



7011A SERIES

ON LINE UPS



User Manual

Revision 1

01/10/01

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Thank you for purchasing the Mitsubishi 7011A UPS (Uninterruptible Power Supply). This UPS provides protection against voltage variations and power failure to supply stable power to your equipment loads.

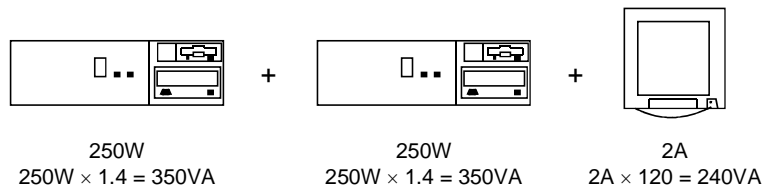
Please read this instruction manual and enclosed documents prior to inspection, installation, operation, and maintenance to ensure proper usage. Thoroughly understand the UPS functions and safety information prior to operating the unit.

To ensure proper operation of the UPS unit, verify the total load requirements in volt-amperes (VA) of the equipment to be protected by the UPS. The total load requirements must not exceed the UPS capacity rating shown on its nameplate.

UPS SIZING:

Follow the steps below to determine the total of the equipment loads and to confirm the proper UPS size for your application.

- Determine the load ratings of the equipment to be protected by the UPS unit. This information should be found on the equipment's nameplate or in the instruction manual and should be rated in either watts (W), amperes (A) or volt-amperes (VA).
- If the ratings are given in watts (W), multiply by 1.4 to obtain the volt-amperes (VA) requirement. This multiplier is typical of computing equipment to convert watts (W) into volt-amperes (VA).
If the ratings are given in amperes (A), multiply by 120 (input voltage rating) to obtain the volt-amperes (VA) requirement.
- To obtain the total load requirements to be protected by the UPS, simply add all the volt-amperes (VA) together as shown in the example below.



Total load requirement: $350VA + 350VA + 240VA = 940VA$
 Recommended unit: 7011A model 7011A-10 rated at 1400VA

Do not attempt to install, operate, maintain, or inspect this product until you have read through this instruction manual carefully and can properly operate this equipment. Do not use this product until you have a full knowledge of the equipment, safety information and instructions.



WARNING This equipment should be serviced by qualified personnel only. Do not attempt to service this equipment as risk of electrical shocks exists.



DANGER This UPS unit contains lethal voltages. Only qualified personnel should service this equipment. Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.



CAUTION Do not dispose of battery or batteries in a fire. The battery may explode.

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

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:

- Remove watches, rings, or other metal objects.
- Use tools with insulated handles.

CAUTION Proper disposal of the batteries is mandatory by law. Consult your local codes for proper disposal procedures.

CAUTION To reduce the risk of electrical shock or fire, install this UPS in a temperature and humidity controlled environment that is free of conductive contaminants. The ambient temperature must not exceed 104°F (40°C).

STORAGE

Should the UPS be stored prior to installation, it should be in its original packing carton in a weatherproof environment. Although the storage temperature range for this UPS is -4 to 104°F (-20 to $+40^{\circ}\text{C}$), the recommended storage temperature is 77°F (25°C) to maximize the battery life.

For extended storage time, the UPS batteries should be charged every 6 months to keep them at their optimum condition. Should a battery recharge be deemed necessary, connect the AC line cord into the utility outlet for approximately 8 to 12 hours. The charging circuitry of the UPS will automatically provide the necessary charging amount to fully recharge the batteries.

UNPACKING

Unpack the UPS and carefully inspect the unit for any damages that may have occurred during shipment. If any damage is present, notify your representative or distributor immediately.

INSTALLATION



WARNING The UPS should be installed only by qualified personnel. Install the UPS in accordance with this instruction manual.

Install the UPS upright on a firm and flat surface leaving at least 4 inches (100mm) of clearance on both sides, front, top and rear for proper air ventilation flow. Do not block the ventilation louvers as the internal temperature of the UPS will rise and may cause a fire or damage internal components.



CAUTION Do not install the UPS horizontally or on its side as the unit may not operate properly and could cause a failure.

WIRING

- Connect the supplied AC input line cord into a 120V grounded 3-pin commercial utility outlet rated at 15 amps (NEMA 5-15R type) for models 7011A-10 and 20 amps (NEMA 5-20R type) for model 7011A-20 and 7011A-30.
- Always use a grounded 3-pin NEMA 5-15P plug to connect your loads into the output side of the UPS.



CAUTION Do not connect the supplied AC input line cord into the output receptacles provided on the back of the unit. This will cause a current to flow back and generate arcs, which may lead to a fire.

CONNECTION DATA

1) Circuit breaker, Recommended socket, Recommended plug (1kVA)

UPS unit		UPS input power side		UPS output side
Input plug	Output socket	Circuit breaker	Recommended socket	Recommended plug
Single-phase 5-15R plug with grounding pole	Single-phase 5-15R socket with grounding pole	15A or more	Single-phase 5-15R socket with grounding pole	Single-phase 5-15R plug with grounding pole

2) External Input Circuit breaker, Recommended cable size (AWG), Tightening Torque (2, 3kVA)

UPS unit		External Input Circuit breaker	UPS input side		UPS output side	
UNIT kVA	Input breaker		AWG	Torque	AWG	Torque
2kVA	30A	40A or more	10	2.0N.m	10	2.0N.m
3kVA	40A	40A or more	8	2.0N.m	8	2.0N.m

Note: field wiring lug; Type 5.5-5(170725-2)/10AWG, manufacturer AMP
Type 5.5-8(170727-1)/8AWG

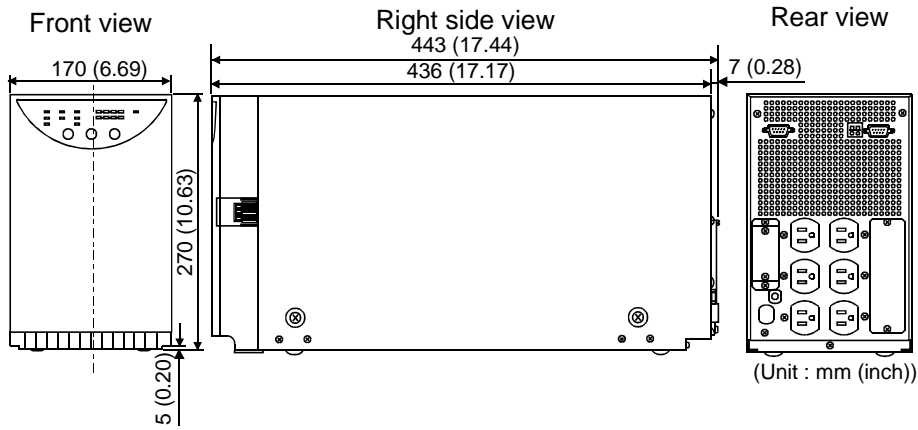
Note: Crimping tool ; Type 59239/10AWG, manufacturer AMP
Type 59070/8AWG



