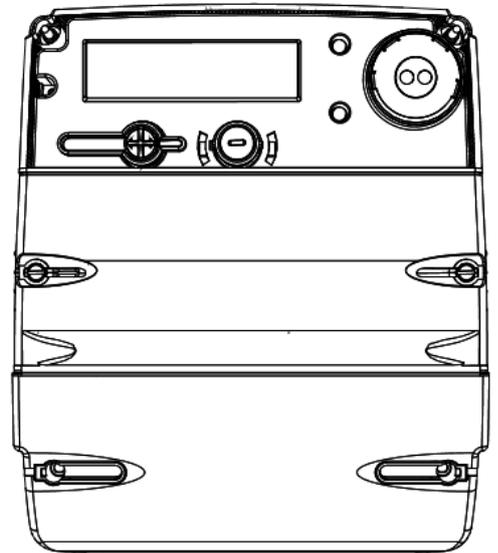




Sprint 211 electricity meter with Skyline- i 533/033 communication module



Installation Manual

BGX701-160-R01

Commercial and Confidential

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Sprint 211[®] and Skyline-i 533/033[®] are registered trade names of Secure Meters Ltd.

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As part of Secure Meter's continuous endeavour to improve product design, specifications mentioned are liable to change.

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Important

As part of Secure Meters continuous endeavour to improve product design, the specifications mentioned in this manual are liable to change anytime and therefore availability of features is product build specific.

Specifications / features listed in this document are the most advanced available with Secure Meters on the date of release of this document, and hence should not be considered as default. Availability of all or some of the same depends upon the product builds and may not be readily available. Sales team should be contacted for queries, if any.

No part of the manual, or its content thereof, must be published, distributed, scanned or copied, in either electronic form or otherwise, without prior information and express consent of Secure Meters.

While all efforts have been made by Secure Meters to minimize errors, some errors may inadvertently exist. Secure Meters undertake to correct such errors wherever possible, and request feedback from users in this regard.

Secure Meters reserve the right to alter some or whole of the specifications mentioned in this document without any prior notice.

For any queries or clarifications, the user is requested to email the Secure Meters' support team at tech.support@securemeters.com

In most countries, electrical installations comply with more than one set of regulations issued by National Authorities or by recognized private bodies. It is essential to take into account these local constraints.

Secure Meters have duly conducted product quality tests as per regulations based on the observance of rigorous safety rules in the design and realization of the product.

In order to prevent tampering, the meter should be appropriately sealed after installation. Inappropriate handling of the seal may cause damage to the meter thus creating a false impression of being tampered with.

Please take note of the warning and caution icons presented in this manual as follows:



**Possible
Electric Hazard**

This icon indicates the existence of dangerous electrical voltage. These operations must only be performed by qualified personnel.



Attention

This icon warns the user to take special precautions whilst performing an operation. The procedure must be followed as described in the manual.

Disclaimer

Secure Meters assume no responsibility for damage caused to the meter under the following circumstances:

- ✎ Irregular maintenance / improper installation
- ✎ Imprudence or carelessness during installation
- ✎ Normal (or abnormal) wear and tear of insulation
- ✎ Accidental contact with hazardous elements
- ✎ Immersion of meter in water
- ✎ Handling of meter by unauthorised persons
- ✎ Handling of meter by inebriated persons

Precautions and safety practices

- ✎ This product must be installed and serviced only by trained personnel. We strongly recommend reading the 'Sprint 211 installation manual' thoroughly before installing the product.
- ✎ Energy meters are generally installed in electrically hazardous areas. To minimise the risk of electrical shock, stay away from loose or exposed electrical connections. If there is loose or exposed electrical wiring near the meter, initiate appropriate preventive measures.
- ✎ The electrical installation of electronic meters at a site requires an adequate understanding of all governing rules and regulations.
- ✎ Keep the meter away from fire, rain and direct exposure to water.
- ✎ The meter may be damaged, either in part or completely, if it falls from a height.
- ✎ It is recommended to immediately cut off the electricity supply upon occurrence of a fault within the meter.
- ✎ Ensure that the load does not exceed the current range specified on the rating plate.
- ✎ Appropriate fuses and circuit breakers must be used in accordance with the rating of the meter.
- ✎ Secure Meters recommend regular installation checks to be carried out, especially when product is installed at locations posing high risk of degradation or corrosion, such as under direct strong sunlight, areas with high ambient temperature and little ventilation, areas near heat sources such as a furnace, areas where the meter is regularly exposed to chemical fumes, etc.
- ✎ When enabling the external antenna always ensure that it has been plugged into the SMA connector under the module.
- ✎ To ensure optimal performance of the radio system with the meter, the radio antenna must be fitted externally if the meter (or modem) is installed inside a metal enclosure.
- ✎ Always refer to installation & associated documentations and follow the instruction and the practices described. Manual should be strictly referred for details wherever the caution symbols are used on the product.
- ✎ If the meter is not used in the manner specified in the manual, the protection provided by the meter may be impaired.
- ✎ Safety practices must be followed as open position of the supply or load control switch does not provide isolation from the mains network.
- ✎ The installer is responsible for coordinating the rating and the characteristic of the supply side over current protection devices to the maximum current rating of the metering equipment. Refer section General for details.

Terms and abbreviations

Terms used in the manual

- Manual connection** : Connecting supply using the push buttons.
- Remote connection/ disconnection** : Connecting/disconnecting supply using remote commands.
- Local disconnection** : Self-disconnection of meter's supply switch due to load limit.
- Sprint 211** : Smart electricity meter with a display push buttons.
- Skyline-i 533/033** : Internal 3G module mounted inside the communication module cover of Sprint 211 electricity meter. The manual refers to it as the communication module.

Abbreviations and Acronyms

Acronym	Description
TBC	Terminal Block Cover
3G	Third Generation of broadband cellular networking
PC-FR	Fire Retardant- Poly Carbonate
LCD	Liquid Crystal Display
LED	Light Emitting Diode
SMA	Sub-Miniature version A
WAN	Wide Area Network
HAN	Home Area Network
ID	Identity
CT	Current Transformer
IHD	In-Home Display
IEC	International Electro-technical Commission

1 Product overview and operating principle

Sprint 211 is a three phase, single element electricity meter that supports both Credit and Prepayment (or Pay As You Go (PAYG) modes of operation for Smart Metering. It is available in two variants one with load control feature and other without this feature. Please check the rating plate to know your version of the meter. The meter supports 230V (+20%/– 20%) connection with the current of 10-100A. It is used with a Skyline-i 533/033 intimate modular communication module.

Skyline-i 533 communication module supports 3G (with fallback on GPRS).

The communication module sits on front belly of the meter cover. It serves as the communication gateway to the Head End System (HES) via a Wide Area Network (WAN) and other smart metering devices via a Home Area Network (HAN). The modular communication design provides the flexibility to upgrade or change the meter's communication technology without the need to remove the meter or break metrological seals. The communication module connects the meter to HES over 3G. This communication provides remote data transfer between the meter and HES either as per the request or according to the schedule. The Zigbee® module connects the communication module with other HAN devices –In Home Display (IHD).

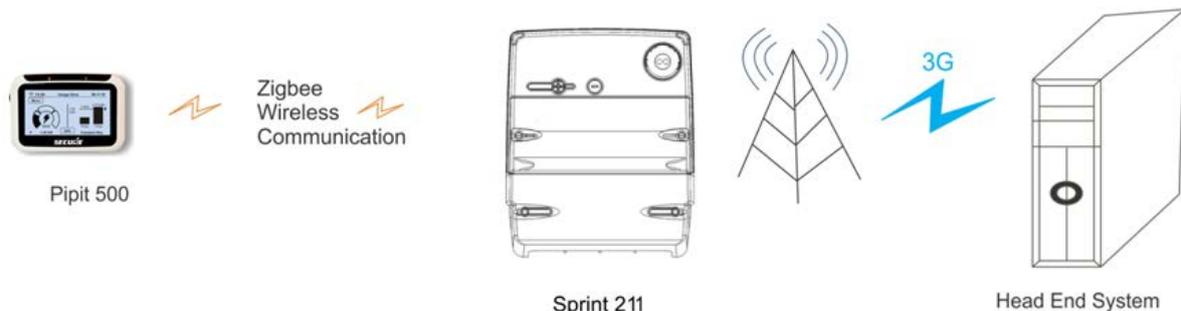


Figure 1: Operational scenario (with Skyline-i 533/033)

It has an 1107 optical communication port for local communications and a user interface consisting of two push buttons which allows the user to select and display the data.

Commands or changes of configuration can be delivered to the meter in the form of authorised messages or UTRNs. UTRNs are encrypted codes that are valid only in the meter for which they are generated.

An integrated 100A mains supply contactor is provided which can be used for disconnecting/ reconnecting mains supply. Supply disconnection / reconnection can be done remotely over the WAN or locally. Mains frequency based clock or a battery-backed internal clock maintains the meter's date and time. Removal of the terminal cover and main cover is detected and logged in power-on condition.

Internal sensors monitor external magnetic fields allowing magnetic events to be logged and reported.

In addition, a load control switch rated at 31.5 A (variant specific) is integrated into the meter which controls loads connected to the auxiliary load terminal of the meter.

