取扱説明書/ User's Manual

# 小容量無停電電源装置

Uninterruptible Power Supply

Model:

PEN102J1C
PEN102J1RT
PEN152J1RT/15
PEN152J1RT
PEN302J1RT/30
PEN302J1RT

Fuji Electric Co., Ltd.

DN074-04-01 C

Read ″User's guide″ first of all to the last minute to use the UPS safely that defends customer's important information.
Especially, it might cause a fire and the injury, etc. when the installation method and the battery handling are mistaken. It is very dangerous. Guard notes on safety. And, use it correctly. Moreover, importantly keep this document in the place that can be seen at any time after it reads.

## NOTE

① We are prohibited to reprint part or all of the content of this book without permission.
② We are to change without a previous notice for the content of this book in the future.
③ Contact the your service when there are any suggestions like a suspicious point, the mistake, and the description leakage, etc. about the content of this document.
④ We cannot assume the responsibility about the influence of the result of the operation of the customer regardless of the above-mentioned clause 3.
⑤ Units are considered acceptable for use in a maximum ambient of 40°C.
⑥ This UPS may be provided with a maximum of two extensiOn-Battery packs.
⑦ For Replacement of batteries located in an SERVICE ACCESS AREA -.
   1) Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
   2) Risk of explosion if battery is replaced by an incorrect type. When replacing batteries, replace with the same type and number of batteries or battery packs.
   3) CAUTION: Do not dispose of batteries in a fire. The batteries may explode. Dispose of used batteries according to the instructions.
   4) CAUTION – Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
   5) CAUTION – 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 disconnecting 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).

Except 3kVA

⑧ For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

Only 3kVA

⑨ A disconnect switch shall be provided by others for ac input circuit and output circuit.

⑩ The instruction manual shall include the statement indicating that overcurrent protection for the fixed output AC circuit is to be provided by others.

⑪ Use No. 8 AWG, 90°C copper wire and 22.5lb-in torque force when connecting to input/output terminal block.

## EMC

### Models over 1.5k VA

ＶＣＣＩ

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

### FCC Part 15

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

### EN62040-2

WARNING：This is a product for commercial and industrial application in the second environment installation restrictions or additional measures may be needed to prevent disturbances.

### Models up to 1.5k VA

ＶＣＣＩ

この装置は，クラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
取扱説明書に従って正しい取り扱いをして下さい。　VCCI－B

## FCC Part 15

NOTE : This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules.There limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generated, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures :

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician help.

## Packing Content

First of all, Open the packing box and confirm contents in the table below.
Contact the service when there is insufficient something. There is the following form/capacity in the UPS.

| Capacity | Rack&Tower Type | Tower Type |
|---|---|---|
| 1kVA | PEN1 0 2J1RT | PEN1 0 2J1C |
| 1.1kVA | PEN1 5 2J1RT/15 | — |
| 1.5kVA | PEN1 5 2J1RT | — |
| 2.4kVA | PEN3 0 2J1RT/30 | — |
| 3kVA | PEN3 0 2J1RT | — |

UPS Packing parts

| | |
|---|---|
| UPS | 1set |
| Communication Cable | 1set |
| CD | 1set |
| User's Guide (with Guarantee) | 1set |
| Flange for Rack (Rack&Tower Type only) | 1set |
| Pedestal (Rack&Tower Type only) | 1set |
| 3P-2P Change Plug (1kVA and 1.1kVA only) | 1set |
| Wire Protection (3kVA Only) | 2sets |

# To use device safely

## 1 Attention

In this paragraph, the matter that we would like you to defend to use this device safely is shown. Often read this book before it uses it and use it correctly. Keep this book in by the side to refer soon when it is necessary.

- Display and meaning of notes

In this Document, the ranks of notes on safety are distinguished as ″Danger″ and ″Caution″ and ″Attention″.

| | |
|---|---|
|  DANGER | Show a pressing dangerous situation of causing death or a serious injury, when not avoiding it. |
|  CAUTION | Show a dangerous situation with a possibility of causing death or of a serious injury, when not avoiding it. |
|  ATTENTION | Show a dangerous situation with a possibility of causing the slight injury or more injury, or show the case where there is a possibility that only physical loss or damage may occur, when not avoiding it. |

The matter described to attention has the possibility of relating to an important result according to the situation. Both important content has been described and defend.

- Meaning of sign

The following signatures show attention.
Attention content is shown in △


General attention


Attention about Electric shock


Attention about FAN


Possibility of a fire

The following signatures show prohibition.
Prohibitions content is shown in ⊘


General prohibitions


Resolution prohibitions


Fire use prohibition

The following signatures show compulsion.
Compulsions content is shown in ●


General compulsion


Compulsion about earth


Compulsion about cord

The following signatures show note.


Note


This symbol indicates that you should not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

This symbol indicates that you should discard waste electrical or electronic equipment(WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

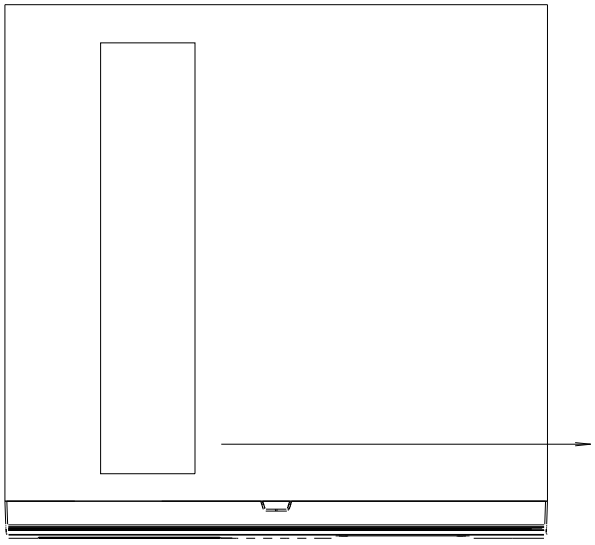
# 2 Content and position of Warning Label

## Rack & Tower Type

The attention label becomes it as follows.

### 1kVA

〈 REAR 〉



〈 FRONT 〉

TOP VIEW

**CAUTION**
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

**CAUTION** - Risk of electric shock -
This UPS receives power from more than one source - disconnection of all AC source and the DC source is required to de-energize this unit before servicing.

**CAUTION**
For continued protection against risk of fire, replace only with same type and rating of fuse.
See Installation Instructions before connecting to the supply.

**WARNING**
Do not short the battery terminals.

**WARNING**
Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes.Flush electrolyte at once with water.

**WARNING**
Exchange the same battery module type. See instruction manual before exchanging the battery module.

**WARNING**
Do not discard the UPS or the UPS batteries in the trash.
For more information, contact your local recycling/reuse or hazardous waste center.

Pb

**警　告**

感電のおそれあり
カバーをはずさないでください。

火災のおそれあり
異常時（異臭・異音）は運転を停止し、入力プラグを抜いてください。

けが・感電・火災のおそれあり
据付け、配線、運転、保守点検の前に取扱説明書を必読し、実施してください。

火災のおそれあり
バッテリは定期的に交換してください。
寿命に至ったバッテリは漏液・発火等の二次障害を起こす原因となります。

アース線を必ず接続してください。

医療機器など人命にかかわる用途に使用しないでください。

けがのおそれあり
装置の上に乗ったり、腰かけたり、寄りかからないでください。

感電・火災のおそれあり
水をかけたり、水の入った容器をおかないでください。

Pb
寿命に至ったバッテリはリサイクルします。そのまま廃棄せず、当社保守拠点又は販売店へご連絡ください。

**注　意**

けがのおそれあり
重量物につき、2人以上で移動してください。
質量　約16.3ｋｇ

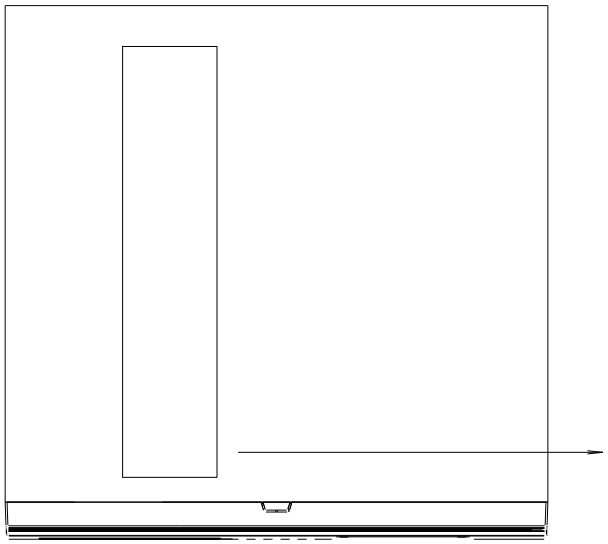
Pb
鉛蓄電池はリサイクルへ
蓄電池総質量：　7.8 kg

（連絡先社名）**富士電機株式会社**

Y41-560876

1.1kVA/1.5kVA

< REAR >



< FRONT >

TOP VIEW

**CAUTION**
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

**CAUTION** - Risk of electric shock -
This UPS receives power from more than one source - disconnection of all AC source and the DC source is required to de-energize this unit before servicing.

**CAUTION**
For continued protection against risk of fire, replace only with same type and rating of fuse.
See Installation Instructions before connecting to the supply.

**WARNING**
Do not short the battery terminals.

**WARNING**
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Released electrolyte is harmful to the skin and eyes.Flush electrolyte at once with water.

**WARNING**
Exchange the same battery module type.
See instruction manual before exchanging the battery module.

**WARNING**
Do not discard the UPS or the UPS batteries in the trash.
For more information, contact your local recycling/reuse or hazardous waste center.

Pb

**警　告**

感電のおそれあり
カバーをはずさないでください。

火災のおそれあり
異常時（異臭・異音）は運転を停止し、入力プラグを抜いてください。

けが・感電・火災のおそれあり
据付け、配線、運転、保守点検の前に取扱説明書を必読し、実施してください。

火災のおそれあり
バッテリは定期的に交換してください。
寿命に至ったバッテリは漏液・発火等の二次障害を起こす原因となります。

アース線を必ず接続してください。

医療機器など人命にかかわる用途に使用しないでください。

けがのおそれあり
装置の上に乗ったり、腰かけたり、寄りかからないでください。

感電・火災のおそれあり
水をかけたり、水の入った容器をおかないでください。

Pb
寿命に至ったバッテリはリサイクルします。そのまま廃棄せず、当社保守拠点又は販売店へご連絡ください。

**注　意**

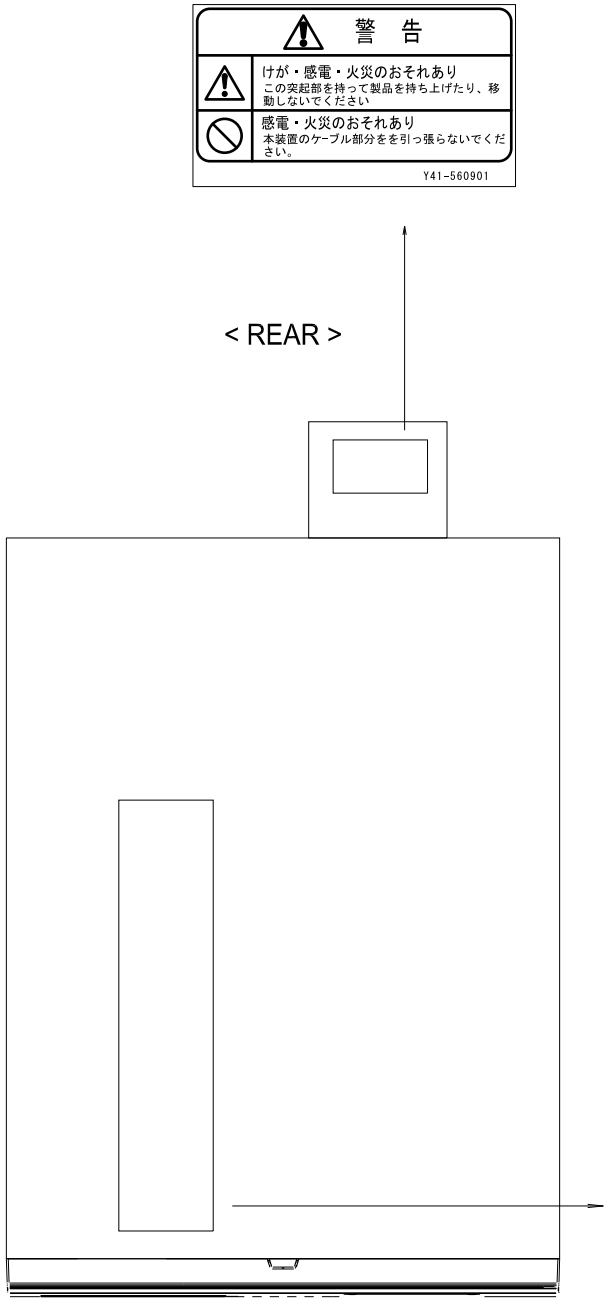
けがのおそれあり
重量物につき、2人以上で移動してください。
質量　約 20 kg

Pb
鉛蓄電池はリサイクルへ
蓄電池総質量：10.4 kg

（連絡先社名）**富士電機株式会社**

Y41-560877

## 2.4kVA




**CAUTION**
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

**CAUTION** - Risk of electric shock -
This UPS receives power from more than one source - disconnection of all AC source and the DC source is required to de-energize this unit before servicing.

**CAUTION**
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See Installation Instructions before connecting to the supply.

**WARNING**
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**WARNING**
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See instruction manual before exchanging the battery module.

**WARNING**
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For more information, contact your local recycling/reuse or hazardous waste center.

Pb

**警　告**

感電のおそれあり
カバーをはずさないでください。

火災のおそれあり
異常時（異臭・異音）は運転を停止し、入力プラグを抜いてください。

けが・感電・火災のおそれあり
据付け、配線、運転、保守点検の前に取扱説明書を必読し、実施してください。

火災のおそれあり
バッテリは定期的に交換してください。
寿命に至ったバッテリは漏液・発火等の二次障害を起こす原因となります。

アース線を必ず接続してください。

医療機器など人命にかかわる用途に使用しないでください。

けがのおそれあり
装置の上に乗ったり、腰かけたり、寄りかからないでください。

感電・火災のおそれあり
水をかけたり、水の入った容器をおかないでください。

Pb
寿命に至ったバッテリはリサイクルします。そのまま廃棄せず、当社保守拠点又は販売店へご連絡ください。

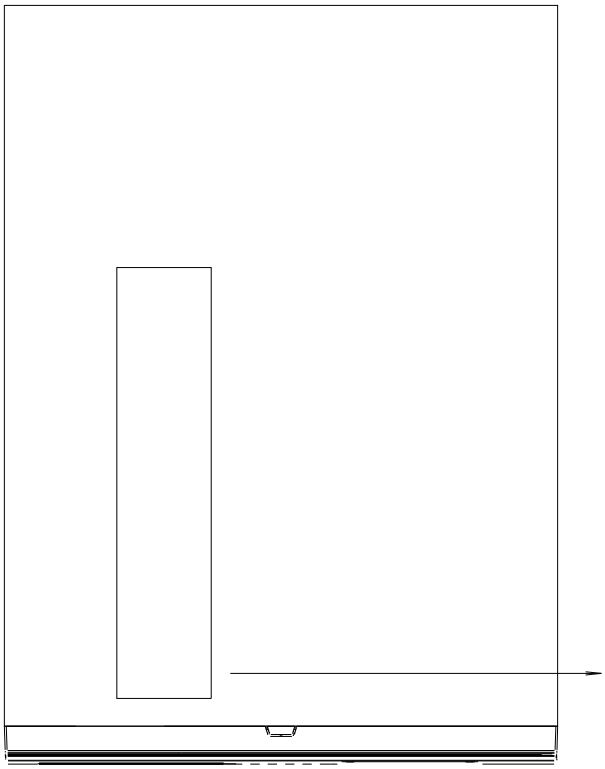
**注　意**

けがのおそれあり
重量物につき、2人以上で移動してください。
質量　約 31.6kg

Pb
鉛蓄電池はリサイクルへ
蓄電池総質量：15.6 kg
（連絡先社名）**富士電機株式会社**
Y41-560900

3kVA

< REAR >



< FRONT >

TOP VIEW

**CAUTION**
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

**CAUTION** - Risk of electric shock -
This UPS receives power from more than one source - disconnection of all AC source and the DC source is required to de-energize this unit before servicing.

**CAUTION**
For continued protection against risk of fire, replace only with same type and rating of fuse.
See Installation Instructions before connecting to the supply.

**WARNING**
Do not short the battery terminals.

**WARNING**
Do not open or mutilate batteries.
Released electrolyte is harmful to the skin and eyes.Flush electrolyte at once with water.

**WARNING**
Exchange the same battery module type.
See instruction manual before exchanging the battery module.

**WARNING**
Do not discard the UPS or the UPS batteries in the trash.
For more information, contact your local recycling/reuse or hazardous waste center.

Pb

**警　告**

感電のおそれあり
カバーをはずさないでください。

火災のおそれあり
異常時（異臭・異音）は運転を停止し、入力プラグを抜いてください。

けが・感電・火災のおそれあり
据付け、配線、運転、保守点検の前に取扱説明書を必読し、実施してください。

火災のおそれあり
バッテリは定期的に交換してください。
寿命に至ったバッテリは漏液・発火等の二次障害を起こす原因となります。

アース線を必ず接続してください。

医療機器など人命にかかわる用途に使用しないでください。

けがのおそれあり
装置の上に乗ったり、腰かけたり、寄りかからないでください。

感電・火災のおそれあり
水をかけたり、水の入った容器をおかないでください。

Pb
寿命に至ったバッテリはリサイクルします。そのまま廃棄せず、当社保守拠点又は販売店へご連絡ください。

**注　意**

けがのおそれあり
重量物につき、2人以上で移動してください。
質量　約 29.3ｋｇ

Pb
鉛蓄電池はリサイクルへ
蓄電池総質量：15.6 kg

（連絡先社名）**富士電機株式会社**

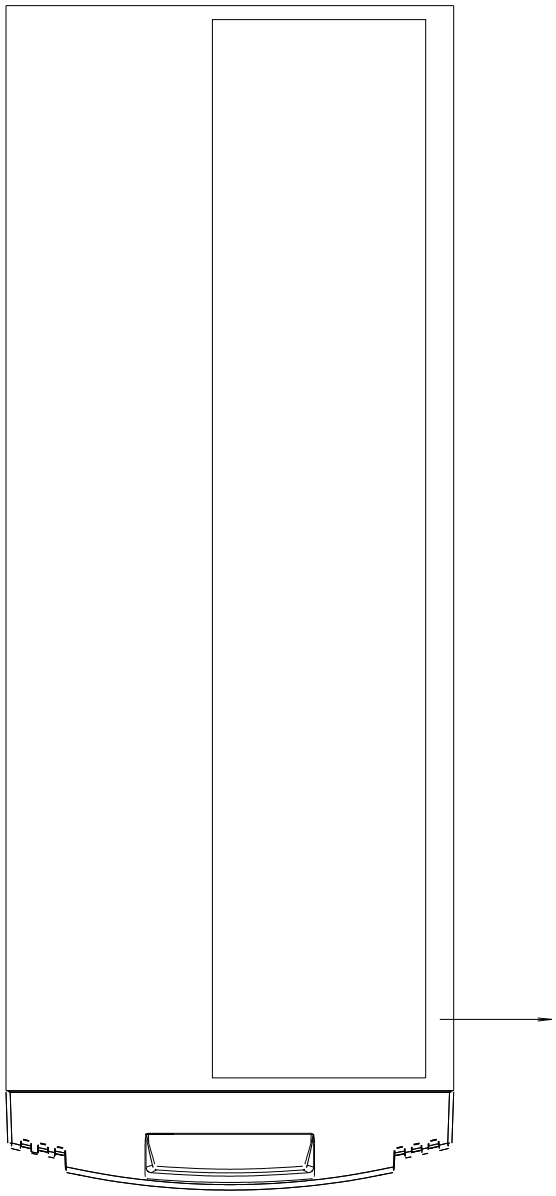
Y41-560878

## Tower Type

The attention label becomes it as follows.

### 1kVA

< REAR >



< FRONT >

TOP VIEW

**CAUTION**
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.

**CAUTION** - Risk of electric shock -
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**WARNING**
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See instruction manual before exchanging the battery module.

**WARNING**
Do not discard the UPS or the UPS batteries in the trash.
For more information, contact your local recycling/reuse or hazardous waste center.

Pb

**警　告**

感電のおそれあり
カバーをはずさないでください。

火災のおそれあり
異常時（異臭・異音）は運転を停止し、入力プラグを抜いてください。

けが・感電・火災のおそれあり
据付け、配線、運転、保守点検の前に取扱説明書を必読し、実施してください。

火災のおそれあり
バッテリは定期的に交換してください。
寿命に至ったバッテリは漏液・発火等の二次障害を起こす原因となります。

アース線を必ず接続してください。

医療機器など人命にかかわる用途に使用しないでください。

けがのおそれあり
装置の上に乗ったり、腰かけたり、寄りかからないでください。

感電・火災のおそれあり
水をかけたり、水の入った容器をおかないでください。

Pb
寿命に至ったバッテリはリサイクルします。そのまま廃棄せず、当社保守拠点又は販売店へご連絡ください。

**注　意**

けがのおそれあり
重量物につき、2人以上で移動してください。
質量　約15.4kg

Pb
鉛蓄電池はリサイクルへ
蓄電池総質量：　7.8 kg

（連絡先社名）**富士電機株式会社**

Y41-560875

# 3 Attention for use

### Security precaution

To use this device safely and correctly, read notes explain here. When you do handling to disregard notes, the device just doesn't break down. And there is a possibility of causing the damage of a human body accident of the death, the injury, the burn, and the electric shock, etc. and fire and surrounding equipment.

### Use of uninterruptive power supply

This device is the one developed as an uninterruptive power supply that assumes use in the environment such as general offices. Advanced safety and reliability are needed, or the breakdown, the malfunction, and the trouble of the equipment might do the life, the body, and the property to the damage, or against the following usages where it might socially have a large-scale influence, adaptability, performance, and quality are not guaranteed. As a result the device operation range and the condition were exceeded or it was used for the particular application, acknowledge being not able to assume the responsibility about the occurring damage.

