

# You can't manage what you can't measure.



## The all new eyePower Limited "eyePower" Power Distribution Unit (PDU)



### eyePower Limited



The 14 way eyePower Power Distribution Unit (PDU) from eyePower Limited offers unrivalled measurement and control of mains power distribution in technical environments. Real time data extends far beyond voltage and current, delivering invaluable safety, reliability and cost management data. eyePower users improve system uptime and can demonstrate their commitment to a safe installation.

PDU's are critical components that affect multiple items of equipment and eyePower Limited have manufactured them to the highest standards for over 25 years. Intelligent mains units were introduced by eyePower Limited in the 1990s to sequence outlets, optionally change over between two supplies; then later a powerful macro language was added to switch outlets on or off with infinite flexibility of timing and external control.

Extensive research has now delivered the eyePower platform, promising the superior build quality for which eyePower Limited are valued whilst accurately measuring the mains supply, connected loads and the environment. High resolution measurements are available as graphs which are better than numbers alone to illustrate a problem such as distorted mains waveforms or low power factors.

**Measuring the Supply** - The eyePower PDU excels in its range of measurements and class leading resolution. Real world systems experience shows that measuring live/neutral voltage is a simplistic view of the mains since most modern power supplies accept a wide variation in voltage and live supply faults are fuse protected anyway. A number of different measurements are required to gain a true picture of a technical mains supply in service, many issues can also be localised so tests should be at the final distribution.

Service continuity demands that technical installations often omit safeguards required in domestic installations, for example residual current devices (RCDs) that disconnect any mains supply with a low current fault to earth. Such faults are still possible in the technical environment, risking injury or fire, so eyePower provides residual current measurement without forced disconnection. Even installations with RCDs can benefit from this feature for advance warning of worsening leakage.

Shorted live circuits will blow a fuse but shorted neutral and earth, either in cabling or equipment, is difficult to detect. Neutral/earth faults do occur in the real world and the consequences can be serious with neutral current from the whole local area trying to return via a 'hot spot' to technical earth. Where this happens there may also be disturbance on technical signals due to multiple earth currents. eyePower measures neutral to earth voltages in 0.1V steps, a value that will rarely be zero once a system is in use. It is normal for local earth and neutral to diverge as the mains is loaded and voltage drops along the live and neutral cables. With a known baseline figure of typically 0.5V or more: if the neutral/earth voltage drops near zero we can conclude there is an earth/ neutral fault. Because eyePower is used exclusively in environments where neutral and earth are bonded at the building intake, neutral/earth measurement also identifies live/neutral reversals or other earthing problems.

Ideal AC mains would have no DC component but electrical equipment can draw power unevenly due to design or a failure. The resulting DC voltage imposed on the mains supply may be a clue to faulty equipment, but more importantly DC on the mains can saturate transformers in linear power supplies. This causes transformers to hum and overheat with increased risk of failure.

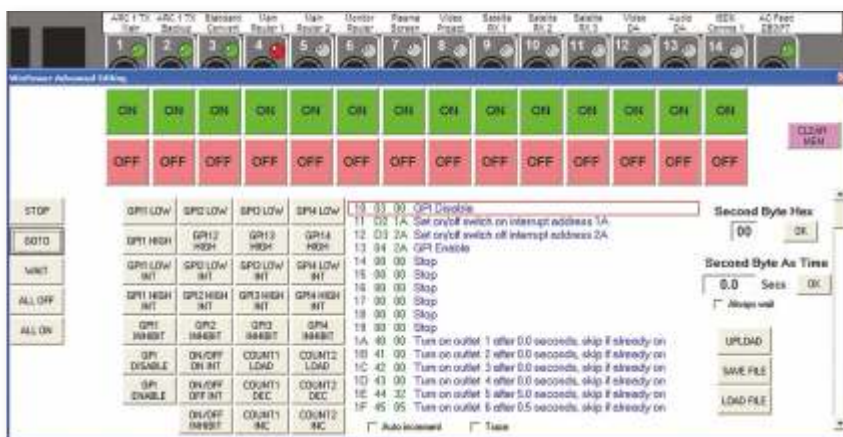




**Measuring Outputs** - eyePower senses individual fuse failure and also checks relay operation for each outlet, allowing detection of faults when an outlet is turned on or off. This requires 28 measurements just for mains presence, but employs advanced circuitry that uses less total power than competing units measuring one output.

Overall and optional individual channel output current uses sensitive current transformers that allow non-invasive current measurement with remarkable resolution from milliamps to 70 Amps peak. Transformers are a better solution than cheap resistors in series with the output circuit, as resistors increase distribution resistance and heating with flawed overload performance. eyePower's current transformers dissipate 0.2% the heat of a typical current sense resistor and cannot interrupt the supply.

