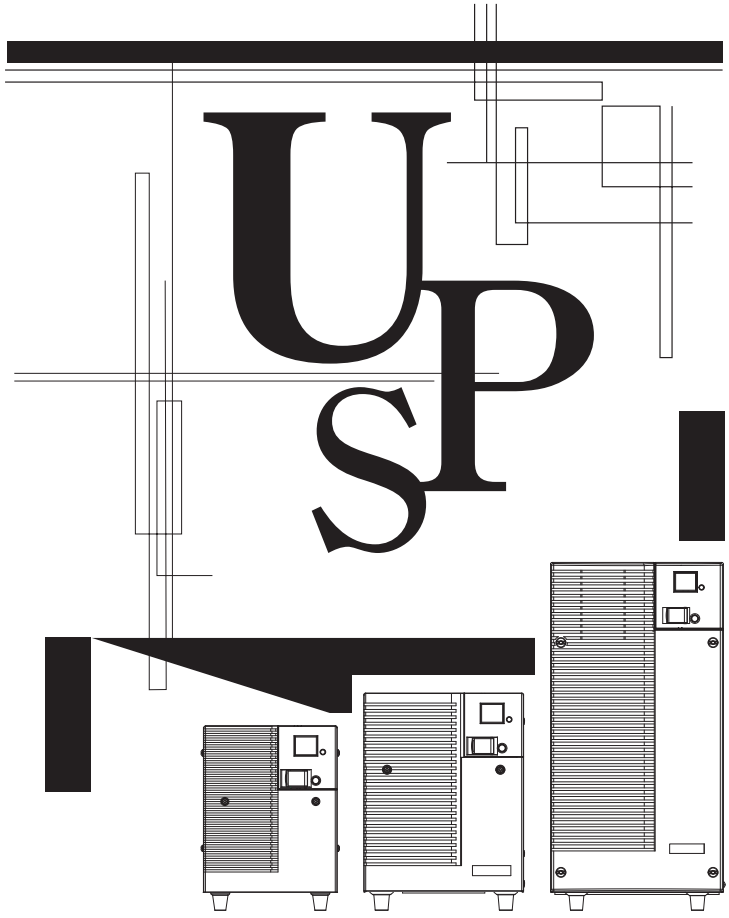
OMRON

Uninterruptible Power Supply

POWLI BN50S/BN75S/BN100S BN150S/BN220S/BN300S

Instruction Manual



- This manual provides important safety-related information. Thoroughly read and understand this manual before installing and using the product.
- Keep this manual in a convenient location so that you can refer to it whenever necessary.
- The contents of this manual are subject to change without notice.

Introduction

Features of this product

Thank you for purchasing Omron's Uninterruptible Power Supply (UPS).

- The UPS protects computers and other devices from power failures, voltage variations, instantaneous voltage drops, and surge voltage such as that caused by lightning (a phenomenon in which extraordinary high voltage occurs instantaneously).
- The BN50S/BN75S/BN100S/BN150S/BN220S/BN300S are line interactive UPS with simple output voltage adjustment functions. Under normal service conditions, commercial power input passes through the transformer and is output, and when the input voltage is low, the transformer raises the voltage, and when the input voltage becomes high, the transformer lowers the voltage. In addition, when abnormalities in commercial power are detected, such as in a power failure or when there are large changes in voltage, power supply is shifted to the battery within 10ms, and sine wave output is continued.
- BN50S output capacity is 500VA/450W, BN75S output capacity is 750VA/680W, BN100S output capacity is 1000VA/900W, BN150S output capacity is 1500VA/1350W, BN220S output capacity is 2200VA/1980W and BN300S output capacity is 3000VA/2700W.

Notes on the use of the Backup Power Supply

- This product is designed and manufactured for use with FA or OA equipment such as personal computers.
  Do not use it when very high reliability and safety are required as listed below.
  - Medical equipment that may cause death directly
  - Applications that may cause injury (applications that directly affect the operation and control of planes, ships, railroads, elevators, and so on)
  - Applications that are always subjected to vibration such as cars and ships
  - Applications in which a failure of this product may cause significant damage or effect to the society and public (important computer systems, main communication equipment, public transportation systems, and so on)
  - Equipment with the same level of importance
- For equipment that greatly affects the safety of people and maintaining public functions, special considerations related to operation, maintenance, and management must be taken such as duplicating the system and emergency power generation facilities.
- Observe the contents of this manual such as the use conditions and environments.
- When you want to use this product for an important system that requires very high reliability, contact us;
- Do not modify/alter this product.

Disclaimers

We are not liable for any damage or secondary damage resulting from the use of our product, including malfunction and failure of equipment, connected devices, or software.

- Make sure to read the safety precautions before using the unit.
- In the event you transfer or sell this unit to a third party, please include all of the documentation that came with this unit. This is to ensure that the unit is used in line with the conditions described in the included documentation.
  - This manual contains important safety-related information. Please read and understand the contents of the manual before beginning operation.
    If you discover any omissions or errors in the manual, please contact the shop of purchase.

- Windows is the registered trademark of Microsoft Corporation in the United States and/or other countries.
- The names of other companies and products mentioned herein are the trademarks or registered trademarks of their respective owners.
- Note on user registration Please fill out the required items on the included user registration card and send it to our customer support center.

IMPORTANT SAFETY INSTRUCTION

1.SAVE THESE INSTRUCTIONS.

This manual contains important instructions for BN50S/BN75S/BN100S/BN150S/BN220S/BN300S that should be followed when using the UPS and batteries.

2.SYMBOL


This symbol indicates earth ground.


This symbol indicates turning on UPS.


This symbol indicates turning off UPS.

3.INTERNAL BATTERY

Internal battery voltage is 24V DC FOR BN50S/BN75S;48V DC FOR BN100S/BN150S;96V DC FOR BN220S/BN300S.

4.TEMPERATURE RATING

The maximum ambient temperature of the UPS is 40°C.

5.ENVIRONMENT

The unit is intended for installation in a temperature controlled, indoor area free of conductive contaminants.

Procedure from installation to operation

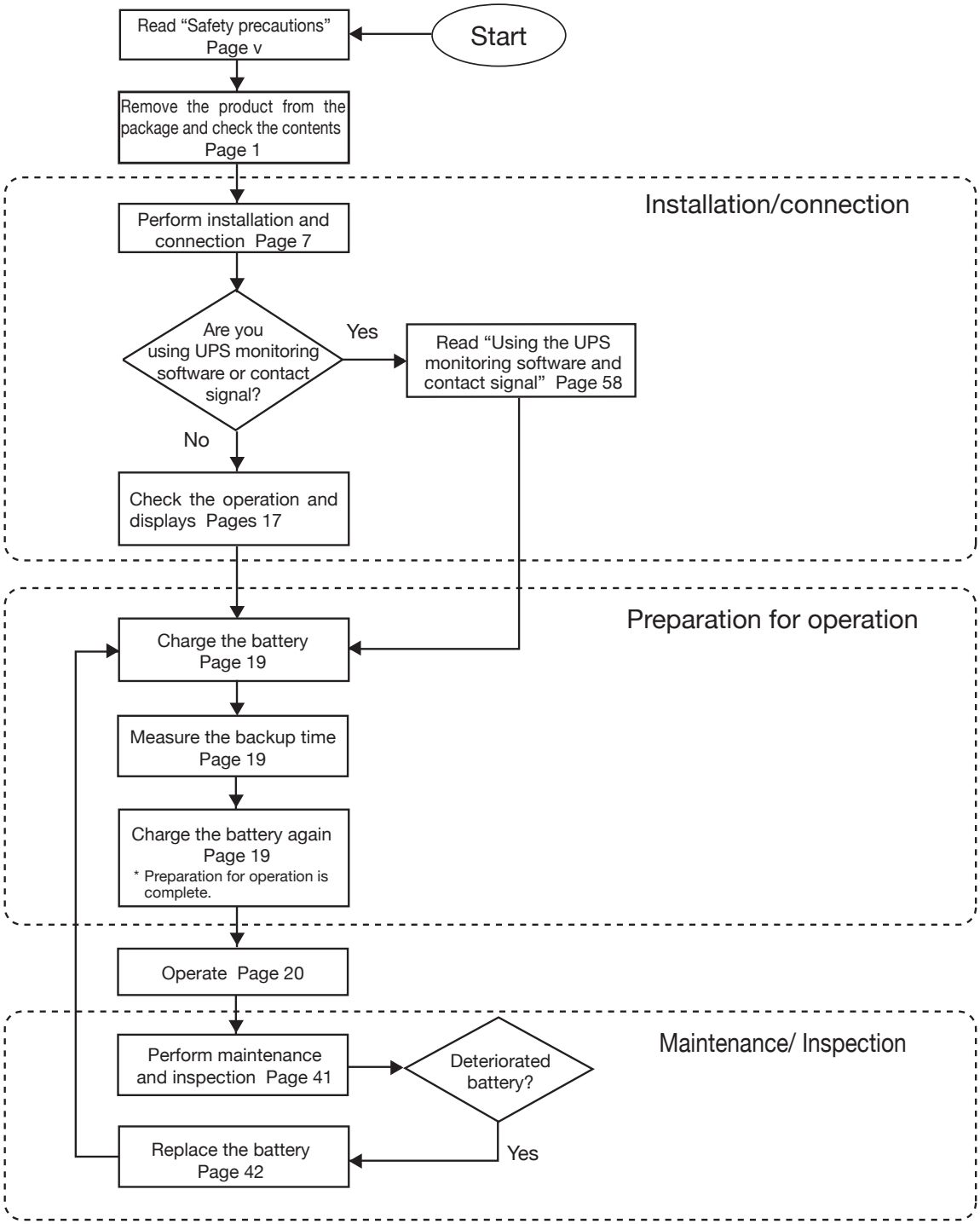


Table of Contents

Safety precautions

Important information for safe operation is described.
Be sure to read it before installation and start of use.

● The safety symbols and their meaning used in this manual are as follows:

Warning	Misuse may cause death or serious injury.
Caution	Misuse may cause injury or property damage.

* Property damage means damage to houses/household effects, livestock, and pets.

: Indicates prohibition. For example, indicates that disassembly is prohibited.

: Indicates obligation. For example, indicates that grounding is necessary.

Note that events categorized as a caution required matter also may cause more serious results under certain conditions.

Warning

Do not use this unit when very high reliability and safety are required as listed below. This unit is designed and manufactured for use with FA or OA equipment such as personal computers.

- Medical equipment or system that may cause death directly.
- Applications that directly affect the safety of people (For example, the operation and control of cars and elevators).
- Applications in which a failure of the unit may cause significant damage to the society and public (For example, essential computer systems and main communication equipment.)
- Applications with the same level of importance.

Caution (for installation and connection)

Two or more people should work together to carry, unpack and install the unit (BN100S/BN150S/BN220S/BN300S).

- Because the unit is heavy, you may injure yourself or drop the unit, or it may fall over.

Carry the unit considering its weight and balance, and place it on a stable and robust base.

- Dropping or toppling the unit may cause injury.
- Approximate weight of the unit:
  10kg (BN50S/BN75S) / 22kg (BN100S/BN150S) / 38kg (BN220S/BN300S)
- If you drop the unit, stop using it and have it inspected and repaired.
  For repair, contact us; ____

Keep plastic package bags out of reach of children.

- Children may suffocate if they place their heads into plastic bags.

Make sure to connect the unit's AC input plug to a commercial power source with rated input voltage (100 to 115V AC) and 50/60Hz frequency.

- Connecting to a wall outlet (commercial power) with a different voltage or frequency may result in a fire.
- The unit may fail.

⚠ Caution (for installation and connection)

When an abnormality (unusual sound or smell) occurs, turn OFF the unit's power switch and disconnect the AC input plug from the wall outlet.

Install the unit soon after the AC input plug is disconnected from the wall outlet.

- When performing maintenance on the connected devices, follow the above instructions to ensure safety.

Do not connect devices such as dryers, some solenoid valves, etc. , which have a half-wave rectifier that allows only half-cycle AC power to flow through.

- Overcurrent may damage the UPS.

The maximum output capacity cannot be used when using the AC input plug that ships with the BN150S and BN300S (BN150S: 15A/NEMA5-15P, BN300S: 30A/NEMAL5-30P).

- Overheating or fire may occur if the power consumption exceeds the limits shown in the “AC input plug” table on page 16.
- If the maximum output capacity is being used, replace the plug as described in the table on page 13.

When changing the input cable for the BN150S/BN220S/BN300S, perform connection as specified and make sure to properly match the AC input terminal with the appropriate wire color.

- Refer to “ AC input plug replacement procedure” on page 16.
- Failure to do so may result in electric shock or ground fault.

Provide secure grounding.

- After checking the plug shape of the wall outlet, directly connect the AC input plug of the unit to it. A failure or leak that occurs when the unit is not properly grounded may result in electric shock.

Do not disassemble, repair, or modify the unit.

- Doing so may cause an electric shock or a fire.

Do not install the unit in other than specified orientations.

- Dropping or toppling the unit may cause injury.
- If you install the unit in an orientation other than specified, the unit cannot be protected from a battery fluid leakage.

Do not use the unit where the maximum temperature exceeds 40°C.

- The battery deteriorates rapidly.
- Doing so may cause a failure or malfunction of the unit.

Do not exceed the ranges specified for environmental conditions during use/storage.

Do not install or store the unit in the places listed below.

- Do not store in places where the humidity is lower than 10% or higher than 90%.
- Do not use the unit in places where the ambient temperature is lower than 0°C or higher than 40°C.
- Do not use in places where the humidity is lower than 25% or higher than 85%.
- Do not install/store the unit in closed places such as cabinets with no clearance, places where there is flammable or corrosive gas, places exposed to direct sunlight, places with large amounts of dust, places exposed to shock or vibration, or outdoors.
- Installation or storing the unit in such a place may cause a fire.

Do not connect equipment that exceeds the output capacity of the unit. You can use plug strip to connect additional devices, but do not connect devices that exceed the current capacity of the plug strip.

- The current protection of the unit may operate, which may stop the output.
- The wiring of the plug strip heats up, which may cause a fire.

⚠ Caution (for installation and connection)

Do not pinch or tie the cable of the unit.

- Doing so may cause the cable to be damaged or heated, which may cause an electric shock or a fire.
- If the cable is damaged, stop using the unit and have the cable repaired.
  For repair, contact us; ____

All of the included accessories are designed to be used exclusively with the unit. Do not use the accessories with other devices.

- Doing so may compromise the safety of devices.

Do not block the air vents on the front and back of the unit (the BN50S/ BN75S has air vents on the sides).

- Doing so will cause the internal temperature to rise, which may cause the unit to fail and the battery to deteriorate.
- Leave at least 5 cm of space between the vent and the wall.

Do not connect a transformer such as a voltage transformer or isolating transformer to the output side.

- Overcurrent may damage the UPS or cause it to malfunction.
- Even when connected to the input side, the UPS may fail or malfunction. Make sure to check the operation before use.

Do not connect devices that cannot be used with commercial power supply.

- When the unit's power switch is turned ON and an error occurs with the connected device, bypass operation is performed and commercial power supply is supplied as is to the connected devices.

⚠ Caution (for use)

Do not allow the unit to come in contact with water.

- Doing so may cause an electric shock or a fire.
- If the unit becomes wet, immediately stop using it, unplug the AC input cable, and have the unit inspected and repaired.
  For repair, contact us:_____

When the battery is dead, replace it immediately or stop using the unit.

- Continuing the use of it may cause a fire.

Ambient temperature	Expected life
20°C	4 to 5 years
30°C	2 to 2.5 years

* The values in the table are the expected life under standard use conditions and are not guaranteed.

Using a dry cloth, periodically wipe the dust from the AC input plug and power supply output receptacles.

- Accumulated dust may cause a fire.

Do not use the unit in a closed place and do not cover the unit.

- Doing so may cause abnormal heating or a fire.

If you notice abnormal sound or smell, smoke, or leakage from the inside, immediately turn off the power switch and disconnect the AC input plug from a wall outlet (commercial power).

- Using the unit under such conditions may cause a fire.
- Under such conditions, make sure to stop using the unit, unplug the AC input cable, and contact the shop of purchase or the OMRON Electronic Systems & Equipments Repair Center at _____ for inspection and repairs.
- Use the unit under the conditions in which you can immediately disconnect the AC input plug from a wall outlet (commercial power) in the case of an abnormal event.

If fluid leaks from the unit, do not touch the fluid.

- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not place objects heavier than 25kg on the unit, and do not drop heavy objects onto the unit.

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, which may cause a fire.

⚠ Caution (for maintenance)

When maintaining the connected equipment, turn OFF the power switch and disconnect the AC input plug.
- Even if you disconnect the AC input plug while the UPS is operating, the power output of this unit does not stop and power is supplied from the outlet during a power failure.

Do not disassemble, repair, or modify the unit.
- Doing so may cause an electric shock or a fire.

If fluid leaks from the unit, do not touch the fluid.
- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not throw the unit into fire.
- The lead battery in the unit may explode, or leak dilute sulfuric acid.

Do not insert metal objects into the power supply output receptacle of the UPS.
- Doing so may result in electric shock.

Do not insert metal objects into the battery connectors.
- Doing so may result in electric shock.

⚠ Caution (for battery replacement)

Perform replacement on a stable and flat place.
- Handle the battery carefully so that you do not drop it.
- Not doing so could cause injury or burns due to liquid (acid) leakage.

Use a specified battery for replacement.
- Not doing so may cause a fire.
- Product model: BNB75S: One required (Replacement battery pack for BN50S/BN75S)
  BNB300S: One required (Replacement battery pack for BN100S/BN150S)
  BNB300S: Two required (Replacement battery pack for BN220S/BN300S)

Do not replace the battery in a place where there is flammable gas.
- Spark may occur when connecting the battery, which may cause an explosion or fire.

If fluid (dilute sulfuric acid) leaks from the battery, do not touch the fluid.
- Doing so may cause blindness or burns.
- If it contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not disassemble or modify the battery.
- Doing so could cause dilute sulfuric acid leak, which could cause blindness and burns.

Do not drop the battery and do not expose it to strong impact.
- Dilute sulfuric acid may leak.

Do not short the battery with metal objects.
- Doing so could cause an electric shock, fire or burn.
- Some electrical energy still remains inside the spent battery.

Do not put the battery into fire and do not break it.
- The battery may explode or leak dilute sulfuric acid.

Do not use a new battery and an old battery at the same time.
- Dilute sulfuric acid may leak.

Notes

When moving the unit from a cold place to a warm place, leave it for several hours before using it.

- If the unit is promptly turned ON after being moved to a warmer place, condensation may form inside the unit and cause it to fail.

Charge the battery for at least 8 hours soon after purchasing the unit.

- If you do not use the unit for a long time after the purchase, the battery may deteriorate and the battery may become unusable.
- To charge a battery, connect the AC input plug of the unit to a wall outlet (commercial power).

When storing the unit, charge the battery for at least 8 hours and turn OFF the power switch.

- Even if the unit is not used, the battery gradually discharges, and if it is left for a long time, it goes into an over discharge state.
  The backup time may become shorter or the battery may become unusable.
- We recommend keeping the temperature 25°C or less when storing the unit for long periods of time.

Do not short the output lines of the unit to each other, and do not short the output lines to the ground.

- The unit may fail.

Do not connect the AC input plug of the unit to its Power Supply Output Receptacle during the Battery Mode.

- The unit may fail.

Do not connect a page printer (such as a laser printer) to the unit.

- The unit repeatedly and frequently switches between Commercial Power Mode and Battery Mode, which may shorten the life of the battery.
- The page printer has a large peak current, so an excess of the connection capacity or a power failure due to instantaneous voltage drop may be detected.

Check system operation beforehand if the unit is used in combination with a device whose power supply frequency fluctuates widely, such as a personal electric generator.

- The unit automatically recognizes the input power frequency when input power is supplied.If the unit is connected when the input power frequency is not stable at the rated level, the unit may misidentify the power supply frequency and may fail to operate normally. (If the unit is in operation, changing from commercial power supply to another power supply source, such as generating equipment, will cause no problem. Set the generator's frequency to the same level as that of the commercial power supply.)

Do not install or store the unit in a place exposed to direct sunlight.

- The rise of temperature may cause the built-in battery to deteriorate rapidly and become unusable.

Before performing a withstand voltage test or insulation resistance test, make sure to remove the input surge protection GND screw from the back of the unit.

When in use, make sure the input surge protection GND screw is securely fastened.

- Performing the withstand voltage test with the ground wire connected may damage the surge absorption element built into the power supply input circuit.

Before stopping the commercial power to the unit, turn OFF the power switch of the unit.

- The unit enters Battery Mode when commercial power is stopped. If you frequently use the unit in Battery Mode, the battery life may be significantly shortened.

Notes

If this unit is used with an inductive device such as a coil or motor, check the operation beforehand.

- With some types of devices, the effect of inrush current may cause this unit to stop operating properly.

In the event you transfer or sell this unit to a third party, please include all of the documentation that came with the unit. This is to ensure that the unit is used in line with the conditions described in the included documentation.

- This manual contains important safety-related information. Please read and understand the contents of the manual before beginning operation.

This unit uses lead acid batteries,

- Which are a valuable recyclable resource. Please recycle.
- For information about recycling, please contact the OMRON Electronic Systems & Equipments Repair Center at: _____.

Explanation

Usual operation

- You may either leave the power switch of the unit ON (operation status) or turn it OFF each time when stopping the connected system. Choose whichever operation method is more convenient. We recommend turning OFF the power switch when you do not use connected devices for a long time.
- The battery can be charged once the AC input plug of the unit is connected to a wall outlet (commercial power).

Quitting Battery Mode

- If a power failure lasts for an extended period of time, the battery discharges and power output from the unit stops. Shut down your computer after performing appropriate procedures (for example, saving data) while the unit is still supplying power.

Rebooting

- If the battery discharges completely during a power failure, the unit stops. After recovery from the power failure, the unit automatically restarts and supplies power. If you do not want to restart the connected devices, turn OFF the power switch of either the unit or the connected devices.

See also Setting switch 2 can be used to select whether or not auto restart is performed. See Page 30

Scheduled operation using the UPS monitoring software

- When performing scheduled operation in which the UPS is stopped and a device such as a breaker is used to stop the UPS at the same time that commercial power stops, specify a period of no more than 3 months for the start of the next operation.
  If you specify a period longer than 3 months, the internal timer is reset and the scheduled operation does not start. Note that this period reduces to approximately half when the battery is dead. If a period of 3 months is exceeded, you start operation by supplying commercial power and pressing the start switch. However, if the battery is dead, you may not be able to start operation.
  In this case, replace the battery according to the instructions in “6-2 Replacing the battery” on page 42.

The cooling fan operation of BN100S/BN150S/BN220S/BN300S

- The cooling fan starts operating at the Battery Mode due to a power failure, auto battery test, self-diagnostic test, etc., and automatically stops after a period of approximately 24 hours when the UPS returns to the Commercial Power Mode and the battery is fully charged.

Take measures for handling unforeseen accidents, such as data backup and system redundancy.

- The output may stop when there is a circuit failure in the UPS.

1 Preparation

1-1 Unpacking the product

⚠ Caution

Two or more people should work together to carry, unpack and install the unit (BN100S/BN150S/BN220S/BN300S).

- Because the unit is heavy, you may injure yourself or drop the unit, or it may fall over.

The weight of the product is 10kg (BN50S/BN75S), 22kg (BN100S/BN150S), 38kg(BN220S/BN300S).

Unpack/transport this product considering this weight.

- Dropping may cause injury.

Open the package box and take out the UPS and accessories.

1-2 Checking the contents

Check whether all the package contents are included and there is no damage found on their appearance. If you should notice defects or anything wrong, contact us; ____

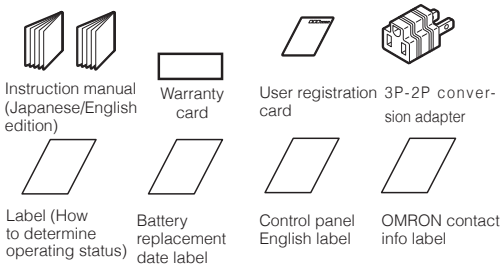
(1) Accessories related to the main unit

	BN50S	BN75S	BN100S	BN150S	BN220S	BN300S
Instruction manual (Japanese and English versions)	1 each	1 each	1 each	1 each	1 each	1 each
Warranty card	1	1	1	1	1	1
User registration card	1	1	1	1	1	1
3P-2P conversion adapter	1	1	1	1	None	None
Label (How to determine operating status)	1	1	1	1	1	1
Battery replacement date label	1	1	1	1	1	1
Control panel English label	1	1	1	1	1	1
Omron contact info label	1	1	1	1	1	1

(2) UPS monitoring software related items

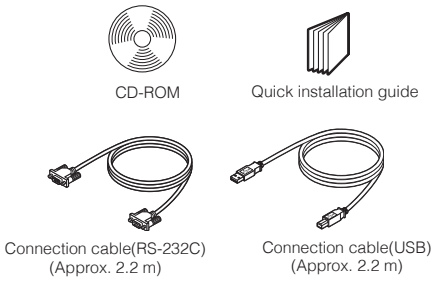
	BN50S	BN75S	BN100S	BN150S	BN220S	BN300S
Quick installation guide	1	1	1	1	1	1
CD-ROM	1	1	1	1	1	1
Connection cable (RS-232C)	1	1	1	1	1	1
Connection cable (USB)	1	1	1	1	1	1

<Accessories related to main unit>



*1: When the unit is used in compliance with UL standards, do not use a 3P-2P plug adapter.

<UPS monitoring software>

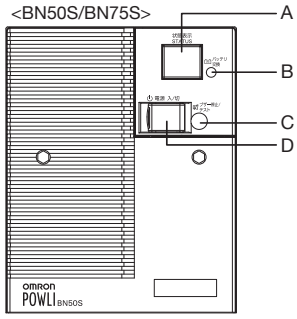


1-3 Name of each part

This section describes the name of each part of the UPS.
For information on the function of each part, refer to "2. Installation and connection" on page 17 and "3. Operation" on page 34 that provides the details.

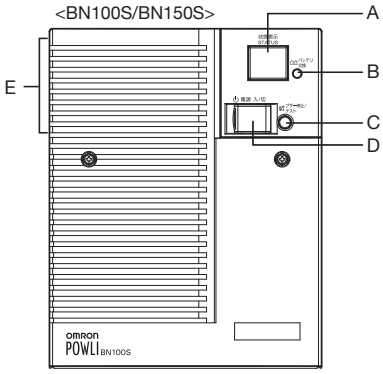
Front view

<BN50S/BN75S>



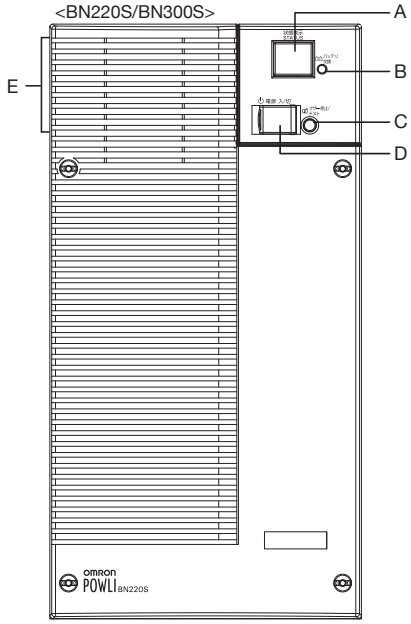
A. Status indicator digital display
B. Battery replacement lamp
C. Beep stop/test switch
D. Power switch

<BN100S/BN150S>



A. Status indicator digital display
B. Battery replacement lamp
C. Beep stop/test switch
D. Power switch
E. Supply air vent

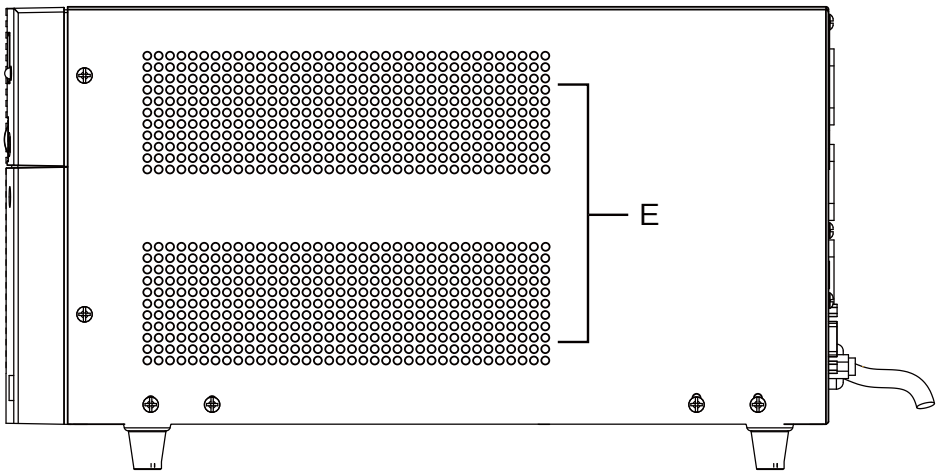
<BN220S/BN300S>



A. Status indicator digital display
B. Battery replacement lamp
C. Beep stop/test switch
D. Power switch
E. Supply air vent

Side view

<BN50S/BN75S>



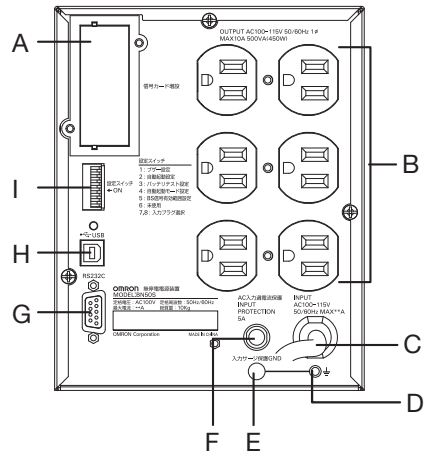
E. Air vent

There are also air vents on the other side (right side of the unit).

