linc

Overview

The **Electrical 16-channel Node** is an energy meter, power quality monitor and spectrum analyser. Simultaneous monitoring of up to 16 circuits across 1/3 voltage phases. Real time, time-synchronous data at 1 second intervals.

Plug-and-play installation with clamp-on sensors. Built-in wireless connectivity over Wi-Fi, Linc Mesh and optional cellular LTE.

Suited for industrial, commercial, residential and grid applications.

Data Reporting

Voltage

Physical connection (1/3 phase. Y:L-N):
- Wired, clamp or magnetic connections for L1, L2, L3 and N.
- Associate any voltage phase to any current input channel.
- 3-phase voltage and neutral inputs calibrated to ±0.2%.

Parameters:
- RMS (L1: 100-277V, L2/L3: 0-277V)
- Waveform peak (V_{peak})
- Crest Factor
- Harmonic Distortion (THDf, THDr)
- Spectrum (1 Hz granularity for all inter/harmonic values up to 2048 Hz).

Line Frequency

- Measured on L1 (range: 45-67 Hz)
- Transient statistics (every 10 AC cycles):
    - Min / Max
    - Standard deviation

Current

Clamp-on Sensors (up to 16 circuits):
- Current transformers (up to 400A, ±0.5% accuracy).
- Flexible Rogowski Coils (up to 5000A, ±0.5% accuracy). Direct connection, no integrator or power supply needed.
- All 16 current inputs calibrated to ±0.2%.

Parameters:
- RMS (up to 5000A)
- Waveform peak (A_{peak})
- Crest Factor
- Harmonic Distortion (THDf, THDr)
- Spectrum (1 Hz granularity for all inter/harmonic values up to 2048 Hz).

Energy

- Independent metering of imported and exported energy (Wh).
- Metering functionality continues even if the network is offline.
- Accuracy: Class 1.0

Network

- Signal quality metrics (dBm):
    - RSSI (Rel. Signal Strength Indicator)
    - RSRP (Ref. Signal Received Power)
    - RSRQ (Ref. Signal Received Quality)
    - SINR (Signal to Interference plus Noise Ratio)

Power

- Individual power monitoring for every current channel and associated phase.
    - Active Power (W)
    - Reactive Power (var)
    - Apparent Power (VA)
    - Power Factor

Connectivity

- Integrated wireless modules:
    - **Wi-Fi**: Standard 2.4 GHz network.
    - **Linc Mesh**: Self-organising network for in-building connectivity between Linc nodes sharing data or internet.
    - **Cellular** (optional): LTE-M (Cat-M1) and NB-IoT (Cat-NB2) support with insertion of a standard SIM card.
- Typical >99% network uptime.
- End-to-end data encryption over TLS.

Data Handling

- Real time (sub-second) data delivery.
- Time synchronisation with NTP server every 10 mins. All Linc nodes within 1s.
- Configurable reporting intervals (1/60s).
- Selectable parameters to suit use-case. Optional min/max for 60s intervals.
- Flexible data handling modes: **Platform** (storage, visuals, alerts and analytics), **Relay** (MQTTS transfer), or **Local** (on-site access).

Installation

Mounting

- Direct mount on DIN rail (IEC 60715)
- Wall mount (hole separation: 108mm)

Current sensors

- Clamp sensors on to individual current-carrying wires or bus-bars.
- Arrow marking on Current Transformer (CT) and Rogowski Coil (RC) indicates positive current flow towards load.
- Built-in RC support. No additional integrator or power supply needed.

Power supply and voltage sensing

- Connect voltage (L1) and neutral (N) to supply power to the Linc node.
    - 100-277V at 50/60Hz
    - Peak draw: 3W
    - Nominal draw: 1.5W
- For poly-phase sensing, connect L2/L3.
- Available clamp and magnetic contacts.

Configuration

Remote

- Full support for remote configuration.
- Over-the-Air (OTA) firmware updates.

On-site

1. Press setup button. LED will blink green while in setup mode.
2. Connect your mobile device to the node over Wi-Fi (Linc_ _ _ _).
3. Browse to **http://linc.home**
4. Follow on-screen steps to configure.

For **factory reset:** press button for 10s.

LED states

- <u>Breathing</u> pattern: Normal operation.
    - **Blue**: Connected to server.
    - **Orange**: Connected to local host.
- <u>Blinking</u> pattern: System process.
    - **Green**: Setup mode active.
    - **White**: Scanning for network.
    - **Red**: Waiting for internet access.
    - **Magenta**: Booting up.
    - **Yellow**: Downloading firmware.

Operational Environment

- Temperature range:
    - From -40°C to +80°C.
- Humidity range:
    - From 0% to 95%, non condensing.
- Ingress protection:
    - IP X0 (IEC 60529)
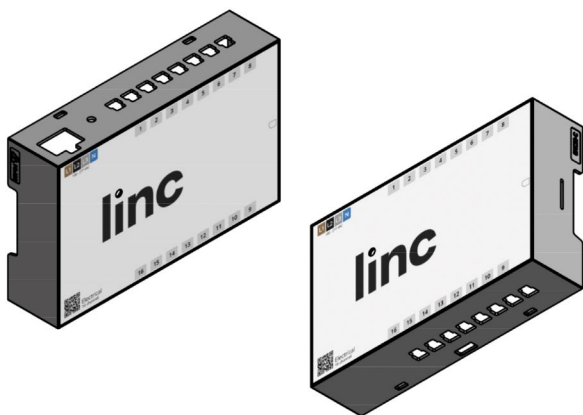- Altitude:
    - Up to 4000m

Compliance

- CE Marking
    - EMC: EN 301489-1, EN 301489-17, EN 61326-1, FCC 15B/2015, ICES-003 Issue 6/2016
    - RED: EN 300328
    - RF: EN 62311
    - Safety: EN 61010-1, EN 62368-1
    - RoHS: 2011/65/EU

Mechanical

Enclosure

- Dimensions: 142 x 90 x 32 mm
- Weight: 170g (180g with LTE)
- Material: Self extinguishing Blend PC/ABS

Schematic