M0007932B

SANUPS

HYBRID UPS

E11A

TYPE C

Uninterruptible Power Supply

1kVA

100V Model

Instruction Manual

SANYO DENKI

E

ENGLISH

Introduction

Thank you for choosing the SANUPS (E11A102U).

SAVE THESE INSTRUCTIONS

This manual contains important instructions for E11A102U011 that should be followed during installation and maintenance of the UPS and batteries to protect the safety of the service technician* and the customers. To use the UPS correctly and safely, read this manual before using the UPS. Please be sure to also read the *User Settings Guide* for details about user setting menus. After reading, please keep these handy for convenient reference.
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)

UPS is an abbreviation for Uninterruptible Power Supply.

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* Service technician

This term is used to indicate service technicians from SANYO DENKI or entrusted from SANYO DENKI with knowledge of this UPS.
Maintenance work must not be performed by other than a qualified service technician.

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§1. Before Use

The procedures to use the UPS are shown in the following. Be sure to proceed as follows to use the UPS safely and properly.

Check the safety precautions ⇒ **pages 2 to 5**

↓

Check the usage precautions ⇒ **pages 6 to 7**

↓

Check the contents of the package ⇒ **page 8**

↓

Install the UPS ⇒ **pages 15 to 18**

↓

Wire the UPS ⇒ **pages 19 to 21**

↓ When using Optional Equipment

If you are not using optional equipment, proceed to the next item.

Connecting Optional Equipment ⇒ **pages 49 to 61**

↓ When using the power management software to manage UPS power supply

If you are not using the power management software, proceed to the next item.

Using the Power Management Software ⇒ **pages 44 to 45**

↓

Check the default value of the user setting. ⇒ **pages 23, 32 to 34**

↓ When the default settings do not match with your environment or requirements

If you do not need to change the user settings, proceed to the next item.

Change the user setting ⇒ ***User settings Guide***

↓

Charge the UPS ⇒ **page 24**

↓

Perform the power outage simulation test ⇒ **pages 25 to 26**

↓

Connect the load devices ⇒ **page 27**

↓

Start up the UPS ⇒ **page 28**

↓

Turn the load device power on ⇒ **page 29**

↓

Check the UPS daily by user ⇒ **page 36**

↓ UPS is malfunctioning, battery needs to be replaced, etc.

Contact your supplier for maintenance ⇒ **page 35**

↓

Maintenance by technically qualified personnel. ⇒ **pages 39 to 40**

§2. Safety Precautions

PRECAUTIONS
(IMPORTANT SAFETY INSTRUCTIONS)

This Manual contains important instructions for operating and maintaining the E11A102U011 and the batteries to protect the safety of the service technician and the customers.
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 described two 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 incorrect operation.
⚠ CAUTION	Denotes hazards which COULD cause bodily injury and product or property damage, as a result 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). ❗ : 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 example signifies the general caution. ⚡ : This example signifies that there is danger of electric shock.

1. Relocation and Transportation Precautions

CAUTION

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

2. Installation Precautions

CAUTION

- The UPS should be installed only by technically qualified personnel.
  Improper installation can 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.
  a. 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.
  b. Where the UPS is exposed to direct sunlight.
  c. Where the UPS is directly exposed to the heat from a heat source, such as a stove.
  d. Where the UPS may be subject to vibration or physical shock.
  e. Near a device that may emit sparks.
  f. In the presence of dust, salt or corrosive or flammable gas.
  g. Outdoors
- Be careful not to block the air intake and exhaust vents of the UPS.
  Keep the front and back of the UPS at least 20 cm away from the wall.
  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 (39.4 inches) space at the front and 50 cm (20 inches) at the back.
- The space around the UPS must be ventilated. Unless the 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 capable of bearing the weight （17kg, 37.48 lbs） of the UPS in the correct manner specified in this manual. 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.
- 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 a danger of suffocation.
- The socket-outlet shall be installed near the equipment and shall be easily accessible.

3. Wiring Precautions

CAUTION

- Wiring should be performed only by technically qualified personnel.
  Incorrect wiring can result in electric shock and/or fire.
- Protection in primary circuits against over currents, short circuits and earth 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.
- Connect the grounding cable securely in the manner specified. Failure to connect the grounding cable 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 terminal. Failure to connect the grounding cables 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 the UPS off 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 and equipment damage.

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 could 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 the 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, 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 and damage to the UPS when performed by anyone other than qualified service personnel. All such repairs and modifications will void the warranty.

CAUTION

- The following table shows the UPS states resulting from operation of the INV. ON/STAND BY switche and MAIN SW switch . Check the indicators before and after operating. Do not touch the INV. ON/STAND BY switche and MAIN SW switch unless necessary. If power is supplied incorrectly, an electric shock or bodily injury could result.

UPS Status		Power Output Status	LEDs
MAIN SW	INV. ON/STAND BY	OUTPUT	
OFF	STAND BY	Stopped	INPUT (off-green), OUTPUT (off-green)
ON	STAND BY	Stopped	INPUT (on-green), OUTPUT (off-green)
OFF	ON	Power supplied from inverter	INPUT (blinking-green), OUTPUT (lit-green)
ON	ON	Power supplied 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 and burns, fuming, or fire could 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 chemicals such as gasoline, thinner, benzene or detergent to clean batteries. These can cause the casing to crack and leak, resulting in fire.
- Do not allow sharp metallic objects or fingers to touch the battery connectors of the UPS. Doing so may result in an electric shock.
- Do not touch any parts inside the UPS, even when AC input is removed. Voltage produced from the batteries can still cause an electric shock.

6. Radio Frequency Interference

CAUTION

- 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

CAUTION

- Battery servicing should be performed by technically qualified personnel. Keep unqualified personnel away from batteries.
- Replace batteries only with the same model and brand: HRL1234WF2FR manufactured by CSB BATTERY Co., LTD. 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 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) 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 can present a risk of fire due to generation of hydrogen gas. The following procedures should always be followed:
  a. DO NOT SMOKE when 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-distinguishing agent (ABC). Using water can cause the fire to spread.
- Do not dispose of batteries in fire, as they could 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 the battery directly.
  b. Do not charge the battery 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 compounds such as gasoline, thinner, 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 Requirements
The input power of this UPS is shown in the following table. Adjust the output voltage of the UPS to match the AC input voltage*1 of the region where you are using the UPS.

*1. The output voltage is same as the rated value of AC input voltage. See §3.2 "Setting Output Voltage" in the *User Settings Guide* to change the setting.

MODEL	AC input voltage	AC input frequency
E11A102U011-20	120V (+15%,-20%)	50 or 60Hz (±8% *2)
E11A102U011-00	100V (+15%,-20%)	50 or 60Hz (±8% *2)

*2. The range of which the AC input frequency can be synchronized with the inverter varies according to the setting in §3.1 "Setting UPS Operation Mode" in the *User Settings Guide* as follows. When the AC input frequency exceeds ±8%, UPS operation switches to the battery operation.

- When "Double conversion" is set, the synchronization range is ±1%. *3
- When "Auto" or "Economy" is set, the synchronization range is selectable. User can select synchronization range from ±1%, ±3% or ±5%. *3

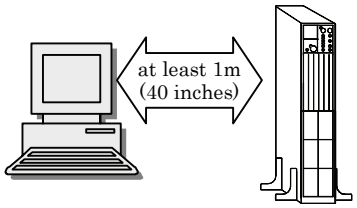
*3. See §3.3 "Setting Frequency Sync Range" in the *User Settings Guide* to change the setting. The factory default setting is 3%.

(2) The current capacity of the AC power supply
The current capacity of the AC power supply must satisfy the requirements of the UPS
(The current capacity varies according to the MODEL.)

MODEL	Input capacity	Recommended capacity of breaker	
E11A102U011-20	0.9kVA or more	10A	UL standard
E11A102U011-00		15A	

§3.2 Installation Precautions

* Installation must be done in accordance with the National Electric Code Articles 110-17 and 110-18.



(1) Carefully consider the leakage current when a leakage circuit breaker is installed on the input side.
The maximum leakage current of the UPS is 3mA.
(2) Keep the UPS at least 1 m (about 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 a clearance specified in §6.2 "Installation Space Check" at the front and back of the UPS to permit free airflow at the air intake and exhaust vents.
(4) When the AC input power is single-wire grounded, always connect the ground phase to the W terminal (S phase) side of the UPS. See §7.3 "Input Plug Connection" for details.
(5) As far as possible, do not ground the output (load) side. If you must make a single-wire grounded connection, always connect the ground phase to the W terminal (V phase) side on the UPS. (This is to prevent short-circuiting by the ground.) See §10 "Load Devices Connection" for details.

§3.3 Usage Precautions

(1) Never short-circuit the output terminals.
Doing so causes protective functions to activate or fuses to blow, preventing output.

(2) Unsuitable load devices
Do not connect laser printers, plain paper fax machines, copy machines, or overhead projectors as load devices. Such devices typically include heating elements that draw high current. This may cause an overload that could prevent battery backup operation when an outage occurs, and could damage the UPS.

(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 not 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 (refresh charge) in accordance with the UPS storage environment as shown in the table below.

Storage Temperature	Charge Interval	Operation
25°C	Once every 6 months	At least 20 hours
30°C	Once every 4 months	At least 20 hours
40°C	Once every 2 months	At least 20 hours

Recharging procedures

① Set MAIN SW on the back panel of the UPS to "ON".
② Check that the "Green INPUT" lights.
↓ Recharging starts.
③ Continue operation for at least 20 hours.
④ Set MAIN SW to "OFF" after at least 20 hours elapses.

(5) Insulation testing
Before testing 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) Rack support rails (not supplied) are required to mount the UPS on a rack. For details, contact your supplier or Sanyo Denki representative.

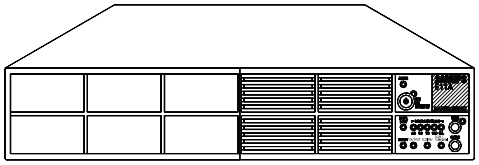
§4.Checking the Contents of the Package

After opening the package carton, check to be sure that it contains all of the following items.

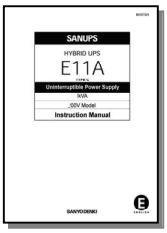
Are UPS and all accessories in ?
Is there no visible damage on the UPS?
Check and put the mark in ☑ .

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

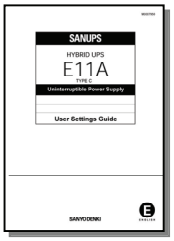
☐ E11A102 1



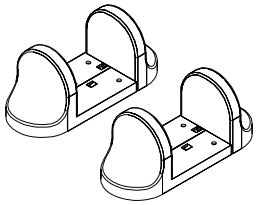
☐ Instruction Manual
Japanese 1
English 1



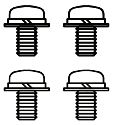
☐ User Settings Guide
Japanese 1
English 1



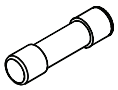
☐ Stands 2



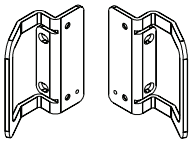
☐ Screws for Stands
M4×8 4



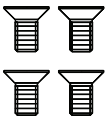
☐ Fuse 15 A 1



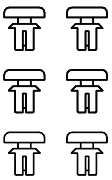
☐ Rack mounting bracket
Right 1
Left 1



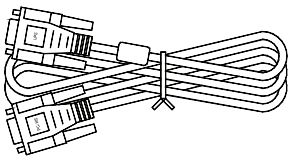
☐ Screws for Rack mounting brackets M4×6 4



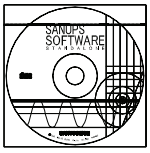
☐ Bushings 6



☐ Network cable 1



☐ Power Management Software disc CD-ROM 1



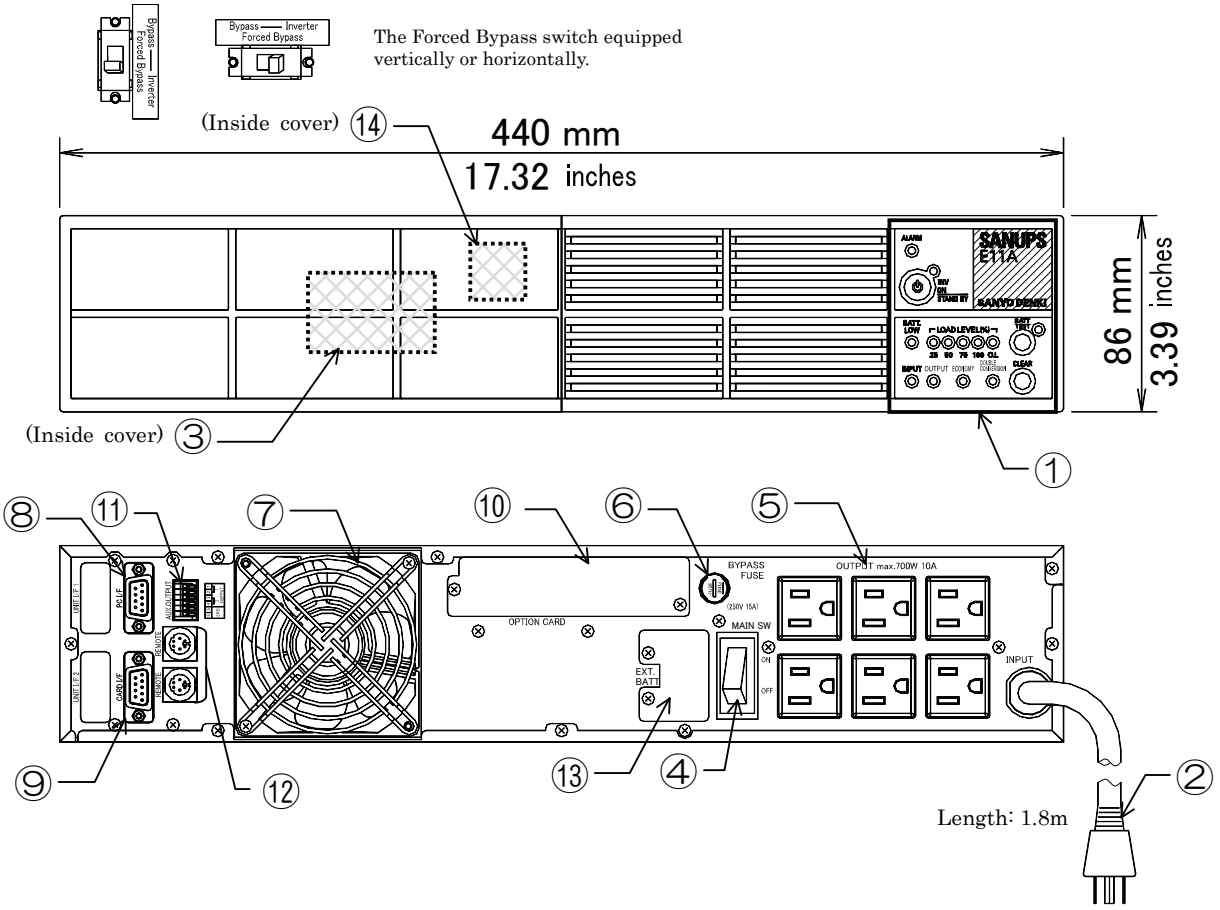
Note about sale or transfer of ownership

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

§5. External Dimensions and Part Names

§5.1 Front and Back Panels of UPS

Depth: 408 mm (16.06 inches)
Weight: 17 kg (37.48 lbs)

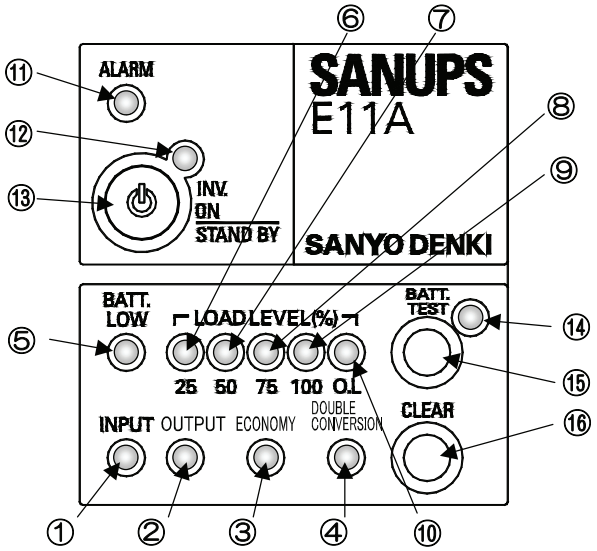


No.	Name	Label	Function
①	Control panel and indicators	–	Control panel for control operations, UPS status display, and function settings
②	Input power cable	INPUT	Connect the input power cable
③	Battery connector	–	Battery connector
④	Input switch	MAIN SW	Input power On and Off switch
⑤	Output terminals	OUTPUT	Output terminals
⑥	Bypass fuse	BYPASS FUSE	Fuse to protect bypass circuits
⑦	Exhaust vent for cooling fan	–	Ventilation inside UPS
⑧	PC interface	PC I/F	Connector for the Power control software
⑨	Card interface	CARD I/F	Connector for the option card*2
⑩	Option card slot	OPTION CARD	Option card*2 slot
⑪	External control terminals	AUX.OUTPUT	Connect an optional outlet box *2, or an emergency power off (EPO) switch.
⑫	Remote switch connectors	REMOTE	Connect an optional remote switch *2, or optional linked operation cables.
⑬	Battery connector	EXT.BATT	Battery connector for external battery (optional)*2
⑭	Forced bypass switch*1	Forced Bypass	Switch to bypass power supply during maintenance connecting the maintenance bypass unit (optional)*2

Notes

*1. Activate the Forced Bypass switch when using a maintenance bypass unit (option). Normally, do not change the position of this switch. Leave it set to" Inverter".
*2. Contact your supplier or SANYODENKI for details of the optional devices. Refer to the Instruction manual of the optional devices for more information such as specifications and installation of the optional devices.

§5.2 Control Panel and Indicators



Indications of LED in this manual

The LEDs on the control panel are described as "Green INPUT" or "Red ALARM". The LEDs state are indicated as follows;

: LED lights. : LED blinks.

No.	Label		Functions				
			Status display	Lit	Not lit	Blink	Fast blink
①	INPUT		UPS input power status	Normal input	–	Input error	–
②	OUTPUT		UPS output power status	UPS outputting power supply	OFF	Power supply bypassing	During Output Line Control delay operation. *5
③	ECONOMY		Operation mode	Economy mode operation *1	OFF *3	–	–
④	DOUBLE CONVERSION		Operation mode	Double conversion mode operation *2	OFF *3	–	–
⑤	BATT. LOW		Battery status	Battery power low	Battery power normal	Battery exhausted	–
⑥	LOAD LEVEL (%)	25	Load level 25%	Load 25% or more	Load under 25%	*4	–
⑦		50	Load level 50%	Load 50% or more	Load under 50%	*4	–
⑧		75	Load level 75%	Load 75% or more	Load under 75%	*4	–
⑨		100	Load level 100%	Load 100% or more	Load under 100%	*4	–
⑩		O. L.	Overload display	Load 105% or more	Load under 105%	–	–
⑪	ALARM		Alarm	Failure detected	No failure	–	–
⑫	INV. ON STAND BY		Operation status	UPS outputting power supply	OFF	Power supply bypassing	During Linked delay operation. *6
⑬	INV. ON STAND BY		UPS ON/OFF switch				
⑭	BATT. TEST		Battery test	Result: Normal	–	Testing ====> Result: Error Blinking speed changes.	
⑮	BATT. TEST		Battery test operation				
⑯	CLEAR		Stop buzzer, clear result of battery test				

Operation mode of the UPS and indication of LED

*1. Economy mode operation····When power conditions are good, UPS supplies this power to the load.

*2. Double Conversion Mode Operation····When power conditions fluctuate, UPS converts to the stable power, and supplies to the load.

*3. Active Filter Mode operation····When the "Green DOUBLE CONVERSION" and the "Green ECONOMY" are both off, the UPS is in Active Filter Mode.

*4. For about 5 seconds after MAIN SW is turned on, the LED that indicates the output voltage setting of UPS blinks as shown in the following table.

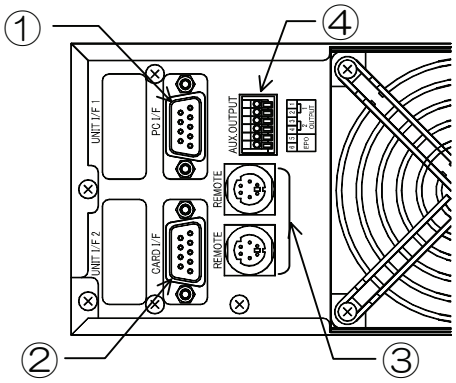
Output voltage setting	Blinking LED
100V	Green LOAD ELEVEL 25
110V	Green LOAD ELEVEL 50
115V	Green LOAD ELEVEL 75
120V	Green LOAD ELEVEL 100

For example, when the output voltage of the UPS is set to 120V, after MAIN SW is turned on, "Green LOAD ELEVEL 100" blinks for about 5 seconds.

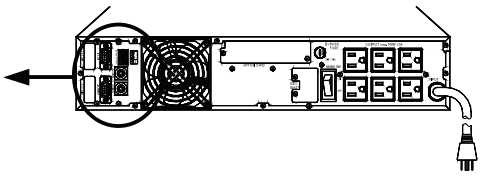
*5. Blinks during delay operation when output line control is being performed with an optional outlet box. The blinking is faster than the blinking which indicates UPS bypass power supply.

*6. Blinks during delay operation when linked operation is being performed with an optional remote switch and optional linked operation cable(s). The blinking is faster than the blinking which indicates UPS bypass power supply.

§5.3 External Interfaces



UPS back panel



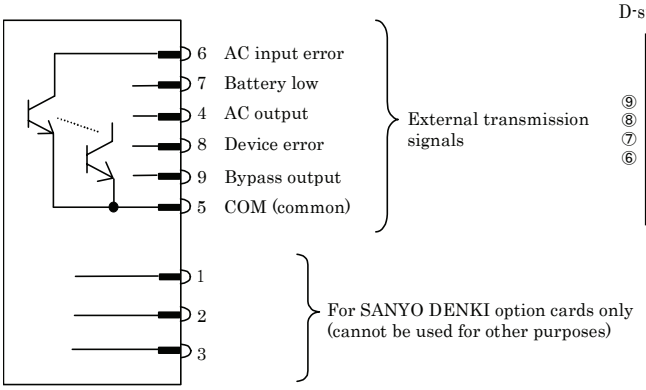
No.	Name	Function
①	PC I/F PC interface (RS-232C)	Connect the computer to this connector with the supplied Network cable. The unit functions as follows, depending on the value of the Interface user setting. Set the Interface setting to select the functions that you want to use. See §3.5 "Setting PC Interface" in the *User Settings Guide* for details on the setting procedure. 1. Interface setting: Workstation ➢ Select this setting when you want to perform power management and shut down the computer (personal computer, workstation, etc.) by means of communications between the UPS and the computer, using the power management software on the supplied CD-ROM or another power management application. For more information about the power management software, see §16 "How to Use Power Management Software" or the *User Guide* on the supplied CD-ROM. 2. Interface setting: Standalone ➢ Select this setting when you want to shut down the UPS automatically, using the standard UPS service* provided by the operating system (NetWare, Windows NT, etc.). * Note about using UPS service functions • See §17 "Using Standard OS UPS Services" for more information about the setting procedure. • Do not connect the supplied Network cable when using an operating system (Windows 95, 98, etc.) that does not have a standard UPS service. Backup may not be possible when a power outage occurs. • When using the optional power management software with a serial connection, set the Interface setting to Workstation. The UPS may stop immediately on a power outage if the setting is set to Standalone. Signal names 2 RXD 3 TXD 5 GND 4 DTR 6 DSR 8 CTS 7 RTS External view D-sub 9-pin Male ⑥ ⑦ ⑧ ⑨ ① ② ③ ④ ⑤ Fixing screw inch

No.	Name	Function
②	CARD I/F Card interface	This is a dual-purpose interface, for connection of Sanyo option cards (LAN interface card, contact interface card) and for output of UPS status signals. To use the LAN interface card, set the Interface user setting to Workstation (default setting). See §3.5 "Setting PC Interface" in the *User Settings Guide* for details on the setting procedure.

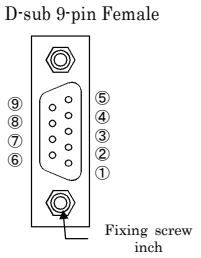
Note

The LAN interface card and the contact interface card cannot be used simultaneously.

