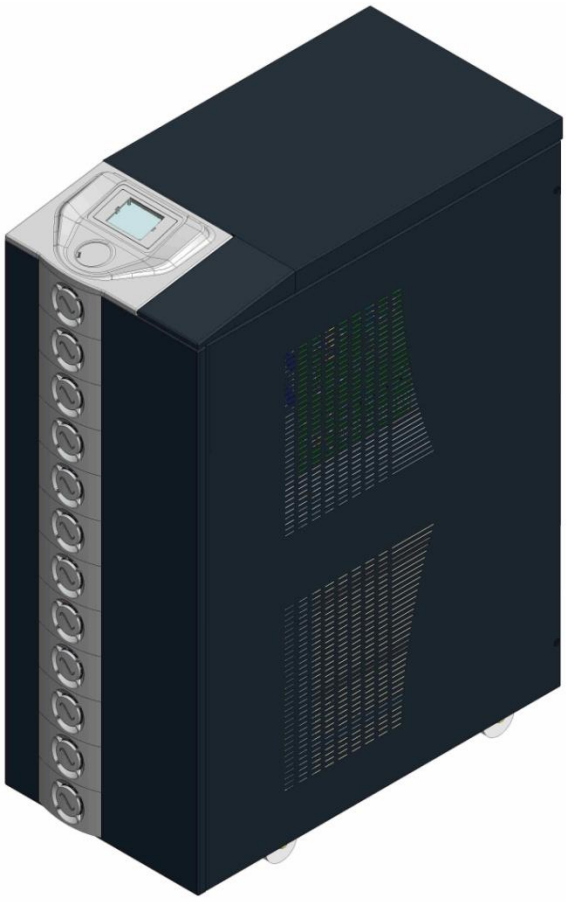
PYRAMID DSP PREMIUM SERIES

THREE PHASE IN – THREE PHASE OUT
10-100kVA

INSTALLATION and OPERATING MANUAL



UNINTERRUPTIBLE POWER SYSTEMS

288717199 INF511-Y01-U694-01-00

Important Notices!

Thank you for choosing Inform UPS Systems.

This manual contains important information about technical properties, installation, comissioning of the UPS and contains safety information for users and loads. Learning and applying of the subjects in this manual is necessary to use UPS safely and correctly.

Read the manual completely before working on this equipment!

Keep this manual near UPS for easy consultation!

The manufacturer reserves the rights to change the technical specifications and design without notice.

INFORM reserves the rights to change the information in this document without notice.
Refer to http://www.informups.com/ web site to dowload last release and translations.

Units that are labeled with a CE mark comply with the Standard: EN 62040-1 and EN 62040-2.

CE

Description of the Symbols Used in the Manual

This symbol points out the instructions which are especially important.

This symbol points out the risk of electric shock if the following instruction is not obeyed.

This symbol points out the instructions, which may be resulted with the injury of the operator or damage of the equipment if not obeyed.

All packing material must be recycled in compliance with the laws in force in the country where the system is installed.

Description of the Abbreviations Used in the Guide

UPS: Uninterruptible Power Systems
ESD: Emergency Switching Device
RS232: Serial Communication Protocol
SNMP: Simple Network Management Protocol
V: Voltage
A: Ampere
P: Power

For Input, Output and Manual/Maintenance Bypass Circuit Breaker;
“I” (ON): Closing the Circuit
“0” (OFF): Opening the Circuit

For Battery Circuit Breaker;
Active (ON/I): Closing the Fast Fuse Holder
Passive (OFF/0): Opening the Fast Fuse Holder

Manufacturer

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1. WARRANTY

1.1. Terms of Warranty

- Warranty period begins from the date of commissioning of the UPS by Inform or authorized Inform distributor technical personnel.
- The UPS including all the internal parts is under the warranty of Inform.
- If the UPS is malfunctioned because of component, manufacturing, or installation (if it's done by authorized personnel) problems during the warranty period, the UPS will be repaired without asking any price for spare parts and labor cost.

Replacements, repairs or modifications of the parts during the warranty period can not extend the duration of the warranty

1.2. Out of Warranty Terms and Conditions

This Warranty does not cover any defects or damages caused by;

- If the UPS is not used or installed according to the terms in the manual, then the UPS is out of warranty,
- Neglect, accident, misuse, misapplication or incorrect installation,
- Failure due to fortuitous circumstances or force majeure,
- After delivery of the UPS to the customer, unloading and transportation damage and failures,
- Damage or injuries caused by negligence, lack of inspection or maintenance, or improper use of the products,
- Faulty electrical wiring,
- Defects arising either from designs or parts imposed or supplied by the purchaser,
- Defects and damage by fire and lightning,
- Failures due to modification in the products without Inform approval,
- Improper testing, operation, maintenance, repair, alteration, adjustment, or modification of any kind by unauthorized personnel,

The Manufacturer will repair the device above cases for a fee and is not responsible for the shipment of the equipment.

This Warranty is not valid if the Product's Serial Number have been removed or is illegible.

2. SAFETY

2.1. Important Notice for UPS

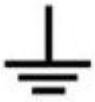
Information related to safety of the UPS, battery, load and the user is summarized below. But the equipment should not be installed before reading the manual completely.

- The equipment may only be installed and commissioned by authorized technical personnels.
- This manual contains important instructions that you should follow during installation and maintenance of the UPS and batteries. Please read all instructions before operating the equipment and save this manual for future reference.
- Not obeying the instructions written on this manual which may be resulted with the injury of the operator or damage of the equipment.
- Even with no connections have been done, hazardous voltages and/or high temeperature may exist on connection terminals and inside the UPS. Before beginning with the any installation or maintenance, isolate the input and output of UPS and wait for 5 minutes for DC capacitor discharge. If UPS has internal battery; remove the cover of UPS and disconnect the battery cables.
- The equipment shall be packed properly during transportation and proper equipment should be used for transportation.
- The UPS must always stands in a vertical position. Make sure that the floor can support the weight of the system.
- Connect the PE ground connector before connecting any other cable.
- UPS is designed for indoor use. To reduce the risk of fire or electric shock, install this UPS in a temperature and humidity controlled indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°F). Do not operate near water or excessive humidity (95% maximum).
- Equipment and batteries whose packages are damaged during transportation shall be inspected by qualified technical personnel before starting with the installation.
- UPS requires 3Ph-N+PE input connection.
- It should be checked between all the terminals included PE to be sure that no hazardous voltages exist.
- Do not connect the output neutral to the protective ground or protective bounding.
- The connections shall be made with cables of appropriate cross-section in order to prevent the risk of fire. All cables shall be of insulated type and shall not be laid out on the walking path of the persons.
- This is a product for commercial and industrial application in the second environment – installation restrictions or additional measures may be needed to prevent disturbances.
- Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.
- Make sure that the UPS is not overloaded to provide a higher quality supply to the loads.
- In case of an extraordinary situation (damaged body or cabinet or connections, penetration of foreign materials into the body or cabinet etc.) deenergize the UPS immediately and consult to the Technical Service.

2.2. Important Notice for Battery

- **The batteries may only be installed and commissioned by authorized technical personnels.**
- Make sure that the battery qty is proper for the unit and they are same type and capacity. Otherwise danger of explosion and fire is within the bounds of possibility.
- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- In case of electrolyte in contact with skin, immediately wash the contamimated skin with water.
- Replaced batteries must be disposed of at authorized battery waste disposal centers.
- **A battery can present risk of electric shock and high short circuit currents.**
  The following precautions should be observed when working on batteries;
    - ❖ Remove rings, watches, neckleaces, bracelets and all metal objects.
    - ❖ Only use tools with insulated handles.
    - ❖ Wear rubbers gloves and a rubber apron when handling batteries.
    - ❖ Do not lay tools or metal parts on top of batteries.
    - ❖ Eye protection should be worn to prevent injury from accidental electrical arcs.
- **Before a maintenance or repair work on the UPS;**
    - ❖ Switch the input, output and battery circuit breakers (F1, F2 and F5) to “0” position.
    - ❖ If UPS has internal batteries; Remove **+** battery (red), **-** battery (black) and **N** battery neutral (blue) cables.
    - ❖ If UPS has external batteries; switch the circuit breakers of the battery cabinet to “0” position.
    - ❖ Determine if the battery is inadvertently grounded. If inadvertently grounded; remove source of ground. Contact with any part of a grounded battery can result in electrical shock.
- Battery fuses shall only be replaced with the same rating and type which came along with the UPS.

2.3. Description of the Symbols Used on the Labels Applied to the UPS

	PE: PROTECTIVE EARTH
	PB: PROTECTIVE BOUNDING
	DANGER! HIGH VOLTAGE (BLACK/YELLOW)
	This symbol points out the instructions, which may be resulted with the injury of the operator or damage of the equipment if not obeyed.

3. REQUIREMENT

3.1. Transportation

The UPS must be placed and stand in a vertical position throughout the transportation.

Use suitable equipment to remove the UPS from the pallet.

The equipment shall be packed properly during transportation. Therefore it is recommended to keep the original package for feature need.

All packing material must be recycled in compliance with the laws in force in the country where the system is installed.

3.2. Placement

This product meets the safety requirements for devices to be operated in restricted access locations according to EN 62040-1 safety standard, which states that the owner should guarantee the following:

- Access to the equipment can only be gained by service persons or by users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken and,
- Access is through the use of a tool or lock and key, or other means of security and is controlled by the authority responsible for the location.
- UPS is not designed for outdoor application.
- The equipment and the batteries should not be exposed to direct sunlight or placed near to a heat source.
- Recommended operating temperature and humidity values are listed on the Appendix-1 Technical Specifications section. To provide the required enviromental condition.
- Avoid dusty environments or areas where dust of conductive or corrosive materials is present.
- The connection and the circuit breakers are at the front of UPS. Leave at least 75 cm at the front of the UPS for installation.
- For 10-40kVA: Air outlets of the UPS are on front and back sides. Air flow from front to back, so leave at least 50cm at the back for ventilation.
- For 60-100kVA: Air outlets of the UPS are at the top and bottom sides. Air flow from bottom to top, so leave at least 50cm at the top for ventilation.
- For 10-80kVA: The boards at right and left sides. Leave at least 50cm from sides for maintenance.
- For 100kVA: The boards at front side of the UPS. Leave at least 75cm at the front for maintenance.

- Even though the operating temperature of the UPS and batteries are between 0-40°C, It is suggested to provide an environment temperature between 20-25°C to get maximum performance from the UPS and batteries.
- Adviced Environmental humidity condition is between 20% 80% (non-condensing).

3.3. Storage

Please store the UPS in an environment where the temperature is between –25 °C +55 °C, no receipt of direct sunlight, far from the heating, in a dry place.
Environmental humidity must be between 0% 95% (none condensing).
Recommended storage temperature, humidity and altitude values are listed on the Appendix-1 Technical Specifications section.
If the batteries will be stored for longer than 6 months, they shall be charged periodically. Charge period depends on the storage temperature. The relationship is as shown below:

- Every 9 months if the temperature is below 20°C,
- Every 6 months if the temperature is between 20°C and 30°C,
- Every 3 months if the temperature is between 30°C and 40°C,
- Every 2 months if the temperature is over 40°C

For long storage duration; please follow up the instructions of installation described in Section 4, start-up UPS described in Section 7 and charge the batteries at least 10 hours.

3.4. Electrical Requisites

The installation must comply with national installation regulations.
The electrical distribution panels for the mains and separated bypass mains inputs must have a protection and disconnection system. Disconnection devices used in these panels shall disconnect all line conductors simultaneously. The following table shows the recommended size of the mains and separate bypass mains input protection devices (thermal, magnetic and differential) and the cable cross-sections.

POWER	INPUT CIRCUIT BREAKER	OUTPUT CIRCUIT BREAKER	BATTERY FAST FUSE	INPUT	BYPASS	BATTERY	NEUTRAL	BYPASS FAST FUSE	LEAKAGE PROTECTION*
10 kVA (3Ph- 3ph)	20 A	20 A	25 A	6 mm^2	6 mm^2	6 mm^2	10 mm^2	-	300 mA
15 kVA (3Ph- 3ph)	32 A	32 A	32 A	6 mm^2	6 mm^2	6 mm^2	10 mm^2	100 A	300 mA
20 kVA (3Ph- 3ph)	32 A	32 A	50 A	10 mm^2	10 mm^2	10 mm^2	11 mm^2	100 A	300 mA
30 kVA (3Ph- 3ph)	63 A	63 A	63 A	16 mm^2	16 mm^2	16 mm^2	12 mm^2	125 A	300 mA
40 kVA (3Ph- 3ph)	80 A	63 A	80 A	16 mm^2	16 mm^2	16 mm^2	13 mm^2	160 A	300 mA
60 kVA (3Ph- 3ph)	125 A	125 A	100 A	25 mm^2	25 mm^2	25 mm^2	14 mm^2	200 A	300 mA
80 kVA (3Ph- 3ph)	125 A	125 A	100 A	35 mm^2	35 mm^2	35 mm^2	15 mm^2	250 A	300 mA
100 kVA (3Ph- 3ph)	175 A	175 A	125 A	35 mm^2	35 mm^2	35 mm^2	16 mm^2	250 A	300 mA

* Minimum 300mA delayed (Type-B). When used, the residual current earth leakage protection system must be common for the two AC inputs (input & split bypass) and installed upstream.
Load leakage currents are added to those generated by the UPS. If loads with high leakage currents are present, adjust this value accordingly. It is recommended to adjust the protective device after measuring the total leakage current with the UPS installed and operational with the intended load.
During transitory phases (power failure, return and voltage fluctuations) short leakage current peaks may occur. Make sure that the protection is not activated in such cases.
Input magnetic protection devices shall have D characteristic.

Protective Earth/Bonding: Recommended cross section for ground wire at least half of the section of cable phases AND shall comply with the standards of the country.

4. UNPACKING AND INSTALLATION OF UPS

Equipment and batteries whose packages are damaged during transportation shall be inspected by qualified Technical Personnel before starting with the installation.

If any equipment has been damaged during shipment, keep the shipping and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

Check if the following are provided with the equipment

- UPS
- User Manual
- Test Report
- Key of the cabin door
- Battery fuses (three pieces)

Before the installation, please check if your UPS is customized following your special requirements (if any).

4.1. Unpacking and Moving

It is recommended to store the original UPS packaging for future needs.

The procedure is as following:

- Remove the bands and the protective packaging from the UPS.
- Use suitable equipment to remove the UPS from the pallet.
- Mount the cabinet parts supplied with the UPS after positioning and connecting the UPS.

4.2. Installation Procedures

The equipment may only be installed and commissioned by authorized Technical Personnel.

When the UPS is brought from a cold place to a warmer place, humidity of the air may condensate in it. In this case, wait for 2 (two) hours before beginning with the installation.

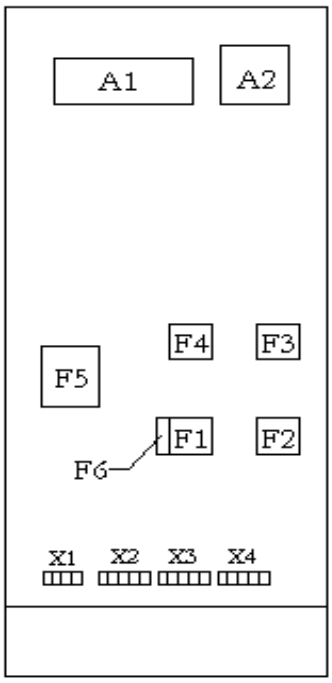
Devices with internal batteries may have dangerous voltages on the battery terminals.

4.2.1. Power Connections

Make sure that all circuit breakers are “OFF” before starting with the installation.

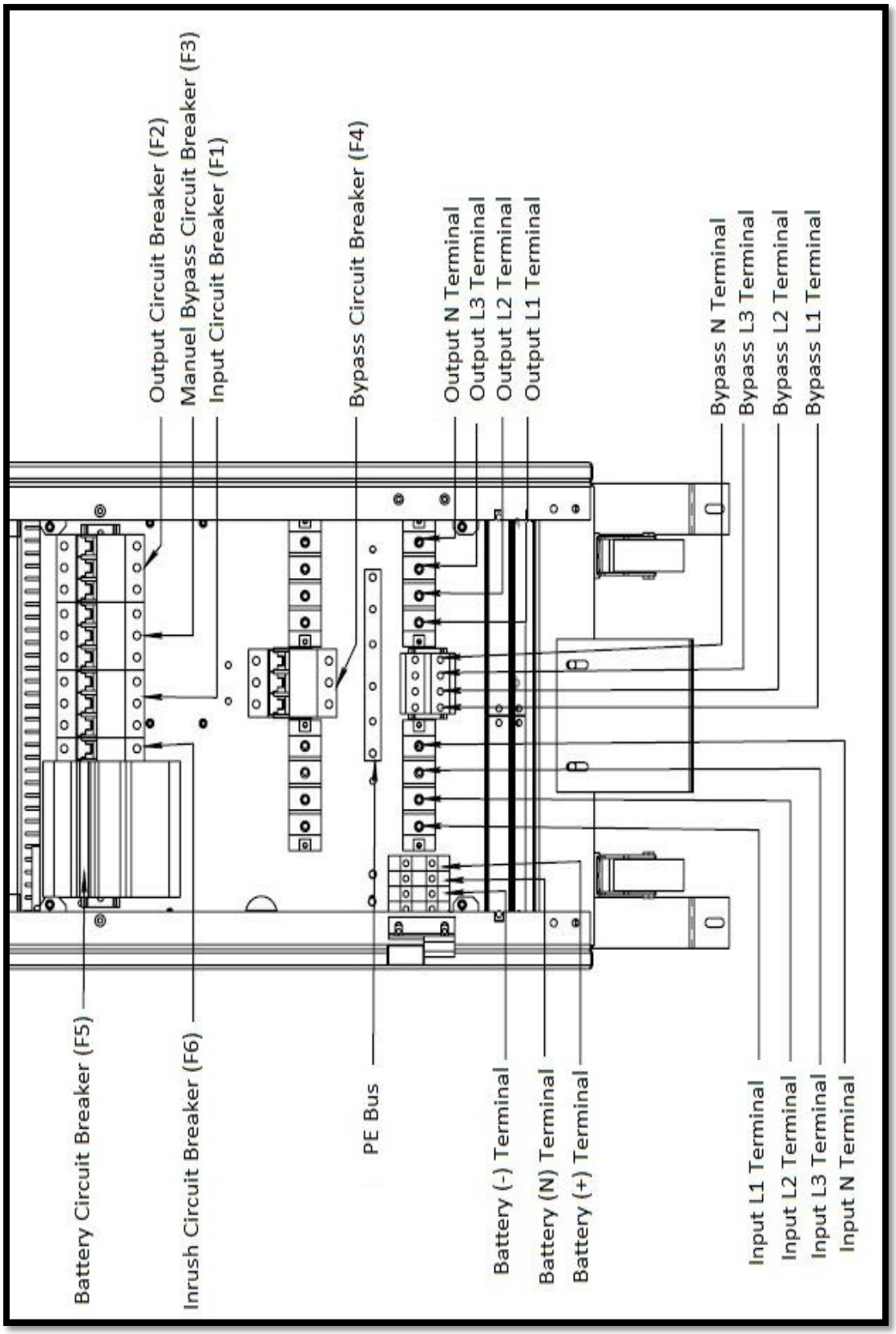
The power screw terminals are located on the lower front side of the UPS. Terminal details are shown separately in the below figures. Refer to the names of each terminal to identify it during connection:
After the terminal front cover is removed, the cables shall be passed through the hole under the connection terminals.

