

AB-MSII20000 User Manual

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1. Safety Instructions and Battery Care

1.1 Safety Instructions

1. Because of small leakage currents generated by the EMI filter in the UPS it is necessary to double check that the ground wire of the UPS is properly grounded before connecting the UPS to the AC mains.
2. To ensure safety in all applications where a UPS is hard wired to the electrical supply, ensure that the system is installed by a qualified electrical contractor.
3. The UPS has its own internal energy source (battery). Should the battery be switched on when no AC power is available there could be voltage at the output terminals.
4. Make sure that the AC utility outlet is correctly grounded.
5. Do not open the case as there are no serviceable parts inside. Opening the case voids the warranty.
6. Do not try to repair the unit yourself; contact your local supplier. Repairing the unit yourself voids the warranty.
7. Please make sure that the input voltage of the UPS matches the supply voltage.
8. Use a certified input power cable with the correct plugs and sockets for the appropriate system voltage.
9. To prevent any overheating of the UPS keep all ventilation openings free from obstruction, and do not store things on top of the UPS. Keep the UPS 30 cm away from the wall.
10. Ensure that the UPS is installed within the proper environmental range. (0-40°C and 0-90% non-condensing humidity)
11. Do not install the UPS in direct sunlight. Your warranty may be void if the batteries fail.
12. Install the UPS indoors as it is not designed for installation outdoors.
13. Dusty, corrosive and salty environments can damage any UPS.
14. Install the UPS away from objects that give off excessive heat and areas that are excessively wet.
15. If liquids are spilled onto the UPS or foreign objects dropped into the unit the warranty will be null and void.
16. The battery will discharge naturally if the system is unused for a long time.
17. The UPS should be recharged every 2-3 months if unused. If this is not done then the warranty will be null and void. When installed and being used the batteries will be automatically recharged and kept in top condition.
18. This UPS supports electronic equipment in office, telecommunication, process-control, medical, and security applications. Non-authorized technicians are not allowed to install the UPS in the following areas.
 - a. Medical equipment directly related to human life.
 - b. Elevators, subway systems, or any other equipment related to human safety.
 - c. Public systems or critical computer systems.
19. Do not install the UPS in an environment with sparks, smoke or hazardous gas.
20. Make sure the UPS is completely turned off when transporting it. It might cause electrical shock if the output is not cut completely.
21. The UPS includes a Maintenance Bypass Switch. Please follow the procedures strictly when switching on or off the Maintenance Bypass Switch.
22. The UPS offers a CVCF (Constant Voltage Constant Frequency) setting function.
 - a. For correct setting and wiring please contact with your local utility agent.
 - b. Do not set it yourself or your warranty will be void.
23. This UPS has been designed and constructed to protect your assets from the wide range of power aberrations experienced on utility power lines today. It is your insurance for a reliable, clean and stable voltage supply. It is worth taking care to install the system correctly and to have it maintained correctly by your local dealer.
24. **SAVE THESE INSTRUCTIONS.** This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries.
25. The UPS is intended for installation in a controlled environment.
26. Install the UPS so that it is not likely to be contacted by people.
27. The maximum ambient operating temperature is 40°C or equivalent.
28. Units are considered acceptable for use in a maximum ambient 40°C
29. **CAUTION - RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.**
30. **CAUTION -** Do not dispose of batteries in a fire. The batteries may explode.
31. **CAUTION –** Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
32. **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:
 - 1) Remove watches, rings, or other metal objects.
 - 2) Use tools with insulated handles.
 - 3) Wear rubber gloves and boots.
 - 4) Do not lay tools or metal parts on top of batteries.
 - 5) Disconnect charging source prior to connecting or disconnecting battery terminals.

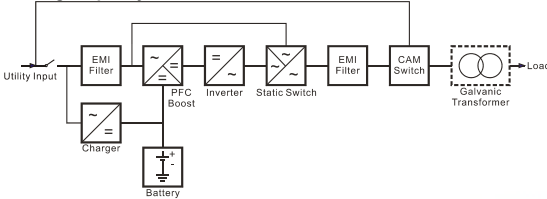
- 6) Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

1.2 Battery Care

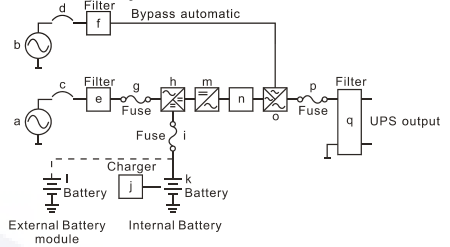
If the UPS is unused for an extended period of time it must be stored in a moderate climate. The batteries should be charged for twelve hours every three months by plugging the UPS power cord into a wall receptacle and turning on the input breaker on the front panel. Repeat this procedure every two months under a high-temperature environment.

