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From 100-200 kVA

MASTERLINE SERIES USER MANUAL

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STARTING PROCESS

- Complete the internal battery connections.
- Connect the device mains and load connections.
- Turn F1 (input) breaker ON.
- Wait for 5 seconds for the front panel to open.
- From the front panel, check that the device is in “bypass mode”
- The device will give warning because it is in “bypass mode”
- Turn F2 (output) breaker ON.
- Press the ON button once and the alarm will stop.
- Press the ON button for one time and see “LINE START” warning
- After then seconds the device will display “ONLINE MODE”.
- Check that the battery charging voltages of the device are generated.
- Set F3 (bypass) breaker to ON position.
- Turn F1 (input) breaker OFF to see that the device is operating on battery.
- Check that the device is in ONLINE MODE by turning F1 (input) breaker ON.

CLOSING PROCESS

- Switch off the load safely before starting the closing process of the device!
- Make sure the loads are switched off!
- Set F2 (output) breaker to OFF.
- Turn battery breaker OFF.
- Press and hold the ON button for 5 seconds.

Check that the device is in “BYPASS MODE”2

- Press the ON and SELECT buttons at the same time to see that the LCD panel of the device is turned off.
- Set F1 (input) breaker to OFF.

Important Notices!

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

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

CE

Description of the Abbreviations

- **UPS:** Uninterruptible Power Systems
- **Batt:** Battery
- **EPO:** EmergencyPowerOff
- **RS232:** Serial Communication Protocol
- **SNMP:** Simple Network Management Protocol
- **V:** Voltage
- **A:** Ampere
- **P:** Power
    - For Input, Output, Battery and Manual Bypass Circuit Breaker;
    - “I” (ON): Closing the Circuit
    - “0” (OFF):Opening the Circuit

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 dam the equipment if not obeyed.

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

Explanation of Symbols

	**PE: PROTECTIVE EARTH**
	**DANGER! HIGH VOLTAGE**
	**CAUTION**
	**RECYCLING**
	**HEAVY GOODS**

ingredients

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Chapter 1: SAFFETY INFORMATION

Life Safety

Use the UPS in room with restricted Access.

The UPS has its own energy source. So, even all the switches are thrown off, there will be energy at the output.

There is high voltage inside of the UPS. So, the UPS must be open only by qualified service perso

The UPS must be grounded accordance with the rules.

Explosion Hazard: Do not litter batteries in fire.

Do not open the plastic cover of the batteries. Electrolyte liquid inside batteries is highly hazardous to skin and eyes.

Comply with all applicable regulations for disposal of waste batteries.

Ups Safety

The UPS must be protected by *a circuit breakereasily accessiblein short circuit and overload case*

If the environment temperature and relative humidity are out of value specified in the manual, do not operate the UPS.

Do not operate the UPS with liquids or excessive moisture environment.

Do not allow a liquid or a foreign object to enter into the UPS.

Do not block the ventilation grids located onthe UPS.

Do not leave the UPS exposed to direct sunlight or heat source.

Lifetime of the UPS is 10 years.

Replacing the Batteries and Recycling

Replacing the batteries must be done by authorized service staff.

Metal accessory as watch, ring are must be taken to prevent personal accidents. Gumshoe and glove must be used..

Tools with dielectric handle must be used.

Be sure that battery connections did not grounded by mistake.

Do not put tool or metal accessory to above batteries.

Battery has an electric shock and short circuit shock.

Batteries must be replaced with batteries are same capacity and same type, same quantity and same sizes

Recycle of batteries must be provided.Deliver batteries to any recycling plant with packaging material of batteries

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Chapter 2: REQUIREMENTS

2-1 Safety Transportation

Be careful when moving the load. Do not carry heavy loads without assistance.
Wheeled UPS must be move unhindered and smooth surfaces.
Do not use a ramp inclined more than 10° angle.
Follow the following recommendations for load weights.
An adult human can carry loads up to 18 kg.
Two adult human can carry loads up to 32 kg.
Three adult human can carry loads up to 55 kg.
Use pallet truck and forklift to move loads are heavy than 55 kg.

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

Use suitable equipment to remove the UPS from the pallet.

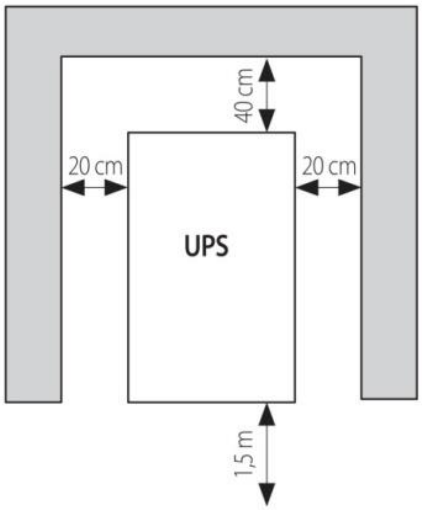
The equipment shall be packed properly during transportation.It is recommended to keep the origina package for feature need.

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

	Environment Requirement	
	Working temperature	0/40 °C (32/104 °F) (15-25 °C for maximum battery life)
	Maximum relative humidity	95% max. without condensation
	Maximum altitude without derating	2.000 m (3.300 ft)
	Degree of protection	IP 20 (other IP as option)

2-2 Placement

This product meets the safety requirements for devices to be operated in restricted access locations according to EN 60950-1 safety standard, which states that the owner should guarantee thefollowing:



LxWxH (mm) 1423 x 902 x 1733

Unsuitable conditions for Ups

	Harmful fumes, abrasive dust.
	Humidity, vapor, bad air, raw.
	Explosive dust and gas mixture.
	Over temperature variation.
	Bad ventilation.
	Be exposure to heat in direct or with radiation from other sources.
	Intense electromagnetic field.
	Harmful level of radioactive.
	Insect, rabble, fungus, etc.
	The UPS is not design to run in outdoor open area.
	No receipt of direct sunlight, far from the heating, in a dry place.
	Please store the UPS in an environment where the temperature is between –25 ?C +55 ?C, It is suggested to provide an environment temperature between 20-25°C to get maximum performance from the UPS and batteries.AdvicedEnvironmental humidity condition is between 20% 80% (non-condensing).
	Make sure that the floor can support the weight of the system.

2-3 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.For internal battery upss please store the ups where the temperature is between -15°C ile +40°C otherwise batteries may damage

Environmental humidity must be between 20% 80% (none condensing).

İf the batteries will be stored for longer than 4 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

Check the conformity of the total load and mains with the UPS.

The UPS must be stored in place is terms of moisture dry conditions between -10°C and 45°C before installation.

The UPS must be operated at least once a month to charge batteries during 24 hours.

Storage time is limited due to battery life starts in production date.

Chapter 3: UNPACKING AND INSTALLATION OF THE UPS

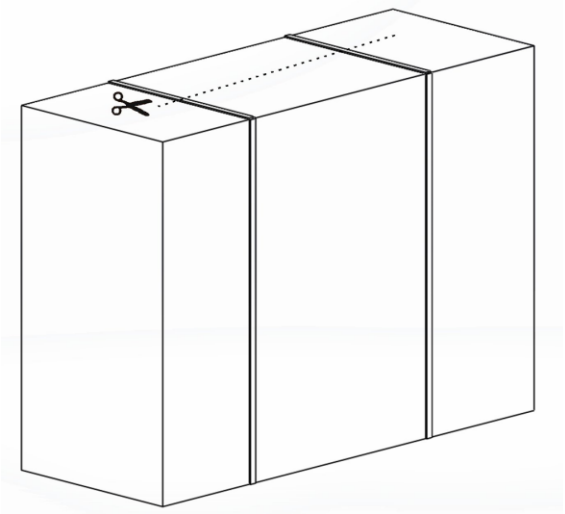
Equipment and batteries whose packages are damaged during transportation shall be inspected by qualified Technical Personnel before starting with the installation.