Layout of the connection terminals and boards are shown below:



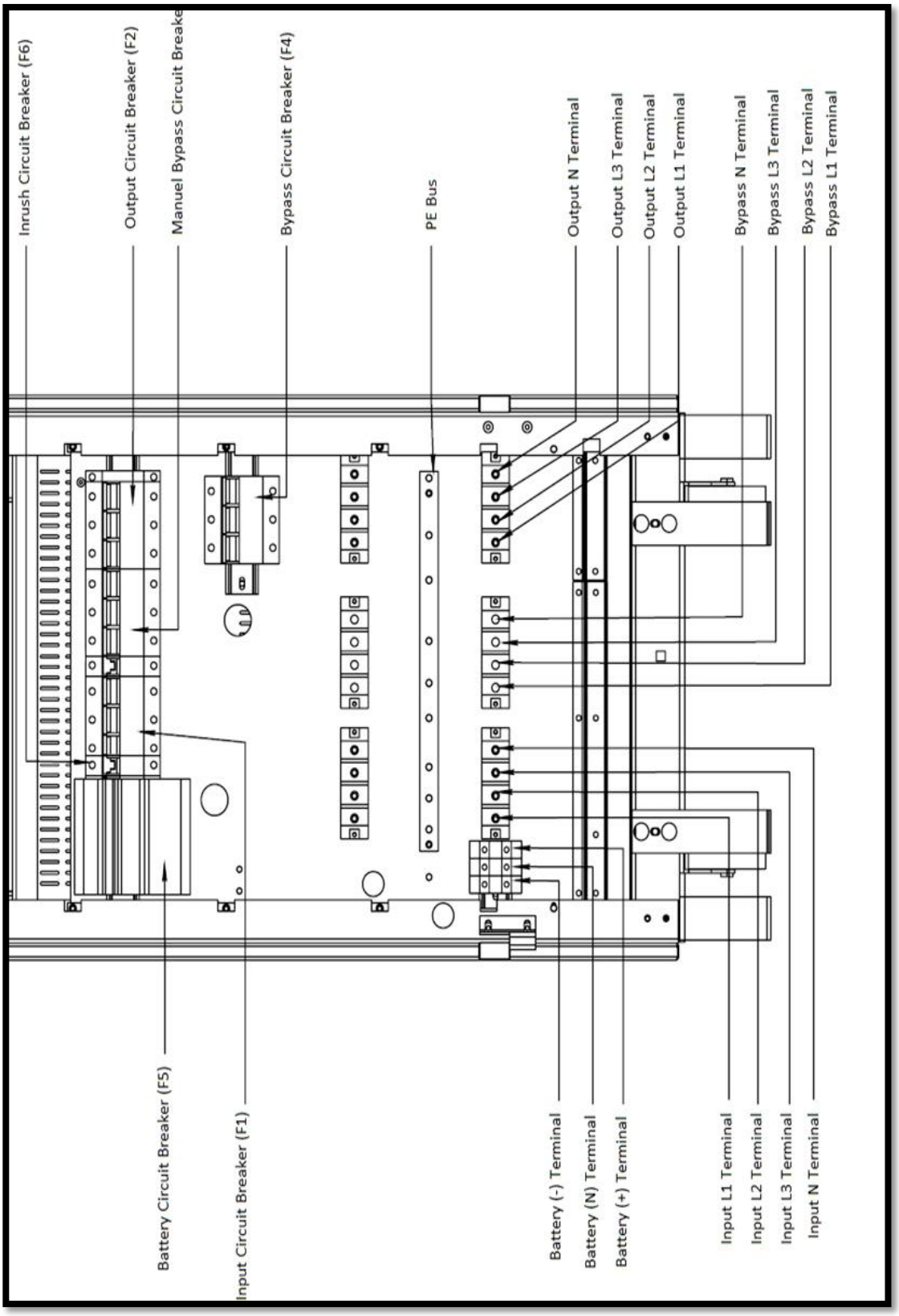
A1: Communication interface board
A2: Parallel connection board (optional)
F1: Input circuit breaker
F2: Output circuit breaker
F3: Manual/Maintenance Bypass circuit breaker
F4: Bypass circuit breaker (optional)
F5: Battery circuit breaker
F6: Inrush fuse
X1: Battery terminals
X2: Input mains terminals
X3: Separate bypass mains terminals (optional)
X4: Output terminals

10-15-20-30kVA Terminal Connections



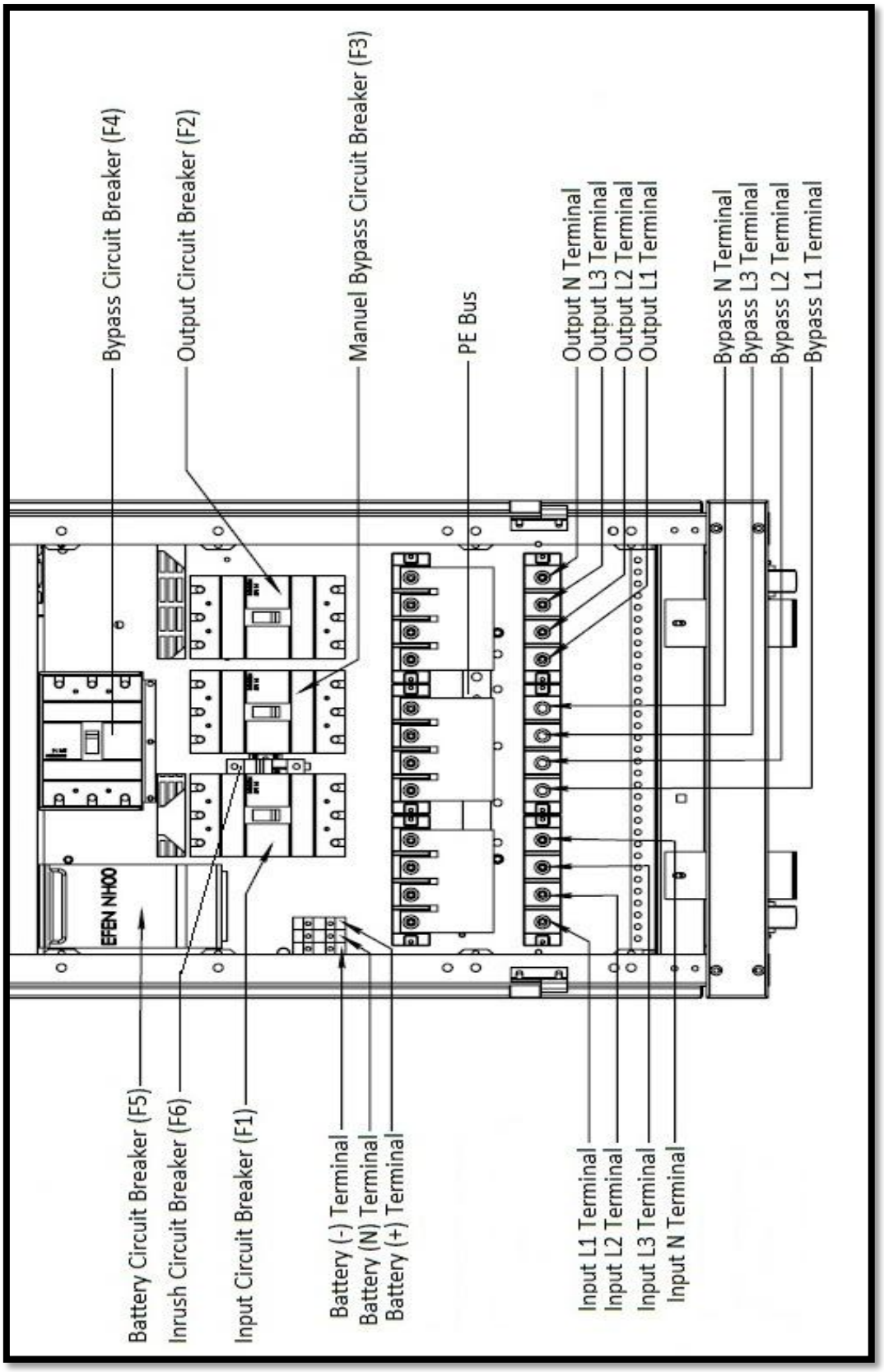
* Separate Bypass Terminal (Bypass L1, L2, L3, N) version is optional.

40-60kVA Terminal Connections



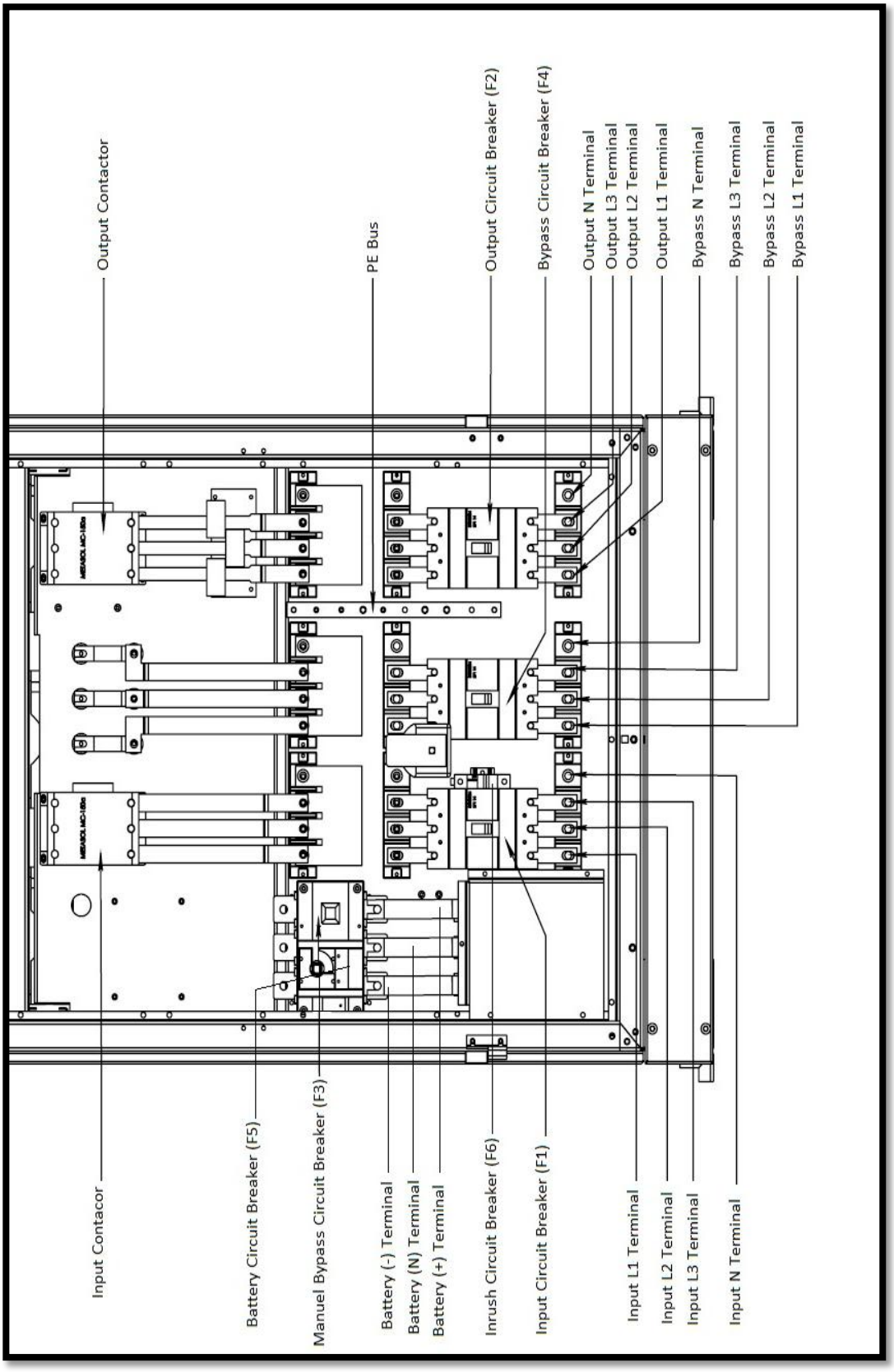
* Separate Bypass Terminal (Bypass L1, L2, L3, N) version is optional.

80kVA Terminal Connections



* Separate Bypass Terminal (Bypass L1, L2, L3, N) version is optional.

100kVA Terminal Connections



* Separate Bypass Terminal (Bypass L1, L2, L3, N) version is optional.

Connections shall be made in the following order;

4.2.1.1. Protective Earth (PE) Connection

The device shall be earthed for a safe and reliable operation. Connect the PE ground connectors before connecting any other cable.

Input protective earth connection terminal **PE** of the UPS shall be connected to ground with a low impedance connection.

PE terminals of the loads shall be connected to output protective earth terminal of the UPS.
If there is an external battery cabin present, it shall be grounded via battery protective earth terminal of the UPS.

If PE cables come along with the power cables; PE cable should be min. 10cm longer than the other cables.

4.2.1.2. Input Connection

The installation and adjustment of distribution panel should be done by authorized Technical Personnel.

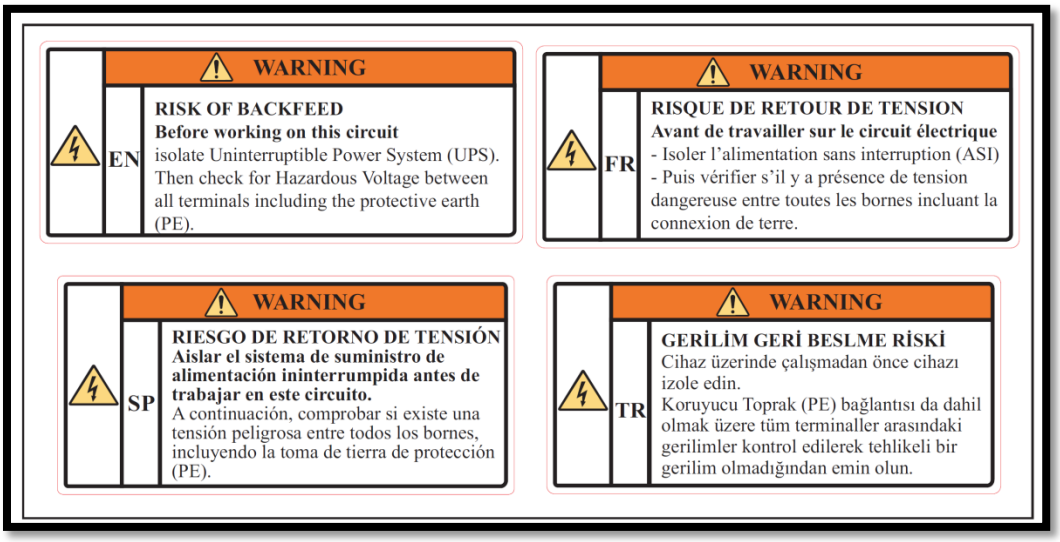
Swicth the circuit breaker on the distribution panel to “0” position before making the connections.

Please add four-pole (4-pole) circuit breaker (equivalent UPS input breaker) to distribution panel where UPS is to be connected. Do not connect any other load to this circuit breaker and please do not forget to add leakage current relay.
Leakage protection relay value must be the total value of 300mA (UPS input leakage current relay) and total leakage current value of the load connected to UPS. Relay must be protected type against peak current that can be happened on EMI filter capacitor.
Connect the phase cables to **Input L1-L2-L3** terminals, the neutral to **Input N** terminal. Neutral connection should be done directly from distributon neutral bus to UPS neutral.

According to EN 62040-1, the user should place a warning label on the input distribution panel and the other primary power isolators, in order to prevent the risk of voltage backfeed. This label is sent with the UPS It indicates:

RISK OF VOLTAGE BACKFEED

- Isolate Uninterruptable Power Supply before working on this circuit.
- Then check for Hazardous Voltage between all terminals including the protective earth (PE).



4.2.1.3. Bypass Input Connection

	Bring the circuit breaker on the distribution panel to "OFF" position before making the connections

Please add four-pole (4-pole) circuit breaker (equivalent UPS Bypass breaker) to distribution panel where UPS is to be connected.
Connect the phase cables to **Bypass L1-L2-L3** terminals, the neutral to **Bypass N** terminal. Neutral connection should be done directly from distributon neutral bus to UPS neutral.

4.2.1.4. Battery Connection

	Devices with internal batteries may have dangerous voltages on the battery terminals.

	Do not switch the battery circuit breaker (F5) to **ON** position before operating the equipment and seeing "Online Operation" message on the LCD.

If the batteries are already built-in inside the UPS cabinet; remove the cover of UPS and connect the **Positive (red), Negative (black) and Neutral (blue**) cables of the batteries. There is no need any further connection so replace the cover.

If the batteries shall be put in a separate additional battery cabinet, please follow up the instructions below;

- Connect between battery circuit breaker and battery terminals with using proper cross-section **Positive (red), Negative (black) and Neutral (blue)** cables.
- Switch on to "**0**" position the battery cabinet circuit breaker.
- Connect the **"-"**on the battery cabinet to **"-"**on the UPS.
- Connect the **"+"**on the battery cabinet to **"+"**on the UPS.
- Connect the **"N"**on the battery cabinet to **"N"**on the UPS.

