Data Management Server 2 (MIM-D00A)

Data Management Server 2

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- **Built-in web server for PC-independent management and remote access control**
- **Multiple upper-layer control access (S-NET 3, S-NET Mini, 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**

Size		240 * 255 * 64.8 mm (Width * Length * Depth)
Power supply	Source	DC Adaptor
	Input	100~240VAC (±10%), 50/60Hz
	Output	12V 3A
Operating humidity range		0%RH ~ 90%RH
Storage temperature range		-20 ℃ ~ 70 ℃
Communication connection		Lower layer : RS485 (to centralized controllers) Upper layer : Ethernet 100Base-T (S-NET3, S-NET mini, Web Browser)
Max. communication length		Lower layer : Maximum 1000m (RS485) Upper layer : 100m (for one segment without repeaters)
Max. number of interface		Lower layer : 16 centralized controllers, 80 interface modules Upper layer : Unlimited

Main Features

1. Easy Control & Monitoring

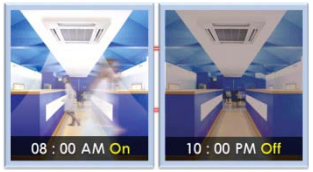
- Individual/Group control of up to 256 indoor units including ERV,AHU
- Operation mode, temperature setting, airflow direction and fan speed.
- Restriction on use of wireless/wired remote controllers.
- ODU/IDU cycle monitoring

2. Web Server Function

- Remote control with the public IP address
- No management software required – PC-independent management

3. Schedule Control Function

- Up to 256 schedule settings
- Weekly and daily schedule setting
- Wireless/wired remote controller restriction setting



4. Power Distribution System

- Power distribution to 256 indoor units.
- Remote data query in -1day units
- File save in Microsoft Excel format.
- Power distribution data storage for one year in 1-day units.

5. External Contact Interface

- Full indoor unit control with simple contact input (Emergency/Lock)
- State output (Operation/Error) for synchronous control

Main Features

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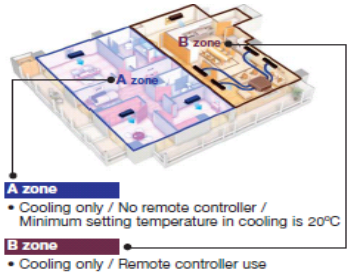
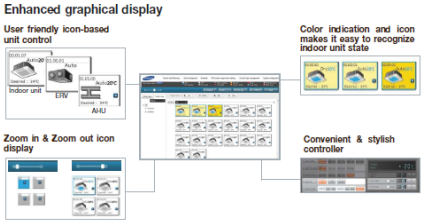
6. Smart Central Management

- Control & monitoring zone edition
- Wireless/wired remote control restriction
- Temperature limit setting
- Operation mode restriction



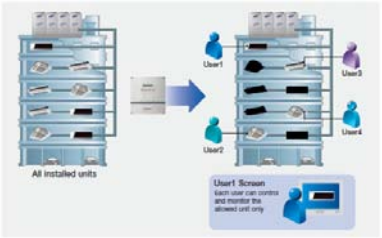
7. Enhanced graphical display

- User friendly icon-based unit control
- Zoom in & Zoom out icon display
- Color indication and icon makes it easy to recognize indoor unit state
- Convenient & stylish controller



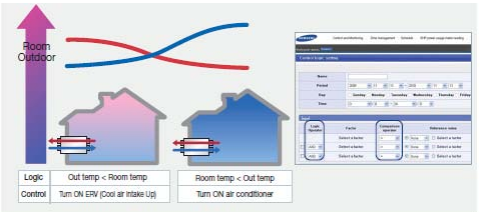
8.Accessible level / Dynamic user security Management

- Specify the scope of control and monitoring unit on a per-user
- 3 accessible level -Admin/Manager/User



9. User editable control logic

- User can edit control logic with arithmetic/conditional operators and parameters
- Efficient energy saving realization for various operation conditions
- EHP/ERV/AHU parameters + AND/OR + Arithmetic equation Function



10. Powerful data backup/Useful history management

- Important data is safely stored in SD memory card
- Record the operation history and error history

Comparison of DMS1 & DMS2

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	DMS1	DMS2
Exterior view		
Size (mm)	130(L) x 135(H) x 60(D)	240(L) x 255(H) x 64.8(D)
No. of units	256 units (EHP + ERV + AHU)	256 units (EHP + ERV + AHU)
Lower interface	On/Off controllers only	Both on/off controllers and interface modules
prerequisite	Java Runtime Environment	Silverlight
Main function	- Control/Monitoring - Schedule setting - Power distribution	- Control/Monitoring - Schedule setting - Power distribution - Zone control - Logic programming - Security level
Input/Output	- RS485 Port : 1ch - DI, DO Port : 2ch / 2ch - Ethernet port : 1ch	- RS485 Port : 5ch - DI, DO Port : 10ch / 10ch - Ethernet port : 1ch
Others		- Fast access speed (approx. 4 times faster) - Data & configuration backup to SD memory - Dynamic zoom in/out - Indoor/Outdoor unit cycle data display - Dynamic IP support (IP display on LCD)

Comparison of DMS1 & DMS2

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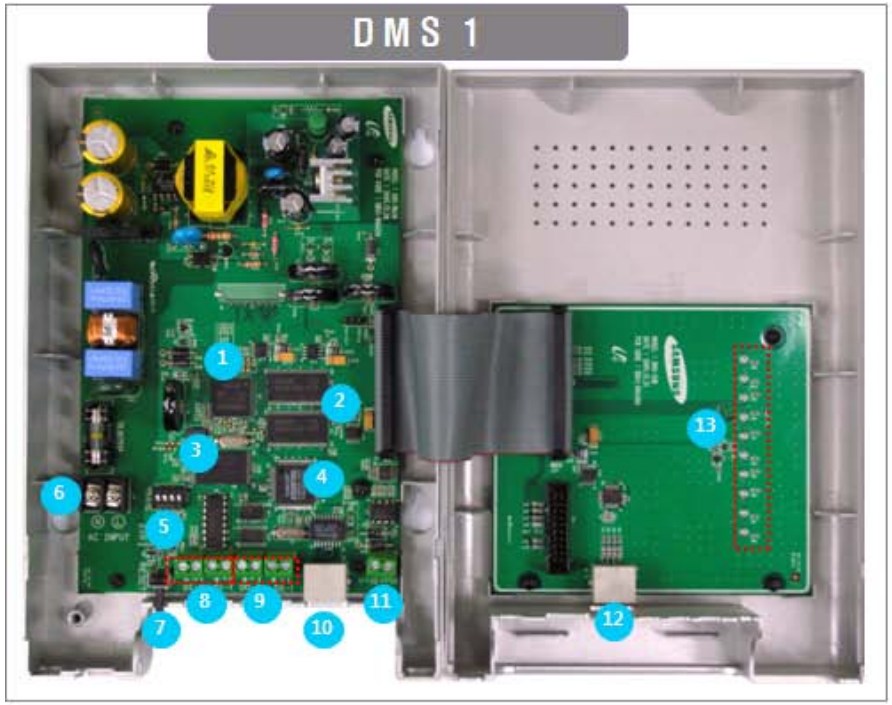

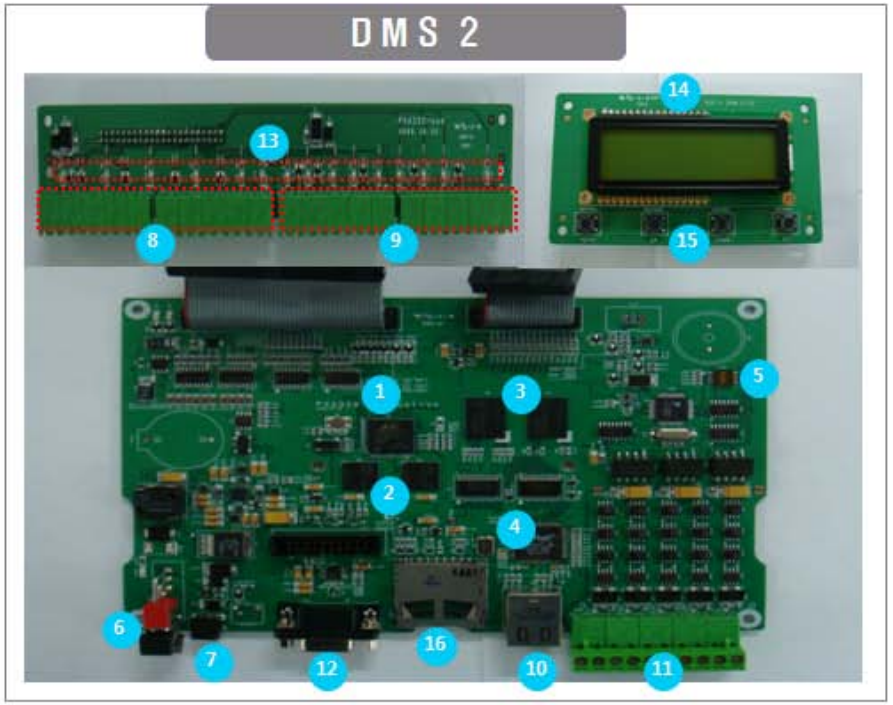

1	Main CPU	7	Reset Button	13	LED Display
2	SDRAM	8	Digital Input	14	LCD Display
3	NAND Flash	9	Digital Outpu	15	LCD Control Button
4	Ethernet Chip	10	Ethernet Connector	16	SD Card Port
5	Option Switch	11	485 communication Connector		
6	Power Connector	12	Serial Port		

View & Connector

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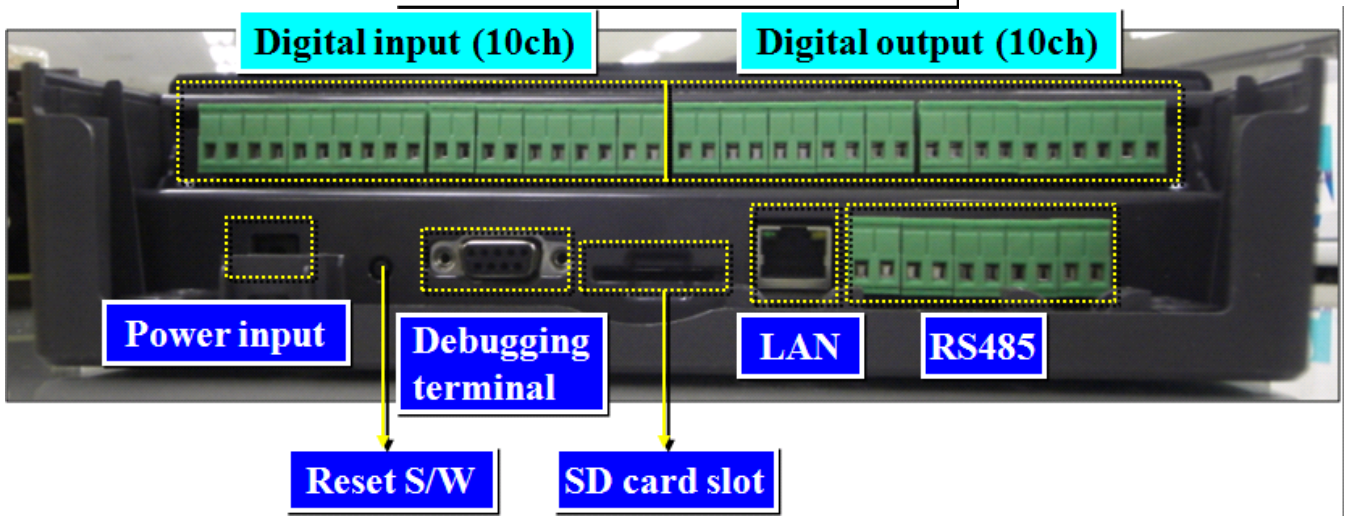
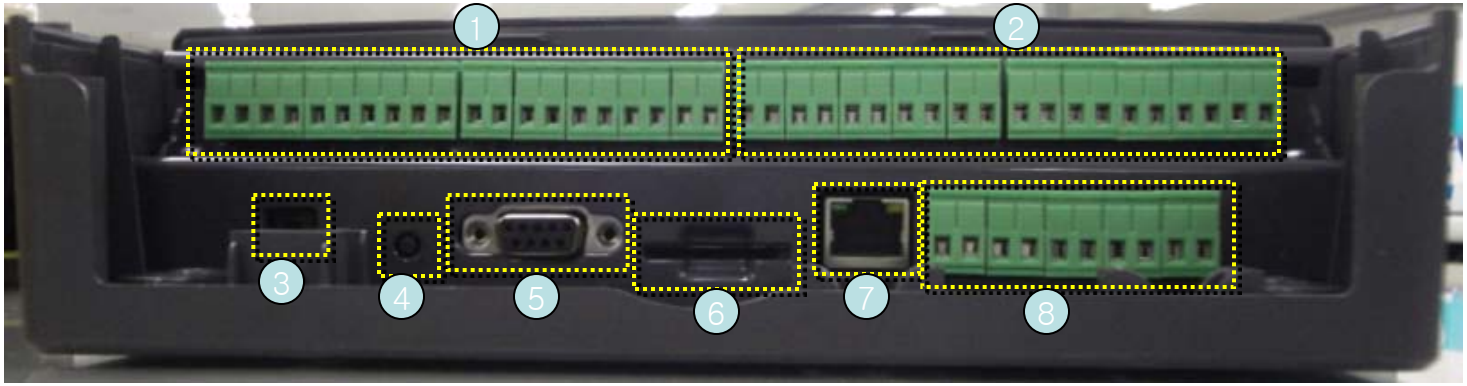
Exterior View

Interior View

Connectors

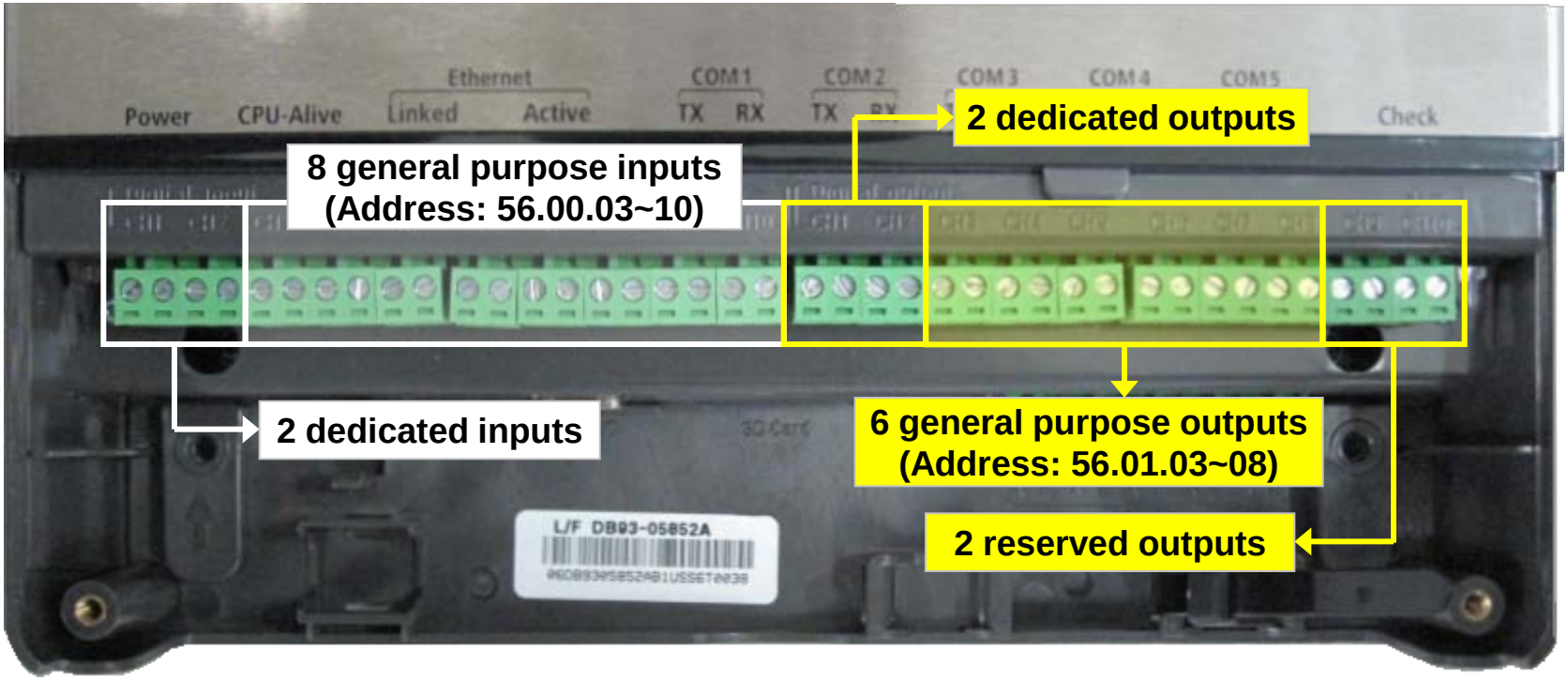


Connectors



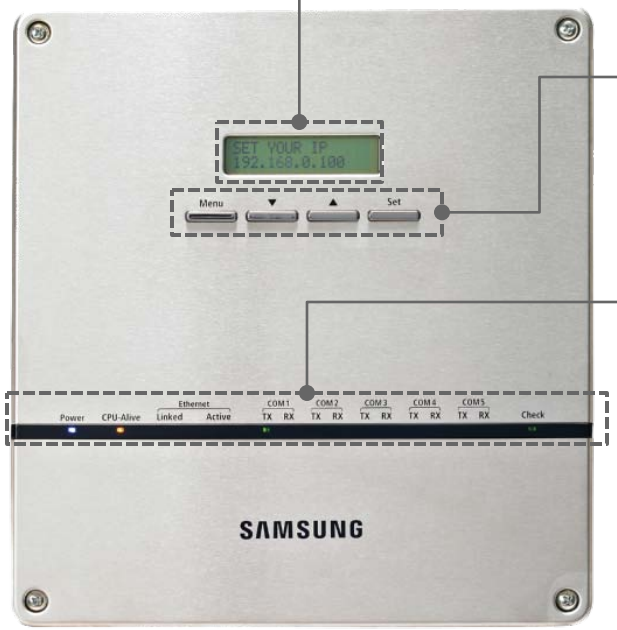
No	Name	Description
1	Digital Input	All indoor unit operation and wired/wireless remote controller use are controlled according to the option switch setting.
2	Digital Output	DC signal voltage is output in case of error in more than one indoor unit and outdoor unit. Output voltage : 12VDC, 500mA
3	Power	Power supply to DMS. 12VDC/3.0A (adapter)
4	Reset button	Press the reset button to restart DMS.
5	Debugging terminal	Used for system debugging of DMS operation, configuration and data management.
6	SD card slot	SD card slot for data storage and updating software
7	LAN port	LAN connection with upper-layer devices.
8	RS485 port	RS485 connection with centralized controllers (polarized)

Connectors



- Interface with external control system
- 2 dedicated voltage-free inputs (Emergency control and others)
- 8 voltage-free contact inputs for general purposes (Open/short contact input)
- 2 dedicated voltage-free outputs (Operation/Error)
- 6 12-voltage outputs for external interlocking systems
- 2 reserved outputs for later use
- Inputs and outputs have each fixed address
  - Digital input address: 56.00.03~56.00.10
  -Digital output address: 56.01.03~56.01.08

LCD/LED Display



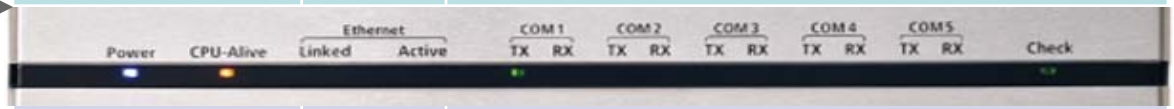
LCD Display

-. Usually display the IP address and current time
-. Display the menu name when the button is input

LCD menu input button

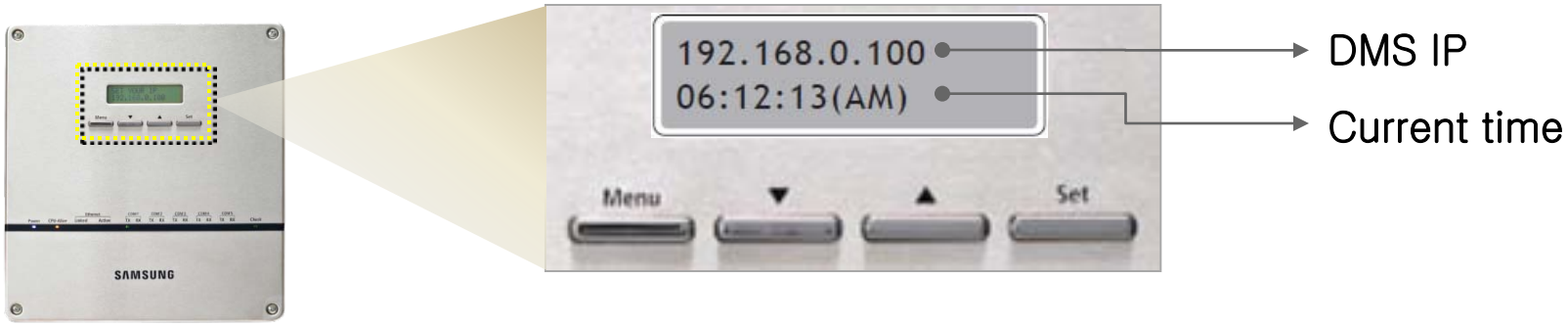
-.4 button: Menu, ▼(down), ▲(up), Set
−.Menu entering/ moving/ setting

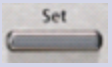
LED Display



Name	Color	Description
Power	Blue	Power LED is ON when power input is applied normally.
CPU Alive	Orange	CPU Alive starts to flicker every second in normal state.
Ethernet Linked	Green	Linked LED is ON in normal LAN connection
Ethernet Active	Orange	It flickers whenever LAN communication is activated between DMS and upper-layer devices
COM1~COM5 TX	Green	It flickers when data request is sent from the DMS to lower-layer devices through RS485 communication
COM1~COM5 RX	Green	It flickers when DMS receives data from the lower-layer devices through RS485 communication.
Check	Green	It lights on when there is an error on more than one indoor/outdoor unit or in communication..

LCD Display



Button	Description
LCD display	▪ Normal state: IP / Current time is displayed ▪ Menu setting status
Menu 	▪ Selection the main menu ▪ Cancel the menu setting
▼ 	▪ Searching the menu ▪ changing the menu setting
▲ 	▪ Searching the menu ▪ changing the menu setting
Set 	▪ Entering the sub menu ▪ Saving the menu setting

LCD Display menu

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	Main Menu	Sub menu	View	Setting	Description
1	**IP Config**	IP ADDRESS	O	O	IP Setting
		NETMASK ADDRESS	O	O	Subnet mask setting
		GATEWAY ADDRESS	O	O	Gateway setting
		DNS SERVER	O	O	DNS server address setting
		DHCP CONFIG	O	O	DHCP enable/disable setting
2	**In/Outdoor**	Indoor	O	X	Indoor units quantity connected with DMS
		Outdoor	O	X	Outdoor units quantity connected with DMS
3	**DMS Version**	DMS version	O	X	DMS version
4	**DMS Time**	CURRENT DATE	O	O	DMS current date setting
		CURRENT TIME	O	O	DMS current time setting
5	**Data Backup**	data backup	X	O	Data backup with SD card
		data restore	X	O	Data restoration with SD card
6	**Peak Level**	Peak Level	O	X	Only for Korea market
		Cur Demand	O	X	
		Tar Demand	O	X	
7	**Error Status**	ERROR INFO	O	X	Error occurrence information
8	**Password Reset**	-	X	O	Reset password to factory default
9	**Button Lock**	-	O	O	Lock whole buttons
10	**Safety Halt**	-	X	O	Safety halt function

LCD Display button

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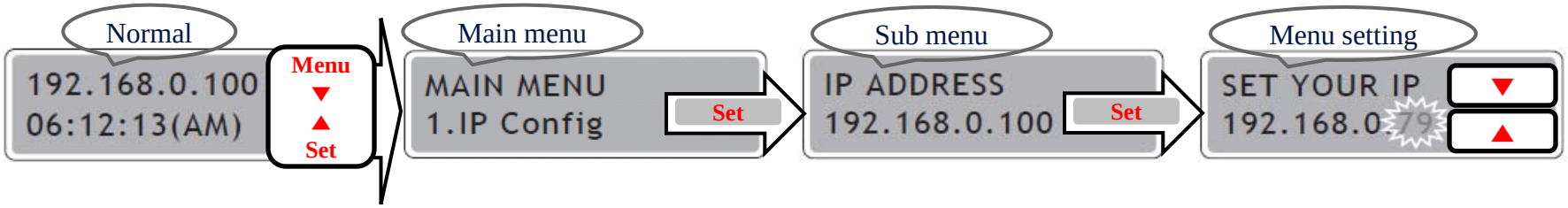
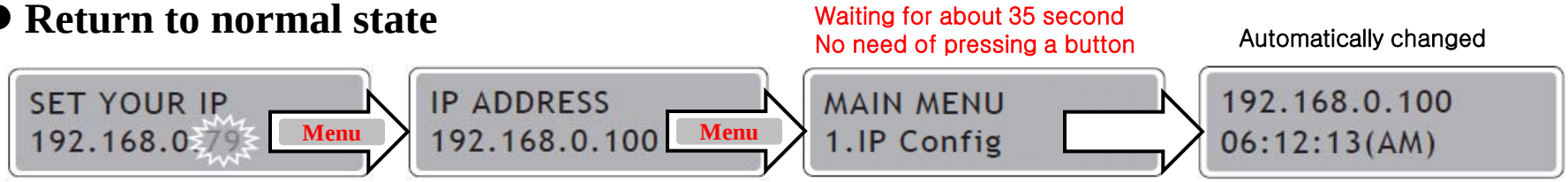
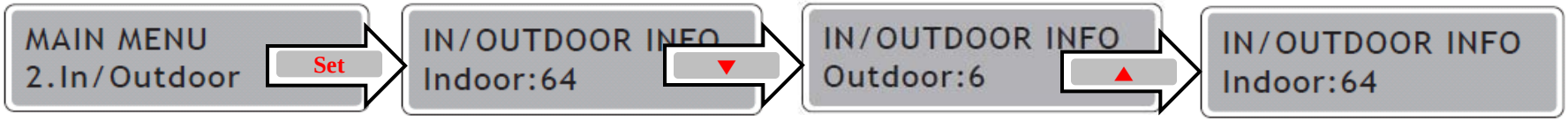
● Sub Menu Setting



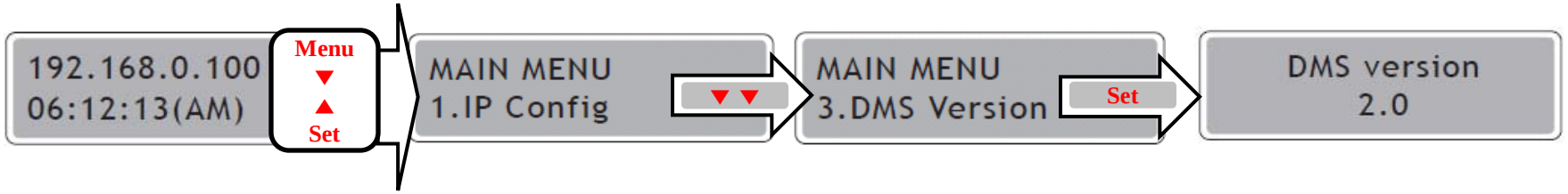
● Return to normal state



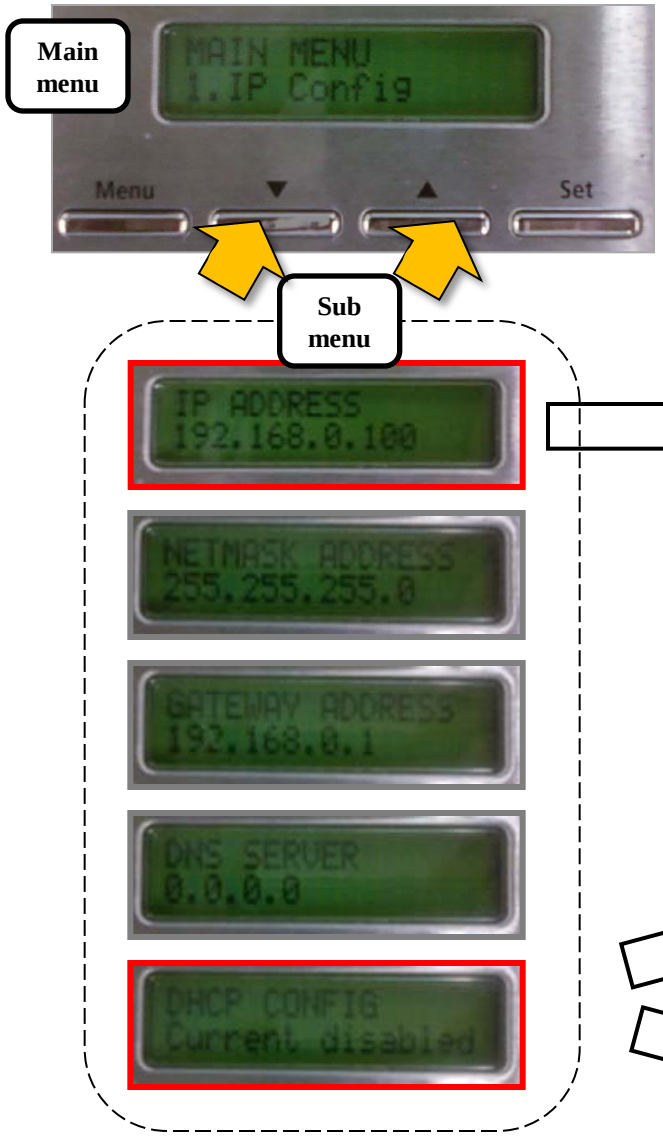
● Moving in the sub menu



● Moving the sub menu



IP setting in LCD display



▪ **If you enable DHCP, you have to check IP in LCD display because IP is automatically assigned .**

▪ **If you enable DHCP and DMS2 is connected with SNET3, you have to check DMS IP in SNET3 tracking menu.**

LCD display button

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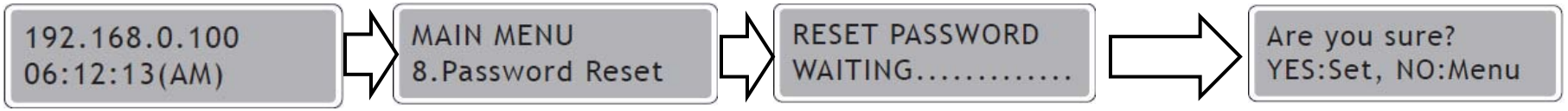
Initialize system configuration (Caution: all data is erased)

In normal display, initialization is impossible. Enter the main menu

Press the buttons in order **Menu**→▼→ ▲→▼→ **Menu**

If press **Set** button, initialized
If press **Menu** button, canceled.

Initialize the password



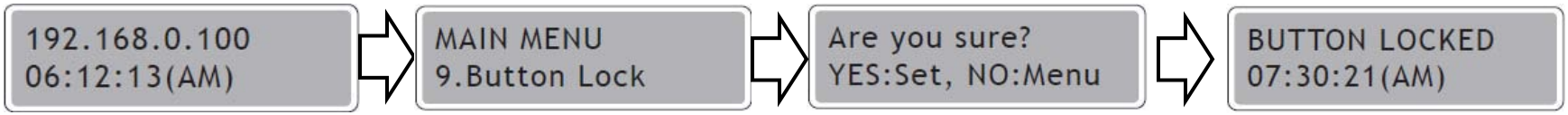
Press any button.

In password reset menu, press the **Set**

while above message is displaying, press **Menu** + **Set** **simultaneously within 3 second.**

If press **set,** password is initialized to "1234"

Button lock



Press any button.

In button lock menu, press the **Set**

If press **set**, button lock is enabled.

Button lock message is displayed.

* To unlock the buttons, press **Menu** + **Set** simultaneously for 5 second.

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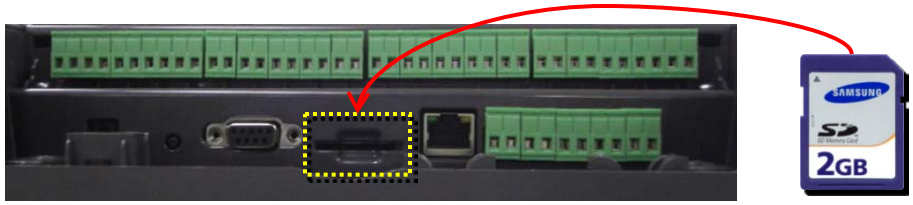
Data backup with SD card

Firstly, insert the SD card in DMS2



192.168.0.100 06:12:13(AM)	MAIN MENU 5.Data Backup	DMS BACKUP MENU data backup	Are you sure? YES:Set, NO:Menu
Press any button.	In data backup menu, press the **Set**	Press **Set**	If press **Set**, data backup will start.

Restore the data with SD card

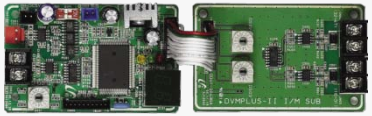
Firstly, insert the SD card which has backup data in DMS2

192.168.0.100 06:12:13(AM)	MAIN MENU 5.Data Backup	DMS BACKUP MENU data restore	Filename: 20090725.dms
Press any button.	In data backup menu, press the **Set** then ▼	Press **Set** then select the file using ▼ or ▲	If press **Set**, restoration will start.

Installation

Procedure

1. Wiring



- Interface module wiring
- Centralized controller wiring

2. Access to DMS2

- IP setting
- LAN cable connection
- Starting a web browser

3. Tracking

- Initialization
- Disconnection
- Tracking result

4. System environment setting

- Time, Language , Name
- Network information
- E-mail, contact control

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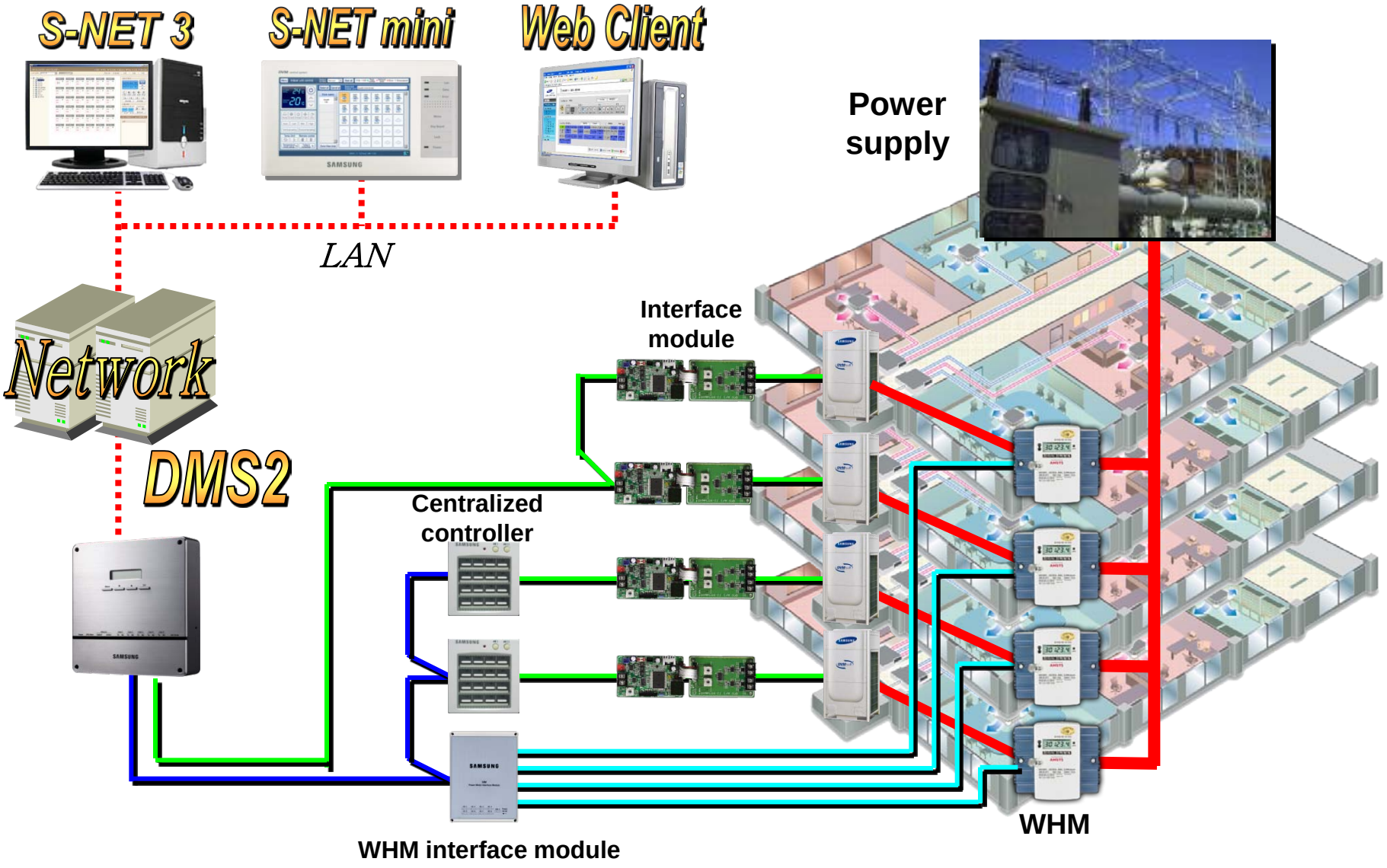
Connection diagram



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Interface

No	Device	Model	Remark
1	Upper-layer device	MST-P3P(S-NET3) MST-S3W(S-NET mini) Web-Client	HUB or network environment is required to support multiple upper-layer devices.
2	Centralized controller	MCM-A202, MCM-A202A MCM-A202B	
3	Interface Module	MIM-B04A, MIM-B13A, MIM-B13B	
4	WHM interface module (SiM)	MIM-B12	Max. 8 watt-hour meters are supported for 1 SiM.
5	WHM interface module (New)	MIM-B16	Development schedule: July, 2010 (Pulse type power meter)
6	Power meter	Specified Korean watt-hour meter	Local watt-hour meter can be used after launching MIM-B16
7	DI/DO	No power dry contact	DI: Max.8, DO: Max.6
8	Outdoor unit	DVM Plus III, DVM Plus III HR DVM Plus II, DVM Plus II HR DVM HR, DVM Mini DVM, FJM, CAC,ERV	

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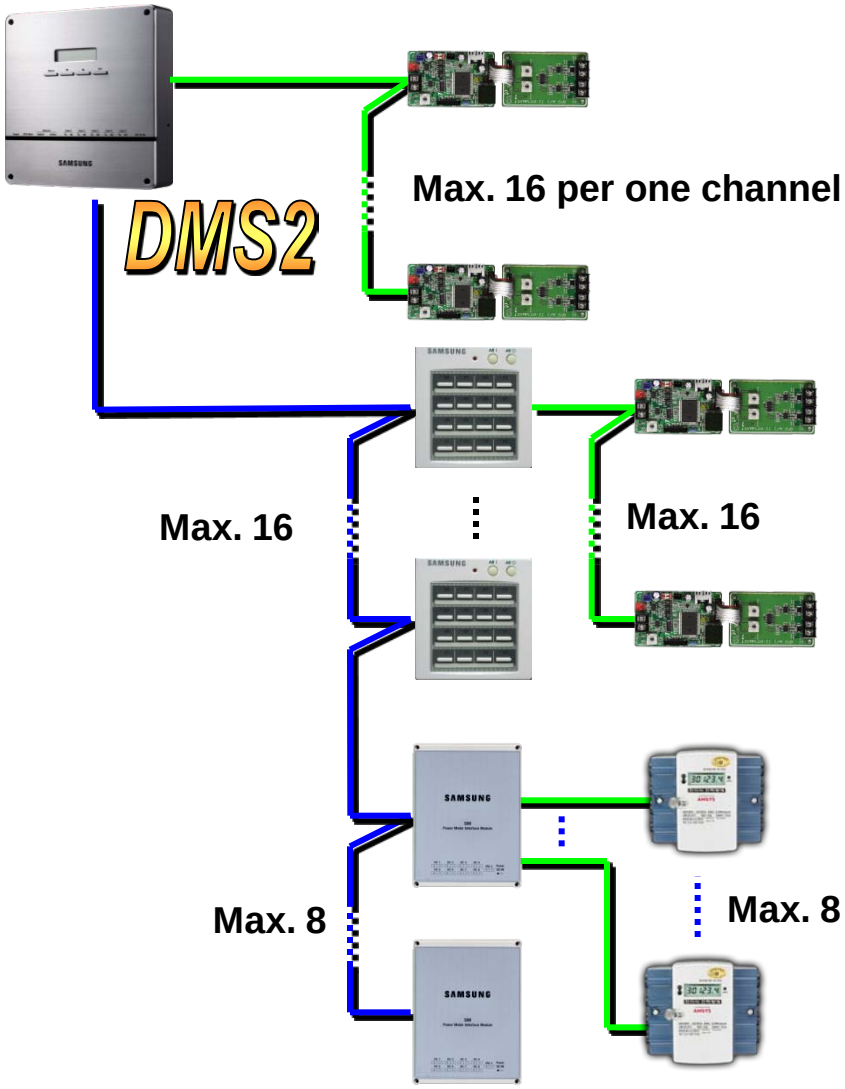
Number of interface



- Centralized controller : Max. 16
- Interface module : Max. 80
  (16 per one channel X 5 channel)
- Indoor unit : Max. 256
- WHM interface module : Max. 8
- WHM : Max. 8 per one WHM I/M

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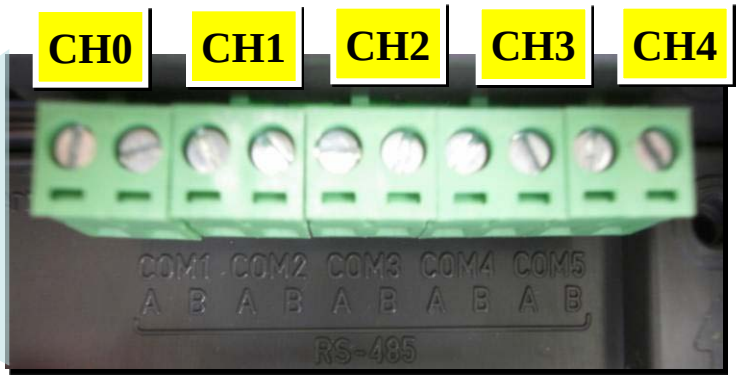
485 communication connectors



System Settings > Tracking

- Connect “Centralized controller “ or “Interface module”

DVM Tracking | Disconnect all devices

SIM 1 EA	Central controller 1 EA	Interface module 3 EA	Indoor unit 18 EA

Communication mode by channel	
Channel 0	○ Interface module ◉ Central controller
Channel 1	◉ Interface module ○ Central controller
Channel 2	○ Interface module ◉ Central controller
Channel 3	○ Interface module ◉ Central controller
Channel 4	○ Interface module ◉ Central controller

1. Interface module :
→Max 16EA to 1 communication channel
= Max 80 EA to 1 DMS

2. Centralized controller :
→ Max 16 EA to 1 DMS

Caution
Do not connect interface module and centralized controller to same communication channel

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Address structure

No	Device	Address	Remark
1	Interface module	(CH0: 00~15) ~ (CH4: 00~15)	Max.80
2	Centralized controller	(CH0:00~15) ~ (CH4:00~15)	Max.16
3	Virtual Centralized controller	CH0:11, CH1:12, CH2:13 CH3:14, CH4: 15	Internal fixed address. Max. 5
4	WHM interface module	(8 SiM: 16~23).(8 WHM:1~8) Ex) 16.1 / 16.2 / 23.8	Internal fixed address. Max. 64.
5	Virtual WHM interface module	(Virtual: 24~31).(Vitual:1~16) Ex) 24.1 / 25.2 / 31.16	Internal fixed address Max.128
6	Digital Input	56.00.03~56.00.10	Internal fixed address Max.8
7	Digital Output	56.01.03~56.01.08	Internal fixed address Max.6

Caution !!

If you install together interface module and centralized controller, maximum number of centralized controller is limit within 11 because virtual centralized controller address is assigned from 11 to 15.

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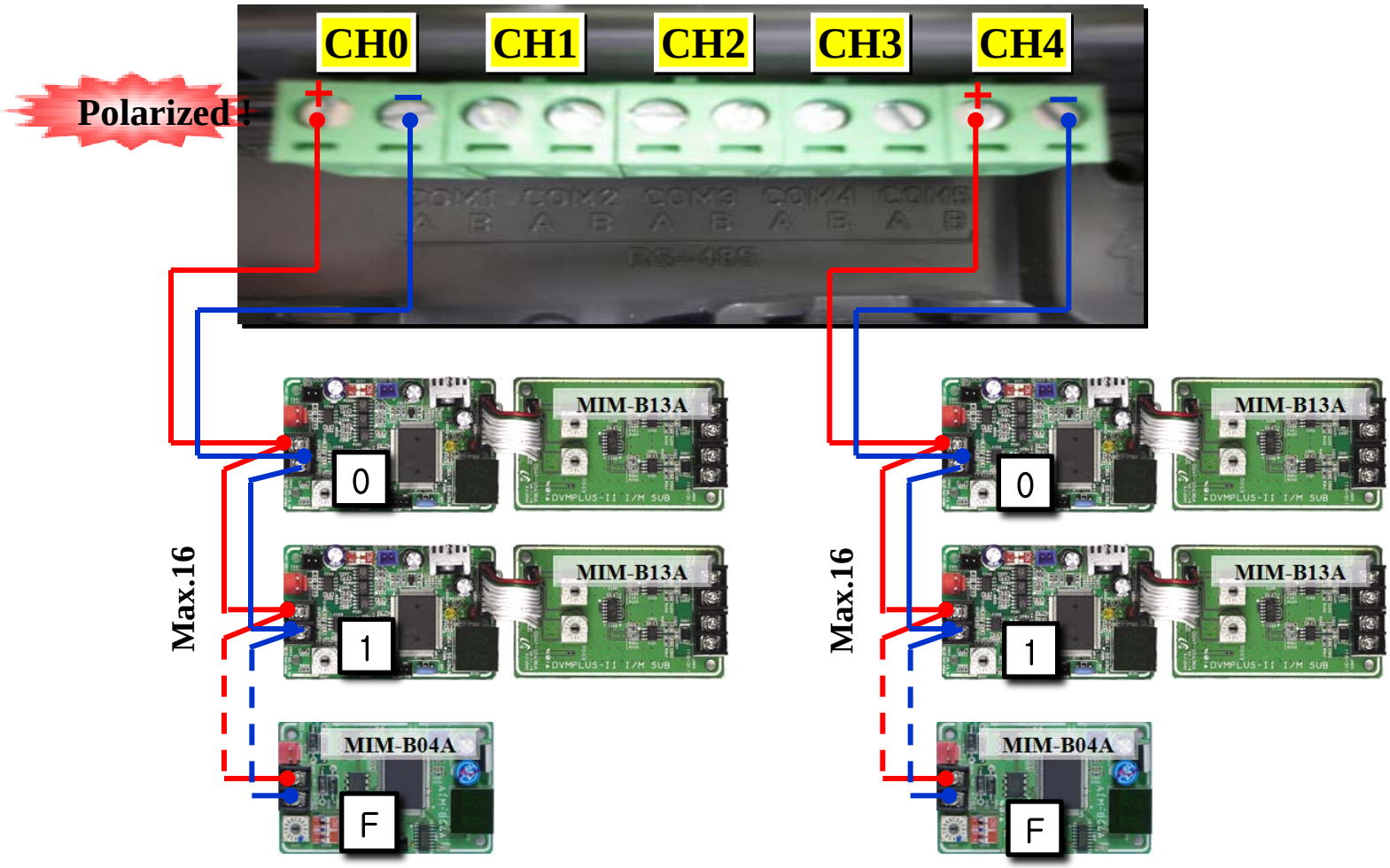
Interface module connection



(Per one channel = Max.16) X (5 channel) = Max. 80

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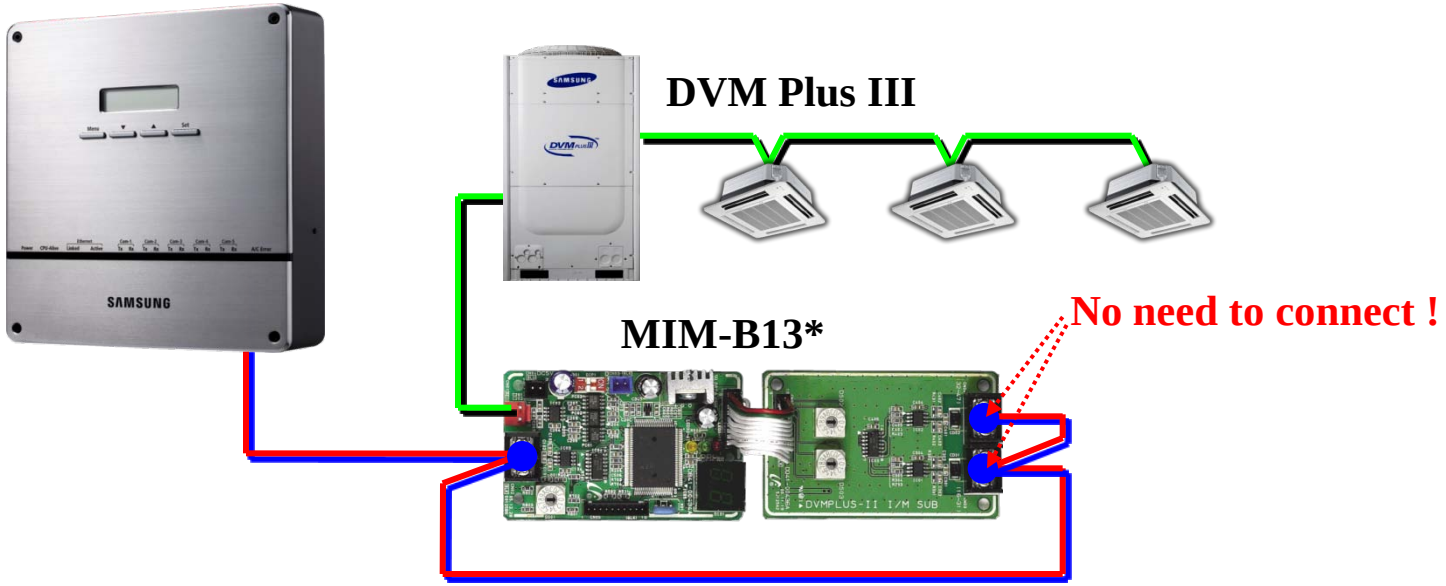
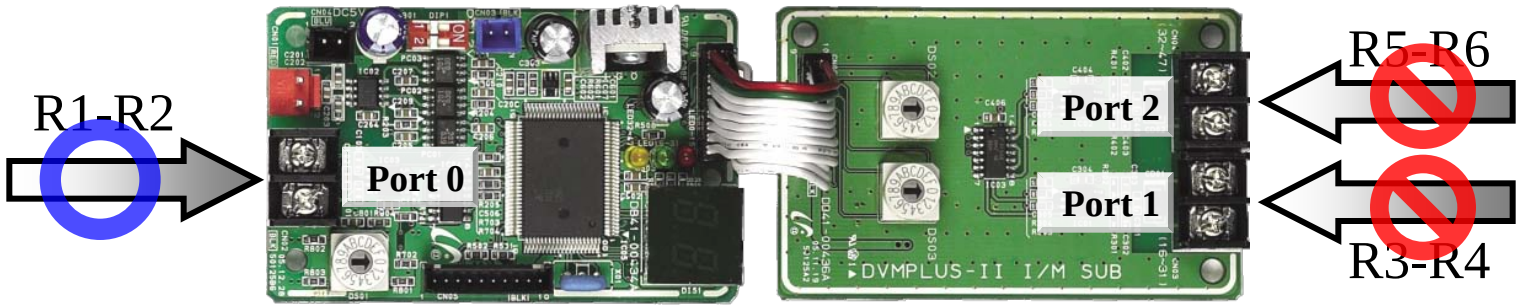
Interface module connection



