

SANUPS

ON LINE UPS

A11J

5 kVA

Instruction Manual

SANYODENKI

Introduction

Thank you for choosing the SANUPS A11J.

SAVE THESE INSTRUCTIONS

This manual contains important instructions for A11J that should be followed during installation and maintenance of the UPS*¹ and batteries to protect the safety of the customer and the service technician*². To use the UPS correctly and safely, read this manual before using the UPS. For details on the functions and operation of the LCD panel, see the separate ***LCD Panel Operating Manual***. After reading, please keep this manual handy for convenient reference together with the ***LCD Panel Operating Manual***.

This UPS is intended for installation in a temperature-controlled indoor environment free of conductive contaminants.

- Operating temperature: 0 to 40°C (32 to 104°F)

*¹ UPS is an abbreviation for Uninterruptible Power Supply.

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*² Service technician

This term is used to indicate service technicians from SANYO DENKI or entrusted by SANYO DENKI with knowledge of this UPS.

Maintenance work must not be performed by other than a qualified service technician.

Notes about UPS Models

This manual is for the UPS models in the following table. Confirm your UPS model before using the UPS. When using a UPS with long backup times, for details on the extension battery, see the supplied instruction manual with the extension battery.

Capacity	Type*	Model*	
		3U Type	4U Type
5 kVA	Terminal Block Type	A11J502A002TE	A11J502A002TE4U
	Plug Type	A11J502A002NE	A11J502A002NE4U

* In this instruction manual, the names of UPS may be referred to as “Terminal block type” and “Plug type” or “3U type” and “4U type” as shown in the table above depending on the item explained.

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この装置は、クラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI-A

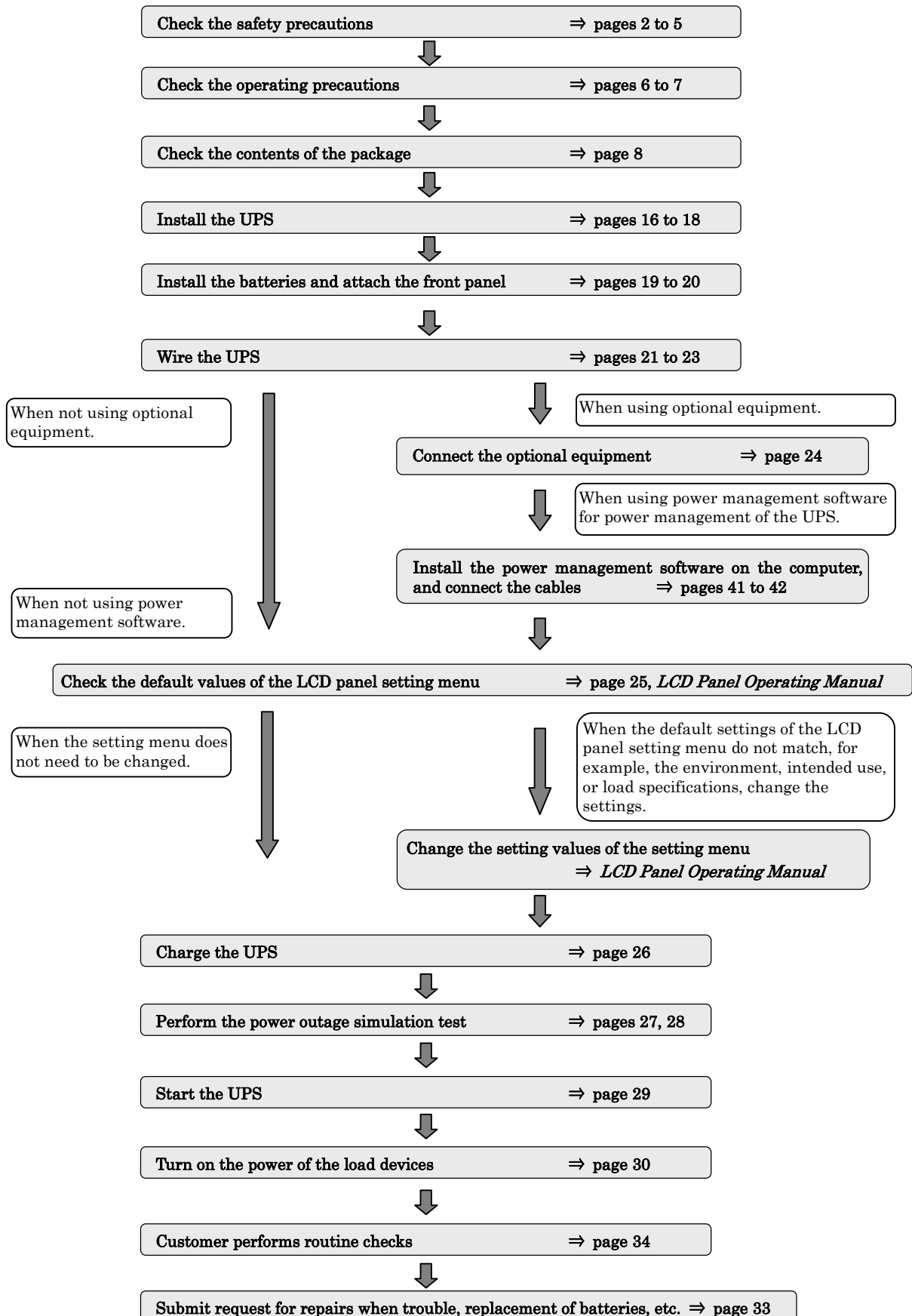
Translation:

This is a Class A product based on the standard of the VCCI Council. If this equipment is used in a domestic environment, radio interference may occur, in which case, the user may be required to take corrective actions.

VCCI-A

§1. Before Use

The following shows the procedures to use the UPS. Be sure to follow the procedures described in this instruction manual to ensure safe and proper use of the UPS.



§2. Safety Precautions

PRECAUTIONS (IMPORTANT SAFETY INSTRUCTIONS)

This manual contains important instructions for operating and maintaining the A11J Series and the batteries to protect the safety of the customers and the service technician.

Before installing, operating, performing maintenance or inspecting the UPS, be sure to read this manual and accompanying documents carefully to obtain a clear understanding of the information related to its operation, safety and important precautions.

This manual uses two safety warning levels, WARNING and CAUTION, as described below.

Label	Explanation
 WARNING	Denotes immediate hazards which WILL probably 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.

Additionally, even those hazards denoted by  **CAUTION** could lead to a serious accident, so the instructions should be strictly followed.

The following labels indicate particularly important instructions which must be carefully followed. The graphic symbols indicate prohibited and mandatory actions.

Symbol	Explanation
	Indicates actions that must not be allowed to occur (prohibited actions).
	Indicates actions that must be taken (mandatory actions). Specific information appears within the graphic symbol or in an explanation nearby.  : This example signifies the mandatory actions.  : This example signifies that the equipment must be securely grounded.
	Indicates CAUTION (including WARNING). Specific information appears within the graphic symbol or in an explanation nearby.  : This symbol signifies the general caution.  : This symbol signifies that there is danger of electric shock.  : This symbol signifies that there is danger of a fire or smoke generation.

1. Relocation, Transportation and Moving Precautions



- Be careful to avoid falling or dropping the UPS during relocation, transportation, as bodily injury could result.
- Be careful to avoid back strain when handling the UPS.
- To avoid bodily injury or a malfunction caused by dropping the UPS, do not tilt the UPS more than 10 degrees to either side when moving it vertically. Take preventative measures to avoid dropping the UPS if it must be tilted more than 10 degrees when moving it.

2. Installation Precautions



- The UPS should be installed only by technically qualified personnel. Improper installation may result in electric shock, bodily injury, and/or fire.
- Never operate or store the UPS in the following environmental conditions. Doing so may cause the UPS to malfunction, sustain damage or deteriorate, which could result in a fire or other accidents.
 - In ambient environmental conditions other than those specified in the product brochure and instruction manual (temperature 0 to 40°C (32 to 104°F), relative humidity 20 to 90%), such as in extremely high or low temperature and high humidity.
 - Where the UPS is exposed to direct sunlight.
 - Where the UPS is directly exposed to the heat from a heat source, such as a stove.
 - Where grounding is not possible.
 - Where the UPS may be subject to vibration or physical shock.
 - Near a device that may emit sparks.
 - In the presence of dust, salt or corrosive or flammable gas.
 - Outdoors
 - When the UPS is rack mounted, in a poorly ventilated rack.
- Be careful not to block the air intake and exhaust vents of the UPS. Keep the front of the UPS at least 20 cm (8 inches) and the back of the UPS at least 15 cm (6 inches) away from a wall or other object. If you mount the UPS in a rack, mount it in a rack that can be well ventilated, and be careful not to block the air intake and exhaust vents of the rack and UPS. If the air intake or exhaust vent is blocked, the internal temperature of the UPS rises, which could cause battery deterioration resulting in a fire. For maintenance, the UPS requires at least 1 m (40 inches) of space at the front, and at least 50 cm (20 inches) at the back.
- The space around the UPS must be ventilated. The table on the right shows the required ventilation airflow. Unless the specified ventilation airflow is maintained, gas produced by battery charging could result in rupture or explosion of the case.
- Install the UPS on a stable surface or rack capable of bearing the weight of the UPS in the correct manner specified in this manual. Refer to the table in §5.1 for the weight of the UPS. If the UPS is installed incorrectly, impact or vibration could cause it to fall or move inadvertently, resulting in bodily injury. Be careful to avoid back strain when handling the UPS.
- Move packaging such as plastic bags and film and accessories such as screws to a place that is out of reach of children. If a child, for example, places film over his or her head or swallows a screw, there is danger of suffocation.
- Install a plug type UPS near an outlet and make sure the plug can be easily inserted and removed.



UPS	Ventilation Airflow (m³/h)
3U Type	7
4U Type	7

3. Wiring Precautions



- Wiring should be performed only by technically qualified personnel. Incorrect wiring may result in electric shock and/or fire.
- Protection for primary circuits against over currents, short circuits and ground faults is not provided inside this UPS. Protection in primary circuit against over currents, short circuits and earth faults shall be provided as part of the building installation.
- In the case of the terminal block type, connect the grounding cable securely in the manner specified (input/output terminal block).
In the case of the plug type, connect the plug to an outlet that is securely grounded.
This UPS requires class D grounding work. Failure to connect the grounding cable in accordance with the specified grounding class may result in electric shock.
Have a qualified electrician perform any grounding work that may be required (a fee will be charged).
- The grounding cables of all load devices* connected to the output of the UPS must be securely connected to the grounding terminals. Failure to connect the grounding cables of the load devices correctly may result in electric shock.



* Load devices are devices such as computers that are connected to the UPS.

4. Operating Precautions



WARNING

- Immediately shut down the UPS if it malfunctions, or if an unusual odor or noise is observed. Failure to do so may result in a fire.
- To avoid electric shock, do not open the cover of the UPS. Do not detach the cover of the options, except when you use some options. There is danger of electric shock or other accidents.



PROHIBITED

- Never use the UPS for the following types of loads :
 - a. Medical instruments used for life support.
 - b. Control units for trains or elevators, failure of which may cause bodily injury.
 - c. Computer systems upon which social or public infrastructure depends.
 - d. Devices which serve applications related to the above.



Contact your sales representative if you need to use the UPS in an application like the above. Special equipment such as redundant devices or an emergency generator must be incorporated when operating, maintaining and controlling systems in which a UPS is used with loads affecting life-support or public infrastructure-dependent applications.

- This UPS must be installed, operated and maintained by technically qualified personnel in an industrial environment. This UPS should not be used in any other environment; for example, a general home environment where a technically qualified personnel is not in.
- Do not smoke or use an open flame near the UPS, as it could cause the UPS to explode or rupture, resulting in injury or fire.
- Do not place containers of liquid, such as a flower vase, on the UPS. If the container was to spill, the liquid could cause a short circuit, resulting in sparks or fire inside the UPS.
- Do not sit, ride, step or lean on the UPS, as bodily injury could result if the UPS was to fall.
- Do not operate the switches with wet hands. There is danger of electric shock.
- All repairs and modifications to the UPS are prohibited. The UPS contains high voltage and no user serviceable parts. Opening the cover, exchanging the battery, parts exchange, and repair can result in electric shock or other accidents when performed by anyone other than qualified service personnel. All such repairs and modifications will void the warranty.



CAUTION

- Check the load-side safety before starting the UPS, and operate the UPS in accordance with the instructions in the manual. The following table shows the UPS states resulting from operation of the **MAIN MCCB** or **ON/OFF** button. Check the indicators before and after operating. Do not touch the **MAIN MCCB** or **ON/OFF** button unless necessary. If power is supplied incorrectly, electric shock or bodily injury could result.

UPS Status		Output Status	LEDs
MAIN MCCB	ON/OFF	OUTPUT	
OFF	OFF	Stopped	INPUT (off-green), OUTPUT (off-green)
ON	OFF	Stopped	INPUT (on-green), OUTPUT (off-green)
OFF	ON	Output from inverter	INPUT (blinking-green), OUTPUT (lit-green)
ON	ON	Output from inverter	INPUT (lit-green), OUTPUT (lit-green)

- Avoid inserting sharp objects or fingers into the fan. Doing so may result in bodily injury.
- Do not touch the UPS, including the cables, if you hear thunder nearby. There is danger of electric shock from a lightning strike.



5. Maintenance and Inspection Precautions



CAUTION

- Maintenance and repair of the inside of the UPS should be performed only by technically qualified personnel. Electric shock, bodily injury, burns, fuming, or fire may otherwise result.
- Contact your nearest sales representative or authorized service center to have the UPS checked out or to replace defective parts. Opening the cover carelessly can result in an electric shock or burn.
- Replace the batteries periodically (once every 4.5 years when operated at 25°C (77°F)). Using batteries after their service life has expired may cause a fire.
- Never use organic solvents such as gasoline, thinner, benzene or detergents to clean batteries. These can cause the casing to crack and leak, resulting in electric leakage or fire.
- Do not allow metal objects or fingers to touch the battery connectors of the UPS or optional equipment. Doing so may result in an electric shock or burn.
- Do not touch any parts inside the UPS, even when the AC input is removed and the batteries are removed. There is the danger of electric shock from high voltage that remains in parts.



6. Radio Frequency Interference



- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in the residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

7. Battery Handling Precautions



- Battery servicing should be performed by technically qualified personnel. Keep unqualified personnel away from batteries.
- Replace batteries only with the same model and brand as the ones used for this UPS. Risk of explosion if battery is replaced by an incorrect type.
- The batteries in this product are lead type batteries which are a reusable resource. Please cooperate by recycling when replacing or disposing of used batteries. Dispose of used batteries according to the instructions. Customers should not dispose of used batteries themselves. To dispose of used batteries, contact your nearest sales representative, an authorized industrial waste handling company, or repack them in their original cartons and send them to your supplier or SANYO DENKI.
- Do not use batteries after their service life has expired. Doing so may result in fuming or fire. Additionally, the battery backup function may fail to operate with such batteries, so that power will not be supplied to the load when a power outage occurs.
- Batteries pose hazards for electrical shock and dangerous short-circuit current. The following precautions should be observed when working with batteries.
 - a. Remove watches, rings and other metal objects.
 - b. Use insulated tools.
 - c. Wear rubber gloves and boots.
 - d. Do not lay tools or metal parts on top of batteries.
 - e. Disconnect the charging source prior to connecting or disconnecting battery terminals.
 - f. Determine whether the batteries have been inadvertently grounded, and if so, remove the source of grounding. Contact with any part of a grounded battery can result in electric shock.
- Do not attempt to open or disassemble batteries. The electrolyte is harmful to the skin and eyes. The battery contains diluted sulfuric acid, which is extremely toxic. If a battery leaks, take appropriate measures to prevent any battery fluid contacting your skin or clothing. Diluted sulfuric acid may cause blindness if it gets into the eye, may burn skin upon contact. It is electrically conductive and corrosive. Observe the following procedures if electrolyte spills:
 - a. Wear full eye protection and protective clothing.
 - b. If sulfuric acid contacts the skin, wash it off immediately with water.
 - c. If sulfuric acid contacts the eyes, flush thoroughly and immediately with water, and seek medical attention.
 - d. Spilled sulfuric acid should be washed down with a suitable acid-neutralizing agent, such as a solution of approximately one pound (500 grams) of bicarbonate of soda in one gallon (4 liters) of water. The bicarbonate of soda solution should be applied until evidence of reaction (foaming) has ceased. The resulting liquid should be flushed with water and the area dried.
- Lead-acid batteries may present the risk of fire due to the generation of hydrogen gas. The following precautions should be observed.
 - a. DO NOT SMOKE near batteries.
 - b. DO NOT allow flames or sparks near batteries.
 - c. Before working with batteries, discharge static electricity from the body by first touching a grounded metal surface before touching the batteries.
- If a fire occurs near a battery, do not use water to extinguish it. Use only a powder-extinguishing agent (ABC). Using water may cause the fire to spread.
- Do not dispose of batteries in fire, as they may explode.
- Strictly observe the following precautions when handling the batteries. Failure to do so may cause battery leakage, overheating or explosion.
 - a. Do not solder to any part of a battery directly.
 - b. Do not charge the batteries with reversed positive (+) and negative (-) terminal polarity.
 - c. Do not mix different battery types, brands or versions.
 - d. Do not attempt to peel off or break the outer covering of a battery.
 - e. Do not subject batteries to strong physical shock, or throw them away.
 - f. Clean batteries with water-moistened cloth squeezed hard. Do not use organic solutions such as gasoline, thinner or benzene or detergent.
 - g. Electrical energy may remain in a battery even after its service life has expired. Do not allow sparks near used batteries, and protect them from short-circuiting.



§3. For Proper Operation

§3.1 UPS Input Power Supply

(1) Input Power Supply and Power Supply Capacity

The following table shows the ratings for the AC input power of this UPS. For the voltage and frequency variation ranges, see §14.4 “Specifications.”

UPS	AC Input Voltage Rating	AC Input Frequency Rating	Input Capacity	Input Distribution Board Breaker
A11J502A002TE A11J502A002TE4U	200, 208, 220, 230, 240V*1	50 or 60 Hz*2	5.5 kVA	40 A or higher
A11J502A002NE A11J502A002NE4U	(Factory default)			30 A or higher

*1. When the UPS is shipped from the factory, this is set to 200 V. Change the setting to match the AC voltage of the area in which the UPS is to be used from the setting menu of the LCD panel. For the setting procedure, see the *LCD Panel Operating Manual*.

*2. When the UPS is shipped from the factory, it is set to automatically detect the AC input frequency (50 or 60 Hz).

(2) To ensure the correct ground potential is used for the computer system and power supply device, connect to the UPS in accordance with the type of AC input power supply as shown in the table below.

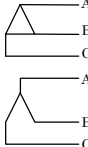
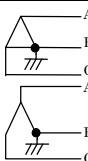
① AC input power supply check

Check in advance whether the AC power supply that will be used corresponds to one of those shown in the table. If you are unsure, use a tester or other device to measure the voltage to ground and then make a judgment.

② Input wiring work

To ensure that the mark in the “Applicable” column becomes ○ or △, select the connection wires (phase) to the UPS input terminals R and N when carrying out the wiring work.

- The ○ mark in the “Applicable” column indicates a standard connection of an ungrounded power supply or single-wire grounded power supply.
- The △ mark indicates that voltage to ground (of both wires) is occurring (not excessive) in the UPS output terminal, so care needs to be taken because the power supply will be short circuited if a single-wire ground is used on the load device side.
- The × mark indicates that voltage to ground of the UPS output terminal is excessive, and may cause the load device to malfunction. Furthermore, using a single-wire ground on the load device side will cause the power supply to be short circuited, so change the wiring to ○ or △, or add an insulation transformer to the output side.

