



TECHNICAL SPECIFICATIONS



POWER DIALOG PLUS

6kVA SINGLE-PHASE INPUT / SINGLE-PHASE OUTPUT
6÷10kVA THREE or SINGLE-PHASE INPUT / SINGLE-PHASE OUTPUT
On Line Double Conversion (VFI) Technology

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1 - OBJECTIVE

This technical document has been produced to be used by UPS system designers and installers.

The objective of this document is to provide and illustrate:

- the technical information required to enable you to choose the correct UPS to suit your needs
- the information required to set up and configure the system
- the information concerning the installation and location of the UPS
- the information the UPS displays locally to the user or to the monitoring systems it is connected to (E.g. control centres, etc.)
- a list of the possible options available to configure the UPS to the operators specific requirements

2 - SYSTEM DESCRIPTION

The **POWER DIALOG PLUS** range of UPS systems is available in 6kVA single/single phase and 6.5-8-10kVA single/single-phase or three/single-phase, and uses the latest On Line double conversion (VFI) technology: the load is constantly powered by the inverter, which supplies a filtered and stabilised sinewave output voltage and frequency. The UPS has input and output EMI/RFI filters to significantly increase the immunity of the load to mains interference and disturbances.

The advanced technology used offers user-selectable functions such as On-Line, Economy, Smart Active or Standby/Off modes, with intelligent self diagnostics, digital display, RS232 and EPO interfaces, and a communications card slot for network interfacing, a second serial port or serial duplexer. **POWER DIALOG PLUS** is the best solution for protecting sensitive "mission critical" applications and safety devices (electro-medical).

Note: the 6.5-10kVA units can be connected to either a single-phase or a three-phase power supply without the need for any extensive modifications.

3 - APPLICATIONS

- => Personal computers
- => Small IT networks
- => Local Area Networks (LAN)
- => Workstations
- => Servers
- => Point of sale (POS) systems
- => Data centres
- => Industrial PLC's
- => Cash registers
- => Electrical medical equipment
- => Emergency devices
- => Telecommunications equipment

4 - CHARACTERISTICS

High level of reliability

- **Filtered, stable and reliable:**

The systems provide a filtered, stable and reliable voltage (On Line double conversion VFI technology in accordance with the European standard IEC62040-3) with filters for suppressing atmospheric and mains borne disturbances.

The On Line technology provides the maximum protection for the connected loads. The double conversion stage filters and stabilises the input voltage, and reproduces it free of any disturbances such as overvoltages, variations in frequency and voltage, noise, etc.

The IEC62040-3 standard defines this technology as VFI (Voltage and Frequency Independent), meaning that the output voltage and frequency are completely independent of any variations or disturbances caused to the incoming mains supply.

- **Redundant auxiliary by-pass power supply:**

Should a problem or fault occur to the UPS during normal operation, the integral by-pass system is equipped with a redundant power supply. This allows the bypass to operate even if a fault occurs with the main system power supply.

- **High degree of protection against current surges (6kV in accordance with EN61000-4-5):**

The Power Dialog Plus range has been tested to EN61000-4-5 by subjecting models to massive overvoltage and current surges on the inputs. The current surge used for these tests had a leading edge of 1.2 microseconds and a trailing edge of 50 microseconds, with 300Joules of energy. The standard (EN61000-4-5) requires the UPS to be able to withstand these current surges up to 6kV without damage occurring to the UPS or its protected load.

- **High level of UPS reliability:**

The digital control system dramatically improves the overall reliability and efficiency of the UPS; resulting in a reduction in the number of electronic components required, the microprocessor controls and monitors all UPS functions using one common control card. The control card is used a number of systems, thereby increasing the productivity and reliability of the range.

Low impact on the mains supply

- **Power factor correction (UPS input power factor close to 1):**

The UPS absorbs power from the incoming mains supply with a power factor close to 1, even if the systems supplied by the UPS have a power factor lower than this. For example, if the UPS supplies a piece of IT equipment with an input power factor of 0.65, the UPS input power factor will still remain close to 1, ensuring that any mains supply power factor correction banks are not overloaded.

- **Sinusoidal absorption:**

The UPS draws a sinusoidal current from the mains supply, meaning that the system has a very low impact on the mains supply and, as a consequence, on the other pieces of electrical equipment connected to it.



Total installation protection

- The UPS has back feed energy protection. The back feed protection prevents energy from the UPS posing a risk to maintenance personnel should a fault occur to either the by-pass line or rectifier circuit. In addition, should any current leakage occur whilst the UPS is operating on inverter mode, the UPS will automatically switch over to the by-pass supply.

During a power supply failure, the UPS is equipped with input contactors, which will isolate the UPS from the mains power supply during battery operation.

The new CE11-20 regulations contain similar provisions, and are intended to enable technical or maintenance staff to perform work on the power supply to the UPS without risk to themselves or others.

High level of battery reliability and performance

- **Automatic battery test:**

The UPS carries out battery tests automatically; these tests enable the system to periodically check battery efficiency in order to prevent faults. The test does not in any way compromise the supply to the connected equipment, and given the short duration (seconds), it does not affect the working life or back-up time of the batteries.

The battery test can also be activated manually from the display panel.

- **Active control LRCD (Low Ripple Current Discharge):**

The LRCD device constantly controls the discharge of the battery system when a mains supply failure occurs. This limits the harmful ac component (ripple at 50 and 100Hz) normally produced during battery discharge, maintaining a low ripple prevents damage and prolongs battery working life.

- **High hold up time (40mSec):**

The system can continue to operate normally even during mains supply interruptions of up to 40mS in duration. This is due to the high hold up time provided by the system and means that the inverter continues to power the load during such interruptions without drawing power from its batteries. Battery life is a function of temperature and the number of charge/discharge cycles experienced, so this function helps to optimise overall battery performance.

- **Protection against deep discharge:**

The end of battery discharge voltage is automatically increased when low loads are connected to the UPS. This ensures that deep battery discharges are avoided. These can dramatically affect battery operational working life.

- **Auto power off function:**

For automatic shutdown of the UPS with minimum loads (<5% of the nominal load):

When operating from the battery, the UPS can be programmed to shut down, if the connected load is less than 5% of the nominal value. This function (programmable via software) avoids deep battery discharge through the unnecessary powering of very low loads or no load over long periods.

- **Unlimited back-up expandability:**

By means of external battery extension packs which can be supplied with or without their own internal battery charger to maintain a reasonable recharge time.



Advanced diagnostics:

- The control and display panel provides visual (LED and LCD) and audible (buzzer) signals regarding UPS operational status. The panel also enables UPS control, monitoring, diagnosis and customisation using the simple menu system.

Low Consumption

A low power consumption especially in the "Economy Mode" or "Smart Active Mode" functions where efficiencies of up to 98% can be achieved.

- **Operating modes to reduce consumption:**

In addition to the On Line operating mode, another three operating modes are provided. These can be programmed according to user and load characteristic: Economy Mode/Smart Active Mode or Emergency backup/Standby Off mode.

- **Economy Mode:**

Enables the user to select Line Interactive (VI) technology. This mode provides power to non sensitive loads from the incoming mains supply through the built-in filters. In the event of a mains supply failure occurring or the incoming voltage or frequency exceeding the pre-determined range, the load is automatically powered by the inverter. This function can be programmed via software.

The mains voltage tolerance range can be programmed using 3 levels of sensitivity (minimum / medium / maximum) depending on connected load sensitivity.

- **Smart Active Mode:**

Enables the UPS to automatically determine which method of operation (on-line or line interactive) is most suitable dependent on the quality of the incoming mains supply. If the mains supply is not within the acceptable limits for both voltage and frequency, the UPS will supply power to the load from the inverter (on-line). When the mains supply returns to within the acceptable limits, the system will first ensure that the supply remains stable, before switching the load back onto the mains supply.

During both of these operating modes, the load is powered directly from the mains supply via the bypass. However, due to the EMI filters in both the input and output, the mains supply is filtered and therefore free of any electrical disturbances.

If the incoming mains supply fails, the load is supplied directly by the inverter. This function reduces energy consumption as the inverter is off if the mains supply is present.

- **Emergency/Stand-by operation:**

The UPS can function as an emergency stand-by device. This particular operating mode is suitable for applications such as emergency lighting. The UPS output remains off under normal operating conditions and the batteries are charged. The output only activates when the mains power supply fails.

The inverter switches on within 320ms. This is lower than the current Central Supply System (CSS) regulations, which stipulate a maximum delay time of 500ms. The inverter starts up gradually, thus preventing any sudden current surges.

This operating mode enables considerable energy savings, as the inverter is off under normal conditions and therefore does not consume any energy. In addition, the system does not need to be over-sized, as the gradual inverter start up prevents any current surge problems that might otherwise occur.



Flexibility of use

- **Auto-restart:**

Auto-restart (programmable automatic restart on mains return):

It is possible to program the UPS to automatically restart after the UPS has been switched off for one of the following reasons. This can be programmed via the software supplied.

Auto restart can be selected for the following scenarios:

- On mains return after the UPS has shut down due to a full battery discharge.
- On mains return after the UPS has been instructed to power down by the remote UPS monitoring and management software.
- Programmed UPS auto shutdown if Auto Power Off has been activated due to load removal

- **Start up from battery (cold start):**

The UPS can start up on inverter, even when there is no mains supply available.