- Port connection with DMS2 – **Only Port 0 allowed !**



MIM-B13/MIM-B13A/MIM-B13B

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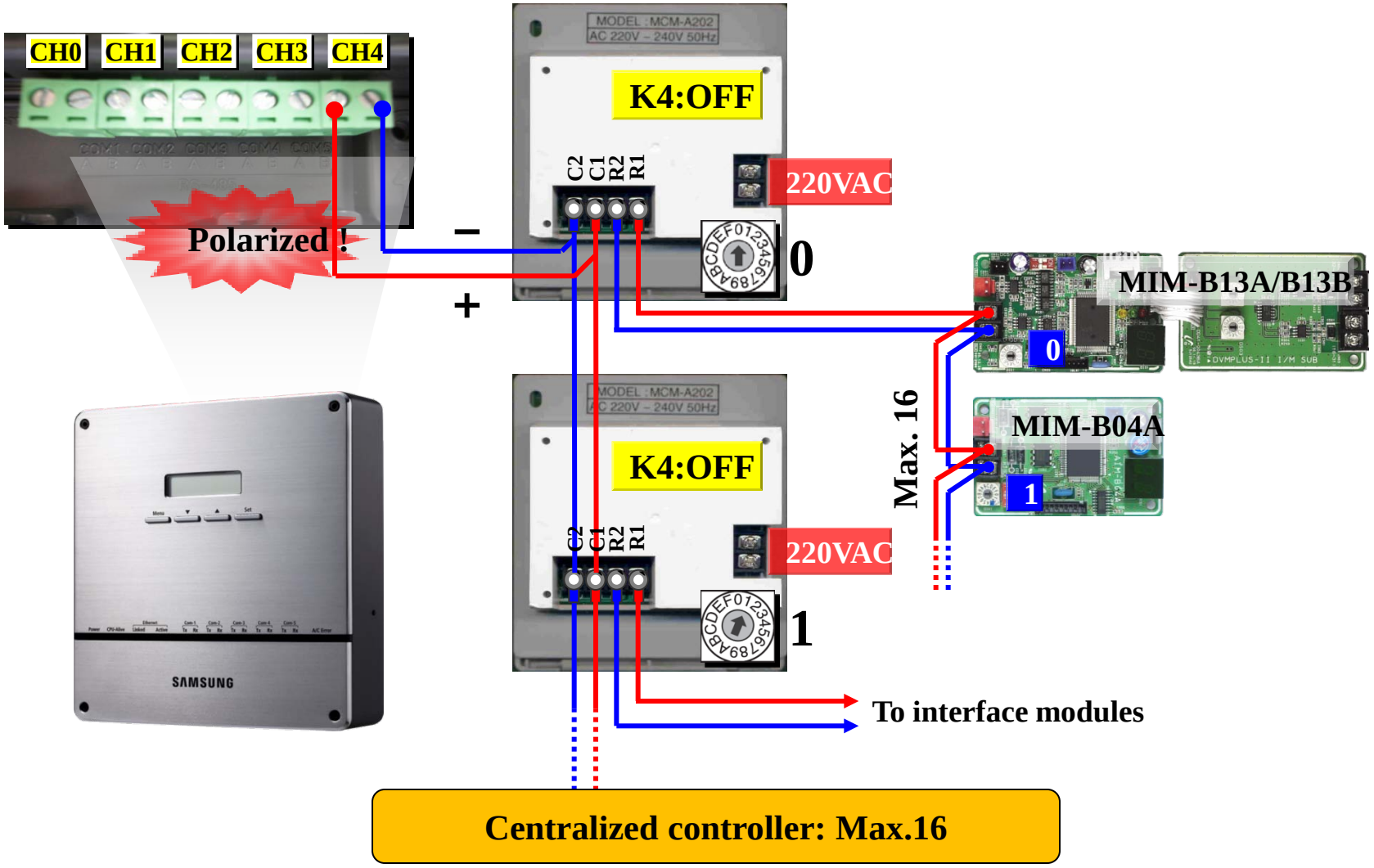
Centralized controller connection



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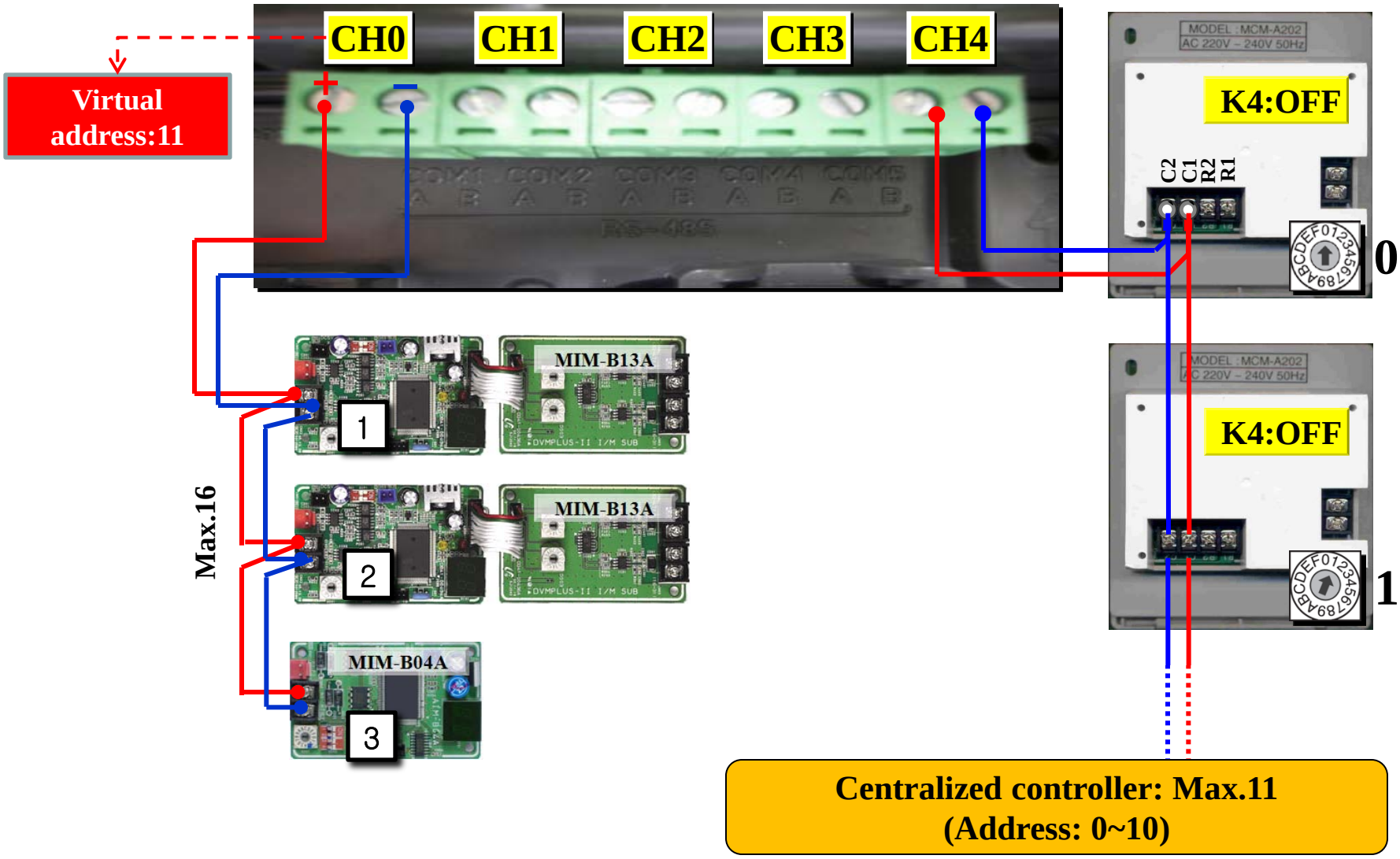
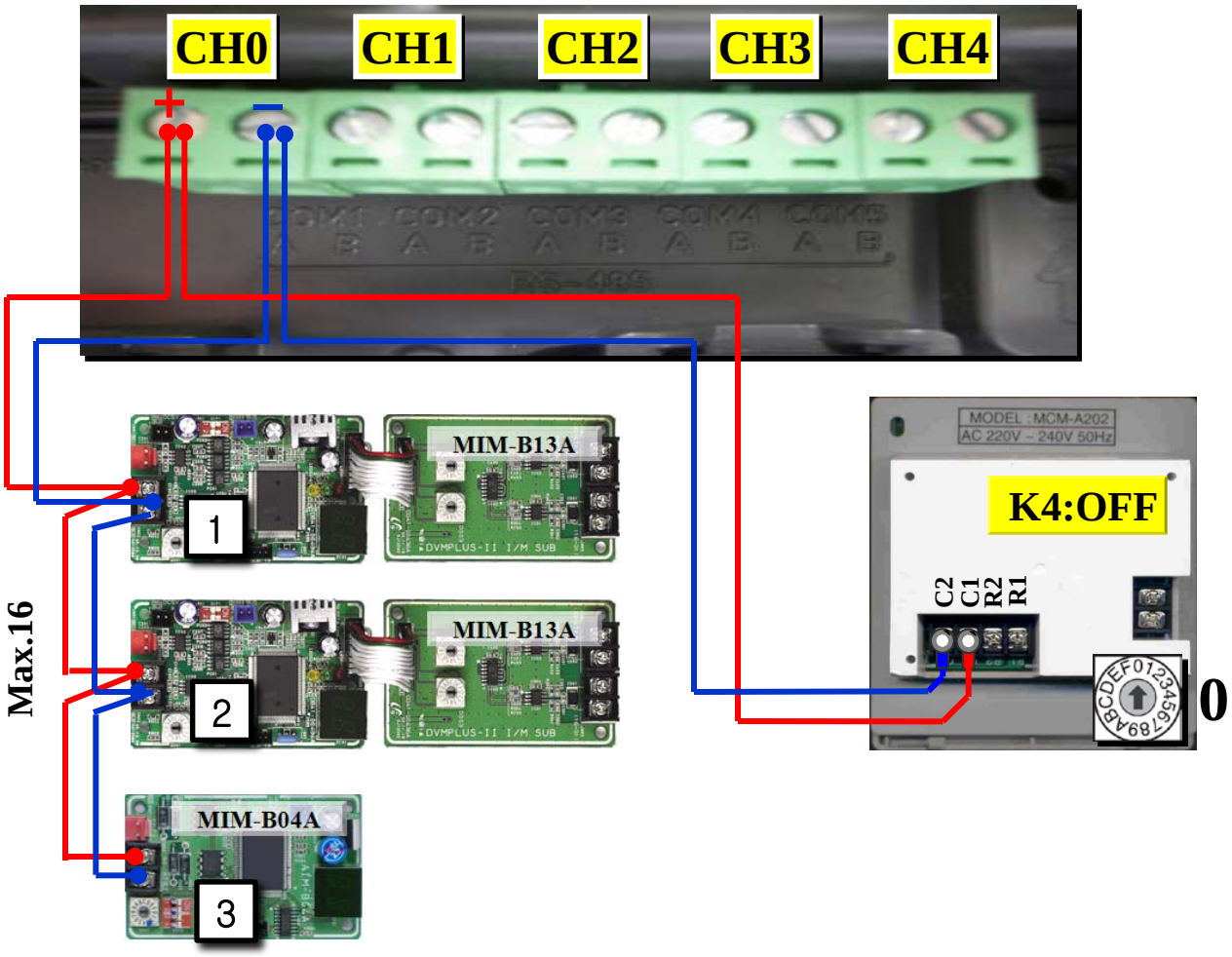
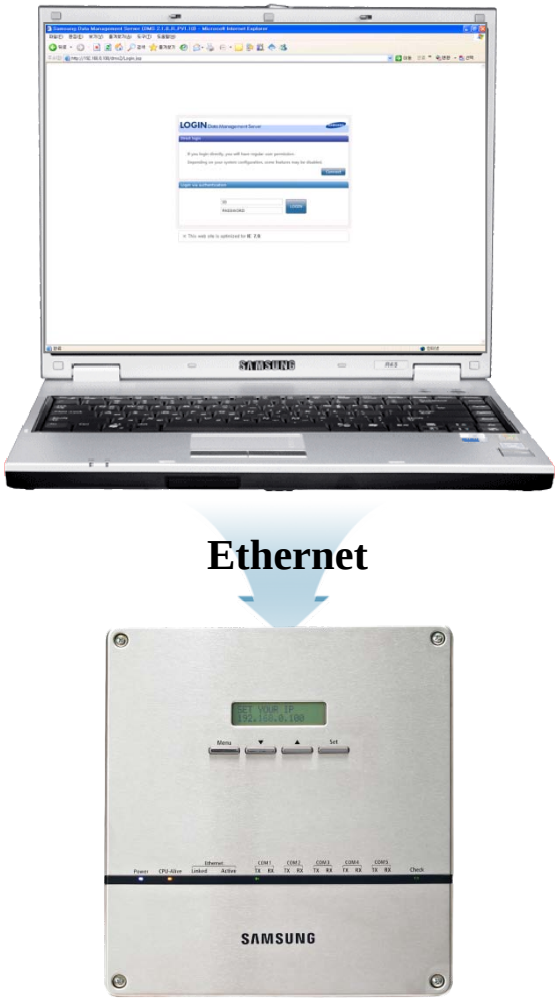
Interface module & Centralized controller Connection





Do not connect together interface module & centralized controller at same channel !!



Prerequisite

1. LAN cable
2. Internet Explorer
   - Internet Explorer 6.0 or later
3. Silverlight
   (Automatically DMS2 install this software)

Access to DMS2

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	Local usage	Internet Usage
Access	Only access to connected PC	Access the internet in other site
LAN cable	Cross LAN cable	Direct LAN cable
IP setting	Private IP	Public IP
E-mail service	Non available	Available

❖ **Public IP & Private IP**

- Public IP :

A public IP address is designated for use in a public domain, such as the Internet

- Private IP

A private IP address is designated for use only in a private domain, such as a local area network (LAN)

❖ **Static IP & Dynamic IP**

-Static IP:

When a computer is configured to use the same IP address each time it powers up, this is known as a Static IP address

Static IP addresses are manually assigned to a computer by an administrator

- Dynamic IP:

In situations when the computer's IP address is assigned automatically each time it powers up, it is known as a Dynamic IP address.

cf) DHCP (Dynamic Host Configuration Protocol)

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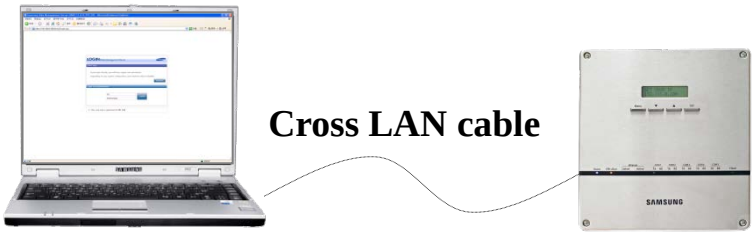
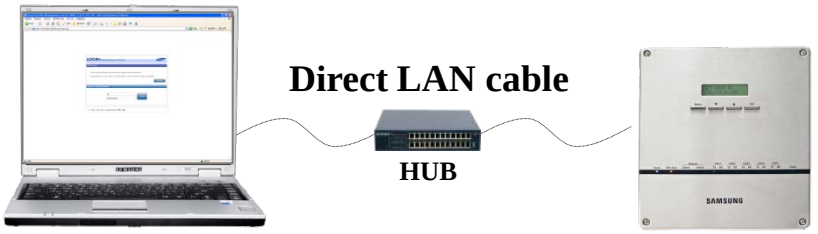
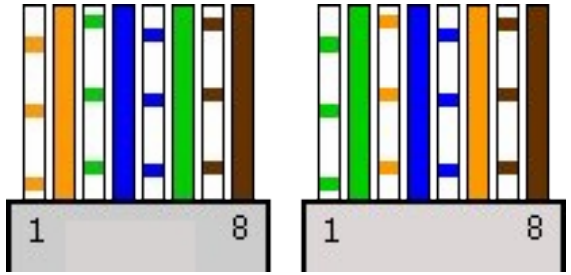
LAN cable



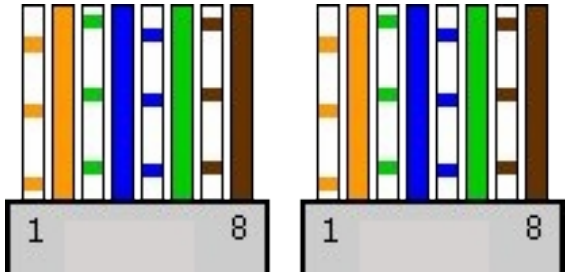


Cross LAN cable



1. Striped orange	1. Striped green
2. Orange	2. Green
3. Striped green	3. Striped orange
4. Blue	4. Blue
5. Striped blue	5. Striped blue
6. Green	6. Orange
7. Striped brown	7. Striped brown
8. Brown	8. Brown

Direct LAN cable



1. Striped orange	1. Striped orange
2. Orange	2. Orange
3. Striped green	3. Striped green
4. Blue	4. Blue
5. Striped blue	5. Striped blue
6. Green	6. Green
7. Striped brown	7. Striped brown
8. Brown	8. Brown

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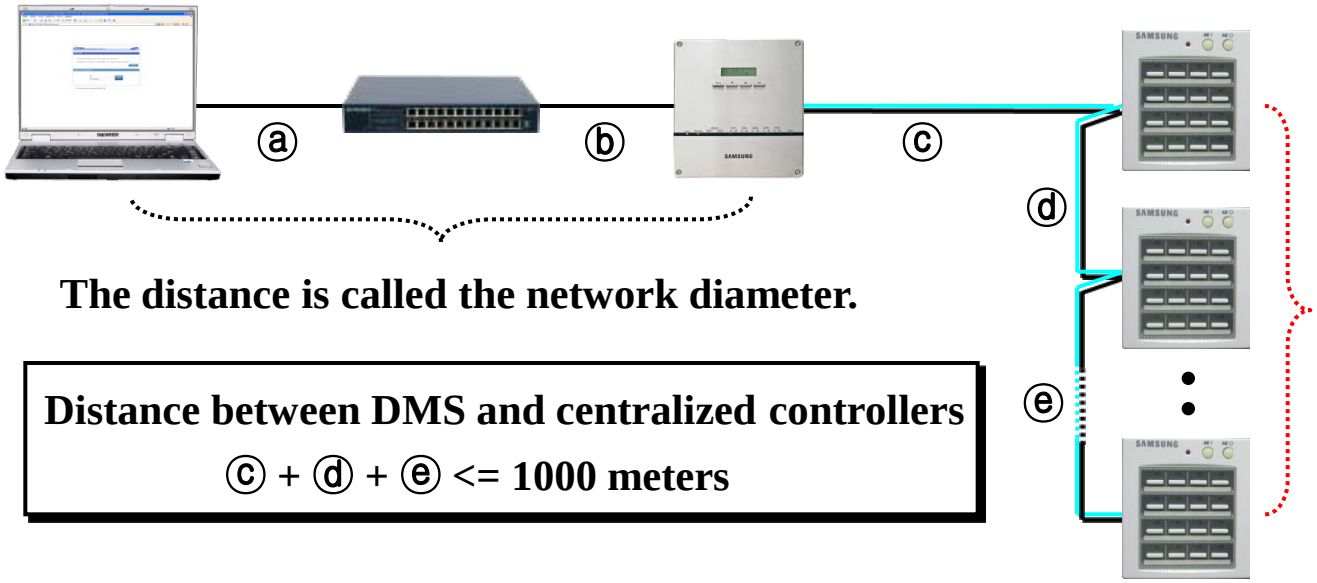
Wiring length



The distance is called the network diameter.

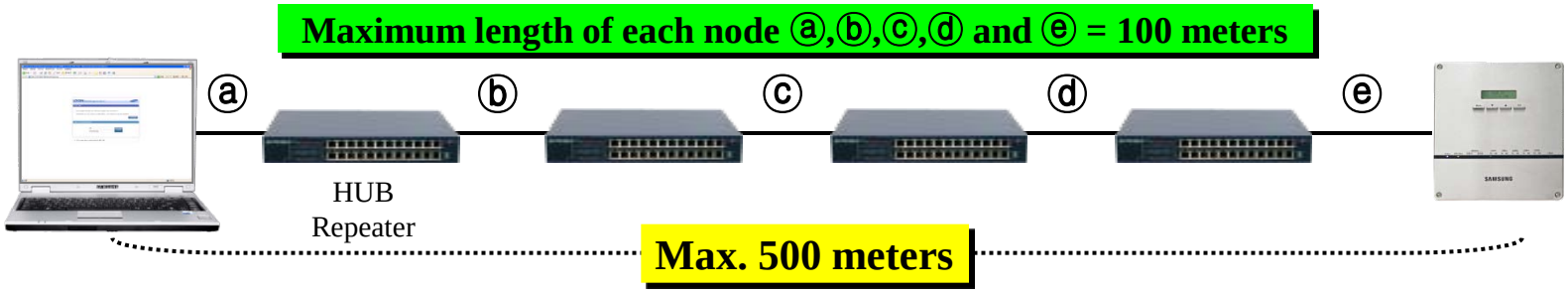
Distance between DMS and centralized controllers

ⓒ + ⓓ + ⓔ <= 1000 meters

Max. number of centralized controller = 16

Direct distance of DMS to the upper layer

- Direct distance of DMS2 to the upper layer : 100m (Ethernet 10Base-T, UTP cable CAT3,4,5)
- Maximum number of cascaded hub/repeaters in the network diameter : 4
- Distance of upper device to the DMS2 cannot exceed 500 meters.



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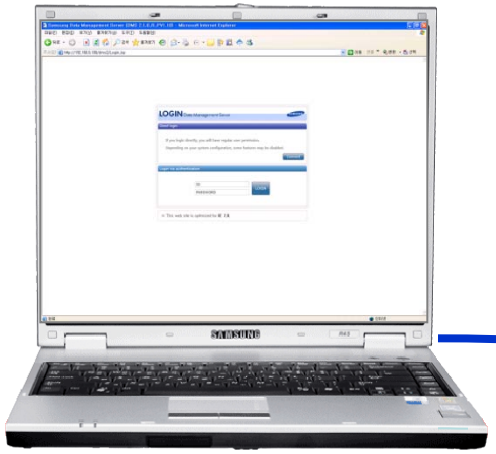
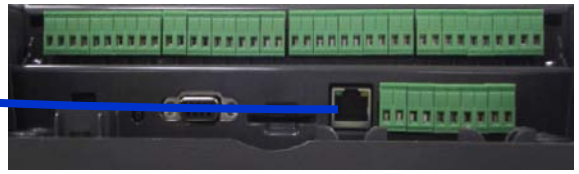
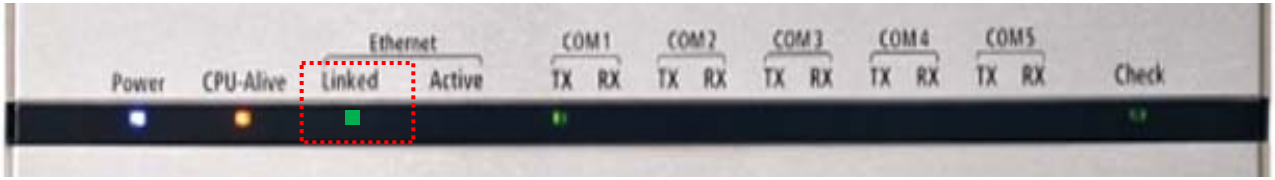
LAN cable connection





Cross LAN cable

Linked LED is ON when LAN connections made between the DMS and the PC.



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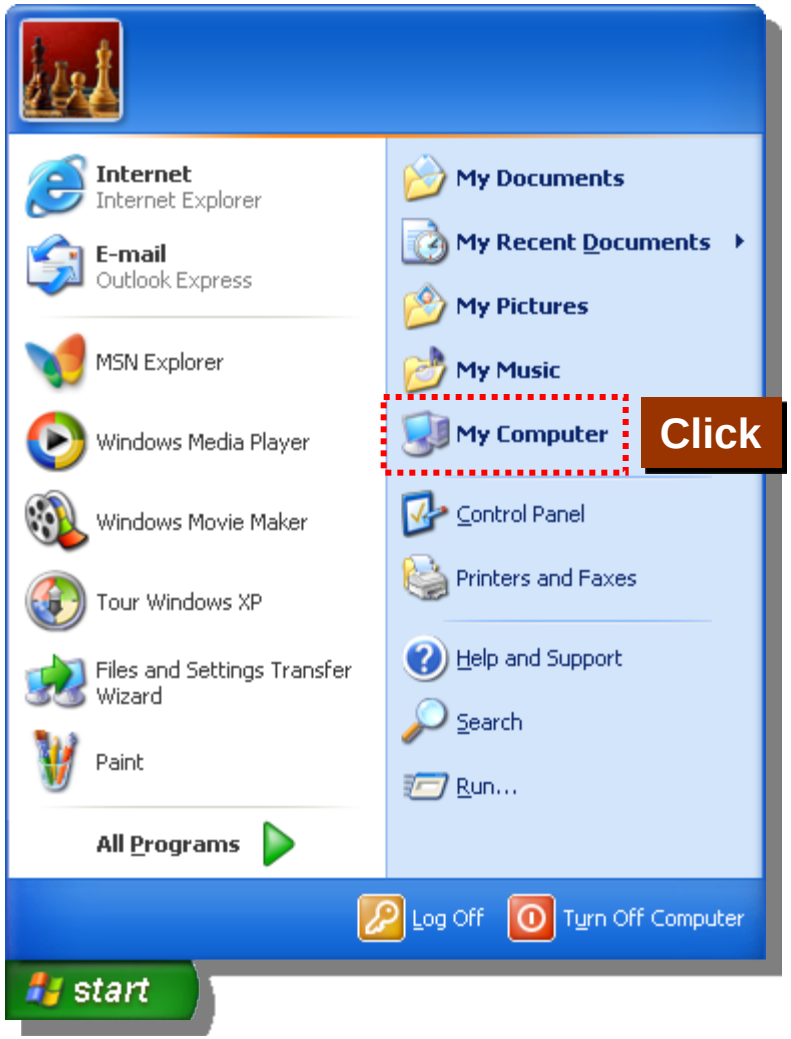
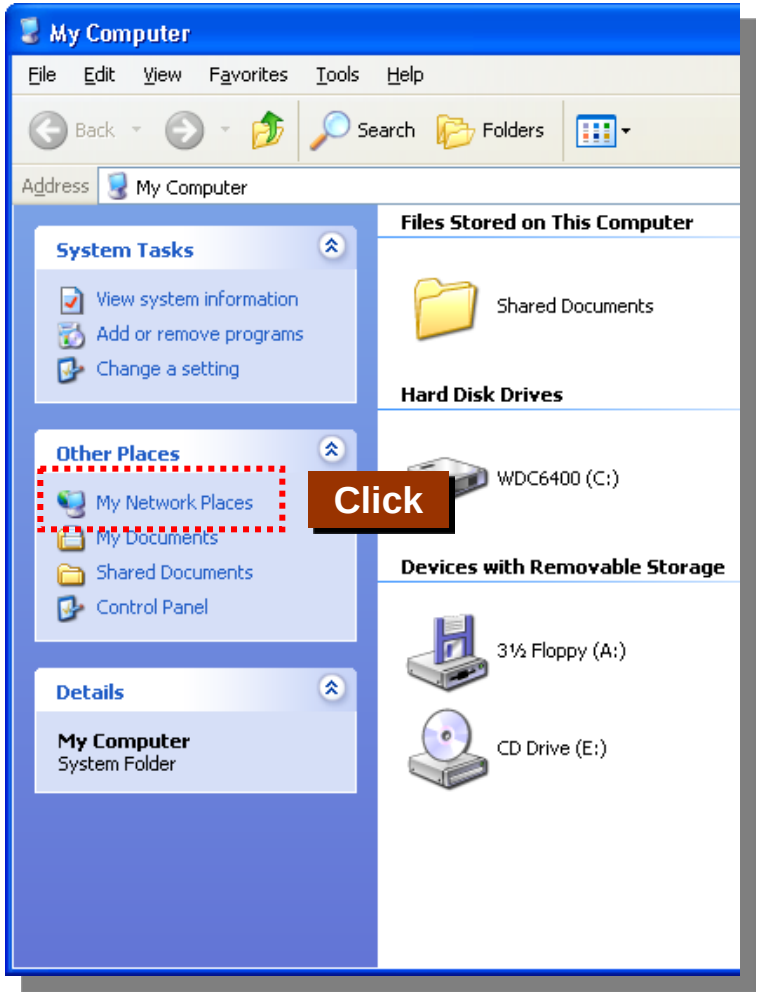
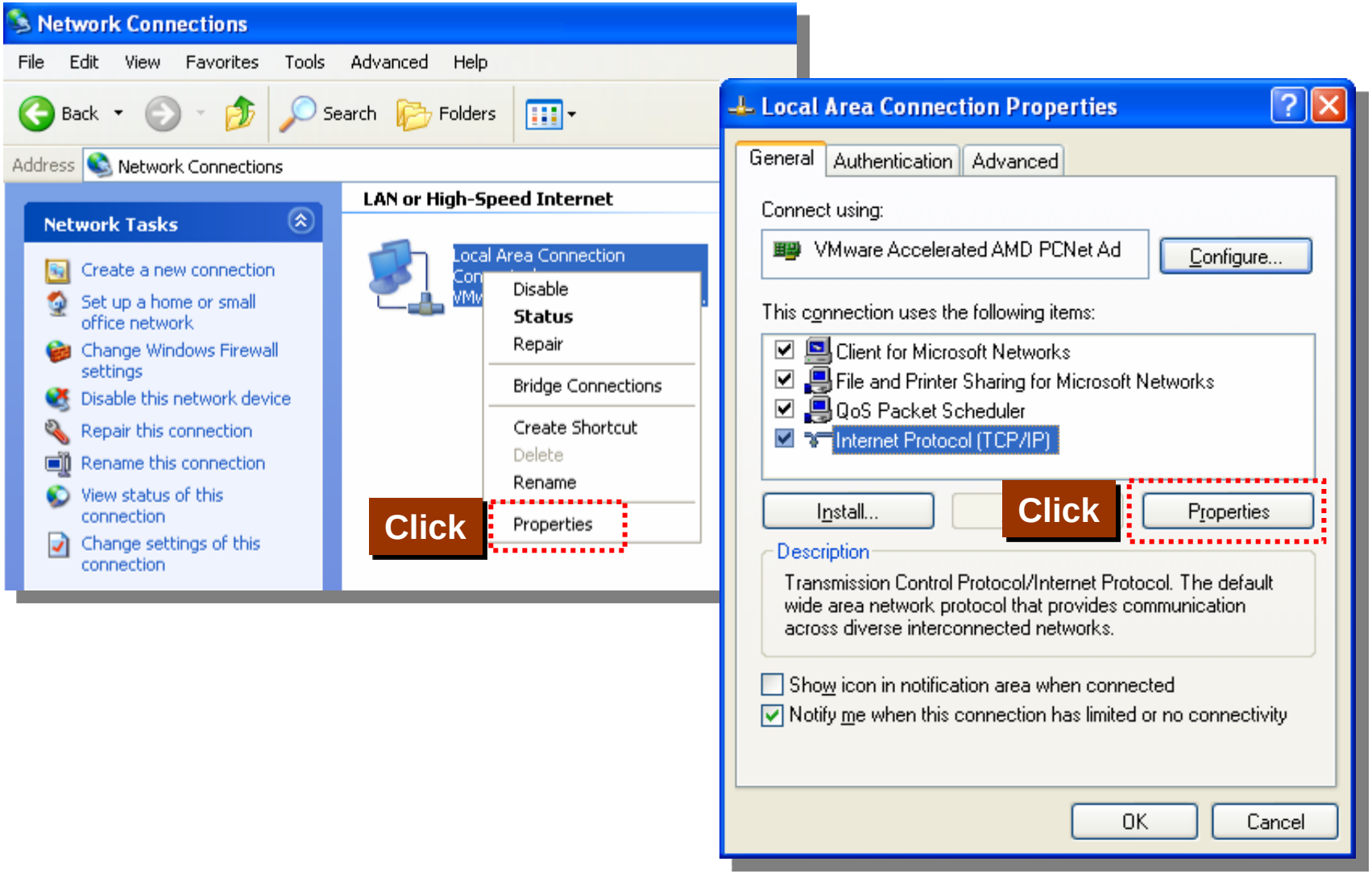
IP setting in the PC



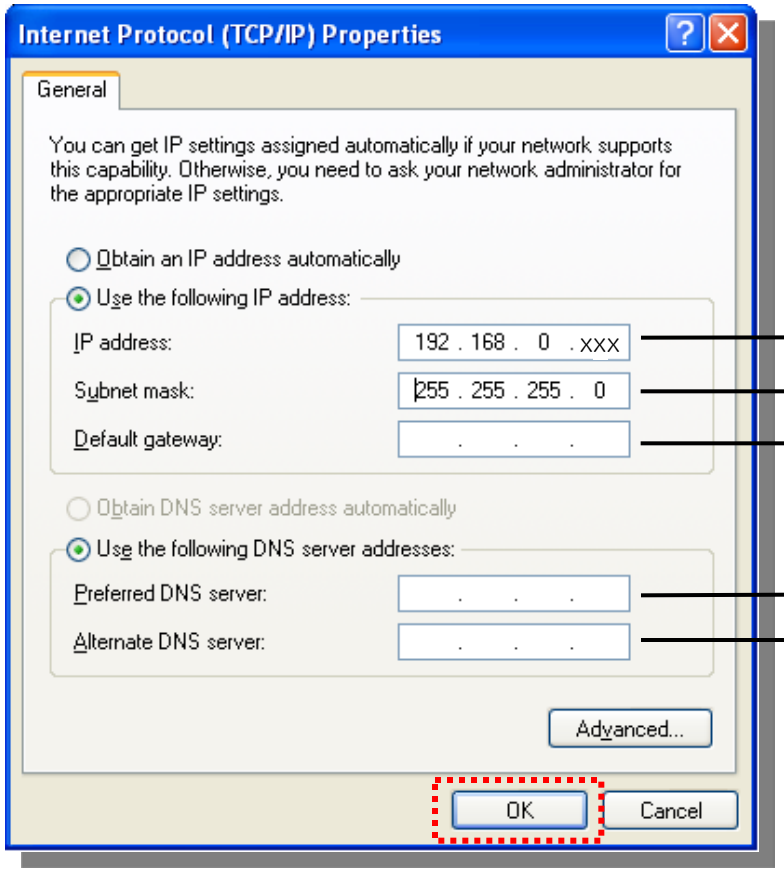


Access to DMS2



Access to DMS2

1. Before accessing the DMS2, check network configuration of the PC.
2. Default IP of the DMS is set to 192.168.0.100.



Set to 192.168.0.xxx. xxx can be assigned to any number between 1 to 254 except 100

IP collision when set to 192.168.0.100

Set 255.255.255.0

No need to set under the direct connection environment

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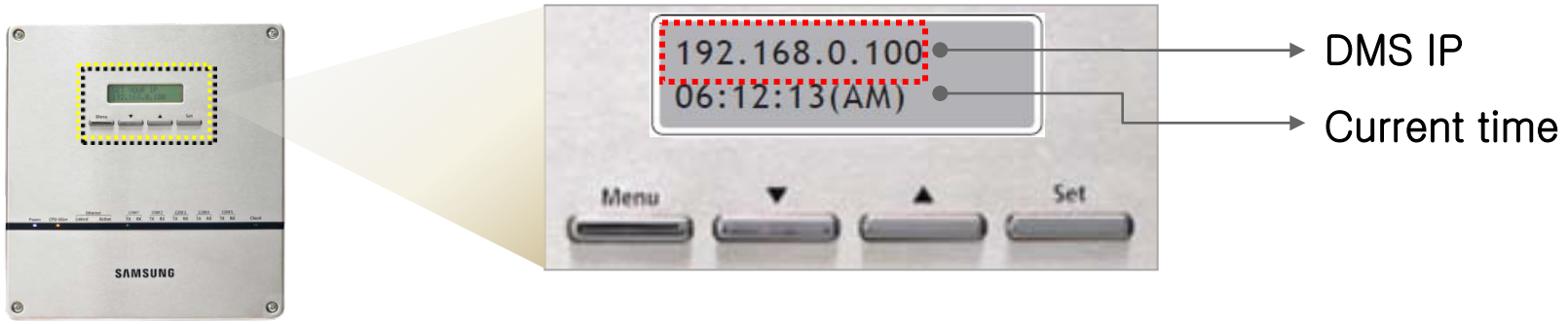
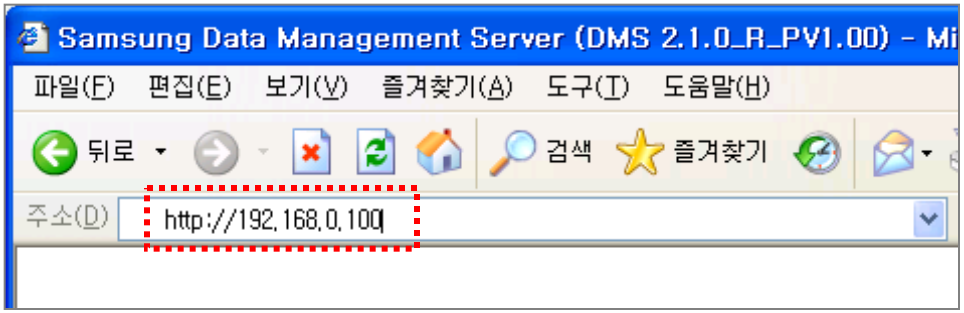
Internet Explore

1. Check DMS2 current IP address from LCD panel



2. Open Internet explorer and type IP address to address window.



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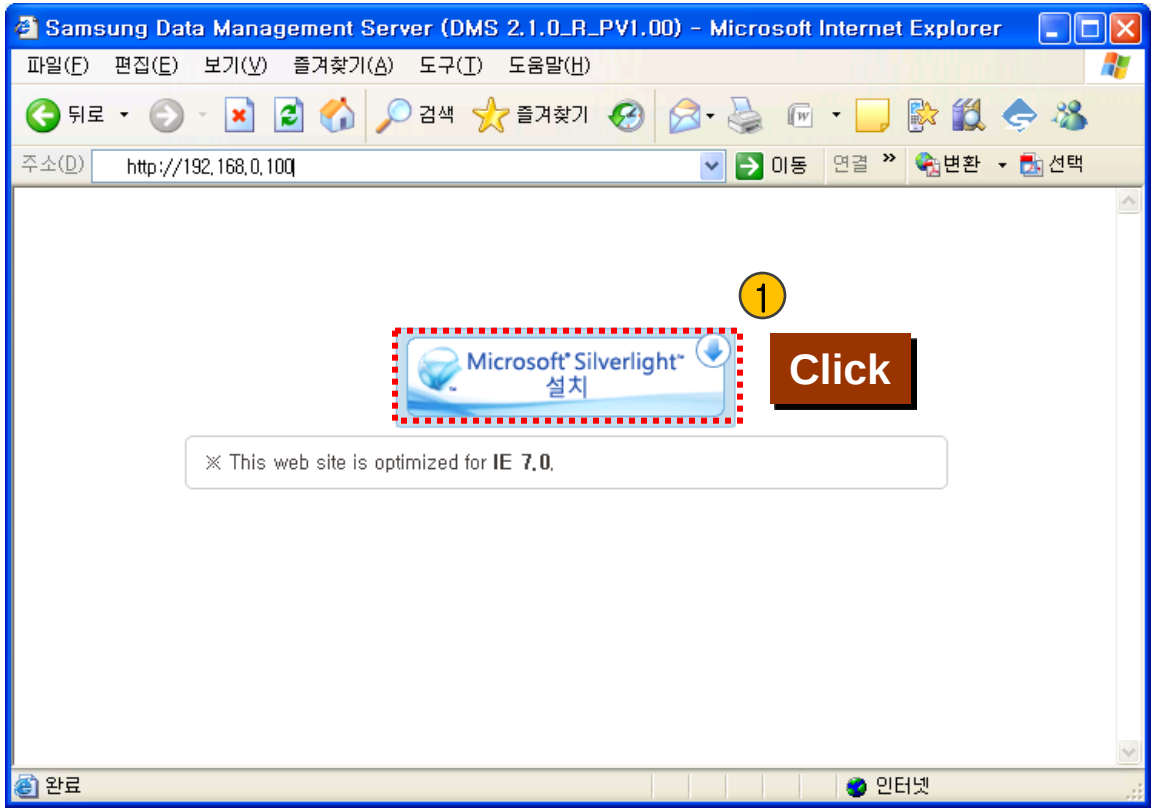
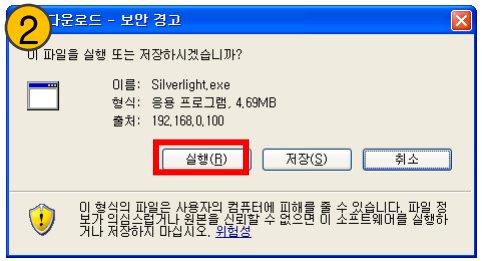
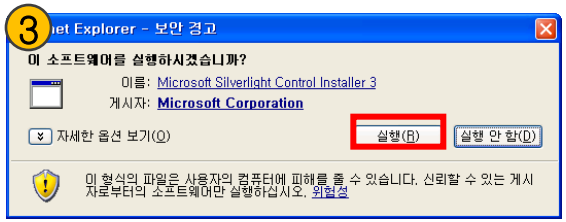
3. Install “Silverlight” (only first access is needed)







6 Press “F5”

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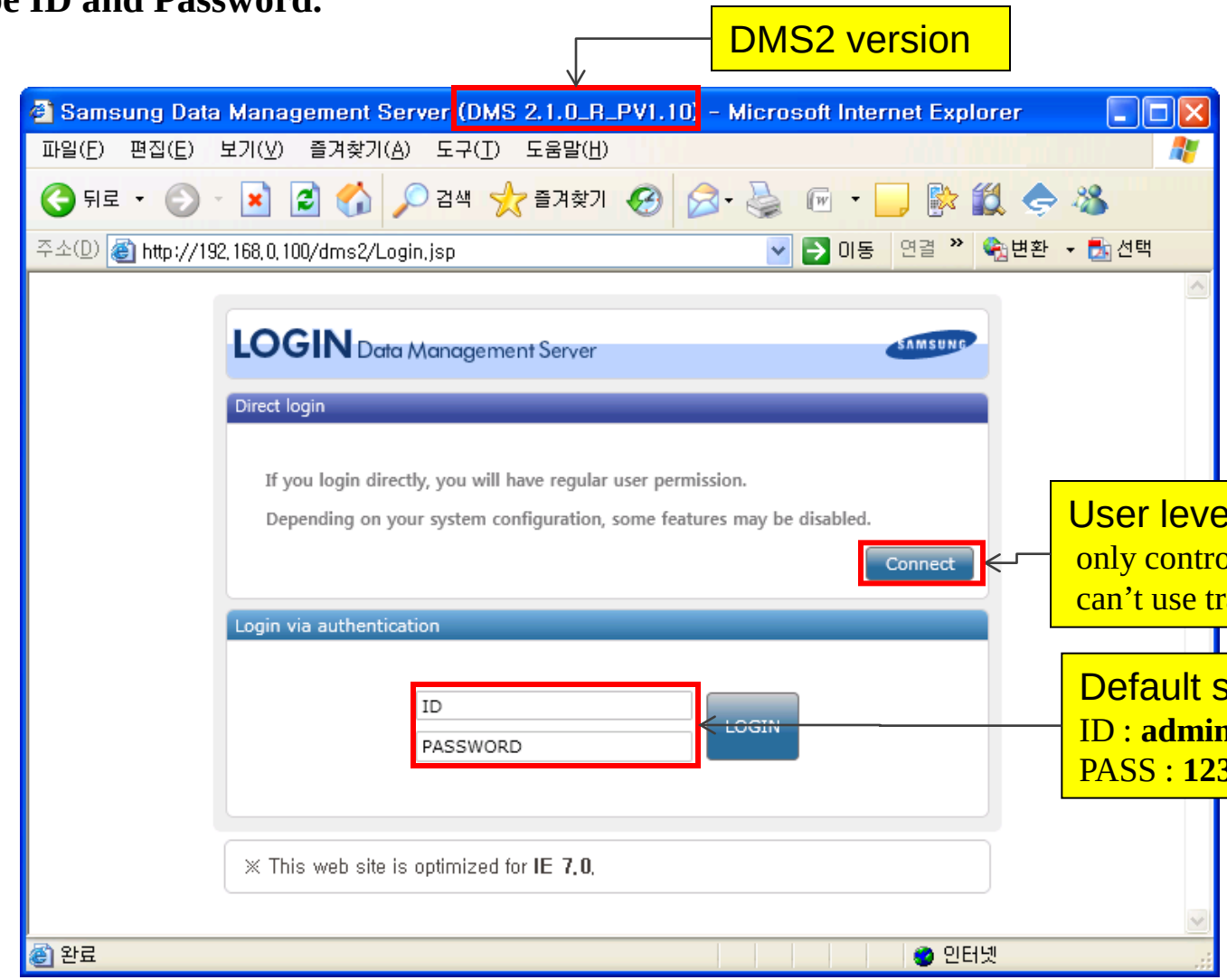
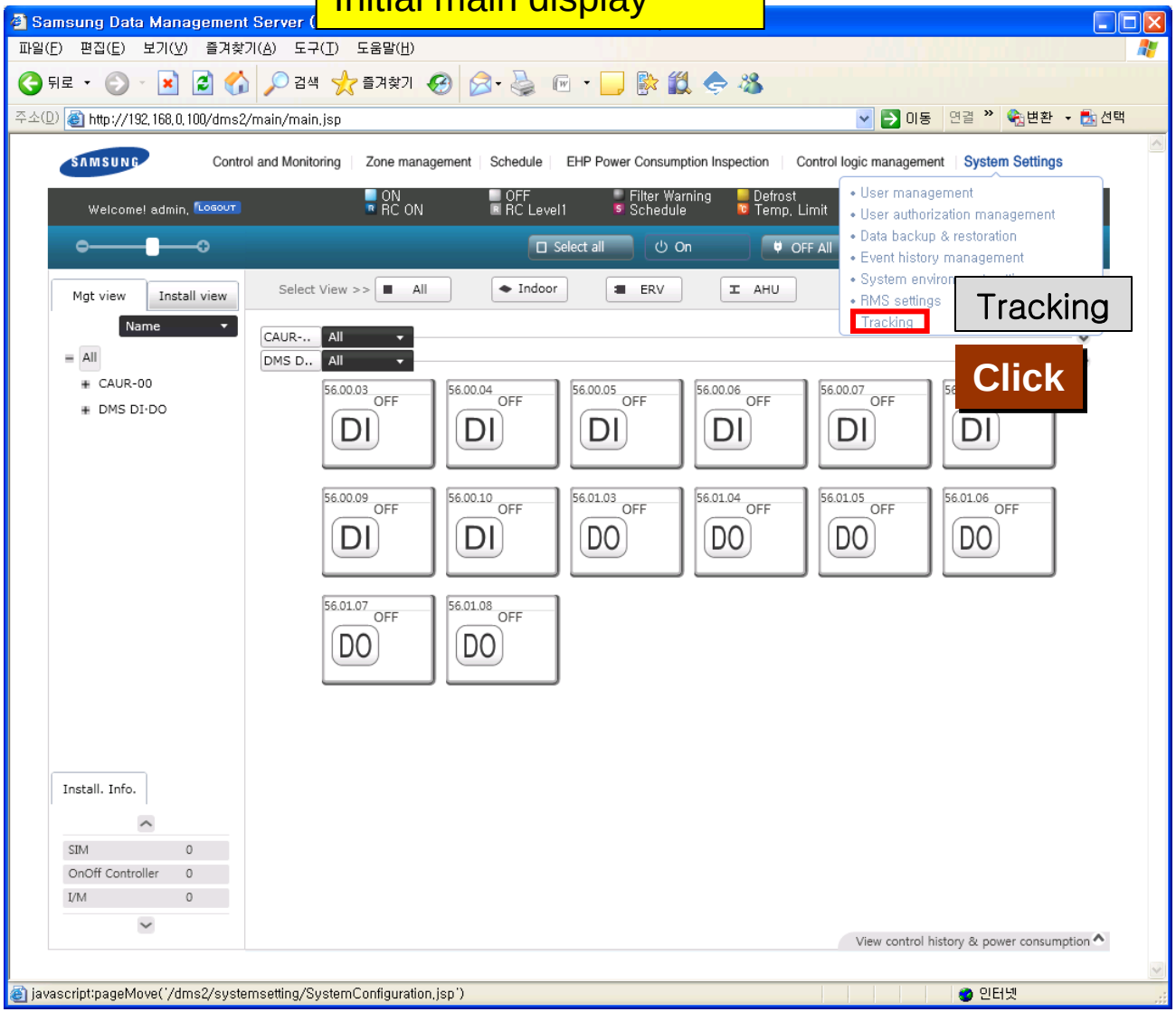
4. Type ID and Password.



