



Functions and Specification

AC Smart 5

AC Smart 5 is a central controller that can manage individual or group of maximum of 128 units in one space.

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

[AC Smart 5 Functions]

- Web Server Embedded Function
- Devices that can be interfaced

[AC Smart 5 Components]

- Components

[Name of Each Part of AC Smart 5]

- Name of Each Part

[AC Smart 5 Hardware Specification]

- Hardware Specification

WARNING

This equipment is compliant with Class A of CISPR 32. In a residential environment this equipment may cause radio interference.



Web Server Embedded Function

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

- Control of Max. of 128 air conditioner units
- Error and Operation Status Monitoring
- Peak/Demand Power Control
- System Setting Function



Devices that can be interfaced

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

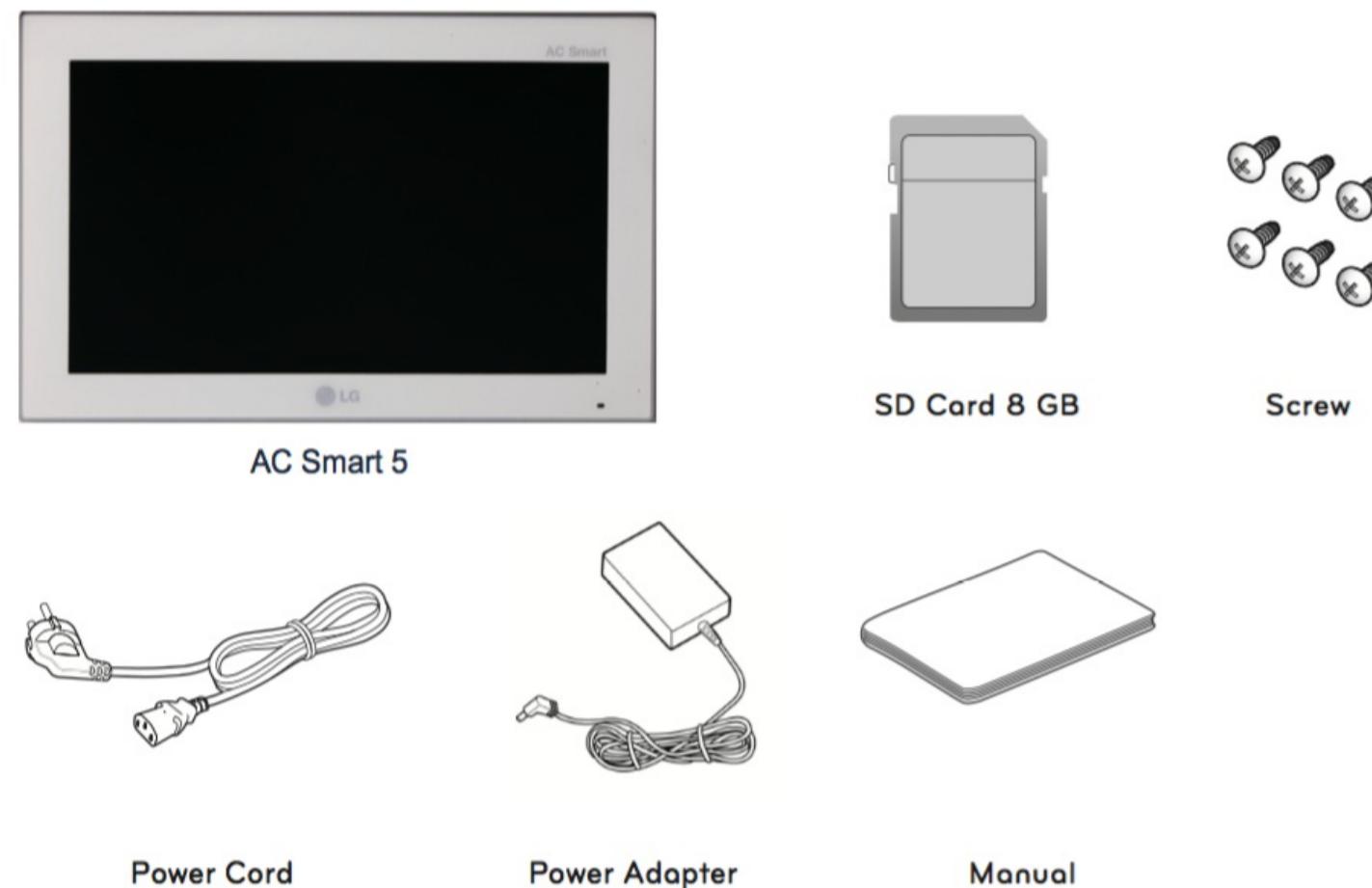
Device	AC Smart 5
AC Ez(Touch)	o
Simple Central Controller	o
AC Manager 5	o
Air conditioner	o
ERV	o
Heating	o
AHU	o
Chiller	o
EXP. I/O	o
Air purifier	o



Components

The components of the following figure are included in AC Smart 5 package box.

Open the package box, and check if all corresponding components are included.



Note

Components or options may differ from the actual product picture.

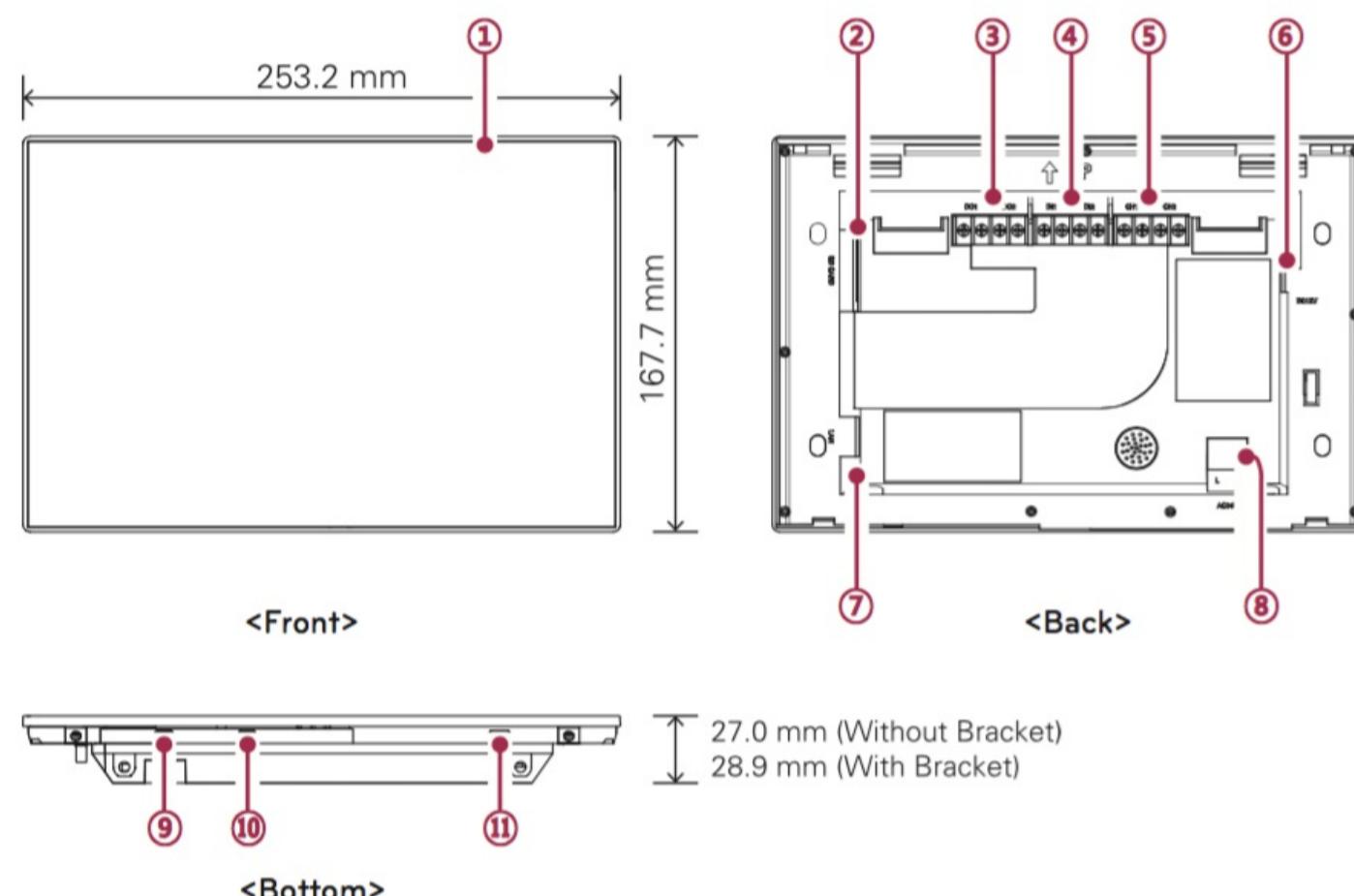
Caution

The SD card provided by our company is for backup and restoration of data when service is provided by qualified service engineer. Do not use on other purpose.



Name of Each Part

AC Smart 5 is composed as the following form.



No.	Category	Contents
①	Touch Screen	<ul style="list-style-type: none">10 inch type LCD control panelAC Smart 5 control and information display
②	SD Memory Slot	SD card memory slot
③	DO Port	2CH DO port
④	DI Port	2CH DI port
⑤	RS-485 Port	2CH 485 port (CH1: AHU, CH2: devices other than AHU) <ul style="list-style-type: none">CH1 default setting : LGAP_AHU / CH2 default setting : LGAP ITo change default setting, refer to the contents of 'Device Setting - AC Smart 5 Editing' in the user manual provided in [Help] category.
⑥	12 V Input Port	12 V power input port
⑦	LAN Port	LAN cable port for Ethernet connection (100Mbps/10Mbps)
⑧	24 V~ Input Port	24 V~ power input port
⑨	Micro USB Port (for service)	Port for upgrading software and storing floor plans, reports, statistics, etc. (It needs cable to connect USB memory sticks, supporting USB 2.0 or later)
⑩	Mini USB Port	PC port for debugging software
⑪	Power ON/OFF	<ul style="list-style-type: none">If you press less than 9 seconds, AC Smart 5 LCD backlight controlPush 10 seconds or more to reset AC Smart 5.If you are not going to use AC Smart 5 for a long time, it is recommended that the product be turned off to prolong the LCD backlight's life.



Hardware Specification

AC Smart 5 hardware specification is as follows.

Category	Contents
CPU	<ul style="list-style-type: none">• ARM Cortex A9 1 GHz• Dual Core
MEMORY	2 GB
Storage	16 GB
LCD	10 inch type(1024 x 600) TFT LCD
Speaker	Mono
RS-485	2 Port
USB/SD	<ul style="list-style-type: none">• Micro USB 1EA (for external USB memory connection, for service)• Mini USB 1EA• SD Card 1EA
Ethernet	10 / 100 BASE-T
DI	2 Port
DO	2 Port
Touch Screen	C-Type Touch Panel
Button Key	Less than 9 seconds (LCD Power On/Off), 10 seconds (System reset)
POWER	12 V (3.33 A), 24 V~
Operating temperature	0 °C ~ 40 °C
Protection class	IP20



Installation and Setting

It describes AC Smart 5 Installation and Setting Method.

[Installation Order]

- ▶ Order of AC Smart 5 Installation

[Connect AC Smart 5]

- ▶ Connect AC Smart 5



Order of Installation

To use AC Smart 5, you need to establish environment for mutual communication between AC Smart 5 and devices (indoor unit, ERV, DI/DO, DOKIT, Heating, AHU, I/O module) and register the corresponding devices through the functions of AC Smart 5.

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

STEP 1. Installation environment inspection and device address setting

Before installing AC Smart 5, check network composition with interfacing devices and assign non-overlapping address to the connected devices.

STEP 2. PI485 setting

Install PI485 and set DIP switch.

STEP 3. PI485 and AC Smart 5 connection

Connect PI485 and AC Smart 5 through RS-485 cable.

STEP 4. Log-in and device registration

Log in to AC Smart 5 and register device with address set.

CAUTION

The installation of AC Smart 5 must be done by a professional. Be sure to contact a qualified engineer for the installation. If you have a question or request regarding the installation, contact an installation professional at an authorized LG service center or LG Electronics.

NOTE

Maximum node numbers which can be connected to RS485 communication line.

- Multi V

Maximum of 16 nodes can be connected to 1 RS485 line.

- Multi/Single

Maximum of 32 nodes can be connected to 1 RS485 line.

- ERV

Maximum of 32 nodes can be connected to 1 RS485 line.



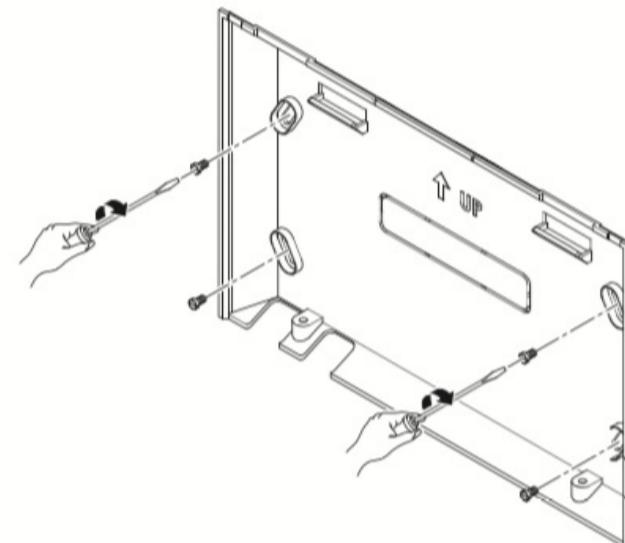
Connect AC Smart 5

You can install AC Smart 5 and its cables as follows.

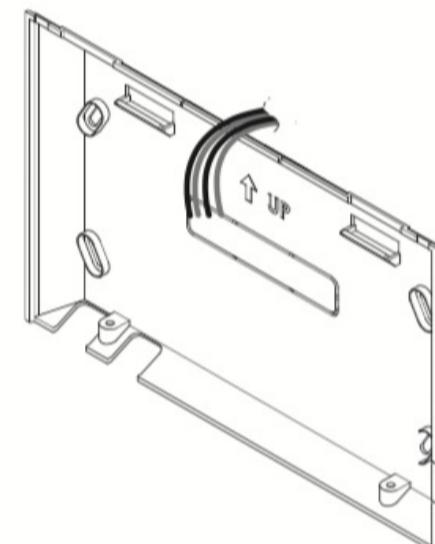
1. Choose a space for AC Smart 5.

- Prior to securing AC Smart 5, check if the space is suitable for installing AC Smart 5, an RS485 cable, power cord, and an Ethernet cable.

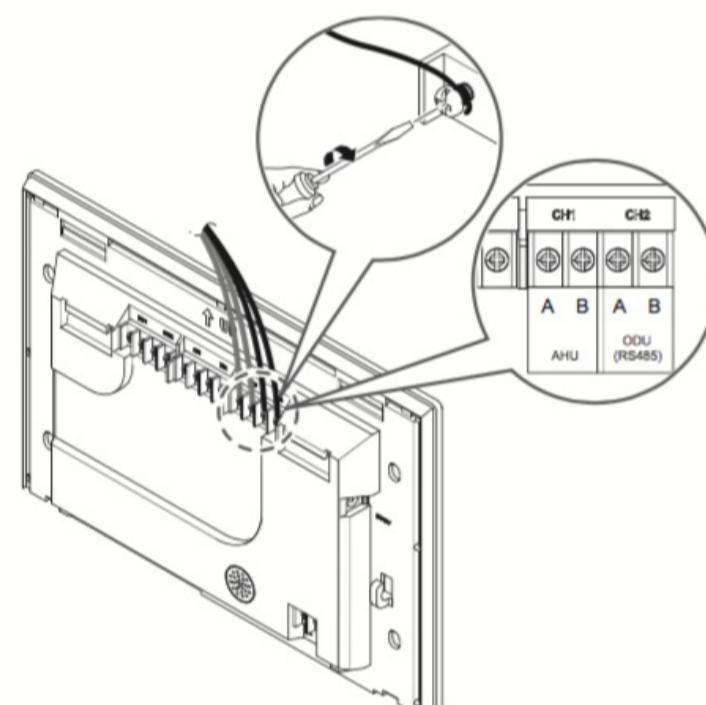
2. Secure the back panel of AC Smart 5 to the wall under which the RS485 cable is located.



3. Extend the RS485 cable through the top opening of the back panel.



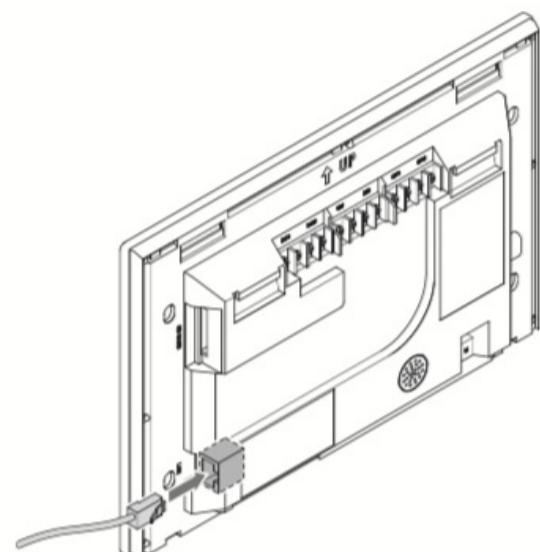
4. Connect the RS485 cable, which is located behind the AC Smart 5, to the RS485 terminal.



CAUTION

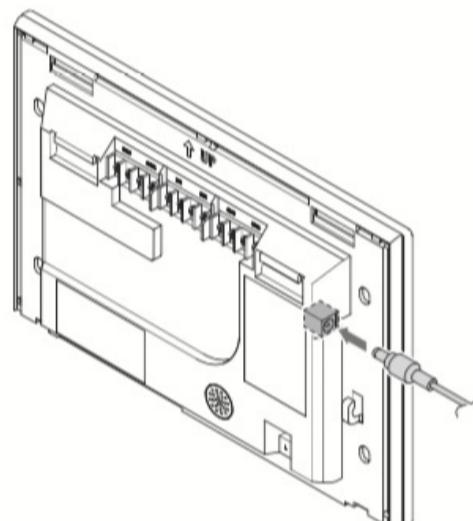
The RS485 cable has polarity, so be careful about keeping polarity when connecting the cables.

5. To use the network functions (email transmission and web control) provided by AC Smart 5, connect an Ethernet cable to the LAN port on the back of AC Smart 5.



6. Connect the power.

- For global models
- On the back of AC Smart 5, connect the power adapter to the power port.

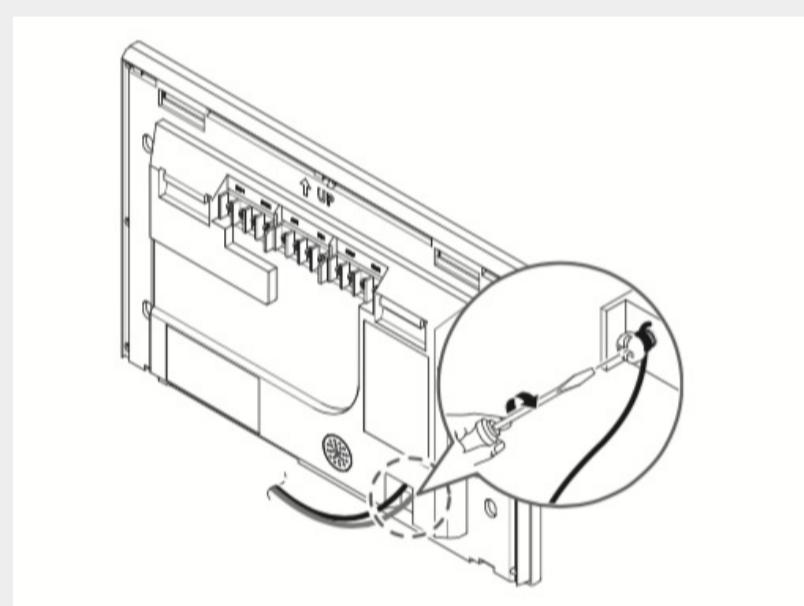


The adaptor is not provided with the AC Smart 5 package sold in the U.S.

NOTE

You can hang the power cord on the power cord hanger located below the power port.

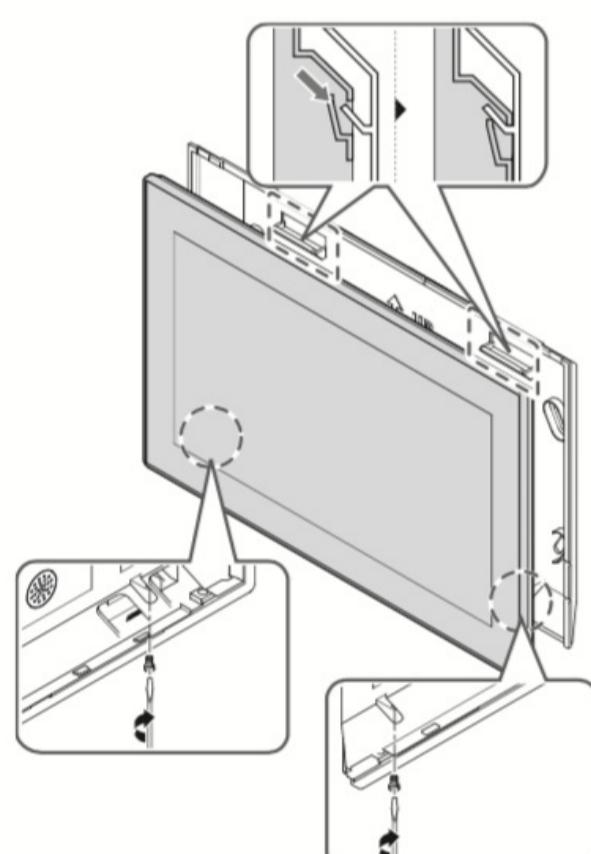
- For US models
- At the bottom of AC Smart 5, connect the power cord to the power port.



NOTE

In some countries, except for the U.S, you can connect the DC 12 V power to the AC Smart 5 by using the provided adapter. If necessary, connect the AC 24 V power to the AC Smart 5.

7. After attaching the hook on the top of the main body to the top of the rear panel installed on the wall, please push the top of the main body unit forward for firm attachment.



CAUTION

Please screws 2 points from the bottom of the unit to prevent from falling.

NOTE

Product removal

After removing 2 screws from the bottom of the body, slightly pull the body using the flatblade screwdriver and lift up the body to remove the product.



Usage (PC)

- LogIn / LogOut
- Account
- Dashboard
- Indoor Fine Dust Monitoring

[Control]

- Device Control
- Schedule Control
- InterLocking
- Time limit control
- Hotel Solution(BACnet)

[Energy]

- Energy Usage
- Energy Navigation
- Peak control
- Energy Unit Cost

[History]

- Operation History
- Energy Navigation History
- Operation Trend
- Cycle

[Setting]

- Device setting
- Group Setting
- System Setting
- Network Setting
- Notification Settings
- Administrator Setting
- Additional User Setting
- Screen Setting
- Advance Setting
- TMS Setting
- BACnet/Modbus Setting
- Set Fine Dust Monitoring

Note

- AC Smart 5 may have different features on the web and devices.



You can access to the product with IP address in internet address window to use various central control functions.

Note

- Chrome browser is recommended for web control.
- For access to web, IP address needs to be set.
- At the time of the first access, you need to set password of the manager account.
- On every 90 days, popup is provided to change password.
For personal information protection and safe service usage, please change password periodically.

Login

Login method is as follows.

1. Please input IP address of the product in the internet address window.
2. Input ID and password in the login window and click **[Login]** button.

LogOut

Logout method is as follows.

1. In menu, click **[Account]** menu.
2. In Account information window, click **[Logout]** button.

Automatic Login

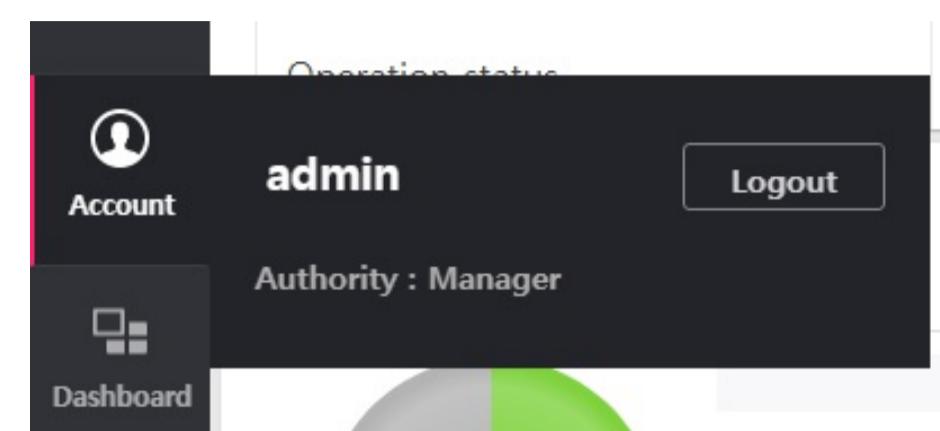
Once you check the Automatic Login option, you will remain logged in until you delete the browser cookies or choose to log out.

- Automatic Login is deactivated when you log out.
- If you use the Internet via InPrivate Browsing which is provided in some browsers, this option cannot be used since cookies are not saved.
- The LCD screen does not provide the automatic login feature.



Account

You can check the information of the currently logged in account.

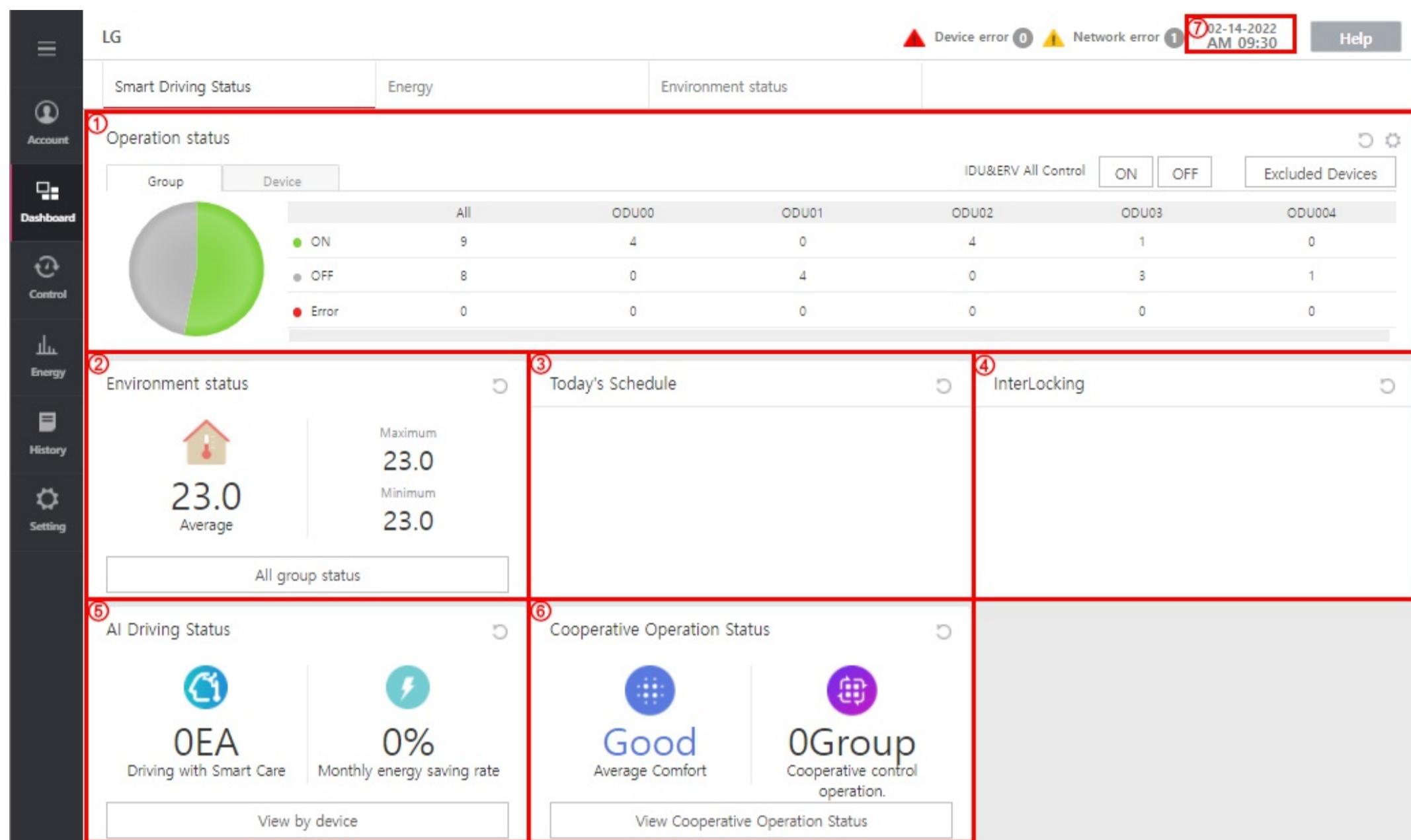




You can check the current operation status and energy usage trend of the equipment installed in the product.

Operation status

It describes the dash board's current operation status tab composition and functions.



No.	Category	Contents
①	Operation status	<p>Check operation status (ON/OFF/Error) of the equipment installed in the product</p> <p>[group]</p> <ul style="list-style-type: none"> Checking of operation status of each management group designated by user <p>[device]</p> <ul style="list-style-type: none"> Check operation status of each device designated by the user <p>All indoor units and ERV ON / OFF control</p> <ul style="list-style-type: none"> All indoor units and ERV ON / OFF control When exception device is registered, it is excluded from overall control
②	Environment status	Checking of average indoor temperature, Max./Min. indoor temperature and group
③	Today's Schedule	Checking today's schedule list
④	InterLocking	Checking of InterLocking list
⑤	AI Driving Status	<p>Check the number of devices running Smart Care and monthly energy saving rates</p> <ul style="list-style-type: none"> Click View by Device to see the number of outdoor units running Smart Care and energy usage rate of each device
⑥	Cooperative Operation Status	<p>Use of cooperative control widget</p> <ul style="list-style-type: none"> Average Comfort Cooperative control operation View Cooperative Operation Status
⑦	Time/date display	View the device time and date

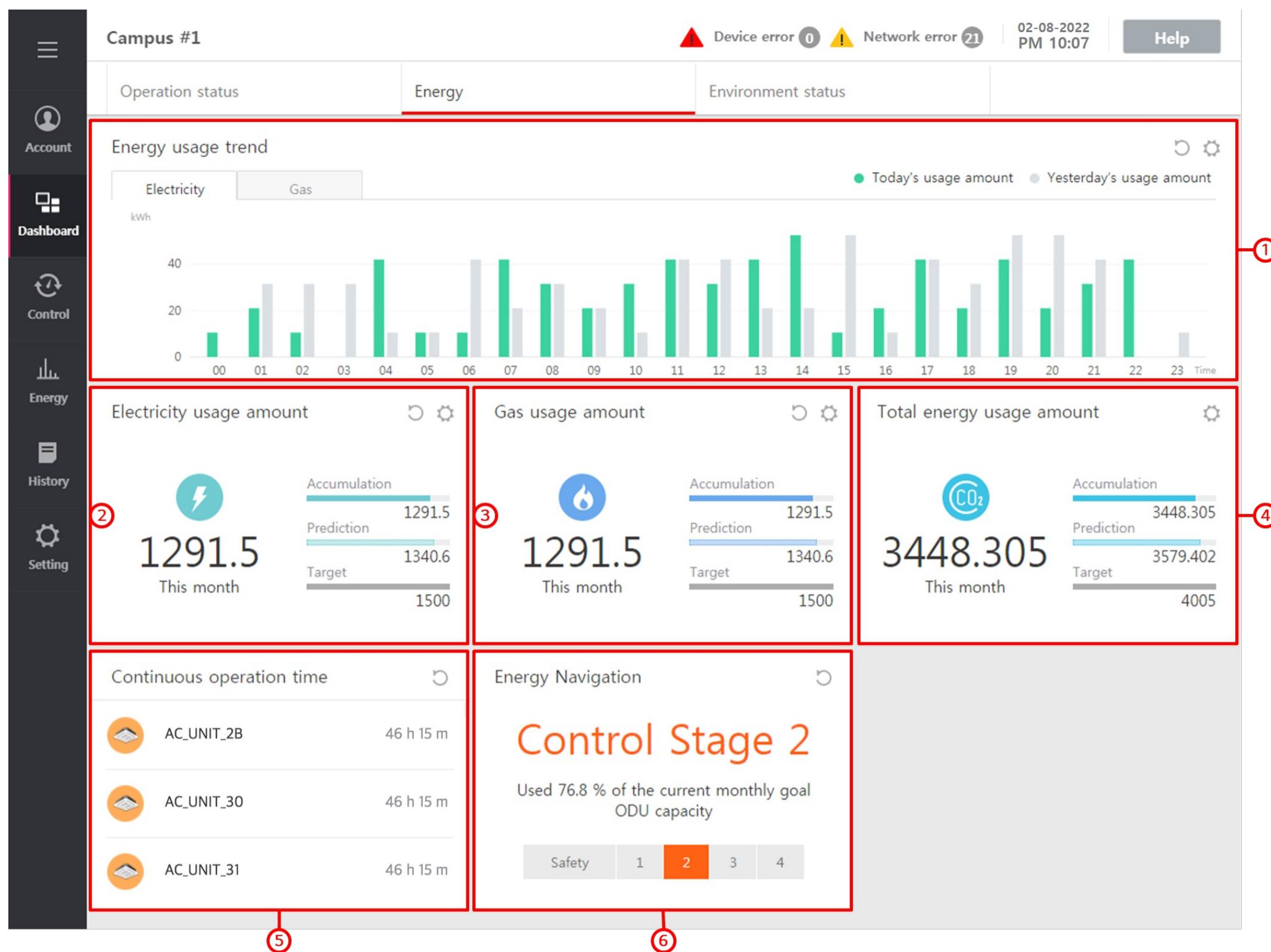
[Widget setting]

You can select the monitoring setting through each widget of the dash board.

→ Operation status Widget

Energy

It describes the dash board's energy tab composition and functions.



No.	Category	Contents
①	Energy usage trend	Checking of daily, monthly, and yearly trend of electricity/gas usage amount The monthly/yearly energy use trends include data up to the previous date.
②	Electricity usage amount	Checking of electricity usage amount accumulation, forecast, and goal
③	Gas usage amount	Checking of gas usage amount accumulation, forecast, and goal
④	Total energy usage amount	Checking of total energy usage amount accumulation, forecast, and goal
⑤	Continuous operation time	Check continuous operation time ranking of indoor unit
⑥	Energy Navigation	Check energy navigation status

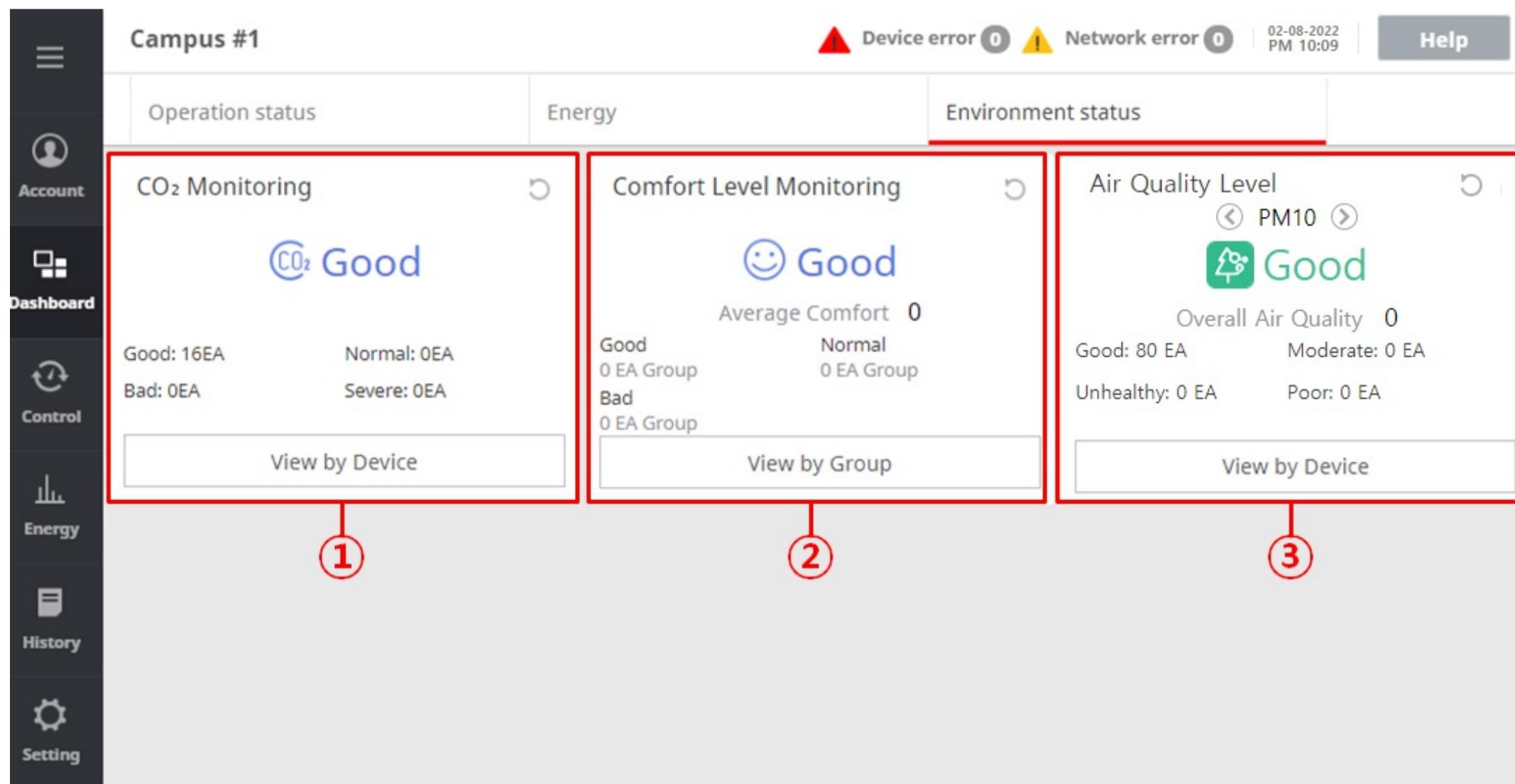
[Widget setting]

You can select the monitoring setting through each widget of the dash board.

- Energy usage trend Widget
- Electricity usage amount Widget
- Gas usage amount Widget
- Total energy usage amount Widget

Environment status

It describes the composition and functions of dash board environment status tab



No.	Category	Contents
①	CO ₂ monitoring	Check CO ₂ status of registered ERV

②	Comfort Level Monitoring	Check registered indoor unit's pleasantness status
③	Fine dust monitoring	Check registered indoor unit, air purifier's fine dust status Fine dust is classified to PM10, PM2.5, and PM1.0, and it indicates each status and concentration



Operation status Widget

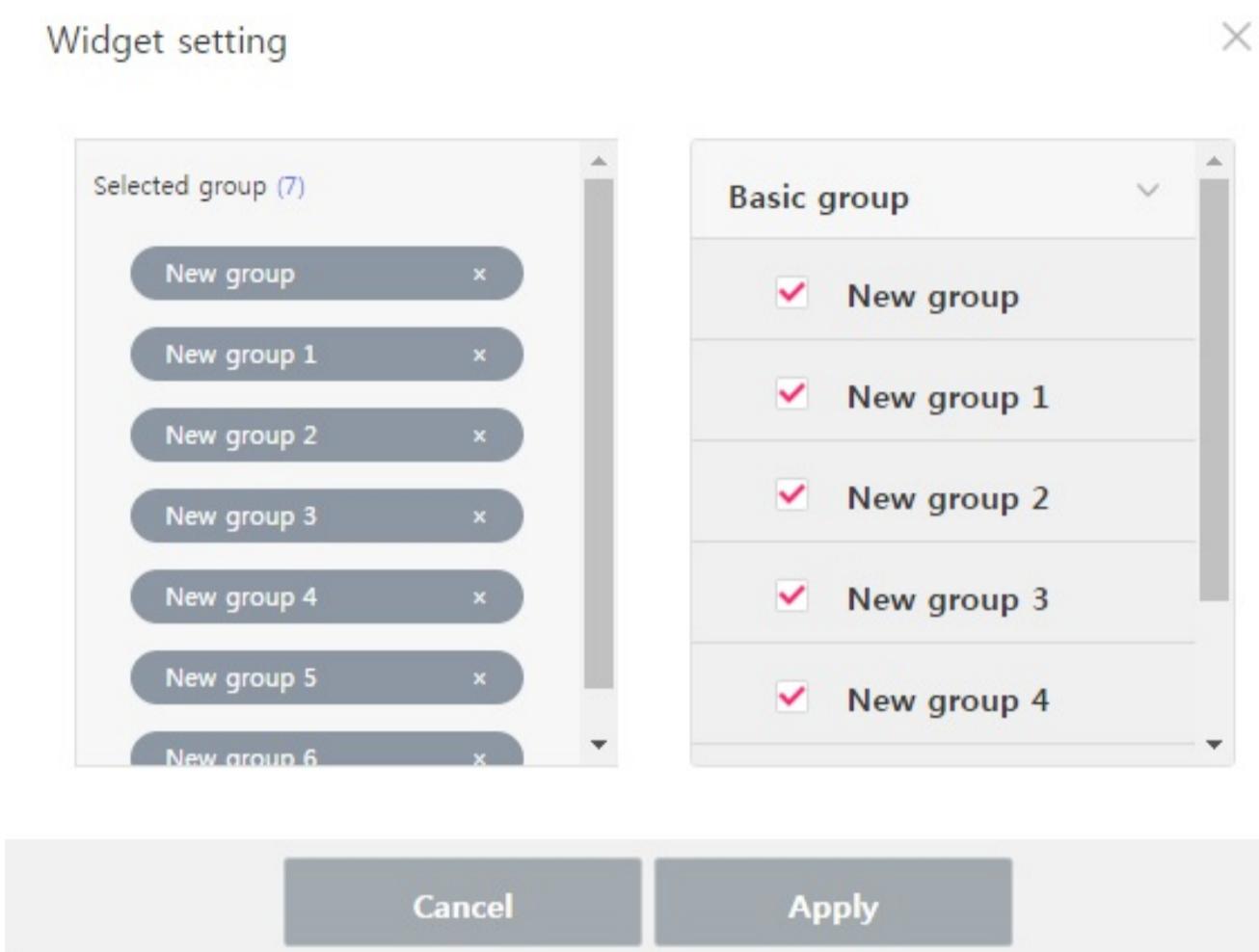
You can set the group to monitor the operation status.

1. In the left menu tab, click [Dashboard] > [Operation status] menu.

- The current operation status screen is displayed.

2. Click the current operation status screen's button.

- The Widget setting screen is displayed.



3. Select the group to monitor the operation status.

4. When selection is completed, click [Apply] button.



Energy usage trend Widget

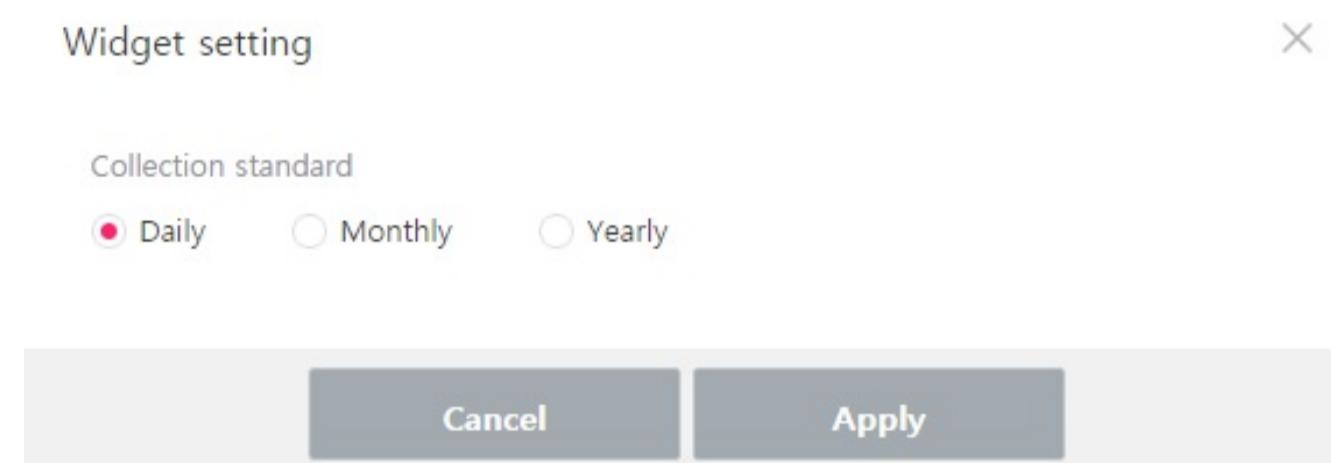
You can select the standard for energy usage amount trend monitoring collection.

1. In the left menu tab, click [Dashboard] > [Energy] menu.

- The energy screen is displayed.

2. Click the energy usage trend screen's button.

- The Widget setting screen is displayed.



3. Select the collection standard(Daily/Monthly/Yearly).

4. When selection is completed, click [Apply] button.



Electricity usage amount Widget

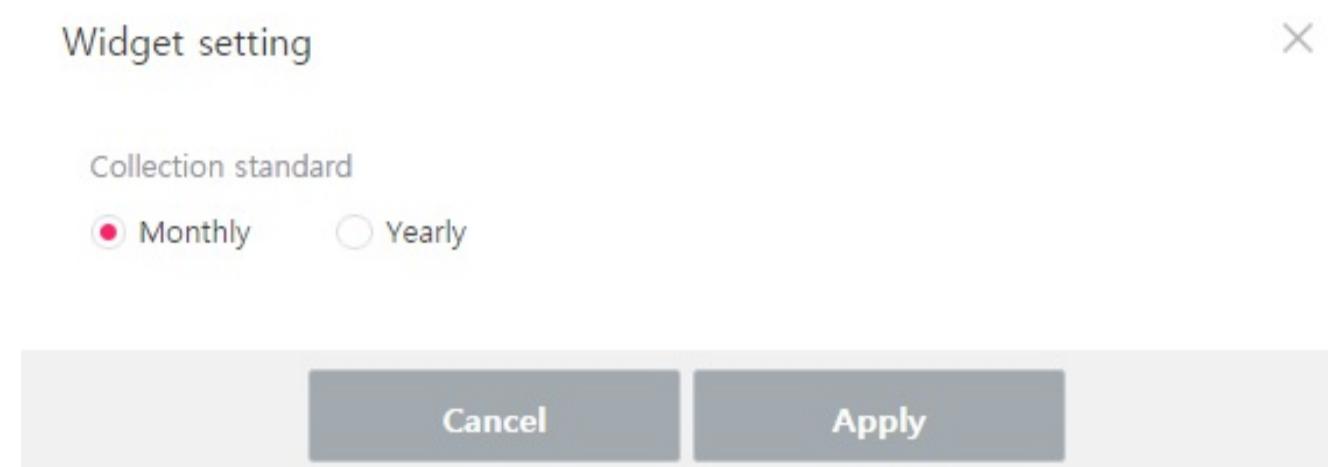
You can select the standard for the electricity usage amount collection standard.

1. In the left menu tab, click [Dashboard] > [Energy] menu.

- The energy screen is displayed.

2. Click the electricity usage amount screen's button.

- The Widget setting screen is displayed.



3. Select the collection standard(Monthly/Yearly).

4. When selection is completed, click [Apply] button.



Gas usage amount Widget

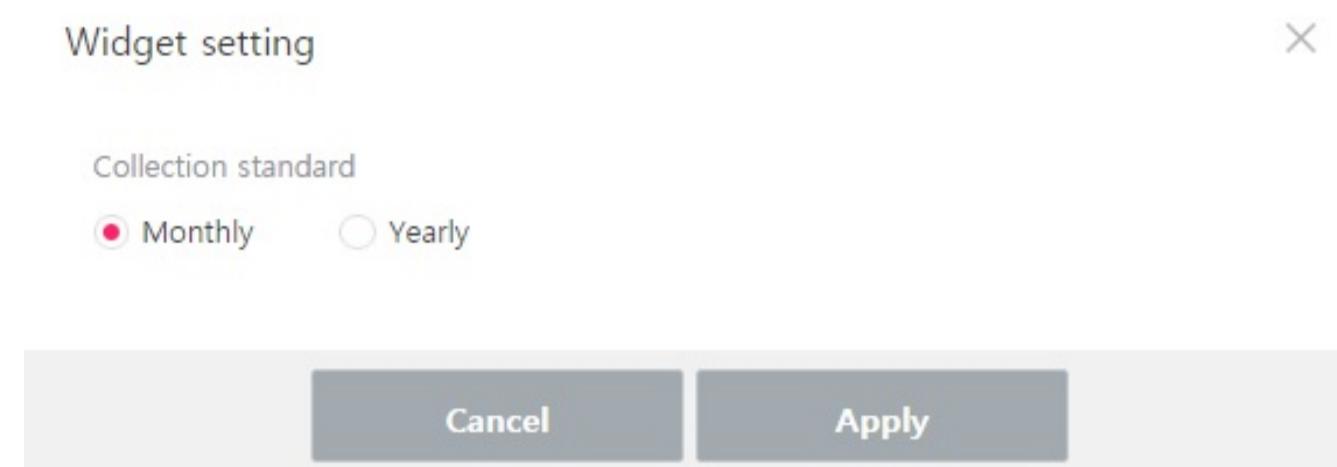
You can select the standard for gas usage amount collection.

1. In the left menu tab, click [Dashboard] > [Energy] menu.

- The energy screen is displayed.

2. Click the gas usage amount screen's button.

- The Widget setting screen is displayed.



3. Select the collection standard(Monthly/Yearly).

4. When selection is completed, click [Apply] button.



Total energy usage amount Widget

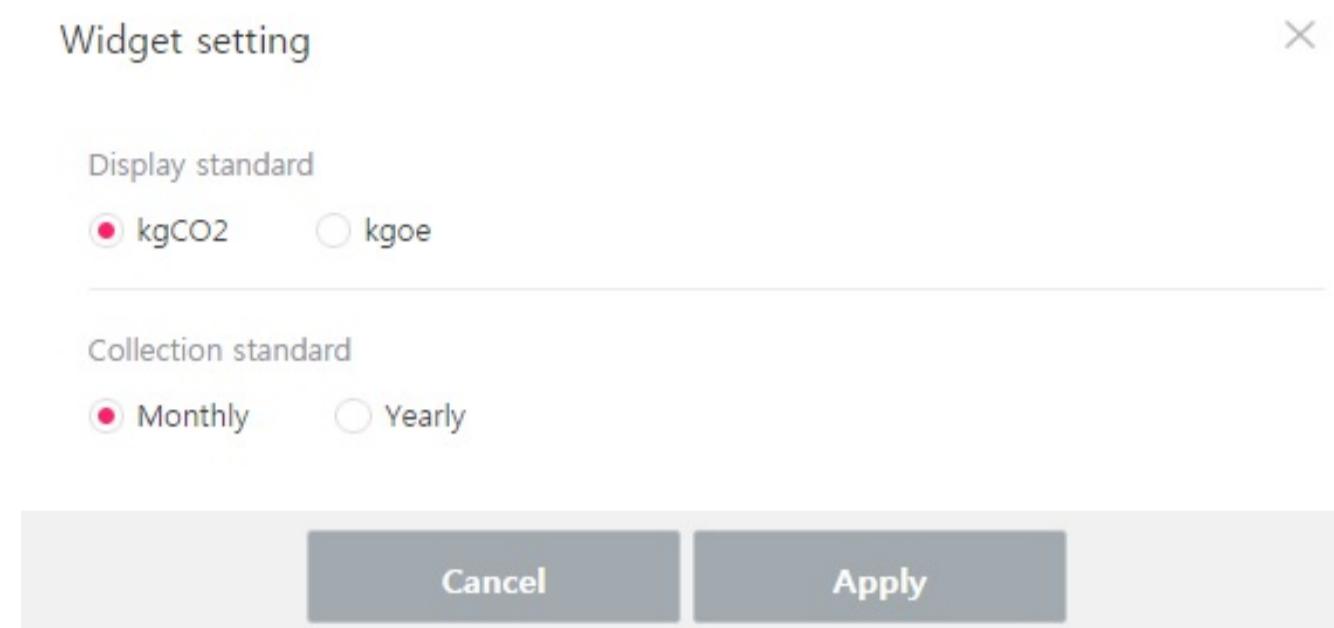
You can select the display and collection standard for the total energy usage amount.

1. In the left menu tab, click [Dashboard] > [Energy] menu.

- The energy screen is displayed.

2. Click the total energy usage amount screen's button.

- The Widget setting screen is displayed.



3. Select the display standard(**kgCO₂**/**kgoe**) and the collection standard(**Monthly**/**Yearly**).

4. When selection is completed, click [**Apply**] button.



Indoor Fine Dust Monitoring

You can view the Fine Dust status on the indoor units and air purifiers connected to the product.

Connect to Indoor Fine Dust Monitoring

The method to connect to the Indoor Fine Dust Monitoring screen is as follows.

1. Input IP address of the product in internet address window.
2. On the login window, enter the ID and password and click the **[Indoor Fine Dust Monitoring]** button.

List of Indoor Fine Dust Monitoring

You can view the current list of Indoor Fine Dust Monitoring and start monitoring.

Indoor Fine Dust Monitoring

Fine Dust Monitoring List

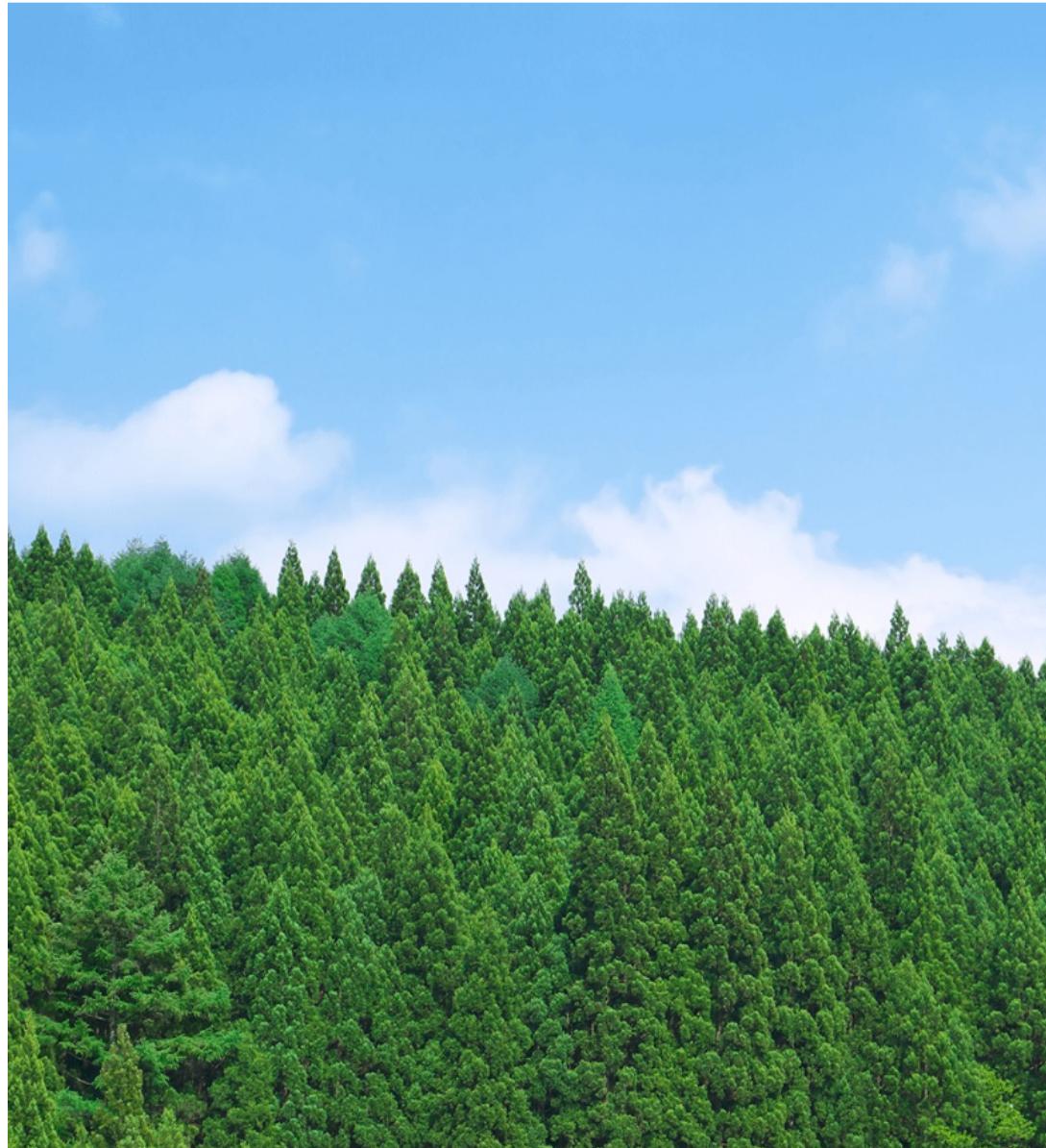
Select	Name	No.	Device and Group
<input checked="" type="radio"/>	1st Floor	Individual	AC_UNIT_00 and 15cases
<input type="radio"/>	2nd Floor	Group	Basic group > Group_00

Cancel **Start**

Item	Description
Select	Select an item for Indoor Fine Dust Monitoring to run monitoring.
Start	Start the selected indoor Fine Dust monitoring task.
Cancel	Move back to the Login page.

Individual Device Monitoring

The following describes options and functions of Individual Device Monitoring.



Campus #1 (16EA) 1 2 3 4 5 6 7 8 9 10

AC_UNIT_00

Air Purification Zone

Indoor Fine Dust Control Status

 **Good**

PM10 **Good** $10 \mu\text{g}/\text{m}^3$ | PM25 **Good** $10 \mu\text{g}/\text{m}^3$ | PM10 **Good** $10 \mu\text{g}/\text{m}^3$

 Temperature 23.0°C |  Humidity 0%



Campus #1 (16EA)

1 2 3 4 5

AC_UNIT_00

Indoor Fine Dust Control Status



PM10
Good
10 $\mu\text{g}/\text{m}^3$

PM25
Good
10 $\mu\text{g}/\text{m}^3$

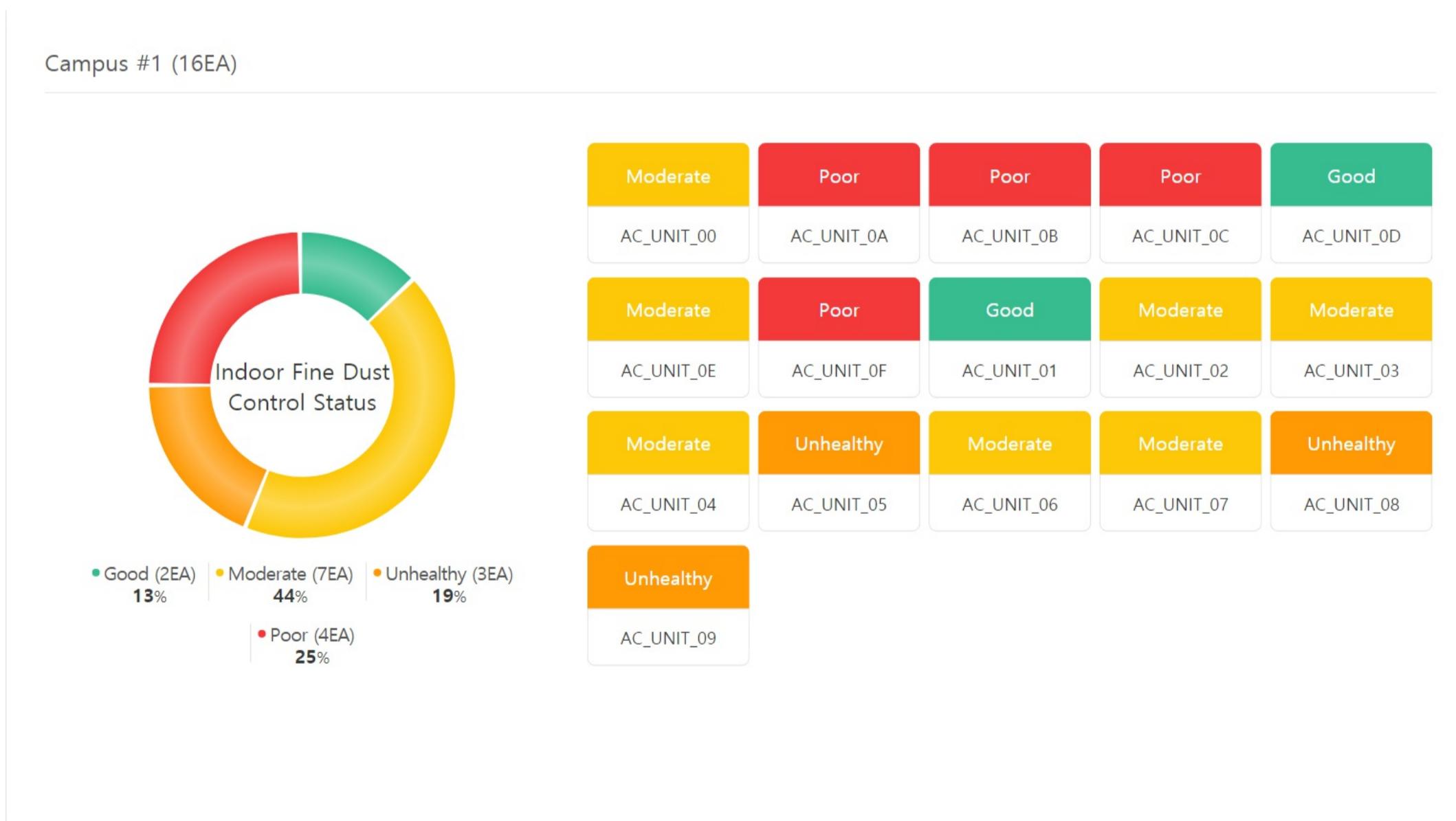
PM10
Good
10 $\mu\text{g}/\text{m}^3$

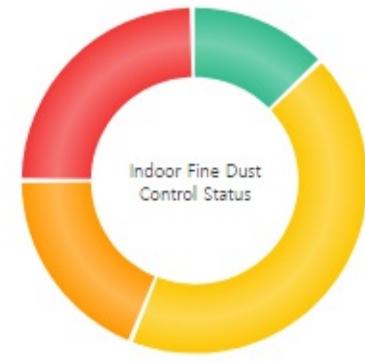
Temperature 23.0°C | Humidity 0%

Item	Description
Indoor Fine Dust Management Status	Checks the Fine Dust status on the registered indoor units and air purifiers. Displays the total cleanliness, and displays the odor and density status for fine dust [pm10], fine Fine Dust [pm2.5], and ultra-fine Fine Dust [pm1.0]. • Odor information is only displayed on air purifiers and only displays status information.
Temperature/Humidity	Displays current temperature and humidity • Indoor units only
Fine Dust management zone	Displays the Fine Dust control areas that LG Whisen produces • To make the settings, go to [Settings] > [Set Fine Dust Monitoring].
Image	To set the images to display, go to [Settings] > [Set Fine Dust Monitoring]. • Up to 10 images can be set.

Group Monitoring

The following describes options and functions of group monitoring.





• Good (2EA) 13% • Moderate (7EA) 44% • Unhealthy (3EA) 19% • Poor (4EA) 25%

Moderate	Poor	Poor	Poor	Good
AC_UNIT_00	AC_UNIT_0A	AC_UNIT_0B	AC_UNIT_0C	AC_UNIT_0D
Moderate	Poor	Good	Moderate	Moderate
AC_UNIT_0E	AC_UNIT_0F	AC_UNIT_01	AC_UNIT_02	AC_UNIT_03
Moderate	Unhealthy	Moderate	Moderate	Unhealthy
AC_UNIT_04	AC_UNIT_05	AC_UNIT_06	AC_UNIT_07	AC_UNIT_08
Unhealthy				
AC_UNIT_09				

Item	Description
Indoor Fine Dust Control Status Statistics	Displays statistical data of group's total cleanliness in a donut graph and information by item
Total cleanliness by device	Displays the total cleanliness for each device in the group.
Fine Dust management zone	Displays the Fine Dust control areas that LG Whisen produces <ul style="list-style-type: none"> To make the settings, go to [Settings] > [Set Fine Dust Monitoring].

Cancel Indoor Fine Dust Monitoring

The following describes how to cancel indoor Fine Dust monitoring.

1. Place the mouse pointer on the top of the screen.
 - The (⊗) button will appear on the top of the screen.
2. Click the ⊗ button.
 - You will be directed to the list of Indoor Fine Dust Monitoring.



Device Control

It describes the method to control the device and to monitor the device status.

[Screen and Icon]

- Screen Structure and Function
- Device Icon

[Control Window]

- Control of Each Device
- Device Information

[Control/Monitoring]

- Control
- Monitoring

[Drawing]

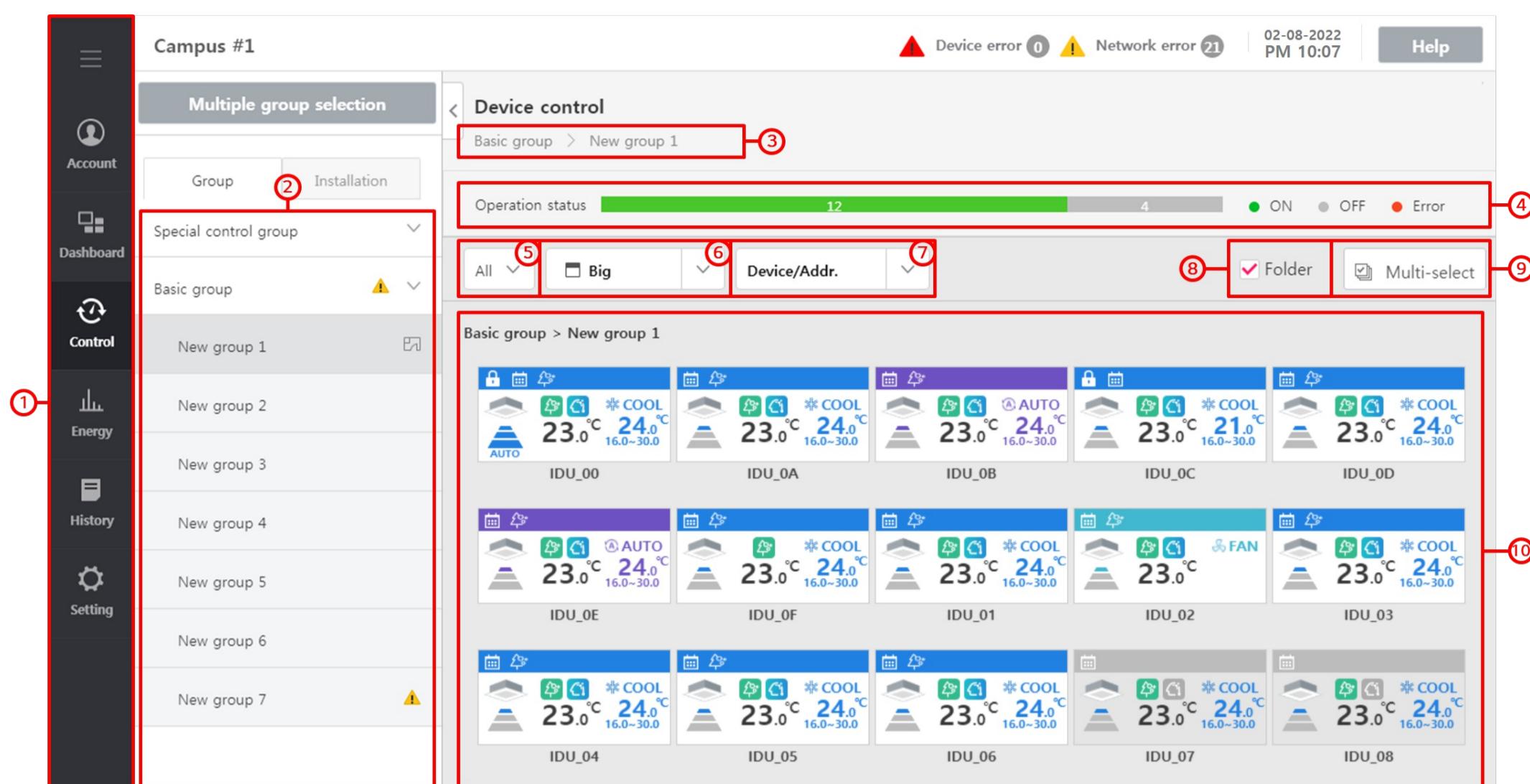
- Edit Drawing
- Delete Drawing



Screen Structure and Function

1. In the left menu tab, click [Control] > [Device control] menu.

- The device control screen is displayed.



No.	Category	Contents
①	Main Menu	Main Menu Tab
②	Group List	Check control group
③	Group Information	Group name and group location
④	Operation status	Check the devices' current operation status (ON/OFF/Error)
⑤	Filtering	Device category and device status filtering
⑥	Viewing method	Select viewing method of device icon ■ : Big ■ : Small ☰ : List ☒ : Drawing
⑦	Sorting device	Select the sorting method of the device <ul style="list-style-type: none"> • Name • Device/Name • Device/Addr. • Operation
⑧	View folder	Check the lower level group category of the current group when it is checked
⑨	Multi-select	Select multiple devices when it is clicked
⑩	Device section	Check the information of the devices set in the group

Management/installation group

1. Group

- management group set for convenience

2. Installation

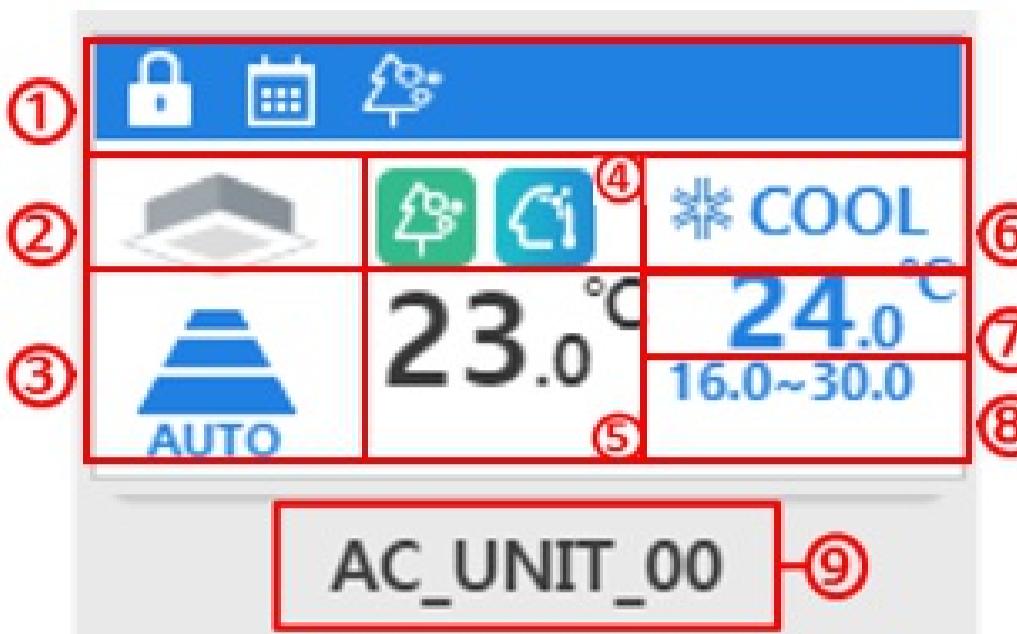
- Provides the information of actually connected device



Device Icon

You can check important information of individual devices with icon.

1. Big icon



No.	Category	Contents
①	Device status indicating icon	Check Device Status Indicator Icon
②	Device Icon	Check device icon
③	Fan speed	Check device's Fan speed
④	Fine Dust status and Smart Care status	Check Fine Dust status and Smart Care operating status Blue (good), Green (normal), Orange (bad), Red (very bad)
⑤	Current temperature	Check current temperature
⑥	Mode	Check mode
⑦	Set temperature	Check set temperature
⑧	Set temp range	Check upper limit/lower limit temperature
⑨	Device name	Check device name

Device status indicating icon

Icon	Contents
	Lock
	Schedule
	Occupied
	Peak control
	Filter replacement alarm / Prefilter replacement alarm / Fine dust filter replacement alarm
	Oil replacement alarm
	Air cleaning
	Air quality sensor
	Multi-V Interlocking Energy Saving Control
	UVnano
	UVnano LED inspection required
	Cooperative control operation
	Group Control (Slave)

2. Small icon

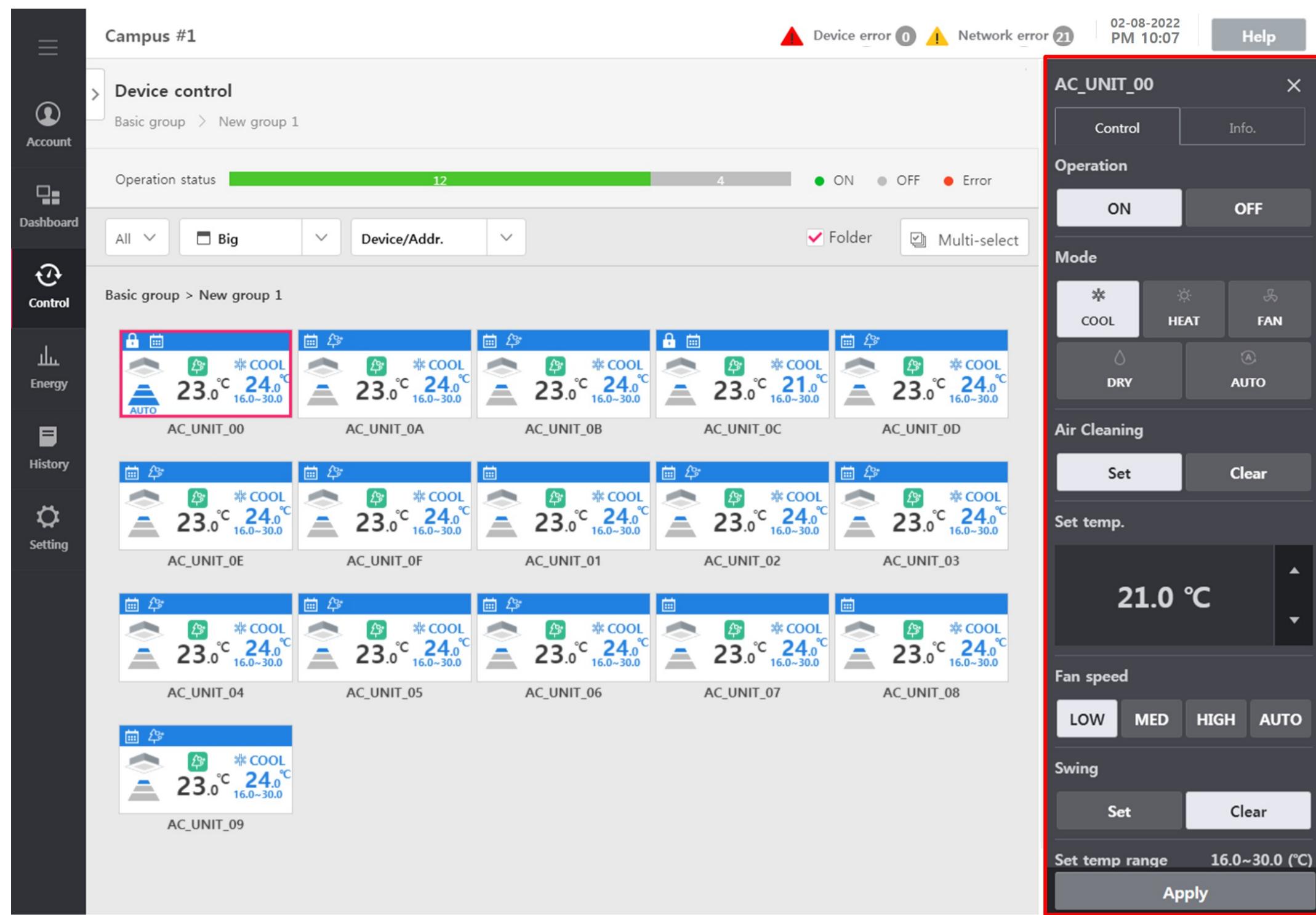
- Check device icon/operation/mode/device name

3. View list

- indication of attribute of the device in the group (device name, operation status, operation mode, current temperature, set temperature, error code, ACP address, outdoor unit address, device address, etc.).



When a device selected in the device section, control window is created in the right side as in the following screen. You can control the selected device through the control window.