2. UPS System Block Diagram

2.1 Single input System Block



2.2 Dual input System Block



- a UPS Utility Input: to provide the AC source to the UPS rectifier circuit and charger.
- b UPS Bypass Input: to provide the AC source to the UPS Bypass Input and Maintenance Bypass loop.
- c UPS Utility Input Breaker: to protect the UPS Rectifier circuit from over-current.
- d UPS Bypass Input Breaker: to protect the UPS Bypass circuit from over-current.
- e EMI Filter on UPS Utility Input : to eliminate the magnetic interference from AC Source or UPS Utility Input.
- f EMI Filter on UPS Bypass Input: to eliminate the magnetic interference from AC Source or UPS Bypass Input.
- g Fuse for UPS Utility Input: to provide over-current protection for UPS Rectifier Circuit.
- h Rectifier and Booster: When Utility is normal, they will converts the AC to DC and correct input power factor. When Utility is abnormal, the batteries will be boosted to provide the DC voltage to the Inverter.
- i Input fuse for Battery: to protect batteries when DC-Booster is out of order.
- j Charger: the battery charging device.
- k Internal Battery: When AC abnormal, it provide the backup power from the batteries.
- l External Battery Bank: To provide longer backup time by adding additional Battery bank.
- m Inverter Generator: To convert the DC voltage to AC voltage
- n Inverter Output Switch: Only when the UPS is overloaded or abnormal, or the UPS is working on ECO mode or if EPO(Emergency Power Off) is activated, the Switch will be opened.
- o Auto Bypass Loop: When the UPS is overloaded or abnormal, the UPS will Switch the UPS from inverter output to bypass output automatically.
- p UPS Output Fuse: When the UPS is overloaded, the fuse will open.
- q UPS Output EMI Filter: To eliminate the magnetic interference from the UPS Output and avoid the interference caused by the output load and the UPS.

Note: Informational purposes only ,the actual configuration depend on each model.

3. UPS Functional Descriptions

3.1 Front Panel Display

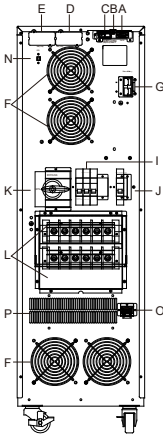
3.1.1 Front Panel Function Explanations

LCD Panel	
Symbol	Description
	UPS On/Alarm Silence
	UPS OFF Switch
	Special functions log in/out
	To re-confirm the change of UPS Setting
	Go to next page
	Go to previous page or change the setting of the UPS.
	Solid green LED indicates that the utility input voltage is within the window. Flashing green LED indicates that the utility input voltage is outside the acceptable window.
	Green LED indicates that Bypass Input is normal.
N+1	Green LED indicates that the UPS is able to run under redundancy mode.
ECO	UPS is working under ECO (Economical) mode.
	UPS Fault or Abnormal

3.1.2 LCD display description

LCD Panel	
Sign	Description
	Bypass Input Abnormal, UPS fails to transfer to bypass, Bypass Abnormal at ECO mode
	Utility Input Abnormal
	Site Wiring Fault
	Buzzer Silent
	UPS Overloading
	UPS Working in specified mode*
	UPS Fault or Abnormal Warning
	UPS Flow Chart
	3-Digit Measurement Display
	Indicates the item to be measured
Fault ◀	Battery Abnormal
Low ◀	Battery Low
Testing ◀	Testing

3.1.3 Rear Panel



- A) RS-232 Port
 - B) Terminal Resistor for Parallel function
 - C) CAN Bus Connection Port for Parallel System
 - D) Customer Options Slot 1
 - E) Customer Options Slot 2
 - F) Cooling Fan
 - G) External Battery Connector
 - I) Utility Input Breaker CB1
 - J) Bypass Input Breaker CB2 (for Dual Input Model Only)
 - K) CAM Switch (Maintenance Bypass Switch)*
 - L) Input / Output Terminal Block
 - N) EPO (Emergency Power Off) : Short to enable the function
 - O) Transformer Input Breaker CB3
 - P) Air Ventilation Hole
- ◆ DIM : Dual Input Model, SIM : Single Input Model
* :Option

3.2 Communication Port

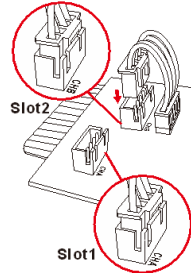
The communication port on the UPS provides for RS-232 communication with the UPS software to remotely monitor the power and UPS status.