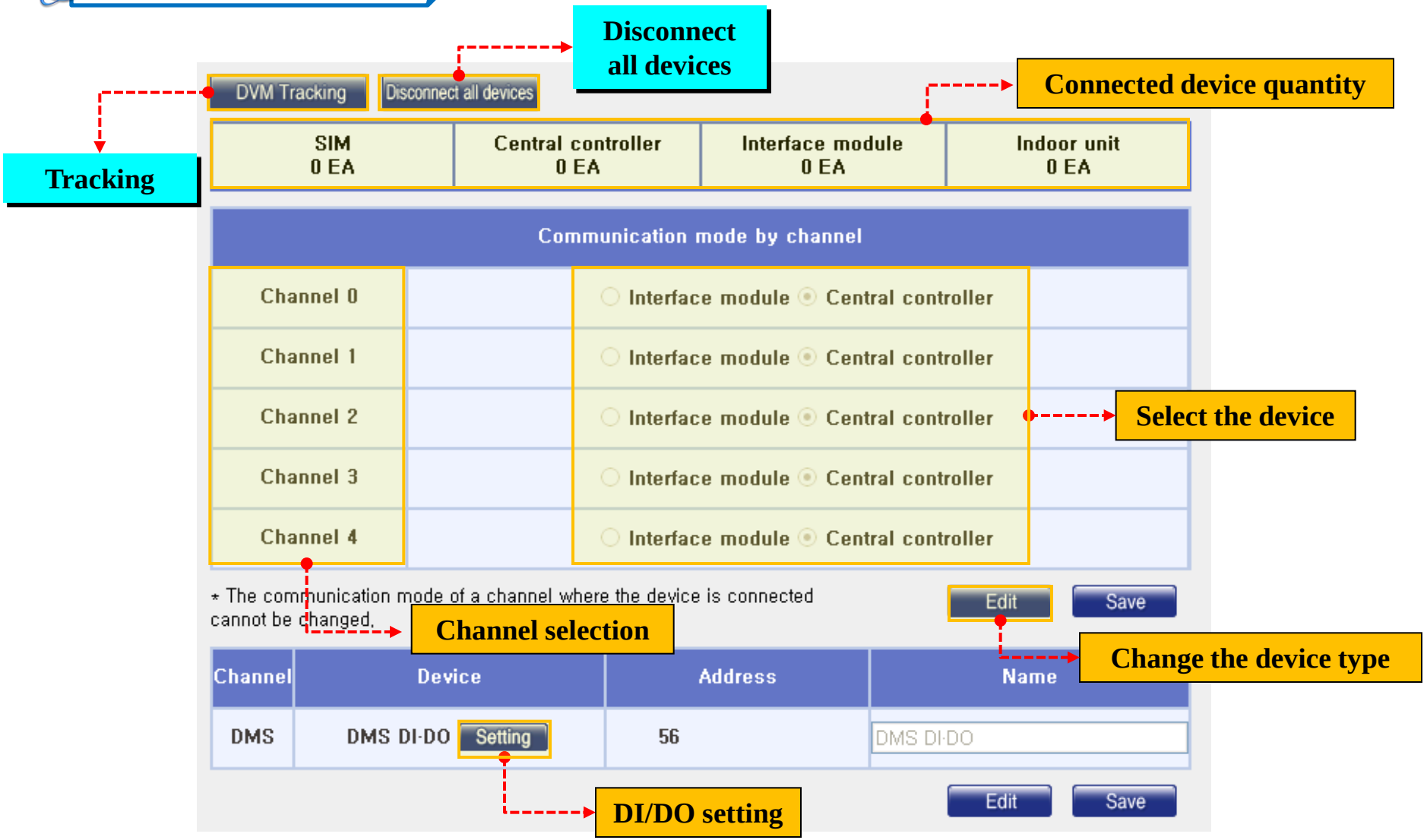
Tracking

Initial main display



Tracking

System Settings > Tracking



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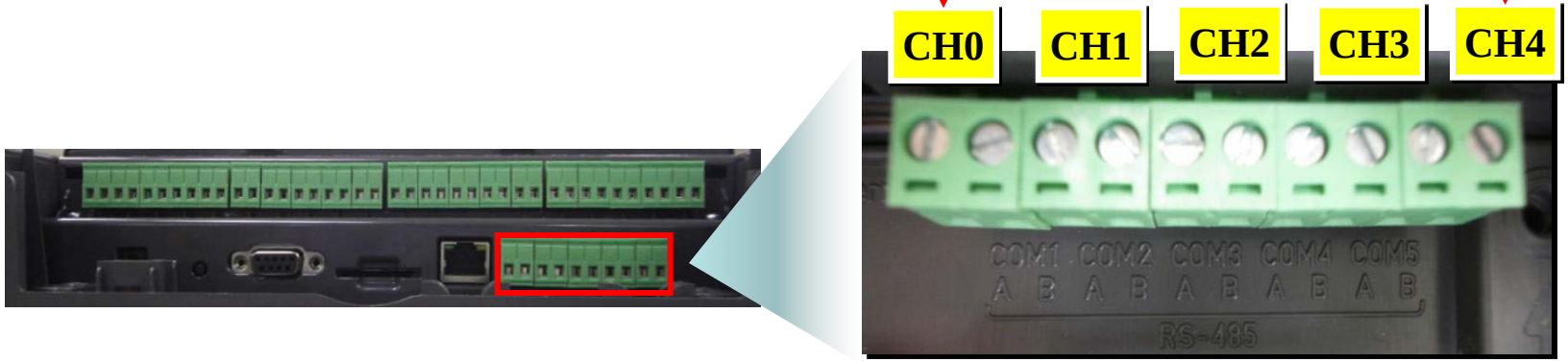
RS 485 ports & channel selection

Communication mode by channel	
Channel 0	Interface module / Central controller
Channel 1	Interface module / Central controller
Channel 2	Interface module / Central controller
Channel 3	Interface module / Central controller
Channel 4	Interface module / Central controller



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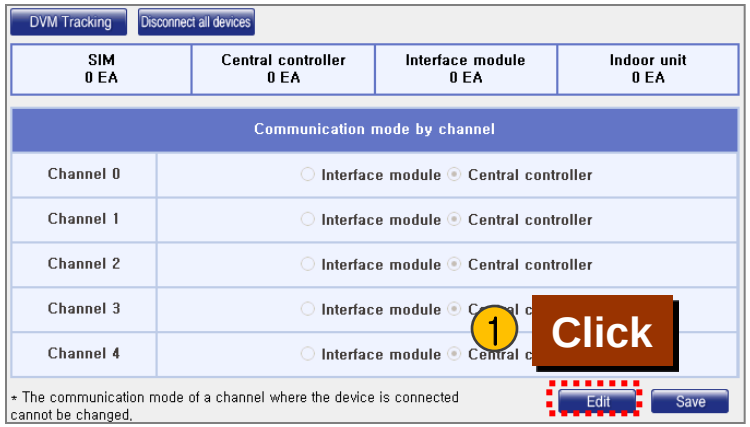
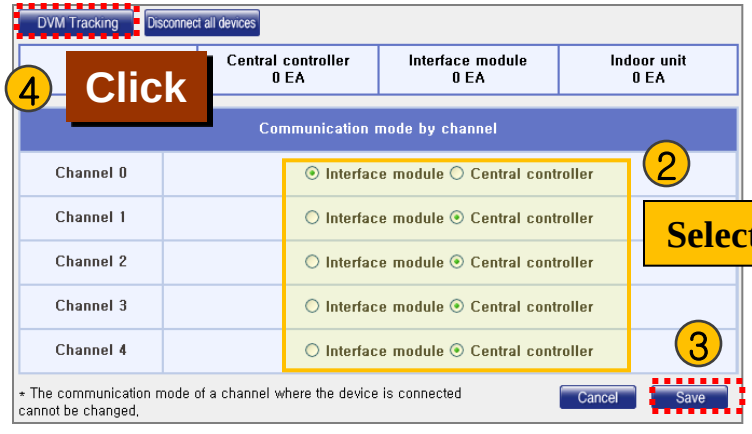
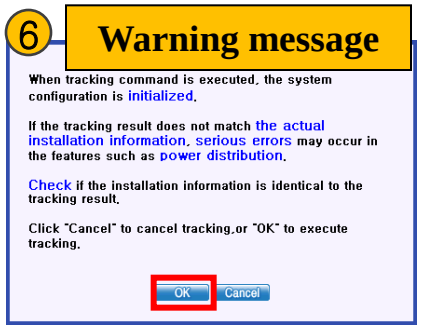
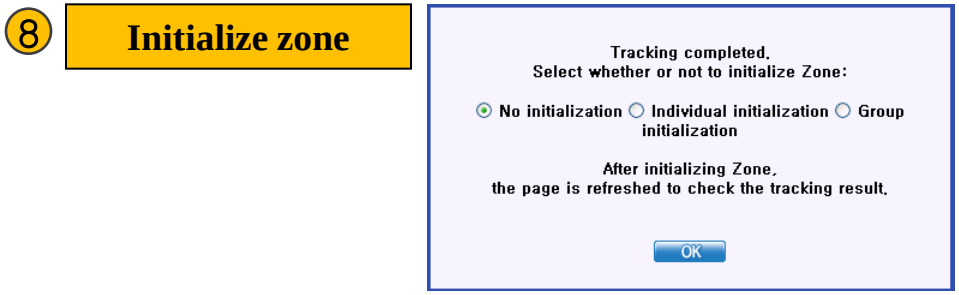
Tracking sequence

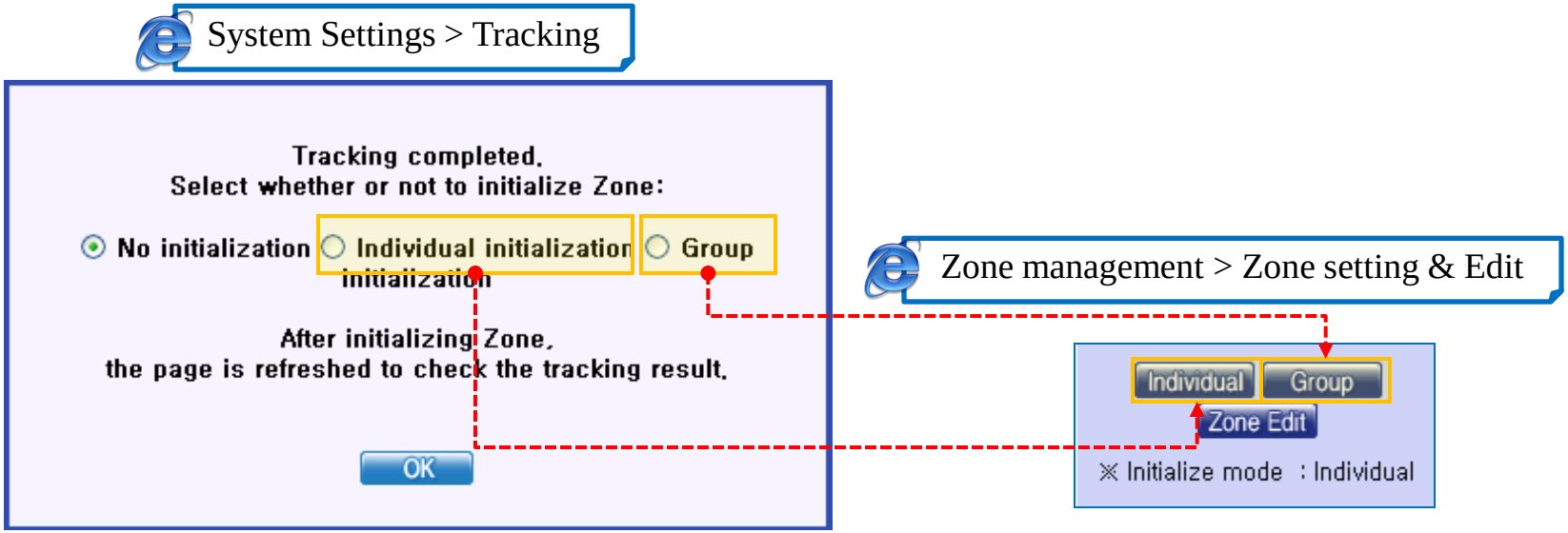








Initialize zone



Tracking mode	Control, monitoring
No initialization	Keep last tracking mode (Individual or Group)
Individual initialization	By indoor unit Main address
Group initialization	By indoor unit RMC address

Although you didn't initialize zone in Tracking menu , you can initialize the zone again in Zone management

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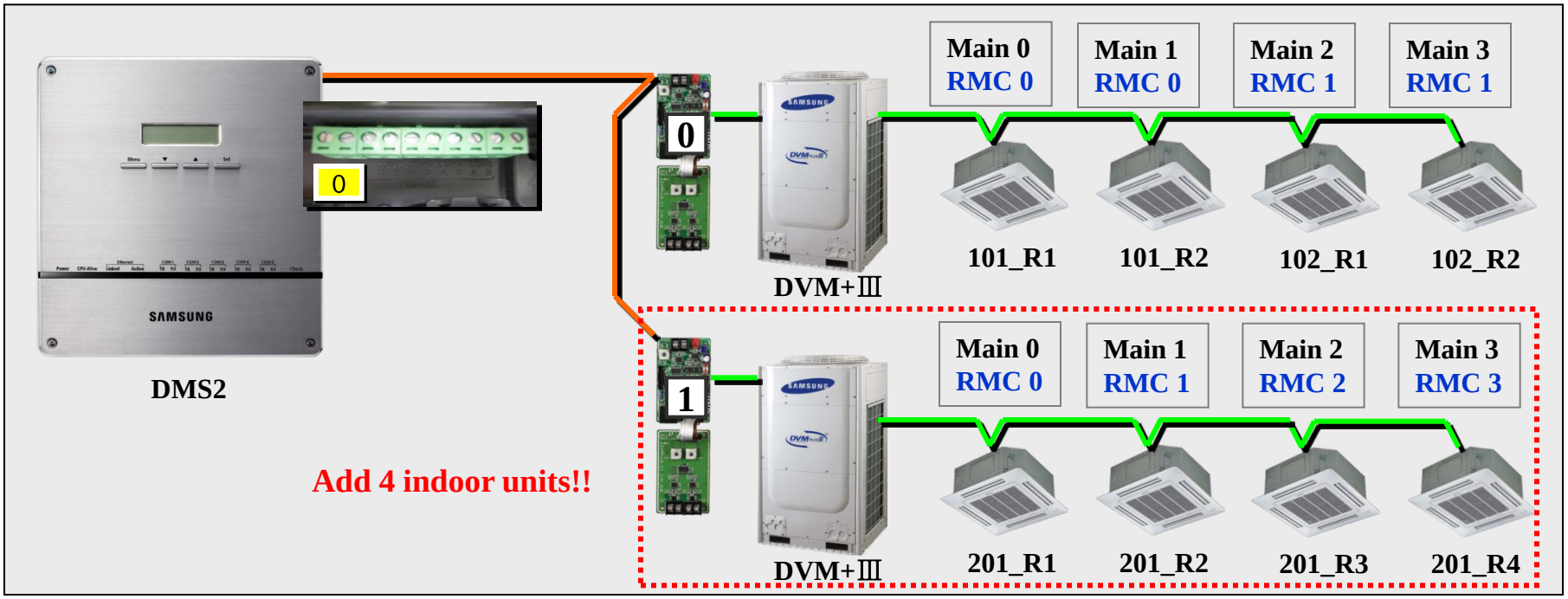
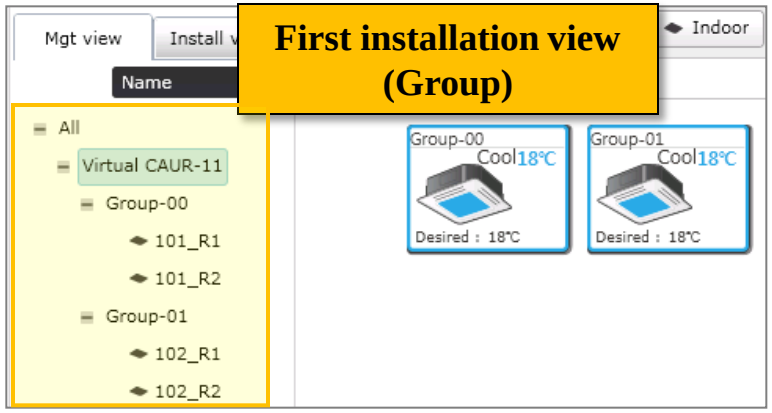
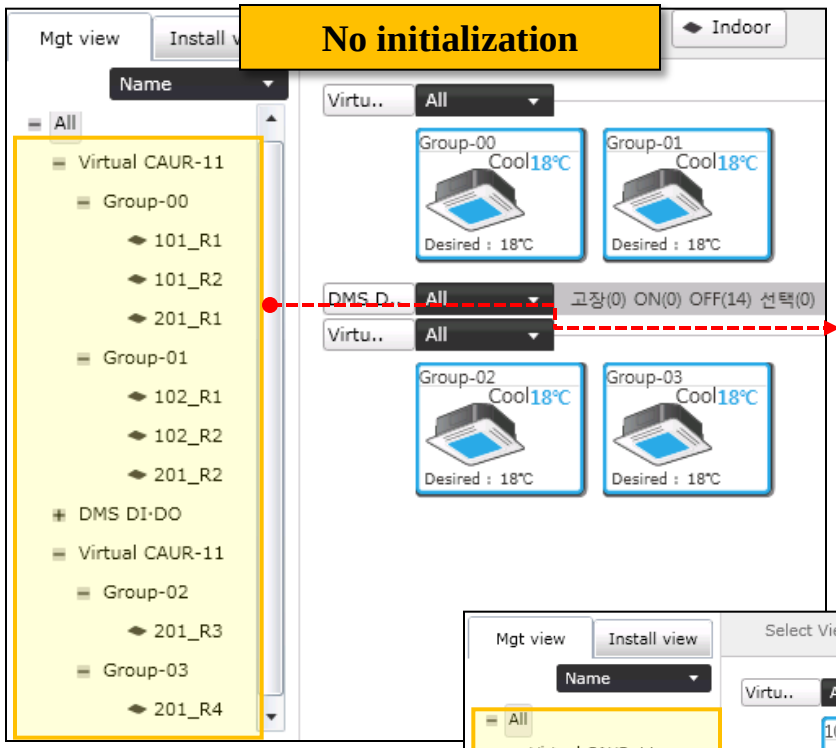
Example for initializing zone



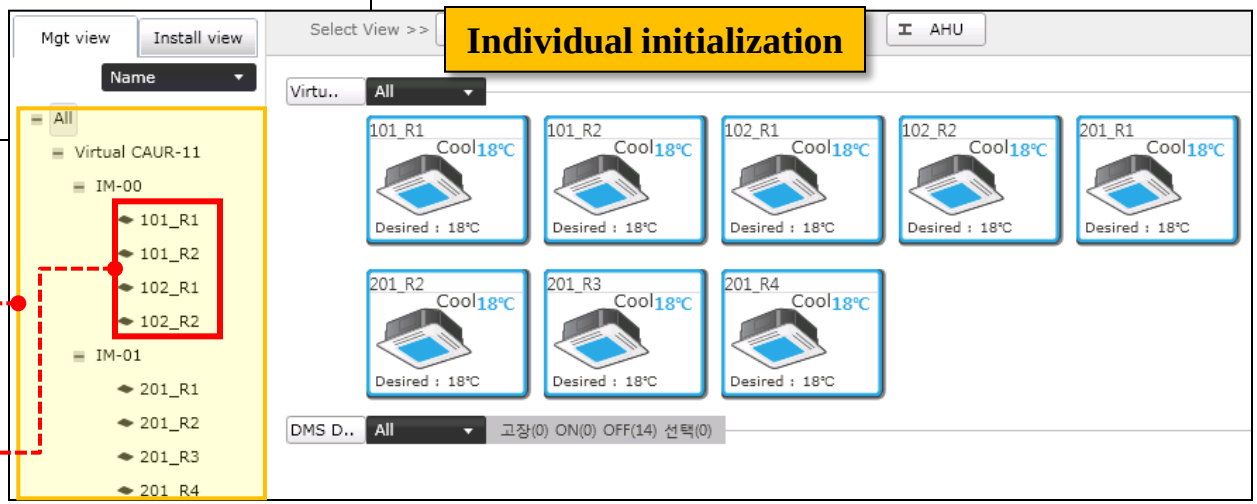
1. First installation – only 4 indoor units
2. Add 4 indoor units
3. Tracking



Tracking



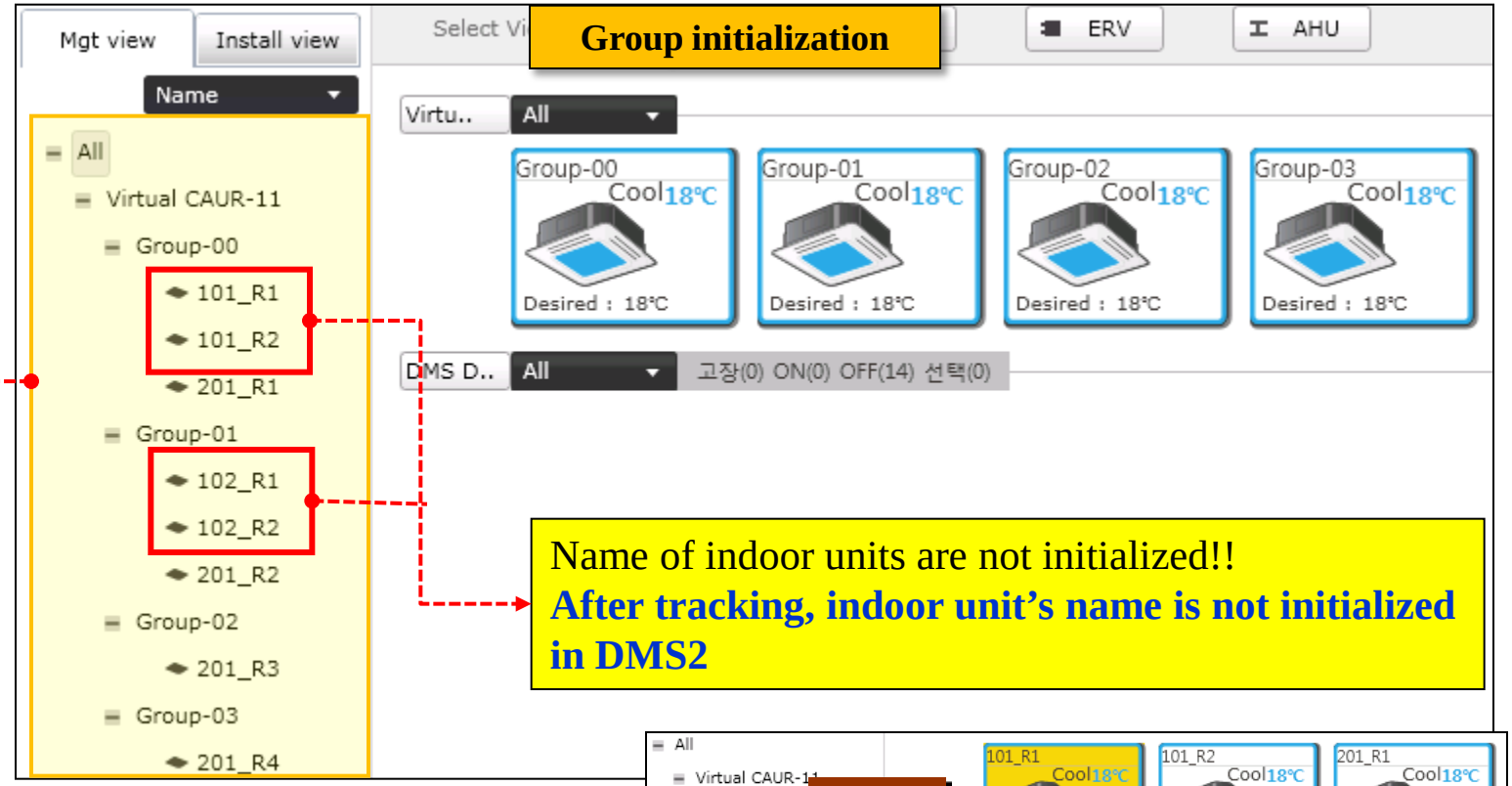
It is initialized by group.
Added indoor units are displayed below DI/DO.
It is strange !!
So recommend the individual or group initialization



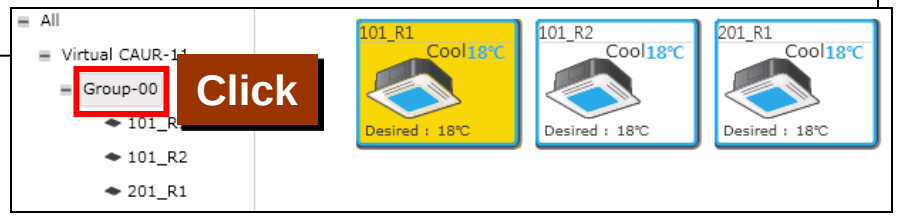
Individual initialization is success !!

Name of indoor units are not initialized!!

Tracking



Name of indoor units are not initialized!!
After tracking, indoor unit's name is not initialized in DMS2



It is initialized by group.
There are 4 group.
RMC address is form 0 to 3

After group initialization,
user can control indoor units by individual or group

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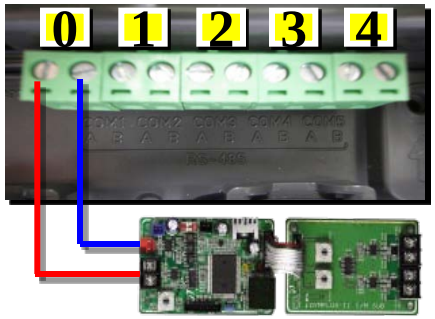
❖ Why channel 0 is inactivated in tracking menu?

When the communication mode is changed (interface module ↔ centralized controller), it will occur.
In this case, click " disconnect all device" then can change communication mode.

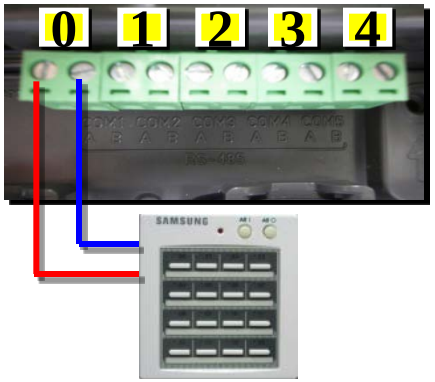
Example

1st installation



Change

2nd installation



Communication mode by channel	
Channel 0	◉ Interface module ○ Central controller
Channel 1	◉ Interface module ○ Central controller
Channel 2	◉ Interface module ○ Central controller
Channel 3	◉ Interface module ○ Central controller
Channel 4	◉ Interface module ○ Central controller

* The communication mode of a channel where the device is connected cannot be changed.

Cancel Save

Inactivated !!

Tracking

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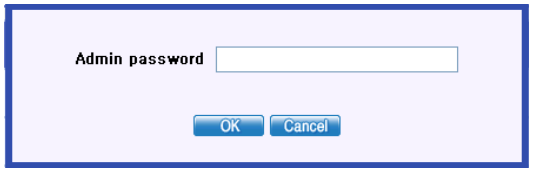
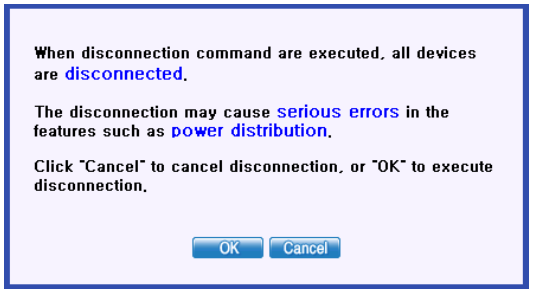
1. Click “Disconnect all devices”

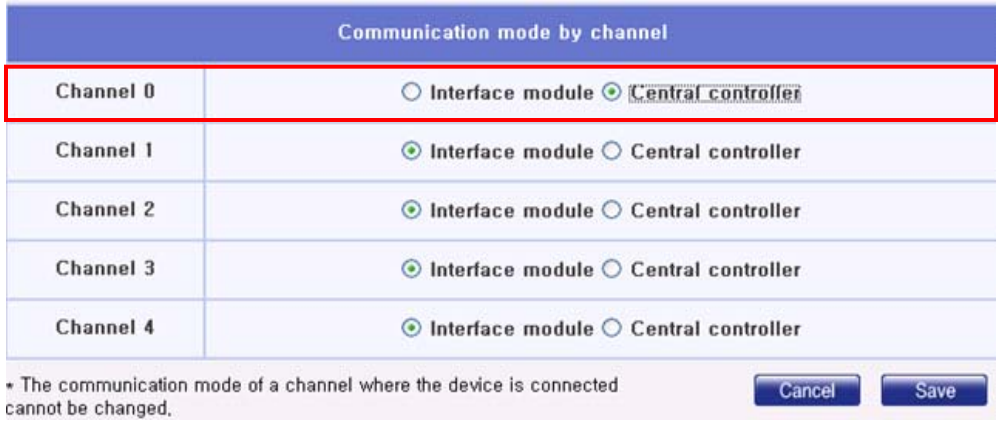
2. Enter the password



3. Click “OK” in pop-up menu



4. Channel 0 is activated



Activated !!

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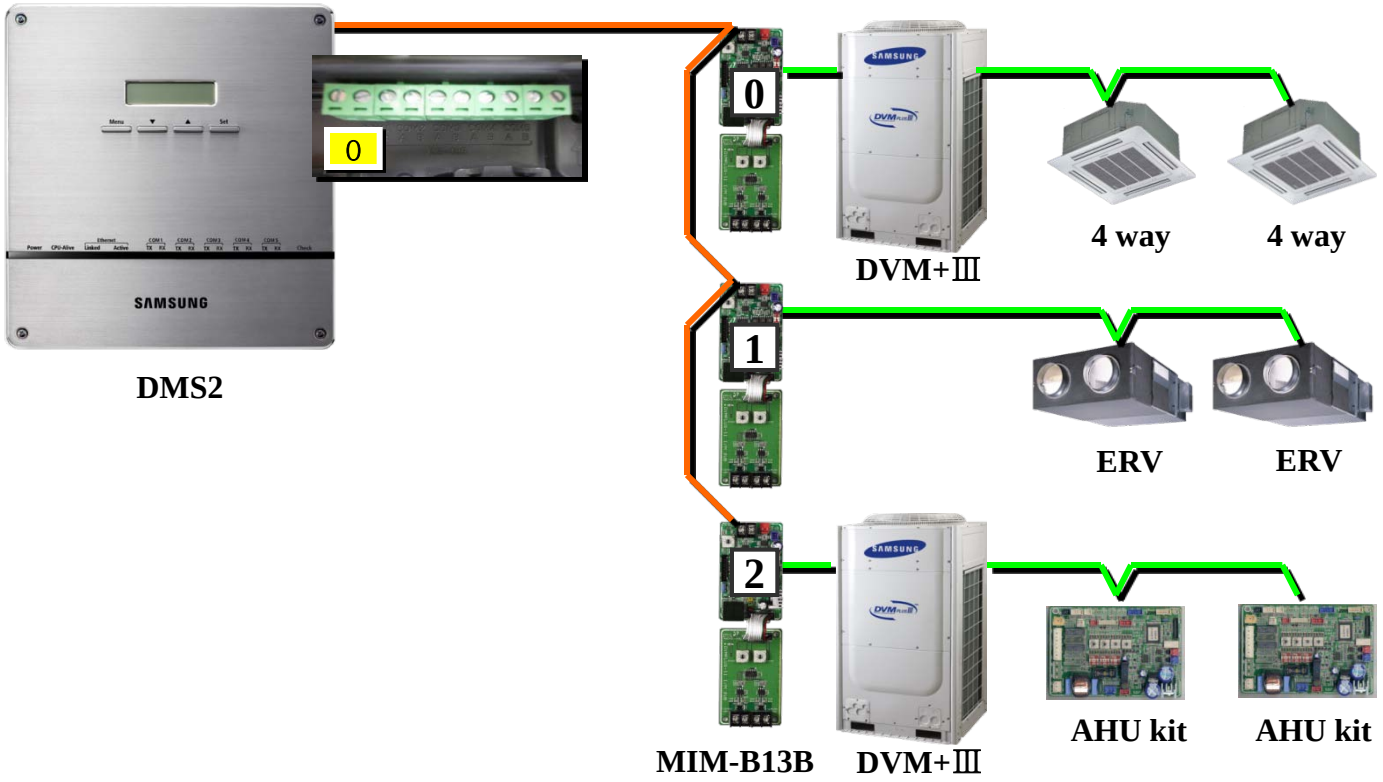
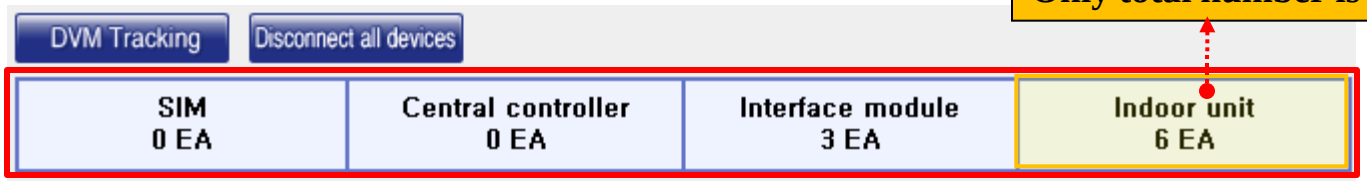
Installation Diagram



System Settings > Tracking

Only total number is displayed !



Tracking

System Settings > Tracking

Channel	Device	Address	Name
CH0	Central controller	11	
	Interface module	11.00	
	Indoor unit	11.00.00 (00)	11.00.00
	Indoor unit	11.00.01 (01)	
	Outdoor unit	11.00.00	
	Interface module	11.01	
	Indoor unit(ERV)	11.01.00 (00)	
	Indoor unit(ERV)	11.01.01 (01)	11.01.01
	Interface module	11.02	
	Indoor unit(AHU)	11.02.00 (00)	11.02.00
	Indoor unit(AHU)	11.02.01 (01)	11.02.01
	Outdoor unit	11.02.00	11.02.00
DMS	DMS DI-DO Setting	56	DMSDIDO

Virtual centralized controller address is automatically assigned

RMC addresses

MAIN addresses

Interface module addresses

Centralized controller addresses

ERV

AHU

Indoor unit name

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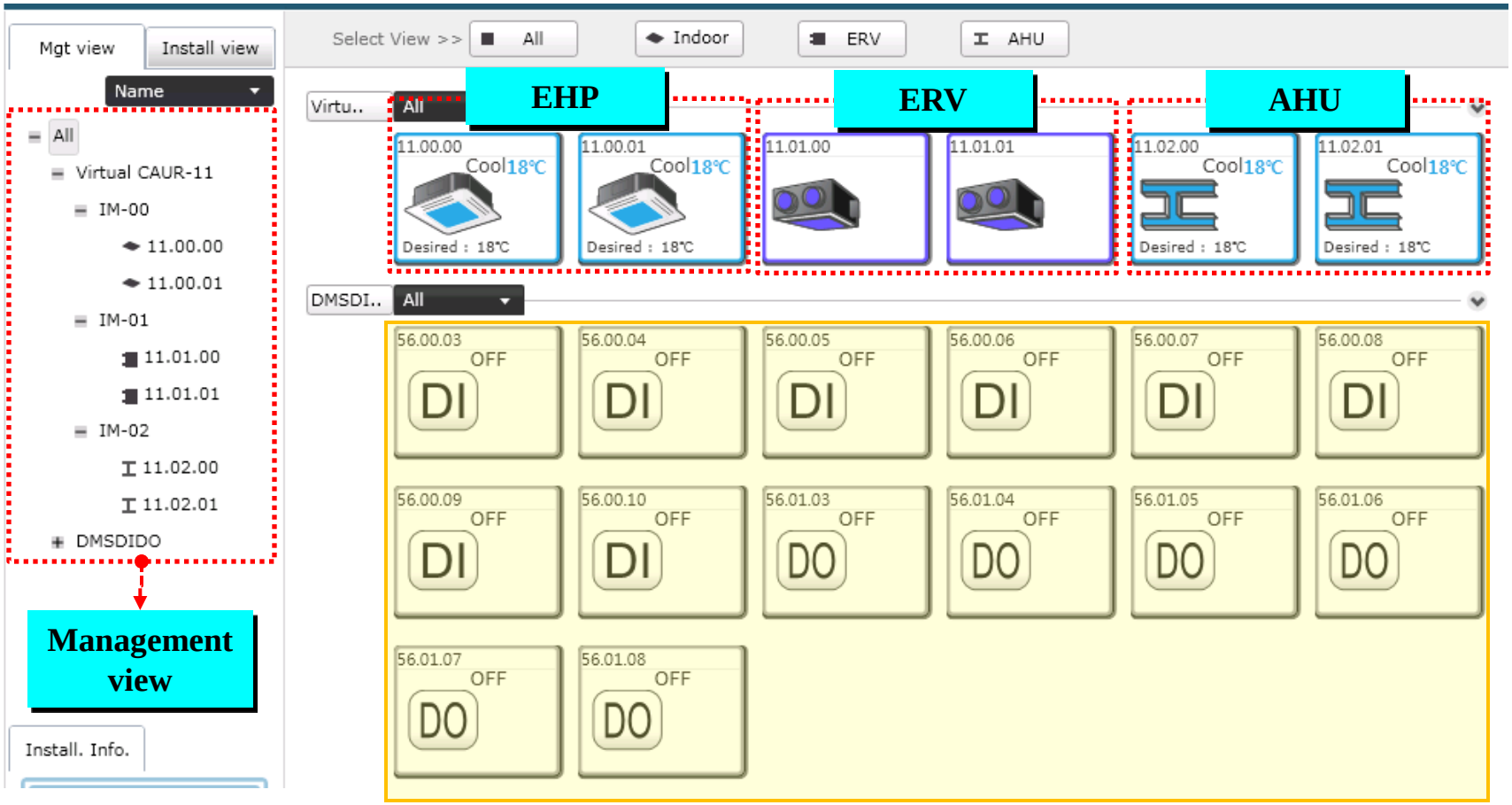
Main display after tracking



Although DI and DO ports not connected, DI/DO icons are displayed.
Because DI/DO ports have each fixed address .
- DI port address: 56.00.03~56.00.10
-DO port address: 56.01.03~56.01.08

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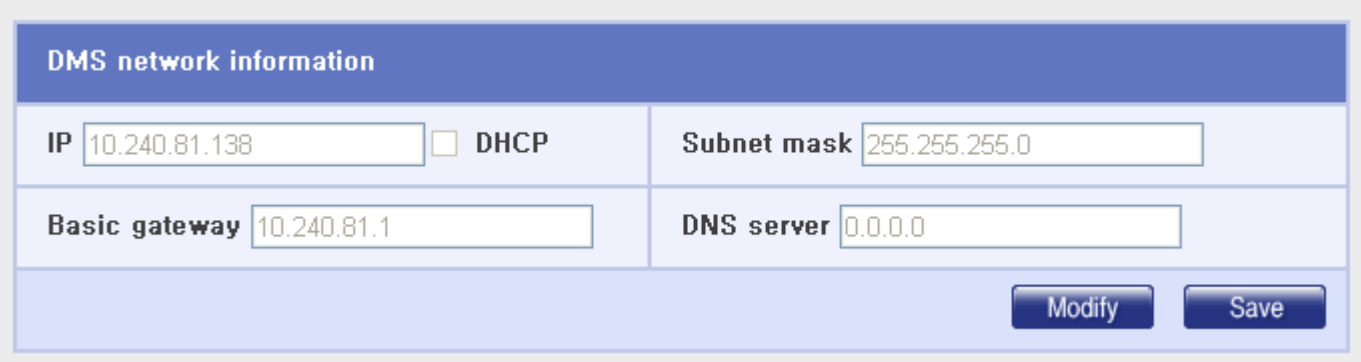
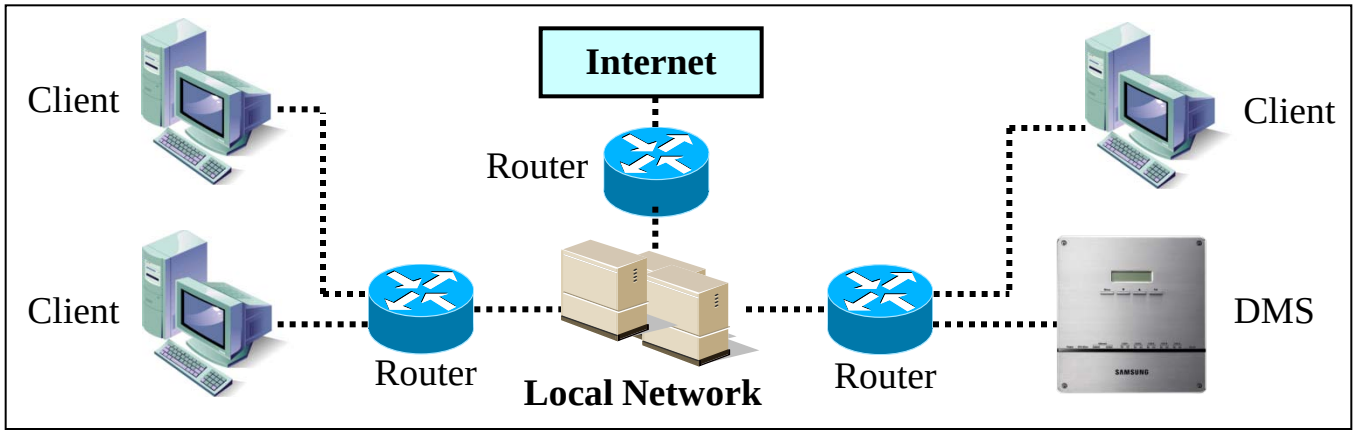
a. DMS network information



IP Address : Networking DMS IP
Gateway : Gateway or router IP which each subgroup is networked with.
Subnet Mask : IP masking constant for subnet group
DNS Server : Preferred Domain Name Server IP



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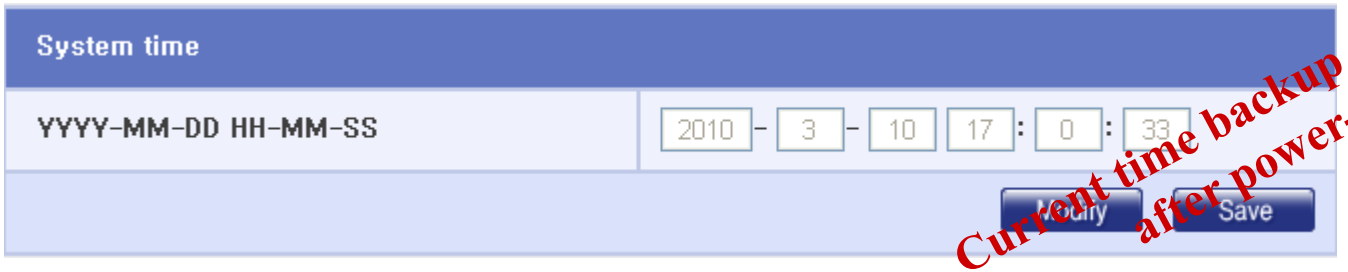
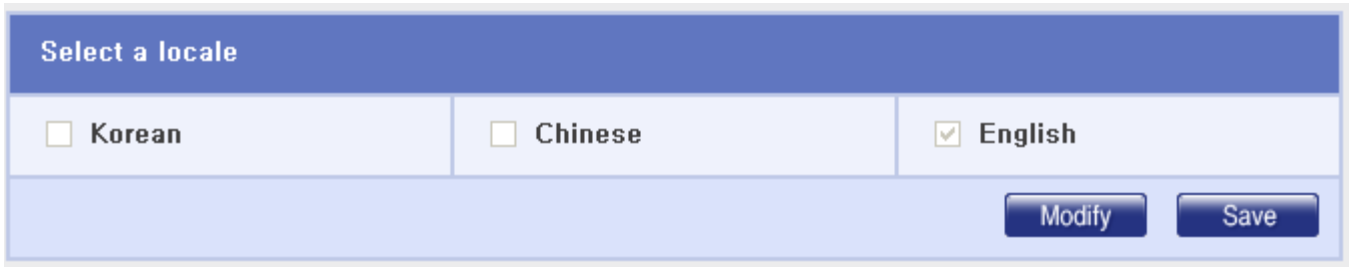
b. System time

Current time setting for power distribution or schedule control.



c. Select Language

DMS language can set be set among English, Korean and Chinese.



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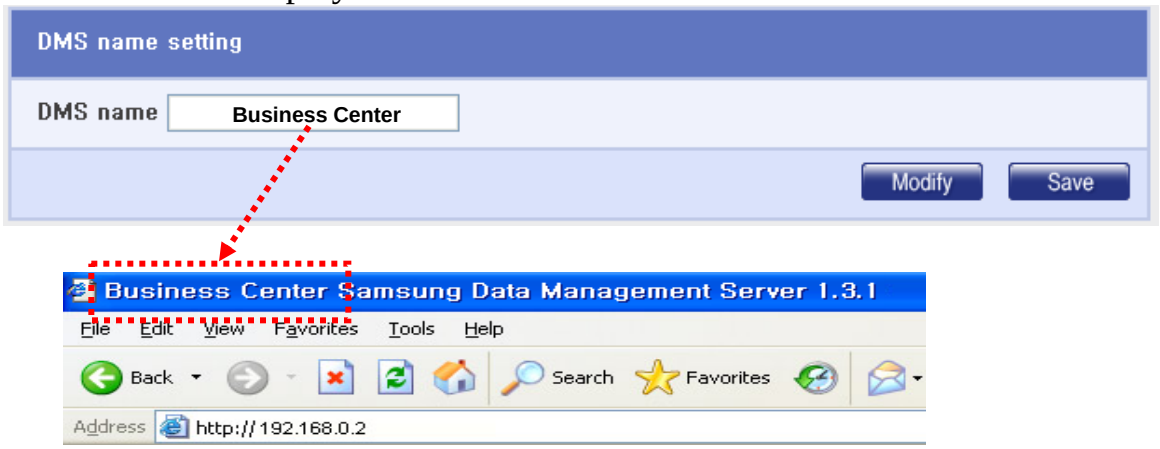
d. DMS name setting

DMS name is displayed on the web browser title bar.



e. Error email forwarding

If there occurs an error in the DMS air-conditioning system, DMS sends error notification e-mail to managers by using SMTP servers in mailing service companies.

Password : Access password of the account in a mail server
Email : Email address to which error notification is expected to receive.
SMTP server : Mailing server IP address where DMS tries to access in case of error

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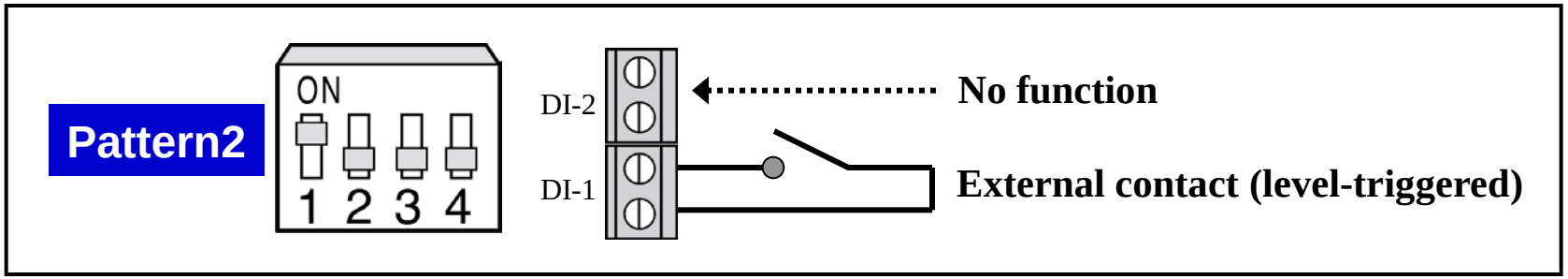
f. Select the contact control pattern

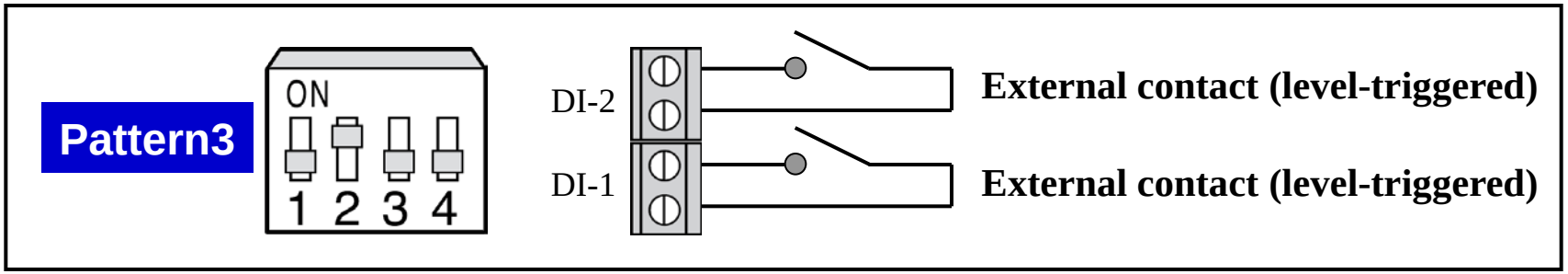
3 patterns can be selected depending on external contact interlocking operation.

Pattern	Control	Contact Input
1	No function (Default setting)	Not applied
2	1. Emergency stop operation. All indoor units stop operating and any command from upper controllers is ignored when the contact is closed. When released, the indoor units remains in the OFF state.	Level-triggered
3	1. Collective indoor unit ON/OFF control 2. Permitted/Prohibited remote controller use	Level-triggered
4	1. Indoor unit ON/OFF control 2. Permitted/Prohibited remote controller use	Pulse-triggered



- **Short external contact** : **Emergency stop**
  - . Turns off all the indoor units when there is an ON signal input.
  - . All the remote controller use is disabled.
  - . DMS will ignore any request from the upper-layer controllers.
  - . Schedule control is disabled temporarily.

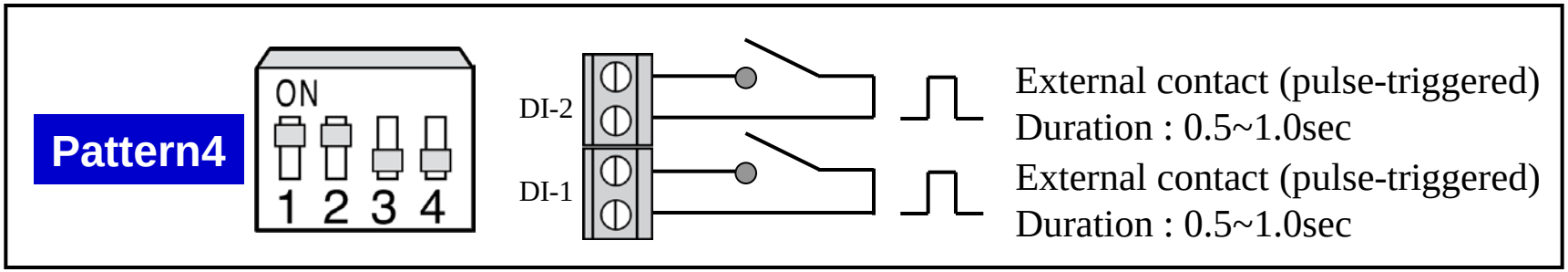
- **Open external contact** : **Resume operation**
  - . After Emergency stop, the indoor units stay the current OFF states.
  - . All the remote controller use is restored to the previous state.
  - . Schedule controls is enabled again.



- **External contact input to DI-1**
  - Short contact : Starts all indoor unit operation.
  - Open contact : Stops all indoor unit operation.

- **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.

Schedule control is not interrupted in Pattern 3.



External contact pulse input to DI-1

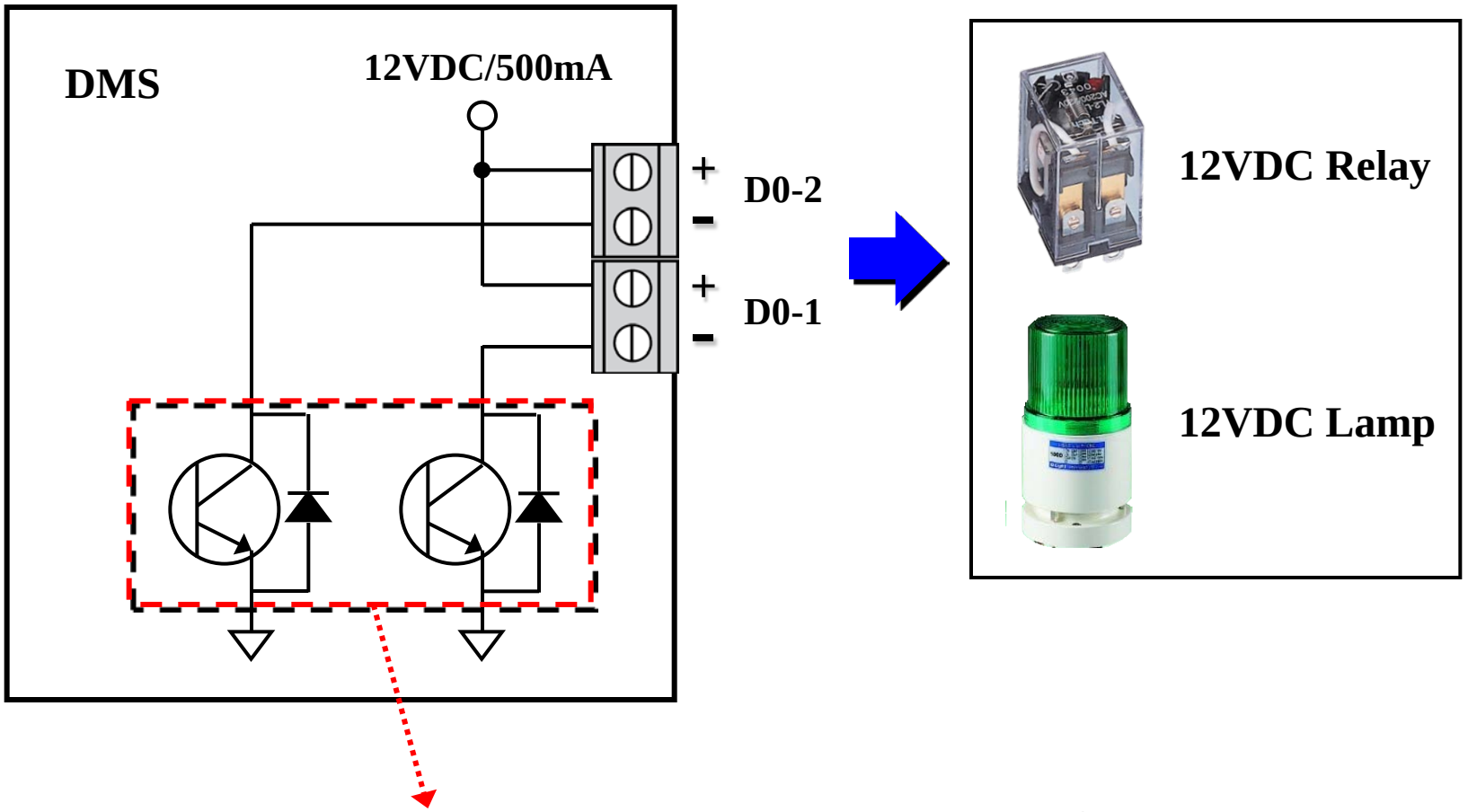
- Short pulse-triggered : Starts all indoor unit operation.

External contact pulse input to DI-2

- Short pulse-triggered : Stops all indoor unit operation.

Schedule control is not interrupted in Pattern 4.

System environment setting



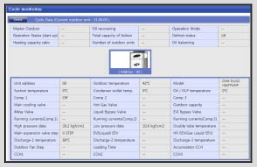
2 digital outputs with open-collector front-end.

