/Off controller

LonWorks Gateway

CH0 CH1 CH2 CH3 CH4

Maximum 15 On/Off controllers

C2 C1 R2 R1

C2 C1 R2 R1

R1R2

R1R2

Outdoor unit

Outdoor unit

Outdoor unit

Outdoor unit

Connecting with outdoor unit and on/off controller

Wiring distance

Network radius

Maximum 15 On/Off controllers and
16 outdoor units can be connected
to 1 channel of the LonWorks Gateway
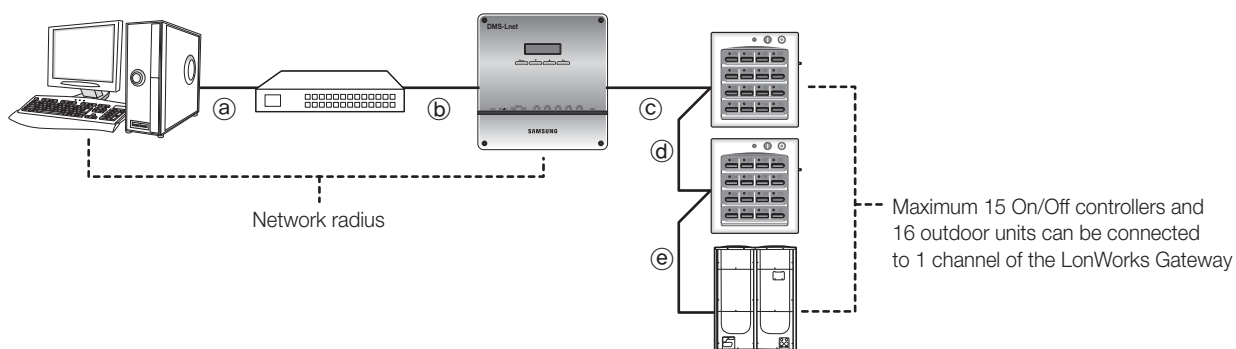
▶ **Distance between LonWorks Gateway and On/Off controller/outdoor unit**
  • Distance from the LonWorks Gateway to the furthest device cannot exceed 1000m.
  • ⓒ + ⓓ + ⓔ ≤ *1000m*

▶ **Distance between LonWorks Gateway and upper level controller**
  • Since LonWorks Gateway supports 100 Base-T Ethernet, first repeater or upper level controller from the LonWorks Gateway cannot be further than 100m (IEEE 802.3). Therefore, maximum network radius is restricted to 500m.

ⓐ, ⓑ, ⓒ, ⓓ, ⓔ = *100m*

HUB
Repeater

Maximum number of repeaters = 4

ⓐ 500m
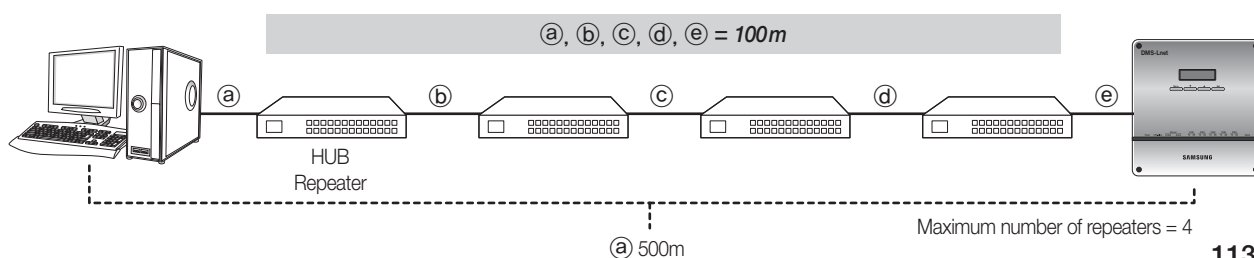
VI Building management system

1. LonWorks Gateway

☐ *MIM-B18N*

6) Commission

- For Commission operation with BMS, press the [Set] button for more than 3 seconds.
- Pressed time will be displayed in the LCD display
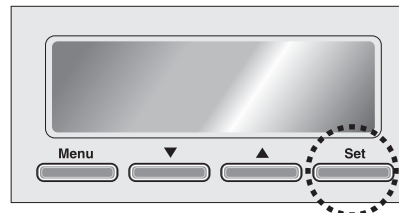
- When commission operation is normal, [SVC] LED of the front panel will lit up.
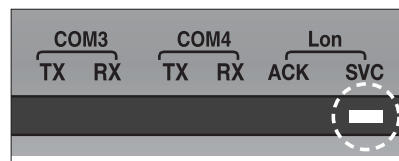
7) Standard program identifier (SPID)

- Manufacturers : Samsung Electronics Co., Ltd. MID: 191
- Device Classes : 70.00 - Gateways   72.80 --- HVAC Gateways
- Usage (Device Subclass) : Utility {11}
- Channel Types : TP/FT-10   {ID : 4}

Object Types	Description	SFPT Name
8500	SCC – Generic	SFPTspaceComfortController

※ Program ID : 90:00:BF:48:50:0B:04:00

8) Item summary

Item		Function
Control & Monitoring	Common	Operation On/Off
		Operation mode
		Air flow direction
		Fan speed
		Device error information
		Model, address, type information
	Indoor unit AHU	Set temperature
		Indoor temperature
		Filter replacement alert/ reset
		Remote controller level
		Thermostat information
		Operation restriction setting (Cooling/Heating)
		Setting lowest temperature/ restriction
		Setting highest temperature/ restriction
		Power consumption
	Additional functions	Operation time
		Emergency stop
		DMS2 DI/DO
		DMS2 lock
		DMS2 error information
		System error information

9) Network variable

(1) Indoor unit/ ERV/ AHU kit object

No.	Name	Type	M/O	Description
1	nviONOff	SNVT_switch	O	ON/OFF command
2	NviApplicMode	SNVT_hvac_mode	O	Setting operating mode
3	nviSetpoint	SNVT_temp_p	O	Setting desire temperature
4	nviFanStatus	SNVT_switch	O	Setting fan speed
5	nviERVMode	SNVT_count	O	Setting ERV operation mode
6	nviFilterReset	SNVT_switch	O	Filter reset command
7	nviUserLockout	SNVT_switch	O	Setting the restriction of remote control use
8	nviOccOpMode	SNVT_switch	O	Setting cooling only mode / heating only mode
9	nviCoolTempLock	SNVT_switch	O	Setting the low temperature limit
10	nviHeatTempLock	SNVT_switch	O	Setting the high temperature limit
11	nvoSpaceTemp	SNVT_temp_p	M	Display indoor temperature
12	nvoApplicMode	SNVT_hvac_mode	O	Display operating mode
13	nvoSetpoint	SNVT_temp_p	O	Display desire temperature
14	nvoOnOff	SNVT_switch	O	Display ON/OFF status
15	nvoFanStatus	SNVT_switch	O	Display fan speed
16	nvoERVMode	SNVT_count	O	Display ERV operating mode
17	nvoErrorCode	SNVT_count	O	Display Error code
18	nvoDeviceAlarm	SNVT_state	O	Remote control lock, Filter sign, Thermo ON/OFF, Error occurrence status display
19	nvoOccOpMode	SNVT_switch	O	Cooling only/Heating only setup status display
20	nvoCoolTempLock	SNVT_switch	O	Display low temperature limit setting status
21	nvoHeatTempLock	SNVT_switch	O	Display high temperature limit setting status
22	nvoUserLockout	SNVT_switch	O	Display the restriction of remote control use
23	nvoEnergyConp	SNVT_elec_kwh_l	O	Display electricity usage (Time Period)
24	nvoEnergyCon	SNVT_elec_kwh_l	O	Display electricity usage (Basic date)
25	nvoRuntimep	SNVT_time_hour	O	Display used hours (Period)
26	nvoRuntime	SNVT_time_hour	O	Display used hours (Basic date)
27	nvoDevListDesc	SNVT_str_asc	O	Indoor unit HW information

(2) Outdoor unit/ System object

No.	Name	Type	M/O	Description
1	nviDigitalOut[6]	SNVT_ switch	O	Set Digital output
2	nviAllOff	SNVT_hvac_emerg	O	Set emergency stop
3	nvoDigitalOut[6]	SNVT_ switch	O	Display Digital output status
4	nvoDigitalIn[8]	SNVT_ switch	O	Display Digital input status
5	nvoSystemLock	SNVT_ switch	O	Display System Lock status
6	nvoDMS2Alarm	SNVT_ count	O	Display communication error
7	nvoSystemAlarm	SNVT_ count	O	Display error satus

(3) Configuration properties

No.	Name	Type	M/O	Description
1	nciSndHrtBt	SNVT_time_sec SCPTmaxSendTime	O	Send Heartbeat
2	nciMinOutTm	SNVT_time_sec SCPTminSendTime	O	Minimum Send Time
3	nciMinDeltaTemp	SNVT_temp_p SCPTminDeltaTemp	O	Min. difference before update
4	nciDelayStatrup	SNVT_time_sec SCPTpwrupDelay	O	Delay time after a power-up