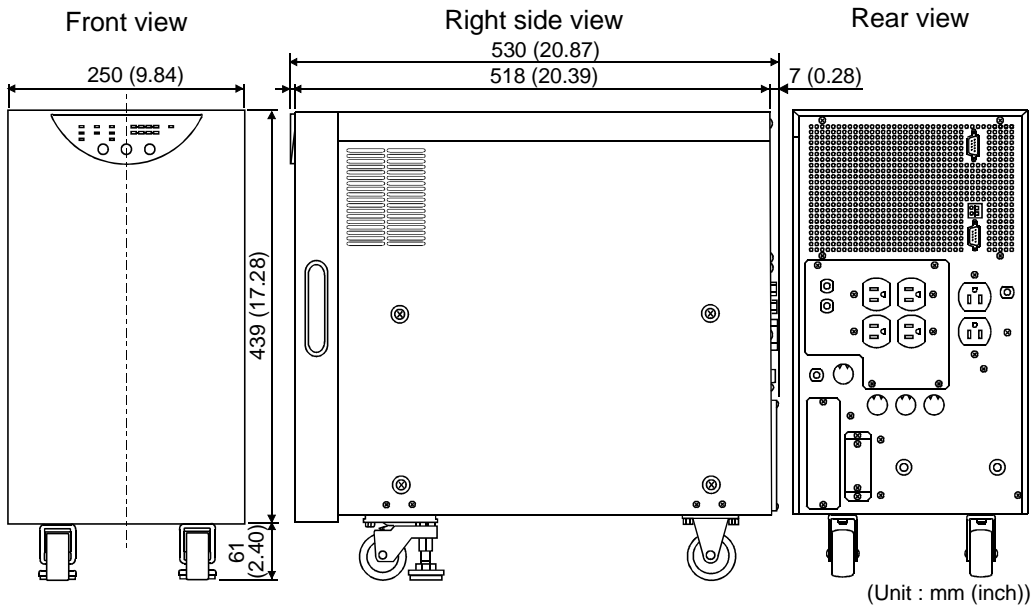
CAUTION The sum of the capacities of the load equipment connected to the receptacles must not exceed the rated capacity of the UPS output. Confirm the total load capacity by viewing the "**Load**" LED indicators on the front display unit.

OUTLINE DIMENSIONS

● 7011A-10

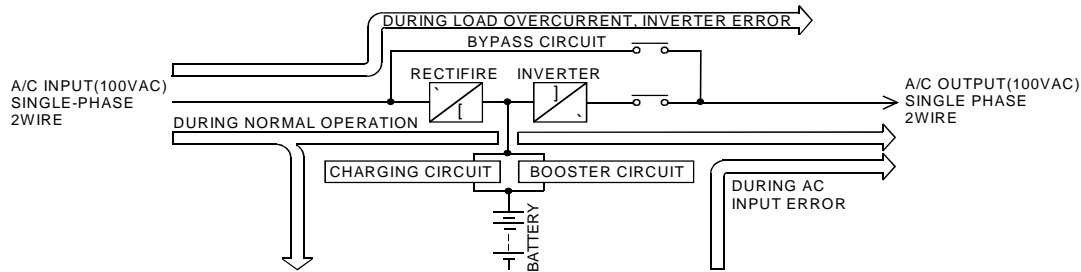


● 7011A-20/7011A-30



CONFIGURATION

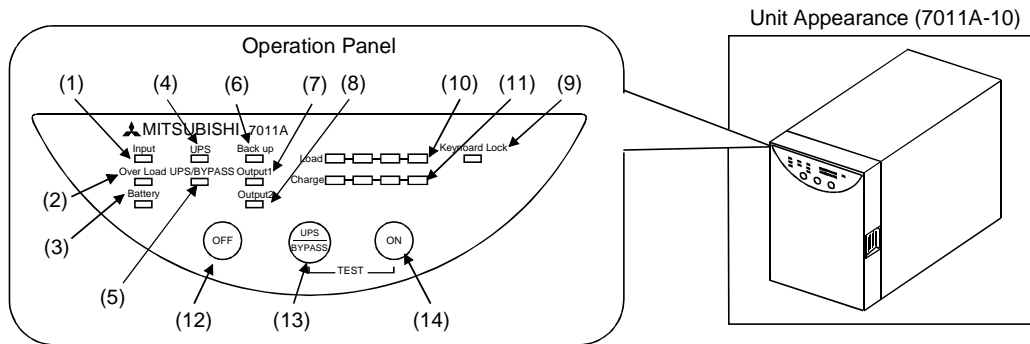
<UPS internal structure>



- (1) During normal operation (UPS operation)
 When commercial power is normal, this uninterruptible power supply (UPS) converts the input AC power into a DC power. Then the converter reconverts this DC power into an AC power at the inverter, and supplies stable AC power to the load. When the commercial power is present to the UPS, the charging circuit charges the battery. The UPS will function under normal conditions until an AC input voltage error occurs. (Note 1)
- (2) During power failure (backup operation)
 If an error occurs in the AC input, DC power is supplied to the inverter from the battery through the booster circuit, allowing AC power to be supplied continuously to the load device. To indicate that AC power will be fed by the UPS, the "Back Up" LED will be lit and two consecutive intermittent double beeps will sound. If the power failure occurs for a long period of time, the battery capacity will decrease and the "Charge" LEDs will decrease. Once the batteries discharge the power, all "Charge" LEDs will disappear and the buzzer will sound intermittently. Approximately 2 minutes after that (at rated load, initial battery characteristic, ambient temperature 25°C), the UPS output will shut off. Hence, you must stop the load immediately. When the commercial power is recovered, the UPS will automatically start operating and return to the normal operation status. (Note 2)
- (3) During overload
 If an overload occurs during the inverter power feed, the "Over Load" LED will be lit red, the buzzer will sound, and the UPS will be switched to bypass operation. (Note 3) (Refer to page 30 for details.) Once the overload period is cleared, the UPS will return to the normal operation automatically. If an overload occurs during backup operation, the UPS will shut off and not provide AC power.