Note

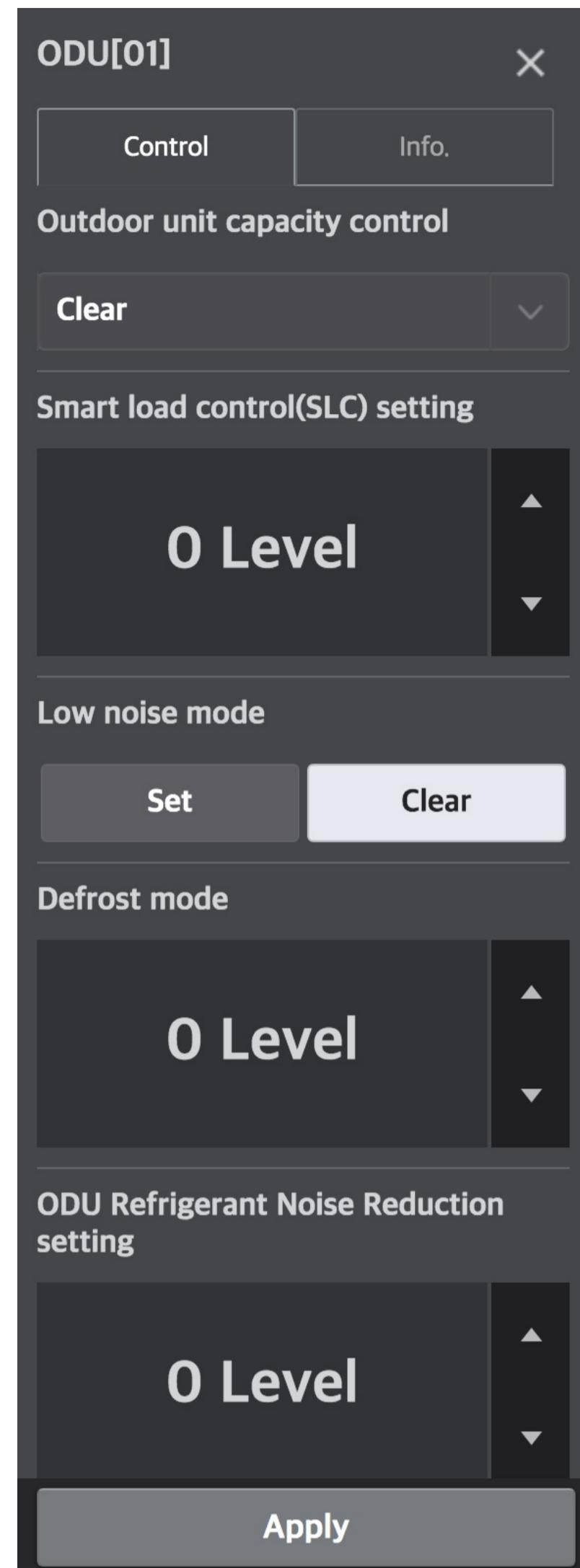
- The detail control boundary for each device may be different from the actual device, so make sure to refer to the corresponding device's manual.
- ACS I/O devices may have different control tool name, unit, upper limit, lower limit, etc. according to the setting.

Control of Each Device

- Outdoor Unit
- IDU
IDU (2Set)
- ERV
- ERV DX
- Floor mounted vent
- Heating
- AHU
- Scroll chiller
- Screw chiller
- Turbo chiller
- Absorption Chiller
- Scroll Chiller Mini
- DOKIT
- DO
- AO
- Air purifier



Outdoor Unit



Category	Contents
Outdoor unit capacity control	<ul style="list-style-type: none">• Press [▼] button to set operation rate (%)
Smart load control function	<ul style="list-style-type: none">• Press [▲]/[▼] button to set smart load control stage (0stage, 1stage, 2stage, 3stage, 4stage)
Low noise operation	<ul style="list-style-type: none">• [Set/Clear] button: outdoor unit low noise operation Set/Clear
Defrost mode	<ul style="list-style-type: none">• Press [▲]/[▼] button to set defrost mode stage (0stage, 1stage, 2stage, 3stage)
ODU Refrigerant Noise Reduction setting	<ul style="list-style-type: none">• Press [▲]/[▼] button to set outdoor unit refrigerant noise reduction stage (0stage, 1stage, 2stage)

Note

In the central controller, if 'outdoor unit low noise operation' is used, in the installed indoor unit's remote controller, you need to set [Installer setting] > [Low noise mode] to 'ODU'. (Default value 'ODU')



Category	Contents
Operation	<ul style="list-style-type: none"> • [ON] button: starts the device operation • [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> • [COOL] button: Switches to cooling mode • [HEAT] button: Switches to heating mode • [FAN] button: Air purification operation. When FAN is selected, set temperature is not applied to the device • [DRY] button: Removes moisture during rainy season or when humidity is high. When DRY is selected, set temperature is not applied to the device • [AUTO] button: Switches to automatic mode
Air cleaning	<p>Air cleaning control only for air cleaning function supporting indoor unit</p> <ul style="list-style-type: none"> • Air cleaning single operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of air cleaning [Set], air cleaning single operation with wind only (automatic wind) (During air cleaning single operation, mode lock and wind amount lock are not checked) 2) During air cleaning single operation, in case of operation [OFF] or air cleaning [Clear], air cleaning is cancelled to previous mode and previous wind amount (But, in case of mode or wind amount control together, control is done with controlled mode and wind amount) • Air cleaning additional operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of operation status [ON] and air cleaning [Set], in current mode, air cleaning additional operation 2) In indoor unit operation state, in case of air cleaning [Set], in current mode, air cleaning additional operation 3) During air cleaning additional operation, in case of operation [OFF], operation stops 4) During air cleaning additional operation, in case of air cleaning [Clear], air cleaning is cancelled
Set temperature	Press [▲]/[▼] button to set the desired temperature
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast • [AUTO] button: [LOW]-[MED]-[HIGH] automatic switching
Swing	<ul style="list-style-type: none"> • [Set/Clear] button: Set/Clear the Swing function
Set temp range	When user set the desired temperature individually, the desired temperature outside the designated temperature boundary cannot be set

Human detection mode - ON/OFF learned power saving	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - ON/OFF learned power saving Set/Clear
Human detection mode - Temperature power saving	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - temperature power saving Set/Clear
Human detection mode - Unoccupied time setting(minute)	Only for human detection mode - supporting indoor unit, human detection mode - control Set empty decision time to 5, 10, 15, 30, 60, or 90 min.
Human detection mode - Direct wind	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - direct wind Set/Clear
Human detection mode - Indirect wind	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - indirect wind Set/Clear
Comfortable Power Saving	• [Set/Clear] button: Comfortable Power Saving function Set/Clear • You can press [▲]/[▼] button to set stage Only when indoor unit is in cooling operation, Comfortable Power Saving control is possible
Prefilter replacement alarm	• [Clear] button: In case of prefilter replacement alarm, it cancels prefilter replacement alarm
Fine dust filter replacement alarm	• [Clear] button: In case of fine dust filter replacement alarm, it cancels fine dust filter replacement alarm
HardLock	• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller
Mode lock	• [Set/Clear] button: Set/clear lock so that user cannot control mode setting with individual remote controller
Fan lock	• [Set/Clear] button: Set/clear lock so that user cannot control Fan speed setting with individual remote controller
TempLock	• [Set/Clear] button: Set/clear lock so that user cannot control temperature setting with individual remote controller
Auto change over(Occupied)	It is a function to automatically switch to cooling operation if indoor temperature exceeds upper limit temperature, to heating operation if it is less than lower limit temperature, and to wind only operation if it is between upper limit temperature and lower limit temperature (supported only in outdoor unit with both cooling/heating) • [Set/Clear] button: Set/clear Auto change over(Occupied)
Lower /Upper temp.	Auto change over(Occupied)'s lower limit temperature and upper limit temperature setting
Auto change over(Occupied) Fan speed	Select the Fan speed value to set in the indoor unit during Auto change over(Occupied) operation • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast • [AUTO] button: [LOW]-[MED]-[HIGH] automatic switching
Setback(UnOccupied)	Function to maintain the temperature of the space where the device is installed in certain boundary (Only supported by cooling/heating simultaneous type outdoor unit) • [Set/Clear] button: Set/clear the Setback(UnOccupied)
Cool start	Press [▲]/[▼] button to set the cooling operation start temperature(21°C~40°C)
Heat start	Press [▲]/[▼] button to set the heating operation start temperature(1°C~20°C)
Combination heating control	(Supported for certain indoor and outdoor units only) [Set/Clear] button : Activates/deactivates control based on outdoor temperature.
Mode	It is activated only when combination heating control is set. • [AUTO] button : Sets the control mode to auto. • [Manual] button : Sets the control mode to manual. You can activate/deactivate control of the heat pump and the heater. You cannot deactivate control of both the heat pump and the heater.
Temp. 1	It is activated only in the auto mode. You can set Temp. 1 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically. Press [▲]/[▼] to set Temp. 1 (-23°C-16°C).
Temp. 2	It is activated only in the auto mode. You can set Temp. 2 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically. Press [▲]/[▼] to set Temp. 2 (-23°C-51°C).
Heat pump	It is activated only in the manual mode. [Set/Clear] button : Activates/Deactivates heat pump control.
Heater	It is activated only in the manual mode. [Set/Clear] button : Activates/deactivates heater control.
Smart Care	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate Smart Care
Cooperative control	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate cooperative control
UVnano	Only for UVnano mode - supporting indoor unit, UVnano mode - control [Set/Clear] button: Activate/Deactivate UVnano



IDU (2Set)

When 2Set function supporting outdoor unit/indoor unit/remote controller are used and in [Setting] > [Installing], if ACP's 2Set automatic mode is selected as IDU, indoor unit 2Set control window is generated on the right side as in the following screen.



Category	Contents
Operation	<ul style="list-style-type: none"> • [ON] button: Starts the device operation • [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> • [COOL] button: Switches to cooling mode • [HEAT] button: Switches to heating mode • [FAN] button: Air purification operation. When FAN is selected, set temperature is not applied to the device • [DRY] button: Removes moisture during rainy season or when humidity is high. When DRY is selected, set temperature is not applied to the device • [AUTO] button: Switches to automatic mode
Air cleaning	<p>Air cleaning control only for air cleaning function supporting indoor unit</p> <ul style="list-style-type: none"> • Air cleaning single operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of air cleaning [Set], air cleaning single operation with wind only (automatic wind) (During air cleaning single operation, mode lock and wind amount lock are not checked) 2) During air cleaning single operation, in case of operation [OFF] or air cleaning [Clear], air cleaning is cancelled to previous mode and previous wind amount (But, in case of mode or wind amount control together, control is done with controlled mode and wind amount) • Air cleaning additional operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of operation status [ON] and air cleaning [Set], in current mode, air cleaning additional operation 2) In indoor unit operation state, in case of air cleaning [Set], in current mode, air cleaning additional operation 3) During air cleaning additional operation, in case of operation [OFF], operation stops 4) During air cleaning additional operation, in case of air cleaning [Clear], air cleaning is cancelled
Occupancy	<p>Function to set the space with the corresponding indoor unit as occupied or empty</p> <ul style="list-style-type: none"> • [Occupied] button: occupied setting • [Unoccupied] button: empty setting
Cooling set temperature	Press [▲]/[▼] button to set cooling set temperature

Heating setting temperature	Press [▲]/[▼] button to set heating set temperature
Cooling lower limit/upper limit temperature	Cooling lower limit temperature and upper limit temperature setting
Heating lower limit/upper limit temperature	Heating lower limit temperature and upper limit temperature setting
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast • [AUTO] button: [LOW]-[MED]-[HIGH] automatic switching
Swing	<ul style="list-style-type: none"> • [Set/Clear] button: Set/Clear the Swing function
Human detection mode - ON/OFF learned power saving	Only for human detection mode - supporting indoor unit, human detection mode - control <ul style="list-style-type: none"> • [Set/Clear] button: human detection mode - ON/OFF learned power saving Set/Clear
Human detection mode - Temperature power saving	Only for human detection mode - supporting indoor unit, human detection mode - control <ul style="list-style-type: none"> • [Set/Clear] button: human detection mode - temperature power saving Set/Clear
Human detection mode - Unoccupied time setting(minute)	Only for human detection mode - supporting indoor unit, human detection mode - control Set empty decision time to 5, 10, 15, 30, 60, or 90 min.
Human detection mode - Direct wind	Only for human detection mode - supporting indoor unit, human detection mode - control <ul style="list-style-type: none"> • [Set/Clear] button: human detection mode - direct wind Set/Clear
Human detection mode - Indirect wind	Only for human detection mode - supporting indoor unit, human detection mode - control <ul style="list-style-type: none"> • [Set/Clear] button: human detection mode - indirect wind Set/Clear
Comfortable Power Saving	<ul style="list-style-type: none"> • [Set/Clear] button: Comfortable Power Saving function Set/Clear • You can press [▲]/[▼] button to set stage Only when indoor unit is in cooling operation, Comfortable Power Saving control is possible
Prefilter replacement alarm	<ul style="list-style-type: none"> • [Clear] button: In case of prefilter replacement alarm, it cancels prefilter replacement alarm
Fine dust filter replacement alarm	<ul style="list-style-type: none"> • [Clear] button: In case of fine dust filter replacement alarm, it cancels fine dust filter replacement alarm
HardLock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller
Mode lock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear lock so that user cannot control mode setting with individual remote controller
Fan lock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear lock so that user cannot control Fan speed setting with individual remote controller
TempLock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear lock so that user cannot control temperature setting with individual remote controller
Combination heating control	(Supported for certain indoor and outdoor units only) [Set/Clear] button : Activates/deactivates control based on outdoor temperature.
Mode	<p>It is activated only when combination heating control is set.</p> <ul style="list-style-type: none"> • [AUTO] button : Sets the control mode to auto. • [Manual] button : Sets the control mode to manual. <p>You can activate/deactivate control of the heat pump and the heater. You cannot deactivate control of both the heat pump and the heater.</p>
Temp. 1	<p>It is activated only in the auto mode.</p> <p>You can set Temp. 1 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically.</p> <ul style="list-style-type: none"> • Press [▲]/[▼] to set Temp. 1 (-23°C-16°C).
Temp. 2	<p>It is activated only in the auto mode.</p> <p>You can set Temp. 2 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically.</p> <ul style="list-style-type: none"> • Press [▲]/[▼] to set Temp. 2 (-23°C-51°C).
Heat pump	<p>It is activated only in the manual mode.</p> <ul style="list-style-type: none"> • [Set/Clear] button : Activates/Deactivates heat pump control.
Heater	<p>It is activated only in the manual mode.</p> <ul style="list-style-type: none"> • [Set/Clear] button : Activates/deactivates heater control.
Smart Care	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate Smart Care
Cooperation control	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate cooperation control
UVnano	Only for UVnano mode - supporting indoor unit, UVnano mode - control [Set/Clear] button: Activate/Deactivate UVnano

Note

2set automatic mode

- Only with 2Set automatic mode supporting indoor/outdoor air, the corresponding function can be used. (For whether each device supports 2Set, please refer to the manual of the corresponding device.)
- Override is a function that can be set from remote controller. For override function related contents, please refer to remote controller manual.
- In 2Set automatic mode, along with Auto icon, product's actual operation mode (cooling, heating) status is displayed.

Occupancy

- If occupancy sensor is interlinked to indoor unit, setting from the central control has priority over the corresponding occupancy sensor. For occupancy sensor related contents, please refer to indoor unit or Dry Contact manual.
- When occupied setting is changed, automatically set cooling set temperature and heating set temperature are the most recently run schedule's cooling set temperature and heating set temperature, and if there is no previously run schedule, it is set to default value.

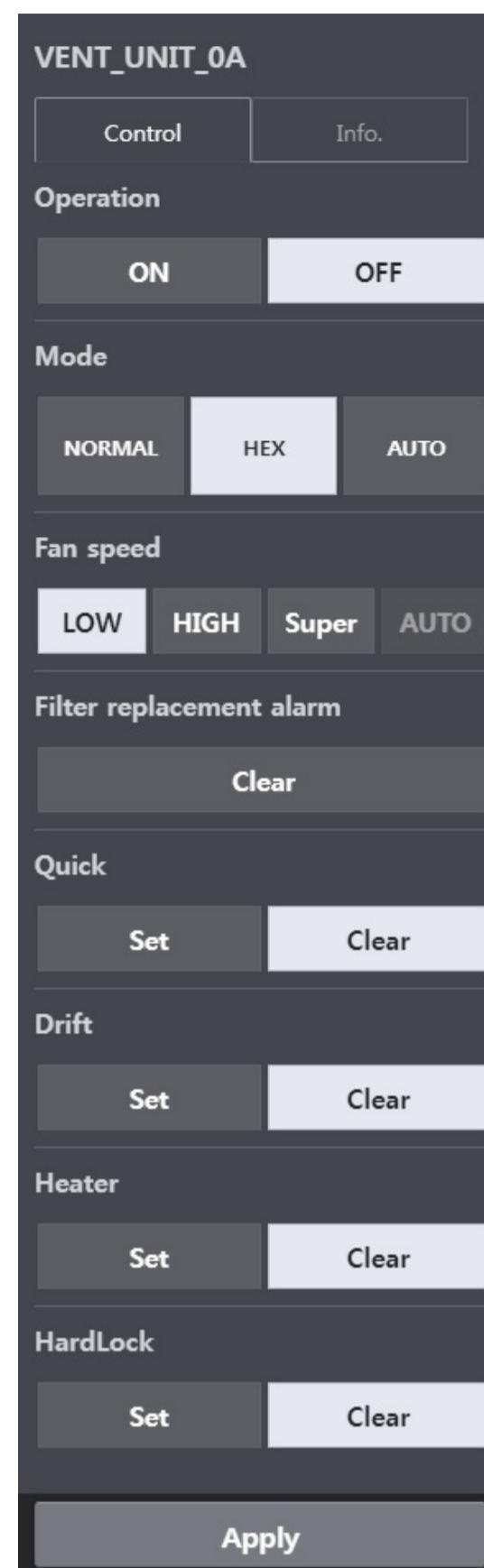
(Example)

09:00 - 12:00: occupied / cooling set temperature 27°C / heating set temperature 18°C

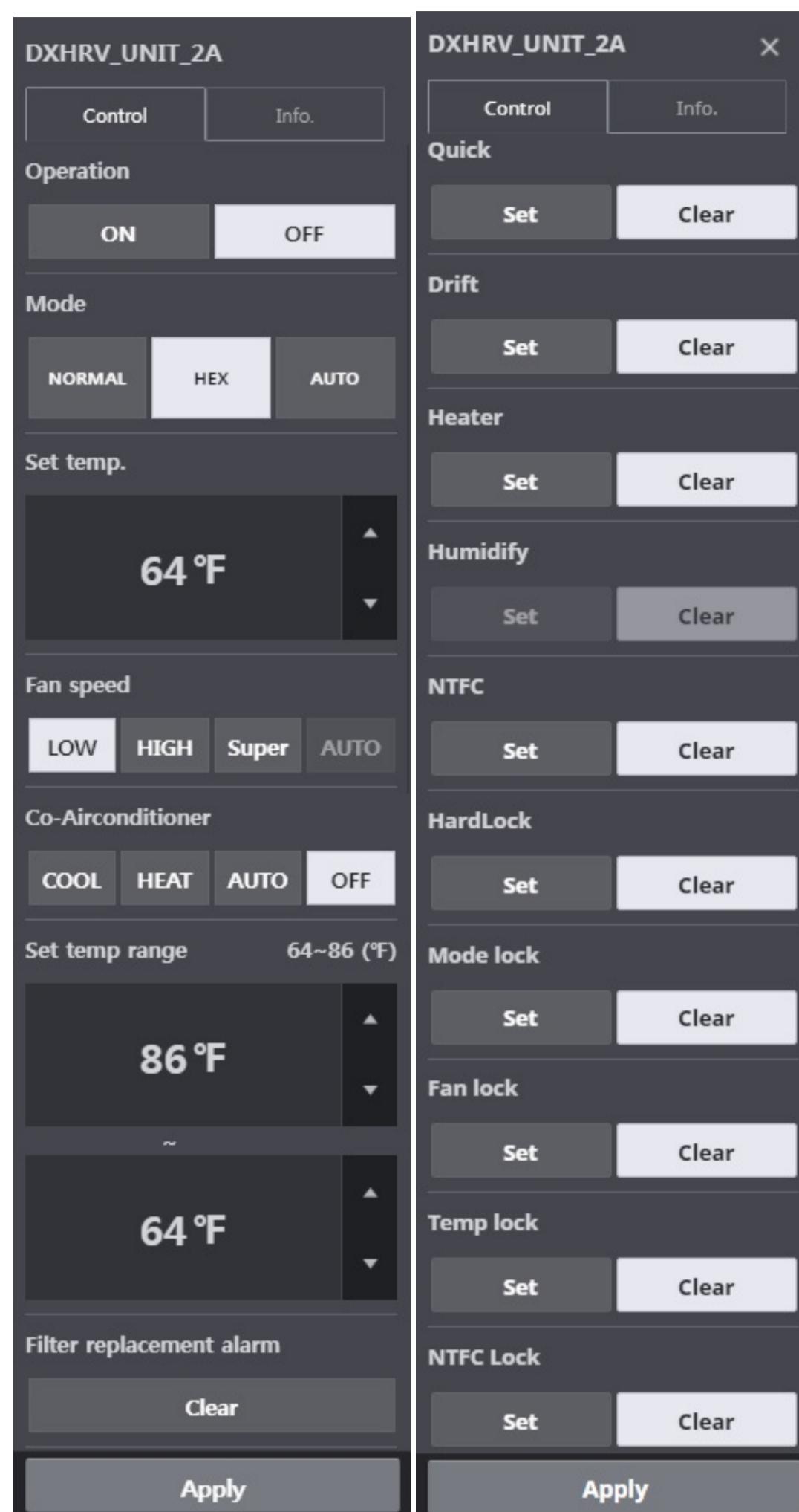
12:00 - 13:00: occupied / cooling set temperature 29°C / heating set temperature 16°C

13:00 - 15:00: occupied / cooling set temperature 26°C / heating set temperature 19°C

If it is empty without schedule after 15:00, cooling set temperature is 29°C and heating set temperature is 16°C, and if it is occupied, cooling set temperature becomes 26°C and heating set temperature becomes 19°C.



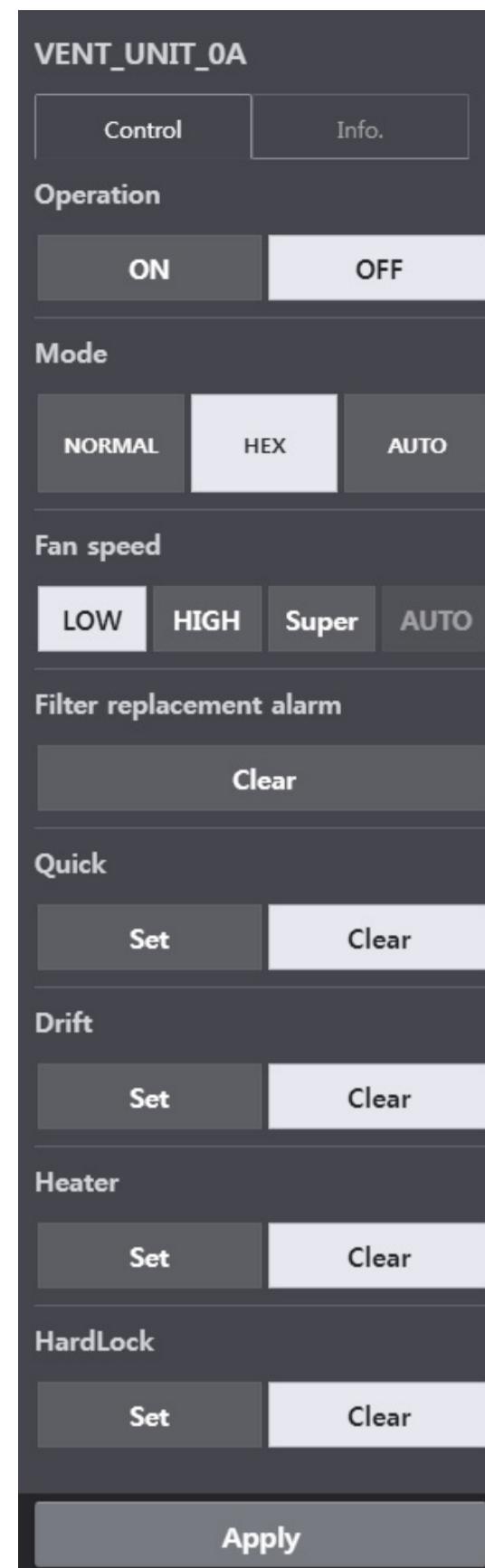
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none">• [NORMAL] button: Discharged air ventilates without going through the electric heat exchanger• [HEX] button: Both air supply/discharge ventilates through the electric heat exchanger• [AUTO] button: Switches to four seasons mode
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none">• [LOW] button: Set the fan speed to slow• [HIGH] button: Set the fan speed to fast• [SUPER] button: Set the fan speed to Max. speed• [AUTO] button: [LOW]-[HIGH]-[SUPER] automatic switching<ul style="list-style-type: none">- User setting is impossible- When Drift/Quick is set, [AUTO] Fan speed is selected- When Drift/Quick is cleared, [HIGH] Fan speed is selected- During [AUTO] operation, when [LOW]/[HIGH]/[SUPER] is selected, Drift/Quick function in operation is cleared
Filter replacement alarm	<ul style="list-style-type: none">• [Clear] button: in case of filter replacement alarm, it cancels filter replacement alarm
Additional function	<ul style="list-style-type: none">• Quick [Set/Clear] button: Set/clear Quick function (When Quick function is selected, Drift function is cleared)• Drift [Set/Clear] button: Set/clear Drift function (When Drift function is selected, Quick function is cleared)• Heater [Set/Clear] button: Set/clear heater function
Midnight air cooling(NTFC)	<ul style="list-style-type: none">• [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) function that can outdoor unit cooling when outdoor temperature is lower than the base temperature at night time
HardLock	<ul style="list-style-type: none">• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller



Category	Contents
Operation	<ul style="list-style-type: none"> [ON] button: starts the device operation [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> [NORMAL] button: Discharged air ventilates without going through the electric heat exchanger [HEX] button: Both air supply/discharge ventilates through the electric heat exchanger [AUTO] button: Switches to four seasons mode
Set temperature	Press [▲]/[▼] button to set the desired temperature
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none"> [LOW] button: Set the fan speed to slow [HIGH] button: Set the fan speed to fast [SUPER] button: Set the fan speed to Max. speed [AUTO] button: [LOW]-[HIGH]-[SUPER] automatic switching <ul style="list-style-type: none"> User setting is impossible When Drift/Quick is set, [AUTO] Fan speed is selected When Drift/Quick is cleared, [HIGH] Fan speed is selected During [AUTO] operation, when [LOW]/[HIGH]/[SUPER] is selected, Drift/Quick function in operation is cleared
Air conditioner	<ul style="list-style-type: none"> [COOL] button: Operates the ERV DX in cooling mode [AUTO] button: Operates the ERV DX in auto mode [HEAT] button: Operates the ERV DX as heating mode [OFF] button: Stops the air conditioner of the ERV DX
Set temp range	When user set the desired temperature individually, the desired temperature outside the designated temperature boundary cannot be set
Filter replacement alarm	<ul style="list-style-type: none"> [Clear] button: in case of filter replacement alarm, it cancels filter replacement alarm
Additional function	<ul style="list-style-type: none"> Quick [Set/Clear] button: Set/clear Quick function (When Quick function is selected, Drift function is cleared) Drift [Set/Clear] button: Set/clear Drift function (When Drift function is selected, Quick function is cleared) Heater [Set/Clear] button: Set/clear heater function Humidify [Set] button: Set Humidify function (only for air conditioner heating mode)
Midnight air cooling(NTFC)	<ul style="list-style-type: none"> [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) function that can outdoor unit cooling when outdoor temperature is lower than the base temperature at night time
HardLock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller
Mode lock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear lock so that user cannot control mode setting with individual remote controller
Fan lock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear lock so that user cannot control Fan speed setting with individual remote controller
TempLock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear lock so that user cannot control temperature setting with individual remote controller
Midnight air cooling(NTFC) lock	<ul style="list-style-type: none"> [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) schedule set in the remote controller



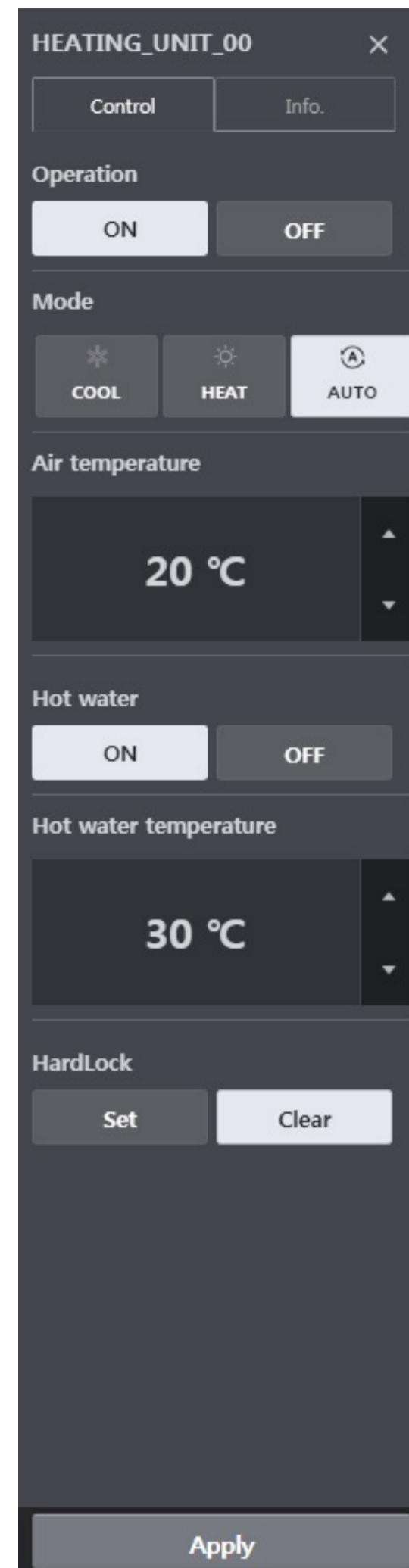
Floor mounted vent



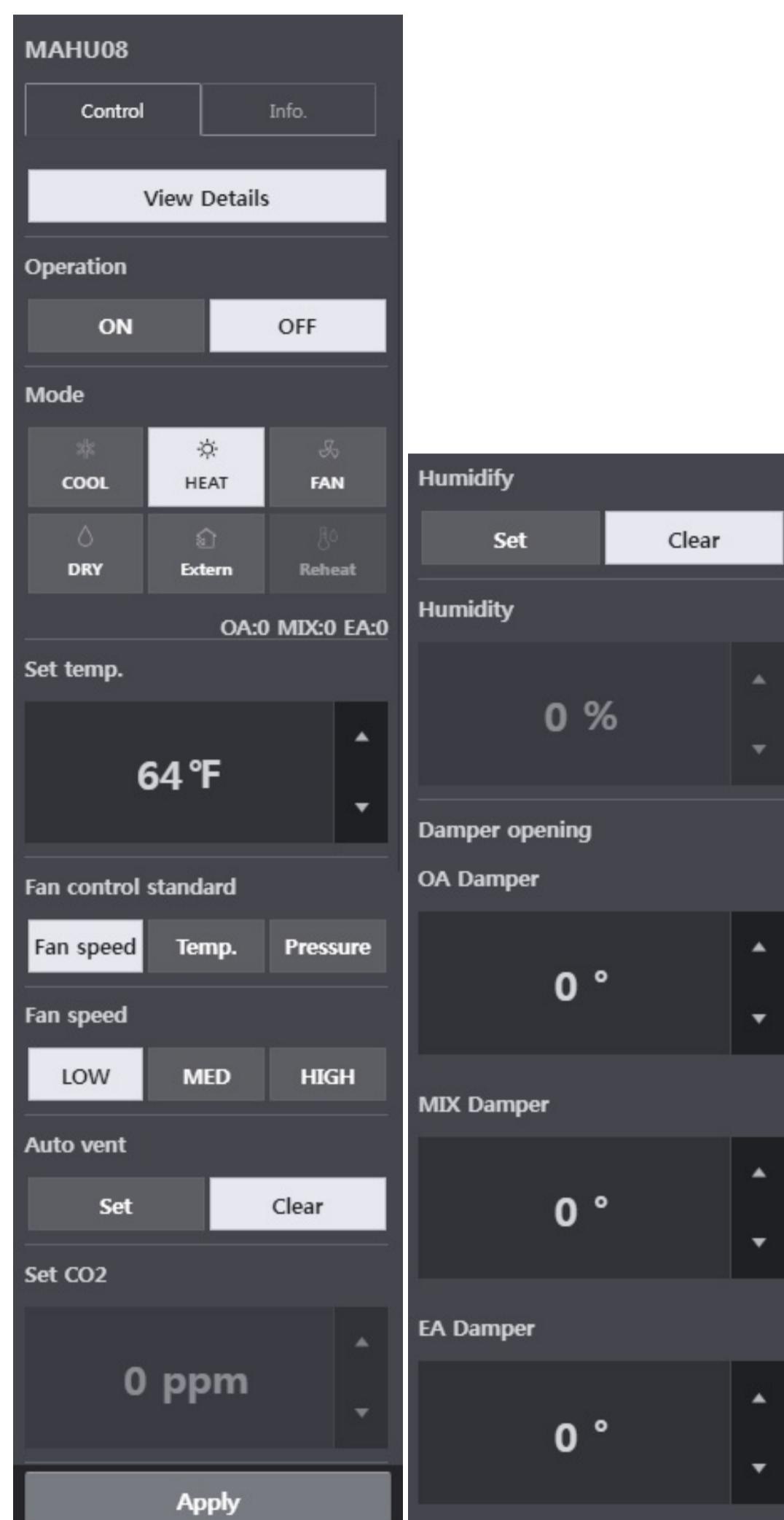
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none">• [NORMAL] button: Discharged air ventilates without going through the electric heat exchanger• [HEX] button: Both air supply/discharge ventilates through the electric heat exchanger• [AUTO] button: Switches to four seasons mode
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none">• [LOW] button: Set the fan speed to slow• [HIGH] button: Set the fan speed to fast• [SUPER] button: Set the fan speed to Max. speed• [AUTO] button: [LOW]-[HIGH]-[SUPER] automatic switching<ul style="list-style-type: none">- User setting is impossible- When Drift/Quick is set, [AUTO] Fan speed is selected- When Drift/Quick is cleared, [HIGH] Fan speed is selected- During [AUTO] operation, when [LOW]/[HIGH]/[SUPER] is selected, Drift/Quick function in operation is cleared
Filter replacement alarm	<ul style="list-style-type: none">• [Clear] button: in case of filter replacement alarm, it cancels filter replacement alarm
Additional function	<ul style="list-style-type: none">• Quick [Set/Clear] button: Set/clear Quick function (When Quick function is selected, Drift function is cleared)• Drift [Set/Clear] button: Set/clear Drift function (When Drift function is selected, Quick function is cleared)• Heater [Set/Clear] button: Set/clear heater function
Midnight air cooling(NTFC)	<ul style="list-style-type: none">• [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) function that can outdoor unit cooling when outdoor temperature is lower than the base temperature at night time
HardLock	<ul style="list-style-type: none">• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller



Heating



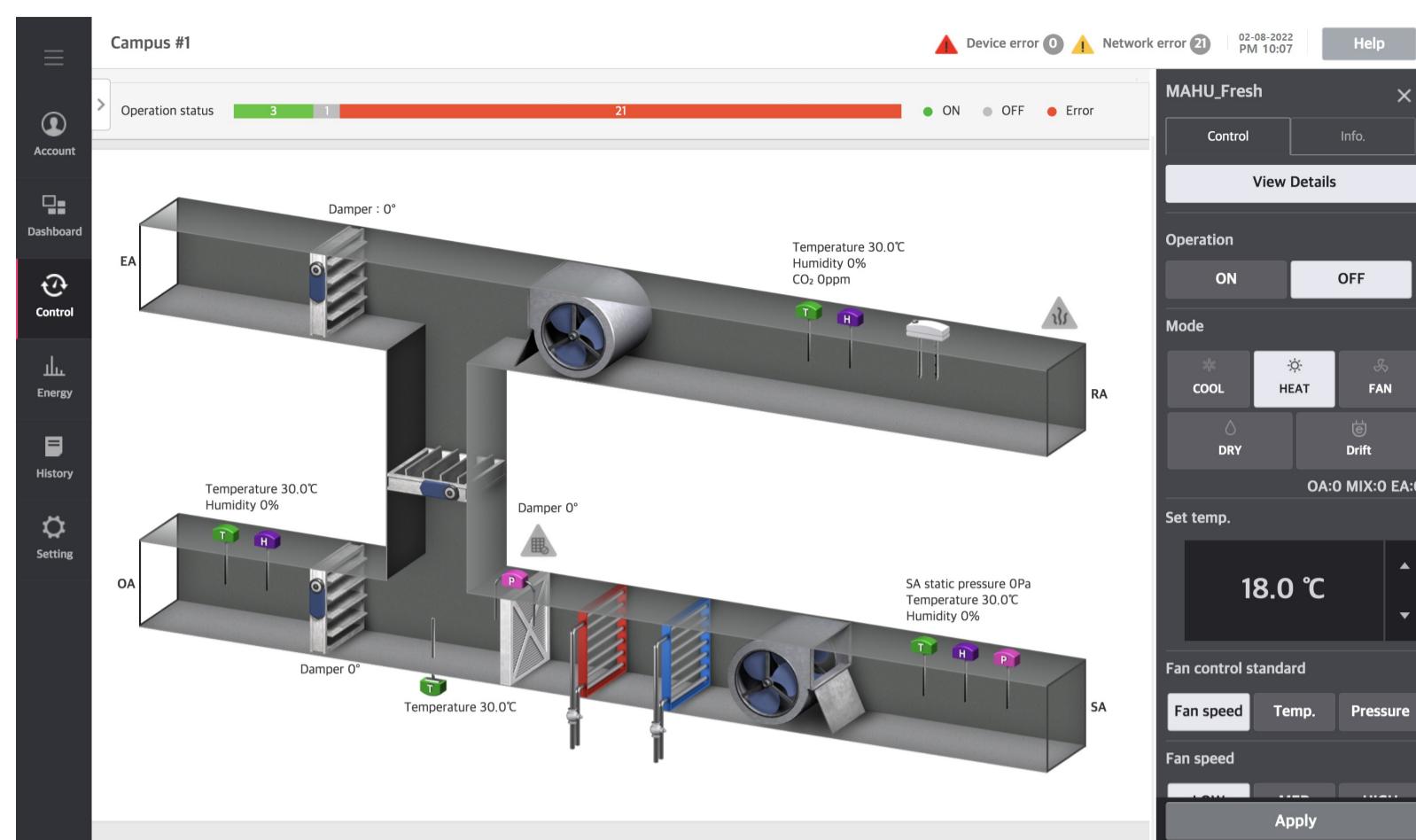
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none">• [COOL] button: Switches to cooling mode• [HEAT] button: Switches to heating mode• [AUTO] button: Switches to automatic mode
Air/Water in/out temperature	Press [▲]/[▼] button to set Air/Water in/out temperature It is displayed based on the set temperature selected in [Setting]-[Installing] <ul style="list-style-type: none">• When [Water in/out] is selected, it is displayed as water in/out temperature• When [indoor] is selected, it is displayed as air temperature
Hot water	<ul style="list-style-type: none">• [ON] button: Starts hot water operation<ul style="list-style-type: none">- If hot water is operated while the device is in automatic/cooling operation, the corresponding mode and hot water are displayed in the icon of the contents display section- If hot water is operated while the device is stopped, the icon in the contents display section is enabled, and hot water is displayed• [OFF] button: Stops hot water operation
Hot water temperature	Press [▲]/[▼] button to set hot water temperature
HardLock	<ul style="list-style-type: none">• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller



Category	Contents
View Details	Press [View Details] button to check detail information (But, mobile is excluded)
Operation	<ul style="list-style-type: none"> • [ON] button: starts the device operation • [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> • [COOL] button: Switches to cooling mode • [HEAT] button: Switches to heating mode • [FAN] button: Air purification operation. When FAN is selected, you cannot set the desired temperature • [DRY] button: Removes moisture in rainy season or when humidity is high. When DRY is selected, you cannot set the desired temperature • [Drift] button: Operation to find the operation point with the best ventilation system efficiency to save power consumption. It fluently discharges the contaminated indoor air by having bigger discharger Fan speed than air supply • [Reheat] button : Maintains a constant temperature and humidity while the cooling/heating function is active. (Available only when the AHU reheat coil is in use.)
Set temperature	Press [▲]/[▼] button to set the temperature
Fan control standard	<ul style="list-style-type: none"> • [Fan speed] button: Controls the fan based on Fan speed status • [Temp] button: Controls the fan based on temperature status • [Pressure] button: Controls the fan based on Pressure status
Fan speed	<p>It is displayed only when fan control standard is Fan speed</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast
Automatic ventilation	<p>It is displayed only when the additional function's automatic ventilation or automatic ventilation and Humidify are selected during AHU device registration</p> <ul style="list-style-type: none"> • Automatic ventilation [Set/Clear] button: Starts/stops automatic ventilation
Set CO ₂	<p>It is enabled only when automatic ventilation function is set</p> <p>Press [▲]/[▼] button to set in the unit of 100ppm within 100 ppm ~ 2 000 ppm range</p>
Humidify	<p>It is displayed only when the additional function's Humidify or automatic ventilation and Humidify are selected during AHU device registration</p> <ul style="list-style-type: none"> • Humidify [Set/Clear] button: Starts/stops Humidify function
Humidity	<p>It is enabled only when Humidify function is set</p> <p>Press [▲]/[▼] button to set the target humidity</p>
Damper opening	<ul style="list-style-type: none"> • Press [OA Damper] : [▲]/[▼] button to set the outdoor unit air damper opening value in the unit of 1 ° within 0 ° ~ 90 ° range • Press [MIX Damper] : [▲]/[▼] button to set the mixer damper opening value in the unit of 1 ° within 0 ° ~ 90 ° range • Press [EA Damper] : [▲]/[▼] button to set the air discharge damper opening value in the unit of 1 ° within 0 ° ~ 90 ° range <p>When you set [Setting]-[system setting]'s Apply damper opening formula as set, it operates as OA Damper = EA Damper, OA Damper = MIX Damper = 90</p>
HardLock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller

View AHU in detail

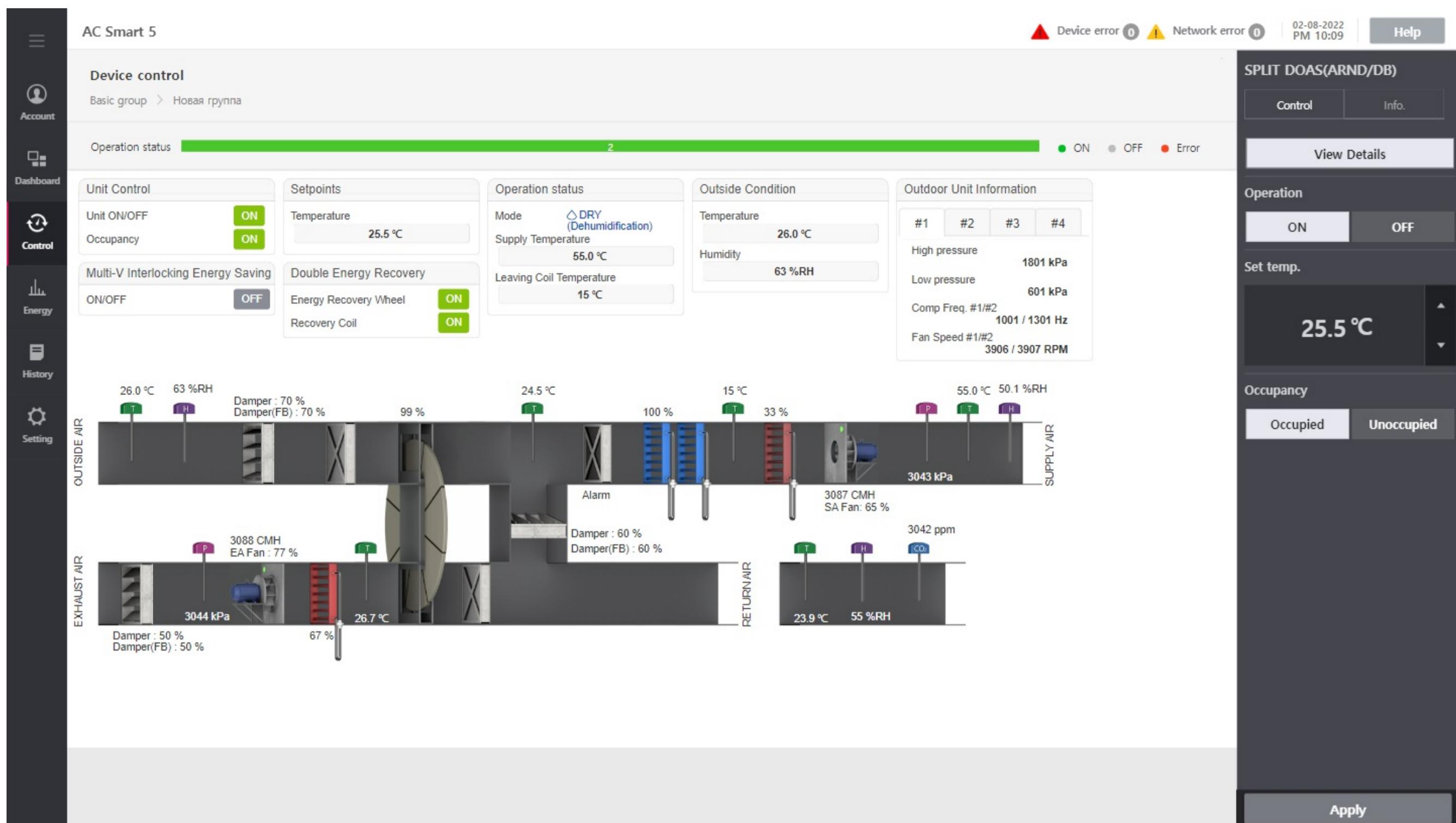
In AHU's control screen, you can press [View Details] button to check detail information.



→ SPLIT DOAS

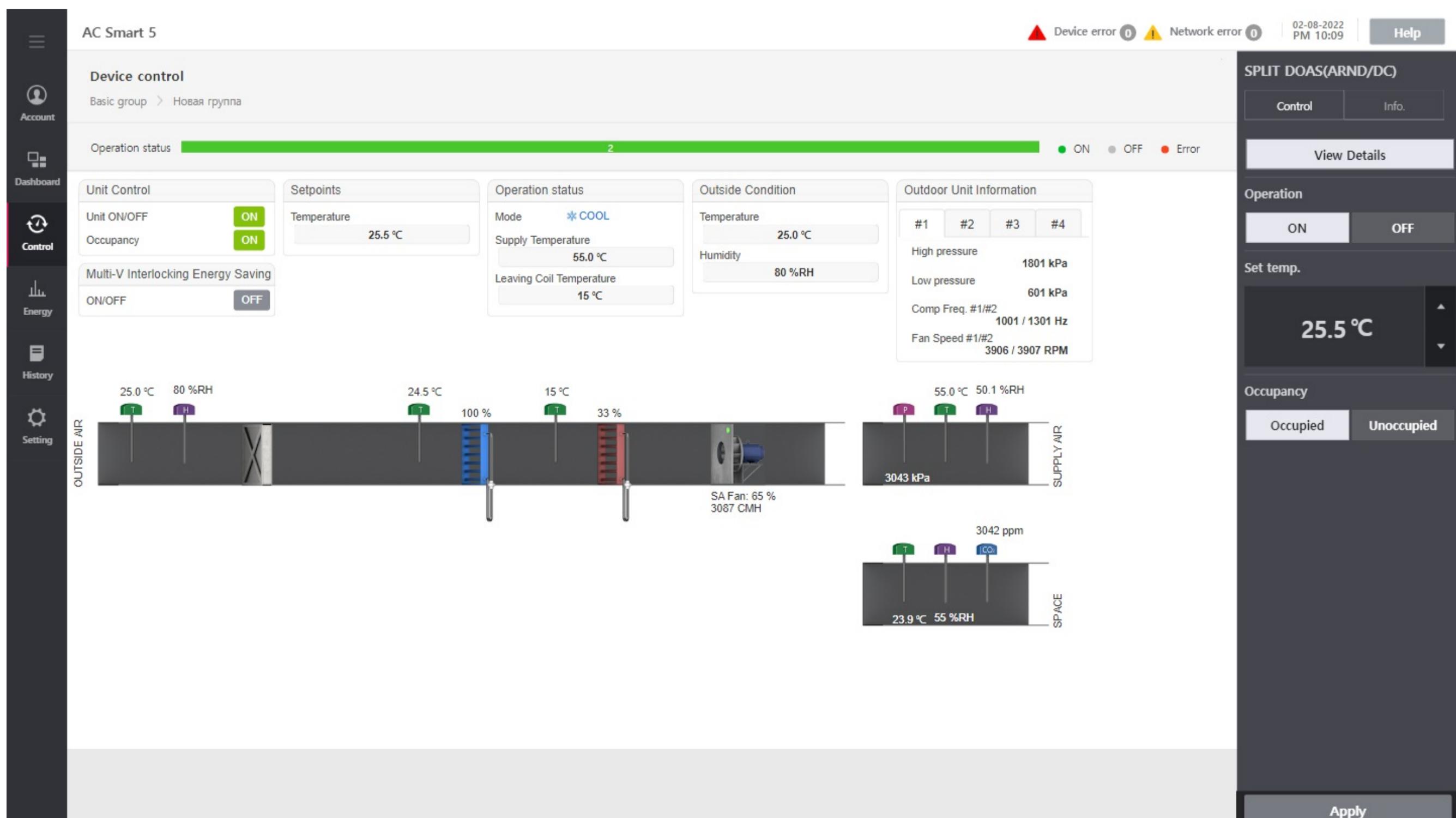


SPLIT DOAS(ARND/DB)



Item	Description
View details	Click the [View Details] button to view detailed information (Not available on mobile)
Operating status	<ul style="list-style-type: none"> [Start Operation] button: Starts device operation [Stop Operation] button: Stops device operation
Target temperature	Press the [▲]/[▼] button to set target temperature
Occupied	<p>Function to set the space managed by DOAS as occupied or vacant</p> <ul style="list-style-type: none"> [Occupied] button: Set to Occupied [Vacant] button: Set to Vacant

SPLIT DOAS(ARND/DC)



Item	Description
------	-------------

View details	Click the [View Details] button to view detailed information (Not available on mobile)
Operating status	<ul style="list-style-type: none"> • [Start Operation] button: Starts device operation • [Stop Operation] button: Stops device operation
Target temperature	Press the [▲]/[▼] button to set target temperature
Occupied	Function to set the space managed by DOAS as occupied or vacant <ul style="list-style-type: none"> • [Occupied] button: Set to Occupied • [Vacant] button: Set to Vacant

Multi-V Interlocking Energy Saving Control

This is a function to control DOAS and Multi-V operation modes based on the operation status of Multi-V and indoor and outdoor air temperature/humidity in order to save the system's energy.

Energy saving operation can be run only under agreeable indoor conditions (for cooling, temperature of 28°C or lower and relative humidity of 60% or lower). You can adjust the degree of freshness and energy saving as preferred.

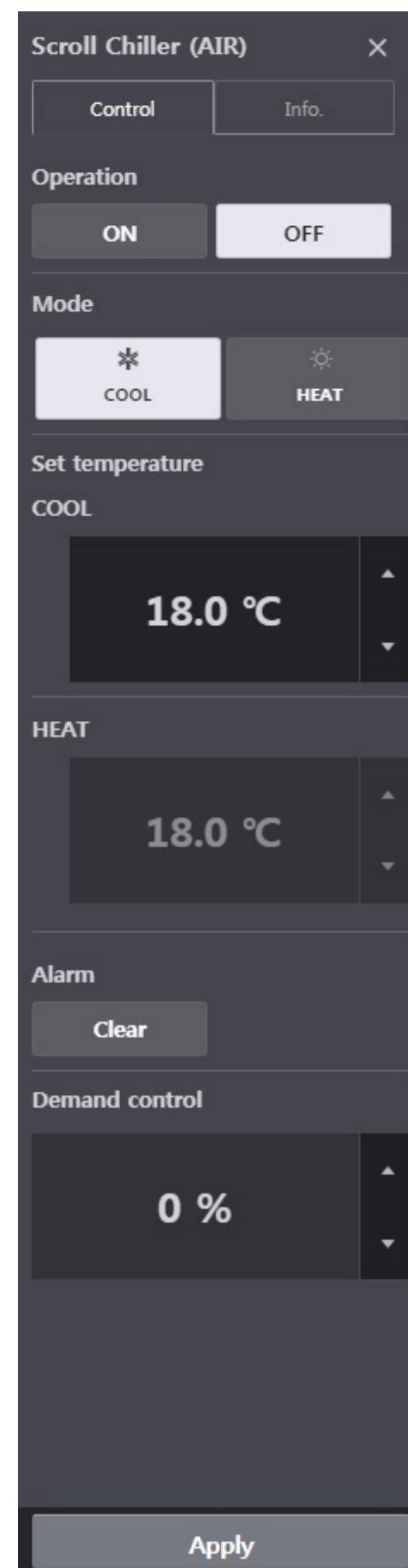
Note

- To use Multi-V Interlocking Energy Saving Control, you need a DOAS indoor humidity sensor.
- Energy saving operation can be run only when DOAS is running in the cooling or dehumidification mode and all indoor units are in cooling operation.
- Energy saving step: As you get closer to step 3, dehumidification weakens and energy saving increases.

► Set Multi-V Interlocking Energy Saving Control



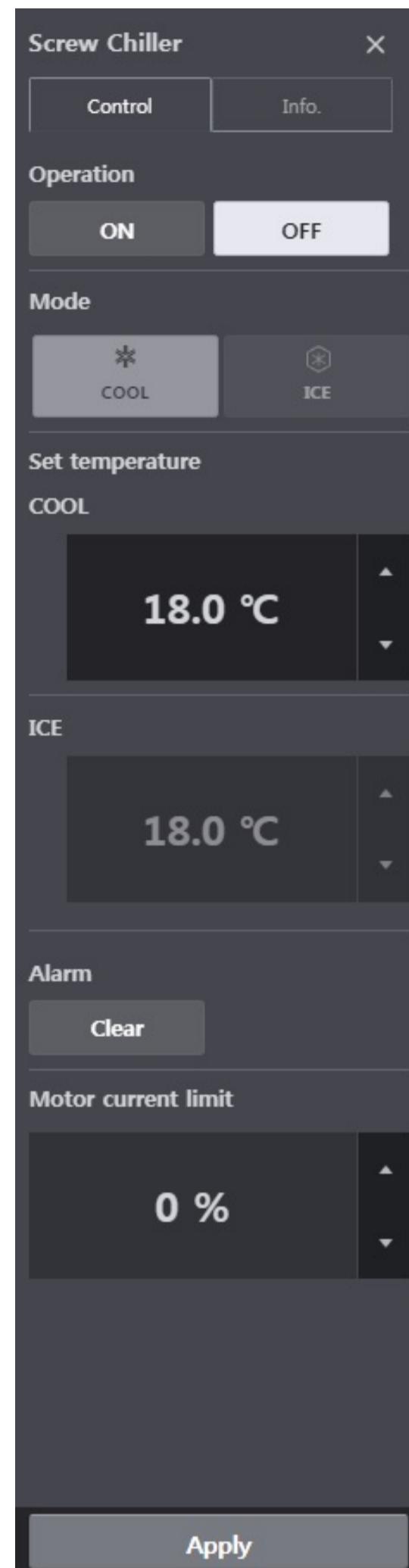
Scroll chiller



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	(It is displayed only when device supports the corresponding mode) <ul style="list-style-type: none">• [COOL] button: Switches to cooling mode• [HEAT] button: Switches to heating mode
Set temperature	Set the load water out temperature for indoor cooling/heating Press [▲]/[▼] button to set the temperature of cooling mode and heating mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Demand control	Press [▲]/[▼] button to set demand limit ratio



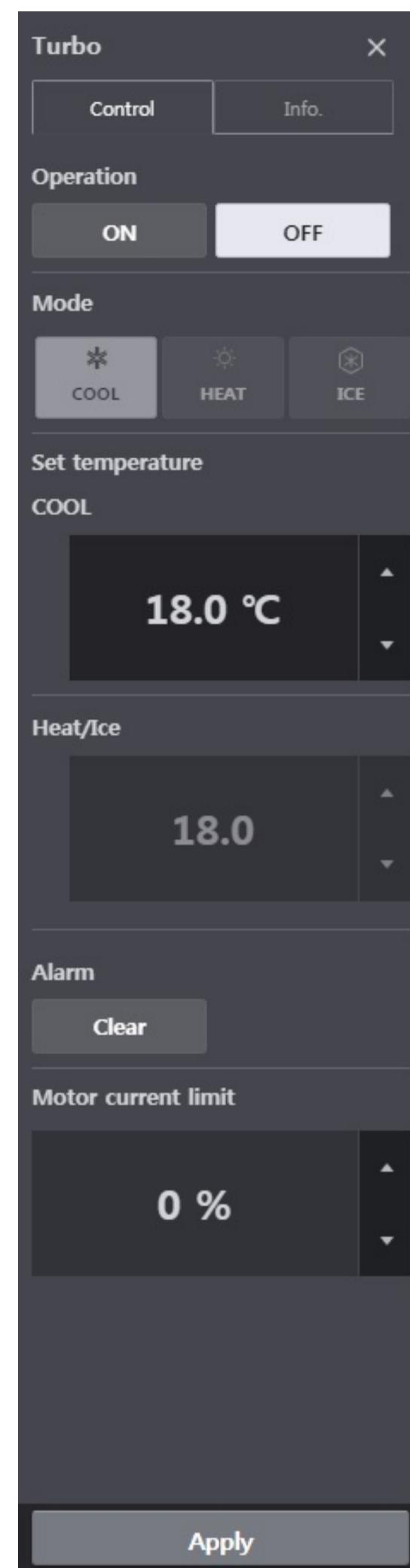
Screw chiller



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	Mode control is impossible. Controls monitored operation mode's set temperature
Set temperature	Set the load water out temperature for indoor cooling/ice making Press [▲]/[▼] button to set the temperature of cooling mode and ice making mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Motor current limit	Press [▲]/[▼] button to set motor current limit ratio



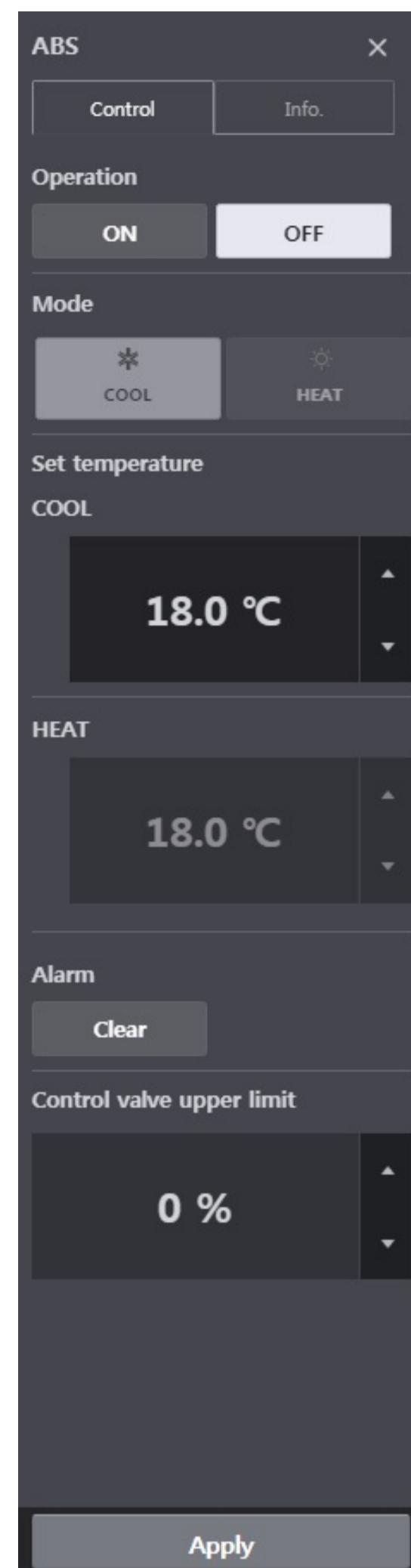
Turbo chiller



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	Mode control is impossible. Controls monitored operation mode's set temperature
Set temperature	Set the load water out temperature for indoor cooling/heating/ice making Press [▲]/[▼] button to set the temperature of cooling mode and heating/ice making mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Motor current limit	Press [▲]/[▼] button to set motor current limit ratio



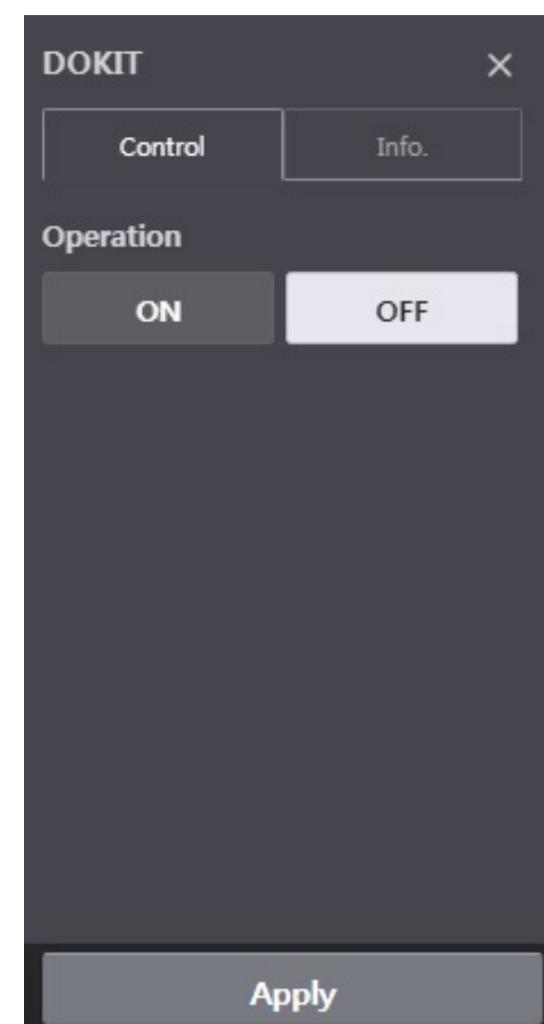
Absorption Chiller



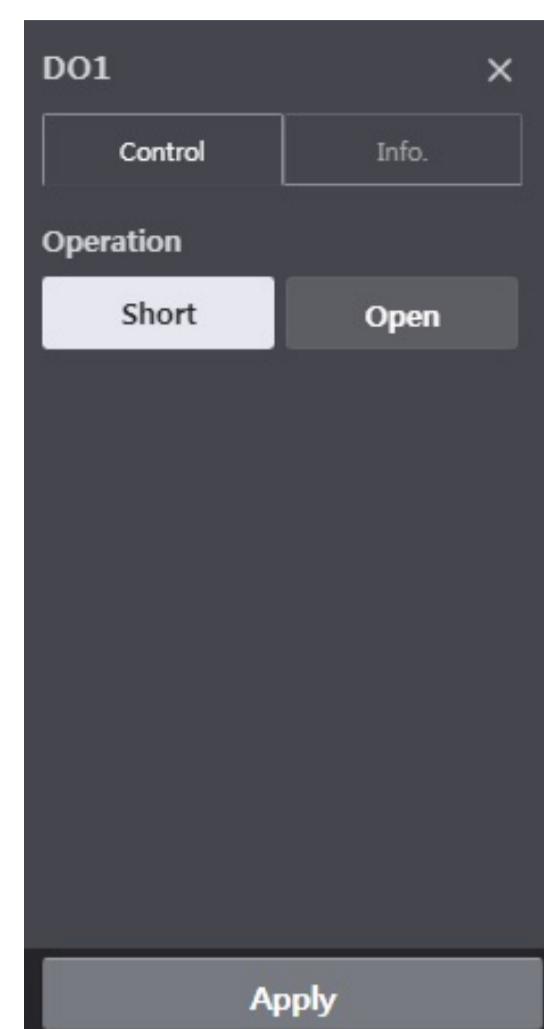
Category	Contents
Operation	<ul style="list-style-type: none">[ON] button: starts the device operation[OFF] button: Stops the device operation
Mode	Mode control is impossible. Controls monitored operation mode's set temperature
Set temperature	Set the load water out temperature for indoor cooling/heating Press [▲]/[▼] button to set the temperature of cooling mode and heating mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Control valve upper limit	Press [▲]/[▼] button to set the control valve upper limit ratio



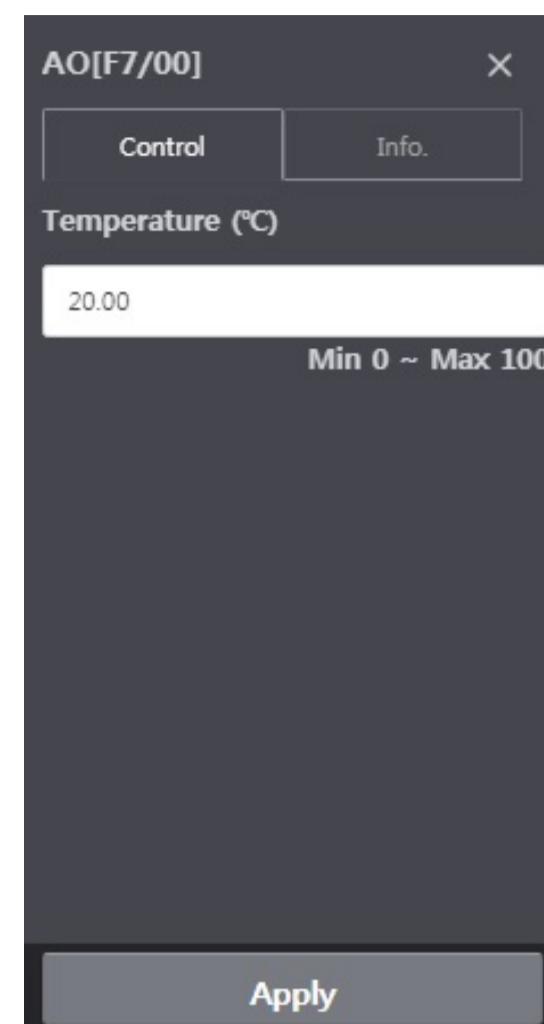
DOKIT



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation



Category	Contents
Operation	<ul style="list-style-type: none">• [Short] button: Short signal output• [Open] button: Open signal output



Category	Contents
Temperature	Set temperature value

Note

Unit symbol may change according to the usage set during device registration.



Device Information

When you click device information tab in the device's control screen, you can check the device information.

You can check device's basic information, operation information, schedule information, error information, and today's history.

The image shows five separate windows, each representing a different tab within a device information interface for an AC unit. Each window has a header with 'Control' and 'Info.' buttons and a close button (X).

- Basic information:** Shows the device name as 'AC_UNIT_00', address '00', and group 'New group 1'. It includes a 'View drawing' button and an 'ODU' section with 'ODU[00]' and 'ODU model MULTIV'.
- Operation information:** Shows the current operation status as 'ON' and the mode as 'AUTO'. It also displays 'Air Cleaning Set' and various air quality metrics: 'Current temperature 23.0 °C', 'Fine dust(PM10) 0µg/m³ (Good)', 'Ultra fine dust(PM2.5) 0µg/m³ (Good)', and 'Super ultra fine dust(PM1.0) 0µg/m³ (Good)'. It also shows 'Occupancy Unoccupied'.
- Schedule information (5):** A table showing five scheduled events with times and descriptions:

Time	Description
10:10	Schedule
- Error information:** Shows 'Error No error', 'Error code 0', and 'Error description No error'. It also includes a 'History' section.
- History:** Displays a log entry: '2018-02-01 Control Mode: AUTO 10:11 by Schedule'.



Control

You can set the registered device to the desired status and control.

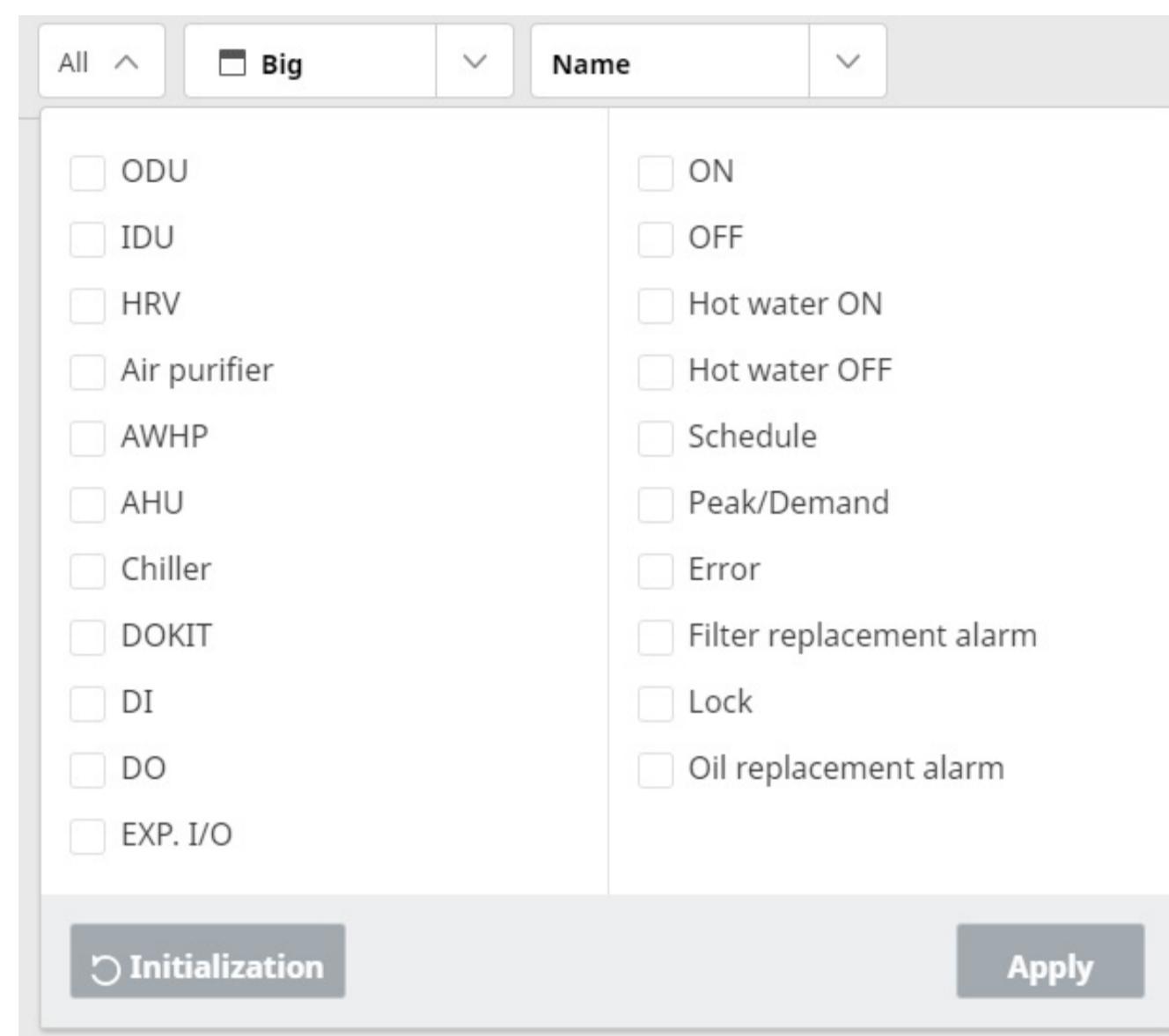
1. In the left side menu tab, click [Control] > [Device control] menu.

2. In the device list tab section, click the desired tab.

Category	Description
Group	List of group set for convenience
Installation	Provides actually connected device information

3. In the filter section, click the filter button of the device type or status to control.

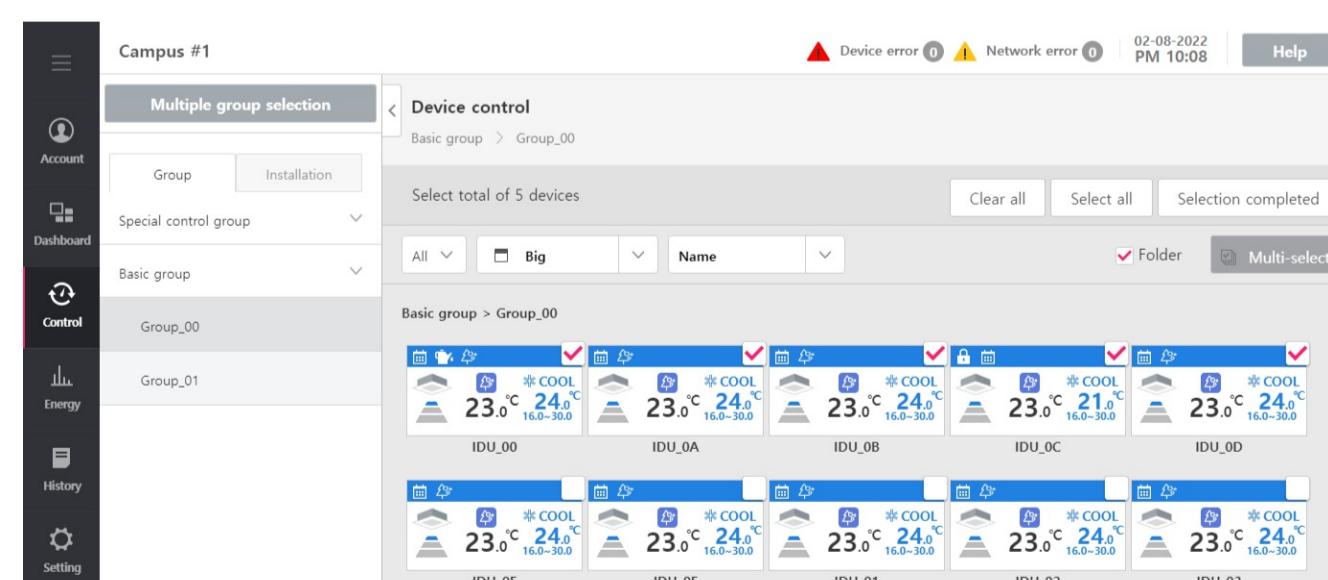
- All filter buttons can be selected in multiple.
- Only the corresponding information are selected and displayed.



Filter type	Detail category
Device	Outdoor unit, indoor unit, air purifier, AHU, chiller, ERV, Heating, ON/OFF device, DI, DO, Exp.I/O
Status	ON, OFF, Hot water ON, Hot water OFF, Schedule, Peak control, Error, Filter replacement alarm, Lock, Oil replacement alarm

4. In the device section, select the device to control.

- You can select several devices at once to control. To select all devices in certain group, click [Multi-select] button, and click [Select All] button. According to the multiple selected device types, the category to control is limited.



5. In the control window, set the corresponding equipment's control status.

6. When setting is completed, click [Apply] button.



Monitoring

You can check the registered device's control status.

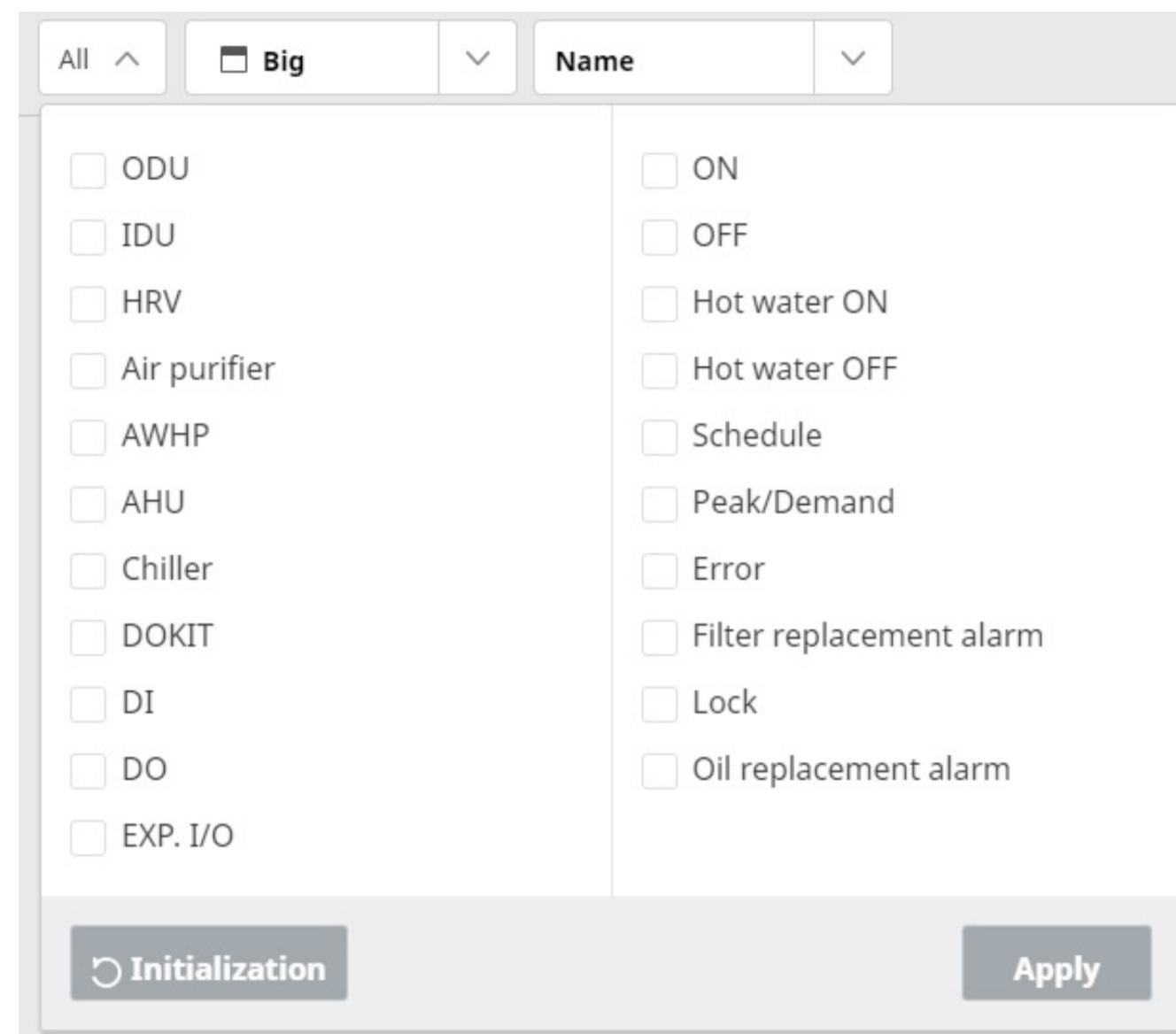
1. In the left side menu tab, click [Control] > [Device control] menu.

2. In the device list tab section, click the desired tab.

Category	Description
Group	List of group set for convenience
Installation	Provides actually connected device information

3. In the filter section, click the filter button of the device type or status to check.

- All filter buttons can be selected in multiple.
- Only the corresponding information are selected and displayed.



