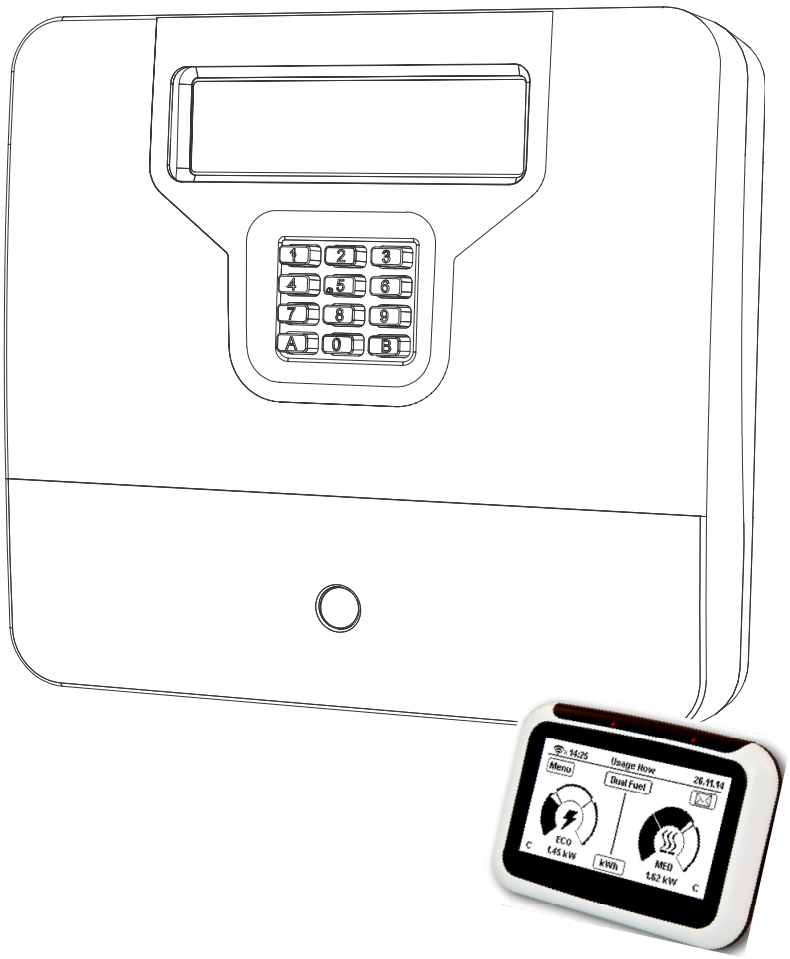
Liberty Connect 100

Electronic Interface Unit (EIU)

In-Home Device

Pipit 500



Installation and Maintenance Guide

BGX501-986-R02

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1 Important

1. As part of Secure Meters' continuous endeavour to improve product design, the specifications mentioned in this document are liable to change and therefore availability of features is product specific.
2. Specifications/features, listed in this document are the most advanced available with Secure Meters on the date of release of this document but shall not be considered as default. Availability of all or some of these depends upon the product variants and may not be readily available. Sales team to be contacted for any query.
3. Any part or whole of this document shall not be published, used or copied without prior consent of Secure Meters.
4. While all efforts have been made by Secure Meters to minimize errors, inadvertently some errors may exist. Secure Meters Limited undertakes to correct such errors wherever possible, and requests feedback from users in this regard.
5. Secure Meters reserves the right to alter some or whole of the specifications mentioned in this document without any prior notice.
6. For any queries or clarifications, the user is requested to contact the Secure Meters Sales team.
7. 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.
8. Secure Meters in principle has conducted product quality tests as per regulations based on the observance of rigorous safety rules in the design and realization of the product.

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.

CE	Liberty Connect 100 conforms to all the essential requirements of EU Directive 1999/5/EC, WEEE Directive 2002/96/EC and complies with RoHS.
	Observe local safety norms when disposing of the product and any batteries that it contains, at the end of their life, to ensure that they do not enter the household waste stream. Secure Meters (UK) Ltd Battery Producers Registration Number: BPRN03577

2 Disclaimer

Whilst every effort has been made in the development of the Liberty Connect 100 unit and its associated documentation, the possibility of error always remains. Secure Meters undertakes to correct such errors wherever possible, and requests feedback from users in this regard.

Secure Meters is not responsible for any losses arising from the use of the Liberty Connect 100, and its warranties are limited solely to the equipment supplied.

Secure Meters assumes no responsibility for damages caused to the Liberty Connect 100 unit under following circumstances:

1. Improper maintenance/installation
2. Imprudence, carelessness
3. Normal (or abnormal) wear and tear of insulation
4. Accidental contact with hazardous elements
5. Immersion of the unit in water
6. Handling of the unit by unauthorized persons
7. Handling of the unit by persons under the influence of alcohol or any other intoxicant

3 Precautions and Safety Practices

1. Installation should be indoor and must only be performed by suitably trained personnel in a safe and secure manner in accordance with local best practice.
2. Care must be exercised during the installation of the Liberty Connect 100 unit and associated equipment. Installation should be done in mains off condition.
3. Local best practice and regulatory stipulations must always be observed. In addition safety precautions recommended for installation of electrical equipment should be strictly followed.
4. Liberty Connect 100 does not have an inbuilt fuse so a 3A fuse must be used prior to the connection of mains and relay in Liberty Connect 100 at the site for protection from short circuits. The fuse must be suitably located, easily reached and must be marked as the disconnecting device for the unit.
5. Wires /cables other than specified in the manual should not be used.
6. While plugging cable between heat meter and Liberty Connect 100, correct polarity should be observed. In case, the cable is ever replaced due to any reason, it is mandatory to re-commission the unit with due process.
7. 'Valve off' flow on the third party heat meter should be zero. If ever this condition is not met during 'valve off' condition, the valve fitting should be properly checked.
8. The Relay Out terminals are hazardous so any maintenance on the valve side should be done after disconnecting the power to the unit.
9. After installation, Liberty Connect 100 unit should be checked for no evidence of overheating and access to the terminals and conductors must be prevented by fitting the covers supplied, ensuring that they are secured in position with the screws provided and if appropriate sealed in accordance with local practice.
10. Liberty Connect 100 unit contains a lithium battery which must be disposed off in a suitable manner at the end of the unit's life.
11. Liberty Connect 100 should not be installed in concealed or semi concealed boxes as this might affect their HAN communication with in-home devices. Install the unit at a convenient height for proper visibility of its display and keypad operation.
12. A visual inspection should be performed before installing the unit to ensure there is no external damage or missing parts and no missing or damaged wiring.
13. Liberty Connect 100 contains no user-serviceable parts.
14. 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.
15. If the equipment is not used in the manner specified in the manual, the protection provided by the equipment may be impaired.

4 Deliverables

Following is the list of deliverables:

S. No.	Deliverables	Items
1	EU1001-Z00	1. Liberty Connect 100 2. Power supply cord – 2 meter length 3. Wired M-Bus cable – 2 meter length 4. Pulse input cable – 2 meter length
2	PMR000-Z25	1. In Home Display - Pipit 500 2. Power supply module AC adaptor (UK Plug)

Note:

Accessories are delivered as per the order.

5 About this Guide

This guide is intended to assist suitably trained personnel in the process of installing and maintaining Secure Meter's smart metering devices.

It introduces the reader to Secure Meter's smart metering devices and provides important safety information for installing and commissioning each device.

Secure Meter's smart metering system comprises:

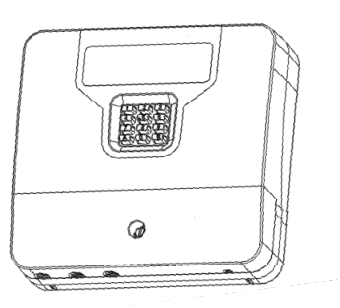
- Liberty Connect 100
- Pipit 500 In-Home Display (IHD)

The following processes are also described in this guide:

- How to fit the Liberty Connect 100. (Refer section 9)
- How to terminate conductors in the Liberty Connect 100. (Refer section 9.1.5)
- How to commission and pair each device. (Refer section 9.3)
- How to replace individual products in field. (Refer section 10)

6 Smart Metering Devices Overview

Liberty Connect 100



Liberty Connect 100 is Secure Meters' latest addition to its very successful Liberty range of smart solutions. It is an electronic interface unit (EIU) which measures heat energy data (via pulses or wired M-bus) received from the third party heat meter.

It also allows data to be read and analysed and is particularly suited to the prepayment and credit systems.

