San Ace Controller

Instruction Manual

9CT1 Series

SANYO DENKI

Safety Precautions

Please read this instruction manual and its appendix carefully prior to installation, operation, maintenance or inspection and perform all tasks according to the instructions provided here.
A good understanding of this equipment, its safety information as well as all Warnings/Cautions is also necessary prior to operation.
Matters that require attention are ranked as "Warning" and "Caution" in this document.

Warning Symbol

⚠ **WARNING**	Denotes immediate hazards which could cause severe bodily injury or death as a result of incorrect operation.
⚠ **CAUTION**	Denotes hazards which could cause bodily injury and product or property damage as a result of incorrect operation.

Even those hazards denoted by this symbol ⚠**CAUTION** could lead to a serious accident.
Make sure to strictly follow these safety precautions.

⚠ WARNING

- If the product is used in medical appliances or other types of equipment that affect people's lives, sufficient safety-related evaluations and preparations must be made in advance, and the product or the type of equipment into which the product is assembled must be used under the full responsibility of the user.
- If the product is used in types of equipment that have a strong social and public impact, sufficient prior evaluations and safety-related evaluations and preparations must be made, and the product or the type of equipment into which the product is assembled must be used under the full responsibility of the user.
- The product is not designed to be used in a car or a ship. When using the product in an environment with vibration, such as in a car or a ship, use it at your own discretion only after deploying sufficient safety measures and making prior evaluations.
- Connect all wires properly and securely. Failure to do so may result in fire, burns, or electrical shock.
- Never use in explosive atmospheres, as doing so might result in fires, burns, or bodily injury. Otherwise, it may result in fire, burns, or bodily injury.
- Do not operate the product when electronic components are exposed. Failure to do so may result in electrical shock.
- Turn off the power and stop using the product immediately if you notice any sparks, smoke, odd odors, sounds, or anything unusual during operation. Failure to do so may result in fire, bodily injury, or electrical shock.
- Never allow the product to fall, topple over, or otherwise be subjected to excessive shocks when moving it. Otherwise, it may result in product failure.
- The product should be handled only by personnel with sufficient training and knowledge and under the full responsibility of the user.
- Never attempt to disassemble, repair, or alter the product in any way. Doing so may result in fire, bodily injury, or electrical shock.

⚠ CAUTION

Handling

- Installation, placement, connections, wiring, or relocation of the product should be performed by knowledgeable or correctly licensed personnel. Never perform such work while the product is on. Doing so may result in fire, burns, or electrical shock.
- Never allow yourself to come into contact with the ends of wires or plugs when measuring insulation resistance or dielectric strength voltage. Failure to do so may result in electrical shock.
- Never attempt to disassemble or alter the product in any way. Doing so may invalidate any warranties concerning the functions or performance of the product, and may also result in fire, burns, bodily injury, or electrical shock.

Operating Precautions

- Take measures to protect the device from potential damage caused by the product stopping during operation.
- Never use the product at voltages, temperatures, or any other settings which exceed those given in the product specifications. This might result in substandard operation, breakdown, fire, bodily injury, or electrical shock.
- Do not remove the nameplate. Do not install the product so that the identification cannot be seen after installation.
- Turn the power supply ON/OFF using the power switch on the product. Otherwise, it may result in product failure.
- Do not use the product with a negative power supply. Otherwise, it may result in product failure.
- Do not apply excessive force to the product while it is operating. Otherwise, it may result in product failure.
- If you install and use the product in a car or a ship, we shall not be responsible for any faults caused by the environment of the car or ship in which the product is installed.

Installation

- When fixing the product into place, be sure to take into consideration the product's weight and all other relevant factors. Failure to do so may result in the product or its parts falling, resulting in bodily injury or device failure.
- Do not block the airflow openings of the product. Failure to do so may result in device failure, product failure, or product malfunction.
- When fixing the product with screws, ensure correct tightening torque. If the tightening torque is over the recommended values, the product structure may deform or break.
- Take proper precautions against static electricity when making electrical connections. Failure to do so may result in device or product failure.
- Make electrical connections properly. Failure to do so may result in device failure, product failure, or product malfunction.
- Ensure that wires are fitted with insulation to prevent accidental short circuiting. Failure to do so may result in device failure, product failure, or product malfunction.

Operating environment

- Do not use or store the product where it is exposed to flammable or corrosive gas, water or oil splashes, dust or humidity, condensation, radioactive rays or direct sunlight, salty air or saltwater, or where the product may be contaminated by corrosive materials such as sulfurous water, sulfurous volcanic ash, organic solvents, acidic chemicals, alkali chemicals, nuclear fuel materials, or other hazardous substances. Failure to do so may result in fire, failure, or product deterioration.
- Do not use or store the product in locations and environments where it could be constantly exposed to vibrations, strong shocks, magnetic or electromagnetic noise, or in which electromagnetic noise overlaps into power voltage. Otherwise, it may result in product failure.
- Do not use or store the product in environments subject to sudden changes in temperature and humidity. Otherwise, it may result in product failure.

⚠ CAUTION

Maintenance

- Only certified personnel with sufficient training and knowledge should perform maintenance and inspections. Otherwise, it may result in fire, burns, bodily injury, or electrical shock.
- Perform maintenance or inspections while the product is off. Otherwise, it may result in fire, burns, bodily injury, or electrical shock,
- Never use gasoline, paint thinner, benzene, or any other organic solvents to clean the product. Otherwise, it may result in product deformation or substandard operation.

Radio wave

- Disassembling or altering the radio wave circuit of this product may be punishable by law.
- This product uses a frequency band of 2.4 GHz to transmit radio waves. Radio wave interference may occur if this product is used in the vicinity of the following equipment or a radio station.
    - Industrial, scientific, or medical equipment (such as microwave ovens, wireless LAN devices, security devices, or cardiac pacemakers)
    - Radio stations for which no license is required (specific power-saving radio stations)
    - Radio stations for which a license is required (local wave stations used on factory production lines, etc. to identify moving objects, or amateur radio stations)
- If this product affects a cardiac pacemaker or other medical equipment, immediately turn OFF the power to this product.
- Do not use this product in the vicinity of a microwave oven, in a location where static electricity or electromagnetic interference occurs, or in a room shielded by metallic doors. Radio waves may not reach the target device depending on the environment.

Other Precautions

- This product falls into the category of the products specified in the Appended Table 1, Item 16 (Class 90, Item 32) of the Export Trade Control Order. To export the product as an individual part or to export a product into which the product is assembled, the "Informed Condition" and "Objective Condition" that the Ministry of Economy, Trade and Industry of Japan established based on the "Catch-All Controls" must be studied for applicability. Accordingly, appropriate export formalities must be performed.
- When disposing the product, treat it as industrial waste. Please contact your local government office for further details about disposal.

Preface

Thank you for purchasing the San Ace *Controller*.
Please read this instruction manual thoroughly before using this product to fully understand its functions.
Also read the instruction manual during operation where appropriate.
After thoroughly reading this manual, keep it handy for reference.

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Disclaimer

- It is prohibited to reproduce or copy in part or in whole this manual without permission.
- The contents of this manual have reviewed with the utmost care; however, if you have any comments, please contact SANYO DENKI.
- Note that the descriptions or images in the manual may not be up to date due to product version upgrades.
- Contents of this manual are subject to change without prior notice.
- Read this manual carefully and understand the functions before using this product.

Expressions used in this manual

The following expressions are used in this manual.

- The "**controller**" in this manual means The San Ace Controller.
- The "**default**" in this manual means the setting values of the controller that were set prior to shipment from the factory.
- The following expressions are used for different types of computers.
  - **Initial setting PC:** Computers used to configure initial settings of the controller
  - **Local**: Computers used to run the controller within a LAN
  - **Cloud**: Computers, etc. used to run the controller in a cloud

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Chapter 1 Before Using the Product

1.1. Flow from controller installation to operation

This section describes the procedure for using the San Ace Controller.

Be sure to follow the procedure to use the product correctly and safely.

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Configuring the initial settings of the controller   ⇒ **Page 3-5**
- **Setting the language and time**
- **Configuring the fan settings**
- **Configuring the sensor settings**
- **Setting the control information for fans and sensors**
- **Setting an operation when an event is detected**
- **Setting external input/output**
- **Configuring the account settings**
- **Configuring the network settings**
- **Configuring the cloud settings**

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Logging out of San Ace Controller	⇒ **Page 3-31**

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1.2. Introduction of controller functions

This section introduces the controller functions.

1.2.1 Outline

The San Ace Controller can perform automatic control and remote monitoring of fans with PWM control function.

By using the cloud (San Ace NET), you can operate it from anywhere in an environment that has an Internet connection.

1.2.2. Main functions

The following introduces the main functions of the controller.

- Fan control function

  The controller can control fans with PWM control function.

  Two control methods are available: Automatic and manual.

- Measurement

  The controller measures the speed and current value of fans as well as the values of sensors that are connected to the controller.

- Remote settings, control, and monitoring

  The controller settings can be remotely configured on a local area network or cloud. Fans can be remotely controlled. Fans, sensors, and external devices can be remotely monitored.

- Alarm function

  Users can be notified of selected alarms via email, LED, or the web browser screen, or by external output signals.

- Saving and downloading measurement data

  The fan and sensor data the controller measured is saved to memory inside the controller or to a cloud.

  The stored data can also be downloaded.

1.3. Controller connection image

The following diagram is an image of controller connection with fans, sensors, the local, the cloud, and an external input/output device.
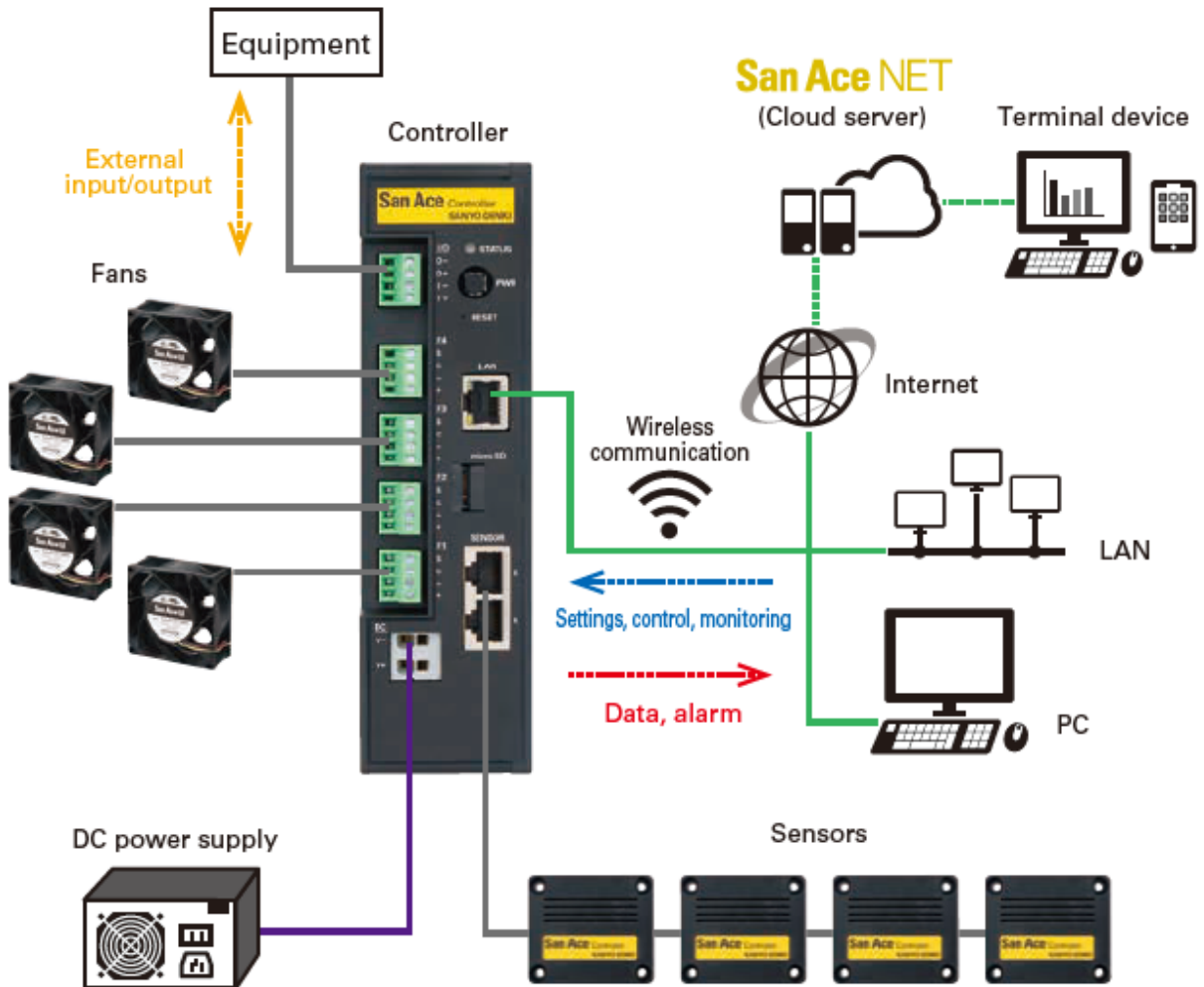
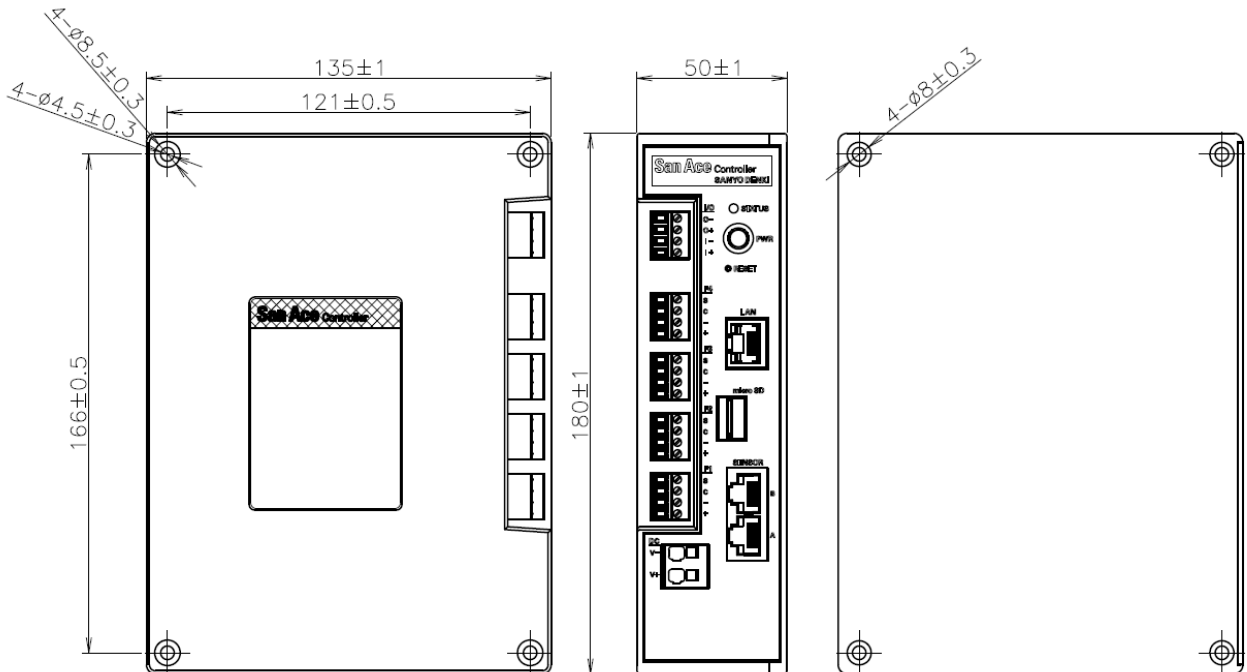# Chapter 2 Controller Installation

2.1. External dimensions and part names

Check the external dimensions and part names of the controller.
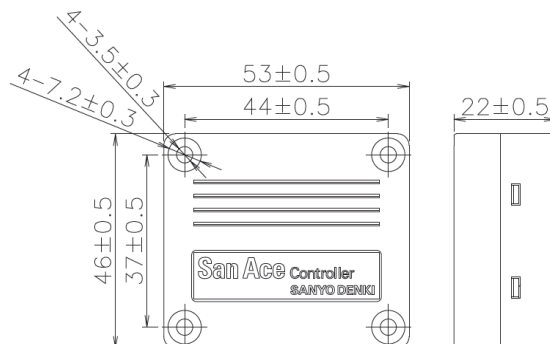
2.1.1. External dimensions

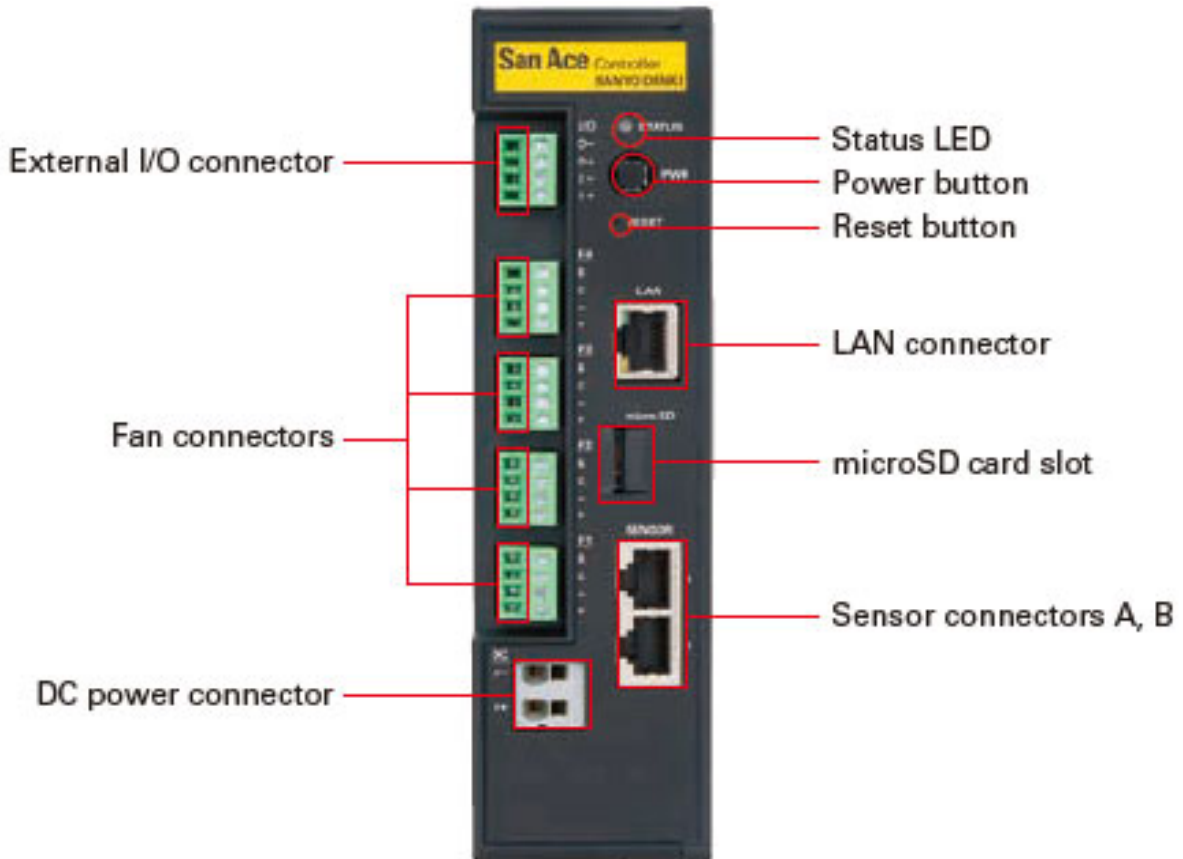The following figures show external dimensions of the controller and sensor.

■ Controller

■ Sensor (optional)

2.1.2. Part names

Part names of the controller are shown in the following figure.

■ **Description of each part**

	Name	Indication (from top)	Description
[1]	DC power connector	DC V− V+	This connector is for DC power supply. ■ **PIN assignment** V− : DC power supply − V+ : DC power supply +(7 to 60 V) ■ **Cable used** AWG8 to 20 Select a cable by taking into consideration the current of the fan to be connected and the ambient temperature of the controller.

■ Description of each part (continue)

	Name	Indication (from top)	Description

[2]	Fan connector	F4 to F1
		S
		C
		−
		+
			These connectors are for fans.
			
			■ **PIN assignment**
			  S : Sensor (pulse sensor)
			  C : Control (PWM)
			  − : Power −
			  + : Power+
			
			■ **Cable used**
			  AWG14 to 30

[3]	External input/output connector	IO
		O−
		O+
		I−
		I+
			This connector is for an external device.
			
			■ **PIN assignment**
			  O− : External output − (COM)
			  O+ : External output +
			  I− : External input − (COM)
			  I+ : External input +
			
			■ **Cable used**
			  AWG14 to 30

[4]	Sensor connector	SENSOR B A	These connectors are for sensors. Two ports, A and B, are available. ■ **Cable used** LAN cable (CAT5e or higher) The maximum length of the cable (allowable for both the A and B ports) is 100 meters.
[5]	microSD slot	micro SD	This slot is for a micro SD card. The card may be used to upgrade the controller software.
[6]	LAN connector	LAN	This connector is a LAN interface modular jack (RJ45). Use this to connect network. Connect the controller to a hub or similar device by using a network cable. Transmission speed (100 Mbps/10 Mbps) is automatically detected. ■ **Cable used** LAN cable (CAT5e or higher)
[7]	Reset button	RESET	Use this button to reset the settings of the controller IP address and account to default. To reset, press and hold this button for approximately three seconds.
[8]	Power button	PWR	This button is for turning the power to the controller ON or OFF. • To turn the power ON, press and hold the button for approximately three seconds. • To turn the power OFF, press and hold the button for approximately three seconds. • To shutdown the controller forcibly, press and hold this button for six seconds or more. When a DC voltage is inputted to the DC power connector, the controller turns ON without pressing the power button.
[9]	Status LED	STATUS	This LED indicates the operation status of the controller. • Green: Running • Orange: Starting or shutting down • Red: An alarm is occurring.

2.2. Device installation

Secure the controller and sensor using screws.

For information about screw hole positions, see "2.1.1 External dimensions".

■ **Controller main unit**

Secure the controller on the installation position using four screws.

✓ **M4 screws** must be used.

✓ The required tightening torque is **0.78 N·m** or less.