Filter type	Detail category
Device	Outdoor unit, indoor unit, AHU, chiller, ERV, Heating, ON/OFF device, DI, DO, Exp.I/O
Status	ON, OFF, Hot water ON, Hot water OFF, Schedule, Peak control, Error, Filter replacement alarm, Lock, Oil replacement alarm

4. In the device section, check the device information.

5. To check the device's detail control status, click the corresponding device icon.

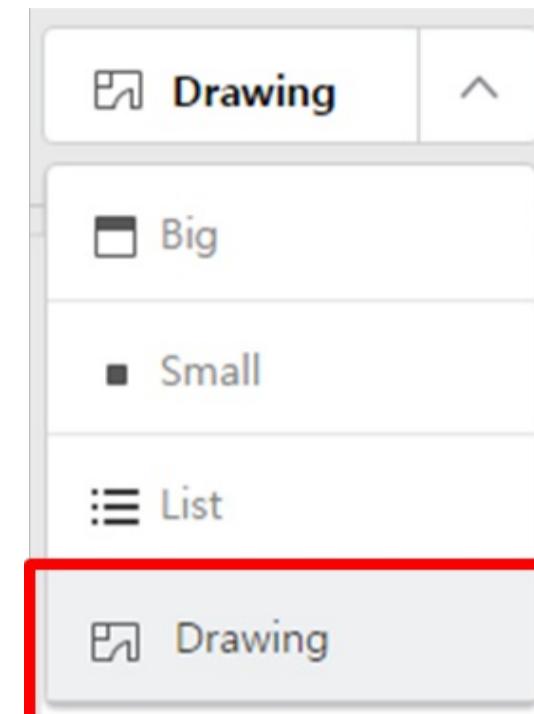
- The corresponding device's control window is displayed.



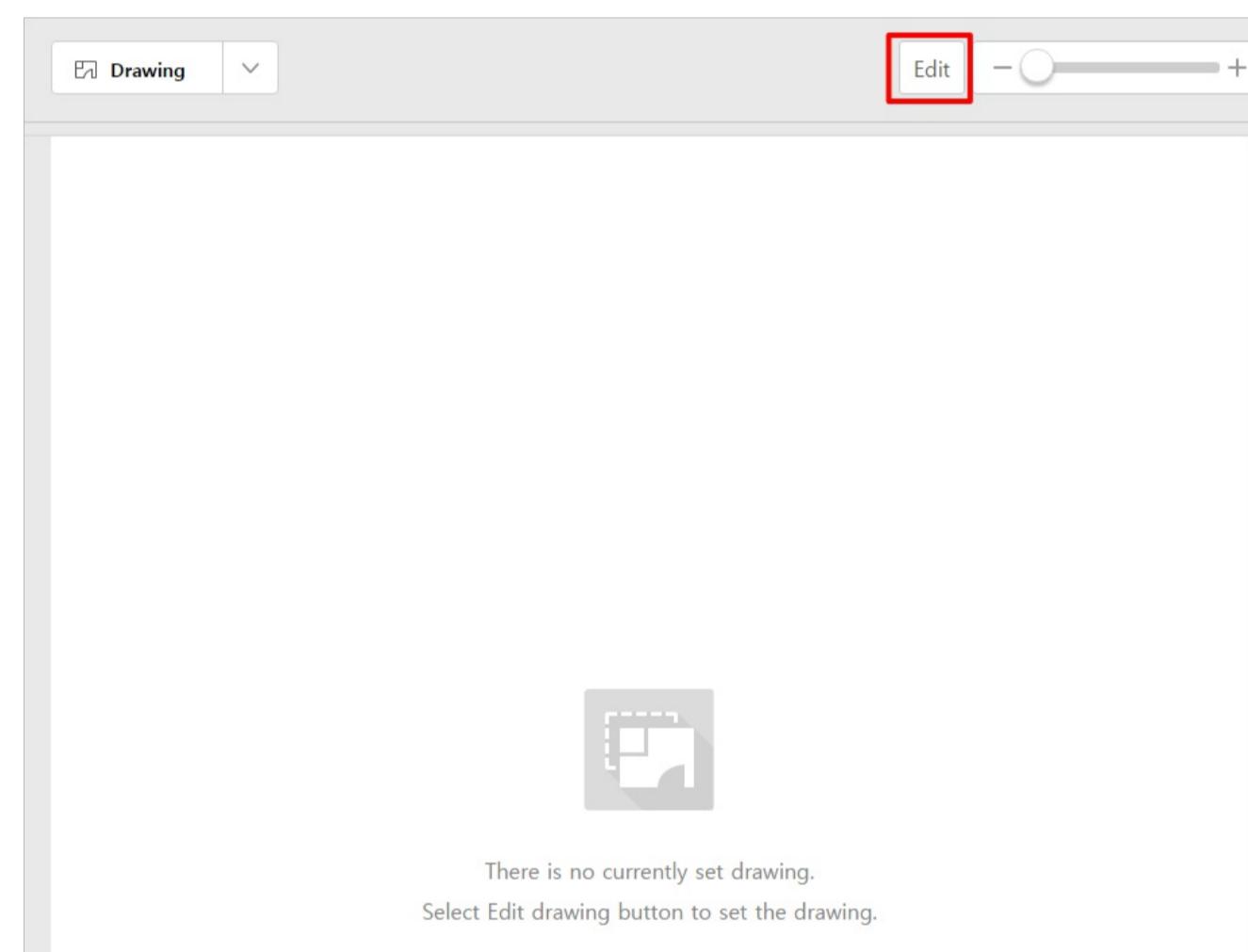
Edit Drawing

When [Setting] > [System setting]'s Use 'Drawing' is selected as **Set**, you can edit the drawing.

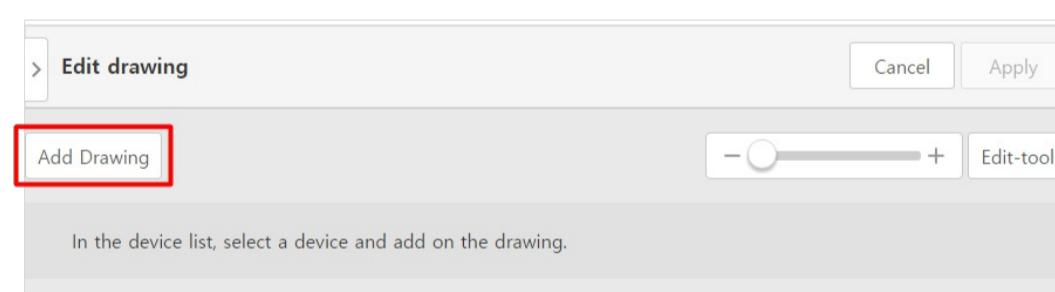
1. In the left side menu tab, click [Control] > [Device control] menu.
2. In device group tab area, click [Group] tab.
 - When you select [Installation] tab, the viewing method's [Drawing] is disabled.
3. In the viewing method, click [View Drawing].



4. Click [Edit] button.

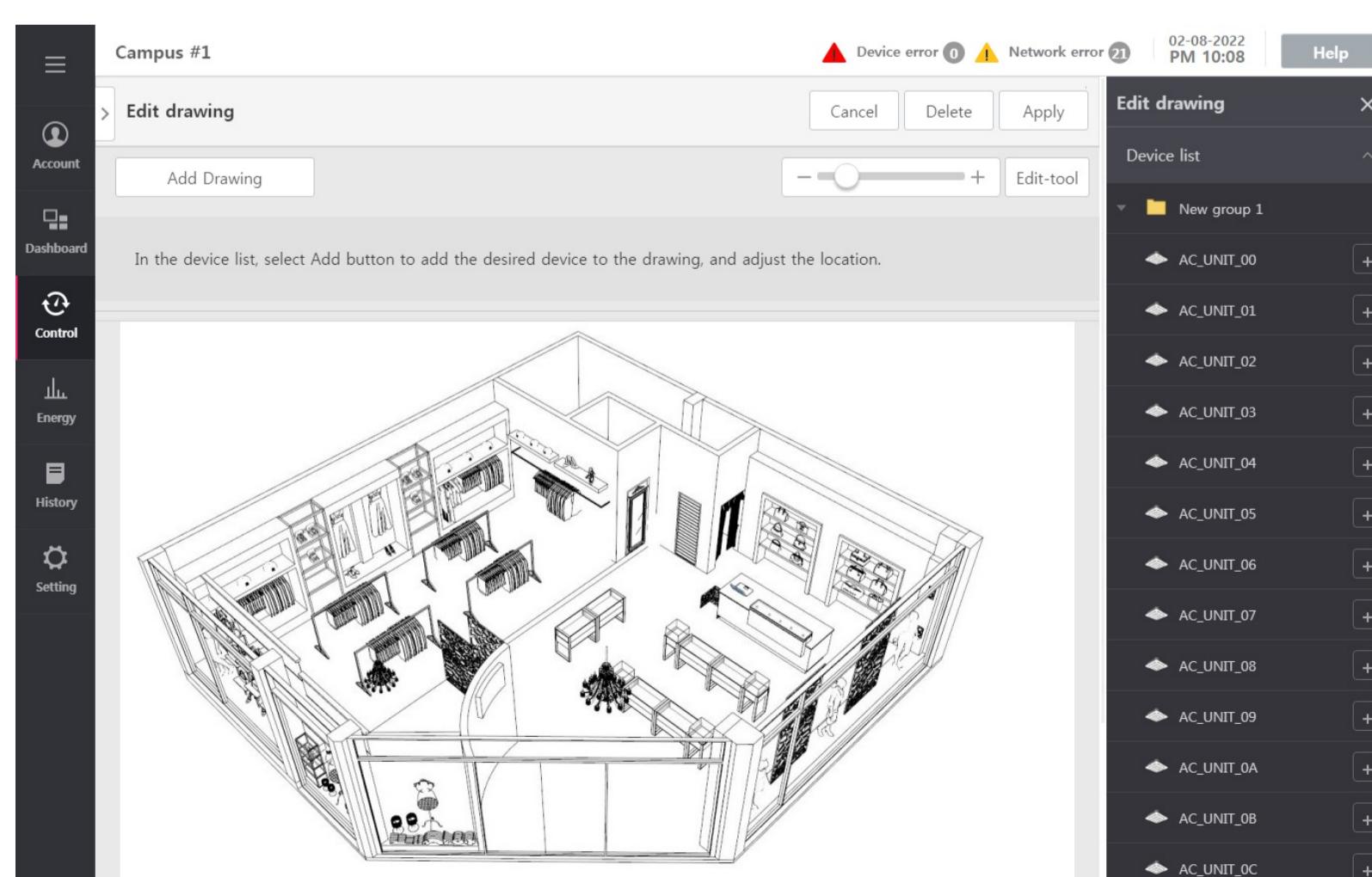


5. When you add or change drawing, click [Add Drawing] button.

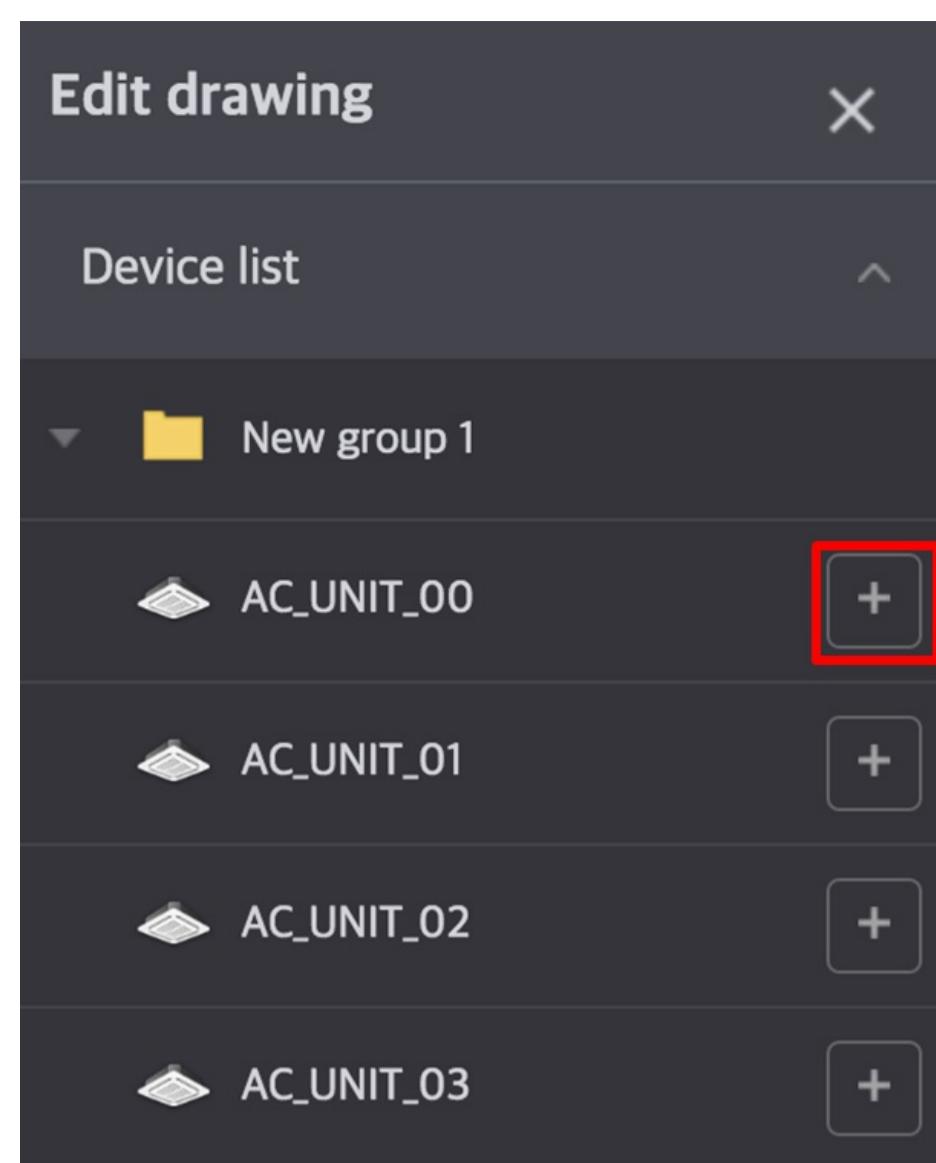


6. When file load window is displayed, select the drawing file to add and click [Open] button.

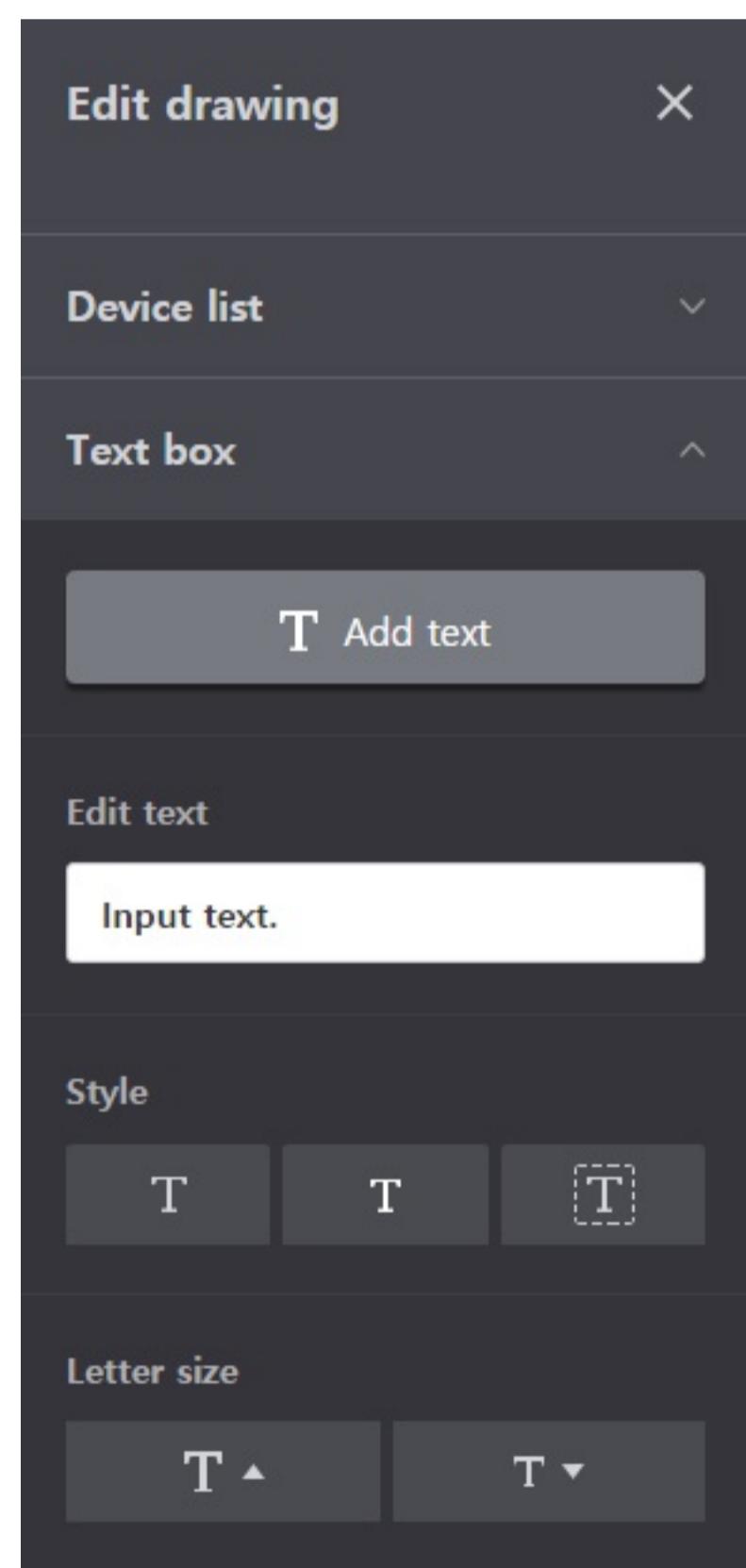
- The selected drawing is displayed in the Edit drawing screen.



7. To add device in the drawing, select the desired device in the device list in the right side Edit drawing window, and click [+] button. The device is added in the drawing section.

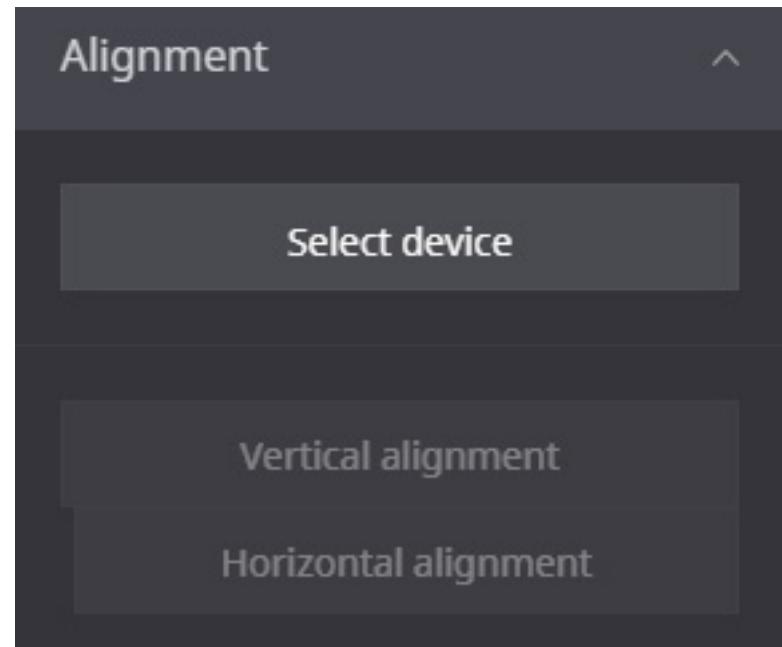


8. To add text or change text in the drawing, use text box.



Category	Description
Add text	Add text box in drawing section
Edit text	Edit text in text box
Style	<p>T : Normal letter, thick, Italic, underline</p> <ul style="list-style-type: none"> • T : Display in normal letter • T : Display in thick letter • T : Display in Italic letter • T : Display with underlined letter <p>T : Change letter color</p> <p>T : Change letter background color</p>
Letter size	<p>T ▲ : Larger letter</p> <p>T ▼ : Smaller letter</p>

9. To align the device icons on the drawing, use the Alignment Box.



Category	Description
Select device	Select a device to align on the drawing
Alignment	Vertical alignment : Aligns the selected device icons vertically. Horizontal alignment : Aligns the selected device icons horizontally.

10. When setting is completed, click **[Apply]** button.

Note

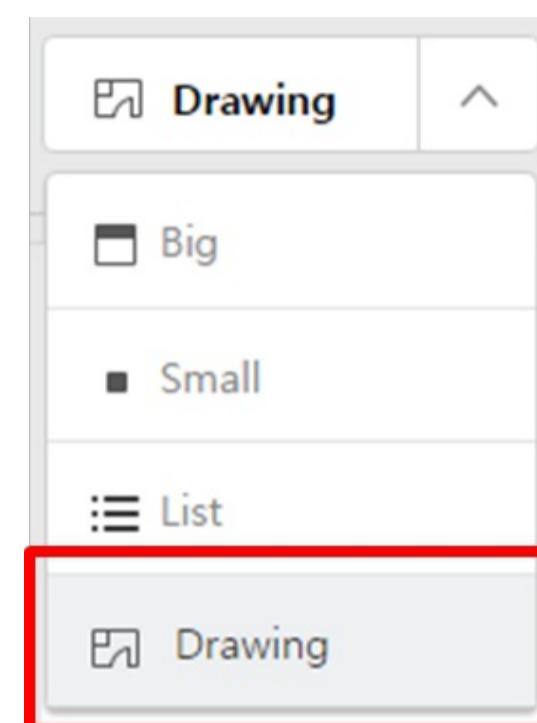
- Part of drawing image with vertical resolution of 1000px or more may not be displayed, and please use image of adequate resolution according to the display resolution.
In environment with display resolution of 1920x1080, image of 1478x1000 or less is recommended.
- File format : jpg, png, bmp / Max size : 10MB
- During text add / edit, special symbol (^, "IW") may not be used.
- You can enter up to 40 characters.
- AC Smart 5 Device does not support the drawing editing function.



Delete Drawing

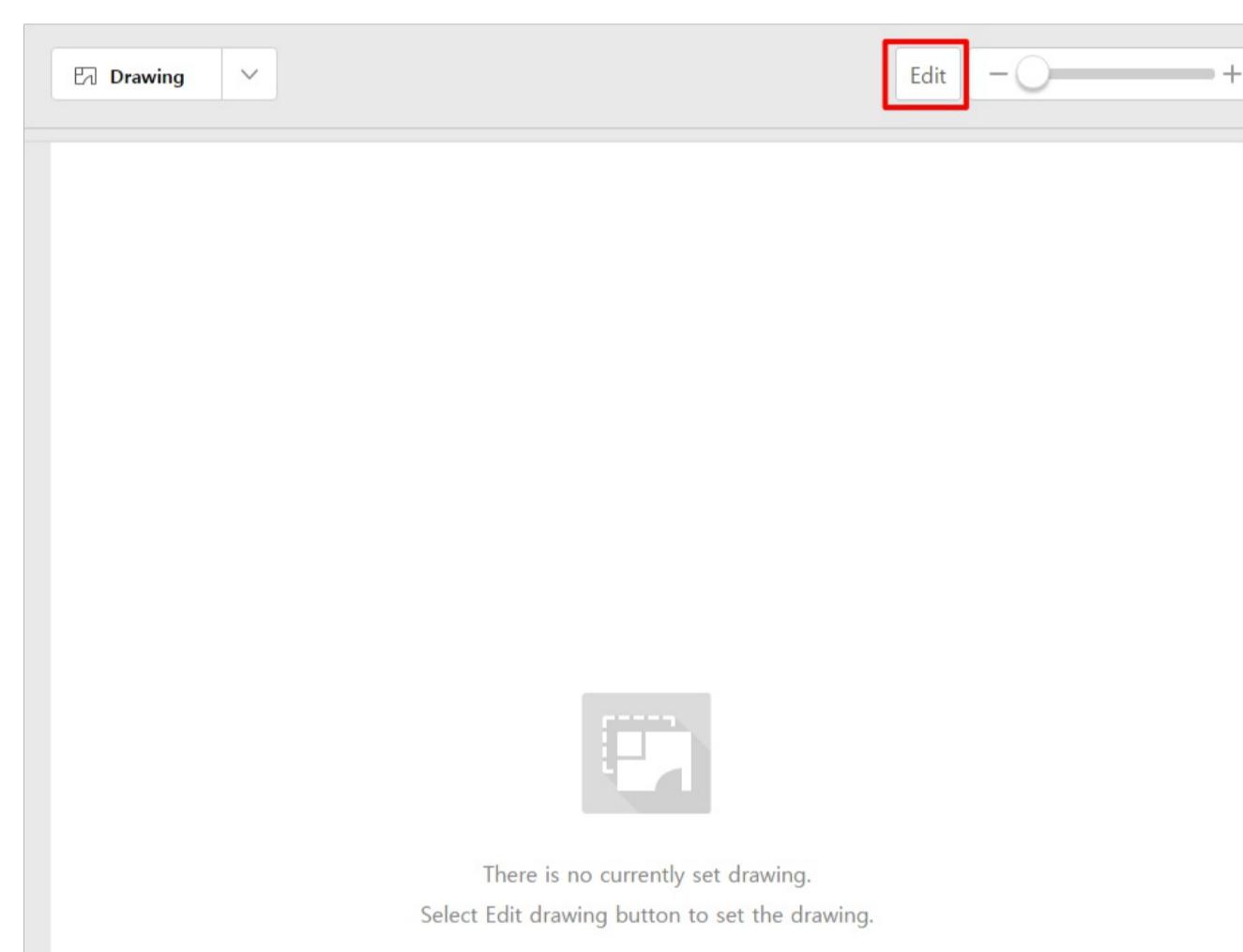
You can delete the added drawing.

1. In the left side menu tab, click [Control] > [Device control] menu.
2. In device group tab area, click [Group] tab.
3. In the viewing method, click [View Drawing].



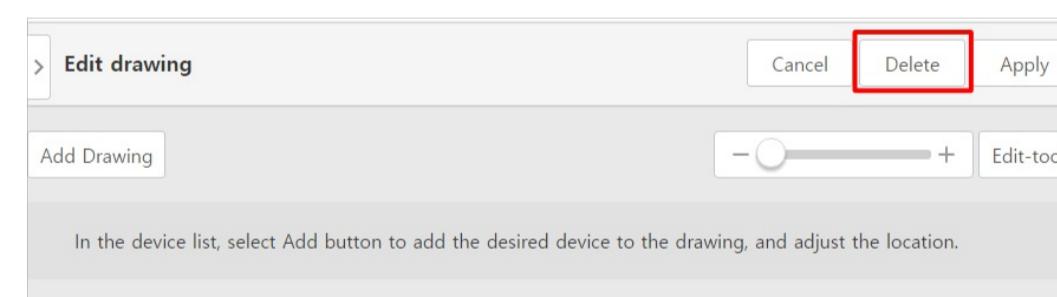
4. Click [Edit] button.

- The Edit drawing screen is displayed.



5. Click [Delete] button at the top.

- The drawing is deleted.





Schedule Control

Schedule is the function to designate the device operation in advance and let the device perform the operation reserved at certain time. When you use this function, you can efficiently manage the device operation in time unit for excellent energy saving effect.

[Schedule]

- View entire schedule
- Add Schedule
- Delete schedule
- Copy schedule
- Edit schedule

[Exception Date]

- Load exception date
- Add exception date
- Delete exception date

Note

Recommended specification

- Schedule: No. of all events included in entire schedule is 50
- If it is set to be over the recommended specification, performance degradation may occur.



View entire schedule

You can see the list of schedule in the set period.

You can check whether the set schedule is applied, name, whether to repeat, start date, end date, and device list, and directly [Set] or [Clear] the desired schedule.



Add Schedule

You can add schedule category.

1. In the left menu tab, click [Control] > [Schedule Control] menu.

- The schedule control screen is displayed.

2. In the schedule list, click [Add Schedule] button.

- The Add schedule screen is displayed.

3. In the schedule name input field, input the desired schedule name.

4. Set whether to repeat the schedule.

Category	Description
Once	Apply the corresponding schedule only to one day designated in [Period]
Day of week selection	Select the desired day of week, and apply the schedule only to the corresponding day of week from the start date to the end date

5. Set the desired period.

- When repetition is selected as [Once], select only 1 day
- When repetition is selected as [select day of week], select start and end date

Category	Description
Start Date	<ul style="list-style-type: none">• Select the desired start date in mini calendar• Initial start date is selected as today's date
End date	<ul style="list-style-type: none">• Select the desired end date in mini calendar• You cannot set the end date before the start date
End date not specified	<ul style="list-style-type: none">• Apply the schedule repeatedly without designating the end date

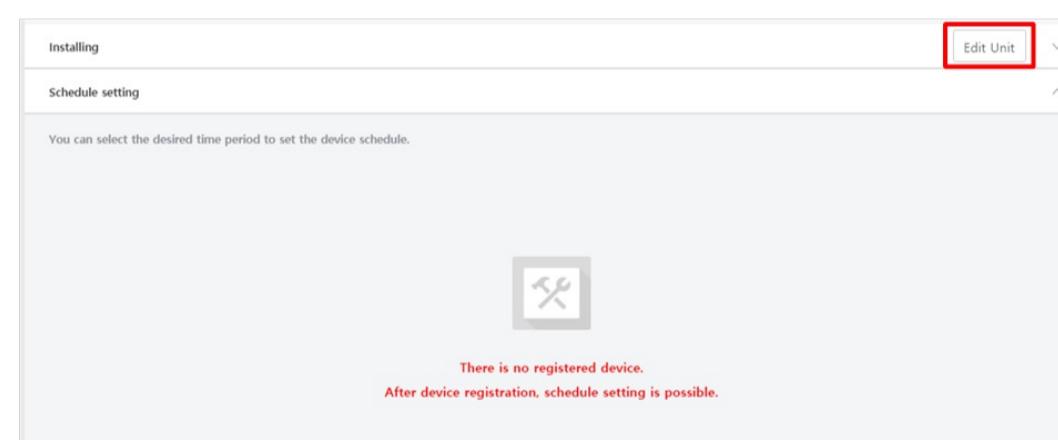
6. To apply the set exception date, click [Load] button.

- The exception date set in [Setting]-[system setting]'s schedule exception date setting is updated and displayed.

7. To apply the new exception date, click [Add Exception Date] button to set the exception date name and date to add.

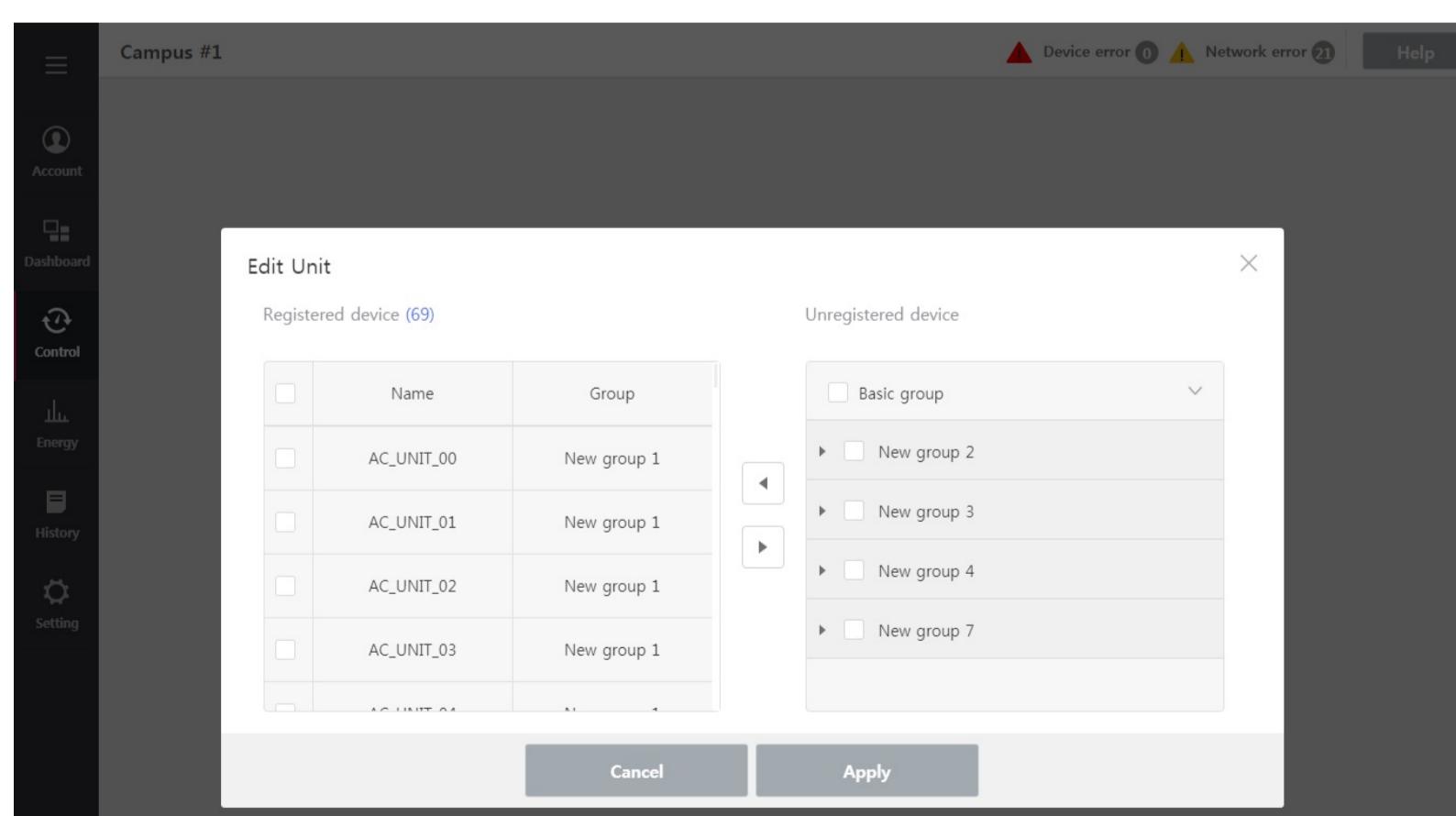
8. In the device setting section, click [Edit Unit] button.

- The Edit Unit window is displayed.



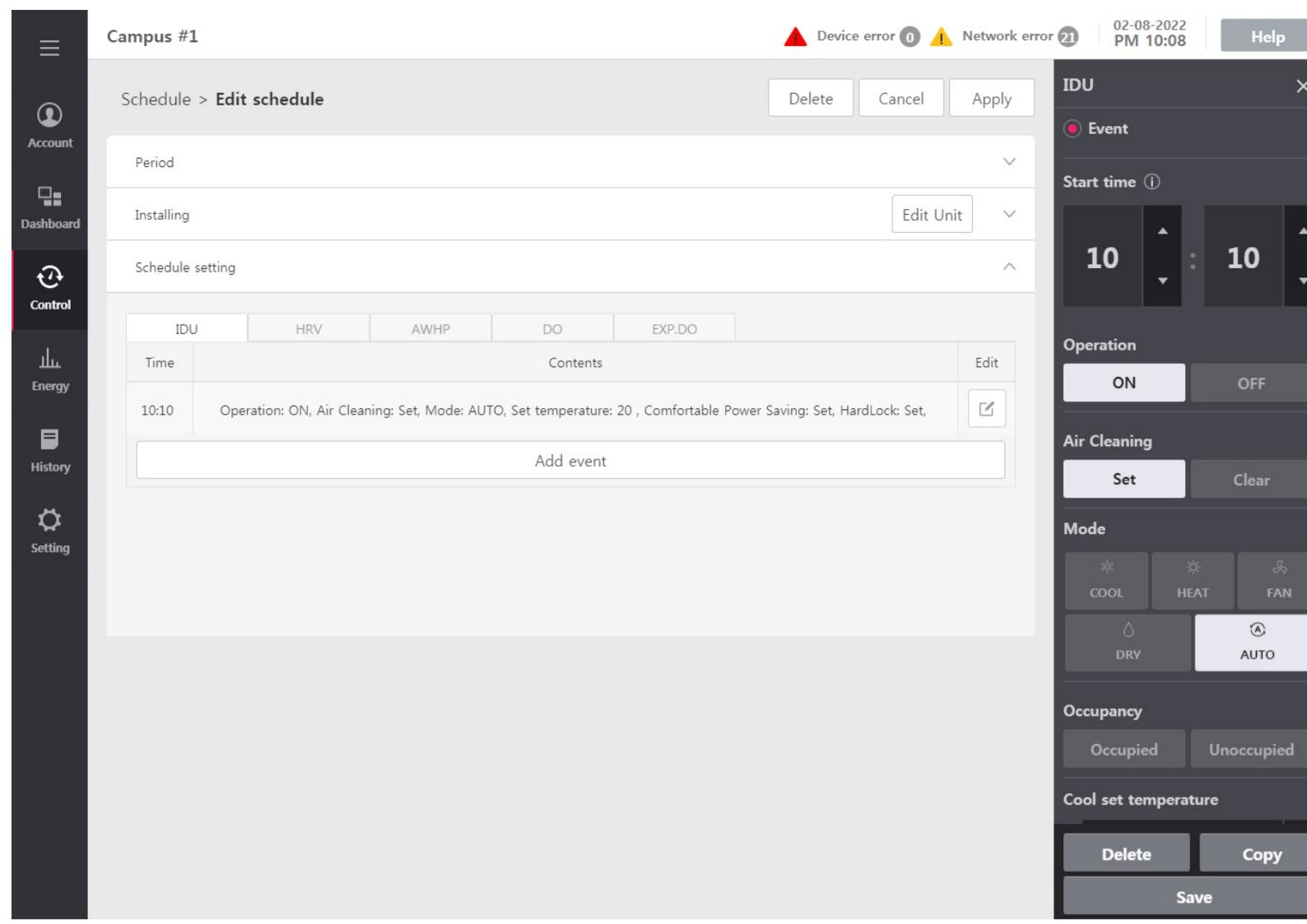
9. In the unregistered device list, click the checkbox of the device to register and click [◀] button.

- To register several groups at once, click the checkbox of the group to register and click [◀] button.
- The selected devices are added to the registered device list.



10. When device registration is completed, click [Apply] button.

11. To add schedule event, in **Schedule setting**, select device type tab, and click [Add event] button or edit button to set control status of the device in the right side control area.



12. When control setting is completed, click **[Save]** button.
13. When all settings are completed, click **[Apply]** button.



Delete schedule

You can delete already registered schedule.

1. In the left menu tab, click [Control] > [Schedule Control] menu.
 - The schedule control screen is displayed.
2. In the schedule list, click the Edit button of the schedule to delete.

The screenshot shows the 'Schedule control' screen for 'Campus #1'. On the left is a vertical menu with tabs: Account, Dashboard, Control (which is selected and highlighted in red), Energy, History, and Setting. The main area shows a table of scheduled operations. One row is selected, showing details: Name: Schedule, Repeat: Daily, Start date: 2018-01-29, End date: Not specified, Device: All (69), IDU (16), HRV (16), AWHP (32), DO (2), EXP.DO (3). An 'Edit' button is visible next to the row. A modal dialog box is open on the right, titled 'Schedule'. It contains fields for 'Repeat' (set to Mon., Tue., Wed., Thu., Fri., Sat., Sun.), 'Start date' (2018-01-29), 'End date' (Not specified), 'Registered device' (All (69), IDU (16), HRV (16), AWHP (32), DO (2), EXP.DO (3)), and 'Exception date' (Not set). At the bottom of the dialog are buttons for 'Delete', 'Copy', and 'Edit'.

3. In the right side Edit window screen, click [Delete] button.
4. When notice popup window is created, click [Check] button.



Copy schedule

You can copy and use registered schedule.

1. In the left menu tab, click [Control] > [Schedule Control] menu.

- The schedule control screen is displayed.

2. In schedule list, click edit button of the schedule to copy.

The screenshot shows the 'Schedule control' screen for 'Campus #1'. On the left is a vertical navigation menu with tabs: Account, Dashboard, Control (which is selected and highlighted in red), Energy, History, and Setting. The main area displays a table of scheduled operations. One row is selected, showing details: Name: 'Schedule', Repeat: 'Daily', Start date: '2018-01-29', End date: 'Not specified', Device: 'All (69), IDU (16), HRV (16), AWHP (32), DO (2), EXP.DO (3)'. An 'Edit' button is visible next to the row. A modal window titled 'Schedule' is open on the right, showing the 'Schedule status' with 'Set' selected. It also displays the repeat pattern: 'Mon., Tue., Wed., Thu., Fri., Sat., Sun.' and the start date: '2018-01-29'. The 'Edit' button is at the bottom of the modal.

3. In the right side edit window screen, click [Copy] button.

4. When notice popup window is created, click [Check] button.



Edit schedule

You can change the set contents of the already registered schedule.

1. In the left menu tab, click [Control] > [Schedule Control] menu.
 - The schedule control screen is displayed.
2. In the schedule list, click Edit button of the schedule to edit.

The screenshot shows the 'Schedule control' screen for 'Campus #1'. On the left is a vertical navigation menu with tabs: Account, Dashboard, Control (which is selected and highlighted in red), Energy, History, and Setting. The main area shows a table of scheduled operations. One row is selected, showing details: Name: Schedule, Repeat: Daily, Start date: 2018-01-29, End date: Not specified, Device: All (69), IDU (16), HRV (16), AWHP (32), DO (2), EXP.DO (3). To the right of the table is an 'Edit' window. The window has tabs: Schedule (selected), Schedule status (Set is selected), and a detailed view of the schedule. The detailed view shows: Repeat: Mon., Tue., Wed., Thu., Fri., Sat., Sun.; Start date: 2018-01-29; End date: Not specified; Registered device: All (69), IDU (16), HRV (16), AWHP (32), DO (2), EXP.DO (3); and Exception date: Not set. At the bottom of the edit window are buttons: Delete, Copy, and Edit (which is highlighted in red).

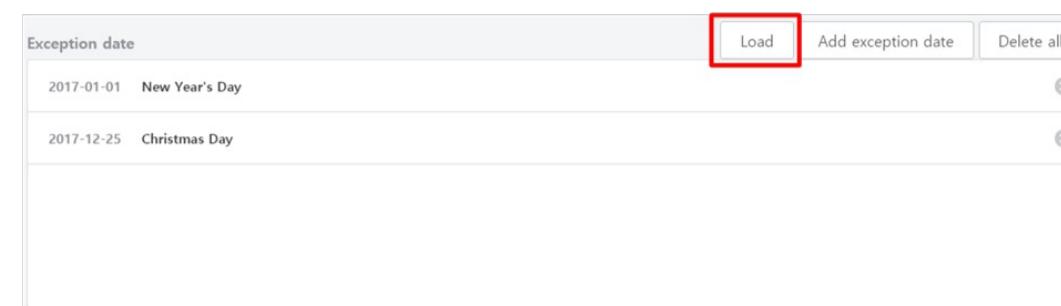
3. In the right side edit window screen, click [Edit] button.
4. Edit the schedule contents.
 - To check the detail contents, check 'Add Schedule' Category.



Load exception date

You can load already set exception date.

1. In the left menu tab, click [Control] > [Schedule Control] menu.
 - The schedule control screen is displayed.
2. In the schedule list, click [Add Schedule] button.
 - The Add schedule screen is displayed.
3. In the exception date tab, click [Load] button
 - The exception date set in [Setting]-[system setting]'s schedule exception date setting is updated and displayed.





Add exception date

You can add new exception date.

1. In the left menu tab, click [Control] > [Schedule Control] menu.

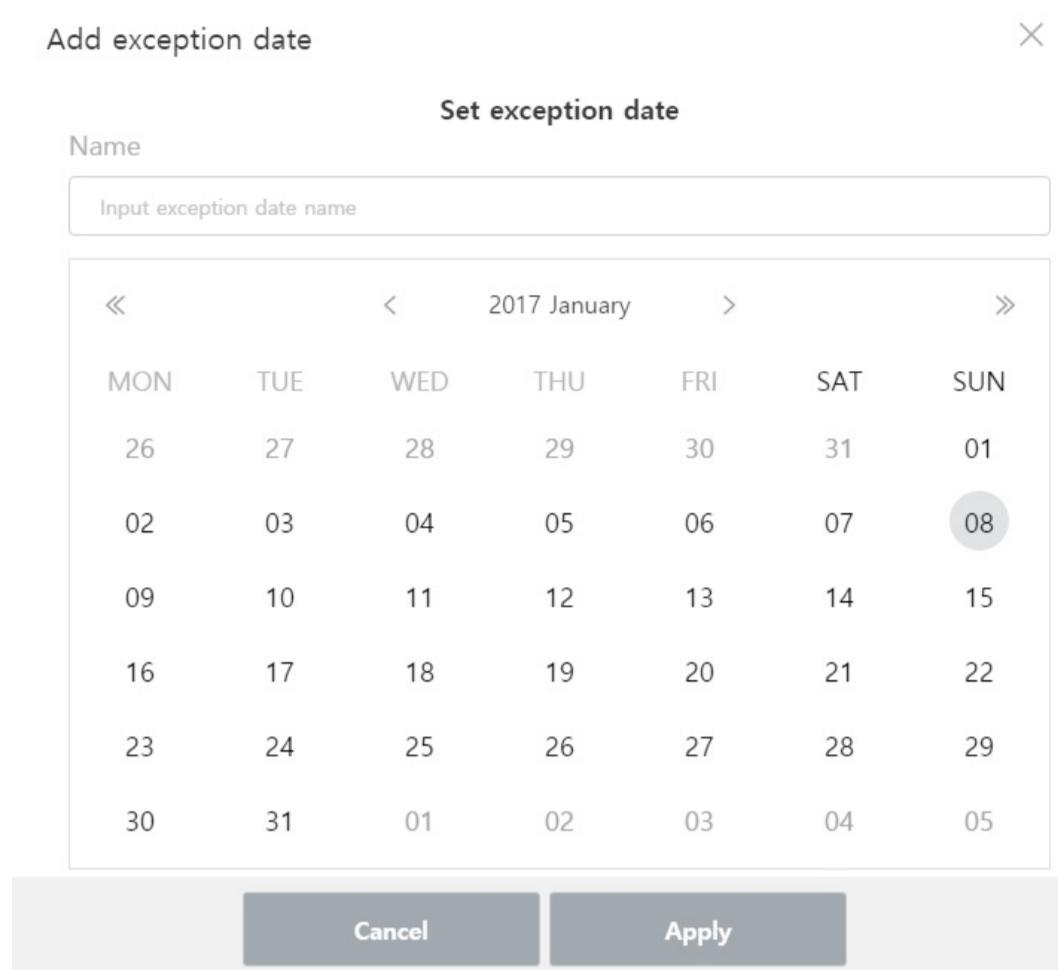
- The schedule control screen is displayed.

2. In the schedule list, click [Add Schedule] button.

- The Add schedule screen is displayed.

3. In the exception date tab, click [Add Exception Date] button

- The Add exception date screen is displayed.



4. Input the desired exception date name.

5. Select the exception date to set.

6. When selection is completed, click [Apply] button.



Delete exception date

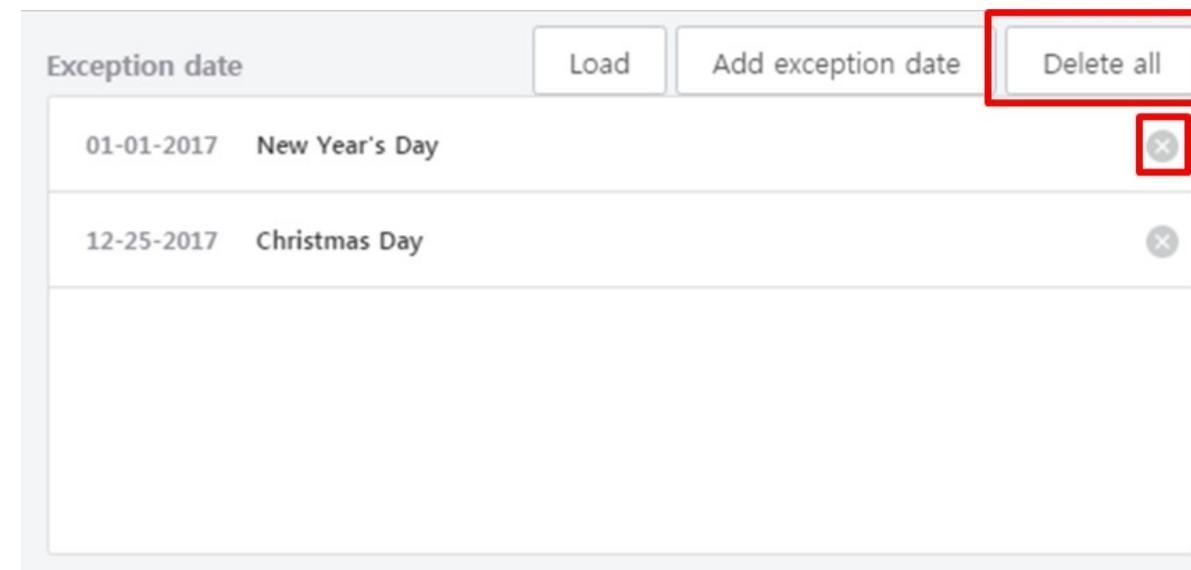
You can delete already registered exception date.

1. In the left menu tab, click [Control] > [Schedule Control] menu.

- The schedule control screen is displayed.

2. In Edit schedule screen, click [X] button to delete exception date.

- To delete the entire category, click [Delete All] button.





InterLocking

InterLocking is the function to interface with one or more equipment and to control output operation when input condition is satisfied. For InterLocking, you need to group the equipment to mutual interface in one group and apply the control setting. It describes the method to create and manage the group and equipment interface control method.

1. In the left menu tab, click [Control] > [InterLocking] menu.

- The InterLocking screen is displayed.

Type	Name	Address	Group	Condition
IDU	AC_UNIT_00	00	New group 1	Operation(ON) Mode(COOL)

Type	Name	Address	Group	Condition
IDU	AC_UNIT_01	01	New group 1	Operation(ON) Mode(AUTO)
IDU	AC_UNIT_02	02	New group 1	Operation(ON) Mode(AUTO)

2. In the group list, select the group to check the setting.

- The corresponding group's setting status is displayed in the screen.

3. In the group list, when you click [Set] / [Clear] button, you can set the InterLocking operation.

4. To start all the registered group, click [Set All] button, and to stop all, click [Clear All] button.

Note

Recommended specification

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

Add/edit InterLocking

You can add and edit new InterLocking.

1. In the left menu tab, click [Control] > [InterLocking] menu.

- The InterLocking screen is displayed.

2. Click [+ Add new pattern] button.

- Add InterLocking screen is displayed.

Name

General pattern Pattern that output control command is executed when the input condition is met.

Permit user control

Input Condition Start Output Immediately	Output Condition 1 Start Output Immediately
---	--

Status and OR NAND NOR

Maintenance Time Cancel Setting 1Min. later



There is no registered device.
Register the device by selecting Edit device button.

3. In the InterLocking name input field, input the desired InterLocking name.

4. Select pattern type.

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

5. Select whether to permit user control. (Only general pattern is possible)

- When check box is selected, even if the status is changed by the InterLocking, user may change the status of the equipment.

6. Set equipment interface condition. When you press **[+]** button, you can add up to 3 output conditions.

- It only appears when input condition tab is selected.

Category	Description
Status	<ul style="list-style-type: none"> AND : all device conditions match OR : one or more device conditions match NAND : one or more device conditions do not match NOR : no condition matches
Maintaining time	If it is set, while all input conditions are met, output condition control after maintaining time Press [▼] button to select maintaining time

- It only appears when output condition tab is selected.

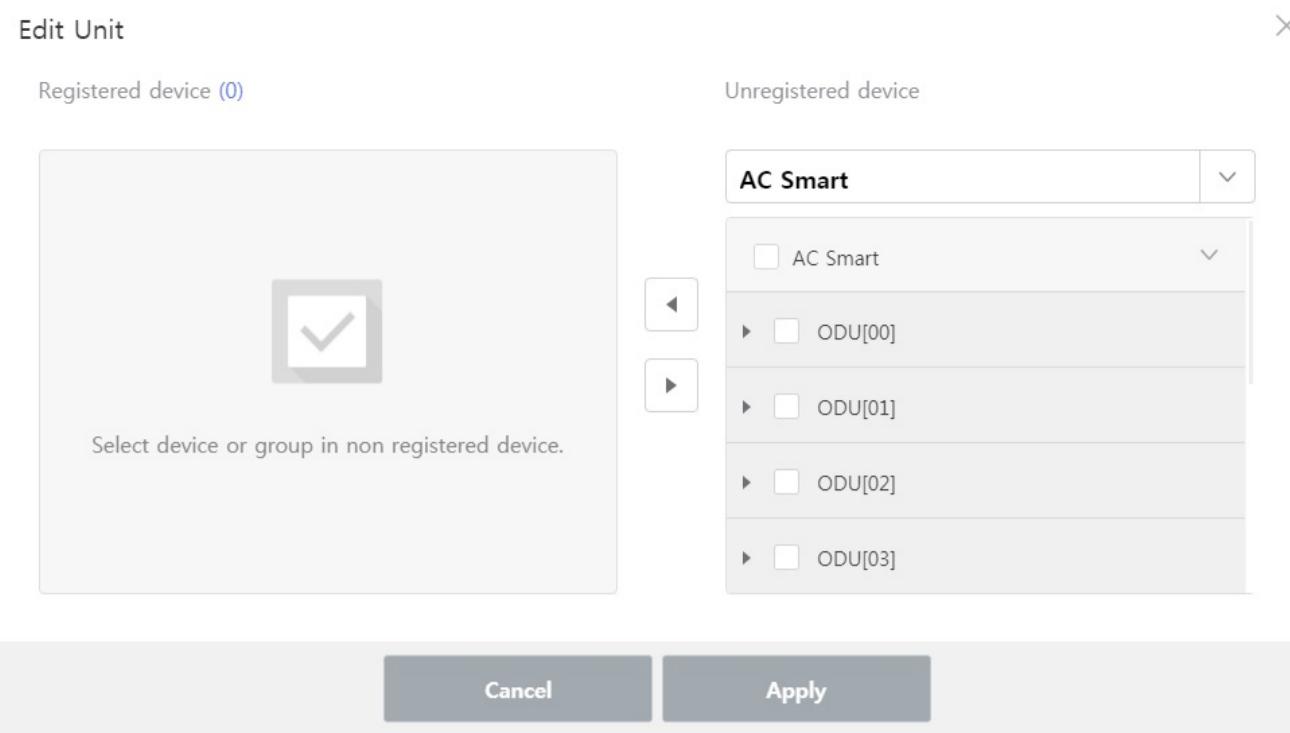
Category	Description
Send e-mail	When check box is selected, if the corresponding event is executed in ACP, whether event occurred is sent to the e-mail set in Setting > Administrator Setting > receiving e-mail address <ul style="list-style-type: none"> ACP shall be connected to internet network that can send e-mail.
Delay time	If it is set, when input condition is met, output condition is controlled after the registered delay time Press [▼] button to select delay time <ul style="list-style-type: none"> If input condition is met, even if it becomes a status that does not meet the input condition during the delay time, output condition is controlled after delay time.

7. To add device, click **[Edit Unit]** button.

- The Edit Unit popup window appears.

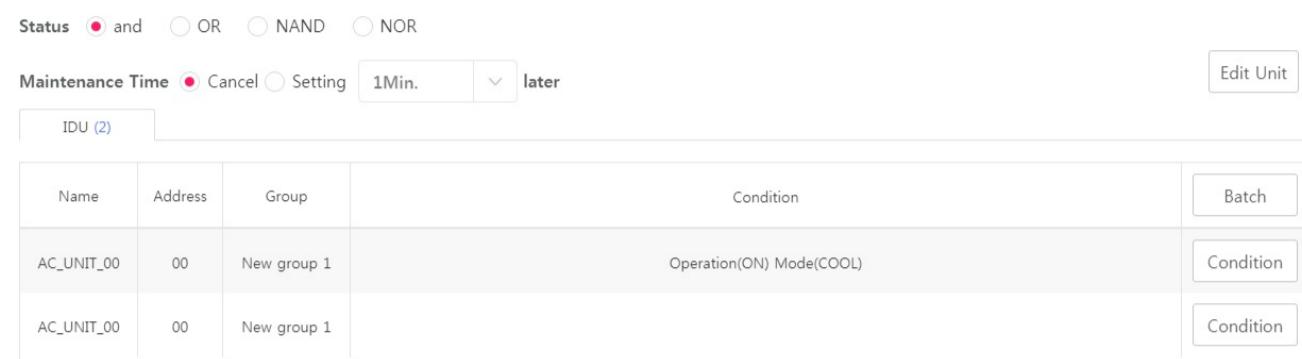
8. In the selectable device list, click the checkbox of the device to register and click **[◀]** button.

- To register several groups at once, click the checkbox of the group to register and click **[◀]** button.
- The selected devices are added to the registered device list.



9. When device registration is completed, click **[Apply]** button.

10. Click registered device's **[Condition]** button.



11. In the right side control window section, set the desired control status.

12. Select output condition tab, and run No. 7~11 processes in the order.

13. To save the set contents, click **[Apply]** button.

Note

Meaning of Odor Conditions by Level

- Reference Value 2 : Weak
- Reference Value 4 : Moderate
- Reference Value 5 : Strong
- Reference Value 6 : Very strong

Delete InterLocking

You can delete registered InterLocking.

1. In the left menu tab, click **[Control] > [InterLocking]** menu.
 - The InterLocking screen is displayed.
2. In the InterLocking list, select the group to delete, and click **[Delete]** button.
3. When InterLocking delete popup window appears, click **[Yes]** button.
 - In the InterLocking list, the selected category is deleted.



Time limit control

You can control the device to operate for the set time and automatically stop.

1. In the left menu tab, click [Control] > [Time limit control] menu.
2. In the group list, select the group to check the setting.
 - The corresponding group's setting status is displayed in the screen.
3. In the group list, you can click [Set] / [Clear] button to set the time limit operation.
4. To start all the registered group, click [Set All] button, and to stop all, click [Clear All] button.

The screenshot shows the 'Time limit control' interface. On the left, a sidebar lists 'Campus #1' with sections for 'Account', 'Dashboard', 'Control' (which is selected and highlighted in red), 'Energy', 'History', and 'Setting'. Under 'Control', there are buttons for '+ Add new group', 'All (2)', 'group1' (selected), and 'group2'. For 'group1', there are 'Set' and 'Clear' buttons. The main content area is titled 'Time limit control' and shows 'group1' settings: 'Time limit control : 1', 'Applied day of week : Mon.,Tue.,Wed.,Thu.,Fri.,Sat.,Sun.', and 'Application time: All day'. Below this is a table titled 'Registered device (16)' with 16 rows of data. The table columns are: Type, Name, Address, Usage time, Remaining time, Operation, Current temp..., Set temperatu..., Mode, Hot water, and Group. Each row represents a device (IDU) with values corresponding to the settings in the screenshot.

Type	Name	Address	Usage time	Remaining time	Operation	Current temp...	Set temperatu...	Mode	Hot water	Group
IDU	IDU_00	00	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_01	01	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_02	02	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_03	03	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_04	04	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_05	05	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_06	06	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_07	07	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_08	08	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00
IDU	IDU_09	09	0Min.	60Min.	ON	23.0 °C	24.0 °C	*COOL	-	Group_00

Note

Recommended specification

- Time limited operation : No. of groups is 10
- If it is set to be over the recommended specification, performance degradation may occur.

Add/edit Time limit control group

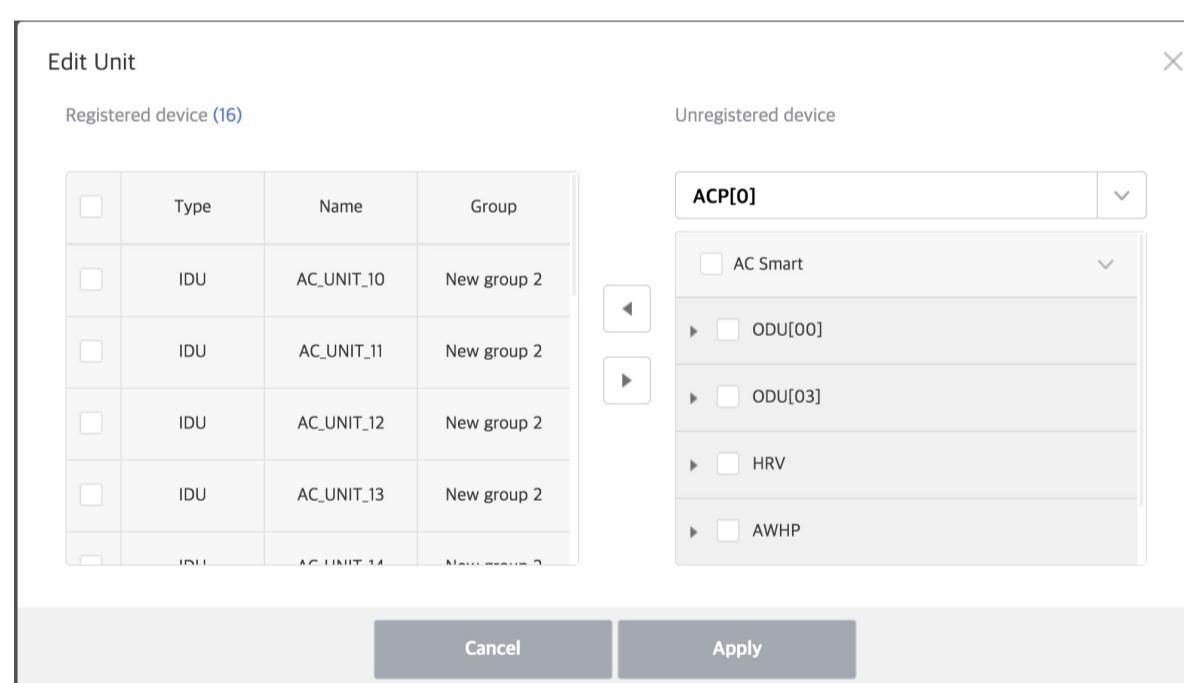
You can add and edit Time limit control group.

1. In the left menu tab, click [Control] > [Time limit control] menu.
 - Time limit control screen is displayed.
2. Click [+ Add New Group] button.
 - Add new group screen is displayed.
 - During the editing, when you select the group to edit and click [Edit] button, the following screen is displayed.

3. Input group name.
4. Select continuous operation time, days of week for application and application time.

Category	Description
Continuous operation time	<ul style="list-style-type: none"> Press [▼] button, and set the desired continuous operation time (1 hour ~ 4 hours)
Applied day of week	<ul style="list-style-type: none"> Select checkbox to select day of week to run the time limit operation
Application time	<ul style="list-style-type: none"> Check box to select time to start time-limited operation <ul style="list-style-type: none"> All Day: Runs time-limited operation for 24 hours Set Period: Runs time-limited operation from start time to end time set by user

5. To add device, click [Edit Unit] button.
- The Edit Unit popup window appears.



6. In the selectable device list, click the checkbox of the device to register and click [◀] button.
- For time limited control, you can register all devices except DI, DO, ON/OFF, Chiller, and Exp.I/O device.
- To register several groups at once, click the checkbox of the group to register and click [◀] button.
- The selected devices are added to the registered device list.
7. When device registration is completed, click Edit Unit popup window's [Apply] button.
8. Click [Apply] button at the top right side.

Delete Time limit control

You can delete Time limit control group.

1. In the left menu tab, click [Control] > [Time limit control] menu.
- Time limit control screen is displayed.
2. In the group list, select the group to delete and click [Delete] button.
3. When Delete group popup window appears, click [Yes] button.

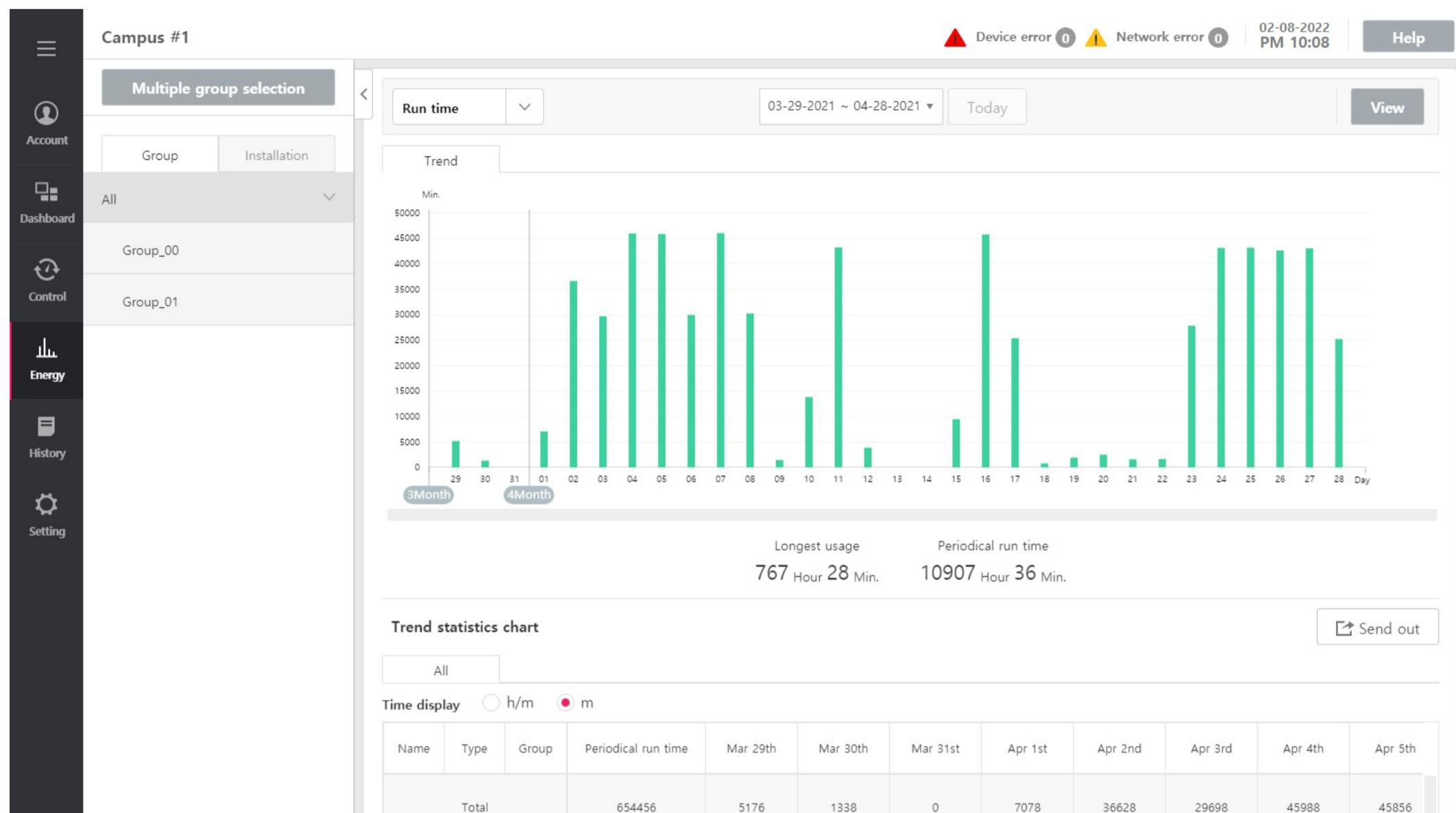


Energy Usage

It describes the method to check the device's operation time, electricity usage amount, electricity usage amount(total amount over time), gas usage amount, TOE, and CO₂ with values and graph.

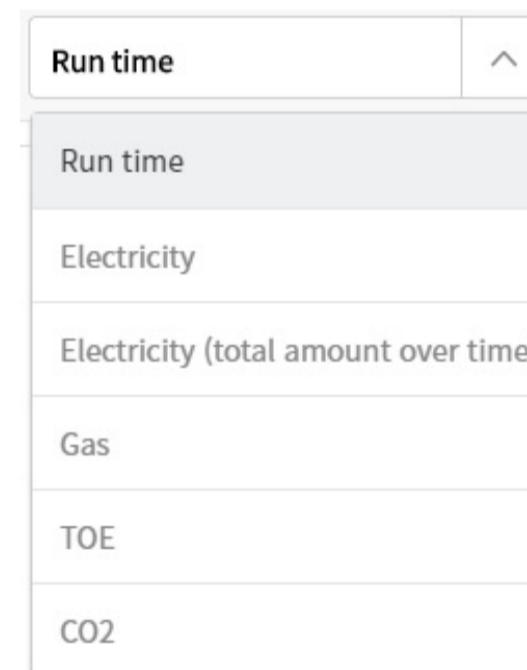
1. In the left menu tab, click [Energy] > [Energy Usage] menu.

- Energy usage amount screen is displayed.



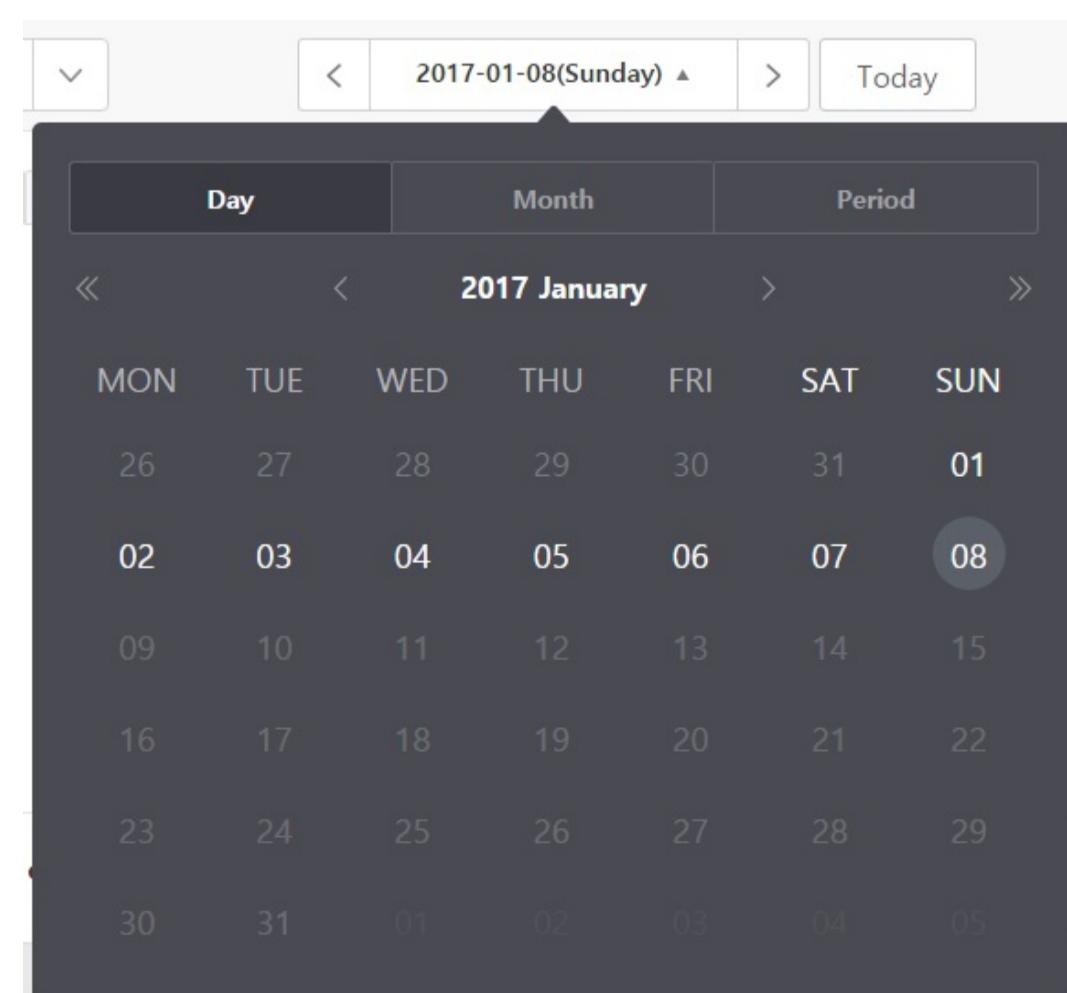
2. In the group list, select group to view.

3. In the top left side box, select the category to view.



4. Set the viewing period.

Category	Description
Day	Set the desired day in mini calendar
Month	Set the desired month in mini calendar
Period	Set the desired period in mini calendar
Today	Set today's date as the base date



5. To view the set contents, click [View] button.

- Energy usage amount of the set period is displayed.

- To save the viewed contents, click **[Send Out]** button.

(In AC Smart 5 Device, it is stored in USB.)

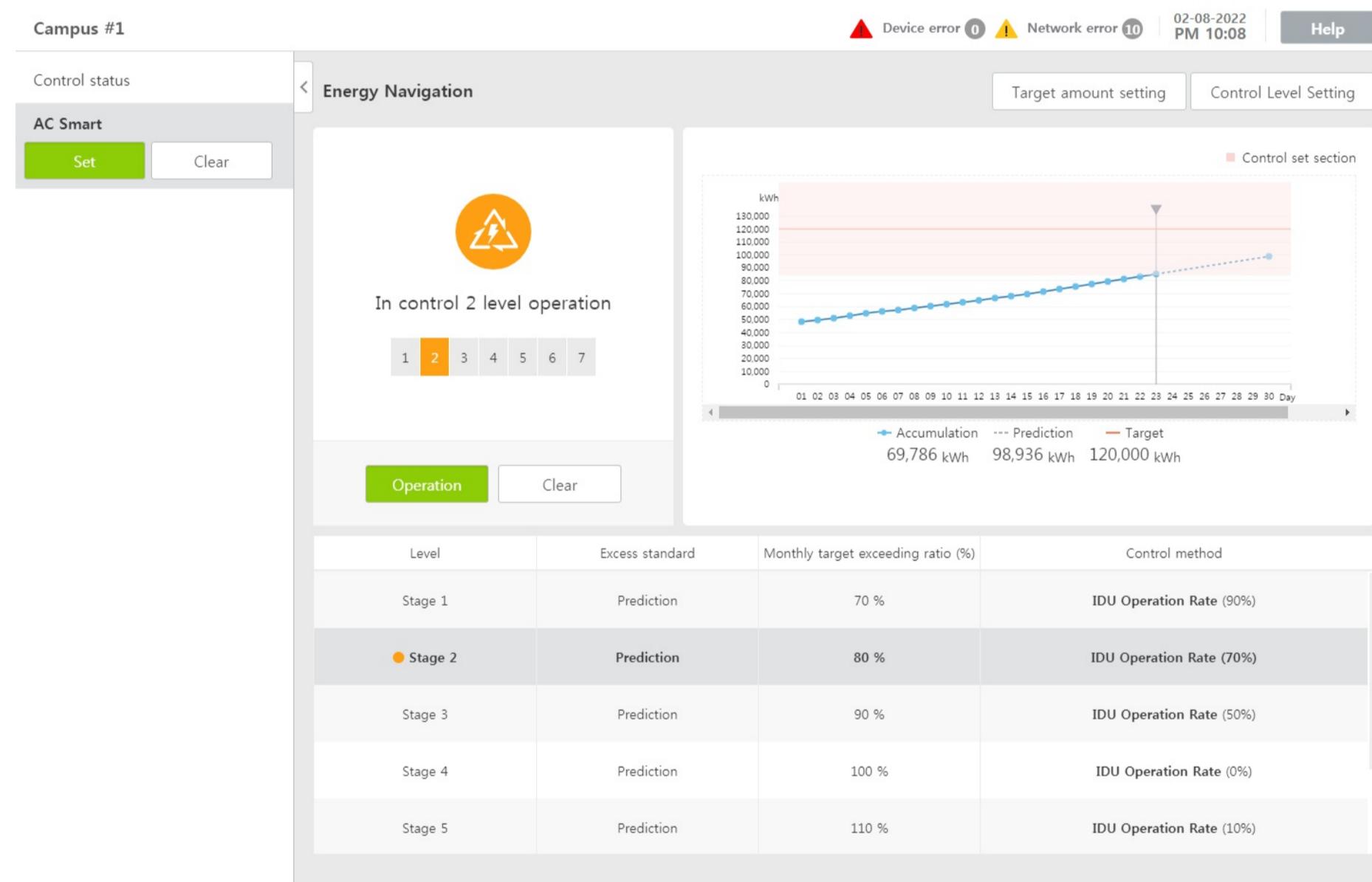
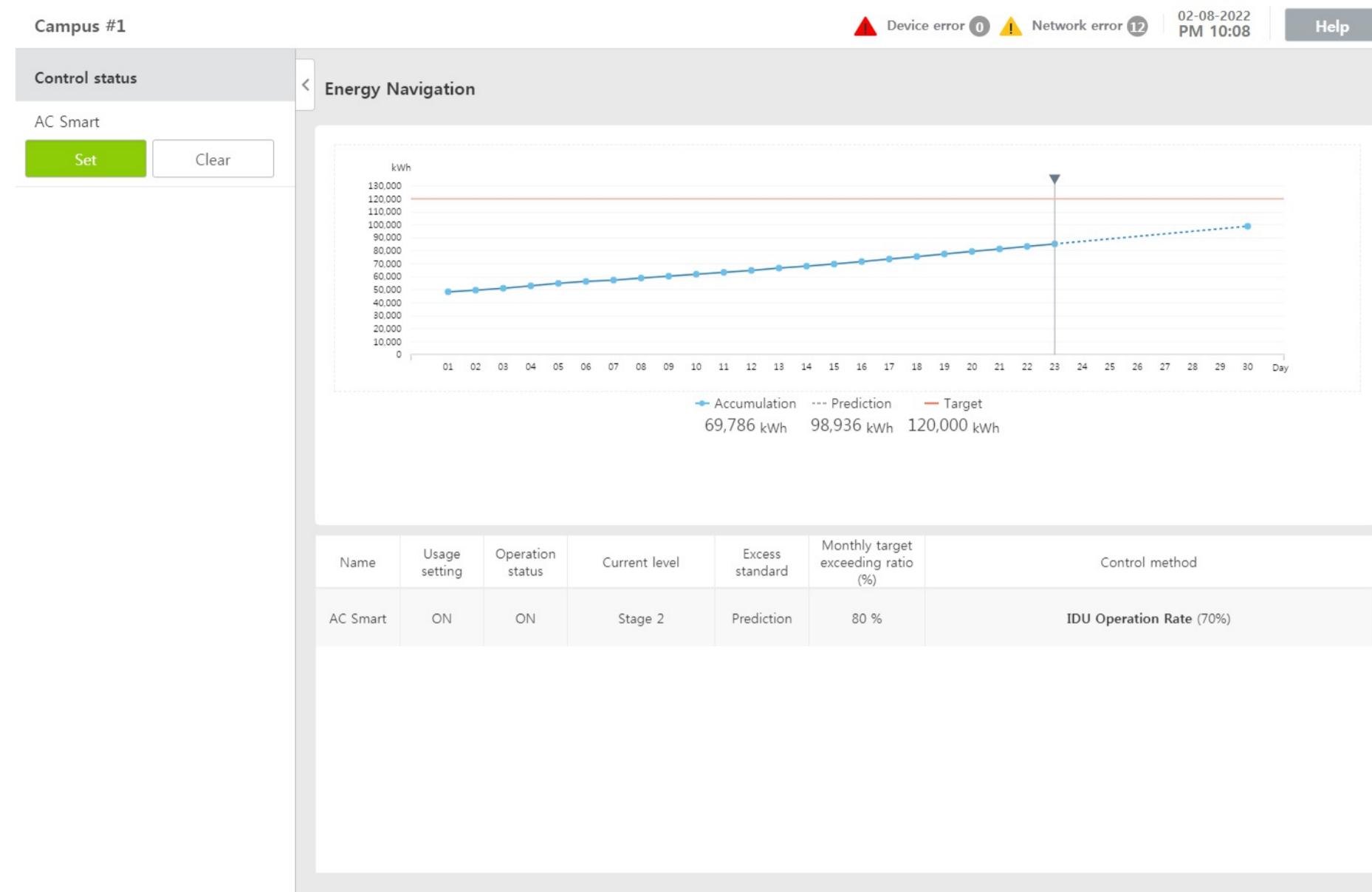
Note

- Viewing power is possible only when PDI is installed.
- If PDI is installed, indoor unit, ERV DX, and Heating address shall be set to avoid overlapping.
- The power consumption amount appeared in the program may be a little different from the power consumption amount marked on actual bill.
- In [Setting]-[Installing], only ACP with [Electricity Usage Amount] set can be monitored.
- Viewing gas is possible only when GDI is installed.
- The gas amount appeared in the program may be a little different from the gas amount marked on actual bill.
- In [Setting]-[Installing], only ACP with [Gas usage amount] set can be monitored.
- Energy monitor maintains only the last 1 year's data.
- Hourly data is provided up to last 3 months.