Pipit 500 In-Home Display (IHD) unit

Pipit 500 is an In-Home Display unit with a touch-sensitive LCD screen. It is fitted with a ZigBee® module for communicating with installed smart meter(s) over the wireless home-area network (HAN) via the Liberty Connect 100 unit to display near real-time energy usage and cost of consumption information both numerically and graphically. See the 'Pipit 500 Technical Reference Manual (E+H)' for more information.

7 Operating Principle

Liberty Connect 100 unit is a part of complete system. The design of the system is flexible and will vary between installations. The hub located inside the unit serves as the communication gateway to the head-end system (HES) via WAN and with the IHD via HAN. The GPRS WAN communication module connects the unit to the HES over the WAN while the ZigBee® low power radio HAN module connects the unit with other HAN devices like In-Home Display (IHD).

The below schematic shows a practical example of a heat metering system. The interface is a combination of ZigBee wireless communication (HAN) and GPRS (WAN) networks. The relay is controlled by the Liberty system and is used to open and close the heat flow valve thus controlling consumer usage. The heat meter produces pulses or heat energy data proportional to the heat measured. The pulses or heat energy data represents consumer energy usage. Liberty Connect 100 collects this data and supplies the information to the Liberty system for client billing.

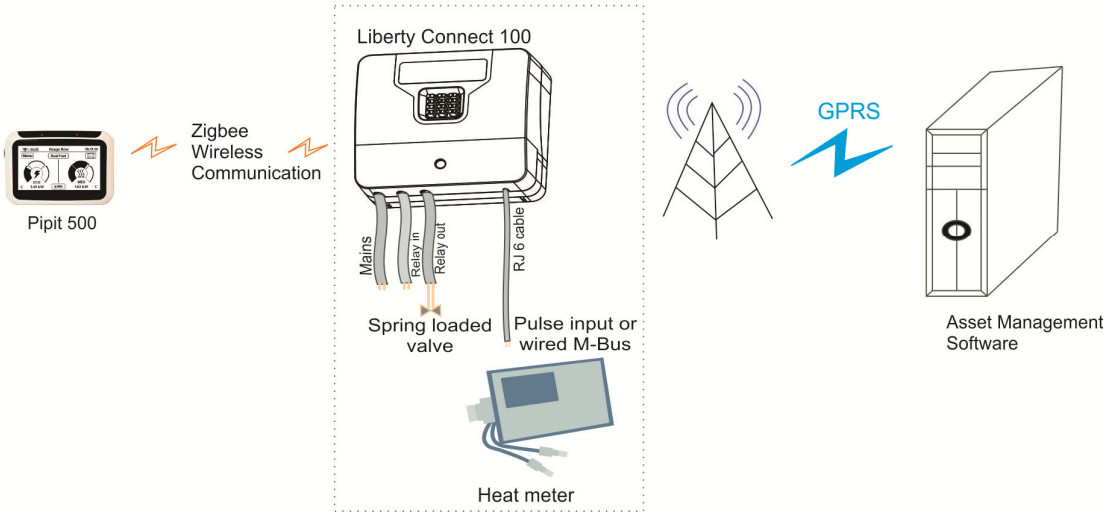


Figure 1: Operational Scenario

7.1 Communication between Liberty Connect 100 and Heat Meter

Liberty Connect 100 is designed to accept inputs from a heat meter. The communication with the third party heat meter is established via pulses or wired M-bus.

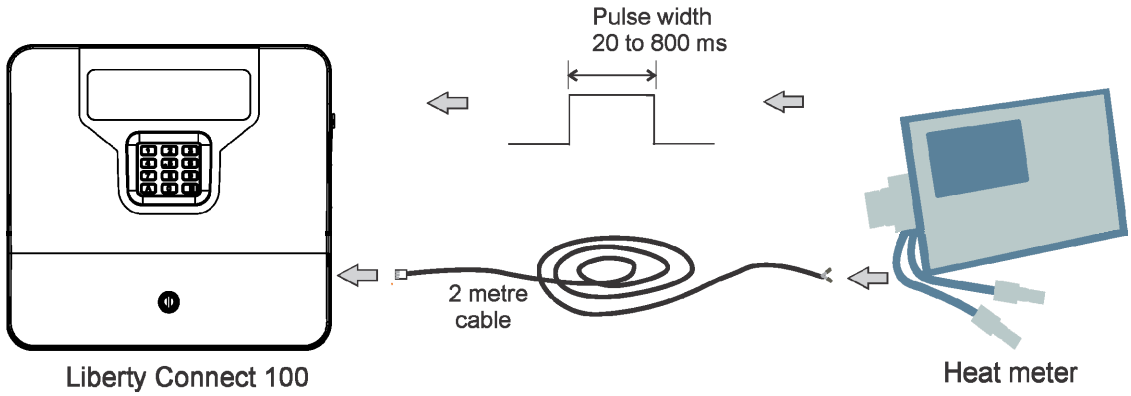


Figure 2: Communication with Heat Meter

The length of cable is approx 2 metres having a plug at one end and lugs at the other end as shown below:

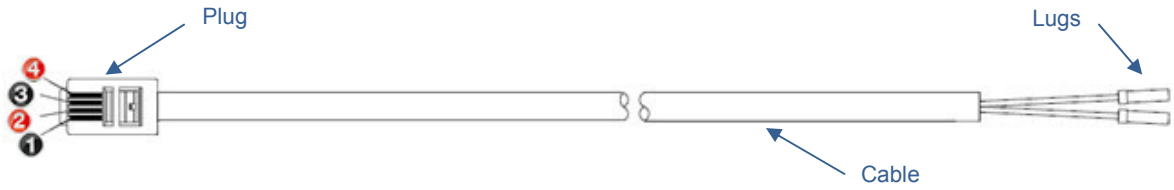
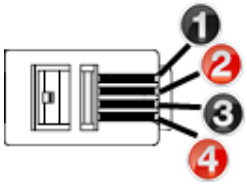


Figure 3: Communication cable

This plug fits inside the RJ6 port (as shown in Figure 6: Liberty Connect 100 parts) and the lugs are inserted in the third party heat meter. For M-Bus and pulse connection the cables are different. The connections of the RJ6 plug are as shown below:

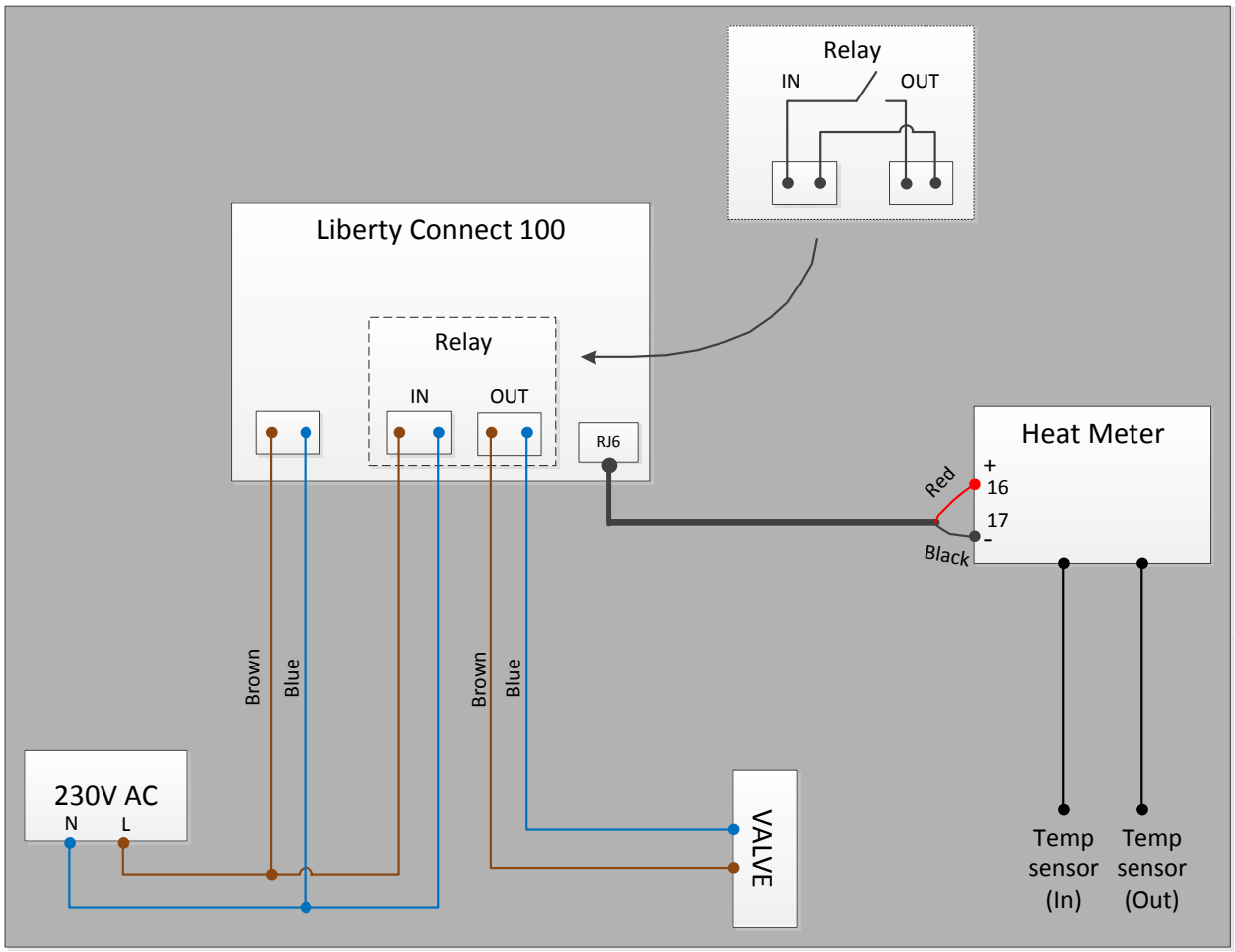
	**Colour**	**Pulse**	**M-BUS**
	Red	4	2
	Black	1	3

