



**UNINTERRUPTIBLE POWER SUPPLY SYSTEM**  
**MODEL**

# **M9950 SERIES**

**OWNERS / TECHNICAL MANUAL**

**60~600kVA**

**(Inclusive Parallel Operation System Application)**



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## HOW TO USE THIS MANUAL

This manual is designed for ease of use, giving the user easy and quick reference to information.

This manual uses notice icons to draw attention to the user important information regarding the safe operation and installation of the UPS. The notice icons used in this manual are explained below, and should be taken into account and adhered to whenever they appear in the text of this manual.



**Warning:** A warning symbol shows potentially hazardous situation or condition which could result in personal injury or death, if not avoided.



**Caution:** A caution symbol shows potentially hazardous situation or condition which could result in personal injury or equipment damage, if not avoided.



**Note:** A Note symbol shows the information the user or the service personnel should observe during the UPS operation or service work.



**Prohibit:** A prohibit symbol shows the act the user or the service personnel should NEVER perform during the UPS installation, operation or service work.

**Safety Recommendations:** If any problems are encountered while following this manual, TMEIC field service group assistance and correspondence is recommended.

## **1.0 INTRODUCTION**

The MITSUBISHI Uninterruptible Power Supply System (UPS) is designed to provide many years of reliable protection from power failure, brown-outs, line noise, and voltage transients. To ensure optimum performance of the equipment, follow the manufacturer's instructions. This manual contains descriptions required to operate the UPS. Please read this manual carefully and retain it for future reference.



### **IMPORTANT SAFETY INSTRUCTIONS**

**SAVE THESE INSTRUCTIONS**

This manual contains important instructions for the M9950 SERIES Uninterruptible Power Supply Systems that should be followed during installation and maintenance of the UPS and batteries.



### **WARNING 1**

**Lethal voltages exist within the equipment during operation. Observe all warning and cautions in this manual. Failure to comply may result in serious injury or death. Obtain qualified service for this equipment as instructed.**


**WARNING**
**WARNING 2**

In no event will MITSUBISHI be responsible or liable for either indirect or consequential damage or injury that may come from the use of this equipment.


**PROHIBIT**

**Don't modify the UPS entirely or partially.**

**Any modifications without authorization by MITSUBISHI could result in personal injuries, death or destruction of the UPS.**

**1.1 SAFETY PRECAUTIONS**
**APPLICATION**

**This UPS shall NOT be applied to support equipment (\*) that could affect the human lives.**


**PROHIBIT**

- \* • Medical operation room equipment
- Life support equipment (artificial dialysis, incubators, etc.)
- Toxic gas or smoke eliminators
- Equipment that must be provided under fire laws, construction standards or other ordinances
- Equipment equivalent to the above

**Special considerations are required when applying this UPS to the equipment (\*\*) that affect human safety and/or maintain public services.**


**NOTE**

- \*\* • Equipment to supervise or control airways, railways, roads, sea-lanes or other transportation.
- Equipment in nuclear power plants.
- Equipment to control communications.
- Equipment equivalent/similar to the above mentioned.




**WARNING 3**

**The UPS is to be installed in a controlled environment.**

**Improper storage and installation environment may deteriorate insulation, shorten component life and cause malfunctions.**

**Keep the installation environment per standard described as follows:**

**TABLE 1.1** UPS Installation Environment

No.	Item	Environment standard	
1	Installation location	Indoors	
2	Ambient temperature	Minimum temperature: 32°F(0°C), Maximum temperature: 104°F(40°C) The average temperature over any 24-hour period must be in the range 41° F (5°C) to 95°F(35°C), and over one year period must be in the range 77° F (25°C).	
3	Relative humidity	The relative humidity must be held between 20 and 95%. The environmental condition must be no condensation when temperature changes.	
4	Altitude	This equipment must not be applied at altitude that exceeds 1000m(3280ft) above sea level.	
5	Dust	Dust in the room where the UPS is installed must not exceed normal atmospheric dust levels. In particular, that dust should not include iron particles, oils or fats, or organic materials such as silicone.	
6	Inflammable gas following IEC654-4(1987) Class1	There should be no inflammable/explosive gas.	
		Hydrogen sulfide (H <sub>2</sub> S)	No more than 0.003 PPM
		Sulfurous acid gas (SO <sub>2</sub> )	No more than 0.01 PPM
		Chlorine gas (Cl <sub>2</sub> )	No more than 0.002 PPM
		Hydrogen fluoride gas (HF)	No more than 0.001 PPM
		Ammonia gas (NH <sub>3</sub> )	No more than 1 PPM
		Nitrous oxides (NO <sub>x</sub> )	No more than 0.05 PPM
		Ozone (O <sub>3</sub> )	No more than 0.002 PPM

**WARNING 4**

This UPS does not include a Bypass input circuit breaker (MCCB) to protect bypass circuit. The Bypass input circuit breaker (MCCB) is to be field supplied and installed. Recommended Breaker (MCCB)'s Specifications are as follows:

**TABLE 1.2** Rating of Bypass Input Circuit Breaker

Capacity (kVA)	AC Input (A)	Bypass Input (A)	DC Input (A)
	Pf=0.9		Pf=0.9
60	125	125	200
120	225	225	300
160	300	300	400
200	400	400	500
300	630	630	800
400	800	800	1000
500	1000	1000	1250
600	1250	1250	1400

AC input and AC output overcurrent protection and disconnect devices shall be field supplied and installed. The DC circuit breaker (MCCB) shall be field supplied and installed. The overcurrent protection device should be installed in the Battery cabinet and rated as indicated in TABLE 1.7.

**Note:** The DC input overcurrent protection (Battery disconnect breaker) hereinafter will be referred as “72B”.

**WARNING****WARNING 5****Risk of Voltage Backfeed**

Before working on this circuit Isolate Uninterruptible Power System (UPS),  
Then check for Hazardous Voltage between all terminals including the protective earth

## **1.2 GENERAL**

The MITSUBISHI M9950 SERIES UPS is designed to provide continuous and clean electrical power to a critical load. Additionally the UPS monitors power conditions affecting the load. In the event of an input power failure, the UPS will supply power to the critical load for the specified battery time.

If the input power is not restored promptly, back-up power from the UPS battery permits the orderly shutdown of equipment supported by the UPS. The UPS is simple to start-up, operate and maintain.

The M9950 SERIES UPS is available in five kVA sizes – 60, 120, 160, 200, 300, 400, 500 and 600kVA. Specifications for each kVA model appear in Section 1.6. The principles of operation described herein are applicable to all models.

This manual provides an overview of the M9950 SERIES components and their functions. The appearance and purpose of operator controls and indicators is described with procedures for operation, start-up, shutdown and basic maintenance included.

### 1.3 DEFINITIONS

**UNINTERRUPTIBLE POWER SUPPLY SYSTEM (UPS)** - All components within the UPS Module Cabinet and associated batteries that function as a system to provide continuous, conditioned AC power to a load. This is sometimes referred to as the "System".

**UPS MODULE CABINET** - The metal enclosure which contains the Converter / Charger, Inverter, Static Transfer Switch, Internal Bypass line, operator controls, and internal control systems required to provide specified AC power to a load.

**UPS MODULE** - The Converter / Charger and Inverter assemblies which, under the direction of the internal control system and operator controls, provide specified AC power to a load.

**INVERTER** - The UPS components which contain the equipment and controls necessary to convert DC power from the Converter / Charger, or the battery, to AC power required by the critical load.

**CONVERTER / CHARGER** - The UPS components which contain the equipment and controls necessary to convert input AC power to regulated DC power required for battery charging and for supplying power to the Inverter.

**STATIC TRANSFER SWITCH** - The device which connects the critical load to the bypass line when the Inverter cannot supply continuous power.

**BYPASS LINE** - The line which conducts electricity directly from the input power source to the critical load during Maintenance or whenever the UPS is not completely operational.

**AC INPUT POWER** - Power provided by the electrical utility company, or auxiliary generator, which is connected to the UPS for supplying the critical load.

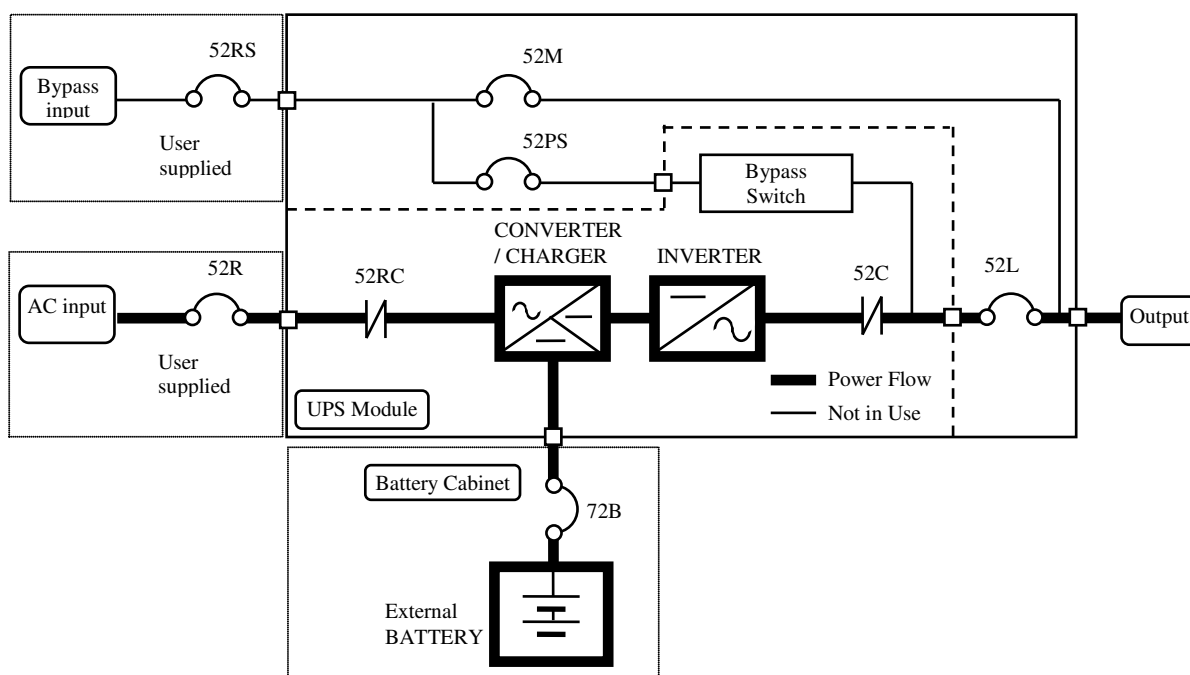
**BATTERY** - The rechargeable battery strings which supply DC power to the inverter to maintain continuous AC power to the load during AC input power failure conditions.

## 1.4 OPERATION OVERVIEW

The UPS provides two power paths between the utility source and the critical load. FIGURE 1.1 shows the path for normal operation, with the load powered from the inverter. FIGURE 1.2 shows the path for bypass operation, with the load supplied through the static bypass line.

**A) Normal operation:** Load power supplied by each system UPS inverter.

**FIGURE 1.1** Single Line Diagram - Normal Operation: Load powered by UPS inverter



During normal operation, the path through the UPS inverters is used to power the load.

Referring to FIGURE 1.1: Input AC power is converted to DC by the Converter. DC power is utilized to charge the UPS battery and to provide power to the Inverter. The Inverter converts the DC power to clean AC power to supply the critical load.

The conversion - inversion process eliminates any voltage transients or fluctuations existing in the input power before it reaches the critical load.

The power drawn by the critical load is equally shared between all UPS whenever the system is in the Parallel Operation. (Refer to FIGURE 3.4 that shows a sample of Parallel Operation System Configuration.)

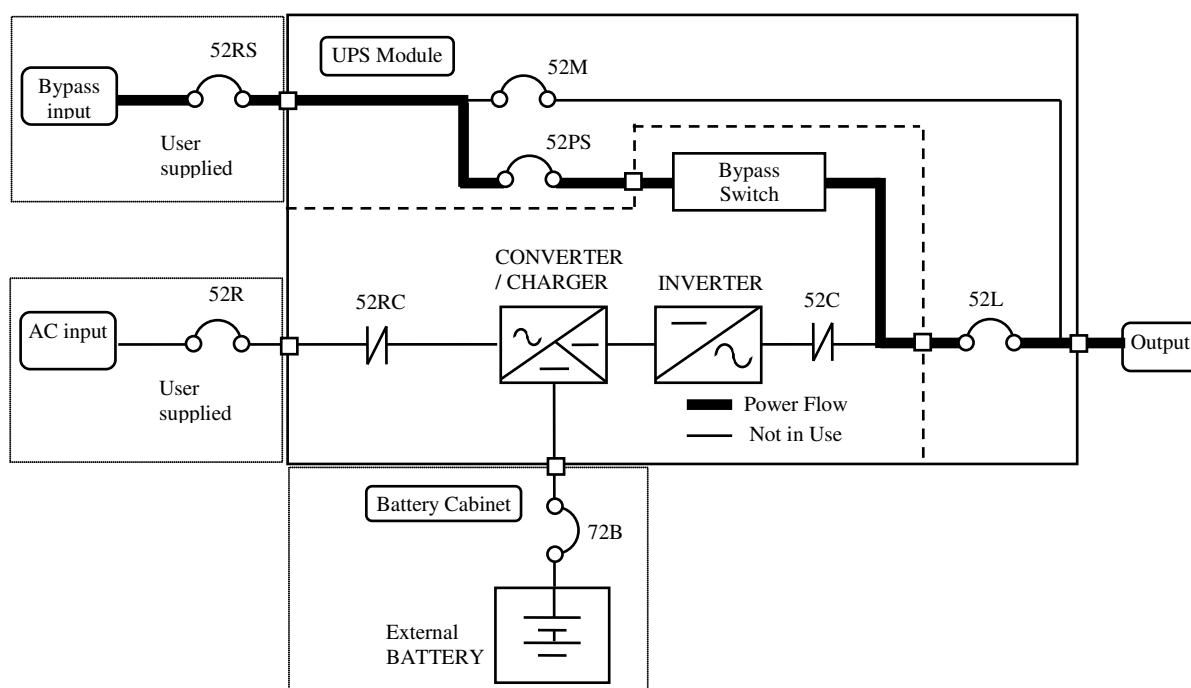
In the event of a UPS module failure during Parallel Operation, the critical load power will be continually supplied and shared by all other UPS.



*The Bypass Input circuit breaker (MCCB) for protection of the UPS and cables are field supplied and field installed. (See WARNING 4 on page 1-4)*

**B) Bypass Operation:** Load Power supplied through UPS internal static bypass line.

**FIGURE 1.2** Single Line Diagram - Bypass Operation: Load fed through static bypass line.



Referring to FIGURE 1.2: The Internal Bypass line is a Hard-wired line through bypass switch which supplies the critical load with unconditioned bypass input power. Upon switching to the Internal Bypass line, the bypass switch line through 52PS supplies the power immediately. In the event of a switching to the Bypass line, the power to the critical load will be uninterrupted. The purpose of this Internal Bypass line is to route power to the critical load while the UPS module is de-energized (converter and inverter), and during Start-up before the system is fully operational.

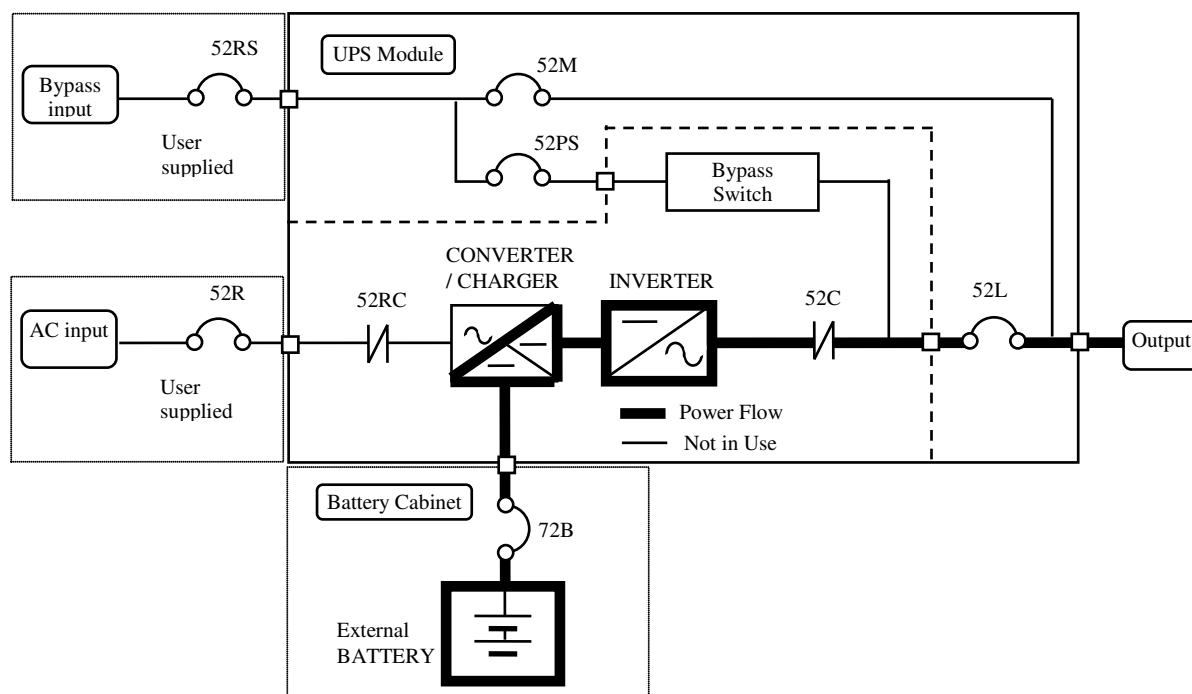
Each UPS internal static bypass line will equally share the power supplied to the critical load whenever the system is in the Parallel Operation.

In the event of a load overcurrent, the UPS transfers to bypass without interruption to the critical load. In the case of the Parallel Operation, all UPS will transfer to bypass without interruption to the critical load.

The internal control system determines the operation of the two paths, with the load powered from the inverter being the normal operation.

**C) Battery operation:** Load Power supplied by UPS battery.

**FIGURE 1.3** Single Line Diagram - Battery Operation



Referring to FIGURE 1.3: In the event of AC input source failure or interruption, the UPS Converter(s)\* will de-energize and the UPS battery(s)\* will immediately discharge and supply DC power to the Inverter to maintain continuous AC power to the load. This operation will continue until:

- The battery capacity expires and the inverter turns off, or
- Input power is restored after which the converter will power the inverter and critical load and simultaneously recharge the batteries.

A fully charged battery will provide power for the specified time at the rated load, or longer, at a reduced load.

(s)\* : In the case of the Parallel Operation

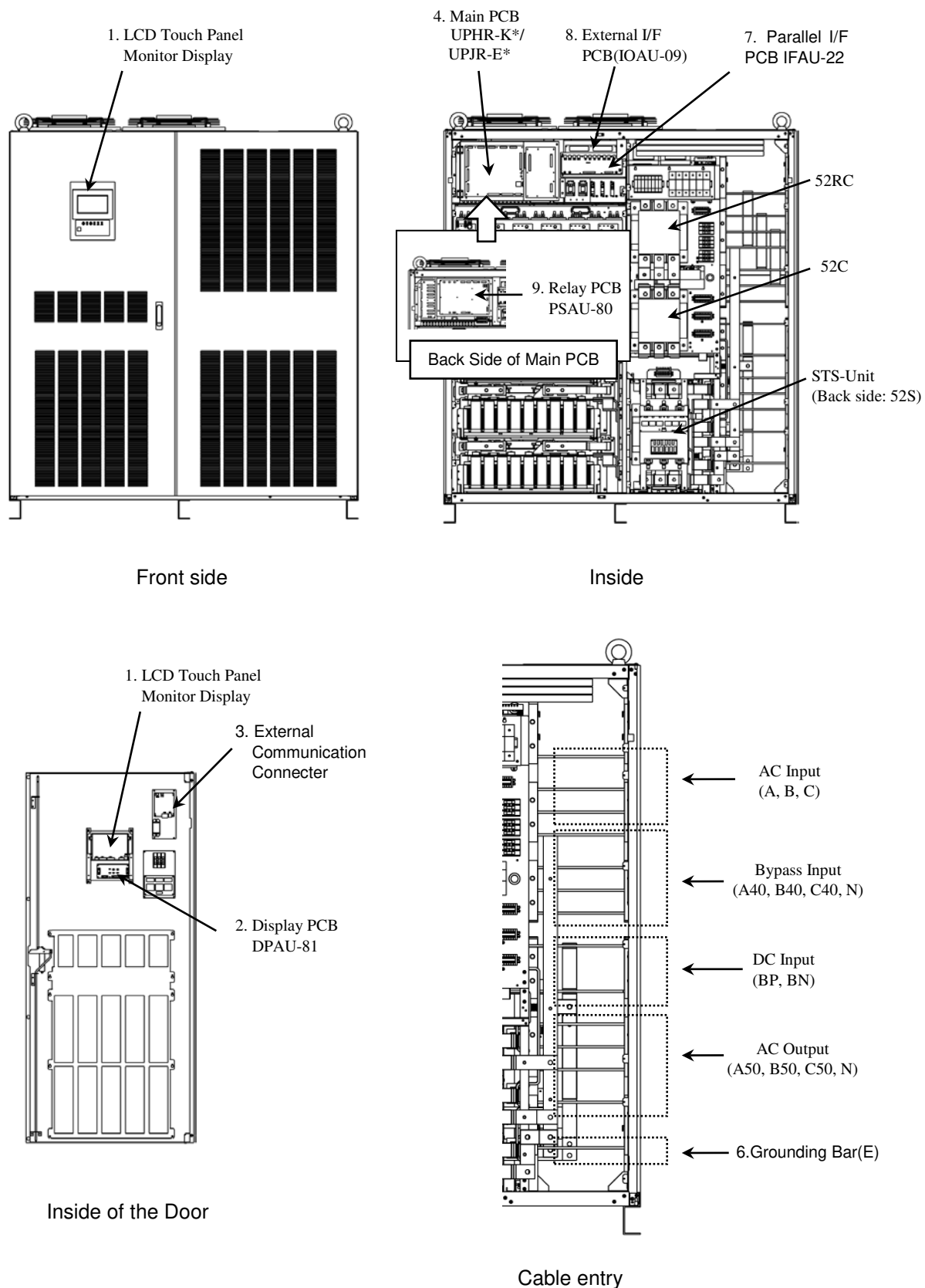
When power is restored after a low battery shutdown, the UPS converter(s)\* automatically restarts operation, the charger(s)\* recharges the batteries and the Inverter(s)\* is automatically restarted without operator intervention. Load is automatically assumed by the inverter without operator intervention.

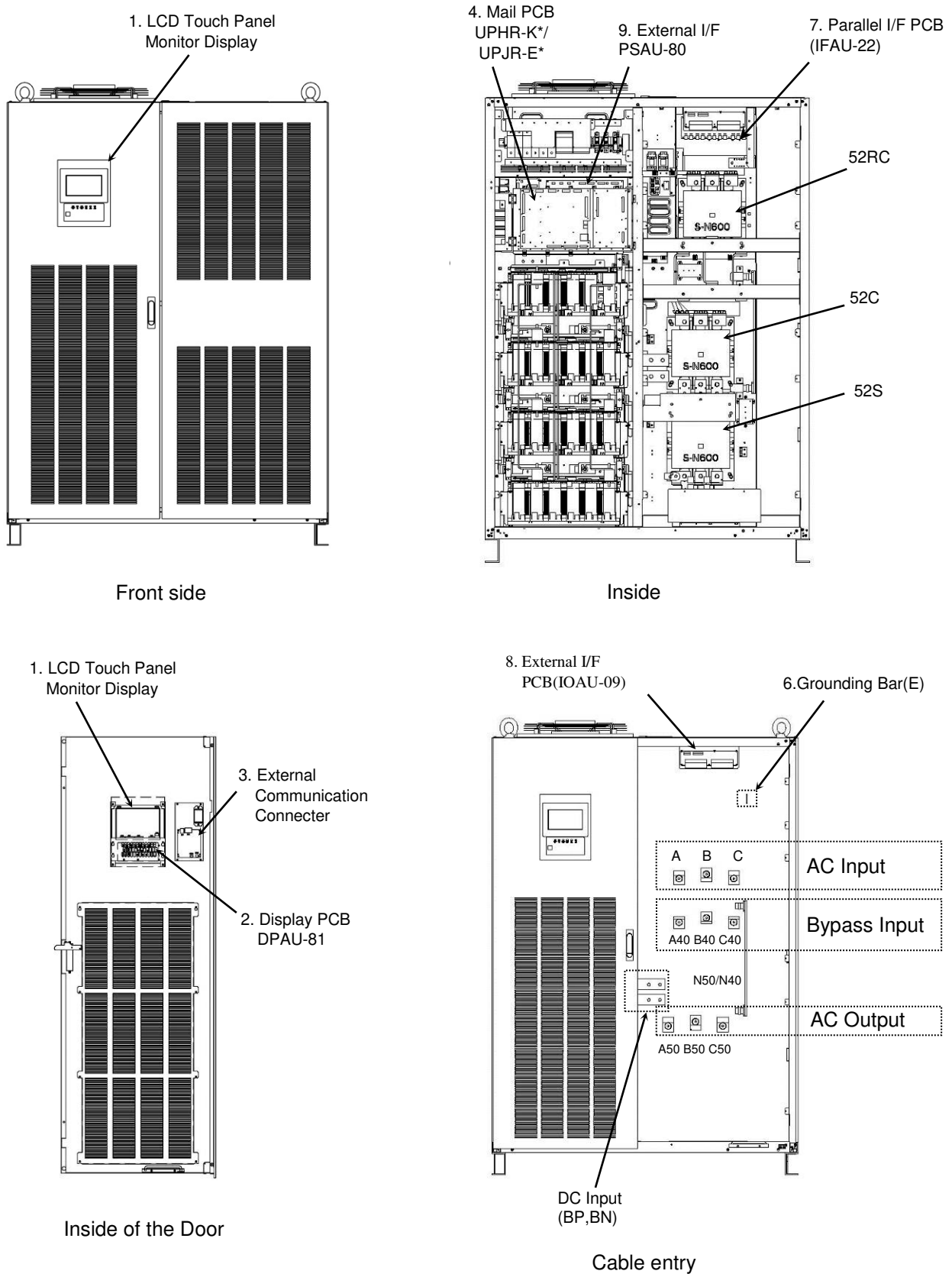
(s)\* : In the case of the Parallel Operation

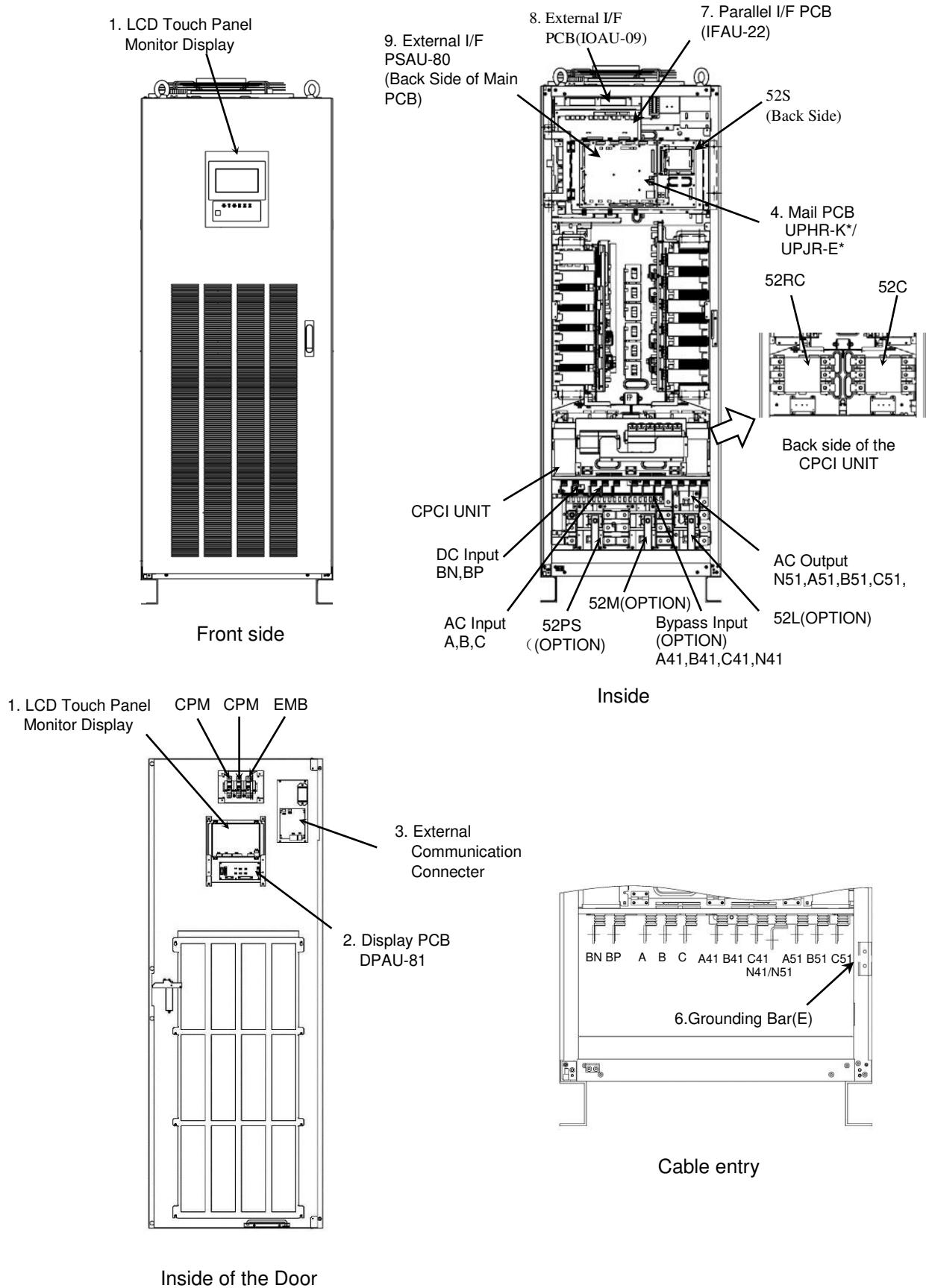
The power drawn by the load is equally shared between all UPS regardless of the presence or absence of the UPS that is (are) in battery operation or not whenever the system is in the Parallel Operation. .