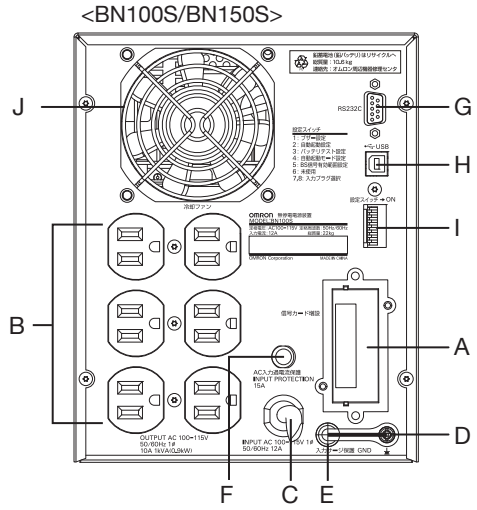
* The BN100S/BN150S/BN220S/BN300S does not have air vents on the sides.

Rear view

<BN50S/BN75S>



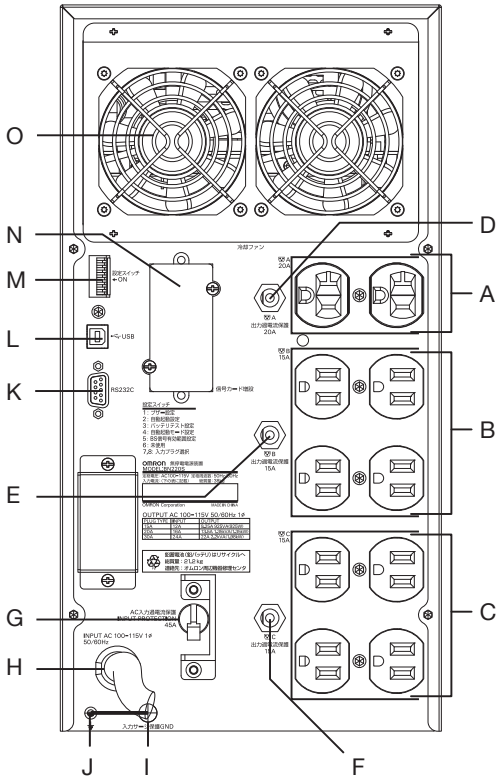
<BN100S/BN150S>



A. Signal card expansion slot
B. Power supply output receptacles
C. AC input cable
D. Grounding terminal
E. Input surge protection GND
F. AC input overcurrent protection switch
G. RS232C connector
H. USB connector
I. Setting switch
J. Cooling fan

Rear view

<BN220S/BN300S>



A. Power supply output receptacle A (NEMA5-20R)
B. Power supply output receptacle B (NEMA5-15R)
C. Power supply output receptacle C (NEMA5-15R)
D. Power supply output receptacle A overcurrent protection switch 20A
E. Power supply output receptacle B overcurrent protection switch 15A
F. Power supply output receptacle C overcurrent protection switch 15A
G. AC input overcurrent protection switch (45A)
H. AC input cable
I. Input surge protection GND
J. Grounding terminal
K. RS232C connector
L. USB connector
M. Setting switch
N. Signal card expansion slot
O. Cooling fan

1-4 Explanation of symbols used on unit

Symbol	Description
	Start the UPS.
	Stop the UPS.
	Suspend a beep.
	Batteries at end of useful life, necessary to replace the batteries.

2 Installation and connection

2-1 Precautions and notes on installation and connection

⚠ Caution (for installation and connection)

Two or more people should work together to carry, unpack and install the unit (BN100S/BN150S/BN220S/BN300S).

- Because the unit is heavy, you may injure yourself or drop the unit, or it may fall over.

Carry the unit considering its weight and balance, and place it on a stable and robust base.

- Dropping or toppling the unit may cause injury.
- Approximate weight of the unit:
  10kg (BN50S/BN75S) 22kg (BN100S/BN150S) 38kg (BN220S/BN300S)
- If you drop the unit, stop using it and have it inspected and repaired.
  For repair, contact us; ____

Keep plastic package bags out of reach of children.

- Children may suffocate if they place their heads into plastic bags.

Make sure to connect the unit's AC input plug to a commercial power source with rated input voltage (100 to 115V AC) and 50/60Hz frequency.

- Connecting to a wall outlet (commercial power) with a different voltage or frequency may result in a fire.
- The unit may fail.

When an abnormality (unusual sound or smell) occurs, turn OFF the unit's power switch and disconnect the AC input plug from the wall outlet. Install the unit soon after the AC input plug is disconnected from the wall outlet.

- When performing maintenance on the connected devices, follow the above instructions to ensure safety.

Do not connect devices such as dryers, some solenoid valves, etc. , which have a half-wave rectifier that allows only half-cycle AC power to flow through.

- Overcurrent may damage the UPS.

Connect the unit to a wall outlet (commercial power) with a capacity of 7A (BN50S) / 10A (BN75S) / 15A (BN100S) / 20A (BN150S) / 30A (BN220S) / 42A (BN300S) or more.

- Otherwise, the power cord may be heated.
- When equipment with the maximum output capacity is connected, a maximum current of XXA (BN50S) / 10A (BN75S) / 15A (BN100S) / 20A (BN150S) / 30A (BN220S) / 42A (BN300S) / flows.

Provide secure grounding.

- After checking the plug shape of the wall outlet, directly connect the AC input plug of the unit to it. A failure or leak that occurs when the unit is not properly grounded may result in electric shock.

Do not disassemble, repair, or modify the unit.

- Doing so may cause an electric shock or a fire.

Do not install the unit in other than specified orientations.

- Dropping or toppling the unit may cause injury.
- If you install the unit in an orientation other than specified, the unit cannot be protected from a battery fluid leakage.

⚠ Caution (for installation and connection)

Do not use the unit where the maximum temperature exceeds 40°C.

- The battery becomes weak rapidly, which may cause a fire.
- Doing so may cause a failure or malfunction of the unit.

Do not exceed the ranges specified for environmental conditions during use/storage.

Do not install or store the unit in the places listed below.

- Do not store in places where the humidity is lower than 10% or higher than 90%.
- Do not use the unit in places where the ambient temperature is lower than 0°C or higher than 40°C.
- Do not use in places where the humidity is lower than 25% or higher than 85%.
- Do not install/store the unit in closed places such as cabinets with no clearance, places where there is flammable or corrosive gas, places exposed to direct sunlight, places with large amounts of dust, places exposed to shock or vibration, or outdoors.
- Installation or storing the unit in such a place may cause a fire.

Do not connect equipment that exceeds the output capacity of the unit. You can use a plug strip to connect additional devices, but do not connect devices that exceed the current capacity of the plug strip.

- The current protection of the unit may operate, which may stop the output.
- The wiring of the plug strip heats up, which may cause a fire.

Do not pinch or tie the cable of the unit.

- Doing so may cause the cable to be damaged or heated, which may cause an electric shock or a fire.
- If the cable is damaged, stop using the unit and have the cable repaired.
  For repair, contact us; ____

Do not use any of the included accessories with other devices.

- The accessories are designed exclusively for use with this unit.
- Doing so may compromise the safety of devices.

Do not block the air vents on the front and back of the unit (the BN50XS/ BN75XS has air vents on the sides).

- Doing so will cause the internal temperature to rise, which may cause the unit to fail and the battery to deteriorate.
- Leave at least 5 cm of space between the vent and the wall.

Do not connect a transformer such as a voltage transformer or isolating transformer to the output side.

- Overcurrent may damage the UPS.
- Even when connected to the input side, the UPS may fail or malfunction. Make sure to check the operation before use.

Do not connect devices that cannot be used with commercial power supply.

- When the unit's power switch is turned ON and an error occurs with the connected device, bypass operation is performed and commercial power supply is supplied as is to the connected devices.

Notes

When moving the unit from a cold place to a warm place, leave it for several hours before using it.

- If the unit is promptly turned ON after being moved to a warmer place, condensation may form inside the unit and cause it to fail.

Charge the battery for at least 8 hours soon after purchasing the unit.

- If you do not use the unit for a long time after the purchase, the battery may deteriorate and the battery may become unusable.
- To charge a battery, connect the AC input plug of the unit to a wall outlet (commercial power).

When storing the unit, charge the battery for at least 8 hours and turn OFF the power switch.

- Even if the unit is not used, the battery gradually discharges, and if it is left for a long time, it goes into an over discharge state.
  The backup time may become shorter or the battery may become unusable.
- We recommend keeping the temperature 25°C or less when storing the unit for long periods of time.
  Connect the units AC input plug to a wall outlet (commercial power) for at least 8 hours at the following intervals:
  - Every 6 months when storage temperature is 25°C or less
  - Every 2 months when storage temperature is 40°C or less
- Turn off the power switch of the unit during storage.

Do not short the output lines of the unit to each other, and do not short the output lines to the ground.

- The unit may fail.

Do not connect the AC input plug of the unit to its Power Supply Output Receptacle during the Battery Mode.

- The unit may fail.

Do not connect a page printer (such as a laser printer) to the unit.

- The unit repeatedly and frequently switches between Commercial Power Mode and Battery Mode, which may shorten the life of the battery.
- The page printer has a large peak current, so an excess of the connection capacity or a power failure due to instantaneous voltage drop may be detected.

Check system operation beforehand if the unit is used in combination with a device whose power supply frequency fluctuates widely, such as a personal electric generator.

- The unit automatically recognizes the input power frequency when input power is supplied.If the unit is connected when the input power frequency is not stable at the rated level, the unit may misidentify the power supply frequency and may fail to operate normally. (If the unit is in operation, changing from commercial power supply to another power supply source, such as generating equipment, will cause no problem. Set the generator's frequency to the same level as that of the commercial power supply.)

Do not install or store the unit in a place exposed to direct sunlight.

- The rise of temperature may cause the built-in battery to deteriorate rapidly and become unusable.

Before performing a withstand voltage test or insulation resistance test, make sure to remove the input surge protection GND screw from the back of the unit.

When in use, make sure the input surge protection GND screw is securely fastened.

- Performing the withstand voltage test with the ground wire connected may damage the surge absorption element built into the power supply input circuit.

Notes

Before stopping the commercial power to the unit, turn OFF the power switch of the unit.

- The unit enters Battery Mode when commercial power is stopped. If you frequently use the unit in Battery Mode, the battery life may be significantly shortened.

If this unit is used with an inductive device such as a coil or motor, check the operation beforehand.

- With some types of devices, the effect of inrush current may cause this unit to stop operating properly.

2-2 Installation and connection

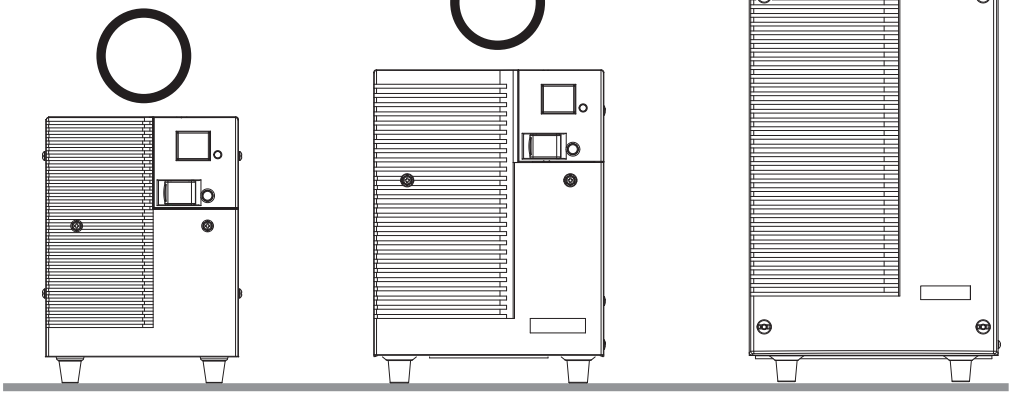
This section describes how to install the UPS. Do not use this unit in any position other than the “correct positions” indicated in the illustration below.

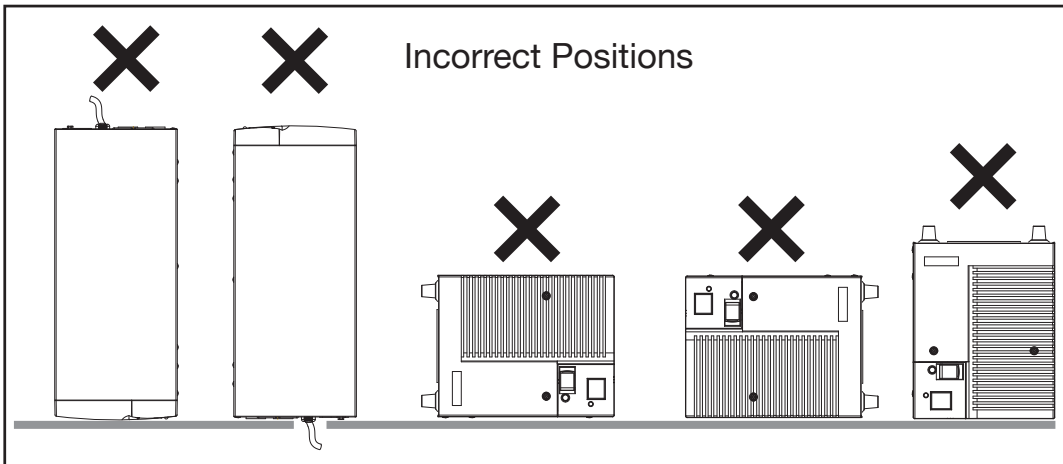
Note

Before installing this device, make a record of the unit’s serial number.
The serial number is required when contacting us about the device.
The serial number is inscribed on the back of the unit.

Correct Positions

⚠ Be careful not to get your fingers caught when arranging the unit.





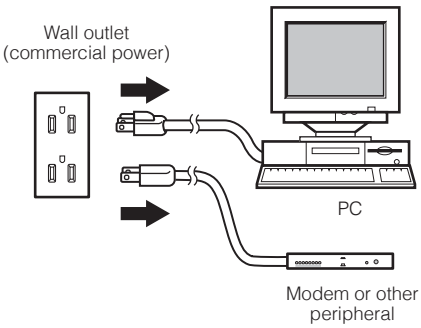
2-3 Connecting the equipment

Connecting a device to the power supply output (BN50S/BN75S/BN100S/BN150S)

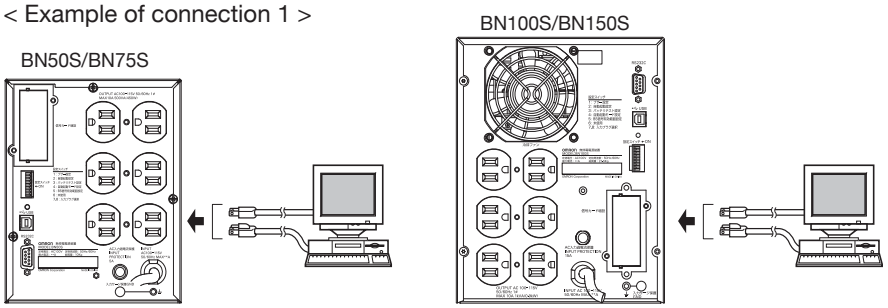
(1) Disconnect the AC Input Plugs of all devices you want to back up such as your PC and modems from a wall outlet (commercial power).

(2) Connect devices you want to back up to the Power Supply Output Receptacles of the UPS.

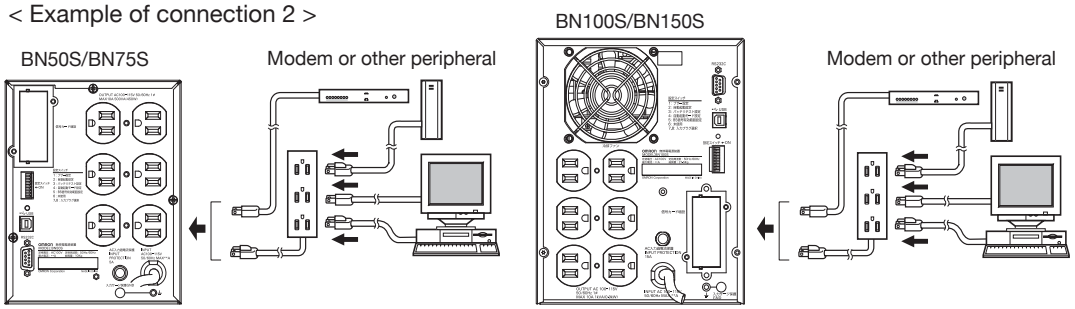
- If you need more output receptacles than those of the UPS, purchase a plug strip and use it for extra output receptacles.



< Example of connection 1 >



< Example of connection 2 >



- When using a 2-pin input plug with a grounding wire, connect the grounding wire to earth in building.
- When you want to use an AC adaptor, connect it to a Power Supply Output Receptacle of the UPS with space enough for the connection.

Note 1: This connection cannot be performed when the unit is used in compliance with UL standards.

(3) If you use the included UPS monitoring software or the standard UPS service of Windows NT or Windows XP/2000 or if you use Contact Signal, connect the connecting cable between the UPS and your PC.

See also **"7. Using the UPS monitoring software " Page 58, "8. Using a Contact Signal" page 72**
*** If you do not use the UPS monitoring software and Contact Signal, this step is not required.**

Connecting a device to the power supply output (BN220S/BN300S)

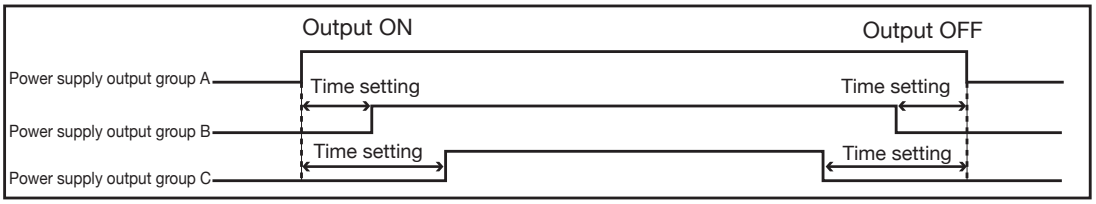
● Group control of power supply output

The output receptacles of the the UPS (BN220S/BN300S) are separated into 3 groups: A, B, and C.

- The output start times for power supply output group B and C are independent of power supply output group A, so they can be delayed or set to precede the output stop time.
- The output start/stop time control funtion is available when using the included “PowerAct Pro” UPS monitoring software, “UPS Power Manager” or “SNMP/Web card”.
- Output ON/OFF can be controlled with the included UPS monitoring software while the UPS (BN220S/BN300S) is operating.
- The delay settings and ON/OFF control described here can be performed independently for power supply output group B and power supply output group C.

This function can be used to set the startup order of servers, peripheral devices, etc.

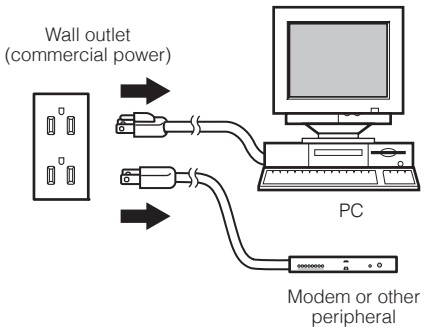
The output receptacles can also be forcibly turned ON/OFF remotely.

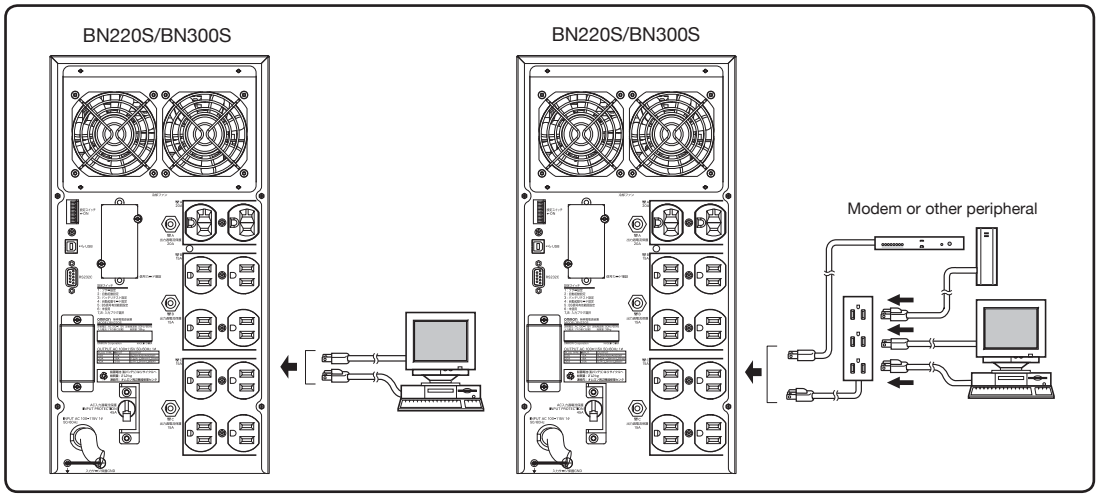


(1) Disconnect the AC Input Plugs of all devices you want to back up such as your PC and modems from a wall outlet (commercial power).

(2) Connect devices you want to back up to the Power Supply Output Receptacles of the UPS.

- If you need more output receptacles than those of the UPS, purchase a plug strip and use it for extra output receptacles.





- When using a 2-pin input plug with a grounding wire, connect the grounding wire to earth in building.
- When you want to use an AC adaptor, connect it to a Power Supply Output Receptacle of the UPS with space enough for the connection.

Note 1: This connection cannot be performed when this product is used in compliance with UL standards.

(3) If you use the included UPS monitoring software or the standard UPS service of Windows NT or Windows XP/2000 or if you use Contact Signal, connect the connecting cable between the UPS and your PC.

See also **"7. Using the UPS monitoring software " Page 58, "8. Using a Contact Signal" page 72**
*** If you do not use the UPS monitoring software and Contact Signal, this step is not required.**

- **The UPS has been charged prior to shipment. However, the backup time becomes shorter when using it for the first time due to spontaneous discharge.**
  We recommend charging the UPS before using it.
  When the AC input plug is connected to a wall outlet (commercial power), the battery automatically starts charging, taking up to 8 hours to complete (24 hours when an additional battery unit is connected).
- **You can perform "2-4 Checking the operation" on page 17 also before charging the battery.**

AC input plug

The AC input plug for the BN150S/BN220S/BN300S can be changed according to the operating environment. The table below lists the AC input plugs provided at shipment and those that can be replaced, and it shows the maximum output capacity for each plug.

- Items in bold are the AC input plug shapes that ship with the product and the maximum output capacities.

		100V mode				115V mode			
High voltage sensitivity		Standerd/High		Low		Standerd/High		Low	
Model	AC input plug	VA	W	VA	W	VA	W	VA	W
BN50S	**15A**	**500**	**450**	**500**	**450**	**500**	**450**	**500**	**450**
BN75S	**15A**	**750**	**680**	**750**	**680**	**750**	**680**	**750**	**680**
BN100S	**15A**	**1000**	**900**	**1000**	**900**	**1000**	**900**	**1000**	**900**
BN150S	**15A**	**1095**	**1095**	**1020**	**1020**	**1220**	**1220**	**1145**	**1145**
	20A	1500	1350	1420	1350	1500	1350	1500	1350
BN220S	**30A**	**2200**	**1980**	**2050**	**1980**	**2200**	**1980**	**2200**	**1980**
	15A	925	925	850	850	1020	1020	945	945
	20A	1350	1350	1250	1250	1495	1495	1395	1395
BN300S	15A	925	925	850	850	1020	1020	945	945
	20A	1350	1350	1250	1250	1495	1495	1395	1395
	30A	**2200**	**2200**	**2050**	**2050**	**2445**	**2445**	**2295**	**2295**
	50A	3000	2700	2850	2700	3000	2700	3000	2700

*1: The output voltage setting and input power sensitivity setting can be changed in the operating mode setting.
*2: The AC input plug (NEMA 5-15P (15A)/ NEMA L5-30P (30A)) that ships with the BN150S/BN300S cannot use the maximum output capacity (1500VA/1350W, 3000VA/2750W). If you want to use the maximum output, replace the plug with a 20A or 50A plug.
*3: If the BN220S plug is replaced with a 15A or 20A plug, the values specified in the table above apply and the maximum output capacity is limited.

Shape of replaceable AC input plug

NEMA5-15P	NEMA5-20P	NEMAL5-20P	NEMA5-50P
			

Replaceable AC input plugs are not available through our company, so you need to purchase them separately through another company.

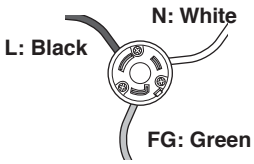
⚠ Caution

When the maximum output capacity is connected to the BN150S (1500VA/1350W), replace the AC input plug with a 20A plug. When the maximum output capacity is connected to the BN300S (3000VA/2700W), replace the AC input plug with a 50A plug.

- Overheating or fire may occur if the power consumption exceeds the limits shown in the “AC input plug” table above.
- If the maximum output capacity is being used, replace the plug as described in the table above.
- Overheating or fire may occur if the power consumption exceeds the limits noted above.
- After replacing the plug, make sure to change setting switches 7 and 8 on the back of the unit and connect the AC input plug to a wall outlet (commercial power).

- The BN50S/75S/100S/150S/220S/330S ships with the AC input plugs and maximum output capacities noted in bold in the table above. If an AC input plug is replaced to suit the operating environment, check that the maximum output capacity changes to the corresponding value shown in the table above.
- The warranty becomes invalid if the AC input plug is replaced with one that is not up to the standards shown in the table above.

AC input plug replacement procedure



1. Disconnect the plug to be replaced.
2. Connect the replacement plug as shown in the diagram on the right. Connect the black wire to the L pole, the white wire to the N pole, and the green wire to the FG pole.

⚠ Make sure the wire colors match those in the diagram before tightening the screws

- It is possible to connect the 15A (NEMA5-15P) plug to a 2-pin outlet when using the included 3P-2P adapter.

⚠ In this case, make sure the grounding is connected separately.

When replacing the plug, make sure to change setting switches 7 and 8 (located on the back of the unit) as shown in the table below.-

AC input plug selection/ Setting switches 7 and 8

Setting switch 7	Setting switch 8	BN150S	BN220S	BN300S
OFF	OFF	15A (at shipment) (NEMA5-15P)	15A (NEMA5-15P)	15A (NEMA5-15P)
ON	OFF	20A (NEMA5-20P NEMAL5-20P)	20A (NEMA5-20P NEMAL5-20P)	20A (NEMA5-20P NEMAL5-20P)
OFF	ON	-	30A (at shipment) (NEMAL5-30P)	30A (at shipment) (NEMAL5-30P)
ON	ON	-	-	50A (NEMA5-50P)

(4) When the installation and connection is complete, connect the AC Input Plug of the UPS to a wall outlet (commercial power).

(5) For BN220S/BN300S, turn ON the AC input overcurrent protection [INPUT PROTECTION] on the back of the unit after connecting to the commercial power.

⚠ Make sure the wall outlet is protected by a branch type beaker wihich rating is equal to the rating of AC input plug.

2-4 Checking the operation

After you finish connecting devices to the unit, make sure the backup function operates properly.

Check that the Battery Mode is performed normally according to the following procedure.

