



## Fiscal Smart-Meter – Wall mounted, single phase BBSP-SUB1W

User guide

Version 0.2

For further details, please contact:

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### SHOCK HAZARD

1. DISCONNECT SUPPLY BEFORE ATTACHING OR UNATTACHING ANY WIRES
2. SWITCH OFF LOAD BEFORE OPENING COVER
3. ONLY TO BE FITTED BY A QUALIFIED ELECTRICIAN
4. USE AS SPECIFIED. DO NOT EXCEED MAXIMUM RATINGS.

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## OVERVIEW

The Smart Meter SUB1W is a high accuracy energy meter suitable for use for residential energy billing or single phase monitoring applications. The meter accepts a wide range of input voltages and is suitable for international use. The SUB1W provides a comprehensive range of power quality information which can be used to diagnose or monitor precise electrical behaviour.

Wireless communications, wall mount fittings and internal current clamps make for simple installation.

## FEATURES

- High accuracy meter
- Suitable for residential billing or metering single phase circuits
- Manufactured to comply with IEC 60687/61036/61268 and IEC 62053-21/62053-22/62053-23
- Single phase operation up to 60A
- Comprehensive energy measurements including active energy, reactive energy, power factor and RMS voltage / current.
- Wireless operation
- Low power operation
- Simple installation

## TECHNICAL FEATURES

- High accuracy design, AC2.0
- Manufactured to comply with international standards IEC 60687/61036/61268 and IEC 62053-21/62053-22/62053-23
- Measures active energy, reactive energy, apparent energy, active power, RMS voltage, RMS current, power factor, temperature and frequency
- Clear LCD to show measured values
- Wide voltage supply range of 110-240VAC
- Ib=10A, maximum 60A

- Wireless operation
- Encrypted communications for secure operation
- Mesh networking for excellent range
- Unique serial number embedded in each device for identification on network

#### APPLICATION AREAS

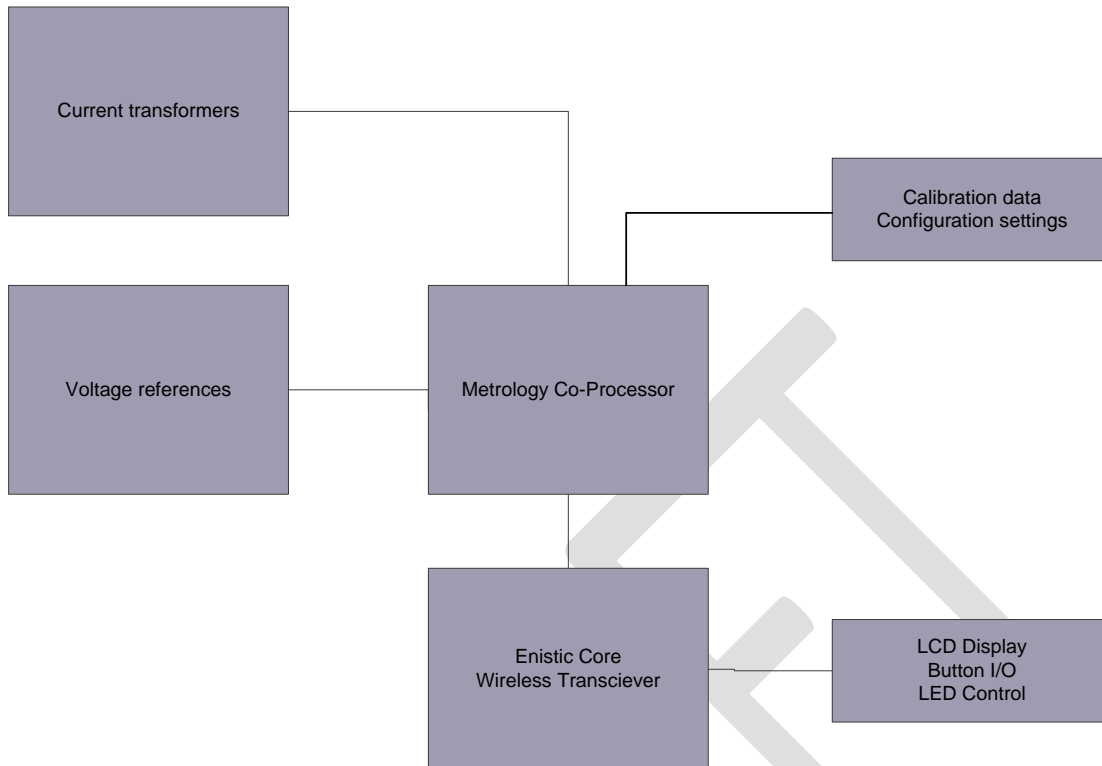
- Metering of incoming feed to residential buildings
- Microgeneration (e.g. Solar PV / Wind)
- Metering of individual machines and single phase circuits
- Billing and bill apportionment of residential tenants
- Analysis of power factor quality



