MITSUBISHI ELECTRIC AUTOMATION, INC.

UNINTERRUPTIBLE POWER SUPPLY SYSTEM

9700 SERIES

OWNERS / TECHNICAL MANUAL

(100 - 225kVA)

9700 100-225 Revision 3.3: August 28 2002
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INTRODUCTION

Your Mitsubishi Uninterruptible Power 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 9700 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 2

This UPS does not include a Bypass Input circuit breaker (MCCB). The Bypass Input contactor (CB3) does not protect against load induced short circuits. The bypass input circuit breaker (MCCB) is field supplied and installed. Breaker(MCCB)'s Specifications are as follows:

Capacity (kVA)	Bypass Voltage (VAC)	Maximum Bypass Rating (AAC)	Recommended Breaker (A)
100	208	278	350
100	480	120	150
100	600	96	100
150	208	416	500
150	480	180	225
150	600	144	150
225	208	625	700
225	480	271	300
225	600	217	225
300	480	361	400
300	600	289	300
375	480	451	500
375	600	361	400

1.0 GENERAL

The Mitsubishi 9700 Series UPS is designed to provide continuous, clean electrical power to your critical load and to monitor power conditions affecting that 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 9700 Series UPS is available in five kVA sizes-100, 150, 225, 300, 375kVA. Specifications for each kVA model appear in Section 1.3. The principles of operation described herein are applicable to all models.

This manual provides an overview of the 9700 Series components and their functions. It describes the appearance and purpose of operator controls and indicators. It contains procedures for operation, start-up, shutdown, and basic maintenance.

1.1 Definitions

UNINTERRUPTIBLE POWER SUPPLY SYSTEM (UPS) - All components within the UPS Module Cabinet includes the batteries which 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, the Inverter, the Static Transfer Switch, the Internal Bypass line, the operator controls, and the internal control system 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.

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.

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.

STATIC TRANSFER SWITCH - The device which connects the critical load to the bypass line when the UPS module 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.

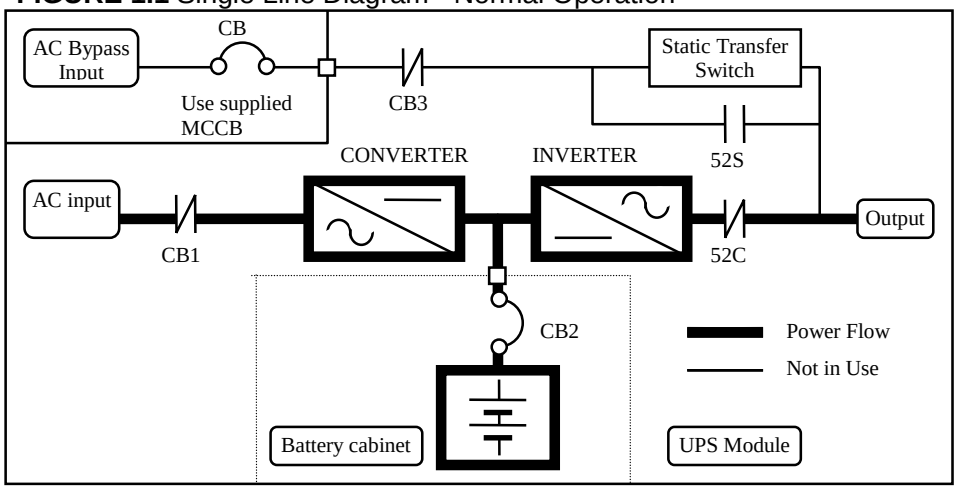
INPUT POWER - Power provided by the electrical utility company, or auxiliary generator, which is connected to the UPS for supplying the critical load.

1.2 Overview

The UPS provides two power paths between the utility source and the critical load as shown in figures 1.1 and 1.2.

A) Through the UPS Module (FIGURE 1.1)

FIGURE 1.1 Single Line Diagram - Normal Operation



When the load is on the Inverter, the internal control system determines which of the two paths supplies power to the load. During normal operation, the path through the UPS module is used.

Input AC power flows through the UPS where it is converted to DC by the Converter / Charger. This 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.

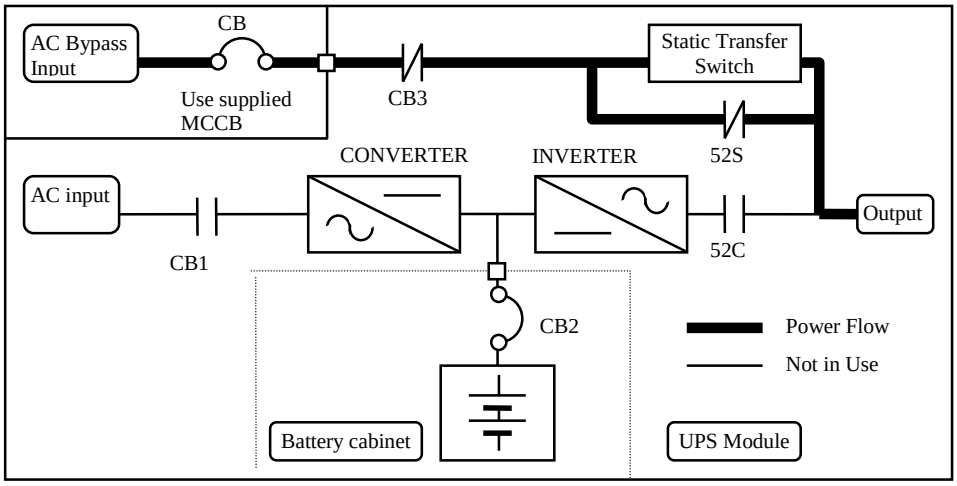
The conversion - inversion process eliminates any voltage transients or fluctuations existing in the input power before it reaches the critical load.

* The Bypass Input circuit breaker (MCCB) for protection of the UPS and cables is field supplied and field installed. (See WARNING 2 on page iv)

B) Internal Static Bypass Line (FIGURE 1.2)

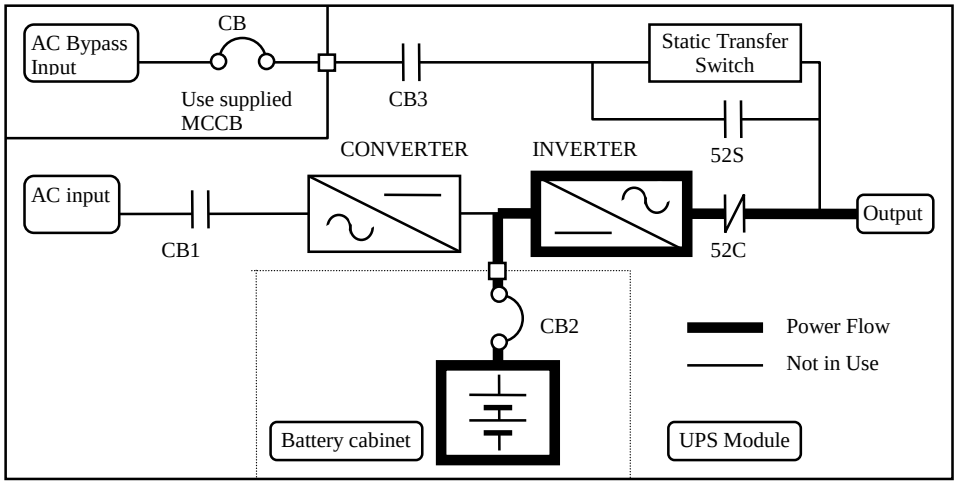
The Internal Static Bypass line is a Hard wired line through CB3, contactor 52S which supplies the critical load with unconditioned input power. The purpose of this line is to route power to the critical load while the UPS module is de-energized during Start-up before the system is fully operational.

FIGURE 1.2 Single Line Diagram- Bypass Operation



C) Inverter supply at battery operation (FIGURE 1.3)

FIGURE 1.3 Single Line Diagram - Battery Operation



If the input power is interrupted, the battery will immediately supply the DC power required by the Inverter to maintain continuous AC power to the load. A fully charged battery will provide power for the specified time at the rated load, or longer, at a reduced load.

When power is restored after a low battery shutdown, the Converter automatically restarts operation, recharges the batteries, and the Inverter is automatically restarted without operator intervention. The load is assumed by the inverter automatically without operator intervention.

In the event of a power failure, the rectifier will de-energize and the batteries will discharge into the inverter and maintain power to the critical until a) the battery capacity expires and the inverter turns off, or b) input power is restored after which the converter will power the critical load and simultaneously recharge the batteries. Figure 1.3 illustrates the flow diagram during battery operation.

FIGURE 1.4-a UPS Parts Location (100kVA)

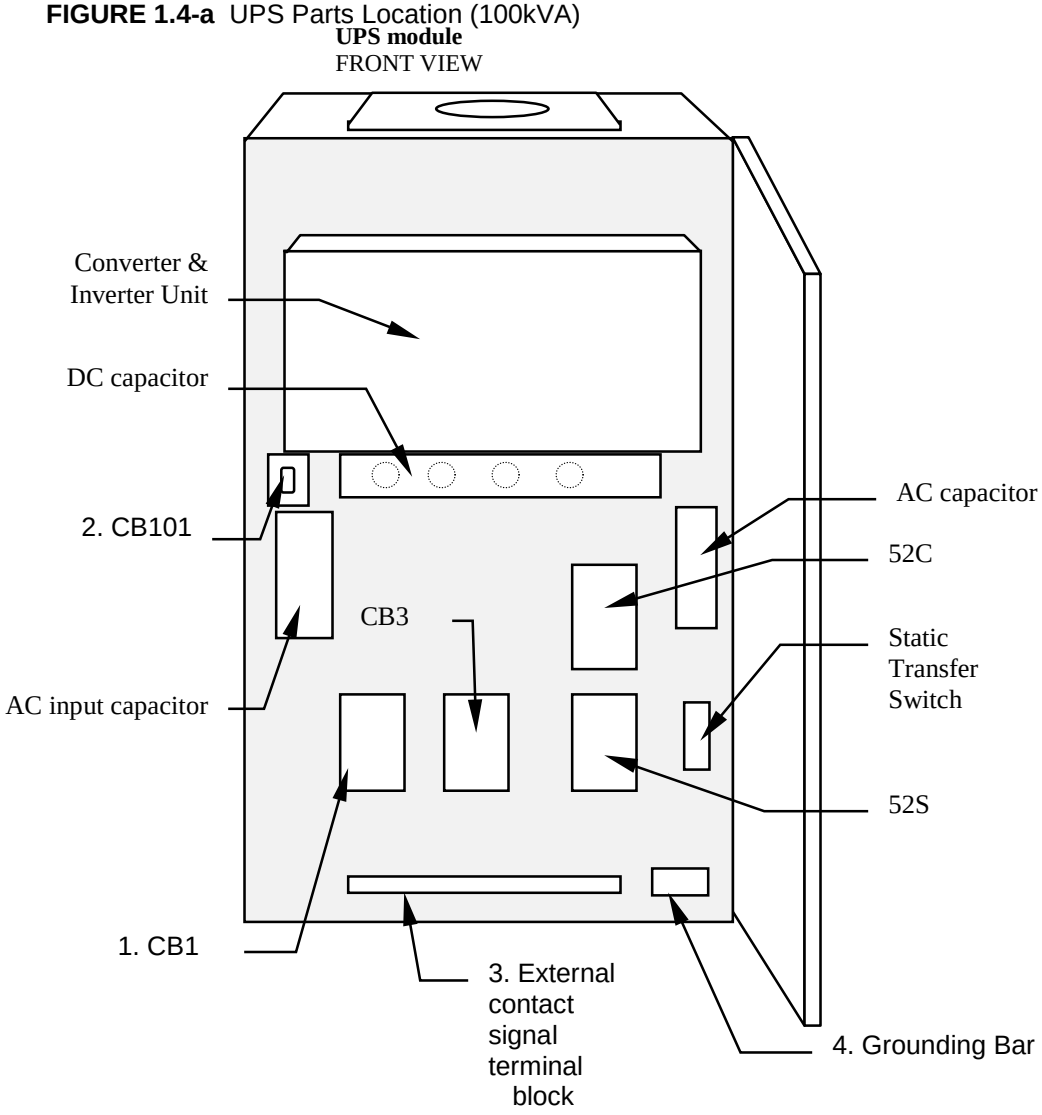
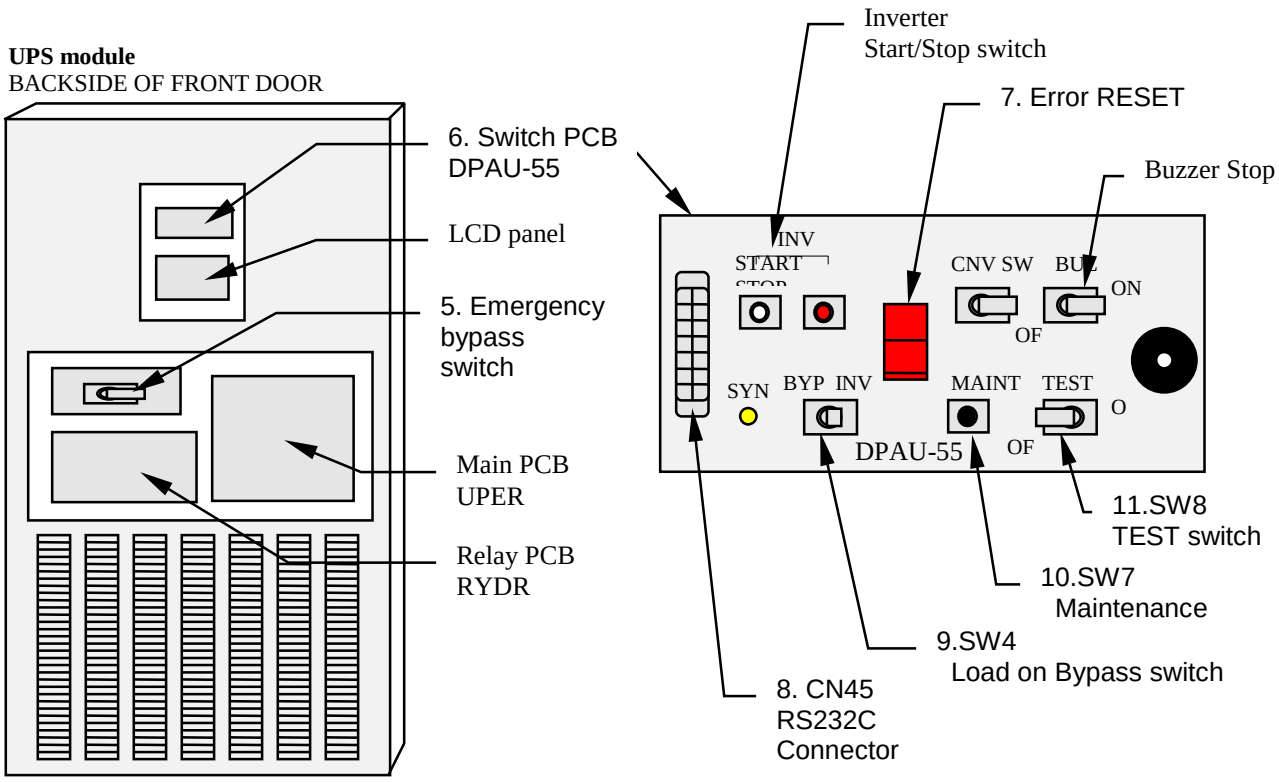


FIGURE 1.4-b UPS Parts Location (Continued)



Description of Figure 1.4:

1. **AC Input circuit breaker (CB1)** Circuit breaker for converter input power .
2. **Control Power circuit breaker(CB101)**
3. **External contact signal terminal block** Terminal block to connect contact signal input/output lines to and from the external devices. Refer to FIGURE 2.4 for details.
4. **Grounding bar (E)**
5. **Emergency bypass switch.** This switch activates bypass power supply for emergency reasons if the UPS is turned off. Normal position is “TRANSFER is PERFORMED”
6. **Switches on the DPAU-54(PCB) (FOR SERVICE PERSONNEL ONLY)**
   Normally the customers do not have to operate those switches.
   - SW4 (Load on Bypass switch) (9)
   - SW3 (Maintenance Set button) (10)
   - SW5 (TEST Switch): Normal = “Off” side. ()
   - SW6 (Error RESET) (11)
7. **"Error reset" switch** This switch resets errors resulting from alarm conditions.
   (Do not operate this switch while inverter and converter are in operation.)
8. **RS232C connector** (CN45)
9. **Bypass manual change-over button (FOR SERVICE PERSONNEL ONLY)**
   This switch is used to transfer the UPS from inverter to static bypass for maintenance purposes. Do not operate it under normal operation. Transfers will be lock-out if the bypass voltage is more than +10%,-10% of nominal.
   1) Uninterrupted switching is made at the time of synchronous operation. Switching is impossible at the time of asynchronous operation.
   2) Return to “Normal” after use.
10. **Maintenance (Set) button** This switch sets the UPS menu parameters.
11. **"Test mode" switch** This switch should be operated by Authorized Service Personnel only.

1.3 Specifications

The UPS name plate displays the rated kVA as well as nominal voltages and currents. The name plate is located on the interior side of the UPS front door.