You may use optional interfaces cards for R2E (second RS-232), RSE (RS-485), USE (USB), DCE (Dry Contact), and SNMP. However, the R2E card, RSE card and USE card must not be used simultaneously.

The software bundled with the UPS is compatible with many operating systems such as Windows 98, 2000, ME, NT and XP. For other applications such as Novell NetWare, Unix, or Linux please contact your local distributor for a proper solution.

When the optional interface cards are used together with the onboard RS-232 port the EPO signals will get highest priority, then the SNMP/WEB card, then the shutdown command at the DCE, R2E, RSE, and USE cards, and then finally the onboard RS-232 port gets the lowest priority.

Model	Interface		Comment
	Slot1 (CHA)	Slot2 (CHB)	
RS232 Card (R2E)	✓	✓	Connect CHA on RS232 Card for Slot1 Connect CHB on RS232 Card for Slot2 (Default)
RS485 Card (RSE)*	✓	✓	*Previous version of MSXN55 only for Slot1 Connect CHA on RS485 Card for Slot1 Connect CHB on RS485 Card for Slot2 (Default)
USB Card (USE)	✓	✓	Connect CHA on USB Card for Slot1 Connect CHB on USB Card for Slot2 (Default)
Dry Contact Card (DCE)	✓	✓	Connect CHA on Dry Contact Card for Slot1 Connect CHB on Dry Contact Card for Slot2 (Default)
SNMP/WEB Card		✓	



3.2.1 True RS-232

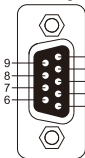
3.2.1.1 Interface Settings

The RS-232 interface shall be set as follows:

Baud Rate	2400 bps
Data Length	8 bits
Stop Bit	1 bit
Parity	None

3.2.1.2 Pin Assignments

The Pin Assignments of true RS-232 are as follows (The connector is male.):



- Pin 3: RS-232 Rx
- Pin 2: RS-232 Tx
- Pin 5: Ground

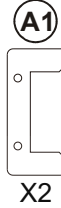
4. Installation and Operation

Carefully inspect the UPS for shipping damage before installation. Retain the packing material for future use.

4.1 Unpacking

4.1.1 Standard package contents:

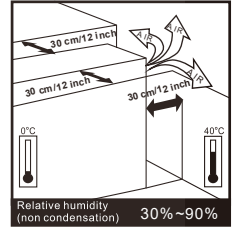
- User Manual
- Metal Accessories Kit as below:



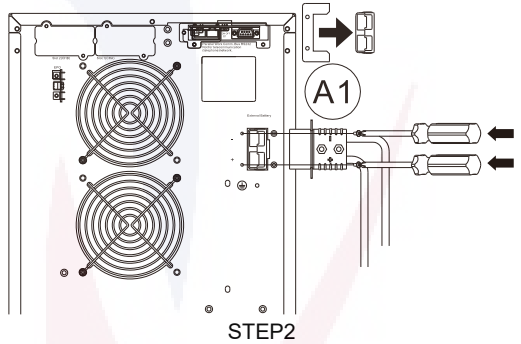
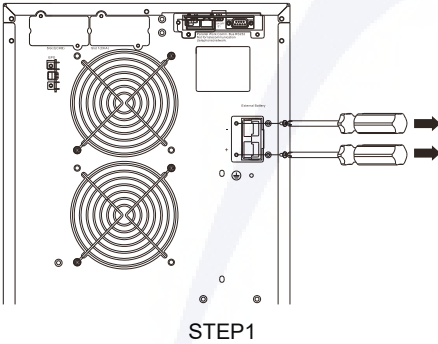
4.2 Selecting Installation Position

Install the UPS in a proper environment to minimize the possibility of damage to the UPS and to extend the life of the UPS. Please follow these rules:

1. Keep at least 30 cm (12 inches) clearance from the rear panel of the UPS to the wall.
2. Do not block the air flow to the ventilation openings of the unit.
3. Ensure that the installation site is not excessively hot or moist.
4. Do not place the UPS in an environment near dust, corrosive or salty material, or flammable objects.
5. Do not expose the UPS to the outdoors.