Web browser

SAMSUNG ELECTRONICS CO.LTD

1. Web user interface

2. Control and Monitoring



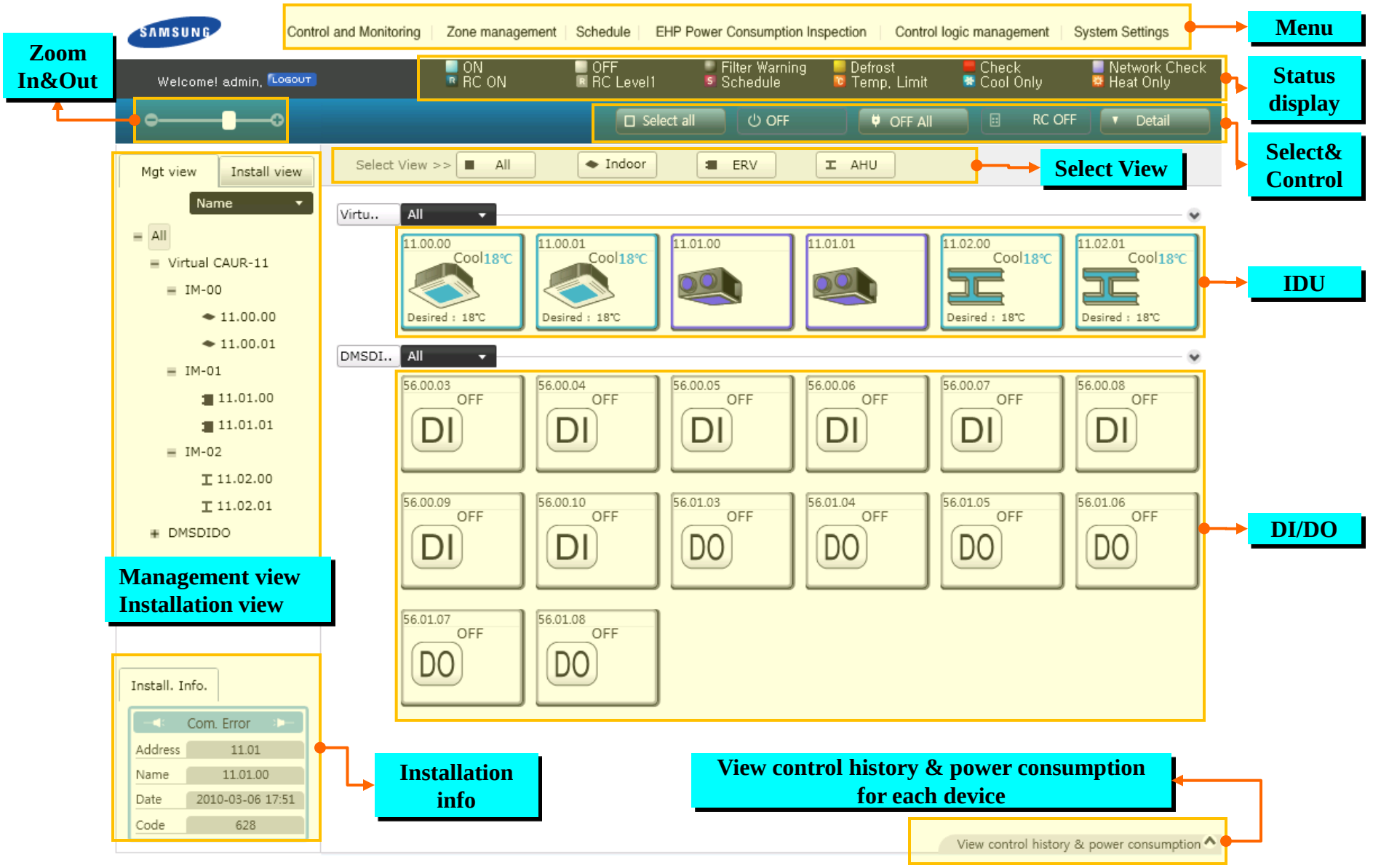
3. Zone management

4. Schedule

5. Control logic management

6. System Settings

Web user interface



Web user interface

SAMSUNG ELECTRONICS CO.LTD

1 Control and Monitoring | 2 Zone management | 3 Schedule | 4 EHP Power Consumption Inspection | 5 Control logic management | 6 System Settings

	Menu	Sub menu	Description
1	Control and Monitoring	• Cycle monitoring	ODU/IDU cycle data
		• Indoor unit usage restriction	Operation/Temperature limit
		• Trouble history	Error occurrence time/No./status
		• Checking operation status	Device control type
2	Zone management	• Zone setting& Edit	Individual/Group zone control
3	Schedule	• Schedule setting	Schedule resister/modify
		• Checking schedule control history	Schedule occurrence time search
4	EHP Power Consumption Inspection	• Check inspection result	IDU power consumption search
		• Setting the inspection section	Power meter reading section setting
		• Setting and checking watt-hour meter	SiM channel setting
		• Setting and checking virtual channel	Virtual channel setting
		• Channel setting by indoor unit	SiM/Virtual channel setting
		• Checking indoor unit operation time	Operation/Thermo on search

Web user interface

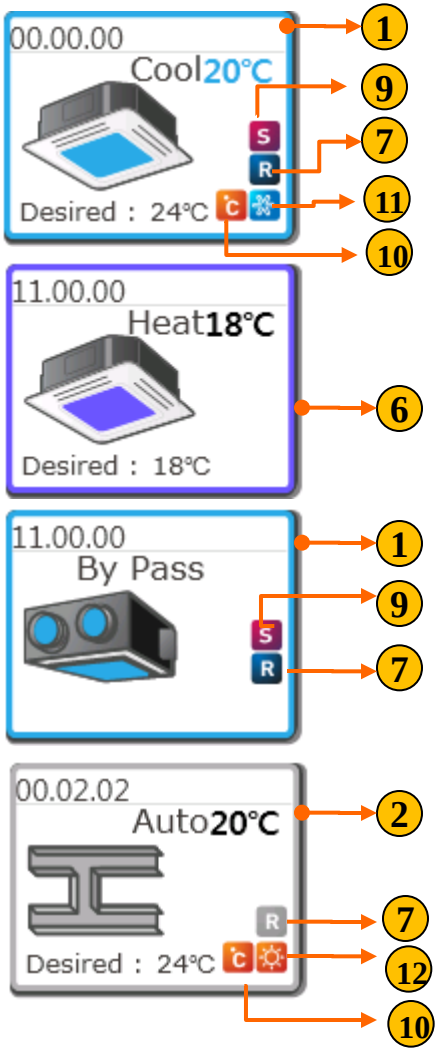
SAMSUNG ELECTRONICS CO.LTD

1 Control and Monitoring | 2 Zone management | 3 Schedule | 4 EHP Power Consumption Inspection | 5 Control logic management | 6 System Settings

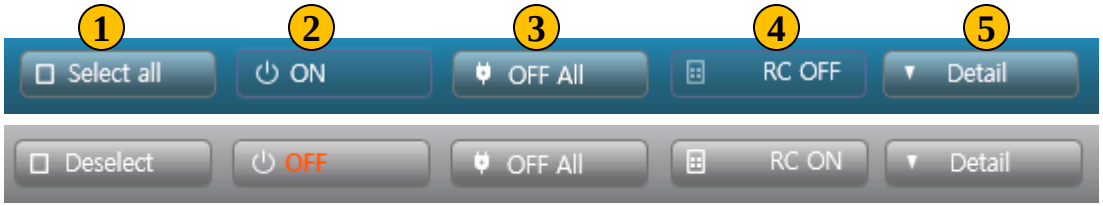
	Menu	Sub menu	Description
5	**Control logic management**	• **Setting control logic**	Logic control setting
		• **Checking control history**	Logic control history
6	**System Settings**	• **User management**	User add/delete
		• **User authorization management**	User access level setting
		• **Data backup & restoration**	PC/SD card backup, recovery
		• **Event history management**	Searching event history
		• **System environment setting**	Network setting Time setting Language setting Name setting Mail transfer setting Pattern setting
		• **RMS setting**	RMS service setting
		• **Tracking**	Tracking /IDU name setting

Web user interface

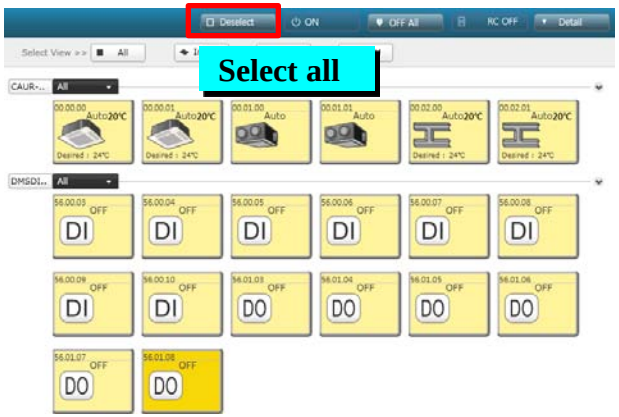
	Icon	Description
1	ON	Status of device is ON
2	OFF	Status of device is OFF
3	Filter Warning	Filter reset alarm
4	Defrost	Defrost occurrence
5	Check	Error occurrence
6	Network Check	Communication error occurrence
7	RC ON	Remote controller On/Off restriction
8	RC Level1	When indoor unit is off by DMS2, remote controller usage is restricted.
9	Schedule	Schedule
10	Temp. Limit	Upper/Lower temperature limit
11	Cool Only	Cooling only mode restriction
12	Heat Only	Heating only mode restriction

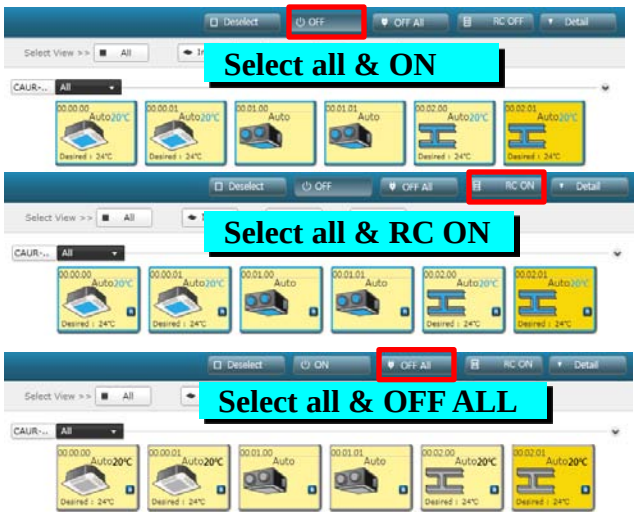


Web user interface



	Icon	Description
1	**Select all/Deselect**	Select all devices or Deselect all devices (Icon is toggled)
2	**ON/OFF**	Turn On or Off the selected device (Icon is toggled)
3	**OFF All**	Turn Off all devices
4	**RC ON/RC OFF**	Remote controller allow or restriction (Icon is toggled)
5	**Detail**	Control panel of indoor/ERV/AHU/DI/DO





1 Click

Web user interface

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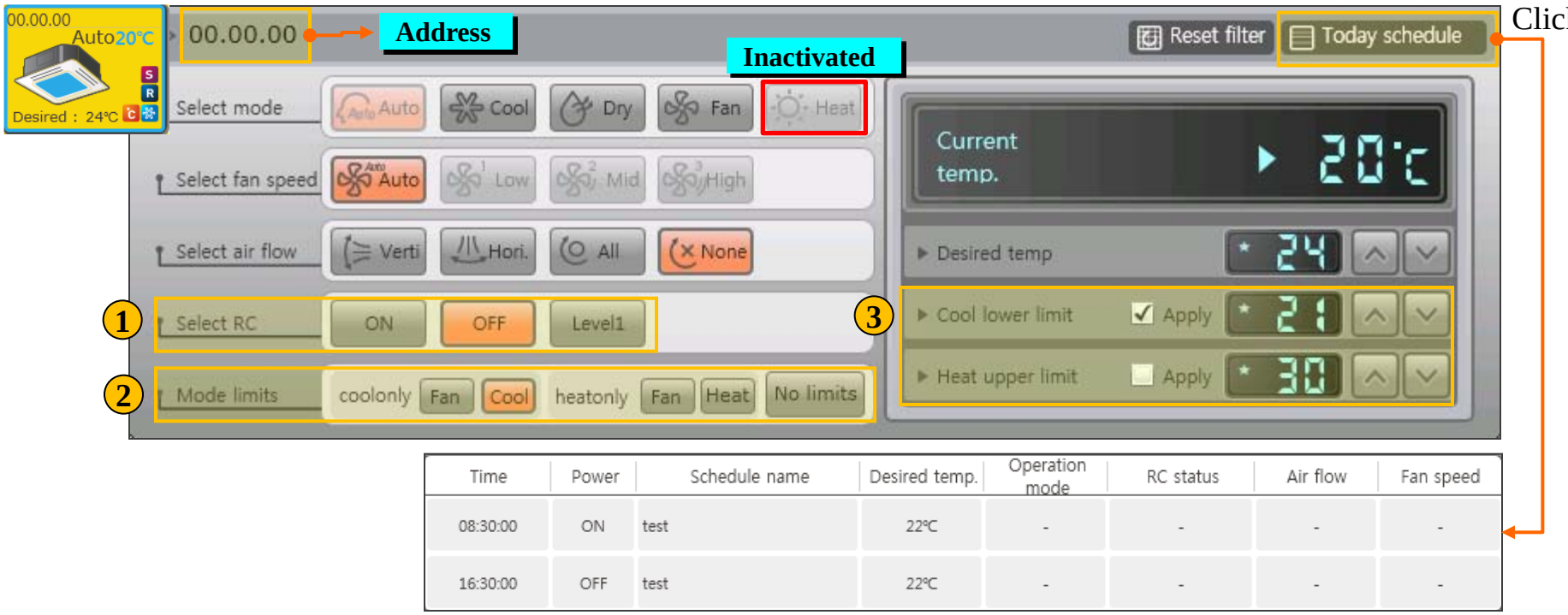
Type	Display icon	Detail (Control panel)
Indoor unit		
ERV		
AHU		
DI		 -. Input value is impossible, only monitoring -. ON/OFF control is impossible
DO		 -. Output value can be controlled -. ON/OFF control is possible

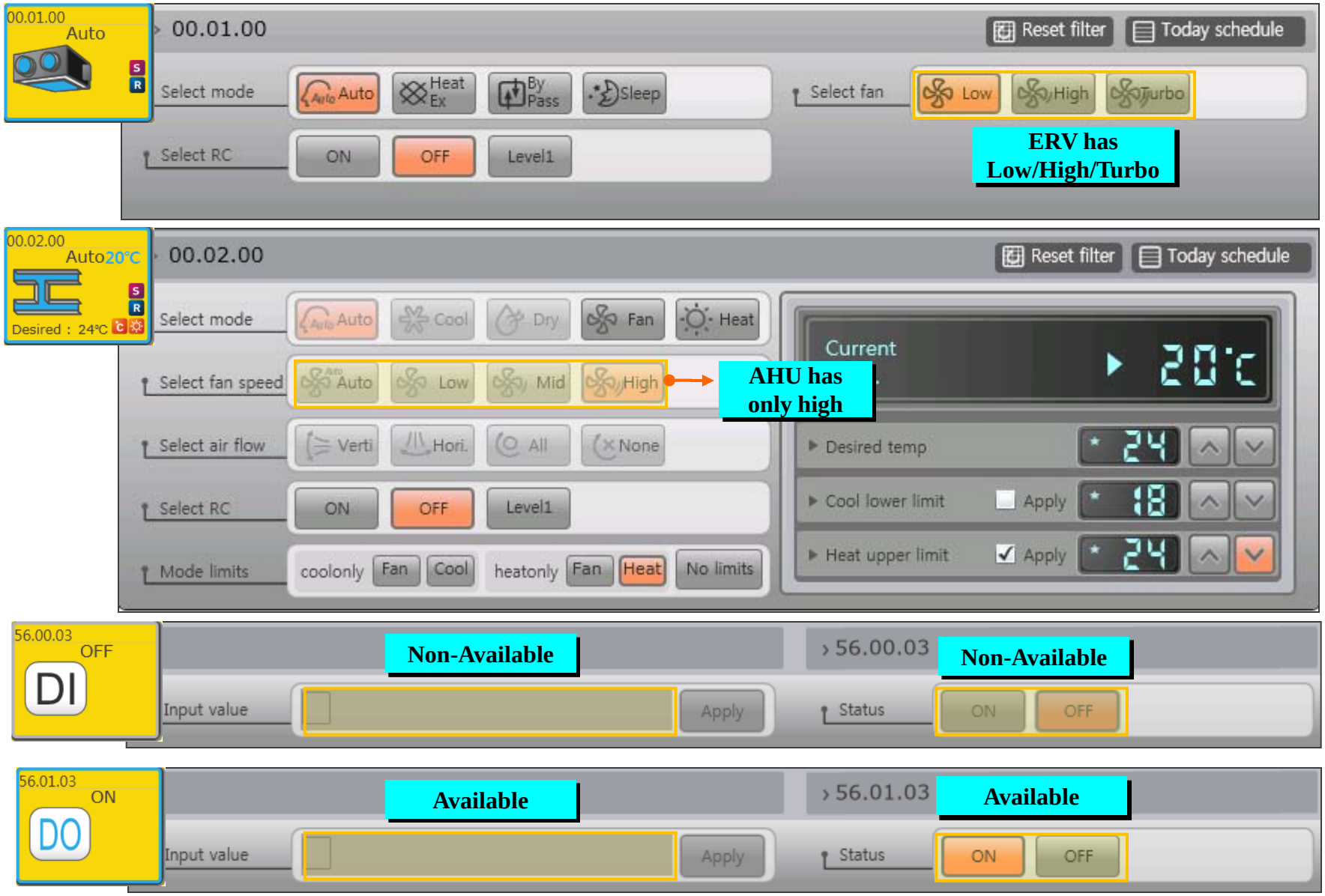
Web user interface



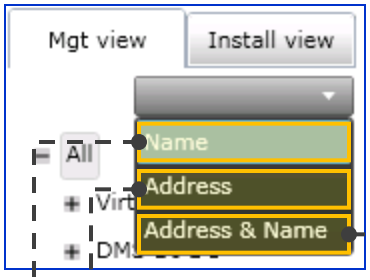
Time	Power	Schedule name	Desired temp.	Operation mode	RC status	Air flow	Fan speed
08:30:00	ON	test	22°C	-	-	-	-
16:30:00	OFF	test	22°C	-	-	-	-

	Icon	Description
1	**Select RC**	ON: Remote controller allow OFF: Remote controller restriction Level 1: When IDU is on by DMS2, remote controller is available When IDU is off by DMS2, remote controller is restricted
2	**Mode limits**	Cool only: can not select the heat mode Heat only: can not select the cool mode
3	**Temperature limit**	Cool: 18℃~30℃, Heat: 16℃~30℃

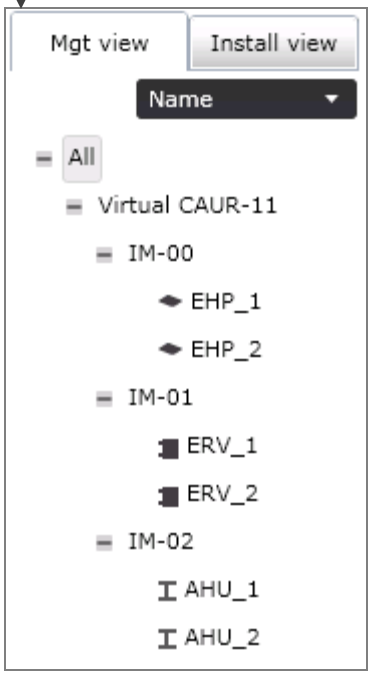
Web user interface

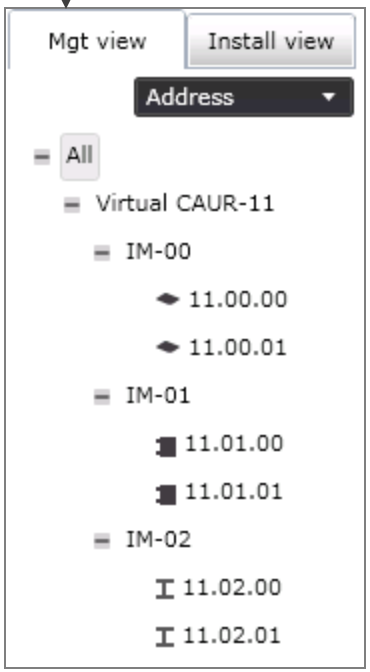


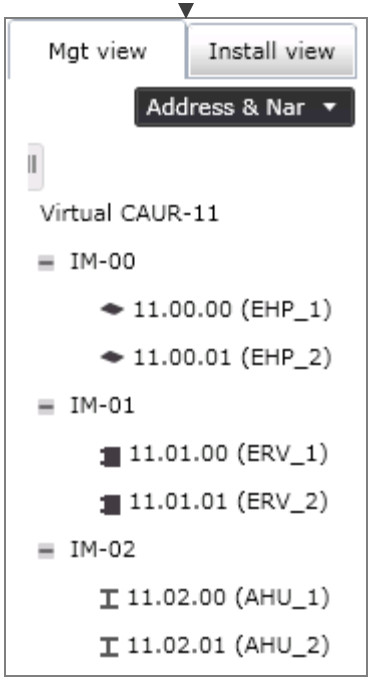
Web user interface

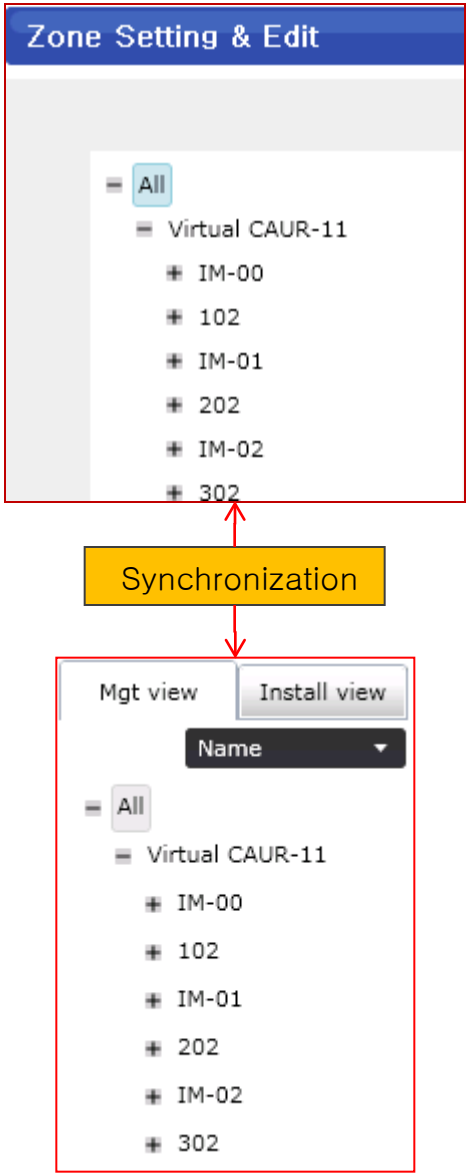


- Management view is base on zone management
- If zone setting is change, management view will be synchronized.
- Management view has 3 type.

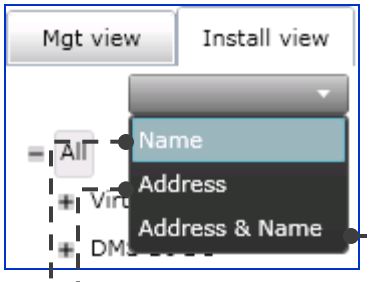




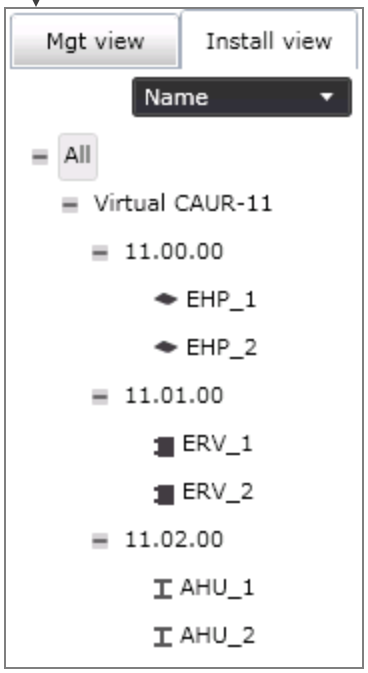


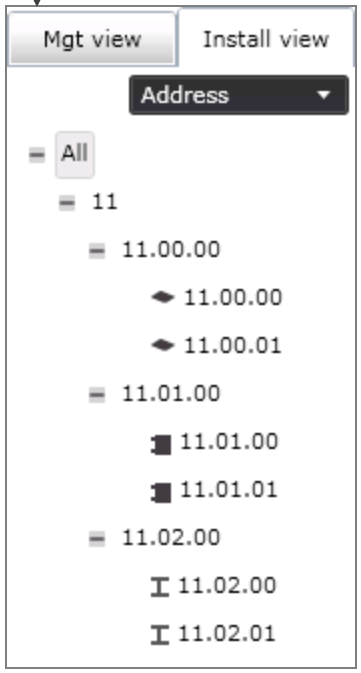


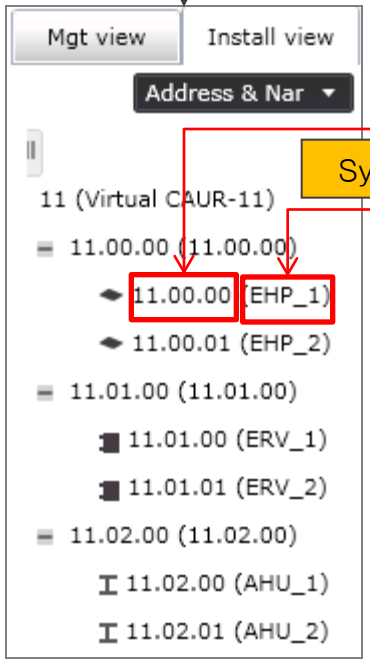
Web user interface



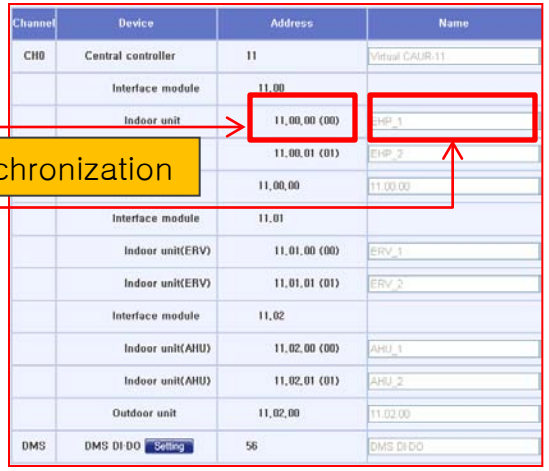
- Install view is base on tracking .
- Although zone setting is change, install view is not changed.
- Install view has 3 type.







Synchronization



Tracking result

Web user interface

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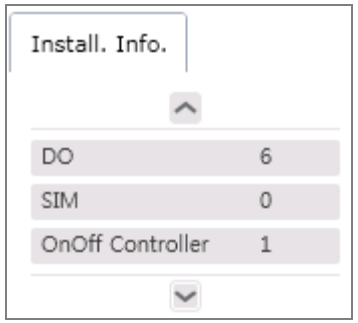
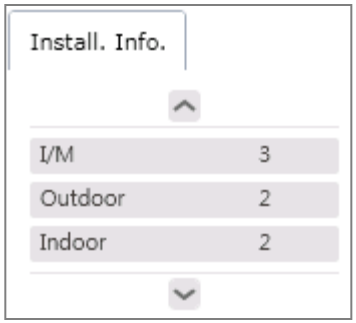
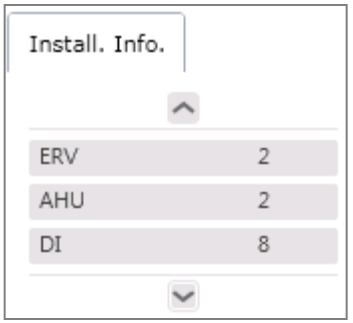
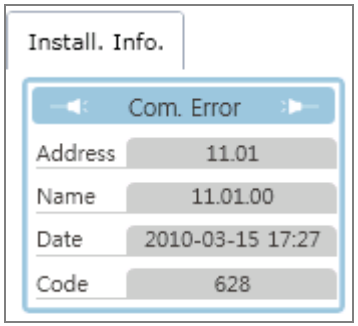
- **Install Info**
  If you press "∧ "or "∨" , install information will be displayed.
  When a error happen, error information will be described.

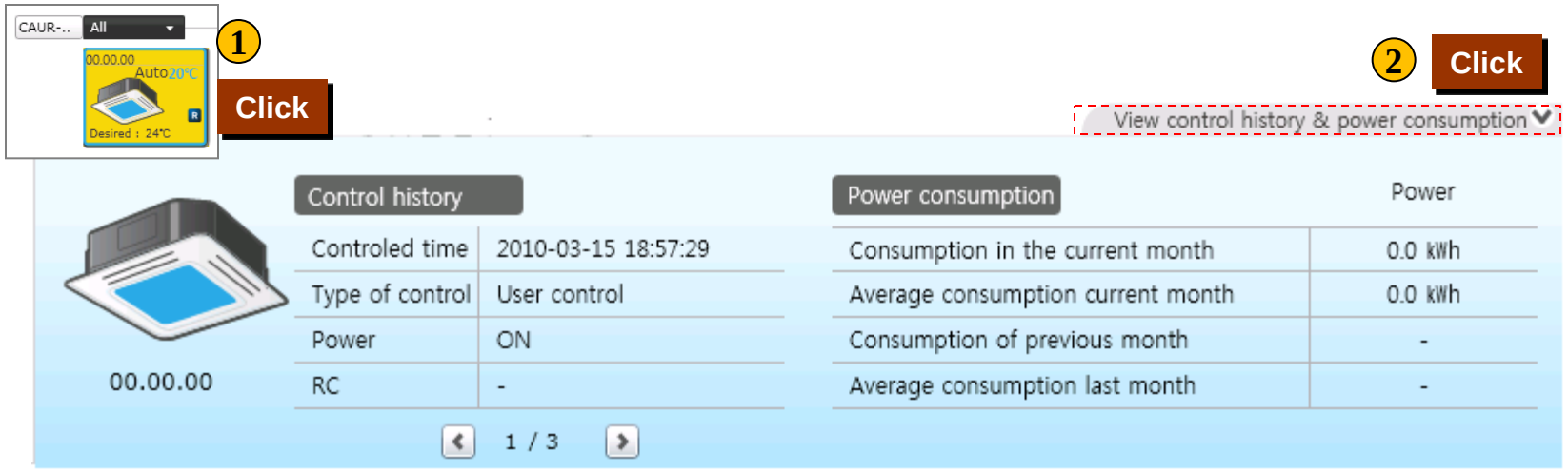








- **View control history & power consumption**
  If you press one indoor unit and then click this menu, you can see indoor unit information



Control and Monitoring

SAMSUNG ELECTRONICS CO.LTD

Control and Monitoring > Cycle monitoring

1 Select — Cycle Data (Current outdoor unit : 00.00.00) → Selected outdoor unit

Click

- All
  - CAUR-00
    - 00.00.00 (2)
    - 00.01.00
    - 00.02.00

Select the outdoor unit

	--	Oil recovering	--	Operation Mode	--
Op	--	Total capacity of Indoor	--	Defrost status	Off
He	--	Number of outdoor units	--	Oil balancing	--

[Address : 00]

Unit address	00	Outdoor temperature	25℃	Model	DVM-PLUS3 HEATPUMP
Suction temperature	20℃	Condenser outlet temp.	33℃	Oil / OLP temperature	10℃
Comp 1	Off	Comp 2	--	Comp 3	--
Main cooling valve	--	Hot Gas Valve	--	Outdoor capacity	--
4Way Valve	--	Liquid Bypass Valve	--	EVI Bypass Valve	--
Running currents(Comp.1)	--	Running currents(Comp.2)	--	Running currents(Comp.3)	--
High pressure data	40.0 kgf/cm2	Low pressure data	4.4 kgf/cm2	Double tube temperature	--
Main expansion valve step	300 STEP	EVI(Liquid) EEV	--	HR EEV(Gas Liquid EEV)	--
Discharge-1 temperature	22℃	Discharge-2 temperature	--	Discharge-3 temperature	--
Outdoor Fan Step	--	Loading Time	--	Accumulator CCH	--
CCH1	--	CCH2	--	CCH3	--

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Control and Monitoring > Cycle monitoring

EHP indoor unit cycle data

00.00.00		Address	00.00.00	RMC	00	Mode	Auto	Current temp.	20℃	Desired temp.	24℃
		Fan speed	Auto	Status	normal	Demand capacity	100kcal	Model code	2 Way	Eva In temp	50℃
		RC status	Disable	Filter warnning	Off	Expansion valve step	120 STEP	Version	00575C 2008-03	Eva Out temp	50℃

ERV indoor unit cycle data

00.01.00		Address	00.01.00	RMC	00	Mode	Auto	Current temp.	--	Desired temp.	--
		Fan speed	Low	Status	normal	Demand capacity	--	Model code	ERV	Eva In temp	--
		RC status	Disable	Filter warnning	Off	Expansion valve step	--	Version	00575C 2007-12	Eva Out temp	--

AHU indoor unit cycle data

00.02.00		Address	00.02.00	RMC	00	Mode	Auto	Current temp.	20℃	Desired temp.	24℃
		Fan speed	High	Status	normal	Demand capacity	100kcal	Model code	AHU	Eva In temp	50℃
		RC status	Disable	Filter warnning	Off	Expansion valve step	120 STEP	Version	00575C 2008-03	Eva Out temp	50℃

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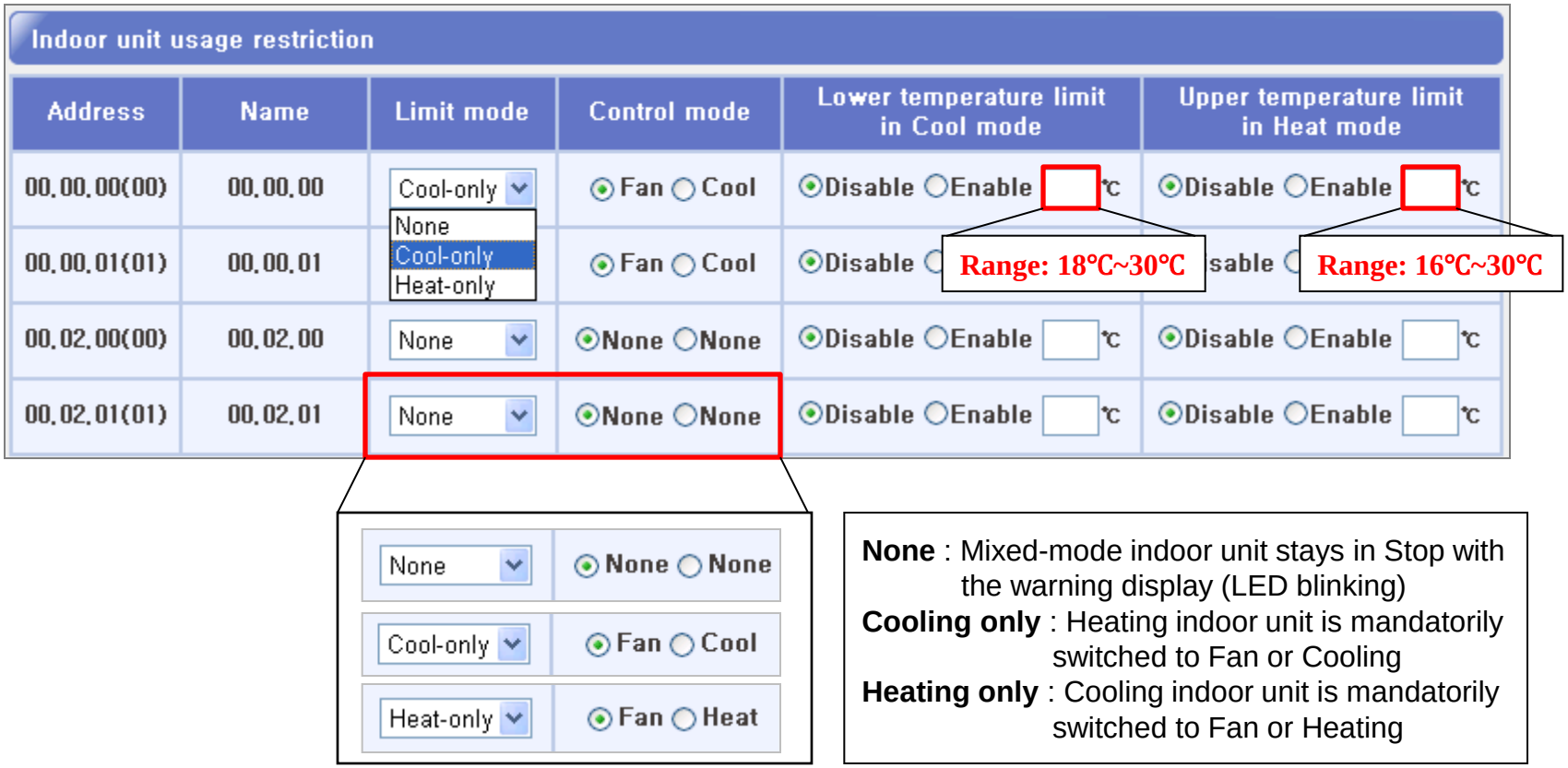
Control and Monitoring > indoor unit usage restriction

- Operation mode lock and mandatory control can be set for each of indoor units to prevent the mixed operation.
- Set temperature can be limited to a certain range for heating and cooling energy saving.



None : Mixed-mode indoor unit stays in Stop with the warning display (LED blinking)
Cooling only : Heating indoor unit is mandatorily switched to Fan or Cooling
Heating only : Cooling indoor unit is mandatorily switched to Fan or Heating

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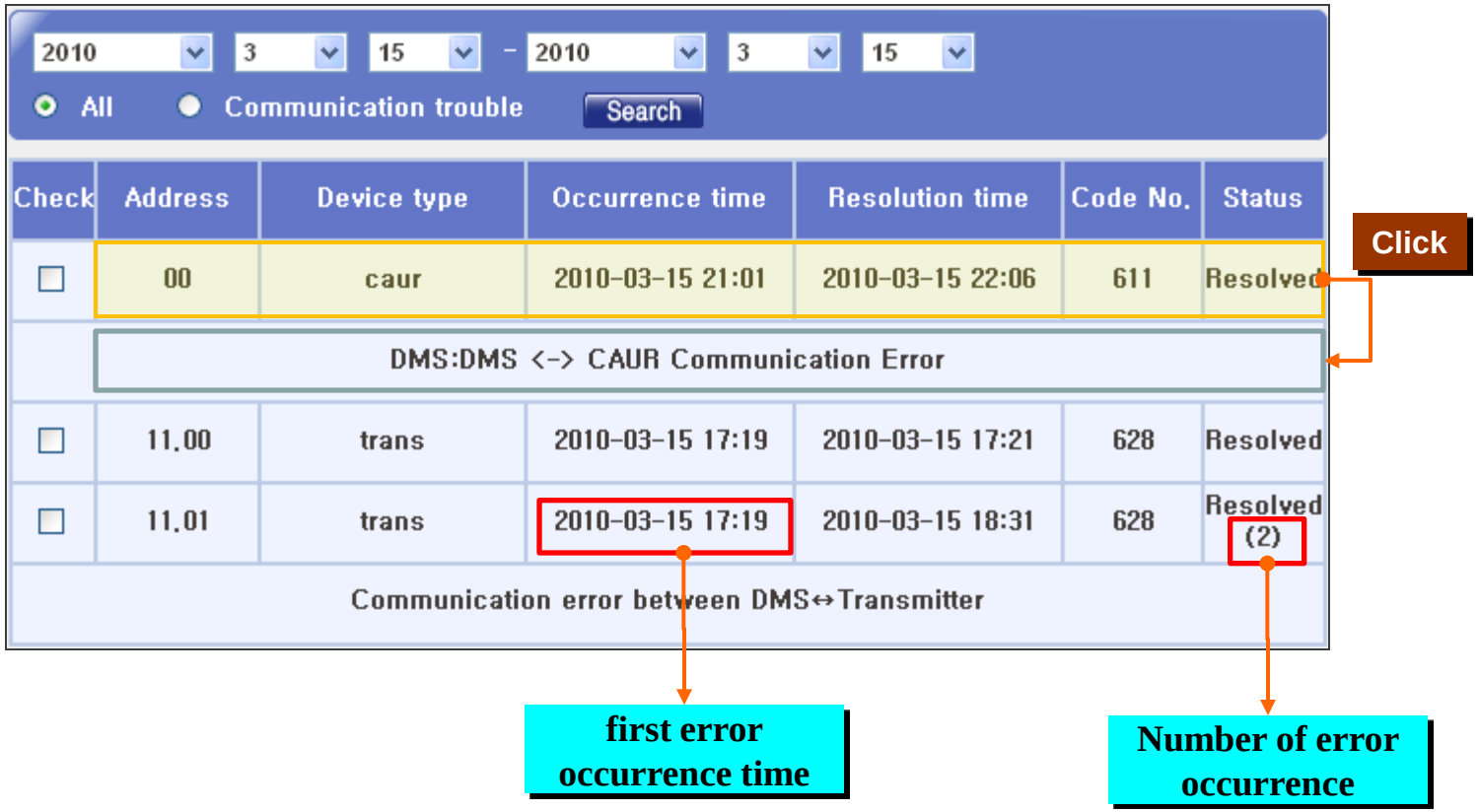
Control and Monitoring > Trouble history

- Trouble history show the device type, occurrence time, resolution time, error code and status.
- If same error code happens in one day, number of error occurrence is displayed within parenthesis. In this case, occurrence time display first error occurrence time.
- DMS2 can save maximum 1024 trouble history. If the number of history exceeds 1024, DMS2 will delete the oldest history first.



Control and Monitoring

SAMSUNG ELECTRONICS CO.LTD

Control and Monitoring > Checking operation status

- Checking operation status shows
  - Device type
  - Occurrence time
  - Control unit
  - Control type
  - Controlled device address

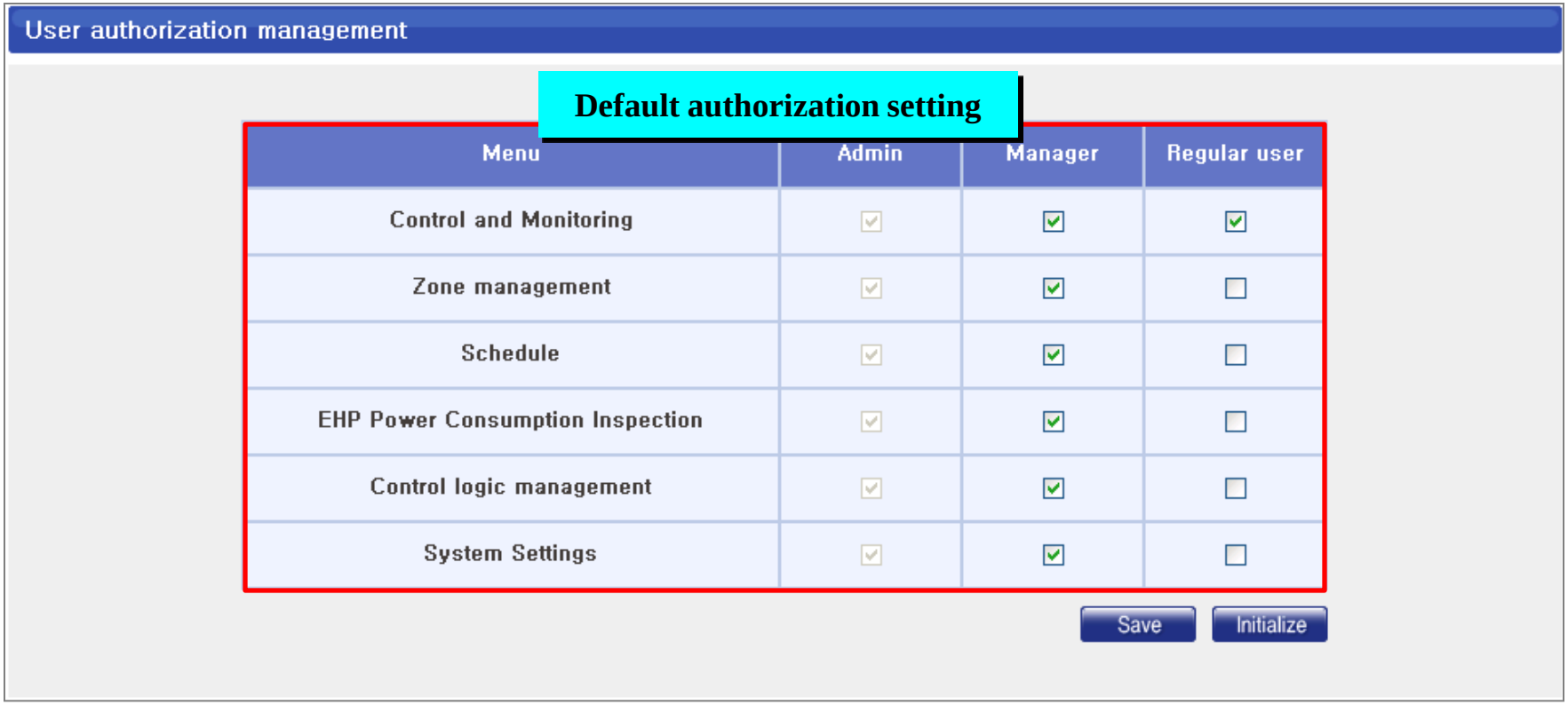
- In this menu, check below items.
  DMS2 On/Off,
  Device O/Off, remote restriction,
  operation mode change, set temperature and so on….

-DMS2 saves the information of operation history 180 days. However, it varies depending on saving space of DMS2

System Settings

SAMSUNG ELECTRONICS CO.LTD

System Settings > User authorization management



- **Admin(Administrator):** Default setting is allowed to access to all menu. Can't be edit.
- **Manager:** Default setting is allowed to access to all menu. Can be edit
- **Regular user:** Default setting is allowed to only "Control and Monitoring". Can be edit.

System Settings

SAMSUNG ELECTRONICS CO.LTD

▪ **Editing the accessible menu**

Menu	Admin	Manager	Regular user
Control and Monitoring	☑	☑	☑
Zone management	☑	☑	☐
Schedule	☑	☑	☑
EHP Power Consumption Inspection	☑	☐	☐
Control logic management	☑	☐	☐
System Settings	☑	☑	☐

Save Initialize

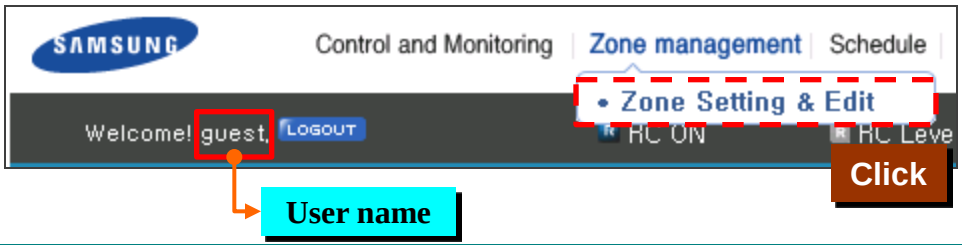
Microsoft Internet Explorer
Successfully done.
확인

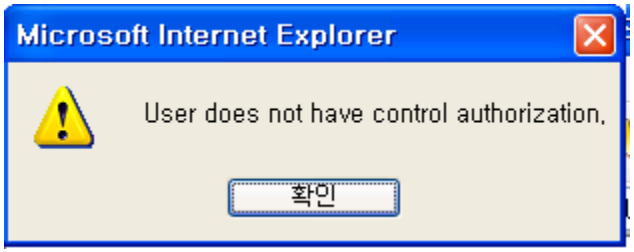
3 Click

1 Select or deselect the accessible menu

2 Click

▪ **If a user press the menu which can't be access, warning message is pop-up**

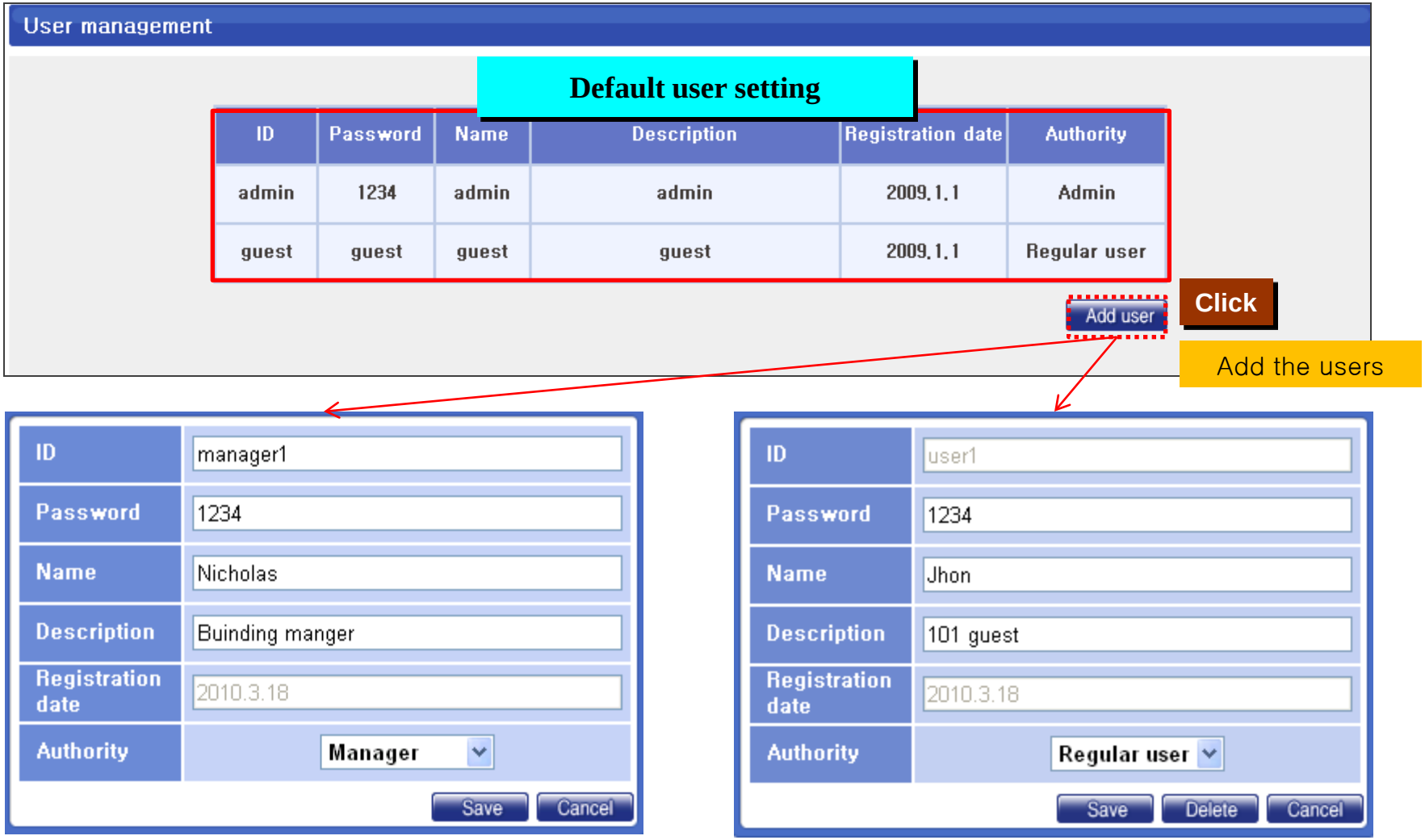




System Settings

SAMSUNG ELECTRONICS CO.LTD

System Settings > User management



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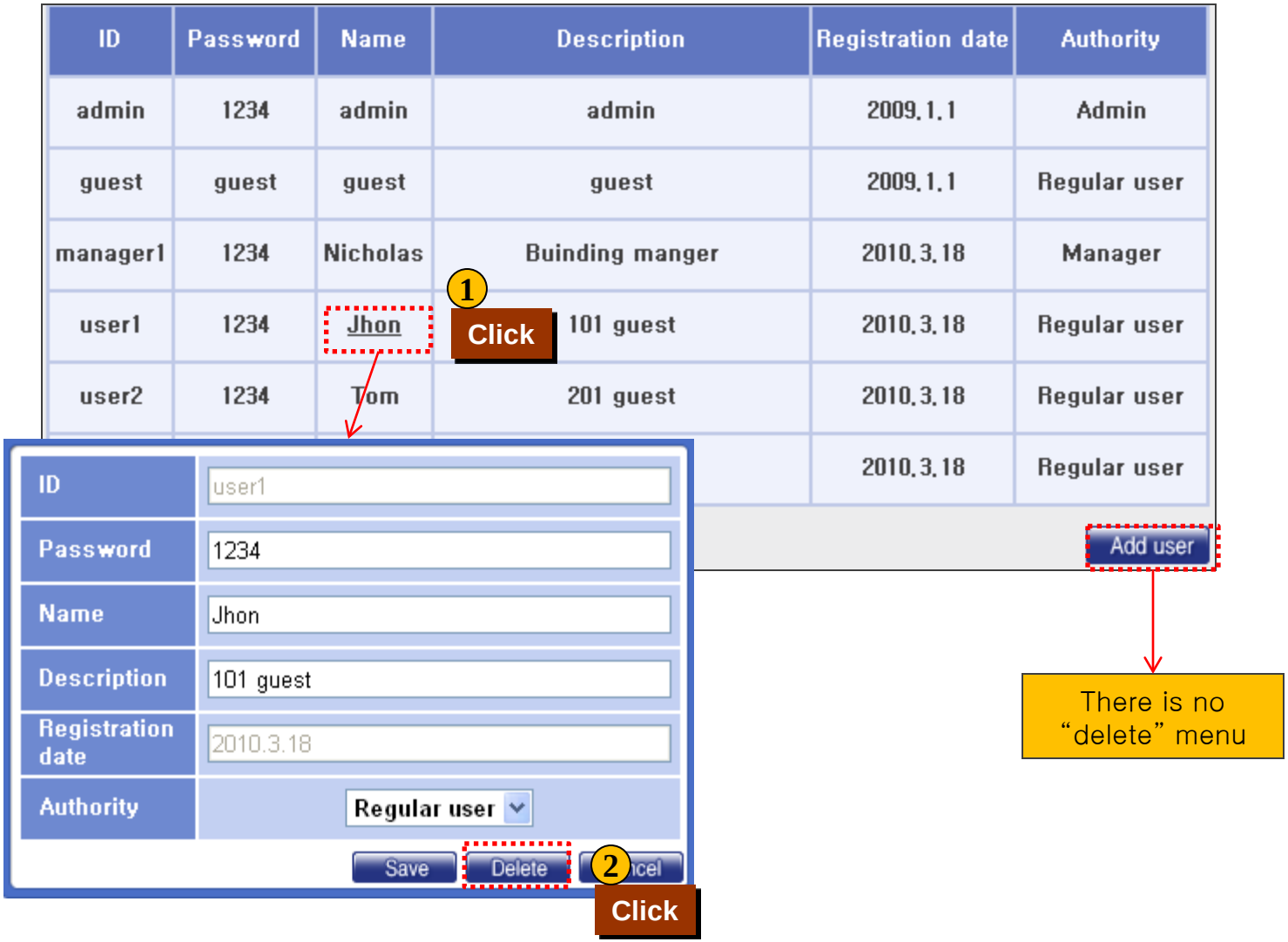
▪ **How to delete a user?**