TABLE 1.1 Power Specifications

Rated output Power	Input voltage 3 Φ / 3 wire	Output voltage 3 Φ /3 or 4 wire
100kVA / 80kW	208V, 480V or 600V	208V, 480V or 600V
150kVA / 120kW	208V, 480V or 600V	208V, 480V or 600V
225kVA / 180kW	208V, 480V or 600V	208V, 480V or 600V
300kVA / 270kW	208V, 480V or 600V	480V or 600V
375kVA / 338kW	208V, 480V or 600V	480V or 600V

TABLE 1.2 UPS Module Information

UPS [kVA]	CABLE ENTRY	WIDTH [in / mm]	DEPTH [in / mm]	HEIGHT [in / mm]	WEIGHT [lb./ kg]	HEATING [kBTU/h]
100	BOTTOM	35.4 / 900	29.9 / 759	79.7 / 2025	1900 / 860	31.0
150	BOTTOM	47.2 / 1200	29.9 / 759	79.7 / 2025	2350 / 1065	45.3
225	BOTTOM	55.1 / 1400	29.9 / 759	79.7 / 2025	3300 / 1495	63.0
300	TOP	94.5 / 2400	38.3 / 974	79.7 / 2025	4950 / 2240	113.8
375	TOP	94.5 / 2400	38.3 / 974	79.7 / 2025	5550 / 2515	149.4

TABLE 1.3 Input Cabinet Information

UPS [kVA]	INPUT VOLTAGE[V]	CABLE ENTRY	WIDTH [in / mm]	DEPTH [in / mm]	HEIGHT [in / mm]	WEIGHT [lb./ kg]
100	480	TOP	36.0 / 910	29.9 / 759	79.7 / 2025	1275 / 580
150	480	TOP	44.0 / 1118	29.9 / 759	79.7 / 2025	1325 / 600
225	480	TOP	44.0 / 1118	29.9 / 759	79.7 / 2025	2000 / 910
300	480	TOP	44.0 / 1176	38.3 / 973	79.7 / 2025	2600 / 1180
375	480	TOP	54.0 / 1320	38.3 / 973	79.7 / 2025	3000 / 1360

TABLE 1.4 Detail of Specifications

Rated Output kVA	100	150	225	300	375
Rated Output kW	80	120	180	270	338
AC INPUT CHARACTERISTICS					
Configuration	3 phase, 3 wire				
Voltage	208 V, 480 V, 600 V +10% ~ -15%				
Input Power Factor	0.98 Typical				
Frequency	60 Hz ± 5%				
Reflected Current THD	3% max. at 100% load; 5% max. at 50% load				
STATIC BYPASS INPUT					
Configuration	3 phase, 3 or 4 wire				
Voltage	120/208 V, 277/480 V, 346/ 600 V ±10%				
Frequency	60 Hz (±3% Tracking window)				
BATTERY					
Type	VRLA, Flooded Lead Acid, Nickel Cadmium				
Ride Through	Application Specific				
Nominal Voltage	360 VDC				
Minimum Voltage	290 VDC				
Number of Cells	176 ~ 185				
AC OUTPUT					
Configuration	3 phase, 3 or 4 wire				
Voltage	120/208 V, 277/480 V, 346/ 600 V				
Voltage Stability	±1%				
Frequency	60 Hz				
Frequency Stability	±0.01% in free running mode				
Power Factor	0.8 nominal			0.9 nominal	
Power Factor range	0.8 ~ 1.0 lagging (within output kW rating)				
Voltage THD	2% maximum THD at 100% Linear Load 5% maximum THD at 100% non-linear load				
Transient Response	±2% maximum at 100% load step ±1% maximum at loss or return of AC power ±5% maximum at load transfer to/from static bypass				
Transient Recovery	Less than 1 line cycle				
Voltage Unbalance	1% maximum at 100% unbalanced load				
Phase Displacement	1% maximum at 100% unbalanced load				
Inverter Overload	125% for 10 minutes; 150% for 1 sec				
System Overload	500% for 2 cycle (with bypass available)				
Bypass Overload	125% for 10 minutes				
Withstand Rating	65kA* *:with optional fuses				
ENVIRONMENTAL					
Cooling	Forced Air				
Operating Temperature	2° F ~ 104° F (0° C ~ 40° C). Recommended 68° F ~ 86° F (20° C ~ 30° C)				
Relative Humidity	5% ~ 95% Non Condensing				
Altitude	3300 Feet (1000 meters); 5000 feet @ 0.99 derating				
Location	Indoor (free from corrosive gases and dust)				
Paint Color	Munsell 5Y7/1 (Beige)				

TABLE 1.5 Rating of Circuit Breakers (MCCB) and Fuses

	NUMBER	APPLICATION	OUTPUT CAPACITY OF EQUIPMENT												
			100kVA			150kVA			225kVA			300kVA		375kVA	
			208V	480V	600V	208V	480V	600V	208V	480V	600V	480V	600V	480V	600V
MC	CB1	AC input circuit breaker	-	-	-	-	-	-	-	-	-	600A	400A	800A	600A
	52RC	AC input contactor	350A			420A			660A			-		-	
CB	CB2	Battery disconnect circuit breaker	400A			600A			800A			1200A		1600A	
	CB101	Control circuit breaker	15A									30A			
FU	FCU, FCV, FCW, FCX, FCY, FCZ	Converter main circuit fuse	450A			630A			900A			900A		800A	
	FIU, FIV, FIW, FIX, FIY, FIZ	Inverter main circuit fuse	450A			630A			900A			900A		800A	
	(OPTION) FSU, FSV, FSW	Bypass main circuit fuse	450A	-		630A	-		900A	-		-		-	
SES	FUD1, 2	Control power fuse	DC500V 3A			DC500V 3A			DC500V 3A			DC500V 3A		DC500V 3A	
	FUS1, 2, 3	Bypass input ZNR fuse	AC600V 10A			AC600V 10A			AC600V 10A			AC600V 10A		AC600V 10A	
	FZS1, 2, 3	Bypass input ZNR fuse	AC600V 30A			AC600V 30A			AC600V 30A			AC600V 30A		AC600V 30A	
	FBS1, 2	CB3 control circuit fuse	AC600V 5A			AC600V 5A			AC600V 5A			AC600V 5A		AC600V 5A	
	FZC1, 2, 3	AC input ZNR fuse	AC600V 30A			AC600V 30A			AC600V 30A			AC600V 30A		AC600V 30A	

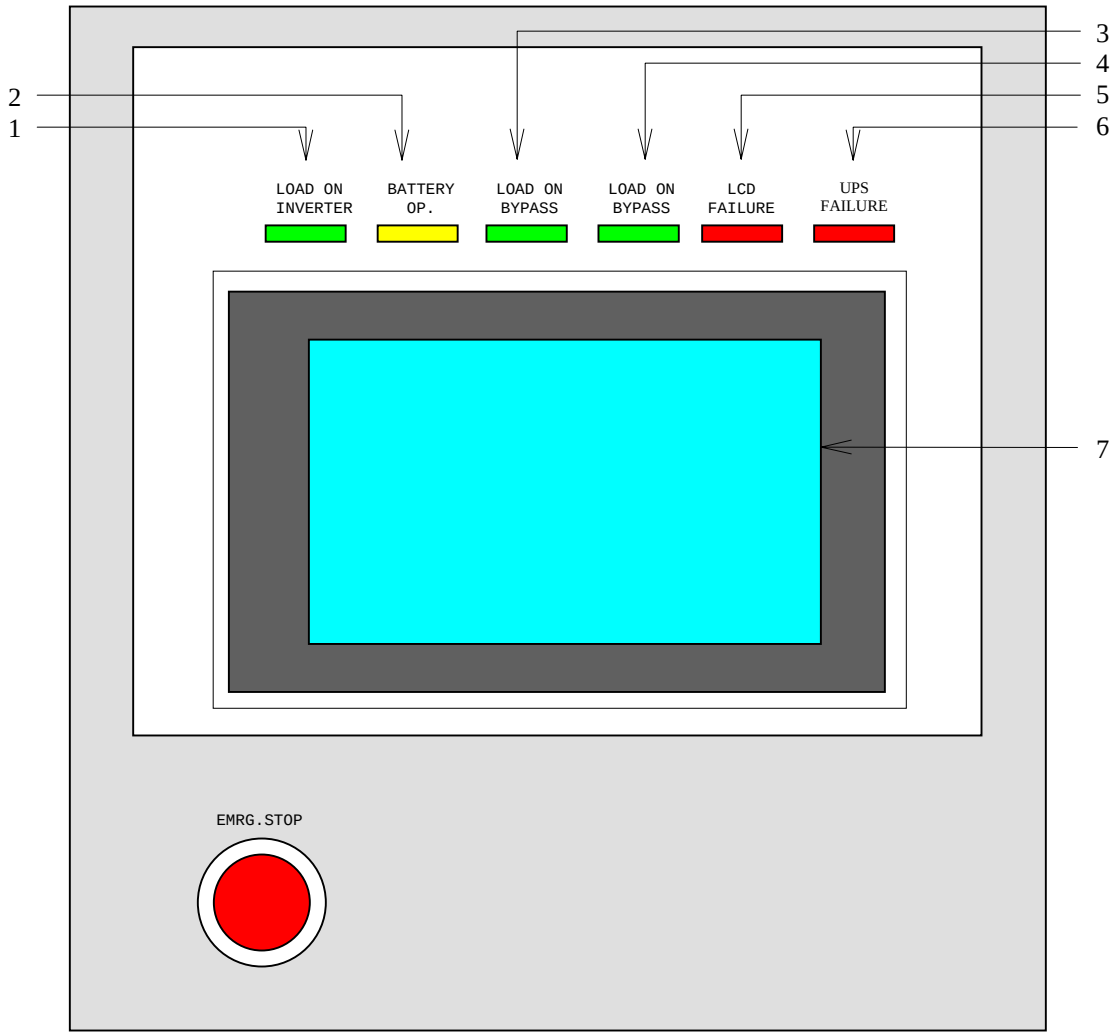
2.0 OPERATOR CONTROLS AND INDICATORS

The 9700 Series operator controls and indicators are located as follows:

Circuit breakers and contactors : Inside the module

UPS status indicators : Outside of door

FIGURE 2.1 Operation/Display Panel (Front panel)



2.1 LED Display

1) **Load on inverter (green)**
   Turned on when power is supplied from inverter to the critical load.
   (Indicates the state of transfer switch "52C" of inverter.)
2) **Battery operation (yellow)**
   Turned on when the battery is operating following an AC power failure..
3) **Load on bypass (yellow)**
   Turned on when power is supplied through bypass to load devices.
   (Indicates the state of transfer switch "52S" of bypass.)
4) **Overload(yellow)**
   Turned on when an overload has occurred to the system.
5) **LCD failure [LCD FAIL](red)**
   Turned on when an error occurs on the LCD.
6) **UPS failure [UPS FAIL](red) [Annunciator: intermittent or constant tones]**
   Turned on when an error occurs on the system. In this case, the details of error are indicated on the display panel.

2.3 Liquid Crystal Display (8)

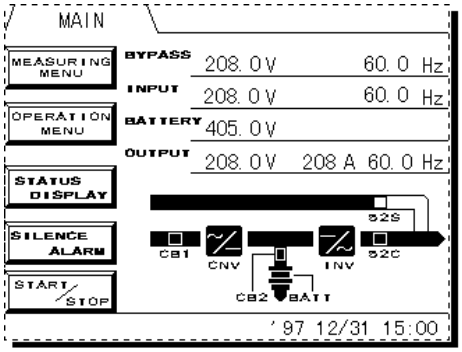
The Liquid Crystal Display (LCD) panel indicates the power flow, measured values, operational guidance, data record and error messages. The LCD panel is back-lit to facilitate viewing in different ambient lighting conditions. The LCD will automatically clear if the keyboard is not activated for 3 minutes. The ERROR indicator is cleared after 24 hours and can be reproduced by pressing any key on the panel.

2.3.1 Menu's

A) MAIN MENU (FIGURE 2.2)

The LCD panel indicates the power flow, measured values and remote operation mode. The LCD panel shows the power flow. This allows the user to verify the status of the UPS Module.

FIGURE 2.2 Main screen

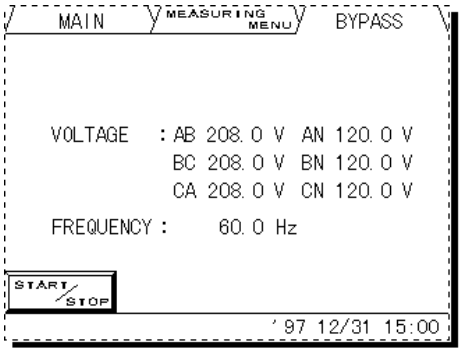


The following will be displayed when the measuring point button on LCD panel is pressed.

1) Bypass Voltage (FIGURE 2.3)

The voltages displayed are the Bypass input voltages (line-to-line) between phases A-B, B-C, C-A and frequency of the Bypass line. Line to neutral voltages A-N, B-N, C-N are measured on 4 wire systems only.

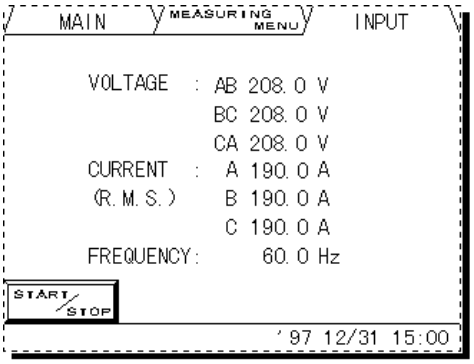
FIGURE 2.3 Bypass screen



2) Input Voltage and Current (FIGURE 2.4)

The voltages displayed are the RMS AC input voltages (line-to-line) between phases A-B, B-C C-A and frequency of the AC input line. The RMS values of Phases A, B and C currents are also displayed.

FIGURE 2.4 Input screen



3) Output Voltage, Output Current and Trend Graph

The voltages displayed on the LCD include the inverter output voltages A-B, B-C, C-A. Line to neutral voltages A-N, B-N, C-N are displayed on 4 wire systems only. Inverter output frequency is also displayed. (FIGURE 2.5)

The current displayed and the RMS values and Peak Values of Phases A, B, C. N-current (Neutral) is display on a 4 wire system only. (FIGURE 2.6)

The Trend Graph displays the Effective power values and the Reactive power values. (FIGURE 2.7)

FIGURE 2.5 Output voltage screen

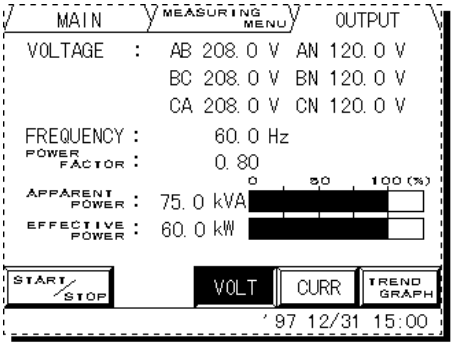


FIGURE 2.6 Output current screen

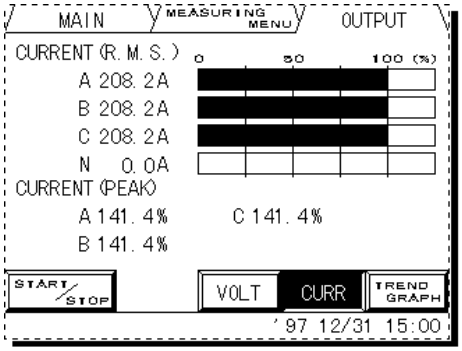
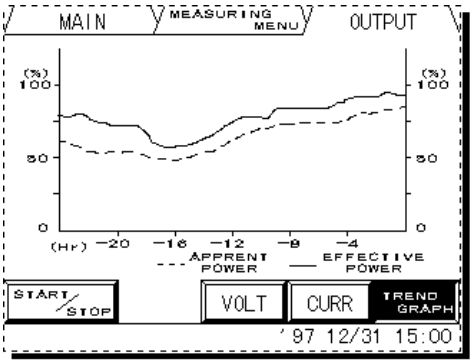


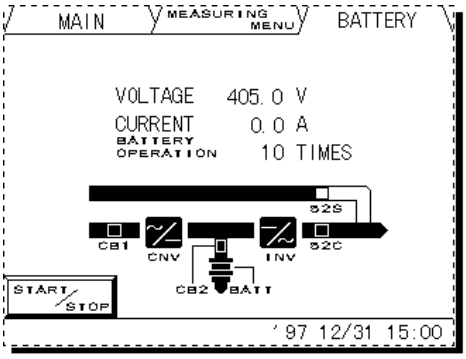
FIGURE 2.7 Trend graph screen



4) Battery (FIGURE 2.8)

This displays the charging, discharging or float mode of the battery, battery current and battery voltage.

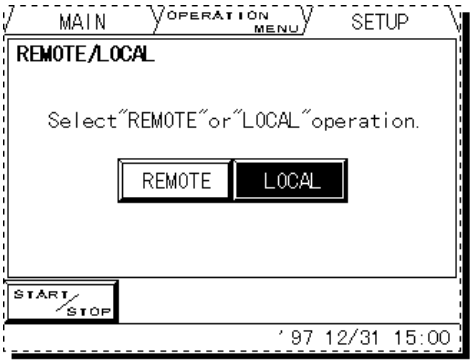
FIGURE 2.8 Battery screen



5) Remote / Local Selection (FIGURE 2.9)

The system asks user to select whether the start & stop operation will be performed by a local or remote operation.

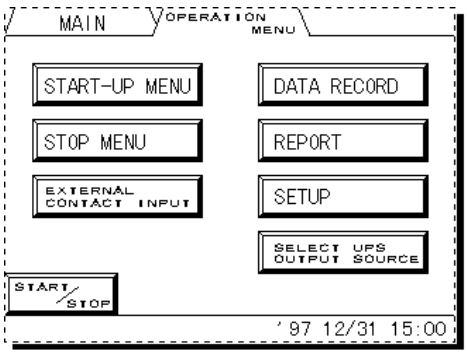
FIGURE 2.9 Remote / Local selection



B) OPERATION MENU (FIGURE 2.10)

The following will be displayed when the OPERATION MENU button is pressed on theLCD

FIGURE 2.10 Operation menu screen



1) START-UP MENU

The display indicates the operation from closing circuit breakers to starting the inverter. When the inverter is started, the display shows the MAIN MENU. When the display changes, the annunciator sounds 3 times requesting user to perform next procedure.

2) STOP MENU

The display indicates the operation of how to stop the inverter and to shutdown the UPS system.

3) EXTERNAL CONTACT INPUT

The input of external contacts is indicated by closed or open contacts.

4) DATA RECORD

Operation data and events is indicated.

5) REPORT

Record data is indicated.

6) SETUP

Time, Remote/Local selection and Equalizing charge are set.

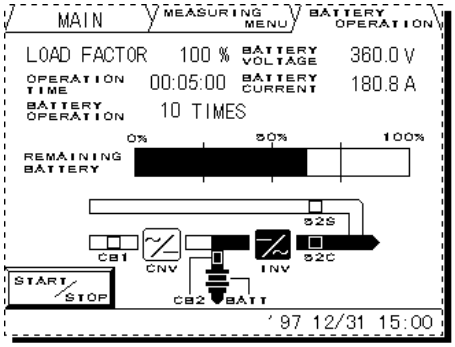
7) SELECT UPS OUTPUT SOURCE

This display is used to transfer the UPS from inverter to static bypass for maintenance purposes.

2.3.2 INPUT POWER FAILURE

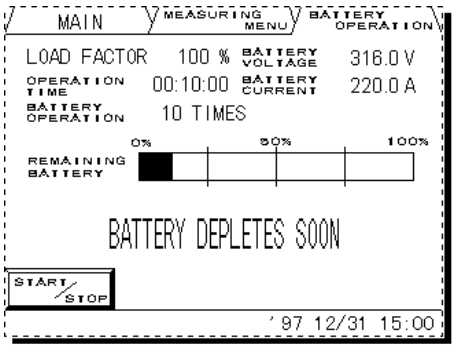
During an Input Power Failure the UPS will run on the Batteries. The following will be displayed. The indication of battery operation, load factor, and bar graph.

FIGURE 2.11 Battery Operation Screen



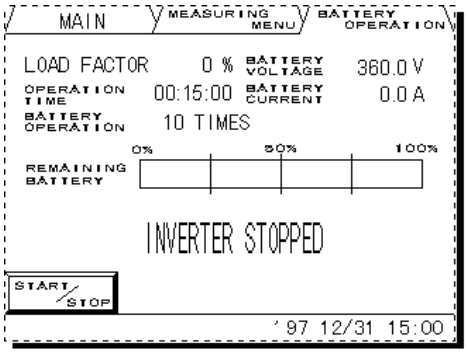
The LCD will display a battery low voltage announcement when battery capacity is near depletion.

FIGURE 2.12 Battery Low Voltage Screen



The End of Battery Discharge announcement is displayed when the battery end voltage is reached. At that time, the inverter will perform an electronic shutdown to prevent battery loss of life typical of extreme deep discharge conditions. The inverter will automatically restart to power the load and the batteries will be simultaneously recharged after input power is restored. Details of the End of Battery announcement is shown in Figure 2.13.