(This operation check simulates a power failure by disconnecting the AC input plug from a wall outlet.)

(1) Turn ON the unit's power switch.

The beeper sounds and the current settings are displayed on the LED.

After 5 secounds, the self-diagnostic test is performed in Battery Mode for approximately 10 seconds.

When the self-diagnostic test finishes successfully, switching to AC output from commercial power is performed and the the display below is shown.

(If the battery voltage is low, the self-diagnostic test is not performed and the operation starts immediately, using output from commercial power.)

Status indicator	Description
On	Power switch “ON” Operating normally

(2) Bring all the connected devices into operation.

(Including devices connected to the AC outlet of your PC.)

Operate the devices in a way in which abrupt power stop does not damage the connected devices, data, etc.

(3) Under this condition, check the the unit's LED display and beep sound.

Are they in the same status as shown below?

Status indicator	On
Beep	None
Power supply output receptacles	Outputs power (connected devices are powered)

If the same as the one shown above: ➜ The operation is normal. Proceed to (4).

If not the same as the one shown above: ➜ The operation is abnormal. One of the cases described in "4. Display and beeps when there is an equipment failure" of "3-3 Interpreting a beep and displays" on page 25 must apply.
Take necessary measures and then proceed to (4).

(4) Disconnect the AC input plug of this unit from a wall outlet (commercial power).

The UPS enters Battery Mode.

(5) In Battery Mode, check the unit's LED display and beep sound.

Does the status indicator appear as one of those shown below?

(` ´ indicates blinking)

Status indicator	Beep	Output	Charging	Description
	Intermittent 4-second intervals	ON	OFF Discharging	Backup is operating due to power failure or AC input error. Output will stop if Battery Mode continues.
	Intermittent 1-second intervals	ON	OFF Discharging	(Same as above.) Battery level is low, so output will stop soon.
	None	OFF	OFF Discharging	Battery is dead, so output stopped. (This is displayed only for a few seconds.)

If not the same as one of those shown above: ➜ Operation is abnormal. Check the status of lamps and beep and turn OFF the Power Switch.

- If the display is one of those shown in “4. Displays and beeps when there is an equipment failure” in “3-3 Interpreting beeps and displays” on page 25, take the necessary measures and then go back to (1) on page 17.
- If no Battery Mode is performed and the UPS and the devices connected to the UPS stop, this may be attributed to an insufficient battery charge.

  After connecting the AC input plug to a wall outlet (commercial power) and waiting at least 8 hours for the battery to charge, go back to (4) on page 17.
- If the problem persists after checking the 2 points above, contact us; ____

See also Setting switch 1 can be used to turn the beeper ON/OFF. ➛ Page 31

(6) Connect the AC input plug to a wall outlet (commercial power) again.

The status indicator returns to its normal state and the beeping sound stops.
(The status is as shown below.)

Status indicator	Description
	Power switch “ON” Operating normally

Checking the operation is now complete.

Installation and connection is now complete.

2-5 Charging the battery

When you connect the AC input plug of this unit to a wall outlet (commercial power), the battery charging automatically starts regardless of whether the power switch is ON or OFF, and it is fully charged within 8 hours.

(Charging is performed regardless of whether the power switch is ON or OFF.)

- This unit has been charged prior to shipment. However, the backup time becomes shorter when using it for the first time due to spontaneous discharge. We recommend charging this unit before using it.
- If you do not perform the initial backup time measurement described below in “2-6 Measuring the initial value of backup time”, proceed to “3. Operation. → Page 20”

2-6 Measuring the initial value of backup time

- When you measure the backup time initial value of the unit in your environment, this value can be used as a guide when checking the battery and deciding the UPS monitoring software setting values.

See also "5. Measuring the backup time" → Page 39

2-7 Recharging the battery

The battery is discharged completely when the backup time is measured, so you need to recharge it before using the UPS.

- You can use connected devices while recharging the battery, but the backup time when a power failure occurs is shorter until the battery is fully charged.
  (If a power failure occurs immediately after the start of charging, backup stops immediately.)

See also Charge the battery as described in "2-5 Charging the battery."

Preparation for starting operation is now complete.

3 Operation

3-1 Precautions and notes for operation

⚠ Caution (for use)

Do not allow the unit to come in contact with water.

- Doing so may cause an electric shock or a fire.
- If the unit becomes wet, immediately stop using it and unplug the AC input cable. For repair, contact us:_____

When the battery is dead, replace it immediately or stop using the unit.

- Continuing the use of it may cause a fire.

Ambient temperature	Expected life
20°C	4 to 5 years
30°C	2 to 2.5 years

* The values in the table are the expected life under standard use conditions and are not guaranteed.

Using a dry cloth, periodically wipe the dust from the AC input plug and power supply output receptacles.

- Accumulated dust may cause a fire.

Do not use the unit in a closed place and do not cover the unit.

- Doing so may cause abnormal heating or a fire.

If you notice abnormal sound or smell, smoke, or leakage from the inside, immediately turn OFF the power switch and disconnect the AC input plug from a wall outlet (commercial power).

- Using the unit under such conditions may cause a fire.
- If the unit becomes wet, immediately stop using it, unplug the AC input cable, and contact the shop of purchase or the OMRON Electronic Systems & Equipments Repair Center at _____ for inspection and repairs.
- Use the unit under the conditions in which you can immediately disconnect the AC input plug from a wall outlet (commercial power) in the case of an abnormal event.

If fluid leaks from the unit, do not touch the fluid.

- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not place objects heavier than 25kg on the unit, and do not drop heavy objects onto the unit.

- Doing so may cause distortion/damage to the case or a failure of the internal circuit, which may cause a fire.

Notes

Before stopping the commercial power to the unit, turn OFF the power switch of the unit.

- The unit enters Battery Mode when commercial power is stopped. If you frequently use the unit in Battery Mode, the battery life may be significantly shortened.

Take measures for handling unforeseen accidents, such as data backup and system redundancy.

- The output may stop when there is a circuit failure in the UPS.

Explanation

Usual operation

- You may either leave the power switch of the unit ON (operation status) or turn it OFF each time when stopping the connected system. Choose whichever operation method is more convenient. We recommend turning OFF the power switch when you do not use connected devices for a long time.
- The battery can be charged once the AC input plug of the unit is connected to a wall outlet (commercial power).

Quitting Battery Mode

- If a power failure lasts for an extended period of time, the battery discharges and power output from the unit stops. Shut down your computer after performing appropriate procedures (for example, saving data) while the unit is still supplying power.

Rebooting

- If the battery discharges completely during a power failure, the unit stops. After recovery from the power failure, the unit automatically restarts and supplies power. If you do not want to restart the connected devices, turn OFF the power switch of either the unit or the connected devices.

See also Setting switch 2 can be used to select whether or not auto restart is performed. See Page 30

Scheduled operation using the UPS monitoring software

- When performing scheduled operation in which the UPS is stopped and a device such as a breaker is used to stop the UPS at the same time that commercial power stops, specify a period of no more than 3 months for the start of the next operation.
  If you specify a period longer than 3 months, the internal timer is reset and the scheduled operation does not start. Note that this period reduces to approximately half when the battery is dead. If a period of 3 months is exceeded, you start operation by supplying commercial power and pressing the start switch. However, if the battery is dead, you may not be able to start operation. In this case, replace the battery according to the instructions in “6-2 Replacing the battery” on page 42.

3-2 Start and stop procedures and basic operation

● When the power switch is OFF and the AC input plug is connected to a commercial power supply:

- The details of the most recent error are displayed. (item 4 on page 26)
- The status indicator displays " ▬ ▬ ".
- Power output is stopped.
- The battery automatically starts recharging.

● Start procedure

Operation **Turn on the power switch of the UPS.**

- The beeper sounds and the current settings are displayed on the status indicator.
  See also Cold start ON/OFF setting ➛ Output voltage setting (page 31)
- The status indicator displays " FU ", and the self-diagnostic test is performed in Battery Mode for about 10 seconds. (If the battery voltage is low, the self-diagnostic test is not performed. It is automatically executed after the battery is charged.)
  *1 When the self-diagnostic test finishes successfully, switching to AC output from commercial power is performed and normal operation starts.
  *2 Self-diagnostic test is not performed at cold start.
- If the self-diagnostic test is finished normally, It is replaced by the AC output from a commercial power supply and become a normal driving state through inverter mode.
- If the self-diagnostic test is not executed, the UPS immediately starts outputting AC from commercial power.

Status indicator	On
Beep	None
Power supply output receptacles	Outputs power (connected devices are powered)

See also Cold start ON/OFF setting ➛ Page 34

- During operation, the battery is charged automatically.

● Operation after a power failure

- If a power failure or abnormal input power supply occurs, the UPS automatically switches to Battery Mode, continuing power output from the Power Supply Output Receptacles supplied from the battery.
- The status is displayed and the beeper sounds intermittently to alert the user.

See also Setting switch 1 can be used to turn the beeper ON/OFF. ➛ Page 30

(` ´ indicates blinking)

Status indicator	Battery replacement	Beep	Output	Charging	Description	Solution
bU	○	Intermittent 4-second intervals	ON	OFF Discharging	In Battery Mode due to power failure or AC power error.	Perform shutdown operations for the connected devices and stop them.
bL	○	Intermittent 1-second intervals	ON	OFF Discharging	(Same as above.) Battery level is low, so output will stop soon.	(Same as above.)
bE	○	None	OFF	OFF Discharging	Battery is empty, so output stopped.	Charge the battery.

● Operation during recovery from a power failure

- If a power failure or abnormal power input is resolved while the UPS supplies power, it returns to the commercial power output status automatically. Charging the consumed battery starts.
- If a power failure or abnormal power input is resolved after the battery is discharged completely and power output is stopped, the UPS restarts automatically and resumes power output. The expended battery begins to charge.

See also Setting switch 2 can be used to select whether or not auto restart is performed. ➛ Page 30

● Stop procedure

Status indicator	Battery replacement	Beep	Output	Charging	Description
▬ ▬	○	None	OFF	ON	There is AC input Power switch "OFF"

Operation **Turn OFF the power switch of the UPS.**

- The power output from the UPS stops.
- Even if you turn off the power switch, if AC is supplied from commercial power, the battery is automatically charged.

3-3 Interpreting beeps and displays

(○ indicates the display is OFF)
(● indicates the display is ON)
(: : indicates blinking)

1. Displays and beeps in normal operation

No.	Status indicator	Battery replacement lamp	Beep	Output	Charging	Description	Solution
1	88	○	None	OFF	OFF	No AC input Operation stopped	– –
2	– –	○	None	OFF	ON	There is AC input Power switch is OFF	– –
3	On	○	None	ON	ON	Power switch is ON Operating normally	– –
4	HS	○	None	OFF	ON	Standby due to an insufficient battery charge	Automatically starts when the battery level exceeds the specified level.

2. Displays and beeps while testing

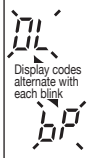
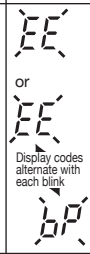
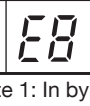
5	FU	○	None	ON	OFF Discharging	Self-diagnostic test in progress	– –
6	bC	○	None	ON	OFF Discharging	Auto battery test in progress	– –

3. Displays and beeps during power failure or AC input error

7	bU	○	Intermittent 4-second intervals	ON	OFF Discharging	In Battery Mode due to power failure or AC input error Output will stop if Battery Mode continues	Perform shutdown operations for the connected devices and stop them
8	bL	○	Intermittent 1-second intervals	ON	OFF Discharging	(Same as above) Battery level is low, so output will soon stop	(Same as above)
9	bE	○	None	OFF	OFF Discharging	Battery is dead, so output stopped (This is displayed only for a few seconds)	Charge the battery
10	HH	○	None	OFF	(ON)	AC input voltage and AC input frequency are too high	Use within the AC input voltage/frequency range described in the specifications → Page 83
11	-H	○	None	OFF	(ON)	AC input frequency is too high	
12	LH	○	None	OFF	(ON)	AC input voltage is too low and AC input frequency is too high	
13	H-	○	None	OFF	(ON)	AC input voltage is too high	
14	L-	○	None	OFF	(ON)	AC input voltage is too low	
15	HL	○	None	OFF	(ON)	AC input voltage is too high and AC input frequency is too low	
16	-L	○	None	OFF	(ON)	AC input frequency is too low	
17	LL	○	None	OFF	(ON)	AC input voltage and AC input frequency are both too low	

4. Displays and beeps when there is an equipment failure

(○ indicates the display is OFF)
(● indicates the display is ON)
(: : indicates blinking)

No.	Status indicator	Battery replacement lamp	Beep	Output	Charging	Description	Solution
18		○	Intermittent 0.5-second intervals	ON	ON or Discharging	There are too many connected devices and the rated capacity is exceeded If this state continues for as long as or longer than the times described below, commercial power continues to be supplied through bypass operation (Note 1) - When 110% or higher: Bypass operation begins after 5 minutes (Go to No.19) - When 150% or higher: Output stops immediately (Go to No.20)	Reduce the number of connected devices until the display appears as in status No. 3
19		○	Intermittent 0.5-second intervals	ON	ON or Discharging	Moved to bypass operation (Note 1) because status No.17 continued If the connection capacity is increased further and reaches 150% or higher, output stops immediately (Go to No.20)	Turn OFF the power switches of all devices connected to the unit, reduce the number of connected devices, and turn the power switch back ON again
20		○	Continuous	OFF	ON or Discharging	Output stopped due to exceeded connection capacity	(Same as above)
21		○	Continuous	OFF	ON or Discharging	Output stopped due to exceeded connection capacity or a short-circuit with the connected devices	Check that the AC input of connected devices is not short-circuited, or that the connection capacity does not exceed the rated capacity
22		○ (Note 2)	Continuous	ON or OFF	– –	Failure occurred (Only “EE” is blinking: Output stopped Blinking switches between “EE” and “bP”: Entered bypass operation) When the beep stop switch is pressed, the details of the error are displayed (Nos. 23 to 29)	Turn OFF this unit and all connected devices Then, turn the power switch back ON for this unit only If the display does not change, there is a problem with this unit Contact the shop of purchase or our Electronic Systems & Equipments customer support center at: _____
23		○	Continuous	ON	– –	Moved to bypass operation due to output voltage error (over) (Note 1)	Displays the details of the error that occurred only while pressing the beep stop switch while in state No. 22
24		○	Continuous	ON	– –	Moved to bypass operation due to output voltage error (under) (Note 1)	(Same as above)
25		○	Continuous	ON	– –	Moved to bypass operation due to battery charge voltage error (over)	(Same as above)
26		○	Continuous	ON	– –	Moved to bypass operation due to battery charge voltage error (under)	(Same as above)
27		○	Continuous	ON	– –	Moved to bypass operation due to problem with the internal temperature (Note 1)	(Same as above)
28		○	Continuous	OFF	– –	Stopped due to bypass bus voltage error (Commercial Power Mode continues)	(Same as above)
29		○	Continuous	ON	– –	Moved to bypass operation due to problem with the internal cooling fan (Note 1)	(Same as above)

Note 1: In bypass operation, commercial power is output directly.
Output stops when a power failure (AC input OFF) occurs in bypass operation.
Note 2: The displays and operations vary according to the status.

5. Display and beep for battery replacement

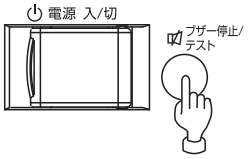
(○ indicates the display is OFF)
(● indicates the display is ON)
(⁚ indicates blinking)

No.	Status indicator	Battery replacement lamp	Beep	Output	Charging	Description	Solution
30	On	●	Intermittent 2-second intervals	ON	ON	The battery test detected a weak battery (warning only, output continues)	Replace the battery You can replace the weak battery with a separately purchased replacement battery as needed

4 UPS functions

4-1 Suspending a beep

When the beep is sounding, you can suspend it by pressing and holding the beep stop/test switch for 0.5 seconds or longer.



4-2 Self-diagnosis test

This test performs a failure diagnosis on the unit and performs a simple test to check for battery deterioration.

Use the procedure below to check whether a circuit failure has occurred inside the unit and whether battery replacement is required.

If the battery is not fully charged, the self-diagnostic test is not executed immediately.
After charging is complete, it is automatically executed.

(1) Connect your computer and other devices to the UPS and then turn ON the power switch of the UPS.

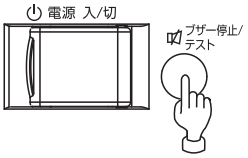
(2) The Battery Mode starts for testing purpose automatically (Status indicator "FU"). (No beep sounds.) After about 10 seconds, when the test is complete the normal operation automatically starts.

(3) If the status indicator/battery replacement lamp blinks and the beeper sounds:
See also "3-3 Interpreting beeps and displays" ➛ Page 25

Follow the directions for the solutions described in "4. Displays and beeps when there is an equipment failure" and "5. Display and beep for battery replacement".

* This test can also be run from the included UPS monitoring software.
For more details, refer to the online help for the UPS monitoring software.

This test can also be performed manually.
Press and hold the Beep Stop/Test Switch of the UPS for 5 second or longer.
When the beeper begins to sound intermittently, release the Switch.



4-3 Description of the auto battery test function

This test performs a failure diagnosis on the unit and performs a test to check for battery deterioration.

(This test is more accurate than the self-diagnostic test.)

This test is performed automatically. (You do not have to perform any special operations.)

The test is performed at intervals of 4 weeks after the AC Input Plug is connected to a wall outlet (commercial power).

The test is not performed if the power switch is OFF or if the battery is not fully charged.

(1) When the auto battery test starts, the Battery Mode automatically starts (Status indicator "bC"). (No beep sounds.) After the auto battery test is complete, the normal operation automatically starts.

(2) If the status indicator/battery replacement lamp blinks and the beeper sounds:

See also "3-3 Interpreting beeps and displays" ➛ Page 25

Follow the directions for the solutions described in "4. Displays and beeps when there is an equipment failure" and "5. Display and beep for battery replacement".

The setting switch on the Front of the UPS allows you to select the "disable the auto battery test" setting.

See also "4-4 Changing the setting of the functions" ➛ Page 29
See "Setting for whether or not to perform battery test."

This test can also be performed manually.

Press and hold the Beep Stop/Test Switch of the UPS for 10 second or longer.

When the beeper changes from intermittent beeps to a sustained beep, release the switch.

4-4 Changing the setting of the functions

1. Selecting functions with the DIP switch

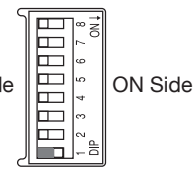
After changing the setting switch, follow the procedure described below.

After changing the setting switch, turn OFF the UPS power switch, disconnect the AC input plug, wait until the status indicator is completely OFF, and then reinsert the AC input plug.

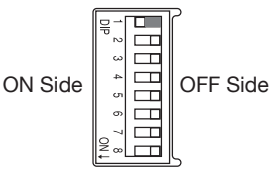
● The setting switch changes do not become valid until the AC input plug is reinserted.

- Use a fine-pointed tool such as a small screwdriver to maneuver the switch's lever.

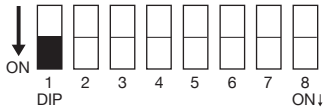
BN100S/BN150S



BN50S/BN75S
BN220S/BN300S



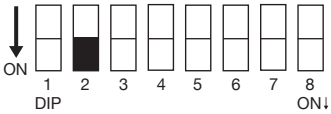
● Setting for beeper sound in the event of power failure, etc. (setting switch 1)
··· Factory setting: OFF



OFF: The beeper sounds when an alarm is necessary.

ON: The beeper does not sound for backup operation or battery replacement. The beeper sounds for other errors (connection capacity exceeded, operation error, etc.).

● Auto startup setting after recovery from power failure (setting switch 2)
··· Factory setting: OFF



OFF: Automatically starts when power is restored.

After a power failure occurs and the unit shuts down using the shutdown software or contact signal(BS signal), the unit automatically starts and begins to output when the commercial power is restored.

ON: Does not automatically start when power is restored.

After the unit is shut down with the UPS monitoring software or contact signal (BS signal), it does not start up when commercial power is restored. Startup is performed by turning the power switch OFF once, and then back ON again.

● Setting for whether or not to perform battery test (setting switch 3)
··· Factory setting: OFF

OFF: The battery test is automatically executed once every 4 weeks.

ON: Does not perform the auto battery test.

Use this setting to disable Battery Mode for for the regularly performed auto battery test.

● Auto startup mode setting (setting switch 4) ··· Factory setting: OFF

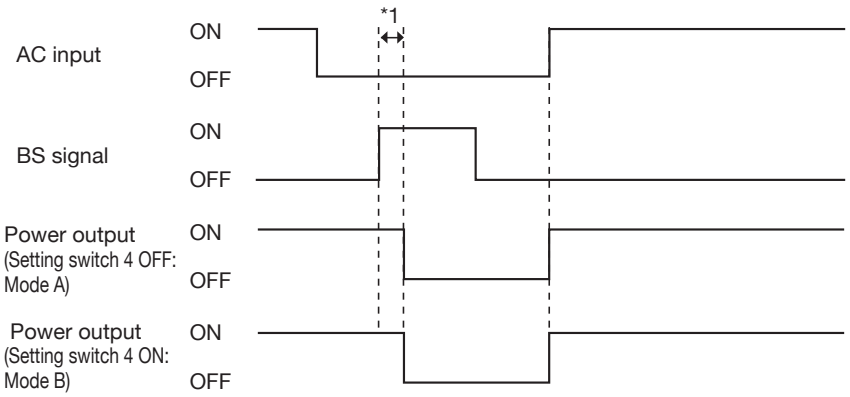
OFF: (Mode A) After UPS stopped, the UPS is automatically started immediately when “ON” is detected for the AC input.

ON: (Mode B) After UPS stopped, the UPS is automatically started in the AC input’s “OFF to ON” timing that is detected.

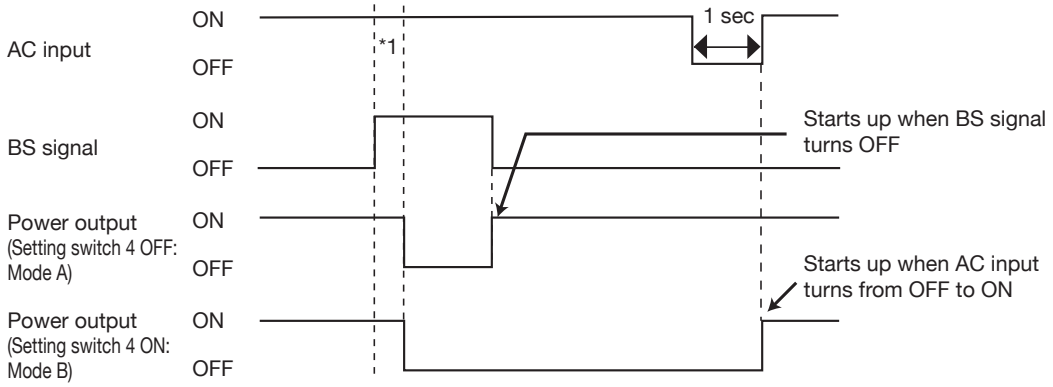
(Definition of AC input OFF: When AC input is OFF for 1 second or more)

* Setting switch 4 is valid when the auto startup after recovery from power failure setting (setting switch 2) is set to OFF (auto restart is performed).
* This setting mode is valid only after the UPS has been stopped by the contact signal backup stop signal (BS).
* When a cable is connected to the RS-232C connector and the UPS monitoring software is used, the unit operates in Mode A regardless of this setting.

(1) When BS signal is used to stop the UPS after a power failure occurs

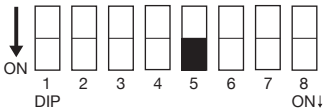


(2) When BS signal is used to shut down the UPS when AC input is ON



* 1: BS signal reception time corresponds to the setting switch 5.

● BS signal valid range setting (setting switch 5) ··· Factory setting: OFF



OFF: The BS signal is always valid (receivable).
The unit's "power output" can be stopped by inputting a "ON" backup power supply stop signal (BS) that continues for 10 seconds or more.

ON: The BS signal is valid (receivable) only when in Battery Mode. (The signal is not received when in Commercial Power Mode.)
The unit's "power output" can be stopped by inputting a "ON" backup power supply stop signal (BS) that continues for 0.01 (10 ms) seconds or more.

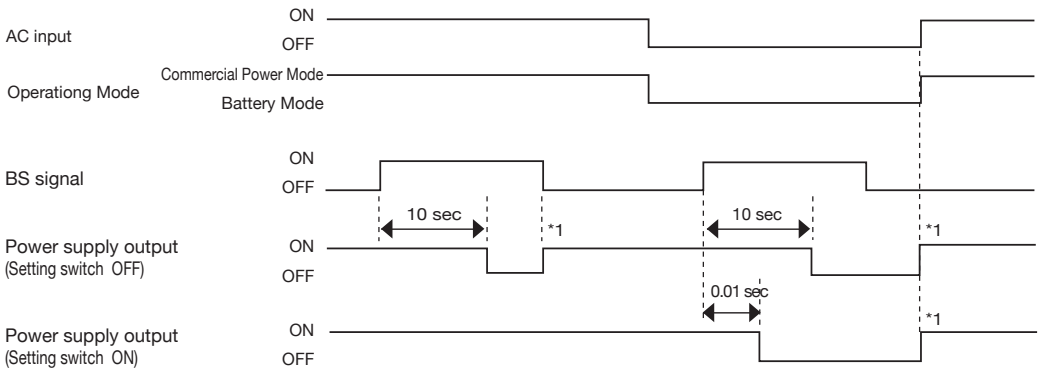
Use this setting in commercial operation when you do not want to stop operations when a backup power supply stop signal (BS) is received.

•Auto startup operation when power is restored

Auto startup when power is restored is associated with setting switch **2**.

However, the unit does not start up when the BS signal is ON.

● BS signal valid range setting (setting switch 5)



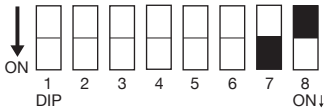
Note 1: Operation when setting switch 2 is OFF (auto startup is performed). When it is ON (auto startup is not performed) auto startup is not performed.

● AC input plug selection (setting switch 7, 8)

··· Factory setting: Refer to the table below. (The values may vary depending on the model.)

* Always use the BN50S/BN75S/BN100S with the switches in their original OFF/OFF state (factory settings).

When replacing the AC input plug on the BN150S/BN220S/BN300S, change the settings according to the table below.



Setting switch 7	Setting switch 8	BN150S	BN220S	BN300S
OFF	OFF	15A (at shipment) (NEMA5-15P)	15A (NEMA5-15P)	15A (NEMA5-15P)
ON	OFF	20A (NEMA5-20P NEMAL5-20P)	20A (NEMA5-20P NEMAL5-20P)	20A (NEMA5-20P NEMAL5-20P)
OFF	ON	-	30A (at shipment) (NEMAL5-30P)	30A (at shipment) (NEMAL5-30P)
ON	ON	-	-	50A (NEMA5-50P)

See also After changing the AC input plug, check the maximum allowable output values in the “AC input plug” table in “2-3 Device connection procedure.” Page 12

2. UPS operation mode settings

2-1 Settable items and explanations

There are 5 items to select.

1) Cold start ON/OFF setting
2) Input power sensitivity setting
3) Output voltage setting
4) Power output stop delay time setting *
5) Signal input/output test *

* Can be used when the SC07 (option) is added.

The settings available for this operation are shown below.

1) Cold start ON/OFF setting

• Cold start OFF mode
The unit can start up only when there is AC input.

• Cold start ON mode
It is possible to start up the unit even when there is no AC input plug.
(It is not possible, however, to start up the unit by the remote signals.)
Normal operation occurs when AC input is ON. The output frequency is the same as the frequency the last time there was AC input.

• When using the cold start function
When performing operation with cold start a second time, turn OFF the power switch and wait at least 20 seconds before turning it back ON.
If the time is too short, UPS may not start up.

2) Input power sensitivity setting

Three types of input sensitivity can be set.

• Standard voltage sensitivity mode (100V AC mode and 115V AC mode)
The power failure detection voltage is set to the standard setting.

• Low voltage sensitivity mode (100V AC mode and 115V AC mode)
The power failure detection voltage is 5V lower than the standard setting.