✓ Ensure that no walls or other objects are blocking the vents on the upper or rear faces. Keep a distance of at least 3 cm from the wall or other objects.
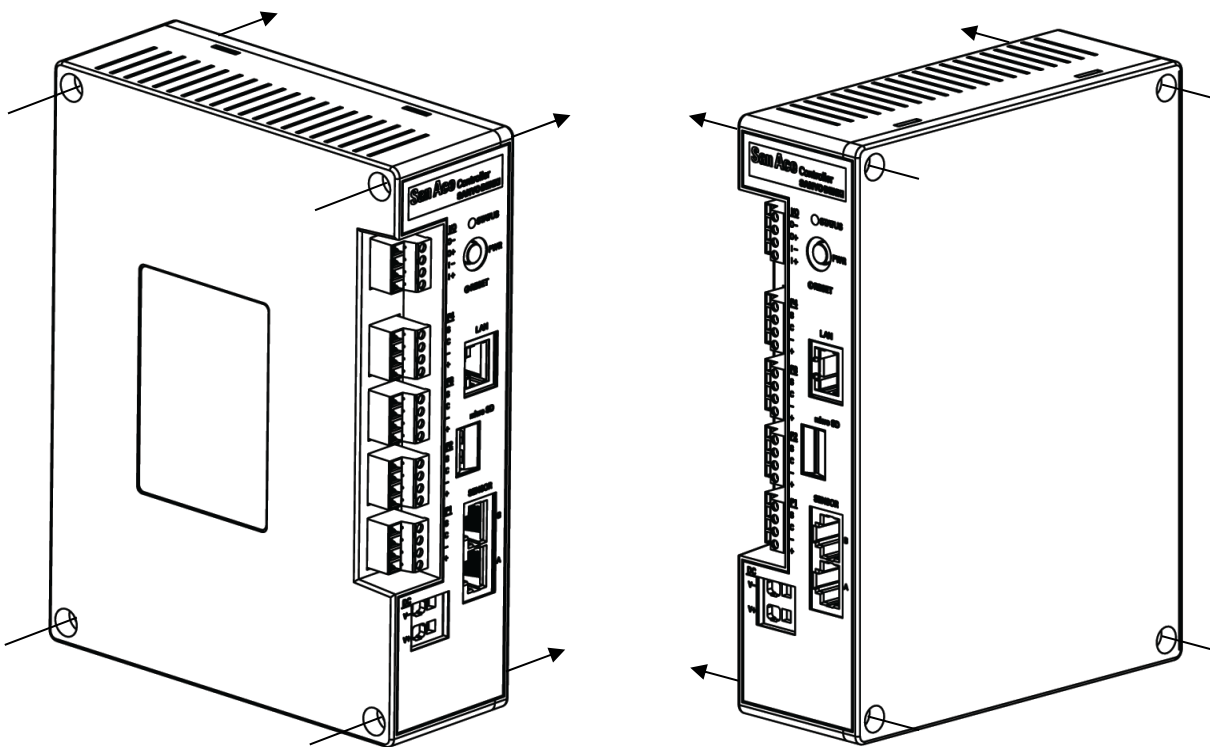
■ **Sensor (optional)**

Secure the sensor on the installation position using four screws.

Ensure that no walls or other objects are blocking the vents on the upper or rear faces.

✓ **M3 screws** must be used.

✓ The required tightening torque is **0.44 N·m** or less.
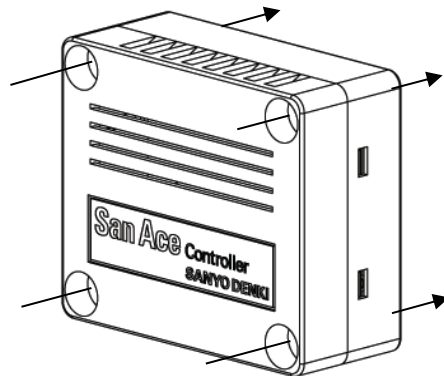
2.3.　Connections

Take the following steps to connect devices to the controller.

1. Connecting controller and fans
2. Connecting controller and external devices
3. Connecting controller and sensors
4. Connecting controller and DC power supply
5. Connecting controller and initial setting PC
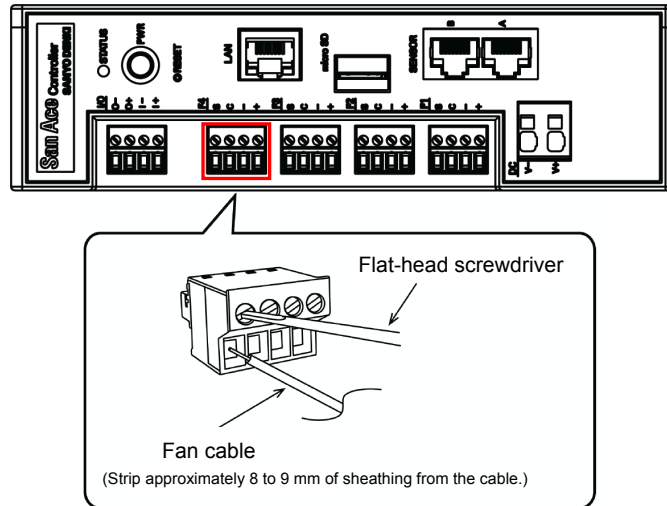
2.3.1. Connecting controller and fans

Connect fans to the controller.

- ✓ The applicable cable is **AWG14** to **30**. The recommended length of sheath to strip is 8 to 9 mm.
- ✓ When using, make sure that the values of the DC power supply output voltage, controller input voltage, and fan input voltage are correct as these can vary due to factors such as fan current, wiring conditions, and voltage drops generated from the controller internal circuit.
- ✓ The PWM signal output may be subject to noise and impedance due to the wiring conditions. Use wires as thick and short as possible.

■ Connector positions

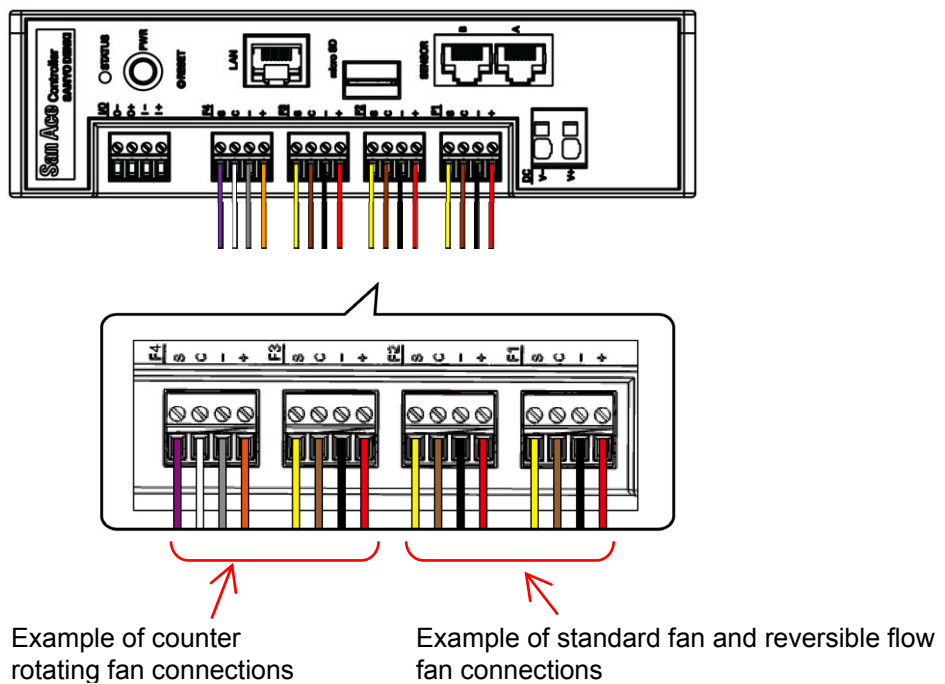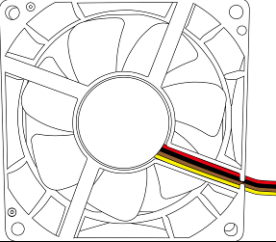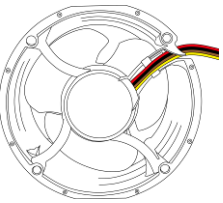Check the fan connector positions (F1 to F4), and connect fan cables.
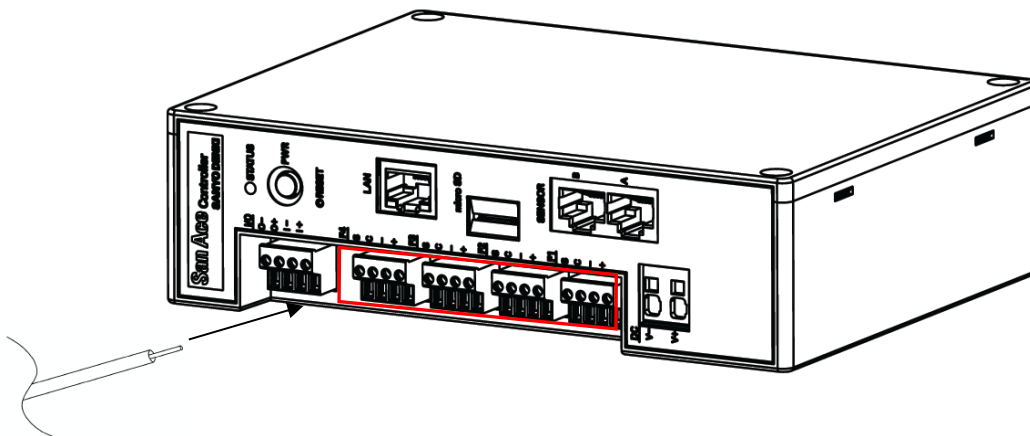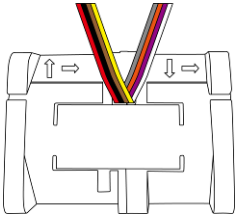
■ Cable connection

Attach the fan cables to the connector terminals using a flat-head screwdriver (0.4mmx2.5mm for the precision use is recommended).

Flat-head screwdriver

Fan cable
(Strip approximately 8 to 9 mm of sheathing from the cable.)

■ Wiring

Wire the cables as shown in the following figures.

Example of counter
rotating fan connections

Example of standard fan and reversible flow
fan connections

| Fan type	Wiring (when using SANYO DENKI standardized fans)
Ex.: Standard fan	+ : Red (Fan +) − : Black (Fan −) C : Brown (Fan control) S : Yellow (Fan pulse sensor)
Ex.: Reversible flow fan	+ : Red (Fan +) − : Black (Fan −) C : Brown (Fan control) S : Yellow (Fan pulse sensor)

Ex.: Counter rotating fan	Inlet
	  + : Red (Fan +)
	  − : Black (Fan −)
	  C : Brown (Fan control)
	  S : Yellow (Fan pulse sensor)
	Outlet
	  + : Orange (Fan +)
	  − : Gray (Fan −)
	  C : White (Fan control)
	  S : Purple (Fan pulse sensor)
	
	To connect a counter rotating fan, use one of the following combinations.
	
	Combination 1:
	Connect the inlet to the F1 connector, and the outlet to F2.
	
	Combination 2:
	Connect the inlet to the F3 connector, and the outlet to F4.

2.3.2. Connecting controller and external devices

Connect an external device to the controller.

✓ The applicable cable is **AWG14** to **30**. The recommended length of sheath to strip is 8 to 9 mm.
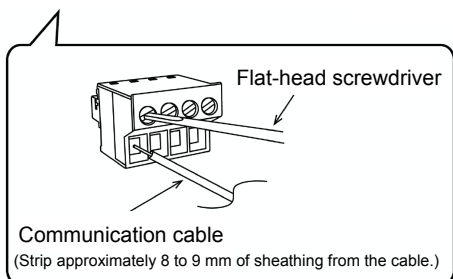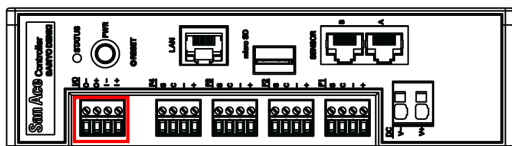✓ Turn the power to the external device OFF before starting connection work.

■ Connector positions

Check the position of the external input/output connector (I/O), and connect the cables for the external device.
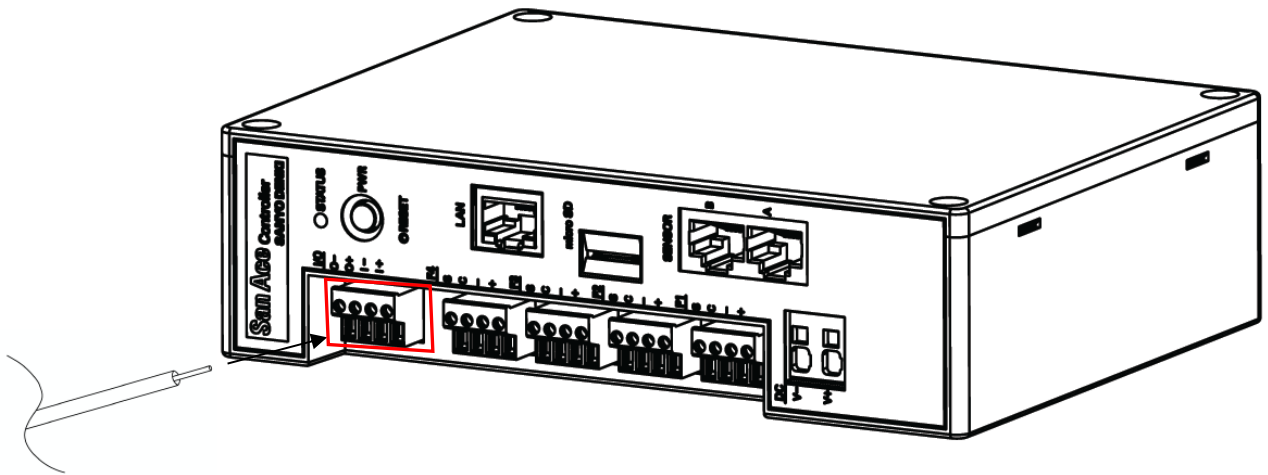
■ Cable connection

Attach the cables to the connector terminals using a flat-head screwdriver (0.4mmx2.5mm for the precision use is recommended).

I/O Connector Connection

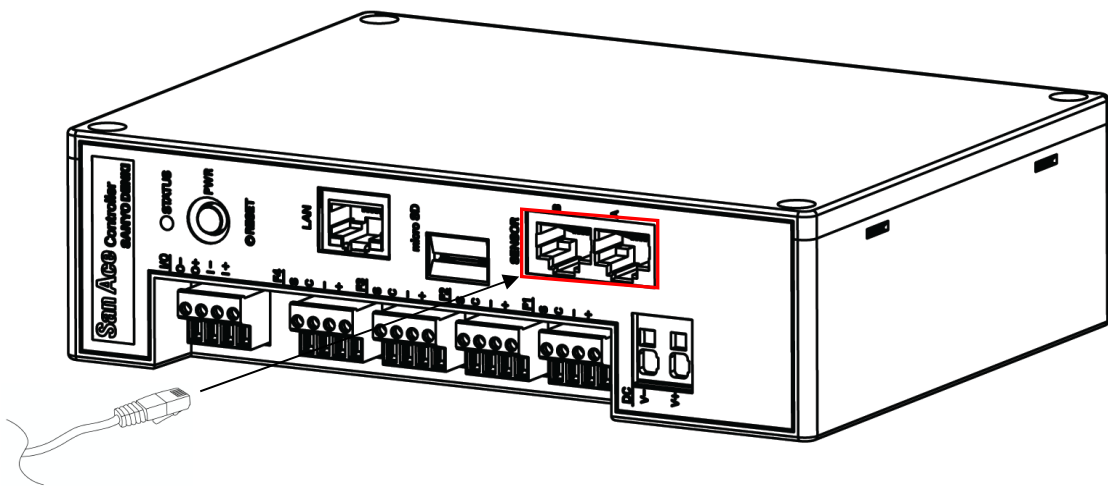| Connector symbol	Function
I+	External input +
I−	External input − (COM)
O+	External output +
O−	External output − (COM)

2.3.3. Connecting controller and sensors

Connect sensors to the controller using LAN cables.

✓ For the LAN cable, use **CAT5e** or higher specification.

■ Connector position and cable connection
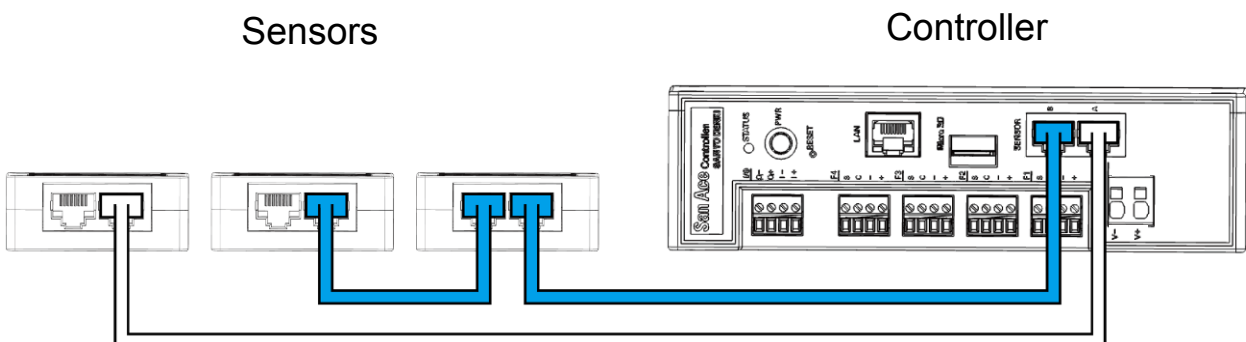Check the sensor connector position (A or B), and connect the LAN cable.

■ Sensor connection
Two sensor ports are available. Use one of them to connect a sensor to the controller using the LAN cable.
When using two or more sensors, connect sensors serially.
Up to four sensors can be connected by using A and B connectors on the controller.

Sensors   Controller

2.3.4. Connecting controller and DC power supply

Connect the DC power supply to the controller.

✓ The applicable cable is **AWG14** to **30**. The recommended length of sheath to strip is 10 to 12 mm.
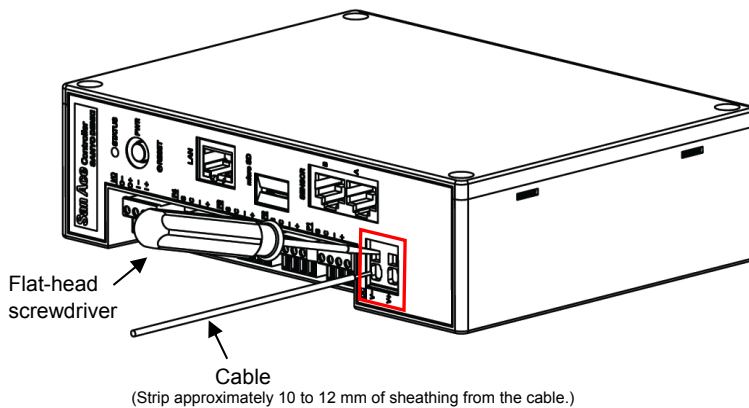
■ Connector positions

Check the position of the DC power supply connector (DC), and connect the cables for the DC power supply.
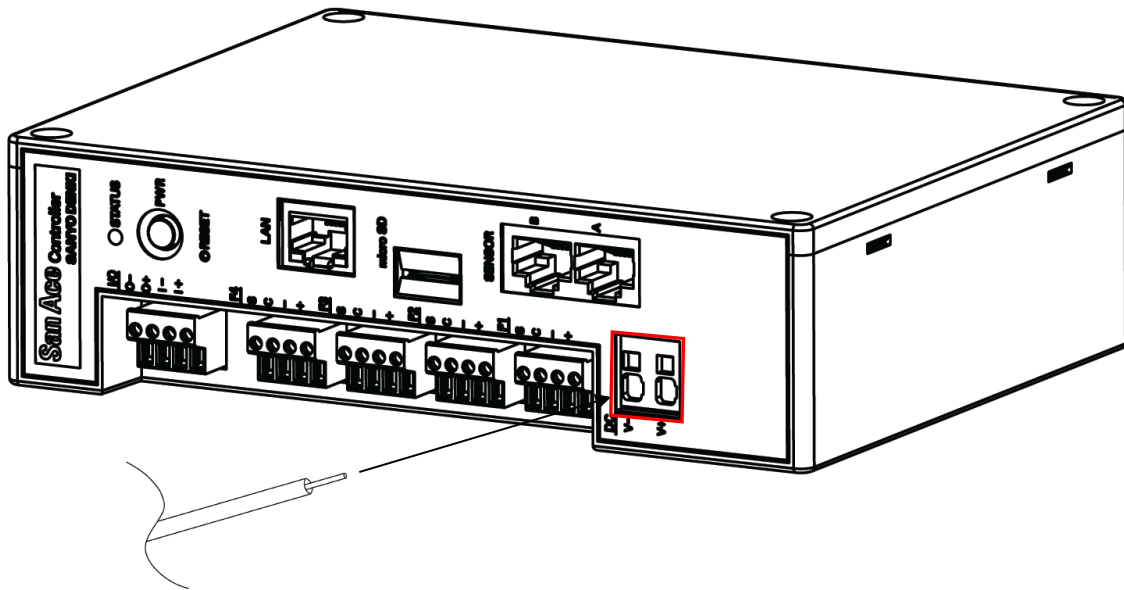
■ Cable connection

Attach the cables to the connector terminals using a flat-head screwdriver (0.4mmx2.5mm for the precision use is recommended.

DC Connector Connection

Connector symbol	Function
V+	DC power supply +
V−	DC power supply −

Flat-head screwdriver

Cable
(Strip approximately 10 to 12 mm of sheathing from the cable.)

After connecting the controller and DC power supply, turn ON the DC power supply.

Turning ON the DC power automatically turns ON the power to the controller.

2.3.5. Connecting controller and initial setting PC

Connect the initial setting PC to the controller.

1. Connect the LAN cable.
2. Assign IP address for initial setting PC.

✓ The controller can be operated with a cloud, but the cloud cannot be used for the initial settings.
   The initial settings must be configured by connecting the initial setting PC to the controller using a LAN cable.

✓ You can only configure the initial settings for a single controller, and not for multiple controllers at a time.
   When multiple controllers are used, configure them one at a time.

2.3.5.1. Connecting LAN cable

Connect the initial setting PC with the controller using a LAN cable.

✓ For the LAN cable, use **CAT5e** or higher specification.
✓ You can also use a hub for the connection.
   For the initial settings, however, connect only the controller and initial setting PC to the hub. This is because the default IP address assigned to the controller prior to the initial settings may overlap a connected device.
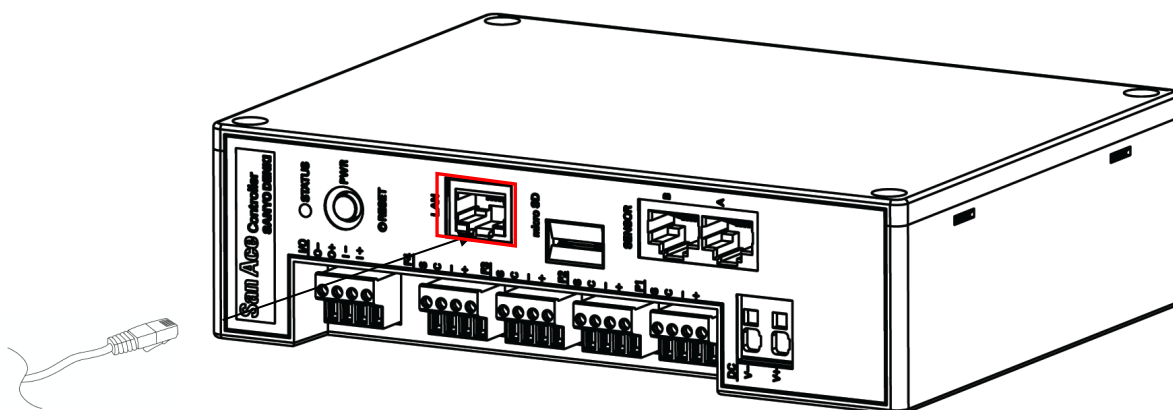
Connect the network cable to the LAN connector on the controller.

When the network is available, the link LED of the LAN connector lights up green.