FIGURE 2.13 Discharge Termination Screen

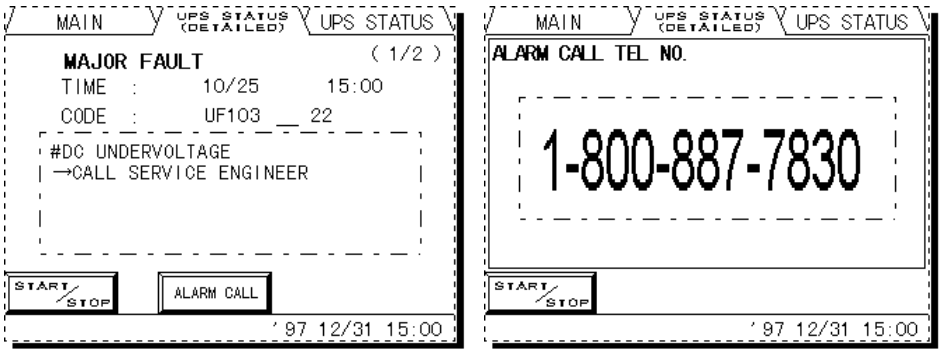


2.3.3 FAULT INDICATION (FIGURE 2.14)

The display shows a fault code, description of fault and a guidance of what action is to take place by the user. A maximum of 10 faults are displayed at the same time.

When an input power failure occurs during the fault Indication, the fault indication and input power failure are alternatively displayed at 5 second intervals.

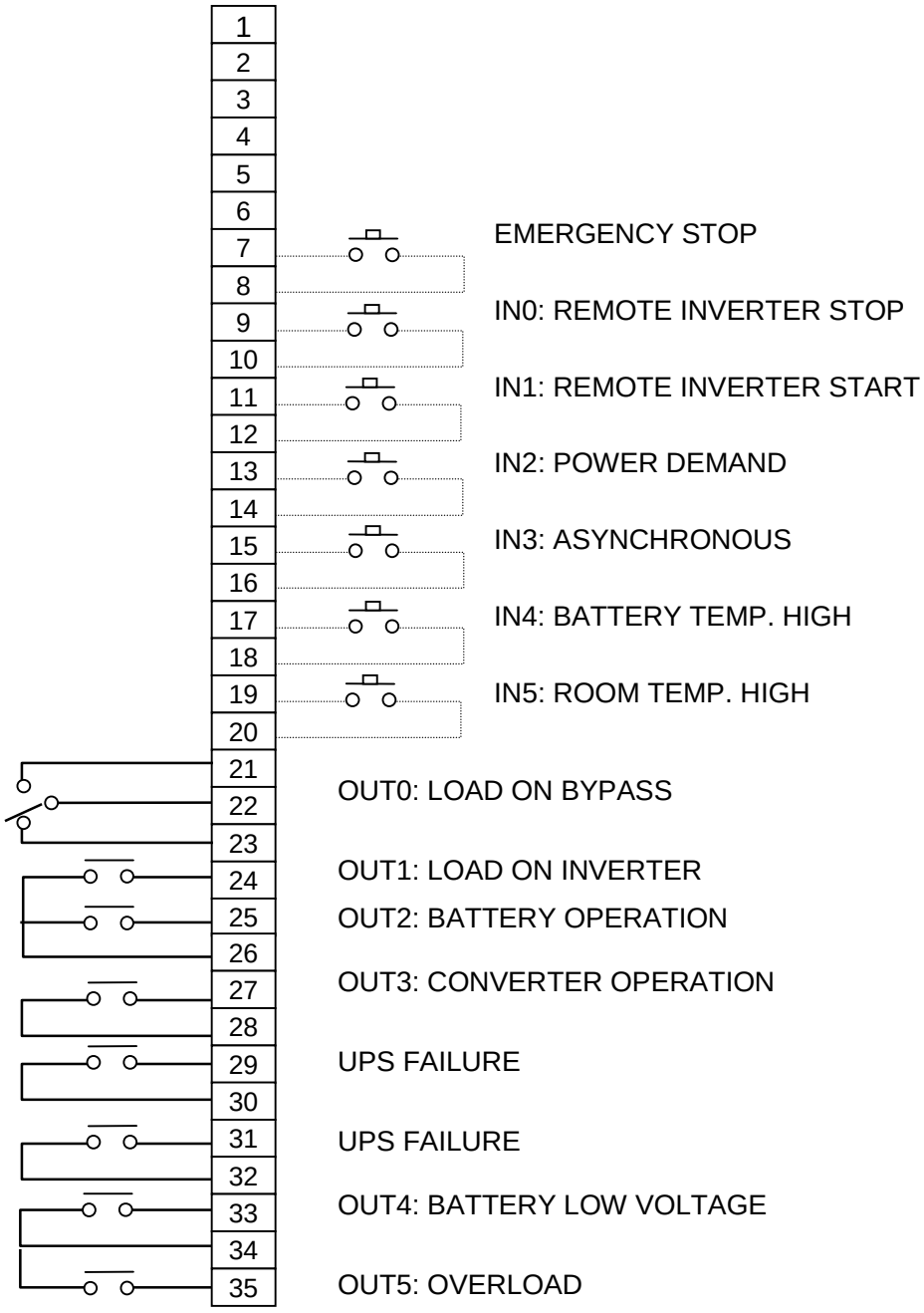
FIGURE 2.14 Failure indication screen



2.4 External Signal Terminal Block

The UPS is equipped with a series of input/output terminals for the external annunciation of alarms and the remote access of certain UPS functions. A functional description of the input/output port is presented below. Layout of terminals is shown in Figure 2.15

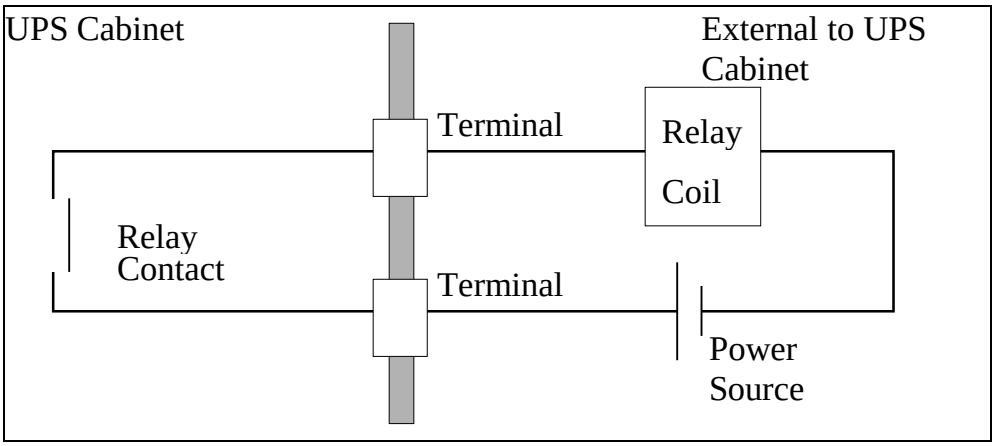
FIGURE 2.15 External Signal Terminal Block



A) Output Contacts(for external alarm annunciation)

Output contacts consist of form "A" dry type contacts. Rated value of all output contacts is 120Vac/0.5Aac or 30Vdc/1Adc. Operate all dry contacts at their rated values or lower. Figure 2.16 illustrates typical installation. The external relay can also be a lamp, LED, computer, etc.

FIGURE 2.16 Control Wiring for External Contacts



Details of output alarm contacts :

Terminals 22 to 21 **"Load on Bypass" contact (OUT0)**

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

Terminals 24 to 26 **"Load on Inverter" contact (OUT1)**

Activated when the power is supplied by the inverter.

Terminals 25 to 26 **"Battery Operation" contact (OUT2)**

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

Terminals 27 to 28 **"Converter Operation" contact (OUT3)**

Activated when the converter is operating.

Terminals 29 to 30 **"UPS failure" contact**

Activated when a major fault has occurred to the system.

Terminals 31 to 32 **"UPS failure" contact**

Activated when a major fault has occurred to the system.

Terminals 34 to 33 **"Battery Low Voltage" contact (OUT4)**

Activated when DC voltage dropped below discharge end during inverter operation.

Terminals 35 to 34 **"Overload" contact (OUT5)**

Activated when an overload has occurred to the system.

NOTE: ***The UPS is equipped with a selectable output contact feature. The above alarms are the default settings. Contact MITSUBISHI ELECTRIC AUTOMATION, INC. for set-up information.***

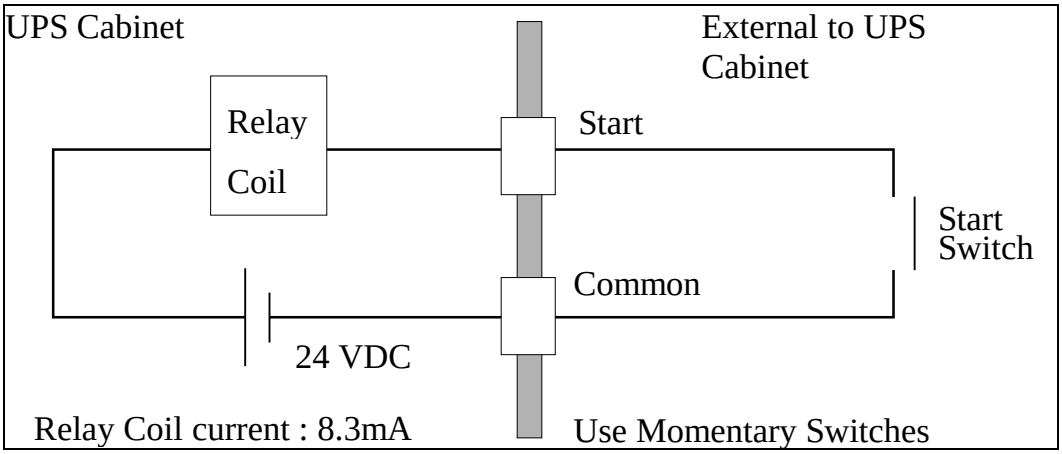
B) Input Contacts(for remote access of UPS)

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

NOTE: ***Do not apply voltage to remote access input terminals. Damage to UPS may result.***

Refer to Figure 2.17 for typical wiring configuration. Although this figure applies to the remote start/stop terminals, the same wiring arrangement is used for emergency stop; asynchronous command; power demand; battery temperature high.

FIGURE 2.17 Remote "Start" Contact Connections



Details of input contacts for remote access :

Terminals 7 to 8 **"Emergency Stop" contact input**

Used to perform a remote UPS emergency power off (EPO).

The load will be dropped.

Terminals 9 to 10 **Remote "Inverter Stop" input terminal (IN0)**

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 **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 13 to 14 **"Power Demand Command" contact input (IN2)**

Used to control the input current limit to the UPS converter (usually during

generator operation). Power demand is turned ON when the contact is closed. Power demand is turned OFF when the contact is open.

Terminals 15 to 16 **"Asynchronous Command" contact input (IN3)**

Used to create an asynchronous condition between the static bypass source and the inverter. Asynchronous condition is enabled when the switch is closed. Asynchronous condition is disabled when the switch is opened.

Terminals 17 to 18 **"BATTERY TEMP. HIGH" contact input (IN4)**

Input fed by a thermocouple that monitors battery temperature. The converter float voltage level is reduced for battery over-temperature conditions. Use battery manufacture recommended thermocouple.

Terminals 19 to 20 **"ROOM TEMP. HIGH" contact input (IN5)**

Input fed by a thermocouple that monitors room temperature.

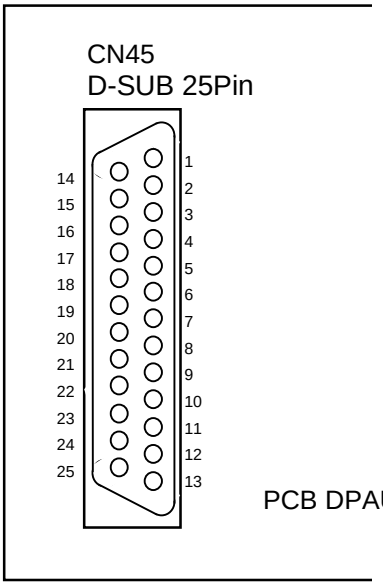
External thermocouple is user supplied.

NOTE : ***In all cases, a switch having a plate is recommended in order to reduce possibility of accidental operation.***

2.5 External communication connector

This is a RS232C port for "DiamondLink". Layout of connector is shown in Figure 2.18.

FIGURE 2.18 External communication connector



Pin 2. TXD : Transmit data
Pin 3. RXD : Receive data
Pin 7. GND : Signal ground
Pin 9. 5VS : DC5V supply
Pin 10. GND : Ground
Pin 11. 5VS : DC5V supply

3.0 INSTALLATION AND OPERATION

3.1 Transportation and Installation

TABLE 3.1 How to transport and install the system

Transportation	Installation
Transport unit with forklift. Use eye bolts (supplied) to carry with overhead crane.	Using the holes (4 - 24) pre drilled into the UPS channel base, anchor the unit using appropriate hardware.

Note : ***Do not transport in a horizontal position. Cabinets should be maintained upright within +/- 15° during handling.***

3.2 Installation Procedure

A) Note the load tolerance of the floor

Refer to Table 3.2 for list of weights of UPS's.

TABLE 3.2 List of UPS weights

UPS Capacity (kVA)	100	150	225	300	375
Weight (lb.)	3060	3810	4960	5890	6620

B) Minimum clearance required for ventilation

Right side ..... 1.0" (25 mm) (not required when sidecars are used)
Left side ..... 1.0" (25 mm) (not required when sidecars are used)
Back side ..... 0.0" (0.0 mm)
Top side ..... 23.6" (600 mm) (for air flow)

C) Space requirement for routine maintenance

Allow the following space at the time of installation.
Front ..... 39.4" (1000 mm)
Sides ..... 0.0" (0.0 mm)
Rear ..... 0.0" (0.0 mm)

D) External Battery Supply

Please refer to the following when installing batteries:

1. The customer shall make reference to the battery manufacturer's installation manual for battery installation and maintenance instructions.
2. The maximum permitted fault current from the remote battery supply and the DC voltage rating of the battery supply over-current protective device are shown in Table 3.3.

TABLE 3.3 Maximum Permitted Fault Current

UPS CAPACITY (kVA)	DC VOLTAGE RATING (V)	MAXIMUM PERMITTED FAULT CURRENT (A)
100	360	35000
150	360	25000
225	360	25000
300	360	25000
375	360	25000

3.3 Procedure for Cable Connections

A) Required metric tools – 19mm wrench, 19mm socket.

B) Confirm the capacity of the UPS being installed. Identify the input/output power terminal blocks as shown in the appropriate Figure 3.1 through Figures 3.2-a~h.

C) Connect the internal control wire and power wire.

i) Control wire Inter-connect

a) AC input cabinet (300, 375kVA only)

(1) CB1-UVR to terminal 45, 46 in bypass cabinet section.

(2) CB1 Alarm to terminal 43, 44 in bypass cabinet section.

(3) CB1 Auxiliary connect to terminal 41, 42 in bypass cabinet section.

(4) Input transformer Over-temperature to terminal 52, 54 in bypass cabinet section.

(5) Control power A, B, C phases (Terminal block) to A00, B00, C00 in UPS converter section.

b) DC breaker cabinet or battery cabinet

(1) CB2-UVR to terminal 59, 60 (300, 375kVA) / 5, 6 (100, 150, 225kVA) in bypass cabinet section.

(2) CB2 Alarm to terminal 57, 58 (300, 375kVA) / 1, 2 (100, 150, 225kVA) in bypass cabinet section.

(3) CB2 Auxiliary to terminal 55, 56 (300, 375kVA) / 3, 4 (100, 150,

225kVA) in bypass cabinet section.

ii) Power wire Inter-connect

a) Output of transformer cabinet

(1) X1 (A-phase) to A10 bus bar in UPS converter section.

(2) X2 (B-phase) to B10 bus bar in UPS converter section.

(3) X3 (C-phase) to C10 bus bar in UPS converter section.

b) DC Input to UPS

(1) Positive cable to BP bus bar in UPS converter section.

(2) Negative cable to NP bus bar in UPS converter section.

D) Connect the grounding conductor from the input service entrance to the UPS ground bar.

E) Two (2) sources feeding the UPS:

i) Connect the converter input power cables from the input service entrance to the converter input power terminals identified as A00, B00, C00 or A10, B10, C10 in Figures 3.2-a~h. Input cables must be sized for an ampacity larger than the maximum input drawn by the converter. Refer to Table 3.4 for recommended cable sizes.

ii) Confirm that an external bypass input circuit breaker (MCCB) is installed (refer to WARNING 2). Connect the bypass input power cables from the input service entrance to the bypass input power terminals identified as A40, B40, C40 and N40 in Figures 3.2-a~h. Bypass input cables must be sized for an ampacity larger than the maximum output current capacity of the UPS. Refer to Table 3.4 for recommended cable sizes.

F) One (1) source feeding the UPS:

i) Confirm that an external input circuit breaker sized to protect both the converter input and the bypass lines is installed. Consult 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, C40 and N40 in Figures 3.2-a~h. Input cables must be sized for an ampacity larger than the maximum current capacity of the UPS. Refer to Table 3.4 for recommended cable sizes.

ii) Using adequately sized conductors per Table 3.4 and referring to the appropriate figure identified in Figures 3.2-a~h, jumper bypass terminals A40, B40, C40 to converter input power A00, B00, C00 or A10, B10, C10 identified Figures 3.2-a~h.

G) Referring to Figures 3.2-a~h, connect UPS load terminals A50, B50, C50 and N50 to

load distribution panel. Refer to Table 3.4 for cable sizes.

H) Connect external signal terminal block as needed. Refer to section 2.4 and Figure 2.15 for functional description. 12 AWG, or less, shielded conductor is recommended.

NOTES: ***1. Confirm that all UPS internal contactors(breakers) "CB1", "CB2", and "CB3" are open before energizing UPS.***

2. UPS power terminals are supplied with bus bar and hardware (12mm diameter Nut/Bolt assembly). It is recommended that compression lugs be used to fasten all input/output power cables. Refer to Table 3.5 for recommended compression lugs and appropriate crimping tool.

3. If three wire source for input and bypass input is utilized, the neutral conductor is the UPS must be banded to ground.