Ⅵ Building management system

1. LonWorks Gateway

  ☐ *MIM-B18N*

10) Network parameter chart

  (1) Indoor unit/ ERV/ AHU kit object

SSACIndoor[nn](objectid=1-128)

nviOnOff SNVT_switch	nvoSpaceTemp SNVT_temp_p
nviApplicMode SNVT_hvac_mode	nvoApplicMode SNVT_hvac_mode
nviSetPoint SNVT_temp_p	nvoSetPoint SNVT_temp_p
nviFanStatus SNVT_switch	nvoOnOff SNVT_switch
nviERVMode SNVT_count	nvoFanStatus SNVT_switch
nviFilterReset SNVT_switch	nvoERVMode SNVT_count
nviUserLockout SNVT_switch	nvoErrorCode SNVT_count
nviOccOpMode SNVT_switch	nvoDeviceAlarm SNVT_state
nviCoolTempLock SNVT_switch	nvoOccOpMode SNVT_switch
nviHeatTempLock SNVT_switch	nvoCoolTempLock SNVT_switch
	nvoHeatTempLock SNVT_switch
	nvoUserLockout SNVT_switch
	nvoEnergyConp SNVT_elec_kwh_l
	nvoEnergyCon SNVT_elec_kwh_l
	nvoRuntimep SNVT_time_hour
	nvoRuntime SNVT_time_hour
	nvoDevListDesc SNVT_str_asc

  (2) Outdoor unit/ System object

SSACSystem(objectid=129)

nviDigitalOut[6]_switch	nvoDigitalOut[6] SNVT_switch
nviAllOff SNVT_hvac_emerg	nvoDigitalIn[8] SNVT_switch
	nvoSystemLock SNVT_switch
	nvoDMS2Alarm SNVT_count
	nvoSystemAlarm SNVT_count

Configuration Properties
nciSndHrtBt
nciMinOutTm
nciMinDelta Temp
nciDelayStartup

11) Network variable list

• Supported NV (Network Variable) is different depending on the connected devices.

No.	NV Name	Description	Indoor	ERV	AHU Kit
1	nviOnOff	ON/OFF command	O	O	O
2	nviApplicMode	Setting operating mode	O	X	O
3	nviSetpoint	Setting desirable temperature	O	X	O
4	nviFanStatus	Setting fan swing and speed	O	O	X
5	nviERVMode	Setting ERV operation mode	X	O	X
6	nviFilterReset	Filter reset command	O	O	O
7	nviUserLockout	Setting the restriction of remote control use	O	O	O
8	nviOccOpMode	Setting cooling only mode / Setting heating only mode	O	X	O
9	nviCoolTempLock	Setting the low temperature limit	O	X	O
10	nviHeatTempLock	Setting the high temperature limit	O	X	O
11	nvoSpaceTemp	Display indoor temperature	O	X	O
12	nvoApplicMode	Display operating mode	O	X	O
13	nvoSetpoint	Display desire temperature	O	X	O
14	nvoOnOff	Display ON/OFF status	O	O	O
15	nvoFanStatus	Display wind speed and direction	O	O	X
16	nvoERVMode	Display ERV operating mode	X	O	X
17	nvoErrorCode	Display Error code	O	O	O
18	nvoDeviceAlarm	Remote control Lock, Filter Sign, Thermo ON/OFF, Error occurrence status display	O	O	O
19	nvoOccOpMode	Cooling only/Heating only setup status display	O	X	O
20	nvoCoolTempLock	Low temperature limit setting status display	O	X	O
21	nvoHeatTempLock	High temperature limit setting status display	O	X	O
22	nvoUserLockout	Display the restriction of remote control use	O	O	O
23	nvoEnergyConp	Display electricity usage	O	X	X
24	nvoEnergyCon	Monitor total electricity usage	O	X	X
25	nvoRuntimep	Display used hours (Period)	O	X	O
26	nvoRuntime	Monitor total operation hours	O	X	O
27	nvoDevListDesc	The summary of device information (Model, Address, Operation Status)	O	O	O

12) Detail description of network variable

(1) Indoor unit/ ERV/ AHU kit object

1-1. nviOnOff

- Description : Indoor unit ON/OFF
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Off	-
100.0	1	On	-

1-2. nviApplicMode

- Description : Indoor unit operation mode
- SNVT : SNVT_hvac_mode
- Operation

Hvac_t	Operation	Remark
1	Heat	-
3	Cool	-
6	Off	-
9	Fan	-
14	Dry(dehumid)	-
0	Auto	-

1-3. nviSetpoint

- Description : Set temperature
- SNVT : SNVT_temp_p
- Operation

Auto/Cool/Dry	18 ~ 30ºC
Heat	16 ~ 30ºC

VI Building management system

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12) Detail description of network variable

(1) Indoor unit/ ERV/ AHU kit object

1-4. nviFanStatus

- Description : Setting fan swing and speed
- SNVT : SNVT_switch
- Operation

	Value	State
Auto	0	-
Low	1	-
Mid	2	-
High	3	-
Eco	4	-
Turbo	5	-
Auto	Any > 5	-
Stop	-	0
Up-Down	-	1

1-5. nviERVMode

- Description : ERV mode
- SNVT : SNVT_count
- Operation

Value	Operation	Remark
0	Auto	Auto ventilation mode
1	H/R	Heat exchange ventilation mode
2	Air purification	Air purification mode
3	Sleep	Sleep mode
4	Normal	By-pass mode

1-6. nviFilterReset

- Description : Filter reset command
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	No Alarm	-
100.0	1	Alarm	-

1-7. nviUserLockout

- Description : Setting the restriction of remote control use
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Unlock	-
100.0	1	Level 1	-
100.0	2	Lock	-

1-8. nviOccOpMode

- Description : Setting cooling only mode/ heating only mode
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Unlock	-
1.0	1	Cooling only	-
2.0	1	Heating only	-

1-9. nviCoolTempLock

- Description : Setting the low temperature limit
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
18~30	0	Unlock	-
18~30	1	Lock	-

1-10. nviHeatTempLock

- Description :Setting the high temperature limit
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
16~30	0	Unlock	-
16~30	1	Lock	-

2-1. nvoSpaceTemp

- Description : Display indoor temperature
- SNVT : SNVT_temp_p
- Operation : -10°C ~ 50°C

2-2. nvoApplicMode

- Description : Display operating mode
- SNVT : SNVT_hvac_mode
- Operation

Hvac_t	Operation	Remark
1	Heat	-
3	Cool	-
6	Off	-
9	Fan	-
14	Dry(dehumid)	-
0	Auto	Review needed (VOC on deleting Auto mode)

2-3. nvoSetpoint

- Description : Display desire temperature
- SNVT : SNVT_temp_p
- Operation

Auto/Cool/Dry	18 ~ 30°C
Heat	16 ~ 30°C

2-4. nvoOnOff

- Description : Display ON/OFF status
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Off	-
100.0	1	On	-

2-5. nvoFanStatus

- Description : Display fan speed
- SNVT : SNVT_switch
- Operation

	Value	State
Auto	0	-
Low	1	-
Mid	2	-
High	3	-
Eco	4	-
Turbo	5	-
Auto	Any > 5	-
Stop	-	0
Up-Down	-	1

2-6. nvoERVMode

- Description : ERV Display ERV operating mode
- SNVT : SNVT_count
- Operation

Value	Operation	Remark
0	Auto	Auto ventilation mode
1	H/R	Heat exchange ventilation mode
2	Air purification	Air purification mode
3	Sleep	Sleep mode
4	Normal	By-pass mode

2-7. nvoErrorCode

- Description : Display Error code
- SNVT : SNVT_count
- Operation : Error code refers to integrated error code of system air conditioner

2-8. nvoDeviceAlarm

- Valid Range : 0 ~ 999
  - 00 00 → No Error
- Description : Filter Sign, Thermo ON/OFF, Error occurrence status display
- SNVT : SNVT_state
- Operation

Byte	Bit1	Bit0	Operation	Remark
	0	0	Unlock	nviUser Lockout
Flag_1	0	1	Level1	
	1	0	Lock	

Byte	Bit1	Bit0	Operation	Remark
	2	0	No alarm	Filter alert
	2	1	Alarm	
Flag_2	1	0	Thermo On	Thermo On/Off
	1	1	Thermo Off	
	0	0	No Error	nvoError Code
	0	1	Error	

2-9. nvoOccOpMode

- Description : Cooling only/Heating only setup status display
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Permit	-
1.0	1	Cooling only	-
2.0	1	Heating only	-

2-10. nvoCoolTempLock

- Description : Low temperature limit setting status display
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
18~30	0	Unlock	-
18~30	1	Lock	-

