User Manual

VALUE NET

40-60-80kVA

Modular (n+1)-redundant
3phase UPS System
40-80kVA

CONTENTS

1 Safety

BEFORE ATTEMPTING TO INSTALL OR START UP THIS UPS THE USER MUST ENSURE THAT THE SAFETY INSTRUCTIONS IN THIS MANUAL ARE CAREFULLY READ AND OBSERVED BY TECHNICALLY COMPETENT PERSONNEL. KEEP THIS MANUAL WITH THE UPS FOR FUTURE REFERENCE.
THIS UPS MUST NOT BE STARTED UP OR PUT INTO USE WITHOUT HAVING BEEN COMMISSIONED BY A FULLY TRAINED AND AUTHORISED PERSON.

ALL SERVICING MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL. DO NOT ATTEMPT TO SERVICE THE UPS YOURSELF.
BY OPENING OR REMOVING THE UPS-COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

IN CASE OF ANY KIND OF DOUBT REGARDING THIS UPS, CONTACT:
☎ NIGICO SA
Tel. +210 9855084
Fax. +210 9855094
e-mail: info@nigico.gr
www.nigico.gr

NIGICO SA WILL ASSUME NEITHER RESPONSIBILITY NOR LIABILITY DUE TO INCORRECT OPERATION OR MANIPULATION OF THE UPS.

HIGH LEAKAGE CURRENT!
MAKE SURE THAT THE EARTHING IS CARRIED OUT CORRECTLY BEFORE YOU CONNECT THE MAINS POWER SUPPLY!

THE VALUENET 40 – 80 kVA IS CLASS A - UPS-PRODUCT (ACCORDING TO EN 50091/Part-2).
IN A DOMESTIC ENVIRONMENT IT MAY CAUSE RADIO INTERFERENCE. IN SUCH AN ENVIRONMENT THE USER MAY BE REQUIRED TO UNDERTAKE ADDITIONAL MEASURES.

NIGICO S.A. HAS TAKEN EVERY PRECAUTION TO PRODUCE AN ACCURATE, COMPLETE AND EASY TO UNDERSTAND MANUAL AND WILL THEREFORE ASSUME NO RESPONSIBILITY NOR LIABILITY FOR DIRECT, INDIRECT OR ACCIDENTAL PERSONAL OR MATERIAL DAMAGE DUE TO ANY MISINTERPRETATION OR UNDESIRED MISTAKES IN THIS MANUAL.
THIS MANUAL MAY NOT BE COPIED NOR REPRODUCED PRIOR TO WRITTEN PERMISSION OF NIGICO SA.

USER MUST HANG A WARNING LABEL ON ALL PRIMARY UPS POWER ISOLATORS. ELECTRICAL MAINTENANCE PERSONNEL SHOULD BE AWARE OF DANGEROUS VOLTAGES. THE WARNING LABEL SHOULD CARRY THE FOLLOWING WORDING:
"ISOLATE UPS BEFORE WORKING ON THIS CIRCUIT"

2 Description

2.1 RELIABILITY AND QUALITY STANDARDS.

Congratulation on your purchase of the VALUENET.

The **VALUENET** will provide your critical equipment with a steady and reliable power supply for many years.

The unique and modular UPS **valuenet** belongs to the newest generation of midrange 3phase UPS-Systems. High reliability, low operating cost and excellent electrical performance are only some of the highlights of this innovative UPS solution.

The criteria and methods implemented for the design and manufacture correspond to the most stringent quality standards.

2.2 VALUENET MODELS

The Midi-Line cabinet consists of only one UPS of 40, 60 or 80kVA in a Single or Multi-Cabinet configuration.

2.3 SINGLE/MULTI-CABINET CONFIGURATIONS

The valuenet has unique paralleling features. We distinguish:

Single/Multi-Cabinet Configurations
Single-Cabinet Configuration: A single-cabinet configuration means that there are no cabinets operating in a chain (in parallel).
Multi-Cabinet Configurations. It is possible to parallel Valuenet Cabinets into a multi cabinet Configuration in order to increase the power power capacity or to provide redundancy.

2.4 WARRANTY

The valuenet is supplied with a limited warranty that the UPS and its component parts are free from defects in materials for a period of 12 months from the date of original commissioning or 15 months from the date of original delivery, whichever is the sooner. Transportation cost is not included in the warranty and has to be paid by the end-user.

Do not return anything without written authorisation fromNIGICO or your closest service centre. NIGICO or the closest service centre will then give you further instructions how to proceed.

Any product must be returned with transportation charges prepaid and must be accompanied by a description of the failure. Products without description will not be handled.

This warranty is invalidated if the UPS is put into use without having been commissioned by a fully trained and by NIGICO authorised person.

1 Safety

BEFORE ATTEMPTING TO INSTALL OR START UP THIS UPS THE USER MUST ENSURE THAT THE SAFETY INSTRUCTIONS IN THIS MANUAL ARE CAREFULLY READ AND OBSERVED BY TECHNICALLY COMPETENT PERSONNEL. KEEP THIS MANUAL WITH THE UPS FOR FUTURE REFERENCE.
THIS UPS MUST NOT BE STARTED UP OR PUT INTO USE WITHOUT HAVING BEEN COMMISSIONED BY A FULLY TRAINED AND AUTHORISED PERSON.

ALL SERVICING MUST BE PERFORMED ONLY BY QUALIFIED PERSONNEL. DO NOT ATTEMPT TO SERVICE THE UPS YOURSELF.
BY OPENING OR REMOVING THE UPS-COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

IN CASE OF ANY KIND OF DOUBT REGARDING THIS UPS, CONTACT:
☎ NIGICO SA, HELLAS
Tel. +30 210 9855084
Fax. +30 210 9855094
e-mail: info@nigico.gr
www.nigico.gr

NIGICO SA WILL ASSUME NEITHER RESPONSIBILITY NOR LIABILITY DUE TO INCORRECT OPERATION OR MANIPULATION OF THE UPS.

HIGH LEAKAGE CURRENT!
MAKE SURE THAT THE EARTHING IS CARRIED OUT CORRECTLY BEFORE YOU CONNECT THE MAINS POWER SUPPLY!

THE VALUENET 40 – 80 kVA IS CLASS A - UPS-PRODUCT (ACCORDING TO EN 50091/Part-2).
IN A DOMESTIC ENVIRONMENT IT MAY CAUSE RADIO INTERFERENCE. IN SUCH AN ENVIRONMENT THE USER MAY BE REQUIRED TO UNDERTAKE ADDITIONAL MEASURES.

NIGICO S.A. HAS TAKEN EVERY PRECAUTION TO PRODUCE AN ACCURATE, COMPLETE AND EASY TO UNDERSTAND MANUAL AND WILL THEREFORE ASSUME NO RESPONSIBILITY NOR LIABILITY FOR DIRECT, INDIRECT OR ACCIDENTAL PERSONAL OR MATERIAL DAMAGE DUE TO ANY MISINTERPRETATION OR UNDESIRED MISTAKES IN THIS MANUAL.
THIS MANUAL MAY NOT BE COPIED NOR REPRODUCED PRIOR TO WRITTEN PERMISSION OF NIGICO SA.

USER MUST HANG A WARNING LABEL ON ALL PRIMARY UPS POWER ISOLATORS. ELECTRICAL MAINTENANCE PERSONNEL SHOULD BE AWARE OF DANGEROUS VOLTAGES. THE WARNING LABEL SHOULD CARRY THE FOLLOWING WORDING:
"ISOLATE UPS BEFORE WORKING ON THIS CIRCUIT"

3 Installation

3.1 INTRODUCTION

This chapter contains all the necessary information for the correct unpacking, positioning, cabling and installation of the UPS **valuenet**.

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED PERSONNEL.
NIGICO will take no responsibility for any personal or material damage caused by incorrect cabling or operations or activities, which are not carried out as per the instructions contained in this manual.

3.1.1 Receipt of the UPS

Upon receiving the UPS, carefully examine the packing container and the UPS for any sign of physical damage. In case of rupture or suspect inform immediately:

a) The carrier and
b) NIGICO SA.

Ensure that the received UPS corresponds to the material indicated in the delivery note.

The packing container of the valuenet protects it from mechanical and environmental damage. To increase its protection the UPS is wrapped with a plastic sheet.

3.1.2 Nameplate

The technical specifications of the valuenet are provided on the nameplate, which is situated at the front of the UPS. Check if it corresponds to the purchased material mentioned in the delivery note.

3.2 UNPACKING

When unpacking the UPS observe the "FRAGILE" and "ARROW" on the packing container.

Perform the following steps to unpack the UPS:

- Cut wrappers and remove packing container by pulling it upwards;
- Remove the plastic cover from the UPS;
- Remove pallet from the UPS;
- Retain the packaging materials for future shipment of the UPS;
- Examine the UPS for any sign of damage. Notify your carrier or supplier immediately if damage is apparent.

3.3 BATTERIES

The standard batteries of the valuenet are sealed, maintenance-free batteries, mounted in an external battery cabinet and will typically be connected when the UPS is commissioned.

The battery life depends very much on the ambient temperature. A temperature range between +18° and +23°C will achieve the optimum battery life.

If the UPS is delivered without batteries, NIGICO is not responsible for any damage or malfunctioning caused to the UPS by incorrect wiring.

3.4 STORAGE

3.4.1 UPS

If you plan to store the UPS prior to use, keep the UPS unpacked in a dry, clean and cool storage room with an ambient temperature between (+5 °C to +40°C) and humidity of less than 90%.

If the packing container is removed protect the UPS from dust.

3.4.2 Battery

The battery life depends very much on the ambient temperature.

It is therefore important not to store the battery longer than 6 months at 20°C, 3 months at 30°C and 2 months at 35°C storage temperature without a battery recharge.

For longer-term storage make sure that the battery is fully recharged every 6 months.

SEALED BATTERIES MUST NEVER BE STORED IN A DISCHARGED OR PARTIALLY DISCHARGED STATE.

EXTREME TEMPERATURE, UNDER- AND OVERCHARGE AND OVERDISCHARGE WILL DESTROY BATTERIES!

Before and after storing, charge the battery.

Always store the batteries in a dry, clean, cool environment in their original packaging.

If the packing container is removed protect the batteries from dust and humidity.

3.5 POSITIONING

The **valuenet** is a compact and light UPS and can easily be moved to the final position.

All parts of the **valuenet** are accessible from the front and rear making it a service-friendly and maintenance-friendly UPS.

The UPS should be located where:

- Humidity and temperature are within prescribed limits;
- Fire protection standards are respected;
- Cabling can be performed easily;
- Available front accessibility for service or periodic maintenance;
- Requested air cooling flow should be granted;
- The air conditioning system should have sufficient capacity;
- Dust or corrosive/explosive gases must be absent;
- The place is vibration free;
- Minimum 600mm rear space is recommended for accessibility (see Figure 3.1 and 3.2);
- Only front and rear access is necessary for service and maintenance.

Clearances	X
X (Rear)	600mm
Y (RightSide)	600mm

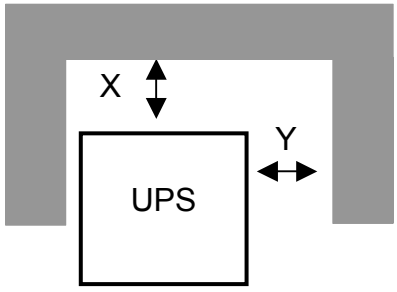


Figure 3.1: UPS space recommendation

Clearances	X
X (Rear)	600mm
Y (RightSide)	600mm

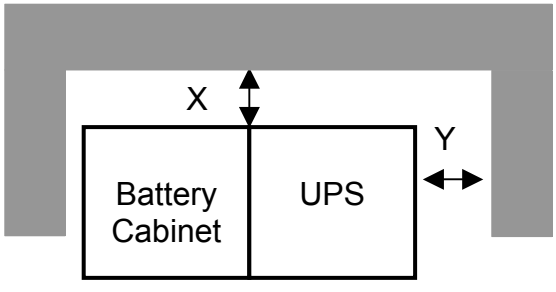


Figure 3.2: UPS + Battery cabinet space recommendation

3.6 CABLING

3.6.1 Connection Diagram

To ensure correct operation of the UPS and its ancillary equipment it is necessary to provide the mains cables with appropriate fuse protection.

To connect the **valuenet** to the mains power supply see Figures 3.3, 3.4 and 3.5.

ALL THE OPERATIONS IN THIS MANUAL MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.
DO NOT OPERATE IN CASE OF PRESENCE OF WATER OR MOISTURE.
BY OPENING OR REMOVING THE UPS-COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

3.6.2 Preparation for the Input Cabling

Before you start connecting the UPS, ensure that:

- MAINS VOLTAGE (INPUT VOLTS) AND FREQUENCY (FREQUENCY) CORRESPOND TO THE VALUES INDICATED ON THE NAMEPLATE OF THE UPS.
- EARTHING IS PERFORMED IN ACCORDANCE WITH THE PRESCRIBED IEC STANDARDS OR WITH LOCAL REGULATIONS;
- UPS IS CONNECTED TO THE MAINS THROUGH A LV-DISTRIBUTION BOARD WITH A SEPARATE MAINS LINE (PROTECTED WITH A CIRCUIT BREAKER OR FUSE) FOR THE UPS.

Provide input fuses and cables according to Figure 3.4 or in accordance with the prescribed IEC Standards or with the local regulations.

The input of the UPS must be fitted with circuit breakers or other kind of protection. The circuit breakers will be connected between the mains supply and the UPS and will provide additional protection to the UPS in the event of overloads and short circuits.

3.6.3 Earthing

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED TRAINED INTERNAL PERSONNEL.

To ensure protection of personnel during the installation of UPS make sure that the connections are performed under the following conditions:

- No mains voltage is present;
- Loads are shut down and disconnected;
- UPS **valuenet** is shut down and voltage-free.

Connect the earthing wire coming from the LV-Distribution Board to the terminal "PE".

Under the connection terminal of the UPS there is a cable-fixing rail to ensure that the cables have been fastened properly.

3.6.4 Connection of the Mains Supply

After the UPS has been unpacked and brought to its final position the authorized technician may start with the cabling.

