



# Installation Manual

## Orsis S2-M Single Phase Meter

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Page 1 of 16



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Version 3

Issue Date:

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Page 2 of 16

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## Document Control

Version	Date	Initials	Details
1.0	09/09/2014	MG	Initial version
2.0	24/11/2015	JB	Updated

## CONTENTS

1. Foreword
2. Warning
3. Compliance with Standards and European Directives
4. General Description
5. Connections
6. Meter Case
7. Installation
8. Fixing and Connection
9. LCD Display
10. S2-M Meter Connection Diagram
11. Display Item Instruction
12. Communications Items
13. Meter Commissioning Phase



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MAN23

Version 3

Issue Date:

21/06/2016

Page 3 of 16

**- Orsis (UK) advise the checking of mobile network signal levels at the equipment installation point as part of any survey, and also before installation.**

## 1. Foreword.

### HEALTH AND SAFETY

Compliance with Instructions in this Manual. The instructions and information in this manual are provided in compliance with Section 6 of the UK Health and Safety at Work Act, as amended by Schedule 3 of the Consumer Protection Act 1987. The purchaser is responsible for making sure that everyone, whether in his employment or not, who will be associated with the products supplied by Orsis (UK) Limited, and to which these instructions and information apply, are made familiar with the contents of this manual. This applies to all persons who may be involved in activities such as unpacking, inspecting, testing, setting, cleaning, installing, commissioning, operating, maintaining, decommissioning or disposing of the products.

### Safety of Persons using Electrical Products

Employers have a duty to ensure, as far as is reasonably practicable, the Health, Safety and Welfare at Work of all their employees. Employers must therefore ensure that employees are informed, trained and supervised and use proper working procedures to ensure the safety of themselves and others. The information provided in this manual is intended to ensure that products are properly installed and otherwise handled in order to maintain them in a safe condition. In the UK, employers have duties under the Health and Safety at Work Act 1974 and the various regulations stemming there from. In countries outside the UK, employers should ensure proper compliance with the Health and Safety Legislation that is applicable to them.

### Putting into Service

Products supplied by Orsis (UK) Limited have been designed and manufactured, in accordance with appropriate standards, to operate under specified conditions, when properly installed. The purchaser or delegated contractor is responsible for the "Putting into Service" of any Orsis (UK) Limited Systems products that have been supplied as "Non-connected". All related activities must therefore be carried out with due regard to any applicable legislation, standards and good practice.



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MAN23

Version 3

Issue Date:

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Page 4 of 16

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## 2. Warning.

### **Internal Electronic Circuits**

The internal electronic circuits of these meters are, due to technical necessity, connected to MAINS LIVE.

### **Removal of Terminal Cover**

All supplies connected to the meter should be isolated before any attempt is made to remove the meter terminal cover. Failure to do so may result in electric shock or death. Live parts will be exposed when the terminal cover or main cover is removed. The main cover is permanently fixed. It cannot be removed without destroying the meter.

### **Liquid Crystal Display**

Liquid crystals are toxic. If a display is damaged, avoid contact with the liquid. If the liquid makes contact with the skin it must be washed off immediately with water, then seek medical advice.

## 3. Compliance with standards and European Directives.

Meters are marked with the European CE mark, in accordance with the Marking Directive 93/68/EEC, to indicate compliance with the requirements of the EMC Directive 89/336/EEC. Safety requirements for meters are addressed in specific metering standards outlined below. The CE Mark does not denote compliance with the European Low Voltage Directive 73/23/EEC, which specifically excludes electricity meters. The S2-M meter measures active energy according to the requirements of EN 62053-21:2003 for indoor kWh meters of protective Class II and accuracy Class B. The degree of protection is to IP53, IEC 60529:1989. The meter complies with BS7856:1996 – dimensional requirements.