Lit
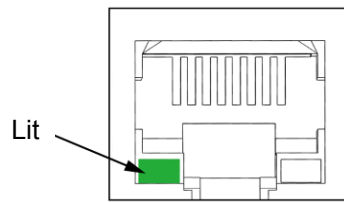
✓ The controller automatically detects the baud rate (100 Mbps or 10 Mbps) of the LAN connector.
✓ If the controller is connected a hub capable of changing the baud rate setting, set the baud rate setting of the hub to automatic recognition for the port to which this device is connected.
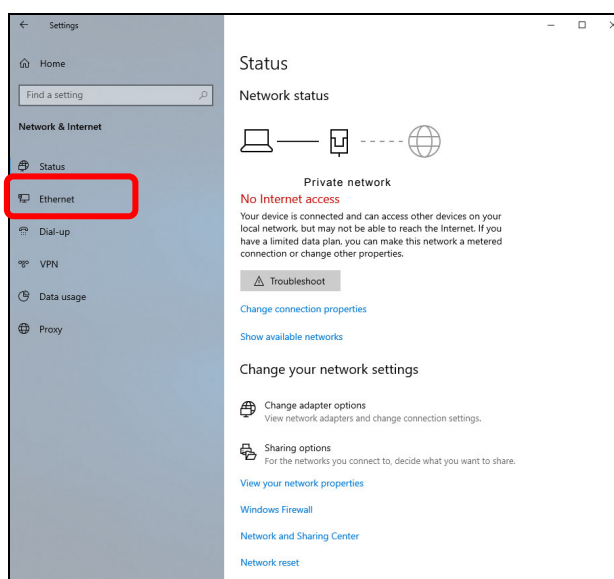
2.3.5.2. Assigning IP address for initial setting PC

For the initial setting PC to access the controller, you must assign an IP address to the PC.

- The following description is based on Windows10.
- These steps differ depending on the Windows version.
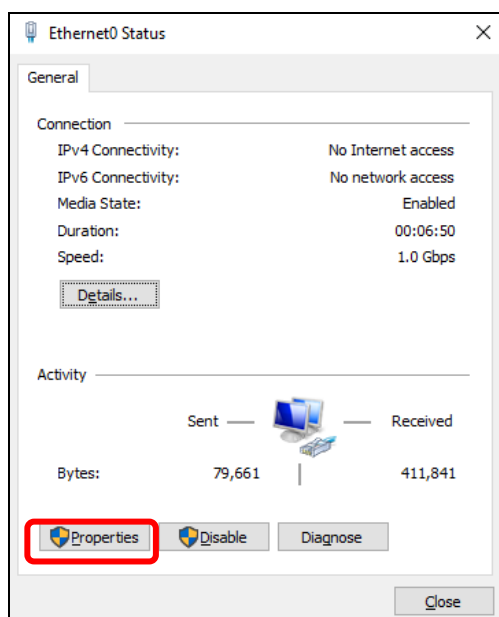
[1] From Windows "Set", select "Network and Internet".
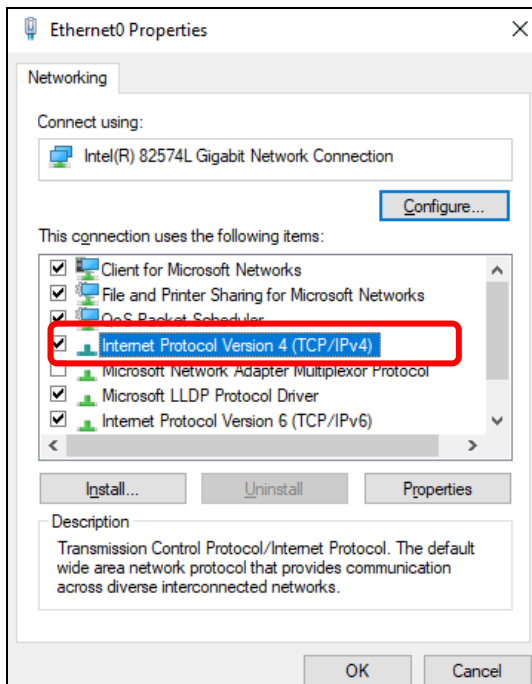
The screen shown below appears.

[2] From "Ethernet", select "Change adapter options" then select Ethernet.
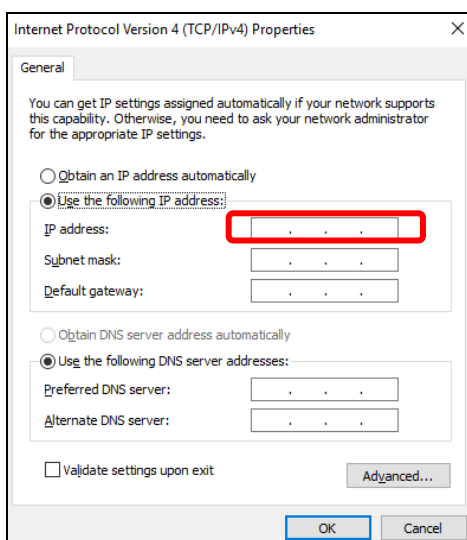
The screen shown below appears.

[3]   Click "Property" used.

The screen shown below appears.

[4]   Select the Internet protocol to be used and double-click it.

[5]   Assign an IP address.

The IP address you assign must not overlap the default IP address of the controller (192.168.1.1).

Example: 192.168.1.2

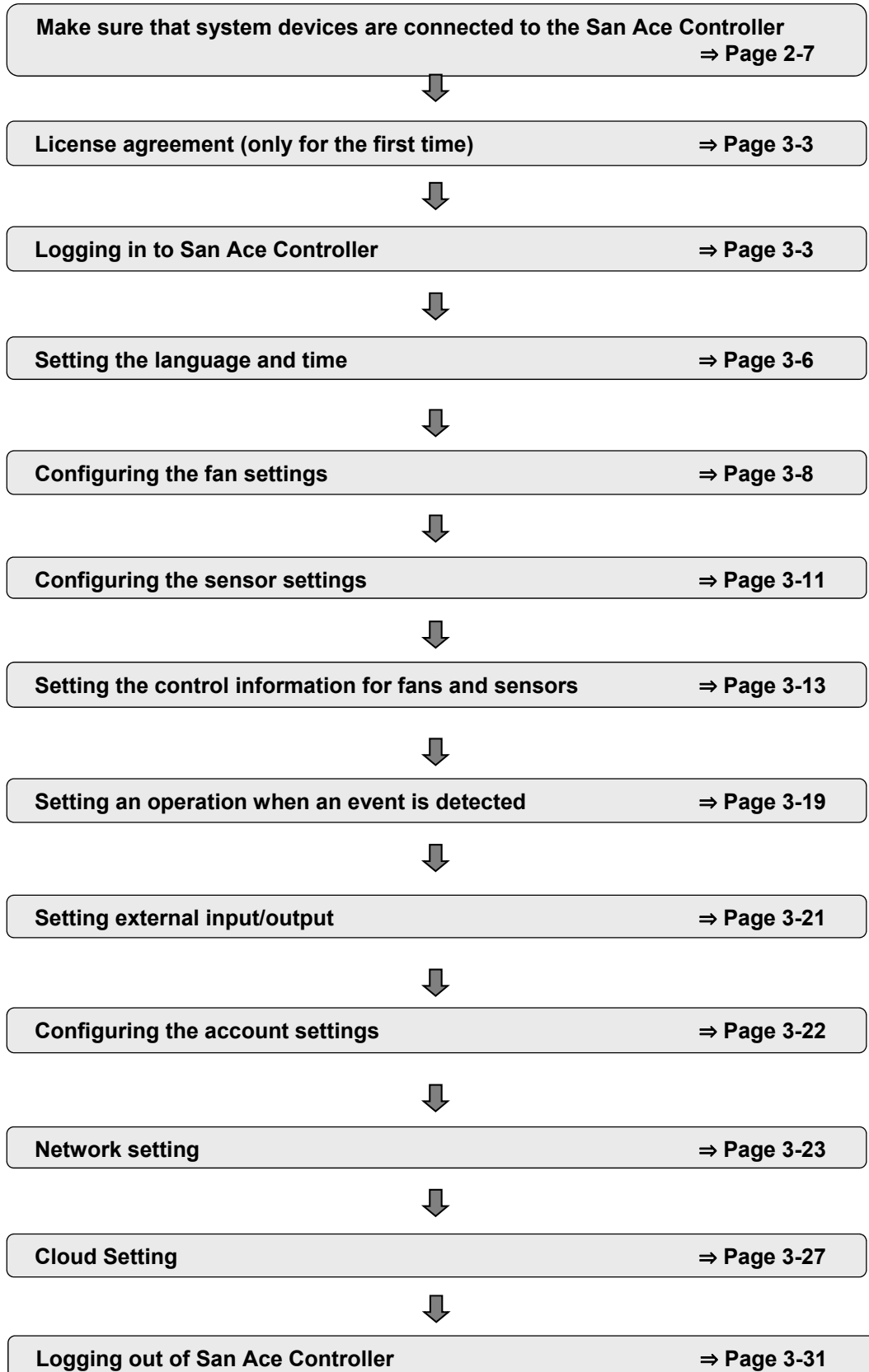✓ Numbers 0 and 255 cannot be used for the last octet.

[6]   After you complete the settings, click the [OK] button.

Chapter 3   Initial Settings of Controller

3.1. Flow of initial settings

This section defines the initial settings of the controller.

Make sure that system devices are connected to the San Ace Controller	**⇒ Page 2-7**

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License agreement (only for the first time)	**⇒ Page 3-3**

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Setting the language and time	**⇒ Page 3-6**

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Configuring the fan settings	**⇒ Page 3-8**

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Setting the control information for fans and sensors	**⇒ Page 3-13**

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Configuring the account settings	**⇒ Page 3-22**

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Cloud Setting	**⇒ Page 3-27**

⬇

Logging out of San Ace Controller	**⇒ Page 3-31**

3.2. Logging in to San Ace Controller

Log in to the controller.

[1]   Start the Web browser.

We recommend that you use the latest version of the following browsers.

- Microsoft Edge
- Mozilla Firefox
- Google Chrome
- Safari

[2]   Enter the controller IP address in the address bar of the Web browser.

IP address: http:// 192.168.1.1/

[3]   Confirmation of license agreement

When you start the controller for the first time, the license agreement screen is displayed.

If you agree to the license, click [Agree].

If you disagree, you cannot use the controller.

[4]   Login

The Controller will start up, and the Login screen will appear. (The English language screen is displayed for the first time.)

[5] Enter the account and password.

You can log in as either the administrator user or the user.

The following table describes the default values for account information.

	Administrator	User
Account	Admin	User
Password	Admin12345 The characters are case sensitive.	User12345 The characters are case sensitive.
Privileges	All functions are available.	This user can use the following functions. • Measured value display function • Alarm and event log check function • Language setup function • Data save function • System information check function

✓ Be sure to change your account and password before starting your system.
✓ To change the account information, see "3.3.7. Account".

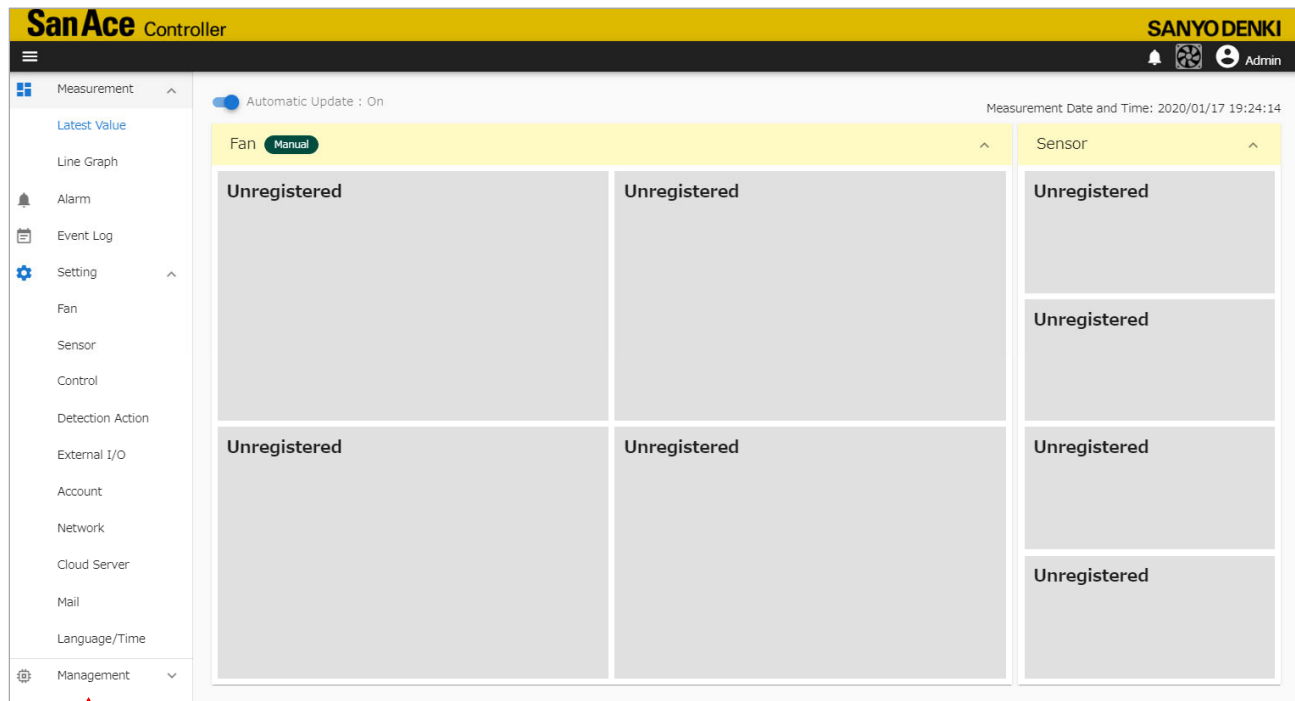[6] Enter the account information, and click the [SIGN IN] button.

If user authentication is successful, the following measured value screen is displayed.
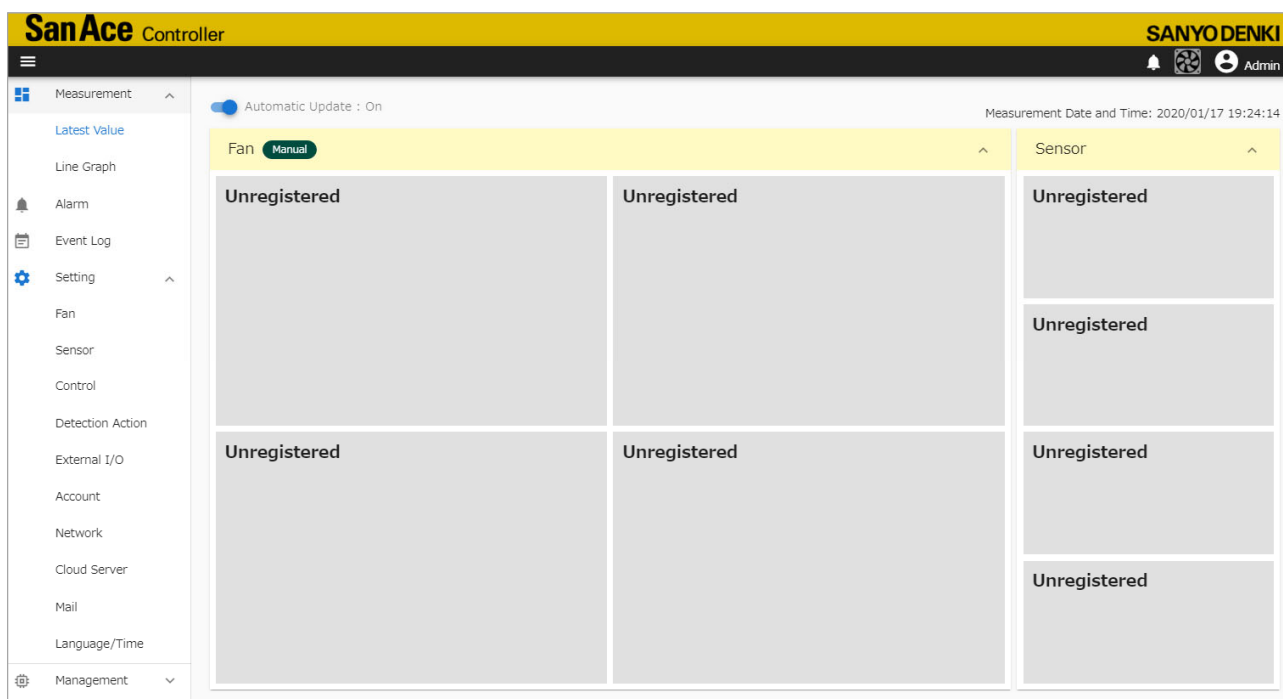
3.3. Settings

This section explains how to set up the controller.

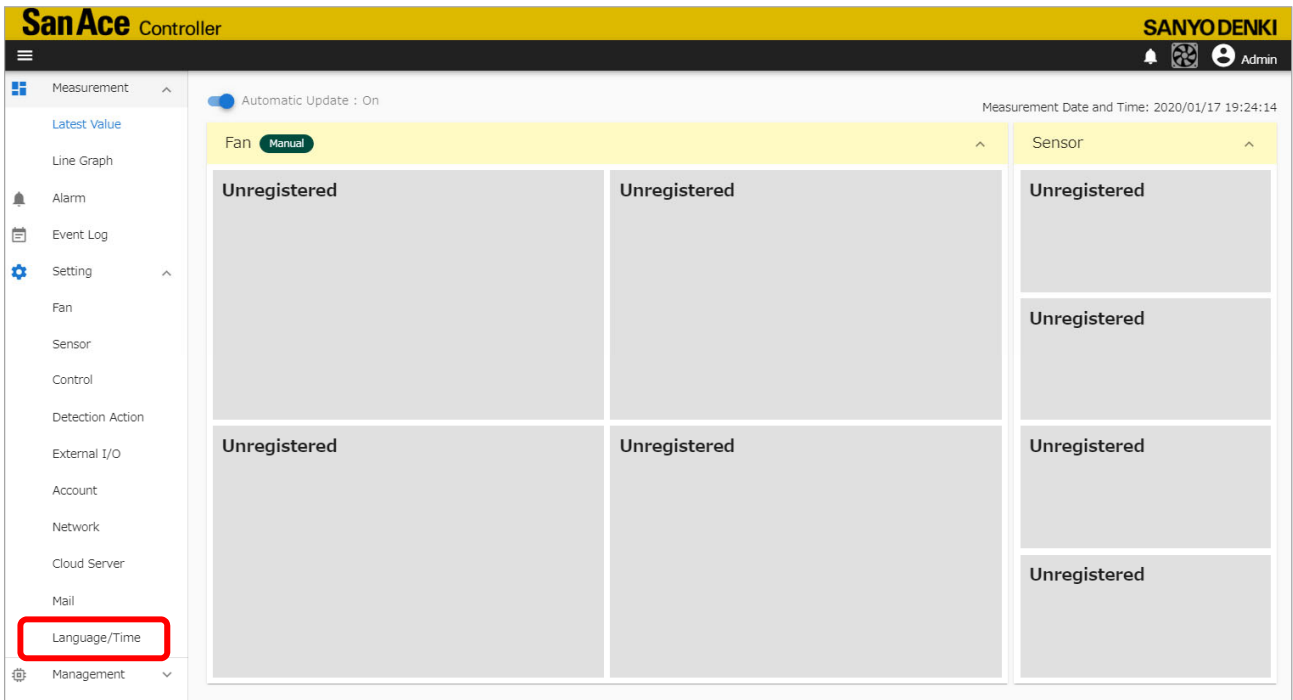Follow instructions of the side bar for the initial setup.

Side bar

✓ The display of the side bar depends on the display size of the Web browser.

3.3.1. Language/time

Initially, the screen is displayed in English.

Select "Language/Time" from the side bar, and set the language and time of the controller.

Then, click [APPLY] to apply your settings.

■ **Buttons**

Button	Description
[APPLY DEVICE DATE] button	Set the clock time of the PC for the initial setup.
[APPLY] button	Applies the current settings.

■ **Settings**

| Settings	Description
Language	
Language	Select the language. • Japanese • English When you start for the second time and later, the configured information is displayed.
Clock	
Time zone	Select the time zone. Select the standard time zone from −12:00 to +14:00. It can be "+9:00" in Japan. For information about the time zones, see "6.6.2. Time zone list".
NTP	To use the clock time of the NTP server, check the "Use NTP" box. An environment with an Internet connection is required.
NTP server	If you use the NTP, enter the address of the NTP server.

3.3.2. Fans

Click the "Fan" on the side bar, and set the fan control information.

Up to four fans can be set.

After this setting is completed, click the [APPLY] button to apply your settings.

✓ The operation is stopped by default.

If you wish to set the fans after starting operations, stop the controller from operating.
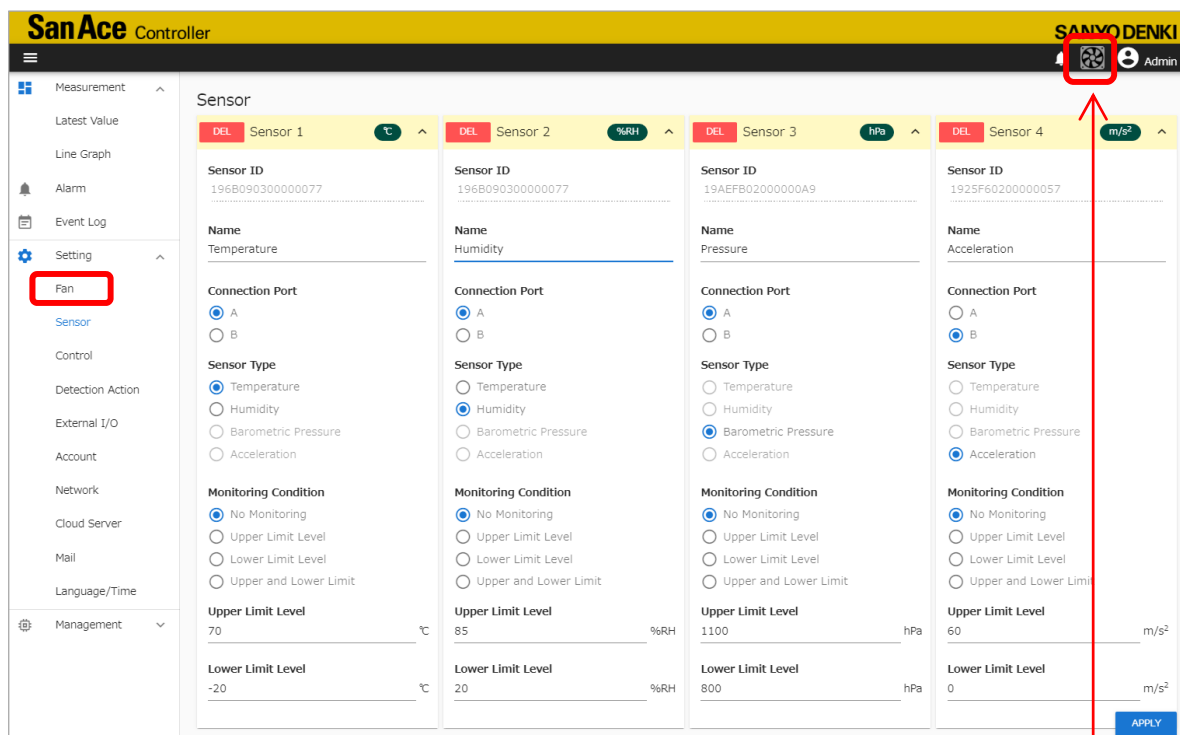
[Run/Stop] button

■ **Buttons**

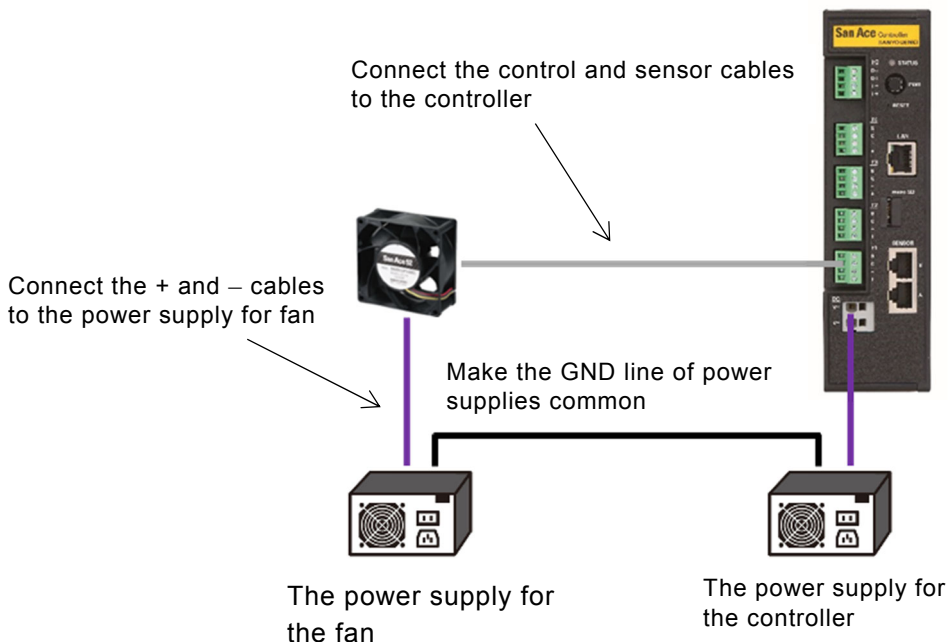| Button	Description
[ADD] button	Click this button to add a fan. If you can add a fan, it is displayed.
[DEL] button	Click this button to delete a fan. If a fan has already been registered, it is displayed.
Fan type	The registered fan type is displayed. • STD: Standard fan • RF: Reversible flow fan • CR: Counter rotating fan
[RESET] button	Resets the total installation time or the total operation time.
[APPLY] button	Applies the current settings.