- **Stand by:**

Standby operation can be selected: during this mode the inverter is off and the batteries are charged. The standby function is automatically activated when the UPS is shut down and is useful when prolong periods of inactivity occur.

- **Operation as a frequency converter:**

The UPS can be configured (from the control panel) to function as a frequency converter. Therefore when the input frequency is 50Hz the output frequency can be 60Hz and vice versa. During this operating mode the automatic by-pass is deactivated.

- **Frequency auto sensing:**

The UPS can be configured to automatically select the output frequency (50 or 60Hz), by using the input frequency as its reference (50 or 60Hz).

- **Easy to install and maintain:**

The UPS can be connected to either a single-phase or a three-phase power supply (6.5-8-10kVA models only) without the need for extensive modification. The conversion can be carried out during UPS installation simply by fitting the supplied terminal connection bridge.

In addition to the output terminal connection point, the UPS is supplied with 2 IEC fuse protected output sockets for providing power to local users, for items such as computers, modems, etc (6.5-8-10kVA models only).

Integral castors make it easy to manoeuvre and position the UPS. These can be locked once the UPS is in position.

Adjustable output voltage via the control panel. This enables the output voltage from the system to be increased to compensate for voltage drop when very long load connection cables are used.



- **Manual by-pass for easy maintenance:**

The internal manual bypass enables the user to carry out UPS maintenance work without disconnecting power to the protected loads. The manual by-pass switches the load from the inverter to the incoming mains power supply and vice versa, without disruption to the connected equipment.

- **Compact Dimensions:**

The compact dimensions make it one of the smallest on the market:

Thanks to:

- microprocessor control
- IGBT technology
- internal batteries
- ventilation, front to rear which eliminates the need for air clearance down either side of the unit
- Internal manual bypass.

- **Low Noise (<40db(A):**

Thanks to:

- use of high frequency IGBT technology
- electronically controlled ventilation with PWM (Pulse Width Modulation) technology for improved cooling fan reliability and speed control in relation to the loads applied and internal UPS temperature.
- special design of the magnetic components

Advanced Communication

- **Monitoring software including shut down**

Powershield² provides an efficient and intuitive system for controlling and monitoring the UPS, displaying important information, such as input voltage, applied load, battery capacity, etc. using a series of bar charts.

The software is able to provide detailed information even if the UPS develops a fault, enabling the user to find out why and when the condition occurred.

Powershield² has been developed using a client/server architecture that renders it flexible and easy to use, with multilingual support and on line help.

The Powershield² software is provided free of charge with an SNMP agent. This version will operate on Windows 95, 98, 2000, Windows 2003 Server, Me, XP, NT4.0, Novell, Mac OS, Mac Osx, Mac Os 9.x & Linux operating systems.

The software enables the user to programme the automatic start-up and shutdown of the system on a weekly basis.

The UPS is supplied with the following hardware interfaces:

- RS232 serial port
- Volt-free contacts
- EPO (Emergency Power Off)
- Network and communications card slot

5 - NORMATIVE REFERENCES

> 5.1 Main reference standards

The company quality system has been certified as conforming to ISO 9001 (Certificate No. CERT-04674-99-AQ-VEN-SINCERT). This covers all procedures, operating methods and controls from the design stage to production, sales, and through to the after sales service.

This certification guarantees the following to our customers:

- the use of quality materials
- rigorous standards in production and testing
- receptiveness and openness to our customers
- constant support of all our customers

As well as conforming to this certification, the company also produces “state of the art” products, as dictated by the requirements of the standards quoted below.

The advances that have taken place in Information Technology systems, mean that the power systems used to supply them must be able to provide a precise, stable and reliable source of power. The standards produced by IEC/CENELEC in the IEC/EN62040 series, cover all aspects of the product: safety, electromagnetic compatibility and performance. In more detail, this series is divided into the following individual standards:

STANDARDS

EN62040-1:

Uninterruptible power supply systems (UPS): general provisions and safety provisions

EN62040-1-1:

Uninterruptible power supply systems (UPS): general provisions and safety provisions used in areas accessible to the operator

EN60950 (CEI74-2):

ITE (Information Technology Equipment) safety

EN50091-2:

Uninterruptible power supply systems (UPS): electromagnetic compatibility provisions.

EN50081-2:

Electromagnetic compatibility (immunity)

IEC61000-4-2:

Immunity: Electro Static Discharge (ESD)

IEC61000-4-3:

Immunity: electromagnetic fields

IEC61000-4-4:

Immunity: transient overvoltages (BURST)

IEC61000-4-5:

Immunity: current surges (Surge)

IEC61000-4-11:

Low frequency disturbances

EN50141:

Induced radio interference

EN55022:

Radio frequency disturbance

EN62040-3

Uninterruptible power supply systems (UPS): performance provisions and test procedures.

EN50171:

Central supply systems for emergencies (CSS)

IEC146 (CEI22):

Semiconductor electronic converters

IEC529 (CEI70-1):

Degree of protection of casings

European Directives**73/23**

Low voltage directive requiring obligatory CE marking as from 1/1/97. This directive safeguards aspects with regard to equipment safety.

89/336

Electromagnetic compatibility directive enforcing the use of the CE marking from 1/1/96. This directive concerns all issues of immunity and emissions relating to the UPS once installed.

> 5.2 Systems and installation standards

The above product regulations refer specifically to uninterruptible power supply systems. It is these regulations that manufacturers of uninterruptible power supply systems are obliged to adhere to. However, with regard to the electrical system, the installer must refer to other standards.

- standard CEI 64-8 (HD384/IEC60364)
Electrical systems in general
- standard CEI 64-8/7 variant 2:
Installation in hospital environments
- standard CEI 11-20:
Systems with UPS machines connected to category I or II networks
- standard CEI 17-13 (EN60439-1)
Relating to control equipment
- standard EN50272:
Battery installation
- CEI 20:
Electrical cables

6 - INSTALLATION INSTRUCTIONS

Installation must only be carried out by qualified and trained personnel.

When installed within an electrical system, the UPS will not change the existing neutral regime provided that all neutral (N) and live (L) connections on the plugs and sockets remain unchanged. The resistance on the neutral connection is less than 0.1 ohm.

A residual circuit device positioned upstream of the UPS will intervene in the case of any malfunction occurring downstream the UPS (mains present). The sensitivity of this device will need to take into account the UPS leakage current of approximately 9mA in addition to the load current.

The neutral regime can be modified using an additional isolation transformer.

Do not connect the output neutral to the input neutral or to earth.

To connect the input, output and battery expansion connections, remove the rear terminal cover as shown in the diagram and follow the instructions below.

Remove the screws that secure the terminal cover into position then carefully remove the cover as shown (see Fig.1).

The following table provides the necessary information required to correctly size the input and output cables and protections where the distance is no greater than 10metres.

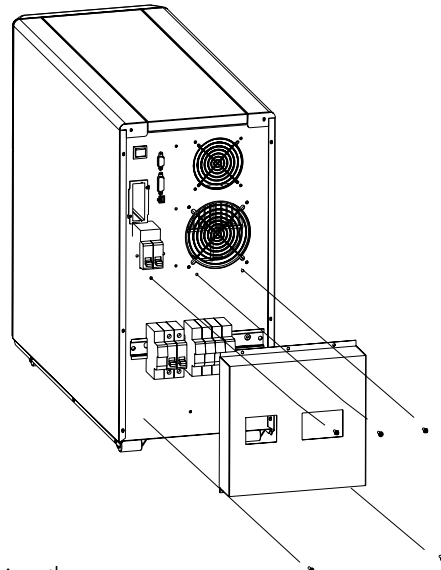
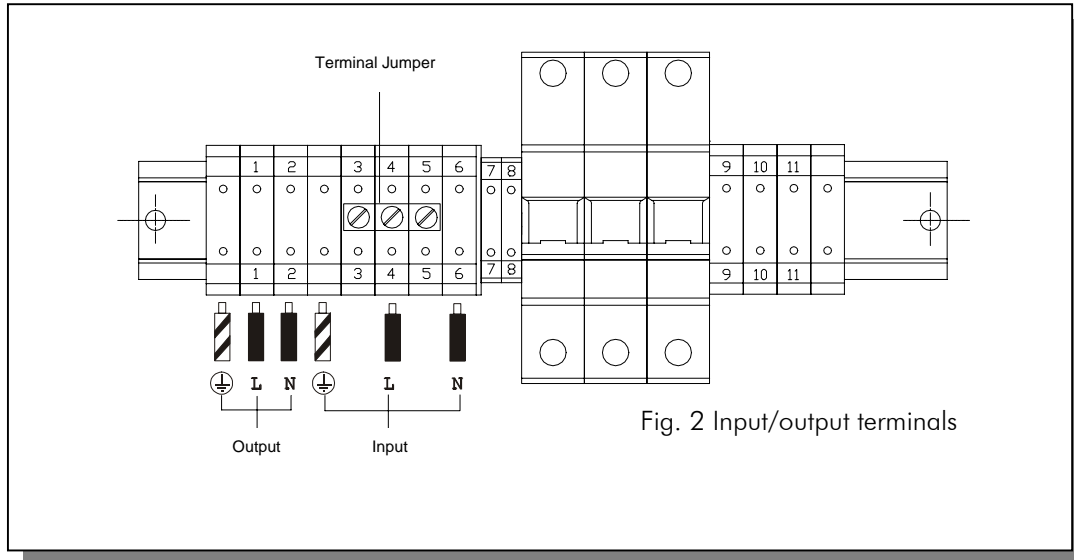