Energy Navigation

Energy Navigation is the function that can control [ODU capacity]/[IDU Operation Rate]/[IDU] for each level according to the power usage amount forecast and current power usage amount to be able to manage the monthly power usage amount below the target amount.



Add target amount

You can add Energy Navigation's target amount.

1. In the left menu tab, click [Energy] > [Energy Navigation] menu.
2. In the control status tab, click the group to add target amount.
3. Click [Target amount setting] button at the top right side.
 - Target amount setting window appears.

Energy target management(AC Smart)

Cancel Apply

Input method Direct input Decrease ratio compared to the previous year

Monthly target amount		Decrease ratio	
Batch input	<input type="text"/>	<input type="button" value="Apply"/>	
Month	Target value	Month	Target value
1Month	100000	7Month	100000
2Month	100000	8Month	100000
3Month	100000	9Month	100000
4Month	100000	10Month	100000
5Month	100000	11Month	100000
6Month	100000	12Month	100000
Total 1200000 kWh			

100 %
Previous year

4. Input target amount in each month.

- To input in all months at once, input target amount in batch input field and click **[Apply]** button on the side.

5. When target amount input is completed, click **[Apply]** button at the top right side.

6. When Apply notice window appears, click **[Check]** button.

Control Level Setting

You can set control level of Energy Navigation.

1. In the left menu tab, click **[Energy] > [Energy Navigation]** menu.

2. In the control status tab, click the group to set the control level.

3. Click **[Control Level setting]** button at the top right side.

- Control Level Setting window appears.

Energy Navigation > Control Level Setting

Cancel Apply Help

Set control execution method AUTO Manual

+ Add level

Level	Excess standard	Monthly target exceeding ratio (%)	Control method	Delete
1	Prediction	70 %	ODU capacity 90%	<input type="button" value="Delete"/>
2	Prediction	80 %	ODU capacity 70%	<input type="button" value="Delete"/>
3	Prediction	90 %	ODU capacity 50%	<input type="button" value="Delete"/>
4	Prediction	100 %	ODU capacity 0%	<input type="button" value="Delete"/>

4. Select control run method setting.

Category	Description
AUTO	At the time of the alarm, control method set for each level is automatically executed.
Manual	At the time of the alarm, you select whether to execute the control method set for each level.

5. Click Control Level Setting window's **[+Add Level]** button.

6. Set the Control Level Setting categories.

Category	Description
Excess Standard	You can select between usage amount forecast and actual usage amount.
Monthly target excess ratio	You can set in 10% unit within 70~130%
Control method	ODU capacity: You can set in 10% unit within 0~100%. IDU operation ratio: You can set in 10% unit within 0~100%. IDU: IDU control

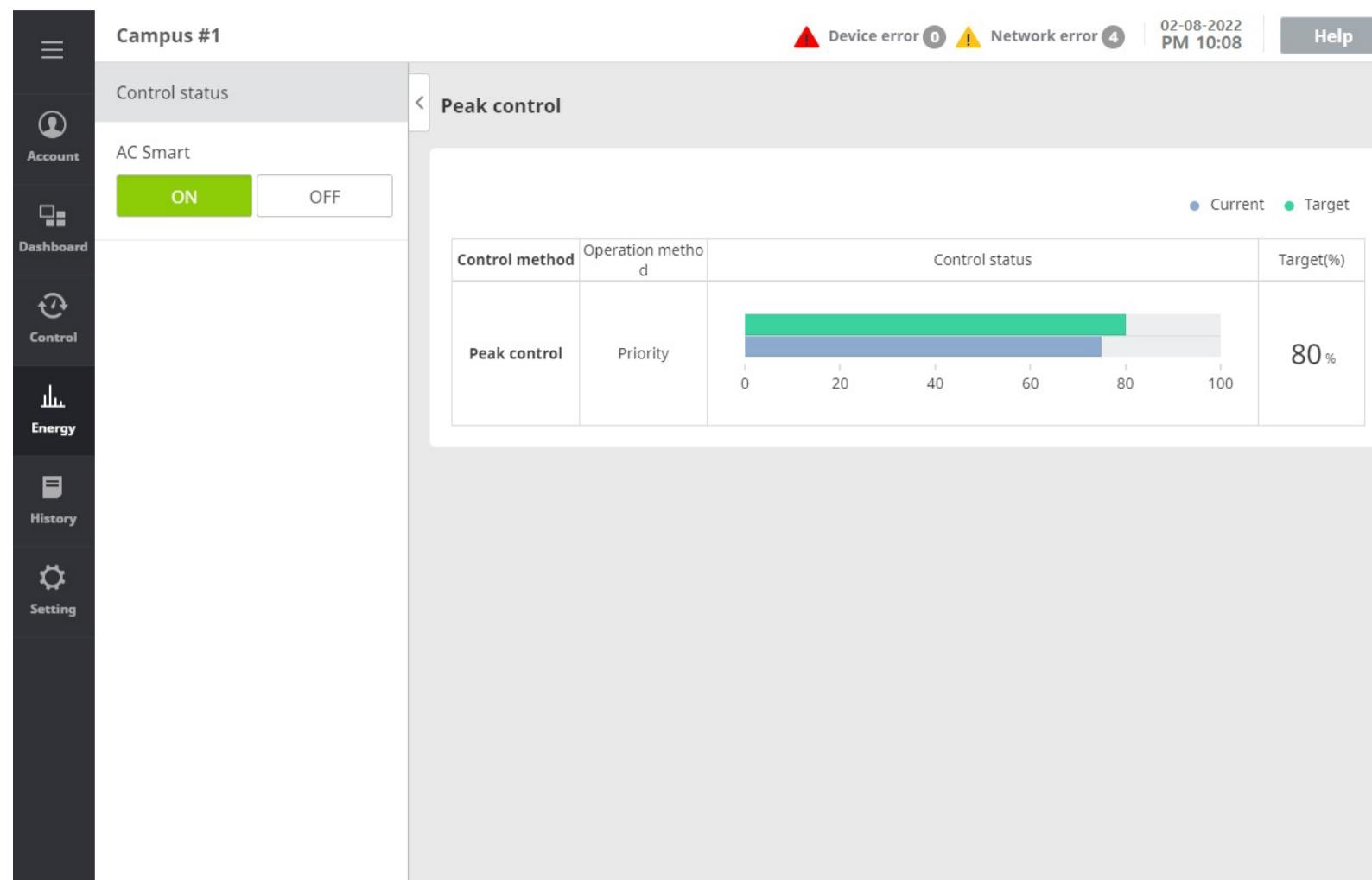
7. When setting is completed, click **[Apply]** button at the top right side.

8. When Apply notice window appears, click **[Check]** button.



Peak control

In the control status, you can check ACP name, control method, operation method, control status, and target operation ratio.



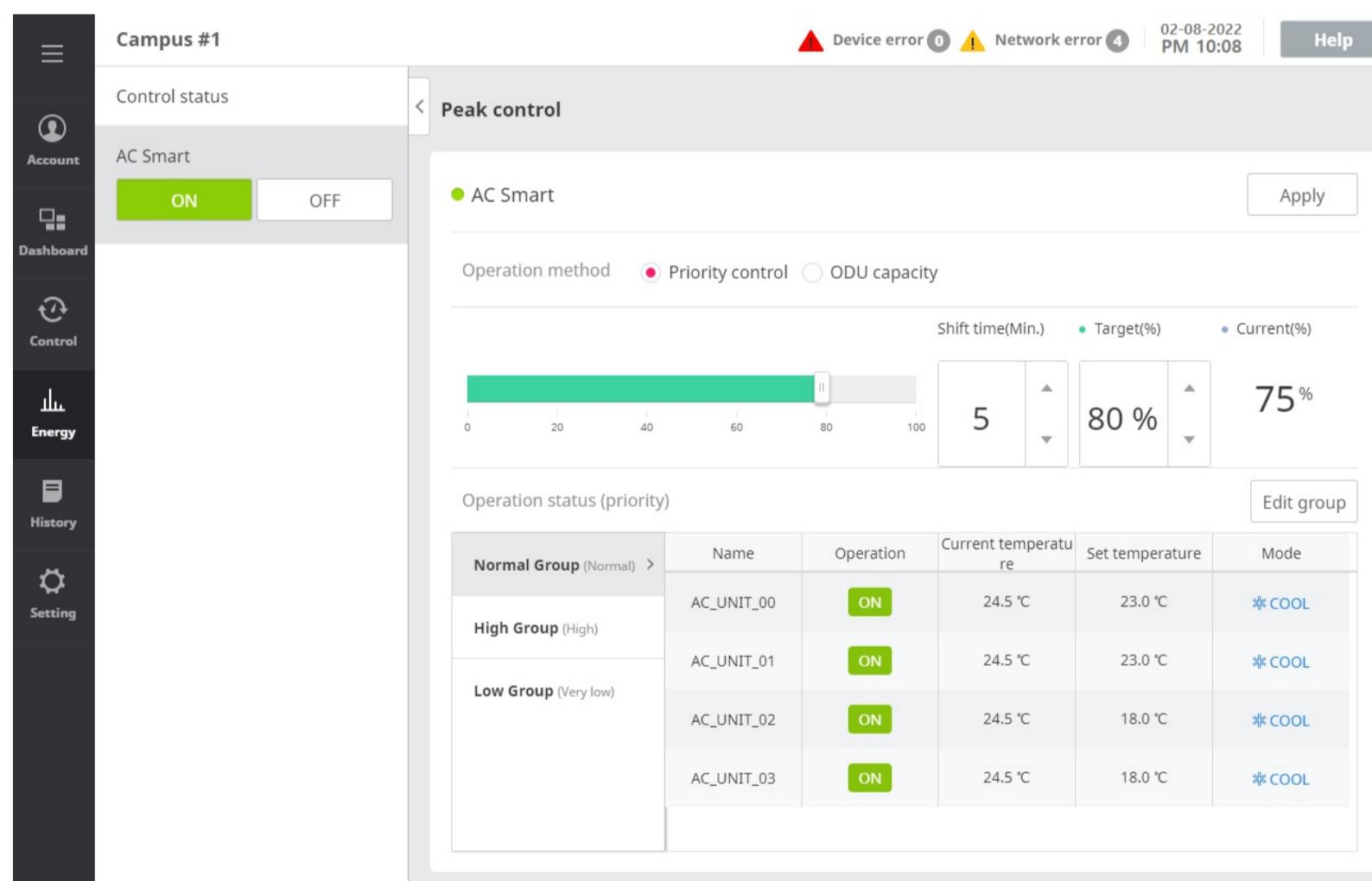
Peak control is a function to set the target operation rate to limit the maximum power usage and to control total power usage not to exceed the target operation rate. To prevent total power usage from exceeding target operation rate, cooling mode is automatically converted to wind only mode according to the priority and heating mode automatically stops, so the power usage amount can be saved.

1. In the left menu tab, click [Energy] > [Peak control] menu.

- Peak control screen is displayed.

2. In ACP list, select ACP to control.

- The corresponding ACP's control setting status is displayed in the screen.



3. In the control information display, set the desired control status.

Category	Description
Operation Method	<ul style="list-style-type: none"> Outdoor unit capacity control: Target operation ratio is applied in the units of outdoor unit to control outdoor unit capacity operation ratio Priority control: Controls according to the priority of ACP lower level groups
Operation ratio bar	<ul style="list-style-type: none"> Indoor unit's target operation ratio is displayed as bar graph You can drag the bar of the graph to set the target operation ratio
Current(%)	Among all of the selected ACP indoor units, it marks the % reached by the device currently in operation
Target(%)	Press [▲]/[▼] button to set the target operation ratio
Shift time(min.)	<ul style="list-style-type: none"> Press [▲]/[▼] button to set the cycle of forced operation stop in min. unit You can set to 5 ~ 15 min. range in the units of 1 min.
Operation status	It displays device name/whether operating/current temperature/set temperatureemode information

4. To apply the control setting, click **[Apply]** button.

- The set control status is saved.

5. To start the corresponding group with the set status, click the group list's **[ON]** button. To stop the corresponding group's operation, click the group list's **[OFF]** button.

Note

To change the control settings, stop the peak control operation first. (Stop peak control → Change and apply control settings → Operate peak control)

Add/edit peak group

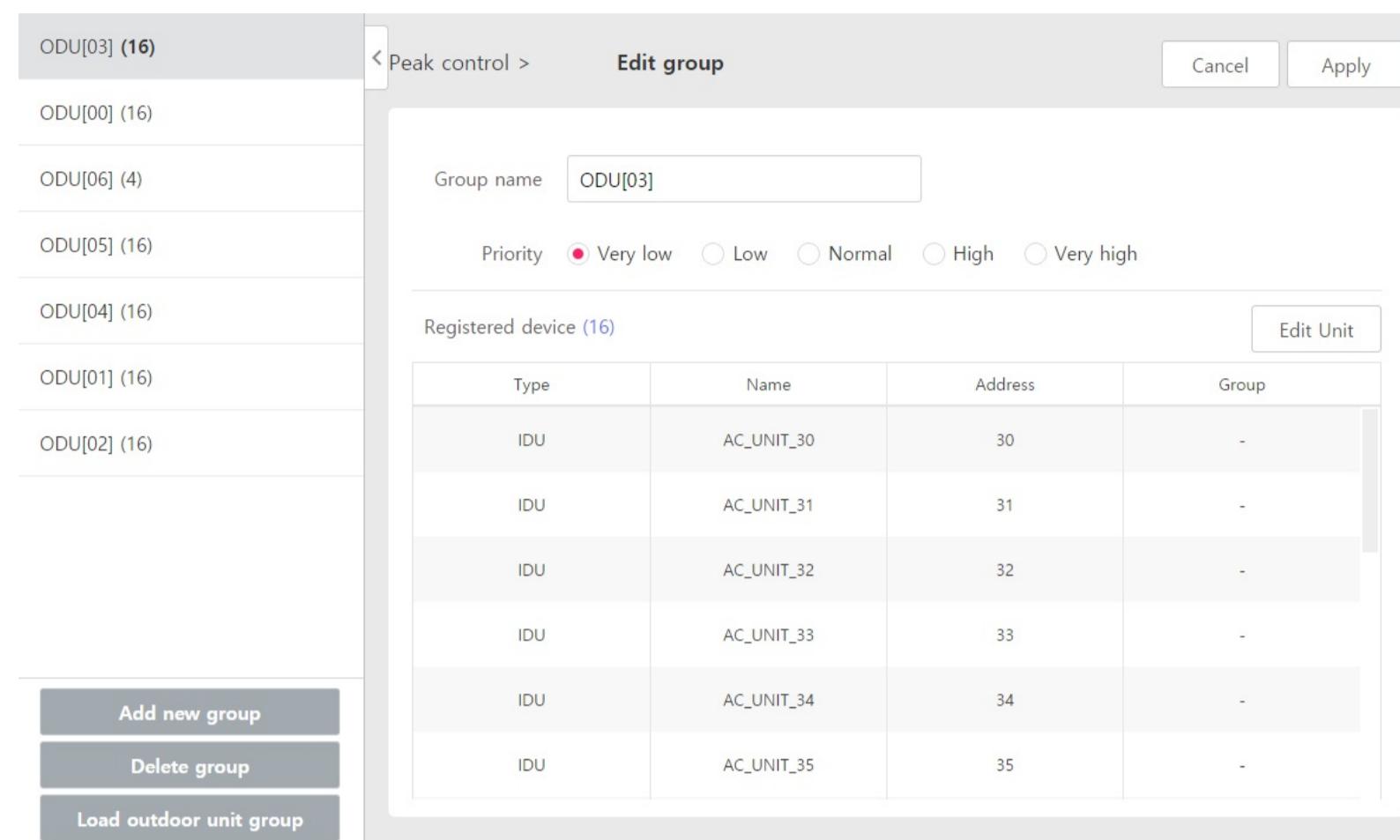
You can add and edit peak control group.

1. In the left menu tab, click [Energy] > [Peak demand control] menu.

- Peak demand control screen is displayed.

2. Click [Edit Group] button.

- Edit group screen is displayed.



Category	Description
Group name	Input the name of the group to add
Priority	Select the desired priority among very low/low/normal/high/very high
[Edit Unit]	Open device edit window (add or delete device list)
Registered device	It displays the device list registered in the group
[Add New Group]	Add group for peak control
[Delete Group]	Delete the selected peak group
[Load outdoor unit group]	Applied in the units of outdoor unit registered in ACP

3. Input the name of the corresponding group in the group name input field.

4. Select the desired priority.

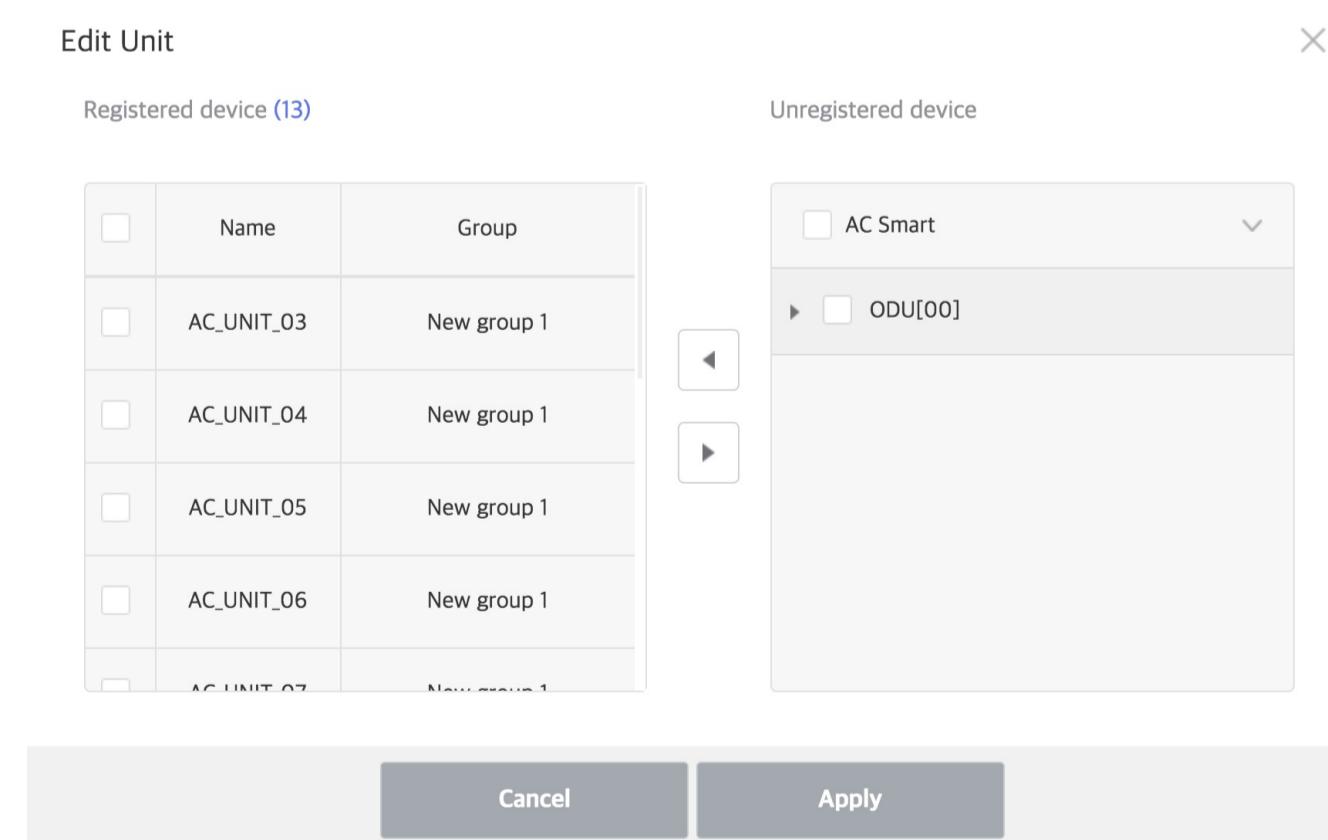
- The control levels are as follows: Very Low → Low → Medium → High → Very High

5. To register the device, click [Edit Unit] button.

- Edit Unit popup window appears.

6. In the unregistered device list, click the checkbox of the device to register and click [◀] button.

- For peak control, only indoor units can be registered.
- To register several devices at once, click the check boxes of the devices to register and click [◀] button.
- The selected devices are added to the registered device list.



7. To apply in Edit Unit popup window, click [Apply] button.

8. To save the set contents, click Peak demand control screen's [Apply] button.

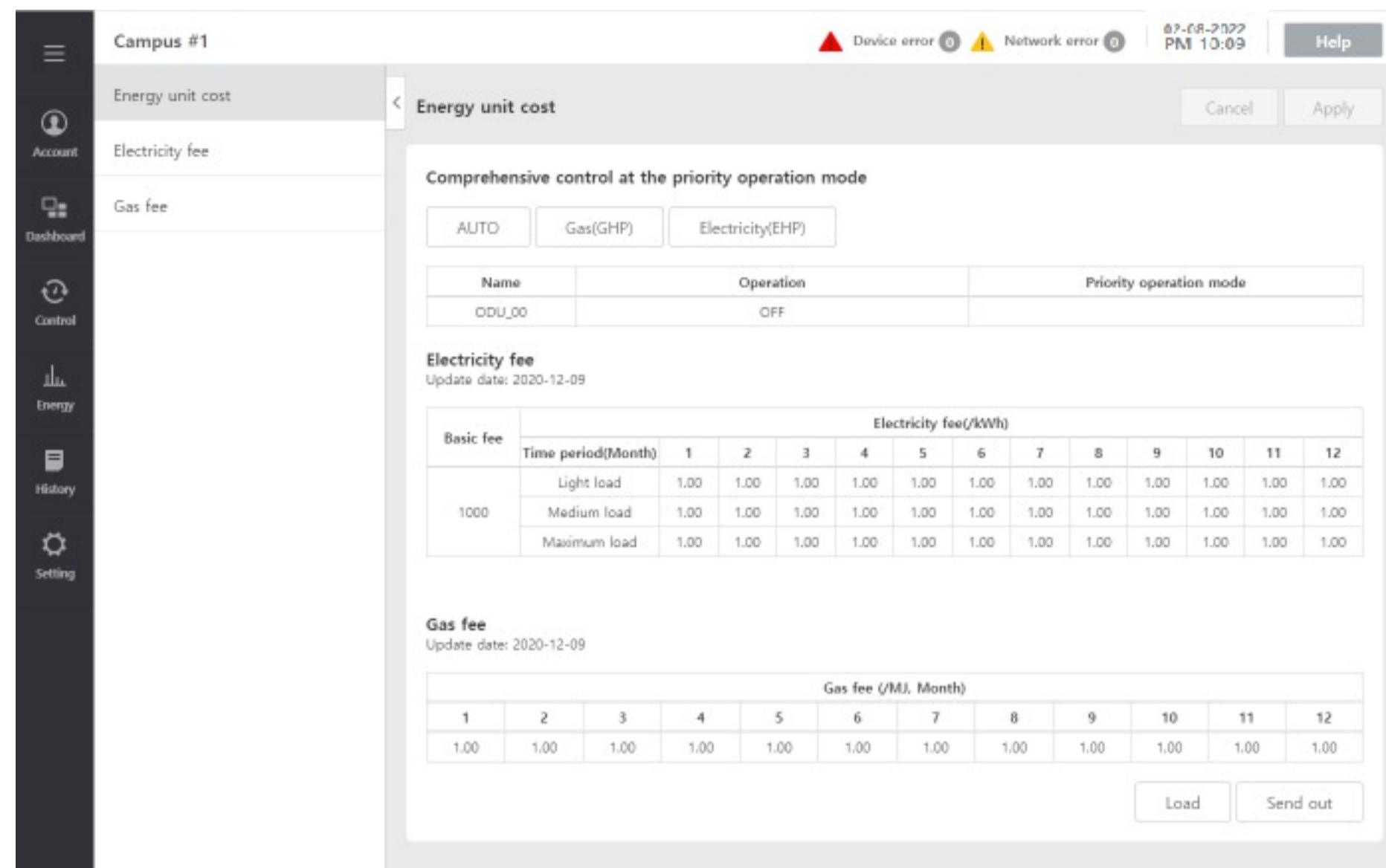


Energy Unit Cost

In the Energy Unit Cost menu, you can check the Priority Mode Total Control option and the electricity and gas fee states currently set.

Note

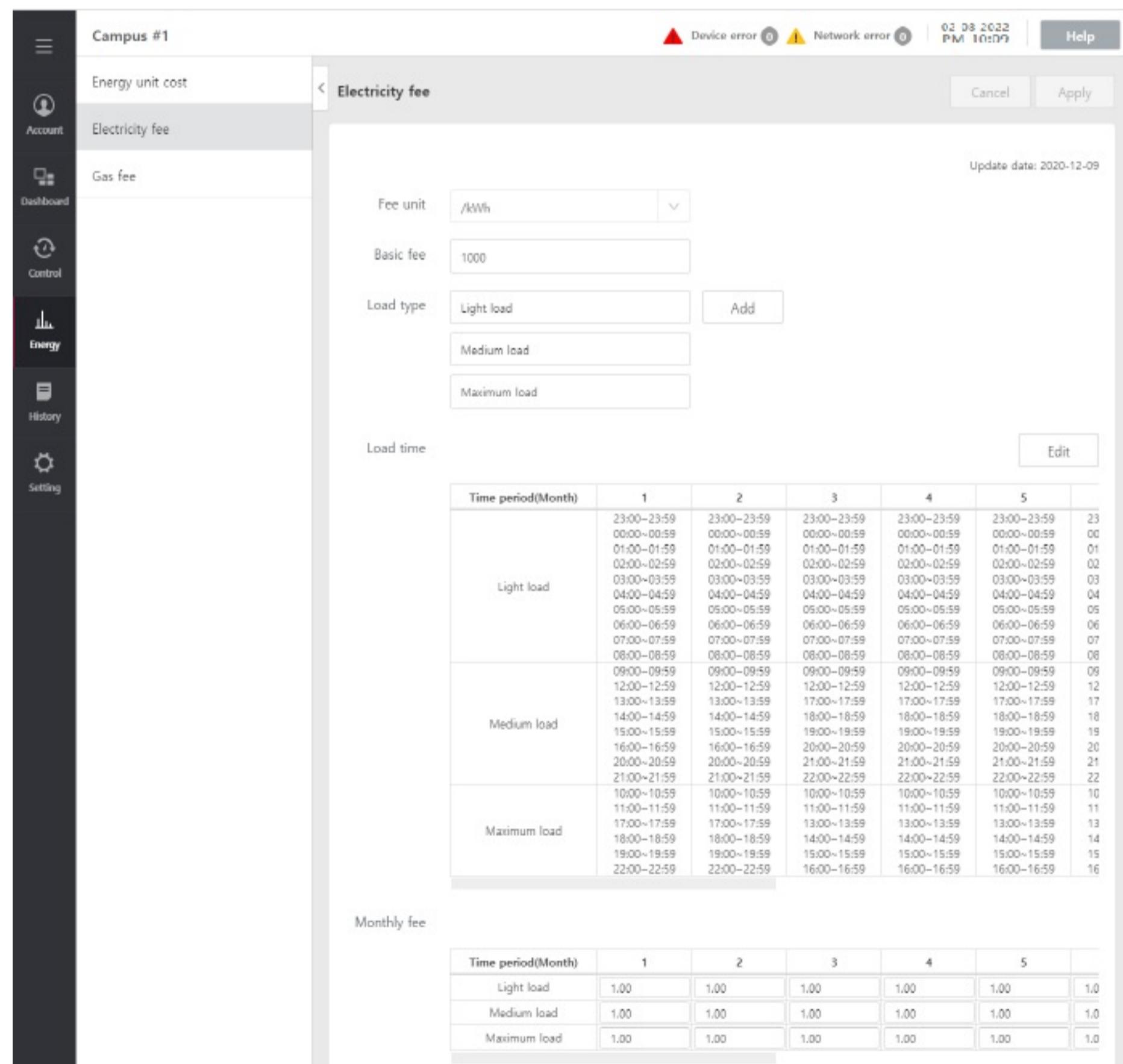
- Energy Unit Cost is an exclusive menu for a GHP Hybrid outdoor unit. It is not available when other outdoor units are linked.



Electricity Fee

The Electricity Fee option allows you to set the monthly fee based on the load hour.

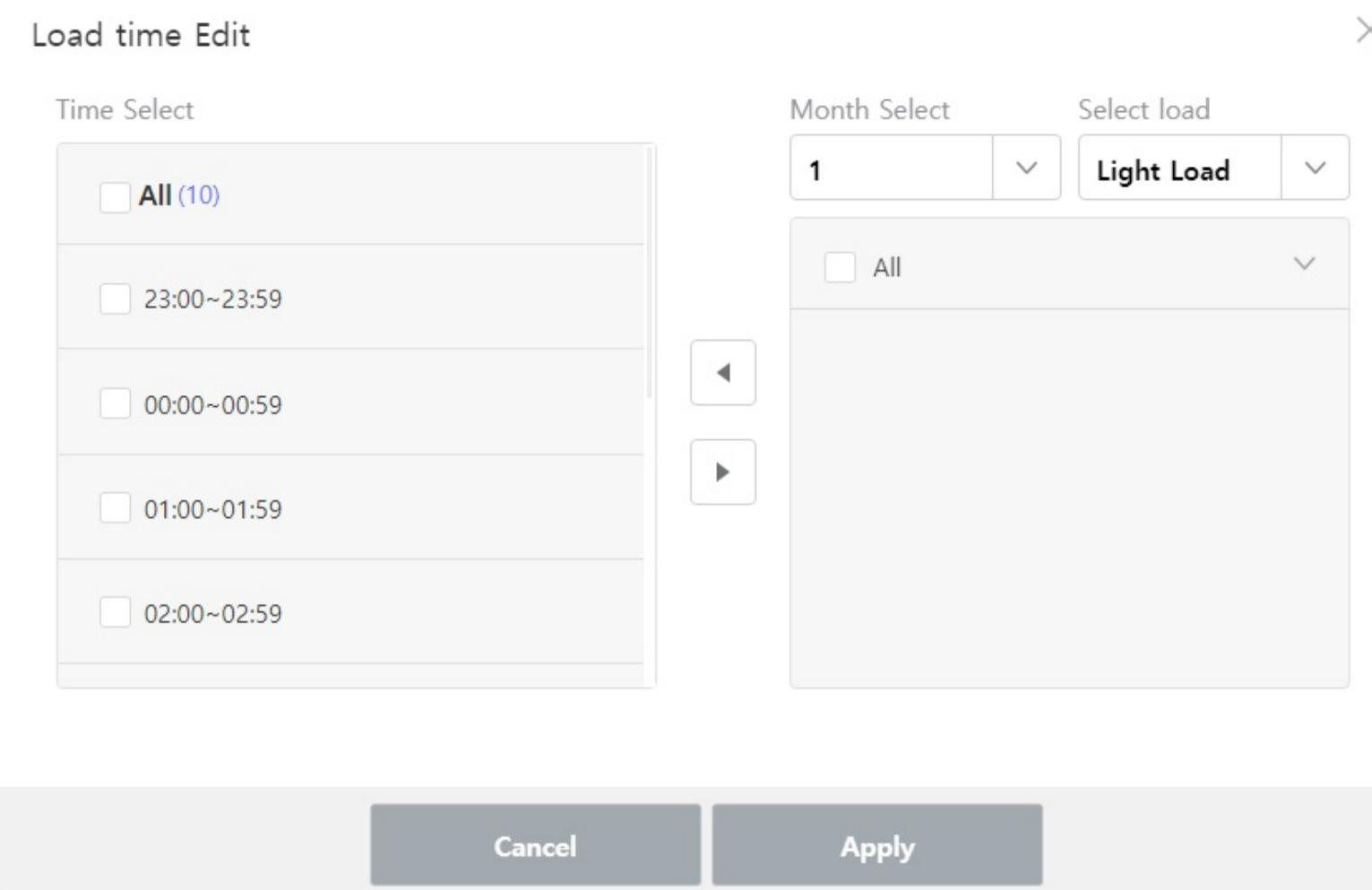
Monthly electricity fee must be determined based on the electricity fee table.



1. You can edit the basic fee.
2. You can add or edit the load type.
3. You can edit the monthly fee.

Edit Load Hour

You can edit the load hour based on the month and load type.



Load time Edit

Time Select

- All (10)
- 23:00~23:59
- 00:00~00:59
- 01:00~01:59
- 02:00~02:59

Month Select

1

Select load

Light Load

All

Cancel

Apply

Category	Description
Select Month	Select a month to edit the load hours.
Select Load	Select a load type for the selected month.
Select Hour	Select hours to be applied to the selected month and load.

1. Select a month to edit the load hours.
2. Select a load type for the selected month.
3. Select hours to be applied to the selected month and load, click a checkbox, and press the > button.

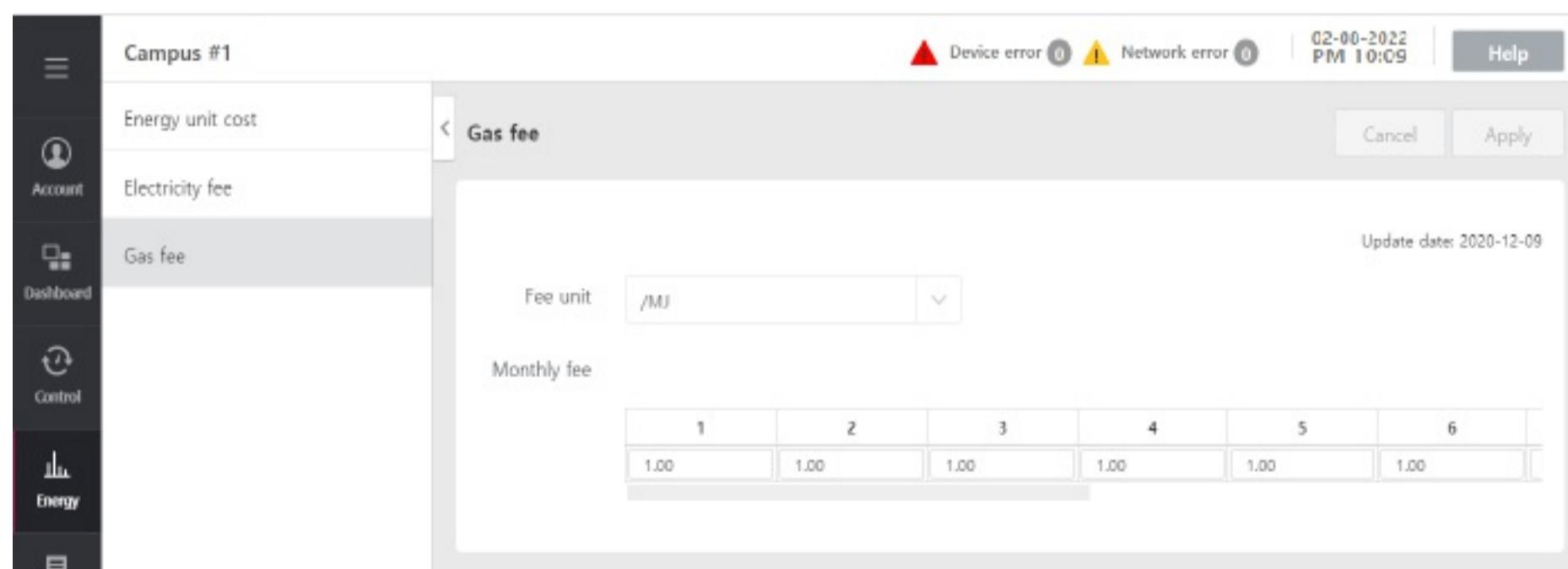
Note

- If all the hours are not applied, the Apply button is not activated.
- For Monthly Fee, you can enter up to six digits, but the value cannot exceed 655.35.
- The update date is applied when you apply the Edit Electricity Fee option.

Gas Fee

The Gas Fee option allows you to set the monthly fee based on the load hour.

Monthly gas fee must be determined based on the gas fee table.



Campus #1

Device error 0 Network error 0 02-00-2022 PM 10:09 Help

Energy unit cost

Electricity fee

Gas fee

Gas fee

Fee unit /MJ

Update date: 2020-12-09

1	2	3	4	5	6
1.00	1.00	1.00	1.00	1.00	1.00

Cancel

Apply

Note

- For Monthly Fee, you can enter up to six digits, but the value cannot exceed 65.535.
- The update date is applied when you apply the Edit Gas Fee option



Operation History

You can view user/automatic control's operation history and the connected device's status change or error status.

1. In the left menu tab, click [History] > [Operation History] menu.

- Operation history screen is displayed

2. Set the period to view.

Category	Description
Viewing period	<ul style="list-style-type: none"> • Day: Views the history of the selected date • Period: Views the history of the selected period • Today: Views today's history

3. In filter category, select device or history type.

- You can click the checkbox to select multiple information.
- You can initialize the selected contents through [Initialization] button.

4. When device and history type selection is completed, click [Apply] button.

- The operation history of the set period is displayed.

Operating unit details displayed	Operation details (central controller)	Operating unit details displayed	Operation details (Others than central controller)
ACS	Monitoring the result of the command sent by the central controller.	Remote control	History of control by units other than central controller (e.g. remote control/Drycontact/indoor and outdoor units' automated logic)
Admin	User control details of central controller	BMS	Control by BACnet
Slave controller	Control by slave central controller	Lonworks	Control by LonWorks
ACM	Control by AC Manager	TMS EMS engine control	Control by EMS engine of TMS
Schedule	Control by central controller's schedule	TMS energy saving control	Control by energy saving function of TMS
AutoChangeOver(Occupied)	Control by automatic switch operation of central controller	TMS Mobile	Control by TMS mobile user
Setback(UnOccupied)	Control by temperature limit operation of central controller	TMS Web	Control by TMS web user
Peak control	Control by peak control operation of central controller	KEPCO	Control by Korea Electric Power Corporation
Peak clear	Control by peak removal command of central controller		
Time limit control	Control by operation time limit command of central controller		
InterLocking	Control by device interlock command of central controller		
InterLocking	Control by device interlock copying pattern of central controller		
Emergency situation	Control by DI1 port's short-circuit signal of the central controller		
Energy Navigation	Control by energy navigation operation control of central controller		
	Control by 2-set override function of		

Send out information

1. In the left menu tab, click [History] > [Operation History] menu.

- Operation history screen is displayed

2. Set the period to view.

Category	Description
Viewing period	<ul style="list-style-type: none"> • Day: Views the history of the selected date • Period: Views the history of the selected period • Today: Views today's history

3. Click [Send Out] button.

- Excel File, Max 20000 EA
- In AC Smart 5 Device, it is stored in USB.



Energy Navigation History

You can view history of Energy Navigation alarm and control operation.

1. In the left menu tab, click [History] > [Energy Navigation History] menu.

- Energy navigation screen is displayed.

Energy navigation history				
Number of events : 53			2016-12-16 ~ 2017-01-16 ▾	View
No.	Occurred time	Exceeding standard	Energy warning contents	Execution control option
1	2017-01-16 15:17:26	Prediction	Exceeded monthly target 70% amount	AUTO, ODU capacity, 90%
2	2017-01-16 15:17:21	Prediction	Exceeded monthly target 70% amount	AUTO, ODU capacity, Pause
3	2017-01-16 10:17:46	Prediction	Exceeded monthly target 70% amount	AUTO, ODU capacity, 90%
4	2017-01-16 10:00:39	Prediction	Exceeded monthly target 130% amount	AUTO, ODU capacity, 0%
5	2017-01-12 17:39:27	Prediction	Exceeded monthly target 70% amount	AUTO, ODU capacity, 90%
6	2017-01-11 04:07:15	Prediction	Exceeded monthly target 80% amount	AUTO, ODU capacity, 70%
7	2017-01-11 00:37:15	Prediction	Exceeded monthly target 90% amount	AUTO, ODU capacity, 50%
8	2017-01-10 09:37:13	Prediction	Exceeded monthly target 80% amount	AUTO, ODU capacity, 70%
9	2017-01-10 00:22:12	Prediction	Exceeded monthly target 90% amount	AUTO, ODU capacity, 50%
10	2017-01-09 15:12:11	Prediction	Exceeded monthly target 80% amount	AUTO, ODU capacity, 70%

2. Select device to view the history.

3. Set the start date and end date of the period to view history.

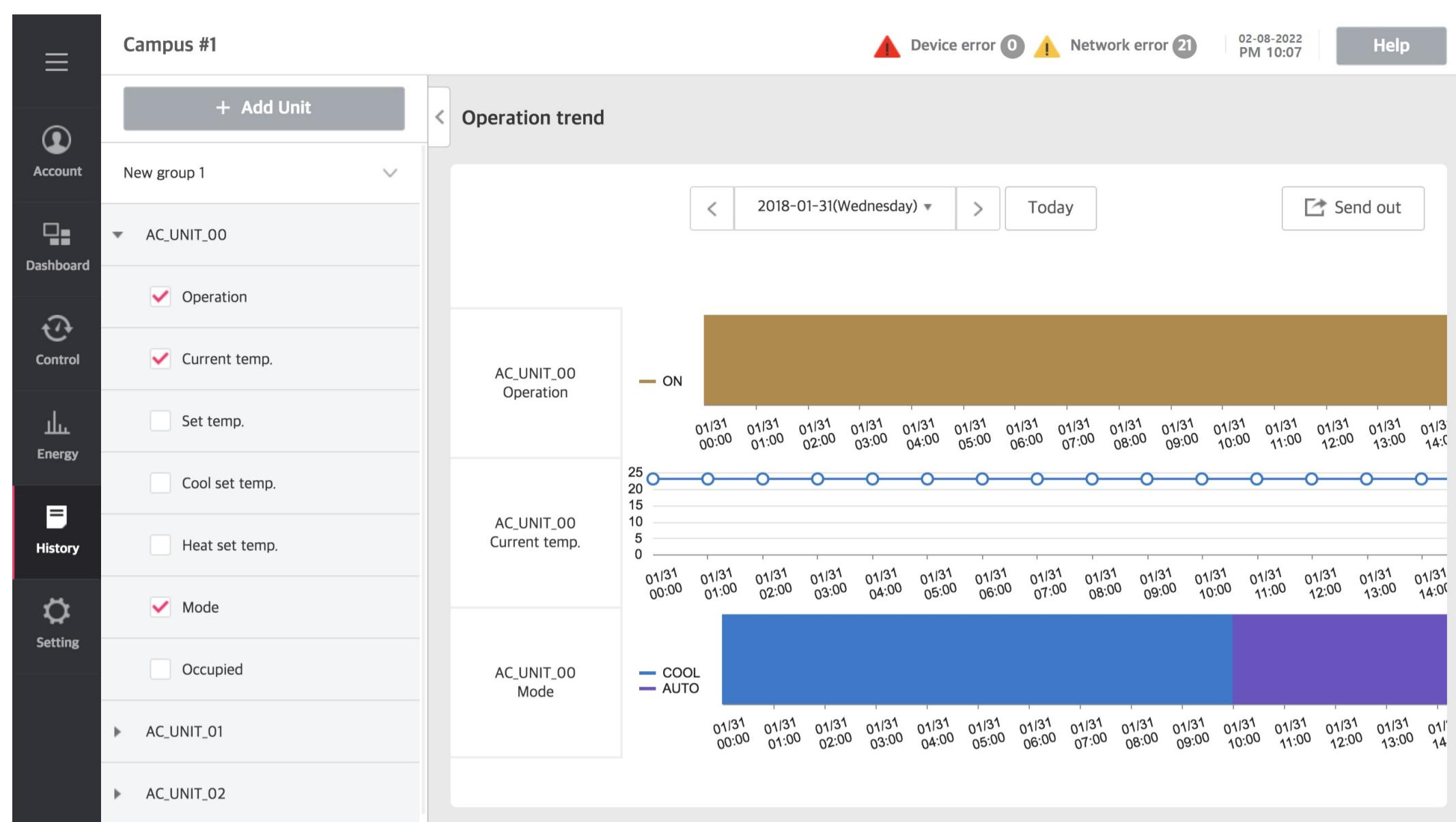
4. To view the set contents, click [View] button.

- Energy Navigation history of the set period is displayed.



Operation Trend

Operation trend function is the function to provide the past status change of the selected device to help establishing reasonable site operation plan.



Add Device

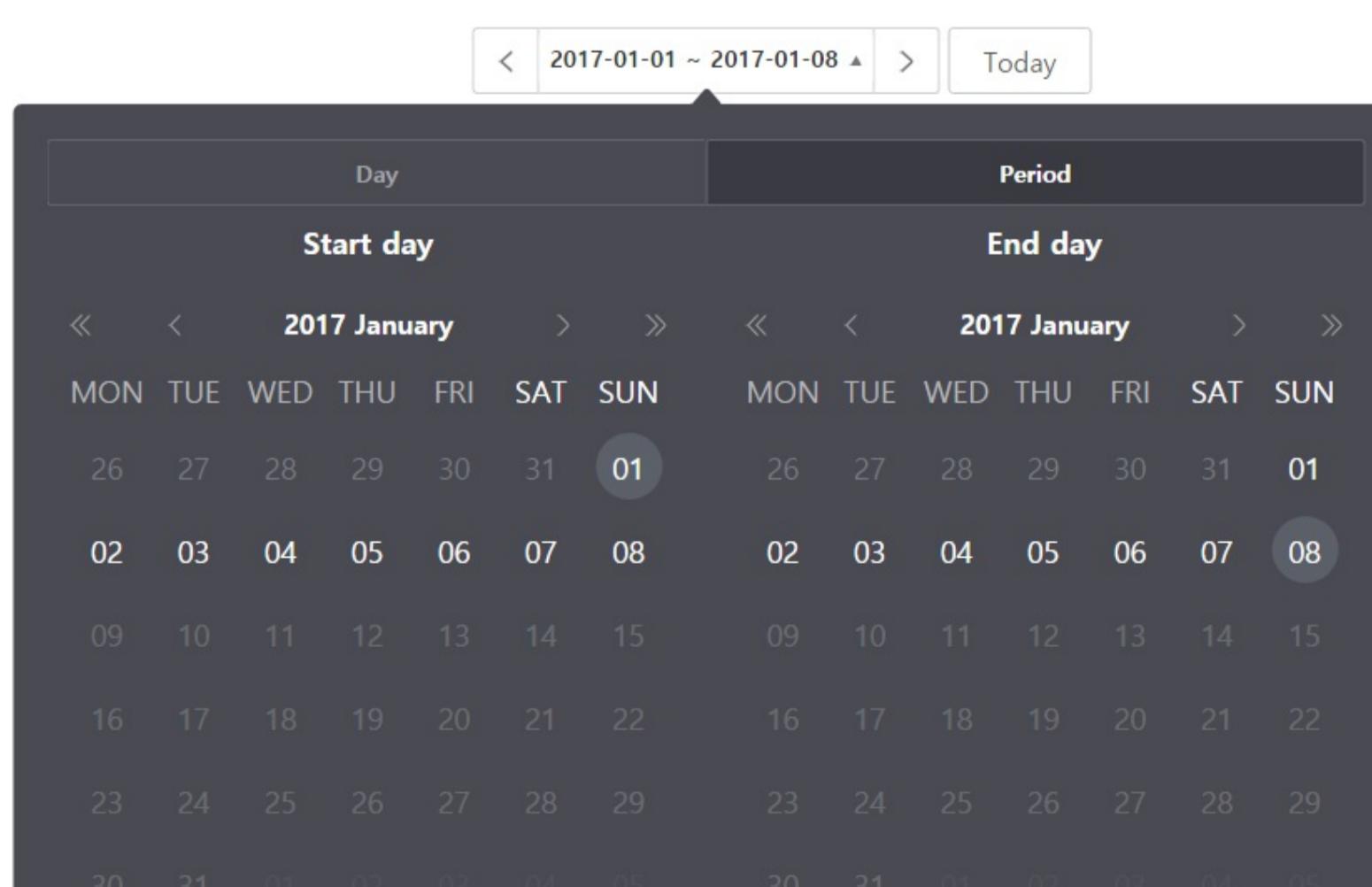
You can add unit to view operation trend.

1. In the left menu tab, click [History] > [Operation Trend] menu.
 - Operation trend screen is displayed.
2. Click [+ Add Unit] button.
 - Add device screen is displayed.
3. In the unregistered device list, click the checkbox of the device to register and click [◀] button.
 - To register several devices at once, click the check boxes of the devices to register and click [◀] button.
 - The selected devices are added to the registered device list.
4. To apply in Edit Unit popup window, click [Apply] button.

View Information

You can view the selected device's operation trend information.

1. In the left menu tab, click [History] > [Operation Trend] menu.
 - Operation trend screen is displayed.
2. In the device list tab section, select the category of the device to view.
3. Select the period to view operation trend.



Category	Description
	[Day] button: Select the desired date in mini calendar and set as the base date

Period

[Period] button: Set the start date and end date of the period to view
• The maximum period to view is 1 week.
[Today] button: Set today's date as the base date

Send out information

You can send out the viewed device's operation trend information.

1. In the left menu tab, click [History] > [Operation Trend] menu.
 - Operation trend screen is displayed.
2. In the left side category, select the category to send out and click [Send Out] button at the top right side.
(In AC Smart 5 Device, it is stored in USB.)

Note

Each device stores the following information.

- Indoor unit : operation, current temperature, set temperature, cooling set temperature, heating set temperature, operation mode, occupancy, PM10, PM2.5, PM1.0
- ERV: operation, mode, current temperature (only for ERV DX), set temperature (only for ERV DX), CO₂ concentration (only for ERV)
- AHU: operation, mode, set temperature, air supply temperature, air supply humidity, ventilation temperature, ventilation humidity
- Heating: Operation, Water inlet temperature, Water outlet temperature, Hot water temperature, Set temperature, Hot water set temp., Mode, Hot water operation
- Chiller: Operation, Water inlet temperature, Water outlet temperature, Mode
- DOKIT: Operation
- DI: Operation
- DO: Operation
- Exp.I/O's Port : value
- Air purifier : Operation, Odor, PM 10, PM 2.5, PM 1.0



Cycle

You can view indoor/outdoor unit and chiller's cycle information.

Outdoor Unit

It provides the selected outdoor unit's cycle information data.

1. In the left menu tab, click [History] > [Cycle] menu.

- Cycle screen is displayed.

Name	Group name	Operation	Mode	Set temperature	Fan speed	Lock	Wind direction	Air temp.	LEV	Pipe in temperature	Pipe out temperature	Error code
AC_UNIT_...	IDU	ON	COOL	23.0 °C	LOW	Clear	Clear	24.5 °C	0	220.0 °C	220.0 °C	0

Category	Description
Outdoor unit cycle information	Master/slave outdoor unit information display
Indoor unit cycle information	Displays all indoor unit information connected to the outdoor unit

2. In the outdoor unit list, select the outdoor unit to check cycle information.

- The corresponding outdoor unit's cycle information is displayed.

Note

You can view only when the outdoor unit providing cycle information is installed.

Chiller

It provides the selected chiller's cycle information data.

1. In the left menu tab, click [History] > [Cycle] menu.
2. In the chiller list, select the chiller to check cycle information.

- The corresponding chiller's cycle information is displayed.

Campus #1

Device error 0 Network error 4 02-08-2022 PM 10:09 Help

Account

Dashboard

Control

Energy

History

Setting

ODU Chiller

AC Smart

SCROLL AIR

SCROLL WTR

TURBO

ABS

SCREW WTR

Cycle

SCROLL AIR Cycle information

Common Cycle 1 Cycle 2 Cycle 3 Cycle 4



Operation	OFF	Heating set temperature	0.0 °C
Outside air temperature	0.0 °C	Chilled water leaving temp.	0.0 °C
Operation current	0 A	Chilled water entering temp.	0.0 °C
Start standby time	0 Sec	Chilled water flux switch	OFF
Mode	* COOL	Chilled water pump output status	OFF
Demand limit ratio	0 %	Chilled water pump interface status	OFF
Cool set temperature	0.0 °C	Total Run time	0 Hours



Device setting

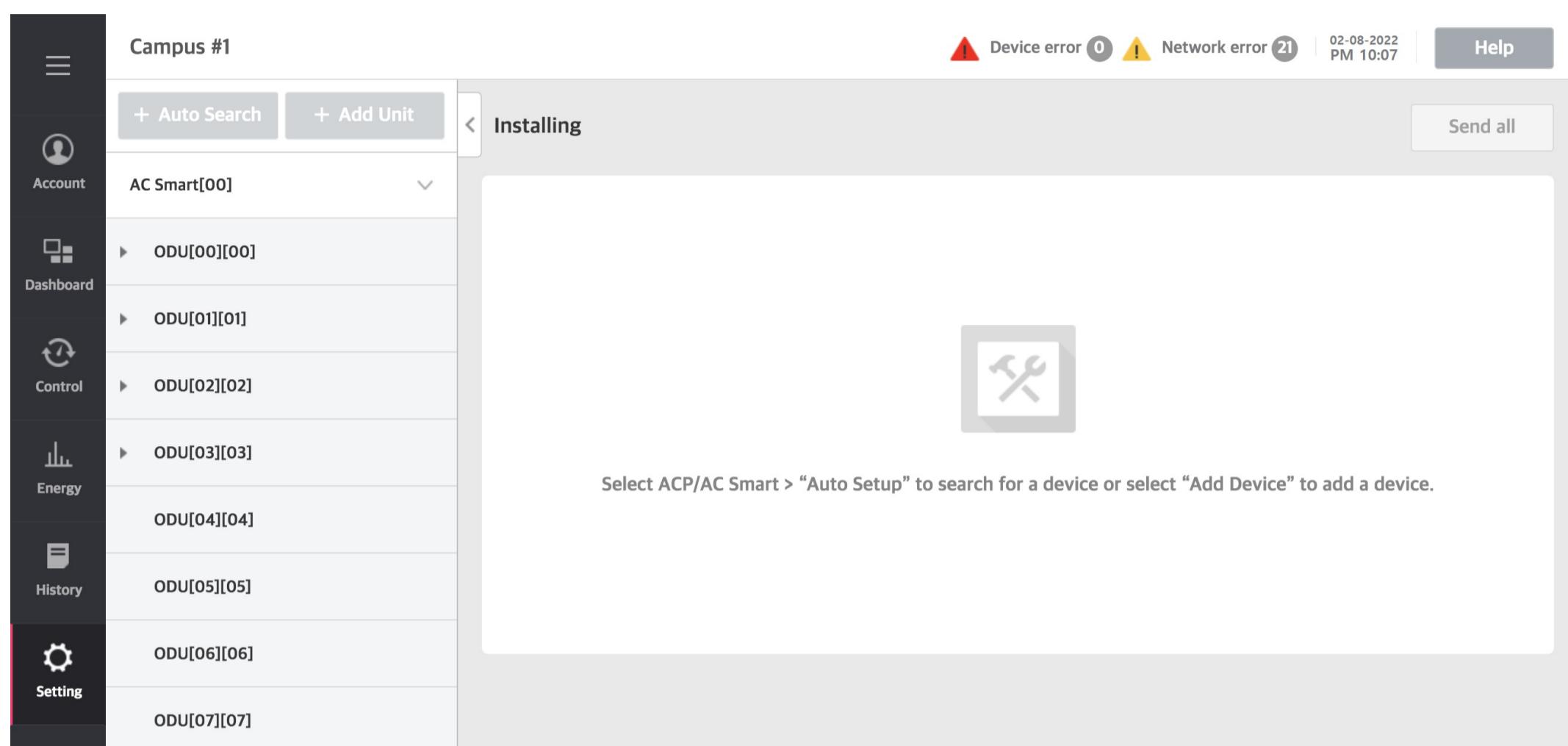
You can change AC Smart setting, add device, and change registered device's setting.

AC Smart 5 edit

You can change AC Smart setting.

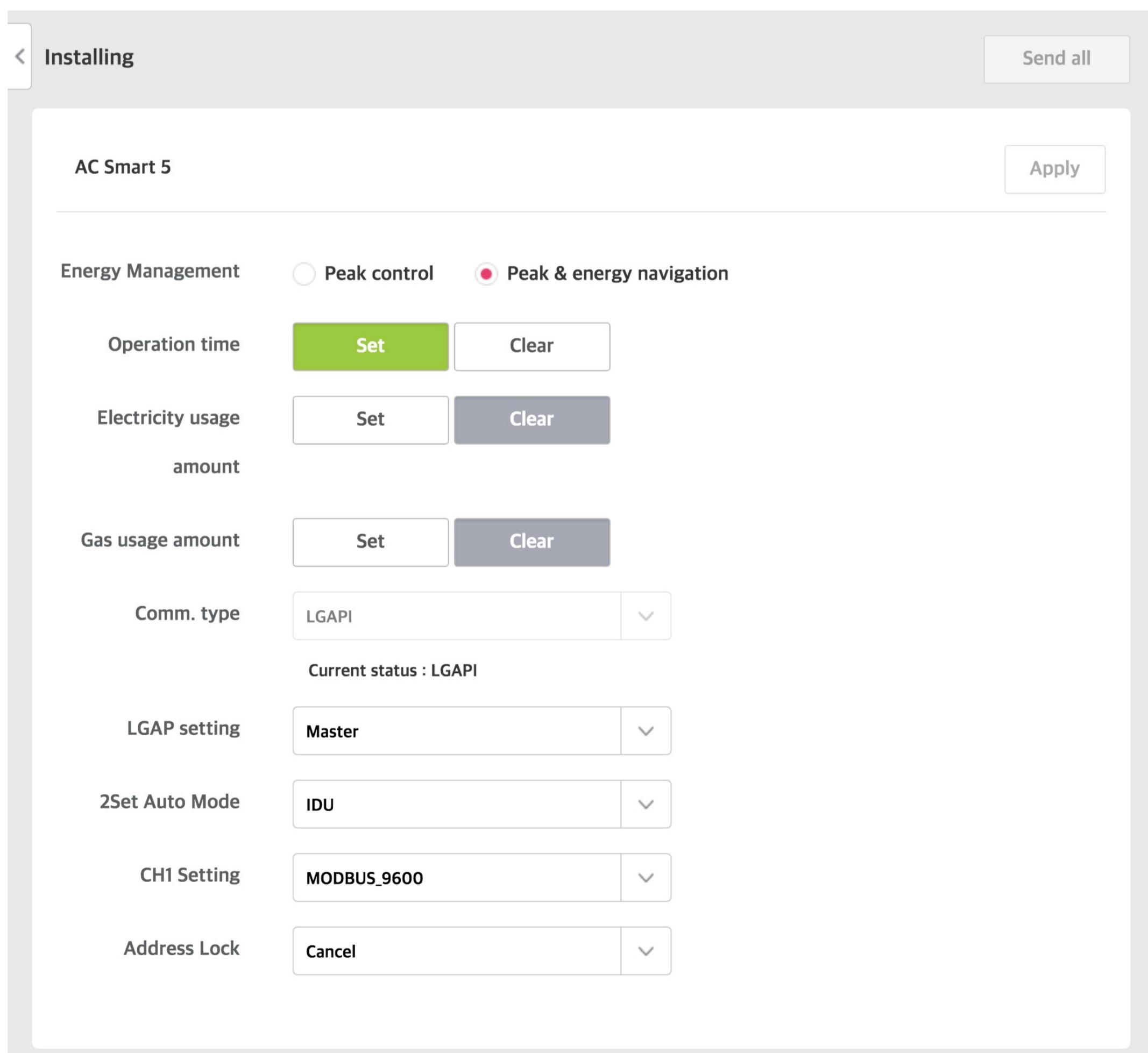
1. In the left menu tab, click [Setting] > [Installing] menu.

- Device setting screen is displayed.



2. In device list, select AC Smart.

- AC Smart edit screen is displayed.
- In device edit area, you can change AC Smart setting information.



Category	Description
Energy Management	Select among peak control / peak control and energy navigation
Operation Time	Operation time collection and view Set/Clear

Electricity usage amount	Electricity usage amount collection and view Set/Clear
Gas usage amount	Gas usage amount collection and view Set/Clear
Communication method	LGAPI / LGAPII setting
LGAP setting	Communication Master / Slave setting
2Set automatic mode	Press [▼] button to select main agent of 2Set automatic mode • Central controller / indoor unit
CH1 setting	Press [▼] button to select communication type of the device to connect to CH1 port • LGAP: for indoor unit, ERV, ERV DX, and Heating connection • LGAP_AHU: for AHU (general, all fresh air, waste heat recovery) connection • MODBUS_9600, MODBUS_19200: for AHU (modular air conditioner, modular all fresh air, DOAS), Exp.I/O, and chiller connection
Address lock	When it is set, you cannot change address in indoor unit and ERV remote controller

Note

- Some models do not support LGAPII.
- When the controller is set as slave, register the IDU or other devices to be controlled by the corresponding controller. At this time, it should not be registered in duplicate with other slave controllers.

3. When input is completed, click [Apply] button.

4. Click [Send All] button.

Automatic setting

You can automatically search device connected to AC Smart and register.

1. In the left menu tab, click [Setting] > [Installing] menu.
 - Device setting screen is displayed.
2. In device list, select AC Smart, and click [Auto Search] button.
3. To overwrite AC Smart device setting on the existing setting, click [Check] button.
 - AC Smart device setting status is applied.
4. When automatic setting is finished, before device edit, click [Send All] button.

Note

- Automatic setting takes about 10 min.
- Some AHU (modular air conditioner, modular all fresh air, DOAS), chiller, and Exp.I/O do not support automatic setting function.
- Exp.I/O is activated when you check 'use' in device edit window after device registration.

Add Device

You can additionally register new device to the device list.

1. In the left menu tab, click [Setting] > [Installing] menu.
 - Device setting screen is displayed.
2. Click [+ Add Unit] button.
 - Add device screen is displayed.

Select device type to add to ACP

<input checked="" type="radio"/> ODU	<input type="radio"/> HRV	<input type="radio"/> AWHP
<input type="radio"/> AHU	<input type="radio"/> Chiller	<input type="radio"/> DOKIT
<input type="radio"/> DI	<input type="radio"/> DO	<input type="radio"/> EXP. I/O
<input type="radio"/> Air purifier		

ACP name	<input type="text" value="ACP"/>
Address	<input type="text"/>
Name	<input type="text"/>
Model	<input type="text" value="ODU"/>
Capacity	<input type="text" value="3"/>
<input type="radio"/> Set <input checked="" type="radio"/> Clear	
<small>control(Icon)</small>	

3. In the device list, select upper level group to add device.

- When you select AC Smart in device list, you can add outdoor unit, ERV, Heating, AHU, Chiller, ON/OFF device, DI, DO, and Exp.I/O.
- In the device list, when outdoor unit is selected, you can add only indoor units.

4. In Add device section, input the setting information of the device to add.

- According to the selected device, the setting category according to the corresponding device is displayed differently. For the setting information of each device, refer to the next page.

5. To save the set contents, click [**Apply**] button.

6. To complete adding device, click [**Send All**] button.

Note

- AC Smart 5 Slave does not support the air purifier and ODU control/monitoring.

Device edit

In device list, you can edit registered device.

1. In the left menu tab, click [**Setting**] > [**Installing**] menu.

- Device setting screen is displayed.

2. In device list, select device to edit.

3. Device setting screen is displayed.

4. Edit device setting information.

- According to the selected device, the setting category according to the corresponding device is displayed differently. For the setting information of each device, refer to the next page.

5. To save the set contents, click [**Apply**] button.

6. To complete device edit, click [**Send All**] button.

Delete Device

In the device list, you can delete registered device.

1. In the left menu tab, click [**Setting**] > [**Installing**] menu.

- Device setting screen is displayed.

2. In device list, select device to delete, and click [**Delete**] button.

3. When device delete popup window appears, click [**Yes**] button.

- In device list, selected item is deleted.

4. To complete device deleting, click [**Send All**] button.

Setting information of each device

Setting information of each device is as follows.

- ➔ Outdoor Unit
- ➔ IDU
- ➔ ERV
- ➔ Heating
- ➔ AHU
- ➔ Chiller
- ➔ DOKIT
- ➔ DI/DO
- ➔ Exp.I/O
- ➔ Exp.I/O's lower level setting
- ➔ Air purifier



Outdoor Unit

Select device type to add to AC Smart

ODU **HRV** **AWHP**
 AHU **Chiller** **DOKIT**
 DI **DO** **EXP. I/O**

ACP name	AC Smart
Address	<input type="text"/>
Name	<input type="text"/>
Model	<input type="text" value="ODU"/>
Capacity	<input type="text" value="3"/>

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Model	Product model name
Capacity	Product capacity
Activate device control(Icon)	Set whether to activate ODU device icon • ODU device is displayed in Group setting, Device control, Device error and Operation history only when ODU activate device control(Icon) is set.
Add All	When checkboxes are selected, all selected devices are added



Select device type to add to ODU[00]

IDU

ACP name	AC Smart
ODU name	ODU[00]
Address	
Name	
Model	IDU
Type	FCU
Capacity	3

Add all EA

Category	Description
ACP name	The corresponding device's upper level ACP name
ODU name	Name of the outdoor unit connected to the corresponding device
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Model	Product model name
Type	Indoor unit type selection
Capacity	Product capacity
Add All	When checkboxes are selected, all selected devices are added



Select device type to add to AC Smart

ODU ERV Heating AHU
 Chiller DOKIT DI DO
 EXP. I/O Air purifier

ACP name	AC Smart
Type	ERV
Address	
Name	
Model	VENT
Capacity	3

Add all EA

Category	Description
ACP name	The corresponding device's upper level ACP name
ODU address	Address of the outdoor unit connected to the device <ul style="list-style-type: none">Activation in case of ERV DX / Floor mounted vent
Type	ERV type selection
Address	Device address
Name	Device name to be displayed in the system <ul style="list-style-type: none">For batch add, it is displayed as "Name_device address" form
Model	Product model name
Capacity	Product capacity
Add All	When checkboxes are selected, all selected devices are added



Heating

Select device type to add to AC Smart

ODU ERV Heating AHU Chiller
 DOKIT DI DO EXP. I/O Air purifier

ACP name:

Address:

Name:

Model:

Capacity:

Control method: Hot water control Water in/out control All

Current Temp 1
 Water out Water in Air Hot water Do not use

Current Temp 2
 Water out Water in Air Hot water Do not use

Current Temp 3
 Water out Water in Air Hot water Do not use

Set temperature
 Water in/out Air

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
ODU address	Address of the outdoor unit connected to the device
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Model	Product model name
Capacity	Product capacity
Control method	Select control method
Current Temp 1	Type of the current temperature to be displayed first
Current Temp 2	Type of the current temperature to be displayed second
Current Temp 3	Type of the current temperature to be displayed third
Set temperature	Type of the set temperature to control
Add All	When checkboxes are selected, all selected devices are added



Select device type to add to AC Smart

ODU ERV Heating AHU
 Chiller DOKIT DI DO
 EXP. I/O Air purifier

ACP name:

Address:

Name:

Model:

AHU Type: Normal All outside air device Multi-fan general
 Multi-fan all outside air unit DOAS(AR-DE) DOAS(AR-DR)
 DOAS(AR-ND) Comm.Kit(SA)

Additional function: None Automatic ventilation Humidify
 Automatic ventilation, humidification

Room Temp: Air supply standard Ventilation standard

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Model	Product model name
AHU type	Select AHU type
Additional function	Select function to add
Room Temp	Between air supply or ventilation, select the desired indoor temperature setting standard
Add All	When checkboxes are selected, all selected devices are added

Set Multi-V Interlocking Energy Saving Control

AHU Type

- Normal
- All outside air device
- Multi-fan general
- Multi-fan all outside air unit
- DOAS(AR-DE)
- DOAS(AR-DR)
- DOAS(AR-ND)
- Comm.Kit(SA)
- SPLIT DOAS(ARND/DB)
- SPLIT DOAS(ARND/DC)

Room Temp

- Air supply standard
- Ventilation standard

Multi-V Interlocking

- Set
- Clear

Energy Saving

Energy saving step

3 Level

Select device

Edit Unit

Type	Name	Address	Group
ODU	ODU_00	00	-
ODU	ODU_01	01	-

Add all

EA

Category	Description
Set Multi-V Interlocking Energy Saving Control	Activate/Deactivate Multi-V Interlocking Energy Saving Control <ul style="list-style-type: none"> • Setting Multi-V Interlocking Energy Saving Control activates the energy saving step and device selection options.
Energy saving step	Select energy saving steps among steps 1~3
Select a device	Select an outdoor device to which to apply Multi-V Interlocking Energy Saving Control

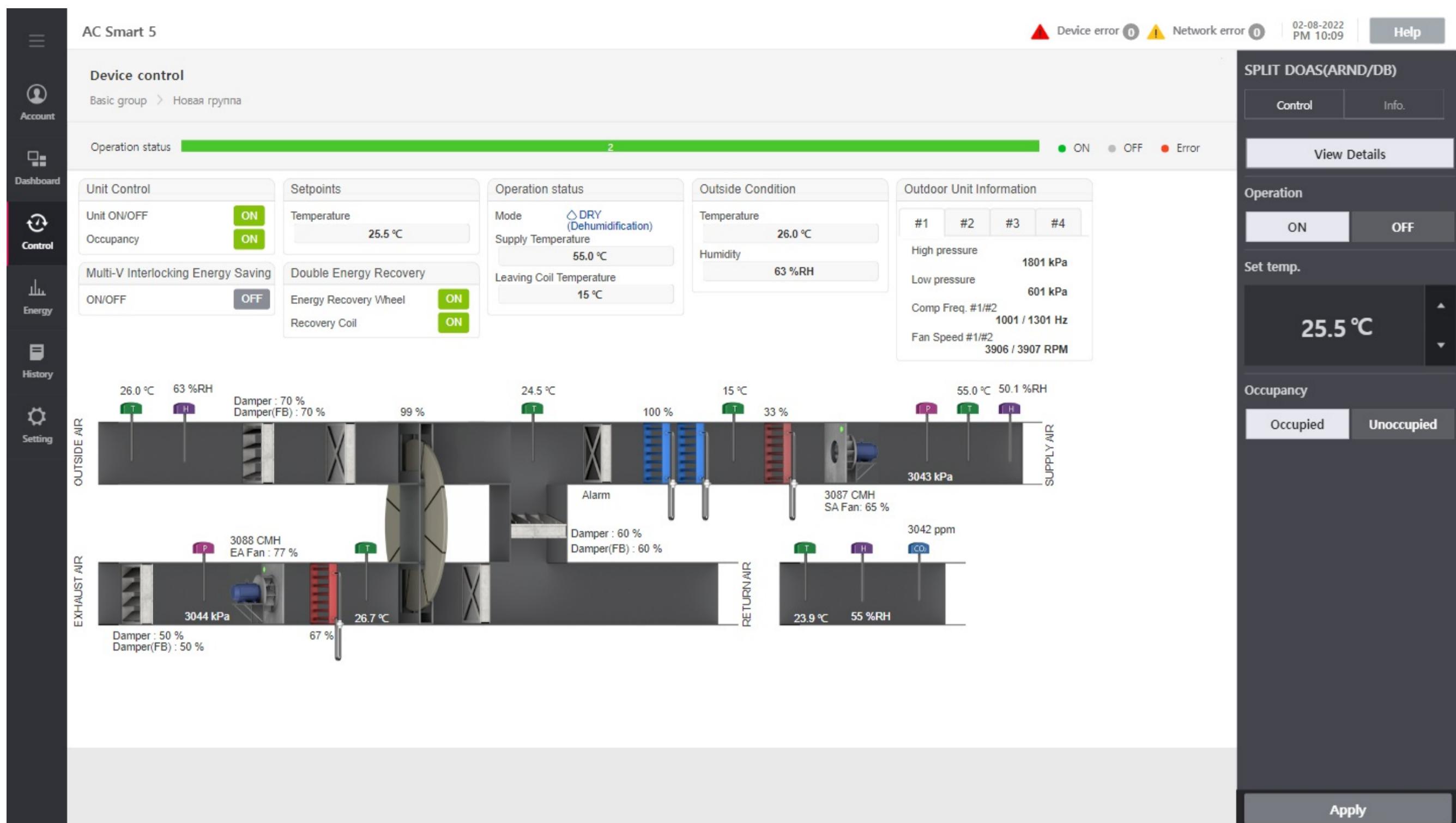
Note

- Only SPLIT DOAS(ARND/DB) is available for Multi-V Interlocking Energy Saving Control.
- When Multi-V Interlocking Energy Saving Control is in operation, the main coil, reheat coil, and energy recovery wheel may turn off and on automatically.

➔ Multi-V Interlocking Energy Saving Control

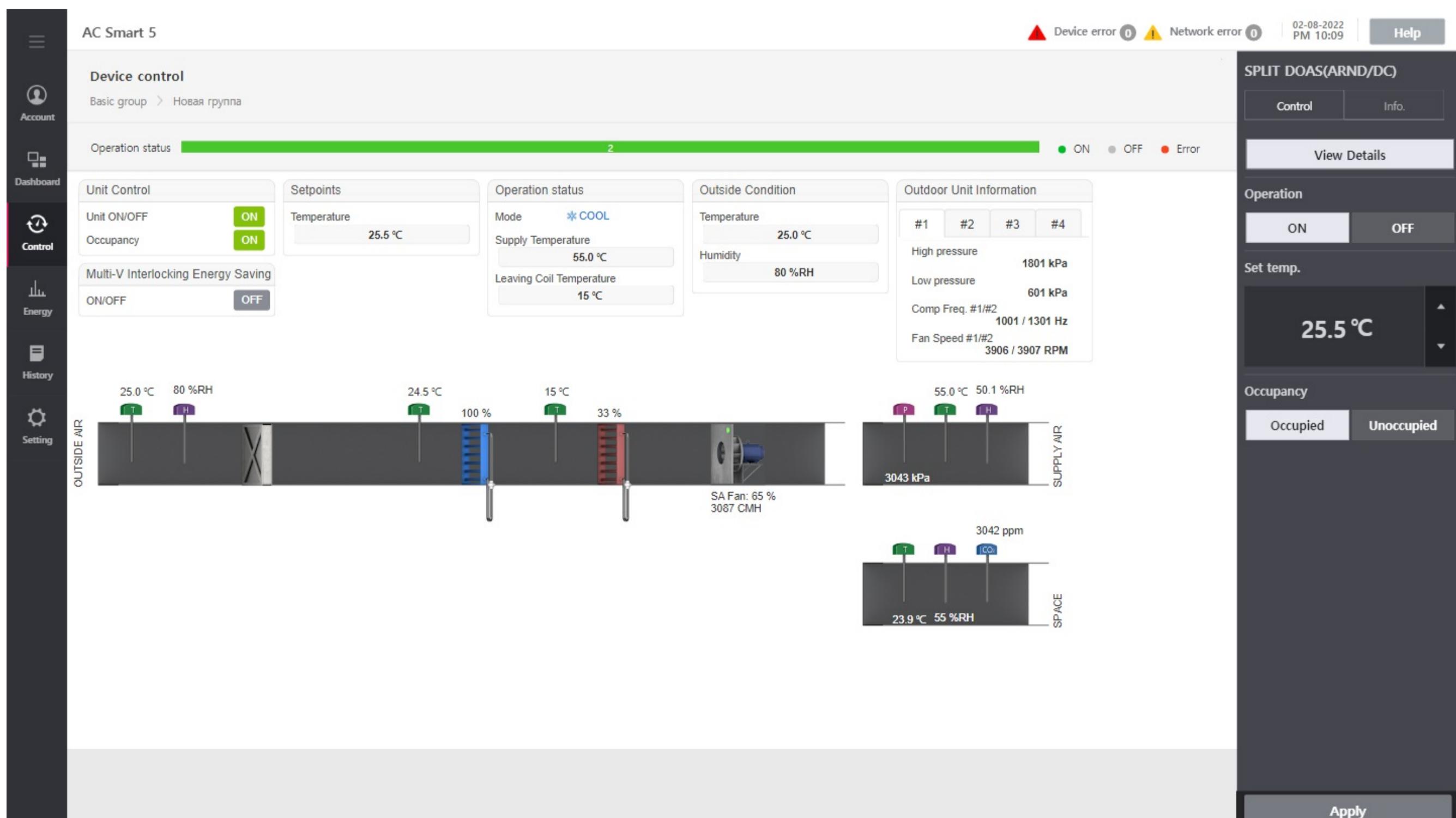


SPLIT DOAS(ARND/DB)



Item	Description
View details	Click the [View Details] button to view detailed information (Not available on mobile)
Operating status	<ul style="list-style-type: none"> [Start Operation] button: Starts device operation [Stop Operation] button: Stops device operation
Target temperature	Press the [▲]/[▼] button to set target temperature
Occupied	<p>Function to set the space managed by DOAS as occupied or vacant</p> <ul style="list-style-type: none"> [Occupied] button: Set to Occupied [Vacant] button: Set to Vacant

SPLIT DOAS(ARND/DC)



Item	Description
------	-------------

View details	Click the [View Details] button to view detailed information (Not available on mobile)
Operating status	<ul style="list-style-type: none"> • [Start Operation] button: Starts device operation • [Stop Operation] button: Stops device operation
Target temperature	Press the [▲]/[▼] button to set target temperature
Occupied	Function to set the space managed by DOAS as occupied or vacant <ul style="list-style-type: none"> • [Occupied] button: Set to Occupied • [Vacant] button: Set to Vacant

Multi-V Interlocking Energy Saving Control

This is a function to control DOAS and Multi-V operation modes based on the operation status of Multi-V and indoor and outdoor air temperature/humidity in order to save the system's energy.