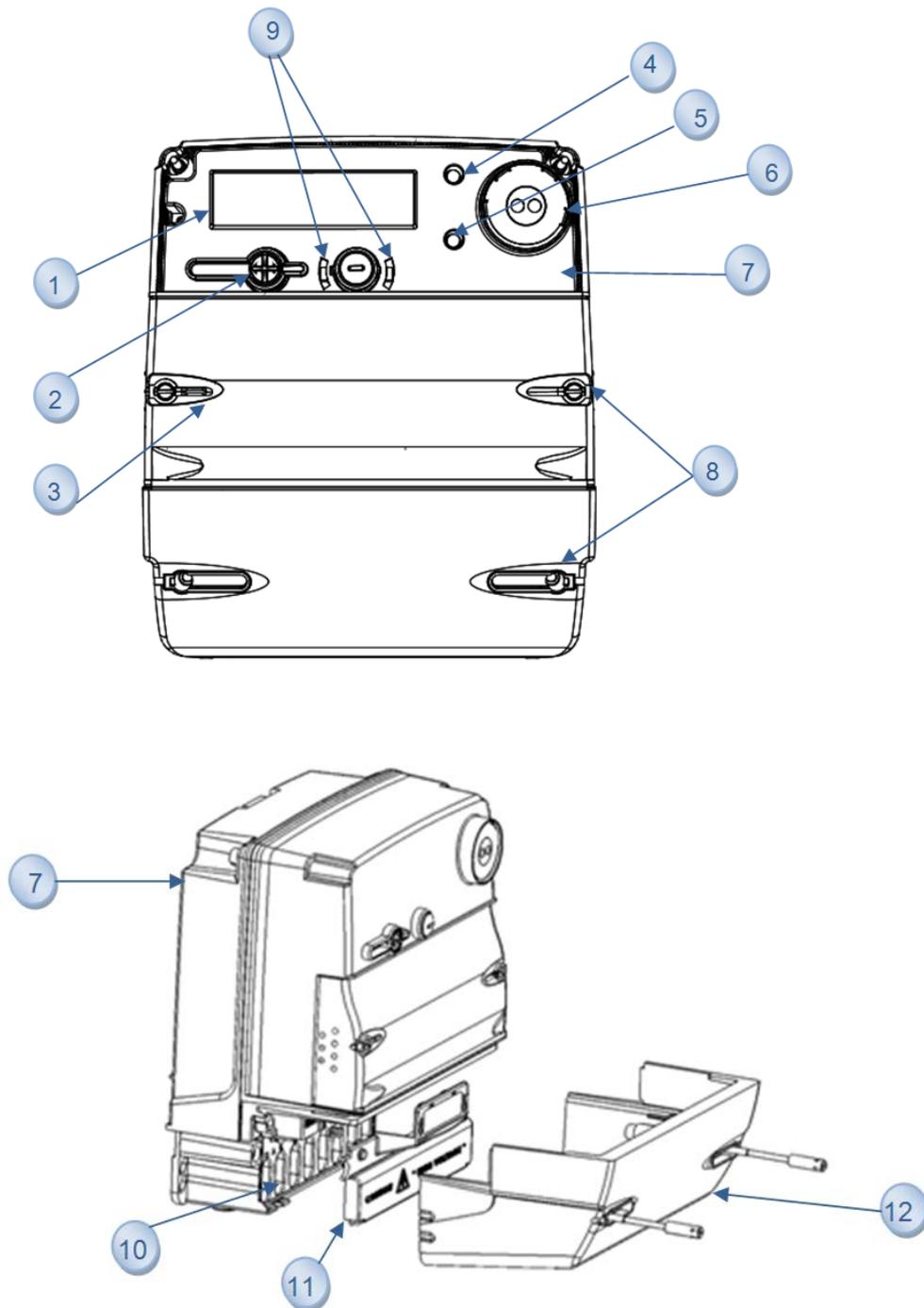
Notes:

- The operational scenario is similar for Skyline-i 033 except that the communication with IHDs over HAN is not supported.
- Some of the functionalities / features will be applicable depending upon the availability for load control switch in the product.

2 Product description

This section describes the salient features of the product.

2.1 Sprint 211 main features



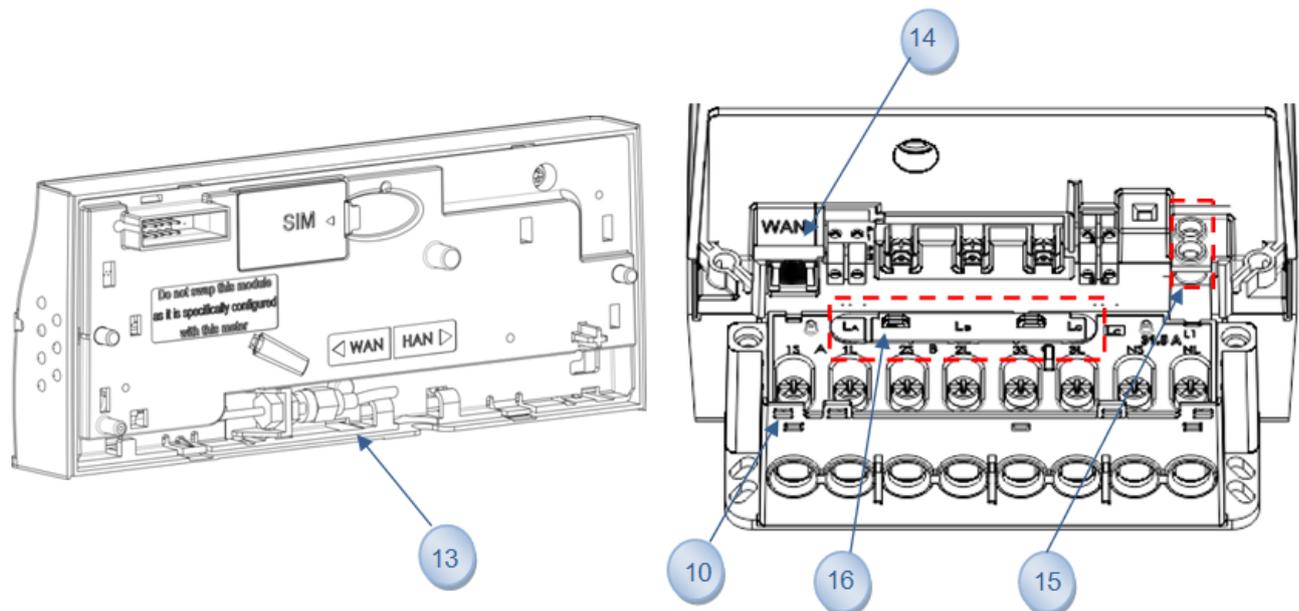


Figure 2: Sprint 211 electricity meter

Fixed Plate—Information is fixed and is common for all meters of this type.

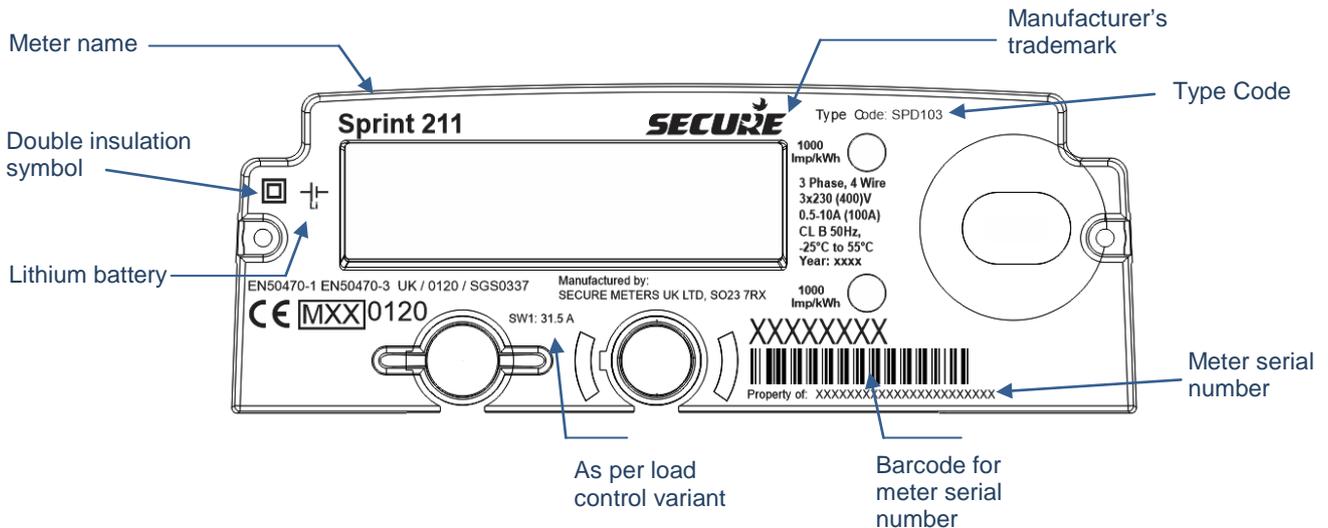
1. **LCD display** - A large multi-segment LCD supporting alpha-numeric characters displays the information and values for various electrical parameters recorded by the meter.
2. **Push Buttons** - Two push buttons Left and Right, allow interactions with Sprint 211. These buttons are used for various user operations such as display navigation, boost operation etc.
3. **Communication Module** – To facilitate AMI communication, Sprint 211 provides a modular compartment; into which, a communication module can be fitted as required.
4. **Metrological LED (Fixed)** - This LED is provided on the meter main face plate and flashes according to the rate of energy consumption measured by the meter. It is used for testing the accuracy of the meter and as a visual indication of the rate of energy consumption.
5. **Metrological LED (Configurable)** - This LED is provided on the meter main face plate and by default it is configured for Reactive Import Energy consumption.
6. **1107 Port** – The communication with the external world is supported through 1107 optical port. The port supports a maximum data rate of up to 9600 baud.
7. **Meter Base and Front Cover** - The base or enclosure of the meter is made of a high-grade fire-retardant poly-carbonate. The front cover, made of the same material, is fastened to the base with screws. A sealing arrangement is provided to prevent tampering.
8. **Sealable Screws** - These screws facilitate the sealing arrangement necessary after the installation of the meter in the field.
9. **Supply LEDs:** Two supply LEDs are provided on the meter main face plate for indicating main switch status such as OFF, ON and ARM state.
10. **Terminals and Terminal Block** - A terminal block, capable of sustaining high temperature, is provided in the meter with adequate provisions for connecting wires to the meter.
11. **Secondary Terminal Cover-** The secondary terminal cover provides additional protection for the live terminals of the meter and keeps them inaccessible even after removal of the main terminal cover.
12. **Terminal Cover**—The terminal cover protects the terminal connections from tamper or interference, provides safety from hazards and provides security of add-on modules.
13. **SMA connector for external antennas** - SMA (Sub-Miniature version A) connectors are available under the module to connect a compatible external antenna (WAN and HAN) on the Sprint 211.
14. **RJ 45 Port:** This port is not accessible to the user.