①Air and space appliance
②Equipment for transportation (car, train, and ship, etc.)
③Equipment for medical treatment
④Equipment for power generation control
⑤Equipment related to nuclear power
⑥Equipment used in water
⑦Traffic control equipment
⑧Information Technology equipment with high publicity
⑨Military equipment
⑩Electrothermal articles and burning appliances
⑪Security equipment
⑫Various safety equipment
⑬Device that converts AC into DC by half wave rectification(Heater)
⑭Usage admitted other particular application

When this product is used by a standard usage, because safety or more is secured, the consideration such as installing the backup circuit, or securing the protection circuit and the device is preferable.

This device is a Japanese specification. Consult about use in foreign countries separately. When a Japanese specification is used outside the country, the voltage and the system requirements might be different, and it cause the expected operation not to be done.

### The check in daily

Check the following matters to use this device safely.

- Check the maintenance space.
- Check the presence of an abnormal sound.

- Check abnormality of the rotation sound of FAN.
- Check the nasty smell.
- Check whether the surface temperature of the case is abnormal.
- Check the dust of air- intake area or air – outtake area. Or, check whether to put the thing.
- Check whether to put the thing on the device.

### About a potential risk of this device

Here, a potential risk means the influence on human body/life.
This devices have the following risks to potential.

・Electric shock
・Fire by heatup or output short

### Influence of electromagnetic radiation radiated from device

An electric equipment radiates the electromagnetic radiation from the device by the principle. The electromagnetic radiation radiated from the device cannot be completely removed by a present technology. Especially, when this device is used near the machine that controls remotely by the electric wave, it might cause the malfunction of the equipment. When this device is used by such an equipment, measures such as electromagnetic shields are needed.

### Notes on handling in use

Do often read this book, and do not do wrong use. Moreover, Pull out the plug of the input power strip from the outlet, or turn off the input breaker of this device, after stopping outputting by the OFF button of the front panel of this device when you felt dangerous. The input power strip is pulled out without stopping outputting with the OFF button, or when you turn off the input breaker of this device or the breaker of the input distribution panel, it enters same state of the backup as the power failure, and the electric power maintained with an internal battery is consumed

In this case, note that it becomes impossible to secure the backup time assumed when really power failure.

Handling instructions

## Danger

- Do not use it in the place with a gas with the inflammability and ignited material. It ignites to these materials if the spark is generated, and there is danger of exploding.
- Do not put the battery of this device in the fire. There is danger of the explosion, and exploding.

- Do not take apart, do not repair this device, and remodel it. It is likely not only to operate normally if it resolves, it repair, and it remodels it but to cause the electric shock and a fire.

## Attention

- Pull out the input power plug, the output must stop with an off button because you do not get an electric shock when you clean this device.
- Take the plug part to remove the input power plug after stopping outputting with an off button of this device. The cable is damaged when the cable part is pulled and it causes a fire and the electric shock.
- Do not touch the input-output terminal while energizing. It is likely to get an electric shock.
- Do not feel after the connecting cable by a wet hand. It is likely to get an electric shock.
- Do not touch this device including cables when beginning to thunder. When striking it, it is likely to get an electric shock.

- The earth construction is necessary for this device for safety. When the earth construction is not done, it is likely to get an electric shock.
- Do not share the groundline of the outlet that connects the input power of this device with the groundline such as devices that consume the high-power. It causes the malfunction and the breakdown.

- Do not close air-intake area/air-outtake area of this device. It not only causes the malfunction and the breakdown when this temperature in the device rises abnormally, but also it causes a fire.
- Do not leave this device under the heat of direct sunshine and the thermal appliance. It causes a fire due to the breakdown, damage, and deterioration, etc. by heat.

- This device is for AC100,110,120V 50/60Hz. It breaks down when using it by the voltage excluding this, and it causes a fire and the electric shock.
- Do not use the table tap. The tap overheats, and it causes a fire.
- Do not use the extension cable. The power cable overheats when the power cable not suitable for the power supply specification of this device is used and it causes a fire.
- Pull wiring from the input distribution panel directly. Use wiring suitable for the power supply specification of this device. The wiring overheats when the wiring not suitable for this is used and it causes a fire
- Do not tightly bend cables, do not bundle cables, do not put the one on connected cables. The cable is damaged, and it causes the electric shock and a fire.
- The connection of cables must not use it imperfectly. It causes the electric shock and a fire by the short and heatup.
- Wet the cable and neither rear connector nor the terminal stand of this device with water etc. It causes the electric shock and a fire.
- Tightening the terminal must not have loosening. It might cause smoking and the ignition.
- Select the diameter of wire more than the device ratings current by the voltage-standing 600V or more.
- Do not put the foreign body. Internal parts are short-circuited when foreign bodies of metals and the combustible one, etc. enter and it causes the electric shock and a fire. Stop outputting with the turning off button, and pull out the power cable when the foreign body enters UPS.
- Do not set up this device in a dusty place. Dust is accumulated, internal parts are short-circuited, and it causes the electric shock and a fire.
- Do not use it in the place where salinity and the causticity gas are generated. Internal parts are short, deteriorated, and it causes the electric shock and a fire.

- This device is a heavy load. Work by two people or more when you carry. work wearing gloves and the safety shoes, etc. because it doesn't injure.
- Do not put the container including water on the upper face of the device.。Might it get an electric shock when falling, and it cause a fire.
- Pull out the power cable after stopping outputting at once by off button of UPS when abnormality is caused while using this device.

- Do not get on on this device, and don't put the one. It is likely to injure by falling, and breaking.
- Do not set up this device in an unstable place. It is likely to injure by falling, and breaking.

# 4 Attention for maintenance

### About the exchange and the recycling of the battery

The battery is used so that this device may correspond to the power failure for a short time. The battery uses the lead and diluted sulphuric acid enough. Note the following content.

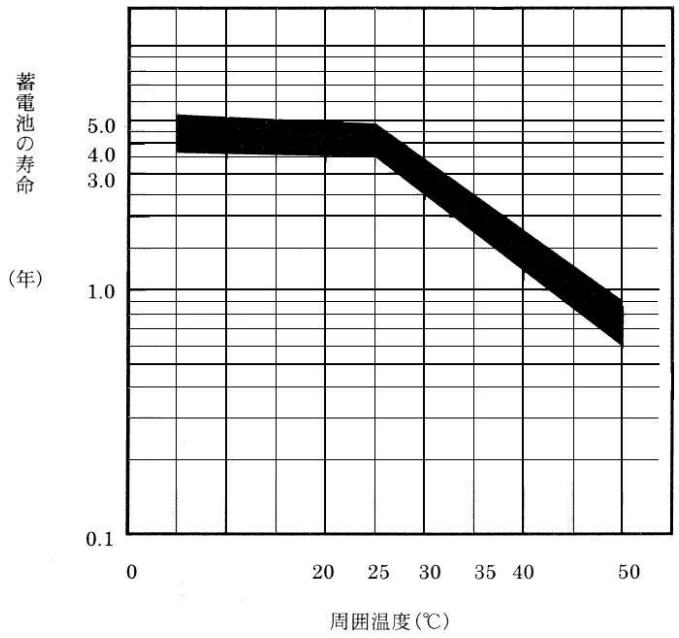
**Attention**

- When usually using it, the exchange time of the battery is 3-4.5 years (the used temperature 25℃). Exchange it regularly. The battery shelf life shortens when the used temperature is 25℃ or more or there are a lot of electrical discharge frequencies, and exchange it ahead of time.

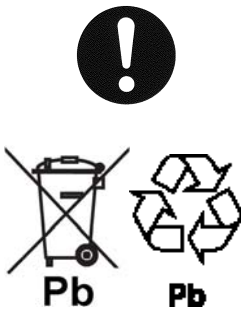
| Used temp | Battery life expectancy | Battery Replaced time |
|---|---|---|
| 25℃ | 3.5～5 years | 3～4.5 years |
| 30℃ | 2.5～3.5 years | 2～3 years |
| 40℃ | 1.3～1.8 years | 0.7～1.3 years |

About the exchange cycle of the battery

The longevity of the battery changes greatly by the installation environment of UPS. Exchange it in the used environment to use it safely.




The longevity display of the battery is displayed in accordance with user's guide line (JEM-TR204:2001).

| | |
|---|---|
|  | • The liquid might leak due to the deterioration of the battery case when using it for a long time without exchanging the batteries. The leaked liquid causes smoking and a fire. When the leaked liquid adheres to the skin, it is possible to cause the burn. It is possible to lose sight when the leaked liquid catches one's eye. In that case, wash at once, and consult the doctor.<br>• Do not discard the UPS or the UPS batteries in the trash. This product contains sealed lead-cid bateries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center. |
|  | • The exchanging work of the battery of this device is designed intending person who has experience and knowledge of electric work, to do. Follow the replacement procedure of the user's guide. |

### Remodeling and repair

| | |
|---|---|
|  **Attention** | |
|  | • Because there is a high voltage part in this device, The people other than the maintenance member repair or open the cover of this device and it becomes off the subject of the guarantee. It causes the accident of the electric shock etc. |

# 5 Other notes

### Transfer of this device or attention when selling

Transfer or sell off everything appended to this device when this device is transferred or is sold off to the third party.

### Guarantee

Guarantee is appended to this user's guide. Keep it importantly after confirming the content of the description. We will repair based on the content of the guarantee when breaking down by any chance in the guaranteed term. See the guarantee in detail. When there is no description matter by the shop, it becomes the repair or an exchange for a fee regardless of the guaranteed term.

# Chapter 1
# Summary

## 1-1 Feature

**Uninterruptive power supply (UPS)** defends an electronic equipment from the power supply trouble that the power failure, the voltage sag, the voltage surge, the voltage decrease, the excess voltage, the utility power noise, the frequency variation, the switching noise, the harmonics wave.
Such a power supply trouble destroys critical data, loses the content of the work of the unpreservation, and there is a possibility of damaging hardware. As a result, productivity of long time is lost, and high recovery cost is generated.
**UPS series** is composed by UPS and External Battery module(EBM) of each capacity / form by shown in Table 1-1.

Table 1-1 UPS series

| Capacity | Rack & Tower Type | | Tower Type | |
|---|---|---|---|---|
| | UPS | EBM | UPS | EBM |
| 1kVA | PEN102J1RT | PEB036-2RT | PEN102J1C | PEB036-2C |
| 1.1kVA | PEN152J1RT/15 | PEB048-2RT | — | — |
| 1.5kVA | PEN152J1RT | PEB048-2RT | — | — |
| 2.4kVA | PEN302J1RT/30 | PEB072-2RT | — | — |
| 3kVA | PEN302J1RT | PEB072-2RT | — | — |

EBM is constituted for increase when the backup is long necessary.

It introduces the feature of **UPS** that offers the superior performance and reliability.

- Normal mode of clean sinusoidal output／High Effeciency(HE) mode that suppressed power consumption／Intelligent mode that switches automatically between Normal mode and High Effeciency(HE) mode by judging utility input, these modes of three stages can be selected from front panel or communication. In this case, it becomes a compulsion change.
- In the Normal mode of a clean sinusoidal output, the exchange input electric power is filtered, it adjusts, and a steady electric power to the equipment is offered.
- The High Effeciency(HE) mode that suppresses power consumption contributes to the power consumption reduction.
- The intelligent mode of a possible mode switching can change both the power consumption reduction and the power supply quality by the

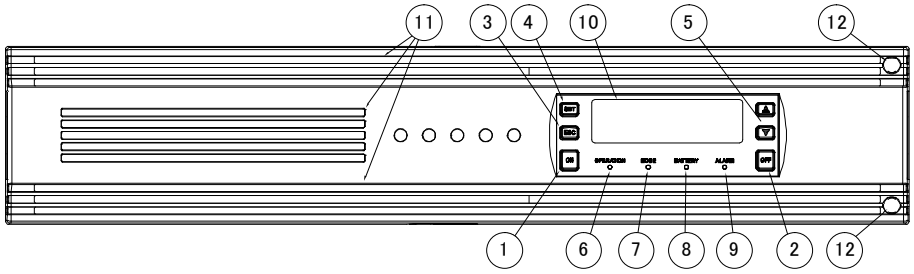
setting. Because the On Battery is not operated as much as possible, the consumption of the battery is suppressed. Normally, the input is judged and the mode is changed by the automatic operation. When the mode is specified by the communication in intelligent, the mode is decided by the communication priority, and an automatic operation is not done. However, if the other mode is possible and the mode specified by the communication is impossible, UPS becomes the other mode without OnBattery. When the communication is cut off or the communication is invalided , or newly communication is connected, or UPS shuts down, UPS is automatically transfer automatic operation.

- Important rack space is saved by having pressed height to 2U(about 90mm).
- Rack&Tower can be used as 19-inch rack installation or a tower installation.
- The backup time can be extended by connecting EBM up to two until.
- The load segment made a group can be started one by one, and it intercept it one by one.
- The output can be intercepted from remoteness in the emergency with the REPO port of a Dry cntact card(option). (REPO)
- ON/OFF of the UPS output can be remotely controlled by using the REPO port of a Dry cntact card(option). (REMOTE ON/OFF)
- The remote supervision/remote operation is possible by the function installed on the network agent card (option).
- UPS can be output by the battery start function even when there is no utility input power.(Default is invalidily.)
- The state of good visibility can be displayed by the LCD interface.
- In a compulsion change of the mode by the communication, or in a change of the mode by the communication in intelligent, It is possible with a network agent card (Option).
- This UPS can start without battery.

# Chapter 2
## Part name and function

### 2-1 UPS front

Rack&Tower Type




Tower Type

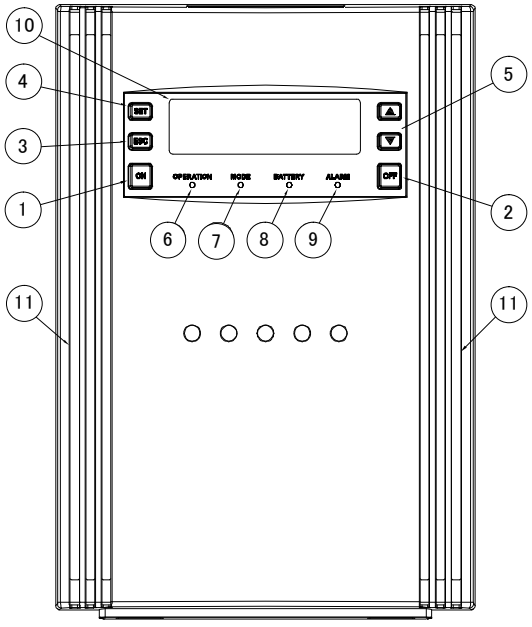


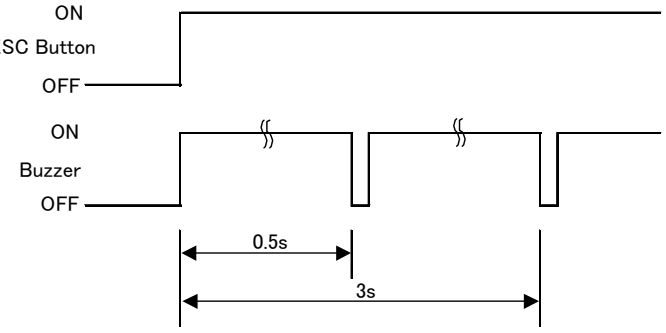

Figure 2-1 UPS front

## Table 2-1 Name

| No | Name | Function | |
|---|---|---|---|
| 1 | ON button | 0.5s push | When UTL normally, output |
| | | 3s push | When UTL abnormally, output (On-Battery operation) |
| 2 | OFF button | 3s push | Output stop |
| 3 | ESC button | 0.5s push | Buzzer stop (The buzzer of that time is stopped.)<br>Configuration mode(select cntent) : Return to Item display. |
| | | 3s push | Return from configuration (Only Configuration mode) |
| | | 3s push | Self test (Stanby, HE-Standby,On-Line,On-HE only) |
| 4 | SET button | 0.5s push | Latest alarm display(Automatically return to normal display)<br>Configuration mode : Select content/Item. |
| | | 3s push | Go to configuration (All mode) |
| 5 | ↑ ↓ button | 0.5s push | Change the display (Automatically return to initial display)<br>Configuration mode : Chnage content/Item |
| 6 | OPERATION LED | ON | State of output |
| | | 1s ON 1s OFF repeat | State of no output |
| | | OFF | Converter OFF |
| 7 | MODE LED | ON | Normal |
| | | OFF | Hight Effeciency (HE) |
| | | 0.5s ON 0.5s OFF repeat | Battery |
| | | 2s ON 2s OFF repeat | Bypass |
| 8 | BATTERY LED | ON | Battery disconnect |
| | | 0.5s ON 0.5s OFF repeat | Constant Current Charge<br>Or Immediately before Battery ShutDown |
| | | 1s ON 1s OFF repeat | Self Test / Low Battery |
| | | 2s ON 2s OFF repeat | Service Battery |
| 9 | ALARM LED | ON | Alarm |
| | | 1s ON 1s OFF repeat | Bypass not available |
| | | 2s ON 2s OFF repeat | Input abnormal |
| 10 | LCD | State display | |
| 11 | Air-Intake | Air intake area | |
| 12 | Screw | For the panel assembly | |

- The buzzer stops momentarily at the above time after it presses it. The function is not recognized when not pressing it until the buzzer sound stops momentarily. Press it until the buzzer sound stops momentarily.

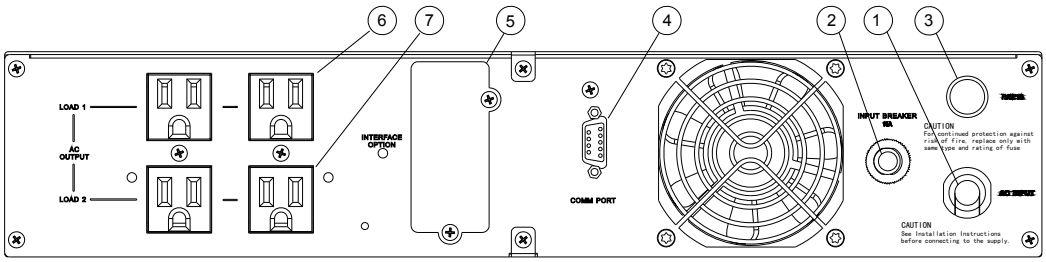
Ex) ESC button



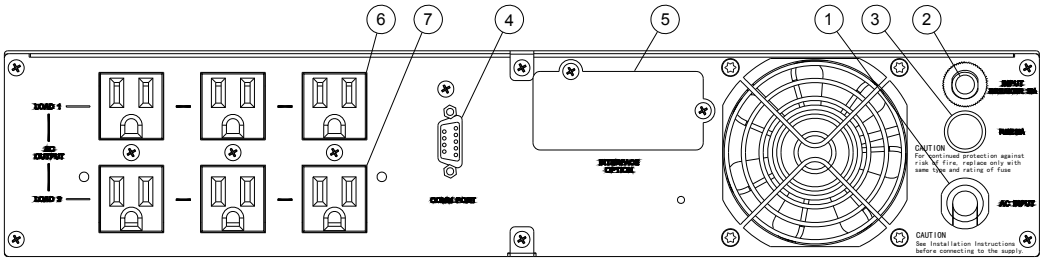
## 2-2 UPS rear

Rack&Tower Type

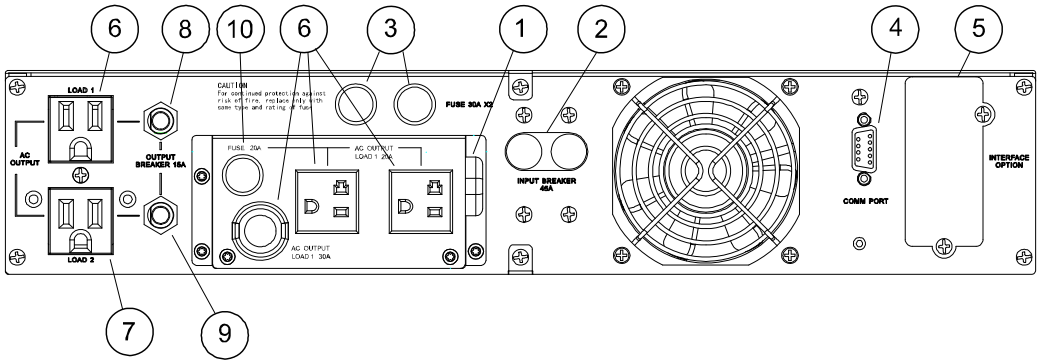
1kVA




1.1kVA/1.5kVA




2.4kVA




3kVA

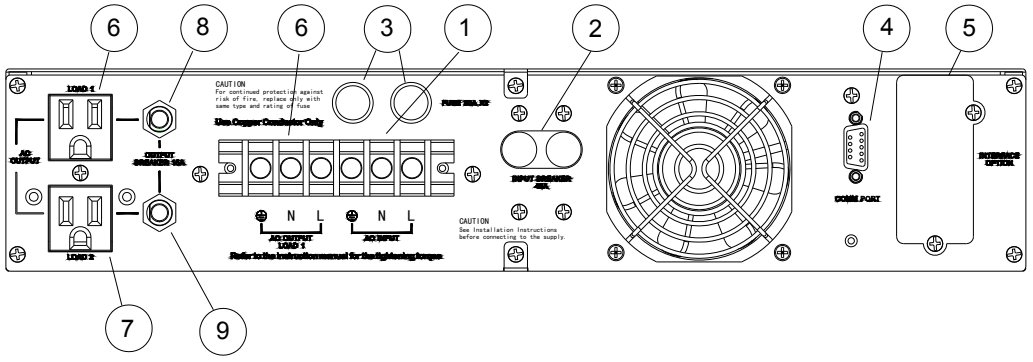



Figure 2-2 Rack&Tower Type UPS rear

Tower Type
1kVA

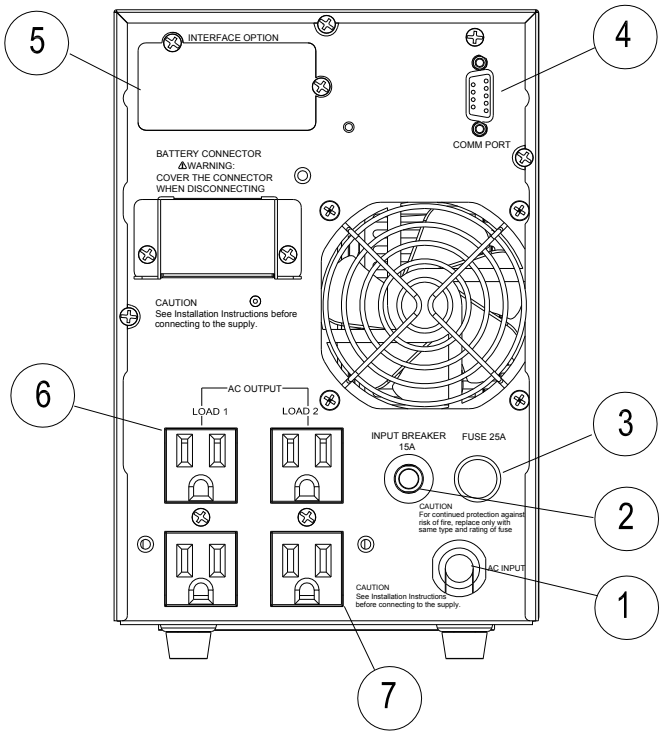



Figure 2-3 Tower Type UPS rear

Table 2-2 Name

| No | Name | Function | |
|---|---|---|---|
| 1 | Input | Except 3k | Input cable with plug |
| | | 3k | Terminal L-Line, N-Nutral, ⏚-Earth |
| 2 | Input Breaker | 1k | 15A Breaker |
| | | 1.1k/1.5k | 20A Breaker |
| | | 2.4k/3k | 45A Breaker |
| 3 | Input Fuse | 1k | 25A |
| | | 1.1k/1.5k | 30A |
| | | 2.4k/3k | 30A x 2 |
| 4 | RS232C | For communication | |
| 5 | Option Slot | For network agent card or Dry contact card | |
| 6 | Load1 | 1k | 5-15R x 2 |
| | | 1.1k/1.5k | 5-15R x 3 |
| | | 2.4k | 5-15R x 1, 5-20R x 2, Output cable with L5-30R |
| | | 3k | 5-15R x 1 and Terminal L- Line, N-Nutral, ⏚-Earth |
| 7 | Load2 | 1k | 5-15R x 2 |
| | | 1.1k/1.5k | 5-15R x 3 |
| | | 2.4k/3k | 5-15R x 1 |
| 8 | Output Breaker1 | 2.4k/3k | 15A, for 5-15R (Load1) |
| 9 | Output Breaker2 | 2.4k/3k | 15A, for 5-15R (Load2) |
| 10 | Output Fuse | 2.4k | 20A, for 5-20R (Load1) |

# Chapter 3 Installation

## 3-1 Confirmation

Confirm there are all accessories after opening packing, and is no damage in the UPS and the accessory. Confirm a list of this content of packing in the user's guide opening and an actual accessory.
Keep the packing box and the transport document when it seems that damage was received while UPS is transported. And contact your survice.