Fig. 1 Removing the rear cover

| kVA | Minimum cross-section area (distance < 10m) | | | | | |
|------|---|----|-------|----|--------|------|
| | INPUT | | | | OUTPUT | |
| | PE | L1 | L2/L3 | N | PE | L1/N |
| 6 | 4 | 4 | 4 | 4 | 4 | 4 |
| 6.5 | 6 | 6 | 4/6 | 6 | 6 | 6 |
| 8/10 | 10 | 10 | 10 | 10 | 10 | 10 |

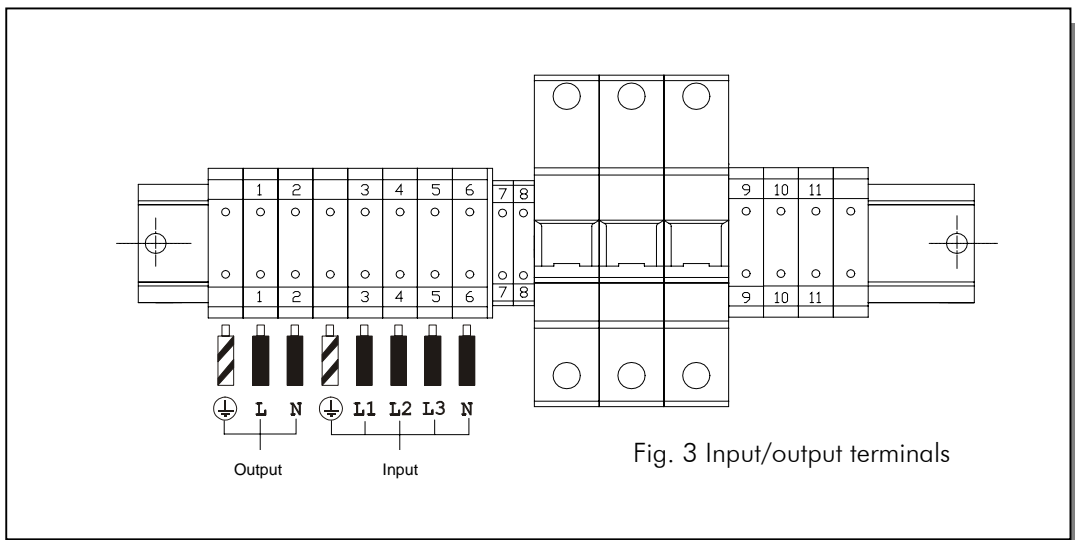
Single-phase supply and single-phase load connection:

For single phase input connection short circuit the three input live terminals using the supplied jumper. Connect the input and output cables to the terminals as shown in figure 2.



Three-phase supply and single-phase load connection

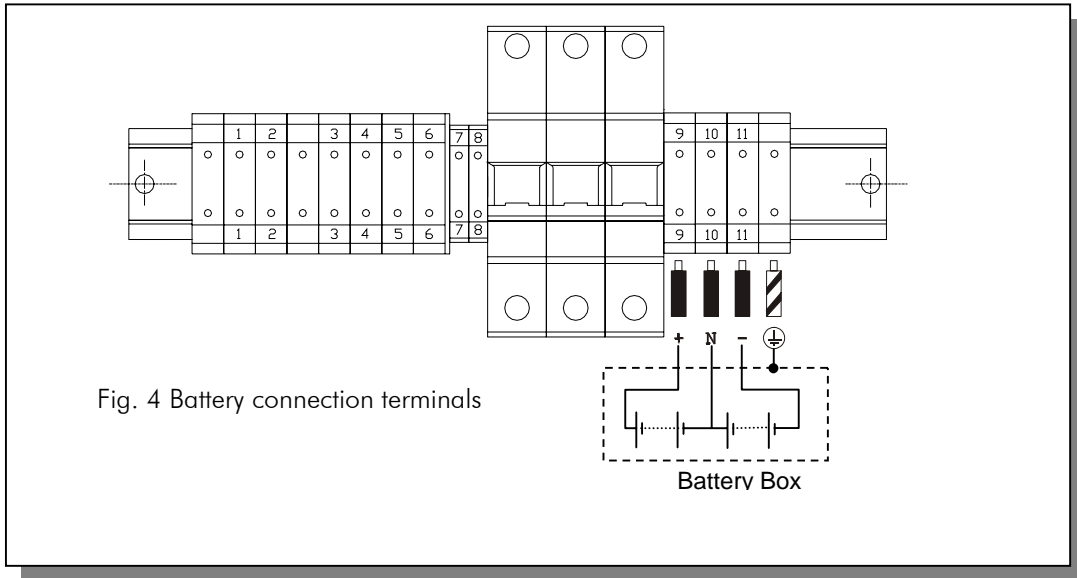
Connect the input and output cables to the terminals as shown in figure 3.



When operating in by-pass mode (automatic or manual), the load is powered directly from the mains via the L1 line. Therefore the supply must be appropriately sized to power the entire single-phase load that is connected to the output of the UPS.

Battery expansion connection

Connect the battery expansion cable as shown in figure 4



7 - UPS BLOCK DIAGRAM

> 7.1 UPS Operation

Description of the UPS

The purpose of a UPS is to provide a perfect power supply voltage and frequency to the equipment connected to it, regardless of the quality and stability of the incoming mains supply. Once connected and switched on, the UPS generates a sinusoidal alternating voltage with stable amplitude and frequency, regardless of any surges and/or variations present on the mains supply.

Whilst the UPS draws energy from the incoming mains supply, the batteries are charged. The microprocessor continuously monitors the amplitude and frequency of the incoming mains voltage, the amplitude and frequency of the voltage generated by the *inverter*, the applied load, the internal temperature and the state of battery charge and efficiency.

The block diagram for the UPS is shown below (see Fig. 5) followed by a description of the individual components.

> 7.2 - UPS Block diagram

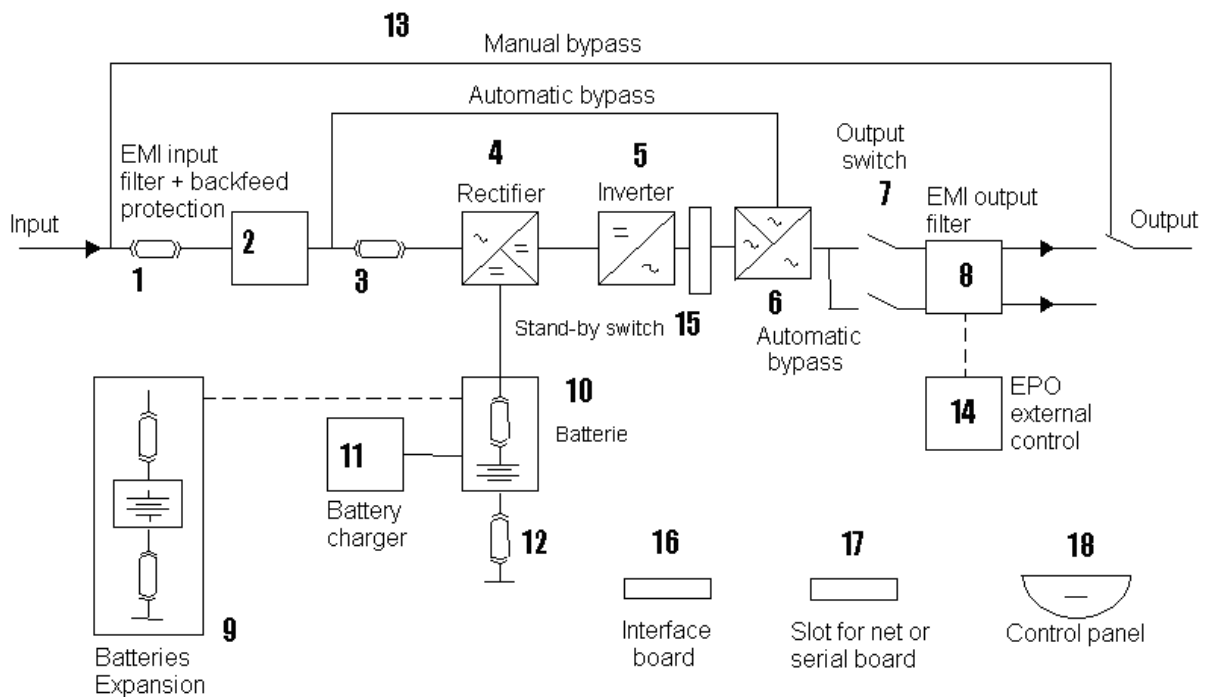


Fig. 5 UPS Block diagram

KEY:**1) Input protection (fuse).****2) EMI input filter + back-feed protection:**

Input filter for protecting the UPS and load against any electromagnetic disturbances.

Back-feed protection: intervenes when the mains power supply fails, thereby isolating the UPS from the input socket to prevent any back feed to the mains power supply.

This protection is required to prevent any voltage from returning to the supply, which could put the operator at risk whilst carrying out maintenance work.

3) Rectifier/booster block protection fuse.

Operation of this fuse is dependent on the input fuse (1): a fault occurring in the rectifier/booster will open this protection before the input fuse intervenes. This ensures that the power supply to the user is not interrupted, as the by-pass line remains powered.