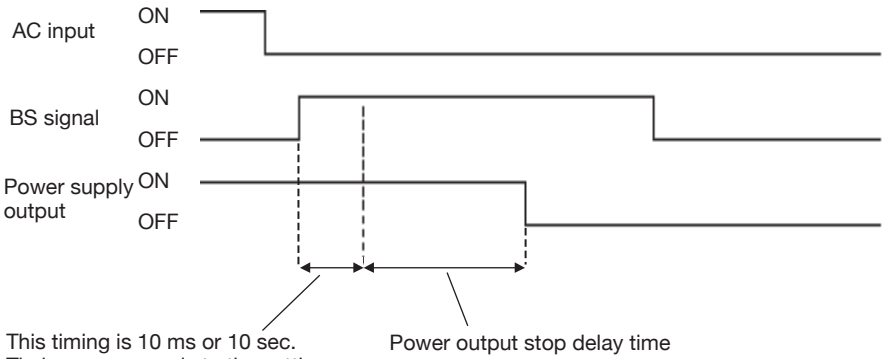
• High voltage sensitivity (100V AC mode)
The power failure detection voltage is 5V higher than the standard setting.

● The allowable voltage ranges for each setting are shown below.

	100V mode	115V mode
Standard voltage sensitivity	89±2 to 118±2V AC (with 90% or less connection load)	99±2 to 129±2V AC
Low voltage sensitivity	84±2 to 118±2V AC	94±2 to 129±2V AC
High voltage sensitivity	89±2 to 113±2V AC	—

3) Output voltage setting (100V/115V)
Two types of output voltage can be set. (Setting range: 100V/115V)
Output is performed at the set voltage, with no relation to the input voltage.

4) Power output stop delay time setting
It is possible to set the delay time for stopping the power supply output after the BS signal is received. (Setting range: 0 to 10 minutes)



See also → Page 33

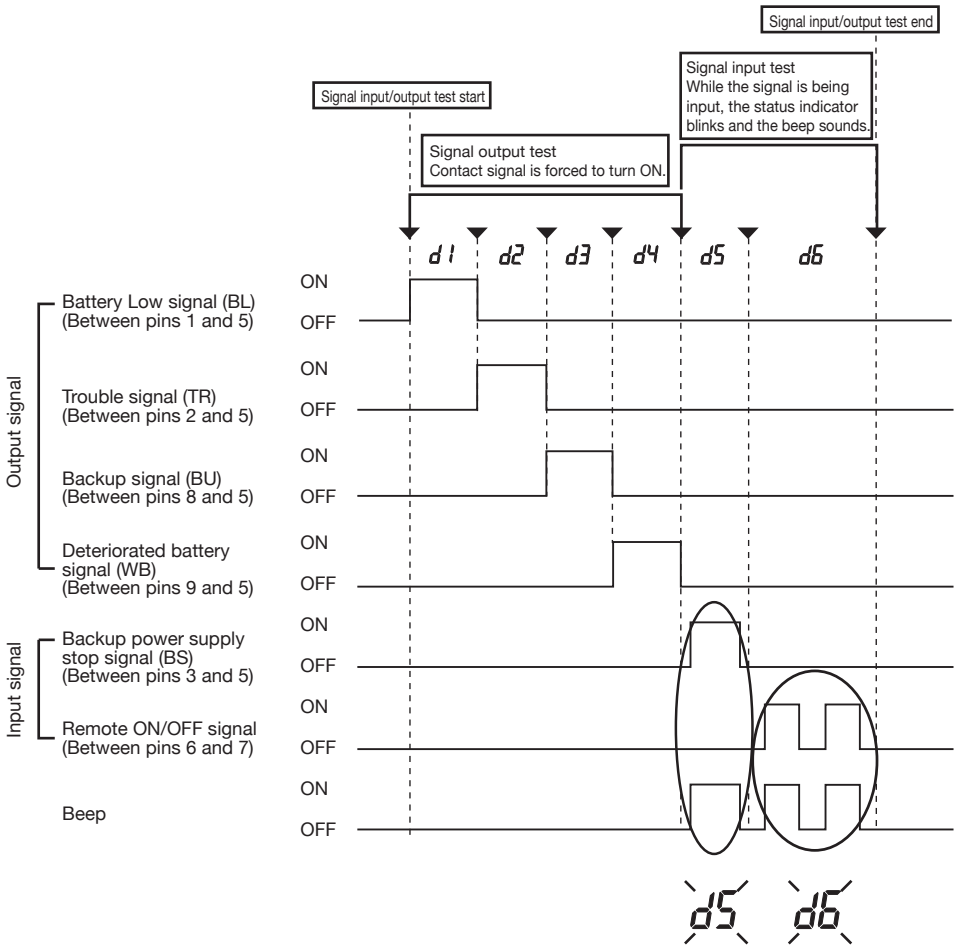
<Note>

The remote ON/OFF signal is not related to this setting.

When the remote ON/OFF signal is “High”, the UPS stops the output immediately.

5) Signal input/output test (BL/TR/BU/WB/BS/remote)

- Four types of output signal can be forcibly turned ON.
- The ON/OFF state of two types of input signal can be checked with the status indicator and the beeper.

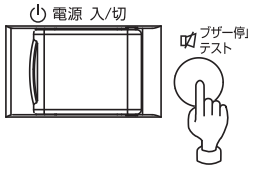


While the signal is being input, these status indications blink and the beep sounds.

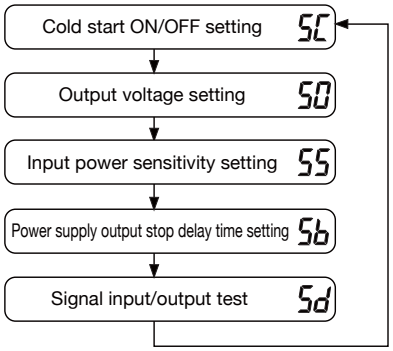
2-2 Settings

The UPS operation mode can be set if the power switch is turned ON while the beeper stop /test switch is pressed.

Note: While in setting mode, output from the power supply output is OFF even if the power switch is ON.



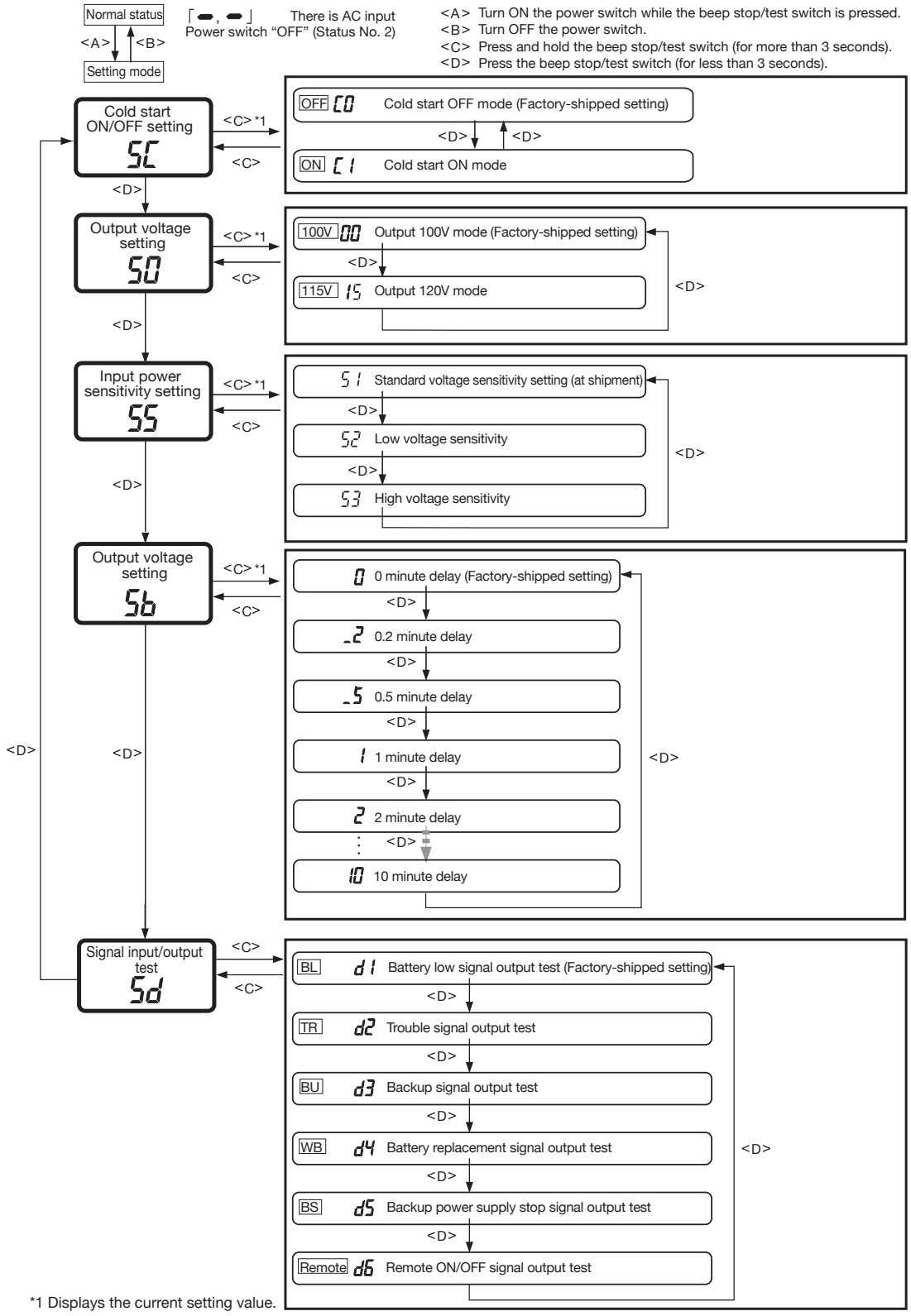
(1) When the beeper stop/test switch is briefly pressed (for less than 1 second), the next item is displayed.



(2) The unit enters the “individual item setting mode” when the beeper stop/test switch is pressed and held (for more than 1 second).

(3) When the power switch is turned OFF, the setting mode quits and the unit enters power switch OFF status (status – –).

4.UPS functions



*1 Displays the current setting value.

5 Measuring the backup time

5-1 How to measure backup time

(1) When the AC input plug is connected to a wall outlet (commercial power), the battery automatically starts charging, taking up to 8 hours to complete.

(2) Turn ON all devices connected to the power output to be “backed up during a power failure”.
(This includes devices connected to the AC outlet of your computer.)
Operate the connected devices in a way that allows the power supply to be stopped at any time.

- **For Windows Server 2003/Vista/XP/Me/2000/Windows NT/Linux/Mac:**
  Perform measurement while the hard drive is stopped.
- **For Windows 98/95:**
  Choose "Shut Down" in Windows and follow the procedure below to shut down your OS.
  Choose "Restart in MS-DOS mode" to exit from OS and display the MS-DOS mode screen.

(3) Disconnect the AC Input Plug of the UPS and measure the backup time.
Measure the time until the unit automatically stops and all displays disappear with the plug disconnected.

* The backup time you measure for the first time after purchase is the "initial value of the back-up time."

5-2 Estimated backup time

The backup time varies depending on the capacity of connected devices.
After calculating the total capacity of connected devices, refer to the graph of the backup time to obtain an estimation of the initial value of the backup time. (This is also applied to checking the battery.)

(1) Convert the total capacity (power consumption) of the connected devices to watts (W).
For the indication of connected devices, check your computer and the rear of the display.
The indicator can show values in three different ways: volt-amperes (VA), amperes (A), and watts (W).

Example 1) 100 VAC, 50/60Hz, 145 W
Example 2) 100 VAC, 50/60Hz, 1.8 A
Example 3) 100 VAC, 50/60Hz, 150 VA

Indication	Value
VA	× power factor = W
A	× power factor × 100 = W

For devices that use the VA or A indication, convert the capacity into W. Multiply the value indicated on devices by the value in the right table for conversion.

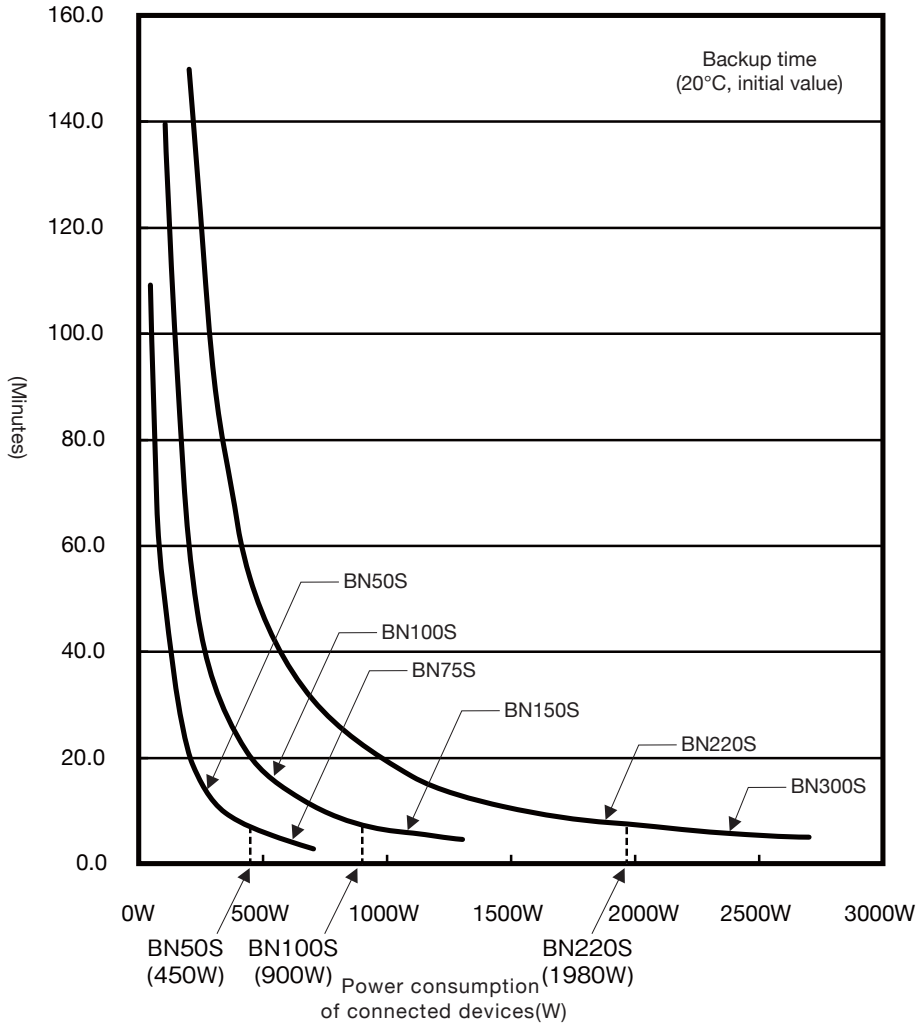
(When the power factor is unknown, enter “1”. The power factor usually ranges between 0.6 and 1.)

5.Measuring the backup time

(2) Add the values converted into W to obtain the total capacity of the connected devices.

(3) Calculate the initial value of the backup time for the total capacity of the connected devices from the graph below.

- Graph of backup time (graph of initial values for products that have not been used)
- The smaller the capacity of connected devices becomes, the longer the backup time becomes.



Time unit: Minutes

Model	20W	50W	100W	200W	300W	400W	500W	700W	1000W	1400W
BN50S	230	109	49	21	12	8.2	5.5 (at 450W)	-	-	-
BN75S	230	109	49	21	12	8.2	6	3.5 (at 680W)	-	-
BN100S	620	290	140	60	35	24	18	11	7.9 (at 900W)	-
BN150S	620	290	140	60	35	24	18	11	7	5.0 (at 1350W)

Model	200W	400W	600W	800W	1000W	1200W	1400W	1600W	1800W	2000W	2700W
BN220S	150	64	38	25	18	15	12	10	8.4	7.0 (at 1980W)	-
BN300S	150	64	38	25	18	15	12	10	8.4	7.5	5

* These backup times are for reference only. Times may vary according to battery life and external environmental conditions (temperature, etc.).

6 Maintenance and Inspection

⚠ Caution (for maintenance)

When maintaining the connected equipment, turn OFF the power switch and disconnect the AC input plug.

- Even if you disconnect the AC input plug while the UPS is operating, the power output of this unit does not stop and power is supplied from the outlet during a power failure.

Do not disassemble, repair, or modify the unit.

- Doing so may cause an electric shock or a fire.

If fluid leaks from the unit, do not touch the fluid.

- Doing so may cause blindness or burns.
- If the fluid contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not throw the unit into fire.

- The lead battery in the unit may explode, or leak dilute sulfuric acid.

Do not insert metal objects into the power supply output receptacles of the UPS.

- Doing so may result in electric shock.

Do not insert metal objects into the battery connectors.

- Doing so may result in electric shock.

6-1 Checking the battery

The sealed lead battery used in the unit has a limited life.
(The life varies depending on your storage/use environment and backup frequency.)
The nearer the end of the life is, the more rapidly deterioration proceeds.

1. Life of battery (estimated replacement timing)

Ambient temperature	Life of battery	Replacement estimation
20°C	4 to 5 years	4 to 5 years after staring use
30°C	2 to 2.5 years	2 years after staring use

2. Methods for checking the battery

There are 3 methods for checking the battery.

- Perform a self-diagnostic test. (See page 28.)
- Use the auto battery test function. (See page 29.)
- Measure the backup time. (See page 39.)

By measuring the backup time, the battery life can be determined more accurately.

See also Measure the backup time according to "5-1 How to measure backup time" ➛ Page 39

If the measured value is equal to the "initial value of the backup time" or less than half the value obtained from the graph of "Estimated backup time" on page 39, replace the battery.

- When you compare the "initial value of the backup time" you measured and the current backup time, make the capacity of devices connected to the UPS same as when you measured the initial value to make judgment accurately.

3. Guidelines for how often to check the battery (measure the backup time)

Ambient temperature	Check once every 6 months	Check once a month
20°C	For the first 3 years after purchase	When 3 or more years have passed since purchase
30°C	For the first 1.5 years after purchase	When 1.5 or more years have passed since purchase

*** The battery deteriorates even if it is stored. The higher the temperature is, the shorter the life becomes.**

6-2 Replacing the battery

The battery can be replaced while the unit is stopped (power supply output stopped).

⚠ Caution

When the unit is used in compliance with UL standards, do not replace the battery while in operation (while power is being output). Replacing the battery while in operation does not comply with UL standards. Make sure to stop the operation of the unit before replacing the battery.

* When replacing the battery, stop the connected devices, turn OFF the power switch of the UPS, and disconnect the AC input plug from the wall.
* If an input power supply error such as a power failure occurs when replacing the battery while in operation, backup cannot be performed and output stops.
* Do not replace the battery during backup operation. Output will stop.

⚠ Caution (for battery replacement)

Perform replacement on a stable and flat place.
- Handle the battery carefully so that you do not drop it.
- Not doing so could cause injury or burns due to liquid (acid) leakage.

Use a specified battery for replacement.
- Not doing so may cause a fire.
- Product model: BNB75S: One required (Replacement battery pack for BN50S/BN75S)
  BNB300S: One required (Replacement battery pack for BN100S/BN150S)
  BNB300S: Two required (Replacement battery pack for BN220S/BN300S)

Do not replace the battery in a place where there is flammable gas.
- Spark may occur when connecting the battery, which may cause an explosion or fire.

If fluid (dilute sulfuric acid) leaks from the battery, do not touch the fluid.
- Doing so may cause blindness or burns.
- If it contacts your eyes or skin, wash it out with lots of clean water and consult your doctor.

Do not disassemble or modify the battery.
- Doing so could cause dilute sulfuric acid leak, which could cause blindness and burns.

Do not drop the battery and do not expose it to strong impact.
- Dilute sulfuric acid may leak.

Do not short the battery with metal objects.
- Doing so could cause an electric shock, fire or burn.
- Some electrical energy still remains inside the spent battery.

Do not put the battery into fire and do not break it.
- The battery may explode or leak dilute sulfuric acid.

Do not use a new battery and an old battery at the same time.
- Dilute sulfuric acid may leak.

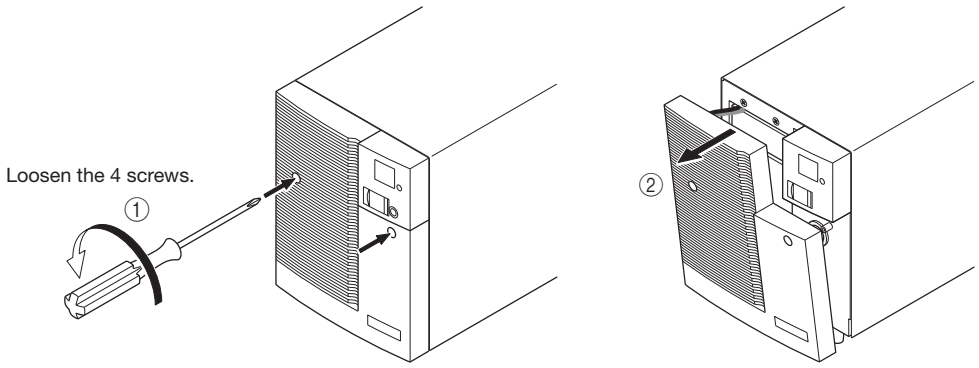
Battery recycling
The unit uses lead acid batteries, which are a valuable recyclable resource. Please recycle.
For information on recycling, please contact our Electronic Systems & Equipments repair center.

Pb

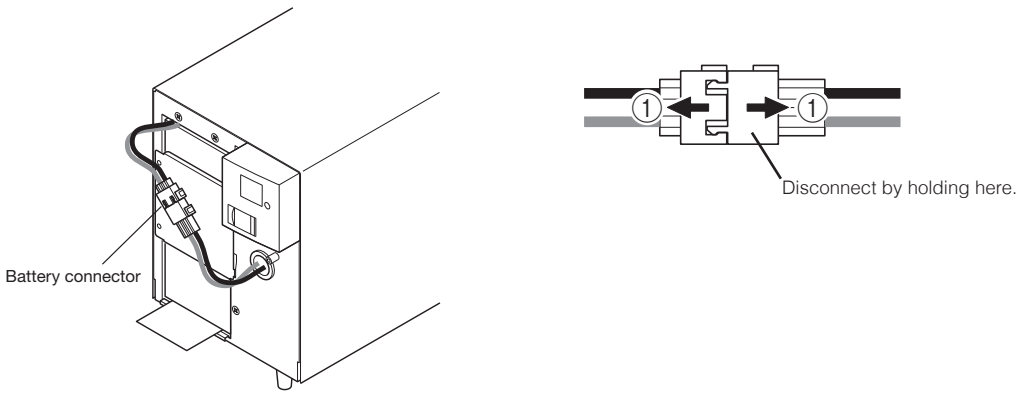
■ Procedure for recycling the battery

<BN50S/BN75S>

1. Use a screwdriver to loosen (turn counter-clockwise) the 2 screws at the top of the front panel of the unit, until they turn freely. (The screws cannot be removed from the front panel.) ①
Pull the top of the front panel open and remove it taking care of the hook at the bottom. ②



2. Disconnect the battery connector by holding it. ①



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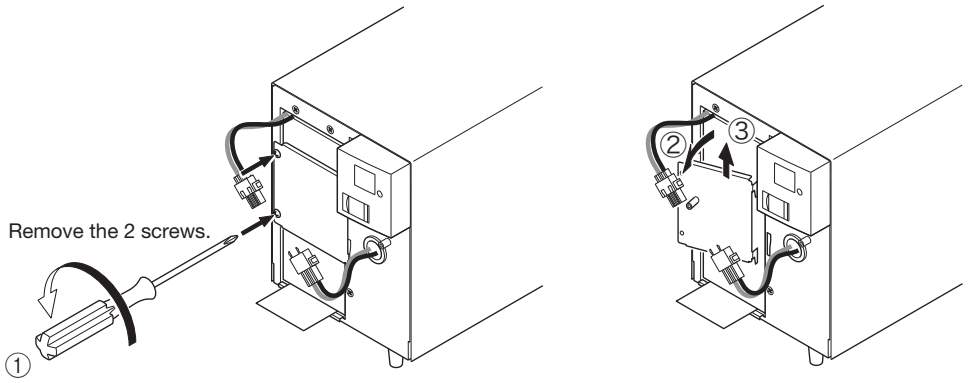
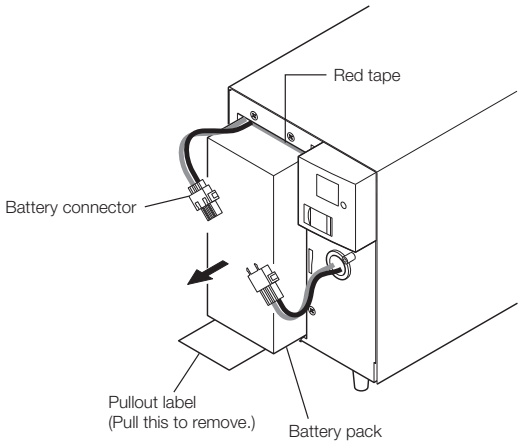
3. Turn the 2 screws that fix the plate cover counter-clockwise to remove them. ①
Pull the plate cover towards you ② and lift it up to remove it.③



4. Hold the pullout label at the bottom of the battery pack and remove the battery pack.

⚠ Do not hold the connector or cable of the battery pack.

Use the red tape on the top of the battery pack, which is 10 cm from the inner edge of the battery, to gauge how much further you need to pull the battery to remove it. Hold the battery securely with both hands so as not to drop it.



5. Insert a new battery into the UPS as far as it will go. ①

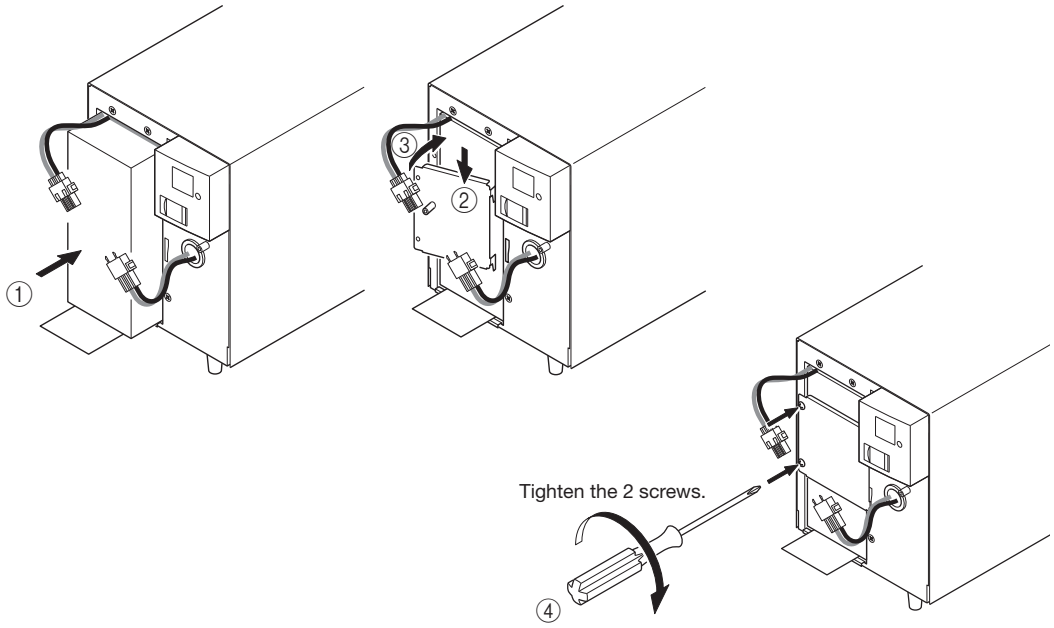
● Replacement battery pack

For BN50S/BN75S: Model BNB75S

Attach the plate cover in order of ② to ③.

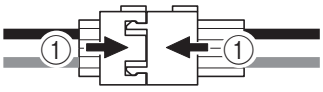
Use a screwdriver to securely tighten (clockwise) the 2 screws you removed. ④

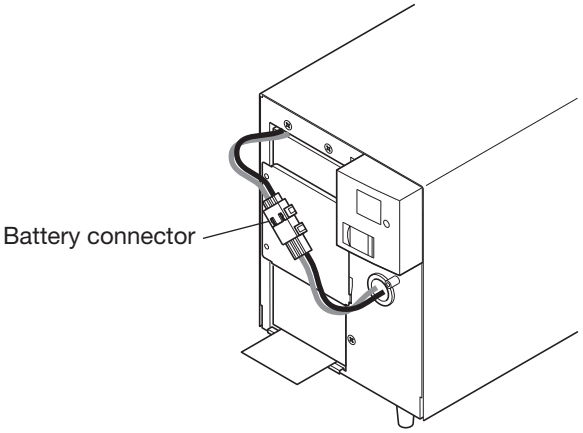
Do not pinch the cable with the plate cover.



