Asset Management
Distribution Transformer Monitoring

AM10

- Rogowski: Pri: 50-100kA at 50/60 Hz Sec: 100mV/1000A @ 50 Hz
  - o Frequency: 20Hz - 5 kHz
  - o Accuracy: 1%

Voltage:
- 16 cycle resolution
- Accuracy: <0.5% error
- Range 0–600VAC P-P, P-N (with Aux supply) 58-500VAC P-P, P-N (without Aux supply)
- Abs Max: 650V for 1sec (with Aux supply). 600V for 1sec (without Aux supply)
- Burden < 6VA @ Vn

Temperature
- Digital sensor: 1-wire Digital thermometer
- Accuracy : +/- 0.5°C over -10 to +85°C

Other Parameters
- Frequency: +/-0.01Hz over 45-65 Hz
- Sag/Swell: 16 cycle resolution Records Duration/Magnitude for each period Programmable trigger levels
- Interrupts: 16 cycle resolution Records Duration/Magnitude for each period Programmable trigger levels
- Voltage Unbalance
- THD+N: +/- 5% relative error
- Harmonics: 1-32nd, +/- 5% relative error
- Power: W, var, VA +/- 0.5%
- Power Factor: +/- 0.5% over -1.000-+1.000
- Phase Angle: +/-0.5% over -180°-+180°

Logging
- User set logging period 1min-60min (Typ. 10min)
- Logged Parameters: Typ. 2 yrs data @ 10min log period. [Steady state Vrms, Sag/Swell, Interrupts, Frequency, Unbalance, THD, Irms, Phase Angle, Active/Reactive/Aparent Power]
- Logs are Time and date stamped.
- Ad hoc Parameters: Harmonics.

Displayed Values
- Live + Min and Max for the day so far, Average over a user set period, for [Vrms, Irms, Frequency, THD, Temperature, Active/Reactive/Apparent Power]
- System settings

Time and Calendar
- Accuracy: 15sec/month. Auto corrected during data collection
- Clock backup time: 5days without power

Communications
- LAN: WiFi to operate technicians software
- WAN: 3G cellular data to user set IP address and APN
- Data Drive: SD card

Calibration
- Input errors - Factory set

Power Supply
- External: 58-500V AC supply. Typ.3W Max.6W

Environment
- Storage temperature: -20 to +85°C
- Operating temperature: -20 to +80°C
- Humidity: 90%RH non condensing
- Enclosure IP54

Maintenance
- Configuration changes deployed remotely.
- Firmware Upgrade deployed remotely

Physical dimensions
- Input module: 80(W) x 110(H) x 120(D)mm
- Display + Input: 95(W) x 125(H) x 140(D) mm
- Input + Comms module: 550g
- Display + Input + Comms module: 650g

Specification:
IEC 61000-4-7 equivalent

AM10 Installation Software

Software
- OS: Windows XP and Windows 7
- Applications:
  - o storing, modifying, programming configuration settings
  - o Diagnostics
  - o Emergency data retrieval in the field.
- One-click synchronisation with master database (data and settings)

Scalability
- USB interface
- One Installation application for 1–10,000+ AM10's

Remote Power Manager Software (RPMS)

Scalability
- One server and database for 1-10,000 AM10's

Software
- OS: Windows XP and Windows 7

Function
- Large scale AMI/AMR capable
- Configuration: create, store, modify, deploy (over 3G)
- Data retrieval: periodic push from field; periodic pull from server; ad-hoc pull from server
- Data storage: internal network server
- Data processing: Calculated quantities [Power Factor,];

Simple graphs of parameters
- Data export: CSV, XML files; ODBC and SQL queries.
- Firmware upgrade: remote deployment (over 3G)
- Diagnostics