2-11. nvoHeatTempLock

- Description : High temperature limit setting status display
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
16~30	0	Unlock	-
16~30	1	Lock	-

2-12. nvoUserLockout

- Description : Lock status
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0	0	Unlock	-
100.0	1	Level 1	-
100.0	2	Level 2	-

2-13. nvoEnergyConp

- Description : Display electricity usage (Time Period)
- SNVT : SNVT_elec_kwh_l
- Operation

Value	Operation	Remark
0~999999	Electricity usage	First decimal place

2-14. nvoEnergyCon

- Description : Display electricity usage (Basic date)
- SNVT : SNVT_elec_kwh_l
- Operation

Value	Operation	Remark
0~999999	Electricity usage	First decimal place

2-15. nvoRuntimep

- Description : Display used hours (Period)
- SNVT : SNVT_time_hour
- Operation

Value	Operation	Remark
0~65535	Accumulated used hour	-

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12) Detail description of network variable

(1) Indoor unit/ ERV/ AHU kit object

2-16. nvoRuntime

- Description : Display used hours (Basic date)
- SNVT : SNVT_time_hour
- Operation

Value	Operation	Remark
0~65535	Accumulated used hour	First decimal place

2-17. nvoDevListDesc

- Description : Display indoor unit status
- SNVT : SNVT_str_asc
- Operation : ex) a1b2c3_00.00.01_0

			Description	Character		Value
ascii.		[0]	Model information	Alphabet or digit		-
		[1]				
		[2]				
		[3]				
		[4]				
		[5]				
		[6]	Separator	Underbar (_)		095
		[7]	On/Off controller address	Second significant digit		-
		[8]		First significant digit		
		[9]	Separator	Period (.)		046
		[10]	Interface Module address	Second significant digit		-
		[11]		First significant digit		
		[12]	Separator	Period (.)		046
		[13]	Indoor Unit Address	Second significant digit		-
		[14]		First significant digit		
		[15]	Separator	Underbar (_)		095
		[16]	Unit type	0: Indoor unit, 1: AHU, 2: ERV		-
		[17]	Separator	Underbar (_)		095
		[18]	Operation mode	0,1,2,3,4		-
		[19]	ON/OFF	0,1		-
		[20]	Fan speed	0,1,2,3,4,5		-
		[21]	Fan Swing	0,1		-
		[22]	Error	0,1		-
		[23]	Separator	Underbar (_)		095
		[24]	Set temperate	Second significant digit (SSD)		-
		[25]		First significant digit (FSD)		
		[26]		First decimal place (FDP)		
		[27]	Space temperate	SSD	minus sign	-
		[28]		FSD	SSD	
		[29]		FDP	FSD	
		[30]	Null padding	Null (ASCII 0)		048

(2) Indoor

1-1. nviDigitalOut

- Description : DMS2 DO status control
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Off	-
100.0	1	On	-

1-2. nviAllOff

- Description : All indoor units turn off
- SNVT : SNVT_hvac_emerg
- Operation

Value	Operation	Remark
0	-	-
4	ShutDown	-

1-3. nvoDigitalOut

- Description : DMS2 DO status monitoring
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Off	-
100.0	1	On	-

1-4. nvoDigitalIn

- Description : DMS2 DI status monitoring
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Off	-
100.0	1	On	-

1-5. nvoSystemLock

- Description : Display all indoor unit off command status
- SNVT : SNVT_switch
- Operation

Value	State	Operation	Remark
0.0	0	Unlock	-
100.0	1	Lock	-

1-6. nvoDMSAlarm

- Description : DMS2 related error
- SNVT : SNVT_count
- Operation

Value and operation	0 : Normal 8 : Emergency stop 105 : Tracing in progress 108 : Tracking failed 109 : Lon Module ↔ DMS2 communication Error 110 : Object ID Update

1-7. nvoSystemAlarm

- Description: Indoor unit related error
- SNVT: SNVT_count
- Operation
  - PIM Communication Error Refer to list of Error code

VI Building management system

2. BACnet Gateway

❏ *MIM-B17N*

1) Features

(Unit : mm)
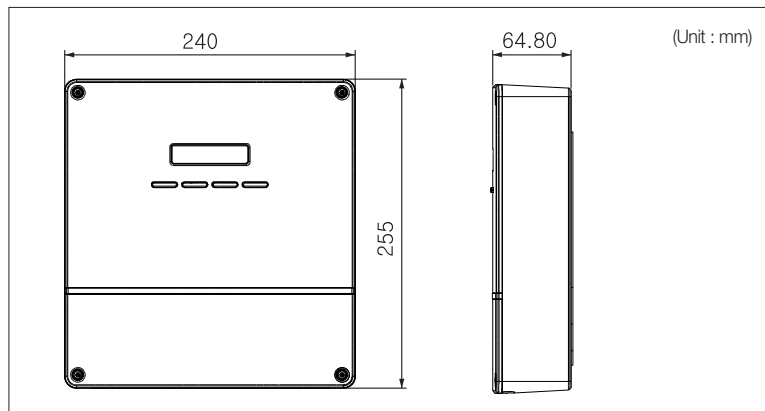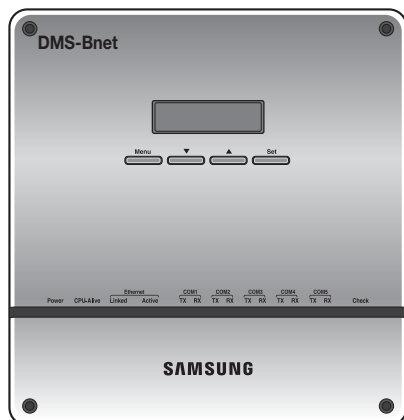
- For BACnet protocol system Support DMS2 control function at the same time.

2) Product specification

Size		240 x 255 x 64.8 mm (Width x Length x Depth)
Power supply	Source	DC Adaptor
	Input	100~240VAC (±10%), 50/60Hz
	Output	12V 3A
Operating temperature range		-10°C ~ 50°C
Operating humidity range		10%RH ~ 90%RH
Communication connection		Lower layer : RS485 (Outdoor unit, On/off controller, PIM) Upper layer : Ethernet 100Base-T (S-NET3, Web Browser) LonWorks layer : TP/FT-10A(Free topology 78kbps)
Max. communication length		Lower layer : Maximum 1000m (RS485) Upper layer : 100m (for one segment without repeaters) LonWorks layer : 78 kilobits-per-second bit rate for distances up to 500 meters in free topology or 2700 meters in bus topology with double terminations

Compatible devices

Type		Model	Maximum device connection	Remarks

Outdoor unit		DVM S series only	▪ Each communication channel :
			  16 units (Max. 128 indoor units)
			▪ Max. 80 outdoor units
			  (Max. 256 indoor units)
				Can not connect interface module
				(ex. MIM-B13D, MIM-B13D, MIM-B04A)

Controller	On/Off controller	MCM-A202DN	▪ Each communication channel : 15 units ▪ Max. 75 outdoor unit	Can not connect interface module (ex. MCM-A202D, MCM-A202B, MCM-A202A, MCM-A202)
	PIM	MIM-B16	8 units	-
Watt-meter		Pulse-type	Connected with PIM Pulse width : 20~400(ms) Pulse : 1~10000(Wh/pulse)	-

※ ERV cannot be connected until end of 2013

3) Description of parts

(1) Front

No	Name	Function
①	LCD display	Displays current time or menu
②	Menu button	Access the setting menu
	▲/▼ button	Select function or setting item in the setting menu
	Set button	Enter or check setting item in the setting menu
③	Bottom cover	Unscrew 2 screws on the bottom to remove the cover and check the cable connections

(2) LED indicator

No.	Item	Name	Status
①	Power	Power indicator	Turns blue when the power is supplied
②	CPU Alive	CPU operation indicator	Blinks in orange with 1 second intervals during normal operation
③	Ethernet–Linked	Internet connection indicator	Turns green during normal connection
④	Ethernet–Active	Internet data transmission/reception indicator	Blinks in orange during normal transmission/reception
⑤	COM1~5 – TX	Channel 1~5 On/Off controller/Interface module Data transmission indicator	Blinks in green during normal transmission
⑥	COM1~5 – RX	Channel 1~5 On/Off controller/interface module Data reception indicator	Blinks in green during normal reception
⑦	Check	Indoor/Outdoor unit Communication status indicator	Turns green when communication error occurs