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## HARDWARE ARCHITECTURE

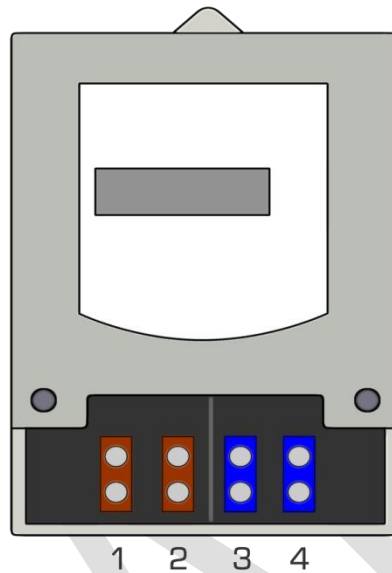


The Fiscal Meter uses one primary processor and an advanced metrology co-processor working concurrently:

1. Enistic Core Wireless Transceiver – responsible for decoding, interpreting and responding to incoming Zigbee Pro wireless messages from other Enistic equipment.
2. Metrology co-processor – The main metrology processor, responsible for the accurate measurement of the electrical characteristics such as active energy usage, re-active energy usage etc.

CONNECTIONS

## Fiscal Smart Meter - Connections



### Connections

1 = Live IN      2 = Live OUT  
3 = Neutral IN    4 = Neutral OUT\*

\*Terminal 4 (Neutral) is not required to be connected for normal operation.



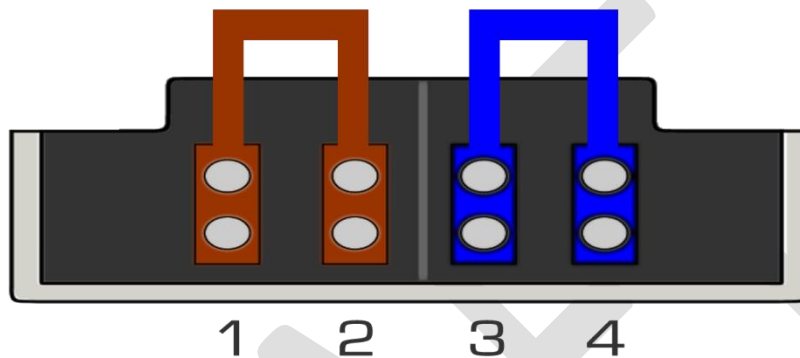
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SCHEMATIC DIAGRAM

### Fiscal Smart Meter - Internal schematic



#### Connections

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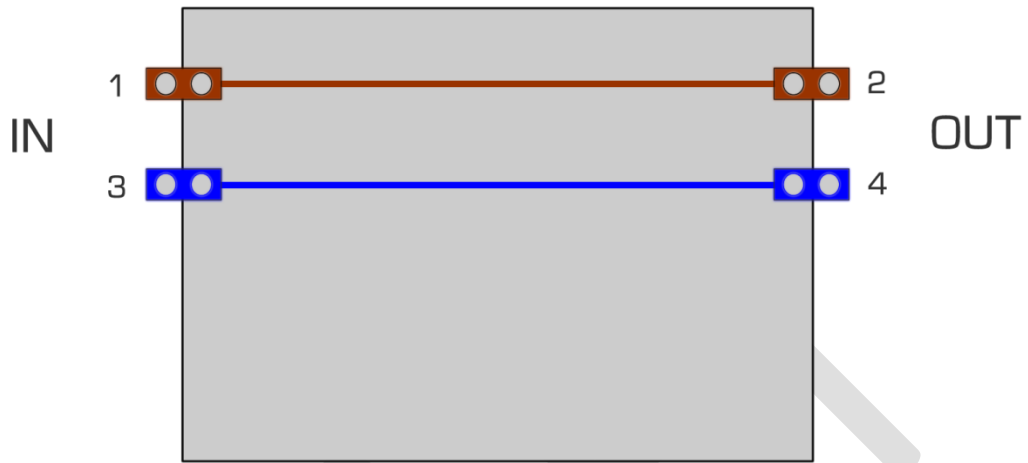