Zone management

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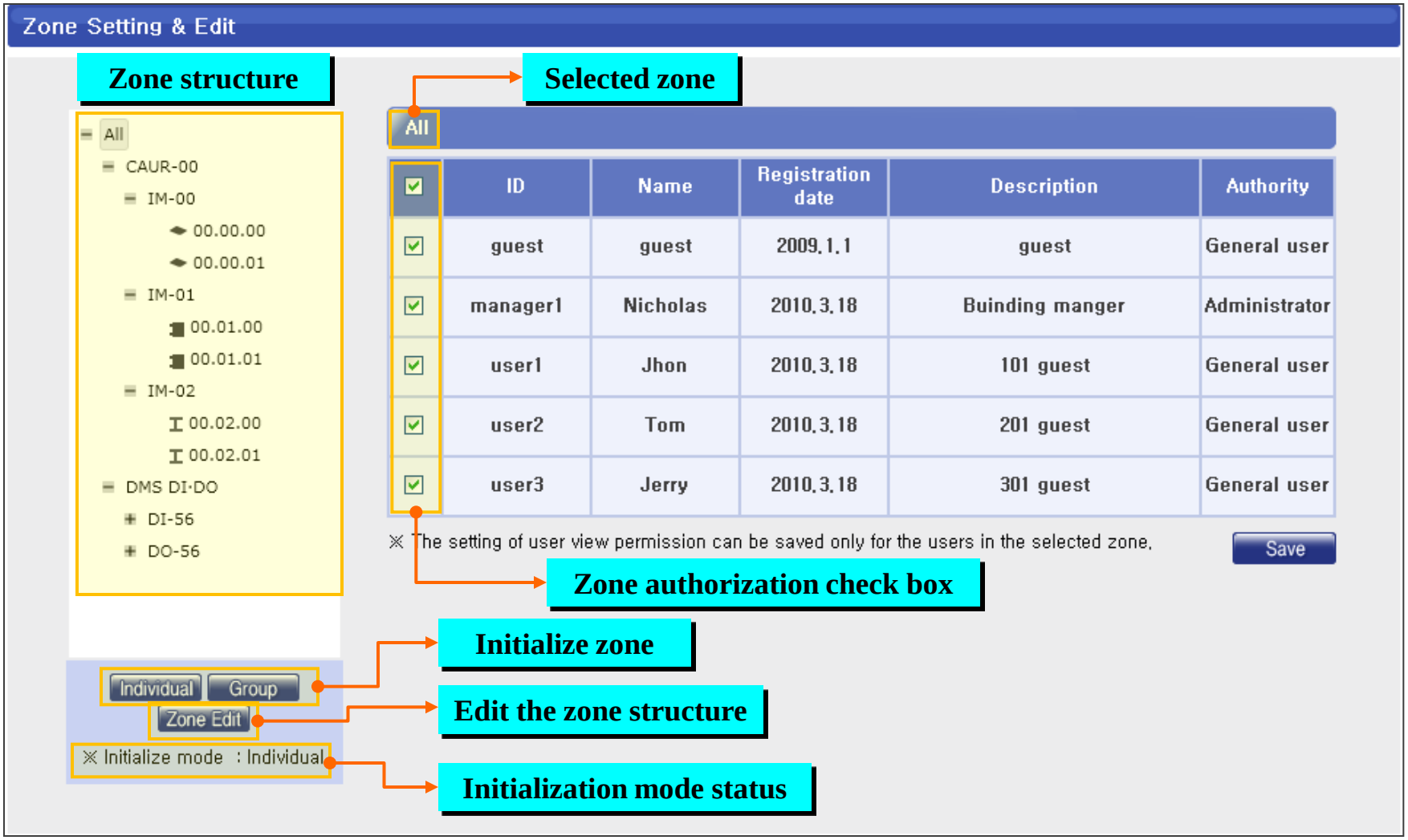
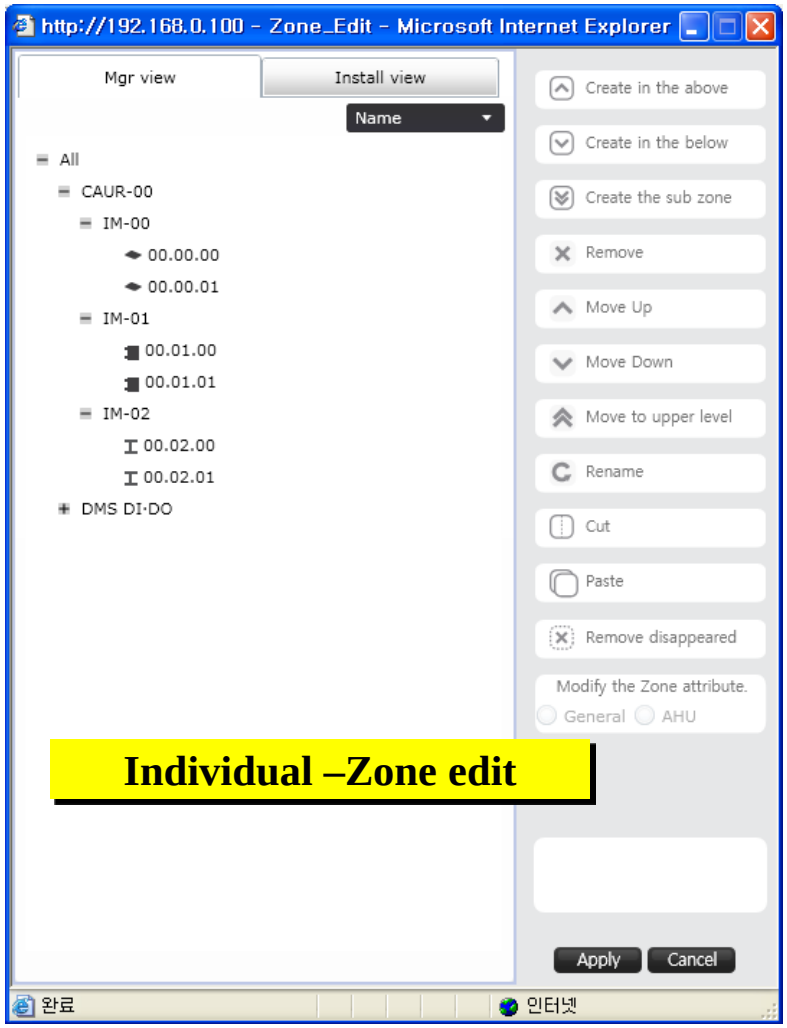
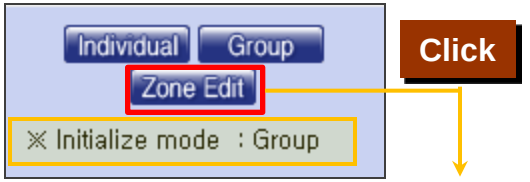
Zone management > Zone Setting & Edit

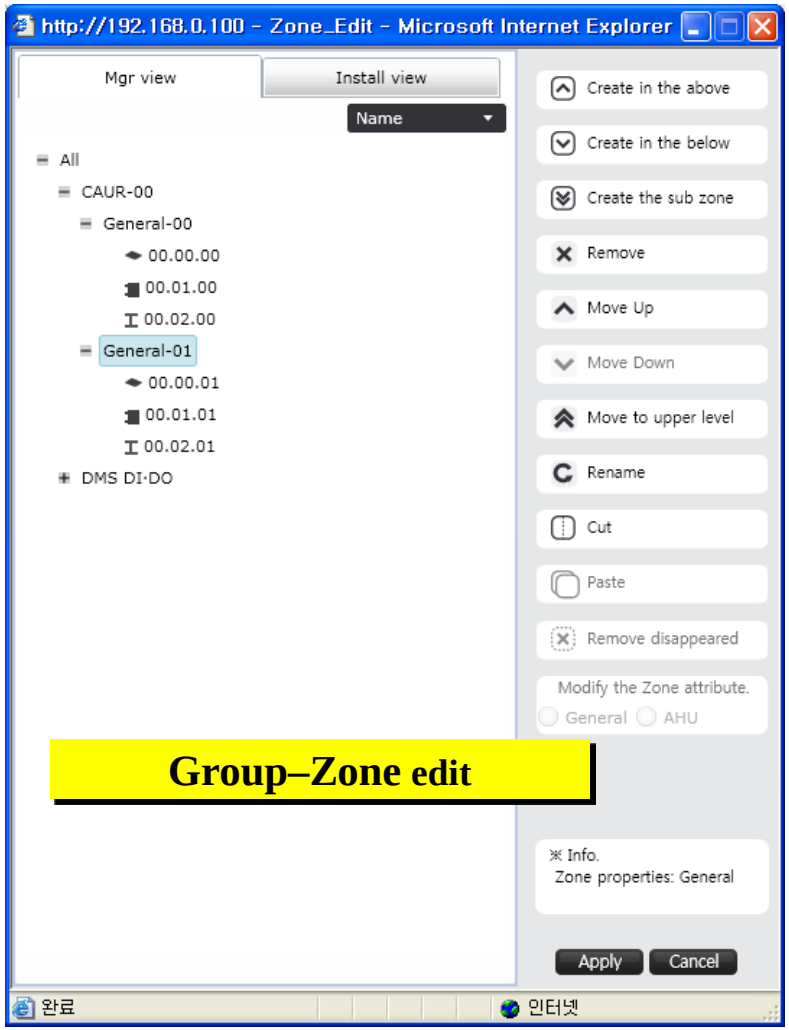


Zone management



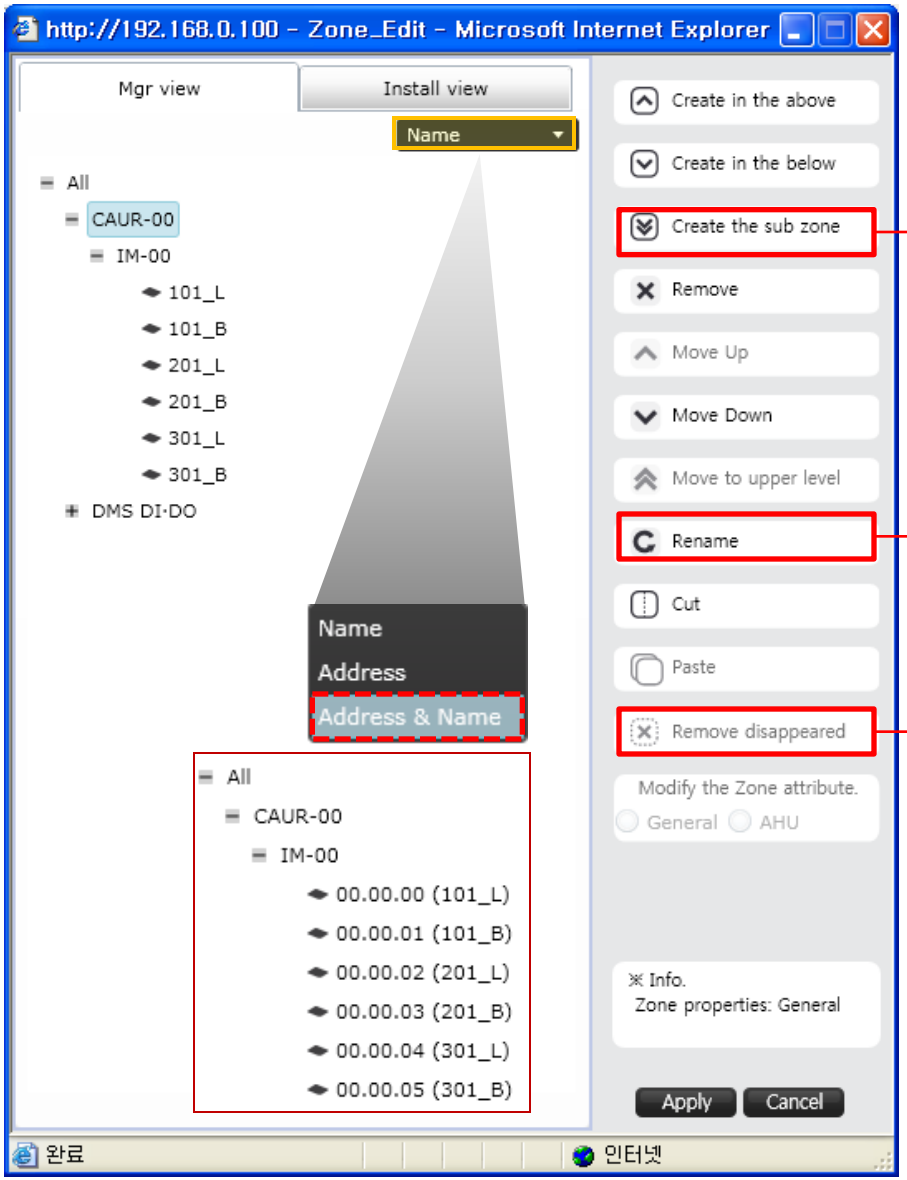
Individual –Zone edit



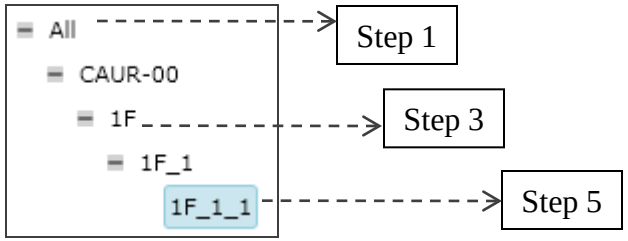


Group–Zone edit

Zone management



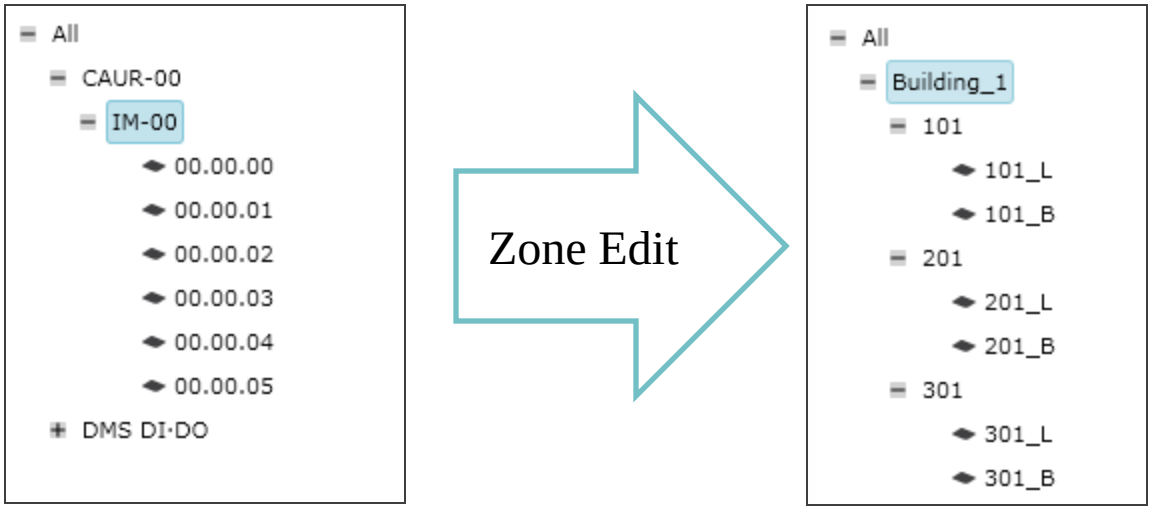
Max. is under step 5

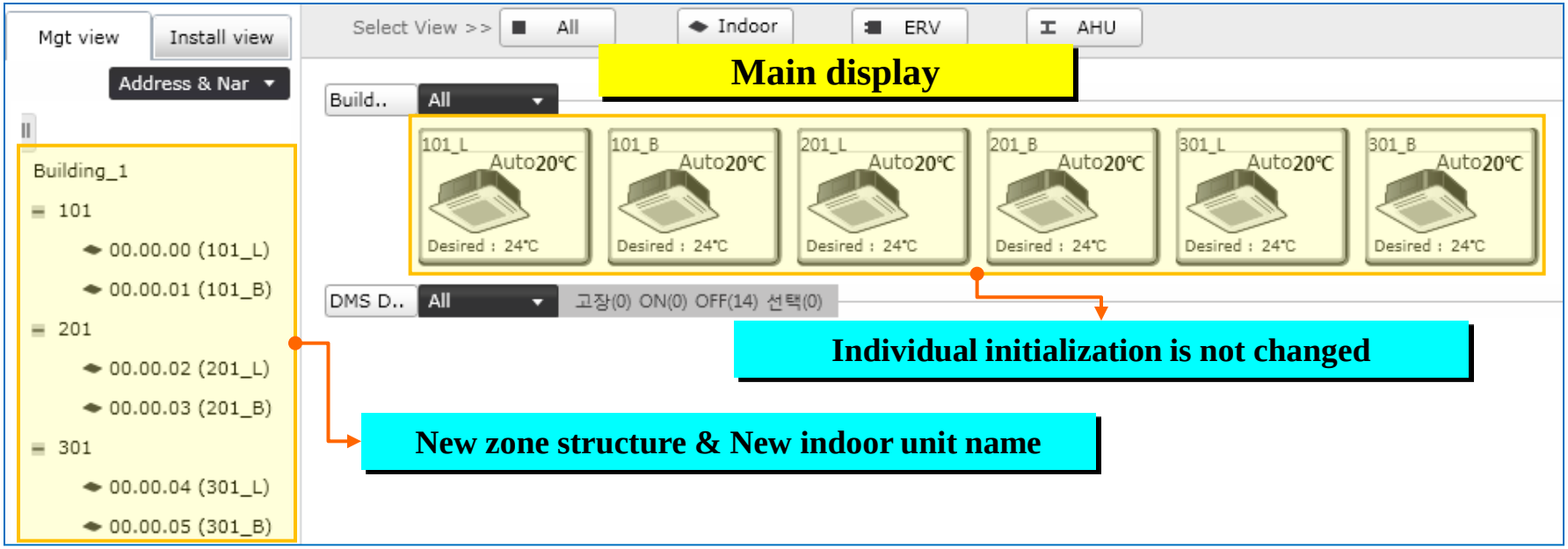


Max. is 16 character

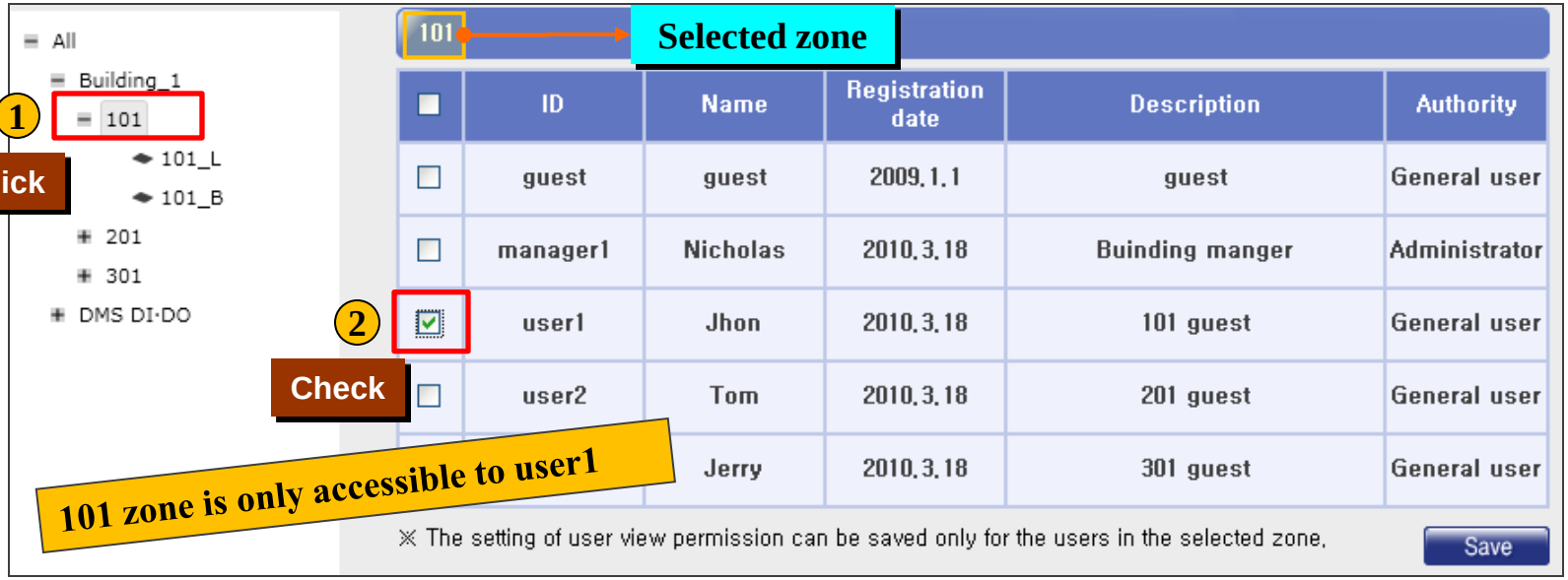
Delete all missing devices which were found after tracking

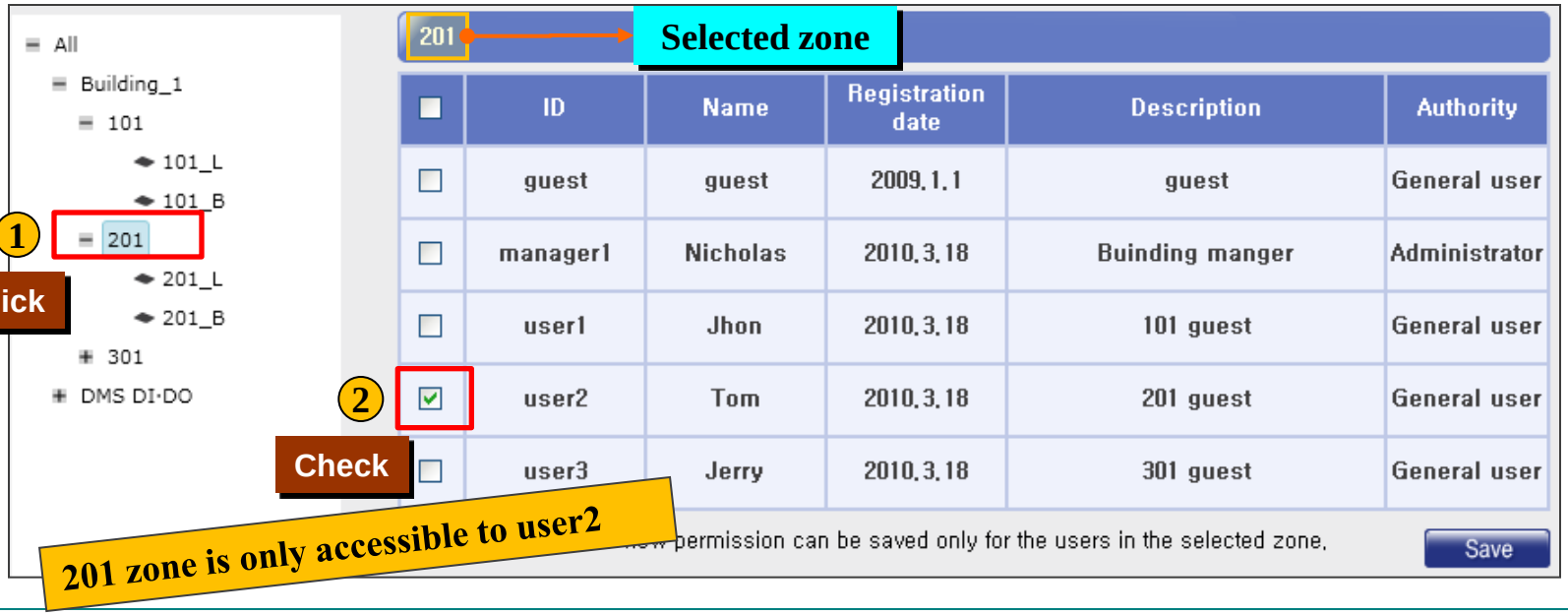
Zone management



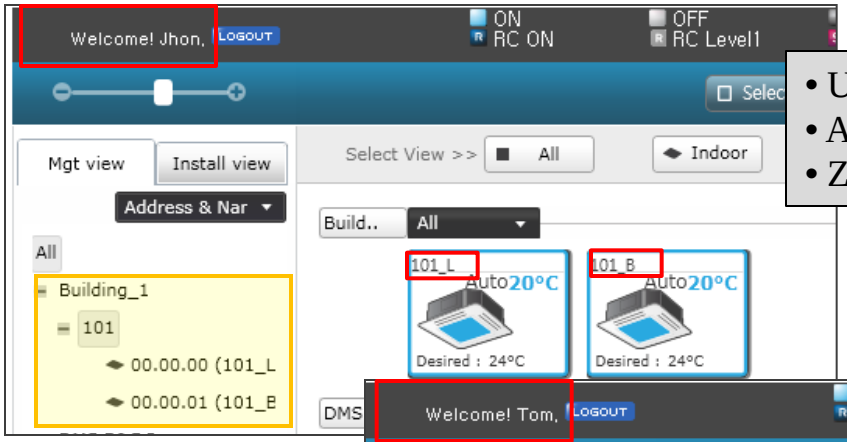


Zone management

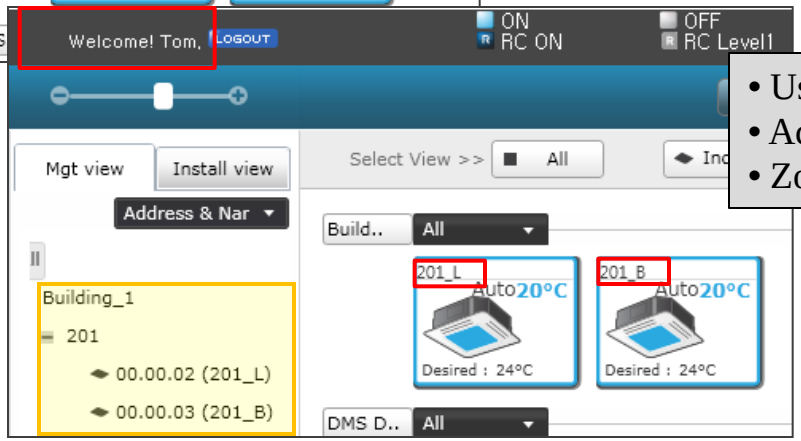




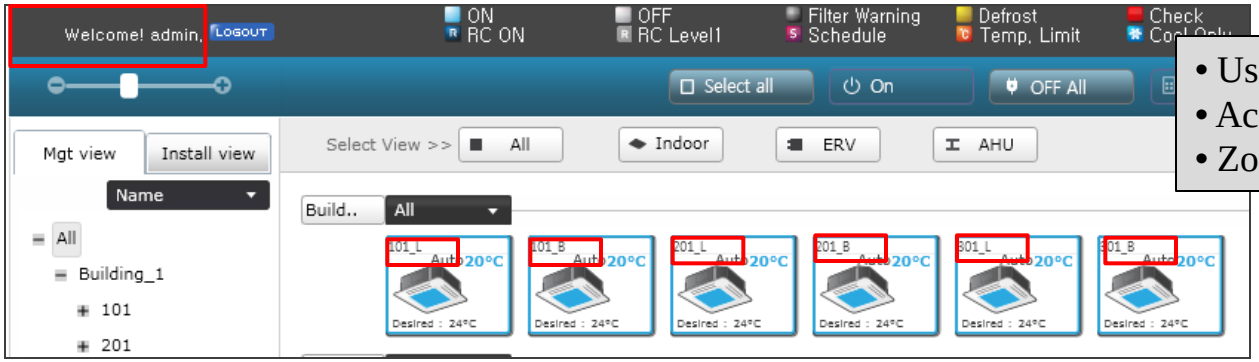
Zone management



- User name: Jhon
- Accessible level: regular user
- Zone: 101(101_L, 101_B)



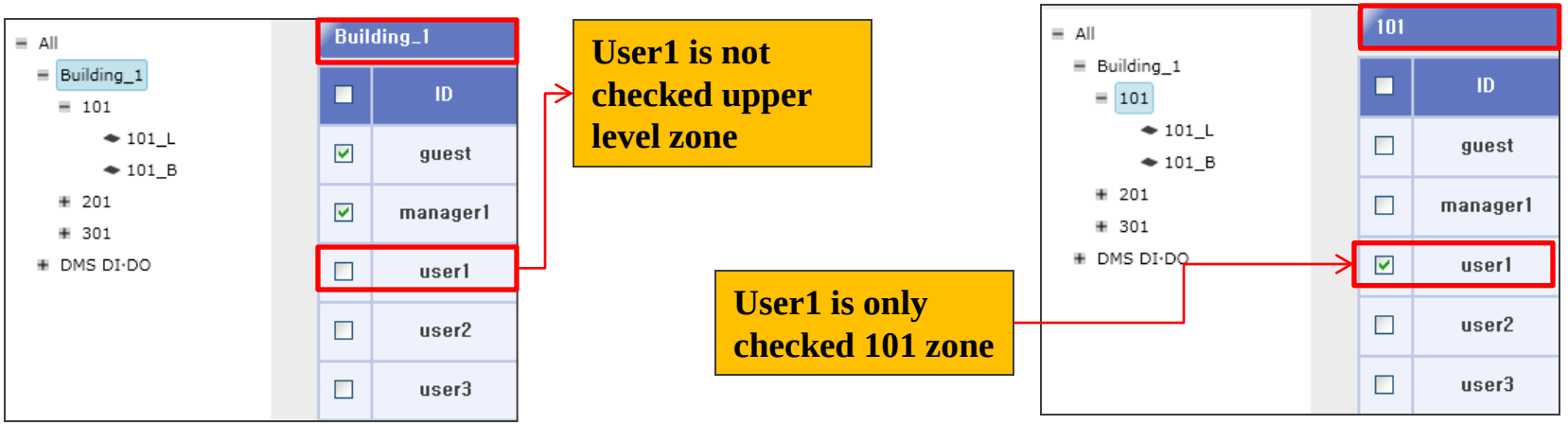
- User name: Tom
- Accessible level: regular user
- Zone: 201(201_L, 201_B)

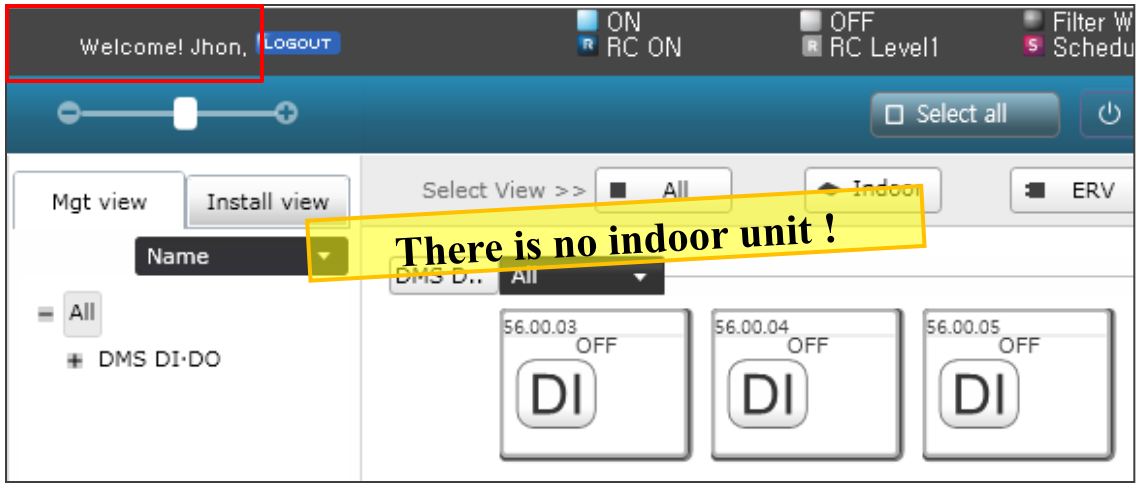


- User name: admin
- Accessible level: Administrator
- Zone: all

Zone management

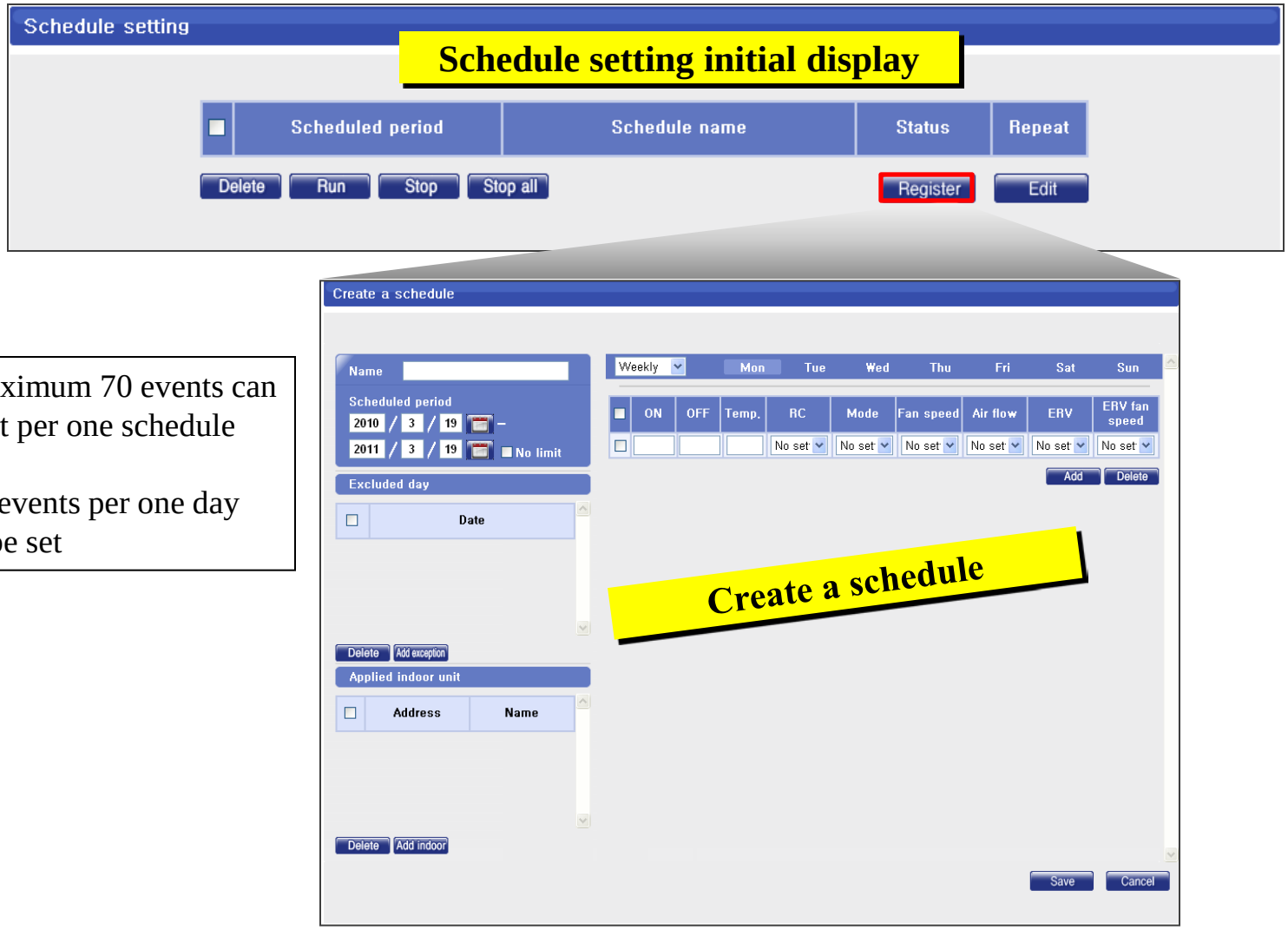
Upper level should be check !!
If upper level zone is not check, there is no indoor unit when the regular user login.





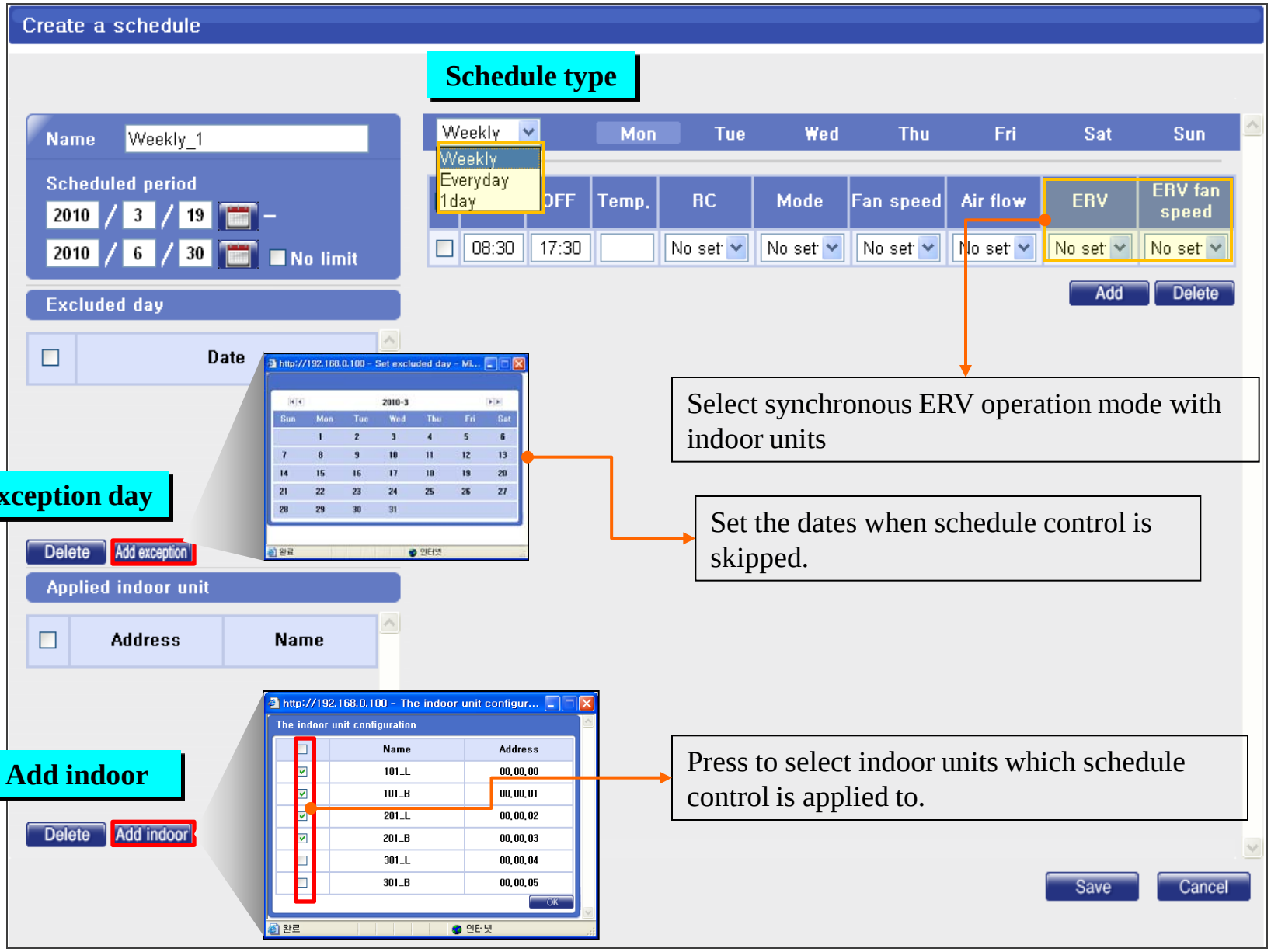
Schedule

Schedule > Schedule setting

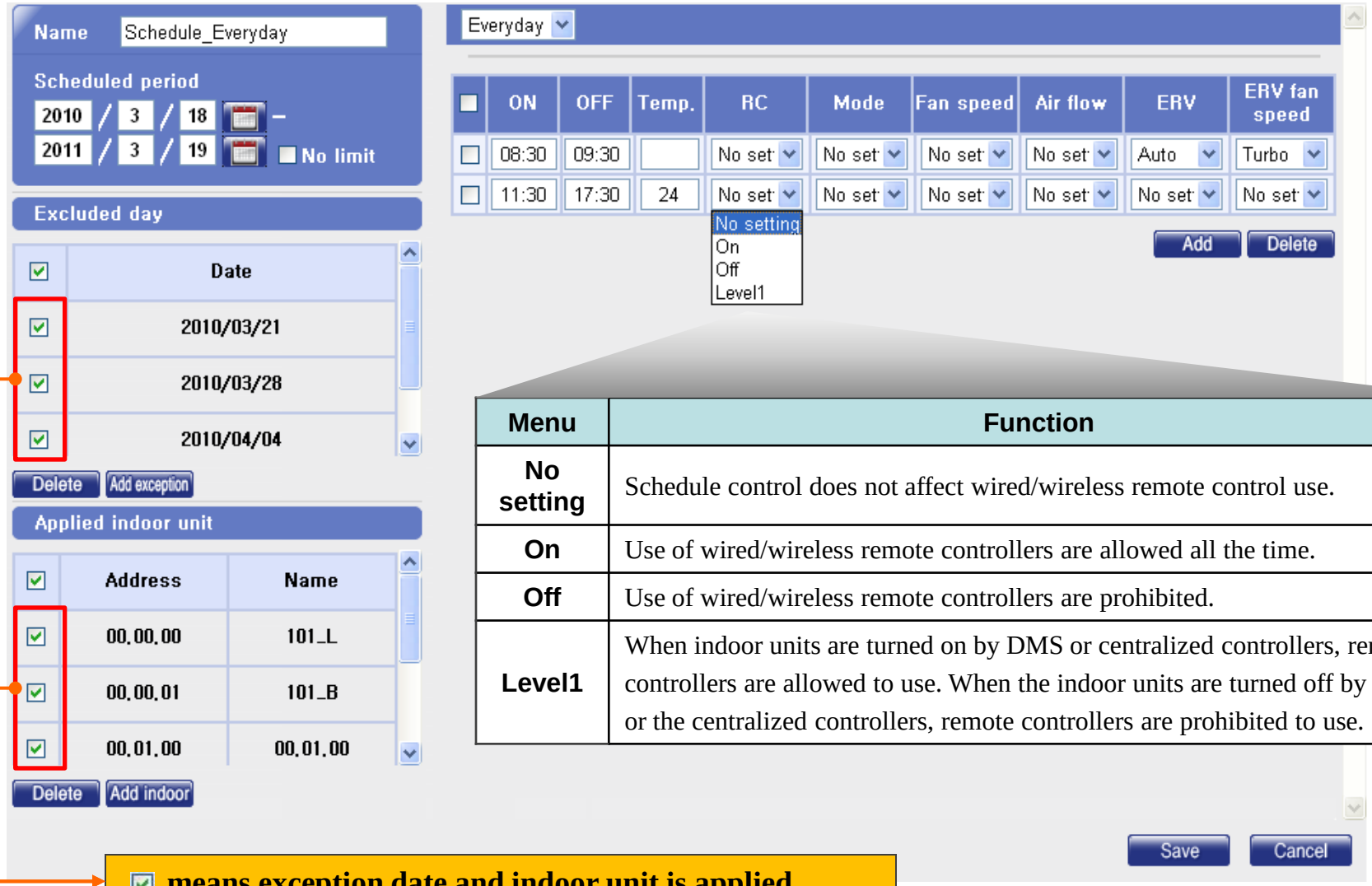


- Maximum 70 events can be set per one schedule
- 10 events per one day can be set

Schedule


Create a schedule
Schedule type
Name
Weekly_1
Scheduled period
2010 / 3 / 19
2010 / 6 / 30
No limit
Weekly
Everyday
1day
Mon
Tue
Wed
Thu
Fri
Sat
Sun
OFF
Temp.
RC
Mode
Fan speed
Air flow
ERV
ERV fan speed
08:30
17:30
No set
Add
Delete
Excluded day
Date
Exception day
Delete
Add exception
Select synchronous ERV operation mode with indoor units
Set the dates when schedule control is skipped.
Applied indoor unit
Address
Name
Add indoor
Delete
Add indoor
The indoor unit configuration
Name
Address
101_L
101_B
201_L
201_B
301_L
301_B
00.00.00
00.00.01
00.00.02
00.00.03
00.00.04
00.00.05
OK
Press to select indoor units which schedule control is applied to.
Save
Cancel

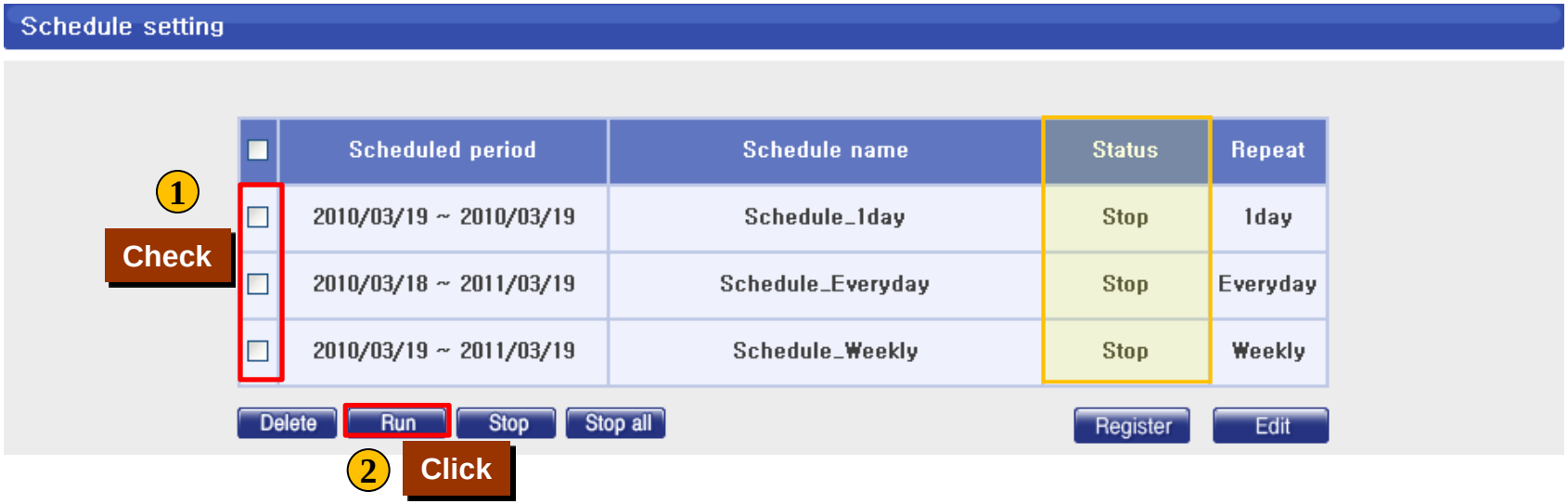
Schedule



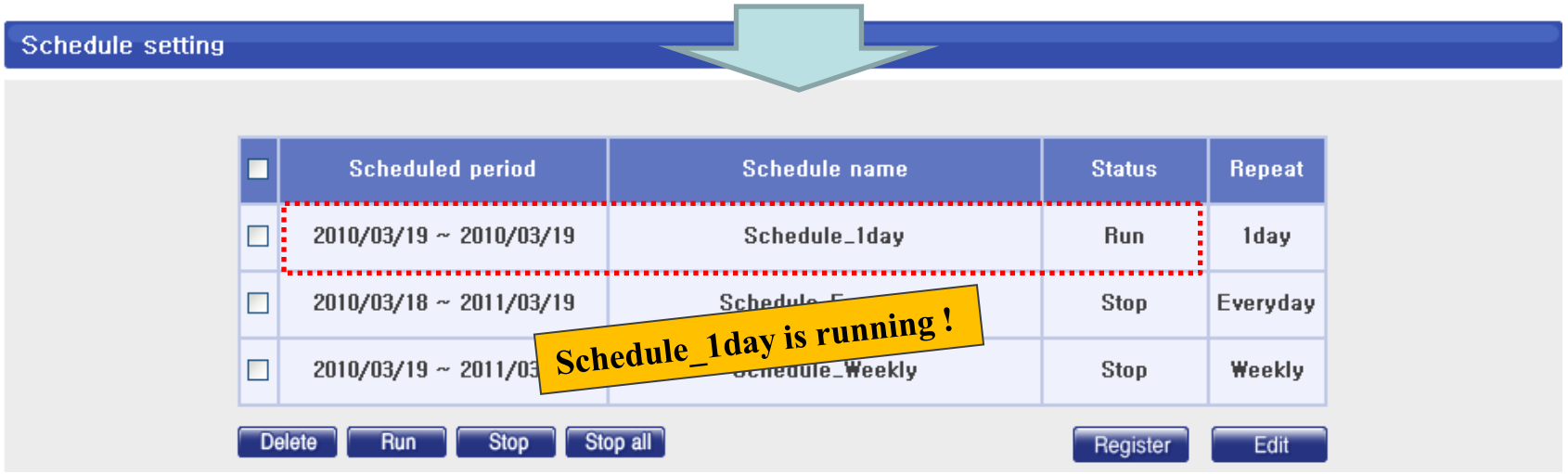
Menu	Function
No setting	Schedule control does not affect wired/wireless remote control use.
On	Use of wired/wireless remote controllers are allowed all the time.
Off	Use of wired/wireless remote controllers are prohibited.
Level1	When indoor units are turned on by DMS or centralized controllers, remote controllers are allowed to use. When the indoor units are turned off by DMS or the centralized controllers, remote controllers are prohibited to use.

☑ **means exception date and indoor unit is applied**

Schedule



Schedule is not running. To run each schedule, check box is checked and click “run”



Schedule

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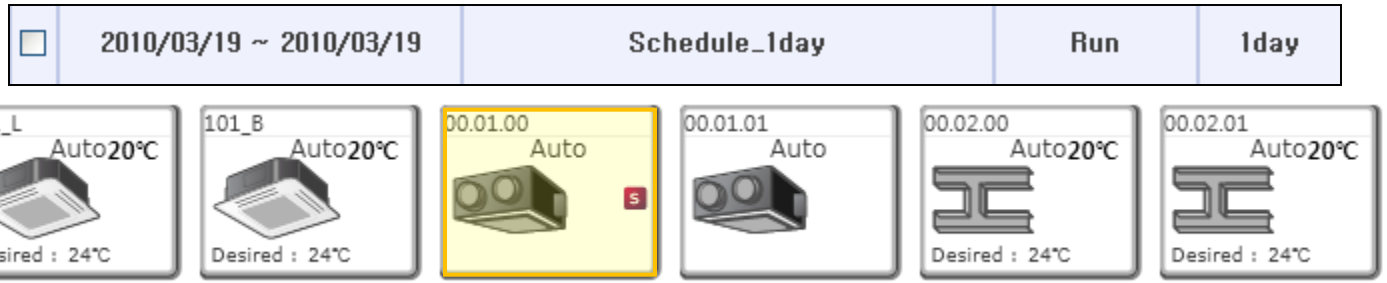
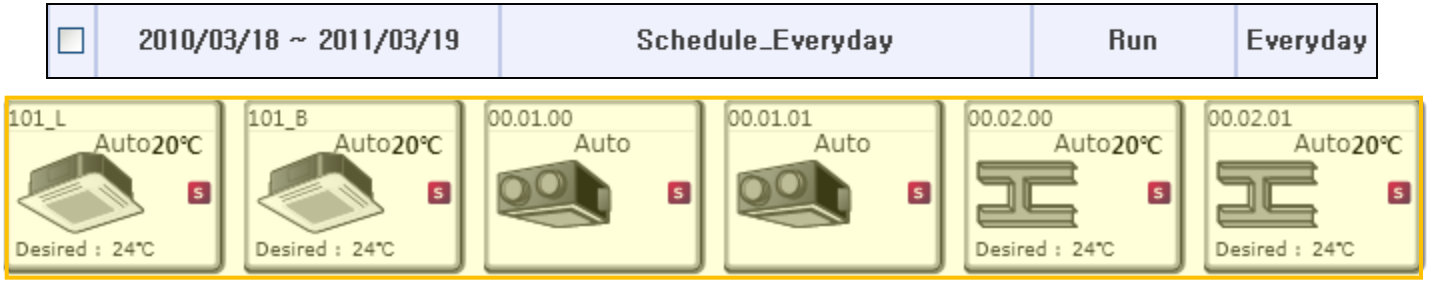
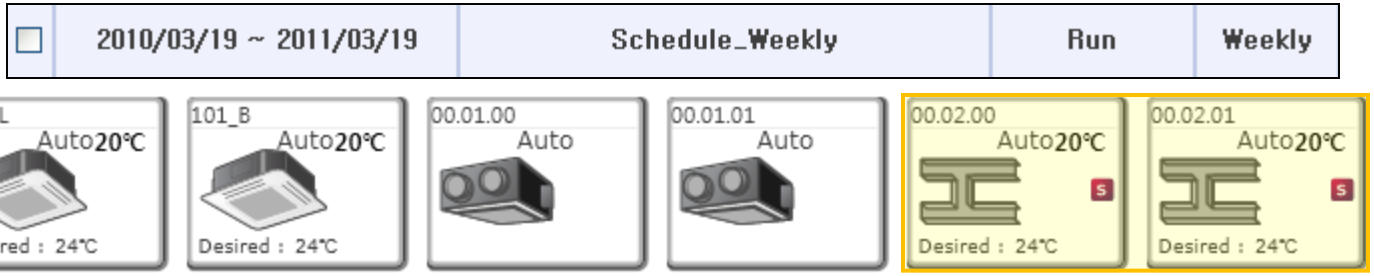
● 1day schedule is running : one indoor scheduled



● Everyday schedule is running : 6 indoor units are scheduled



● Weekly schedule is running : 2 indoor units are scheduled



Schedule

Schedule > Checking schedule control history

Schedule name	Occurrence time	Controlling subject	Control type
Schedule_Everyday	2010.03.20 08:00:00	DMS internal features	Schedule control
Control device(DVM) 00.02.01(00.02.01), 00.02.00(00.02.00), 101_B(00.00.01), 101_L(00.00.00) Control device type : DVM Power : On			
Schedule_Everyday	2010.03.20 08:00:00	DMS internal features	Schedule control
Schedule_Everyday	2010.03.20 10:00:00	DMS internal features	Schedule control
Schedule_Everyday	2010.03.20 10:00:00	DMS internal features	Schedule control
Control device(DVM) 00.01.01(00.01.01), 00.01.00(00.01.00)			
Control device type : DVM Power : Off, Operation mode : Auto, Fan speed : Turbo			

Click

Detail information is shown

Controlled indoor unit address

Schedule setting is described

- **DMS2 saves the information of operation history 180 days. However, it varies depending on storage space of DMS2**

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What is the control logic?