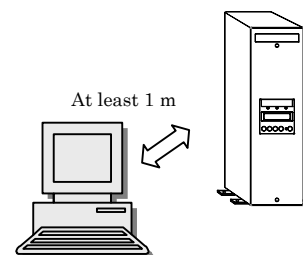
		Input Power Supply Type	Connection to UPS		Applicable	UPS Output Voltage to Ground*2		Notes											
			R	N		U-G	V-G												
1	3-phase ungrounded power supply		A B C C C A A	B A C B A C	○	Refer to notes	Refer to notes	The ground to voltage value is unstable because there is a floating voltage. Ground to voltage output: V _{U-G} +V _{V-G} = Approx. 200 V											
2	Single-phase ungrounded power supply		A B B	B A					○	Refer to notes	Refer to notes								
3	3-phase grounded power supply		A C A C	B C A								○	Approx. 200 V	Approx. 0 V	1. Connect the ground phase to the N terminal side of the UPS input. 2. If the N terminal is not the ground phase: (1) The ground to voltage of the UPS output rises during non-synchronized operation. (2) If the UPS output side is single-wire grounded, a power supply short circuit occurs.				
			A C C	A A					×	Approx. 200 V (Approx. 400 V)	Approx. 200 V								
			A B C	A C								×	Approx. 0 V (Approx. 400 V)	Approx. 200 V					
4	Single-phase grounded power supply		A B B	B A					○	Approx. 200 V	Approx. 0 V								
			A B	A	×	Approx. 0 V (Approx. 400 V)	Approx. 200 V												
5	Intermediate grounded power supply Single-phase, 3-wire		A B B	B A				△	Approx. 100 V (Approx. 300 V)	Approx. 100 V									
6	Intermediate grounded power supply 3-phase, 4-wire		A B C C C A A	B A C B A C	△	Approx. 120 V (Approx. 320 V)	Approx. 120 V												
			A B C C	A B A C				×	Approx. 100 V (Approx. 380 V)	Approx. 180 V									
			A B C	A C							△	Approx. 100 V (Approx. 300 V)	Approx. 100 V						
			A B C	A C										△		Approx. 100 V (Approx. 300 V)	Approx. 100 V		
			A B C	A C											△			Approx. 100 V (Approx. 300 V)	Approx. 100 V
			A B C	A C															
7	Intermediate grounded power supply 3-phase, 3-wire		A C B A A C	B A C A	×	Approx. 100 V (Approx. 380 V)	Approx. 180 V												
			A C	B				△	Approx. 100 V (Approx. 300 V)	Approx. 100 V									
			A C	B							△	Approx. 100 V (Approx. 300 V)	Approx. 100 V						
			A C	B										△		Approx. 100 V (Approx. 300 V)	Approx. 100 V		
			A C	B											△			Approx. 100 V (Approx. 300 V)	Approx. 100 V
			A C	B															

*1. The voltage values in the table above are when the input/output voltage is 200 V. The values in parenthesis are the maximum values during non-synchronized operation.

*2. Nonstandard input power supply types are also shown in the table above.

§3.2 Installation Precautions

- (1) Carefully consider the leakage current when a leakage circuit breaker is installed on the input side.
The maximum leakage current is 4 mA.
- (2) Keep the UPS at least 1 m (40 inches) away from CRT displays.
Other devices which may be sensitive to magnetic flux should be kept away from the UPS, as it emits a slight amount of magnetic flux.
- (3) The UPS employs a fan for forced-air cooling. Provide the clearances specified in §6.1.2 "Checking Installation Space" to permit air to flow freely at the air intake and exhaust vents.
- (4) When the AC input power is single-wire grounded, always connect the ground phase to the N terminal of the UPS.
For details, see §6.3 "Wiring."



§3.3 Usage Precautions

- (1) Never short-circuit the output circuits.
Doing so will cause the protective functions of the UPS to activate or the breaker to trip, preventing output.
- (2) Unsuitable load devices
Do not connect laser printers, plain paper fax machines, copy machines, overhead projectors, vacuum cleaners or hair dryers to the UPS. Since such devices are subject to high transient current surges, the UPS will detect current surges and the battery backup operation will become no longer possible when a power outage occurs. There is also the danger of the UPS malfunctioning.
- (3) Power supply environment
If the UPS is used in an environment subject to long and frequent power outages (more than once a week), the batteries may not receive sufficient charge, which could result in foreshortened battery life and premature battery failure.
- (4) If the UPS is stored without being operated for a long period, the batteries may require recharging. If the batteries in the UPS are left uncharged, their service life will be greatly foreshortened. Recharge the batteries in accordance with the UPS storage environment as shown in the table below.
For the time required to recharge the batteries, see §7.2 "Charging UPS."

Storage Temperature	Recharge Interval
25°C (77°F)	Once every 6 months
30°C (86°F)	Once every 4 months
40°C (104°F)	Once every 2 months

Recharging procedure

- ① Set **MAIN MCCB** on the front panel of the UPS to "ON."
- ② Check that "Green INPUT" is lit.
↓ Recharging starts.
- ③ Continue operation as is for specified time or longer.
- ④ After the specified time or longer elapses, set **MAIN MCCB** to "OFF."

- (5) Insulation testing
Before testing the indoor wiring insulation, shut down the UPS and disconnect the input and output cables.
Conducting an insulation test with the UPS connected may damage electronic components such as the built-in arrester.
- (6) L-type rails (support rails) are required to mount the UPS on a rack.
For more information, contact the manufacturer of your rack, your supplier or SANYODENKI.

§4. Checking Contents of Package

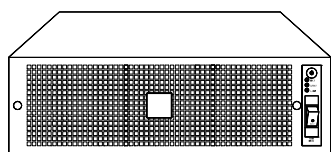
After you open the package, check to make sure that it contains all of the following items.

Does it contain the UPS and all accessories?
Is the exterior of the UPS damaged or unusual?
Check and place a mark in ☒.

If any item is missing or unusual, contact your supplier or SANYO DENKI.

This is an image. The actual shapes of the UPS and accessories may differ.

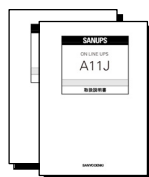
☐ A11J 1



The shape of the UPS differs by model

☐ LCD Panel Operating Manual 1

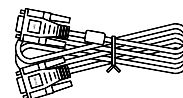
☐ Instruction Manual (this booklet) 1



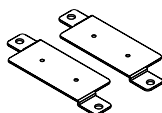
☐ Power Management Software CD-ROM 1



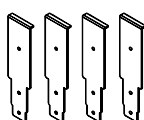
☐ Communication Cable 1



☐ Floor Mounting Bracket 2



☐ Support Bracket A: For attaching Floor Mounting brackets 4



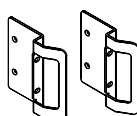
☐ Screw A : For attaching brackets M4X6 (black) 6



☐ Screw B: For attaching brackets M4X6 4



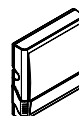
☐ Rack Mounting Bracket 2



☐ Support Bracket B: For attaching Rack Mounting brackets 2



☐ LCD Panel 1



☐ Screw C: For securing LCD panel M3X6 2

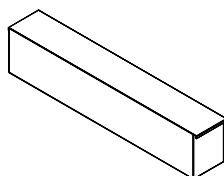


☐ LCD Panel Connection Cable 1



Separate Packages

☐ Battery Pack A 1



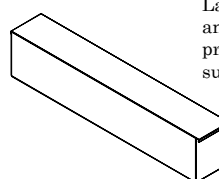
☐ Label for Battery Replacement 1



☐ Name Plate Usage Procedure Manual 1



☐ Battery Pack B 1



Label for battery replacement and name plate usage procedure manual are not supplied with battery pack B.

- The shape of battery packs differ depending on the UPS model.
- When using a UPS with battery extension unit, the battery packs are not supplied.

Note on transferring or selling the UPS

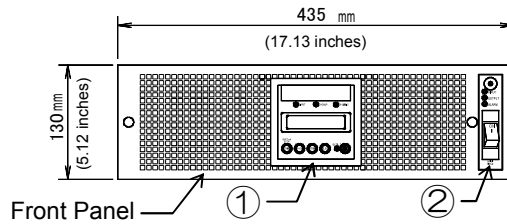
If you sell the UPS or transfer ownership to a third party, transfer or sell all the accessories and other items supplied with the UPS.

§5. External Dimensions and Part Names

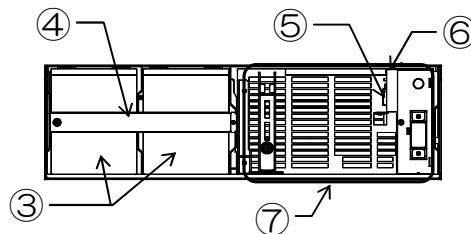
§5.1 UPS

3U Type

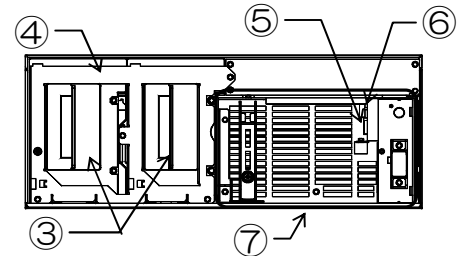
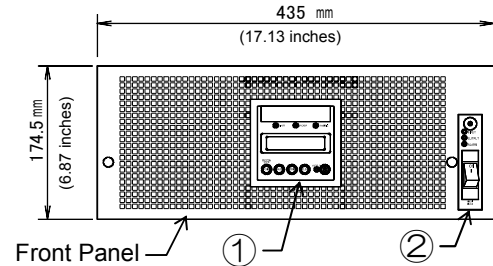
Front



Inside Front

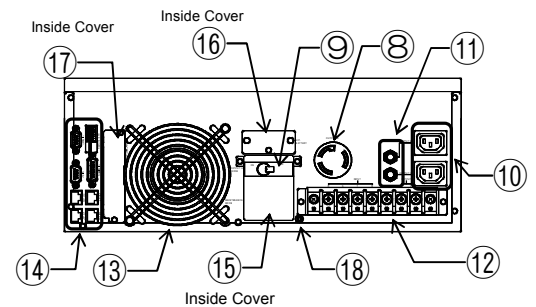
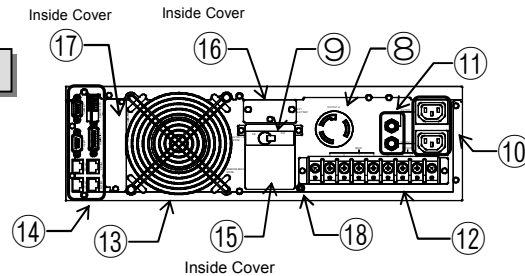


4U Type



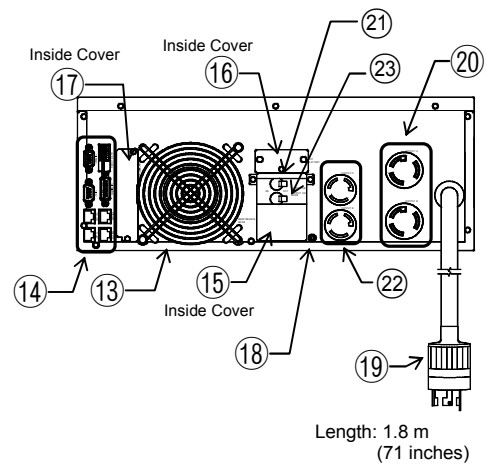
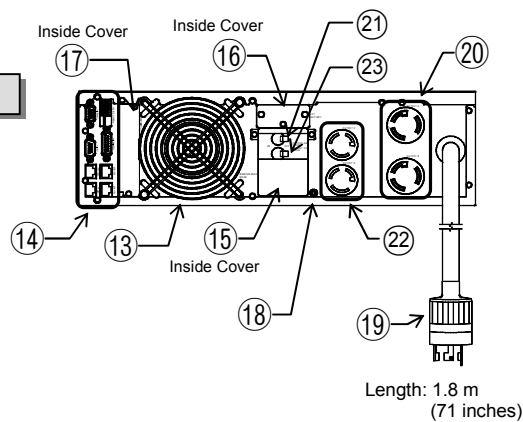
Terminal Block Type

Back



Plug Type

Back



No.	Name	Label	Function
①	LCD panel	See §5.2	UPS status display, measurement display, settings and operation
②	Unit control panel	See §5.3	UPS status display and operation
③	Battery pack*4	—	Batteries for backup
④	Battery pack securing bracket	—	For securing battery packs
⑤	LCD panel connector	—	For connecting LCD panel
⑥	Forced bypass switch*3	Forced Bypass	For switching to maintenance bypass circuits (used in conjunction with maintenance bypass breaker)
⑦	Inverter module	—	Rectifier, charger, inverter, and bypass circuit
⑧	Output outlet A	OUTPUT A	For connecting load device (NEMA L6-30R)
⑨	Breaker for output outlet A	OUTPUT A MCCB	For protecting output outlet A
⑩	Output outlets B and C	OUTPUT B OUTPUT C	For connecting load device (IEC-C13) x2
⑪	Breaker for output outlets B and C	OUTPUT B OUTPUT C	For protecting output outlets B and C, 1 for each
⑫	Input/output terminal block	INPUT E OUTPUT	For connecting input power, ground, and load devices
⑬	Exhaust vent for cooling fan	—	For ventilation inside the UPS
⑭	External interfaces	See §5.4	Interfaces for connecting external devices
⑮	Maintenance bypass breaker	MAINTENANCE MCCB	For turning ON/OFF and protecting the maintenance bypass circuits
⑯	Extension battery connector	EXT. BATTERY	For connecting an extension battery*1
⑰	Option card slot	OPTION CARD	For inserting an option card*1
⑱	Extension battery ground terminal	—	For connecting the ground of an extension battery*1
⑲	Input plug	—	For connecting the input power supply to the UPS (NEMA L6-30P)
⑳	Output outlets A and B	OUTPUT A OUTPUT B	For connecting load device (NEMA L6-30R) x2
㉑	Breaker for output outlets A and B	OUTPUT A OUTPUT B	For protecting output outlets A and B (1 shared for A and B)
㉒	Output outlets C and D	OUTPUT C OUTPUT D	For connecting load device (NEMA L6-20R) x2
㉓	Breaker for output outlets C and D	OUTPUT C OUTPUT D	For protecting output outlets C and D (1 shared for C and D)

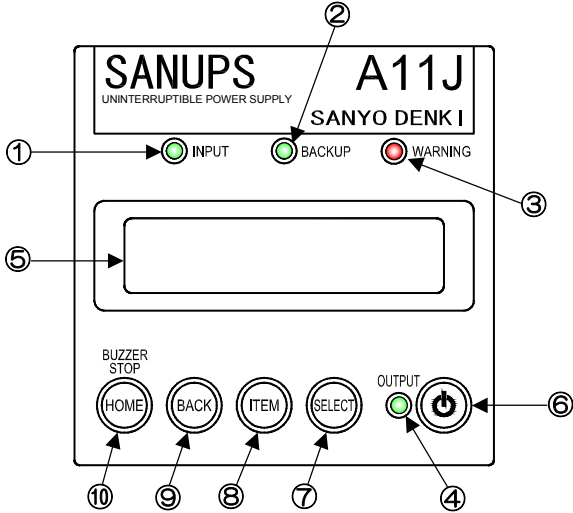
Notes

- *1. For information on various optional equipments, contact your supplier or SANYO DENKI representative.
- *2. In this manual, breakers and switches are displayed enclosed in like MAIN MCCB.
- *3. Activate the forced bypass switch Forced Bypass when using the maintenance bypass breaker MAINTENANCE MCCB. Normally, do not change the position of this switch. Leave it set to “Inverter.”
- *4. When using a UPS with extension battery unit, the battery packs are not installed.
- *5. Unless otherwise specified, the diagrams in this manual are of a 3U type installed horizontally. With regards to a vertical installation, the procedure is the same as for the 4U type.

The following table shows the weight and depth.

Type	3U Type	Weight		4U Type	Weight		Depth (Excluding protrusions)	
		kg	lbs		kg	lbs	mm	inches
Terminal block type	A11J502A002TE	61	134.5	A11J502A002TE4U	80	176.4	700	27.56
Plug type	A11J502A002NE	61	134.5	A11J502A002NE4U	80	176.4		

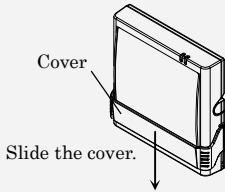
§5.2 LCD Panel



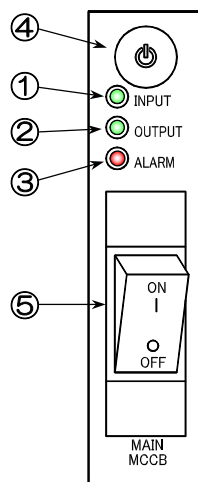
No.	Name	Label	Color	Function	
①	Input LED	INPUT	Green	Lit	When input power is normal.
				Blinking	When input power is abnormal.
②	Backup LED	BACKUP	Green	Lit	When the battery is operating.
③	Warning LED	WARNING	Red	Lit	Caution/warning, malfunction, or end of battery discharge.
④	Output LED	OUTPUT	Green	Lit	When supplying power by inverter operation.
				Blinking	When supplying power by bypass operation.
⑤	LCD screen	—	—	Displays UPS status information, measurement values, maintenance support information, various setting values, operation, etc.	
⑥	ON/OFF button	—	—	Starts and stops inverter operation.	
⑦	SELECT key	SELECT	—	Selects and accept LCD display items or contents.	
⑧	ITEM key	ITEM	—	Switches LCD display items or contents.	
⑨	BACK key	BACK	—	Cancels the selection and returns to previous LCD display (menu) level.	
⑩	HOME key	BUZZER STOP HOME	—	Returns the LCD display (menu) level to the home menu. When the buzzer is sounding, stops the buzzer.	

Notes on the LCD panel

- For details on the operating procedure and functions of the LCD panel, see the *LCD Panel Operating Manual*.
- About indications of LEDs
LEDs are displayed in this manual as “Green INPUT” and “Red WARNING”, and the lighting state is indicated as follows:
☀: LED lights. ⚡: LED blinks.
- About the cover of the LCD panel control section
To operate the ON/OFF button and keys, slide the cover downwards.
After you finish operation, return the cover to its original position to prevent accidental operation.



§5.3 Unit Control Panel



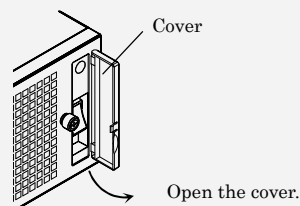
No.	Name	Label	Color	Function	
①	Input LED	INPUT	Green	Lit	When input power is normal.
				Blinking	When input power is abnormal.
②	Output LED	OUTPUT	Green	Lit	When supplying power by inverter operation.
				Blinking	When supplying power by bypass operation.
③	Alarm LED	ALARM	Red	Lit	When there is a malfunction or the battery is exhausted.
④	ON/OFF button	—	—	Starts and stops inverter operation.	
⑤	Main Breaker	MAIN MCCB	—	Turns ON/OFF the UPS input power and provides protection. Protects the internal bypass circuits.	

Notes on the UPS unit control panel

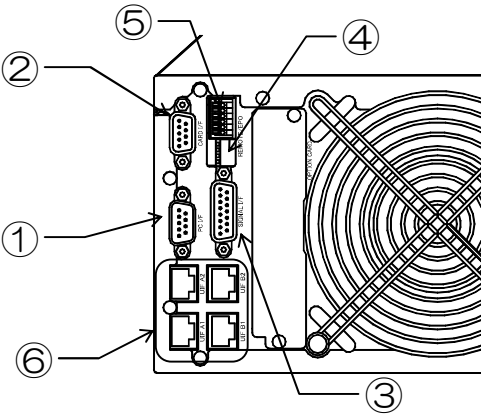
- In this manual, breakers are displayed enclosed in MAIN MCCB like MAIN MCCB.
- About indications of LEDs
LEDs are displayed in this manual as “Green INPUT” and “Red WARNING”, and the lighting state is indicated as follows:

✱: LED lights. ✱: LED blinks.

- About the cover of the operation section
To operate the MAIN MCCB and ON/OFF button, open the cover.
After you finish operation, close the cover to prevent accidental operation.



§5.4 External Interfaces



Note
The PC interface connector and card interface connector cannot be used at the same time.