	Read the **PDSP PREMIUM Service Manual** carefully for External Battery connection!

	Danger of explosion and fire if the batteries of the wrong type are used.

	The batteries must be charged min. 10 hours before first-use.

	Battery fast fuses shall only be replaced with fuses of the same type and rating.

4.2.1.5. Output Connection

Please add four-pole (4-pole) circuit breaker (equivalent to UPS output breaker) to distribution panel where the loads are to be connected. Connect the phase cable to **Output L1-L2-L3** terminal and the neutral cable to **Output N** terminal. Neutral connection should be done directly.

	To enable the short circuit protection feature of the UPS, each load shall be supplied through a separate circuit breaker chosen according to the load current. This may provide quick disconnection of the short circuited load and maintain operation continuity of the other loads. To obtain maximum protection, the rating of each individual load circuit breaker shall have the minimum value, which is enough to carry the full load current continuously.

	Make sure that all circuit breakers are at “0” position before starting with the installation.

	Each load should be supplied through separate circuit breaker and the cable cross section should be chosen according to the load current value.

	Make sure that the UPS is not overloaded to provide a higher quality supply to the loads.

4.2.2 Communiation Interface Connection

Interface connectivity cards allow UPS to communicate in a variety of networking environments and with different type of devices.
Standard and optional communication interfaces are listed below;

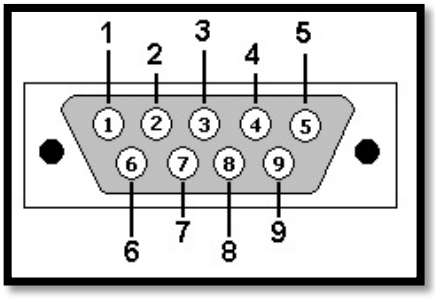
Communication Interfaces								
Model (kVA)	**10**	**15**	**20**	**30**	**40**	**60**	**80**	**100**
RS232	•							
RS485 / MODBUS	•							
Dry Contacts	•							
Generator Interface	•							
Emergency Switching Device (ESD) Interface	•							
Internal SNMP / Web Monitoring / e-mail	◦							
External SNMP	◦							
• Standard **◦ Option**								

Inverter and Rectifier connectors are used for Technical Service only.
Do no not connect RS232 or external SNMP, damage may occur to your equipment and cancel your warranty.

4.2.2.1 Serial Communication (RS232)

UPS is equipped with Serial Communication as standard. RS232 cable shall be shielded and shorter than 25m.

RS232: DSUB-9 male connector with the following pin layout shall be used on the UPS side of the connection cable.



RS232 PIN LAYOUT		
PIN#	**Signal Name**	**Signal Description**
2	RX	Receive Data
3	TX	Transmit Data
5	GND	Signal Ground

The communication solutions listed below can be used with this port:

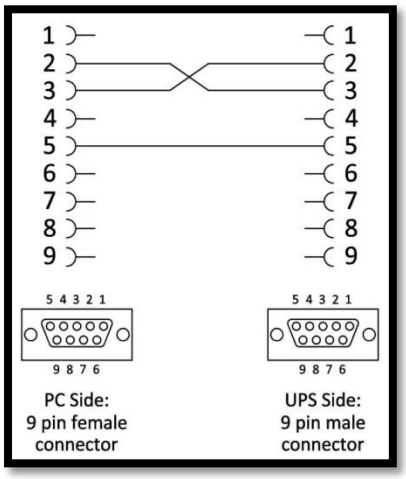
- Monitoring Software (Optional)
- External SNMP Adapter (Optional)

Via SNMP; the information listed below can be monitored;

- ❖ The Latest Battery Test Date
- ❖ UPS Information (example: 220V - 50Hz)

- Input Data (V_{in}, F_{in}, V_{max} etc.)
- Output Data (V_{out}, Load Percentage...etc.)
- Battery Situation (V_{batt}...etc)

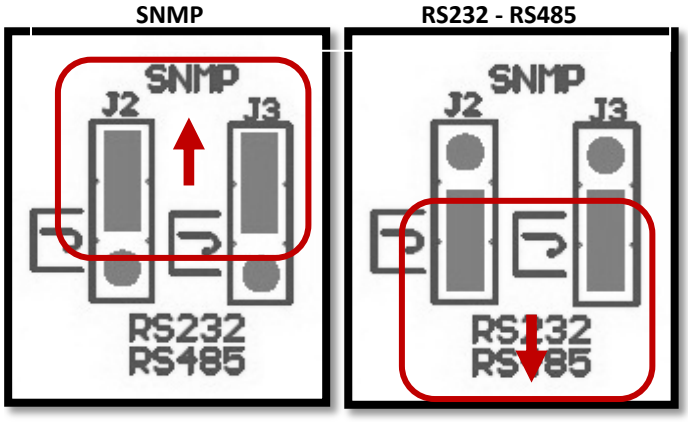
Over SNMP communication, battery test can be started or current test can be cancelled. UPS can be shut-down or stand-by (stand-by duration is adjustable). Alarms can be discarded.



If Serial Communication cable is needed, it can be produced according to the pin configuration described at side.

4.2.2.2 Internal SNMP Communication

Internal SNMP card can be installed into SNMP slot placed at the front of UPS. As soon as SNMP installed, RS232 port would be disabled.
Internal SNMP has the same features as External SNMP.



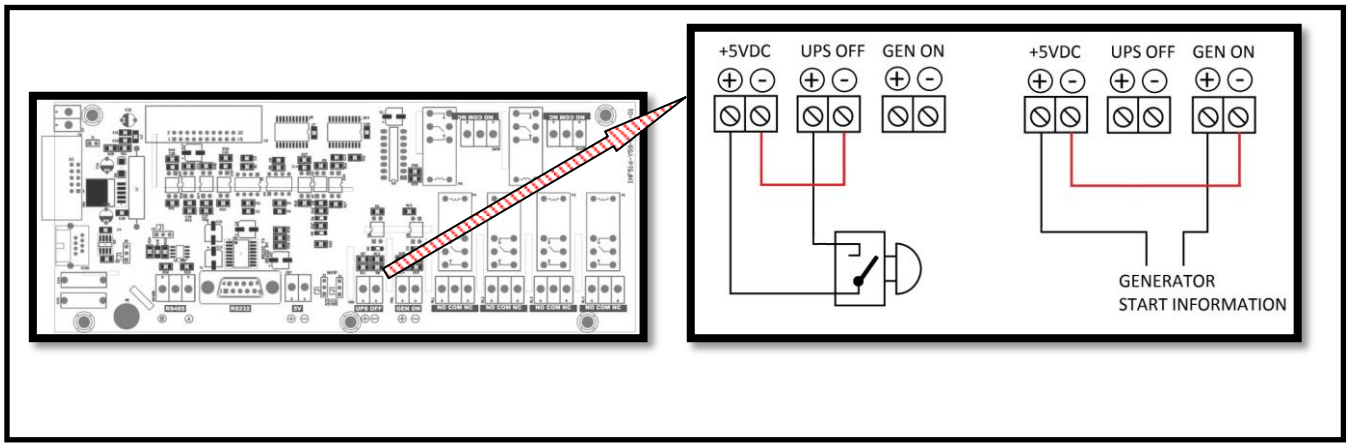
SNMP JUMPER (J2 – J3): If internal SNMP would be used, 2 jumpers should be moved to upper side.

If RS232 or RS485 would be used, 2 jumpers should be moved to lower side.

If the jumpers are at the upper side for internal SNMP configuration, RS232 and RS485 Serial Communication are disabled.
If the jumpers are at the lower side for RS232 or RS485 configuration, internal SNMP is disabled.

4.2.2.3 Emergency Switching Device and Generator Connections

Voltage to be applied to the digital inputs is 5VDC. Maximum current drawn by each input is 1mA. 5VDC supply provided on the communication interface board can be used to supply both digital inputs.

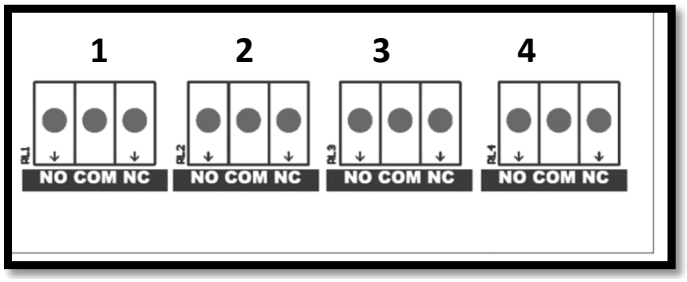


UPS output can be switched off immediately by Remote Emergency Switching Device interface (ESD) connection if desired. A remote latched switch can be used as described in above figure.

Input	Function
UPS OFF	If the UPS OFF input is set high by applying 5VDC voltage on the related terminals, UPS stops generating the output voltage and stops feeding the load. When the voltage on the digital input is removed, you have to restart UPS. **The factory default setting of ESD contact is "Normally open".**
GEN ON	If the GEN ON input is set high by applying 5VDC voltage on the related terminals, UPS transfers to Generator Mode, bypass and battery charging is disabled. Generator icon appears on Energy Flow Diagram screen. **The factory default setting of Generator contact is "Normally open".**

Pay attention to the polarity of the voltages applied to the digital input terminals.

4.2.2.4 Dry Contacts



There are 4 dry contact sockets on the Interface Board. The relays can be programmable from **Relay Functions** menu (under **Settings** menu). "General alarm, Input failure, Battery failure, Output failure, Bypass active, Output overload, High temperature" alarms can be assigned to the contacts. Each alarm can be assigned to separate relays but also one alarm may be assigned to all relays.
Each output socket 3-pin and middle pin is fixed, the upper pin is normally closed and lower pin is normally open.
You may see the relay numbers as above.

Free contact relay connection cables shall have a cross-section of 1.5 mm^2.

Maximum voltage to be applied to the relay contacts is 42VAC rms (sinus) or 60VDC. Maximum contact current depends on the applied voltage and the load characteristic. Both maximum voltage and maximum contact current corresponding to the applied voltage shall not be exceeded.

Maximum allowed resistive contact currents for several voltages are given on the table below:

Applied voltage	**Maximum contact current for resistive load**
Up to 42 VAC	16 A
Up to 20 VDC	16 A
30 VDC	6 A
40 VDC	2 A
50 VDC	1 A
60 VDC	0.8 A

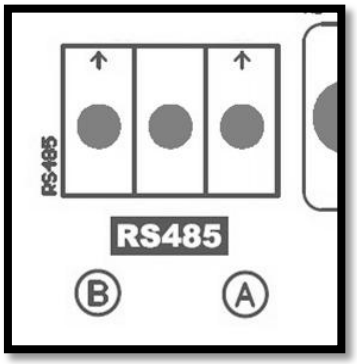
Each relay has both a normally open (NO) and a normally closed (NC) contact. One end of these contacts is common.
Relay functions are described below:

Relay	**Default Function**
Relay 1	General Alarm
Relay 2	Input failure
Relay 3	Battery failure
Relay 4	Output failure

Relay functions can be changed through front panel.

4.2.2.5 RS485

RS485 with Modbus protocol is used in a wide range of automation systems for Industrial Process monitoring or for Building Management Systems. This communication link allows monitoring UPS status and measurements with such systems.



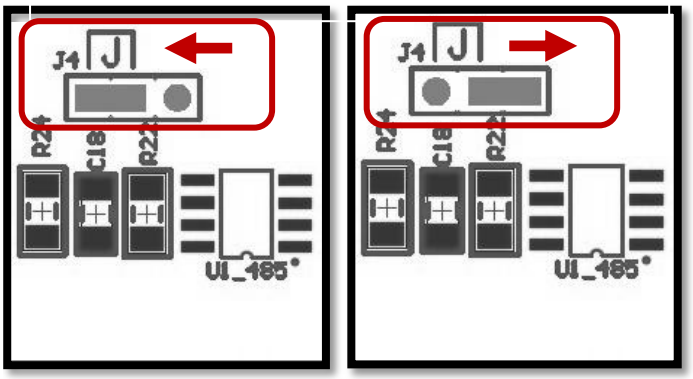
The RS485 differential line consists of three pins:

- A is inverting pin (TxD-/RxD-)
- B is non-inverting pin (TxD+/RxD+)
- Middle Pin is reference pin (optional GND)

Middle Pin is the reference potential used by the transceiver to measure the A and B voltages.
The B line is positive (compared to A) when the line is idle.

Communication Parameters	
Baud Rate	2400
Data Bits	8
Stop Bits	1
Parity	No Parity
Flow Control	No Flow Control
Communication Type	RTU

DEFAULT **MODBUS END**



MODBUS END JUMPER (J4): If the UPS is at the end of the bus; the jumper should be moved to right side to close the bus.

5. MODES OF OPERATION

Uninterruptible **P**ower **S**upplies (UPS) have an important function in the protection of the critical and sensitive loads from the irregular mains electricity conditions and they are used to supply uninterruptible energy to these loads. In such irregular mains electricity conditions, the user can provide an artificial energy supply to the equipment present in the office or at home by using an UPS.

UPS during Inverter operation provides stable pure sine wave. This pure sine wave is not affected from the input voltage fluctuations. This helps to extend the life time of your sensible loads. Power factor of the current consumed from the mains is nearly one. You do not have any problem on generator or isolation transformer applications. The reactive energy consumption decreases.

During the mains failure, the energy needed for the load is provided by the battery in UPS (or in external battery cabinet/s). These batteries are charged by an intelligent battery charging circuit during the mains within the limits. Batteries are lead acid battery (VRLA) and do not require any maintenance until the end of their life time.

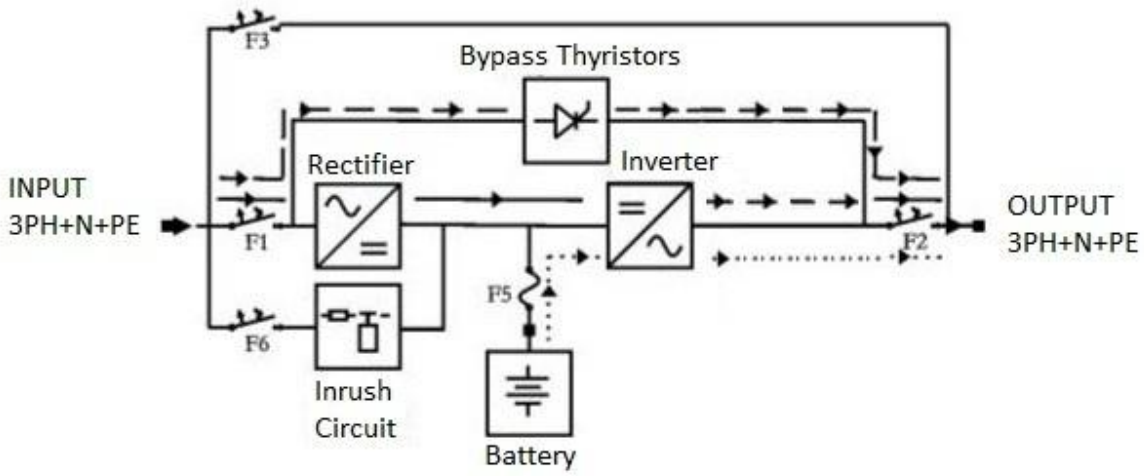
In case of longer overload or inverter failure situation, UPS transfers the load to Bypass line, and load is supplied from the mains. When the condition turns back to normal, UPS shall continue to supply the load through inverter.

UPS control and management is done by Digital Signal Processor (DSP) which is 200 times faster than standard microprocessors. This helps to make your UPS smarter. DSP uses all the sources on optimum conditions, observes the failure conditions, and communicates with your computer system.

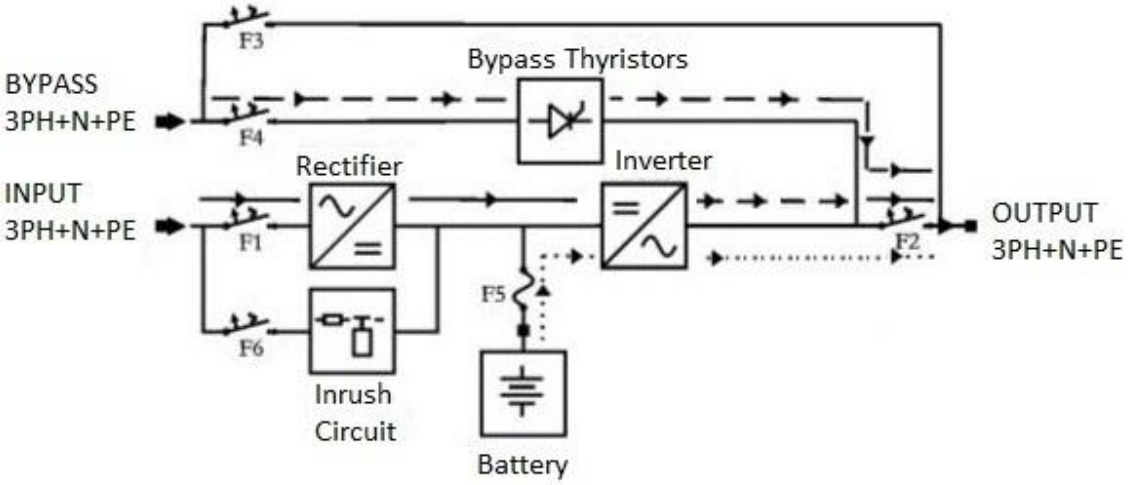
UPS can be operated in one of the following operational modes depending on the condition of mains, battery, bypass, UPS and/or user preference.

You may see the block diagram of UPS in Appendix-5 Description of UPS and Block Diagram.