4) Rectifier/Booster:

When mains power is present, this converts the mains alternating current (AC) into a direct current (DC) whilst controlling the power factor. If the mains power supply fails, it increases the voltage from the battery to an appropriate voltage level to power the inverter stage.

5) Inverter:

Converts the direct current (DC) into alternating current (AC) to supply the load.

6) Automatic by-pass:

The automatic by-pass is an SCR (static) device that automatically switches the UPS output to the input power supply if an overload and/or an inverter fault occurs. It is equipped with a redundant auxiliary power supply that receives power even if the main power supply fails.

7) Output switch:

To isolate the UPS output whilst carrying out maintenance work.

8) Output EMI filter:

The EMI output filter protects the load against any electromagnetic disturbances present.

9) Battery expansion module:

The battery expansion module enables the battery autonomy time to be increased. The additional battery modules are available with integrated battery chargers to decrease the recharge time.

10) Batteries:

Maintenance-free, sealed lead acid batteries: Supplies power to the inverter to support the load when the incoming mains power supply fails.

11) Battery charger:

A DC-DC converter which converts the output voltage from the rectifier/booster to a suitable level to recharge the batteries. It is deactivated when the mains power supply fails.

12) Battery protection:

Battery to UPS protection fuses

13) Manual by-pass

By closing the manual maintenance by-pass switch (SWMB) and then opening the input switch (SWIN) and the output switch (SWOUT), it is possible to safely carry out maintenance work inside the UPS, without disrupting power to the load. The auxiliary contact used to indicate the closure of the manual bypass switch to the microprocessor can be found on the input/output terminal rail. This enables the user to install an additional external maintenance by-pass into the distribution network.

14) External EPO (Emergency Power Off) command:

The EPO enables the user to completely shutdown the UPS via a remote emergency push-button. The Standards also refer to this device as an Emergency Switching Device (ESD).

15) Stand-by Switch:

Electromagnetic device used to automatically disconnect the UPS inverter output from the load during the following scenarios:

- Stand-by mode
- By-pass mode (whilst operating on-line)
- If a fault occurs to the inverter
- If the Emergency Power Off (EPO) button is pressed.

16) Interface board:

The interface board provides an RS232 interface, volt-free contacts and an isolated Emergency Power Off (EPO) for the remote shutdown of the system during an emergency.

17) Slot for serial or network card:

The communications card slot can be used to insert various interface cards: for example a second RS232 serial card, an SNMP interface for communication over the computer network or an RS232 serial interface duplex.

18) Display panel:

The display panel provides the user with visual (LED + LCD) and audible (buzzer) signals about the UPS operating status. The panel also enables the user to control and customise UPS operation.

> 7.3 - Operating modes

| Operating mode | Supply and load status | Lower line of display | LED indications | Observations |
|------------------|--|--------------------------|---|---|
| STAND-BY | Supply present, loads not powered | STATUS: STAND-BY | Red "lock/stand-by" LED: flashing | The UPS is in its minimum energy consumption state as the boosters and the inverter are off. The microprocessor is operational and performs the supervision and diagnosis functions. The batteries are charged and the UPS is ready to be switched on. When drawing power from the batteries, the UPS only functions in battery mode if a programmed start-up has been selected using the software. |
| ON-LINE | Supply present, loads powered by the inverter with the power drawn from the mains supply | STATUS: INVERTER MODE | Green "line present" LED: lit | This is the normal status for this operating mode. The loads receive power from the inverter. The batteries are charged. |
| ON-LINE | Supply present, loads powered by the by-pass | STATUS: BY-PASS MODE | Green "line present" and green "by-pass" LED's: lit | The UPS operates in this mode when it has switched on from the mains (before switching to inverter mode), or when there is a distorting load or a temporary overload |
| ON-LINE | Supply absent, loads powered by the inverter with the power drawn from the batteries | STATUS: BATTERY MODE | Yellow "battery working" LED: lit | The UPS operates in this mode when the mains supply is absent (Black out) or when it is not within acceptable tolerance limits (over or under voltage and frequency). The loads receive power from the inverter with a stable frequency and voltage and the power is drawn from the batteries. |
| LINE-INTERACTIVE | Supply present, loads powered by the by-pass | STATUS: BY-PASS MODE | Green "line present" LED, green "by-pass" LED and green "line-interactive" LED: lit | This is the normal status for this operating mode. The loads receive power from the by-pass whilst the mains supply remains within the preset range (voltage and frequency), the batteries are charged. |
| LINE-INTERACTIVE | Supply present, loads powered by the inverter with power drawn from the mains | STATUS: INVERTER MODE | Green "line present" LED, and green "line-interactive" LED: lit | The UPS operates in this mode when the mains supply voltage and frequency is no longer within the preset range. |
| LINE-INTERACTIVE | Supply absent, loads powered by the inverter with power drawn from the batteries | STATUS: BATTERY MODE | Yellow "battery working" LED, green "line interactive" LED lit | The UPS operates in this mode when the mains supply is absent (Black out) or not within the preset range for operating from the mains supply (over or under voltage and frequency) |

SMART-ACTIVE

Enables the UPS to automatically determine which method of operation (on-line or line interactive) is most suitable dependent on the quality of the incoming mains supply. If the mains supply is not within the acceptable limits for both voltage and frequency, the UPS will supply power to the load from the inverter (on-line). When the mains supply returns to within the acceptable limits, the system will first ensure that the supply remains stable, before switching the load back onto the mains supply.

During both of these operating modes, the load is powered directly from the mains supply via the bypass. However, due to the input and output EMI filters, the mains supply is filtered and therefore free of any electrical disturbances.

If the incoming mains supply fails, the load is powered directly by the inverter. This function reduces energy consumption. When the mains supply is present, the inverter is off.

8 - INTERFACING

The following connectors are located on the rear of the UPS:

- SUB-D 9 pin female connector labelled RS232
- SUB-D 15 pin female connector labelled REMOTE
- Connector complete with jumper labelled EPO.

There is also an expansion slot for additional interface cards.

> 8.1 - Interfacing via RS232

The UPS is equipped with a sub-D 9 pin female connector that carries the RS232 interface signals in DCE configuration:

| PIN | NAME | TYPE | FUNCTION |
|-----|-------|------|---|
| 1 | DCD | ID | Data Carry Detect |
| 2 | TX | UD | TX serial line |
| 3 | RX | ID | RX serial line |
| 5 | GND | PWR | Earth |
| 6 | DTR | UD | Data Terminal Ready |
| 8 | +12V | PWR | Isolated power supply 12V±5%, 80 mA max |
| 9 | WKATX | UD | ATX power supply restart |

> 8.2 - Remote controls

The UPS has a sub-D 15 pin female connector (see Fig. 6) providing remote control signals:

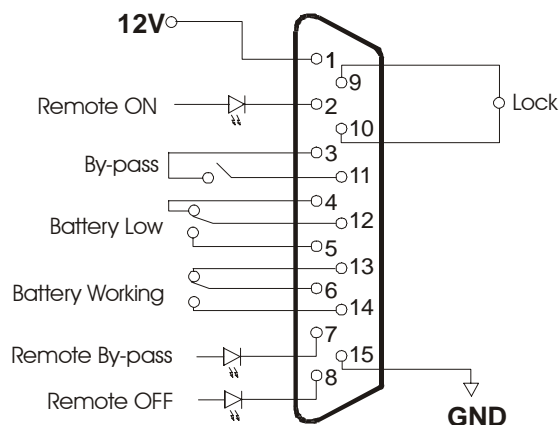


Fig. 6 Communication connector

| PIN | NAME | TYPE | FUNCTION |
|---------|-----------------|------|--|
| 1 | 12V | PWR | Isolated auxiliary power supply +12V±5% 80mA max |
| 15 | GND | PWR | Earth to which the isolated auxiliary power (12V) and remote controls (Remote ON, Remote By-pass, Remote OFF) refer |
| 2 | REMOTE ON | IN | Connecting pin 2 to pin 15 for at least 3 seconds switches the UPS on |
| 8 | REMOTE OFF | IN | Connecting pin 2 to pin 15 switches the UPS off immediately. |
| 7 | REMOTE BY-PASS | IN | Connecting pin 7 to pin 15 the power supply to the load switches from inverter to by-pass. As long as this connection is maintained, the UPS will remain in by-pass mode even if the input mains power supply fails. If the bridge is removed when the mains is present the UPS reverts to inverter mode. If the bridge is removed when the mains is absent, the UPS switches to battery mode. |
| 3,11 | BY-PASS | OUT | When this contact is closed, it means that the load is receiving power from the by-pass |
| 4,5,12 | BATTERY LOW | OUT | When contact 5/12 is closed, it means that that the batteries have reached the end of their charge. |
| 6,13,14 | BATTERY WORKING | OUT | When contact 6/14 is closed, it means that the UPS is operating in battery mode |
| 9,10 | LOCK | OUT | When this contact is closed, it means that the UPS is locked |

N.B.: The contacts can support a maximum current of 0.5A at 42V.

The position of the contacts shown in Fig.6 is in the absence of any alarm/signal (normal operation).

> 8.3 - Remote Emergency Power Off (EPO)

This isolated input is used to switch the UPS off remotely in the event of an emergency (e.g. fire or malfunction). Any "Emergency Power Off" (EPO) switch installed must be connected to the connector on the interface board located on the rear of the UPS.