No.	Name	Function																		
①	PC I/F PC interface connector (RS-232C)	Connect the connector and a computer with the supplied communication cable. This interface functions as follows depending on the setting of “Interface” in the LCD panel setting menu. Select the interface according to the function to be used. For the setting procedure, see §3.5 “Setting PC Interface” in <i>the LCD Panel Operating Manual</i>. 1. Interface setting: WS (work station) (default setting) ➤ Use software such as the power management software on the supplied CD-ROM to manage the power and shut down the computer by performing communication between the UPS and computer (personal computer, work station, etc.). For details on the power management software, see §12 “Using Power Management Software” or the User’s Guide on the supplied CD-ROM. 2. Interface setting: Standalone (standalone) ➤ Use the standard UPS service function* of the operating system (NetWare, Windows NT, etc.) to shut down the UPS automatically. * Notes on using the UPS service function - For details on the setting procedure, see §13 “Using Standard OS UPS Service.” - When using an operating system (Windows 95 and 98, etc.) that does not have a UPS service function, do not connect the supplied communication cable. The backup operation may not be possible in the event of a power outage. - When using a combination of the UPS service function and the power management software (option) with a serial connection, set the interface to WS (work station). If the UPS is used when the setting is set to standalone, the UPS may shut down suddenly when there is a power outage. Signal Names <table><tr><td>1</td><td>DCD</td></tr><tr><td>2</td><td>RXD</td></tr><tr><td>3</td><td>TXD</td></tr><tr><td>4</td><td>DTR</td></tr><tr><td>5</td><td>GND</td></tr><tr><td>6</td><td>DSR</td></tr><tr><td>7</td><td>RTS</td></tr><tr><td>8</td><td>CTS</td></tr><tr><td>9</td><td>RI</td></tr></table> External Appearance D-sub 9-pin Male Fixing Screw (inch)	1	DCD	2	RXD	3	TXD	4	DTR	5	GND	6	DSR	7	RTS	8	CTS	9	RI
1	DCD																			
2	RXD																			
3	TXD																			
4	DTR																			
5	GND																			
6	DSR																			
7	RTS																			
8	CTS																			
9	RI																			
②	CARD I/F Card interface connector	Connect the connection cable of an optional Sanyo LAN interface card. When connecting a LAN interface card, set the interface to WS (work station). For the interface setting procedure, see §3.5 “Setting PC Interface” in <i>the LCD Panel Operating Manual</i>.																		

No.	Name	Function																			
③	SIGNAL I/F Contact signal interface connector	Outputs status information of the UPS such as a power outage or voltage drop. External Transmission Signals and Shutdown Input Signals <table border="1"> <thead> <tr> <th>Signal Name</th><th>Explanation</th><th>Pin No. and Status when Operating</th></tr> </thead> <tbody> <tr> <td rowspan="6">Output signal</td><td>AC input error</td><td>1-8: ON 2-8: OFF</td></tr> <tr> <td>Battery voltage drop</td><td>3-11: ON</td></tr> <tr> <td>AC output</td><td>4-7: ON 15-7: OFF</td></tr> <tr> <td>Inverter output</td><td>14-8: ON</td></tr> <tr> <td>Bypass output</td><td>5-12: ON</td></tr> <tr> <td>Device error</td><td>6-13: ON</td></tr> <tr> <td>Input signal</td><td>UPS shutdown</td><td>9-10</td></tr> </tbody> </table> The UPS is shut down as a result of receiving 5 V DC (pulse signal of at least 4 sec.) during battery operation when there is a power outage. Current flows at approximately 5 mA when the power is on. This is enabled when the interface is set to Standalone. For the setting procedure, see §3.5 “Setting PC Interface” in the <i>LCD Panel Operating Manual</i>. External Transmission Signals and Electrical Characteristics - Interface: Relay non-voltage contact signal - Contact rating: 100 V AC / 50 V DC, 0.1 A Note When connecting an inductive/capacitive load, make sure the contact rating is not exceeded. Terminal Names S1 to S4 — Switches for independent contact signals (see ④) External Appearance D-sub 15-pin Female Fixing screw M3	Signal Name	Explanation	Pin No. and Status when Operating	Output signal	AC input error	1-8: ON 2-8: OFF	Battery voltage drop	3-11: ON	AC output	4-7: ON 15-7: OFF	Inverter output	14-8: ON	Bypass output	5-12: ON	Device error	6-13: ON	Input signal	UPS shutdown	9-10
Signal Name	Explanation	Pin No. and Status when Operating																			
Output signal	AC input error	1-8: ON 2-8: OFF																			
	Battery voltage drop	3-11: ON																			
	AC output	4-7: ON 15-7: OFF																			
	Inverter output	14-8: ON																			
	Bypass output	5-12: ON																			
	Device error	6-13: ON																			
Input signal	UPS shutdown	9-10																			
④	Switches for independent contact signals	Setting these switches to “OFF” makes each contact of the external transmission signals independent. Refer to contact interface connector ③, and set “ON” or “OFF” according to how the UPS will be used by the customer. The switches are all set to “ON” at the time of shipment from the factory. External Appearance When all of 1 to 4 are in the “ON” state. Set them to “OFF” when using each contact signal as an independent circuit. Set them to “ON” when using each contact signal as a common COM circuit.																			

No.	Name	Function
⑤	REMOTE/EPO External control terminals	Use these terminals for controlling the UPS with a non-voltage contact from an external device. REMOTE/EPO Terminal Names External Appearance REMOTE Terminals (Terminal Nos. 1 to 4) Connect a remote switch for performing the ON/OFF operation of the UPS and shutting down a computer from a remote location. The operation is as follows depending on the interface setting value. - Interface setting: WS (work station) (default setting) - Remote ON of UPS/ One-touch Shutdown of System The OFF operation of the remote switch enables the computer connected to the UPS to be shut down with one touch from a remote location, and then the UPS to be stopped. - Interface setting: Standalone - Remote ON of UPS/Remote OFF of UPS Select the interface according to the function to be used. For the setting procedure, see §3.5 “Setting PC Interface” in the <i>LCD Panel Operating Manual</i>. EPO Terminals (Terminal Nos. 5 and 6) EPO stands for “Emergency Power Off.” Connect, for example, a switch for an emergency stop of UPS output. If the switch is pressed when there is an emergency, the EPO terminals will enter the short-circuit state and UPS output will stop. After an emergency stop of the UPS has been performed, the UPS remains in the emergency stop state even if the emergency output stop switch is released. Also, the remote ON function cannot be enabled in the event of an emergency stop (when the EPO terminals are in a short-circuited state). To resume operation of the UPS, release the emergency output stop switch (short-circuited state), and press on the unit control panel for at least 1 second. For how to connect to the terminals, see §6.4 “Connecting Optional Equipment.” This function will work regardless of whether the interface setting is set to “Standalone” or “WS” (work station). Notes on contact of, for example, switch to connect to terminals A switch for connecting to the terminals is not provided as an option for the UPS. Check the following specifications and then connect and use, for example, a switch or a contact of the customer’s system that matches the terminal specifications. Terminal specifications • Circuit voltage: +5 V DC • Flowing current when short-circuited: Approx. 10 mA • Operating conditions - REMOTE: Short-circuit between terminals for at least 1 second. - EPO: Short-circuit between terminals for at least 0.2 second. • Terminals: One-touch terminal block • Compatible wires: AWG 26 to 20 When using a transistor or other semiconductor switch, connect terminal Nos. 2, 4, and 6 to the - (minus) pole side as shown in the right chart. (In the case of a non-polar switch, there is no specified connection direction.)
⑥	UIF A1, A2, B1, B1 Interface connectors for connecting between units.	When connecting multiple units, connect the units with dedicated cables. These connectors cannot be used with this device.

§6. Installation and Wiring

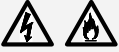
Install the UPS in the installation location, and then insert the batteries, attach the LCD panel, and perform the wiring work. When installing and wiring the UPS, carefully follow the instructions in this instruction manual.

§6.1 Installation



CAUTION

- Installation work should be performed only by technically qualified personnel. When installing the UPS, carefully follow the instructions in this Instruction Manual. Improper installation can result in electric shock, bodily injury, and/or fire.
- In accordance with the instruction manual, install the UPS on a stable surface that can bear the weight (see the table on the right). This surface should be flat, so the UPS cannot fall and cause bodily injury. The possibility of vibration and shock should be minimized at the installation location. Shock and vibration from, for example, an earthquake may cause the UPS to shift or fall, possibly resulting in bodily injury.
- For safety, wear protective shoes when performing installation work. All work that involves lifting the UPS, such as mounting it in a rack and attaching the brackets, should be carried out by at least two persons. There is the danger that the UPS may fall or be dropped, resulting in bodily injury. Also, be careful to avoid straining your lower back.
- Be careful not to trap a hand or the like when attaching the brackets and installing the UPS.
- There is the danger that the UPS could fall or be dropped during relocation or installation. Always hold the bottom side of the UPS firmly with both hands. Failure to do so may result in bodily injury or damage to the UPS.



Model	Weight	
	kg	lbs
A11J502A002TE	61	134.5
A11J502A002NE	61	134.5
A11J502A002TE4U	80	176.4
A11J502A002NE4U	80	176.4

§6.1.1 Checking Installation Environment

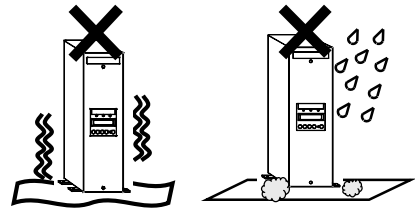
Suitable installation environment: Ambient temperature of 0 to 40°C (32 to 104°F) and relative humidity of 20 to 90%.

Do not install the UPS in the following locations:

- In ambient environmental conditions other than those specified in the product brochure and instruction manual such as in extremely high or low temperature and high humidity.
- Where the UPS is exposed to direct sunlight.
- Where the UPS is directly exposed to the heat from a heat source, such as a stove.
- Where grounding is not possible.
- Where the UPS may be subject to vibration or physical shock.
- Near a device that may emit sparks.
- In the presence of dust, salt or corrosive or flammable gas.
- Outdoors
- When the UPS is rack mounted, in a poorly ventilated rack.

Note

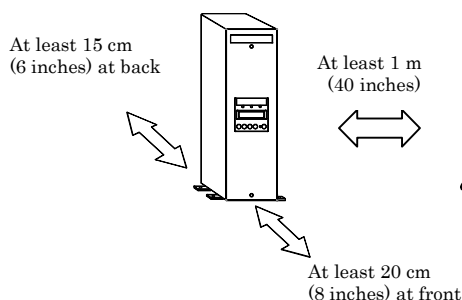
The battery service life will be foreshortened if the UPS is used in an environment where the ambient temperature exceeds 30°C (86°F). We recommend that the UPS is normally used and maintained at a temperature between 20 to 25°C (68 to 77°F).



§6.1.2 Checking Installation Space

During installation, provide the following space around the UPS.

- At least 20 cm (approx. 8 inches) at the front and at least 15 cm (approx. 6 inches) at the back:
As air intake or exhaust space for the cooling fan.
- At least 1 meter (approx. 40 inches) from CRT displays:
To allow for slight leakage of magnetic flux.
Allow some space from devices which might be affected by magnetic flux.

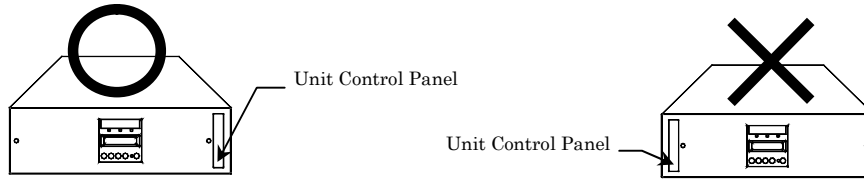


Notes on installation

For maintenance of the UPS, provide space of at least approximately 1 meter (40 inches) at the front and at least approximately 50 cm (20 inches) at the back.

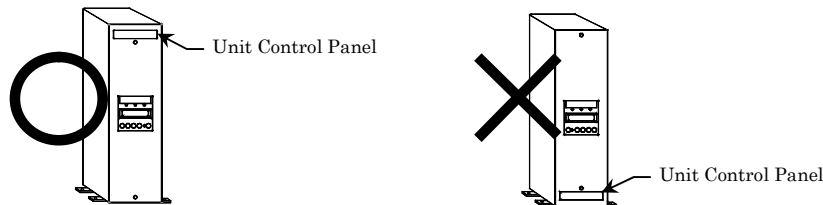
§6.1.3 Installing UPS Horizontally

Place the UPS horizontally in the installation location so that the Unit Control Panel on the front of the UPS is on the right side. Do not place objects on top of the UPS. Doing so may damage the UPS.

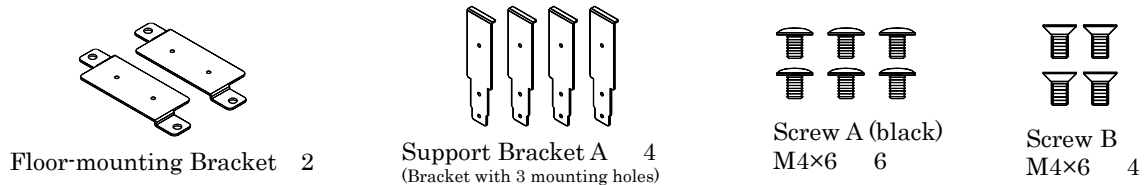


§6.1.4 Installing UPS Vertically

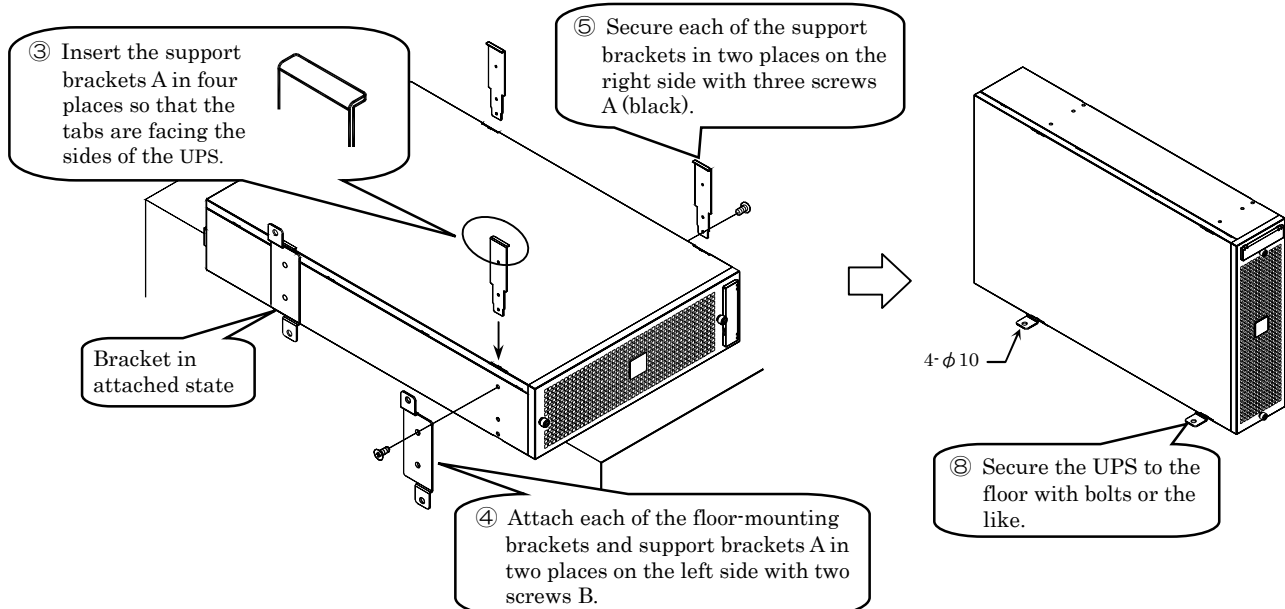
When installing the UPS vertically, attach two supplied floor-mounting brackets. Be sure to place the UPS so that the Unit Control Panel on the front of the UPS is at the top.



- ① Prepare two floor-mounting brackets, four support brackets A, six screws A (black), and four screws B that are supplied with the UPS.



- ② Place the UPS horizontally on a table or other surface.
- ③ Insert the support brackets A in four places on the left and right sides of the UPS so that the tabs at the top are facing the sides of the UPS.
- ④ Align the floor-mounting brackets with the mounting holes on the left side, and secure them with two screws B.
- ⑤ Secure the support brackets A on the right side with three screws A.
- ⑥ Check that the brackets are firmly secured.
- ⑦ Place the UPS upright with the floor-mounting brackets facing downward in the installation location.
- ⑧ For safety, we recommend securing the UPS to the floor with bolts or the like.



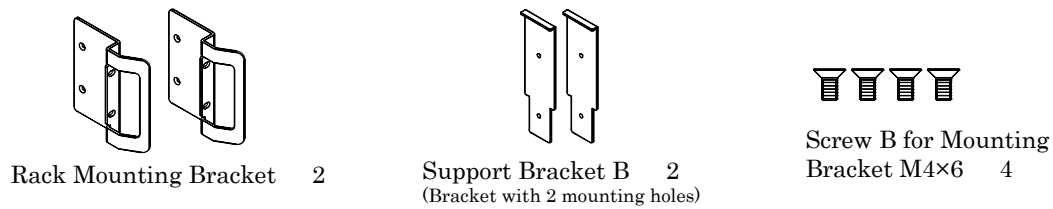
§6.1.5 Mounting UPS in Rack



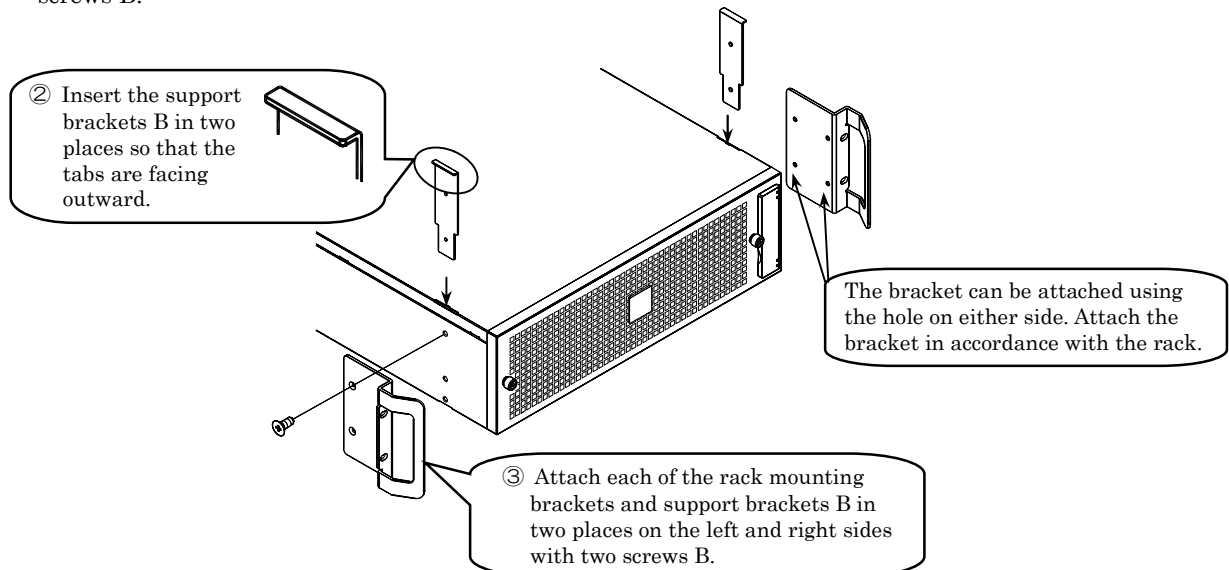
- For safety, use L-type rails (support rails) when mounting the UPS in a rack. For more information on L-rails, contact the manufacturer of your rack, your supplier or SANYO DENKI.

The UPS can be mounted in a 19-inch rack. See §6.1.2 “Checking Installation Space” and make sure you secure enough ventilation space at the front and back of the UPS. Do not place objects on top of the UPS. Doing so may damage the UPS. The UPS is heavy so we recommend mounting it in the very bottom of the rack. Use L-type rails (support rails) to mount the UPS in the rack. For more information on L-rails, contact the manufacturer of your rack, your supplier or SANYO DENKI.

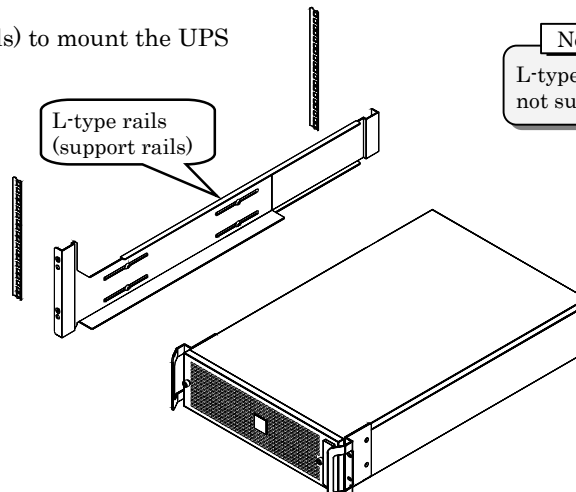
- ① Prepare two mounting brackets, two support brackets B for attaching the rack mounting brackets, and four screws B for mounting the brackets that are supplied with the UPS.