There are three operation modes, which differ in the path of the energy flow.
UPS block diagrams and the energy flow path in each operation mode is shown below:



Block Diagram of without Seperate Bypass Input



Block Diagram of with Seperate Bypass Input

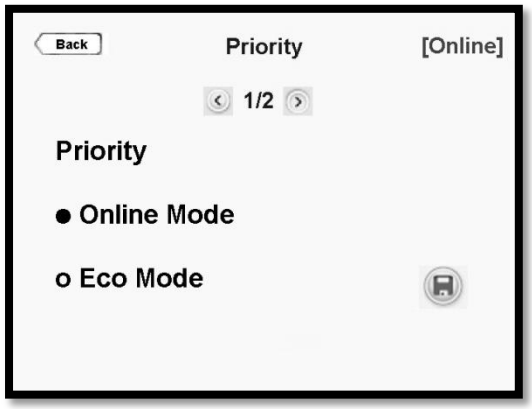
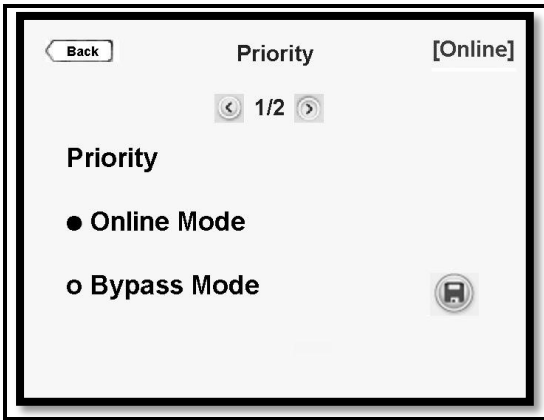
——— Normal Mode – – – Bypass Mode · · · · · Battery Mode

When UPS has no separate bypass mains input, bypass line is also fed from the mains input. Thus, if such a device is in question, mains input shall be comprehended when the bypass mains input is referred in the following sections of the manual.

UPS behavior at the start-up is different from the usual operation. The UPS can only operate in bypass mode during start-up. So, in order for the UPS to start-up, frequency/waveform/rms value of the bypass mains voltage shall be in acceptable limits and bypass shall be enabled.

After start-up, the following applies:

Operation mode depends on the priority, inverter (online) and bypass preferences made by the user and mains, separate bypass mains and battery voltages.

	Via this menu; you may choose operation mode of UPS as Online or Eco Mode. If system is configured as ***Single;*** you may choose operation mode of UPS Online or Eco Mode. When you touch the **Save icon** key, a confirmation pop-up bar will appear. You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.
	Via this menu; you may choose operation mode of UPS as Online or Bypass Mode. If system is configured as ***Parallel;*** you may choose operation mode of UPS Online or Bypass Mode. It would be enough to set the priority on one of the UPS, all the UPSs will pass to Bypass Mode at the same time. When you touch the **Save icon** key, a confirmation pop-up bar will appear. You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.

5.1. Bypass Operation

Devices without separate bypass mains input, absorb energy from the mains. In devices with separate bypass mains input, energy is drawn from the separate bypass mains.
Loads are fed via static bypass line.
Output voltage has the same amplitude, frequency and waveform as the input voltage.
Current drawn by the loads are only limited by the thermal/magnetic switches over the energy flow path.
Voltage, frequency and waveform of the bypass supply shall be in their tolerance limits, and bypass shall be enabled for the UPS to operate in this mode.
When the upper provisions are met, the UPS works in bypass mode in the following conditions:

- During the start-up
- If the bypass priority is selected
- If the inverter is disabled or blocked
- In case of a prolonged overload

You can save energy by selecting the bypass priority. Efficiency in bypass mode is higher than the efficiency in normal mode. If the bypass priority is selected, the UPS will operate in bypass mode whenever the frequency/waveform/rms value of bypass mains voltage is in their tolerance limits. If the bypass voltage goes beyond these limits, the UPS switches into normal operation.

Bypass Operation mode does not provide perfect stability in frequency/waveform/rms value of the output voltage like in Online Operation. Thus, the use of this mode should be carefully executed according to the level of protection required by the application.

Bypass Operation mode does not provide electronic short circuit protection as provides in Online Operation. If a short circuit occurs on the output during this operation, the thermal/magnetic protection will act and all loads will be deenergized.

Prolonged overloads in Bypass Operation may cause the thermal/magnetic protection act. In this case, all loads will be deenergized.

Mains Limits for Bypass Operation

Frequency, rms value and total harmonic distortion of the bypass mains input voltage has to be between acceptable limits for the UPS to operate in bypass mode.

Different rms voltage upper and lower limits are present for the return from another operation mode to bypass mode. This provides hysteresis and ensures that the device does not change operation mode very often when the bypass mains rms voltage is close to one of the limits.

Bypass mains limits are software parameters. They can be changed upon request.

5.2. Normal (Online) Operation

Energy is drawn from the mains input.

Loads are fed via the rectifier and the inverter. The AC voltage at the input is converted to a DC voltage by the rectifier. The inverter converts this DC voltage to an AC voltage with a stable sinusoidal waveform, amplitude and frequency.

Output voltage is sinusoidal and has a regulated amplitude and frequency. It is independent from the input voltage.

The inverter is synchronized in frequency with the bypass mains input to enable load transfer to the bypass supply without any interruption, in case of an overload or inverter failure.

Voltage and frequency of the mains input shall be in their tolerance limits, and both the rectifier and the inverter shall be enabled for the UPS to operate in this mode.

When the upper provisions are met, the UPS works in normal (online) mode in the following conditions:

- If the inverter priority is selected.
- If the bypass priority is selected but bypass is disabled or frequency/waveform/rms value of bypass mains voltage is not in acceptable limits.

Mains Limits for Normal (Online) Operation

Frequency and rms value of the mains input voltage has to be between acceptable limits for the UPS to operate in normal (online) mode.

Lower limit of the voltage depends on how much the UPS is loaded and it decreases as the load decreases until it reaches 80 V phase-neutral.

Frequency lower and upper limits and voltage upper limit are fixed.

Voltage and frequency ranges for normal (online) mode are given in the Appendix-1 Technical Specifications.

This feature lessens the need to use the batteries. Thus, it increases the battery life and continuity of the load power.

Electronic Short Circuit Protection

The UPS attempts to force the thermal/magnetic protection devices between the output terminals and the short circuited load to open, by supplying current to the short circuited load for a limited duration. The UPS shall be working in battery or normal mode, for this feature to work.

To enable the short circuit protection feature of the UPS, each load shall be fed over a separate circuit breaker chosen according to the load current. This may provide quick disconnection of the short circuited load and operation continuity of the other loads. To obtain maximum protection, the rating of each individual load circuit breaker shall have the minimum value, which is enough to carry the full load current continuously.

If the protection device fails to open the circuit in a limited time, the UPS stops feeding current to the output

Overload Behaviour

While operating in normal (online) or battery mode, the UPS can feed overloads for a limited duration which is given in the Appendix-1 Technical Specifications section. After that duration, UPS automatically switches into bypass mode, if the bypass is enabled and frequency/waveform/rms value of the bypass mains voltage is acceptable. If the overload situation continues in the bypass operation, UPS can feed overloads for a limited duration which is given in the Appendix-1 Technical Specifications section. Before this period; thermal/magnetic protection devices may activate and protect the circuit. In this case, all loads on the output will be deenergized.

Make sure that the UPS is not overloaded to provide a higher quality supply to the loads.

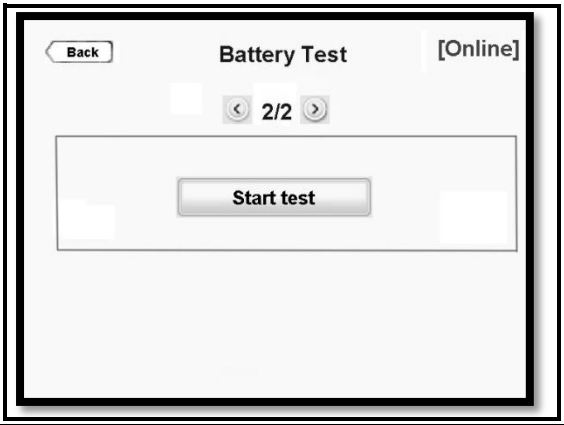
5.3. Battery Operation

Energy is drawn from the batteries. Loads are fed via the inverter.
Output voltage is sinusoidal and has a regulated amplitude and frequency. It is independent from the battery voltage.
Battery voltage shall be in acceptable limits and the inverter shall be enabled for the UPS to operate in this mode.
When the upper provisions are met, the UPS works in battery mode in the following conditions:

- If rectifier is disabled.
- If the rectifier is disabled or frequency/waveform/rms value of mains voltage is not in acceptable limits.

Battery Test

This feature enables the user to obtain information about the battery condition. If the batteries have approached end of their lives, batteries fail.
Battery life depends on several parameters like the number of charge-discharge cycles, discharge depth and ambient temperature. Battery life greatly decreases as the ambient temperature increases. Therefore it is recommended to keep the ambient temperature about 20°C.

	With this command, UPS battery test feature can be started. When you touch the **Start test** key, a confirmation pop-up bar will appear. You should touch **Yes** to start the test; otherwise touch **No**. UPS tests the battery automatically once each 90 days.

Make sure that the batteries are fully charged and battery circuit breaker is “ON”/”I” before starting battery test. Otherwise, the batteries will fail even if they are in good condition.

5.4. Manual/Maintenance Bypass Operation

This procedure may only be executed by authorized Technical Service personnel.

Some parts inside the UPS (terminals, EMC filters and measurement circuits) are still energized during Maintenance Bypass Operation. In order to deenergize all UPS parts, circuit breakers on mains and bypass mains distribution panels feeding the UPS and circuit breakers on external battery cabinet shall be brought to “OFF” position. Internal batteries should also be isolated from the system.

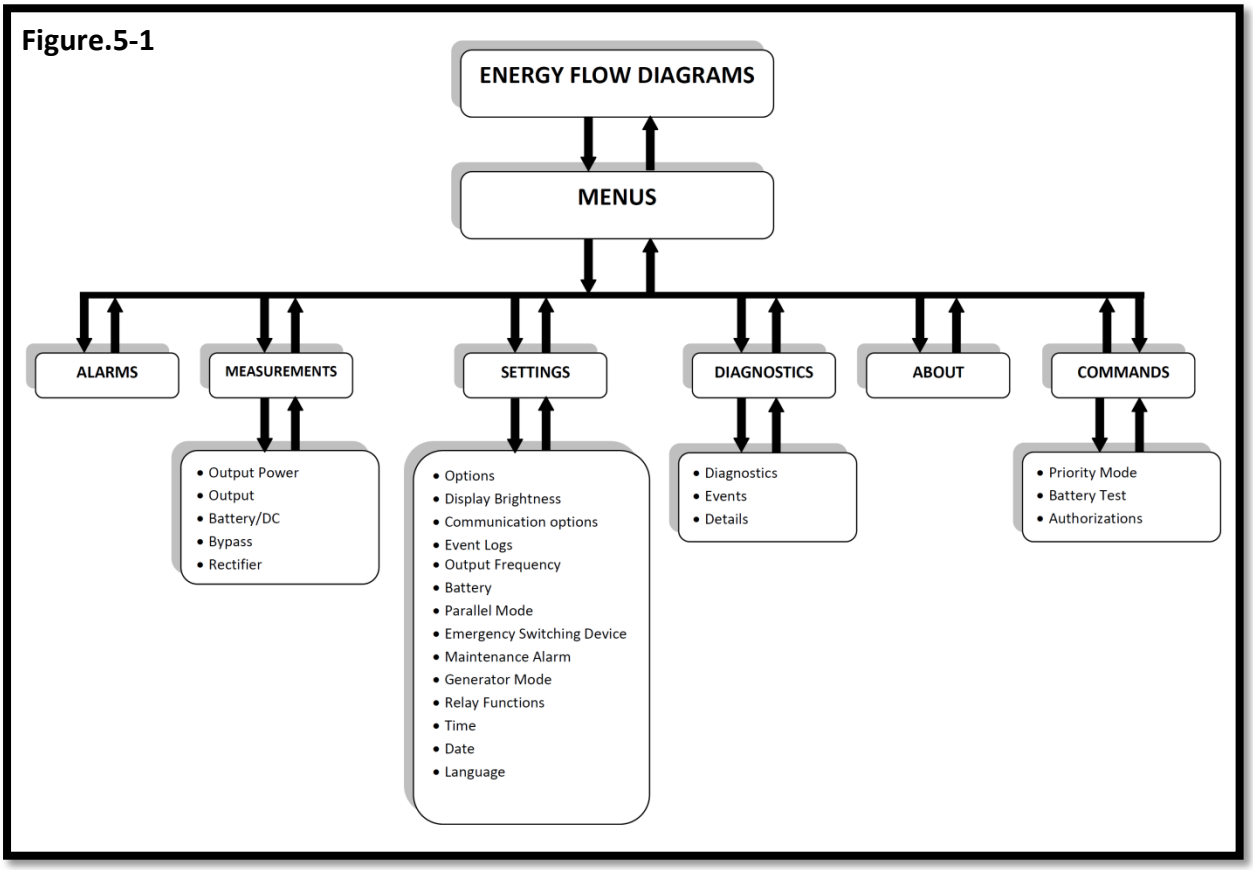
Manual/Maintenance Bypass enables the user to isolate the electronic circuitry of the UPS from the mains and the load without interrupting the load operation by connecting the loads directly to the bypass utility supply. This feature is useful while performing maintenance or service and should only be executed by authorized technical service personnel.

During Manual/Maintenance Bypass operation; in case of any mains interruption occurs, all loads on the output will be deenergized. Manual/Maintenance Bypass Operation should not be preferred for long time use.

6. FRONT PANEL

The front panel is located at the top of the UPS which informs the user about operating status, alarm conditions and measurements. It also provides access to control commands and user parameters settings.
Main screen image shows the energy flow path and Operation Modes. The information of the current operation is written at the upper side of the panel. Additionally, the energy flow path is given by a graphical animation.

Figure.5-1



2 Password protected menus for SETTINGS and COMMANDS;

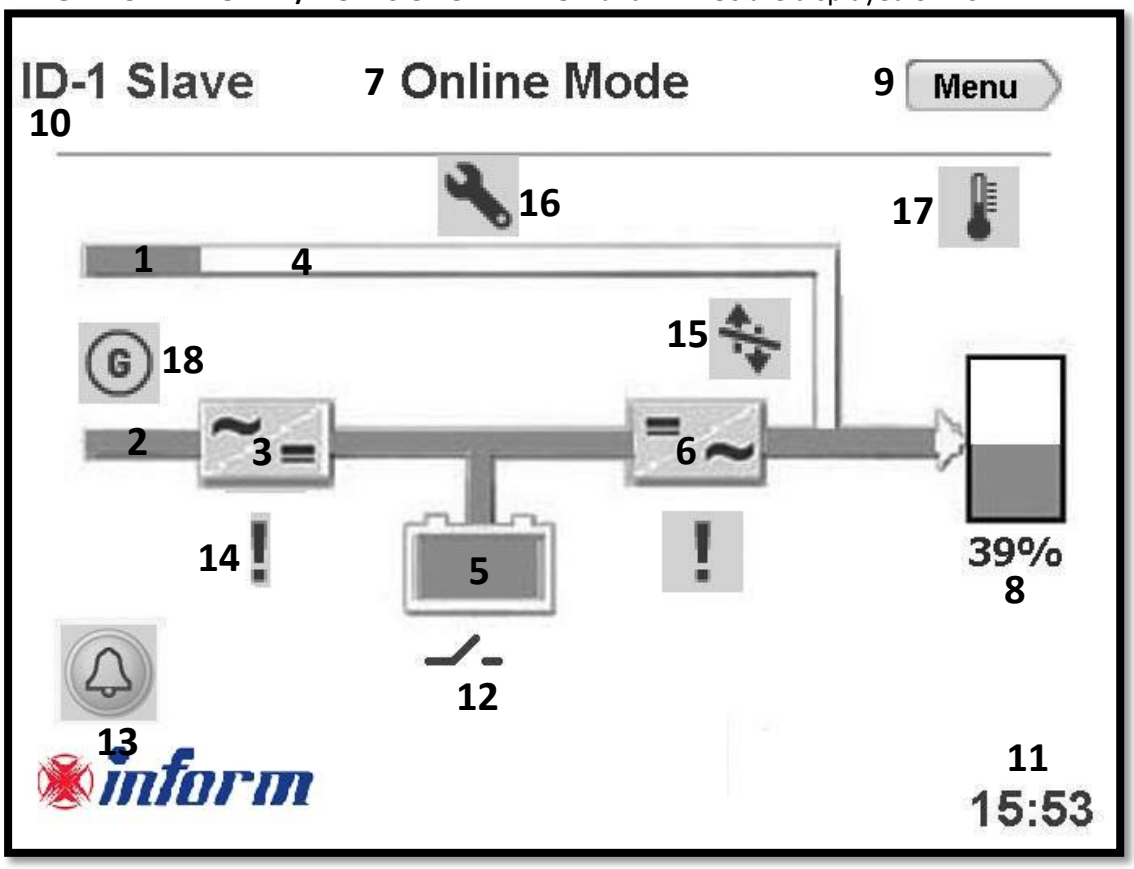
Password Authorizations	
User Password by default: 1111	**Service Password: access only to INFORM UPS Technical Service Personnel**
• Options	• Events Logs
• Display Brightness	• Output Frequency
• Relay Functions	• Battery
• Time	• Parallel Mode
• Date	• ESD
• Language	• Generator Mode
• Priority Mode	• Communication Options
• Battery Test	• Maintenance Alarm
	• Authorizations

6.1. Front Panel Segments

Front panel consists of two segments: **Colour Touchscreen Graphical Control Panel** and **UPS Status LED Bar** offers detailed information about UPS.

6.1.1. Colour Graphical Touchscreen

ENERGY FLOW DIAGRAM/MODES OF OPERATION and **MENUs** are displayed on LCD.



