



## Fiscal Smart Meter, DIN mount BBSP-SUB3

User guide

Version 0.3

For further details, please contact:

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## OVERVIEW

The Enistic Smart Meter SUB3 is a high accuracy energy meter suitable for use for residential, office and industrial energy metering applications. The meter can be used in single or three phase modes . Wireless communications, DIN mount fitting and external current clamps make for simple installation. A pushbutton display on the front of the meter allows for selective display of energy, power, voltages and currents in each of the phases.

- High accuracy meter suitable for residential, commercial and industrial billing purposes
- Manufactured to comply with IEC 60687/61036/61268 and IEC 62053-21/62053-22/62053-23
- Single phase or three phase operation
- Up to 1800A maximum current
- Measures active, reactive and apparent energy as well as power factor
- Wireless operation
- Low power operation

## FEATURES

- High accuracy design
- Available in 300A (3 x 100A) or 1800A (3 x 600A) configurations
- Manufactured to comply with international standards IEC 60687/61036/61268 and IEC 62053-21/62053-22/62053-23
- Measures each phase: apparent energy, power, active energy, reactive energy, voltages, currents, phase angles, power factor,
- Also measures temperature and frequency
- LCD and pushbutton to show measured values
- Wide voltage supply range of 110-240VAC
- Wireless operation
- Encrypted communications for secure operation
- Mesh networking for excellent range

## APPLICATION AREAS

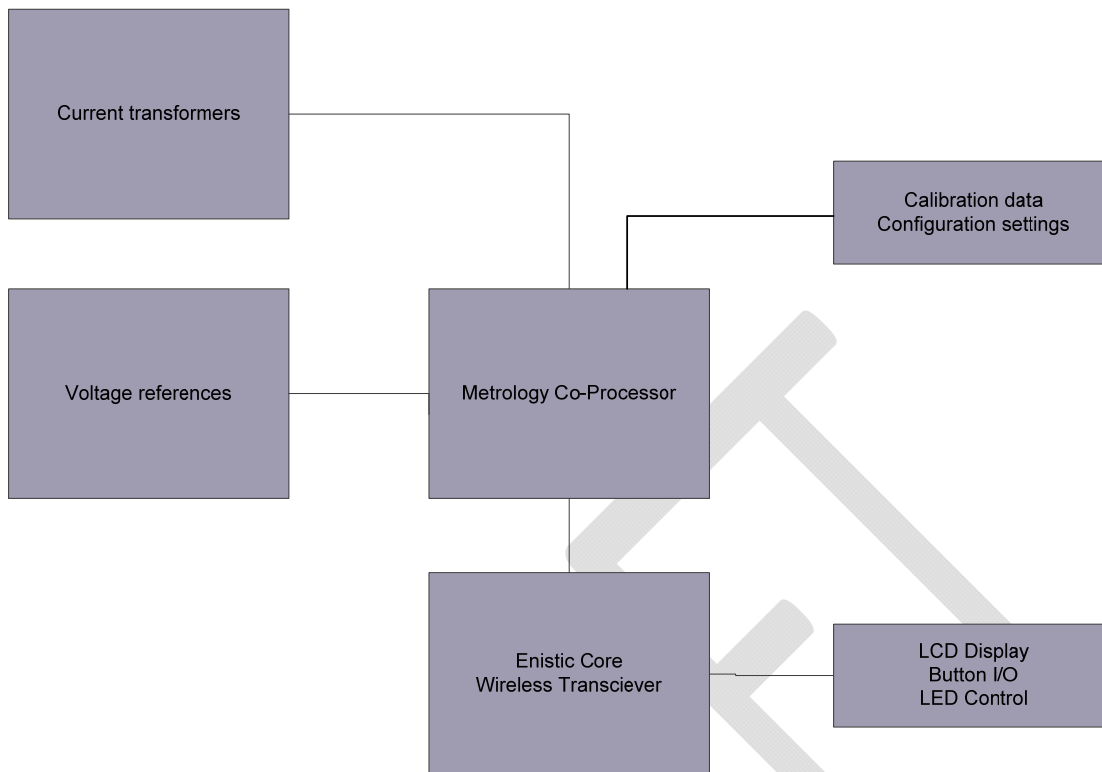
- Metering of single phase or three phase circuits
- Billing and bill apportionment
- Metering residential, office and industrial energy use
- Analysis of power factor quality
- Metering energy use of large plant