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

To ensure protection of the personnel during the installation of the UPS make sure that the connections are performed under the following conditions:

- No mains voltage is present;
- All loads are shut down and disconnected;
- UPS valuenet is shut down and voltage-free.

Remove the terminal cover of the UPS

Before connecting the input power cables make sure that:

- Maintenance Bypass IA1 is open in position OFF;
- Parallel Isolator IA2 is in position OFF;
- Static Bypass Line fuse F2 is OPEN
- Rectifier Line fuse F1 is OPEN
- External Battery Breaker/fuse (battery side) is OPEN (in position OFF)

Connect the input power cable coming from the LV-Distribution Board to the terminals of the UPS showed in the following pages, keeping the phase rotation in clock-wise sense.

NOTE: Neutral input wire must always be connected!

NOTE: The UPS **valuenet** is provided with facilities for both single feed (one common input cable for rectifier and bypass) and dual feed (separate input cable for rectifier and bypass).

The standard UPS **valuenet** is always supplied with facilities for a single feed.

If dual feed is required please contact your nearest Service Centre.

3.6.5 Single Input Feed

To achieve correct Input Cabling see Drawing in Figure 3.5.

For single input feed connect the mains input cable to UPS Terminal Block according to the following table:

MAINS INPUT CABLE	UPS TERMINAL
Phase L1	1L1
Phase L2	1L2
Phase L3	1L3
NEUTRAL	1N
EARTH	PE

For minimum recommended Input Cable Sections and Fuse Ratings for the valuenet Midi-Line see table in Figure 3.4.

Under the connection terminal of the UPS there is a cable-fixing rail to ensure that the cables have been fastened properly.

3.6.6 Dual Input Feed

To achieve correct input cabling see Terminal Block in Figure 3.5.

NOTE: The UPS is supplied (as standard version) with facilities for a single cable feed (for rectifier and bypass).

For dual feed please contact your nearest Service Centre.

For dual input feed connect the mains input cables to UPS Terminal according to following tables:

MAINS INPUT CABLE	UPS TERMINAL
Phase L1	1L1
Phase L2	1L2
Phase L3	1L3
NEUTRAL	1N
EARTH	PE

BYPASS INPUT CABLE	UPS TERMINAL
Phase L1	2L1
Phase L2	2L2
Phase L3	2L3
NEUTRAL	2N
EARTH	PE

For minimum recommended Input Cable Sections and Fuse Ratings for the **valuenet Midi-Line** see table in Figure 3.4.

Under the connection terminal of the UPS there is a cable-fixing rail to ensure that the cables have been fastened properly.

3.6.7 Preparation for the Output Cabling

The output of the UPS must be fitted with circuit breakers or other kind of protection. These circuit breakers will be connected between the loads and the UPS and will provide additional protection to the UPS in the event of overloads and short circuits.

These circuit breakers will enable the protection of each load separately.

The size of the circuit breakers depends on the load rating of the load sockets.

The circuit breakers must comply with the prescribed IEC Standards. It is recommended to provide a separate output distribution board for the load.

The following values should be indicated on the output distribution board:

- Maximum total load rating;
- Maximum load rating of the load sockets.
- If a common distribution board is used (sockets for Mains and UPS voltage), ensure that on each socket there is an indication of the applied voltage ("Mains" or "UPS").

Output power cable ratings should be in accordance with the recommended cable sections and fuses ratings or in accordance with the prescribed IEC Standards or with the local regulations.

Under the connection terminal of the UPS there is a cable-fixing rail to ensure that the cables have been fastened properly.

Ensure that the earthing is performed in accordance with the prescribed IEC Standards or with the local regulations.

3.6.8 Connection of the Load

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL

To ensure protection of the personnel during the installation of the UPS make sure that the connections are performed under the following conditions:

- No mains voltage is present;
- All loads are shut down and disconnected;
- UPS valuenet is shut down and voltage-free.

Before connecting the output power cables make sure that:

- Maintenance bypass IA1 is in position OFF;
- Parallel Isolators IA2 is in position OFF;
- Static Bypass Line Fuse F2 is OPEN (in position OFF);
- Rectifier Line Fuse F1 is OPEN
- External Battery Breaker/Fuse (battery side) is OPEN (in position OFF).

Remove the terminal cover of the UPS.

Connect the output power cable coming from the LV-Distribution Board to the terminals of the UPS as shown in drawing of Figure 3.5.

3.6.9 Output Cabling

To achieve correct Output Cabling see Terminal Block in Figure 3.5.

For output cabling connect output cable to UPS Terminal according to following Output to UPS terminal block correlation.

OUTPUT CABLE	UPS TERMINAL
Phase L1	3L1
Phase L2	3L2
Phase L3	3L3
NEUTRAL	3N
EARTH	PE

Under the connection terminal of the UPS there is a cable-fixing rail to ensure that the cables have been fastened properly.

Block Diagram

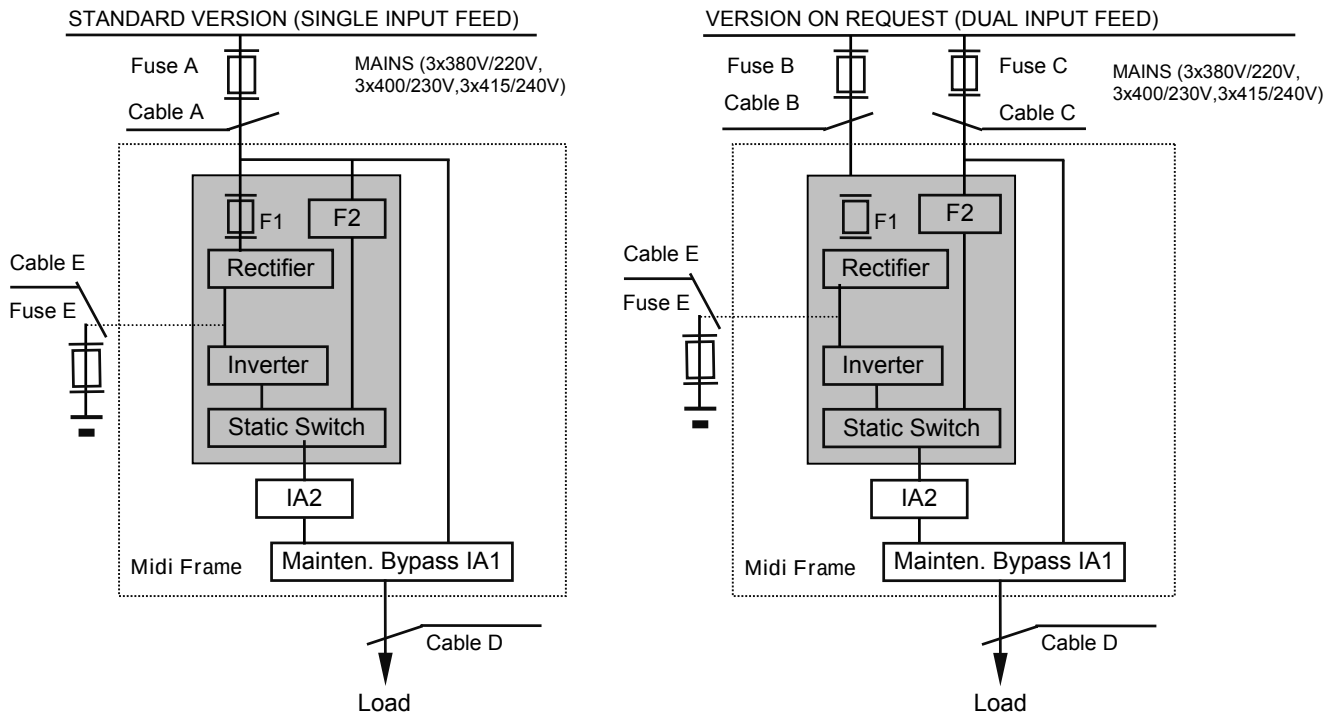
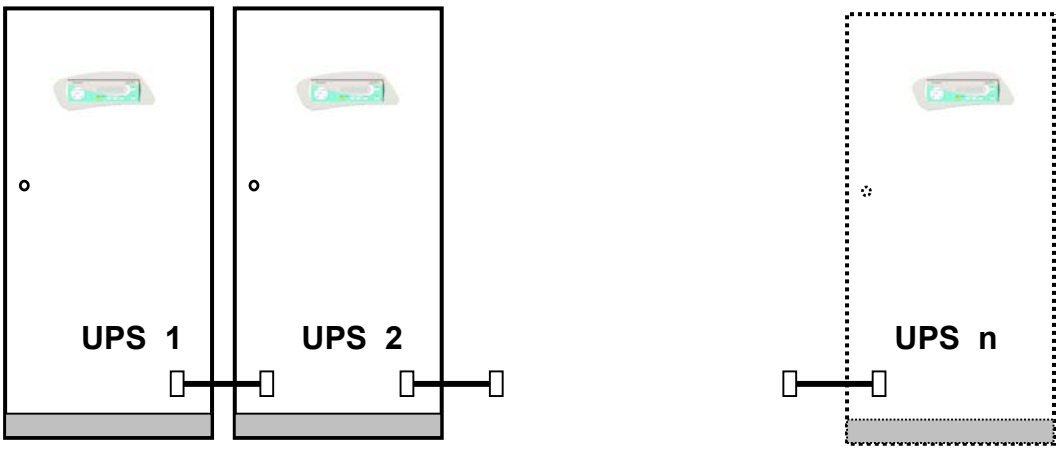


Figure 3.3: Block Diagram

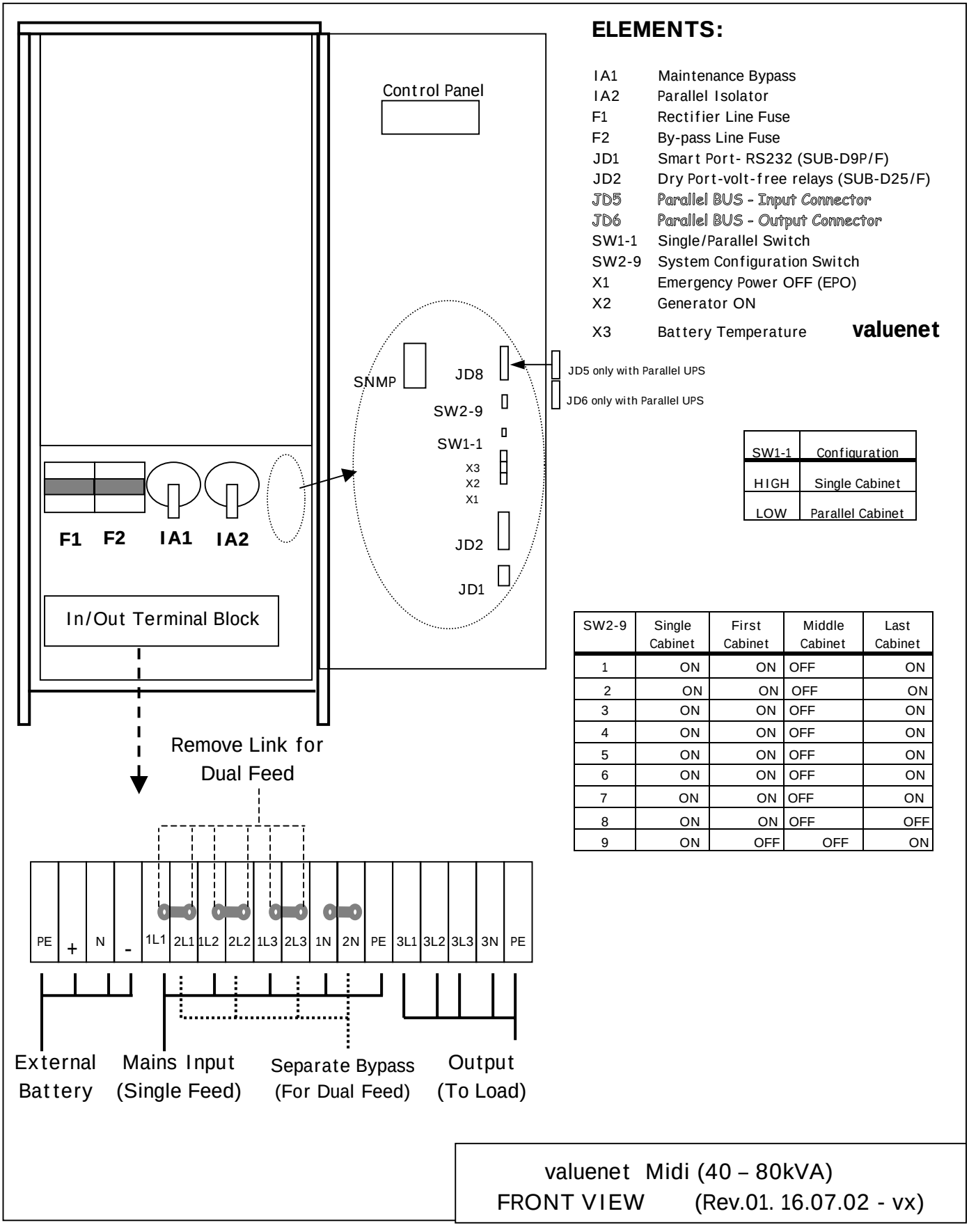
Power (kVA)	Fuse A (Agl/CB)	Cable A (IEC 60950-1:2001)	Cable D (IEC 60950-1:2001)	Fuse E +/N/-	Cable E +/N/-
40	3x80	5x25	5x25	3x100A	3x25
60	3x100	5x35	5x35	3x125A	3x35
80	3x125	5x50	5x50	3x160A	3x50

Power (kVA)	Fuse B (Agl/CB)	Cable B (IEC 60950-1:2001)	Fuse C (Agl/CB)	Cable C (IEC 60950-1:2001)	Cable D (IEC 60950-1:2001)	Fuse E +/N/-	Cable E +/N/-
40	3x80	5x25	3x80	4x25	5x25	3x100A	3x25
60	3x100	5x35	3x100	4x35	5x35	3x125A	3x35
80	3x125	5x50	3x125	4x50	5x50	3x160A	3x50

Figure 3.4: Cable Sections and Fuse Ratings recommended by European standards for valuenet Midi 40-80kVA. Alternatively, local standards to be respected



The valuenet Midi UPS's may be paralleled for power capacity upgrade or redundancy



SW1-1	Configuration
HIGH	Single Cabinet
LOW	Parallel Cabinet

SW2-9	Single Cabinet	First Cabinet	Middle Cabinet	Last Cabinet
1	ON	ON	OFF	ON
2	ON	ON	OFF	ON
3	ON	ON	OFF	ON
4	ON	ON	OFF	ON
5	ON	ON	OFF	ON
6	ON	ON	OFF	ON
7	ON	ON	OFF	ON
8	ON	ON	OFF	OFF
9	ON	OFF	OFF	ON

Figure 3.5: In/Out Terminal Block, Front View valuenet Midi Line 40-80kVA

3.7 INTERNAL BATTERY

In the **valuenet Midi Line** there are no internal batteries.