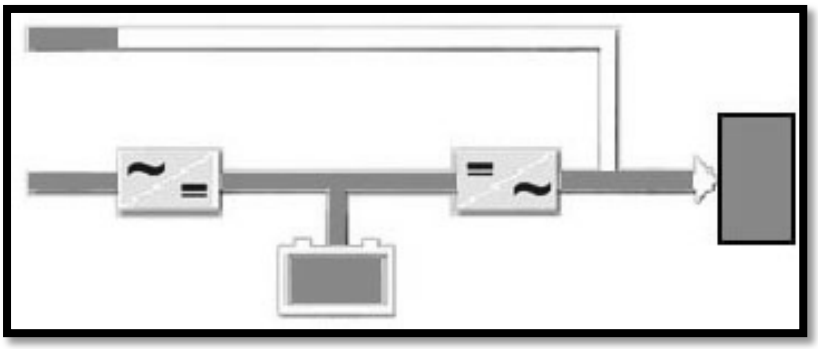
The description of the symbols in the energy flow diagram:

1. **Bypass Input:** If Bypass voltage is OK and synchronizes with inverter; it lits Green, If Bypass voltage is OK and not synchronizes with inverter; it lits Orange.
2. **Rectifier Input:** If Input voltage is OK, it lits Green.
3. **Rectifier:** Converts AC voltage at the input into DC voltage. You may reach the rectifier measurements by touching it.
4. **Bypass Line:** Shows that the loads are supplied via Bypass and line colour is Orange. If UPS is on Eco Mode it is Green.
5. **Battery:** Shows battery conditions. If it is discharging the indicator goes down, if it is charging the indicator goes up. You may reach the battery/DC measurements by touching it.
6. **Inverter:** Converts DC voltage into AC voltage. You may reach the output measurements by touching it.
7. **Operation Mode Information:** Shows UPS's current operation mode.
8. **Load:** Shows the percentage of the load as numerical and graphical information. If there is overload at the output the load graphic lits Red. You may reach the output power measurements by touching it.
9. **Menu:** You may reach the menus by touching it.
10. **Configuration:** It indicates if UPS is in parallel or single operation configuration. At Single Mode; there is no symbol.
11. **Time:** It indicates the time.

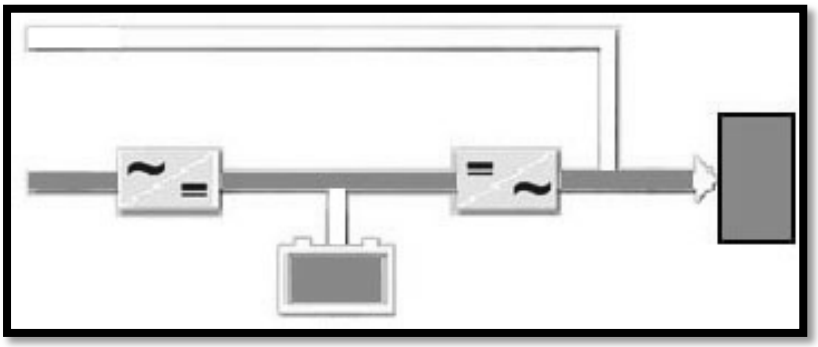
12.Circuit Breaker: It appears if battery Fuse is in “OFF” position or battery fuse has blown. If battery Fuse is in “ON” position; the circuit breaker icon is not displayed, instead battery capacity percentage is displayed.
13. Alarms: If there is an alarm on UPS this icon appears and informs the user by flashing. You may reach the alarms by touching it.
14. Exclamation Mark: Indicates that there is a problem where the icon appears.
15. Transfer: Indicates that transfer to bypass is disabled.
16. Wrench: Indicates that UPS requires Periodic Preventive Maintenance.
17. Temperature: Indicates ambient temperature of UPS is too high.
18.Generator Mode: Indicates UPS operates on Generator Mode.

Operation Modes of UPS and Energy Flow Diagram;

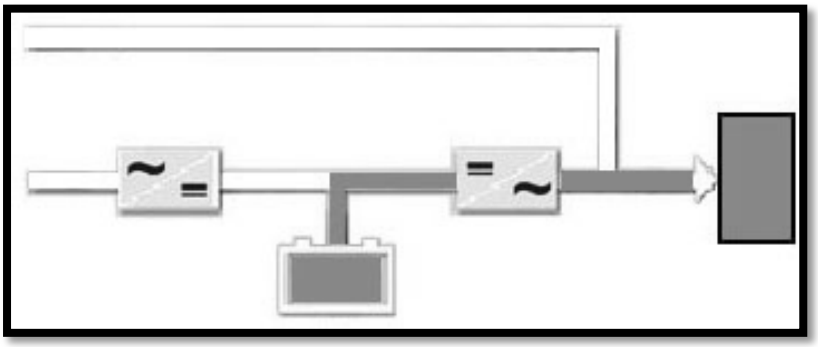
Online Mode:



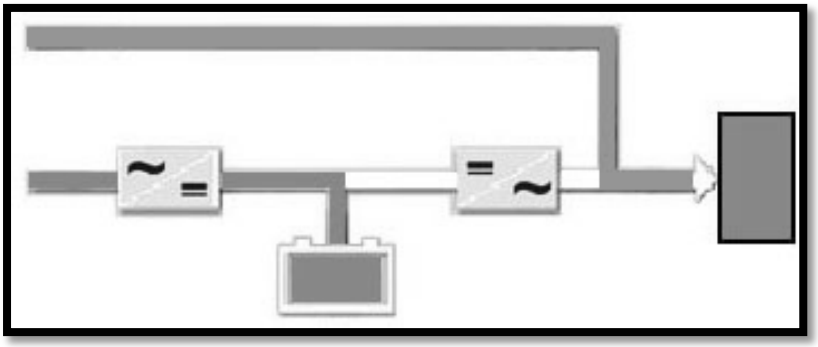
Frequency Converter Mode:



Battery Mode:

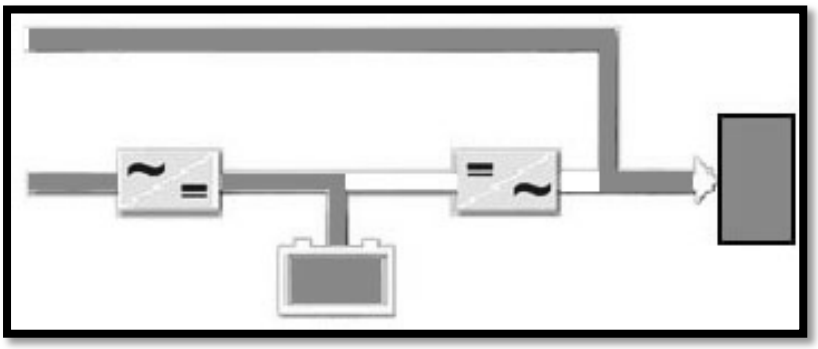


Bypass Mode:



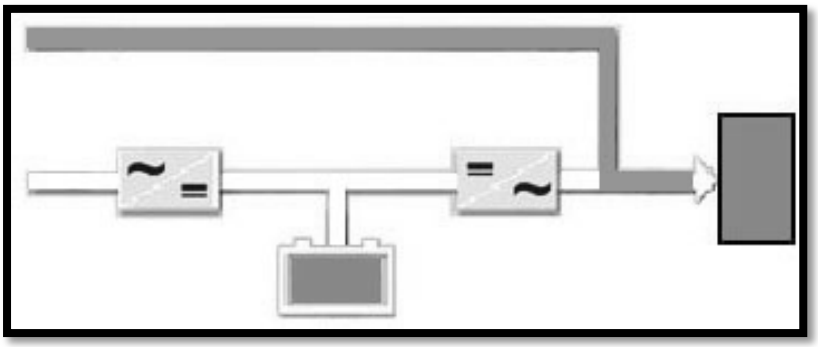
*Bypass Line is Orange

Eco Mode:



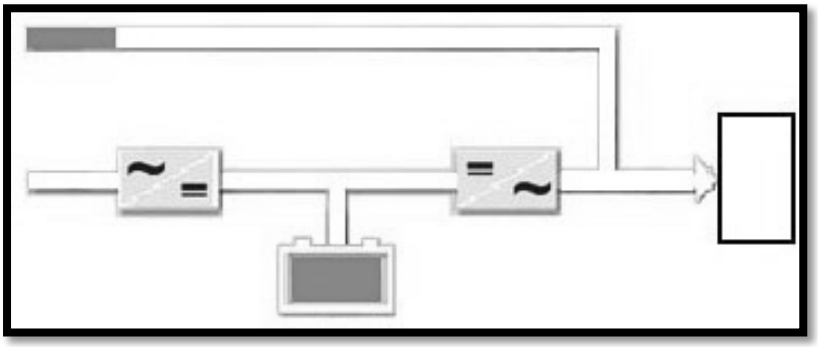
*Bypass Line is Green

Maintenance Bypass Mode:



*Bypass Line is Orange and no battery charging

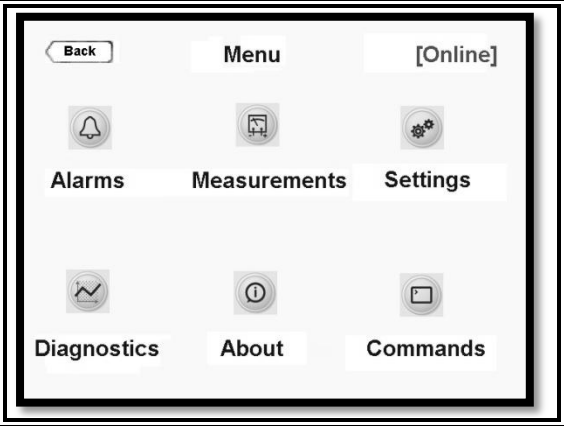
No Operation:



6.2. Menu

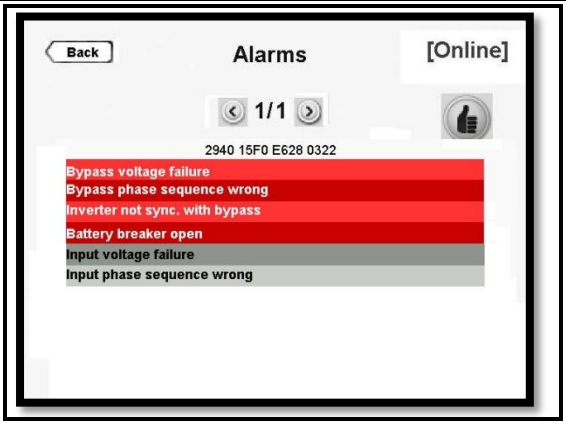
The related sub-menus under the main Menu can be reached by touching MENU icon while main screen image is displayed. They provide information to user about the measurements, about the UPS and status of UPS.
By touching **Back** icon you may exit from the menu.

You may see the sub-menus as shown below;

	You may reach sub-menus by touching Menu; Alarms, Measurements, Settings, Diagnostics, About and Commands.

6.2.1. Alarms Menu

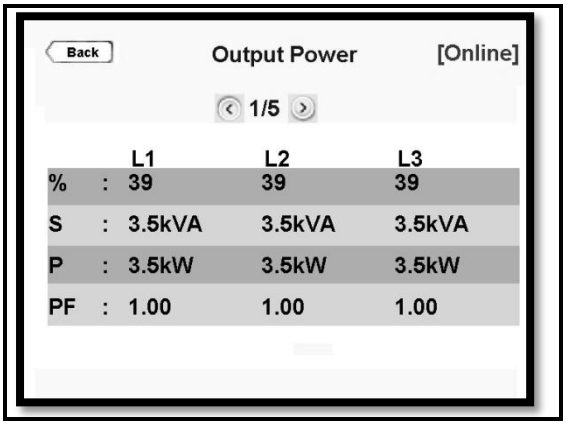
UPS displays 24 different alarms in Alarms menu. For detailed information about alarms please check Appendix-2-Alarms List.

	All active alarms present are displayed on the Alarms screen. They will appear in red colour and as soon as acknowledged by touching the hand icon at the right side of the screen, they switch to gray colour and the buzzer will stop. In case a new alarm occurs; the buzzer is activated, new alarm is displayed in red in addition with the remaining active alarms already acknowledged. It is necessary to acknowledge again the new alarm to stop the buzzer, then alarm text switch to gray colour.

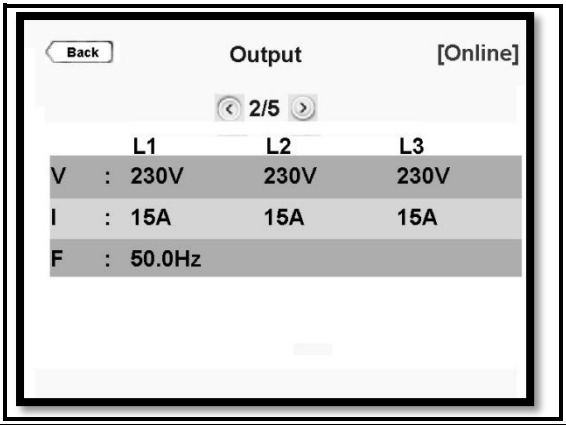
6.2.2. Measurements Menu

It provides useful measurements about the UPS and the load.

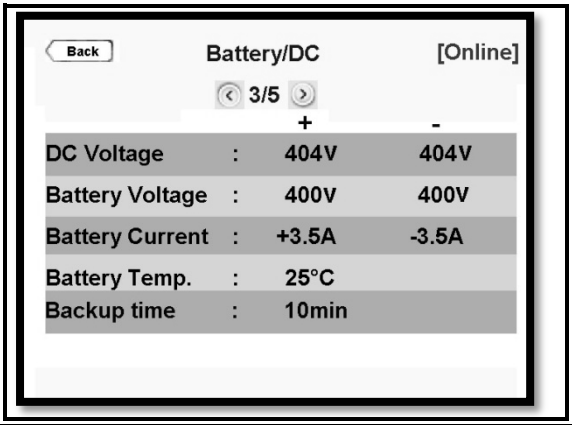
You may scroll to right and left by touching right and left keys through Measurements menu.
The screens of MEASUREMENTS menu are as below:



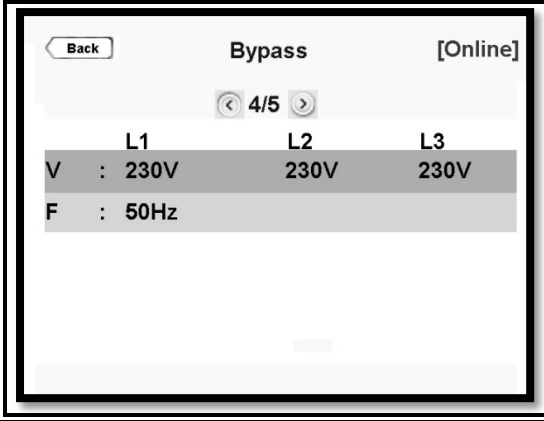
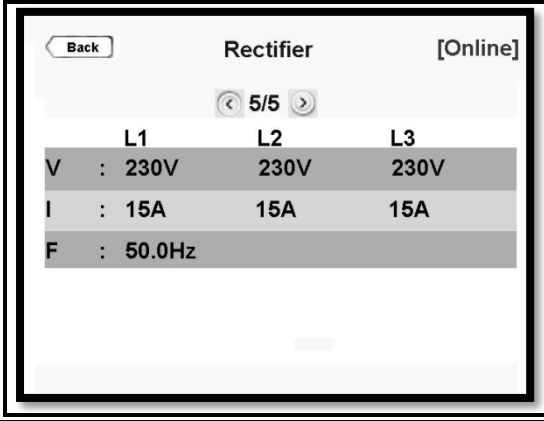
Output load percentage, apparent power, real power and power factor information of each phase is displayed.



Output voltage (Ph-N), current, frequency information of each phase is displayed.



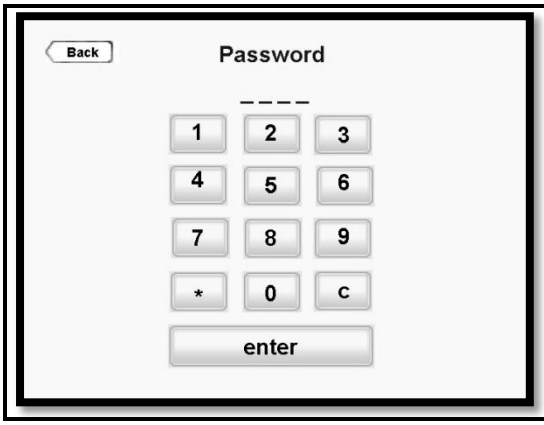
DC Bus and Positive-Negative string of battery voltage is displayed. When the battery circuit breaker is closed, it gives just Battery Voltage measurements.
Charge **(+)** / Discharge **(-)** battery current, ambient temperature and back-up time are displayed.

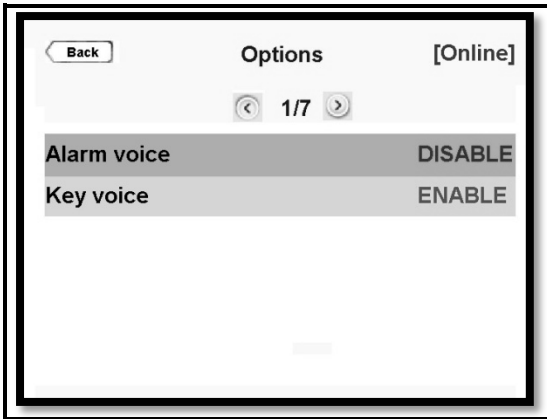
	Bypass voltage (Ph-N) and frequency information of each phase are displayed. If the INPUT and BYPASS are connected in COMMON, Rectifier and Bypass values will be the same.
	Rectifier voltage (Ph-N), current and frequency information of each phase are displayed. If the INPUT and BYPASS are connected in COMMON, Rectifier and Bypass values will be the same.

6.2.3. Settings Menu

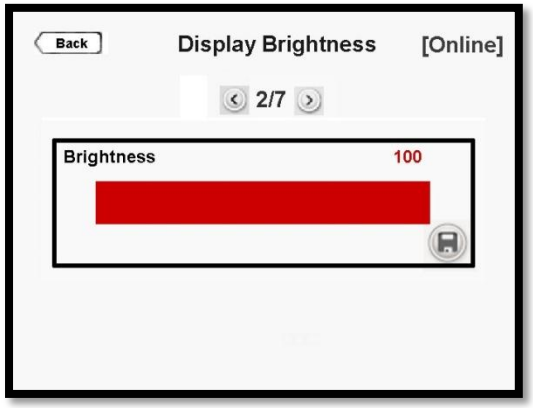
This menu is the section where all the settings related to UPS usage customization can be done.

User Password must be entered to make changes in this section.
User Password: 1111 (the password cannot be changed)

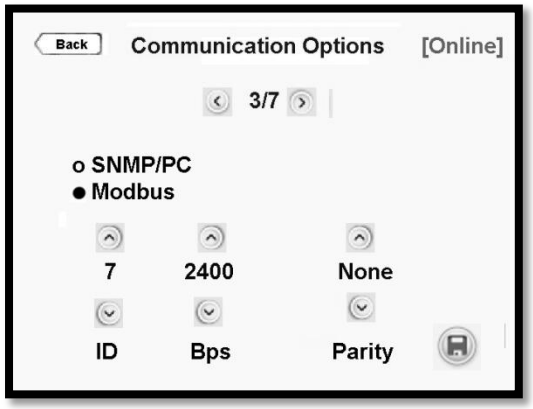
	When the Password Screen appears, enter 1111, touch **ENTER** to confirm.