## 3-2 Place

UPS is designed for the room. Choose the comforting place to be an installation. Set up the device in a flat place. Especially, Avoid the following places.

- Outdoor
- Place of direct sunshine
- Place of high temperature and humidity (Recommendation: 10-25℃)
- Place of strong vibration and strong impact
- Place where salinity and causticity gas are generated
- Sealing room
- Place with inclination
- Near wireless
- Place where a lot of dust exists

Keep the following space when you set up UPS.
Set up CRT display 30cm or more apart from this devices, because UPS might give the influence such as shakes against CRT
This device does the forced air cooling.。 Therefore, the space of 20cm or more is each front side/rear side necessary. Moreover, the maintenance work is done on the front side and rear side. The space of 2m or more is necessary for the front side/rear side.

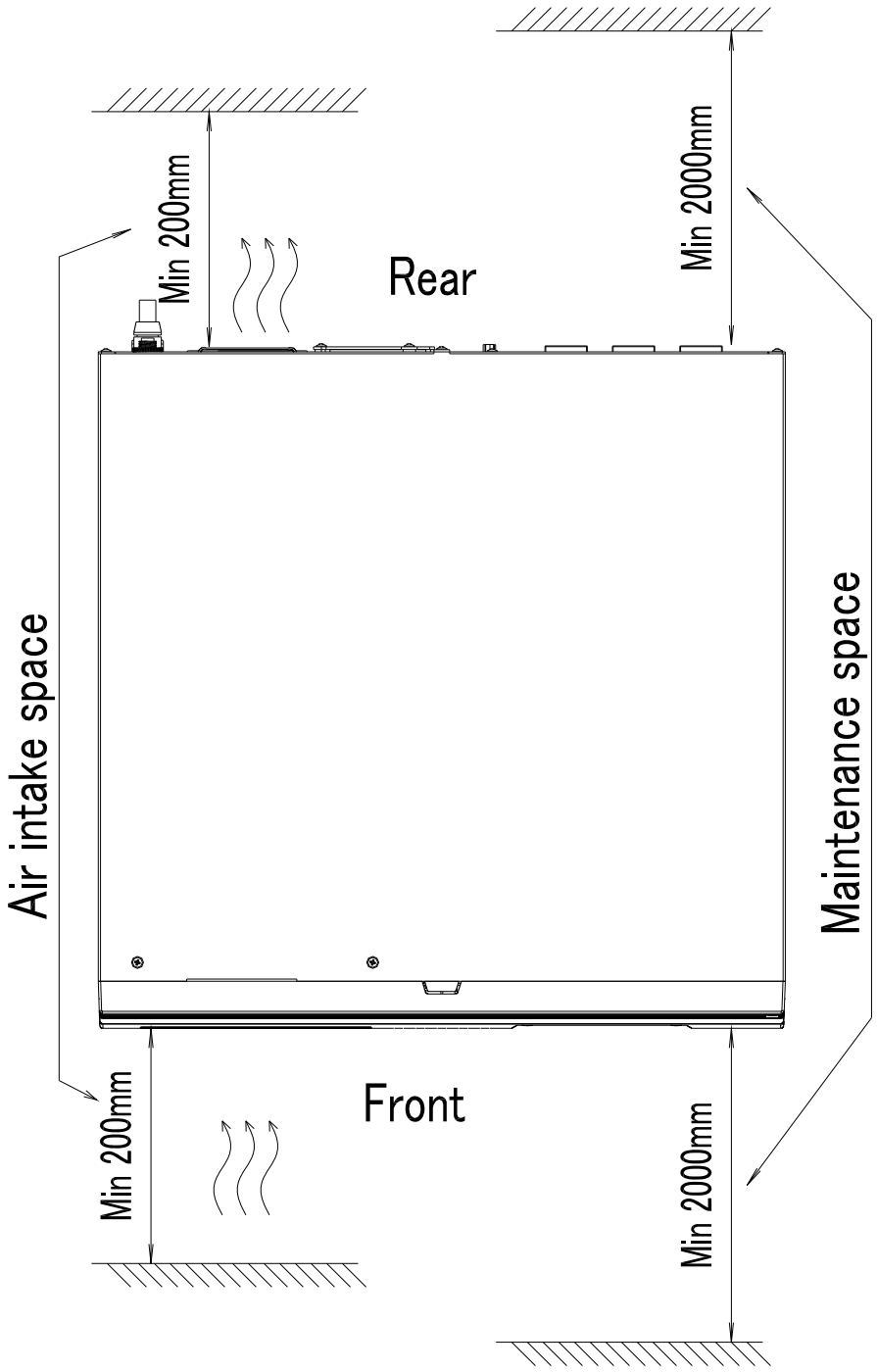



Figure 3-1 Need Space

## 3-3 Installation

UPS is designed by a flexible installation. Rack & tower type prepares accessories necessary to use it as a rackmounting installation or a tower installation.

### 3-3-1 Rack & tower type Installation

UPS is possible to set up in 19-inch rack, and only 2U uses valuable rack space. It is possible to fix to 19-inch rack with the installation fittings (flange) for rackmounting.

・The screw that fixes the rail and UPS to the frame is not included in UPS. Prepare the rail for your 19-inch rack.

Installation of Rack type

Install UPS in the rack according to the following procedure.

1. Make the front side of UPS the front, and put UPS on a flat place.
2. Install the handles with the long screw 2pcs appended to two flanges.
3. Fix the flange that installs the handles to the side of UPS with the short screw 4 pcs of the attachment. (Figure 3-2)
4. Fix to the screw hole in one step interior with the short plate screw when you want to put out the device forward.
5. Repeat step 3 from step 1 when you set up EBM of the option.

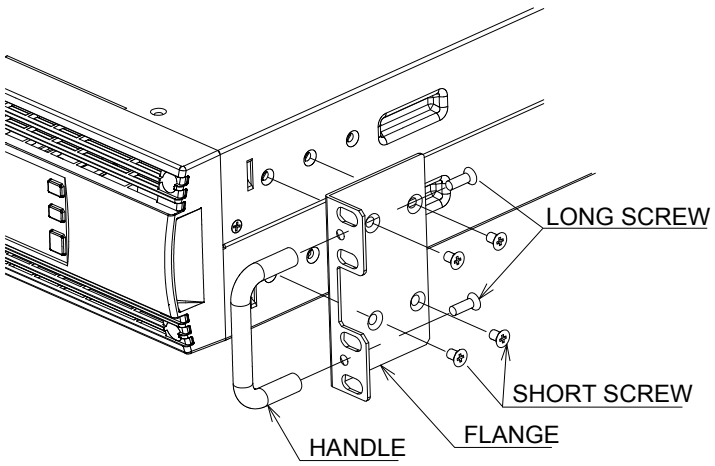



Figure 3-2 Installation of flange

・Install EBM on the the lower of UPS like Figure 3-3. Use the rail for the mount every EBM.

6. Do the slide and put UPS and EBM on the rail.
   Fix the flange of UPS to the frame of the rack to fix UPS to the rack.
   Advance toward clause 3-3-3～3-3-5 to complete the installation.

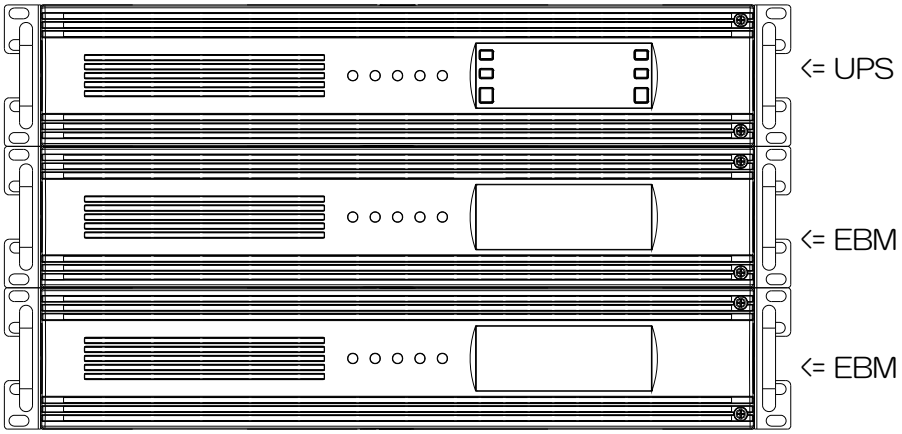



Figure 3-3 Installation of Rackmount (used EBM)

Installation of Tower type

When UPS is set up in the tower, the pedestal (plinth) for the tower installation is installed in the bottom of the main flame.

1. The pedestal for the tower installation is assembled.
2. Slowly put UPS on the pedestal, and put UPS on a flat, horizontal place.

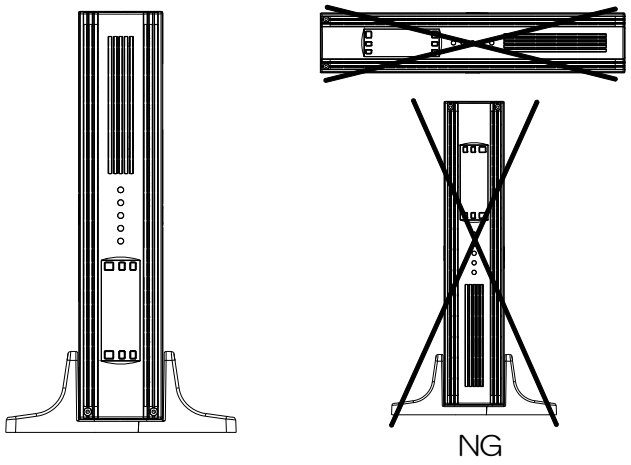



Figure 3-4 Installation of Tower

**Attention**

- Install the bracket when you add EBM.
- Position the air-intake vent in the upper part at the Tower installation.

3. Fix the pedestal of EBM between pedestal of UPS when you set up EBM.
4. Slowly put UPS and EBM on the pedestal, and put on a flat, horizontal place.
5. Fix UPS and EBM with a bracket like Figure 3-5.
6. In addition, repeat step 5 from step 3 when you add one EBM another.

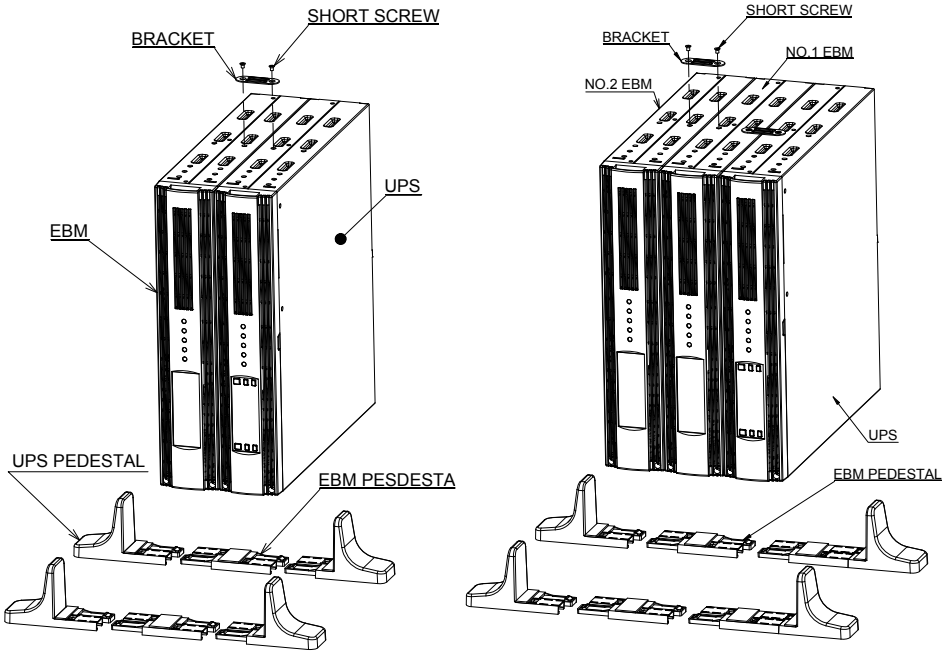



Figure 3-5 Installation of Tower (used EBM)

- Change the EBM connection number setting in clause 6-1-1 when you use EBM. The predictive value at actual electrical discharge time and the electrical discharge time is influenced when not normally set.
- Match in the operation form and set "Shutdown timing" of Power-sol when EBM and power management software (Power-sol) is additionally used. When "Power-sol" is used like the factory setting, the backup time expected might not be able to be kept.
- The recommendation of pedestal intervals is 300mm(3kVA is 350mm). Please set it up so that pedestal may become symmetry for UPS.

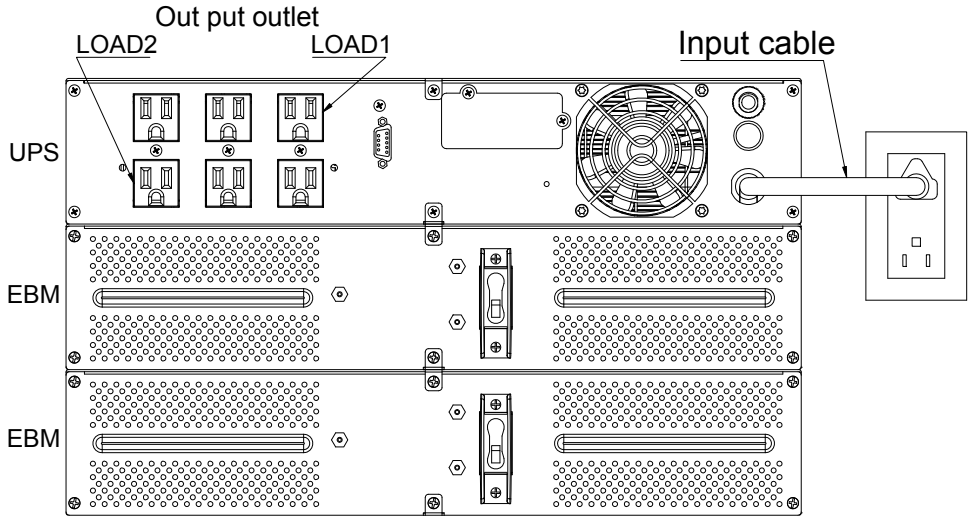
## 3-3-2 Tower type Installation

Put tower type UPS on a flat, horizontal place.

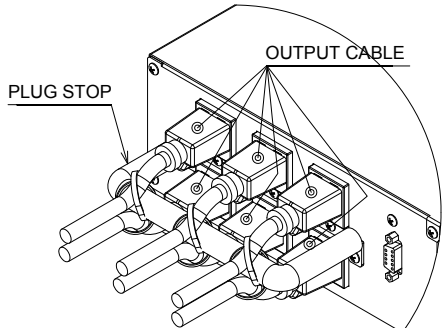
**Attention**

- Otherwise, this device might fall, and it injure.

### 3-3-3 Wiring (up to 1.5kVA)




a) Wiring

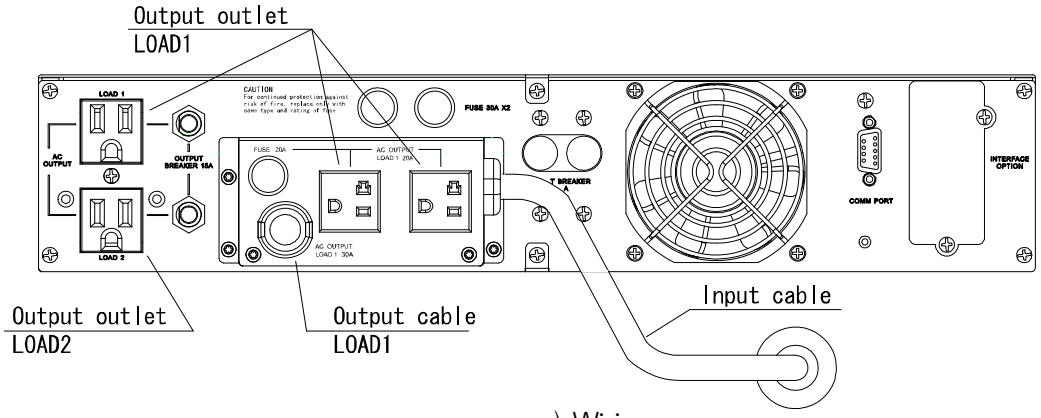



b) PLUGSTOP

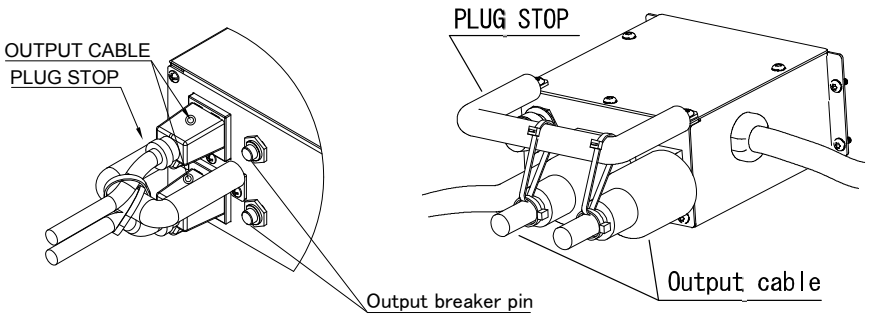
Figure 3-6 Wiring up to 1.5kVA

- Do not remodel UPS. The UPS breaks down, and the guarantee becomes invalid.
- Do not connect the large load of instant electric power. (Laser printer etc)
- Ground the earth of the load with the rush current independently on the load side.
- The output cable connected with the outlet by Plug Stop (option) can be fixed.

## 3-3-4 Wiring (Only 2.4kVA)




a) Wiring




b) PLUGSTOP

Figure 3-7 Wiring only 2.4kVA

- Do not remodel UPS. The UPS breaks down, and the guarantee becomes invalid.
- The input distribution breaker must select the breaker more than 50A.
- Do not connect the large load of instant electric power. (Laser printer etc)
- Ground the earth of the load with the rush current independently on the load side.
- The output cable connected with the outlet with Plug Stop (option) can be fixed.
- Do not push an output breaker pin.The output of applicable Load stops.
- Do not place a thing on the line of an output breaker pin.
  Be careful not to block a motion of a pin.
- Do not lift UPS, having the fixed part of input/output cable

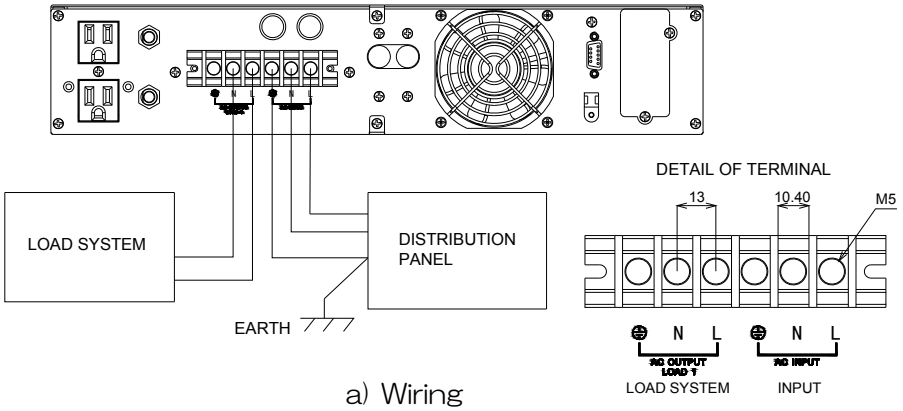
## 3-3-5 Wiring (Only 3kVA)

1. 1.Wiring work becomes the customer's work including the connection to the terminal of UPS. The torque of the terminal shown in Table 3-1 is showing of the torque of the device terminal.