Table 3.4 Recommended cable size and torque requirements

kVA Capacity	Input Voltage	Output Voltage	Input Side * 1, 2		Output Side * 1, 2		Bypass Side * 1, 2		DC Input Side * 1, 2	
			Cable Size	Torque in. lbs.	Cable Size	Torque in. lbs.	Cable Size	Torque in. lbs.	Cable Size	Torque in. lbs.
100kVA	208V	208V	300 MCM or larger	347 - 469 in. lbs.	300 MCM or larger	347 - 469 in. lbs.	300 MCM or larger	347 - 469 in. lbs.	250 MCM or larger	347 - 469 in. lbs.
	480V	480V	1/0 AWG or larger	200 - 269 in. lbs.	1/0 AWG or larger	200 - 269 in. lbs.	1/0 AWG or larger	200 - 269 in. lbs.	250 MCM or larger	200 - 269 in. lbs.
	600V	600V	3 AWG or larger	200 - 269 in. lbs.	3 AWG or larger	200 - 269 in. lbs.	3 AWG or larger	200 - 269 in. lbs.	250 M] or larger	200 - 269 in. lbs.
150kVA	208V	208V	600 MCM or larger	347 - 469 in. lbs.	600 MCM or larger	347 - 469 in. lbs.	600 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.
	480V	480V	3/0 AWG or larger	347 - 469 in. lbs.	3/0 AWG or larger	347 - 469 in. lbs.	3/0 AWG or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.
	600V	600V	1/0 AWG or larger	347 - 469 in. lbs.	1/0 AWG or larger	347 - 469 in. lbs.	1/0 AWG or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.
225kVA	208V	208V	2x350 MCM or larger	347 - 469 in. lbs.	2x350 MCM or larger	347 - 469 in. lbs.	2x350 MCM or larger	347 - 469 in. lbs.	2x300 MCM or larger	347 - 469 in. lbs.
	480V	480V	300 MCM or larger	347 - 469 in. lbs.	300 MCM or larger	347 - 469 in. lbs.	300 MCM or larger	347 - 469 in. lbs.	2x300 MCM or larger	347 - 469 in. lbs.
	600V	600V	4/0 AWG or larger	347 - 469 in. lbs.	4/0 AWG or larger	347 - 469 in. lbs.	4/0 AWG or larger	347 - 469 in. lbs.	2x300 MCM or larger	347 - 469 in. lbs.
300kVA	208V	480V	3x350 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.	2x600 MCM or larger	347 - 469 in. lbs.
	480V		600 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.	2x600 MCM or larger	347 - 469 in. lbs.
	600V	600V	400 MCM or larger	347 - 469 in. lbs.	300 MCM or larger	347 - 469 in. lbs.	300 MCM or larger	347 - 469 in. lbs.	2x600 MCM or larger	347 - 469 in. lbs.
375kVA	208V	480V	3x500 MCM or larger	347 - 469 in. lbs.	700 MCM or larger	347 - 469 in. lbs.	700 MCM or larger	347 - 469 in. lbs.	3x400 MCM or larger	347 - 469 in. lbs.
	480V		2x250 MCM or larger	347 - 469 in. lbs.	700 MCM or larger	347 - 469 in. lbs.	700 MCM or larger	347 - 469 in. lbs.	3x400 MCM or larger	347 - 469 in. lbs.
	600V	600V	600 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.	500 MCM or larger	347 - 469 in. lbs.	3x400 MCM or larger	347 - 469 in. lbs.

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

*2 - Allowable ampacities based on 90 *C insulation at an ambient temperature of 30 *C

Not more than 3 conductors in a raceway without derating.

TABLE 3.5 Crimp Type Compression Lug

WIRE SIZE (CODE)	WIRE STRAND CLASS	RECOMMENDATION		CRIMP TOOL REQUIRED BURNDY TYPE Y35 OR Y46	
		VENDOR	CAT. NO.	COLOR KEY	DIE INDEX
2	B	BURNDY	YA2C	BROWN	10
		ILSCO	CRB-2L	BROWN	10
	I	BURNDY	YA1C-LB	GREEN	11 / 375
1	B	BURNDY	YA1C	GREEN	11 / 375
		ILSCO	CRA-1L	GREEN	11 / 375
	I	BURNDY	YA25-LB	PINK	12 / 348
1/0	B	BURNDY	YA25	PINK	12 / 348
		ILSCO	CRA-1/OL	PINK	12 / 348
	I	BURNDY	YA25-LB	BLACK	13
2/0	B	BURNDY	YA26	BLACK	13
		ILSCO	CRA-2/OL	BLACK	13
	I	BURNDY	YA27-LB	ORANGE	14 / 101
3/0	B	BURNDY	YA27	ORANGE	14 / 101
		ILSCO	CRB-3/OL	ORANGE	14 / 101
	I	BURNDY	YA28-LB	PURPLE	15
4/0	B	BURNDY	YA28	PURPLE	15
		ILSCO	CRB-4/OL	PURPLE	15
	I	BURNDY	YA29-LB	YELLOW	16
250 MCM	B	BURNDY	YA29	YELLOW	16
		ILSCO	CRA-250L	YELLOW	16
	I	BURNDY	YA30-LB	WHITE	17 / 298
300 MCM	B	BURNDY	YA30	WHITE	17 / 298
		ILSCO	CRA-30OL	WHITE	17 / 298
	I	BURNDY	YA32-LB	RED	18 / 324
350 MCM	B	BURNDY	YA31	RED	18 / 324
		ILSCO	CRA-350L	RED	18 / 324
	I	BURNDY	YA34-LB	BLUE	19 / 470
400 MCM	B	BURNDY	YA32	BLUE	19 / 470
		ILSCO	CRA-40OL	BLUE	19 / 470
	I	BURNDY	YA34-LB	BROWN	20 / 299
500 MCM	B	BURNDY	YA34	BROWN	20 / 299
		ILSCO	CRA-500L	BROWN	20 / 299
	I	BURNDY	YA38-LB	GREEN	22 / 472
600 MCM	B	BURNDY	YA36	GREEN	22 / 472
		ILSCO	------	-----	--------
	I	BURNDY	YA39-LB	PINK	300
750 MCM	B	BURNDY	YA39	BLACK	24 / 473
		ILSCO	CRA-750L	BLACK	24 / 473
	I	BURNDY	YA44-LB	WHITE	27
1000 MCM	B	BURNDY	YA44	WHITE	27
		ILSCO	CRA-1000L	WHITE	27
	I	BURNDY	-------	-----	--------

NOTE: ***When using crimp type lugs, the lugs should be crimped to the specifications given in the manufacturer's instructions for both crimp tool and lug.***

Fig.3.1-1 UPS Terminal Designation (100, 150, 225kVA)

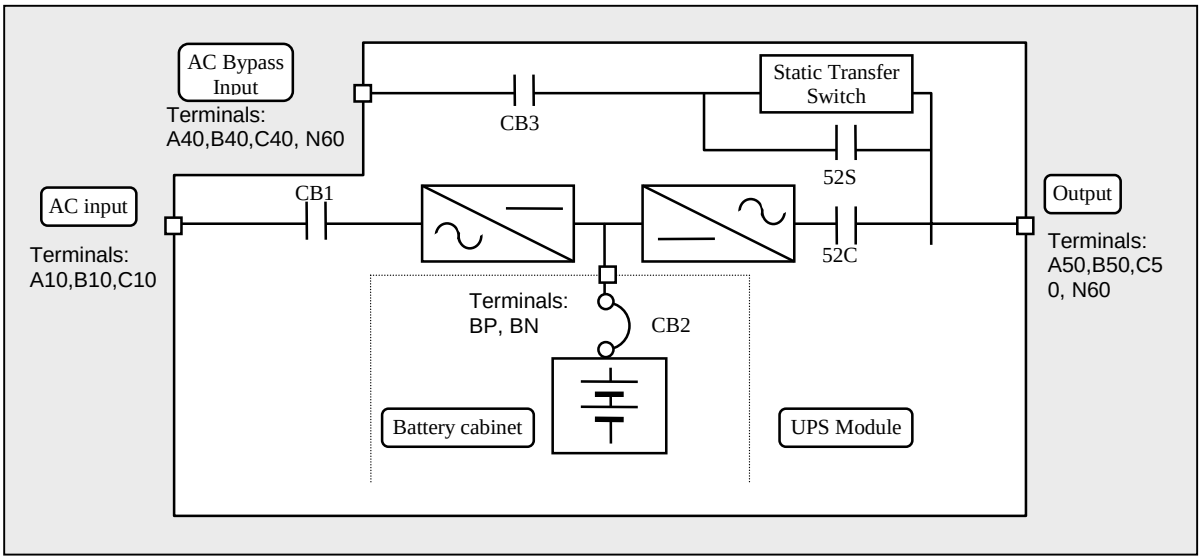


Fig.3.1-2 UPS Terminal Designation (300, 375kVA)

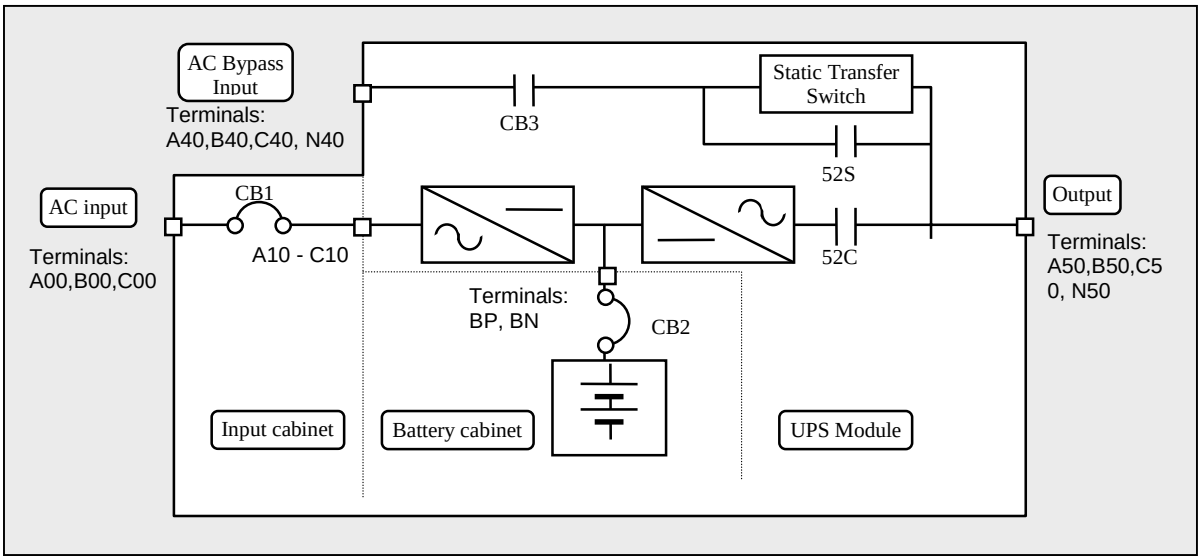
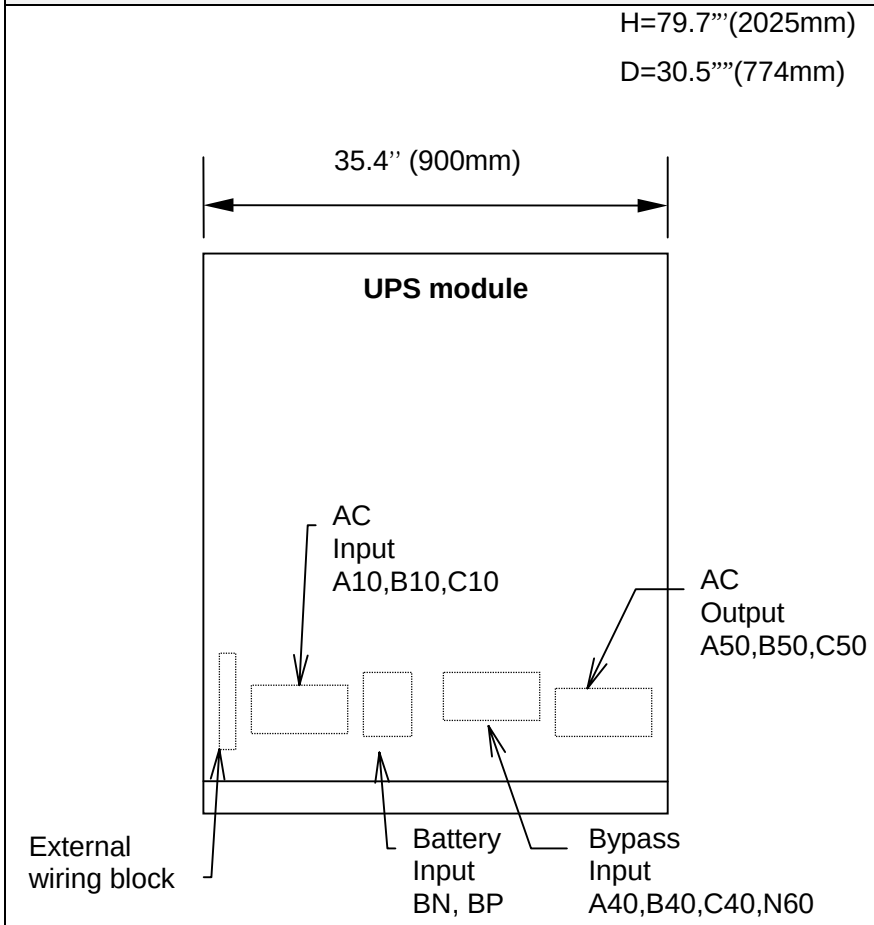


Fig. 3.2-a-1 Diagram of input/output bus bars and terminal blocks (100kVA UPS, Input voltage 208VAC)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

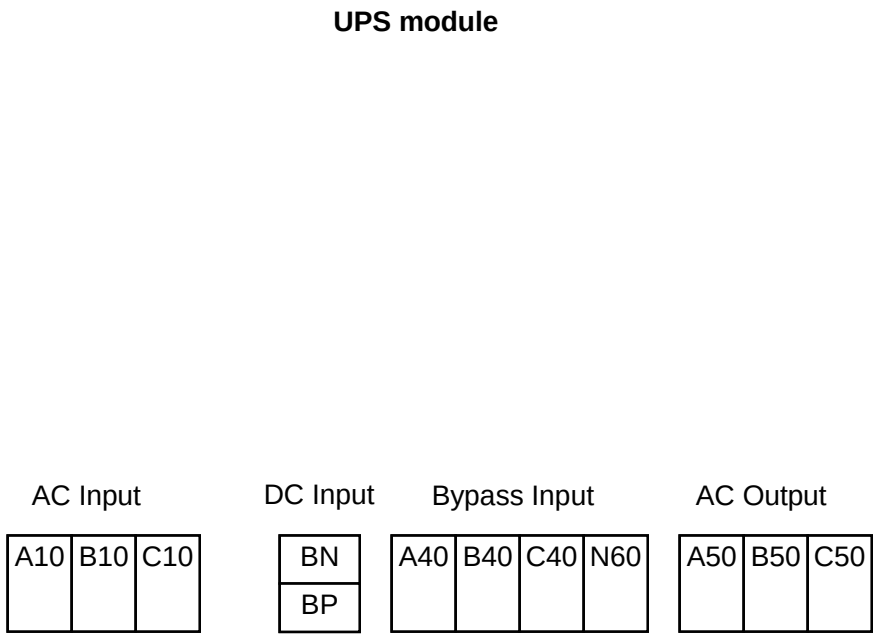


Fig. 3.2-a-2 Diagram of Power Wire & Control Wire Inter-Connect (100kVA UPS, Input voltage 208VAC)

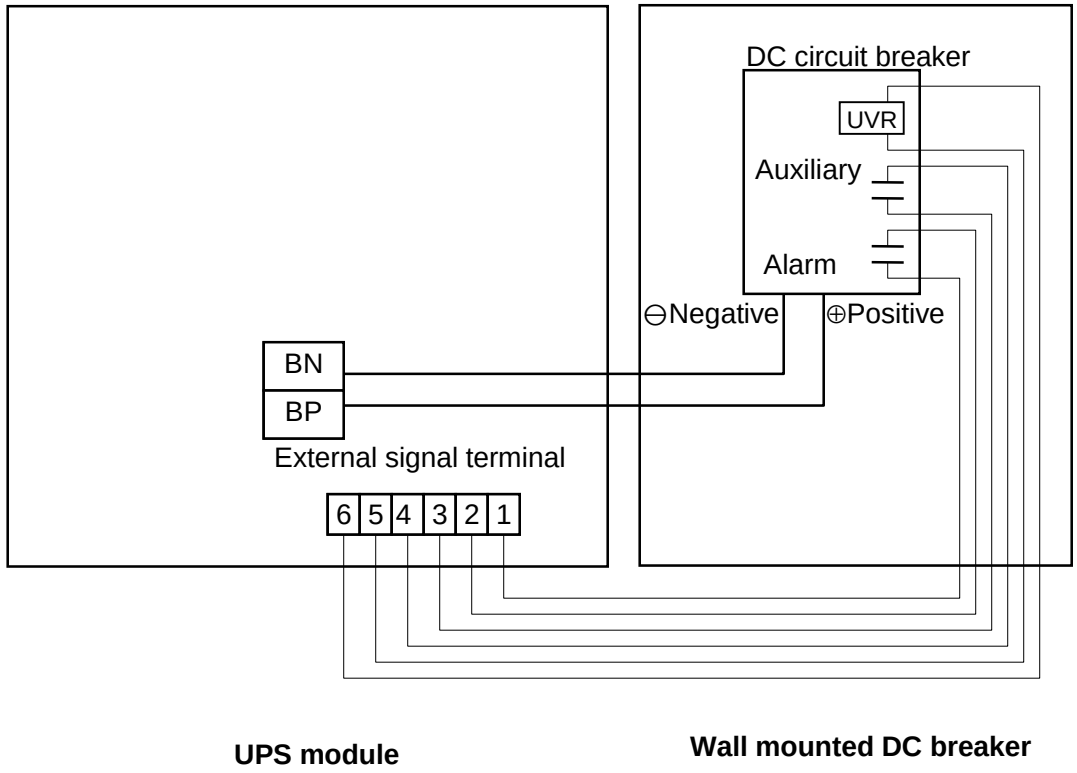
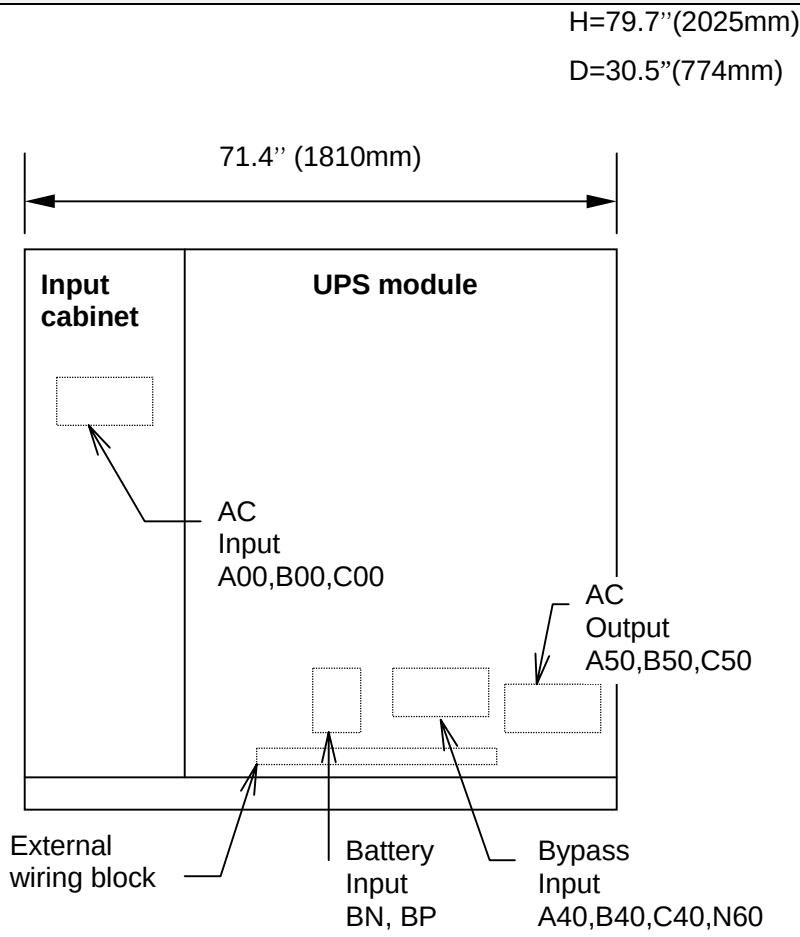