3.8 EXTERNAL BATTERY CABINET AND BATTERY CONFIGURATIONS

3.8.1 External Battery Configuration

An external matching battery cabinet CBAT-30C/S and CBAT-M are also available for 24Ah and 28Ah battery blocks. Up to 120 x 24Ah battery blocks may be fitted in this cabinet. See Figure 3.6.

NOTE: For UPS-Midi use only 40-50 (only even numbers) of 12V-battery blocks or multiples.

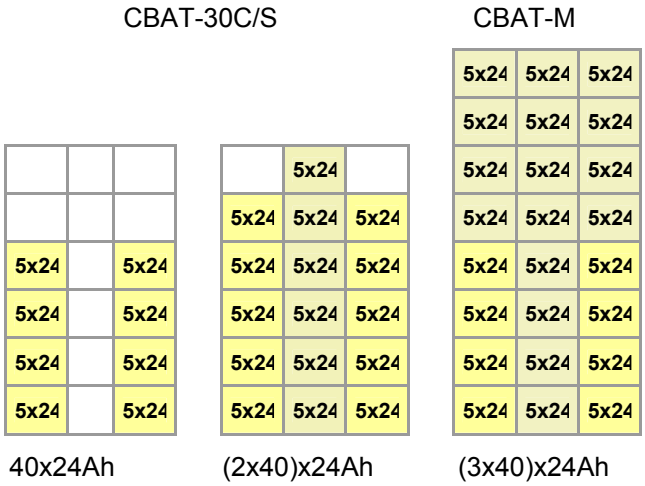


Figure 3. 6 External Battery Cabinet CBAT-M with up to 120 x 24Ah batteries is shown.

Depending on the request the batteries it is possible to parallel them together into one common battery for all UPS-cabinets.

3.8.2 Connection of External Battery Cabinet and UPS valuenet Midi-Line

ALL THE OPERATIONS IN THIS MANUAL MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.
DO NOT OPERATE IN CASE OF PRESENCE OF WATER OR MOISTURE.
BY OPENING OR REMOVING THE UPS-COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!

It is normally recommended for redundant Multi-Cabinet systems to provide each UPS-Cabinet with its own separate battery. In this way the redundancy is extended also to the batteries. In the Figure 3.7 the drawing shows how to connect the batteries in the external battery cabinet CBAT-30C/S or CBAT-M and the UPS valuenet Midi Line.

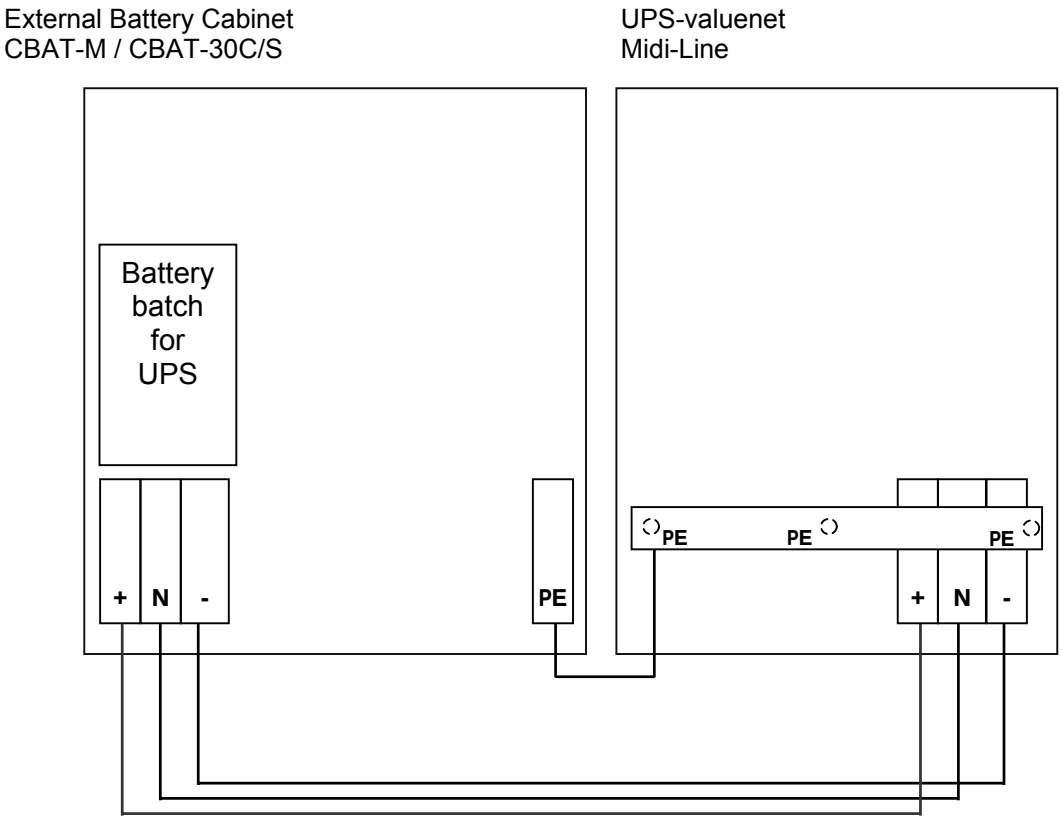


Figure 3.7 Connection of external batteries

To ensure protection of the personnel during the installation of the UPS make sure that the connections are performed under the following conditions:

- No mains voltage is present in the UPS
- All the loads are disconnected
- The UPS and the external battery are voltage-free

To verify the complete shut down of the **valuenet** perform following steps:

1) Make sure that the fuses feeding the UPS in the input Distribution Board are all open and no power is fed to the UPS.
2) Make sure the "MAINTENANCE BYPASS"(IA1) is open (position "OFF")
3) Make sure that the Input Line Fuses F1 and F2 are all OPEN
4) Make sure the battery fuses in the external battery cabinet are open.
5) Connect Earth **(PE)** between the UPS and external battery cabinet.
6) Connect the corresponding + , N, - terminals between UPS and external battery cabinet according to drawing in Figure 3.7.

3.9 INTERFACING

The **valuenet** is provided with two ports:

- SMART PORT (Serial RS 232);
- DRY PORT (volt-free contacts);

3.9.1 SMART PORT (Serial RS 232)

The SMART PORT JD1 is an intelligent RS 232 serial port that allows the UPS to be connected to a computer. The connector is a standard D-Type, 9-pin, female.

When installed the optional SMART PORT, the software WAVEMON allows the computer to monitor the mains voltage and the UPS status continuously.

In the event of any changes the computer terminal will display a message. (For details see our Monitoring Package: ***WAVEMON***)***.

The Fig. 3.8 and 3.9 shows how to connect a PC to the UPS.

a) Fig. 3.8 in case the PC has a 9 pin serial port
b) Fig. 3.9 in case the PC has a 25 pin serial port

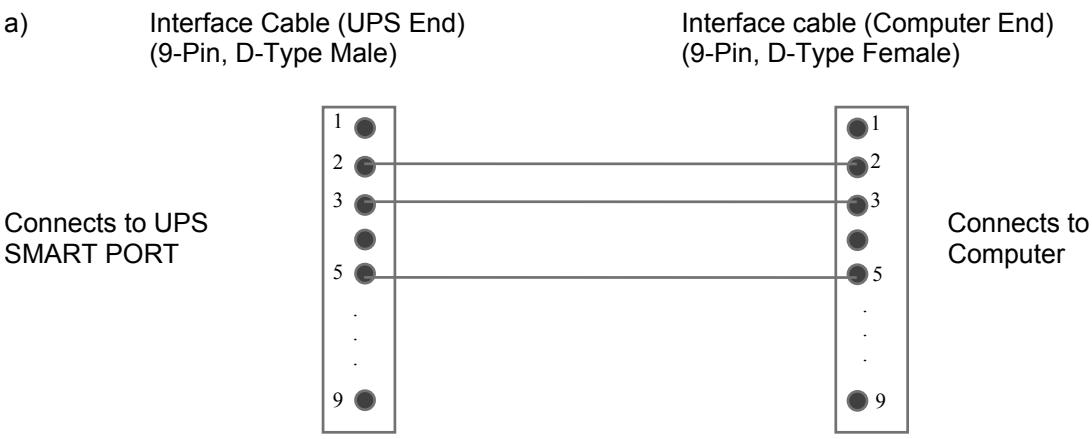


Figure 3.8 Connector Cable - PC Serial Port with 9-Pin Connection

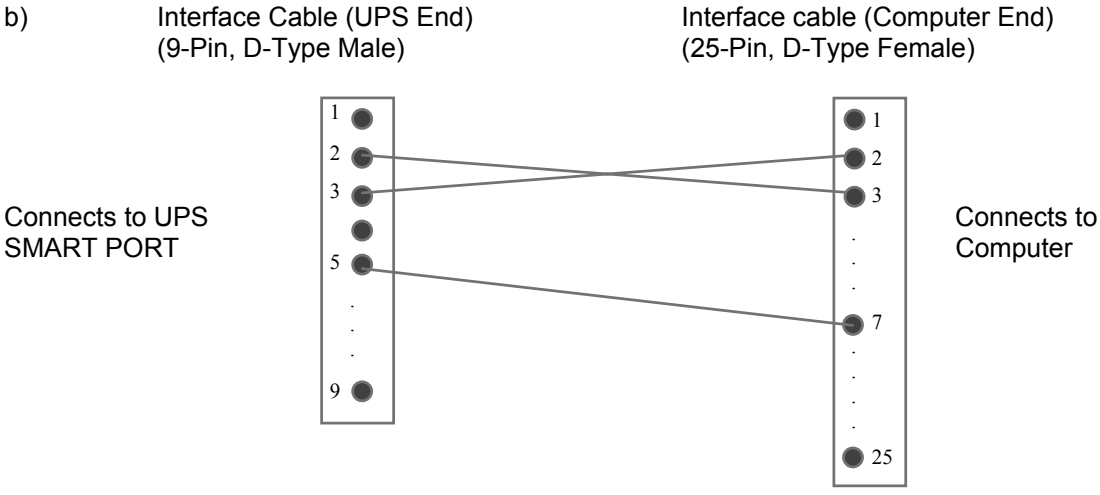


Figure 3.9 Connector Cable – PC Serial Port with 25-pin Connection

3.9.2 DRY PORT (volt-free contacts)

Description:

The DRY PORT JD2 (DB-25P/F) may be used for:

- Connection of remote emergency stop facilities (see paragraph 9.2);
- Connection of Remote Status Panel (see paragraph 9.3);
- Provision of signals for the automatic and orderly shutdown of servers
- or IBM AS400, etc.

Definition of PINs on DRY PORT JD2 (25 PIN):

Pin	Contact	Signal		Function
1	NO	ALARM	MAINS_OK	Mains failure
2	NC			Mains present
3	C			Common
4	NO	Message	LOAD_ON_INV	Load on inverter
5	NC			
6	C			Common
7	NO	ALARM	BATT_LOW	Battery low
8	NC			Battery OK
9	C			Common
10	NO	Message	LOAD_ON_MAINS	Load on Mains (BYPASS mode)
11	NC			
12	C			Common
13	NO	ALARM	COMMON_ALARM	Common Alarm
14	NC			No Alarm Condition
15	C			Common
16 - 19		NC		Not Connected
20				Customer in +12V
21		GND		Customer in GND
22		PS_12		GND
23		PS_12		+ 12V (Imax = 100 mA)
24				Not Connected
25				Not Connected

All volt free contacts are rated 60 VAC max. and 500 mA max.

Figure 3.10 DRY PORT (JD2) Connections

4 Operation

4.1 COMMISSIONING

The valuenet UPS is a high quality electronic machine that must be commissioned by a fully trained and authorized NIGICO field service engineer before being put into use.

The commissioning of the UPS involves the connection of the UPS and battery, the checking of the electrical installation and operating environment of the UPS, the controlled start-up and testing of the UPS and customer training.

Any VALUENET UPS system not commissioned by a NIGICO field service engineer or authorized service centre must be considered an electrical hazard and NIGICO accepts no responsibility for its safe operation or the safety of any personnel. Additionally, the manufacturer's warranty is immediately invalidated if the UPS is put into use before it has been correctly commissioned.

4.2 CONTROL PANEL.

The user-friendly control panel is composed of three parts:

- POWER MANAGEMENT LCD DISPLAY (PMD);
- LED INDICATORS;
- KEYS.

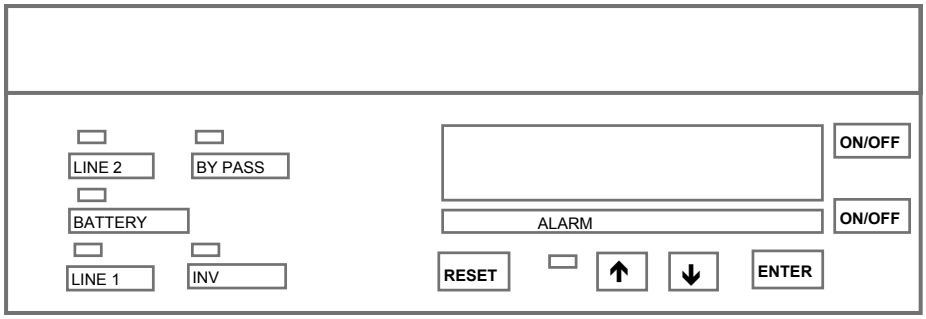


Figure 4.1 Control Panel.