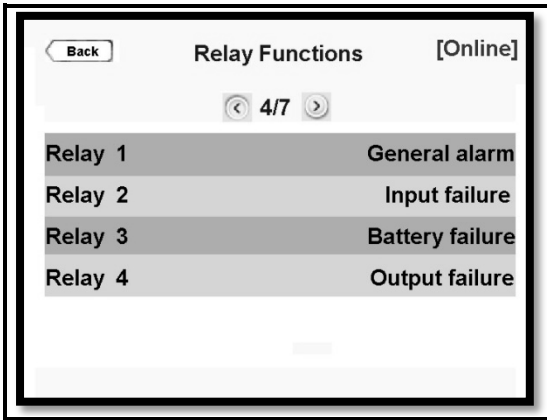
UPS gives audible warning when alarm occurs. Alarm voice can be disabled if requested.
UPS gives audible echo when keyboard is used. Key voice can be disabled if requested.



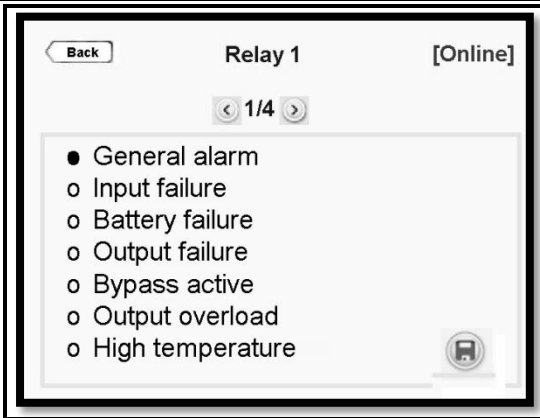
You can adjust brightness setting of LCD screen.
When you touch the **save icon** key, a confirmation pop-up bar will appear.
You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.



You may choose communication options here.
If Modbus is chosen; you may also make Modbus adjustments.

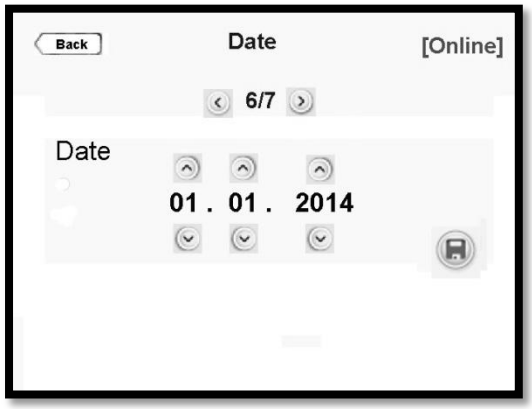


There are 4 different relays and one alarm is assigned to each relay.



There are 7 different alarms defined.
By default one alarm is assigned to each relay; however this can be changed by the user. It is also possible to assign the same alarm to each of the 4 relays. You may set each relay via this menu.
When you touch the **save icon** key, a confirmation pop-up bar will appear.
You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.

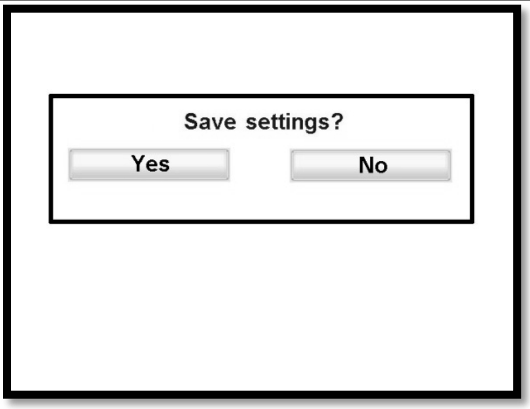
UPS records the event logs with the date and time information. Thus, the events can be followed chronologically.
When you touch the **save icon** key, a confirmation pop-up bar will appear. You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.



UPS records the event logs with the date and time information. Thus, the events can be followed chronologically.
When you touch the **save icon** key, a confirmation pop-up bar will appear. You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.

Set the date and time of UPS during pre-setting.

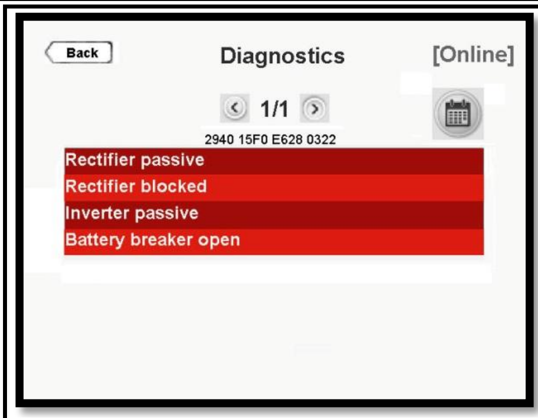
You may choose the language package installed in UPS.
When you touch the **save icon** key, a confirmation pop-up bar will appear. You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.



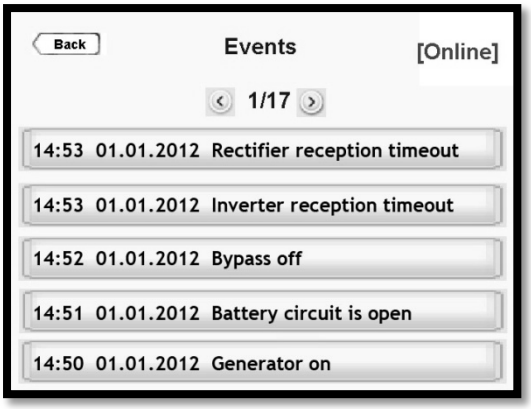
When you touch the **save icon** key, a confirmation pop-up bar will appear.
You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.

6.2.4. Diagnostics Menu

All the alarms/notifications are logged real-time and can be reached via this menu.
UPS displays up to 380 last events. Events are stored in EEPROM using FIFO method. Order number of last occurred event is 001, the oldest event is erased.
You may touch **right/left** arrow through the menu pages. When you touch any event log, you may reach the details of it.



You may see UPS status here. There are 17 different notifications.
When you touch the **calendar icon**; you may reach below Event Menu.



You may see the logged events with time and date stamp.
Events are stored in EEPROM using FIFO method.
When you touch any event log, you may reach the details of it as you see on the side.

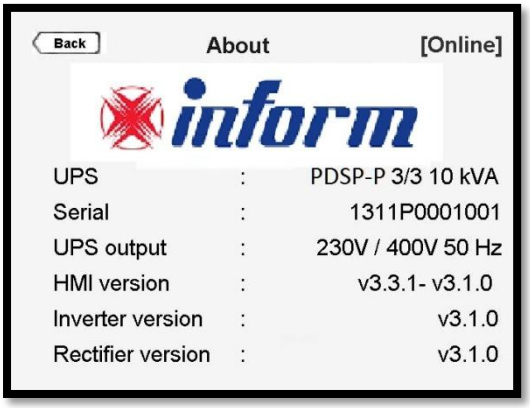
You may see the details of the event with event code.

If Technical Support required; taking notes of current event logs would be useful.

You may reach detailed information about events from Appendix-4: Event List.

6.2.5. About Menu

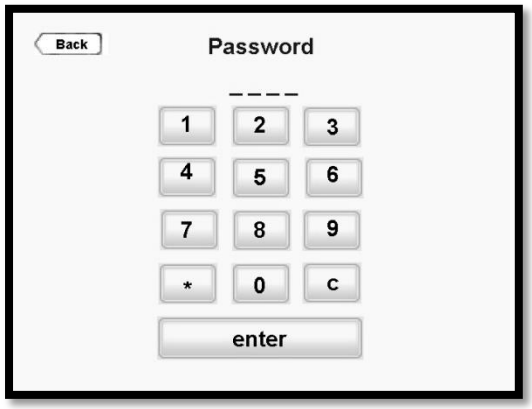
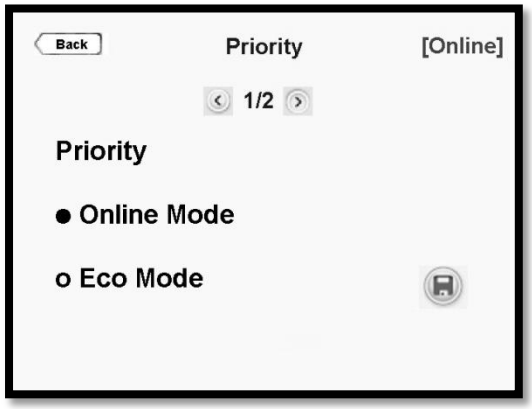
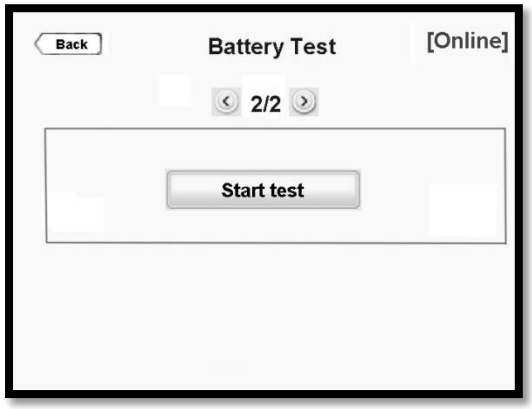
This menu provides information about the UPS itself.



- **UPS:** UPS model and nominal power
- **Serial:** UPS serial number
- **UPS output:** UPS output voltage (Ph-N / Ph-Ph) and frequency
- **HMI version:** Human Machine Interface version
- **Inverter version:** Inverter firmware version
- **Rectifier version:** Rectifier firmware version

6.2.6. Command Menu

Through this menu; you may send some commands to UPS. User Password must be entered to make changes in this section.
User Password: 1111 (the password cannot be changed).
You may see the COMMAND Menu's screen as below;

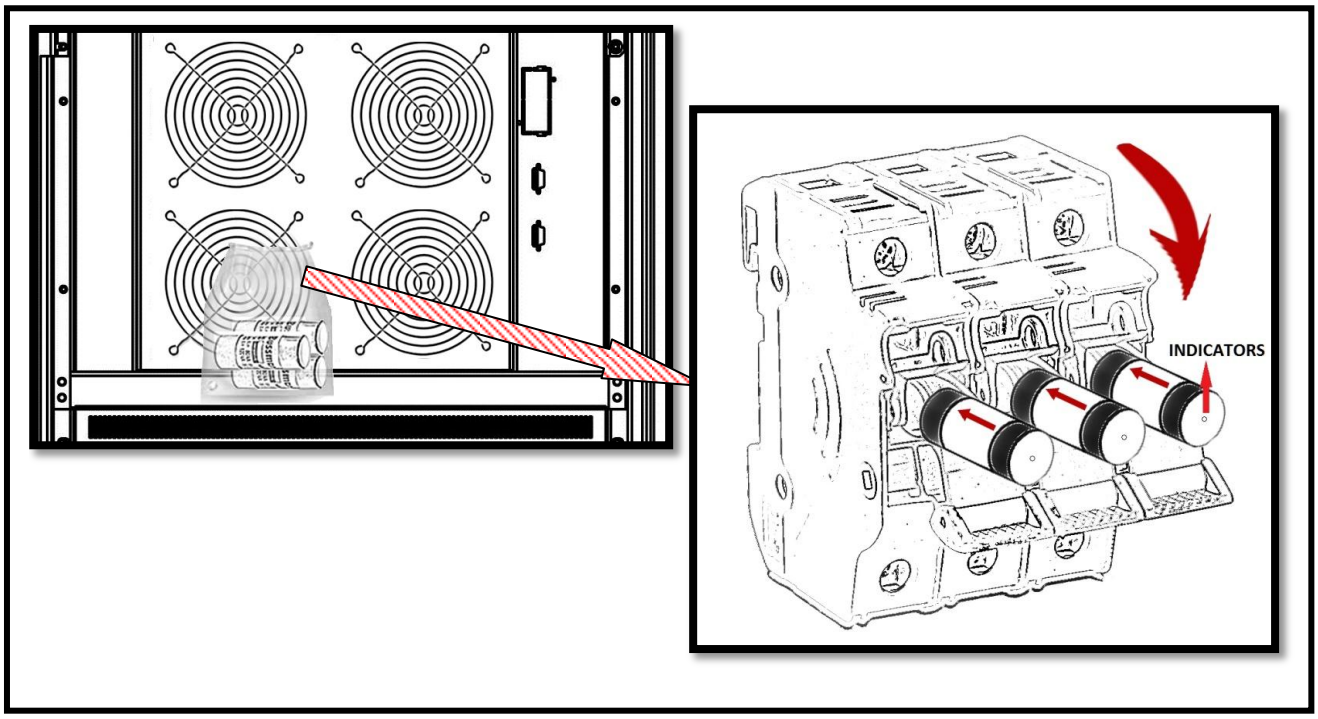
	When the Password Screen appears, enter 1111, touch **enter** to confirm.
	Via this menu; you may choose operation mode of UPS as Online or Eco Mode. If system is configured as ***Single;*** you may choose operation mode of UPS Online or Eco Mode. When you touch the **Save icon** key, a confirmation pop-up bar will appear. You should touch **Yes** to save the settings. Touch **No** to exit without saving the changes.
	With this command, UPS battery test feature can be started. When you touch the **Start test** key, a confirmation pop-up bar will appear. You should touch **Yes** to start the test; otherwise touch **No**. UPS tests the battery automatically once each 90 days.

7. OPERATING PROCEDURES

7.1. Preparations

UPS is shipped with 3pcs battery fast fuses in a plastic package attached to the rear side of UPS. Separate the package from UPS and take out the fuses.

After all connections are completed as described in Section 4, the battery fuses must be placed as shown below.



Do not leave the battery fuse package at the front of UPS. Otherwise the fans would be blocked and UPS may overheat.
Do not close battery fuse holder F5 before reading Commissioning procedure Section 7.2

Mount the battery fast fuses into battery fuse holder on the UPS. Fast fuses indicators side must be placed upper side of the holder.

7.2. Commissioning

After all connections and settings have been done, UPS can be started-up.

Even with no connections have been done, hazardous voltages may exist on connection terminals and inside the UPS. Do not touch these parts.

If you work on terminals; all circuit breakers in the input/bypass distribution panel, and if any the battery circuit breakers in the external battery cabinet should be brought to “0” position.

Units with internal batteries have hazardous voltages on the battery connectors even if the battery circuit breaker is at “0” position. **Do not touch the battery connectors!**

7.2.1. Start-Up UPS with Internal Battery

1. Put the battery fast fuses into the battery circuit breaker on the UPS **(F5)**. **Do not close the circuit breaker yet!**
2. Switch the bypass circuit breaker on the distribution panel to **“ON”** position.
3. Switch the mains supply circuit breaker on the distribution panel to **“ON”** position.
4. Switch the bypass circuit breaker on the UPS **(F4)** to **“ON”** position.
5. Switch the input circuit breaker on the UPS **(F1)** to **“ON”** position.
6. Switch the inrush circuit breaker on the UPS **(F6)** to **“ON”** position.
7. Touch Battery icon to see **Battery / DC** menu measurement. Do not close the battery circuit breakers **(F5)** until the difference between DC bus and Battery voltages decreases below 10V.
8. Switch the output circuit breaker on the UPS **(F2)** to **“ON”** position.
9. Switch the output circuit breaker on the distribution panel to **“ON”** position.

Afterwards UPS starts to supply the loads.

7.2.2. Start-Up UPS with External Battery

1. Put the battery fast fuses into the battery circuit breaker on the UPS **(F5)**. **Do not close the circuit breaker yet!**
2. Switch the bypass circuit breaker on the distribution panel to **“ON”** position.
3. Switch the input circuit breaker on the distribution panel to **“ON”** position.
4. Switch the bypass circuit breaker on the UPS **(F4)** to **“ON”** position.
5. Switch the input circuit breaker on the UPS **(F1)** to **“ON”** position.
6. Switch the inrush circuit breaker on the UPS **(F6)** to **“ON”** position.
7. Switch the circuit breakers on the external battery cabinet to **“ON”** position.
8. For the first start up after external battery cabinet installation, you need to check if no polarity inversion between battery cabinet and UPS. You can control voltages with multimeter on external battery connection terminals.
9. Touch Battery icon to see **Battery / DC** menu measurement. Do not close the battery circuit breakers **(F5)** until the difference between DC bus and Battery voltages decreases below 10V.
10. Switch the output circuit breaker on the UPS **(F2)** to **“ON”** position.
11. Switch the output circuit breaker on the distribution panel to **“ON”** position.

Afterwards UPS starts to supply the loads.

7.3. Decommissioning

Follow the order written below to decommission the UPS:

1. Switch the output circuit breaker on the distribution panel to **"OFF"** position.
2. Switch the output circuit breaker on the UPS **(F2)** to **"OFF"** position.
3. Switch the battery circuit breaker on the UPS **(F5)** to **"OFF"** position.
4. If exists, switch the circuit breakers on the external battery cabinet to **"OFF"** position.
5. Switch the input circuit breaker on the distribution panel to **"OFF"** position.
6. Switch the bypass circuit breaker on the distribution panel to **"OFF"** position.
7. Switch the inrush circuit breaker on the UPS **(F6)** to **"OFF"** position.
8. Switch the input circuit breaker on the UPS **(F1)** to **"OFF"** position.
9. Switch the auxiliary circuit breaker on the UPS **(F4)** to **"OFF"** position.

Wait a few minutes till UPS completely turn off.

Even without connections on UPS terminals, residual voltages may exist on these terminals and inside the UPS. Do not touch these parts.
RISK OF BACKFEED: Before working on UPS terminals, check for Hazardous Voltage between all terminals including the protective earth (PE).

7.4. Maintenance Bypass Commissioning Instructions (Transfer Load Supply from UPS to Internal Maintenance Bypass)

This procedure may only be executed by trained Personnel.