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

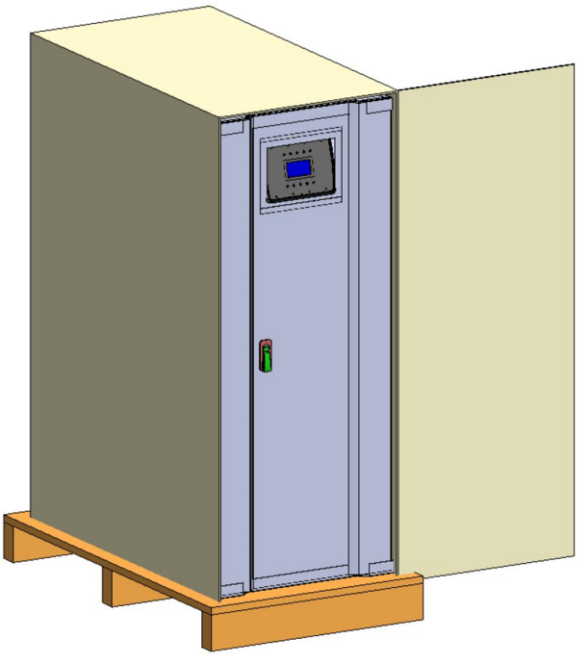
UPS output voltage and frequency is set to 380V/50Hz, as default.

It is recommended to store the originalUPSpackagingforfutureneeds.

3-1 Unpacking of the Ups



Cut the black protection band shown in figure



Remove the nylon protective material inside the card box. Lift the carton upwards to remove

3-2 Installation Procedures

The UPS must be installed according to standards below:

TS HD 384.4.42 S1: Electric Wiring in Buildings chapter 4: Protection for S group 42: Protection against Thermal Effect.

TS HD 384.4.482.S1: Electric Wiring in Buildings chapter 4: Safety Protection-Group 48: Choosing of Protective Measures Which is Depend on External Effects-Section 482: Protection against Fire at the Places Where There Are Special Risk or Danger.

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.

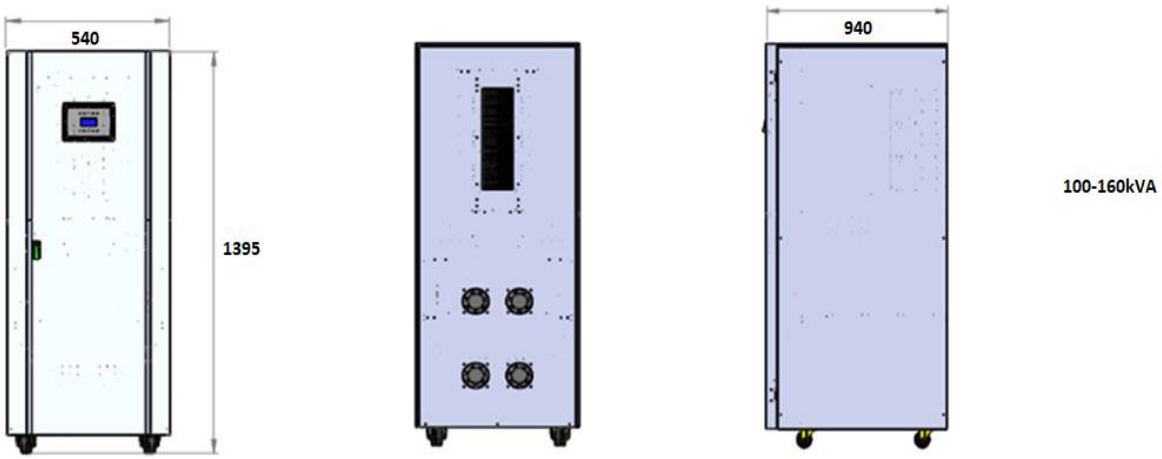
During transitory phases (power failure, return and voltage fluctuations) short leakage current peaks may occur. Make sure that the protection is not activated in such cases.

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

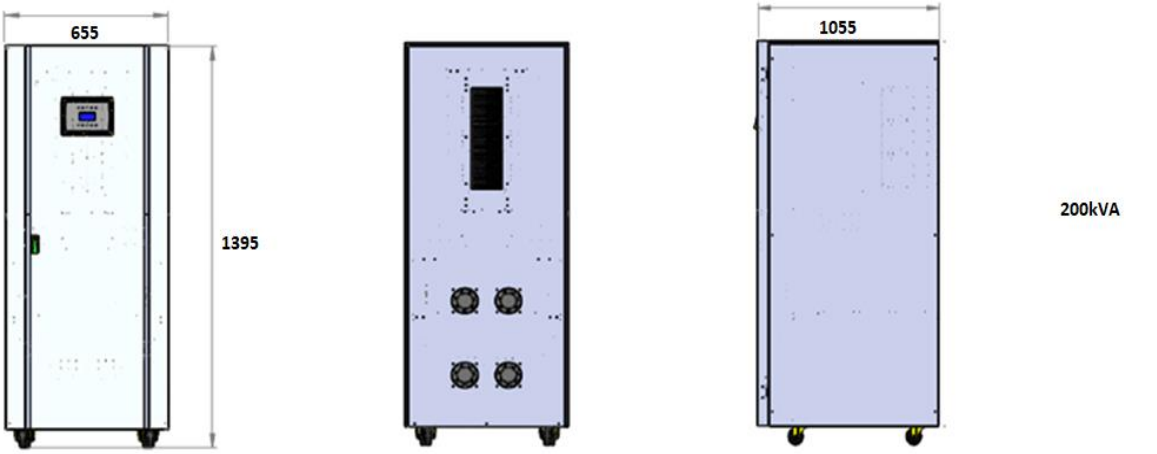
When the UPS is brought from a cold place to a warmer place, humidity of the air may condensate in this case, wait for 2 (two) hours before beginning with the installation.