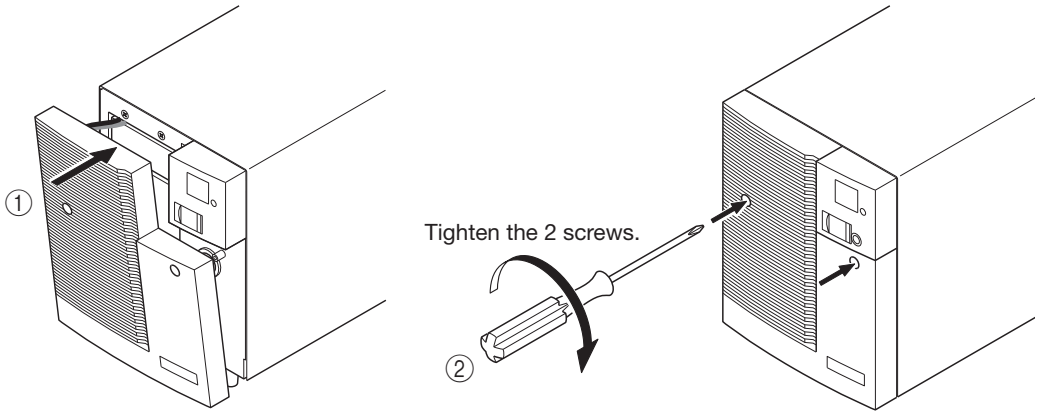
6. Insert the connector until it is locked. ①

You may hear a "pop" sound when you connect the battery if it is replaced after the unit's operation is stopped, but this sound is not abnormal.





7. Attach the front panel.
Push the top of the front panel towards the main body taking care of the hook at the bottom. ①
Use a screwdriver to securely tighten (clockwise) the 2 screws at the top of the front panel. ②



Battery replacement is now complete.

<After replacing the battery during operation...>
If the battery replacement indicator is displayed and the beeper sounds before replacement, press the beeper stop/test button once to stop the beeper, and hold it for 5 sec. to perform a self-diagnostic test. The beeper stops and normal operation resumes after the 10-second test is complete.

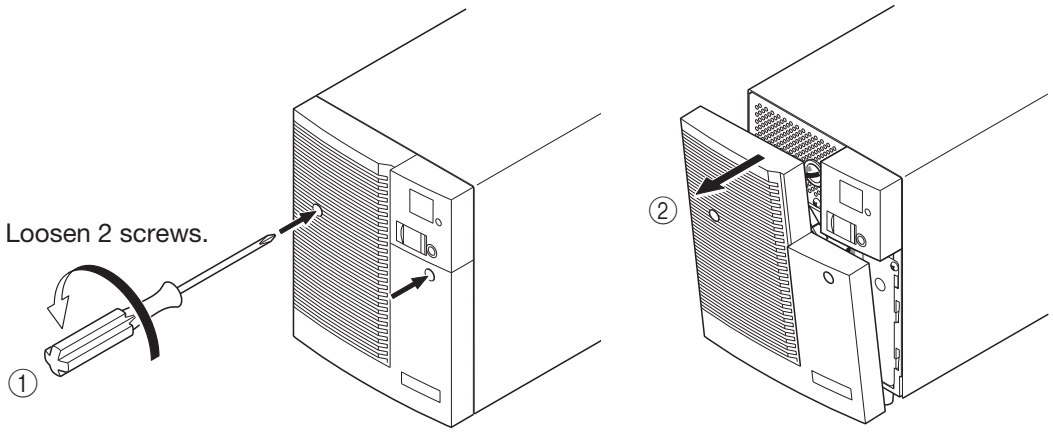
<After replacing the battery when operation was stopped...>
Connect the AC input plug to a wall outlet (commercial power) and turn ON the power switch of the UPS. When operation starts, the self-diagnostic test is automatically performed. Normal operation resumes after the 10-second test.

Write the date you started using the battery on the included battery replacement date label, and attach it to the front panel.
Also, by using the included UPS monitoring software, possible to keep a record of usage start date by the software.

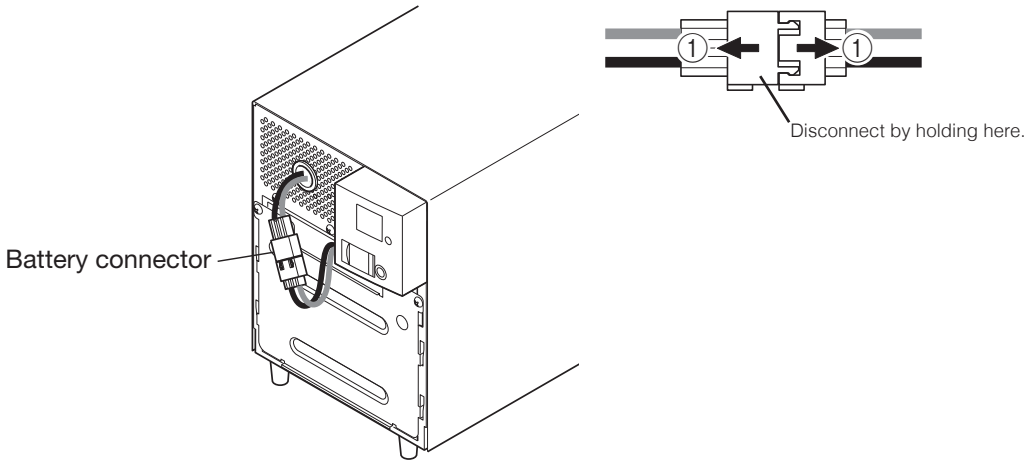
■ Procedure for recycling the battery

<BN100S/BN150S>

1. Use a screwdriver to loosen (turn counter-clockwise) the 2 screws at the top of the front panel of the unit, until they turn freely. (The screws cannot be removed from the front panel.) ① Pull the top of the front panel open and remove it taking care of the hook at the bottom. ②

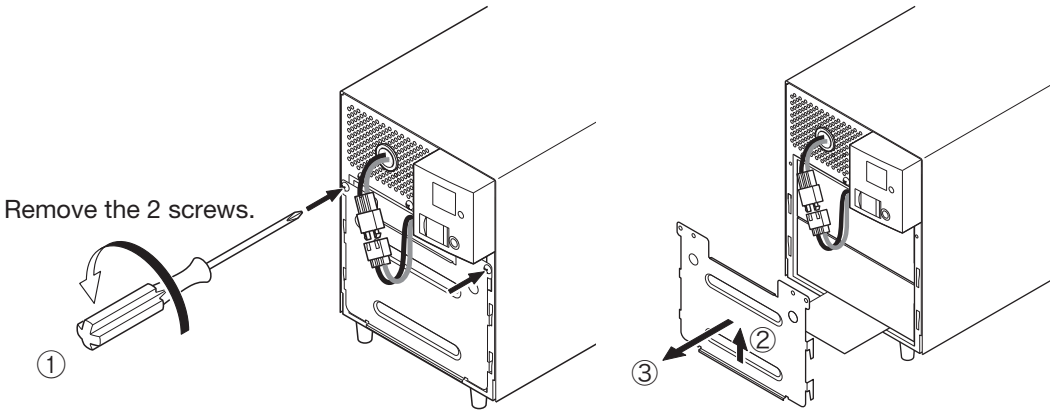


2. Disconnect the battery connector by holding it. ①



6

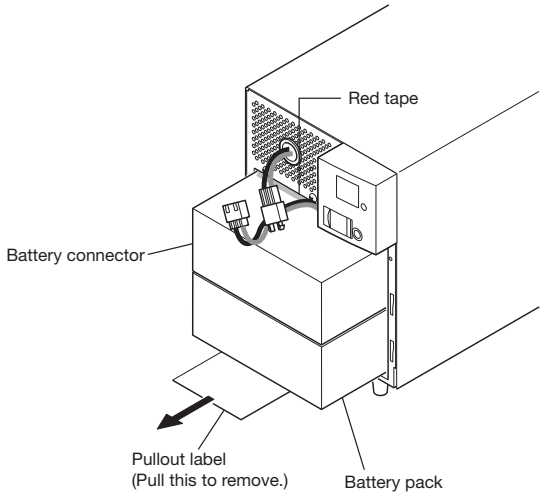
3. Turn the 2 screws that fix the plate cover counter-clockwise to remove them. ①
Pull the plate cover towards you ② and lift it up to remove it.③



4. Hold the pullout label at the bottom of the battery pack and remove the battery pack.

⚠ Do not hold the connector or cable of the battery pack.

Use the red tape on the top of the battery pack, which is 10 cm from the inner edge of the battery, to gauge how much further you need to pull the battery to remove it. Hold the battery securely with both hands so as not to drop it.



5. Insert a new battery into the UPS as far as it will go. ①

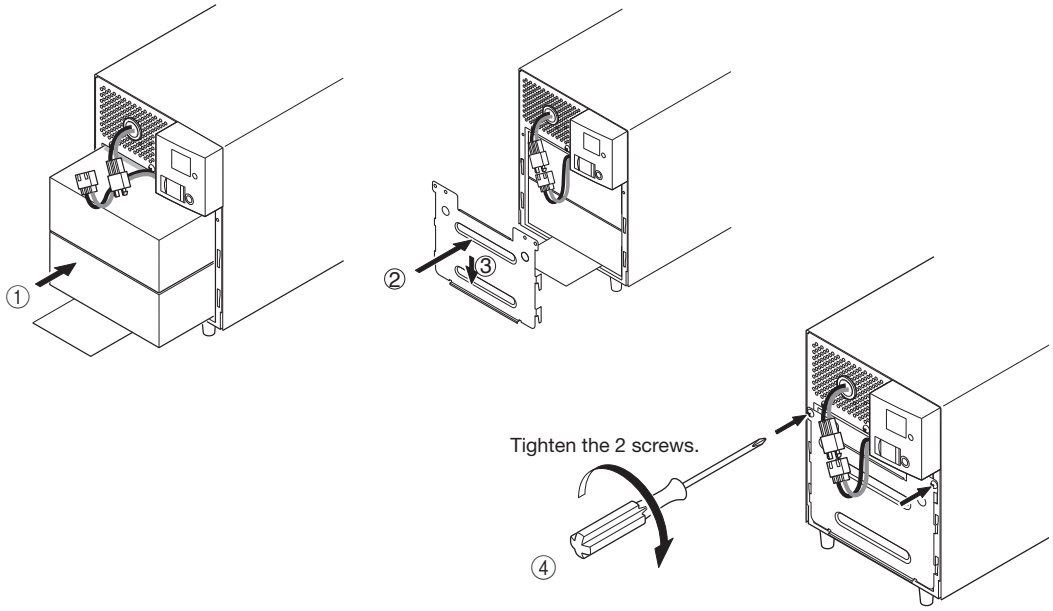
● Replacement battery pack

For BN100S/BN150S: Model BNB300S

Attach the plate cover in order of ② to ③.

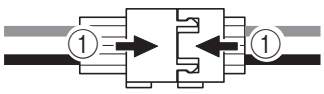
Use a screwdriver to securely tighten (clockwise) the 2 screws you removed. ④

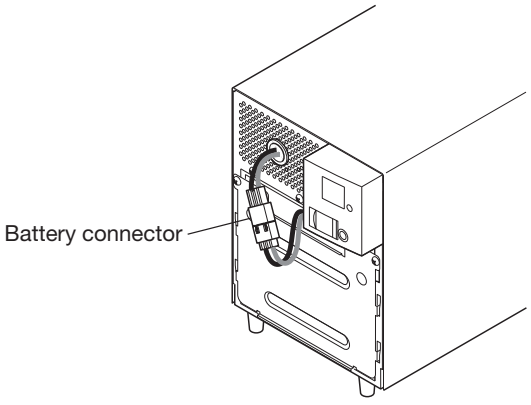
Do not pinch the cable with the plate cover.



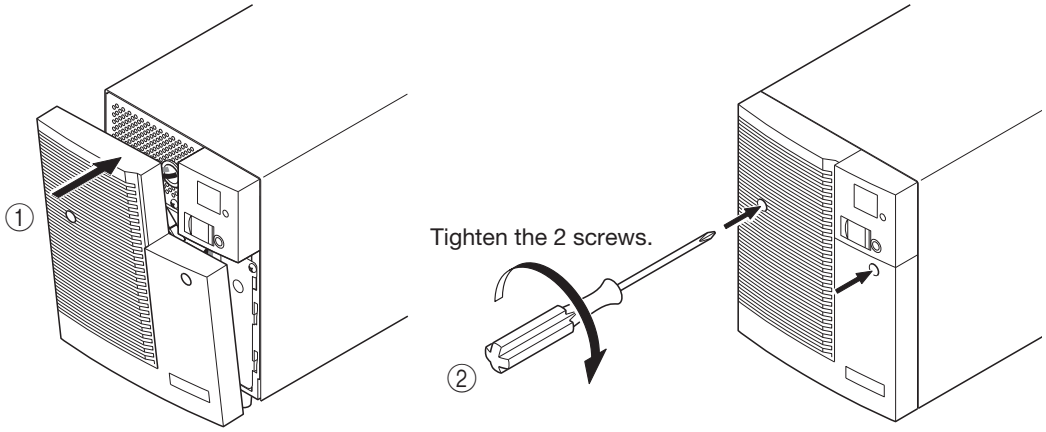
6. Insert the connector until it is locked. ①

You may hear a "pop" sound when you connect the battery if it is replaced after the unit's operation is stopped, but this sound is not abnormal.





7. Attach the front panel.
Push the top of the front panel towards the main body taking care of the hook at the bottom. ①
Use a screwdriver to securely tighten (clockwise) the 2 screws at the top of the front panel. ②



Battery replacement is now complete.

<After replacing the battery during operation...>
If the battery replacement indicator is displayed and the beeper sounds before replacement, press the beeper stop/test button once to stop the beeper, and hold it for 5 sec. to perform a self-diagnostic test. The beeper stops and normal operation resumes after the 10-second test is complete.

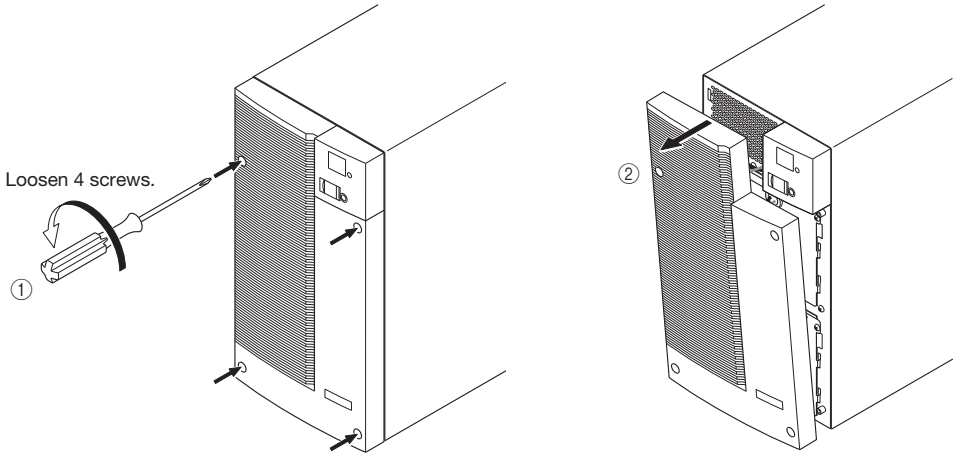
<After replacing the battery when operation was stopped...>
Connect the AC input plug to a wall outlet (commercial power) and turn ON the power switch of the UPS. When operation starts, the self-diagnostic test is automatically performed. Normal operation resumes after the 10-second test.

Write the date you started using the battery on the included battery replacement date label, and attach it to the front panel.
Also, by using the included UPS monitoring software, possible to keep a record of usage start date by the software.

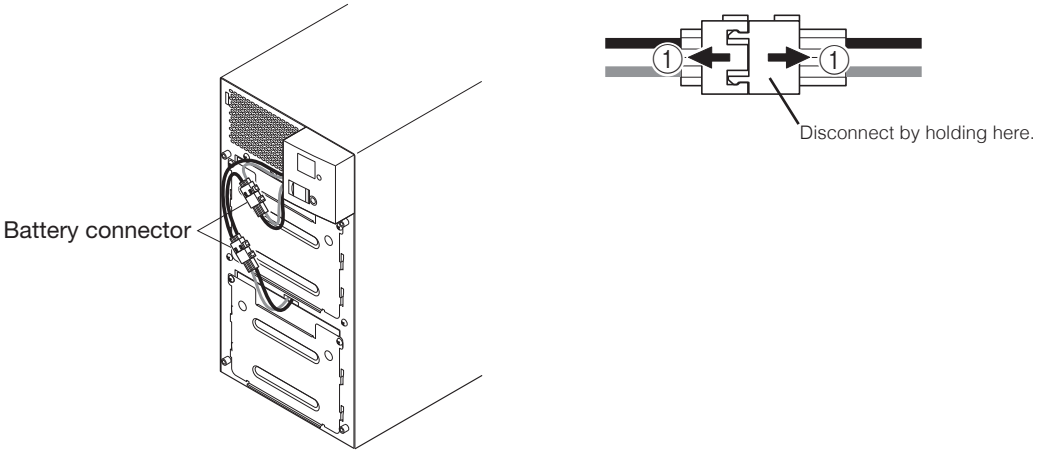
■ Procedure for recycling the battery

<BN220S/BN300S>

1. Use a screwdriver to loosen (turn counter-clockwise) the 4 screws at the top of the front panel of the unit, until they turn freely. (The screws cannot be removed from the front panel.) ① Pull the top of the front panel open and remove it taking care of the hook at the bottom. ②



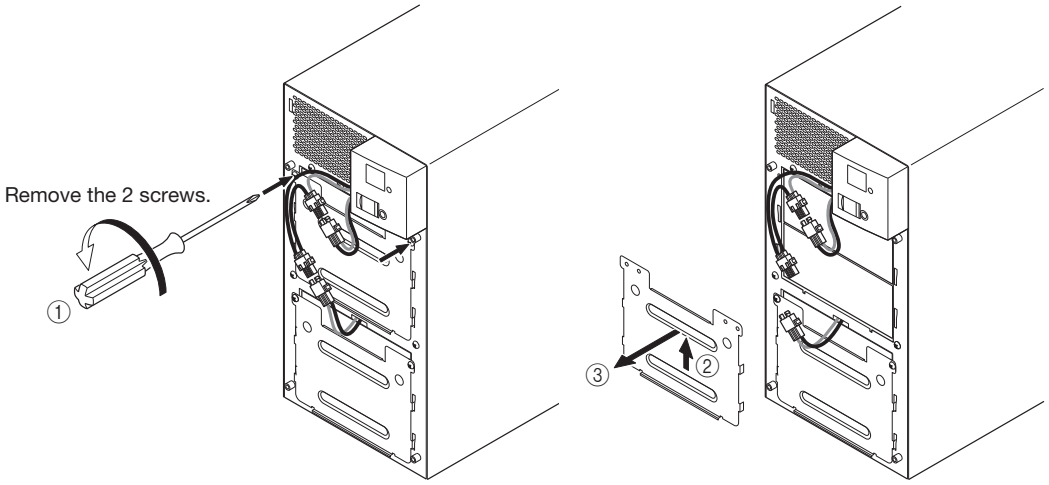
2. Disconnect the battery connectors on the upper side and the lower side.
Disconnect the battery connector by holding it. ①



6

3. Turn the 2 screws that fix the plate cover over the upper battery counter-clockwise to remove them. ①

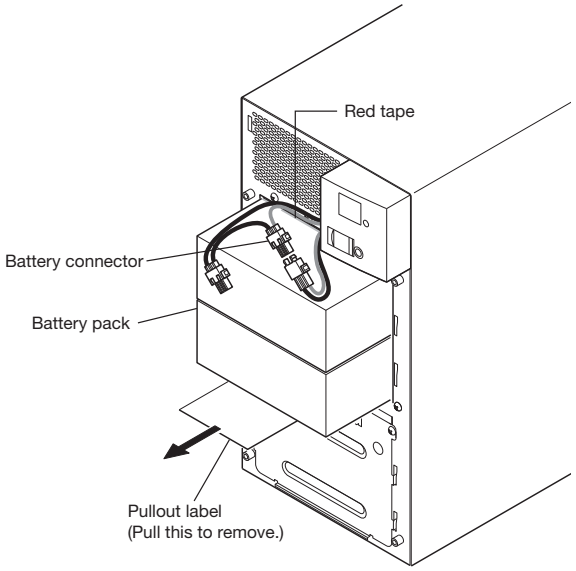
Pull the plate cover towards you ② and lift it up to remove it. ③



4. Hold the pullout label at the bottom of the upper battery pack and remove the battery pack.

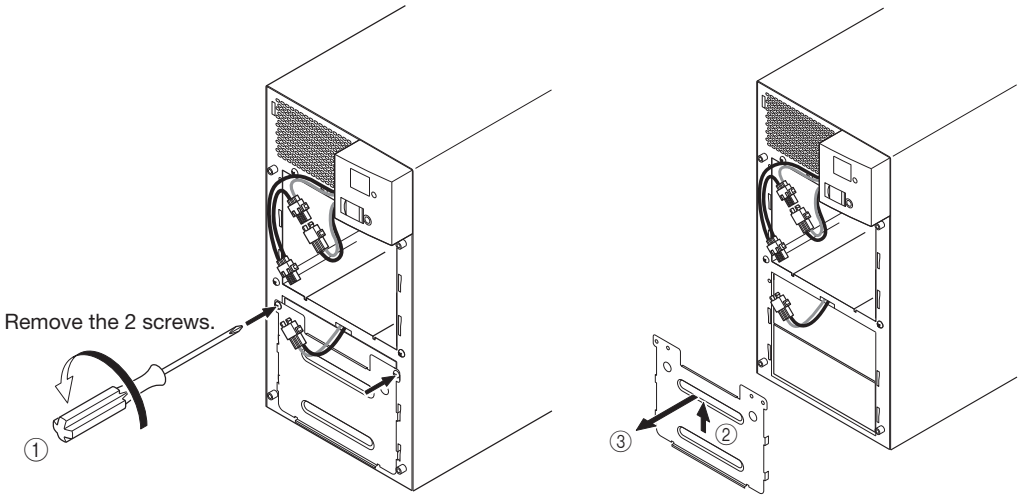
⚠ Do not hold the connector or cable of the battery pack.

Use the red tape on the top of the battery pack, which is 10 cm from the inner edge of the battery, to gauge how much further you need to pull the battery to remove it. Hold the battery securely with both hands so as not to drop it.



5. Turn the 2 screws that fix the plate cover over the lower battery counter-clockwise to remove them. ①

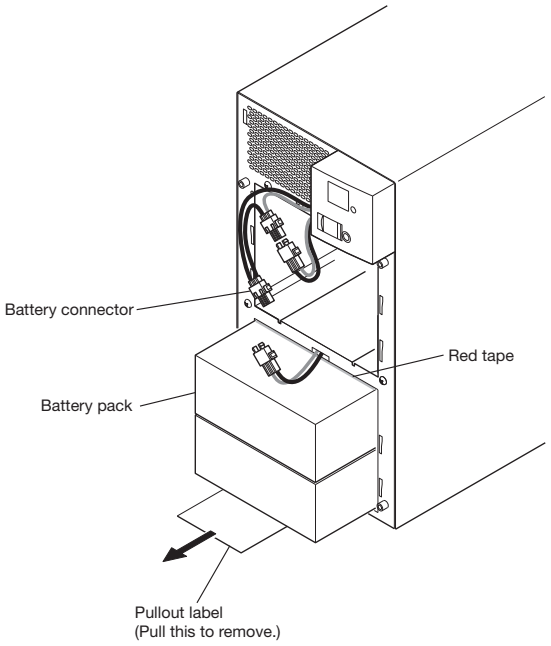
Pull the plate cover towards you ② and lift it up to remove it.



6. Hold the pullout label at the bottom of the lower battery pack and remove the battery pack.

⚠ Do not hold the connector or cable of the battery pack.

Use the red tape on the top of the battery pack, which is 10 cm from the inner edge of the battery, to gauge how much further you need to pull the battery to remove it. Hold the battery securely with both hands so as not to drop it.



7. Insert a new battery into the UPS as far as it will go. ①

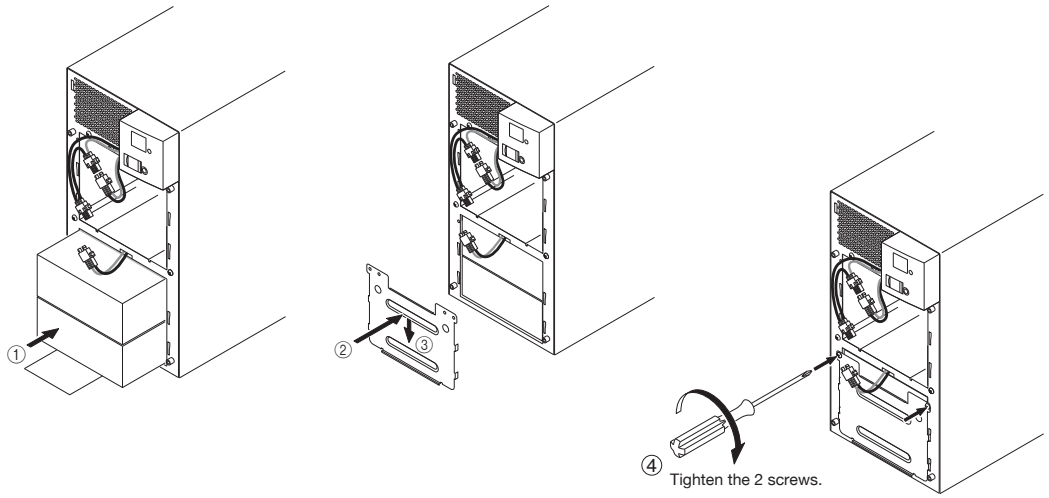
● Replacement battery pack

For BN220S/BN300S: Model BNB300S

Attach the plate cover in order of ② to ③.

Use a screwdriver to securely tighten (clockwise) the 2 screws you removed. ④

Do not pinch the cable with the plate cover.



8. Insert a new battery into the UPS as far as it will go. ①

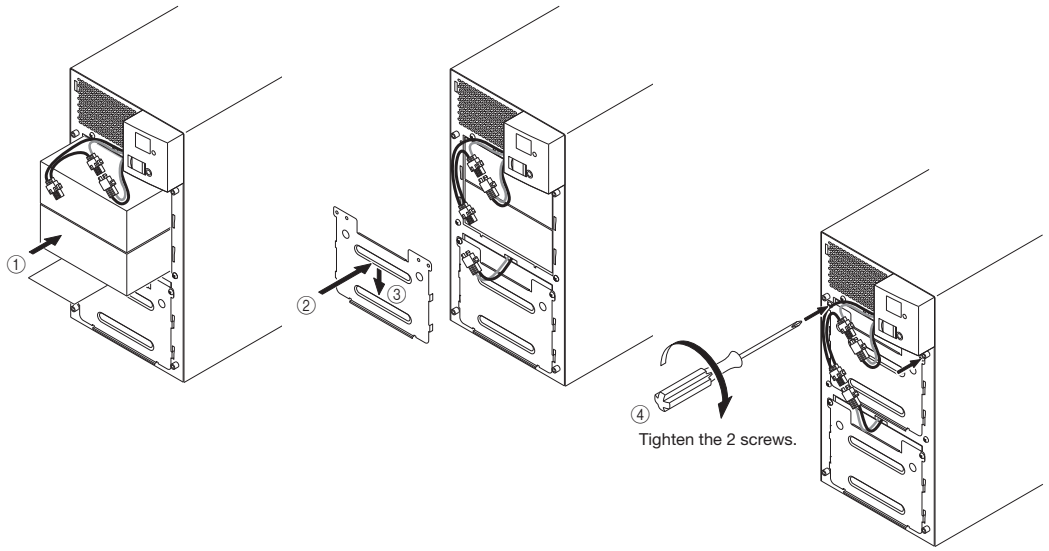
● Replacement battery pack

For BN220S/BN300S: Model BNB300S

Attach the plate cover in order of ② to ③.

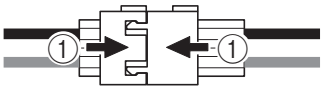
Use a screwdriver to securely tighten (clockwise) the 2 screws you removed. ④

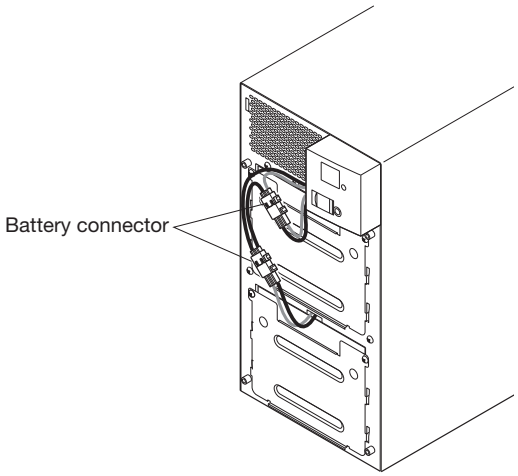
Do not pinch the cable with the plate cover.