The UPS is factory supplied with the EPO terminals short-circuited. Remove the short circuit if the system requires auxiliary contact interfacing with an emergency power off button.

> 8.4 - Expansion slot

The UPS has an expansion slot for a wide range of interface cards (see figure opposite):

- Second RS232 port
- Serial port duplexer
- Ethernet network agent with TCP/IP, HTTP and SNMP protocol
- RS232 + RS485 port with JBUS / MODBUS protocol

For more information on the accessories available, refer to the manufacturer's web site (WWW.RIELLO-UPS.COM)

9 - OPTIONS
> 9.1 - Options summary table

| Description | Dimensions (HWD) mm | Weight (kg) |
|---|---------------------|-------------|
| Battery expansion module for PWP 600 | 735x283x895 | 80 |
| Battery expansion module for PWP 650/800/1000 | 735x283x895 | 112 |
| Isolating transformer module for PWP 600 | 500x400x265 | 80 |
| Isolating transformer module for PWP 650 | 500x400x265 | 80 |
| Slot network adapter module | / | / |
| Communication software | / | / |
| Remote LED display | / | / |
| Slot second serial board | / | / |

Battery expansion module:

This is used to extend the UPS back up time. It is supplied in a metal cabinet to match the UPS and is available without or with an additional battery charger to help maintain reasonable recharge times

Isolating transformer module:

The UPS output can be galvanically isolated from the input.

The isolation transformer enables the user to modify the neutral arrangements (for example, from TT to TN, or from TT to IT), to increase the continuity of the power supply (IT systems) or to increase the level of user protection (TN systems).

The transformer may be connected to either the UPS input (single-phase/single-phase version) or to the UPS output (three-phase/single-phase version).

Remote display (LED):

The remote LED display can be connected at a distance of up to 200m from the UPS, thus enabling the user to view the general status of the UPS remotely in real time.

The remote display indicates system status:

- green LED: normal operation
- yellow LED: non critical alarm
- red LED: alarm

The remote display allows the user to send UPS switch on or UPS shutdown commands from a remote location.

> 9.2 - Communications software

MAIN FEATURES

1) Sequential shut-down with defined priority:

PowerShield² enables the user to shutdown the network without having to individually switch off each PC or server, and before doing so. Powershield² will save the work that was being done regardless of the application that being used. The user can also define their own shutdown procedure and prioritise the shutdown of critical components within the system (such as essential and non essential servers).

2) Multiplatform compatibility:

PowerShield² provides the user with a standard control and monitoring capability, using TCP/IP communication protocol. This enables the user to monitor computers that use different operating systems from a single console. For example, not only could the user monitor a UNIX server from a PC with Windows 98, the user could also connect to UPS systems situated in different locations by using either a dedicated network (intranet) or the Internet.

3) Events scheduling:

PowerShield² enables the user to define their own shutdown/switch off and on procedures, for the systems that are connected to the UPS. Not only does this noticeably increase the degree system security, it also enables the user to make significant energy savings.

4) Management of messages:

PowerShield² keeps the user constantly informed of the status of the UPS, whether locally or by sending messages to users connected to the network. It is also possible to create a list of the people to receive messages by e-mail, fax and SMS should a fault or sudden blackout occur.

5) Integrated SNMP agent:

PowerShield² contains an integrated SNMP agent for managing the UPS via SNMP. This agent is able to send all of the information regarding the UPS and is capable of generating traps using the RFC 1628 MIB standard. This enables the user to control the UPS using SNMP compatible workstations such as HP Open View, Novell Managewise and IBM NetView.

OPERATING SYSTEMS SUPPPORTED (Powershield² FULL version)

- Windows 95, 98, Me, NT 4.0, Win 2000, Win 2003 Server, XP.
- Novell Netware 3.x, 4.x, 5.x, Intra NetWare
- IBM OS/2 Warp and Server,
- Mac OS, 9.X, OSX
- The most commonly available UNIX systems such as:

IBM AIX, HP UNIX, SUN OS SPARC, SUN Solaris INTEL and SPARC, SCO Unix and UnixWare, Siemens SINIX, Silicon Graphic IRIX, Compaq True64 UNIX and DEC UNIX, Linux, BSD UNIX and FreeBSD UNIX

POWERSHIELD² SOFTWARE FUNCTIONS

1) Graphic monitoring of UPS status

PowerShield² is an easy to use yet powerful program that enables the user to monitor and control the UPS systems. There are various graphical versions including Windows, Java, OS/2 and MacOS.

2) Version for MacOS

The PowerShield² software is the only UPS control and shutdown software available for the Macintosh with a client-server architecture, enabling the user to access the Windows, Novell, IBM OS/2 and the most commonly available UNIX operating systems, when using a TCP/IP network.

It also allows the user to support the NetMan series of network agents for UPS control via a network. In addition it comes with multilingual support.

3) Detailed display with all UPS values

PowerShield² provides all the data required to make an accurate and swift assessment of the UPS operation and status.

4) UPS block and operating diagrams

PowerShield² displays a block diagram of the UPS, thus providing the user with visual status information.

5) Saving the event history log and graphic display of the main values

All of the events regarding UPS operation are saved and recorded. This allows the user to monitor data such as the input voltage, applied load or the remaining back-up time available from the batteries.

6) Alarm notification via e-mail and SMS

It is possible to configure PowerShield² to automatically send alarms via an e-mail or SMS message.

7) Programming UPS controls

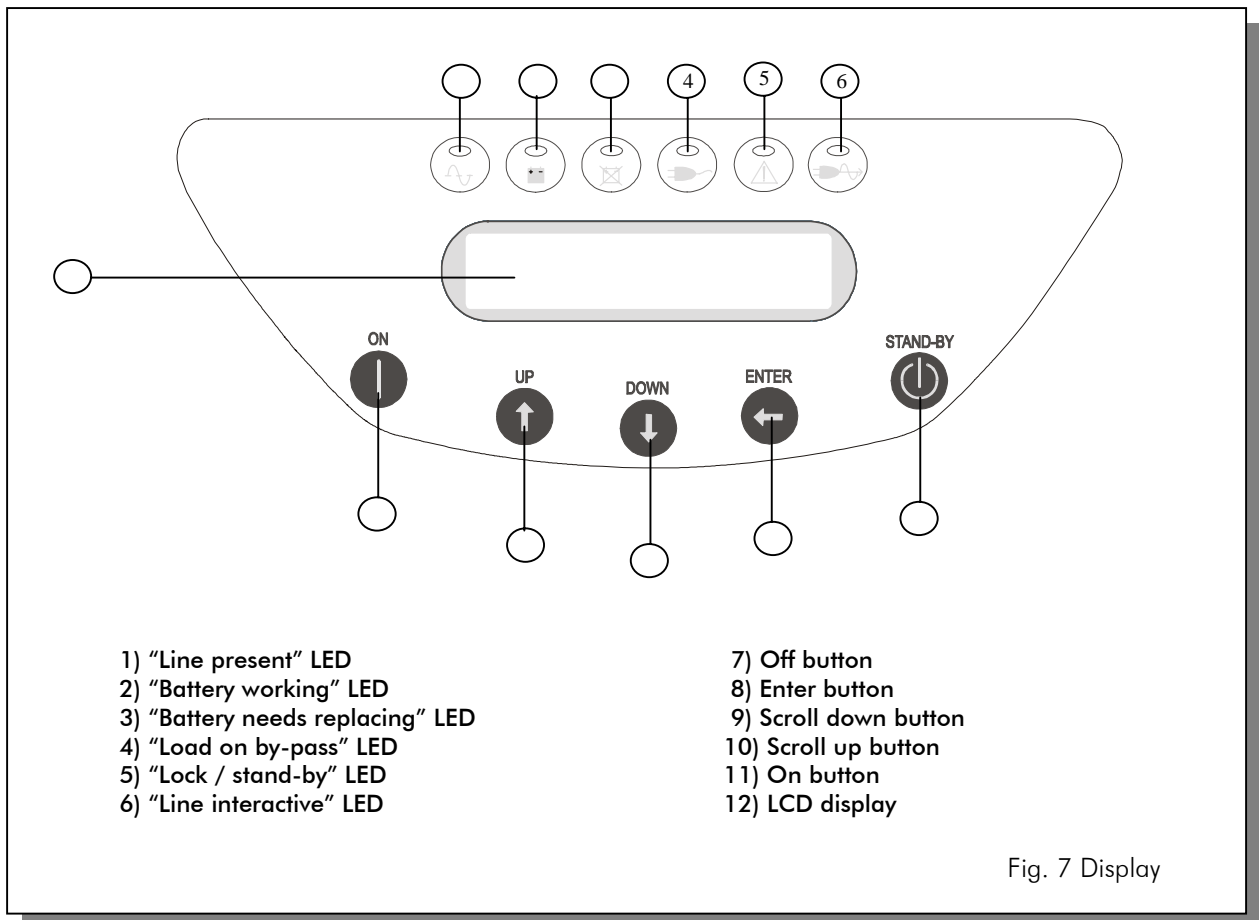
Enables the user to program all of the commands that would normally be carried out manually or performed automatically, for example: shutting down or switching the servers back on, UPS battery test, etc.