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

3-3 100Kva-200kVA (3P Input / 3P Output) Ups Dimensions

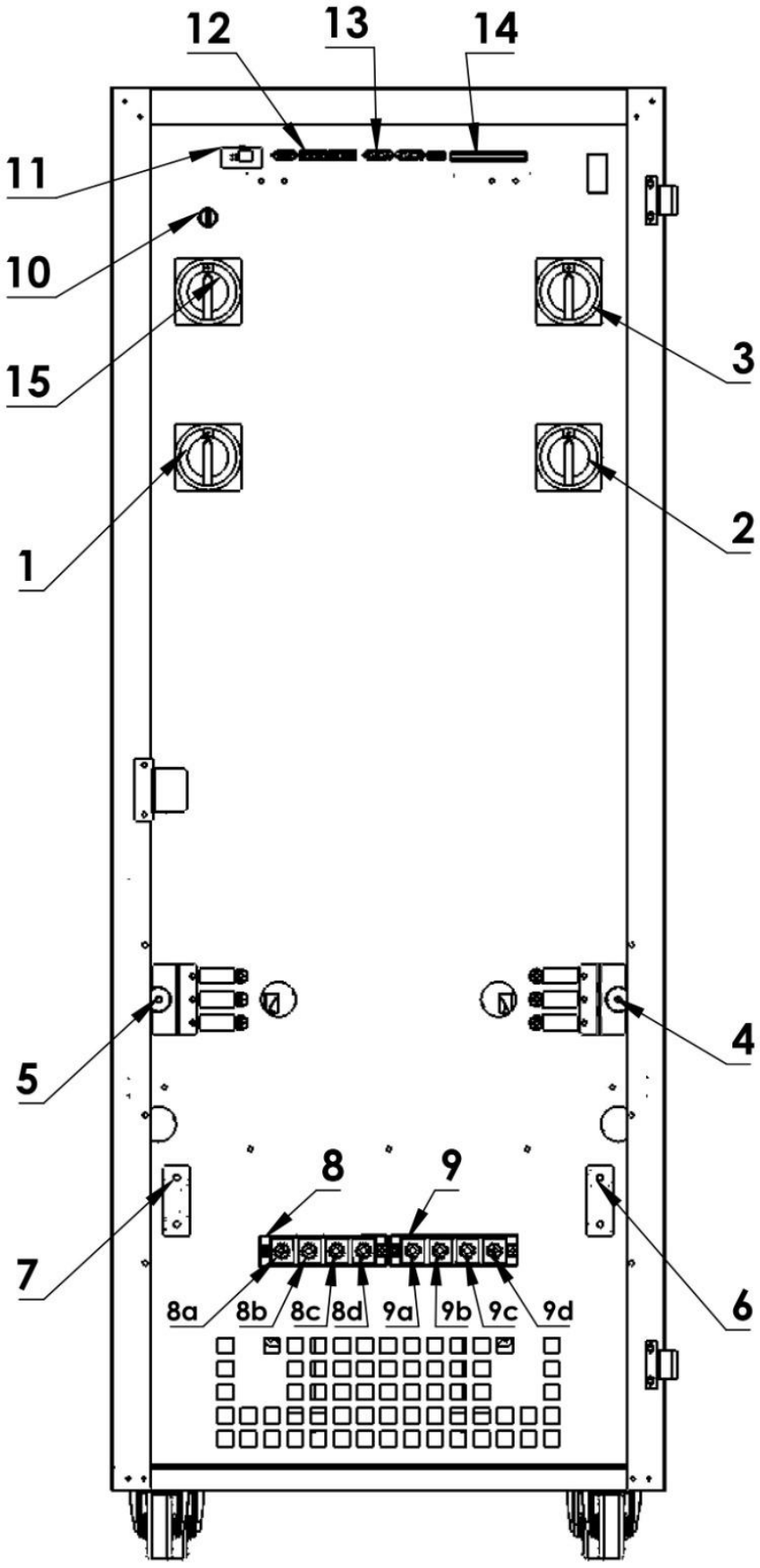


100-160kVA



200kVA

3-4 100kVA-200kVA (3P Input / 3P Output) Front View



3-5 100kVA-200kVA (3P Input / 3P Output) Front Panel View Terminal and Breaker

1	**S1-INPUT BREAKER**			
2	**S2-OUTPUT BREAKER**			
3	**S3-MANUEL BY-PASS BREAKER**			
4	**1. GROUP POZITIVE BATTERY BREAKER**			
6	1. GROUP NEGATIVE BATTERY TERMINAL			
5	2. GROUP NEGATIVE BATTERY BREAKER			
7	**2. GROUP POZITIVE BATTERY TERMINAL**			
8	INPUT TERMINAL CONNECTION	**8a**	**R-in**	**INPUT PHASE R connection terminal**
		8b	**S-in**	**INPUT PHASE S connection terminal**
		8c	**T-in**	**INPUT PHASE T connection terminal**
		8c	**N-in**	**INPUT NOTUREL connection terminal**
9	OUTPUT TERMINAL CONNECTION	**9a**	**R-out**	**OUTPUT PHASE R connection terminal**
		9b	**S-out**	**OUTPUT PHASE S connection terminal**
		9c	**T-out**	**OUTPUT PHASE T connection terminal**
		9c	**N-out**	**OUTPUT NOTUREL connection terminal**
10	**SERVICE SWITCH**			
11	**Optional SNMP Card**			
12	**Optional Parallel Board**			
13	**RS232-RS485 Comm.**			
14	**Optional Relay Contact**			
15	**Optional Externel By-Pass Input**			

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

Swicth the breakeron the distribution panel to "0" position before making the connections.

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

Power connection terminals are back side of the Ups Cover must be remove properly with suitable screw terminals.

The device shall be earthed for a safe and reliable operation. Connect the PE (L15) ground connectors before connecting any other cable.

3-6 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.

(L8)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 PE cables come along with the power cables; PE cable should be min. 12 cm longer than the other cables.

3-7 Input Connection

The installation and adjustment of distribution panel should be done by authorized technical person.

Swicth the breaker on the distribution panel to "OFF" position before making the connections.

Please add Three-pole (3-pole) breaker (equivalent UPS input breaker) to distribution panel where UPS is to be connected. Do not connect any other load to this circuit breaker

Do not use any breakerfor the Neutral line. Netural connection should be done directly from distributon neutral bus to UPS neutral.

Connect the phase cables to the Ups's **L1-L2-L3 (Input mains terminals)** terminals, Connect the neutral cable to the Ups's L14 **(Neutral Terminals).**

Please do not forget to 300mA add leakage current relay to the distribution panel. Total leakage current value of the load connected to UPS Neutral connection should be done directly from distributon neutral bus to UPS neutral.

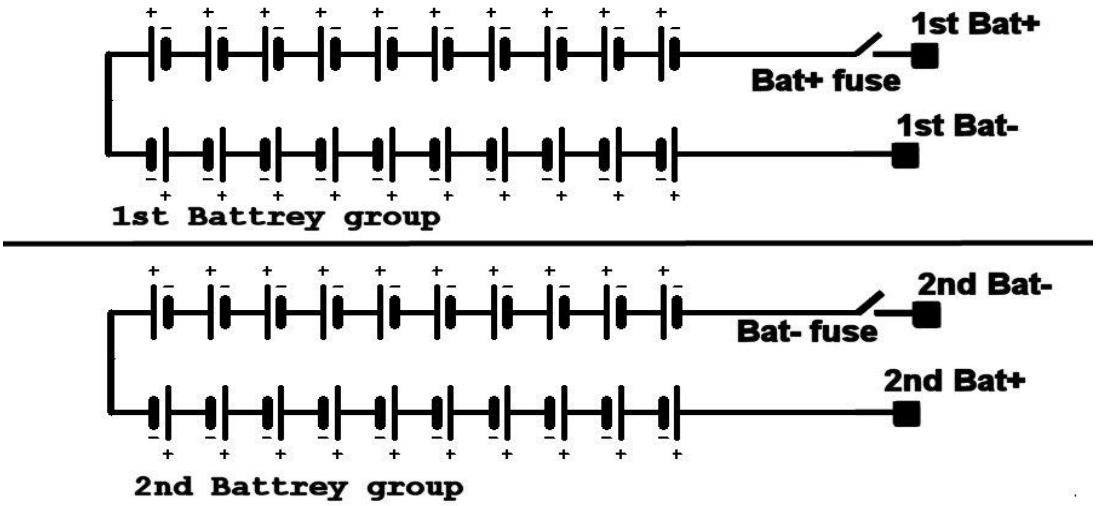
Relay must be protected type against peak current that can be happened on EMI filter capacitor.

	***According to EN 62040-1-2, 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 feedback. The label should carry the following indication:*** ***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)***

3-8 Battery Connection

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

40 No's Battery Connection



3-9 Details to be Considered in Battery Connection

If the batteries are already built-in inside the UPS cabinet; remove the cover of UPS and connect the **Positive (red), Negative (black)** 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;

- Switch on to "**OFF**" 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 **"BATT N"**on the battery cabinet to **"BATT N"**on the UPS.

Connect between battery breakerand battery terminals with using proper cross-section **Positive, Negative and Neutral** cables.

	***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.

3-10 Output Connection

Please add theree-pole breaker (equivalent to UPS output breaker) to distribution panel where the loads are to be connected. Do not use any fuse for the Neutral Line and Neutral connection should be done directly.