15. 31.5 Ampere load contactor (variant specific)- This is provided in Sprint 211 to support basic load control functions such as load switch actions, switch time randomisation and load cycling.

16. Phase Selection Sockets – Either of phases i.e. A, B or C can be used to energise the auxiliary load connected to L1 with the help of a phase selection provision provided on Sprint 211’s terminal block. This is done by tightening the screw provided in any ONE of the phase selection sockets above each phase.

CAUTION – DO NOT connect the auxiliary load in parallel to more than one phase at a time. This will lead to a short circuit. For a given meter installation, the auxiliary load can be connected to only one phase. This is a variant specific feature.

2.2 Information printed on Sprint 211 front cover



		3 Phase, 4 Wire
Rated operating voltage	→	3x230 (400)V
Current rating	→	0.5-10A (100A)
Class index, Frequency	→	CL B 50Hz,
Temperature	→	-25°C to 55°C
Year of manufacture	→	Year: xxxx

Figure 3: Information on the Sprint 211 front cover

3 Meter specifications

This section describes the mechanical, electrical, compliance, hardware and environmental specifications for the Sprint 211 meter.

3.1 General specifications

S. No.	Specification	Description	
1	Mechanical	Dimensions (mm)	221 (H) x 180 (W) x 116 (D)
		Weight	2.2 kg approx (Actual weight may vary with variants)
		Mounting	Projection type
		Front cover	Translucent PC-FR grade V0
		Base	Opaque, PC-FR material
		Communication module cover	Opaque, PC-FR material
		Terminal cover	Opaque, PC-FR material
		Secondary terminal cover	Opaque, PC-FR material
		Terminal block	Opaque 10% glass filled PC-FR grade V0, matt finish
		Rating plate	Opaque, PC-FR material
		Main load terminal screws	Nickel plated M8 brass grub, optional nickel plated M8 Pozidriv PZ#3
		Current bus-bars (Internal)	Made of copper with tin plating
		Minimum bore diameter for main terminals	11 mm, suitable for 35 mm ² multi-strand copper cables
		Sealing Provision	<ul style="list-style-type: none"> • 2 seals at the back of the meter (upper screws) • 2 seals under the terminal cover • 2 seals on the terminal cover • 1 optional seal for configuration button • 2 seals on the module
Sealing screw	Captive type, made of brass, sealing hole diameter 2mm		

		Display	Super-twisted Nematic (STN) LCD with backlight			
2	Electrical	Connection, Supply	3 Phase, 4 Wire, Direct Connected			
		Voltage measuring element	Voltage divider			
		Current measuring element	CT			
		Measuring Elements	Three			
		Reference Voltage (Supply Voltage)	230V± 20%			
		Reference current range	10A Ib, 100A I _{max} (per phase)			
		Frequency	50 Hz ±5%			
		EMC/Electric Surge	BS EN 50470-1, 50470-3			
		Metrology LED	Two LEDs, 1000 pulses/unit			
		RJ45 port/connector	Option not accessible			
		Load control contactor	230 VAC, 100A			
		Non-volatile memory	2MB Flash, Data retention up to 15 years			
		Connecting Cables (Recommended -As per service and installation practices)	Type	PVC, V-75, Copper	PVC, V-90, Copper	
			Size	35mm ² for 100A	35mm ² for 100A	
Voltage rating	600/1000V		600/1000V			
Normal temperature rating	75°C		90°C			
Communication module	Nominal Voltage: 4V(+/-0.1V) Maximum load: 1.4A (Peak)					
3	Protection	Dielectric Strength	<ul style="list-style-type: none"> AC voltage withstands as per BS EN 50470-1 Impulse withstand as per BS EN 50470-1 			
4	Compliance	Metrology	BS EN 50470-1, 50470-3 Class B			
		Power Consumption	BS EN 50470-1, 50470-3			

		Protective class	II	
5	Environmental	Operating Temperature as per IEC standard	Range	Indoor Meter
			Specified operating range	-10 °C to +40 °C
			Limit range of operation	-25 °C to +55 °C
			Limit range for storage	-25 °C to +55 °C
			Limit range for transportation	-25 °C to +70 °C
		Operating Humidity	Annual mean	< 75 %
			For 30 days, spread in a natural manner over one year	95 % (non- condensing)
			Occasionally on other days	85 %

3.2 Firmware

The meter supports the following firmware:

- Metrology firmware

Metrology firmware controls the measurement functions. It also provides an operating system for the application firmware. This firmware is fixed and cannot be upgraded.

- Application firmware

Application firmware controls the functions of the meter outside of metrology. It is possible to remotely upgrade this firmware to change the meter operation. Upgrading or updating the firmware will not affect the meter data unless the update involves changing the parameters of such data. Information related to load survey, transactions, events and storage or contents in billing registers are not affected during these upgrades.

Note: The current firmware name and version are available in meter readings and on the meter's display.

3.3 Handling, storage and operating conditions

The Sprint 211 meter is an electronic device containing delicate components, which should be handled carefully during transit, storage, and installation. The meter should be protected from physical vibration and shocks. Wherever possible the meter should be kept in its original packaging until it is installed at the customer's site. Temperature and humidity must be maintained within the limits expressed in the above table.

Proper installation and removal procedures should be followed, in order to prevent damage or injury. Physical damage to the meter's case could indicate damage to internal components. Under no circumstances should an attempt be made to install a damaged meter.

A visual inspection should be performed before installing the meter. The following should be checked, as a minimum:

- No evidence of external damage or missing parts
- No missing or damaged wiring
- No evidence of overheating

Ideally the meter should be stored and operated in a dry, well ventilated, climate-controlled building. Rapid changes in temperature and humidity should be avoided.

3.4 Standards and external certification

The Sprint 211 meter with internal communication module conforms to the following standards:

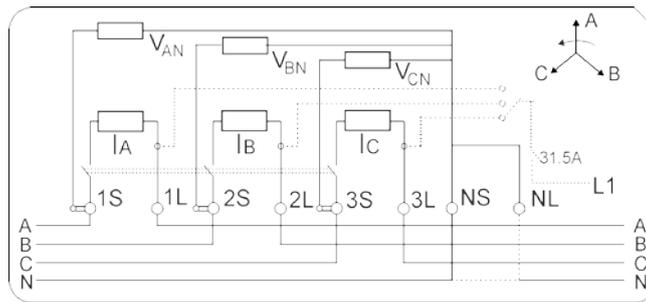
Table 1: Standards

Electrical requirements	
MID Approval	0120/SGS0337

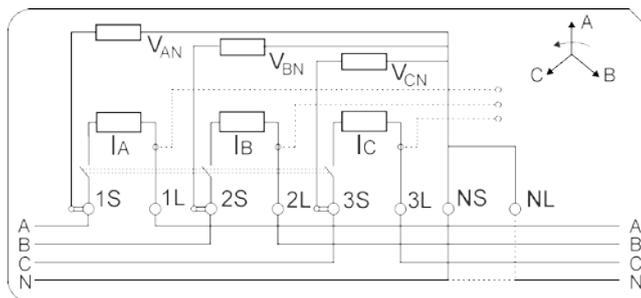
3.5 Connection terminals

The following diagram shows the internal connection for two build types of the Sprint 211.

3.5.1 Connection diagram, with disconnect and LC



3.5.2 Connection diagram, with disconnect and without LC



4 Installation and mounting details

The installation of Sprint 211 must be performed with extra care and attention. The existence of dangerous electrical voltage may be fatal. Hence, these operations should be performed only by skilled personnel.

4.1 Lifting the meter

Meter should be handled with care while lifting and transferring from one place to another.

4.2 Unpacking the Meter

The meter needs to be unpacked from its original packing before installation.

Open the box cover and take out the meter vertically.

4.3 Precautions & safety practices

- While working with live equipment, always wear hand-gloves made of an insulating material.
- Disconnect the mains supply before meter installation.
- Ensure that there are no loose or exposed electrical connection(s) or uninsulated, live wires near, or at, the installation site.
- Follow standard precautions to prevent damage due to electrostatic discharge while handling external antenna port.

If necessary, use fast-drying, commercially available insulation coating to cover the exposed electrical wiring.

- Always use proper tools and equipment.
- Never use damaged tools.

The use of damaged tools is major cause of installation-related accidents. Improper tools may cause an irreversible damage to the meter and its accessories.

- When the meter is being installed within the premises like an apartment (inside), always install it at a safe height which allows clear vision of meter display and easy access to meter buttons.
- Never connect a load which makes the meter operate outside its specified limits.

Operating current range of meter is specified on the rating plate.

4.4 Quick start

This section is intended only for experienced field staff with prior exposure to energy meter installation. It summarizes the recommended sequence of actions for installation.