4.2.1 Power Management Display (PMD)

The 2 x 20 character LCD simplifies the communication with the UPS and provides the necessary monitoring information about the UPS.

The menu driven LCD enables the access to the:

- EVENT REGISTER;
- Monitor the input and output U, I, f, P,
- Battery runtime;
- To perform commands like start-up and shut-down of UPS and
- Load transfer from INVERTER to BYPASS and vice-versa;
- DIAGNOSIS (SERVICE MODE);
- Adjustments and testing.

4.2.2 LED Indicators

The mimic diagram serves to indicate the general status of the UPS. The LED-indicators show the power flow status and in the event of mains failure or load transfer from inverter to bypass and vice-versa. The corresponding LED-indicators will change colours from green (normal) to red (warning).

The LED's LINE 1 (rectifier) and LINE 2 (bypass) indicate the availability of the mains power supply.

The LED's INVERTER and BYPASS if green indicate which of the two is supplying power to the critical load. When the battery is supplying the load due to mains failure the LED-indicator BATTERY is flashing.

The LED-indicator ALARM is a visual indication of any internal or external alarm condition. At the same time an audible alarm will be activated.

INDICATOR	INDICATOR STATUS	MEANING
ALARM	OFF	No alarm condition
	RED	Alarm condition
LINE 1	GREEN	Mains rectifier available
	RED	Mains rectifier not available
LINE 2	GREEN	Mains bypass available
	RED	Mains bypass not OK or not available
	OFF	UPS is turned off
BY-PASS	GREEN	Load on bypass (Bypass-or Eco-Mode)
	OFF	Bypass not operating (switched-off)
INV	GREEN	Load on inverter
	RED	Inverter fault or load not transferable to inverter
	OFF	Inverter not operating (switched-off)
BATTERY	GREEN	Battery OK
	RED	Battery fault or battery is discharged
	Flashing GREEN	Battery in discharge or battery fuse open

4.2.3 Keys

The keys allow the user to operate the UPS to perform settings and adjustments, to start-up and shutdown the UPS, to monitor on the LCD display the voltages, currents, frequencies and other values.

KEYS	FUNCTION
ON/OFF ON/OFF	Serve to switch-on (press both keys simultaneously), or shutdown the UPS (press both keys simultaneously)
UP (↑)	Move upwards through the menu
DOWN (↓)	Move downwards through the menu.
RESET	Cancel the audible alarm. If the alarm condition was only transient the LED-indicator ALARM would also extinguish otherwise it will remain on (red).
ENTER	Confirms a chosen menu item.

4.2.4 ON/OFF Start-up and Shutdown Buttons

By pressing simultaneously both ON/OFF Buttons on the Control Panel the UPS may be switched on or shutdown. This is to prevent accidental start-up or shutdown of the UPS. The two main ON/OFF buttons are also used as a security LOAD–OFF-switch, making it possible to quickly disconnect the load from the UPS in emergency situations when a competent technician working on the UPS is in danger or if the UPS has some kind of anomaly.

TO SHUT DOWN A PARALLEL SYSTEM YOU MUST PRESS BOTH ON/OFF-BUTTONS ON EVERY UPS-CABINET!

ACTIVATION OF THE ON/OFF BUTTONS WHEN THE UPS IS NOT IN MAINTENANCE BYPASS MODE WILL INTERRUPT THE POWER SUPPLY TO THE LOAD.

LOAD OFF in Single Cabinet System (MIDI LINE)

If, for security or emergency reasons, it is necessary to immediately disconnect the load from the UPS, press the two red ON/OFF Buttons simultaneously. This is to avoid any accidental manipulation.

4.2.5 Definition of a Single/ Parallel-Cabinet (DIP Switch SW1-1)

By means of the DIP Switch SW1-1, which is located on the front of the Cabinet, it is possible to determine if the UPS is operating as a single UPS or as a parallel UPS in Multi-Cabinet-Chain.

SW1-1	Configuration
HIGH	Single Cabinet
LOW	Parallel Cabinet

4.2.6 Definition of a Single/ Multi-Cabinet Chain (DIP Switch SW2-9)

By means of the DIP Switch SW2-9, which is located on the front of a Cabinet, it is possible to determine the "position" of the Cabinets in Multi-Cabinet Chain:

- **"First"** in the Multi-Cabinet Chain
- **"Middle"** in the Multi-Cabinet Chain (there may be more than one)
- **"Last"** in the Multi-Cabinet Chain.

NOTE: If a Cabinet is a **Single Cabinet** then it is seen as the **"First"** and **"Last"** in an imaginary Chain. So the positions of the DIP Switch SW1-9 must be set as shown below:

SW2-9	**Single Cabinet**	First Cabinet	Middle Cabinet	Last Cabinet
1	**ON**	ON	OFF	ON
2	**ON**	ON	OFF	ON
3	**ON**	ON	OFF	ON
4	**ON**	ON	OFF	ON
5	**ON**	ON	OFF	ON
6	**ON**	ON	OFF	ON
7	**ON**	ON	OFF	ON
8	**ON**	ON	OFF	OFF
9	**ON**	OFF	OFF	ON

4.3 DESCRIPTION OF THE LCD

4.3.1 Status Screens

	DESCRIPTION	LCD-DISPLAY
1	Load is protected by UPS power (load is supplied by inverter(Normal Operation)	**LOAD** P01 **PROTECTED**
2	Load is not protected by UPS power it is supplied by mains power (load on bypass)	**LOAD** P01 **NOT PROTECTED**
3	Load supply completely interrupted. UPS has been switched off by “ON/OFF” buttons	**LOAD OFF** P01 **SUPPLY FAILURE**
4	The UPS/module is not supplying load anymore. The output switch is open.	**LOAD DISCONNECTED** P01 **PARALLEL SWITCH OPEN**

NOTE: On the right hand side of the LCD there is a 3 digit indicator defining the Module “Position” in the Multi-Module system.

S stands for Single Module. The system consists only of one Module.

P01 stands for Parallel Cabinet in a Multi-Module system and 01 stands for the first Cabinet (MASTER) in the Multi-Module system.

P02 stands for Parallel Cabinet in a Multi-Cabinet system and 02 stands for the second Cabinet (SLAVE) in the Multi-Cabinet system.

P03 stands for Parallel-Cabinet in a Multi- Cabinet system and 03 stands for the third Cabinet (SLAVE) in the Multi- Cabinet system.

The definition of the Cabinet “Position” is achieved in the Menu Service Set-Up.

4.3.2 Main Menu Screen

	DESCRIPTION	LCD-DISPLAY
1	Logging Control. A log of the last 64 events is stored in the Power Management Display.	→ **EVENT LOG** **MEASUREMENTS**
2	In Menu Measurements: monitor voltages, power,frequencies, currents, autonomy etc.	→ **MEASUREMENTS** **COMMANDS**
3	The Command Menu enables to perform the commands “Load to inveter”, Load to bypass, battery test.	→ **COMMANDS** **UPS DATA**
4	The UPS Data are the UPS personalized information “serial number”	→ **SET-UP DATA** **SET-UP USER**
5	Various settings can be performed by the user: Date/Time, automatic battery test, etc.	→ **SET-UP USER** **SET-UP SERVICE**
6	Various adjustments can be performed by the service staff	→ **SET-UP SERVICE** **NO MORE MENU**

4.3.3 Event Log Screen

	DESCRIPTION	LCD-DISPLAY
1	Logging Control; a log of the last 64 events is stored in the Power Management Display.	**01** 05-10-00 14-38-59 **LOAD TO INV.**
2	Every stored event is identified with a sequential number and time stamp.	**02** 05-10-00 14-38-56 **LOAD TO BYP.**
3	All events and alarms are indicated with their date and time of appearance.	**03** 05-10-00 14-37-14 **LOAD OFF**

4.3.4 Measurements Screen

	DESCRIPTION	LCD-DISPLAY
1	Battery Runtime	**BATT. RUN TIME (MIN)** 00h 00m
2	UPS-Output Frequency	**OUTPUT FREQUENCY (HZ)** 50.00
3	Bypass Frequency.	**BYPASS FREQUENCY (HZ)** 50.00
4	Battery Voltage	**BATTERY VOLTAGE (V)** + 0.0 - 0.0
5	Battery Charger Current	**BATT. CHARGE CUR. (A)** + 0.0 - 0.0
6	Discharge Current.	**DISCHARGE CURRENT (A)** 00.00
7	Rectifier Voltage of all three phases	**RECTIFIER VOLTAGE (V)** 230 230 230
8	Bypass Voltage of all three phases	**BYPASS VOLTAGE (V)** 230 230 230
9	Output Voltage of all three phases	**OUTPUT VOLTAGE (V)** 230 230 230
10	Output Current of all three phases	**OUTPUT CURRENT (A)** 00.00 00.00 00.00
11	Active Output Power of all three phases	**ACTIVE POWER (KW)** 00.00 00.00 00.00
12	Reactive Output Power of all three phases	**REACTIVE POWER (kVAr)** 00.00 00.00 00.00
13	Apparent Output Power of all three phases	**APPARENT POWER (KVA)** 00.00 00.00 00.00
14	Output Power of all three phases	**OUTPUT POWER (%)** 00.00 00.00 00.00
15	Battery capacity	**BATT. CAPACITY (%)** 00.00

4.3.5 Commands Screen

	DESCRIPTION	LCD-DISPLAY
1	Transfer Load to inverter	→ **LOAD TO INVERTER** **LOAD TO BYPASS**
2	Transfer Load to bypass.	→ **LOAD TO BYPASS** **PERFORM BATT.TEST**
3	Battery Test	→ **PERFORM BATT.TEST** **NO MORE COMMANDS**

4.3.6 UPS Data

	DESCRIPTION	LCD-DISPLAY
1	These general UPS Data are installed at the manufacturing plant	**UPS SERIAL NUMBER** **NW-nnnnn**
2	Manufacturing date	**DATE OF MANUFACTURE** **15-01-2003**
3	EPROM Version	**EPROM VERSION** **V-000**
4	Actual Date and Time	**DATE** **TIME** dd-mm-yyyy hh:mm:ss

4.3.7 Set-Up User

DESCRIPTION	LCD-DISPLAY
1 Set-up Language (not active yet)	→ **SET LANGUAGE** **SET DATE AND TIME**
	ENGLISH **FRANCAIS** **POLISH**
2 Set-up Date and Time	→ **SET-UP DATE/TIME** **SET-UP BATT. TEST**
	DD-MM-YY HH-MM-SS
3 Set-up battery test	→ **SET BATTERY TEST** **SET GENERATOR OP.**
	DAY OF MONTH **(1-31)**
	HOUR OF DAY **(1-24)**
	REPETITIVE (Y/N) **YES/NO**
4 Set-up operation with Gen-Set	→ **SET GENERATOR OP.** **NO MORE SETTINGS**
	BATT.CHARGE LOCK **YES/NO**
	BYPASS LOCK **YES/NO**

4.3.8 Set-Up Service

DESCRIPTION	LCD-DISPLAY
1 This Menu is reserved for authorized service engineers. It is not to be used by End-Users	→ **SET-UP SERVICE** **PASSWORD**
2 Type in password	→ **PASSWORD.**

Password is necessary to enter.

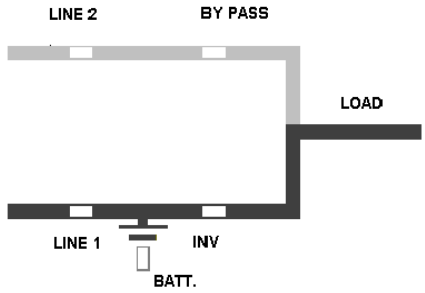
NOTE: Apart from the adjustment of voltages, frequencies, currents, power and autonomies in the SET-UP Service it is also possible to set and check the following parameters:

- UPS Rated Power
- Module configuration S, P01, P02,…
- Single (standard) or Dual Input feed
- f-converter, 50/60Hz and 60/50Hz
- Sync window (2-4%)

4.4 OPERATING MODES

4.4.1 Mode "ON LINE" (INVERTER MODE)

The ON-LINE-Mode is the UPS-Operating Mode in which the load is supplied through the RECTIFIER and INVERTER.



LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	OFF
INVERTER	Green
BATTERY	Green

Using the control panel (see figure 4.1), the UPS can easily be transferred to the ON-LINE-Mode. The ON-LINE-Mode provides the highest degree of protection, especially in the event of a mains disturbance or failure.

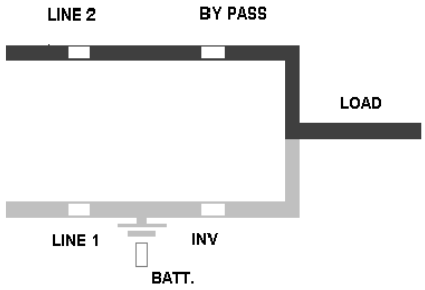
This operating mode is always recommended if the critical loads (computer systems) will not tolerate any interruption of the supply (not even the shortest).

In the unlikely event of an inverter fault or overload condition the UPS will transfer the load automatically and without interruption to the static bypass-mains supply (transfer time = 0).

4.4.2 Mode"OFF-LINE"(ECO- or BYPASS MODE)

In the "OFF-Line Mode", the load is supplied from the mains through the static bypass.

Using the control panel (see figure 4.1), the UPS may be easily transferred to "Bypass Mode".



LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	OFF
BATTERY	Green

When the UPS is operating in "Bypass Mode", the efficiency of the system is higher. In the event of a mains failure the load will automatically be transferred from mains to inverter within 5 msec (this is valid for single and parallel systems). The battery charger remains active in the "Bypass-Mode".