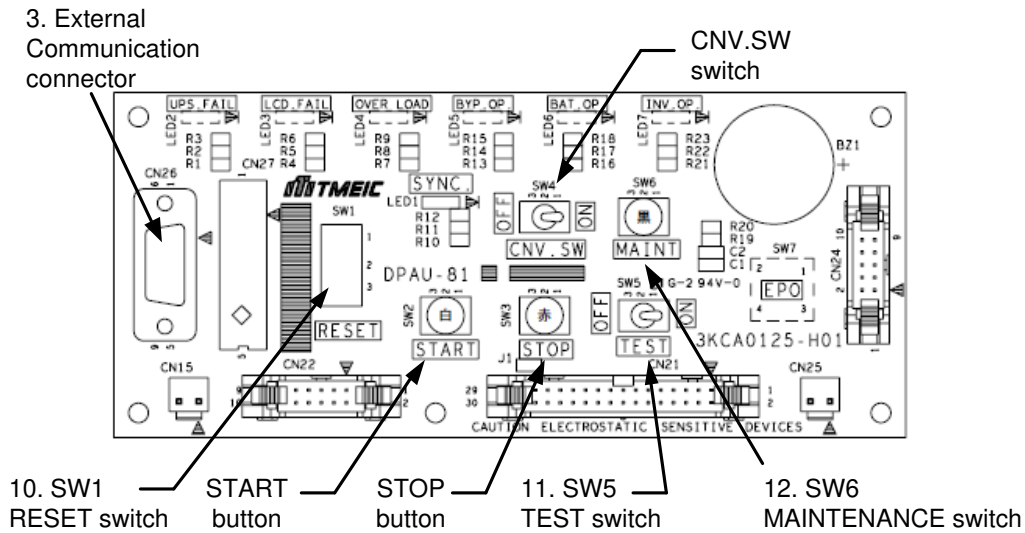
**FIGURE 1.4.a UPS Parts Location (500,600kVA)**



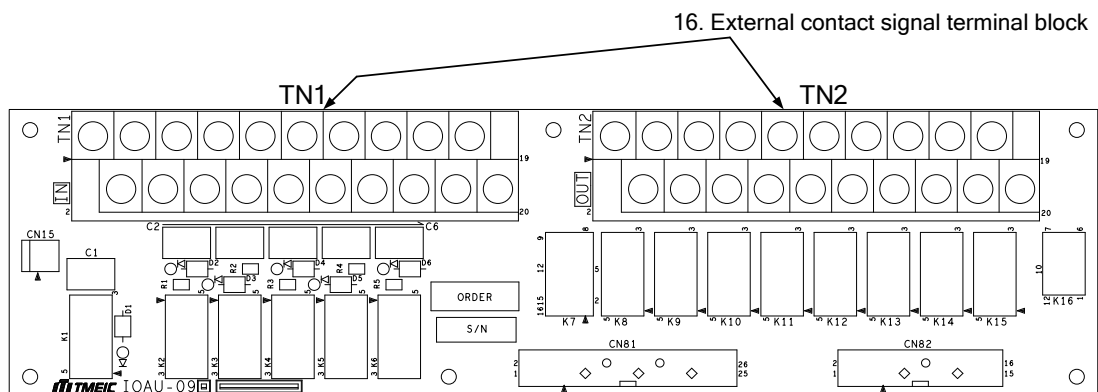
**FIGURE 1.4.b UPS Parts Location (300,400kVA)**


**FIGURE 1.4.c UPS Parts Location (60, 120, 160, 200kVA)**


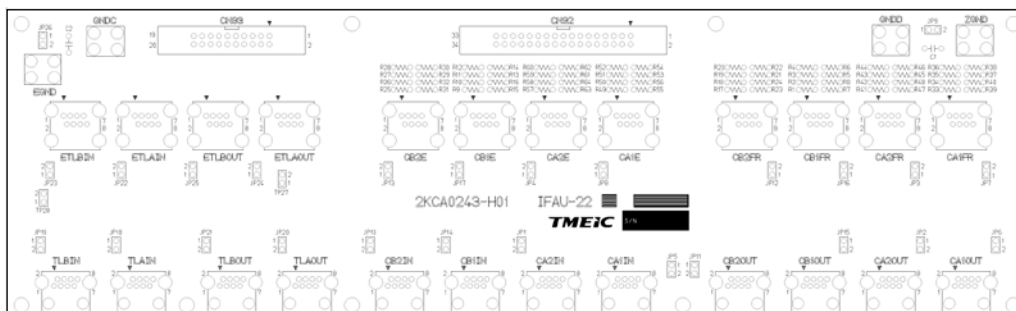
**FIGURE 1.5** Display PCB DPAU-81



**FIGURE 1.6** External I/F PCB IOAU-09

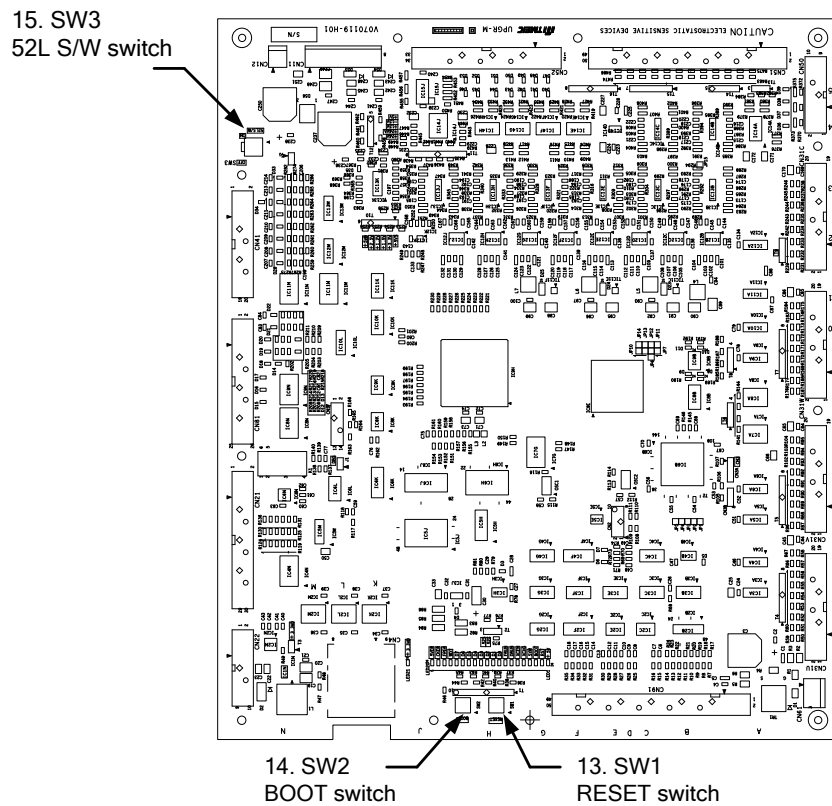


**FIGURE 1.7** Parallel I/F PCB IFAU-22 (\*Option of parallel system)

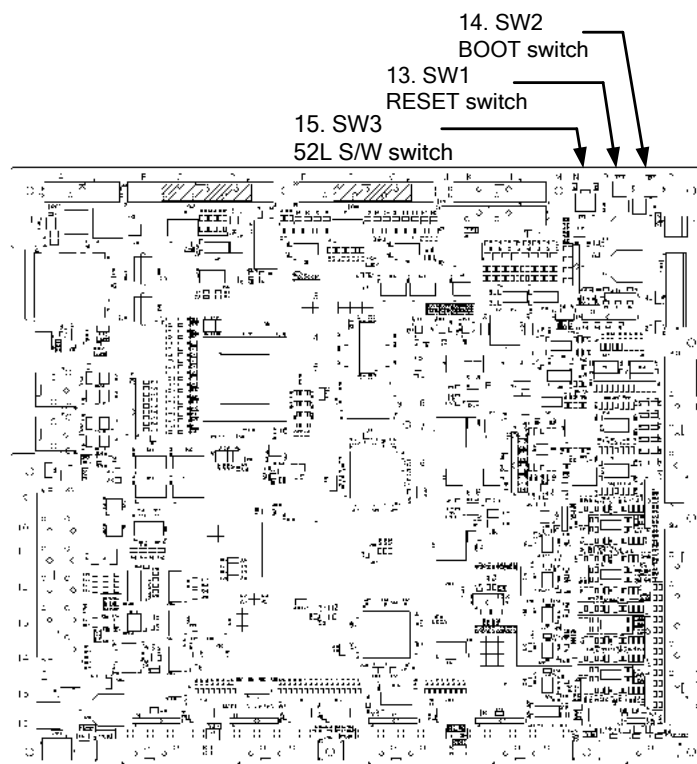


**FIGURE 1.8 MAIN PCB**

**(a) UPHR-K\***



**(b) UPJR-E\***



Description of FIGURES 1.4 to 1.8:

1. **LCD Touch Panel Monitor Display**

The Liquid Crystal Display (LCD) Touch Panel Monitor Display indicates power flow, measured values and fault and error messages via user selectable display screens.

Refer to FIGURE 2.1 for details.

2. **Display PCB DPAU-81 (FIGURE 1.5):**

**Switches on DPAU-81 board : FOR SERVICE PERSONNEL ONLY**

- (10) SW1 (RESET switch)
- (11) SW5 (TEST switch)
- (12) SW6 (MAINTENANCE switch)

3. **External Communication Connector**

**RS232C connector on DPAU-81 board : FOR SERVICE PERSONNEL ONLY**

4. **Main PCB UPHR-K\*/UPJR-E\* (FIGURE 1.8):**

**Switches on UPHR-K\*/UPJR-E\* board : FOR SERVICE PERSONNEL ONLY**

- (13) SW1 (RESET switch)
- (14) SW2 (BOOT switch)
- (15) SW3 (52L S/W switch)

5. **Parallel control PCB TLCR-H (not shown)**

**For use in Parallel Operation system application : Option**

6. **Grounding Bar (E)**

Refer to FIGURE 3.2.

7. **AC input, AC output, DC input terminal**

Refer to FIGURE 3.2 for details.

8. **External I/F PCB IOAU-09 (FIGURE 1.6):**

**Signal I/F on IOAU-09 board**

- (16) External contact signal terminal block

Refer to FIGURE 2.10 for details.

9. **Power supply PCB PSAU-80**

10. **"RESET" switch (FOR SERVICE PERSONNEL ONLY)**

This switch resets errors resulting from alarm conditions.

11. **"TEST" switch (FOR SERVICE PERSONNEL ONLY)**

This switch changes system operation to the test-mode.

12. **"MAINTENANCE" switch (FOR SERVICE PERSONNEL ONLY)**

This switch sets the UPS menu parameters.

13. **"RESET" switch (FOR SERVICE PERSONNEL ONLY)**

This switch resets errors resulting from alarm conditions.

14. **"BOOT" switch (FOR SERVICE PERSONNEL ONLY)**

This switch boots the processor on the main control circuit board following alarm conditions.

15. **"52L S/W" switch (FOR SERVICE PERSONNEL ONLY)**

This switch prohibits turning on the AC output contactor "52C" during test/maintenance in Parallel Operation system application.

16. **External contact signal terminal block**

Terminal block to connect contact signal input/output lines to and from external dry contacts. Refer to FIGURE 2.10 for details.

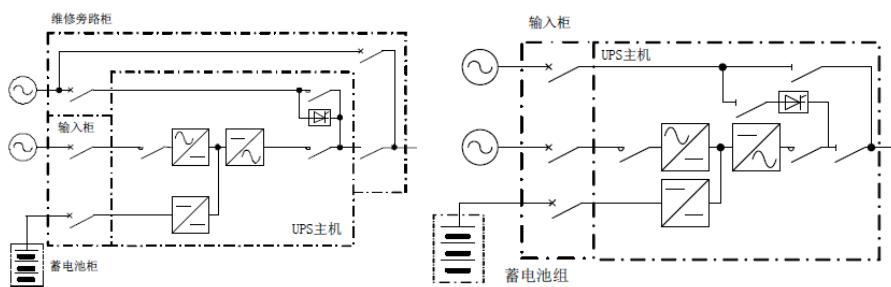
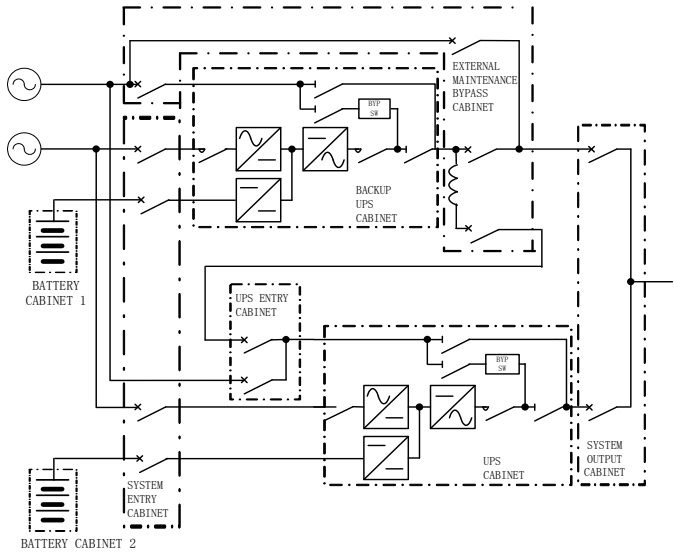
## 1.5 SYSTME SINGLE LINE DIAGRAM

The UPS is apply to three types of systems as below

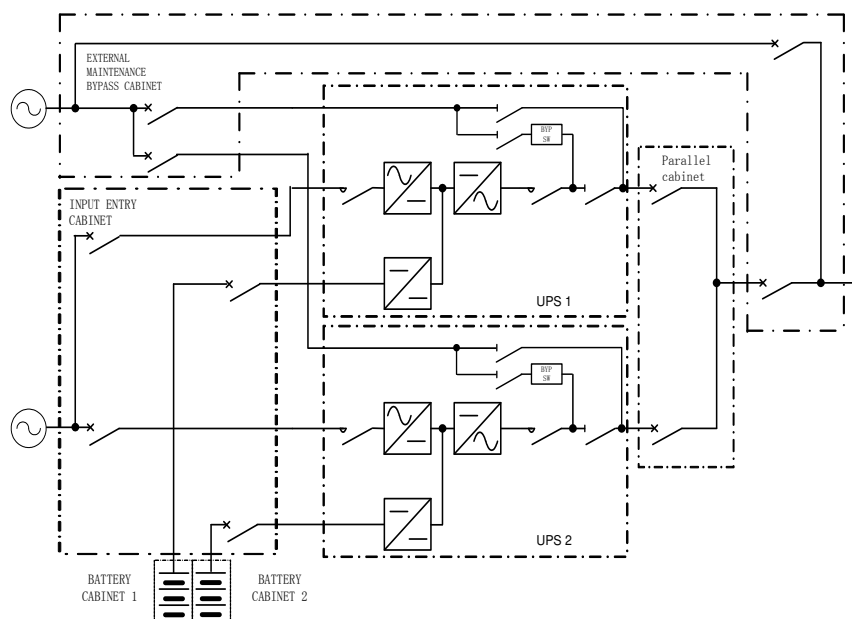
- ① Single module system with maintenance bypass
- ② Series backup redundancy system
- ③ Distributed bypass redundancy system

Using the different system to support the different requires. The UPS can be shut down for maintenance without cut the power in redundancy parallel system.

**TABLE 1.3** System Diagram

SYSTME	SYSTEM DIAGRAM
Single module system with maintenance bypass	 <p>The diagram shows a single UPS module system. It includes an input cabinet (输入柜) with two input lines, a maintenance bypass cabinet (维修旁路柜) at the top, and a battery cabinet (蓄电池柜) at the bottom. The UPS main unit (UPS主机) is in the center, with internal bypass circuitry. The output goes to a battery bank (蓄电池组).</p> <p>*External maintenance circuit cabinet is required with 300~600kVA UPS. 200kVA UPS With internal maintenance bypass circuit (Option).</p>
Series backup redundancy system	 <p>The diagram illustrates a series backup redundancy system. It features two main UPS units: a main UPS and a backup UPS. The main UPS has an input cabinet (输入柜), a bypass cabinet (BYP 5F), and a battery cabinet (BATTERY CABINET 1). The backup UPS has its own input cabinet, bypass cabinet (BYP 5F), and battery cabinet (BATTERY CABINET 2). Both units connect to a common system entry cabinet (SYSTEM ENTRY CABINET), which then feeds into a system output cabinet (SYSTEM OUTPUT CABINET). An external maintenance bypass cabinet (EXTERNAL MAINTENANCE BYPASS CABINET) is also shown, connected to the main UPS and the system output.</p> <p>*.This system is required to add a reactor to the bypass circuit between main UPS and backup UPS. *.The internal switches 52PS and 52L keep connecting, and 52M keeps disconnecting during normal operation. Transfer load to external maint enance bypass to supply power during maintenance procedures.</p>



**Distributed  
bypass  
redundancy  
system**


\*.Bypass input should be the same utility input. Otherwise, the cable of both bypass circuit must be the same in length.

\*.Maximum units of parallel above to 8 UPSs.

\*.The internal switches 52PS and 52L keep connecting, and 52M keeps disconnecting during normal operation. Transfer load to external maintenance bypass to supply power during maintenance procedures.

**The precautions for safety to operating the UPS**

- ※1: Bypass Input/Maintenance Bypass Input/AC Input, all of them should to connect to the same 3 phase 4 wires Utility Input source.
- ※2: Refer to AC Input and Bypass Input (Maintenance Bypass) should be separated input power source, only bypass input source connect to ground, and the transformer of AC Input should be non-grounded.
- ※3: To prevent circuit unbalance occurred when providing power by bypass mode, to install a 1% reactor(Variability $\pm$  1%) to AC Output for each UPS would be necessary in MMS system.

## 1.6 SPECIFICATIONS

The UPS nameplate displays the rated kVA as well as nominal voltages and currents. The nameplate is located on the inside of the UPS front door.

**TABLE 1.4** Power Specifications

<b>Rated output Power</b>	<b>Input voltage 3 phase / 4 wire</b>	<b>Bypass input voltage 3 phase / 4 wire</b>	<b>Output voltage 3 phase / 4 wire</b>
60kVA/54kW, 120kVA/108kW	380V	380V	380V
160kVA/144kW, 200kVA/180kW	380V	380V	380V
300kVA/270kW, 400kVA/360kW	380V	380V	380V
500kVA/450kW, 600kVA/540kW	380V	380V	380V

**TABLE 1.5** UPS Module Information

<b>UPS [kVA]</b>	<b>Cable Entry</b>	<b>Width [in / mm]</b>	<b>Depth [in / mm]</b>	<b>Height [in / mm]</b>	<b>Weight [lb./ kg]</b>	<b>Heating [kcal/h]</b>
60 120 160 200	BOTTOM	72.6 / 700	32.6 / 830	81.8 / 2080	1344.8/ 610	2060 4100 5500 6900
300 400	BOTTOM/TOP	55.1 / 1400	32.6 / 830	81.8 / 2080	2314.9 / 1050	10350 13800
500 600	BOTTOM/TOP	70.9/ 1800	32.6 / 830	81.8 / 2080	3637.6 / 1650	15450 20600

**TABLE 1.6** Detail of Specifications

Rated Output kVA	60	120	160	200	300	400	500	600
Rated Output kW	54	108	144	180	270	360	450	540
AC INPUT								
Configuration	3 phase, 4 wire							
Voltage	380V, 400V, 415V (+15% to -20%)							
Frequency	50 / 60 Hz (+/-10%)							
Reflected Current THD	8% max 100% load	5% max 100% load (no input filter required)						
STATIC BYPASS INPUT								
Configuration	3 phase, 4 wire							
Voltage	380V - 415V ±10%							
Frequency	50/60 Hz ±5%							
BATTERY								
Nominal Voltage	480 Vdc							
Floating charge Voltage	540 Vdc							
Minimum Voltage	400~540 Vdc							
Number of Cells	240							
AC OUTPUT								
Configuration	3 phase, 4 wire							
Voltage	380V, 400V, 415V							
Voltage Regulation	±5%							
Frequency	50 / 60 Hz							
Frequency Regulation	±0.01 in free running mode							
Power Factor	0.9 lagging							
Voltage THD	2% maximum THD at 100% Linear Load 5% maximum THD at 100% non-linear load *. ±5% when load switched from inverter to bypass							
Transient Response	±2% maximum at 100% load step ±2% maximum at loss/return of AC power ±5% maximum at load transfer to/from static bypass							
Transient Recovery	Less than 20ms							
Voltage Unbalance	2% maximum at 100% unbalanced load							
Phase Displacement	±1 deg. maximum at 100% load, ±3 deg. at unbalanced load							
Inverter Overload	125% for 10 minutes; 150% for 60 seconds at 25°C							
ENVIRONMENTAL								
Cooling	Forced Air							
Operating Temperature	32° F to 104° F ( 0° C to 40° C). Recommended : 68° F to 86° F ( 20° C to 30° C)							
Relative Humidity	20% ~ 80% Non Condensing							
Altitude	1000 meter (3280feet)							
Location	Indoor (free from corrosive gases and dust)							



**TABLE 1.7** Rating of Contactors, Breaker and Fuses

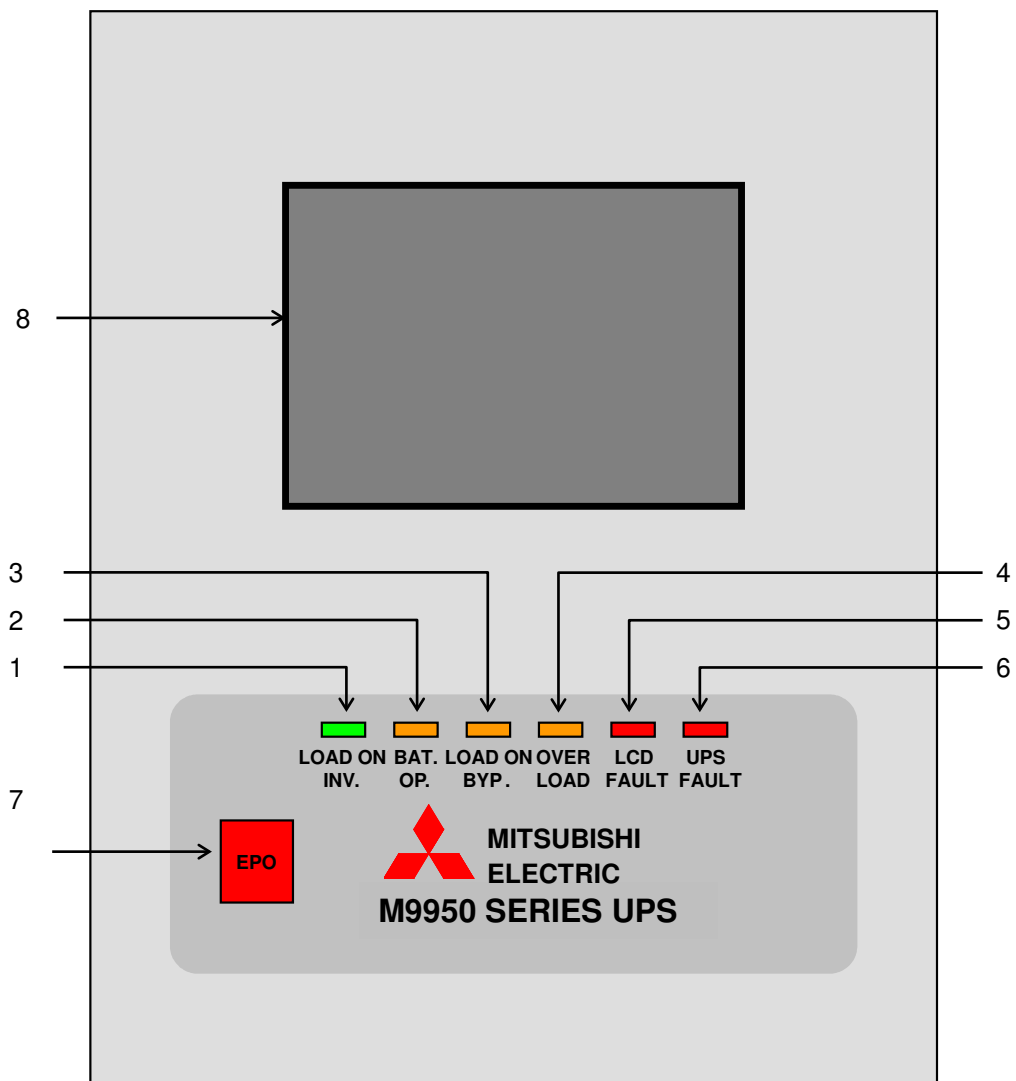
	NUMBER	APPLICATION	OUTPUT CAPACITY OF EQUIPMENT							
			60kVA	120kVA	160kVA	200kVA	300kVA	400kVA	500kVA	600kVA
			54kW	108kW	144kW	180kW	270kW	360kW	450kW	540kW
Contactor	52RC	AC input contactor	350A				800A		1000A	
	52C	Inverter output contactor	350A				800A		1000A	
	88RC	Control circuit contactor	20A				20A		20A	
Breaker	72B	Battery disconnect breaker (Recommended)	600A				1200A		1600A	
	User supply	AC input breaker (Recommended)	400A				800A		1250A	
	User supply	AC output breaker (Recommended)	400A				800A		1250A	
	User supply	AC Bypass breaker (Recommended)	400A				800A		1250A	
Fuses	FPR-FPW FNR-FNW	DC fuse	—				630A / 690V		700A / 690V	
	FP-FN	DC fuse	400A / 690V				—		—	
	FRR1-FRT2	AC input fuse	450A / 690V				900A / 550V		800A / 690V * 2P	
	FIU1-FIW2	AC output fuse	450A / 690V				900A / 550V		800A / 690V * 2P	
	FPC-FNC	CHOP fuse	—				800A/690V		1250A / 600V	
Disconnect (Optional)	52M	AC maintenance switch	400A				—		—	
	52PS	AC bypass switch	400A				—		—	
	52L	AC output switch	400A				—		—	

*\*Rating would be changed.*

## 2.0 OPERATION CONTROLS AND INDICATORS

The M9950 Series operator controls and indicators are located as follows (Door exterior).

**FIGURE 2.1** Operation/Display Panel (Front panel)



## **2.1 LED DISPLAY**

**1) Load on inverter [ LOAD ON INVERTER ](green)**

Illuminates when power is supplied from inverter to the critical load.

(Indicates the state of inverter transfer switch "52C".)

**2) Battery operation [ BATTERY OP. ](orange)**

Illuminates when power is supplied from batteries following a power failure.

**3) Load on bypass [ LOAD ON BYPASS ](orange)**

Illuminates when power is supplied to load devices by static bypass.

(Indicates the state of bypass transfer switch "52S".)

**4) Overload [ OVERLOAD ](orange)**

Illuminates in overload condition.

**5) LCD fault [ LCD FAULT ](red)**

Illuminates when an error occurs.

**6) UPS fault [ UPS FAULT ](red) [Annunciator: intermittent or constant tones]**

Illuminates when an error occurs in the system. In this case, the details of the error are indicated on the display panel.

## **2.2 EPO BUTTON (Emergency Power Off button) (7)**

When activated, the Emergency Power Off (EPO) function shuts down the UPS module. The critical load will lose power and also shutdown. The EPO function can be performed both locally or remotely.

## 2.3 LIQUID CRYSTAL DISPLAY (8)

The Liquid Crystal Display (LCD) touch panel indicates power flow, measured values, operational guidance, data records and error messages. The LCD panel has a back-light which facilitates viewing in different ambient lighting conditions. The LCD will automatically clear and turn off, if the screen is not activated within 3 minute period. The LCD is turned back on when it is touched again. The ERROR indicator is cleared after 24 hours and can be reproduced by pressing any key on the panel.

### 2.3.1 MENU

#### A) MAIN MENU (FIGURE 2.2)

The LCD panel indicates power flow and measured values, while also operating the start/stop function. The LCD panel also allows the user to verify the status and operation of the UPS Module.