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**Version 3**

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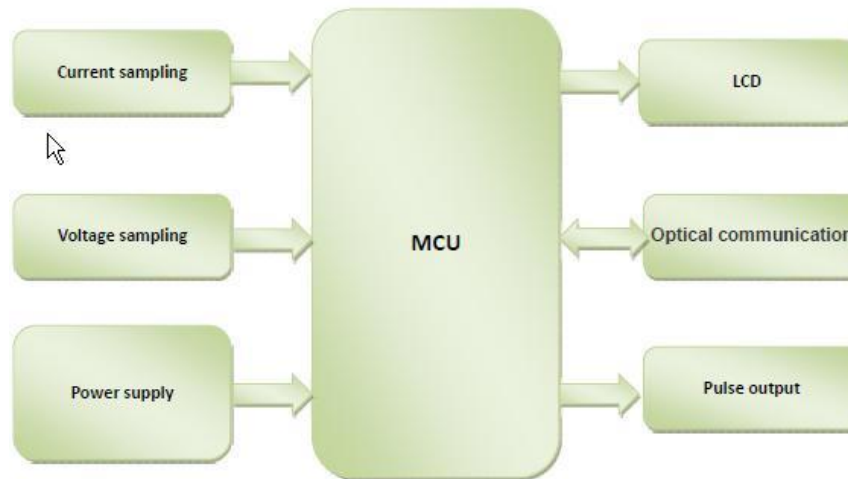
**Page 5 of 16**

## 4. General Description

The S2-M is a single phase meter for applications of up to 100A. The meter offers Accuracy Class B, communications and security data as standard.

### 4.1 Schematic

The S2-M single phase smart meter is furnished with a chip with hyper-scale digital signal processing capacity, registers of permanent storage and a high contrast, wide viewing angle liquid crystal display. The S2-M applies advanced technology like fully-isolated Optical communications and SMT. By using high-strength, flame retardant eco-friendly material for its case, the meter is characterized by excellent insulation strength and corrosion resistance, as well as its modern, beautiful, practical design.



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MAN23

Version 3

Issue Date:

21/06/2016

Page 6 of 16

## 5. Connections.

### Terminal Arrangements

Main terminals 8mm diameter bore, 2 x M6 cross/slot head combination screws. Auxiliary terminals 3.2mm diameter bore, M3 cross/slot head combination screws. Meter nameplates are marked with the rated current, reference voltage, frequency and relevant meter constant (for example pulses/kWh). Connection diagrams are shown inside the terminal cover.

## 6. Meter Case.

The main meter cover is fixed permanently to the base at manufacture. The case is double insulated to protective Class II. The case provides an ingress protection rating of IP53 in accordance with IEC 60529:1989. The base, with its integral terminal block is moulded in glass-filled polycarbonate.



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MAN23

Version 3

Issue Date:

21/06/2016

Page 7 of 16

## Single Phase Installation

### 7. Installation.

#### 7.1 Unpacking

Remove the meter from its packaging and inspect for damage. Check that there is no movement or loose parts within the meter enclosure. If damage has been sustained in transit, an immediate report and claim should be made to your supplier.

#### WARNING

Removal of the meter seal will invalidate certification. The meter type and rating must be correct for the intended application.

#### 7.2 Handling

Once removed from the packaging, meters must be treated with care and not subjected to excessive shock or mechanical vibration. Normal care should be taken to avoid marking or scratching the meter case and polycarbonate cover.

#### 7.3 Storage

If the meter is not required for immediate use, it should be returned to the original packing (including plastic bag) and stored in a clean, dry environment.

Storage temperature: -25° C to +85° C

Humidity: Annual mean 75% (for 30 days spread over one year, 95%)

#### 7.4 Installation Site

The installation site should be a dry indoor environment, and as far as is practicable, away from direct sunlight and free from mechanical shock and vibration.



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**Version 3**

**Issue Date:**

**21/06/2016**

**Page 8 of 16**



## 8. Fixing and Connection

### Notice

Installation must always be carried out by appropriately trained and qualified personnel in accordance with normal metering practice. The installer is responsible for the choice of connecting cables that must be appropriate for the voltage and current rating of the meter and for ensuring that the supply is properly fused. It is recommended that meters are protected by fuses equal to the meter rating. i.e. 100A fuse for a 100A meter. Failure to do so may result in damage or fire. Isolate all circuits before carrying out the installation. Refer to the connection diagram inside the terminal cover. Failure to comply with these instructions may result in damage and/or electric shock.

### To mount the meter on the meter board

Remove the meter terminal cover. Fix a 5mm dia. x 13mm long round headed wood screw into the meter board to accommodate the keyhole fixing aperture at the back of the meter. Leave the shank of the screw projecting from the board by 4.5 mm. Hang the meter on the screw and align it to be vertical. Secure the lower end of the meter to the board using two 5mm dia. x 13mm long round head screws through the lower mounting holes. Tighten screws sufficiently to prevent movement of the meter.