Fig. 3.2-b-1 Diagram of input/output bus bars and terminal blocks (100kVA UPS, Input voltage 480VAC)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

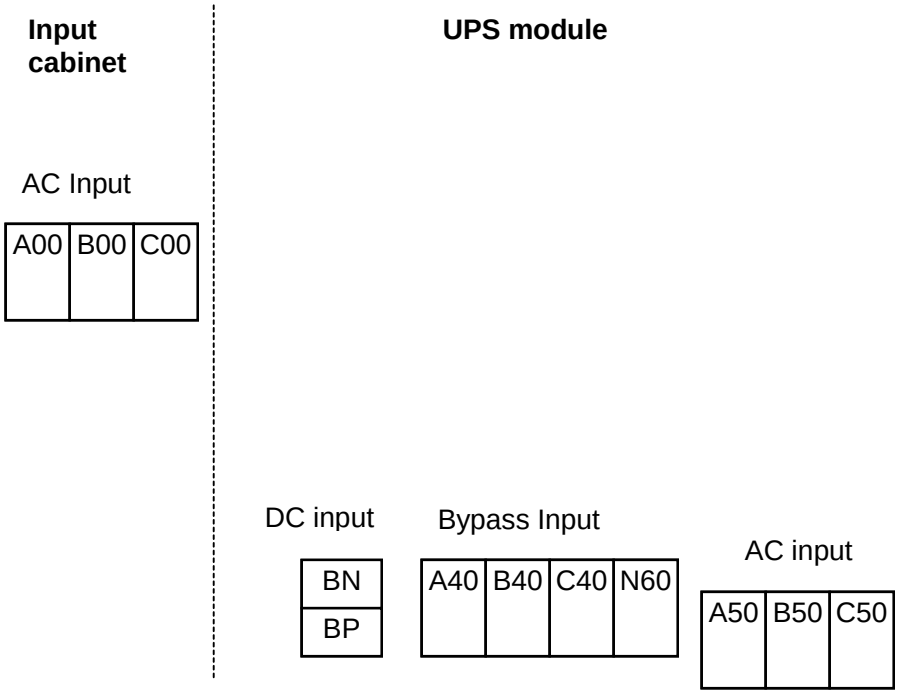


Fig. 3.2-b-2 Diagram of Power Wire & Control Wire Inter-Connect (100kVA UPS, Input voltage 480VAC)

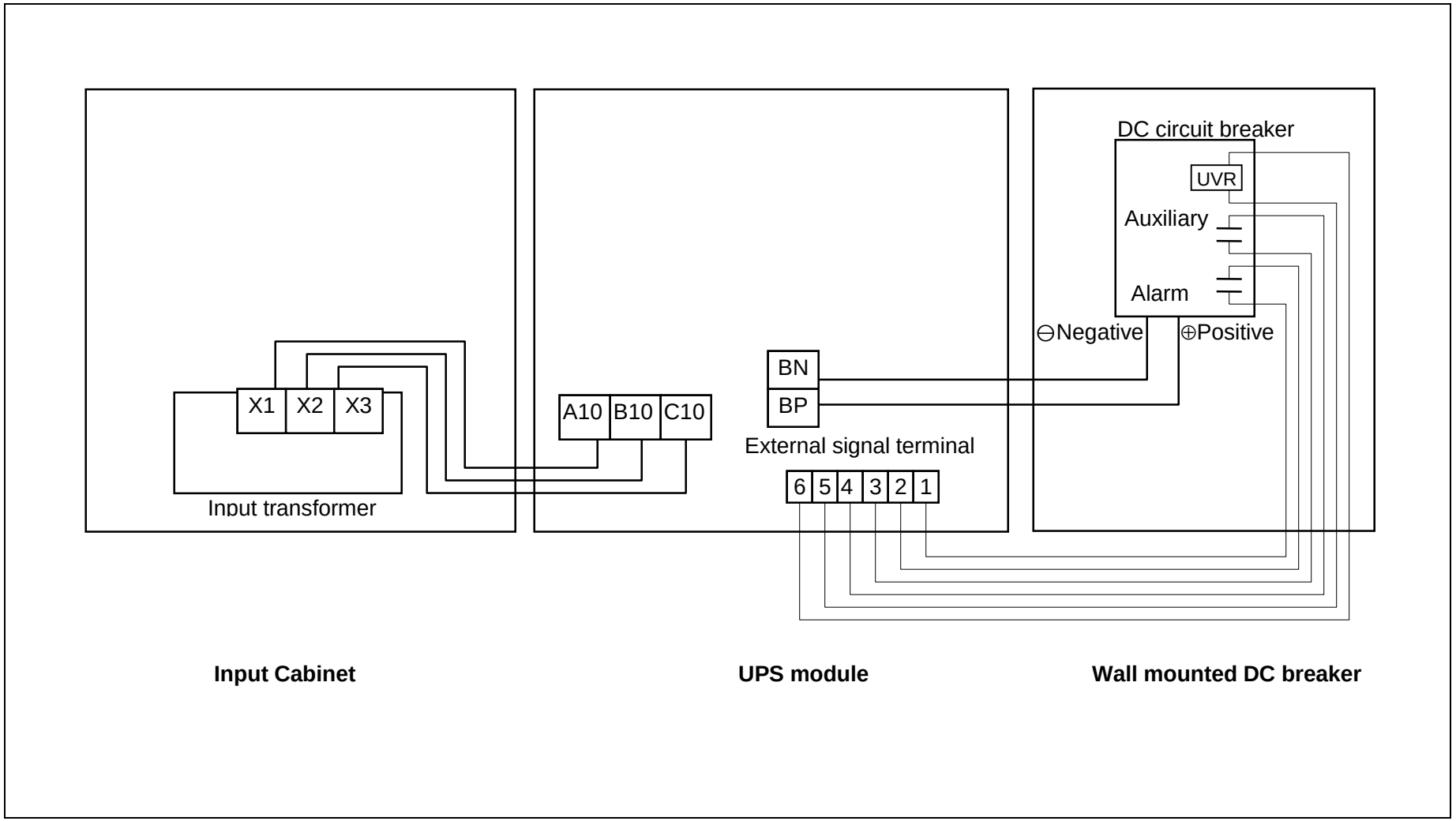
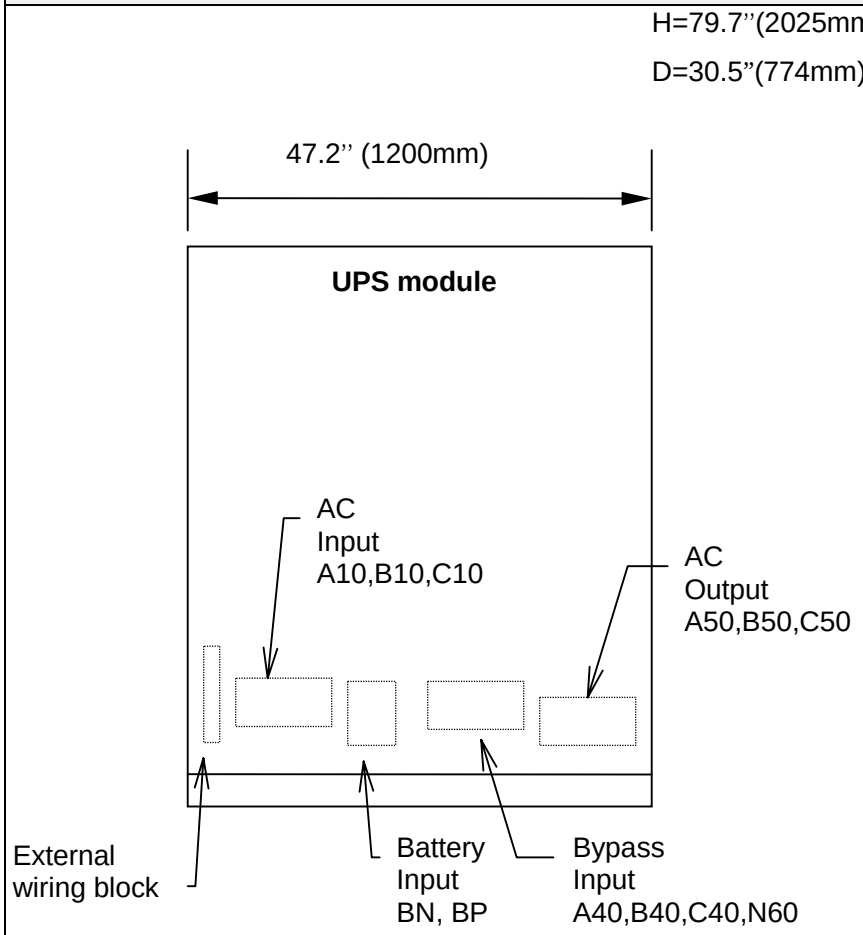


Fig. 3.2-c-1 Diagram of input/output bus bars and terminal blocks (150kVA UPS, Input voltage 208VAC)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

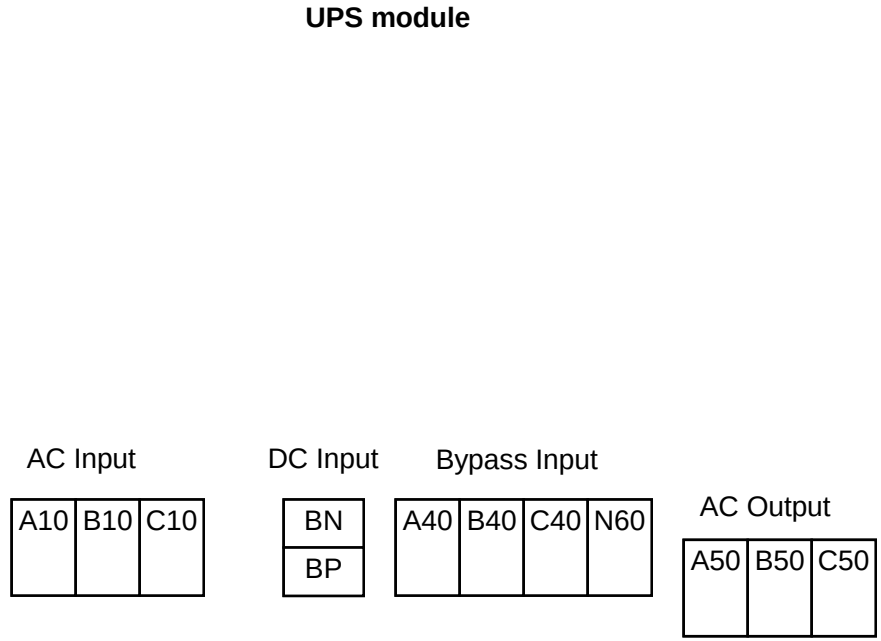


Fig. 3.2-c-2 Diagram of Power Wire & Control Wire Inter-Connect (150kVA UPS, Input voltage 208VAC)

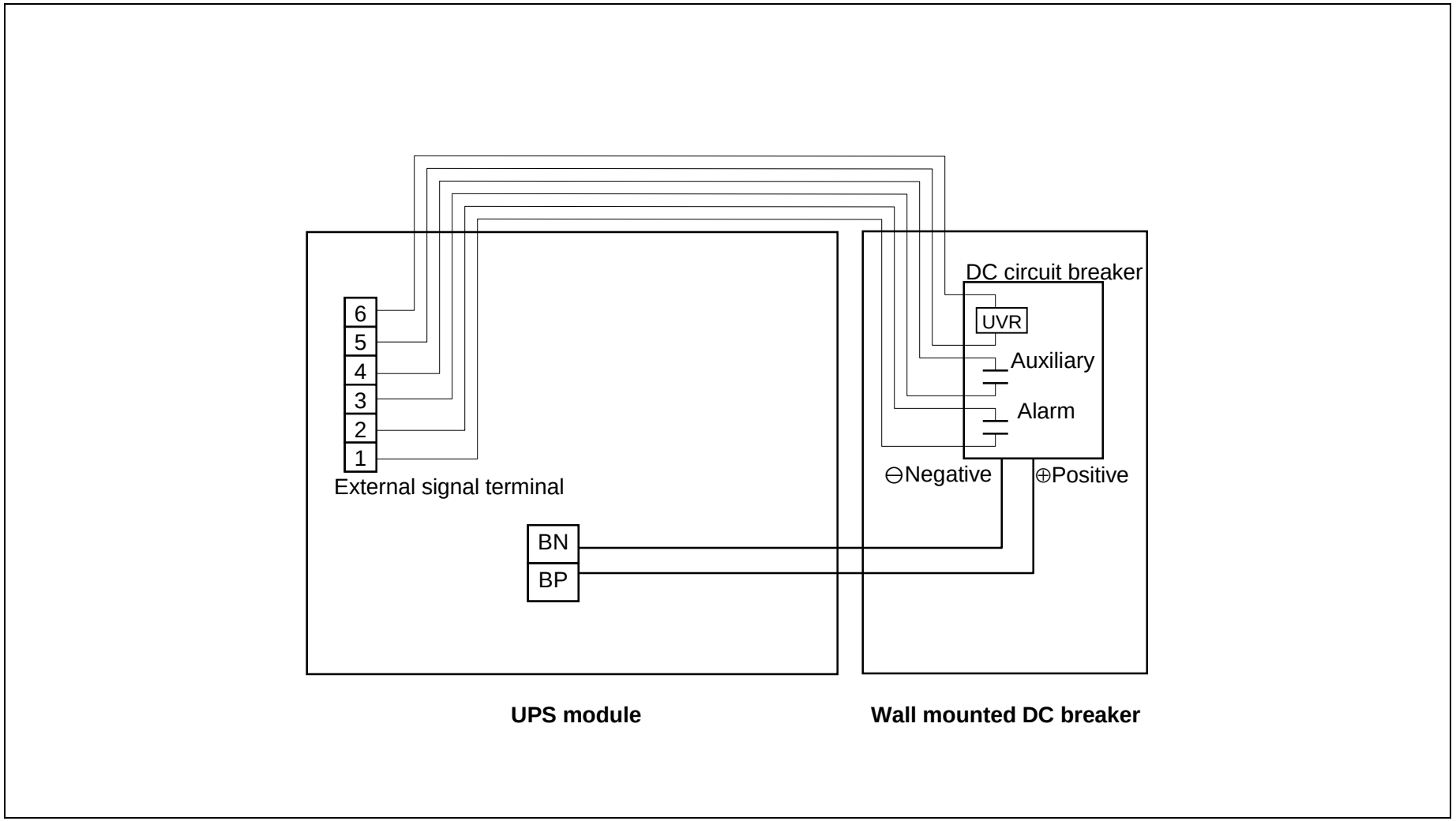
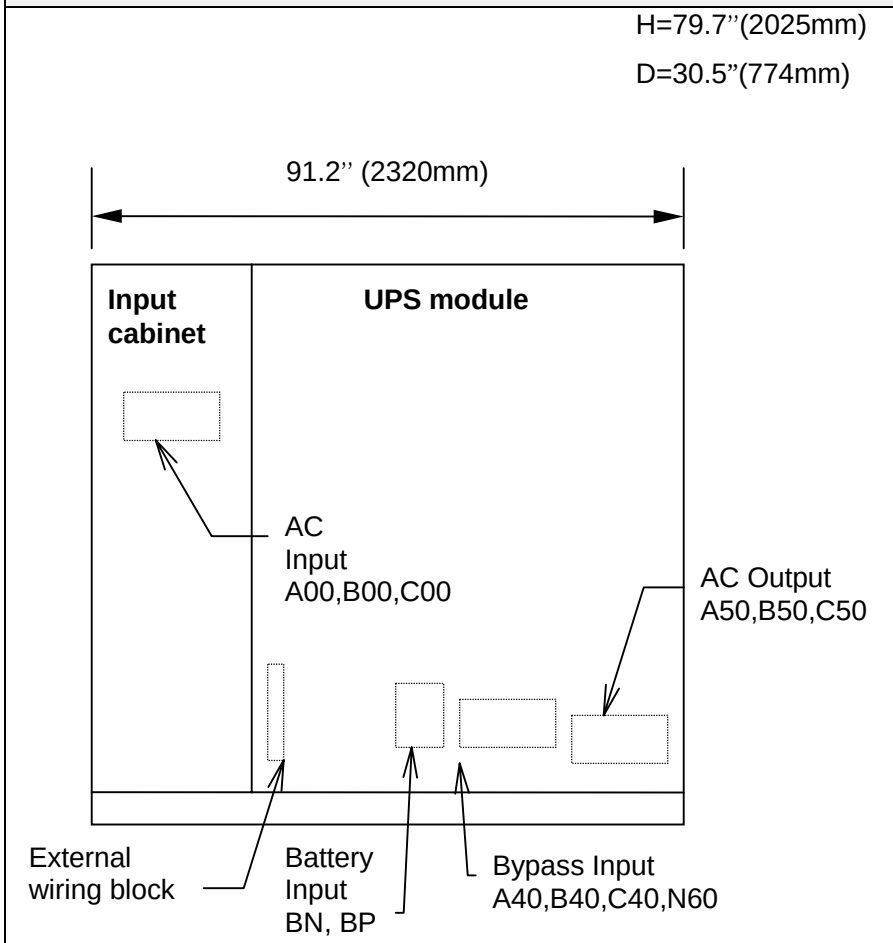


Fig. 3.2-d-1 Diagram of input/output bus bars and terminal blocks (150kVA UPS, Input voltage 480VAC)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

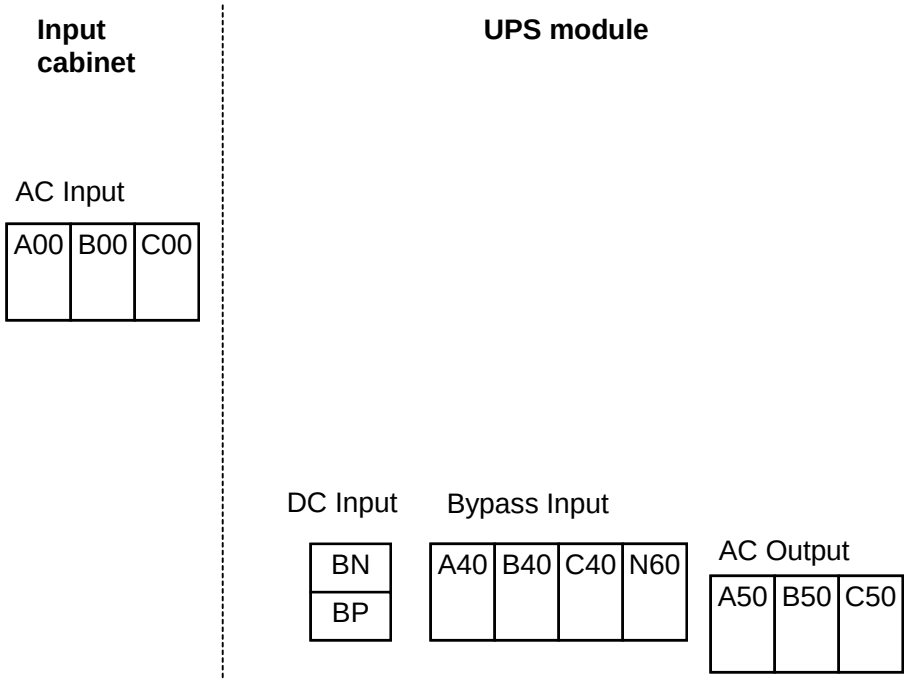


Fig. 3.2-d-2 Diagram of Power Wire & Control Wire Inter-Connect (150kVA UPS, Input voltage 480VAC)