4.3 Installation of Accessories Kit



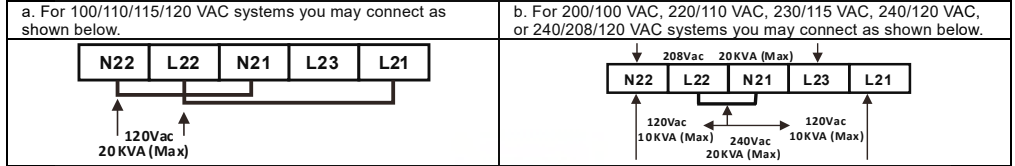
4.4 Terminal Block Explanation

INPUT					
G1	L12			L11	
G1: INPUT EARTH GROUND			L11-L12 UTILITY INPUT		
OUTPUT					
G2	N22	L22	N21	L23	L21
N22, L22, N21, L23, L21: UPS OUTPUT			G2: OUTPUT EARTH GROUND		

- **L11-L12:** the terminal for Utility Input to provide the power source when the UPS is working under Utility mode
- **G1:** the terminal for UPS Input Ground
- **L21 · L23 · N21 · L22 · N22:** the terminals for UPS Output
- **G2:** the terminal for UPS Output Ground

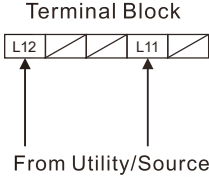
Remarks:

1. The maximum current for each terminal is 120 Arms for 20 kVA.
2. This UPS is a SIM (Single Input) type, only AC source can be supplied to the UPS from the L11-L12 terminal for the 1-phase input model.
3. Use No. 4 AWG, 75°C minimum copper wire and 23 lb-in Torque force when connecting to terminal block
4. This isolation transformer tower-type UPS Output terminals:



5. Please refer to the specifications of input current, output current and recommended conductors listed below.

Model	Maximum Current	Conductor Section AWG (mm ²)	Torque force
20KVA	120 A/111 A (In/Out)	AWG #4 (25mm ²)	



b. Battery input

Model	Maximum Current	Conductor Section AWG (mm ²)
20KVA	62.5 A/83 A	AWG #6 (16mm ²) / AWG #4(25mm ²)

4.5 Installation and Operation

4.5.1 Start Up in Normal Mode

4.5.1.1 Open the terminal block cover on the rear panel. (Refer to 3.1.3) Before starting the installation make sure the grounding is connected properly.


4.5.1.2 Make sure the utility breaker and the UPS' Utility breaker and Bypass breaker are in the "Off" position.

4.5.1.3 Make sure the utility voltage matches the input voltage window of the UPS.

4.5.1.4 Connect the utility separately to the terminal blocks of the UPS' Utility and Bypass inputs. Switch on the power breaker of the distribution panel and the breakers of the UPS' Utility and Bypass inputs. Then the UPS will start up. Green LEDs λ_1 and λ_2 show that the Utility and Bypass inputs are normal. UPSs with parallel function enabled will display first figure A1, then figure A2, and then figure B. Otherwise the LCD will display figure A1 directly followed by figure B.

A1		A2	
B			

4.5.1.5 The UPS is in Bypass Mode now. It will proceed to self-test automatically. If no abnormal message appears then the pre-startup of the UPS was successful and the charger starts to charge the batteries.

4.5.1.6 Press the UPS On Switch  for approximately three seconds. The Buzzer sounds twice and the LCD display changes from figure B to figure C.


4.5.1.7 The UPS is in self-test mode again. The LCD display will change from figure C to figure D, and the UPS will remain in battery mode for approximately four seconds. Then the display will change from figure E1 to figure E2 if the self-test was successful. The entire process will take approximately 1 to 2 minutes.