### Warning

Do not over-tighten the screws or the meter base may be damaged. For connecting to the large diameter terminals, strip back the cable insulation by 26mm. Fully insert cables into the terminals so that the insulation butts up into the counter-bored recesses in the bottom face of the terminal block. Tighten the M6 terminal screws to a torque of between 2.2N m minimum, 3.0N m maximum. Connections to rate select and/or pulsing output terminals should be completed with appropriately sized cable. The M3 terminal screw should be tightened to a maximum torque of 0.45N m.



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Version 3

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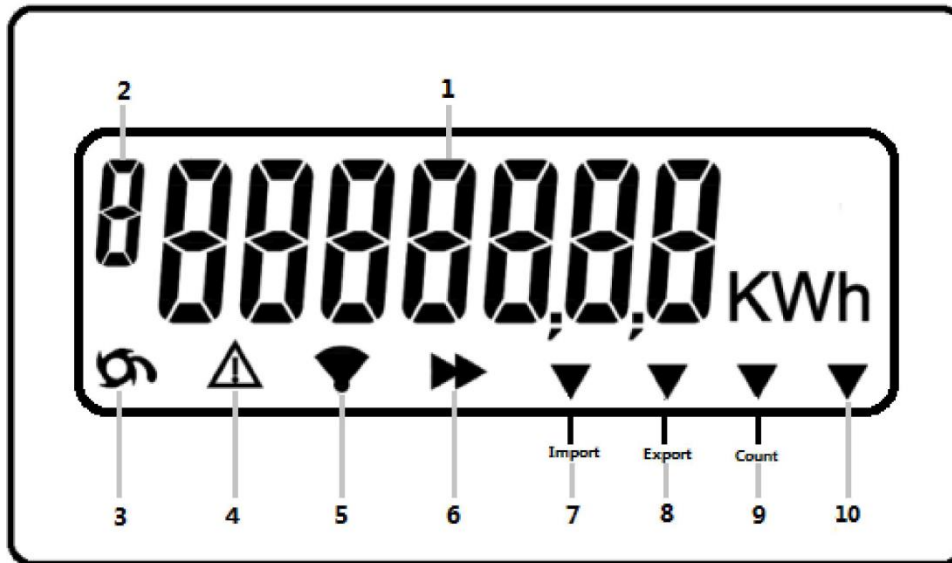
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Page 9 of 16

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## 9. LCD Display

The S2-M meter is fitted with a high contrast, wide viewing angle liquid crystal display with seven large digits (9.8mm x 3.5mm). The smaller digit (reference indicator) may identify the parameters being displayed. Seven chevrons identify displayed information. This identification is marked on the nameplate. Typical display sequences and a list of displayable data are shown as below.



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Version 3

Issue Date:

21/06/2016

Page 10 of 16

### Display indicators

No.	Display in LCD	Indicator
1		Number display
2		Display page
3		Reverse Run Indicator
4		Error/Alarm
5		Wireless Communications available
6		On optical communications
7		Energy flow – Import
8		Energy flow – Export
9		Counter
10		On wireless communications

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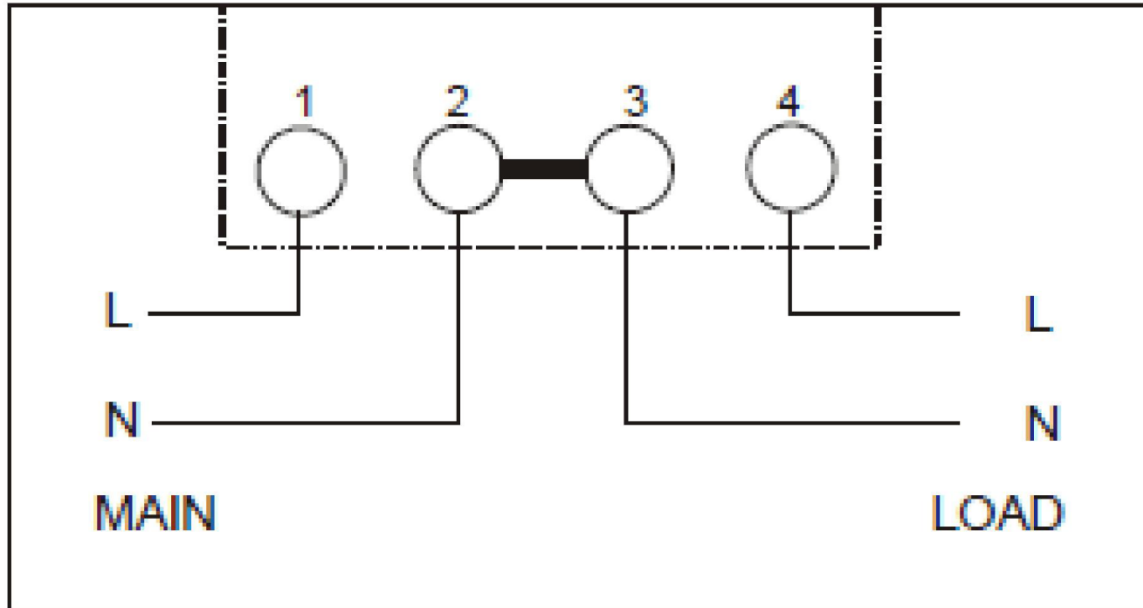
Issue Date:

21/06/2016

Page 11 of 16

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### 10. S2-M Meter Connection Diagram



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Issue Date:

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Page 12 of 16

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## 11. Display Index Instruction

No	Code	Data Form	Length	Read	Write	Data Instruction
1						Full Screen
2	2000	NNNNNNNN	4	*		Import KWh (xxxxxx.xx kWh)
3		NNNNNNNN	4	*		Export KWh (xxxxxx.xx kWh)
4	2100	NNNNNN	3	*		Instantaneous voltage (xxxx.xx V)
5		NNNNNN	3	*		Instantaneous current (xxx.xxx A)
6		NNNNNN	3	*		Instantaneous kW (xx.xxxx kW)
7		NNNNNN	3	*		Instantaneous kvarh
8		NNNNNN	3	*		Instantaneous kVA (xx.xxxx kVA)
9		NNNN	2	*		Instantaneous PF (x.xxx)
10		NNNN	2	*		Instantaneous frequency (xx.xx Hz)
11	2110	NNNN	2	*		Meter status
12	2200	NNNNNN	3	*		Total running time (xxxxxx hours)
13		NNNNNN	3	*		Accumulated reverse time (xxxxxx hours)
14		NNNNNN	3	*		Accumulated running time last time (xxxxxx hours)

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Version 3

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Page 13 of 16

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No	Code	Data Form	Length	Read	Write	Data Instruction
15	2203	NNNN	2	*		Current flow reverse count
16		NNNN	2	*		Over voltage count
17		NNNN	2	*		Low voltage count
18		NNNN	2	*		Power restoration count
19		NNNN	2	*		Meter programmed count
20		NNNN	2	*		Current abnormal (>120A) count
21		NNNN	2	*		Power fail count
22	1004	NNNN	2	*	*	Load limit upper (xx.xx KW)
23	1001	NNNNNN	3	*	*	The first 6 digits of the meter number
24		NNNNNN	3	*	*	The last 6 digits of the meter number
25	1015	NNNN	2	*	*	Outstation No
26	2203	NNNN	2	*		Terminal cover removal count (on power)

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Page 14 of 16

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## 12. Communications Items

Code	Data Form	Length	Readable	Writeable	Data Instruction
1006	NNNNNN...NNNNNN	16	*	*	Code display (one byte for one screen, 9 screens at most)
1005	NN	1	*	*	Automatic display time (NN seconds)
1013	NNNN	2	*	*	Over voltage threshold, V
1014	NNNN	2	*	*	Under voltage threshold, V
F000	NNNN....NNNN	8	*		Meter software version

	Bit 0 (Kw)	Bit 1 (Kvar)	Bit 2 (Meter creeping)	Bit 3 (over load)	Bit 4 (terminal case removal)	Bit 5 (wireless module)	Bit 6	Bit 7
0	Import	Import	NO	NO	NO	YES	Retention	Retention
1	Export	Export	YES	YES	YES	NO	Retention	Retention

	Bit 8	Bit 9 (Epsom)	Bit 10 (over voltage)	Bit 11 (under voltage)	Bit 12 (meter under test)	Bit 13	Bit 14 (abnormal current > 120A)	Bit 15
0	Retention	Normal	NO	NO	NO	Retention	No	Retention
1	Retention	Faulty	YES	YES	YES	Retention	Yes	Retention

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Version 3

Issue Date:  
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Page 15 of 16

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### 13. Meter Commissioning Phase

If the meter is being used for remote monitoring, it is essential that the commissioning Engineer contacts the Orsis (UK) Ltd Support Team to confirm the communications paths are operational between: Meter and communications module and Orsis Back Office systems via GPRS **BEFORE** leaving site.

**The metering system will not be deemed operational until Orsis Support Staff confirm all communications paths are working.**

**Orsis (UK) Ltd Support Team number: 01423 537088**



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Page 16 of 16

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