Attention

Use appropriate cables for connecting the unit with the Heat meter i.e use pulse cable for pulse mode and M-Bus cable for M-Bus mode.

7.2 Heat meter wiring example

For Pulse input

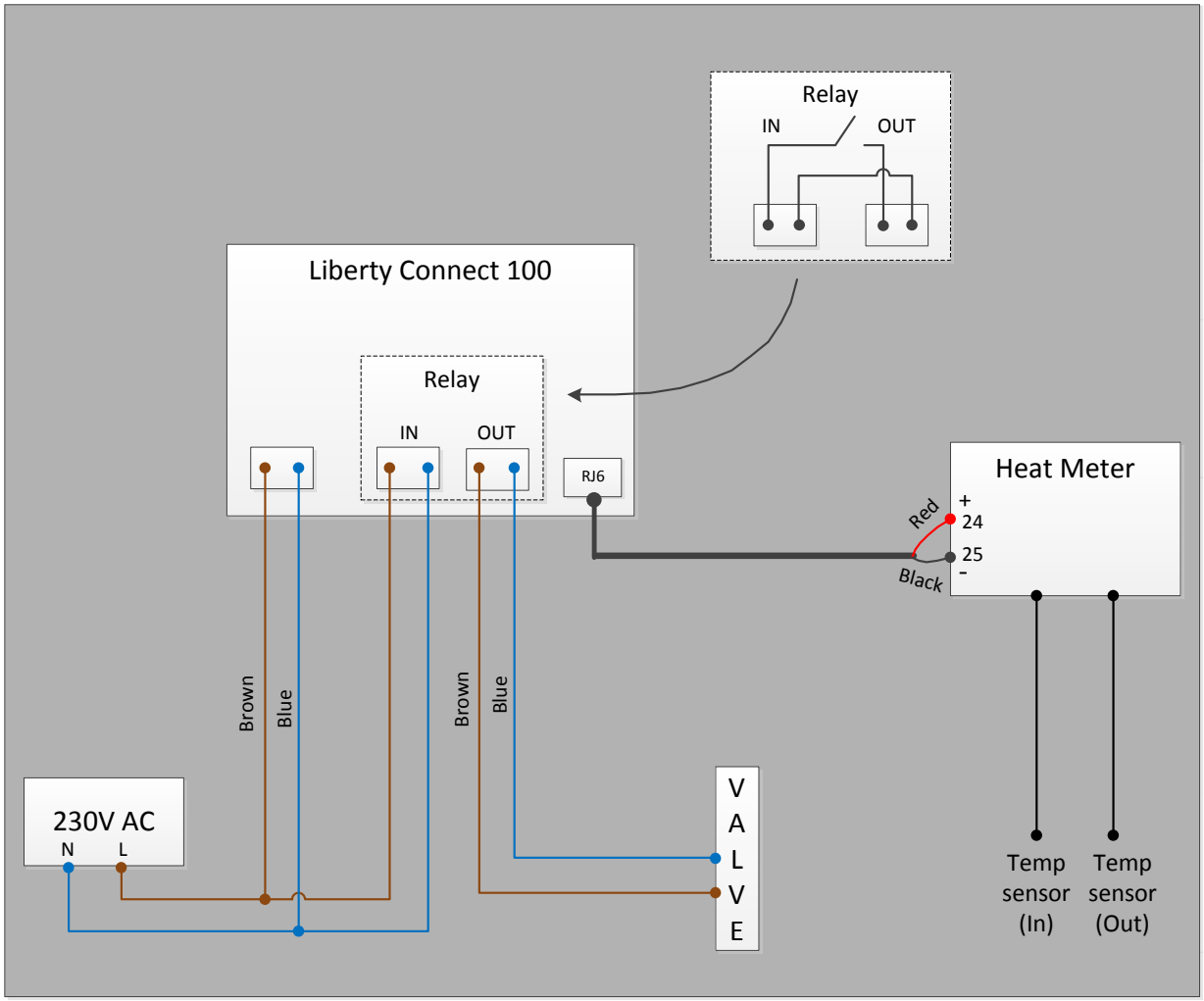


* The pin numbers may vary as per the connected heat meter. Please refer the connected heat meter manual for pin details.

* The relay input voltage can be 12V DC/ 24V DC/ 110V AC or 230V AC

Figure 4: Heat Meter Wiring Example (Pulse)

For M-Bus



* The pin numbers may vary as per the connected heat meter. Please refer the connected heat meter manual for pin details.

* The relay input voltage can be 12V DC/ 24V DC/ 110V AC or 230V AC.

Figure 5: Heat Meter Wiring Example (M-Bus)

8 Product Features

This section describes the physical features of the smart meter devices and information printed on them, the significance of the symbols on Liberty Connect 100's displays, the function of the different keys on the keypad as well as the Pipit 500 display buttons.