C		D	
E1		E2	
F			


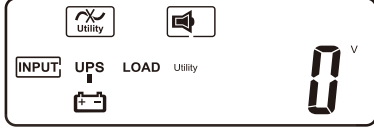
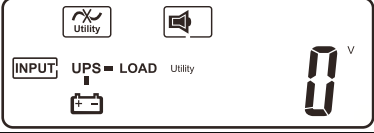
4.5.1.8 If the self-test fails the LCD display will change from figure D to figure E2. Then an error code or error status will appear on the screen.

4.5.2 Start-up in Battery Mode (Cold Start)


4.5.2.1 Make sure the UPS has at least one set of batteries (20 pcs 12V/7Ah or 9Ah for 20k model).

4.5.2.2 Push the UPS On Switch  once for approximately 5 seconds to awaken the UPS. The buzzer will sound twice. The LCD display will change from figure A to figure G for approximately 15 seconds.

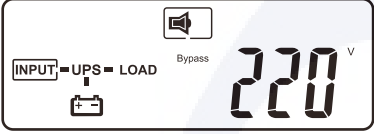
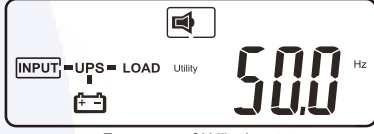
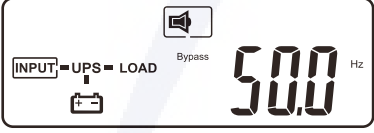
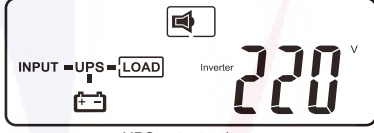
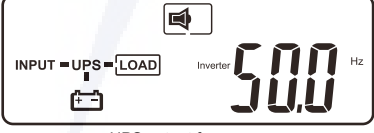


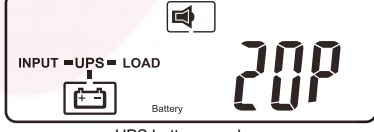
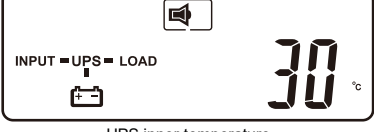
4.5.2.3 Press the UPS On Switch  again for about three seconds until the LCD display changes from figure G to figure H. Then the UPS will be in self-test mode. The UPS may offer energy to the output in a minute, and the LCD displays figure I. In case of failure in pushing the UPS On Switch for 15 seconds, the UPS will automatically turn off. You must then repeat steps 4.5.2.1 to 4.5.2.3.

G	 <p>"Off", which means the UPS pre-start was successful</p>	H	 <p>Utility input is "0" and Utility Abnormal.</p>
I			

4.5.3 Check Measured Values and Figures detected by the UPS


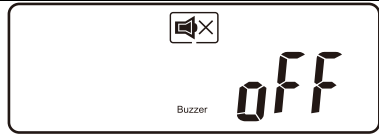
4.5.3.1 If you would like to check the measured values and figures detected by the UPS use the scroll up  and scroll down  keys.


The display sequence are as below figure C ~ P.