9. Insert the connector until it is locked. ①

You may hear a “pop” sound when you connect the battery if it is replaced after the unit’s operation is stopped, but this sound is not abnormal.

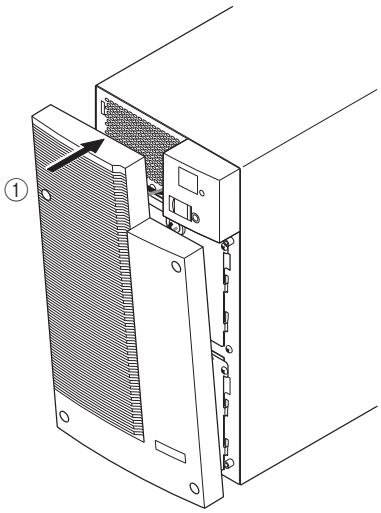


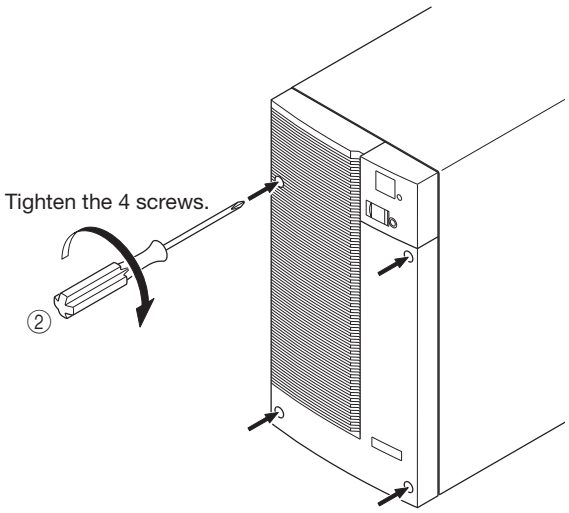


10. Attach the front panel.

Push the top of the front panel towards the main body taking care of the hook at the bottom. ①

Use a screwdriver to securely tighten (clockwise) the 4 screws at the top of the front panel. ②





Battery replacement is now complete.

<After replacing the battery during operation...>

If the battery replacement indicator is displayed and the beeper sounds before replacement, press the beeper stop/test button once to stop the beeper, and hold it for 5 sec. to perform a self-diagnostic test. The beeper stops and normal operation resumes after the 10-second test is complete.

<After replacing the battery when operation was stopped...>

Connect the AC input plug to a wall outlet (commercial power) and turn ON the power switch of the UPS. When operation starts, the self-diagnostic test is automatically performed. Normal operation resumes after the 10-second test.

Write the date you started using the battery on the included battery replacement date label, and attach it to the front panel.
Also, by using the included UPS monitoring software, possible to keep a record of usage start date by the software.

6-3 Cleaning

1. Cleaning the UPS

Moisten a soft cloth with water or detergent, squeeze it tightly, and wipe the product lightly.

Do not use chemicals such as thinner and benzene. (They cause deformation or discoloration.)

2. Removing dust from the AC input plug, power supply output receptacles of the UPS

Stop all the connected devices and the UPS and disconnect the AC input plug from a wall outlet (commercial power).

Then, remove dust with a dry cloth and make the connection again.

(For information on the connection procedure:)

See also "2-3 Connecting the equipment" ➛ Page 12

7 Using the UPS monitoring software and contact signal

*** If you do not use the UPS monitoring software and contact signal, this step is not required.**

■ UPS monitoring software

"PowerAct Pro (for Windows/Linux)" , "UPS service driver" and "UPS Power Manager (Mac)" UPS monitoring software is included with this product. Refer to the table below for details about compatibility. Choose which one to use based on the application. Refer to the table below for details about compatibility. For further details about the software functions, refer to the separate "UPS Monitoring Software Quick Installation Guide."

• UPS monitoring software selection table

Model	OS	Communication method	UPS monitoring software	Required options (sold separately)	Reference
BN50S/ BN75S/ BN100S/ BN150S/ BN220S/ BN300S	Windows 7 Windows Vista Windows Server2008 (including R2)	Serial (RS232C or USB 1.1)	PowerAct Pro 4.x (Note 1) Simple Shutdown software (Note 1)	-	➔ See 7-1
		LAN	PowerAct Pro 4.x (Slave Agent) (Note1)	SC20G	➔ See 8-1
	Windows server2003 x64 Edition Windows XP x64 Edition	Serial (RS232C or USB 1.1)	PowerAct Pro 4.x (Note 1) Simple Shutdown software (Note 1)	-	➔ See 7-1
			UPS service (OS standard) + UPS service driver (included software)	-	➔ See 7-2
		Contact signal (Note 2) (Note 4)	UPS service (OS standard)	SC07 BUC26	➔ See 7-3
		LAN	PowerAct Pro 4.x (Slave Agent) (Note1)	SC20G	➔ See 8-1
	Windows server2003 Windows XP/2000	Serial (RS232C or USB 1.1)	PowerAct Pro 4.x (Note 1) Simple Shutdown software (Note 1) (Note 6)	-	➔ See 7-1
			UPS service (OS standard) + UPS service driver (included software)	-	➔ See 7-2
		Contact signal (Note 2) (Note 3)	UPS service (OS standard)	SC07 BUC26	➔ See 7-3
		LAN	PowerAct Pro 4.x (Slave Agent) (Note1)	SC20G	➔ See 8-1
	Windows NT 4.0	Contact signal (Note 2) (Note 3)	UPS service (OS standard)	SC07 BUC26	➔ See 7-3
		LAN	Shutdown Agent	SC20G	➔ See 8-1
	Linux (Note 2)	Serial (RS232C or USB 1.1)	PowerAct Pro (Note 1)	-	➔ See 7-1
		LAN	PowerAct Pro (Slave Agent) (Note1) Shutdown Agent	SC20G	➔ See 8-1
	Mac OS X v10.6/v10.5 Mac OS X Server v10.6/v10.5	Serial (USB 1.1)	PowerAct Pro 4.x (Note 1) (Note 5)	-	➔ See 7-1
		LAN	PowerAct Pro 4.x (Slave Agent) (Note1)	SC20G	➔ See 8-1

Note 1: The most recent version can be downloaded from our homepage (http://www.omron.co.jp/ese/).
Note 2: Files cannot be automatically saved.
Note 3: To automatically stop the UPS, it may be necessary to change the PC's BIOS settings.
Change the PC's BIOS settings so that the PC's power supply is not cut after OS shutdown is performed.
Note 4: The UPS automatically stops once the battery is depleted.
Note 5: Compatible with Ver 4.1 or later, not with Power PC version.
Note 6: Not compatible with Windows 2000.

• UPS monitoring software function list

● Standard ○ Option ▲ Limited

Function \ Software title		General applications (Simple functions, standalone)			Network management applications (Advanced functions, network support)	SNMP management applications (Advanced functions, network support)
		UPS service driver	OS standard UPS service	Simple Shutdown Software	PowerAct Pro 4.x	SNMP/Web card
Required options		—	SC07 BUC26	—	—	SNMP/Web card SC20G
Compatible OS	Windows 7 Windows Vista Windows Server2008 (including R2)	—	—	●	●	○
	Windows Server 2003 x64 Edition Windows XP x64 Edition	●	○	●	●	○
	Windows Server 2003 Windows XP/2000	●	○	● (*5)	●	○
	Windows NT4.0	—	○	—	—	○
	Linux	—	—	●	●	○
	Mac OS X v10.6/v10.5 Mac OS X Server v10.6/v10.5	—	—	—	● (*4)	○ (*4)
Software function	Auto shutdown	●	○ (*1)	●	●	○
	UPS monitoring (operating status)	●	○	—	●	○
	UPS monitoring (data)	▲ (*2)	—	—	●	○
	Pop-up notification	●	○	—	●	○
	End when OS is inactive (*3)	●	—	—	●	○
	Auto file sabe (*3)	●	—	—	●	○
	Schedule operation	—	—	—	●	○
	UPS setting change	—	—	—	●	○
	External command execution	●	○	●	●	○
	Event log save	—	—	—	●	○
	Data log save	—	—	—	●	○
	Coordinated shutdown (shutdown of multiple units)	—	—	—	●	○
	Output receptacle control	—	—	—	●	○
	Redundant power supply support	—	—	—	●	○
	Remote UPS management	—	—	—	●	○
	Mail send	—	—	—	●	○
	SNMP management	—	—	—	—	○
	Telnet connection	—	—	—	—	○
	SYSLOG support	—	—	—	●	○

*1) The UPS automatically stops only when the battery is depleted. (Battery Mode continues until the battery is depleted.)
*2) Only the battery capacity can be monitored.
*3) This function is available only for Windows, not for Linux.
*4) Compatible with PowerAct Pro Ver 4.1 or later.
*5) Not compatible with Windows 2000.

[Explanation of software functions]

1	Auto shutdown	The computer can be shut down automatically when a problem occurs with the power supply.
2	UPS monitoring (operating status)	The operating status of the UPS can be monitored (in Commercial Power Mode/Battery Mode).
3	UPS monitoring (data)	Monitoring can be performed for input voltage value, connection capacity, battery capacity, etc.
4	Pop-up notification	When a problem such as a power failure occurs, a pop-up window that shows the details of the problem can be displayed.
5	Shutdown when OS is inactive	Shutdown can be performed when the computer is in an inactive state. The operating status is retained at shutdown in inactive state, so operation details are not lost.
6	Auto file save	Files such as open Word and Excel documents are automatically saved at shutdown.
7	Schedule operation	Schedule settings can be made for UPS stop/start.
8	UPS setting change	UPS settings (beep ON/OFF, etc.) can be changed. (Items that can be set vary according to the UPS.)
9	External command execution	By executing commands at shutdown, items such as application programs can be launched.
10	Event log save	Information of events that occur on the UPS (power supply problems, setting changes, occurrences of failure, etc.) are saved as a log.
11	Data log save	Data of input/output voltage value, connection capacity, etc. is periodically saved as a log (the save frequency can be set).
12	Coordinated shutdown	When a problem occurs with the power supply, multiple computers connected to the UPS can coordinate to perform auto shutdown.
13	Output receptacle control	The UPS output receptacles can be individually set to ON/OFF.
14	Redundant power supply support	Two or more UPS can be connected to computers equipped with redundant power supply. Shutdown is not performed when a power supply proble affects only one of the units. Shutdown is performed only when a power supply problem occurs with both UPS, so the system's operating rate is improved.
15	Remote UPS management	The UPS can be managed remotely from a computer on the network.
16	Mail send	When a problem such as a power failure occurs, a notification email describing the problem can be sent to the system administrator.
17	SNMP management	UPS management information can be sent to the SNMP manager.
18	Telnet connection	Settings such as shutdown parameters can be made via the Telnet connection.
19	SYSLOG support	UPS management information can be recorded in SYSLOG.

7-1 When using the included UPS monitoring software to perform auto shutdown

● When using PowerAct Pro

"PowerAct Pro" UPS monitoring software

The included "PowerAct Pro" UPS monitoring software allows you to automatically save files and perform shutdown processing of your PC when a power failure occurs.(It is possible to shut down multiple computers on the network.)

Also, you can perform desired operation by setting the automatic start/stop of the UPS based on the schedule setting.

* The time between the occurrence of a power failure and the shutdown of your PC must be within the backup time measured in "5-1 How to measure backup time" on page 39.
For more information, refer to the Instruction Manual and online help of the UPS monitoring software.

● When using Simple Shutdown Software

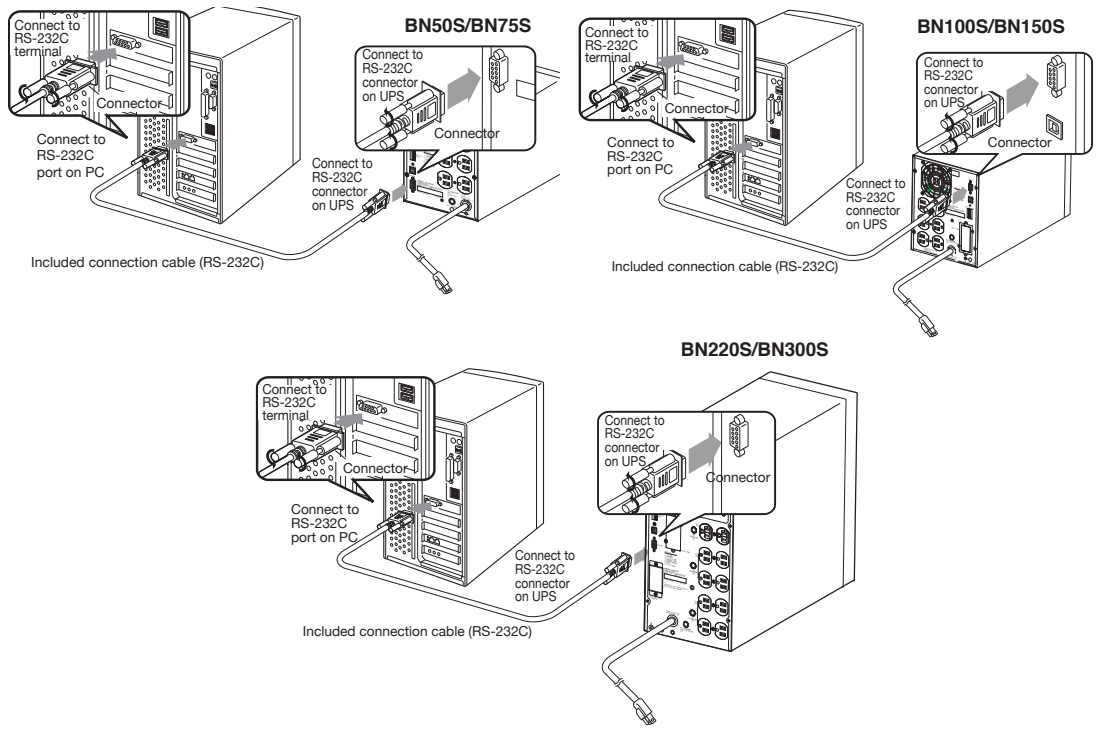
The included “Simple Shutdown Software” allows you to automatically shut down the PC when a power failure occurs. For more information, refer to the manual in the CD-ROM.

1. Connect the UPS to a computer.

Cable: Included connection cable (RS-232C or USB)

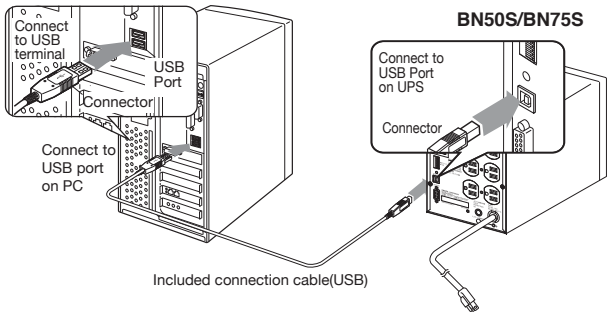
* The RS232C and USB cannot be used at the same time.

<RS-232C>

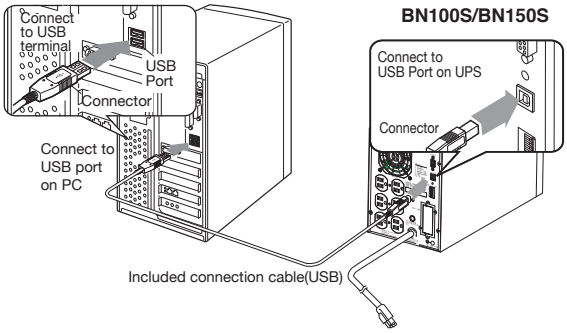


<USB>

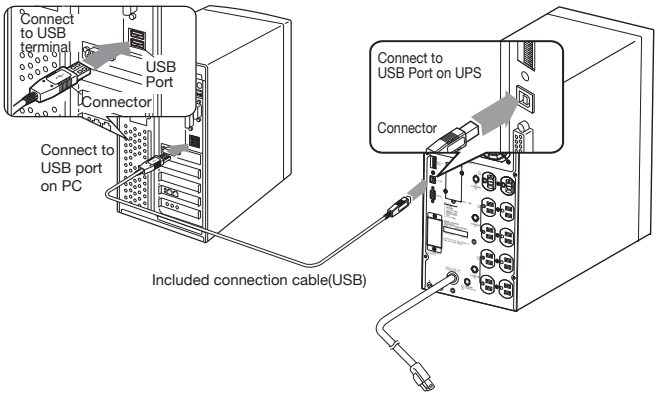
BN50S/BN75S



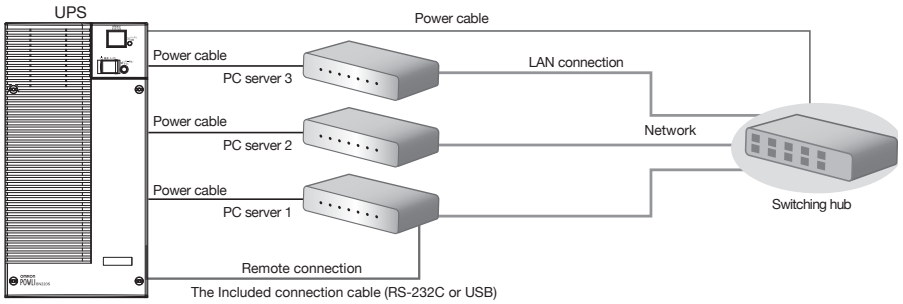
BN100S/BN150S



BN220S/BN300S



*** When connecting 2 or more computers to the UPS □(Only when using PowerAct Pro)**



2. Install the included “PowerAct Pro 4.x/3.x” or “Simple Shutdown Software” to the PC you want to shutdown.

Installation method:
Refer to the “Quick Installation Guide for UPS Monitoring Software” for “PowerAct Pro 4.x/3.x”.
Refer to the manual in the CD-ROM for “Simple Shutdown Software.”

Explanation

Scheduled operation using the UPS monitoring software

● When performing scheduled operation in which the UPS is stopped and a device such as a breaker is used to stop the UPS at the same time that commercial power stops, specify a period of no more than 3 months for the start of the next operation.
If you specify a period longer than 3 months, the internal timer is reset and the scheduled operation does not start.
Note that this period reduces to approximately half when the battery is dead.
If a period of 3 months is exceeded, you start operation by supplying commercial power and pressing the Start Switch. However, if the battery is dead, you may not be able to start operation. In this case, replace the battery according to "6-2 Replacing the battery" on page 54.

Start of operation in scheduled operation using the UPS monitoring software

● To manually start up this unit after it has been stopped by a scheduled operation, turn OFF the power switch and turn it back ON again.
To stop the unit when it is in operation, turn OFF the power switch.

Auto restart after OS closing processing using the UPS monitoring software

● When a power failure occurs, certain PCs (*1) automatically restart immediately after the OS is shut down by auto shutdown.
In this case, the UPS stops during or after the restart of the PC, which may damage files and the hard disk. You can avoid this phenomenon by disabling POWER MANAGEMENT in the BIOS settings of the PC.
*1) Certain PC: It is known that this phenomenon occurs for MICRON's Millennia Mme.

Precautions when “setting the UPS to stop automatically” after OS shutdown

● If, after a power failure occurs, the power is restored while auto shutdown processing is being performed, UPS output stops once after the set time elapses. After shutdown processing is complete, do not turn ON the computer until the UPS has finished restarting.

7-2 When performing auto-save functions using the UPS service in Windows Server 2003/ XP/2000 + UPS service driver

When using the included "UPS service driver", the OS standard UPS service in Windows Server 2003/ XP/2000 can be used. When there is a power failure, files can automatically be saved and the computer can be shut down.

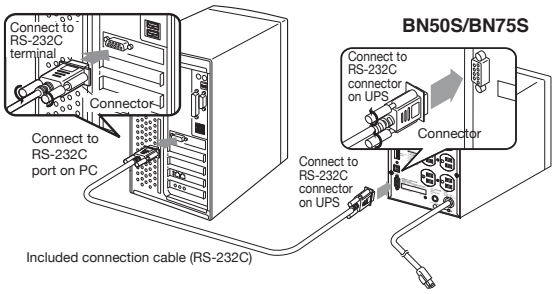
1. Connect the UPS to a computer.

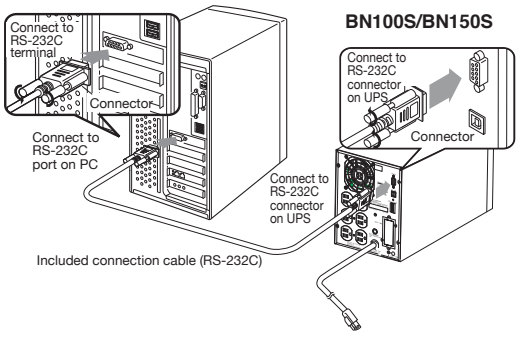
* Only 1 computer can be connected to the UPS

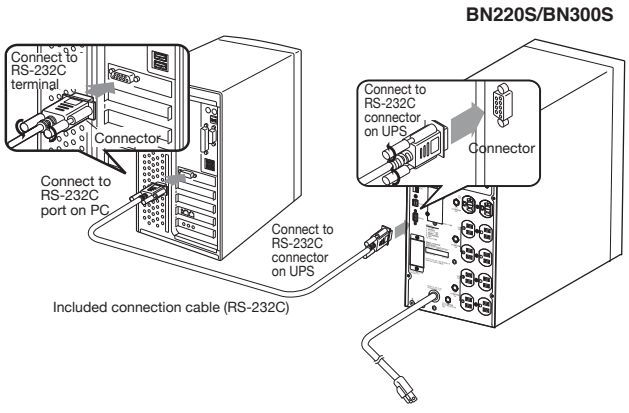
Cable: Included connection cable (RS-232C or USB)

* The RS232C cable and USB cable cannot be used at the same time.

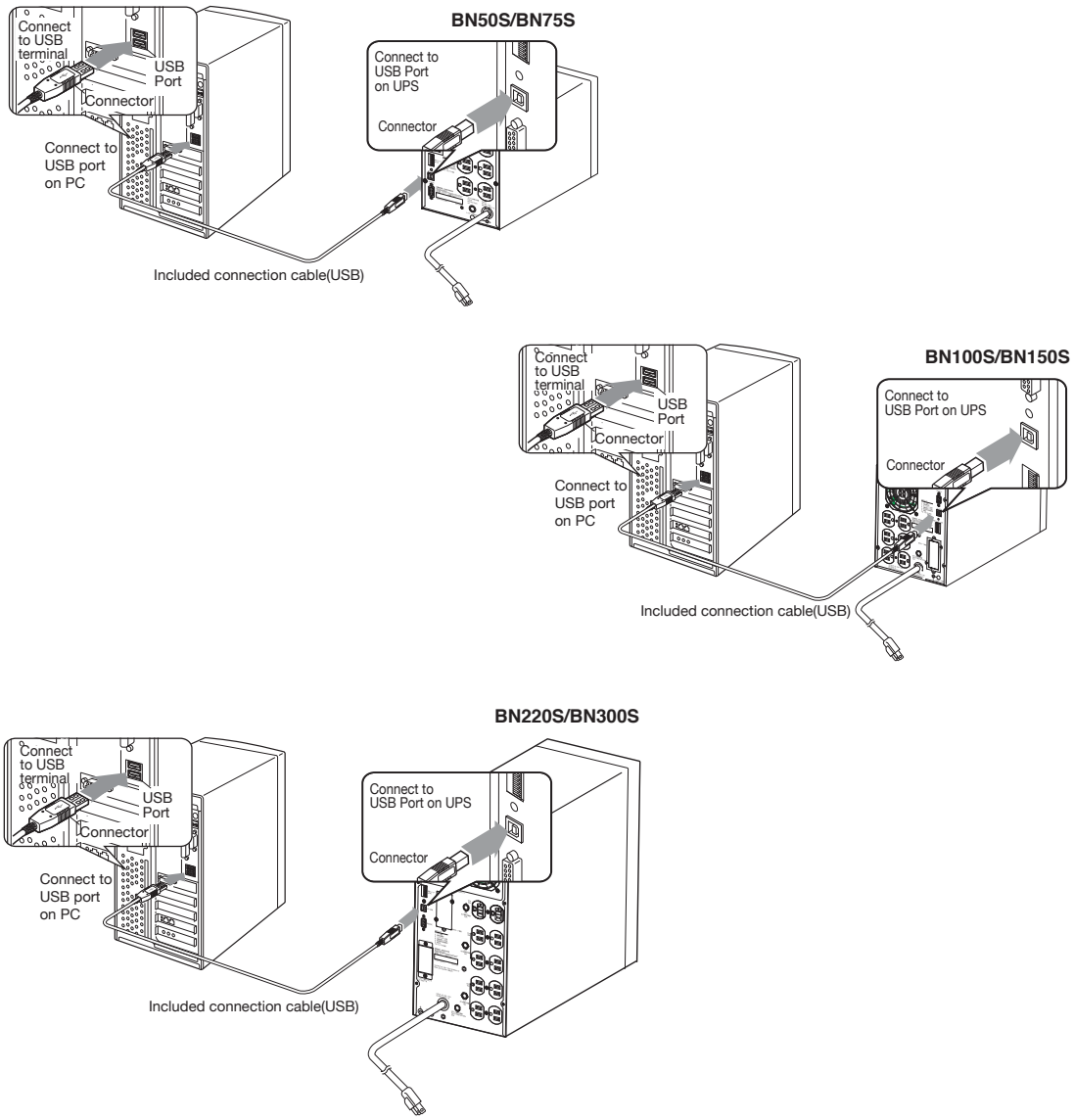
<RS-232C>







<USB>



2. Install the included "UPS service driver" on the computer.

Software to install: UPS service driver

How to install: Refer to the separate "UPS monitoring software installation guide".

7-3 When performing auto-save functions using the standard UPS service in Windows Server 2003/XP/2000/NT

When using the product with the optional SC07 contact signal card and BUC26 cable, the OS standard UPS service in Windows Server 2003/XP/2000/NT can be used. When there is a power failure, the computer can be shut down.

* When using the unit in the SC05 compatible mode, use an optional BUC10 cable.