- ② Insert the support brackets B in two places on the left and right at the front of the UPS so that the tabs at the top are facing outward.
- ③ Align the rack mounting brackets with the mounting holes on the sides, and secure them with two screws B.



- ④ Use L-type rails (support rails) to mount the UPS to the rack.

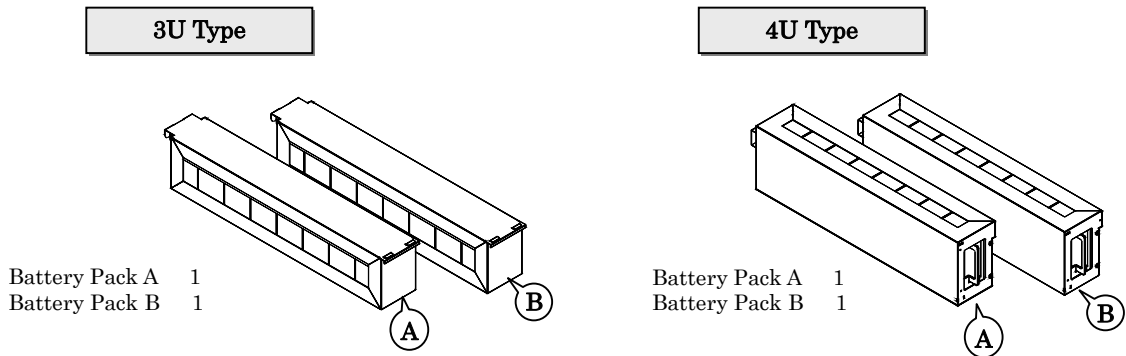
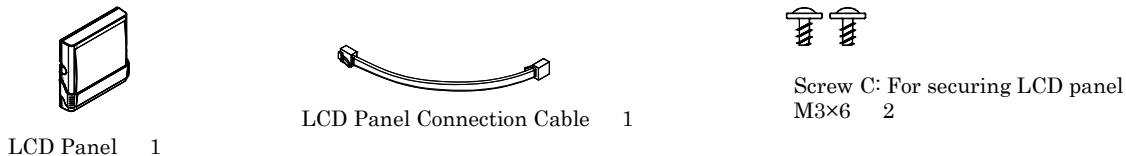


Note

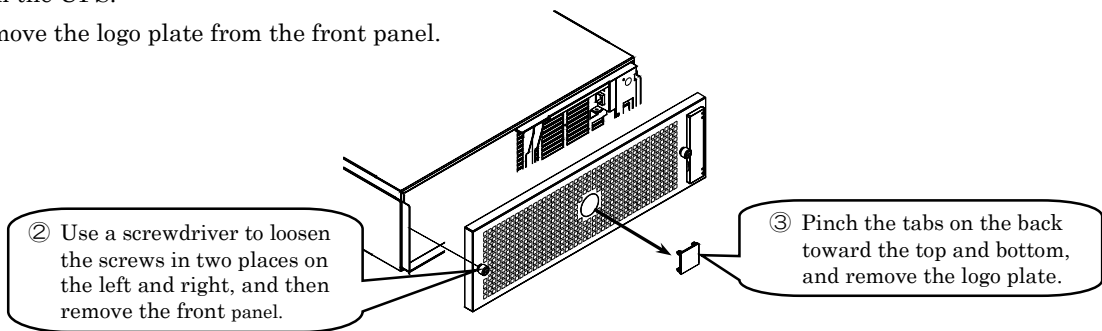
L-type rails (support rails) are not supplied with the UPS.

§6.2 Installing Battery Packs and Attaching Front Panel

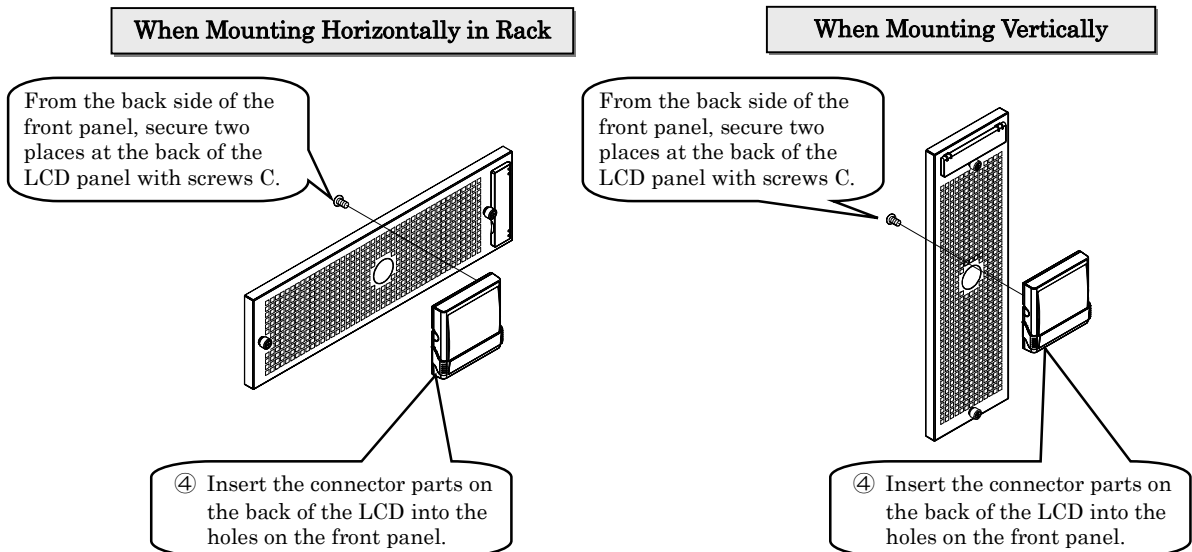
- ① Prepare the LCD panel, LCD panel connection cable, two screws C for securing the LCD panel (only when securing the LCD panel), and two battery packs that are supplied with the UPS.



- ② Loosen the screws in two places on the left and right of the front panel, and then remove the front panel from the UPS.
- ③ Remove the logo plate from the front panel.



- ④ Attach the LCD panel to the front panel.
The LCD panel is secured by magnets, but also secure it with the screws C in two places if there is the risk of it falling off.

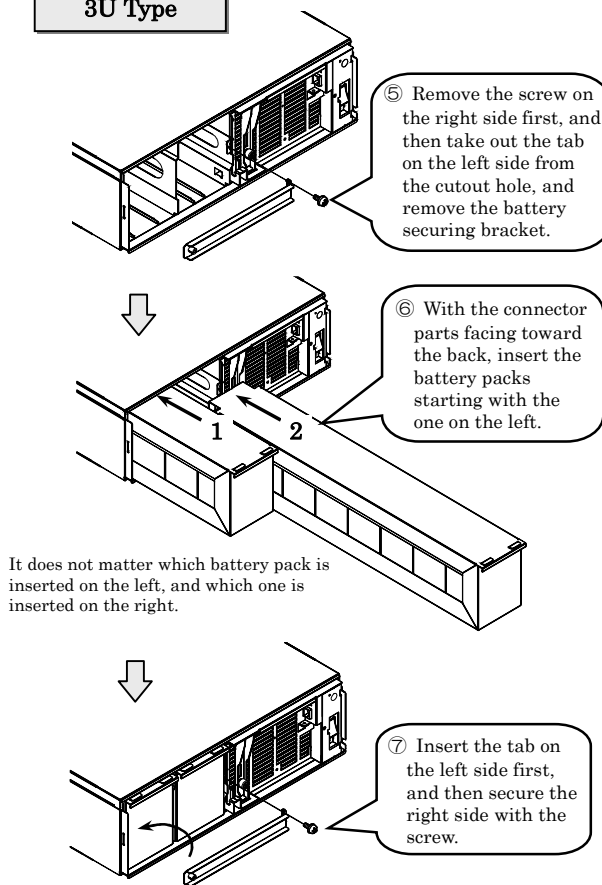


- ⑤ Remove the battery securing bracket.
- ⑥ Insert two battery packs into the UPS.
- ⑦ Attach the battery securing bracket that you removed in step ⑤.

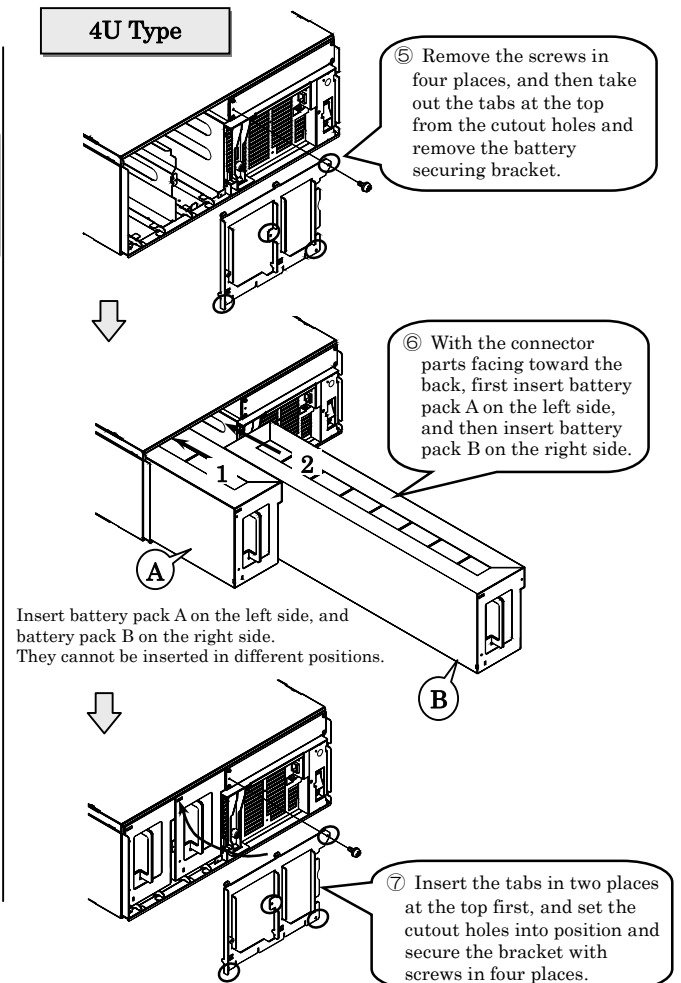


The weight of one battery pack is 17.5 kg (38.6 lbs) in the case of the 3U type, and 25 kg (55.1 lbs) in the case of the 4U type. Be careful not to drop the battery packs. Insert the battery pack on the left side first when installing the UPS horizontally, and insert the battery pack at the bottom first when installing the UPS vertically.

3U Type



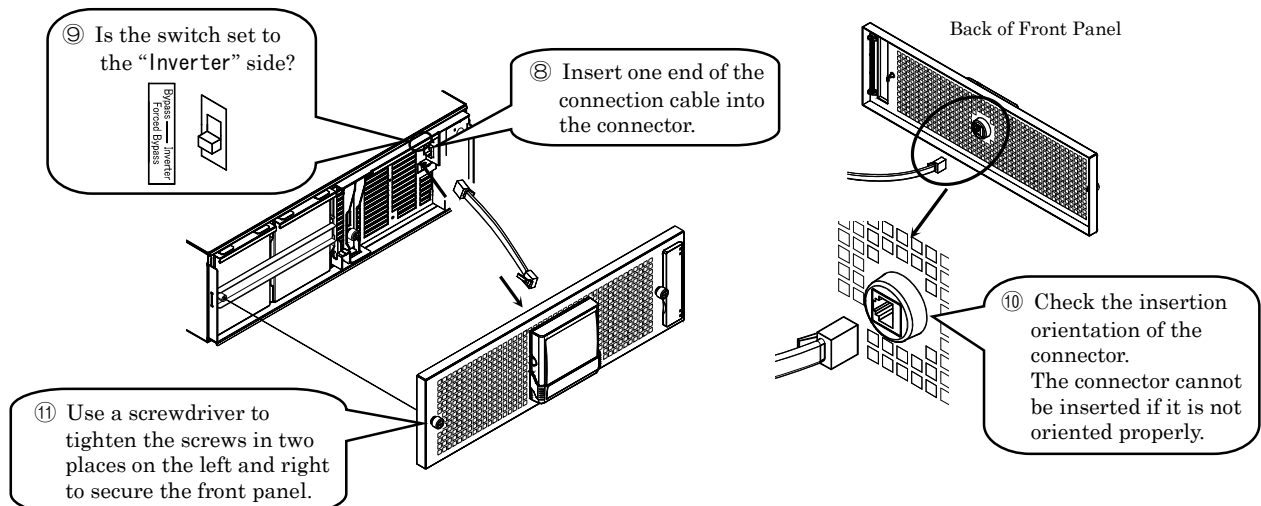
4U Type



Note on attaching battery securing bracket

The battery securing bracket cannot be attached if the battery packs are not inserted properly.

- ⑧ Insert one end of the LCD panel connection cable into the connector at the position shown in the diagram.
- ⑨ Check that the forced bypass switch **Forced Bypass** above the connector is set to the "Inverter" side.
- ⑩ Insert the other end of the cable connected in step ⑧ into the connector on the back of the front panel.
- ⑪ Secure the front panel with screws in the two places on the left and right.



§6.3 Wiring

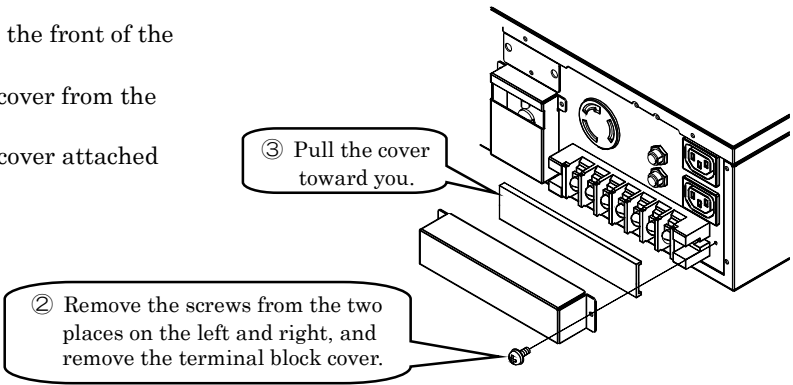


- Wiring work should be performed by technically qualified personnel. When wiring the UPS, carefully follow the instructions in this instruction manual. Incorrect wiring may result in electric shock and/or fire.
- There is the danger of electric shock so wear insulated gloves as a preventive measure when performing wiring work.
- Make sure that the plugs inserted in the UPS are firmly inserted and that the connections of the terminal block are not loose. Failure to do so may result in electric shock, bodily injury, or fire.
- Be sure to ground the UPS. There is danger of electric shock. Do not use the UPS in a location where it cannot be grounded.

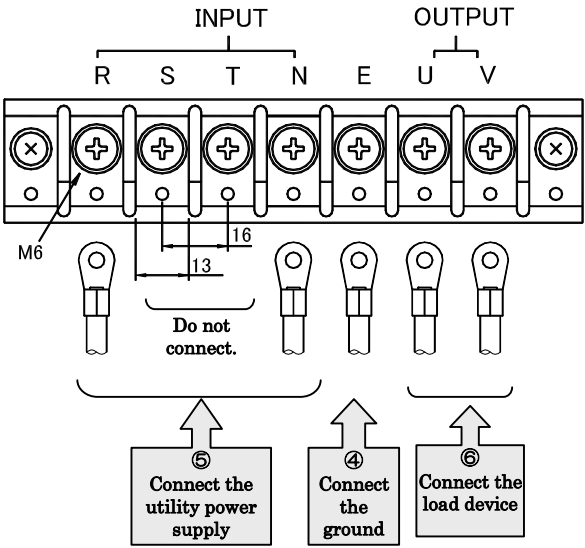


§6.3.1 Wiring Terminal Block Type

- ① Check that **MAIN MCCB** on the front of the UPS is set to “OFF.”
- ② Remove the terminal block cover from the back of the UPS.
- ③ Remove the terminal block cover attached to the terminal block.



- ④ Connect the ground to the “E” terminal of the terminal block. Use D class grounding for the ground.
- ⑤ Connect the utility power supply to the “INPUT R and N” input terminals.
- ⑥ Connect the customer’s load devices to the “OUPUT U and V” output terminals.



See the table below, and connect wires of the specified sizes.

Terminal Type	Label	Wire Size
Input terminals	INPUT R,N	8 mm ²
Ground terminal	E	5.5 mm ²
Output terminals	OUTPUT U,V	8 mm ²

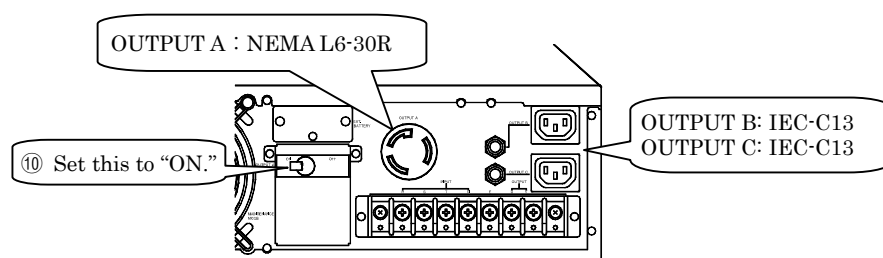
The indicated wire diameters are for when 600-V cross-linked polyethylene cables are used.

Notes on wiring terminal block

- Do not connect anything to input terminals “S” and “T.”
- When disconnecting wires, disconnect the ground last.
- Be careful with regards to the polarity of the input power when performing wiring work. When the input is single-wire grounded, make sure you connect the ground phase to the N terminal.
- If the load device to be connected is single-wire grounded, be sure to connect the ground phase to the V phase side.

- ⑦ When you have finished the wiring, check that the connections are not loose.
- ⑧ Reattach the terminal cover.

- ⑨ Connect the load devices to the output outlets.

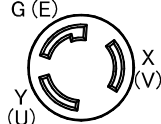
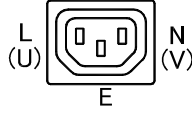


- ⑩ Set **OUTPUT A MCCB** to "ON."

Note

If **OUTPUT A MCCB** is not set to "ON," output will not be supplied from the OUTPUT A outlet. Be sure to set it to "ON" if a load device is connected to OUTPUT A outlet.

Make sure the total capacity of the load devices to be connected to the terminal block and outlets does not exceed **5 kVA (4.5 kW)**.

Outlet	Outlet Capacity	Notes
OUTPUT A	Make sure the current of the load device to be connected does not exceed 30 A. Outlet rating: 250 V, 30 A NEMA L6-30R 	If the load device to be connected is single-wire grounded, <u>be sure to connect the ground phase to the X terminal (V phase) side.</u>
OUTPUT B OUTPUT C	Make sure the current of the device connected to one outlet does not exceed 10 A. Outlet rating: 250 V, 10 A IEC-C13 x2 	If the load device to be connected is single-wire grounded, <u>be sure to connect the ground phase to the N terminal (V phase) side.</u>

Unsuitable load devices

Do not connect the following types of load device to the UPS.

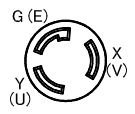
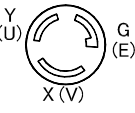
Load Devices	Reason
Laser printers, plain paper fax machines, copy machines, overhead projectors, vacuum cleaners, dryers, etc.	Since such devices are subject to high transient current surges, the UPS will detect current surges and the battery backup operation will become no longer possible when a power outage occurs. There is also the danger of the UPS malfunctioning.
Medical instruments, control devices for elevators, computer systems upon which public infrastructure depends	Special considerations need to be given to operation, maintenance, and management, such as system redundancy and the installation of emergency power generation facilities.