## ORDER CODES

- 300A = BBSP-SUB3
- 1800A = BBSP-SUB3-600

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## HARDWARE ARCHITECTURE

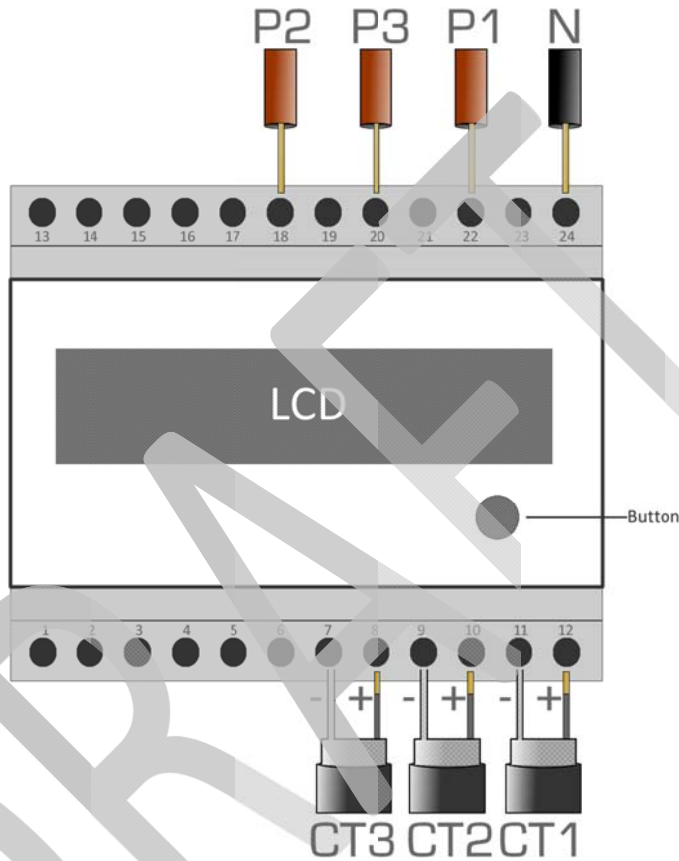


The Fiscal Meter uses one primary processors and an advanced metrology co-processor working concurrently:

1. Enistic Core Co-Processor – responsible for decoding, interpreting and responding to incoming Zigbee Pro 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.

THREE PHASE WIRING GUIDE

## Fiscal Meter - Three phase connections



Note that the current transformer connections are polarised. Shielding on the wire is the negative (-) connection.

**Key:**

- |              |                           |
|--------------|---------------------------|
| N = Neutral  | CT1=Current Transformer 1 |
| P1 = Phase 1 | CT2=Current transformer 2 |
| P2 = Phase 2 | CT3=Current transformer 3 |
| P3 = Phase 3 |                           |