**FIGURE 2.2.a** Main screen (EN)



**FIGURE 2.2.b** Main screen (CN)



The following will be displayed when the START/STOP key on the MAIN MENU is pressed (Jump into **OPERATION MENU**) :

#### 1) Startup/Shutdown Guidance (FIGURE 2.3)

The display indicates the Startup and Shutdown guidance for the UPS system. If this operation is PIN protected, the user is required to enter the security PIN before the screen can be accessed.

When in remote mode, the message "REMOTE operating model" will appear on this Screen. The user cannot operate the start and stop functions without changing the setup from remote mode to local mode.

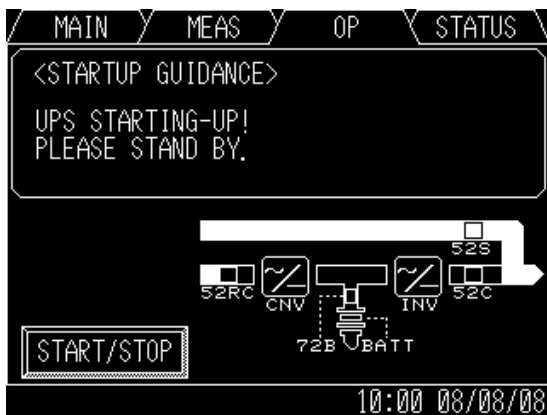
When bypass voltage is abnormal, the message "Bypass voltage abnormal" will appear.

**-Start:** When the bypass voltage is abnormal, the LCD asks the operator if an interrupted transfer is acceptable (Load may be lost).

**-Stop:** When the bypass voltage is abnormal, the user cannot transfer from inverter to bypass line.

**FIGURE 2.3-a Startup/Shutdown guidance(EN)**

**FIGURE 2.3-b Startup/Shutdown guidance(CN)**

**FIGURE 2.3-c Startup guidance(EN)**

**FIGURE 2.3-d Startup guidance(CN)**

**FIGURE 2.3-e Shutdown guidance(EN)**

**FIGURE 2.3-f Shutdown guidance(CN)**


Follow Startup/Shutdown guidance accordingly.

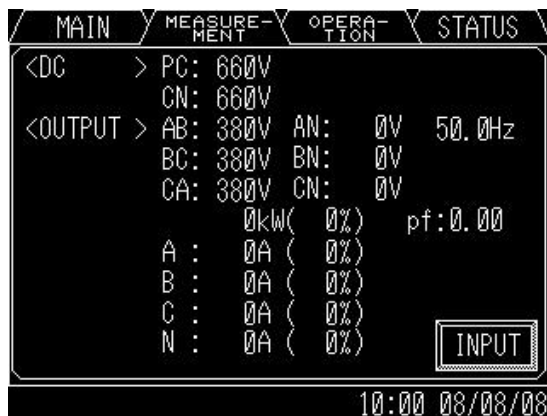


**B) MEASUREMENT MENU (FIGURE 2.4)**

This screen shows details of measured values. Input and Output values are displayed. During Battery operation, Remaining battery power and Run time are also displayed.

**FIGURE 2.4-a Input values (EN)**

**FIGURE 2.4-b Input values (CN)**

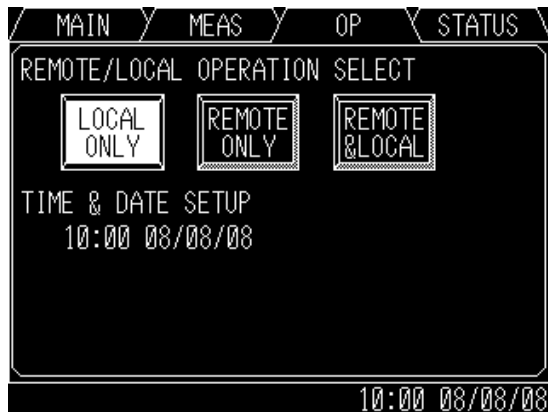
**FIGURE 2.4-c Output values(EN)**

**FIGURE 2.4-d Output values(CN)**

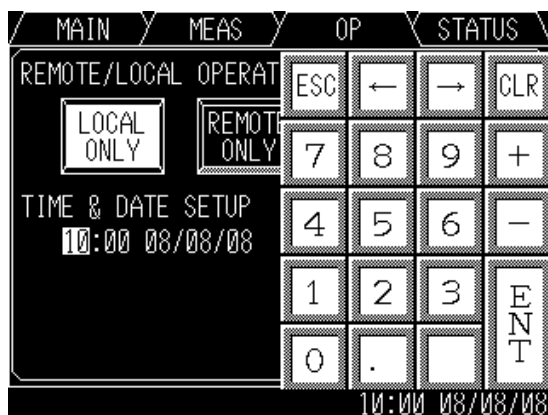
**FIGURE 2.4-e Values in Battery operation(EN)**

**FIGURE 2.4-f Values in Battery operation(CN)**


**C) OPERATION MENU (FIGURE 2.5)**

This screen prompts the user to select: (a) whether the start & stop operation will be performed by local or remote operation; (b) date & time adjustment; (c) battery equalizing charge. The battery equalizing charge operation key will appear when battery equalizing charge is set up (Setup is based on battery type).

**FIGURE 2.5-a Remote/Local  
operation select(EN)**

**FIGURE 2.5-b Remote/Local  
operation select(CN)**

**FIGURE 2.5-c Date & Time adjustment(EN)**

**FIGURE 2.5-d Date & Time adjustment(CN)**


**D) LOG MENU (FIGURE 2.6)**

This LOG MENU displays two Touch icons in EVENT LOG and BATTERY LOG.

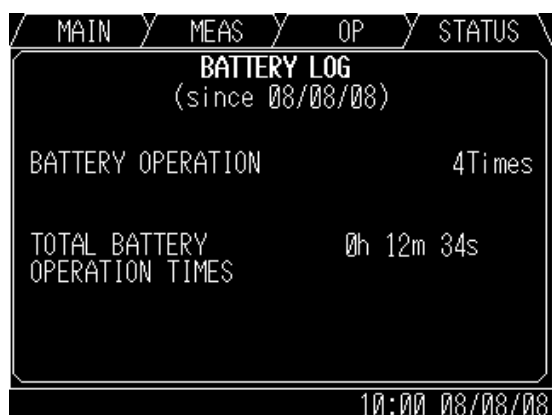
Pressing the EVENT LOG icon, up to 50 condition/operation records will be displayed.

Press ▲ or ▼ button for page turning.

Pressing the BATTERY LOG icon, Number of battery operations and Summed battery operation time are displayed.

**FIGURE 2.6-a Log menu(EN)**

**FIGURE 2.6-b Log menu(CN)**

**FIGURE 2.6-c Event log(EN)**

**FIGURE 2.6-d Event log(CN)**

**FIGURE 2.6-e Battery log(EN)**

**FIGURE 2.6-f Battery log(CN)**


### 2.3.2 INPUT POWER FAILURE (FIGURE 2.7)

During an Input Power Failure, the UPS inverter will be powered by the UPS batteries. The following will be displayed on the main and measurement screen (Indication of battery operation and remaining battery life).

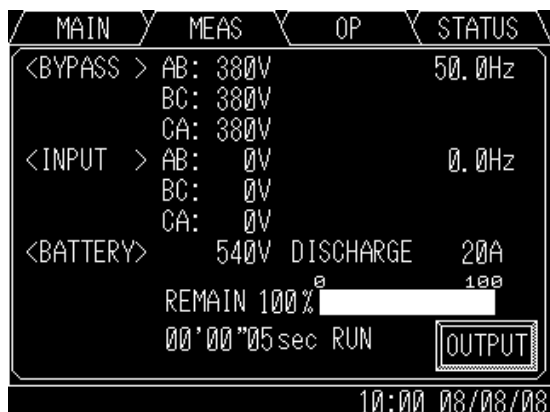
**FIGURE 2.7-a** Main screen(EN)  
(Battery operation)



**FIGURE 2.7-b** Main screen(CN)  
(Battery operation)



**FIGURE 2.7-c** Measurement screen(EN)  
(Battery operation)



**FIGURE 2.7-d** Measurement screen(CN)  
(Battery operation)



The LCD will display a battery low voltage message when the battery capacity is near depletion. The End of Battery Discharge announcement is displayed when the battery end voltage is reached. At this time, the inverter will perform an electronic shutdown to prevent battery loss of life typical from extreme deep discharge conditions. When the input power is restored, the inverter will automatically restart to power the load, and the batteries will be simultaneously recharged. The End of Battery announcement is shown at the bottom of the screen.

### 2.3.3 FAULT INDICATION (FIGURE 2.8)

“MESSAGE” and “STOP ALM” icons will appear on the main menu when UPS failure condition has occurred.

**FIGURE 2.8-a** Main screen (Fault indication)(EN)



**FIGURE 2.8-b** Main screen (Fault indication)(CN)

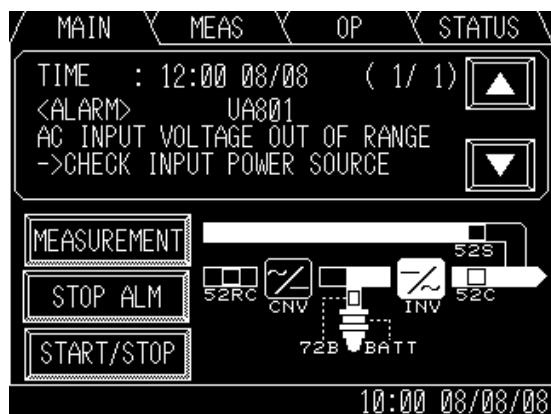


The following will be displayed when the MESSAGE icon on the main menu is pressed.

#### 1) MESSAGE (FIGURE 2.9)

The display shows a fault code, the description of the fault and a guidance of what action is to be taken by the user. A maximum of 10 faults is displayed at one time. If an input power failure occurs during a fault condition, the fault indication and input power failure announcement are alternatively displayed at 5 second intervals.

**FIGURE 2.9-a** Message screen(EN)



**FIGURE 2.9-b** Message screen(CN)



#### 2) SILENCE ALARM

This icon “STOP ALM” will appear when a failure occurs. The audible alarm (announcing the failure) can be silenced by pressing this icon.

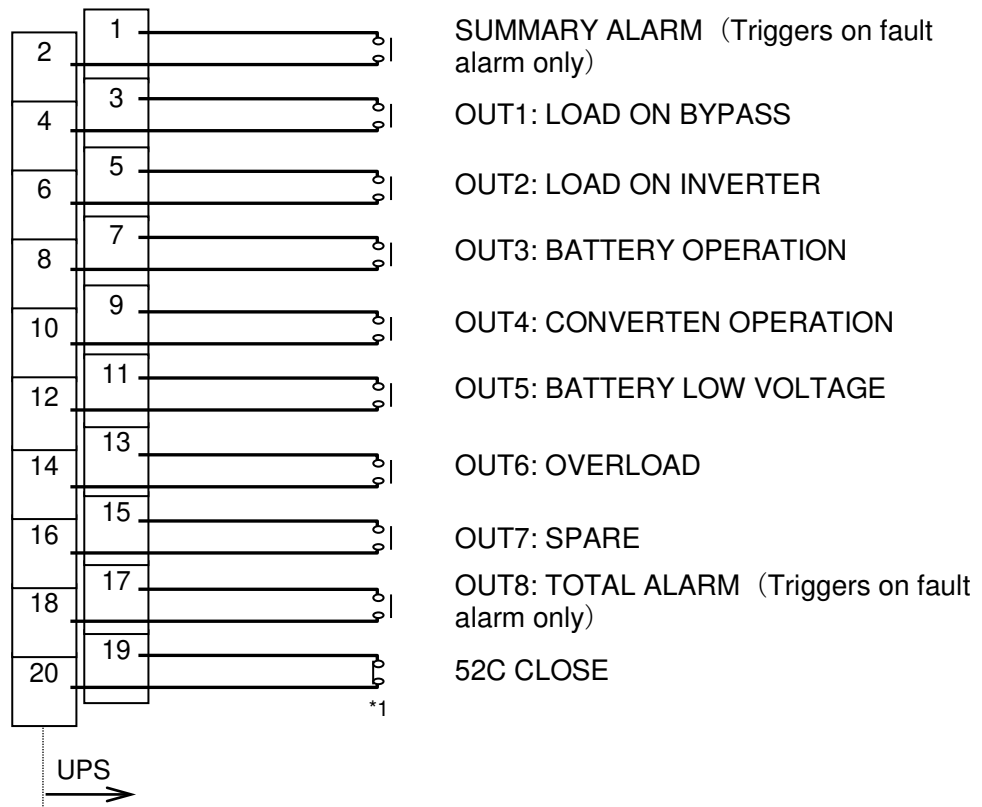
## 2.4 EXTERNAL SIGNAL TERMINAL BLOCK

The UPS is equipped with a series of input/output terminals for external annunciation of alarms and for remote access of certain UPS functions. The layout of terminals is shown in FIGURE 2.10 with a functional description of the input/output port presented. OUT1 to OUT8 are user programmable, but are factory default set being also shown in FIGURE 2.10.

Adding same external I/F PCB "IOAU-09", doubling signal outputs is applicable for OUT1 to OUT8.

**FIGURE 2.10-a** External Signal Terminal Block (NEC Class2)

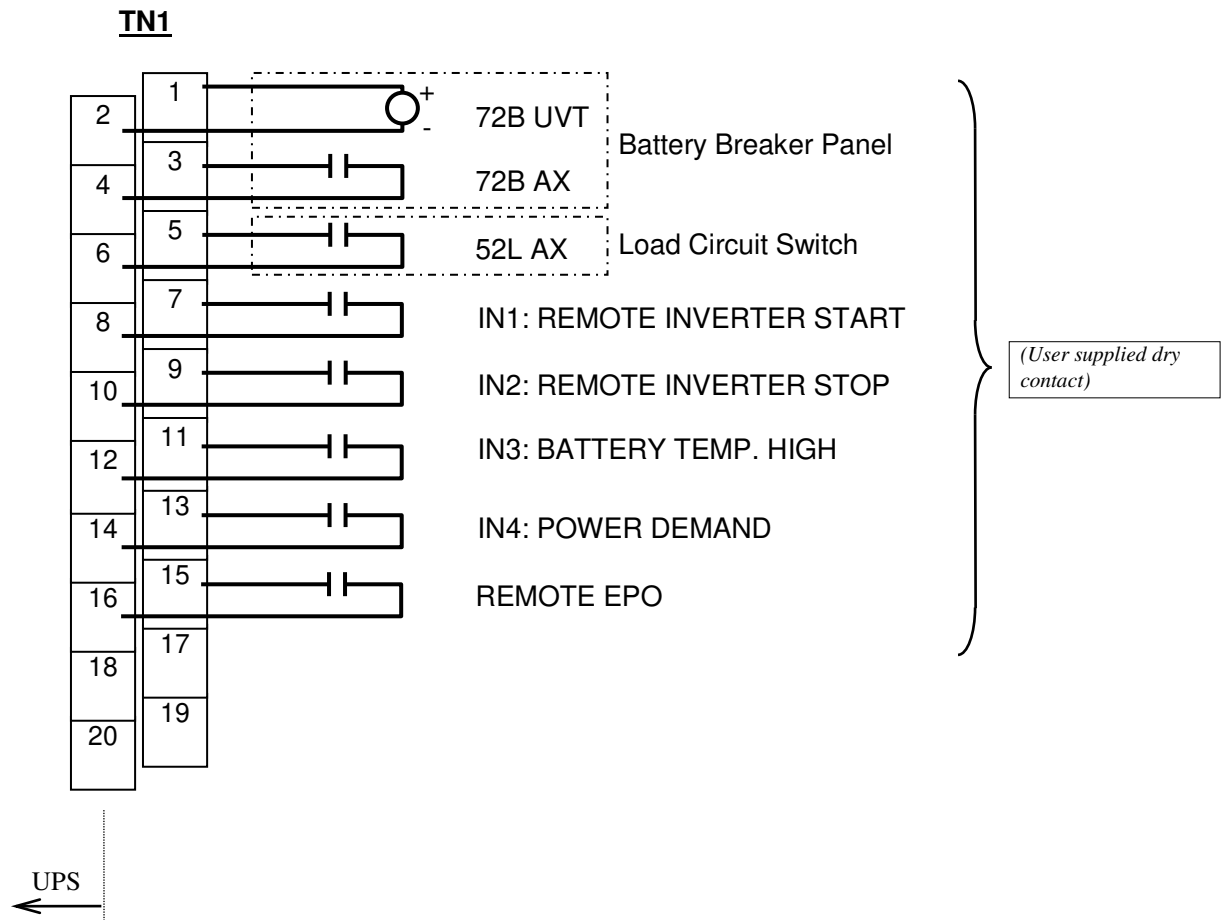
### TN2



\*1 Relay contactor (52C close): Normal Closed



FIGURE 2.10-b External Signal Terminal Block (NEC Class2)

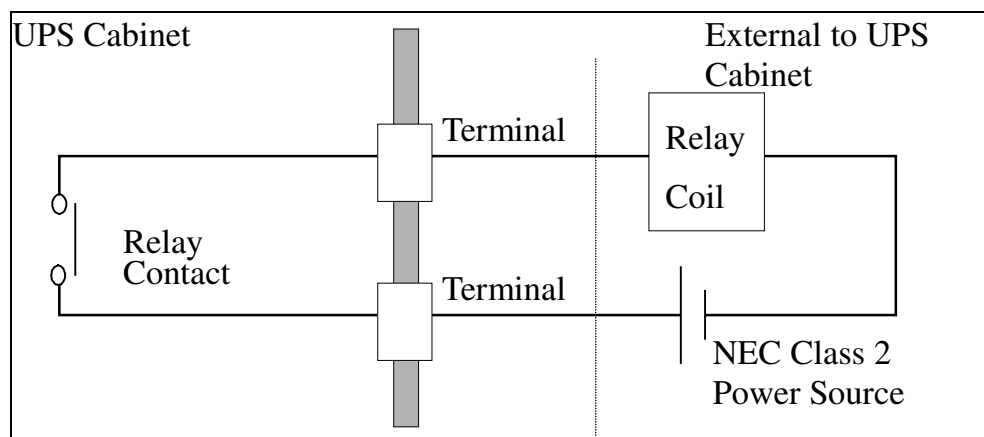




**A) Output Contacts (for external alarm annunciation)**

Output contacts consist of form “A” dry type contacts. Rated capacity of all output contacts is NEC Class2 (30Vdc/1Adc). All dry contacts should be operated at their rated values or lower. Figure 2.11 illustrates a typical installation. The external relay can also be a lamp, LED, computer, etc.

**FIGURE 2.11** Control Wiring for External Contacts



**Details of output alarm contacts : TN2**

**Terminals 1 to 2 "Summary Alarm" contact**

Activated when a major fault has occurred with the system.

**Terminals 3 to 4 "Load on Bypass" contact (OUT1)**

Activated when the power is supplied from the static bypass input.

**Terminals 5 to 6 "Load on Inverter" contact (OUT2)**

Activated when the power is supplied by the inverter.

**Terminals 7 to 8 "Battery Operation" contact (OUT3)**

Activated when the battery is operating following an AC power failure.

**Terminals 9 to 10 "Converter Operation" contact (OUT4)**

Activated when the converter is operating.

**Terminals 11 to 12 "Battery Low Voltage" contact (OUT5)**

Activated when the battery voltage drops below discharge end voltage level during inverter operation (i.e. During AC fail condition).

**Terminals 13 to 14 "Overload" contact (OUT6)**

Activated when an overload has occurred to the system.

**Terminals 15 to 16 "Total Alarm" contact (OUT7)**

Activated during major fault, minor fault and alarm events.

**Terminals 17 to 18 "Spare" contact (OUT8)**

**Terminals 19 to 20 "52C Close" contact (OUT9)**

Activated when the inverter output contactor 52C has closed.

→  
*User supplied*




**NOTE**

*The UPS is equipped with a selectable output contact feature.  
The above alarms are the default settings.  
Contact MITSUBISHI for setup information.*

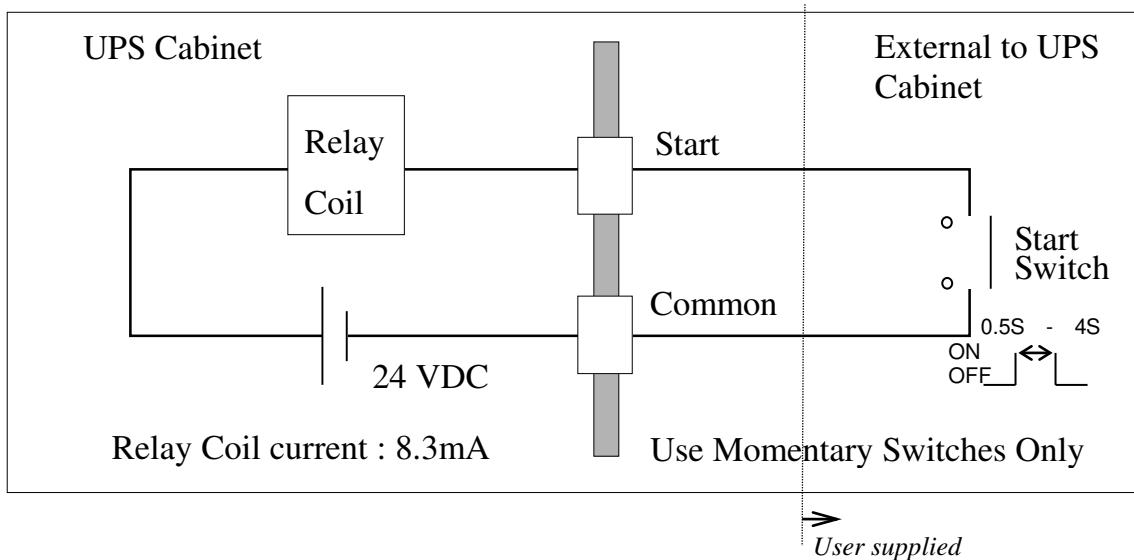
**B) Input Contacts (for remote access of UPS)**

External contacts are provided by the user of the UPS system. Terminal voltage at the UPS is 24Vdc. Provide external dry contact accordingly.


**PROHIBIT**

*Do not apply voltages to remote access input terminals.  
Damage to UPS may result.*

Refer to FIGURE 2.12 for a typical wiring configuration. Although this figure applies to the remote start/stop terminals, the same wiring arrangement is used for emergency stop; power demand; and battery temperature high.

**FIGURE 2.12** Remote "Start" Contact Connections


**Details of input contacts for remote access : TN1****Terminals 7 to 8    Remote "Inverter Start" input terminal (IN1)**

Used to start inverter from a remote location. UPS must be programmed for remote operation. Refer to Operations Menu for procedure.

**Terminals 9 to 10    Remote "Inverter Stop" input terminal (IN2)**

Used to stop inverter from a remote location. UPS must be programmed for remote operation. Refer to Operations Menu for procedure.

**Terminals 11 to 12    "Battery Temp. High" contact input (IN3)**

Input fed by a thermocouple that monitors battery temperature. The converter float voltage level is reduced for battery over-temperature conditions. External thermocouple is user supplied

**Terminals 13 to 14    "Power Demand" Command contact input (IN4)**

This contact is used to control the input power. Power demand is turned ON when the contact is closed, and power demand is turned OFF when the contact is open.

**Terminals 15 to 16    "Remote EPO" contact input**

Used to perform a remote UPS Emergency Power Off (EPO).

*The load will be dropped.*

**NOTE**

*The UPS is equipped with a selectable input contact item.*

*The above items are the default settings.*

*Contact MITSUBISHI for setup information.*

**CAUTION**

*In all cases, a switch having a protective cover is recommended in order to reduce the possibility of accidental operation.*

### 3.0 INSTALLATION AND OPERATION

#### 3.1 TRANSPORTATION AND INSTALLATION

**TABLE 3.1.1** How to transport and install the system

Transportation	Installation
Transport unit with overhead crane or forklift.	Using the pre-drilled four holes in the UPS channel base, anchor the unit using appropriate hardware. (Not provided)

If carry by overhead crane, use four eyebolts (Not provided)

**TABLE 3.1.2** Transport by overhead crane

Model	UPS Cabinet
60, 120, 160, 200 kVA	4 x M20 Lifting Eyes
300,400 kVA	4 x M24 Lifting Eyes
500,600 kVA	4 x M24 Lifting Eyes

\* Use lifting eyes on landing cabinet only to lift landing cabinet by itself, not as part of assembled unit.



**PROHIBIT**

***Do not transport UPS cabinet laid horizontally.***



**NOTE**

***Cabinets must be maintained upright within +/- 15° of the vertical during handling.***

### 3.2 INSTALLATION PROCEDURE

#### A) Note the load tolerance of the floor

Refer to TABLE 3.2 for list of UPS weights.

**TABLE 3.2** List of UPS weights

UPS Capacity (kVA)	60	120	160	200	300	400	500	600
Weight (kg.)	610				1050		1650	

#### B) Minimum clearance required for ventilation

Front side ..... 1000 mm (39.4 inch) (for air flow)

Right side ..... 0 mm (0 inch)

Left side ..... 0 mm (0 inch)

Back side ..... 0 mm (0 inch)

Top side ..... 600 mm (23.6 inches) (for air flow)

#### C) Space requirement for routine maintenance

Allow for the following space at the time of installation.

Front ..... 1000 mm (39.4 inches)

Sides ..... 0.0 mm (0 inch)

Back side ..... 500mm (19.7 inch)

(Required for parts changes, also can be 0.0mm)

Top side ..... 600 mm (23.6 inches)

#### D) External Battery Supply

Please refer to the following when installing and maintaining batteries:

1. The customer shall refer to the battery manufacturer's installation manual for battery installation and maintenance instructions.
2. The maximum permitted fault current from the remote battery supply.



**NOTE**

### 3.3 PROCEDURE FOR CABLE CONNECTIONS \*

1. Confirm the capacity of the UPS being installed. Identify the input/output power terminal blocks as shown in the appropriate FIGUREs 3.1 through 3.4.
2. Connect the internal control wire and power wire.
  - (1) Control wire Inter-connect
    1. 72B UVT to terminal TN1-1, 2 of external I/F PCB IOAU-09.
    2. 72B ON Auxiliary to terminal TN1- 3, 4 of external I/F PCB IOAU-09.
  - (2) Selection of one (1) source or two (2) sources feeding the UPS.

When two (2) sources feeding the UPS is selected, remove Jumper BUS Bars between AC and Bypass Input (Fig. 3.4).
  - (3) Control wire Inter-connect
    1. 72B UVT to terminal TN1-1, 2 of external I/F PCB IOAU-09.
    2. 72B ON Auxiliary to terminal TN1- 3, 4 of external I/F PCB IOAU-09.
  - (4) Power wire (AC input, Bypass input, AC output) Inter-connect
    - a.) From user's distribution panel
      1. X1 (A-phase) to A bus bar in UPS
      2. X2 (B-phase) to B bus bar in UPS
      3. X3 (C-phase) to C bus bar in UPS
      4. X4 (Neutral) to N bus bar in UPS
    - b.) DC Input to UPS
      1. Positive cable to BP bus bar in UPS
      2. Negative cable to BN bus bar in UPS

**NOTE**

**CAUTION : After the completion of the input power cables connection:**

***With a phase rotation meter, check that the phase rotation of the AC Input power terminals A, B and C as well as the Bypass Input power terminals A40, B40 and C40 are correct. The proper phase rotation is clockwise A(R) → B(S) → C(T).***

**MANDATORY**

3. Connect the grounding conductor from the input service entrance to the UPS Ground Bar (E).



4. Two (2) sources feeding the UPS:

- (1) Connect the AC input power cables from the input service entrance to the AC input power terminals, identified as A, B, C in FIGUREs 3.1 to 3.3. Input cables must be sized for an ampere rating larger than the maximum input drawn by the converter. (Refer to equipment nameplate for current ratings.) Confirm that an external bypass input circuit breaker (MCCB) is installed (refer to WARNING 4, page 1-4). Connect the bypass input power cables from the input service entrance to the bypass input power terminals, identified as A40, B40 and C40 in FIGUREs 3.1 to 3.3. Bypass input cables must be sized for an ampere rating larger than the maximum output current capacity of the UPS. Refer to TABLE 3.4 for recommended cable sizes.
- (2) Connect the external signal terminal block as desired. Refer to section 2.4 and FIGURE 2.10 for functional description. 2mm<sup>2</sup>, or less, shielded conductor is recommended.

5. One (1) source feeding the UPS:

- (1) Confirm that an external input circuit breaker sized to protect both the AC input and the bypass line is installed. (Refer to equipment nameplate for current ratings.) Connect the bypass input power cables from the input service entrance to the bypass input power terminals, identified as A40, B40 and C40 in FIGUREs 3.1 to 3.3. Input cables must be sized for an ampere rating larger than the maximum current capacity of the UPS. Refer to TABLE 3.4 for recommended cable sizes.
- (2) Using adequately sized conductors and referring to the appropriate figure identified in FIGUREs 3.1 to 3.4, connect jumper bypass terminals A40, B40, C40 to AC input power terminals A, B, C as identified in FIGUREs 3.1 to 3.4.

- (3) Connect the external signal terminal block as desired. Refer to section 2.4 and FIGURE 2.10 for functional description. 2mm<sup>2</sup>, or less, shielded conductor is recommended.