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## Fiscal Smart Meter - Schematic



### Connections

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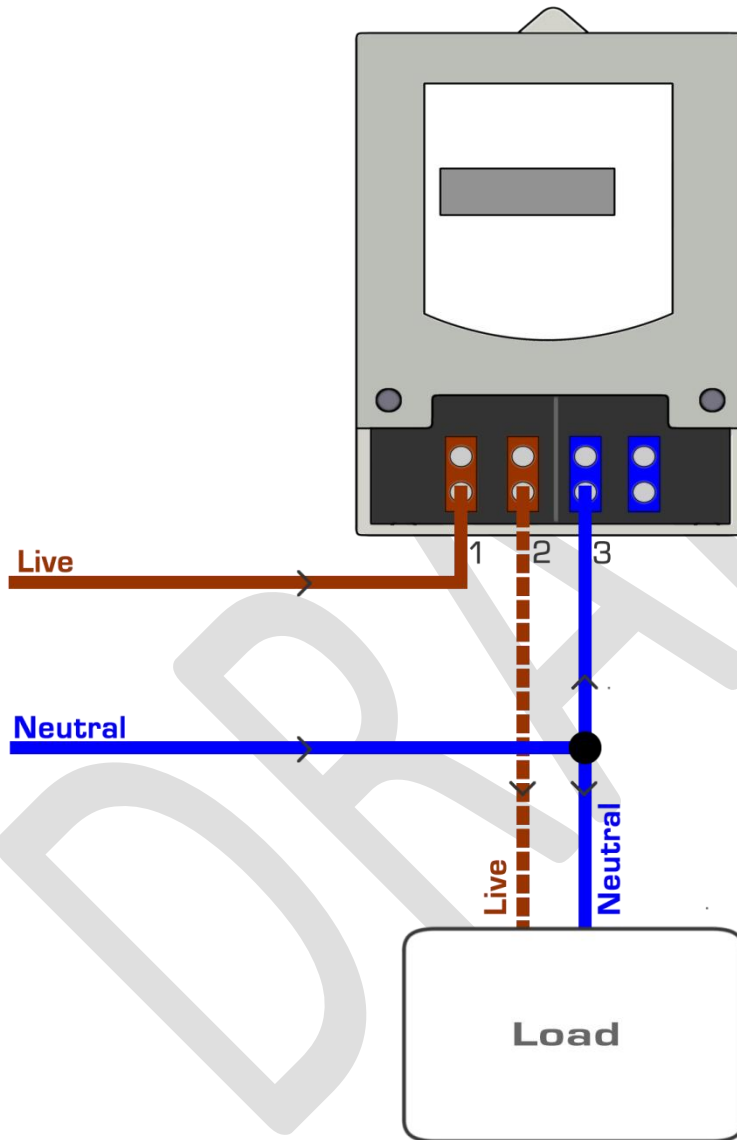
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THREE PHASE WIRING GUIDE

