Data Sheet

SMARTPANEL X835-MID
96mm² Panel Mounted Multifunction Power Meter (MID Certified)

• MID B+D Certified by SGS UK
• Class C (0.5 % kWh) EC Directive 2004/22/EC
• Certified for Single & Three Phase
• Certified for Import / Export kWh
• Phase Summary Screen

SMARTPANEL X835-MID
Multifunction Power Meter

The SMARTPANEL X835 is a new generation modern design power monitor that will measure and display electrical power quality parameters. It has been engineered to cover most applications (Single Phase and Three Phase networks / Built in Pulsed and RS485 Modbus / Import and Export kWh), replacing the need for several different models of this power meter.

As the demand for MID certified meters has increased, we have obtained annex B and D of the EC Directive 2004/22/EC. This power meter has been tested and certified for single or three phase networks and import and export active energy (kWh).

The SMARTPANEL X835 is produced to the highest quality and utilizes the latest microprocessor and technology. It has a backlit display and 16 different measuring parameters. This includes a negative power reading to indicate reversal of CT installation or connection. With built in pulsed outputs and RS485 Modbus RTU it is fully compatible for integration with BMS and remote monitoring systems.

Parameters

- Phase to Neutral Voltage (V)
- Phase to Phase Voltage (V)
- Phase Current (A)
- Voltage Total Harmonic Distortion (U%THD)
- Current Total Harmonic Distortion (I%THD)
- Frequency (Hz)
- Power Factor (PF)
- Current Max Demand (MD A)
- Power Max Demand (MD kW)
- Active Power (kW)
- Reactive Power (kVar)
- Apparent Power (kVA)
- Import Active Energy (kWh)
- Export Active Energy (kWh)
- Total Active Energy (kWh)
- Import Reactive Energy (kVArh)
- Export Reactive Energy (kVArh)
- Total Reactive Energy (kVArh)
SmartConnect “Plug In” System

Our meter is designed to heavily reduce labour costs!
The SMARTPANEL X835-MID meter features cleverly engineered Plug-in terminals, allowing for a quicker, simpler installation process. The unit comes supplied with Terminal plugs for traditional wiring as standard, alternatively the unit can be supplied with wiring looms for a quick, error-free installation. Wiring looms are available in a variety of different lengths, and also can be custom-made to order in the UK for a quick turnaround.

Once the meter has been mounted within a 92mm² panel cut-out, and all plugs have been connected to the meter, the clip-in terminal covers can be attached to the back of the meter and sealed. This ensures that once the installation is completed, the wiring is tamper-proof and cannot be accessed again without breaking the seals.

Plug In Current Transformers

Three-in-one Current Transformers save space and money!
Three-in-one Current Transformers are particularly popular due to the ease of installation. The CT is clearly labelled so that it is installed the right way round, and the CT to Meter loom ensures an error-free connection.

Instead of purchasing three separate current transformers which takes up more space and uses considerably more cabling, which can be messy or time-consuming to tidy up, the three-in-one CT and loom can be installed in seconds.

Backlit Display

Ensuring the meter can be read at all times!
The display on the SMARTPANEL meter features a backlight, ensuring it can be clearly seen even in poor lighting conditions. The display also features graphs for visual representation of current load, clearly indicating if the system is under-performing, or if it is exceeding a safe load.

Comms Plugs

The SMARTPANEL X835-MID has Pulsed outputs and Modbus RTU built in, removing the need to purchase additional comms modules.

Touch-sensitive Buttons

The touch-sensitive buttons of the SMARTPANEL X835-MID make it easy to navigate through the various parameter screens. The meter also has a programming menu to configure the meter, this saves time in comparison to alternatives that require programming through modbus interrogation.

Voltage to Fuse Loom

Quick and easy to connect, no auxiliary!
The pre-made loom of the Voltage to Fuse loom clicks into the SMARTPANEL X835-MID meter and has open ends on the other end for connection to the appropriate fused breaker.

The SMARTPANEL X835-MID has an intelligent self-supplying auxiliary which draws power from any available phase connected, this guarantees that the meter stays powered and recording if one of the connected phases fails.