2. Make the utility power source non-earth. However, ground the Nutral side when you ground UPS.

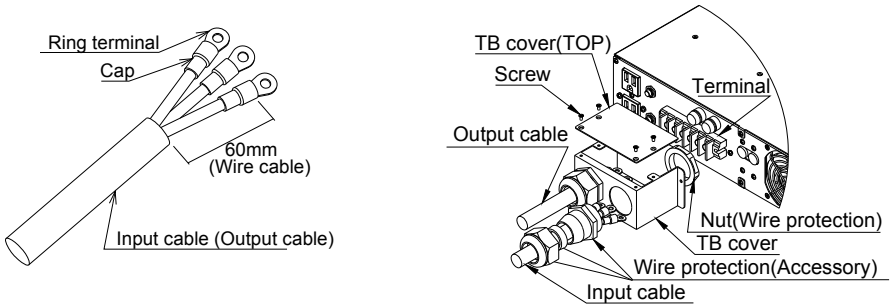
## Table 3-1 Selection of distribution breaker and screw size of UPS terminal

| Cap | Input Voltage | Output Voltage | Distribution breaker (Recommendation) | WIRE(Recommendation) | | | UPS terminal | |
|---|---|---|---|---|---|---|---|---|
| | | | | Input | Output | Earth | Size | Torque |
| 3kVA | 100V | 100V | 50A | AWG No.8 | | | M5 | 22.5lb·in |

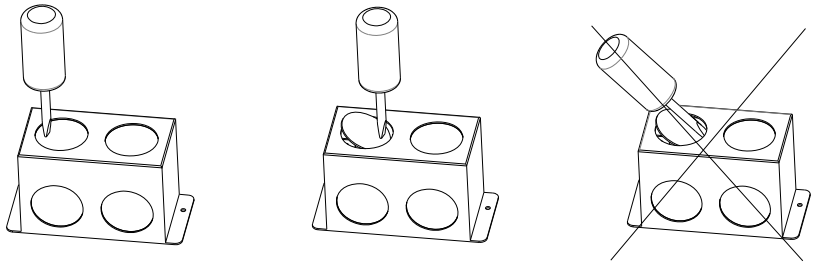



a) Wiring

Use the wire protection when you connect the wire cable with the terminal.

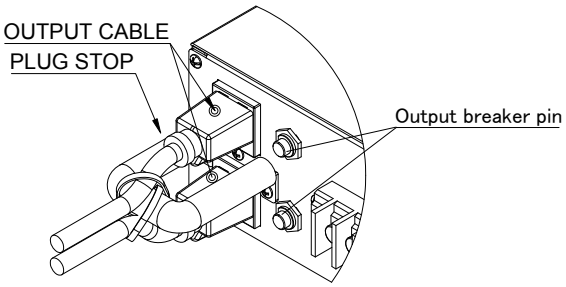



Wire protection can be an put on the back or the bottom of the TB cover. Remove the round part of the TB cover, and put it. When removing, the cutting lack side can be removed by strongly pushing the right and left (i and ii) several times in the driver as shown in the figure below. Do not beat strongly Do not push the driver into the space. (iii) The TB cover is damaged. Please note it.



( i ) ( ii ) ( iii )

b) Details when wire protection is used

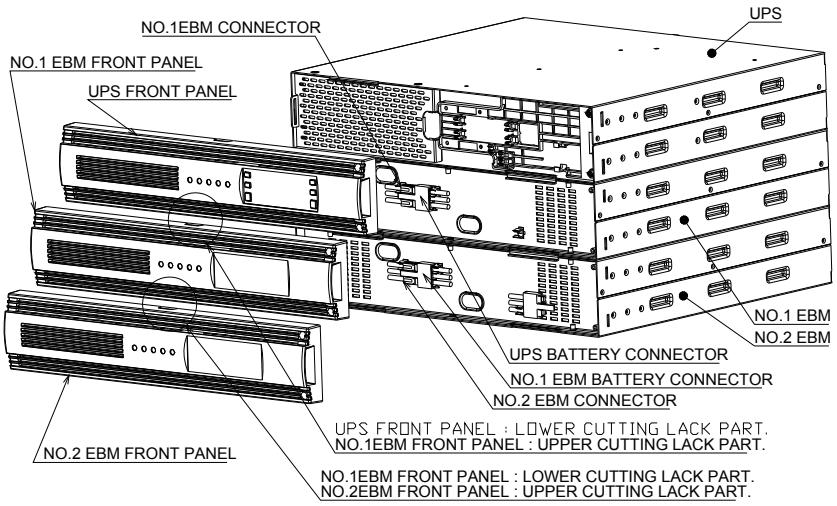



c) PLUGSTOP

Figure 3-8 Wiring and detailed terminal

- Do not remodel UPS. The UPS breaks down, and the guarantee becomes invalid.
- The input distribution breaker must select the breaker more than the above-mentioned current value.
- The qualification owner must do electrical work.
- Do not connect the large load of instant electric power. (Laser printer etc)
- Ground the earth of the load by itself.
- The output cable connected with the outlet with Plug Stop (option) can be fixed.
- Do not push an output breaker pin.The output of applicable Load stops.
- Do not place a thing on the line of an output breaker pin.
  Be careful not to block a motion of a pin.
- Do not lift UPS, having TB cover.

## 3-3-6 Rack & Tower type EBM Installation



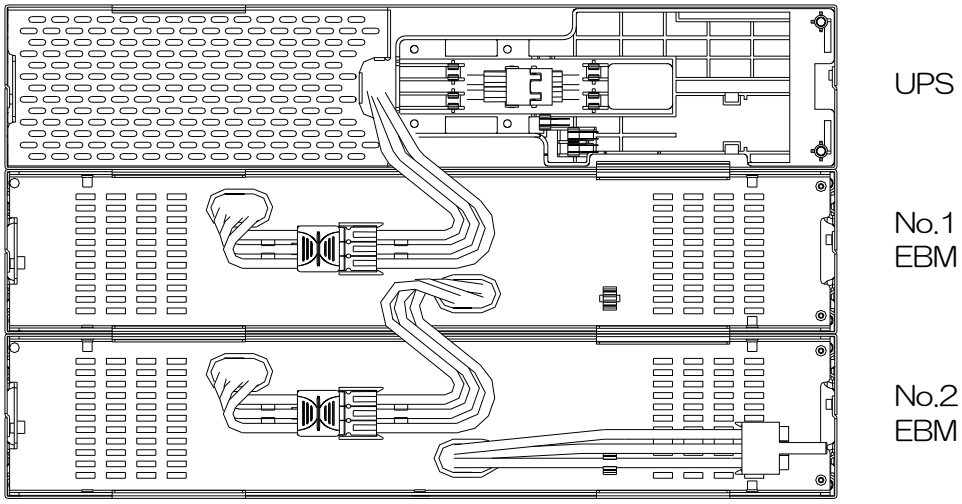




Figure 3-9 EBM connection

1. When EBM is connected, the front panel of UPS and EBM is detached.
2. The cutting lack under the front panel center of UPS and the cutting lack on the EBM front panel center are cut out.
3. The connecting cable of UPS is passed through the cutting lack of UPS and EBM.
4. The connecting cable of UPS and EBM is connected in front of EBM.
5. The cable is fixed to the cable guide in front of EBM.
6. The front panel of UPS and EBM is installed.
7. In addition, when you install one EBM, it is put under EBM that has already been installed, repeated step 6 from step 1 in above mentioned .

・Operate it after charging with UPS for 24 hours set up first time or after it preserves it for a long time.

**Attention**

・A few arcs might occur when EBM is connected with UPS.
・Cconnect the connector of EBM with the connector of UPS firmly.
・Do not work by a wet hand. It is likely to get an electric shock.

## 3-3-7 Tower type EBM Installation

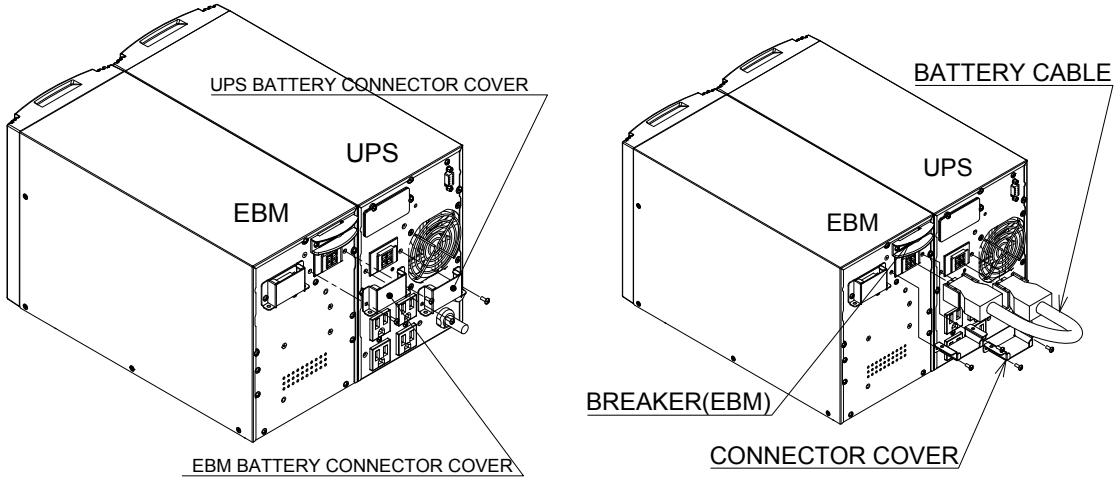



Figure 3-10 EBM connection

1. When EBM is connected, the battery connector cover on the back of UPS and the back of EBM is removed, and renewed.
2. An accessory of EBM battery cable is connected with the battery connector of UPS and EBM.
3. In addition, when you install one EBM, the battery connector cover on the back of EBM that has already been installed and EBM of the addition is removed, and renewed. An accessory of EBM battery cable is connected with the battery connector of EBM and EBM.

・Operate it after charging with UPS for 24 hours set up first time or after it preserves it for a long time.

**Attention**

・A few arcs might occur when EBM is connected with UPS.
・Cconnect the connector of EBM with the connector of UPS firmly.
・Do not work by a wet hand. It is likely to get an electric shock.

## 3-3-8 Optional card Installation

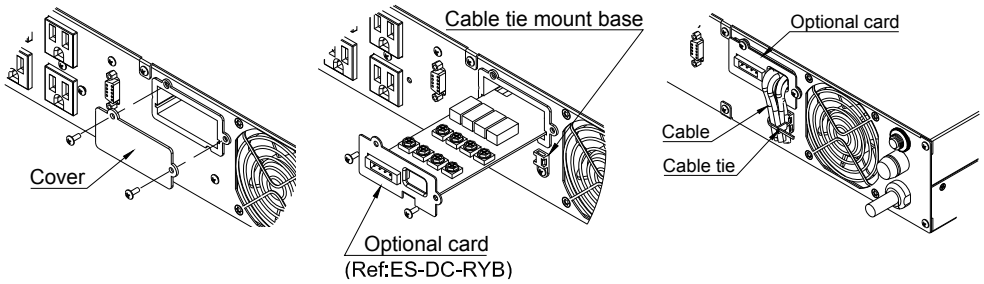



Figure 3-11 Optional card connection

1. Remove the cover of INTERFACE OPTION on the back of UPS when you connect an optional card.
2. If used dry contact signal, pass the cable through the window of a rear panel.
3. If used dry contact signal, fix the cable to the terminal on the substrate.
4. Make the rail of the slot slide into the card edge, and insert it up to the interior.
5. Fix wiring from the terminal on the substrate to the rear of UPS by using Cable Tie stuck on the card.

# Chapter 4
# Operation

## 4-1 Mode

The UPS exists the following main seven operation mode, and displays the status by LCD and LED of UPS. (Refer Chapter 5)

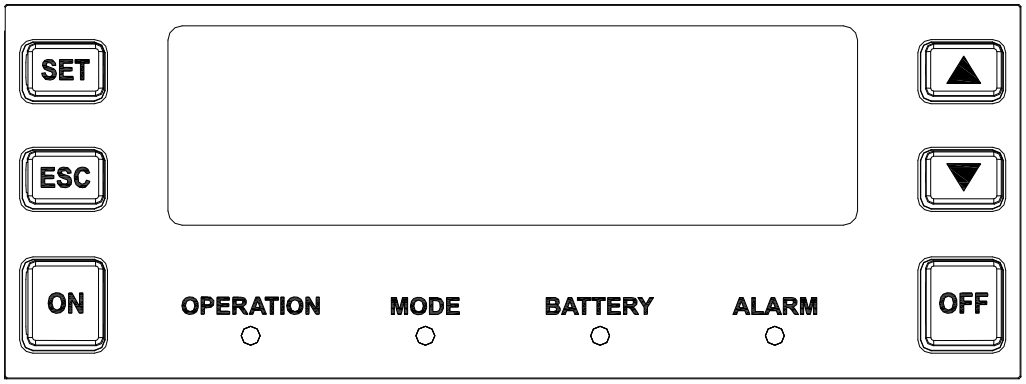



Figure 4-1 Panel

### 4-1-1 On-Line

UPS obtains the electric power from a utility input. And UPS is outputs through INV.

MODE LED lights, and "On-Line" is displayed in LCD for this period. Other states can be displayed with the ▲ button/▼ button. The state display displays the following. Input power(W), input current(A), input voltage(V), input frequency(Hz), load percent(%), output power(W), output VA(VA), output current(A), output voltage(V), output frequency(Hz), battery voltage(V), battery capacity(%), and backup time。As for this display, any mode is possible.

When the power failure occurs, UPS transfers the On-Battery mode.

When the UPS load exceeds 100%, it is shown for ALARM LED to light, and to have exceeded the UPS capacity.

---

・UPS blinks(1s ON/OFF) ALARM LED when the utility input deviates from the input range of the zero transfer, except for the On-Battery.

the input range of the zero transfer (Bypass available range)

Input voltage : Rated voltage±12%

Input frequency : ±3Hz (Default)

＊I put frequency range is possible to change by setting of Chapter 6.

・When the input deviates from the range of bypass available, if overload/internal abnormality occurs, the output is cut.

・When the phase match cannot be done even within bypass available, the UPS doesn't change to the by-pass operation. And output is cut.

・When the load is over 110%, the output is cut after transition to On-Bypass.

・When the load is over 150%, the output is cut.

---

- It transfers to the On-Bypass once, when the load is near less than 100% after detecting the overload.
- When the input deviates from the range of bypass available, if manual bypass is set, the UPS transfer Bypass with output cut within 10ms.
- The output of UPS might decrease when the big inrush current is connected.

### 4-1-2 On-HE

It is a mode that supplies a utility input to the load side through UPS.
MODE LED is turned off, and ″ On-HE ″ is displayed in LCD for this period. Other states can be displayed with the ▲ button/▼ button. When the power failure occurs, UPS transfers the On-Battery mode.
When the UPS load exceeds 100%, it is shown for ALARM LED to light, and to have exceeded the UPS capacity.

- UPS transfers On-Battery when the utility input deviates from the HE input range, when the HE mode. (When Input power is cut , the output cut by the transition of On-HE ⇔ On-Battery is about 10ms.)
  HE input range
  Input voltage : Rated voltage±5% (Default)
  Input frequenvy : ±1Hz (Default)

＊Input voltage/Input frequency range is possible to change by setting of Chapter6

- When the load is over 110%, the output is cut after transition to On-Bypass.
- When the load is over 150%, the output is cut.
- If overload/internal abnormality occurs, the UPS transfer Bypass.
- It transfers to the On-Bypass once, when the load is near less than 100% after detecting the overload.

### 4-1-3 On-Battery

When an abnormal input occured, UPS transfers On-Battery that does the backup operation. UPS sounds an intermittent alarm for 2 seconds. MODE LED blinks 0.5 seconds, and ″ On-Battery ″ is displayed in LCD for this period. Other states can be displayed with the ▲ button/▼ button. UPS returns to an On-Line mode or On-HE when the utility input power returns.
Blinking BATTERY LED of UPS shows the low-battery warning. In addition, the shutdown warning of 0.5 seconds blinking is generated when advancing. UPS shuts down after it warns of the shutdown, and the output is stopped.

- If overload/internal abnormality occurs, the output is cut.
- In the case of the deterioration battery, UPS might shut down by not the electrical discharge shutdown but the alarm. In this case, Autostart cann't be done after UTL return.

### 4-1-4 On-Bypass

When the overload is generated or the internal abnormality occurs, UPS becomes On-Bypass. The alarm sounding and MODE LED blink every 2 seconds. Other states can be displayed with the ▲ button/▼ button.

・UPS returns by the autoreturn function when the overload is released. However, when the input deviates from the range of the zero transfer, the return operation is not done.
・When the overload of 110% or more continues, the output is cut.
・When the "SET" button is pushed after transfering to the by-pass by the event, the mode and abnormality when abnormality occurs are displayed. UPS returns to the normal display when leaving it.
・When the phase match cannot be done even within bypass available, the UPS doesn't change to the Online operation. And On-Bypass is kept.

### 4-1-5 Standby

The state that UPS has stopped outputting is indicated. OPERATION LED blinks for this period. Other states can be displayed with the ▲ button/▼ button. ″Standby″, "HE Standby", "Bypass Standby", "Battery Standby" is displayed in LCD for this period.

・Battery standby effects only schedule by communication from management software.
・Bypass standby effects only manual bypass setting.

### 4-1-6 Converter OFF

Converter OFF indicates the state to have turned off AC/DC, DC/AC, DC/DC of UPS. OPERATION LED is unlighting, and MODE LED blink every 2 seconds for this period. It changes in this state by alarm generation or an input abnormal. Other states can be displayed with ▲ button/▼ button. ″Converter OFF″ is displayed in LCD for this period.

・When the "SET" button is pushed after transfering to the converter OFF by the internal abnormality, the mode and abnormality when abnormality occurs are displayed. UPS returns to the normal display when leaving it.

### 4-1-7 Powerdown

Powerdown indicates the state to have turned off AC/DC, DC/AC, DC/DC of UPS. MODE LED blink for this period. ″Power Down″ is displayed in LCD for this period. The state cannot be transferred from Power-Down. There is only reset by detaching the plug. Other states can be displayed with ▲ button/▼ button.

### 4-1-8 Charging

BATTERY LED blink every 0.5 seconds for fast charging.

## 4-2 Start・Stop

### 4-2-1 Start

Push the ON button after connecting UPS with the utility power .

- If UPS shuts down by battery cut-off, UPS automatically becomes an output status by utility return. (This is possible to change by item of Chapter6)
- Even if the ON button of UPS is pushed with no Utility Power, UPS can not start. (This is possible to change by item of Chapter6)
- UPS starts by inputting utility again even if UPS unplugs by the alarm state. (This is possible to change by item of Chapter6)

### 4-2-2 Stop

When the OFF button is pressed for 3 seconds or more, the output of UPS is turned off. Afterwards, UPS will shut down, and stop completely when the input power plug of UPS is pulled out.

## 4-3 Self-test

When you keep pushing the ESC button for 3 seconds, the self test of the battery is begun. The self test is effective at each mode of a standby, HE standby, On-Line, and On-HE. Moreover, it is necessary to have done the charge for 12 hours or more. The test is interrupted, and the alarm is output, when not agreeing with the condition, or when events of the power failure and the alarm and etc occurred. BATTERY LED blinks while testing. BATTERY LED blinks every 2 seconds. if the battery is judged to be longevity after the test ends. However, The test is interrupted, and the alarm isn't output, when not agreeing with the condition, or when events of the power failure and the alarm and etc occurred, in the automatic battery test.

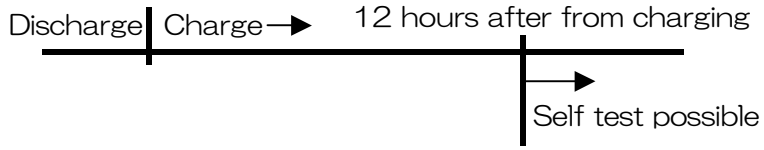



Figure 4-2 Time Table

- After the battery is charged, the self test is done. Moreover, when UPS is a On-Battery, it is not executed.
- When the self test cannot be executed, the alarm is output. However, the alarm isn't output, when the automatic testing cannot be executed.
- When the utility failure occurs while testing self, it is canceled.
- If Load change occur in selftest, self test might be stopped.
- When the breakdown is found in UPS, the self test is not done.

# Chapter 5
# Display

## 5-1 LED display

The LED display is as follows.

Table 5-1 LED Display

| Status LED | | State | Note |
|---|---|---|---|
| OPERATION | MODE | | |
| ☀ | ● | On-Line standby | Normal Mode |
| ● | ● | On-Line | |
| ☀ | ○ | On-HE standby | High Effeciency (HE) Mode |
| ● | ○ | On-HE (High Effeciency) | |
| ● | 0.5s ☀ | On-Battery | Byzzer : 2s interval |
| ☀ | 2s ☀ | Bypass Standby | |
| ● | 2s ☀ | On-Bypass | |
| ○ | 2s ☀ | Converter OFF | |
| ☀ | ☀ | Power-Down | |

| Status LED | | State | Note |
|---|---|---|---|
| BATTERY | ALARM | | |
| ● | - | Battery Disconnect | |
| ☀ | - | Battery testing | Standby On-Line HE Standby On-HE |
| 2s ☀ | - | Service Battery | |
| ☀ | - | Low Battery | On-Battery Buzzer: Synchronized |
| 0.5s ☀ | - | Just befire Low Battery shut Down | |
| 0.5s ☀ | - | Fast Charging | |
| - | ● | Allarm | |
| - | ☀ | Bypass not Available | |
| - | 2s ☀ | Input Abnormal | |

☀ : 1sBlink(Blink) ● : Lighting
2s ☀ : 2sBlink ○ :UnLighting
0.5s ☀ : 0.5sBlink

## 5-2 Normal LCD display

The normal display of LCD is following. The state is displayed in the upper row and the input power is displayed in the the lower.