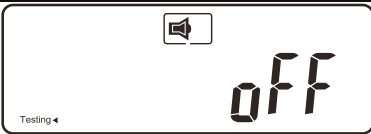

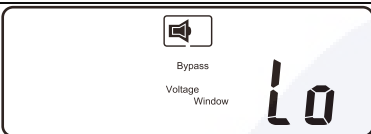
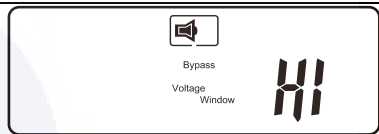
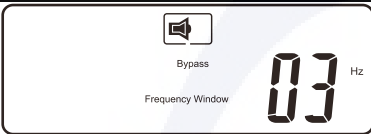
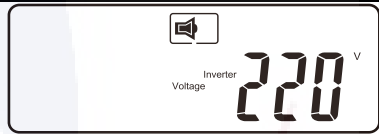
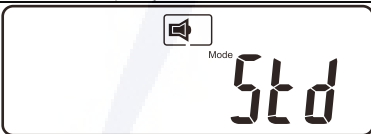
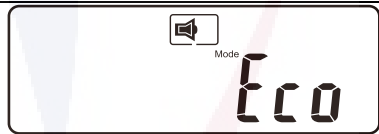
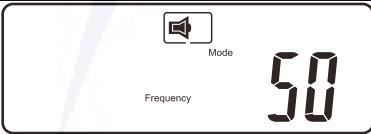
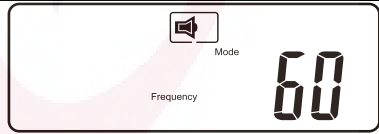
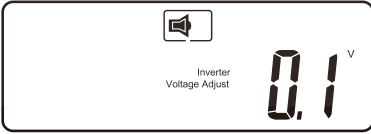
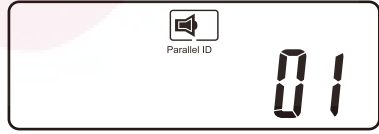
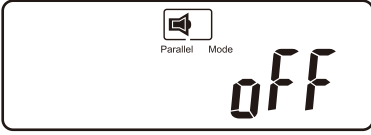
I1	 <p>Voltage comes from Bypass Input</p>	J	 <p>Frequency of Utility Input</p>
K	 <p>Frequency of Bypass Input</p>	L	 <p>UPS output voltage</p>
M	 <p>UPS output frequency</p>	N	 <p>UPS output load level (%)</p>
O1	 <p>UPS battery voltage</p>	O2	 <p>UPS battery numbers</p>
P	 <p>UPS inner temperature</p>		


4.5.4 UPS Default Data and Special Function Execution

4.5.4.1 After the UPS completely starts up, press the  key to change the LCD display to figure Q1.



Q1	 <p>Buzzer On</p> <p>buzzer "On"</p>	Q2	 <p>Buzzer Off</p> <p>buzzer "Off"</p>
----	--	----	---

4.5.4.2 Press the  key to scroll through the UPS settings. The LCD will display in sequence figure Q1~Y.


R1	 <p>Testing ◀</p> <p>Off</p> <p>Self-test is not "On"</p>	R2	 <p>Testing ◀</p> <p>On</p> <p>Self-test is "On"</p>
S1	 <p>Bypass Voltage Window Lo</p> <p>Bypass Voltage is adjusted to wide range</p>	S2	 <p>Bypass Voltage Window Hi</p> <p>Bypass Voltage is adjusted to narrow range</p>
T	 <p>Bypass Frequency Window 03 Hz</p> <p>Frequency Window is ± 3 Hz.</p>	U	 <p>Inverter Voltage 220 V</p> <p>Inverter output voltage</p>
V1	 <p>Mode Std</p> <p>The UPS is operating in "normal mode".</p>	V2	 <p>Mode Eco</p> <p>The UPS is operating in "Eco mode".</p>
V3	 <p>Mode 50</p> <p>Frequency</p> <p>The UPS is operating in "CVCF 50 Hz mode"</p>	V4	 <p>Mode 60</p> <p>Frequency</p> <p>The UPS is operating in "CVCF 60 Hz mode"</p>
W	 <p>Inverter Voltage Adjust 0.1 V</p> <p>Output Voltage Adjustment ($\pm 6.0V, 0.1V/Per-scale$)</p>	X	 <p>Parallel ID 01</p> <p>UPS position in parallel mode</p>
Y	 <p>Parallel Mode Off</p> <p>The parallel function is disabled.</p>		

4.5.4.3 Press the scroll up  key to execute special functions. The functions include buzzer ON (as in figure Q1), buzzer OFF (as in figure Q2, Alarm silence for UPS Warning), and self-test OFF (as in figure R1) or self-test ON (as in figure R2). The UPS will execute the battery test for ten seconds. If the self-test is successful it will display figure E1; otherwise, it will display figure E2 and an error message at the same time.)

4.5.5 UPS Default Settings and their alternatives

4.5.5.1 Make sure the UPS is not "On". Press the On  and scroll down  keys simultaneously for approximately three seconds. The buzzer will sound twice, and the LCD will display figure Q1, indicating that the UPS is in setting mode.

4.5.5.2 To scroll through the options refer to section 4.5.4.2.

4.5.5.3 Except for Buzzer (figures Q1 and Q2) and Self-test (figures R1 and R2) all of the other default settings may be changed by pressing the scroll up  key.

4.5.5.4 Figures S1 and S2 indicate the bypass input acceptable window. It follows the inverter output voltage. (i)Bypass Sensitivity Low: many selectable output voltages±15% and (ii)Bypass Sensitivity High: many selectable output voltages±10%.