Security
- Multilevel access with Username/Password restrictions for reading/writing values.
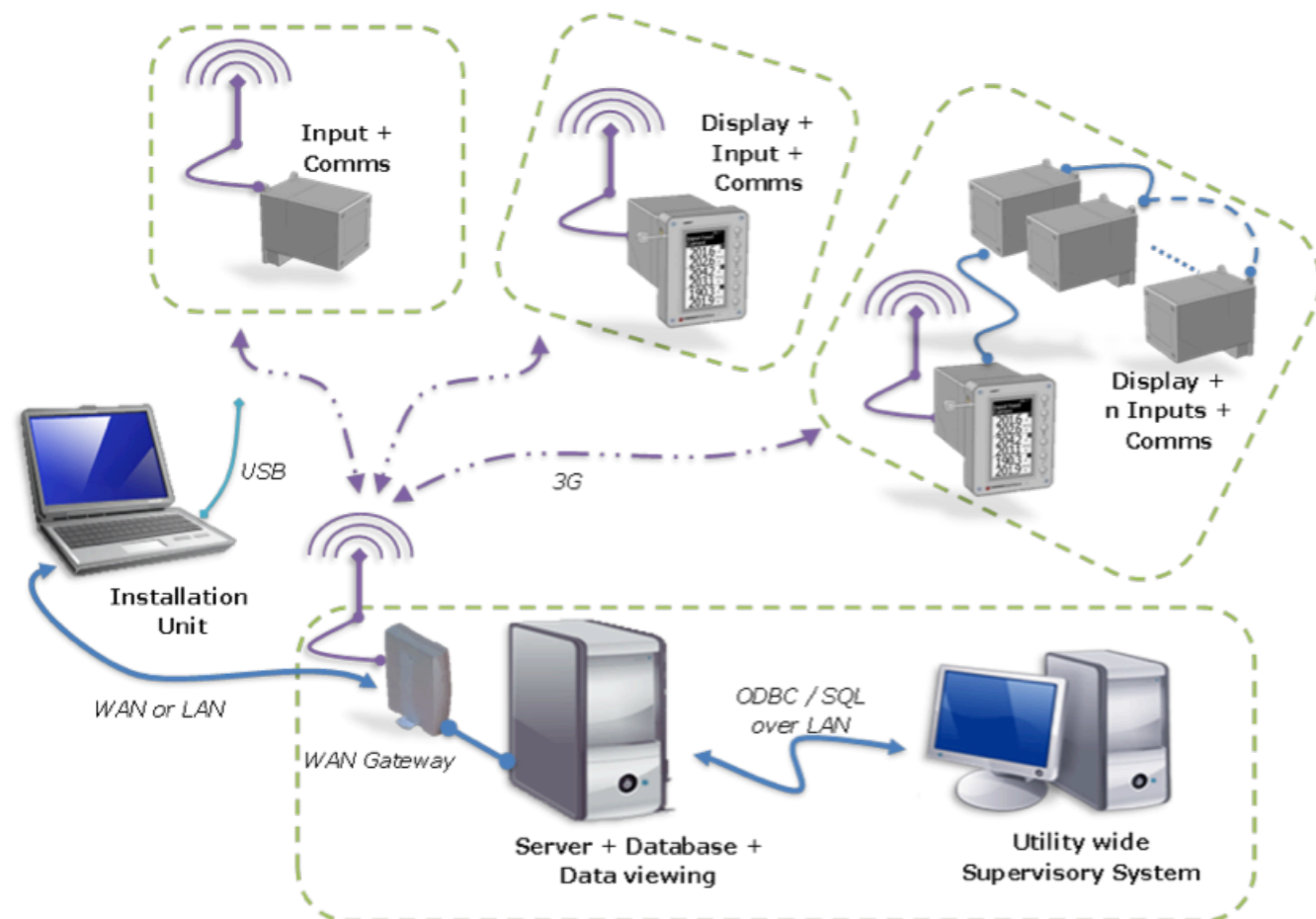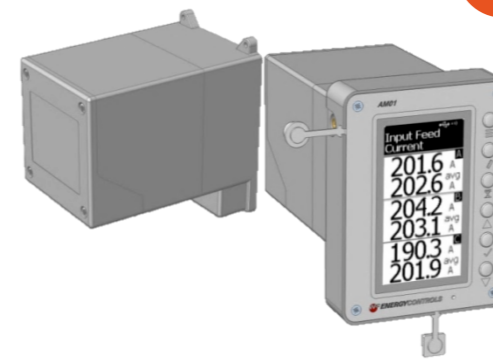
Figure 2: AM10 Input module (plate mount) and Input module with Display (panel mount).
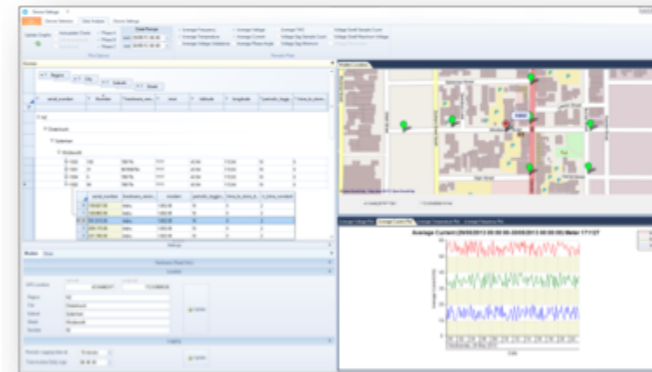

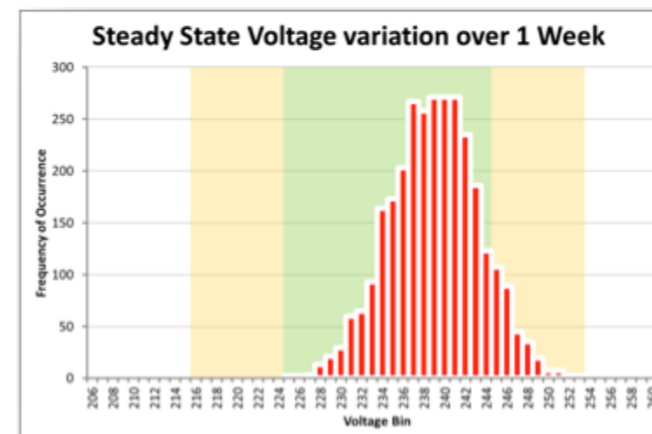Figure 3: Remote Data Management + Configuration.

