



USER'S MANUAL

Uninterruptible Power Supply GX200 series (1.5kVA, 3kVA)

Model	M-UPS015AE2S
	M-UPS015AE2R
	M-UPS030AE2B
	M-UPS030AE2R
	M-UPS030AE2C

For safe use

- **About handling of this manual**

This manual contains important information for safe use of the product. Please read this manual carefully before using this product. Use this product, after reading and understanding especially "Caution about Safety" and "Caution for Use" in this manual well. Furthermore, this manual should be retained for future reference.

High-safety uses

This product is designed and manufactured for the general use, such as general office use and personal use, and is not designed and manufactured for uses (control of nuclear reactions at the nuclear facilities, aircraft flight control, air traffic control, mass transport control, medical life support systems, and missile launch control in weapon systems, etc.) that require a high degree of safety, and can cause death or serious injury if the required safety is not maintained. Do not use this product without carrying out measures to ensure the required safety for such a use. If using this product for such a use, consult with our sales representatives.

Prevention of radio disturbance

CAUTION
This product is equivalent to Class A information technology device based on standards of VCCI and EN62040-2(category C2 UPS). There is a possibility where radio disturbance arises if the product is used in a home environment. The user may be requested to take appropriate measures in such a case. VCCI : Voluntary Control Council for Interference by Information Technology Product in JAPAN

Prevention of harmonics current disturbance

The products are based on the JIS C61000-3-2.

- All rights reserved.
Copyright © Fuji Electric Co., Ltd. 2012

Foreword

An uninterruptible power system is what supplies stable electric power to OA devices, FA devices, computer devices or the like.

This manual describes installation, running, daily management, troubleshooting and maintenance of an uninterruptible power system. Use an uninterruptible power supply correctly in accordance with this manual.

In this manual, an uninterruptible power supply (this product) is described as UPS for short.

● Contents and composition of this manual

The composition of this manual is shown below.

Cautions for safety and use

The cautions about safety are described. If you use the UPS, be sure to read this section.

1 Unpacking

The cautions about taking out the UPS from a box are described.

2 Outline

The name of each part and the operation mode of the UPS are described.

3 Installation

Installation of the UPS and connection of the cable are described.

4 Running

The methods of run and stop of the UPS are described.

5 Inspection

The cautions about daily inspection and rolling blackouts are described.

6 Troubleshooting

Troubleshooting is described.

7 Maintenance

Replacement of battery and cooling fan and method of storage of the UPS are described.

8 Appendix

Rated specification and the additional description for UL type are described.

Due to the purpose to use, the chapters which should be referred to especially are as follows.

- For installation personnel : Caution about safety, Caution for use Chapters 1, 2, 3 and 4
- For users : Caution about safety, Caution for use Chapters 2, 4, 5 and 6
- For maintenance personnel : Caution about safety, Caution for use Chapters 2, 4, 5 and 7

- **Warning indication**

In this manual, the following warning displays are described so that user or the people around the UPS do not suffer damage to the body and property.



WARNING

A “WARNING” sign indicates a potentially hazardous situation that could result in death or serious injury if the user does not follow instructions.



CAUTION

A “CAUTION” sign indicates a potentially hazardous situation, which if not avoided, may result in minor injury, moderate injury or property damage.

IMPORTANT

An “IMPORTANT” sign indicates matters that require attention in the use of the UPS.

- **Symbols appearing in this manual**

Symbols appearing in the text of this manual are of the meanings indicated below.



Describes the status of the Product.



Reference to be read, if necessary. How to take actions and what to be referred to are described.

- **LED display**

Indicates the LED status by any of the symbols indicated below.



: Lighting



: Blinking



: Out

Notice

- The description in this manual is subject to change without notice.

Caution about safety

● List of important warning matters

The important warning matters described in this manual are as follows.

 WARNING A “WARNING” sign indicates a potentially hazardous situation that could result in death or serious injury if the user does not follow instructions.	
Electric shock	Do not remove the cover from the Product. There are sections of high voltage in the Product, and electric shock may arise.
 CAUTION A “CAUTION” sign indicates a potentially hazardous situation, which if not avoided, may result in minor injury, moderate injury or property damage.	
Electric shock Personal injury	Do not stick a bar or finger into a cooling fan or ventilation hole. There is fear of an electric shock or an injury.
Electric shock	Only maintenance personnel must perform the maintenance other than daily inspection, such as the replacement of battery and cooling fan. There is fear of an electric shock. Connect an AC input plug to a grounding power receptacle, or connect a grounding wire to a ground terminal. (class D grounding) There is fear of an electric shock. A commercial power ordinarily has electrodes of a grounding side and an un-grounding side apart from a grounding electrode (ground). Be sure to confirm before connecting. If connected in reverse, there is fear of the malfunction by noise or the electric shock. When inspecting or maintaining the connection device (a device getting connected to the UPS) or the UPS, turn off the connection device and the UPS. And in the case of M-UPS015AE2S, pull out the AC input plug on the back of the UPS from an input power receptacle. In the case of M-UPS015AE2R and M-UPS030A2E□, turn off the input breaker in the distribution board and cut off connection with AC input terminal (R, S). There is fear of an electric shock.

Injury	Do not ride on or put an object on the UPS. There is fear of an injury or an overturn.
Injury	The UPS is heavy. Pay enough attention Injury to handling the UPS.
Damage	Take out the UPS in a level and flat place. Pay enough attention to prevent an accident such as an overturn or a drop. The mass of the Product is as follows. • M-UPS015AE2S : 24 kg (12 kg without batteries) • M-UPS015AE2R : 26 kg (14 kg without batteries) • M-UPS030AE2B : 47 kg (23 kg without batteries) • M-UPS030AE2R : 42 kg (18 kg without batteries) • M-UPS030AE2C : 48 kg (24 kg without batteries)

Damage	Do not use the UPS for the uses that may hurt the human body or exert an important influence on the society and public. • Medical equipment directly affecting human life • Device that may affect the human body • Socially and publicly important computer systems Do not put an object (CRT display or floppy disk, etc.) vulnerable to magnetism around the UPS. There is fear of exerting a bad influence on the object. Confirm that the voltage set up by the switch of voltage setting is within the range of input voltage of the connection device. There is fear of damaging the connection device. Do not operate the switch of voltage setting during operation of the UPS. There is fear of damaging the connection device, since the changed voltage is outputted at the restart. And even if operating the switch during operation of the UPS, the output voltage cannot be changed. Replace the battery periodically. If continuing to use the UPS that the battery life ended, there is fear of a leak of battery and a smoke. Replace the battery with one specified by our company and a new one. If using the un-specified battery or mixing an old battery and a new battery, it becomes the cause of failure and trouble of the UPS. When performing the rolling blackouts or when pulling out the AC input plug from an input power receptacle or turning off the input breaker on the back of the UPS, confirm that the RUN LED (green) is blinking slowly (in the cycles of approximately 1.6 sec.). If the breaker of the distribution board is turned off or the AC input plug is pulled out from an input power receptacle, when the RUN LED is lighting, the internal battery will be discharged, since it will be in the same state as a power failure. There is fear of the battery deterioration or a shortening of a cycle of battery replacement.
--------	--

● Warning label

A warning label is attached to the Product.

- Never remove this warning label from the Product.
- This warning label is targeted to the person who uses the Product.

Cautions for use

Pay attention to the following matters in the use of the Product.

IMPORTANT	“ Important ” indicates caution about the use of the UPS.
------------------	---

Do not install and store the UPS in the following places:

- In an outdoor location
- A place exposed to the elements
- An extremely humid place and a dusty place
- A place with corrosive gas or salinity
- A place subjected to direct sunlight
- A place near sparks or heating element
- An extremely hot or cold place or place where the temperature fluctuates greatly
- A place where vibration and a shock are added

Do not perform the battery check in succession.

When the battery check is performed, the internal battery is actually discharged and the voltage is checked.

If the battery check is performed in succession, there is fear of the battery deterioration or a shortening of a cycle of battery replacement.

If the UPS is not used for a long time, charge the battery every two months.

Charge the battery by operating the UPS 12 hours or more every two months, and after charging the battery, perform the battery check.

If the UPS is left without operating for a long time, there is a possibility that the UPS get unusable since the battery becomes an over-discharge state due to self-discharge.

The disposal of used battery has legal restrictions.

Commission industrial waste disposal contractor, or consult with an agent from which you purchased the UPS, or a maintenance company.

Do not block the vent hole and cooling fan or use the UPS in a stuffy place.

The vent hole and cooling fan are equipped in order to cool the inside of the UPS. There is a possibility that the inside and ambient temperature of the UPS may get out of the rated specification. The UPS may rise temperature to a level that causes UPS failure or breakage.

Replace the cooling fan periodically.

If continuing to use the UPS that the fan life ended, there is a possibility that the inside temperature of the UPS may get out of the rated specification.

Do not use 5 to 9 of the switch of voltage setting.

It becomes impossible for the UPS to start up normally

The allowable voltage between the input line and grounding terminal of the Product is 250V AC.

The filter circuit in the input unit may be damaged, if a voltage that is higher than 250V AC is impressed.

The input surge voltage capacity of the UPS is 2 kV peak ($1.2 \times 50 \mu\text{sec}$).

The filter circuit in the input unit may be damaged, if a surge voltage that is higher than 2 kV peak is impressed.

The input voltage range of the UPS is from 160Vac to 288Vac.(tolerance)

If the input voltage is different from the above, provide a transformer for voltage conversion outside of the Product. The UPS may be damaged, if a voltage outside of the input voltage range is impressed.

The input voltage of the UPS should not exceed the input voltage range of connected equipment.

During bypass running, the input voltage to the UPS is output as it is as the output voltage. The connected equipment may be damaged, if a voltage that exceeds the input voltage range of connected equipment is impressed.

Do not apply single-line grounding on the output side.

Between the input and output of the UPS is not insulated. Therefore, do not apply single-line grounding on the output side.

There is a possibility of becoming the cause of the trouble by noise or the failure.

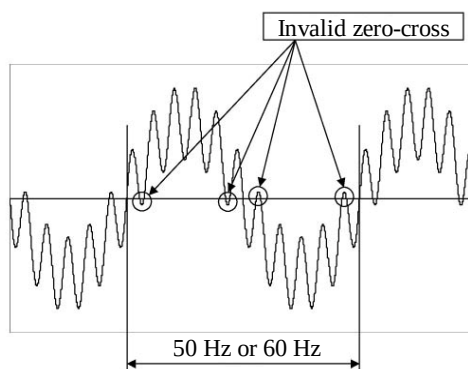
When connecting the UPS to a three-phase power supply system, be sure to connect the grounding phase of the three-phase power supply system to the electrode of a grounding side of the AC input of the UPS.

If connecting to an un-grounding power supply, there is a possibility of becoming the cause of the malfunction.

When using a generator temporarily during the rolling blackouts, use a generator satisfying the following specification.

If connecting a generator not satisfying the following specification to the input part of the UPS, there is a possibility of becoming the cause of the malfunction or damage of the UPS.

- Voltage range: from 160Vac to 288Vac
- Frequency variation: within $\pm 5\%$ of rated frequency (less than 1Hz per second)
- Voltage waveform distortion: 5% or less
- Voltage zero-cross condition: No multiple zero-cross during a cycle



Contents

Foreword.....	i
Caution about safety.....	iii
Cautions for use.....	vi
1 Unpacking.....	1
1.1 Open the package.....	1
● Open the package.....	1
● Check what are contained in the case.....	1
2 Overview.....	2
2.1 Names and principal functions of components.....	2
2.2 Setup of the Product.....	5
● During normal running.....	5
● During battery running (case of input power supply error).....	5
● Automatic bypass running.....	6
● Manual bypass running	6
3 Installation.....	7
3.1 Installation of the Product	7
● Precautions for installation.....	7
● Determine the place of installation	7
● Method for installation.....	9
3.2 Connection of cables	12
● Caution about connecting the cable	12
● Preparation before connection	13
● Connecting the output cable	15
● Connecting the input cable	15
3.3 Interface port	16
● CN1 (standard monitoring interface)	16
● CN2 (PC interface)	17
3.4 Setting up the Output Voltage	18
4 Running.....	20
4.1 Power ON.....	20
● Check cable connection.....	20
● Turn ON the power for the Product	21
● Turn ON the power for connected equipment	22
4.2 Power OFF	23
● Turn OFF the power for the connected equipment	23
● Turn OFF the power for the Product.....	23
5 Inspection.....	25
5.1 Care and daily inspection	25
● Care.....	26
● Daily inspection.....	26
5.2 Precautions and measures for planned interruption of power supply	27
● Operation before implementation of planned interruption of power supply	27
● Operation after planned interruption of power supply	28
5.3 Battery inspection (battery check)	29
● Check conditions of the Product.....	29
● Use the manual battery check function	30
● Charge batteries	31
● Charge batteries	32

6	Troubleshooting.....	33
6.1	If a Warning Beep Sounds.....	33
6.2	Operation Mode List	34
●	Types of blink of LED.....	34
●	Types of the warning beep.....	34
●	List of motion modes.....	35
7	Maintenance	39
7.1	Battery replacement	39
●	Time of battery replacement	39
●	Method for battery replacement.....	40
●	Battery treatment and storage	41
7.2	Cooling fan replacement.....	42
●	Time of cooling fan replacement	42
●	Method for cooling fan replacement	43
7.3	Storage of the Product	44
●	Operations before storage.....	44
●	Case where storage period exceeds 2 months	44
8	Appendix.....	45
8.1	Rated specification	45
8.2	Additional Description for UL Type.....	47

1 Unpacking

1.1 Open the package

● Open the package

⚠ CAUTION	
Injury	The UPS is heavy. Pay enough attention Injury to handling the UPS.
Damage	Take out the UPS in a level and flat place. Pay enough attention to prevent an accident such as an overturn or a drop. The mass of the Product refer to “Caution about Safety”.