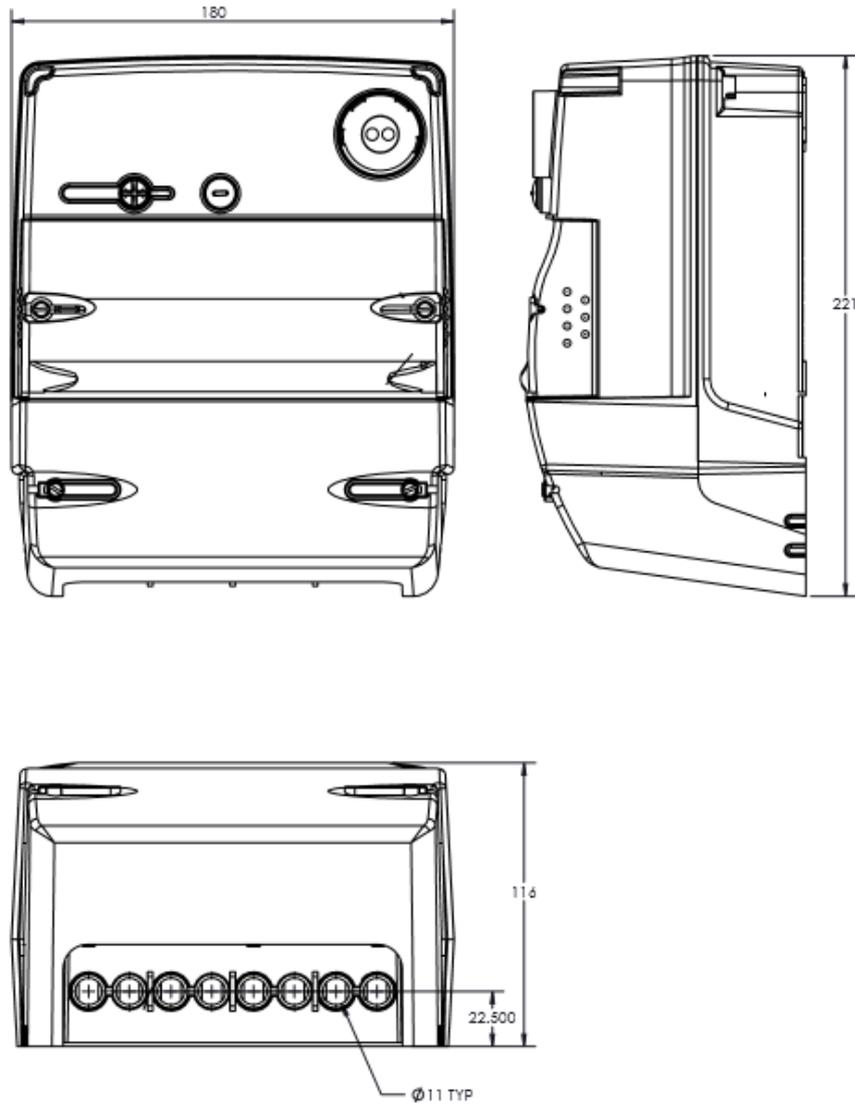
4.4.1 Getting started

1. Select an easily accessible mounting location for the meter. When the selected location has multiple meter installations, identify the correct consumer installation.

2. Ensure safe working conditions near the installation location.
3. Check whether the consumer installation can be isolated safely from the mains.
4. Check for the polarity of the supply.
5. Label the wiring for correct connections.

4.5 Dimensions and mounting arrangements

This section displays the dimensions of the product in various views. The meter terminal dimensions are also provided here. Details such as possible vertical and horizontal mounting positions are included to ease the installation process.



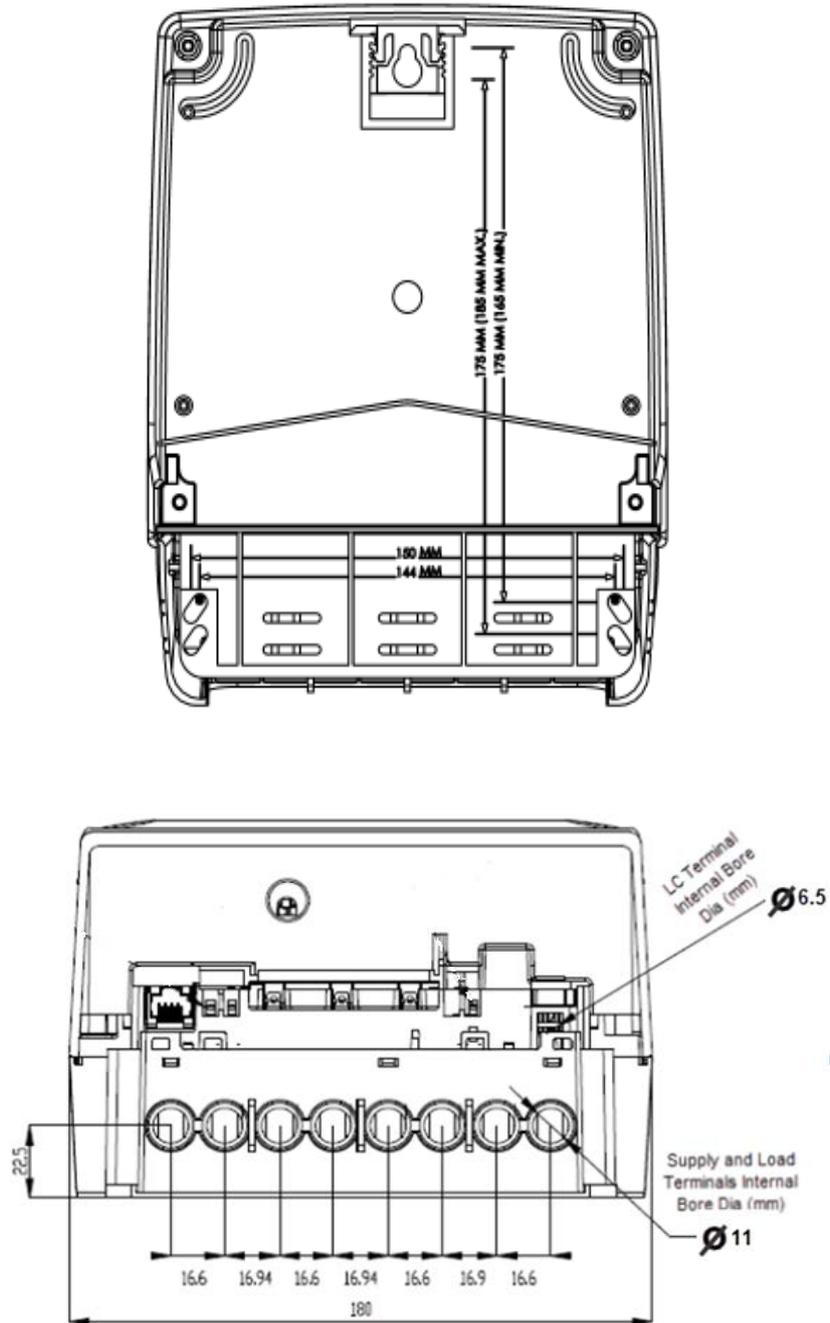


Figure 4: Terminal connections

Sprint 211 supports various mounting options which include arrangements to substitute any currently installed meters too. The figure below displays the rear view fixing dimensions in mm.

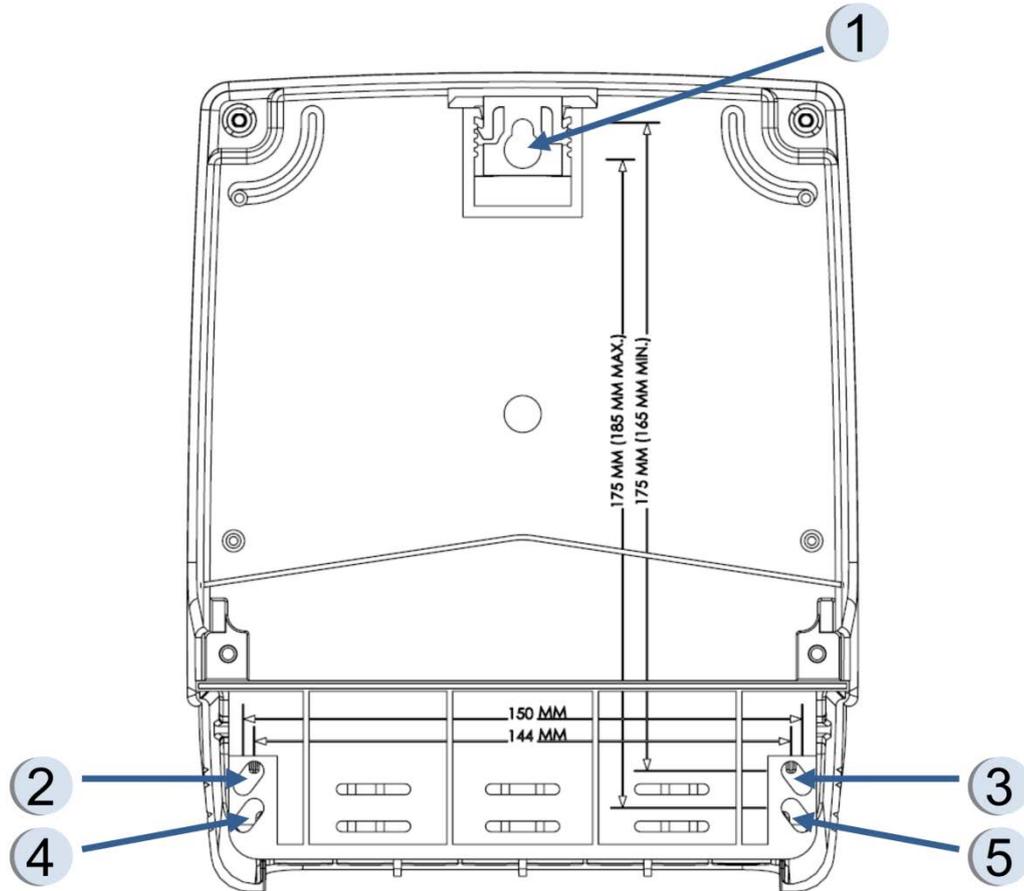


Figure 5: Dimensions and Mounting Details

All the possible mounting options are described in the table below:

Table 2: Sprint 211 Mounting measurements

Options	Mounting arrangement holes	Vertical distance (mm)	Horizontal distance (mm)
Option 1	1, 2, 3	165	144
Option 2	1, 4, 5	175	144

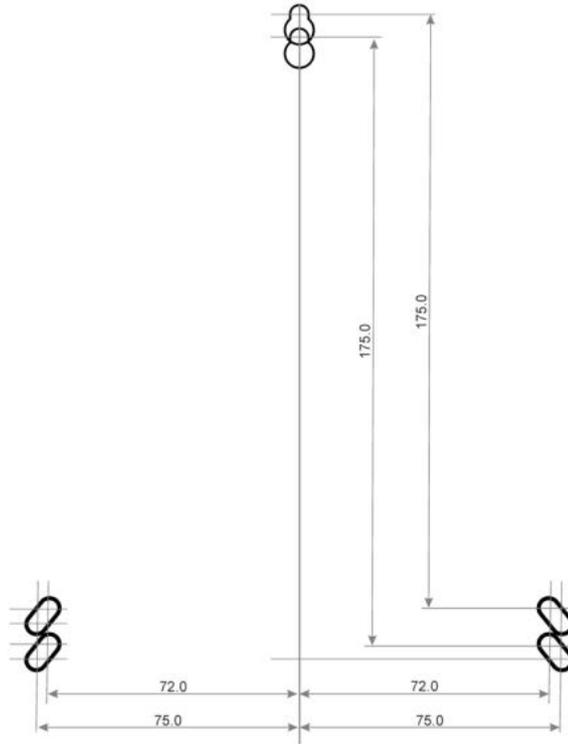


Figure 6: Mounting Arrangements

4.6 Pre-installation checklist

This section provides you with a recommended list of items and tools that will aid you with the installation procedure. Please note that some additional tools may be required depending upon site installation conditions.