8.1 Liberty Connect 100 Parts

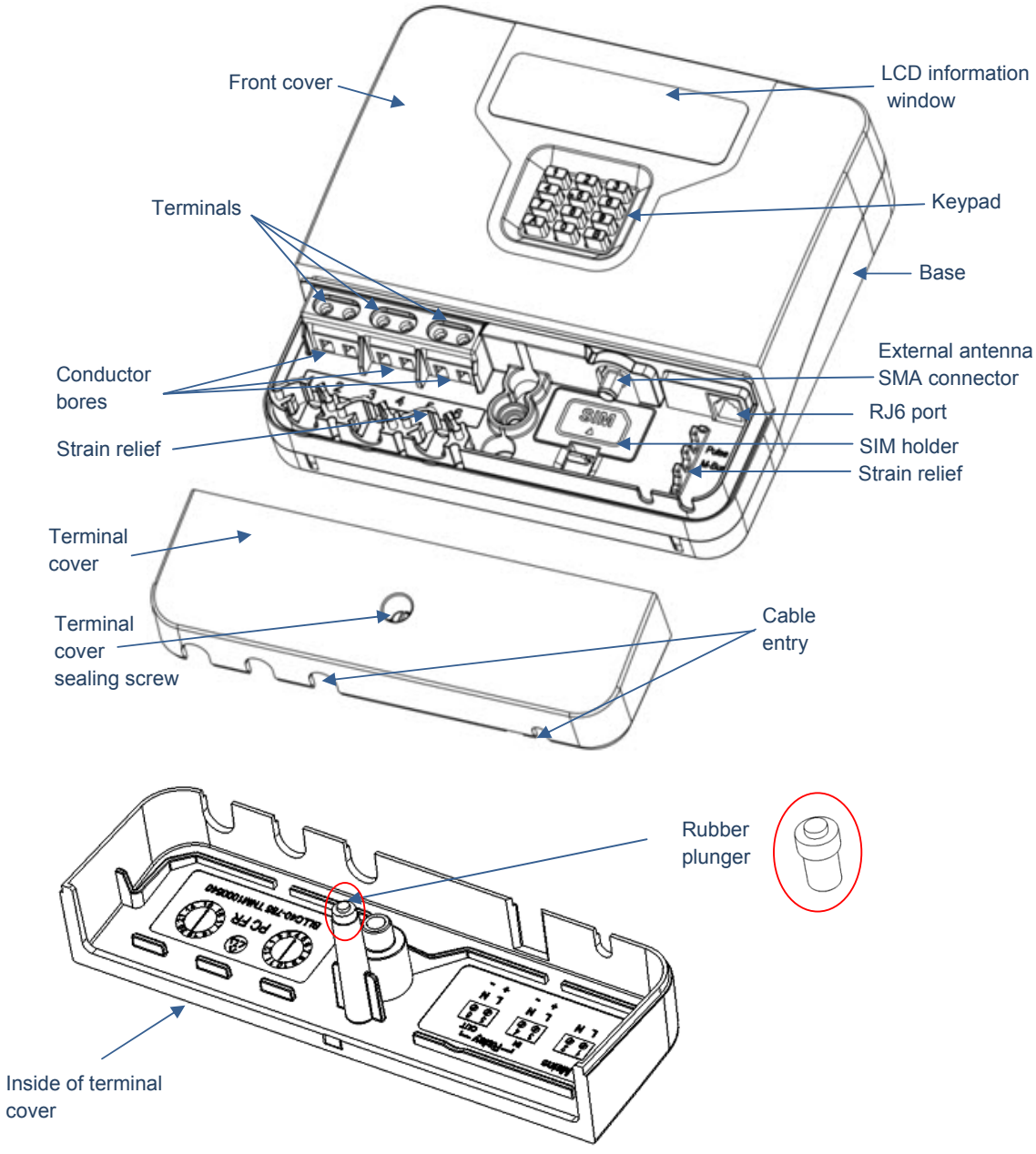


Figure 6: Liberty Connect 100 parts

Information printed on the Liberty Connect 100 front cover

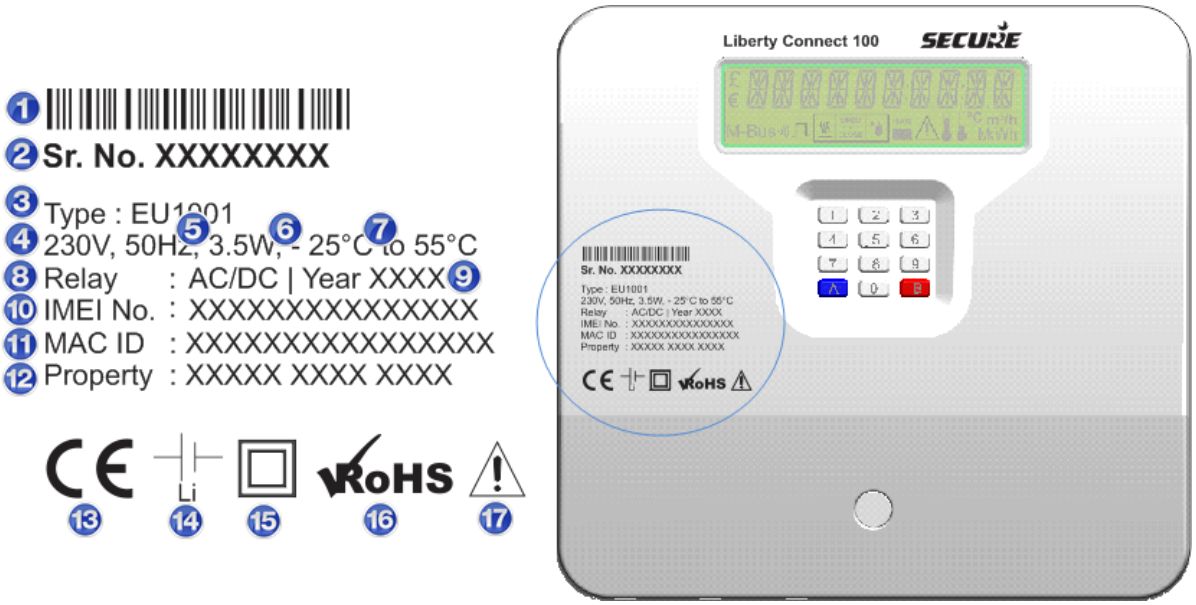


Figure 7: Information on the Liberty Connect 100 front cover

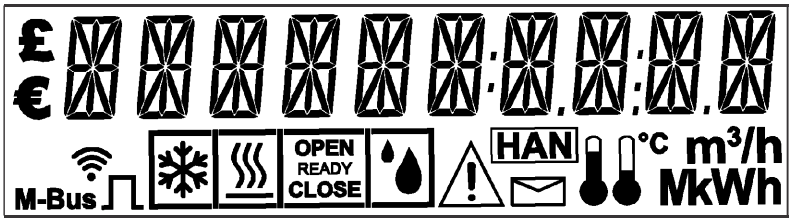
The following table lists the meaning of symbols or information printed on the front cover of Liberty Connect 100:

Number	Description	Number	Description
1	Barcode for serial number	9	Year of manufacture
2	Product serial number	10	IMEI number
3	Category code	11	MAC ID
4	Reference voltage	12	Owner's name
5	Frequency	13	Standard (Conformité Européenne)
6	Power	14	Lithium battery
7	Operating temperature	15	Double insulation
8	Relay (AC/DC)	16	RoHS complaint
17	Warning / Caution		

8.2 Liberty Connect 100 Display

Liberty Connect 100 is equipped with a 150 Segment Transflective STN LCD display.

The LCD screen has various sections for displaying specific bits of information using symbols, numeric and English language characters.



The following table lists the icons that may be displayed on the LCD and their significance:

Display icon	Significance
88888888.88	Displays numeric data such as energy consumption or an alert or message.
£ €	Indicates currency in use
M-Bus	Wired M-Bus
M-Bus	Wireless M-Bus
	Heat meter connection (communication)
	Cooling meter connection (communication)
HAN	HAN communication
	Heat pulse input from Heat meter
°C	Inlet temperature
°C	Outlet temperature
°C	Temperature difference between inlet and outlet
m³/h	Water flow unit
	Caution (Tamper / Event occurrence)
OPEN CLOSE	Valve status (at heat exchanger unit)
kWh / M Wh	Unit of energy consumed
kW / M W	Instantaneous power