### Fiscal Smart Meter - Single phase wiring schematic



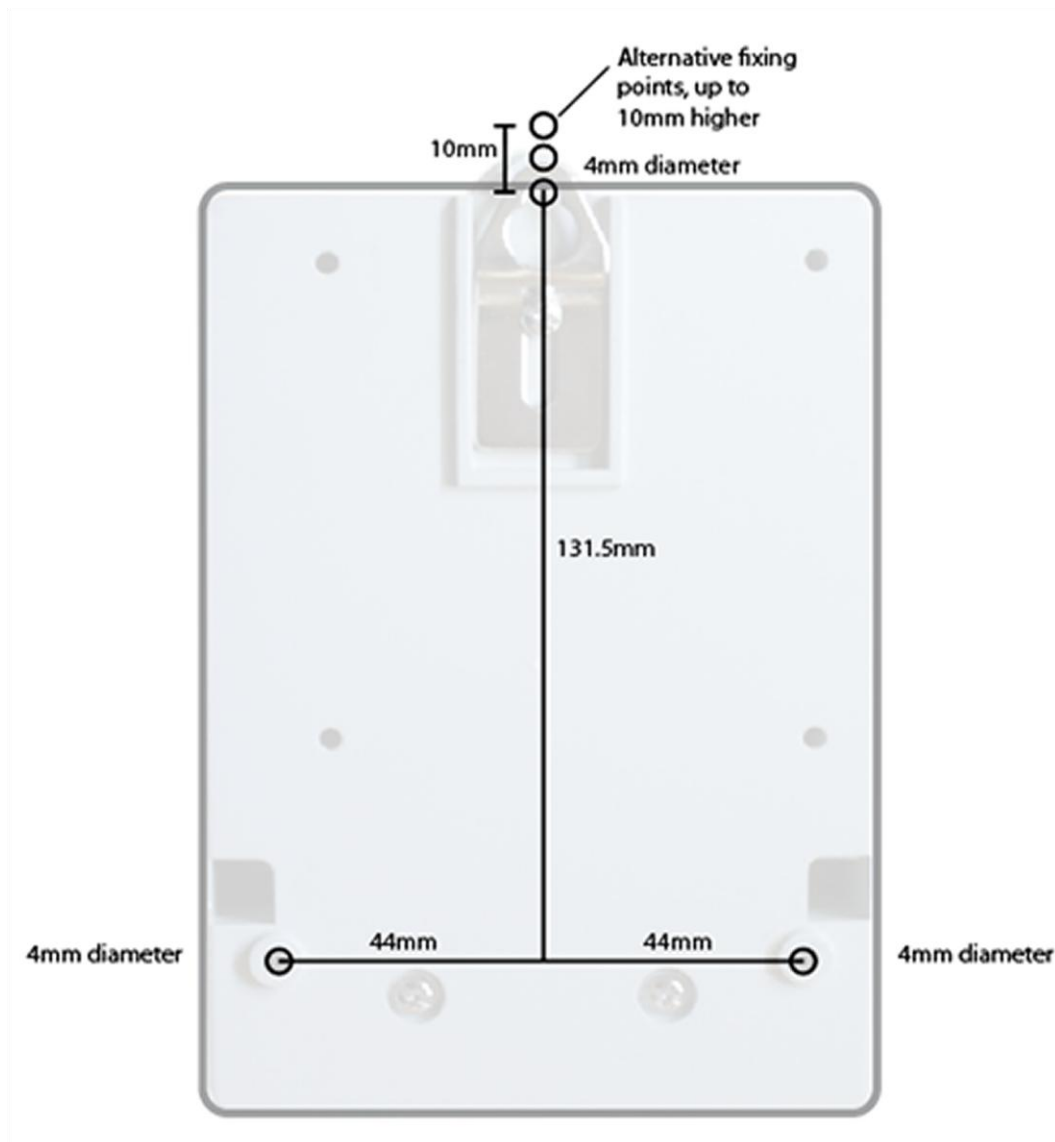
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FIXING GUIDE

### Fiscal Smart Meter - Fixing Guide



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OPERATION



The display shows:

kWh The number of kilo watt hours of energy that have been consumed, measured in kWh.

kW The instantaneous power that is being used, measured in kW.

Net: The status of the enistic wireless network connection.  
"OK" Signifies normal operation

/ A "spinner" which spins to show correct meter operation

## SITUATING YOUR METER

Your Smart Meter can be operated stand alone or as part of an integrated energy management system. If you want to access the comprehensive energy reporting that the Smart Meter can deliver, you will need to operate the meter as part of a larger Enistic system by including in your design at least 1 Smart Energy Controller and subscription to the Enistic Energy Manager Online system.

The Smart Meter has a wireless transceiver built in that can send information to the Smart Energy Controller, as shown in the diagram below.

## WIRELESS RANGE

The Smart Meter has nominal wireless range of 30m. The signal can travel through solid objects such as walls and floors although every time it goes through a solid object, the maximum range will decrease. Objects with a lot of metal in them, such as metal floors, will stop the signal completely.

Interference from heavy electrical circuitry, such as found in large distribution boards will also decrease the available range.