4.6.1 Tools and accessories

Carry appropriate tools for meter installation keeping in mind the site conditions.

4.6.2 Selecting an appropriate mounting location

The meter is suitable for wall mounting and can be directly installed on wall with the recommended screws and mounting bolts. It can also be installed on a metering panel inside an enclosure.

NOTE:

To ensure optimal performance of the radio system with the meter, the radio antenna must be fitted externally if the meter (or modem) is installed inside a metal enclosure.

4.6.3 Selecting suitable mounting screws

Given below is a list of recommended Mounting Screws to ensure proper fixing of meter at the mounting location.

Table 3: Recommended mounting screws

S. No	Position for use	Screw type	No. of screws	Screw material	Recommended torque (in Nm)
1.	Top Mounting Hole	AB8	1	-	-
2.	Bottom Mounting Holes (Oblong)	M4	2	Steel	1.2

4.6.4 Selecting the cable

Given below is a general cable chart with details on current carrying capacity using different conductors.

Table 4: Cable selection chart

S. No	Cross section area (mm ²)	Current range : Copper conductor (in Amperes)	Current range : Aluminium conductor (in Amperes)
1.	4	26	23
2.	6	33	30
3.	10	45	39
4.	16	60	50
5.	25	75	-
6.	35	95	-
7.	50	125	-

ⓘ This is a general chart and the installer may refer to vendor specification for the accurate details.

ⓘ Copper cable is highly recommended for current ratings above 50 ampere.

4.7 Installation procedure

Having selected a suitable mounting position for the meter, install the meter using the following procedure.

4.7.1 The groundwork

1. Ensure that all the necessary tools are available.

🔗 Refer to the section 4.6.1 for more details.

2. By visual inspection, check for any loose or exposed electrical connections near the installation location.

🔗 If required, secure the loose connections or use fast-drying, commercially available insulation coating to cover exposed connections.

3. Check and label the polarity of the supply to the consumer circuit.

🔗 Polarity test can be performed by a line tester. Phase wire should cause the tester's LED to glow whereas the neutral wire should not.

4. Ensure that the consumer's installation is safe for isolation.

🔗 Check the health status of fuses, cut-outs etc.

5. Isolate / disconnect the consumer's supply before installation of the meter.

6. Check for the correct cable size.

7. When multiple meters are being installed next to each other on a central panel, ensure that correct position is located for each consumer's meter. Label the meter accordingly.

8. Where a meter box is provided, fix the meter box first and then proceed with the installation of the meter.

9. Remove both main and secondary terminal block cover of the meter. Refer 9.

10. The communication module is an RF device: choose a suitable location for optimum reception.

11. If you are fitting an external antenna: allow adequate space for both the antenna and cable.

4.7.2 Mounting the meter

1. Ensure that the recommended screw is tightened at the correct mounting position.

🔗 The mounting screw should be able to withstand the meter weight (approximately 2 kg).

2. Hang the meter from the top mounting hole provided at the rear panel of the meter.

3. Mark out the positions for mounting screws.

🔗 Refer mounting dimensions given above or mounting template available at the rear of meter packing box.

4. Remove the meter from the top mounting screw and drill out the holes for the bottom mounting screws.

5. Re-hang the meter from the top mounting screw, and then fit the bottom mounting screws.

- ① Two pairs of mounting holes are provided adjacent to the terminal block from which any pair can be used for fixing the meter. These are visible on the front after removing the terminal block cover.
- ① Refer to the section Selecting Suitable Mounting Screws for more details.

4.7.3 Preparing cables for termination

1. Ensure that a cable of the correct rating is being used. If a cable of lower rating is used, replace it with appropriate cable.
2. Strip the insulation of cables used as per given recommendations. Following table shows the internal bore diameters of all the terminals.

Table 5: Sprint 211 Internal Bore Diameters

S. No	Meter terminal type	Internal bore diameter (in mm)	Depth of terminal hole (in mm)
1.	Main Supply & Load Terminals (1S, 2S, 3S, 1L, 2L, 3L, NS, NL)	11	29
2.	Load Control Terminals	6.5	20

3. Check the condition of the cable. If the cable is corroded or oxidized, replace the entire cable.
4. If cable was already stripped for a previous installation, cut the previous stripped length. Re-prepare the cable termination.
5. Loosen the terminal screws and insert one cable core into the terminal cage.
6. Ensure that at least 5 mm of the insulated part of the cable core is inserted into the terminal box shroud. If the cable insulation is thick enough to be inserted into the shroud, strip an extra length of 5.00 mm and insulate this extra length with a standard insulation tape to prevent exposed conductor at terminal end. Terminal block shroud will work as an insulation sleeve.
7. Prepare each core in the same manner for supply as well as load side.

4.7.4 Making connections

1. Insert each conductor core into the appropriate connection cage. Insert each cable into the terminal box shroud. Connect load side first, i.e. 1L, 2L, 3L, NL and then the supply side, 1S, 2S, 3S, NS.

Ensure that no exposed conductor is visible outside the terminal block shroud and approximately 5.00 mm insulated length is inside the shroud.

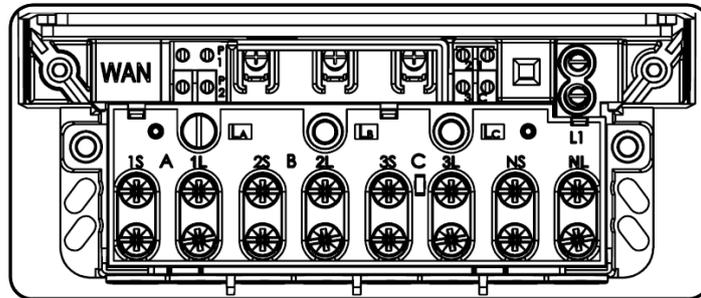


Figure 7: Terminal Block showing all the Load Terminals

2. For Load Control connections, do the following:
 - a. Pull out the insulation cover provided for the phase selection sockets on the Sprint 211's terminal block. (Refer Figure 10: Load Control Connections). By default, the selection socket LA is set to energise the auxiliary load connected to L1. To select supply from a different phase, tighten the screw provided in any ONE of the phase selection sockets i.e. LA, LB or LC above each phase.
 - b. Next insert the cable into the conductor shroud provided for terminal L1 and tighten the screws corresponding to the terminals (positioned adjacent to each other.). Refer Figure 10: Load Control Connections below.
 - c. Fix the phase selection cover back onto the sockets.

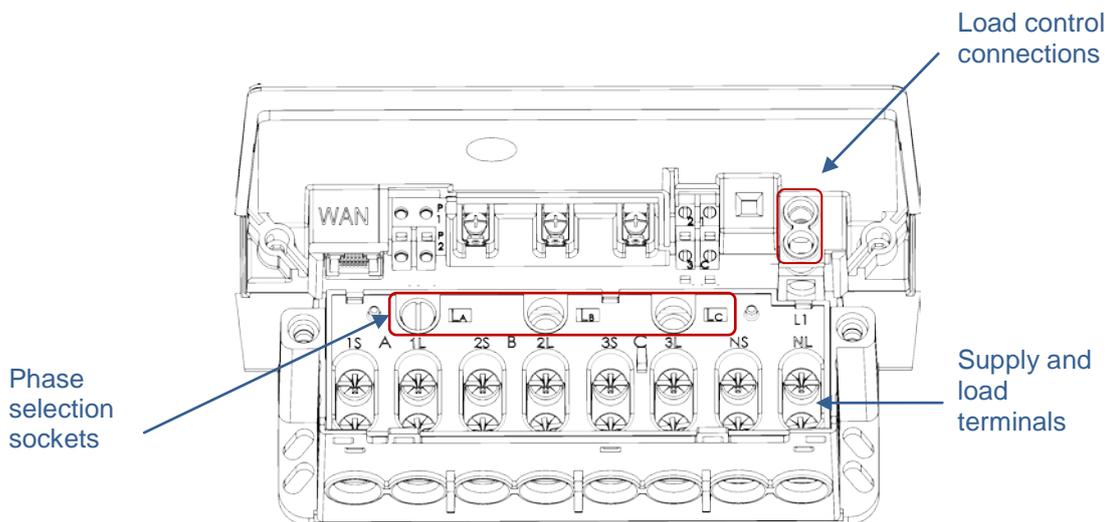


Figure 8: Load Control Connections (Line diagram)



Attention

Be extremely careful to ensure that no conductor part of the cable is in direct contact with any other conductive surface.

Refer the below table for recommended torque. Use a torque screw driver to tighten the screws. Tighten all the terminal screws in turn using a torque screw driver. Tight the lower screws first, followed by the upper screws. Check tightness of lower screw after tightening the upper screw. Check for any loose connections and tighten if required.

Table 6: Details for various electrical connection screws

S. No	Meter terminal type	Screw type	No. of screws	Screw material	Recommended torque (in Nm)
1.	Main Supply & Load	M8	16	Mild Steel	3.5
2.	Load Control Terminal	M5	2	Brass	0.8
3.	TBC sealing	M4	2	Brass	0.7
4.	Phase selection screw	-	1	Brass	2.5

Tightening the screws causes the cage clamp to grip the conductor more tightly. Tightening both screws ensures that the force is distributed correctly.