Table 1: Description of Liberty Connect 100 LCD icons

Keypad Functions

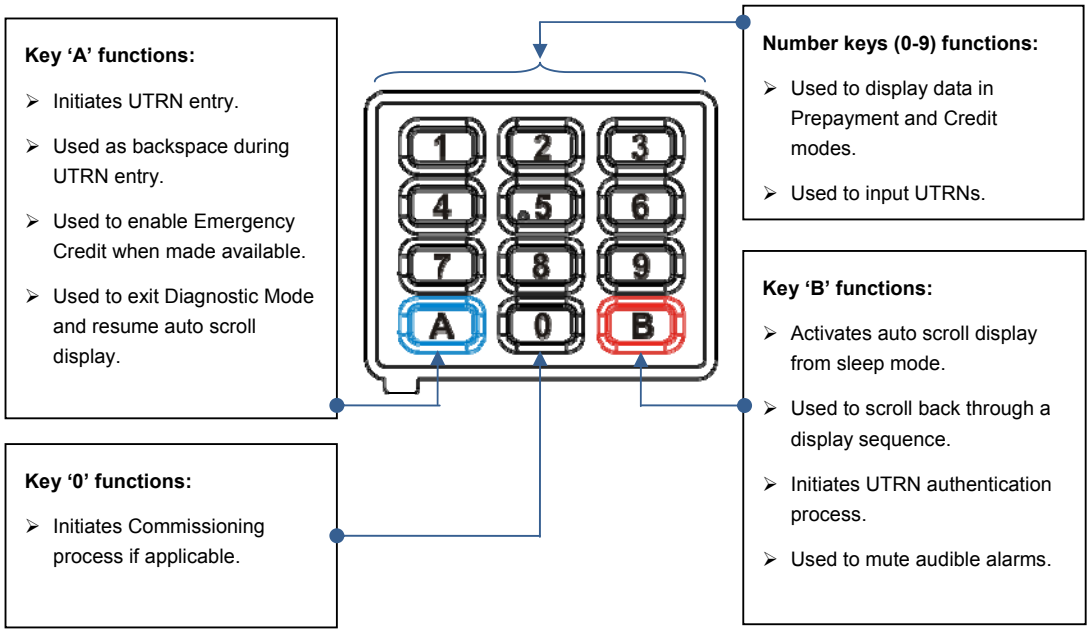


Figure 8: Liberty Connect 100 keypad

8.3 Pipit 500 IHD

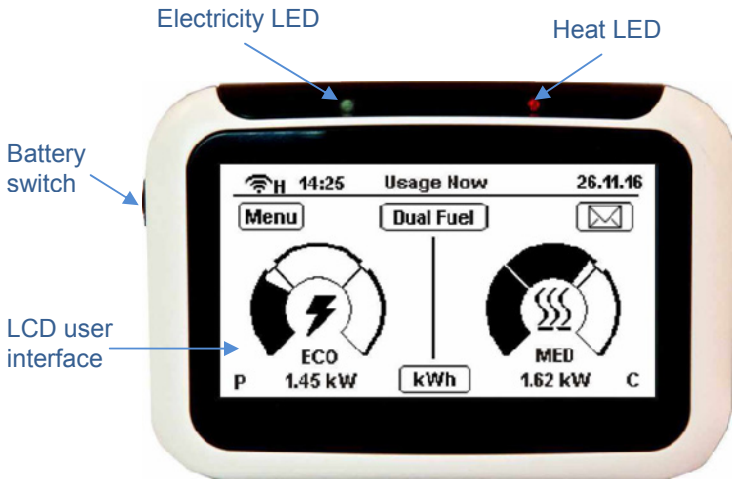


Figure 9: Pipit 500 In-Home Display

Information printed on the base of the unit:

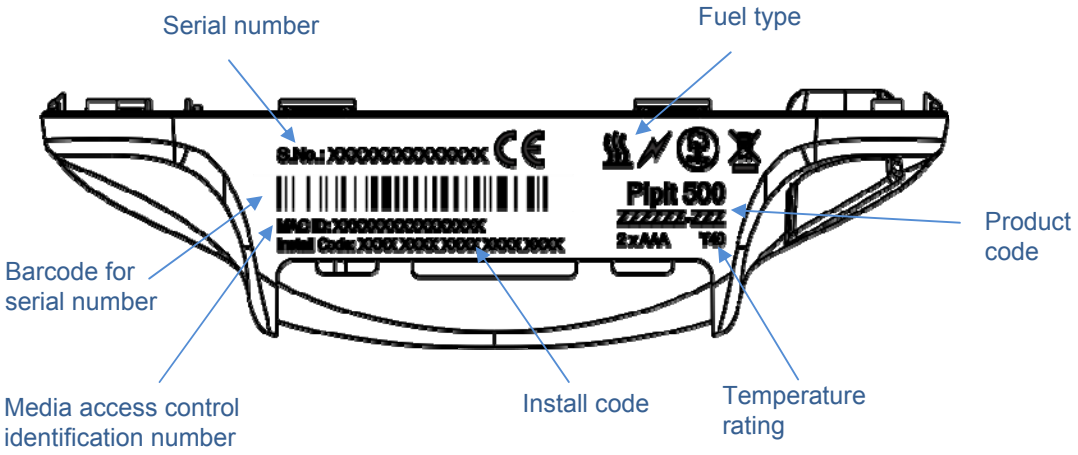


Figure 10: Information printed on Pipit 500

The following table summarises the function of navigation icons displayed on the Pipit's Menu screen:

Icon	Function	Icon	Function
	Gives access to **heat only Home** screen.		Gives access to the **History** screen.
	Gives access to **dual-fuel Home** screen.		Gives access to the **Tariff** screen.
	Gives access to **electricity only Home** screen.		Gives access to the **Account** screen.
	Gives access to the **Messages** screen.		Gives access to the **Settings** screen.

Table 2: Function of Pipit's display icons

9 Installation Process

For installations that include a Liberty Connect 100 unit and an IHD, the installer should note the following points before installing the devices:

- Note the overall dimensions of Liberty Connect 100 to make sure that it can be fitted in the required position. Further, identify and mark the position for mounting the IHD.
- The unit should be wall mounted within 2 meter range from HIU or Heat meter (Pulse and M-Bus cable provided with the unit is of 2 meters)
- Cables should be properly routed through cable entry slot to mains supply unit and heat meter.
- The unit should not be mounted inside metallic enclosure otherwise HAN or WAN communication performance might be impacted. If ever the unit is installed in a closed location, the WAN connectivity should be properly checked before leaving the installation site. The external antenna should be kept outside the closed location for better connectivity.

9.1 Installing the Liberty Connect 100

Before installing the Liberty Connect 100 unit, installer should note its overall dimension to make sure it can be fitted in the required position.

9.1.1 Overall Dimension

The outer dimensions of the Liberty Connect 100 are as detailed below. All dimensions are in mm. Tolerance is +/- 2.0 mm

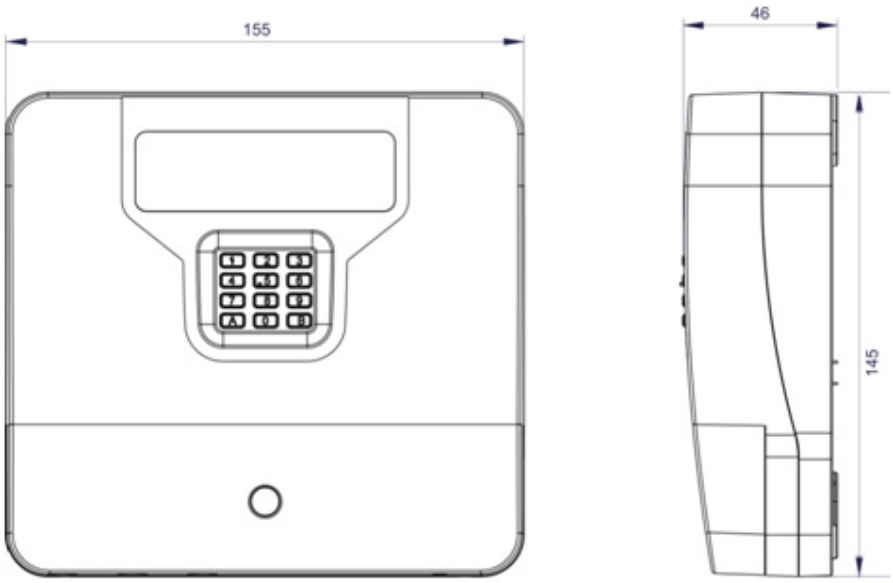


Figure 11: Liberty Connect 100 front and side view dimensions

The distance between each cable entry slot is as detailed below.

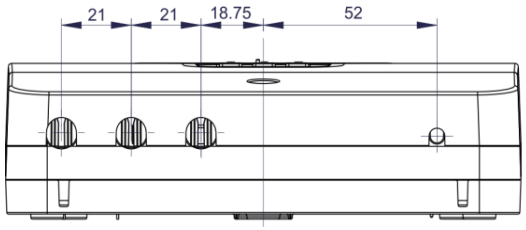


Figure 12: Liberty Connect 100 cable entry view

Note: For wiring convenience, terminal numbers are moulded from 1 through 6 at the front of the unit base near the terminal block area.

9.1.2 Mounting Liberty Connect 100 on the Wall

Liberty Connect 100 unit is designed for vertical mounting, and can be fitted in panels, boards, enclosures or walls. M4 screws must be used to ensure a good fixture.

The unit uses a two point fixing arrangement. The top screw is located on the unit's centre-line and fits into a 'key-hole' locator on the rear of the device. This screw supports the unit in position on the surface to which it is to be attached. One bottom screw is also located on the unit's centre-line.

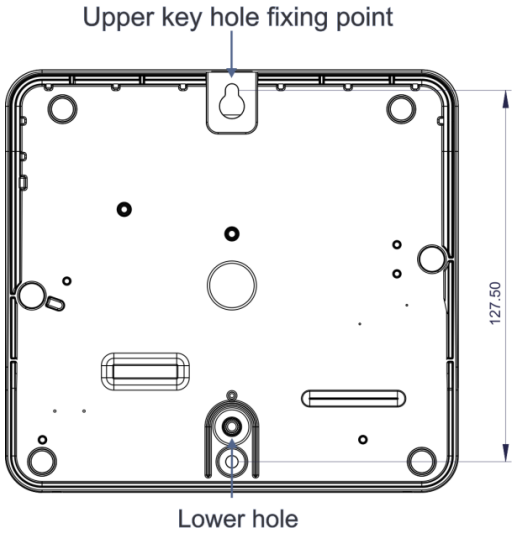


Figure 13: Liberty Connect 100 rear view

1. Hold the unit upright on the wall where it is to be mounted leaving sufficient space on all sides and mark the position on the mounting surface.
2. Drill a hole on the mounting surface and fit the top fixing screw.
3. Fit the unit onto the top fixing screw taking care to align it correctly within the 'key-hole' locator.
4. With the terminal cover removed, mark out the position of the lower fixing screw.
5. Remove the unit, drill hole for the lower fixing screw.
6. Fit the unit over the top fixing screw again.
7. Fit the lower fixing screw.
8. Ensure that the unit is vertical and firmly fitted to the mounting surface.