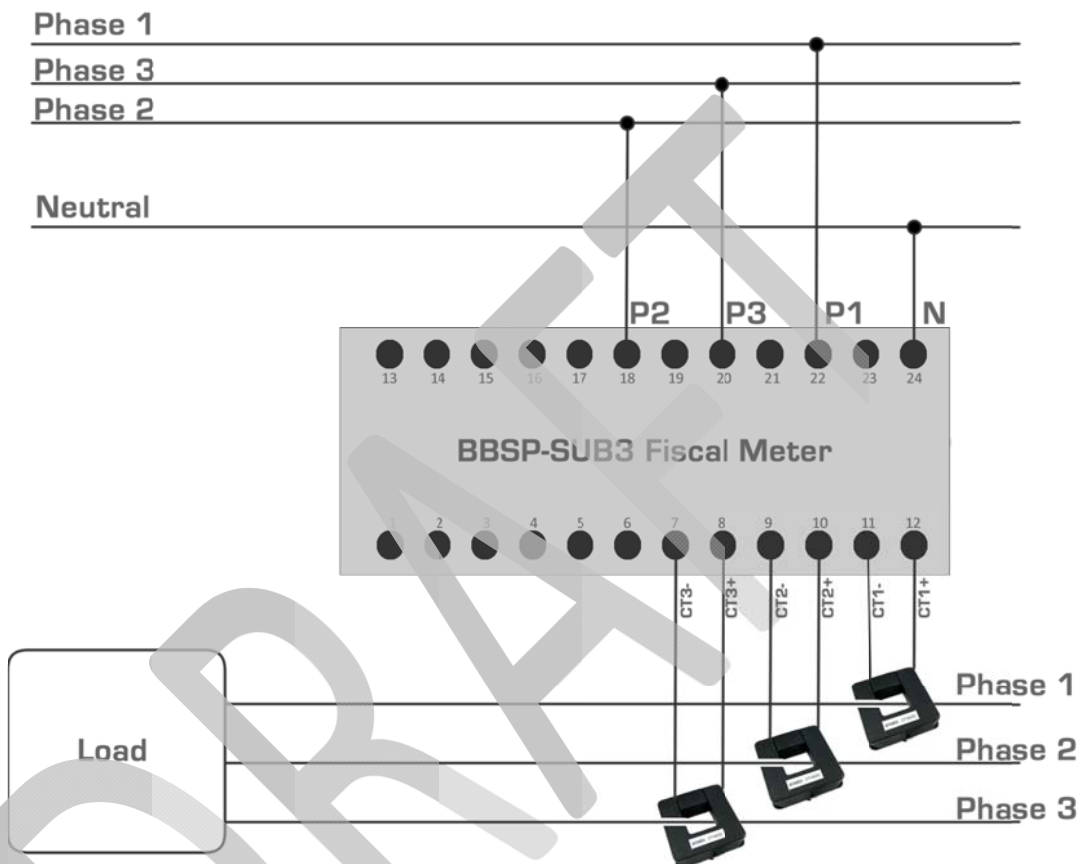
**SHOCK HAZARD**

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

**BBSP-SUB3 Fiscal Meter - [www.enistic.com](http://www.enistic.com)**

THREE PHASE WIRING SCHEMATIC

## Fiscal Meter - Three phase wiring schematic



**Key:**

- N = Neutral
- P1 = Phase 1
- P2 = Phase 2
- P3 = Phase 3
- CT1=Current Transformer 1
- CT2=Current transformer 2
- CT3=Current transformer 3



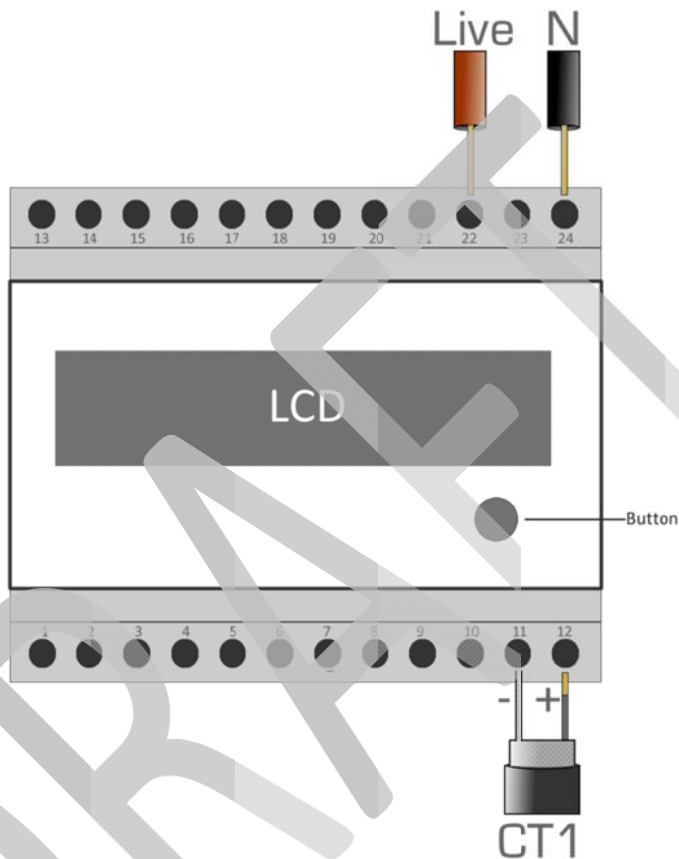
**SHOCK HAZARD**

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**BBSP-SUB3 Fiscal Meter - [www.enistic.com](http://www.enistic.com)**

SINGLE PHASE WIRING GUIDE

# Fiscal Meter - Single phase connections



Note that the current transformer connections are polarised. Shielding on the wire is the negative (-) connection.

Key:

N = Neutral

Live = Live

CT1=Current Transformer 1



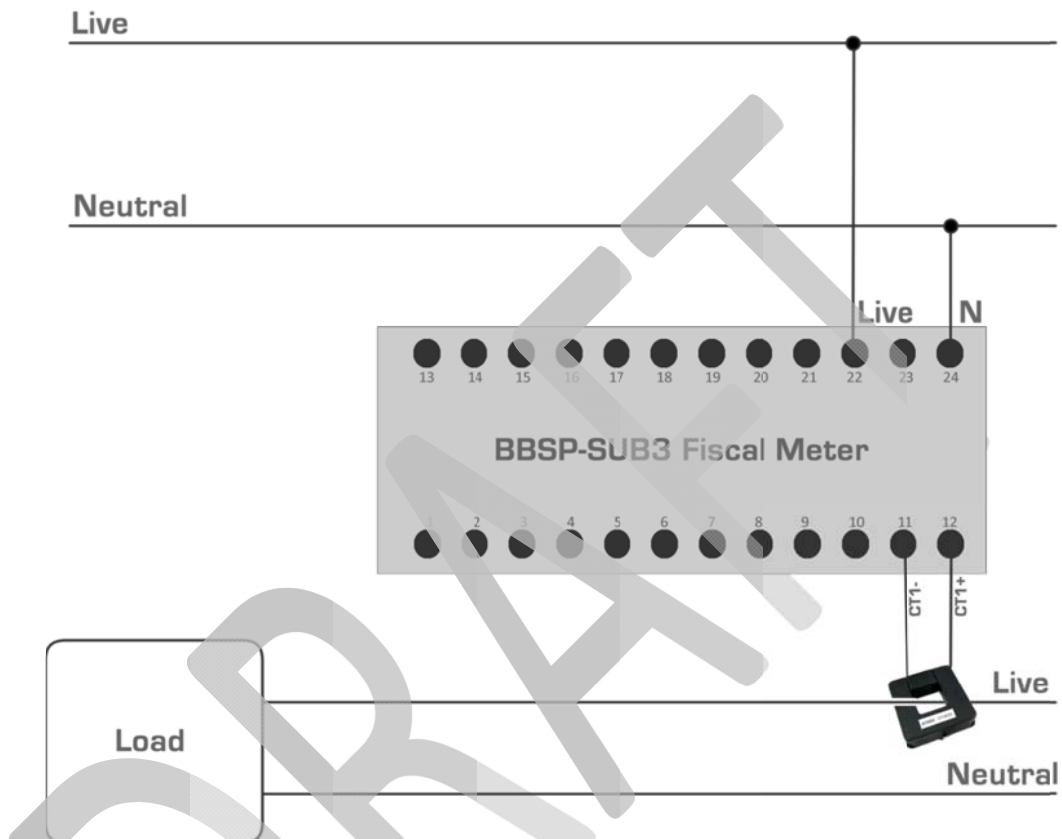
**SHOCK HAZARD**

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

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SINGLE PHASE WIRING SCHEMATIC

## Fiscal Meter - Single phase wiring schematic



**Key:**

N = Neutral      CT1=Current Transformer 1  
 Live= Live



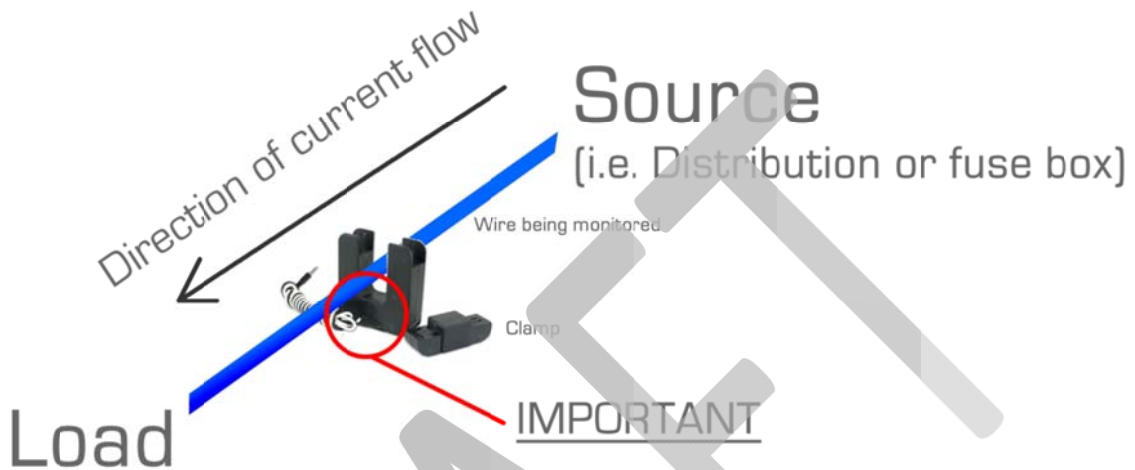
**SHOCK HAZARD**

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

**BBSP-SUB3 Fiscal Meter - [www.enistic.com](http://www.enistic.com)**

CLAMP CONNECTIONS

### Fiscal Smart Meter - Clamp Connections



Note that the label side of the clamp is facing towards the source.

\* Often this means that the label faces the distribution board

\* Label faces away from the load



**SHOCK HAZARD**

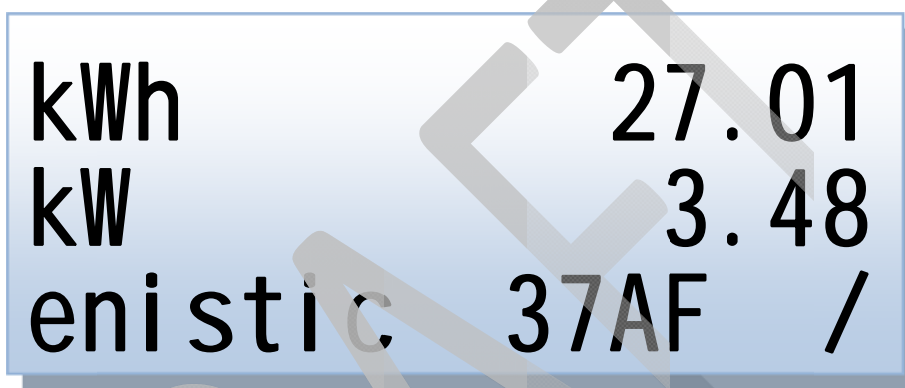
1. DISCONNECT SUPPLY BEFORE ATTACHING OR UNATTACHING ANY WIRES
2. SWITCH OFF LOAD BEFORE OPENING COVER
3. ONLY TO BE FITTED BY A QUALIFIED ELECTRICIAN
4. USE AS SPECIFIED. DO NOT EXCEED MAXIMUM RATINGS.