According to input condition as like room temperature or outdoor temperature, the user can control EHP, ERV, AHU and digital output. Input condition can be combined with parameter and calculated with arithmetic equation. Schedule setting is operated with base on time but control logic works according to the input condition

When is the control logic required?

Case 1)

In any country, government restrict the lowest room temperature at 26℃ with regulation in public area. If the room temperature is lower than 26℃, building manager has to turn off the system.
In this case, is it very convenient that indoor unit is automatically off ?

Case 2)

In spring or fall season, morning is a little cold but day is a little hot. The customer requires heat mode in the morning but want to change the operation mode to cool mode at noon.
At that time, it is very nice that system automatically change over the operation mode according to outdoor temperature ?

Case3)

In site which EHP and EVR is together installed, the user requires that EHP is turned on if room temperature is high and ERV is turned on if outdoor temperature is lower than room temperature to save the energy. It is very difficulty to handle the system. Is there no solution ?

Control logic management

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Control logic management > Setting control logic

Control logic management

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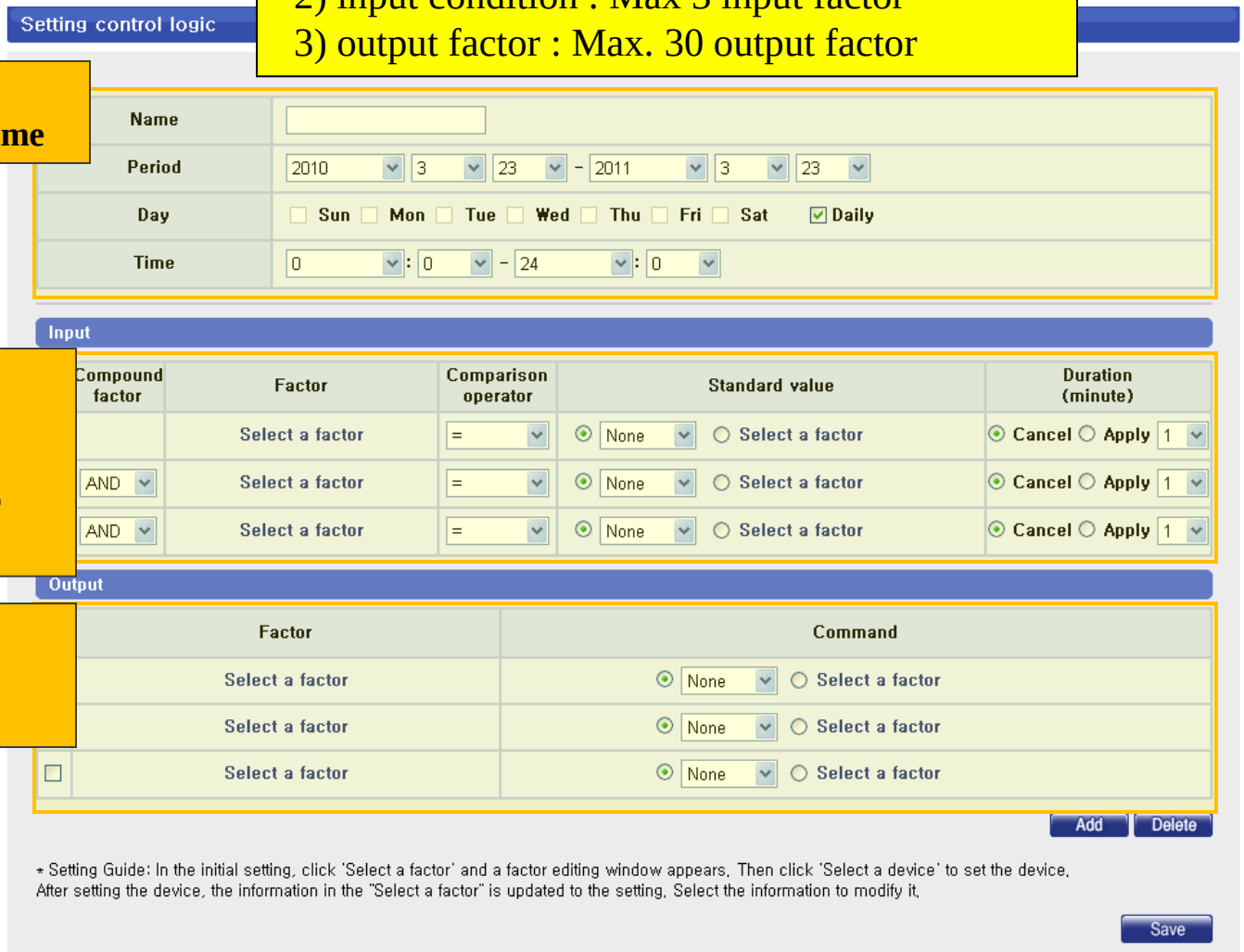
Control logic configuration
1) set the program name, period, day and time
2) input condition : Max 3 input factor
3) output factor : Max. 30 output factor

1)Basic setting
Name, Period, Day, Time

2)Input condition
-Edit factor
-Compound factor
-Comparison operator
-Duration

3)Output condition
-Edit factor
-Command



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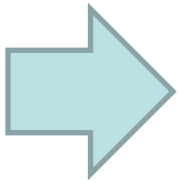
Sequence of control logic setting

Input

1. Select a factor
2. Choose the device
3. Edit the factor
4. Determine
   - compound factor,
   - comparison operator,
   - standard value
   - duration



Output

1. Select a factor
2. Choose the device
3. Edit the factor
4. Determine
   -Command

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

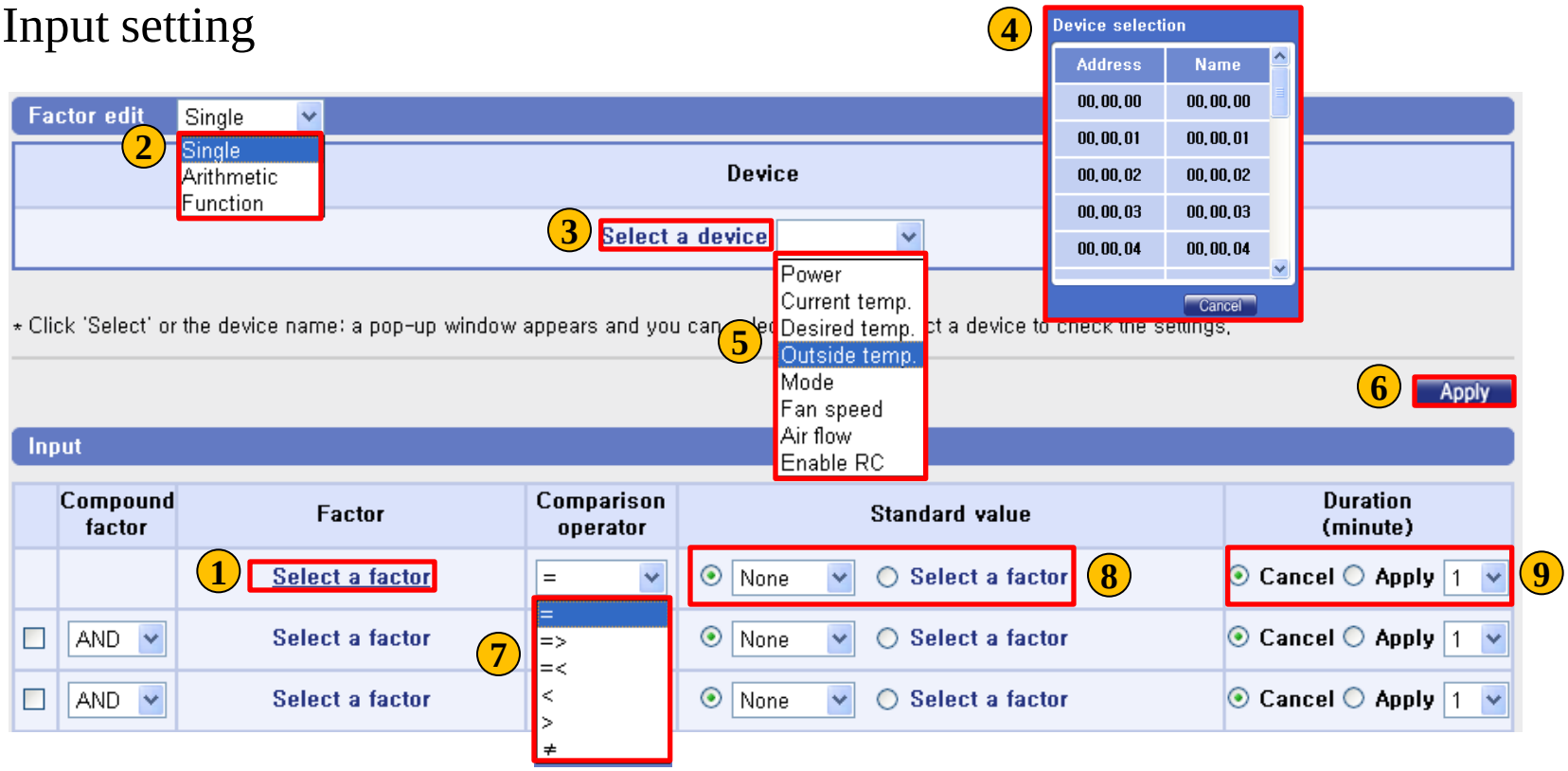
Compound factor
AND
OR

Comparison operator
=
=>
=<
<
>
≠

Command
Power
Desired temp
Mode
Fan speed
Air flow
Enable RC

Control logic management

Input setting



1. Click “Select a factor”
2. Select the type of factor
3. Click “ Select a device”
4. Select a device
5. Choose the detail item
6. Click “ apply”
7. Select comparison operator
8. Determine standard value
9. Determine duration time

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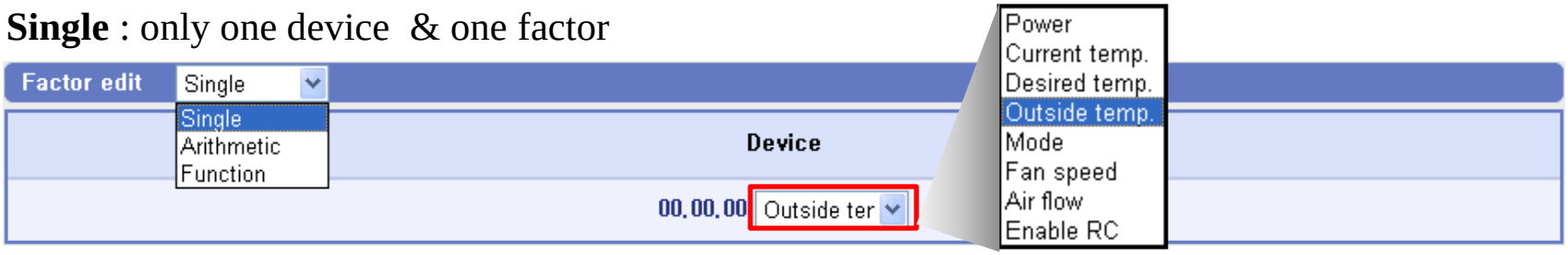
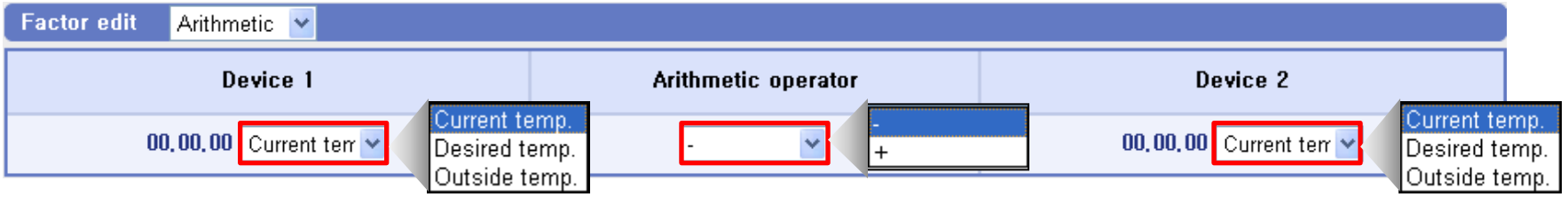
Type of factor

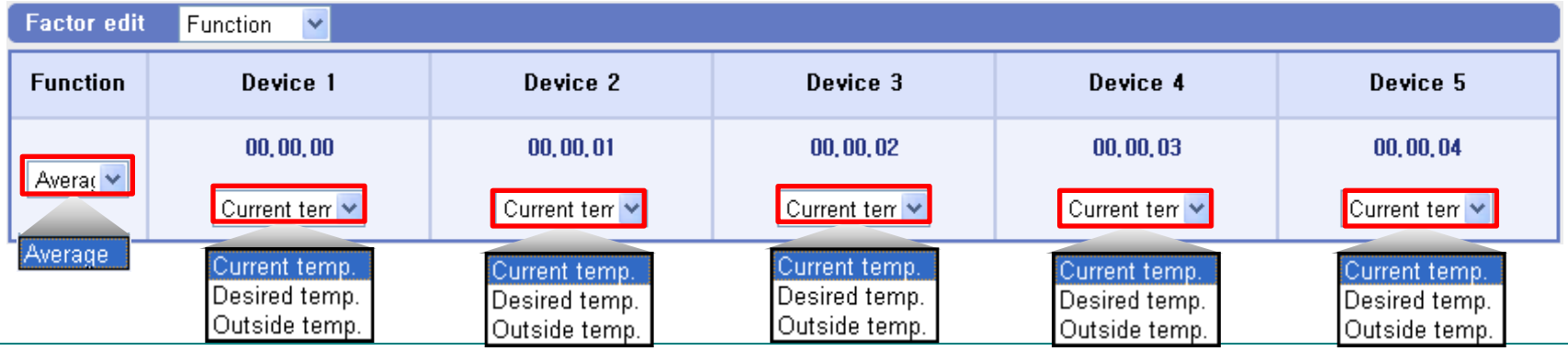
- **Single** : only one device & one factor



- **Arithmetic**: two devices are calculated by arithmetic operator



- **Function**: several devices are using as value of function



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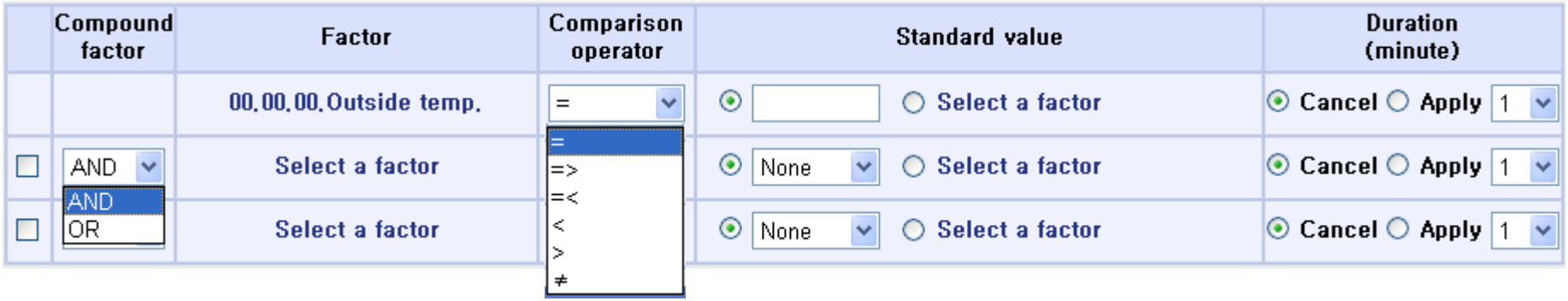
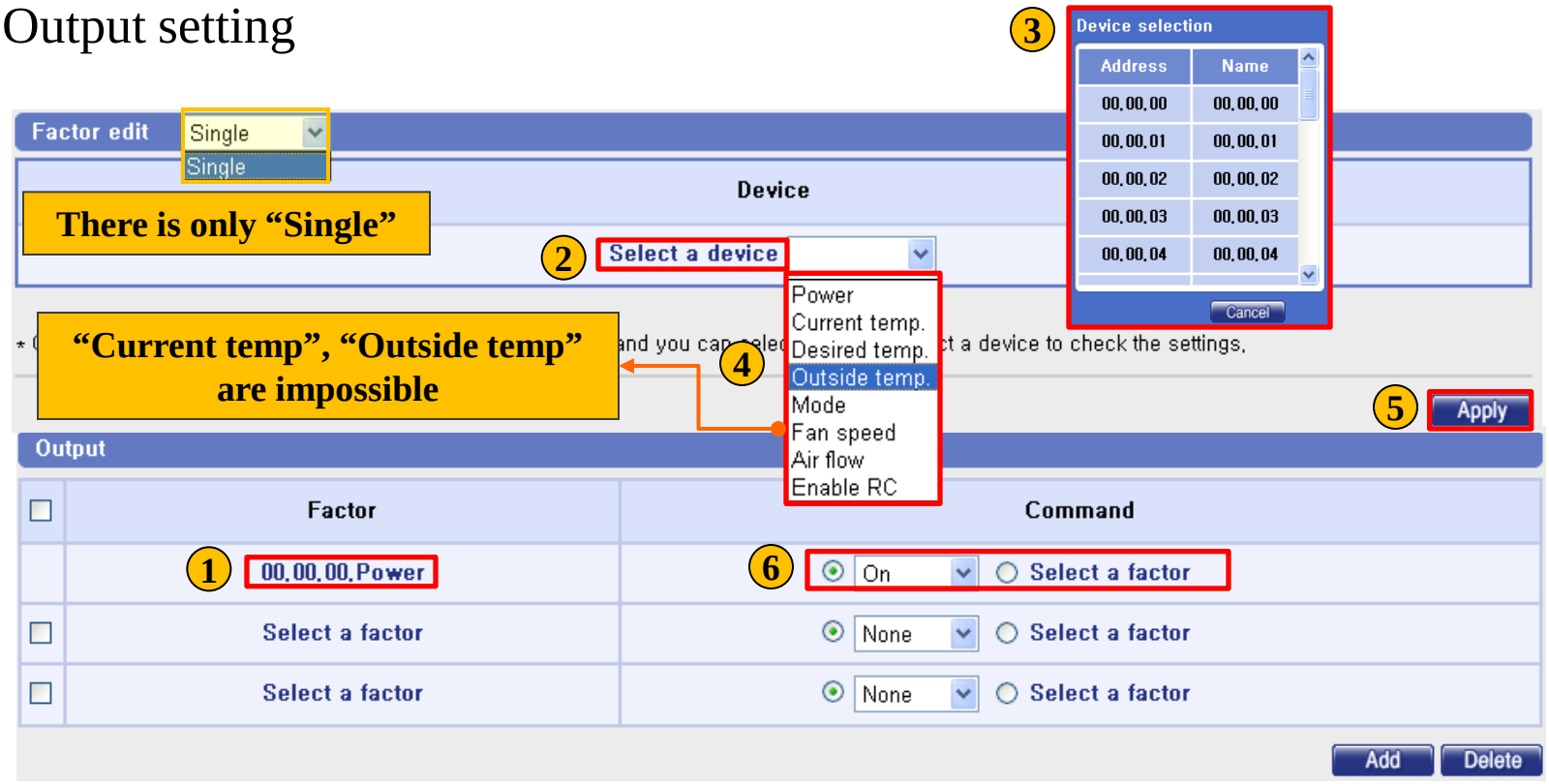
Compound factor, Comparison operator, Standard value, Duration



1.Compound factor: AND, OR and no selection
ex) if you set 'AND','OR' in order, it means (input 1) AND (input2) OR(input3)
2. Comparison operator: there are 6 kinds.
= , => , =< , < , > , ≠
3. Standard value:
1) The standard value varies depending on left factor
ex) left factor: current temp
standard value: 29
2)'Select a factor' must be same with left factor
ex) left factor: power
Standard value: power
4. Duration: form 1minute to 60 minute

Item	Comparison operator	Standard value
Power	=, ≠	On, Off
Current temp	= , => , =< , < , > , ≠	Number
Desired temp	= , => , =< , < , > , ≠	Number
Outside temp	= , => , =< , < , > , ≠	Number
Mode	=, ≠	Auto, Cool, Dry, Fan, Heat
Fan speed	=, ≠	Auto, Low, Med, High
Air flow	=, ≠	Vertical, Horizontal, All, None
Enable RC	=, ≠	ON, OFF, Level1

Output setting



1. Click “Select a factor”
2. Click “ Select a device”
3. Select a device
4. Choose the detail item
5. Click “ apply”
6. Select command
7. Click “Save”

Control logic management

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Control logic example -1

DMS2

DVM+Ⅲ

Requirement

1) If the outdoor temperature is higher than 30℃, turn on the indoor unit. – 1st control logic
2) If the outdoor temperature is lower than 26℃, turn off the indoor unit. – 2nd control logic

In this installation, one outdoor unit is connected with 4 indoor unit.
Therefore, one input condition and 4 output is required per one control logic program.
Output has only one factor. There are two control logic program (Power On and Off)

Control logic management

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1st Control logic

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)
		1 00.00.00.Outdoor temp.	=>	◉ 30	○ Select a factor	○ Cancel ◉ Apply 5 (2)
☐	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	
3	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

1. Outside temperature is higher than 30℃
2. This condition is keeping during 5 minute
3. Power on 4 indoor units

Control logic management

2nd Control logic

Name	PwoerOff_Temp25
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)
		1 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	
2	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

1. Outside temperature is lower than 26℃
2. Power off 4 indoor units

Control logic management

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Registered control logic

Setting control logic

	No.	Name	Period	Days	Time	Apply	Run
☐	1	PowerOn_Temp30	2010-03-23 ~ 2011-03-23	Mon Tue Wed Thu Fri	08:00 ~ 18:00	No	No
☐	2	PwoerOff_Temp25	2010-03-23 ~ 2011-03-23	Mon Tue Wed Thu Fri	08:00 ~ 18:00	No	No

Register | Edit | Delete | Copy | Apply | Not apply

① Click

② Click

Apply control logic

Setting control logic

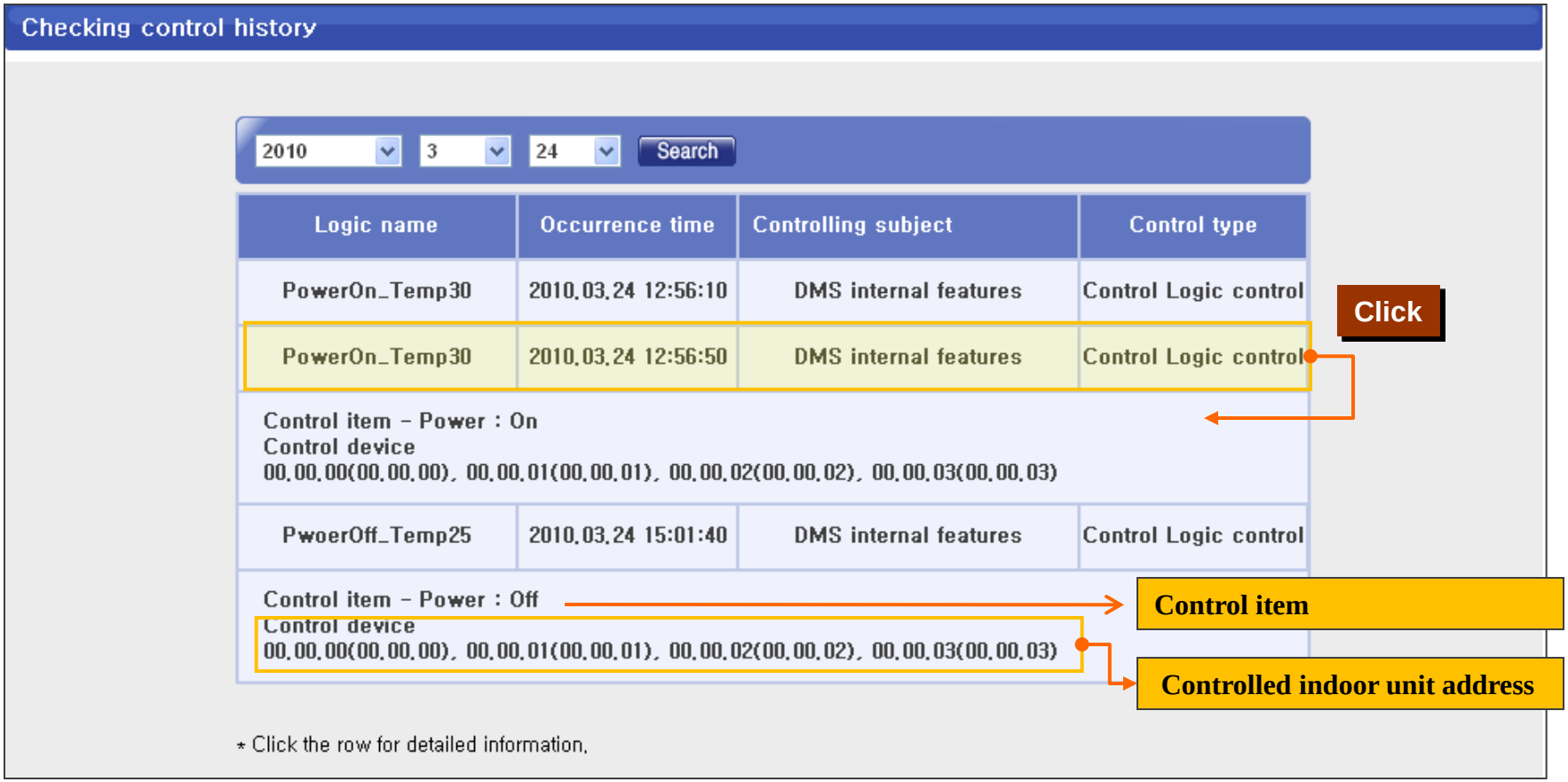
	No.	Name	Period	Days	Time	Apply	Run
☐	1	PowerOn_Temp30	2010-03-23 ~ 2011-03-23	Mon Tue Wed Thu Fri	08:00 ~ 18:00	Yes	No
☐	2	PwoerOff_Temp25	2010-03-23 ~ 2011-03-23	Mon Tue Wed Thu Fri	08:00 ~ 18:00	Yes	No

Copy | Apply | Not apply

2 control logic is applied !

Control logic management

Control logic management > Checking control history



- **DMS2 saves the information of operation history 180 days. However, it varies depending on storage space of DMS2**

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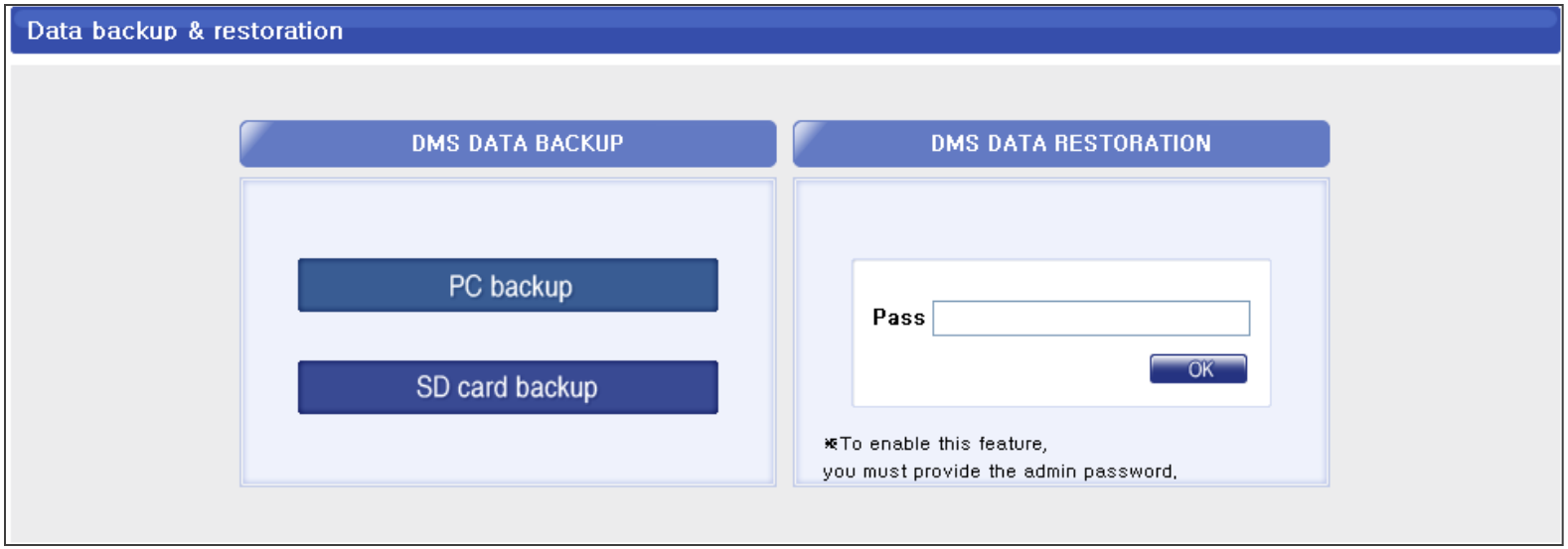
System Settings > Data backup & restoration



- **Depending on the size of the data, backup time may very.**
  It will usually take few seconds.
- **Backup data includes DB data, setting data, data related indoor/outdoor unit control and various kinds of history data. They will be back up in single unified file.**
- **You can't use files bigger than 100M bytes for restoration file.**
- **Restoration should be carefully executed because existing data will be delete.**

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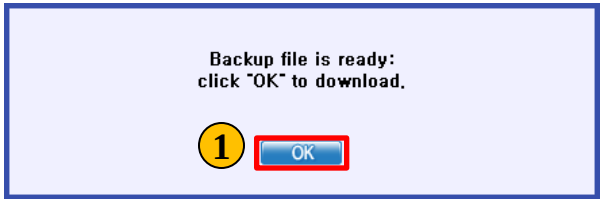
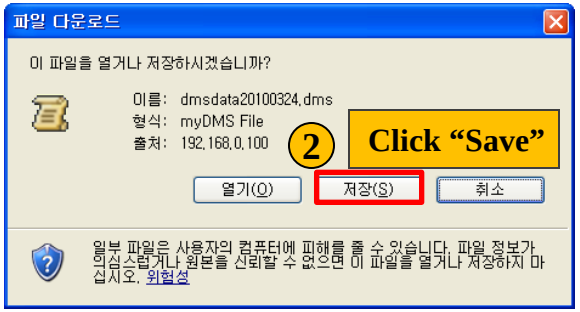
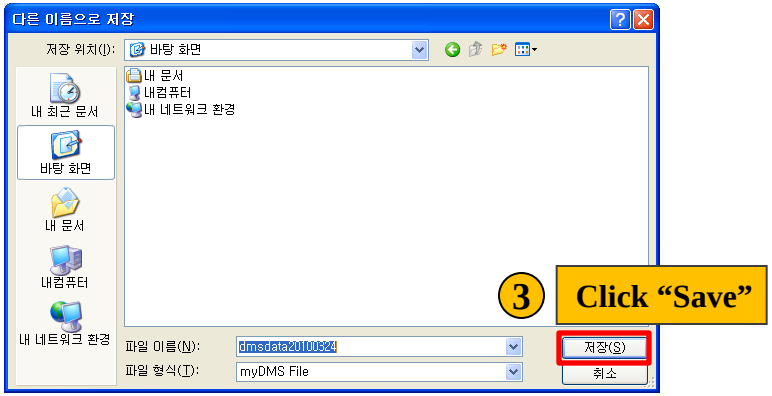
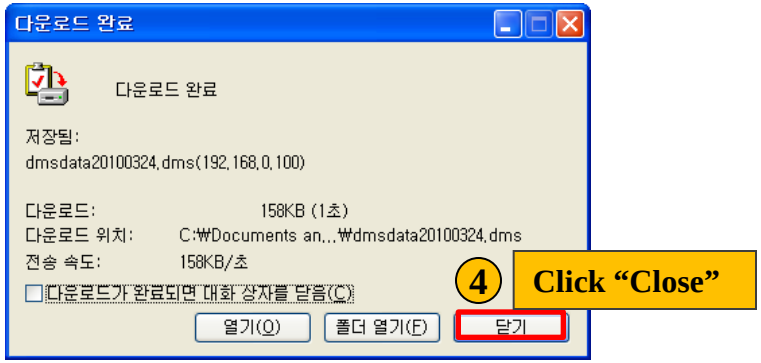
PC backup



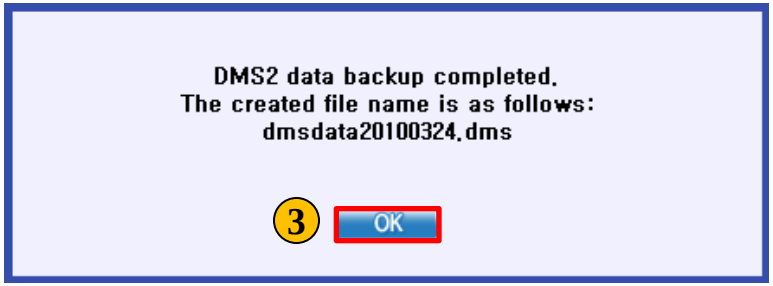






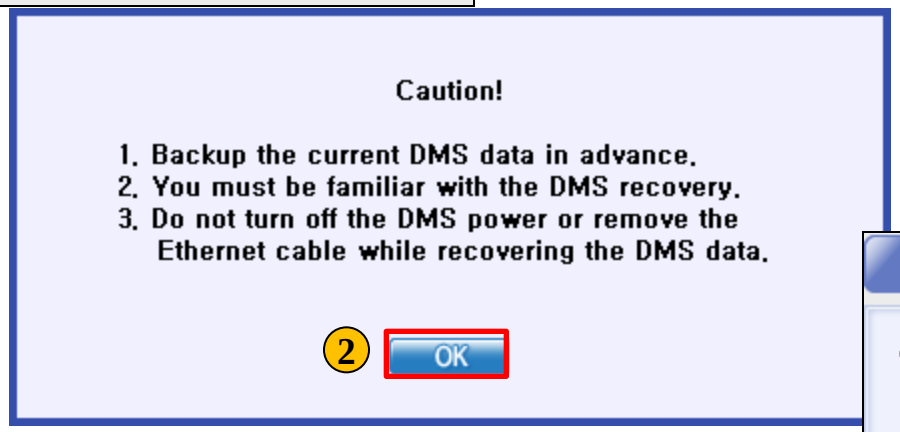
SD card backup

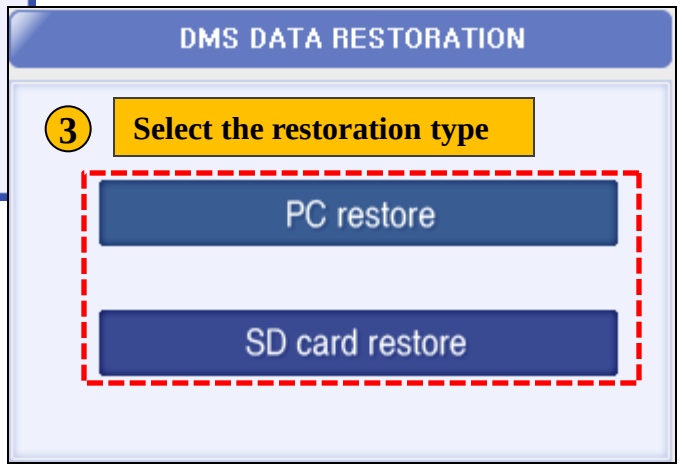
1. Insert the SD card in DMS2
2. Click "SD card backup"



If SD card is already inserted, automatic backup function will be operated and everyday data will be backup in SD card


DMS DATA RESTORATION
1
Type the administrator password
Pass
OK
※To enable this feature,
you must provide the admin password.


Caution!
1. Backup the current DMS data in advance.
2. You must be familiar with the DMS recovery.
3. Do not turn off the DMS power or remove the Ethernet cable while recovering the DMS data.
2
OK


DMS DATA RESTORATION
3
Select the restoration type
PC restore
SD card restore

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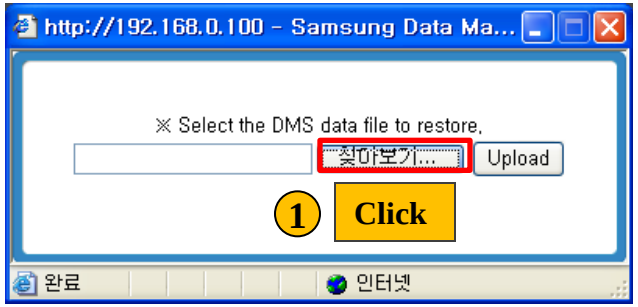
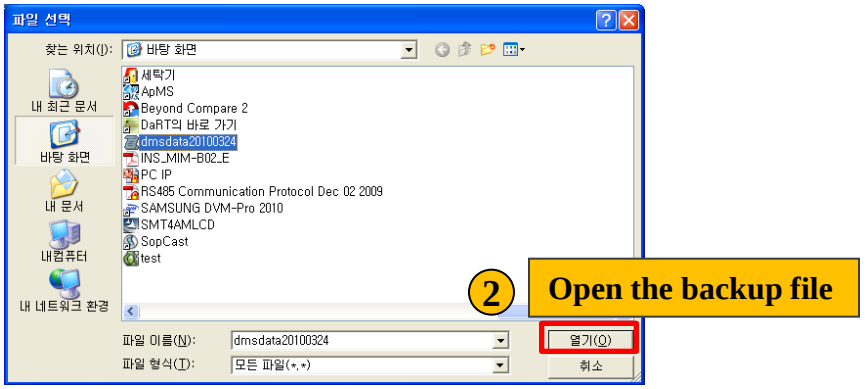
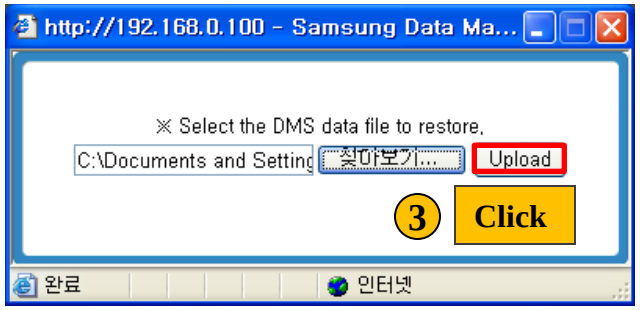
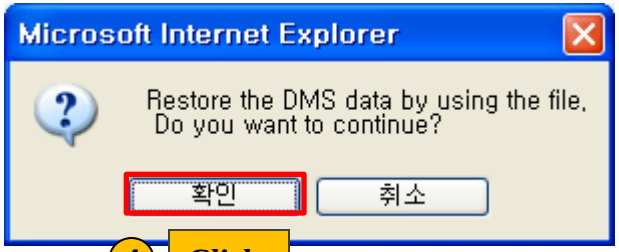
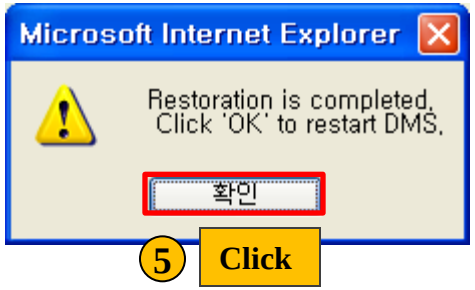
PC restore

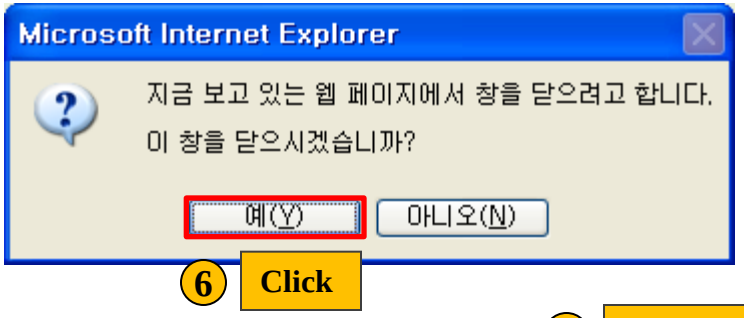












7 Restart DMS2

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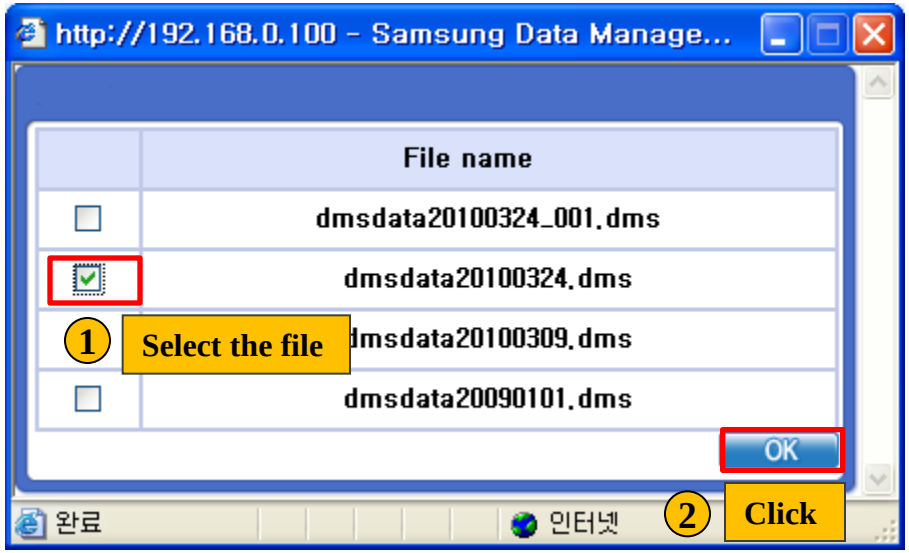
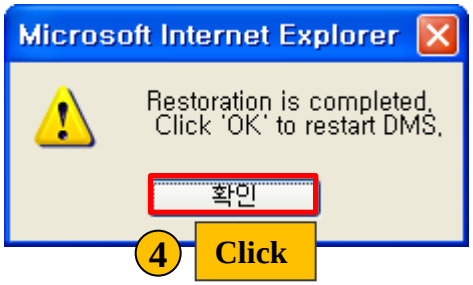
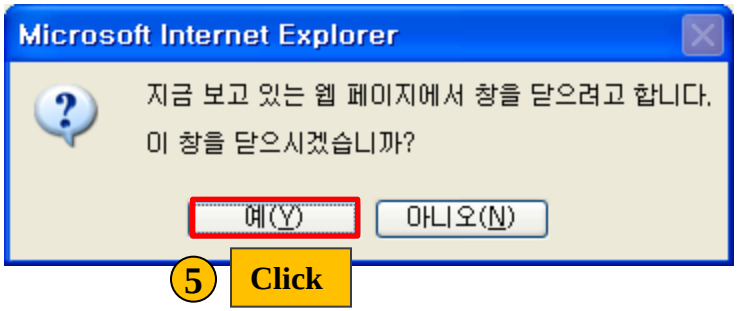
SD card restore







6 **Restart DMS2**

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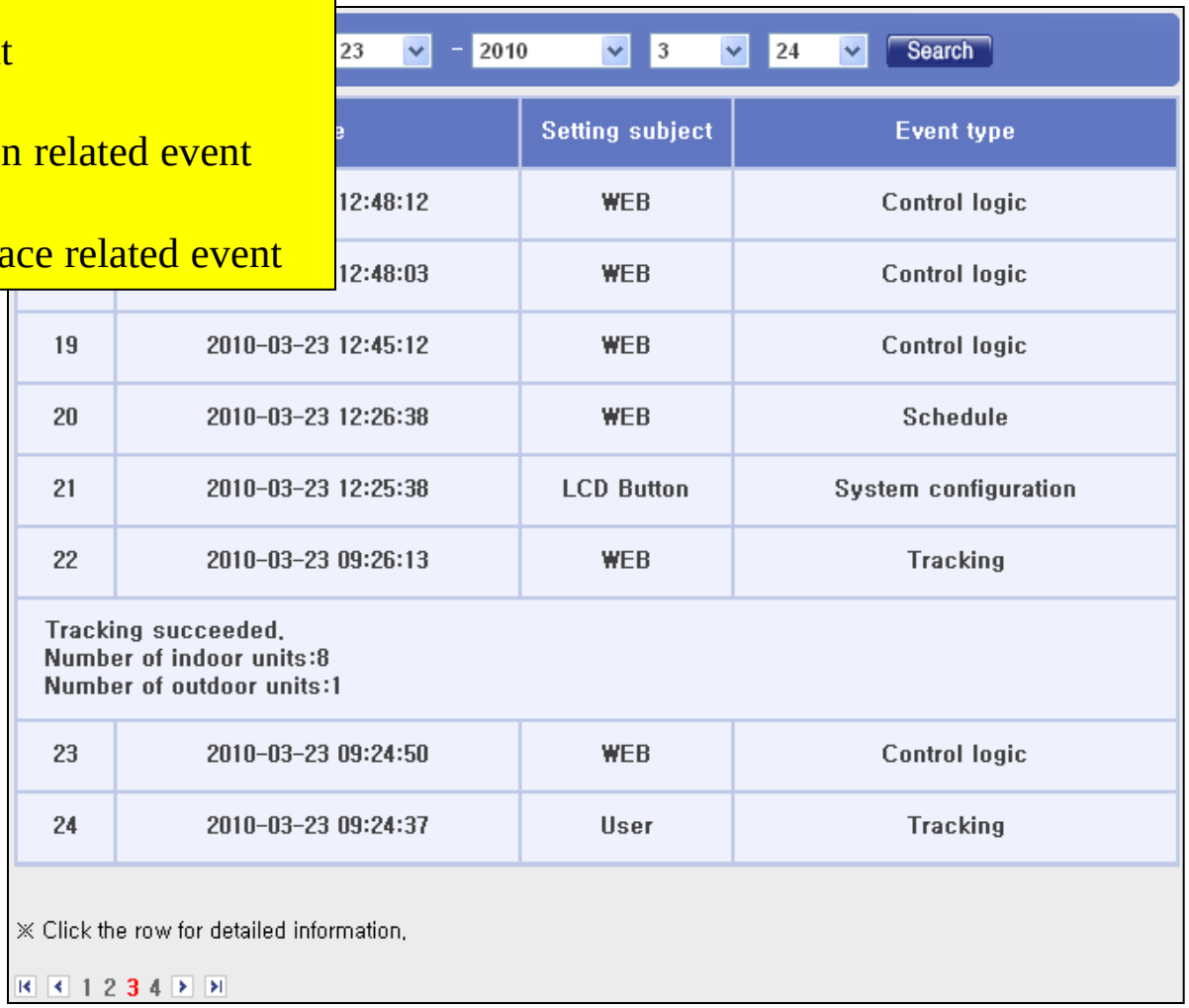
System Settings > Event history management

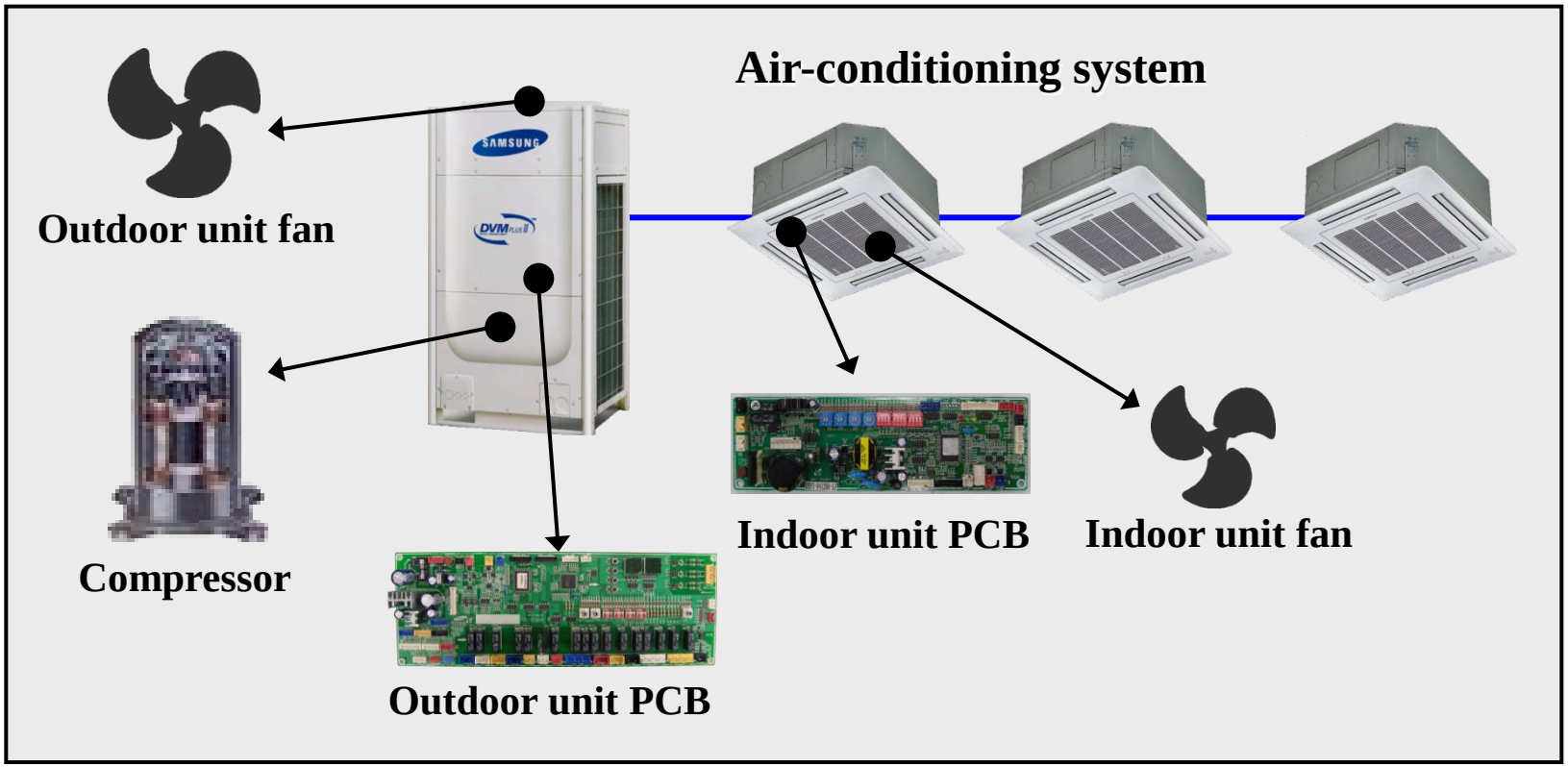
1. DMS2 power related event
2. Schedule setting related event
3. Tracking related event
4. User information modification related event
5.System setting related event
6.Opration using external interface related event



Power distribution

1. Power distribution theory	• Device of power consumption • Equation of power consumption • Installation example
2. Power distribution Setting & Result	• SiM channel • Setting in DMS2 • Power distribution result
3. Power distribution error	• DMS2 power error • Communication error

Where does power consumption occur ?