9.1.3 Connection Diagram

The connection diagram is marked on the inside of the terminal cover.

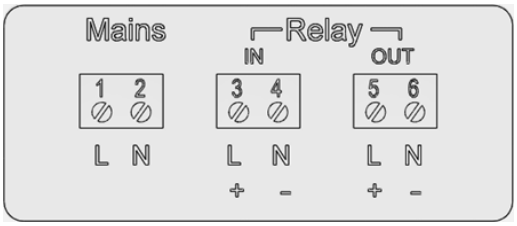


Figure 14: Connection diagram

9.1.4 Cable Specifications (Power supply and Relay In)

Local best practice must be observed when selecting conductor size and type. The cables to be used should be as per the below specifications. Cable(s) should meet compliance as per safety standard recommendation EN 61010-1.

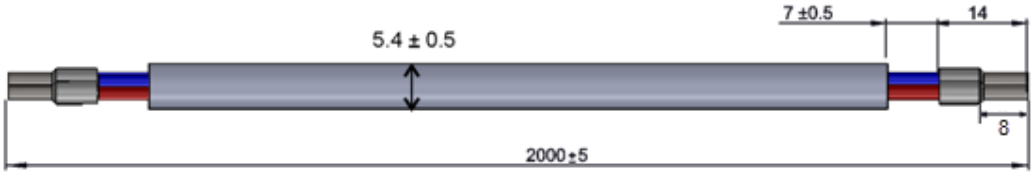


Figure 15: Cable specifications

- The conductors' nominal cross section should be 0.75 mm².
- Crimped lug length should be 8mm (Recommended lug part No: 61801630 from Lapp Kabel, Germany).
- Lugs should fully accommodate the cross section area of conductor which is to be used.
- The conductor must be fully inserted into the full length of crimp connector.
- Relay Out cable termination: For better strain relieving of the relay out cable (Valve cable) at EIU end, it's recommended to adopt the termination type length as specified in Figure 15.

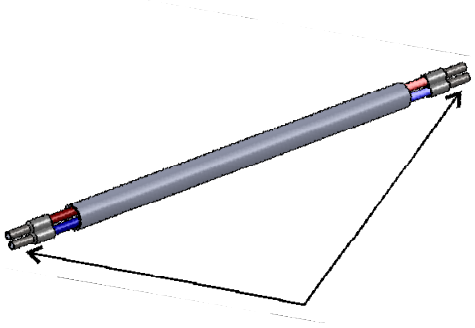


Figure 16: Lugs crimped with the cable

Note: If ever there is a need of changing cables in the field, the above specifications are recommended.

9.1.5 Fitting Conductors

The procedure for fitting the conductors is as follows:

1. Loosen the connector screws fully.
2. Insert lugs into the conductor bores as shown in the below figure.

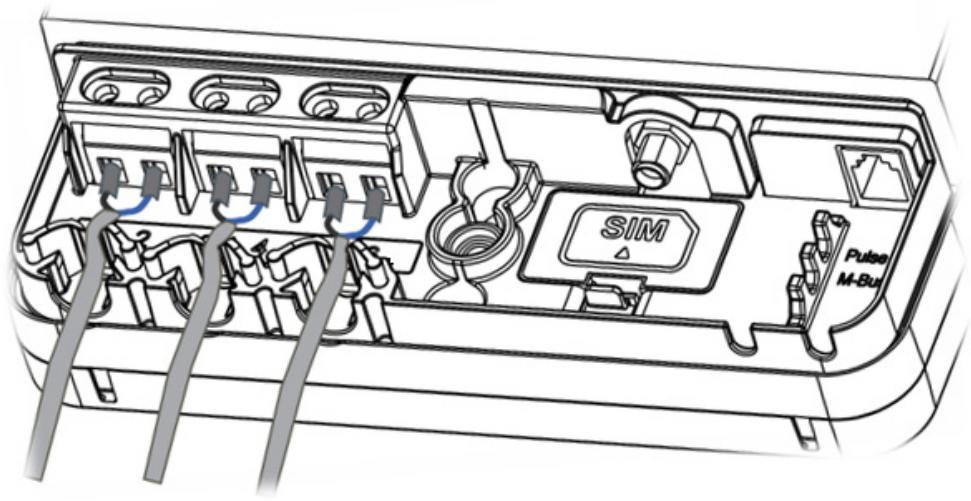


Figure 17: Correct way of inserting cables

3. Tighten the connector screws.

The maximum permissible torque setting for the screws is 0.6 Nm.

4. Fix the cables between the strain reliefs and pass them through the cable entry hole as shown in Figure 17: Correct way of inserting cables. Please note that loose strands or individual cores should not be exposed outside the product once the terminal block cover is fitted.

9.1.6 Fitting RJ6 cable

Insert the RJ6 cable head in the RJ6 port and route the cable through strain relief as shown below:

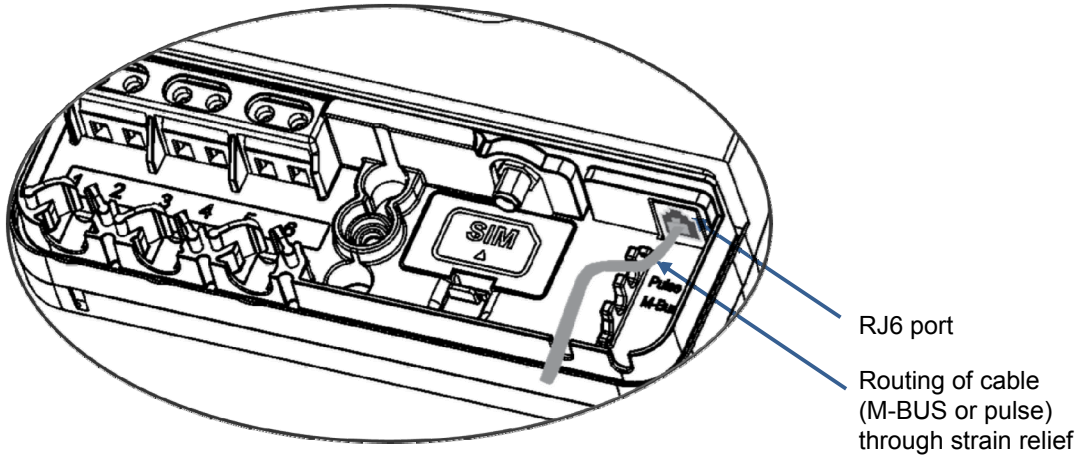
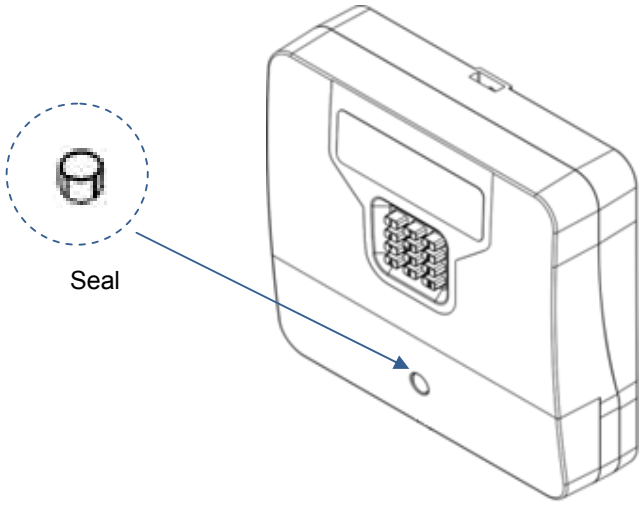


Figure 18: Fitting RJ6 cable

1. Now, fit the terminal cover.
2. Seal the product with the terminal cover in accordance with local best practices after completion of commissioning and pairing with and IHD.