1. Open the packing box and take out the UPS.

● Check what are contained in the case

2. Confirm that there is no damage in the appearance of the UPS.
3. Confirm that all accessories are contained.

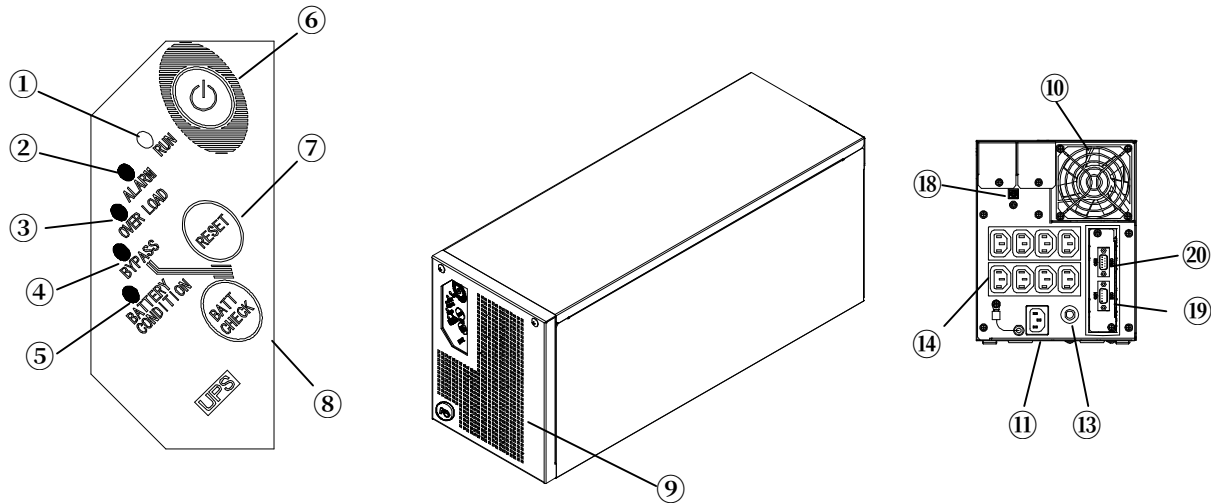
Product type	Accessory	Quantity
M-UPS015AE2S	• Instruction manual (this manual)	1 copy
	• Guarantee (this manual)	
	• Cord plug for Inlet	1 set
	• Cord plug for Outlet	1 set
M-UPS015AE2R	• Instruction manual (this manual)	1 copy
	• Guarantee (this manual)	
	• Rack mount rails for right side and left side	1 set
	• Screws for rack mount rail fixation	10 set
	• Washers for rack mount rail fixation	8 set
M-UPS030AE2B	• Instruction manual (this manual)	1 copy
	• Guarantee (this manual)	
	• Stabilizer (with 6 setscrews)	1 set
M-UPS030AE2R	• Instruction manual (this manual)	1 copy
	• Guarantee (this manual)	
	• Rack mount rails for right side and left side	1 set
	• Screws for rack mount rail fixation	10 set
	• Washers for rack mount rail fixation	8 set
M-UPS030AE2C	• Instruction manual (this manual)	1 copy
	• Guarantee (this manual)	
	• L-type Bracket (with 4 setscrews)	1 set

 If damaged, or any of accessories is missing:
Please contact your sales representative.

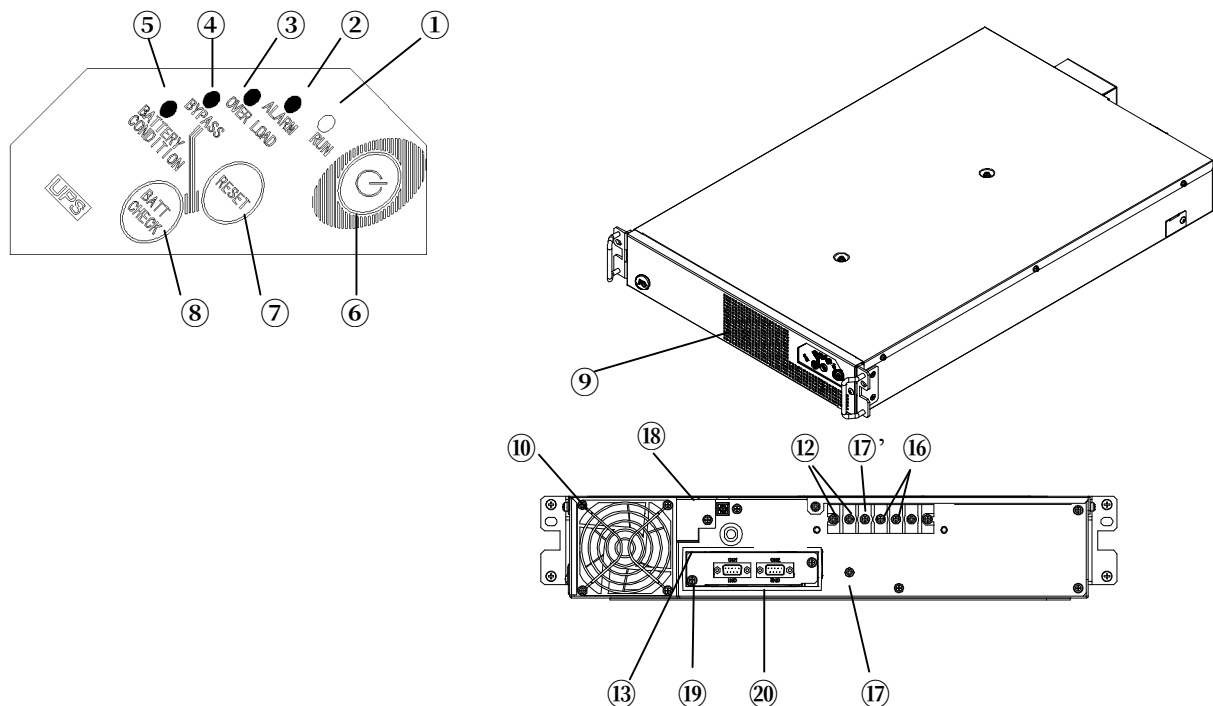
2.1 Names and principal functions of components

The names and principal functions of components of the Product are described below.

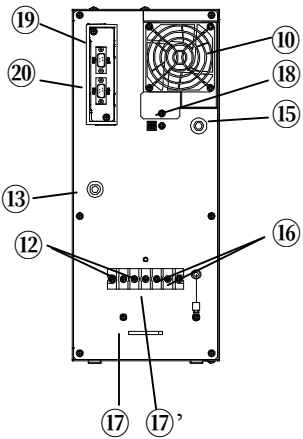
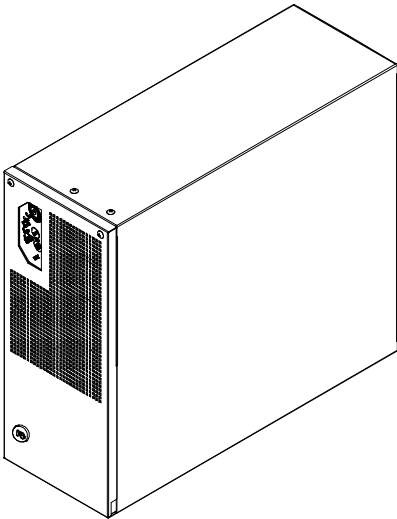
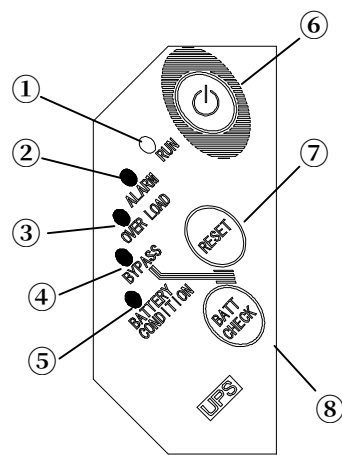
<M-UPS015AE2S>



<M-UPS015AE2R, M-UPS030AE2R>



<M-UPS030AE2B, M-UPS030AE2C>

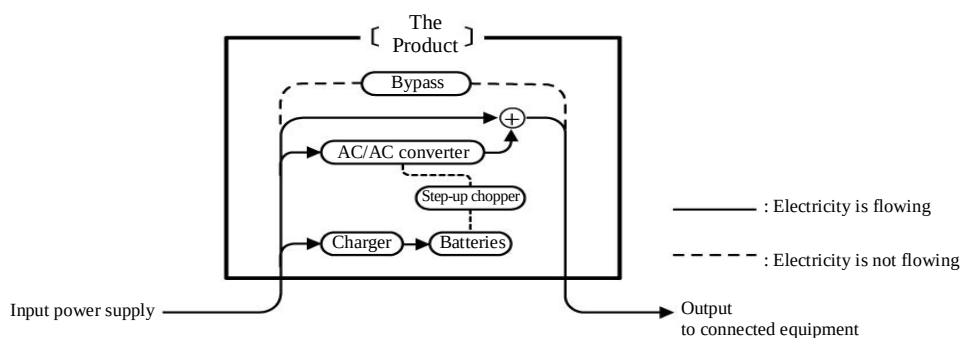


	Name		Principal function
①	LED	RUN	It blinks (green) when the UPS is connected to an input power supply. It lights up (green) while the UPS is operating normally.
②		ALARM	It lights up (orange) when the abnormalities occurred inside the UPS.
③		OVER LOAD	It lights up (orange) when the load capacity of the connection device exceeded the rated specification.
④		BYPASS	It lights up (orange) while the UPS is performing the bypass operation.
⑤		BATTERY CONDITION	When the battery is normal, it indicates the amount of battery charge according to the sort (not lighting/blinking/lighting) of lighting (green). When the battery is abnormal, it lights up (orange).
⑥	Switch	ON/OFF	It is the switch for performing operation and stop of the UPS. RUN and STOP are switched every time this switch is pressed for approximately 1 second.
⑦		RESET	Press this switch when stopping the warning beep. Also, if this switch is pressed for approximately 3 seconds after the failure is restored, theALARM LED goes out.
⑧		BATT CHECK	It is the switch for performing the battery check manually. By pressing the switch for approximately 2 seconds, the battery check is performed.
		BYPASS	Press switch ⑦ and ⑧ for approximately 3 seconds simultaneously when switching to the bypass operation forcibly (manually) while the UPS is operating normally. When the switches are pressed for approximately 3 seconds simultaneously again, the UPS returns to the normal operation.
⑨	Ventilation hole (Air suction)		The inside of the UPS is ventilated. The direction of air is intake.
⑩	Cooling fan		The inside of the UPS is cooled. The direction of air is exhaust.
⑪	AC inlet (only M-UPS015AE2S)		Connect to an input power supply (IEC60320-1 C14)
⑫	Input terminal block (except M-UPS015AE2S)		Connect to an input power supply.
⑬	Input supplementary protector		It is the breaker for protecting the input circuit.
⑭	AC outlet (only M-UPS015AE2S)		Connect the input plug of the connection device. (IEC60320-1 C13)
⑯	Output terminal block (except M-UPS015AE2S)		Connect to an output system.
⑰	Ground terminal		P.E. (Protect Earth)
⑰'	Ground terminal		F.G. (Functional ground)
⑱	Switch of voltage setting		Set up the output voltage
⑲	Standard monitoring interface (CN1)		Output a no-voltage contact signal.
⑳	PC interface (CN2)		It is a computer interface.

2.2 Setup of the Product

● During normal running

The Product runs using AC power supply as the input during normal running, and feeds a constant voltage output to the connected equipment. At the same time, the Product charges batteries located in the Product, in preparation for battery running. The output frequency is synchronized with the input frequency.

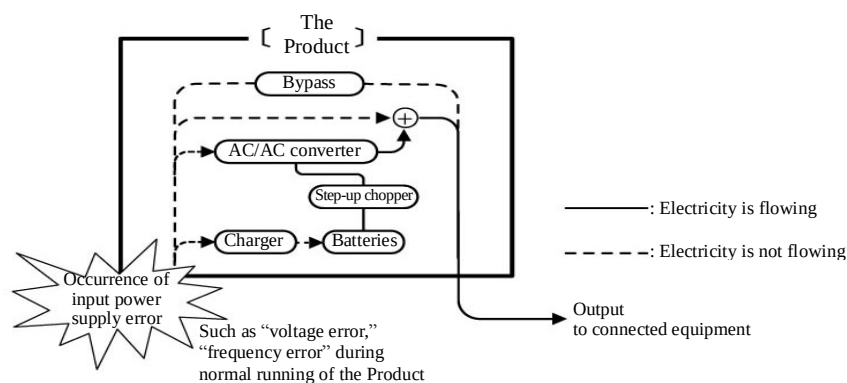


Flow of electricity during normal running

● During battery running (case of input power supply error)

If any input power supply error such as interruption of input power supply and voltage or frequency error arises while the Product is running, discharge from batteries begins and stable power is kept supplied to the load. Switching to battery running occurs uninterruptibly.