Voltage Daisy Chain

Cut down on fused terminals!
By using the Voltage to Voltage loom, you can reduce the number of fused terminals used on the installation. Up to 32 SMARTPANEL meters can be daisy chained from a single set of fuses.

Plug In Current Transformers

The three-in-one current transformers are available at a wide range of primary ratings as well as different window sizes, such as: 15mm x 25mm (25mm Centres); 21mm x 25mm (35mm Centres); 32mm x 27mm (45mm Centres); 52mm x 40mm (70mm Centres).
Specifications

Measured Parameters
The unit can monitor and display the following parameters of a Single Phase Two Wire (1P2W), Three Phase Three Wire (3P3W) or Three Phase Four Wire (3P4W) system.

Voltage and Current
- Phase to Neutral Voltages 100 to 276V AC (not for 3P3W supplies).
- Phase to Phase Voltages 174 to 480V AC (3 Phase supplies only).
- Percentage total Voltage Harmonic Distortion (U THD%) for each Phase to N (not for 3P3W supplies).
- Percentage Voltage THD% between Phases (3 Phase supplies only).
- Percentage total Current Harmonic Distortion (I THD%) for each Phase.

Power factor and Frequency and Max. Demand
- Frequency in Hz (45~66Hz)
- Instantaneous power:
  - Power 0 to 999MW
  - Reactive power 0 to 999MVAr
  - Volt-amps 0 to 999MVA
- Maximum demanded power since last Demand reset
  - Power factor
- Maximum neutral demand current, since the last Demand reset (for 3 Phase supplies only)

Energy Measurements

<table>
<thead>
<tr>
<th>Imported/Exported active energy</th>
<th>0 to 9999999.9 kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported/Exported reactive energy</td>
<td>0 to 9999999.9 kVArh</td>
</tr>
<tr>
<td>Total active energy</td>
<td>0 to 9999999.9 kWh</td>
</tr>
<tr>
<td>Total reactive energy</td>
<td>0 to 9999999.9 kVArh</td>
</tr>
</tbody>
</table>

Measured Inputs
Voltage inputs through 4-way fixed connector with 2.5mm² stranded wire capacity. Single Phase Two Wire (1P2W), Three Phase Three Wire (3P3W) or Three Phase Four Wire (3P4W) unbalanced. Line frequency measured from L1 Voltage or L3 Voltage. Three Current inputs (six physical terminals) with 2.5mm² stranded wire capacity for connection of external CTs. Nominal rated input current 5A or 1A AC RMS.

<table>
<thead>
<tr>
<th>Nominal Voltage Input</th>
<th>100-276V AC (Ph+N) or 174-480V AC (Ph+Ph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max Continuous Voltage</td>
<td>120% of Nominal</td>
</tr>
<tr>
<td>Nominal Input Current</td>
<td>0.25-5A(6)A AC RMS</td>
</tr>
<tr>
<td>Max Continuous Current</td>
<td>120% of Nominal</td>
</tr>
<tr>
<td>Nominal Input Current Burden</td>
<td>0.5VA</td>
</tr>
<tr>
<td>Frequency</td>
<td>50Hz ±10%</td>
</tr>
</tbody>
</table>

Accuracy

<table>
<thead>
<tr>
<th>Voltage</th>
<th>0.5% of range maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>0.5% of nominal</td>
</tr>
<tr>
<td>Frequency</td>
<td>0.2% of mid-frequency</td>
</tr>
<tr>
<td>Power Factor</td>
<td>1% of unity (0.01)</td>
</tr>
<tr>
<td>Active Power (W)</td>
<td>±1% of range maximum</td>
</tr>
<tr>
<td>Reactive Power (VAr)</td>
<td>±1% of range maximum</td>
</tr>
<tr>
<td>Apparent Power (VA)</td>
<td>±1% of range maximum</td>
</tr>
<tr>
<td>Active Energy (Wh)</td>
<td>Class 1 IEC 62053-21 or Class 0.5 IEC 62053-22</td>
</tr>
<tr>
<td>Reactive Energy (VARh)</td>
<td>Class 2 IEC 62053-23</td>
</tr>
<tr>
<td>Total Harmonic Distortion</td>
<td>1% up to 63rd harmonic</td>
</tr>
</tbody>
</table>
**Auxiliary Supply**

This unit does not require a separate auxiliary supply; the unit draws the necessary power from the voltage input connections. If a three phase supply is connected, and the phase that is powering the unit fails, it will change the phase supply to avoid shutting down.