Connect the phase cable to Ups's **L1-L2-L3 (Output Termnial)** terminal and the neutral cable to Ups's **L14 (Output Terminal)** terminal.

To enable the short circuit protection feature of the UPS, each load shall be supplied through a separ breakerchosen 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 breakershall have the minimum value, which is enough to carry the full load current continuously.

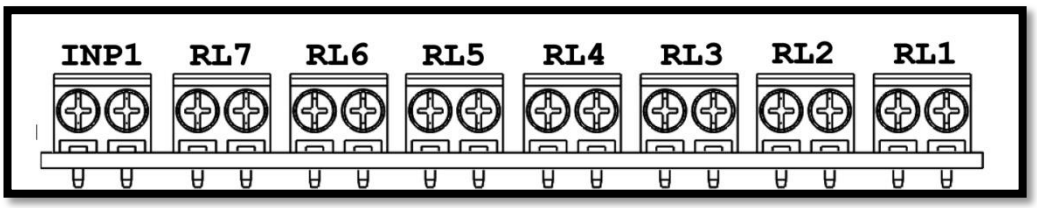
Each load should be supplied through separate breakerand the cable cross section should be chosen according to the load current value.

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

3-11 Dry Contacts

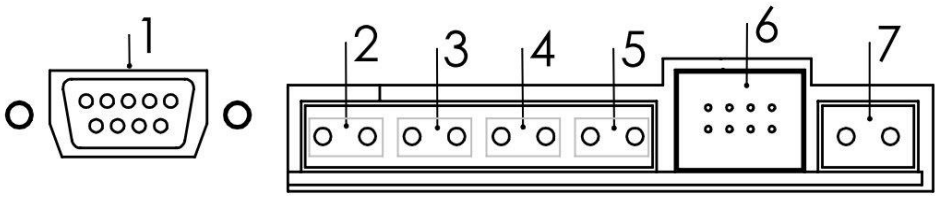
This unit consists of relays that transmit the status signals of the uninterruptible power supply to user

Connections:



1	General Failure
2	SMPS On
3	Battery Mode
4	Online Mode
5	Bypass Mode
6	Battery Low
7	Empty
8	Ext Manuel Bypass

3-12 Serial Communication (RS232)/ Communication Card

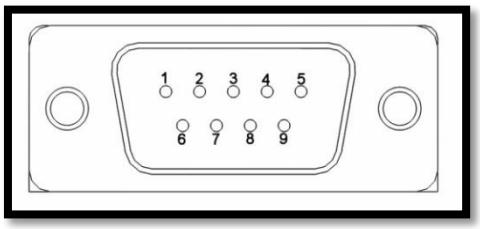


1	RS 232 PORT
2	Digital input 1
3	Digital input 2
4	Generator input
5	EPO
6	Remote monitoring
7	EXT Bat temp

UPS is equipped with Serial Communication as standard.
RS232 connection (DSUB-9 fmale connector):

RS232 Pin LAYOUT

PIN	Signal Name	Signal Description
2	RX	Receive Data
3	TX	Transmit Data
5	GND	Signal Ground



The hardware and software listed below can be used with this port;

Monitoring Software (Optional): This software is instaled on a computer. To establish communication between the UPS and a computer, connect your computer to the UPS communication port using the RS232 communication cable. With the software; many ups parameters such voltage, current, frequency etc can be monitored.

External SNMP Adapter (Optional): This is a communication protocol that was designed and developed to enable monitoring and controlling of multiple UPSs from a single center simultaneously. Each UPS that will be used in network environment is connected to network over an SNMP adaptor. By IP address assignment SNMP adapter is connected to current network, hence UPS can be monitored on web browser interface.

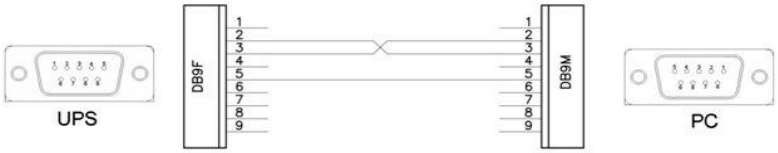
Over SNMP communication; battery test can be rted or current test can be cancelled. UPS can be shut-down or stand-by (stand-by duration is adjustable). Alarms can be discarded.

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} vb.)
- Output Data (V_{out}, Load Percantge.etc.)
- Battery Situation (V_{batt}.etc)

Service Software: This software is used only by authorized Technical Service Personnel. Do not let unauthorized to use this software; otherwise, damage may occur to your equipment and void your warranty

If Serial Communication cable is needed, it can be produced according to the pin configuration described as below



Cable Schema of Serial Communication

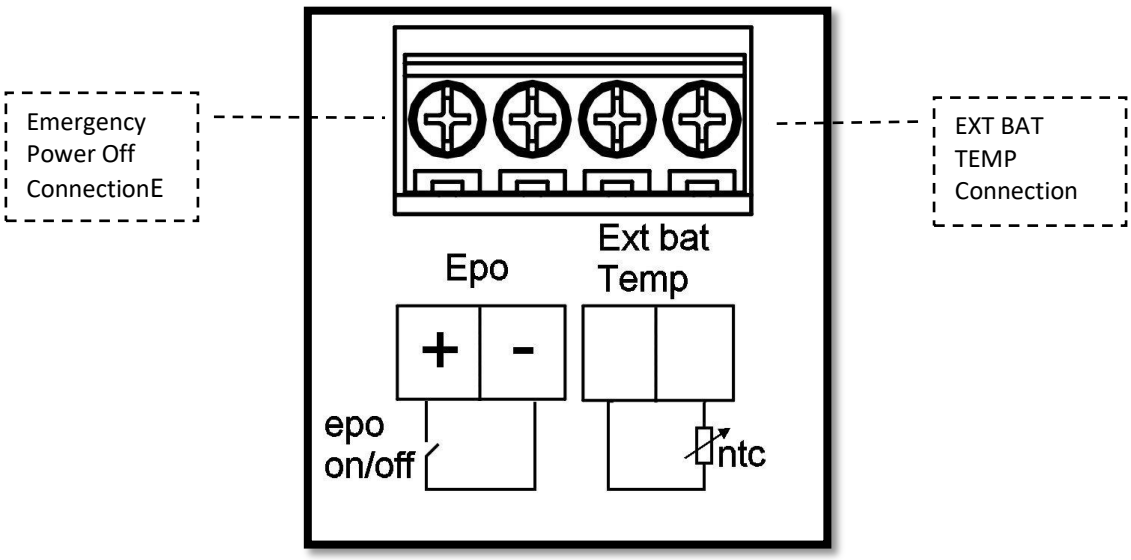
3-13 Emergency Power Off and External battery cabinet temperature measurement (Optional)

Ups shutdown remotely and external battery temperature sensor can be connected to the ups by using two digital inputs at communication interface.

- Voltage to be applied to the digital inputs is 5V DC.
- Maximum current drawn by each input is 1 mA.