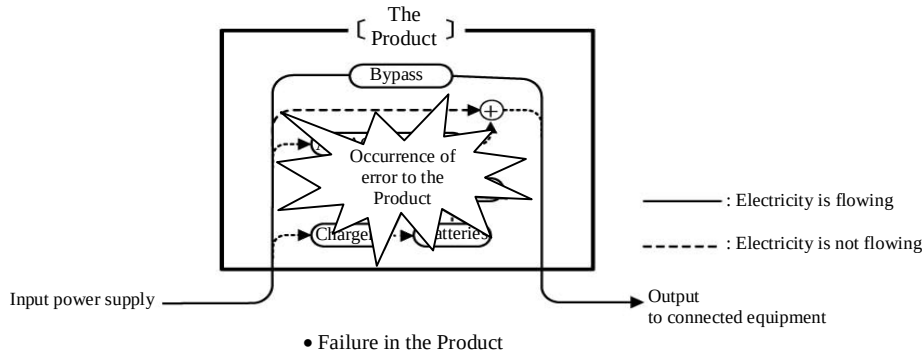
Return to running described in “● During normal running” stated above occurs automatically upon recovery of the AC input power supply (the voltage of input power supply returns to the rated specification).



Flow of electricity during battery running

● Automatic bypass running

If any error occurs to the Product during normal running, switching to bypass running occurs automatically. During bypass running, input voltage is directly fed and power is supplied to the connected equipment. If interruption of power supply arises in this running status, switching to battery running will not occur and interruption of power supply will affect the connected equipment.

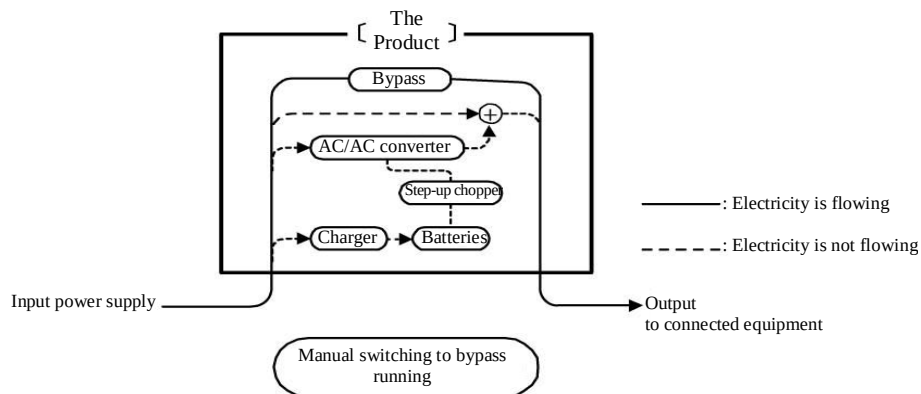


Flow of electricity during automatic bypass running

● Manual bypass running

Switching to bypass running can be executed manually during normal running.

For this operation, press the RESET and BATT CHECK switch simultaneously for about 3 seconds. Return to normal running occurs when both of these switches are pressed simultaneously for about 3 seconds. If interruption of power supply arises in this running status, switching to battery running will not occur and interruption of power supply will affect the connected equipment.



Flow of electricity during manual bypass running

3 Installation

3.1 Installation of the Product

- Precautions for installation

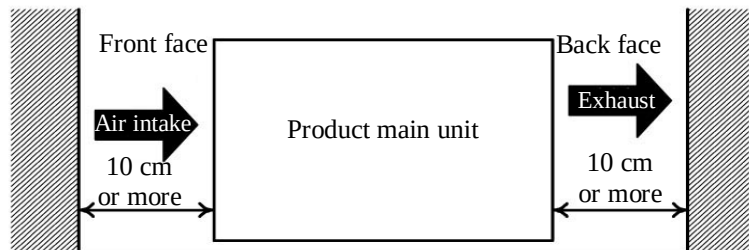
 CAUTION	
Injury	Do not ride on or put an object on the UPS. There is fear of an injury or an overturn.
Damage	Do not put an object (CRT display or floppy disk, etc.) vulnerable to magnetism around the UPS. There is fear of exerting a bad influence on the object.

- Determine the place of installation

IMPORTANT
Do not install and store the UPS in the following places: • In an outdoor location • A place exposed to the elements • An extremely humid place and a dusty place • A place with corrosive gas or salinity • A place subjected to direct sunlight • A place near sparks or heating element • An extremely hot or cold place or place where the temperature fluctuates greatly • A place where vibration and a shock are added Do not use the UPS in a residential area or its neighborhood. This UPS is equivalent to Class A information technology device based on standards of Voluntary Control Council for Interference by Information Technology Product (VCCI). There is a possibility where radio disturbance arises if the product is used in a home environment. The user may be requested to take appropriate measures in such a case. Do not block the vent hole and cooling fan or use the UPS in a stuffy place. The vent hole and cooling fan are equipped in order to cool the inside of the UPS. There is a possibility that the inside and ambient temperature of the UPS may get out of the rated specification. The UPS may rise temperature to a level that causes UPS failure or breakage.

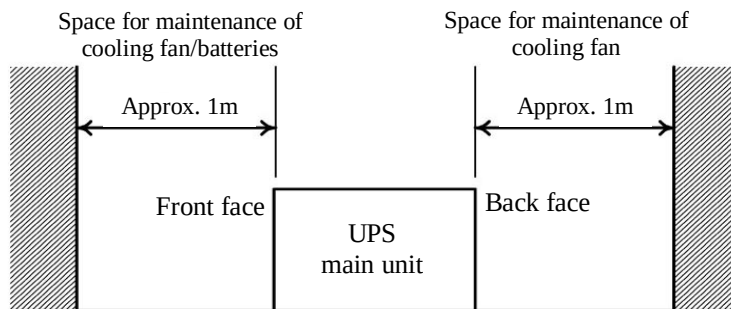
The following spaces are required for an installation location.

- The UPS takes in air through the vent hole on the front of the UPS and exhausts air through the cooling fan on the back of the UPS. Therefore, the space of 10cm or more is required in the front and rear of the UPS.



 When performing maintenance of the UPS:

The space of approximately 1m is required in the front and rear of the UPS.



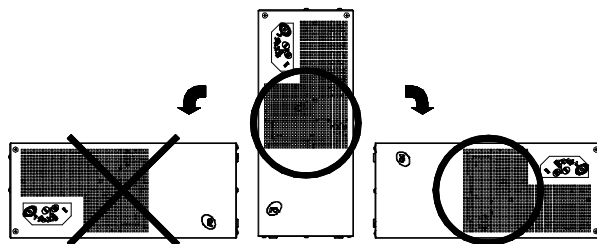
Confirm the environment of the installation location. The recommended environment in consideration of the battery life, etc. is as follows.

Item	Recommended environment
Temperature	15 to 25°C
Humidity	30 to 70% (No condensation)

● Method for installation

 CAUTION	
Injury	This UPS can be installed laying down. If installing laying the UPS down, tilt it only to the right side, seeing from the front. Never tilt the UPS to the left side.
Damage	Take out the UPS in a level and flat place. Pay enough attention to prevent an accident such as an overturn or a drop. The mass of the UPS refers to “Caution about Safety”.

M-UPS015AE2S and M-UPS030AE2B can be installed lying down. If install laying down the UPS, tilt it only to the right side, seeing from the front. Never tilt the UPS to the left side.

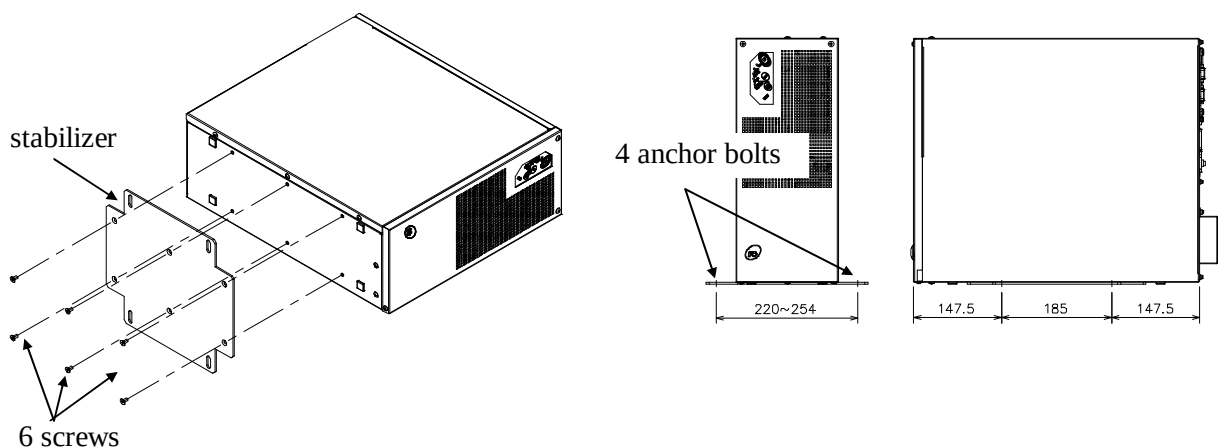


<M-UPS030AE2B>

For preventing an overturn of the UPS, the UPS fixes to a floor with an attached stabilizer and screws.

(1) Tilt the UPS gently to the right and attach the bracket to the bottom of the UPS with 6 screws.

(2) Fixed the stabilizer to a floor with an anchor bolt.
(Please prepare the anchor bolt by a user.)



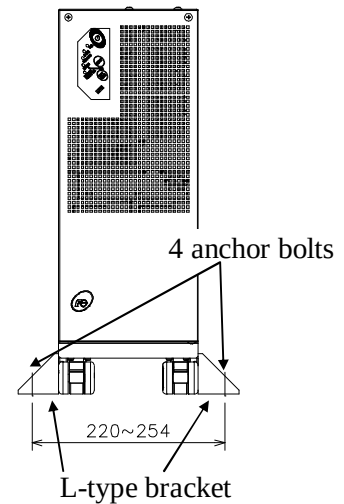
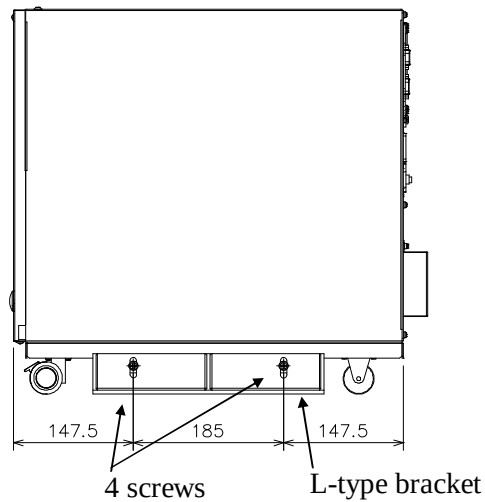
<M-UPS030AE2C>

For preventing an overturn of the UPS, the UPS fixes to a floor with an attached L-type bracket and screws.

(1) Fix the L-type brackets (right side and left side) to the UPS with 4 screws

(2) Fix the L-type brackets to a floor with an anchor bolt.

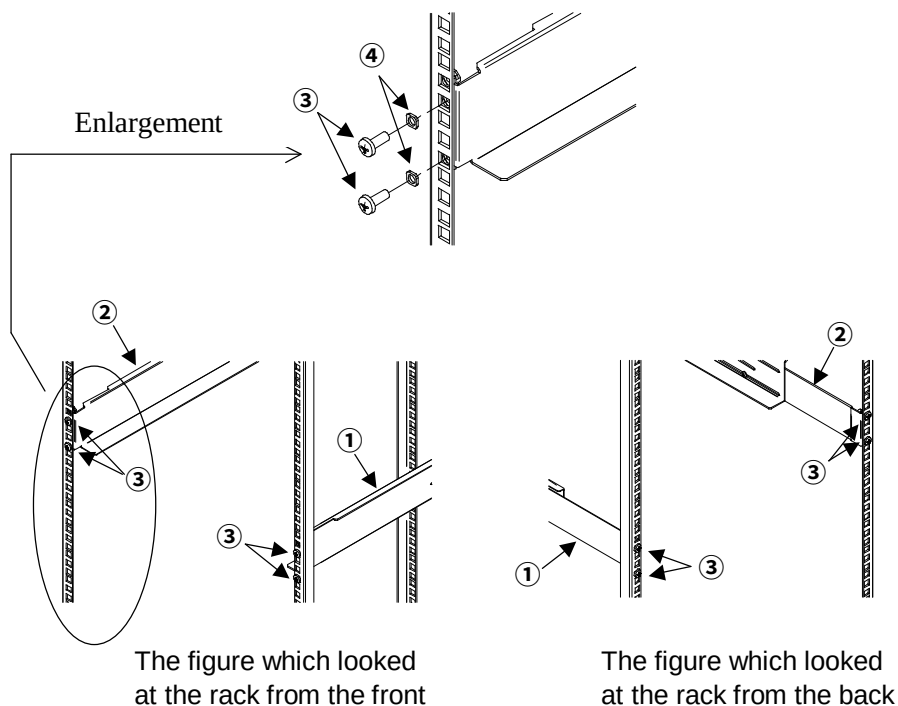
(Please prepare the anchor bolt by a user.)



