



GridKey MCU318 Datasheet



Unlocking the smartgrid

A collaboration between Lucy Electric and Sentec

Why choose the GridKey MCU318?

GridKey is a custom designed continuous monitoring solution for low voltage (LV) networks. It consists of a number of current sensors on each feeder together with voltage taps, connected to a Metrology and Communications Unit (MCU) which processes the sensor data and generates and logs substation loading and condition parameters.

This information is relayed to a cloud based data centre where the data is securely stored, analysed and displayed. Substation performance and feeder cable condition can be analysed via our customer web portal.

The GridKey MCU318 LV monitoring system is designed specifically to offer a flexible and highly configurable information system with the following benefits:

- Safe and easy retrofit solution for installations indoors and out – lightweight and compact with no interruption of customer supply
- Built to be weather resistant – IP54 rated; meeting relevant electrical standards for external and internal substation use
- When used with SlimSensor modified Rogowski sensors the system provides class 2 metering accuracy – on three phases of up to 6 feeders
- Comprehensive reporting of substation feeder and calculated busbar parameters, giving better information to drive evidence based decision making for grid management
- Compact design allows the system to be fitted internally within LV cabinets reducing the risk of theft or vandalism. A built-in GPRS modem and antenna provides reliable communications
- A secure Wi-Fi connection to the unit is provided to allow configuration and testing whilst installing
- GridKey are able to supply a cost effective roaming SIM card, which forms a secure data link with the GridKey data centre. These can be soldered directly onto the PCB to improve security and reliability.

The customer can choose to configure and generate alert messages that would be sent via the data network system for multiple grid measurement states, for example to provide indications and warnings of any over or under voltage currents.

The information and alerts provided enable network managers to make evidence based decisions and plan effectively for future preventive maintenance and capital expenditure.



The Metrology and Communications Unit

The MCU318 continuously and accurately measures and calculates a wide range of grid condition data including:

- Busbar min / max / averaged voltages
- Minimum, maximum and rms current and phase angle for individual phases per feeder
- Active and reactive powers per feeder
- Stores calculated values and alarms for up to 180 days.

The MCU318 is fully configurable at installation time via a Wi-Fi link with a laptop or via Android and IOS apps. Parameters that can be set include:

- Substation identification and location information
- The feeder connections used
- The reporting intervals and alert message settings
- Measurement parameters.

When using the phone/tablet apps the GPS co-ordinates are automatically passed to the unit and onto the data centre allowing the location of the MCU to be accurately displayed on a map.

At any point in operation, the data reporting and alert messaging settings for each MCU can be individually re-configured remotely via its network interface. The operator can select the MCU measurement reporting interval from 1 minute, 10 minute or 30 minute periods as needed.

Over-the-air software update capability is provided as standard to allow updates to the capabilities of the system without the need to visit the substations.

Additional Modules

The MCU318 has been designed to allow additional functionality to be added by the simple addition of internal modules fitted to existing connectors on the main circuit board. At present two of these modules are in development:

- Ethernet module – a 100MB interface is provided together with an additional processor compatible of outputting the data using standard protocols such as MODBUS and DNP3
- I/O module – providing a range of serial and discrete connections:
 - One-wire bus for sensing temperature (maximum of 4 sensors)
 - Additional one-wire bus which can be used for sensing or reconfigured to provide R5232/R5485 serial interface
 - 4 discrete inputs
 - 2 discrete outputs

In addition an isolated 5V supply is also provided to give pull-down/ pull-up indications

Metrology

Measurement Standards	Class 2 in accordance with EN 62053-21 when used with Slimsensor current sensors
Electrical safety standards	EN 61010-1: 2010, with corrigendum May 2011 EN 61010-2-030: 2010
Over voltage	300V rms category IV. pollution degree 3
Current measurement range	Accurate up to 720 A AC per feeder phase No damage at any over-current condition
Operating voltage and measurement range	230V AC + 15%. -20% rms phase to neutral
Line frequency	50Hz (nominal)

Protection, Environmental & Compatibility

IP Rating	IP54
Electromagnetic compatibility	EN 61000-6-2 immunity EN 61000-6-4 emissions
Surge protection	IEC61000 6kV
Operating temperature range	-20°C to 55°C (<93% RH, non-condensing)
Storage temperature range	-25°C to 70°C
Altitude	Up to 2000m

Mechanical

Size (h x w x d)	300mm x 245mm x 80mm
Weight	1.35 kg
IP category	IP54 IEC 60529
Impact	EN 62262 IK08
Power	Power from single phase only, 6W typical, 11W maximum (GPRS enabled)
Communications interfaces	GSM/GPRS quad band 850/900/1800/1900 MHz Any network SIM can be provided by customer

GridKey is a collaboration between Sentec, the smart grid and metering specialists and Lucy Electric, experts in the design, development, manufacture and integration of a wide range of sensor and data exploitation systems.

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