**BBSP-SUB3 Fiscal Smart Meter - [www.enistic.com](http://www.enistic.com)**

**OPERATION**

The Smart Meter has a button on the front. Pressing the button switches between the different displays (“Screens”).

After 3 minutes of inactivity, the Smart Meter displays the “Home Screen”

**HOME SCREEN (SCREEN 0)**

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.

**enistic** The brand name of the meter

**37AF** The last four digits of the meter's unique serial number

**/** A “spinner” which spins to show correct meter operation

POWER SCREEN (SCREEN 1)

<b>kW1</b>	<b>27.01</b>
<b>kW2</b>	<b>3.48</b>
<b>KW3</b>	<b>45.50</b>

The display shows:

- KW1 The instantaneous power being used by Phase 1, measured in kW
- KW2 The instantaneous power being used by Phase 2, measured in kW
- KW3 The instantaneous power being used by Phase 3, measured in kW

ACTIVE ENERGY SCREEN (SCREEN 2)

<b>kWH1</b>	<b>127.01</b>
<b>kWH2</b>	<b>23.48</b>
<b>KWH3</b>	<b>45820.73</b>

The display shows:

- KWH1 The active energy used by Phase 1, measured in kWh
- KWH2 The active energy used by Phase 2, measured in kWh
- KWH3 The active energy used by Phase 3, measured in kWh

APPARENT ENERGY SCREEN (SCREEN 3)

<b>VAH1</b>	<b>150.22</b>
<b>VAH2</b>	<b>12.31</b>
<b>VAH3</b>	<b>32005.50</b>

The display shows:

- VAH1 The apparent energy used by Phase 1, measured in VAH
- VAH2 The apparent energy used by Phase 2, measured in VAH
- VAH3 The apparent energy used by Phase 3, measured in VAH

REACTIVE ENERGY SCREEN (SCREEN 4)

<b>VARH1</b>	<b>17.11</b>
<b>VARH2</b>	<b>9.48</b>
<b>VARH3</b>	<b>21.53</b>

The display shows:

- VARH1 The reactive energy used by phase 1, measured in VARH
- VARH2 The reactive energy used by phase 2, measured in VARH
- VARH3 The reactive energy used by phase 3, measured in VARH

VOLTAGE MEASUREMENT SCREEN (SCREEN 5)

<b>VRMS1</b>	<b>229.78</b>
<b>VRMS2</b>	<b>229.41</b>
<b>VRMS3</b>	<b>229.12</b>

The display shows:

- VRMS1      The RMS voltage of phase 1, measured in Vrms AC
- VRMS2      The RMS voltage of phase 2, measured in Vrms AC
- VRMS3      The RMS voltage of phase 3, measured in Vrms AC

CURRENT MEASUREMENT SCREEN (SCREEN 6)

<b>I RMS1</b>	<b>29.98</b>
<b>I RMS2</b>	<b>29.98</b>
<b>I RMS3</b>	<b>29.99</b>

The display shows:

- VRMS1      The RMS current of phase 1, measured in Arms AC
- VRMS2      The RMS current of phase 2, measured in Arms AC
- VRMS3      The RMS current of phase 3, measured in Arms AC

POWER SUMMARY SCREEN (SCREEN 7)

<b>KWh</b>	<b>45.71</b>
<b>VARH</b>	<b>0.12</b>
<b>VAh</b>	<b>72.39</b>

The display shows:

- kWh            The sum of the active energy consumed by all phases, measured in kW
- VARH          The sum of the reactive energy consumed by all phases, measured in VARH
- VAH            The sum of the apparent energy consumed by all phases, measured in VAH

POWER SUMMARY SCREEN (SCREEN 8)

<b>freq</b>	<b>50.00</b>
<b>temp</b>	<b>25.00</b>
<b>cal</b>	<b>5289.77</b>

The display shows:

- FREQ            The frequency of phase 1, measured in Hz
- Temp            The temperature of the meter, measured in deg. C and accurate to +- 3 deg. C
- Cal                Reserved for factory use

PART CODE DISPLAY SCREEN (SCREEN 9)

**Fiscal Meter  
(c) 2011 enistic  
www.enistic.com**

The display shows details of the manufacturer and copyright information.

SERIAL NUMBER DISPLAY SCREEN (SCREEN 10)

**Serial number  
00200000d132789A**

The display shows the complete 16 digit unique serial number of the meter in hexadecimal format.

RESET SCREEN (SCREEN 11)



Factory Reset?

The display allows you to reset the meter to factory settings. Do this by pressing and holding the button for 7 seconds whilst this display is shown. At this point, a series of "\*" appear (shown below) on the bottom row and you can then release the button.



Factory Reset?

\* \* \* \* \* \* \* \* \* \* \* \* \* \* \*

SCREENS RESERVED FOR FACTORY USE (SCREENS 12, 13 AND 14)

# Calibrate?

Dea1	15.71
dea2	15.88
dea3	15.71

DV1	7.28
Dv2	7.28
dv3	7.27

All of these are reserved for factory use.