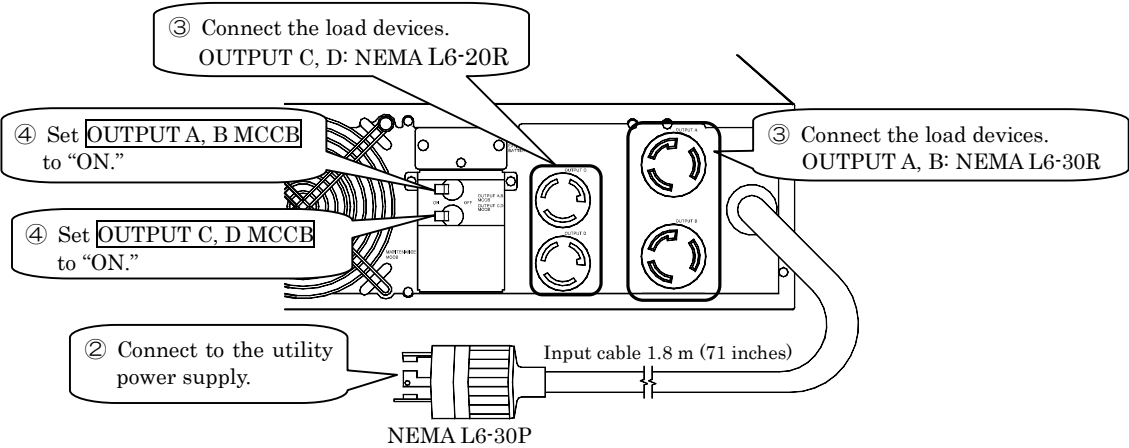
§6.3.2 Wiring Plug Type

- ① Check that **MAIN MCCB** on the front of the UPS is set to “OFF.”
- ② Insert the input plug into a utility power supply outlet.
- ③ Connect the input plug of the load device to be connected to an outlet of the UPS.
- ④ Set each of **OUTPUT A, B MCCB** and **OUTLET C, D MCCB** to “ON.”

Note
If **OUTPUT A, B MCCB** and **OUTPUT C, D MCCB** are not set to “ON,” output will not be supplied from the outlets. Be sure to set the breaker for a load device connected to an outlet to “ON.”

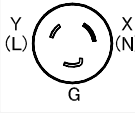
Make sure the total capacity of all of the load devices to be connected to the outlets does not exceed **5 kVA (4.5 kW)**.

Outlet	Outlet Capacity		Notes
OUTPUT A OUTPUT B	Make sure the total current of the load devices to be connected to the two outlets does not exceed 30 A . Outlet rating: 250 V, 30 A NEMA L6-30R x2		If the load device to be connected is single-wire grounded, <u>be sure to connect the ground phase to the X terminal (V phase) side.</u>
OUTPUT C OUTPUT D	Make sure the total current of the load devices to be connected to the two outlets does not exceed 20A . Outlet rating: 250 V, 20 A NEMA L6-20R x2		



Notes on connecting UPS input cable

Connect the input cable as follows depending on the power supply environment in which the UPS will be used.

Input Plug Shape	Power Supply Environment	Notes
 NEMA TYPE L6-30P (Seen from prong side)	When used in power supply environment in which not single-wire grounded	—
	When used in power supply environment in which single-wire grounded	When the AC input power supply is single-wire grounded, always connect the ground phase to <u>the X terminal (N phase).</u>

Unsuitable load devices

Do not connect the following types of load device to the UPS.

Load Devices	Reason
Laser printers, plain paper fax machines, copy machines, overhead projectors, vacuum cleaners, dryers, etc.	Since such devices are subject to high transient current surges, the UPS will detect current surges and the battery backup operation will become no longer possible when a power outage occurs. There is also the danger of the UPS malfunctioning.
Medical instruments, control devices for elevators, computer systems upon which public infrastructure depends	Special considerations need to be given to operation, maintenance, and management, such as system redundancy and the installation of emergency power generation facilities.

§6.4 Connecting Optional Equipment

When using, for example, communication cable and optional equipment, connect them to the external interface section. For details on the functions of the external interface section, see §5.4 “External Interfaces.”

Connect optional equipment before starting the UPS. If you want to connect optional equipment after starting the UPS, completely stop the UPS, turn off the input power supply, and then connect the equipment.

For details on wiring and settings, see §12. “Using Power Management Software” or the instruction manual of the optional equipment.

For details on optional equipment, contact your supplier or SANYO DENKI.

REMOTE/EPO Terminal Connection Method

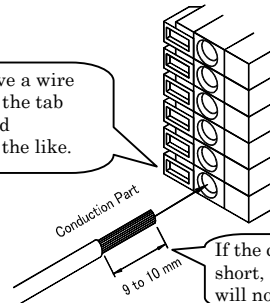
Connect and use, for example, a switch or a contact of the customer's system that matches the terminal specifications.

For details on the functions of the terminals, see ⑤ of §5.4 “External Interfaces.”

Terminal Connection Procedure

- ① Peel off the coating at the end of the wire by approximately 9 to 10 mm.
- ② Insert the wire into the terminal while pressing the tab with a flat-head screwdriver.
- ③ Pull the inserted wire to make sure that it does not come out.

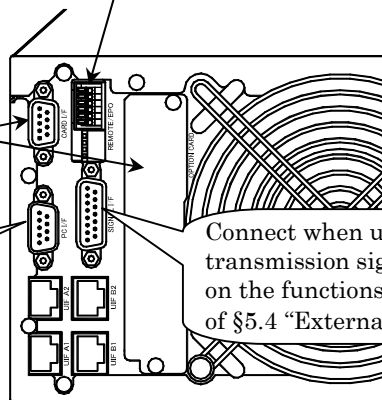
Insert or remove a wire while pressing the tab with a flat-head screwdriver or the like.



Compatible wires: AWG 26 to 20

Connect a SANYO LAN interface card (option).
For details, see the instruction manual of the LAN interface card.

Connect the supplied communication cable and use the power management software (on the supplied CD-ROM).
See §12. “Using Power Management Software.”



This completes the installation and wiring of the UPS.

§7. Preparation Before Operation

§7.1 Checking UPS Settings

- ① Check the settings in the setting menu of the UPS.

See §3. “Setting UPS” of the *LCD Panel Operating Manual*, and check the settings. The factory default settings of the UPS are indicated by the “*” mark in the Default Setting column of the “List of Settings.”

When using the UPS without changing the default settings

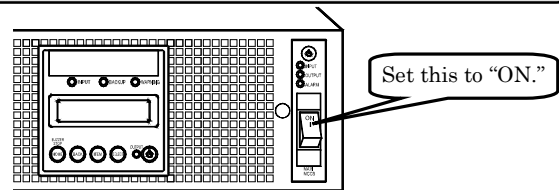


Proceed to §7.2 “Charging UPS.”

When the default settings do not match your environment, application, load specifications, and other requirements, change the settings.

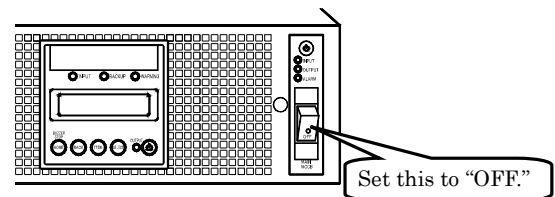


- ② Set **MAIN MCCB** on the front of the UPS to “ON.”



- ③ Change the settings.
See the page on each item in the LCD Operation Manual.

- ④ Set **MAIN MCCB** on the front of the UPS to “OFF.”



Proceed to §7.2 “Charging UPS.”

Tip

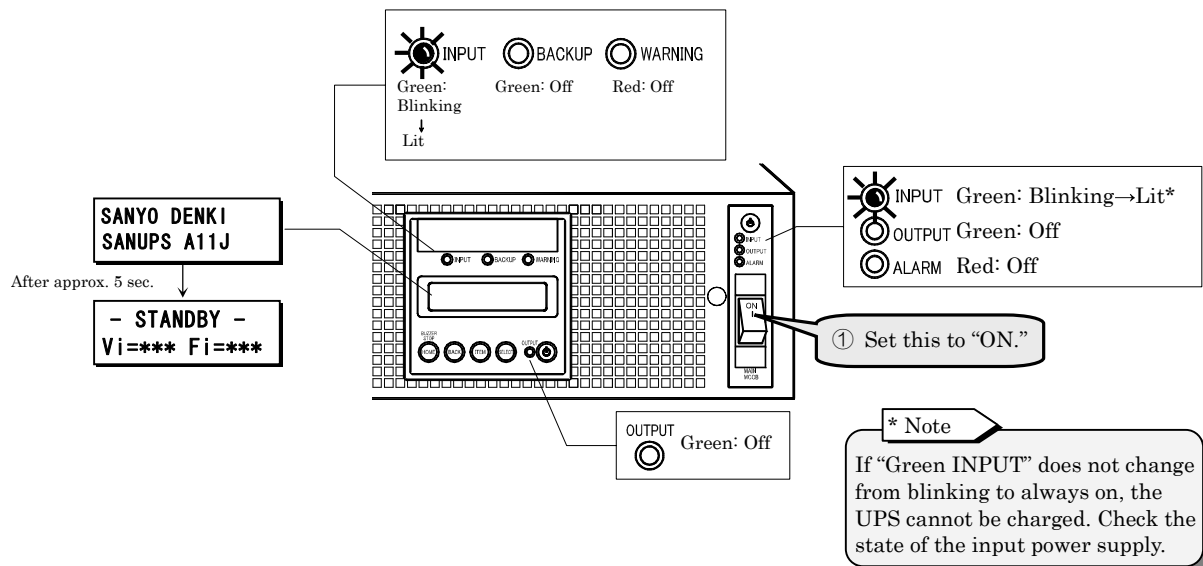
You can also change the settings after starting load device operation. However, the UPS needs to be restarted for setting items indicated by “★” in the Setting Item column of the setting item list. Setting such items at the preparation stage prior to UPS operation is recommended because the load devices also need to be stopped when the UPS is restarted.

§7.2 Charging UPS

At initial startup or when the UPS has not been operated for a long period, the batteries installed in the UPS should be charged for at least 18 hours as described in the following procedure.

Be sure to charge the UPS before operating the load devices.

① Set **MAIN MCCB** on the front of the UPS to “ON.”



② Check that “Green INPUT” has changed from blinking to always on.

Charging of the batteries starts automatically.

③ Operate the UPS for at least 18 hours in this state.

Notes on charging time

The UPS should be charged for at least 18 hours to ensure backup in the event of a power outage, but the UPS can be used when the UPS is first started even if there is insufficient charge because the batteries will be charged during operation of the UPS. However, if a power outage occurs at that stage, the full capacity of the backup function may not be available.

When an optional extension battery is used, extra charging time is required for the extension battery. See the instruction manual of the extension battery.

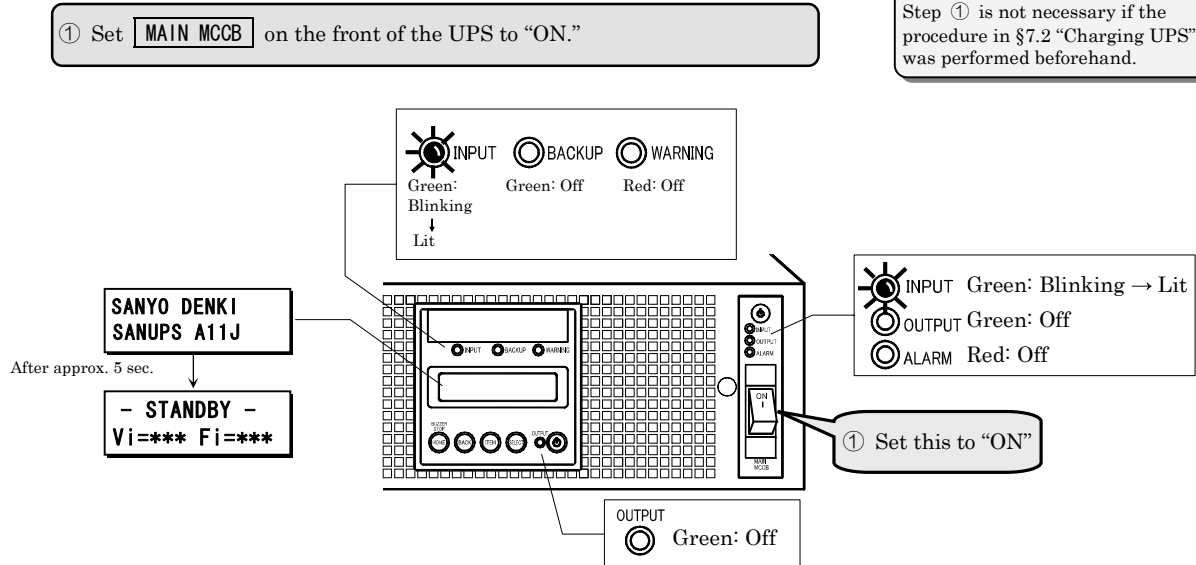
This completes the charging of the UPS.

§7.3 Power Outage Simulation Test

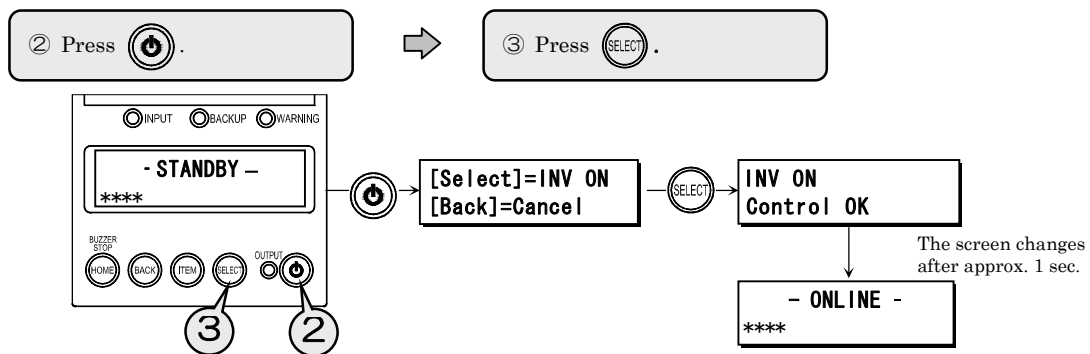
Perform a power outage test to confirm whether the UPS is working properly.

Tip

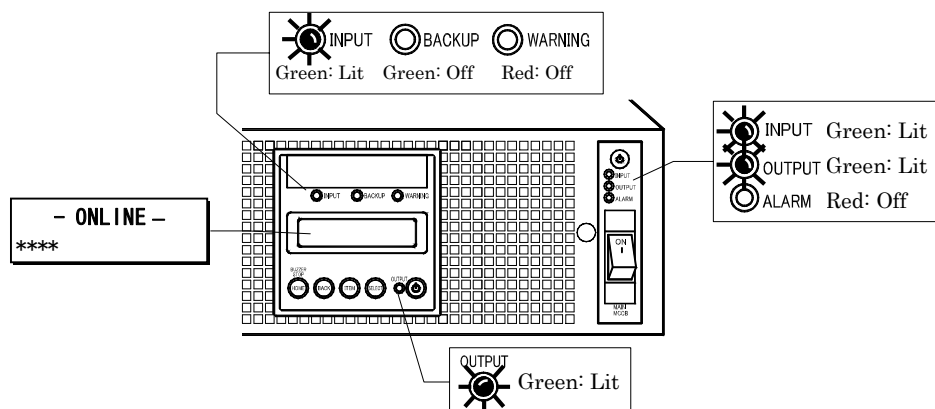
Step ① is not necessary if the procedure in §7.2 “Charging UPS” was performed beforehand.



Check that “Green INPUT” has changed from blinking to always on, and then proceed to step ②.

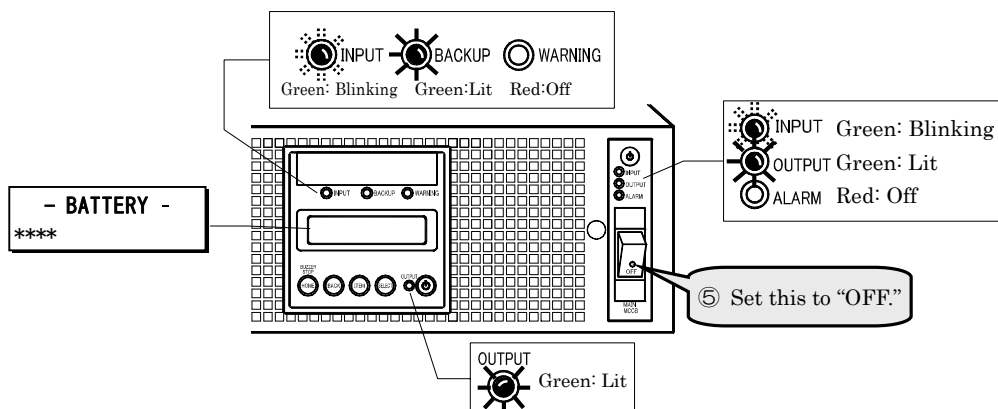


④ Check that the LCD display and LEDs are in the states shown in the diagram below.



⑤ Set **MAIN MCCB** to "OFF."

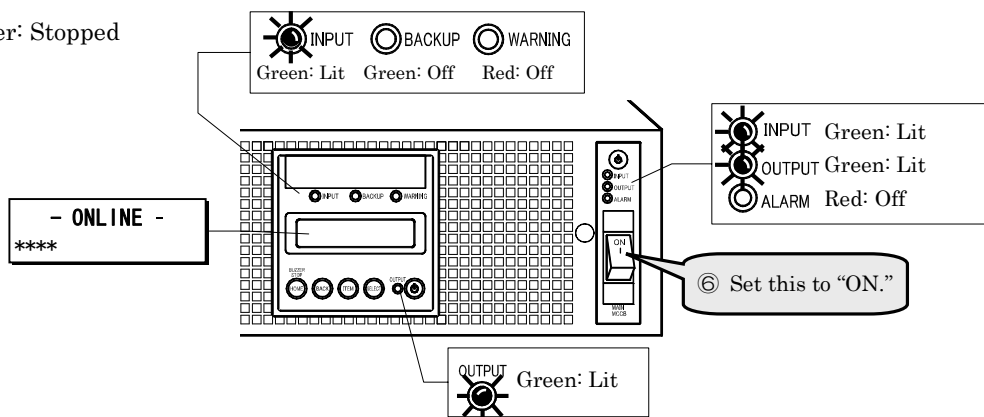
Buzzer: Beep-beep, beep-beep, beep-beep...



⑥ Set **MAIN MCCB** to "ON."

After 5 seconds elapse, the state becomes as shown below.

Buzzer: Stopped



When the UPS is working properly, the buzzer sound, LCD display, and LED state will be as indicated in steps ⑤ and ⑥.

When the power outage simulation test does not finish properly

Check the possible causes and counter measures in the table below, and then conduct the power outage simulation test again from step ①.

Possible Cause	Countermeasure
Are both battery packs installed properly?	Install both battery packs. ⇒§6.2 "Installing Battery Packs and Attaching Front Panel"
Is the forced bypass switch Forced Bypass set to the "Bypass" side?	Set the switch to the "Inverter" side. ⇒Step ⑨ of §6.2 "Installing Battery Packs and Attaching Front Panel"
Is "Green OUTPUT" off?	Perform the ON operation properly. ⇒Steps ② and ③ of §7.3 "Power Outage Simulation Test"
Are "Red ALARM" and "Red WARNING" on?	Contact your supplier or SANYO DENKI.

Contact your supplier or SANYO DENKI when "Red ALARM" and "Red WARNING" are on or when the UPS does not operate properly even if you perform the corresponding countermeasure above.

⑦ Check that the UPS operates properly.

This completes the power outage simulation test.

§8. Operating Procedures

§8.1 UPS Startup

Follow the procedure below to start up the UPS.