■ **Settings**

Settings	Description
Name	Enter the fan name. Up to 20 characters can be set. This is a mandatory item.
Model no.	Enter the fan model number. Up to 20 characters can be set. This is a mandatory item.
Fan type	Selects a fan type. • Standard fan • Reversible flow fan • Counter rotating fan Select a counter rotating fan by specifying terminal F1 and F3. The counter rotating fan occupies two terminals.
Power route	Select a power route of the fan. • Internal: The power supply (common to the controller) is used. • External: An external power supply is used. The fan is turned ON or OFF. If the external power supply is used, you cannot measure the current.
PWM signal output voltage	Select the High-level output voltage of PWM signal of each fan. • 3.3V • 5V
Current monitoring condition	Select the condition to monitor average current of each fan. • No monitoring • Upper limit: The upper limit is monitored. • Lower limit: The lower limit is monitored. • Upper and lower limits: Both upper and lower limits are monitored.
Upper/lower limit level	Enter the upper or lower limit of current monitor value. 0.00 to 5.00. This is a mandatory item when monitoring.
Rotating speed monitoring condition	Select a condition to monitor the rotational speed of each fan. • No monitoring • Upper limit: The upper limit is monitored. • Lower limit: The lower limit is monitored. • Upper and lower limits: Both upper and lower limits are monitored. When using a counter rotating fan, you can set the limits at the inlet and the outlet.
Upper/lower limit level	Enter the upper/lower limit of rotational speed monitor value. • 100 to 50000. This is a mandatory item when monitoring. When using a counter rotating fan, set the limits at the inlet and the outlet.

■ Settings (Continued)

Settings	Description
Limit of installation time	Enter the installation time limit. 1 to 999999. This is a mandatory item. The installation time is the length of time it takes to add and apply a fan. This is counted regardless of the operating state of the fan.
Total time	The total installation time of each fun is displayed. When you click the [RESET] button, the total installation time is reset.
Limit of operation time	Enter the operation time limit of fan. • 1 to 999999. The operation time is a mandatory item. The operation time means the time when the fan is rotating. This is not counted if the fan is stopped.
Total time	The total time the fan has been rotating is displayed. When you click the [RESET] button, the total time is reset.

✓ If you cannot change the settings, delete the fan first and then add the fan again.

■ Power route (external)

Connect the control and sensor cables to the controller

Connect the + and − cables to the power supply for fan

Make the GND line of power supplies common

The power supply for the fan

The power supply for the controller

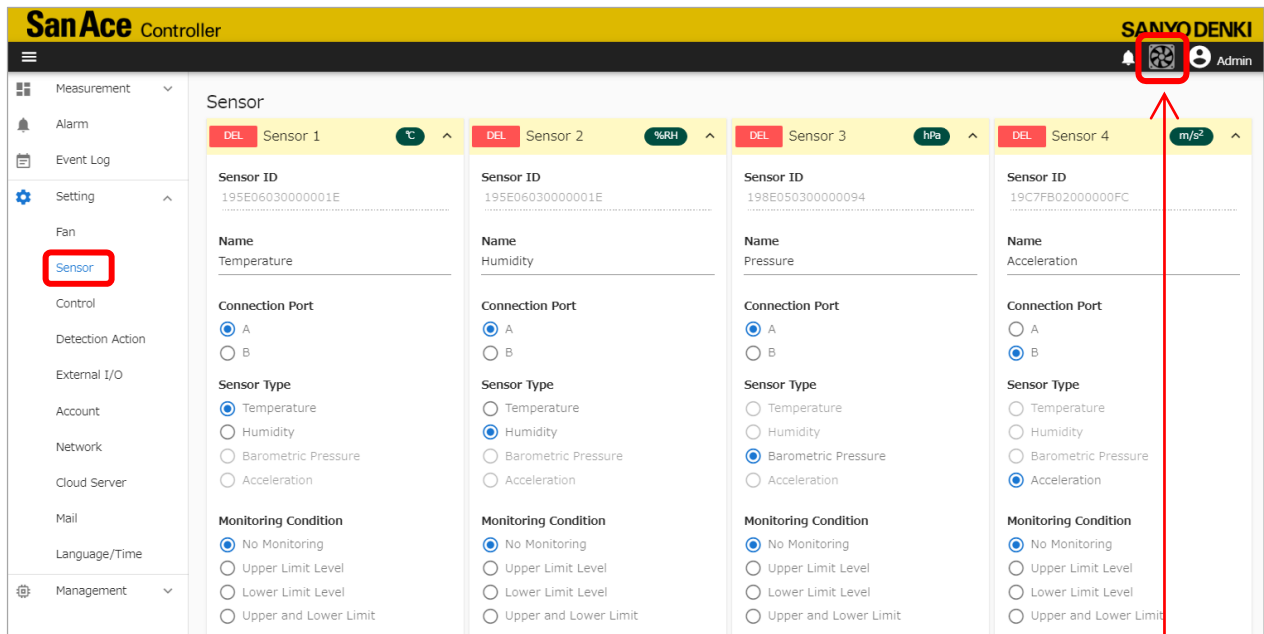✓ Note: you cannot stop the fans by using ⊞ (Run/Stop) button.

3.3.3. Sensors

Click "Sensor" on the side bar, and set the sensor information.

Up to four sensors can be set.

After this setting is completed, click the [APPLY] button to apply your settings.

✓ The operation is stopped by default.

   If you wish to set the fans after starting operations, stop the controller from operating.

[Run/Stop] button

■ **Buttons**

Button	Description
[ADD] button	Click the [ADD] button to add a sensor. A sensor that is connected to the controller is searched.
[DEL] button	Click the [DEL] button to delete a sensor.
[APPLY] button	Applies the current settings.

■ **Settings**

Settings	Description
Sensor ID	A sensor ID is indicated when you click the [ADD] button.
Name	Enter a sensor name. Up to 20 characters can be set. This is a mandatory item.
Connection port	The port where the sensor is connected is selected automatically. • A • B For information about the sensor A and B positions, see "2.1.2. Part names".
Sensor type	Specify the sensor type. • Temperature ($^\circ$C) • Humidity (%RH) • Barometric pressure (hPa) • Acceleration (m/s^2) The temperature/humidity sensor can measure temperature and humidity. Vibration value is monitored by the acceleration. The acceleration is used for alarm monitoring. It is not used for control purposes.
Monitoring conditions	Select the conditions to monitor the measured values. • No monitoring • Upper limit: The upper limit is monitored. • Lower limit: The lower limit is monitored. • Upper and lower limits: Both upper and lower limits are monitored.
Upper/lower limit level	Enter the upper and lower limits of the measured value for monitoring. • Temperature ($^\circ$C): -20 to 70 • Humidity (%RH): 20 to 85 • Barometric pressure (hPa): 800 to 1100 • Acceleration (m/s^2): 0 to 60 This is a mandatory item.

3.3.4. Control

Click "Control" on the side bar, and set the information for fan and sensor control.

There are two control modes: Automatic control mode and manual control mode. Two types of automatic control are available: Single control and comparison control.

- Manual control
- Automatic control (single control/comparison control)

✓ If fans are not registered, you cannot set their control.

✓ If you do not control fans, (for example, if you only monitor the rotational speed), select the manual control and set the output duty cycle to 0%.

3.3.4.1. Manual and automatic control

This section gives application examples in the Control mode.

- Manual control
- Automatic control (single control)
- Automatic control (comparison control)

■ **Manual control**

You can control the fan speed by selecting the manual control and entering any output duty cycle (from the initial setup PC).

- Four fans can be controlled individually.
- The output duty cycle can be set from 0 to 100% in unit of 1%.

- You can set the output duty cycle from the "Control" page or the page following clicking (Run/Stop) button in the page header.

＜Control page setting example＞

＜Fan information card screen example＞

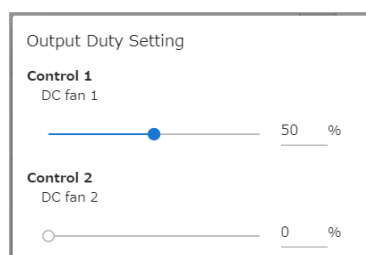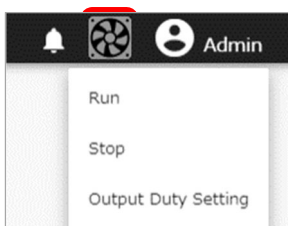＜Page header setting example＞

■ **Automatic control**

The fan speed can be controlled automatically using sensor measured values and set values.

- Temperature sensors, humidity sensors, and barometric pressure sensors are supported.
- The accelerometer is used for the monitoring function only.

■ **Automatic control (single control)**

The fan speed is controlled automatically so that the measured value of the target sensor matches the target value.

You can set one to four fans for one sensor.

Relationship between target value, sensor detection value, and output duty cycle

Fan type	Condition	Output duty cycle
Standard fan, Counter rotating fan	Target value < Target sensor measured value	Increases
	Target value > Target sensor measured value	Decreases
Reversible flow fan	Target value < Target sensor measured value	Increase (in forward direction)
	Target value > Target sensor measured value	Decrease (in reverse direction)

The target value tolerance can be set for the reversible flow fan only.

If the difference between the target and the target sensor measured value is within the target value tolerance, they are considered to be the same value, and the output duty cycle is set to 50% (the fan is stopped).

■ **Automatic control (comparison control)**

The fan speed can be controlled automatically so that the measured value of the control sensor becomes the same as the measured value of the target sensor.

Use two sensors (of the same type) for a single fan.

Relationship between control sensor value, target sensor value, and output duty cycle

Fan type	Condition	Output duty cycle
Standard fan, Counter rotating fan	Target sensor measured value < Control sensor measured value	Increases
	Target sensor measured value > Control sensor measured value	Decreases
Reversible flow fan	Target sensor measured value < Control sensor measured value	Increase (in forward direction)
	Target sensor measured value > Control sensor measured value	Decrease (in reverse direction)

The target value tolerance can be set for the reversible flow fan only.

If the difference between the control sensor measured value and the target sensor measured value is within the target value tolerance, they are considered to be the same value, and the output duty cycle is set to 50% (the fan is stopped).

3.3.4.2. Control settings

Set the control mode of the fan.

After this setting is completed, click the [APPLY] button to apply your settings.

When you click ⊞ (Run/Stop) button at right top of page header and you select to start the operation, measuring and control will start.

✓ When you set the control, be sure to stop the operation. You cannot set the control during operation.
✓ You cannot set multiple controls for a single fan.
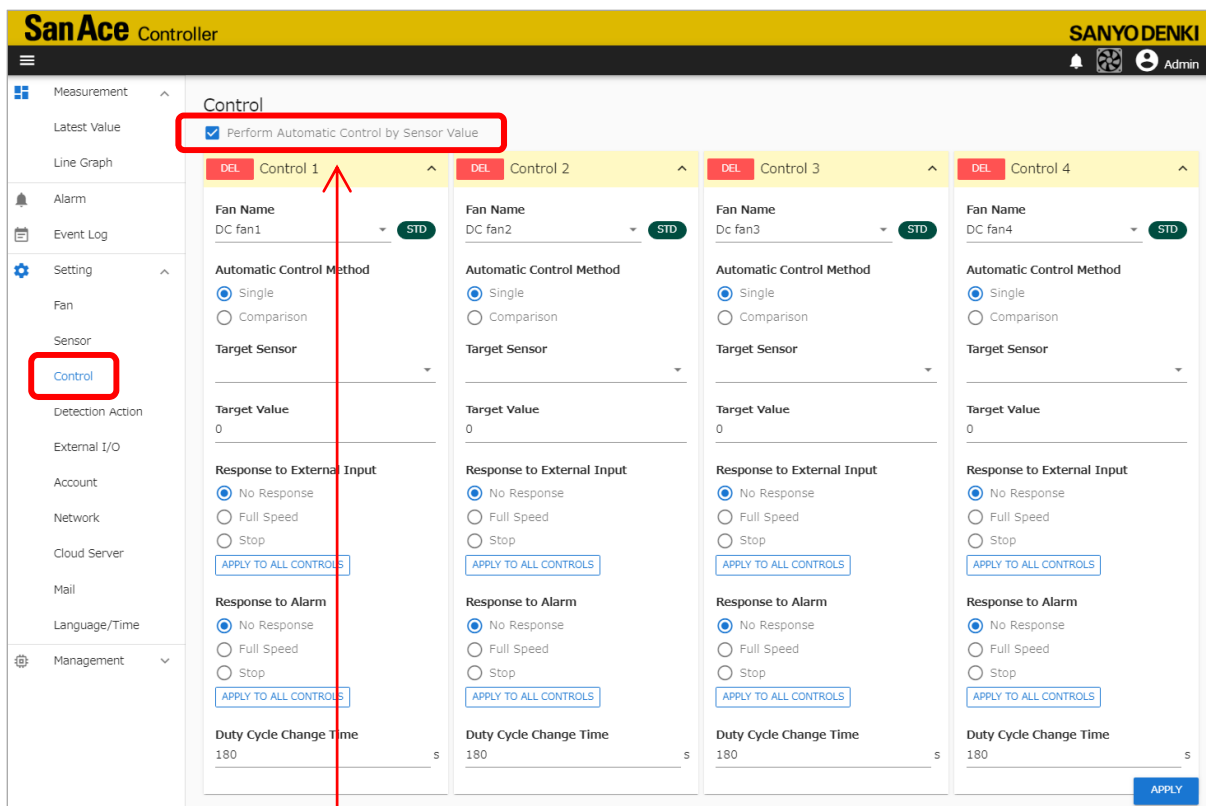

Clear this check box to select the manual control.

There are two types of control mode: the manual control and the automatic control.

- Manual control

  You can control the fan speed by entering any duty cycle value.

  Up to four fans can be controlled separately.

  To select manual control, clear the [Perform Automatic Control by Sensor Value] check box.

- Automatic control

  The fan speed can be controlled by changing the sensor measured value and set value.

  There are two types of control type: the single control and the comparison control.
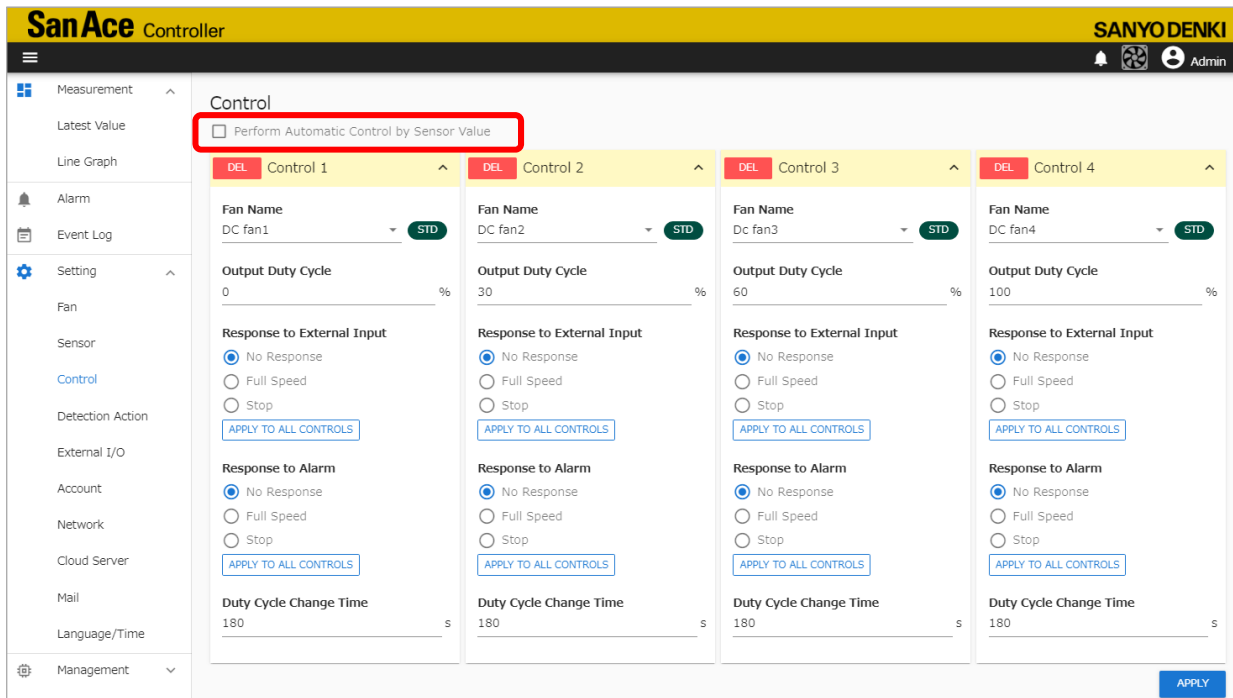
■ **Manual control**
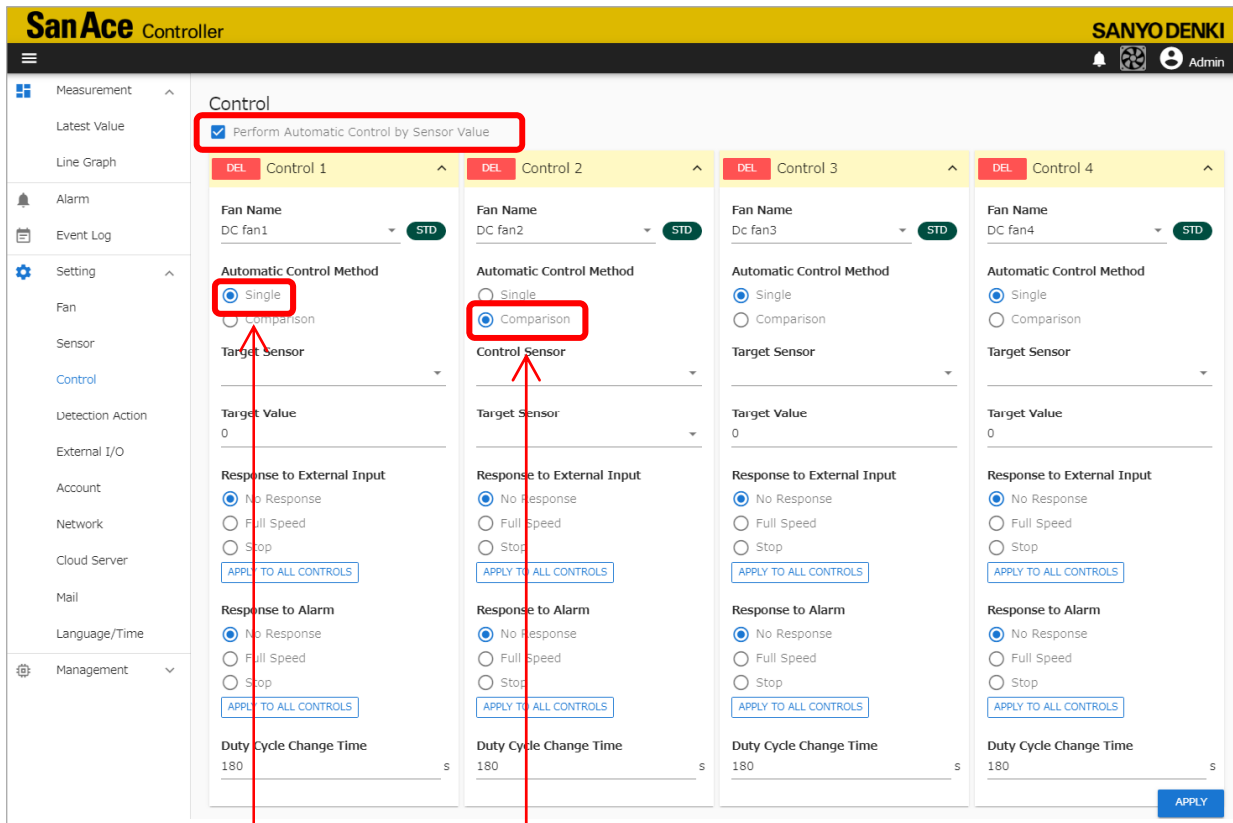
■ **Automatic control**

Automatic control   Automatic control
(Single)   (Comparison)

✓ The display items vary depending on the selected control type (Manual, Automatic single, or Automatic comparison).

■ Buttons

Button	Description
[ADD] button	Click this button to add control.
[DEL] button	Click this button to delete control.
[APPLY TO ALL CONTROLS] button	Applies settings of response to external input and alarm to all controls
[APPLY] button	Applies the current settings.

■ Settings

Settings	Description
Fan name	Select fans for control. A fan or fans (registered in "3.3.2. Fans") can be selected. This is a mandatory item.
Output duty cycle	Enter the output duty cycle for manual control. 0 to 100. This is a mandatory item for manual control. This can also be changed during operation.
Automatic control method	During automatic control, switch the control method to single control or comparison control. • Single control • Comparison control
Target sensor	During automatic control (single control), select a target sensor. Any of sensors (registered in "3.3.3. Sensors") can be selected except for the accelerometers. This is a mandatory item for automatic control (single control).
Target value	Enter a target value to control the target sensor. • Temperature (°C): −20 to 70 • Humidity (%RH): 20 to 85 • Barometric pressure (hPa): 800 to 1100 This is a mandatory item for automatic control (single control).
Target value tolerance (RF: For Reversible Flow fan)	For automatic control, enter the tolerance of target value. The units are displayed according to the target sensor and the target sensor type. • Temperature (°C): 0 to 90 • Humidity (%RH): 0 to 105 • Barometric pressure (hPa): 0 to 2000 This is a mandatory item for automatic control.
Control sensor	During automatic control (comparison control), select sensors for control. Any registered sensors can be selected except for the accelerometers. • Temperature (°C) • Humidity (%RH) • Barometric pressure (hPa) This is a mandatory item for automatic control (comparison control).
Target sensor	During automatic control (comparison control), select the control target sensors. Any registered sensors can be selected except for the accelerometers. • Temperature (°C) • Humidity (%RH) • Barometric pressure (hPa) This is a mandatory item for automatic control (comparison control).