**Measuring the Environment** - eyePower supports Maxim 1-Wire® for multiple temperature and humidity sensors, optionally extending GPIOs beyond the four GPIOs already available on the unit, to support items such as access switches and smoke detectors. Temperature sensors are available as small devices that can be used to monitor heating issues at equipment level.

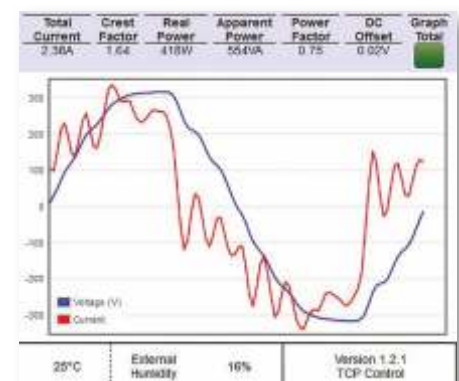


**Controlling Outputs** - The macro language to control outlets and GPIOs was well proven in the previous generation of eyePower Limited mains units. Routines can be customised to sequence on, cycle power, or load shed/restore according to changeover or UPS operation for example. Routines can be initiated according to GPI, serial command, TCP control or via the web browser. eyePower now treats the front panel switch as a GPI, allowing the unit to be programmed with a number of outlets

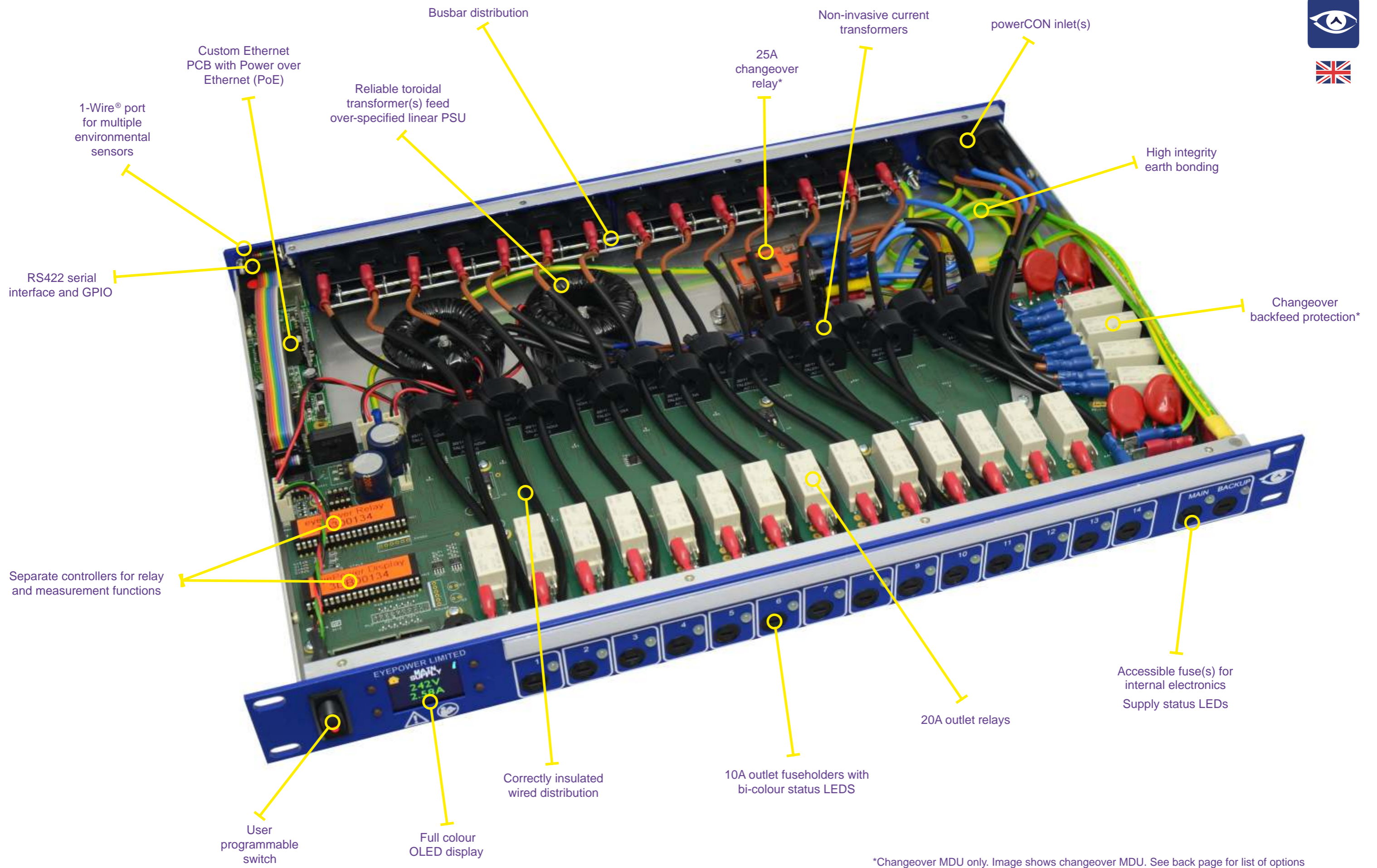
under front panel control while others are 24 hour or remote control powered. eyePower Limited PDUs with macro programming have been used to control installations varying from simple to highly complex, advice is always available to installers while the setup program is very easy to use.