NOTE

**1. Confirm that all UPS internal contactors (breakers) "52RC", "52C" are open before energizing UPS.**

**2. UPS power terminals are supplied with stud type fittings.**

***It is recommended that compression lugs be used to fasten all input/output power cables.***

6. Procedure for Cable Connections for Parallel Operation System
- (1) Confirm the number of units to be connected in parallel. Identify the input/output power terminal blocks and control wire connections for parallel operation systems as shown in the appropriate FIGURES 3.5 and 3.6.
- (2) Connect the external control wire and power wire.
- a.) Control wire connection
- Parallel configuration wiring (Refer to FIGURE 3.5 and 3.6.)
- External 52L-n control signal from Critical Load Cabinet (CLC) to UPS-n IOAU-09 (TN1– 5 , 6).
  - Parallel control signal for CN94 as shown in FIGURE 3.6.
  - Parallel control signal for CN96 and CN95 as shown in FIGURE 3.6.
- b.) Power wire connection
- From UPS AC Output Terminals to Critical Load Cabinet (CLC) (Refer to FIGURE 3.5 and 3.6.)



### 3.4 RECOMMENDED CABLE SIZES

The cable sizes of AC Input, AC Output, Bypass Input, DC Input are shown in TABLE 3.3 to 3.5. Due to that many of different cable sizes used may cause mistakes for installation, using the maximum size for design be recommended.

TABLE 3.3 Recommended Cable Sizes (AC Input)

Capacity[kVA]	Cable size(MAX)	Screw size	Rated Current[A]
60	2×70 mm <sup>2</sup>	M10 or M12	102
120	2×70 mm <sup>2</sup>		205
160	2×70 mm <sup>2</sup>		273
200	2×70 mm <sup>2</sup>		341
300	2×120 mm <sup>2</sup>		485
400	2×120 mm <sup>2</sup>		646
500	2×240 mm <sup>2</sup>		808
600	2×240 mm <sup>2</sup>		969

TABLE 3.4 Recommended Cable Sizes (AC Output, Bypass Input)

Capacity[kVA]	Cable size(MAX)	Screw size	Rated Current[A]
60	2×70 mm <sup>2</sup>	M10 or M12	91
120	2×70 mm <sup>2</sup>		182
160	2×70 mm <sup>2</sup>		243
200	2×70 mm <sup>2</sup>		304
300	2×120 mm <sup>2</sup>		456
400	2×120 mm <sup>2</sup>		608
500	2×240 mm <sup>2</sup>		760
600	2×240 mm <sup>2</sup>		912

TABLE 3.5 Recommended Cable Sizes (DC Connection)

Capacity[kVA]	Cable size(MAX)	Screw size	Rated Current[A]
60	2×95 mm <sup>2</sup>	M10 or M12	141
120	2×95 mm <sup>2</sup>		281
160	2×95 mm <sup>2</sup>		375
200	2×95 mm <sup>2</sup>		470
300	2×185 mm <sup>2</sup>		703
400	2×185 mm <sup>2</sup>		938
500	4×150 mm <sup>2</sup>		1172
600	4×150 mm <sup>2</sup>		1406

\*1 - The cables must be selected to be equal to the sizes listed in the table.

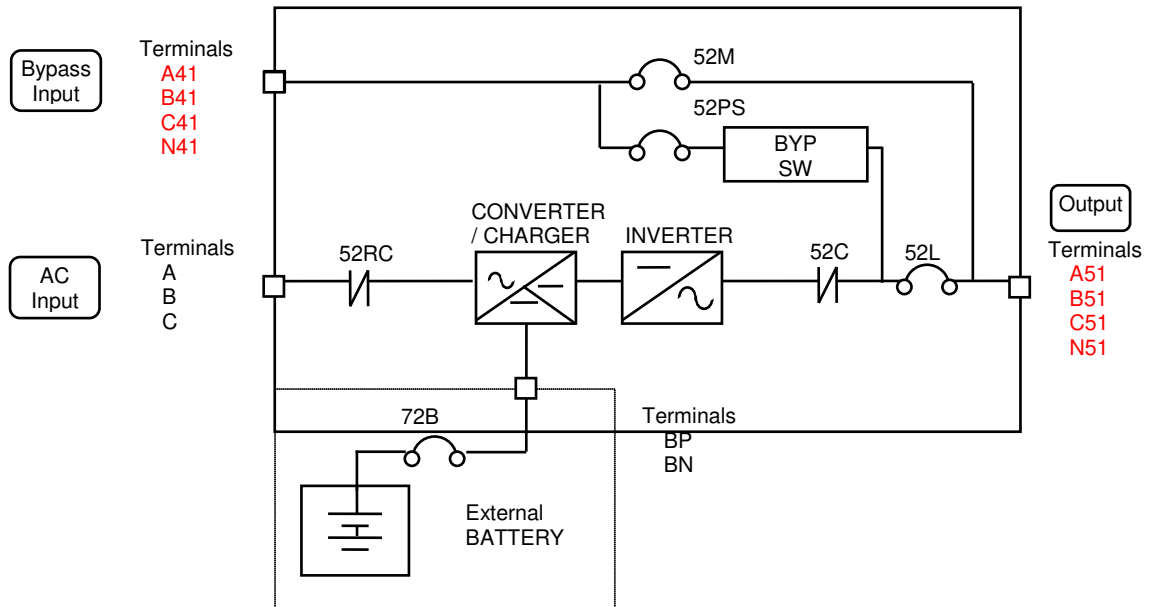
\*2 - Voltage drop across power cables not to exceed 2% of nominal source voltage.

\*3 - Allowable ampere-capacities based on 75 degree C. insulation at ambient temperature of 40 degree C.

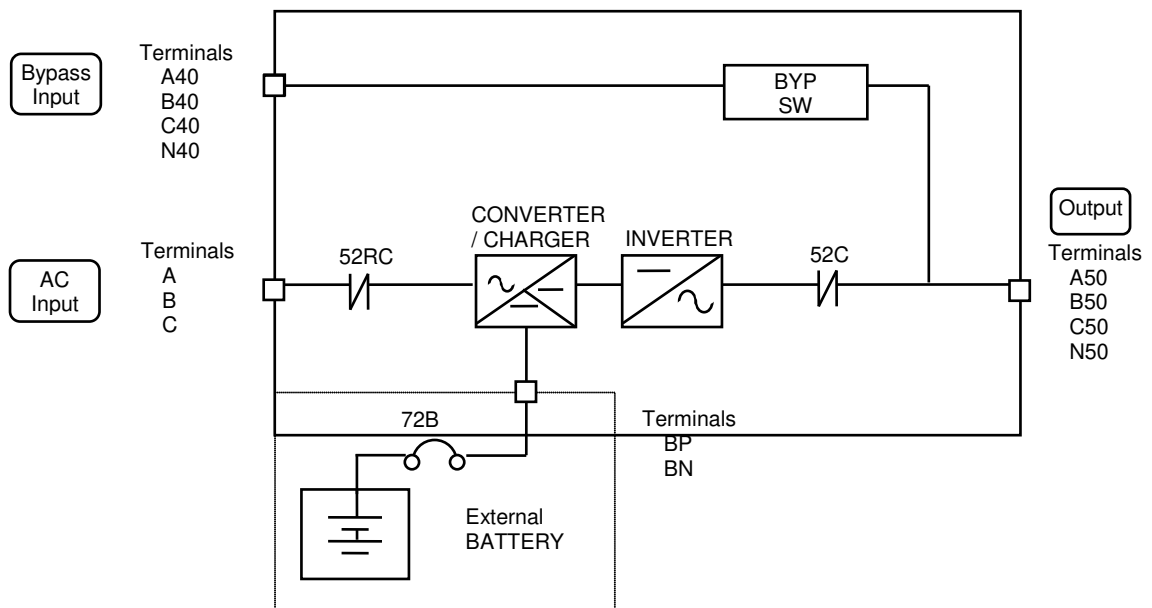
**Note: Copper conductors assumed.**



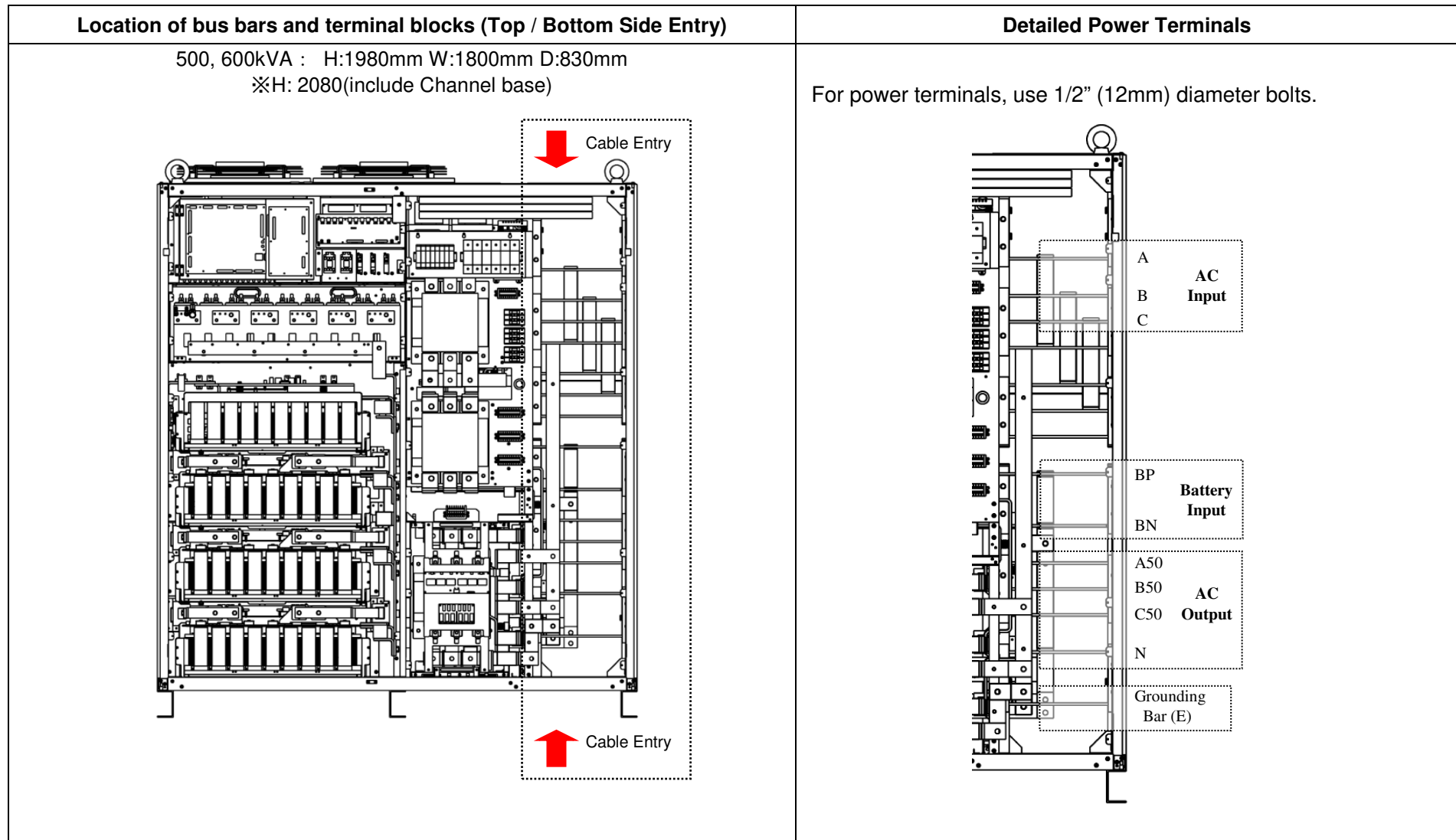
**FIGURE 3.1** UPS Terminal Designation  
(60, 120, 160, 200kVA)



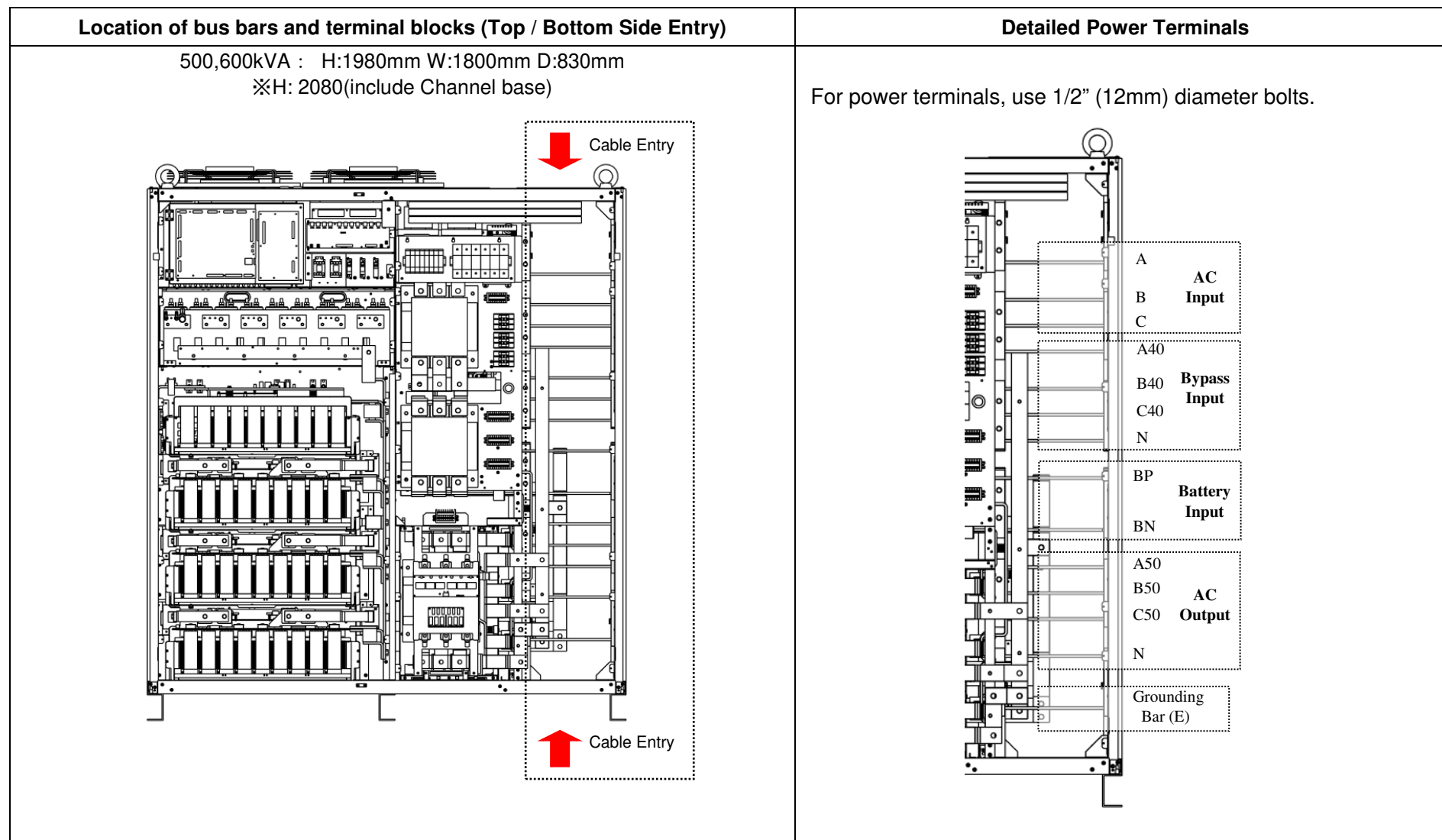
(300~600kVA)



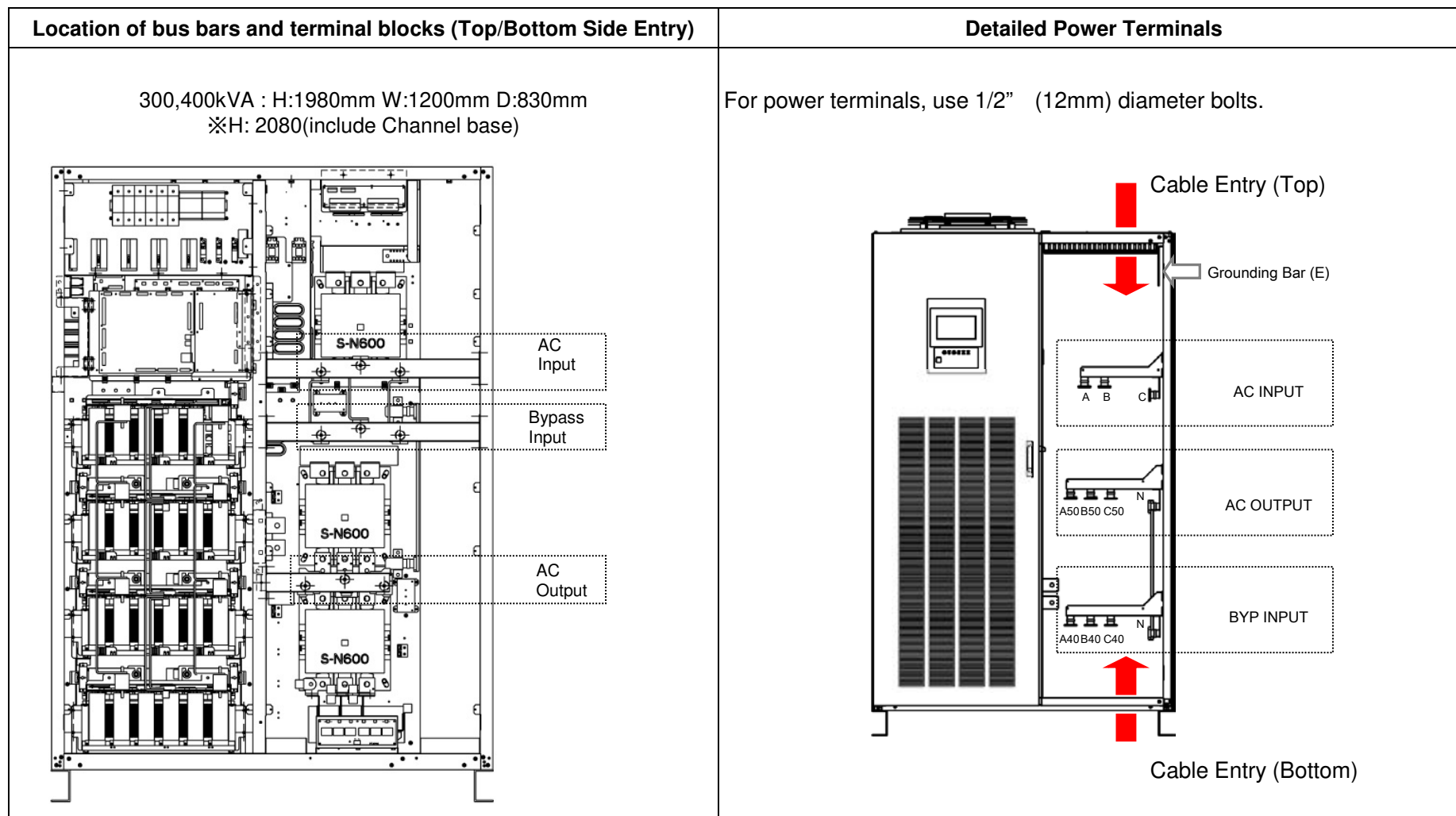
**FIGURE 3.2.a** Diagram of input/output bus bars and terminal blocks at one (1) source feeding the UPS (500,600kVA)



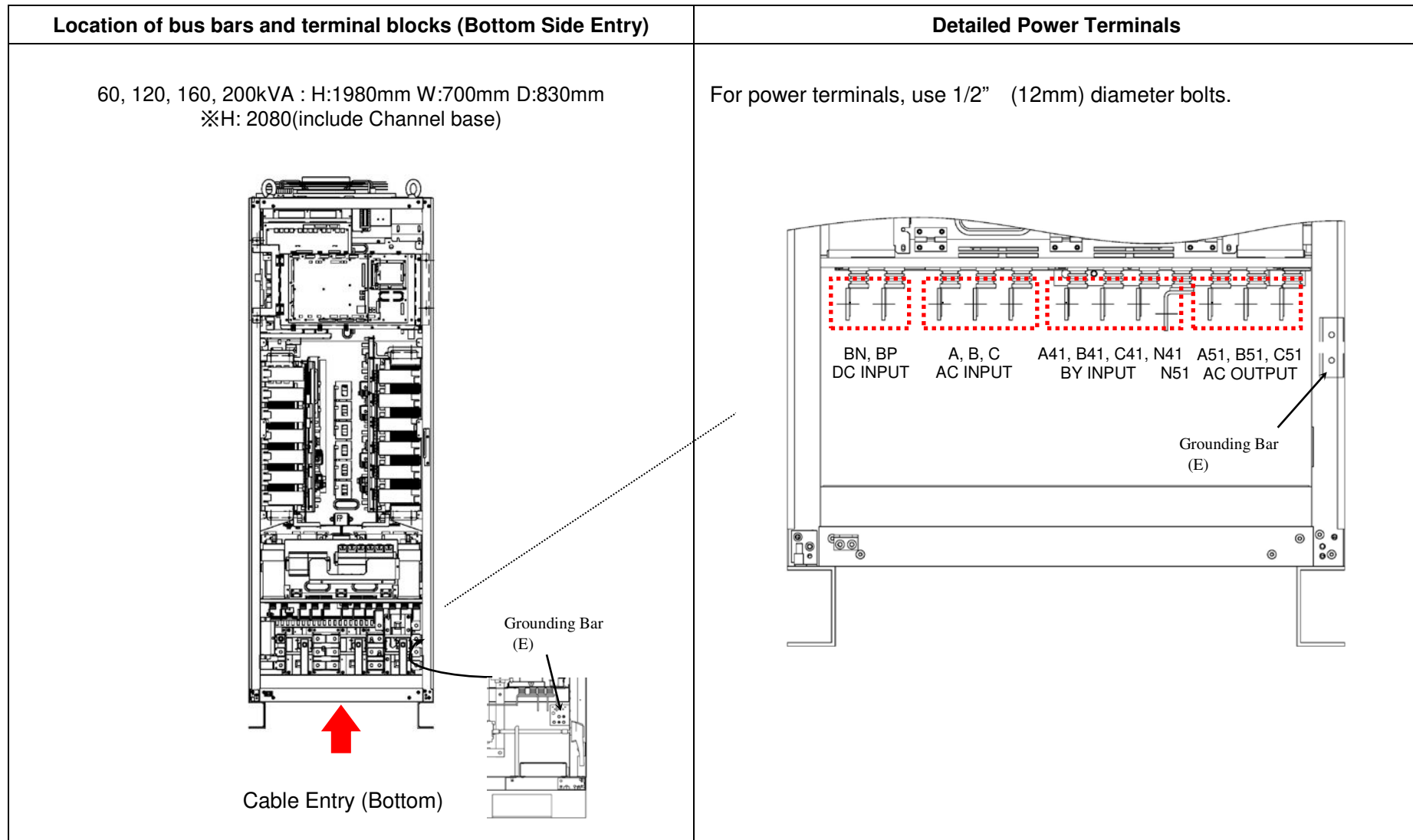
**FIGURE 3.2.b** Diagram of input/output bus bars and terminal blocks at two (2) source feeding the UPS (500,600kVA)

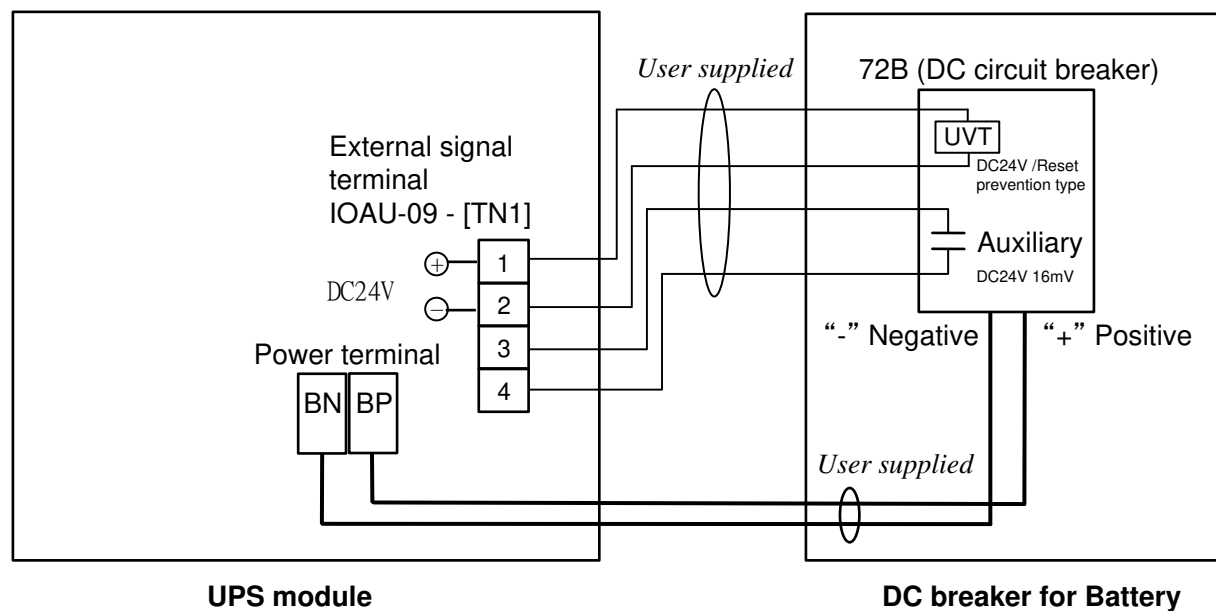


**FIGURE 3.2.c** Diagram of input/output bus bars and terminal blocks (300,400kVA)



**FIGURE 3.2.d** Diagram of input/output bus bars and terminal blocks (200kVA)



**FIGURE 3.3** Diagram of Power Wire & Control Wire Inter-Connect between UPS and Battery


Note1)DC24V is outputted to 72B UVT coil through a terminal box from IOAU-09 PWB.

(DC24V power supply capability: maximum current 1.25A, rated current 0.41A)

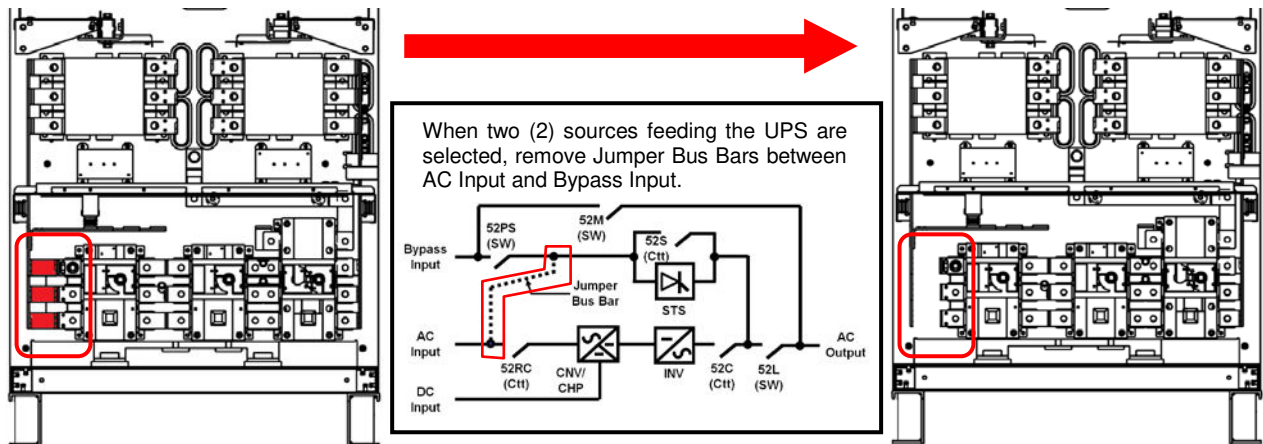
If DC24V loses, the trip state of 72B will be carried out.

Note2)Even if a 72B UVT coil carries out reset operation of the breaker from a trip state in the state of no magnetizing, it cannot turn OFF.