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3) Description of parts

(3) Bottom
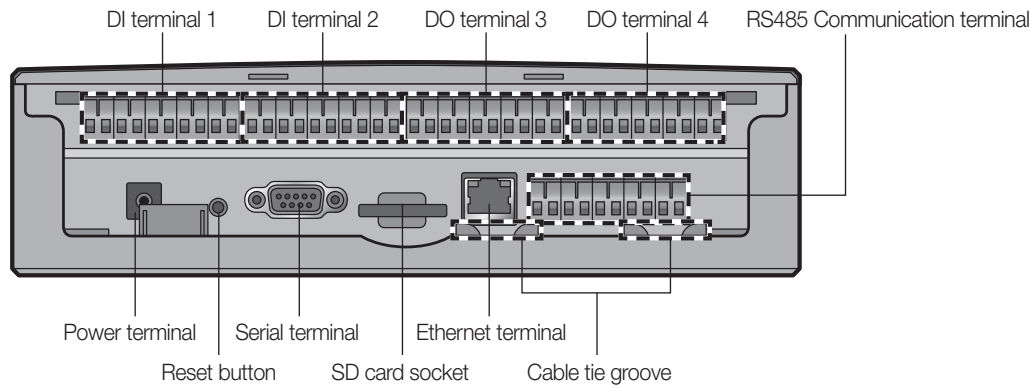
DI terminal 1   DI terminal 2   DO terminal 3   DO terminal 4   RS485 Communication terminal

Power terminal   Serial terminal   Ethernet terminal

Reset button   SD card socket   Cable tie groove

Name	Description
DI terminal 1	Digital Input connection terminal, Channel 1~Channel 5
DI terminal 2	Digital Input connection terminal, Channel 6~Channel 10
DO terminal 3	Digital Output connection terminal, Channel 1~Channel 5
DO terminal 4	Digital Output connection terminal, Channel 6~Channel 8
Reset button	Reset BACnet Gateway
Serial terminal	Sevice check port
SD card socket	Sub memory (for program update and set information saving) socket
RS485 communication terminal	RS485 port for communication with On/Off controller / interface module
Ethernet Terminal	Connect LAN cable
Cable tie groove	Groove for arranging cables

4) Connection diagram

▶ MIM-B16(PIM) should be connected separately with outdoor units or controllers.

For power distribution

PIM

On/Off controller

BACnet Gateway

Internet

BMS (BACnet)

Power line

R1-R2

F1-F2

R1-R2

F1-F2

Electrical substation

Watt-hour meter

R1-R2

F1-F2

5) Wiring

(CH = Channel)

CH0 CH1 CH2 CH3 CH4

C2 C1 R2 R1

F1 F2 R1 R2

F1 F2 R1 R2

(1) Connecting outdoor unit directly

• Maximum 16 outdoor units can be connected to each channel
• Total 80 outdoor units can be connected

(2) Connecting On/Off controller

• Maximum 15 On/Off controller can be connected to each channel

☑ *Note*

♦ BACnet Gateway can connect outdoor unit and On/Off controller at the same time.
♦ Outdoor unit and On/Off controller can be connected to 1 communication channel at the same time.

VI Building management system

2. BACnet Gateway

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5) Wiring

Connecting with outdoor unit

BACnet Gateway

CH0 CH1 CH2 CH3 CH4

R1R2

R1R2

Outdoor unit

R1 R2

Outdoor unit

0

Outdoor unit

0

Outdoor unit

R1R2

R1R2

1

Outdoor unit

1

Outdoor unit

Maximum 16
connections

F

Outdoor unit

F

Outdoor unit

Outdoor unit

※ Outdoor unit's address is defined automatically.
The address can be changed manually also.

Connecting with On/Off controller

BACnet Gateway

CH0 CH1 CH2 CH3 CH4

C2 C1 R2 R1

Maximum 15
On/Off controllers

Outdoor unit

R1R2

Outdoor unit

C2 C1 R2 R1

Outdoor unit

R1R2

Outdoor unit

Connecting with outdoor unit and on/off controller

BACnet Gateway

CH0 CH1 CH2 CH3 CH4

Maximum 16 outdoor units

R1R2

1
Outdoor unit

R1R2

2
Outdoor unit

R1R2

3
Outdoor unit

C2 C1 R2 R1

C2 C1 R2 R1

Wiring distance

ⓐ ⓑ ⓒ ⓓ ⓔ

Network radius

Maximum 15 On/Off controllers or 16 outdoor units can be connected to 1 channel of the BACnet Gateway

▶ **Distance between BACnet Gateway and On/Off controller/outdoor unit**
- Distance from the BACnet Gateway to the furthest device cannot exceed 1000m.
- ⓒ + ⓓ + ⓔ ≤ *1000m*

▶ **Distance between BACnet Gateway and upper level controller**
- Since BACnet Gateway supports 100 Base-T Ethernet, first repeater or upper level controller from the BACnet Gateway cannot be further than 100m (IEEE 802.3). Therefore, maximum network radius is restricted to 500m.

ⓐ, ⓑ, ⓒ, ⓓ, ⓔ = *100m*

ⓐ ⓑ ⓒ ⓓ ⓔ

HUB
Repeater

Maximum number of repeaters = 4

ⓐ 500m
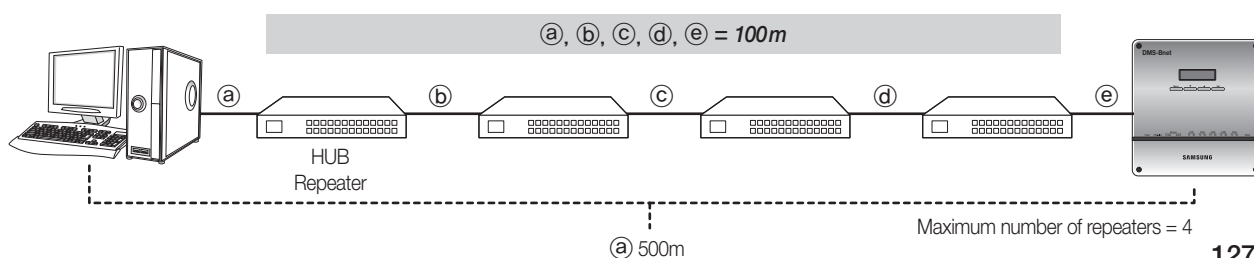
VI Building management system

2. BACnet Gateway

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6) Description of device ID

Item	DNET-Range [Digit 2]	CPP-Range [Digit 3]	INDOOR-Range [Digit 2]
On/Off controller	1~40	000~015	64
SIM / PIM	1~40	100~115	64
DMS2 DI/DO	1~40	300~315	64
Interface module (Outdoor unit)	1~40	400~655 (16 x 16)	64
Indoor Unit/ERV/AHU kit	1~40	400~655	0~63
Gateway	1~40	900	64

Ex)

- Indoor Unit
- DNET (Gateway number) : 9
- Indoor Unit Address: 01.01.32
- Device ID: 941732

Device Instance Number (Gateway ID)   Indoor unit main address

$$9 \quad\quad 417 \quad\quad 32$$

$$400 + \boxed{1 \times 16} + \boxed{1} = 417$$

On/Off controller address   Interface module address
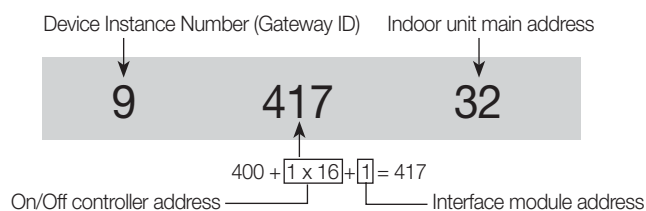
Checking device ID from BACnet Gateway

- Click 'Object ID' from the 'Object ID' column.
  Detail information window will appear and detail information will be displayed.
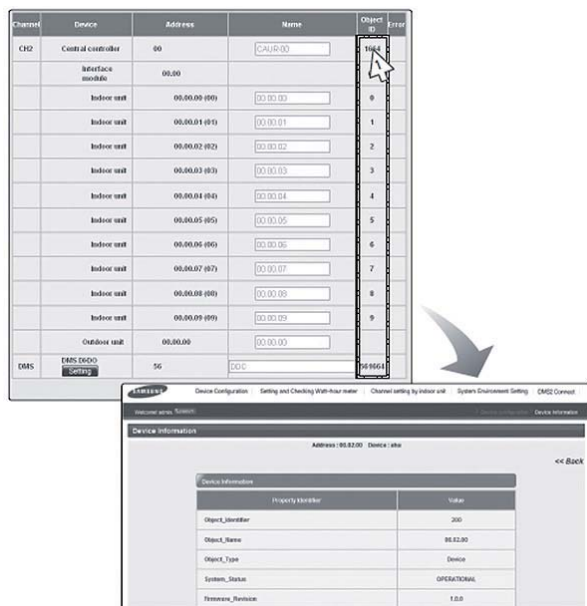
7) Object list

(1) Indoor unit

Single indoor unit has following point list.