Interface connector terminal names



External view



External transmission signals

Signal name	Description
AC input error	Active* when UPS is supplying battery power due to failure of utility power.
Battery low	Active when battery voltage decreases to below the specified level during battery power supply.
AC output	Active when AC power is being supplied to the UPS OUTPUT terminals.
Bypass output	Active when bypass power is being supplied to the UPS OUTPUT terminals.
Device error	Active when a fault occurs in the UPS main unit.

* Active = transistor conduction state

External transmission signal electrical characteristics

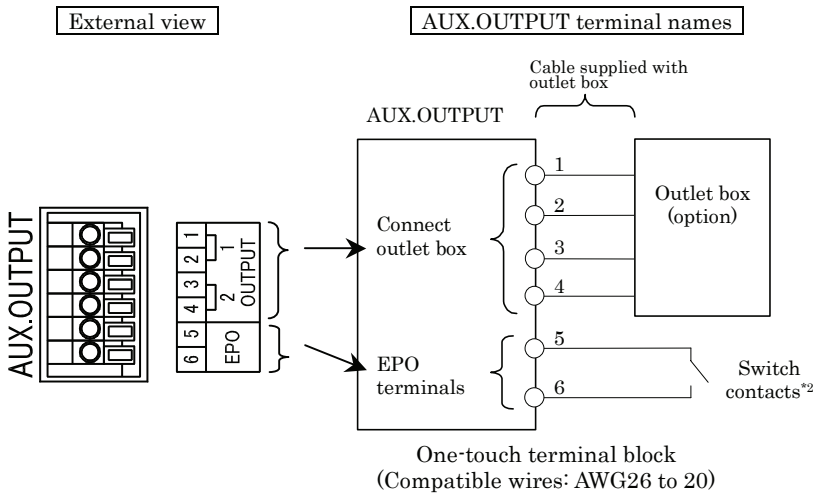
- Interface: Transistor open collector output
- Maximum rating: DC +35V/100mA
- Normal state: Open (high impedance); Active state: Conduction

Notes

- When connecting inductive or capacitive loads, do not exceed the maximum rating.
- When connecting a voltage load, connect - (minus) polarity to the COM (common) pin, and ensure that the maximum rating is not exceeded. Use in excess of the maximum rating or connection of applied voltage with the wrong polarity can result in damage to the UPS. AC voltage cannot be applied.
- External transmission signals are transistor output. If you require no-voltage contact (relay contact), use the optional contact interface card.

No.	Name	Function
③	REMOTE (2) Remote switch connectors	These are connectors for remote ON/OFF signal input and for linked operation. Connect an optional remote switch for remote control of UPS ON/OFF and computer shutdown from a remote location, or connect an optional linked operation cable. These connectors function as follows, depending on the setting of the Interface user setting. 1. Interface setting: Standalone ➢ UPS Remote ON/ UPS Remote OFF 2. Interface setting: Workstation ➢ UPS Remote ON/One-touch system shutdown By a Remote switch OFF operation, you can perform a one-touch shutdown of computers connected to the UPS from a remote location. Select the Interface setting for the functions you want to use. See §3.5 "Setting PC Interface" in the *User Settings Guide* for details on the setting procedure. REMOTE connector terminal names UPS REMOTE connector / Remote switch (option) ON input (2) COM (1) COM (3) OFF input (4) Unused (5, 6) ON switch: At least 2 sec. pulse, Start at contact close OFF switch: At least 2 sec. pulse, Stop at contact close Circuit voltage DC5V Current approx. 10mA External view Mini DIN 6-pin Female 2 connectors (same function) There are 2 REMOTE connectors, each with the same functions. ・ For remote control of one UPS unit, connect either of the connectors to a remote switch. ・ For control of multiple UPS units, connect as follows. Connect one of the REMOTE connectors on one UPS unit to a remote switch. Connect a linked operation cable (option) to the other REMOTE connector to link the next UPS. You can connect up to 5 UPS units, and set the ON/OFF delay for each unit, so that you can start and stop the units in sequence. This method of operation is called "**Linked operation**". For details, see §18.1 "Remote Switch" and §18.2 "Linked Operation Cable". Linked operation configuration Remote switch Linked operation cables

No.	Name	Function
④	AUX.OUTPUT External control terminal block	These are terminals for connecting the optional outlet box and for use as EPO terminals[*1]. Connecting an outlet box to the UPS provides three output lines: OUTPUT0, 1, and 2. You can set ON/OFF delay times for OUTPUT1 and 2, allowing you to control system start and stop. This function is called "**Output line control**". [*1]: EPO is an abbreviation of Emergency Power Off.



AUX.OUTPUT (OUTPUT) terminals 1 to 4: Outlet box connection terminals

Connect the optional outlet box for control of UPS output lines. In the user settings menu, you can set ON/OFF delay times for OUTPUT1 and OUTPUT2 of the outlet box, allowing you to start and stop connected loads in sequence.
For details, see §18.3 "Outlet Box".

AUX.OUTPUT (EPO) terminals 5 and 6: EPO terminals

Connect these to the terminals of a switch or other device to enable Emergency Power Off of UPS output.
When the switch is pressed in an emergency, the EPO terminals are shorted and UPS output stops. For details, see §18.7 "Connecting the Emergency Power Off (EPO) Terminals".

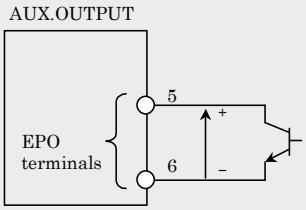
[*2] Connecting switch or other contacts to EPO terminals

The switch to connect to the EPO terminals is not provided as a standard option for the UPS. Check the following specifications, and use a switch that complies with the specifications, or connect to compliant contacts on your system.

EPO terminal specifications

- Circuit voltage: DC+5V (terminal 6 is - (minus) polarity)
- Current when shorted: Approx. 10 mA
- EPO operating conditions: Short-circuit terminals 5-6 for 0.2 seconds or longer
- EPO terminals: One-touch terminal block (compatible wires: AWG26 to 20)

When using a transistor or other semiconductor switch, connect terminal 6 to − (minus) polarity, as shown in the figure.
(Connection direction is not specified for nonpolar switches.)



§6. Installation

⚠ CAUTION	• When installing the UPS, carefully follow the instructions in this Instruction Manual. Improper installation can result in electric shock, bodily injury, and/or fire. • Install the UPS on a stable surface that can bear the weight (17 kg, 37.48 lbs). 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. • All work that involves lifting the UPS, such as mounting it in a rack or attaching the stand, should be carried out by at least 2 persons. For safety, put on protective shoes. • Be careful to avoid straining your lower back when moving and installing the UPS. • There is a 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 can result in bodily injury or damage to the UPS.

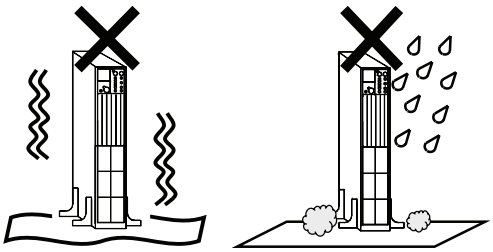
§6.1 Installation Environment Check

Suitable installation environment:
- Ambient temperature: 0 to 40°C (32 to 104°F)
  Relative humidity: 20 to 90%

Do not install the UPS in the following locations:
- Where the ambient temperature exceeds 40°C (104°F).
- Where high humidity may occur.
- Where corrosive gas or salt spray may be present.
- Where it may be subject to vibration and shock.
- Where dust may accumulate.
- When the UPS is rack mounted, in a poorly ventilated rack.

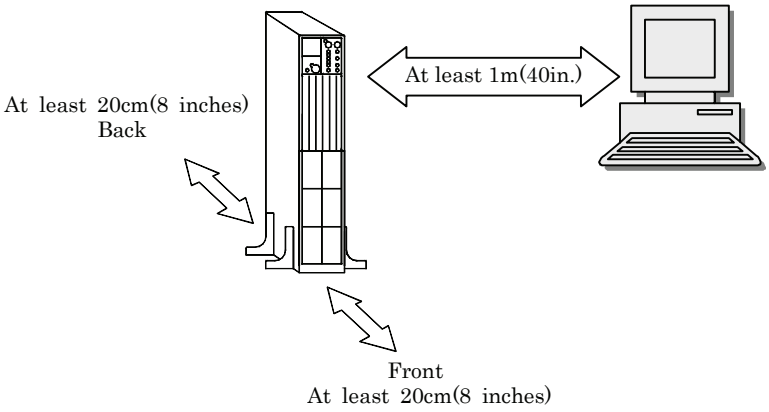
Note

Battery service life will be foreshortened if the UPS is used in an environment where the ambient temperature exceeds 30°C (86°F). For optimum battery life, install the UPS where the ambient temperature remains between 20 to 25°C (68 to 77°F).



§6.2 Installation Space Check

During installation, provide the following space around the UPS.
- At least 20 cm (about 8 inches) at the front and back as air intake or exhaust space for cooling.
- At least 1 meter (about 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.



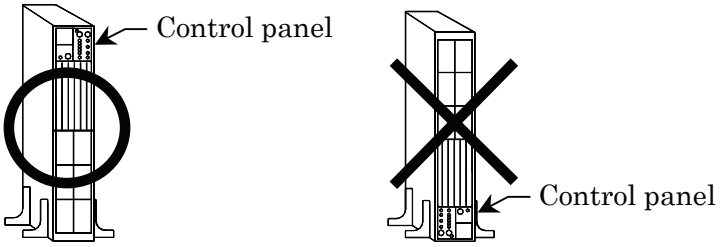
Note for installation

For maintenance of the UPS allow for the space at least 1 meter (40 inches) at the front and 50 cm (20 inches) at the back when needed.

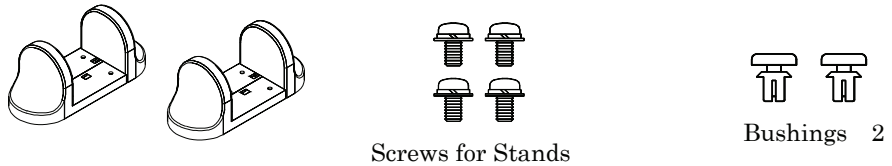
§6.3 Vertical Installation

⚠ CAUTION	• Attach the stands to the UPS securely. Unless the UPS is secured solidly in place, it can shift or fall during seismic events (earthquakes) or when it is subjected to shock or vibration, possibly causing bodily injury. • The UPS weighs about (17 kg, 37.48 lbs). All work that involves lifting the UPS, such as attaching the stand, should be carried out by at least 2 persons. For safety, put on protective shoes. Bodily injury can result if the UPS falls. Be careful to avoid straining your lower back when moving and installing the UPS. • Be careful not to get your hands caught when installing the stand.

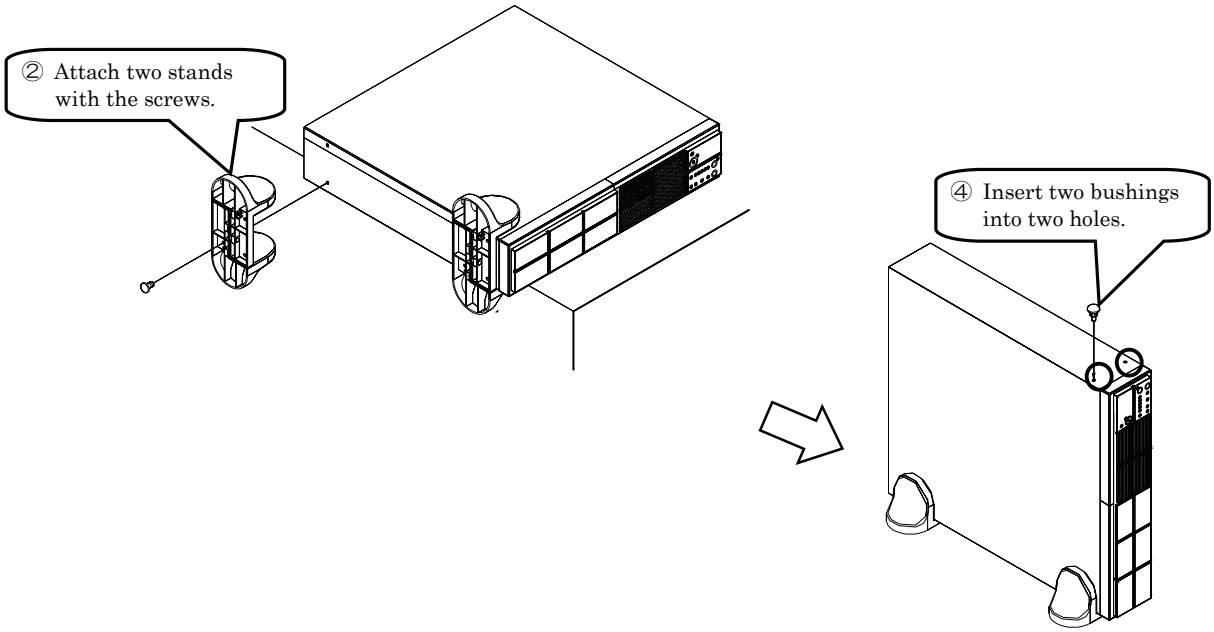
When the UPS is vertically installed, attach two supplied stands.
Always place with the left side of the UPS on the bottom, and the control panel on the top.



① Prepare two stands, four screws, and two bushings supplied.



② Place the UPS on the table and then use screws to attach the stand to the holes on the left side.
③ Place the UPS with the stand on the bottom, and the control panel on the top.
④ Insert two bushings into the holes on the UPS.
⑤ Place the UPS on installation location.

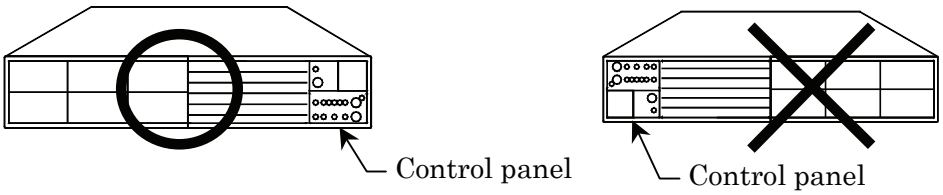


This completes vertical installation.

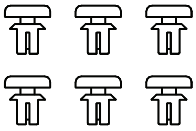
§6.4 Horizontal Installation

⚠ CAUTION	• Do not sit, step or lean on the UPS, as bodily injury could result if the UPS was to fall. • The UPS weighs about (17 kg, 37.48 lbs). All work that involves lifting the UPS should be carried out by at least 2 persons. For safety, put on protective shoes. Bodily injury can result if the UPS falls. Be careful to avoid straining your lower back when moving and installing the UPS. • Be careful not to get your hands caught when installing the stand.

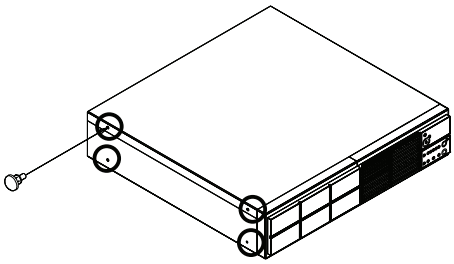
When the UPS is horizontally installed, always place with the control panel on the right.
Do not place other objects on top of the UPS. Doing so can damage the UPS.



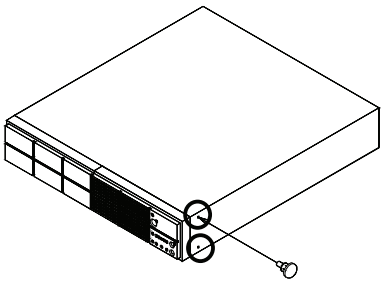
① Prepare six bushings supplied.



② Insert the supplied bushings into the four holes on the left side and two holes on the right side.
③ Place the UPS on installation location.



Four holes on the left side.



Two holes on the right side

This completes horizontal installation.

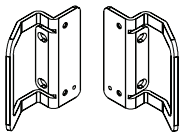
§6.5 Rack Mounting

⚠ CAUTION	• Attach the rack mounting brackets to the UPS and mount it to the rack securely. Unless the UPS is secured in the rack, it can shift or fall during seismic events (earthquakes) or when it is subjected to shock or vibration, possibly causing bodily injury. • The UPS weighs about (17 kg, 37.48 lbs). All work that involves lifting the UPS, such as mounting it in a rack, should be carried out by at least 2 persons. For safety, put on protective shoes. Bodily injury can result if the UPS falls. Be careful to avoid straining your lower back when moving and installing the UPS. • For safety, use L-type rails (support rails) when mounting the UPS in a rack. (Contact the manufacturer of your rack for more information about L-type rails.)

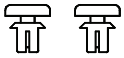
The UPS is designed for mounting in 19-inch racks only. Refer to §6.2 "Installation Space Check" and make sure you secure enough ventilation space in front of and behind the UPS. Do not place other objects on top of the UPS. Doing so can damage the UPS.
The UPS is heavy, weighing about 17 kg (37.48 lbs). Installation at the very bottom of the rack is recommended. Always use L-type rails (support rails) when mounting the UPS in a rack. (Contact the manufacturer of your rack for more information about L-type rails.)

① Prepare the left and right rack mounting brackets, four screws, and two bushings supplied.

Rack mounting bracket
Left 1
Right 1

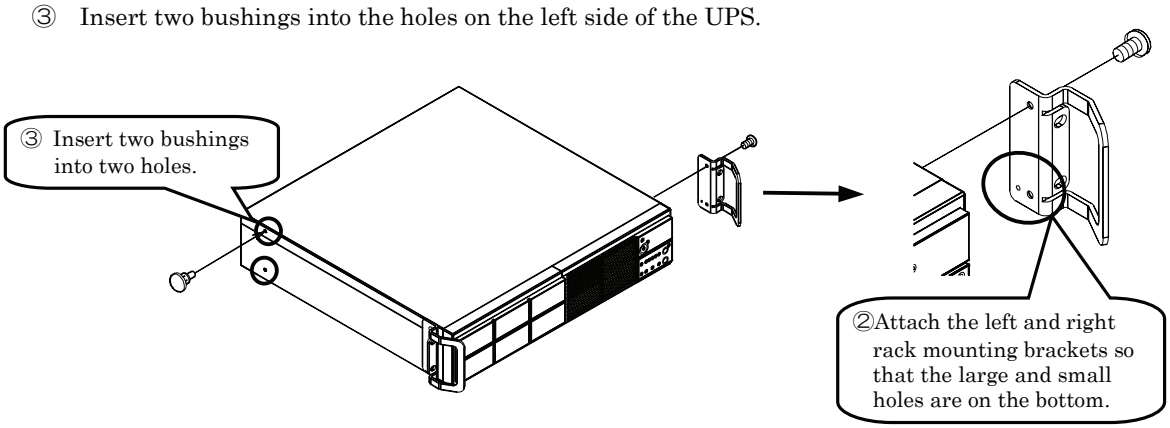


Screws for rack mounting bracket
M4×6 4

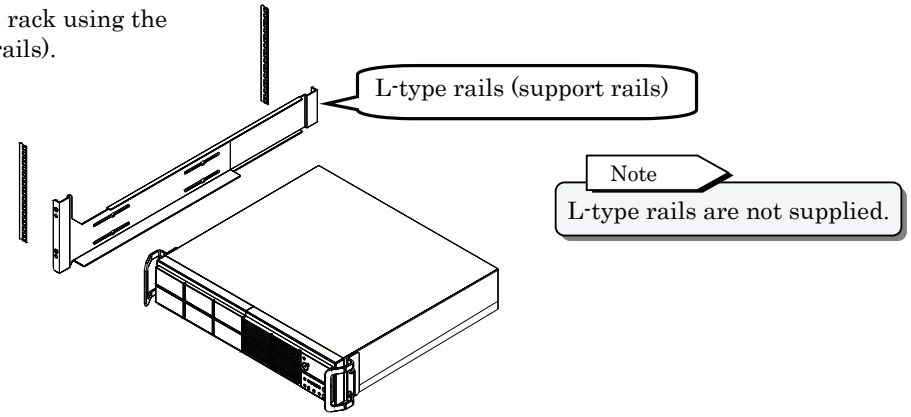


Bushings 2

② Attach the left and right rack mounting brackets to the UPS using the screws.
③ Insert two bushings into the holes on the left side of the UPS.



④ Mount the UPS in the rack using the L-type rails (support rails).



This completes rack mounting.

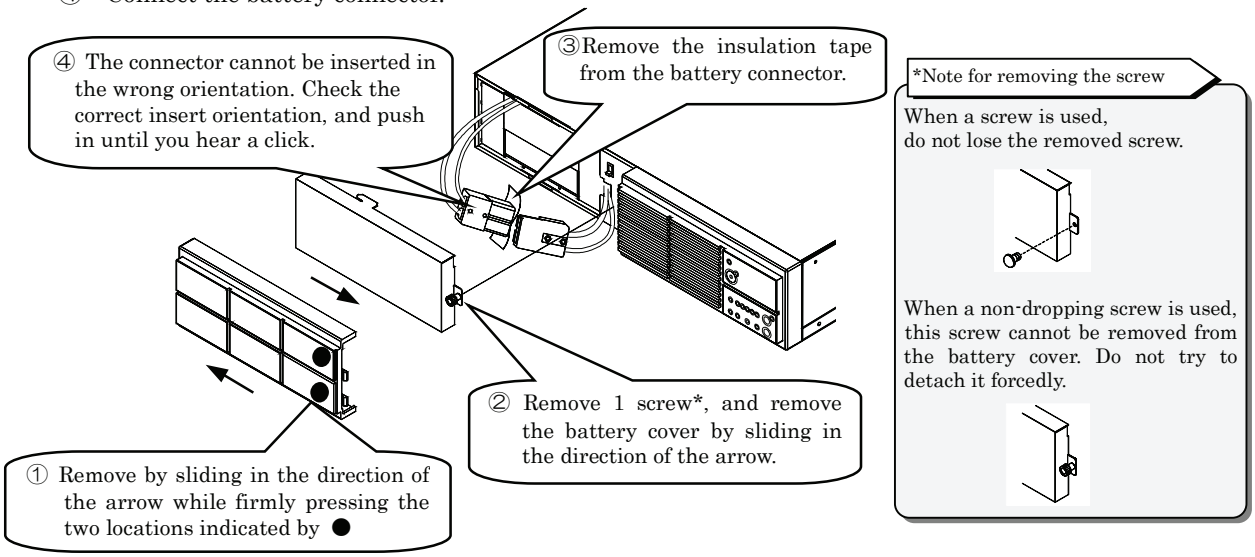
§7. Wiring

§7.1 Battery Connector Connection

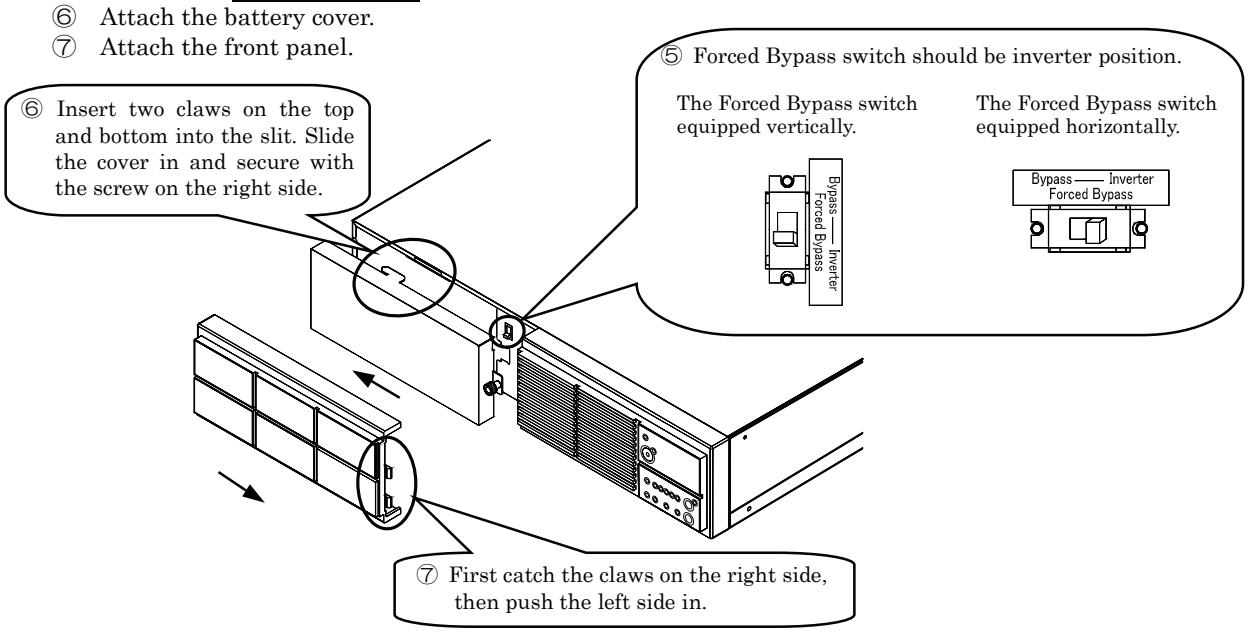
CAUTION	• Wear insulated gloves and take other precautions when connecting the batteries. Otherwise electric shock can result. • There is a constant voltage (max. approx. 24 V : approx. 12 V × 2) at the battery terminals. Do not touch them with your hands or short circuit them. Bodily injury can result. • The battery connector cannot be inserted in the wrong orientation. If it does not go in, do not try to force it. Doing so can damage the connector and result in electric shock. • Be careful not to get your hands caught when securing the cover.