Maintenance bypass enables the user to isolate the electronic circuitry of the UPS from the mains voltage and the load without interrupting the load operation by connecting the loads directly to the bypass supply. This feature is useful while waiting service staff and shall only be executed by trained Personnel.
In order to transfer to Maintenance Bypass without interruption, do the following instruction respectively;

1. On the display, select **Menu / Command**, enter User password (1111).
2. In page **Priority**, select Eco Mode, save and confirm, go back to Energy Flow Diagram screen
3. Check that UPS is in Eco Mode operation.
4. Open the front door with the UPS key.
5. Switch the maintenance bypass circuit breaker on the UPS **(F3)** to **"ON"** position.
6. See **"M. Bypass Mode"** written on LCD of UPS.
7. Switch to **"OFF"** position the output circuit breaker **(F2)**, the battery circuit breakers **(F5)**, the breakers on external battery cabinets if any, the input circuit breaker **(F1)** and the inrush circuit breakers **(F6)** on the UPS.
8. Switch the bypass circuit breaker on the UPS **(F4)** to **"OFF"** position.
9. LCD would be off and the alarms would be silenced.

The loads will be continued to be supplied directly from the mains voltage.

Some parts inside the UPS including terminals are still energized during maintenance bypass operation.
All the maintenance operations should be done by authorized INFORM UPS Technical Service Personnel.

During Maintenance Bypass operation; in case any mains voltage interruption occurs, all loads supplied downstream the UPS will be de-energized. Maintenance Bypass Operation should not be preferred for long time use.

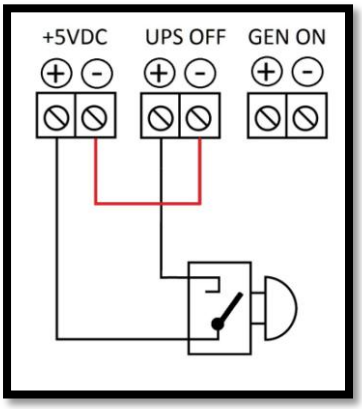
7.5. Maintenance Bypass Decommissioning Instructions

In order to transfer the loads from Maintenance Bypass to UPS without interruption, do the following instruction respectively;

1. Switch the bypass circuit breaker on the UPS **(F4)** to **"ON"** position, after 30s check if fans are running.
2. Switch the input circuit breaker on the UPS **(F1)** to **"ON"** position.
3. Switch the inrush circuit breaker on the UPS **(F6)** to **"ON"** position.
4. LCD will be ON. See **"M. Bypass Mode"** written on LCD of UPS.
5. Switch the circuit breakers on the external battery cabinet to **"ON"** position.
6. Touch Battery icon to see **Battery / DC** menu measurement. Do not close the battery circuit breakers **(F5)** until the difference between DC bus and Battery voltages decreases below 10V.
7. Switch the output circuit breaker on the UPS **(F2)** to **"ON"** position.
8. Switch the maintenance bypass circuit breaker on the UPS **(F3)** to **"OFF"** position.
9. Check on Energy Diagram screen that UPS is in **Eco Mode** operation.
10. On the display, select **Menu / Command**, enter User password (1111)
11. In page **Priority Mode**, select Online Mode if requested, save and confirm, go back to Energy Flow Diagram screen.
12. See **"Online Mode"** written on LCD.
13. Close the front door of UPS.

When installing external maintenance bypass breaker please make sure that auxiliary contact information signal cable is connected in parallel to internal maintenance bypass auxiliary contacts. And please use twisted and shielded cable for this transmission.

7.6. Emergency Switching Device (ESD)



UPS output can be cut off immediately by ESD connection if desired.

ESD switch should be placed where unauthorized people can not reach it. Unauthorized use may cause the load be deenergized.

7.7. Connection to a Generator

If the input power is supplied by a generator, set the digital input "GEN ON" high. This ensures generator friendly operation by smoothing the increment of the current drawn from the generator, during transition from battery mode to normal mode.
When this is done, "Generator mode active" will be shown in Diagnostics menu. Connection details are given in the 4.2.2. Communication Interface Connection section.

8. OPERATING PROCEDURES FOR PARALLEL SYSTEMS

8.1. Introduction

PDSP PREMIUM UPS Systems are designed according to high MTBF figures with increased reliability.
To increase the output power or the UPS system availability a second (or more) PDSP PREMIUM UPS can be connected in parallel redundant/power. Maximum of 4 identical power PDSP PREMIUM power unit can be connected in parallel.

You may see the block diagrams of Parallel Systems in Appendix-6: Description of UPS and Block Diagram.

Parallel configuration must only be activated by INFORM UPS Technical Service Personnel.

There are two paralleling modes you may choose via Front Panel. **You may reach this menu with service password, only.**

8.1.1. Redundancy

The UPS parallel system is redundant when one or more UPS units can be stopped by failure or maintenance operation without affecting the load supply by the remaining operating UPS units.
N+1 redundancy means than one UPS unit can be stopped without affecting secured load supply.
N+2 redundancy means than up to two UPS unit can be stopped without affecting secured load supply.

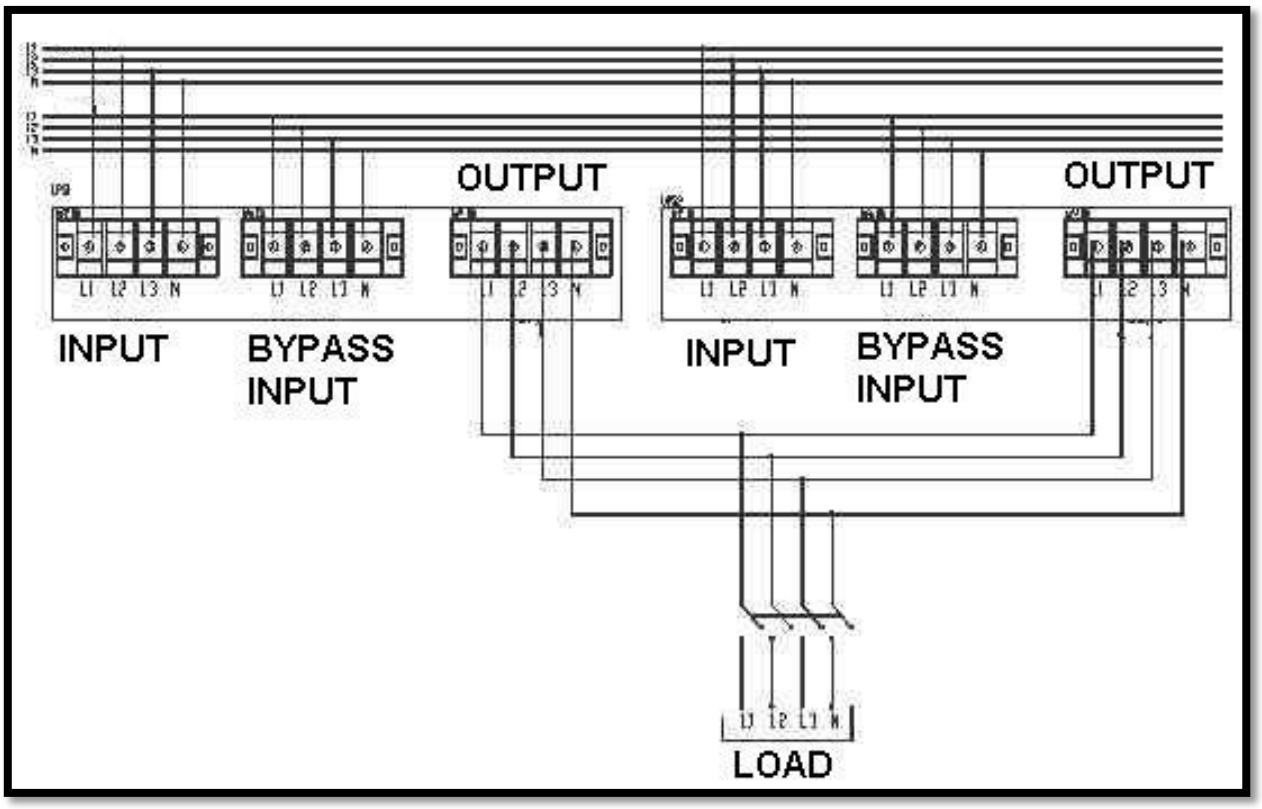
Maximum Load per parallel UPS unit to keep redundancy:

		Number of Parallel UPS Units		
		2	**3**	**4**
Redundancy	N+1	50%	66%	75%
	N+2	---	33%	50%

8.1.2. Power Increase

If Power Increase Mode is selected, the total capacity of the system is N times the capacity of each UPS unit. Maximum load per unit can reach 100% in normal operation. All running UPS units in parallel share the load equally.
In case of any problem on one of the units, the remaining units may operate in overload and the loads supplied through bypass after certain time.

8.2. Procedure for Commissioning and Start-Up (First Installation)



(OUTPUT CONNECTION OF PARALLEL UPS SYSTEMS)

If the UPSs are not factory parallel configured; the initially started-up UPS will operate as master and the remaining UPS's will operate as slave. According ID numbers defined for each UPS, Master and Slave messages should be observed on the LCD panel. On the master unit, candidate master UPS is also shown as CX.

CX represents the best available master candidate UPS among the slave UPSs. X represents the ID number of this slave UPS. In case the master UPS fails, then this candidate assigned UPS becomes Master.

Start up for "PARALLEL" UPSs not on Maintenance Bypass Mode;

1. Switch the Bypass circuit breaker on the distribution panel to **"ON"** position.
2. Switch the input circuit breaker on the distribution panel to **"ON"** position.
3. Switch **F4** (Bypass) circuit breakers of all UPSs **"ON"** position.
4. Switch **F1** (Input) circuit breakers of all UPSs to **"ON"** position.
5. Switch **F6** (Inrush) circuit breakers of all UPSs to **"ON"** position.
6. Touch Battery icon to see **Battery / DC** menu measurement. Do not close the battery circuit breakers **(F5)** until the difference between DC bus and Battery voltages decreases below 10V.
7. If exists, switch external Battery circuit breaker to **"ON"** position.
8. Switch **F2** (Output) circuit breakers of all UPSs to **"ON"** position.
9. Switch the output circuit breakers on the distribution panel to **"ON"** position.

Start up for "PARALLEL" UPSs on Maintenance Bypass Mode;

1. Switch **F4** (Bypass) circuit breakers of all UPSs **"ON"** position.
2. Switch **F1** (Input) circuit breakers of all UPSs to **"ON"** position.
3. Switch **F6** (Inrush) circuit breakers of all UPSs to **"ON"** position.
4. LCDs will be ON. See **"M. Bypass Mode"** written on LCD of all UPS.
5. Touch Battery icon to see **Battery / DC** menu measurement. Do not close the battery circuit breakers **(F5)** until the difference between DC bus and Battery voltages decreases below 10V.
6. If exists, switch external Battery circuit breakers to **"ON"** position.
7. Switch **F5** (Battery) circuit breakers of all UPSs to **"ON"** position.
8. Switch **F2** (Output) circuit breakers of all UPSs to **"ON"** position.
9. Switch **F3** (Maintenance Bypass) circuit breakers of all UPSs to **"OFF"** position.
10. See **"Online Mode"** written on LCDs.

CAUTION: Do not remove the communication cables between the UPS's during parallel operation.

In case the communication cable is removed or damaged during parallel operation and the communication is lost then the slave UPS which cannot communicate with the master UPS will disconnect from the output bus and turn off. The other UPSs will continue normal operation. In such a case, this UPS should be turned off completely in order to insert its communication cable again and then switched on again.

CAUTION: Do not try to insert its communication cable while it is operating.

The Redundancy System expects to have at least one more UPS than N value. Otherwise it shall provide **"Redundancy Lost"** alarm. The same alarm shall also appear in case:
Load % > N / (N+1) * 100

8.3. Procedure for Decommissioning

Decommissioning "PARALLEL" UPS without switching to Maintenance Bypass Mode;

1. Switch the output circuit breakers on the distribution panel to **"OFF"** position.
2. Switch **F2** (Output) circuit breakers of all **Slave** to **"OFF"** position.
3. Switch **F2** (Output) circuit breaker of **Master** to **"OFF"** position.
4. Switch **F5** (Battery) circuit breakers of all **Slave** to **"OFF"** position.
5. If exists, switch external Battery circuit breakers of all **Slave** to **"OFF"** position.
6. Switch **F5** (Battery) circuit breaker of **Master** to **"OFF"** position.
7. If exists, switch external Battery circuit breaker of **Master** to **"OFF"** position.
8. Switch **F6** (Inrush) circuit breakers of all **Slave** to **"OFF"** position.
9. Switch **F6** (Inrush) circuit breaker of **Master** to **"OFF"** position.
10. Switch **F1** (Input) circuit breakers of all **Slave** to **"OFF"** position.
11. Switch **F4** (Bypass) circuit breakers of all **Slave** to **"OFF"** position.
12. Switch **F1** (Input) circuit breaker of **Master** to **"OFF"** position.
13. Switch **F4** (Bypass) circuit breaker of **Master** to **"OFF"** position.

Decommissioning "PARALLEL" UPS with switching Maintenance Bypass Mode;

1. Go to **Commands** menu of **Master** UPS, enter User password (1111).
2. In page **Priority**, select Bypass Mode, save and confirm, go back to Energy Flow Diagram screen.
3. Check that UPS is in Bypass Mode operation. See all UPSs switch to Bypass Operation.
4. Switch **F3** (Maintenance Bypass) circuit breakers of all **Slave** to **"ON"** position.
5. Switch **F3** (Maintenance Bypass) circuit breaker of **Master** to **"ON"** position.
6. Switch **F2** (Output) circuit breakers of all **Slave** to **"OFF"** position.
7. Switch **F2** (Output) circuit breaker of **Master** to **"OFF"** position.
8. Switch **F5** (Battery) circuit breakers of all **Slave** to **"OFF"** position.
9. If exists, switch external Battery circuit breakers of all **Slave** to **"OFF"** position.
10. Switch **F5** (Battery) circuit breaker of **Master** to **"OFF"** position.
11. If exists, switch external Battery circuit breaker of **Master** to **"OFF"** position.
12. Switch **F6** (Inrush) circuit breakers of all **Slave** to **"OFF"** position.
13. Switch **F6** (Inrush) circuit breaker of **Master** to **"OFF"** position.
14. Switch **F1** (Input) circuit breakers of all **Slave** to **"OFF"** position.
15. Switch **F4** (Bypass) circuit breakers of all **Slave** to **"OFF"** position.
16. Switch **F1** (Input) circuit breaker of **Master** to **"OFF"** position.
17. Switch **F4** (Bypass) circuit breaker of **Master** to **"OFF"** position.

9. MAINTENANCE

All the maintenance operations should be done by authorized Technical Service Personnel.

Hazardous voltage and high temperature metal parts inside even if the UPS is disconnected. Contact may cause electric shock and burns. All operations except replacing battery fuses shall be carried out by the authorized Technical Personnel only.

Some parts inside the UPS (terminals, EMC filters and measurement circuits) are still energized during maintenance bypass operation. In order to deenergize all UPS parts, circuit breakers on mains and bypass mains distribution panels feeding the UPS and circuit breakers on external battery cabinet shall be brought to “OFF/0” position. Internal batteries shall also be isolated from the system.

Maintenance includes fully control of all the electronic and mechanical components in UPS. And they needed to be replaced after their lifetime is over. Systematic maintenance ensures to improve UPS’s efficiency and to extend life-time. INFORM recommends every 3 to 6 months of period for systematic maintenance after warranty by authorized service.

9.1. Batteries

The life of batteries strongly depends on the usage and environmental conditions. (ambient temperature, frequency of electricity cuts, etc.). There are also other factors like the number of charge-discharge cycles and discharge depth. Performing battery test can provide you information about battery condition. But not to come acrross any unrequired condition during electricity cut, the batteries should be maintained periodically by authorized Technical Personnel.

Danger of explosion and fire if the batteries of the wrong type are used.

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

When replacing batteries; use the same quantity and type that were originally fitted.

Batteries must always be disposed of according to local environmental laws.

9.2. Battery Fuses

Switch the battery circuit breaker to “I” position before seeing “Online Mode” message on the LCD may cause battery fuses to blow out.

Battery fuses should only be replaced with the same rating or equivalent.

9.3. Fans

The life of fans used to cool the power circuits depends on the usage and environmental conditions.
Please look at Appendix-1: Technical Specifications for detailed environment conditions.
Preventive maintenance shall be done by authorized Technical Personnel periodically.

9.4. Capacitors

The life of the electrolytic capacitors on the DC BUS and the capacitors used for output and input filtering purposes depends on the usage and environmental conditions.
Preventive maintenance should be done by authorized Technical Personnel periodically.

10. TROUBLESHOOTING

The aim of this chapter is to identify potential issues, understand the root cause of the problems and provide solution to them.

Residual voltage and high temperature metal parts inside even if the UPS is disconnected. Contact may cause electric shock and burns. All operations except replacing battery fuses shall be carried out by the authorized INFORM UPS Technical Service Personnel only.

10.1. Bypass voltage failure Alarm

It means that bypass voltage is out of the limit.
Make sure that the bypass circuit breaker is “ON” and the voltage / frequency is between the bypass limit.

10.2. Bypass phase sequence wrong Alarm

It means that phase sequence of bypass voltage is not OK. Phase sequence of the bypass should be changed. Please contact the INFORM Technical Assistance Centre.

10.3. Inverter not sync. with bypass Alarm

Frequency of bypass voltage is beyond the frequency range for online operation or bypassvoltage is out of limit. Check if the bypassvoltage is in specified limits.

10.4. Input phase sequence wrong Alarm

It means that phase sequence of common mains supply voltage is not OK. Phase sequence of common mains supply input should be changed. Please contact the INFORM Technical Assistance Centre.

10.5. Rectifier not sync. with input Alarm

Frequency of common mains supply voltage is beyond the frequency range of rectifier or common mains supply voltage is out of limit. Check if common mains supply is in specified limits.

10.6. DC voltage failure Alarms

Any of the DC bus voltages is out of the limit. If you encounter this alarm during start-up, check if the inrush circuit breaker is at “ON” position. Check polarity of external battery connections if any. If it still exists contact the INFORM Technical Assistance Centre.

10.7. ESD active Alarm

It means that Emergency Switching Device (ESD) is activated (digital input “UPS OFF” is set high). Check if ESD switch is ON or not.