Instance Number	Object	Object Type	Object Name	Unit Inactive Text-1	Status value Active Text-2	Text-3	Text-4	Text-5
1	Indoor temperature	AI	AC_RoomTemp_xx_xxxxxx	℃				
2	Set temperature	AV	AC_Temp_Set_xx_xxxxxx	℃				
3	Setting lower temperature limit	AV	AC_Cool_LimitTemp_xx_xxxxxx	℃				
4	Setting upper temperature limit	AV	AC_Heat_LimitTemp_xx_xxxxxx	℃				
5	The power value of an indoor unit after the basic date	AI	AC_Baseline_kWh_xx_xxxxxx	kWh				
6	The number of hours usage of an indoor unit after the basic date	AI	AC_Baseline_Minute_xx_xxxxxx	Minute				
7	Power value within period	AI	AC_Period_kWh_xx_xxxxxx	kWh				
8	The number of hours usage of an indoor unit within period	AI	AC_Period_Minute_xx_xxxxxx	Minute				
9	Power On/Off	BV	AC_Power_xx_xxxxxx	Off	On			
10	Applying lower temperature limit setting	BV	AC_Cool_Limit_set_xx_xxxxxx	False	True			
11	Applying upper temperature limit setting	BV	AC_Heat_Limit_set_xx_xxxxxx	False	True			
12	Filter sign status	BI	AC_FilterSign_xx_xxxxxx	False	True			
13	Filter sign reset	BO	AC_FilterSign_Reset_xx_xxxxxx	False	True			
14	Operation mode status	MV	AC_Operation_Mode_xx_xxxxxx	Auto	Cool	Heat	Fan	Dry
15	Fan speed status	MV	AC_FanSpeed_xx_xxxxxx	Auto	Low	Mid	High	
16	Air flow direction status	MV	AC_FanFlow_xx_xxxxxx	None	Vertical	Horizon	All	
17	Operation mode limit status	MV	AC_Mode_Limit_xx_xxxxxx	No Limit	Cool Only	Heat Only		
18	Remote controller limit status	MV	AC_Remocon_Limit_xx_xxxxxx	Enable RC	Disable RC	Conditional RC		
19	Integrated error code of both indoor unit and outdoor unit	AI	AC_Error_Code_xx_xxxxxx	Refer to Samsung integrated error code list				
20(*)	SPI setting	BV	AC_SPI_xx_xxxxxx	False	True			
21(*)	HumanSensor setting	BV	AC_MDS_xx_xxxxxx	False	True			
22(*)	AC Indoor Notify	NC	AC_Notify_xx_xxxxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)				

※ Temperature setting range can be different depending on the model and the common range is as follows :

Auto : 18℃~30℃

Cool : 18℃~30℃

Heat : 16℃~30℃

Fan : Temperature cannot be adjusted

Dry : 18℃~30℃

(*) Mark is optionally supported.

VI Building management system

2. BACnet Gateway

❑ *MIM-B17N*

7) Object list

(2) AHU kit

Single AHU unit has following point list.

Instance Number	Object	Object Type	Object Name	Unit	Status value			
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Indoor Temperature	AI	AHU_RoomTemp_xx_xxxxxx	℃				
2	Set temperature	AV	AHU_Temp_Set_xx_xxxxxx	℃				
3	Setting lower temperature limit	AV	AHU_Cool_LimitTemp_xx_xxxxxx	℃				
4	Setting upper temperature limit	AV	AHU_Heat_LimitTemp_xx_xxxxxx	℃				
5	The power value of an indoor unit after the basic date	AI	AHU_Baseline_kWh_xx_xxxxxx	kWh				
6	The number of hours usage of an indoor unit after the basic date	AI	AHU_Baseline_Minute_xx_xxxxxx	Minute				
7	Power value within period	AI	AHU_Period_kWh_xx_xxxxxx	kWh				
8	The number of hours usage of an indoor unit within period	AI	AHU_Period_Minute_xx_xxxxxx	Minute				
9	Power On/Off	BV	AHU_Power_xx_xxxxxx	Off	On			
10	Applying lower temperature limit setting	BV	AHU_Cool_Limit_set_xx_xxxxxx	False	True			
11	Applying upper temperature limit setting	BV	AHU_Heat_Limit_set_xx_xxxxxx	False	True			
12	Filter sign status	BI	AHU_FilterSign_xx_xxxxxx	False	True			
13	Filter sign reset	BO	AHU_FilterSign_Reset_xx_xxxxxx	False	True			
14	Operation mode status	MV	AHU_Operation_Mode_xx_xxxxxx	Auto	Cool	Heat	Fan	Dry
15	Operation mode limit status	MV	AHU_Mode_Limit_xx_xxxxxx	No Limit	Cool Only	Heat Only		
16	Remote controller limit status	MV	AHU_Remocon_Limit_xx_xxxxxx	Enable RC	Disable RC	Conditional RC		
17	Integrated error code of both indoor unit and outdoor unit	AI	AHU_Error_Code_xx_xxxxxx	Refer to Samsung integrated error code list				
18(*)	Discharge cooling set temperature	AV	AHU_DisCoolSetTemp_xx_xxxxxx	℃				
19(*)	Discharge heating set temperature	AV	AHU_DisHeatSetTemp_xx_xxxxxx	℃				
20(*)	Discharge current temperature	AI	AHU_Dis_CurrentTemp_xx_xxxxxx	℃				
21(*)	Humidification setting	BV	AHU_Humidification_xx_xxxxxx	Off	On			
22(*)	Outdoor air intake setting	BV	AHU_OAIntake_xx_xxxxxx	Off	On			
23(*)	Outdoor cooling setting	BV	AHU_OutdoorCool_xx_xxxxxx	Off	On			
24(*)	Fan speed status	MV	AHU_FanSpeed_xx_xxxxxx	Low	Mid	High		
25(*)	Set humidity status	MV	AHU_SetHumidity_xx_xxxxxx	Low	Mid	High		
26(*)	Current humidity status	MI	AHU_CurrentHumidity_xx_xxxxxx	Low	Mid	High		
27	AHU Notify	NC	AHU_Notify_xx_xxxxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)				

(*) Mark is optionally supported.

(3) ERV

Single ERV unit has following point list.

Instance Number	Object	Object Type	Object Name	Unit		Status value		
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Power On/Off operation	BV	ERV_Power_xx_xxxxxx	Off	On			
2	Filter sign status	BI	ERV_FilterSign_xx_xxxxxx	False	True			
3	Filter sign reset	BO	ERV_FilterSign_Reset_xx_xxxxxx	False	True			
4	Operation mode status	MV	ERV_Operation_Mode_xx_xxxxxx	Auto	HeatEx	Bypass	Sleep	
5	Fan speed status	MV	ERV_FanSpeed_xx_xxxxxx	Low	High	Turbo		
6	Remote controller limit status	MV	ERV_Remocon_Limit_xx_xxxxxx	Enable RC	Disable RC	Conditional RC		
7	Integrated error code of ERV unit	AI	ERV_Error_Code_xx_xxxxxx	Refer to list of error code				
8	ERV Notify	NC	ERV_Notify_xx_xxxxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)				

(4) SIM

Single SIM has following point list.

Instance Number	Object	Object Type	Object Name	Status value
1	SIM error code	AI	SIM_Error_Code_xx_xx	Refer to list of error code
2	SIM Notify	NC	SIM_Notify_xx_xx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)

(5) On/Off Controller

Single On/Off Controller has following point list.

Instance Number	Object	Object Type	Object Name	Status value
1	On/Off Controller error code	AI	Central_Error_Code_xx_xx	Refer to the list of the integrated error code
2	On/Off Controller notify	NC	Central_Notify_xx_xx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)

(6) Interface module (Outdoor unit)

Single Interface(Outdoor unit) module has following point list.

Instance Number	Object	Object Type	Object Name	Unit		Status value		
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Outside temperature	AI	ODU_Outside_Temp_xx_xxxx	°C				
2(*)	Cool capacity compensation	AV	ODU_Cool_Compensation_xx_xxxx	0 : 5~7°C / 1 : 7~9°C / 2 : 9~11°C / 3 : 10~12°C / 4 : 11~13°C / 5 : 12~14°C / 6 : 13~15°C / 14 : Auto control (from ODU)				
3(*)	Heat capacity compensation	AV	ODU_Heat_Compensation_xx_xxxx	0 : 25kg/cm² / 1 : 26kg/cm² / 2 : 27kg/cm² / 3 : 28kg/cm² / 4 : 29kg/cm² / 5 : 30kg/cm² / 6 : 31kg/cm² / 7 : 32kg/cm² / 8 : 33kg/cm² / 14 : Auto control (from ODU)				
4	Compressor status	BI	ODU_Comp_Status_xx_xxxx	False	True			
5	Interface module error code	AI	Repeater_Error_Code_xx_xxxx	Refer to the list of the integrated error code				
6	Interface module notify	NC	IM_Notify_xx_xxxx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)				

(*) Mark is optionally supported.

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7) Object list

(7) BACnet Gateway

BACnet Gateway has following point list.