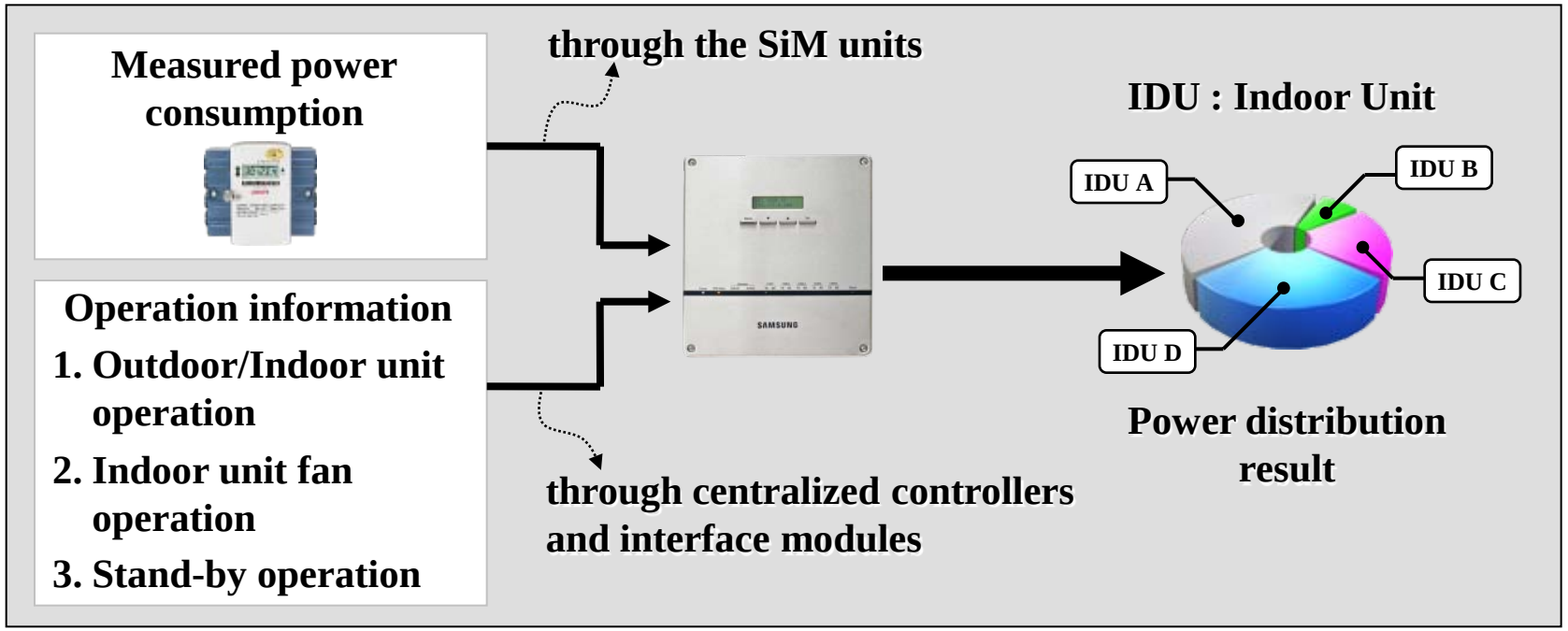


System power consumption includes :

1. Main Power - Compressor operation
2. Fan Power - Indoor/Outdoor unit fan operation
3. Stand-by Power - Preheating coil, Indoor/Outdoor PCB

DMS Power Distribution Theory

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



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

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

Main capacity

Expressed as compressor operation power. It varies depending on the difference between the set temperature and room temperature.

Fan capacity

Fan operation power. It differs from the indoor unit type.

Stand-by capacity

Power consumption when the system is in the Stop mode.
Indoor/Outdioor unit PCBs and pre-heating coil surrounding the compressor

What if the room temperature begins to reach the set temperature ?

The indoor unit needs less refrigerant and alse sends less Main capacity.
The smaller temperature difference changes, the smaller capacity and power is required.

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, which results in fan or stand-by power distribution only.

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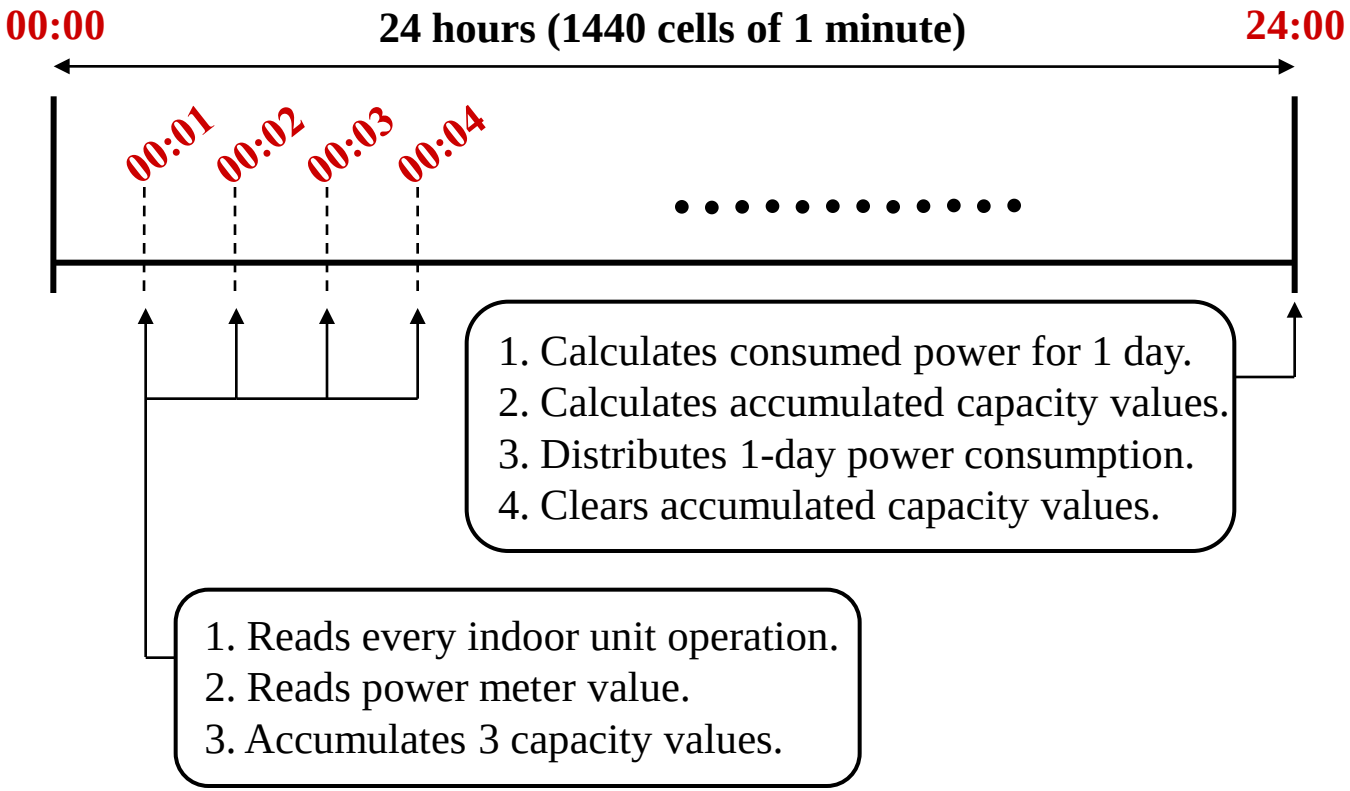
Capacity accumulation and power distribution

DMS gathers power consumption and capacity values every minute through the centralized controllers and watt-hour meter interface modules. At midnight, 1-day power consumption is distributed with the gathered information to the indoor units.



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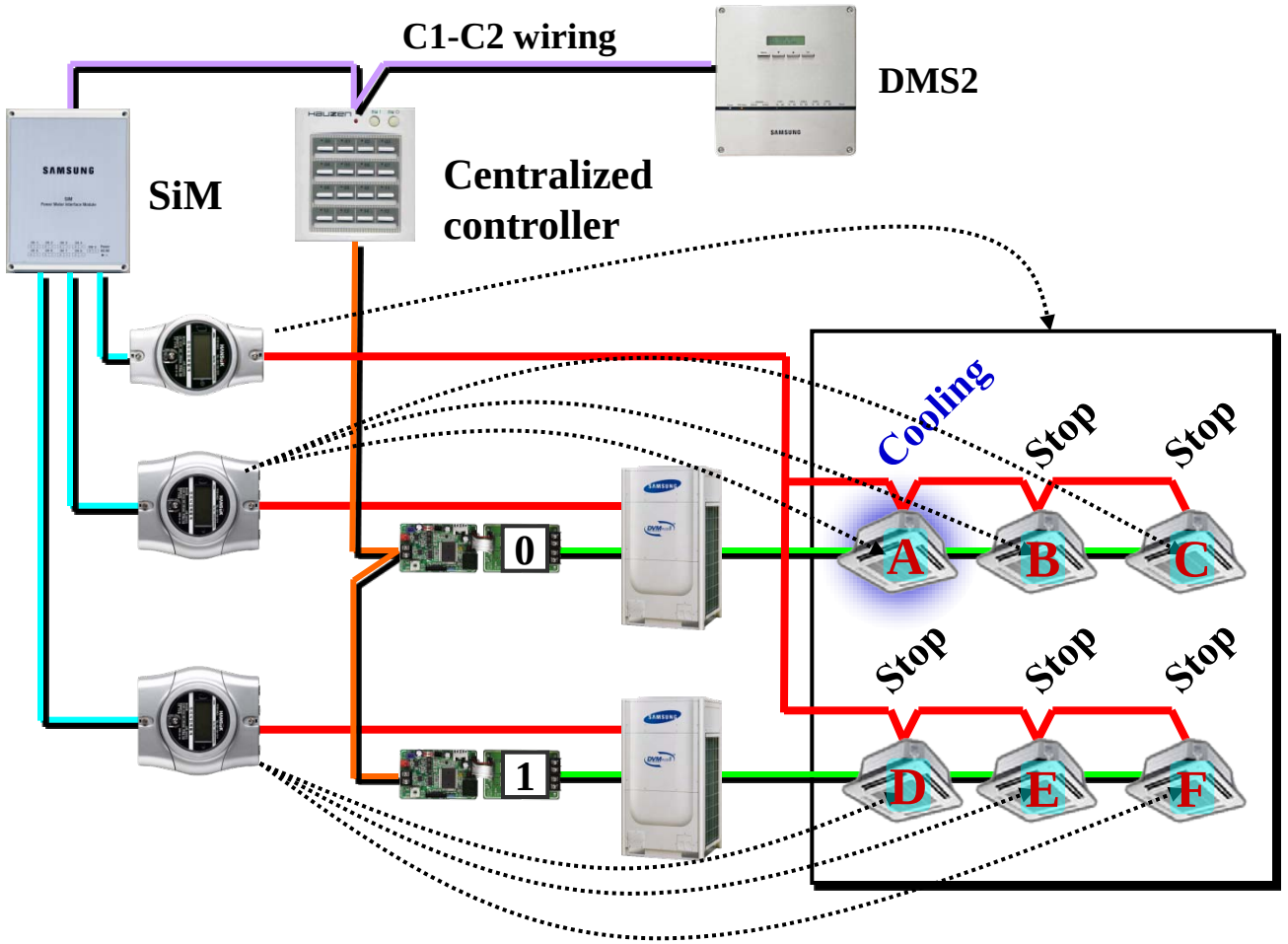
Not equal stand-by power consumption



Power distribution : B = C, D = E = F
But B might be not equal to D due to ratio calculation.

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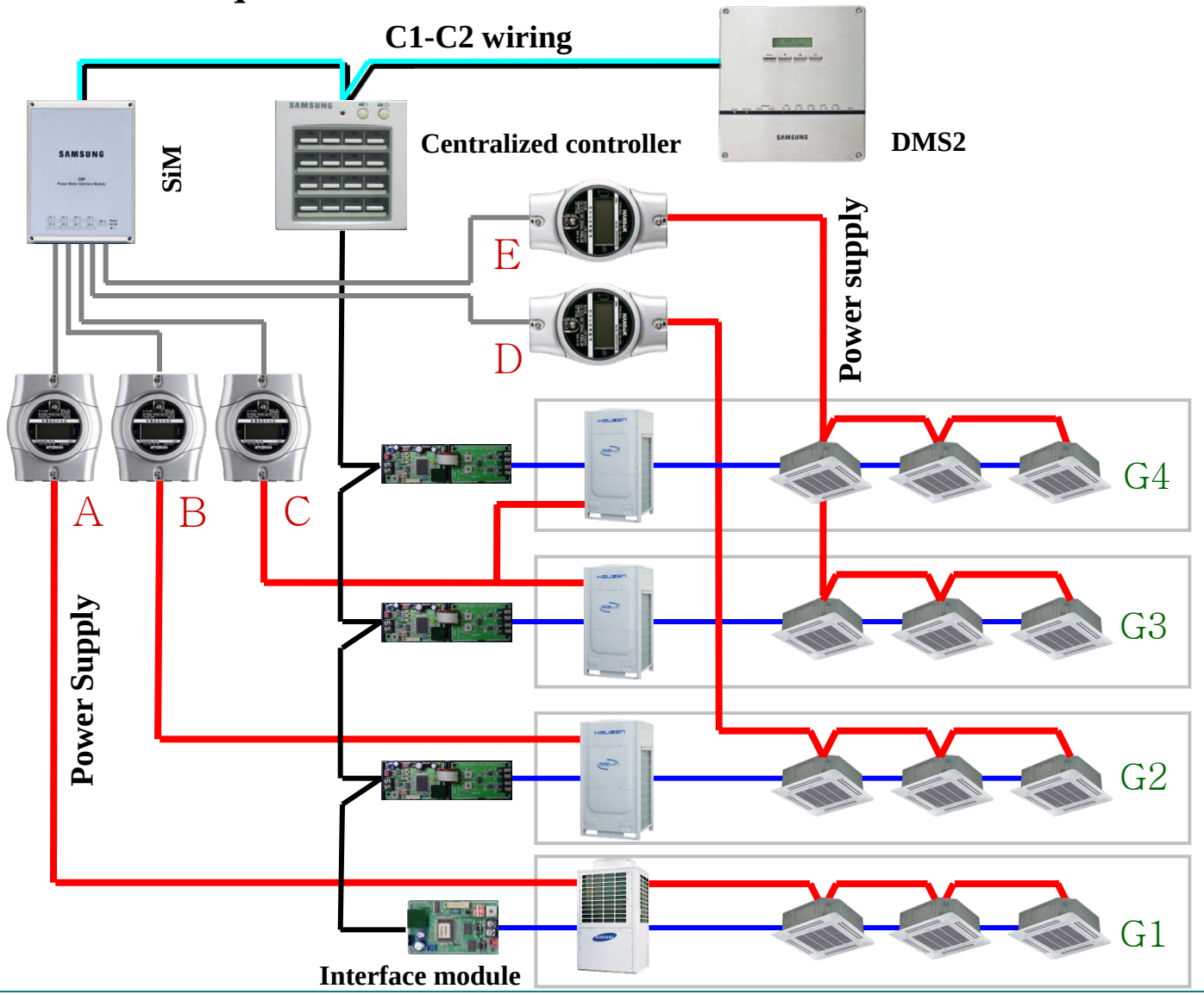
Power distribution equation



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

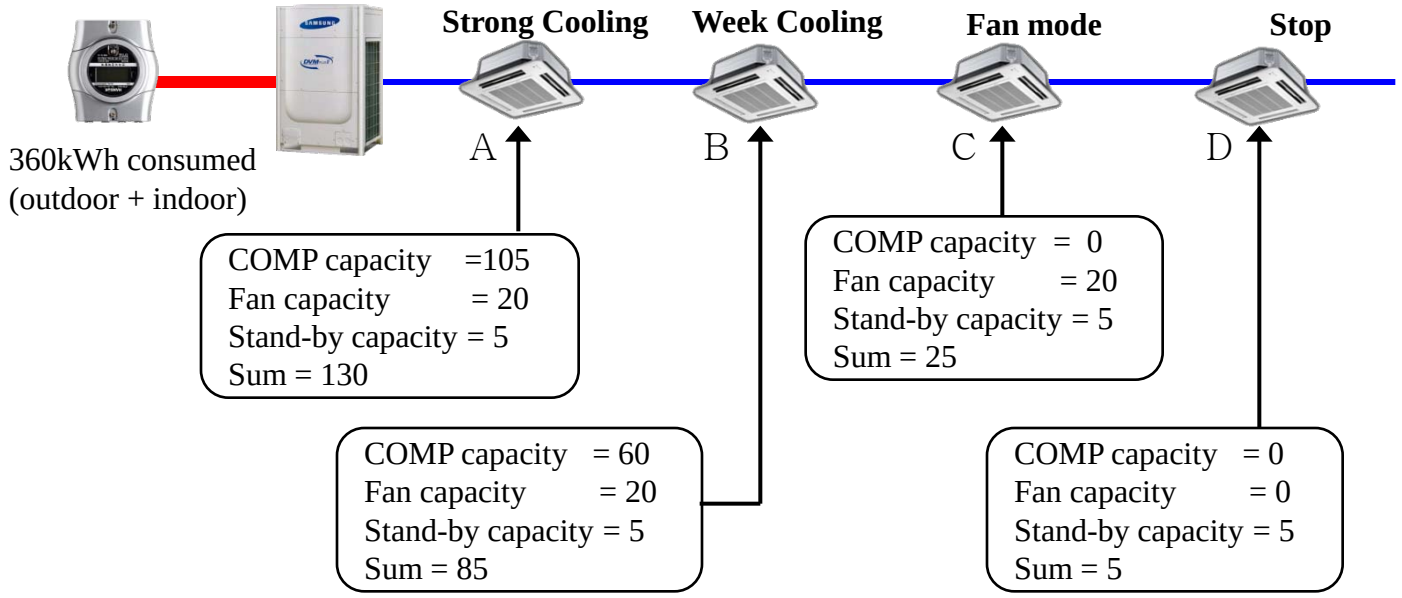
$$\text{Indoor unit power X in G2} = \text{Watt-hour B} \times \frac{\text{Main + Fan + Stand-by capacity of indoor unit X}}{\text{Total capacity of G2}} + \text{Watt-hour D} \times \frac{\text{FAN + Stand-by capacity of indoor unit X}}{\text{Total FAN/Stand-by capacity of G2}}$$

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

Warning : Correct watt-hour assignment is a must.

Example-1

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



$$\text{Pd of Indoor unit A} = \frac{\text{Indoor unit capacity}}{\text{Total capacity}} \times \text{Total kWh} = \frac{130 \times 360}{130 + 85 + 25 + 5} = 192.020 \text{ kWh}$$

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

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

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

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Why does power consumption occur although the customer didn’t use Air conditioner ?

That is due to stand-by power.
All home appliances have stand-by power.

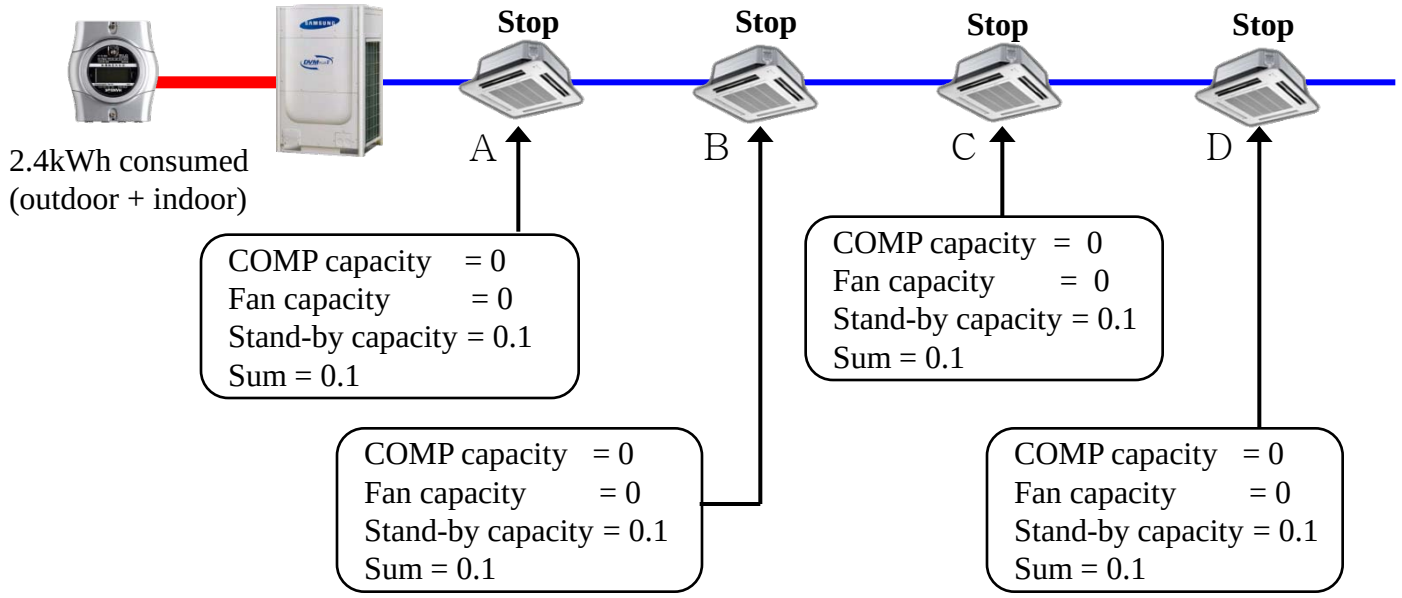
For example, power consumption occurs when the power code of TV is only plug-in although the user don’t use the TV.
Likewise, air conditioner has stand-by power because indoor unit PCB and outdoor unit PCB consume the power when the units are only plug-in.
Each stand-by power of home appliances is different.

The customer can’t see the stand-by power consumption of other home appliance .
So it seems that only samsung air conditioner consume the power because power consumption data is displayed in SNET3

The outdoor unit is public facility like a elevator.
Therefore all tenant should pay for stand-by power consumption although the customer didn’t use indoor unit.
Power consumption is different according to operation status.

Example-2

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



$$\text{Pd of Indoor unit A} = \frac{\text{Indoor unit capacity}}{\text{Total capacity}} \times \text{Total kWh} = \frac{0.1 \times 2.4}{0.1 + 0.1 + 0.1 + 0.1} = 0.6 \text{ kWh}$$

$$\text{Pd of Indoor unit B} = \frac{0.1 \times 2.4}{0.1 + 0.1 + 0.1 + 0.1} = 0.6 \text{ kWh}$$

$$\text{Pd of Indoor unit C} = \frac{0.1 \times 2.4}{0.1 + 0.1 + 0.1 + 0.1} = 0.6 \text{ kWh}$$

$$\text{Pd of Indoor unit D} = \frac{0.1 \times 2.4}{0.1 + 0.1 + 0.1 + 0.1} = 0.6 \text{ kWh}$$

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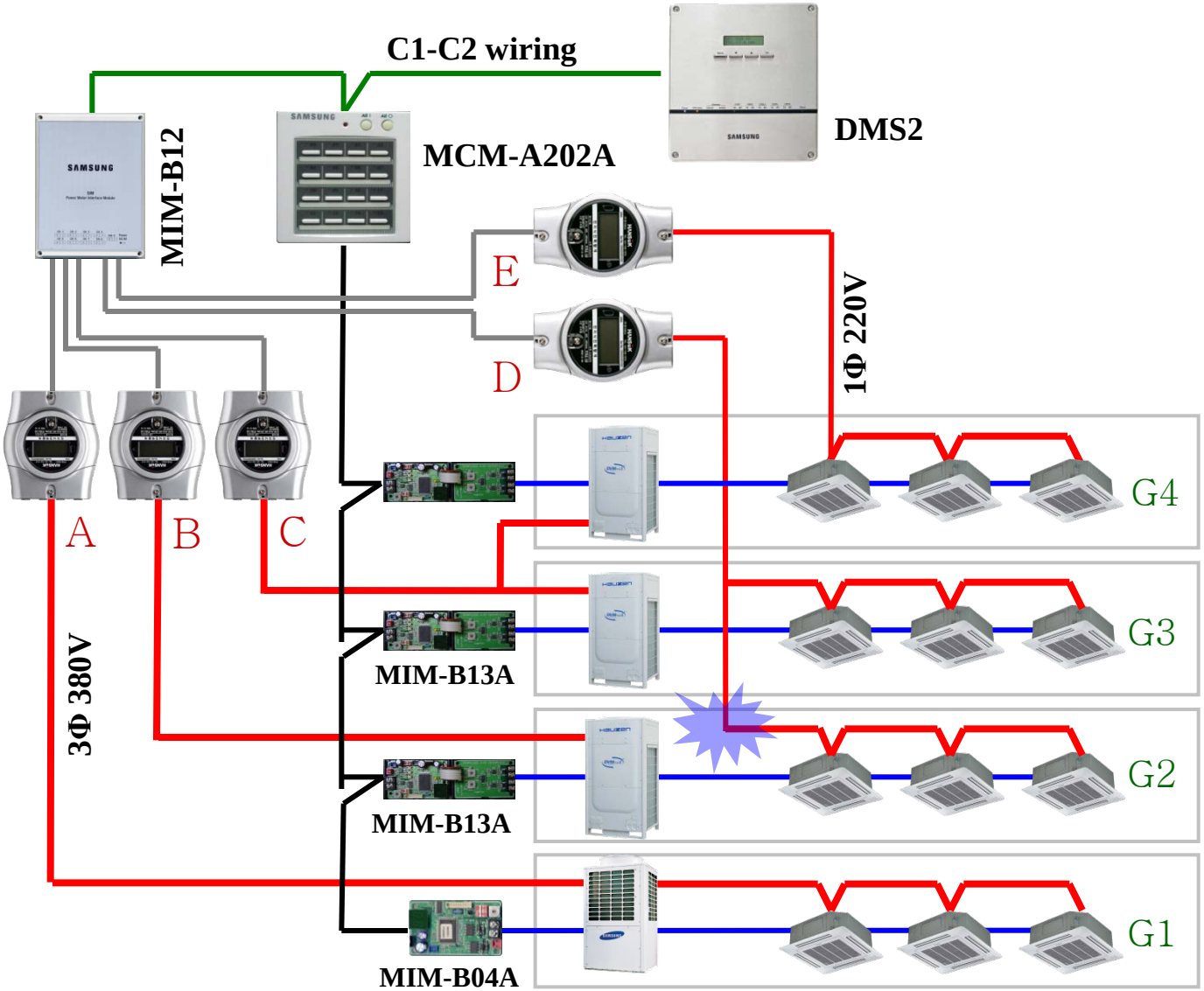
Installation example (Allowed)



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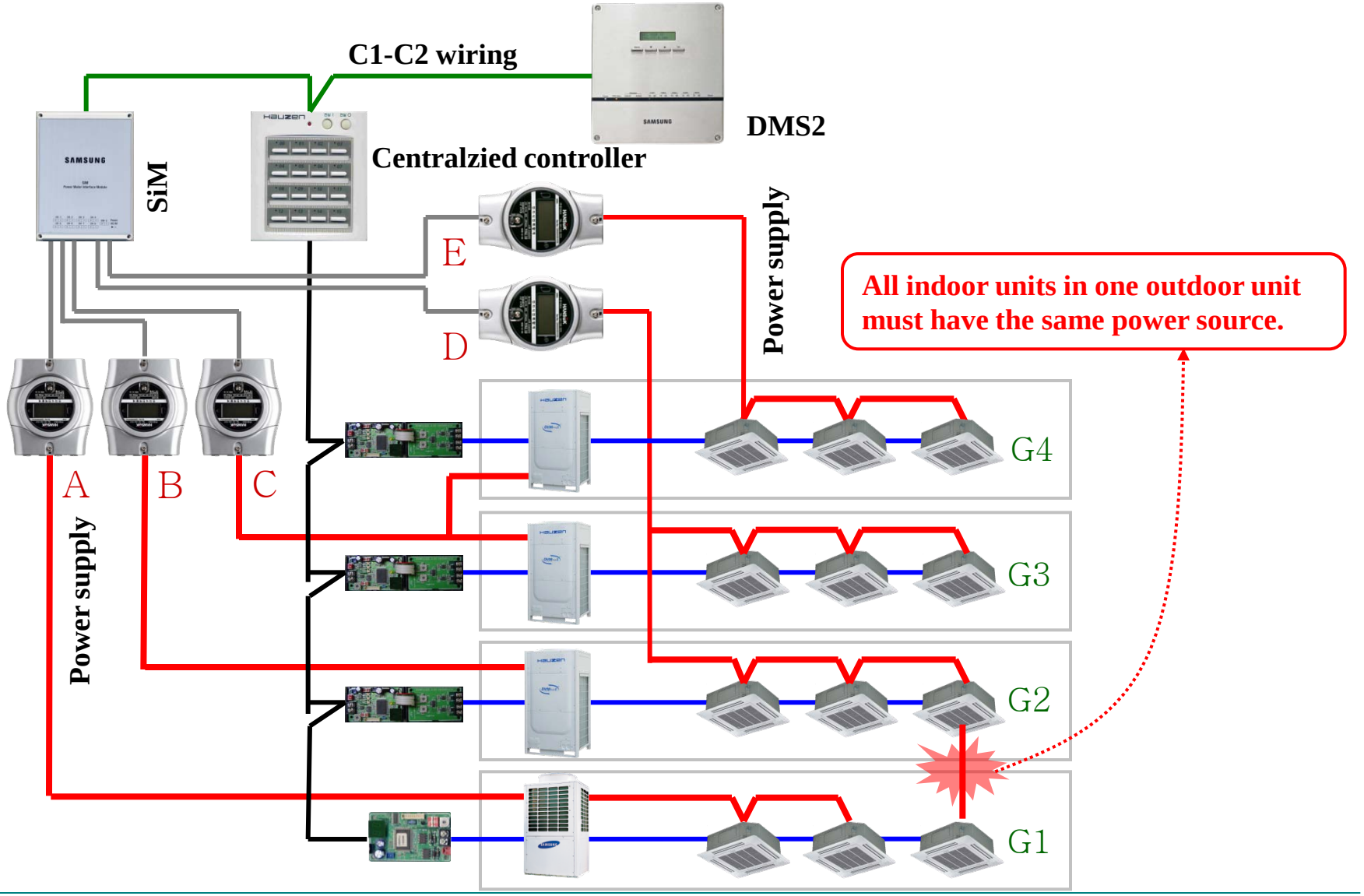
Installation example (Not allowed)



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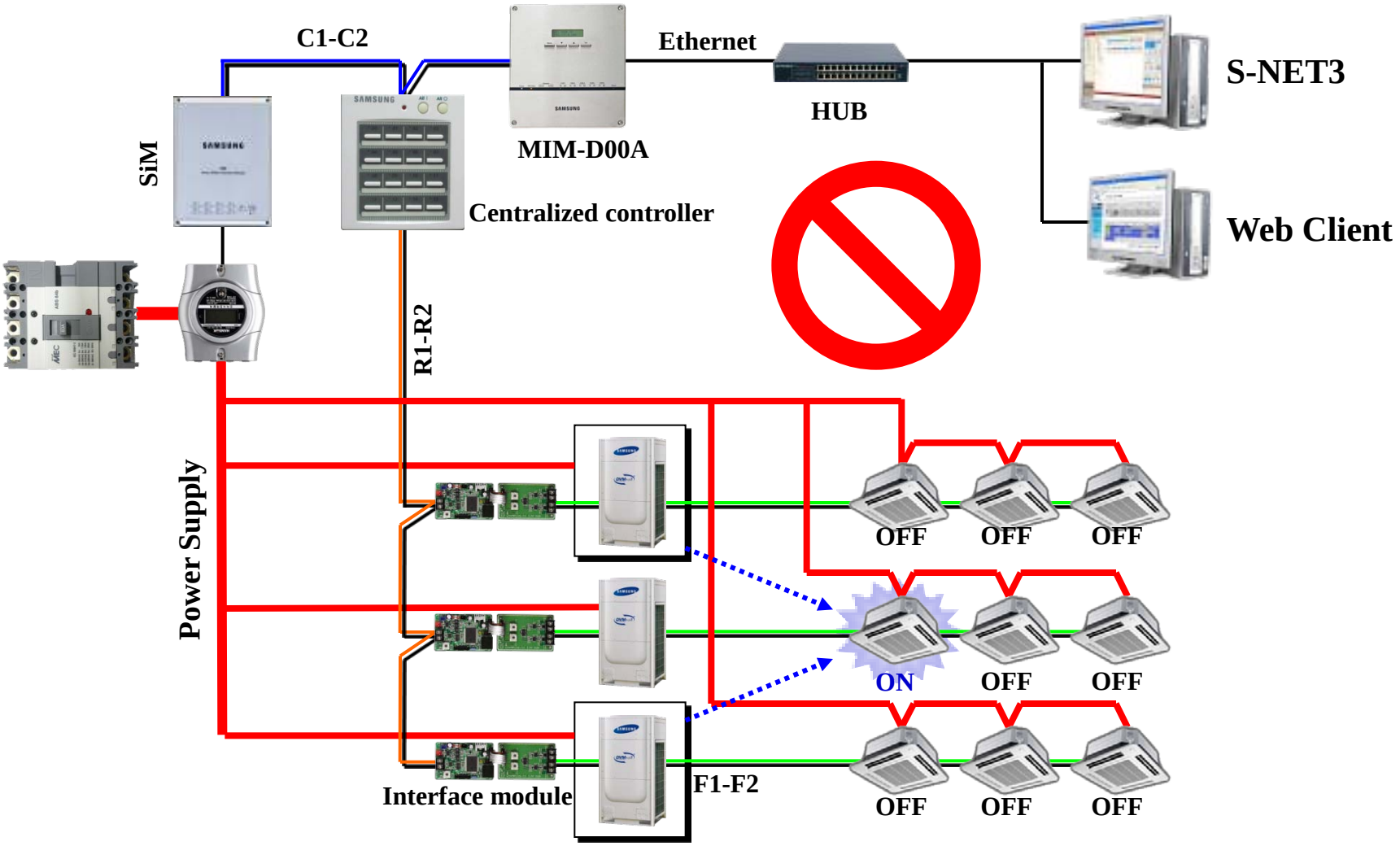
Power distribution with one WHM (Not allowed)



All pre-heater power consumption is delivered to the operating indoor unit !!!

Power distribution Setting & Result

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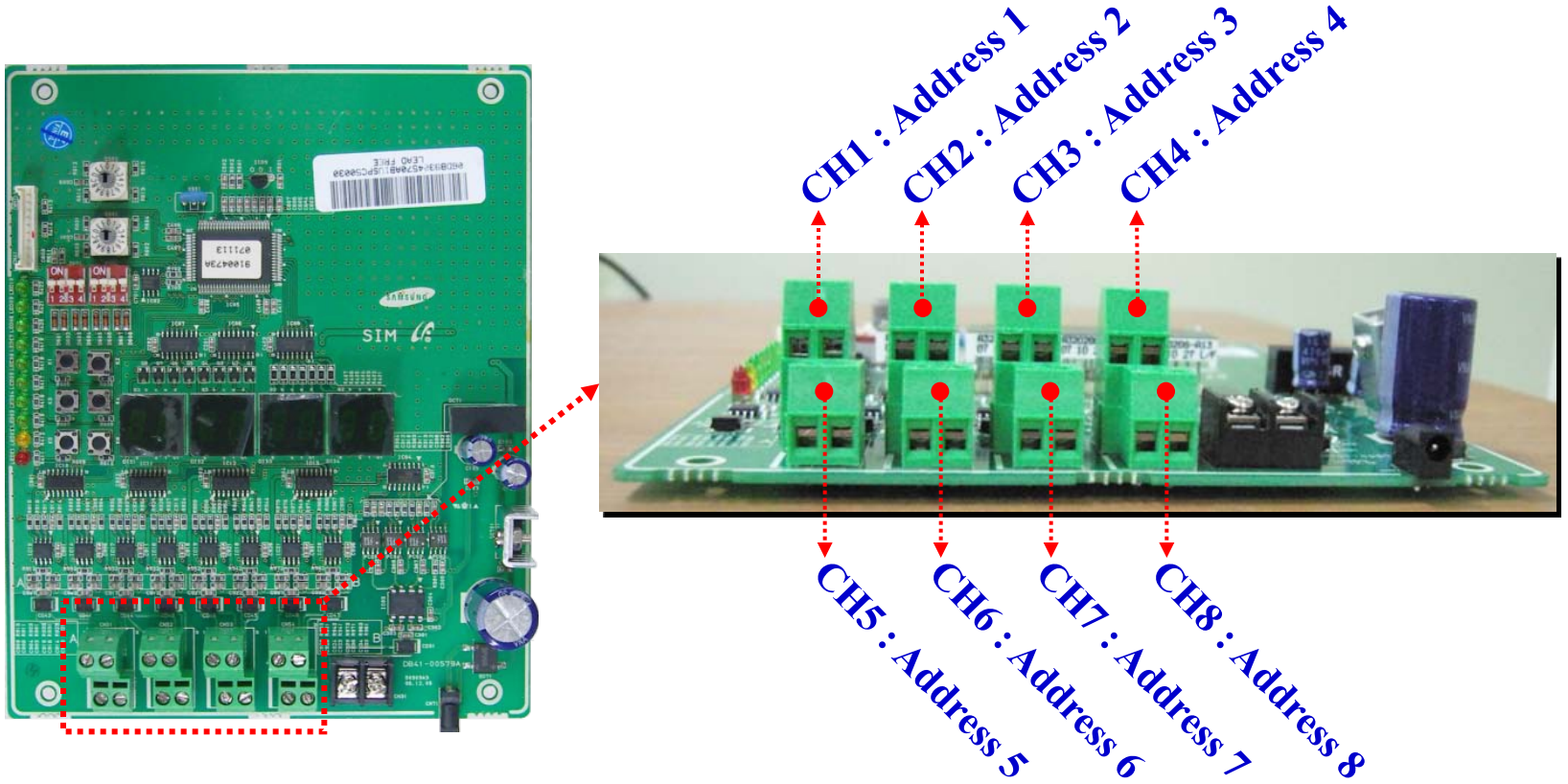
Menu	Sub menu	Description
EHP Power Consumption Inspection	• **Check inspection result**	-Power consumption -Proportion -Individual indoor unit by date
	• **Setting the inspection section**	Power meter reading section setting
	• **Setting and checking watt-hour meter**	SiM channel setting
	• **Setting and checking virtual channel**	Virtual channel setting
	• **Channel setting by indoor unit**	SiM/Virtual channel setting
	• **Checking indoor unit operation time**	Operation/Thermo on time search -All indoor units by period -Individual indoor unit by date

STEP1	▪ Power distribution wiring
STEP2	▪ Setting the SiM channel or virtual channel
STEP3	▪ Channel setting by indoor unit
STEP4	▪ Check inspection result ▪ Checking indoor unit operation time

WHM interface module (SiM)

WHM address is assigned to constant value for each terminal of SiM interface like below.
SiM address can be set from 0 to 7. DMS2 recognizes SiM of which address is added by 8 to differentiate it from those of centralized controllers.



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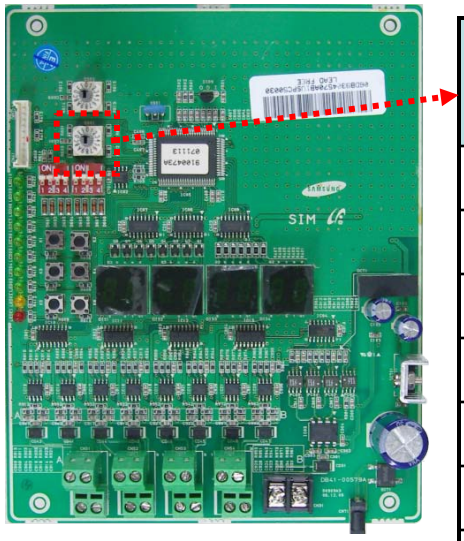
WHM interface module (SiM)

If SiM address is set to 1 and one WHM is connected to CH2, DMS2 then recognizes the WHM address as 17.2 after completing tracking process.



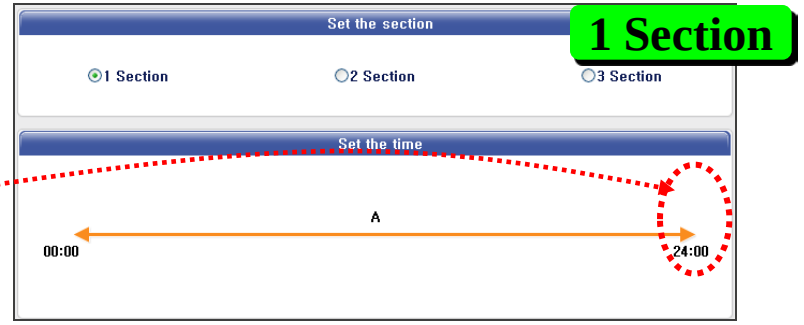
WHM address assignment table

SiM address	SiM Channel							
	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							

Power distribution Setting & Result

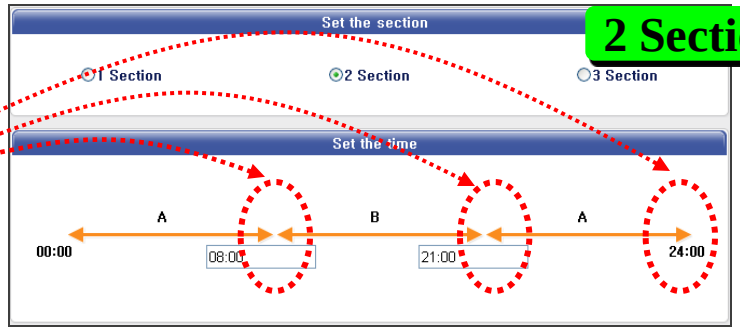
EHP Power Consumption Inspection > Setting the inspection section

Time reference - 00:00



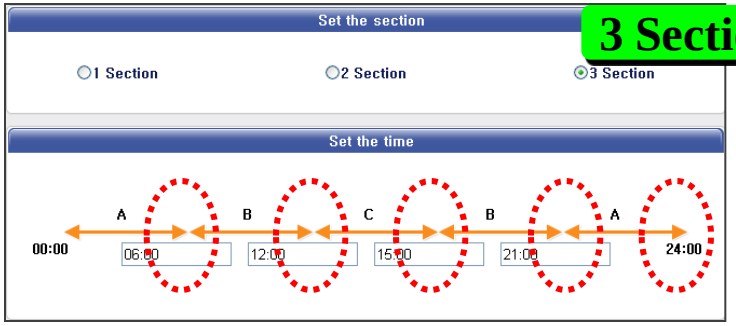
1 Section

Time reference



2 Section

Time reference



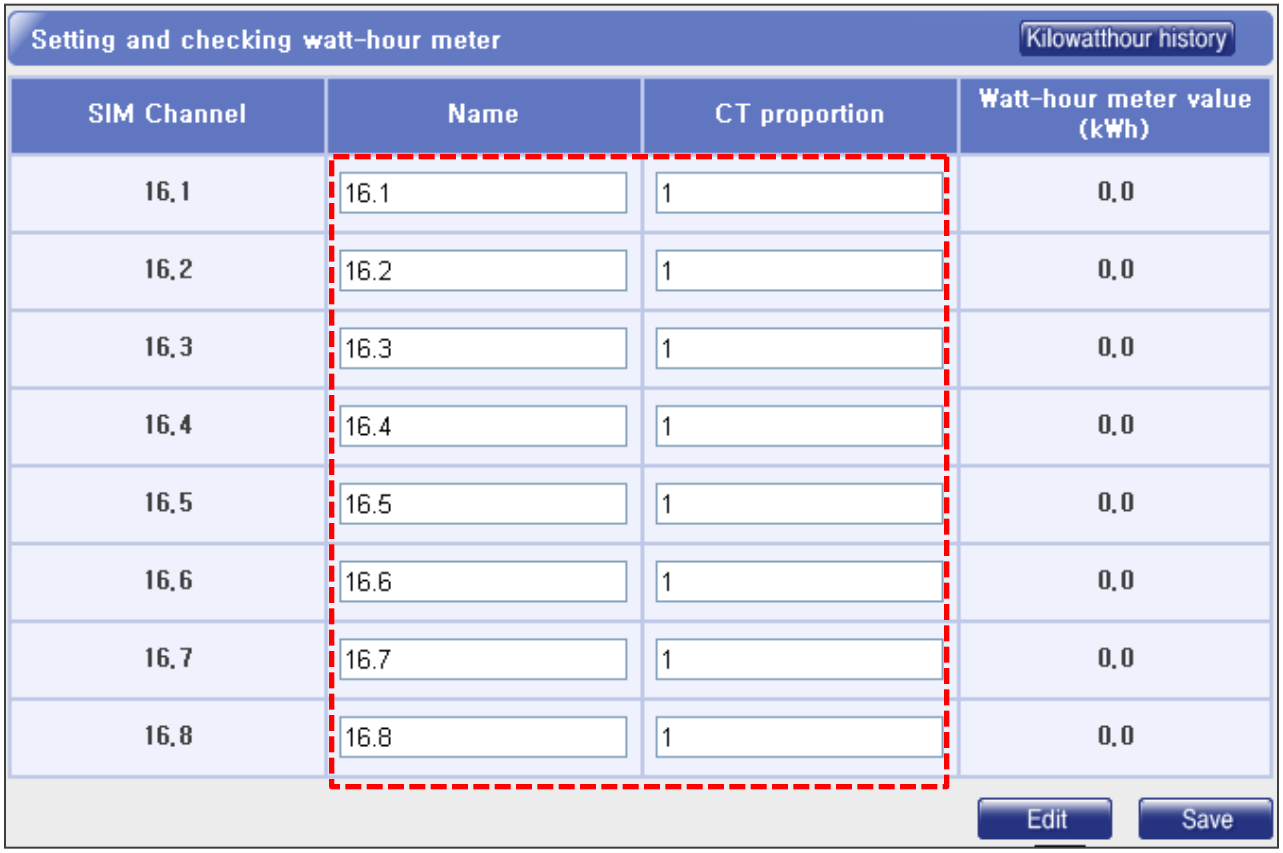
3 Section

Query on DMS web : Power distribution result based on Section 1

Query on S-NET3 : Power distribution result based on time sections

Power distribution Setting & Result

EHP Power Consumption Inspection > Setting and checking watt-hour meter



- Set name and CT proportion (Default:1, Range: 1~5000)
- When using CT watt-hour meter, be careful that there can be difference with actual power consumption as much as CT ratio error
- Watt-hour meter value shows actual value of currently connected watt-hour meter.