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

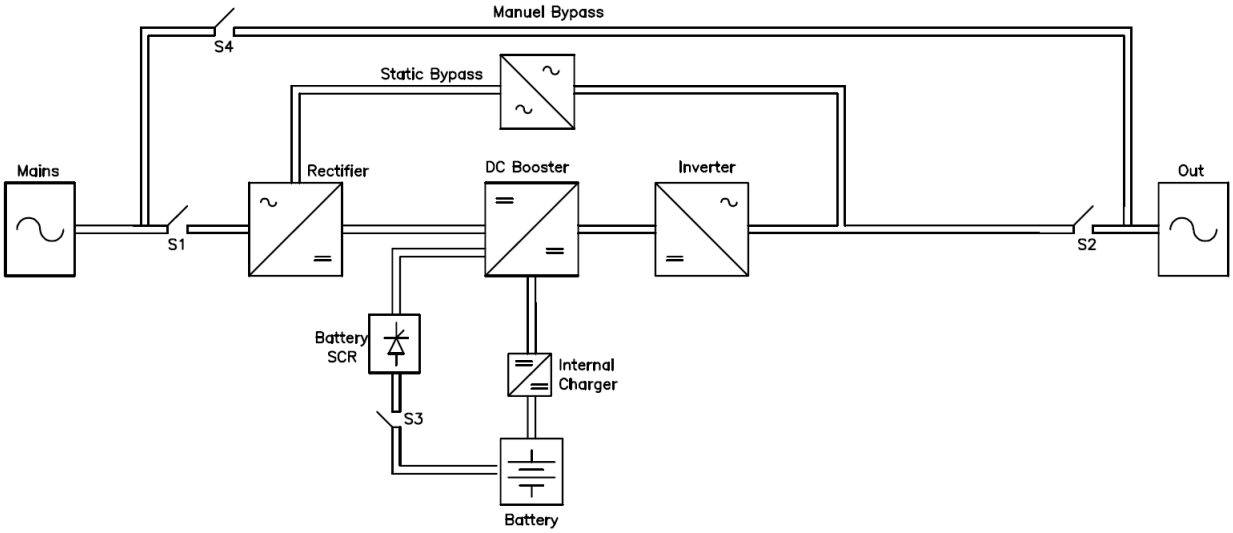
Input	Function
UPS OFF (Emergency Power Off)	If the UPS OFF input is set high by applying 5V DC voltage on the related terminals, UPS stops generating the output voltage and stops feeding the load. When the voltage on the digital input is removed, the UPS starts up according to the normal procedure.
EXT BAT TEMP	Ups measures external battery cabinet heat information. If the heat changes are above the limits inthat case ups transfers to Bypass mode and give warning.



Chapter 4: OPERATION MODES

This device was designed double conversion on-line system basis, it supplies all connected loads with continuous voltage with stable frequency and stable amplitude. Therefore, no transition period is necessary when electric power is interrupted or recovered.

Block diagram of the ups;



Ups Block Diagram

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 themains failure, the energy needed for the load is provided by the battery in UPS (or inexternal batterycabinet/s). These batteries are charged by an intelligentbattery chargingcircuit during the mains within the limits. Batteries are lead acid battery (VRLA) anddo not requireany maintenance until theend 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 Processor. This helps to make your UPS smarter. Processor uses all the sources on optimum conditions, observes the failure conditions, and communicates with your computer system.

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

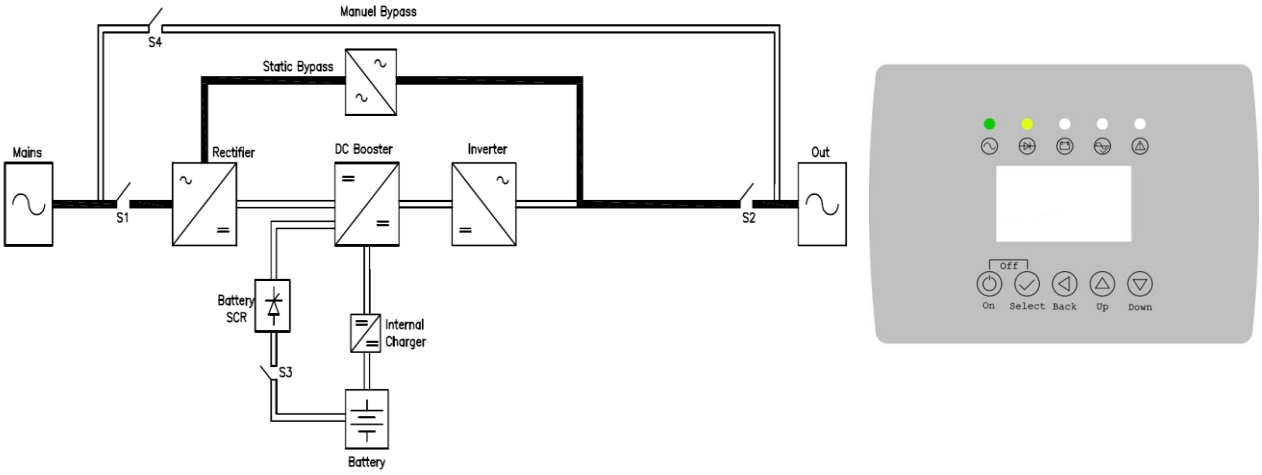
4-1 By-pass Mode

Inverter and rectifier units do not run. Load is supplied by bypass source over static bypass unit.

Since the loads are fed supplied by the mains directly, the loads are unprotected against any possible future risks.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.

Mimic diagram is as shown in the figure;

In this operation mode, LED bar is constantly lit in red.



While UPS operatesin Online Operation, UPS switches to bypass automatically (in case the mains voltage and frequency is within the limits of bypass) in the following conditions;

- During the start-up
- Bypass Priority
- Inverter Fault
- Prolonged Overload
- High Heatsink Temperature

After these conditions are eliminated, the UPSautomaticallyreturns toinverter.

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

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

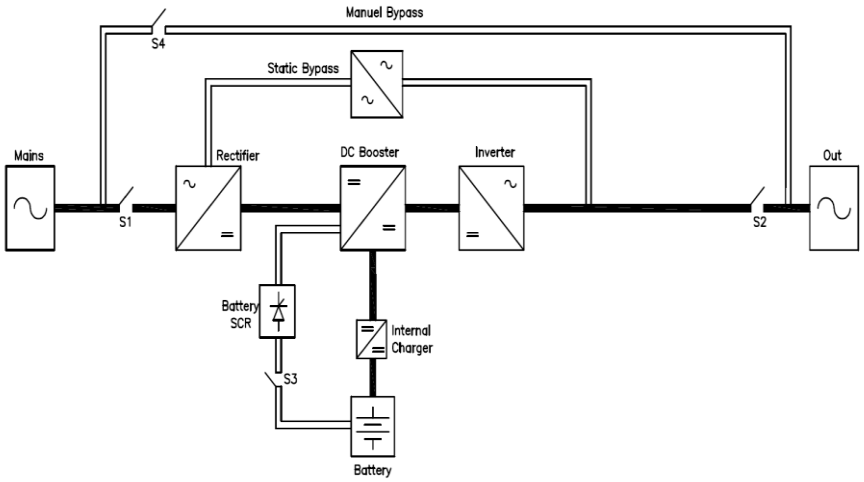
Bypass Operation Voltage Range

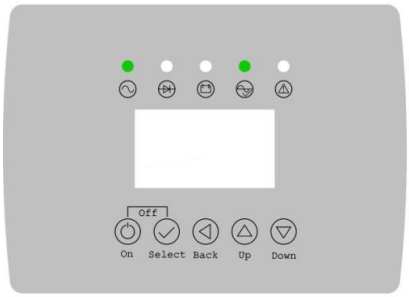
The mains voltage is required to be in certain range for Bypass Operation. Voltage tolerance is set ±10% of the output voltage in the factory. For instance; if the output voltage is 220V, the tolerance range of bypass voltage would be 198V – 242V.

4-2 Online Mode

UPS devices supply all connected loads with continuous voltage with stable frequency and stable amplitude during online operation. Rectifier and inverter units run continuously. Load is supplied with a stable sinusoidal voltage generated by the inverter. Inverter and bypass voltages are synchronized. So, uninterruptable load transfer can be done in the UPS. Batteries are constantly kept at a buffer charge voltage.

Mimic diagram displayed on the LCD screen is as shown in figure below. During this operation mode, Input and ouput LED bar is constantly lit in green.