10 - CONTROL AND DISPLAY PANEL

> 10.1 - CONTROL and display panel

The information regarding the operating status (see Fig.7) of the UPS is provided by:

- six LED indicators
- a Liquid Crystal Display (LCD) with two lines of 20 characters
- an audible signal
- five buttons for switching the UPS on and off, scrolling through the display options and customising the UPS



LED's

The LED's provide a quick visual indication of the status of the UPS.

1) Line present (Green LED):

This LED is *lit* when the UPS is operating in on-line mode. It will *flash* after the UPS has been switched on until the inverter synchronises with the mains supply, or if the mains frequency is not synchronised with the output frequency. The LED *flashes* alternately during programmed start-up.

2) Battery working (Yellow LED):

This LED is *lit* when power is drawn from the batteries, either when the mains supply is absent or no longer within the acceptable preset tolerance limits. The LED *flashes* when the batteries have reached the end of discharge alarm threshold.

3) Battery needs replacing (Red LED):

This LED is *lit* when the batteries need replacing

4) Load on by-pass (Green LED):

This LED is *lit* when the load receives power from the mains supply via the automatic by-pass.

5) Lock/stand-by (Red LED):

This LED is *lit* when the UPS is in alarm mode or locked. It *flashes* when the UPS is in Stand-by mode.

6) Line-interactive (Green LED):

This LED is *lit* when the UPS is in line-interactive mode

> 10.2 - Control and command buttons

1) On button.

This button allows the user to perform the following functions:

- If the UPS is in stand-by mode, by pressing this button for 0.5 seconds the UPS can be switched on to supply power to the output loads.
- If the batteries are charged, by holding this button down for more than 5 seconds, the microprocessor will perform a battery efficiency test. If, as a result of this test, the batteries prove deficient, the red "battery needs replacing" LED will illuminate and the relevant audible signal will be heard
- Enables the user to switch off the audible signal for the following cases (pressing for \geq 0.1 sec):
 - When the UPS is operating on battery mode (yellow "battery working" LED lit)
 - During battery operation mode, when the UPS reaches the end of discharge pre-alarm threshold.
 - When the UPS enters the final countdown phase of a programmed shutdown.
- By holding this button down for more than 2 seconds during the waiting phase of a programmed shutdown, will cancel the shutdown.

7) Off button.

By holding this button down for at least 1.5 seconds (after four beeps) the UPS will switch off. If the mains supply is present, the UPS will switch to stand-by mode. If the mains supply is absent, and the programmed restart function has not been activated, the UPS will switch off completely. If the mains supply is absent and the programmed restart function has been activated, the UPS can be switched off by holding this button down for at least 5 seconds.

9-10) Scroll buttons

By pressing the scroll buttons the user can scroll through the information available on the display, both in read-only and programming modes.

8) Enter button

During the read-only mode, the user can enter the programming mode by holding this button down for more than 2 seconds. During programming mode, this button enables the user to enter or exit the various menus and to choose the options required.

> 10.3 - Liquid Crystal Display (LCD)

The LCD enables the user to:

- Quickly ascertain the operational status of the UPS, with information relating to the input, load and the batteries (**read-only mode**)
- Personalise the display settings (e.g. the language), the operating mode (on-line, line-interactive, smart-active, etc), certain output parameters (voltage and frequency), and the operational configuration (auto-restart, auto-power-off, etc...) (**Programming mode**).

Read-only mode:

During the read-only mode, the information displayed on screen will be similar to the example shown below:



The **top line** displays information relating to the supply, the output, the load, the batteries and the temperature of the heat sink. This information can be accessed using the scroll buttons.

The following information is displayed:

| | |
|----------------------|--|
| IN=230V 50.0Hz | Input voltage and frequency single-phase |
| IN=230 230 230V 50.0 | Input line (L1, L2, L3) voltages and frequency three-phase |
| BYP= 230V 50.0Hz | By-pass line voltage and frequency |
| BATT= +204V -204V | Battery positive and negative pole voltage |
| TIME= 8m BATT= 100% | Back-up time and battery charge percentage |
| OUT= 230V 50.0Hz | Output voltage and frequency |
| LOAD= 10.0kVA 7.0kW | Apparent power and active power of the load |
| LOAD= 100% 43A | Load % in relation to rated value and rms current supplied to the load |
| TEMP= 40°C | Temperature of the heat sink |

The lower line of the display shows the UPS status and indicates whether it is operating correctly on the basis of load and mains conditions. It also shows the operating mode that has been selected, or whether there is a fault, an alarm, or if the UPS is locked:

- o **Faults** are the least significant problems. They do not result in the UPS becoming locked. They do reduce its performance or mean that some of its functions cannot be used (e.g. if the by-pass fuse is missing, this does not prevent the load from receiving power from the inverter but it does prevent the use of the by-pass line).

- o **Alarms** are more significant problems than general faults because if they persist, even for a short time. They may result in the UPS becoming locked.
- o **Locks** are generally preceded by an alarm signal. Due to their severity they mean that the inverter will be switched off and that the load will receive power from the by-pass supply (excluding locks due to overloads and short-circuits).

The following table illustrates the messages that may appear on the lower line of the display:

| OPERATING STATUS | |
|-------------------------|--|
| STATUS: STAND-BY | Indicates that the UPS is not powering the load but is awaiting the on command |
| STATUS: INVERTER MODE | Indicates that the UPS is powering the load via the inverter, drawing the power from the mains supply |
| STATUS : BY-PASS MODE | Indicates that the UPS is powering the load directly from the mains power supply via the automatic by-pass |
| STATUS: BATTERY MODE | Indicates that the UPS is powering the load via the inverter, drawing the power from the batteries |
| BATTERY TEST ACTIVE | Indicates that the UPS is performing a battery test |
| REMOTE BY-PASS COMMAND | Indicates that the remote by-pass function command has been activated |
| REMOTE OFF COMMAND | Indicates that the remote off command has been activated or that the EPO connector has not been inserted |

| OPERATING STATUS | |
|-------------------------|---|
| REPLACE BATTERIES | Indicates that the batteries need replacing |
| FAULTS | |
| FAULT: LINE L1 | Faults on L1, L2 and L3 input lines. If the UPS is in stand-by mode, the presence of one or more faults will prevent it being activated. If the UPS is on, it operates in on-line or battery mode on the basis of the load percentage applied |
| FAULT: LINE L2 | |
| FAULT: LINE L3 | |
| FAULT: BY-PASS LINE | Fault on the By-pass line. |
| FAULT: V> BATTERIES | Fault in the functioning of the battery charger which is switched off to prevent the batteries overcharging |
| FAULT: TEMP. <0°C | Fault due to the heat sink temperature being less than 0°C. If the UPS is in stand-by mode, this fault prevents the UPS from being activated. |
| FAULT: BATTERIES | Fault due to batteries being interrupted or disconnected |
| ALARMS | |
| ALARM: PRE-CHARGING | Problems in the pre-charging phase in the internal capacitors of the UPS alarm. |
| ALARM: V> BOOSTER | Booster overvoltage alarm. |
| ALARM: V<INVERTER | Inverter undervoltage alarm |
| ALARM: Vko INVERT. | Inverter voltage waveform alarm: if the by-pass is OK it switches to this; if not it remains on the inverter. |
| ALARM: OVERTEMP. | Heat sink overtemperature alarm |
| ALARM: TEMP.SENSOR | Internal temperature sensor malfunction alarm |
| ALARM : AUX. POWER | Main auxiliary power supply malfunction alarm. |
| ALARM: OVERLOAD | Output overload alarm |
| ALARM: SHORT-CIRCUIT | Output short-circuit alarm |

LOCKS

| | |
|--------------------------------|---|
| LOCK: PRE-CHARGING | Lock due to problems in the pre-charging phase of the internal capacitors |
| LOCK: AUX. POWER | Lock due to auxiliary power supply malfunction |
| LOCK: SENSOR TEMP. | Lock due to temperature sensor malfunction |
| LOCK: OVERTEMP. | Lock due to heat sink malfunction |
| LOCK: V> BOOSTER | Lock due to booster overvoltage |
| LOCK: V< BOOSTER | Lock due to booster undervoltage |
| LOCK: V< INVERTER | Lock due to inverter undervoltage |
| LOCK: V> INVERTER | Lock due to inverter overvoltage |
| LOCK: V _{dc} INVERTER | Lock due to DC current on the output |
| LOCK: V _{ko} INVERTER | Lock due to output waveform distortion |
| LOCK: OVERLOAD | Lock due to overload |
| LOCK: SHORT-CIRCUIT | Lock due to output short-circuit |
| LOCK: BYPASS FAULT | Lock due to static by-pass switch malfunction |

Programming modes:

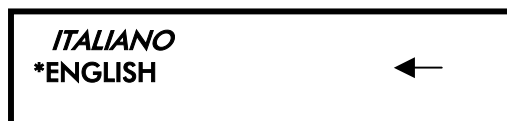
To enter the programming mode simply press the enter button for more than 2 seconds. The display will appear as shown in the following example:



The menu displayed is the main menu. This can be viewed using the scroll buttons. To access the various sub-menus simply align the arrow with the relevant menu and press the ENTER button.