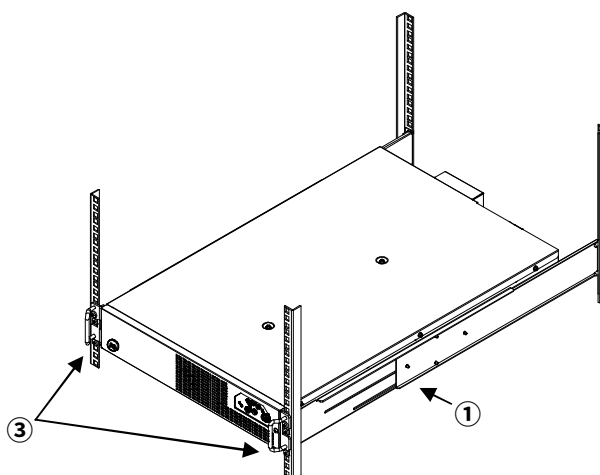
<M-UPS015AE2R / M-UPS030AE2R>

1. Loosen the screw of the right rail for rack mounting ① and the left rail for rack mounting ②, and adjust the length of each rail to the length of the rack. The length of the rail can be adjusted from 565 mm to 764 mm. Tighten the screw after adjusting the length of each rail.

2. To match the position of each rail, set the washers for positioning ④ in the corner hole of the rack respectively (four places of each rail). Then, fix the rail with the screws for rack mounting ③ in the place of the corner hole with the washers. Set up the bending part in the rail to the lower side and inside. (The washers might become unnecessary by the kind of the rack.)



3. Put the system on the rail, and fix the right and left in the front side part with screws for rack mounting ③.



3.2 Connection of cables

● Caution about connecting the cable

⚠ CAUTION	
Electric shock	Connect an AC input plug to a grounding power receptacle, or connect a grounding wire to a ground terminal. (class D grounding) There is fear of an electric shock. A commercial power ordinarily has electrodes of a grounding side and an un-grounding side apart from a grounding electrode (ground). Be sure to confirm before connecting. If connected in reverse, there is fear of the malfunction by noise or the electric shock.

IMPORTANT	
The permissible voltage between the input electric cable of the UPS and the ground is 250 VAC. If the voltage more than 250 VAC is applied, the filter circuit of the input part may be damaged. The input surge voltage capacity of the UPS is 2 kV peak ($1.2 \times 50 \mu\text{sec}$). The filter circuit in the input unit may be damaged, if a surge voltage that is higher than 2 kV peak is impressed. The input voltage range of the UPS is from 160Vac to 288Vac.(tolerance) If the input voltage is different from the above, provide a transformer for voltage conversion outside of the Product. The UPS may be damaged, if a voltage outside of the input voltage range is impressed. Connect the UPS to an input power supply within the range of the rated input voltage of the connection device. At the bypass operation, the input voltage of the UPS is outputted to the connection device directly. If the voltage more than the range of the rated input voltage of the connection device is applied, the connection device may be damaged. Do not apply single-line grounding on the output side. Between the input and output of the UPS is not insulated. Therefore, do not apply single-line grounding on the output side. There is a possibility of becoming the cause of the trouble by noise or the failure.	

● **Preparation before connection**

IMPORTANT

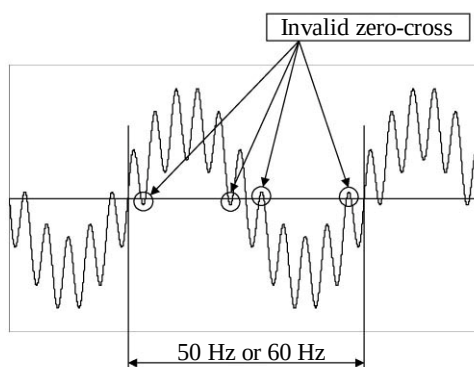
When connecting the UPS to a three-phase power supply system, be sure to connect the grounding phase of the three-phase power supply system to the electrode of a grounding side of the AC input of the UPS.

If connecting to an un-grounding power supply, there is a possibility of becoming the cause of the malfunction.

When using a generator temporarily during the rolling blackouts, use a generator satisfying the following specification.

If connecting a generator not satisfying the following specification to the input part of the UPS, there is a possibility of becoming the cause of the malfunction or damage of the UPS.

- Voltage range:: from 160Vac to 288Vac
- Frequency variation: within $\pm 5\%$ of rated frequency (less than 1Hz per second)
- Voltage waveform distortion: 5% or less
- Voltage zero-cross condition: No multiple zero-cross during a cycle



1. Check the input power supply. The input power supply that may be connected to the Product is as follows.

Product type	Circuit breaker capacity	Input capacity	Input voltage	Input frequency	Number of phases			
M-UPS015 AE2S	10 A or greater	1.5kVA or greater	160V to 288VAC	50/60 Hz ±5% (See note.)	Single phase, 2-wire system			
M-UPS015 AE2R								
M-UPS030 AE2B	20 A or greater	3 kVA or greater						
M-UPS030 AE2R								
M-UPS030 AE2C								

Remarks: The Product may reach the state described below or failure may arise to the Product, if the input voltage or frequency is deviated out of this range.



When the power for the Product is ON:

“input error at start-up” arises. The Product cannot be started in this state.



While the Product is running:

“Input voltage error” is detected, and the running status changes to battery running. If the Product is connected to input power supply that frequently deviates from this range, charge/discharge of batteries is repeated, and battery “empty” state arises or deterioration of batteries may result. Be cautious.

Note: An input frequency is automatically chosen according to the area in which the Product is used.

- The terminal block specification is as follows. Select conforming crimp-style terminals and the input/output cable size with reference to the following table.

UPS side	Specification			Connect with
Input/output terminal block	Terminal symbol	Connection to	Form	Input power supply and output system
	L/R	AC input (non-grounded side terminal)	5P screw terminal (M4)	
	N/S	AC input (Grounded side terminal)		
	GND (FG)	Ground		
	l/U	AC output (non-grounded side terminal)		
	n/V	AC output (grounded side terminal)		
Protective Earth terminal	PE (G)	Ground (protective earth)	(M4)	Grounding conductor

- The specifications of the AC input plug and AC outlet of M-UPS015AE2S is as follows. Prepare an input power receptacle and the plug of connection device which are suitable for specification.

UPS side	Specification	Connect with
AC input plug	IEC60320-C14 (the length of a cord : approximately 2m)	Input power receptacle
AC outlet	IEC60320-C13 x 8 (Rating capacity 250VAC, 10A)	Plug of connection device



If there is no ground in an input power receptacle:

Connect the grounding wire to the ground terminal of AC input plug.

- **Connecting the output cable**

1. In the case of M-UPS015AE2S, connect the plug of connection device to the AC outlet out the back of the UPS.
Confirm that the ground is connected.
2. In the case of M-UPS015AE2R and M-UPS030AE2, remove the AC input/output terminal block cover from the back face of the UPS, and connect the AC output cable to the AC output terminal block.
Confirm that the ground is connected.

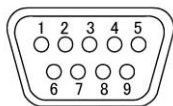
- **Connecting the input cable**

1. In the case of M-UPS015AE2S, connect the AC input plug on the back of the UPS to an input power receptacle.
Confirm that the ground is connected.
2. In the case of M-UPS015AE2R and M-UPS030AE2□, remove the AC input/output terminal block cover from the back face of the UPS, and connect the AC input cable to the AC input terminal block.
Confirm that the ground is connected.

3.3 Interface port

The Product is provided with a D-sub 9-pin interface port on its back face, and this interface port permits take-out of signals indicated below. Use these signals as required.

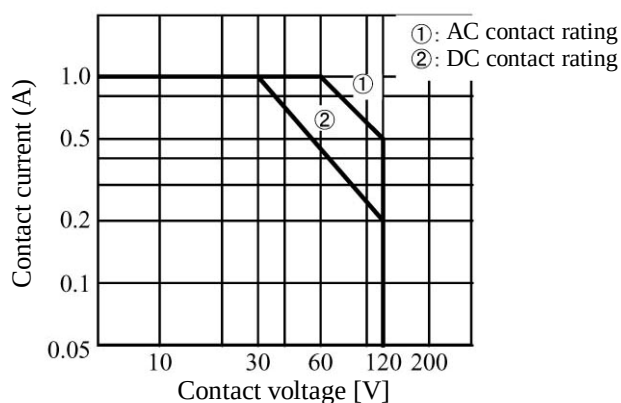
● **CN1 (standard monitoring interface)**



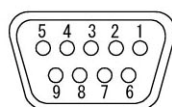
D-sub 9-pin male port
(3 mm threads)

Pin No.	Signal type	Signal name	Description
1-4	“Opens” on action	Product failure signal	No-voltage contact signal that is output when any failure arises in the Product, and any error arises to batteries or when the battery replacement recommended time comes.
1-6	“Closes” on action		
2-5	“Opens” on action	Input power supply error signal	No-voltage contact signal that is output when any voltage error arises to the input power supply due to interruption of power supply or the like. (No action will occur, if the power supply error is of up to 1.5 seconds.)
2-7	“Closes” on action		
3-9	“Opens” on action	Low battery voltage signal	No-voltage contact signal that is output about 2 minutes (during rated load) before termination of battery discharge during battery running.
3-8	“Closes” on action		

Use the contact output in the voltage and current ranges indicated below.



● CN2 (PC interface)



D-sub 9-pin female port
(#4-40 inch threads)

Pin No.	Signal type	Signal name	Description
2-3	“Closes” on action	Input power supply error signal (See Note 1.)	No-voltage contact signal that is output when any voltage error arises to the input power supply due to interruption of power supply or the like. (No action will occur, if the power supply error is of up to 1.5 seconds.)
1-3	“Closes” on action	Low battery voltage signal (See Note 1.)	No-voltage contact signal that is output about 2 minutes (during rated load) before termination of battery discharge during battery running.
8-7	AC output stops upon receipt of “H” signal	UPS automatic shutdown signal (See Note 2.)	Signal input to the Product for stopping AC output from the Product. (1) AC output may be stopped only during battery running. (2) This signal (5 to 25 V DC) should be input for about 0.6 second or longer.
6-7	RS-232C serial signal (See Note 3.)	Serial data input (RX)	<Communication method> • Baud rate: 2400 bps • Data length: 8 bits • Stop bit: 1 bit • Parity: non • Character type: ASCII type
9-7		Serial data output (TX)	
7		Signal ground (SG)	

Note 1: See the graph on the previous page for contact capacity. In case the UPS monitor function (using contact signals stated above) that is mounted as default in the following OS is used, a dedicated contact signal cable that corresponds to the OS is required elsewhere. Therefore, please contact the in-charge maintenance staff. For details of the UPS monitor function that is mounted as default in each OS, see the instruction manual and online manual for the OS.

- Windows NT/2000/XP: FiFH/WS9 (dedicated contact signal cable)

Note 2: Windows 2000 and XP permit shutdown of the OS on occurrence of interruption of power supply, and UPS automatic shutdown thereafter is not feasible.

Note 3: Dedicated RS-232C communication cable is required elsewhere for execution of RS-232C serial communication. Please contact the in-charge maintenance staff.

- FiFA/WS9 (dedicated RS-232C communication cable)

3.4 Setting up the Output Voltage

This UPS can change the rated output voltage by the switch of voltage setting on the back of the UPS.



CAUTION

Damage Confirm that the voltage set up by the switch of voltage setting is within the range of input voltage of the connection device.

There is fear of damaging the connection device.

Do not operate the switch of voltage setting during operation of the UPS.

There is fear of damaging the connection device, since the changed voltage is outputted at the restart. And even if operating the switch during operation of the UPS, the output voltage cannot be changed.

IMPORTANT

Do not use 5 to 9 of the switch of voltage setting.

It becomes impossible for the UPS to start up normally

● The setup procedures of the rated output voltage

1. Turn off the connection device.
2. Press the RUN/STOP switch on the front of the UPS for approximately 1 second.
The buzzer will sound if the switch is received.
3. An output stops. The RUN LED (green) on the front of the UPS blinks slowly (in the cycles of approximately 1.6 sec.).
4. In the case of M-UPS015AE2S, pull out the AC input plug on the back of the UPS from an input power receptacle.
5. In the case of M-UPS015AE2R and M-UPS030AE2□, turn off the breaker of the distribution board.
6. After confirming that all LEDs on the front of the UPS have gone out, operate the switch of voltage setting on the back of the UPS. The rated output voltage corresponding to a setup of the switch of voltage setting is shown below.

Setup of the switch of voltage setting Rated output voltage

0 200 VAC

1 208 VAC

2 220 VAC

3 230 VAC

4 240 VAC

5-9 They are not used.

7. In the case of M-UPS015AE2S, connect the AC input plug on the back of the UPS to an input power receptacle.

In the case of M-UPS015AE2R and M-UPS030AD2□, turn on the breaker on the distribution board.

For M-UPS030AE2□, turn on the input breaker on the back of the UPS.

The RUN LED (green) on the front of the UPS blinks slowly (in the cycles of approximately 1.6 sec.).

8. Press the RUN/STOP switch on the front of the UPS for approximately 1 second.

The buzzer will sound if the switch is received.