Note 1: The battery will start charging when commercial power is supplied to the UPS, and the "Charge" LED's will be lit according to the amount of charge.
 Note 2: Using the "DiamondLink" UPS control kit, you can also choose the mode which does not make an automatic start at power recovery. For details, refer to the "DiamondLink" manual.
 Note 3: When the output frequency fixing function (refer to page 21) is used, the UPS will shut off the output without being switched to bypass operation.

PARTS IDENTIFICATION



LED status: off: □ flicker: ◆ on: ■

LED's

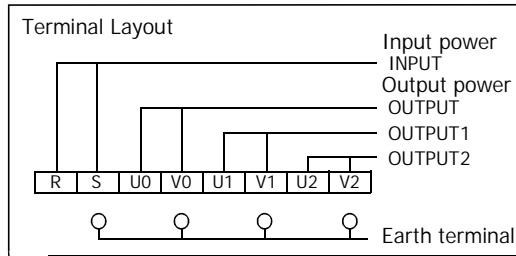
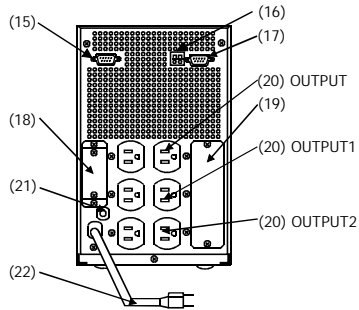
Designation	Function	Indication
(1) Input (Green)	Indicates the input power status.	<ul style="list-style-type: none"> ■: Input power normal ◆: Input frequency alarm/input power alarm □: Power failure
(2) Over Load (Red)	Output overload status indication.	<ul style="list-style-type: none"> ■: 100% load or more
(3) Battery (Red)	Warns that the battery will soon reach the end of its life.	<ul style="list-style-type: none"> ■: Battery life ◆: Battery door or extension battery door open
(4) UPS (Green)	Lit to indicate UPS operation.	<ul style="list-style-type: none"> ■: UPS operation ◆: Waiting for start
(5) Bypass (Orange)	Lit to indicate bypass operation.	<ul style="list-style-type: none"> ■: Bypass operation ◆: Bypass operation due to overload
(6) Back Up (Orange)	Backup operation status indication.	<ul style="list-style-type: none"> ■: Backup operation in progress

<u>Designation</u>	<u>Function</u>	<u>Indication</u>
(7) OUTPUT1 (Green)	Output 1 status indication.	■: Output 1 output
(8) OUTPUT2 (Green)	Output 2 status indication.	■: Output 2 output
(9) Key Board Lock (Orange)	Key lock status indication. To change the key lock setting, use the DIP switch on rear panel.	■: Key operation disable
(10) Load (Green)	Indicates the load current in percentage to the rated current in five levels.	□□□□ 0 to 5% (No-load detection level) ■□□□ 6 to 25% ■■□□ 26 to 50% ■■■□ 51 to 75% ■■■■ 76 to 100%
(11) Charge (Green)	Level meter which indicates the battery charge status. This indicates the charge status of the battery in five levels.	□□□□ 0 to 25% ■□□□ 26 to 50% ■■□□ 51 to 75% ■■■□ 76% or more ■■■■ Fully charged

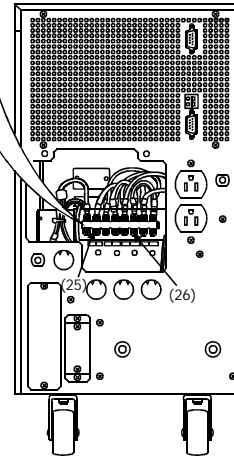
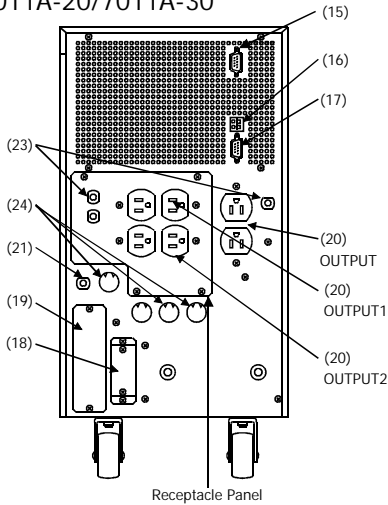
SWITCHES

<u>Designation</u>	<u>Function</u>
(12) OFF	Switch used to stop the UPS operation.
(13) UPS/BYPASS	Switch used to select between UPS operation and bypass operation. (Also used to make a self-test (page 17).)
(14) ON	Used to start the UPS. Also used to stop the buzzer temporarily or perform a Self-test (page 17).

● 7011A-10



● 7011A-20/7011A-30



View after Removal of Receptacle Panel

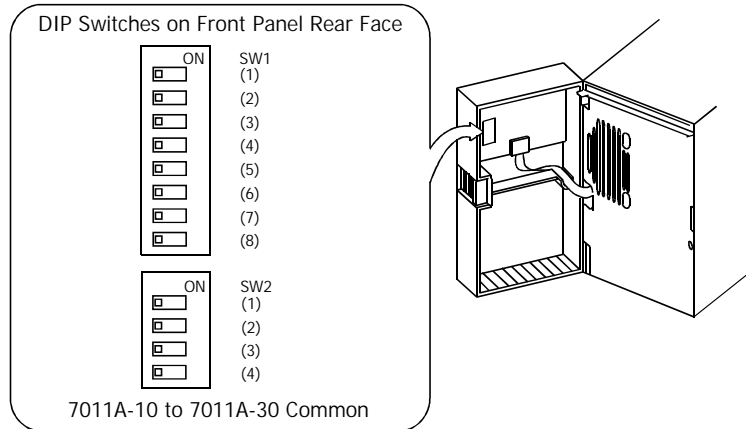
Designation

Function

- | | |
|---|---|
| (15) RS-232C connector (D-sub, 9-pin, female) | Used to shut down the network operating system or use the "DiamondLink" UPS control kit. |
| (16) REMOTE ON/OFF connector | Connect an external contact to this terminal when starting and stopping UPS operation at a remote location. |
| (17) External in/out connector | Connector which outputs alarm and other signals.
Output signals: UPS alarm, backup operation, battery voltage (D-sub, 9-pin, low female) Input signal: UPS shutdown. |

<u>Designation</u>	<u>Function</u>
(18) External battery connector	Connector used to connect an extended battery to ensure longer runtime during a power failure.
(19) Option slot	Slot in which an optional board is inserted. (For the optional board, refer to the optional board instruction manual.)
(20) Output receptacle	UPS output receptacles. There are OUTPUT1 and OUTPUT2 to enable load shedding.
(21) Input circuit protector	The circuit protector trips if the current from the power supply exceeds the input capacity of the UPS, and the button pops out. Press the button to reset the UPS.
(22) Input plug	Supplies power to the UPS unit.
(23) Output circuit protector	The button pops up at occurrence of an overcurrent trip of the load equipment connected to the UPS. Press the button to reset.
(24) Wiring holes	When using the terminal block, remove the receptacle panel, insert cables through the wiring holes, and connect the I/O cables.
(25) Input terminal block	For connection of input cables.
(26) Output terminal block	Cables with crimping terminals can be used for output power.