■ **Settings (Continued)**

Settings	Description
Duty cycle change time	Enter the time until the output duty cycle reaches from 0% to 100%. 10 to 300. This is a mandatory item. If this change time is increased, the fan speed is changed gradually.
Response to external input	Select the operation of the fan that is connected when an external input is detected. • No response: The currently specified operation is continued. • Full speed: The output duty cycle is set to 100%. • Stop: See the shutdown operation details.
Response to alarm	Select the operation of the fan that is connected when an alarm occurs. • No response: The currently specified operation is continued. • Full speed: The output duty cycle is set to 100%. • Stop: See the shutdown operation details.

✓ In settings where an external input action and alarm occurrence are activated at the same time, the external input action will prevail.

Shutdown operation details

Condition		Operation
Power route of fans	Fan type	
Internal	Standard fan, counter rotating fan, reversible flow fan	Fan power Off + Output duty cycle 0%
External	Standard fan, counter rotating fan	Output duty cycle: 0%
	Reversible flow fan	Output duty cycle: 50%

3.3.5. Detection action

This section explains how to set the Email transmission and external output if the "Detection Action" is clicked on the side bar, and if a fan, sensor or another alarm or warning is detected.

After this setting is completed, click the [APPLY] button to apply your settings.
The [APPLY] button is shown at the lower right of the screen.
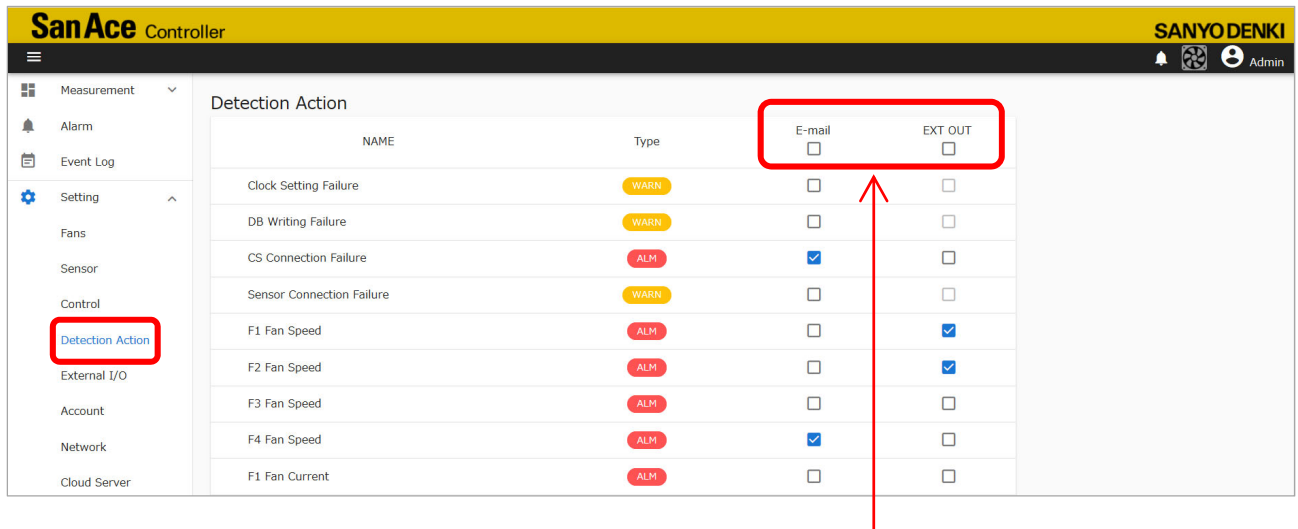
The mail and external output can be selected at the same time.

■ **Buttons**

Button	Description
[APPLY] button	Applies the current settings.

■ **Settings**

Settings	Description
E-mails	Set whether or not to send an e-mail when an alarm or warning is detected. Set the destination of e-mail from the "Mail" button of the side bar. For details about e-mails, see "3.3.10. E-mails".
EXT OUT	If an alarm is detected, the output of the external output connector is switched based on the external output settings.

■ **Types**

Settings	Description
ALM	This shows an alarm. If the controller deviates from the preset threshold or if an abnormal status is detected, this event occurs.
WARN	This shows a warning. This event occurs if the controller setting has failed or if a communication fails.

■ **Items of detection action**

Item	Description	Occurrence condition
Clock setting failure	The clock setting has failed.	A
DB writing failure	Registration of database measured values has failed.	A
CS connection failure	Connection with the cloud server has failed.	A
Sensor connection failure	Connection with the external sensor has failed.	A
(F1 to F4) Fan speed	The fan speed has exceeded the preset threshold.	B
(F1 to F4) Fan current	The current of the fan has exceeded the preset threshold.	B
(F1 to F4) Fan overcurrent	The current of the fan has exceeded 5A.	A
(F1 to F4) Fan installation time	The fan installation time has reached the preset time.	A
(F1 to F4) Fan operation time	The fan operation time has reached the preset time.	A
Sensor (1 to 4) measurement value	The sensor measured value has exceeded the preset threshold.	B
External input start	An external input was detected.	A
Internal temperature abnormality	The internal controller temperature is abnormal.	A

* Occurrence condition

A: Alarm occurs when detected one time.

B: Alarm occurs when detected three times in succession.

3.3.6. External input/output

Set a detection of controller's external input/output by selecting "External I/O" from the side bar.

After this setting is completed, click the [APPLY] button to apply your settings.

■ **Buttons**

Button	Description
[APPLY] button	Applies the current settings.

■ **Settings**

Settings	Description
Input detection condition	Set the conditions to detect an external input. • Input ON ⇒ A detection will be made when the input is turned ON. • Input OFF ⇒A detection will be made when the input is turned OFF. .
Output during detection	Set an external output for when a detection occurs. • LOW ⇒ The output goes Low. • OPEN ⇒ The output turns to OPEN.

3.3.7. Account

Click "Account" on the side bar to set account settings.

There are two types of accounts: Administrator account and User account.

After this setting is completed, click the [APPLY] button to apply your settings.

■ **Buttons**

Button	Description
[APPLY] button	Applies the current settings.

■ **Settings**

Settings	Description
Account	Enter a string containing one to 20 (single-byte) alphanumeric characters. This is a mandatory item.
Password	Enter a string containing eight to 20 (single-byte) alphanumeric characters. This is a mandatory item.
Password confirmation	Enter your password for confirmation. This is a mandatory item.

✓ The same account name cannot be used for both the administrator and user.

3.3.8. Network

Click "Network" on the side bar, and set the network information.

After this setting is completed, click the [APPLY] button to apply your settings.

✓ Note: If you set the address assignment to DHCP or Auto, it's hard to identify IP address of the controller.

✓ You can reset the network settings to defaults by using the reset button. For information about the reset button, see "2.1.2. Part names".

✓ Until the network settings are reflected to the controller, communications, cloud, or e-mail errors may occur.

■ **Buttons**

Button	Description
[SEARCH] button	Searches for the SSID of access point.
[APPLY] button	Applies the current settings.

■ Settings: Wired LAN

Settings	Description
IPv4	
Address assignment	Select an address assignment method. • DHCP • Manual If you select the manual selection, you can enter the other wired LAN setting (IPv4) items.
IP address	If the address assignment is set to "Manual", enter the IP address. This is a mandatory item.
Network mask	If the address assignment is set to "Manual", enter the network mask. This is a mandatory item.
Default gateway	Enter the default gateway of your network information.
IPv6	
Address assignment	Select an address assignment method. • Auto • Manual If you select the manual selection, you can enter the other wired LAN setting (IPv6) items.
IP address	If the address assignment is set to "Manual", enter the IP address.
Prefix length	Enter the prefix length. 1 to 128. This is a mandatory item.
Default gateway	Enter the default gateway of your network information.

■ **Settings: Wireless LAN**

Wireless LAN settings will be displayed for wireless LAN-compatible models only.

If you use a wireless LAN, check the "Use wireless LAN" box.

Caution

- If you set the wireless LAN incorrectly, you may fail to connect to the controller.
  Ensure that the wired LAN is connected when you set the wireless LAN.
- The corresponding channels of wireless LAN are 1ch to 11ch. See "6.3. Specifications".

Settings	Description
Access points	
SSID	Enter the SSID of access point to be connected. Click the [SEARCH] button, and the access point will be displayed and you will be able to select it.
Encryption method	Select an encryption method. • No Auth (No authentication) • WPA2-PSK AES • WPA-PSK TKIP • WPA/WPA2-PSK Mixed This is a mandatory item.
Access key	Enter the access key. If you have selected the "No Auth" above, you cannot enter the access key.
IPv4	
Address assignment	Select an address assignment method. • Don't use • DHCP • Manual If you select the manual assignment, you can enter the other wireless LAN setting (IPv4) items.
IP address	If the address assignment is set to "Manual", enter the IP address. This is a mandatory item.
Network mask	If the address assignment is set to "Manual", enter the network mask. This is a mandatory item.
Default gateway	Enter the default gateway of your network information.
IPv6	
Address assignment	Select an address assignment method. • Auto • Manual If you select the manual assignment, you can enter the other wireless LAN setting (IPv6) items.
IP address	If the address assignment is set to "Manual", enter the IP address.
Prefix length	If the address assignment is set to "Manual", enter the prefix length. 1 to 128. This is a mandatory item.
Default gateway	Enter the default gateway of your network information.

■ **Settings: Common**

Settings	Description
DNS server setting method	Select an address assignment method. • Auto • Manual If you select the automatic assignment, the required values are obtained from the DHSP server or the router (IPv6). If you select the manual assignment, you can enter the DNS server items.
DNS server address	If set to Manual, enter the DNS server of your network information.

✓ In a stateful DHCPv6 deployment, if the IPv6 address assignment setting is "Manual" and an IP address is already entered, a DNS server address will not be obtained from the DHCPv6 server.

You can check the connected network information by referring to the system information.

For details, see "4.7.1. System information".

3.3.9. Cloud system

Click "Cloud Server" on the side bar, and set up the cloud information.
After this setting is completed, click the [APPLY] button to apply your settings.

- ✓ Once applied, the controller is connected to the cloud system (San Ace NET).
- ✓ To use the cloud system, you need to establish an environment with the Internet connection.
- ✓ Set up this system only if you use the cloud system. If you do not use the cloud system, delete the cloud settings.
- ✓ If the proxy server is used on the network, you may not connect to the cloud system.
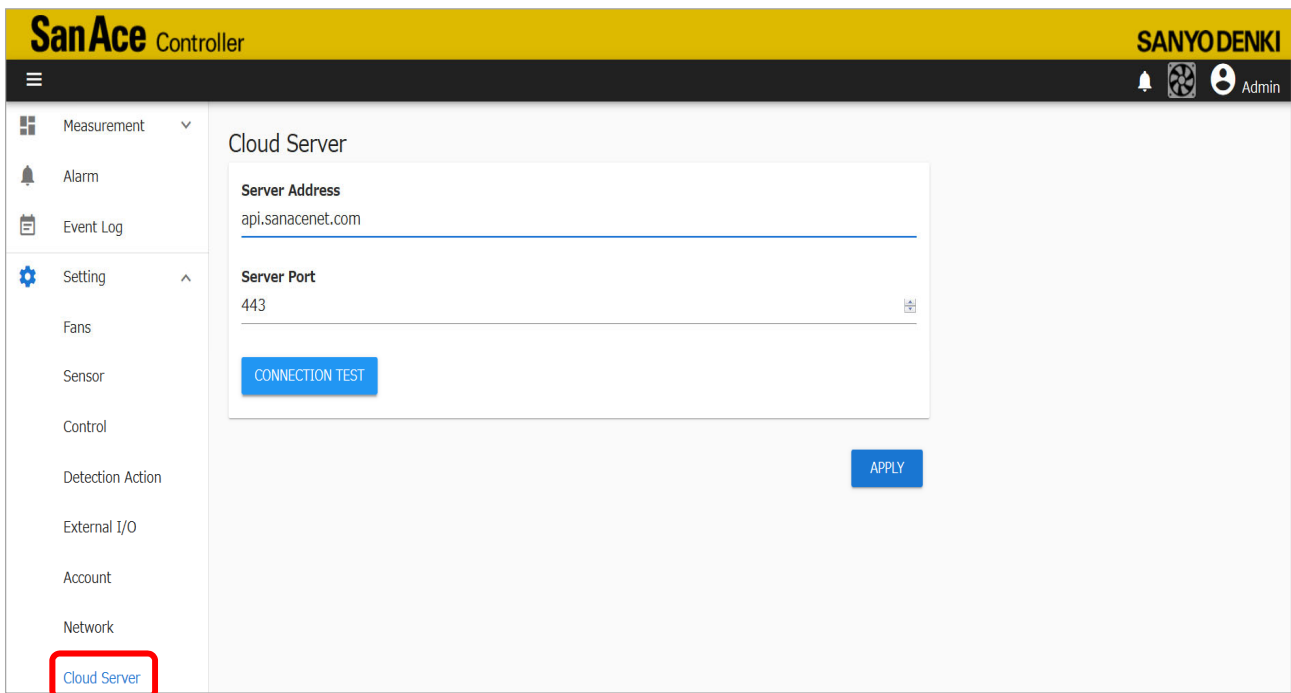
■ Buttons

Button	Description
[CONNECTION TEST] button	Tests the connection to the cloud service.
[APPLY] button	Applies the current settings.

■ Settings

Settings	Description
Server address	Enter the server address. If using the cloud system, enter the following address. api.sanacenet.com
Server port	Enter the server port information. The default value is as follows. 443 This is a mandatory item.

3.3.10. E-mails

Click "Mail" on the side bar, and set the e-mail destination information to send e-mails to when an event such as an alarm occurs.

After this setting is completed, click the [APPLY] button to apply your settings.

■ **Buttons**

Button	Description
[TEST] button	Sends an e-mail for testing purposes.
[APPLY] button	Applies the current settings.

■ **Settings**

Settings	Description
Mail server	
Controller mail address	Enter the mail address of Controller (the source address when the e-mail is sent).
Server address	Enter the address of the mail server.
Server port	Enter the server port to be connected. This is a mandatory item.

Encryption method	Select an encryption method.
	• No encryption
	• STARTTLS
	• SSL/TLS
	
	• If you select an item, the server port value is changed to the standard value.
	  • No encryption: 25
	  • STARTTLS: 587
	  • SSL/TLS: 465

Authentication method	Select an authentication method for the server. • No authentication • Automatic selection • LOGIN • PLAIN • CRAM-MD5
Account	Enter the account that has been issued by the mail server. This is a mandatory item. If you have selected the "No authentication" above, you cannot enter the method.
Password	Specify the password for the account. This is a mandatory item. If you have selected the "No authentication" above, you cannot enter the method.
Mail destination	
Destinations 1 to 5	Enter the recipient's e-mail address to send an alarm occurrence notification. To disable the mail notification, clear the [Enable Mail Transmission from Controller] check box.
Re-transmission interval	If an alarm continues, specify whether or not to send an e-mail after the re-transmission interval elapses. To send a mail again, enter the re-transmission interval. 30 to 1500. This is a mandatory item. If you do not want the e-mail to be re-transmitted, clear the [Re-transmission] check box.

When you set the mail server, check the specifications of the mail server you use.

The information you enter "Account" is the mail address or mail account (characters before @). Please confirm it with your mail service.

■ Test transfer of mails

When you click the [Test send] button, the following e-mail is sent.

Example

Item	Description
Subject	[TEST] San Ace Controller Notification
E-mail sender	The sender who has been set during mail address setting in "3.3.10. E-mails".
Body text	This e-mail has been sent from the controller (ID: xxxx-xxxx-xxxx-xxxx).

■ E-mail sent at event occurrence

If an event occurs, the event type is displayed in the e-mail title and body text.

For information about event types, see "6.6.1. Event list".

Mail format

Item	Description
Subject	San Ace Controller Notification (Event type and event code)
E-mail sender	The sender who has been set during mail address setting in "3.3.10. E-mails".
Body text	The following event has occurred on the controller (ID: xxxx-xxxx-xxxx-xxxx). Event name <Event occurrence date> <Detailed information>

3.4. Logging out of San Ace Controller

After you have set the controller, log out from this Controller.
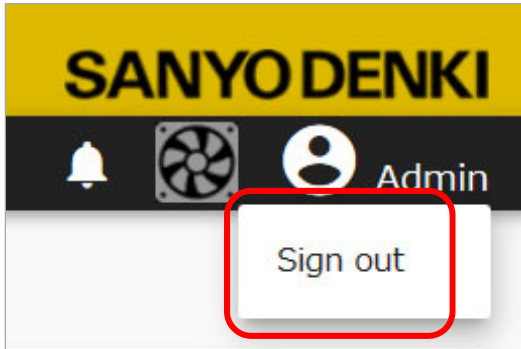
Click and select "Sign out".

Chapter 4 Operations Using Local

4.1. Logging in to San Ace Controller

This section explains how to operate the PC (referred to as "Local device" hereafter) when the controller is operated in the LAN.

Log in to the San Ace Controller.

[1]   Start the Web browser.

[2]   Enter the IP address of Controller in the address bar of Web browser.
Default IP address: http:// 192.168.1.1/

   ✓   If the customer has already changed the controller's IP address, enter this changed IP address.

The Controller will start up, and the Login screen will appear.

[3]   Enter the account and password.
You can log in as either the administrator or the user.
For details about account information, see "3.2. Logging in to San Ace Controller".

[4]   Enter the account information and click the [SIGN IN] button, and the user authentication will start.
If the user authentication is made normally, the measured value screen appears.

4.2.　Measured value display screen

This section explains how to view the measured value display screen.

- Page header
- Side bar
- Measured value display area

Side bar

Measured value
display area

Page header

4.2.1. Page header

The page header contains the Alarm, Operation status, and Account.

Alarm   Operation   Account
status
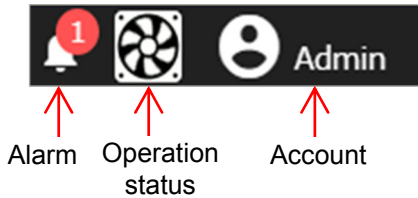
■ Alarm

The current alarm is displayed.
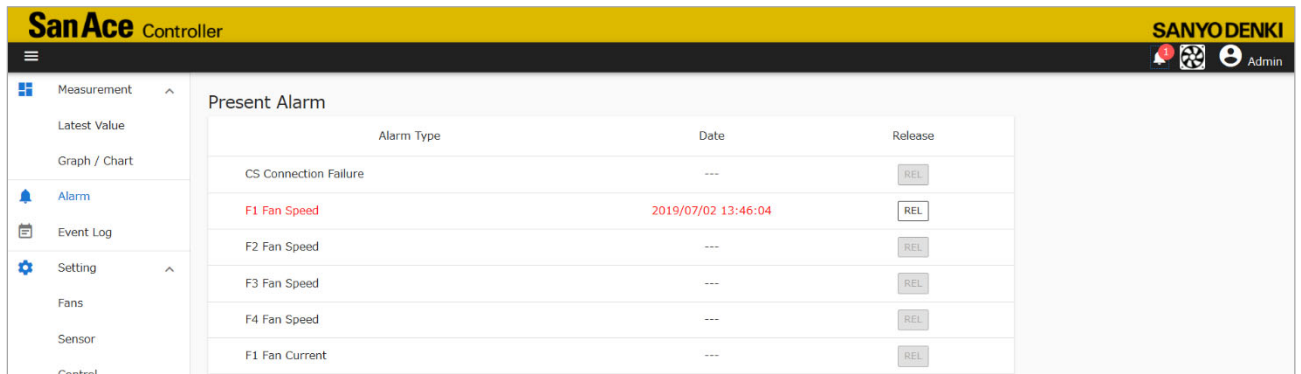
If alarms have occurred, the alarm count is displayed.

■ **Operation status**

The fan rotates during operation.

Click the "Fan" to switch between "Run" and "Stop".

■ **Account**

The name of the logged in account is displayed.

When you click it, the Logout menu is displayed.

4.2.2. Side bar

You can set up the controller by using the side bar.

Most of control settings are already completed in "Chapter 3. Initial Settings of Controller". If you need to add or change the current settings, set them by following the side bar options.

4.2.3. Measured value display area

The measured values of fans and sensors are displayed in the measured value display area.

The displayed contents vary depending on which item is selected on the side bar.

- Latest Value: The latest measured value
- Line Graph: Graph of measured value summary data

■ **Latest Value**

Click "Latest Value" on the side bar.
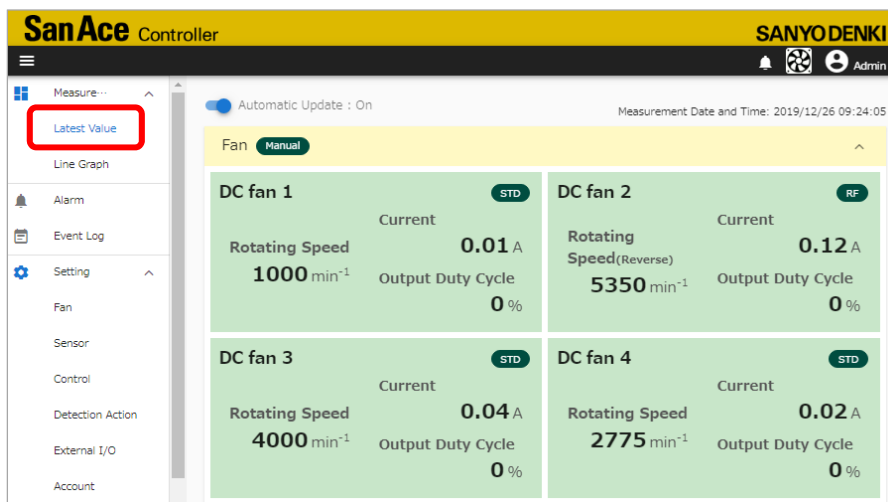
■ **Line Graph**

Click "Line Graph" on the side bar.
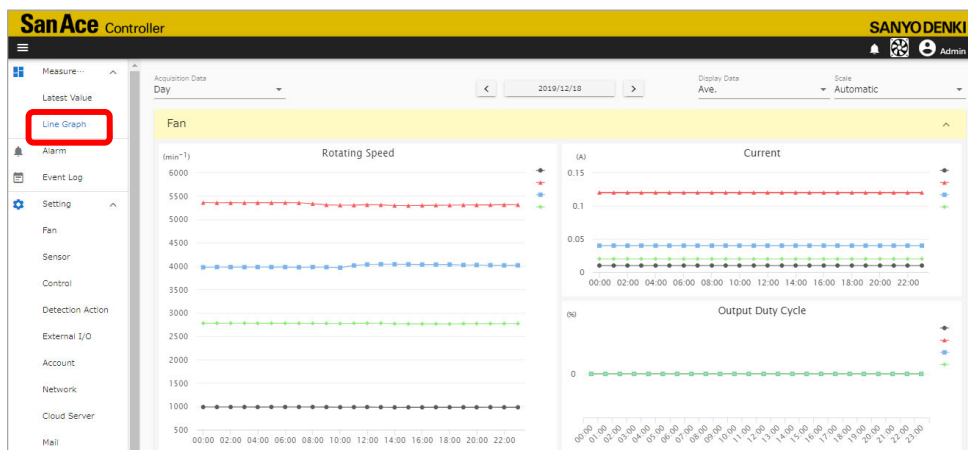
4.3. Measured values

The measured values of fans and sensors are displayed in the measured value display area.