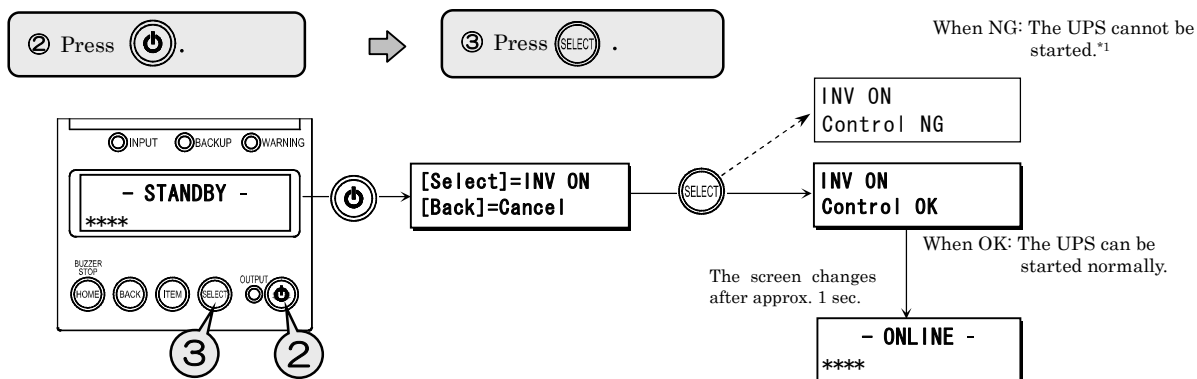
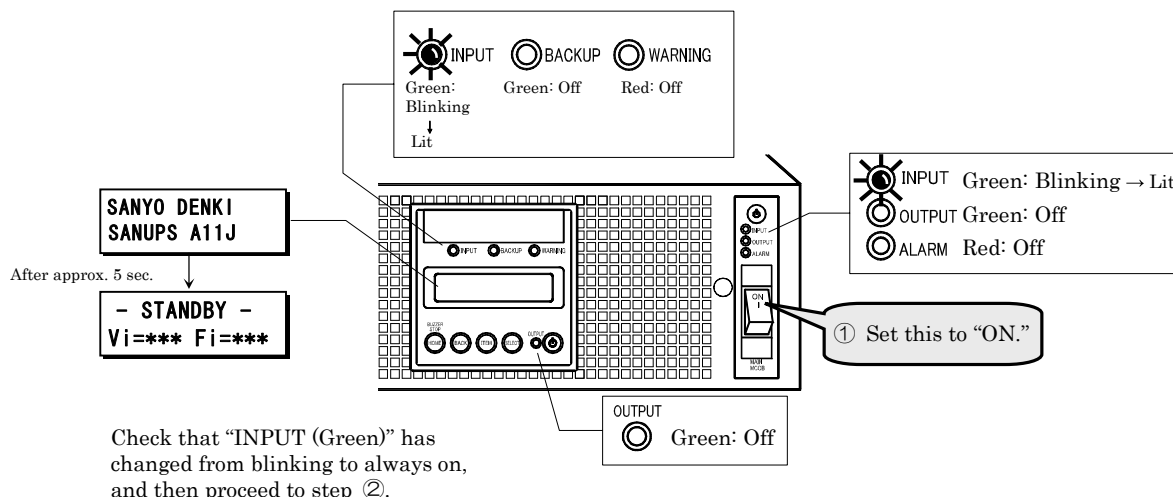
- ① Set **MAIN MCCB** on the front of the UPS to "ON."

Indications of breakers, LEDs, and LCD in this manual

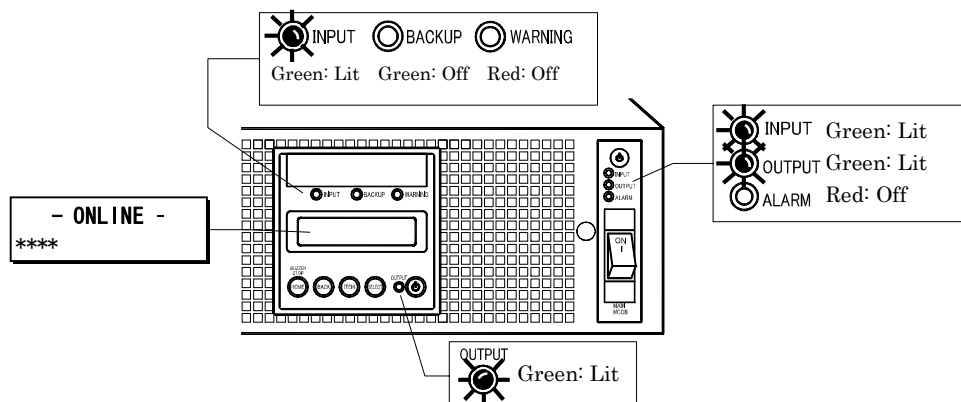
Breakers are displayed enclosed in  like **MAIN MCCB**, and LEDs of the LCD panel and unit control panel are indicated as "Green INPUT" and "Red ALARM", and the lighting states are indicated as follows

 : LED lights.  : LED blinks.

The states and measurement values of the UPS are indicated as "***" on the LCD screen.



- ④ Check that the LCD display and LEDs are in the states shown in the diagram below.



After checking the startup of the UPS in step ④, turn ON the power of the load devices.*2

Notes on UPS startup

- *1. If the “CONTROL NG” is displayed, the UPS cannot be started because, for example, there is an input power supply error. Check the status of “STATUS” in the home menu of the LCD panel and see §11. “Troubleshooting.”
- *2. Load capacity
If “OVER LOAD” is displayed on the LCD screen and a beep-beep-beep-beep beep-beep-beep-beep buzzer sound can be heard when the power of the load devices is turned ON, the load devices connected to the UPS exceed the rated capacity of the UPS. Reduce the number of connected load devices.

§8.2 UPS Shutdown

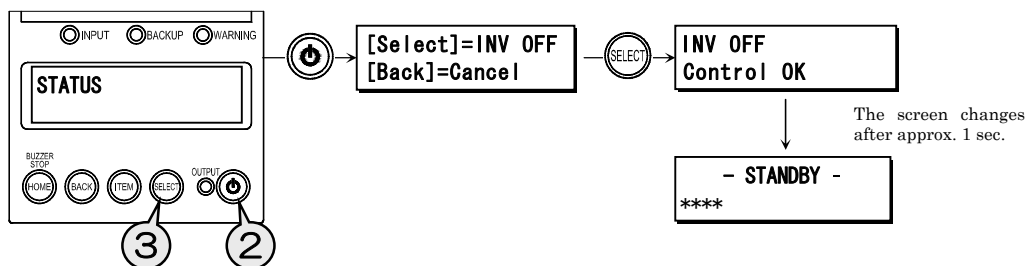
Follow the procedure below to shut down the UPS.

Be sure to shut down the load devices prior to shutting down the UPS.

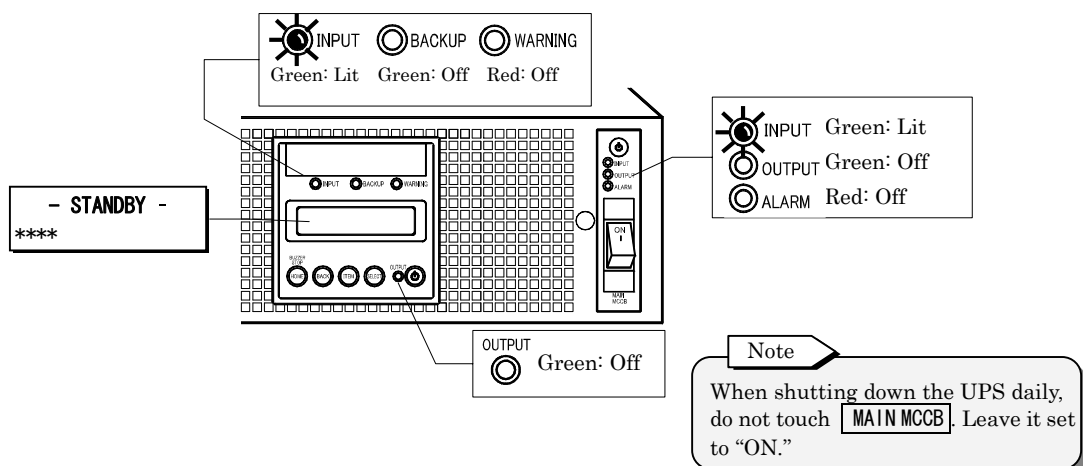
① Press any key on the LCD panel to display the screen.

② Press .

③ Press .



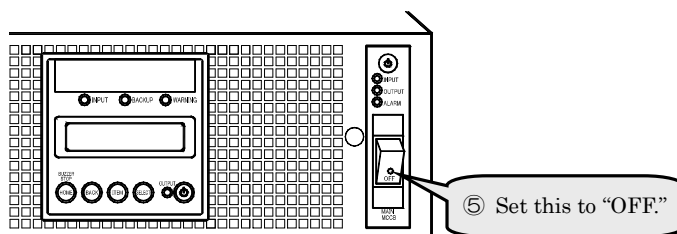
④ Check that the LCD display and LEDs are in the states shown in the diagram below.



If the UPS will not be used for one week or more, proceed to step ⑤.

⑤ Set **MAIN MCCB** to "OFF."

The LCD panel and all LEDs turn off.



Notes

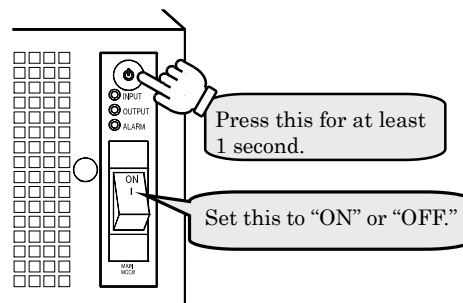
- If **MAIN MCCB** is set to "OFF" while the UPS is operating, the batteries are discharged as if a power outage occurred. Be aware that when the input supply is restored, the full capacity of the backup function will not be available until the batteries have had time to recharge.
- Recharge the UPS periodically when you store the UPS for a long period after shutting down the UPS using the procedure above. For details on charging, see ④ of §3.3 "Usage Precautions."

§8.3 Operation Using Unit Control Panel

You can use the control panel on the right side of the front of the UPS to start up and shut down the UPS.

Startup Operation

- ① Set **MAIN MCCB** on the front of the UPS to “ON.”
- ② Press the  switch for at least 1 second.



Shutdown Operation

- ① Press the  switch for at least 1 second.
- ② If the UPS will not be used for one week or more, set **MAIN MCCB** on the front of the UPS to “OFF.”

* Note

In the case of the shutdown operation only, the operating procedure differs depending on the setting of “Setting UPS Shutdown Operation” in the LCD panel setting menu.
For details, see §3.9 “Setting UPS Shutdown Operation” in the *LCD Panel Operating Manual*.

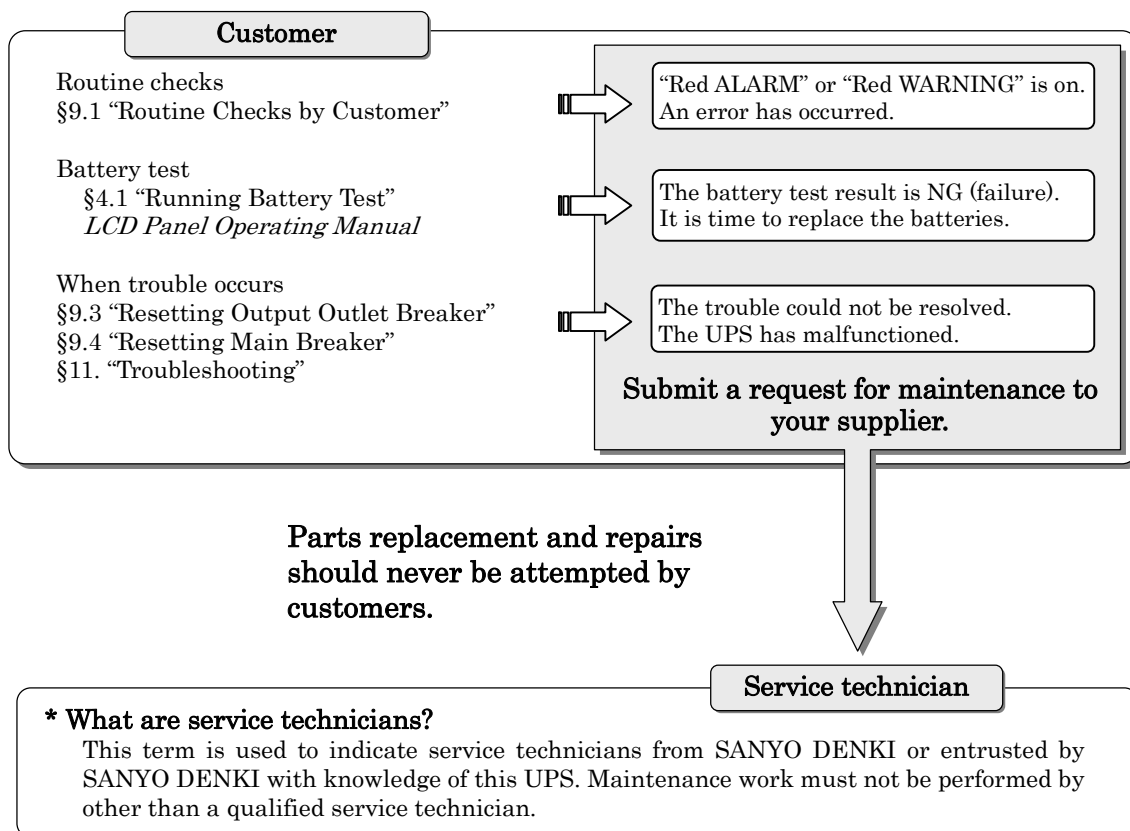
§9. Inspection and Maintenance

 CAUTION	• Internal maintenance and inspection should be performed only by technically qualified personnel. Electric shock, injury, burning, fuming or fire could otherwise result. • Before beginning inspection, shut down the UPS completely and remove the input power. Failure to do so may result in an electric shock. • While the batteries are connected to the equipment, hazardous voltage is present. Never touch any parts with your hand. Doing so may result in electric shock. • Batteries should be replaced periodically. Batteries used after their service life has passed may cause a fire.	 
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The projected service life of this UPS is 10 years. During this period, the batteries must be replaced periodically.

There are routine checks to be performed by the user and maintenance to be performed by a service technician.

Some maintenance items are not able to be performed by the user, so be sure to submit a request for such work to your supplier or Sanyo when maintenance is required.



§9.1 Routine Checks by Customer

 CAUTION	• Be sure not to inspect the inside of the UPS. Doing so may result in an electric shock, burn, injury, smoke, or fire. • Do not touch the fan on the back of the UPS when cleaning the UPS or anywhere around the UPS. Doing so may result in an injury. • Do not use, for example, a wet cloth for cleaning. Doing so may result in electric shock. • When cleaning, do not connect a vacuum cleaner to the output terminal of the UPS. Doing so may result in smoke or fire.	  
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Routinely check the following items.

- ① **Is the display state of the LCD panel and unit control panel abnormal?**
⇒ See §11. “Troubleshooting” and perform the countermeasure.
- ② **Is the buzzer sounding?**
⇒ If any buzzer sounds, see §10 “Buzzer Sounds” and perform the countermeasure.
- ③ **Is the exterior of the UPS in any way damaged or deformed?**
- ④ **Is an unusual sound or odor emitted from the UPS?**
- ⑤ **Is the installation environment of the UPS suitable?**
Are the humidity and temperature within the specified ranges?
⇒ See §6.1.1 “Checking Installation Environment.”
- ⑥ **Has the specified amount of space been provided at the front and back of the UPS?**
If the air intake or exhaust vent is blocked, the internal temperature of the UPS will rise, which may result in a malfunction of the UPS.
⇒ See §6.1.2 “Checking Installation Space.”
- ⑦ **Remove any dust or dirt adhering to the intake and exhaust vents.**
Dust or dirt adhering to parts inside the UPS may result in a malfunction of the UPS.
- ⑧ **Perform the battery backup time test periodically.**
When the UPS is shipped from the factory, it is set up to perform an automatic battery test once every 180 days. If you changed the setting for the schedule of the automatic battery test in “§3.14” of the *LCD Panel Operating Manual* to “None,” see §4.1 “Running Battery Test” in the *LCD Panel Operation Manual* and periodically perform a manual battery backup test. Depending on the result of the test, replace the batteries.

Estimated battery replacement interval

The battery service life is affected by operating conditions such as ambient temperature and the number of discharge cycles.

Ambient temperature has a particularly strong influence as indicated in the following table.

Average Ambient Operating Temperature	Projected Service Life	Battery Replacement Interval
25°C (77°F)	5 years	4.5 years
30°C (86°F)	3.5 years	3 years
35°C (95°F)	2.5 years	2 years
40°C (104°F)	1.7 years	1.5 years

Using a battery after its service life has expired may result in battery leakage, and in the worse case, smoke and fire. Request that the battery be replaced early as a preventative measure.

§9.2 Battery Test

Test the batteries. You can do this without stopping the load devices connected to the UPS.

When the UPS is shipped from the factory, it is set up to perform an automatic battery test once every 180 days. To change the schedule of the automatic battery test, see §3.14 “Setting Test Battery Schedule” in the *LCD Panel Operating Manual*.

If the UPS has performed a backup operation within 12 hours prior to the test, the result may show an error. In such a case, conduct the test again when the UPS has not performed a backup operation within the last 12 hours.

To perform a manual backup test:



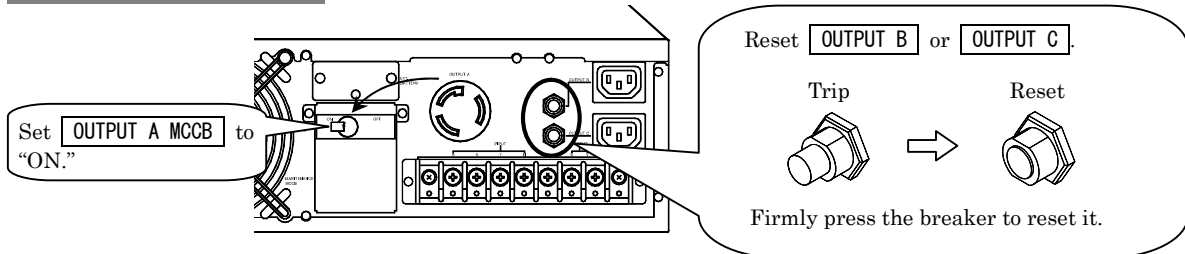
See §4.1 “Running Battery Test” in the *LCD Panel Operating Manual*.

§9.3 Resetting Output Outlet Breaker

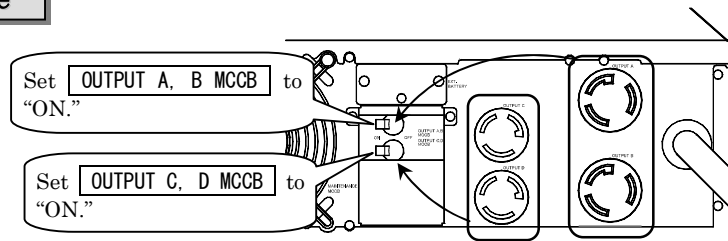
If the output outlet breaker trips, power supply from the outlet corresponding to the tripped breaker stops. Follow the procedure below to reset the breaker.

- ① Check that there is no abnormality with the connected load device, and reduce the load capacity.
- ② Reset the breaker on the back of the UPS.

Terminal Block Type



Plug Type

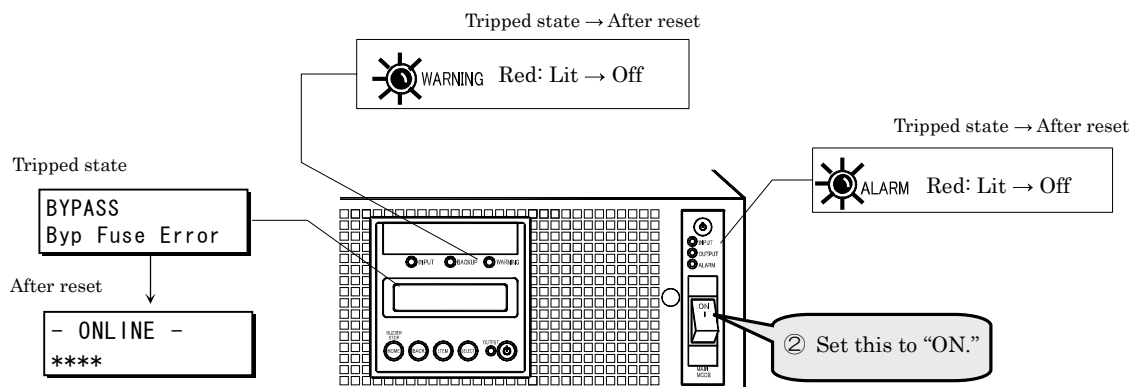


§9.4 Resetting Main Breaker

If the total capacity of the load devices connected to the UPS exceeds the rated capacity of the UPS, the UPS enters the overload state and the main breaker trips.

If the main breaker is tripped, the power supply stops. Follow the procedure below to reset the breaker. After the reset, restore normal operation.

- ① Check that there is no abnormality with the connected load devices, and reduce the load capacity.
- ② Set the main breaker on the unit control panel to "ON."
- ③ Check that the state of the display on the LCD panel and unit control panel is as shown in step ④ of §8.1 "UPS Startup."



§10. Buzzer Sounds

The buzzer sounds to indicate a UPS status error or change. Check the sound pattern and see the following table for the countermeasures to take.