Connect the battery connectors inside the front cover.
Proceed as follows to connect the battery connectors.

① Remove the front panel of the UPS.
② Remove the screw on the right side of the battery cover, and then remove the battery cover.
③ Remove the insulation tape from the battery connector of the battery pack side.
④ Connect the battery connector.



⑤ Verify that Forced Bypass is set to "Inverter".
⑥ Attach the battery cover.
⑦ Attach the front panel.



This completes the battery connector connection.

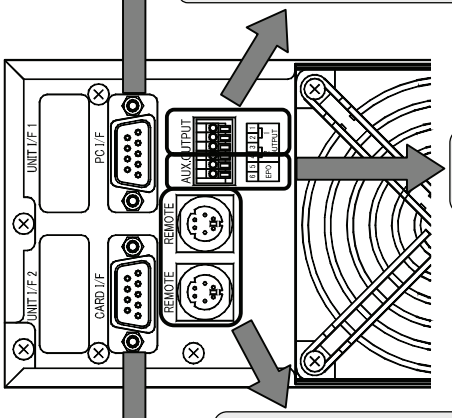
§7.2 Connecting Optional Equipment

CAUTION	Before connecting optional equipment, disconnect the UPS input power plug from the utility power outlet and make sure that the UPS is completely stopped. Failure to do so can result in electric shock.

If you want to use a Network cable or optional equipment, connect them before operating the UPS.
If you need to connect them after operating the UPS, do so after completely stopping the UPS and disconnecting the input power plug from the utility power outlet.
For details about wiring and settings, see the descriptions in §16. "How to Use Power Management Software" and §18. "Using Optional Equipment" and the instruction manual supplied with the optional equipment.
Contact your supplier or a Sanyo Denki representative for more information about optional equipment.

Connecting a Network cable and using the power management software (on supplied CD-ROM) ⇒ pages 44 to 45

Connecting an outlet box and performing output line control ⇒ pages 55 to 58

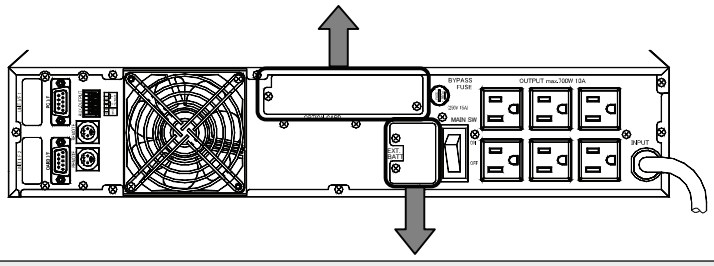


Connecting the Emergency Power Off (EPO) terminals ⇒ page 61

Connecting a remote switch for remote operation ⇒ pages 50 and 58
Using linked operation ⇒ pages 51 to 54

Using a LAN interface card ⇒ page 59
Using a contact interface card ⇒ page 60

Notes
The contact interface card and the LAN interface card cannot be used simultaneously.



Using expansion battery modules
The following expansion battery modules are available to extend backup time.
For more information, refer to the instruction manual of the expansion battery module.

Battery modules		
Type	Modules connected	Backup time
20-minute backup Battery module for E11A102	1	20 minutes
	2	40 minutes
	3	60 minutes
30-minute backup Battery module for E11A102	1	30 minutes
	2	60 minutes

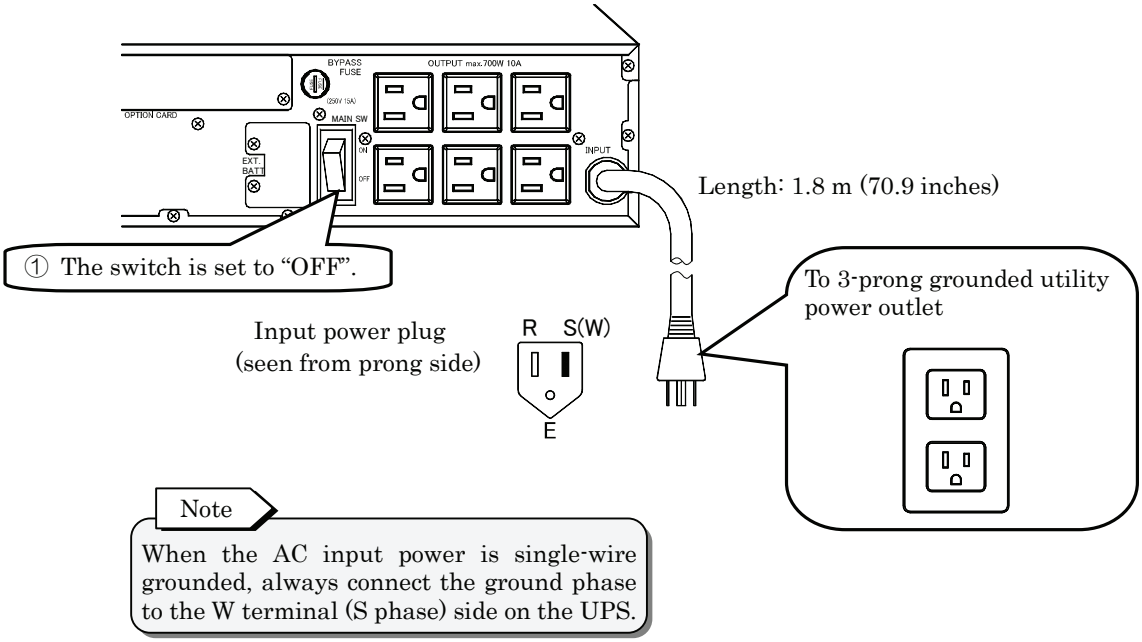
§7.3 Input Plug Connection

CAUTION	• Wiring should be performed only by technically qualified personnel. Incorrect wiring can result in electric shock and/or fire. • Check that the input power plugs are firmly seated. Failure to do so can result in electric shock, fire, or bodily injury. • The input power plug must be grounded. Failure to ground it can result in electric shock. Never use the UPS in the place where the UPS input power plug cannot be grounded.

Proceed as follows to connect the input power plug of the UPS.

① Check that MAIN SW is in the "OFF" position.

② Connect the input power plug of the UPS to a utility power outlet.



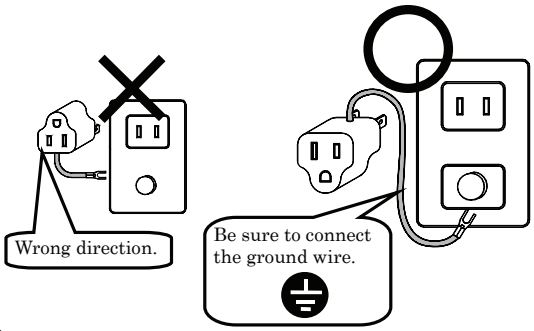
Note

When the AC input power is single-wire grounded, always connect the ground phase to the W terminal (S phase) side on the UPS.

Connect as follows if the utility power outlet is a 2-prong type (with no ground terminal).

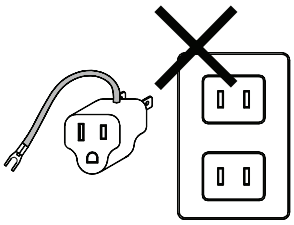
Connection to the outlet with ground terminal

① Insert the adapter to the outlet in the correct direction as shown in the figure.
② Connect the grounding wire to the ground terminal.
③ Insert the input power plug of the UPS to the adapter.



Connection to the outlet without the ground terminal

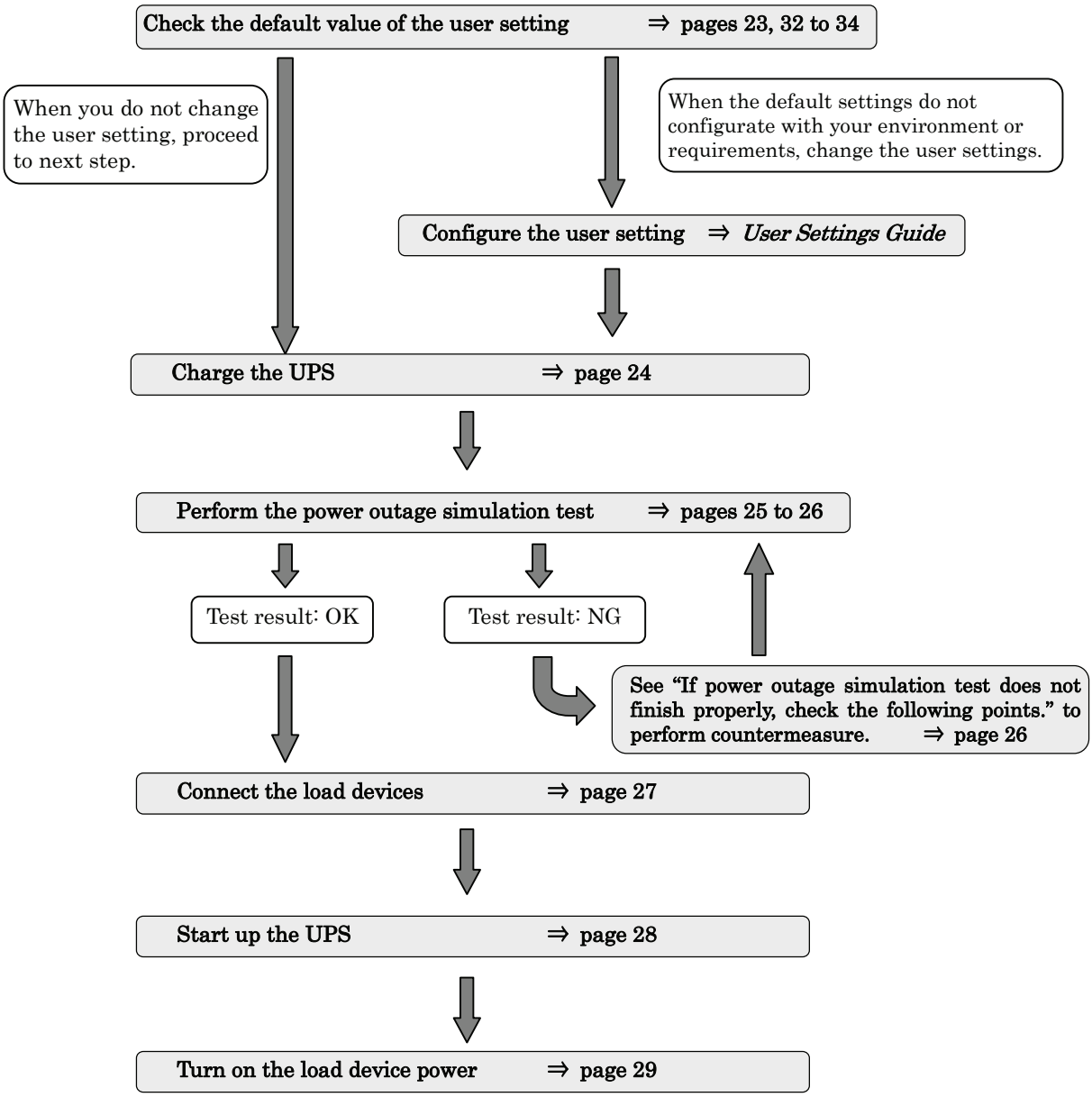
When the ground terminal is not on the outlet, the ground wiring by technically qualified personnel is required. Contact your supplier. Never use the UPS under the environment where the ground wire cannot be connected.



This completes wiring of the UPS.

§8.Procedure Until Load Device Operation

The procedure outline until turning on the load devices is as follows.
Be sure to follow the procedure outline below to backup the load devices during power outage.



The backup function is available during power outage.

§9. Preparation Before Operation

§9.1 User Settings Check

① Check the user settings of the UPS.

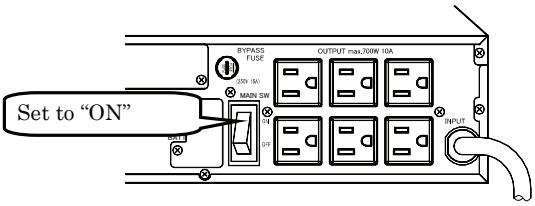
See §12.2 “Setup Menu List” to check the setting value. The factory default settings of the UPS are indicated by the “ * ” mark in the “Default Setting” column in the “Setup Menu List”.

When you use the UPS without changing the user settings, proceed to next step.

Proceed to §9.2 “UPS Charge”.

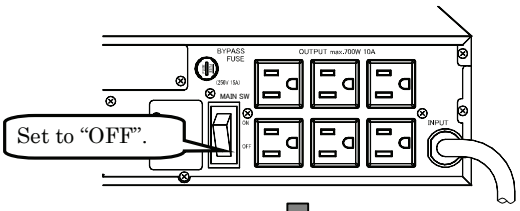
When the load specification, requirement or your environments do not configurate with the default setting of the UPS, change the user setting.

② Set MAIN SW to “ON”.



③ Configure the user settings. Refer to each item in the *User Settings Guide*.

④ Set MAIN SW to “OFF”.



Proceed to§9.2 “UPS Charge”.

Tip

You can also change the user settings after starting load device operation. However, the UPS needs to be restarted for items indicated by RESTART in the “Menu” column of the §12.2 “Setup Menu List”.
Setting such items at the preparation stage prior to UPS operation is recommended because the load devices need to be stopped when the UPS is restarted.

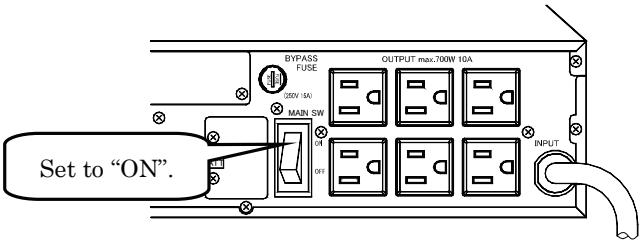
§9.2 UPS Charge

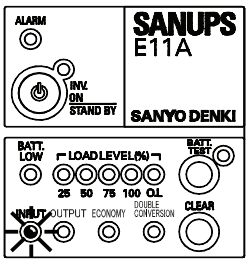
At initial startup or when the UPS is not operated for long period, the UPS should be charged for at least 12 hours before operation.
Proceed as follows before connecting the load devices.

Indications of switch and LED in this manual.

The switches are indicated by a frame [ ] .
Example: [MAIN SW] .
The LEDs on the control panel are described as "Green INPUT" or "Red ALARM".
The LEDs state are indicated as follows;
: LED lights. : LED blinks.

① Set [MAIN SW] on the back panel of the UPS to "ON".





LEDs	
Green INPUT	Blinking
Green INV.ON/STAND BY	Off
Green OUTPUT	Off
↓	
Green INPUT	Lit
Green INV.ON/STAND BY	Off
Green OUTPUT	Off

② Check that the "Green INPUT" stops blinking and remains lit.

Charging of the UPS starts automatically.

③ Operate the UPS for at least 12 hours in this state.

Note on the charging time

The UPS should be charged for at least 12 hours to ensure backup in the event of a power outage, but load devices can be connected for use when the UPS is first activated even if there is insufficient charge because the battery 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.

* The UPS should be charged as follows when the battery modules (optional) are connected.

Battery module			Charge time
Type	Connecting unit qty.	Backup time	
20-minute backup Battery module for E11A102	1	20 min.	At least 36 hours
	2	40 min.	At least 60 hours
	3	60 min.	At least 84 hours
30-minute backup Battery module for E11A102	1	30 min.	At least 48 hours
	2	60 min.	At least 84 hours

This completes the charging of the UPS.

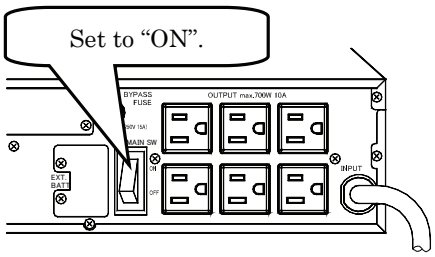
§9.3 Outage Simulation Test

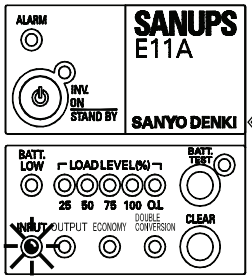
Perform a power outage test to confirm whether the UPS is working properly.
Be sure to perform this test prior to connecting the load devices.

Tip

Step ① is not necessary if the procedure in §9.2 "UPS Charge" was performed beforehand.

① Set MAIN SW on the back panel of the UPS to "ON".

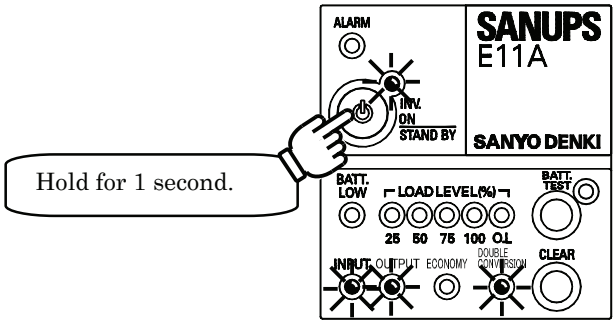




LEDs	
Green INPUT	Blinking
Green INV.ON/STAND BY	Off
Green OUTPUT	Off
↓	
Green INPUT	Lit
Green INV.ON/STAND BY	Off
Green OUTPUT	Off

Check that the "Green INPUT" stops blinking and remains lit, and then proceed to step ②.

② Press and hold INV. ON STAND BY for at least 1 second.



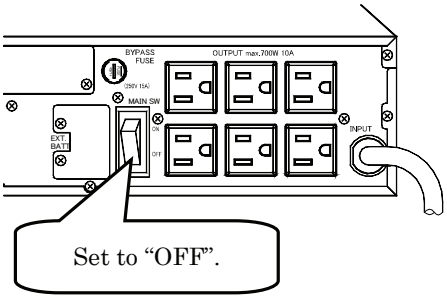
Buzzer
Musical trill

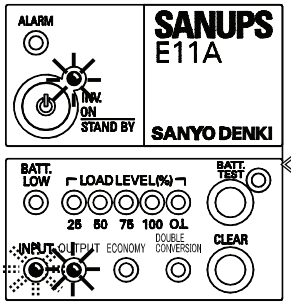
LEDs	
Green INPUT	Lit
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit
Green DOUBLE CONVERSION	Lit

After "Green DOUBLE CONVERSION" lights, it might go off depending on the input power condition.

When the UPS is working properly, the buzzer sound and LED state will be as indicated in steps ③ and ④.

③ Set MAIN SW to "OFF".

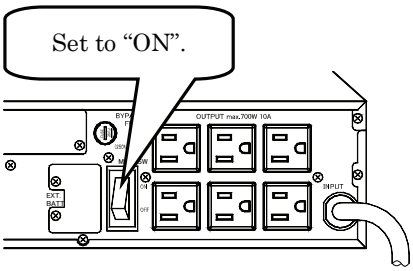


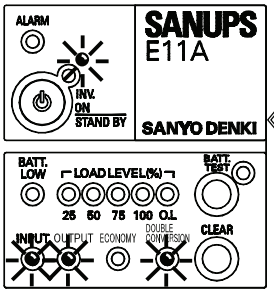


Buzzer
2 beeps..., 2 beeps..., repeated

LEDs	
Green INPUT	Blinking
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit

④ Set MAIN SW to “ON”.





Buzzer
Silent

LEDs

Green INPUT	Lit
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit
Green DOUBLE CONVERSION	Lit

After “Green DOUBLE CONVERSION” lights, it might go off depending on the input power condition.

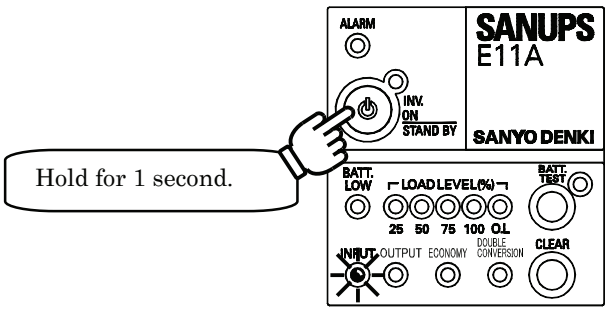
If power outage simulation test does not finish properly, check the following points.

Possible cause	Countermeasure
The battery connector is not connected.	Connect the battery connector. ⇒ See §7.1 “Battery Connector Connection”.
The Forced Bypass switch is set to “Bypass”.	Set to “Inverter”. ⇒ See the step ⑤ in §7.1 “Battery Connector Connection”.
“Green OUTPUT” does not light.	Press and hold INV. ON STAND BY for 1 second. ⇒ See the step ② in §9.3 “Outage Simulation Test”.
“Red ALARM” lights.	Contact your supplier.

Contact your supplier or SANYO DENKI when the “Red ALARM” lights or when the UPS does not operate properly even if you perform the countermeasure above.

Check that the UPS operates properly, and then proceed to step ⑤.

⑤ Press and hold INV. ON STAND BY for at least 1 second.

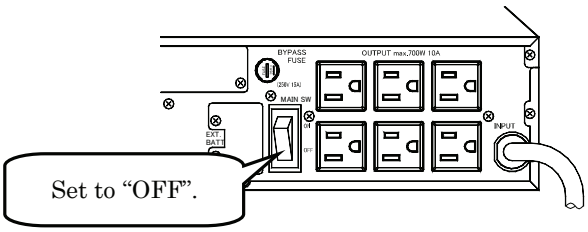


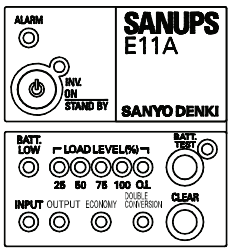
Buzzer
Musical trill

LEDs

Green INPUT	Lit
Green INV.ON/STAND BY	Off
Green OUTPUT	Off

⑥ Set MAIN SW to “OFF”.





All of the LEDs go off.

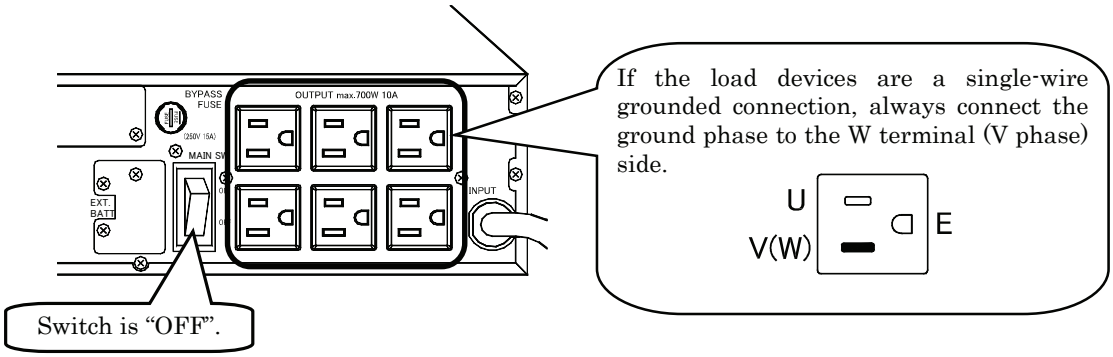
This completes outage simulation test.

§10. Load Devices Connection

Connect the load devices.

① Check that the input switch MAIN SW is set to "OFF".

② Connect the input power plugs of the load devices to the output terminals.
The total output from all output terminals must not exceed 1kVA (0.7kW).



Never connect the following types of load devices to the UPS.

Load devices	Details
Copy machines, Laser printers, Plain paper fax machines, Overhead projectors, Cleaner and so on	Since such devices are subject to high transient current surges, the UPS will detect the excess current and backup will not be possible when there is a power outage. There is also the risk of the UPS malfunctioning.
Medical equipment, control equipment for elevators and the like, computer systems of public importance	Special considerations such as system redundancy, installation of emergency power generation facilities, need to be given to operation, maintenance, and management.