Energy saving operation can be run only under agreeable indoor conditions (for cooling, temperature of 28°C or lower and relative humidity of 60% or lower). You can adjust the degree of freshness and energy saving as preferred.

Note

- To use Multi-V Interlocking Energy Saving Control, you need a DOAS indoor humidity sensor.
- Energy saving operation can be run only when DOAS is running in the cooling or dehumidification mode and all indoor units are in cooling operation.
- Energy saving step: As you get closer to step 3, dehumidification weakens and energy saving increases.

► Set Multi-V Interlocking Energy Saving Control



Chiller

Select device type to add to AC Smart

ODU ERV Heating AHU
 Chiller DOKIT DI DO
 EXP. I/O Air purifier

ACP name:

Address:

Name:

Type:

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Type	Select chiller type
Add All	When checkboxes are selected, all selected devices are added



Select device type to add to AC Smart

ODU ERV Heating AHU
 Chiller DOKIT DI DO
 EXP. I/O Air purifier

ACP name:

Address:

Name:

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Add All	When checkboxes are selected, all selected devices are added



DI/DO

Select device type to add to AC Smart

ODU ERV Heating AHU
 Chiller DOKIT DI DO
 EXP. I/O Air purifier

ACP name:

Address:

Name:

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
Address	Device address
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Add All	When checkboxes are selected, all selected devices are added

Note

- DI1 port can only be used for emergency purpose and cannot be configured for other purposes.
- DI1 port must always be in open state except the emergency situation.
- If DI1 port is short-circuited, an alarm sounds and all devices linked to the port stop.



Exp.I/O

Select device type to add to AC Smart

ODU ERV Heating AHU
 Chiller DOKIT DI DO
 EXP. I/O Air purifier

ACP name:

Type:

Address:

※ For detailed address range for each type, refer to [Usage (PC)] > [Device Setting] > [EXP.I/O] page in the Help (User Manual).

Name:

Add all

Category	Description
ACP name	The corresponding device's upper level ACP name
Type	Select DeviceType
Address	Device address • Address Range of ACS I/O : 01 ~ F7 • Address Range of ACU UIO : 60 ~ 67 • Address Range of ACU UI : 70 ~ 77 • Address Range of ACU UO : 80 ~ 87
Name	Device name to be displayed in the system • For batch add, it is displayed as "Name_device address" form
Add All	When checkboxes are selected, all selected devices are added



Exp.I/O's lower level setting

AO[01/02]

Whether used Use Do not use

ACP name: AC Smart

Device type: AO

Address: 12

Name: AO[01/02]

Icon: Basic icon

I/O Type: VOL

Signal boundary: 0~10V

Usage: Temperature Humidity Opening Water level Operation ratio Concentration Pressure

Unit symbol: % °

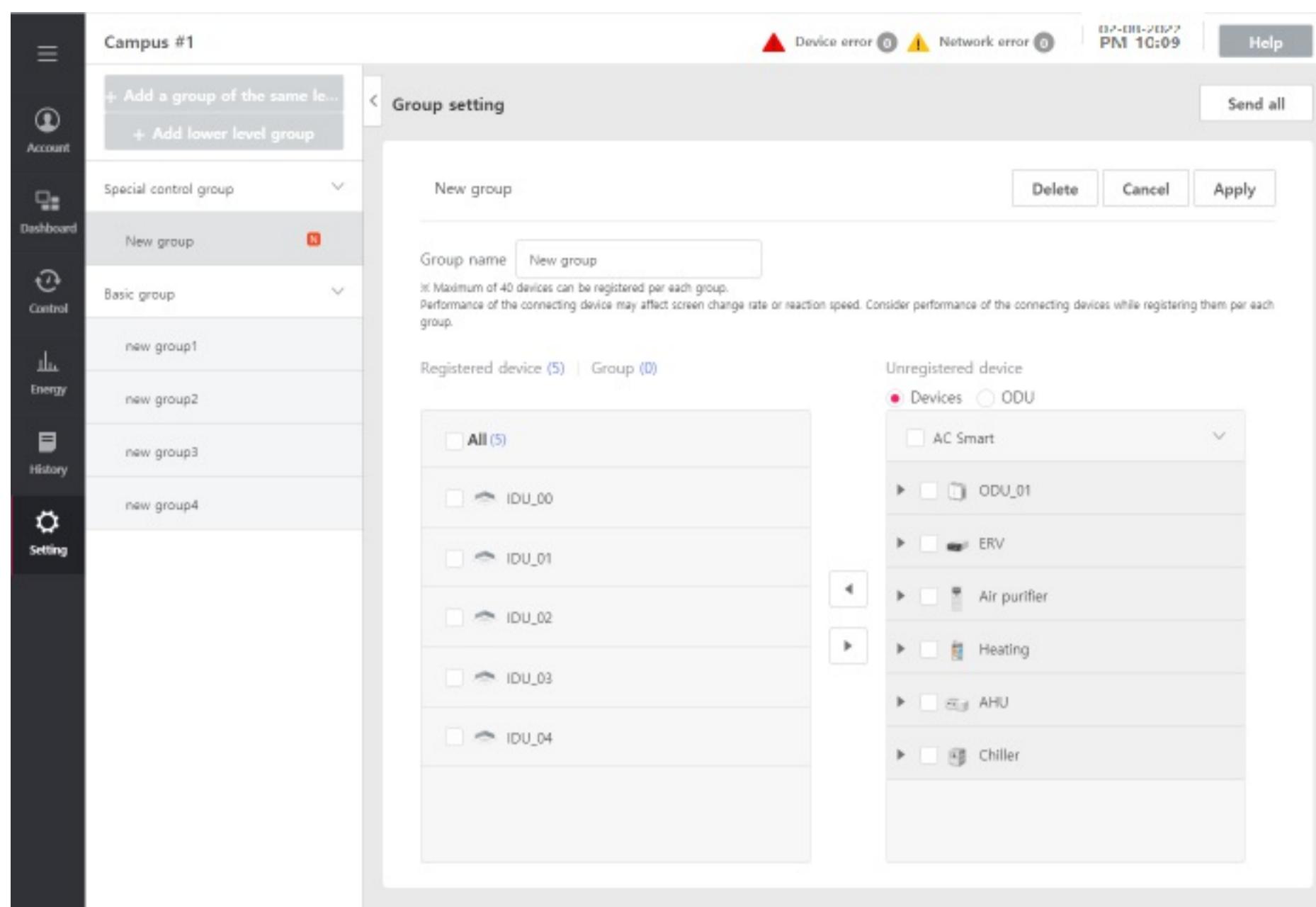
Display boundary: Min: 0 Max: 100

Correction value: 0

Category	Description
Whether used	Select whether to use the device
ACP name	The corresponding device's upper level ACP name
Device type	Device type
Address	Device address
Name	Device name
Icon	Select icon type
I/O type	Select I/O type • AO: VOL • UI: BI, VOL, CUR, PT1000, NTC10K, NI1000 (But, when EXP/IO type is ACU UIO, ACU UI, it can be selected from BI or VOL.) • DO: BI • DI: BI
Signal boundary	Select signal boundary
Usage	Select usage of the device (Usage selection is different according to I/O type) • Status information: On/Off, short/Open, Warning/Normal, Close/Open, On/Off, Occupied/Unoccupied, 1/0 • Value information: Temperature, Humidity, Opening, Water level, Operation ratio, Concentration, Pressure
Unit Symbol	Select unit symbol Flexibly changed according to the usage selection
Display boundary	Max./Min. value input
Correction value	Correction value input

Group Setting

You can add/delete management group created according to user's usage.



Add Group

You can add new group.

1. In the left menu tab, click [Setting] > [Group Setting] menu.
 - Group setting screen is displayed.
2. Select a group and click the Add Group button.
 - Select [+ Add lower level group] to create a sub-group.
 - Select [+ Add a group of the same level] to create a same-level group.
3. Input group name in the group name input field.
4. To register new device in the device list, in the unregistered device list, click the checkbox of the device to register and click [◀] button.
5. To save the set contents, click [Apply] button.
6. To complete group addition, click [Send All] button.

Group edit

You can edit group.

1. In the left menu tab, click [Setting] > [Group Setting] menu.
 - Group setting screen is displayed.
2. In group list, select group to edit.
3. Edit group information.
4. To save the set contents, click [Apply] button.
5. To complete group addition, click [Send All] button.

Delete group

In the group list, you can select and delete the desired group.

1. In the left menu tab, click [Setting] > [Group Setting] menu.
 - Group setting screen is displayed.
 - In the group list, select the group to delete and click [Delete] button.
2. When Delete group popup window appears, click [Yes] button.
 - The selected group is deleted.
3. To complete group deletion, click [Send All] button.



System Setting

You can change the system setting.

1. In the left menu tab, click [Setting] > [System Setting] menu.

- System setting screen is displayed.

2. Set the system.

System setting

Cancel Apply

Title	ACP 5
Language	English
Air quality index	Global
Day format	MM-DD-YYYY
Time format	24 Time
Temperature	Celsius 0.5°C
Set the lowest temperature for COOL/HEAT	18 °C
Applies only when the mode is COOL/HEAT.	
Use energy navigation	<input checked="" type="radio"/> Set <input type="radio"/> Clear
Power usage statistics base date	1Day

Category	Description
Title	Input the desired name in the input field
Language	Press [▼] button to select the desired language (한국어/ English/ Español/ Português/ Italiano/ Deutsch/ Türkçe/ Polski/ русский/ Français/ 中文/ Čeština)
Air quality index	Select the reference country for the fine dust level display. (한국/Global/USA/中国/India)
Day format	You can set the Day format. (YYYY-MM-DD / MM-DD-YYYY / DD-MM-YYYY)
Time format	You can set the Time format. (12 / 24)
Temperature	Press [▼] button to select the desired control temperature unit (Celsius 0.5°C / Celsius 1°C / Fahrenheit 1°F)
Set the lowest temperature for COOL/HEAT	Press [▼] button to select the desired cooling/heating lower limit temperature (16°C / 18°C)
Use Energy Navigation	Select whether to use Energy Navigation
Energy navigation base date	Press [▼] button to select the desired date <ul style="list-style-type: none">• Energy navigation monthly power usage amount base date setting• Calculate the days to the one day before in the next month from the set date

Use 'Drawing'	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Use CO ₂ concentration widget	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Use comfort widget	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Use finedust widget	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Use AI Driving Status widget	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Enable Automatic Switching and Temperature Limit	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Apply damper opening formula	<input checked="" type="radio"/> Set	<input type="radio"/> Clear
Comfort - Season setting	<input checked="" type="radio"/> Summer	<input type="radio"/> Winter

Category	Description
Use 'Drawing'	Select whether to use 'Drawing'
Use CO ₂ concentration widget	When it is set, dash board CO ₂ concentration widget is activated
Use pleasantness widget	When it is set, dash board pleasantness widget is activated
Use fine dust widget	When it is set, dash board fine dust widget is activated
Use AI Driving Status widget	Setting this option activates the AI Driving Status Widget on the dashboard.
Enable Automatic Switching and Temperature Limit	Enables the automatic central control switching and the temperature limit function.
Apply damper opening formula	<ul style="list-style-type: none"> Select whether to apply damper opening formula When damper opening is set, it operates at OA=EA and OA+MIX=90
Pleasantness season setting	Winter/summer setting for pleasantness calculation When summer is set, pleasantness range is formed in lower temperature

Energy target management	<input type="button" value="Set"/>
Schedule exception date setting	<input type="button" value="Set"/>
To register schedule exception device	<input type="button" value="Set"/>
Back up Setting Data	<input type="button" value="Backup"/> <input type="button" value="Apply backup file"/>
System restart	<input type="button" value="Restart"/>
Send out installation status	<input type="button" value="Send out"/>

Category	Description
Energy target amount setting	Target energy amount setting for energy(Dashboard) management
Schedule exception date setting	Set exception date for schedule setting
To register schedule exception device	Set the device to except in schedule setting in advance
Setting data backup	<ul style="list-style-type: none"> Backup: backup of data to PC (In AC Smart 5 Device, it is stored in USB.) Backup file application: overwrite data with backup file stored in PC
System restart	Restart the entire system
Send out installation status	Save installation status to PC (In AC Smart 5 Device, it is stored in USB.)

System time 2018-06-18 11:50

Date setting

2018-06-18 ▾

Time setting

11 50

If you change the system date or time, the system reboots and you need to log on again.

Daylight Saving Time

Set

Clear

Start date

1Month ▾ 1st ▾ Mon.Days ▾ 1:00 ▾

End date

1Month ▾ 1st ▾ Mon.Days ▾ 1:00 ▾

Version

Ver.1.40.0

Copyright © 2015 - 2018 LG Electronics Inc. All right reserved.

Category	Description
System time	Check system time
Date setting	You can set the date.
Time setting	You can set the time.
Daylight saving time setting	Daylight saving time (summer time) start and end date Set/Clear
Version	You can check the version.

3. When setting is completed, click [Apply] button.

- Setting the exception date
- Delete exception date
- Register schedule exception device

Note

- When system time or date is changed, it can be logged out, and you need to log in again.



Network Setting

You can set or change network information.

1. In the left menu tab, click [Setting] > [Network Setting] menu.

- Network setting screen is displayed.

2. Set the network information.

Network setting

Cancel Apply

IPv4 enable Setting Cancel

IPv4 address setting AUTO Manual
If device set as DHCP, it is possible to change IP address.

IPv4 information

IP address	10.175.191.199
Subnet mask	255.255.255.0
Basic gateway	10.175.191.254

IPv6 enable Setting Cancel

IPv6 address setting Auto Configuration DHCP Manual
If device set as DHCP, it is possible to change IP address.

IPv6 information

IPv6 address	fe80::dc81:e7ff:fe96:cc5a/64
IP address	<input type="text"/>
subnet prefix length	<input type="text"/>

DNS setting AUTO Manual

Main DNS	165.186.85.11
Sub DNS	165.243.137.34

MAC address

MAC address	de:81:e7:96:cc:5a
-------------	-------------------

Web Port Set

Port number	443
-------------	-----

※ Unusable port is a port defined as Public Port, or a port used by AC Smart 5.

Category	Description
IPv4 enable	IPv4 usage address Set/Clear
IPv4 address setting	Check IPv4 address setting AUTO(DHCP)/Manual If you use AUTO(DHCP), the IP address may be changed. So we recommend using the manual IP address configuration.
IPv4 information	Check IPv4 address
IPv6 enable	IPv6 usage address Set/Clear
IPv6 address setting	Check IPv6 address setting Auto Configuration/DHCP/Manual If you use DHCP, the IP address may be changed. So we recommend using the automatic or manual IP address configuration.
IPv6 information	Check IPv6 address
DNS setting	[AUTO]: Automatically sets main DNS and secondary DNS [Manual]: User sets main DNS and secondary DNS
MAC address	Check MAC address
Web Port setting	Port setting (range: 443, 1024~49151)

Note

Network setting can be set in Device, and only some settings may be changed in Web.

3. When setting is completed, click **[Apply]** button.



Notification Settings

You can set or change Error Notification and Energy Notification.

Error Notification

You can set or change error notice.

1. In the left menu tab, click [Setting] > [Notification Settings] menu.

- Notification Settings screen is displayed.

2. Set the error notice.

Notification Settings

Error Notification Energy Notification

e-mail usage setting Set Clear

e-mail title

Receiving e-mail address Add address

Sending cycle when error occurs ▾

Repeat sending when error occurs Once Repeat

Automatic daily error-notification mail Set Clear

Cancel Apply

Category	Description
e-mail usage setting	Selection of set/clear of whether to send the error occurred device's address and error No. through e-mail
e-mail title	e-mail title setting
Receiving e-mail address	Input receiving e-mail address
Sending cycle when error occurs	Set transmission cycle in case of error (10/20/30/40/50/60 min.)
Repeat sending when error occurs	Once: Sending once same error alarm when error occur. Repeat: Sending same error alarm repeatedly every cycle.
Automatic daily error-notification mail	Automatic sending of e-mail once a day when no error occurs

3. To save the set contents, click [Apply] button.

Energy Notification

You can set or change Energy Notification.

1. Press the [Energy Notification] tab at the top of the screen.

2. Set Energy Notification.

Notification Settings

Cancel Apply

Error Notification Energy Notification

e-mail usage setting Set Clear

e-mail title

Receiving e-mail address Add address

Notification Item Operation time Electricity Electricity (total amount over time) Gas TOE CO₂

Alert Interval Receive notifications. ?

Category	Description
e-mail usage setting	Set whether to send energy usage data via email.
e-mail title	e-mail title setting
Receiving e-mail address	Input receiving e-mail address
Notification Item	Select energy items
Alert Interval	Press the [▼] button to select the desired date. • Set the date to receive energy usage data via email. • Calculate the data for one month period up to the day before the set date.

3. To save the set contents, click [Apply] button.

Note

Before e-mail usage setting, check the following categories.

- [Setting] > [Network setting]'s DNS server shall be set.
- [Setting] > [Administrator setting]'s mail server and sending e-mail shall be set.



Administrator Setting

You can set or change the user management environment when the user logs in with manager authority.

1. In the left menu tab, click [Setting] > [Administrator Setting] menu.

- Administrator setting screen is displayed. You can change the manager information or set the system usage environment.

Administrator setting

Set password

Current password

New password

Verify new password

Set receiving e-mail

E-mail

※ When you add 'new InterLocking', if you select Send e-mail with output condition You can receive InterLocking execution information to the set manager e-mail.

Set mail server

SMTP Server

Port
Scope 2~65535

※ While editing the email server settings or the incoming/outgoing email settings, you cannot perform [Test Connection]. Click the [Apply] button to save the changes, and then try it again.

※ To perform [Test Connection] in the email server settings or to receive/send emails through the central controller, you first need to set the [Network setting] > [DNS setting].

Set sending e-mail

ID

Password

※ You need to save the mail server (SMTP server) ID and password that connection test succeeded to send e-mail through mail server.

Set menu

Dashboard

Control

Device control Schedule control InterLocking Time limit control

Hotel Solution (BACnet)

Energy

Energy Usage Energy Navigation Peak demand control Energy unit cost

History

Operation history Energy navigation history Operation trend Cycle

Set

Installing Group setting System setting Network setting

Error notice setting Administrator setting Additional user setting Screen Setting

Advance Setting TMS Setting BACnet/Modbus Setting Indoor Fine Dust Monitoring

Category	Description
Set password	Set the password to use during login <ul style="list-style-type: none"> • Current password: Input password used currently for login • New password: Input new password • New password verification: Input the same new password one more time
Set receiving e-mail	Input e-mail address
Set Mail server	Manager mail server setting <ul style="list-style-type: none"> • SMTP server: Input SMTP server address • Port: Input port No. • Connection test: Input mail account test (network shall be connected)
Set sending e-mail	<ul style="list-style-type: none"> • ID: Input user ID • Password: Input user password
Set Menu	Click checkbox to select the desired manager menu (you can select multiple) <ul style="list-style-type: none"> • Dashboard • Control: device control, schedule control, InterLocking, Time limit control, Hotel Solution(BACnet) • Energy: Energy usage, Energy Navigation, Peak demand control, Energy Unit Cost • History: operation history, Energy Navigation history, operation trend, cycle • Setting: Installing, Group setting, System setting, Network setting, Notification Settings, Administrator setting, Additional user setting, Screen Setting, Advance Setting, TMS Setting, BACnetModbus Setting, Innenraum-Feinstaub-Überwachung, Set Fine Dust Monitoring

2. To save the set contents, click **[Apply]** button.



Additional User Setting

You can manage the additional user list when you login with manager authority.

1. In the left menu tab, click [Setting] > [Additional User Setting] menu.

- Additional user setting screen is displayed. You can add user or edit or delete registered user information.

Add User

You can add secondary manager and general user.

1. In the left menu tab, click [Setting] > [Additional User Setting] menu.

- Additional user setting screen is displayed.

2. Click [Add User] button.

- Add user screen is displayed.

3. Set each category.

Category	Description
Info	[User authority] <ul style="list-style-type: none">Secondary manager: Provides authority assigned menuGeneral user: Provides only device control menu
Set password	[ID]: input ID to use [password]: input password to use [Verify password]: input password to use again
Group Authority	Assign additional user's group authority <ul style="list-style-type: none">When group is selected, only the corresponding group can control
	Assign menu authority used by additional user

4. When setting is completed, click **[Apply]** button.

Delete User

You can delete registered user.

1. In the left menu tab, click **[Setting] > [Additional User Setting]** menu.

- Additinal user setting screen is displayed.

2. Click **[Delete]** button of the user to delete.

- Delete user screen is displayed.

3. Click **[Yes]** button



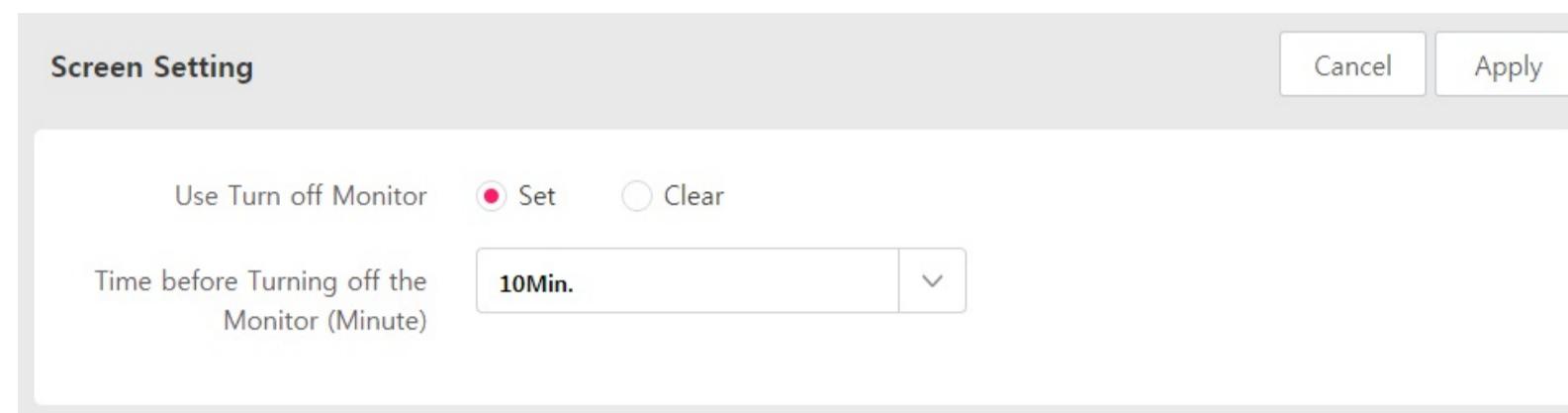
Screen Setting

You can set product screen related usage environment.

1. In the left side menu tab, click **[Setting] > [Screen Setting]** menu.

- Screen setting screen is displayed.

2. Set screen information.



Category	Description
Screen saver setting	<ul style="list-style-type: none">• Monitor OFF usage: use of monitor power OFF function Set/Clear• Monitor OFF standby time (min.): set standby time until monitor power OFF (10/20/30/40/50/60 min.)

3. When setting is completed, click **[Apply]** button.

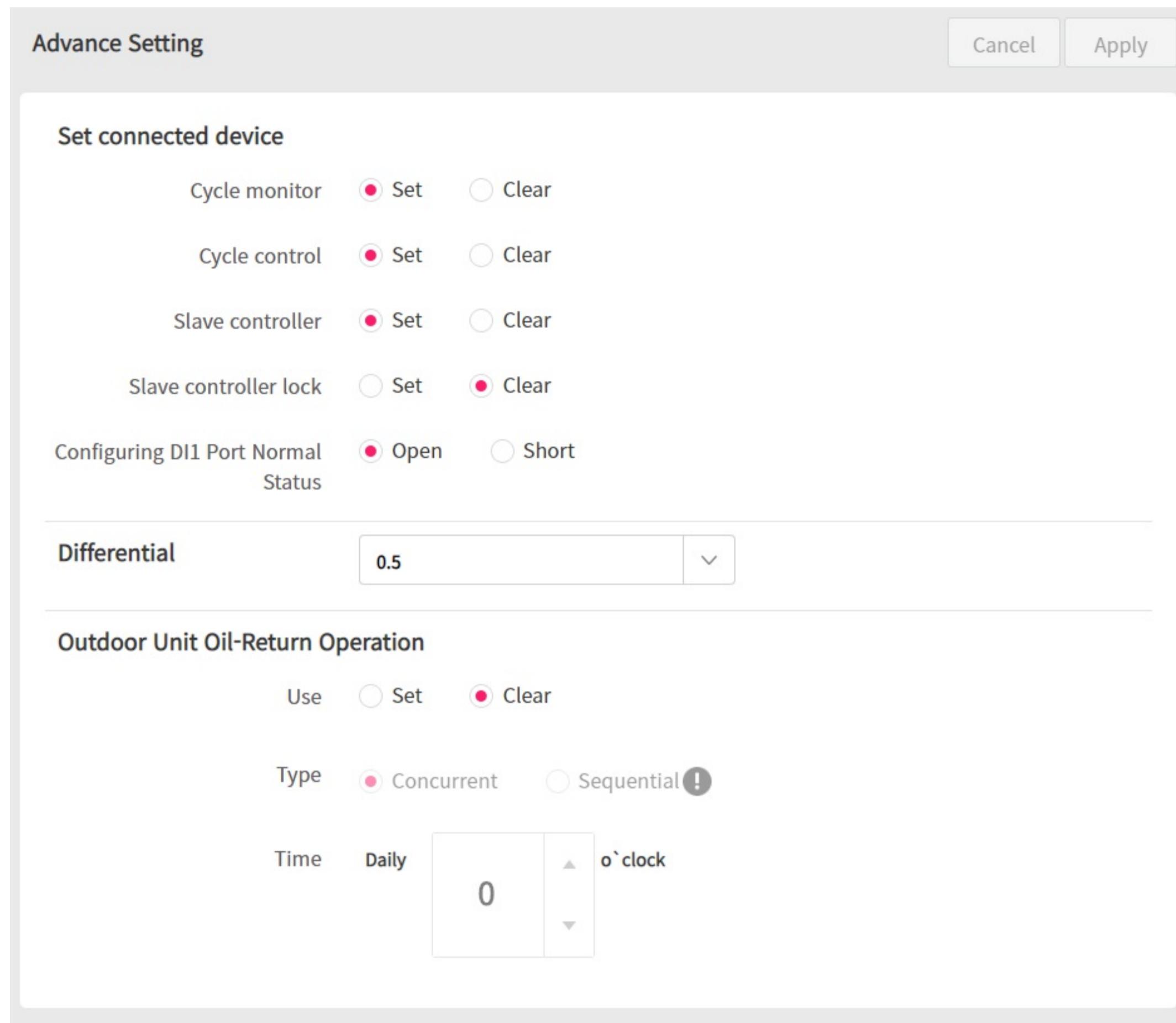


Advance Setting

You can set functions required for device operation.

1. In the left side menu tab, click [Setting] > [Advance Setting] menu.

- Advance Setting screen is displayed.



Category	Description
Set connected device	<ul style="list-style-type: none">Outdoor unit cycle monitoring: set whether to use cycle information monitoringOutdoor unit cycle control: set whether to run cycle controlSlave controller: set whether slave controller control is possibleSlave controller lock: set whether slave controller control is possible for indoor unit with all lock set (Use: Slave controller control is not possible)Configuring DI1 Port Normal Status: Configures the DI1 port normal status.
Differential	Press [▼] button to set temperature difference for automatic switching operation
Outdoor Unit Oil-Return Operation	<ul style="list-style-type: none">Set whether to run Outdoor Unit Oil-Return OperationSet outdoor unit oil recovery to Concurrent/Sequential operation.<ul style="list-style-type: none">- Concurrent operation: Operates outdoor unit oil recovery at the same time.- Sequential operation: Operates outdoor unit oil recovery sequentially at a 10-minute intervalPress [▲]/[▼] button to set Outdoor Unit Oil-Return Operation time

2. To save the set contents, click [Apply] button.



TMS Setting

You can set remote service that can manage the system remotely.

1. In the left side menu tab, click [Setting] > [TMS Setting] menu.

- TMS Setting screen is displayed.

TMS Setting

TMS configuration

Set Clear

TMS 2.0 TMS 3.0

TMS 3.0 should be set after checking with a professional TMS engineer.

Information TMS service

TMS server address: tms2.lge.com

TMS server port: 23

Update Cycle (Second): 10Seconds

ODU Cycle monitoring boost: Set Clear

ODU Cycle monitoring boost should be set after checking with a professional TMS engineer.

Site information

Site address: [input field]

Site name: [input field]

Site code: 0000000000

Category	Description
TMS configuration	<ul style="list-style-type: none">• Set whether to use remote service• Sets the server type for remote service.<ul style="list-style-type: none">- [TMS 2.0] button : Connect to TMS 2.0 server- [TMS 3.0] button: Connect to TMS 3.0 server
Information TMS service	<ul style="list-style-type: none">• Service server address: input remote service server address• Service server port: input remote service server port number• Update cycle (sec.):Press [▼] button to select remote service update cycle 10 / 30 / 60 / 90 / 120 seconds• ODU Cycle monitoring boost: Sets whether to ODU Cycle monitoring boost
Site information	<ul style="list-style-type: none">• Site address: remote site address input• Site name: input remote site name• Site code: Press [Request a site code] button to input site code

2. To save the set contents, click [Apply] button.



BACnet/Modbus Setting

Guide on BTL authentication

You need to set BACnet to Type C to make the devices operate using the functions authenticated by BTL.

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

Operation method according to BACnet type

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

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

You can change BACnet/Modbus Setting.

1. In the left side menu tab, click [Setting] > [BACnet/Modbus Setting] menu.

- BACnet/Modbus Setting screen is displayed.

2. Set BACnet/Modbus information.

BACnet/Modbus Setting

BACnet enable Set Clear

Temperature Unit Setting °C °F

Device ID Setting
9000

Network Number Setting
0

Register as Foreign Device Set Clear

IP: 192.168.0.1

Port: 47808

TTL: 36000

Only Monitoring Setting Set Clear

BACnet Port Setting

ACP Port: 47808

BMS Port: 47808

BACnet Type Setting A Type B Type C Type

Time sync setting Set Clear

Modbus TCP enable Set Clear

Vnet Number Setting
10

Cancel **Apply**

Category	Description
BACnet enable	BACnet enable Set/Clear
Temperature unit setting	Select temperature unit type (°C/°F)
Device ID setting	Device ID setting to designate Device Instance Number <ul style="list-style-type: none">• Air conditioner: Device ID• ERV: Device ID + 1• AHU: Device ID + 2• Outdoor unit cycle information: Device ID + 3• Heating: Device ID + 4• Normal : Device ID + 5
Network Number Setting	Network Number Setting

Register as Foreign Device	Foreign Device Set/Clear
Only Monitoring setting	Only Monitoring Set/Clear
BACnet Port setting	BACnet Port setting
BACnet Type setting	BACnet Type selection (A/B/C)
Time sync setting	Time sync setting Set/Clear
Modbus TCP enable	Modbus TCP enable Set/Clear
Vnet Number setting	Vnet Number setting to use Modbus TCP function Set Vnet Number value operates as Modbus TCP's Slave ID Address

3. When setting is completed, click **[Apply]** button.



Set Fine Dust Monitoring

This option allows you to set and manage Fine Dust monitoring.

1. On the left menu tab, click [Settings] > [Set Fine Dust Monitoring].

- The screen for setting Fine Dust monitoring will appear. You can add Fine Dust monitoring tasks and edit or delete the listed tasks.

Name	No.	Device and Group	Edit	Delete
1st Floor	Individual	AC_UNIT_00 and 15cases		
2nd Floor	Group	Basic group > Group_00		

Add/edit Fine Dust monitoring task

You can add or edit Fine Dust monitoring tasks.

1. On the left menu tab, click [Settings] > [Set Fine Dust Monitoring].

- The screen for setting Fine Dust monitoring will appear.

2. Click the [Add] button.

- The screen for adding Fine Dust monitoring task will appear.

3. Set the items on the screen.



Campus #1

Device error 0 Network error 0 02-08-2022 PM 10:08

Help

Set Fine Dust Monitoring

[Cancel](#) [Apply](#)

Name

Type Group Monitoring Individual Device Monitoring

Switching Frequency for Device Page

Display Clean Air Area Certification Cancel Use

Image (Size: 3MB, Ratio: 8:9 recommended)

Image Switching Frequency

Select device

Type	Name	Address	Group
 There is no registered device. Register the device by selecting Edit device button.			

Campus #1
Device error 0
Network error 0
02-08-2022
PM 10:08
Help

Set Fine Dust Monitoring

Name

Cancel
Apply

Type Group Monitoring Individual Device Monitoring

Device Switching Frequency

Use Alternative Text for Bad Status

Display Clean Air Area Certification Cancel Use

Image (Size: 3MB, Ratio: 8:9 recommended)

Image Switching Frequency

Select device

Type	Name	Address	Group
<p>There is no registered device. Register the device by selecting Edit device button.</p>			

Item	Setup
Name	Set the name of Fine Dust monitoring
Device Page Switching Cycle/Device Switching Cycle	Set the Device Page Switching Cycle/Device Switching Cycle
Type	Set the monitoring type <ul style="list-style-type: none"> • Group Monitoring: Provides total cleanliness level and statistical data of group • Individual Device Monitoring: Provides total cleanliness level and images for each device
Use Alternative Text for Bad Status	Provides alternative text and images for total cleanliness status of Bad or lower <ul style="list-style-type: none"> • Available only for individual device monitoring
Display Clean Air Area Certification	Display or hide the Clean Air Area Certification sticker
Image	Set the image to be displayed during monitoring. Up to 10 images can be set. <ul style="list-style-type: none"> • [Import]: Import an image to use. When the Import window appears, select the image file to add and click the [Open] button. • [Add]: Adds an image setting tab. • [Delete]: Deletes an image setting tab. • [Reset]: Resets the added image. • Available only for individual device monitoring
Image Switching Frequency	Set Image Switching Frequency <ul style="list-style-type: none"> • Available only for individual device monitoring
Device edit	Select the device or group for which to perform Fine Dust monitoring <ul style="list-style-type: none"> • Click the [Device edit] button to bring up the pop-up window for editing the device. • On the list of non-registered devices, check the box for the device or group to register and click the [◀] button. • Once the device is registered successfully, click the [Apply] button.

4. Once the setting is completed, click the **[Apply]** button.

Delete Fine Dust Monitoring

You can delete the listed particulate monitoring setting.

1. On the left menu tab, click **[Settings] > [Set Fine Dust Monitoring]**.
 - The screen for setting Fine Dust monitoring will appear.
2. Click the **[Delete]** button next to the item to delete.
 - The pop-up window for deleting will appear.
3. Click the **[Yes]** button.

Note

Recommended image size (for 1920x1080 resolution)

- Horizontal: 960x1080px
- Vertical: 1080x840px



Usage (Mobile, Tablet)

- LogIn / LogOut
- Dashboard
- Device Control
- Schedule Control



You can access to the product with IP address in internet address window to use various central control functions.

Note

- Chrome browser is recommended for web control.
- For access to web, IP address needs to be set.

Login

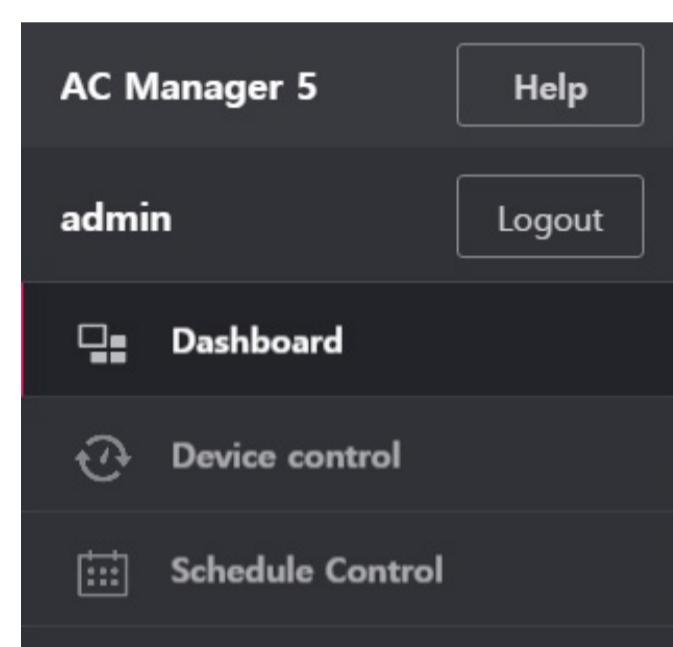
Login method is as follows.

1. Please input IP address of the product in the internet address window.
2. Input ID and password in the login window and click **[Login]** button.

LogOut

Logout method is as follows.

1. In the menu, click **[LogOut]** button.

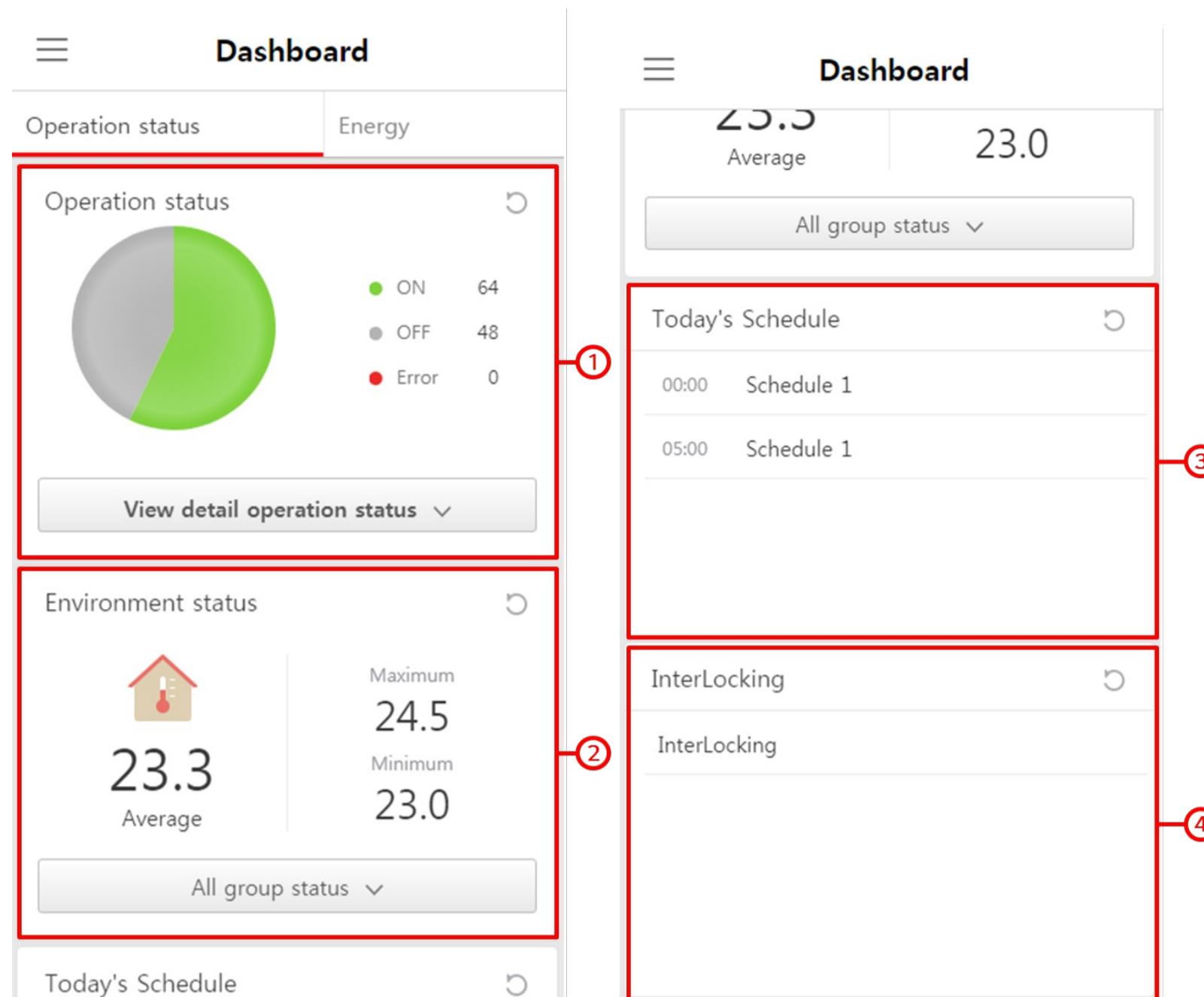




You can check the current operation status and energy usage trend of the equipment installed in the product.

Operation status

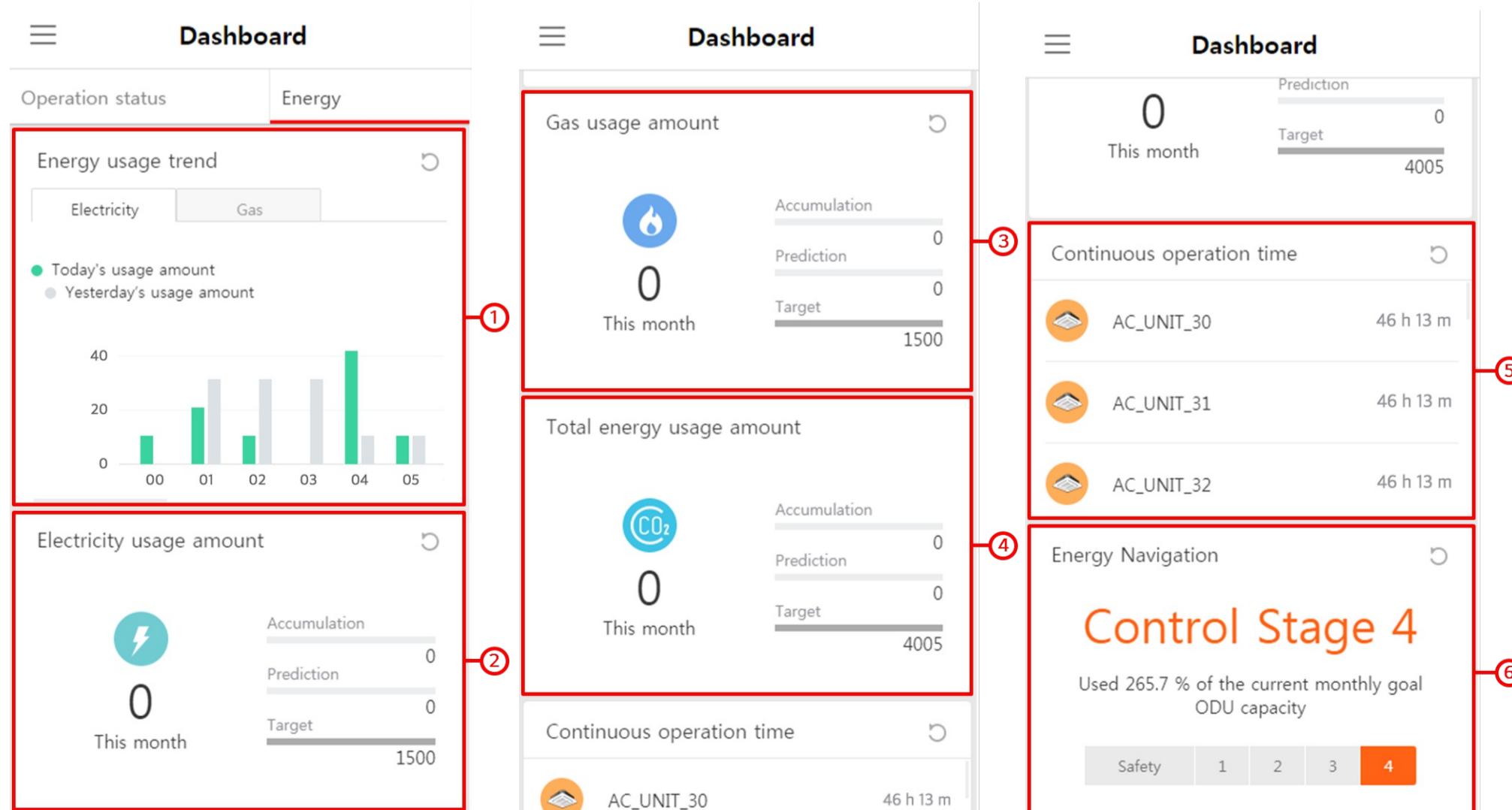
It describes the dash board's current operation status tab composition and functions.



No.	Category	Contents
①	Operation status	Check operation status (start/stop/error) of the equipment installed in the product [group] <ul style="list-style-type: none">• Checking of operation status of each management group designated by user [device] <ul style="list-style-type: none">• Checking of operation status of each device
②	Environment status	Checking of average indoor temperature, Max./Min. indoor temperature and group
③	Today's Schedule	Checking today's schedule list
④	InterLocking	Checking of InterLocking list

Energy

It describes the dash board's energy tab composition and functions.

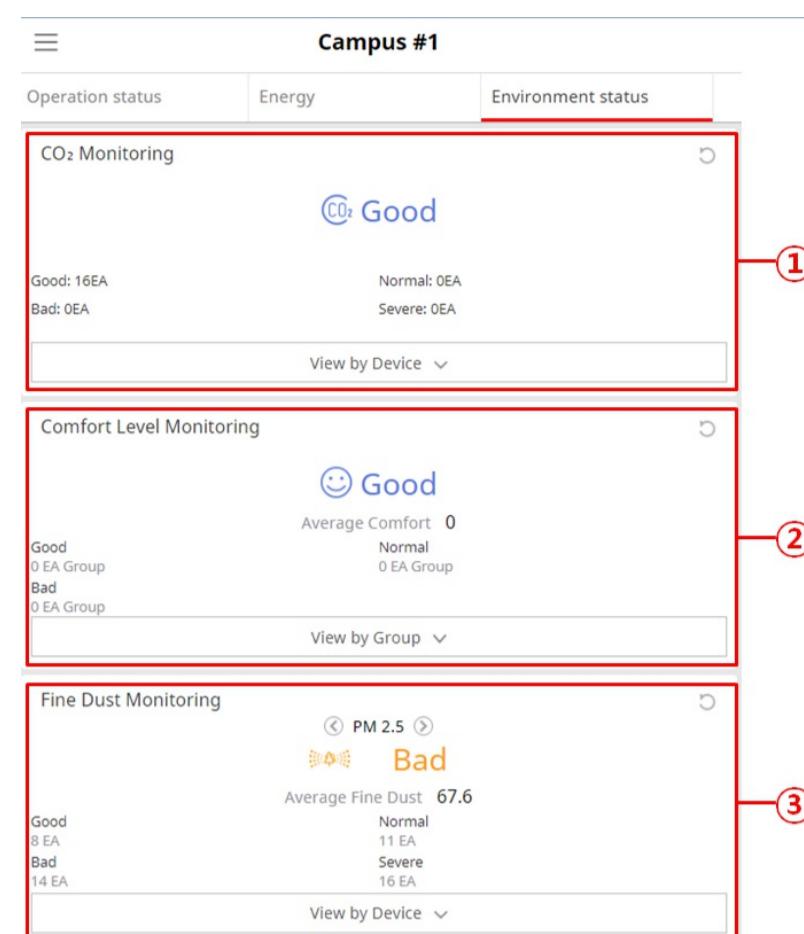


No.	Category	Contents
①	Energy usage trend	Checking of daily, monthly, and yearly trend of electricity/gas usage amount
②	Electricity usage amount	Checking of electricity usage amount accumulation, forecast, and goal
③	Gas usage amount	Checking of gas usage amount accumulation, forecast, and goal
④	Total energy usage amount	Checking of total energy usage amount accumulation, forecast, and goal

⑤	Continuous operation time	Checking of continuous operation time rank of indoor unit
⑥	Energy Navigation	Check energy navigation status

Environment status

It describes the composition and functions of dash board environment status tab



No.	Category	Contents
①	CO ₂ monitoring	Check CO ₂ status of registered ERV
②	Comfort Level Monitoring	Check registered indoor unit's pleasantness status
③	Fine dust monitoring	Check registered indoor unit, air purifier's fine dust status Fine dust is classified to PM10, PM2.5, and PM1.0, and it indicates each status and concentration



Device Control

It describes the method to control the device and to monitor the device status.

[Screen]

- ▶ Screen Structure and Function

[Control Window]

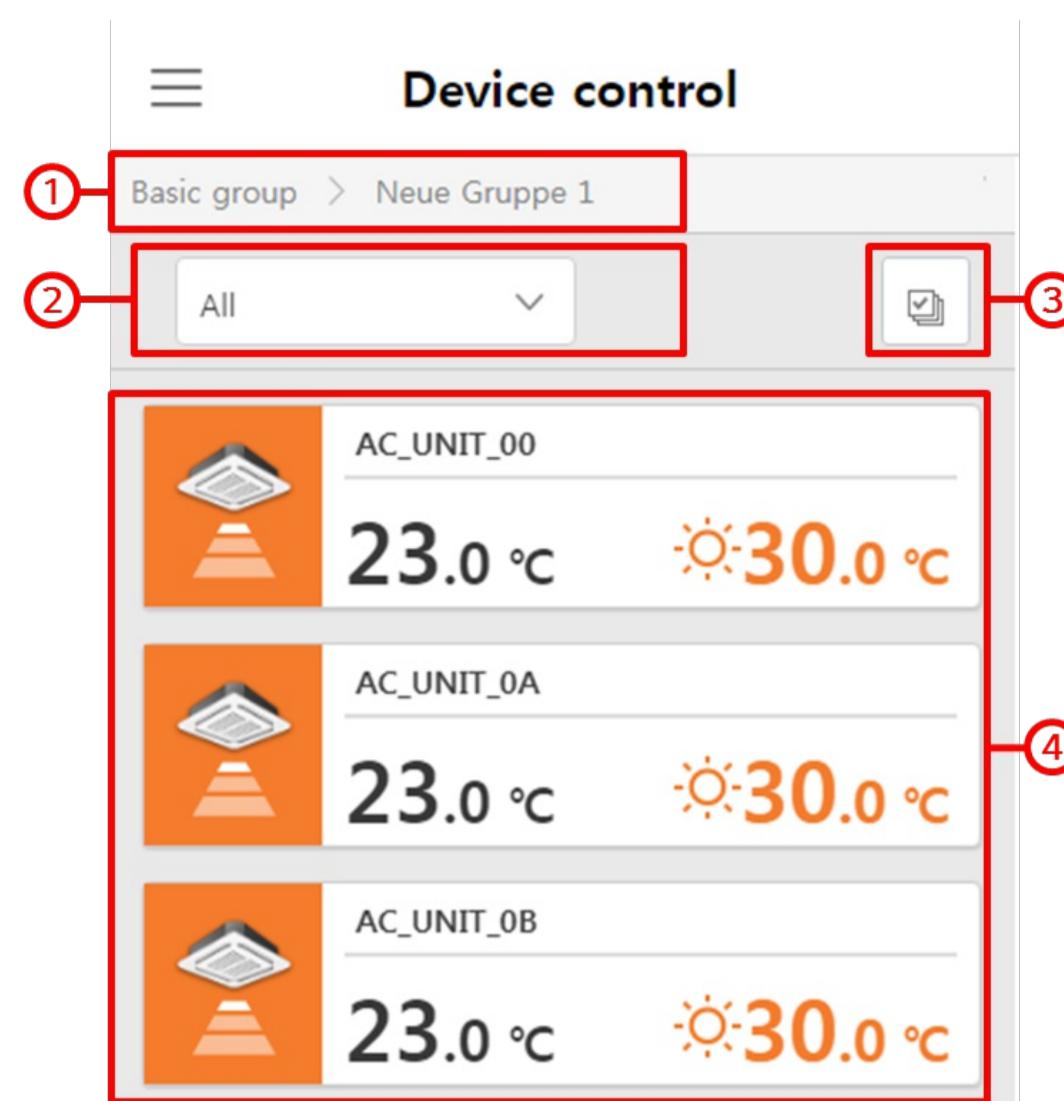
- ▶ Control of Each Device
- ▶ Device Information



Screen Structure and Function

1. In the left menu tab, click [Control] > [Device Control] menu.

- The device control screen is displayed.

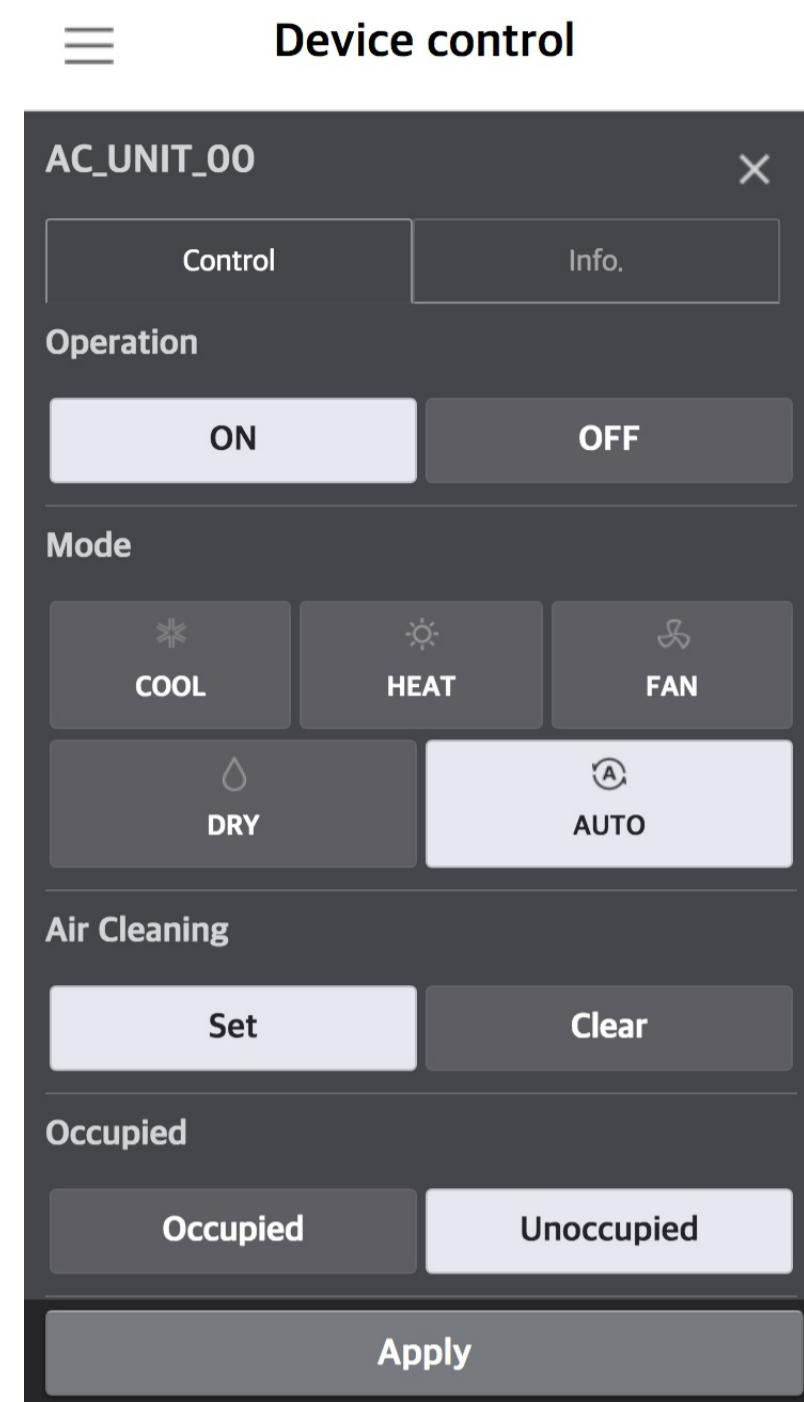


No.	Category	Contents
①	Group Information	Group name and group location
②	Filtering	Device category filtering
③	Multi-select	Select multiple devices when it is clicked
④	Device section	Check the information of the devices set in the group



Control of Each Device

When a device is selected in the device section, control window is created as in the following screen. Through the control window, you can control the selected device.



Note

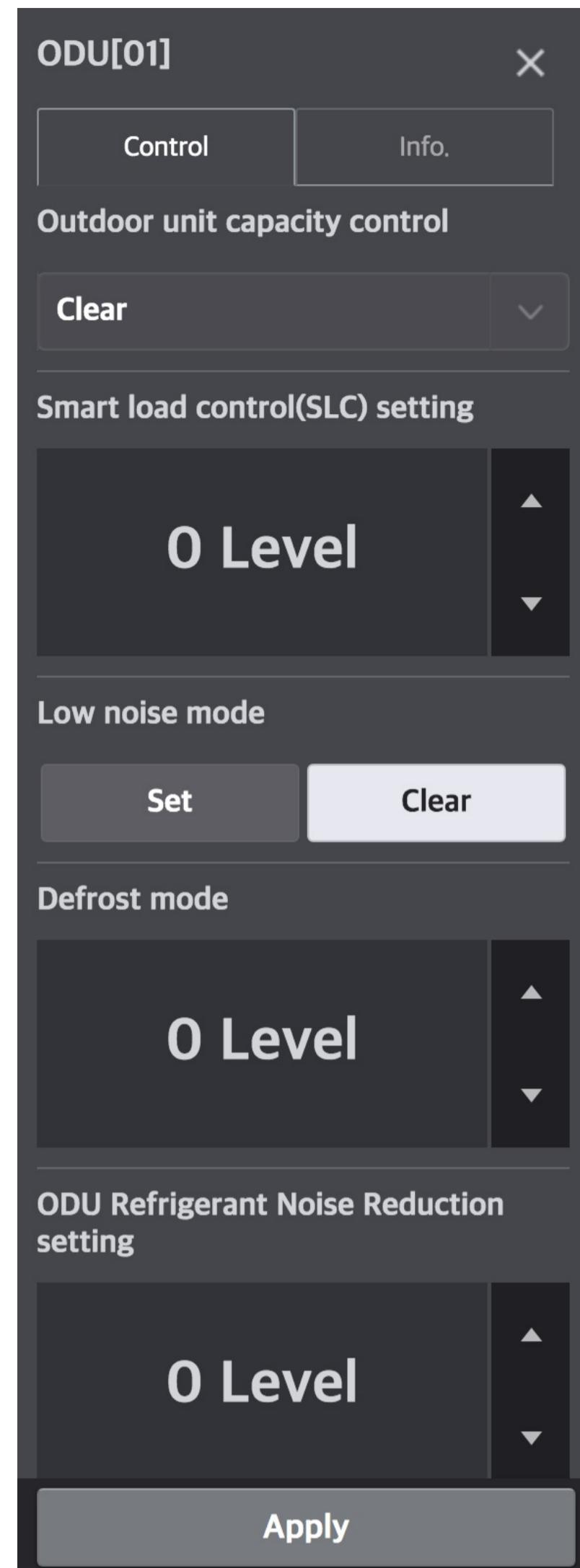
- The detail control boundary for each device may be different from the actual device, so make sure to refer to the corresponding device's manual.
- ACS I/O devices may have different control tool name, unit, upper limit, lower limit, etc. according to the setting.

Detail controls for each device

- Outdoor Unit
- IDU
IDU (2Set)
- ERV
- ERV DX
- Floor mounted vent
- Heating
- AHU
- Scroll chiller
- Screw chiller
- Turbo chiller
- Scroll Chiller Mini
- Absorption Chiller
- DOKIT
- DO
- AO
- Air purifier



Outdoor Unit



Category	Contents
Outdoor unit capacity control	<ul style="list-style-type: none">• Press [▼] button to set operation rate (%)
Smart load control function	<ul style="list-style-type: none">• Press [▲]/[▼] button to set smart load control stage (0stage, 1stage, 2stage, 3stage, 4stage)
Low noise operation	<ul style="list-style-type: none">• [Set/Clear] button: outdoor unit low noise operation Set/Clear
Defrost mode	<ul style="list-style-type: none">• Press [▲]/[▼] button to set defrost mode stage (0stage, 1stage, 2stage, 3stage)
ODU Refrigerant Noise Reduction setting	<ul style="list-style-type: none">• Press [▲]/[▼] button to set outdoor unit refrigerant noise reduction stage (0stage, 1stage, 2stage)

Note

In the central controller, if 'outdoor unit low noise operation' is used, in the installed indoor unit's remote controller, you need to set [Installer setting] > [Low noise mode] to 'ODU'. (Default value 'ODU')



Category	Contents
Operation	<ul style="list-style-type: none"> • [ON] button: starts the device operation • [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> • [COOL] button: Switches to cooling mode • [HEAT] button: Switches to heating mode • [FAN] button: Air purification operation. When FAN is selected, set temperature is not applied to the device • [DRY] button: Removes moisture during rainy season or when humidity is high. When DRY is selected, set temperature is not applied to the device • [AUTO] button: Switches to automatic mode
Air cleaning	<p>Air cleaning control only for air cleaning function supporting indoor unit</p> <ul style="list-style-type: none"> • Air cleaning single operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of air cleaning [Set], air cleaning single operation with wind only (automatic wind) (During air cleaning single operation, mode lock and wind amount lock are not checked) 2) During air cleaning single operation, in case of operation [OFF] or air cleaning [Clear], air cleaning is cancelled to previous mode and previous wind amount (But, in case of mode or wind amount control together, control is done with controlled mode and wind amount) • Air cleaning additional operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of operation status [ON] and air cleaning [Set], in current mode, air cleaning additional operation 2) In indoor unit operation state, in case of air cleaning [Set], in current mode, air cleaning additional operation 3) During air cleaning additional operation, in case of operation [OFF], operation stops 4) During air cleaning additional operation, in case of air cleaning [Clear], air cleaning is cancelled
Set temperature	Press [▲]/[▼] button to set the desired temperature
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast • [AUTO] button: [LOW]-[MED]-[HIGH] automatic switching
Swing	<ul style="list-style-type: none"> • [Set/Clear] button: Set/Clear the Swing function
Set temp range	When user set the desired temperature individually, the desired temperature outside the designated temperature boundary cannot be set

Human detection mode - ON/OFF learned power saving	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - ON/OFF learned power saving Set/Clear
Human detection mode - Temperature power saving	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - temperature power saving Set/Clear
Human detection mode - Unoccupied time setting(minute)	Only for human detection mode - supporting indoor unit, human detection mode - control Set empty decision time to 5, 10, 15, 30, 60, or 90 min.
Human detection mode - Direct wind	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - direct wind Set/Clear
Human detection mode - Indirect wind	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - indirect wind Set/Clear
Comfortable Power Saving	<ul style="list-style-type: none"> • [Set/Clear] button: Comfortable Power Saving function Set/Clear • You can press [▲]/[▼] button to set stage Only when indoor unit is in cooling operation, Comfortable Power Saving control is possible
Prefilter replacement alarm	<ul style="list-style-type: none"> • [Clear] button: In case of prefilter replacement alarm, it cancels prefilter replacement alarm
Fine dust filter replacement alarm	<ul style="list-style-type: none"> • [Clear] button: In case of fine dust filter replacement alarm, it cancels fine dust filter replacement alarm
HardLock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller
Mode lock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear lock so that user cannot control mode setting with individual remote controller
Fan lock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear lock so that user cannot control Fan speed setting with individual remote controller
TempLock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear lock so that user cannot control temperature setting with individual remote controller
Auto change over(Occupied)	<p>It is a function to automatically switch to cooling operation if indoor temperature exceeds upper limit temperature, to heating operation if it is less than lower limit temperature, and to wind only operation if it is between upper limit temperature and lower limit temperature (supported only in outdoor unit with both cooling/heating)</p> <ul style="list-style-type: none"> • [Set/Clear] button: Set/clear Auto change over(Occupied)
Lower /Upper temp.	Auto change over(Occupied)'s lower limit temperature and upper limit temperature setting
Auto change over(Occupied) Fan speed	<p>Select the Fan speed value to set in the indoor unit during Auto change over(Occupied) operation</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast • [AUTO] button: [LOW]-[MED]-[HIGH] automatic switching
Setback(UnOccupied)	<p>Function to maintain the temperature of the space where the device is installed in certain boundary (Only supported by cooling/heating simultaneous type outdoor unit)</p> <ul style="list-style-type: none"> • [Set/Clear] button: Set/clear the Setback(UnOccupied)
Cool start	Press [▲]/[▼] button to set the cooling operation start temperature(21°C~40°C)
Heat start	Press [▲]/[▼] button to set the heating operation start temperature(1°C~20°C)
Combination heating control	(Supported for certain indoor and outdoor units only) [Set/Clear] button : Activates/deactivates control based on outdoor temperature.
Mode	<p>It is activated only when combination heating control is set.</p> <ul style="list-style-type: none"> • [AUTO] button : Sets the control mode to auto. • [Manual] button : Sets the control mode to manual. <p>You can activate/deactivate control of the heat pump and the heater. You cannot deactivate control of both the heat pump and the heater.</p>
Temp. 1	<p>It is activated only in the auto mode.</p> <p>You can set Temp. 1 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically.</p> <p>Press [▲]/[▼] to set Temp. 1 (-23°C-16°C).</p>
Temp. 2	<p>It is activated only in the auto mode.</p> <p>You can set Temp. 2 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically.</p> <p>Press [▲]/[▼] to set Temp. 2 (-23°C-51°C).</p>
Heat pump	<p>It is activated only in the manual mode.</p> <p>[Set/Clear] button : Activates/Deactivates heat pump control.</p>
Heater	<p>It is activated only in the manual mode.</p> <p>[Set/Clear] button : Activates/deactivates heater control.</p>
Smart Care	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate Smart Care
Cooperative control	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate cooperative control
UVnano	Only for UVnano mode - supporting indoor unit, UVnano mode - control [Set/Clear] button: Activate/Deactivate UVnano



IDU (2Set)

When 2Set function supporting outdoor unit/indoor unit/remote controller are used and in [Setting] > [Installing], if ACP's 2Set automatic mode is selected as IDU, indoor unit 2Set control window is generated on the right side as in the following screen.



Category	Contents
Operation	<ul style="list-style-type: none"> • [ON] button: Starts the device operation • [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> • [COOL] button: Switches to cooling mode • [HEAT] button: Switches to heating mode • [FAN] button: Air purification operation. When FAN is selected, set temperature is not applied to the device • [DRY] button: Removes moisture during rainy season or when humidity is high. When DRY is selected, set temperature is not applied to the device • [AUTO] button: Switches to automatic mode
Air cleaning	<p>Air cleaning control only for air cleaning function supporting indoor unit</p> <ul style="list-style-type: none"> • Air cleaning single operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of air cleaning [Set], air cleaning single operation with wind only (automatic wind) (During air cleaning single operation, mode lock and wind amount lock are not checked) 2) During air cleaning single operation, in case of operation [OFF] or air cleaning [Clear], air cleaning is cancelled to previous mode and previous wind amount (But, in case of mode or wind amount control together, control is done with controlled mode and wind amount) • Air cleaning additional operation <ul style="list-style-type: none"> 1) In indoor unit stop state, in case of operation status [ON] and air cleaning [Set], in current mode, air cleaning additional operation 2) In indoor unit operation state, in case of air cleaning [Set], in current mode, air cleaning additional operation 3) During air cleaning additional operation, in case of operation [OFF], operation stops 4) During air cleaning additional operation, in case of air cleaning [Clear], air cleaning is cancelled
Occupancy	<p>Function to set the space with the corresponding indoor unit as occupied or empty</p> <ul style="list-style-type: none"> • [Occupied] button: occupied setting • [Unoccupied] button: empty setting
Cooling set temperature	Press [▲]/[▼] button to set cooling set temperature

Heating setting temperature	Press [▲]/[▼] button to set heating set temperature
Cooling lower limit/upper limit temperature	Cooling lower limit temperature and upper limit temperature setting
Heating lower limit/upper limit temperature	Heating lower limit temperature and upper limit temperature setting
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast • [AUTO] button: [LOW]-[MED]-[HIGH] automatic switching
Swing	• [Set/Clear] button: Set/Clear the Swing function
Human detection mode - ON/OFF learned power saving	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - ON/OFF learned power saving Set/Clear
Human detection mode - Temperature power saving	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - temperature power saving Set/Clear
Human detection mode - Unoccupied time setting(minute)	Only for human detection mode - supporting indoor unit, human detection mode - control Set empty decision time to 5, 10, 15, 30, 60, or 90 min.
Human detection mode - Direct wind	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - direct wind Set/Clear
Human detection mode - Indirect wind	Only for human detection mode - supporting indoor unit, human detection mode - control • [Set/Clear] button: human detection mode - indirect wind Set/Clear
Comfortable Power Saving	<ul style="list-style-type: none"> • [Set/Clear] button: Comfortable Power Saving function Set/Clear • You can press [▲]/[▼] button to set stage <p>Only when indoor unit is in cooling operation, Comfortable Power Saving control is possible</p>
Prefilter replacement alarm	• [Clear] button: In case of prefilter replacement alarm, it cancels prefilter replacement alarm
Fine dust filter replacement alarm	• [Clear] button: In case of fine dust filter replacement alarm, it cancels fine dust filter replacement alarm
HardLock	• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller
Mode lock	• [Set/Clear] button: Set/clear lock so that user cannot control mode setting with individual remote controller
Fan lock	• [Set/Clear] button: Set/clear lock so that user cannot control Fan speed setting with individual remote controller
TempLock	• [Set/Clear] button: Set/clear lock so that user cannot control temperature setting with individual remote controller
Combination heating control	(Supported for certain indoor and outdoor units only) [Set/Clear] button : Activates/deactivates control based on outdoor temperature.
Mode	<p>It is activated only when combination heating control is set.</p> <ul style="list-style-type: none"> • [AUTO] button : Sets the control mode to auto. • [Manual] button : Sets the control mode to manual. <p>You can activate/deactivate control of the heat pump and the heater. You cannot deactivate control of both the heat pump and the heater.</p>
Temp. 1	<p>It is activated only in the auto mode.</p> <p>You can set Temp. 1 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically.</p> <ul style="list-style-type: none"> • Press [▲]/[▼] to set Temp. 1 (-23°C-16°C).
Temp. 2	<p>It is activated only in the auto mode.</p> <p>You can set Temp. 2 for the outdoor temperatures. According to the set temperatures, the heat pump and the heater operate automatically.</p> <ul style="list-style-type: none"> • Press [▲]/[▼] to set Temp. 2 (-23°C-51°C).
Heat pump	<p>It is activated only in the manual mode.</p> <ul style="list-style-type: none"> • [Set/Clear] button : Activates/Deactivates heat pump control.
Heater	<p>It is activated only in the manual mode.</p> <ul style="list-style-type: none"> • [Set/Clear] button : Activates/deactivates heater control.
Smart Care	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate Smart Care
Cooperation control	Activated only when an AI controller is connected [Set/Clear] button: Activate/Deactivate cooperation control
UVnano	Only for UVnano mode - supporting indoor unit, UVnano mode - control [Set/Clear] button: Activate/Deactivate UVnano

Note

2set automatic mode

- Only with 2Set automatic mode supporting indoor/outdoor air, the corresponding function can be used. (For whether each device supports 2Set, please refer to the manual of the corresponding device.)
- Override is a function that can be set from remote controller. For override function related contents, please refer to remote controller manual.
- In 2Set automatic mode, along with Auto icon, product's actual operation mode (cooling, heating) status is displayed.

Occupancy

- If occupancy sensor is interlinked to indoor unit, setting from the central control has priority over the corresponding occupancy sensor. For occupancy sensor related contents, please refer to indoor unit or Dry Contact manual.
- When occupied setting is changed, automatically set cooling set temperature and heating set temperature are the most recently run schedule's cooling set temperature and heating set temperature, and if there is no previously run schedule, it is set to default value.

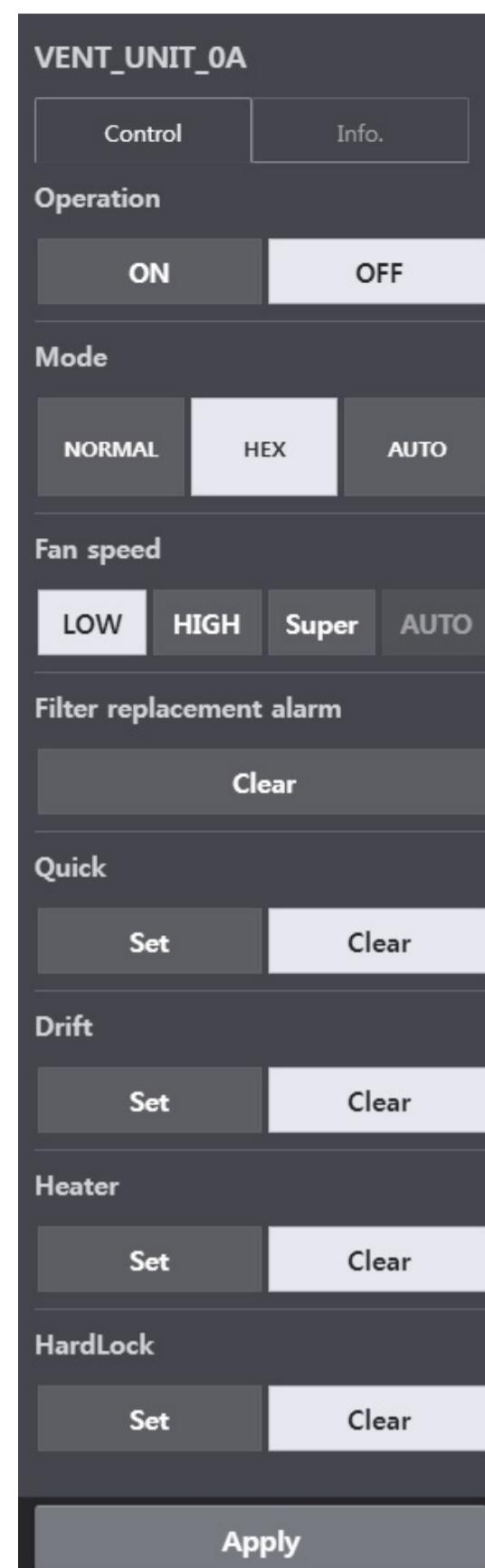
(Example)

09:00 - 12:00: occupied / cooling set temperature 27°C / heating set temperature 18°C

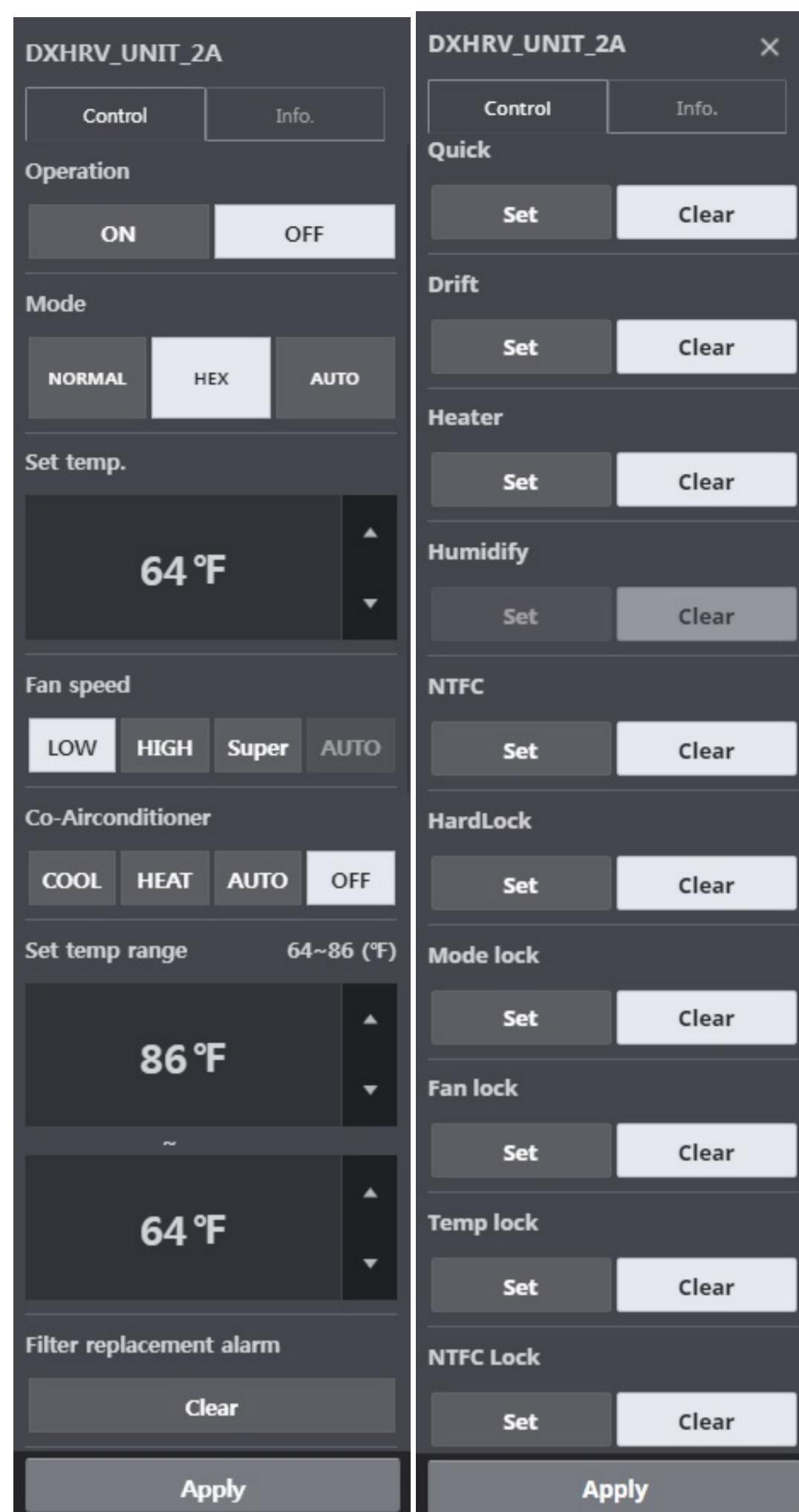
12:00 - 13:00: occupied / cooling set temperature 29°C / heating set temperature 16°C

13:00 - 15:00: occupied / cooling set temperature 26°C / heating set temperature 19°C

If it is empty without schedule after 15:00, cooling set temperature is 29°C and heating set temperature is 16°C, and if it is occupied, cooling set temperature becomes 26°C and heating set temperature becomes 19°C.