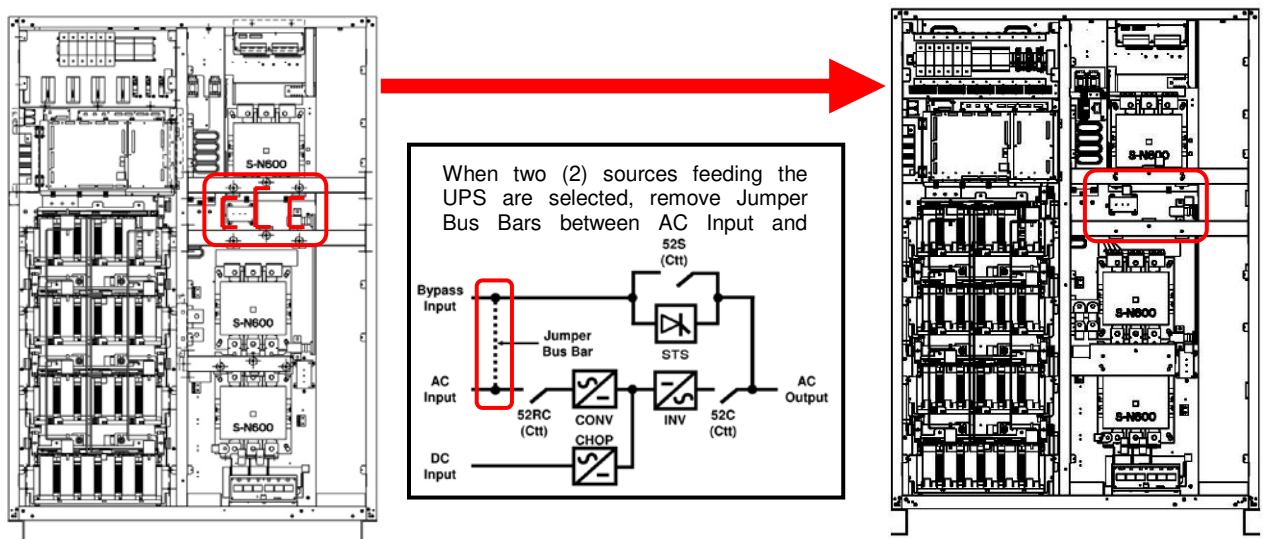
Note3)When the magnetization voltage of a coil returns to 24V, it is possible to reset a breaker in the OFF state.

Note4)DC24V-16mA is impressed to 72B auxiliary contact through a terminal box from IOAU-09 PWB.

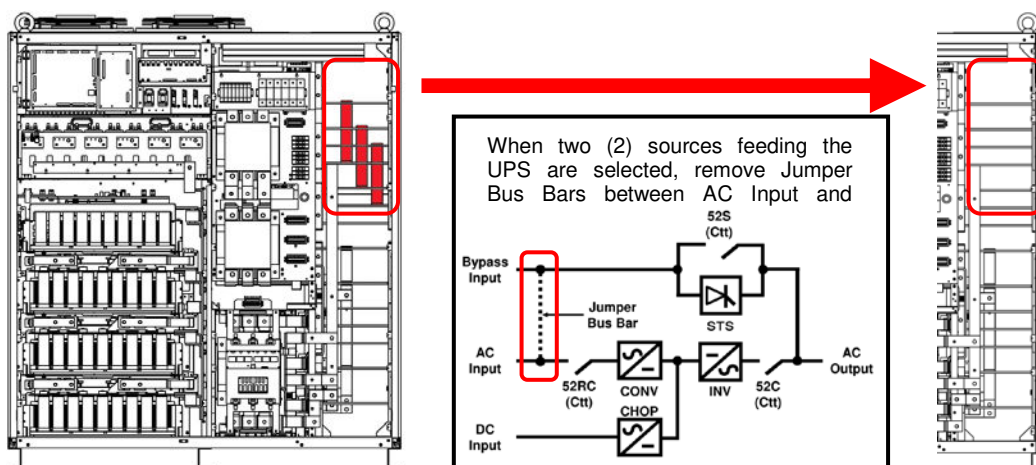
**FIGURE 3.4.a** Changing to two (2) source feeding the UPS from one (1) sources feeding the UPS at 200kVA

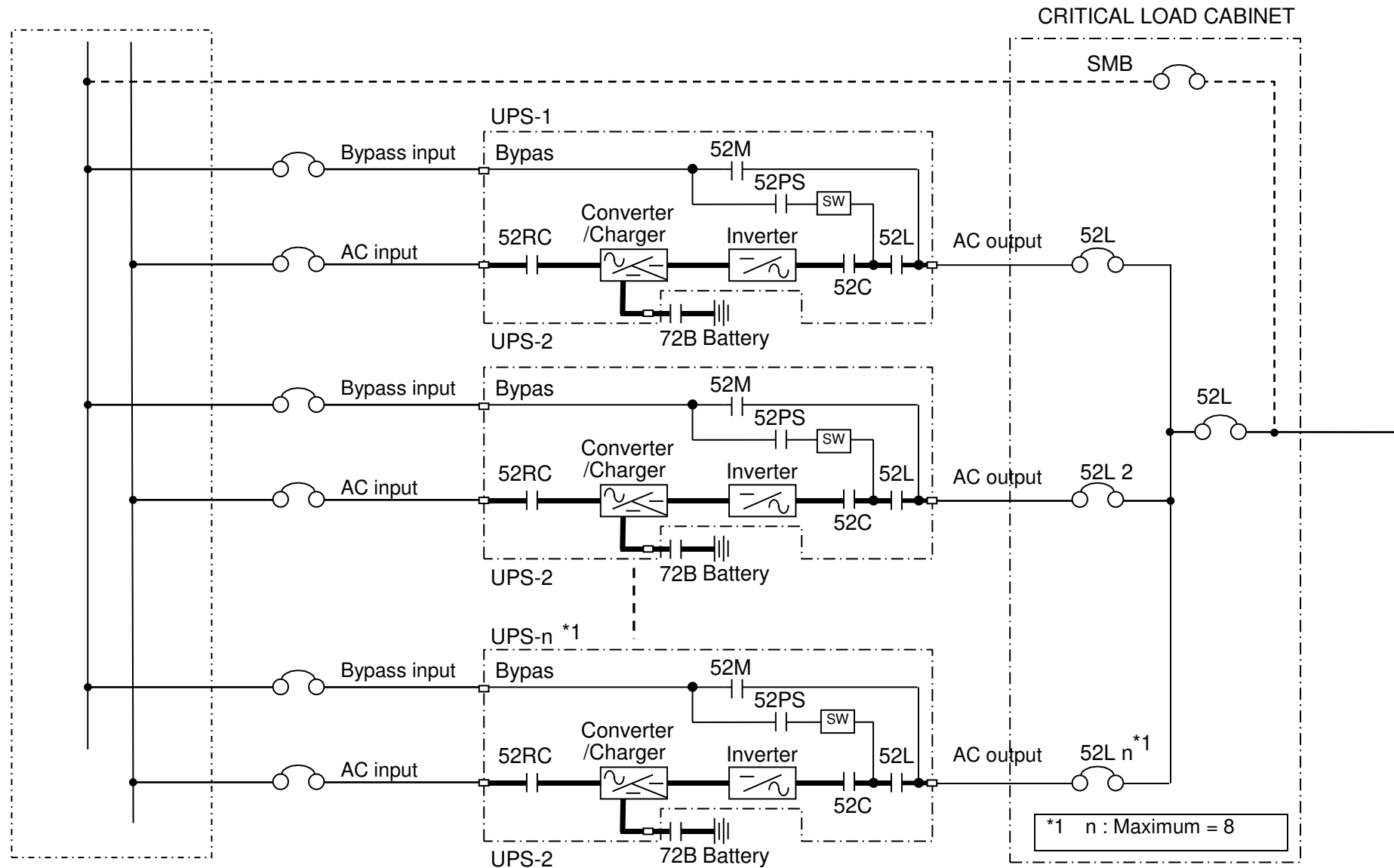


**FIGURE 3.4.b** Changing to two (2) source feeding the UPS from one (1) sources feeding the UPS at 300,400kVA



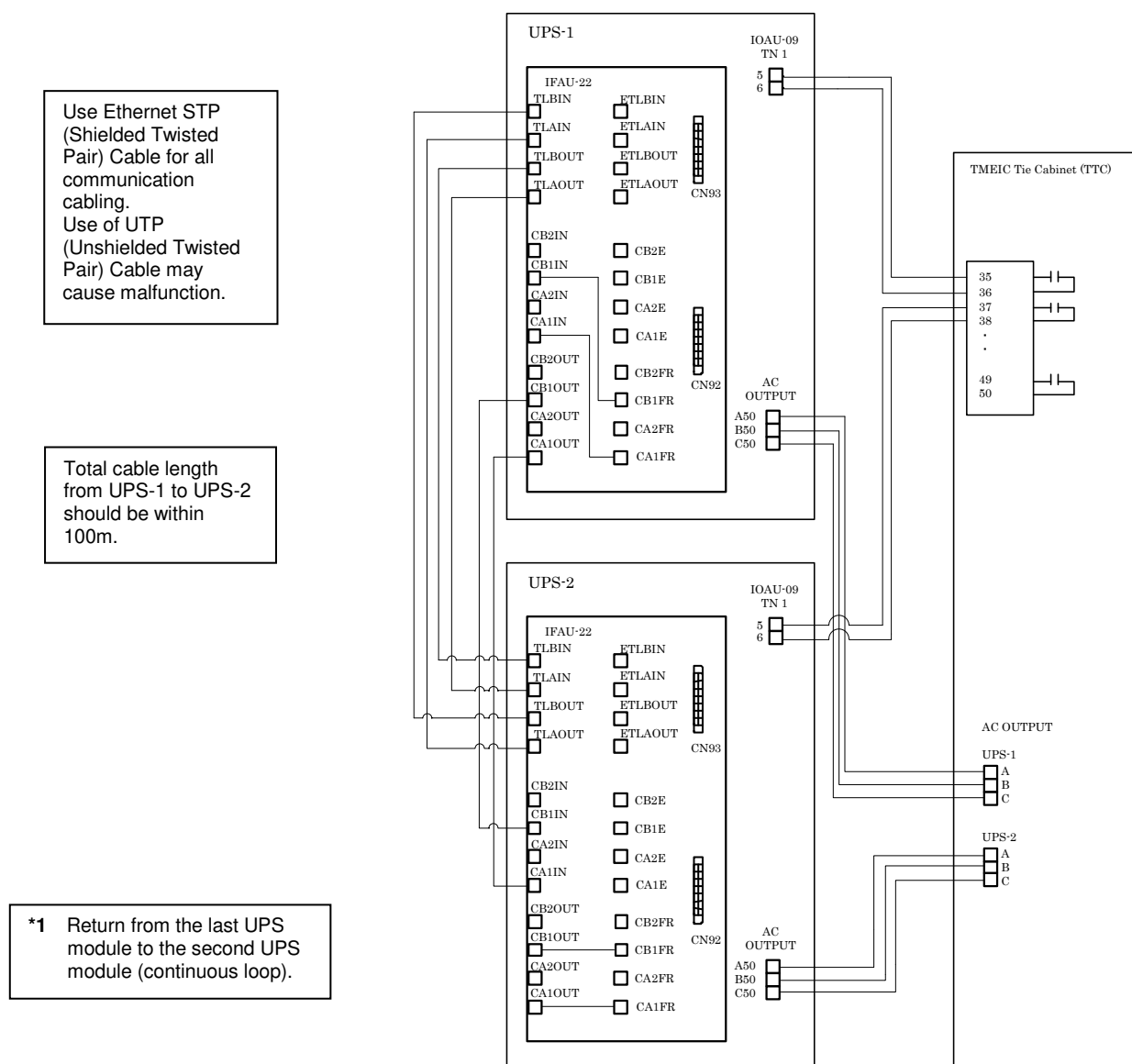
**FIGURE 3.4.c** Changing to two (2) source feeding the UPS from one (1) sources feeding the UPS at 500,600kVA



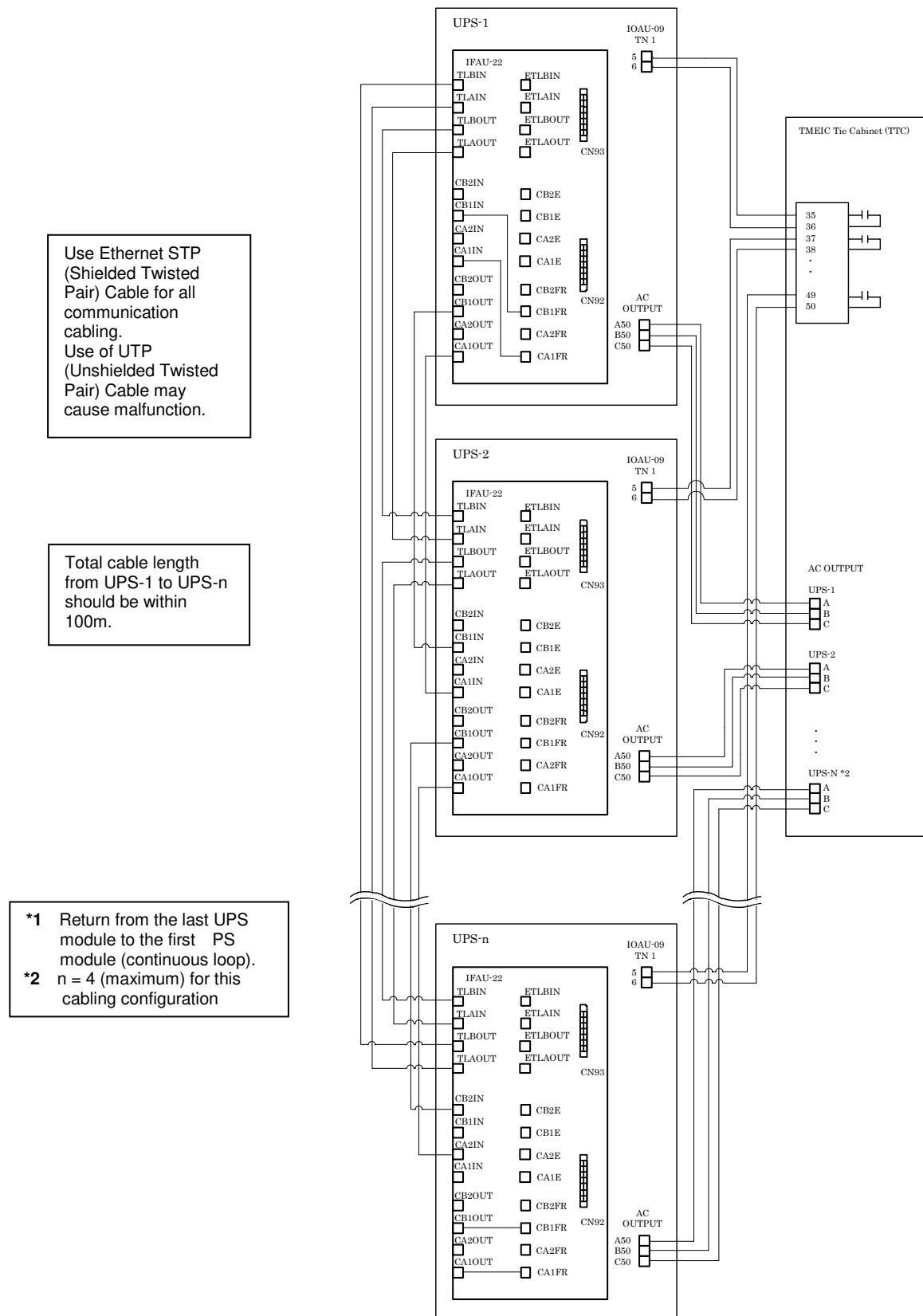
**FIGURE 3.5** Diagram of Power Wire Connect ( Parallel Operation system connection )


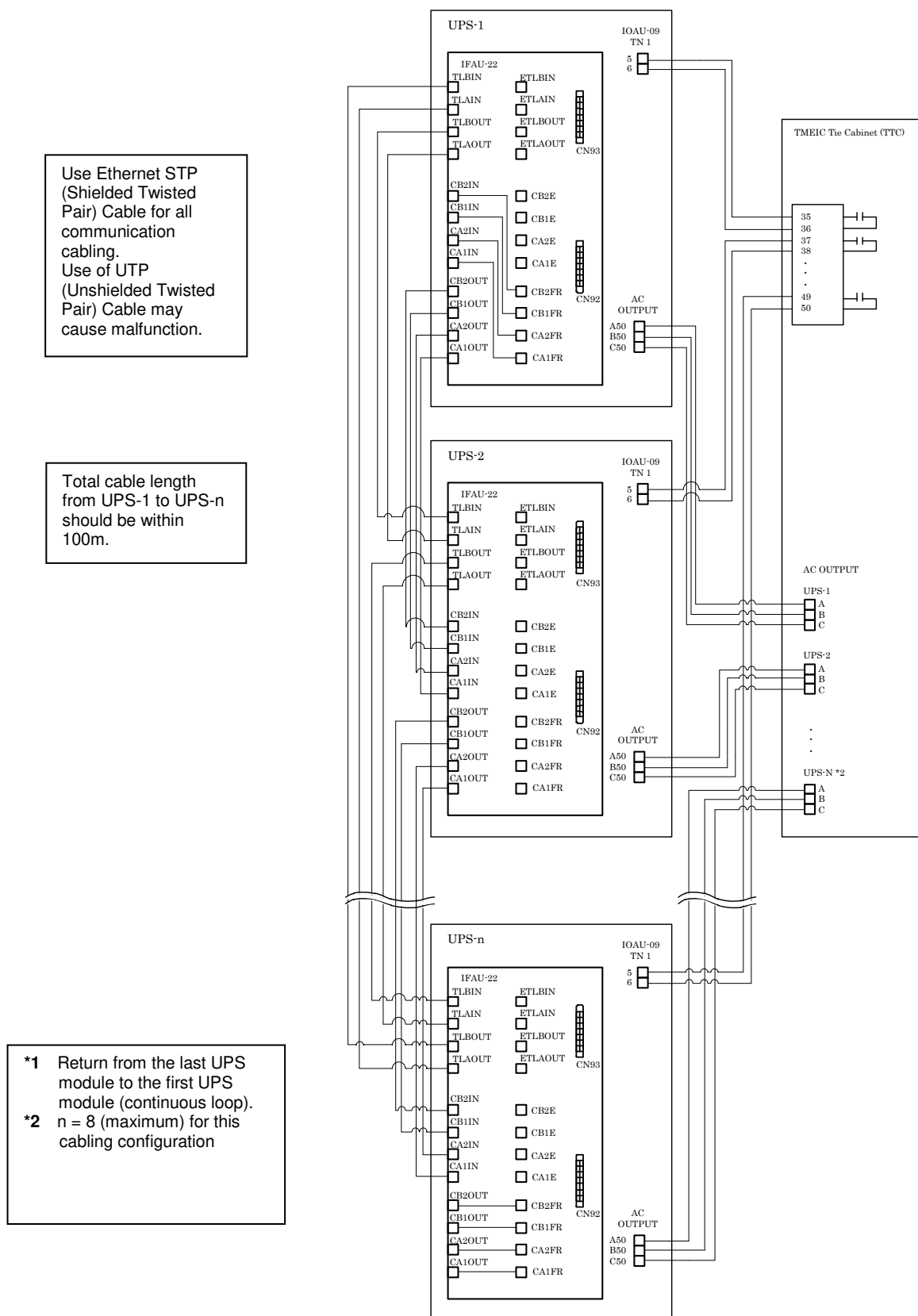


**FIGURE 3.6.a** Diagram of Power Wire & Control Wire Connections for 2 units in MMS Configuration



**FIGURE 3.6.b** Diagram of Power Wire & Control Wire Connections for 3 or 4 units in MMS Configuration

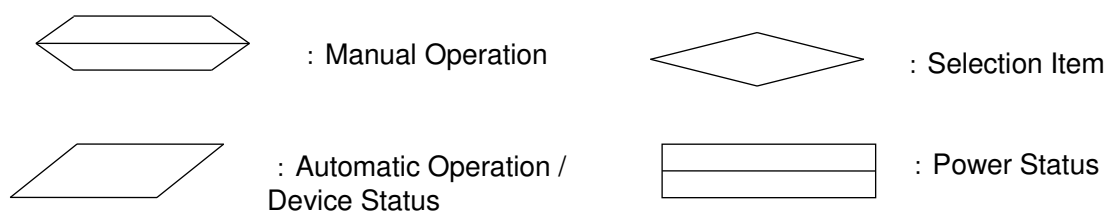


**FIGURE 3.6.c** Diagram of Power Wire & Control Wire Connections for 5 to 8 units in MMS Configuration


### 3.5 OPERATING PROCEDURES

The operation procedures are described by the symbols below.

Although the operation of “UPS supply” ⇔ “bypass supply” might be different in each system which depends on user’s requirements, please consult the exclusive manual for each system in order to ensure proper operation.



For parallel operation system of MMS (Multi-Module System), refer to section “3.5.2 Start-up / Shut-down (MMS with Individual Bypass Parallel Redundancy)”.

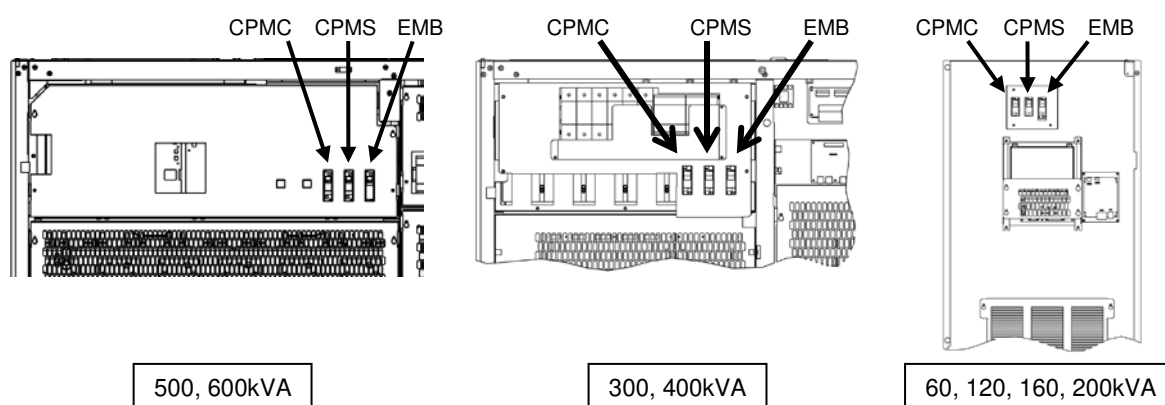


**NOTE**

***Before the UPS startup, the internal Bypass line starts to supply the unconditioned bypass input power to the critical load if the External input (or Bypass) Circuit Breaker is closed. Be extremely careful with closing the External input (or Bypass) Circuit Breaker. Confirm the position of the circuit protectors (CPMC, CPMS and EMB) located at the upper part of the cabinet (FIGURE 3.7).***

***1) CPMC and CPMS: ON; 2) EMB: OFF.***

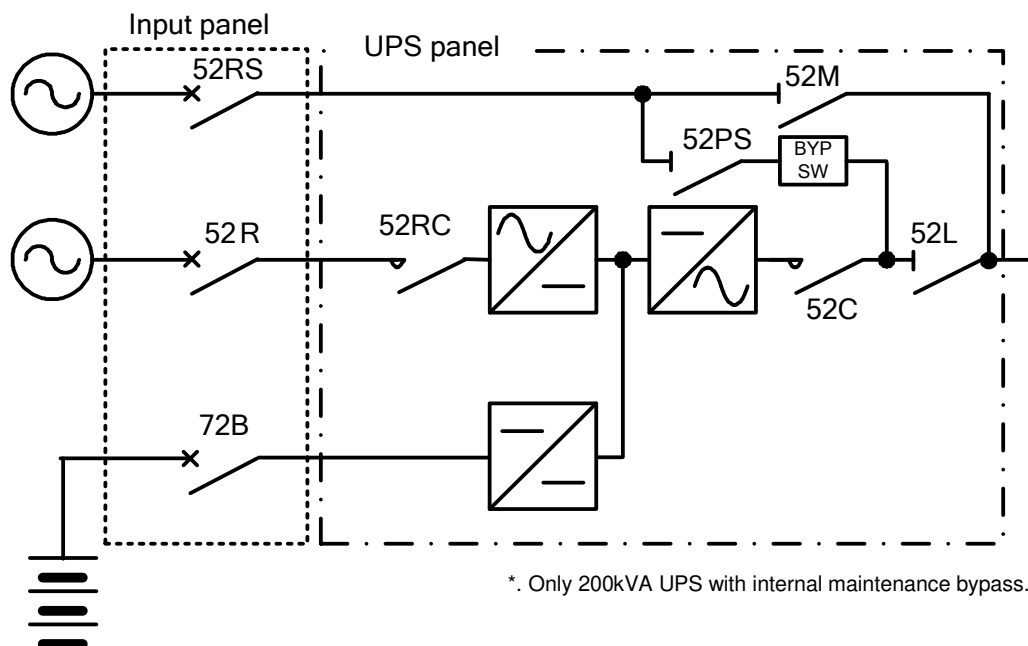
**FIGURE 3.7** Circuit protectors location



### 3.5.1 Start-up/Shut-down Procedure (Single Module System)

The single-line diagram of single module system is shown in FIGURE 3.8.

**FIGURE 3.8** Circuit diagram of single module system



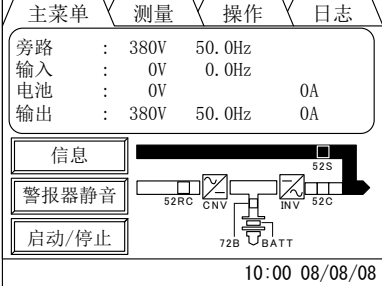
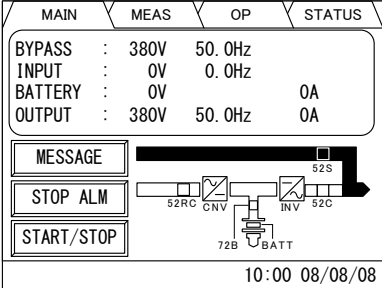
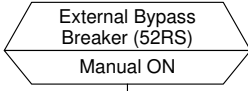
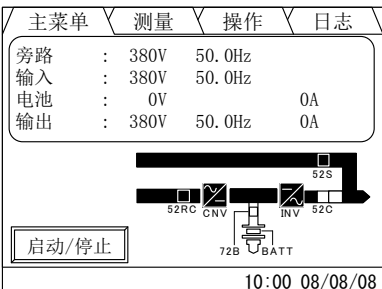
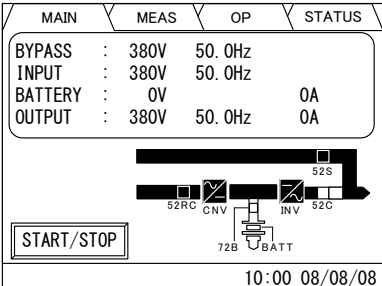
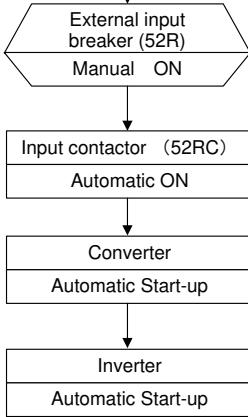
In this section, the operation started with the status in "Bypass Supply Mode". (Confirm all of the switches is opened or in tripping position besides 52MB.)