Tip Press  to stop the buzzer.

Sound Pattern	LCD Indication	LED Status	UPS Status	Countermeasure
Continuous tone * _____	Total Unit# Err Fatal Error	Red ALARM: Lit Red WARNING: Lit	The number of connected UPS units and the setting value differ.	Set the number of connected UPS units properly. See §3.19 "Setting Number of UPS Units Connected in Parallel" in the <i>LCD Panel Operating Manual</i> .
	Fatal Error	Red ALARM: Lit Red WARNING: Lit	The UPS has malfunctioned.	Contact your supplier or SANYO DENKI.
	Byp Fuse Error	Red ALARM: Lit Red WARNING: Lit	[When bypass power supply] MAIN MCCB has tripped (OFF).	Check the load capacity and whether there is a short circuit. If the load capacity is high, reduce the number of connected load devices, and set MAIN MCCB to "ON." See §9.4 "Resetting Main Breaker."
	AUX2 Error	Red ALARM: Lit Red WARNING: Lit	The auxiliary power supply has failed.	Contact your supplier or SANYO DENKI.
	LCD Error	Red WARNING: Lit	The LCD panel has malfunctioned.	Contact your supplier or SANYO DENKI.
	Batt Vol End	Red ALARM: Lit Red WARNING: Lit	The batteries are exhausted.	When the utility power is restored, the UPS will restart automatically depending on the setting value of "UPS Operation Upon Power Recovery" in the LCD panel setting menu. See §3.7 "Setting UPS Operation Upon Power Recovery" in the <i>LCD Panel Operating Manual</i> .
2 seconds ** ** 2 beeps	Input Error Input Freq Err Input Vol Hi Input Vol Low	Green INPUT: Blinking Green BACKUP: Lit	Power is being supplied from the batteries because of an input voltage or input frequency error.	- Check that the input voltage and input frequency are within the rated ranges. See §14.4 "Specifications." - Is MAIN MCCB set to "OFF"? If it is set to "OFF," set it to "ON."
	Test Condition Testing	—	The UPS is performing a battery test.	Wait for the battery test to end. To stop the battery test, see the procedure to stop the battery test in §4.1 "Running Battery Test" in the <i>LCD Panel Operating Manual</i> .
Continuous beeps ***** ...	Batt Vol Low	Green INPUT: Blinking Green BACKUP: Lit	The battery voltage is low.	- Check that the input voltage and input frequency are within the rated ranges. See §14.4 "Specifications." - Is MAIN MCCB set to "OFF"? If it is set to "OFF," set it to "ON."
2 seconds *** ***... 4 beeps 4 beeps	Over Load	—	The load capacity of devices connected to the terminal block or output outlets of the UPS exceeds the rated capacity of the UPS.	Reduce the number of load devices connected to the terminal block or output outlets of the UPS.
2 seconds ***** ***** 7 beeps 7 beeps	Batt Vol Error	—	[When UPS starts] The batteries are not connected.	See §6.2 "Installing Battery Packs and Attaching Front Panel" and securely attach the battery packs.
	Last Result BATTST: NG BATTST: Suspended	—	[When performing battery test] The battery check result was an error.	See §7.2 "Charging UPS," charge the batteries for at least 12 hours, and then see §4.1 "Running Battery Test" in the <i>LCD Panel Operating Manual</i> and perform the battery test again. If the result is the same, the batteries need to be replaced. Contact your supplier or SANYO DENKI.
2 seconds **** ****... 5 beeps 5 beeps	Batt Life Warn	—	The remaining battery service life is 6 months.	Battery replacement is recommended. Contact your supplier or SANYO DENKI early. Press  to stop the buzzer. The buzzer will sound again each time you start the UPS. This will continue until you replace the batteries.
	Batt Life End	—	The service life of the batteries has ended.	The batteries need to be replaced. Contact your supplier or SANYO DENKI. Press  to stop the buzzer. The buzzer will sound again each time you start the UPS. This will continue until you replace the batteries.

Note

If any other trouble occurs or you think there is a malfunction, contact your supplier or SANYO DENKI.

§11. Troubleshooting



- Internal maintenance and inspection should be performed only by technically qualified personnel. Electric shock, injury, burning, fuming or fire could otherwise result.
- Before beginning inspection, shut down the UPS completely, and remove the input power. Failure to do so may result in an electric shock.
- While the batteries are connected to the UPS, hazardous voltage is present. Never touch any parts with your hand. Doing so may result in an electric shock.

Check the status of the UPS and see the following table for the countermeasures to take.

1/3

UPS Status	LCD Indication	LED Status	Countermeasure
The buzzer sounds when the UPS starts.	Batt Vol Error	—	• Are the battery packs installed properly? Stop the UPS, and then see §6.2 “Installing Battery Packs and Attaching Front Panel,” and securely install the battery packs. After installing the battery packs, restart the UPS and check that the buzzer does not sound.
No power is supplied from the output outlets or terminal block of the UPS.	—	Green OUTPUT: Off	• Is the input power supply connected to the UPS properly? See §6.3 “Wiring,” and perform the wiring properly. • Check that the input voltage and input frequency are within the rated ranges. See §14.4 “Specifications.” • Was the startup operation performed in accordance with the correct procedure? See §8.1 “UPS Startup” and check the correct operating procedure.
	—	All: Off	• Is MAIN MCCB set to “ON”? See §8.1 “UPS Startup” and check the correct operating procedure.
	Input Error Input Freq Err Input Vol Hi Input Vol Low	Green INPUT: Blinking	• Is the voltage of the UPS set properly? See §3.1 “Setting Voltage” of the <i>LCD Panel Operating Manual</i>, and check the settings. • Check that the input voltage and input frequency are within the rated ranges. See §14.4 “Specifications.”
	—ONLINE—	Green OUTPUT: Lit	• Has the output outlet breaker tripped? See §9.3 “Resetting Output Outlet Breaker.”
	Remote OFF	—	• The remote OFF signal is set to “ON.” See §5.4 “External Interfaces.”
	EPO ON	—	• The EPO signal is set to “ON.” See §5.4 “External Interfaces.”
Power from the output outlets or terminal block of the UPS does not stop.	—ONLINE—	Green OUTPUT: Lit	• Was the shutdown operation performed in accordance with the correct procedure? See §8.2 “UPS Shutdown.” However, bypass power supply will continue during bypass operation if it was started by, for example, a change over with the forced bypass switch, an overload, or malfunction. • If the shutdown operation was performed by pressing  on the unit control panel, was the shutdown operation performed in accordance with the setting value? Is “UPS Shutdown Operation” in the LCD panel setting menu set to “3 Sec.” (3 seconds) or “Unique” (special operation)? See §3.9 “Setting UPS Shutdown Operation” in the <i>LCD Panel Operating Manual</i> and check the setting value. The default setting is “1 Sec.” (1 second).
	—BYPASS—	Green OUTPUT: Blinking	• Is “UPS Operation at  OFF” in the LCD panel setting menu set to “BYPASS”? See §3.11 “Setting UPS Operation at  OFF” in the <i>LCD Panel Operating Manual</i> and check the setting value. The default setting is “OFF.”
	Nothing is indicated.	Red ALARM: Lit All other LEDs are off.	• The UPS has malfunctioned. Contact your supplier or SANYO DENKI.

UPS Status	LCD Indication	LED Status	Countermeasure
Power from the output outlets or terminal block of the UPS stopped during operation.	—STANDBY—	Green INPUT: Lit	Was  on the LCD panel or  on the unit control panel pressed accidentally and set to “OFF”? Perform the correct procedure to set it to “ON.”
	—ONLINE—	Green INPUT: Lit	Has the output outlet breaker on the back of the UPS tripped? The breaker may have been tripped by an overload or short circuit. Check the load capacity and whether there is a short circuit. If the load capacity is high, reduce the number of load devices connected to the outlets or terminal block of the UPS. See §9.3 “Resetting Output Outlet Breaker.”
	—	Green INPUT: Lit	Is the remote OFF signal being input? See §5.4 “External Interfaces,” and check whether the external control terminal is connected properly.
	—	Green INPUT: Lit	Is the EPO signal being input? See §5.4 “External Interfaces,” and check whether the external control terminal is connected properly.
Power from the output outlets or terminal block of the UPS stopped during a power outage.	—	—	- Have the batteries deteriorated? Check the time to replace the batteries. The battery service life will vary depending on the ambient temperature. Early battery replacement is recommended. - Did a power outage occur within the last 12 hours? The remaining capacity of the batteries may be low. Sufficiently charge the UPS.
The buzzer sounded.	—	—	The alarm buzzer sounds when a state change, warning, or error occurs in the UPS. See §10. “Buzzer Sounds.”
The buzzer does not sound.	—	—	Is “Buzzer” in the LCD panel setting menu set to “SILENT (stopped).” See §3.8 “Setting Buzzer Condition” in the <i>LCD Panel Operating Manual</i> and check the setting value.
Nothing is displayed on the LCD panel.	—	—	Are the UPS unit and LCD panel connected properly with the connection cable? See §6.2 “Installing Battery Packs and Attaching Front Panel.”
Cannot operate the LCD panel.	—	—	Are the UPS unit and LCD panel connected properly with the connection cable? See §6.2 “Installing Battery Packs and Attaching Front Panel.”
The LEDs on the unit control panel do not turn on.	—	All: Off	Is MAIN MCCB set to “ON”? See §8.1 “UPS Startup” and check the correct operating procedure.
Cannot operate the unit control panel.	—	Red ALARM: Lit	The UPS has malfunctioned. Contact your supplier or SANYO DENKI.
Battery power supply continues. Power supply switches to battery power frequently.	Input Error Input Freq Err Input Vol Hi Input Vol Low	Green BACKUP: Lit	- Is MAIN MCCB on the unit control panel set to “ON”? If it is set to “OFF,” set it to “ON.” (If MAIN MCCB is set to the “OFF” during normal operation, the operation will become the same as for a utility power supply failure and the power supply will switch to battery power.) - Check that the input voltage and input frequency are within the rated ranges. See §14.4 “Specifications.”
Cannot perform a battery test.	—	—	- A battery test cannot be performed when: (1) The inverter is stopped. (2) The bypass power supply is active. (3) The battery operation is being performed (4) A shutdown is being performed by, for example, a remote operation. (5) The UPS has malfunctioned. (6) During asynchronous operation (7) “50Hz” or “60Hz” is set in §3.3 “Setting Frequency” in the <i>LCD Panel Operation Manual</i>.

UPS Status	LCD Indication	LED Status	Countermeasure
The UPS does not switch from bypass power supply to UPS power supply (inverter power supply).	—	—	- When “Auto” is set in §3.3 “Setting frequency” in the <i>LCD Panel Operation Manual</i>; is the UPS being on asynchronous operation? The UPS cannot switch to UPS power supply from the bypass power supply during asynchronous operation. Check the UPS operation status. See §2 “Viewing UPS Information”. When “50Hz” or “60Hz” is set; the UPS cannot switch to UPS power supply unless the input frequency is within the specified tracking range ($\pm 1\%$, $\pm 3\%$, or $\pm 5\%$) set in §3.2 “Setting Synchronous Frequency Tracking Range”. Check the input frequency. - Check that the forced bypass switch Forced Bypass is set to “Inverter.” The forced bypass switch Forced Bypass is located inside the front panel of the UPS. Remove the front panel to check. See step ⑨ of §6.2 “Installing Battery Packs and Attaching Front Panel.” If the forced bypass switch is set to “Bypass,” set it to “Inverter” and then press ⑤ again to switch to UPS power supply. - If “Overload Recovery Operation” in the LCD panel setting menu is set to “Auto Ret BYP,” the UPS switches to bypass power supply when there is an overload, and after the overload continues for a certain period of time, switches back to UPS power supply automatically. If the overload condition persists, the UPS switches to bypass power again, and this cycle is repeated. See §3.10 “Setting Overload Recovery Operation” in the <i>LCD Panel Operating Manual</i>. - If “Overload Recovery Operation” in the LCD panel setting menu is set to “Stay on BYP,” bypass power supply continues when the overload condition continues. When the overload condition is resolved, the UPS switches to UPS power supply. If the voltage of the utility power supply is low and the load current is at or below the overload detection threshold when the UPS switches to bypass power supply, the UPS continues to switch between UPS power supply and bypass power supply. See §3.10 “Setting Overload Recovery Operation” in the <i>LCD Panel Operating Manual</i>.
When using the power management software, serial communication fails.	—	—	- Is “Interface” in the LCD panel setting menu set to “WS” (workstation). See §3.5 “Setting PC Interface” in the <i>LCD Panel Operating Manual</i>. The default setting is “WS” (workstation). - Is “Serial Baud Rate” in the LCD panel setting menu set properly? See §3.6 “Setting Baud Rate” in the <i>LCD Panel Operating Manual</i>. The default setting is “9600bps.” Set the same setting value as that of the power management software. - Is the communication cable connected properly? See §12 “Using Power Management Software,” and connect the computer and UPS properly.
When the power recovers after the UPS has shut down due to battery exhaustion during a power outage, the UPS does not restart automatically.	—	—	Check the setting value of “UPS Operation Upon Power Recovery” in the LCD panel setting menu. If it is set to “STOP,” the inverter will not start automatically. If this item is set to “BATT>30%,” “BATT>50%,” or “BATT>80%,” the UPS will not start until the batteries are charged to the specified level. The default setting is “Auto.” See §3.7 “Setting UPS Operation Upon Power Recovery” in the <i>LCD Panel Operating Manual</i>.
The UPS does not start automatically at the time set for scheduled operation in the power management software.	—	—	If “When power failure recovered, automatically start the UPS” of the “Configuring the UPS control conditions” items described in the User Guide of the Power Management Software is selected and a value between “10” to “90” is set for the specified value (%), the UPS will not start even at a scheduled start time if the batteries are not charged to the specified value. When scheduling operation for the UPS, set this specified value (%) to “0”. For details, see “Setting the Shutdown Conditions” in the User Guide of the power management software.
“Red ALARM” lights.	—	Red ALARM: Lit	When there is a power outage, “Red ALARM” turns on if the battery is exhausted. In cases other than the above, the UPS has malfunctioned. Contact your supplier or SANYO DENKI.

Note

If the UPS does not operate normally even if you perform the countermeasures above, or if any other trouble occurs or you think there is a malfunction, contact your supplier or SANYO DENKI.

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§12. Using Power Management Software

What is power management software “SANUPS SOFTWARE STANDALONE” (supplied CD-ROM)?

This software is for managing the power supply with a computer by communicating between the UPS and computer (personal computer, workstation, etc.).

Install and use the power management software on your computer.

For more information, see the *Installation Guide and User Guide* in the “PDF” folder on the CD-ROM.

Computer system requirements

Computer: AT compatible

CPU: Pentium III 500 MHz or faster

Memory: Minimum of 32 MB (64 MB or more is recommended)

Available disk space: Minimum of 95 MB

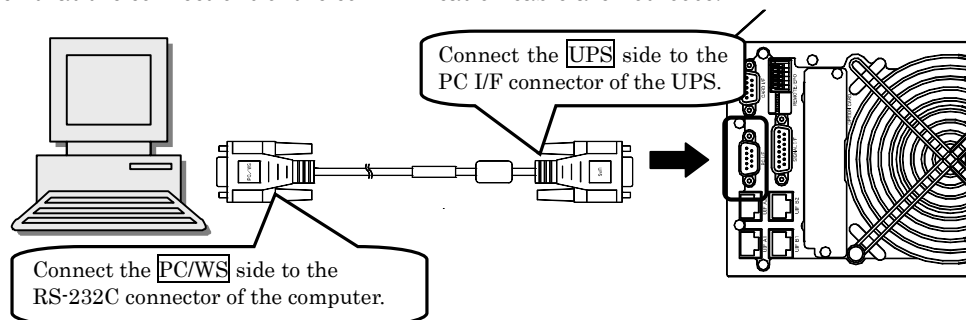
Display: Capable of displaying minimum of 640 x 480 pixels

Supported OS: Windows NT 4.0 ^(*), Windows 2000, Windows XP (x86, x64), Windows Server 2003 (x86, x64) ^(*)

Windows Vista (x86, x64), Windows Server 2008 (x86, x64) ^(*)

(*) Service Pack 6 or later, (2) Standard Edition or Enterprise Edition, (*) Standard or Enterprise

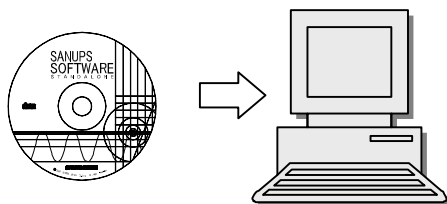
- ① Check that “Interface” in the LCD panel setting menu is set to “WS” (workstation).
The default setting is “WS” (workstation).
If the interface setting has been changed, set it to “WS” (workstation).
For the setting procedure, see §3.5 “Setting PC Interface” in the *LCD Panel Operating Manual*.
- ② Connect the PC I/F connector on the back of the UPS to the computer with the supplied communication cable.
- ③ Check that the connections of the communication cable are not loose.



Note

For details on the PC I/F connector, see §5.4 “External Interfaces.” If the PC I/F connector is used, a LAN interface card cannot be used at the same time.

- ④ Install the power management software “SANUPS SOFTWARE STANDALONE.”
The installation starts automatically when the CD-ROM is inserted.
Install the software as instructed on the screen.
- ⑤ After completing the software installation, reboot the computer.
- ⑥ Start “SANUPS SOFTWARE STANDALONE”, and configure the settings in the UPS connection setting screen.



Tip

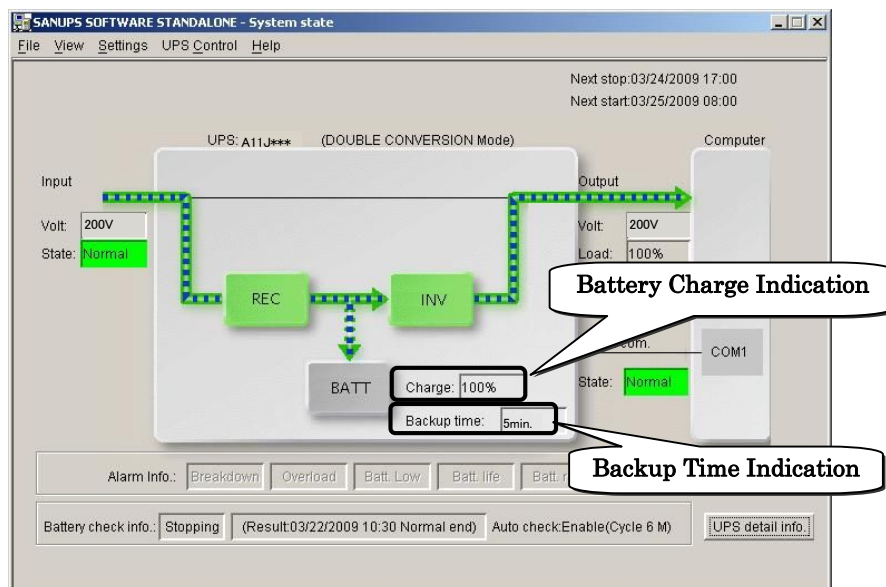
If the installation program does not start automatically, double-click Setup.exe on the CD-ROM to start installation manually.

This completes preparation to use SANUPS SOFTWARE STANDALONE.
For more usage information, refer to the *Install Guide and User Guide* in the CD-ROM of the power management software.

Usage Notes for Power Management Software

When using SANUPS SOFTWARE STANDALONE, note the following points for the items displayed on the main screen. For details on the main screen, see §6.1 “Main Screen” in the *User Guide* of SANUPS SOFTWARE STANDALONE.

Main Screen of SANUPS SOFTWARE STANDALONE



About the Battery Charge Rate Indication

- ① Although the batteries in the UPS have been charged when shipping the UPS from factory, the battery charging rate “Charge” is indicated as “0%” on the software at initial startup of the UPS. Since the battery charging rate will increase according to operating time of the UPS, see §7.2 “Charging UPS” to operate the UPS. The operating time of which the battery charging rate becomes 100% differs depending on the configuration of the connected battery.
- ② If the UPS is stopped and then restarted, even when the UPS is sufficiently charged, the charge rate may be indicated as “80%” or “90%.” This occurs due to the influence of operating conditions such as ambient temperature, and the charge rate will be indicated correctly if the UPS is operated for about 1 to 2 hours.
- ③ If the UPS is operated when the batteries are not connected properly, the battery charging rate “Charge” may not be indicated correctly. In such a state, even if the batteries are reconnected and the UPS is operated again, the correct value will not be displayed immediately. If this happens, the correct value will be indicated if the UPS is operated normally for at least 12 hours. However, the operating time of which the battery charging rate will be correctly indicated differs depending on the specifications of the UPS (configuration of the battery).
- ④ The value indicated by “Charge” is only an approximation. It may differ from the actual charge rate.