This completes the load devices connection.

§11. Operating Procedures

Operating procedures differ when you are using optional equipment. Refer to §18. "Using Optional Equipment" and to the Instruction Manual of the optional equipment.

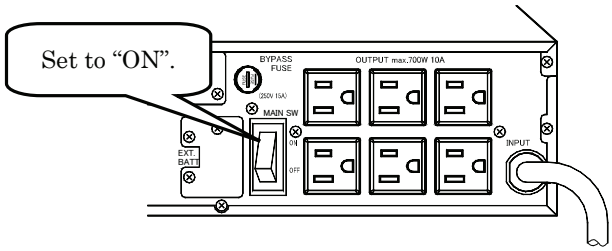
§11.1 UPS Startup

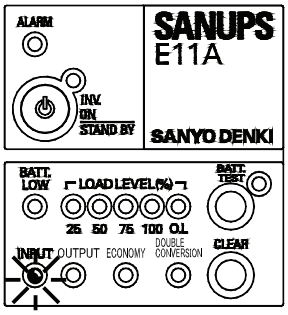
Proceed as follows to start up the UPS.

Indications of switch and LED in this manual.

The switchs are indicated by a frame [ ] .
Example: [MAIN SW] .
The LEDs on the control panel are described as "Green INPUT" or "Red ALARM".
The LEDs state are indicated as follows;
: LED lights. : LED blinks.

① Set [MAIN SW] on the back panel of the UPS to "ON".





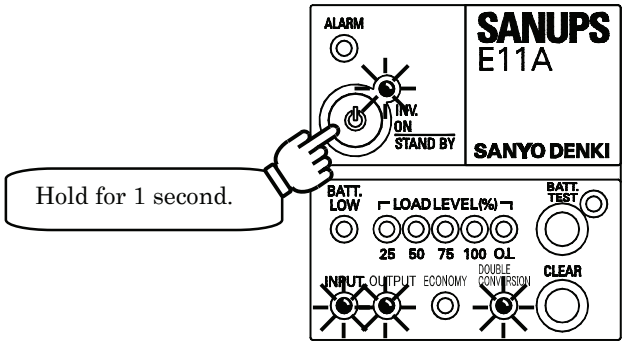
LEDs
LED that indicates the output voltage setting of UPS blinks. (See §5.2 "Control panel and Indicators").

↓ after 5 seconds

Green INPUT	Blinking
Green INV.ON/STAND BY	Off
Green OUTPUT	Off
↓	
Green INPUT	Lit
Green INV.ON/STAND BY	Off
Green OUTPUT	Off

Check that the "Green INPUT" stops blinking and remains lit, and then proceed to step ②.

② Press and hold INV. ON STAND BY for at least 1 second.



Buzzer
Musical trill

LEDs

Green INPUT	Lit
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit
Green DOUBLE CONVERSION	Lit

After "Green DOUBLE CONVERSION" lights, it might go off depending on the input power condition or the load device condition.

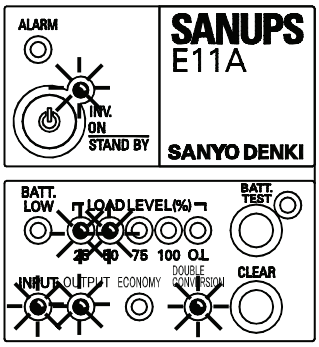
Note for the UPS operation mode and LED indicators.

- After performing step ②, the "Green DOUBLE CONVERSION" lights regardless of the UPS operation mode. And then the LEDs will be in the following state according to the operation of the UPS depending on the "UPS operation mode" in the user setting.

⇩

- The "Green ECONOMY" lights when the UPS is in Economy Mode.
- The "Green DOUBLE CONVERSION" lights when the UPS is in Double Conversion Mode.
- When the "Green DOUBLE CONVERSION" and the "Green ECONOMY" are both off, the UPS is in Active Filter Mode.

At this step, turn the load device power on.



LEDs	
Green INPUT	Lit
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit
Green LOADLEVEL 25 -100%	Lit
Green DOUBLE CONVERSION	Lit

After "Green DOUBLE CONVERSION" lights, it might go off depending on the input power condition or the load device condition.

Note for the load capacity

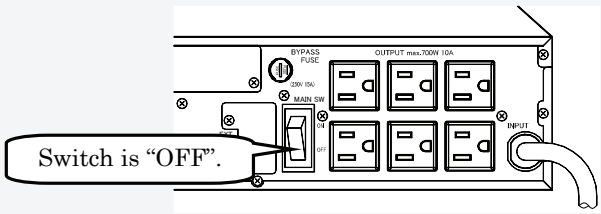
- "Green LOAD LEVEL 25 - 100%" will light depending on the connected load capacities.
- If the "Red O.L" lights and the buzzer sound is emitted (four short beeps followed by another four short beeps), the load devices connected to the UPS exceed the rated capacity of the UPS. Reduce the number of load devices connected.

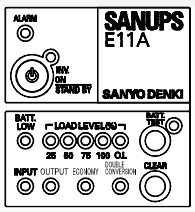
UPS Battery Power Startup

You can operate the UPS even when the state of the AC input power supply is not good.

You can follow the procedure below to operate the UPS when the AC input power supply is in an abnormal state (power outage, voltage drop, etc.).
Since power is supplied to the load devices from the battery in the UPS when this procedure is used, use the devices for a period of time less than the possible backup time of the UPS.

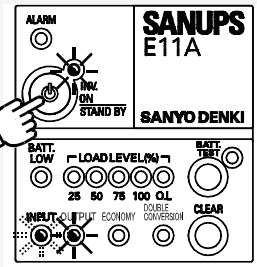
① Check that MAIN SW is set to "OFF".





All of the LEDs go off.

② Press and hold until the buzzer sounds. Release it when the buzzer sounds.



Buzzer
Musical trill

LEDs
LED that indicates the output voltage setting of UPS blinks. (See §5.2 "Control panel and Indicators").

↓ after 3 seconds	
Green INPUT	Blinking
Green INV.ON/STAND BY	Off
Green OUTPUT	Off
↓ after 3 seconds	
Green INPUT	Blinking
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit

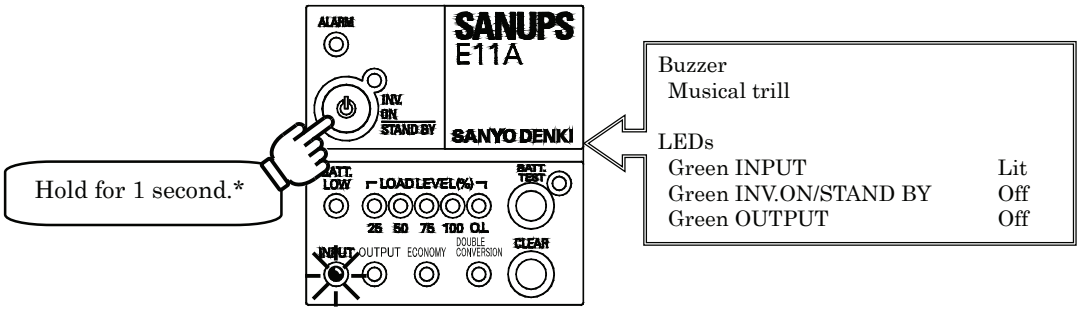
* The default setting of the output frequency at UPS startup by this procedure is shown in the right table. Change the setting according to the using load devices if needed. See §3.4 "Setting Battery Power Startup Frequency" in the *User Settings Guide* for details. However, the setting cannot be changed if MAIN SW is not set to "ON", so preset this setting when there is a normal AC input power supply during UPS operation.

Model	Default setting
E11A102U011-00	50Hz
E11A102U011-20	60Hz

§11.2 UPS Shutdown (Daily)

Perform the following operation to shut down the UPS daily. Be sure to shut down the load devices prior to shutting down the UPS.

① Press and hold INV. ON STAND BY for at least 1 second.



* Operation varies depending on the user setting of "Shutdown operation". See §3.9 "Setting UPS Shutdown Operation" in the *User Settings Guide* for details.

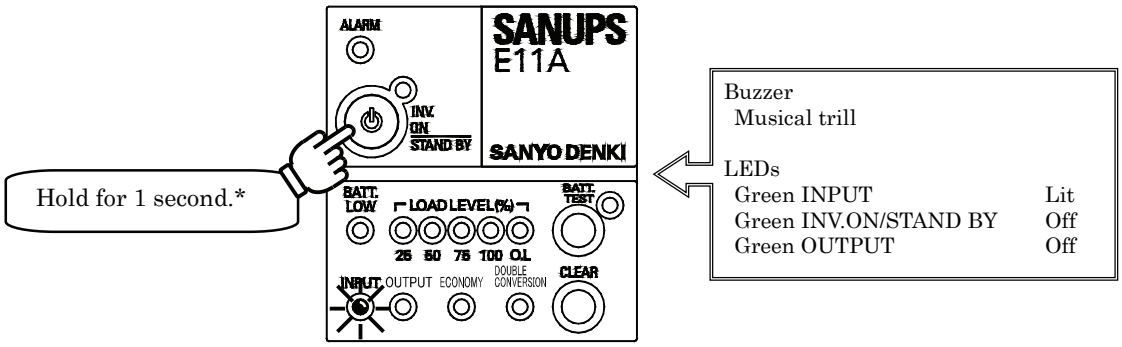
Note

Do not touch MAIN SW when you perform a daily shutdown. Leave it set to "ON".

§11.3 UPS Shutdown (If Not to Be Used for More Than a Week)

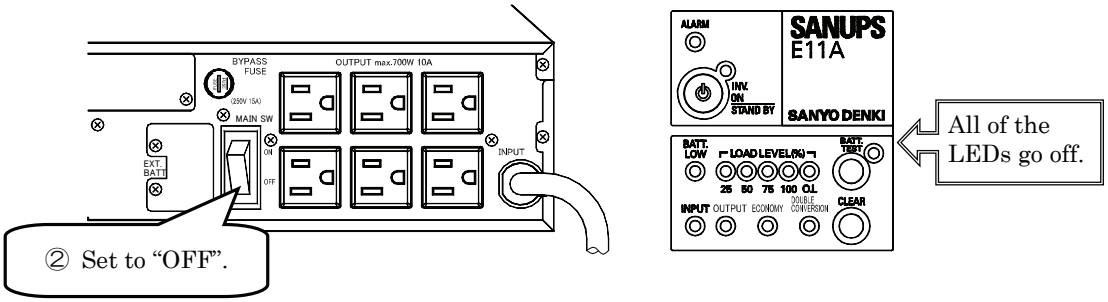
Perform the following operation if the UPS is not to be used for at least a week. Be sure to shut down the load devices prior to shutting down the UPS.

① Press and hold INV. ON STAND BY for at least 1 second.



* Operation varies depending on the user setting of "Shutdown operation". See §3.9 "Setting UPS Shutdown Operation" in the *User Settings Guide* for details.

② Set MAIN SW to "OFF."



Note

If input power is shut 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.

§12. User Settings

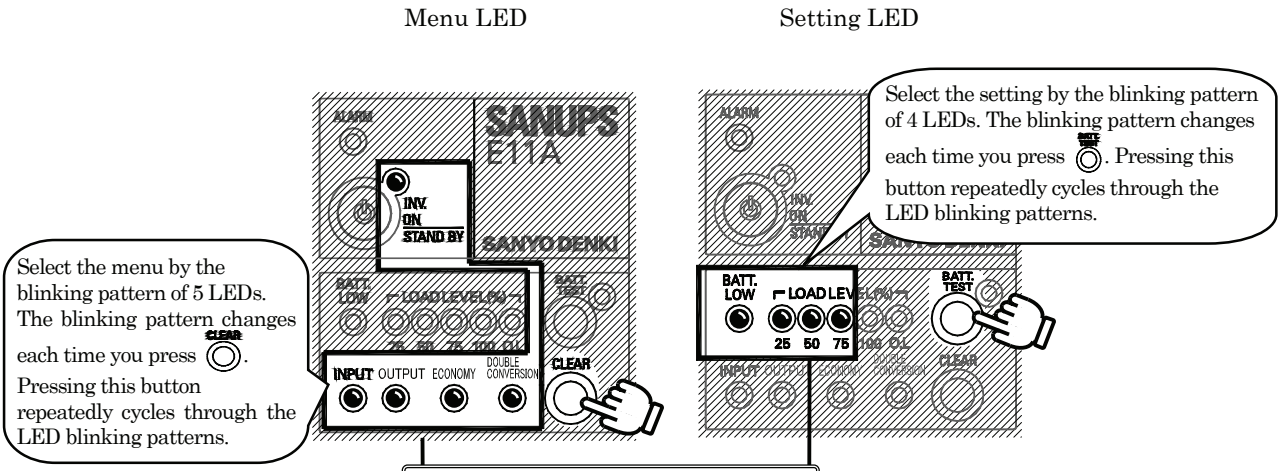
§12.1 Prior to Modifying the User Settings

The UPS has a user settings menu, described in §12.2 "Setup Menu List". The factory default setting of the UPS is indicated by the " * " mark in the "Default Setting" column. You can set the various menu items to configure the UPS according to your environment, your applications, and the specifications of the connected load devices. Whenever you change a menu item setting, we recommend that you place a check mark in the "Current Setting" column field of the Setup Menu List.

For details of setup operations of each menu, see the *User Settings Guide*.

All of the user setting menu items can be selected and set by display LED blinking pattern.

Setup menu list and the blinking pattern of indicators on the control panel are illustrated in the following figure.



●: indicates that LED is blinking.
○: indicates that LED is off.

No.	User Settings Guide Ref. page	User Settings Guide Item	Menu	Menu LED	Setting	Setting LED	Default Setting	Current Setting	Notes
1	4	3.1	UPS operation mode	○	Auto	● ○ ○ ○	*		
				●○○○	Double Conversion	○ ● ○ ○		✓	
					Economy	● ● ○ ○			
2	5	3.2	Output voltage (RESTART)	○	100V	● ○ ○ ○	See remarks		
				○●○○	110V	○ ● ○ ○			
					115V	● ● ○ ○			
					120V	○ ○ ● ○			

Indicates the section numbers of sections with reference information for each item. See the indicated sections for detailed information.

For the menus indicated by "RESTART" in this column, restart of the UPS is required.

The factory default setting.

Place a check mark when you change the setting.

Note

When you change the setting of the menus indicated by RESTART in the "Menu" column, its changes do not take effect until you restart the UPS. If a restart is required, be sure to power off the load devices before resetting.
See §11.3 "UPS Shutdown (If Not to Be Used for More Than a Week)" about how to shut down the UPS, and §11.1 "UPS Startup" for information about how to start the UPS.

§12.2 Setup Menu List

●: indicates that LED is blinking.
○: indicates that LED is off.

No.	User Settings Guide Ref. page	User Settings Guide Item	Menu	Menu LED	Setting	Setting LED	Default Setting	Current Setting	Remarks	
1	4	3.1	UPS operation mode	○●○○○	Auto	●○○○	*		Switch the UPS operating mode automatically.	
					Double Conversion	○●○○			Set the UPS operating mode to Double Conversion mode.	
					Economy	●●○○			Set the UPS operating mode to Economy mode	
2	5	3.2	Output voltage (RESTART)	○○●○○	100V	●○○○	See remarks		Default setting of E11A102U011-00	Set the rated Output voltage. Same as Input voltage. Default setting varies depending on UPS Model.
					110V	○●○○			–	
					115V	●●○○			–	
					120V	○○●○			Default setting of E11A102U011-20	
3	6	3.3	Frequency sync range (RESTART)	●●○○○	1%	●○○○			±1%	Output frequency variation range (%)
					3%	○●○○	*		±3%	
					5%	●●○○			±5%	
4	7	3.4	Battery power startup frequency (RESTART)	○○○●○	50Hz	●○○○	See remarks		Default setting of E11A102U011-00	Set the output frequency when UPS starts from the battery power during AC input power failure. Default setting varies depending on UPS Model.
					60Hz	○●○○			Default setting of E11A102U011-20	
5	8	3.5	PC interface	●○●○○	Standalone	●○○○			Set when using UPS remote ON/OFF or Standard OS UPS Services	
					Workstation	○●○○	*		Set when using a power management software, LAN card or UPS remote ON and One-touch system shutdown.	
					Serial Login	●●○○			Shutdown by serial login.	
					-	○○●○			Do not use this setting.	
6	9	3.6	Serial baud rate	○●●○○	9600	●○○○	*		9600 bps.	Set the serial baud rate when a workstation, PC, or optional LAN card is connected.
					4800	○●○○			4800 bps.	
					2400	●●○○			2400 bps.	
7	10	3.7	UPS operation upon power recovery	●●●○	Auto	●○○○	*		Auto restart	Specify when to restart the UPS after a power outage and shutdown of the UPS due to final discharge of the batteries.
					OFF	○●○○			The UPS stays off.	
					30%	●●○○			Auto restart when battery charge reaches 30%.	
					50%	○○●○			Auto restart when battery charge reaches 50%.	
					80%	●○●○			Auto restart when battery charge reaches 80%.	
8	11	3.8	Buzzer sound	○○○○●	All patterns	●○○○	*		All sounds	
					Pattern 1	○●○○			Emit sounds on serious failure and battery trouble.	
					Pattern 2	●●○○			Emit alarm and key click sounds.	
					OFF	○○●○			Emit key click sounds only.	
9	12	3.9	Shutdown operation	●○○○●	1 second	●○○○	*		Turn the UPS off when pressed for 1 second.	Set the operation for switch to stop the UPS power supply.
					3 seconds	○●○○			Turn the UPS off when pressed for 3 second.	
					Special operation	●●○○			Turn the UPS off on special operation.	
10	13	3.10	Overload recovery operation	○○●○●	Auto return	●○○○	*		Auto recovery when a certain period of time has elapsed.	Set the UPS operation after switching to the bypass power supply because of overload.
					Bypass	○●○○			Fixed as bypass power supply on overload.	
11	14	3.11	UPS operation at OFF (RESTART)	●●○●	OFF	●○○○	*		The UPS stays off.	Specify the UPS power supply conditions when is off.
					Bypass	○●○○			Bypass power supply	
12	15	3.12	Low battery voltage warning timing	○○●●	Battery voltage	●○○○	*		When low battery voltage level is detected.	Set the timing of emitting the low battery voltage warning alarm (beep, Red BATT. LOW lit).
					2 minutes	○●○○			When remaining battery duration is 2 minutes.	
					3 minutes	●●○○			When remaining battery duration is 3 minutes.	
13	16	3.13	Battery backup time	●○●●	5 minutes	●○○○	*		5 minutes backup	Set the UPS backup time on power outage. An external battery must be connected for settings of 20 minutes or higher.
					20 minutes	○●○○			20 minutes backup	
					30 minutes	●●○○			30 minutes backup	
					40 minutes	○○●○			40 minutes backup	
					60 minutes	●○●○			60 minutes backup	
					90 minutes	○●●○			90 minutes backup	
					120 minutes	●●●○			120 minutes backup	
					180 minutes	○○○●			180 minutes backup	
14	17	3.14	Battery type	○●●●	5 years	●○○○	*		5 years lifetime type	Set the battery type. Set this when you replace the battery or connect an external battery.
					10 years	○●○○			10 years lifetime type	
					3 years	●●○○			3 years lifetime type	
15	18	3.15	Battery test schedule	●●●●	180 days	●○○○	*		Test batteries every 180 days.	Set the interval (number of days) for the automatic battery check. The check is carried out automatically when the specified number of days has elapsed.
					90 days	○●○○			Test batteries every 90 days.	
					30 days	●●○○			Test batteries every 30 days.	
					None	○○●○			No battery check.	
16	19	3.16	Reset battery information	●○○○○	Do not reset	●○○○	*		Do not reset.	
					Reset	○●○○			Reset the battery information when you replace the battery.	

No.	User Settings Guide Ref. page	User Settings Guide Item	Menu	Menu LED	Setting	Setting LED	Default Setting	Current Setting	Remarks	
17	20	3.17	Linked delay operation	● ●○○○	No delay	●○○○	*		Linked ON/OFF delay disabled (operate with delay of 0 seconds)	Set when you connect a remote switch, or connect linked operation cable(s) to conduct linked operation.
					Delay	○●○○			Linked ON/OFF delay enabled (operate with specified delay)	
18	21	3.18	Linked operation ON delay time	● ○●○○	0 seconds	●○○○	*		Set the ON/OFF delay times when you conduct linked operation. Delay operation is not enabled unless item §3.17 "Enabling and Disabling Linked Operation Delay" in the *User Settings Guide* is set to "Delay".	
					10 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					3 minutes	●○●○				
					5 minutes	○●●○				
					10 minutes	●●●○				
					15 minutes	○○○●				
					30 minutes	●○○●				
19	22	3.19	Linked operation OFF delay time	● ●●○○	0 seconds	●○○○	*			
					10 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					3 minutes	●○●○				
					5 minutes	○●●○				
					10 minutes	●●●○				
					15 minutes	○○○●				
					30 minutes	●○○●				
20	23	3.20	Output line control (Restart)	● ○○●○	Disabled	●○○○	*		Disable output line control	Set when you connect an outlet box to perform output line control.
					Enabled	○●○○			Enable output line control	
21	24	3.21	Outlet box OUTPUT1 ON delay time	● ●○●○	0 seconds	●○○○	*		Set the ON delay times for the OUTPUT1 and OUTPUT2 terminals of the outlet box. The delay times are not enabled unless item §3.20 "Enabling and Disabling Output line Control" in the *User Settings Guide* is set to "Enabled".	
					5 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					5 minutes	●○●○				
					10 minutes	○●●○				
22	25	3.22	Outlet box OUTPUT2 ON delay time	● ○●●○	0 seconds	●○○○	*			
					6 seconds	○●○○				
					35 seconds	●●○○				
					1 minute 30 seconds	○○●○				
					5 minutes 30 seconds	●○●○				
					10 minutes 30 seconds	○●●○				
23	26	3.23	Outlet box OUTPUT1 OFF delay time	● ●●●○	0 seconds	●○○○	*		Set the OFF delay times for the OUTPUT1 and OUTPUT2 terminals of the outlet box. The delay times are not enabled unless item §3.20 "Enabling and Disabling Output line Control" in the *User Settings Guide* is set to "Enabled".	
					10 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					3 minutes	●○●○				
					5 minutes	○●●○				
24	27	3.24	Outlet box OUTPUT2 OFF delay time	● ○○○●	0 seconds	●○○○	*			
					10 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					3 minutes	●○●○				
					5 minutes	○●●○				
25	28	3.25	Outlet box OUTPUT1 power outage output time	● ●○○●	Until batteries exhausted	●○○○	*		Set the power outage output times for the OUTPUT1 and OUTPUT2 terminals of the outlet box. The delay times are not enabled unless item §3.20 "Enabling and Disabling Output line Control" in the *User Settings Guide* is set to "Enabled" and item §3.5 "Setting PC Interface" in the *User Settings Guide* is set to "Standalone".	
					0 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					3 minutes	●○●○				
					5 minutes	○●●○				
26	29	3.26	Outlet box OUTPUT2 power outage output time	● ○●○●	Until batteries exhausted	●○○○	*			
					0 seconds	○●○○				
					30 seconds	●●○○				
					1 minute	○○●○				
					3 minutes	●○●○				
					5 minutes	○●●○				
27	30	3.27	Operation of Outlet box OUTPUT0 after stopping of OUTPUT1 and 2	● ●●○●	Stop power supply	●○○○	*		Set the operation of OUTPUT0 after output from the OUTPUT1 and 2 terminals has stopped. This setting is not enabled unless item§3.20 "Enabling and Disabling Output line Control" in the *User Settings Guide* is set to "Enabled".	
					Continue power supply	○●○○				
28	31	3.28	Ring signal	● ○○●●	Output	●○○○	*		Output a Ring signal when the UPS starts.	
					Do not output	○●○○			Do not output a Ring signal when the UPS starts.	