Instance Number	Control and Monitoring	Object Type	Object Name	Status value
1	All device OFF	BO	ALL_OFF_xx	Inactive : All devices Off
1	DMS2 Status	AI	DMS2_Status_xx	0: Normal, 8: Emergency stop, 105 : Tracking in progress, 108 : Tracking failed 109 : DMS2 ↔ BACnet Communication failed
1	BACnet error code	AI	BACnetApp_Error_ Code_xx	BACnet error code
2	Gateway Notify	NC	GW_Notify_xx	When the error occurred, send event to list of destination in the recipient_list. (Max : 8)

(8) Digital input / output

Digital input / output Gateway has following point list.

| Instance Number	Object	Object Type	Object Name	Unit	Status value			
				Inactive	Active			
				Text-1	Text-2	Text-3	Text-4	Text-5
1	Digital Input 1	BI	DI_01_xx_xx (BACnet Gateway Reserved)	Off	On			
2	Digital Input 2	BI	DI_02_xx_xx (BACnet Gateway Reserved)	Off	On			
3	Digital Input 3	BI	DI_03_xx_xx	Off	On			
4	Digital Input 4	BI	DI_04_xx_xx	Off	On			
5	Digital Input 5	BI	DI_05_xx_xx	Off	On			
6	Digital Input 6	BI	DI_06_xx_xx	Off	On			
7	Digital Input 7	BI	DI_07_xx_xx	Off	On			
8	Digital Input 8	BI	DI_08_xx_xx	Off	On			
9	Digital Input 9	BI	DI_09_xx_xx	Off	On			
10	Digital Input 10	BI	DI_10_xx_xx	Off	On			
11	Digital Output 1	BO	DO_01_xx_xx (BACnet Gateway Reserved)	Off	On			
12	Digital Output 2	BO	DO_02_xx_xx (BACnet Gateway Reserved)	Off	On			
13	Digital Output 3	BO	DO_03_xx_xx	Off	On			
14	Digital Output 4	BO	DO_04_xx_xx	Off	On			
15	Digital Output 5	BO	DO_05_xx_xx	Off	On			
16	Digital Output 6	BO	DO_06_xx_xx	Off	On			
17	Digital Output 7	BO	DO_07_xx_xx	Off	On			
18	Digital Output 8	BO	DO_08_xx_xx	Off	On			

▶ Caution

- You may use ALL_OFF command to turn on all the indoor units but it is not recommended.
- If communication error occurs on devices such as SIM/On/Off Controller/Interface Module etc, other functions such as power distribution may also create a problem. You must have BMS system to check the errors and you must take action immediately.

8) Checking BACnet communication through Wireshark

(1) Who-is (I-Am)

- After device instance numbers have been automatically assigned, Who-is command which is requested in the Wireshark will be replied by i-am from the devices.
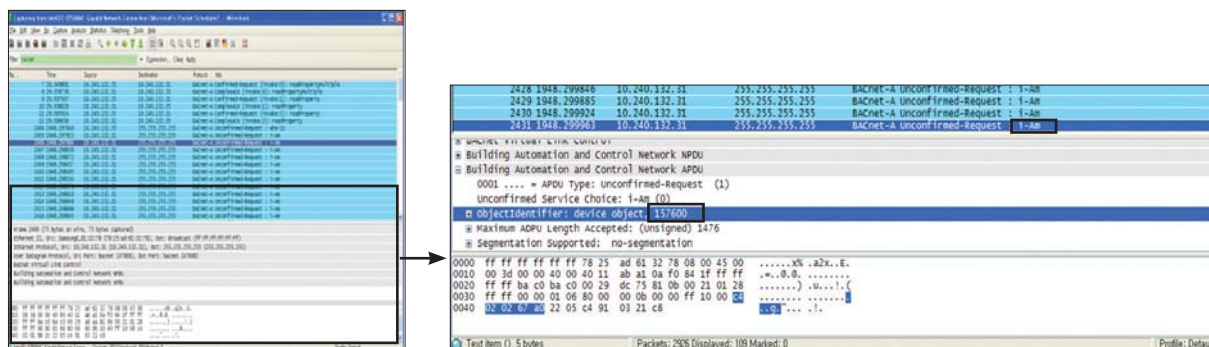
(2) ReadPropertyMultiple

- Request all status datas.
- Device description, BACnet network number device node ID, status, BACnet MAC address version, Max APDU length accepted, APDU retries, timeout, supported services, supported object types and so on.
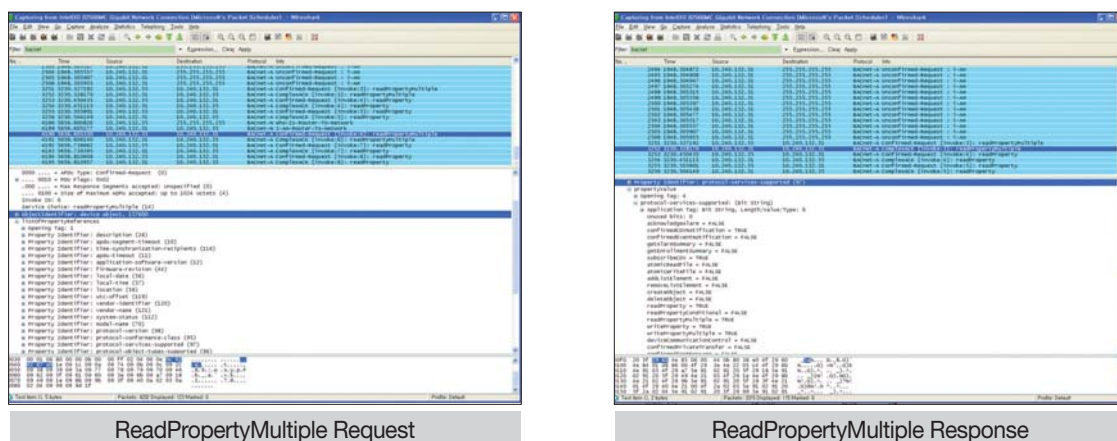
ReadPropertyMultiple Request

ReadPropertyMultiple Response

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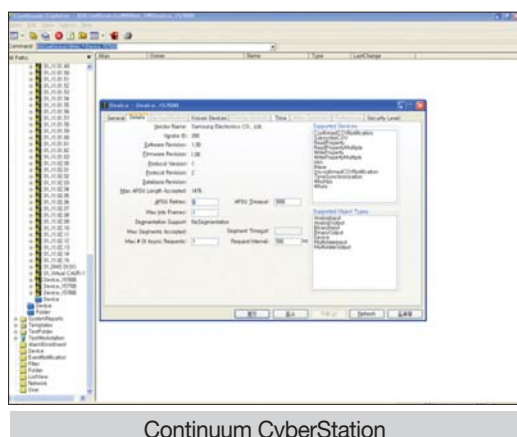### 8) Checking BACnet communication through Wireshark

(3) ReadPropertyMultiple

• Object_MultiStateInput

Request

Response

(4) WriteProperty

• Change the FanSpeed from Auto to Low

1. Request - WriteProperty (FanSpeed 'Auto' ➜ 'Low')
2. Response - SimpleACK
3. Request - ReadPropertyMultiple (FanSpeed)
4. Response – ReadPropertyMultiple (FanSpeed 'Low')
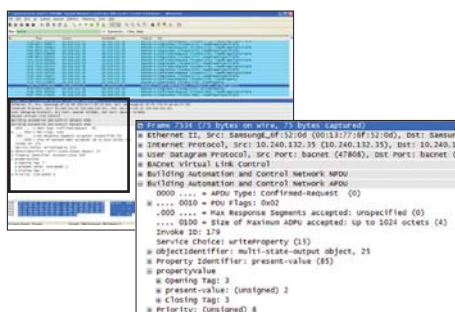
WriteProperty

ReadPropertyMultiple

(5) Subscribe COV

Request

```
User Datagram Protocol, Src Port: bacnet (47808), Dst Port: bacnet (47808)
BACnet Virtual Link Control
Building Automation and Control Network NPDU
  Version: 0x01 (ASHRAE 135-1995)
  Control: 0x24
  Destination Network Address: 1
  Destination MAC Layer Address Length: 6
  Destination ISO 8802-3 MAC Address: 80:00:00:0b:00:01 (80:00:00:0b:00:01)
  Hop Count: 255
Building Automation and Control Network APDU
  0000 .... = APDU Type: Confirmed-Request  (0)
  .... 0010 = PDU Flags: 0x02
  .000 .... = Max Response Segments accepted: Unspecified (0)
  .... 0100 = Size of Maximum ADPU accepted: Up to 1024 octets (4)
  Invoke ID: 121
  Service Choice: subscribeCOV (5)
  subscriber Process Id: (unsigned) 100
  ObjectIdentifier: analog-input object, 7
  issue Confirmed Notifications: TRUE
  life time (hh.mm.ss): 0.20.00
```