If the mains voltage and frequency are in certain range,Online Operationis possible. For the mains limits for Online Operation, please see Appendix- Technical Specifications

The upper limit ofmains voltage is independent from the load percentageand it is 275V.UPSswitches toBattery Operation mode when the mains is over 275V and under 165V. The mains is required to decrease below 265V and over 175V for UPS to return Online Operation. (This max/min values can make different up to required specifications)

Online Operation Conditions;

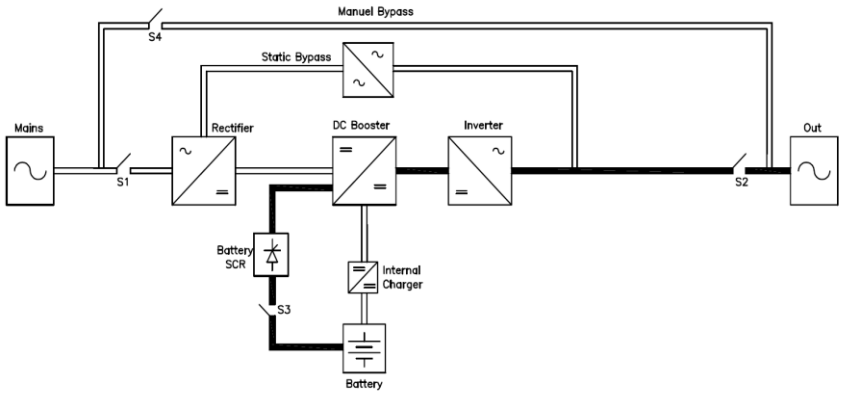
In case Online Operation is set as operation mode of UPS, the mains is within the limits and/or if there is no abnormal condition (overheat, overload, failure.etc.) UPS operates in Online Operation. Except for failures, as soon as the abnormal conditions are eliminated, UPS switches to Online Operation automatically.

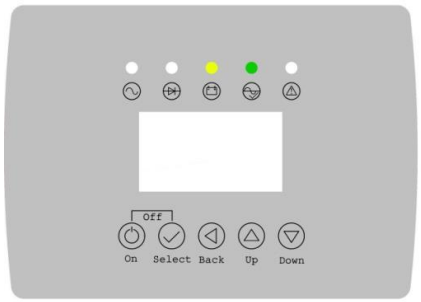
In case Bypass Operation is set as operation mode of UPS and the voltage and frequency is out of the bypass limits but within the rectifier limits, UPS swithes to Online Operation.

4-3 Battery Mode

Rectifier unit does not run, inverter unit runs. Inverter unit is supplied from the battery. Load is supplied a stable sinusoidal voltage generated by the inverter. Batteries are in discharge position In this operation, energy is drawn from the batteries. It is independent from the battery voltage. Battery voltage should be in acceptable limits and the inverter should be enabled for the UPS to operate in this mode.

In this operation mode, Battery and Output LED bar flashes green.





UPS operates in BatteryOperation inthe following cases:

- Mains voltage or mains frequency is out of limits
- Battery test procedure

4-3-1 Battery Management and Battery Back-Up Time

Autonomy time depends on battery type, quantity, capacity, situation and load level. UPS stops supplying the loads if the battery voltage decreases under a specific value.

In order to obtain longer autonomy time, you may add batteries in an external battery cabinet.

Ups test batteries once in a month. If Battery Test is successful, UPS resumes normal operation. If not, "Battery test failure" alarm is displayed on LCD.

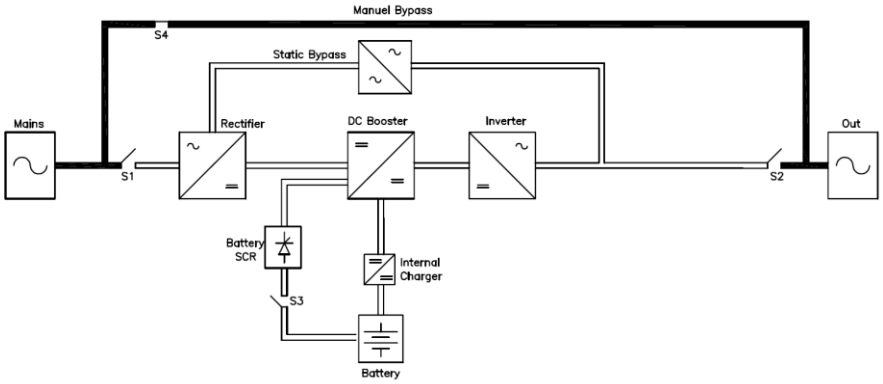
Battery life depends on some parameters such as battery type, charge-discharge cycle, and depth of discharge, ambient temperature, conditions. Please look at Appendix Technical Specifications for the ideal environmental conditions for the batteries.Using the batteries outsidethistemperature rangewill decreasebatteryoperationtimeand batterylife.

4-4 Maintenance –No Operation Mode

This operation mode is used for maintenance. Maintenance and repair of the UPS can be done by authorized personnel without cut the power.

Before using this mode;

- Swich to BypassMode.
- Remove Manual bypass cover.
- Manuel Bypass swich circuit breakers must be at "ON" position.
- Battery-Input-Output circuit breakers must be at "OFF" position
- Call technical service.



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

4-5 Closed Mode

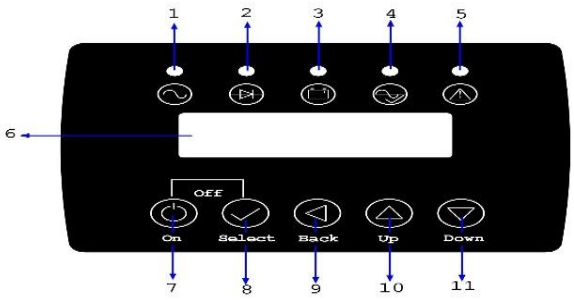
This mode is used to make settings through Front Panel or by Service Software to start-up Ups in Closed mode all the circuit breakers must be at "OFF" position except **F3** Input circuit breakerin this mode UPS does not produce output voltage to supplythe loads.

Chapter 5: FRONT PANEL

Front panel informs the user about operating status, alarm conditions and measurements. It also provides access to control and configuration parameters.

5-1 Display (LCD)