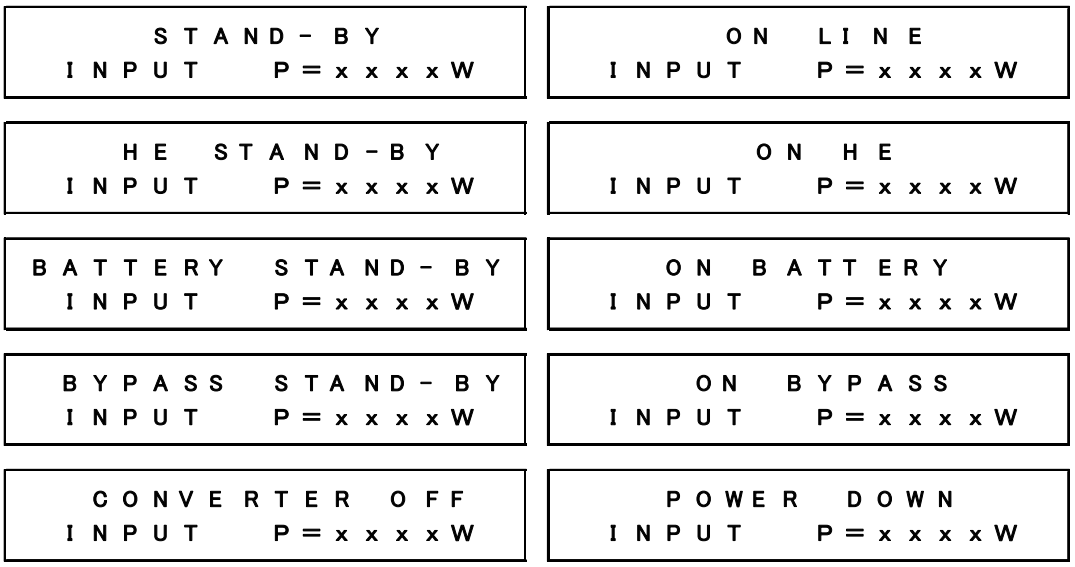



Figure 5-1 Normal display

## 5-3 Other LCD display

When ▲ button /▼ button is pushed in normal display, other states are displayed. The content of the display in the standby as follows. A similar display is done at other states. If ▲ button /▼ button is not pushed, the display return to usual display.

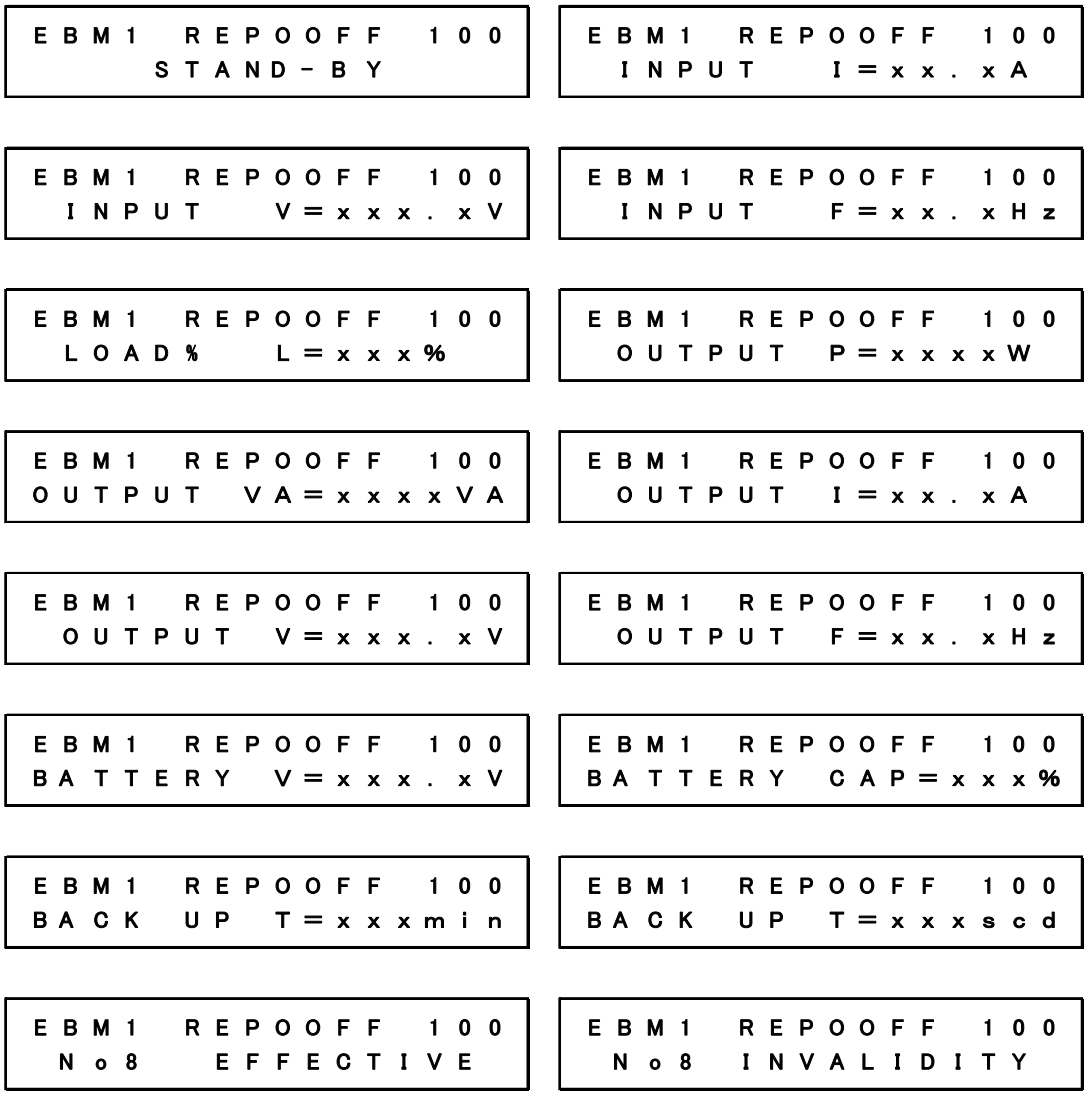



Figure 5-2 Other display

Minute/Second display in BACK UP T transfers by backup time.
Refer the BACK UP T as a rough standard.
No8 Effective/Invalidity is displayed only in powerdown.
No8 indicates 6-1-8 .

The LCD upper row of other displays displays the content set by 6-1-1 , 6-1-2 , 6-1-5 .

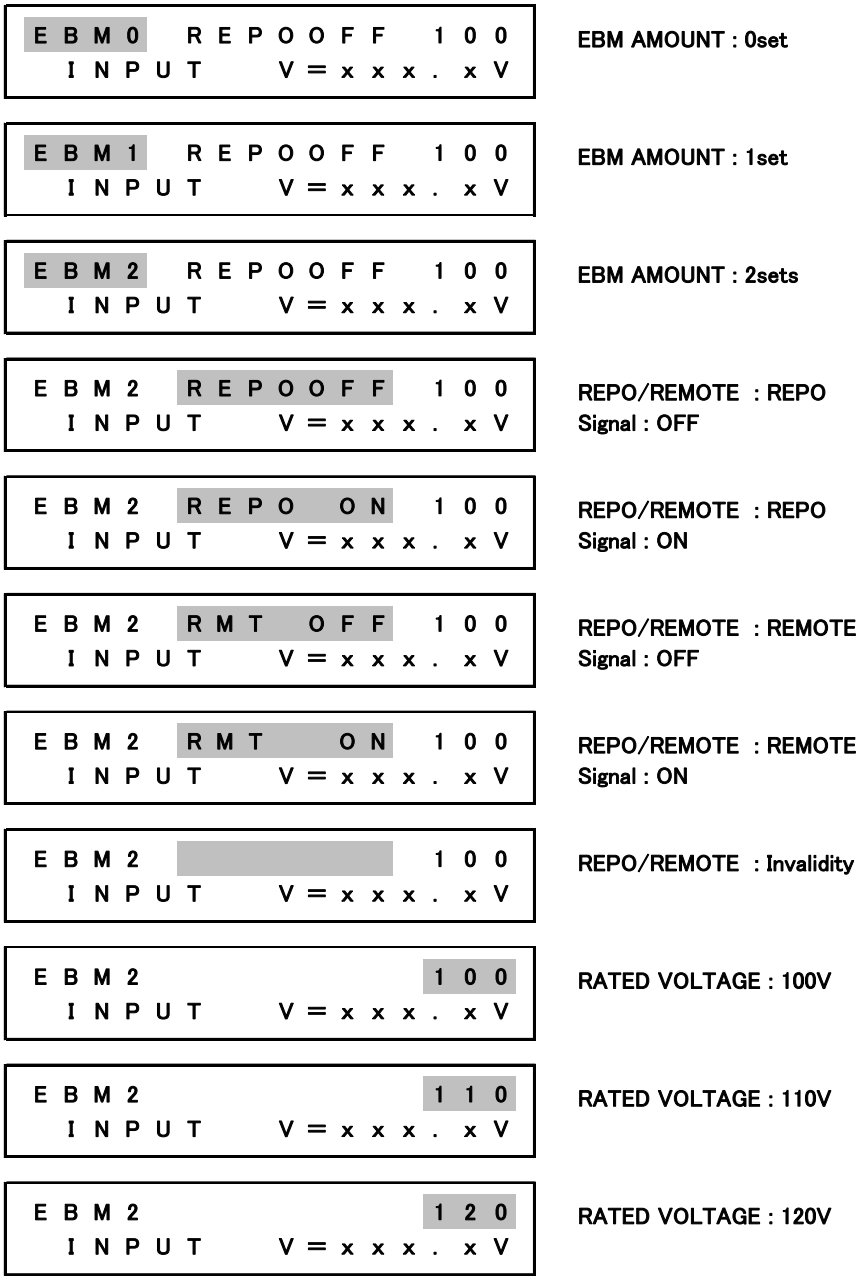



Figure 5-3 Setting display

# Chapter 6

## Setting

The following setting can be changed in any mode with an operation panel of UPS.

| No | Item | Default |
|---|---|---|
| ① | External Battery module(EBM) set | 0set |
| ② | REPO / REMOTE | Invalidity |
| ③ | UTL failure signal delay | 0 second |
| ④ | Output delay | 0 second |
| ⑤ | Rated Voltage | 100V |
| ⑥ | Mode select | Normal |
| ⑦ | Synchronized range | ±3Hz |
| ⑧ | AUTOSTART after shutdown with alarm | Effective |
| ⑨ | Polarity | Active close |
| ⑩ | Buzzer stop | No active |
| ⑪ | AUTOSTART | Effective |
| ⑫ | Auto battery test | Effective |
| ⑬ | Remote shut down signal term | 4.5seconds |
| ⑭ | Manual Bypass | Invalidity |
| ⑮ | Voltage range of HE mode | ±5% |
| ⑯ | Frequency range of HE mode | ±1Hz |
| ⑰ | Language | Japanese |
| ⑱ | DC start | Invalidity |

- When the power cable is pulled out no battery, content of setting change is not preserved.
- Only ⑥ can be changed from the network agent card by the communication. This change becomes a compulsion change.

## 6-1 Panel operating

The setting method in the operation panel is shown. The item is displayed in LCD. The item and the content can be changed by using the operation button (ESC button/SET button /▲ button /▼ button).

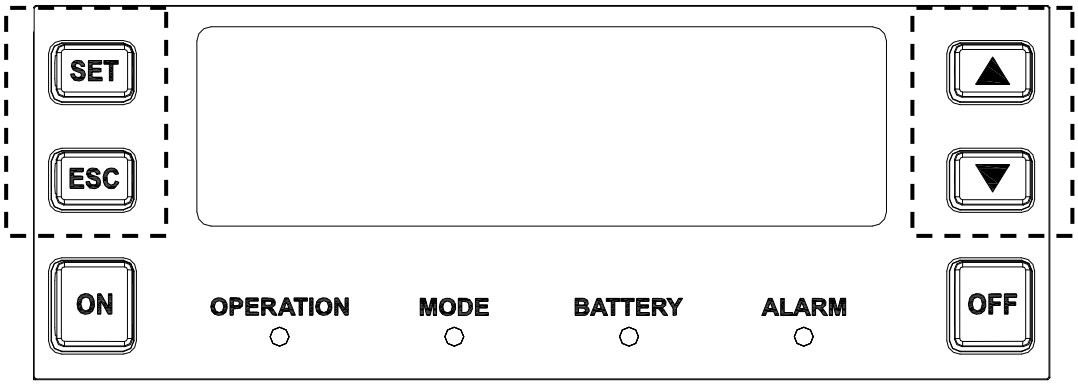



Figure 6-1 Panel

Figure 6-1 shows the panel used when setting of ①～⑲, and explains the operation as follows.

・The alarm generation or the mode changes for this period, and this state is ended. The content of the setting change is not reflected.

1. Push the SET button for 3 seconds. ″Configuration″ is displayed in LCD. At this time, the item of ① on the former page is displayed.
2. ▲ button/▼ button is pushed, and it moves to the item that changes.
3. Push the SET button when you move to the item that changes. The content of the item is displayed.
4. ▲ button/▼ button is pushed, and it moves to the content that changes.
5. It is changed to the content to which it wants to change the content of the item that changes by pushing the SET button. And, it becomes the next item display of the item that changes. Push the ESC button when you want to return to the item that changes.
6. This state can be ended by always preserving the content of the change when the ESC button is pushed for 3 seconds.

・This state ends automatically when a no operation passes 2 minutes. The content of the change is not reflected.
・When the event is generated on the way, this state is discontinued. At this time, the content of the change is not reflected.

### 6-1-1 EBM set

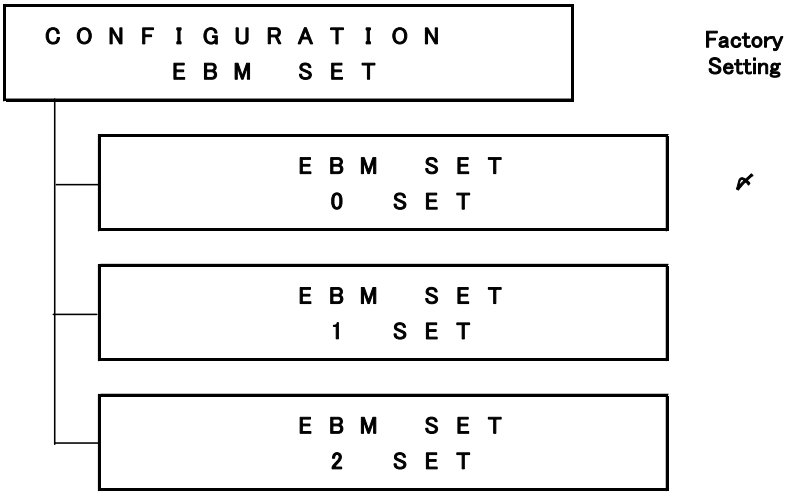



Figure 6-2 EBM set

It changes into the "EBM set" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "EBM set" item.

- Set this when you increase EBM. The deterioration of the battery is fast when using UPS without setting this.
- Do not change initialization with EBM not increased.

### 6-1-2 REPO/REMOTE

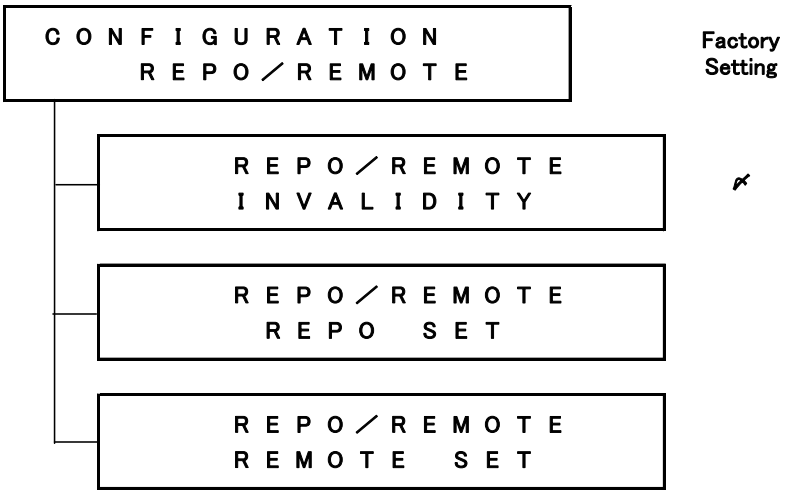



Figure 6-3 REPO/REMOTE

It changes into the "REPO/REMOTE" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "REPO/REMOTE" item.

- This setting is a function of installing in the dry contact card of the option. Do not change the default, when the card uninstalling. The button might become invalid, and the output might be cut.
- This terminal becomes iREMOTE ON/OFF when changing to the REMOTE setting.
- ON button/OFF button of the panel becomes invalid when changing to the REMOTE setting.
- Make it to the remote setting after it changes to the setting that the output is turned off at 6-1-9 .

## 6-1-3 UTL failure signal delay

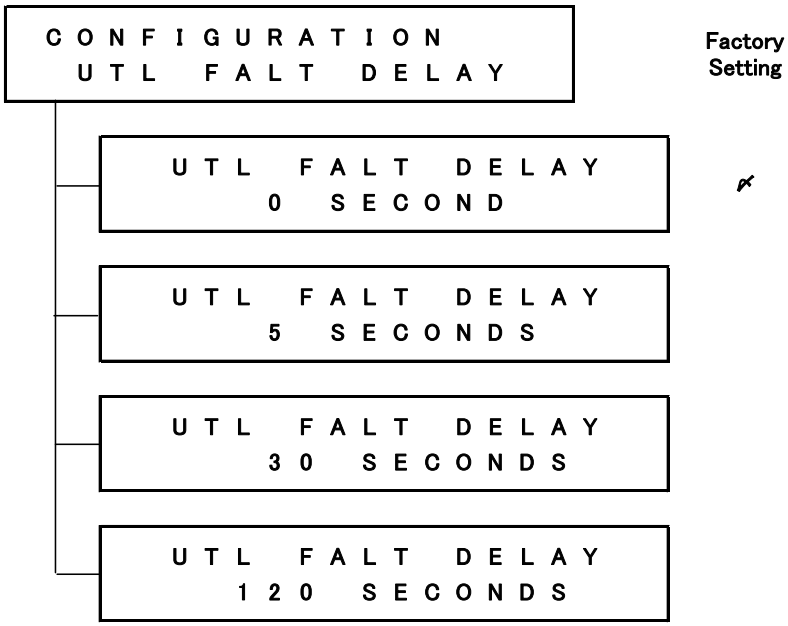



Figure 6-4 UTL failure signal delay

It changes into the "UTL failure signal delay" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "UTL failure signal delay" item.

- This setting is a function of installing in the dry contact card of the option.
- This setting is used for the delay of the input abnormal signal (UTL failure signal) of 9-2-6 .

### 6-1-4 Output delay

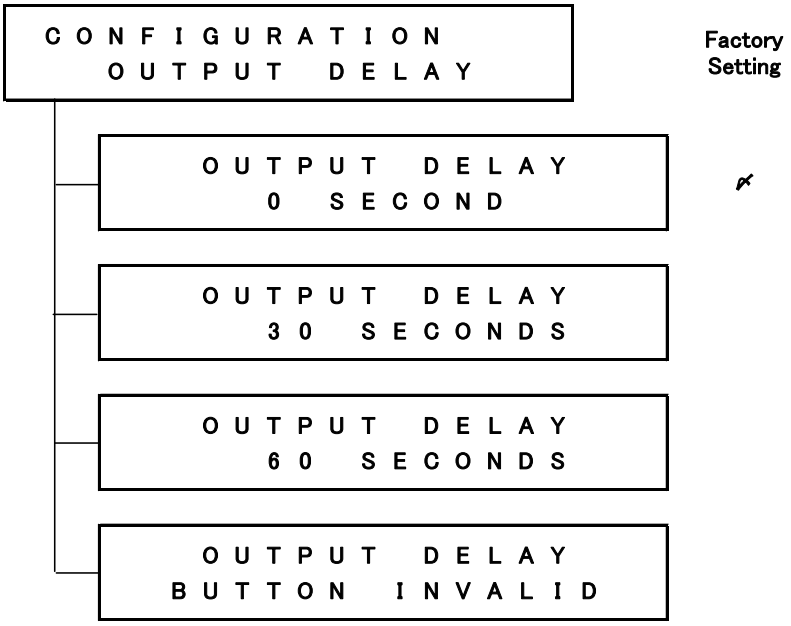



Figure 6-5 Output delay

It changes into the "Output delay" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Output delay" item.

・This setting is effective against the OFF button operation when On-Battery.

### 6-1-5 Rated Voltage

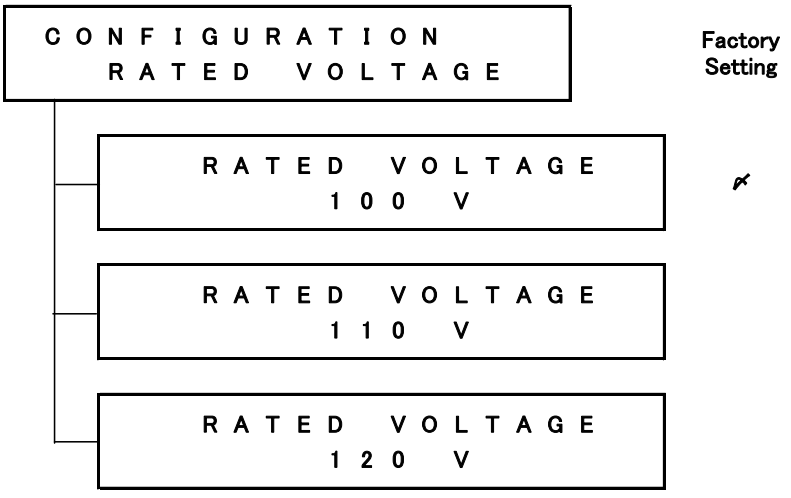



Figure 6-6 Rated Voltage

It changes into the "Rated Voltage" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Rated Voltage" item.

### 6-1-6 Mode select

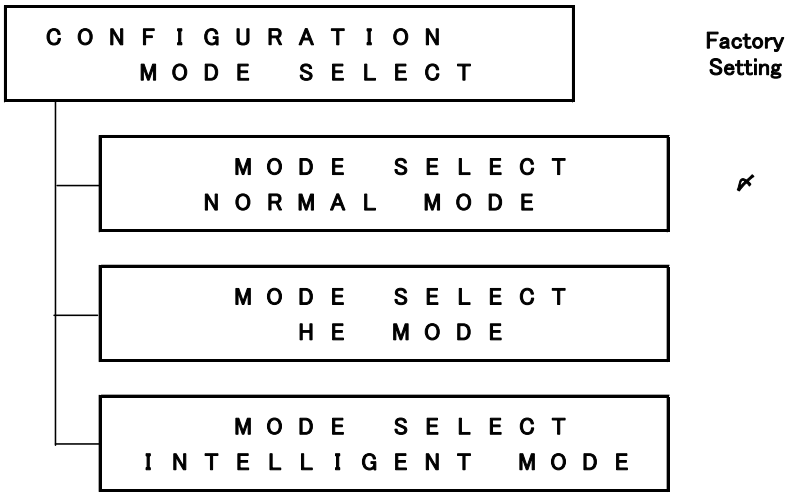



Figure 6-7 Mode select

It changes into the "Mode select" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Mode select" item.