Response

```
User Datagram Protocol, Src Port: bacnet (47808),
BACnet Virtual Link Control
Building Automation and Control Network NPDU
  Version: 0x01 (ASHRAE 135-1995)
  Control: 0x08
  Source Network Address: 1
  Source MAC Layer Address Length: 6
  SADR: 80:00:00:0b:00:01 (80:00:00:0b:00:01)
Building Automation and Control Network APDU
  0010 .... = APDU Type: SimpleACK  (2)
  Invoke ID: 121
  Service Choice: subscribeCOV (5)
```

(6) COV Notification
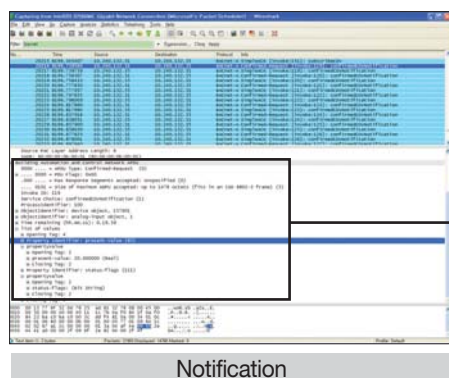
Notification

```
Building Automation and Control Network APDU
  0000 .... = APDU Type: Confirmed-Request  (0)
  .... 0000 = PDU Flags: 0x00
  .000 .... = Max Response Segments accepted: Unspecified (0)
  .... 0101 = Size of Maximum ADPU accepted: Up to 1476 octets (fits in an ISO 8802-3 frame) (5)
  Invoke ID: 119
  Service Choice: confirmedCOVNotification (1)
  ProcessIdentifier: 100
  ObjectIdentifier: device object, 157601
  ObjectIdentifier: analog-input object, 1
  Time remaining (hh.mm.ss): 0.19.59
  list of values
    Opening Tag: 4
    Property Identifier: present-value (85)
    propertyvalue
      Opening Tag: 2
      present-value: 20.000000 (Real)
      Closing Tag: 2
    Property Identifier: status-flags (111)
    propertyvalue
      Opening Tag: 2
      status-flags: (Bit String)
      Closing Tag: 2
    Closing Tag: 4
```
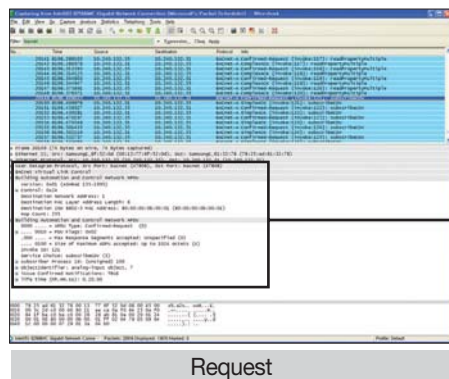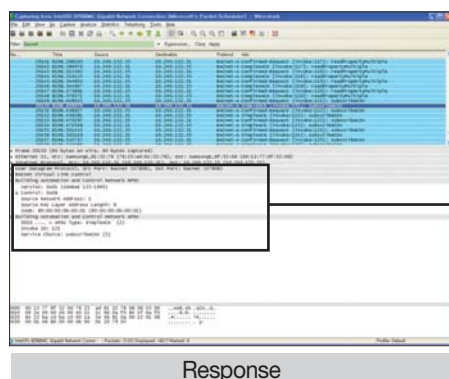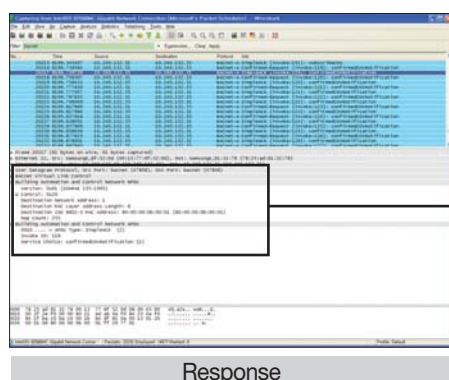

Response

```
BACnet Virtual Link Control
Building Automation and Control Network NPDU
  Version: 0x01 (ASHRAE 135-1995)
  Control: 0x20
  Destination Network Address: 1
  Destination MAC Layer Address Length: 6
  Destination ISO 8802-3 MAC Address: 80:00:00:0b:00:01 (80:00:00:0b:00:01)
  Hop Count: 255
Building Automation and Control Network APDU
  0010 .... = APDU Type: SimpleACK  (2)
  Invoke ID: 119
  Service Choice: confirmedCOVNotification (1)
```

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9) Standard object type

Object Type	Support	Description
Analog Input	■	[Indoor temperature], [Lower limit temperature], [Upper limit temperature], [Electric value after baseline], [Indoor unit usage after baseline], [Electric value within the period], [Electric value within period], [Indoor unit error code], [On/Off controller error code], [Interface module error code], [SIM interface module error code], [DMS2 status], [DMS2 error]
Analog Output	■	[Set temperature], [Setting lower limit temperature], [Setting upper limit temperature]
Analog Value	☐	
Averaging	☐	
Binary Input	■	[Power On/Off Status], [Filter alert status], [Lower limit function toggle status], [Lower limit function toggle status], [Upper limit function toggle status], [DI]
Binary Output	■	[Power On/Off control], [Filter reset control], [Setting lower limit function toggle], [Setting upper limit function toggle], [DO]
Binary Value	☐	
Calendar	☐	
Command	☐	
Device	■	[DMS2], [A/C Indoor Unit], [ERV], [AHU], [SIM], [On/Off controller], [Interface module], [DMS2 DI/DO]
Event Enrollment	☐	
File	☐	
Group	☐	
Life Safety Point	☐	
Life Safety Zone	☐	
Loop	☐	
Multi-state Input	■	[Operation mode status], [Fan speed status], [Air direction status], [Cooling only/Heating only/Restriction cancellation status], [Allow/Stop Remote control/Level 1 status]
Multi-state Output	■	[Control operation mode], [Control Fan speed], [Control air flow direction], [Setting cooling only/Heating only/Restriction cancellation], [Control allowing/stopping remote control/level 1]
Multi-state Value	☐	
Notification Class	☐	
Program	☐	
Pulse Converter	☐	
Schedule	☐	
Trend Log	☐	
Access Door	☐	
Event Log	☐	
Load Control	☐	
Structured View	☐	
Trend Log Multiple	☐	

10) Property support specification

(1) Device property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	Individual identifier
2	Object name	CharaterString	R	V	SAMSUNG DVM Gateway
3	Object type	BACnetObjectType	R	V	DEVICE
4	System status	BACnetDeviceStatus	R	V	During communication: "OPERATIONAL" Error with DMS2: "NON_OPERATIONAL"
5	Vendor name	CharacterString	R	V	Samsung Electronics CO., Ltd.
6	Vendor identifier	Unsigned16	R	V	200
7	Model name	CharterString	R	V	MIM-B17N
8	Firmware revision	CharterString	R	V	1.00
9	Application software version	CharterString	R	V	1.00
10	Location	CharterString	O		X
11	Description	CharterString	O	V	DMS2_BACnetIP [ver 1.00]
12	Protocol version	Unsigned	R	V	1.00
13	Protocol conformance class	Unsigned(1..6)	R		X
14	Protocol services supported	BACnetServicesSupported	R	V	For each device
15	Protocol object types supported	BACnetObjectTypesSupported	R	V	For each device
16	Object list	BACnetidentifier BACnet sequence [N]	R	V	For each device
17	Max APDU length accepted	Unsigned	R	V	1476
18	Segmentation supported	BACnetSegmentation	R	V	NO-SEGMENTATION
19	VT classes supported	BACnetVTClass	O[1]		X
20	Active VT sessions	BACnetVTSessions	O[1]		X
21	Local time	Time	O	V	Supported
22	Local date	Date	O	V	Supported
23	UTC offset	INTEGER	O		X
24	Daylight savings timeout	BOOLEAN	O		X
25	APDU segment timeout	Unsigned	O[2]		X
26	APDU timeout	Unsigned	R	V	3000
27	Number of APDU retries	Unsigned	R	V	3
28	List of session keys	BACnetSessionKey	O		X
29	Time synchronization recipients	BACnetRecipient	O[3]		X
30	Max master	Unsigned(1..127)	O[4]	V	X
31	Max info frames	Unsigned	O[4]	V	X
32	Device address binding	BACnetAddressBinding	R	V	X
33	Protocol revision	Unsigned	R	V	2

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10) Property support specification