Note

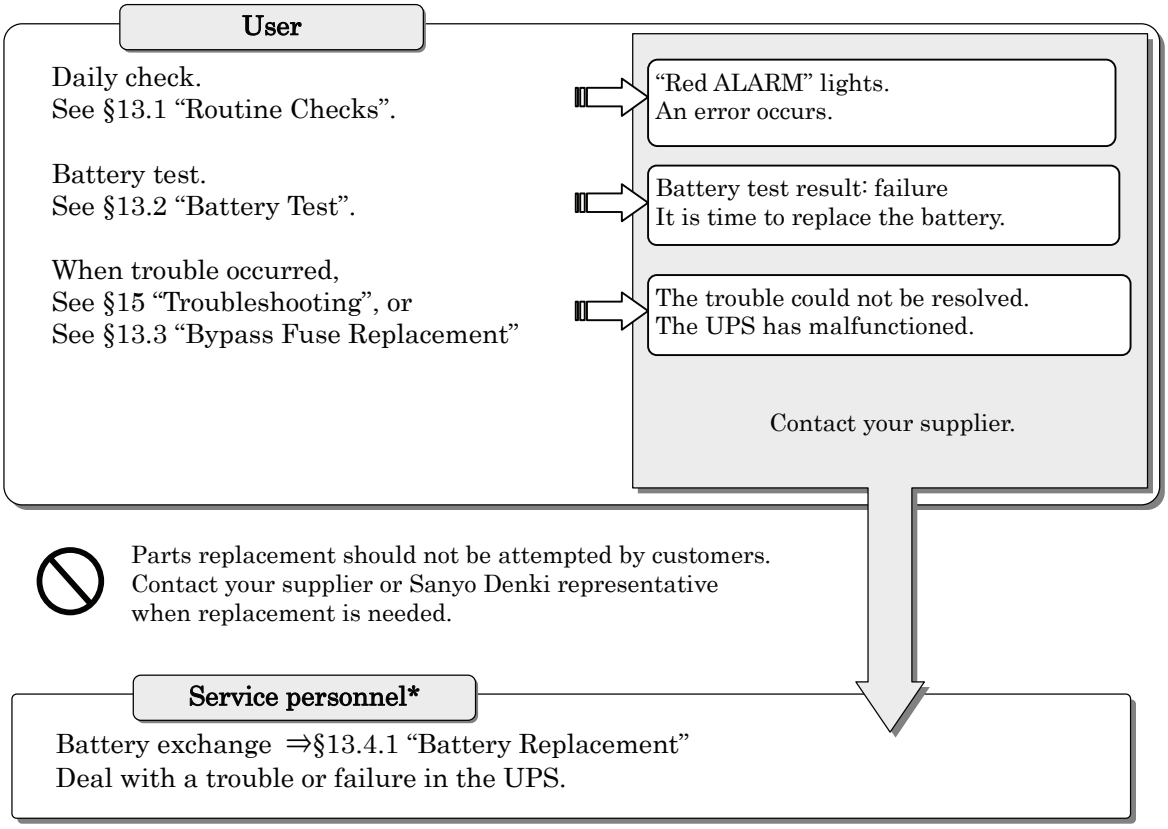
When you change the setting of the menus indicated by RESTART in the "Menu" column, its changes do not take effect until you restart the UPS. If a restart is required, be sure to power off the load devices before resetting.
See §11.3 "UPS Shutdown (If Not to Be Used for More Than a Week)" for information about how to shut down the UPS, and §11.1 "UPS Startup" for information about how to start the UPS.

§13. 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 an electric shock. • Batteries should be replaced periodically. Batteries used after their service life has passed may cause a fire.

The projected service life of the UPS is about 7 years. During this period, the battery must be replaced periodically. If you intend to continue using the UPS after its projected service life, components other than the battery also need to be replaced (a fee will be charged). Contact your supplier. If these components are not replaced at the end of the service life, the UPS may not function properly.

There are routine checks to be performed by the user and maintenance to be performed by service personnel. 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 when maintenance is required.



*** What are service personnel?**

This term is used to indicate service technicians from SANYO DENKI or entrusted from SANYO DENKI with knowledge of this UPS. Maintenance work must not be performed by other than a qualified service technician.

§13.1 Routine Checks

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 panel 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 an 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.

Routinely check the following items.

① Is the control panel LED lighting state abnormal?

⇒ See §15 "Troubleshooting" to perform the countermeasure.

② Is the buzzer sounding?

⇒ If any buzzer sounds, see §14 "Alarm Sounds" to 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 things like humidity and temperature within the specified ranges?

⇒ See §6.1 "Installation Environment Check".

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 rises, which could result in a damage of the UPS.

⇒ See §6.2 "Installation Space Check".

⑦ Remove any dust or dirt adhering to the intake and exhaust vents.

Dust or dirt adhering to parts inside the UPS may cause it to malfunction.

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 6 months. If you change the setting to "None", periodically perform a manual battery backup test. Refer to §13.2 "Battery Test". Depending on the results of the test, exchange the battery.

Estimated battery replacement interval

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.

§13.2 Battery Test

You can perform tests of the built-in and externally connected batteries. You can do this without stopping the load devices connected to the UPS.
When it is shipped from the factory, the UPS is set up to perform an automatic battery test once every 6 months. To change the automatic battery test schedule, see §3.15 "Setting Test Schedule" in the *User Settings Guide*.

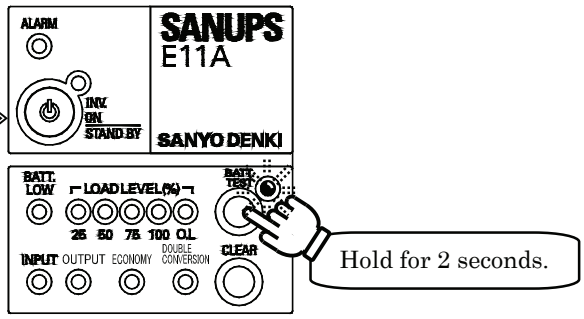
Follow the procedure below when conducting a manual battery test. However, if the UPS has performed a backup operation within 12 hours prior to the test, the result may show an error. The test should, therefore, be conducted when the UPS has not performed a backup operation within the last 12 hours.

① Press BATT. TEST and hold it for at least 2 seconds.

The "Green BATT. TEST" indicator starts blinking, and the battery test starts.

Buzzer
2 beeps... 2 beeps... 2 beeps...
LED
Green BATT. TEST Blinking

Battery operation for about 90 seconds



The test finishes in about 90 seconds.

Check the "Green BATT. TEST" indicator for the results of the test.

Battery Test Results

Green BATT. TEST	lit	blink
Buzzer	—	******* 7 beeps ... ******* 7 beeps ....
Confirmed Backup Time	90 seconds or more	Less than 90 seconds
Result	The batteries are OK.	Replacing the battery early is recommended. Contact SANYO DENKI.

② After the battery test has finished and the "Green BATT. TEST" indicator lights or blinking, press CLEAR.

The "Green BATT. TEST" indicator goes off and returns to its normal indication.

Note

The results of the test are only an approximate guide. If the batteries have reached their replacement interval, an early replacement is recommended even if the results of the test are OK. See "Estimated battery replacement interval" in the previous page for more information.

Stopping battery test

- To stop the battery test while it is underway,
  Press BATT. TEST for at least 2 second ⇒ The UPS returns to normal operation.
- The battery test stops if any of the following 1-4 occur or if any of the following 5-8 is operated while it is underway.

1. Input power error (voltage or frequency).
2. Mechanical failure
3. Output power overload
4. If the load level will be less than 20% when the UPS operates in Active Filter Mode or Economy Mode.
5. Switching of Forced Bypass switch
6. Setting MAIN SW to "OFF"
7. Pressing INV. ON STAND BY for 1 second or longer
8. Executing the battery test stop by the power control software

The "Green BATT.TEST" indicator does not display the results of the test if the test is interrupted.

§13.3 Bypass Fuse Replacement

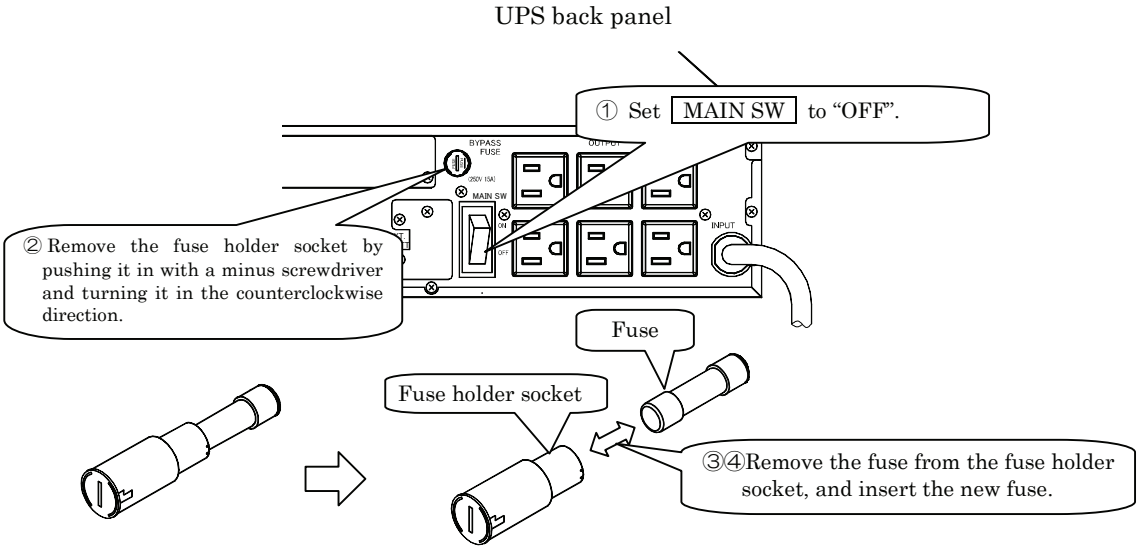
CAUTION	• Always power the UPS off before exchanging the bypass fuse. Failure to do so can cause electric shock.

If the bypass fuse blows, the "Red ALARM" indicator lights and output from the output terminal stops. Proceed as follows to replace the fuse with a new fuse (supplied).

① Stop the UPS by setting MAIN SW to "OFF".

② Remove the fuse holder socket on the back panel of the UPS by pushing it in with a minus screwdriver and turning it in the counterclockwise direction.

③ Remove the fuse from the fuse holder socket.



④ Insert the new supplied fuse (250V 15A) to the fuse holder socket.

⑤ Return it to the original location by turning it in the clockwise direction.

⑥ Set MAIN SW to "ON", and then start the UPS by pressing and holding it for at least 1 second. For details about UPS startup, see §11.1 "UPS Startup".

Note

- If you replace the bypass fuse while the UPS is powered on, the "Red ALARM" indicator will remain lit until you turn the UPS off. Always turn the UPS off before replacing the fuse.
- Discard the old fuse as non-combustible industrial waste by a local rule.

This completes the bypass fuse replacement.

§13.4 Maintenance by Service Personnel

The user must not perform the maintenance described in this section.
Be sure to contact your supplier for maintenance.

CAUTION	• Internal maintenance and inspection should be performed only by technically qualified personnel. Electric shock, injury, burning, fuming or fire could otherwise result. • Batteries should be replaced periodically. Batteries used after their service life has passed may cause a fire. • Never use organic chemicals such as gasoline, thinner, benzene or detergent to clean batteries. These can cause the casing to crack and leak, resulting in fire or current leakage. • Do not touch the rotating fan at maintenance. Doing so may result in bodily injury. • Never use a wet cloth to clean the UPS. Doing so may result in an 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.

§13.4.1 Battery Replacement

You can replace the batteries without stopping the load devices. However, this should be done as quickly as possible, because the UPS will be unable to provide backup power in the event of a power outage.

CAUTION	• The battery pack weighs about 6 kg (13.23 lbs). Be careful not to drop it on your feet. Bodily injury can result. • Wear insulated gloves and take other precautions when replacing the batteries. Otherwise electric shock can result. • There is a constant voltage (max. approx. 24 V: approx. 12 V × 2) at the battery terminals. Do not touch them with your hands or short-circuit them. Bodily injury can result.

① Check the replacement battery model name.

Mode name: HRL1234WF2FR (manufactured by CSB BATTERY Co., LTD.)

Note on battery replacement

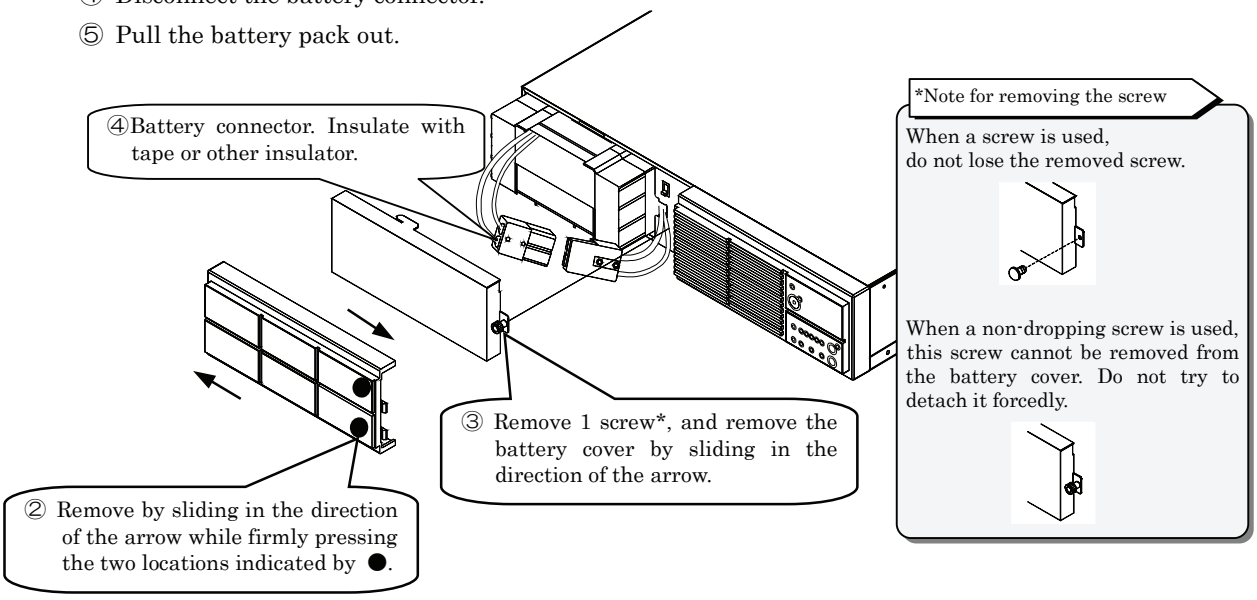
This UPS uses the battery HRL1234WF2FR manufactured by CSB BATTERY Co., LTD.
Since this battery is designed specifically for the UPS, do not use a different battery. Do not substitute with any other type, and do not mix new and old batteries, as shortened battery life, leakage, and heat could result.

② Remove the front panel of the UPS.

③ Loosen the screw on the right side of the battery cover, and then remove the battery cover.

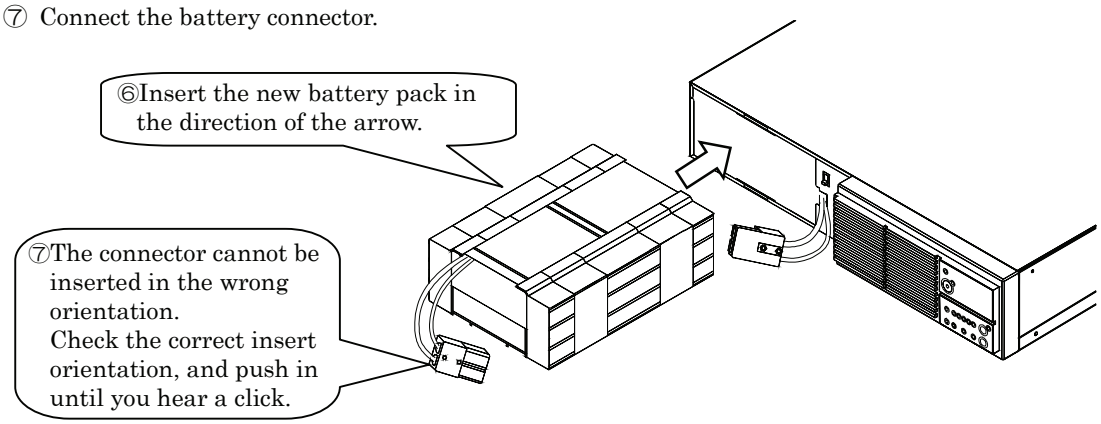
④ Disconnect the battery connector.

⑤ Pull the battery pack out.



⑥ Insert the new battery pack so that the connector faces forward.

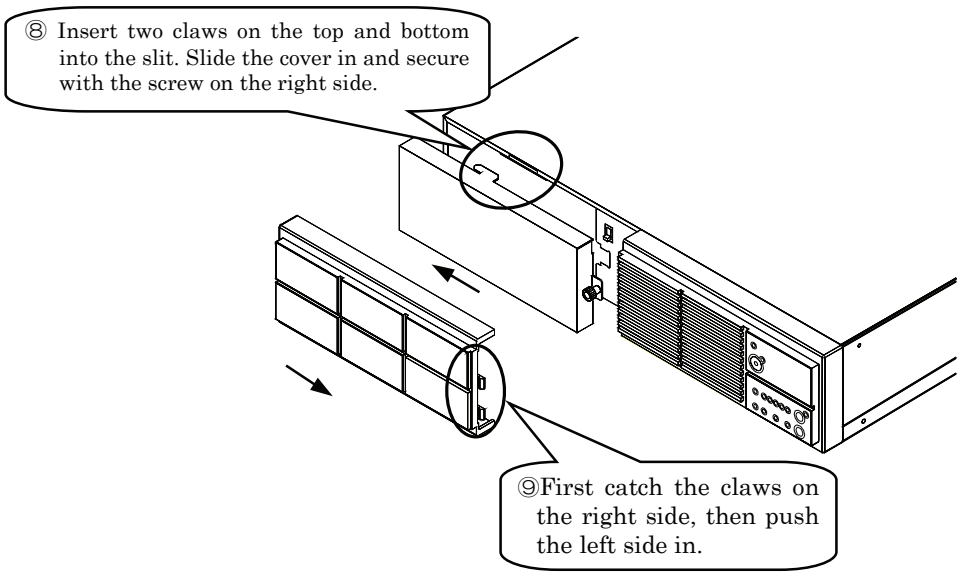
⑦ Connect the battery connector.



⚠ CAUTION	・The battery connector cannot be inserted in the wrong orientation. If it does not go in, do not try to force it. Doing so can damage the connector and result in electric shock. ・Be careful not to get your hands caught when securing the cover.

⑧ Attach the battery cover.

⑨ Attach the front panel.



⑩ Set the backup time in the user setting. See §3.13 “Setting Battery Backup Time” in the *User Settings Guide.*

⑪ Set the battery type in the user setting. See § 3.14 “Setting Battery Type” in the *User Settings Guide.*

⑫ Reset the battery information in the user setting. See §3.16 “ Resetting Battery Information” in the *User Settings Guide.*

Note on the used battery

The batteries used 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. 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. (An extra charge is required.)

This completes the battery exchange.

§14. Alarm Sounds

The buzzer sounds to indicate an UPS status error or change.
Check the sound pattern and refer to the following table for the steps to take.

Tip
Press CLEAR to stop the buzzer.

Sound Pattern	LED Status	UPS Status	What to Do
Continuous tone * ————————	Red ALARM lit	This is a mechanical failure.	Contact your supplier.
	Red ALARM lit	During bypass operation, the bypass fuse is blown.	Replace the bypass fuse with the supplied one. See §13.3 “Bypass Fuse Replacement”.
	Red ALARM lit Red BATT.LOW lit	The battery is exhausted.	When utility power is restored, the UPS will restart automatically depending on the setting value of “UPS Operation Upon Power Recovery” in the user setting. Refer to §3.7 “Setting UPS Operation Upon Power Recovery” in the *User Settings Guide.*
2 seconds ** ** ... 2 beeps 2 beeps	Green INPUT blinking	Power is being supplied from the battery because of an input voltage or frequency error.	Verify that the input voltage and input frequency are within the rated range. Refer to §19.4 “Specifications”.
	Green INPUT blinking	MAIN SW was set to “OFF” during UPS power supply.	Set MAIN SW to “ON”.
	Green BATT.TEST blinking	The UPS is performing a battery check.	Wait for the battery check to end. You can stop the battery check by pressing BATT TEST and holding it for at least 2 seconds.
Continuous beeps ********** ...	Red BATT.LOW lit	The battery voltage is low.	• Verify that the input voltage and input frequency are within the rated range. Refer to §19.4 “Specifications”. • MAIN SW may be set to “OFF”. If MAIN SW is “OFF”, set it to “ON”.
1 sec. 2 sec. **** **** ... 4 beeps 4 beeps	Red O.L lit	The load devices connected to the output terminal exceed the rated capacity of the UPS.	Connect fewer load devices to the output terminal.
2 seconds ******* *******.. 7 beeps 7 beeps	Green BATT.TEST blinking	【When UPS starts】 The battery connectors are not connected.	Stop the UPS, refer to §7.1 “Battery Connector Connection”, and firmly connect the battery connectors. After connecting the battery connectors, start the UPS, and check to make sure that buzzer sounds are not head and that “Green BATT.TEST” does not blink.
		The battery check result was an error.	Perform the battery test. Refer to §13.2 “Battery Test”. When the same result persists, the battery must be replaced. Contact your supplier.
2 seconds ***** ***** ... 5 beeps 5 beeps	–	Remaining battery service life is six months.	A battery replacement is recommended. Contact your supplier. You can press CLEAR to stop the buzzer sound. But the buzzer sound will start again the next time the UPS is powered on. This will continue until you replace the battery.
	Red BATT.LOW blinking	The battery has reached its service life.	The battery must be replaced. Contact your supplier. You can press CLEAR to stop the buzzer sound, but “Red BATT. LOW” blinking continues. The buzzer sound and LED blinking will start again the next time the UPS is powered on. This will continue until you replace the battery.

Note
Contact your supplier if any other failure occurs in the UPS.

§15. Troubleshooting

⚠ 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 UPS, hazardous voltage is present. Never touch any parts with your hand. Doing so may result in an electric shock.

If a problem occurs, check the condition of the UPS and perform countermeasures listed in the table below.

UPS Status	LED Status	Countermeasure
When the UPS starts, the buzzer sounds and "Green BATT.TEST" blinks.	Green BATT.TEST blinking	• Check that the battery connectors are connected properly. Stop the UPS, refer to §7.1 "Battery Connector Connection", and firmly connect the battery connectors. After connecting the battery connectors, start the UPS, and check to make sure that buzzer sounds are not head and that "Green BATT.TEST" does not blink.
No output power is supplied from the output terminal of the UPS.	Green OUTPUT off	• Check whether the input wiring has been performed correctly. Refer to §7 "Wiring". • Verify that the input voltage and input frequency are within the rated range. See §19.4 "Specifications". • must be pressed for at least 1 second. See §11.1 "UPS Startup" for the correct startup procedure.
	All off	• Check that MAIN SW is set to "ON". See §11.1 "UPS Startup" for the correct startup procedure.
	Green INPUT blinking	• Check whether the output voltage is set correctly. See §3.2 "Setting Output Voltage" in the *User Settings Guide*. • Verify that the input voltage and input frequency are within the rated range. See §19.4 "Specifications".
	Red ALARM lit	• The bypass fuse may be blown. See §13.3 "Bypass Fuse Replacement".
Output power from the output terminal of the UPS does not stop.	Green OUTPUT lit	• must be pressed for at least 1 second. See §11.2 "UPS Shutdown (Daily)" for the correct shutdown procedure. However, bypass power supply continues if bypass operation was started by changing over with the forced bypass switch, overload, or failure. • Check the setting of "UPS Shutdown Operation" in the user setting menu. It may be set to "3 seconds" or "Special operation". The factory default setting is "1 second". See §3.9 "Setting UPS Shutdown Operation" in the *User Settings Guide*.
	Green OUTPUT blinking	• Check the setting of "UPS Operation at OFF" in the user setting menu. It may be set to "Bypass". The factory default setting is "OFF". See §3.11 "Setting UPS Operation at OFF" in the *User Settings Guide*.
Output power from the output terminal of the UPS stops during operation.	Green INPUT lit	• may be turned off by accidental operation. Turn on .
	Red ALARM lit	• Check whether the bypass fuse on the back panel is blown. It may have been blown by an overload or short circuit. Check the total load and the possibility of a short circuit. When the total load is high, reduce the number of load devices connected to the UPS. See §13.3 "Bypass Fuse Replacement".
Output power from the output terminal of the UPS stops during power outage.	Red ALARM on, Red BATT.LOW lit	• Check whether the battery has deteriorated. Check the time to replace the battery. The battery service life will differ depending on the ambient temperature. Earlier battery replacement is recommended. • Check whether there was a power outage within the last 12 hours. The battery level may be low. Sufficiently charge the UPS.
Alarm buzzer sounds.	–	• The alarm buzzer sounds when an error, abnormal state, or alarm condition is detected in the UPS. See §14 "Alarm Sounds".