---

- Normal mode is fixation in the mode of the On-Line.
- HE mode is fixation in the mode of the On-HE.
- Intelligent mode ijudges a utility input and does the transfering of On-Line ⇔ On-HE.

  UPS transfers from On-Line to On-HE by the automatic operation. The change from On-HE to On-Line, when the input deviates from the HE input range, and when the input is bypass available transfers by automatic operation. Moreover, when there is a mode transition by the communication, it gives priority to the communication, don't automatic operation. However, when the UPS changes into the OnBattery by the condition of the AC input, the change operation is not done.

  When the communication is not possible, or the communication is invalided , or newly communication is connected, or UPS shuts down, after the mode is changed by the communication, UPS change to automatic operation.

---

## 6-1-7 Synchronized range

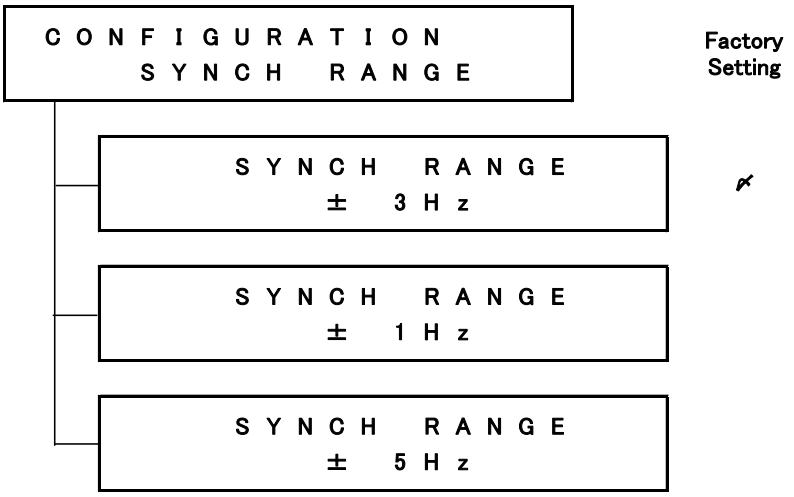



Figure 6-8 Synchronized range

It changes into the "Synchronized range" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Synchronized range" item.

- This setting sets the synchronized range in On-Line. The INV output outputs the frequency within this range.
- The INV output outputs by the asynchronization at a utility input outside of this range.
- The output is cut when there are an internal abnormality and an overload at the asynchronization.

## 6-1-8 AUTOSTART after shutdown with alarm

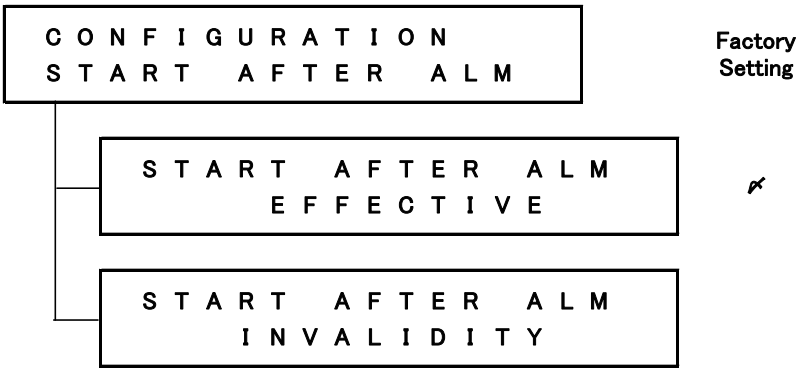



Figure 6-9 AUTOSTART after shutdown with alarm

It changes into the "AUTOSTART after shutdown with alarm" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "AUTOSTART after shutdown with alarm" item.

- This setting decides whether to start when re-start after shutting down in the alarm state.
- If UPS shut down with alarm, the mode transfers to the Powerdown in case of Invalidity.
- When invalidity, ON button recovery is Invalidity.

## 6-1-9 Polarity

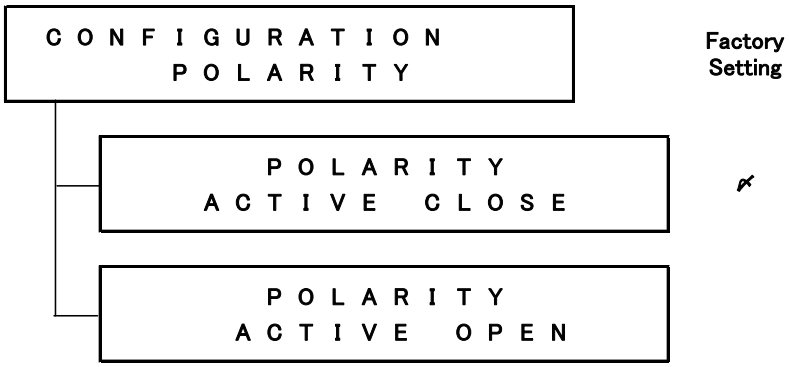



Figure 6-10 Polarity

It changes into the "Polarity" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Polarity" item.

- This setting is a function of installing in the dry contact card of the option.
- An active close becomes REPO ON and REMOTE OFF, When the contact close,
- An active open becomes REPO ON and REMOTE OFF, When the contact open,

## 6-1-10 Buzzer stop

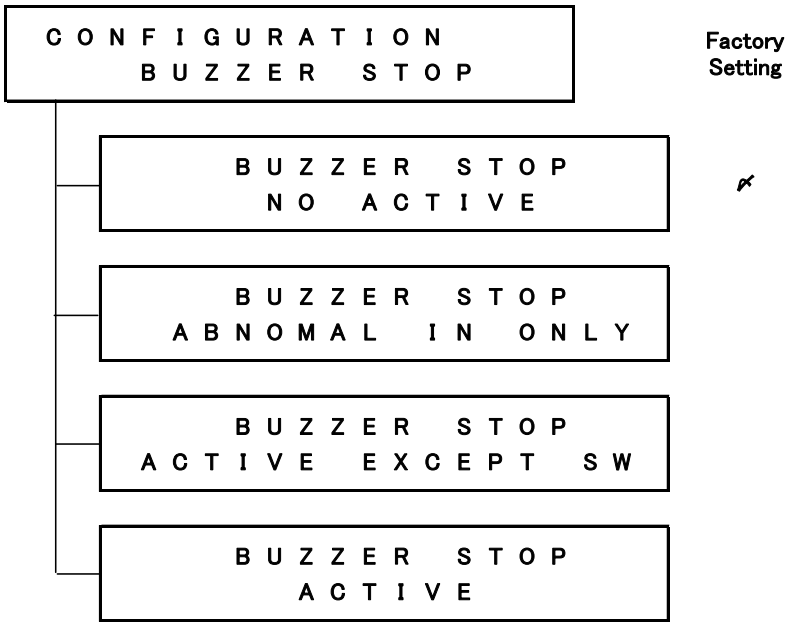



Figure 6-11 Buzzer stop

It changes into the "Buzzer stop" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Buzzer stop" item.

## 6-1-11 AUTOSTART

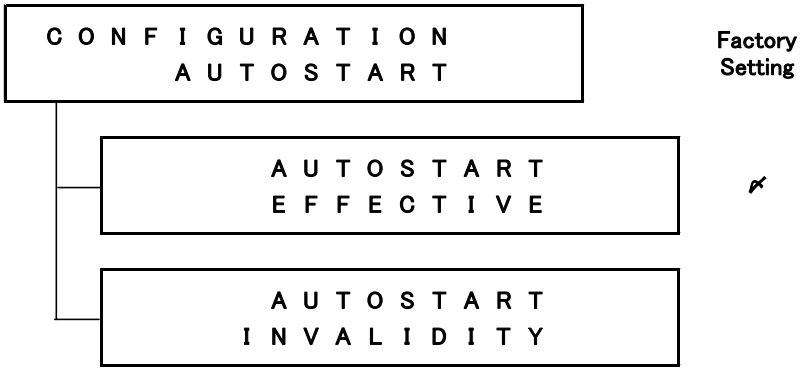



Figure 6-12 AUTOSTART

It changes into the "AUTOSTART" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that

changes and it moves to the next item display. Push the ESC button when it returns to the “AUTOSTART” item.

- This setting is function of reboot by utility return.
- The output is automatically output by Utility return after shutdown by low battery when it is effective.
- The output is not automatically output by Utility return after shutdown by low battery when it is invalidity.

### 6-1-12 Auto battery test

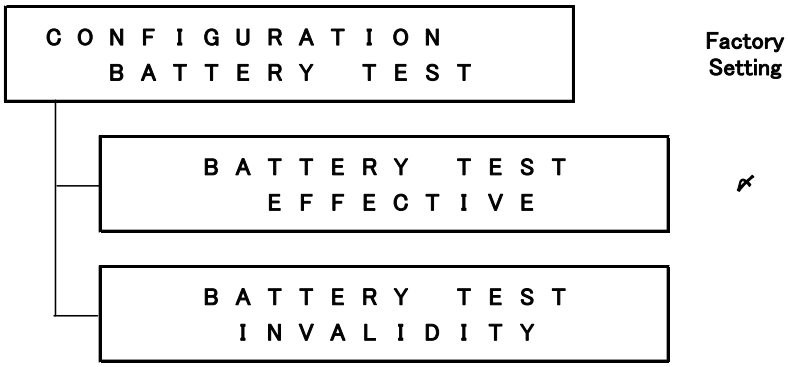



Figure 6-13 Auto battery test

It changes into the “Auto battery test” display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the “Auto battery test” item.

- The battery is automatically tested every the 30th in case of effective.

### 6-1-13 Remote shut down signal term

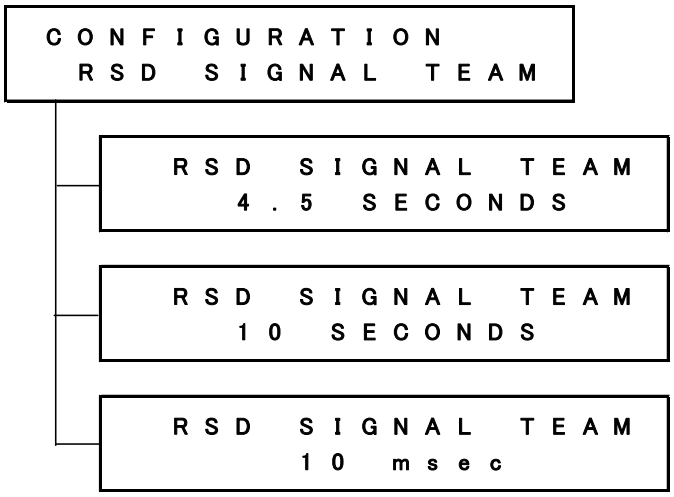



Figure 6-14 Remote shut down signal term

It changes into the "Remote shut down signal term" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Remote shut down signal term" item.

・This setting is a function of installing in the dry contact card of the option.
・UPS shuts down after confirming the set time.

### 6-1-14 Manual Bypass

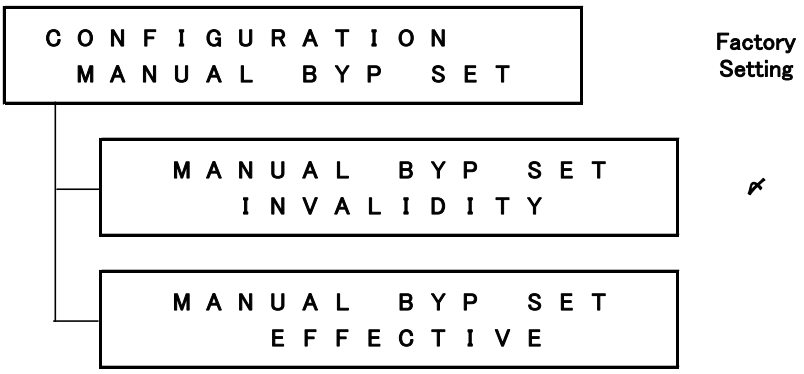



Figure 6-15 Manual Bypass

It changes into the "Manual Bypass" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when

it returns to the “Manual Bypass” item.

・When a utility input deviates from the Bypass Available, the transition of On-Line -> On-Bypass have cutting time of output of about 10ms .
・On manual Bypass, when this setting is invalided, if a utility input deviates from the Bypass Available, there is no transition of On-Bypass -> On-Line.

## 6-1-15 Voltage range of HE mode

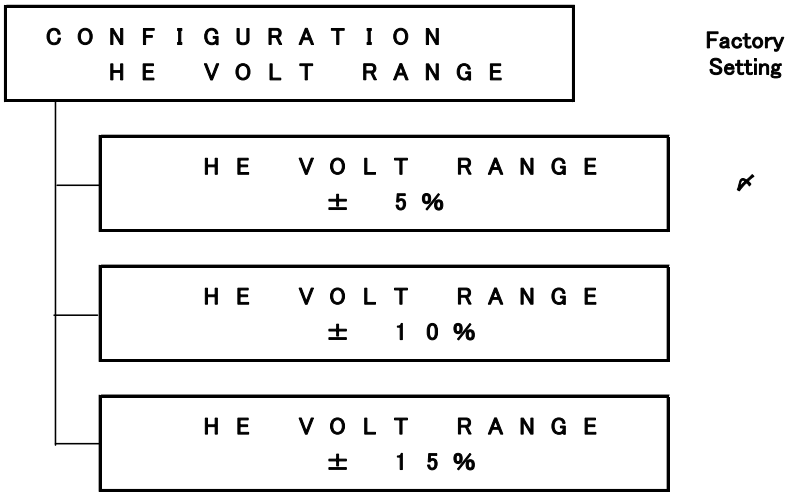



Figure 6-16 Voltage range of HE mode

It changes into the “Voltage range of HE mode” display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the “Voltage range of HE mode” item.

・When a utility input deviates from this setting range
HE mode : UPS transfer to On-Battery with output cut of moment.
Intelligent mode : UPS transfers to On-Battery with output cut of moment. And if possible On-Line , UPS transfers to On-Line.

### 6-1-16 Frequency range of HE mode

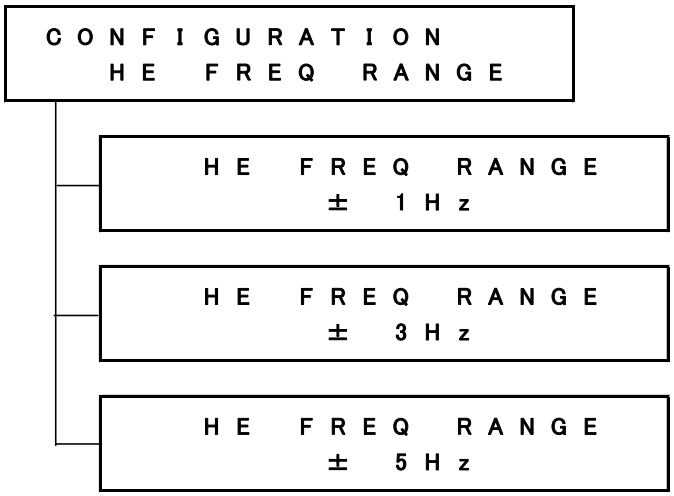



Figure 6-17 Frequency range of HE mode

It changes into the "Frequency range of HE mode" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the "Frequency range of HE mode" item.

・When a utility input deviates from this setting range
HE mode : UPS transfer to On-Battery with output cut of moment.
Intelligent mode : UPS transfers to On-Battery with output cut of moment.
And if possible On-Line , UPS transfers to On-Line.

### 6-1-17 Language

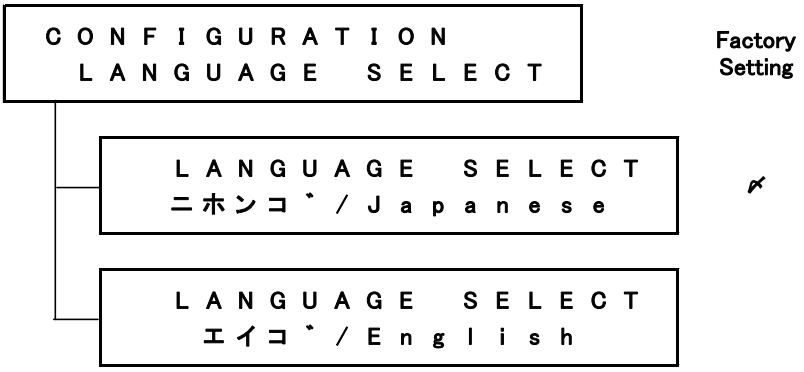



Figure 6-18 Language

It changes into the "Language" display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is

changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the “Language” item.

### 6-1-18 DC start

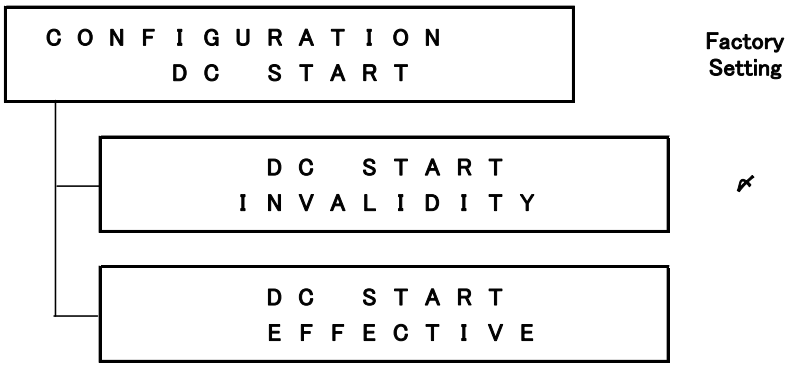



Figure 6-19 DC start

It changes into the “DC start” display in pushing the SET button. Push、▲ button/▼ button when you change the content display. The content is changed when the SET button is pushed by the content that changes and it moves to the next item display. Push the ESC button when it returns to the “DC start” item.

・In case of effective, UPS transfers to On-Battery in pressing ON button for three seconds or more even if there is no utility input.

# Chapter 7
# Maintenance

## 7-1 Care

The best approach is to keep the area in UPS surroundings in a clean state of no dust. Clean the outside of the UPS when air is very dusty. The longevity of the battery is influenced according to the temperature. Maintain 25℃ or less to the ambient temperature of UPS.

• Remove dust when dust adheres to the intake vent of the UPS front panel with UPS stopped. There is a possibility of shortening the longevity of UPS and abnormal heat by stopped up of the intake vent.

## 7-2 Storing

UPS is charged every 6 months by plug-in when UPS is kept for a long term. Use it after charging with UPS for 24 hours after it keeps it a long term.

## 7-3 Battery exchange time

When BATTERY LED of UPS blinks every two seconds, it is time of the battery exchange.
It is necessary to exchange the batteries, and Refer to the paragraph of ″Battery exchange″. (The expectation time of the battery exchange is displayed on the rear of UPS. )
There is longevity in the battery. The longevity of the battery changes greatly depending on the use temperature condition and the electrical discharge time / frequency. The battery shelf life to which it is expected by the temperature is as follows. Exchange it ahead of time.

| Tempurature | Expected battery shelf life | Recommended exchange time |
|---|---|---|
| 25℃ | 3.5~5 years | 3~4.5 years |
| 30℃ | 2.5~3.5 years | 2~3 years |
| 40℃ | 1.3~1. years | 0.7~1.3 years |

• It is not possible to back up when power failure when used with the battery shelf life exceeded, and it causes an unexpected trouble to be caused additionally. Exchange it ahead of time.

## 7-4 Battery exchange

**Caution**

・A Battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working 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 the charging source prior to connecting or disconnecting 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 hock 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).

### 7-4-1 Internal battery exchange

**Attention**

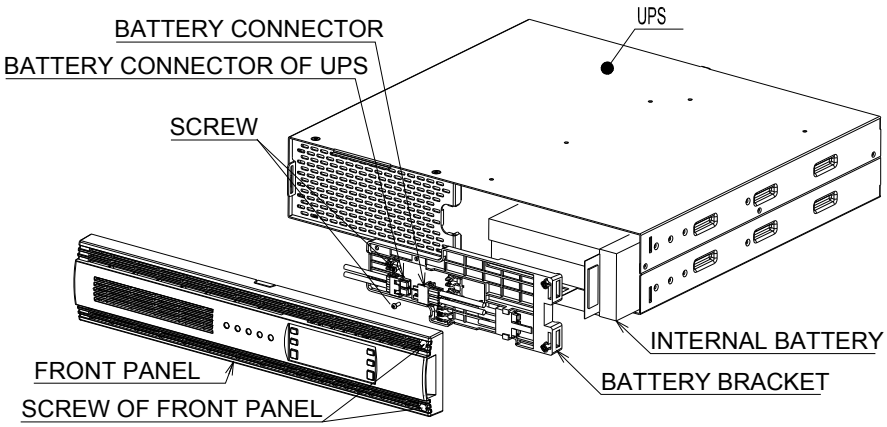
・Do the exchanging work by the person who has experience and knowledge of electric work. There is possible of the breakdown and the electric shock when doing by the methods other than the following procedures.

Exchange internal battery according to the following procedures.

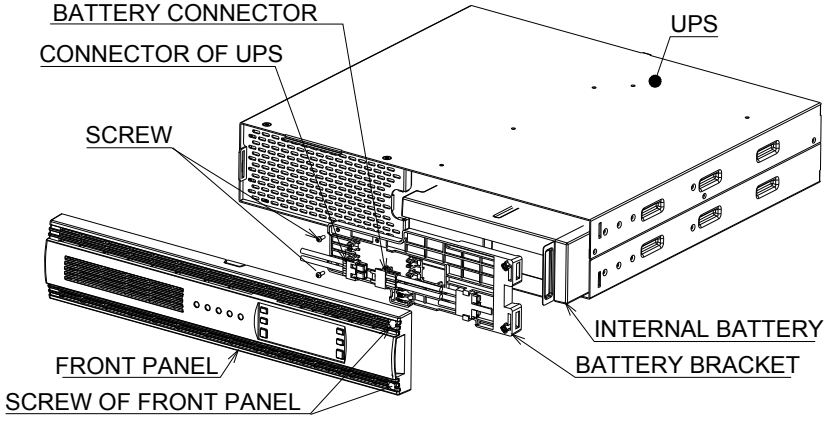
1. Do the internal battery exchange by the modes other than the On-Battery.
2. Remove the front panel.
3. Remove the battery connector mutually.
4. Take the screw of the battery bracket in front of the battery, and detach the battery bracket.
5. Take out a built-in battery, and insert a new battery.
6. Install the battery bracket in UPS.
7. Connect the battery connector (red-red and black-blacks) mutually.
8. Install the front panel.
9. Check that battery LED does not shine after pushing the ESC button for 3 seconds.