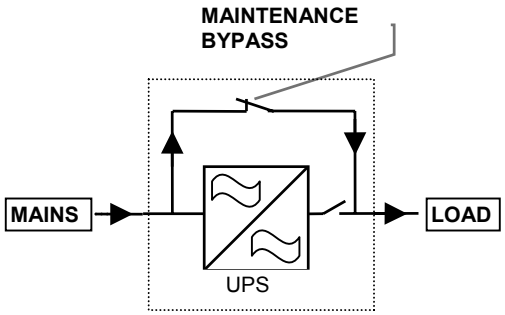
The "Bypass-Mode", is recommended only if the loads can tolerate interruptions of 3-5 ms (transfer time from Bypass Mode to ON-LINE Mode).

In order to provide the load with maximum protection NIGICO always recommends that the load be supplied by the inverter (ON-LINE-Mode).

4.4.3 "MAINTENANCE BYPASS" - Mode

The Maintenance Bypass Mode is performed by means of the IA1 BYPASS SWITCH on the front of the UPS:

POSITION OF SWITCH	EFFECT
ON	Bypass-Switch Closed (Load supplied directly from mains) LCD-indication: "MANUAL BYP IS CLOSED" LED Indicators will indicate as shown in table below.
OFF	Bypass-Switch Open – Normal operating condition (Load supplied by inverter) LCD-indication "MANUAL BYP IS OPEN" LED Indicators will indicate as shown in table below.



LED Indicator	ON	OFF
LINE 1	Green	Green
LINE 2	Green	Green
BYPASS	Green	OFF
INVERTER	RED	GREEN
BATTERY	Green	Green

Before transferring the load to Maintenance Bypass (IA1) always make sure all the UPS-modules are in the "Bypass-Mode" or "ECO-Mode".

IF THE UPS IS OPERATING IN THE MAINTENANCE BYPASS MODE THROUGH THE BYPASS SWITCH THE LOAD WILL NOT BE PROTECTED IN THE EVENT OF A MAINS FAILURE. IT IS THEREFORE STRONGLY RECOMMENDED TO SWITCH OVER TO THE ON-LINE MODE (INV. ON) OR BYPASS MODE (OFF-LINE MODE) AS SOON AS POSSIBLE.

4.4.4 Parallel Isolator (IA2)

Every UPS-unit is provided with an output parallel isolator (IA2) which, when opened isolates the corresponding unit from the PARALLEL BUS and from the LOAD. Once IA2 is open there is no power coming from its inverter.

In redundant parallel configurations it is used to isolate a unit from the parallel system without the need of transferring the load to bypass.

POSITION	EFFECT
ON	Normal Operation (Load supplied by UPS)
OFF	UPS isolated from Parallel Bus for maintenance (UPS not supplying load)

4.5 START-UP PROCEDURE

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

Situation of UPS-System before switching it on:

1. The fuses for the supply of UPS-System in the Input Distribution Board on site are open.
2. Make sure all the input and output cabling has been performed correctly and check the input phase rotation.
3. Verify that the Parallel Isolator Switch IA2 is open (Position OFF)
4. Verify that the Maintenance Switch IA1 is open and in Position OFF.
5. Make sure the battery breakers in external battery cabinets are open.
6. Static Bypass Line Breaker F2 is open.
7. Check the Position of the DIP Switches SW1-1 and SW2-9. This is a **Single- Cabinet** Configuration, and the DIP Switches SW1-1 and SW2-9 must be set according to positions shown in Table of Paragraph 4.2.5 and 4.2.6.

Start up procedure of Midi Line:

1. Insert fuses for the supply of UPS-System in the Input Distribution
   - The LED-indicators LINE 1 and battery on UPS panel are lit – green
   - On LCD-Display “LOAD OFF, SUPPLY FAILURE” will appear.
2. Close Bypass Line Breaker F2.
3. Close Parallel Isolator IA2 (position ON).
   Check message “PARALLEL SW CLOSED” on LCD by pressing ENTER twice.
4. UPS: Press both “ON/OFF” Main Buttons to switch on UPS. On LCD: “LOAD NOT PROTECTED” will appear and the LED-indicator will indicate as shown below:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	OFF
BATTERY	Flashing Green

5. Check Command: LOAD TO INVERTER
   On LCD: “LOAD PROTECTED” will appear and the LED-indicator will indicate as shown below:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	OFF
INVERTER	Green
BATTERY	Flashing Green

6. Scroll through the measurement and check their correctness
7. Check battery polarity and voltage.
8. If the battery polarity and voltage is correct close the external battery breaker/fuse.

9. Load transfer to Maintenance Bypass
   Go to Menu COMMANDS and choose command “LOAD TO BYPASS” and transfer load to mains.
   Close Maintenance Bypass Switch IA1 (position ON).
   On LCD: “MANUAL BYP CLOSED” will appear and the LED-indicator will indicate as shown below:

LED Indicator	**Colour**
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	RED
BATTERY	Green

10. Connect Load to the UPS Output
    Insert fuses in output Distribution Board
    Verify on control Panel that the load is on bypass”
11. Open Maintenance Bypass Switch IA1
    On LCD: “MANUAL BYP IS OPEN” will appear followed by
    “LOAD NOT PROTECTED”
12. Check on LCD the Output Powers, Voltages Currents and Frequencies.
13. Load transfer to Inverter
    Go to Menu COMMANDS and choose command “LOAD TO INVERTER” and transfer the load to inverter.
    On LCD: “LOAD PROTECTED” will appear.
14. Check the output Voltages and Currents once again.

THE LOAD IS NOW PROTECTED BY THE UPS VALUENET

4.6 SHUTDOWN PROCEDURE

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

The valuenet UPS may be shutdown completely if the load does not need input power for an extended period of time.

It may be switched to Maintenance Bypass Mode for service or maintenance purposes, or transferred to the OFF-LINE Mode if the load does not need the highest degree of protection.

The load may be disconnected by means of the two ON/OFF (LOAD-OFF) buttons for security reasons.

Complete Shutdown procedure of Midi-Line:

The UPS may be shut down completely if the loads do not need any power supply. Therefore the following steps are to be performed only after the load has been disconnected and does not need any power supply.

ACTIVATION OF BOTH ON/OFF BUTTONS SIMULTANEOUSLY WHEN DURING NORMAL OPERATION WILL SWITCH OFF THE UPS OUTPUT AND NO LONGER SUPPLY POWER TO THE LOAD.

1. Verify that the loads are shutdown and that there is no need for power supply to the load.
2. If the loads are all disconnected, press simultaneously the two ON/OFF buttons on the UPS-control panel.
   On the LCD: “LOAD OFF, SUPPLY FAILURE” will appear and the LED-indicator will indicate as shown below:

LED Indicator	Colour
LINE 1	Green
LINE 2	OFF
BYPASS	OFF
INVERTER	OFF
BATTERY	Flashing Green

3. Open Parallel Isolator Switch IA2 to position OFF.
4. Open battery breakers in external battery cabinets or racks.
5. Open the Bypass Line Breaker F2.
6. Open the mains fuses/breaker in the building distribution panel.

AFTER SWITCHING OFF A UPS UNIT MAKE SURE THE INTERNAL DC-CAPACITORS HAVE BEEN DISCHARGED AND WAIT AT LEAST 10 MINUTES

THE UPS VALUENET IS NOW VOLTAGE FREE.

4.7 LOAD TRANSFER: FROM INVERTER OPERATION TO MAINTENANCE BYPASS

Prior to perform any service or maintenance on the UPS, LOAD should be transferred to MAINTENANCE BYPASS.

BEFORE YOU SWITCH THE MAINTENANCE BYPASS TO POSITION «ON», MAKE SURE THAT THE LOAD HAS BEEN TRANSFERRED TO MAINS SUPPLY (OFF-LINE MODE)

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

Situation of UPS-System before starting the Transfer Procedure to Maintenance Bypass:

The load is protected by valuenet UPS running in normal operation. The UPS system is operating on inverter.

1. Using LDC panel, select the COMMANDS menu and choose command “LOAD TO BYPASS”. This will transfer the LOAD to mains on the complete system. On LCD panel
   “LOAD NOT PROTECTED” will appear.
2. Close Maintenance Bypass Switch IA1.
   On LCD: “MANUAL BYP IS CLOSED” will appear and the mimic panel will show:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	RED
BATTERY	Green

3. Press simultaneously both ON/OFF buttons on UPS-control panel.
   On the LCD’s message “LOAD OFF, SUPPLY FAILURE” will appear and the mimic panel will show:

LED Indicator	Colour
LINE 1	Green
LINE 2	OFF
BYPASS	OFF
INVERTER	OFF
BATTERY	Flashing Green

4. Open the Parallel Isolator IA2 to position OFF.
5. Open the Bypass Fuses F2.
6. Open the Rectifier Fuses F1.
7. Open battery breakers in external battery cabinets or racks.

THE LOAD IS NOW SUPPLIED BY MAINS AND IS NOT PROTECTED

4.8 LOAD TRANSFER: FROM MAINTENANCE BYPASS TO INVERTER OPERATIONS

This procedure describes the sequence of operations to be done in order to restart the UPS and restore ON-LINE mode (Load on Inverter).

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

Situation of UPS-System before starting the Transfer Procedure to ON-LINE mode:

The load is supplied directly by Input Mains power and the UPS is OFF.

1. Close battery breakers in external battery cabinets or racks.
2. Close the Rectifier fuses F1.
   LCD and mimic panel switches ON.
3. Close the Bypass Fuses F2.
4. On the LCD's: "LOAD OFF, SUPPLY FAILURE" will appear and the mimic panel will show:

LED Indicator	Colour
LINE 1	Green
LINE 2	OFF
BYPASS	OFF
INVERTER	OFF
BATTERY	Flashing Green

5. Wait 90 seconds to complete the initialization process, then close the Parallel Isolator IA2 to position ON.
6. Press simultaneously both ON/OFF buttons on UPS-control panel.
   Unit will start-up and after about 60 seconds the mimic panel will show:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	RED
BATTERY	Green

7. Make sure that the bypass LED is green, then open the Maintenance Bypass Switch IA1.
8. Using LDC panel, select the COMMANDS menu and choose command "LOAD TO INVERTER". This will transfer the LOAD to Inverter on the complete system. On LCD panel "LOAD PROTECTED" will appear.

THE LOAD IS NOW SUPPLIED BY INVERTER POWER AND IS PROTECTED

5 Multi-Cabinet Configuration

5.1 CONCEPT OF MULTI-CABINET CONFIGURATION

The Midi-Line UPS-Cabinets may be paralleled for power capacity or for redundancy indefinitely. Every standard **valuenet** UPS is provided with the parallel option and therefore no time-consuming upgrading is necessary on site.

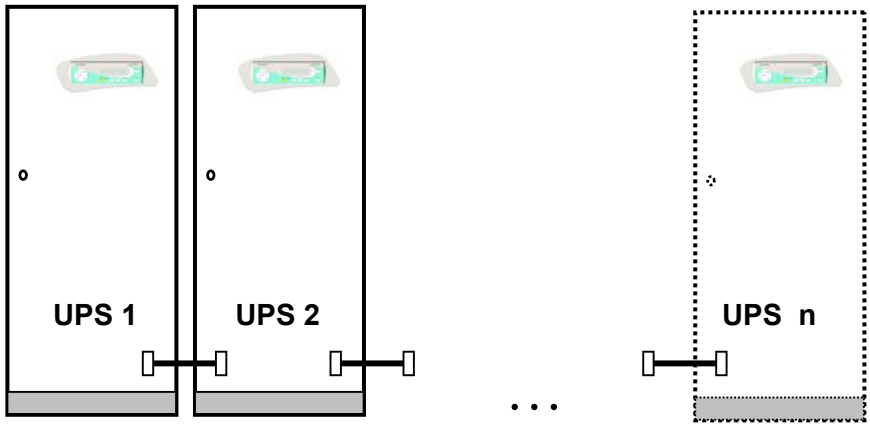


Fig. 6.1. UPS **valuenet Midi-Line** Multi-Cabinet Chain.

The Multi-Cabinet Configuration is based on a decentralised bypass architecture i.e. every UPS is provided with its own static bypass. In a parallel system there is always one Master Module and the other Modules are slaves. If at any time the master is faulty the next UPS (former slave) will immediately take over the master function and the former master will switch off.

Every UPS unit in a parallel configuration is provided with a proper output parallel Isolator (IA2) which, when opened isolates the corresponding unit from the parallel system. Once the parallel isolator (IA2) of a unit is open that unit (module) is isolated from the rest of the parallel system and therefore does not provide power to the output.

For example if you perform the command “LOAD TO BYPASS” on any unit, all the units will transfer the load simultaneously to mains and if you perform the command “LOAD TO INVERTER” on any unit all the UPS’s will simultaneously transfer the load to the inverters.

The **valuenet** is paralleled for redundancy (highest availability) or for power parallel systems.

IMPORTANT: The BYPASS MODE (ECO-MODE) function of a parallel systems is the same as in single units of **valuenet**. If in a parallel UPS system the load is transferred to the BYPASS (load on mains) and if the mains fails, the UPS’s will all be automatically transferred to inverter within 5msec.

In order to provide the load with maximum protection NIGICO always recommends that the load be supplied by the inverter (ON-LINE-Mode).

5.2 INSTALLATION INSTRUCTIONS

5.2.1 Introduction

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL TRAINED PERSONNEL.
BY OPENING THE UPS-CABINET AND PROTECTION COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!
AFTER SWITCHING OFF A UPS UNIT MAKE SURE THE INTERNAL DC-CAPACITORS HAVE BEEN DISCHARGED AND WAIT AT LEAST 10 MINUTES.
DO NOT EVER LEAVE THE UPS-CABINET WITHOUT AN APPROPRIATE PROTECTION COVER.
NIGI WILL NOT TAKE RESPONSIBILITY OR BE LIABLE FOR PERSONNEL INJURIES OR MATERIAL DAMAGES CAUSED BY IMPROPER MANIPULATION OF THE UPS, OR BY INCORRECT CABLING. THE PROPER INSTALLATION AND USAGE INSTRUCTIONS OF THE UPS ARE DESCRIBED WITHIN THIS MANUAL AND MUST BE STRICTLY ADHERED TO.