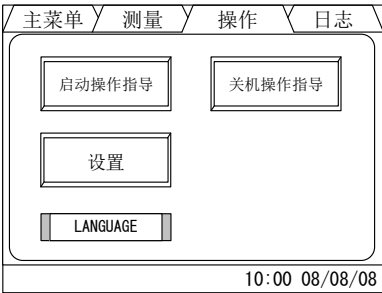
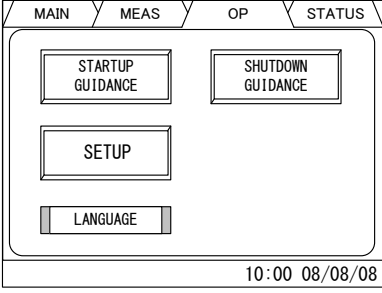
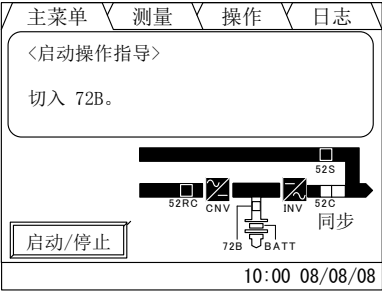
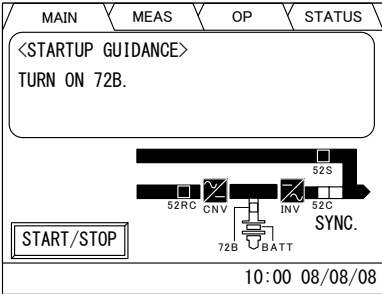


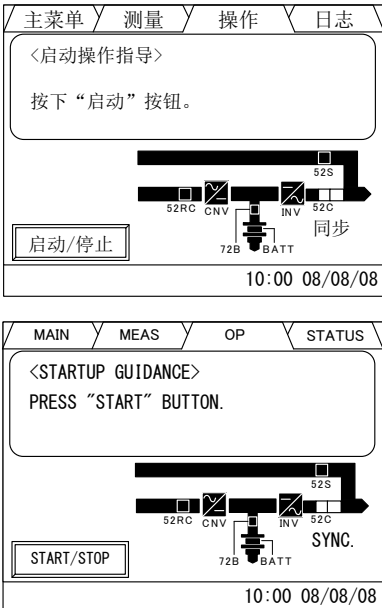
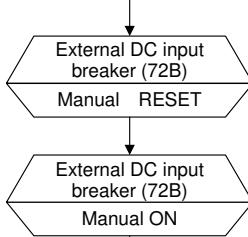
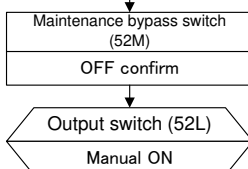
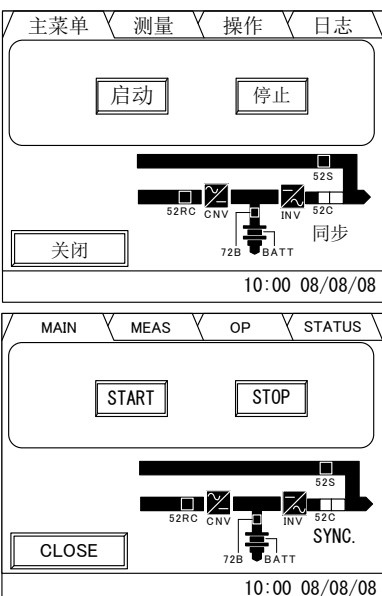

**NOTE**

***When "REMOTE OPERATION MODE" is displayed on the touch screen, the inverter start operation can only be performed remotely. If local inverter start operation is required (at the UPS), select "LOCAL ONLY" or "REMOTE & LOCAL" in the OPERATION MENU.***

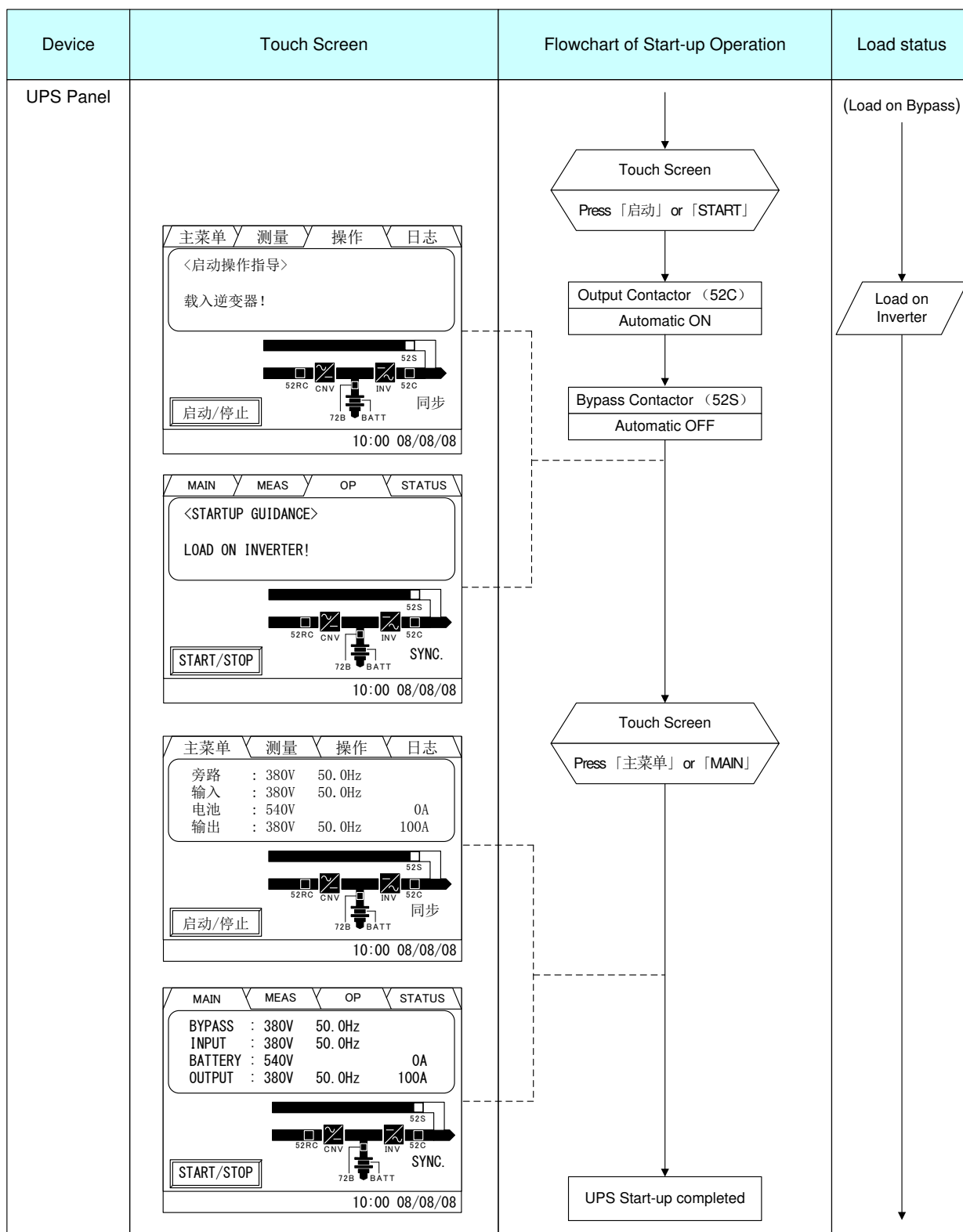
**●Start-up Procedure (Single Module System)**

Device	Touch Screen	Flowchart of Start-up Operation	Load status
Load		Confirm the loads had turned OFF	OUTAGE
UPS Panel		Confirm input switch <b>52PS is closed.</b> Confirm output switch <b>52L is opened.</b> Confirm maintenance bypass switch <b>52M is opened.</b>	
Input Panel	<p>When external bypass breaker turns to "ON", the status of power supply will be shown on the MAIN screen. Due to the status of input breaker "52R" is "OFF", the message "Warning"(UA801) will be detected. Please follow the next indication for operation.</p>  <p>10:00 08/08/08</p>  <p>10:00 08/08/08</p>		
Input Panel	 <p>10:00 08/08/08</p>  <p>10:00 08/08/08</p> <p>After turning external input breaker (52R) "ON", the status of "Alarm" will be deactivated.</p>		

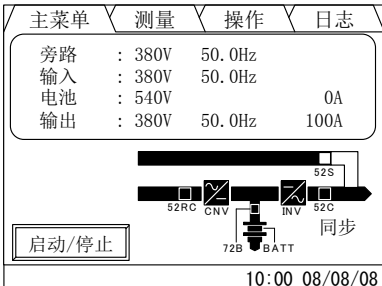

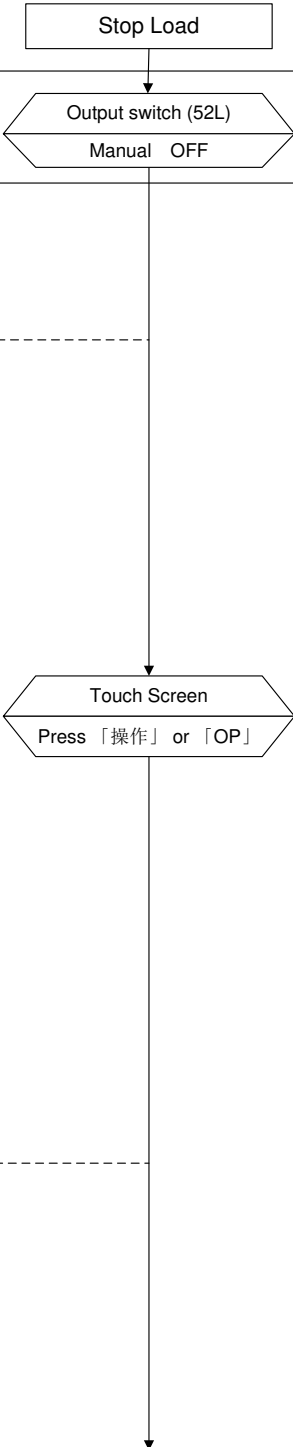
Device	Touch Screen	Flowchart of Start-up Operation	Load status
UPS Panel	    <p>When inverter output voltage and bypass voltage are synchronized, the message "SYNC." or "同步" will be shown on screen.</p>	<pre> graph TD     Start([Touch Screen Press 「操作」 or 「OP」]) --&gt; Next([Touch Screen Press 「启动操作指导」 or 「STARTUP GUIDANCE」])     Next --&gt; End([ ])           </pre>	(OUTAGE)

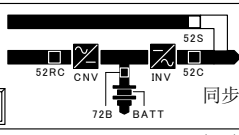
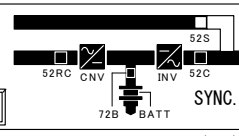
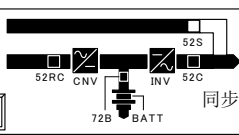
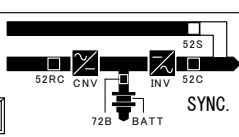
Device	Touch Screen	Flowchart of Start-up Operation	Load status
Input Panel			(OUTAGE)
UPS Panel			Load on Bypass
UPS Panel			

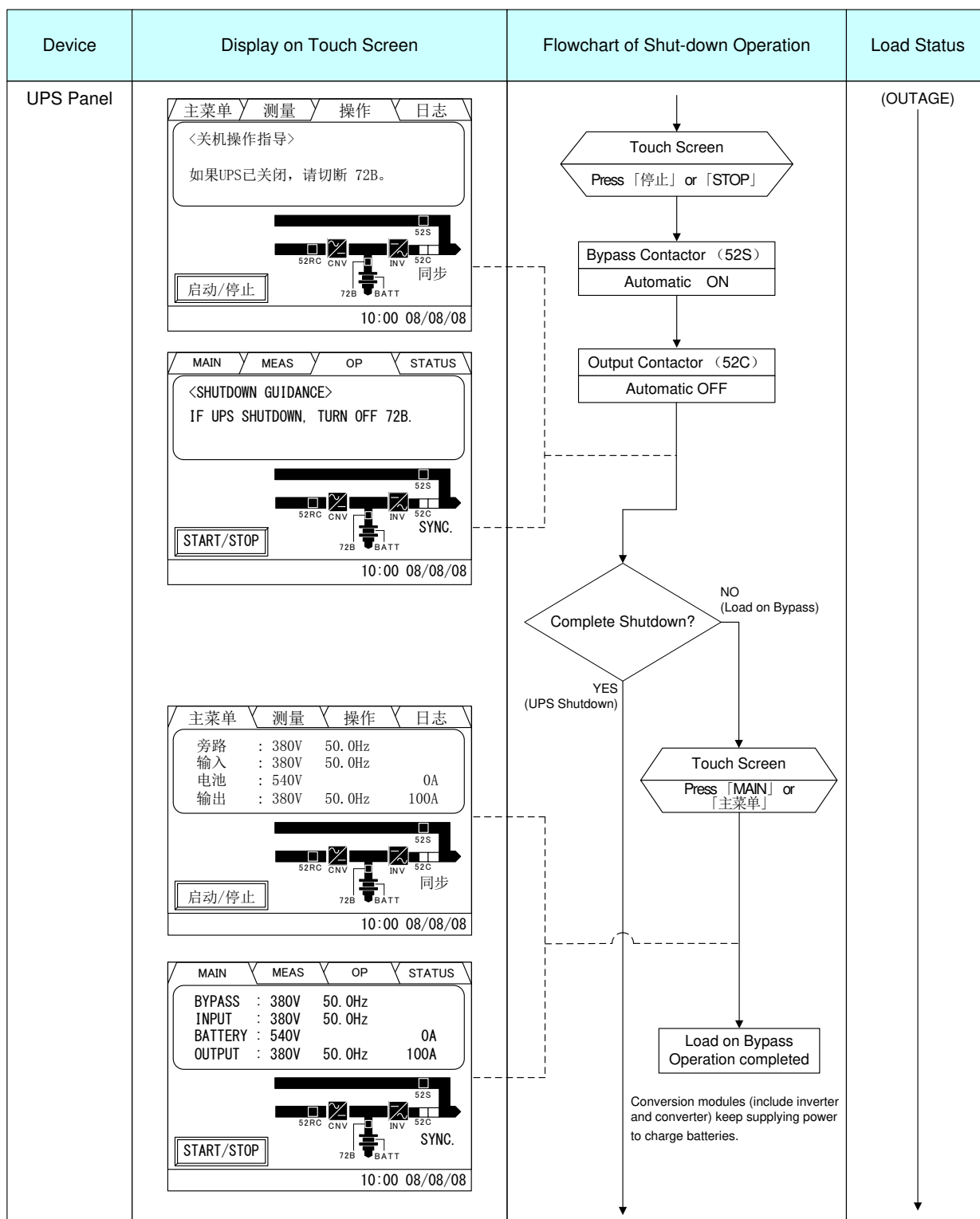


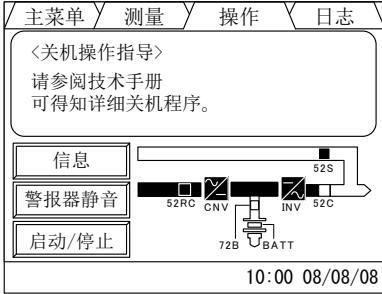
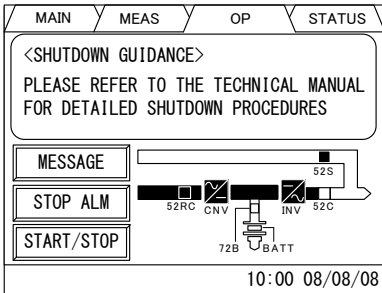


**●Shut-down Procedures (Single-Module System)**

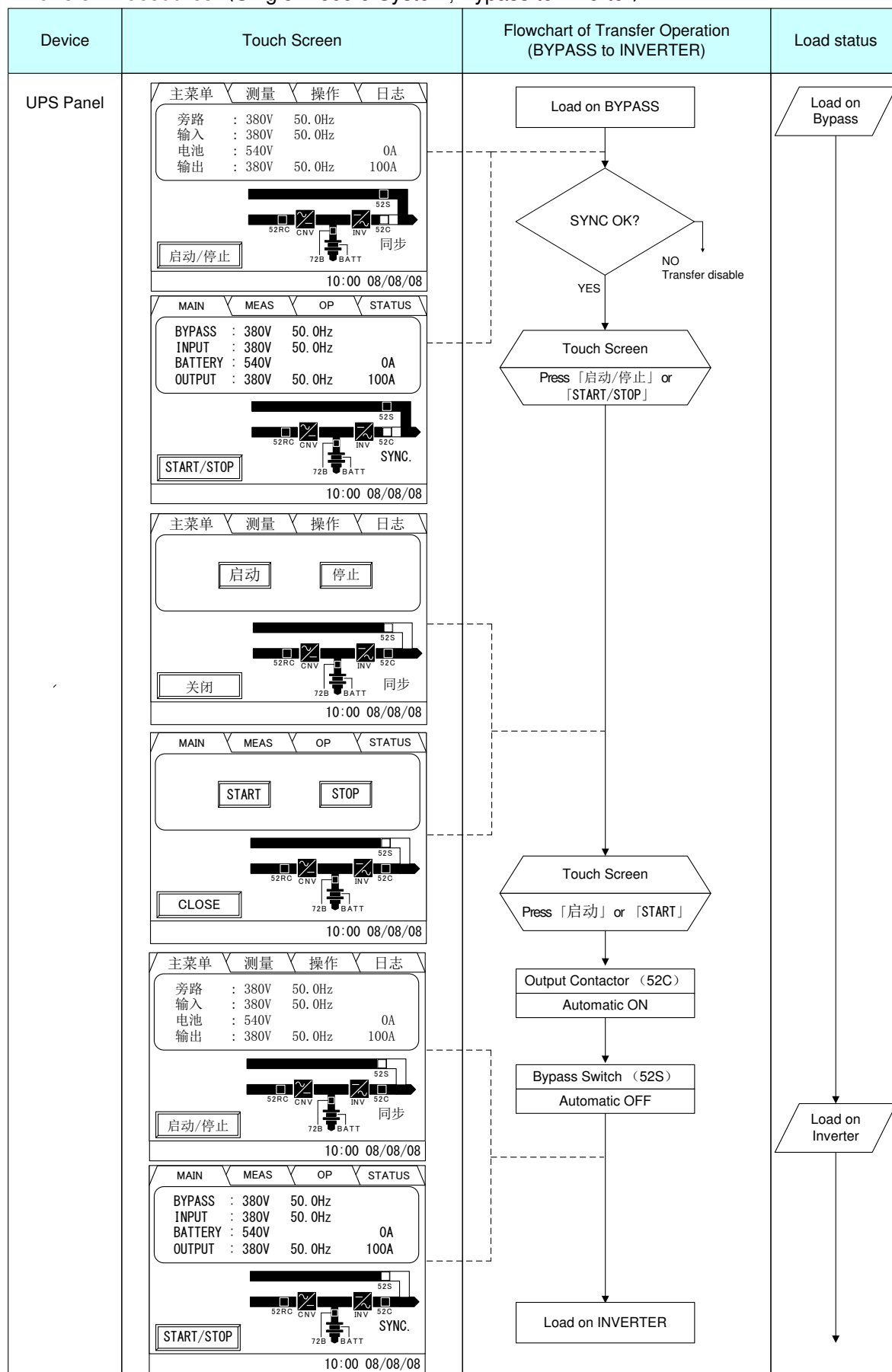
Device	Touch Screen	Flowchart of Shut-down Operation	Load status
Load		<div>Stop Load</div>	
UPS Panel		<div>Output switch (52L) Manual OFF</div>	<div>OUTAGE</div>
UPS Panel	 <p>When inverter output voltage and bypass voltage are synchronized, the message "SYNC." or "同步" will be shown on screen.</p> 		

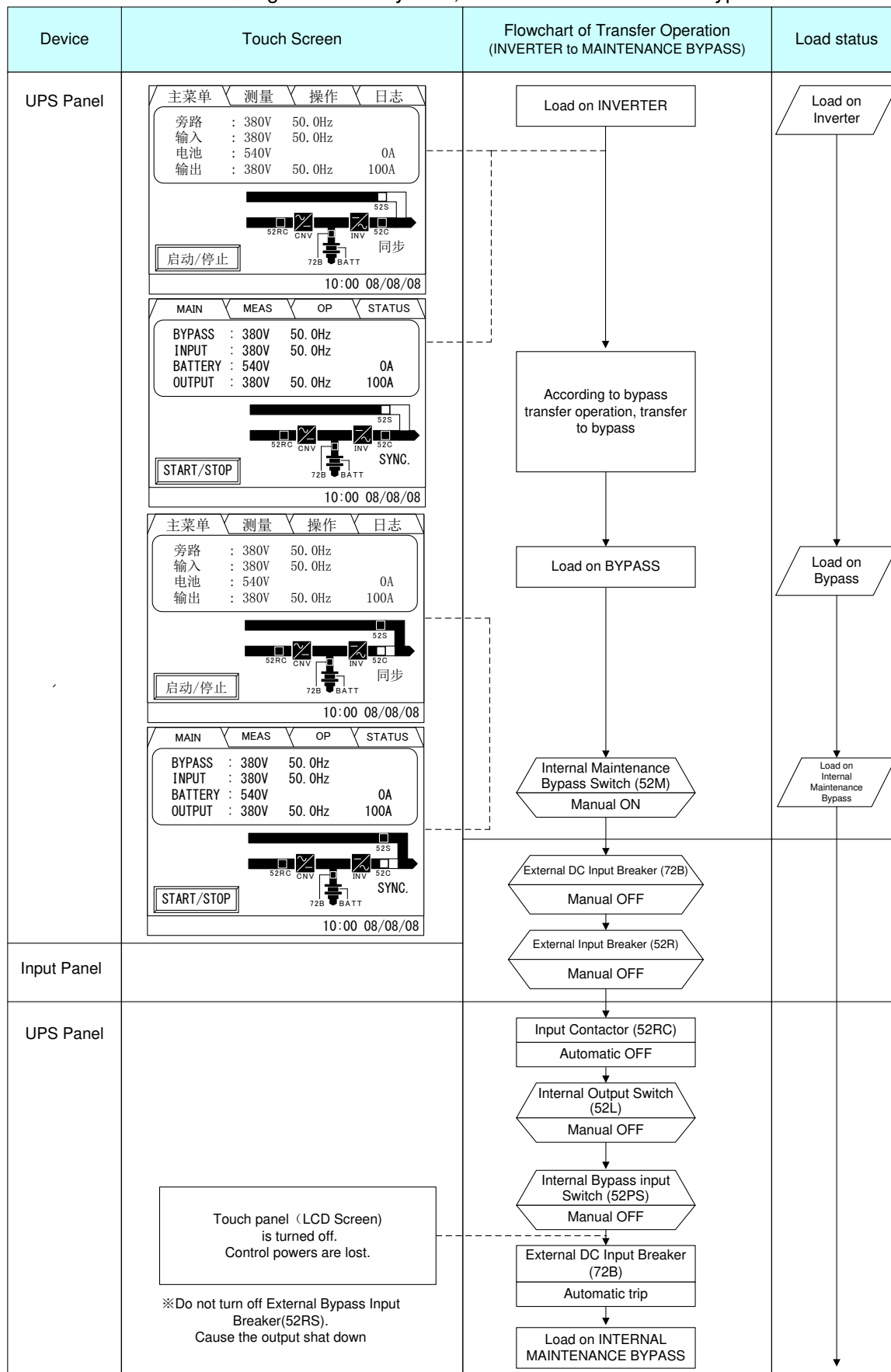
Device	Touch Screen	Flowchart of Shut-down Operation	Load status
UPS Panel	<div> 主菜单 测量 操作 日志 </div> <div> &lt;关机操作指导&gt; 按下“停止”按钮。 </div> <div>  </div> <div> 启动/停止 </div> <div> 10:00 08/08/08 </div> <div> MAIN MEAS OP STATUS </div> <div> &lt;SHUTDOWN GUIDANCE&gt; PRESS "STOP" BUTTON. </div> <div>  </div> <div> START/STOP </div> <div> 10:00 08/08/08 </div> <div> 主菜单 测量 操作 日志 </div> <div> <div>启动 停止</div>  <div>关闭</div> </div> <div> 10:00 08/08/08 </div> <div> MAIN MEAS OP STATUS </div> <div> <div>START STOP</div>  <div>CLOSE</div> </div> <div> 10:00 08/08/08 </div>	<div> Touch Screen Press 「关机操作指导」 or 「SHUTDOWN GUIDANCE」. </div> <div> Touch Screen Press 「启动/停止」 or 「START/STOP」. </div>	(OUTAGE)



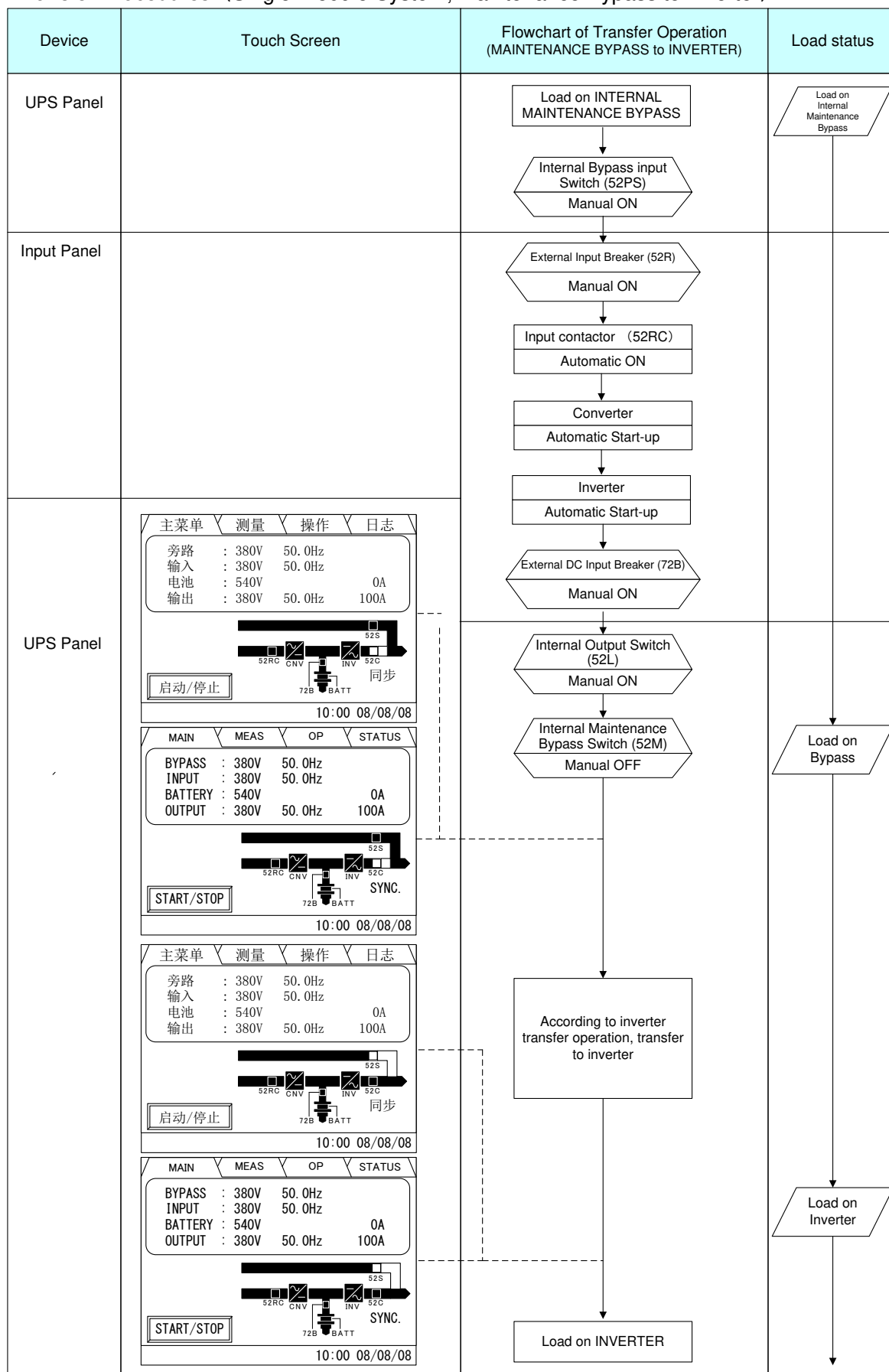
Device	Touch Screen	Flowchart of Shut-down Operation	Load Status
Input Panel		<p>(UPS Shutdown)</p> <p>External Bypass Breaker (52RS)</p> <p>Manual OFF</p>	(OUTAGE)
Input Panel	<p>Due to the status of bypass breaker "52RS" is "OFF", the message "Warning"(UA812) will be detected on screen. Please follow the flowchart for operation.</p>   <p>Fellow the procedure of operation flowchart, the touch screen will shutdown after turning the external breaker "52R" off.</p>	<p>External DC Input Breaker (72B)</p> <p>Manual OFF</p> <p>External Input Breaker (52R)</p> <p>Manual OFF</p> <p>External DC Input Breaker (72B)</p> <p>Automatic trip</p> <p>Input Contactor (52RC)</p> <p>Automatic OFF</p> <p>UPS Shutdown, Operation completed</p>	



**•Transfer Procedures (Single-Module System, Bypass to Inverter)**


**•Transfer Procedures (Single-Module System, Inverter to Maintenance Bypass)**




**•Transfer Procedures (Single-Module System, Maintenance Bypass to Inverter)**


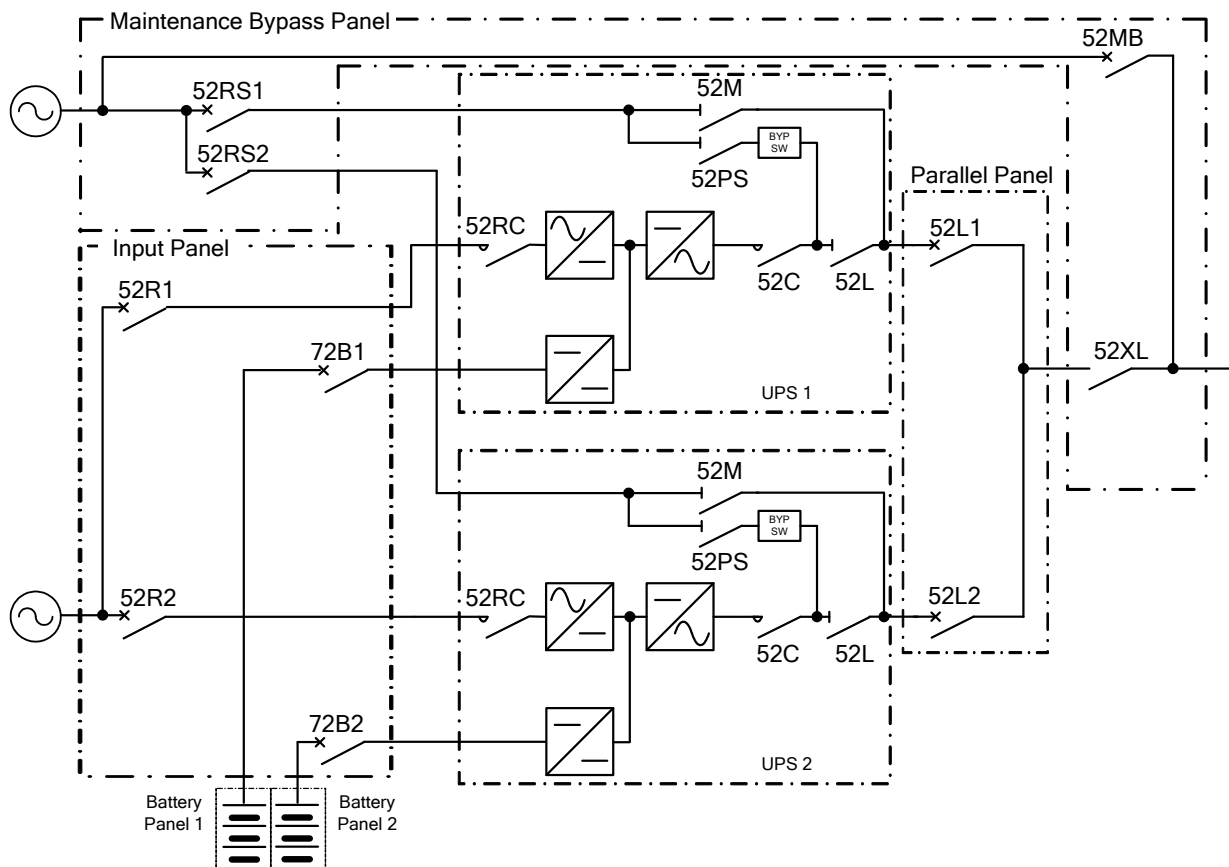
### 3.5.2 Start-up / Shut-down (MMS with Individual Bypass Parallel Redundancy)

Parallel system of two UPS modules (MMS) with general configuration of Individual Parallel Redundancy System is shown in FIGURE 3.9.