Rack&Tower Type

1kVA




1.1kVA/1.5kVA




2.4kVA/3kVA

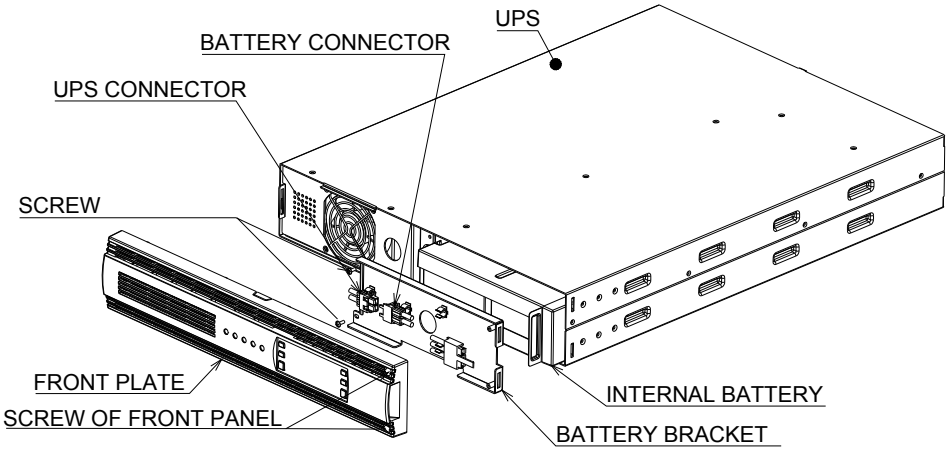



Figure 7-1 Rack & Tower type internal battery exchange

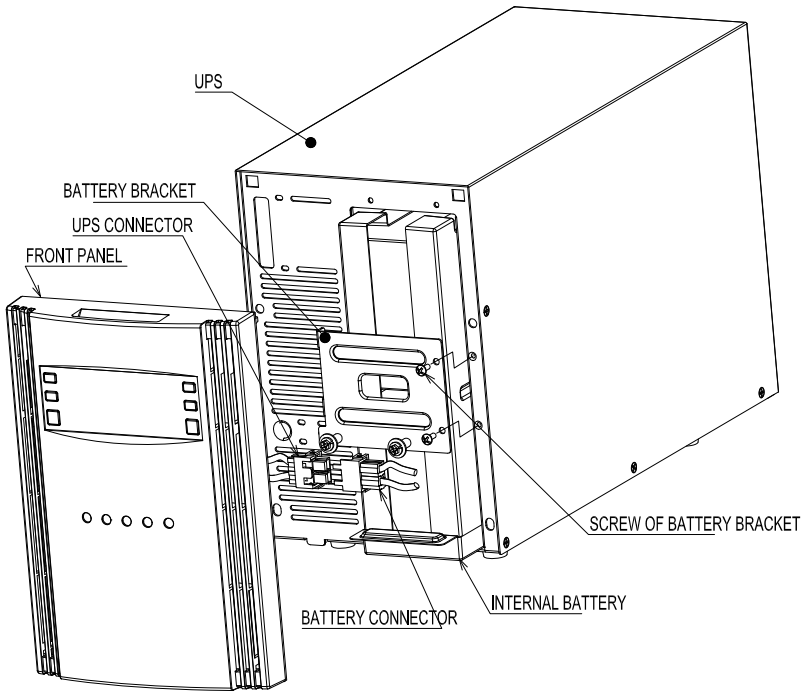



Figure 7-2 Tower tyoe internal battery exchange

- Insert battery cable surely. When insertion is loose, it causes the breakdown.
- Do not leave UPS with the battery removed.
- The battery is a heavy load. Be careful when you insert it.

## 7-4-2 Rack & Tower EBM exchange

**Attention**

- Do the clearing work by the person who has experience and knowledge of electric work. There is possible of the breakdown and the electric shock when doing by the methods other than the following procedures.

Exchange EBM according to the following procedure.

1. Do the EBM exchange by the mode other than the On-Battery.
2. The breaker on the rear of EBM is turned off.
3. The front panel of EBM is removed.
4. The connector of EBM connected with the cable from UPS/EBM is removed.
5. EBM is detached.
6. New EBM is fixed to the rack. The cable from UPS/EBM removed in front of new EBM ahead is connected with the connector of new EBM.
7. The front panel of EBM is installed, and the breaker on the rear is turned on.
8. When EBM is added, it is more similar. Above-mentioned the cable from UPS becomes a cable from EBM.

The exchange of EBM becomes an exchange of not the internal battery exchange but EBM units

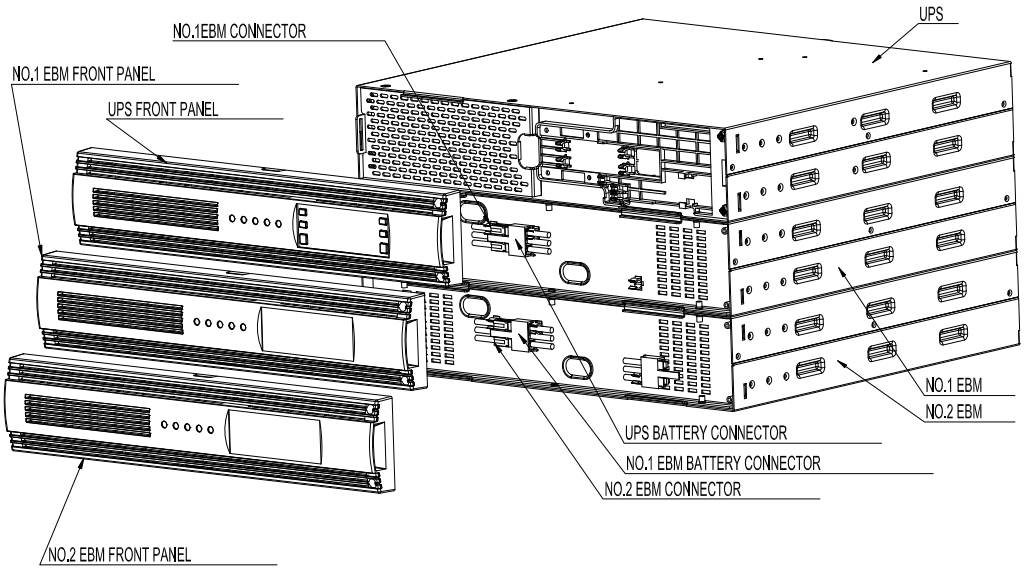



Figure 7-3 Rack & Tower EBM exchange

- When EBM is exchanged or EBM is added, already exchange all EBM and an internal battery under use. When a new battery and an old battery are combined and used, The longevity of the battery is influenced by an old battery, and the expected life of a new battery shortens.
- Make the UPS side a full charge about the exchange of EBM.

**Caution**

- Do not short-circuited, and do not take the battery apart. There is a possibility of the electric shock, and injuring the burn etc.
- When the electrobath of the battery touches the skin and eyes, it is dangerous. Flush it when having touched.

## 7-4-3 Tower type EBM exchange

**Attention**

・Do the clearing work by the person who has experience and knowledge of electric work. There is possible of the breakdown and the electric shock when doing by the methods other than the following procedures.

Exchange EBM according to the following procedure.

1. Do the EBM exchange in the mode other than the On-Battery.
2. The breaker on the rear of EBM is turned off.
3. The battery cable on the rear of EBM is removed.
4. EBM is detached.
5. New EBM is fixed. The cable from UPS/EBM removed in rear of new EBM is connected with the connector of new EBM.
6. The breaker on the rear of EBM is turned on.
7. When EBM is added, it is more similar. Above-mentioned the cable from UPS becomes a cable from EBM.

The exchange of EBM becomes an exchange of not the internal battery exchange but EBM units.

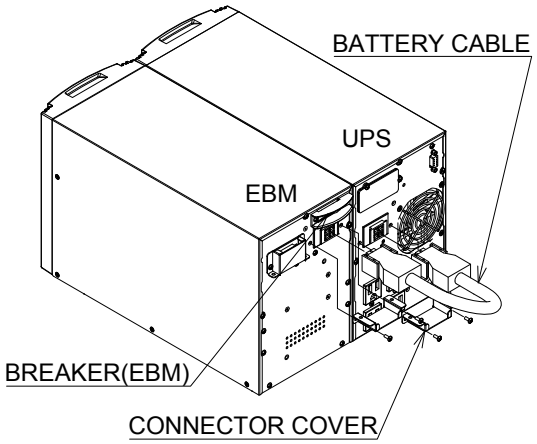



Figure 7-4 Tower type EBM exchange

・When EBM is exchanged or EBM is added, already exchange all EBM and an internal battery under use. When a new battery and an old battery are combined and used, The longevity of the battery is influenced by an old battery, and the expected life of a new battery shortens.
・Make the UPS side a full charge about the exchange of EBM.

**Caution**

・Do not short-circuited, and do not take the battery apart. There is a possibility of the electric shock, and injuring the burn etc.
・When the electrobath of the battery touches the skin and eyes, it is dangerous. Flush it when having touched.

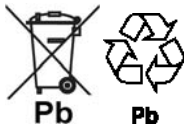
## 7-5 Test of new battery

Do the battery test when you exchange the battery. Check the connection of the battery when BATTERY LED of UPS blinks every two seconds after executing the test. Refer to the troubleshooting guide when the problem continues.

- After the electrical discharge stops, when exchanging the battery with a new full charge, the battery remainder capacity on management soft will be correctly displayed after six hours. There is no influence in operation.
- The Battery test is done in only Standby, Online, HE Standby, OnHE. Refer the section 4-3.

## 7-6 Recycling

Read "**Attention for maintenance**" about a correct abandonment method of a used battery.




**Attention**

- Do not discard the batteries in the trash. This product contains sealed lead-cid bateries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

**Attention**

- Do not discard the waste electrical or electronic equipment (WEEE) in the trash. For proper disposal and more information, contact your local recycling/reuse or hazardous waste center.

## 7-7 Fuse exchange

**Attention**

- Do the clearing work after confirming LED of UPS is not lighting with the input cable pulled out. There is a possibility of the breakdown and the electric shock when doing by the methods other than the following procedures.

Exchange fuses in the fuse box on the rear of UPS according to the following procedures.

1. Remove the input cable of UPS from the power supply.
2. Confirm LED of UPS has been turned off.
3. Remove the lid of the fuse box on the back of UPS, and take out an inside fuse.
4. Put a new fuse in the fuse box.
5. Turn and tighten the lid in the fuse box.
6. Connect the input cable of UPS with the power supply.
7. Confirm that UPS starts as usual.

# Chapter 8
## Communication

The communication port enables what Device of different types, and a variety of network environments communicates with UPS.

UPS provides with the insulation RS232C by the standard. To establish the communication between UPS and the computer, it connects it with the communication port of UPS and RS232C communication port of the computer by using an attached communications cable. It is possible to cooperate with the Power management Software(Power-SOL), the Power Management software can exchange UPS and data by connecting the communications cable. When abnormality occurs in the utility power, the software demands the shutdown to OS, and it shuts down the equipment in regular order.

The pin layout of the communication port is shown in Figure 8-1, and it explains the pin assignment inTable 8-1.

※ Inch screw use

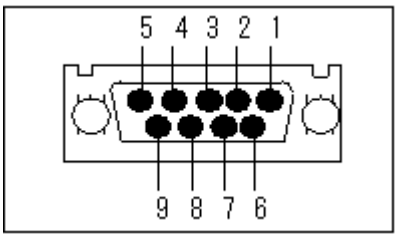



Figure 8-1 Pin layout

Table 8-1 Pin assignment

| Pin No | Signal | Function | Out / In |
|---|---|---|---|
| 1 | - | (No used) | - |
| 2 | TxD | Transmission signal | OUT |
| 3 | RxD | Reception signal | IN |
| 4 | - | (No used) | - |
| 5 | - | GND | - |
| 6 | - | (No used) | - |
| 7 | - | (No used) | - |
| 8 | - | (No used) | - |
| 9 | - | (No used) | - |

# Chapter 9

## Optional card

The following card is prepared in the UPS with optional.

- Network Agent card (Option)
  : Cooperation with Power Management Software (Power-SOL). It is a card equipped with SNMP agent's function.
- Dry Contact card (Option)
  : It is a card equipped with 4 Relay Outputs(Input abnormal, Low battery, UPS alarm, On-Bypass). It provides with REPO (REMOTE ON/OFF) function and the remote shutdown function

### 9-1 Network Agent Card

Externals are shown in Figure 9-1.

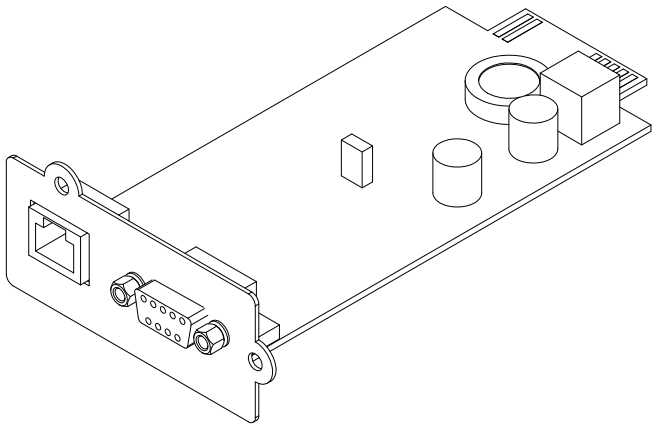


Figure 9-1 Network Agent Card

(1) Network port

The card communicates with the administrative terminal where power supply management software Power-SOL was installed by way of the network by using this communication port.

The transmission rate corresponds to 10Mbps/100Mbps.

The hot-swap of the card is possible.

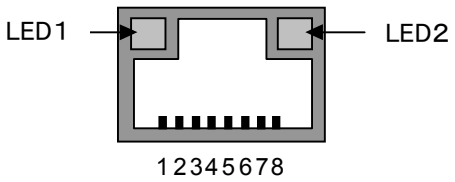



Figure 9-2 Network port

The pin layout and externals of the port and position of LED that shows communication are shown in Figure 9-2.

LED1: The state of 10BASE-T /100BASE-TX is shown.

LED2: The communication with UPS is shown.

(2) Pin assignment of RS232C

The pin assignment of RS232C (D-sub9P connector) is as follows.

Table 9-1 RS232C pin assignment

| Pin | Singnal ※1) | Direction | Note |
|---|---|---|---|
| 1 | Low Battery | Reception | 5V output |
| 2 | RxD | Reception | Reception signal |
| 3 | TxD | Transmission | Transmission signal |
| 4 | DTR | Transmission | DTR signal output |
| 5 | GND | —— | GND |
| 6 | Alarm | Reception | 5V output |
| 7 | RTS | Transmission | RTS signal output |
| 8 | UTL failure | Reception | 5V output |
| 9 | RI | Reception | Wakeup on MODEM |

※1) The network agent card is displayed for the DCE by the signal name that sees from DTE (host terminal). The cable used is straight.

The RS232C port externals and the pin layout (D-sub9P connector) is shown in Figure 9-3.
※ Inch screw use

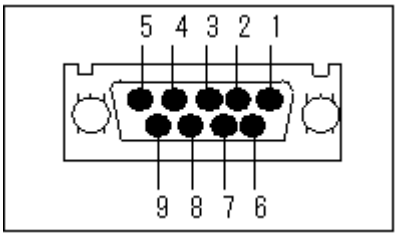



Figure 9-3 RS232C port

(3) Reset switch

This switch resets the network agent card.

## 9-2 Dry Contact Card

Externals are shown in Figure 9-4.

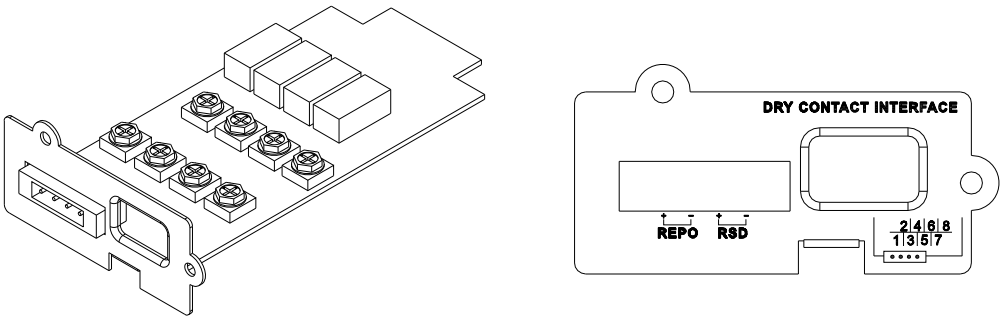



Figure 9-4 Dry Contact Card

The UPS offers four relay (Input abnormal, Low battery, UPS alarm, On-Bypass). The signal can output the open or the close. Moreover, it provides with the terminal of REPO (REMOTE ON/OFF) and a Remote Shutdown.

Table 9-2 Terminal on PCB (M4)

| No | Terminal | Signal | I/O | Jumper | | Relay | Note |
|---|---|---|---|---|---|---|---|
| 1 | P1-P2 | Input abnormal | Out | JP1 | 1−2 | OPEN | DC30V MAX 2A MAX<br>AC125V MAX 0.5A MAX |
| | | | | | 3−2 | CLOSE | |
| 2 | P3-P4 | Low battery | Out | JP2 | 1−2 | OPEN | |
| | | | | | 3−2 | CLOSE | |
| 3 | P5-P6 | UPS alarm | Out | JP3 | 1−2 | OPEN | |
| | | | | | 3−2 | CLOSE | |
| 4 | P7-P8 | On-Bypass | Out | JP4 | 1−2 | OPEN | |
| | | | | | 3−2 | CLOSE | |
| | | | | JP5 | 1−2 | − | On-Bypass output possible |
| | | | | | 3−2 | − | On-Bypass output impossible |

- Choose the ring tongue terminal of the size that suits M4
- Cover and mount the sleeve on the ring tongue terminal.

Table 9-3 Terminal

| No | Terminal | Signal | I/O | Spec | Note |
|---|---|---|---|---|---|
| 5 | REPO | REPO<br>REMOTE ON/OFF | In | 10mA MAX | This is used for an urgent stop or remote ON/OFF. |
| 6 | RSD | Remote shut down | In | 5V~30V | When remotely shutting down, This is used. |

Prepare the line kind of the following condition in the connection to this terminal.

Table 9-4 Condition

| Item | Content |
|---|---|
| Kind | Twist or Shield |
| DIA | AWG22~16 |
| Torque | 5 lbf·in |
| Screw | M3 |
| Stripping Length | 6~7mm |

- Defend and use the connection condition and the signal specification. There is a possibility of damaging it besides.
- Do the static electricity measures when you connect it.

An internal logic and an electric specification of the card I/O signal are figures below.

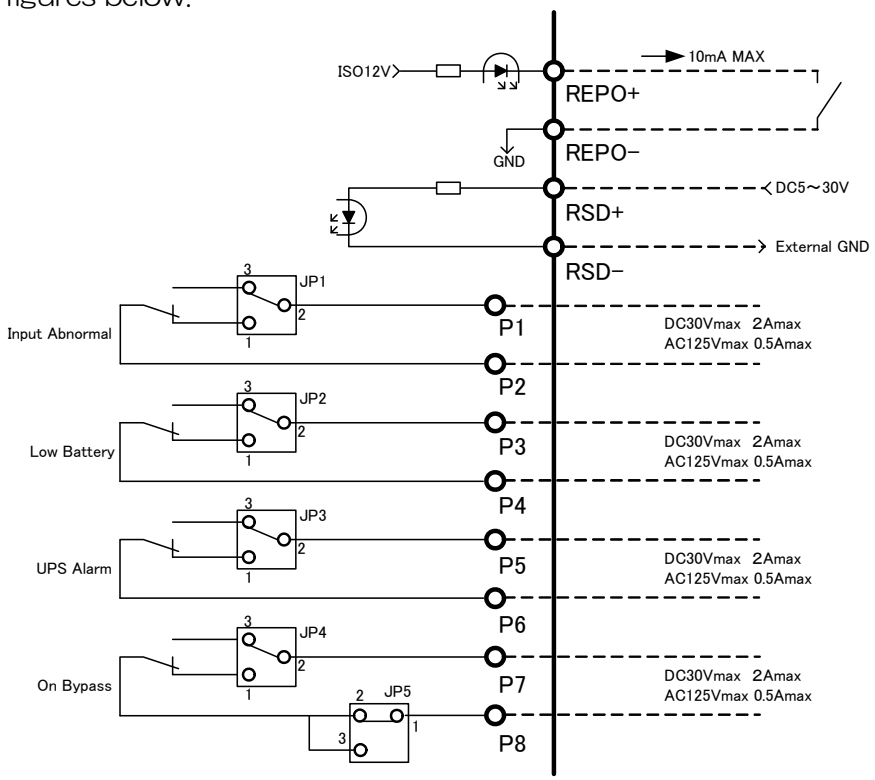



Figure 9-5 Connect in card

## 9-2-1 REPO (Remote Emergency Power Off)

The UPS supports the REPO function that UPS can be stopped (urgent stop function) with the terminal. UPS stops by operation(Short/Open) of the lock switch that the customer prepared from remoteness. REPO is a set item of Chapter6. It is invalidly set in initialization. Refer Chapter6 to make the REPO function effective.

The REPO operation stops the power supply to the connected equipment at once. UPS becomes Converter OFF. UPS transfers automatically to the standby state, if the REPO signal is released. UPS turns on the output with a repeated ON button. UPS shuts down by the REPO input when the On-Battery.

- The terminal REPO is a current of 10mA or less. Choose the lock switch that corresponds to the ratings. The line kind used must use the twist or shield to prevent the noise malfunction.
- Separate the input power supply from UPS when you use the REPO function. It is more certain..
- The REPO function can be set by the method of Chapter6. Note that the metal piece doesn't come in contact with the terminal when you set REPO. There is a possibility that UPS stops.

Install the REPO switch according to the following procedure.