The displayed contents vary depending on which item is selected on the side bar.

- Latest Value: The latest measured value
- Line Graph: Line graph of measured value summary data

4.3.1. Latest

When you click "Latest Value" on the side bar, the measured values of fans and sensors are displayed.

■ **Screen configuration**

[Automatic Update] button   Control mode   Fan information card   Sensor information card

■ Buttons

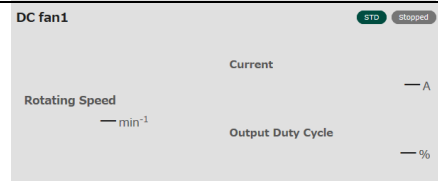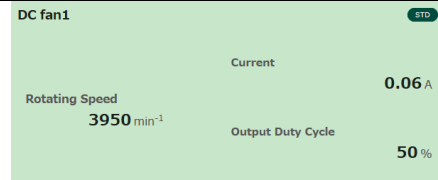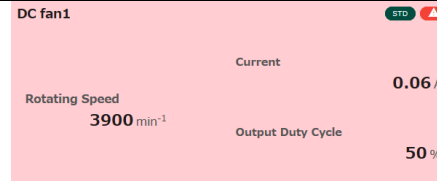| Button	Description
[Automatic Update] button	If the button is ON, the measured value is automatically updated every 10 seconds.

■ Display items
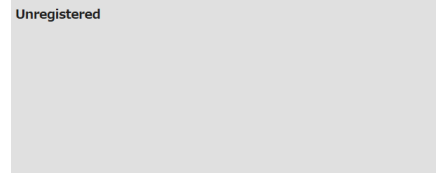
Item	Description
Measurement Date and Time	The measurement date and time of the value (in YYYY/MM/DD hh:mm:ss) is displayed.
Control mode	The Control of the fan, that has been set in "Control", is displayed. • Auto: Automatic control • Manual: Manual control
Fan information card	The fan registration information and the operation status are displayed. If a counter rotating fan is registered, use a card of two fans.
Sensor information card	The registration information and measured value of each sensor are displayed.

4.3.1.1. How to view fan information card

The following explains how to view the fan information card.

■ Type of the fan information card

The color of the fan information card varies depending on the fan status.

Indication	Description
Unregistered	No fan has been registered.
DC fan1 — STD Stopped — Current — A — Rotating Speed — min⁻¹ — Output Duty Cycle — %	The fan has been stopped.
DC fan1 — STD — Current 0.06 A — Rotating Speed 3950 min⁻¹ — Output Duty Cycle 50 %	The fan rotates normally.
DC fan1 — STD ⚠ — Current 0.06 A — Rotating Speed 3900 min⁻¹ — Output Duty Cycle 50 %	An alarm has occurred when fan is rotating. If a counter rotating fan is used and if an alarm has occurred at inlet or outlet, the alarm is generated.

■ **Display position of the fan information card**

The display of the fan information card varies depending on the registration status of counter rotating fans.

- If a counter rotating fan is not registered

F1	**F2**
F3	**F4**

- If counter rotating fans are registered for F1 and F2

F1 shows the inlet of the counter rotating fan, and F2 shows the outlet of the counter rotating fan.

F1 (Inlet)	**F3**
F2 (Outlet)	**F4**

- If counter rotating fans are registered for F3 and F4

F3 shows the inlet of the counter rotating fan, and F4 shows the outlet of the counter rotating fan.

F1	**F3 (Inlet)**
F2	**F4 (Outlet)**

- If two counter rotating fans are registered

F1 and F3 show the inlet of the counter rotating fans, and F2 and F4 shows the outlet of the counter rotating fans.

F1 (Inlet of fan A)	**F3 (Inlet of fan B)**
F2 (Outlet of fan A)	**F4 (Outlet of fan B)**

■ Information card display depending on the fan type

The contents of the fan information card vary depending on the fan information card.
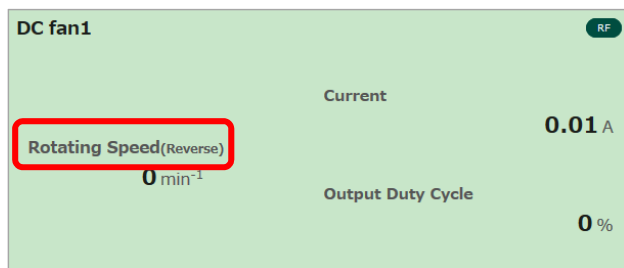
✓：Displayed

Blank：Not displayed

Display data	Registered fan type			Display contents
	Standard fan	Reversible flow fan	Counter rotating fan	
Fan name	✓	✓	✓	If fan name is not registered, "Unregistered" is displayed.
Fan speed	✓	✓		Integer containing up to five digits Unit: min^{-1}
Rotating direction		✓		See the following "Rotating direction indication of reversible flow fan" section.
Current	✓	✓		Real number containing two decimal digits Unit: A
Output duty cycle	✓	✓		Integer from 0 to 100 Unit: %
Fan speed (Inlet)			✓	Integer containing up to five digits Unit: min^{-1}
Fan speed (Outlet)			✓	Integer containing up to five digits Unit: min^{-1}
Current (Inlet)			✓	Real number containing two decimal digits Unit: A
Current (Outlet)			✓	Real number containing two decimal digits Unit: A
Output duty cycle (Inlet)			✓	Integer from 0 to 100 Unit: %
Output duty cycle (Outlet)			✓	Integer from 0 to 100 Unit: %
Fan type	✓	✓	✓	The fan type is displayed. ・STD ・RF ・CR
Fan status	✓	✓	✓	The fan status is displayed. ・Alarm (⚠) ・Stopped

Note: A hyphen ("-") will be displayed as a measured value in the following cases.

- Stopped
- No measurement data

■ Rotating direction indication of reversible flow fan

The rotating direction of Reversible Flow fan is shown as "Forward" or "Reverse" to the right of rotational speed.

The rotating direction is judged and displayed as follows.

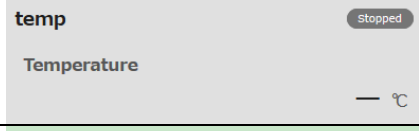| Output duty cycle	Rotating direction
45% to 55%	Not displayed
No measurement data	
45% or less	Reverse
Greater than 55%	Forward
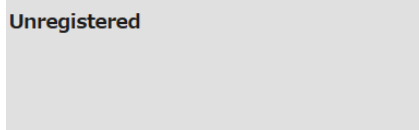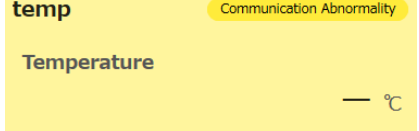
4.3.1.2. How to view sensor information card

The following explains how to view the sensor information card.
- Type of the sensor information card
- Difference of information card display depending on the sensor type

■ **Type of the sensor information card**

The color of Sensor Information card varies depending on the sensor status.

Indication	Description
Unregistered	No sensor has been registered.
temp Stopped Temperature — ℃	The sensor is being stopped.
temp Temperature **24.9** ℃	The sensor operates normally.
temp ⚠ Temperature **25.3** ℃	An alarm has occurred in the currently operating sensor.
temp Communication Abnormality **Temperature** — ℃	A connection failure has occurred in the currently operating sensor.

✓ Until the communication between the controller and sensors is stabilized after operation is started, measurement or communication errors may occur.

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■ **Difference of information card display depending on the sensor type**

The display of Sensor Information card varies depending on the sensor type.

✓：Displayed

Blank：Not displayed

Display data	Registration sensor type				Display contents
	Temperature	Humidity	Barometric pressure	Acceleration	
Sensor name	✓	✓	✓	✓	If the sensor name has not yet been registered, "Unregistered" is displayed.
Sensor type	✓	✓	✓	✓	
Measured value (Temperature)	✓				Real number containing one decimal digit Unit: °C
Measured value (Humidity)		✓			Integer from 0 to 100 Unit: % RH
Measured value (Barometric pressure)			✓		Real number containing two decimal digits Unit: hPa
Measured values (Acceleration)				✓	Integer containing two decimal digits Unit: m/s^2
Sensor status	✓	✓	✓	✓	The sensor status is displayed. • Alarm (⚠) • Stopped

Note: A hyphen ("-") will be displayed as a measured value in the following cases.

- Connection failure
- Stopped
- No measurement data

4.3.2. Line Graph

When you click "Line Graph" on the side bar, the measured values of fans and sensors are displayed in graphical form.

✓ Local mode takes longer to display graphs than cloud mode.
   If you use graphs frequently, use of cloud mode is recommended.

■ **Screen configuration**

Fan summary data panel   Display data setting   Sensor summary data panel

■ **Buttons**

Button	Description
[Date/time] button	Selects the measured value and time for graphic display.
[Forward] button	Displays a summary graph, that is one cycle before the currently displayed graph. • Hour: Before one hour • Day: Before one day • Week: Before one week • Month: Before one month • Year: Before one year
[Next] button	Displays a summary graph, that is one cycle after the currently displayed graph. • Hour: After one hour • Day: After one day • Week: After one week • Month: After one month • Year: After one year

■ **Display items**

Item	Description
Selection of display data	Select the display data conditions.
Fan summary data panel	The fan summary data graphs are displayed side by side.
Sensor summary data panel	The sensor summary data graphs are displayed side by side.

■ **Settings**
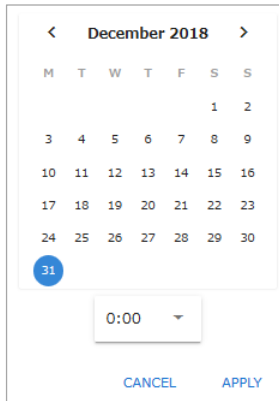
Item	Description
Acquisition data	Specify the display range of graph acquisition data. • Hour: The display range is one hour. Six plots are displayed at 10-minute intervals. • Day: The display range is one day. 24 plots are displayed at 1-hour intervals. It starts from 00:00 hours. • Week: The display range is one week. Seven plots are displayed at one-day intervals. It starts from Monday. • Month: The display range is one month. Twenty eight to 31 lots are displayed at one-day intervals. It starts from the first day. • Year: The display range is one year. Twelve plots are displayed at 1-month intervals. It starts from January.
Display data	Select a data type to be displayed in graphs. • Min: Minimum value of summary data • Ave: Average value of summary data • Max: Maximum value of summary data
Scale	Select how to display the graph scale. • Automatic: The maximum or minimum scale is changed automatically so that the graph data is shown in the display area. • Fixed: The maximum or minimum scale of the graph is fixed when this is selected. The scale is fixed even if the graph acquisition data is changed.
Date/time	Click the [Date/time] button to select the date and time of measured value when graphs are displayed. The items you can select vary depending on the display range (selected in the "Acquisition data").

■ Type of Date Selection screens

The Date Selection screen varies depending on the display range that you have selected in "Acquisition data".
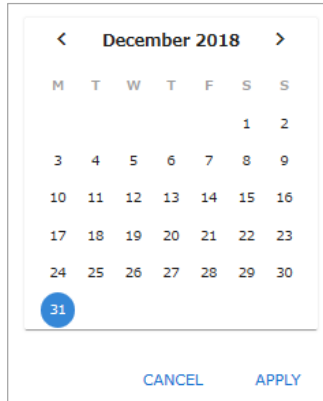
Change the display screen using the [<] or [>] button, set the correct date and others, and click [Apply].
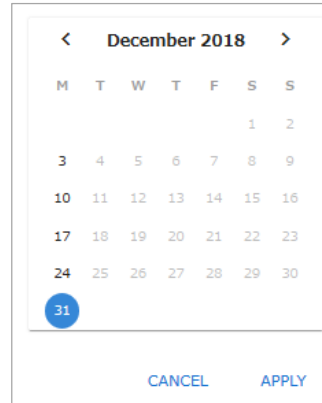
• Hour

• Day

• Week
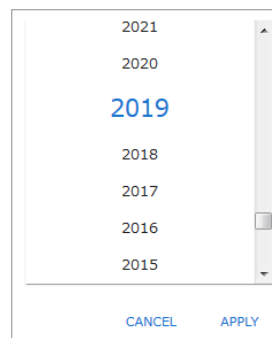
• Month

• Year

■ How to view the summary data panel
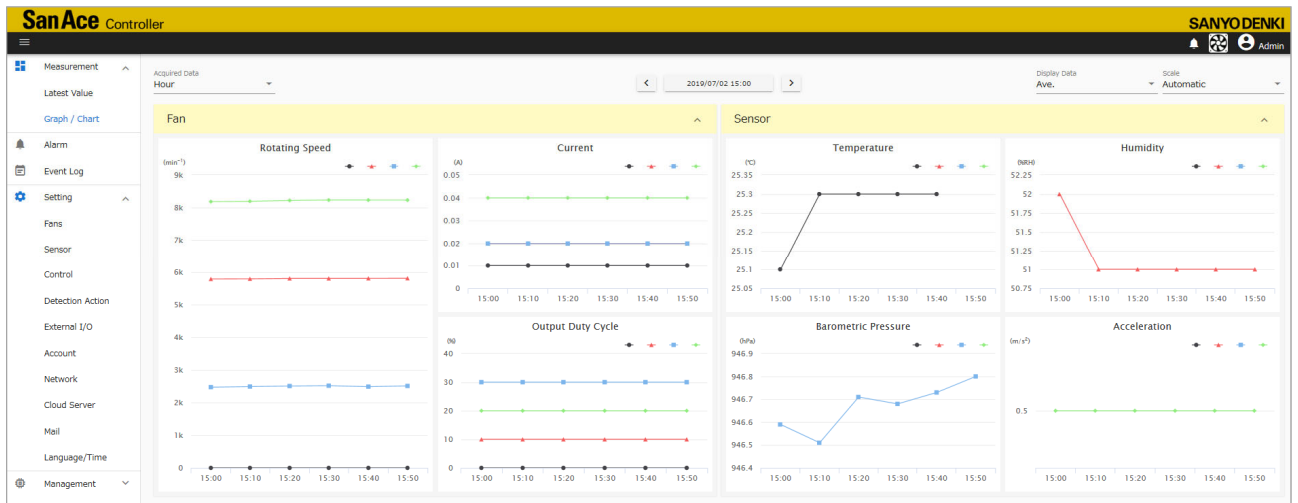
Item	Description
Fan speed	The summary data of the fan speed is displayed as a line graph.
Current	The summary data of the fan current is displayed as a line graph.
Output duty cycle	The summary data of the output duty cycle is displayed as a line graph.
Temperature	The summary data of the temperature sensor is displayed as a line graph.
Humidity	The summary data of the humidity sensor is displayed as a line graph.
Barometric pressure	The summary data of the barometric pressure sensor is displayed as a line graph.
Acceleration	The summary data of the accelerometer is displayed as a line graph.

If there is no measurement data, message "No Data" is displayed.

■ How to view the graph legend

The graph legend corresponds to "F1 to F4" and "Sensors 1 to 4" for the fans and sensors respectively in order from the top, specified in "Setting".
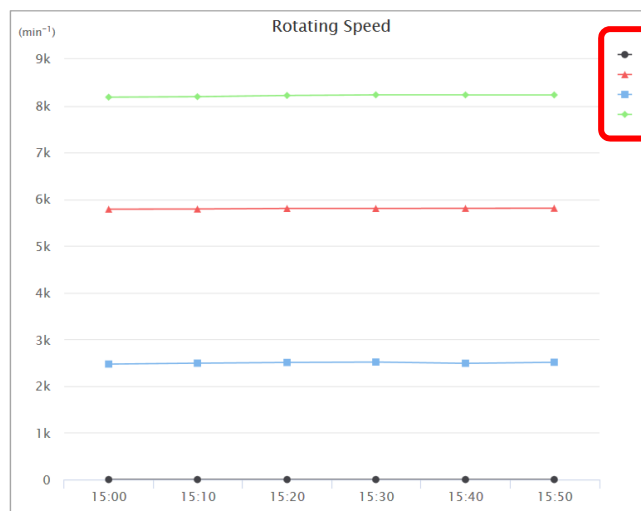

You can click the legend to switch between display and no display of data.

- If data is not continued

  If the measurement data is partially lost, it is not displayed on the graph.

  The measurement data may be partially lost in the following cases

  - The power is not supplied to the controller.
  - The operation is stopped.
  - A measurement error occurs.
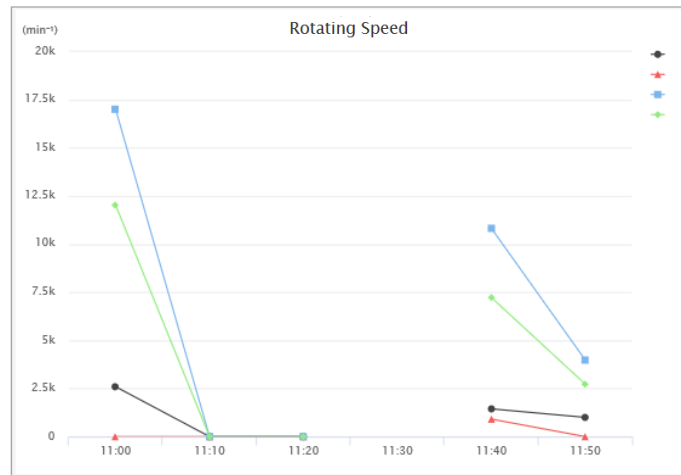
■ **How to view the tooltips of the graphs**

You can click the graph tooltip and check the display contents.
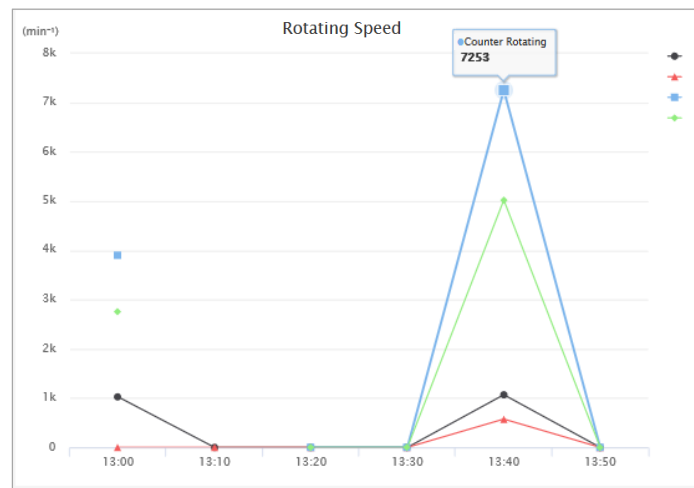

The following contents are displayed on the tooltip.

Display data	Description
Ave: Average value	Measured value of corresponding point (average)
Min: Minimum value	Measured value (minimum) of corresponding point and measuring date
Max: Maximum value	Measured value (maximum) of corresponding point and measuring date

■ **Graph zoom function**

When you hold down the left mouse button and select an area in the graph, the vertical axis of the graph is zoomed and you can check the detailed items.
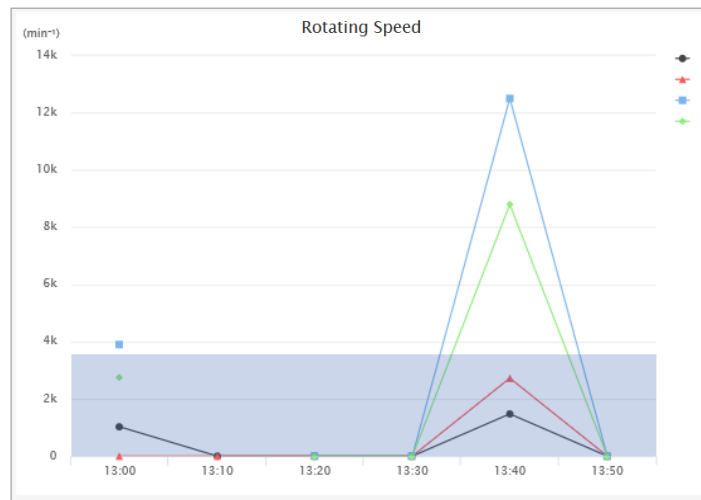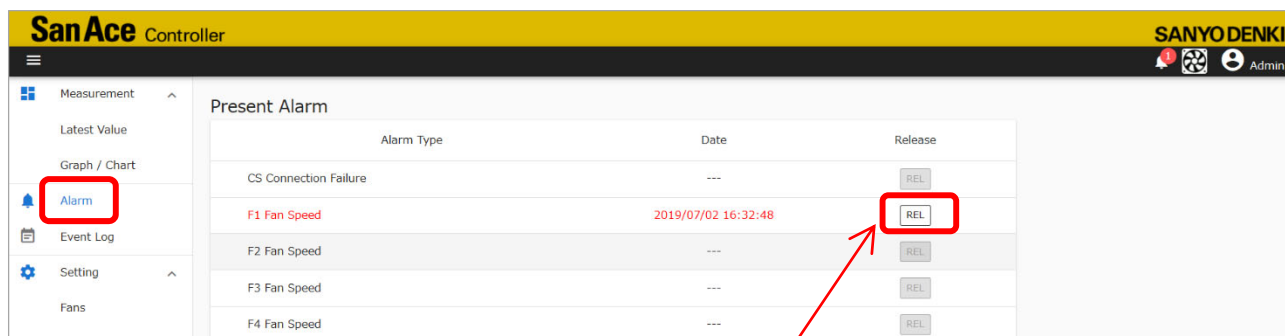

When you zoom the graph, the [Reset zoom] button is shown at upper right of the graph.
Click the [Reset zoom] button to reset the zoom function.
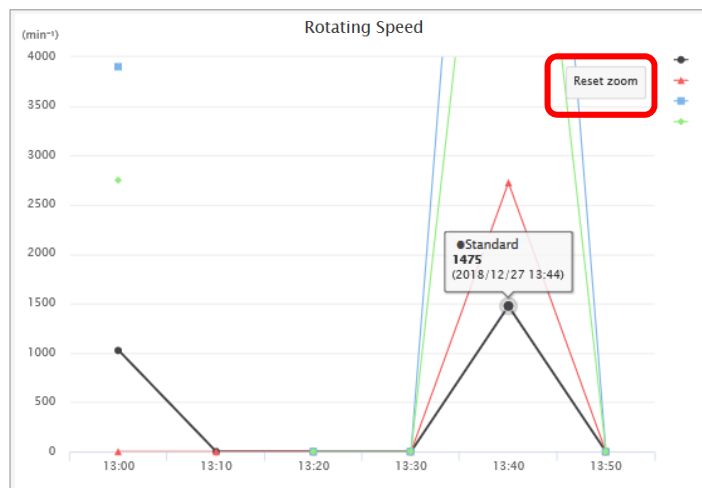
4.4. Alarms

When you click "Alarm" on the side bar, you can check the current alarms and their occurrence date and time.

To release the alarms, click the [REL] button.

■ **Buttons**

Button	Description
[REL] button	Releases the current alarms.

■ **Alarm items**

Target	Item	Description	Alarm setting example
Fan	Fan speed	Rotational speed of each fan	Generate an alarm if the fan speed drops below the limit.
	Current	Average current of each fan	Generate an alarm if abnormal current is detected.
	Operation time	Total rotation time of each fan	Generate an alarm every 1,000 hours.
	Installation time	Total installation time after connection of each fan to the controller	Generate an alarm when the expected lifespan (40,000 hours) has passed.
Sensor	Temperature	Detection value of the temperature sensor	Generate an alarm when the temperature exceeds 50°C.
	Humidity	Detection value of the humidity sensor	Generate an alarm when the humidity exceeds 70% RH.
	Barometric pressure	Detection value of the barometric pressure sensor	Generate an alarm when the barometric pressure drops below 950 hPa.
	Acceleration	Detection value of the accelerometer	Generate an alarm when abnormal vibration is detected.
External communication	External input	Externally entered ON/OFF signals	Generate an alarm if an external input is turned ON.