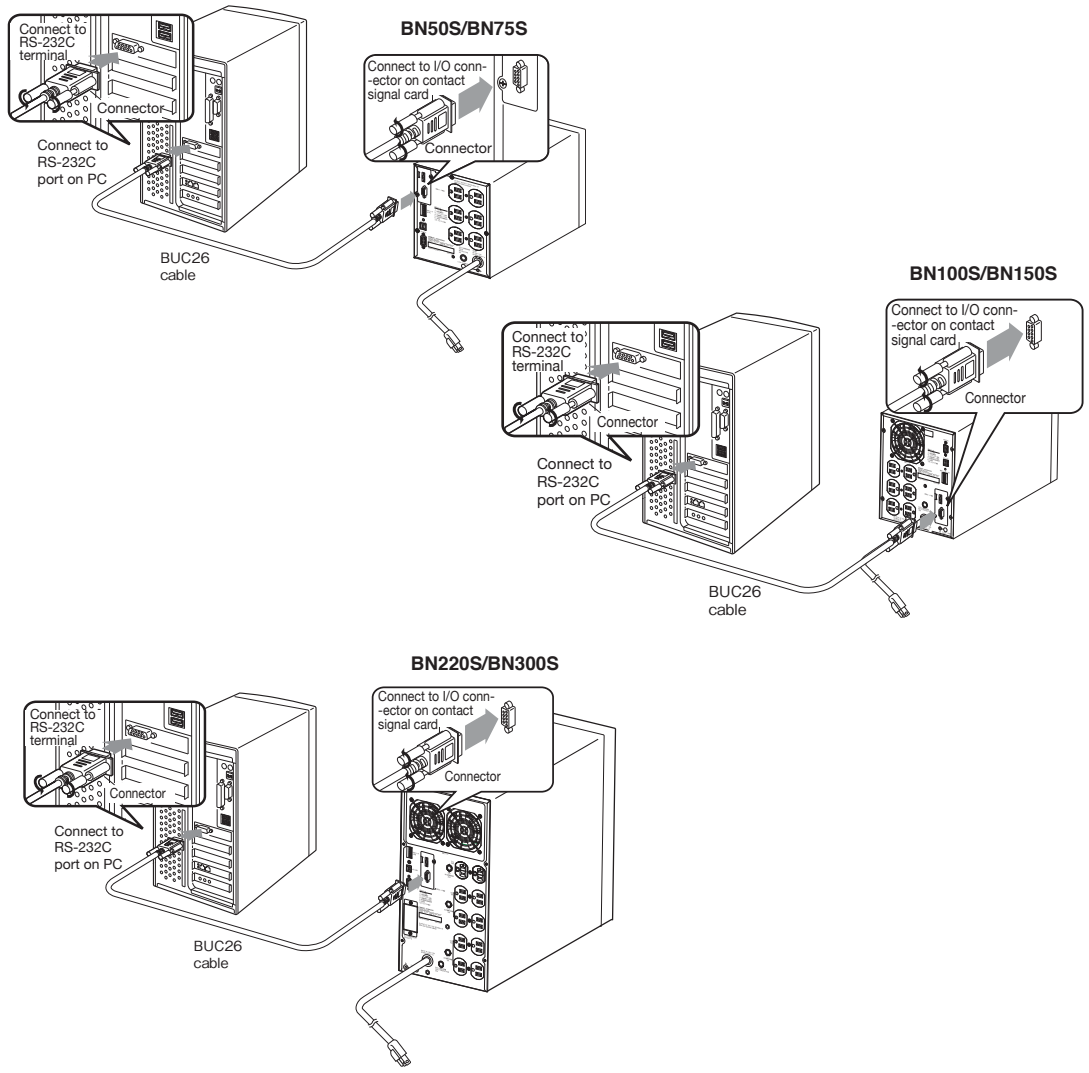
See also " 8 Using a contact signal" ➛ See page 72

1. Connect the UPS to a computer.

Contact singal card (SC07), sold separately

Connection cable (BUC26), sold separately

* Only 1 computer can be connected to the UPS



2. Perform UPS service setup.

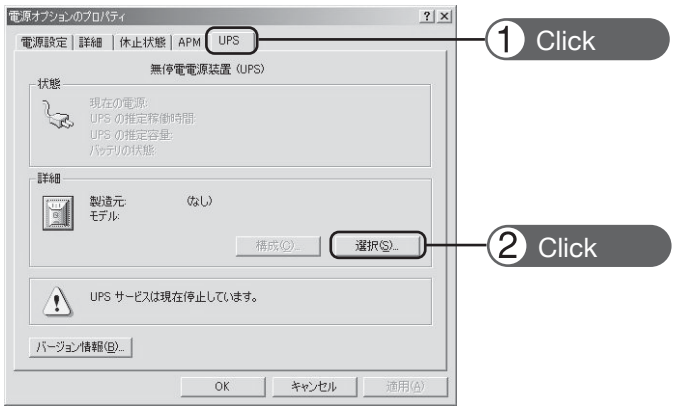
You need to make Windows settings in order to perform auto shutdown. There is no need to install software.

<When using the Windows Server 2003/XP/2000 standard UPS service>

Start up the computer after connecting it with the UPS.
Perform "Log on to Windows" as the Administrator.
After logging on, follow the instructions below to set up the UPS service.

● How to set up UPS service (shut down Windows when low battery level is detected)

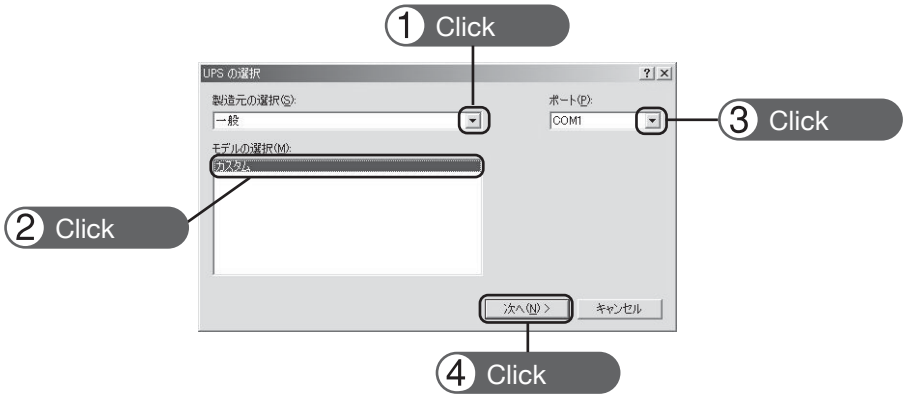
1) Double-click the "Power supply options" icon in "Control Panels".
2) Click the "UPS" tab in the "Power supply options" window.
   Click the "Select (S)" button.



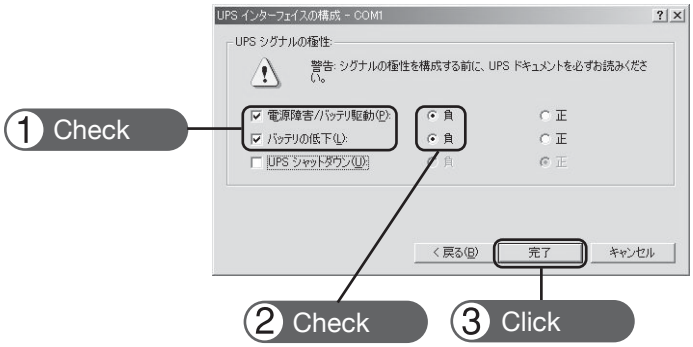
3) Click the button on the right of the "Select manufacturer (S)" window, and select "General" from the list.
   Click on "Custom" in the "Select model (M)" window.

   Click the button on the right of the "Port (P)" window, and select from the list the port that the UPS is connected to. (In the example screen below, the UPS is connected to COM1.)

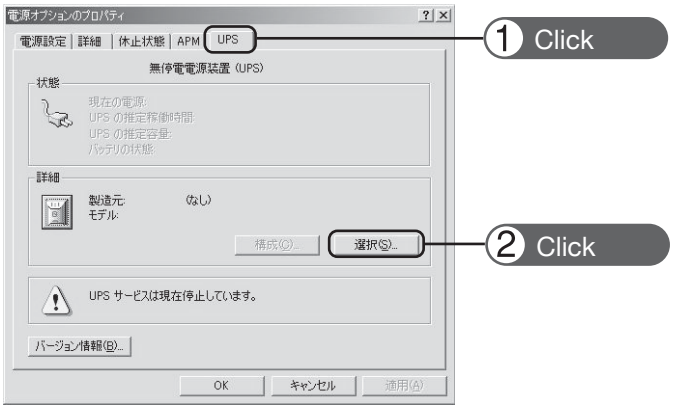
   Click the "Next (N)" button.



4) In the "UPS signal polarity" box, click on the boxes to the right of "Power supply failure/battery drive (P)" and "Low battery (L)" signals to insert check marks.
Set the polarity for each signal to "Negative". Click the "End" button.



5) Click the "OK" button in the "Power supply options" window.
Setup is complete.



When a power failure occurs, Windows shutdown starts once the Low battery level signal is detected.

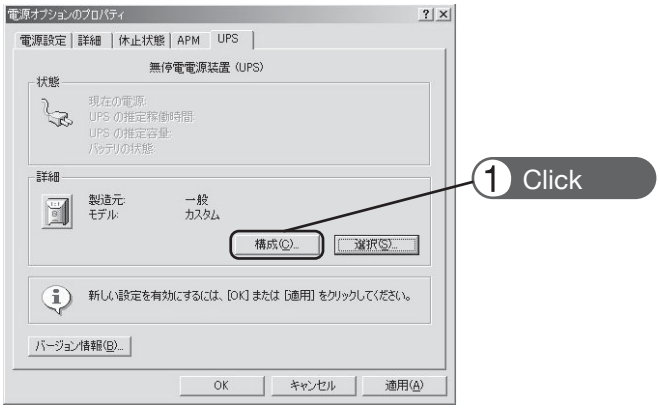
If the power is restored before the Low battery level signal is detected, Windows shutdown does not start and the normal monitoring state is restored.

Stopping the UPS

In the Windows Server 2003/XP/2000 UPS service, there is no function to stop the UPS. After Windows is shut down, manually turn OFF the unit's power switch.

● **How to set up UPS service (set the time to shut down Windows)**

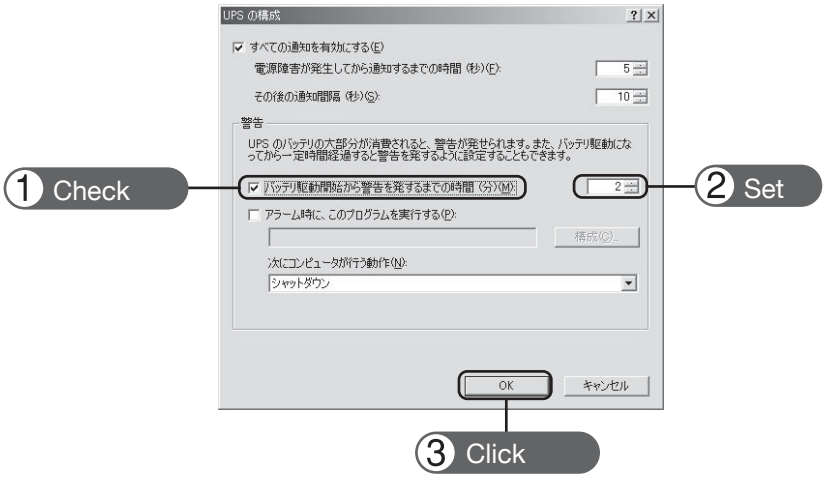
1) After performing the setup described in the previous section, click the "Configure (C)" button in the "Power supply options" window.



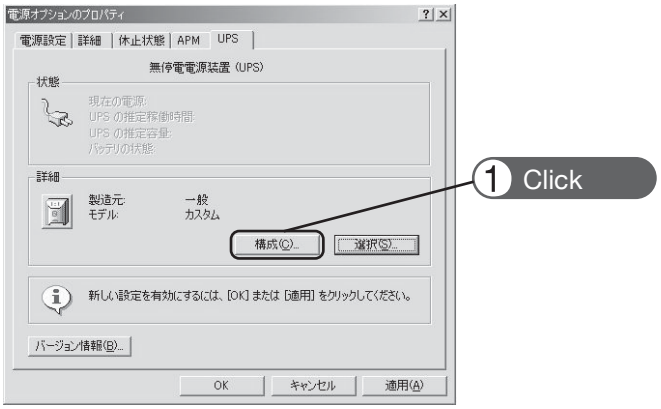
2) In the "Warning" box, place a check mark in the box to the left of "Time from when battery drive starts until warning is issued (M)" by clicking on it.

In the window to the right, set the amount of time to wait before starting Windows shutdown after a power failure occurs. (Setting range: 2 to 720 minutes)

Click the "OK" button.



3) Click the "OK" button in the "Power supply options" window.
   Setup is complete.



When a power failure occurs, Windows shutdown starts once the set time is exceeded or the low battery voltage signal is detected.

If the power is restored before the set time is exceeded, Windows shutdown does not start and the normal monitoring state is restored.

<When using the Windows NT standard UPS service>

● **How to set up UPS service**

1) Double-click the "UPS" icon in "Control Panels".
2) Insert a check mark in the checkbox to the right of "Port where UPS is installed (U)..." by clicking on it.
   In the setting field, select the number of the serial port (COM1 to 4) the unit is connected to.
3) To shut down Windows when a low battery is detected, click on the checkboxes to the left of "Power failure signal (P)" , "Low battery level signal (L)" and "Remote uninterruptible power source shutdown signal (R)" to insert check marks.

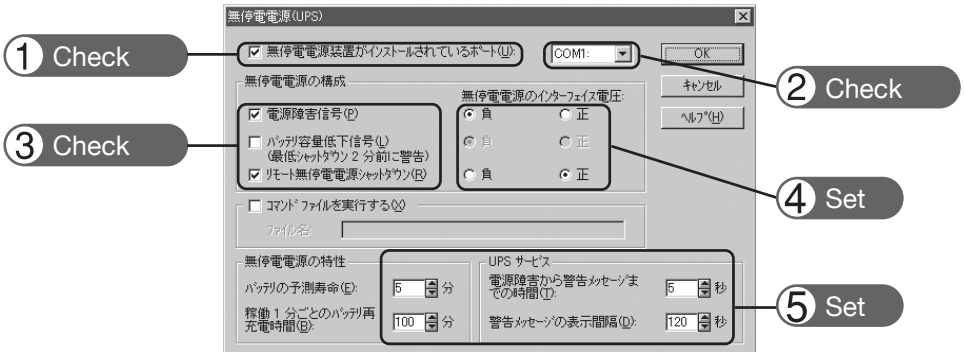
<Setting to detect low battery singal and shut down Windows>

Set each signal interface voltage setting as shown below.

- Power failure signal (P) ... Negative
- Low battery signal (L) ... Negative
- Remote uninterruptible power source shutdown ... Positive

4) To set the time to shut down Windows, click on the checkboxes to the left of “Power failure signal (P)” and “Remote uninterruptible power source shutdown signal (R)” to insert check marks.

<Setting to detect low battery singal and shut down Windows after the set delay period>



Set each signal interface voltage setting as shown below.

- Power failure signal (P) ... Negative
- Remote uninterruptible power source shutdown ... Positive

Set the attributes for the uninterruptible power source and the time for each UPS service item.

Note

Please note that in the case of incorrect interface voltage signal settings, Windows NT will not receive the signal from the UPS and the UPS will not stop when there is a power failure.

Failure to put check marks in the boxes will lead to the same result.

5) After the settings are made, double-click the "Service" icon in "Control Panels".
6) Select the UPS service and click the "Start" button.

By starting the alerter service, messenger service, and event log service in advance, the UPS service sends warning messages to the user and records a history of events such as power failures when they occur.

When a power failure occurs, Windows shutdown is performed once the Low battery level signal is detected. If the power is restored before the Low battery level signal is detected, Windows shutdown is not performed and the normal monitoring state is restored.

8 Using a contact signal

8-1 Using a contact signal card

Adding a contact signal card

An additional contact signal card can be installed in the contact signal input/output slot on the back of the UPS.

- Contact signal card (model number: SC07), sold separately
- Contact cable (model number: BUC28), sold separately

  * When using the unit in the SC05 compatible mode, use an optional BUC10 cable.

Contact Signal

You can develop your unique system based on the following specifications to automate the process at a power failure. You can perform power-failure processing by allowing the system to detect the backup signal and also perform system shutdown processing by allowing the system to detect the Low battery level signal. Also, by inputting the backup stop signal from the system, you can stop the UPS with a sufficient battery level to prepare for the next occurrence of a power failure.

1. Signal output

The UPS has 4 kinds of output signals. The output circuit consists of an open collector circuit using a photo coupler (a kind of electronic switch).

- **Backup Signal output: BU**
  BU stays ON during a power failure.

BU-COM	ON when a power failure occurs

- **Low battery level signal output: BL**
  Goes ON when the battery becomes weak during the Battery Mode.

BL-COM	ON when the battery is low

- **Trouble Signal output: TR**
  Goes ON when an internal failure of the UPS occurs.

TR-COM	ON when a power failure occurs

- **Battery Replacement Signal output (WB)**
  Goes ON when the test determines that battery replacement is necessary due to deterioration.

WB-COM	ON when battery deterioration is detected

2. Signal input

- **Input of the UPS Stop Signal (BS)**

BS-COM	UPS stops

Stops the output of the UPS after the time period specified by the “power output stop delay time setting” has elapsed.

(1) When the "BS signal valid range setting" (setting switch **5**) is set to OFF:

You can stop the output of the UPS by inputting the voltage signal (HIGH) that lasts at least 10 seconds from the outside.

(2) When the "BS signal valid range setting" (setting switch **5**) is set to ON:

You can stop power output by inputting the voltage signal (HIGH) that lasts at least 0.01 second (10 ms) from the outside that is accepted only during backup.

See also "4-4 Changing the setting of the functions" "2. UPS operation mode settings" ➛ Page 29, 34

● **Remote ON/OFF Signal**

Remote ON/OFF signals can be used to start and stop the UPS, by using either an externally connected contact or the ON/OFF status of the open collector circuit. To use this function, turn on the Power Switch of the UPS. (Note: When there is no AC power supply, it is not possible to start up UPS by the remote ON/OFF signals even though cold start is set ON.)

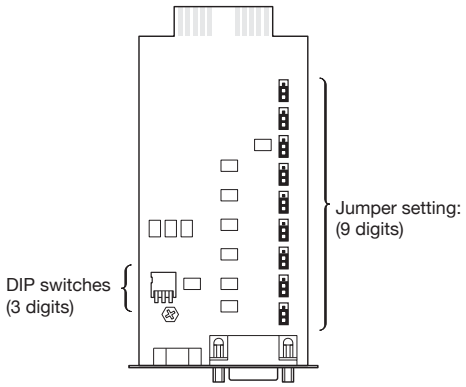
Connection terminals are at contact signal connector pins 6 ,7 and the remote ON/OFF connector.

External contact	Operate
Open	Start
Close	Stop

3. Items that can be set using the contact signal card

Please make a cable to connect to the system by yourself.

See also "8. Example of the use of the Contact Signal circuit" ➛ Page 76



■ Setting the switches

After changing the setting switch, follow the procedure described below.

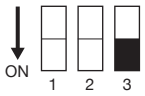
After changing the setting switch, turn OFF the UPS power switch, disconnect the AC input plug, wait until the status indicator is completely OFF, and then reinsert the AC input plug.

● The setting switch changes do not become valid until the AC input plug is reinserted.

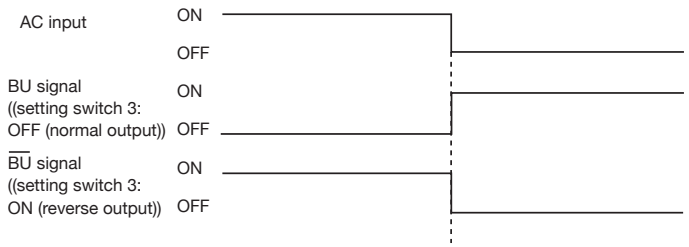
By using the switches of contact signal card, set the item below.

● BU/BL signal reverse output setting

BU and BL signals are output in reverse.



Setting switch 3	Backup signal output (BU)
OFF	Normal output (factory setting)
ON	Reverse output



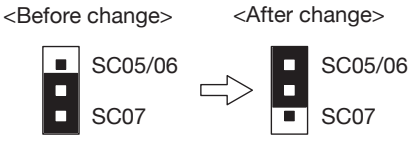
■ Setting up when using the unit in the SC05 compatible mode

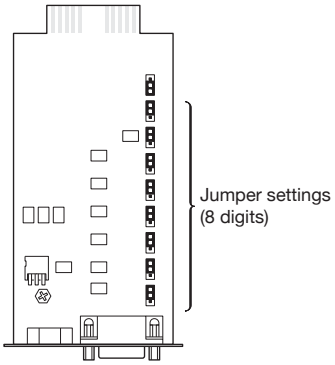
● Jumper settings

By making jumper settings, the contact signal card SC05/06 connector pin assignments can be changed.

Turn over the contact signal card, and change the contact sugnal card's JP2 to JP9 jumper settings (8 settings) to "SC05/06".

* Use the [SC05/06/07] side for JP10.
* Factory settings: SC07 side for JP2 to JP9, SC05/06/07 side for JP10

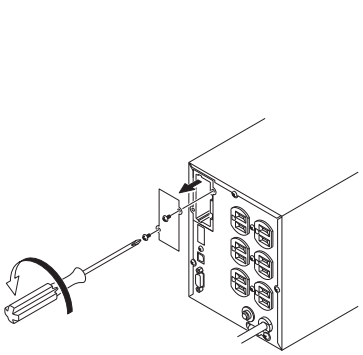




* When using the unit in the SC05 compatible mode, use an optional BUC10 cable.

● **Insert/ removal method of contact signal card**

(1) Turn OFF the power switch, remove the two screws below the signal card expansion slot on the back of the unit, and remove the cover.



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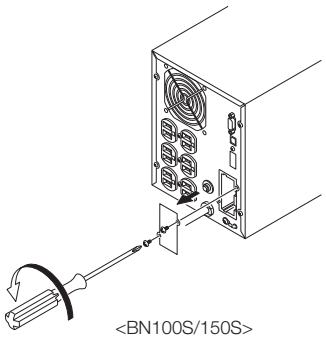

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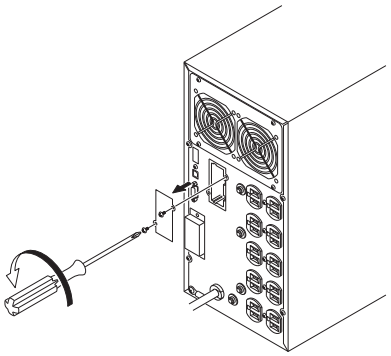
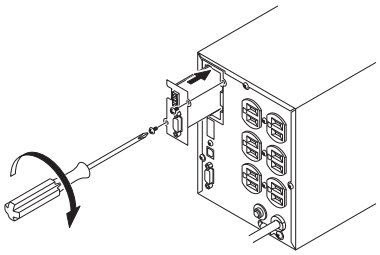


<BN220S/300S>

(2) Carefully insert the contact signal card whose settings have been changed, and securely tighten the 2 screws.



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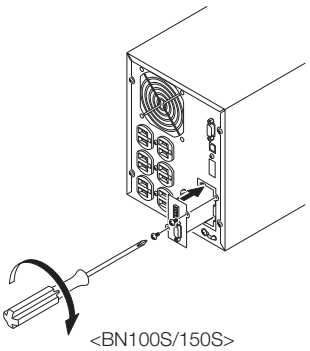

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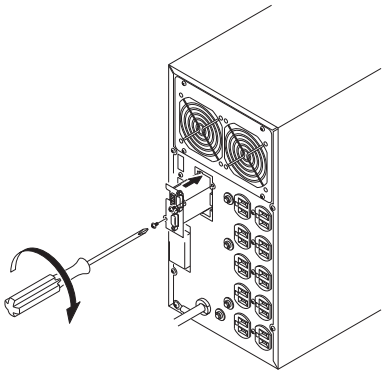
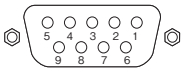
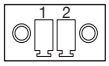


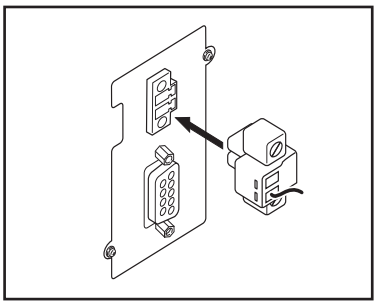
<BN220S/300S>

4. Contact Signal Connector (female DSUB9P)

Pin assignment	Pin number	For jumper setting “SC07” * Factory settings	For jumper setting “SC05/06”
	1	Battery LOW signal output (BL)	NC
	2	Trouble signal output (TR)	Backup signal output (BU)
	3	Backup stop signal input (BS)	Backup reverse signal output (BU)
	4	NC	COMMON (COM)
	5	COMMON (COM)	Battery Low Signal output (BL)
	6	Remote ON/OFF input (-)	Backup stop signal input (BS)
Front view Screw size: inch screw #4-40 UNC	7	Remote ON/OFF input (+)	Remote ON/OFF input (-)
	8	Backup signal output (BU)	Trouble Signal output (TR)
	9	Battery replacement signal output (WB)	Remote ON/OFF input (+)

5. Remote ON/OFF connector

Pin assignment	Pin number	Signal name
	1	Remote ON/OFF (+)
	2	Remote ON/OFF (-)
Front view Screw size: Inch screw #4-40 UNC		



6. Contact Signal ratings

● Signal output (BL, TR, BU, WB, $\overline{BU}$)

Photo coupler ratings

Appliable voltage: 35 VDC or less

Maximum current: 20 mA

● Remote ON/OFF

Voltage between terminals: 10 VDC

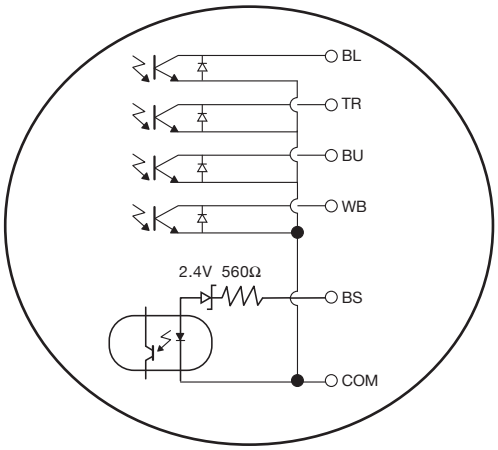
Current when closed: max.10 mA

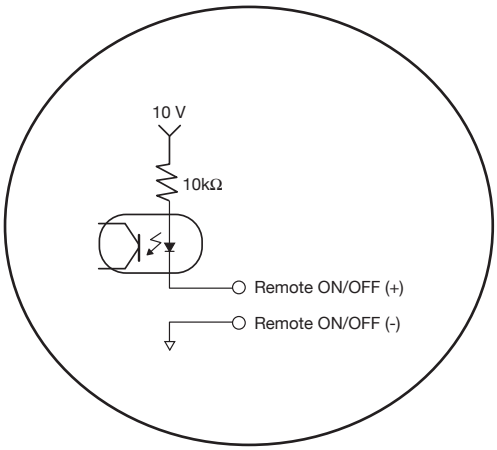
● UPS Stop Signal input (BS)

Input voltage HIGH(ON) 5 to 12 VDC

LOW(OFF) 0.7 VDC or less

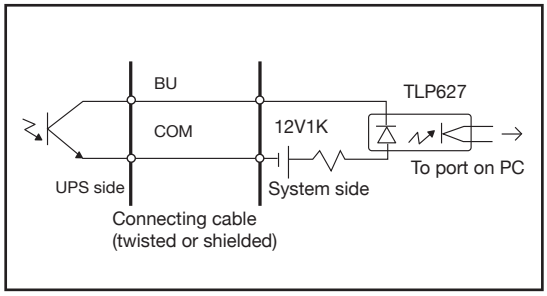
7. Contact Signal circuit inside the UPS



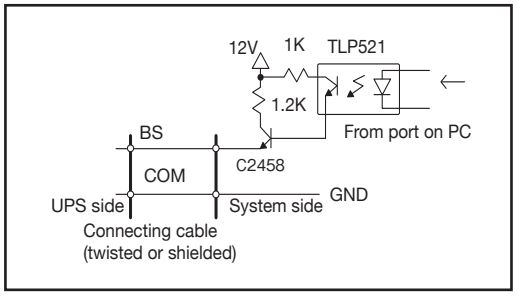


8. Example of the use of the Contact Signal circuit

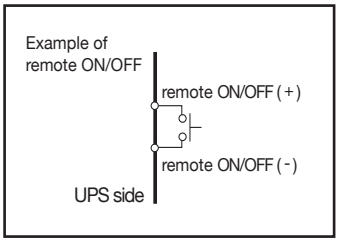
● **Example of BU signal output circuit and the connected circuit**



● **Example of BS signal input circuit and the connected circuit**



● **Remote ON/OFF circuit**



9. Precautions and notes for the use of the Contact Signal

Notes

● When connecting a device such as a relay that generates counter electromotive force to the signal output circuit, connect diodes that prevent counter electromotive force to both ends of the relay.

Explanation

● When power is restored after the unit stopped automatically during a power failure, the unit automatically restarts and supplies power. If you do not want to start the connected devices, turn OFF their switches or set the auto startup setting after recovery from power failure (setting switch 2) to ON(Auto startup is not performed). (See page 30.)

10.Xserve RAID connection procedure

Apple's Xserve RAID can be controlled by changing the contact signal card settings.
* Cable: Connection cable (BUC28), sold separately

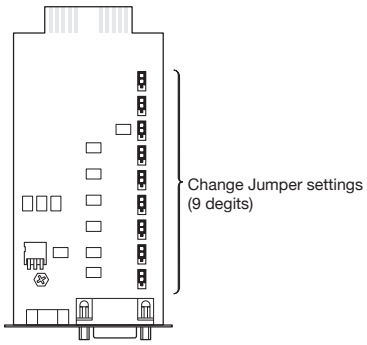
1. UPS connection procedure

(1) Turn OFF the unit's power switch and remove the cover of the slot for "signal card addition" from the rear of the unit.