DIP SWITCH CONFIGURATION



SW1

Switch	Function	ON Setting	OFF Setting	Refer to
(1)	UPS RESTART	UPS RESTART ON POWER RECOVERY	UPS WILL NOT RESTART ON POWER RECOVERY	Page 20
(2)	Master/Slave	Master station	Slave station	Page 20
(3)	No-load current detection function	With no-load current detection	Without no-load current detection	Page 20
(4)	Buzzer off	Enable	Disable	–
(5)	Shutdown by "OFF" switch	Enable	Disable	Page 20
(6)	Load selection function for backup operation	OUTPUT1, 2 disconnects	No function	Page 21
(7)	Select output voltage	110V	120V	Page 21
(8)	Soft start	Enable	Disable	Page 21

SW2

Switch	Function	ON Setting	OFF Setting	Refer to
(1)	Output frequency STATUS	CVCF FUNCTION	–	Page 21
(2)	Select output frequency	50Hz	60Hz	–
(3)	Output frequency on backup mode	50/60Hz SW2(2)	No function	Page 21
(4)	Keyboard lock	Lock	Unlock	Page 21

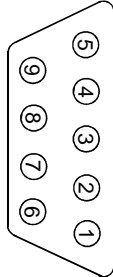
Note: The DIP switches are all factory-set to OFF.

EXTERNAL I/O CONNECTOR (D-sub 9-pin, Female connector)

This is an external input/output signal port.

Plugging this connector to the serial port of a computer allows the computer to be shut down using the software included with the Operating System (Windows NT[®], Netware[®]).

External signal connector



UPS side connector: D-sub 9 pin, female, inch screw

- (a) Alarm (output): Pins 1(+), 2(-)
 - Output to indicate an alarm.
- (b) Input power alarm (output): Pins 3(+), 4(-)
 - Output to indicate an error in the commercial power supply, such as a power failure.
- (c) Battery voltage low (output): Pins 6(+), 7(-)
 - Output to indicate the battery voltage is low.
 - When this contact is actuated while power is supplied from the battery during a power failure, the UPS will stop automatically in 1 to 2 minutes.
- (d) Remote shutoff (input): Pins 8(+), 9(-)
 - Shutdown occurs only when a signal is sent during output of an "input power alarm".

I/O specifications

Output: Open collector output
min. 12V to max. 24V, 100mA

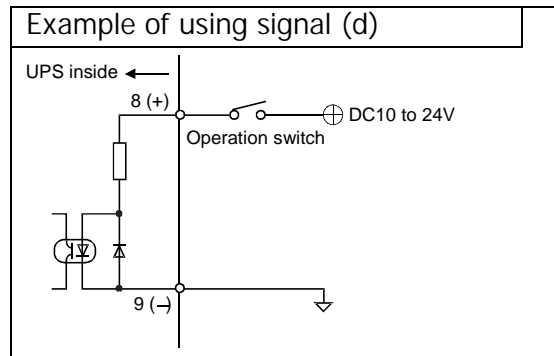
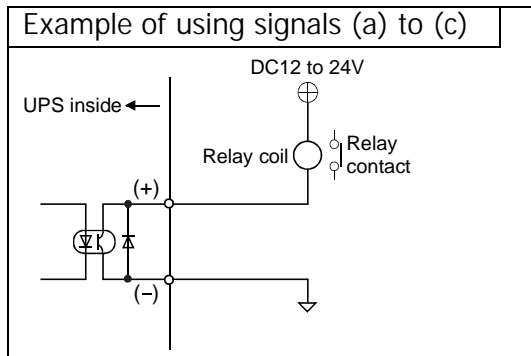
Input: hotocoupler input
min. 10V to max. 24V

Note the polarity (positive or negative).



CAUTION Do not bring your fingers and other items into contact with the connector terminals. Doing so can cause a failure due to static electricity.

Do not use the free pins of the external signal connector.



PRE-OPERATION PROCEDURES

- It is recommended to give the battery a refreshing charge prior to the initial use of the UPS unit to ensure optimal performance. To recharge the battery insert the UPS input plug into the corresponding AC commercial receptacle (NEMA 5-15R for models 7011A-10 and NEMA 5-20R for model 7011A-20 and 7011A-30) for approximately 5-6 hrs or until all "Charge" LED's are lit on the system (refer to the "Charging the battery" instructions on page 17)
- Confirm that the switch settings on the back of the UPS suits your application. Switch settings are provided for several features that can be individually activated. (See details of switch settings on pages 11, 20, and 21).
- Connect the load (equipment) to the UPS NEMA 5-15R output receptacles. The receptacles are each rated at 15 amps. Prior to starting the UPS unit up, confirm once again that the load requirements do not exceed the UPS rating (refer to sizing section on page 1). When connecting your equipment to the UPS output receptacles, connect your critical loads on the receptacles labeled OUTPUT 1. "Load Shedding" feature, refer to page 21 for detail explanation.

OPERATION

Procedure	UPS Status
<ol style="list-style-type: none">(1) Insert the input plug into the 120VAC commercial power receptacle.(2) Press the "ON" and "UPS/BYPASS" switches at the same time.	<p>When the UPS starts, the "UPS" LED is lit, the "Load" LED's are lit according to the connected load capacities, and the "Charge" LED's are lit according to the battery charging status.</p> <p>By holding down the switch for more than 1 second during operation, an intermittent sound is given and the UPS can change to self-test mode (refer to page 17).</p>

BACKUP OPERATION



CAUTION The UPS stops when the battery is fully discharged. When the commercial power is recovered, the UPS will start automatically.

The UPS switches to backup operation if the commercial power falls out of the voltage range 85VAC to 144VAC. The "Back Up" LED is lit and two consecutive intermittent sounds are given. The battery "Charge" LED's indicates the remaining capacity of the system's batteries and are decreased accordingly to the batteries' charge level. After all of the LED's have turned off, an intermittent sound is provided. Shortly thereafter (approximately 2 minutes), the loads are shut off.

Procedure

UPS Status

STOP

Press the "**OFF**" switch on the front panel.

Note: Hold down the switch until the indicators are off.