9. AC voltage set up is outputted from the AC outlet or the output terminal block. The

RUN LED (green) on the front of the UPS lights up.

10. Turn on the connection device, if the normal operation is started with the rated voltage set up.

4

Running

4.1 Power ON



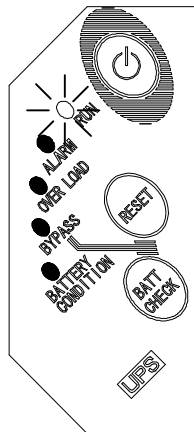
CAUTION

Damage Confirm that the voltage set up by the switch of voltage setting is within the range of input voltage of the connection device.
There is fear of damaging the connection device.

● Check cable connection

1. Confirm that the UPS is connected to an input power supply and the connection device.

The RUN LED (green) on the front of the UPS blinks slowly (in the cycles of approximately 1.6 sec.).



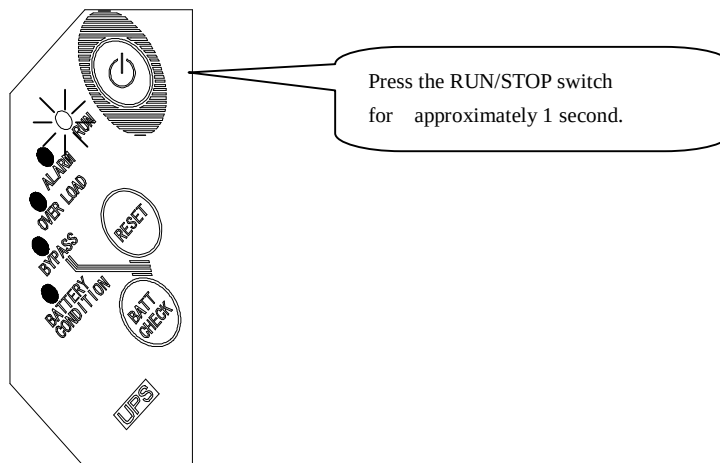
If the UPS is not connected:

Refer to Chapter 3.2 “Connecting the Cable”.

● Turning on the UPS

2. Press the RUN/STOP switch on the front of the UPS for approximately 1 second.

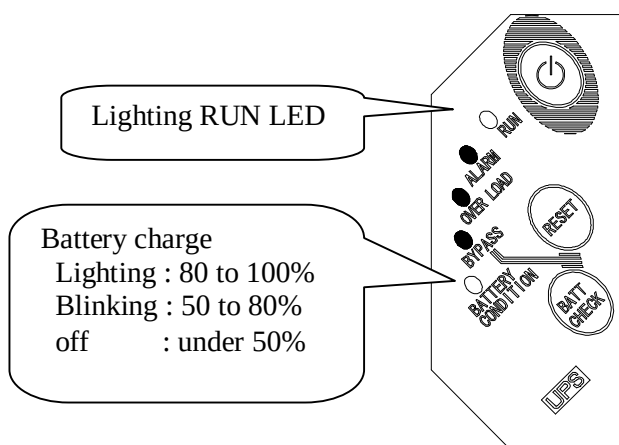
The buzzer will sound if the switch is received.



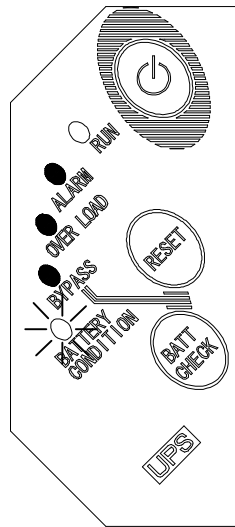
3. AC voltage is output from the AC outlet or the output terminal block.

The RUN LED (green) on the front face of the Product lights up.

The BATTERY CONDITON LED (green) on the front face of the UPS indicates the extent of battery charge by the lighting type.



4. The battery check is performed automatically. The BATTERY CONDITION LED (orange) on the front of the UPS blinks (in the cycles of approximately 1.6 sec.).



5. The battery check is performed for approximately 5 seconds. Then, if the battery is normal, the BATTERY CONDITION LED (green) on the front of the UPS indicates the amount of battery charge again, and the UPS returns to the normal operation.



If normal running is not started:
Refer to Chapter 6 “Troubleshooting”.

- **Turn ON the power for connected equipment**

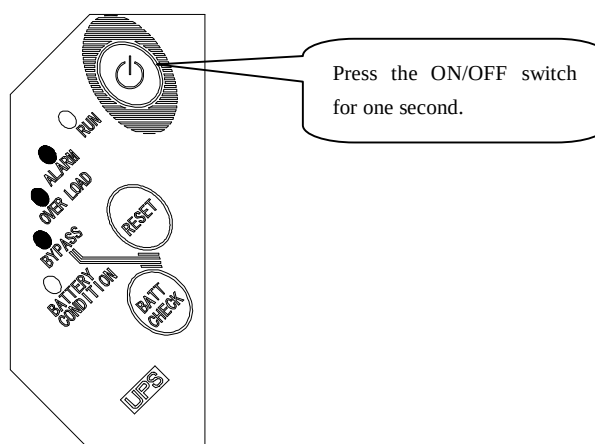
6. Turn on the connection device if the normal operation is started.

4.2 Power OFF

Make sure to perform the operation described below also in case of implementation of planned interruption of power supply. (See “5.2 Precautions and measures for planned interruption of power supply” for details.)

⚠ CAUTION	
Damage	At the occasion of OFF of the input circuit breaker on the back side of the Product, assure that the RUN LED (green) is slowly blinking (in about 1.6-second period). If the circuit breaker of the distribution board is turned OFF, or the input circuit breaker on the back side of the Product is OFF without execution of the operation described in “● Turn OFF the power for the Product” below, conditions that are identical to those in the state of interruption of power supply arise, and therefore, discharge from batteries located in the Product begins. Damage to batteries and shortening of battery replacement period may arise otherwise.

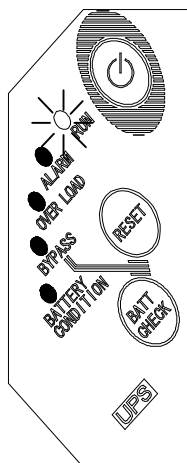
- **Turn OFF the power for the connected equipment**
 1. Turn OFF the power for the connected equipment
- **Turn OFF the power for the Product**
 2. Press the ON/OFF switch on the front face of the Product for about one second.
The buzzer begins to beep upon acceptance of the switch.



3. The output stops.

The RUN LED (green) on the front face of the Product blinks slowly (in about 1.6-second period).

- 👉 If the output fails to stop normally:
See “Chapter 6 Troubleshooting”.



4. Turn OFF the input circuit breaker of distribution board.

5.1 Care and daily inspection

It is essential to implement care and inspection described below, to keep using the Product without anxiety over an extended period of time,



WARNING

Electric shock	Do not remove the cover from the Product. There are sections of high voltage in the Product, and electric shock may arise.
----------------	---



CAUTION

Electric shock	At the occasion of inspection and maintenance of the Product, turn OFF the power for the connected equipment and the Product, turn OFF the input circuit breaker on the back side of the Product, and disconnect cables from AC input terminals (L/R, N/S). Electric shock may result otherwise. It is requested that maintenance (such as replacement of batteries and replacement of cooling fans) other than daily inspection is executed by professional engineers. Electric shock may result otherwise.
Damage	At the occasion of OFF of the input circuit breaker on the back side of the Product, assure that the RUN LED (green) is slowly blinking (in about 1.6-second period). If the circuit breaker of a distribution board is turned OFF, or the input circuit breaker on the back side of the Product is OFF without execution of the operation described in “4.2 Power OFF”, conditions that are identical to those in the state of interruption of power supply arise, and therefore, discharge from batteries located in the Product begins. Damage to batteries and shortening of battery replacement period may arise otherwise.

● Care

1. Turn OFF the power for the connected equipment and then turn OFF the power for the Product. Then remove dust from ventilation holes and cooling fans of the Product with a vacuum cleaner or the like.
2. Rub surfaces of the Product with a soft dry cloth.

● Daily inspection

- Assure that ventilation holes and cooling fans are free of dust attachment.
 If dust is attached:
See “● Care”.
- Assure that the Product surfaces, cables and power outlet are not abnormally heated.
 If abnormally heated:
Check the situation and contact your dealer or the maintenance in-charge company.
- Assure that major abnormal noise and abnormal odor are not produced during running.
 If any abnormality is arising:
Check the situation and contact your dealer or the maintenance in-charge company.

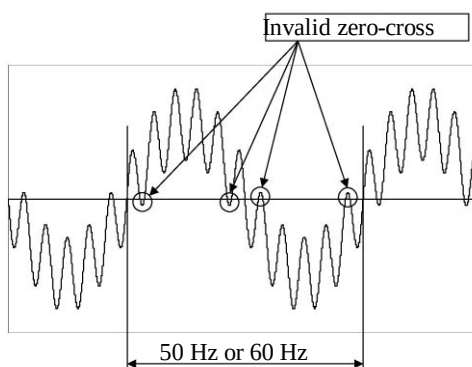
5.2 Precautions and measures for planned interruption of power supply

IMPORTANT

In case a generator is used temporarily for planned interruption of power supply, use a generator that satisfies the following specification.

If a generator that does not satisfy the following specification is connected to the input unit of the Product, malfunction and damage to the Product may result.

- Voltage range:: from 160Vac to 288Vac
- Frequency variation: within $\pm 5\%$ of rated frequency (less than 1Hz per second)
- Voltage waveform distortion: 5% or less
- Voltage zero-cross condition: No multiple zero-cross during a cycle



● Operation before implementation of planned interruption of power supply

Turn OFF the power for the connected equipment and the Product before implementation of planned interruption of power supply (see note).

1. Turn OFF the power for the connected equipment.
2. Press the ON/OFF switch on the front face of the Product for about one second.
The buzzer begins to beep upon acceptance of the switch.
3. The output stops.

The RUN LED (green) on the front face of the Product begins to blink slowly (in about 1.6-second period).

In case planned interruption of power supply was implemented without turning OFF the power for the Product, conditions that are identical to those in the state of interruption of power supply arise, and power is fed to the connected equipment from batteries in the Product until power recovery (termination of planned interruption of power supply). On termination of discharge, therefore, power feed to the connected equipment will not be implemented until power recovery arises.

Note: Planned interruption of power supply means interruption of power supply, the date and hour of occurrence of which is known in advance for electricity safety checkup or the like.

● Operation after planned interruption of power supply

1. Assure that the Product is connected to the input power supply and connected equipment.

The RUN LED (green) on the front face of the Product begins slowly blinking (in about 1.6-second period).

2. Press the ON/OFF switch on the front face of the Product for about one second.
The buzzer begins to beep upon acceptance of the switch.

3. AC voltage is output from the output terminal block, and the RUN LED (green) on the front face of the Product lights up.

4. Turn ON the power for the connected equipment upon normal start-up of normal running.

 See “4.1 Power ON” for details.

 If warning beep is issued:

See “6.1 When warning beep was issued”.

5.3 Battery inspection (battery check)

Inspection of batteries is implemented with battery check functions. Two battery check functions, that is, automatic battery check function and manual battery check function, are available.

Manual battery check is not required in an ordinary state, because automatic battery check is executed while the Product is running.

Automatic battery check is executed in any of the following cases.

- When running of the Product begins.
- Once every 2 weeks while running of the Product is continued.
- When switching from bypass running to normal running arises.

Execute manual battery check in any of the following cases.

- When warning beep is issued.
- When it is wanted to execute battery check at an occasion other than automatic battery check.

IMPORTANT

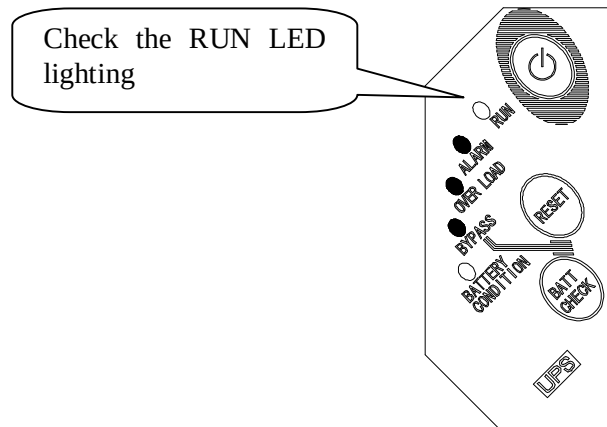
Do not continuously execute battery check.

The battery voltage is checked while discharge is occurring from batteries located in the Product in practice during battery check.

If battery check is continuously executed, therefore, damage to batteries and shortening of battery replacement period may result

● Check conditions of the Product

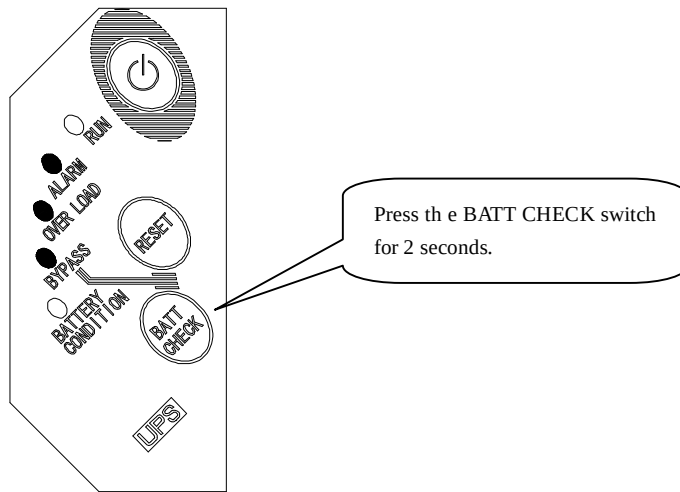
1. Check if the Product is in the normal running status.



