

# Data Sheet

2017 v1.0

## SMART X96 -1-MID "Easy Click"

### 96mm<sup>2</sup> Panel Mounted Multifunction Power Meter

- MID Approved
- Class 0.5 Accuracy (Class C)
- Single & Three Phase
- Import / Export kWh
- Phase Summary Screen



## SMART X96-1 Multifunction Power Meter

The SMART X96-1 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.

For ease of installation, this meter features RJ12 connectors. This is the quickest, most efficient way of connecting the meter to the current transformer.

The SMART X96-1 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 SMART X96-1 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 92mm<sup>2</sup> 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.

## Backlit Display

Ensuring the meter can be read at all times!

The display on the SMART X96 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.



## 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.

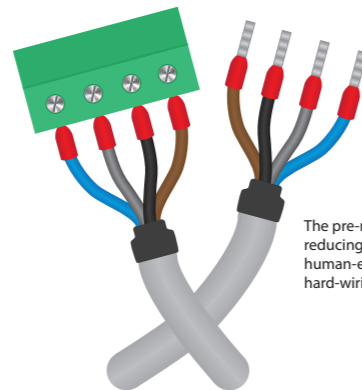
- L1
- L2
- L3
- N

## Voltage to Fuse Loom

Quick and easy to connect, no auxiliary!

The pre-wired plug of the Voltage to Fuse loom clicks into the SMART X96-1 meter and has open tails on the other end for connection to the appropriate fused breaker.

The SMART X96-1 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.



The pre-made looms are a proven method of dramatically reducing installation time, as well as eradicating potential human-error. The looms are a cost-effective alternative to hard-wiring the units.

## Comms Plugs

The SMART X96-1 has Pulsed outputs and Modbus RTU built in, removing the need to purchase additional comms modules.

## Meter to CT RJ12 Cable

Pre-wired looms ensure an error-free install!

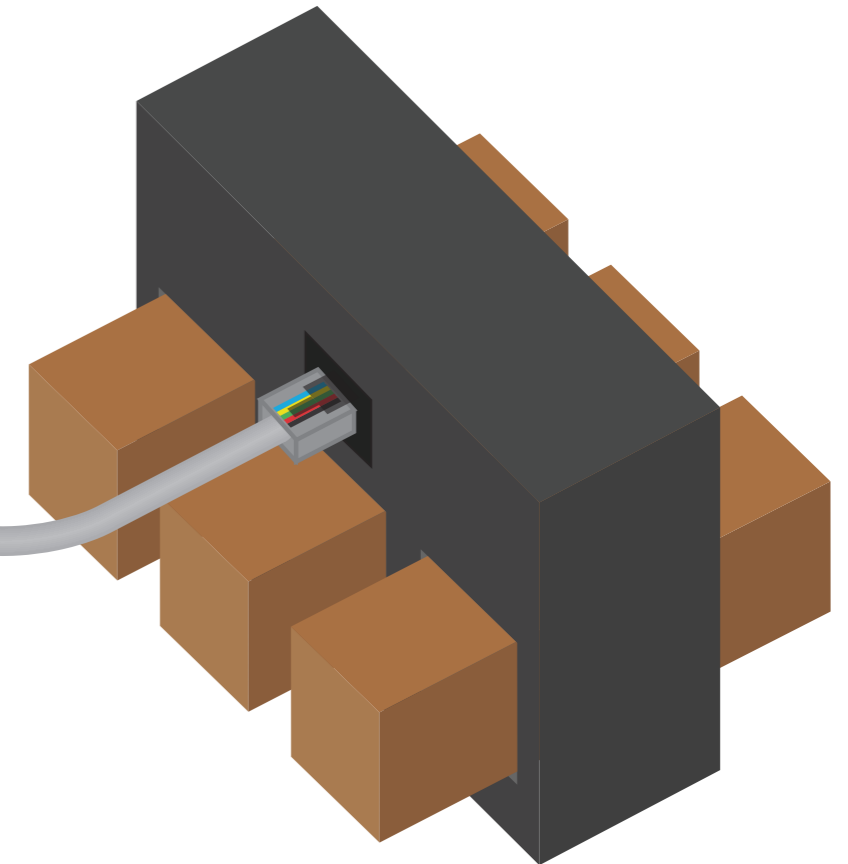
Instead of using traditional terminals, the RJ12 cable is a proven method of connecting the meter to the current transformer significantly quicker; eradicating human error.

## RJ12 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 RJ12 cable 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 cable can be installed in seconds.



## 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) and 52mm x 40mm (70mm Centres). Please request for a data sheet on the plug in transformers.