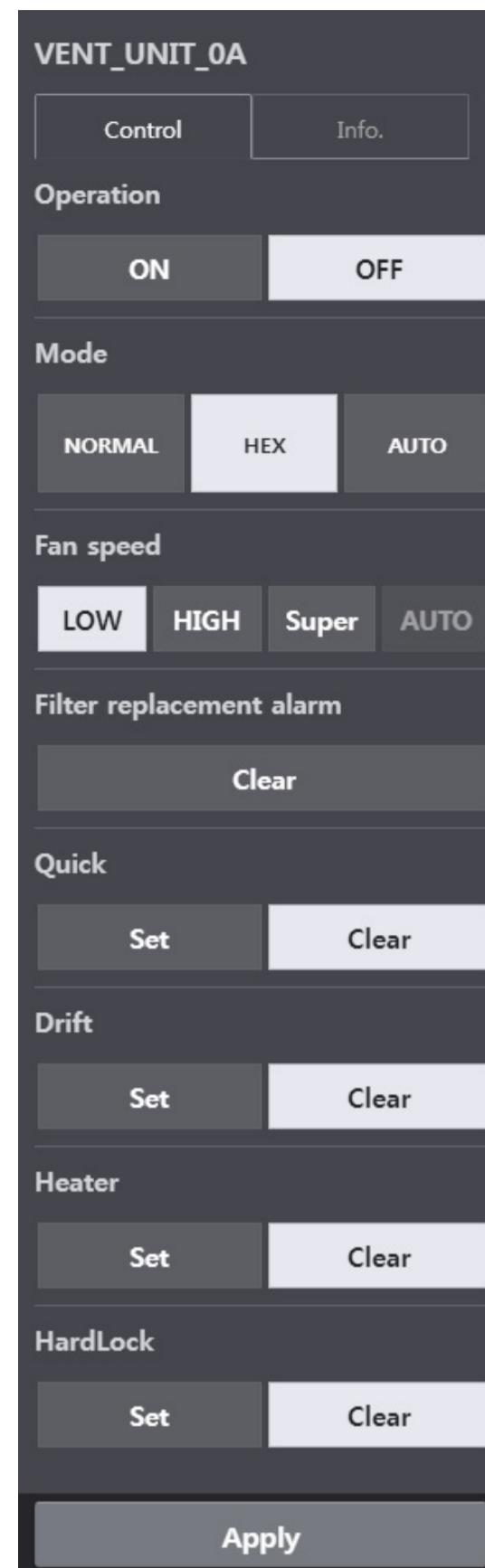
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none">• [NORMAL] button: Discharged air ventilates without going through the electric heat exchanger• [HEX] button: Both air supply/discharge ventilates through the electric heat exchanger• [AUTO] button: Switches to four seasons mode
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none">• [LOW] button: Set the fan speed to slow• [HIGH] button: Set the fan speed to fast• [SUPER] button: Set the fan speed to Max. speed• [AUTO] button: [LOW]-[HIGH]-[SUPER] automatic switching<ul style="list-style-type: none">- User setting is impossible- When Drift/Quick is set, [AUTO] Fan speed is selected- When Drift/Quick is cleared, [HIGH] Fan speed is selected- During [AUTO] operation, when [LOW]/[HIGH]/[SUPER] is selected, Drift/Quick function in operation is cleared
Filter replacement alarm	<ul style="list-style-type: none">• [Clear] button: in case of filter replacement alarm, it cancels filter replacement alarm
Additional function	<ul style="list-style-type: none">• Quick [Set/Clear] button: Set/clear Quick function (When Quick function is selected, Drift function is cleared)• Drift [Set/Clear] button: Set/clear Drift function (When Drift function is selected, Quick function is cleared)• Heater [Set/Clear] button: Set/clear heater function
Midnight air cooling(NTFC)	<ul style="list-style-type: none">• [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) function that can outdoor unit cooling when outdoor temperature is lower than the base temperature at night time
HardLock	<ul style="list-style-type: none">• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller



Category	Contents
Operation	<ul style="list-style-type: none"> [ON] button: starts the device operation [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> [NORMAL] button: Discharged air ventilates without going through the electric heat exchanger [HEX] button: Both air supply/discharge ventilates through the electric heat exchanger [AUTO] button: Switches to four seasons mode
Set temperature	Press [▲]/[▼] button to set the desired temperature
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none"> [LOW] button: Set the fan speed to slow [HIGH] button: Set the fan speed to fast [SUPER] button: Set the fan speed to Max. speed [AUTO] button: [LOW]-[HIGH]-[SUPER] automatic switching <ul style="list-style-type: none"> User setting is impossible When Drift/Quick is set, [AUTO] Fan speed is selected When Drift/Quick is cleared, [HIGH] Fan speed is selected During [AUTO] operation, when [LOW]/[HIGH]/[SUPER] is selected, Drift/Quick function in operation is cleared
Air conditioner	<ul style="list-style-type: none"> [COOL] button: Operates the ERV DX in cooling mode [AUTO] button: Operates the ERV DX in auto mode [HEAT] button: Operates the ERV DX as heating mode [OFF] button: Stops the air conditioner of the ERV DX
Set temp range	When user set the desired temperature individually, the desired temperature outside the designated temperature boundary cannot be set
Filter replacement alarm	<ul style="list-style-type: none"> [Clear] button: in case of filter replacement alarm, it cancels filter replacement alarm
Additional function	<ul style="list-style-type: none"> Quick [Set/Clear] button: Set/clear Quick function (When Quick function is selected, Drift function is cleared) Drift [Set/Clear] button: Set/clear Drift function (When Drift function is selected, Quick function is cleared) Heater [Set/Clear] button: Set/clear heater function Humidify [Set] button: Set Humidify function (only for air conditioner heating mode)
Midnight air cooling(NTFC)	<ul style="list-style-type: none"> [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) function that can outdoor unit cooling when outdoor temperature is lower than the base temperature at night time
HardLock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller
Mode lock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear lock so that user cannot control mode setting with individual remote controller
Fan lock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear lock so that user cannot control Fan speed setting with individual remote controller
TempLock	<ul style="list-style-type: none"> [Set/Clear] button: Set/clear lock so that user cannot control temperature setting with individual remote controller
Midnight air cooling(NTFC) lock	<ul style="list-style-type: none"> [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) schedule set in the remote controller



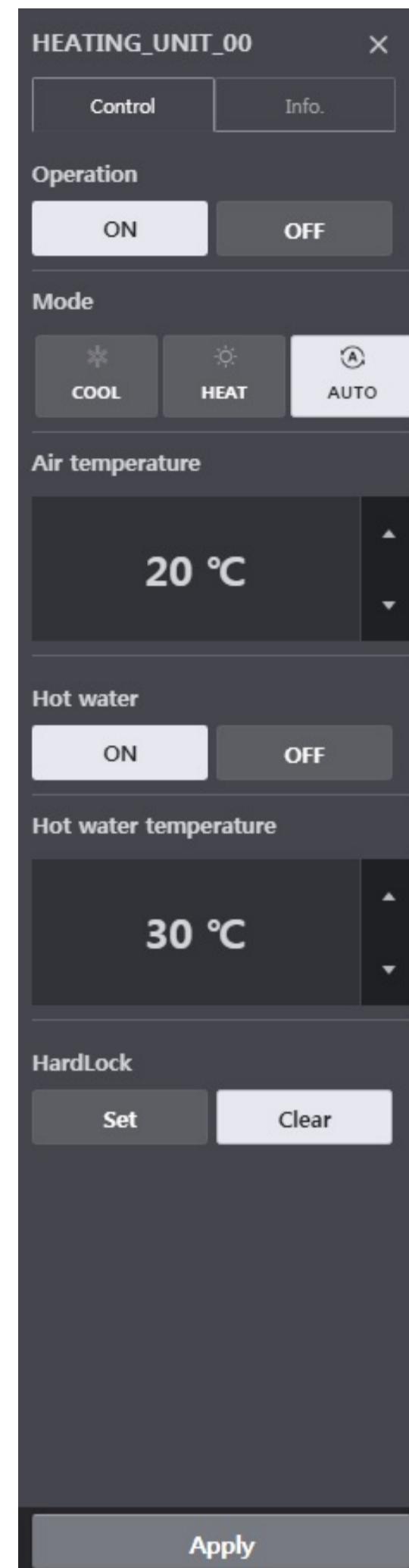
Floor mounted vent



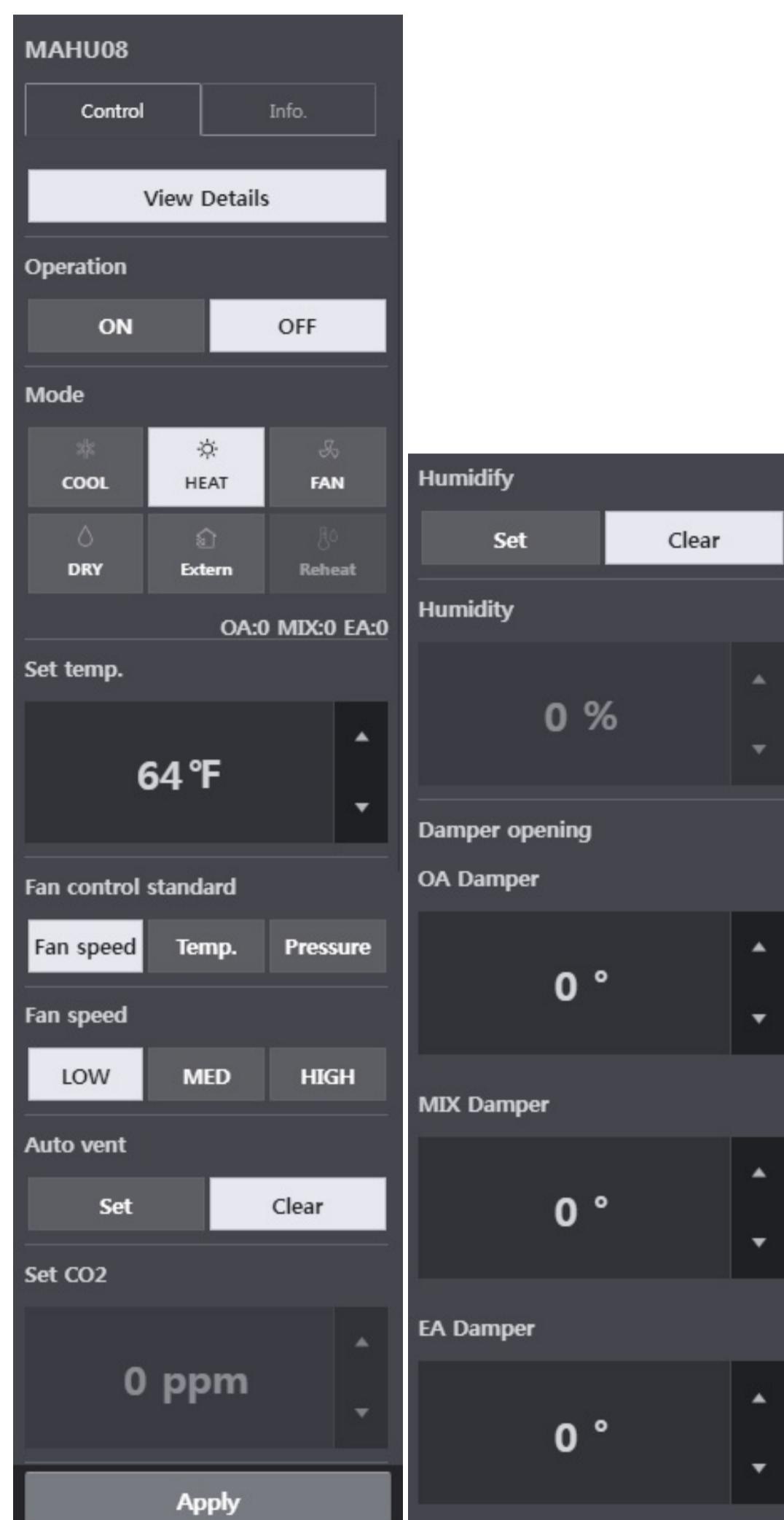
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none">• [NORMAL] button: Discharged air ventilates without going through the electric heat exchanger• [HEX] button: Both air supply/discharge ventilates through the electric heat exchanger• [AUTO] button: Switches to four seasons mode
Fan speed	<p>Wind strength setting</p> <ul style="list-style-type: none">• [LOW] button: Set the fan speed to slow• [HIGH] button: Set the fan speed to fast• [SUPER] button: Set the fan speed to Max. speed• [AUTO] button: [LOW]-[HIGH]-[SUPER] automatic switching<ul style="list-style-type: none">- User setting is impossible- When Drift/Quick is set, [AUTO] Fan speed is selected- When Drift/Quick is cleared, [HIGH] Fan speed is selected- During [AUTO] operation, when [LOW]/[HIGH]/[SUPER] is selected, Drift/Quick function in operation is cleared
Filter replacement alarm	<ul style="list-style-type: none">• [Clear] button: in case of filter replacement alarm, it cancels filter replacement alarm
Additional function	<ul style="list-style-type: none">• Quick [Set/Clear] button: Set/clear Quick function (When Quick function is selected, Drift function is cleared)• Drift [Set/Clear] button: Set/clear Drift function (When Drift function is selected, Quick function is cleared)• Heater [Set/Clear] button: Set/clear heater function
Midnight air cooling(NTFC)	<ul style="list-style-type: none">• [Set/Clear] button: Set/Clear Midnight air cooling(NTFC) function that can outdoor unit cooling when outdoor temperature is lower than the base temperature at night time
HardLock	<ul style="list-style-type: none">• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller



Heating



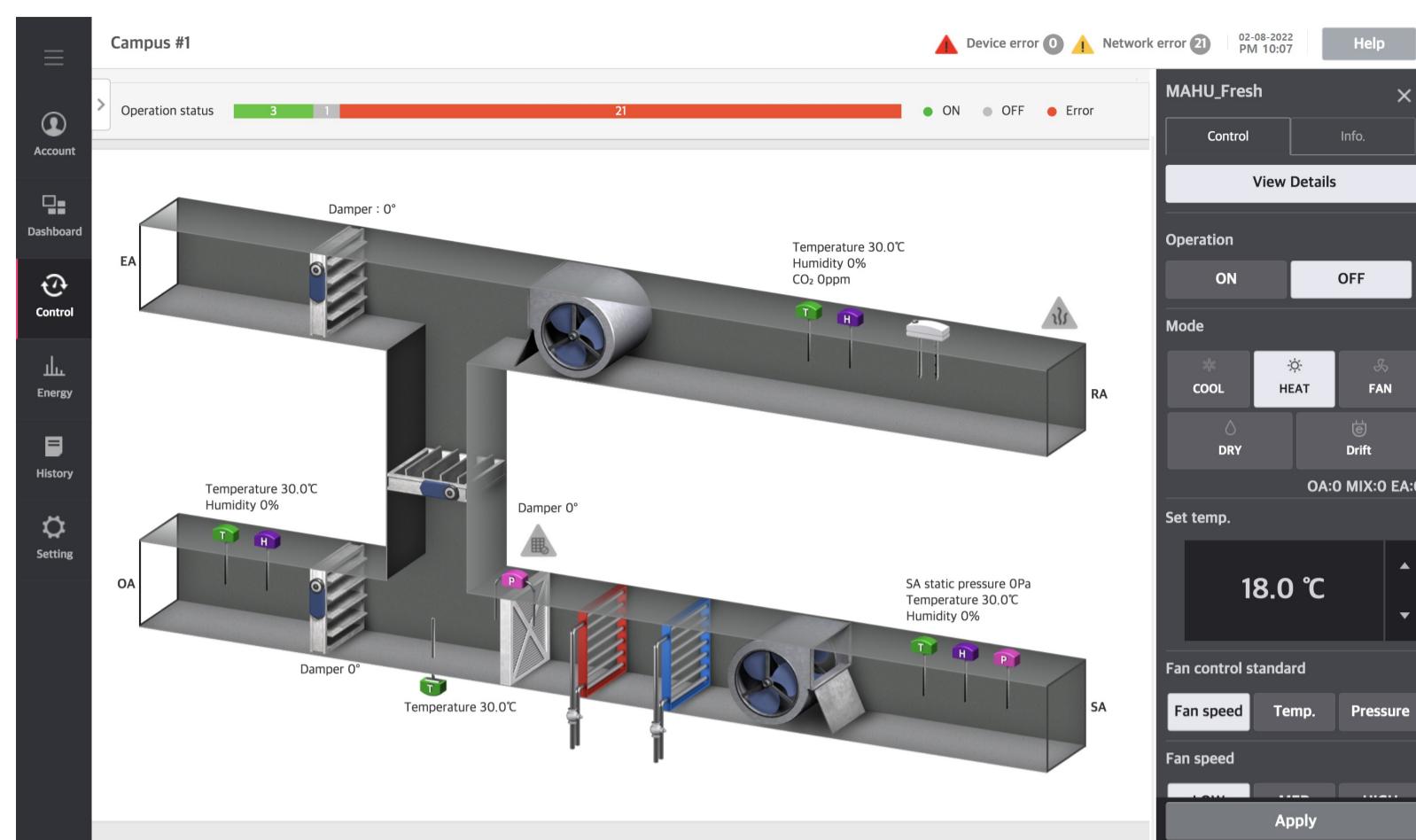
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none">• [COOL] button: Switches to cooling mode• [HEAT] button: Switches to heating mode• [AUTO] button: Switches to automatic mode
Air/Water in/out temperature	Press [▲]/[▼] button to set Air/Water in/out temperature It is displayed based on the set temperature selected in [Setting]-[Installing] <ul style="list-style-type: none">• When [Water in/out] is selected, it is displayed as water in/out temperature• When [indoor] is selected, it is displayed as air temperature
Hot water	<ul style="list-style-type: none">• [ON] button: Starts hot water operation<ul style="list-style-type: none">- If hot water is operated while the device is in automatic/cooling operation, the corresponding mode and hot water are displayed in the icon of the contents display section- If hot water is operated while the device is stopped, the icon in the contents display section is enabled, and hot water is displayed• [OFF] button: Stops hot water operation
Hot water temperature	Press [▲]/[▼] button to set hot water temperature
HardLock	<ul style="list-style-type: none">• [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller



Category	Contents
View Details	Press [View Details] button to check detail information (But, mobile is excluded)
Operation	<ul style="list-style-type: none"> • [ON] button: starts the device operation • [OFF] button: Stops the device operation
Mode	<ul style="list-style-type: none"> • [COOL] button: Switches to cooling mode • [HEAT] button: Switches to heating mode • [FAN] button: Air purification operation. When FAN is selected, you cannot set the desired temperature • [DRY] button: Removes moisture in rainy season or when humidity is high. When DRY is selected, you cannot set the desired temperature • [Drift] button: Operation to find the operation point with the best ventilation system efficiency to save power consumption. It fluently discharges the contaminated indoor air by having bigger discharger Fan speed than air supply • [Reheat] button : Maintains a constant temperature and humidity while the cooling/heating function is active. (Available only when the AHU reheat coil is in use.)
Set temperature	Press [▲]/[▼] button to set the temperature
Fan control standard	<ul style="list-style-type: none"> • [Fan speed] button: Controls the fan based on Fan speed status • [Temp] button: Controls the fan based on temperature status • [Pressure] button: Controls the fan based on Pressure status
Fan speed	<p>It is displayed only when fan control standard is Fan speed</p> <ul style="list-style-type: none"> • [LOW] button: Set the fan speed to slow • [MED] button: Set the fan speed to normal • [HIGH] button: Set the fan speed to fast
Automatic ventilation	<p>It is displayed only when the additional function's automatic ventilation or automatic ventilation and Humidify are selected during AHU device registration</p> <ul style="list-style-type: none"> • Automatic ventilation [Set/Clear] button: Starts/stops automatic ventilation
Set CO ₂	<p>It is enabled only when automatic ventilation function is set</p> <p>Press [▲]/[▼] button to set in the unit of 100ppm within 100 ppm ~ 2 000 ppm range</p>
Humidify	<p>It is displayed only when the additional function's Humidify or automatic ventilation and Humidify are selected during AHU device registration</p> <ul style="list-style-type: none"> • Humidify [Set/Clear] button: Starts/stops Humidify function
Humidity	<p>It is enabled only when Humidify function is set</p> <p>Press [▲]/[▼] button to set the target humidity</p>
Damper opening	<ul style="list-style-type: none"> • Press [OA Damper] : [▲]/[▼] button to set the outdoor unit air damper opening value in the unit of 1 ° within 0 ° ~ 90 ° range • Press [MIX Damper] : [▲]/[▼] button to set the mixer damper opening value in the unit of 1 ° within 0 ° ~ 90 ° range • Press [EA Damper] : [▲]/[▼] button to set the air discharge damper opening value in the unit of 1 ° within 0 ° ~ 90 ° range <p>When you set [Setting]-[system setting]'s Apply damper opening formula as set, it operates as OA Damper = EA Damper, OA Damper = MIX Damper = 90</p>
HardLock	<ul style="list-style-type: none"> • [Set/Clear] button: Set/clear HardLock so that user cannot control any function with individual remote controller

View AHU in detail

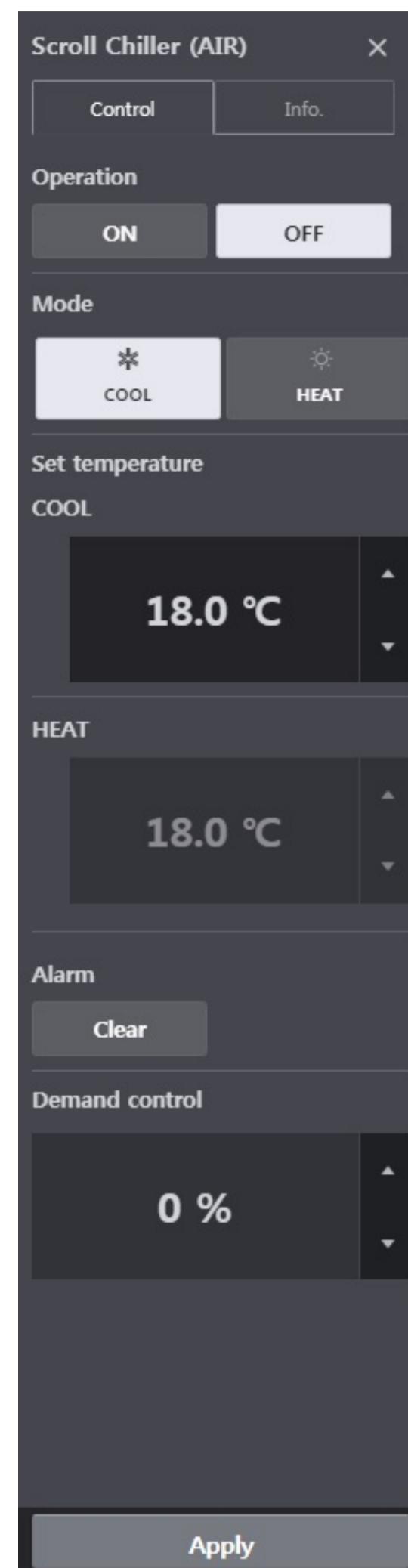
In AHU's control screen, you can press [View Details] button to check detail information.



→ SPLIT DOAS



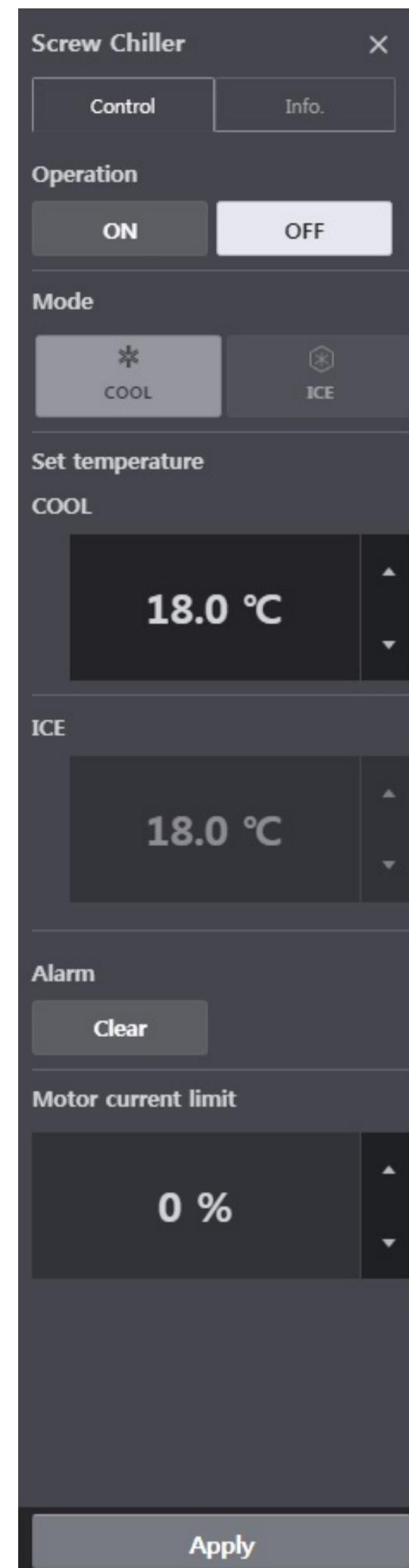
Scroll chiller



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	(It is displayed only when device supports the corresponding mode) <ul style="list-style-type: none">• [COOL] button: Switches to cooling mode• [HEAT] button: Switches to heating mode
Set temperature	Set the load water out temperature for indoor cooling/heating Press [▲]/[▼] button to set the temperature of cooling mode and heating mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Demand control	Press [▲]/[▼] button to set demand limit ratio



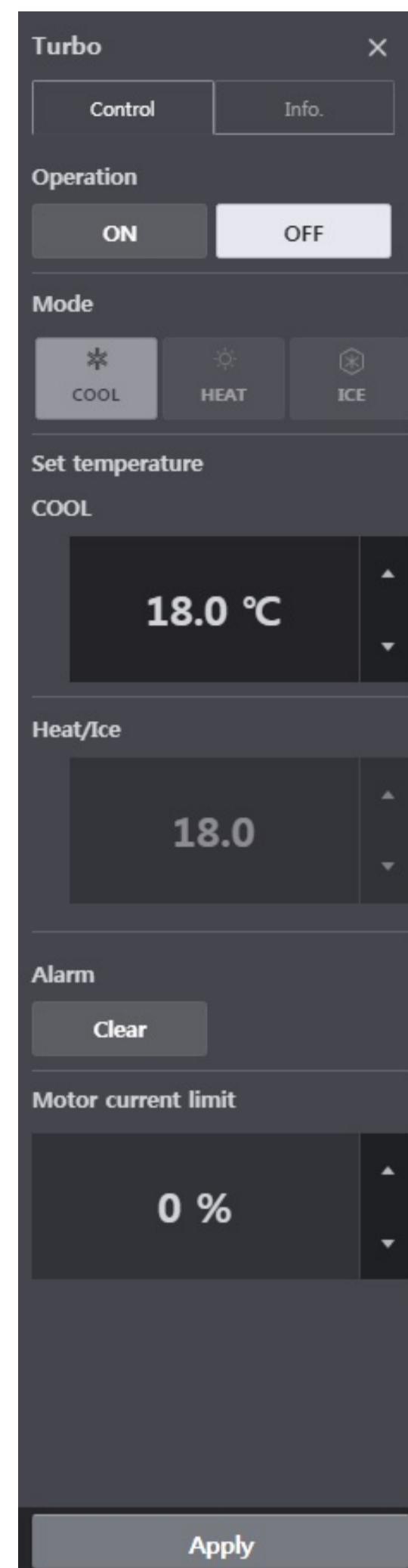
Screw chiller



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	Mode control is impossible. Controls monitored operation mode's set temperature
Set temperature	Set the load water out temperature for indoor cooling/ice making Press [▲]/[▼] button to set the temperature of cooling mode and ice making mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Motor current limit	Press [▲]/[▼] button to set motor current limit ratio



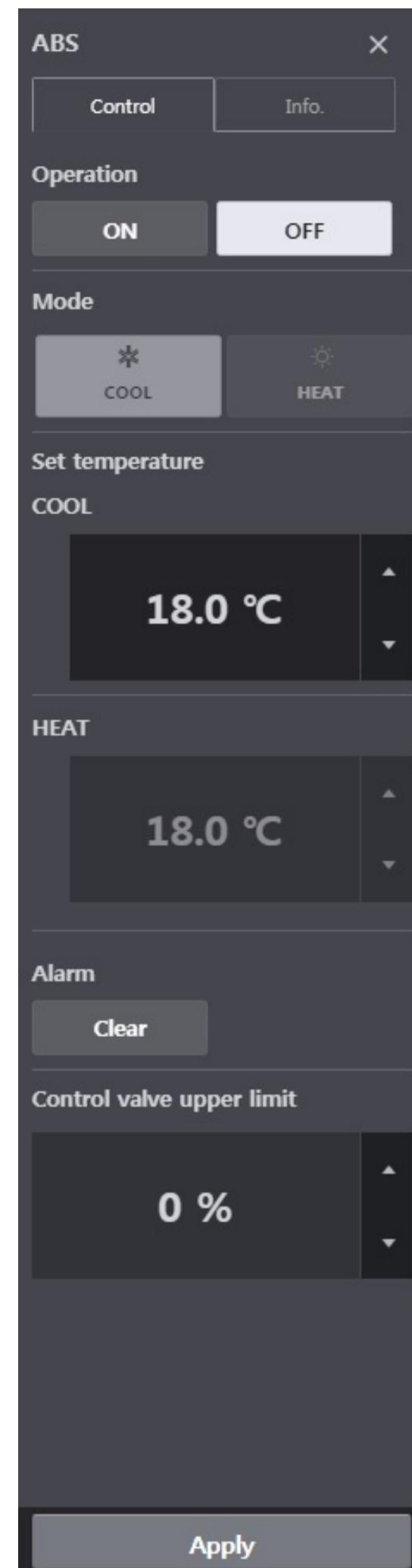
Turbo chiller



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	Mode control is impossible. Controls monitored operation mode's set temperature
Set temperature	Set the load water out temperature for indoor cooling/heating/ice making Press [▲]/[▼] button to set the temperature of cooling mode and heating/ice making mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Motor current limit	Press [▲]/[▼] button to set motor current limit ratio



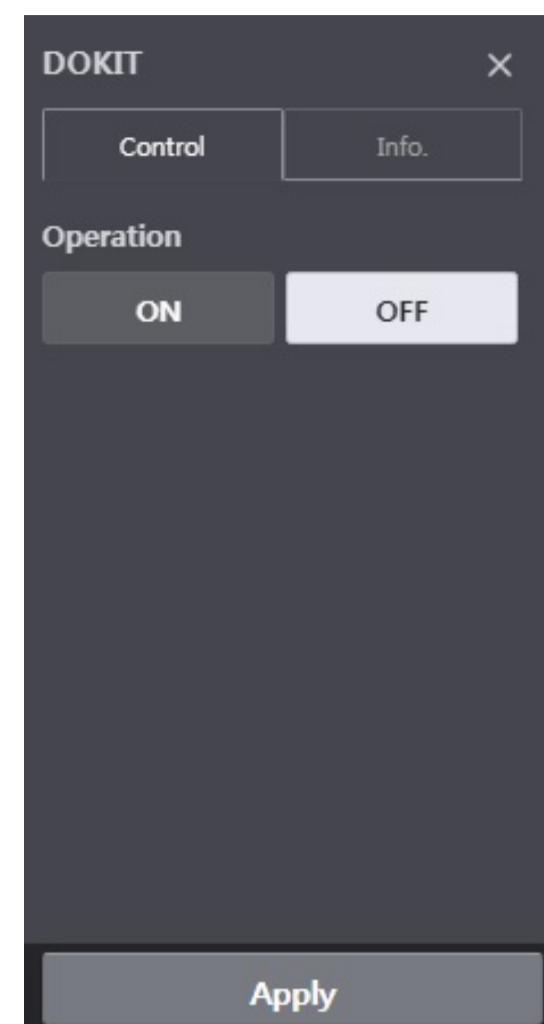
Absorption Chiller



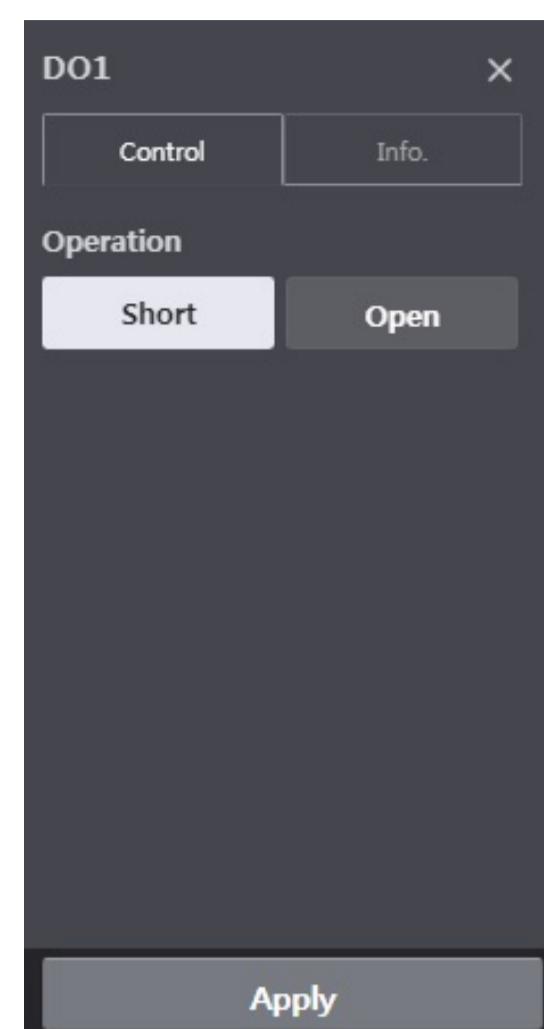
Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation
Mode	Mode control is impossible. Controls monitored operation mode's set temperature
Set temperature	Set the load water out temperature for indoor cooling/heating Press [▲]/[▼] button to set the temperature of cooling mode and heating mode
Alarm	[Clear] button: Clears Chiller alarm in case of Chiller alarm
Control valve upper limit	Press [▲]/[▼] button to set the control valve upper limit ratio



DOKIT



Category	Contents
Operation	<ul style="list-style-type: none">• [ON] button: starts the device operation• [OFF] button: Stops the device operation



Category	Contents
Operation	<ul style="list-style-type: none">• [Short] button: Short signal output• [Open] button: Open signal output



Category	Contents
Temperature	Set temperature value

Note

Unit symbol may change according to the usage set during device registration.



Device Information

When you click device information tab in the device's control screen, you can check the device information.

You can check device's basic information, operation information, schedule information, error information, and today's history.

The image shows five separate device control screens, each titled "Device control" and showing information for "AC_UNIT_00".

- Basic information:** Shows device details like Name (AC_UNIT_00), Address (00), Group (New group), ODU (ODU[00]), Model (AC), and Capacity (3).
- Operation information:** Shows current status (Operation: ON, Mode: AUTO), current temperature (23.0 °C), set temperature (23.0 °C), fan speed (HIGH), and swing mode.
- Schedule information (2):** Shows two scheduled events: 10:00 ON Schedule and 19:00 OFF Schedule.
- Error information:** Shows error status (No error) and error code (0).
- History:** Shows a log of events with timestamp, content, and user information. Examples include "07-31-2018 Control Mode: AUTO PM 04:20 by admin" and "07-31-2018 Control Set temp range (lower limit): 20°C PM 04:20 by admin".



Schedule Control

Schedule is a function for device to perform reserved operation at certain time by designating device operation in advance. When this function is used, device operation can be managed in time unit efficiently and energy saving effect is excellent.

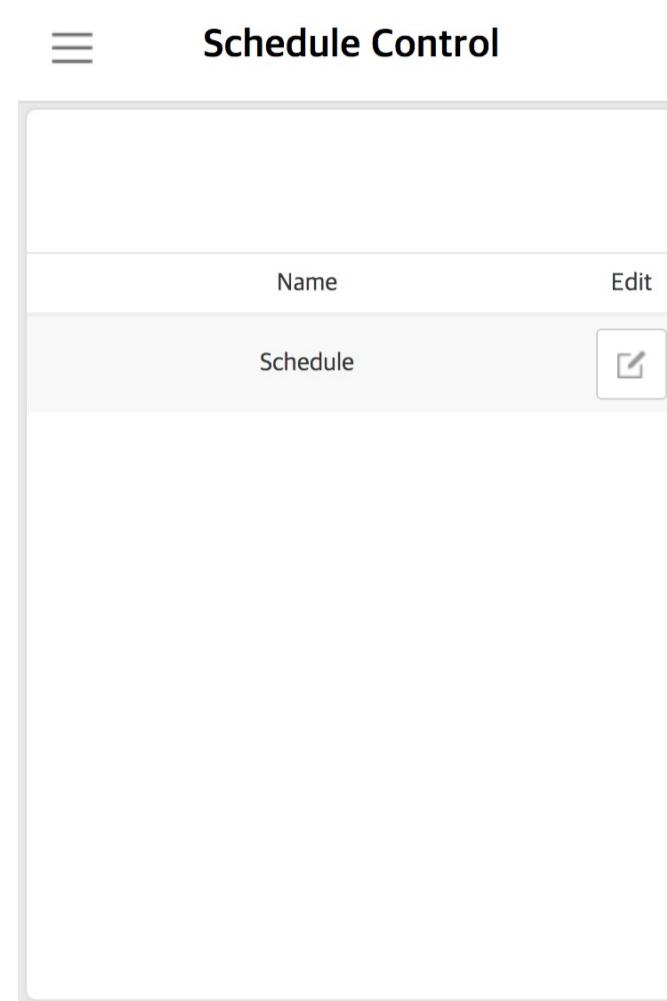
[Schedule]

→ Check schedule

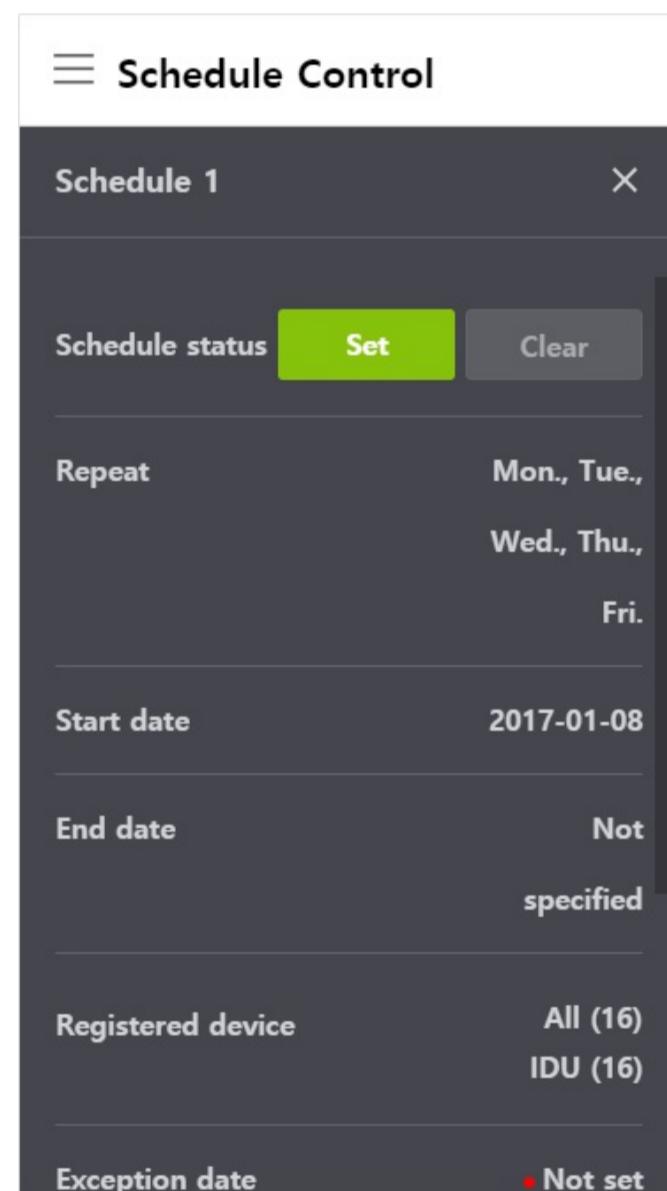


Check schedule

You can see all set schedules.



When you click Edit icon, you can check detail contents of the schedule.





BACnet/Modbus Protocol

Guide on BTL authentication

You need to set BACnet to Type C to make the devices operate using the functions authenticated by BTL.

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

For BACnet Type settings, go to **[Usage (PC)] > [BACnet/Modbus Setting]** menu.

Operation method according to BACnet type

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

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

AC Smart 5 can be linked with the BMS (Building Management System) that supports the BACnet IP/Modbus TCP protocol.

The functions that can be controlled or monitored by the BMS vary depending on the protocol.

[BACnet]

- Commission
- Object List
- BIBBs
- PICS

[Modbus]

- Commission
- Function code
- Register List



BACnet Commission

Commissioning is the process of verifying the subsystems to achieve the owner's project requirements as intended by the building owner and as designed by the building architects and engineers.

After AC Smart 5 installation, you can check the operation status of the device by using the web function before connection with the BMS system.

Creating of the Points. This is NOT to be done by LG since it is directly related to the BMS side. The BMS engineer is to carry out the engineering of the Point, however LG is responsible for providing the method of how the Points are calculated.

Precautions

- To use BACnet feature, you must select **[Settings] > [BACnet/Modbus Setting] > [BACnet enable]** as Set.
- In case of installing 2 or more AC Smart 5, you must change **[Settings] > [BACnet/Modbus Setting] > [Device ID Setting]** so that the Device IDs are not duplicate among AC Smart 5. It is recommended that you keep a difference of 10 or more for different Device IDs.
- If Device Discover doesn't work well, change **[Settings] > [BACnet/Modbus Setting] > [BACnet Type Setting]**.
- It is recommended that you request ReadProperty/WriteProperty at an interval of 200 ms or more for each property.
- It is recommended that you request ReadPropertyMultiple/WritePropertyMultiple at an interval of 500 ms or more for each property.
- SubscribeCOV can be registered up to 1024.
- If AC Smart 5 and BMS are located on different networks, BBMD (BACnet/IP Broadcast Management Device) is needed.
- As AC Smart 5 does not support the BBMD function, a separate BBMD is required. You can register AC Smart 5 as a foreign device in BBMD using **[Settings] > [BACnet/Modbus Setting] > [Register as Foreign Device]** function.



BACnet Object List

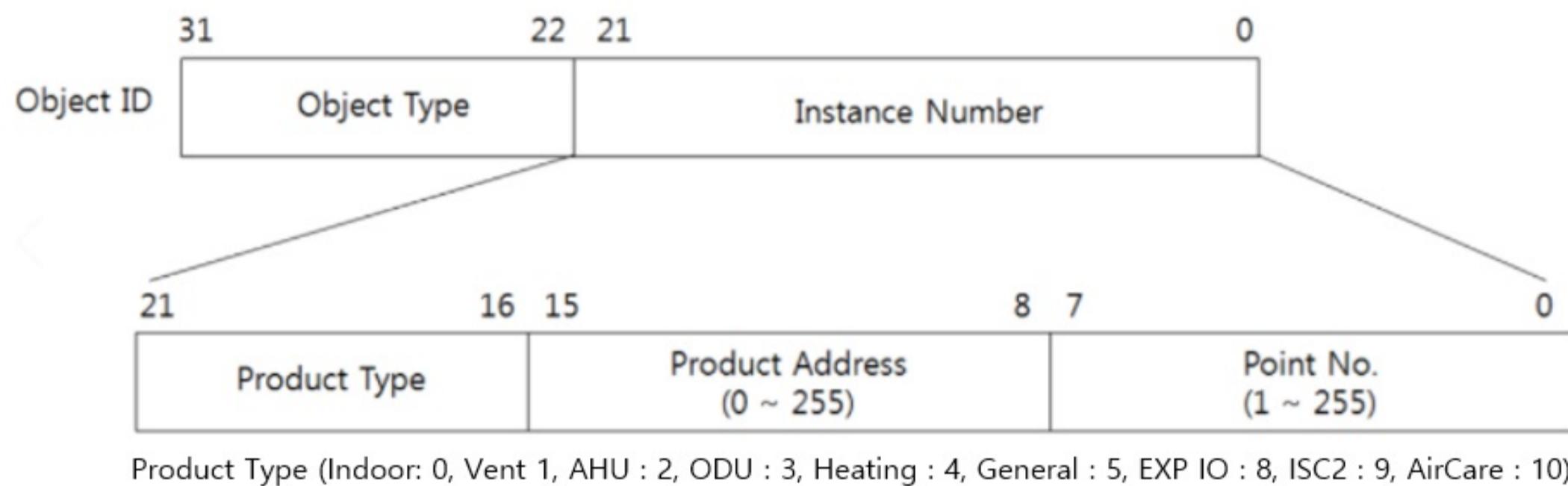
It describes the BACnet object list provided by AC Smart 5.

- ▶ Instance Number
- ▶ Indoor Unit Object List
- ▶ ERV Object List
- ▶ AHU Object List
- ▶ Outdoor Unit Object List
- ▶ Heating Object List
- ▶ General Object List
- ▶ EXP.I/O object list
- ▶ Scroll Chiller(Air Cooling) object list
- ▶ Air purifier object list



Definition of Instance Number

The instance number of each device is assigned as follows



Example of Instance Number

Description	Product Type	Product Address	Point	Instance Number
IDU Address 0x00, On/Off (Setting)	0	0	1	1
IDU Address 0x00, Operation Mode (Setting)	0	0	7	7
IDU Address 0x1B, On/Off (Setting)	0	27	1	6913
IDU Address 0x1B, Operation Mode (Setting)	0	27	7	6919
ERV Address 0x00, On/Off (Setting)	1	0	1	65537
ERV Address 0x00, Operation Mode (Setting)	1	0	7	65543
ERV Address 0x1B, On/Off (Setting)	1	27	1	72449
ERV Address 0x1B, Operation Mode (Setting)	1	27	7	72455
AHU Address 0x00, On/Off (Setting)	2	0	1	131073
AHU Address 0x00, Operation Mode (Setting)	2	0	7	131079
AHU Address 0x0F, On/Off (Setting)	2	15	1	134913
AHU Address 0x0F, Operation Mode (Setting)	2	15	7	134919
ODU Address 0x00, Compressor Operation	3	0	1	196609
ODU Address 0x00, Operation Mode	3	0	14	196622
ODU Address 0x0F, Compressor Operation	3	15	1	200449
ODU Address 0x0F, Operation Mode	3	15	14	200462
Heating Address 0x00, On/Off (Setting)	4	0	1	262145
Heating Address 0x00, Operation Mode (Setting)	4	0	5	262149
Heating Address 0x0F, On/Off (Setting)	4	15	1	265985
Heating Address 0x0F, Operation Mode (Setting)	4	15	5	265989
Scroll-Air-Inv-Gen2 Address 0x00, On/Off (Setting)	9	0	1	589825
Scroll-Air-Inv-Gen2 Address 0x00, Operation Mode (Setting)	9	0	39	589863
Scroll-Air-Inv-Gen2 Address 0x0F, On/Off (Setting)	9	15	1	595201
Scroll-Air-Inv-Gen2 Address 0x0F, Operation Mode (Setting)	9	15	39	595239
Air purifier Address 0x00, On/Off (Setting)	10	0	1	655361
Air purifier Address 0x00, Operation Mode (Setting)	10	0	5	655365
Air purifier Address 0x0F, On/Off (Setting)	10	15	1	660737
Air purifier Address 0x0F, Operation Mode (Setting)	10	15	5	660741
General Object, All Unit Run/Stop (Setting)	5	0	1	327681
General Object, All Unit Set Room Temperature (Setting)	5	0	2	327682



Indoor Unit Object List

One Indoor unit has the following list of points. Some points may not be supported depending on the product.

	(Setting)													
44	2Set Cooling Lower Temperature (Status)	2SetHeatingUpperLimitStatus_XXX	AI	°C(°F)										4 °C ~ 32 °C (40 °F ~ 90 °F)
45	2Set Heating Upper Temperature (Setting)	2SetCoolingLowerLimitCommand_XXX	AV	°C(°F)										10 °C ~ 37.5 °C (50 °F ~ 99 °F)
46	2Set Heating Upper Temperature (Status)	2SetCoolingLowerLimitStatus_XXX	AI	°C(°F)										10 °C ~ 37.5 °C (50 °F ~ 99 °F)
47	2Set Heating Lower Temperature (Setting)	2SetHeatingLowerLimitCommand_XXX	AV	°C(°F)										4 °C ~ 32 °C (40 °F ~ 90 °F)
48	2Set Heating Lower Temperature (Status)	2SetHeatingLowerLimitStatus_XXX	AI	°C(°F)										4 °C ~ 32 °C (40 °F ~ 90 °F)
49	Thermo Status (Status)	ThermoStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-	-	-	-
50	Accumulated Gas Distribution (Status)	AccumulatedGas(100 Watt)_XXX	AI	100 Liter										Gas values
51	Dust Sensor Available (Status)	DustSensorAvail_XXX	BI	-	Disabled (0)	Enabled (1)	-	-	-	-	-	-	-	-
52	Air Cleaning Opereration (Setting)	AirCleaningOperCommand_XXX	BO	-	Stop (0)	Start (1)	-	-	-	-	-	-	-	-
53	Air Cleaning Opereration (Status)	AirCleaningOperStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-	-	-	-
54	PM10 (Status)	FineDustStatus_XXX	AI	µg/m³										
55	PM2.5 (Status)	UltraFineDustStatus_XXX	AI	µg/m³										
56	PM1.0 (Status)	SuperUltraFineDustStatus_XXX	AI	µg/m³										
57	Humidity (Status)	HumidityStatus_XXX	AI	%										
58	Comfort Cooling Available (Status)	ComfortCoolingAvail_XXX	BI	-	Disabled (0)	Enabled (1)	-	-	-	-	-	-	-	-
59	Comfort Cooling Opereration (Setting)	ComfortCoolingOperCommand_XXX	BO	-	Stop (0)	Start (1)	-	-	-	-	-	-	-	-
60	Comfort Cooling Opereration (Status)	ComfortCoolingOperStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-	-	-	-
61	Comfort Cooling Step (Setting)	ComfortCoolingStepCommand_XXX	AV	-										1 step ~ 3 step
62	Comfort Cooling Step (Status)	ComfortCoolingStepStatus_XXX	AI	-										1 step ~ 3 step
63	Human Detection Available (Status)	HumanDetectionAvail_XXX	BI	-	Disabled (0)	Enabled (1)	-	-	-	-	-	-	-	-
64	Human Detection Opereration (Setting)	HumanDetectionOperCommand_XXX	MO	-	-	Stop (1)	OnOffSaving (2)	TempSaving (3)	-	-	-	-	-	-
65	Human Detection Opereration (Status)	HumanDetectionOperStatus_XXX	MI	-	-	Stop (1)	OnOffSaving (2)	TempSaving (3)	-	-	-	-	-	-
66	Human Detection Wind (Setting)	HumanDetectionWindCommand_XXX	MO	-	-	Stop (1)	Direct (2)	Indirect (3)	-	-	-	-	-	-
67	Human Detection Wind (Status)	HumanDetectionWindStatus_XXX	MI	-	-	Stop (1)	Direct (2)	Indirect (3)	-	-	-	-	-	-
68	Human Detection Time (Setting)	HumanDetectionTimeCommand_XXX	MO	-	-	5 min (1)	10 min (2)	15 min (3)	30 min (4)	60 min (5)	90 min (6)			
69	Human Detection Time (Status)	HumanDetectionTimeStatus_XXX	MI	-	-	5 min (1)	10 min (2)	15 min (3)	30 min (4)	60 min (5)	90 min (6)			
70	Hotel Check In (Setting)	HotelCheckinCommand_XXX	BO	-	Check_out (0)	Check_in (1)	-	-	-	-	-	-	-	-
71	Hotel Mode (Setting)	HotelModeCommand_XXX	MO	-	-	Comfort (1)	Pre_comfort (2)	Economy (3)	-	-	-			



ERV Object List

One ERV has the following list of points. Some points may not be supported depending on the product.



AHU Object List

One AHU has the following list of points. Some points may not be supported depending on the product.

Point	Description	Object Name(_XXX : Address)	Object Type	Unit	Text-0	Text-1	Text-2	Text-3	Text-4	Text-5	Text-6
1	On/Off (Setting)	StartStopCommand_XXX	BO	-	Stop (0)	Start (1)	-	-	-	-	-
2	On/Off (Status)	StartStopStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
3	Lock (Setting)	LockCommand_XXX	BO	-	Permit (0)	Prohibit (1)	-	-	-	-	-
4	Lock (Status)	LockStatus_XXX	BI	-	Permit (0)	Prohibit (1)	-	-	-	-	-
5	Filter Sign	FilterSign_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-
7	Operation Mode (Setting)	AirConModeCommand_XXX	MO	-	-	Cool (1)	Dry (2)	Fan (3)	Heat (4)	Energy saving (5)	-
8	Operation Mode (Status)	AirConModeStatus_XXX	MI	-	-	Cool (1)	Dry (2)	Fan (3)	Heat (4)	Energy saving (5)	-
9	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-
11	Fan Speed (Setting)	FanSpeedCommand_XXX	MO	-	-	High (1)	Middle (2)	Low (3)	-	-	-
12	Fan Speed (Status)	FanSpeedStatus_XXX	MI	-	-	High (1)	Middle (2)	Low (3)	-	-	-
13	Set Room Temperature	SetRoomTemp_XXX	AV	°C(°F)	-	-	-	-	-	-	-
14	Set Temperature (Status)	RoomTemp_XXX	AI	°C(°F)	-	-	-	-	-	-	-
15	Alarm	Alarm_XXX	BI	-	Normal (0)	Abnormal (1)	-	-	-	-	-
16	Error Code	MalfunctionCode_XXX	AI	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-
19	Room Temperature	SetTempStatus_XXX	AI	°C(°F)	-	-	-	-	-	-	-
20	FireAlarm (Setting)	FireAlarmCommand_XXX	BO	-	Off (0)	On (1)	-	-	-	-	-
21	FireAlarm (Status)	FireAlarmStatus_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
22	Humidity (Setting)	SetHumidityCommand_XXX	AV	%	-	-	-	-	-	-	-
23	Humidity (Status)	SetHumidityStatus_XXX	AI	%	-	-	-	-	-	-	-
24	Humidify ON/OFF (Setting)	HumidifyCommand_XXX	BO	-	Stop (0)	Start (1)	-	-	-	-	-
25	Humidify ON/OFF (Status)	HumidifyStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
26	Auto Ventilation ON/OFF (Setting)	AutoVentilCommand_XXX	BO	-	Stop (0)	Start (1)	-	-	-	-	-
27	Auto Ventilation ON/OFF (Status)	AutoVentilStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
28	Supply Unit Temperature (Status)	SupplyTempStatus_XXX	AI	°C(°F)	-	-	-	-	-	-	-
29	Outdoor Unit Temperature (Status)	OutdoorTempStatus_XXX	AI	°C(°F)	-	-	-	-	-	-	-
30	Mix Unit Temperature (Status)	MixTempStatus_XXX	AI	°C(°F)	-	-	-	-	-	-	-
31	Supply Unit Humidity (Status)	SupplyHumidifyStatus_XXX	AI	%	-	-	-	-	-	-	-
32	Outdoor Unit Humidity (Status)	OutdoorHumidifyStatus_XXX	AI	%	-	-	-	-	-	-	-
33	Ventilation Unit Humidity (Status)	VentilHumidifyStatus_XXX	AI	%	-	-	-	-	-	-	-
34	CO2 Value (Status)	CO2ValueStatus_XXX	AI	-	0~255 (Real Value = Value*10, Example : In case Value is 20, CO2 is 20*10=200ppm)	-	-	-	-	-	-
35	Humidity Unit ON/OFF (Status)	HumidifyUnitStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
36	Heating Unit ON/OFF (Status)	HeaterUnitStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
37	Ventilator FAN ON/OFF (Status)	VentilFanStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
38	Supply Unit FAN ON/OFF (Status)	SupplyFanStatus_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
39	Current OA Damper (Status)	CurrOADamperStatus_XXX	AI	°	-	-	-	-	-	-	-
40	Current EA Damper (Status)	CurrEADamperStatus_XXX	AI	°	-	-	-	-	-	-	-
41	Current Mix Damper (Status)	CurrMixDamperStatus_XXX	AI	°	-	-	-	-	-	-	-
42	Cooling OA Damper (Setting)	OADamperCoolCommand_XXX	AV	°	-	-	-	-	-	-	-
43	Cooling OA Damper (Status)	OADamperCoolStatus_XXX	AI	°	-	-	-	-	-	-	-
44	Cooling EA Damper (Setting)	EADamperCoolCommand_XXX	AV	°	-	-	-	-	-	-	-
45	Cooling EA Damper (Status)	EADamperCoolStatus_XXX	AI	°	-	-	-	-	-	-	-
46	Cooling Mix Damper (Setting)	MixDamperCoolCommand_XXX	AV	°	-	-	-	-	-	-	-
47	Cooling Mix Damper (Status)	MixDamperCoolStatus_XXX	AI	°	-	-	-	-	-	-	-
48	Heating OA Damper (Setting)	OADamperHeatCommand_XXX	AV	°	-	-	-	-	-	-	-
49	Heating OA Damper (Status)	OADamperHeatStatus_XXX	AI	°	-	-	-	-	-	-	-
50	Heating EA Damper (Setting)	EADamperHeatCommand_XXX	AV	°	-	-	-	-	-	-	-
51	Heating EA Damper (Status)	EADamperHeatStatus_XXX	AI	°	-	-	-	-	-	-	-
52	Heating Mix Damper (Setting)	MixDamperHeatCommand_XXX	AV	°	-	-	-	-	-	-	-
53	Heating Mix Damper (Status)	MixDamperHeatStatus_XXX	AI	°	-	-	-	-	-	-	-
54	FAN OA Damper (Setting)	OADamperFanCommand_XXX	AV	°	-	-	-	-	-	-	-
55	FAN OA Damper (Status)	OADamperFanStatus_XXX	AI	°	-	-	-	-	-	-	-

56	FAN EA Damper (Setting)	EADamperFanCommand_XXX	AV	°		0 ° ~ 90 °
57	FAN EA Damper (Status))	EADamperFanStatus_XXX	AI	°		0 ° ~ 90 °
58	FAN Mix Damper (Setting)	MixDamperFanCommand_XXX	AV	°		0 ° ~ 90 °
59	FAN Mix Damper (Status))	MixDamperFanStatus_XXX	AI	°		0 ° ~ 90 °



Outdoor unit Object List

One outdoor unit has the following list of points. Some points may not be supported depending on the product.

Point	Description	Object Name(_XXX : Address)	Object Type	Unit	Text-0	Text-1	Text-2	Text-3	Text-4	Text-5	Text-6
1	Compressor Operation	CompressorOperation_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
2	Refrigerant Type	RefrigerantType_XXX	MI	-	-	R407C (1)	R22 (2)	R410A (3)	-	-	-
3	Fan1 Frequency	Fan1Frequency_XXX	AI	rpm							
4	High Pressure	HighPressure_XXX	AI	kPa							
5	Low Pressure	LowPressure_XXX	AI	kPa							
6	Compressor Suction Temp	CompressorSunctionTemp_XXX	AI	°C(°F)							
7	Liquid Pipe Temp	LiquidPipeTemp_XXX	AI	°C(°F)							
8	Heat Exchange Temp	HeatExchangeTemp_XXX	AI	°C(°F)							
9	Outdoor Unit EEV	OutdoorUnitEEV_XXX	AI	-							
10	Over-cooler EEV	Over-coolerEEV_XXX	AI	-							
11	Hot Gas Valve	HotGasValue_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
12	Inverter Discharge Temp	InverterDischargeTemp_XXX	AI	°C(°F)							
13	Air Temp	AirTemp_XXX	AI	°C(°F)							
14	Operation Mode	OperationMode_XXX	MI	-	-	Stop (1)	Cool (2)	Heat (3)	-	-	-
15	Error Code	ErrorCode_XXX	AI	0~255							
16	Inverter1 Compressor Frequency	Inverter1CompressorFrequency_XXX	AI	rpm							
17	Inverter2 Compressor Frequency	Inverter2CompressorFrequency_XXX	AI	rpm							
18	Fan2 Frequency	Fan2Frequency_XXX	AI	rpm							
19	Inverter2 Discharge Temp	Inverter2DischargeTemp_XXX	AI	°C(°F)							
20	Std1 Discharge Temp	Std1DischargeTemp_XXX	AI	°C(°F)							
21	Std2 Discharge Temp	Std2DischargeTemp_XXX	AI	°C(°F)							
22	Upper Hex Temp	UpperHexTemp_XXX	AI	°C(°F)							
23	Lower Hex Temp	LowerHexTemp_XXX	AI	°C(°F)							
24	Sub Cool Pipe In Temp	SubCoolPipeInTemp_XXX	AI	°C(°F)							
25	Sub Cool Pipe Out Temp	SubCoolPipeOutTemp_XXX	AI	°C(°F)							
26	Sub EEV Pulse	SubEevPulse_XXX	AI	-							
27	Oil Equalizing EEV	OilEqualizingEEV_XXX	AI	-							
28	Vapor Injection EEV1	ViEev1_XXX	AI	-							
29	Vapor Injection EEV2	ViEev2_XXX	AI	-							
30	Inverter1 Heater	Inverter1Heater_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
31	Inverter2 Heater	Inverter2Heater_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
32	Inverter1 Oil Sensor	Inverter1OilSensor_XXX	BI	-	Not Detect Oil (0)	Detect Oil (1)	-	-	-	-	-
33	Inverter2 Oil Sensor	Inverter2OilSensor_XXX	BI	-	Not Detect Oil (0)	Detect Oil (1)	-	-	-	-	-
34	Inverter1 Backup	Inverter1Backup_XXX	BI	-	Not Used (0)	Used (1)	-	-	-	-	-
35	Inverter2 Backup	Inverter2Backup_XXX	BI	-	Not Used (0)	Used (1)	-	-	-	-	-
36	DDC	DDC_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
37	DEFROST	DEFROST_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
38-64	Additional Point for Master Outdoor Unit										
65	(Slave1) Compressor Operation	CompressorOperation_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
66	(Slave1) Refrigerant Type	RefrigerantType_XXX	MI	-	-	R407C (1)	R22 (2)	R410A (3)	-	-	-
67	(Slave1) Fan1 Frequency	Fan1Frequency_XXX	AI	rpm							
68	(Slave1) High Pressure	HighPressure_XXX	AI	kPa							
69	(Slave1) Low Pressure	LowPressure_XXX	AI	kPa							
70	(Slave1) Compressor Suction Temp	CompressorSunctionTemp_XXX	AI	°C(°F)							
71	(Slave1) Liquid Pipe Temp	LiquidPipeTemp_XXX	AI	°C(°F)							
72	(Slave1) Heat Exchange Temp	HeatExchangeTemp_XXX	AI	°C(°F)							
73	(Slave1) Outdoor Unit EEV	OutdoorUnitEEV_XXX	AI	-							
74	(Slave1) Over-cooler EEV	Over-coolerEEV_XXX	AI	-							
75	(Slave1) Hot Gas Valve	HotGasValue_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-
76	(Slave1) Inverter Discharge Temp	InverterDischargeTemp_XXX	AI	°C(°F)							
77	(Slave1) Air Temp	AirTemp_XXX	AI	°C(°F)							
78	(Slave1) Operation Mode	OperationMode_XXX	MI	-	-	Stop (1)	Cool	Heat (3)	-	-	-

79	(Slave1) Error Code	ErrorCode_XXX	AI	0~255						(2)		
80	(Slave1) Inverter1 Compressor Frequency	Inverter1CompressorFrequency_XXX	AI	rpm								
81	(Slave1) Inverter2 Compressor Frequency	Inverter2CompressorFrequency_XXX	AI	rpm								
82	(Slave1) Fan2 Frequency	Fan2Frequency_XXX	AI	rpm								
83	(Slave1) Inverter2 Discharge Temp	Inverter2DischargeTemp_XXX	AI	°C(°F)								
84	(Slave1) Std1 Discharge Temp	Std1DischargeTemp_XXX	AI	°C(°F)								
85	(Slave1) Std2 Discharge Temp	Std2DischargeTemp_XXX	AI	°C(°F)								
86	(Slave1) Upper Hex Temp	UpperHexTemp_XXX	AI	°C(°F)								
87	(Slave1) Lower Hex Temp	LowerHexTemp_XXX	AI	°C(°F)								
88	(Slave1) Sub Cool Pipe In Temp	SubCoolPipeInTemp_XXX	AI	°C(°F)								
89	(Slave1) Sub Cool Pipe Out Temp	SubCoolPipeOutTemp_XXX	AI	°C(°F)								
90	(Slave1) Sub EEV Pulse	SubEevPulse_XXX	AI	-								
91	(Slave1) Oil Equalizing EEV	OilEqualizingEEV_XXX	AI	-								
92	(Slave1) Vapor Injection EEV1	ViEev1_XXX	AI	-								
93	(Slave1) Vapor Injection EEV2	ViEev2_XXX	AI	-								
94	(Slave1) Inverter1 Heater	Inverter1Heater_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
95	(Slave1) Inverter2 Heater	Inverter2Heater_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
96	(Slave1) Inverter1 Oil Sensor	Inverter1OilSensor_XXX	BI	-	Not Detect Oil (0)	Detect Oil (1)	-	-	-	-	-	-
97	(Slave1) Inverter2 Oil Sensor	Inverter2OilSensor_XXX	BI	-	Not Detect Oil (0)	Detect Oil (1)	-	-	-	-	-	-
98	(Slave1) Inverter1 Backup	Inverter1Backup_XXX	BI	-	Not Used (0)	Used (1)	-	-	-	-	-	-
99	(Slave1) Inverter2 Backup	Inverter2Backup_XXX	BI	-	Not Used (0)	Used (1)	-	-	-	-	-	-
100	(Slave1) DDC	DDC_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
101	(Slave1) DEFROST	DEFROST_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
102-128	Additional Point for Slave1 Outdoor Unit											
129	(Slave2) Compressor Operation	CompressorOperation_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-	-
130	(Slave2) Refrigerant Type	RefrigerantType_XXX	MI	-	-	R407C (1)	R22 (2)	R410A (3)	-	-	-	-
131	(Slave2) Fan1 Frequency	Fan1Frequency_XXX	AI	rpm								
132	(Slave2) High Pressure	HighPressure_XXX	AI	kPa								
133	(Slave2) Low Pressure	LowPressure_XXX	AI	kPa								
134	(Slave2) Compressor Suction Temp	CompressorSunctionTemp_XXX	AI	°C(°F)								
135	(Slave2) Liquid Pipe Temp	LiquidPipeTemp_XXX	AI	°C(°F)								
136	(Slave2) Heat Exchange Temp	HeatExchangeTemp_XXX	AI	°C(°F)								
137	(Slave2) Outdoor Unit EEV	OutdoorUnitEEV_XXX	AI	-								
138	(Slave2) Over-cooler EEV	Over-coolerEEV_XXX	AI	-								
139	(Slave2) Hot Gas Valve	HotGasValue_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
140	(Slave2) Inverter Discharge Temp	InverterDischargeTemp_XXX	AI	°C(°F)								
141	(Slave2) Air Temp	AirTemp_XXX	AI	°C(°F)								
142	(Slave2) Operation Mode	OperationMode_XXX	MI	-	-	Stop (1)	Cool (2)	Heat (3)	-	-	-	-
143	(Slave2) Error Code	ErrorCode_XXX	AI	0~255								
144	(Slave2) Inverter1 Compressor Frequency	Inverter1CompressorFrequency_XXX	AI	rpm								
145	(Slave2) Inverter2 Compressor Frequency	Inverter2CompressorFrequency_XXX	AI	rpm								
146	(Slave2) Fan2 Frequency	Fan2Frequency_XXX	AI	rpm								
147	(Slave2) Inverter2 Discharge Temp	Inverter2DischargeTemp_XXX	AI	°C(°F)								
148	(Slave2) Std1 Discharge Temp	Std1DischargeTemp_XXX	AI	°C(°F)								
149	(Slave2) Std2 Discharge Temp	Std2DischargeTemp_XXX	AI	°C(°F)								
150	(Slave2) Upper Hex Temp	UpperHexTemp_XXX	AI	°C(°F)								
151	(Slave2) Lower Hex Temp	LowerHexTemp_XXX	AI	°C(°F)								
152	(Slave2) Sub Cool Pipe In Temp	SubCoolPipeInTemp_XXX	AI	°C(°F)								
153	(Slave2) Sub Cool Pipe Out Temp	SubCoolPipeOutTemp_XXX	AI	°C(°F)								
154	(Slave2) Sub EEV Pulse	SubEevPulse_XXX	AI	-								
155	(Slave2) Oil Equalizing EEV	OilEqualizingEEV_XXX	AI	-								
156	(Slave2) Vapor Injection EEV1	ViEev1_XXX	AI	-								
157	(Slave2) Vapor Injection EEV2	ViEev2_XXX	AI	-								
158	(Slave2) Inverter1 Heater	Inverter1Heater_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
159	(Slave2) Inverter2 Heater	Inverter2Heater_XXX	BI	-	Off (0)	On (1)	-	-	-	-	-	-
160	(Slave2) Inverter1 Oil Sensor	Inverter1OilSensor_XXX	BI	-	Not Detect Oil (0)	Detect Oil (1)	-	-	-	-	-	-



Heating Object List

One Heating has the following list of points. Some points may not be supported depending on the product.



General Object List

This is the list of BACnet objects provided for the general information. Some points may not be supported depending on the product.

Point	Description	Object Name(_XXX : Address)	Object Type	Unit	Text-0	Text-1	Text-2	Text-3	Text-4	Text-5	Text-6
1	All Unit Run/Stop (Setting)	AllStartStopCommand	BO	-	Stop (0)	Start (1)	-	-	-	-	-
2	All Unit Set Room Temperature (Setting)	AllSetRoomTempCommand	AV	°C(°F)		18 °C ~ 30 °C (64 °F ~ 86 °F)					
3	All Unit Temperature Lock (Setting)	AllTempLockCommand	BO	-	Permit (0)	Prohibit (1)	-	-	-	-	-
4	Total Accumulated Power (Status)	TotalAccumulatedPower	AI	100 Watt							
5	Peak Control Operation (Setting)	PeakStartStopCommand	BO	-	Stop (0)	Start (1)	-	-	-	-	-
6	Peak Control Operation (Status)	PeakStartStopStatus	BI	-	Stop (0)	Start (1)	-	-	-	-	-
7	Peak Shift Time(Setting)	PeakShiftTimeCommand	AV	min		5 min ~ 15 min					
8	Peak Shift Time(Status)	PeakShiftTimeStatus	AI	min		5 min ~ 15 min					
9	Peak Target Ratio(Setting)	PeakTargetCommand	AV	%		0 % ~ 100 %					
10	Peak Target Ratio(Status)	PeakTargetStatus	AI	%		0 % ~ 100 %					
11	Peak Current Running Ratio(Status)	PeakCurrentStatus	AI	%		0 % ~ 100 %					
12	Remote Shutdown(Setting)	RemoteShutDownCommand	BO	-	Normal (0)	Shutdown (1)	-	-	-	-	-
13	Temperature Unit Setting (Setting)	TempUnitCommand	BO	-	°C (0)	°F (1)	-	-	-	-	-
14	Temperature Unit Setting (Status)	TempUnitStatus	BI	-	°C (0)	°F (1)	-	-	-	-	-



Scroll-Air-Inv-Gen2 object list

Scroll-Air-Inv-Gen2 has a point list as shown below. Some points may not be supported depending on the product.

Point	Description	Object Name(_XXX : Address)	Object Type	Unit	Text-0	Text-1	Text-2	Text-3	Text-4	Text-5	Text-6
1	On/Off (Setting)	Operation_XXX	BO	-	Stop (0)	Start (1)	-	-	-	-	-
2	Chilled Water Flow Switch	ChilledWaterFlowSwitch_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
3	Chilled Water Pump Output	ChilledWaterPumpOutput_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
4	Chilled Water Pump Output	ChilledWaterPumpInterlock_XXX	BI	-	Stop (0)	Start (1)	-	-	-	-	-
5	Main PCB Version	MainPCB_Version_XXX	AI	-							
6	Total Current Consumption	CurrentConsumption_XXX	AI	-							
7	Outside Air Temp	OutsideAirTemp_XXX	AI	°C(°F)							
8	Chilled Water Leaving Temp	ChilledWaterLeavingTemp_XXX	AI	°C(°F)							
9	Chilled Water Entering Temp	ChilledWaterEnteringTemp_XXX	AI	°C(°F)							
10	Error Cycle	ErrorCycle_XXX	AI	-							
11	Error Code	ErrorCode_XXX	AI	-							
12	Left To Start Time	LeftToStartTime_XXX	AI	sec							
13	Total Operation Time(high)	TotalOperationTime(high)_XXX	AI	min							
14	Total Operation Time(low)	TotalOperationTime(low)_XXX	AI	min							
15	Cycle1_1 Water Leaving Temp	Cycle1_1WaterLeavingTemp_XXX	AI	°C(°F)							
16	Cycle1_2 Water Leaving Temp	Cycle1_2WaterLeavingTemp_XXX	AI	°C(°F)							
17	Cycle1_1 Inverter Comp Freq	Cycle1_1InvCompFreq_XXX	AI	Hz							
18	Cycle1_2 Inverter Comp Freq	Cycle1_2InvCompFreq_XXX	AI	Hz							
19	Cycle1_1 HighPressure	Cycle1_1HighPressure_XXX	AI	kPa							
20	Cycle1_2 HighPressure	Cycle1_2HighPressure_XXX	AI	kPa							
21	Cycle1_1 LowPressure	Cycle1_1LowPressure_XXX	AI	kPa							
22	Cycle1_2 LowPressure	Cycle1_2LowPressure_XXX	AI	kPa							
23	Cycle2_1 Water Leaving Temp	Cycle2_1WaterLeavingTemp_XXX	AI	°C(°F)							
24	Cycle2_2 Water Leaving Temp	Cycle2_2WaterLeavingTemp_XXX	AI	°C(°F)							
25	Cycle2_1 Inverter Comp Freq	Cycle2_1InvCompFreq_XXX	AI	Hz							
26	Cycle2_2 Inverter Comp Freq	Cycle2_2InvCompFreq_XXX	AI	Hz							
27	Cycle2_1 HighPressure	Cycle2_1HighPressure_XXX	AI	kPa							
28	Cycle2_2 HighPressure	Cycle2_2HighPressure_XXX	AI	kPa							
29	Cycle2_1 LowPressure	Cycle2_1LowPressure_XXX	AI	kPa							
30	Cycle2_2 LowPressure	Cycle2_2LowPressure_XXX	AI	kPa							
31	Cycle3_1 Water Leaving Temp	Cycle3_1WaterLeavingTemp_XXX	AI	°C(°F)							
32	Cycle3_2 Water Leaving Temp	Cycle3_2WaterLeavingTemp_XXX	AI	°C(°F)							
33	Cycle3_1 Inverter Comp Freq	Cycle3_1InvCompFreq_XXX	AI	Hz							
34	Cycle3_1 Inverter Comp Freq	Cycle3_2InvCompFreq_XXX	AI	Hz							
35	Cycle3_1 HighPressure	Cycle3_1HighPressure_XXX	AI	kPa							
36	Cycle3_2 HighPressure	Cycle3_2HighPressure_XXX	AI	kPa							
37	Cycle3_1 LowPressure	Cycle3_1LowPressure_XXX	AI	kPa							
38	Cycle3_2 LowPressure	Cycle3_2LowPressure_XXX	AI	kPa							
39	Mode(Setting)	ModeCommand_XXX	MO	-	-	Cool	-	-	-	Heat	-
40	Mode(Status)	ModeStatus_XXX	MI	-	-	Cool	-	-	-	Heat	-
41	Set Cool Water Temp	SetCoolWaterTemp_XXX	AV	°C(°F)							
42	Set Hot Water Temp	SetHotWaterTemp_XXX	AV	°C(°F)							



BIBBs

BACnet Interoperability Building Blocks

Alarm and Event Management, Scheduling, Trending and Network Security BIBBs are not supported.