4.5.5.5 Figure T indicates the bypass frequency window of the Inverter Output. The acceptable setting values are ±3 Hz and ±1 Hz.

4.5.5.6 Figure U indicates the acceptable Inverter Output Voltage. Possible values are 200, 208, 220, 230, or 240 VAC.


4.5.5.7 Figures V1, V2, V3 and V4 indicate the operation modes of the UPS. Possible values are Online, Eco (Economical) mode, fixed 50 Hz Output, and fixed 60 Hz Output.

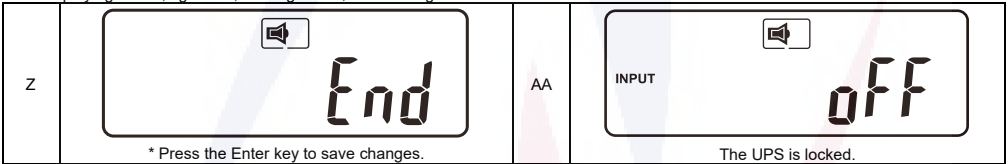
4.5.5.8 Figure W indicates the fine tune range of inverter voltage which can be set from -6V to +6V of rating voltage. (The minimum adjustable scale is 0.1V).

4.5.5.9 Figure X indicates the position of the UPS when the UPS is in Parallel mode. Possible positions are 1, 2, 3, and 4. The position must be 1 if the UPS is not in Parallel mode.

4.5.5.10 Figure Y indicates the parallel function status. "OFF" and "ON" separately indicate disabled and enabled.

4.5.5.11 Figure Z indicates the last page of settable parameters.

4.5.5.12 After changing settings, you must press the enter  key to save all of your changes and exit the setting mode. Then the LCD will display figure AA, figure A1, then figure A2, and then figure B.











4.5.5.13 Turn Off the Utility Input breaker.

4.5.5.14 Your setting changes are now complete.

4.5.6 Troubleshooting when the UPS is Off Due to Unknown Reasons


4.5.6.1 If there is a serious abnormal condition the UPS will lock itself in the "OFF" position as shown in figure AB, and an "abnormal" message will appear on the LCD.

4.5.6.1.1 After three seconds all messages will be locked except both Bypass messages (LED ² and LCD ) and Utility messages (LED ¹ and LCD ). If the Bypass or Utility is abnormal after the UPS is locked, the related LED ² or ¹ will be extinguished and also the related LCD symbol  or  will appear.

4.5.6.2 To release the UPS lock proceed as follows:

4.5.6.2.1 Check the recorded error messages.


4.5.6.2.2 Check the error messages in section 3 to help troubleshoot the problem. For further help consult your local distributor.

4.5.6.2.3 Press the Off  key for five seconds. A buzzer will sound twice.

4.5.6.2.4 Turn Off the Utility Input breaker.

4.5.6.2.5 Even if the UPS lock problem is solved now, consult with your local distributor to make sure that the error condition is resolved.

4.5.7 Shut Off

4.5.7.1 Press the Off  key for five seconds. The Inverter output will be turned off, and the output load will be supplied by the Bypass loop.
The LCD will display figure B.

4.5.7.2 Turn Off the Utility and Bypass Input breakers.

4.5.7.3 The UPS is now turned off completely.

5. Troubleshooting Guide




5.1 Troubleshooting

If the UPS malfunctions during operation first check the following:

a) Is the input and output wiring correct? b) Is the input voltage of the utility within the input window of the UPS?

If problems still exist check the following for proper adjustment.

Should the problem still persist, please contact your local distributor for help.