In MMS system, Internal switches must be kept the status as follows.

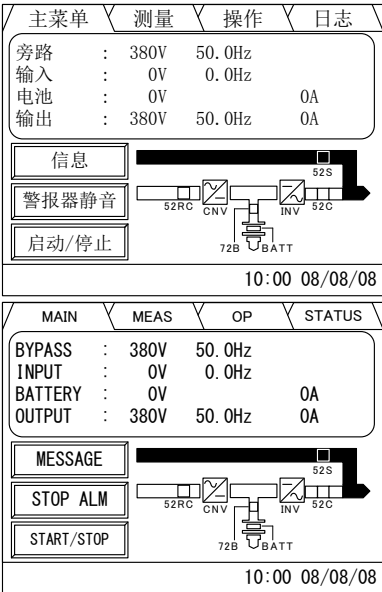
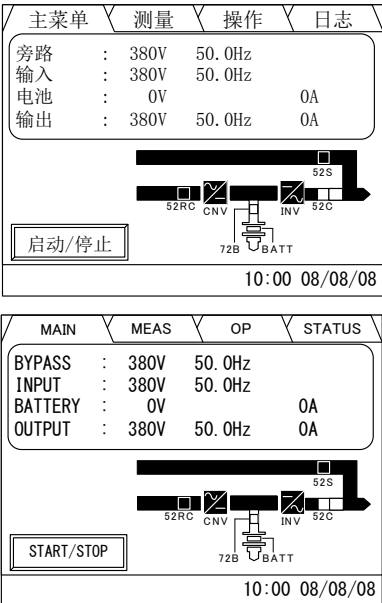
52PS : ON, 52L : ON, 52M : OFF

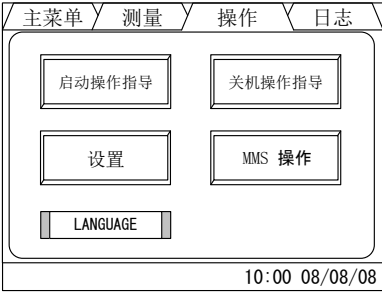
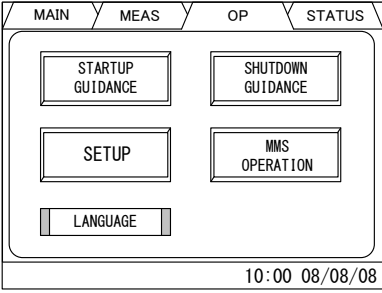
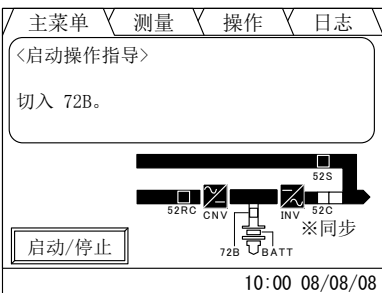
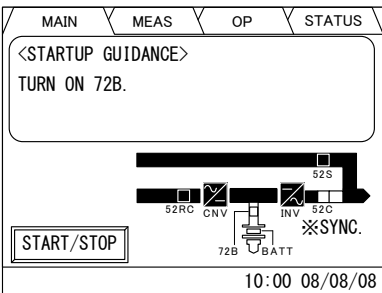
**FIGURE 3.9** Circuit configuration of Individual Bypass Parallel Redundancy System

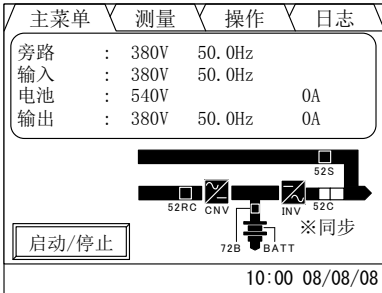
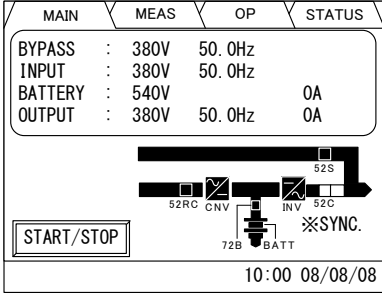
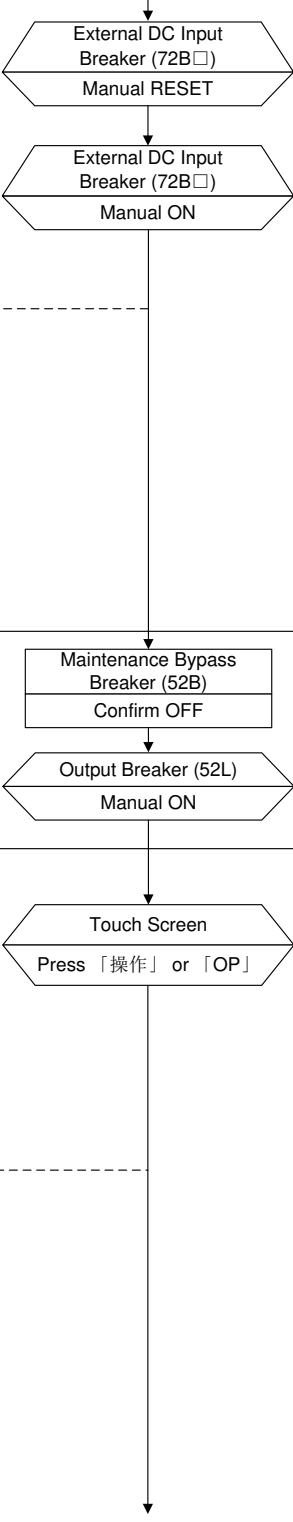
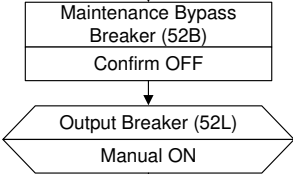
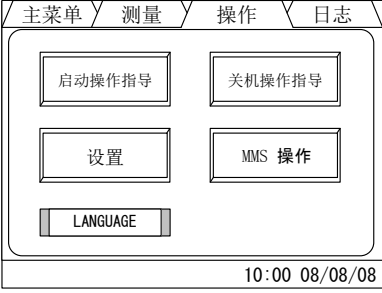
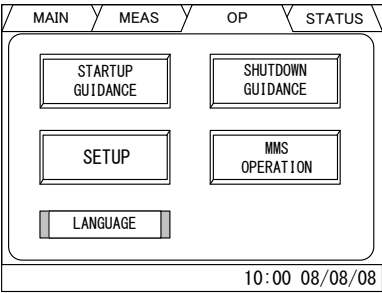
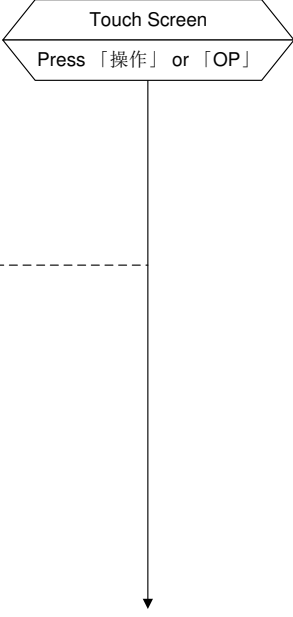


The operation of system start in the status of "Load on maintenance bypass". (Confirm all of the switches is opened or in tripping position besides 52MB.).

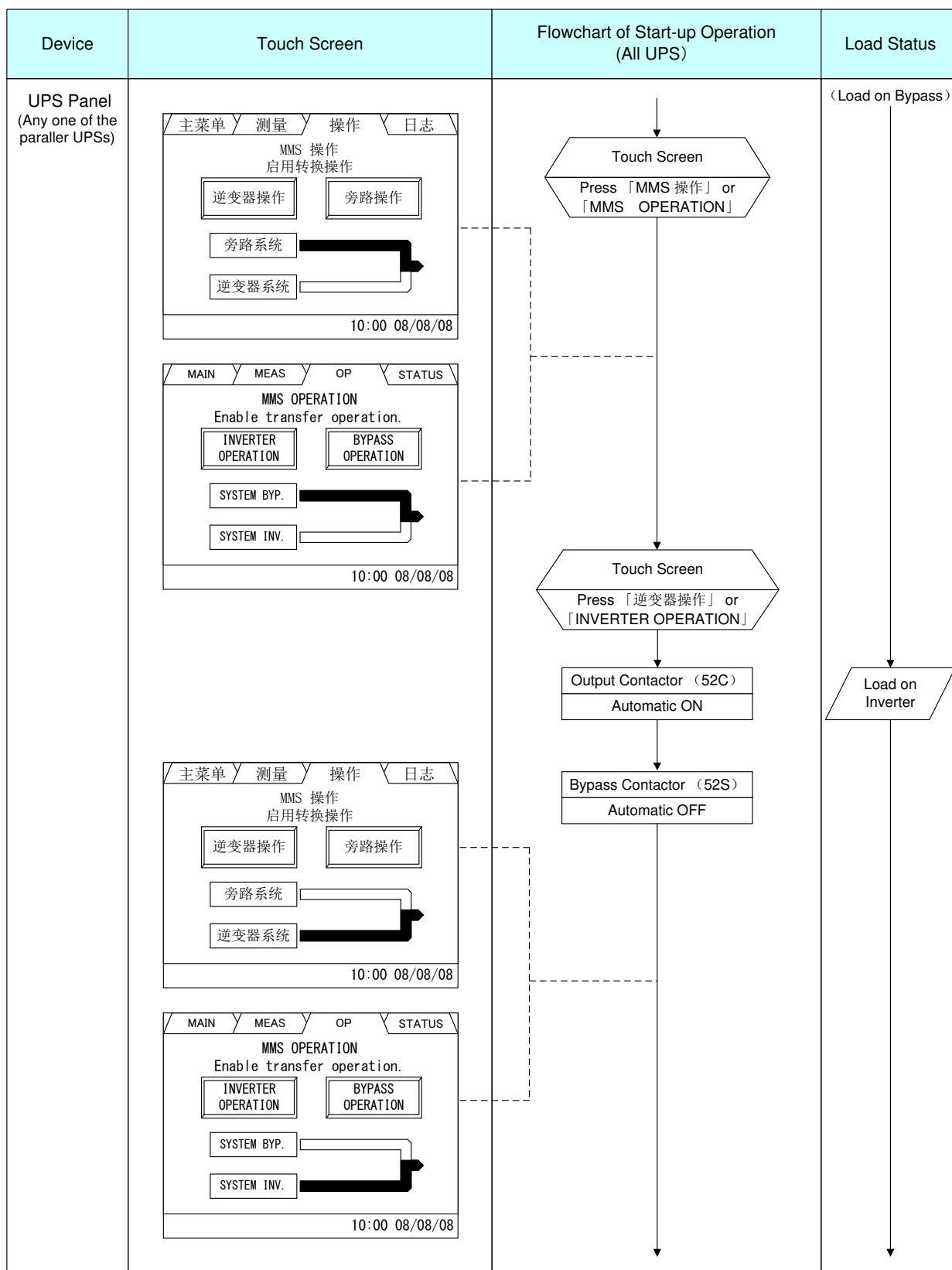
**●Start-up Procedure (MMS with Individual Bypass Parallel Redundancy)**

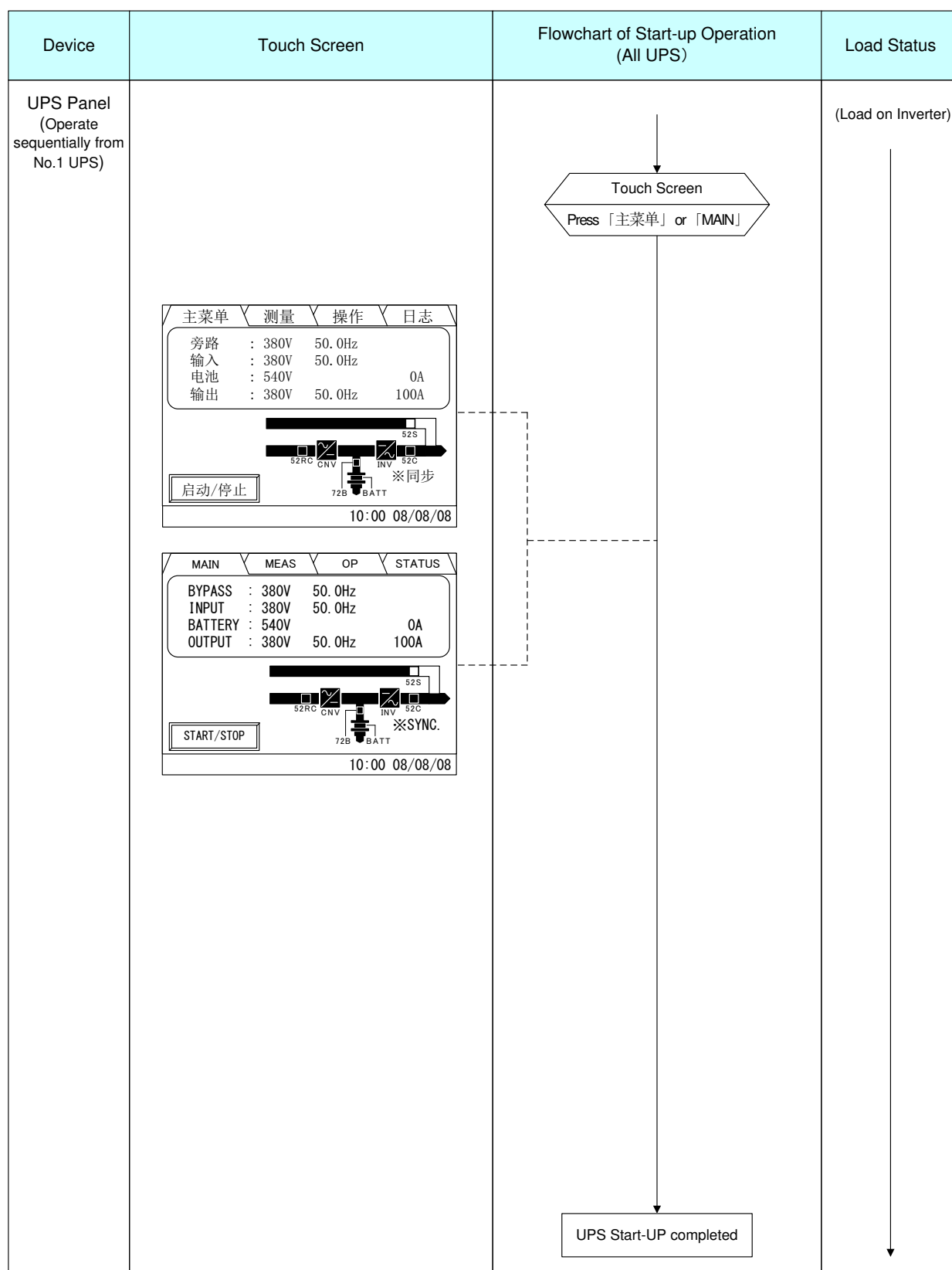
Device	Touch Screen	Flowchart of Start-up Operation	Load Status
Load		<div>Confirm the loads had turned OFF</div>	OUTAGE
Maintenance Bypass Panel	<p>When external bypass breaker turned to "NO", the status of power supply will be shown on the MAIN screen. Due to the status of input breaker "52R" is "OFF", the message "Warning"(UA801) will be detected. Please follow the next indication for operation.</p> 	<div>Confirm output breaker (52L) and maintenance bypass breaker (52MB) is opened.</div> <div>External Bypass Breaker (52RS)</div> <div>Manual ON</div>	
Input Panel	 <p>After turning external input breaker (52R) "ON", the status of "Alarm" will be deactivated.</p>	<div>External Input Breaker (52R)</div> <div>Manual ON</div> <div>Input Contactor (52RC)</div> <div>Automatic ON</div> <div>Converter</div> <div>Automatic Start-up</div> <div>Inverter</div> <div>Automatic Start-up</div>	

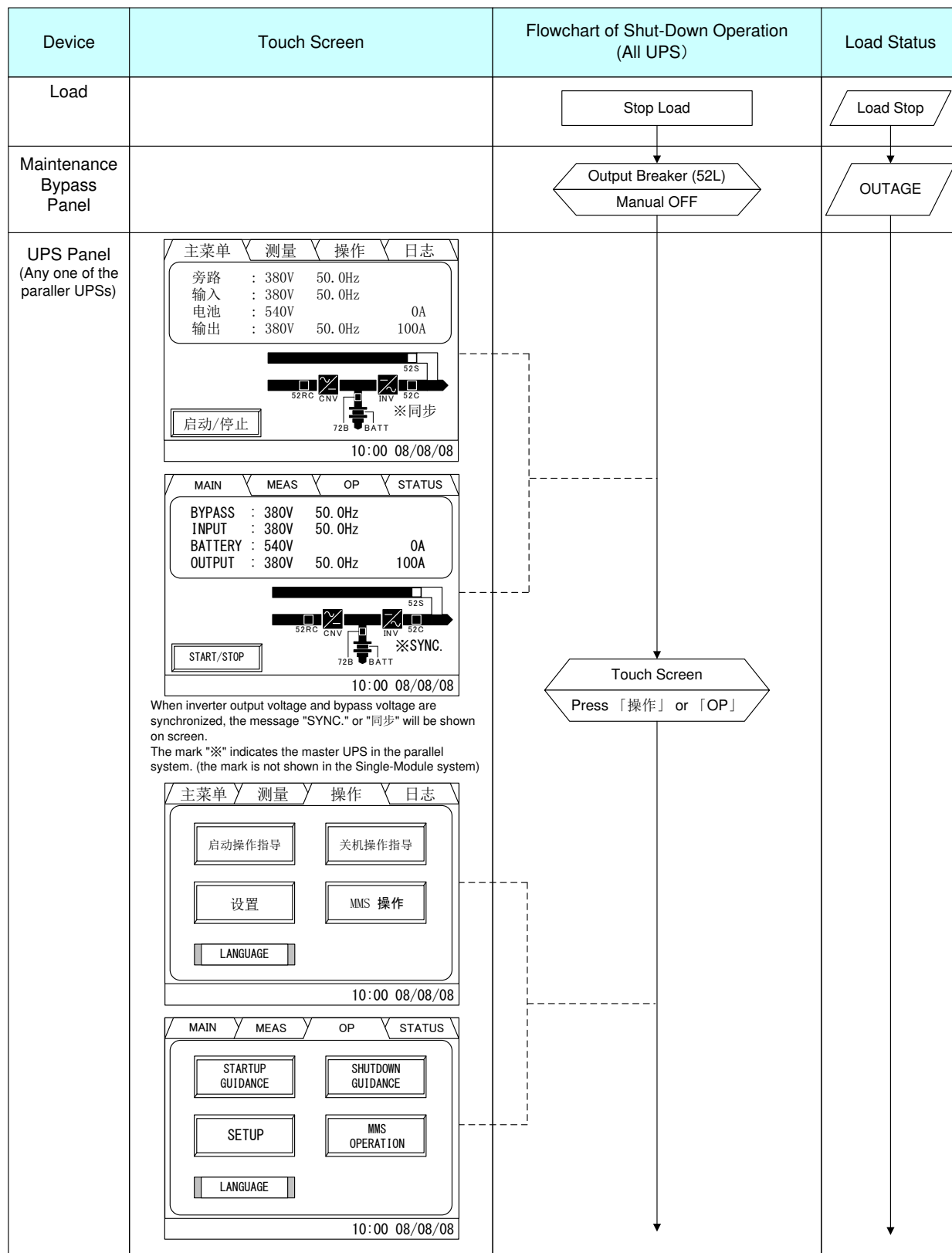
Device	Touch Screen	Flowchart of Start-up Operation (All UPS)	Load Status
UPS Panel (Operate sequentially from No.1 UPS)	    <p>When inverter output voltage and bypass voltage are synchronized, the message "SYNC." or "同步" will be shown on screen. The mark "※" indicates the master UPS in the parallel system. (the mark dose not show in the Single-Module system)</p>	<p>Touch Screen Press 「操作」 or 「OP」</p> <p>Touch Screen Press 「启动操作指导」 or 「STARTUP GUIDANCE」</p>	(OUTAGE)

Device	Touch Screen	Flowchart of Start-up Operation (All UPS)	Load Status
Input Panel	 		(OUTAGE)
Maintenance Bypass Panel			Load on Bypass
UPS Panel (Any one of the parallel UPSs)	 		