When commercial input power is being supplied, all indicators go off but the internal circuits are operating.

To stop the UPS operation completely, disconnect the input plug.

BYPASS OPERATION

Press the "**UPS/BYPASS**" switch on the front panel.

The "**UPS**" or "**Bypass**" LED is lit to indicate UPS or bypass operation, and the UPS is placed in the corresponding operation mode.

Procedure

SELF TEST

During commercial power supply operation, press the "ON" and "UPS/BYPASS" switches simultaneously to perform a self-test.

AUTOMATIC SELF-CHECK

When the UPS is operating continuously, it conducts a self-test at intervals of every 14 days.

Note: A self-test cannot be done if:

1. Backup operation is performed
2. Alarm has occurred
3. Front panel is open
4. While UPS stop instruction is given

CHARGING THE BATTERY

Insert the input plug into the corresponding commercial power receptacle.

Note: There is no need to press the "ON" switch since the internal circuits are operating.

UPS Status

5 or 6 seconds after the start of the test, the "Back Up" LED is instantaneously lit. When no fault is found, normal operation is resumed.

Alarms are indicated as follows:

	LED Indication	Buzzer	UPS Status
Battery Operation Alarm	All LED's flicker	Continuous sound	Switched to commercial power supply operation
Fan alarm	All LED's flicker	Intermittent sound	Buzzer beeps
Battery deterioration	"Battery" LED is lit	No	Operation continued

The alarm mode indication and buzzer are reset by pressing the "OFF" switch. Diagnose battery deterioration when two or more "Load" LED's and all "Charge" LED's are lit.

To check the charging status, press the "ON" switch.

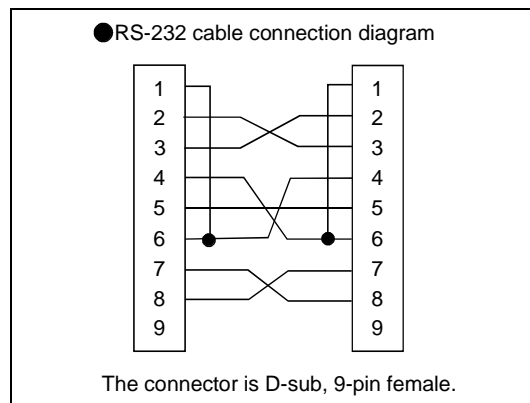
The "Charge" LED's are lit according to the charging status. When all four LED's are on, it indicates full charging.

RS-232 CONNECTOR (D-sub 9-pin, male connector)

Serial communication through DiamondLink Software

The operation mode of the UPS can be set through serial communication by a computer through Mitsubishi Electric's DiamondLink software.

The DiamondLink software offers monitoring and shutdown functions for the management of your system. Most operating systems are offered and are selectable on the software menu.



REMOTE ON/OFF CONNECTOR

Plugging an external contact to the remote on/off connector on the UPS rear panel allows you to start and stop UPS operation from a remote location.

Among the remote ON/OFF input terminal and the UPS unit's "ON" and "OFF" switches, the one used later has higher priority. Therefore, when using this function, use the remote ON/OFF switch.

The UPS status is governed by the switch operation as indicated below.

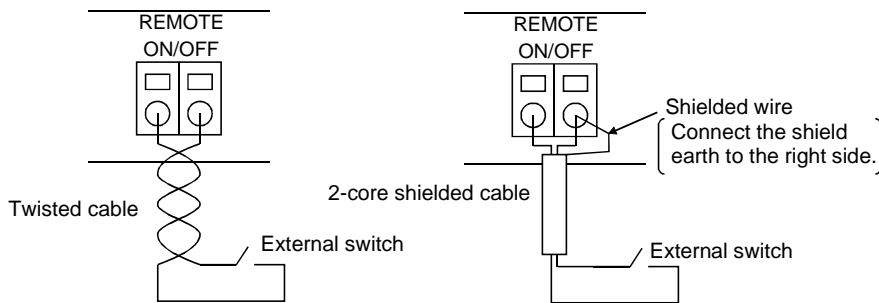
"ON"/"OFF" Switch Operation	Remote ON/OFF Terminal Status	UPS Status Change
ON operation	OFF	Stop → start
OFF operation	OFF	Start → stop
ON operation	ON	Stop → start
OFF operation	ON	Start → stop

USABLE CABLES AND SWITCHES

Cable type	Twisted or 2-core shielded cable
Wire size	Solid wire $\varnothing 0.4$ (AWG26), $\varnothing 1.2$ (AWG16) Stranded wire 0.3mm^2 (AWG22) to 1.25mm^2 (AWG16), strand diameter $\varnothing 0.18$ or more
Stripping length	11mm
Switch	Use the one which can be turned on/off at 15VDC 15mA.

EXTERNAL SWITCH CONNECTION

Connection diagram

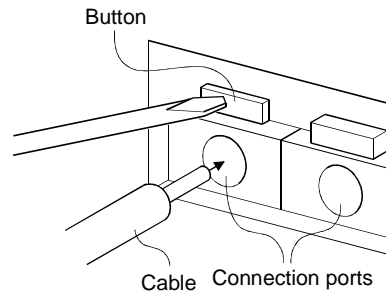


Twisted cable

Hold down the button of the remote ON/OFF input terminal with a flat-blade screwdriver and insert the tip of the cable into the connection port.

Releasing the button completes the connection.

At this time, pull the cable lightly to make sure that the cable has been connected securely.



SHUTDOWN BY "OFF" SWITCH FUNCTION

To activate this function set the SW1(5) on back of front panel to the ON position.

Pressing the "OFF" switch activate this function and forces the "**Battery Voltage Low**" signal to be output to prompt the OS to shut down.

To use this function, the software, DiamondLink, or the OS (Windows NT®, Netware®) must have started on the computer side. Since this function forcibly outputs the "Battery Low" signal, the "Battery Low" event remains in the computer side log.

UPS RESTART FUNCTION ON POWER RECOVERY

To activate this function, set the SW1(1) on back of front panel to the ON position.

This function restarts the UPS on power recovery to start supplying power to the load/equipment. When the switch is in the OFF position, the UPS will not automatically start on power recovery.

MASTER/SLAVE FUNCTION

With one UPS set as the master and other UPS as slaves, batch control can be exercised from the master UPS through the RS-232C port.

The slave UPS will operate with the start and stop of the master UPS.

Set the SW1(2) on back of front panel to the ON position to set any UPS as the master station or to the OFF position to set it as the slave station.

NO LOAD CURRENT AUTOMATIC STOP FUNCTION

To activate this function, set the SW1(3) on back of front panel to the ON position.