- ☞ If the Product is in the pause status (all the LED's on the front face of the Product are out):
Turn ON the power for the Product, and proceed to Step 2.
See “4.1 Power ON” for details.
- ☞ If it cannot be identified that the Product is in normal running in a status other than pause:
See “Chapter 6 Troubleshooting”. Take troubleshooting actions, and then proceed to Step 2.

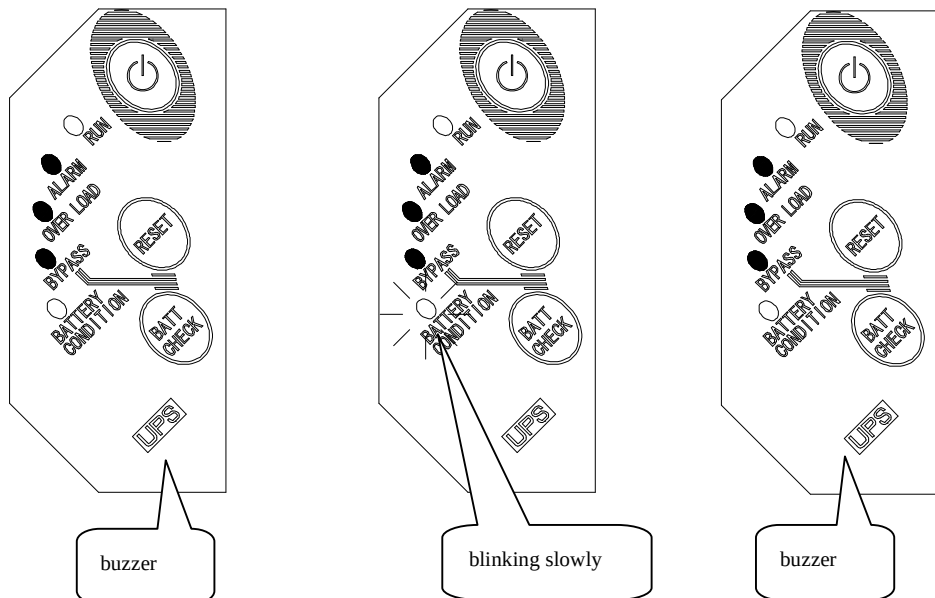
● **Use the manual battery check function**

2. Press the BATT CHECK switch on the front face of the Product for about 2 seconds.



The buzzer beeps, and the BATTERY CONDITION LED (orange) begins blink slowly (in about 1.6-second period).

The buzzer beeps again about 5 seconds later, and battery check terminates.

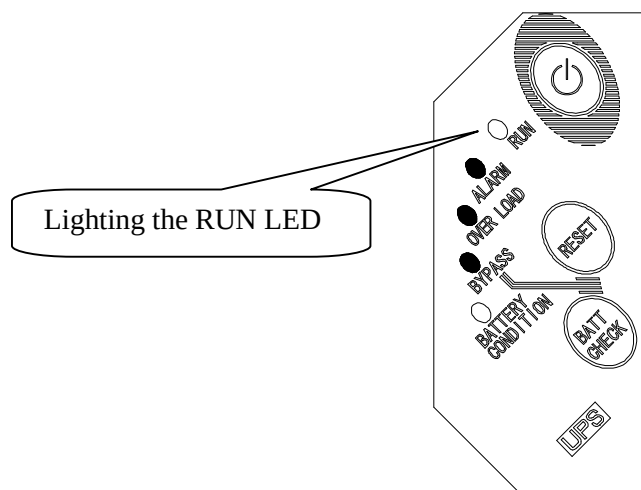


3. The Product reaches the following status as a result of battery check.

 In case batteries are fully charged:

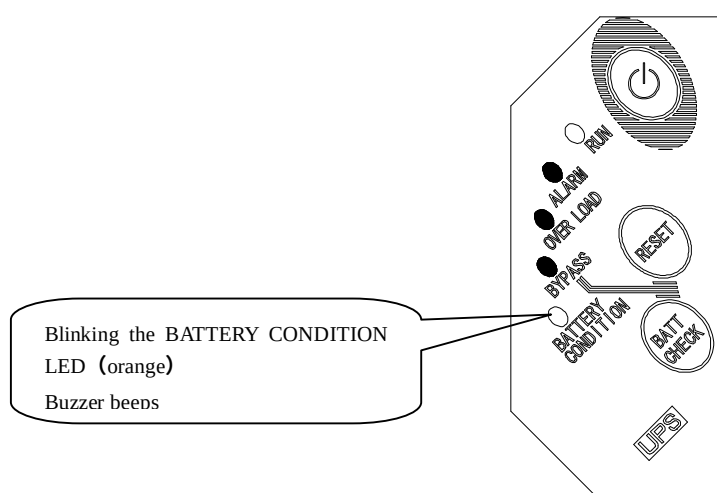


The RUN LED (green) on the front face of the Product lights up, and return to normal running occurs.



 In case charge of batteries is insufficient:

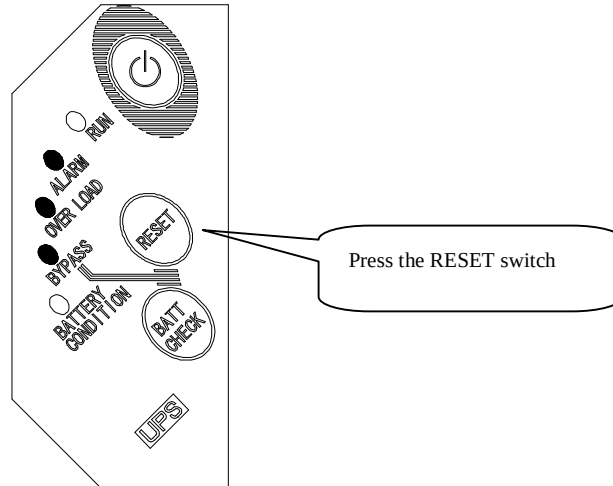
- Warning beep is issued and the BATTERY CONDITON LED (orange) on the front face of the Product begins to blink. Proceed to Step 4.



● **Charge batteries**

4. Press the RESET switch on the front face of the Product for about 3 seconds. Blinking of the BATTERY CONDITION LED (orange) terminates. Charge batteries by running the Product in this state for 12 hours or longer.

Remarks: In this status, there is a possibility where battery running does not occur even if interruption of power supply arises.



5. Return to Step 2, and execute manual battery check again.
 - ☞ If the state of “In case charge of batteries is insufficient:” in Step 3 arises again:
 The batteries have failed (maturity of lifetime). Replace batteries.
 See “7.1 Battery replacement” for details.

6.1 If a Warning Beep Sounds

1. Confirm the state of LED on the front of the UPS, and the type of a warning beep.
2. Refer to the “Operation mode list”, and deal with it according to directions.

If the UPS is not connected to an input power supply, connect. For details, refer to Chapter 3.2 “Connecting the Cable”.



How to stop a warning beep:

A warning beep can be stopped by pressing the RESET switch on the front of the UPS for approximately 1 second. (Note)

However, if a warning beep does not stop even if pressing the RESET switch, stop a warning beep by the following procedures. For details, refer to Chapter 4.2 “Turning off the UPS”.

- (1) Turn off the connection device.
- (2) Press the RUN/STOP switch on the front of the UPS for approximately 1 second.
- (3) An output stops.
The RUN LED (green) on the front of the UPS blinks slowly (in the cycles of approximately 1.6 sec.).
- (4) In the case of M-UPS015AE2S, pull out the AC input plug on the back of the UPS from an input power receptacle.
- (5) In the case of M-UPS015AE2R and M-UPS030AE, turn off the breaker of a distribution board.

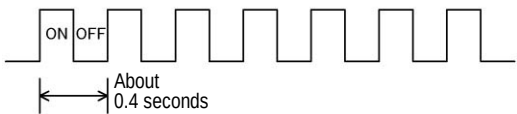
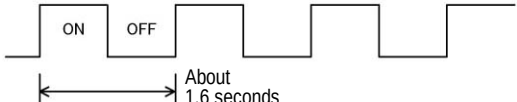
Note) In the output overload state, even if pressing the RESET switch, a warning beep does not stop. Reduce the capacity of the connection device to less than the rated value of the UPS.

6.2 Operation Mode List

When it seems that the abnormalities have occurred inside the UPS or the connection device has stopped, confirm the LED and a warning beep by the following lists, and deal with the trouble in accordance with the remarks in the "Operation mode list".

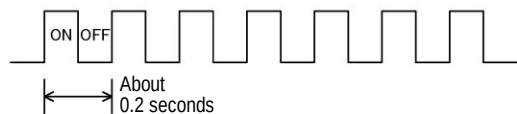
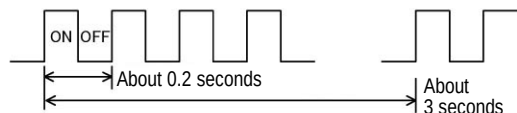
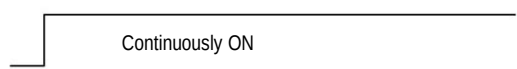
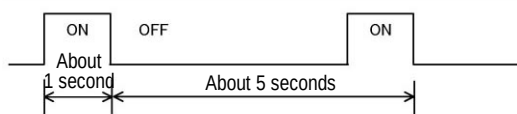
● Types of blink of LED

(The symbols correspond to the symbols in the "Operation mode list".)

Symbol	Blink pattern
(a) Quick blinking (about 0.4-second period)	
(b) Slow blinking (about 1.6-second period)	

● Types of the warning beep

(The symbols correspond to the symbols in the "Operation mode list".)

Symbol	Warning beep
(i) Pip-pip-pip-pip . . . (continuous sound)	
(ii) Pip-pip-pip-pip (a stop for approximately 2 sec.) Pip-pip-pip-pip (four times every approximately 3 sec.)	
(iii) Pi— (continuance)	
(iv) Pi— (a stop for approximately 4 sec.) Pi—	

● **List of motion modes**

- LED symbol:  ... Lighting,  ... Out,  ... Blinking
- The [BATTERY CAPACITY] LED (green) indicates the extent of battery charge by the lighting type as follows.

Charge is insufficient. There is a possibility where backup is not feasible on occurrence of interruption of power supply.

The batteries were charged to a certain extent. But sufficient backup time cannot be expected.

The batteries were almost fully charged. They provide sufficient backup time.

 (Out)... 0 to 50%

 (Blinking)... 50 to 80%

 (Lighting)... 80 to 100%

No.	LED					Warning beep	Operational status	Remarks
	RUN (green)	ALARM (orange)	OVER LOAD (orange)	BYPASS (orange)	BATTERY CONDITION (green/orange)			
1	Lighting 				Indication of the amount of battery charge (green)	-	Normal operation	The UPS is operating normally.
2						-	Stopping (without an input power supply)	The output of the UPS is stopping. If an input power supply returns, the UPS will become the stopping (No.3). If the UPS does not become the stopping (No.3) even if an input power supply returns, check whether or not the input breaker has tripped. If the breaker has tripped, reset it. Nevertheless, if the UPS does not become the stopping (No.3), contact an agent from which you purchased the UPS, or a maintenance company. When the UPS stopped since the input power failure had continued and electric discharge of a battery had been completed, the UPS will return to the normal operation (No.1) automatically if an input power supply returns.
3	(b) Slow blink 					-	Stopping (with an input power supply)	The output of the UPS is stopping. The UPS will return to the normal operation (No.1) by pressing the RUN/STOP switch for approximately 1 second.
4		Lighting 		Lighting 		(1)	Bypass operation due to UPS failure	The UPS became the failure state and switched to the bypass operation. Evacuate important connection device from the UPS. In this state, even if an input power failure occurs, the battery operation cannot be performed. Confirm ambient temperature and ventilation, and press the RESET switch on the front of the UPS for approximately 3 seconds after approximately 10 minutes have passed. If there is no problem, the UPS will return to the normal operation (No.1). If the ALARM LED does not go out or lights up again, even if the above operation is performed, contact an agent from which you purchased the UPS, or a maintenance company.