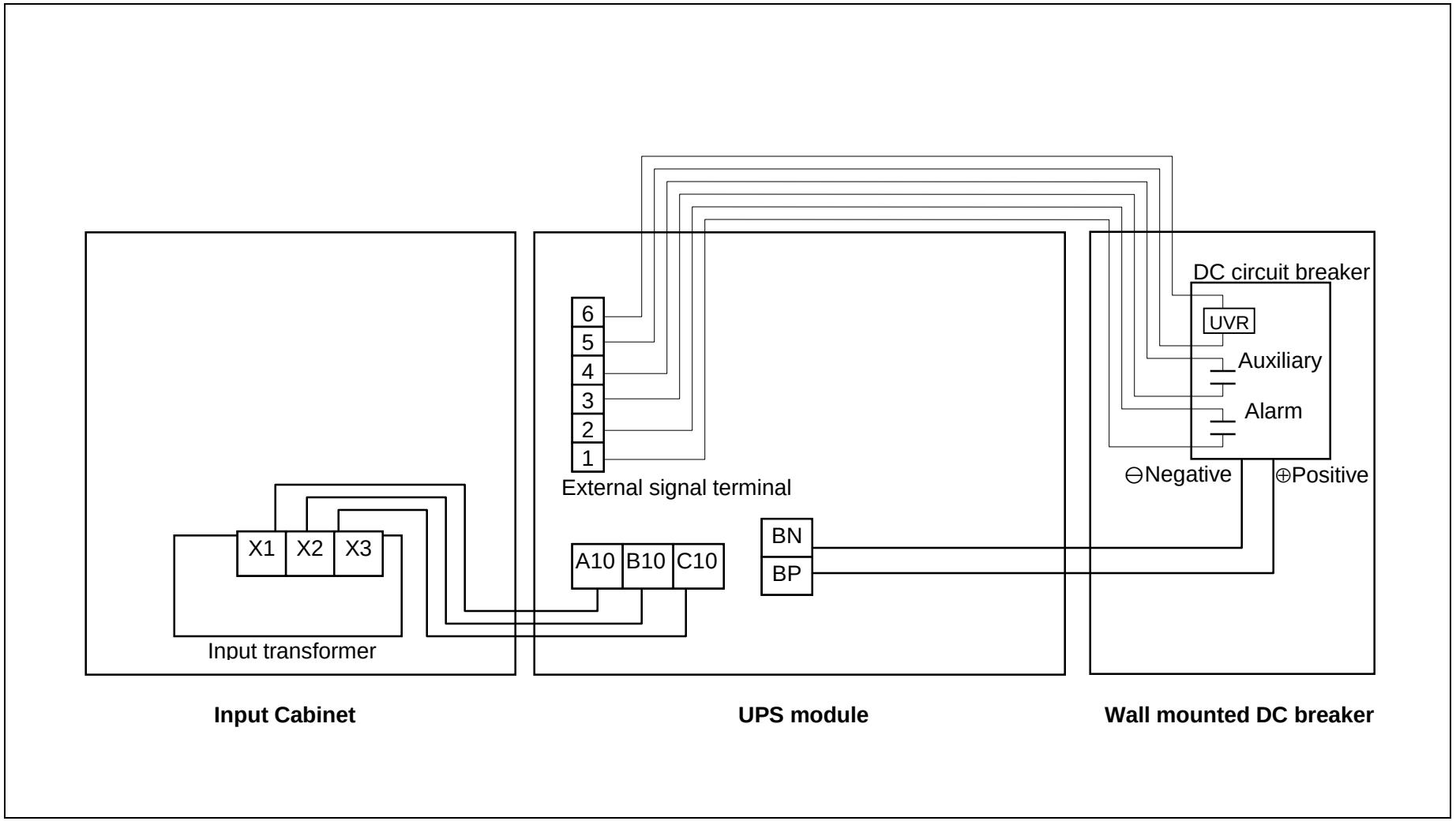
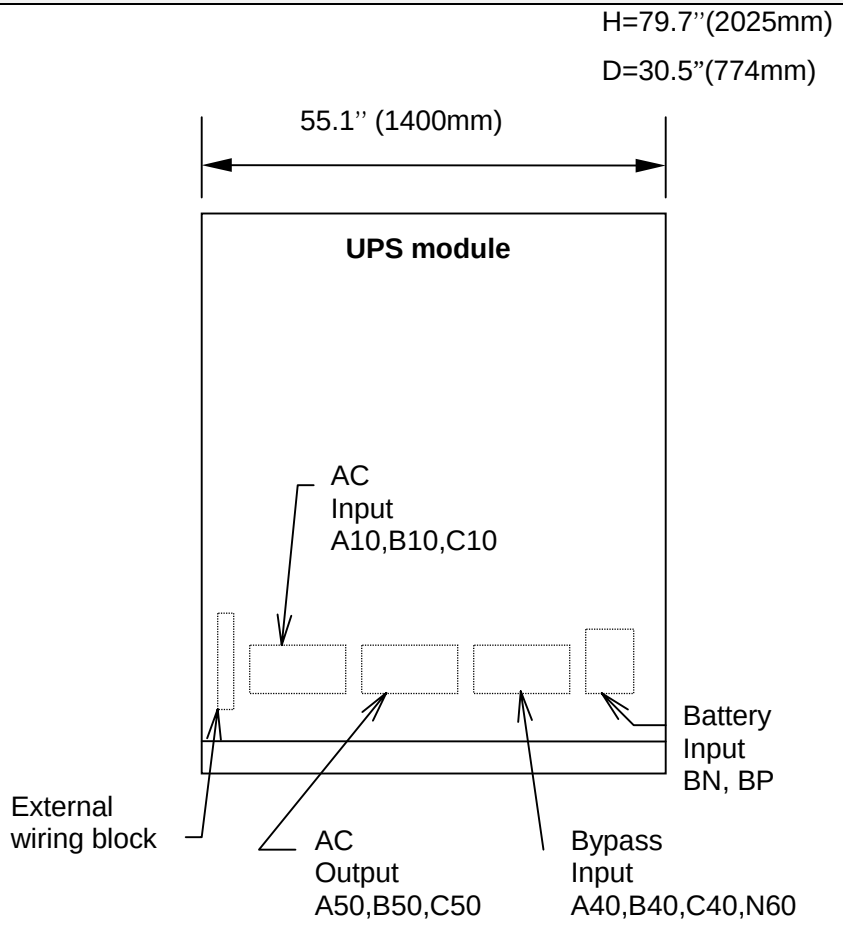


Fig. 3.2-e-1 Diagram of input/output bus bars and terminal blocks (225kVA UPS, Input voltage 208VAC)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

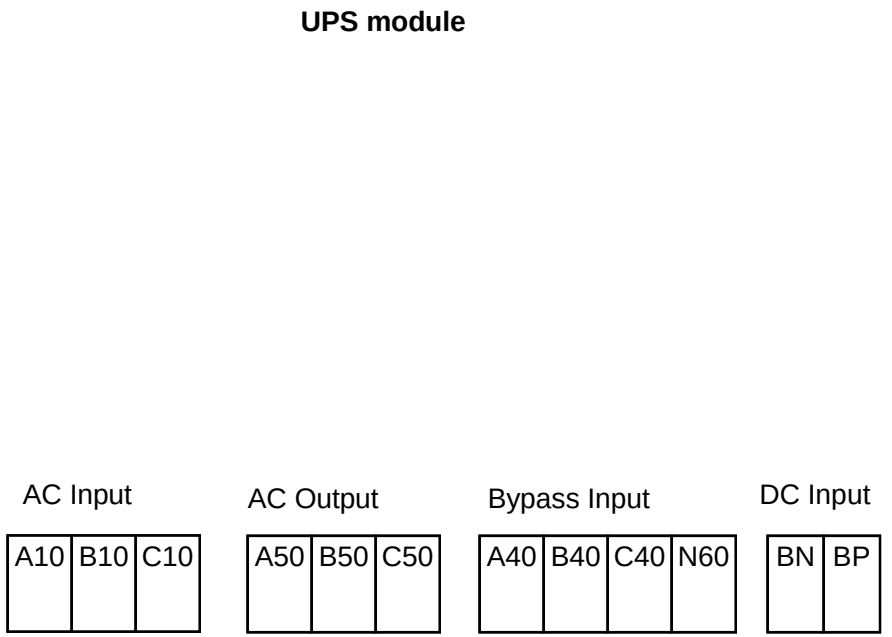


Fig. 3.2-e-2 Diagram of Power Wire & Control Wire Inter-Connect (225kVA UPS, Input voltage 208VAC)

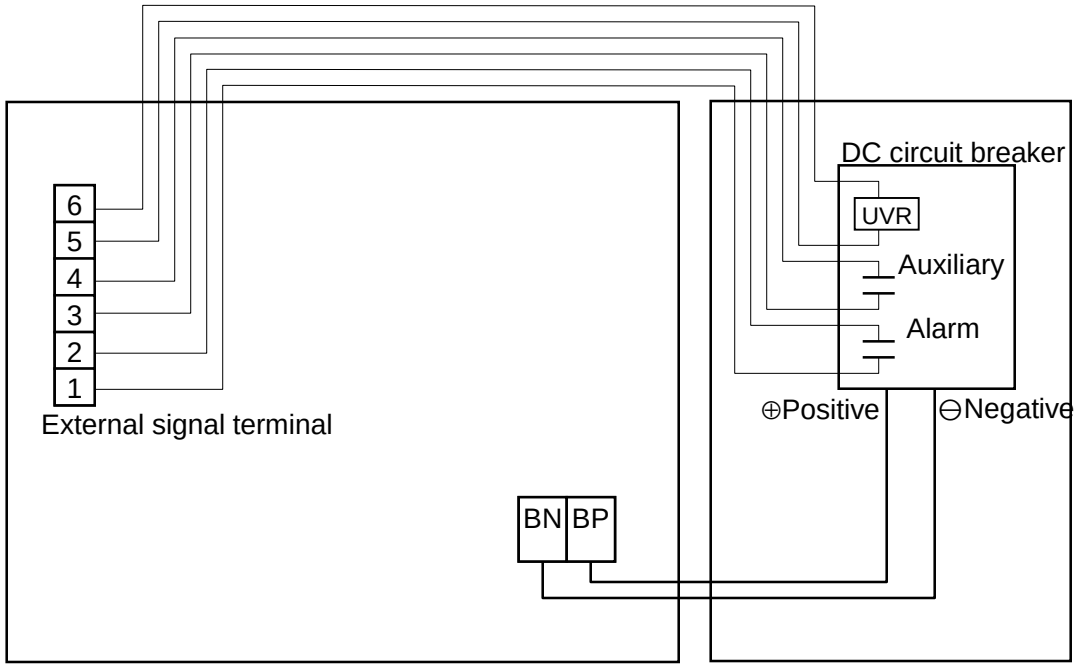
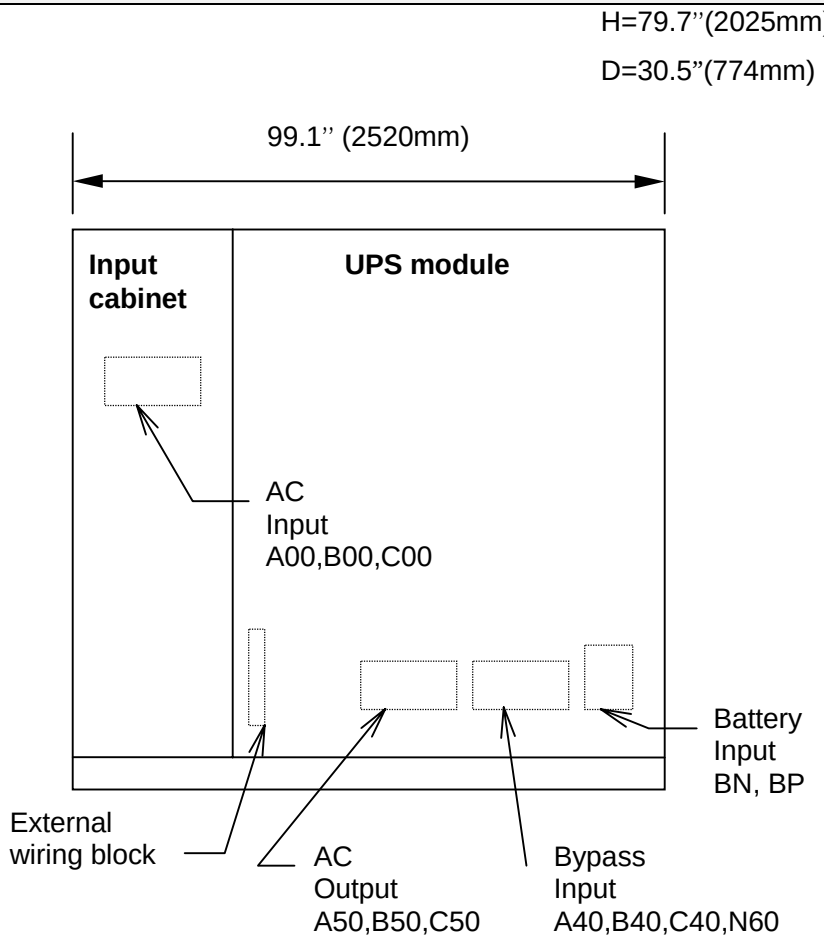


Fig. 3.2-f-1 Diagram of input/output bus bars and terminal blocks (225kVA UPS, Input voltage 480VAC)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

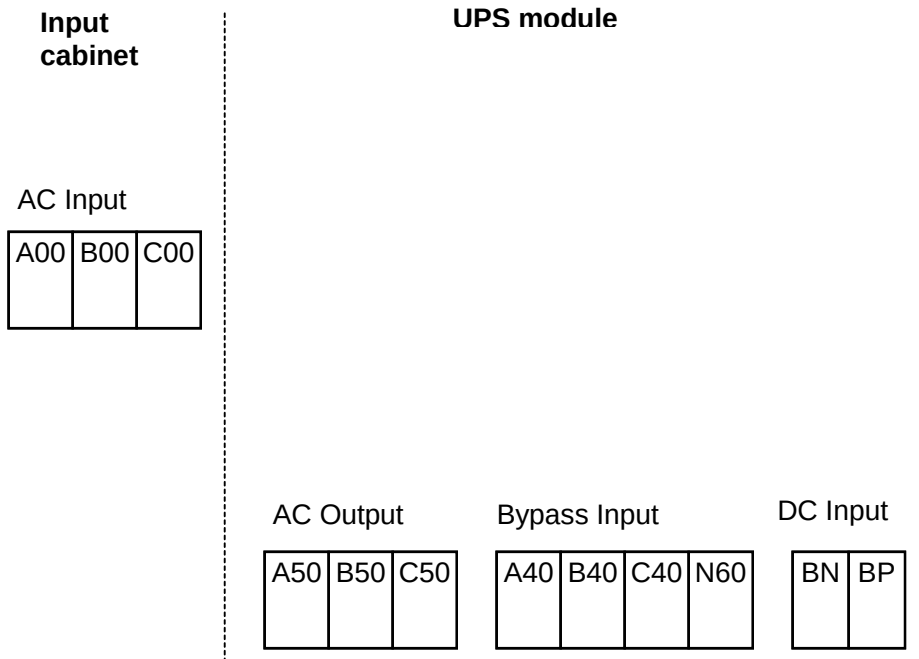


Fig. 3.2-f-2 Diagram of Power Wire & Control Wire Inter-Connect (225kVA UPS, Input voltage 480VAC)

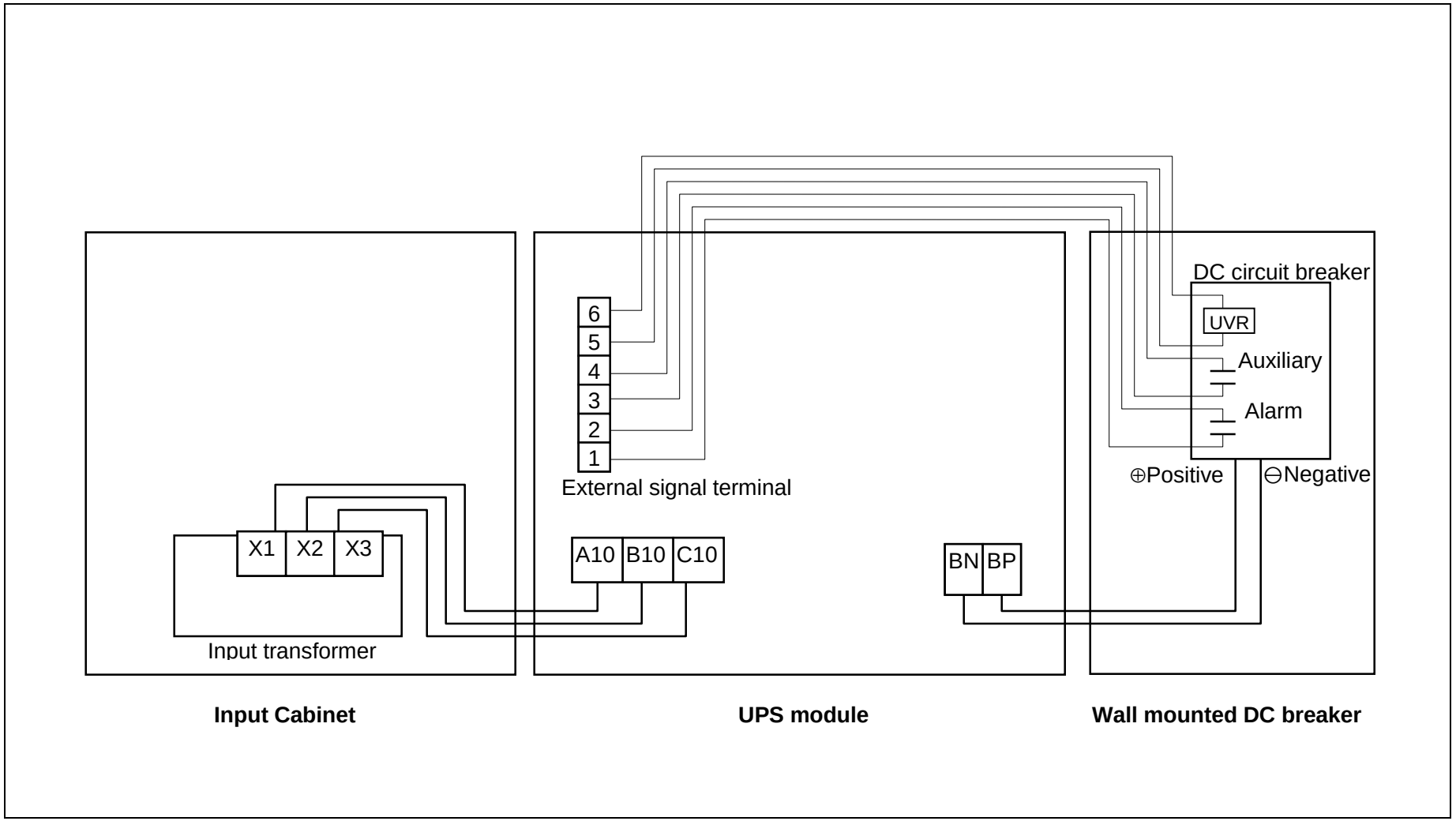
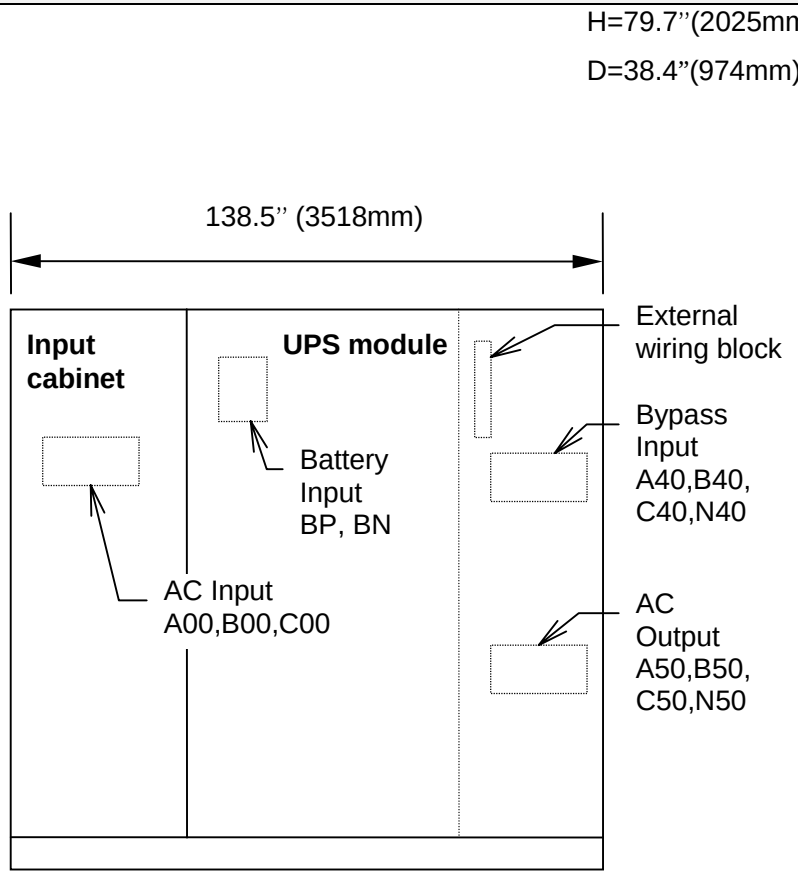