Seal

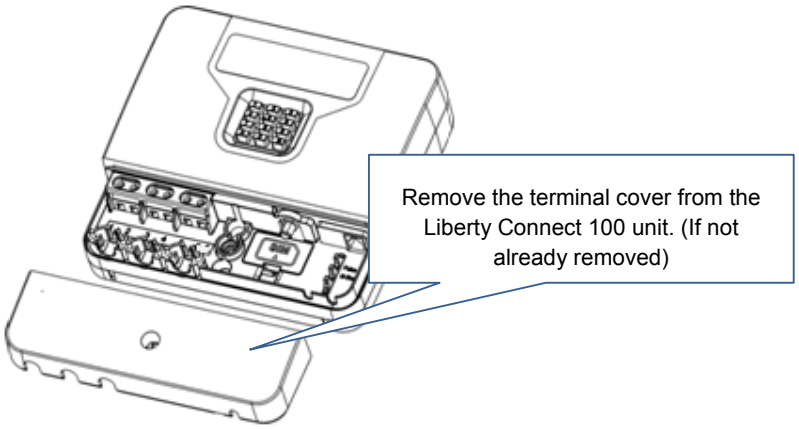
9.1.7 Installing an External Antenna

The need of installing an external antenna can be judged either before the commissioning of meter by looking at the environmental conditions / installation location or during commissioning when the signal strength of the internal antenna is detected as weak.

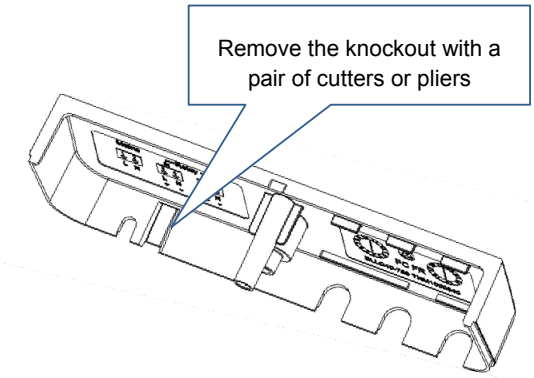
In the later case, the unit should be powered off before plugging in the external antenna and the commissioning process should be started all over again.

The steps to install an external antenna are as follows:

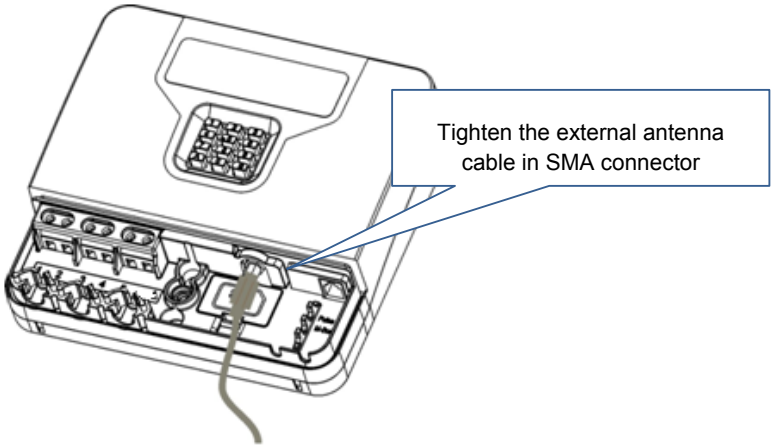
Step 1:



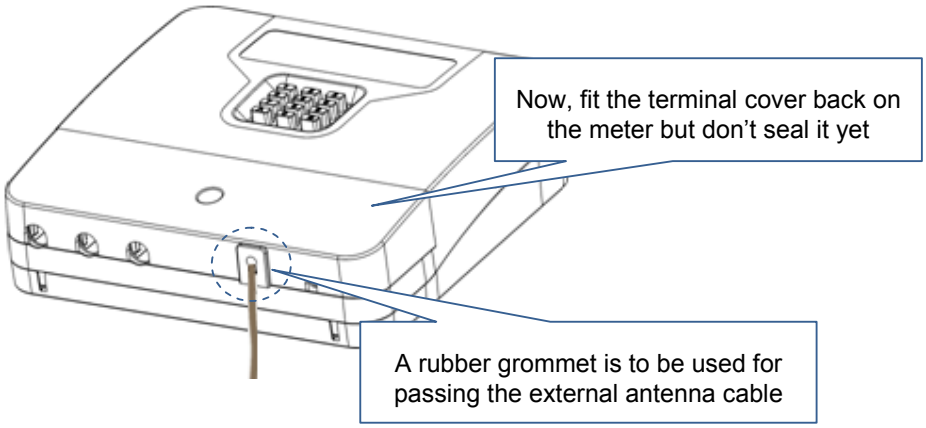
Step 2:



Step 3:



Step 4:



Note: For details and specifications of rubber grommet, please contact Secure Meters Limited.

9.2 Installing the Pipit 500 IHD

Inside your Pipit 500 pack you will find:

- Pipit 500 (In-home display unit)
- Mains power adaptor
- Quick start guide
- Wall mount bracket
- Battery (Optional)

9.2.1 Care Instructions

Before installing the IHD note its outer dimension and then identify and mark its mounting position.

- Do not use the unit for any purpose other than for which it is intended.
- To avoid damage, do not use sharp objects on the display.
- Do not immerse the unit in water or any other liquid. Keep it away from heat-generating sources or areas with high moisture.
- Excessive impact or shock may damage the unit. If the display is damaged avoid touching the liquid crystals contained in it.

9.2.2 Overall Dimension

The outer dimension of the Pipit 500 and its wall bracket are detailed below. All dimensions are in mm.

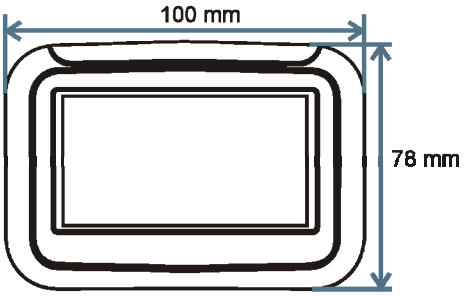


Figure 19: Pipit IHD front dimensions

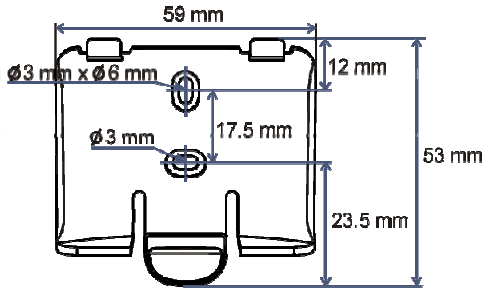


Figure 20: Pipit wall mounting bracket dimensions

9.2.3 Wall Mounting Pipit 500

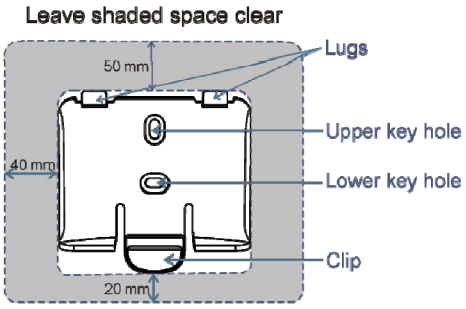


Figure 21: Fitting Pipit wall mounting bracket

1. Select a suitable position for mounting Pipit in agreement with the consumer.
2. Hold the wall mounting bracket upright on the wall, leaving at least 50 mm space above, 20 mm space below, and 40 mm space on either side so that Pipit can be fitted on to the bracket.
3. Mark the positions of the two key holes of the bracket on the wall, and then remove the bracket.
4. Drill holes through each of the marks made on the wall.
5. Hold the bracket against the wall so that the two key holes align with the drilled holes. Insert suitable wall-fixing in each of the holes and then fix the bracket in place using M3 screws.
6. **Prepare the battery cover for fitting Pipit on to the bracket:** remove the battery cover from the rear by sliding the cover downward and then break the section along the dotted line shown in the following figure:

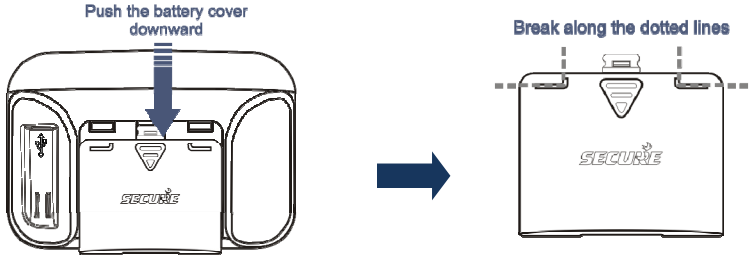


Figure 22: Remove and prepare the battery cover

7. Fit the battery cover back on to Pipit by sliding the top lug of the cover onto Pipit's middle groove at the back.

Figure 23: Fitting Pipit's battery cover

8. Align Pipit's top two grooves at the back with the top two lugs of the wall bracket and then slide it gently with a downward push until a click is heard.

