ASD

Automation Systems and Diagnostics

Integrated Systems Design and Development

Substation Remote Metering And Control System

Substation Remote Metering And Control System

In an attempt to overcome a lot of financial and technical obstacles, substations try to achieve several management and control techniques. One of those is the substations automated information system for remote metering. This system aims at enhancing reading accuracy, energy monitoring and billing process; as well as, revenue, collections and cash flow.

Automation System and Diagnostics Inc. based in NC, USA and Automation System and Diagnostics Sarl, based in Khaldeh, Lebanon, offers you the main part of this system. A leader in the field of power systems diagnostics and automation, ASD has successfully integrated hardware technologies and software algorithms and continues doing so.

INTRODUCING THE MEASUREMENT AND STORAGE UNIT (MSU)

MSU is a programmable three phase electronic meter used to measure the outgoing energy from MV feeders' switch gears in the main substation. It is capable of measuring and storing data in a non volatile flash memory at adjustable time intervals, varying from 1 to 60 minutes.

MODES OF OPERATION

The meter has two operation modes: local data retrieval and remote data retrieval modes.

The normal operation (local mode), you can have direct control over the meter functions using the front panel keypad and through the internal microprocessor software you see on the LCD. The meter automatically saves data as mentioned previously.

On the other hand, during remote data retrieval, the MSU displays "REMOTE MODE" and disables all manual functions. The data can be retrieved by the substation PC or by the main control center PC and stored in an access database accessible by the standard software packages: MS access, VB….

The meter may be read either visually, or by telemetry via laptop interface or via the RS 485 network that connects the meter to the local substation PC. All configuration parameters could be set either manually or remotely from a laptop (via RS 232 or an optical port), or a PC (via RS 485). The user can set up the meter ID, update interval, scaling factor, date and time.

DISPLAYING / CLEARING FAULTS

The meter has four LEDs with different colors and indications:

- Power LED (Red): Indicates that the meter is powered up.
- TX/RX LED (Red): Indicates that communication is in progress.
- Fault LED (Orange): Indicates that a warning message or error occurs.
- Sampling LED (Orange): Indicates that current or voltage signal sampling is in progress.

MSU controls the proper operation of memories, electronic circuits, display, failure of voltage or current circuits and battery replacement. It shows a code error in case of failure of one of them. The user can check the meter status for errors/faults any time.

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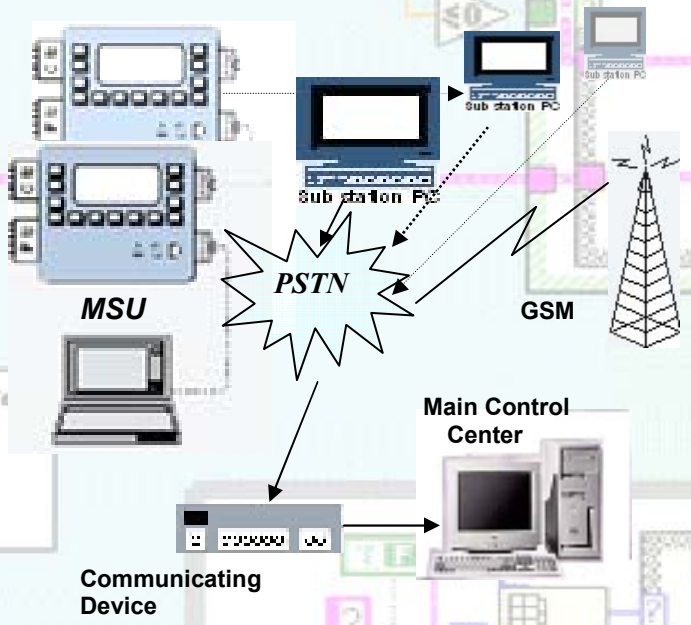
The meter status checks a list of parameters:

- Battery
- Voltage balance
- Current balance
- Transducer
- Flash memory
- Power direction
- Balance
- Supply interrupt

More parameters can be easily added to the list when required.

SYSTEM ARCHITECTURE

All the data gathered from MSUs by the substations' PCs shall reach the main control center PC through the public switched telephone network or via GSM communication.



DISPLAYED FUNCTIONS

The following functions can be displayed at any moment on the meter display using the keypad:

- Active energy (KWH)
- Reactive energy (KVarH)
- Maximum Apparent power (KVA max) reached every month with the date and the time of the measured value
- Maximum Active power (KW max) reached every month with the date and the time of the measured value
- Maximum Reactive power (KVar max) reached every month with the date and the time of the measured value
- Maximum and minimum cosØ reached every month with the date and the time of the measured value
- Instantaneous RMS voltage per phase
- Instantaneous RMS current per phase
- Instantaneous active power
- Instantaneous reactive power
- Instantaneous apparent power
- Instantaneous cosØ
- Power- transmit direction (import/export).

BACKUP OF SETUP PARAMETERS / MEASUREMENTS

In case of power failure, the instrument protects some setup parameters and measurements; due to the presence of a lithium battery.

- Meter Number
- Update Interval
- Date & Time
- Active Energy counters (+WP and –WP)
- Reactive energy counter (+WQ)
- Maximum Power (P,Q & S)
- Maximum & Minimum PF
- Instance of Maximum Power
- Instance of Maximum & Minimum PF

SYSTEM FEATURES

- User friendly (4 × 20) LCD interface
- I/P keypad for configuration and setting
- Water and rustproof shock resistant metal case
- Noise immune components
- Well shielded against interference from nearby radiations.
- Four indication LEDs
- Real time clock
- Lithium coin battery
- Four digital output pins/open collector type (+WP,- WP, WQ and one that can be used optionally as a pulse output or a fault output)
- High accuracy 0.2%

Substation Remote Metering System

- Easy and extremely flexible SET UP menu including scaling factor , value to the primary/ secondary ratio of transformers.

SYSTEM SPECIFICATIONS

MEASUREMENTS

- ***Full Measurement Set:***
  V, I, P, Q, S, PF, +WP, WP,+WQ, Max Power, Max/Min PF
- ***High accuracy measurement:***
  0.2 % for active & 0.5 % for reactive energy
- ***Exceptional Linear dynamic range:***
  Up to 500 VAC and 5 A

RECORDING

- ***Waveform Capture:***
  256 samples / cycle
- ***Simultaneous Recording***
- ***Triggering from any measured or calculated parameter***
- ***Long term trend data of all measured parameters***
- ***User selectable pre- and post-trigger times***
- ***Communication***
- ***Multiple Physical links:***
  Configurable RS 232/485 communication ports, optical port and variety of Ethernet Boards choices
- ***Display:***
  For local indication of three-phase measured parameters

OUTPUT PORTS

- Optically isolated RS232 or USB for laptop connection
- Optically isolated RS485 for substation meters network
- Dry contact pulse output pins for total KWH and KVarH.

SOFTWARE

- Windows based software tool, coupled to the system, manage the configuration and the analysis of multiple data

Data Transfer

- Recorded files are in binary format and can be transferred via serial or Ethernet connection

DIMENSIONS

- Height: 40 cm
  Width: 30 cm
  Thickness: 20 cm

STANDARDS AND REGULATIONS

The system conforms to international standards:
IEC 62053-22
IEC 61268
IEC 62056
EN 61000-6-2
EN 61000-4-2 / -4-3 / -4-4
EN 61000-4-6
EN 61000-4-11

CONTACT INFORMATION

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