1. Connect it with the terminal REPO and the terminal GND by using twist or shield and size AWG(16 - 22) ($0.3mm^2$ – $1.3mm^2$).
2. Because UPS is not stopped, confirm the prepared lock switch is not active in 6-1-9

- Install REPO with UPS stopped. Confirm the prepared lock switch is not active in 6-1-9 .
- When you should install REPO when UPS is being output, Confirm the prepared lock switch is not active in 6-1-9 .

## 9-2-2 REMOTE ON/OFF

The UPS supports the REMOTE function that you can do UPS ON/OFF with the terminal. UPS is turned on and off by operation (Short/Open) of the lock switch that the customer prepared from remoteness. REMOTE ON/OFF is a set item of Chapter6. It is invalidly set in initialization. Refer Chapter6 to make the REMOTE ON/OFF function effective. When a remote ON/OFF function is effective, the ON button and the OFF button of UPS are invalid.

Install a remote switch according to the following procedure.

1. Connect it with the terminal REMOTE and the terminal GND by using twist or shield and size AWG(16 - 22) ($0.3mm^2$ – $1.3mm^2$).
2. Because UPS is not stopped, confirm the prepared lock switch is not active in 6-1-9 .

- The terminal REMOTE is a current of 10mA or less. Choose the lock switch that corresponds to the ratings. The line kind used must use the twist or shield to prevent the noise malfunction.
- The REMOTE function can be set by the method of Chapter6. Note that the metal piece doesn't come in contact with the terminal when you set REMOTE. There is a possibility that UPS stops.
- Install REMOTE with UPS stopped. Confirm the prepared lock switch is not active in 6-1-9 .
- When you should install REMOTE when UPS is being output, Confirm the prepared lock switch is not active in 6-1-9 .
- When a remote ON/OFF function is effective, the ON button and the OFF button of UPS are invalid.

## 9-2-3 REMOTE SHUT DOWN

The UPS supports the REMOTE SHUT DOWN function that you can do UPS OFF in On-Battery from external with the terminal. REMOTE SHUT DOWN is a set item of Chapter6. It is 4.5seconds set in initialization.

- Use external source (DC5V-30V).

### 9-2-4 Low battery

When Low-Battery is detected, the UPS turns on relay contact of Low-Battery. Open/Close output is possible according to Jumper 2.

The contact spec is (30VDC MAX-2AMAX, 125VACMAX-0.5AMAX).

- Do not deviate from the contact specification. The card is damaged.
- The connecting cable must use the twist or shield for the malfunction prevention.

### 9-2-5 On-Bypass

When On-Bypass is detected, the UPS turns on relay contact of On-Bypass. Open/Close output is possible according to Jumper 4,5.

The contact spec is (30VDC MAX-2AMAX, 125VACMAX-0.5AMAX).

- Do not deviate from the contact specification. The card is damaged.
- The connecting cable must use the twist or shield for the malfunction prevention.
- This relay is turned on to the output status by the manual bypass.

### 9-2-6 Input abnormal

When input abnormal is detected, the UPS turns on relay contact of input abnormal. Open/Close output is possible according to Jumper 1.

The contact spec is (30VDC MAX-2AMAX, 125VACMAX-0.5AMAX).

- Do not deviate from the contact specification. The card is damaged.
- The connecting cable must use the twist or shield for the malfunction prevention.

### 9-2-7 UPS alarm

When Alarm is detected, the UPS turns on relay contact of input abnormal. Open/Close output is possible according to Jumper 3.

The contact spec is (30VDC MAX-2AMAX, 125VACMAX-0.5AMAX).

- Do not deviate from the contact specification. The card is damaged.
- The connecting cable must use the twist or shield for the malfunction prevention.
- On-Line impossible continuance by the overload and the manual bypass is excluded.

# Chapter１０

## Specification

The following specification is described about **the UPS.**

| | |
|---|---|
| Product configuration | Circuit Block |
| Electrical specification | Expected life |
| Weight and size | Environment and safety |
| Battery | Backup time (At New Battery) |
| Accessories/ Replaced Parts | |

Table １０-1　Product configuration

| Rack & Tower Type | | |
|---|---|---|
| 1kVA | UPS | PEN102J1RT |
| | EBM | PEB036-2RT |
| 1.5kVA | UPS (1.1kVA) | PEN152J1RT/15 |
| | UPS (1.5kVA) | PEN152J1RT |
| | EBM | PEB048-2RT |
| 3kVA | UPS (2.4kVA) | PEN302J1RT/30 |
| | UPS (3kVA) | PEN302J1RT |
| | EBM | PEB072-2RT |
| Tower Type | | |
| 1kVA | UPS | PEN102J1C |
| | EBM | PEB036-2C |

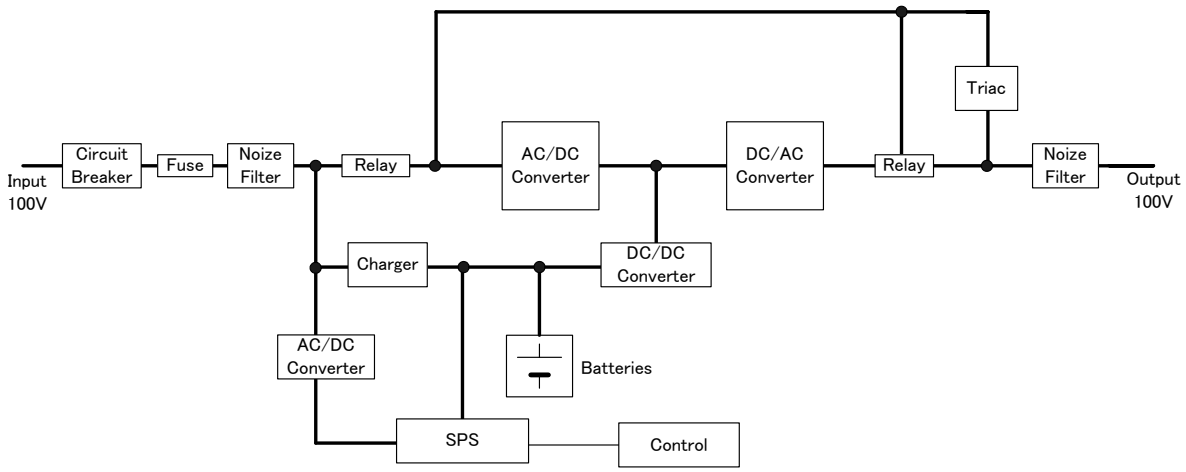



Figure １０-1　Circuit Block

## Table 10-2 Electrical specification

| | | |
|---|---|---|
| Rated Voltage | | 100V/110V/120V |
| Input Voltage | | 80－140V |
| Rated Frequency | | 50／60Hz (Auto sensing) |
| Input filter | | Varistor, Common mode filter |
| Input cable Plug | 1kVA / 1.1kVA | 5-15P |
| | 1.5kVA | L5-20P |
| | 2.4kVA | L5-30P |
| | 3kVA | Terminal（M5） |
| Output Power | 1kVA | 800W/1kVA |
| | 1.1kVA | 1kW/1.1kVA |
| | 1.5kVA | 1.2kW/1.5kVA |
| | 2.4kVA | 2.2kW/2.4kVA |
| | 3kVA | 2.4kW/3kVA |
| Output reguration | | < ±3% |
| Output distortion | | Linear Load：< 3% |
| Outlet | 1kVA | 5-15R x 4 2 segments |
| | 1.1kVA / 1.5kVA | 5-15R X 6 2 segments |
| | 2.4kVA | 5-15R x 2, 5-20R x 2, L5-30R 2 segments |
| | 3kVA | 5-15R x 2 , Terminal（M5） 2 segments |
| To bypass time | | Zero transfer(Synchronized)<br>INV Output cut（Asynchronized） |
| Over Load | INV | 102～130%：12s<br>131～150%：2s<br>>151%：200ms |
| | Bypass | 110～130%：5m<br>131～150%：15s<br>>151%：200ms |

## Table 10-3 Expected life

| | |
|---|---|
| UPS Expected life | 7years（25℃） expect battery |

## Table 10-4 Mass and size(Body)

| | | |
|---|---|---|
| Rack & Tower Type Size (W×D×H) | PEN102J1RT | 438×431×86.5 (mm) |
| | PEB036-2RT | 438×431×86.5 (mm) |
| | PEN152J1RT/15<br>PEN152J1RT | 438×431×86.5 (mm) |
| | PEB048-2RT | 438×431×86.5 (mm) |
| | PEN302J1RT/30 | 438×721×86.5 (mm) |
| | PEN302J1RT | 438×601+70(TB cover)×86.5 (mm) |
| | PEB072-2RT | 438×601×86.5 (mm) |
| Tower Type Size (W×D×H) | PEN102J1C | 160×388×245(with foot) (mm) |
| | PEB036-2C | 160×388×245(with foot) (mm) |
| Rack & Tower Type Mass | PEN102J1RT | 16.3Kg |
| | PEB036-2RT | 22.4Kg |
| | PEN152J1RT/15<br>PEN152J1RT | 20Kg |
| | PEB048-2RT | 27.5Kg |
| | PEN302J1RT/30 | 31.6Kg |
| | PEN302J1RT | 29.3Kg |
| | PEB072-2RT | 40.4Kg |
| Tower Type Mass | PEN102J1C | 15.4Kg |
| | PEB036-2C | 19.4Kg |

## Table 10-5 Environment and safety

| | | |
|---|---|---|
| Operating temperature | | 0℃~40℃ (Battery Optimum temp ; 25℃) |
| Operating humidity | | 25%~85% (No dewfall) |
| Storage temperature | | -15℃~50℃ (the battery expected life shortens as for keeping 25℃ or more.) |
| Storage humidity | | 10%~90% (No dewfall) |
| Operating altitude | | < 1,500m |
| Audible noise | 1kVA | < 50dBA |
| | 1.1kVA / 1.5kVA | < 50dBA |
| | 2.4kVA / 3kVA | < 55dBA |
| Safty | | UL1778 , CE |
| EMC | 1kVA | VCCI / FCC ClassB , CE |
| | 1.1kVA / 1.5kVA | VCCI / FCC ClassB , CE |
| | 2.4kVA / 3kVA | VCCI / FCC ClassA , CE |

## Table 10-6 Internal Battery

| | | |
|---|---|---|
| Battery | 1kVA | 12V , 3sets |
| | 1.1kVA / 1.5kVA | 12V , 4sets |
| | 2.4kVA / 3kVA | 12V , 6sets |
| Battery type | | Sealed lead storage battery |
| Expected life | | 3.5~5 years (25℃, NEW) |
| Charging | | 6 hours |

The expected life shortens while becoming a high temperature.

## Table 10-7 Back up time (100V、New、25℃)

| Capacity | Load(W) | Internal Battery (M) | +1EBM (M) | +2EBM (M) |
|---|---|---|---|---|
| 800W / 1kVA | 100W | 66 | 230 | 420 |
| | 200W | 33 | 118 | 220 |
| | 400W | 18 | 58 | 110 |
| | 600W | 8 | 37 | 67 |
| | 800W | 6 | 27 | 48 |
| 1kW/ 1.1kVA | 100W | 90 | 320 | 540 |
| | 300W | 31 | 116 | 196 |
| | 600W | 15 | 52 | 100 |
| 1.2kW/ 1.5kVA | 900W | 7 | 32 | 60 |
| | 1.2kW * | 5 | 22 | 42 |
| 2.2kW/ 2.4kVA | 100W | 105 | 370 | 620 |
| | 600W | 23 | 82 | 155 |
| | 1.2kW | 10 | 37 | 70 |
| 2.4kW/ 3kVA | 1.8kW | 5 | 23 | 42 |
| | 2.4kW ** | 4 | 15 | 30 |

Backup times are approximate and vary depending on the load configuration and charge.
＊ : Except in 1kW/1.1kVA, ＊＊ : Except in 2.2kW/2.4kVA

## Table 10-8 Accessories/ Replaced Parts

| Category | Type name | Model name |
|---|---|---|
| Accessories | Rail kits | RAIL-KIT-2U-EIA |
| | Network Agent card | ES-PS-NAC |
| | Dry Contact card | ES-DC-RYB |
| | **Plug Stop** | |
| | 1kVA (Rack & Tower Type) | PLUG-STOP/PEN102 |
| | 1.1kVA / 1.5kVA (Rack & Tower Type) | PLUG-STOP/PEN152 |
| | 2.4kVA (Rack & Tower Type) | PLUG-STOP/PEN242 |
| | 3kVA (Rack & Tower Type) | PLUG-STOP/PEN302 |
| | 1kVA (Tower Type) | PLUG-STOP/PEN102 |
| Replaced Parts | **Battery (Rack & Tower Type)** | |
| | 1kVA | 9128RBM-1000R |
| | 1.1kVA / 1.5kVA | 9128RBM-1500R |
| | 2.4kVA / 3kVA | 9128RBM-3000R |
| | **Battery (Tower Type)** | |
| | 1kVA | 9128RBM-1000C |
| | **Fuse** | |
| | 1kVA | LittelFuse 314025 1set |
| | 1.1kVA / 1.5kVA | LittelFuse 314030 1set |
| | 2.4kVA (For output) | BUSSMANN MDA-20-R 1set |
| | 2.4kVA / 3kVA | LittelFuse 505030 2sets |

# Chapter１１
# Trouble-Shooting

## １１-１　Alarm sound stop

To stop the alarm sound, the ESC button is pushed. The alarm rings newly regardless of the alarm stop when a new trouble occurs in UPS.

## １１-２　Alarm

When the SET button is pushed, UPS displays the alarm. The upper row displays the state when the alarm. Table １１-１ is used to judge and to solve the alarm and the state.

・When the input plug is removed or the input breaker is turned off after the alarm is generated, the PowerDown mode is continued until falling to safety internal DC voltage.

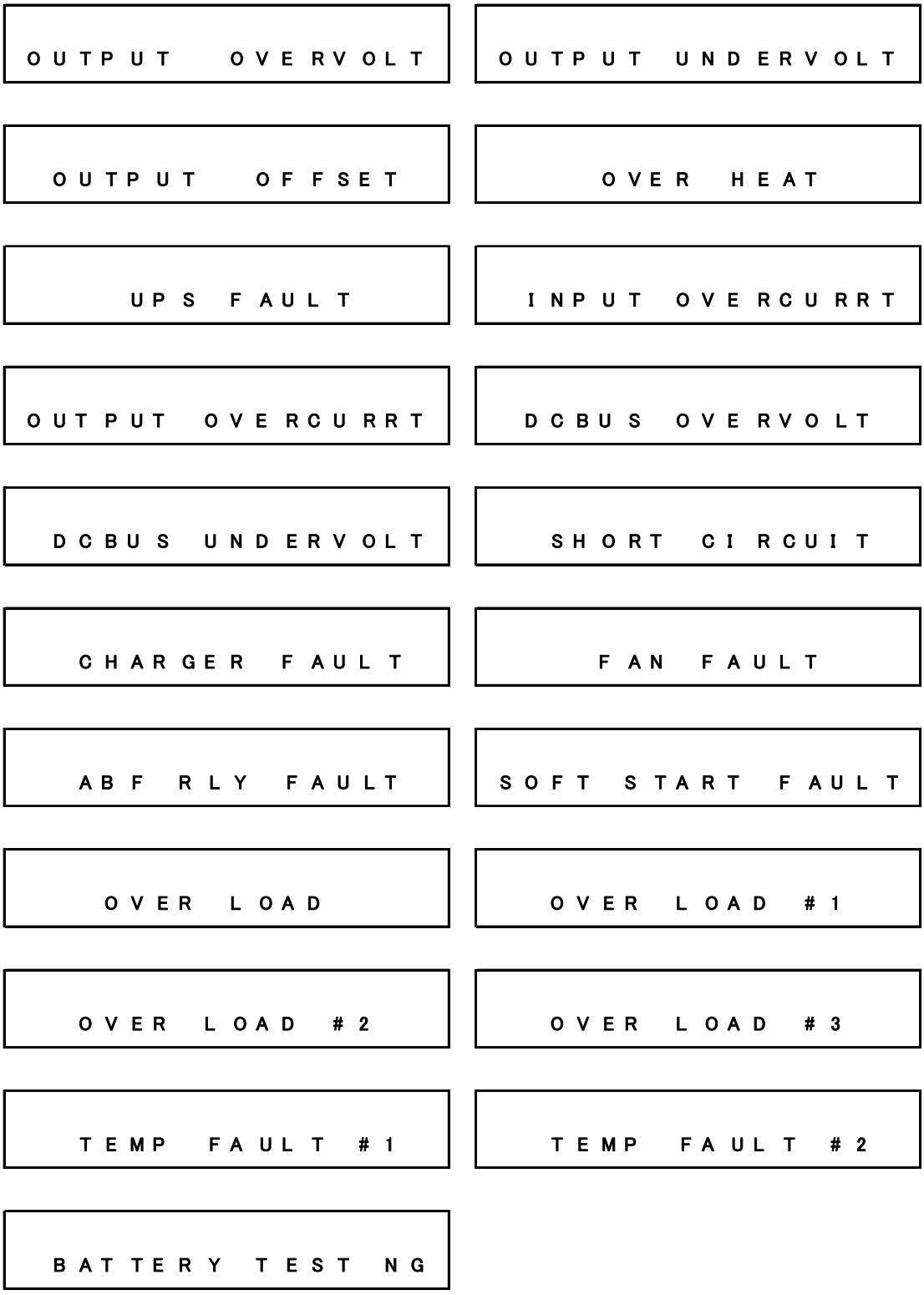



Figure 11-1 Alarm Display

## 11-3 ON Button Recovery

When UPS transfers to Converter OFF or On-Bypass by the alarm, UPS does recovery operation to the alarm that recovery operation is possible by pushing the ON button for three seconds. However, when the alarm is detected again while recovery, recovery operation is stopped. Recovery display is following.


Figure 11-2 Recovery Display

The alarm that can be recovered is the following alarm.

① Output Over/Under Voltage
② Output Offset
③ Input/Output Over Current
④ DC BUS Over Voltage
⑤ FAN Fault
⑥ Charger Fault
⑦ Short Circuit

Though the overload is not a breakdown, the recovery operation is possible by pushing the ON button for three seconds.

- When 6-1-8 is invalidly set, this operation is not done.
- This operation cannot be done while Manual Bypass. When operate, release the manual Bypass
- This operation is effective also for the alarm occured while OnBypass or Converter off.

## １１-４ Trouble-shooting

### Table １１-１ UPS trouble-shooting guide

| Alarm / State | Possible Cause | Action |
|---|---|---|
| No start | Wiring is not correct. | Check the connection of the UPS input wiring. |
| UPS cannot be output. | OFF bottun operation<br>REMOTE setting | The ON button is pushed.<br>Do REMOTE ON |
| Input breaker trip | Load trouble | Check the load. Separate the load with the possibility of the trouble.<br>（Reset pushes the button in the rear.） |
| | UPS trouble | There is a possibility that there is a trouble in UPS when trip is done at once even if the breaker is reset. Contact your service. |
| UPS doesn't offer the expected backup time。 | Charges or exchange is need. | Execute the self test pushing the ESC button for 3 seconds. Exchange the batteries when BATTERY LED of UPS blinks every 2 seconds. |
| BATTERY LED<br>Blink<br>Buzzer every 1second | Low-batery | Backup times has shortened. (It is different depending on the load and the charging status.) 。Prepare the shutdown. |
| BATTERY LED<br>0.5sBlink<br>Buzzer every 0.5second | Worning before shutdown | Soon the UPS output stops, and will shut down. Prepare the shutdown. |
| BATTERY LED<br>Lightring<br>No Buzzer | Battery disconnect | Connect the battery. |
| BATTERY LED<br>2sBlink<br>No Buzzer | Service Battery | Need to exchange Battery |
| ALARM LED Lightring<br>LCD : No Display<br>Continuous Buzzer | The load has exceeded 100% Load. | Remove some equipment from UPS. |
| ALARM LED Blink<br>LCD : No Display<br>No Buzzer | Input deviates from the input range of the zero transfer | Check the input power. |
| ALARM LED 2sBlink<br>LCD : No Display<br>Buzzer every 2second | Input deviates from the input range | Check the input power. |

| LCD | LED | Buzzer | Possible Cause | Action |
|---|---|---|---|---|
| TEMP FAULT #1 | Lighting | Continue | The UPS atmosphere temperature exceeded 40℃. | Adjust the temperature to 40℃ or less |
| TEMP FAULT #2 | Lighting | Continue | The UPS atmosphere temperature exceeded 41℃. | It returns automatically when the temperature falls on 40℃ or less. |
| OVER LOAD | Lighting | Continue | The load has exceeded 102% Load. | Remove some equipment from UPS. |
| OVER LOAD #1 | Lighting | Continue | The load has exceeded 110% Load. | |
| OVER LOAD #2 | Lighting | Continue | The load has exceeded 130% Load. | |
| OVER LOAD #3 | Lighting | Continue | The load has exceeded 150% Load. | |
| BATTERY TEST NG | Unlighting | No | The condition of the self test is not satisfactory. The event was generated while testing self. | The alarm deletes after one hour from occurd. |
| OUTPUT OVERCURRT<br>OUTPUT OFFSET<br>SHORT CIRCUIT | Lighting | Continue | alarm | Remove equipment from UPS. Even retrying , if occur, It is necessary to repair UPS. Contact your service. |
| OUTPUT OVERVOLT<br>OUTPUT UNDERVOLT<br>DCBUS OVERVOLT<br>DCBUS UNDERVOLT<br>UPS FAULT<br>OVER HEAT<br>INPUT OVERCURRT<br>CHARGER FAULT<br>ABF RLY FAULT<br>FAN FAULT<br>SOFT START FAULT | Lighting | Continue | alarm | It is necessary to repair UPS. Contact your service. |

# Chapter１２
# Guarantee and Support

## １２-１ Guarantee

The guarantee is appended to this user's guide. Keep it importantly after confirming a content and a prescribed matter of the guarantee are filled in.The guaranteed term is one year from the purchase day.

## １２-２ Service

If you have any question or problems with the UPS, call your service.

**Repair during guaranteed**
It will be repaired or exchanged to based on the content of the guarantee. Have the following information ready when you call for service.

| | |
|---|---|
| ①Model name | :Discription in guarantee |
| ②Guarantee number | :Discription in guarantee |
| ③Purchase date | :Discription in guarantee |
| ④Symptoms of failure | :In detail |

**Repair after guaranteed**
When the function can be maintained by the repair, it repairs for a fee by the customer's demand.

Refer the homepage about latest information of the product and the nearest office.
http://www.fujielectric.co.jp/products/power_supply