If you want to increase the effective range of your meter, you can do so by either:

1. Using another enistic product, such as the Plug In Smart Socket to “bridge” between your meter and the Smart Energy Controller. The additional product will receive the broadcasts from your meter and then retransmit them, thus effectively doubling the possible range<sup>1</sup>. This is illustrated below.
2. Using multiple Smart Energy Controllers. This technique is useful for larger sites, such as when you need to install meters into different buildings or in different, distant distribution boards. This is also illustrated below.

## NETWORK STATUS

The status of your enistic Zigbee Pro wireless network is shown on the bottom line of the LCD.

Normal Operation is shown as “NET:OK”

The complete list of possible network statuses are shown below.

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<sup>1</sup> If you want to span a greater distance you can use multiple bridging devices but please ensure you do not use more than 7 bridging devices in any one chain, at which point performance will degrade.

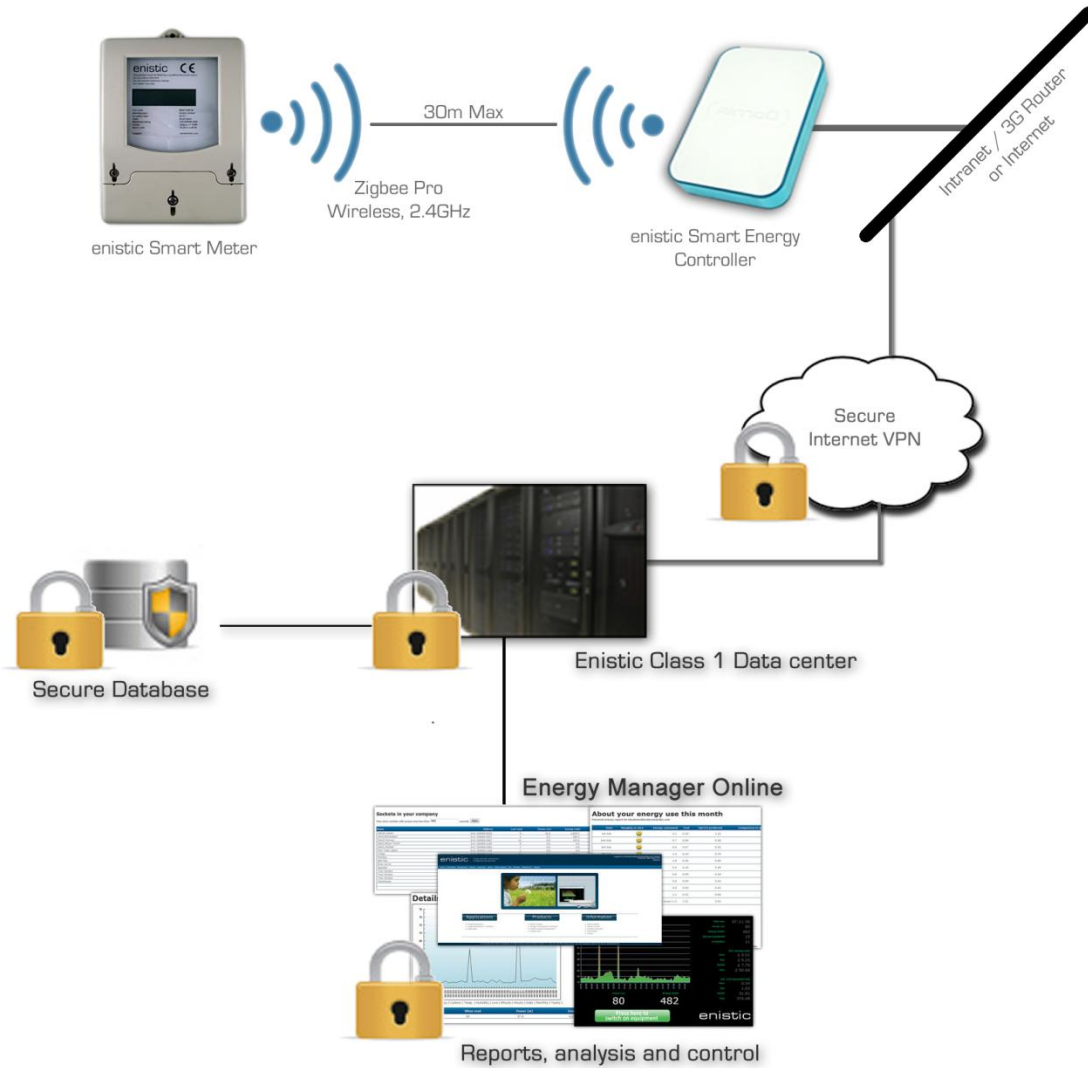
LCD Display	Meaning
<b>NET:OK</b>	<b>Normal operation.</b> The meter is communicating normally with the Controller.
<b>NET:SCAN</b>	<b>Scanning for an Enistic Wireless Network</b> The meter is trying to find a network to join.
<b>NET:LOST</b>	<b>Lost connection</b> The previous wireless network connection has been lost.
<b>NET:NONE</b>	<b>No network</b> The meter is currently not joined to any wireless network
<b>NET:RECW OR NET:RECR OR NET:RECC</b>	<b>Wireless command received</b> The meter has received a command from the controller over the wireless network
<b>NET:SEND AND NET:SEND (1234)</b>	<b>Wireless data sent</b> The meter has sent data to the controller. Note that this does not guarantee that the controller received the data, simply that the meter tried to send some data to it. The number in brackets is the last 4 digits of the meter's unique serial number.
<b>NET:FAIL</b>	<b>Sending failure</b> The meter tried to send data to the controller but an error occurred during the sending process.