6 Troubleshooting

No.	LED					Warning beep	Operational status	Remarks
	RUN (green)	ALARM (orange)	OVER LOAD (orange)	BYPASS (orange)	BATTERY CONDITION (green/orange)			
5	Lighting 				Indication of the amount of battery charge (green)	(3)	Abnormality in cooling fan	Abnormalities have occurred in the cooling fan. If this state continues for approximately 2 minutes or the inside temperature of the UPS rises, the UPS will become the failure state of No.4.
6				(b) Slow blink 		-	Manual bypass operation	The UPS has been switched to the bypass operation manually. In this state, even if an input power failure occurs, the battery operation cannot be performed.
7	(b) Slow blink 	(a) Fast blink 				(1)	Input error at startup	Since the abnormalities have occurred at an input power supply, the UPS cannot be started up. Stop the UPS once, and restart after confirming that an input power supply is within the range of the following conditions. Input voltage: 85 to 138 VAC Input frequency: 47.5 to 52.5 Hz or 57 to 63 Hz
8	Lighting 		Lighting 		Indication of the amount of battery charge (green)	(1)	Output overload during the normal operation (M-UPS015 AE2)	The capacity of the connection device exceeds the rated value. Reduce the capacity of the connection device to less than the rated value of the UPS. An output voltage is dropped by the output current restriction function. If this state continues for 100 seconds, the UPS will stop due to an output overload (No.12). In addition, even if an input power failure occurs, the battery operation cannot be performed. At an output short circuit, the UPS stops immediately.
9	Lighting 		Lighting 	Lighting 		(1)	Bypass operation due to an output overload during the normal operation (M-UPS030 AD2)	Since the capacity of the connection device exceeded the rated value and the UPS became the overload state, the UPS has switched to the bypass operation automatically. Reduce the capacity of the connection device to less than the rated value of the UPS. If the capacity of the connection device become below the rated value, the UPS will return to the normal operation (No.1). In the state of the continuation of overload, even if pressing the RESET switch, the warning beep does not stop. Although it may become the overload temporarily by inrush current at the time of a load injection, it is no matter since it is canceled automatically.
10			Lighting 	(b) Slow blink 		(1)	Output overload during the bypass operation	During the bypass operation, the capacity of the connection device exceeds the rated value. Reduce the capacity of the connection device to less than the rated value of the UPS. In this state, even if pressing the bypass switch (pressing the RESET switch and the BATT CHECK switch for approximately 3 seconds simultaneously), the UPS will not return to the normal operation (No.1).

6.2 List of motion modes

No.	LED					Warning beep	Operational status	Remarks
	RUN (green)	ALARM (orange)	OVER LOAD (orange)	BYPASS (orange)	BATTERY CONDITION (green/orange)			
11	Lighting 		Lighting 		Indication of the amount of battery charge (green)	(1)	Output overload during the battery operation	During the battery operation, the capacity of the connection device exceeds the rated value. Reduce the capacity of the connection device to less than the rated value of the UPS. If this state continues for 100 seconds, the UPS will stop. Evacuate important connection device from the UPS.
12		Lighting 	Lighting 			(1)	A stop due to an output overload (M-UPS015 AE2)	Since the UPS continued to be used even after the capacity of the connection device had exceeded the rated value of the UPS, the UPS stopped. Reduce the capacity of the connection device to less than the rated value of the UPS, and restart the UPS.
13	Lighting 				Indication of the amount of battery charge (green)	(2)	Battery operation	Since the abnormalities occurred at an input power supply, the UPS started to supply the electric power to the connection device from the battery. It is not necessary to deal with it especially. If an input power supply returns, the UPS will return to the normal operation (No.1) automatically.
14	Lighting 				Indication of the amount of battery charge (green)	(1)	Battery voltage drop due to continuing the battery operation	The battery voltage dropped since the battery operation has continued. In the rated load, the battery operation will be completed approximately 2 minutes later. Evacuate important connection device from the UPS. If an input power supply returns, the UPS will return to the normal operation (No.1) automatically.
15	Lighting 				(b) Slow blink (orange) 	(4) (at the manual check)	Battery checking	The battery check is performed. At the manual battery check, a buzzer sounds at the start and end of the battery check. After the battery check is performed for approximately 5 seconds, the UPS will return to the normal operation (No.1) if there is no problem.
16	Lighting 				(a) Fast blink (orange) 	(1)	Battery check error	There is possibility that the battery is not fully charged. Perform the battery check manually after operating the UPS 12 hours or more to charge the battery. Since an adequate backup time cannot be assured, evacuate important connection device from the UPS. If the UPS becomes this state again, the battery is out of order. Since it is necessary to replace the battery, contact an agent from which you purchased the UPS, or a maintenance company.

No.	LED					Warning beep	Operational status	Remarks
	RUN (green)	ALARM (orange)	OVER LOAD (orange)	BYPASS (orange)	BATTERY CONDITION (green/orange)			
17	Lighting 				Lighting (orange) 	(1)	End of battery life	The recommendation time of battery replacement has come. Since it is necessary to replace the battery, contact an agent from which you purchased the UPS, or a maintenance company. Although the alarm (indication and warning beep) can be stopped by pressing the RESET switch for 3 seconds, the alarm (warning beep) is issued again 24 hours later or at the restart. When only the warning beep is stopped by pressing the RESET switch 1 second or more, the alarm (warning beep) of the end of battery life will be issued again at the automatic battery check which is performed every two weeks.
18	(b) Slow blink 	(a) Fast blink 				(1)	Setting error of rated output voltage	A setup of the switch of voltage setting on the back of the UPS is wrong. Use 0 to 4 of the switch of voltage setting. For details on a setup, refer to Chapter 3.4 "Setting up the Output Voltage".
19	(b) Slow blink 				(b) Slow blink (orange) 	-	Waiting for a restart	The output of the UPS has stopped by setup of the RS-232C communication. After a time specified at the setup passes, the UPS will be started up automatically, and return to the normal operation (No.1). Also, the UPS can be started up with the RUN/STOP switch.

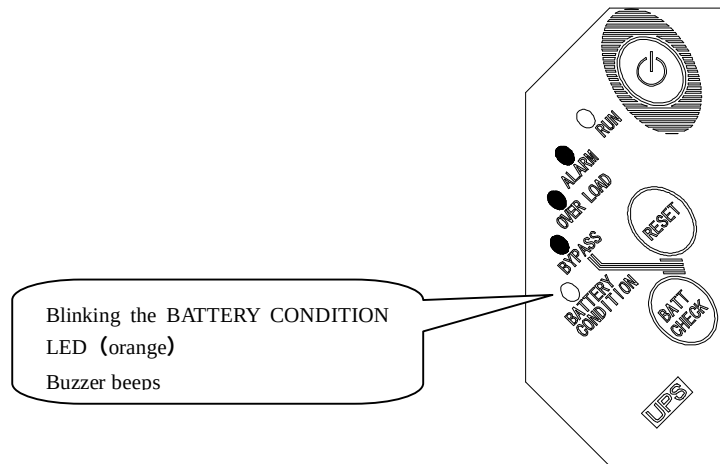
7.1 Battery replacement

● Time of battery replacement

⚠ CAUTION	
Damage	Replace the batteries periodically. Electrolyte leakage, smoke emission and ignition may arise, if use of batteries is continued in the state where the battery lifetime has matured.

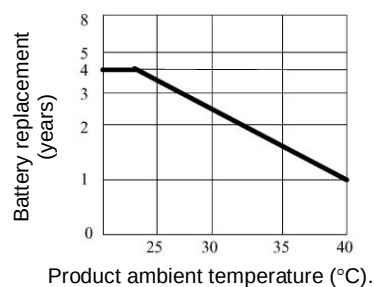
The battery lifetime has matured, if any of the following cases arises.

- When the BATTERY CONDITION LED (orange) on the front of the UPS lights up and a warning beep sounds.



- When the back up time of the battery has been lowered 3 minutes or less (at the rated load)

Battery lifetime is influenced greatly by ambient temperature and conditions of connection device. If using the UPS in the standard environment and conditions (an ambient temperature of 25 degrees C, and the rated load), replace the battery in approximately 3 years.



Relation between ambient temperature and time of battery replacement

● **Method for battery replacement**

 CAUTION	
Electric shock	Only maintenance personnel must perform the battery replacement. There is fear of an electric shock.
Damage	Replace the battery with one specified by our company and a new one. Electrolyte leakage, smoke emission, ignition and failure/malfunction to the Product may arise, if batteries other than what we nominate or used or if old and new batteries of different types are used in mixture.

IMPORTANT	
The disposal of used battery has legal restrictions. Request a professional industrial-waste disposal business or contact your dealer or the maintenance in-charge company.	

The batteries of UPS can be replaced (hot swap) without turning off the UPS and connection device (Note). For detail, consult with an agent from whom you purchased the UPS, or a maintenance company.

Note: The UPS performs the bypass operation during hot swapping. In the state of the bypass operation, even if the abnormalities, such as a power failure, occur at an input power supply, the battery operation cannot be performed.

Use batteries shown in the following list. For the method of purchasing the battery unit, consult with an agent from whom you purchased the UPS, or a maintenance company.

Product type	Battery unit type	Number of units used (per Product)	Battery unit	
			Mass (per unit)	Used battery capacity
M-UPS015AE2S	RRABU-G2A	1 unit	Approximately 12kg	12V, 9Ah x 4
M-UPS015AE2R				
M-UPS030AE2B	RRABU-G2A	2 units	Approximately 12kg	12V, 9Ah x 8
M-UPS030AE2R	RRABU-G4A		Approximately 12kg	
M-UPS030AE2C	RRABU-G2A		Approximately 12kg	

● Battery treatment and storage

- Pay enough attention to treatment and storage of batteries. When batteries were taken out of the Product for disposal, take short-circuit preventing measures such as adhesion of adhesive tapes to terminals. Do not mix these batteries with ordinary batteries such as dry cell batteries.
- This UPS uses small-size control valve type lead storage batteries. Small-size control valve type lead storage batteries use expensive rare resources of limited reserve, and such resources can be recycled for reuse. You are kindly requested to give your cooperation for recycling of used batteries. Please contact your dealer or the company in charge of maintenance, if you have any question regarding battery recycling.



This mark is a small-size control valve type lead storage battery recycling mark.

7.2 Cooling fan replacement

- Time of cooling fan replacement

IMPORTANT
Replace the cooling fans periodically. If use of cooling fans is continued after their lifetime has matured, the Product internal temperature may rise to a level that is outside of the rated specification range.

The cooling fan lifetime has matured, if any of the following phenomenon arises.

- The time for second replacement of batteries has come.
The cooling fans involve lifetime due to wear to bearings, and it is essential that cooling fans are periodically replaced with new ones. However, there are cases where the lifetime is shortened in correspondence to the working environment. It is recommended that cooling fans are replaced early.

● **Method for cooling fan replacement**

 CAUTION	
Electric shock Personal injury	Do not stick a bar or finger into a cooling fan or ventilation hole. Electric shock and personal injury may result.
Electric shock	It is requested that replacement of cooling fans is executed by professional engineers. Electric shock may result otherwise.

The cooling fans of the Product can be replaced in the live state (parts are replaced in the state where the power is kept ON for the Product and connected equipment) (see note). Please contact your dealer or the maintenance in-charge company for details.

Note: It is requested that replacement of cooling fans in the live state is executed in a short length of time. The Product is in bypass running during cooling fan replacement in the live state. During bypass running, switching to battery running will not occur even if any input power supply error such as interruption of power supply arises.

Use cooling fans shown below. Please contact your dealer or the maintenance in-charge company for the method for purchase of cooling fans.

Cooling fan type for replacement:

M-UPS015AE2S : RRAF-G1×1
M-UPS015AE2R : RRAF-G1×1
M-UPS030AE2B : RRAF-G2×1
M-UPS030AE2R : RRAF-G2×1
M-UPS030AE2C : RRAF-G2×1

7.3 Storage of the Product

● Operations before storage

IMPORTANT
Do not store the UPS in any of the places indicated below. • Outdoors • Place exposed to rain and wind • Place of excessively high humidity and dust • Place with corrosive gases and salt • Place directly exposed to sunlight • Place located close to sparks or heating elements • Place of extremely high or low temperature or place of excessive temperature changes • Place to which vibration and impact is applied

1. Charge batteries by running the Product for 12 hours or longer. Check batteries by the battery check function (manual) after the batteries were charged. See “5.3 Battery inspection (battery check)” for details.
The storable period of batteries used in the Product is about 2 months from the fully charged state.
2. Turn OFF the power for the connected equipment, turn OFF the power for the Product, and turn OFF the input circuit breaker on the back face of the Product. See “4.2 Power OFF” for details.
3. Place the Product in a case (such as the case used for shipping of the Product).

● Case where storage period exceeds 2 months

IMPORTANT
Charge batteries once every 2 months, if the Product is not used for a long time. Run the Product for 12 hours or longer to charge batteries once every 2 months, and check batteries on termination of their charge. If the Product is shelved for a long time without being run, batteries may reach over-discharged state due to natural discharge, and may become unusable.

Charge batteries by running the Product for 12 hours or longer once every 2 months. Check batteries by the battery check function (manual) after the batteries were charged.

See “5.3 Battery inspection (battery check)” for details.

The batteries discharge naturally in the Product even while the Product is not in use. If the batteries are shelved for over 2 months, batteries may reach over-discharged state due to natural discharge, and may become unusable.