■ **Alarm notification method**

An alarm can be notified depending on the settings as follows.

Settings	Description
E-mail notification	E-mails are sent to the registered mail addresses (up to five addresses). • The mail transmission can be turned ON or OFF. • Repeated mail notification can be set. For details about e-mails, see "3.3.10. E-mails".
LED	If an alarm has occurred, the controller's LED lights up red. This is common to all alarms.
Screen display	Alarm information is displayed on both the local and cloud system screens.
External output	The H/L signal can be output to an external device according to the alarm occurrence. • The external output can be turned ON or OFF. For details about external output, see "3.3.6. External input/output".

4.5. Event log

You can click "Event Log" on the side bar, and check the event logs.

■ **Types**

Settings	Description
ALM	If the controller deviates from the preset threshold or if an abnormal status is detected, this event occurs.
WARN	This event occurs if the controller setting has failed or if a communication fails.
INFO	This is the controller information.

■ **Buttons**

Button	Description
[REACQUIRE] button	When you select a type for display conditions and when you click the [REACQUIRE] button, only the corresponding event log is displayed.

✓   Clicking individual events will display detailed information.

4.6. Settings

You can specify the settings in the similar way as for initial settings.

For information about how to specify, see "Chapter 3 Initial Settings of Controller".

4.7. Management

Management has the following functions.

- System information
- Data save/restore
- Program update/setting initialization

4.7.1. System information

You can click "System information" on the side bar, and check the system information list.

■ **Display items**

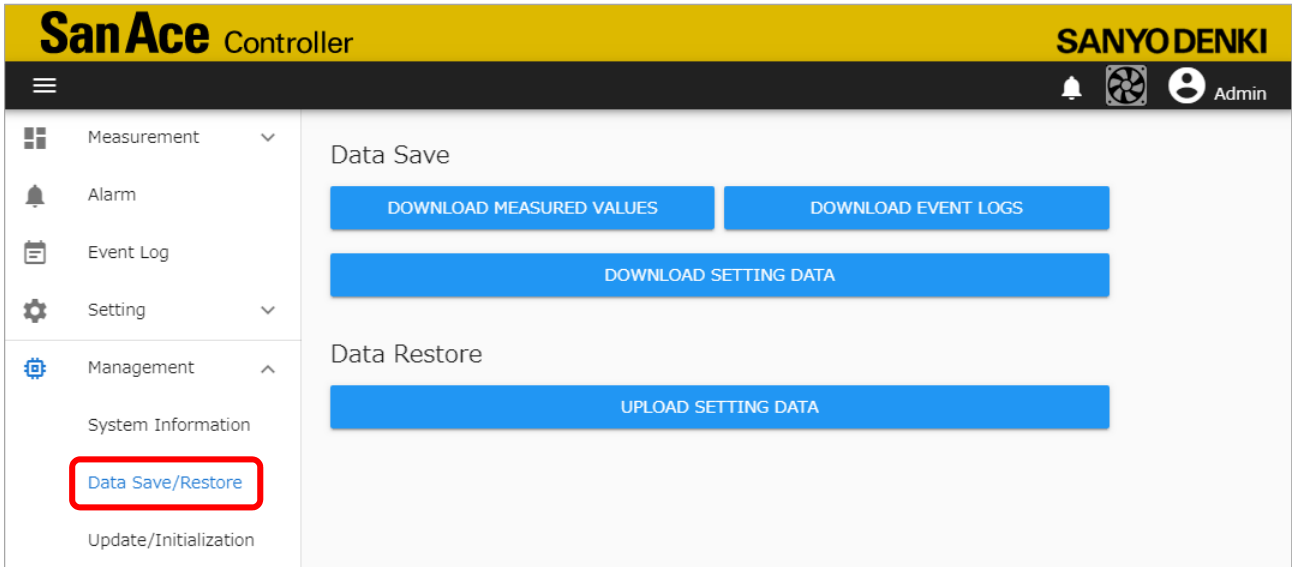| Displayed item	Description
Version	
System version	The system version is displayed.
F/W version	The firmware program version is displayed.
Web version	The Web program version is displayed.
Clock	
Controller time	The clock time of Controller is displayed. The time zone depends on the controller's settings.
Internal storage	
Total capacity	The total capacity of the internal storage is displayed.
Free space	The amount of free space on the internal storage is displayed.
Network information	
eth0	The Wired LAN information is displayed.
mlan0	The Wireless LAN information is displayed.
DNS	The IP address of DNS server to be used is displayed.
Kernel IP routing table	The routing table is displayed.

■ **Buttons**

Button	Description
[OSS LICENSE] button	This button links to a site with license information of the open source software that is used in the San Ace Controller. An internet environment is required to access the site.

4.7.2. Data save/restore

When you click "Data save/restore" on the side bar, you can save or restore data.

- The average, maximum, and minimum values are measured every 10 minutes, and saved as data.
- Up to two years of data is saved in the controller. As data after the third year is overwritten, download the data as required.

■ **Buttons**

Button	Description
Data save	
[DOWNLOAD MEASURED VALUES] button	Downloads the measured value data (means.csv), and saves it on the PC storage.
[DOWNLOAD EVENT LOGS] button	Downloads the event log data (log.csv), and saves it on the PC storage.
[DOWNLOAD SETTING DATA] button	Downloads the setting data (config.json), and saves it on a local device.
Data restore	
[UPLOAD SETTING DATA] button	Select the setting data (config.json) to restore the controller's setting data. This cannot be made during operation. The setting data may be overwritten. Please be careful. Only the administrator user can change the setting data.

4.7.3. Program update/setting initialization

When you click "Update/ initialization" on the side bar, you can update the program, control the power supply and perform the initial setup.

Program update

This function updates the controller to have the latest software.

Select and execute the controller's update file.

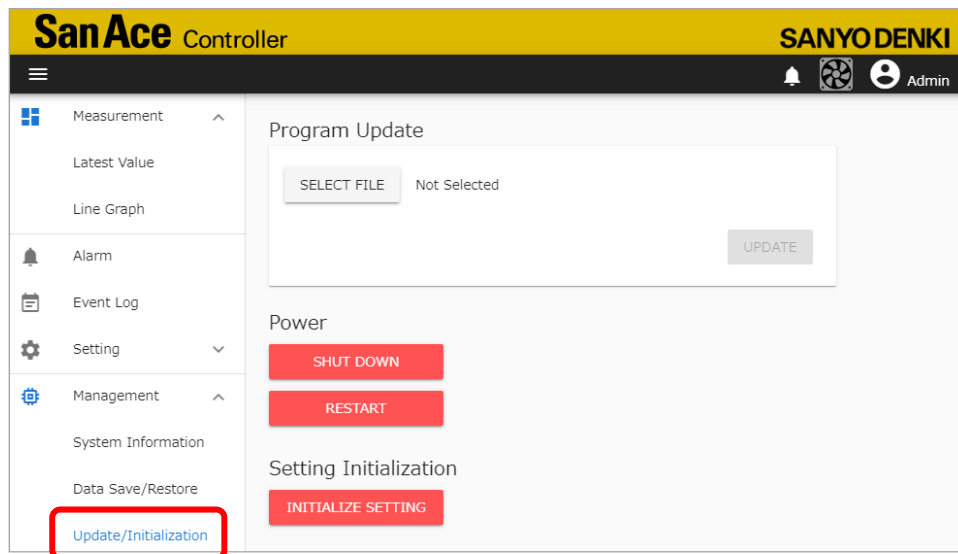You can download the updating program files from the Sanyo Denki's Web site.

Power

The controller can be turned off and restarted.

Setting initialization

This function initializes the controller to the shipment state.

During this time, all of measurement data and setting data are lost. Download and execute the data as required.

■ **Buttons**

Button	Description
[SELECT FILE] button	You can select the updating program file from a local device.
[SHUT DOWN] button	This button turns off the controller. Note that turning it on requires to toggle a power switch.
[RESTART] button	This button restarts the controller (power turned off then on).
[INITIALIZE SETTING] button	Initialize the setting information that has set for "Setting" on the side bar. This cannot be made during operation.

4.8. Logging out of San Ace Controller

After you have completed the processing, log out from the San Ace Controller.

Click and select "Sign out".

Chapter 5 Operations Using Cloud

5.1. Logging in to San Ace NET

Purchasing the San Ace Controller allows you to use the cloud service, San Ace NET.

To log in to San Ace NET, the account and password are required. They can be acquired by registering user information in our website (https://www.sanyodenki.co.jp/).

The basic operation method is the same as the local environment. This chapter describes items different from the local environment.
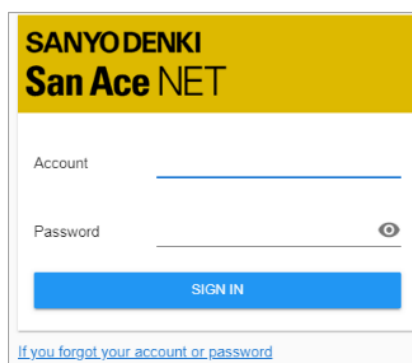
Caution

- To use San Ace NET, you need to consent to the San Ace NET cloud service agreement.
- An environment with the Internet connection is required.
- A few seconds to a few tens of seconds is required to apply the cloud settings to the controller.
- The cloud settings may not be applied in an environment in which an Internet connection is unstable.
- When the local and cloud settings are simultaneously applied, the local settings have priority.
- Some functions cannot be configured using the cloud.

Log in to San Ace NET.

[1] Start the Web browser.

[2] Enter the San Ace NET address in the address bar of the Web browser.

Address: https:// sanacenet.com

This establishes a connection with San Ace NET, and displays the Login screen.

[3] Enter the account and password.
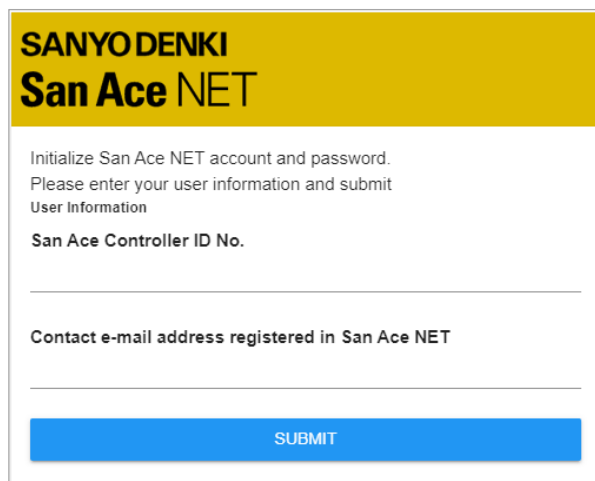
[4] Enter the account information and click the [SIGN IN] button, and the user authentication will start.

If user authentication succeeds, the "Language/Time" screen is displayed.

■ If you forgot your account or password

If you forgot your account or password, click the "If you forgot your account or password" link on the login screen.

A screen will appear where you can reset your account and password.

To reset your account and password, provide the ID No. on the controller label and the contact email address registered with San Ace NET, then click SUBMIT.

Your account and password will be reset, and the initial account and password will be sent to your registered contact email address.

✓ Regarding registering your contact email address, see "5.7.4. Account".

5.2. Language and time settings

Set the language and time for the cloud.

After this setting is completed, click the [APPLY] button to apply your settings.

■ **Settings**

Settings	Description
Language	
Language	Select the language. • Japanese • English When you start for the second time and later, the selected information is displayed.
Clock	
Time zone	Select the time zone. Select the standard time zone from −12:00 to +14:00. It can be "+9:00" in Japan. See "6.6.2. Time zone list".

5.3. Measured value display screen

This section explains how to view the measured value display screen.

- Page header
- Side bar
- Measured value display area
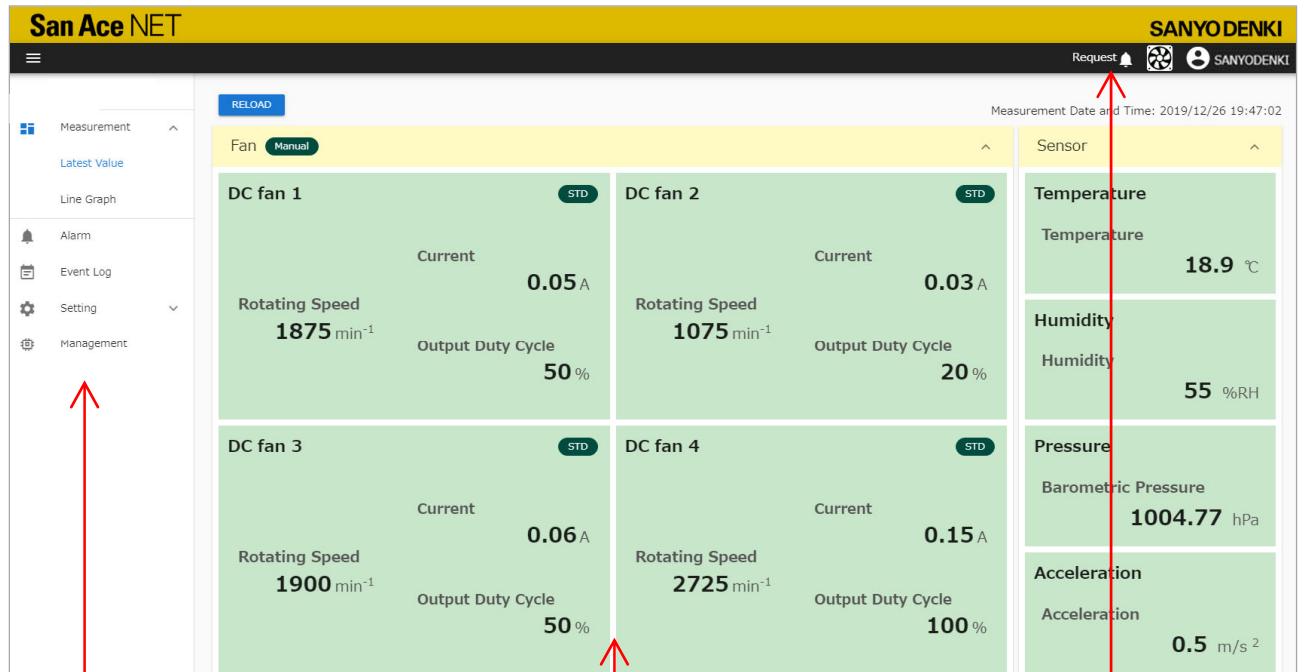
Side bar

Measured value display area

Page header

5.3.1 Cloud page header

The cloud page header provides four items: Request, Alarm, Operation status, and Account.
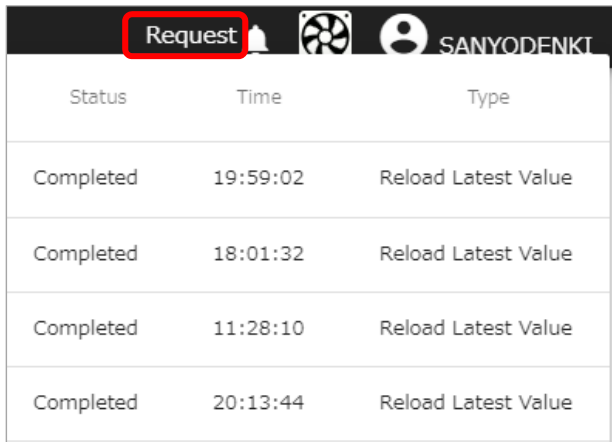
Request   Operation status

■ **Request**

Displays information requested from the cloud to the controller.

When you click "Request", the requested information is displayed.

Status	Time	Type
Completed	19:59:02	Reload Latest Value
Completed	18:01:32	Reload Latest Value
Completed	11:28:10	Reload Latest Value
Completed	20:13:44	Reload Latest Value

■ **Operation status**

Clicking "Fan" allows you to switch between "Run" and "Stop".

When the fan stops in local mode, "Stopped" is displayed, and the fan icon is marked with a diagonal line.

If the fan stops in local mode, operation cannot be started in cloud mode.

< Running >
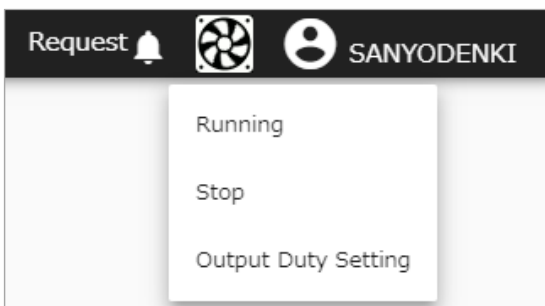
Request

Running

Stop

Output Duty Setting

< Stopped in cloud mode >

Request

Cloud Maintenance

Run

Output Duty Setting

< Stopped in local mode >

Request

Stopped

Output Duty Setting
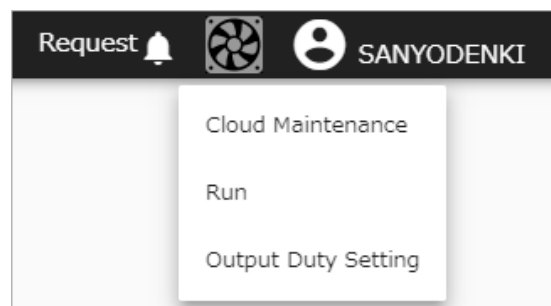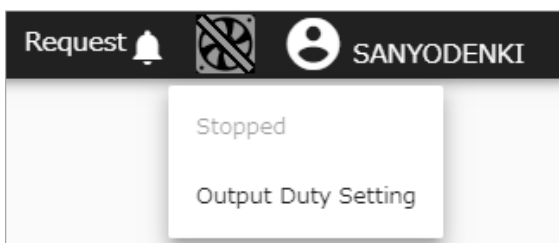
Other functions can be operated in the same way as local mode.

5.4. Measured values

The measured values of fans and sensors are displayed in the measured value display area.

The displayed contents vary depending on which item is selected on the side bar.

- Latest Value: The latest measured value
- Line Graph: Graph of measured value summary data

5.4.1. Latest

When you click "Latest Value" on the side bar, the measured values of fans and sensors are displayed.

■ **Screen configuration**
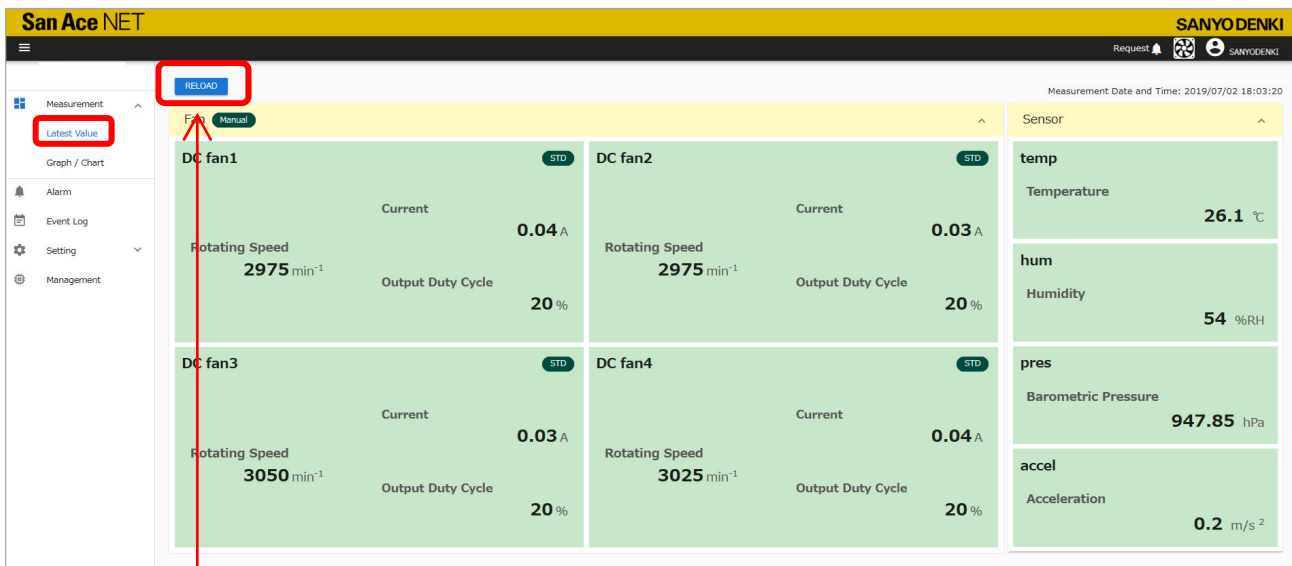
[RELOAD] button

■ **Buttons**

Button	Description
[RELOAD] button	Reload the measured value.
	Wait until the measured value is reloaded.

Other functions can be operated in the same way as local mode.

5.5. Event log

You can click "Event Log" on the side bar, and check the event logs.
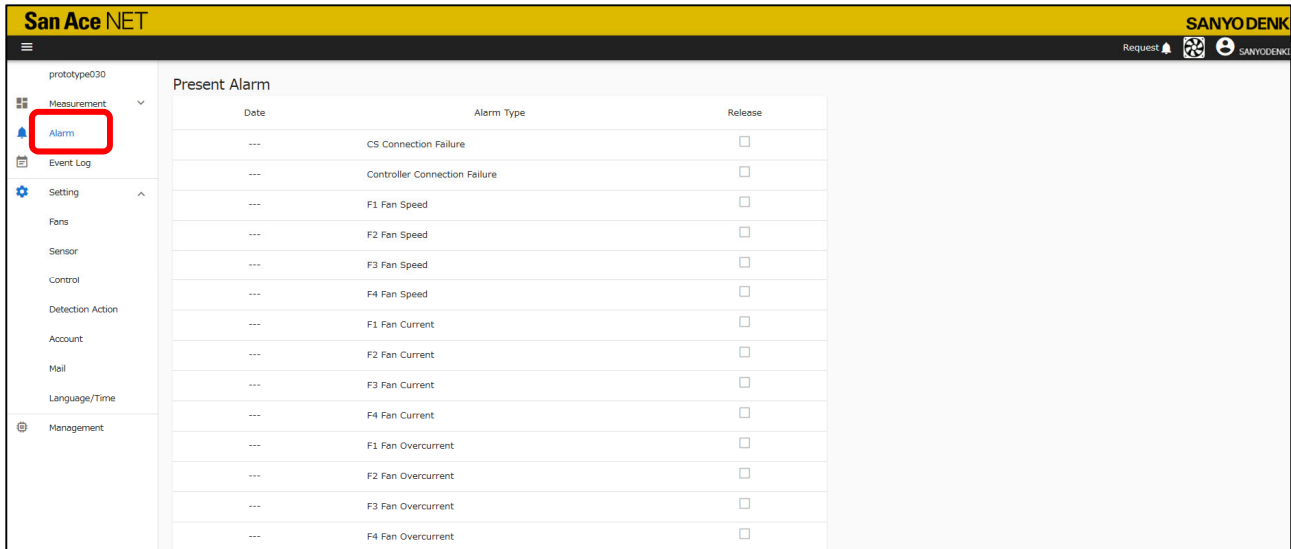
Date selection

■ **Buttons**

Button	Description
[Date selection] button	Toggles the following time display modes when displaying event logs. ・UTC: Coordinated Universal Time mode ・Local: The time display setting of the controller

Other functions can be operated in the same way as local mode.

5.6. Alarms

When you click "Alarm" on the side bar, you can check the current alarms and their occurrence date and time.

To release an alarm, select the "Release" check
box, and click the [APPLY] button.