3. If the installation requires an external antenna refer the Appendix 1: and then return to these instructions.
4. Fit the secondary terminal cover and then the main terminal cover with the screw over the terminal block. Do not seal the screw at this stage.
5. Reconnect the mains supply. The LCD should show 'All segment check' display.
6. If the load is switched on, the calibration LEDs should start flashing in accordance with the current drawn. If there is no load, the calibration LEDs should not flash.
7. Seal the meter with the available sealing kit. Utility seals can be applied at terminal cover and Configuration button. The sealing provision in Sprint 211 is as follows:
 - 2 seals at the back of the meter (upper screws)
 - 2 seals under the terminal cover
 - 2 seals on the terminal cover
 - 1 optional seal for Configuration button
 - 2 seals on module

This completes the installation of Sprint 211.

5 Display and button details

Sprint 211 is equipped with a large multi-segment alpha-numeric LCD display and two buttons for the essential user interface.

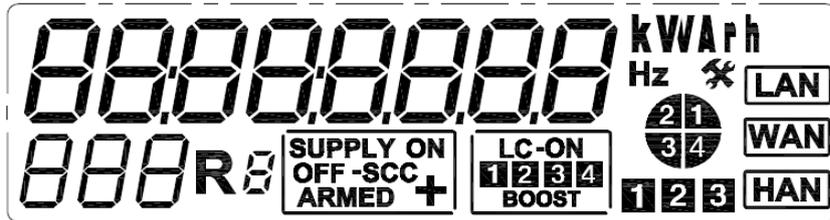


Figure 9: Segment Check for the LCD Display

The LCD screen has various sections and annunciators for displaying specific bits of information such as supply or load connection status, parameter values, user messages etc. An annunciator or a section corresponding to the demanded information is illuminated at the time of display. When powered, the LCD is capable of displaying a group of related electrical parameter values together on a single page.

For example, the mains and auxiliary supply status can be displayed simultaneously on a single display page.

Details of individual sections are summarised below:

Table 7: Sprint 211 LCD segment / Annunciator details

S. No.	Icon / Segment	Details / Remark
1.	00000000	Alpha-numeric main value indicator - This segment displays the values of pre-configured parameters in an interactive mode. It also displays the health status of the meter and messages on the transactions performed with the meter.
2.	kVArh	Unit indicators - These icons display unit values using combination of characters like k, V, W, A, r and h.
3.	+	Sensitive load indicator - This icon indicates presence of Sensitive load mode in the meter. (Sensitive load: Main supply disconnection is not allowed, however auxiliary switch operations are not impacted by this function.)
4.	Hz	Frequency indicator - This icon indicates supply frequency unit.
5.	000	Display code indicator - This icon indicates individual display ID assigned to each of the displayed parameter. This code allows distinction between two similar displays.
6.	R0	NOT USED
7.		Energy quadrant annunciators - glowing of a particular quadrant indicates the instantaneous information about the energy flow, as follows - <ol style="list-style-type: none"> 1 Active import, Reactive import, Lagging PF 2 Active export, Reactive import, Leading PF

		3 Active export, Reactive export, Lagging PF 4 Active import, Reactive export, Leading PF
8.		Load contactor annunciators - glowing of a particular LC annunciator indicates that the switch state is ON. The annunciator is turned off when the switch state is OFF. For Sprint 211, only auxiliary switch 1 is used. During the switch time randomisation period, auxiliary switch 1 flashes to indicate the connection status.
9.		Supply contactor annunciators - Indicates the current connection status of the Supply Contactor. The Switch symbol is illuminated with ON / Armed / OFF annunciators for connected / armed / disconnected status respectively. Note: SCC is not used.
10.		Boost indicator - This icon indicates activation of boost.
11.		NOT USED
12.		WAN communication indicator - Indicates presence of 3G/ GPRS communication modules.
13.		Indicates that the meter is paired or ready for pairing with the HAN device
14.		Service status mode indicator - Indicates that attention and due service by authorised personnel is needed for maintenance e.g. Real Time Clock failure.
15.		Phase annunciators - Indicate the presence of supply voltages at the respective phase. The annunciators also flash if reverse current is detected in any of the phase.

Table 8: Operations possible through Sprint 211 push buttons

S. No.	Function	Details
1.	Parameter Navigation	Sprint 211 may be configured to display a desired list of parameters. These parameters are logically grouped to appear as a different display page, each of which is assigned an individual display ID.
2.	Boost Activation	Boost can be activated by holding the right push button pressed for five seconds. The Boost annunciator glows when boost is activated. Similarly, Boost can be deactivated by repeating this process.
3.	Metrological LED configuration	The metrological LED can be configured to flash on desired energy channel using the parameter navigation function. Note: This is applicable only till midnight cross over, following which, it switches to the factory configured settings. The same is applicable for a power interruption.

5.1 Using the display

Two modes are available for viewing the displays in the meter:

- ☞ Push Button Mode
- ☞ Auto Mode

Push button mode

The push buttons provided on the front panel can be used to navigate through various displays, switching to a different display mode.

Table 9: Push button display mode

Button	Action
Left button	☞ Advance to next page or display the first parameter of the next page.
Right button	<ul style="list-style-type: none"> ☞ Select the next parameter in the current page sequence ☞ To activate/de-activate Boost

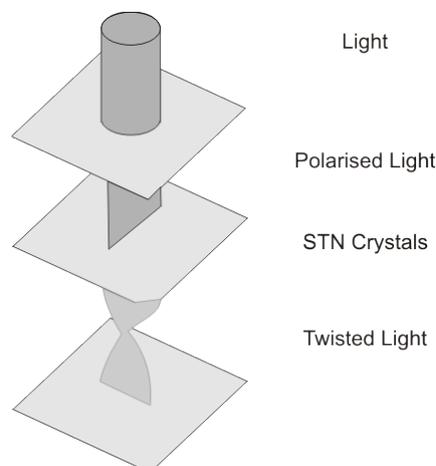
Auto mode

Auto Mode is the default mode for Sprint 211 display. The configured parameters scroll automatically within a specified period. The auto cycle ends with a brief sleep mode of two minutes, following which the display cycle is repeated. Upon power interruption, the display starts in auto mode.

5.1.1 Display types and viewing arrangements

Sprint 211 uses a Super Twisted Nematic (STN) type Liquid Crystal Display (LCD) which offers more contrast than normal TN types. Twisted Nematic Display is the most commonly used crystal display used in digital devices. A STN display contains a liquid crystal sandwiched between two plates of glass, which twists and untwists at varying degrees to allow light to pass through. When no voltage is applied to a STN liquid crystal cell, the light is polarised to pass through the cell. In proportion to the voltage applied, the liquid crystal cells can twist from 180° to 270° changing the polarisation and blocking the light's path.

The example shown below illustrates how the longitudinal polarisation is twisted after passing through STN Crystal Display.



The figure below illustrates the meter display from two different positions:

Case 1: When the meter display is viewed from a level above the meter.

Case 2: When the meter display is viewed from a level below the meter.

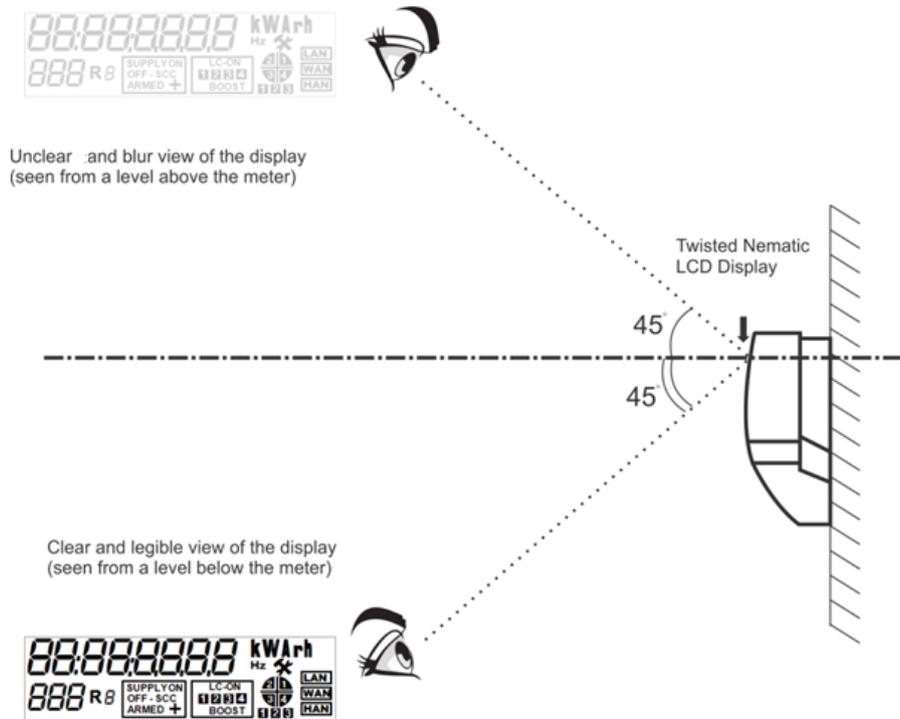
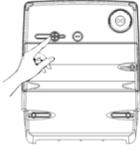


Figure 10: LCD Viewing Angle

6 Appendix 1: Commissioning

Sprint 211 Electricity Meter



Step 1: Press left push button

Press left push button continuously for 5 seconds on the electricity meter to activate the commissioning process.

Note: “LC ON 1” display is only applicable for Sprint 211 Aux variant.

Note: ‘Busy’ indicates the wait period for the communication module ready state (20 seconds)

The commissioning cycle begins with the detection of following event conditions:

1) Meter cover open, terminal cover open and communication module removal

OR

2) Battery fail or memory corruption

This displays appear directly If none of the conditions stated above are detected by the meter

The All phase displays appears automatically after a time out period of 2 secs



OR



(Timeout 2 seconds)



Note: An already commissioned meter automatically displays the default display cycle.

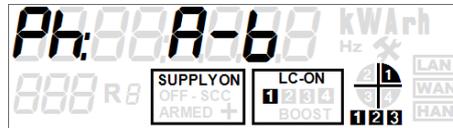
Cover Removal Codes

- 1 indicates Meter cover open
- 2 indicates Terminal cover open
- 3 indicates communication module removal

Note: If no button is pressed within the configured time-out period (30 minutes) then the display automatically returns to the default display cycle .



This display is shown when the left push button is pressed in the previous step.



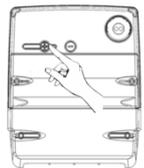
OR

Again press the Left Push button, below display appear.