This function detects the currents of the loads connected to the UPS and stops the UPS without backup operation should the total load connected to the UPS is 5% or less of the UPS rated capacity.

LOAD SHEDDING FUNCTION

This function allows the user to control critical and non-critical loads via the OUTPUT 1 and OUTPUT 2 load receptacles. This feature will enable to preserve battery backup time for critical loads connected to OUTPUT 1 and disconnect non-critical loads of OUTPUT 2 after being on battery backup for 1 minute. This will allocate battery backup time on a priority basis to critical equipment connected to the OUTPUT 1 receptacles when performing shutdown operations. This switch is factory set at the OFF position. To enable this function, set the SW1(6) on back of the front panel to the ON position. In the OFF position, all loads connected to the OUTPUT 1 and OUTPUT 2 load receptacles will receive equal battery current when a power failure occurs.

OUTPUT VOLTAGE SELECTION

When the switch SW1(7) on the front panel rear face is OFF, the output voltage is 110V. Setting this switch to ON enables the voltage to be changed to any value using the DiamondLink Software. In the ON position, 120V is output by default.

SOFT START FUNCTION

Set the DIP switch SW1(8) on the front panel rear face to the ON position. Pressing the "ON" button of the UPS to activate this function increases the output voltage of the UPS gradually. This function suppresses the inrush current flowing on the load side to ensure that the equipment where a starting inrush is large but normal power is low can be used without tripping the input breaker of the UPS.

CVCF FUNCTION

Set the DIP switch SW2(1) on the front panel rear face to the ON position. In a normal status, this UPS outputs the output voltage in synchronization with the frequency of the input power supply. Using this function, the frequency selected with the SW2(2) is output as the frequency of the output voltage if the input frequency varies.

BACKUP FREQUENCY MODE

Set the DIP switch SW2(3) on the front panel rear face to the ON position. In a normal status, this UPS outputs the output voltage in synchronization with the frequency of the input power supply. Using this function, the frequency selected with the SW2(2) is output as the frequency of the output voltage if the input frequency varies.

KEYBOARD LOCK FUNCTION

Set the DIP switch SW2(4) on the front panel rear face to the ON position. This function disables all panel keys to prevent any wrong operation.

SPECIFICATIONS		7011A		
Model Type		7011A-10	7011A-20	7011A-30
Input	Phase	Single phase		
	Voltage (ACV)	40V-160V*		
	Frequency (Hz)	40-120Hz#		
	Capacity (max)	1.0kVA	2.0kVA	3.0kVA
	Power Factor	0.95 over (at full load)		
	Circuit Protection	15A	35A	40A
Output	Phase	Single phase		
	Voltage (ACV)	100V-120V (Enable to change by serial communication) (Note 1)		
	Frequency (Hz)	50/60Hz \pm 0.5% (Note 2)		
	Output waveform	Sine wave		
	Changing time	Zero Transfer Time		
	Capacity	1.1kVA (700W)	2kVA (1.4kW)	3kVA (2.1kW)
	Permissible inverter peak current	300% of rated current effective value (Note 3)		
	Transient Response	\pm 5%		
	Harmonic Distortion	3% or less (Rated resistive load)		
	Overload Capacity	110% for 30seconds		
Battery	Type (Life)	Sealed lead-acid battery (5 years)		
	Quantity	12V 5Ah \times 5	12V 12Ah \times 5	12V 17Ah \times 5
	Backup Time (full charge)	10min (at full load PF=0.7)		
	Recharge Time	90% after 8hours		
Environment	Operating temperature	0 to 40°C (32 to 104°F) optimal at 25°C		
	Operating humidity	5 to 95% (no condensation)		
	Altitude	Less than 3000m (9000ft)		
Audible noise		45db at 1m (3.3ft) from front panel		
Net Weight (kg)		21	50	62

Note 1: Using the "DiamondLink" UPS control kit, you can set any output voltage.

Note 2: For the AC output frequency, you can select either 50 or 60Hz. (Page 21)

Note 3: The crest factor (ratio of crest value to effective value of current) is 3.0.

* Input voltage outside the normal operating voltage(40V-85V and 145V-160V) will be supported for 1 minute depending on the load

The power factor/THD will vary when the frequency is outside the normal operating range (47Hz – 63Hz)

BATTERY TYPE

To optimize the functionality of the UPS system, always replace the existing sealed lead-acid batteries with the same model number and type as listed below. Replacement with other battery models and capacities will affect the performance and operation of the system backup times as shown on page 29. These times are calculated per the original battery manufacturer specifications.

UPS Model	Manufacturer	Quantity	Type
7011A-10	JAPAN STRAGE BATTERY	5	PXL12050
7011A-20	SHINKOBE-DENKI	5	HF12-12
7011A-30	SHINKOBE-DENKI	5	HF17-12W

RECOMMENDED REPLACEMENT INTERVALS

- Replace the battery system at intervals of approximately every five years. However, within five years, its capacity may be reduce depending on power failure frequencies, operating temperature, etc. Whether the UPS has been used or not, replace the battery every five years as a guideline to insure optimal performance.
- The following is the suggested replacement time frame at different operating temperatures. Batteries are affected considerably depending on the ambient temperature in which they operate, thus replacement time will vary. See the table below for the recommended replacement times according to the operating temperature.

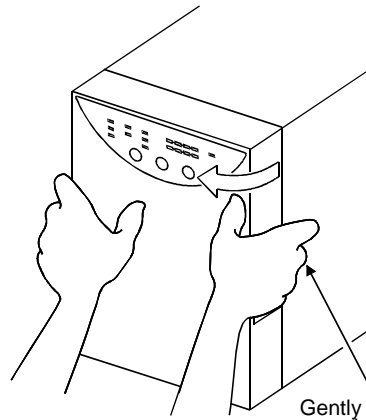
Operating ambient temperature	Recommended battery replacement time
68°F (20°C) or less	5 years
86°F (30°C)	4 years
104°F (40°C)	2 years

- Always replace the battery system as a set only. Do not replace individual batteries unless a battery becomes defective within the first 2-3 months of operation.

The battery can be changed during bypass mode operation of the UPS.

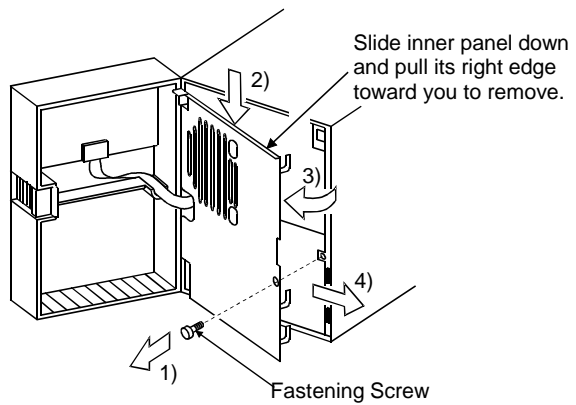
7011A-10

- (1) Hold down the buttons on the sides of the front panel and pull open the front panel.
Opening the front panel will light the "Battery" LED and a buzzer will sound. (intermittent buzzer).