Fig. 3.2-g-1 Diagram of input/output bus bars and terminal blocks (300kVA UPS)

Location of bus bars and terminal blocks	Detailed Terminals



Power Terminals use 5/8" (15mm) Diameter bolts.

Input cabinet

AC Input

A00	B00	C00

UPS module

DC Input

BP	BN

Bypass Input

N40	A40	B40	C40

AC Output

N50	A50	B50	C50

Fig. 3.2-g-2 Diagram of Power Wire & Control Wire Inter-Connect (300kVA UPS)

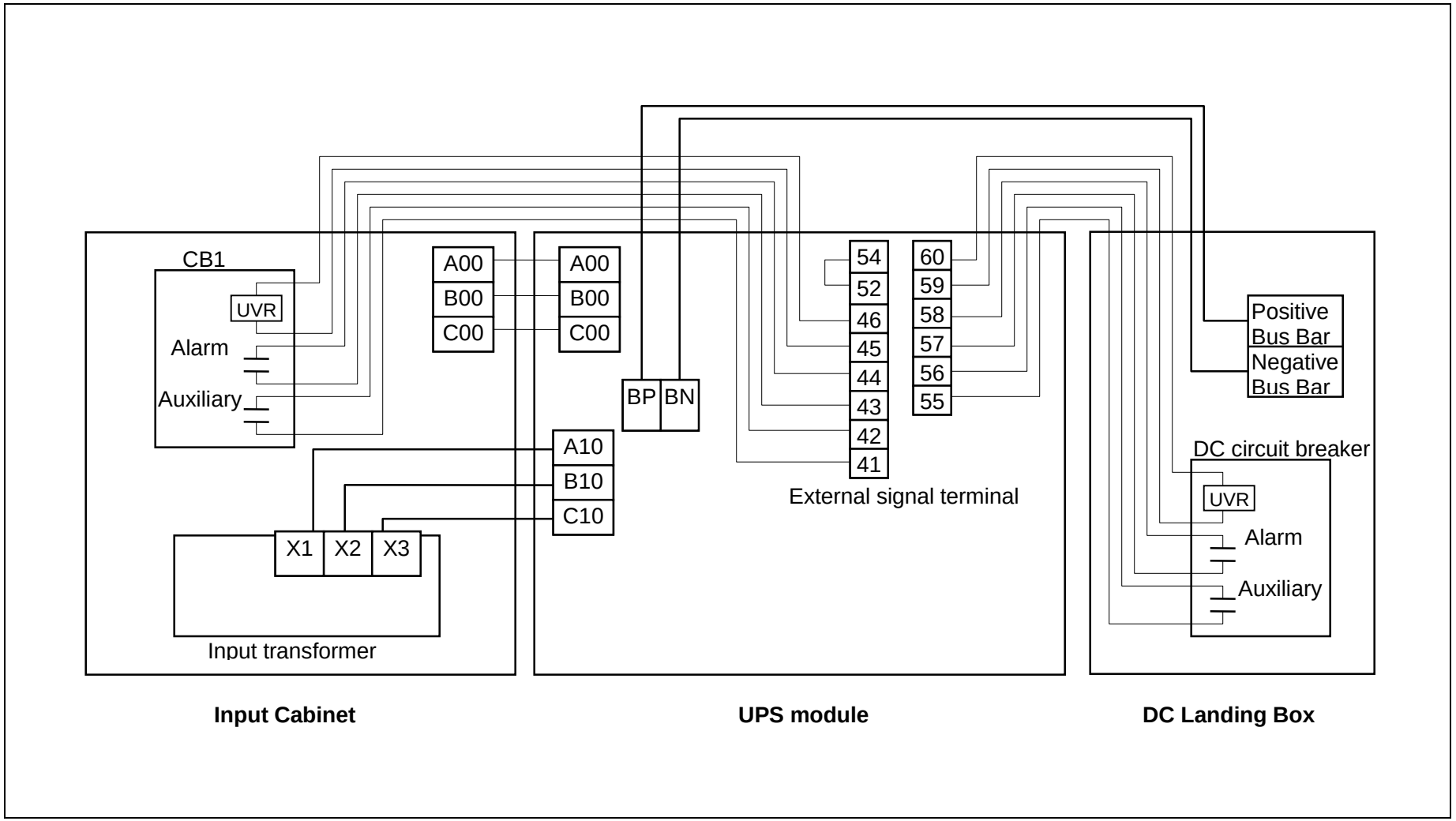
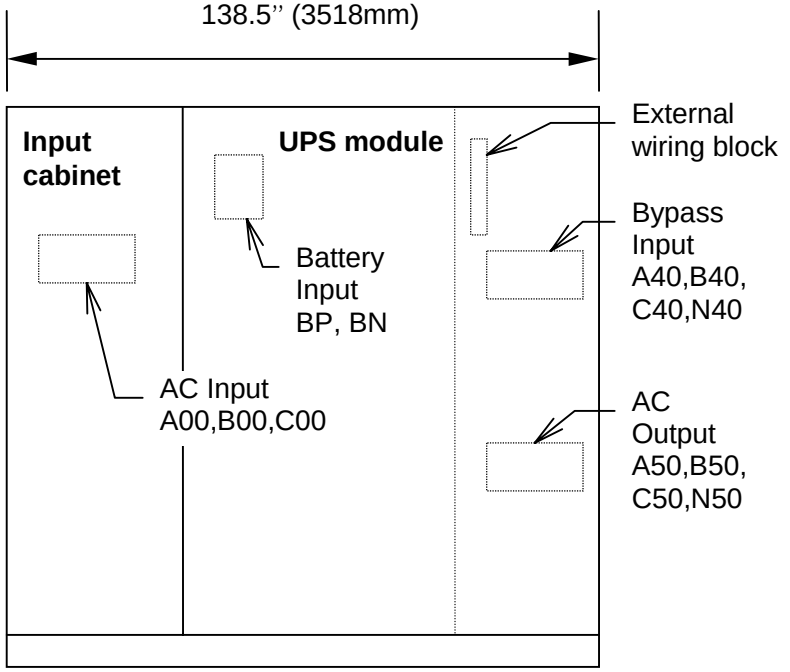


Fig. 3.2-h-1 Diagram of input/output bus bars and terminal blocks (375kVA UPS)

Location of bus bars and terminal blocks	Detailed Terminals

H=79.7”(2025mm)

D=38.4”(974mm)



Power Terminals use 5/8” (15mm) Diameter bolts.

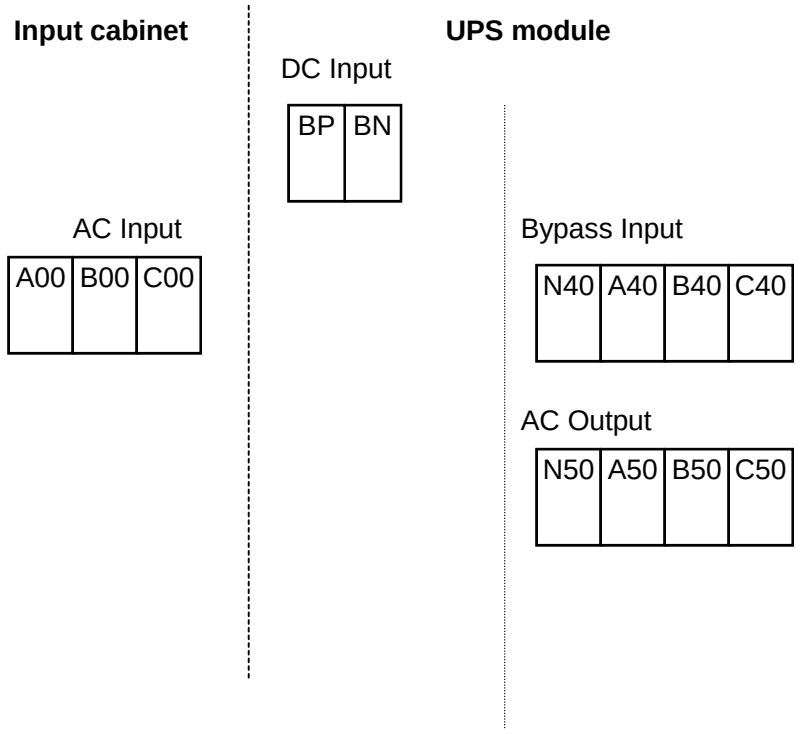
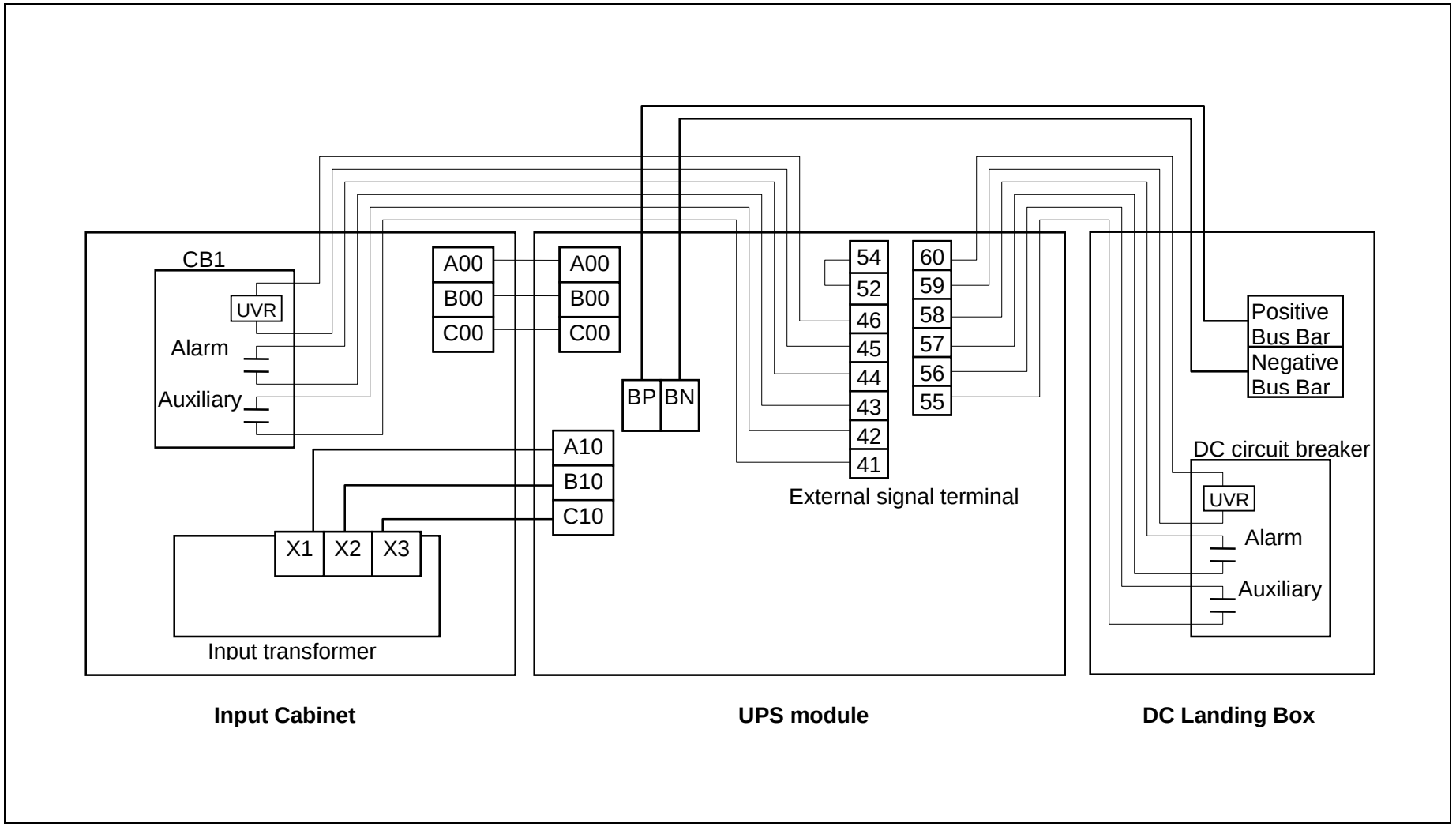


Fig. 3.2-h-2 Diagram of Power Wire & Control Wire Inter-Connect (375kVA UPS)



3.4 Operating Procedures

A) UPS Start-up Procedure

1. Verify that the External Bypass input Circuit Breaker(user supplied. Refer to warning 2) is closed.
2. Close Control Circuit Breaker (CB101).
3. After a few seconds, an audible annunciator will sound and the AC Input Circuit Contactor (CB1) will automatically close.
4. The audible annunciator will sound and the instruction “RESET CB2” will be displayed on the Liquid Crystal Display (LCD) panel.
5. Reset the Battery Disconnect Circuit Breaker (CB2). To reset CB2, press the handle down until the handle stays in the off position.
6. Close the Battery Disconnect Circuit Breaker (CB2).
7. The audible annunciator will sound and the instruction "PRESS START / STOP KEY" will be displayed on the LCD panel. (Figure 3.3)
8. Press the "Inverter Start" key in the START/STOP menu on the LCD panel. (Figure 3.4)

FIGURE 3.3 START-UP MENU

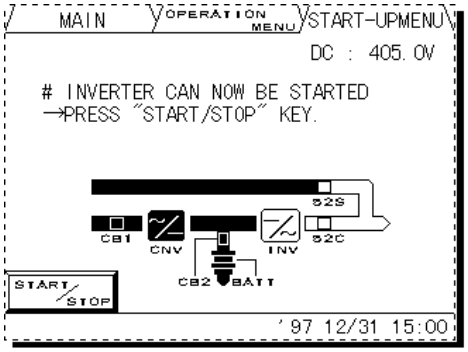
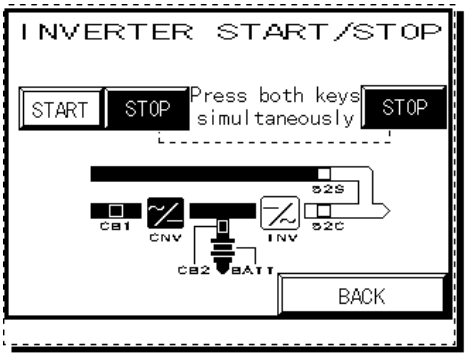


FIGURE 3.4 INVERTER START/STOP



9. When the message "LOCAL" is displayed on the LCD panel, the inverter start operation can only be performed locally at the UPS front panel. When the message "REMOTE" is displayed on the LCD pane, the inverter start operation can be started by remote operation only. Lock-out of one inverter start mode is inherent and cannot be.
10. If a local inverter start operation is required (at the UPS), select "Local" in "Remote/Local" function via the Operation menu. Select “LOCAL” mode.
11. Within five (5) seconds, the Inverter will start-up and begin supplying power to the critical load.
12. If power is not supplied to the load, follow the instructions on the LCD panel.

B) UPS Shutdown Procedure

1. If a total UPS shutdown is required, verify that the critical load is OFF.
2. Select "STOP MENU" from the Operations menu.
3. Press the "INVERTER STOP" key in the START/STOP menu on the LCD panel. The UPS will transfer the load to the static bypass line.
4. When the "LOCAL" is displayed on the LCD panel, the operation can be performed at the UPS front panel. When the "REMOTE is displayed on the LCD pane, the Inverter can be stopped by remote operation only. If the inverter stop operation is required locally (at the UPS), select to "LOCAL" from the "Remote/Local" selection in the Operations menu. Select “Local” mode.
5. Generally, the Inverter alone will be stopped and the Converter will remain energized to float-charge the batteries.
6. If stopping the Converter is required, The operation instruction “TURN OFF CB2” will be displayed on the LCD panel.
7. Open the Battery Disconnect circuit breaker (CB2) manually. The operation instruction “TURN OFF CB101” will be displayed on the LCD panel.

WARNING : ***Verify the load is OFF if the next step is to be performed.***

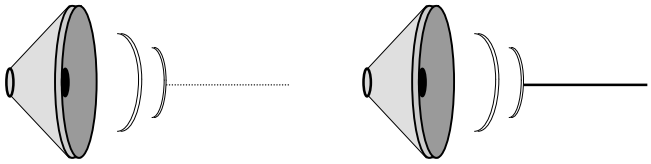
8. Open the control circuit breaker (CB101).
9. Open the AC Input circuit contactor (CB1) automatically.