UPS Status	LED Status	Countermeasure
Alarm buzzer does not sound.	–	• The alarm buzzer sound may be set to "OFF". Check the setting of "Buzzer Sound" in the user setting menu. See §3.8 "Setting Buzzer Sound" in the *User Settings Guide*.
Battery power supply continues. Power supply switches to battery power frequently.	Green INPUT blinking	• Check whether MAIN SW on the back panel of the UPS is set to "ON". (If MAIN SW is set to the "OFF" during normal operation, the same operation as for a utility power source failure will be triggered.). • Verify that input voltage and input frequency are within the rated limits. See §19.4 "Specifications".
UPS does not switch from bypass power supply to UPS power supply.	Green OUTPUT blinking, Green INV.ON/STANDBY blinking	• Check Forced Bypass is set to "Inverter". This switch is located inside the front panel of the unit. Remove the front panel to check. See §7.1 "Battery Connector Connection", step⑤. • When "Overload Recovery Operation" in the user setting menu is set to "Auto return": The UPS switches to UPS power supply every 2.5 seconds, and switches back to bypass power supply if the overload condition still persists. This cycle is repeated. See §3.10 "Setting Overload Recovery Operation" in the *User Settings Guide*. • When "Overload Recovery Operation" in the user setting menu is set to "Bypass": If the utility power voltage is low and the load current is 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 *User Settings Guide*.
Cannot perform battery test.	–	• A battery test cannot be performed when: ① Inverter is stopped. ② Bypass power supply is active. ③ Input voltage or input frequency is out of range. ④ Shutdown under remote control is in progress. ⑤ UPS is defective. ⑥ When load factor is less than 20% in the economy mode operation or the active filter mode operation.
When using the power management software, serial communication fails.	–	• Check that "Interface" in the user setting menu is set to "Workstation". See §3.5 "Setting PC Interface" in the *User Settings Guide* and §5.3 "External Interfaces". The factory default setting is "Workstation". • Check the setting of "Serial Baud Rate". See §3.6 "Setting Serial Baud Rate" in the *User Setting Guide*. The factory default setting is "9600". Select the same setting value as the setting of power management software.
Automatic UPS restart does not occur after shutdown due to battery exhaustion following power outage.	–	• Check the setting of "UPS Operation Upon Power Recovery" in the user setting menu. Automatic UPS restart does not occur if this item is set to "OFF". If this item is set to "30%", "50%", or "80%", the UPS does not start until the batteries are charged to the specified level. The factory default setting of this item is "Auto". See §3.7 "Setting UPS Operation Upon Power Recovery" in the *User Settings Guide*.
The UPS does not automatically start 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 the value "10 to 90" is set for the specified value (%), the UPS will not start even at a scheduled start time if the battery is not charged to the specified value. When scheduling operation for the UPS, set this specified value (%) to "0". For details, refer to "Setting the Shutdown Conditions" in the *User Guide of the power management software*.
"Green DOUBLE CONVERSION" and "Green ECONOMY light and go off frequently at irregular intervals.	–	• The UPS is switching frequently between operating modes because the utility power is unstable. Set the UPS operating mode to "Double Conversion". For details, see §3.1 "Setting UPS Operation Mode" in the *User Settings Guide*. The factory default setting of this item is "Auto".
"Red ALARM LED" is lit.	–	• An alarm condition or error has occurred. Contact your supplier.

Note

When the troubles cannot be resolved even if you perform the countermeasures above, or when other failure occurs in the UPS, contact your supplier.

§16. How to Use Power Management Software

What is Power Management Software "SANUPS SOFTWARE STANDALONE" (supplied CD-ROM)?

This software is used for power supply control or management from the computer by communicating the UPS to a computer (personal computer or workstation).

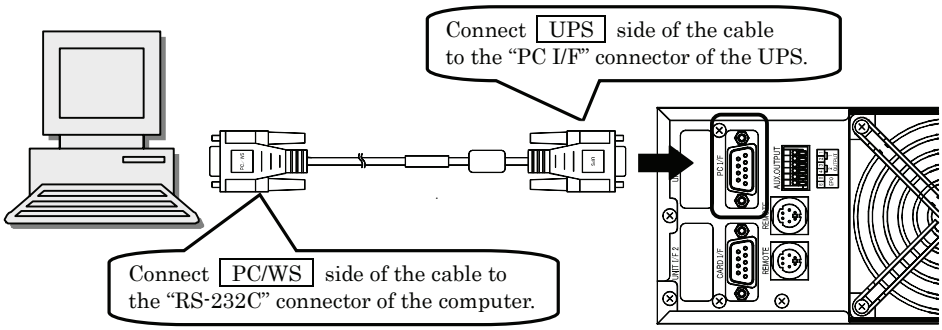
Install power management software on your computer.
For more information, refer to the *Install Guide and User Guide* in the CD-ROM of the power management software.

The following is the minimum system configuration required for the setup and operation of the SANUPS SOFTWARE STANDALONE.
Computer: AT compatible
CPU: PentiumⅢ® 500MHz (or greater)
Memory: Minimum of 32 MB (64 MB or more recommended)
Available disk space: Minimum of 64MB
Display: Minimum 640 x 480 pixel resolution
Supported OS: Windows® NT 4.0 (*1),Windows® 2000, Windows® XP, Windows® Server 2003(*2)
(*1) Service Pack 6 or above
(*2) Standard Edition or Enterprise Edition

① Check that "Interface" in the user setting is set to "Workstation". The factory default setting is "Workstation". See §3.5 "Setting PC Interface" in the *User Settings Guide* for how to set.

② Connect the "PC/IF" connector of UPS to the computer using the supplied Network cable.

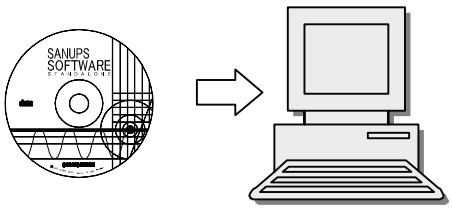
③ Check that network cable connection is not loose.



Note

See §5.3 "External Interfaces" for the details of the PC I/F connector.
LAN interface card and PC I/F connecter can not be used simultaneously.

④ Insert the SANUPS SOFTWARE STANDALONE CD-ROM into the CD-ROM drive to install this program.
The installation program starts automatically. Proceed as instructed on the screen.
⑤ After completing the software installation, reboot the computer.
⑥ Launch the SANUPS SOFTWARE STANDALONE from the Windows Start menu to set up.



Tip

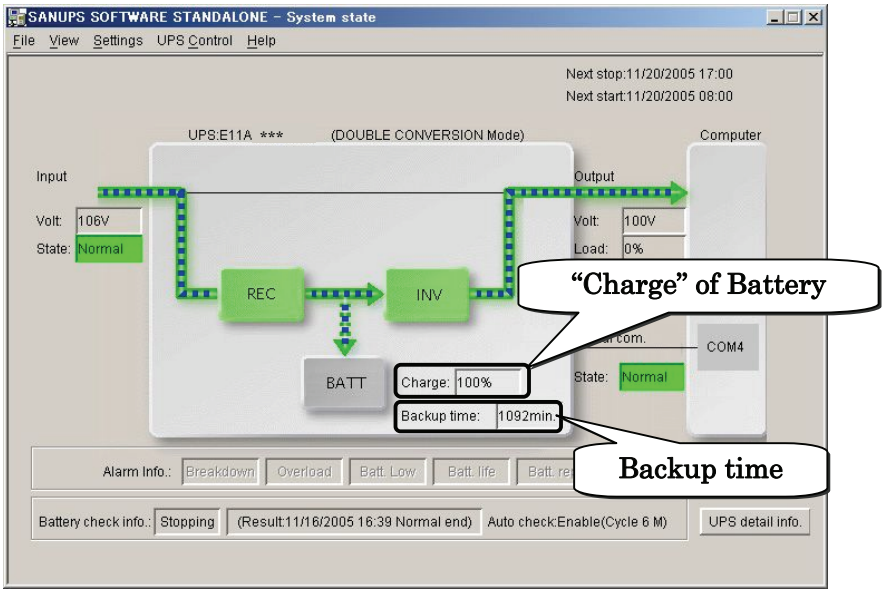
If the installation program does not start automatically, double-click Setup.exe on the CD-ROM to start installation manually.

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 the supplied "SANUPS SOFTWARE STANDALONE", note the following instructions for the items on the main screen.
See §6.1 "Main Screen" in the *User Guide* of SANUPS SOFTWARE STANDALONE for details.

Main screen of SANUPS SOFTWARE STANDALONE



"Charge" of Battery

(1) If UPS is not charged for 12 hours or more when the UPS first started, "Charge" is not displayed properly. See §9.2 "UPS Charge" to charge the UPS.
(2) If the UPS is stopped and then restarted, even when the UPS is charged enough, "Charge" might be displayed as "80%" or "90%". This occurs due to the operating conditions such as ambient temperature. In this case, "Charge" will be displayed properly, if UPS is operated normally for 1 or 2 hours.
(3) Connect the battery connector correctly. If the UPS is operated without the batteries, "Charge" might show a value lower than the actual charge rate. Moreover, even if the battery connector is reconnected and operates the UPS, the proper charge rate is not displayed immediately.
In this case, "Charge" will be displayed properly, if UPS is operated normally for 12 hours or more.
(4) Display of "Charge" is only an approximation. An actual charge rate of the battery might differ slightly.

"Backup time" of Battery

(1) In "Setting the shutdown trigger conditions" of SANUPS SOFTWARE STANDALONE, if "When the backup-time is under the specified value." is selected as the shutdown trigger conditions, set the time more than 40% of the backup time displayed on the main screen.
Refer to §6.4 "Setting the Shutdown Conditions" in the *User Guide* of SANUPS SOFTWARE STANDALONE for details.
(2) If the "Load" displayed on the main screen is less than 30%, the backup time sometimes shows improper value.
(3) "Backup time" displayed is only an approximation. An actual backup time might differ slightly.

§17. Using Standard OS UPS Services

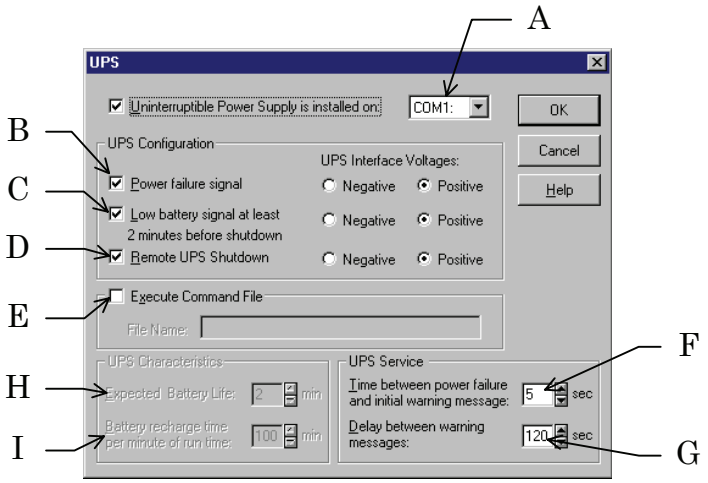
You can use the standard UPS service of your operating system to execute an automatic shutdown when power is lost. See §17.1 or §17.2, depending on your operating system. Use the supplied Network cable to connect the PC I/F connector on the UPS to the serial connector on the computer.

Set the interface setting to "Standalone" to use the standard OS UPS service.
For details on the setting procedure, see §3.5 "Setting PC Interface" in the *User Settings Guide*.

§17.1 Windows NT

To make UPS settings, log in as a user with Administrator privileges.

① Select the UPS icon in the Control Panel, and set the check boxes as shown in the following figure.

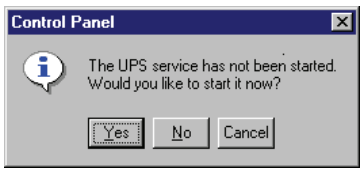


Tip

With these settings, a shutdown will begin when the remaining battery power becomes low.
If you want the shutdown to begin immediately after the power interruption, clear the check from "Low battery signal" and set "Expected Battery Life" to 2 minutes (the minimum value).

No.	Item	Description
A	Uninterruptible Power Supply is installed on	Specifies the number of the COM port where you connected the UPS and the Network cable.
B	Power failure signal	Specifies that a warning message should be displayed according to the settings in the "UPS Service" section.
C	Low battery signal	Specifies that the OS shutdown should begin on reception of a UPS low battery signal. When this check box is not checked, the shutdown begins on reception of a power failure signal, according to the settings in the "UPS Characteristics" section.
D	Remote UPS Shutdown	When this check box is checked, the UPS shuts down 2 minutes after commencement of the OS shutdown. A Registry setting change is required to change the shutdown time.
E	Execute Command File	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	Time between power failure and initial warning message	Specifies the time between a power failure and the initial warning message. No warning message appears if power is restored within the specified time.
G	Delay between warning messages	Specifies the interval between warning messages.
H	Expected Battery Life	This is enabled when "Low battery signal" is disabled.
I	Battery recharge time per minute of run time	This is enabled when "Low battery signal" is disabled. The recharge time is calculated as a sum from the time that the UPS service starts. Battery operation starts when power is interrupted, and the OS shutdown begins when the remaining backup time reaches 2 minutes.

② Click "Yes" in the message that appears when you click "OK".

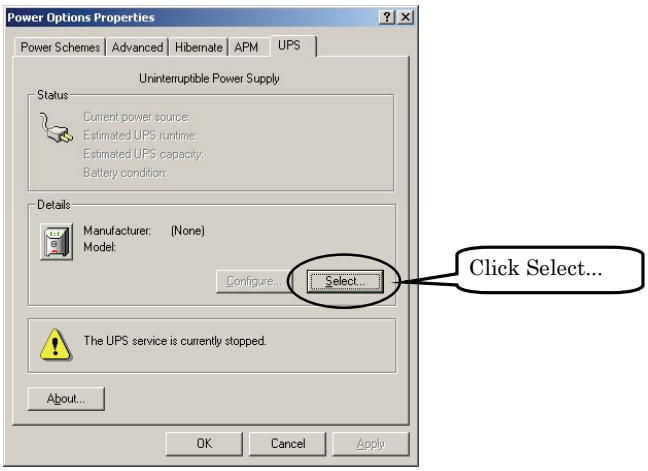


This completes the settings.

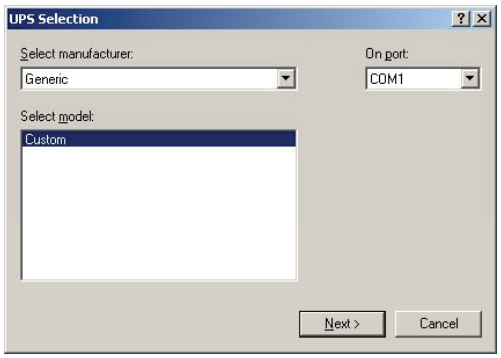
§17.2 Windows 2000/XP/Server 2003

To make UPS settings, log in as a user with Administrator privileges.

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".



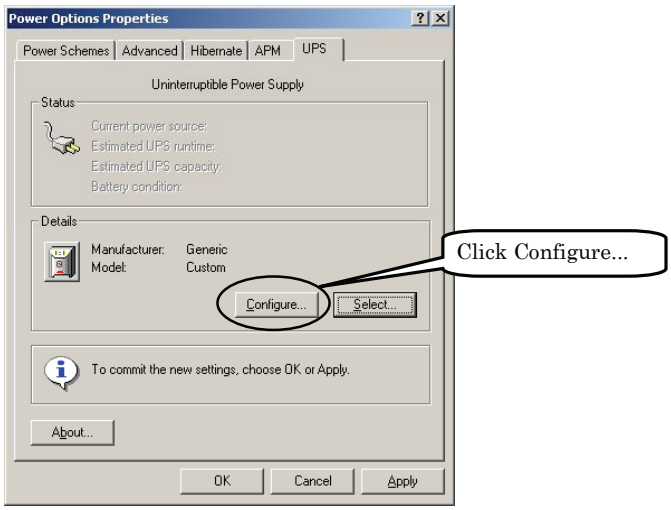
③ Make the settings shown in the following figure, and then click "Finish".
(Select the "Positive" option before clearing the check from the UPS Shutdown check box.)

Note

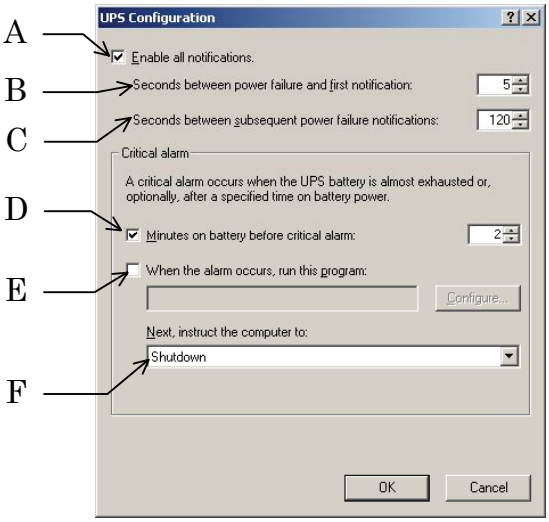
Even if you enable "UPS Shutdown", the UPS will not shut down automatically after Windows 2000/XP/Server 2003 shutdown.
If you need automatic UPS shutdown, use the optional power management software.

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	Enable 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	Minutes 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	Next, 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. If you select “Hibernate”, all of the contents of memory are copied to hard disk. “Hibernate” cannot be selected unless the “Enable hibernation” check box is checked in the “Hibernate” tab.

This completes the settings.

§18. Using Optional Equipment

This section explains the procedures for connecting and operating optional equipment.
For more information about optional equipment, contact your vendor or a SANYO DENKI representative.
Refer to the relevant sections of this manual or to the documentation of the optional equipment for information about wiring, settings, and operating procedures.

⚠ CAUTION	Connect optional equipment to the external interfaces of the UPS, before connecting the UPS input power plug to the utility power socket and after making sure that the UPS is completely stopped. If you need to connect optional equipment after operating the UPS, completely stop the UPS and connected loads, and disconnect their input power plugs from utility power sockets. Failure to do so can result in electric shock.

Check to make sure that the UPS is completely stopped

⇩

Connect and wire the UPS and optional equipment

- **Remote switch** ⇒ pages 50 and 58
- **Linked operation cable** ⇒ pages 51 to 54
- **Outlet box** ⇒ pages 55 to 58
- **LAN interface card** ⇒ page 59
- **Contact interface card** ⇒ page 60
- **Connect Emergency Power Off (EPO) terminals** ⇒ page 61

⇩

Make user settings ⇒ *User Settings Guide*

⇩

Perform an operation test

⇩

Connect load devices ⇒ page 27

⇩

Start operation ⇒ page 38

Note about using optional equipment

When you connect optional equipment, always check that it operates properly before using it in actual operation of the load devices.

§18.1 Remote Switch

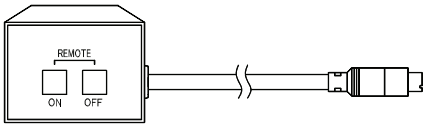
This is a switch for turning the UPS ON and OFF from a remote location, and for executing one-touch shutdown* of connected computers.

*** What is one-touch shutdown?**

This is a function for sending a command requesting computer shutdown from the UPS to the power management software.

Equipment you will need

Remote switch (1)



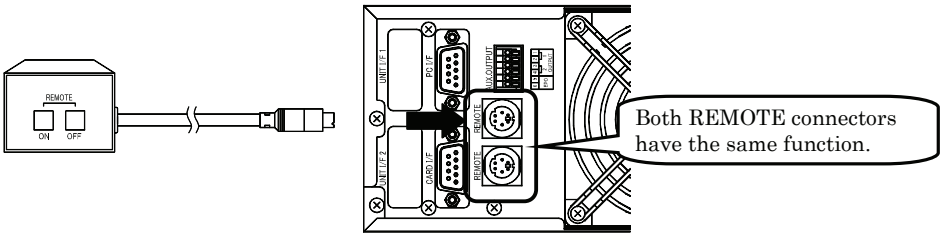
CAUTION

Before wiring, set MAIN SW on the back panel of the UPS to "OFF", disconnect the input power plug from the utility power outlet, and make sure the UPS is completely stopped. Failure to do so can result in electric shock.

To control 1 UPS remotely

① Check that MAIN SW on the back panel of the UPS is set to "OFF", and that the input power plug is not connected to the utility power outlet.

② Connect the remote switch to one of the REMOTE connectors.



③ Connect the UPS input power plug to the utility power outlet, and set MAIN SW on the back panel to "ON".

④ Set the Interface item in the user setting menu.

The following two functions are available, depending on the Interface setting. Select the setting for the function you want to use. See §3.5 "Setting PC Interface" in the *User Settings Guide* for details on the setting procedure.

1. To perform UPS remote ON/OFF
   - Set the Interface to Standalone.

2. To perform UPS remote ON and one-touch system shutdown
   - Set the Interface to Workstation.

Note about operating the remote switch

Always hold the remote switch ON/OFF switch down for at least 2 seconds.

To control multiple UPS units remotely

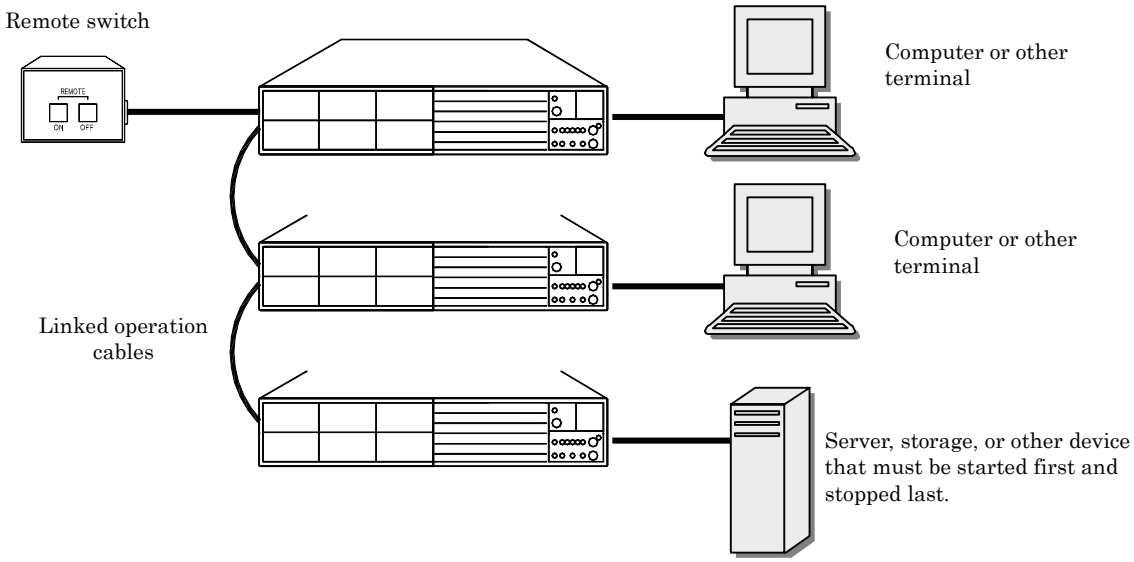
You can connect up to 5 UPS units with linked operation cables and control them remotely from a remote switch. This is called linked operation. For details, see §18.2 "Linked Operation Cable".

§18.2 Linked Operation Cable

What is linked operation?

You can link up to 5 UPS units with cables and set their ON/OFF delay times, so that you can start and stop them in sequence. This is called linked operation. For linked operation, you will need linked operation cables and a remote switch.

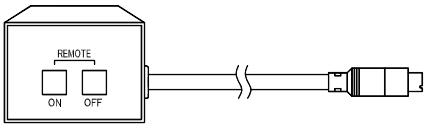
Connect up to 5 UPS units with linked operation cables, and connect one of the UPS units to a remote switch. By turning the remote switch ON and OFF, you can turn the power ON and OFF for all load systems connected to the UPS units in one operation. You can also set the ON/OFF times for each UPS separately, allowing you to start and stop them in sequence.
The following figure shows the configuration of a linked operation system with 3 UPS units.



Configuration of linked operation system with 3 UPS units

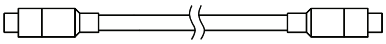
Equipment you will need

Remote switch (1)



Linked operation cables

One cable fewer than the number of linked UPS units.
(Example: 4 cables for a system with 5 linked UPS units)



§18.2.1 Wiring and Settings for Linked Operation

CAUTION	Before wiring, set MAIN SW on the back panel of each UPS to "OFF", disconnect their input power plugs from the utility power outlets, and make sure that each UPS is completely stopped. Failure to do so can result in electric shock.

① Set MAIN SW on all of the UPS units to "OFF", and check to make sure that their input power plugs are not connected to utility power outlets.