Other functions can be operated in the same way as local mode.

5.7. Settings

Click "Setting" on the side bar, and set the information to control the controller from the cloud.

After this setting is completed, click the [APPLY] button to apply your settings.

✓ To configure settings, stop the controller operation.

✓ The items available in the cloud are restricted.

5.7.1. Fans

The following items are available in the cloud.

- Name
- Model number
- Current monitoring conditions
- Rotating speed monitoring conditions
- Installation time monitoring value
- Operation time monitoring value and reset

5.7.2. Sensors

The following items are available in the cloud.

- Name
- Monitoring conditions

5.7.3. Control

The following items are available in the cloud.

Manual control

- Output duty cycle

Automatic control

- Target value
- Target value tolerance
- Response to external input
- Response to alarm
- Duty cycle change time

5.7.4. Account

Click "Account" on the side bar, and set up the user account.

On this page, you can set the account and password you use on the San Ace NET login page.

After this setting is completed, click the [APPLY] button to apply your settings.

■ **Buttons**

Button	Description
[APPLY] button	Applies the current settings.

■ Settings

Settings	Description
Account	Enter a string containing one to 20 (single-byte) alphanumeric characters. This is a mandatory item.
Password	Enter a string containing eight to 20 (single-byte) alphanumeric characters. This is a mandatory item.
Password confirmation	Enter your password for confirmation. This is a mandatory item.
Email address	When resetting your account and password, enter a new account and password you want to use.

✓ If the account you entered is being used by another user, you cannot use it.

✓ Note that if you fail to provide a contact email address or provided an incorrect email address, your account and password will not be reset.

5.6.5. E-mails

Click "Mail" on the side bar, and set the e-mail destination information to send e-mails to when an event such as an alarm occurs.

After this setting is completed, click the [APPLY] button to apply your settings.

■ **Settings**

Settings	Description
Destination 1 to 5	Enter the recipient's e-mail address to send an alarm occurrence notification. To disable the e-mail notification, clear the [Enable e-mail sending from cloud] check box.
Language	Select the language. • Japanese • English
Re-transmission interval	Same as local mode.

■ **Test transfer of mails**

When you click the [TEST] button, the following e-mail is sent.

Example

Item	Description
Subject	[TEST] San Ace NET Notification
E-mail sender	information@sanacenet.com
Body text	This e-mail has been sent from the controller (ID: xxxx-xxxx-xxxx-xxxx).

■ **E-mail sent at event occurrence**

If an event occurs, the event type is displayed in the e-mail title and body text.

For information about event types, see "6.6.1. Event list".

Example

Item	Description
Subject	San Ace NET Notification (Event type and event code)
E-mail sender	information@sanacenet.com
Body text	The following event occurred on the controller (ID: xxxx-xxxx-xxxx-xxxx). Event name <Event occurrence date> <Detailed information>

5.8. Management

In Management, you can save data and perform the automatic compensation operation of the previous data.

■ **Data save**

You can download measured values and event logs.

- The average, maximum, and minimum values are measured every 10 minutes, and saved as data.
- Up to four years of data is saved in the cloud. Download data as needed.
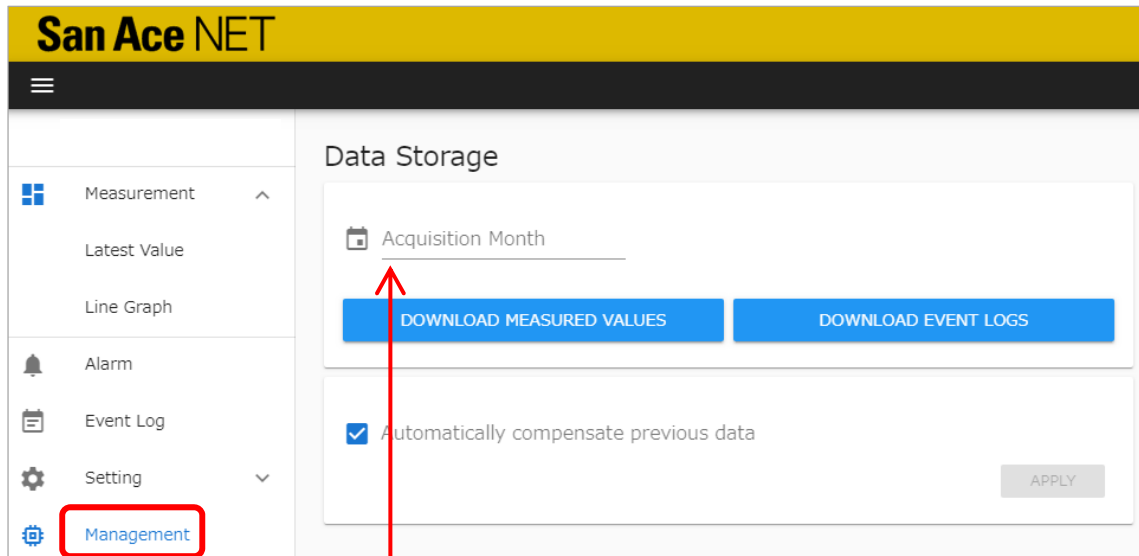
Acquisition month

Clicking the [Acquisition month] column displays the screen to select the month.
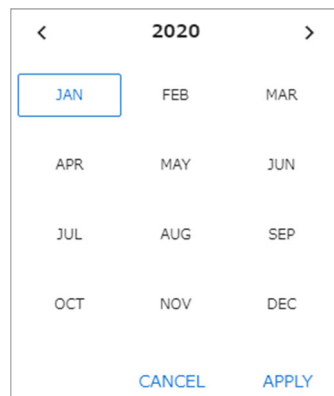
To set the appropriate month, select the month, and click the [APPLY] button.

■ **Buttons**

Button	Description
Data save	
[DOWNLOAD MEASURED VALUES] button	Downloads the measured value data (means.csv), and saves it on the PC storage.
[DOWNLOAD EVENT LOGS] button	Downloads the event log data (log.csv), and saves it on the PC storage.

■ **Settings**

Settings	Description
Data save	Select data to save. • Measured value: means.csv • Event log: log.csv The available data format is "csv".
Acquisition month	Specify the month to acquire data. Monthly data is downloaded.

■ **Automatic compensation of the previous data**

When the [Automatically compensate previous data] check box is selected, the previous data saved in the controller is compensated automatically.

If a data loss occurs in the cloud because data is not sent from the controller to the cloud due to a communication failure, etc., the lost data is compensated automatically.

Chapter 6 Appendices

6.1. Troubleshooting

If the product is not functioning properly, check the following before contacting us for assistance.

Symptom	Countermeasure
The status LED is turned off.	• Is power being supplied properly? → See "2.3.4. Connecting controller and DC power supply".
The status LED lights up red.	• The controller detects an alarm. → See "4.4. Alarms".
Cannot connect to the controller.	• Is the network cable correctly connected? → See "2.3.5. Connecting controller and initial setting PC". • Are the network settings correct? → See "3.3.8. Network".
The LED of the LAN connector does not blink.	• Check your network environment.
Cannot be connected to wireless LAN.	• Are the network settings correct? → See "3.3.8. Network". • Is radio wave interference detected? → Check the installation environment.
A cloud communication error alarm occurs.	• Are the network settings correct? → See "3.3.8. Network". • Are the cloud settings correct? → See "3.3.9. Cloud". • Check your network environment.
(F1 to F4) A fan overcurrent alarm occurs.	• Is the communication cable correctly connected? → See "2.3.1. Connecting controller and fans". • Does the current value of the connected fan exceed the specifications? → See "6.3. Specifications". • Make sure that no failure is detected in the connected fan.
An internal temperature abnormality alarm occurs.	• Does the ambient temperature exceed the specifications? → See "6.3. Specifications". • Is the vent covered? → See "2.2. Device installation".
A sensor failure occurs.	• Is the sensor correctly connected? → See "2.3.3. Connecting controller and sensors".
Cannot log in.	• Are the account and password correct? → See "3.3.7. Account".

If the symptom recurs or operation is unstable, turn the power switch off and on, and make sure of operation.

6.2. Controller warranty

Product warranty

Warranty Period: One year

1. This warranty covers damage caused by defects in production and materials for a specified period from the date of delivery.
2. When damage is caused by a defect in production or in the material of a component or the main unit that is recognized by SANYO DENKI, we will repair or replace the affected device free of charge.
3. This warranty does not apply when products furnished by SANYO DENKI have been modified or altered other than by SANYO DENKI.
4. This warranty does not apply when products supplied by SANYO DENKI are not used in their prescribed manner, nor when products are not used in accordance with the instruction manual.
5. This warranty does not apply to measurement accuracy caused by regular use.
6. This warranty does not apply to damages resulting from accident, misuse, or abuse.
7. This warranty does not apply to failure or damage due to fire, earthquake, storm or flood, lightning, other natural disasters, pollution, salt damage, gas damage (sulfidizing gas, etc.), abnormal voltage, or use of unspecified power supplies.
8. This warranty does not apply to damage or product failure from being dropped during transportation by the customer, from impact, or from improper handling.
9. This warranty period only covers devices specified by SANYO DENKI, and does not apply to devices not specified.
10. SANYO DENKI does not assume any liability for damage to software or loss of data in connected devices, nor for any loss of profits or opportunities.

6.3. Specifications

Controller specifications

Items				Standard model	UL approved model
Model No.				9CT1-001 / 9CT1-002	9CT1-U001 [*1]
Rated voltage [V]				12 / 24 / 48 DC	12 / 24 DC
Power consumption [W]				3.1 [*2]	
Max. input power				970 W Max.	64 W Max. (at 12 V DC) 100 W Max. (at 24 V DC)
Operating voltage range [V]				7 to 60 DC	7 to 30 DC
Operating temperature [°C]				-20 to +70	
Control function				Manual / Automatic	
Control signal (PWM signal) [*3]	High-level voltage (V_{OH})			3.3/5 V	
	Low-level voltage (V_{OL})			0.4 V or less	
	Duty cycle	Range		0 to 100%	
		Accuracy		±2%	
	Frequency			25 ±2 kHz	
Monitoring function				Fan rotation speed, fan current, fan installation time, fan operation time, sensor detection value, external input, cloud connection failure, internal temperature abnormality	
Fan connection connector	Number of connected units			Max. 4	
	Power terminal	Allowable current	Per terminal	5 A	5 A (at 12 V DC) 4 A (at 24 V DC)
			Total of 4 terminals	20 A	
		Withstand voltage		65 V	35 V
	Control signal output terminal	Input/output current		Max. 5mA (per terminal)	
		Withstand voltage		6.5 V	
	Rotation speed signal input terminal	Input signal		Open collector output pulse signal	
		Internal pull-up voltage		5 V	
		Withstand voltage		60 V	
Fan measurement function	Rotation speed	Measurement range		100 to 50000 min^{-1} (2-cycle square wave input per fan rotation)	
		Accuracy [*4]		±5% (at min. 1000 min^{-1})	
	Current	Measurement range		0 to 5A (average current)	
		Accuracy [*4]		Less than 2A: ±0.05 A , 2 A or more： ±0.1 A	
Sensor connections				Max. 4	
Supported sensors [*5]				Temperature and humidity, barometric pressure, acceleration	
External input/output functions	Input	Type		Photocoupler insulation	
		ON/OFF		ON: 15 to 28.8 VDC, OFF: 0 to 5 VDC	
		Input current		10 mA or less	
	Output	Type		Photocoupler insulation open collector output	
		Load voltage		Max. DC 28.8V	
		Output current		Max. 0.1 A	
Communication function	Wireless [*6]			IEEE802.11b/g/n, frequency 2.4 GHz [*7]	
	Wired			Ethernet 10BASE-T, 100BASE-TX	
Safety standards				TUV	$_C$UL$_{US}$, TUV,
Regulations				MIC, VCCI, CE, FCC, ISED	
Size [mm]				50 (W) × 135 (D) × 180 (H)	
Mass [g]				450	
Material				Case: Plastic	

*1 Use a UL Class 2 power supply.
*2 For use of this product alone, at 20°C
*3 Control signal terminal unconnected, at 20°C
*4 At 20°C
*5 Use our dedicated sensors (optional).
*6 9CT1-002 does not support wireless communication.
*7 Available channels: Ch.1 to 11

6.4. Options

Sensor (Optional)

Sensor type	Temperature and humidity sensor	Barometric pressure sensor	Accelerometer
Model No.	9CT1-T	9CT1-P	9CT1-A
Measurement range	Temp.: -20 to +70°C Humidity: 20 to 85% RH [*1]	Barometric pressure: 800 to 1100 hPa	Acceleration: 0 to 60 m/s^2 [*2]
Accuracy	Temp.: ±1°C [*3] Humidity: ±5% RH [*4]	±0.5 hPa [*5]	-
Operating temperature [°C]	-20 to +70		
Operating humidity range [% RH]	20 to 85 [*1]		
Size [mm]	53 (W) × 46 (D) × 22 (H)		
Mass [g]	35		
Material	Case: Plastic		

*1 Non-condensing   *2 Total acceleration from three axes
*3 At 5 to 60°C   *4 At 30°C, 20 to 60% RH
*5 At 30°C

6.5. Safety standards / regulations

This product is compliant with the following safety standards and regulations.

■ Safety standard

Marking	Standard	Application	Description
△	TUV	All models	EN 60730-1
cᵁᴸus	cULus	UL approved models	UL 60730-1

■ Regulations
・Japan

Marking	Regulation	Application	Description
(MIC symbol)	Technical Regulations Conformity Certification (MIC)	Wireless communication models	This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Radio Law.
		All models	This equipment conforms to the technical standards for terminal equipment based on the Telecommunication Business Act.
VCCI	VCCI	All models	This is a Class B product based on the standard of the VCCI Council. If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual. VCCI-B

・EU

Marking	Regulation	Application		Description
CE	Radio equipment directive	Wireless communication models	Safety and Health	EN 60730-1
			EMC	EN 301 489-1 EN 301 489-17 EN 61326-1 EN 61000-6-1 EN 61000-6-3 EN 55032

			Radio frequency spectrum efficiency	EN 300 328
				  Frequency band 2.4GHz
				  Max. power 16dbm

	EMC directive	Non wireless communication models	EMC	EN 61326-1 EN 61000-6-1 EN 61000-6-3

・US / Canada

Marking	Regulation	Application	Description
FC	FCC（US）	All models	47 CFR Part 15, Subpart B, Class B ANSI C63.4
-	ISED (Canada)	Wireless communication models	RSS-310 RSS-Gen
		All models	ICES-003 ICES-Gen ANSI C63.4

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

FCC ClassB Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause

harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is
connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

ISED Statement

This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) This device may not cause interference.
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR
d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) L'appareil ne doit pas produire de brouillage.
(2) L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC/ISED Radiation Exposure Statement

This equipment complies with radio frequency exposure limits set forth by the FCC and Industry Canada for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the device and the user or bystanders. This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement est conforme aux limites d'exposition aux radiofréquences définies par la FCC
et Industrie Canada pour un environnement non contrôlé. Cet équipement doit être installé et
utilisé avec un minimum de 20 cm de distance entre le dispositif et l'utilisateur ou des tiers. Ce
dispositif ne doit pas être utilisé à proximité d'une autre antenne ou d'un autre émetteur.

■ **Regulations compliance requirements**

To comply with these standards/regulations, the following LAN cables must be used.

Use	Requirement
For Ethernet connection	Shielded LAN cable shorter than 3 m
For sensor connection	Shielded LAN cable

Applicable standards/regulations: VCCI, Radio equipment directive, EMC directive, FCC, ISED

6.6. References

- Event list
- Time zone list

6.6.1 Event list

Use this list to check the event type.

- The alphabet character of the target device has the following meaning.

  L: Local

  C: Cloud

  B: Local/Cloud

Target device	Event code	Event name	Event type	Operation setting enabled at detection	
				Email	External output
		Internal event			
L	100	Start-up	Information		
B	101	Setting Update(Account)	Information		
B	102	Setting Update(Fan)	Information		
B	103	Setting Update(Sensor)	Information		
B	104	Setting Update(Control)	Information		
B	105	Setting Update(Monitor)	Information		
B	106	Setting Update(Detection Action)	Information		
B	107	Setting Update(Mail Destination)	Information		
B	108	Setting Update(Mail Server)	Information		
B	109	Setting Update(Network)	Information		
B	110	Setting Update(Cloud Server)	Information		
B	111	Setting Update(Time)	Information		
B	112	Setting Update(External I/O)	Information		
L	113	Clock Setting Success	Information		
L	114	Clock Setting Failure	Warning	✓	
L	200	Operation Mode Switching Success	Information		
L	201	Network Start-up	Information		
L	252	DB Writing Failure	Warning	✓	
L	253	Name Resolution Failure(DNS)	Warning		
L	254	Mail Sending Success	Information		
L	255	Mail Sending Failure	Warning		

Event list (continued)

Target device	Event code	Event name	Event type	Operation setting enabled at detection	
				Email	External output
L	256	CS Connection Failure	Alarm	✓	✓
L	257	CS Connection Recovery	Information		
L	258	CS Connection Test Failure	Information		
Device event					
L	301	Sensor Connection Failure	Warning	✓	
L	302	Sensor Connection Recovery	Information		
Cloud event					
C	400	Controller Connection Failure	Warning	✓	
C	401	Controller Connection Recovery	Information		
Monitoring event					
L	500	F1 Fan Speed	Alarm	✓	✓
L	501	F2 Fan Speed	Alarm	✓	✓
L	502	F3 Fan Speed	Alarm	✓	✓
L	503	F4 Fan Speed	Alarm	✓	✓
L	504	F1 Fan Current	Alarm	✓	✓
L	505	F2 Fan Current	Alarm	✓	✓
L	506	F3 Fan Current	Alarm	✓	✓
L	507	F4 Fan Current	Alarm	✓	✓
L	508	F1 Fan Overcurrent	Alarm	✓	✓
L	509	F2 Fan Overcurrent	Alarm	✓	✓
L	510	F3 Fan Overcurrent	Alarm	✓	✓
L	511	F4 Fan Overcurrent	Alarm	✓	✓
L	512	F1 Fan Installation Time	Alarm	✓	✓
L	513	F2 Fan Installation Time	Alarm	✓	✓
L	514	F3 Fan Installation Time	Alarm	✓	✓
L	515	F4 Fan Installation Time	Alarm	✓	✓
L	516	F1 Fan Operation Time	Alarm	✓	✓
L	517	F2 Fan Operation Time	Alarm	✓	✓
L	518	F3 Fan Operation Time	Alarm	✓	✓
L	519	F4 Fan Operation Time	Alarm	✓	✓
L	520	Sensor1 measurement value	Alarm	✓	✓
L	521	Sensor2 measurement value	Alarm	✓	✓
L	522	Sensor3 measurement value	Alarm	✓	✓
L	523	Sensor4 measurement value	Alarm	✓	✓

Event list (continued)

Target device	Event code	Event name	Event type	Operation setting enabled at detection	
				Email	External output
L	550	External Input Start	Alarm	✓	✓
L	551	Internal TEMP. Abnormality	Alarm	✓	✓
L	552	External input end	Information		
L	553	Internal TEMP. Recovery	Information		
		External event			
L	700	Shut-down	Information		
B	701	Test Mail Sending	Information		
L	702	Wireless LAN Connection Test	Information		
L	703	Cloud connection test	Information		
B	704	Operation Mode Switching	Information		
B	705	Total Installation Time Reset	Information		
B	706	Total Operation Time Reset	Information		
L	707	Setting initialization	Information		
L	708	Upload Setting Data	Information		
L	709	Restart	Information		
B	800	ALM Release(F1 Fan Speed)	Information		
B	801	ALM Release(F2 Fan Speed)	Information		
B	802	ALM Release(F3 Fan Speed)	Information		
B	803	ALM Release(F4 Fan Speed)	Information		
B	804	ALM Release(F1 Fan Current)	Information		
B	805	ALM Release(F2 Fan Current)	Information		
B	806	ALM Release(F2 Fan Current)	Information		
B	807	ALM Release(F2 Fan Current)	Information		
B	808	ALM Release(F1 Fan Overcurrent)	Information		
B	809	ALM Release(F2 Fan Overcurrent)	Information		
B	810	ALM Release(F3 Fan Overcurrent)	Information		
B	811	ALM Release(F4 Fan Overcurrent)	Information		
B	812	ALM Release(F1 Fan Installation Time)	Information		
B	813	ALM Release(F2 Fan Installation Time)	Information		
B	814	ALM Release(F3 Fan Installation Time)	Information		
B	815	ALM Release(F4 Fan Installation Time)	Information		
B	816	ALM Release(F1 Fan Operation Time)	Information		
B	817	ALM Release(F2 Fan Operation Time)	Information		
B	818	ALM Release(F3 Fan Operation Time)	Information		

Event list (continued)

Target device	Event code	Event name	Event type	Operation setting enabled at detection	
				Email	External output
B	819	ALM Release(F4 Fan Operation Time)	Information		
B	820	ALM Release(Sensor1 Measurement Value)	Information		
B	821	ALM Release(Sensor2 Measurement Value)	Information		
B	822	ALM Release(Sensor3 Measurement Value)	Information		
B	823	ALM Release(Sensor4 Measurement Value)	Information		

6.6.2 Time zone list

This is a list of time zones that are set in [Language/Time].

Time zone UTC	Region
+14:00	Kiribati (Line Islands)
+13:00	Tonga, Kiribati (Phoenix Islands), Samoa, Tokelau
+12:45	New Zealand (Chatham Islands)
+12:00	Russia (Kamchatka), New Zealand, Fiji, Kiribati (Gilbert Islands)
+11:00	Russia (Magadan), Solomon Islands, New Caledonia
+10:30	Australia (Lord Howe)
+10:00	Russia (Vladivostok), Guam, Australian Eastern Time
+9:30	Australian Central Time
+9:00	Japan, Russia (Yakutsk), Korea, Palau
+8:45	Australia (Eucla)
+8:00	Russia (Irkutsk), China, Mongol, Malaysia, Australian Western Time
+7:00	Russia (Krasnoyarsk), Thailand, Vietnam, Indonesian Western Time
+6:30	Myanmar, Cocos Islands
+6:00	Russia (Omsk), Kazakhstan, Bangladesh
+5:45	Nepal
+5:30	India
+5:00	Russia (Yekaterinburg), Pakistan
+4:30	Afghanistan
+4:00	Russia (Samara), Azerbaijan, Georgia, United Arab Emirates, Mauritius
+3:30	Iran
+3:00	Russia (Moscow), Belarus, Saudi Arabia, East Africa Time
+2:00	Eastern European Time (Finland, Greece, etc.), Central African Time, South Africa
+1:00	Central European time (France, Germany, etc.), Western African Time (Nigeria, Congo, etc.)
±0:00	United Kingdom, Ireland, Portugal, Iceland, Morocco in Western Africa, etc.
-1:00	Azores, Cabo Verde
-2:00	Brazil (Fernando de Noronha)
-3:00	Brazil (Brazil time), Argentina, Greenland
-3:30	Canada (Newfoundland)
-4:00	Canada (Atlantic Standard Time), Venezuela, Brazil (Amazon Time), Chile
-5:00	U.S., Canada (Eastern Time), Cuba, Peru
-6:00	U.S., Canada, Mexico (Central Time), Central America
-7:00	U.S., Canada, Mexico (Mountain Time)
-8:00	U.S., Canada, Mexico (Pacific Time)
-9:00	Alaska
-9:30	French Polynesia (Marquise Islands)
-10:00	Hawaii, Western Aleutian Islands
-11:00	American Samoa, Niue
-12:00	Baker Island, Howland Island

Contact information for product inquiries