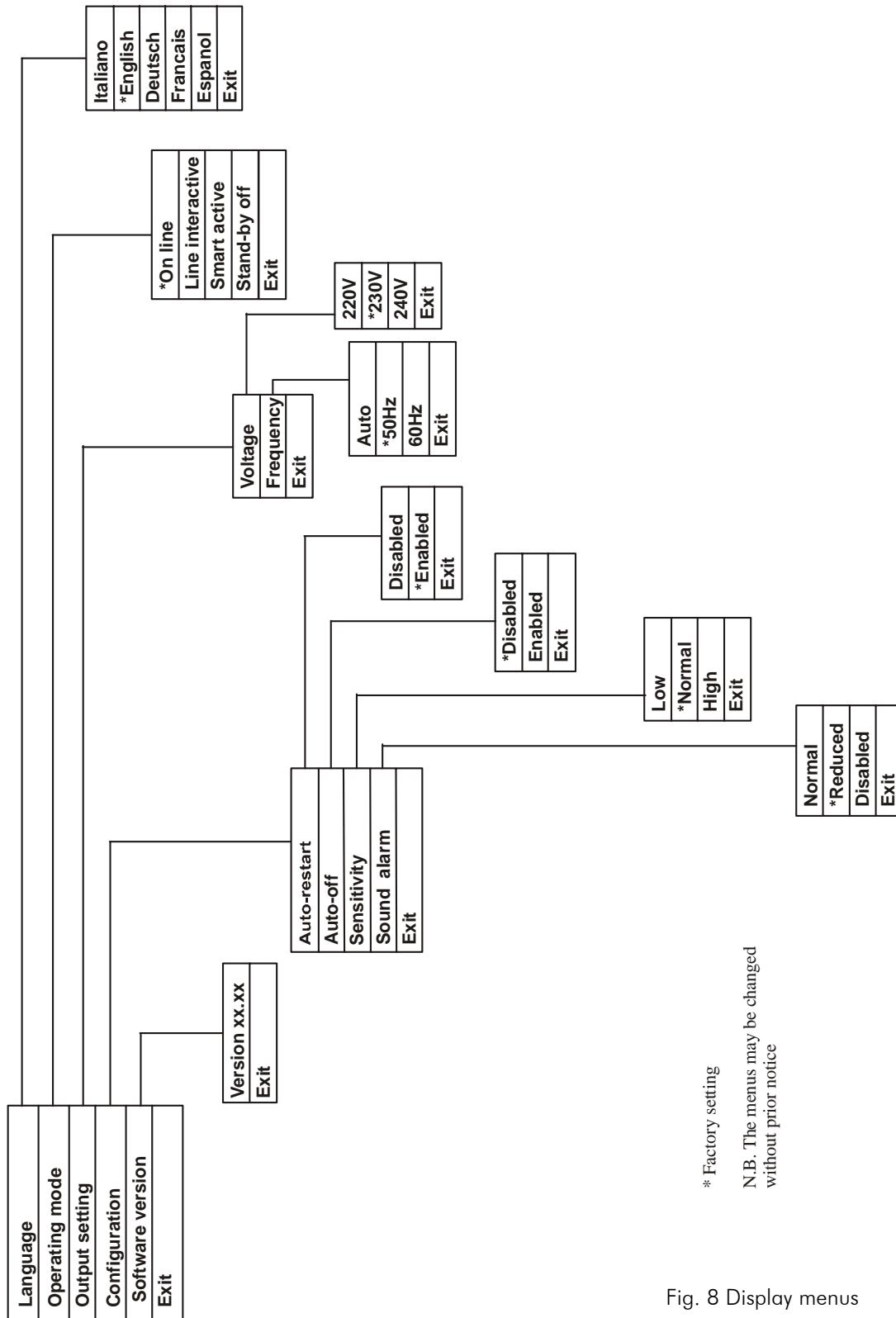
For example, in the figure above, if you press the ENTER button you will enter the LANGUAGE sub-menu.

The figure below shows you how the display will appear once you have pressed the ENTER button and entered the LANGUAGE menu:



The "*" symbol to the left of "ENGLISH" indicates that the language currently selected is English. If the ENTER button is pressed the language used in the display would become Italian.

The following diagram shows the structure of the various menus that may be accessed during programming mode.



* Factory setting
N.B. The menus may be changed without prior notice

Fig. 8 Display menus

Main menu

The main menu is the first menu entered when accessing the programming mode. You can access the following sub-menus via the main menu:

- **LANGUAGE**
- **OPERATING MODE**
- **OUTPUT SETTINGS**
- **CONFIGURATION**
- **SOFTWARE VERSION**
- **EXIT**

LANGUAGE menu

The language menu enables the user to select the language for all of the displayed information.

OPERATING MODE menu

The operating mode menu enables the user to select the required operating mode: On-line, Line-interactive, Smart-active or Stand-by mode.

OUTPUT SETTINGS menu

The output settings menu enables the user to select the required output voltage and frequency.

CONFIGURATION menu

The configuration menu enables the user to customise the following UPS functions:

- Activate or deactivate the **AUTO RESTART** function when the mains supply returns after the UPS has shutdown during battery operation, due to either: a complete discharge, auto shutdown or auto-off.
- Activate or deactivate the **AUTO OFF** function when the output load drops below a minimum value of 5% whilst the UPS is operating in battery mode.
- **SENSITIVITY:** when the UPS is operating in on-line mode, various sensitivity levels at which the UPS switches to the by-pass line may be selected. For example: if the sensitivity is low, it means that the voltage range before the load is switched onto the by-pass is wider. Whilst in line-interactive mode, the sensitivity to which it switches to inverter mode can be selected.

| SENSITIVITY | VOLTAGE AND FREQUENCY RANGE | |
|--------------------|------------------------------------|----------------------|
| LOW | 175 VBYP 269 | FBYP rated \pm 5Hz |
| NORMAL | 180 VBYP 264 | FBYP rated \pm 5Hz |
| HIGH | 185 VBYP 259 | FBYP rated \pm 5Hz |

- **SOUND ALARM:** enables the user to customise the audible alarm function. Normal: the audible alarm sounds in all cases. Reduced: the by-pass operating mode signal is silent for the first 3 seconds. The audible alarm can also be completely deactivated.

“SOFTWARE VERSION” menu.

Enables the user to see which version of software has been installed.
To exit the menus, simply align the **EXIT** with the ← symbol and press ENTER.

11 - REAR VIEW

>11.1 - Rear view of the UPS

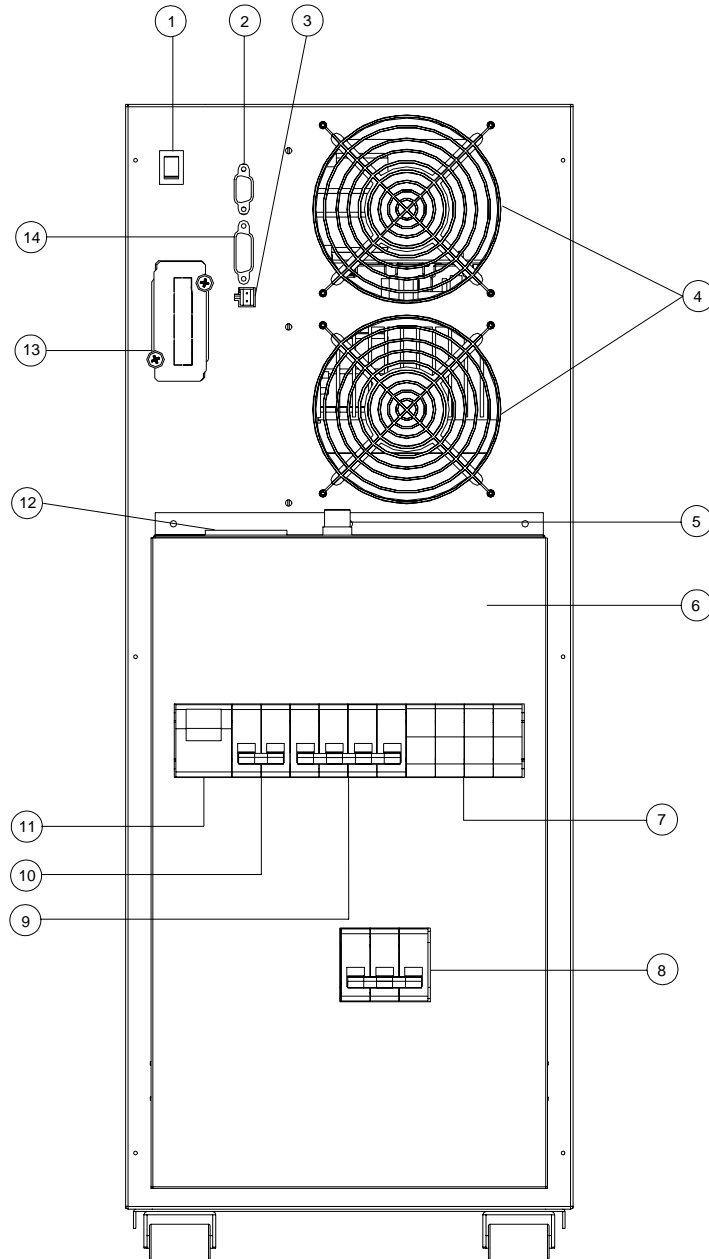


Fig. 9 Rear view

- | | |
|-------------------------------------|---|
| 1) On/off switch | 8) Maintenance by-pass switch (SWMB) |
| 2) RS232 Port | 9) Input switch (SWIN) |
| 3) Emergency Power Off (EPO) | 10) Output switch (SWOUT) |
| 4) Fans | 11) By-pass fuse (SWBYP) |
| 5) 10A fuse holders for IEC outlets | 12) IEC outlets |
| 6) Terminal cover | 13) Expansion slot for additional interface cards |
| 7) Battery fuse holders (SWBT) | 14) Contact port (REMOTE) |

12 - TECHNICAL DATA**> 12.1 - Models**

| MODEL | POWER | BACK-UP (min) | DIMENSIONS (HWD) |
|----------------------------|---------------|-----------------|------------------|
| Power Dialog Plus PWP 600 | 6000VA/4200W | 12 | 585x283x895 |
| Power Dialog Plus PWP 650 | 6500VA/4600W | 20 | 735x283x895 |
| Power Dialog Plus PWP 800 | 8000VA/5600W | 16 | 735x283x895 |
| Power Dialog Plus PWP 1000 | 10000VA/7000W | 12 | 735x283x895 |

> 12.2 - Back-up expansion modules

For types and back up times of the Power Dialog Plus models refer to the Riello Ups's price list.