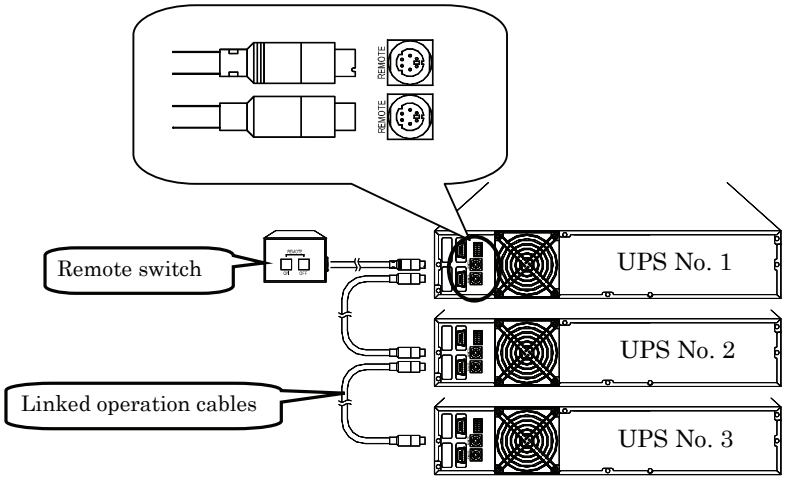
② Connect the remote switch to one of the REMOTE connectors on UPS No. 1.

③ Connect a linked operation cable to the other REMOTE connector.

④ Connect this linked operation cable to one of the REMOTE connectors on UPS No. 2.

⑤ Continue in the same way to connect all UPS units with linked operation cables.

The following figure shows connections for a system with 3 linked UPS units.



⑥ Connect the input power plugs of all UPS units to utility power outlets, and then set MAIN SW on the back panels to "ON".

⑦ Set the Interface item in the user setting menu, according to the procedure in §3.5 "Setting PC Interface" in the *User Settings Guide*.

The following two functions are available, depending on the Interface setting. Select the setting for the function you want to use. Set the Interface setting for all connected UPS units. See §3.5 "Setting PC Interface" in the *User Settings Guide* for details on the setting procedure.

1. To perform UPS remote ON/OFF
   - Set the Interface to Standalone.

2. To perform UPS remote ON and one-touch system shutdown
   - Set the Interface to Workstation.

⑧ Set user setting menu item §3.17 "Enabling and Disabling Linked Operation Delay" in the *User Settings Guide* to "Delay".

⑨ Set user setting menu items §3.18 "Setting Linked Operation ON Delay Times" and §3.19 "Setting Linked Operation OFF Delay Times" in the *User Settings Guide* on each of the 3 UPS units.

Tip

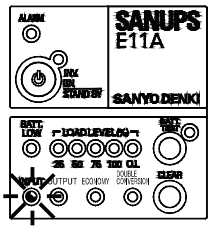
The above user settings are not required if you want to turn UPS output ON and OFF at the same time for all UPS units. Set item §3.17 "Enabling and Disabling Linked delay operation" in the *User Settings Guide* to "No delay" (default setting).

§18.2.2 Linked Operation ON Procedure

Note about linked operation

Linked operation starts or stops on an ON/OFF operation on the remote switch.
It does not start or stop on an ON/OFF operation with the INV. ON STAND BY switch on the front panel.

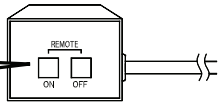
① Check to be sure that "Green INPUT" on all UPS units is lit.



Check that "Green INPUT" is lit

LEDs	
Green INPUT	Lit
Green INV.ON/STAND BY	Off
Green OUTPUT	Off

② Press the "ON" button on the remote switch and hold it down for at least 2 seconds.

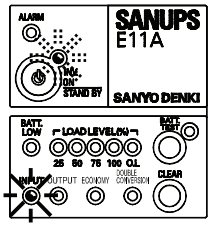


Press "ON" for at least 2 seconds

Note

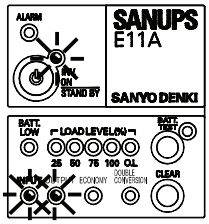
Be sure to keep the remote switch button pressed for at least 2 seconds.

The UPS units start the linked operation ON sequence. After the specified time the system enters the operating state.



LEDs	
Green INPUT	Lit
Green INV.ON/STAND BY	Blinking
Green OUTPUT	Off

The Green INV.ON/STAND BY blinks during the linked operation ON delay sequence.

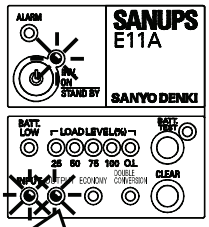


LEDs	
Green INPUT	Lit
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit

The Green INV.ON/STAND BY lights when the system enters the operating state. The state of the other LEDs varies depending on load capacity and UPS operating status.

§18.2.3 Linked Operation OFF Procedure

① Check that "Green OUTPUT" is lit for all UPS units.

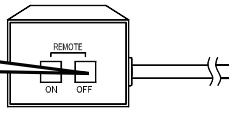


LED	
Green INPUT	Lit
Green INV. ON/STAND BY	Lit
Green OUTPUT	Lit

The state of the other LEDs varies depending on load capacity and UPS operating status

Check that "Green OUTPUT" is lit

② Press the "OFF" button on the remote switch and hold it down for at least 2 seconds.



Press "OFF" for at least 2 seconds

Note

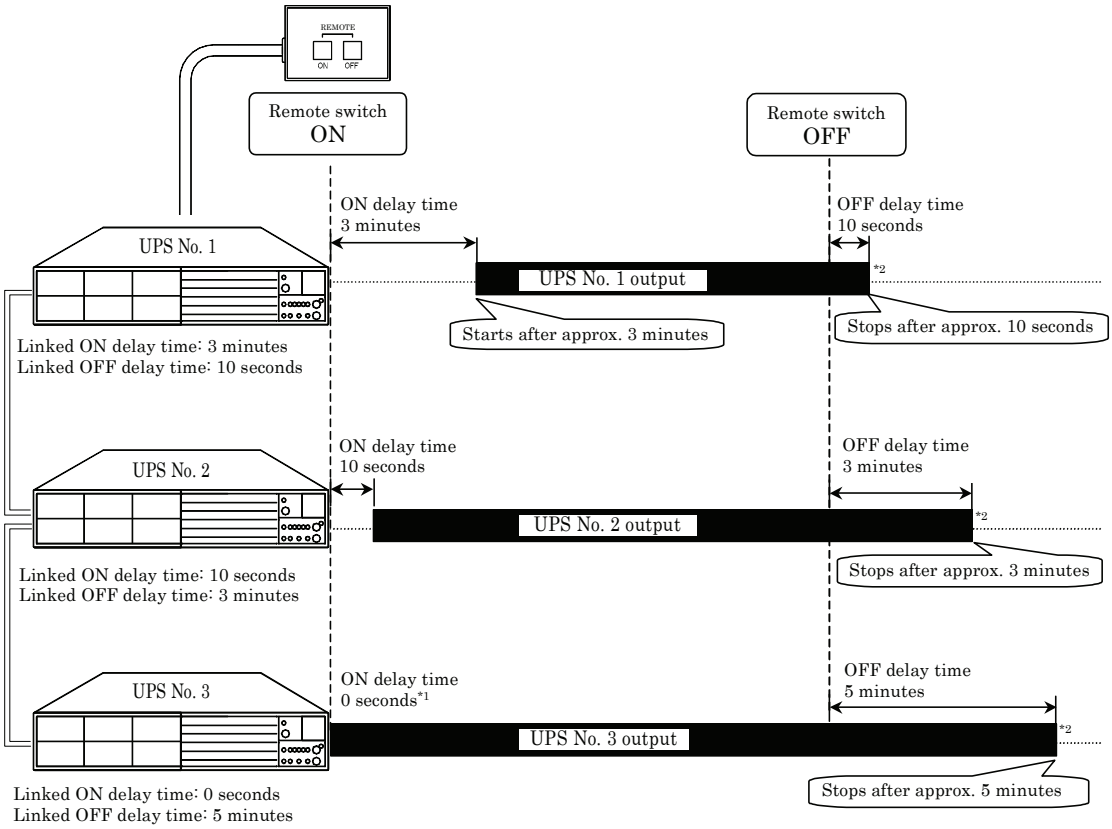
Be sure to keep the remote switch button pressed for at least 2 seconds.

The UPS units start the linked operation OFF delay sequence, and stop after the specified time.
"Green INV. ON/STAND BY" blinks during the linked operation OFF delay sequence.

§18.2.4 Linked Operation System Configuration

The following figure shows linked operation for the case when ON delay and OFF delay times have been set for 3 UPS units.
Remote switch ON/OFF operations control UPS output as shown below.
Note that UPS operation in response to a remote switch OFF operation differs according to the Interface setting.

Operation when Interface setting is "Standalone"



User settings for linked operation

*1: Even when the linked operation ON delay time is set to 0 seconds, several seconds are required before UPS output comes ON.

*2: You can use user setting §3.11 "UPS Operation at OFF" in the *User Settings Guide* to select whether UPS power supply after the UPS stops is "OFF" or "Bypass". When you select "Bypass", UPS output after the UPS stops is bypass power supply.
However, the linked operation ON delay sequence starts at the point when UPS power supply changes from OFF to ON. Even if you perform an ON operation in this state (bypass), the UPS does not start the linked operation ON delay sequence. Instead, it switches from bypass power supply to inverter power supply.
If you want the UPS to use the specified "ON delay time", set §3.11 to "OFF".

Operation when Interface setting is "Workstation"

If you set the Interface to "Workstation" in §3.5 "Setting PC Interface" in the *User Settings Guide*, a command requesting system shutdown is sent from the UPS to the power management software when you press the OFF button on the remote switch. The timing of the request is the OFF delay time specified in §3.19 "Setting the Linked Operation OFF Delay Time" in the *User Settings Guide*, from the point when the OFF button was pressed.
The response of the UPS units to an ON operation on the remote switch is the same as when the Interface item is set to "Standalone".

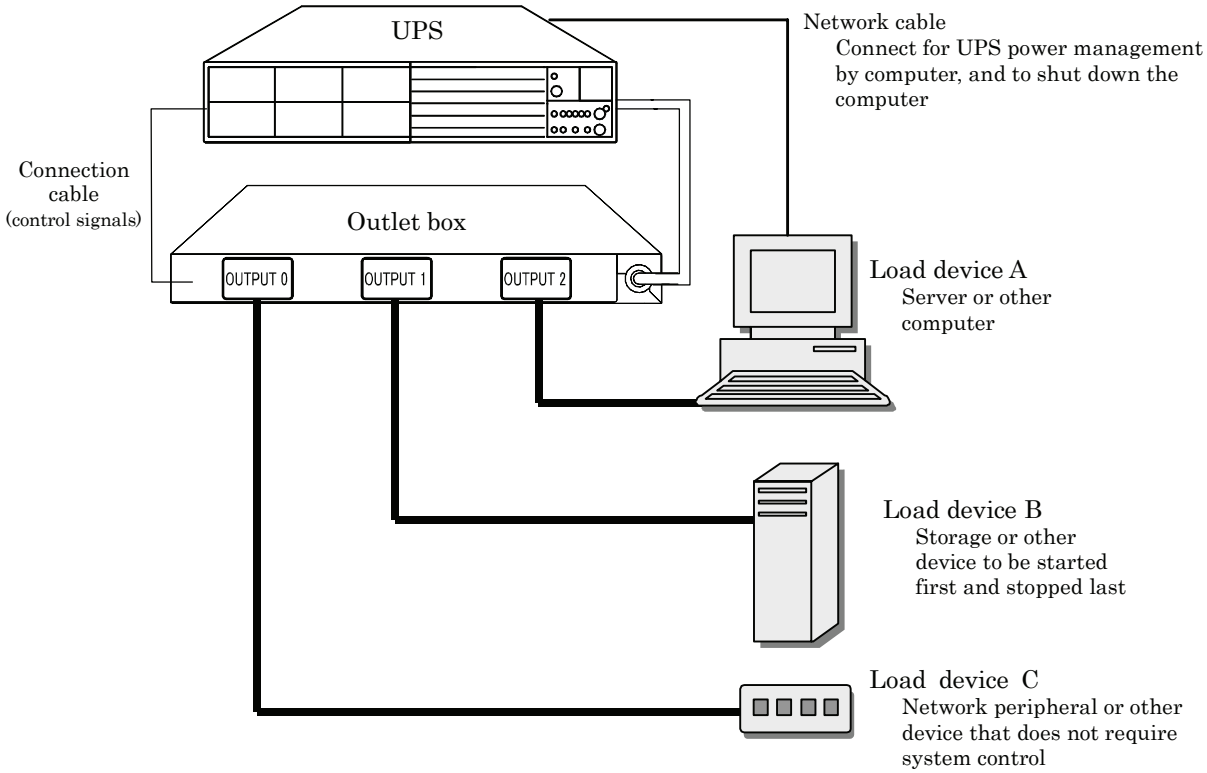
§18.3 Outlet Box

Use an outlet box if you want to control of the output from the UPS.

What is output line control?

Connecting an outlet box to the UPS provides three output lines: OUTPUT0, 1, and 2.
You can set ON/OFF delay times for OUTPUT1 and 2, allowing you to control output start and stop. Operation that utilizes of this function is called **"Output line control"**.

When an outlet box is connected, the UPS output consists of the two lines OUTPUT1 and OUTPUT2, which can be controlled by output line control, and OUTPUT0, which is direct output from the UPS.
The user settings menu allows you to set separate ON/OFF delay times for OUTPUT1 and OUTPUT2. This makes it possible to start and stop connected load devices in sequence.
As an example of a system configured for power control, the following figure shows a computer and peripheral devices connected as loads to an outlet box.



System configuration using outlet box

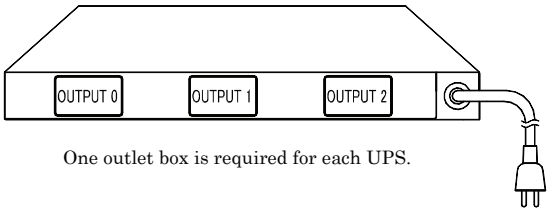
About connected load devices

Ensure that the total capacity of all load devices connected to the outlet box **does not exceed 1kVA(0.7kW).**
For details, see §10. "Load Devices Connection".

§18.3.1 Outlet Box Wiring and Settings

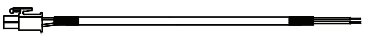
Equipment you will need

Outlet box



One outlet box is required for each UPS.

Connection cable
(supplied with outlet box)



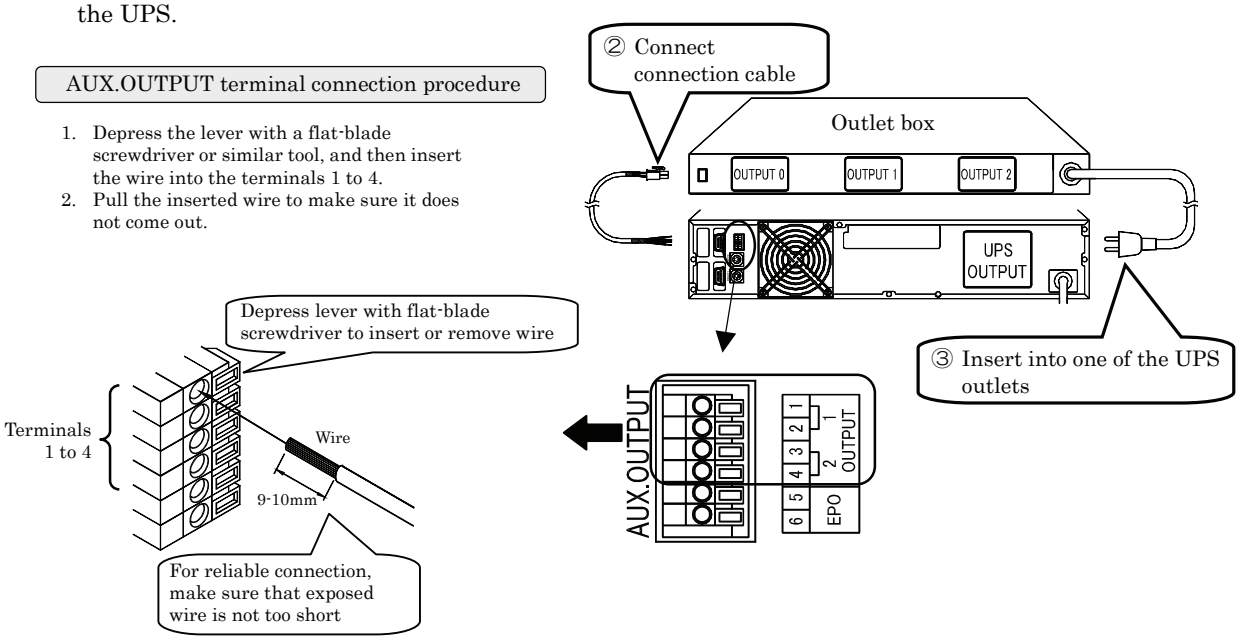
CAUTION	Before wiring, set MAIN SW on the back panel of the UPS to "OFF", disconnect the input power plug from the utility power outlet, and make sure the UPS is completely stopped. Failure to do so can result in electric shock.

① Check that MAIN SW on the back panel of the UPS is set to "OFF", and that the input power plug is not connected to the utility power outlet.

② Using the outlet box connection cable, connect the outlet box to the "AUX.OUTPUT" terminals 1 to 4 of the UPS.

AUX.OUTPUT terminal connection procedure

1. Depress the lever with a flat-blade screwdriver or similar tool, and then insert the wire into the terminals 1 to 4.
2. Pull the inserted wire to make sure it does not come out.



③ Insert the input plug of the outlet box into one of the UPS outlets.

④ Connect the input power plug of the UPS to a utility power outlet, and set MAIN SW on the back panel to "ON".

⑤ Set item §3.20 "Enabling and Disabling Output line Control" in the *User Settings Guide* to "Enabled".

⑥ Set the Output line Control items §3.21 to §3.27 in the *User Settings Guide*.

⑦ Set MAIN SW to "OFF", check that the UPS is completely stopped, and then set MAIN SW to "ON" again to restart the UPS.
The setting of §3.20 "Enabling and Disabling Output line Control" is enabled when the UPS restarts.

User settings when using an outlet box

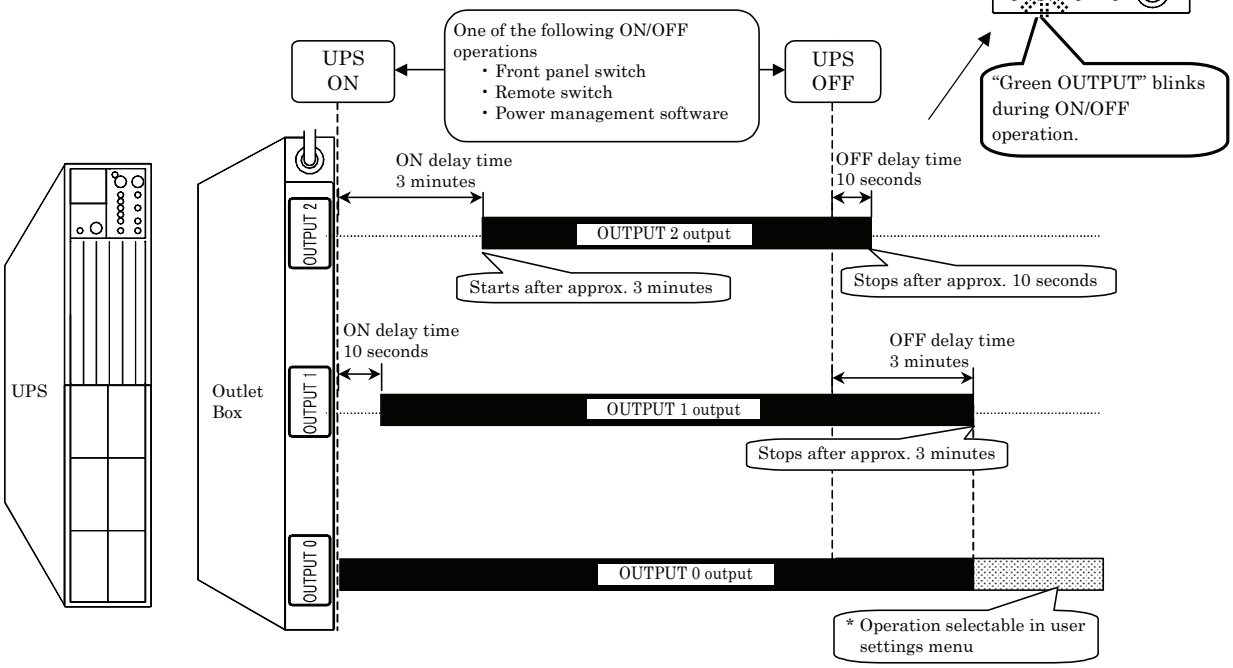
Output line control with the outlet box does not function unless user settings menu item §3.20 "Enabling and Disabling Output line Control" is set to "Enabled". **When using the outlet box be sure to set it to "Enabled".** (The factory default setting is "Disabled".)

§18.3.2 Configuration of an Output line Control System

When the ON/OFF delay settings of OUTPUT1 and OUTPUT2 are set as shown in the following table, and you turn the UPS ON and OFF, power is supplied as shown in the following figure.

Example ON/OFF delay time settings for OUTPUT1 and OUTPUT2

Outlet	ON delay time	OFF delay time
OUTPUT1	10 seconds	3 minutes
OUTPUT2	3 minutes	10 seconds



Output states of OUTPUT0, 1, and 2 under Output Line Control

*Operation of OUTPUT0 after OUTPUT1 and 2 stop

You can use the user settings menu to select the operation of OUTPUT0 after OUTPUT1 and OUTPUT2 stop for one of the following reasons ① to ③.

① Control by power management software
② Stopped by standard UPS service of the operating system
③ When the Interface item is set to Standalone, and power outage backup power is being supplied, after the passage of the outlet box power outage output times specified for OUTPUT1 and OUTPUT2 with items §3.25 and §3.26 in the *User Settings Guide*.

Depending on the setting of §3.27 in the *User Settings Guide*, the operation of OUTPUT0 is as shown in the following table.

User settings menu		OUTPUT0 operation
§3.27 "Setting Operation of Outlet Box OUTPUT0 After Stopping of OUTPUT1 and OUTPUT2"	Power supply stops (default setting)	OFF *
	Power supply continues	Bypass power supply

* Bypass power supply when the setting of §3.11 "Setting UPS Operation at OFF" in the *User Settings Guide*.