#### CONTROLLER VERSION

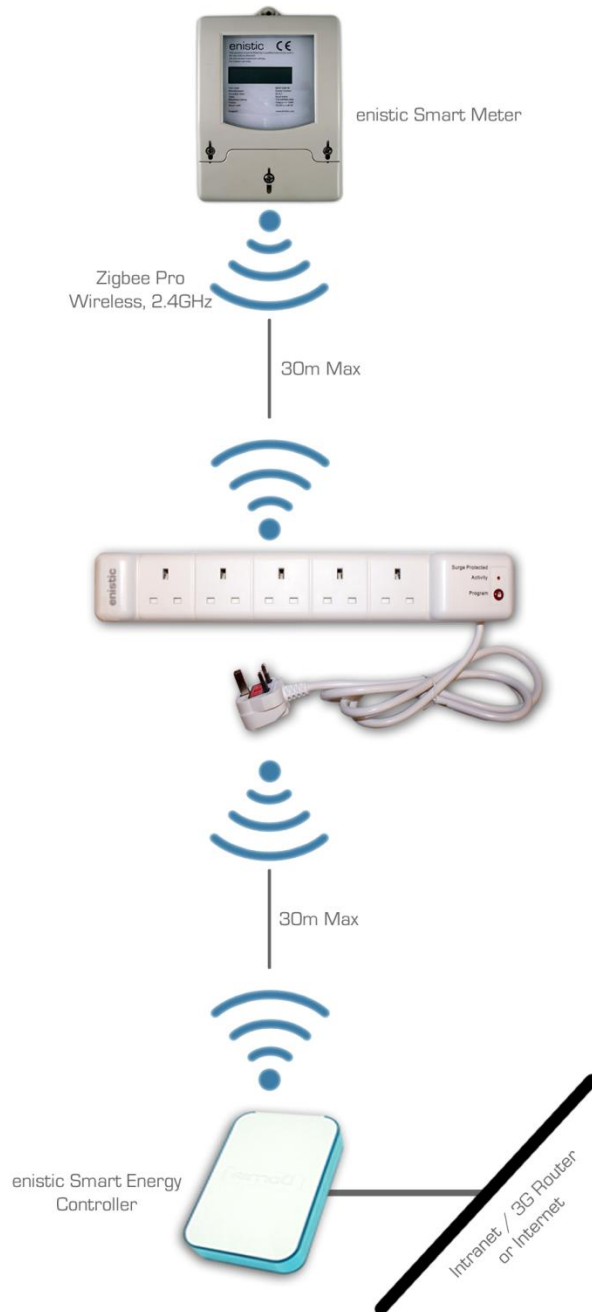
**IMPORTANT**

The meter needs to communicate with a controller that has software version 2.3 or greater on it. Operation with controllers with previous software versions is not recommended.