## 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.

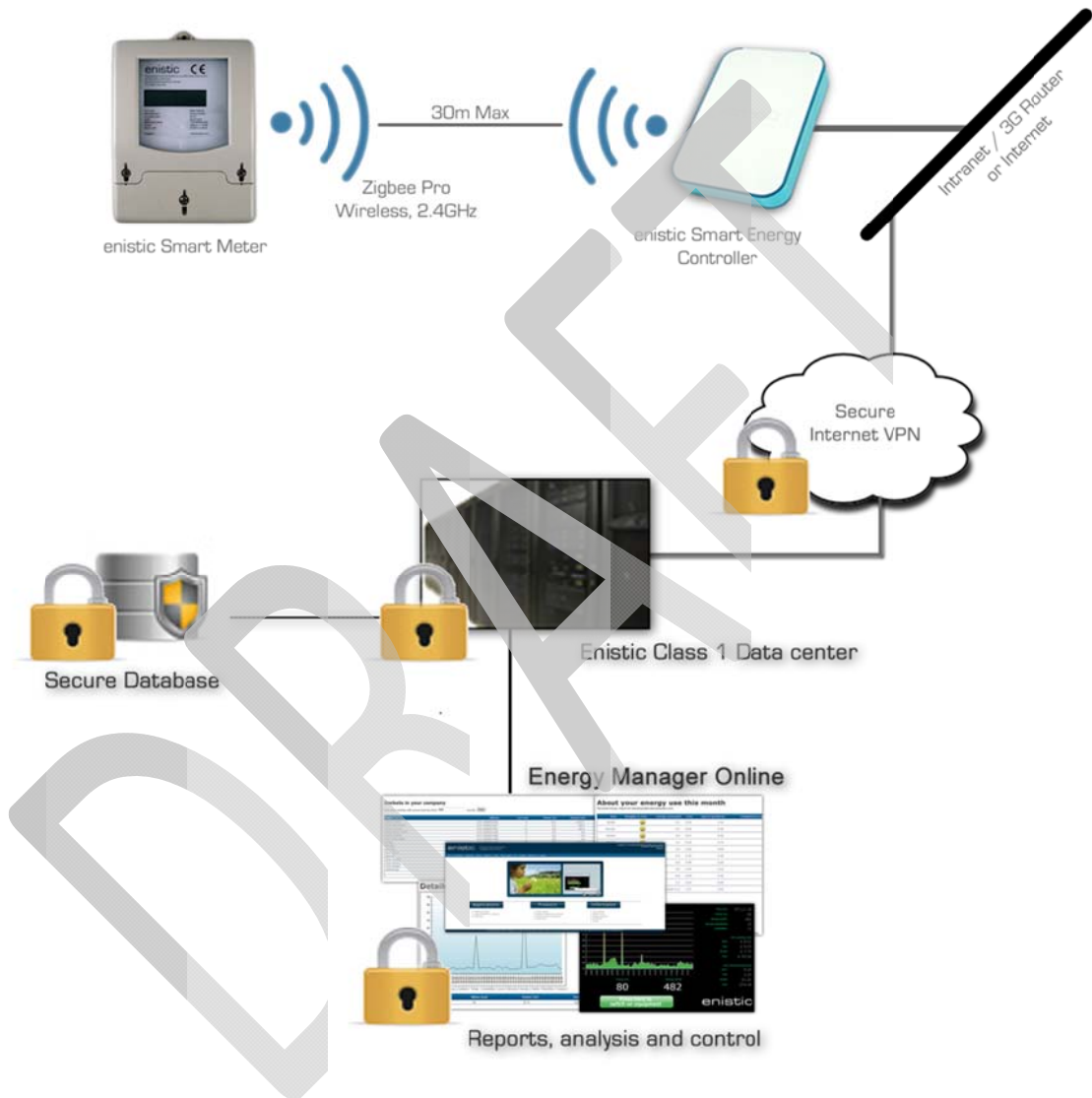
LCD Display	Meaning
<b>NET:OK</b>	<b>Normal operation.</b> The meter is communicating normally with the Controller.
<b>NET:SCAN</b>	<b>Scanning for an Enistic Wireless Network</b> The meter is trying to find a network to join.
<b>NET:LOST</b>	<b>Lost connection</b> The previous wireless network connection 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:SENT</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.
<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**