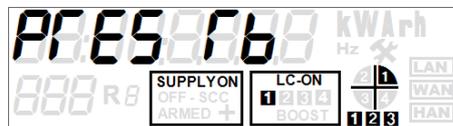
OR

Again press the Left Push button, below display appear.



This display will appear if the Right push button is pressed in any of the previous steps showing phase displays.

Next press the Right button to confirm selection



Followed by

Selected Phase display for E.G.



Note:

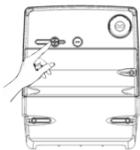
To move to the next display, press the Right button.

Followed by



Before entering into switch test mode, make sure that all the appliances/loads are off.

Step 2: Switch test



The following procedure describes the general flow of the switch tests. Some tests may not be applicable depending on the meter variant.

Note: Press the right push button to skip the switch test and move directly to the next step.

Please note the following in connection with the switch tests to be performed:

Switch type

Mains (Marked with * below)

Auxiliary (Marked with ** below)

Test applicable for variants

- 3P4W (with Auxiliary switch)
- 3P4W (without Auxiliary switch)

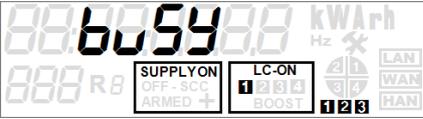
3P4W (with Auxiliary switch)

<p>This display is shown when the left push button is pressed in the previous step.</p> <p>The display shows 'SUPPLY OFF' (2 seconds)</p> <p>'Busy' is displayed showing the wait period for main switch ready status (max. 20 seconds)</p> <p>The display shows 'SUPPLY ON' (2 seconds)</p>	<p style="text-align: center;">Main switch test *</p>  <p>Followed by</p>  <p>Followed by</p>  <p>Followed by</p> 	<p>Note: Initial state of Mains & Aux. Switch will be retained after switch test.</p>
---	---	--

Note: If the switch test (Mains or Aux) fails at any stage, the following display appears:



On pressing any button, the commissioning process is terminated and the display returns to the default display sequence.

<p>'Busy' is displayed showing the wait period for Aux switch ready status (max. 20 seconds)</p> <p>The display shows 'LC-ON' (2 seconds)</p> <p>The display shows 'LC-OFF' (2 seconds)</p> <p>'Busy' is displayed showing the wait period for Auxiliary switch ready status (max. 20 seconds)</p> <p>The display shows 'LC-ON' (2 seconds)</p>	<p>Auxilliary switch test **</p>  <p>Followed by</p>  <p>Followed by</p>  <p>Followed by</p>  <p>Followed by</p> 	
---	--	--

Step 3: SIM registration

<p>This display is shown on successful completion of the switch test described above or if the user has pressed the right push button to skip the switch test.</p> <p>It may take upto 4 minutes for the SIM registration process to complete. During this period, the display shows 'Busy' for the remaining timeout duration in seconds.</p> <p>The meter internally checks the signal strength during this period.</p>	 <p>Followed by</p> 	<p>Note: If the meter receives the valid signal strength for SIM registration, it proceeds to the next display without waiting for the remaining timeout duration.</p>
---	--	---

Note: If the meter is unable to communicate with communication module, the following display appears:



On pressing any button, the commissioning process is terminated and the display returns to the default display sequence.

	 <p>OR</p>  <p>OR</p>  <p>OR</p> 	<p>Any of the following displays is shown based on the detected signal strength and antenna type.</p> <p>By default, antenna type is Internal.</p> <p>The following are the categories of signal strength:</p> <p>(i) 00 to 11 – Low signal strength</p> <p>(ii) 12 and above – Good signal strength;</p> <p>(iii) “_ _” means there is no WAN signal available for the communication module to communicate with WSE</p>
--	---	--

Step 4 : Signal strength test



This display is shown when the left push button is pressed in the previous step.

Press the left push button once again. A countdown timer of 5 seconds is displayed to enable the installer shut the enclosure for performing the closed door test.

At the end of the 5 seconds countdown timer, the meter analyses the signal strength for another 30 seconds. The installer must wait until this period times out.



Followed by



OR



Followed by

Door test is done to check the signal strength for meters which are mounted in an enclosure.

Note: Installer must close the door within 5 seconds of pressing the left push button

Note: During this time, meter will not respond to any button press.

At the end of the 30 seconds timer, the meter displays the analysed results for selected antenna type and minimum signal strength.



OR



OR



OR



Step 5 (a) Switch Antenna (optional)

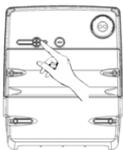


Note: This is an optional step for the installer based on the results of the signal strength analysis acquired in the previous step. If the antenna signal strength is found appropriate for WAN registration refer section **5 (b)** below.

To **switch the antenna** press the left push button in the previous step. The following display will appear:



Press any button to terminate the commissioning process. Next, remove the communication module and change the antenna type. (Internal or External). Again press the left button for 5 seconds to start the commissioning process.



Step 5 (b) WAN registration

This display is shown when the right push button is pressed after completion of the **signal strength test**. The meter performs WAN



Note: The Meter checks the WAN status for up to 2 minutes. When the valid WAN status is received, it automatically switches to next display without waiting for timeout.

<p>registration in this step.</p> <p>This display shows that WAN registration is successful.</p> <p>This display shows that the SIM is not registered/Activated on the network</p> <p>This display shows that the SIM is registered but failed to establish 3G connection with WSE</p>	<p>Followed by</p>  <p>OR</p>  <p>OR</p> 	<p>Note: Refer section 6.2 for 'with WAN' scenario.</p> <p>Note: Refer section 6.1 for 'without WAN' scenario.</p> <p>Note: Refer section 6.1 for 'without WAN' scenario.</p>
--	---	--

Notes:

- ✎ This display is shown when the WAN setting is not configured in the communication module.



- ✎ This display is shown when the SIM is registered on the network but asset details are not available with WSE (Unauthenticated device).



On pressing any button, the commissioning process is terminated and the display returns to the default display sequence.

6.1 'Without WAN' Scenario

<p>Press left push button to switch the HAN antenna from internal to external or vice versa.</p> <p>Press right push button to move to the next display.</p>	<p>Followed by</p>  <p>OR</p>  <p>OR</p> 	<p>Note: The HAN antenna displays appear only if the communication module supports the HAN function.</p> <p>If HAN is not supported, go to Step 6 directly.</p> <p>Note: Before switching to the external HAN antenna, make sure that it is physically connected.</p> <p>HAN icon flashes when HAN pairing is enabled.</p>
<p>Step 6: Installation confirmation</p> <p>Press the left push button to</p>		<p>Note: This display allows the installer to take a decision to go</p>

complete the installation process or press the **right push** button to exit the commissioning mode.



ahead with completion of the installation process or exit the commissioning mode.

This display is shown when the right push button is pressed in the previous step and indicates that the installation process is not yet complete.



Note: This display appears only for 2 seconds, at the end of which, the commissioning process is terminated and the display returns to the default display sequence. To re-enter the commissioning mode, long press the left push button.

Step 7: Installation completion

This display is shown when the left push button is pressed in the previous step. The display indicates that the installation is successfully completed.



Followed by



Once installed, the Auxiliary switch (LC-1) functions as per the Active tariff configured in the meter.

The Install code is displayed for 4 minutes.

The display returns to the default display sequence at the end of the timeout duration or if any button is pressed.

6.2 'With WAN' Scenario

Press the left push button to scroll through the HAN antenna selection displays.

Press the right push button on the required display to select the HAN antenna and move to the next display.



Followed by



Or



Note: The HAN antenna displays appear only if the communication module supports the HAN function.

If HAN is not supported, go to **Step 6** directly.

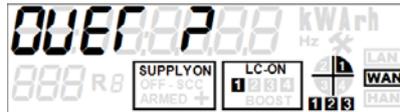
Note:

Before switching to the external HAN antenna, make sure that it is physically connected.

HAN Icon flashes when HAN pairing is enabled.

Step 6: Installation confirmation

Press the **left push** button to complete the installation process or press the **right push** button to exit the commissioning mode.



Note: This display allows the installer to take a decision to go ahead with completion of the installation process or exit the commissioning mode.

This display is shown when the right push button is pressed in the previous step and indicates that the installation process is not yet complete.



Note: This display appears only for 2 seconds, at the end of which, the commissioning process is terminated and the display returns to the default display sequence. To re-enter the commissioning mode, long press the left push button.

Step 7: Installation completion

This display is shown when the left push button is pressed in the previous step. The display indicates that the installation is successfully completed.



Followed by



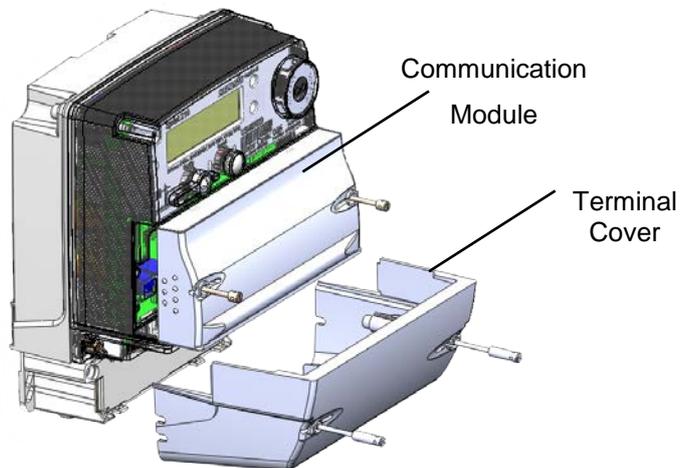
The Install code is displayed for 4 minutes.

Once installed, the Auxiliary switch (LC-1) functions as per the Active tariff configured in the meter.