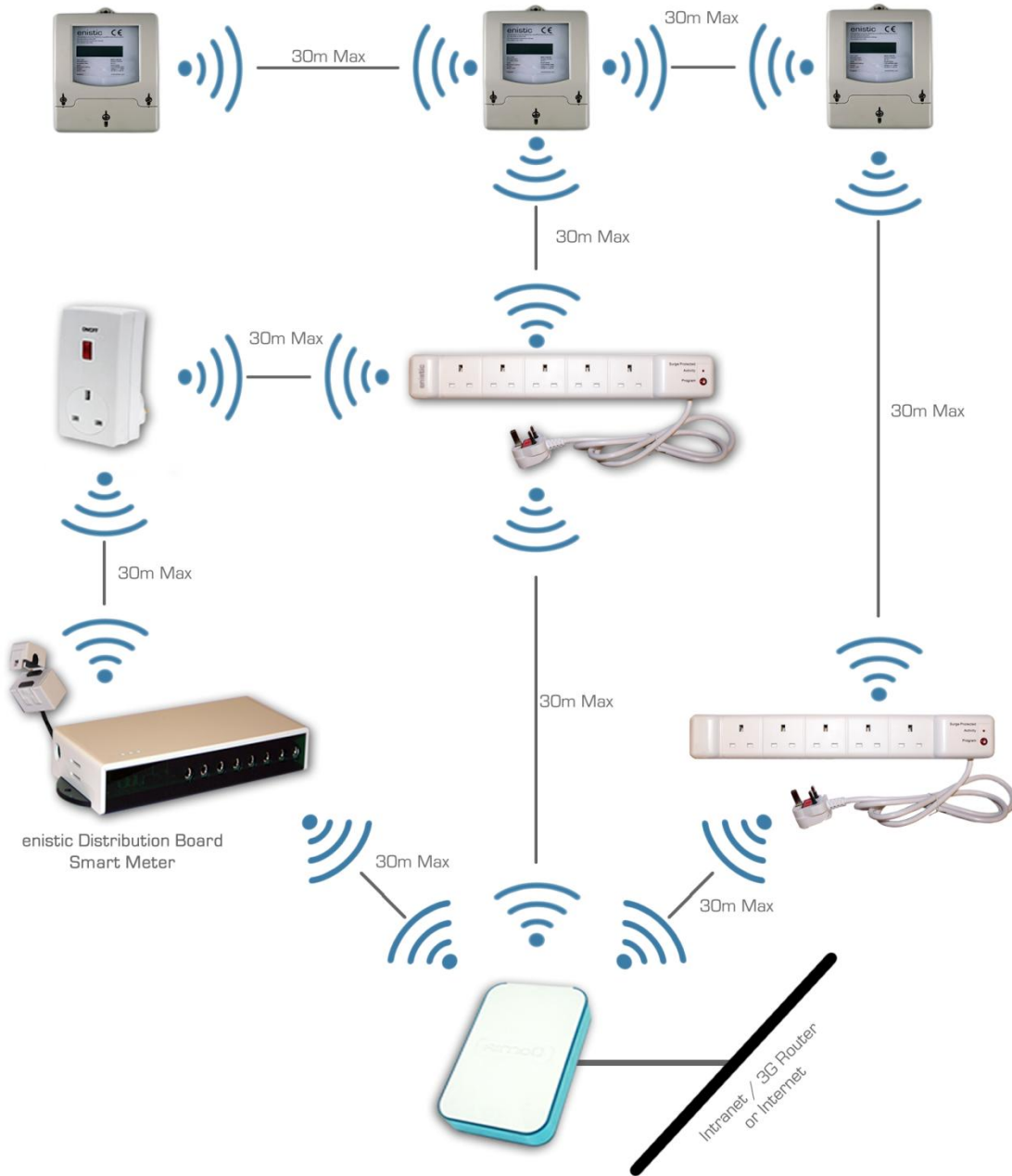
## Fiscal Smart Meter - System Diagram



## Increasing the range of your Smart Meter by bridging using another enistic device



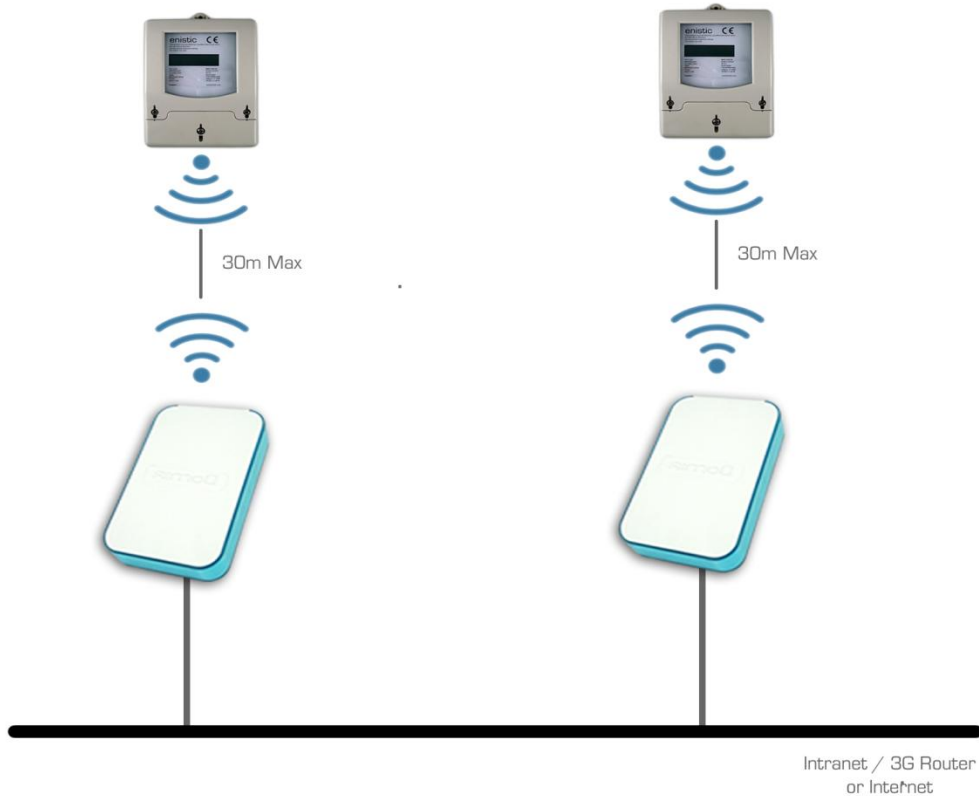
## Your Smart Meter as part of a larger office wireless mesh network



**Situating your Smart Meter when distances between enistic devices is greater than 30m or when obstacles reduce radio range**

Building A

Building B



**SPECIFICATIONS**

**BBSP-SUB1W**

**Electrical**

Item	Value	Unit
Power supply	110 - 240 50-60	VAC Hz
Power consumption (typical/max)	0.1 / 0.1	W

**Metrology**

Item	Value	Unit
Accuracy class	Class AC2.0 / IEC 60044-1 Accuracy class 2 Suitable for billing applications	
Energy	Active energy, reactive energy and apparent energy	kWh VAh, VARh
Power	Instantaneous active power	kW
General metrology	Power factor, RMS Voltage, RMS current frequency, temperature (+- 3DegC)	V, A Hz, Deg C
Maximum current	60	A
Ib	10	A
Maximum diameter of input wires	6.5	mm
Nominal reporting interval (kWh)	10	s
Nominal reporting interval (other measurements)	180	s

**Physical**

Item	Value	Unit
Size (l x w x h)	165 x 117 x 65	mm
Fitting	Wall mount	
Weight	750	g
Storage (min -> max)	-20 to 50	°C
Storage (min -> max)	0 to 60	% rel. hum.
Operation (min -> max)	0 to 75	°C
Operation (min -> max)	0 to 60	% rel. hum.

**Wireless communications**

Item	Value	Unit
Frequency	2.4	GHz
Interferes with WiFi	No	
Standard	IEE 802.15.4 / Zigbee Pro	
Maximum range between mesh nodes	32	m
Maximum nodes per network	> 1,000,000	nodes
Eryption standard	128 bit AES	

**Miscellaneous and standards**

Item	Value	Unit
Standards	CE, EMF, LVD, WEE, ROHS	
Manufactured to comply with	IEC 60687/61036/61268 and IEC 62053-21 IEC 62053-22/62053-23	
Country of origin	UK (Manufactured in UK)	
Packaging	Cardboard box	