### Graphical Interfaces - OLED, Windows, Web Remote Control - RS422, TCP/IP, SNMP

eyePower includes a front panel, full colour OLED display as standard for local monitoring. RS422 and 100Mbit/s Ethernet interfaces allow setup and control using eyePower Limited's Windows™ software, third party control systems such as BNCS or Skyline, the integrated web browser, SNMP or TCP data interrogation and control. The web browser interface is an example of eyePower Limited's commitment to graphically rich and informative user interfaces.



An example of non-ideal mains, eyePower installed by the European Commission, DG Interpretation (Brussels)



- 1-Wire® port for multiple environmental sensors
- Custom Ethernet PCB with Power over Ethernet (PoE)
- Reliable toroidal transformer(s) feed over-specified linear PSU
- Busbar distribution
- 25A changeover relay\*
- Non-invasive current transformers
- powerCON inlet(s)
- High integrity earth bonding
- Changeover backfeed protection\*
- Separate controllers for relay and measurement functions
- 20A outlet relays
- Accessible fuse(s) for internal electronics
- Supply status LEDs
- 10A outlet fuseholders with bi-colour status LEDs
- Correctly insulated wired distribution
- Full colour OLED display
- User programmable switch
- RS422 serial interface and GPIO

\*Changeover MDU only. Image shows changeover MDU. See back page for list of options

# Designed by engineers for engineers

**Build Quality** - Mains fault conditions can be destructive before fuses disconnect, so eyePower Limited PDUs exclusively offer wired and bus bar distribution. Printed circuit boards (PCBs) are used only for control circuits. This reduces resistance and self heating of the unit which should be as transparent as possible. Technical installations typically have high short circuit currents and, at lower overload currents, a fuse can usually carry three times rated current or nine times rated power for at least a minute. PCB mains distribution can be damaged with such overloads.

Internal wiring is fully 20 Amp capable with a 16 Amp powerCON inlet, there is no need for an inlet fuse or breaker which would offer limited fusing discrimination with the supply or outlet fuses.

Outlets are fully 10Amp capable to match the IEC sockets. Although eyePower ships with 3.15A fuses as standard for best fuse discrimination, users can uprate the fuse on installation. Some PDU manufacturers fit cheaper fuse holders and limit individual outlet current to 6 Amps, but these parts are still subject to power supply inrush current or 2000A of short circuit fault current.

Components are over specified for maximum reliability, for example 20A outlet relays on maximum 10A circuits. The main power supplies are rugged, linear units with low component count and a high safety margin. Innovative, energy efficient circuits are used to minimise power consumption and internal heating.

## All units offer

- 16A powerCON inlet and 20A distribution
- 14 x IEC outlets fused at 3.15A, 10A capable
- Reliable components including linear PSU
- Low energy consumption 5.5W (7.5W max changeover)
- Main supply measurements
  - live/neutral 2500Vpk
  - neutral/earth 2500Vpk
  - imbalance 1mA - 5Arms
  - frequency 45Hz - 65Hz
- Supply current 3mA - 70Apk
- Supply DC offset  $\pm 5V$
- Power measurements (real and apparent)
- Outlet fuse status detect
- Monitoring of internal temperature and PSU ageing
- Front panel full colour OLED
- Front panel user programmable switch
- Comprehensive macro language for sequence programming

## Options

- Changeover with backup supply, measurements as main, monitored backfeed protection
- Outlet relays with status detect
- Outlet current measurement 3mA - 70Apk
- RS422/485 with four GPIOs
- 1-Wire<sup>®</sup> interface for environment sensors temperature, humidity, smoke
- 100Mbit/s Ethernet with PoE backup to monitor during mains supply failure

## Specifications

- Basic resolution of 1mA, 0.1V, 0.1W or 1W load dependant, 0.01Hz
- Voltage and current accuracy 1% for sinewave, power 2% PF>0.8
- Accuracy percentage +3 least significant digits voltage/current, +10 LSD power
- Imbalance (earth leakage) common mode rejection 99.5%

Dimensions all models: 482.6mm wide, 43.65mm high, 405mm deep including cable tie bar.

**Complies fully with BS EN 62368-1 (Safety) and BS EN 61326-1 (EMC)**