> 12.3 Summary data sheets

| MODEL | 6000 | 6500 | 8000 | 10000 |
|---|--|--|-------------------------------------|-------------------------------------|
| | INPUT | | | |
| Input phases | 1 | 3 or 1 selectable | | |
| Rated voltage | 220-230-240V Single-phase | 220-230-240V single-phase or 380-400-415V three-phase | | |
| Maximum input voltage before battery intervenes | 276V Single-phase | 276V Single-phase 480V Three-phase | | |
| Minimum input voltage before battery intervenes (applied load 100%) | 170V Single-phase | 170V Single-phase 296V Three-phase | | |
| Minimum input voltage before battery intervenes (applied load 50%) | 140V Single-phase | 140V Single-phase 244V Three-phase | | |
| Rated frequency | 50-60Hz \pm 5 Hz | | | |
| Maximum current | 29A | Single-phase 31A Three-phase 11A | Single-phase 41A Three-phase 15A | Single-phase 50A Three-phase 18A |
| Rated current | 20A | Single-phase 22A Three-phase 8 A | Single-phase 30A Three-phase 11A | Single-phase 37A Three-phase 13A |
| In-rush current | $< I_n$ | | | |
| Power factor | >0.99 | Single-phase >0.99 Three-phase >0.95 | | |
| Current distortion (THDi) | $<7\%$ | Single-phase $<7\%$ Three-phase $<27\%$ | | |
| Input protection | 32A GL fuse overvoltage protections (VDR) | 3x20A GL 3-phase fuse overvoltage protections (VDR) | | |
| "Hold up" time | 40mSec | | | |
| | BY-PASS | | | |
| Maximum voltage acceptable for switching to mains supply | 264V Single-phase | 264V Single-phase 459V Three-phase | | |

| MODEL | 6000 | 6500 | 8000 | 10000 |
|--|---|---------------------------------------|-------------|-------------|
| Minimum voltage acceptable for switching to mains supply | 180V Single-phase | 180V Single-phase 313V Three-phase | | |
| Frequency tolerance accepted for switching | ± 5Hz on selected frequency | | | |
| Switching time (mains/inverter synchronised) | 0.1 ms | | | |
| By-pass protection | 32A GL fuse | | 80A GR fuse | 80A GR fuse |
| SMART ACTIVE OPERATING MODE | | | | |
| Mains supply tolerance low Sensitivity | 175-269V | | | |
| Mains supply tolerance normal Sensitivity | ±5Hz 180-264V | | | |
| Mains supply tolerance high Sensitivity | ±5Hz 185-259V | | | |
| BATTERY | | | | |
| Back-up in min | 12 | 20 | 16 | 12 |
| No. batteries | 18 | 30 | | |
| Battery rated voltage | 216 | 360V | | |
| Type of battery | Maintenance-free lead / High efficiency | | | |
| Battery configuration | In series with neutral mid-point | | | |
| Type of recharge | Single-level (floating) | | | |
| Recharge current | 1A | | | |
| Recharge time | 6-8h | | | |
| Intervention time (loss of mains) | Zero | | | |
| Rated voltage on expansion connector | 216V | 360V | | |
| Rated output supplied | 4773W | 5170W | 6364W | 7955W |
| Recharge voltage | 245V | 409V | | |
| End discharge voltage | 180V | 300V | | |

POWER DIALOG PLUS

| MODEL | 6000 | 6500 | 8000 | 10000 |
|---|------------------------------------|------|------|-------|
| Battle ripple current | <0,01C | | | |
| Battery voltage stability (batteries charged) | 0.07% | | | |
| Battery protection | 32AGL fuse | | | |
| OUTPUT | | | | |
| Rated voltage | 220/230/240V selectable | | | |
| Waveform | Sinusoidal | | | |
| | 50/60Hz auto sensing or selectable | | | |
| Frequency converter function | YES | | | |
| Current peak factor (from EN62040-3 regulation) | 3:1 | | | |
| Rated output (VA) | 6000 | 6500 | 8000 | 10000 |
| Rated output (W) | 4200 | 4600 | 5600 | 7000 |
| Static variation | ±1% | | | |
| Dynamic variation (with load impact from 0 to 100%) | <5% | | | |
| Output frequency variation with mains supply absent | <0.1% | | | |
| Frequency variation velocity (Hz/sec.) | <1 | | | |
| Voltage reset after dynamic variation | <20ms | | | |
| Voltage distortion (linear load) | <2% | | | |
| Voltage distortion (non-linear load) | <5% | | | |
| OVERLOAD TIMES | | | | |
| Overload in battery mode | | | | |
| 100%<Load ≤ 125% | 2' | | | |
| 125%<Load ≤ 150% | 30'' | | | |
| Load > 150% | 0.5'' | | | |
| Maximum inverter effective current | 1.5In per 0.5'' | | | |

| MODEL | 6000 | 6500 | 8000 | 10000 |
|---|---|------------------------------|-------|-------|
| Overload in by-pass mode | | | | |
| 100% < Load ≤ 125% | Permanent | | | |
| 125% < Load ≤ 150% | 10' | | | |
| Load > 150% | 1' | | | |
| Neutral sizing (in UPS) | Three-phase version: input neutral sized for single-phase current | | | |
| Output protection | Electronic overload protection + Overvoltage protections (VDR) | | | |
| Protections on 2 IEC output sockets | No IEC socket | 10A GT | | |
| VARIOUS | | | | |
| AC/AC efficiency (double conversion function) | | | | |
| 25% load | 90.5% | 90% | 90% | 90% |
| 50% load | 91.6% | 91.5% | 91.5% | 91.5% |
| 75% load | 91.8% | 91.5% | 91.5% | 91.7 |
| 100% load | 92% | 91% 92% Three-phase input | | |
| AC/AC efficiency (Line interactive mode) | 98% | | | |
| Maximum permanent operating temperature | 40°C | | | |
| Ambient operating temperature | 40°C | | | |
| Recommended operating temperature (for the batteries) | 20/25°C | | | |
| Humidity | < 90% without condensation | | | |
| Protections | Battery overvoltage – Inverter overvoltage (on the peak) – Inverter voltage outside tolerance limits Excessive battery discharge – output overcurrent -short-circuit –thermal - By-pass protection malfunction | | | |
| Back-Feed protection | YES | | | |
| Back feed protection (input relay to section UPS when mains absent) | YES | | | |

| MODEL | 6000 | 6500 | 8000 | 10000 |
|--|--|------------------------------|-----------|-----------|
| Compliance with safety regulations | EN62040-1-1 Directive 73/23/EEC and 93/68/EEC | | | |
| EMC compliance | EN50091-2 cl. A, directive 89/336/EEC | | | |
| Immunity to sudden current surges | IEC61000-4-5 (overvoltage protections (VDR)) | | | |
| Noise | <40dB(A) | | | |
| DIMENSIONS | | | | |
| Height (mm) | 585 | 735 | 735 | 735 |
| Width (mm) | 283 | | | |
| Depth (mm) | 895 | | | |
| Weight in kg (without integrated batteries) | 60 | 67 | 69 | 69 |
| Weight in kg (with integrated batteries) | 100 | 133 | 135 | 135 |
| Mechanical characteristics | Shielded metal cabinet with an applied plastic front panel display | | | |
| Level of protection | IP205 | | | |
| Resistance to vibrations (G) | <2 | | | |
| Power dissipated with load (W/Cal) | 378 / 325 | 410 / 353 | 504 / 433 | 630 / 542 |
| Power dissipated no load (W/Cal) | 120 / 103 | 140 / 120 | 140 / 120 | 140 / 120 |
| Colour | Light grey - RAL7035 | | | |
| Input differential current | < 10mA | | | |
| OUTPUT PROTECTIONS (RECOMMENDED VALUES FOR SELECTIVITY) | | | | |
| Normal fuses (GI) | In (Rated Current)/7 | | | |
| Normal circuit-breakers (curve C) | In (Rated Current)/7 | | | |
| Ultra rapid fuses (UR-URG) | In (Rated Current)/2 | | | |
| Cable input | Lower/rear | | | |
| Input connections | Terminals | | | |
| Output connections | Terminals | Terminals + 2 IEC sockets | | |
| Cooling | Forced ventilation varying with load and ambient temperature | | | |