DO NOT ATTEMPT TO COMMISSION A PARALLEL SYSTEM WITHOUT CAREFULLY READING THIS USER MANUAL (SEE ALSO CHAPT. 3 AND 4)

NOTE: IN ORDER TO ACHIEVE EQUAL LOAD SHARING BETWEEN THE UPS-CABINETS, THE INPUT CABLE LENGTHS FROM THE INPUT DISTRIBUTION BOARD TO THE UPS AND FROM THE OUTPUT CABLE TO THE OUTPUT DISTRIBUTION BOARD SHOULD BE THE SAME RESPECTIVELY.
WHEN CABLING THE UPS'S BEWARE TO CONNECT INPUT AND OUTPUT WIRES TO THE CORRESPONDING TERMINALS, RESPECTING THE SAME PHASE SEQUENCE ON ALL UPS CABINETS. EXAMPLE: PHASE1 UPS1 = PHASE1 UPS2 = …… = PHASE1 UPS n

WHEN CABLING THE UPS's MAKE SURE THAT THE UPS's ARE COMPLETELY VOLTAGE FREE. CHECK THAT THE MAINTENANCE BYPASSES (IA1), ALL PARALLEL ISOLATOR (IA2) BYPASS LINE BREAKER (F2) ARE OPEN ("OFF") IN ALL CABINETS.

5.2.2 Paralleling of UPS-Cabinets

5.2.2.1 Connection of Parallel Communication Cables (BUS-lines)

For the correct performance of different parallel functions and operations the parallel units communicate continuously between each other. This is achieved by means of the so-called communication BUS-Lines.

After terminating the input and output cabling of each single UPS, it is necessary to connect the units together to form the parallel system. For this purpose a communication BUS line is connected sequentially between the units. Connect communication BUS lines according to Figure 6.2.

NOTE: CONNECT THE BUS CABLES ONLY WITH SWITCHED OFF UPS AND OPENED PARALLEL ISOLATORS IA2. RESPECT THE FOLLOWING CONNECTION SEQUENCES.

1. Fit the Parallel Adapter over the Connector JD8 on all UPS-cabinets
2. Set DIP Switch SW2-2 on each Parallel Adapter depending on the UPS Cabinet in the parallel cabinet configuration (see below).
3. Connect PORT JD6 on Parallel Adapter of UPS-Cabinet 1and PORT JD5 of Parallel Adapter of UPS-Cabinet 2 with the corresponding BUS-Cable.
4. Connect PORT JD6 on Parallel Adapter of UPS-Cabinet 2 and PORT JD5 of UPS-Cabinet 3 with the corresponding BUS-Cable.
5. Continue in the same manner for the remaining UPS-Cabinets.

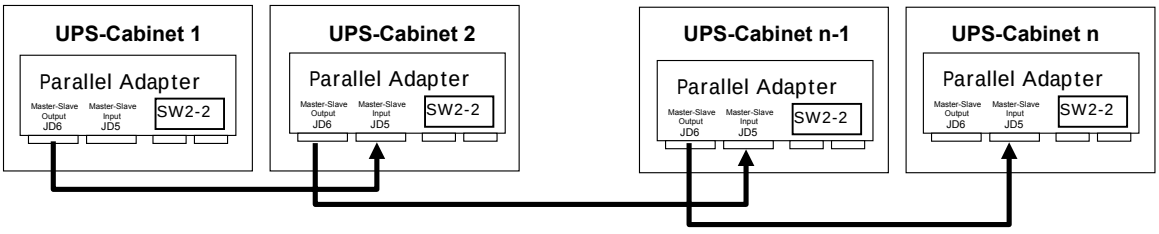
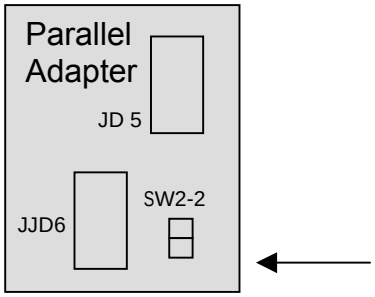


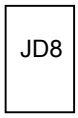
Figure 6.2.Connection of the Bus Lines when paralleling UPS-Cabinets by means of Parallel Adapters.

5.2.2.2 Parallel Adapater and DIP-Switch SW2-2

If the UPS-CABINETS are paralleled the Parallel Adapter will be placed on the Connector JD8 on the distribution panel and the communications cables between the cabinets will be connected through the connectors JD5 and JD6, as we are doing now.

NOTE: set the Switch SW2-2 correctly according to the corresponding cabinet configuration.





	SingleUnit	First Unit	Middle Unit	Last Unit
SW 1	**ON**	**OFF**	**OFF**	**ON**
SW 2	**ON**	**ON**	**OFF**	**OFF**

5.2.3 DIP-Switch SW1-1 and SW2-9 Settings

Before starting up the parallel system it is necessary to set the DIP Switches SW1-1 and SW2-9 to their correct positions.

DIP Switch SW1-1

The DIP Switch SW1-1 is located on every UPS-Cabinet and serves to define if the UPS-Cabinet is a single or parallel Cabinet.

SW1-1 has two positions:

HIGH (upper position) = Single (the Cabinet is a single UPS)

LOW (lower position) = Parallel (the Cabinet is in a parallel system)

In the case of parallel cabinet configurations the SW1-1 on all Cabinets is always in position LOW = Parallel.

SW1-1	Configuration
HIGH	Single Cabinet
LOW	Parallel Cabinet

DIP Switch SW2-9

The DIP Switch SW2-9 is located on every Cabinet. With this switch it is possible to determine the **"position of a Midi -Line-Cabinet"** in a Multi-Cabinet Chain. Define each Midi-Line-Cabinet in a Multi-Cabinet Chain as:

1. The **"First"**,
2. The **"Middle"** (there may be more than one) and
3. The **"Last"**

Cabinet in the Multi-Cabinet Chain by setting the DIP Switch SW2-9 on each cabinet according to the Table below:

SW2-9	Single Cabinet	First Cabinet	Middle Cabinet	Last Cabinet
1	ON	ON	OFF	ON
2	ON	ON	OFF	ON
3	ON	ON	OFF	ON
4	ON	ON	OFF	ON
5	ON	ON	OFF	ON
6	ON	ON	OFF	ON
7	ON	ON	OFF	ON
8	ON	ON	OFF	OFF
9	ON	OFF	OFF	ON

After having set the SW1-1 on all UPS-Modules and SW2-9 on all the Midi -Line-Cabinets correctly the UPS's may be commissioned

5.2.4 ON/OFF – Main Buttons

The ON/OFF-Buttons serve to shutdown the UPS-system for service or maintenance or for emergency reasons.

IF BOTH ON/OFF-BUTTONS ARE PRESSED ON THE UPS-Cabinet IN A MULTI-Cabinet SYSTEM ONLY THAT PARTICULAR UPS-Cabinet WILL SHUTDOWN. TO SHUTDOWN THE COMPLETE SYSTEM PRESS BOTH ON/OFF-BUTTONS ON EVERY UPS OF A MULTI-CABINET SYSTEM .

5.2.5 Parallel Isolator (IA2)

Every UPS-unit is provided with a parallel isolator IA2. The parallel isolator is an important element of the UPS-unit, that allows the isolation of a unit from the parallel system without the need to transfer the load to bypass.

IA2 OPEN: THE CORRESPONDING UPS-CABINET IS ISOLATED FROM THE OUTPUT. THERE IS NO COMMUNICATION BETWEEN THE ISOLATED UNIT AND THE REST OF THE PARALLEL SYSTEM. THE ISOLATED UPS-CABINET MAY BE REPLACED WITHOUT COMPROMISING THE REST OF THE SYSTEM.
IA2 CLOSED: THE CORRESPONDING UPS IS BEING ADDED TO THE REST OF THE PARALLEL SYSTEM.
IMPORTANT: BEFORE CLOSING THE IA2 OF A UPS-CABINET MAKE SURE THAT UPS HAS BEEN TURNED OFF BY PRESSING BOTH ON/OFF KEYS. TURNING IT ON THE UNIT WILL COPY THE STATUS OF OTHER RUNNING UNITS.

5.2.6 Maintenance Bypass (IA1)

There are two types of Parallel System Configurations: redundant and capacity parallel systems.

5.2.6.1 Redundant Parallel Configuration

In a redundant parallel system a UPS-Cabinet may easily be isolated from the parallel system by opening the respective isolator (IA2). It is now possible to operate or shut down this unit without influencing the rest of the parallel system. The rest of the parallel system will continue to protect the load. The isolated UPS-Cabinet may be replaced without the need of transferring the load to bypass by means of the Maintenance Bypass (IA1).

5.2.6.2 Capacity Parallel Configuration

In the event of a fault in one of the UPS-Cabinet in a capacity parallel system the load will automatically be transferred to static bypass (mains). In order to replace the faulty module the load must be transferred to mains by means of Maintenance Bypass (IA1).

5.2.7 ECO-MODE (BYPASS MODE) in Parallel Systems

The Eco-Mode function in a Parallel System is the same as in Single Systems. If in a **valuenet** Parallel System the load is supplied by the mains (load on mains) and in the

event of mains failure, **all UPS's will automatically transfer the load back to the inverters with 5msec.**

In order to provide the load with maximum protection NIGICO always recommends that the load be supplied by the inverter (ON-LINE-Mode).

5.3 COMMISSIONING OF MULTI-CABINET CONFIGURATION

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL TRAINED PERSONNEL.
BY OPENING THE UPS-CABINET AND PROTECTION COVERS YOU RUN RISK OF EXPOSURE TO DANGEROUS VOLTAGES!
AFTER SWITCHING OFF A UPS UNIT MAKE SURE THE INTERNAL DC-CAPACITORS HAVE BEEN DISCHARGED AND WAIT AT LEAST 10 MINUTES.
DO NOT EVER LEAVE THE UPS-CABINET WITHOUT AN APPROPRIATE PROTECTION COVER.
NIGICO WILL NOT TAKE RESPONSIBILITY OR BE LIABLE FOR PERSONNEL INJURIES OR MATERIAL DAMAGES CAUSED BY IMPROPER MANIPULATION OF THE UPS, OR BY INCORRECT CABLING. THE PROPER INSTALLATION AND USAGE INSTRUCTIONS OF THE UPS ARE DESCRIBED WITHIN THIS MANUAL AND MUST BE STRICTLY ADHERED TO.

Before attempting to start the parallel system make sure that:

1. All the input and output cabling has been performed correctly according to Chapter 3.6 of this User Manual;
2. The parallel communication cables have been connected correctly according to Paragraph 5.2.2 of Chapter 5.
3. All the DIP Switches for the Maxi-Line Cabinets have been set correctly according to Paragraph 5.2.3 of Chapter 5.
4. All the external battery cabinets/racks have been connected correctly;

5.3.1 PARALLEL SYSTEM START-UP PROCEDURE

Situation of the UPS-system before switching it on (Check each cabinet).

1. Fuses for the supply of all UPS cabinets in the Input Distribution Board are open.
2. Verify that all Parallel Isolator Switches IA2 are OPEN (position OFF).
3. Verify that all Maintenance Bypass Switches IA1 are OPEN (position OFF).
4. Make sure that all the External Battery Breakers/fuses are OPEN.
5. All UPSes Input Fuses F1 and Bypass Fuse F2 are OPEN.

Energize the UPS-system

1. Insert fuses for each UPS cabinet in the Input Distribution Board. Check on the Input terminals that voltages and frequency correspond to their nominal values and phase sequence is respected on all cabinets.
2. Sequentially, from first to last UPS cabinet, close Fuses F1. Each front panel must show LED indicators LINE1 and Battery lit green. On LCD display "LOAD OFF SUPPLY FAILURE" should appear.
3. Insert battery fuses one at the time and check the corresponding UPS cabinet for correct values and polarity of the battery voltage.
4. Close Bypass Fuses F2 on all UPS cabinets.
5. Turn ON each UPS by pressing simultaneously both ON/OFF buttons. Turn inverter on and transfer load on inverter accessing the COMMAND menu, selecting LOAD TO INVERTER. Such command should be executed on each unit.
6. LCD panel must display: "LOAD DISCONNECTED PARALLEL SWITCH OPEN" and the LED-indicator will appear as shown below:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	OFF
INVERTER	Green
BATTERY	Green

7. Scroll through the measurement and check their correctness.
8. Transfer load to bypass on each unit, accessing the COMMAND menu and choosing "LOAD TO BYPASS". LED-indicator will appear as shown below:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	OFF
BATTERY	Green

9. Stop all UPSes by pressing simultaneously both ON/OFF buttons on every unit.
10. Sequentially, from first to last UPS cabinet, close Parallel Isolators IA2 and make sure that the message "PARALLEL SW CLOSED" got stored on the event memory.

Connect load to the UPSes output

1. Close one at the time each Maintenance Bypass Switch IA1. On every LCD "MANUAL BYP IS CLOSED" will appear.
2. Check on the Output Distribution Board voltage and phase sequence of each UPS between the output connections, then close the fuses.
3. Load is now going to be powered by the UPS Input Mains through the Manual Bypass Switches.
4. Sequentially, from first to last UPS cabinet, start units by pressing simultaneously both ON/OFF buttons.
5. Wait 60 to 90 seconds for the system to synchronize.
   LED Panel must show as below:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	RED
BATTERY	Green

6. Open all the Maintenance Bypass Switches IA1. On every LCD panel the message "MANUAL BYP OPEN" should appear.
7. Load is now powered through the UPS-system Static Bypass.
   Check on LCD panel output voltages and currents of the different units.
8. From any of the units, select COMMAND menu and choose "LOAD TO INVERTER" command. Load will be transferred simultaneously on inverter of all units.

THE LOAD IS NOW PROTECTED BY THE UPS VALUENET

5.3.2 PARALLEL SYSTEM SHUTDOWN PROCEDURE

1. Before shutting-down a parallel Multi-Cabinet Configuration inform the customer that any connected load will be supplied by Input Mains and not protected.
2. Make sure that ALARM LED is OFF on all units. LED indicators of each unit show as below:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	OFF
INVERTER	Green
BATTERY	Green

3. Transfer system load to bypass by selecting the COMMAND menu and choosing "LOAD TO BYPASS" in one UPS-cabinet. All LCD will show display "LOAD NOT PROTECTED" and LED indicators must show:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	Green
INVERTER	OFF
BATTERY	Green

4. Close one at the time each Maintenance Bypass Switch IA1.
   On every LCD "MANUAL BYP CLOSED" will appear.
5. Turn each unit OFF by pressing simultaneously both ON/OFF buttons and open Parallel Isolators IA2 of all units.
6. UPS-system is now disconnected by the load, which is powered through the Maintenance Bypass Switches IA1 of the units.
7. To turn each unit OFF proceed as follows:
   Open Bypass Fuse F2.
   Open External Battery breaker/fuses of the corresponding cabinet.
   Open Input Fuses F1.