10.8. Ambient temperature high Alarm

It is shown “**Ambient temperature high**” on Diagnostics Menu. If the ambient temperature is high, it causes a rise in the internal temperature of UPS and this alarm appears. In this case; the first thing to do is cool the environment.

10.9. Overload Alarms

Loads connected to the output of the UPS exceed the nominal power of the unit so it gives “**Rectifier overload**” and/or “**Output overload**” alarms. Check if there is an overload and origin, remove the excessive load. Hence the alarm would switch to off.

Make sure that the UPS is not overloaded to provide a higher quality supply to the loads.

10.10. Maintenance bypass active Alarm

If Maintenance Bypass circuit breaker is brought to “ON” position, this alarm appears. Refer to Section 7.5 to check if Maintenance Bypass decommissioning procedure has been respected.

10.11. Battery test failure Alarm

UPS tests the batteries periodically. In case the batteries failed in the battery test, this alarm appears. Perform the test again when the batteries have been charged for min. 10 hours and verify the battery circuit breaker is at “ON” position.
If the alarm continues, contact to Inform UPS Technical Service.

10.12. Input voltage failure Alarms

If the input voltage is not in specified limits, these alarms appear and In this case UPS operates in Battery Operation mode. As soon as the mains voltage returns to specified limits, the alarms will disappear.

10.13. Inverter temperature high/ Rectifier temperature high Alarms

If temperature of the inverter or rectifier block rises, these alarms appear. The reasons can be: overload, fan failure, high ambient temperature, and dusty environment. If fans failed or any other problem is identified, contact Inform UPS Technical Service.

If any other alarm occurs or if the above alarms cannot be cleared, contact Inform UPS Technical Service.

Please prepare the following information before you contact Inform UPS Technical Service:

- Ensure you read and apply troubleshooting procedure carefully
- UPS Model Type
- Serial Number
- Firmware version
- Date of failure or problem
- Date of commissioning
- Symptoms of failure or problem
- Customer site address and contact information
- Service contract references if any

Appendix-1: Technical Specifications

MODELS									
		PDSP-P 33010	PDSP-P 33015	PDSP-P 33020	PDSP-P 33030	PDSP-P 33040	PDSP-P 33060	PDSP-P 33080	PDSP-P 33100
Apparent power [kVA]		10	15	20	30	40	60	80	100
ENVIRONMENTAL									
Storage Temperature Range [°C]		-25 to +55 (15 - 40 recommended for longer battery life)							
Operating Temperature Range [°C]		0 to +40 (20 - 25 recommended for longer battery life)							
Relative Humidity Range		% 0 - % 95 (non condensing)							
Max. Altitude without Derating [m]		1000							
Protection Level		IP 20							
Maximum Power Ddissipation	[W]	889	1483	1680	2258	3556	4174	6330	6207
	[Btu]	3033	5061	5731	7705	12132	14242	21598	21179
	[kcal/h]	764	1275	1444	1941	3057	3588	5442	5337
ELECTRICAL									
Mains Input									
Number of Phases		3Ph+N+PE							
Nominal Voltage [V]		380 / 400 / 415 (Ph-Ph)							
Voltage range for normal operation (line to neutral) [V]	Lower limit (depends on the load level)	195.5 @ %100 load (Ph-N)							
	Upper Limit	280							
Nominal Frequency [Hz]		50 / 60							
Frequency Range [Hz]		±10%							
Nominal Current [A]	wave Form	sinusoidal							
	rms Value *(2)	15	23	30	45	61	89	121	148
Maximum Current [A]	wave form	sinusoidal							
	rms Value	19	28	36	53	74	107	144	178
OUTPUT @ 3PH OUTPUT UPS									
Performance Classification		VFI-SS-111							
Number of Phases		3Ph+N+PE							
Nominal Voltage [V]		380 / 400 / 415 (Ph-Ph)							
Static Voltage Regulation @ %100 Linear Load	Normal	<%1							
	Battery								
Nominal Frequency [Hz]		50 / 60							
Free Running Frequency [Hz]		± % 0.01							
Voltage THD @ Rated Linear Load		<%3							

Nominal Apparent Power [kVA]	10	15	20	30	40	60	80	100
Maximum Load P. F.	0.9							
Nominal active power [kW]	9	13,5	18	27	36	54	72	90
Nominal current [A] at 380V	15	23	30	45	61	91	121	152
Load Crest Factor @ Rated Power	3:1							
Overload Duration	101%< Load <125%....: 10 minutes 125%< Load <150%....: 1 minutes							
Efficiency (normal operation) @rated linear load with 0.9 PF	Up to 94% *							
STATIC BYPASS LINE @ 3PH OUTPUT UPS								
Number of Phases	3Ph+N+PE							
Voltage Range (Line- Neutral) [V]*(1)	220 /230 /240 ±%10							
Frequency Range [Hz] *(1)	47-53							
Nominal Apparent Power [kVA]	10	15	20	30	40	60	80	100
Nominal Current [A]	15	23	30	45	61	91	121	152
Transfer Duration [ms]	0							
Overload Duration	Load <175%.... continues							
BATTERIES								
Battery Type	Maintenance-Free Lead Acid Batteries, 12 V							
Number of Batteries	2x31							
Nominal Battery Voltage [V]	2x372							
PHYSICAL								
Dimensions (WxDxH) (cm)	40 x 78 x 107				52 x 90 x 130	67 x 73 x 163		85 x 78 x 182
Weight (kg)	100	114	116	122	180	253	285	405
COMMUNICATION								
Standard Interface	RS232 (Serial communication), RS485 (Modbus),ESD (remote shut down of the UPS), Genset (generator operation feedback)							
	4 Programmable Relay Contacts (General alarm, Input failure, Battery failure, Output failure, Bypass active, Output overload, High temperature)							
Options	Internal or External SNMP Kit, Remote Control Panel							
FRONT PANEL								
3.5" Graphical Touch Screen	Graphical Flow Diagram for Line, Rectifier, Bypass, Battery, Inverter and Load							
Measurements	Input & Output Frequency, Voltage & Current, Load Power Factor, Load%, Load Active & Apparent Power, Bypass Voltage & Frequency, Battery Voltage, Current & Temperature, Autonomy Time (min),							
PROTECTION								
Overload Protection, High Temperature, Input Over Voltage, Input & Output Over Current, Intelligent Charging Algorithm - Deep Charge Protection - Battery Test (Automatic / Manual), Short-Circuit Protection								
STANDARDS								
Safety	EN 62040-1							

Performance	EN 62040-3
EMC	EN 62040-2
Product Certification	CE
OPTIONS	
Parallel Kit, Split Bypass, Battery Cabinet	

*Varies depending on UPS power.

The manufacturer reserves the rights to change the technical specifications and design without notice.

Appendix-2: Alarms List

NO	ALARMS	DESCRIPTION
1	Bypass voltage failure	Bypass voltage is out of the limit
2	Bypass phase sequence wrong	Phase sequence of bypass mains voltage is not OK
3	Inverter not sync. with bypass	Frequency of bypass voltage is beyond the frequency range for online operation or bypass voltage is out of limit.
4	Battery breaker open	Battery fuses blown or breaker opened by user
5	Battery test failure	Battery failure
6	Rectifier temperature high	Rectifier IGBT module temperature high
7	Rectifier overload	RMS current drawn from any of the input lines exceeds its nominal value.
8	Rectifier communication lost	Front panel cannot communicate with rectifier
9	Input voltage failure	Input voltage is out of the limit
10	Input phase sequence wrong	Phase sequence of input mains voltage is not OK
11	Rectifier not sync. with input	Frequency of input mains voltage is beyond the frequency range of rectifier or input mains voltage is out of limit.
12	Rectifier not precharged	DC voltage not charged by inrush circuit
13	DC voltage failure	DC Bus voltage is out of the limit
14	Inverter temperature high	Inverter IGBT module temperature high
15	Output overload	RMS current drawn from any of the output lines exceeds its nominal value.
16	Inverter DC component high	Inverter voltage's DC component is out of the limit
17	Inverter communication lost	Front panel cannot communicate with inverter
18	Output DC component high	Output voltage's DC component is out of the limit
19	Output voltage failure	Output voltage is out of the limit
20	Output short circuit	Short circuit at the output
21	Master communication lost	Slave cannot communicate with master
22	Slave not sync. with master	Slave lost the synchronization with the master
23	N number failure	Parallel UPS count is below the adjusted N number
24	Redundancy lost	Parallel system alarm. The total load is more than the redundancy load. The formula is: Load % > N / (N+1) * 100

Appendix-3: Diagnostics List

NO	DIAGNOSTICS	DESCRIPTION
1	Bypass active	UPS is on Bypass operation.
2	Bypass blocked	Bypass is blocked by UPS
3	Bypass disabled	Bypass is disabled by user
4	Eco mode active	Eco mode is selected
5	Battery test active	Battery test is running now
6	Battery discharging	Rectifier overload and cannot feed DC enough or mains failure
7	Ambient temperature high	Ambient temperature exceeds the upper limit
8	Rectifier passive	Rectifier is not running now
9	Rectifier blocked	Rectifier is blocked by UPS
10	Rectifier disabled	Rectifier is disabled by user
11	Inverter passive	Inverter is not running now
12	Inverter blocked	Inverter is blocked by UPS
13	Inverter disabled	Inverter is disabled by user
14	Generator mode active	Generator friendly operation is activated
15	ESD active	Emergency Switching Device interface is activated
16	Maintenance bypass active	Maintenance bypass switch is at “ON” position
17	Output breaker open	Output circuit breaker is at “OFF” position

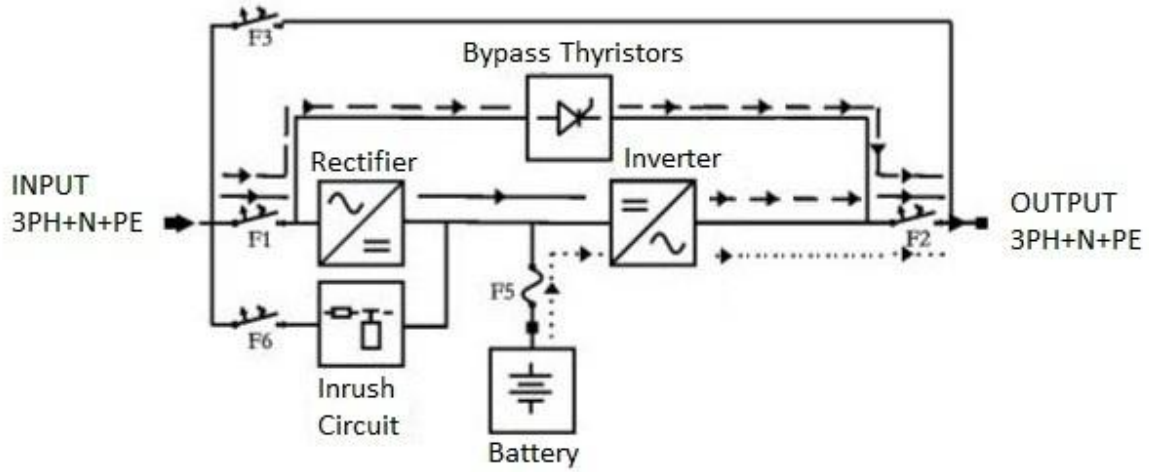
Appendix-4: Event List

NO	EVENTS	DESCRIPTION
1	Bypass voltage ok	Bypass voltage is within its limit.
2	Inv. sync. with Byp.	Frequency of bypass mains voltage synchronized with output frequency.
3	Byp. ph. seq. ok	Phase sequence of bypass mains voltages is OK.
4	M. Bypass passive	Manual/Maintenance Bypass switch is at “0” position.
5	Inverter temp. ok	Inverter block temperature is within the limits.
6	Inverter load ok	RMS current drawn from any of the output lines does not exceed its nominal value.
7	Bypass passive	Bypass does not operate now.
8	Inverter active	Inverter operates now.
9	Output voltage ok	Output voltage is within the limits.
10	Master com. ok	There is no communication problem with master UPS.
11	Input voltage ok	Input voltage is within the limits.
12	Rec. sync. with Inp.	Rectifier is synchronized to input frequency.
13	Inp. ph. seq. ok	Phase sequence of input voltages is OK.
14	Rectifier temp. ok	Rectifier block temperature is within the limits.
15	Rectifier load ok	RMS current drawn from any of the input lines does not exceed its nominal value.
16	DC voltage ok	DC bus voltage is within the limits.
17	DC voltage ok	DC bus voltage is within the limits.
18	Rectifier active	Rectifier operates now.
19	Output breaker closed	Output circuit breaker is at “I” position.
20	Batt. test completed	Battery test is completed.
21	Redundancy ok	All parallel UPS is OK.
22	N number ok	All parallel UPS is OK.
23	Rectifier enabled	Rectifier enabled is set as “YES” from front panel.
24	Inverter enabled	Inverter enabled is set as “YES” from front panel.
25	Bypass enabled	Bypass enabled is set as “YES” from front panel.
26	Eco mode passive	Eco Mode enabled is set as “NO” from front panel.
27	Batt. not discharging	Battery is not discharging.
28	Ambient temp. ok	Ambient temperature is within the limits.
29	Gen. mode passive	Generator friendly operation is passive.
30	ESD incactive	Emergency Switching Device interface is inactive.
31	Battery test succeed	Battery test result is success.
32	Battery breaker closed	Battery circuit breaker is at “I” position.
33	Rec. precharged	DC bus voltage is equal to input voltage.
34	Inverter com. ok	Communication between the inverter and the front panel is OK.
35	Rectifier com. ok	Communication between the rectifier and the front panel is OK.
36	Bypass voltage high	Bypass voltage is higher than its limit.
37	Bypass voltage low	Bypass voltage is lower than its limit.
38	Inv. not sync. with Byp.	Frequency of bypass mains voltage not synchronized with output frequency.
39	Byp. ph. seq. wrong	Phase sequence of bypass mains voltages is not OK
40	M. Bypass active	Manual/Maintenance Bypass switch is “ON”
41	Inverter temp. high	Inverter block temperature is very high.

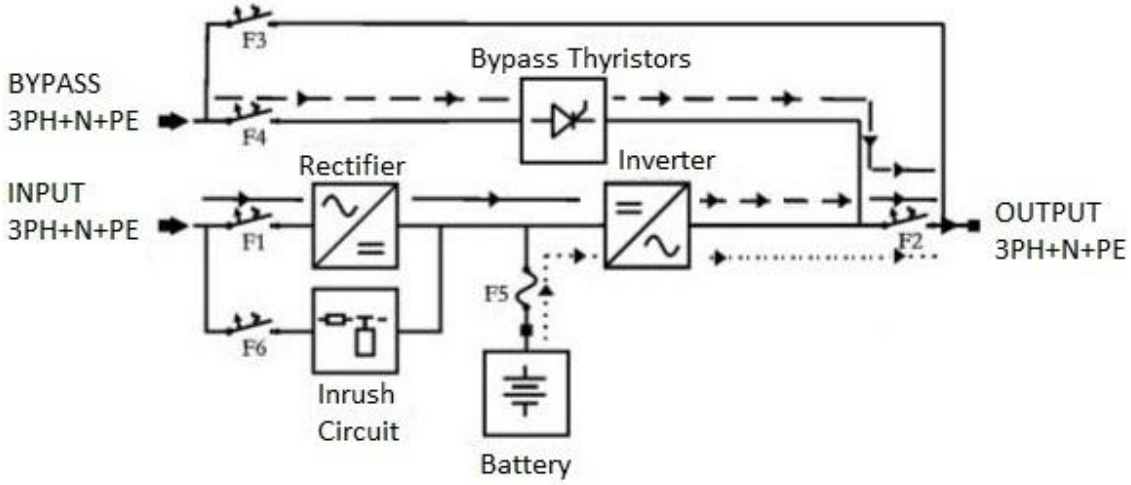
42	Inverter overload	RMS current drawn from any of the output lines exceeds its nominal value.
43	Bypass active	UPS is on Bypass Operation.
44	Inverter passive	Inverter does not operate now.
45	Output voltage failure	Output voltage is beyond its limits
46	Master com. lost	This alarm is observed when information flow from master ups is interrupted
47	Input voltage high	Input voltage is higher than its limit.
48	Input voltage low	Input voltage is lower than its limit.
49	Rec. not sync. with Inp.	Frequency of input voltage is beyond the frequency range for bypass operation or bypass mains voltage is very low
50	Inp. ph. seq. wrong	Phase sequence of input mains voltages is not OK.
51	Rectifier temp. high	Rectifier block temperature is very high.
52	Rectifier overload	RMS current drawn from any of the input lines exceeds its nominal value.
53	DC voltage high	DC bus voltages are higher than its upper limit.
54	DC voltage low	DC bus voltages are lower than its lower limit.
55	Rectifier passive	Rectifier does not operate now.
56	Output breaker open	Output Circuit Breaker is at “OFF” position.
57	Batt. test active	Battery test is on progress.
58	Redundancy lost	Parallel system alarm. The total load is more than the redundancy load. The formula is: Load % > N / (N+1) * 100
59	N number failure	Parallel system alarm. If the UPS number in parallel is less than the preadjusted N number, that alarm appears.
60	Rectifier disabled	Rectifier enabled is set as “NO” from front panel.
61	Inverter disabled	Inverter enabled is set as “NO” from front panel.
62	Bypass disabled	Bypass enabled is set as “NO” from front panel.
63	Eco mode active	Eco Mode enabled is set as “YES” from front panel.
64	Batt. discharging	Battery is discharging.
65	Ambient temp. high	Ambient temperature exceeds its upper limit.
66	Gen. mode active	Generator friendly operation is activated.
67	ESD active	Emergency Switching Device interface is activated.
68	Battery test failure	Batteries failed in the battery test.
69	Battery breaker open	Battery Circuit Breaker is at “OFF” position.
70	Rec. not precharged	DC bus voltage is not equal to input voltage.
71	Inverter com. lost	Communication between the inverter and the front panel is lost.
72	Rectifier com. lost	Communication between the rectifier and the front panel is lost.

Appendix-5: Description of UPS and Block Diagram

There are three operation modes, which differ in the path of the energy flow.
UPS block diagrams and the energy flow path in each operation mode is shown below:
Separate Bypass version is optional.



Block Diagram of without Seperate Bypass Input



Block Diagram of with Seperate Bypass Input

——— Normal Mode – – – Bypass Mode · · · · · Battery Mode