See also ● How to insert/remove the contact signal card ➛ Page 75

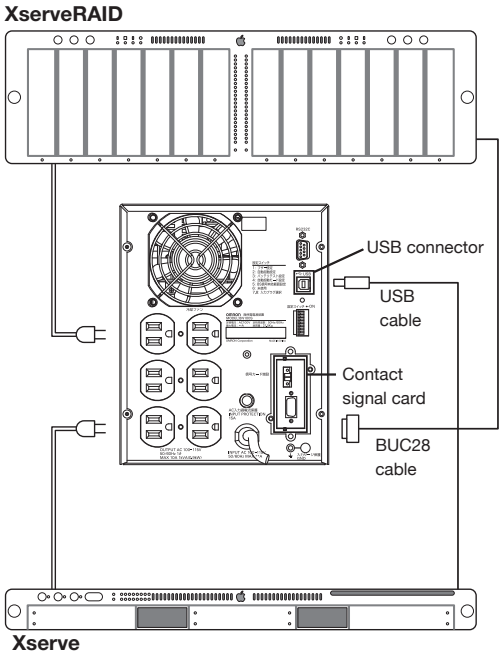
(2) Change the contact signal card's JP2 to JP9 jumper settings (8 settings) to "SC05/06."

(3) Change the JP10 jumper setting to "SC05XSR."



(4) Insert the contact signal card into the UPS.

(5) Connect the BUC28 cable connector (female end) to the Xserve RAID serial port and turn the connector fixing screw clockwise to tighten it.
Connect the other end (male end) of the same cable to the contact signal card and turn the connector fixing screw clockwise to tighten it.



(6) Turn ON the power switches for the Xserve RAID and the UPS.

2. Procedure for changing settings so that Xserve RAID performs auto startup when UPS starts up

(1) Open RAID Admin.

(2) Select the target Xserve RAID and log in to it.

(3) After login is complete, the Settings button on the RAID Admin screen is enabled. Click this button to open the Settings screen. (A RAID Admin administrator password is required when changing the settings. Enter the password when prompted.)

(4) After the Settings screen opens, click the System tab and find the Options section. In the Options section, place a check mark in the check box next to “Auto restart after power failure.”

(5) Click the OK button when finished.

3. Checking operation

(1) Remove the UPS AC input plug from the wall outlet (commercial power) to put it into Battery Mode.

(2) When in Battery Mode, the UPS outputs the power outage signal. When the Xserve RAID receives the power outage signal, the write cache is closed.

(The write cache section on the operating system’s RAID Admin data screen displays “Not in use.”)

(3) Power to the Xserve RAID can be turned OFF.

(4) After checking the operation, connect the UPS AC input plug to the wall outlet (commercial power).

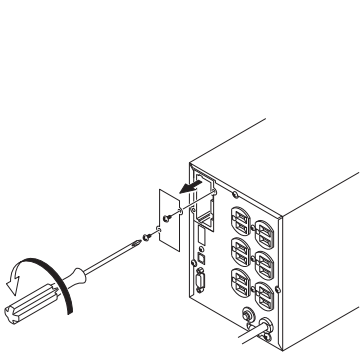
9 Using an SNMP/Web card

9-1 Adding an SNMP/Web card

An SNMP/Web card can be loaded into the card slot on the back of the unit. Remove the cover of the slot for “signal card addition” from the rear of the unit, and plug the SNMP/Web card in its place.

- SNMP/Web card (model number: SC20G), sold separately

(1) Remove the two screws and remove the signal card expansion slot cover.



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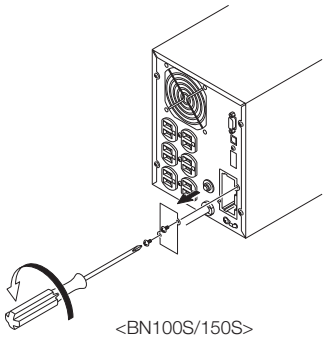

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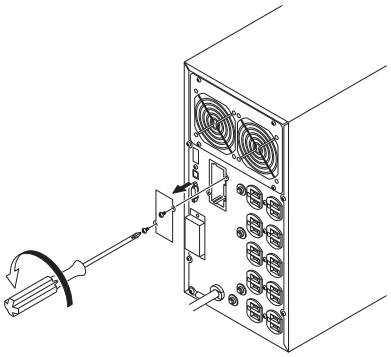
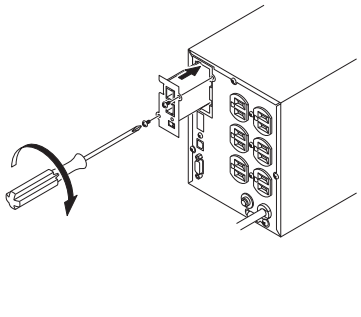


<BN220S/300S>

(2) Carefully insert the SNMP/Web card (model number: SC20G), and securely tighten the 2 screws.
* Replace with BU50SW/BU75SW/BU100SW/BU150SW/BU1002SW/BU3002SW brackets.



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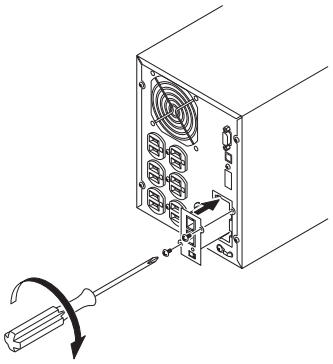

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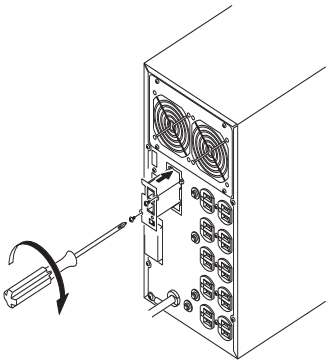


<BN220S/300S>

9-2 SNMP/Web card outline

■ Description (features)

- Direct connection between UPS and network
  Inserting an SNMP/Web card (SC20G) into the UPS enables a LAN connection, allowing the UPS to be controlled via computers with no serial port.
- Remote UPS management
  Using a commercially available SNMP manager or web browser, you can control the UPS via a computer connected to the network.
- Possible to make function settings for the UPS and SNMP/Web card via a computer on the network UPS and SNMP/Web card (SC20G) parameter settings can be made via any SNMP management station or internet browser. (Functions that act as an SNMP agent can make settings via Telnet and serial connection.)
- Enhanced security functions
  For HTTP and SNMP connections, access can be controlled for each IP.
- Coordinated shutdown
  Multiple UPS can coordinate with each other to perform shutdown.
- Log function
  * The UPS power status, battery status, etc. can be stored in the built-in flash memory.
  * Compatible with SYSLOG.
- Auto shutdown function
  Shutdown is automatically performed when there is a power supply error or when a shutdown has been scheduled. Scheduled operations (auto startup and auto shutdown) can be performed over the network.
- Equipped with UPS standard MIB (RFC1628) and proprietary MIB (swc mib)
- Using JAVA applet to monitor the power supply status
  The power supply status can be visually checked on a graph display.

■ Specifications

LAN port	10/100 Mbit
Network protocol	SNMP, HTTP, APR, RARP, TFTP, ICMP
Other communication route	Serial connection: asynchronous method (setting only)
Number of controllable computers	32 max. (including slave UPS when coordinated shutdown is enabled)
Support MIB	UPSMIB (RFC1628) OMRON MIB
Other	Equipped with real-time lock

For more details, refer to the instruction manual included with the SNMP/Web card.

The most recent firmware can be downloaded from our homepage(http://www.omron.co.jp/ese/).

10 Troubleshooting

Perform the checks shown below if the unit is operating abnormally.
If the unit continues to operate abnormally, please contact our Electronic Systems & Equipments customer support center at _____.

Problem	Check and remedy
UPS does not operate. The LED display does not light up, even though the AC input plug is connected to a wall outlet (commercial power) and the power switch is ON.	1. Check that the AC Input Plug is connected to the commercial power securely. 2. The AC Input Overcurrent Protection is working. (If the switch is on the OFF side (the black button has popped up for BN50S/BN75S/BN100S/BN150S, or the lever has been flipped to OFF for BN220S/BN300S), there are probably too many connected devices or there is a short in the connected devices.) Disconnect all of the connected devices, turn ON the AC input overcurrent protection (push in the black button for BN50S/BN75S/BN100S/BN150S, or flip the lever to ON for BN220S/BN300S), and then turn ON the Power Switch of the UPS again. If the status indicator does not display normally, there is a problem with the UPS. (See "Interpreting beeps and displays" on page 25.)
Backup is not possible. The computer stops when a power failure occurs.	Is charging insufficient? Perform the test after charging the battery for at least 8 hours. (You can charge the battery by connecting the AC input plug of the UPS to a wall outlet (commercial power).)
Backup is performed too frequently. Frequent switching is performed although a power failure does not occur. You hear the sound of switching.	Variations (decrease) in the input power occur frequently. Or, noise is included that significantly distorts the voltage waveform of the input power. ● Change the wall outlet (commercial power) to which you connect the UPS. Try connecting to a wall outlet (commercial power) away from equipment that consumes large power. ● This problem may occur also when you connect many devices to a plug strip or extension cord connected to the UPS if it is a long or thin cable.
Does not turn ON when power switch is pressed.	The unit does not start up when the input power supply voltage/frequency is abnormal. (The status indicator displays “H-”, “-H”, “L-” “-L” “HH” or “LL”.) Check the voltage and frequency of the input power supply. See also A. Specifications “Input, Input voltage range, frequency” see Page 83
The display is abnormal. ● The display is unstable. ● White lines occur. ● Noise increases.	The probable cause is noise that occurs inside the UPS. ● Ground all devices connected to the UPS. Connect them to a wall outlet (commercial power) for 3-pin plugs or connect their Grounding Terminal to the Grounding Terminal of a wall outlet. ● This problem may occur when power cords are long or placed closely or when the UPS and devices to be backed up are placed closely. Rearrange them. ● If the UPS or devices connected to the UPS are contained in a metal rack, attempt to ground the rack itself.
The battery replacement lamp blinks and the beeper sounds at 2-second intervals.	1) The auto battery test or self-diagnostic test determined that the battery is dead. Battery Mode cannot be performed properly, so the battery needs to be replaced.
The status indicator shows “OL”, and the beeper sounds at 0.5-second intervals.	There are too many connected devices. Reduce the number of connected devices until “On” is displayed on the status indicator.
The status indicator blinks “EO”, and the beeper sounds continuously.	Output stopped due to exceeded connection capacity. Turn OFF all power to the unit and connected devices, and reduce the number of connected devices. Then, turn the power to the unit and connected devices back ON and check whether "On" is displayed on the status indicator.
The cooling fan suddenly starts rotating and does not stop even after the UPS returns to the Commercial Power Mode.	The cooling fan starts operating at the Battery Mode due to a power failure, auto battery test, self-diagnostic test, etc., and automatically stops after a period of approximately 24 hours when the UPS returns to the Commercial Power Mode and the battery is fully charged.

References

A. Specifications

Model		BN50S	BN75S	BN100S	BN150S	BN220S	BN300S
Method	Operation method	Line-interactive method					
	Cooling method	Natural air cooling		Forced air cooling			
	Connectable devices	PC, display, and peripherals					
Input	Rated input voltage	100 to 115 VAC					
	Startup voltage range and input voltage range	100V mode Standard sensitivity setting: 89±2 to 118±2 VAC Low voltage sensitivity setting: 84±2 to 118±2 VAC High voltage sensitivity setting: 89±2 to 113±2 VAC 115V mode Standard sensitivity setting: 99±2 to 129±2 VAC Low voltage sensitivity setting: 94±2 to 129±2 VAC High voltage sensitivity setting: *8					
	Input frequency	50/60Hz±4Hz					
	Maximum current	7A	10A	15A	20A	30A	42A
	Phase	Single-phase, two-wire					
	Input plug	NEMA 5-15P *4				NEMA L5-30P *5	
	Input protection	Reset-type overcurrent protection device					
	Input protection capacity	10A	13A	15A	25A	45A	45A
Output	Output capacity (shared maximum) *1	500VA/450W	750VA/680W	1kVA/0.9W	1.5kVA/1.35kW *6	2.2kVA/1.98kW	3kVA/2.7kW *7
	Output voltage (In Commercial Power Mode)	100V mode Standard sensitivity setting: 90±2 to 112±2 VAC Low voltage sensitivity setting: 85±2 to 112±2 VAC High voltage sensitivity setting: 92±2 to 108±2 VAC 115V mode Standard sensitivity setting: 100 to 125±2 VAC Low voltage sensitivity setting: 95 to 125±2 VAC High voltage sensitivity setting: *8					
	Output voltage (In Battery Mode)	100V mode 100 VAC±6% 115V mode 110 VAC ±6%					
	Output frequency (In Commercial Power Mode)	Input frequency through output					
	Output frequency (In Battery Mode)	50/60Hz±0.1Hz					
	Phase	Single-phase, two-wire					
	Output waveform	Sine wave					
	Waveform distortion rate (Rectified load, at ratedoutput)	18% or less					
	Output receptacle	NEMA 5-15R x 6 receptacles				NEMA 5-20R x 2 receptacles NEMA 5-15R x 8 receptacles	
	Switching time	10 msec. max.					
Battery	Backup time (*2)	5.5 min. or more	3.5 min. or more	7.9 min. or more	5 min. or more	7 min. or more	5 min. or more
	Type	Compact sealed lead battery					
	Sealed lead battery life expectancy	4 to 5 years (long operating life) *At ambient temperature of 20°C					
	Battery capacity (V/Ah/quantity)	12 V/ 8 Ah/ 2		12 V/ 8 Ah/ 4		12 V/ 8Ah/ 8	
	Charging time	8 hours					
Environment	Operating environment temperature/ humidity	0 to 40°C/ 25 to 85%RH					
	Storage environment temperature/ humidity	-15°C to 50°C/ 10 to 90%RH *With battery fully charged, and with no condensation					
Dimensions *3		148 x 362 x 203 (±1)mm		175 x 415 x 238 (±1)mm		200 x 411 x 405 (±1)mm	
Weight of unit		Approx. 10 kg		Approx. 22 kg		Approx. 38 kg	
Internal power consumption		Normal: 30W, Max.: 70W		Normal: 60W, Max.: 150W		Normal: 100W, Max.: 250W	
Noise regulation (compliance standard)		VCCI Class B				VCCI Class A	
Safety standard compliance		UL1778					
Noise		45 dB max.		50 dB max.			

*1: Make sure that both the VA value and the W value of the load capacity connected to the UPS are within the range specified here.

*2: At ambient temperature of 20°C and with battery in initial state.

*3: The height includes the height of the rubber feet.

*4: For BN150S, the maximum output (1.5kva/1.35kw) cannot be used with the standard input plug (NEMA 5-15P). To use with maximum output, replace with a 20A plug (purchased separately).

*5: For BN300S, the maximum output (3.0kva/2.7kw) cannot be used with the standard input plug (NEMA L5-30P). To use with maximum output, replace with a 50A plug (purchased separately) or perform terminal block connection (not compliant with UL standards).
The standard equipment input plug (NEMA L5-30P) cannot be connected to a household receptacle.

*6: When 20A plug is connected.

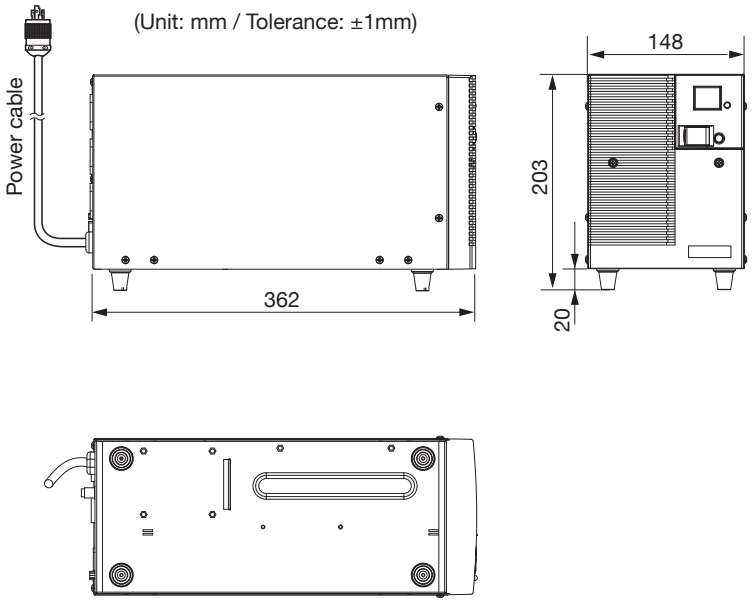
*7: When 50A plug or terminal block is connected.

*8: In 115V mode, the high voltage sensitivity setting is identical to the standard voltage sensitivity setting.

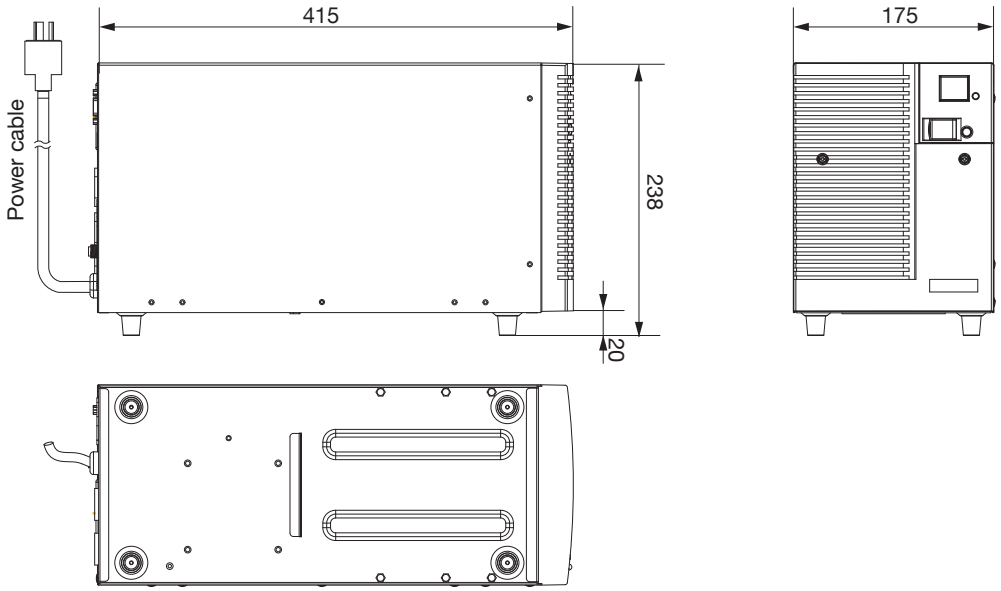
B. Dimensions

• BN50S/BN75S

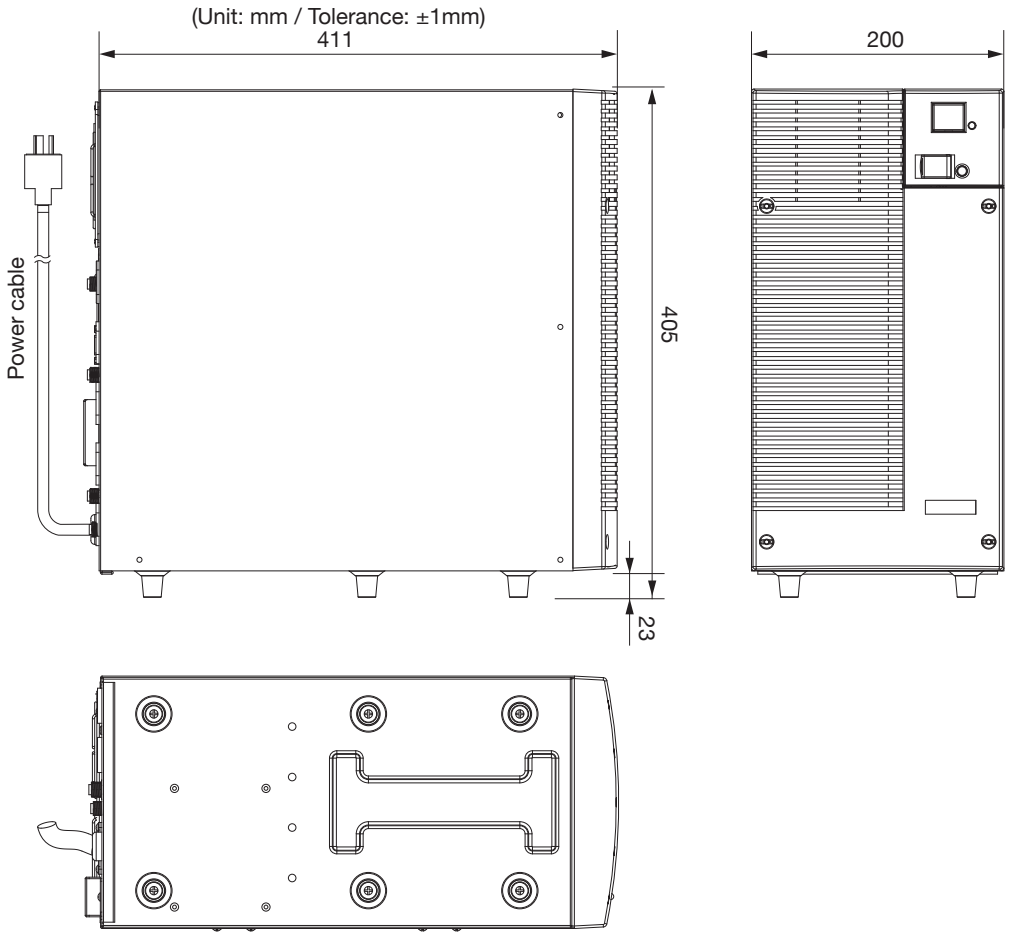
(Unit: mm / Tolerance: ±1mm)



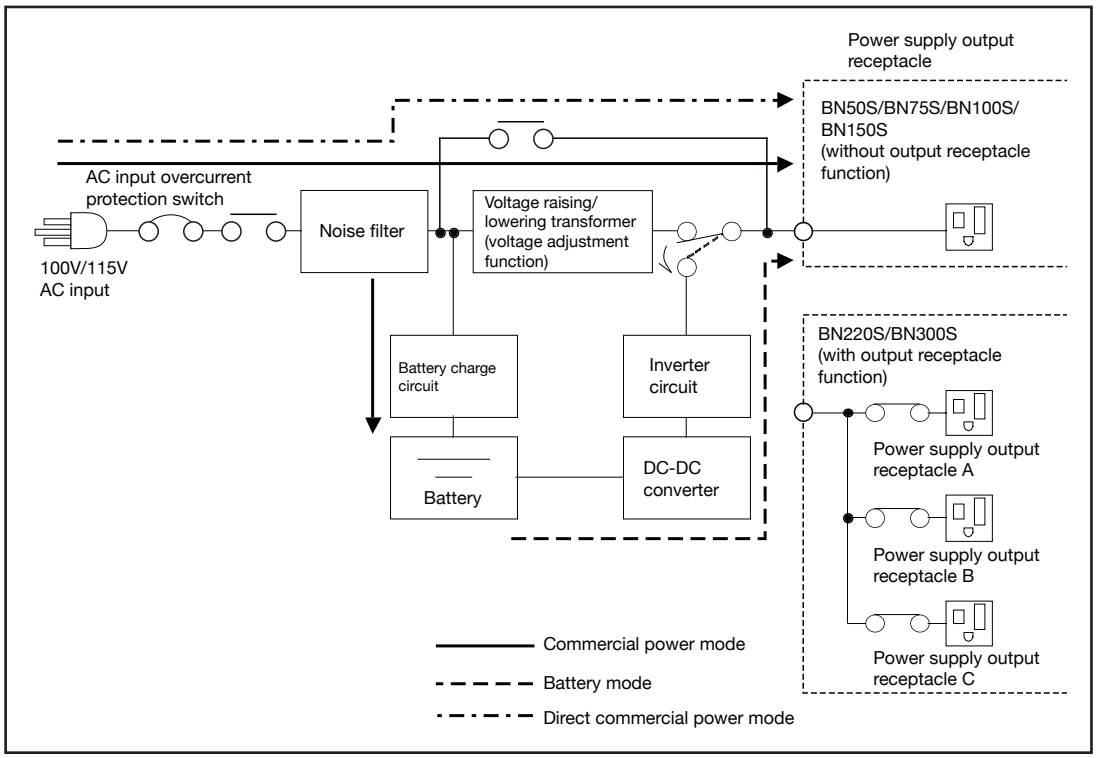
• BN100S/BN150S



• BN220S/BN300S

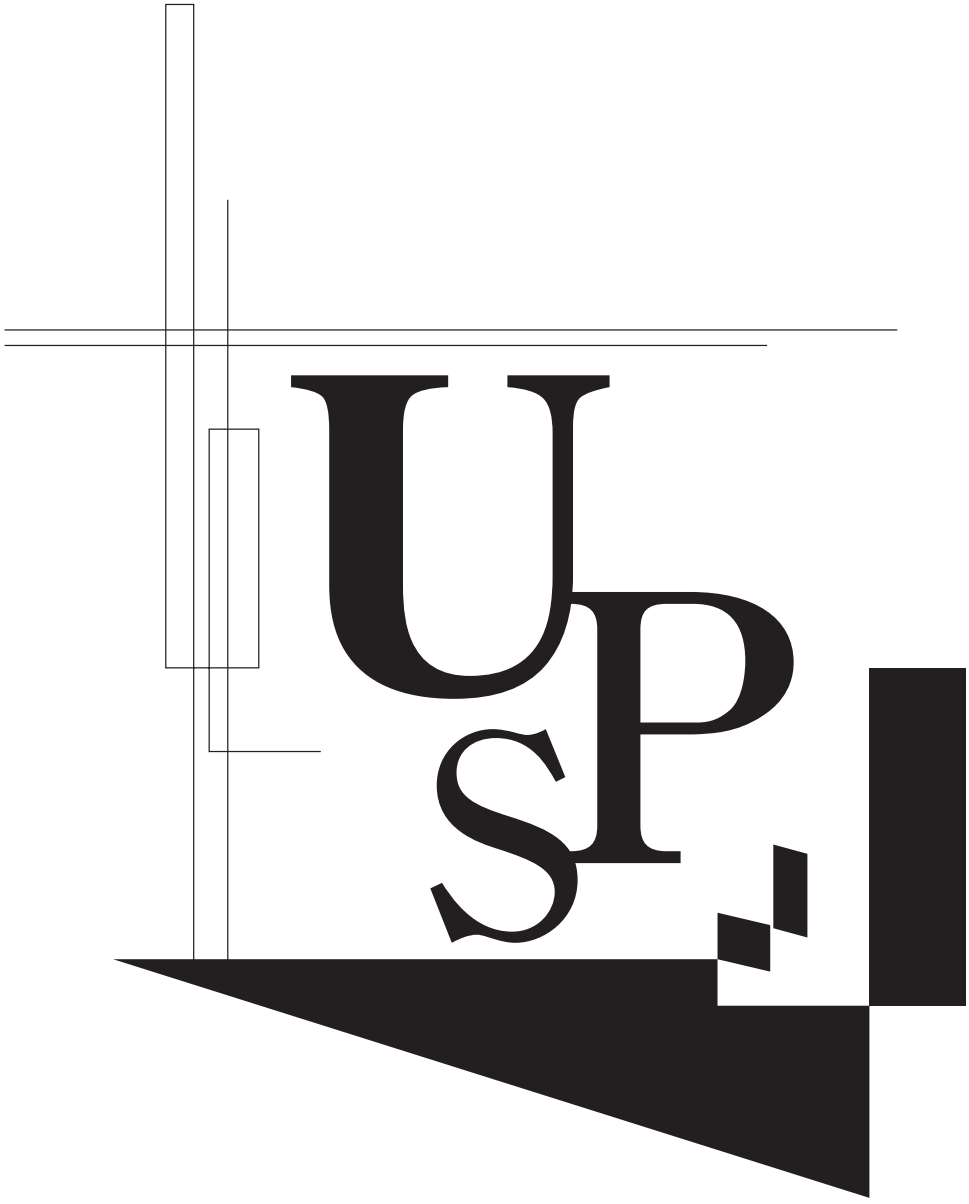


C. Circuit block diagram



D. Related products

Description	BN50S	BN75S	BN100S	BN150S	BN220S	BN300S
Replacement battery pack	BNB75S	BNB75S	BNB300S	BNB300S	BNB300S (Two Required)	BNB300S (Two Required)
Mounting brackets	BNP300S	BNP300S	BNP300S	BNP300S	BNP300S	BNP300S
SNMP/Web card	SC20G	SC20G	SC20G	SC20G	SC20G	SC20G
Contact signal card	SC07	SC07	SC07	SC07	SC07	SC07
Connection cable for Windows UPS service	BUC26	BUC26	BUC26	BUC26	BUC26	BUC26
Apple Xserve RAID connection cable	BUC28	BUC28	BUC28	BUC28	BUC28	BUC28



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