8.1 Rated specification

Type		M-UPS015AE2S	M-UPS015AE2R
AC output	Rated capacity	1500 VA / 1200 W	
	Voltage	200/208/220/230/240V $\pm 2\%$	
	Frequency	50 Hz or 60 Hz (automatic changeover inside the UPS)	
	Frequency accuracy	At the normal operation	Depend on input frequency
		At the battery operation	Within $\pm 0.1\%$
	Number of phases	Single phase, 2-wire (with a ground terminal)	
	Load condition	Linear load or rectifying load with a crest factor of up to 3 times	
	Voltage waveform distortion factor	Under load resistance: 4% or less	
		Under rectified load: 6% or less	
	Overcurrent protection	RMS value: 100% or greater Peak value: 300% or greater of rated RMS value (bearing the load of the crest factor of 3)	
	Grounding system	Un-grounding	
AC input	Bypass circuit	Rely system (changeover time: 10ms or less) Changeover is impossible at the time of a power failure and overload.	
	Voltage	200/208/220/230/240V (Tolerance 160 ~ 288V)	
	Frequency	50 Hz or 60 Hz $\pm 5\%$	
	Number of phases	Single phase, 2-wire (with a ground terminal)	
	Capacity	1500 VA or less	
	Grounding method	Single-line grounding	
	Power factor	0.97 or more (at the rated operation)	
Storage battery	Input higher harmonics current	Based on IEC61000-3-2.	
	Type	Small-size control valve type lead storage battery (long-life battery)	
	Backup time *1 [initial value]	Approximately 5 minutes [1200 W]	
	Nominal voltage	48 V	
Others	Ambient temperature	0 to 40°C	
	Relative humidity	20 to 95% (no condensation)	
	Noise	50 dB (A) max (at 1 m from on the front face of the Product)	
	Cooling method	Forced air cooling	
External dimensions (W × D × H)		170 × 480 × 213mm	437x520x87
Mass		24 kg (without batteries: 12 kg)	26 kg (without batteries: 14 kg)
Applicable standard		Based on VCCI CLASS A, UL1778-4 th , IEC62040-2	
External connection	Input	Parallel 2 pole with grounding inlet (IEC60320-1 C14)	Input/output terminal block (L/R, N/S: M4 screw)
	Grounding terminal		Input/output terminal block (PE (G): M4 screw)
	Output	Parallel 2 pole with grounding outlet (IEC60320-1 C13) x 8	Input/output terminal block (I/U, n/V: M4 screw)

Type		M-UPS030AE2B or C	M-UPS030AE2R
AC output	Rated capacity	3000 VA / 2400 W	
	Voltage	200/208/220/230/240V $\pm 2\%$	
	Frequency	50 Hz or 60 Hz (automatic changeover inside the UPS)	
	Frequency accuracy	At the normal operation	Depend on input frequency
		At the battery operation	Within $\pm 0.1\%$
	Number of phases	Single phase, 2-wire (with a ground terminal)	
	Load condition	Linear load or rectifying load with a crest factor of up to 3 times	
	Voltage waveform distortion factor	Under load resistance: 4% or less	
		Under rectified load: 6% or less	
	Overcurrent protection	RMS value: 100% or greater Peak value: 300% or greater of rated RMS value (bearing the load of the crest factor of 3)	
	Grounding system	Un-grounding	
AC input	Bypass circuit	Thyristor system (changeover time: without power interruption) Changeover is impossible at the time of a power failure and overload.	
	Voltage	200/208/220/230/240V (Tolerance 160 ~ 288V)	
	Frequency	50 Hz or 60 Hz $\pm 5\%$	
	Number of phases	Single phase, 2-wire(with a ground terminal)	
	Capacity	3000 VA or less	
	Grounding method	Single-line grounding	
	Power factor	0.97 or more (at the rated operation)	
Storage battery	Input higher harmonics current	Based on IEC61000-3-2.	
	Type	Small-size control valve type lead storage battery (long-life battery)	
	Backup time *1 [initial value]	Approximately 5 minutes [2400 W]	
	Nominal voltage	96 V	
Others	Ambient temperature	0 to 40°C	
	Relative humidity	20 to 95% (no condensation)	
	Noise	59 dB (A) max (at 1 m from on the front face of the Product)	
	Cooling method	Forced air cooling	
External dimensions (W × D × H)		172 × 410 × 480mm (AE2B) 172 × 474 × 480mm (AE2C)	437x680x87
Mass		47 kg (without batteries: 23 kg) : AE2B 48 kg (without batteries: 24kg) : AE2C	42 kg (without batteries: 18 kg)
Applicable standard		Based on VCCI CLASS A, UL1778-4 th , IEC62040-2	
External connection	Input	Input/output terminal block (L/R, N/S: M4 screw)	
	Grounding terminal	Input/output terminal block (PE (G): M4 screw)	
	Output	Input/output terminal block (I/U, n/V: M4 screw)	

*1 The back up time is the test result and is not a guaranteed value.

8.2 Additional Description for UL Type

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

This manual contains important instructions for UPS GX200 series Models that should be followed during installation and maintenance of the UPS and batteries.

Internal battery voltage is xx V dc.

Where xx stands as follows

Models M-UPS015AE2S-U with suffix : xx is 48Vdc

Models M-UPS015AE2R-U with suffix : xx is 48Vdc

Models M-UPS030AE2B-U with suffix : xx is 96Vdc

Models M-UPS030AE2R-U with suffix : xx is 96Vdc

Models M-UPS030AE2C-U with suffix : xx is 96Vdc

This unit intended for installation in a controlled environment and maximum ambient temperature is 25°C

(temperature controlled, indoor area free of conductive contaminants).

If ambient temperature is higher than 25°C, the output current decrease as follows,

Ambient	Output rating
to 25°C	100%
to 35°C	90%
to 40°C	80%

This UPS must be fasten down the floor by brackets attached this UPS.

For All Models without M-UPS015AE2S, Need to provide External Disconnect and Over current Protective Device for the AC input and the AC output. An UL Listed branch circuit breaker with suitable ratings could provide both functions .

Circuit Breaker (UL Listed Inverse-time Circuit Breaker) is not provided on the UPS at input side as shipped. All Models without M-UPS015AE2S must connect Circuit Breakers for use with the UPS. The rated tripping current of the Circuit Breaker (2 pole type) are shown in Table1 and Table2.

Field wiring connection must be made by a UL and CSA Listed closed-loop terminal connector sized for the wire gauge involved and fully insulated up to terminals. Connector must be fixed using the crimp tool specified by the connector manufacturer. Closed-loop terminal is shown in Table1 and Table2 (made by Japan Solderless Terminal). If can not get these terminals, request to our company or use the similar UL and CSA Listed closed-loop terminal.

Use 75°C Copper conductors.

Wire size and tightening torque are shown in Table1 and Table2.

Circuit diagrams are shown by figure 1 or 2.

UPS must be set up with flexible conduit without M-UPS015AE2S.

For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

M-UPS015AE2S-U

For PERMANENTLY CONNECTED UPS, a readily accessible disconnect device shall be incorporated in the building installation wiring.

Without M-UPS015AE2S-U

Table 1. Input rating, wire size, torque, external input circuit breaker size

MODEL	INPUT & GROUND				TIGHTENING TORQUE (N • m)	2POLE CIRCUIT BREAKER	
	Vin(V)	Iin(A)	WIRE SIZE AWG	Type of Closed-loop Terminal		V	A
M-UPS015AE2R-Ux	200/208 220/230 240	7.5	14	R2-4	2.0	AC240	10
M-UPS030AE2B-Ux-y		15	10	R5.5-4	2.0		20
M-UPS030AE2R-Ux-y							
M-UPS030AE2C-Ux-y							

x : Any letters

y : Any letters

Table 2. Output rating, wire size, torque, external output circuit breaker size

MODEL	OUTPUT				TIGHTENING TORQUE (N • m)	2POLE CIRCUIT BREAKER		
	Vo(V)	Io(A)	WIRE SIZE AWG	Type of Closed-loop Terminal		V	A	
M-UPS015AE2R-Ux	200/208 220/230 240	7.5/7.2 6.8/6.5 6.3	14	R2-4	2.0	AC240	10	
M-UPS030AE2B-Ux-y		15/14.4 13.6/13 12.5	10	R5.5-4	2.0		20	
M-UPS030AE2R-Ux-y								
M-UPS030AE2C-Ux-y								

x : Any letters

y : Any letters

Fig1. M-UPS015AE2 circuit diagram

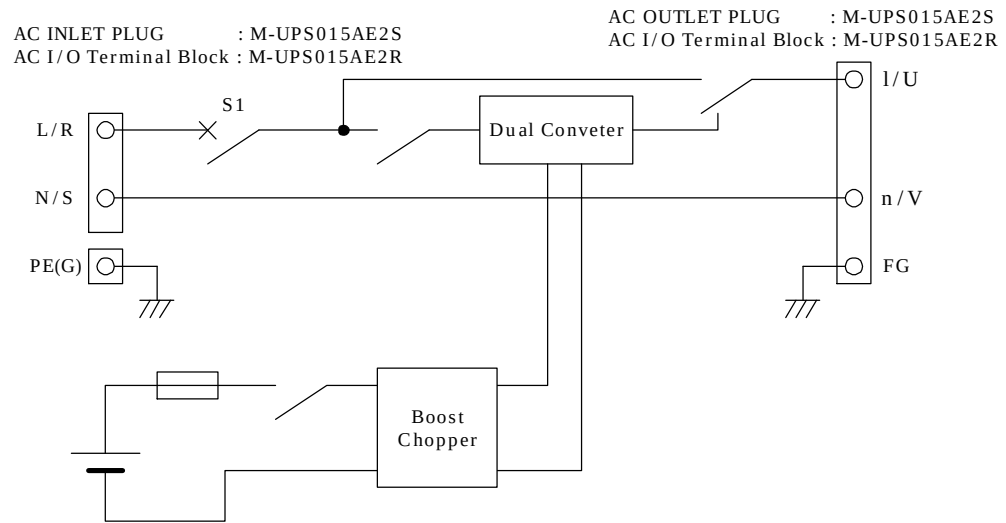
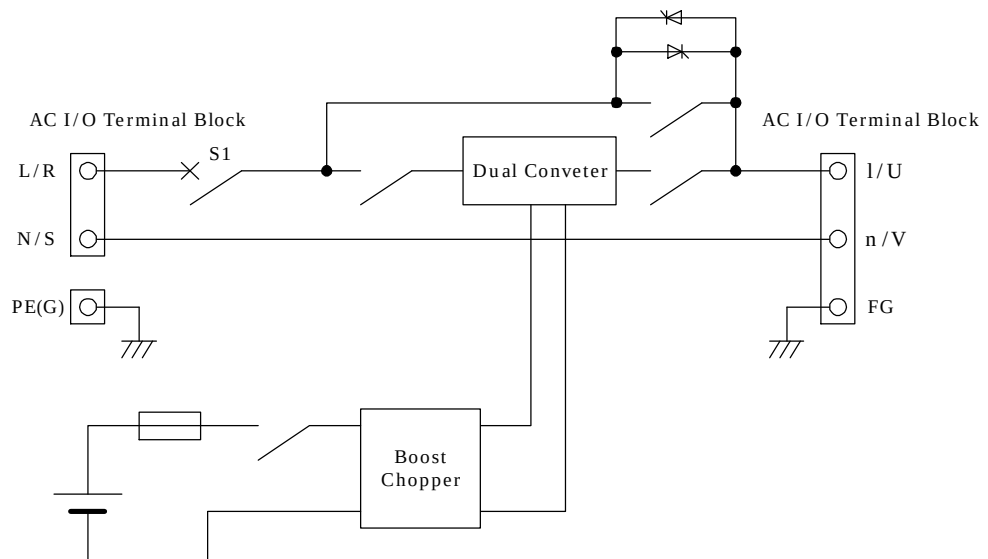


Fig2. M-UPS030AE2 circuit diagram



Refer to “Preparation before connection item2 in 3.2 Connection of cables”
(N/S and n/V are neutral terminals.)



DANGER

■ Risk of electric shock

Do not touch uninsulated battery terminal.



WARNING

■ Risk of electric shock

Do not remove the cover for any reason. There are no user-serviceable parts inside the UPS. Refer servicing to qualified service personnel.

High leakage current - Earth connection essential before connecting supply.



CAUTION

■ Don't use this equipment in life support applications where failure of this equipment can reasonably be expected to cause the failure of the life support equipment or to significantly effect its safety or effectiveness.

■ Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

■ Replace batteries are only the one designated by our company.

■ Risk of electric shock

- Battery and cooling fan servicing should be performed by only authorized servicing personnel who were qualified technically. Keep unauthorized personnel away from batteries and cooling fan.
- The UPS has an internal energy source (the battery). The output may be energized when the unit is not connected to an AC power line.
- Terminal marked "PE(G)" is intended for connection of the Protective Earthing (Grounding) conductor(s). This earth connection is essential before connecting supply conductors. Also ensure the reliability of this connection during any servicing, including connection of protective earthing (grounding) conductors to the output (load).
- Capacitor stores hazardous energy. Do not remove cover until 7 minutes after disconnecting all sources of supply.
- If this UPS installs, removes or does any services, be off the external input circuit breaker for disconnecting all sources of supply.

■ Do not dispose of batteries in a fire. The batteries may explode.

■ Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

■ A battery can present a risk of electrical shock and high short-circuit current. The following precautions should be observed when working on batteries:

- a) Remove watches, rings, or other metal objects.
- b) Use tools with insulated handles.
- c) Wear rubber gloves and boots.
- d) Do not lay tools or metal parts on top of batteries.
- e) Disconnect charging source prior to connecting or disconnection battery terminals.
- f) Determine if battery is inadvertently grounded.

If inadvertently grounded, remove source from ground.

Contact with any part of a grounded battery can result in electrical shock.

The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).