Situation	Check Items	Solution
Red Fault LED	<p>Check the error code shown on the LCD.</p> <ol style="list-style-type: none"> Er05,  &  Er06, Er10, Er12, Er28 &  EPO Er11, Er33 Er14 Er15 Er16, Er27 Er21 Er24 other error code 	<ol style="list-style-type: none"> Check the proper battery connection, then recharge the batteries for 8 hours to see whether the UPS provides backup power normally; otherwise, consult your local distributor right away. If CB3 is tripped, turn off the UPS completely and keep the CAM switch at position INV before pressing CB3. Then remove some uncritical load at the UPS output end. If there is any damage to the insulation of the AC power cord, please replace it with a new one. Remove the short circuit at the EPO terminal. Remove any objects blocking the ventilation holes. Check that the cooling fans on the rear panel are working normally. Make sure the UPS is operated normally. If it is in CVCF mode you must turn off and turn on the UPS again. All of the parameters except ID Number in a parallel UPS must be the same. Please refer to section 4.5.5 to set them again. Disconnect and reconnect the RJ45 connector or set a UPS with ID=1. When the UPS is in CVCF mode it is prohibited from having bypass input. You must turn off the UPS and bypass input and then restart the UPS. Consult your local distributor for assistance.
UPS fails to offer battery backup or its backup power time is shorter than calculated.		If the backup time remains unsatisfactory after 8 hours of charging, please contact your local distributor for battery replacement.
UPS locks itself and can not be turned off.		Refer to section 4.5.6 to troubleshoot the problem; otherwise, consult your local distributor for help.

6. Communication Software

6.1 Hardware Setup

- Connect the male connector of the RS-232 cable to the UPS communication port.
- Connect the female connector of the RS-232 cable to a dedicated RS-232 port of the attached computer.

6.2 Software Installation

Please refer to the software user's manual.

7. Specifications

UPS Model		AB-MSII20000	
INPUT			
Voltage Window		160-280 VAC (1Φ)	
Frequency		45-65 Hz	
Phase/Wire		Single-Phase, Line1 + Line2 + PE	
Power Factor		>0.9 (0.95)	
Current THD (100% linear load)		<30%	
OUTPUT			
Voltage Window		220/230/240 VAC Selectable (208/120 VAC optional)	
Voltage Adjustment		±0%, ±1%, ±2%, ±3%	
Voltage Regulation		±2%	
Capacity		20000 VA/18000 W	
Rated Power Factor		0.9 Lagging	
Wave Form		Sine Wave, THD<3% (no load to full load)	
Frequency Stability		±0.2% (Free Running)	
Frequency Regulation		±1Hz, ±3Hz	
Transfer Time		0 ms	
Crest Factor		3:1 acceptable	
Efficiency (AC to AC, Normal)		Up to 91%	
Efficiency (AC to AC, ECO)		Up to 96%	
Autonomy	60 pcs	≥ 7 min.	
	80 pcs	≥ 11 min.	
DC Start		Yes	
BATTERY (External Battery Bank)			
Type		Sealed Lead Acid Maintenance Free	
Quantity	Without TX	12V/9Ah x 60pcs	
	With TX	12V/9Ah x 80pcs	
Voltage		240 VDC	
Recharge Time		6 Hours to 90%	
DISPLAY			
Status On LED + LCD		Line Mode, Backup Mode, ECO Mode, Bypass Supply, Battery Low, Battery Bad/Disconnect, Overload, Transferring with interruption, UPS Fault	
Readings on LCD		Input Voltage, Input Frequency, Output Voltage, Output Frequency, Load Percentage, Battery Voltage, Inner Temperature.	
Self-Diagnostics		Upon Power-on, Front Panel Setting & Software Control, 24-hour routine checking	
ALARMS			
Audible and Visual		Line Failure, Battery Low, Transfer to Bypass, System Fault Conditions	
PHYSICAL			
Dimensions WxDxH (mm)	Without TX	290 x 645 x 748 mm	
	With TX	320 x 670 x 1018 mm	
Input/Output Connection		Hard-wired	
External Battery Connection		Plug-in & Play	
Net Weight (kg)	Without TX	60	
	With TX	151	
ENVIRONMENT			
Operating Temperature		0 C to 40 C	
Temperature Warning		The battery design life is based on a temperature of 25 C. Ambient temperature above this range will reduce battery life.	
Altitude		0~2000m up to 40 C, 3000m up to 35 C	
Humidity		90% RH Maximum, Non-Condensing	
Noise		<60dB (at 1 meter)	
COMPUTER INTERFACE			
Interface Type		Standard RS232 Interface	
Communication Slots		2 nd RS232, USB, RS485, Relay Contact (DCE), SNMP/WEB Card, etc.	
SAFETY CONFORMANCE			
Quality Assurance		ISO9001 Certified Company	
Safety Standard		EN62040-1-1,	
EMC Standard		EN62040-2, EN61000-3-4, EN61000-3-5,	
Marks		CE	

Specifications are subject to change without prior notice.





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