AFTER SWITCHING OFF A UPS UNIT MAKE SURE THE INTERNAL DC-CAPACITORS HAVE BEEN DISCHARGED AND WAIT AT LEAST 10 MINUTES.

UPS IS NOW TURNED OFF, DANGEROUS POTENTIALS ARE ANYWAY CONNECTED TO THE IN/OUT TERMINALS AND IA1, 2 SWITCHES

The UPS may be shut down completely if the loads do not need any power supply.

Prior to perform a complete shutdown of the Parallel Multi-Cabinet system make sure that customer load has been safely turned OFF.

Open the MAINS fuses/breakers of the Input/Output Distribution Board.

THE UPS VALUENET IS NOW VOLTAGE FREE.

5.3.3 START-UP PROCEDURE OF ONE UPS CONNECTED TO A RUNNING REDUNDANT PARALLEL SYSTEM

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL TRAINED PERSONNEL.

Situation of the UPS before switching it on.

1. Fuses for the supply of the corresponding UPS cabinet in the Input Distribution Board are open.
2. Verify that Parallel Isolator Switches IA2 is OPEN (position OFF).
3. Verify that Maintenance Bypass Switches IA1 is OPEN (position OFF).
4. Make sure that the External Battery Fuse/Breaker is OPEN.
5. UPS Input Fuses F1 and Bypass Fuses F2 are OPEN.
6. All the DIP Switches SW1-1 and SW2-9 of the UPS Cabinet have been set correctly according to Paragraph 5.2.3 of Chapter 5.

Start the UPS

1. Close F1 fuses and connect the UPS input fuses in the Input Distribution Board.
2. UPS LED indicators LINE1 and Battery lit green. On LCD display “LOAD OFF SUPPLY FAILURE” should appear.
3. Close Bypass Fuse F2.
4. Close External Battery Breaker/fuses and check for correct values and polarity of the battery voltage.
5. Turn the UPS ON by pressing simultaneously both ON/OFF buttons. If unit does not run on inverter, select COMMAND menu and choose “LOAD TO INVERTER”. LED indicator must show as follows:

LED Indicator	Colour
LINE 1	Green
LINE 2	Green
BYPASS	OFF
INVERTER	Green
BATTERY	Green

6. Scroll through the measurement and check their correctness.
7. Stop the UPS by pressing simultaneously both ON/OFF buttons. LED indicator must show only LINE1 and Battery LED lit green, LCD display “LOAD OFF SUPPLY FAILURE”.
8. Close the Parallel Isolator IA2 and check the message “PARALLEL SW CLOSE”.
9. Start the unit by pressing simultaneously both ON/OFF buttons.
10. Unit should start-up automatically, synchronize with the others and get connected in parallel, sharing load.

THE LOAD IS NOW PROTECTED BY THE UPS VALUENET

5.3.4 SHUTDOWN PROCEDURE OF ONE UPS CONNECTED TO A RUNNING REDUNDANT PARALLEL SYSTEM

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL TRAINED PERSONNEL.
ACTIVATION OF BOTH ON/OFF BUTTONS SIMULTANEOUSLY WHEN DURING NORMAL OPERATION WILL SWITCH OFF THE UPS OUTPUT AND NO LONGER SUPPLY POWER TO THE LOAD.

The valuenet UPS may be disconnected from a Redundant Parallel System for service or maintenance purposes, without having to transfer LOAD to Maintenance Bypass, leaving other inverters running and protecting LOAD.

UPS Shutdown procedure

Make sure that the system is redundant by checking load percentage values on each unit and output power measures.

1. Turn the unit OFF by pressing simultaneously both ON/OFF buttons. Unit LED indicator must show only LINE1 and Battery LED lit green, LCD display “LOAD OFF SUPPLY FAILURE”.
2. Open the Parallel Isolator IA2 and check on LDC the message: “PARALLEL SW OPEN”.
3. Open External Battery Breaker/Fuse.
4. Open the Bypass Fuse F2.
5. Open the Input fuses F1 and the corresponding input fuses on the Input Distribution Board.

AFTER SWITCHING OFF A UPS UNIT MAKE SURE THE INTERNAL DC-CAPACITORS HAVE BEEN DISCHARGED AND WAIT AT LEAST 10 MINUTES.

VALUENET UPS IS NOW TURNED OFF, DANGEROUS POTENTIALS ARE ANYWAY CONNECTED TO THE OUT TERMINALS AND IA1, 2 SWITCHES

THE LOAD IS PROTECTED BY THE REMAINING VALUENET UPSes

6 Maintenance

6.1 INTRODUCTION

ALL THE OPERATIONS IN THIS SECTION MUST BE PERFORMED BY AUTHORISED ELECTRICIANS OR BY QUALIFIED INTERNAL PERSONNEL.

To ensure an optimum operation of the **VALUENET** and a continuous and efficient protection of the connected load it is recommended to check the batteries every 6 months, depending on the ambiance temperature.

6.2 USER RESPONSIBILITIES

There are no user serviceable parts contained within the UPS so the maintenance responsibilities of the user are minimal. To maximise the useful working life and reliability of the UPS and its batteries, the environment in which the UPS operates should be kept cool, dry, dust and vibration free. The batteries should be hold fully charged.

6.3 ROUTINE MAINTENANCE

The UPS is designed to receive regular preventative maintenance inspections. These preventative maintenance inspections are essential to ensure that both the useful working life and the reliability of the UPS are maximised. When the UPS is commissioned, the commissioning field service engineer will attach a service record book to the front of the UPS and this will be used to record the full service history of the UPS.

Preventative maintenance inspections involve working inside the UPS, which contains hazardous AC and DC voltages. Only NIGICO trained or agreed service personnel and authorised field service engineers are fully aware of all of the hazardous areas within the UPS.

During a preventative maintenance inspection the field service engineer will carry out the following checks:

- Site/environment conditions;
- Integrity of electrical installation;
- Cooling airflow;
- Rectifier operation and calibration;
- Inverter operation and calibration;
- Static switch operation;
- Battery status;
- Load characteristics;
- Integrity of alarm and monitoring systems;
- Operation of all installed options;

6.4 BATTERY TEST

The battery test takes approx. 3 minutes and should be performed only if:

- there are no alarm conditions;
- the battery is fully charged;
- mains is present.

The battery testing can be carried out independently of the operation mode (OFF-LINE or ON-LINE) and whether or not the load is connected.

The battery test procedure can be performed from the UPS front panel. See “Operation” Chapter 4.

7 Troubleshooting

7.1 ALARMS

In the event of an alarm condition the red LED-Indicator “Alarm” and the audible alarm will turn on.

In this case proceed as follows:

1. Silence the audible alarm by pressing the button "Reset".
2. Identify the cause of the alarm condition by means of the EVENT LOG in the MAIN menu.
3. In case of doubts please contact the nearest Service centre.
4. Fault identification and rectification information is given on the following pages.

7.2 MENU, COMMANDS, EVENT LOG, MEASUREMENTS,

In Chapter 4 there is a detailed description of the Menu, Commands, Event Log and Measurements that can be operated and displayed on the LCD. The List of Alarms and Messages are shown in the Annexe.

7.3 FAULT IDENTIFICATION AND RECTIFICATION

The major alarm conditions that will be encountered are:

Alarm Condition	Meaning	Suggested Solution
UPS FAULT	There is a fault in the UPS and therefore normal operation cannot be guaranteed	Call the authorised service centre for assistance
MAINS BYP/RECT FAULT	Mains power supply is outside prescribed tolerance	The input power to UPS is too low or missing. If site power appears to be OK, check the input circuit breakers etc. supplying the UPS
OUTPUT SHORT	There is a short circuit at the output of UPS (on load side)	Check all output connections and repair as required.
OVERLOAD	Load exceeds the UPS rated power	Identify which piece of equipment is causing the overload and remove it from the UPS. Do not connect laser printers, photocopiers, electric heaters, kettles etc. to the UPS
OVERTEMPERATURE	UPS temperature has exceeded the allowed value	Check the ambient temperature of the UPS is less than 30° C. If the ambient temperature is normal call the authorised service centre for assistance.
BATTERY CHARGER OFF	The attached battery and the battery charger set-up do not correspond or battery charger fault	Call the authorised service centre for assistance.
INVERTER FAULT	Inverter is faulty.	Call the authorised service centre for assistance.
SYNCHRON FAULT	The inverter and mains are not synchronised.	The frequency of the input voltage to the UPS is outside operational limits and the UPS static bypass has been temporarily disabled.
BATTERY IN DISCHARGE	Battery is near end of autonomy	Shutdown load connected to UPS before the UPS switches itself off to protect its batteries
MANUAL BYP IS CLOSED	Maintenance Bypass closed. Load supplied by mains	This alarm is only displayed if the UPS is on Maintenance Bypass

8 Options

8.1 INTRODUCTION

The UPS **valuenet** is provided with the following accessories:

- REMOTE EMERGENCY STOP FACILITIES;
- REMOTE SIGNALLING PANEL (RSP);
- GENERATOR ON FACILITIES;
- SOFTWARE FOR AUTOMATIC SHUTDOWN AND MONITORING;
- SNMP INTERFACES FOR NETWORK MANAGEMENT AND REMOTE MONITORING.

8.2 REMOTE EMERGENCY FACILITIES

The emergency stop facility **must** use a normally closed contact, which opens to operate the emergency stop sequence.

The emergency stop port X1 is located at the front of the UPS **valuenet** module. See Figure 3.5 for location drawing.

In order to allow removal, maintenance or testing of any remote emergency stop facility without disturbing the normal operation of the UPS, it is recommended that a terminal block, with linking facilities, be installed between the UPS and the stop button.

1. Use a screened cable with 1 pair (section of wires 0.6 mm^2) and maximum length of 100 m.
2. Connect the cable as shown in Fig. 8.1

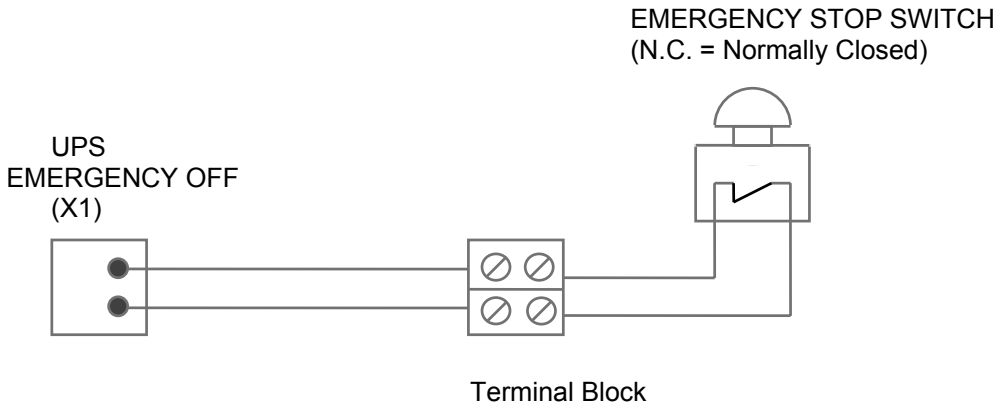
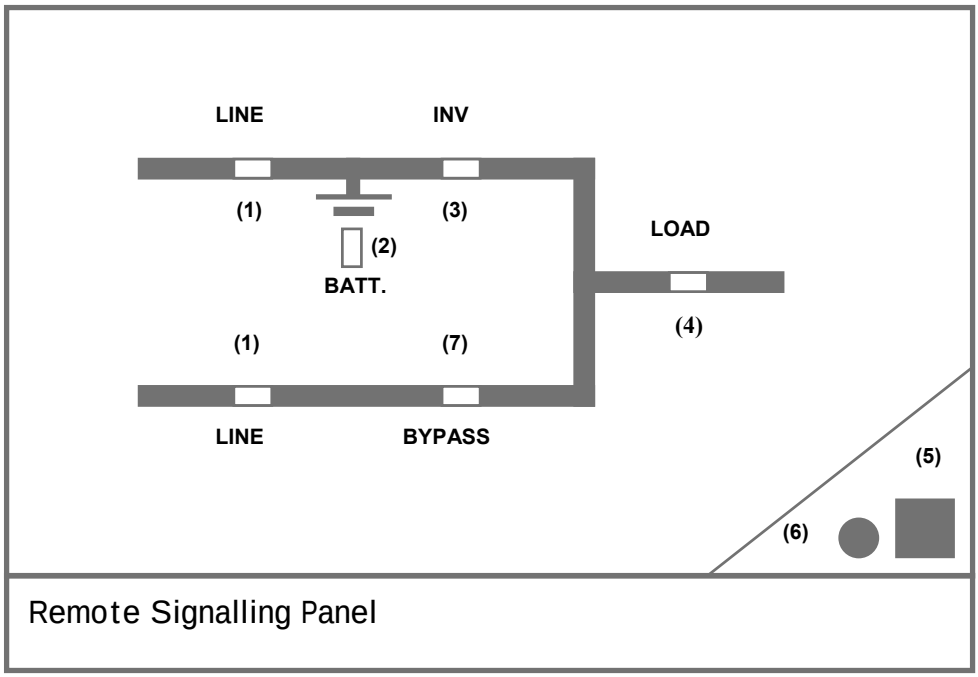


Fig 8.1 Drawing of the wiring for the EMERGENCY-OFF-SWITCH.

8.3 REMOTE SIGNALLING PANEL (RSP)

The optional Remote Status Panel (RSP) may be used to display UPS status information up to a distance of 100m.