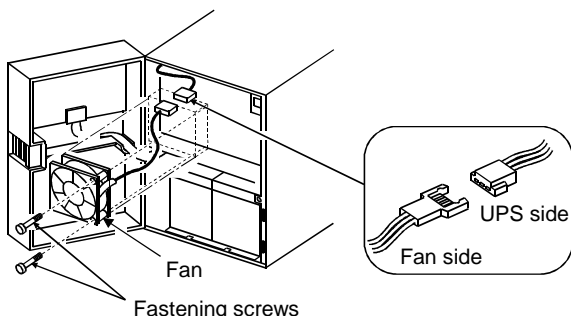


Gently hold down dents and open front panel.

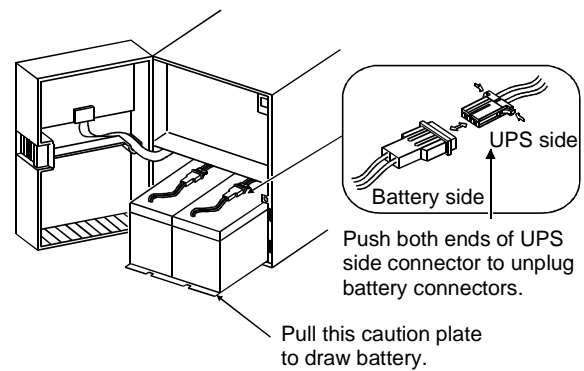
- (2) Remove the fastening screw in the right side, and slide the inner panel down and remove it as shown.



- (3) Remove two fan fastening screws, unplug the connectors, and remove the fan.
After that, install the maintenance fan in the reverse procedure.

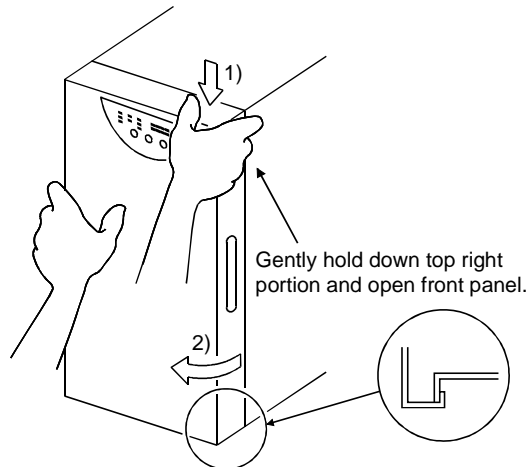


- (4) When changing the battery, hold the battery replacement caution label (caution plate) at the bottom of the battery case, and carefully pull the battery forward.
- (5) Push both ends of the UPS side connector to unplug the battery connectors.

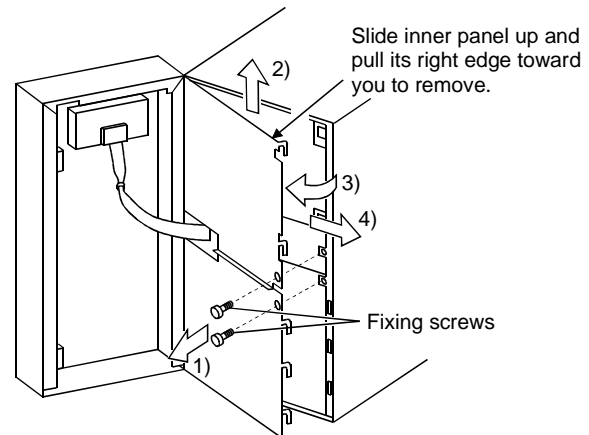


7011A-20/7011A-30

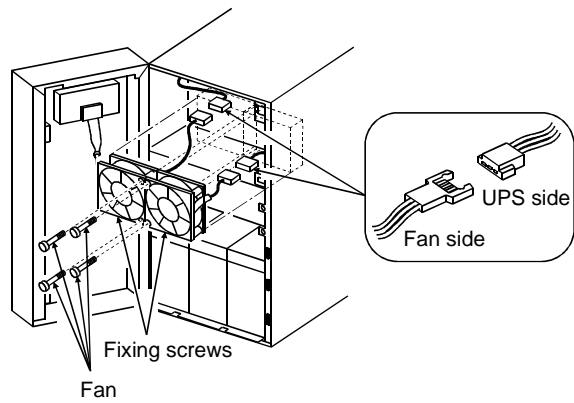
- (1) The front panel is designed to bind at the bottom right. Gently hold down the top right portion and open the front panel. Opening the front panel lights the "**Battery**" LED and sounds the buzzer (intermittent sound).



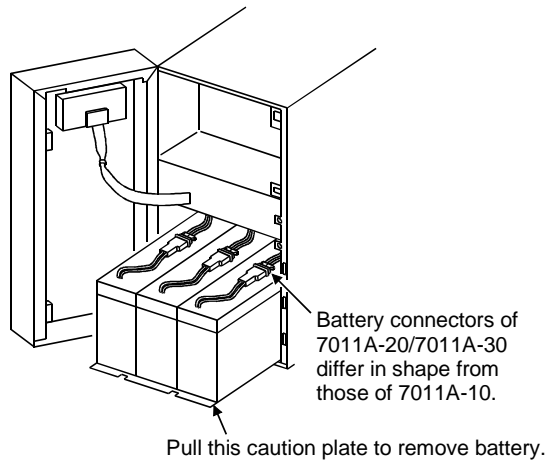
- (2) Remove two fastening screws in the right side, and slide the inner panel up and remove it as shown.



- (3) Remove the four fan fastening screws, unplug the connectors, and remove the fan.
After that, install the maintenance fan in follow the reverse procedure.



- (4) When changing the battery, hold the battery replacement caution label (caution plate) at the bottom of the battery case, and carefully pull the battery forward.
(5) Unplug the battery connectors.