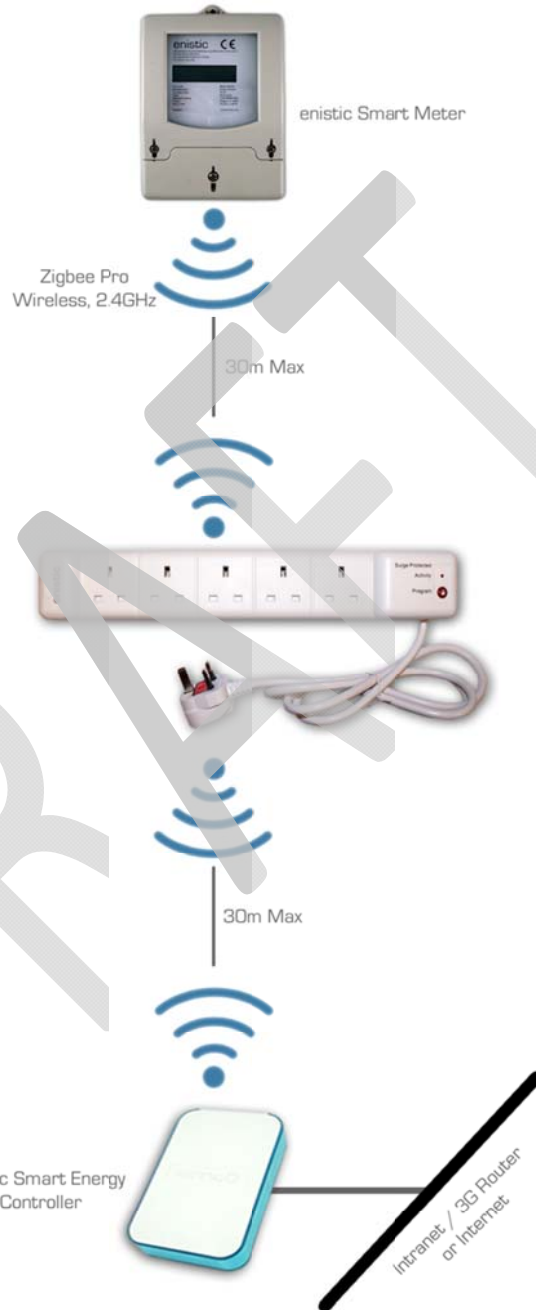
The meter needs to communicate with a controller that has software version 2.3 or greater on it. Operation with controllers with previous software versions is not recommended.