(2) Analog Input Property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	
2	Object name	CharaterString	R	V	
3	Object type	BACnetObjectType	R	V	
4	Present value	REAL	R(1)	V	
5	Description	CharacterString	O	V	AI_Instance_device address
6	Device type	CharacterString	O		
7	Status Flags	BACnetStatusFlags	R	V	Communication Status_Flags FAULT flag → True OUT_OF_SERVICE → TRUE
8	Event state	BACnetEventState	R	V	General Error
9	Reliability	BACnetReliability	O	V	Status_Flags FAULT flag → TRUE FAULT if Reliability is not NO_FALUT_DETECTED Communication error → COMMUNICATION_ FAILURE General error → Unreliable_other
10	Out of service	BOOLEAN	R	V	Communication error → TRUE
11	Update interval	Unsigned	O		
12	Units	BACnetEngineeringUnits	R	V	
13	Min pres value	REAL	O	V	
14	Max Pres Value	REAL	O	V	
15	Resolution	REAL	O		
16	COV increment	REAL	O$^{(2)}$	V	
17	Time delay	Unsigned	O$^{(3)}$		
18	Notification class	Unsigned	O$^{(3)}$		
19	High limit	REAL	O$^{(3)}$		
20	Low limit	REAL	O$^{(3)}$		
21	Deadband	REAL	O$^{(3)}$		
22	Limit Enable	BACnetLimitEnable	O$^{(3)}$		
23	Event enable	BACnetEventTransitionBits	O$^{(3)}$		
24	Acked transition	BACnetEventTransitionBits	O$^{(3)}$		
25	Notify type	BACnetNotifyType	O$^{(3)}$		

(3) Analog output property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	
2	Object name	CharaterString	R	V	
3	Object type	BACnetObjectType	R	V	
4	Present value	REAL	W	V	
5	Description	CharacterString	O	V	AI_Instance_device address
6	Device type	CharacterString	O		
7	Status Flags	BACnetStatusFlags	R	V	Communication Status_Flags FAULT flag → True OUT_OF_SERVICE → TRUE
8	Event state	BACnetEventState	R	V	General Error
9	Reliability	BACnetReliability	O	V	Status_Flags FAULT flag → TRUE FAULT if Reliability is not NO_FALUT_DETECTED Communication error → COMMUNICATION_ FAILURE General error → Unreliable_other
10	Out of service	BOOLEAN	R	V	Communication error → TRUE
11	Units	BACnetEngineeringUnits	R	V	
12	Min pres value	REAL	O	V	
13	Max Pres Value	REAL	O	V	
14	Resolution	REAL	O		
15	Priority array	BACnetPriorityArray	R	V	
16	Relinquish default	REAL	R	V	
17	COV increment	REAL	O[1]		
18	Time Delay	Unsigned	O[2]		
19	Notification class	Unsigned	O[2]		
20	High limit	REAL	O[2]		
21	Low limit	REAL	O[2]		
22	Deadband	REAL	O[2]		
23	Limit enable	BACnetLimitEnable	O[2]		
24	Event Enable	BACnetEventTransitionBits	O[2]		
25	Acked transition	BACnetEventTransitionBits	O[2]		
25	Notify type	BACnetNotifyType	O[2]		

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10) Property support specification

(4) Binary input property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	
2	Object name	CharaterString	R	V	
3	Object type	BACnetObjectType	R	V	
4	Present value	BACnetBinaryPV	W	V	
5	Description	CharacterString	O	V	AI_Instance_device address
6	Device type	CharacterString	O		
7	Status Flags	BACnetStatusFlags	R	V	Communication Status_Flags FAULT flag → True OUT_OF_SERVICE → TRUE
8	Event state	BACnetEventState	R	V	General Error
9	Reliability	BACnetReliability	O	V	Status_Flags FAULT flag → TRUE FAULT if Reliability is not NO_FALUT_DETECTED Communication error → COMMUNICATION_ FAILURE General error → Unreliable_other
10	Out of service	BOOLEAN	R	V	Communication error → TRUE
11	Polarity	BACnetPolarity	R	V	
12	Inactive text	CharacterString	O[1]	V	New
13	Active text	CharacterString	O[1]	V	New
14	Change of state time	BACnetDateTime	O[2]		
15	Change of state count	Unsigned	O[2]		
16	Time of state count reset	BACnetDateTime	O[2] O[3]		
17	Elapsed active time	Unsigned32	O[3]		
18	Time of active time reset	BACnetDate Time	O		
19	Time delay	Unsigned	O[4]		
20	Notification class	Unsigned	O[4]		
21	Alarm value	BACnetBinaryPV	O[4]		
22	Event enable	BACnetEventTransitionBits	O[4]		
23	Acked transition	BACnetEventTransitionBits	O[4]		
24	Notify type	BACnetNotifyType	O[4]		

(5) Binary output property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	
2	Object name	CharaterString	R	V	
3	Object type	BACnetObjectType	R	V	
4	Present value	BACnetBinaryPV	W	V	
5	Description	CharacterString	O	V	AI_Instance_device address
6	Device type	CharacterString	O		
7	Status Flags	BACnetStatusFlags	R	V	Communication Status_Flags FAULT flag → True OUT_OF_SERVICE → TRUE
8	Event state	BACnetEventState	R	V	General Error
9	Reliability	BACnetReliability	O	V	Status_Flags FAULT flag → TRUE FAULT if Reliability is not NO_FALUT_DETECTED Communication error → COMMUNICATION_ FAILURE General error → Unreliable_other
10	Out of service	BOOLEAN	R	V	Communication error → TRUE
11	Polarity	BACnetPolarity	R	V	
12	Inactive text	CharacterString	O[1]	V	
13	Active text	CharacterString	O[1]	V	
14	Change of state time	BACnetDateTime	O[2]		
15	Change of state count	Unsigned	O[2]	V	
16	Time of State count reset	BACnetDateTime	O[2] O[3]	V	
17	Elapsed active time	Unsigned32	O[3]		
18	Time of active time reset	BACnetDate Time	O		
19	Minimum off time	Unsigned32	O		
20	Minimum on time	Unsigned32	O		
21	Priority array	BACnetPriorityArray	R		
22	Relinquish default	BACnetBinaryPV	R		
23	Time delay	Unsigned	O[4]		
24	Notification class	Unsigned	O[4]		
25	Alarm value	BACnetBinaryPV	O[4]		
26	Event enable	BACnetEventTransitionBits	O[4]		
27	Acked transition	BACnetEventTransitionBits	O[4]		
28	Notify type	BACnetNotifyType	O[4]		

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10) Property support specification

(6) Multi-state input property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	
2	Object name	CharaterString	R	V	
3	Object type	BACnetObjectType	R	V	
4	Present value	Unsigned	R(1)	V	
5	Description	CharacterString	O	V	M_Instance_device address
6	Device type	CharacterString	O		
7	Status Flags	BACnetStatusFlags	R	V	Communication Status_Flags FAULT flag → True OUT_OF_SERVICE → TRUE
8	Event state	BACnetEventState	R	V	General Error
9	Reliability	BACnetReliability	O	V	Status_Flags FAULT flag → TRUE FAULT if Reliability is not NO_FALUT_DETECTED Communication error → COMMUNICATION_ FAILURE General error → Unreliable_other
10	Out of service	BOOLEAN	R	V	Communication error → TRUE
11	Number of states	Unsigned	R	V	
12	State text	BACnet sequence of characterString	O	V	
13	Time delay	Unsigned	O[2]		
14	Notification class	Unsigned	O[2]		
15	Alarm values	Unsigned list	O[2]		
16	Fault values	Unsigned list	O[2]		
17	Event enable	BACnetEventTransitionBits	O[2]		
18	Acked transition	BACnetEventTransitionBits	O[2]		
19	Notify type	BACnetNotifyType	O[2]		

(7) Multi-state output property

	Property identifier	Property data	Check code	Support	DMS2
1	Object identifier	BACnetObjectIdentifier	R	V	
2	Object name	CharaterString	R	V	
3	Object type	BACnetObjectType	R	V	
4	Present value	Unsigned	R(1)	V	
5	Description	CharacterString	O	V	M_Instance_device address
6	Device type	CharacterString	O		
7	Status Flags	BACnetStatusFlags	R	V	Communication Status_Flags FAULT flag → True OUT_OF_SERVICE → TRUE
8	Event state	BACnetEventState	R	V	General Error
9	Reliability	BACnetReliability	O	V	Status_Flags FAULT flag → TRUE FAULT if Reliability is not NO_FALUT_DETECTED Communication error → COMMUNICATION_ FAILURE General error → Unreliable_other
10	Out of service	BOOLEAN	R	V	Communication error → TRUE
11	Number of states	Unsigned	R	V	
12	State text	BACnet arrangement of CharacterString	O	V	
13	Time delay	Unsigned	O(2)		
14	Notification class	Unsigned	O(2)		
15	Alarm values	Unsigned list	O(2)		
16	Fault values	Unsigned list	O(2)		
17	Event enable	BACnetEventTransitionBits	O(2)		
18	Acked transition	BACnetEventTransitionBits	O(2)		
19	Notify type	BACnetNotifyType	O(2)		

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