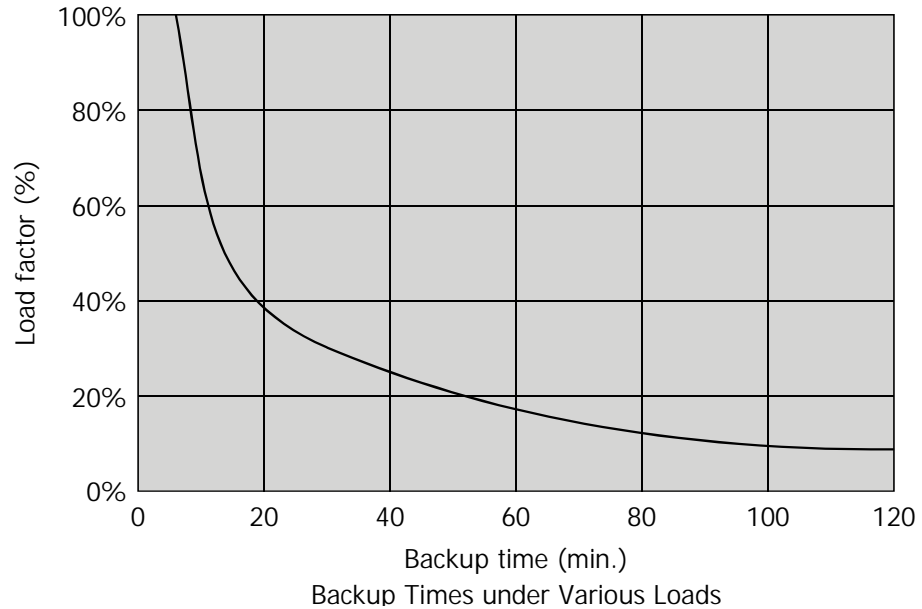


1. Be careful not to short the battery terminals.
2. Always connect the connector terminals or leads of the same color.
Note that a hazardous condition will take place if you connect the positive and negative connector terminals or leads to the terminals of opposite polarity or shorting them by touching them together.

DISPOSAL OF THE OLD BATTERY

Law requires proper disposal of the old batteries. Please contact your local governing authorities regarding proper disposal procedures or contact your sales representative for guidance on this matter.

BATTERY BACKUP TIMES VS LOAD FACTOR



The above characteristics are based on the ambient temperature of 77°F (25°C) at initial characteristics and at fully charged status. The backup time shortens as the battery ages and/or deteriorates. The data of the characteristic graphs are typical values and not guaranteed values.

$$\text{Load factor} = \frac{\text{Load Current}}{\text{Rated Current}} \times 100(\%)$$

BACKUP TIMES IN MINUTES

Capacity		7011A-10	7011A-20	7011A-30
VA	W			
100	70			
200	140			
300	210			
400	280			
500	350			
600	420			
700	490			
800	560			
900	630			
1000	700			
1200	840			
1400	980			
1600	1120			
1800	1260			
2000	1400			
2200	1540			
2400	1680			
2600	1820			
2800	1960			
3000	2100			

ALARM CONDITIONS

Alarm Output		Eternal Signals			Conditions	Resolution
LED Indication	Buzzer	UPS alarm	Battery error	Battery voltage low		
"Back Up" LED is lit.	2 consecutive intermittent double beeps sounds		○		Input power alarm (e.g. power failure)	Check for input power shut-off.
"Input" LED flicker.	-				Large Input voltage fluctuation.	Check the input power.
"Over Load" LED is lit. Four "Load" LED's flickers.	Intermittent sound				Overload alarm <ul style="list-style-type: none"> At "100%<load factor<110%", UPS operates continuously. At "110%≤load factor<140%", UPS switches to bypass operation in 30 seconds. At "140%≤load factor", UPS switches to bypass operation in 3 seconds. 	Overload occurred. Reduce load. *Load factor = Load current/rated current×100 (%)
"Over Load" LED is lit. "Bypass" LED flicker.	Continuous sound	○			Bypass mode under overload. Reducing load will clear overload automatically and start UPS operation.	Same as above
"Over Load" LED flickers. Four "Load" LED's flicker. "UPS" LED is lit.	Continuous sound	○	○		Overload occurred on back up mode Output shuts off.	Same as above
All "Charge" LED's are extinguished.	Intermittent sound			○	Indicates that output will shut off in approximately 2 minutes since battery is reaching its final discharge.	Bring computer and other loads to normal stop.

Alarm Output		Eternal Signals			Conditions	Resolution
LED Indication	Buzzer	UPS alarm	Battery error	Battery voltage low		
"Battery" LED is lit.	-				Battery deteriorated.	Replace battery.
"Battery" LED flickers.	Intermittent sound				Open front panel Battery connection fault	Close front panel. Check that battery is connected.
	Continuous sound			○	Open front panel during backup operation	Close front panel. Output will be shut off if front panel is left open for 15 seconds.
All LED's flicker (Note).	Continuous sound	○			Self-test error (battery) Internal fault (temperature alarm, output voltage alarm, bus voltage alarm, battery overvoltage) If bypass operation can be performed, UPS switches to bypass operation and provides bypass output. In case of a self-test error, operation will be returned to UPS operation.	(1) Check for blocked heat sink or high installation environment temperatures. (2) Check for overload or load short-circuit. If there are no problems in (1) and (2), contact Mitsubishi service group as it is a UPS internal fault.

- The LED indications and buzzers are correct unless the cause of the alarm is removed. However, these indications stop when UPS discharge ends during backup operation.
 - The alarm buzzer can be stopped temporarily by pressing the "ON" switch.
 - When the UPS has received a stop command, some "Charge" LED's give different indications.
- (Note) The exception is the key lock function.

TROUBLESHOOTING GUIDE

Event	Possible Reasons	Actions
Backup operation is not performed	Battery capacity is insufficient	Charge the battery until the "Charge" LED's are lit.
	Battery is deteriorated	Replace the battery if the "Battery" LED is ON.
	Backup operation non-switch over alarm occurred.	Overload alarm, open front panel alarm
	No load current automatic stop function (refer to page 18) is activated.	The UPS does not switch to battery operation under light load (less than 5% of the rated current). Check the load capacity and setting switches.
UPS does not start	"ON/TEST" switch was not pressed	Press the "ON/TEST" switch for 1 sec.
	Circuit protector on the rear panel has tripped	Push the popped-up button
	Cable of the operation/display unit is disconnected	Check cable and reconnect.
Battery operation takes place despite input commercial power being present	Circuit protector on the rear panel is tripped	Push the popped-up button
	Input power it too high, too low or is fluctuating	Input power fluctuates due to generator-driven operation Decrease sensitivity setting (refer to page 20)
UPS "clicks" inside	When input power fluctuates the UPS adjusts the voltage internally, producing switch-over sounds	If input power fluctuates frequently connect the UPS to another AC power source.



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Specifications subject to change without notice.