When using optional "SANUPS SOFTWARE" power management software

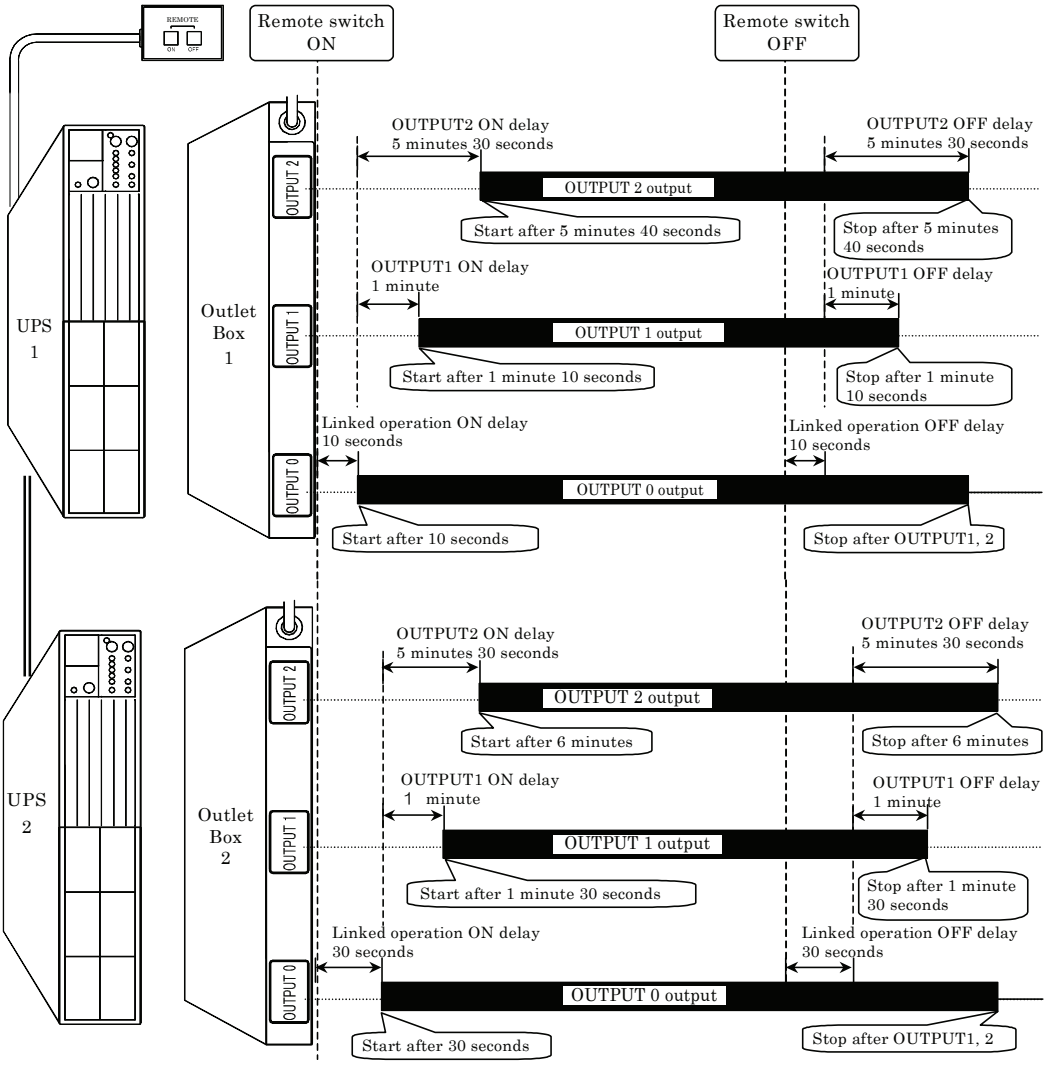
- The optional "SANUPS SOFTWARE" power management software is required to connect two or more computers to OUTPUT1 and OUTPUT2, and perform independent shutdown and UPS power management.
  The "SANUPS SOFTWARE" allows the delay times of OUTPUT1 and OUTPUT2 to be set to user-specified values.
- When using a outlet box and the "SANUPS SOFTWARE" power management software, user setting menu items §3.21 to §3.27 in the *User Settings Guide* cannot be set on the UPS. Set in the power management software. For details, refer to the *User Guide* of the power management software.

§18.4 Combining a Remote Switch and Outlet Boxes

You can connect a remote switch, linked operation cables, and outlet boxes to operate multiple UPS units with linked operation and output line control.
The following figure shows an example of linked operation combined with output line control in a system with 2 UPS units. When linked operation delay times and output line control delay times are set as in the following table, the UPS outputs start and stop in sequence, as shown in the figure. For details about the delay time setting procedure, see the items described in the *User Settings Guide*.

Example of ON/OFF delay time settings for linked operation and output line control

Delay time setting	Linked operation		OUTPUT1		OUTPUT2	
	ON delay	OFF delay	ON delay	OFF delay	ON delay	OFF delay
UPS1	10 seconds	10 seconds	—	—	—	—
UPS2	30 seconds	30 seconds	—	—	—	—
Outlet box 1	—	—	1 minute	1 minute	5 minutes 30 seconds	5 minutes 30 seconds
Outlet box 2	—	—	1 minute	1 minute	5 minutes 30 seconds	5 minutes 30 seconds



Operation when output line control is combined with linked operation

- When linked operation is combined with output line control, the operating order is as follows.
  1. Linked operation delay operation ⇒ 2. Output line control delay operation
- The actual delay time of the OUTPUT1 and 2 lines is the sum of the output line control delay time and the linked operation delay time.
  Actual line delay time = Linked operation ON/OFF delay time + Output line control delay time

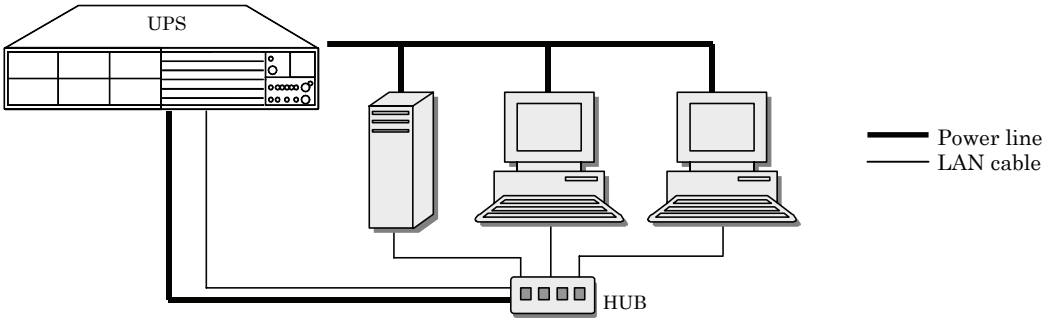
If linked operation ON delay time is not enabled under output line control

Depending on UPS user settings, OUTPUT0 power supply may continue when OUTPUT1 and 2 are OFF because of power management software control or another reason. In this state, when the ON button is pressed on a remote switch, linked operation ON delay time is disabled and OUTPUT1 and 2 are delayed only by the output line control delay time.
To enable linked operation ON delay, make the following user settings so that OUTPUT0 also goes OFF when OUTPUT1 and 2 go OFF.

① Set §3.11 "Setting UPS Operation at OFF" in the *User Settings Guide* to "OFF".
② Set §3.27 "Setting the Operation of Outlet Box OUTPUT0 After Stopping of OUTPUT1 and 2" in the *User Settings Guide* to "Stop power supply".

§18.5 LAN Interface Card

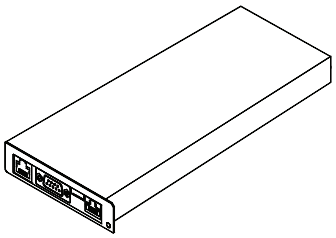
Use the LAN interface card to perform UPS power management and computer shutdown.
When you use the LAN interface card, the optional "SANUPS SOFTWARE" is required. This software provides network support, and is separate from the power management software supplied on the CD-ROM.
For detailed information about connections and settings, refer to the *Instruction Manual* of the LAN interface card and the SANUPS SOFTWARE.



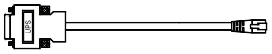
Network configuration for system using LAN interface card

Equipment you will need

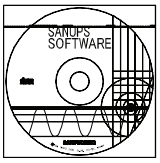
LAN interface card



Communications cable for LAN interface card
(Supplied with LAN interface card)



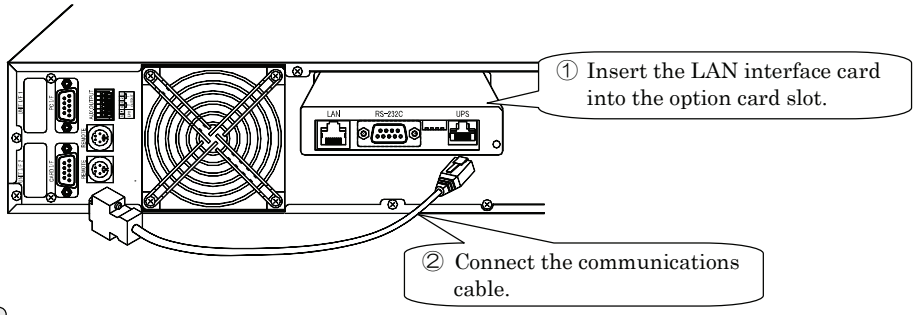
Power management software
SANUPS SOFTWARE



* One SANUPS SOFTWARE license is required for each computer that uses the software.

Connection procedure

① Insert the LAN interface card into the option card slot on the back panel of the UPS.
② Using the LAN interface card communications cable, connect the "CARD I/F" connector of the UPS to the "UPS" connector of the LAN interface card.



User settings

Set the Interface setting to "Workstation" (default setting). For details on the setting procedure, see §3.5 "Setting PC Interface" in the *User Settings Guide*.

Note

LAN interface card and the following two functions cannot be used simultaneously.

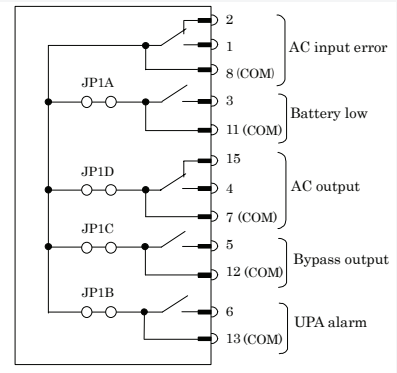
- Using the UPS control software by connecting the supplied communication cable.
- Using LAN interface card.

§18.6 Contact Interface Card

Connect the contact interface card when you want to use the external transmission signals (transistor output) of the UPS "CARD I/F" connector as no-voltage contact (relay contact) output.
For detailed information about connections and so on, refer to the documentation of the contact interface card.

Contact interface card output signals

The following signals are output.

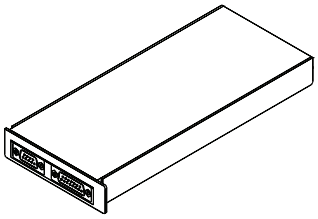


Signal name	Description
AC input error	This signal is output on a utility power outage or voltage error (a contact, b contact).
Battery voltage low	This signal is output when the battery voltage drops below the specified level (a contact).
AC output	This signal is output when the UPS is supply AC power output to the load devices (a contact, b contact).
Bypass output	This signal is output when the UPS is supplying bypass power to load devices (a contact).
UPS alarm	This signal is output when a alarm condition occurs in the UPS main unit (a contact).

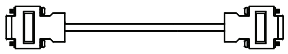
- All signals are output as no-voltage contact. Contact capacity is AC110V/DC24V 0.2A.
- Make short-pin settings for JP1A to JP1D according to the intended application of the contact signals. (When the unit is shipped from the factory, all short pins are inserted in 8, 11, 7, 12, and 13 terminal, and set to common terminal.)

Equipment you will need

Contact interface card

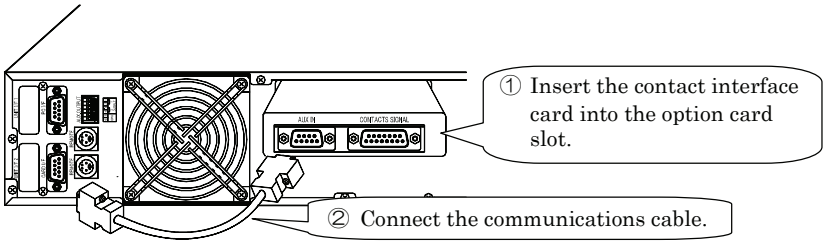


Communications cable for contact interface card
(Supplied with contact interface card)



Connection procedure

① Insert the contact interface card into the option card slot on the back panel of the UPS.
② Using the contact interface card communications cable, connect the "CARD I/F" connector of the UPS to the "AUX IN" connector of the contact interface card.



User settings

You can set the Interface setting to either "Workstation" or "Standalone". The card operates under both settings.

Note

The contact interface card and LAN interface card cannot be used simultaneously.

§18.7 Connecting the Emergency Power Off (EPO) Terminals

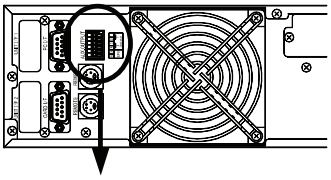
To enable emergency stop of UPS output, connect the contacts of a switch or other required device to EPO terminals 5 and 6 of the AUX.OUTPUT block.
The switch to connect to the EPO terminals is not provided as a standard option for the UPS. Use a switch that complies with the following specifications, or connect to compliant contacts on your system.
For details about the functions of the EPO terminals, see "④ AUX.OUTPUT" in §5.3 "External Interfaces".

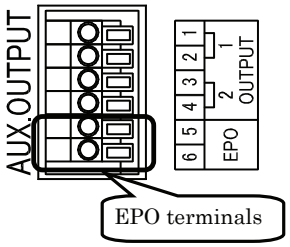
EPO terminal specifications

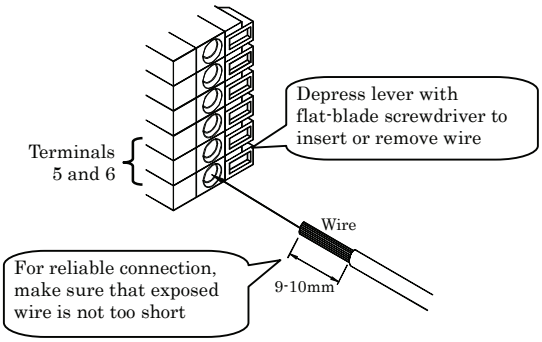
- Circuit voltage: DC 5 V
- Current when shorted: Approx. 10 mA
- EPO operating conditions: Short-circuit terminals 5-6 for 0.2 seconds or longer
- EPO terminals: One-touch terminal block (compatible wires: AWG26 to 20)

AUX.OUTPUT terminal connection procedure

① Strip about 9 to 10mm of the sheath at the tip of the cable.
② While depressing the lever with a flat-blade screwdriver or similar tool, insert the wire into the terminals 5 and 6.
③ Pull the inserted wire to make sure it does not come out.







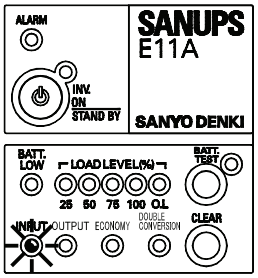
UPS emergency stop procedure

① Press the emergency power off switch.

An emergency stop of the UPS is executed, and the LEDs light as shown in the figure at right.
In this state,the UPS remains powered off even if you cancel the emergency power off on the emergency power off switch.

Note

User setting menu items cannot be changed during an emergency power off.



Buzzer
No sound

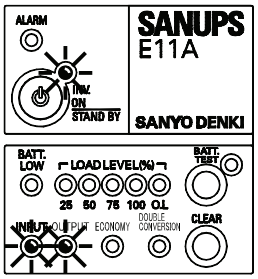
LEDs

Gren INPUT	Lit
Green INV.ON/STAND BY	Off
Green OUTPUT	Off

UPS restart procedure

① Cancel the emergency power off on the connected switch
② Press for at least 1 second on the UPS.

The emergency power off is cancelled, "Green OUTPUT" lights, and the UPS returns to normal operation.



Buzzer
Musical trill

LEDs

Green INPUT	Lit
Green INV.ON/STAND BY	Lit
Green OUTPUT	Lit

§19. Characteristic of UPS

§19.1 Basic Operation

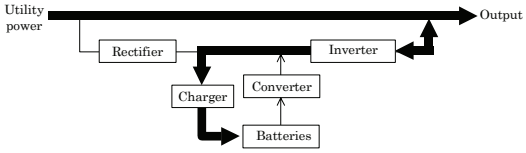
(1) Normal operation

In normal operation, the UPS switches automatically* between the three modes (a) to (c) depending on the state of the power.

* The UPS does not switch automatically when "UPS Operation Mode" in the user setting is set to "Double Conversion".

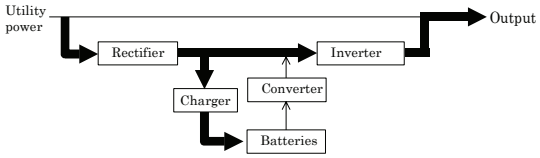
(a) Active Filter mode

The UPS operates in Active Filter mode when the input power voltage is within a certain range and the output power factor is below a certain value. In Active Filter mode, the UPS receives power from the utility power source and supplies it to the load. At the same time, it compensates for high frequencies in the input power at the inverter. The batteries are kept continually charged and ready in case a problem (outage or voltage drop) occurs in the utility supply.



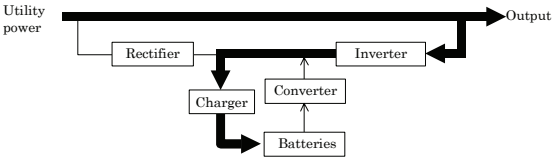
(b) Double Conversion mode

The UPS switches to Double Conversion mode when the input power voltage is outside a certain range. In Double Conversion mode, 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 (outage or voltage drop) occurs in the utility supply.



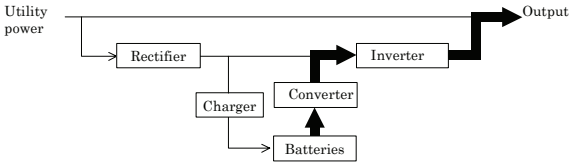
(c) Economy mode

The UPS switches to Economy mode when the input power voltage is within a certain range and the output power factor is above a certain value. In Economy mode, the UPS receives power from the utility power source and supplies it to the load. At the same time, the inverter is connected to the load and ready to activate. The batteries are kept continually charged and ready in case a problem (outage or voltage drop) occurs in the utility supply.



(2) On failure of utility power

When a fault or an outage occurs in the utility power source, the rectifier and charger cease 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 the "Green INPUT" indicator starts blinking.



(3) Upon recovery of utility power

When normal utility power is restored, rectifier and charger operations resume automatically, returning to the normal operating state described in §19.1 (1).

(4) When battery voltage declines

When low voltage or an outage in the utility power source continues, causing the battery voltage to decline to about 22 V (1.85 V/cell), the "Red BATT.LOW" indicator lights to indicate low battery voltage.

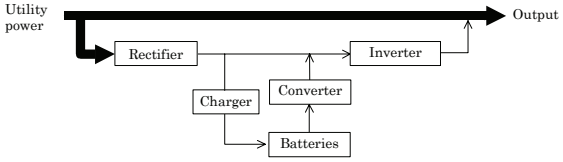
* When "Low Battery Voltage Warning Timing" in the user setting menu is set to "2 minutes" or "3 minutes", the alarm is issued at the point when the remaining battery time drops to the specified level.

(5) Extended power outage

If a power outage persists and the battery voltage reaches the final discharge level, 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 operating state described in §19.1 (1).

* When "UPS Operation Upon Power Recovery" in the user setting menu is set to "OFF", inverter output remains stopped. When it is set to "30%", "50%", or "80%", the UPS restarts operation once the batteries are charged to the specified level and then returns to the normal operating state described in §19.1 (1).

§19.2 Protective Functions



(1) Overload protection

If the UPS output is overloaded by exceeding the current capacity of the inverter, such as when a computer system boots up, the output selector automatically switches the source of AC power from the inverter to the bypass circuit, without interruption.

After a certain period of time has elapsed, the source of power to the load is switched back to the inverter without interruption (auto-return), as shown in §19.1(1).

* When "Overload Recovery Operation" in the user setting menu is set to "Bypass", the UPS switches to inverter power supply without interruption when the overload is resolved.

(2) UPS fault protection

If a fault occurs in the UPS, the output selector activates automatically and switches to bypass power without interruption. The "Red ALARM" indicator lights, and the alarm 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 the UPS fault. Contact your supplier or SANYO DENKI as soon as possible.

§19.3 Protective Function Table

Indication of the marks in the table are as follows.

Lit LED :

Blinking LED :

Buzzer Alarm : ① - ④

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

Item	Operation panel (front panel) indicators						Alarms Buzzer (*1)	Protective functions (UPS operations)	Notes
	Green INPUT	Green OUTPUT	Green INV.ON STAND BY	Red ALARM	Red O.L	Red BATT. LOW			
Preparation	☀	(*2)	(*2)	–	–	–	–	Rectifier, charger, operation	Power up
Normal	☀	☀	☀	–	–	–	–	Inverter operation	Power up, operation
Serious failure	☀	☀	☀	☀	–	–	①	Stop inverter Bypass supply	
Overload (effective value)	☀	☀	☀	–	☀	–	④	Bypass supply	Auto return
Forced bypass	☀	☀	☀	–	–	–	–		Manual switch to bypass supply
Input over voltage	☀	☀	☀	–	–	–	②	Stop rectifier and charger Inverter operation	Battery operation
Input over voltage (prolonged)	☀	☀	☀	–	–	☀	③		Battery operation (*3)
Power outage	☀	☀	☀	–	–	–	②		Battery operation
Power outage (prolonged)	☀	☀	☀	–	–	☀	③		Battery operation (*3)
Input error (frequency)	☀	☀	☀	–	–	–	②		Battery operation
Input error (prolonged)	☀	☀	☀	–	–	☀	③		Battery operation (*3)
Battery failure	☀	☀	☀	☀	–	☀	①	Stop inverter Bypass supply	

(*1): Buzzer sound patterns:

① * ———— Continuous tone

② **.....**.....

③ **********..... Continuous beeps

④ ****.....****...

Note

Press CLEAR to stop the buzzer.

(*2): In this state, the LED blinks or is off, depending on the setting of "UPS Operation at OFF" in the user setting menu.

When this setting is set to "Bypass" : ☀

When this setting is set to "OFF" : –

(*3): Battery operation. Stops inverter operation when final battery discharge is reached.

§19.4 Specifications

Item			Standard or Performance		Notes
UL MODEL			E11A102U011-00	E11A102U011-20	
TYPE			E11A102A011(P)*	E11A102A011US(P)*	
Output capacity			1 kVA/0.7kW		
Cooling system			Forced air cooling		
AC input	Input Power plug		NEMA 5-15P		
AC input	Phases		Single phase, 2-wire		
AC input	Voltage		100V	120V	Rated voltage same as output voltage
AC input	Voltage		-20% to +15%: Double conversion mode operation ±5% : Economy or Active Filter mode operation when Auto is set. ±8% : Economy mode operation when Economy is set.		
AC input	Frequency		50Hz or 60Hz		±8%: Double Conversion mode ±1, 3, 5%: Economy /Active Filter mode
AC input	Power requirements		0.9kVA		Max. capacity during battery charging
AC input	Input power factor		0.95 or more		During rated output (*2)
AC Output	Outlet		NEMA 5-15R×6		
AC Output	Phases		Single phase, 2-wire		
AC Output	Voltage		100V	120V	
AC Output	Voltage regulation		Rated voltage ±2%		During Double Conversion mode operation
AC Output	Rated frequency		50Hz or 60Hz		Same as input frequency (auto selection)
AC Output	Battery power startup frequency		50Hz	60Hz	User settable
AC Output	Frequency regulation		Rated frequency within ±1%: Double conversion setting. Rated frequency within ±1%, ±3% or ±5%: Auto or Economy setting.		1, 3, 5% selectable UPS free running operation ±0.5%
AC Output	Voltage waveform		Sine wave		
AC Output	Distortion factor of voltage waveform		Linear load: 3% or less 100% rectifier load: 7% or less		During rated output
AC Output	Transient voltage variation	Rapid load change	Rated voltage ±5 %		0% ⇔ 100% at transient or output switch
AC Output	Transient voltage variation	Power outage, recovery	Rated voltage ±5 %		During rated output
AC Output	Transient voltage variation	Rapid input voltage change	Rated voltage ±5 %		±10% variation
AC Output	Response time		5 cycles or less		
AC Output	Load power factor (lag)		0.7 (lag)		Variation range 0.7 (lag) to 1.0
AC Output	Overcurrent protection		Auto switch to bypass circuit at 105% or more		With auto return function
AC Output	Overload capability	Inverter	105%		200ms
AC Output	Overload capability	Bypass	15A (Fuse)		200% 30 sec., 800% 2 cycle (reference)
Batteries	Type		Small-sized valve regulated lead-acid battery		
Batteries	Number		2 (12V per battery)		2 in direct series
Batteries	Rated capacity		68 W		15 minute-rate
Batteries	Backup time		5 minutes (700W) 10 minutes(500W)		At 25°C (77°F) ambient temperature, rated load
Generated heat			125W		During Double Conversion mode operation
Input leakage current			3mA or less		
Operating environment			Ambient temperature: 0 to 40°C (32 to 104°F) Relative humidity: 20 to 90%		(*3)
Acoustic noise			40 dB or less		1 m (approx. 40 inches) from UPS front panel, 'A' characteristics (linear load) At Economy mode operation
Safety standard			UL1778-4th/C22.2 No.107.3-05-2nd:2005, CE: EN62040-1-1:2003		
Emission			FCC Part15 Sub partB Class-A EN50091-2:1995 Class-A(VCCI Class-A compliant)		
Immunity			EN50091-2:1995		

(*1): The inverter is capable of operation synchronized with AC input frequency and instantaneous switchover provided that the AC input frequency is within the rated frequency, and the AC input voltage is within the rated voltage.
(*2): When input voltage waveform distortion is under 1%.
(*3): The UPS contains batteries. Battery service life will be foreshortened if the UPS is used in an environment where the ambient temperature exceeds 30°C (86°F).
(*4): If grounded, the ground phase of the input and output must match according to UPS specifications.
(*5): The above table lists standard specifications. Some specifications are different for units with long backup times. For details, refer to the external battery specification instruction manual.

§20. 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 modification or change 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 (chloride 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 Denki 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.