Data Sharing BIBBs

(□:Not supported, ■: Supported)

BIBB Type		Supported	Service	Initiate	Execute
DS-RP-A	Data Sharing-ReadProperty-A	□	ReadProperty	X	
DS-RP-B	Data Sharing-ReadProperty-B	■	ReadProperty		X
DS-RPM-A	Data Sharing-ReadPropertyMultiple-A	□	ReadPropertyMultiple	X	
DS-RPM-B	Data Sharing-ReadPropertyMultiple-B	■	ReadPropertyMultiple		X
DS-RPC-A	Data Sharing-ReadPropertyConditional-A	□	ReadPropertyConditional	X	
DS-RPC-B	Data Sharing-ReadPropertyConditional-B	□	ReadPropertyConditional		X
DS-WP-A	Data Sharing-WriteProperty-A	□	WriteProperty	X	
DS-WP-B	Data Sharing-WriteProperty-B	■	WriteProperty		X
DS-WPM-A	Data Sharing-WritePropertyMultiple-A	□	WritePropertyMultiple	X	
DS-WPM-B	Data Sharing-WritePropertyMultiple-B	■	WritePropertyMultiple		X
DS-COV-A		□	SubscribeCOV	X	
			ConfirmedCOVNotification		X
			UnconfirmedCOVNotification		X
DS-COV-B		■	SubscribeCOV		X
			ConfirmedCOVNotification	X	
			UnconfirmedCOVNotification	X	
DS-COVP-A		□	SubscribeCOVProperty	X	
			ConfirmedCOVNotification		X
			UnconfirmedCOVNotification		X
DS-COVP-B		□	SubscribeCOVProperty		X
			ConfirmedCOVNotification	X	
			UnconfirmedCOVNotification	X	
DS-COVU-A	Data Sharing-Change Of Value Unsubscribed-A	□	UnconfirmedCOVNotification		X
DS-COVU-B	Data Sharing-Change Of Value Unsubscribed-B	□	UnconfirmedCOVNotification	X	

Device and Network Management BIBBs

(□:Not supported, ■: Supported)

BIBB Type		Supported	Service	Initiate	Execute
DM-DDB-A		□	Who-Is	X	
			I-Am		X
DM-DDB-B		■	Who-Is		X
			I-Am	X	
DM-DOB-A		□	Who-Has	X	
			I-Have		X
DM-DOB-B		■	Who-Has		X
			I-Have	X	
DM-DCC-A	Device Management-DeviceCommunicationControl-A	□	DeviceCommunicationControl	X	
DM-DCC-B	Device Management-DeviceCommunicationControl-B	■	DeviceCommunicationControl		X
DM-TS-A	Device Management-TimeSynchronization-A	□	TimeSynchronization	X	
DM-TS-B	Device Management-TimeSynchronization-B	■	TimeSynchronization		X



PICS

BACnet Protocol Implementation Conformance Statement

Vendor Name

LG Electronics Inc.

Product Name

AC Smart 5

Product Description

This gateway converts between BACnet IP and RS-485 LGAP (LG Aircon protocol) allowing third party control and monitoring of the LG A/C system.

It has a built in web server that does not require any additional software.

BACnet Standardized Device Profile (Annex L)

BACnet Application Specific Controller (B-ASC)

Segmentation Capability

Segmented responses supported Window Size - 64

Standard Object Types Supported

Object-Type	Dynamically Creatable	Dynamically Deletable	Optional Properties Supported	Writable Properties
Device	No	No	Location, Description, Max Segments Accepted, APDU Segment Timeout, Active COV Subscriptions, Profile Name	N/A
Analog Input	No	No	Description, Reliability, Min Pres Value, Max Pres Value, Resolution, COV Increment	N/A
Analog Value	No	No	Description, Reliability, Resolution, COV Increment	Present_Value
Binary Input	No	No	Description, Reliability, Inactive Text, Active Text	N/A
Binary Output	No	No	Description, Reliability, Inactive Text, Active Text	Present_Value
Binary Value	No	No	Description, Reliability, Inactive Text, Active Text	Present_Value
Multi-State Input	No	No	Description, Reliability, State Text	N/A
Multi-State Output	No	No	Description, Reliability, State Text	Present_Value

Data Link Layer Options

BACnet IP, (Annex J), Foreign Device - IPv4 only, IPv6 not supported

Device Address Binding

Static device binding is not supported.

Character Sets Supported

ANSI x 3.4



Modbus Commission

Commissioning is the process of verifying the subsystems to achieve the owner's project requirements as intended by the building owner and as designed by the building architects and engineers.

After AC Smart 5 installation, you can check the operation status of the device by using the web function before connection with the BMS system.

Creating of the Points. This is NOT to be done by LG since it is directly related to the BMS side. The BMS engineer is to carry out the engineering of the Point, however LG is responsible for providing the method of how the Points are calculated.

Precautions

- To use the Modbus feature, you must select **[Settings] > [BACnet/Modbus Setting] > [Modbus TCP enable]** as Set.
- In case of installing 2 or more AC Smart 5, you must change **[Settings] > [BACnet/Modbus Setting] > [Vnet Number Setting]** so that the Vnet Numbers are not duplicate among AC Smart 5.
- The Vnet number is used as a Slave ID of the Modbus protocol and can be set to a value from 1 to 247.
- The Read Single Coils command (Function Code 1) can read up to 2,000 commands at a time. The Read Holding Registers command (Function Code 3) can read up to 125 at a time.



Supported Function Codes

The Modbus function codes supported by AC Smart 5 are as follows:

Refer to the Register List page for controlled/monitored items supported by each function code.

- 0x01
- 0x03
- 0x05
- 0x06



Modbus Register List

It describes the Modbus Register List provided by AC Smart 5.

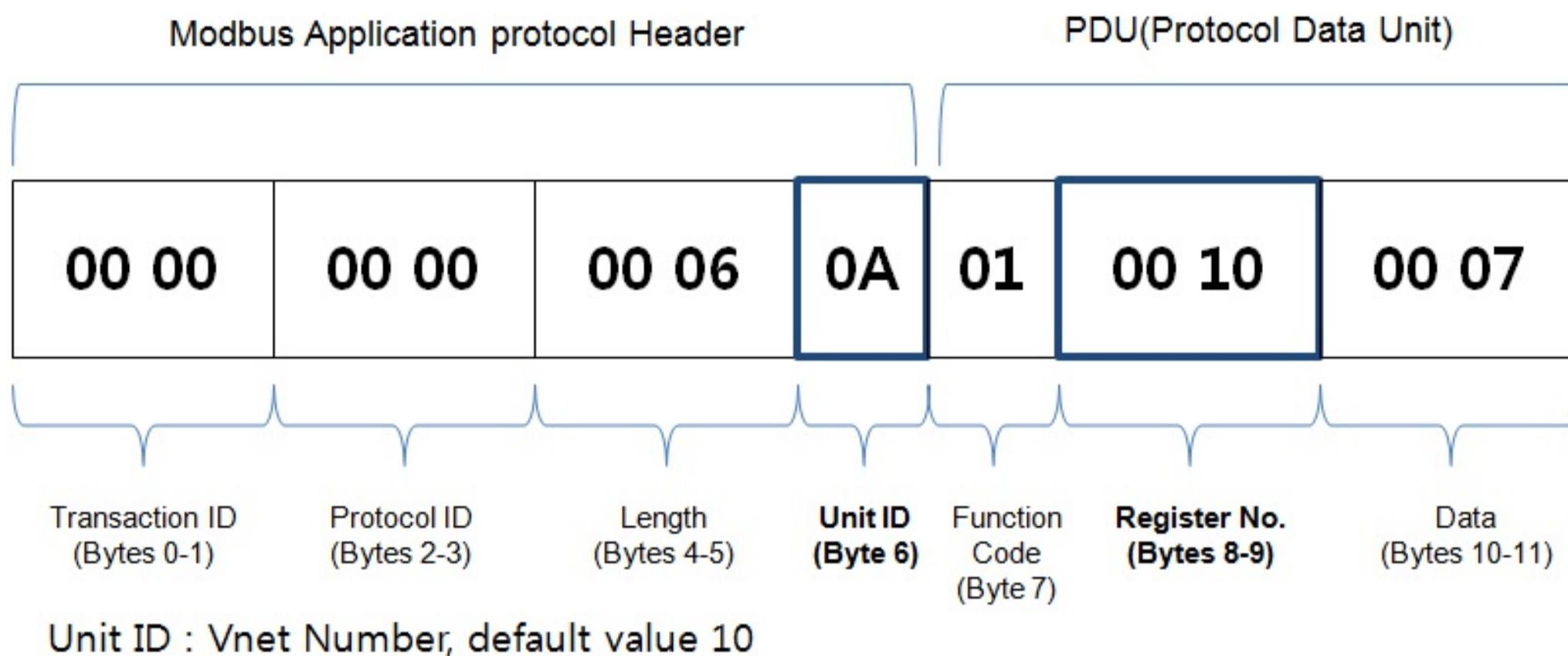
- ▶ Definition of Register Address
- ▶ Indoor Unit Register List
- ▶ ERV Register List
- ▶ AHU Register List
- ▶ Heating Register List



Definition of Register Address

The Register Address of each device is assigned as follows.

- Protocol Configuration



- Register No.



Example of Register Address

Description of Register	Product Type (Hexadecimal)	Product Address (Hexadecimal)	Point (Hexadecimal)	Function Code(Hexadecimal)	Register Address (Hexadecimal)
IDU Address 0x00, On/Off	0x0	0x00	0x1	0x1 / 0x5	0x0000
IDU Address 0x00, Operation Mode	0x0	0x00	0x1	0x3 / 0x6	0x0000
IDU Address 0x1B, On/Off	0x0	0x1B	0x1	0x1 / 0x5	0x01B0
IDU Address 0x1B, Operation Mode	0x0	0x1B	0x1	0x3 / 0x6	0x01B0
ERV Address 0x00, On/Off	0x4	0x00	0x1	0x1 / 0x5	0x4000
ERV Address 0x00, Operation Mode	0x4	0x00	0x1	0x3 / 0x6	0x4000
ERV Address 0x1B, On/Off	0x4	0x1B	0x1	0x1 / 0x5	0x41B0
ERV Address 0x1B, Operation Mode	0x4	0x1B	0x1	0x3 / 0x6	0x41B0
AHU Address 0x00, On/Off	0x8	0x00	0x1	0x1 / 0x5	0x8000
AHU Address 0x00, Operation Mode	0x8	0x00	0x1	0x3 / 0x6	0x8000
AHU Address 0x00, Current OA Damper	0x8	0x01	0x1	0x3	0x8010
AHU Address 0x0F, On/Off	0x8	0x1E	0x1	0x1 / 0x5	0x81E0
AHU Address 0x0F, Operation Mode	0x8	0x1E	0x1	0x3 / 0x6	0x81E0
AHU Address 0x0F, Current OA Damper	0x8	0x1F	0x1	0x3	0x81F0
Heating Address 0x00, On/Off	0xC	0x00	0x1	0x1 / 0x5	0xC000
Heating Address 0x00, Operation Mode	0xC	0x00	0x1	0x3 / 0x6	0xC000
Heating Address 0x0F, On/Off	0xC	0x0F	0x1	0x1 / 0x5	0xC0F0
Heating Address 0x0F, Operation Mode	0xC	0x0F	0x1	0x3 / 0x6	0xC0F0



Indoor Unit Register List

One Indoor unit has the following list of points. Some points may not be supported depending on the product.

Point	Description	Function Code	Unit	Text-0	Text-1	Text-2	Text-3	Text-4	Text-5	Text-6
1	On/Off	01/05	-	Stop (0)	Start (1)	-	-	-	-	-
2	Swing	01/05	-	Stop (0)	Start (1)	-	-	-	-	-
3	Lock	01/05	-	Permit (0)	Prohibit (1)	-	-	-	-	-
4	Mode Lock	01/05	-	Permit (0)	Prohibit (1)	-	-	-	-	-
5	Fan Lock	01/05	-	Permit (0)	Prohibit (1)	-	-	-	-	-
6	Temp Lock	01/05	-	Permit (0)	Prohibit (1)	-	-	-	-	-
7	Alarm	01	-	Normal (0)	Abnormal (1)	-	-	-	-	-
1	Operation Mode	03/06	-	-	Cool (1)	Dry (2)	Fan (3)	Auto (4)	Heat (5)	-
2	Fan Speed	03/06	-	-	Low (1)	Middle (2)	High (3)	Auto (4)	-	-
3	Set Room Temperature	03/06	°C			16 °C ~ 30 °C (60 °F ~ 86 °F)				
4	Set Upper Temperature	03/06	°C			18 °C ~ 30 °C (64 °F ~ 86 °F)				
5	Set Lower Temperature	03/06	°C			16 °C ~ 30 °C (60 °F ~ 86 °F)				
6	Room Temperature	03	°C							
7	Error Code	03	-			Please refer to LG error code list.				
8	Accumulated Power(LOW)	03	-		Accumulated Power Value(100 Watt) = Accumulated Power(HIGH) X 65536 + Accumulated Power(LOW)					
9	Accumulated Power(HIGH)	03	-		Accumulated Gas Value(100 Liter) = Accumulated Gas(HIGH) X 65536 + Accumulated Gas(LOW)					
10	Accumulated Gas(LOW)	03	-							
11	Accumulated Gas(HIGH)	03	-							



ERV Register List

One Indoor unit has the following list of points. Some points may not be supported depending on the product.

Point	Description	Function Code	Unit	Text-0	Text-1	Text-2	Text-3	Text-4	Text-5	Text-6
1	On/Off	01/05	-	Stop (0)	Start (1)	-	-	-	-	-
2	Lock	01/05	-	Permit (0)	Prohibit (1)	-	-	-	-	-
3	Filter	01/05	-	Off (0)	On (1)	-	-	-	-	-
4	Alarm	01	-	Normal (0)	Abnormal (1)	-	-	-	-	-
5	AC ON/OFF	01/05	-	Stop (0)	Start (1)	-	-	-	-	-
6	AC Humidify	01/05	-	Stop (0)	Start (1)	-	-	-	-	-
1	Operation Mode	03/06	-	-	Heat Exchange (1)	Auto (2)	Normal (3)	-	-	-
2	Fan Speed	03/06	-	-	Low (1)	High (2)	Super High (3)	Auto (4)	-	-
3	User Mode	03/06	-	-	Quick fresh (1)	Energy saving (2)	Clear (3)	-	-	-
4	Error Code	03	-		Please refer to LG error code list.					
5	AC Operation Mode	03/06	-	-	Cool (1)	Auto (2)	Heat (3)	-	-	-
6	Set Room Temperature	03/06	°C		16 °C ~ 30 °C (60 °F ~ 86 °F)					



AHU Register List

One AHU has the following list of points. Some points may not be supported depending on the product.

Due to the limited number of points, One AHU device uses two product addresses. Refer to the Definition of Register Address page for the detail information.



Heating Register List

One Heating has the following list of points. Some points may not be supported depending on the product.



This product from LG Electronics, Inc. contains the open source software detailed below. Please refer to the indicated open source licenses (as are included following this notice) for the terms and conditions of their use.

Open Source	License	Copyright
alsa-lib 1.1.2	LGPL-2.1	
alsa-utils 1.1.0	GPL-2.0	<p>Copyright (c) 2008-2010 SlimLogic Ltd Copyright (c) 2010 Wolfson Microelectronics PLC Copyright (c) 2010 Red Hat Inc. Copyright (c) 1998,1999 Tim Janik Copyright (c) 1998-2000, 2008, Jaroslav Kysela <perex@perex.cz> Copyright (c) 1999-2003 Takashi Iwai <tiwai@suse.de> Copyright (c) 2004-2010 Clemens Ladisch <clemens@ladisch.de> Copyright (c) 2005 Nathan Hurst Copyright (c) 2000-2004 James Courtier-Dutton Copyright (c) 2013-2015 Intel Corporation Copyright (c) 2015 Caleb Crome Copyright (c) 2010-2011 Texas Instruments Incorporated Copyright (c) Abramo Bagnara <abramo@alsa-project.org> Copyright (c) 2004-2006 Kay Sievers <kay.sievers@vrfy.org> Copyright (c) 2003 Greg Kroah-Hartman <greg@kroah.com> Copyright (c) 1994-2012 Free Software Foundation, Inc. Copyright (c) 1874 Lewis Carroll</p>
apmd 3.2.2-14	GPL-2.0	<p>Copyright (c) 1996, Rik E. Faith Copyright (c) 1999, Avery Pennarun</p>
ATK 2.14.0	LGPL-2.1	
avahi 0.6.31	LGPL-2.1	<p>Copyright (c) 2003, 2004 Porchdog Software Copyright (c) 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011 Free Software Foundation, Inc.</p>
BACnet Stack	GPL-2.0-with-eCos-exception-2.0 MIT	<p>Copyright (c) 2010 STMicroelectronics Copyright (c) 2012 Steve Karg <skarg@users.sourceforge.net> Copyright (c) 2015 Nikola Jelic <nikola.jelic@euroicc.com> Copyright (c) 2010-2012 Atmel Corporation. Copyright (c) 2011 Krzysztof Malorny <malornykrzysztof@gmail.com> Copyright (c) 2008 John Minack Copyright (c) 2014 Daniel Blazevic <daniel.blazevic@gmail.com></p>
bash 3.2.48	GPL-2.0	Copyright (c) 1987-2005 Free Software Foundation, Inc.
BusyBox 1.23.1	GPL-2.0	<p>Copyright (c) 1999-2004 by Erik Andersen. Copyright (c) 2005-2006 Rob Landley</p>
cairo 1.12.18	LGPL-2.1	<p>Copyright (c) 2005 Red Hat, Inc. Copyright (c) 2004 Carl Worth Copyright (c) 2009 Chris Wilson</p>
codeaurora-platform-external-ethtool 4.10	GPL-2.0	-
coreutils 6.9	GPL-2.0	Copyright (c) 2005, 2006 Free Software Foundation, Inc.
cpufrequtils 008	GPL-2.0	<p>Copyright (c) 2009 Thomas Renninger <trenn@suse.de>, Novell Inc. Copyright (c) 2008 Christian Kornacker <ckornacker@suse.de> Copyright (c) 2002-2003, by Mike Gleason, NcFTP Software.</p>
dosfstools 2.11	GPL-2.0	<p>Copyright (c) 1993, 1994 David Hudson (dave@humbug.demon.co.uk) Copyright (c) 1992, 1993 Remy Card (card@masi.ibp.fr) and 1991 Linus Torvalds (torvalds@klaava.helsinki.fi) Copyright (c) Werner Almesberger <almesber@irc.di.epfl.ch> and Roman Hodek <Roman.Hodek@informatik.uni-erlangen.de>.</p>
e2fsprogs 1.42.9	GPL-2.0	<p>Copyright (c) 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010 by Theodore Ts'o Copyright (c) 1987, 1988, 1989 Massachusetts Institute of Technology Student Information Processing Board</p>
fbset 2.1	GPL-2.0	Copyright (c) 1995-1998, Geert Uytterhoeven
Firebird 2.5.0	Initial Developer's Public License Version 1.0 InterBase Public License	
gconf 3.2.6	LGPL-2.1	Copyright (c) 1999, 2000 Red Hat Inc
 gdk-pixbuf 2.30.8	LGPL-2.1	<p>Copyright (C) 1995-1997 Peter Mattis, Spencer Kimball and Josh MacDonald Copyright (C) 1999 The Free Software Foundation Copyright (C) 2000 Red Hat, Inc Copyright (C) 2008 Dominic Lachowicz Copyright (C) 2008 Alberto Ruiz Copyright (C) 2004 Matthias Clasen <mclasen@redhat.com> Copyright (C) 2005 Imendio AB Copyright (C) 2001-2002 convergence integrated media GmbH Copyright (C) 2002 convergence GmbH</p>
glib 2.21	LGPL-2.1	Copyright (c) 1989-2013 Free Software Foundation, Inc.

gmp 6.1.0	GPL-2.0	Copyright (c) 2000, 2001, 2003 Free Software Foundation, Inc.
GnuTLS 3.3.12	LGPL-2.1	Copyright (c) 2011-2012 Free Software Foundation, Inc.
gstreamer 1.0	LGPL-2.1	Copyright (c) 1999,2000 Erik Walthinsen <omega@cse.ogi.edu> Copyright (c) 2000 Wim Taymans <wtay@chello.be> Copyright (c) 2004 Thomas Vander Stichele <thomas@apestaart.org> Copyright (c) 2011,2013 Stefan Sauer <ensonic@users.sf.net> Copyright (c) 2001, 2002 Arien Malec
GTK+ 2.24.25	LGPL-2.1	
i2c-tools 3.1.1	GPL-2.0	
Imx-kobs 5.5	GPL-2.0	Copyright (c) 2008-2011 Freescale Semiconductor, Inc. Copyright (c) 2008 by Embedded Alley Solution Inc. Copyright (c) 2003, Dr Brian Gladman <brg@gladman.me.uk>, Worcester, UK.
iproute2 3.16.0	GPL-2.0	Copyright (c) 2004-2007, USAGI/WIDE Project Copyright (c) 2008, Intel Corporation. Copyright (c) 2012-2013 Eric Dumazet <edumazet@google.com> Copyright (c) ~1999 A.N.Kuznetsov Copyright (c) 2013 Cisco Systems, Inc, 2013. Copyright (c) 2011 Czech Technical University in Prague Copyright (c) 2004 Harald Welte <laforg@gnumonks.org> Copyright (c) 2000-2002 Joakim Axelsson <gozem@linux.nu> Copyright (c) 2003-2010 Jozsef Kadlecik <kadlec@blackhole.kfki.hu> Copyright (c) 2011-2012 Kathleen Nichols <nichols@pollere.com> Copyright (c) 2001-2004 Lubomir Bulej <pallas@kadan.cz> Copyright (c) 1999-2000 Maxim Krasnyansky <max_mk@yahoo.com> Copyright (c) 2012 Michael D. Taht <dave.taht@bufferbloat.net> Copyright (c) 1999 Pavel Golubev <pg@ksi-linux.com> Copyright (c) 2001 Robert Olsson <robert.olsson@its.uu.se> Copyright (c) 2013 Terry Lam <vtlam@google.com> Copyright (c) 2011-2012 Van Jacobson <van@pollere.com> Copyright (c) 2002-2007 Volkswagen Group Electronic Research Copyright (c) 2009 Wolfgang Grandegger <wg@grandegger.com> Copyright (c) Patrick McHardy
iptables 1.4.21	GPL-2.0	Copyright (c) 2000-2002 by the netfilter coreteam <coreteam@netfilter.org>: Paul 'Rusty' Russell <rusty@rustcorp.com.au>, Marc Boucher <marc+nf@mbsi.ca>, James Morris <jmorris@intercode.com.au>, Harald Welte <laforg@gnumonks.org>, Jozsef Kadlecik <kadlec@blackhole.kfki.hu> Copyright (c) 2008-2013 Patrick McHardy <kaber@trash.net> Copyright (c) 2000-2002 Joakim Axelsson <gozem@linux.nu>, Patrick Schaaf <bof@bof.de>, Martin Josefsson <gandalf@wlug.westbo.se> Copyright (c) 2003-2010 Jozsef Kadlecik <kadlec@blackhole.kfki.hu>
kexec 2.0.9	GPL-2.0	
kmod 21	GPL-2.0	
libdaemon 0.14	LGPL-2.1	
libexif 0.6.21	LGPL-2.1	Copyright (c) 2001, 2002 Lutz Mueller <lutz@users.sourceforge.net>
libiconv 1.11	LGPL-2.1	Copyright (c) 1990-1998, 2000-2003, 2004 Free Software Foundation, Inc.
libmatchbox	LGPL-2.1	Copyright (c) 2002,2003 Matthew Allum
libsysfs 2.1.0	LGPL-2.1	
libusb 1.0.20	LGPL-2.1	Copyright (c) 2001 Johannes Erdfelt <johannes@erdfelt.com> Copyright (c) 2007-2009 Daniel Drake <dsd@gentoo.org> Copyright (c) 2010-2012 Peter Stuge <peter@stuge.se> Copyright (c) 2008-2013 Nathan Hjelm <hjelmn@users.sourceforge.net> Copyright (c) 2009-2013 Pete Batard <pete@akeo.ie> Copyright (c) 2009-2013 Ludovic Rousseau <ludovic.rousseau@gmail.com> Copyright (c) 2010-2012 Michael Plante <micahel.plante@gmail.com> Copyright (c) 2011-2013 Hans de Goede <hdegoede@redhat.com> Copyright (c) 2012-2013 Martin Pieuchot <mpi@openbsd.org> Copyright (c) 2012-2013 Toby Gray <toby.gray@realvnc.com> Copyright (c) 2013-2015 Chris Dickens <christopher.a.dickens@gmail.com>
libwebsockets 1.3	LGPL-2.1 w/libwebsockets exception	Copyright (c) 1995, 1996, 1997, and 1998 WIDE Project. Copyright (c) 1995-2010 Jean-loup Gailly and Mark Adler Copyright (c) 1995-2010 Mark Adler Copyright (c) 2000-2001 Kungliga Tekniska Hgskolan Copyright (c) 2010-2014 Andy Green <andy@warmcat.com> Copyright (c) 2012 Tatsuhiro Tsujikawa Copyright (c) 1991, 1999 Free Software Foundation, Inc. Copyright (c) 1998 Michael Zucchi, All Rights Reserved Copyright (c) 2000 MontaVista Software, Inc. Copyright (c) 2000-2001 Tim Waugh Copyright (c) 2001 Simon Huggins Copyright (c) 2001 Bob Trower, Trantor Standard Systems Inc. Copyright (c) 2005-2009 Randy Dunlap Copyright (c) Kitware Inc.
Linux Kernel 3.14.52	GPL-2.0	
matchbox-terminal	GPL-2.0	
matchbox-wm 1.2	GPL-2.0	Copyright (c) 2002, 2004, 2005 OpenedHand Ltd
memtester 4.3.0	GPL-2.0	Copyright (c) 2007 Charles Cazabon <charlesc-memtester@pyropus.ca>
mtd-utils	---	

1.5.2	GPL-2.0	
nettle 2.7.1	LGPL-2.1	Copyright (c) 2002 Niels Möller Copyright (c) 1992 Dana L. How
node-firebird 0.7.2	MPL-2.0	
nss 3.51.1	MPL-2.0	Copyright (c) 2000-2009 Sun Microsystems, Inc. Copyright (c) 1994-2009 the Initial Developer.
nss-mdns 0.10	LGPL-2.1	Copyright (c) 2004-2007 Lennart Poettering <mzaffzqaf (at) Opointer (dot) de>
opkg 0.3.6	GPL-2.0	Copyright (c) 2003, kernel concepts Copyright (c) 2001, University of Southern California
pango 1.36.8	LGPL-2.1	Copyright (c) 1999 Red Hat Software
procps 3.3.10	GPL-2.0	
proftpd 1.3.5	GPL-2.0	Copyright (c) 1997, 1998 Public Flood Software Copyright (c) 1999, 2000 MacGyver aka Habeeb J. Dihu <macgyver@tos.net> Copyright (c) 2001-2011 The ProFTPD Project team
shared-mime-info 1.15	GPL-2.0	-
startup-notification 0.12	LGPL-2.1	Copyright (c) 2002, Red Hat, Inc. Copyright (c) 2002, 2009, Julien Danjou
sysfsutils 2.1.0	GPL-2.0 LGPL-2.1	Copyright (c) Ananth Mavinakayanahalli Copyright (c) Daniel Stekloff Copyright (c) Mohan Kumar Copyright (c) Nitin Vashisth Copyright (c) Ananth Mavinakayanahalli Copyright (c) Daniel Stekloff Copyright (c) Mohan Kumar Copyright (c) Nitin Vashisth
sysstat 11.2.0	GPL-2.0	Copyright (c) 1999-2015 by Sebastien GODARD (sysstat <at> orange.fr)
sysvinit 2.88dsf	GPL-2.0	Copyright (c) 1991-2004 Miquel van Smoorenburg
udev 182	GPL-2.0	
usbutils 007	GPL-2.0	
Util-Linux 2.25.2	GPL-2.0	
vte 0.28.2	LGPL-2.1	Copyright (c) 2001-2004, Red Hat, Inc.

The source code for the above may be obtained free of charge from LG Electronics, Inc. at <https://opensource.lge.com>. LG Electronics, Inc. will also provide open source code to you on CD-ROM for a charge covering the cost of performing such distribution (such as the cost of media, shipping, and handling) upon email request to opensource@lge.com. This offer is valid for a period of three years after our last shipment of this product. This offer is valid to anyone in receipt of this information.

Please be informed that LG Electronics, Inc. product may contain open source software listed in the tables below.

Open Source	License	Copyright
@developpement/xml2js 0.4.16	MIT	-
android-external-curl 9.0	curl	Copyright (c) 1996 - 2016, Daniel Stenberg, <daniel@haxx.se>, and many contributors
Angular UI Tree 2.13.0	MIT	
angular-file-upload 12.2.13	MIT	Copyright (c) 2013 danialfarid
angular-local-storage 0.2.7	MIT	Copyright (c) 2016 Gregory Pike
angular-moment 0.10.3	MIT	Copyright (c) 2013-2015 Uri Shaked and contributors
angular-slider 0.2.15	MIT	Copyright (c) 2014 PopSugar <cbailey@popsugar.com>
angular-translate 2.8.1	MIT	Copyright (c) <2014> <pascal.precht@gmail.com>
angular-ui-router.statehelper 1.3.1	MIT	Copyright (c) 2014 Mark Lagendijk
angular-virtual-keyboard 0.4.3	MIT	Copyright (c) 2015 Daniel Campos
angular-xml 2.2.2	MIT	Copyright (c) 2013-2015 John Wright http://j-g-w.info
AngularJS 1.5.11	MIT	Copyright (c) 2010-2017 Google, Inc. http://angularjs.org
AngularJS 1.4.14	MIT	Copyright (c) 2010-2015 Google, Inc. http://angularjs.org
angularjs-slider 0.1.36	MIT	Copyright (c) 2013 Rafal Zajac <rzajac@gmail.com>
AngularUI Router 0.2.18	MIT	Copyright (c) 2013-2015 The AngularUI Team, Karsten Sperling
apitrace 5.0	MIT	Copyright (c) 2007-2012 VMware, Inc. Copyright (c) 2011 Intel Corporation Copyright (c) 2011 LunarG, Inc. Copyright (c) 2011 Zack Rusin Copyright (c) 2011-2012 Jose Fonseca

Copyright (c) 2011-2012 Jose Ortega		
async 2.4.1	MIT	Copyright (c) 2010-2017, Caolan McMahon
autohdmi 1.0	MIT	Copyright (c) 2014 Cyrille Pontvieux
body-parser 1.14.1	MIT	Copyright (c) 2014-2015 Douglas Christopher Wilson <doug@somethingdoug.com> Copyright (c) 2014 Jonathan Ong <me@jongleberry.com>
bower-angular-cookies 1.5.11	MIT	Copyright (c) 2016 Angular Copyright (c) 2010-2015 Google, Inc. http://angularjs.org
bower-angular-translate-loader-static-files 2.8.1	MIT	Copyright (c) 2015 The angular-translate team, Pascal Precht
browser-filesaver 1.1.1	MIT	Copyright (c) 2015 Eli Grey
Chromium 40.0.2205.0	BSD-3-Clause	Copyright (c) 2013 The Chromium Authors.
composable-middleware 0.3.0	MIT	Copyright (c) 2013 Randy McLaughlin
cookie-parser 1.3.5	MIT	Copyright (c) 2014 TJ Holowaychuk <tj@vision-media.ca>
couchdb	Apache-2.0	Copyright (c) 2009-2021 The Apache Software Foundation
Crypto-is 3.1.9	MIT	Copyright (c) 2009-2013 Jeff Mott Copyright (c) 2013-2016 Evan Vosberg
Crypto-is 3.1.6	MIT	Copyright (c) 2009-2013 Jeff Mott Copyright (c) 2013-2016 Evan Vosberg
curl 7.59.0	curl	Copyright (c) 1996 - 2018, Daniel Stenberg, <daniel@haxx.se>, and many contributors, see the THANKS file.
curl	curl	Copyright (c) 1996 - 2008, Daniel Stenberg, <daniel@haxx.se>.
d3 3.5.17	BSD-3-Clause	Copyright (c) 2010-2016, Michael Bostock
dbus 1.8.10	AFL-2.1	Copyright (C) 2003, 2004 Red Hat, Inc.
device.js 0.2.7	MIT	Copyright (c) 2015 Matthew Hudson
dropbear 2015.68	MIT	Copyright (c) 2002-2014, Matt Johnston Copyright (c) 2004, Mihnea Stoenescu
Eclipse Paho JavaScript client	EDL 1.0	Copyright (c) 2013 IBM Corp
Eclipse Paho MOTT C client	EDL 1.0	Copyright (c) 2009-2018, IBM Corp.
ejis 2.3.4	Apache-2.0	Copyright (c) 2112 mde@fleegix.org.
errorhandler 1.4.2	MIT	Copyright (c) 2014 Jonathan Ong Copyright (c) 2014-2015 Douglas Christopher Wilson
exceljs 0.2.6	MIT	Copyright (c) 2014-2019 Guyon Roche
expat 2.1.0	MIT	Copyright (c) 1998, 1999, 2000 Thai Open Source Software Center Ltd and Clark Cooper Copyright (c) 2001, 2002, 2003, 2004, 2005, 2006 Expat maintainers.
express 4.13.3	MIT	Copyright (c) 2009-2014 TJ Holowaychuk <tj@vision-media.ca> Copyright (c) 2013-2014 Roman Shtylman <shtylman+expressjs@gmail.com> Copyright (c) 2014-2015 Douglas Christopher Wilson <doug@somethingdoug.com>
express-session 1.11.3	MIT	Copyright (c) 2010 Sencha Inc. Copyright (c) 2011 TJ Holowaychuk <tj@vision-media.ca> Copyright (c) 2014-2015 Douglas Christopher Wilson <doug@somethingdoug.com>
file 5.22	BSD-like License (file)	Copyright (c) Ian F. Darwin 1986, 1987, 1989, 1990, 1991, 1992, 1994, 1995. Software written by Ian F. Darwin and others; maintained 1994- Christos Zoulas.
file-type 4.3.0	MIT	Copyright (c) Sindre Sorhus <sindresorhus@gmail.com> (sindresorhus.com)
FileSaver.js 1.3.2	MIT	Copyright (c) 2016 Eli Grey.
fontconfig 2.13.1	MIT-like License (fontconfig)	Copyright (c) 2000,2001,2002,2003,2004,2006,2007 Keith Packard Copyright (c) 2005 Patrick Lam Copyright (c) 2009 Roozbeh Pournader Copyright (c) 2008,2009 Red Hat, Inc. Copyright (c) 2008 Danilo glrtegan
freescale-fsl-gpu-sdk 2.2.1	Apache-2.0	
freetype 2.5.4	FTL	Copyright (c) 2006-2011 by David Turner, Robert Wilhelm, and Werner Lemberg.
Google Noto Fonts	OFL-1.1	
hangul-js	MIT	Copyright (c) 2013 Chungmin Lee
HarfBuzz 0.9.38	MIT-like License (HarfBuzz)	Copyright (c) 2010,2011,2012, Google, Inc. Copyright (c) 2012, Mozilla Foundation Copyright (c) 2011, Codethink Limited Copyright (c) 2008,2010, Nokia Corporation and/or its subsidiary(-ies) Copyright (c) 2009, Keith Stibley Copyright (c) 2009, Martin Hosken and SIL International Copyright (c) 2007, Chris Wilson Copyright (c) 2006, Behdad Esfahbod Copyright (c) 2005, David Turner Copyright (c) 2004,2007,2008,2009,2010, Red Hat, Inc. Copyright (c) 1998-2004, David Turner and Werner Lemberg

hog	MIT	Copyright (c) 2012 Heather Arthur Copyright (c) 2017 jajoe
howler.js 2.0.4	MIT	Copyright (c) 2013-2017 James Simpson and GoldFire Studios, Inc.
icu 54.1	ICU	Copyright (c) 1995-2010 International Business Machines Corporation and others
Jansson 2.7	MIT	Copyright (c) 2009-2014 Petri Lehtinen <petri@digip.org>
jindw-xmldom 0.1.22	MIT	
ipea_8d	IUG	copyright (C) 1991-1998, Thomas G. Lane.
jquery	MIT	Copyright (c) JS Foundation and other contributors, https://js.foundation/
JSZIP 2.6.0	MIT	Copyright (c) 2009-2014 Stuart Knightley, David Duponchel, Franz Buchinger, António Afonso
kendo-ui-core 2017.2.621	Apache-2.0	Copyright (c) 2014-2015 Telerik
libcap 2.24	BSD-3-Clause	Copyright (c) 1997-8,2007-2011 Andrew G. Morgan <morgan@kernel.org> Copyright (c) 1998 Finn Arne Gangstad <finnag@guardian.no> Copyright (c) 2010 Serge Hallyn <serue@us.ibm.com> Copyright (c) 1997 Aleph One
libdmtx 1.1.3	MIT	Copyright (c) 2002-2004 Red Hat Inc., Durham, North Carolina.
libdrm 2.4.67	MIT	Copyright (c) 2009 VMware, Inc., Palo Alto, CA., USA Copyright (C) 2013 Rob Clark <robclark@freedesktop.org> Copyright 2012 Red Hat Inc. Copyright (c) 2014 NVIDIA Corporation Copyright 2014 Advanced Micro Devices, Inc. Copyright 2008 Tungsten Graphics Jakob Bornecrantz <jakob@tungstengraphics.com> Copyright 2008 Intel Corporation Jesse Barnes <jesse.barnes@intel.com>
libedit 20130712-3.1	BSD-3-Clause	Copyright (c) 1992, 1993 The Regents of the University of California
libevdev 1.3	MIT	
libffi 3.2.1	MIT	Copyright (c) 1996-2014 Anthony Green, Red Hat, Inc and others. Copyright (c) 2011 Anthony Green Copyright (c) 2008 Red Hat, Inc. Copyright (c) 2006 Free Software Foundation, Inc. Copyright (c) 2003-2004 Randolph Chung <tausq@debian.org>
libfontenc 1.1.2	MIT	Copyright (c) 1998-2001 by Juliusz Chroboczek
libpng 1.6.16	Libpng	Copyright (c) 1998-2014 Glenn Randers-Pehrson Copyright (c) 1996, 1997 Andreas Dilger Copyright (c) 1995, 1996 Guy Eric Schalnat, Group 42, Inc.
libtirpc 0.2.5	BSD-3-Clause	Copyright (c) Copyright (c) Bull S.A. 2005
libX11 1.6.2	X11	Copyright (c) 2003-2006, 2008, Jamey Sharp, Josh Triplett Copyright (c) 2009, Red Hat, Inc. Copyright (c) 1990-1992, 1999-2000, 2004, 2009-2010, Oracle and/or its affiliates. Copyright (c) 1984-1994, 1998, The Open Group Copyright (c) 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1994, 1996, X Consortium Copyright (c) 2000, The XFree86, Project, Inc. Copyright (c) 1999-2000, Free Software Foundation, Inc. Copyright (c) 1992, Oki Technosystems Laboratory, Inc. Copyright (c) 1990-1995, FUJITSU LIMITED Copyright (c) 1995, David E. Wexelblat. All rights reserved Copyright (c) 1990, 1991, OMRON Corporation Copyright (c) 1990, 1991, Tektronix, Inc Copyright (c) 1991, the Open Software Foundation Copyright (c) 1993, 1995, Silicon Graphics Computer Systems, Inc. Copyright (c) 1993, Fujitsu Open Systems Solutions, Inc. Copyright (c) 1987-1988, 1990, 1993, Digital Equipment Corporation Copyright (c) 1993, SunSoft, Inc. Copyright (c) 1999-2000, Bruno Haible Copyright (c) 1993, the TOSHIBA Corp. Copyright (c) 1993, 1994, Sony Corporation Copyright (c) 1990, 1991, OMRON Corporation, NTT Software Corporation, Copyright (c) 1988, Wyse Technology, Inc., San Jose, Ca, Copyright (c) 1991, 1992, Fuji Xerox Co., Ltd. Copyright (c) 1996, Sebastien Marineau and Holger Veit Copyright (c) 2000, Bruno Haible Copyright (c) 2003, Keith Packard Copyright (c) 2007-2009, Troy D. Hanson Copyright (c) 1992, 1993, TOSHIBA Corp. Copyright (c) 1993, IBM Corporation
libXft 2.3.2	HPND	Copyright (c) 2001,2003 Keith Packard
libxl	BSD-3-Clause	-
libxml2 2.9.2	MIT	Copyright (c) 1998-2012 Daniel Veillard.
libxml2 2.7.8	MIT-like License (libxml2)	Copyright (c) 1998-2003 Daniel Veillard.
libXmu 1.1.2	MIT-like License (libXmu)	
libXScrnSaver 1.2.2	X11	Copyright (c) 1992, X Consortium Copyright (c) 2003, The XFree86 Project, Inc.
libXxf86dga 1.1.4	MIT-like License (font-xfree86-type1)	Copyright (c) 1995 Jon Tombs Copyright (c) 1995, 1996 The XFree86 Project, Inc

lighttpd 1.4.35	BSD-3-Clause	Copyright (c) 2004, Jan Kneschke, incremental
list-to-tree 0.0.5	BSD-3-Clause	Copyright (c) 2013, Denis Ivanov
lodash 3.10.1	MIT	Copyright (c) 2012-2015 The Dojo Foundation < http://dojofoundation.org/ > Copyright (c) 2009-2015 Jeremy Ashkenas, DocumentCloud and Investigative Reporters & Editors < http://underscorejs.org/ >
main-bower-files 2.4.1	MIT	Copyright (c) 2013 Christopher Knutschke < cknoetschke@gmail.com >
mangle	Apache-2.0	Copyright (c) 2016-2021 VMware, Inc.
method-override 2.3.5	MIT	Copyright (c) 2014 Douglas Christopher Wilson < doug@somethingdoug.com > Copyright (c) 2014 Jonathan Ong < me@jongleberry.com >
minini	Apache-2.0	
moment 2.10.6	MIT	Copyright (c) 2011-2014 Tim Wood, Iskren Chernev, Moment.js contributors
morgan 1.6.1	MIT	Copyright (c) 2014 Jonathan Ong < me@jongleberry.com > Copyright (c) 2014-2015 Douglas Christopher Wilson < doug@somethingdoug.com >
mtdev 1.1.5	MIT	Copyright (C) 2010 Henrik Rydberg Copyright (C) 2010 Canonical Ltd.
ncurses 5.9	MIT-like License (ncurses)	Copyright (c) 1998-2004,2006 Free Software Foundation, Inc.
ndkit 0.0.3	MIT	Copyright (c) HOJUNG-AHN
nginx 1.10.3	BSD-2-Clause	Copyright (C) 2002-2016 Igor Sysoev Copyright (C) 2011-2016 Nginx, Inc.
node-compression 1.5.2	MIT	-
node-mime 1.3.4	MIT	Copyright (c) 2010 Benjamin Thomas, Robert Kieffer
node-npmdoc-connect-multiparty 2.0.0	MIT	Copyright (c) 2014 Kai Zhu (kaizhu256@gmail.com)
nodemailer 2.4.1	MIT	Copyright (c) 2011-2016 Andris Reinman
nodemailer-direct-transport 2.5.0	MIT	Copyright (c) 2014 Andris Reinman
npm 2.14.12	Artistic-2.0	Copyright (c) npm, Inc. and Contributors Copyright (c) 2000-2006, The Perl Foundation.
ntp 4.3.77	BSD-2-Clause NTP	Copyright (c) Network Time Foundation 2011-2015 Copyright (c) University of Delaware 1992-2015
openssl 1.1.1 or earlier	OpenSSL	Copyright (c) 1998-2017 The OpenSSL Project. Copyright (c) 1995-1998 Eric Young (eay@cryptsoft.com)
openssl 1.0.2k	OpenSSL	
openssl 1.0.2d	OpenSSL	
optee_client	BSD-2-Clause	Copyright (c) 2015, Linaro Limited
passport 0.3.0	MIT	Copyright (c) 2011-2015 Jared Hanson
passport-local-mongoose 1.0.0	MIT	Copyright (c) 2013 Christoph Walcher
path 0.12.7	MIT	Copyright (c) Joyent, Inc. and other Node contributors
pcre 8.36	BSD-3-Clause	Copyright (c) University of Cambridge Computing Service, Cambridge, England. Copyright (c) 1997-2012 University of Cambridge Copyright (c) 2009-2012 Zoltan Herczeg Copyright (c) 2007-2012, Google Inc.
perl 5.20.0	Artistic-1.0-Perl	Copyright (C) 1993-2014 by Larry Wall and others.
Pixman 0.32.6	MIT	Copyright (c) 2012 Hannes Flicka
aconvert-is 1.4.1	MIT	Copyright (c) 2016 Quantastica
read-chunk 2.0.0	MIT	Copyright (c) Sindre Sorhus < sindresorhus@gmail.com > (sindresorhus.com)
rpcbind 0.2.3	BSD-3-Clause	Copyright (c) 2005 Bull S.A.
serve-favicon 2.3.0	MIT	Copyright (c) 2010 Sencha Inc. Copyright (c) 2011 TJ Holowaychuk Copyright (c) 2011 LearnBoost Copyright (c) 2014-2015 Douglas Christopher Wilson
shadow 4.2.1	BSD-3-Clause	Copyright (c) 1989 - 1994, Julianne Frances Haugh Copyright (c) 1996 - 2001, Marek Michałkiewicz Copyright (c) 2001 - 2006, Tomasz Kłoczko Copyright (c) 2004 The FreeBSD Project Copyright (c) 1997, Guy Maor < maor@ece.utexas.edu > Copyright (c) 2007 - 2013, Nicolas François Copyright (c) 1991 - 1993, Chip Rosenthal
shelljs 0.6.0	BSD-3-Clause	Copyright (c) 2012, Artur Adib < aadib@mozilla.com >
slider 28.0.0	MIT	Copyright (c) 2018 jssor
sudo 1.8.11p2	MIT-like License (sudo)	
tcpdump 4.9.2	BSD-3-Clause	Copyright (c) 1998-2015, The Tcpdump Project

tiff 4.0.3	libtiff	Copyright (c) 1988-1997 Sam Leffler Copyright (c) 1991-1997 Silicon Graphics, Inc.
Trantor Standard System-base64	MIT	Copyright (c) Trantor Standard Systems Inc., 2001
useragent-parser 0.1.0	MIT	Copyright (c) 2012 Aleksej Gordejev <aleksej@gordejev.lv>
x2js 1.2.0	Apache-2.0	Copyright (c) 2011-2013 Abdulla Abdurakhmanov
xauth 1.0.9	The Open Group License	Copyright (c) 1985, 1988, 1998 , The Open Group
xdpyinfo 1.3.1	The Open Group License	Copyright (c) 1988, 1998, The Open Group Copyright (c) 2005, Hitachi, Ltd.
xhost 1.0.6	MIT	Copyright (c) 2004, Oracle and/or its affiliates.
xinput 1.6.1	MIT	Copyright (c) 2007, Peter Hutterer Copyright (c) 2009, Red Hat, Inc.
xinput_calibrator 0.7.5	MIT	Copyright (c) 2010 Tias Guns <tias@ulyssis.org> and others
xkbcomp 1.3.0	MIT-like License (xkbcomp)	
xmodmap 1.0.8	MIT	Copyright (c) 1987, 2010, Oracle and/or its affiliates
xorg-lib-libpciaccess 0.13.4	ISC MIT X11	Copyright (c) 2008 Juan Romero Pardines Copyright (c) 2008, 2011 Mark Kettenis Copyright (c) 2009 Michael Lorenz Copyright (c) 2009, 2012 Samuel Thibault Copyright (c) IBM Corporation 2006, 2007 Copyright (c) Eric Anholt 2006 Copyright (c) Mark Kettenis 2011 Copyright (c) Robert Millan 2012 Copyright (c) 2007, 2008, 2009, 2011, 2012, 2013 Oracle and/or its affiliates. Copyright (c) 2009, 2012 Red Hat, Inc. Copyright (c) 2007 Paulo R. Zanoni, Tiago Vignatti Copyright (c) 2009 Tiago Vignatti Copyright (c) 2000 The XFree86 Project, Inc.
xorg-lib-libXcursor 1.1.14	HPND	Copyright (c) 2002 Keith Packard
xorg-lib-libXdamage 1.1.4	HPND	Copyright (c) 2001,2003 Keith Packard Copyright (c) 2007 Eric Anholt
xorg-lib-libXdmcp 1.1.1	The Open Group License	Copyright (c) 1989, 1998 , The Open Group
xorg-lib-libXext 1.3.3	The Open Group License	Copyright (c) 1986, 1987, 1988, 1989, 1994, 1998 The Open Group
xorg-lib-libXfixes 5.0.1	HPND MIT	Copyright (c) 2001,2003, Keith Packard Copyright (c) 2006, Oracle and/or its affiliates.
xorg-lib-libXfont 1.5.0	BSD-2-Clause BSD-3-Clause MIT The Open Group License	Copyright (c) 1998-1999 Shunsuke Akiyama <akiyama@jp.freebsd.org>. Copyright (c) 1998-1999 X-TrueType Server Project, Copyright (c) 1991, 1993 The Regents of the University of California. Copyright (c) 2007 Red Hat, Inc Copyright (c) 2008, 2009, Oracle and/or its affiliates Copyright (c) 1997 by Mark Leisher Copyright (c) 1998-2003 by Juliusz Chroboczek Copyright (c) 1998 Go Watanabe Copyright (c) 1998 Kazushi (Jam) Marukawa Copyright (c) 1998 Takuya SHIOZAKI Copyright (c) 1998 X-TrueType Server Project Copyright (c) 2003-2004 After X-TT Project Copyright (c) 1990, 1998 The Open Group
xorg-lib-libXi 1.7.4	HPND	Copyright (c) 1989, Hewlett-Packard Company, Palo Alto, California.
xorg-lib-libXinerama 1.1.3	MIT The Open Group License X11	Copyright (c) 2007, Oracle and/or its affiliates. Copyright (c) 2003, The Open Group Copyright (c) 1991, 1997, Digital Equipment Corporation, Maynard, Massachusetts.
xorg-lib-libxkbfile 1.0.8	HPND	Copyright (c) 1987, Digital Equipment Corporation, Maynard, Massachusetts.
xorg-lib-libXtst 1.2.2	HPND The Open Group License X11	Copyright (c) 1995, Network Computing Devices Copyright (c) 2005, Red Hat, Inc. Copyright (c) 1992, UniSoft Group Ltd. Copyright (c) 1994, Network Computing Devices, Inc. Copyright (c) 1992, 1993, 1995, 1998, The Open Group Copyright (c) 1990, 1991, UniSoft Group Limited Copyright (c) 1992, 1994, 1995, X Consortium
xorg-lib-libXxf86misc 1.0.3	X11	Copyright (c) 1995, 1996, The XFree86 Project, Inc
xorg-lib-libXxf86vm 1.1.3	X11	Copyright (c) 1995 Kaleb S. KEITHLEY
xrandr 1.4.3	HPND	Copyright (c) 2001 Keith Packard, member of The XFree86 Project, Inc. Copyright (c) 2002 Hewlett Packard Company, Inc. Copyright (c) 2006 Intel Corporation
xserver 1.17.2	MIT-like License (xserver)	
xset 1.2.3	The Open Group License	Copyright (c) 1985, 1988, 1998, The Open Group
zlib 1.2.8	Zlib	Copyright (c) 1995-2013 Jean-loup Gailly and Mark Adler

IJG Attribution

This software is based in part on the work of the Independent JPEG Group.

InterBase Public License Attribution

This product includes software developed by Inprise Corporation.

OpenSSL Attribution

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)

AFL-2.1

The Academic Free License
v.2.1

This Academic Free License (the "License") applies to any original work of authorship (the "Original Work") whose owner (the "Licensor") has placed the following notice immediately following the copyright notice for the Original Work:

Licensed under the Academic Free License version 2.1

1) Grant of Copyright License. Licensor hereby grants You a world-wide, royalty-free, non-exclusive, perpetual, sublicenseable license to do the following:

- a) to reproduce the Original Work in copies;
- b) to prepare derivative works ("Derivative Works") based upon the Original Work;
- c) to distribute copies of the Original Work and Derivative Works to the public;
- d) to perform the Original Work publicly; and
- e) to display the Original Work publicly.

2) Grant of Patent License. Licensor hereby grants You a world-wide, royalty-free, non-exclusive, perpetual, sublicenseable license, under patent claims owned or controlled by the Licensor that are embodied in the Original Work as furnished by the Licensor, to make, use, sell and offer for sale the Original Work and Derivative Works.

3) Grant of Source Code License. The term "Source Code" means the preferred form of the Original Work for making modifications to it and all available documentation describing how to modify the Original Work. Licensor hereby agrees to provide a machine-readable copy of the Source Code of the Original Work along with each copy of the Original Work that Licensor distributes. Licensor reserves the right to satisfy this obligation by placing a machine-readable copy of the Source Code in an information repository reasonably calculated to permit inexpensive and convenient access by You for as long as Licensor continues to distribute the Original Work, and by publishing the address of that information repository in a notice immediately following the copyright notice that applies to the Original Work.

4) Exclusions From License Grant. Neither the names of Licensor, nor the names of any contributors to the Original Work, nor any of their trademarks or service marks, may be used to endorse or promote products derived from this Original Work without express prior written permission of the Licensor. Nothing in this License shall be deemed to grant any rights to trademarks, copyrights, patents, trade secrets or any other intellectual property of Licensor except as expressly stated herein. No patent license is granted to make, use, sell or offer to sell embodiments of any patent claims other than the licensed claims defined in Section 2. No right is granted to the trademarks of Licensor even if such marks are included in the Original Work. Nothing in this License shall be interpreted to prohibit Licensor from licensing under different terms from this License any Original Work that Licensor otherwise would have a right to license.

5) This section intentionally omitted.

6) Attribution Rights. You must retain, in the Source Code of any Derivative Works that You create, all copyright, patent or trademark notices from the Source Code of the Original Work, as well as any notices of licensing and any descriptive text identified therein as an "Attribution Notice." You must cause the Source Code for any Derivative Works that You create to carry a prominent Attribution Notice reasonably calculated to inform recipients that You have modified the Original Work.

7) Warranty of Provenance and Disclaimer of Warranty. Licensor warrants that the copyright in and to the Original Work and the patent rights granted herein by Licensor are owned by the Licensor or are sublicensed to You under the terms of this License with the permission of the contributor(s) of those copyrights and patent rights. Except as expressly stated in the immediately preceding sentence, the Original Work is provided under this License on an "AS IS" BASIS and WITHOUT WARRANTY, either express or implied, including, without limitation, the warranties of NON-INFRINGEMENT, MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY OF THE ORIGINAL WORK IS WITH YOU. This DISCLAIMER OF WARRANTY constitutes an essential part of this License. No license to Original Work is granted hereunder except under this disclaimer.

8) Limitation of Liability. Under no circumstances and under no legal theory, whether in tort (including negligence), contract, or otherwise, shall the Licensor be liable to any person for any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or the use of the Original Work including, without limitation, damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses. This limitation of liability shall not apply to liability for death or personal injury resulting from Licensor's negligence to the extent applicable law prohibits such limitation. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion and limitation may not apply to You.

9) Acceptance and Termination. If You distribute copies of the Original Work or a Derivative Work, You must make a reasonable effort under the circumstances to obtain the express assent of recipients to the terms of this License. Nothing else but this License (or another written agreement between Licensor and You) grants You permission to create Derivative Works based upon the Original Work or to exercise any of the rights granted in Section 1 herein, and any attempt to do so except under the terms of this License (or another written agreement between Licensor and You) is expressly prohibited by U.S. copyright law, the equivalent laws of other countries, and by international treaty. Therefore, by exercising any of the rights granted to You in Section 1 herein, You indicate Your acceptance of this License and all of its terms and conditions.

10) Termination for Patent Action. This License shall terminate automatically and You may no longer exercise any of the rights granted to You by this License as of the date You commence an action, including a cross-claim or counterclaim, against Licensor or any licensee alleging that the Original Work infringes a patent. This termination provision shall not apply for an action alleging patent infringement by combinations of the Original Work with other software or hardware.

11) Jurisdiction, Venue and Governing Law. Any action or suit relating to this License may be brought only in the courts of a jurisdiction wherein the Licensor resides or in which Licensor conducts its primary business, and under the laws of that jurisdiction excluding its conflict-of-law provisions. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any use of the Original Work outside the scope of this License or after its termination shall be subject to the requirements and penalties of the U.S. Copyright Act, 17 U.S.C. § 101 et seq., the equivalent laws of other countries, and international treaty. This section shall survive the termination of this License.

12) Attorneys Fees. In any action to enforce the terms of this License or seeking damages relating thereto, the prevailing party shall be entitled to recover its costs and expenses, including, without limitation, reasonable attorneys' fees and costs incurred in connection with such action, including any appeal of such action. This section shall survive the termination of this License.

13) Miscellaneous. This License represents the complete agreement concerning the subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable.

14) Definition of "You" in This License. "You" throughout this License, whether in upper or lower case, means an individual or a legal entity exercising rights under, and complying with all of the terms of, this License. For legal entities, "You" includes any entity that controls, is controlled by, or is under common control with you. For purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

15) Right to Use. You may use the Original Work in all ways not otherwise restricted or conditioned by this License or by law, and Licensor promises not to interfere with or be responsible for such

uses by You.

This license is Copyright (C) 2003-2004 Lawrence E. Rosen. All rights reserved.

Permission is hereby granted to copy and distribute this license without modification. This license may not be modified without the express written permission of its copyright owner.

Apache-2.0

Apache License
Version 2.0, January 2004
<http://www.apache.org/licenses/>

TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition, "control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Licensed under the Apache License, Version 2.0 (the "License");
you may not use this file except in compliance with the License.
You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software
distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.

Artistic-1.0-Perl

The "Artistic License"

Preamble

The intent of this document is to state the conditions under which a Package may be copied, such that the Copyright Holder maintains some semblance of artistic control over the development of the package, while giving the users of the package the right to use and distribute the Package in a more-or-less customary fashion, plus the right to make reasonable modifications.

Definitions:

"Package" refers to the collection of files distributed by the Copyright Holder, and derivatives of that collection of files created through textual modification.

"Standard Version" refers to such a Package if it has not been modified, or has been modified in accordance with the wishes of the Copyright Holder as specified below.

"Copyright Holder" is whoever is named in the copyright or copyrights for the package.

"You" is you, if you're thinking about copying or distributing this Package.

"Reasonable copying fee" is whatever you can justify on the basis of media cost, duplication charges, time of people involved, and so on. (You will not be required to justify it to the Copyright Holder, but only to the computing community at large as a market that must bear the fee.)

"Freely Available" means that no fee is charged for the item itself, though there may be fees involved in handling the item. It also means that recipients of the item may redistribute it under the same conditions they received it.

1. You may make and give away verbatim copies of the source form of the Standard Version of this Package without restriction, provided that you duplicate all of the original copyright notices and associated disclaimers.

2. You may apply bug fixes, portability fixes and other modifications derived from the Public Domain or from the Copyright Holder. A Package modified in such a way shall still be considered the Standard Version.

3. You may otherwise modify your copy of this Package in any way, provided that you insert a prominent notice in each changed file stating how and when you changed that file, and provided that you do at least ONE of the following:

a) place your modifications in the Public Domain or otherwise make them Freely Available, such as by posting said modifications to Usenet or an equivalent medium, or placing the modifications on a major archive site such as uunet.uu.net, or by allowing the Copyright Holder to include your modifications in the Standard Version of the Package.

b) use the modified Package only within your corporation or organization.

c) rename any non-standard executables so the names do not conflict with standard executables, which must also be provided, and provide a separate manual page for each non-standard executable that clearly documents how it differs from the Standard Version.

d) make other distribution arrangements with the Copyright Holder.

4. You may distribute the programs of this Package in object code or executable form, provided that you do at least ONE of the following:

a) distribute a Standard Version of the executables and library files, together with instructions (in the manual page or equivalent) on where to get the Standard Version.

b) accompany the distribution with the machine-readable source of the Package with your modifications.

c) give non-standard executables non-standard names, and clearly document the differences in manual pages (or equivalent), together with instructions on where to get the Standard Version.

d) make other distribution arrangements with the Copyright Holder.

5. You may charge a reasonable copying fee for any distribution of this Package. You may charge any fee you choose for support of this Package. You may not charge a fee for this Package itself. However, you may distribute this Package in aggregate with other (possibly commercial) programs as part of a larger (possibly commercial) software distribution provided that you do not advertise this Package as a product of your own. You may embed this Package's interpreter within an executable of yours (by linking); this shall be construed as a mere form of aggregation, provided that the complete Standard Version of the interpreter is so embedded.

6. The scripts and library files supplied as input to or produced as output from the programs of this Package do not automatically fall under the copyright of this Package, but belong to whoever generated them, and may be sold commercially, and may be aggregated with this Package. If such scripts or library files are aggregated with this Package via the so-called "undump" or "unexec" methods of producing a binary executable image, then distribution of such an image shall neither be construed as a distribution of this Package nor shall it fall under the restrictions of Paragraphs 3 and 4, provided that you do not represent such an executable image as a Standard Version of this Package.

7. C subroutines (or comparably compiled subroutines in other languages) supplied by you and linked into this Package in order to emulate subroutines and variables of the language defined by this Package shall not be considered part of this Package, but are the equivalent of input as in Paragraph 6, provided these subroutines do not change the language in any way that would cause it to fail the regression tests for the language.

8. Aggregation of this Package with a commercial distribution is always permitted provided that the use of this Package is embedded; that is, when no overt attempt is made to make this Package's interfaces visible to the end user of the commercial distribution. Such use shall not be construed as a distribution of this Package.

9. The name of the Copyright Holder may not be used to endorse or promote products derived from this software without specific prior written permission.

10. THIS PACKAGE IS PROVIDED "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

The End

Artistic-2.0

The Artistic License 2.0

Copyright (c) 2000-2006, The Perl Foundation.

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

This license establishes the terms under which a given free software Package may be copied, modified, distributed, and/or redistributed. The intent is that the Copyright Holder maintains some artistic control over the development of that Package while still keeping the Package available as open source and free software.

You are always permitted to make arrangements wholly outside of this license directly with the Copyright Holder of a given Package. If the terms of this license do not permit the full use that you propose to make of the Package, you should contact the Copyright Holder and seek a different licensing arrangement.

Definitions

"Copyright Holder" means the individual(s) or organization(s) named in the copyright notice for the entire Package.

"Contributor" means any party that has contributed code or other material to the Package, in accordance with the Copyright Holder's procedures.

"You" and "your" means any person who would like to copy, distribute, or modify the Package.

"Package" means the collection of files distributed by the Copyright Holder, and derivatives of that collection and/or of those files. A given Package may consist of either the Standard Version, or a Modified Version.

"Distribute" means providing a copy of the Package or making it accessible to anyone else, or in the case of a company or organization, to others outside of your company or organization.

"Distributor Fee" means any fee that you charge for Distributing this Package or providing support for this Package to another party. It does not mean licensing fees.

"Standard Version" refers to the Package if it has not been modified, or has been modified only in ways explicitly requested by the Copyright Holder.

"Modified Version" means the Package, if it has been changed, and such changes were not explicitly requested by the Copyright Holder.

"Original License" means this Artistic License as Distributed with the Standard Version of the Package, in its current version or as it may be modified by The Perl Foundation in the future.

"Source" form means the source code, documentation source, and configuration files for the Package.

"Compiled" form means the compiled bytecode, object code, binary, or any other form resulting from mechanical transformation or translation of the Source form.

Permission for Use and Modification Without Distribution

(1) You are permitted to use the Standard Version and create and use Modified Versions for any purpose without restriction, provided that you do not Distribute the Modified Version.

Permissions for Redistribution of the Standard Version

(2) You may Distribute verbatim copies of the Source form of the Standard Version of this Package in any medium without restriction, either gratis or for a Distributor Fee, provided that you duplicate all of the original copyright notices and associated disclaimers. At your discretion, such verbatim copies may or may not include a Compiled form of the Package.

(3) You may apply any bug fixes, portability changes, and other modifications made available from the Copyright Holder. The resulting Package will still be considered the Standard Version, and as such will be subject to the Original License.

Distribution of Modified Versions of the Package as Source

(4) You may Distribute your Modified Version as Source (either gratis or for a Distributor Fee, and with or without a Compiled form of the Modified Version) provided that you clearly document how it differs from the Standard Version, including, but not limited to, documenting any non-standard features, executables, or modules, and provided that you do at least ONE of the following:

- (a) make the Modified Version available to the Copyright Holder of the Standard Version, under the Original License, so that the Copyright Holder may include your modifications in the Standard Version.
- (b) ensure that installation of your Modified Version does not prevent the user installing or running the Standard Version. In addition, the Modified Version must bear a name that is different from the name of the Standard Version.
- (c) allow anyone who receives a copy of the Modified Version to make the Source form of the Modified Version available to others under

- (i) the Original License or
- (ii) a license that permits the licensee to freely copy, modify and redistribute the Modified Version using the same licensing terms that apply to the copy that the licensee received, and requires that the Source form of the Modified Version, and of any works derived from it, be made freely available in that license fees are prohibited but Distributor Fees are allowed.

Distribution of Compiled Forms of the Standard Version or Modified Versions without the Source

(5) You may Distribute Compiled forms of the Standard Version without the Source, provided that you include complete instructions on how to get the Source of the Standard Version. Such instructions must be valid at the time of your distribution. If these instructions, at any time while you are carrying out such distribution, become invalid, you must provide new instructions on demand or cease further distribution. If you provide valid instructions or cease distribution within thirty days after you become aware that the instructions are invalid, then you do not forfeit any of your rights under this license.

(6) You may Distribute a Modified Version in Compiled form without the Source, provided that you comply with Section 4 with respect to the Source of the Modified Version.

Aggregating or Linking the Package

(7) You may aggregate the Package (either the Standard Version or Modified Version) with other packages and Distribute the resulting aggregation provided that you do not charge a licensing fee for the Package. Distributor Fees are permitted, and licensing fees for other components in the aggregation are permitted. The terms of this license apply to the use and Distribution of the Standard or Modified Versions as included in the aggregation.

(8) You are permitted to link Modified and Standard Versions with other works, to embed the Package in a larger work of your own, or to build stand-alone binary or bytecode versions of applications that include the Package, and Distribute the result without restriction, provided the result does not expose a direct interface to the Package.

Items That are Not Considered Part of a Modified Version

(9) Works (including, but not limited to, modules and scripts) that merely extend or make use of the Package, do not, by themselves, cause the Package to be a Modified Version. In addition, such works are not considered parts of the Package itself, and are not subject to the terms of this license.

General Provisions

(10) Any use, modification, and distribution of the Standard or Modified Versions is governed by this Artistic License. By using, modifying or distributing the Package, you accept this license. Do not use, modify, or distribute the Package, if you do not accept this license.

(11) If your Modified Version has been derived from a Modified Version made by someone other than you, you are nevertheless required to ensure that your Modified Version complies with the requirements of this license.

(12) This license does not grant you the right to use any trademark, service mark, tradename, or logo of the Copyright Holder.

(13) This license includes the non-exclusive, worldwide, free-of-charge patent license to make, have made, use, offer to sell, sell, import and otherwise transfer the Package with respect to any patent claims licensable by the Copyright Holder that are necessarily infringed by the Package. If you institute patent litigation (including a cross-claim or counterclaim) against any party alleging that the Package constitutes direct or contributory patent infringement, then this Artistic License to you shall terminate on the date that such litigation is filed.

(14) Disclaimer of Warranty:

THE PACKAGE IS PROVIDED BY THE COPYRIGHT HOLDER AND CONTRIBUTORS "AS IS' AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES. THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT ARE DISCLAIMED TO THE EXTENT PERMITTED BY YOUR LOCAL LAW. UNLESS REQUIRED BY LAW, NO COPYRIGHT HOLDER OR CONTRIBUTOR WILL BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING IN ANY WAY OUT OF THE USE OF THE PACKAGE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

BSD-2-Clause

Copyright (c) <year> <owner> All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

BSD-3-Clause

Copyright (c) <year> <owner>. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. Neither the name of the copyright holder nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

BSD-like License (file)

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice immediately at the beginning of the file, without modification, this list of conditions, and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

EDL 1.0

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

- Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

- Neither the name of the Eclipse Foundation, Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

FTL

The FreeType Project LICENSE

2006-Jan-27

Copyright 1996-2002, 2006 by David Turner, Robert Wilhelm, and Werner Lemberg

Introduction

The FreeType Project is distributed in several archive packages; some of them may contain, in addition to the FreeType font engine, various tools and contributions which rely on, or relate to, the FreeType Project.

This license applies to all files found in such packages, and which do not fall under their own explicit license. The license affects thus the FreeType font engine, the test programs, documentation and makefiles, at the very least.

This license was inspired by the BSD, Artistic, and IJG (Independent JPEG Group) licenses, which all encourage inclusion and use of free software in commercial and freeware products alike. As a consequence, its main points are that:

o We don't promise that this software works. However, we will be interested in any kind of bug reports. ('as is' distribution)

o You can use this software for whatever you want, in parts or full form, without having to pay us. ('royalty-free' usage)

o You may not pretend that you wrote this software. If you use it, or only parts of it, in a program, you must acknowledge somewhere in your documentation that you have used the FreeType code. ('credits')

We specifically permit and encourage the inclusion of this software, with or without modifications, in commercial products. We disclaim all warranties covering The FreeType Project and assume no liability related to The FreeType Project.

Finally, many people asked us for a preferred form for a credit/disclaimer to use in compliance with this license. We thus encourage you to use the following text:

"" Portions of this software are copyright © <year> The FreeType Project (www.freetype.org). All rights reserved. """

Please replace <year> with the value from the FreeType version you actually use.

Legal Terms

0. Definitions

Throughout this license, the terms 'package', 'FreeType Project', and 'FreeType archive' refer to the set of files originally distributed by the authors (David Turner, Robert Wilhelm, and Werner Lemberg) as the 'FreeType Project', be they named as alpha, beta or final release.

'You' refers to the licensee, or person using the project, where 'using' is a generic term including compiling the project's source code as well as linking it to form a 'program' or 'executable'. This program is referred to as 'a program using the FreeType engine'.

This license applies to all files distributed in the original FreeType Project, including all source code, binaries and documentation, unless otherwise stated in the file in its original, unmodified form as distributed in the original archive. If you are unsure whether or not a particular file is covered by this license, you must contact us to verify this.

The FreeType Project is copyright (C) 1996-2000 by David Turner, Robert Wilhelm, and Werner Lemberg. All rights reserved except as specified below.

1. No Warranty

THE FREETYPE PROJECT IS PROVIDED 'AS IS' WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT WILL ANY OF THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY DAMAGES CAUSED BY THE USE OR THE INABILITY TO USE, OF THE FREETYPE PROJECT.

2. Redistribution

This license grants a worldwide, royalty-free, perpetual and irrevocable right and license to use, execute, perform, compile, display, copy, create derivative works of, distribute and sublicense the FreeType Project (in both source and object code forms) and derivative works thereof for any purpose; and to authorize others to exercise some or all of the rights granted herein, subject to the following conditions:

o Redistribution of source code must retain this license file ('FTL.TXT') unaltered; any additions, deletions or changes to the original files must be clearly indicated in accompanying documentation. The copyright notices of the unaltered, original files must be preserved in all copies of source files.

o Redistribution in binary form must provide a disclaimer that states that the software is based in part of the work of the FreeType Team, in the distribution documentation. We also encourage you to put an URL to the FreeType web page in your documentation, though this isn't mandatory.

These conditions apply to any software derived from or based on the FreeType Project, not just the unmodified files. If you use our work, you must acknowledge us. However, no fee need be paid to us.

3. Advertising

Neither the FreeType authors and contributors nor you shall use the name of the other for commercial, advertising, or promotional purposes without specific prior written permission.

We suggest, but do not require, that you use one or more of the following phrases to refer to this software in your documentation or advertising materials: 'FreeType Project', 'FreeType Engine', 'FreeType library', or 'FreeType Distribution'.

As you have not signed this license, you are not required to accept it. However, as the FreeType Project is copyrighted material, only this license, or another one contracted with the authors, grants you the right to use, distribute, and modify it. Therefore, by using, distributing, or modifying the FreeType Project, you indicate that you understand and accept all the terms of this license.

4. Contacts

There are two mailing lists related to FreeType:

o freetype@nongnu.org

Discusses general use and applications of FreeType, as well as future and wanted additions to the library and distribution. If you are looking for support, start in this list if you haven't found anything to help you in the documentation.

o freetype-devel@nongnu.org

Discusses bugs, as well as engine internals, design issues, specific licenses, porting, etc.

Our home page can be found at

<http://www.freetype.org>

--- end of FTL.TXT ---

GPL-2.0

GNU GENERAL PUBLIC LICENSE Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

one line to give the program's name and an idea of what it does. Copyright (C) yyyy name of author

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA. Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are welcome to redistribute it under certain conditions; type `show c' for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program 'Gnomovision' (which makes passes at compilers) written by James Hacker.

signature of Ty Coon, 1 April 1989 Ty Coon, President of Vice

GPL-2.0-with-eCos-exception-2.0

GNU GENERAL PUBLIC LICENSE
Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

one line to give the program's name and an idea of what it does. Copyright (C) yyyy name of author

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301, USA. Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type 'show w'. This is free software, and you are welcome to redistribute it under certain conditions; type 'show c' for details.

The hypothetical commands 'show w' and 'show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than 'show w' and 'show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the program 'Gnomovision' (which makes passes at compilers) written by James Hacker.

signature of Ty Coon, 1 April 1989 Ty Coon, President of Vice

As a special exception, if other files instantiate templates or use macros or inline functions from this file, or you compile this file and link it with other works to produce a work based on this file, this file does not by itself cause the resulting work to be covered by the GNU General Public License. However the source code for this file must still be made available in accordance with section (3) of the GNU General Public License v2.

This exception does not invalidate any other reasons why a work based on this file might be covered by the GNU General Public License.

HPND

Permission to use, copy, modify and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies[,] [and] that both [that] [the] copyright notice and this permission notice appear in supporting documentation[, and that the name [of] <copyright holder> [or <related entities>] not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission]. [<copyright holder> makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.]

[<copyright holder> DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS[,.] IN NO EVENT SHALL <copyright holder> BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.]

ICU

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, provided that the above copyright notice(s) and this permission notice appear in all copies of the Software and that both the above copyright notice(s) and this permission notice appear in supporting documentation.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

IJG

Independent JPEG Group License

LEGAL ISSUES

In plain English:

1. We don't promise that this software works. (But if you find any bugs, please let us know!)
2. You can use this software for whatever you want. You don't have to pay us.
3. You may not pretend that you wrote this software. If you use it in a program, you must acknowledge somewhere in your documentation that you've used the IJG code.

In legalese:

The authors make NO WARRANTY or representation, either express or implied, with respect to this software, its quality, accuracy, merchantability, or fitness for a particular purpose. This software is provided "AS IS", and you, its user, assume the entire risk as to its quality and accuracy.

This software is copyright (C) 1991-1998, Thomas G. Lane. All Rights Reserved except as specified below.

Permission is hereby granted to use, copy, modify, and distribute this software (or portions thereof) for any purpose, without fee, subject to these conditions:

- (1) If any part of the source code for this software is distributed, then this README file must be included, with this copyright and no-warranty notice unaltered; and any additions, deletions, or changes to the original files must be clearly indicated in accompanying documentation.
- (2) If only executable code is distributed, then the accompanying documentation must state that "this software is based in part on the work of the Independent JPEG Group".
- (3) Permission for use of this software is granted only if the user accepts full responsibility for any undesirable consequences; the authors accept NO LIABILITY for damages of any kind.

These conditions apply to any software derived from or based on the IJG code, not just to the unmodified library. If you use our work, you ought to acknowledge us.

Permission is NOT granted for the use of any IJG author's name or company name in advertising or publicity relating to this software or products derived from it. This software may be referred to

ii) the combination of the Original Code with other software or devices.

2.2. Contributor Grant. Subject to third party intellectual property claims, each Contributor hereby grants You a world-wide, royalty-free, non-exclusive license

(a) under intellectual property rights (other than patent or trademark) Licensable by Contributor, to use, reproduce, modify, display, perform, sublicense and distribute the Modifications created by such Contributor (or portions thereof) either on an unmodified basis, with other Modifications, as Covered Code and/or as part of a Larger Work; and

(b) under Patent Claims infringed by the making, using, or selling of Modifications made by that Contributor either alone and/or in combination with its Contributor Version (or portions of such combination), to make, use, sell, offer for sale, have made, and/or otherwise dispose of: 1) Modifications made by that Contributor (or portions thereof); and 2) the combination of Modifications made by that Contributor with its Contributor Version (or portions of such combination).

(c) the licenses granted in Sections 2.2(a) and 2.2(b) are effective on the date Contributor first makes Commercial Use of the Covered Code.

(d) Notwithstanding Section 2.2(b) above, no patent license is granted:

1) for any code that Contributor has deleted from the Contributor Version;

2) separate from the Contributor Version;

3) for infringements caused by: i) third party modifications of Contributor Version or

ii) the combination of Modifications made by that Contributor with other software (except as part of the Contributor Version) or other devices; or

4) under Patent Claims infringed by Covered Code in the absence of Modifications made by that Contributor.

3. Distribution Obligations.

3.1. Application of License. The Modifications which You create or to which You contribute are governed by the terms of this License, including without limitation Section 2.2. The Source Code version of Covered Code may be distributed only under the terms of this License or a future version of this License released under Section 6.1, and You must include a copy of this License with every copy of the Source Code You distribute. You may not offer or impose any terms on any Source Code version that alters or restricts the applicable version of this License or the recipients' rights hereunder. However, You may include an additional document offering the additional rights described in Section 3.5.

3.2. Availability of Source Code. Any Modification which You create or to which You contribute must be made available in Source Code form under the terms of this License either on the same media as an Executable version or via an accepted Electronic Distribution Mechanism to anyone to whom you made an Executable version available; and if made available via Electronic Distribution Mechanism, must remain available for at least twelve (12) months after the date it initially became available, or at least six (6) months after a subsequent version of that particular Modification has been made available to such recipients. You are responsible for ensuring that the Source Code version remains available even if the Electronic Distribution Mechanism is maintained by a third party.

3.3. Description of Modifications. You must cause all Covered Code to which You contribute to contain a file documenting the changes You made to create that Covered Code and the date of any change. You must include a prominent statement that the Modification is derived, directly or indirectly, from Original Code provided by the Initial Developer and including the name of the Initial Developer in

(a) the Source Code, and

(b) in any notice in an Executable version or related documentation in which You describe the origin or ownership of the Covered Code.