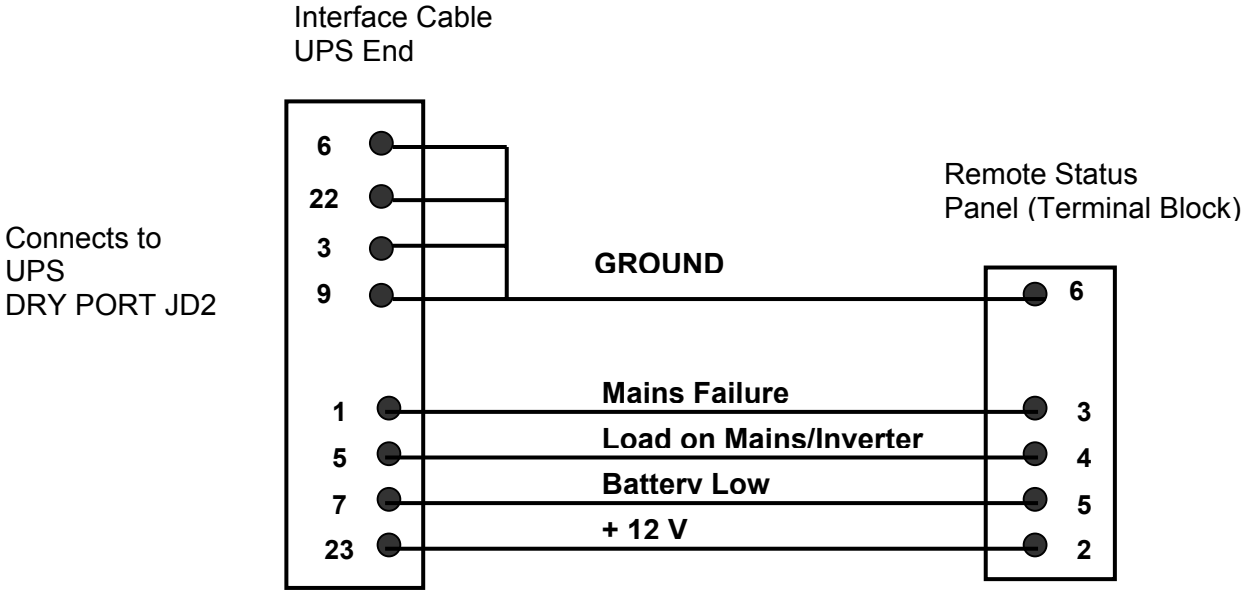
Remote Signalling Panel

No.	INDICATOR	INDICATOR STATUS	MEANING
1	LINE	GREEN RED	Mains available Mains not available
2	BATTERY	GREEN YELLOW OFF	Battery OK Battery near the end of capacity No UPS supply or UPS on bypass
3	INVERTER	GREEN OFF	Load supplied by inverter Inverter supply not available
4	LOAD	GREEN RED FLASHING	Load is supplied Load is not supplied
5	ALARM RESET	Push button	Silence the audible alarm
6	ALARM	RED OFF	Alarm condition; check other LEDS for indication of mains and/or UPS status. UPS is in normal operation condition
7	BYPASS	RED OFF	Load is supplied by mains Load is supplied by inverter

Figure. 8.2: LED Indicators on Remote Signalling Panel (RSP)

8.3.1 How to Connect the Remote Signalling Panel (RSP)

- Provide a 0,7.5 mm^2, shielded cable (max 100 meters);
- Do not connect shielding;
- Connect a D-type, 25pin, Male connector to one end of cable;
- The other end of cable connect to the 6pin, Terminal Block inside the RSP-Box as shown in Figure 8.3
- Connect 25 pin D-type connector to the UPS Dry Port.



Connects Fig. 8.3: Connection of Remote Signalling Panel (RSP)

Details of all Dry Port connections are shown in Figure 3.10.

8.4 GENERATOR ON FACILITIES

The generator ON facility must use a normally open contact that closes to indicate that a generator is running and supplying input power to UPS.

When used, this facility disables the UPS static bypass and prevents the UPS from transferring the load onto the generator power supply.

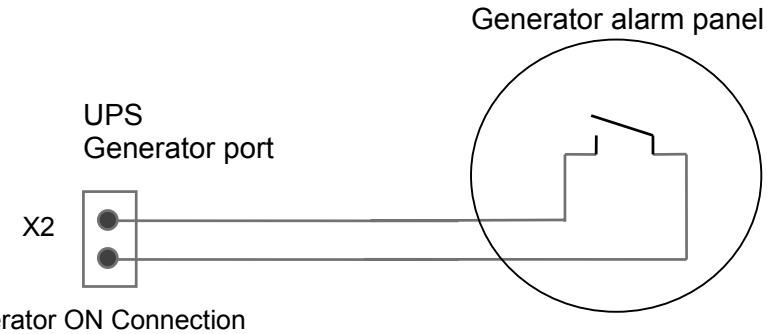


Figure 8.4: Generator ON Connection

8.5 WAVEMON SHUTDOWN AND MANAGEMENT SOFTWARE

8.5.1 Why is UPS Management important?

By combining a UPS with network management products, such as an SNMP protocol, System-administrators are guaranteed their data and their system will constantly be protected from corruption or data loss even in the event of an extended power failure or when batteries reach a critical low state. In the event of a power disturbance system administrators can also monitor their network from a central location, allowing an early detection of problems. In fact utility power is unreliable at times, ensuring that all network systems have constant power can be a difficult task. The situation becomes even more complex if systems are managed across a Local Area Network (LAN) or Wide Area Network (WAN) around the world.

When a power failure occurs action can be taken to protect the system and its valuable data. If no action is initiated by the operator, this event can seriously damage the system. The UPS software will react automatically in such a case and shutdown the operating system. NIGICO has found it important to have a complete solution for its UPS and is able to offer a wide range of monitoring/remote controls for assuring the maximum protection degree to the NIGICO customers.

8.5.2 Wavemon Shutdown and Monitoring Software

Wavemon is an external monitoring and shutdown software which was designed to operate with all NIGICO UPS products, both with the DRY PORT (Relays) JD2 and SMART PORT (RS232) JD1.

The software packet consists of a CD ROM for most diffused operating systems (Windows, Unix, OS/2, DEC VMS, Novell, Apple), a standard connection and a user manual.

The 25 pin port with voltage-free contacts may also be used for automatic shutdown in connection with **wavemon**. It is necessary to provide a special cable to connect the 25 pin port of the UPS and the serial port of the server.

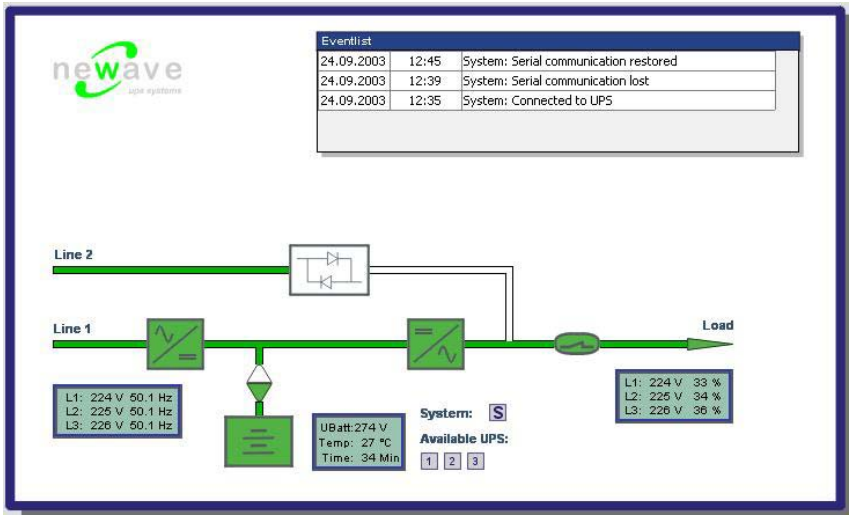


Figure 8.5. Monitoring image.

The main characteristics of **wavemon** software are:

- Automatic unattended master/slave shutdown in heterogeneous networks
- On-screen autonomy time / battery time countdown
- On-screen server log off and shutdown procedure
- Extensive logging of all UPS activity and power quality data, with timestamp
- Scheduled UPS economy mode, service mode, other systems status
- Graphical user interface for Windows compatible platforms
- Automatic unattended local shutdown
- Special software modules to close and save open MS-Office documents.
- Compatible for all optional modules like UPSDIALER, SNMP adapters, Temperature sensors, etc.The UPS-Management Software is a client-/server-application for

networks and local workstations. Basically **Wavemon** consists of two parts: the server-module of the UPS-Management Software is **UPSMAN**, which communicates via RS-232 cable with the UPS. Working as a background process the UPSMAN collects messages, received from the UPS. The UPSMAN interprets received messages and makes them available to the client-module **UPSMON** and to any SNMP-based management station.

When UPSMAN detects voltage variations or a power failure it can execute various so called system „event routines“, which for example may shutdown the server or send warning to connected users. These system event routines which are a part of the UPS-Management Software can be adjusted to your demands.

The UPS management software includes with every serial number the licence for using the UPS service on one server with one UPS and an unlimited numbers of connected WINDOWS workstations. When operating with two or more servers a licence for every additional server is required. It doesn't matter if the UPS service runs at that location or if the server is halted by a UPS service via remote command. The same regulations are applicable to the use of remote send/receive modules RCCMD and multiserver shutdown under NT, UNIX and other operating systems. The service programs are generally delivered as a single-licence. To use a single CD ROM to shutdown multiple servers you have to purchase additional CD license keys.

Parallel/redundant UPS systems are also manageable by the software.

The main principle is: let introduce a shutdown of a Server only when strictly necessary. A correct Parallel Handling has therefore to manage a parallel system as a whole and always considering redundancy. Following statements apply:

- Every alarm on any unit is immediately notified, but …
- … a reaction to a severe fault is introduced only when the minimum number of UPS – Modules necessary to supply the load exhibits an alarming situation.
- The real Battery autonomy time of the (whole) parallel system is computed continuously.
- Maintenance on a redundant unit may be executed without annoyance to the management system (supervisor).

In order to be managed, a NIGICO UPS can be integrated into a network in two ways:

1. By means of the server which is being powered by the UPS and is integrated in the network. In most of the cases the server is used as sub-agent and you only need the Wavemon software without any SNMP Adapter. You need a standard serial connection between the RS232 SMART port of the UPS and the RS232 port of the computer/server.

2. In some situations it is preferable to interface the network via an SNMP adapter. By this way up to 50 computers can be shut down in a RCCMD environment. RCCMD (Remote Console Command) is an additional software module, which can be triggered by the SNMP device to executes a command (typically a shutdown command) on a remote system.

8.6 SNMP CARD/ADAPTER FOR NETWORK MANAGEMENT /REMOTE MONITORING

The **S**imple **N**etwork **M**anagement **P**rotocol (SNMP) is a worldwide-standardized communication-protocol. It is used to monitor any device in the network via simple control language. The UPS-Management Software also provides its data in this SNMP format with its internal software agent. The operating system you are using must support the SNMP protocol. We offer our software with SNMP functionality for Novell, OS/2, all Windows running on INTEL and ALPHA, DEC VMS, Apple.

Two types of SNMP interfaces with identical functionality are available: an external SNMP-Adapter (Box) and an internal SNMP-Card. Both can manage a parallel system (N modules) and return either global values - which are consistent for the whole parallel system - or specific values from the single modules.

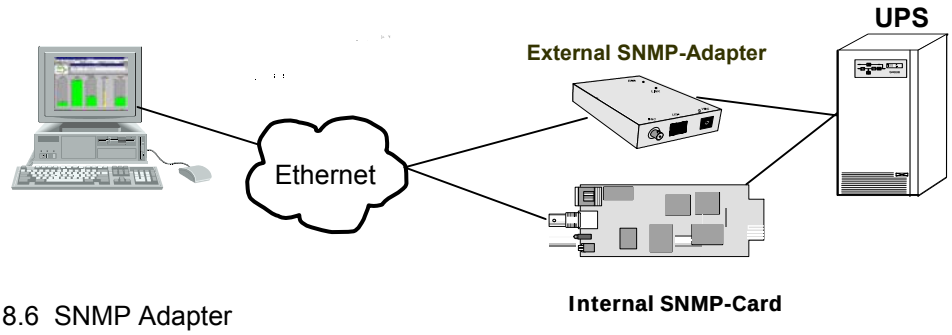


Figure 8.6 SNMP Adapter

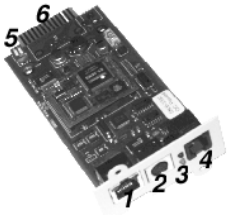
The adapter may be configured via Telnet, HTTP (Web-Browser) or serial connection (Terminal). For normal operation at least one network connection (Ethernet) is required.

The SNMP adapter can be used, utilising the RCCMD send function, for an automatic network wide shut down or just for informing connected users. The shut down procedure can be initiated on a low residual battery autonomy time (downtime) or by a countdown timer which is started at the beginning of the alarm. A shut down is therefore possible without extra input from the operator, and is fully software controlled.

The small (125x70 mm) External SNMP adapter comes with following interfaces:

1. RJ-45 connector for 10/100 Base-T(autoswitchable)
2. Serial Port for configuration (COM2) or optional ModBus interface.
3. Error/Link LED for UPS status
4. Aux Port
5. DIP Switch
6. Serial Port to the UPS (COM1)
7. DC Supply (9 VDC or 9-36 VDC supply, depending on model);

Figure 8.7 External SNMP Adapter



The Internal SNMP-Card can be inserted into an appropriate extension slot of the UPS **valuenet.** This adapter communicates via the serial port of the UPS and makes a direct multiple server shut down possible without additional SNMP management software.

Figure 8.8 Internal SNMP Adapter

For detailed information please see Software Manual provided with the WAVEMON CD ROM.

RCCMD - Remote Console Command module for a multi-server shutdown. This stand-alone software module is designed to receive and execute a command issued by a remote device. Thanks to RCCMD it is possible to execute a shutdown in an heterogeneous multiplatform network. The new release RCCMD2 is an application available for all Operating Systems, analogous to Wavemon. Our SNMP Interfaces are compatible to RCCMD