## Fiscal Smart Meter - System Diagram

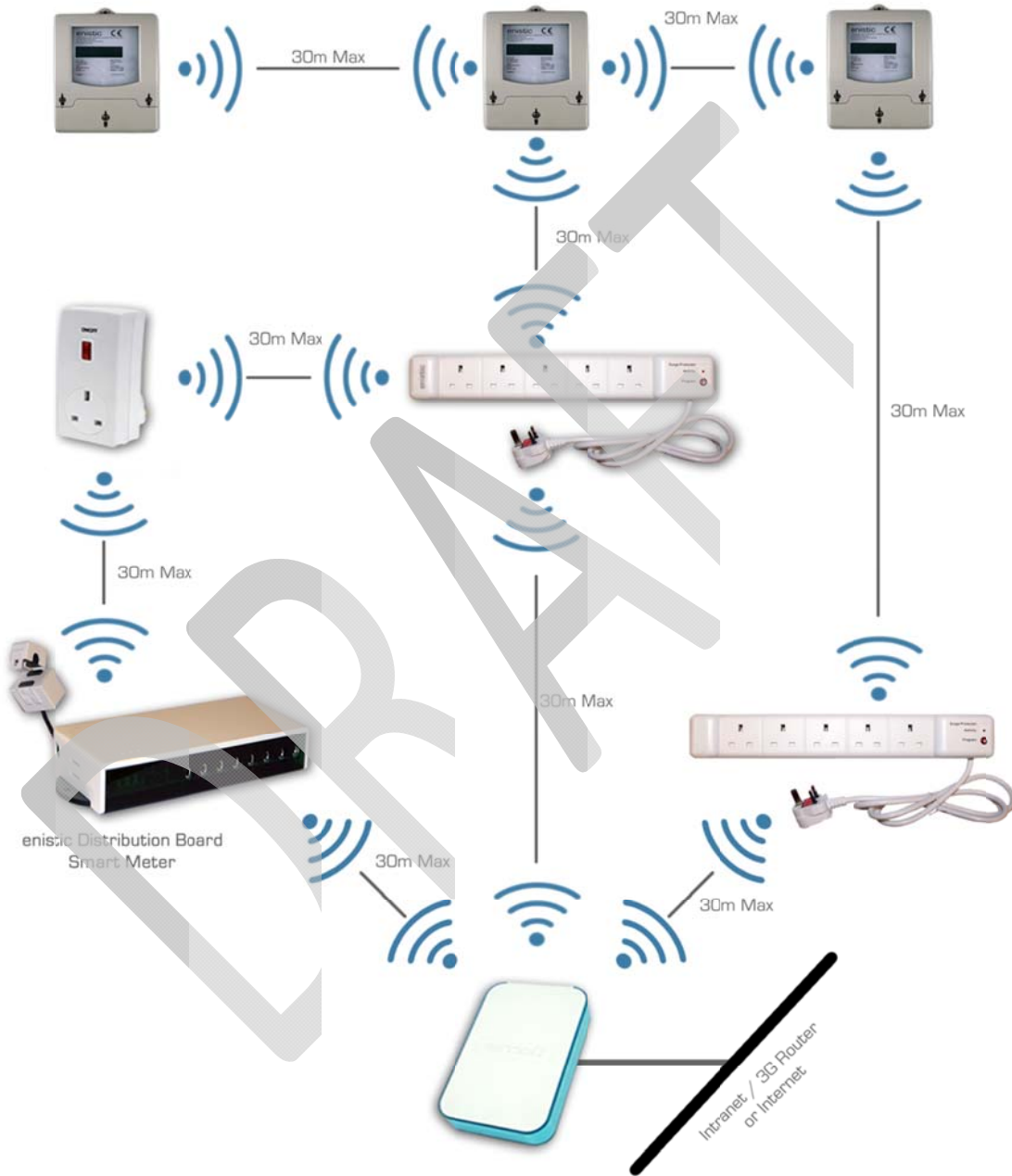


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## Increasing the range of your Smart Meter by bridging using another enistic device



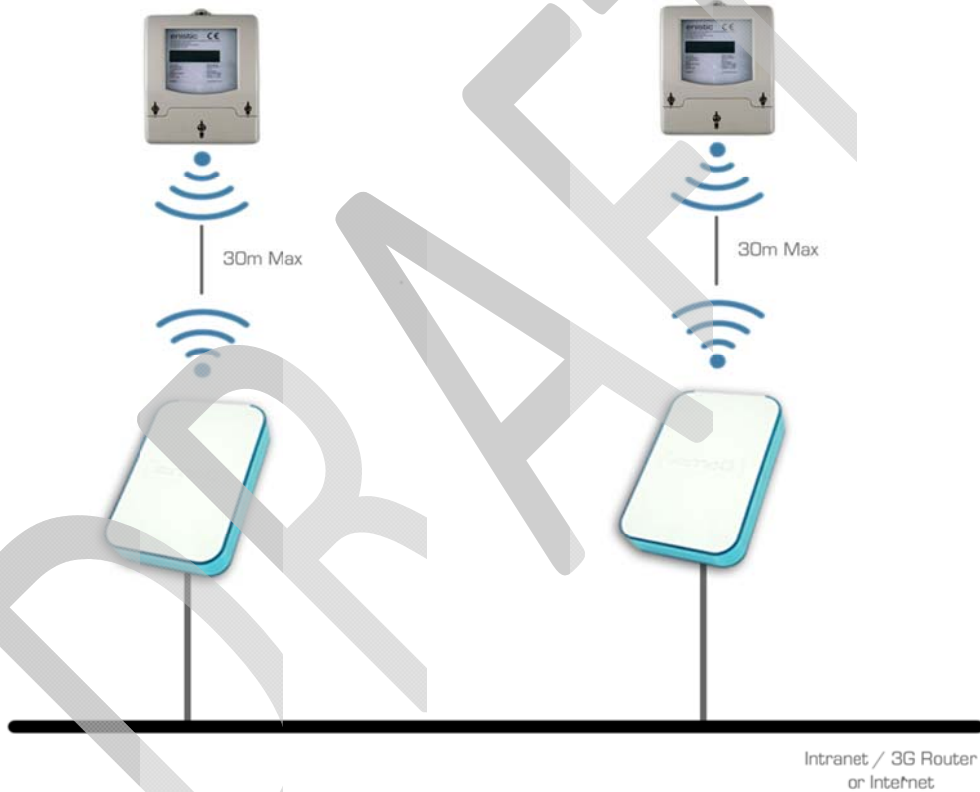
## Your Smart Meter as part of a larger office wireless mesh network



**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-SUB3****Electrical**

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

**Measurements and metrology**

Item	Value	Unit
Energy	Apparent (sum), Active phases 1/2/3, reactive phases 1/2/3 and apparent phases 1/2/3	kWh
Power	Instantaneous power use (sum), VA phases 1/2/3	kW
General metrology	Power factor, phase angle, frequency & temperature	
Accuracy class	Class 1 or class 2 / IEC 60044-1 Accuracy class 1 Suitable for billing applications	
Maximum current	300 (3 phases of 100A ea.) or 1800 (3 phases of 600A ea.)	A
Ib	10A / phase (100A clamps) or 60A / phase (600A clamps)	A
Maximum diameter for use in current clamp	18.5mm (100A clamps) or 32mm (600A clamps)	mm
Current clamp wire length	1000	mm
Nominal reporting interval (kWh)	10	s
Nominal reporting interval (other)	180	s

**Physical**

Item	Value	Unit
Size (l x w x h)	86 x 70 x 58	mm
Fitting	DIN rail mount	
Weight	150 (meter) + 3 x 98g (100A) or 3 x 650g (600A)	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	802.15.4 / Zigbee Pro	
Maximum range between mesh nodes	32	M
Maximum nodes per network	> 1,000,000	nodes
Encryption 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 62053-21/62053-22/62053-23	
Country of design / manufacture	UK / UK	
Packaging	Cardboard box	