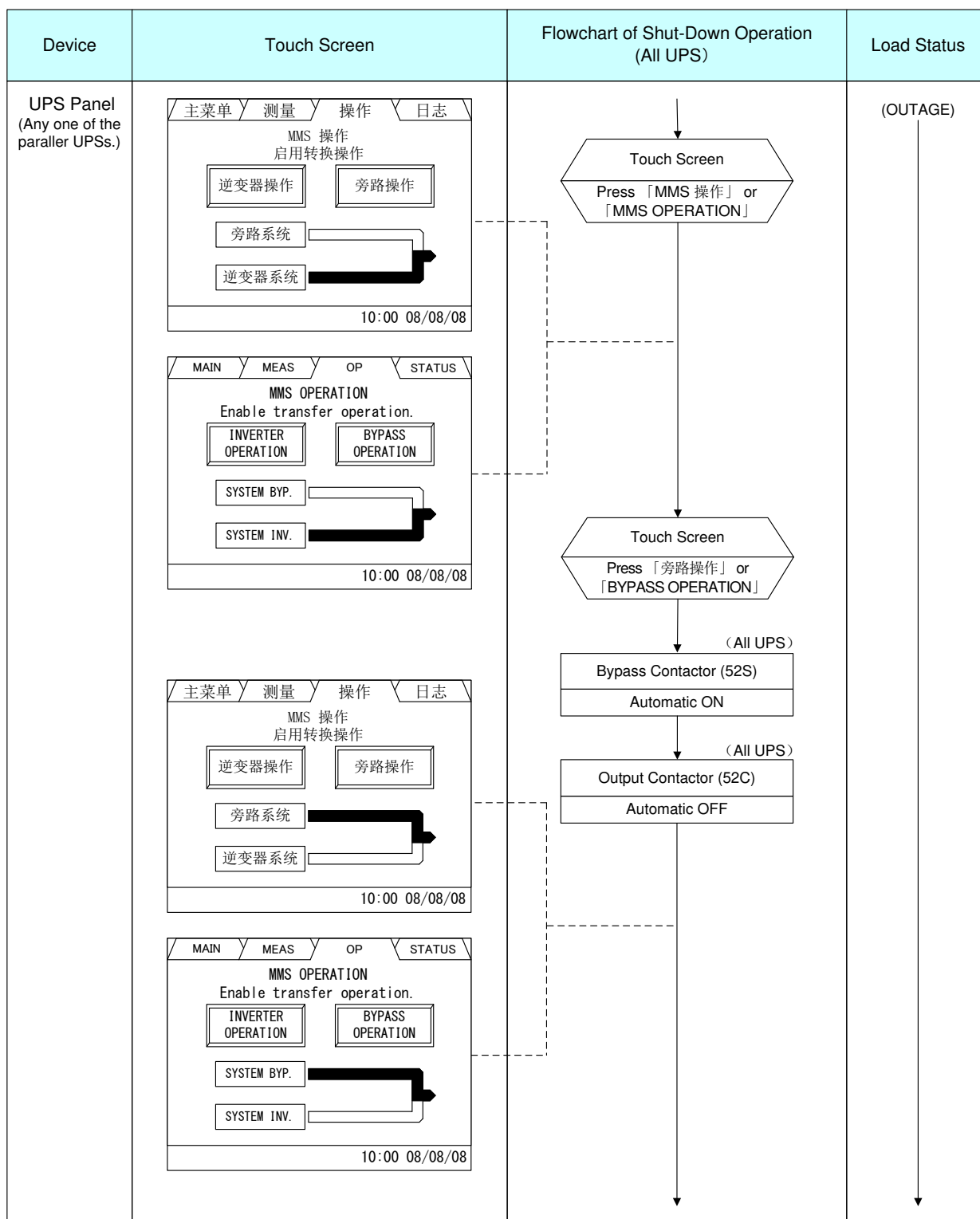
□: Operate sequentially from No.1 UPS

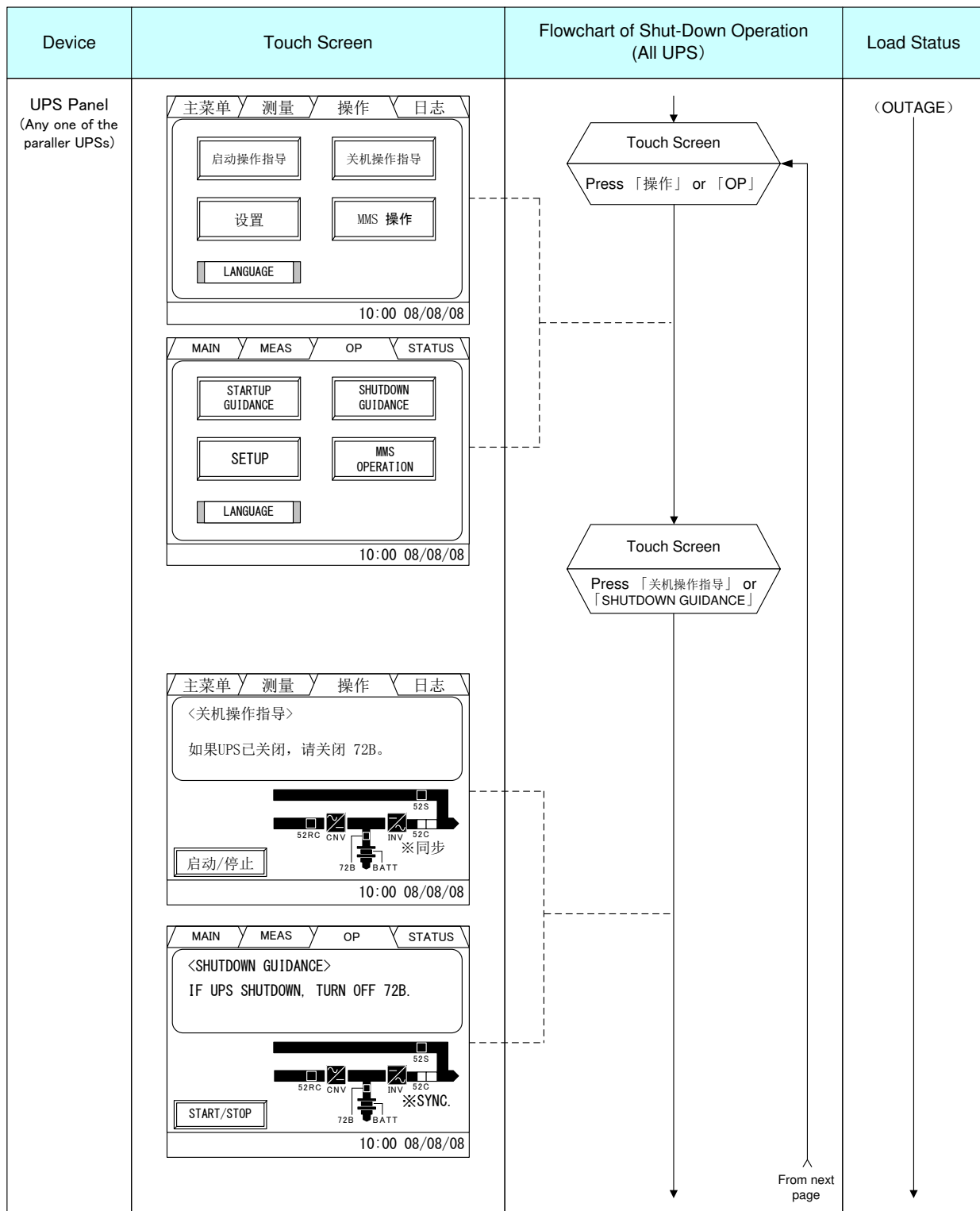


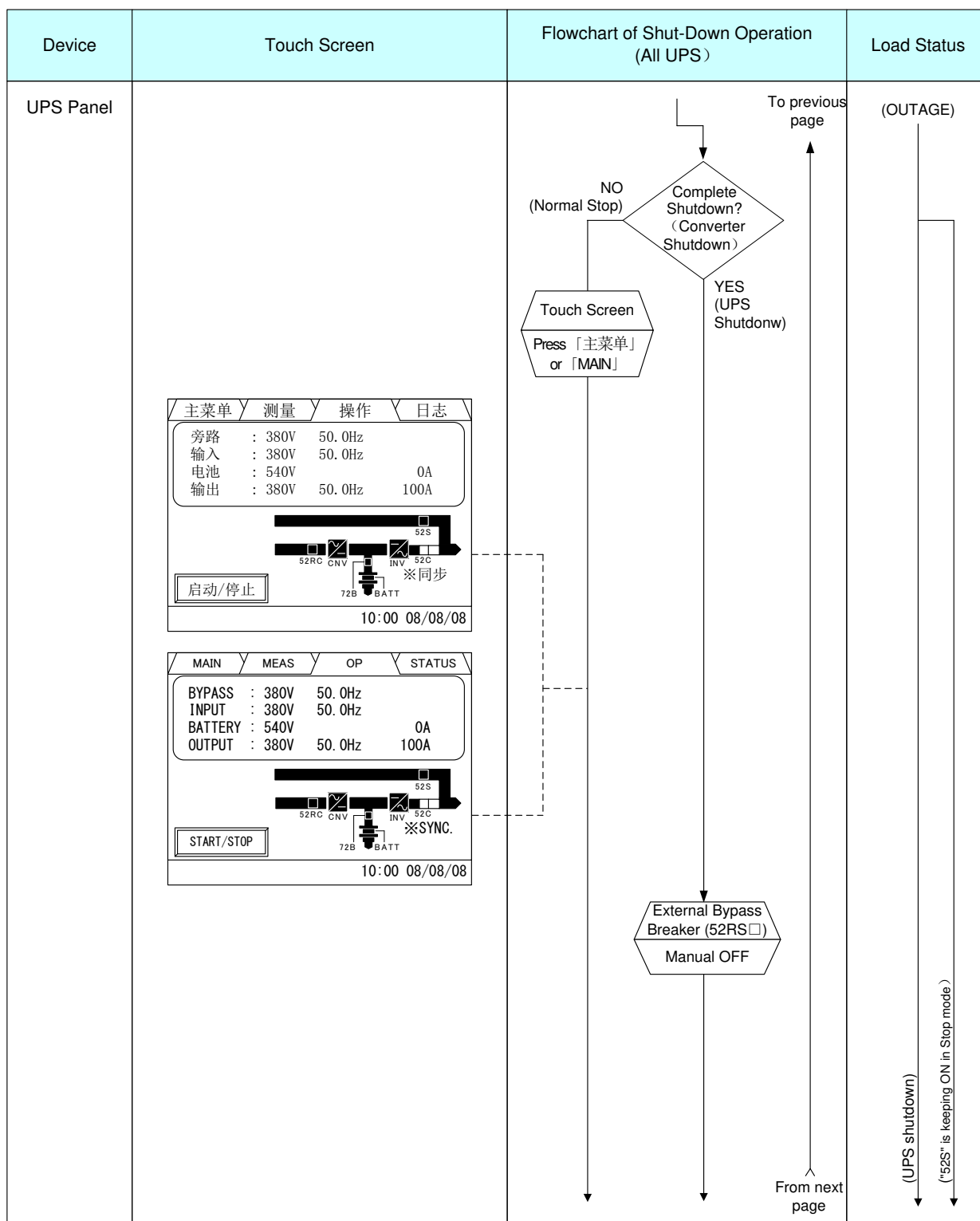


**●Shut-down Procedure (MMS with Individual Bypass Parallel Redundancy)**


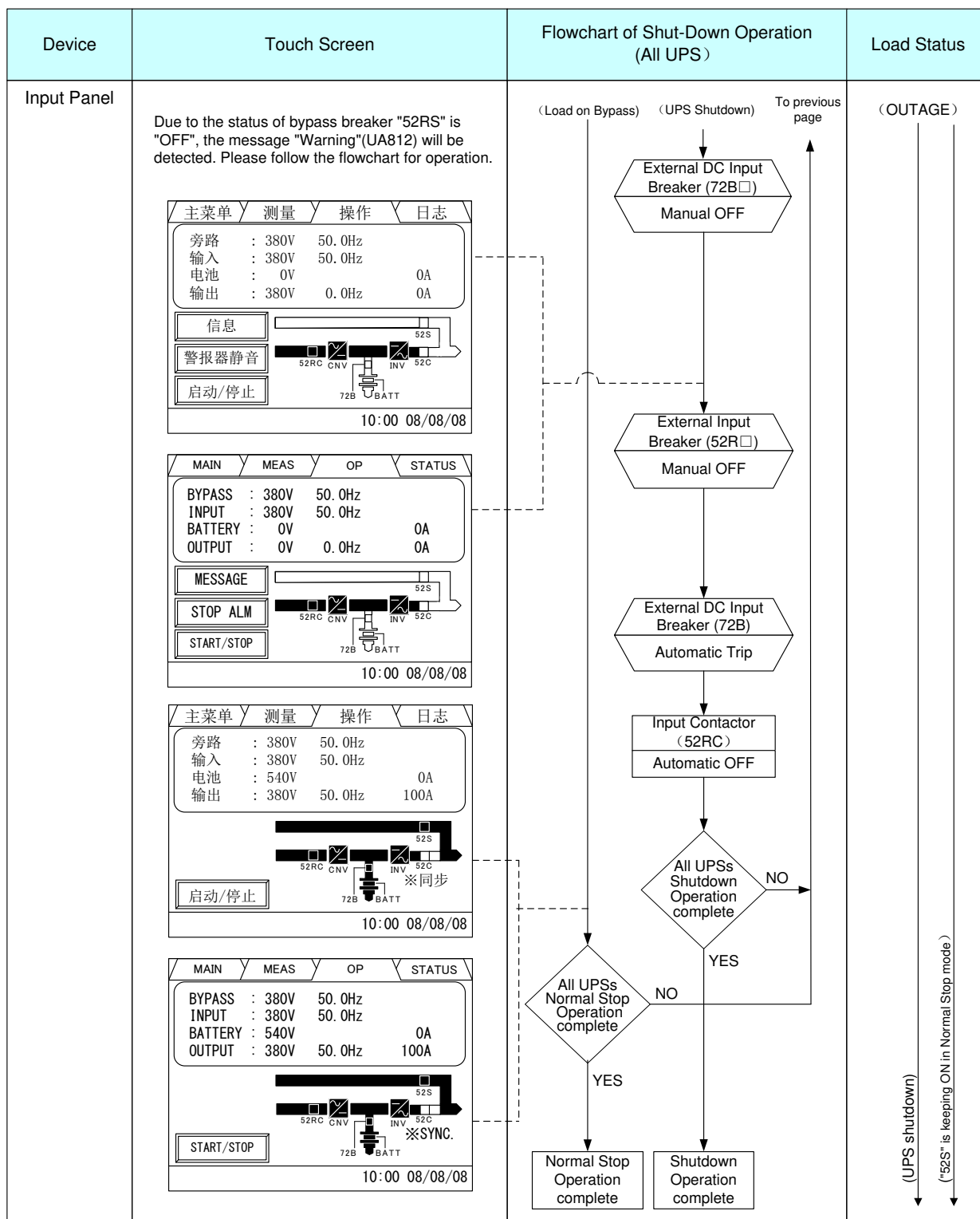








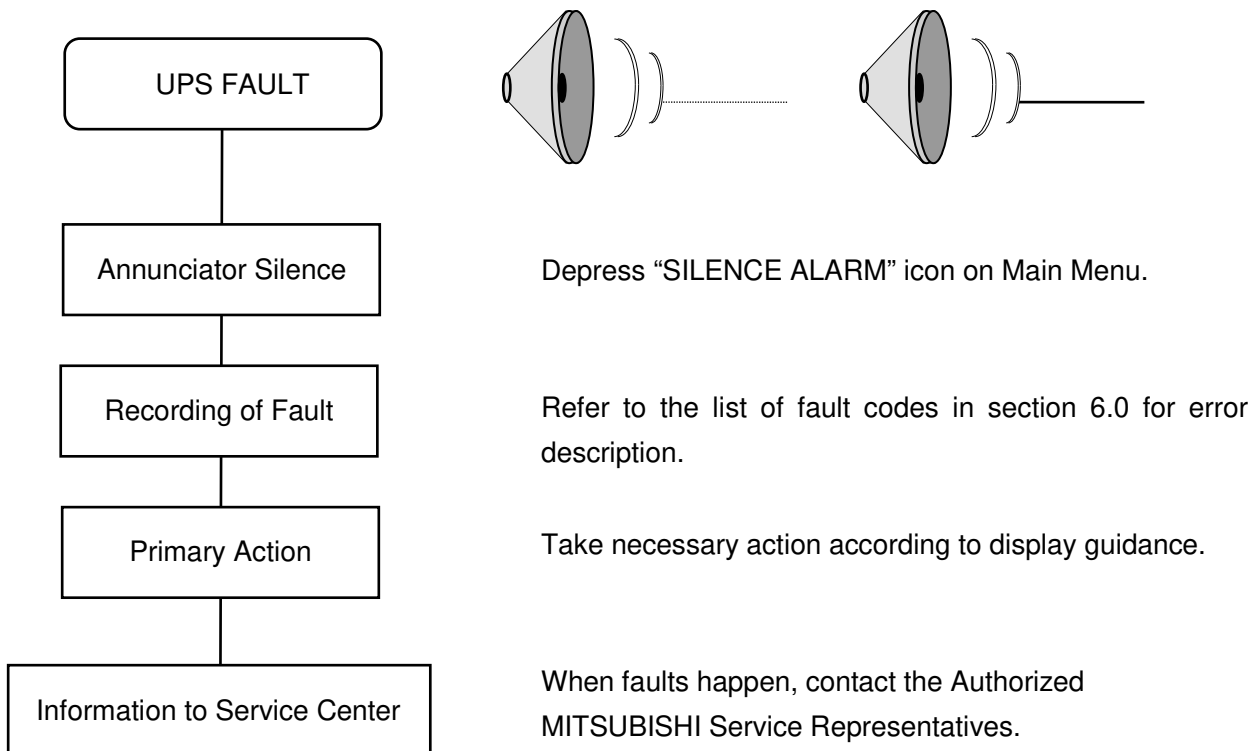
□: Operate sequentially from No.1 UPS



□: Operate sequentially from No.1 UPS



#### 4.0 RESPONSE TO UPS FAILURE



#### NOTE

##### Note

The error code indicated on the LCD display panel when an UPS alarms is very important.

In order to reduce repair time, please include this information, along with the operation and load status for all correspondence to MITSUBISHI field service group.



## **5.0 PARTS REPLACEMENT**

Contact MITSUBISHI or its authorized service representatives on all issues regarding the replacement of parts.

### **A) Battery**

Battery lifetime may vary according to the frequency of use and the average ambient operating temperature. The end of battery life is defined as the state of charge resulting in an ampere-hour capacity less than, or equal to, 80% of nominal capacity. Replace battery if its capacity is within this percentage.

### **B) UPS Component Parts**

UPS components have a defined life expectancy (Fans, Capacitors, Filters, etc.) Contact MITSUBISHI or its authorized service representatives for a complete parts replacement schedule. Recommended replacement time interval varies with operating environment. Contact MITSUBISHI or its authorized service representatives for application specific recommendations.



*Any parts replacements (including modification) without authorized by MITSUBISHI could result in personal injuries, death or destruction of the UPS.*



*Power shutdown and wait 5min for internal capacitors discharge and stopped rotating of fans should be confirmed before any replacement work.*



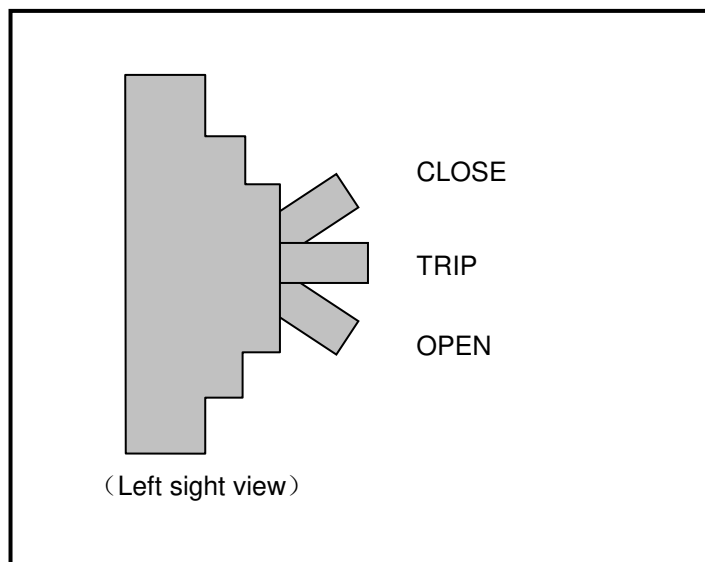
## **6.0 FAULT CODES**

This section covers fault codes, their description and required action.

At time of error :

- A) Verify and record the occurrence of the alarm. Note details of alarm message displayed on the LCD display panel.
  
- B) If a circuit breaker (MCCB) has tripped, depress the toggle to reset the breaker before closing it again.

(Conditions of MCCB)



**Failure Code List**
**Table 6.1 Fault Code**

Code indication (Note 3)	Status message	Meaning	Guidance	Buzzer	External relay contact (Note 1)	Failure Lamp (Note 2)
UA801	AC INPUT VOLTAGE OUT OF RANGE	Input line voltage is out of the specified range.	CHECK INPUT POWER SOURCE	Intermittent sound	Alarm AC input abnormal	—
UA802	AC INPUT FREQUENCY OUT OF RANGE	Input line frequency is out of the specified range.	CHECK INPUT POWER SOURCE	Intermittent sound	Alarm AC input abnormal	—
UA803	AC INPUT PHASE ROTATION ERROR	Input line power conductors are not wired in a proper phase sequence.	CHECK INPUT POWER SOURCE	Intermittent sound	Alarm AC input abnormal	—
UA804	CONVERTER OPE. PROHIBITION	The converter interlock is active.	—	Intermittent sound	Alarm	—
UA805	INVERTER OVERLOAD	The output load current has exceeded 105% of the rated current.	WARNING : DECREASE LOAD	Intermittent sound	Alarm Overload	—
UA806	INVERTER OVERLOAD	The output load current has exceeded 110% of the rated current.	WARNING : DECREASE LOAD	Intermittent sound	Alarm Overload	—
UA807	INVERTER OVERLOAD	The output load current has exceeded 125% of the rated current.	WARNING : DECREASE LOAD	Intermittent sound	Alarm Overload	—
UA808	INVERTER OVERLOAD	The output load current has exceeded 150% of the rated current.	WARNING : DECREASE LOAD	Intermittent sound	Alarm Overload	—
UA810	INVERTER OVERLOAD	Short time over-current has been detected during the inverter operation.	WARNING : DECREASE LOAD	Intermittent sound	Alarm Overload	—
UA812	BYPASS VOLTAGE OUT OF RANGE	Bypass line voltage is out of the specified range.	CHECK BYPASS INPUT	Intermittent sound	Alarm Bypass input abnormal	—
UA813	BYPASS PHASE ROTATION ERROR	Bypass line power conductors are not wired in a proper phase sequence.	CHECK BYPASS INPUT	Intermittent sound	Alarm Bypass input abnormal	—
UA814	BYPASS FREQUENCY OUT OF RANGE	Bypass line frequency is out of the specified range.	CHECK BYPASS INPUT	Intermittent sound	Alarm Bypass input abnormal	—
UA815	TRANSFER PROHIBITION	Transfer to the bypass is not available due to bypass abnormality.	—	Intermittent sound	Alarm	—
UA817	EMERGENCY STOP ACTIVATED	The emergency stop was activated by the EPO switch or an external contact.	—	—	Alarm	—
UA821	TRANSFER PROHIBITION	The UPS could not transfer to the bypass because the inverter output was not synchronized to the bypass.	—	—	Alarm	—





Code indication (Note 3)	Status message	Meaning	Guidance	Buzzer	External relay contact (Note 1)	Failure Lamp (Note 2)
UA822	TRANSFER PROHIBITION	The UPS could not transfer to the bypass because of backup generator operation.	—	—	Alarm	—
UA824	72B OPEN	The battery circuit breaker (72B) is open.	TURN ON 72B	Intermittent sound	Alarm	—
UA827	52C OPE. PROHIBITION	The interlock for the inverter output contactor (52C) is active.	—	Intermittent sound	Alarm	—
UA828	FAN ALARM	Cooling fan abnormal.	—	Intermittent sound	Alarm	—
UA831	EMERGENCY BYPASS SWITCH ON	Emergency bypass switch has been turned on.	—	Intermittent sound	Alarm	—
UA833	52L OPEN	The load circuit breaker(52L) is turned off.	—	Intermittent sound	Alarm	—
UA834	BATTERY DEPLETED/AC OUT STOPPED	The battery voltage has reached the depleted level.	—	—	Major End-of-Discharge	Lit on
UA835	TRANSFER PROHIBITION	The UPS could not transfer to the bypass because the bypass source has an abnormality.	—	—	Alarm	—
UA838	52M OPERATION	Status of 52M ON and 52L open.	CALL SERVICE ENGINEER	—	Alarm	—
UA839	52M OPERATION	Status of 52M ON and 52L ON.	CALL SERVICE ENGINEER	—	Alarm	—
UA860	REMOTE BUTTON ABNORMAL	Remote start or stop signal is being received continuously for a considerable time.	—	Intermittent sound	Alarm	—
UA861	LOCAL BUTTON ABNORMAL	Local start or stop signal is being received continuously for a considerable time.	—	Intermittent sound	Alarm	—
UA870	BALANCER OVERLOAD	The UPS detected an neutral point voltage unbalance.	—	Intermittent sound	Alarm Overload	—
UA890	EXTERNAL ALARM	External Alarm relay turned on.	—	Intermittent sound	Alarm	—
UF001	INPUT CIRCUIT ABNORMAL	Detection of a large variation of the reference error signal.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF002	CONVERTER OVERCURRENT	Detection of converter overcurrent.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF003	CONVERTER ABNORMAL	Pre-charging circuit is not working properly.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF011	52RC ABNORMAL	Major discrepancy between reference signal and actual state of contactor 52RC.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF052	52RC ABNORMAL	Minor discrepancy between reference signal and actual state of contactor 52RC.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF056	CONVERTER OVERCURRENT	Detection of converter overcurrent.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF059	INPUT CIRCUIT ABNORMAL	Detection of a large variation of the reference error signal.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF102	DC OVERVOLTAGE	DC voltage surpasses the overvoltage level.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on



Code indication (Note 3)	Status message	Meaning	Guidance	Buzzer	External relay contact (Note 1)	Failure Lamp (Note 2)
UF103	DC UNDERVOLTAGE	DC voltage dropped below the undervoltage level.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF108	CHOPPER OVERCURRENT	Detection of DC overcurrent.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF109	DC UNBALANCED	Major unbalance of the neutral point voltage.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF111	UPS CONTROL CIRCUIT ERROR	Battery current unbalance.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF112	DC CIRCUIT ABNORMAL	Sudden change of the DC voltage level.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF128	CONTROL POWER SUPPLY ABNORMAL	Power supply voltage to IGBT driver PCB is below the specified level.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF151	DC VOLTAGE ABNORMAL	24 hours after input power restoration, batteries does not reach float voltage level.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF152	DC VOLTAGE ABNORMAL	Unable to equalize the voltage of various batteries after 24 hours.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF154	72B ABNORMAL	During UVT, status signal from 72B is ON.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF156	CHG.STOPPED(BATTERY OVERTEMP.)	UF157 failure persisted for over 2 hours.	CHECK BATTERY	Intermittent sound	Minor Battery abnormal	Flicker
UF157	BATTERY OVERTEMPERATURE	Detection of overtemperature at the batteries.	CHECK BATTERY	Intermittent sound	Minor Battery abnormal	Flicker
UF158	BATTERY LIQUID LOW	Low level of battery electrolyte solution.	CHECK BATTERY	Intermittent sound	Minor Battery abnormal	Flicker
UF160	UPS CONTROL CIRCUIT ERROR	Abnormal behavior of DC current sensor.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF161	CHG.STOPPED(DC VOLT. ABNORMAL)	UF151 failure is running for over 24 hours.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF162	BATTERY ABNORMAL	Failure detection based on battery self-check.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF163	BATTERY VOLTAGE ABNORMAL	Battery voltage is abnormality.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF170	VDB SENSOR ABNORMAL	Detection of a large variation of the difference between control-only and protection-only battery voltage.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF171	UPS CONTROL CIRCUIT ERROR	Poor shared current in parallel chopper circuit; or improper charging current.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF172	CHG. STOPPED (DEVICE STATUS)	Energy storage device error.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker



Code indication (Note 3)	Status message	Meaning	Guidance	Buzzer	External relay contact (Note 1)	Failure Lamp (Note 2)
UF201	INVERTER OVERVOLTAGE	Detection of output overvoltage.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF202	INVERTER UNDERVOLTAGE	Output voltage dropped.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF203	INVERTER OVERCURRENT	Detection of inverter overcurrent.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF204	OUTPUT CIRCUIT ABNORMAL	Detection of a large variation of the reference error signal (current reference and actual current).	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF206	UPS CONTROL CIRCUIT ERROR	Discrepancy between output voltage and external voltage (bypass, common ac bus)	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF208	UPS CONTROL CIRCUIT ERROR	Cross current is abnormality.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF209	52C ABNORMAL	Error to close the contactor 52C.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF210	52C ABNORMAL	Error to open the contactor 52C.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF211	52C ABNORMAL	No answer from contactor 52C during inverter operation.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF213	OVERTEMPERATURE	Heatsinks temperature exceeds thermal settings.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF214	COOLING FAN ABNORMAL	Thermal relay activated protection.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF217	INVERTER OVERVOLTAGE	Detection of inverter output phase overvoltage.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF253	UPS CONTROL CIRCUIT ERROR	Discrepancy between output voltage and inverter voltage, or between output voltage and bypass voltage.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF256	OUTPUT VOLTAGE ABNORMAL	Output voltage is out of the specified range.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF257	52C ABNORMAL	Contactor 52C failed to open during load transfer from inverter to bypass.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF258	LOAD ABNORMAL	Load transfer due to overload for over 4 times within 5 minutes.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF259	ANOTHER UPS ABNORMAL	No detection of another UPS voltage signal.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF301	UPS CONTROL CIRCUIT ERROR	AD reference has an abnormal value.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF302	UPS CONTROL CIRCUIT ERROR	Detection of an external interruption during the software execution.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF303	UPS CONTROL CIRCUIT ERROR	Timer does not reset in the specified period (WDT settings)	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on



Code indication (Note 3)	Status message	Meaning	Guidance	Buzzer	External relay contact (Note 1)	Failure Lamp (Note 2)
UF305	UPS CONTROL CIRCUIT ERROR	Detection of an abnormal clock speed in the DSP or FPGA.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF306	UPS CONTROL CIRCUIT ERROR	Control power supply voltage are below the specified level.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF309	INVERTER VOLTAGE ABNORMAL	Inverter voltage is out of the specified range.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF310	CONTROL POWER SUPPLY ABNORMAL	Backup control power supplies exhibit abnormal condition.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF320	UPS CONTROL CIRCUIT ERROR	Cable disconnection in the parallel interface board during load supply.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF323	UPS CONTROL CIRCUIT ERROR	Major communication error during parallel operation.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF331	UPS CONTROL CIRCUIT ERROR	Gate driver abnormal for phase U (Note 4)	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF332	UPS CONTROL CIRCUIT ERROR	Gate driver abnormal for phase V (Note 4)	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF333	UPS CONTROL CIRCUIT ERROR	Gate driver abnormal for phase W (Note 4)	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF334	UPS CONTROL CIRCUIT ERROR	Gate driver abnormal for chopper (Note 4)	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF352	CONTROL POWER SUPPLY ABNORMAL	Backup control power supplies exhibit abnormal condition.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF363	UPS CONTROL CIRCUIT ERROR	Synchronization status signal is being received for a considerable time.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF371	UPS CONTROL CIRCUIT ERROR	Minor communication error during parallel operation.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF372	UPS CONTROL CIRCUIT ERROR	Unable to synchronize the inverter output and the bypass voltage.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF374	UPS CONTROL CIRCUIT ERROR	Cable disconnection in the parallel interface board.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF375	UPS CONTROL CIRCUIT ERROR	Unable to achieve synchronization for parallel operation.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF376	UPS CONTROL CIRCUIT ERROR	No control response from another UPS although its detection is possible.	CALL SERVICE ENGINEER	Intermittents ound	Minor	Flicker
UF377	UPS CONTROL CIRCUIT ERROR	Overload detection signal is being received continuously for a considerable time.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF378	UPS CONTROL CIRCUIT ERROR	No answer for sending synchronizing signal.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF379	UPS CONTROL CIRCUIT ERROR	Abnormal clock speed of the parallel control board processor.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF381	STS CONTROL CIRCUIT ERROR	STS current value abnormal.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker



Code indication (Note 3)	Status message	Meaning	Guidance	Buzzer	External relay contact (Note 1)	Failure Lamp (Note 2)
UF401	52S ABNORMAL	Error to close the contactor 52S.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF402	52S ABNORMAL	Error to open the contactor 52S.	CALL SERVICE ENGINEER	Continuous sound	Major	Lit on
UF420	52L OPERATION ERROR	Load circuit breaker 52L opened during inverter operation.	CHECK 52L	Continuous sound	Major	Lit on
UF451	52S ABNORMAL	Contactor 52S failed during load transfer from inverter to bypass.	CALL SERVICE ENGINEER	Intermittent sound	Minor	Flicker
UF453	52M ABNORMAL	52M abnormal.	CALL SERVICE ENGINEER	Continuous sound	Minor	Flicker
UF461	STS COOLING FAN ABNORMAL	STS cooling fan abnormal detected.	CALL SERVICE ENGINEER	Continuous sound	Minor	Flicker
UF462	STS CONTROL CIRCUIT ERROR	Both UF461, UF463 occurred.	CALL SERVICE ENGINEER	Continuous sound	Minor	Flicker
UF463	STS OVERTEMPERATURE	STS unit over temperature.	CALL SERVICE ENGINEER	Continuous sound	Minor	Flicker
UF465	STS OVERTEMPERATURE	STS unit over temperature and load on bypass over 30%	CALL SERVICE ENGINEER	Intermittent sound	Major	Lit on

(Note 1) 1) "Major" is defined as major failure. Inverter transferred to the static bypass line;  
2) "Minor" is defined as a minor failure. UPS continues to operate normally, but cause of alarm must be identified;

(Note 2) Indicates one of two possible LED illumination patterns - continuously on (lit on) or intermittent (flicker).

(Note 3) Code indication means:

UA+++ ----- Alarm  
UF+++ ----- Failure  
U%0++ ----- Rectifier circuit failure  
U%1++ ----- DC circuit failure  
U%2++ ----- Inverter circuit failure  
U%3++ ----- Control circuit failure  
U%4++ ----- Bypass system failure  
U%8++ ----- Alarm  
U%+00 - U%+49 ----- Major failure  
U%+50 - U%+99 ----- Minor failure  
\*) "+" denotes any numeral from 0 to 9  
\*) "%" denotes either "A" or "F"



## 7.0 DAILY INSPECTION

Please perform the daily inspection while the UPS is running. The daily inspection items are shown in Table 7.1.



### NOTE

*The customers can only inspect exterior or environment of cabinet.  
When the customers want to perform the detailed inspection,  
contact the Authorized MITSUBISHI Service Representatives.*

**TABLE 7.1** How to perform daily inspection

No.	Subject	Procedure			Criteria and/or Action needed
		Term	Period	Method/Tool	
1.	Environmental ambient	Dust or Gas	Daily	Visual check and smelling	Ventilate room atmosphere if dusty or smelling gas.
		Dewdrops Condensation	Daily	Visual check	Fix the dripping source Dehumidify upon necessity.
		Temperature Humidity	Daily	Thermometer hygrometer	Temperature: 32~104°F Humidity: 30~90% No condensation. To be controlled at 77°F or about by A/C.
2.	Cabinet Construction	Vibration or Audible noise	Daily	Touch and hearing	Check if fans have irregular sound. Contact service representative in case of abnormalities.
		Overheating	When needed	Touching exterior	Contact service representative in case of abnormalities.
		Air filter clog	When needed	Visual check	Clean/wipe if clogged or dusty.
3.	Operation	LCD sharpness Brightness Left-bottom LED	Daily	Visual check	No characters faded, illegible or any other abnormalities. Left-bottom LED should be green. Contact service representative when the LED shows red with the backlight lost.
		Indication terms: Output voltage Output current AC input voltage Output frequency Battery voltage Battery current DC voltage	Daily	Visual check	Check indication terms/values if within the adequate window. Also check indication meters on surface of optional cabinet, if installed.
4.	LEDs	4 status LEDs	Daily	Visual check	Check if LEDs turn on, off or flash according to the operation.
		2 fault LEDs	Daily	Visual check	If UPS fault LED turns on, scroll the screen to see fault codes and record the codes. Contact service representative to tell about fault codes and UPS symptom.

\*Air filter also need to be checked during the daily inspection by visual check. Air filter required to clean up 3 month period.