About the Estimated Battery Time Indication

- ① If “When the backup-time is under the specified value.” is selected as the shutdown trigger for the “Setting the shutdown trigger conditions” item of SANUPS SOFTWARE STANDALONE, set a time that is at least 40% of the displayed estimated backup time. For details on the setting procedure, see §6.4 “Setting the Shutdown Conditions” in the *User Guide* of SANUPS SOFTWARE STANDALONE.
- ② The estimated backup time may not be displayed accurately if the load factor is 30% or less.
- ③ This estimated backup time is only an approximation. It may differ from the actual backup time.

§13. Using Standard OS UPS Services

The standard UPS service of the operating system can be used to perform an automatic shutdown when a power outage occurs.

Connect the PC I/F connector of the UPS and the serial connector of the computer with the supplied communication cable.

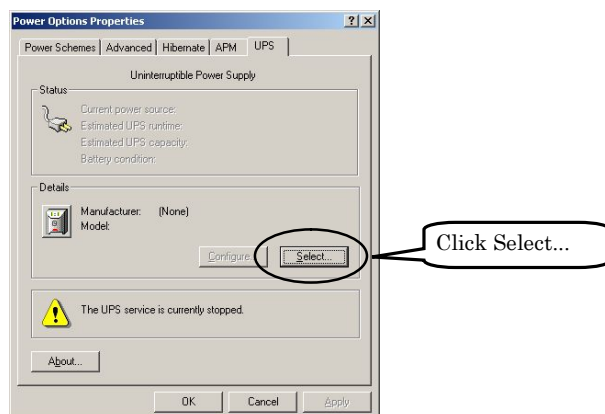
When using the standard UPS service of the operating system, set the interface to “Standalone.”

For the setting procedure, see §3.5 “Setting PC Interface” in the *LCD Panel Operating Manual*.

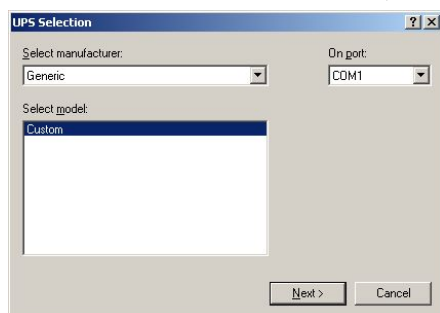
Windows 2000/XP/Server 2003

System administrator privileges are required to configure the settings of the uninterruptible power supply (UPS).

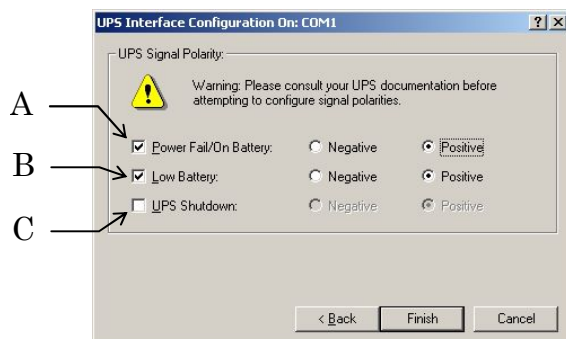
- ① Select the “Power Option Properties” icon in the Control Panel, and then click the “Select...” button in the UPS tab.



- ② Select “Generic” in the “Select manufacturer” list, select “Custom” in the “Select model” list, and then click “Next.”



- ③ Make the settings shown in the following figure, and then click “Finish.”
(Select the “Positive” option before clearing the check from the UPS Shutdown check box.)

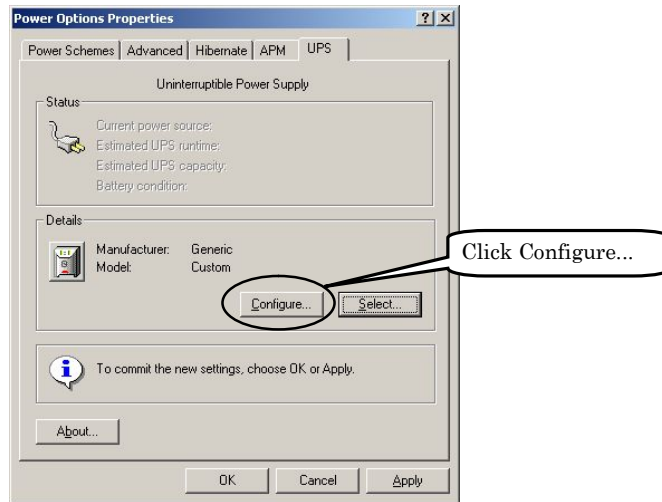


Note

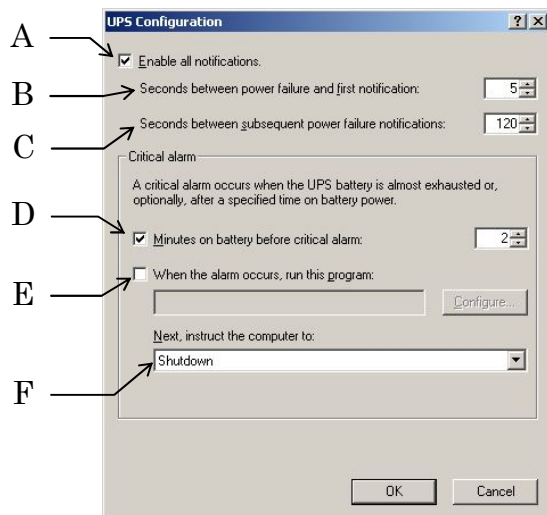
Even if you enable “UPS Shutdown”, the UPS will not shut down automatically after Windows 2000/XP/Server 2003 shutdown. If you need automatic UPS shutdown, use the optional power management software.

No.	Item	Description
A	Power Fail/On Battery	Specifies that a warning message should be displayed according to the settings in the “UPS Service” section.
B	Low Battery	Specifies that the OS shutdown should begin on reception of a UPS low battery signal.
C	UPS Shutdown	Clear this check box.

- ④ Click the “Configure...” button.



- ⑤ Make the settings shown in the following figure, and then click the “OK” button. When you return to the screen in step ①, click “Apply.”



No.	Item	Description
A	<u>E</u> nable all notifications	Check this if you want to display all warning messages related to power failures.
B	Seconds between power failure and first notification	Specifies the time between a power failure and the first warning message. No warning message appears if power is restored within the specified time.
C	Seconds between subsequent power failure notifications	Specifies the interval between subsequent warning messages.
D	<u>M</u> inutes on battery before critical alarm	Specifies the number of minutes that should elapse after a power failure until the OS shutdown begins. The minimum time is 2 minutes. The OS shutdown begins after the specified time, or after the battery power becomes low (as specified in step ③), whichever occurs earlier.
E	When the alarm occurs, run this program	Check this check box and enter a command file name if you want to execute a command file before starting the shutdown. Only commands which finish executing within 30 seconds can be entered here.
F	<u>N</u> ext, instruct the computer to	Specifies whether Windows 2000/XP/Server 2003 should shut down or hibernate. If you select “Shut Down”, Windows2000/XP/server2003 is shut down. “Hibernate” cannot be selected unless the “Enable hibernation” check box is checked in the “Hibernate” tab.

This completes the settings.

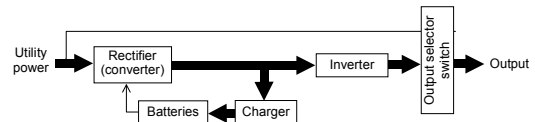
§14. UPS Characteristics

§14.1 Basic Operation

(1) When normal operation

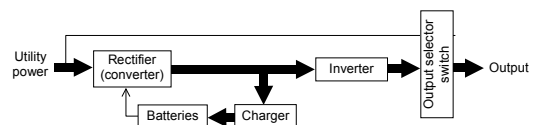
During normal operation, the UPS converts AC power from the utility power source into DC power through the rectifier, and reconverts this DC power back into AC power through the inverter and supplies it to the load. The output power is stable AC power synchronized with the input power source. The batteries are kept continually charged and ready in case a problem (power outage or voltage drop) occurs with the utility supply.

When the UPS is in the normal operation state, (DOUBLE CONVERSION Mode) is displayed on the main screen of the power management software.



(2) When failure of utility power

When a failure or a power outage occurs at the utility power source, the rectifier and charger stop operating while inverter operation continues, now using the batteries as a DC source to produce AC voltage, to ensure stable power supply to the load without even a momentary power dropout. At the same time, the buzzer sounds the battery operation alarm, and "Green INPUT" starts blinking.



(3) When battery voltage drops

When a failure or a power outage at the utility power source continues, the battery voltage drops to approximately 178 V or less, the buzzer sounds, and "Batt Vol Low" is displayed on the LCD screen.

(4) When recovery of utility power

When normal utility power is restored, rectifier and charger operations resume, automatically returning to the normal operation state described in §14.1 (1).

(5) Extended power outage

If a power outage persists and the battery voltage reaches the final discharge level of approximately 168 V, a protective circuit shuts off the inverter to prevent over-discharging of the batteries. When normal utility power recovers after the inverter has been stopped automatically, operation is automatically resumed*, returning to the normal operation state described in §14.1 (1).

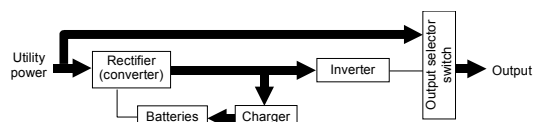
* When "UPS Operation Upon Power Recovery" in the LCD panel setting menu is set to "STOP," inverter output remains stopped.

§14.2 Protective Functions

(1) Overload protection

If the UPS output is overloaded by the current capacity of the inverter being exceeded, such as when a computer system boots up, the output selector automatically switches the source of power from the inverter to bypass circuit without interruption. Once the overload state is resolved, the source of power is switched to the inverter, and operation returns to the normal operation state.

* When "Overload Recovery Operation" in the LCD panel setting menu is set to "Auto Ret BYP," the UPS switches the source of power to the inverter without interruption when the overload is resolved, and operation returns to the normal operation state.



(2) UPS failure protection

If a failure occurs in the UPS, the output selector automatically switches the source of power from the inverter to the bypass circuit without interruption. At the same time, "Red ALARM" lights and the buzzer sounds. The power supply route is the same as for an overload.

Output from the UPS will stop if a power outage occurs during bypass operation due to a UPS failure. Contact your supplier or SANYO DENKI.

§14.3 Protective Function Table

The following table shows the functions and operations to protect the UPS.

Indication of the marks in the table as follows.

Lit LED: 

Blinking LED: 

Buzzer alarms: ① to ⑥

Sending of transmission signal: ○

Item	Indicators/Indications of LCD Panel and Unit Control Panel						Alarm Buzzer *2	Transfer Signal and Contact Signal Output						Protective Functions (UPS operations)	Notes
	Green INPUT	Green OUTPUT	Green BACKUP	Red WARNING	Red ALARM	LCD Indications *1		AC Input Error	Battery Voltage Drop	AC Output	Inverter Output	Bypass Output	Device Error		
Preparation		—	—	—	—	—STANDBY— *****	—	—	—	—	—	—	—	Rectifier and charger operation	Receiving power
Normal			—	—	—	—ONLINE— *****	—	—	—	○	○	—	—	Inverter operation	Receiving power
Series Failure			—			—SYS FAILURE— *****	①	—	—	○	—	○	○	Stop rectifier, charger, and inverter Bypass power supply	—
Overload			—	—	—	—BYPASS— *****	④	—	—	○	—	○	—	Bypass power supply	—
Forced Bypass			—	—	—	—BYPASS— *****	—	—	—	○	—	○	—		Manual switch to bypass operation
Input Over Voltage				—	—	—BATTERY— *****	②	○	—	○	○	—	—	Stop rectifier and charger Continue inverter operation	Battery operation
Input Over Voltage (Prolonged, battery voltage drop)				—	—	—BATTERY— *****	③	○	○	○	○	—	—		
Power Outage				—	—	—BATTERY— *****	②	○	—	○	○	—	—		
Power Outage (Prolonged, battery voltage drop)				—	—	—BATTERY— *****	③	○	○	○	○	—	—		
Input Error (Frequency)				—	—	—BATTERY— *****	②	○	—	○	○	—	—		
Input Error (Prolonged, battery voltage drop)				—	—	—BATTERY— *****	③	○	○	○	○	—	—		
Complete Battery Discharge			—			—BYPASS— *****	①	○	—	○	—	○	—	Stop inverter Bypass power supply	—
Battery Voltage Error			—	—	—	—*****— Batt Vol Error	⑥	—	—	○	○	—	—	Inverter operation	Batteries not connected
Battery Remaining Service Life Warning			—	—	—	—*****— Batt Life Warn	⑤	—	—	○	○	—	—		—
Battery Service Life End			—	—	—	—*****— Batt Life End	⑤	—	—	○	○	—	—		—

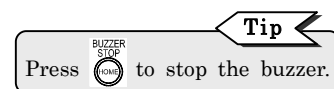
*1. The “*****” indication on the LCD indicates the UPS status, etc.

*2. Buzzer sound patterns:

- ① * ————— Continuous tone
- ② **.....**.....
- ③ *****..... Continuous tone
- ④ ****.....****.....
- ⑤ *****.....*****.....
- ⑥ *****.....*****.....

See §10. “Buzzer Sounds” and perform the corresponding countermeasure.

If the UPS has malfunctioned, contact your supplier or SANYO DENKI.



§14.4 Specifications

Item		Standard or Performance		Notes	
		Terminal Block Type	Plug Type		
Model	3U Type	A11J502A002TE	A11J502A002NE		
	4U Type	A11J502A002TE4U	A11J502A002NE4U		
Output capacity		5 kVA/4.5 kW			
Cooling system		Forced air cooling			
AC input	Input terminals	Terminal block M6	Plug NEMA L6-30P		
	Number of phases	Single-phase, 2-wire			
	Voltage	200 V, 208 V, 220 V, 230 V, 240 V (Allowable variation range: -40% to ±15%)		Selectable, rated voltage same as output voltage At shipment: 200 V *1	
	Frequency	50 Hz or 60 Hz		Auto-detect, fixed setting selectable, at shipment: auto-detect *2	
	Power requirements	5.5 kVA		Max. capacity during battery recovery charging	
	Input power factor	0.95 or more		During rated input voltage *3	
AC output	Output terminals	Terminal block M6 NEMA L6-30R ×1 IEC-C13 ×2	NEMA L6-30R ×2 NEMA L6-20R ×2		
	Number of phases	Single-phase, 2-wire			
	Voltage	200 V, 208 V, 220 V, 230 V, 240 V		At shipment: 200 V	
	Voltage accuracy	Within rated voltage ±2%			
	Frequency	50 Hz or 60 Hz		Same as input frequency (auto-select)	
	Frequency accuracy	Within rated accuracy ±1%, 3%, or 5%		1%, 3%, and 5% selectable *2 When free running operation, or frequency fixed setting: Within ±0.5%	
	Voltage waveform	Sine wave			
	Distortion factor of voltage waveform	Linear load: 3% or less When rectifier load: 8% or less		During rated output	
	Transient voltage variation	Rapid load change	Within rated voltage ±5 %		0% ⇔ 100% at transient or output switch
		Power outage, recovery			During rated output
		Rapid input voltage change			±10% variation
	Load power factor	0.9 (lag)		Variation range 0.7 (lag) to 1.0	
	Overcurrent protection	Auto switch to bypass circuit at 110% or more		With auto return function *4	
	Overload capability	Inverter	110% (1 minute) / 118%(instantaneously)		
		Bypass	200% (30 seconds) / 800% (2 cycles)		
Batteries	Type	Small-sized valve regulated lead-acid battery			
	Quantity	16 (12 V / 1)		Series of 16	
	Rated capacity	3U Type	5 Ah / Battery	20 minute-rate	
		4U Type	9 Ah / Battery		
	Backup time	3U Type	5 minutes when load power factor 0.8 4 minutes when load power factor 0.9	At 25°C (77°F) ambient temperature, initial value *5	
		4U Type	10 minutes when load power factor 0.75 8 minutes when load power factor 0.9		
	Expected service life	5 years		At 25°C ambient temperature	
Generated heat	339 W		During rated output		
Input leakage current	4 mA or less				
Operating environment	Ambient temperature: 0 to 40°C (32 to 104°F) Relative humidity: 20 to 90%		No condensation *6		
Acoustic noise	45 dB or less		1 m (approx. 40 inches) from front of UPS, A characteristics		

*1. The allowable voltage range of AC input is as follows.

Condition	Allowable voltage range	
	Terminal block type	Plug type
• When load factor is less than 70%	-40%~+15%	-20% to +15%
• When load factor exceeds 70%	-20%~+15%	-10% to +15%
• At UPS start up		

When the load factor is less than 70%,
Voltage error detection: -40%
Recovery detection;
Terminal block type: -20%, Plug type -10%

- *2. When the auto-detect setting is set, you can select a synchronous frequency tracking range from ±1%, ±3%, and ±5%. (at shipment: ±3%). And the allowable range for the input frequency is ±8% on the auto-detect setting. When the fixed setting is set, the output frequency is fixed to the set frequency (50 Hz or 60 Hz) regardless of the input frequency. And the allowable range for the input frequency is 40 Hz to 120 Hz on the fixed setting. When the input frequency recovers from being outside the allowable range, the range is ±8% regardless of the setting. Also, even when either setting is set, the inverter will not start if the input frequency is not within the range of the values (±1%, ±3%, or ±5%) set for the synchronous frequency tracking range.
- *3. When the distortion factor of the input voltage waveform is less than 1%.
- *4. The inverter is capable of operation synchronized with AC input frequency and switchover operation without interruption provided that the AC input frequency is within the rated frequency range, and the AC input voltage is within the rated voltage range.
- *5. Some of the specifications for a UPS with long backup times differ from the specifications listed in the table above. See the extension battery specifications instruction manual.
- *6. The UPS contains batteries. The battery service life will be foreshortened if the UPS is used in an environment where the ambient temperature exceeds 30°C (86°F).

§15. Warranty

Warranty for use in Japan: 1 year

Warranty for use Overseas: 1 year

Warranty for use in North America: 3 years*

*Valid only when the UPS is purchased from a vendor recognized by SANYO DENKI

1. In the above areas, this product is warranted for the specified periods against electrical failures due to materials or workmanship.
2. Free repair or replacement by a product with equivalent functions will be made when it is determined that failure has occurred because of defects in materials or workmanship.
3. This warranty is void in the event of any modifications or changes to the product supplied by SANYO DENKI.
4. This warranty is void in the event of any improper use of the product supplied by SANYO DENKI, or failure to use the product as specified in this Instruction Manual.
5. This warranty does not apply when the product is used aboard a ship or in another area subject to vibrations.
6. This warranty does not apply when the product is operated under extraordinary conditions, for example periodic complete discharge of the batteries.
7. This warranty is void in the event that the product supplied by SANYO DENKI is installed in an inappropriate location.
8. This warranty does not apply to failures due to accidents, improper use, or use for other than the product's intended use.
9. This warranty does not apply to defects or damages arising from fire, earthquake, storm or flood disaster, lightning or other natural disasters including pollution, salt disaster, gas disaster (sulfide gas), non-standard voltage or incorrect power sources other than those specified.
10. This warranty does not apply to defects or damages arising from mishandling, such as during transportation, relocation or dropping of the UPS by the customer after purchase.
11. SANYO DENKI reserves the right to determine whether damage to a load device connected to this product is due to faulty operation by this product. (In the event of any such claim, the affected load device must be sent to SANYO DENKI for inspection)*
12. Warranties for devices other than the product supplied by SANYO DENKI shall be the warranties provided by the manufacturers of those devices.*
13. SANYO DENKI provides no warranty for products made by other manufacturers used or composed in the products manufactured by SANYO DENKI.*
14. This warranty applies to the product specified by SANYO DENKI. It does not apply to any other device.
15. Sanyo disclaims all responsibility for damage to load device software, loss of data, lost profits, and lost opportunities.
16. This warranty does not apply to medical or industrial devices connected to this product.