Three-phase electronic energy meter for ñsmart-meteringò applications

E2M is an electronic multi-functional energy meter designed to measure and record the electric quantities on three-phase power lines. GSM/GPRS module, 10/100BaseT Ethernet interface and local RS232/485 communication port are integrated into the E2M device.

These hardware resources and the usage of standard TCP-IP based protocols make E2M the ideal device for both complex WAN networks and simple stand-alone applications where a reliable and accurate metering tool is required to monitor and record energy consumption.

The most important goals reached by E2M are reduced costs, improved reliability, fast problem response, simple integration, expandability, high-level communication interfaces, accurate measurement performances, web based management, making it suitable for load profiling, billing analysis, energy-saving assessment.

E2M can detect voltage dips and interruptions, thus allowing an assessment of the power-quality over the networks.

General features

- 4 voltage channels with common neutral
- 3 insulated current channels
- Standard version for direct insertion
- Optional version for external CT/5A
- True RMS measures
- Measures over IV quadrants:
  - Active and Reactive Power
  - Bidirectional Active Energy
  - Bidirectional Reactive Energy with split according to phase angles
  - Short and Long Voltage interruptions
  - Under and Over Voltage
- Load profiling measurement (69 days of autonomy using 15min integration period)
- Current and future tariff plan with up to 4 different tariffs, in accordance with AEEG profiles
- Accuracy:
  - Class 1 for active Energy (class 0.5 on request)
  - Class 2 for reactive energy
- Back lighted LCD display (2 rows x 16 columns) + 2 scroll page buttons
- N. 2 pulse led outputs (active/reactive energy checking)
- N. 2 programmable digital outputs
- N. 2 programmable digital inputs
- Communication interfaces:
  - RS232/RS485 serial line
  - 10/100BaseT Ethernet interface (option)
  - GSM/GPRS module (option)
  - Acquisition module from ES pulse emitter (option)
- Protocol: Modbus RTU / Modbus over TCP
- Real time clock/calendar (10 years life by Lithium battery)
- Web remote access through common web browser

Technical specifications

E2M

Measurements circuits

- Nominal Voltage Vn:
  - 3x230/400 Vac for direct or semi direct insertion
  - 3x100 Vac for indirect insertion
- Direct insertion on LV networks:
  - Base current Ib: 10Aac
  - Maximum current Imax: 60Aac
- Semi direct or indirect insertion on LV networks:
  - Base current Ib: 1Aac
  - Maximum current Imax: 5Aac
- Permanent overload: 1.2Vn; 1.2Imax
- Measurement channels impedance:
  - Voltage: 1MOhm
  - Current: negligible

50/60 Hz networks measures

- Phase-Neutral / Phase-Phase Voltages
- Phase currents
- Active Power ,reactive and apparent power
- Cosū and PF
- Consumed and generated active energy
- Consumed and generated reactive energy: four quadrants
- Frequency

Accuracy

- Active energy: class 1 (class 0.5 on request)
- Reactive energy: class 2

Power supply

3x230 Vac or 3x100 Vac ± 20%

Operative temperature range

-20 +60 ^{o}C

Reference standards

- IEC 62053-21 ï Class 1 active energy
- IEC 62053-23 ï Class 2 reactive energy
- IEC 62053-31 ï Pulse output devices
- IEC 62053-61 ï Power consumption and voltage requirements

EMC

- Immunity: EN61000-6-2
- Emissions: EN61000-6-4

Applications

E2M is extremely easy to use. The user has not only a complete monitoring device, but also a real measuring instrument and electricity meter class 1. Typical applications are:

- SUB METERING: used in parallel with main energy meters, E2M allows a real-time monitoring of data consumptions, before knowing official invoice information given by the energy distributor.
- POWER QUALITY: analysis of the low voltage network anomalies LV (interruptions, overvoltage, undervoltage).
- PV SOLAR PLANTS: measuring and balancing of produced solar energy.
- COMPENDIUM: industrial monitoring for measures and energy cost analysis and their subsequent optimization; verification of electrical machines yields.

Software

The IeSWeb software system is a web based application that allows to manage remotely E2M devices networks from a central station, collecting data automatically or manually and recording them into a standard SQL data base.

IesWeb allows to analyze stored data, creating graphs, tables, historical trends and statistical reports. Itôs also possible to export data to other computer systems in standard file types (i.e. XLS, CSV, PDF).

EliteSQL software is available for local data analysis. It can interface with E2M devices and provide reports and graphs of energy consumption.

E2MCom software is provided as a support tool, in order to program operating parameters of the device.

TW-TeamWare Srl
Via Pindaro, 19
20128 Milano - Italy
Tel. +39 02 27003261
Fax +39 02 27007753
email tw@teamware.it
web www.teamware.it