Figure 4: Steady state voltage over 1 week of the year.
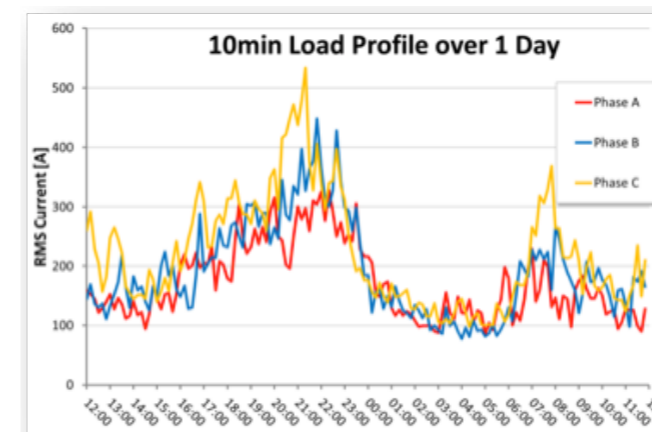

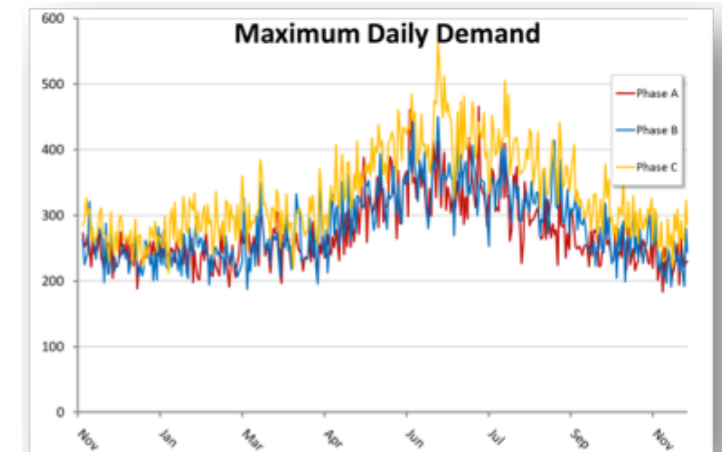Figure 5: 10 minute phase currents over 1 day of the year.
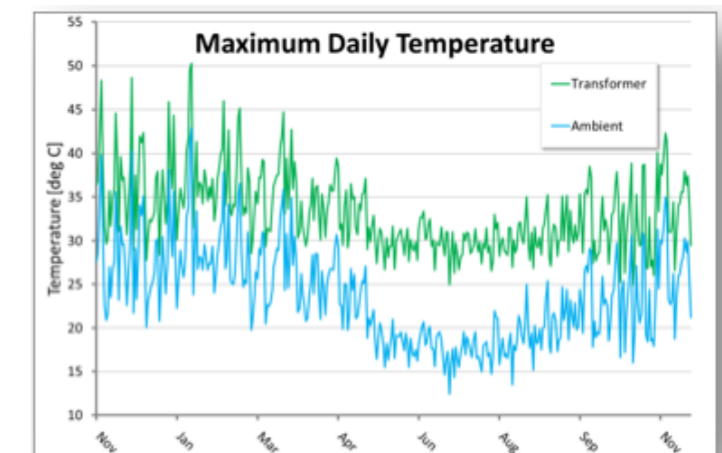

Figure 6: Daily maximum phase currents over 2 years.

Figure 7: Ambient (top) and Transformer (bottom) maximum daily temperature profiles over 2 years

SPECIFICATIONS

SYSTEM
- AM10(s); AM10 Installer; AM10 Manager software
- System supports 10,000+ AM10

Security
- data redundancy, (AM10 2yrs, Master database)
- data access restriction
  - o APN/ VPN private network

AM10
Measurements
- Class 0.5S
- 3P3W, 3P4W
- Standard Inputs: 3V+3I+N+2Temp.
- Terminals: 19mm2 Cu wire

Current
- CT: Pri:50-2500A Sec: 1/5 A
  - o Range: 1%-200%
  - o Accuracy: 0.5% (dependent on CT)
  - o Abs Max: 40A for 5sec, 140A for 1sec
  - o Burden: < 0.5VA/Phase