MIRRIN Multi-Channel Battery Operated Load Logger

The ***MIRRIN Multi-Channel Battery Operated Load Logger*** (MLL) measures AC RMS current (load) up to four channels and is ideal for monitoring loads on circuits and switchboards to record load profiles and used to identify slow changing events such as long duration interruptions, outages and derive estimates of usage patterns.

Figure 1: MIRRIN with holster (left), MIRRIN with back plate and magnetic feet mounting (right)

The MLL is also useful as a diagnostic tool to assess load sharing on single phase circuits and load balancing on three phase systems. The MLL incorporates a Liquid Crystal Display (LCD) which shows the maximum current measurement in each channel together with the date-time stamp of its occurrence and therefore ideally suited as a Maximum Demand Indicator (MDI).

Key hardware features

- Log channels: Four current (standard) and two temperatures (optional).
- Logged data: RMS current for phases A, B, C and Neutral; current THD for phases A, B, C and Neutral; and two temperature channels.
- Current sensors comply with CAT IV 600V.
- Programmable logging interval, from one second.
- Programmable alarms: current and temperature channels. Alarm events listed in a table.
- Over ten years memory at ten minute logging interval (SD card included).
- Displays load current, maximum demand, temperature and maximum temperature with a date-time stamp for each channel.
- Battery (rechargeable) operated with power saving mode to extend battery life.
- External DC e.g. (a) battery, (b) dc power adaptor, (c) solar panel, and (d) USB port.
- Waterproof, rated at IP65. Suitable for indoor and outdoor applications.
- Communications with devices that incorporate Bluetooth or WiFi.
- Detachable accessories: Various flexible and clamp-on current probes; Ambient and surface temperature probes.

Analysis and reporting

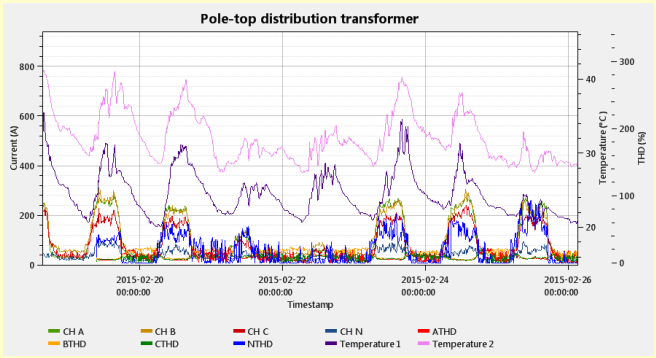

Figure 2: Profiling a distribution transformer - (a) phase and neutral currents; (b) current THD for phase and neutral; and (c) ambient and top oil temperatures

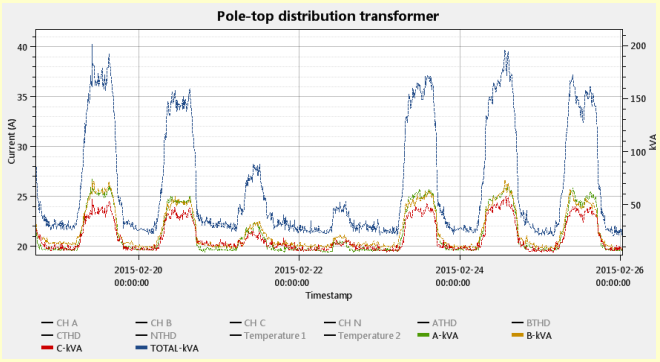

Figure 3: Profiling a distribution transformer - Estimating kVA for phases A, B, C and total

Key software (CITRUS) features

- The CITRUS software is easy to use and intuitive, and provides tools for analysing data and reporting.
- Diagnostics – shows battery voltage level.
- Power estimation (by entering a nominal supply voltage).
- Graphical features
  - Add title.
  - Individual selection of current and temperature channels.

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- Quickly change time and magnitude axes.
- Print function.
- Export PDF.
- Overlay multiple data files.

- Show data table and alarms.
- Export data file as a CSV.

Apps (CITRUS LITE)

- Android and iOS versions available.
- Provides measurements, graphical displays and options for downloading and emailing data files using Bluetooth or WiFi.

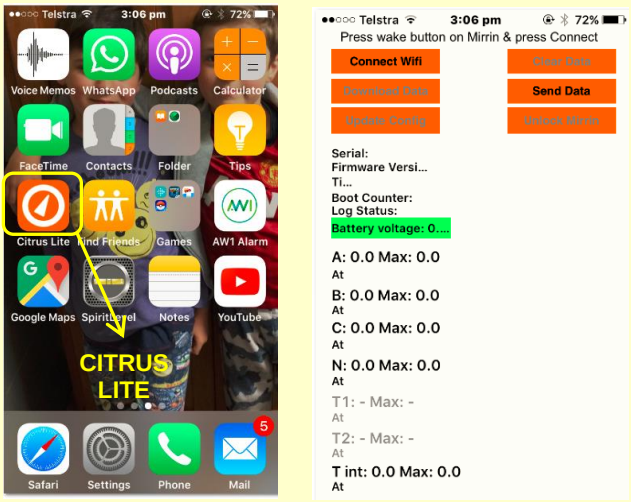

Figure 4: CITRUS LITE: (a) Installed on iOS, (b) Launched

Specifications

Input Channels	
Current Inputs (AC RMS)	4 channels - Phases A, B, C and Neutral
Temperature Inputs	2 x PT100 RTD (optional)
Communications	
Serial Data (standard)	TTL serial; Baud Rate: 230400
Wireless (optional)	Bluetooth or WiFi enabled
Sampling	
A to D Conversion	12 bits
Sampling Rate	1600Hz (1600 samples per second)
Instantaneous measurement	RMS aggregation of four cycles 250ms apart and updated every second
Maximum measurement	Based on the instantaneous measurements using a 60-second exponential time constant.
Logging	
Logged Data Memory	SD card, Over 10 years of data at 10 minute logging
Logging Interval	Programmable from 1 second
Measurements	Current (RMS), current THD, temperature, estimate of kVA
Accuracy	±0.5% (excludes current sensor)
System Accuracy	±1% (clamp-on current sensor)
Outputs	
Visual Tools	Graphical Interface
Data File	Mirrin format binary with CSV export
Visual Indicator	2 x Status LED
General	
Display	LCD: Time-stamped current, current (max.), temperature and temperature (max.)
Current Sensors	Flexible current probes or clamp-on current probes - Automatic detection
Battery Supply	Rechargeable Lithium
External Supply	5V dc adaptor.
Battery Life	Four months typical. Extended to twelve months in Power Saving Mode
Environment	
Use	Indoor and outdoor
Altitude	Up to 2000m.
Operating Temperature	-20°C to 70°C
Relative Humidity	80% for temperatures up to 70°C
Degree of Protection	IP65
Safety Category	IEC 61010-1,CAT IV 600V defined by CT
Electromagnetic Compatibility	
Emissions	AS/NZS CISPR 22: 2002 Class A
Immunity	EN61000-4-3:1995, including Amdt 1:1998
Physical	
Dimensions (H x W x L)	55 x 90 x 145 mm
Weight	400g (battery included)
Case Material and colour	Polycarbonate, moulded in light grey
Holster	Matte black