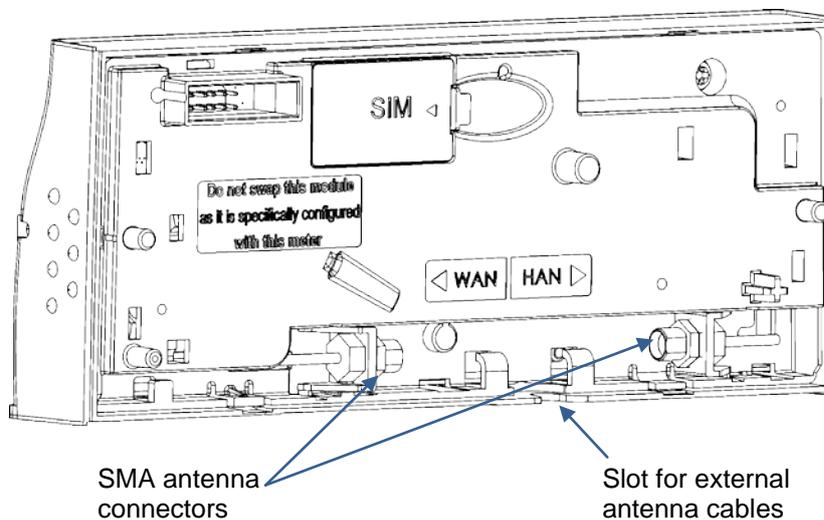
The display returns to the default display sequence at the end of the timeout duration or if any button is pressed.

7 Appendix 1: Fitting an external antenna

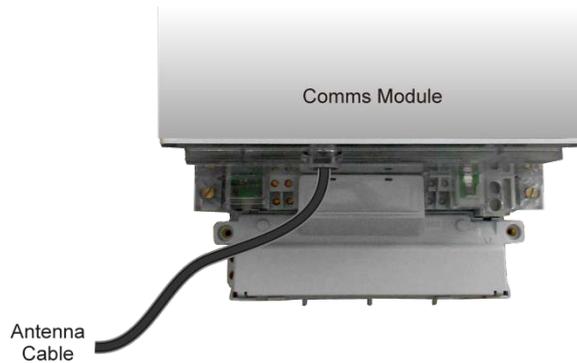
Follow these instructions if the installation requires an external antenna.



- 1 Loosen the sealing screws and carefully remove the communication module.
- 2 Loosen the sealing screws and remove the terminal cover.
- 3 Feed the cable through the cable hole between the module area and the terminal block cover area.
- 4 The external antenna connectors are located on the back of the module.



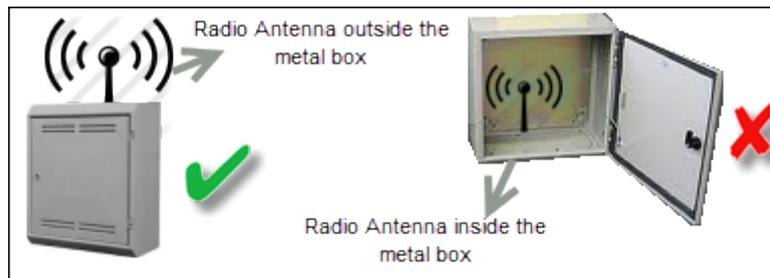
- 5 Be careful when screwing the SMA connector. Do not use excessive force.
- 6 Fit the cable into the cable clips on the module.
- 7 The cable passes through the antenna slot on the edge of the communication module.



- 8 Fit the communication module back onto the meter.
- 9 The antenna cable passes out from the Terminal Block Cover area.
- 10 Fit the Terminal Block Cover.

NOTE:

To ensure optimal performance of the radio system with the meter, the radio antenna must be fitted externally if the meter (or modem) is installed inside a metal enclosure.



Recommendations for external antenna to be used (WAN/HAN):

Manufacturer: Panorama (Part number: LPW-BC3G-26-2SP)

Any alternate antenna selection should be approved by Secure prior to installation to ensure compatibility and avoid degradation of communication performance.

Antenna Placement Requirements

Antenna placement can critically impact the operation of the meter and the radio system and consequently the following recommendations and requirements need to be carefully reviewed and incorporated into the installation.

1. For optimal performance the external antenna should be oriented vertically as per Figure 13: External antenna.
2. The installation of an external antenna within a meter enclosure can have a significant detrimental impact on communications performance and further cause interference with the operation of the meter. To avoid these issues, where the meter (or modem) is installed within a metal enclosure, the radio antenna **must** be fitted externally.
3. Irrespective of enclosure an external antenna must not be fitted within 5 cm of the meter. Where practical, the antenna shall be fitted above the meter.

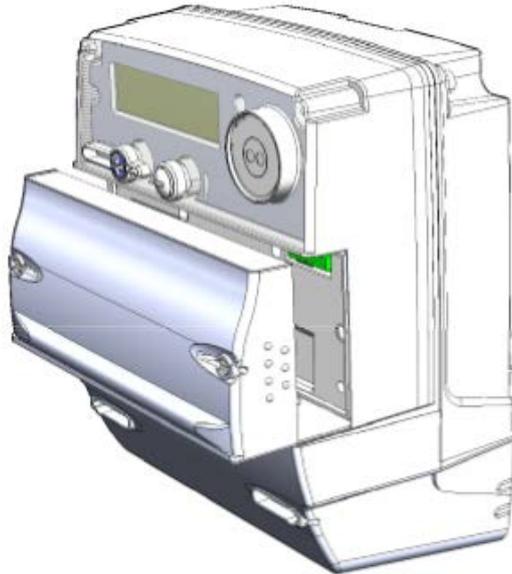


Figure 11: External antenna

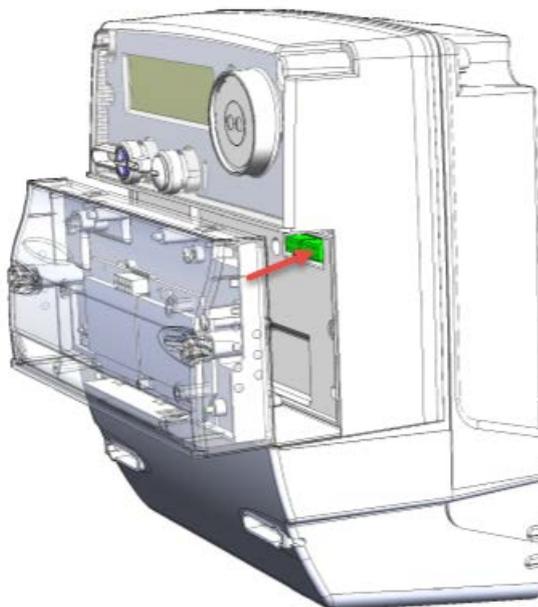
8 Appendix 2: Replacing the communication module

This section describes the procedure to replace an existing communication module in the field.

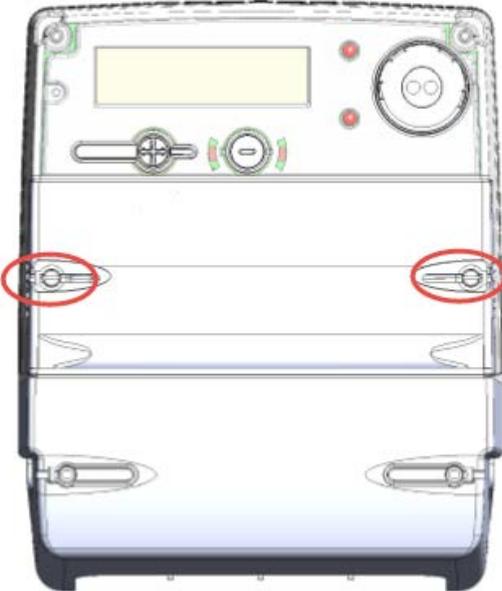
- 1 Loosen the sealing screws on the existing communication module and pull out to detach completely. Refer the figure below.



- 2 To fix the new communication module (plug on device), gently push it straight down into the module cavity, ensuring that the male connector (on the communication module) and female connector (on the meter) fit smoothly. Ensure that the connector pins are not bent or damaged during insertion. A reference illustration is shown below.



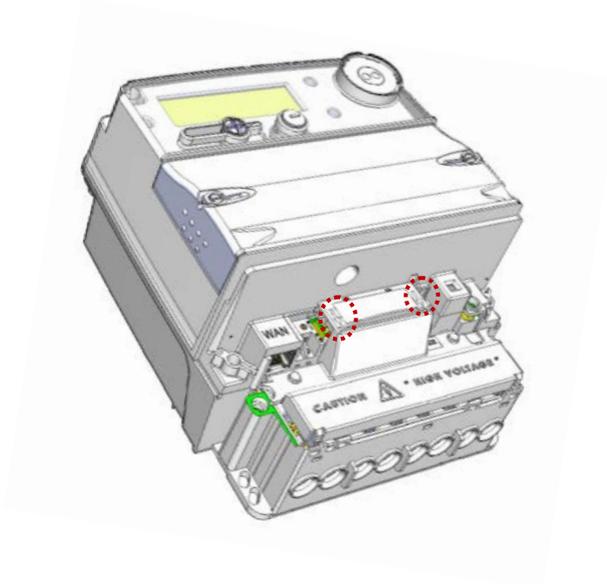
3 Secure the sealing screws by tightening appropriately.



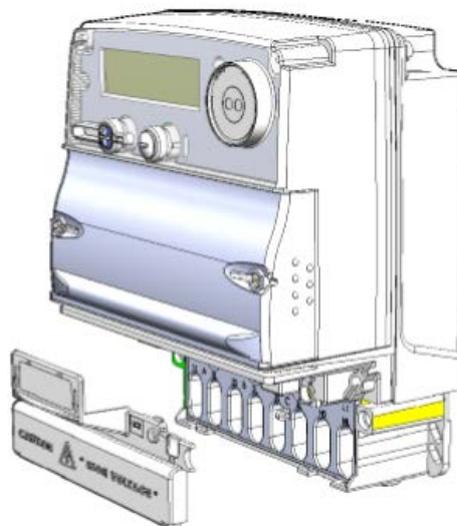
9 Appendix 3: Opening and fitting the secondary terminal cover

Follow these instructions to open the secondary terminal cover.

- 1 First pull downwards at the projection marked with arrows at the snap area, while holding the cover in place around the side walls. This will loosen the cover from the top. Refer to the figure below.



- 2 Next pull the cover at the side walls in upward direction to dismantle completely.



Notes

Notes



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