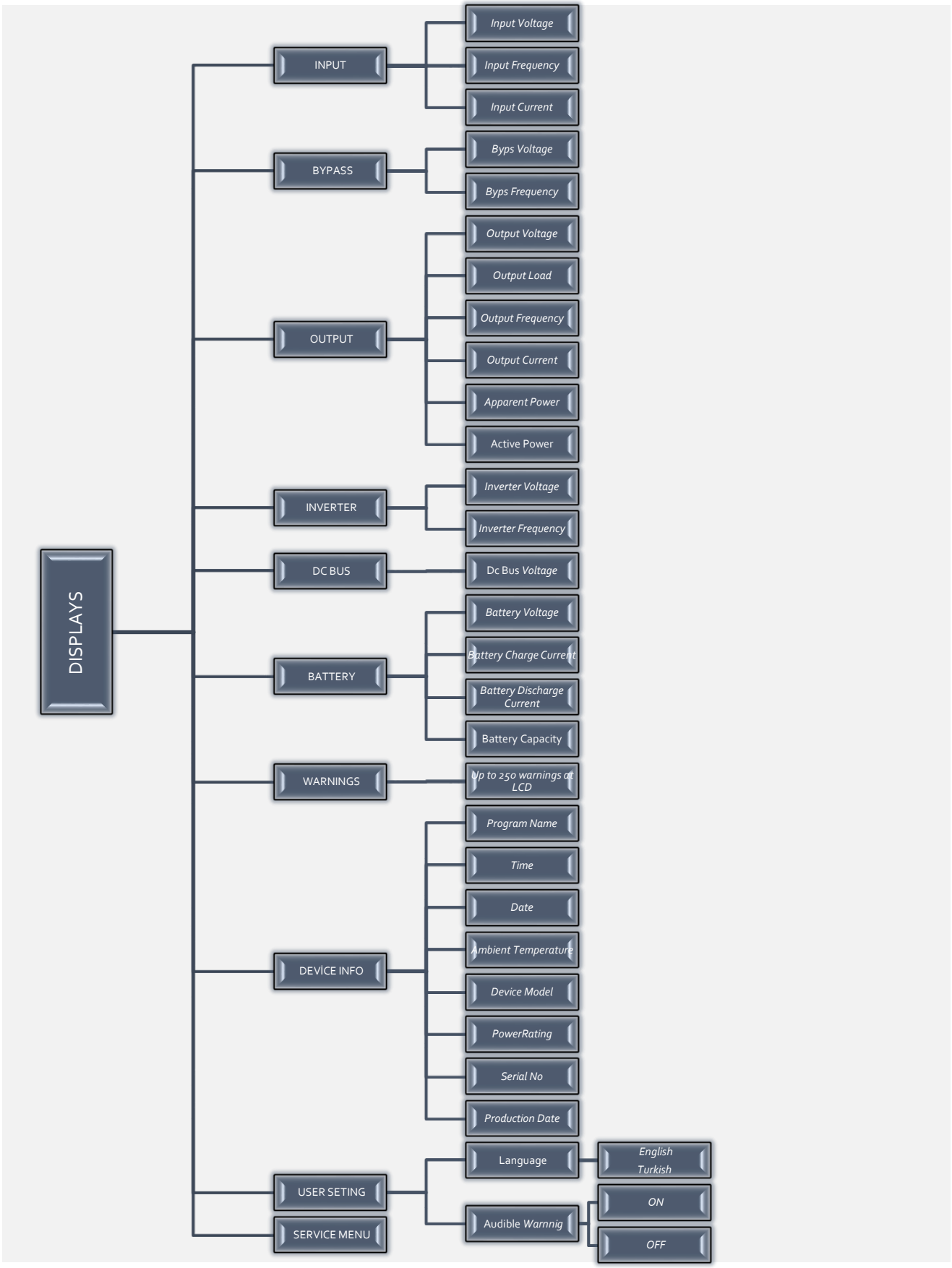
LCD screen displaysUPS's current operation mode, menu, warning and failure information, system date and time, and UPS's internal temperature.



NO	Indicator	Colour	Description
1	Mains Led	GREEN	It blinks green when the mains has normal conditions
2	Bypass Led	YELLOW	It blinks yellow when ups in ''Bypass mode''
3	Battery Led	YELLOW	It blinks yellow when ups in ''Battery mode''
4	Output Led	GREEN	It blinks green when ups in **''Normal Mode''** or in ''Battery Mode ''.
5	Warnıng Led	RED	It blinks red when ups gives warning or when there is a failure at ups.
6	LCD Display		LCD screen displays information about UPS

No	BUTON	Description
7	ON/OFF	✓ Turn device on ✓ Turn device off
8	SELECT	✓ Item Selection ✓ Enter Values ✓ Accessing on the Menu
9	BACK	✓ Accessing on the Menu ✓ Optimizing the selected item unselected.
10	UP	✓ Go up on the main menu ✓ Increasing the value
11	DOWN	✓ Go down on the main menu ✓ Reducing the value

5-2 Menu


DISPLAYS
INPUT
Input Voltage
Input Frequency
Input Current
BYPASS
Byps Voltage
Byps Frequency
OUTPUT
Output Voltage
Output Load
Output Frequency
Output Current
Apparent Power
Active Power
INVERTER
Inverter Voltage
Inverter Frequency
DC BUS
Dc Bus Voltage
BATTERY
Battery Voltage
Battery Charge Current
Battery Discharge Current
Battery Capacity
WARNINGS
Up to 250 warnings at LCD
DEVİCE INFO
Program Name
Time
Date
Ambient Temperature
Device Model
PowerRating
Serial No
Production Date
USER SETING
Language
English
Turkish
Audible Warnnig
ON
OFF
SERVICE MENU

5-3 Menu and Description

The related sub-menus under the main Menu are present which provides information to user about the measurements about the UPS and status of UPS.

It can be reach to ‘’Main menu ‘’by pressing **ESC** key. At “Main Menu” by using **UP/DOWN**, keys you can select requested menü. “>”sign showns selected menu at LCD. By pressing **ENTER**key you can enter inside of the requested menu. Use **ESC** key exist from menu.

MAINMENU	SUB MENU	PURPOSE
1 INPUT	Input Voltage	Displays mains voltage
	InputFrequency	Displays mains frequency
	Input Current	Displays input current of the ups
2 BYPASS	Bypass Voltage	Displays bypass voltage of the ups
	Bypass Frequency	Displays bypass frequency of the ups
3 OUTPUT	Output Voltage	Displays output voltage of the ups
	Output Load	Displays output load of the ups
	Output Frequency	Displays output frequency of the ups
	Output Current	Displays output current of the ups
	ApparentPower	Displays total output power of the ups
	Active Power	Displays active power of the ups
4 INVERTER	Inv Voltage	Displays input voltage of the ups
	Inv Frequency	Displays input frequency of the ups
5 DC BUS	Dc Voltage	Displays -+ dc bus voltage of the ups
6 BATTERY	Battery Voltage	Displays battery voltage of the ups
	Battery Charge Current	Displays battery charge current of the ups
	Battery Discharge Current	Displays battery discharge current of the ups
	Batt Capacity	Displays approximently battery capacity of the ups
7 WARNING	1-250	Displays warnings of the ups
8 DEVICE INFO	Program Name	Displays micro controller program name of the ups
	Time	Displays real time of the ups
	Date	Displays date of the ups
	Ambient Temp	Displays Ambient temperature of the ups
	Device Model	Displays device model of the ups
	Device Power	Displays device power of the ups
	Serial Number	Displays serial number of the ups
	Product Date	Displays production date of the ups
9 CUSTOMER SETTINGS	Language	Displays language of the ups
	Warning	UPS gives audible warning when there is a failure or error it can be disable the audible sound.
10 SERVICE		Must be use only with authorized person otherwise ups will be out of warranty.

Chapter 6: START-UP

6-1 Ups Start-Up

After all connections are completed as described in, Ups must be start-up. Switch the input breaker(F1), bypass breaker (F3) and output breaker(F2) on the ups and distribution panel to “ON” position. Press contionusly 3 sec to ON/OFF key from Lcd panel. Buzzer sound and Lcd light will accour. If mains is inside of the limits from lcd display bypass led and input led will blink and ‘’Mains start up ‘’letter dislays at Lcd panel. Dc bus voltage and inverter voltage accours. Switch the battery breakerto “ON” position.Input and output green Led’s will blink at front panel.

Afterwards UPS starts to supply the loads.

To make battery test at ups switch the input breaker (F1) on the ups to ‘’OFF’’ position. Ups transfers to ‘’Battery Mode’’ and battery led and output led blinks at panel.

By remaking ‘’ON’’ position to the input breaker (F1), ups continous to work at normal mode.

6-2 Ups Shutdown

Close all Ups connected output loads safetly. Switch Ups from ‘’Normal mode’’ to ‘’Bypass mode’’ By 3 sec contionusly presing to ON/OFF key close LCD panel Switch the battery breaker, input breaker(F1) and and output breaker (F2) to “OFF” position.

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 r cause electric shock and burns. All operations except replacing battery fuses shall be carried out by th authorized Technical Personnel only.

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.