3.4. Intellectual Property Matters

a) Third Party Claims. If Contributor has knowledge that a license under a third party's intellectual property rights is required to exercise the rights granted by such Contributor under Sections 2.1 or 2.2, Contributor must include a text file with the Source Code distribution titled "LEGAL" which describes the claim and the party making the claim in sufficient detail that a recipient will know whom to contact. If Contributor obtains such knowledge after the Modification is made available as described in Section 3.2, Contributor shall promptly modify the LEGAL file in all copies Contributor makes available thereafter and shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to inform those who received the Covered Code that new knowledge has been obtained.

(b) Contributor APIs. If Contributor's Modifications include an application programming interface and Contributor has knowledge of patent licenses which are reasonably necessary to implement that API, Contributor must also include this information in the LEGAL file.

(c) Representations. Contributor represents that, except as disclosed pursuant to Section 3.4(a) above, Contributor believes that Contributor's Modifications are Contributor's original creation(s) and/or Contributor has sufficient rights to grant the rights conveyed by this License.

3.5. Required Notices. You must duplicate the notice in Exhibit A in each file of the Source Code. If it is not possible to put such notice in a particular Source Code file due to its structure, then You must include such notice in a location (such as a relevant directory) where a user would be likely to look for such a notice. If You created one or more Modification(s) You may add your name as a Contributor to the notice described in Exhibit A. You must also duplicate this License in any documentation for the Source Code where You describe recipients' rights or ownership rights relating to Covered Code. You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations to one or more recipients of Covered Code. However, You may do so only on Your own behalf, and not on behalf of the Initial Developer or any Contributor. You must make it absolutely clear than any such warranty, support, indemnity or liability obligation is offered by You alone, and You hereby agree to indemnify the Initial Developer and every Contributor for any liability incurred by the Initial Developer or such Contributor as a result of warranty, support, indemnity or liability terms You offer.

3.6. Distribution of Executable Versions. You may distribute Covered Code in Executable form only if the requirements of Section 3.1-3.5 have been met for that Covered Code, and if You include a notice stating that the Source Code version of the Covered Code is available under the terms of this License, including a description of how and where You have fulfilled the obligations of Section 3.2. The notice must be conspicuously included in any notice in an Executable version, related documentation or collateral in which You describe recipients' rights relating to the Covered Code. You may distribute the Executable version of Covered Code or ownership rights under a license of Your choice, which may contain terms different from this License, provided that You are in compliance with the terms of this License and that the license for the Executable version does not attempt to limit or alter the recipient's rights in the Source Code version from the rights set forth in this License. If You distribute the Executable version under a different license You must make it absolutely clear that any terms which differ from this License are offered by You alone, not by the Initial Developer or any Contributor. You hereby agree to indemnify the Initial Developer and every Contributor for any liability incurred by the Initial Developer or such Contributor as a result of any such terms You offer.

3.7. Larger Works. You may create a Larger Work by combining Covered Code with other code not governed by the terms of this License and distribute the Larger Work as a single product. In such a case, You must make sure the requirements of this License are fulfilled for the Covered Code.

4. Inability to Comply Due to Statute or Regulation.

If it is impossible for You to comply with any of the terms of this License with respect to some or all of the Covered Code due to statute, judicial order, or regulation then You must:

(a) comply with the terms of this License to the maximum extent possible; and

(b) describe the limitations and the code they affect. Such description must be included in the LEGAL file described in Section 3.4 and must be included with all distributions of the Source Code. Except to the extent prohibited by statute or regulation, such description must be sufficiently detailed for a recipient of ordinary skill to be able to understand it.

5. Application of this License.

This License applies to code to which the Initial Developer has attached the notice in Exhibit A and to related Covered Code.

6. Versions of the License.

6.1. New Versions. The Initial Developer of this code may publish revised and/or new versions of the License from time to time. Each version will be given a distinguishing version number.

6.2. Effect of New Versions. Once Covered Code has been published under a particular version of the License, You may always continue to use it under the terms of that version. You may also choose to use such Covered Code under the terms of any subsequent version of the License published by the Initial Developer. No one other than the Initial Developer has the right to modify the terms applicable to Covered Code created under this License.

6.3. Derivative Works. If You create or use a modified version of this License (which you may only do in order to apply it to code which is not already Covered Code governed by this License), You must

(a) rename Your license so that the phrases "Mozilla", "MOZILLAPL", "MOZPL", "Netscape", "MPL", "NPL", or any confusingly similar phrases do not appear in your license (except to note that your license differs from this License) and

(b) otherwise make it clear that Your version of the license contains terms which differ from the Mozilla Public License and Netscape Public License. (Filling in the name of the Initial Developer, Original Code or Contributor in the notice described in Exhibit A shall not of themselves be deemed to be modifications of this License.)

6.4 Origin of the Initial Developer's Public License. The Initial Developer's Public License is based on the Mozilla Public License V 1.1 with the following changes:

- 1) The license is published by the Initial Developer of this code. Only the Initial Developer can modify the terms applicable to Covered Code.
- 2) The license can be modified and used for code which is not already governed by this license. Modified versions of the license must be renamed to avoid confusion with the Initial Developer's Public License and must include a description of changes from the Initial Developer's Public License.
- 3) The name of the license in Exhibit A is the "Initial Developer's Public License".
- 4) The reference to an alternative license in Exhibit A has been removed .
- 5) Amendments I, II, III, V, and VI have been deleted.
- 6) Exhibit A, Netscape Public License has been deleted

7. DISCLAIMER OF WARRANTY.

COVERED CODE IS PROVIDED UNDER THIS LICENSE ON AN "AS IS" BASIS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE COVERED CODE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE COVERED CODE IS WITH YOU. SHOULD ANY COVERED CODE PROVE DEFECTIVE IN ANY RESPECT, YOU (NOT THE INITIAL DEVELOPER OR ANY OTHER CONTRIBUTOR) ASSUME THE COST OF ANY NECESSARY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY COVERED CODE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

8. TERMINATION.

8.1. This License and the rights granted hereunder will terminate automatically if You fail to comply with terms herein and fail to cure such breach within 30 days of becoming aware of the breach. All sublicenses to the Covered Code which are properly granted shall survive any termination of this License. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

8.2. If You initiate litigation by asserting a patent infringement claim (excluding declaratory judgment actions) against Initial Developer or a Contributor (the Initial Developer or Contributor against whom You file such action is referred to as "Participant") alleging that:

(a) such Participant's Contributor Version directly or indirectly infringes any patent, then any and all rights granted by such Participant to You under Sections 2.1 and/or 2.2 of this License shall, upon 60 days notice from Participant terminate prospectively, unless if within 60 days after receipt of notice You either:

- (i) agree in writing to pay Participant a mutually agreeable reasonable royalty for Your past and future use of Modifications made by such Participant, or
- (ii) withdraw Your litigation claim with respect to the Contributor Version against such Participant.

If within 60 days of notice, a reasonable royalty and payment arrangement are not mutually agreed upon in writing by the parties or the litigation claim is not withdrawn, the rights granted by Participant to You under Sections 2.1 and/or 2.2 automatically terminate at the expiration of the 60 day notice period specified above.

(b) any software, hardware, or device, other than such Participant's Contributor Version, directly or indirectly infringes any patent, then any rights granted to You by such Participant under Sections 2.1(b) and 2.2(b) are revoked effective as of the date You first made, used, sold, distributed, or had made, Modifications made by that Participant.

8.3. If You assert a patent infringement claim against Participant alleging that such Participant's Contributor Version directly or indirectly infringes any patent where such claim is resolved (such as by license or settlement) prior to the initiation of patent infringement litigation, then the reasonable value of the licenses granted by such Participant under Sections 2.1 or 2.2 shall be taken into account in determining the amount or value of any payment or license.

8.4. In the event of termination under Sections 8.1 or 8.2 above, all end user license agreements (excluding distributors and resellers) which have been validly granted by You or any distributor hereunder prior to termination shall survive termination.

9. LIMITATION OF LIABILITY.

UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, SHALL YOU, THE INITIAL DEVELOPER, ANY OTHER CONTRIBUTOR, OR ANY DISTRIBUTOR OF COVERED CODE, OR ANY SUPPLIER OF ANY OF SUCH PARTIES, BE LIABLE TO ANY PERSON FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF GOODWILL, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION, OR ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSSES, EVEN IF SUCH PARTY SHALL HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM SUCH PARTY'S NEGLIGENCE TO THE EXTENT APPLICABLE LAW PROHIBITS SUCH LIMITATION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THIS EXCLUSION AND LIMITATION MAY NOT APPLY TO YOU.

10. U.S. GOVERNMENT END USERS.

The Covered Code is a "commercial item", as that term is defined in 48 C.F.R. 2.101 (Oct. 1995), consisting of "commercial computer software" and "commercial computer software documentation", as such terms are used in 48 C.F.R. 12.212 (Sept. 1995). Consistent with 48 C.F.R. 12.212 and 48 C.F.R. 227.7202-1 through 227.7202-4 (June 1995), all U.S. Government End Users acquire Covered Code with only those rights set forth herein.

11. MISCELLANEOUS.

This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable. This License shall be governed by California law provisions (except to the extent applicable law, if any, provides otherwise), excluding its conflict-of-law provisions. With respect to disputes in which at least one party is a citizen of, or an entity chartered or registered to do business in the United States of America, any litigation relating to this License shall be subject to the jurisdiction of the Federal Courts of the Northern District of California, with venue lying in Santa Clara County, California, with the losing party responsible for costs, including without limitation, court costs and reasonable attorneys' fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not apply to this License.

12. RESPONSIBILITY FOR CLAIMS.

As between Initial Developer and the Contributors, each party is responsible for claims and damages arising, directly or indirectly, out of its utilization of rights under this License and You agree to work with Initial Developer and Contributors to distribute such responsibility on an equitable basis. Nothing herein is intended or shall be deemed to constitute any admission of liability.

13. MULTIPLE-LICENSED CODE.

Initial Developer may designate portions of the Covered Code as "Multiple-Licensed". "Multiple-Licensed" means that the Initial Developer permits you to utilize portions of the Covered Code under Your choice of the IDPL or the alternative licenses, if any, specified by the Initial Developer in the file described in Exhibit A.

EXHIBIT A -Initial Developer's Public License.

The contents of this file are subject to the Initial Developer's Public License Version 1.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License from the Firebird Project website, at <http://www.firebirdsql.org/en/initial-developer-s-public-license-version-1-0/>

Software distributed under the License is distributed on an "AS IS" basis, WITHOUT WARRANTY OF ANY KIND, either express or implied. See the License for the specific language governing rights and limitations under the License.

The Original Code is _____.

The Initial Developer of the Original Code is _____.

Portions created by _____
are Copyright (C) _____.

All Rights Reserved.

Contributor(s): _____.

InterBase Public License

INTERBASE PUBLIC LICENSE

Version 1.0

1. Definitions.

1.0.1. "Commercial Use" means distribution or otherwise making the Covered Code available to a third party.

1.1. "Contributor" means each entity that creates or contributes to the creation of Modifications.

1.2. "Contributor Version" means the combination of the Original Code, prior Modifications used by a Contributor, and the Modifications made by that particular Contributor.

1.3. "Covered Code" means the Original Code or Modifications or the combination of the Original Code and Modifications, in each case including portions thereof.

1.4. "Electronic Distribution Mechanism" means a mechanism generally accepted in the software development community for the electronic transfer of data.

1.5. "Executable" means Covered Code in any form other than Source Code.

1.6. "Initial Developer" means the individual or entity identified as the Initial Developer in the Source Code notice required by Exhibit A.

1.7. "Larger Work" means a work which combines Covered Code or portions thereof with code not governed by the terms of this License.

1.8. "License" means this document.

1.8.1. "Licensable" means having the right to grant, to the maximum extent possible, whether at the time of the initial grant or subsequently acquired, any and all of the rights conveyed herein.

1.9. "Modifications" means any addition to or deletion from the substance or structure of either the Original Code or any previous Modifications. When Covered Code is released as a series of files, a Modification is:

A. Any addition to or deletion from the contents of a file containing Original Code or previous Modifications.

B. Any new file that contains any part of the Original Code or previous Modifications.

1.10. "Original Code" means Source Code of computer software code which is described in the Source Code notice required by Exhibit A as Original Code, and which, at the time of its release under this License is not already Covered Code governed by this License.

1.10.1. "Patent Claims" means any patent claim(s), now owned or hereafter acquired, including without limitation, method, process, and apparatus claims, in any patent Licensable by grantor.

1.11. "Source Code" means the preferred form of the Covered Code for making modifications to it, including all modules it contains, plus any associated interface definition files, scripts used to control compilation and installation of an Executable, or source code differential comparisons against either the Original Code or another well known, available Covered Code of the Contributor's choice. The Source Code can be in a compressed or archival form, provided the appropriate decompression or de-archiving software is widely available for no charge.

1.12. "You" (or "Your") means an individual or a legal entity exercising rights under, and complying with all of the terms of, this License or a future version of this License issued under Section 6.1. For legal entities, "You" includes any entity which controls, is controlled by, or is under common control with You. For purposes of this definition, "control" means (a) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (b) ownership of more than fifty percent (50%) of the outstanding shares or beneficial ownership of such entity.

2. Source Code License.

2.1. The Initial Developer Grant.

The Initial Developer hereby grants You a world-wide, royalty-free, non-exclusive license, subject to third party intellectual property claims:

(a) under intellectual property rights (other than patent or trademark) Licensable by Initial Developer to use, reproduce, modify, display, perform, sublicense and distribute the Original Code (or portions thereof) with or without Modifications, and/or as part of a Larger Work; and

(b) under Patent Claims infringed by the making, using or selling of Original Code, to make, have made, use, practice, sell, and offer for sale, and/or otherwise dispose of the Original Code (or portions thereof).

(c) the licenses granted in this Section 2.1(a) and (b) are effective on the date Initial Developer first distributes Original Code under the terms of this License.

(d) Notwithstanding Section 2.1(b) above, no patent license is granted: 1) for code that You delete from the Original Code; 2) separate from the Original Code; or 3) for infringements caused by: i) the modification of the Original Code or ii) the combination of the Original Code with other software or devices.

2.2. Contributor Grant.

Subject to third party intellectual property claims, each Contributor hereby grants You a world-wide, royalty-free, non-exclusive license

(a) under intellectual property rights (other than patent or trademark) Licensable by Contributor, to use, reproduce, modify, display, perform, sublicense and distribute the Modifications created by such Contributor (or portions thereof) either on an unmodified basis, with other Modifications, as Covered Code and/or as part of a Larger Work; and

(b) under Patent Claims infringed by the making, using, or selling of Modifications made by that Contributor either alone and/or in combination with its Contributor Version (or portions of such combination), to make, use, sell, offer for sale, have made, and/or otherwise dispose of: 1) Modifications made by that Contributor (or portions thereof); and 2) the combination of Modifications made by that Contributor with its Contributor Version (or portions of such combination).

(c) the licenses granted in Sections 2.2(a) and 2.2(b) are effective on the date Contributor first makes Commercial Use of the Covered Code.

(d) Notwithstanding Section 2.2(b) above, no patent license is granted: 1) for any code that Contributor has deleted from the Contributor Version; 2) separate from the Contributor Version; 3) for infringements caused by: i) third party modifications of Contributor Version or ii) the combination of Modifications made by that Contributor with other software (except as part of the Contributor Version) or other devices; or 4) under Patent Claims infringed by Covered Code in the absence of Modifications made by that Contributor.

3. Distribution Obligations.

3.1. Application of License.

The Modifications which You create or to which You contribute are governed by the terms of this License, including without limitation Section 2.2. The Source Code version of Covered Code may be distributed only under the terms of this License or a future version of this License released under Section 6.1, and You must include a copy of this License with every copy of the Source Code You distribute. You may not offer or impose any terms on any Source Code version that alters or restricts the applicable version of this License or the recipients' rights hereunder. However, You may include an additional document offering the additional rights described in Section 3.5.

3.2. Availability of Source Code.

Any Modification which You create or to which You contribute must be made available in Source Code form under the terms of this License either on the same media as an Executable version or via an accepted Electronic Distribution Mechanism to anyone to whom you made an Executable version available; and if made available via Electronic Distribution Mechanism, must remain available for at least twelve (12) months after the date it initially became available, or at least six (6) months after a subsequent version of that particular Modification has been made available to such recipients. You are responsible for ensuring that the Source Code version remains available even if the Electronic Distribution Mechanism is maintained by a third party.

3.3. Description of Modifications.

You must cause all Covered Code to which You contribute to contain a file documenting the changes You made to create that Covered Code and the date of any change. You must include a prominent statement that the Modification is derived, directly or indirectly, from Original Code provided by the Initial Developer and including the name of the Initial Developer in (a) the Source Code, and (b) in any notice in an Executable version or related documentation in which You describe the origin or ownership of the Covered Code.

3.4. Intellectual Property Matters

(a) Third Party Claims.

If Contributor has knowledge that a license under a third party's intellectual property rights is required to exercise the rights granted by such Contributor under Sections 2.1 or 2.2, Contributor must include a text file with the Source Code distribution titled "LEGAL" which describes the claim and the party making the claim in sufficient detail that a recipient will know whom to contact. If Contributor obtains such knowledge after the Modification is made available as described in Section 3.2, Contributor shall promptly modify the LEGAL file in all copies Contributor makes available thereafter and shall take other steps (such as notifying appropriate mailing lists or newsgroups) reasonably calculated to inform those who received the Covered Code that new knowledge has been obtained.

(b) Contributor APIs.

If Contributor's Modifications include an application programming interface and Contributor has knowledge of patent licenses which are reasonably necessary to implement that API, Contributor must also include this information in the LEGAL file.

(c) Representations.

Contributor represents that, except as disclosed pursuant to Section 3.4(a) above, Contributor believes that Contributor's Modifications are Contributor's original creation(s) and/or Contributor has sufficient rights to grant the rights conveyed by this License.

3.5. Required Notices.

You must duplicate the notice in Exhibit A in each file of the Source Code. If it is not possible to put such notice in a particular Source Code file due to its structure, then You must include such notice in a location (such as a relevant directory) where a user would be likely to look for such a notice. If You created one or more Modification(s) You may add your name as a Contributor to the notice described in Exhibit A. You must also duplicate this License in any documentation for the Source Code where You describe recipients' rights or ownership rights relating to Covered Code. You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations to one or more recipients of Covered Code. However, You may do so only on Your own behalf, and not on behalf of the Initial Developer or any Contributor. You must make it absolutely clear than any such warranty, support, indemnity or liability obligation is offered by You alone, and You hereby agree to indemnify the Initial Developer and every Contributor for any liability incurred by the Initial Developer or such Contributor as a result of warranty, support, indemnity or liability terms You offer.

3.6. Distribution of Executable Versions.

You may distribute Covered Code in Executable form only if the requirements of Section 3.1-3.5 have been met for that Covered Code, and if You include a notice stating that the Source Code version of the Covered Code is available under the terms of this License, including a description of how and where You have fulfilled the obligations of Section 3.2. The notice must be conspicuously included in any notice in an Executable version, related documentation or collateral in which You describe recipients' rights relating to the Covered Code. You may distribute the Executable version of Covered Code or ownership rights under a license of Your choice, which may contain terms different from this License, provided that You are in compliance with the terms of this License and that the license for the Executable version does not attempt to limit or alter the recipient's rights in the Source Code version from the rights set forth in this License. If You distribute the Executable version under a different license You must make it absolutely clear that any terms which differ from this License are offered by You alone, not by the Initial Developer or any Contributor. You hereby agree to indemnify the Initial Developer and every Contributor for any liability incurred by the Initial Developer or such Contributor as a result of any such terms You offer.

3.7. Larger Works.

You may create a Larger Work by combining Covered Code with other code not governed by the terms of this License and distribute the Larger Work as a single product. In such a case, You must make sure the requirements of this License are fulfilled for the Covered Code.

4. Inability to Comply Due to Statute or Regulation.

If it is impossible for You to comply with any of the terms of this License with respect to some or all of the Covered Code due to statute, judicial order, or regulation then You must: (a) comply with the terms of this License to the maximum extent possible; and (b) describe the limitations and the code they affect. Such description must be included in the LEGAL file described in Section 3.4 and must be included with all distributions of the Source Code. Except to the extent prohibited by statute or regulation, such description must be sufficiently detailed for a recipient of ordinary skill to be able to understand it.

5. Application of this License.

This License applies to code to which the Initial Developer has attached the notice in Exhibit A and to related Covered Code.

6. Versions of the License.

6.1. New Versions.

Inprise Corporation ("Inprise") may publish revised and/or new versions of the License from time to time. Each version will be given a distinguishing version number.

6.2. Effect of New Versions.

Once Covered Code has been published under a particular version of the License, You may always continue to use it under the terms of that version. You may also choose to use such Covered Code under the terms of any subsequent version of the License published by Inprise. No one other than Inprise has the right to modify the terms applicable to Covered Code created under this License.

6.3. Derivative Works.

If You create or use a modified version of this License (which you may only do in order to apply it to code which is not already Covered Code governed by this License), You must (a) rename Your license so that the phrases "Mozilla", "MOZILLAPL", "MOZPL", "Netscape", "MPL", "NPL", "InterBase", "Inprise", "Borland" or any confusingly similar phrase do not appear in your license (except to note that your license differs from this License) and (b) otherwise make it clear that Your version of the license contains terms which differ from the Mozilla Public License and Netscape Public License. (Filling in the name of the Initial Developer, Original Code or Contributor in the notice described in Exhibit A shall not of themselves be deemed to be modifications of this License.)

6.4. Origin of the InterBase Public License.

The InterBase public license is based on the Mozilla Public License V 1.1 with the following changes:

1. The license is published by Inprise Corporation. Only Inprise Corporation can modify the terms applicable to Covered Code.
2. The license can be modified and used for code which is not already governed by this license. Modified versions of the license must be renamed to avoid confusion with Netscape's or Inprise's license and must include a description of changes from the InterBase Public License.
3. The name of the license in Exhibit A is the "InterBase Public License".
4. The reference to an alternative license in Exhibit A has been removed.
5. Amendments I, II, III, V, and VI have been deleted.
6. Exhibit A, Netscape Public License has been deleted
7. A new amendment (II) has been added, describing the required and restricted rights to use the trademarks of Inprise Corporation.

7. DISCLAIMER OF WARRANTY.

COVERED CODE IS PROVIDED UNDER THIS LICENSE ON AN "AS IS" BASIS, WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, WARRANTIES THAT THE COVERED CODE IS FREE OF DEFECTS, MERCHANTABILITY, FIT FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE COVERED CODE IS WITH YOU. SHOULD ANY COVERED CODE PROVE DEFECTIVE IN ANY RESPECT, YOU (NOT THE INITIAL DEVELOPER OR ANY OTHER CONTRIBUTOR) ASSUME THE COST OF ANY NECESSARY SERVICING, REPAIR OR CORRECTION. THIS DISCLAIMER OF WARRANTY CONSTITUTES AN ESSENTIAL PART OF THIS LICENSE. NO USE OF ANY COVERED CODE IS AUTHORIZED HEREUNDER EXCEPT UNDER THIS DISCLAIMER.

8. TERMINATION.

8.1. This License and the rights granted hereunder will terminate automatically if You fail to comply with terms herein and fail to cure such breach within 30 days of becoming aware of the breach. All sublicenses to the Covered Code which are properly granted shall survive any termination of this License. Provisions which, by their nature, must remain in effect beyond the termination of this License shall survive.

8.2. If You initiate litigation by asserting a patent infringement claim (excluding declaratory judgment actions) against Initial Developer or a Contributor (the Initial Developer or Contributor against whom You file such action is referred to as "Participant") alleging that:

(a) such Participant's Contributor Version directly or indirectly infringes any patent, then any and all rights granted by such Participant to You under Sections 2.1 and/or 2.2 of this License shall, upon 60 days notice from Participant terminate prospectively, unless if within 60 days after receipt of notice You either: (i) agree in writing to pay Participant a mutually agreeable reasonable royalty for Your past and future use of Modifications made by such Participant, or (ii) withdraw Your litigation claim with respect to the Contributor Version against such Participant. If within 60 days of notice a reasonable royalty and payment arrangement are not mutually agreed upon in writing by the parties to the litigation claim, or if You withdraw the rights granted by Participant to

days of notice, a reasonable royalty and payment arrangement are not mutually agreed upon in writing by the parties or the litigation claim is not withdrawn, the rights granted by Participant to You under Sections 2.1 and/or 2.2 automatically terminate at the expiration of the 60 day notice period specified above.

(b) any software, hardware, or device, other than such Participant's Contributor Version, directly or indirectly infringes any patent, then any rights granted to You by such Participant under Sections 2.1(b) and 2.2(b) are revoked effective as of the date You first made, used, sold, distributed, or had made, Modifications made by that Participant.

8.3. If You assert a patent infringement claim against Participant alleging that such Participant's Contributor Version directly or indirectly infringes any patent where such claim is resolved (such as by license or settlement) prior to the initiation of patent infringement litigation, then the reasonable value of the licenses granted by such Participant under Sections 2.1 or 2.2 shall be taken into account in determining the amount or value of any payment or license.

8.4. In the event of termination under Sections 8.1 or 8.2 above, all end user license agreements (excluding distributors and resellers) which have been validly granted by You or any distributor hereunder prior to termination shall survive termination.

9. LIMITATION OF LIABILITY.

UNDER NO CIRCUMSTANCES AND UNDER NO LEGAL THEORY, WHETHER TORT (INCLUDING NEGLIGENCE), CONTRACT, OR OTHERWISE, SHALL YOU, THE INITIAL DEVELOPER, ANY OTHER CONTRIBUTOR, OR ANY DISTRIBUTOR OF COVERED CODE, OR ANY SUPPLIER OF ANY OF SUCH PARTIES, BE LIABLE TO ANY PERSON FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY CHARACTER INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF GOODWILL, WORK STOPPAGE, COMPUTER FAILURE OR MALFUNCTION, OR ANY AND ALL OTHER COMMERCIAL DAMAGES OR LOSSES, EVEN IF SUCH PARTY SHALL HAVE BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. THIS LIMITATION OF LIABILITY SHALL NOT APPLY TO LIABILITY FOR DEATH OR PERSONAL INJURY RESULTING FROM SUCH PARTY'S NEGLIGENCE TO THE EXTENT APPLICABLE LAW PROHIBITS SUCH LIMITATION. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THIS EXCLUSION AND LIMITATION MAY NOT APPLY TO YOU.

10. U.S. GOVERNMENT END USERS.

The Covered Code is a "commercial item," as that term is defined in 48 C.F.R. 2.101 (Oct. 1995), consisting of "commercial computer software" and "commercial computer software documentation," as such terms are used in 48 C.F.R. 12.212 (Sept. 1995). Consistent with 48 C.F.R. 12.212 and 48 C.F.R. 227.7202-1 through 227.7202-4 (June 1995), all U.S. Government End Users acquire Covered Code with only those rights set forth herein.

11. MISCELLANEOUS.

This License represents the complete agreement concerning subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable. This License shall be governed by Georgia law provisions (except to the extent applicable law, if any, provides otherwise), excluding its conflict-of-law provisions. With respect to disputes in which at least one party is a citizen of, or an entity chartered or registered to do business in the United States of America, Any litigation relating to this License shall be subject to the jurisdiction of the Federal Courts of the Northern District of Georgia and/or the state courts of Gwinnett County, Georgia, with the losing party responsible for costs, including without limitation, court costs and reasonable attorneys' fees and expenses. The application of the United Nations Convention on Contracts for the International Sale of Goods is expressly excluded. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not apply to this License.

12. RESPONSIBILITY FOR CLAIMS.

As between Initial Developer and the Contributors, each party is responsible for claims and damages arising, directly or indirectly, out of its utilization of rights under this License and You agree to work with Initial Developer and Contributors to distribute such responsibility on an equitable basis. Nothing herein is intended or shall be deemed to constitute any admission of liability.

13. MULTIPLE-LICENSED CODE.

Initial Developer may designate portions of the Covered Code as "Multiple-Licensed". "Multiple-Licensed" means that the Initial Developer permits you to utilize portions of the Covered Code under Your choice of the InterBase Public License or the alternative licenses, if any, specified by the Initial Developer in the file described in Exhibit A.

EXHIBIT A - InterBase Public License.

"The contents of this file are subject to the InterBase Public License Version 1.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at <http://www.interbase.com/IPL.html>

Software distributed under the License is distributed on an "AS IS" basis, WITHOUT WARRANTY OF ANY KIND, either express or implied. See the License for the specific language governing rights and limitations under the License.

The Original Code was created by InterBase Software Corp and its successors.

Portions created by Borland/Inprise are Copyright (C) Borland/Inprise. All Rights Reserved.

Contributor(s): _____.

AMENDMENTS

I. InterBase and logo. This License does not grant any rights to use the trademarks "InterBase", "Java" or "JavaScript" even if such marks are included in the Original Code or Modifications.

II. Trademark Usage.

II.1. Advertising Materials. All advertising materials mentioning features or use of the covered Code must display the following acknowledgement: "This product includes software developed by Inprise Corporation."

II.2. Endorsements. The names "InterBase," "Inprise," and "Borland" must not be used to endorse or promote Contributor Versions or Larger Works without the prior written permission of InterBase.

II.3. Product Names. Contributor Versions and Larger Works may not be called "InterBase" or "InterBase" nor may the word "InterBase" appear in their names without the prior written permission of Inprise.

GPL-2.1

GNU LESSER GENERAL PUBLIC LICENSE

Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License: they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) The modified work must itself be a software library.

b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by

permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

one line to give the library's name and an idea of what it does.
Copyright (C) year name of author

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in
the library 'Frob' (a library for tweaking knobs) written
by James Random Hacker.

signature of Ty Coon, 1 April 1990
Ty Coon, President of Vice
That's all there is to it!

LGPL-2.1 w/libwebrtc exception

Libwebrtc and included programs are provided under the terms of the GNU Library General Public License (LGPL) 2.1, with the following exceptions:

1) Any reference, whether in these modifications or in the GNU Library General Public License 2.1, to this License, these terms, the GNU Lesser Public License, GNU Library General Public License, LGPL, or any similar reference shall refer to the GNU Library General Public License 2.1 as modified by these paragraphs 1) through 4).

2) Static linking of programs with the libwebrtc library does not constitute a derivative work and does not require the author to provide source code for the program, use the shared libwebrtc libraries, or link their program against a user-supplied version of libwebrtc.

If you link the program to a modified version of libwebrtc, then the changes to libwebrtc must be provided under the terms of the LGPL in sections 1, 2, and 4.

3) You do not have to provide a copy of the libwebrtc license with programs that are linked to the libwebrtc library, nor do you have to identify the libwebrtc license in your program or documentation as required by section 6 of the LGPL.

However, programs must still identify their use of libwebrtc. The following example statement can be included in user documentation to satisfy this requirement:

"[program] is based in part on the work of the libwebrtc project (<https://libwebrtc.org>)"

4) Some sources included have their own, more liberal licenses, or options to get original sources with the liberal terms.

Original liberal license retained

- lib/misc/sha-1.c - 3-clause BSD license retained, link to original
- win32port/zlib - ZLIB license (see zlib.h)
- lib/tls/mbedtls/wrapper - Apache 2.0 (only built if linked against mbedtls)

Relicensed to libwebrtc license

- lib/misc/base64-decode.c - relicensed to LGPL2.1+SLE, link to original
- lib/misc/daemonize.c - relicensed from Public Domain to LGPL2.1+SLE, link to original Public Domain version

Public Domain (CC-zero) to simplify reuse

- test-apps/*.c
- test-apps/*.h
- minimal-examples/*
- lws/*

----- end of exceptions

GNU LESSER GENERAL PUBLIC LICENSE

Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.
51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification").

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) The modified work must itself be a software library.

b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.

c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.

d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

one line to give the library's name and an idea of what it does.
Copyright (C) year name of author

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in
the library 'Frob' (a library for tweaking knobs) written
by James Random Hacker.

signature of Ty Coon, 1 April 1990
Ty Coon, President of Vice
That's all there is to it!

Libpng

This copy of the libpng notices is provided for your convenience. In case of any discrepancy between this copy and the notices in the file png.h that is included in the libpng distribution, the latter shall prevail.

COPYRIGHT NOTICE, DISCLAIMER, and LICENSE:

If you modify libpng you may insert additional notices immediately following this sentence.

This code is released under the libpng license.

libpng versions 1.2.6, August 15, 2004, through 1.4.5, December 9, 2010, are Copyright (c) 2004, 2006-2010 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-1.2.5 with the following individual added to the list of Contributing Authors

Cosmin Truta

libpng versions 1.0.7, July 1, 2000, through 1.2.5 - October 3, 2002, are
Copyright (c) 2000-2002 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-1.0.6 with the following individuals added to the list of Contributing Authors

Simon-Pierre Cadieux
Eric S. Raymond
Gilles Vollant

and with the following additions to the disclaimer:

There is no warranty against interference with your enjoyment of the library or against infringement. There is no warranty that our efforts or the library will fulfill any of your particular purposes or needs. This library is provided with all faults, and the entire risk of satisfactory quality, performance, accuracy, and effort is with the user.

libpng versions 0.97, January 1998, through 1.0.6, March 20, 2000, are
Copyright (c) 1998, 1999 Glenn Randers-Pehrson, and are distributed according to the same disclaimer and license as libpng-0.96, with the following individuals added to the list of Contributing Authors:

Tom Lane
Glenn Randers-Pehrson
Willem van Schaik

libpng versions 0.89, June 1996, through 0.96, May 1997, are
Copyright (c) 1996, 1997 Andreas Digger
Distributed according to the same disclaimer and license as libpng-0.88, with the following individuals added to the list of Contributing Authors:

John Bowler
Kevin Bracey
Sam Bushell
Magnus Holmgren
Greg Roelofs
Tom Tanner

libpng versions 0.5, May 1995, through 0.88, January 1996, are
Copyright (c) 1995, 1996 Guy Eric Schalnat, Group 42, Inc.

For the purposes of this copyright and license, "Contributing Authors" is defined as the following set of individuals:

Andreas Dilger
Dave Martindale
Guy Eric Schalnat
Paul Schmidt
Tim Wegner

The PNG Reference Library is supplied "AS IS". The Contributing Authors and Group 42, Inc. disclaim all warranties, expressed or implied, including, without limitation, the warranties of merchantability and of fitness for any purpose. The Contributing Authors and Group 42, Inc. assume no liability for direct, indirect, incidental, special, exemplary, or consequential damages, which may result from the use of the PNG Reference Library, even if advised of the possibility of such damage.

Permission is hereby granted to use, copy, modify, and distribute this source code, or portions hereof, for any purpose, without fee, subject to the following restrictions:

1. The origin of this source code must not be misrepresented.
2. Altered versions must be plainly marked as such and must not be misrepresented as being the original source.
3. This Copyright notice may not be removed or altered from any source or altered source distribution.

A "png_get_copyright" function is available, for convenient use in "about" boxes and the like:

```
printf("%s",png_get_copyright(NULL));
```

Also, the PNG logo (in PNG format, of course) is supplied in the files "pngbar.png" and "pngbar.jpg" (88x31) and "pngnow.png" (98x31).

Libpng is OSI Certified Open Source Software. OSI Certified Open Source is a certification mark of the Open Source Initiative.

Glenn Randers-Pehrson
glenrrp at users.sourceforge.net
December 9, 2010

MIT

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

MIT-like License (HarfBuzz)

Permission is hereby granted, without written agreement and without license or royalty fees, to use, copy, modify, and distribute this software and its documentation for any purpose, provided that the above copyright notice and the following two paragraphs appear in all copies of this software.

IN NO EVENT SHALL THE COPYRIGHT HOLDER BE LIABLE TO ANY PARTY FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS SOFTWARE AND ITS DOCUMENTATION, EVEN IF THE COPYRIGHT HOLDER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

THE COPYRIGHT HOLDER SPECIFICALLY DISCLAIMS ANY WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE SOFTWARE PROVIDED HEREUNDER IS ON AN "AS IS" BASIS, AND THE COPYRIGHT HOLDER HAS NO OBLIGATION TO PROVIDE MAINTENANCE, SUPPORT, UPDATES, ENHANCEMENTS, OR MODIFICATIONS.

MIT-like License (font-xfree86-type1)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE XFREE86 PROJECT BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the XFree86 Project shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the XFree86 Project.

MIT-like License (fontconfig)

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the author(s) not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The authors make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE AUTHOR(S) DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE AUTHOR(S) BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

MIT-like License (libXmu)

Copyright 1988, 1989, 1990, 1991, 1994, 1998 The Open Group

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE OPEN GROUP BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of The Open Group shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from The Open Group.

Xmu/StrToBmap.c and Xmu/GrayPixmap.c also have:

Copyright 1987, 1988 by Digital Equipment Corporation, Maynard, Massachusetts.

All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Digital not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

DIGITAL DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL DIGITAL BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Xmu/Clip.c and Xmu/Lookup.h have:

Copyright (c) 1998 by The XFree86 Project, Inc.
Copyright 1999 by Thomas E. Dickey <dickey@clark.net>

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE XFREE86 PROJECT BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the XFree86 Project shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the XFree86 Project.

MIT-like License (libxml2)

Copyright (C) 1998-2003 Daniel Veillard. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE DANIEL VEILLARD BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of Daniel Veillard shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from him.

MIT-like License (ncurses)

Copyright (c) 1999-2004,2005 Free Software Foundation, Inc.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, distribute with modifications, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE ABOVE COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name(s) of the above copyright holders shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization.

MIT-like License (sudo)

Sudo is distributed under the following license:

Copyright (c) 1994-1996, 1998-2013
Todd C. Miller <Todd.Miller@courtesan.com>

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS" AND THE AUTHOR DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Sponsored in part by the Defense Advanced Research Projects Agency (DARPA) and Air Force Research Laboratory, Air Force Materiel Command, USAF, under agreement number F39502-99-1-0512.

The file redblack.c bears the following license:

Copyright (c) 2001 Emin Martinian

Redistribution and use in source and binary forms, with or without modification, are permitted provided that neither the name of Emin Martinian nor the names of any contributors are be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The files getcwd.c, glob.c, glob.h and snprintf.c bear the following license:

Copyright (c) 1989, 1990, 1991, 1993
The Regents of the University of California. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The file fnmatch.c bears the following license:

Copyright (c) 2011, VMware, Inc.
All rights reserved.

Redistribution and use in source and binary forms, with or without

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- * Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- * Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- * Neither the name of the VMware, Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL VMWARE, INC. OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The embedded copy of zlib bears the following license:

Copyright (C) 1995-2012 Jean-loup Gailly and Mark Adler

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

Jean-loup Gailly Mark Adler
jloup@gzip.org madler@alumni.caltech.edu

MIT-like License (xkbcomp)

Copyright (c) 1994 by Silicon Graphics Computer Systems, Inc.

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Silicon Graphics not be used in advertising or publicity pertaining to distribution of the software without specific prior written permission. Silicon Graphics makes no representation about the suitability of this software for any purpose. It is provided "as is" without any express or implied warranty.

SILICON GRAPHICS DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1988, 1998 The Open Group

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE OPEN GROUP BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of The Open Group shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from The Open Group.

Copyright 1988 by Digital Equipment Corporation, Maynard, Massachusetts.

All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Digital not be used in advertising or publicity pertaining to distribution of the

software without specific, written prior permission.

DIGITAL DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL DIGITAL BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

COPYRIGHT 1990
DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS
ALL RIGHTS RESERVED.

THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION. DIGITAL MAKES NO REPRESENTATIONS ABOUT THE SUITABILITY OF THIS SOFTWARE FOR ANY PURPOSE. IT IS SUPPLIED "AS IS" WITHOUT EXPRESS OR IMPLIED WARRANTY.

IF THE SOFTWARE IS MODIFIED IN A MANNER CREATING DERIVATIVE COPYRIGHT RIGHTS, APPROPRIATE LEGENDS MAY BE PLACED ON THE DERIVATIVE WORK IN ADDITION TO THAT SET FORTH ABOVE.

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Digital Equipment Corporation not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

MIT-like License (xserver)

The following is the 'standard copyright' agreed upon by most contributors, and is currently the canonical license preferred by the X.Org Foundation. This is a slight variant of the common MIT license form published by the Open Source Initiative at <http://www.opensource.org/licenses/mit-license.php>

Copyright holders of new code should use this license statement where possible, and insert their name to this list. Please sort by surname for people, and by the full name for other entities (e.g. Juliusz Chroboczek sorts before Intel Corporation sorts before Daniel Stone).

Copyright (c) 2011 Dave Airlie
Copyright (c) 2000-2001 Juliusz Chroboczek
Copyright (c) 1998 Egbert Eich
Copyright (c) 2006-2007 Intel Corporation
Copyright (c) 2006 Nokia Corporation
Copyright (c) 2006-2008 Peter Hutterer
Copyright (c) 2006 Adam Jackson
Copyright (c) 2009-2010 NVIDIA Corporation
Copyright (c) 1987, 2003-2006, 2008-2010 Oracle and/or its affiliates.
Copyright (c) 1999 Keith Packard
Copyright (c) 2007-2009 Red Hat, Inc.
Copyright (c) 2005-2008 Daniel Stone
Copyright (c) 2006-2009 Simon Thum
Copyright (c) 2003-2008, 2013 Geert Uytterhoeven
Copyright (c) 2006 Luc Verhaegen

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice (including the next paragraph) shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

The following licenses are 'legacy': usually MIT/X11 licenses with the name of the copyright holder(s) in the license statement, but also some BSD-like licenses.

Copyright (c) 1994-2003 The XFree86 Project, Inc. All Rights Reserved.
Copyright (c) Colin Harrison 2005-2008
Copyright (c) 2005 Bogdan D. bogdand@users.sourceforge.net

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the author shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the author.

Copyright 1997 by The XFree86 Project, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the XFree86 Project, Inc. not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The Xfree86 Project, Inc. makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE XFREE86 PROJECT, INC. DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL OREST ZBOROWSKI OR DAVID WEXELBLAT BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1985-1998, 2001 The Open Group
Copyright 2002 Red Hat Inc., Durham, North Carolina.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE OPEN GROUP BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of The Open Group shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from The Open Group.

Copyright (c) 1987, 1989-1990, 1992-1995 X Consortium

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE X CONSORTIUM BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the X Consortium shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the X Consortium.

Copyright 2008 Tungsten Graphics, Inc., Cedar Park, Texas.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sub license, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice (including the next paragraph) shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IN NO EVENT SHALL TUNGSTEN GRAPHICS AND/OR ITS SUPPLIERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright (c) 1999-2000 SuSE, Inc.

Copyright (c) 2007 Red Hat, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of SuSE not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. SuSE makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

SuSE DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL SuSE BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1987-1991, 1993 by Digital Equipment Corporation, Maynard, Massachusetts.
Copyright 1991 Massachusetts Institute of Technology, Cambridge, Massachusetts.
Copyright 1991, 1993 Olivetti Research Limited, Cambridge, England.

All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Digital not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

DIGITAL DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL DIGITAL BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1987 by Digital Equipment Corporation, Maynard, Massachusetts,
Copyright 1994 Quarterdeck Office Systems.

All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the names of Digital and Quarterdeck not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

DIGITAL AND QUARTERDECK DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL DIGITAL BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1997 Digital Equipment Corporation.
All rights reserved.

This software is furnished under license and may be used and copied only in accordance with the following terms and conditions. Subject to these conditions, you may download, copy, install, use, modify and distribute this software in source and/or binary form. No title or ownership is transferred hereby.

1) Any source code used, modified or distributed must reproduce and retain this copyright notice and list of conditions as they appear in the source file.

2) No right is granted to use any trade name, trademark, or logo of Digital Equipment Corporation. Neither the "Digital Equipment Corporation" name nor any trademark or logo of Digital Equipment Corporation may be used to endorse or promote products derived from this software without the prior written permission of Digital Equipment Corporation.

3) This software is provided "AS-IS" and any express or implied warranties, including but not limited to, any implied warranties of merchantability, fitness for a particular purpose, or non-infringement are disclaimed. In no event shall DIGITAL be liable for any damages whatsoever, and in particular, DIGITAL shall not be liable for special, indirect, consequential, or incidental damages or damages for lost profits, loss of revenue or loss of use, whether such damages arise in contract, negligence, tort, under statute, in equity, at law or otherwise, even if advised of the possibility of such damage.

Copyright (c) 1991, 1996-1997 Digital Equipment Corporation, Maynard, Massachusetts.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL DIGITAL EQUIPMENT CORPORATION BE LIABLE FOR ANY CLAIM. DAMAGES. INCLUDING.

BUT NOT LIMITED TO CONSEQUENTIAL OR INCIDENTAL DAMAGES, OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of Digital Equipment Corporation shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from Digital Equipment Corporation.

SGI FREE SOFTWARE LICENSE B (Version 2.0, Sept. 18, 2008)
Copyright (c) 1991-2000 Silicon Graphics, Inc. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice including the dates of first publication and either this permission notice or a reference to <http://oss.sgi.com/projects/FreeB/> shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL SILICON GRAPHICS, INC. BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright (c) 1994, 1995 Hewlett-Packard Company
Copyright (c) 2001-2004 Harold L Hunt II All Rights Reserved.
Copyright (c) Colin Harrison 2005-2008
Copyright (c) 1995 Kaleb S. KEITHLEY

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the copyright holders shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the copyright holders.

Copyright 1989 by Hewlett-Packard Company, Palo Alto, California.
All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Hewlett-Packard not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

HEWLETT-PACKARD DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL HEWLETT-PACKARD BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 2001-2004 Red Hat Inc., Durham, North Carolina.
Copyright (c) 2003 by the XFree86 Project, Inc.
Copyright 2004-2005 Red Hat Inc., Raleigh, North Carolina.
All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation on the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice (including the next paragraph) shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IN NO EVENT SHALL RED HAT AND/OR THEIR SUPPLIERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright (c) 2008 Red Hat, Inc.
Partly based on code Copyright (c) 2000 SuSE, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Red Hat not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Red Hat makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

Red Hat DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL Red Hat BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright (c) 2006 Red Hat, Inc.
Copyright (c) 1998-1999 Precision Insight, Inc., Cedar Park, Texas.
Copyright (c) IBM Corporation 2004-2005
All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sub license, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice (including the next paragraph) shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IN NO EVENT SHALL IBM, RED HAT, INC, OR PRECISION INSIGHT AND/OR THEIR SUPPLIERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright (c) 1995 X Consortium
Copyright 2004 Red Hat Inc., Durham, North Carolina.
All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation on the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IN NO EVENT SHALL RED HAT, THE X CONSORTIUM, AND/OR THEIR SUPPLIERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the X Consortium shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the X Consortium.

Copyright 1998-2000 Precision Insight, Inc., Cedar Park, Texas.
Copyright 2000 VA Linux Systems, Inc.
Copyright (c) 2002, 2008, 2009 Apple Computer, Inc.
Copyright (c) 2003-2004 Torrey T. Lyons.
All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sub license, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice (including the next paragraph) shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IN NO EVENT SHALL PRECISION INSIGHT AND/OR ITS SUPPLIERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation on the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice (including the next paragraph) shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. IN NO EVENT SHALL VA LINUX SYSTEM, IBM AND/OR THEIR SUPPLIERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright (c) 1997 Metro Link Incorporated

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE X CONSORTIUM BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the Metro Link shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from Metro Link.

Copyright 1998 by Metro Link Incorporated

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Metro Link Incorporated not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Metro Link Incorporated makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

METRO LINK INCORPORATED DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL METRO LINK INCORPORATED BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright (c) 2000 by Conectiva S.A. (<http://www.conectiva.com>)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL CONECTIVA LINUX BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of Conectiva Linux shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from Conectiva Linux.

Copyright (c) 2001, Andy Ritger aritger@nvidia.com
All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the

distribution.

o Neither the name of NVIDIA nor the names of its contributors
may be used to endorse or promote products derived from this
software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS
"AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT
NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND
FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL
THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT,
INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING,
BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES;
LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER
CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT
LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN
ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE
POSSIBILITY OF SUCH DAMAGE.

Copyright 1992 Vrije Universiteit, The Netherlands
Copyright 1998 by Concurrent Computer Corporation

Permission to use, copy, modify, and distribute this software and its
documentation for any purpose and without fee is hereby granted, provided
that the above copyright notice appear in all copies and that both that
copyright notice and this permission notice appear in supporting
documentation, and that the name of the copyright holders not be used in
advertising or publicity pertaining to distribution of the software without
specific, written prior permission. The copyright holders makes no
representations about the suitability of this software for any purpose.
It is provided "as is" without express or implied warranty.

The COPYRIGHT HOLDERS DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE,
INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO
EVENT SHALL The COPYRIGHT HOLDERS BE LIABLE FOR ANY SPECIAL, INDIRECT OR
CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE,
DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER
TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR
PERFORMANCE OF THIS SOFTWARE.

(c)Copyright 1988,1991 Adobe Systems Incorporated.
All rights reserved.

Permission to use, copy, modify, distribute, and sublicense this software and its
documentation for any purpose and without fee is hereby granted, provided that
the above copyright notices appear in all copies and that both those copyright
notices and this permission notice appear in supporting documentation and that
the name of Adobe Systems Incorporated not be used in advertising or publicity
pertaining to distribution of the software without specific, written prior
permission. No trademark license to use the Adobe trademarks is hereby
granted. If the Adobe trademark "Display PostScript"(tm) is used to describe
this software, its functionality or for any other purpose, such use shall be
limited to a statement that this software works in conjunction with the Display
PostScript system. Proper trademark attribution to reflect Adobe's ownership
of the trademark shall be given whenever any such reference to the Display
PostScript system is made.

ADOB E MAKES NO REPRESENTATIONS ABOUT THE SUITABILITY OF THE SOFTWARE FOR ANY
PURPOSE. IT IS PROVIDED "AS IS" WITHOUT EXPRESS OR IMPLIED WARRANTY. ADOBE
DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED
WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-
INFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL ADOBE BE LIABLE TO YOU
OR ANY OTHER PARTY FOR ANY SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY
DAMAGES WHATSOEVER WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE, STRICT
LIABILITY OR ANY OTHER ACTION ARISING OUT OF OR IN CONNECTION WITH THE USE OR
PERFORMANCE OF THIS SOFTWARE. ADOBE WILL NOT PROVIDE ANY TRAINING OR OTHER
SUPPORT FOR THE SOFTWARE.

Adobe, PostScript, and Display PostScript are trademarks of Adobe Systems
Incorporated which may be registered in certain jurisdictions.

Copyright 1989 Network Computing Devices, Inc., Mountain View, California.

Permission to use, copy, modify, and distribute this software and its
documentation for any purpose and without fee is hereby granted, provided
that the above copyright notice appear in all copies and that both that
copyright notice and this permission notice appear in supporting
documentation, and that the name of N.C.D. not be used in advertising or
publicity pertaining to distribution of the software without specific,
written prior permission. N.C.D. makes no representations about the
suitability of this software for any purpose. It is provided "as is"
without express or implied warranty.

Copyright (c) 1987 by the Regents of the University of California

Permission to use, copy, modify, and distribute this
software and its documentation for any purpose and without
fee is hereby granted, provided that the above copyright
notice appear in all copies. The University of California
makes no representations about the suitability of this
software for any purpose. It is provided "as is" without
express or implied warranty.

Copyright 1992, 1993 Data General Corporation;
Copyright 1992, 1993 OMRON Corporation

Permission to use, copy, modify, distribute, and sell this software and its
documentation for any purpose is hereby granted without fee, provided that the
above copyright notice appear in all copies and that both that copyright
notice and this permission notice appear in supporting documentation, and that
neither the name OMRON or DATA GENERAL be used in advertising or publicity
pertaining to distribution of the software without specific, written prior
permission of the party whose name is to be used. Neither OMRON or
DATA GENERAL make any representation about the suitability of this software
for any purpose. It is provided "as is" without express or implied warranty.

OMRON AND DATA GENERAL EACH DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL OMRON OR DATA GENERAL BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright (c) 1998-2004, 2006 Keith Packard
Copyright (c) 2000 Compaq Computer Corporation
Copyright (c) 2002 MontaVista Software Inc.
Copyright (c) 2005 OpenedHand Ltd.
Copyright (c) 2004, 2006 Nokia Corporation
Copyright (c) 2000-2002 Keith Packard, member of The XFree86 Project, Inc.
Copyright (c) 2002 Apple Computer, Inc.
Copyright (c) 2003 Torrey T. Lyons.
Copyright (c) 1998 Alan Hourihane, Wigan, England.
Copyright (c) 2000-2002 Alan Hourihane, Flint Mountain, North Wales.
Copyright (c) 1990,91 Thomas Roell, Dinkelscherben, Germany
Copyright (c) 1997 Matthieu Herrb
Copyright (c) 1993 David Wexelblat <dwex@goblin.org>
Copyright (c) 2005 Kean Johnston <jkj@sco.com>
Copyright (c) 1993 David McCullough <davidm@stallion.oz.au>
Copyright (c) 2003-2004 Anders Carlsson
Copyright (c) 2003-2004 Eric Anholt
Copyright (c) 2003-2004 Philip Blundell
Copyright (c) 2007 OpenedHand Ltd
Copyright (c) 1997, 1998 UCHIYAMA Yasushi
Copyright (c) 2005 Zack Rusin
Copyright (c) 2005 Lars Knoll & Zack Rusin, Trolltech
Copyright (c) 1995-1998 Metro Link, Inc.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the authors and/or copyright holders not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The authors and/or copyright holders make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE AUTHORS AND/OR COPYRIGHT HOLDERS DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE AUTHORS AND/OR COPYRIGHT HOLDERS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1993 by Davor Matic

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation. Davor Matic makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

Copyright 1990,91,92,93 by Thomas Roell, Germany.
Copyright 1991,92,93 by SGCS (Snitily Graphics Consulting Services), USA.

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of Thomas Roell nor SGCS be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Thomas Roell nor SGCS makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THOMAS ROELL AND SGCS DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THOMAS ROELL OR SGCS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 2004, Egbert Eich

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL EGBERT EICH BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of Egbert Eich shall not be used in advertising or otherwise to promote this software or its derivatives.

be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from Egbert Eich.

Copyright 1992 by Orest Zborowski <obz@Kodak.com>
Copyright 1993 by David Wexelblat <dwex@goblin.org>

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the names of Orest Zborowski and David Wexelblat not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Orest Zborowski and David Wexelblat make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

OREST ZBOROWSKI AND DAVID WEXELBLAT DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL OREST ZBOROWSKI OR DAVID WEXELBLAT BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1992 by Orest Zborowski <obz@Kodak.com>
Copyright 1993 by David Dawes <dwes@xfree86.org>
Copyright 1995-1999 by Frederic Lepied, France. <fred@sugix.frmug.fr.net>
Copyright 1992 by Rich Murphey <Rich@Rice.edu>
Copyright 1993 by David Wexelblat <dwex@goblin.org>

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the names of copyright holders not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. Copyright holders make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

COPYRIGHT HOLDERS DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL COPYRIGHT HOLDERS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright (c) 1998 Todd C. Miller <Todd.Miller@courtesan.com>

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS" AND TODD C. MILLER DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS. IN NO EVENT SHALL TODD C. MILLER BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright (c) 1994-2003 by The XFree86 Project, Inc.
Copyright 1997 by Metro Link, Inc.
Copyright 2003 by David H. Dawes.
Copyright 2003 by X-Oz Technologies.
Copyright (c) 2004, X.Org Foundation

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE COPYRIGHT HOLDER(S) OR AUTHOR(S) BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the copyright holder(s) and author(s) shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the copyright holder(s) and author(s).

Copyright 1990,91 by Thomas Roell, Dinkelscherben, Germany
Copyright 1993 by David Wexelblat <dwex@goblin.org>
Copyright 1999 by David Holland <davidh@luest.net>
Copyright (c) 2000 Compaq Computer Corporation
Copyright (c) 2002 Hewlett-Packard Company
Copyright (c) 2004, 2005 Red Hat, Inc.
Copyright (c) 2004 Nicholas Miell
Copyright (c) 2005 Trolltech AS
Copyright (c) 2006 Intel Corporation
Copyright (c) 2006-2007 Keith Packard
Copyright (c) 2008 Red Hat, Inc

Copyright (c) 2008 George Sapountzis <gsap7@yahoo.gr>

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the copyright holders not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The copyright holders make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE COPYRIGHT HOLDERS DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE COPYRIGHT HOLDERS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1987, 1998 The Open Group
Copyright (c) 1998-1999, 2001 The XFree86 Project, Inc.
Copyright (c) 2000 VA Linux Systems, Inc.
Copyright (c) 2000, 2001 Nokia Home Communications
Copyright (c) 2007, 2008 Red Hat, Inc.
All rights reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, provided that the above copyright notice(s) and this permission notice appear in all copies of the Software and that both the above copyright notice(s) and this permission notice appear in supporting documentation.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR HOLDERS INCLUDED IN THIS NOTICE BE LIABLE FOR ANY CLAIM, OR ANY SPECIAL INDIRECT OR CONSEQUENTIAL DAMAGES, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

Copyright 1996 by Thomas E. Dickey <dickey@clark.net>

All Rights Reserved

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the above listed copyright holder(s) not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

THE ABOVE LISTED COPYRIGHT HOLDER(S) DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE ABOVE LISTED COPYRIGHT HOLDER(S) BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1998-1999 Precision Insight, Inc., Cedar Park, Texas.
Copyright (c) 2001 Andreas Monitzer.
Copyright (c) 2001-2004 Greg Parker.
Copyright (c) 2001-2004 Torrey T. Lyons
Copyright (c) 2002-2003 Apple Computer, Inc.
Copyright (c) 2004-2005 Alexander Gottwald
Copyright (c) 2002-2009 Apple Inc.
Copyright (c) 2007 Jeremy Huddleston
All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE ABOVE LISTED COPYRIGHT HOLDER(S) BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name(s) of the above copyright holders shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization.

Copyright (c) 1999,2000 by Eric Sunshine <sunshine@sunshineco.com>
Copyright (c) 2001-2005 by Thomas Winischhofer, Vienna, Austria.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The name of the author may not be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR ``AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Copyright (c) 2002 David Dawes

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHOR(S) BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the author(s) shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the author(s).

Copyright (c) 1996-1999 SciTech Software, Inc.

Copyright (c) David Mosberger-Tang

Copyright (c) 1999 Egbert Eich

Copyright (c) 2008 Bart Trojanowski, Symbio Technologies, LLC

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of the authors not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The authors makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE AUTHORS DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE AUTHORS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 2005-2006 Luc Verhaegen.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE COPYRIGHT HOLDER(S) OR AUTHOR(S) BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright 1995 by Robin Cutshaw <robin@XFree86.Org>

Copyright 2000 by Egbert Eich

Copyright 2002 by David Dawes

Copyright 1997-2004 by Marc Aurele La France (TSI @ UQV), tsi@xfree86.org

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that

copyright notice and this permission notice appear in supporting documentation, and that the names of the above listed copyright holder(s) not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The above listed copyright holder(s) make(s) no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE ABOVE LISTED COPYRIGHT HOLDER(S) DISCLAIM(S) ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE ABOVE LISTED COPYRIGHT HOLDER(S) BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 1990, 1991 by Thomas Roell, Dinkelscherben, Germany
Copyright 1992 by David Dawes <dawes@XFree86.org>
Copyright 1992 by Jim Tsillas <jtsilla@damon.ccs.northeastern.edu>
Copyright 1992 by Rich Murphey <Rich@Rice.edu>
Copyright 1992 by Robert Baron <Robert.Baron@ernst.mach.cs.cmu.edu>
Copyright 1992 by Orest Zborowski <obz@eskimo.com>
Copyright 1993 by Vrije Universiteit, The Netherlands
Copyright 1993 by David Wexelblat <dwex@XFree86.org>
Copyright 1994, 1996 by Holger Veit <Holger.Veit@gmd.de>
Copyright 1997 by Takis Psarogiannakopoulos <takis@dpmms.cam.ac.uk>
Copyright 1994-2003 by The XFree86 Project, Inc

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the names of the above listed copyright holders not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. The above listed copyright holders make no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

THE ABOVE LISTED COPYRIGHT HOLDERS DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL THE ABOVE LISTED COPYRIGHT HOLDERS BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright 2001-2005 by J. Kean Johnston <jkj@sco.com>

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name J. Kean Johnston not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. J. Kean Johnston makes no representations about the suitability of this software for any purpose. It is provided "as is" without express or implied warranty.

J. KEAN JOHNSTON DISCLAIMS ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL J. KEAN JOHNSTON BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.

Copyright (c) 2000 Jakub Jelinek (jakub@redhat.com)

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL JAKUB JELINEK BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Copyright (c) 1987, 1990, 1993
The Regents of the University of California. All rights reserved.

This code is derived from software contributed to Berkeley by Chris Torek.

This code is derived from software contributed to Berkeley by Michael Rendell of Memorial University of Newfoundland.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
4. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

MPL-2.0

Mozilla Public License Version 2.0

1. Definitions

- 1.1. "Contributor" means each individual or legal entity that creates, contributes to the creation of, or owns Covered Software.
- 1.2. "Contributor Version" means the combination of the Contributions of others (if any) used by a Contributor and that particular Contributor's Contribution.
- 1.3. "Contribution" means Covered Software of a particular Contributor.
- 1.4. "Covered Software" means Source Code Form to which the initial Contributor has attached the notice in Exhibit A, the Executable Form of such Source Code Form, and Modifications of such Source Code Form, in each case including portions thereof.
- 1.5. "Incompatible With Secondary Licenses" means
 - (a) that the initial Contributor has attached the notice described in Exhibit B to the Covered Software; or
 - (b) that the Covered Software was made available under the terms of version 1.1 or earlier of the License, but not also under the terms of a Secondary License.
- 1.6. "Executable Form" means any form of the work other than Source Code Form.
- 1.7. "Larger Work" means a work that combines Covered Software with other material, in a separate file or files, that is not Covered Software.
- 1.8. "License" means this document.
- 1.9. "Licensable" means having the right to grant, to the maximum extent possible, whether at the time of the initial grant or subsequently, any and all of the rights conveyed by this License.
- 1.10. "Modifications" means any of the following:
 - (a) any file in Source Code Form that results from an addition to, deletion from, or modification of the contents of Covered Software; or
 - (b) any new file in Source Code Form that contains any Covered Software.
- 1.11. "Patent Claims" of a Contributor means any patent claim(s), including without limitation, method, process, and apparatus claims, in any patent Licensable by such Contributor that would be infringed, but for the grant of the License, by the making, using, selling, offering for sale, having made, import, or transfer of either its Contributions or its Contributor Version.
- 1.12. "Secondary License" means either the GNU General Public License, Version 2.0, the GNU Lesser General Public License, Version 2.1, the GNU Affero General Public License, Version 3.0, or any later versions of those licenses.
- 1.13. "Source Code Form" means the form of the work preferred for making modifications.
- 1.14. "You" (or "Your") means an individual or a legal entity exercising rights under this License. For legal entities, "You" includes any entity that controls, is controlled by, or is under common control with You. For purposes of this definition, "control" means (a) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (b) ownership of more than fifty percent (50%) of the outstanding shares or beneficial ownership of such entity.

2. License Grants and Conditions

2.1. Grants

Each Contributor hereby grants You a world-wide, royalty-free, non-exclusive license:

- (a) under intellectual property rights (other than patent or trademark) Licensable by such Contributor to use, reproduce, make available, modify, display, perform, distribute, and otherwise exploit its Contributions, either on an unmodified basis, with Modifications, or as part of a Larger Work; and
- (b) under Patent Claims of such Contributor to make, use, sell, offer for sale, have made, import, and otherwise transfer either its Contributions or its Contributor Version.

2.2. Effective Date

The licenses granted in Section 2.1 with respect to any Contribution become effective for each Contribution on the date the Contributor first distributes such Contribution.

2.3. Limitations on Grant Scope

The licenses granted in this Section 2 are the only rights granted under this License. No additional rights or licenses will be implied from the distribution or licensing of Covered Software under this License. Notwithstanding Section 2.1(b) above, no patent license is granted by a Contributor:

- (a) for any code that a Contributor has removed from Covered Software; or
- (b) for infringements caused by: (i) Your and any other third party's modifications of Covered Software, or (ii) the combination of its Contributions with other software (except as part of its Contributor Version); or
- (c) under Patent Claims infringed by Covered Software in the absence of its Contributions.

This License does not grant any rights in the trademarks, service marks, or logos of any Contributor (except as may be necessary to comply with the notice requirements in Section 3.4).

2.4. Subsequent Licenses

No Contributor makes additional grants as a result of Your choice to distribute the Covered Software under a subsequent version of this License (see Section 10.2) or under the terms of a Secondary License (if permitted under the terms of Section 3.3).

2.5. Representation

Each Contributor represents that the Contributor believes its Contributions are its original creation(s) or it has sufficient rights to grant the rights to its Contributions conveyed by this License.

2.6. Fair Use

This License is not intended to limit any rights You have under applicable copyright doctrines of fair use, fair dealing, or other equivalents.

2.7. Conditions

Sections 3.1, 3.2, 3.3, and 3.4 are conditions of the licenses granted in Section 2.1.

3. Responsibilities

3.1. Distribution of Source Form

All distribution of Covered Software in Source Code Form, including any Modifications that You create or to which You contribute, must be under the terms of this License. You must inform recipients that the Source Code Form of the Covered Software is governed by the terms of this License, and how they can obtain a copy of this License. You may not attempt to alter or restrict the recipients' rights in the Source Code Form.

3.2. Distribution of Executable Form

If You distribute Covered Software in Executable Form then:

(a) such Covered Software must also be made available in Source Code Form, as described in Section 3.1, and You must inform recipients of the Executable Form how they can obtain a copy of such Source Code Form by reasonable means in a timely manner, at a charge no more than the cost of distribution to the recipient; and

(b) You may distribute such Executable Form under the terms of this License, or sublicense it under different terms, provided that the license for the Executable Form does not attempt to limit or alter the recipients' rights in the Source Code Form under this License.

3.3. Distribution of a Larger Work

You may create and distribute a Larger Work under terms of Your choice, provided that You also comply with the requirements of this License for the Covered Software. If the Larger Work is a combination of Covered Software with a work governed by one or more Secondary Licenses, and the Covered Software is not Incompatible With Secondary Licenses, this License permits You to additionally distribute such Covered Software under the terms of such Secondary License(s), so that the recipient of the Larger Work may, at their option, further distribute the Covered Software under the terms of either this License or such Secondary License(s).

3.4. Notices

You may not remove or alter the substance of any license notices (including copyright notices, patent notices, disclaimers of warranty, or limitations of liability) contained within the Source Code Form of the Covered Software, except that You may alter any license notices to the extent required to remedy known factual inaccuracies.

3.5. Application of Additional Terms

You may choose to offer, and to charge a fee for, warranty, support, indemnity or liability obligations to one or more recipients of Covered Software. However, You may do so only on Your own behalf, and not on behalf of any Contributor. You must make it absolutely clear that any such warranty, support, indemnity, or liability obligation is offered by You alone, and You hereby agree to indemnify every Contributor for any liability incurred by such Contributor as a result of warranty, support, indemnity or liability terms You offer. You may include additional disclaimers of warranty and limitations of liability specific to any jurisdiction.

4. Inability to Comply Due to Statute or Regulation

If it is impossible for You to comply with any of the terms of this License with respect to some or all of the Covered Software due to statute, judicial order, or regulation then You must: (a) comply with the terms of this License to the maximum extent possible; and (b) describe the limitations and the code they affect. Such description must be placed in a text file included with all distributions of the Covered Software under this License. Except to the extent prohibited by statute or regulation, such description must be sufficiently detailed for a recipient of ordinary skill to be able to understand it.

5. Termination

5.1. The rights granted under this License will terminate automatically if You fail to comply with any of its terms. However, if You become compliant, then the rights granted under this License from a particular Contributor are reinstated (a) provisionally, unless and until such Contributor explicitly and finally terminates Your grants, and (b) on an ongoing basis, if such Contributor fails to notify You of the non-compliance by some reasonable means prior to 60 days after You have come back into compliance. Moreover, Your grants from a particular Contributor are reinstated on an ongoing basis if such Contributor notifies You of the non-compliance by some reasonable means, this is the first time You have received notice of non-compliance with this License from such Contributor, and You become compliant prior to 30 days after Your receipt of the notice.

5.2. If You initiate litigation against any entity by asserting a patent infringement claim (excluding declaratory judgment actions, counter-claims, and cross-claims) alleging that a Contributor Version directly or indirectly infringes any patent, then the rights granted to You by any and all Contributors for the Covered Software under Section 2.1 of this License shall terminate.

5.3. In the event of termination under Sections 5.1 or 5.2 above, all end user license agreements (excluding distributors and resellers) which have been validly granted by You or Your distributors under this License prior to termination shall survive termination.

6. Disclaimer of Warranty

Covered Software is provided under this License on an "as is" basis, without warranty of any kind, either expressed, implied, or statutory, including, without limitation, warranties that the Covered Software is free of defects, merchantable, fit for a particular purpose or non-infringing. The entire risk as to the quality and performance of the Covered Software is with You. Should any Covered Software prove defective in any respect, You (not any Contributor) assume the cost of any necessary servicing, repair, or correction. This disclaimer of warranty constitutes an essential part of this License. No use of any Covered Software is authorized under this License except under this disclaimer.

7. Limitation of Liability

Under no circumstances and under no legal theory, whether tort (including negligence), contract, or otherwise, shall any Contributor, or anyone who distributes Covered Software as permitted above, be liable to You for any direct, indirect, special, incidental, or consequential damages of any character including, without limitation, damages for lost profits, loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses, even if such party shall have been informed of the possibility of such damages. This limitation of liability shall not apply to liability for death or personal injury resulting from such party's negligence to the extent applicable law prohibits such limitation. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so this exclusion and limitation may not apply to You.

8. Litigation

Any litigation relating to this License may be brought only in the courts of a jurisdiction where the defendant maintains its principal place of business and such litigation shall be governed by laws of that jurisdiction, without reference to its conflict-of-law provisions. Nothing in this Section shall prevent a party's ability to bring cross-claims or counter-claims.

9. Miscellaneous

This License represents the complete agreement concerning the subject matter hereof. If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable. Any law or regulation which provides that the language of a contract shall be construed against the drafter shall not be used to construe this License against a Contributor.

10. Versions of the License

10.1. New Versions

Mozilla Foundation is the license steward. Except as provided in Section 10.3, no one other than the license steward has the right to modify or publish new versions of this License. Each version will be given a distinguishing version number.

10.2. Effect of New Versions

You may distribute the Covered Software under the terms of the version of the License under which You originally received the Covered Software, or under the terms of any subsequent version published by the license steward.

10.3. Modified Versions

If You create software not governed by this License, and you want to create a new license for such software, you may create and use a modified version of this License if you rename the license and remove any references to the name of the license steward (except to note that such modified license differs from this License).

10.4. Distributing Source Code Form that is Incompatible With Secondary Licenses

If You choose to distribute Source Code Form that is Incompatible With Secondary Licenses under the terms of this version of the License, the notice described in Exhibit B of this License must be attached.

Exhibit A - Source Code Form License Notice

This Source Code Form is subject to the terms of the Mozilla Public License, v. 2.0. If a copy of the MPL was not distributed with this file, You can obtain one at <http://mozilla.org/MPL/2.0/>.

If it is not possible or desirable to put the notice in a particular file, then You may include the notice in a location (such as a LICENSE file in a relevant directory) where a recipient would be likely to look for such a notice.

You may add additional accurate notices of copyright ownership.

Exhibit B - "Incompatible With Secondary Licenses" Notice

This Source Code Form is "Incompatible With Secondary Licenses", as defined by the Mozilla Public License, v. 2.0.

Copyright (c) (CopyrightHoldersName) (From 4-digit-year)-(To 4-digit-year)

Permission to use, copy, modify, and distribute this software and its documentation for any purpose with or without fee is hereby granted, provided that the above copyright notice appears in all copies and that both the copyright notice and this permission notice appear in supporting documentation, and that the name (TrademarkedName) not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. (TrademarkedName) makes no representations about the suitability this software for any purpose. It is provided "as is" without express or implied warranty.

OFL-1.1

SIL OPEN FONT LICENSE

Version 1.1 - 26 February 2007

PREAMBLE

The goals of the Open Font License (OFL) are to stimulate worldwide development of collaborative font projects, to support the font creation efforts of academic and linguistic communities, and to provide a free and open framework in which fonts may be shared and improved in partnership with others.

The OFL allows the licensed fonts to be used, studied, modified and redistributed freely as long as they are not sold by themselves. The fonts, including any derivative works, can be bundled, embedded, redistributed and/or sold with any software provided that any reserved names are not used by derivative works. The fonts and derivatives, however, cannot be released under any other type of license. The requirement for fonts to remain under this license does not apply to any document created using the fonts or their derivatives.

DEFINITIONS

"Font Software" refers to the set of files released by the Copyright Holder(s) under this license and clearly marked as such. This may include source files, build scripts and documentation.

"Reserved Font Name" refers to any names specified as such after the copyright statement(s).

"Original Version" refers to the collection of Font Software components as distributed by the Copyright Holder(s).

"Modified Version" refers to any derivative made by adding to, deleting, or substituting — in part or in whole — any of the components of the Original Version, by changing formats or by porting the Font Software to a new environment.

"Author" refers to any designer, engineer, programmer, technical writer or other person who contributed to the Font Software.

PERMISSION & CONDITIONS

Permission is hereby granted, free of charge, to any person obtaining a copy of the Font Software, to use, study, copy, merge, embed, modify, redistribute, and sell modified and unmodified copies of the Font Software, subject to the following conditions:

1) Neither the Font Software nor any of its individual components, in Original or Modified Versions, may be sold by itself.

2) Original or Modified Versions of the Font Software may be bundled, redistributed and/or sold with any software, provided that each copy contains the above copyright notice and this license. These can be included either as stand-alone text files, human-readable headers or in the appropriate machine-readable metadata fields within text or binary files as long as those fields can be easily viewed by the user.

3) No Modified Version of the Font Software may use the Reserved Font Name(s) unless explicit written permission is granted by the corresponding Copyright Holder. This restriction only applies to the primary font name as presented to the users.

4) The name(s) of the Copyright Holder(s) or the Author(s) of the Font Software shall not be used to promote, endorse or advertise any Modified Version, except to acknowledge the contribution(s) of the Copyright Holder(s) and the Author(s) or with their explicit written permission.

5) The Font Software, modified or unmodified, in part or in whole, must be distributed entirely under this license, and must not be distributed under any other license. The requirement for fonts to remain under this license does not apply to any document created using the Font Software.

TERMINATION

This license becomes null and void if any of the above conditions are not met.

DISCLAIMER

THE FONT SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF COPYRIGHT, PATENT, TRADEMARK, OR OTHER RIGHT. IN NO EVENT SHALL THE COPYRIGHT HOLDER BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, INCLUDING ANY GENERAL, SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF THE USE OR INABILITY TO USE THE FONT SOFTWARE OR FROM OTHER DEALINGS IN THE FONT SOFTWARE.

OpenSSL

OpenSSL License

Copyright (c) 1998-2008 The OpenSSL Project. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. All advertising materials mentioning features or use of this software must display the following acknowledgment: "This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<http://www.openssl.org/>)"

4. The names "OpenSSL Toolkit" and "OpenSSL Project" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact openssl-core@openssl.org.

5. Products derived from this software may not be called "OpenSSL" nor may "OpenSSL" appear in their names without prior written permission of the OpenSSL Project.

6. Redistributions of any form whatsoever must retain the following acknowledgment: "This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (<http://www.openssl.org/>)"

THIS SOFTWARE IS PROVIDED BY THE OpenSSL PROJECT "AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE OpenSSL PROJECT OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Original SSLeay License

Copyright (C) 1995-1998 Eric Young (eay@cryptsoft.com) All rights reserved.

This package is an SSL implementation written by Eric Young (eay@cryptsoft.com). The implementation was written so as to conform with Netscapes SSL.

This library is free for commercial and non-commercial use as long as the following conditions are aheared to. The following conditions apply to all code found in this distribution, be it the RC4, RSA, Ihash, DES, etc., code; not just the SSL code. The SSL documentation included with this distribution is covered by the same copyright terms except that the holder is Tim Hudson (tjh@cryptsoft.com).

Copyright remains Eric Young's, and as such any Copyright notices in the code are not to be removed. If this package is used in a product, Eric Young should be given attribution as the author of the parts of the library used. This can be in the form of a textual message at program startup or in documentation (online or textual) provided with the package.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. All advertising materials mentioning features or use of this software must display the following acknowledgement:

"This product includes cryptographic software written by Eric Young (eay@cryptsoft.com)"

The word 'cryptographic' can be left out if the rouines from the library being used are not cryptographic related :-).

4. If you include any Windows specific code (or a derivative thereof) from the apps directory (application code) you must include an acknowledgement: "This product includes software written by Tim Hudson (tjh@cryptsoft.com)"

THIS SOFTWARE IS PROVIDED BY ERIC YOUNG "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

The licence and distribution terms for any publically available version or derivative of this code cannot be changed. i.e. this code cannot simply be copied and put under another distribution licence [including the GNU Public Licence.]

The Open Group License

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation.

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE OPEN GROUP BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of The Open Group shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from The Open Group.

X11

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of the authors or copyright holders shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization from the authors or copyright holders.

Zlib

zlib License

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.

2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.

3. This notice may not be removed or altered from any source distribution.

curl

Copyright (c) 1996 - 2015, Daniel Stenberg, <daniel@haxx.se>
All rights reserved.

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OF THIRD PARTY RIGHTS. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

Except as contained in this notice, the name of a copyright holder shall not be used in advertising or otherwise to promote the sale, use or other dealings in this Software without prior written authorization of the copyright holder.

libtiff

Permission to use, copy, modify, distribute, and sell this software and its documentation for any purpose is hereby granted without fee, provided that (i) the above copyright notices and this permission notice appear in all copies of the software and related documentation, and (ii) the names of Sam Leffler and Silicon Graphics may not be used in any advertising or publicity relating to the software without the specific, prior written permission of Sam Leffler and Silicon Graphics.

THE SOFTWARE IS PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EXPRESS, IMPLIED OR OTHERWISE, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

IN NO EVENT SHALL SAM LEFFLER OR SILICON GRAPHICS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES OF ANY KIND, OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER OR NOT ADVISED OF THE POSSIBILITY OF DAMAGE, AND ON ANY THEORY OF LIABILITY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.