**Interfaces for External Monitoring**

Three interfaces are provided:
- RS485 communication channel that can be programmed for Modbus RTU protocol
- Relay output indicating real-time measured energy (configurable)
- Pulse output 3200imp/kWh (not configurable)

The Modbus configuration (baud rate etc.) and the pulse relay output assignments (kW/kVAr, import/export etc.) are configured through the set-up screens.

**Pulsed Outputs**

The pulsed outputs are “passive type” and comply with Class A IEC 62053-31. The pulse output can be set to generate pulses to represent kWh or kVArh.

The Pulse Rate can be set as follows:

- 0.001 = 1 pulse per 1 Wh/kVArh (1000 pulses per kWh/kVArh)
- 0.01 = 1 pulse per 10 Wh/kVArh (100 pulses per kWh/kVArh)
- 0.1 = 1 pulse per 100 Wh/kVArh (10 pulses per kWh/kVArh)
- 1 = 1 pulse per 1 kWh/kVArh
- 10 = 1 pulse per 10 kWh/kVArh
- 100 = 1 pulse per 100 kWh/kVArh
- 1000 = 1 pulse per 1000 kWh/kVArh

The Pulse width can we set as 200/100/60 mS.

**RS485 Output for Modbus RTU**

For Modbus RTU, the following RS485 communication parameters can be configured from the set-up menu:

- **Baud rate**: 2400, 4800, 9600, 19200, 38400
- **Parity**: none (default) / even / odd
- **Stop bits**: 1 or 2
- **RS485 network address**: three digit number, 001 to 247
- **Response Time**: <100mS

**Reference Conditions of Influence Quantities**

Influence Quantities are variables that affect measurement errors to a minor degree. Accuracy is verified under nominal value (within the specified tolerance) of these conditions.

<table>
<thead>
<tr>
<th>Ambient temperature</th>
<th>23°C ±1°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input waveform</td>
<td>50 or 60Hz ±2%</td>
</tr>
<tr>
<td>Input waveform</td>
<td>Sinusoidal (distortion factor &lt; 0.005)</td>
</tr>
<tr>
<td>Auxiliary supply voltage</td>
<td>Nominal ±1%</td>
</tr>
<tr>
<td>Auxiliary supply frequency</td>
<td>Nominal ±1%</td>
</tr>
<tr>
<td>Auxiliary supply waveform (if AC)</td>
<td>Sinusoidal (distortion factor &lt; 0.05)</td>
</tr>
<tr>
<td>Magnetic field of external origin</td>
<td>Terrestrial flux</td>
</tr>
</tbody>
</table>

**Environment**

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>-25°C to +55°C*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage temperature</td>
<td>-40°C to +70°C*</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>0 to 95%, non-condensing</td>
</tr>
<tr>
<td>Altitude</td>
<td>Up to 3000m</td>
</tr>
<tr>
<td>Warm up time</td>
<td>1 minute</td>
</tr>
<tr>
<td>Vibration</td>
<td>10Hz to 50Hz, IEC 60068-2-6, 2g</td>
</tr>
<tr>
<td>Shock</td>
<td>30g in 3 planes</td>
</tr>
</tbody>
</table>

*Maximum operating and storage temperatures are in the context of typical daily and seasonal variation.
Mechanics

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>96 x 96 x 74mm (WxHxD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting</td>
<td>DIN 96 (92mm² Cutout)</td>
</tr>
<tr>
<td>Sealing</td>
<td>IP51 indoor</td>
</tr>
<tr>
<td>Material</td>
<td>Self-extinguishing UL 94 V-0</td>
</tr>
</tbody>
</table>

Dimensions

![Diagram showing dimensions of SMARTPANEL X835-MID]

Installation

**Single Phase Two Wire**

**Three Phase Three Wire**

**Three Phase Four Wire**

![Diagram showing different wiring configurations for single phase and three phase electrical systems]