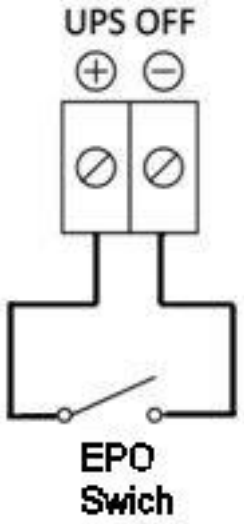
Do not switch the UPS to this mode from battery operation mode. There will not be energy at the outp the UPS when switched.

During Manual Bypass all swiches are at ‘’OFF’’position except manual bypass (F4) swich. Some parts inside the UPS (terminals, EMC filters and measurement circuits) are still energized during maintenance bypass operation.

6-3 Emergency Power Off(EPO)

UPS output can be cut off immediately by EPO connection if desired.In case EPO connection is used in distance; a latched switch can be used as described in below figure. When UPS operatesin Online Operation; if EPO is needed you have to make the switch opened or closed regarding to EPO contact mode settings you have done before to turn the UPS off.

Emergency Off Connection



EPO switch should be placed where unauthorized people can not reach it. Unauthorized use may caus load be deenergized.

Chapter 7: 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 r cause electric shock and burns. All operations except replacing battery fuses shall be carried out by th authorized Technical Personnel only.

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. Recommends every 6 months of period for systematic maintenance after warranty by authorized service.

7-1 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.

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 quantityand type that were originally fitted.

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

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

7-2 Fans

The life of fans used to cool the power circuits depends on the usage and environmental conditions. Please look at 2.2. Placement for detailed environment conditions.

Preventive maintenance shall be done by authorized Technical Personnel periodically.

Chapter 8: TROUBLESHOOTING

The aim of this chapter is to understand some specific problems, to verify the cause of the problems and to provide solution to them.

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

First things to do:

1. Check and verify that PE connections are done properly.
2. Check and verify if all the cables are connected to the right terminals
3. Check and verify if the mains exists and if it is between the limits
4. Check and verify that all the circuit breakers for UPS in the distribution panel are at “I” position.
5. Check and verify that all the circuit breakers of UPS are at “I” position.
6. Check and verify that Input/Bypass sequence is correct.

8-1 Output Short Circuit Alarm

If a short circuit occurs at the output of the unit, UPS acts like a current source (as long as the over current is drawn, it decreases the output voltage keeping the output current constant at a certain value) forcing to trigger the breakerthat is between the UPS and the short-circuited load.

By triggering the mentioned circuit breaker, the short circuited line is being removed and the other loads that are present on the other lines are being prevented to be affected from this failure.

To enable the short circuit protection feature of the UPS, each load shall be suppliedover a separate breakerchosen according to the load current .Additionally UPS should operate in Online or Battery Operation.

During “**Output short circuit**” alarm occurs;

Switch the output breakerof Ups to ‘’0’’ position than switch the input breakerof the ups ‘’I’’ position and start-up the ups with Online operation after display ‘’Normal Mode’’ at Lcd display switch output breakerof Ups to ‘’I’’ position. If the rating of each individual load breakeris well-adjusted; the breakerof short circuit load would be blown, If not well-adjusted, “Short Circuit Alarm” would be shown on LCD. In this case the short-circuited load should be found-out and removed

8-2 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 breakeris at "I" position.

If the alarm continues, contact to authorized Technical Service

8-3 Warnings and Alarms

PROBLEM	DESCRIPTION
Battery Error	Batteries failed in the battery test.
Input voltage high	Input voltage high
Input voltage low	Input mains voltage is lower higher than its lower limit.
Input sequence wrong	Phase sequence of input mains voltages is not OK
DC voltage high	DC bus voltage is higher than its upper limit.
DC voltage low	DC bus voltage is lower than its lower limit may mean that the battery is empty during battery operation.
Ambient temperature high	Ambient temperature exceeds its upper limit.
Over heat	Heatsink temperature exceeds its upper limit.
Output voltage failure	Output voltage is beyond its limits
Output short circuit	Short circuit at the output.
Emergency power off active	Emergency stop is activated.
Battery low	Battery voltage is lower than its lower limit. Batteries are discharging after a mains failure.
Battery high	Battery voltage is higher than its upper limit.

9. APPENDIX: Technical Specifications

100kVA-200kVA (3P Input / 3P Output) Technical Data				
Tower Model (3Ph/3Ph)	**MST-100**	**MST-120**	**MST-160**	**MST-200**
Output Power (VA)	**100.000**	**120.000**	**160.000**	**200.000**
Nominal Active Power (W)	**80.000**	**96.000**	**128.000**	**160.000**
RECTIFIER INPUT				
Nominal Voltage	380/400V/415 (Ph-Ph) 3Ph+N			
Input Voltage Range (VAC) (at 50% Load)	from -35% to +25%			
Input Voltage Range (VAC) (at full Load, with battery charging)	from -20% to +20%			
Frequency (Hz)	45 - 65			
THD_A	< 5%			
Power Factor	≥ 0.99			
BYPASS INPUT				
Nominal Voltage	380/400V/415 (Ph-Ph) 3Ph+N			
Voltage Tolerance	±15%			
Frequency Tolerance (Hz)	±3			
Transfer Time (ms)	<0.5			
OUTPUT				
Nominal Voltage (VAC) (Ph-Ph)	(380/400/415 Adjustable)			
Power Factor	1			
Wave Form	Sinusoidal			
Frequency (Hz)	50 or 60 (Adjustable)			
Frequency Tolerance (Battery Operation)	0.01%			
Voltage Regulation (Static)	±1%			
Out Volt unbalance at reference unbalance load	<0.5%			
Maximum phase angle variation	<0.1°			
Crest Factor	03:01			
Nominal Power (kVA)	100	120	160	200
Overload Protection (sec)	600 (at 100 - 125% Load)			
	60 (at 125 - 150% Load)			
THD_V	< 3%			
	Non-Linear Load < 5%			
BATTERY				
Battery Type	Maintenance-Free Lead Acid Batteries			
Battery String (Blocks)	standart 40 pcs (40-42-44)			
PROTECTION	Overload Protection, High Temperature, Input Over Voltage, Input & Output Over Current, Back-Feed Protection, Intelligent Charging Algorithm - Deep Charge Protection - Battery Test (Automatic / Manual), Short-Circuit Protection			
COMMUNICATION				
Standard Interface	RS232-ESD-Genset,			
Options	Modbus-4 Programmable Relay-Contacts-SNMP			
ENVIRONMENT				
Operating Temperature Range (°C)	0 - 40 C			
Battery Temperature Range (°C)	20°C - 25°C (Recommended For Longer Battery Life)			
Maximum Altitude without Derating (m)	2000			
Relative Humidity Range	20-95% (Non-Condensing)			
Acoustic Noise (dBA)	< 55 (at 1m)			
PYHSICAL				
Dimensions (W x D x H) (mm)	540x940x1395			650x1055x1395
PALLET				
Weight (kg) (without battery)				
Paint	RAL 7016@enclosure			
	RAL 9005@front door metal			
STANDARDS				
Safety	IEC/EN 62040-1			
EMC	IEC/EN 62040-2			
Performance	IEC/EN 62040-3			
Design	IEC/EN 62040			
	ISO 9001:2008 - ISO 14001:2004			
Protection Class	IP 20 (other IP as option)			
**The manufacturer reserves the rights to change the Technical Specifications and design without notice.				

Chapter 10: WARRNTY

10-1 Terms of Warranty

- Warranty period begins from the date of commissioning of the UPS byor authorized innovasis distributor technical personnel.
- The UPS including all the internal parts is under the warranty of innovasis.
- 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

10-2 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 ofthe UPSto the customer, unloading andtransportationdamage andfailures.
- Damage or injuries caused by negligence, lack of inspection or maintenance, or improper use of the products.
- Faultyelectrical 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 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.

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

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