NOTE : ***Power to the critical load is supplied through the static bypass line. Power to the critical will be lost after execution of the next step. The load will drop.***

10. If turning off all power to critical load is desired, open the Bypass input Circuit Breaker(MCCB inside the user’s cabinet) manually.
11. Contactor CB3 will open automatically.

CAUTION : ***All UPS power terminals are still live. Lethal voltages present. De-energize all external sources of AC and DC voltages before handling UPS.***

4.0 RESPONSE TO UPS FAILURE



UPS FAULT

Annunciator Silence

Depress Silence Alarm Key on MAIN menu.

Recording of Fault

Refer to the list of fault codes for the description of the error.

Primary Action

Take necessary action per the guidance on the display.

Information to Service Center

When faults occur continuously contact the Authorized Mitsubishi Service Representative or call Mitsubishi at **1-800-887-7830**.

Note

The error code indicated on the LCD display panel at the time of UPS alarm condition is very important. In order to reduce repair time, please include this information, along with the operation status and load status, on all correspondence with Mitsubishi's field service group.

5.0 PARTS REPLACEMENT

Contact Mitsubishi or its Authorized Service Center 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. Battery end of 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 capacity is within this percentage.

B) UPS Component Parts

Contact Mitsubishi or its Authorized Service Center for a complete parts replacement schedule. Recommended replacement time interval varies with operating environment. Contact Mitsubishi or its Authorized Service Center for application specific recommendations.

6.0 FAULT CODES

This section covers the 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 on the LCD display panel.

Contact Mitsubishi Electric Automation, Inc. at 1-800-887-7830.

B) If a circuit breaker (MCCB) is in the trip state, depress the toggle to reset the breaker before closing it again.

Fault Code List

Note 11. Code indication	Status massage	Contents	Note 1 Guidance	Note 2 Buzzer	Note 3 External send-out contact	Note 4 Failure lamp	Code No.
UF003	CONVERTER ABNORMAL	Preliminary charge impossible	1	[2]	Major	Lit up	64
UF007	SENSOR ABNORMAL	Converter input current sensor circuit abnormality	1	[2]	Major	Lit up	1
UF052	CB1 TRIPPED	Input circuit breaker CB1 has tripped	1	[1]	Minor	Flicker	97
UF053	CB1 ABNORMAL	Input circuit breaker CB1 abnormal	1	[1]	Minor	Flicker	96
UF056	CONVERTER OVERLOAD	Converter input overcurrent	1	[1]	Minor	Flicker	192
UF057	CONVERTER OVERTEMPERATURE	Overheating of converter circuit parts	1	[1]	Minor	Flicker	194
UF058	COOLING FAN ABNORMAL	Abnormality of cooling fan (converter circuit)	1	[1]	Minor	Flicker	193
UF059	CONVERTER ABNORMAL	Converter control circuit abnormality	1	[1]	Minor	Flicker	198
UF102	DC OVERVOLTAGE	Overvoltage of DC voltage	1	[2]	Major	Lit up	5
UF103	DC UNDERVOLTAGE	Low voltage of DC voltage	1	[2]	Major	Lit up	6
UF105	SENSOR ABNORMAL	DC voltage sensor circuit abnormality	1	[2]	Major	Lit up	2
UF106	DC CAPACITANCE ABNORMAL	Electrolytic capacitor abnormality	1	[2]	Major	Lit up	77
UF107	CB2 ABNORMAL	Battery disconnect circuit breaker CB2 abnormal	1	[2]	Major	Lit up	66
UF151	DC VOLTAGE ABNORMAL	Does not return to float voltage after power supply is resumed (24 hours)	2	[1]	Minor	Flicker	116
UF152	DC VOLTAGE ABNORMAL	Does not return to equalizing voltage after power supply is resumed	2	[1]	Minor	Flicker	117
UF153	CB2 TRIPPED	Battery disconnect circuit breaker CB2 has tripped.	1	[1]	Minor	Flicker	100
UF156	CB2 TRIPPED (BATTERY OVERTEMPERATURE)	Battery temperature abnormality (UF157) lasted a long time (Note 6)	1	[1]	Minor Note 5	Flicker	107
UF157	BATTERY OVERTEMPERATURE	Battery temperature abnormality	2	[1]	Minor Note 5	Flicker	106
UF158 (Note10)	BATTERY LIQUID LEVEL LOW	Battery solution level drop (Note 7)	2	[1]	Minor Note 5	Flicker	105
UF159	DC GROUND FAULT	Grounding of DC circuit	1	[1]	Minor	Flicker	112
UF160	SENSOR ABNORMAL	Sensor abnormality of battery circuit	1	[1]	Minor	Flicker	114
UF161	CB2 TRIPPED (DC VOLTAGE ABNORMAL)	Does not return to float voltage after power supply is resumed (48 hours) (Note 6)	2	[1]	Minor	Flicker	196
UF162	BATTERY ABNORMAL	Battery abnormal detected by battery self test.					
UF201	INVERTER OVERVOLTAGE	Output overvoltage during inverter power supply (+ 15%)	1	[2]	Major	Lit up	12
UF202	INVERTER UNDERVOLTAGE	Output low voltage during inverter supply (- 15%)	1	[2]	Major	Lit up	13
UF203	INVERTER OVERCURRENT	Inverter output overcurrent	1	[2]	Major	Lit up	26
UF209	52C ABNORMAL	52C not turned ON	1	[2]	Major	Lit up	75
UF210	52C ABNORMAL	52C not turned OFF	1	[2]	Major	Lit up	76
UF212	FAN ABNORMAL	Fan power source abnormality during operation	1	[2]	Major	Lit up	65
UF213	INVERTER OR CONVERTER OVERTEMPERATURE	Overheating of main circuit parts	1	[2]	Major	Lit up	69
UF214	COOLING FAN ABNORMAL	Abnormality of cooling fan inside panel	1	[2]	Major	Lit up	67
UF215	FREQUENT OVERLOAD!	Load switching was made frequently during overload	4	[2]	Major Note5	Lit up	86
UF216	SENSOR ABNORMAL	Inverter output current sensor abnormality	1	[2]	Major	Lit up	11

UF254	88C ABNORMAL	Fan power source abnormality during operation	1	[1]	Minor	Flicker	197
UF255	52C ABNORMAL	52C turned OFF during inverter power supply	1	[1]	Minor	Flicker	128
UF256	OUTPUT VOLTAGE ABNORMAL	Inverter output voltage fell out of +/- 5%	1	[1]	Minor	Flicker	109
UF257	52C ABNORMAL	52C not turned OFF when manual transfer	1	[1]	Minor	Flicker	98
UF301	UPS CONTROL CIRCUIT ERROR	Control microcomputer abnormality	1	[2]	Major	Lit up	19
UF302	UPS CONTROL CIRCUIT ERROR	Control microcomputer abnormality	1	[2]	Major	Lit up	28
UF303	UPS CONTROL CIRCUIT ERROR	Control microcomputer abnormality	1	[2]	Major	Lit up	29
UF304	UPS CONTROL CIRCUIT ERROR	Control microcomputer abnormality	1	[2]	Major	Lit up	31
UF305	UPS CONTROL CIRCUIT ERROR	Control circuit abnormality	1	[2]	Major	Lit up	21
UF306	UPS CONTROL CIRCUIT ERROR	Control power source circuit abnormality	1	[2]	Major	Lit up	16
UF309	INVERTER VOLTAGE ABNORMAL	Inverter output voltage abnormality before inverter power supply	1	[2]	Major	Lit up	83
UF351	CONTROL FUSE BLOWN	Battery circuit's fuse burnt	1	[1]	Minor	Flicker	115
UF352	SUPPLY OF CONTROL CIRCUIT ABNORMAL	Control circuit abnormality	1	[1]	Minor	Flicker	111
UF355 (Note10)	UPS CONTROL CIRCUIT ERROR	Control circuit abnormality	1	[1]	Minor	Flicker	130
UF356	UPS CONTROL CIRCUIT ERROR	Control circuit abnormality	1	[1]	Minor	Flicker	123
UF357	"INVERTER START " BUTTON ABNORMAL	"INVERTER START" button is abnormal (Local)	1	[1]	Minor	Flicker	124
UF358	"INVERTER STOP " BUTTON ABNORMAL	"INVERTER STOP" button is abnormal (Local)	1	[1]	Minor	Flicker	125
UF359	"INVERTER SUPPLY" BUTTON ABNORMAL	"INVERTER SUPPLY" button is abnormal	1	[1]	Minor	Flicker	126
UF360	"BYPASS SUPPLY" BUTTON ABNORMAL	"BYPASS SUPPLY" button is abnormal	1	[1]	Minor	Flicker	127
UF362	UPS CONTROL CIRCUIT ERROR	52S control circuit abnormality (Note 8)	1	[1]	Minor	Flicker	195
UF401	52S ABNORMAL	52S not turned ON, or 52S turned ON without any command	1	[2]	Major	Lit up	84
UF402	52S ABNORMAL	52S not turned OFF, or 52S turned OFF without any command	1	[2]	Major	Lit up	85
UF451	52S ABNORMAL	52S not turned ON, or 52S turned ON without any command when manual transfer	1	[1]	Minor	Flicker	99
UA801	AC INPUT VOLTAGE OUT OF RANGE	AC input voltage fell out of +/- 18% range	3	[1]	Note 5		239
UA802	AC INPUT FREQUENCY OUT OF RANGE	Ac input frequency fell out of converter synchronization follow-up range	3	[1]	Note 5		161
UA803	AC INPUT PHASE ROTATION ERROR	Phase rotation is inverted when input voltage is normal	3	[1]	Note 5		236
UA804 (Note10)	BATTERY ABNORMAL	Battery abnormal (External input)	1	[1]	Note 5		238
UA805 (Note10)	AMBIENT TEMPERATURE ABNORMAL	Temp. abnormality in room where installed	11	[1]			237
UA806	INVERTER OVERLOAD > 100%	Overload exceeded 105% (Note 9)	4	[1]	Over	Flicker	216
UA807	INVERTER OVERLOAD > 110%	Overload exceeded 110% (Note 9)	4	[1]	Over	Flicker	217
UA808	INVERTER OVERLOAD > 125%	Overload exceeded 125% (Note 9)	4	[1]	Over	Flicker	218
UA809	INVERTER OVERLOAD > 150%	Overload exceeded 150% (Note 9)	4	[1]	Over	Flicker	219
UA810	OVERLOAD	Momentary over-current during Inverter power.	4	[1]	Over	Flicker	220
UA811	BYPASS VOLTAGE OUT OF RANGE	Bypass voltage fell out of +/- 15% range at manual transfer	5	[1]	Note 5		240

UA812	BYPASS VOLTAGE OUT OF RANGE	Bypass voltage fell out of +/- 20% range	5	[1]	Note 5		231
UA813	BYPASS PHASE ROTATION ERROR	Phase rotation is inverted when bypass voltage is normal	5	[1]			242
UA814	BYPASS FREQUENCY OUT OF RANGE	Bypass frequency fell out of inverter synchronization follow-up range	5	[1]	Minor Note 5		243
UA816	EXTENDED BYPASS OPERATION	Bypass power supply continued for many hours		[1]			244
UA817	EMERGENCY STOP ACTIVATED	Emergency stop applied	13	[2]	Minor	Flicker	232
UA819	REMOTE SWITCH ON(START)	There is an error with the remote start switch.	12	[1]			229
UA820	REMOTE SWITCH ON(STOP)	There is an error with the remote stop switch.	12	[1]			230
UA821	UPS STOPPED (TRANSFER INHIBITED - INVERTER AND BYPASS ASYNCHRONOUS)	Transfer cannot be permitted because Bypass voltage abnormal	5	[1]			249
UA822	GENERATOR OPERATION , INHIBITED BYPASS OPERATION	Transfer cannot be permitted because Generator operation contact is ON		[1]			246
UA823	CB1 OFF	AC input circuit breaker CB1 turned OFF	6	[1]			224
UA824	CB2 OFF	Battery disconnect circuit breaker CB2 turned OFF	7	[1]			225
UA826	CB101 OFF	Control power source breaker CB101 turned OFF during inverter operation	8	[1]			226
UA827	52C NOT PERMITTED	"52C PERMISSION" switch turned to OFF	9	[1]			233
UA830	AC INPUT UNDERVOLTAGE	AC input voltage fell out of - 10% range	3	[1]			234
UA831	EMERGENCY BYPASS SWITCH ON	Emergency bypass switch turned to <Emergency>	10	[1]			245
UA832	INTERRUPTED TRANSFER OCCURRED WHEN TRANSFERRING TO BYPASS SOURCE	When transfer to the bypass supply, occurs interrupted transfer.	5	[1]			248
UA834	BATTERY DEPLETED	DC voltage dropped below discharge end during inverter operation	10	[2]	Note 5		255
UA835	UPS STOPPED (TRANSFER INHIBITED - BYPASS INPUT ABNORMAL)	Transfer cannot be permitted because Bypass voltage is abnormal		[1]			250

(Note 1) Numbered guidance:

1: Contact Mitsubishi. 1-800-887-7830
2: Verify battery is operating within recommended voltage and temperature ranges.
3: Verify input power source is properly connected.
4: Reduce load.
5: Verify bypass power source is within amplitude and frequency.
6: Close CB1.
7: Close CB2.
8: Close CB101.
9: Reduce load, and restart.
10: Press the reset button.
11: Reduce room temperature to within specified UPS operating limits
12: Verify remote switch is properly connected and/or functional.
13: Place switch in OFF position.

(Note 2)

Audible annunciator: [1] intermittent sound, [2] continuous sound.

(Note 3)

- "Major" is defined as major failure. Inverter transferred to the static bypass line;
- "Minor" is defined as a minor failure. UPS continues to operate normally, but cause of alarm must be identified;
- “Over" is defined as an overload condition. UPS will transfer to the static bypass line and may or may not return to the inverter. Return to inverter will occur only if overload corrects itself and output load is within rating of UPS.

(Note 4)

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

(Note 5)

External send-out possible by option setting.

(Note 6)

Trips the battery breaker CB2.

(Note 7)

For other than sealed-type battery.

(Note 8)

Place UPS Emergency Bypass switch in the BYPASS position. Contact Mitsubishi.

(Note 9)

If the specified time passes, will transfer to the bypass power supply.

(Note 10)

Shows only when corresponding option settings are made.

(Note 11)

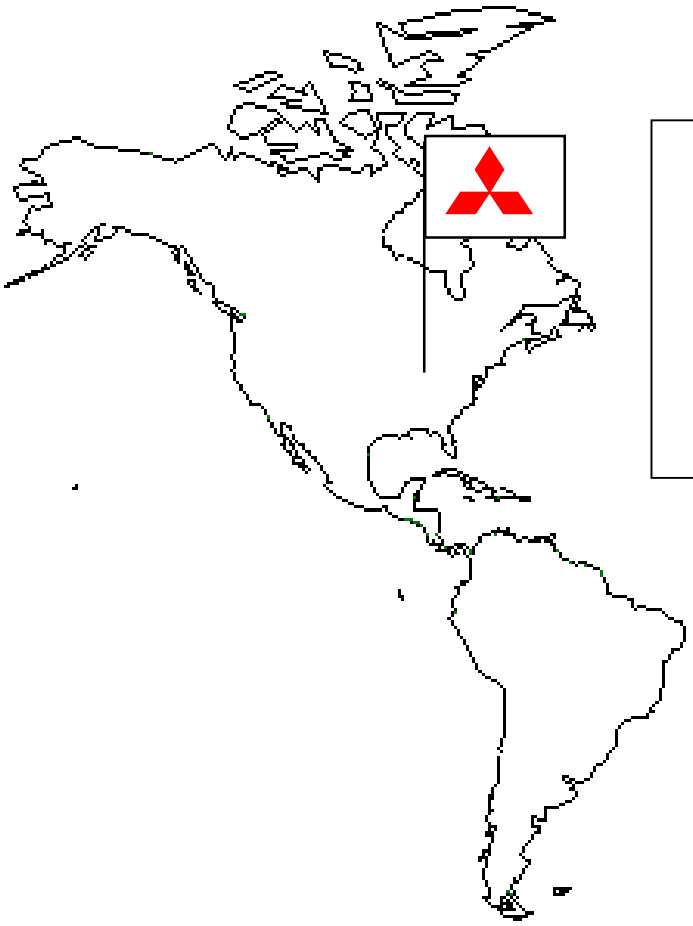
Code indication means:

UA□□□ ---------- Alarm
UF□□□ ---------- Failure
U□0□□---------- Converter 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

7.0 Warranty & Out of warranty Service

The Mitsubishi Electric UPS Systems Group Service Department has many Authorized Service Centers place strategically throughout the US, Canada and Latin America. For both in warranty and out of warranty service, please contact Mitsubishi Electric Automation, Inc. at (847) 478-2500. To register your UPS for warranty purposes, please complete the warranty registration form and fax it to the Mitsubishi Electric UPS Systems Group, Service Department fax line shown on the registration form. (Next page)

For warranty purposes, it is essential that any and all service work that may be required on your Mitsubishi brand UPS equipment is performed by a Mitsubishi Electric Authorized Service Center. The use of non-authorized service providers may void your warranty.



Mitsubishi Electric Automation Inc,
UPS Systems Group Service Department

500 Corporate Woods Parkway,
Vernon Hills, Illinois 60061, USA
Phone: (847) 478-2500
Fax: (847) 478-2290

MITSUBISHI ELECTRIC

Mitsubishi Electric Automation, Inc.
UNINTERRUPTIBLE POWER SUPPLIES
500 Corporate Woods Parkway, Vernon Hills, IL 60061 Phone: (847) 478-2643, Fax: (847) 478-2290

UPS Warranty Registration

__ **Register UPS for Warranty** __ **Address Change**

To validate the Warranty on your UPS this form must be filled out completely by Customer and returned.

CUSTOMER INFORMATION		
Your Name:	**Job Title:**	
Company Name:		
Division / Department:		
Address:		
City:	**State:**	**Zip Code:**
Country:	**Province:**	
Business Phone:	**Ext:**	**Fax:**
E-Mail: @	**Internet Address:**	
UPS Model #:	**Capacity (kVA):**	**UPS Serial #:**
Start-Up Date: / /	**Authorized Mitsubishi Service Company (if known):**	
Signature:	**Date:** / /	

Which *ONE* of These Best Describes Your Organization's Primary Business Classification?

{Energy Producer}
__ Utility
__ Alternate Energy

{Manufacturing Co.}
__ OEM
__ Process
__ Consumer Goods
__ Electronics
__ Power Quality Equipment

__ **Commercial Business**
__ **Electrical Contractor**
__ **Healthcare**
__ **Internet**

__ **Education/Univ. Service**

{Service}
__ Consulting
__ Engineering
__ Outsourcing
__ Financial/Legal/Insurance

{Expectations}

{Government}
__ Military
__ Municipals
__ Federal/State/Local

__ **Communications**
__ **Distributors/Reps**
__ **Other** _____

Number of Employees at This Location is:

__ 1 – 19 __ 100 - 249 __1000 or more
__ 20 – 49 __ 250 - 499
__ 50 – 99 __ 500 - 999

Overall how was Start-Up performed:

__Unsatisfactory __ Satisfactory __ Exceeded

Would you like to receive future product updates and news?

__Yes __ No

After Start-Up has been done Fax completed Form to:

(847) 478-2290