# 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

|                                   |                      |
|-----------------------------------|----------------------|
| Imported/Exported active energy   | 0 to 9999999.9 kWh   |
| Imported/Exported reactive energy | 0 to 9999999.9 kVARh |
| Total active energy               | 0 to 9999999.9 kWh   |
| Total reactive energy             | 0 to 9999999.9 kVARh |

## Measured Inputs

Voltage inputs through 4-way fixed connector with 2.5mm<sup>2</sup> 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 for connection of external CTs with RJ12 cable. Nominal rated input Current 100mA AC RMS.

|                        |   |
|------------------------|---|
| Nominal Voltage Input  | 100-276V AC (Ph+N) or 174-480V AC (Ph+Ph) |
| Max Continuous Voltage | 120% of Nominal                           |
| Nominal Input Current  | 100mA AC RMS                              |
| Max Continuous Current | 120% of Nominal                           |
| Frequency              | 50Hz ±10%                                 |

## Accuracy

|                           |                        |
|---------------------------|------------------------|
| Voltage                   | 0.5% of range maximum  |
| Current                   | 0.5% of nominal        |
| Frequency                 | 0.2% of mid-frequency  |
| Power Factor              | 1% of unity (0.01)     |
| Active Power (W)          | ±1% of range maximum   |
| Reactive Power (VAR)      | ±1% of range maximum   |
| Apparent Power (VA)       | ±1% of range maximum   |
| Active Energy (Wh)        | Class 0.5 IEC 62053-22 |
| ReactiveEnergy (VARh)     | Class 2 IEC 62053-23   |
| Total Harmonic Distortion | 1% up to 63rd harmonic |

## 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/kVArh, 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/VArh (1000 pulses per kWh/kVArh) |
| 0.01  | = 1 pulse per 10 Wh/VArh (100 pulses per kWh/kVArh) |
| 0.1   | = 1 pulse per 100 Wh/VArh (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.

|                                   |  |
|-----------------------------------|--|
| Ambient temperature               | 23°C ±1°C                              |
| Input waveform                    | 50 or 60Hz ±2%                         |
| Input waveform                    | Sinusoidal (distortion factor < 0.005) |
| Auxiliary supply voltage          | Nominal ±1%                            |
| Auxiliary supply frequency        | Nominal ±1%                            |
| Auxiliary supply waveform (if AC) | Sinusoidal (distortion factor < 0.05)  |
| Magnetic field of external origin | Terrestrial flux                       |

## Environment

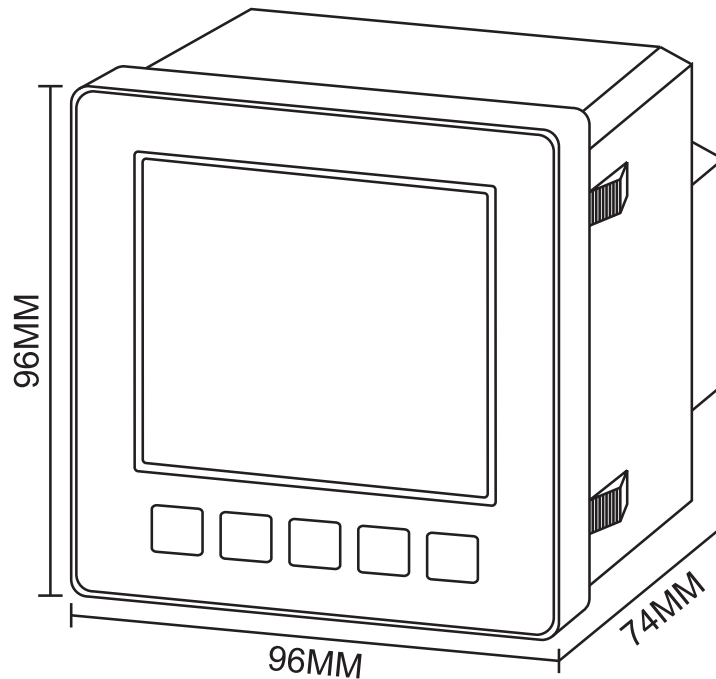
|                       |                                 |
|-----------------------|---------------------------------|
| Operating temperature | -25°C to +55°C*                 |
| Storage temperature   | -40°C to +70°C*                 |
| Relative humidity     | 0 to 95%, non-condensing        |
|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

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

## Mechanics

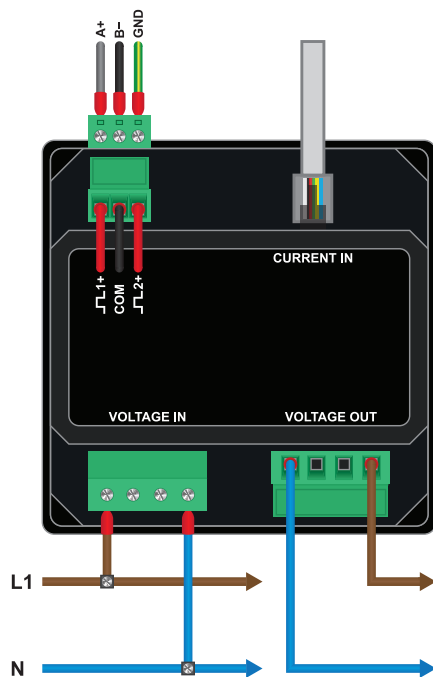
|            |                                   |
|------------|-----------------------------------|
| Dimensions | 96 x 96 x 74mm (WxHxD)            |
| Mounting   | DIN 96 (92mm <sup>2</sup> Cutout) |
| Sealing    | IP51 indoor                       |
| Material   | Self-extinguishing UL 94 V-0      |

## Dimensions



## Installation

Single Phase Two Wire



Three Phase Four Wire