Power distribution Setting & Result

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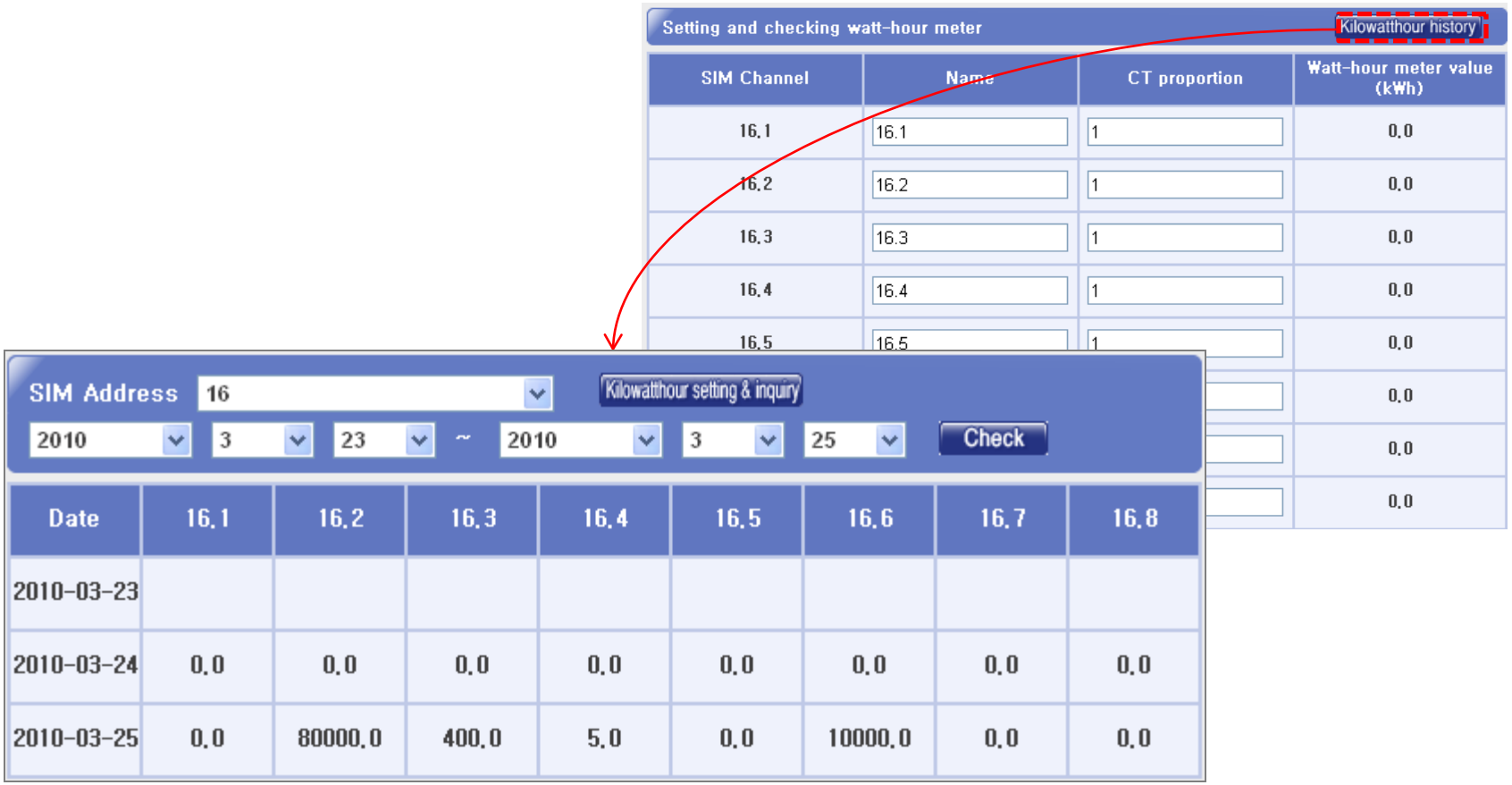

Setting and checking watt-hour meter — Kilowatthour history

SIM Channel	Name	CT proportion	Watt-hour meter value (kWh)
16.1	16.1	1	0.0
16.2	16.2	1	0.0
16.3	16.3	1	0.0
16.4	16.4	1	0.0
16.5	16.5	1	0.0
			0.0
			0.0
			0.0

SIM Address 16 — Kilowatthour setting & inquiry

2010 3 23 ~ 2010 3 25 Check

Date	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8
2010-03-23								
2010-03-24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2010-03-25	0.0	80000.0	400.0	5.0	0.0	10000.0	0.0	0.0

- Enter year/month/day in order
- If you click “Check”, watt-hour meter value of set period will be displayed
- Base on DMS2 time, you can check up to 365 day of watt-hour meter value

Power distribution Setting & Result

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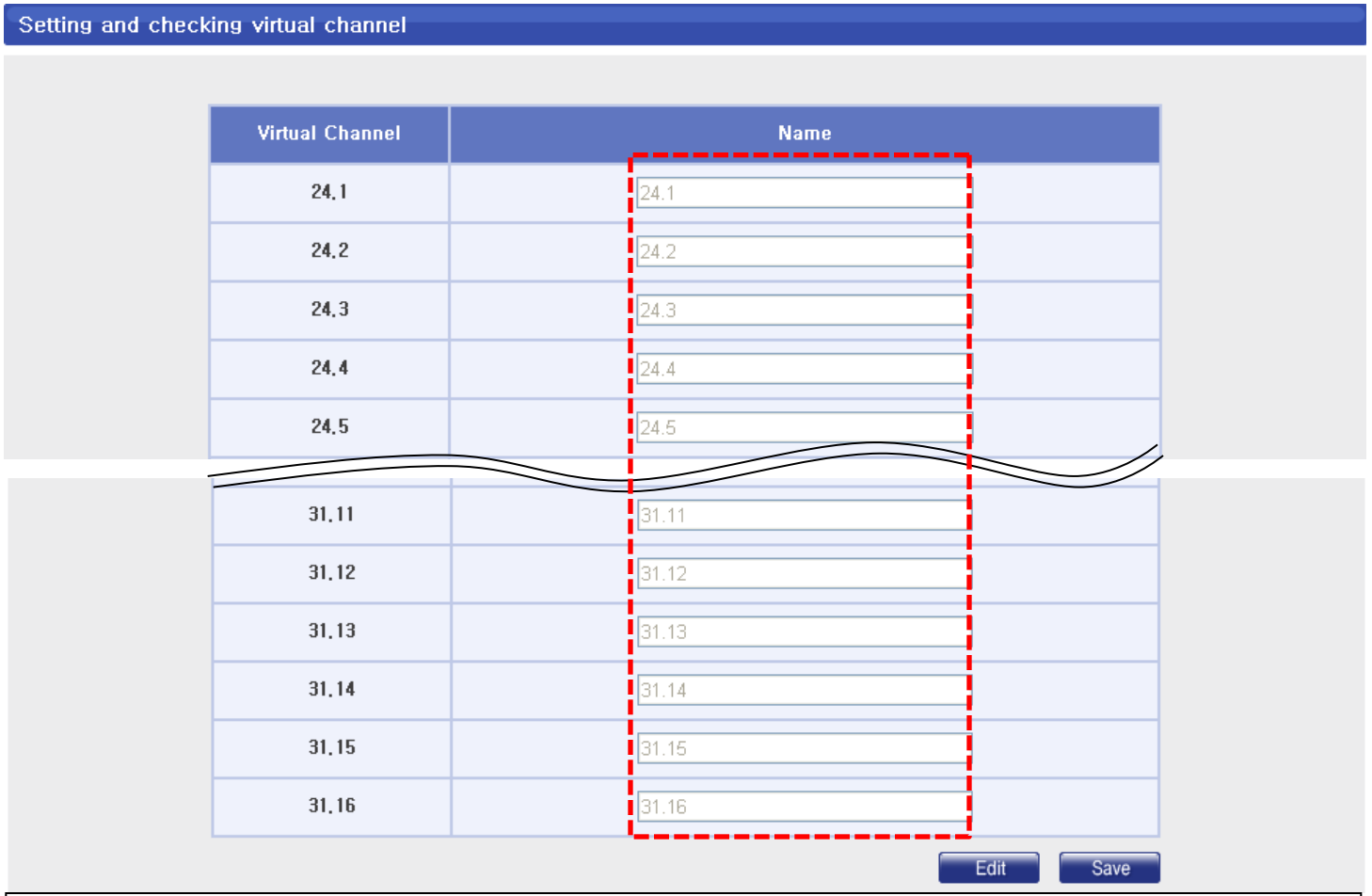
EHP Power Consumption Inspection > Setting and checking virtual channel

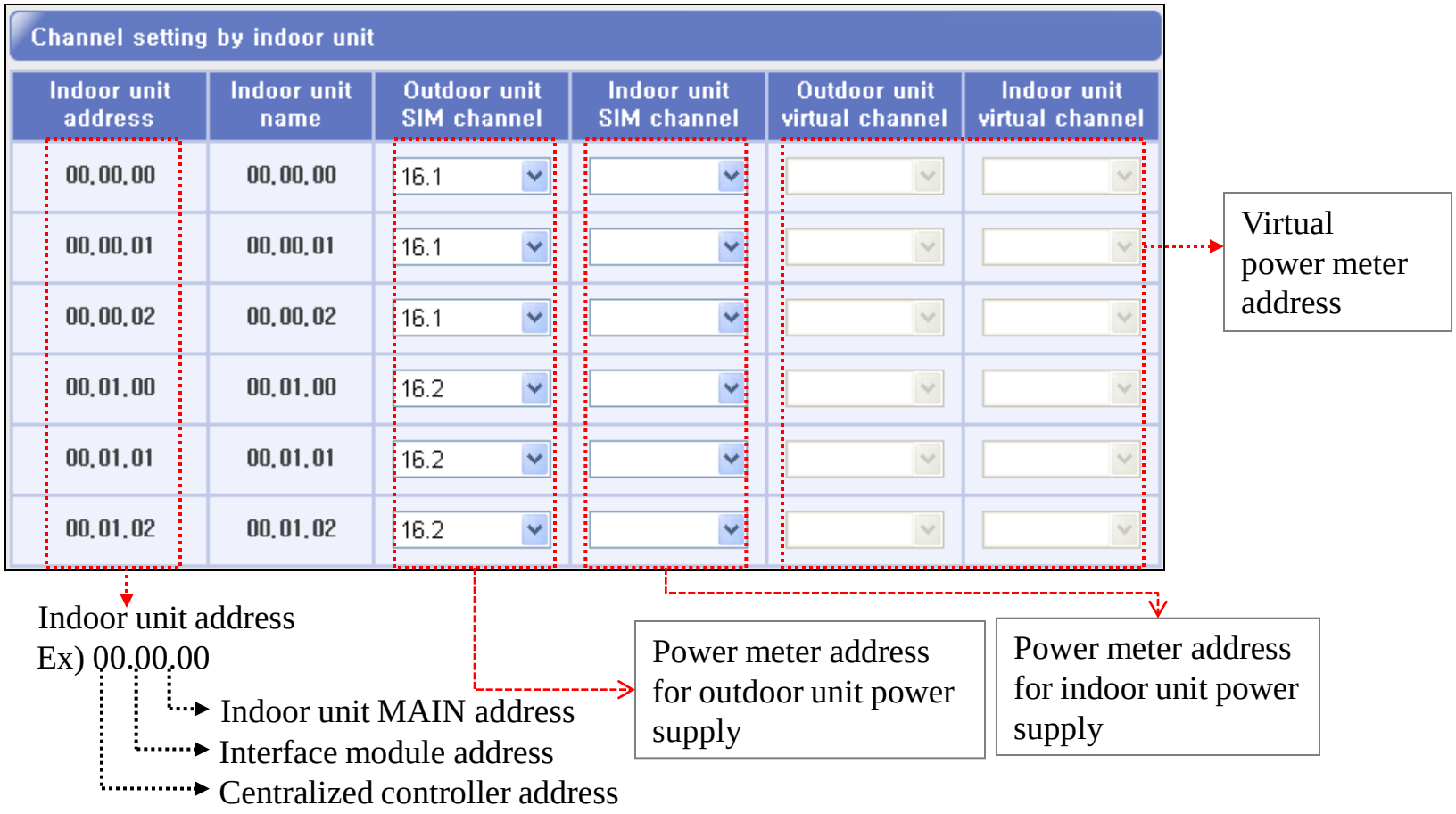


- Maximum 128 virtual channel can be set.
- Virtual channel is written (24~31).(1~16) format address

Power distribution Setting & Result

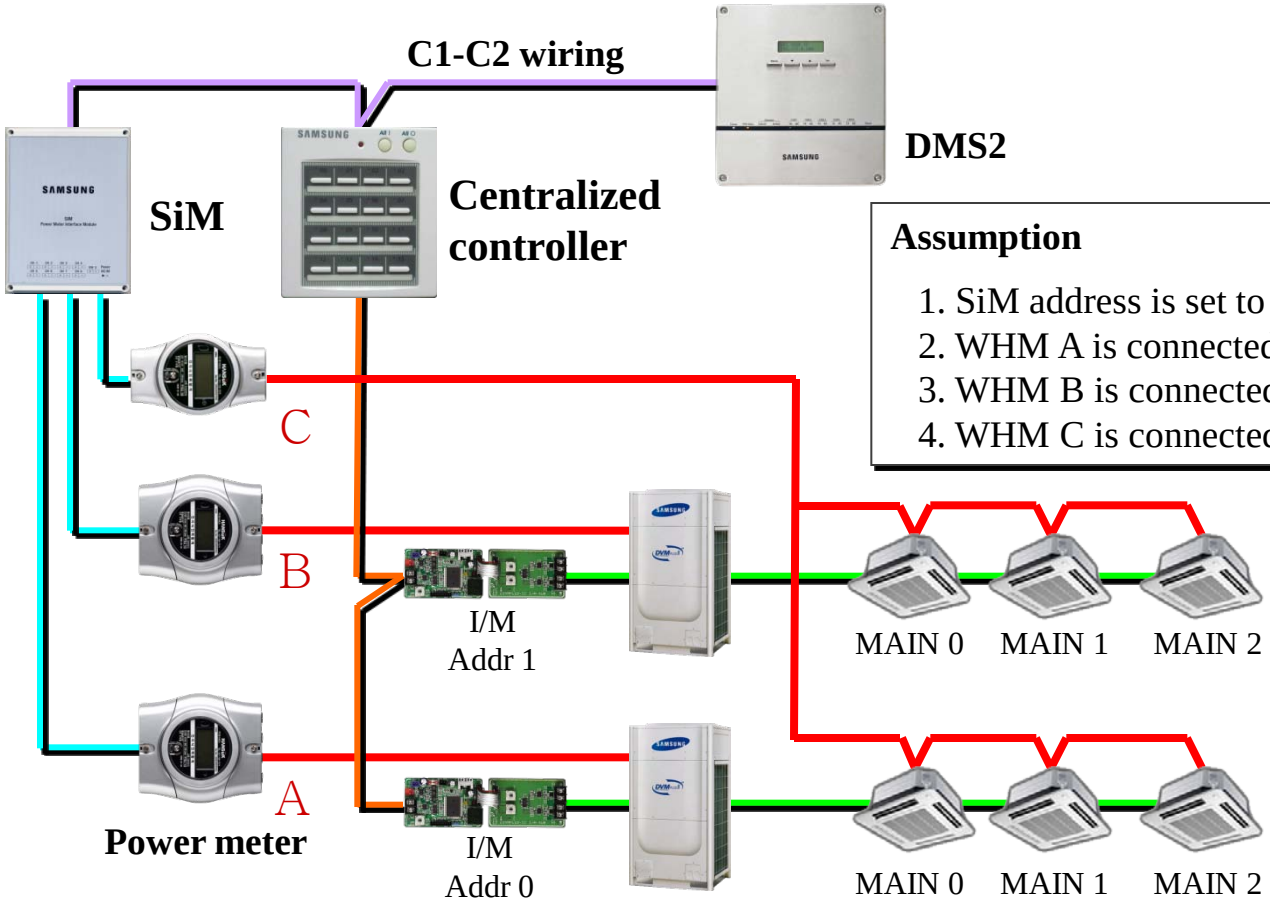
EHP Power Consumption Inspection > Channel setting by indoor unit

This setting is the most important and attention-requiring task to make reasonable power distribution on the basis that consumed power in one indoor/outdoor system is distributed to all indoor units in that boundary.



Power distribution Setting & Result

Channel setting example

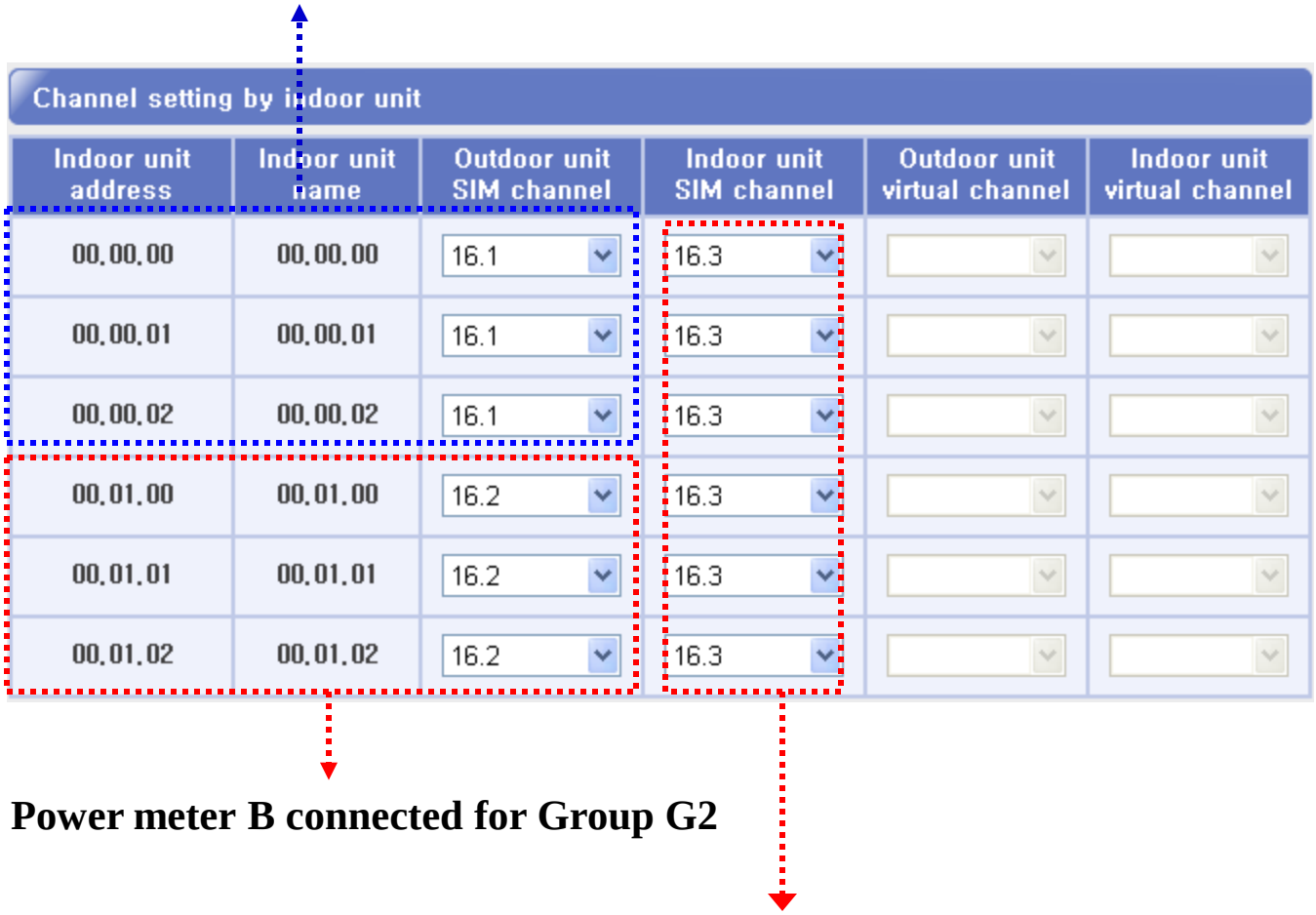


Assumption

1. SiM address is set to 0.
2. WHM A is connected to Channel 1 of the SiM.
3. WHM B is connected to Channel 2 of the SiM.
4. WHM C is connected to Channel 3 of the SiM.

Power distribution Setting & Result

Power meter A connected for Group G1



Channel setting by indoor unit

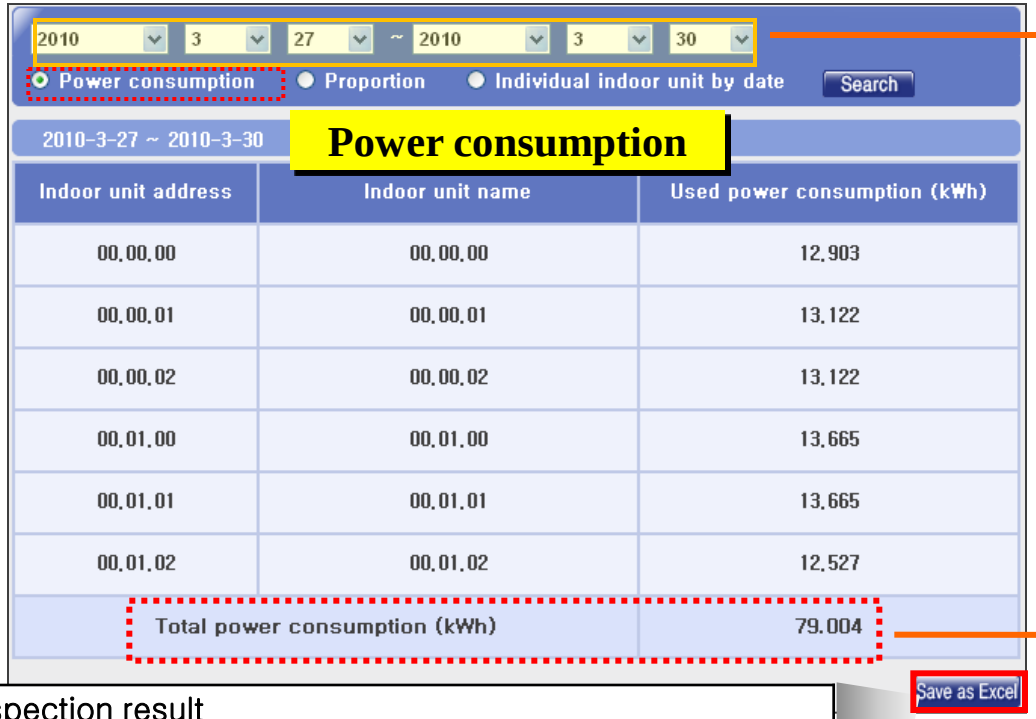
Indoor unit address	Indoor unit name	Outdoor unit SIM channel	Indoor unit SIM channel	Outdoor unit virtual channel	Indoor unit virtual channel
00.00.00	00.00.00	16.1	16.3		
00.00.01	00.00.01	16.1	16.3		
00.00.02	00.00.02	16.1	16.3		
00.01.00	00.01.00	16.2	16.3		
00.01.01	00.01.01	16.2	16.3		
00.01.02	00.01.02	16.2	16.3		

Power meter B connected for Group G2

Since there is power meter C for indoor units,
WHM address 16.3 must be assigned to all the indoor units.

Power distribution Setting & Result

EHP Power Consumption Inspection > Check inspection result



Select period

Each indoor unit power consumption for this period

Total power consumption

Check inspection result

2010-3-27 ~ 2010-3-30

Indoor unit address	Indoor unit name	Used power consumption (kWh)
00.00.00	00.00.00	12.903
00.00.01	00.00.01	13.122
00.00.02	00.00.02	13.122
00.01.00	00.01.00	13.665
00.01.01	00.01.01	13.665
00.01.02	00.01.02	12.527

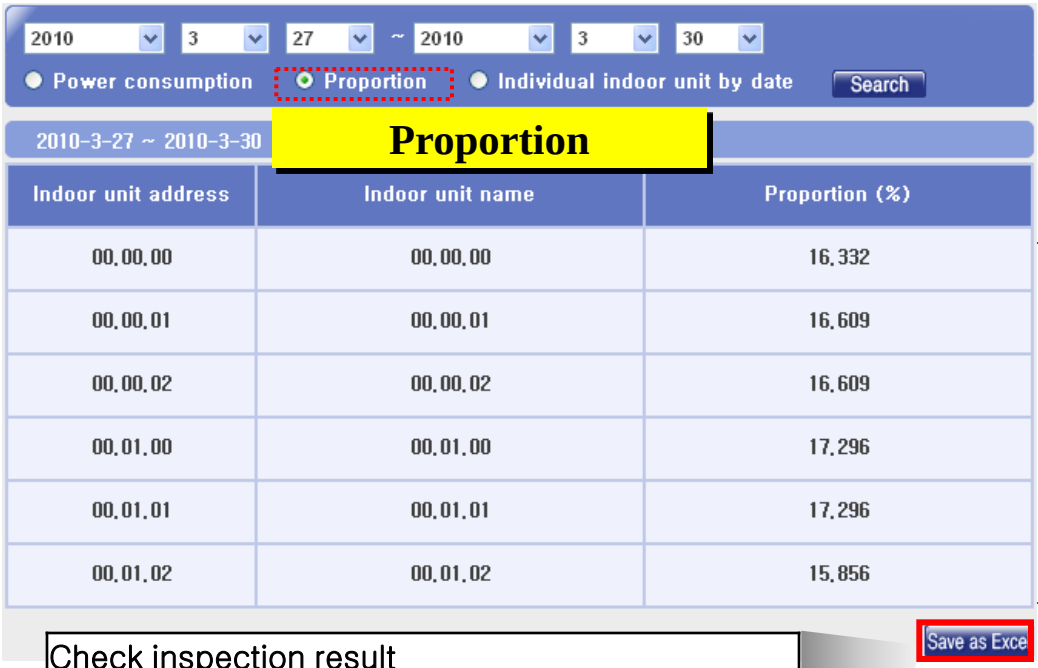
Excel data

▪ Base on DMS2 time, you can check up to 365 day of watt-hour meter value

Power distribution Setting & Result

SAMSUNG ELECTRONICS CO.LTD

EHP Power Consumption Inspection > Check inspection result



Proportion data for each indoor unit

Check inspection result

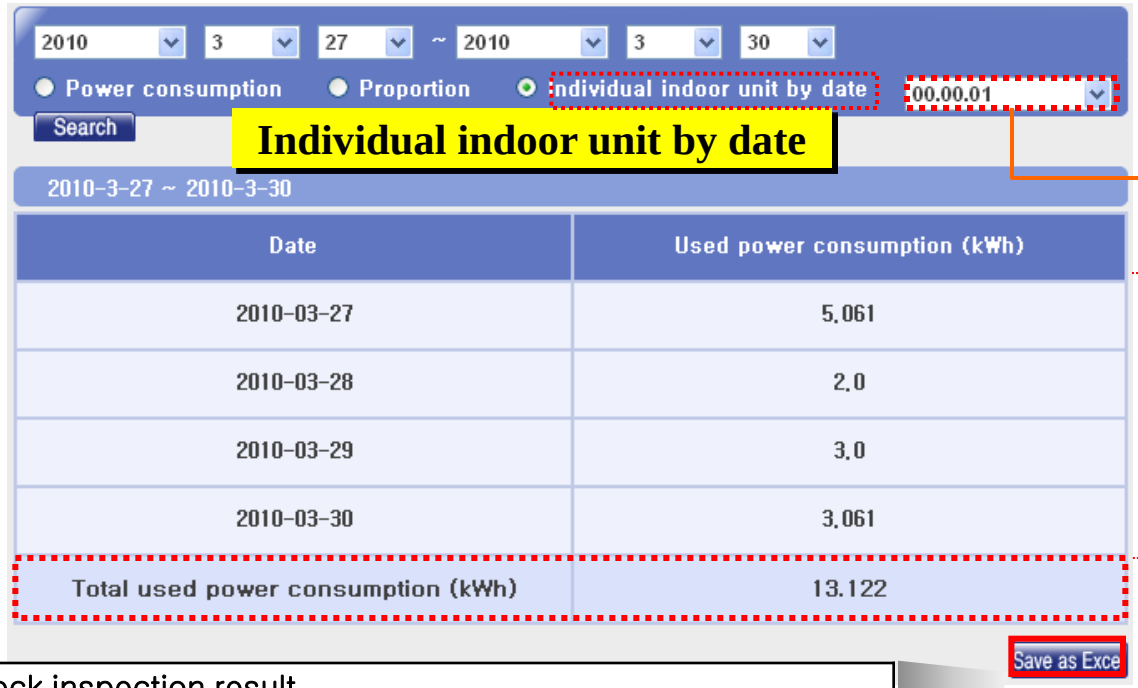
2010-3-27 ~ 2010-3-30

Indoor unit address	Indoor unit name	Proportion (%)
00.00.00	00.00.00	16.332
00.00.01	00.00.01	16.609
00.00.02	00.00.02	16.609
00.01.00	00.01.00	17.296
00.01.01	00.01.01	17.296
00.01.02	00.01.02	15.856
Total power consumption (kWh)		79.004

Excel data

Power distribution Setting & Result

EHP Power Consumption Inspection > Check inspection result



Select indoor unit

00.00.01 indoor unit power consumption data form 27th to 30th

Check inspection result

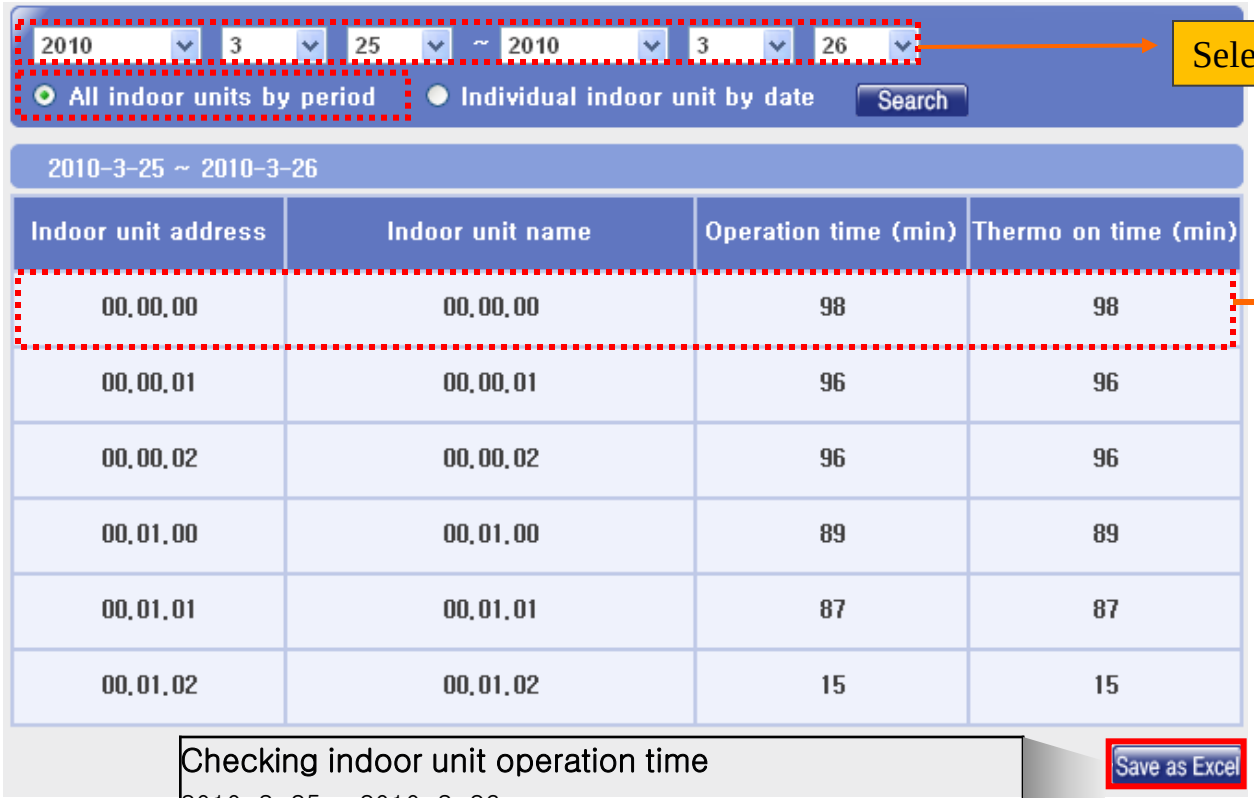
2010-3-27 ~ 2010-3-30

Date	Used power consumption (kWh)
Total used power consumption (kWh)	13.122
2010-03-27	5.061
2010-03-28	2
2010-03-29	3
2010-03-30	3.061

Excel data

Power distribution Setting & Result

EHP Power Consumption Inspection > Checking indoor unit operation time



Select period

00.00.00 unit by period
-Operation time
-Thermo on time

Checking indoor unit operation time

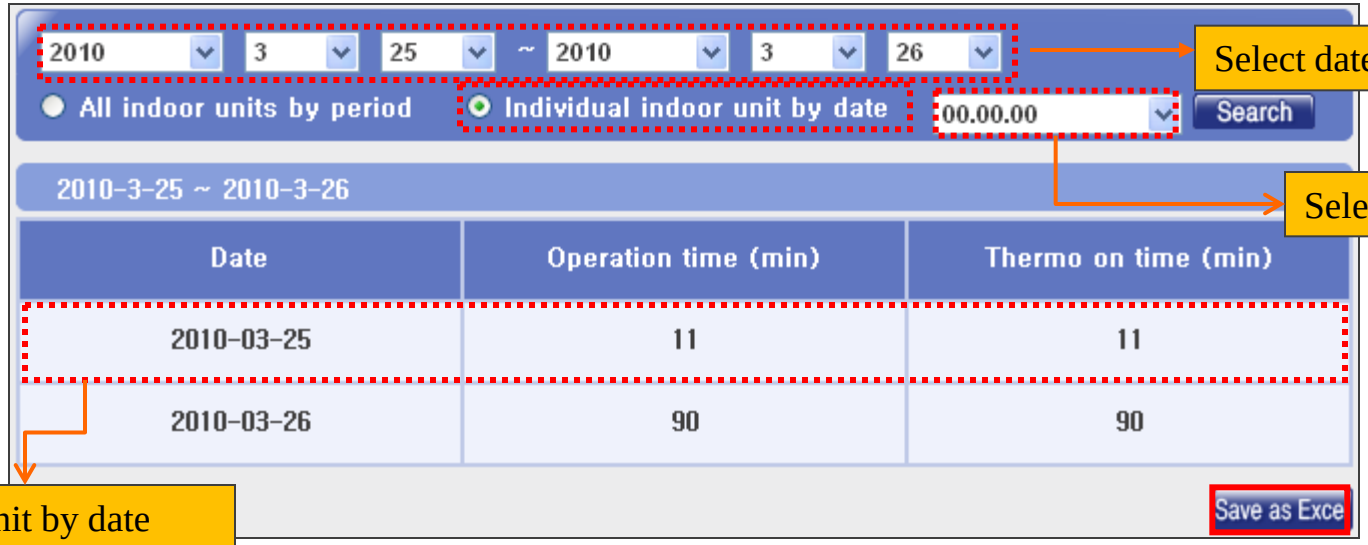
2010-3-25 ~ 2010-3-26

Indoor unit address	Indoor unit name	Operation time (min)
00.00.00	00.00.00	121
00.00.01	00.00.01	119
00.00.02	00.00.02	119
00.01.00	00.01.00	112
00.01.01	00.01.01	110
00.01.02	00.01.02	38

▪ Base on DMS2 time, you can check up to 365 day of watt-hour meter value

Power distribution Setting & Result

EHP Power Consumption Inspection > Checking indoor unit operation time



00.00.00 unit by date
-Operation time
-Thermo on time

Checking indoor unit operation time

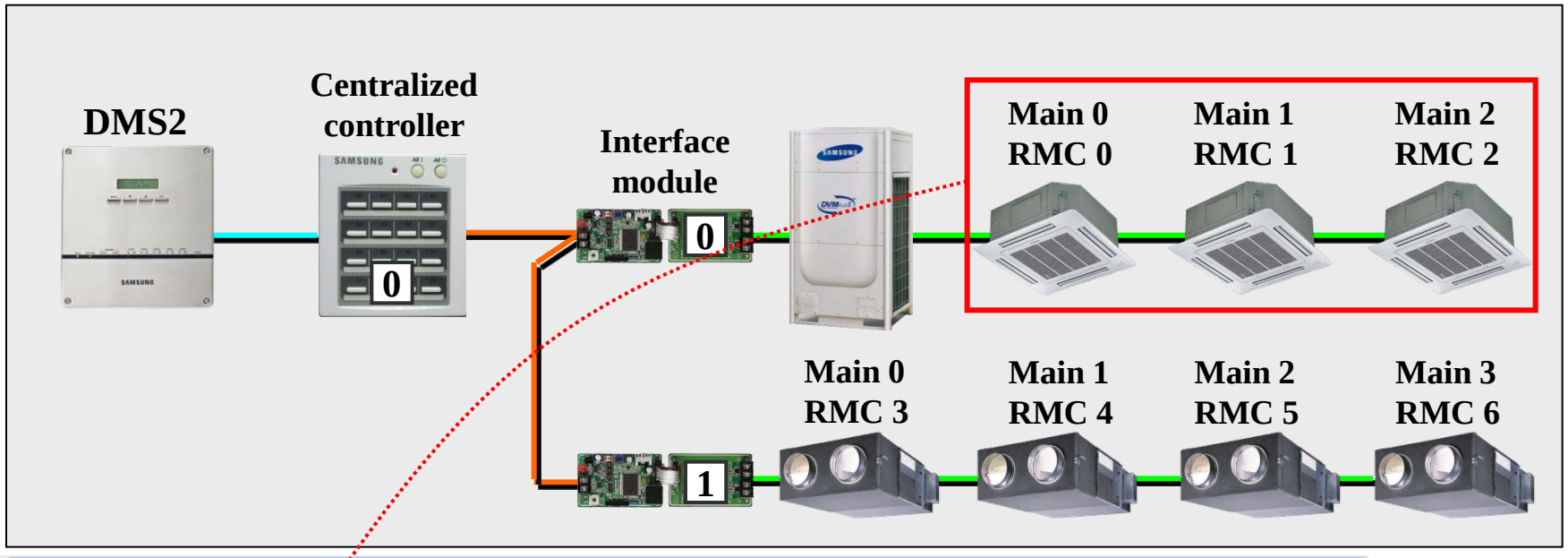
2010-3-25 ~ 2010-3-26

Date	Operation time (min)
2010-03-25	11
2010-03-26	91

▪ Base on DMS2 time, you can check up to 365 day of watt-hour meter value

Power distribution Setting & Result

ERV Power distribution



2010-3-30 ~ 2010-3-30

Indoor unit address	Indoor unit name	Used pov
00.00.00	00.00.00	
00.00.01	00.00.01	3.061
00.00.02	00.00.02	3.061

NO ERVs

Control : EHP, ERV allowed
Power Distribution : EHP only

No need to install a watt-hour meter for ERVs !

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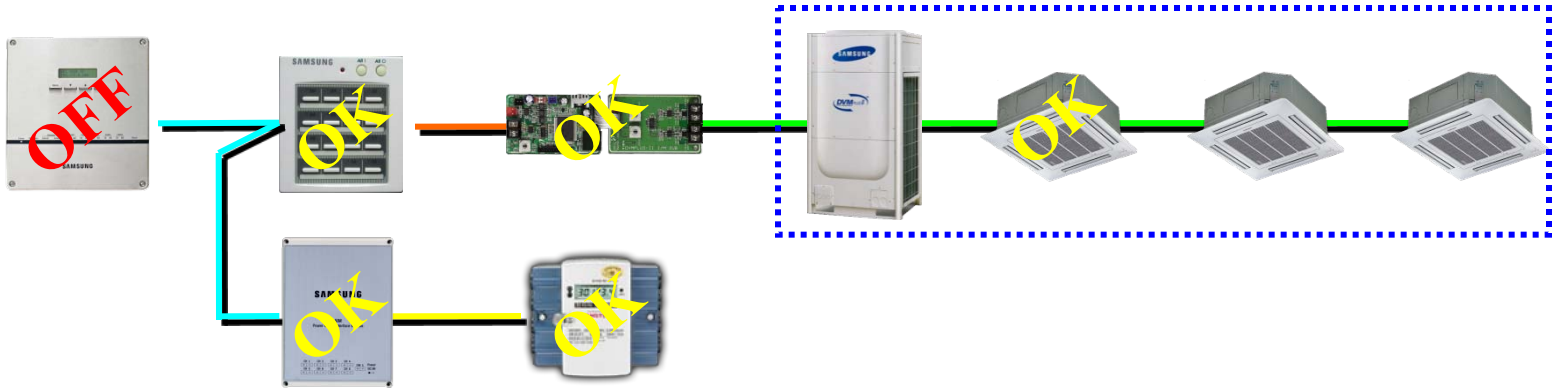
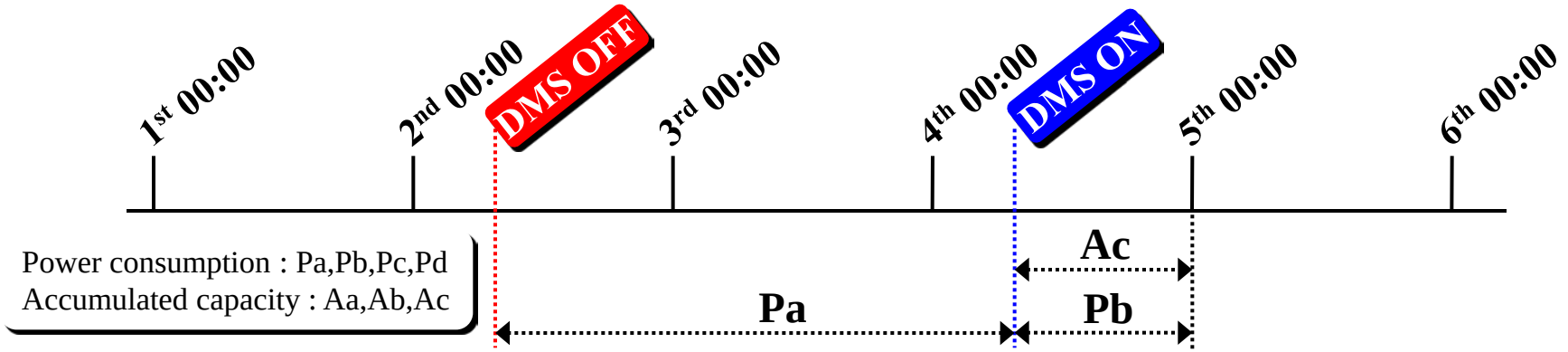
Error on DMS2 power



1) When DMS was powered off and on again with other communication working good,

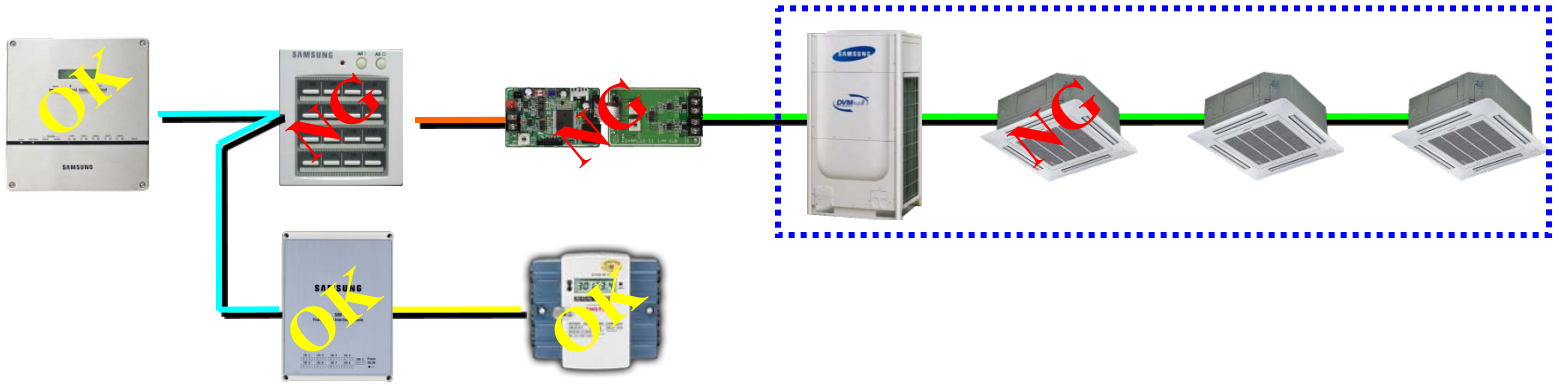


a. If Pa > 2,536kWh, Pb is distributed with Ac at 5th 00:00.
b. If Pa ≤ 2,536kWh, Pa+Pb is distributed with Ac at 5th 00:00.

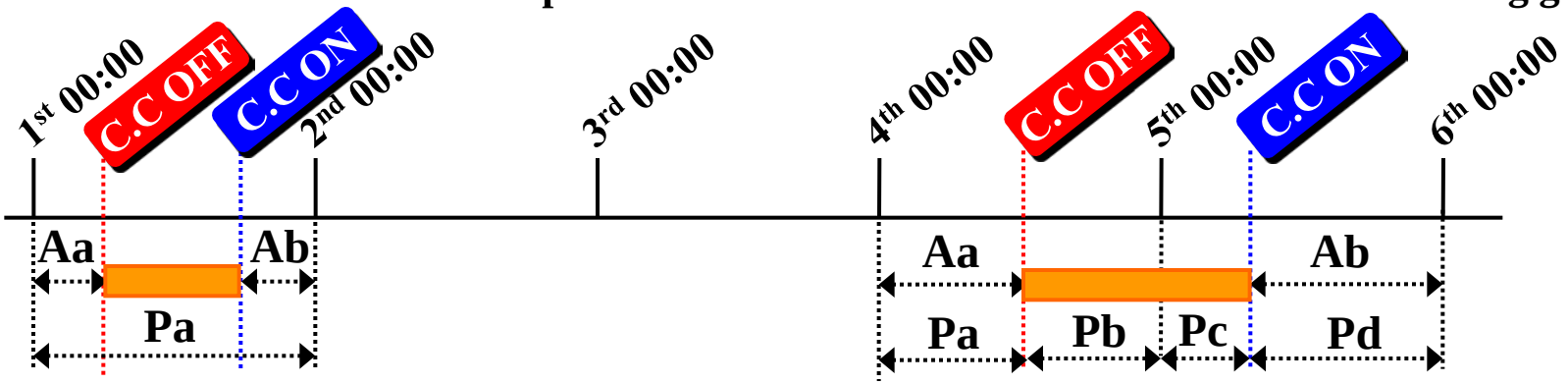
Time reference - 00:00 (for Section 1)

SAMSUNG ELECTRONICS CO.LTD

Communication error on centralized controller or I/M or F1-F2 within 1 day



1) When centralized controller was powered off and on with other communication working good,



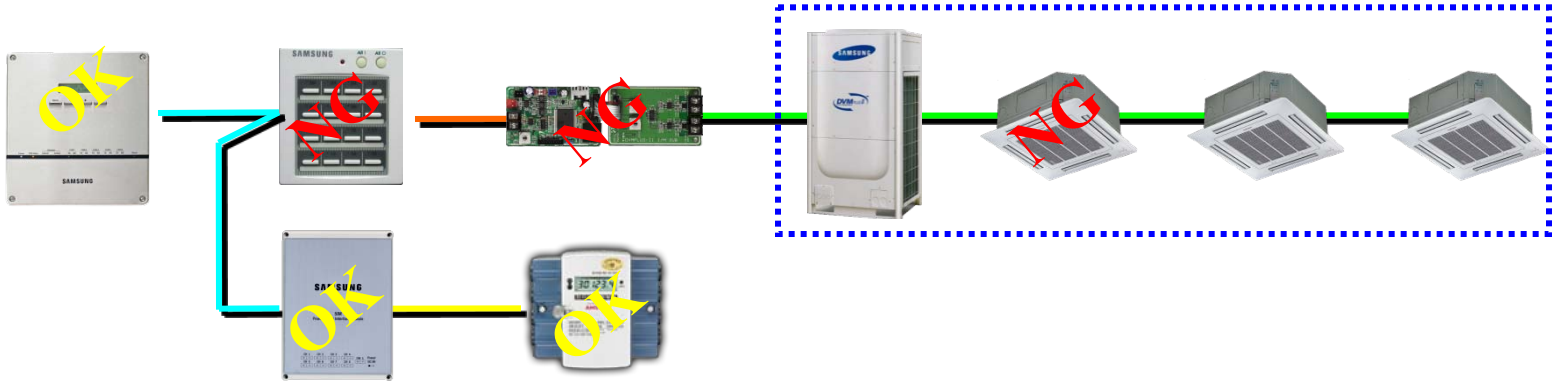
Pa is distributed with Aa+Ab at 2nd 00:00.

Pa+Pb is distributed with Aa at 5th 00:00.
Pc+Pd is distributed with Ab at 6th 00:00.

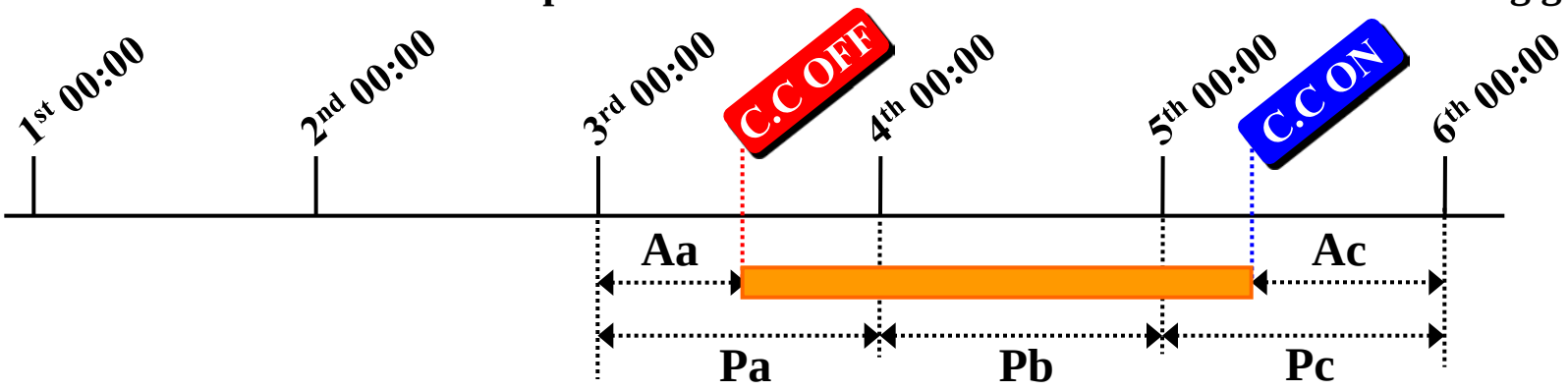
Time reference - 00:00 (for Section 1)

SAMSUNG ELECTRONICS CO.LTD

Communication error on centralized controller or I/M or F1-F2 for over 1 day



1) When centralized controller was powered off and on with other communication working good,

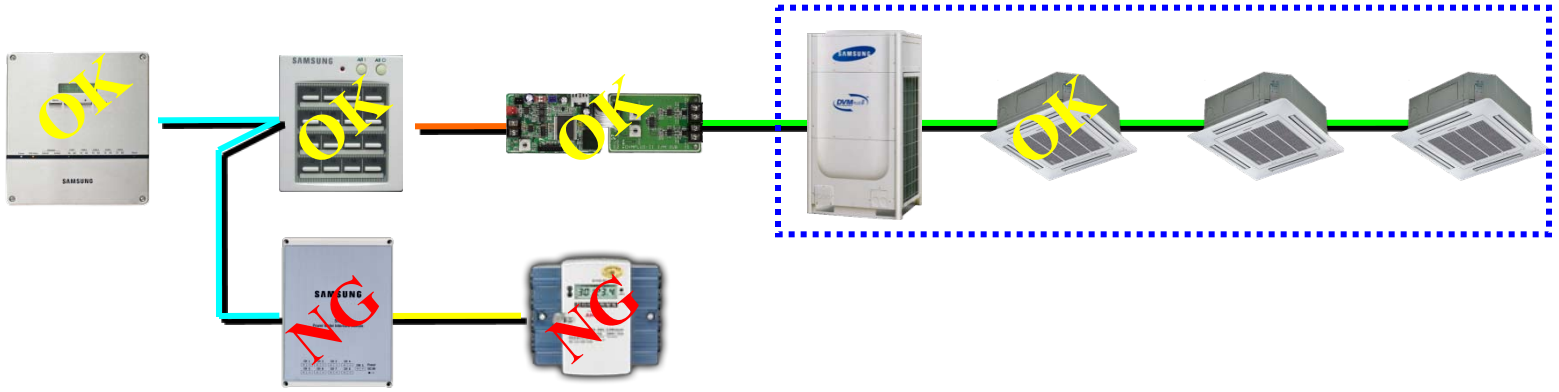


Pa is distributed with Aa at 4th 00:00.
Pb of the whole 1 day is not distributed at 5th 00:00
-> Power distribution result during 4th 00:00 ~ 5th 00:00 : 0kWh
Pc is distributed with Ac at 6th 00:00.

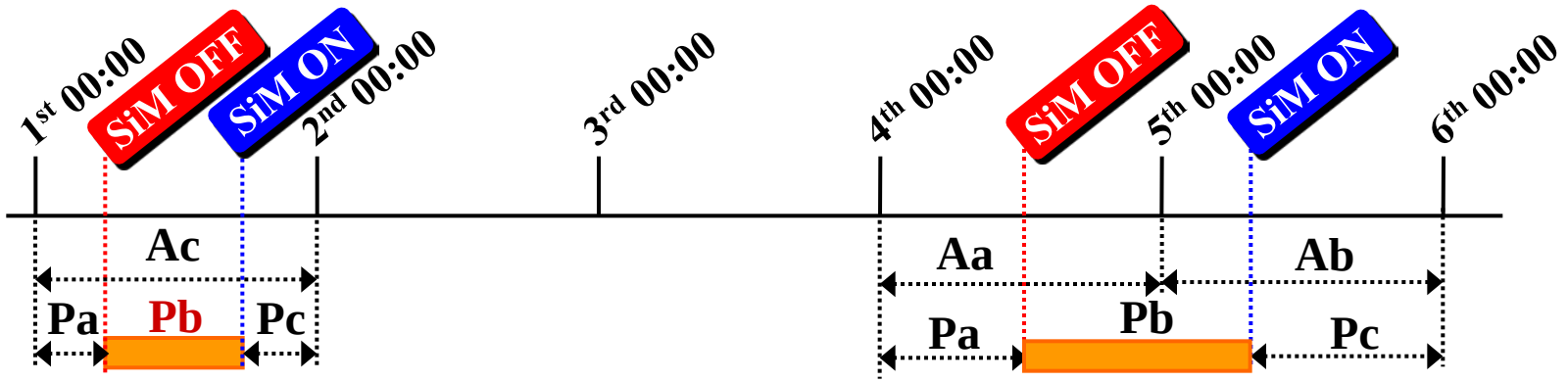
Time reference - 00:00 (for Section 1)

SAMSUNG ELECTRONICS CO.LTD

Communication error on SiM or watt-hour meter within 1 day



1) When SiM was powered off and on again with other communication working good,



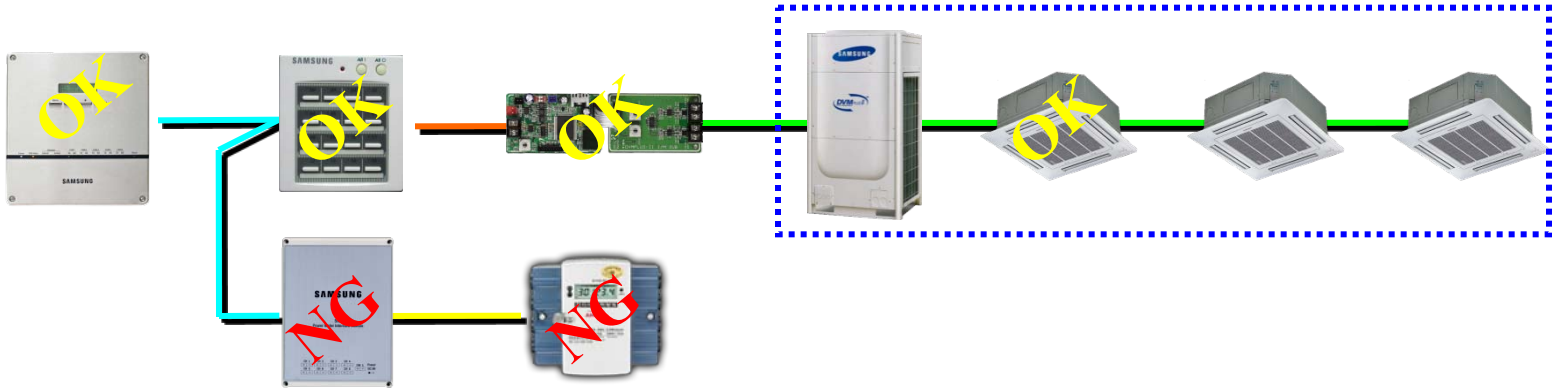
If Pb > 50kWh, Pa+Pc is distributed with Ac at 2nd 00:00.
If Pb ≤ 50kWh, Pa+Pb+Pc is distributed with Ac at 2nd 00:00.

Pa only is distributed with Aa at 5th 00:00.
Pc only is distributed with Ab at 6th 00:00.

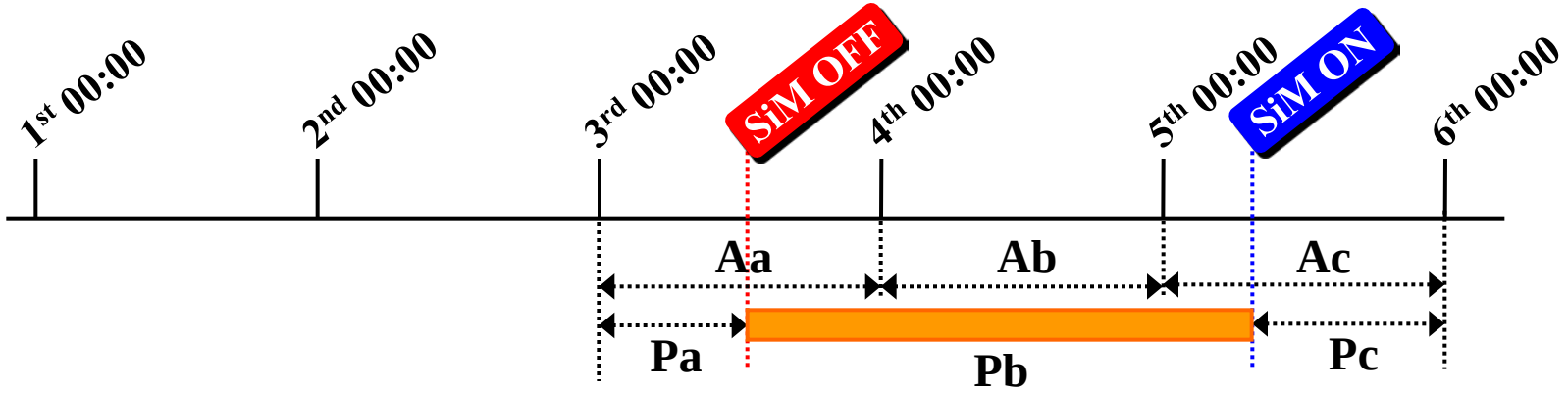
Time reference - 00:00 (for Section 1)

SAMSUNG ELECTRONICS CO.LTD

Communication error on SiM or watt-hour meter for over 1 day



1) When SiM was powered off and on again with other communication working good,



Pa only is distributed with Aa at 4th 00:00.
Pb is not distributed at 5th 00:00 since Pb is not delivered to DMS
-> Power distribution result during 4th 00:00 ~ 5th 00:00 : 0kWh
Pc only is distributed with Ac at 6th 00:00.

Time reference - 00:00 (for Section 1)