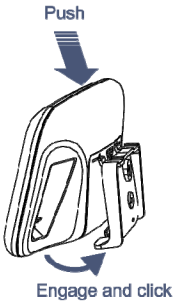


Figure 24: Mounting Pipit on its bracket

9.2.4 Releasing Pipit from the Stand

To release Pipit from the bracket, push the clip downwards from the front and at the same time hold and lift the unit up and away from the bracket.

9.2.5 Connecting the Adapter Cable

Figure 25: Pipit adapter and its label

To connect the unit with its power supply, insert the small end of the power adapter cable into the socket at the back of the display with symbol 'B' facing outwards as shown in the following figure; push the cable into the groove of the cable grip to secure the connector. Plug the other end into a power outlet and switch the power on.

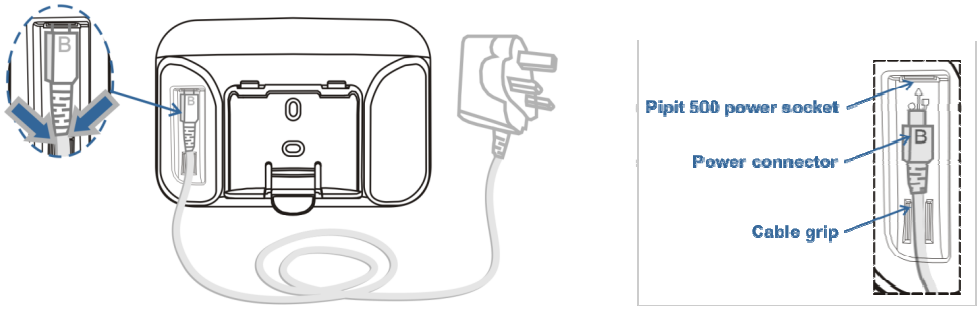


Figure 26: Connecting adapter cable to Pipit's mini-USB socket

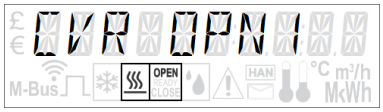
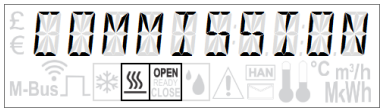
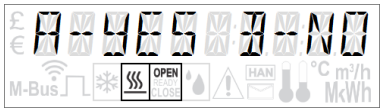
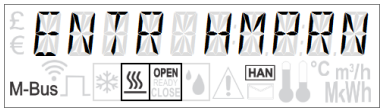
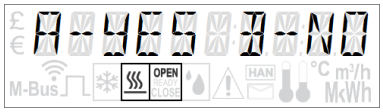
Only use the adapter provided with the Pipit to power it.

9.3 Commissioning of Smart Metering Devices

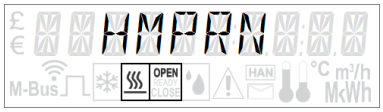
Ensure the following conditions before starting commissioning of the product

1) Product should be properly mounted.
2) Cable connections, power supply, relay IN and relay OUT should be verified.
3) Cable conductor should be properly tightened and cables should be passed through strain relief and cable entry hole provided in terminal block cover.
4) The terminal block cover should be closed and product should be sealed only after completion of commissioning and pairing it with the IHD.
5) The Liberty Connect 100 unit if previously registered on the WSE must be deregistered before commencing the commissioning process.

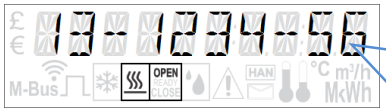
Note: Liberty Connect 100 unit allows entering into commissioning mode after 30 seconds from power up time.

Liberty Connect 100		
Action	**Associated Displays**	
Step 1:  Press key ‘0’ on the keypad to activate its commissioning process. The process begins with the detection of (1) terminal cover open. If the cover is open then ‘Cover Open’ will appear along with its corresponding number as shown on the right-hand column. Close the cover and then press key ‘0’ to begin the process again; when the cover is closed, the following two display sequences will appear prompting the user to press key ‘A’ to initiate the commissioning process.	 Followed by  Followed by 	‘CVR OPN 1’ indicates the terminal cover is open; If this display disappears then it indicates that the open cover is restored to close position without exiting the commissioning mode; **Notes:** 1) If the unit is already commissioned then it will dislpay an auto cycle. 2) Spare rubber plunger for terminal cover open detection is provided in ship way kit
Step 2:  After pressing key ‘A’ in the previous step the display prompts for the HMPRN (Heat Meter Point Reference Number).	 Followed by 	**Note:** Press key ‘B’ to skip HMPRN entry.
Step 3:  **then enter the HMPRN**		

Pressing key ‘A’ displays the HMPRN title.



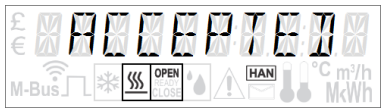
Enter the HMPRN number that identifies the installation point (see the example).



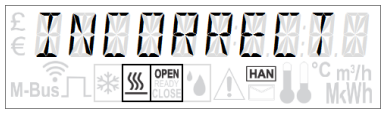
During the HMPRN entry use key ‘A’ for deleting the digit to the left.

Step 4: 

Press key ‘B’ for HMPRN authentication.



Or

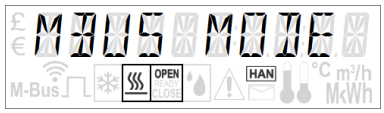


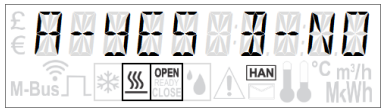
Note: No entry within 20 seconds, ‘INCORRECT’ is displayed. The display will then return to the display in step 2, i.e. ‘HMPRN ENTRY’ followed by ‘A-YES B-NO’. Press key ‘A’ to re-enter the correct HMPRN or key ‘B’ to skip HMPRN entry.

WAN registration:

WAN registration process starts itself as soon as the unit is energised and will take approx. 3-4 minutes during which the Mode and heat flow check can be continued.

Step 5: Mode check

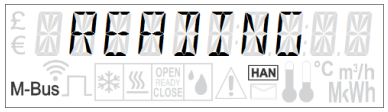


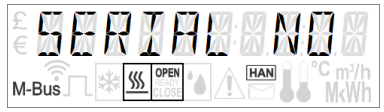


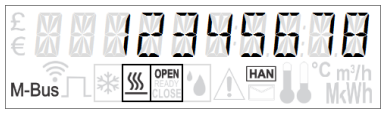
Press key ‘A’ to enter the MBUS mode or press key ‘B’ to move to the Pulse mode (**Step 9**).

Step 6: 

If key ‘A’ is pressed in the previous step then the following is displayed.





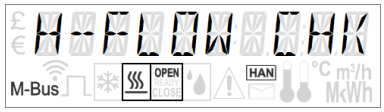


M-Bus icon will keep blinking until successful communication is established and will become stationary thereafter.

Step 7: Heat flow check in M-Bus mode

Notes:

It is advisable to perform the heat flow check for making sure that there is no leakeage on the valve side and the same is operating properly.

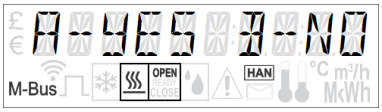


Followed by

Note: Press key ‘B’ if heat flow check is not required.

If no key is pressed within the configured time-out period then the commissioning

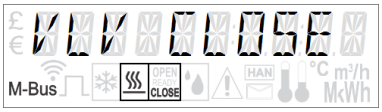
The Valve open and Valve close tests are monitored for 3 minutes each with extra 3 minutes being added on each retry.



process will terminate and the display returns to the default display sequence.

Step 8: 

If key ‘A’ is pressed in the previous step then the following is displayed.



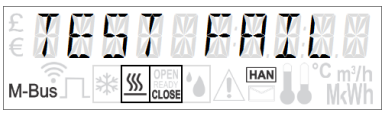
The display shows ‘VLV CLOSE’. The interface unit is tested for heat flow Off condition.

Note: During ‘Valve close’ water flow on the third party heat meter display should also be zero.

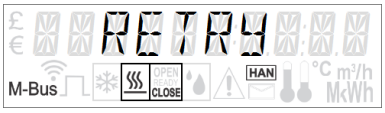
If this condition is not met during ‘valve close’ condition, the valve fitting should be properly checked.

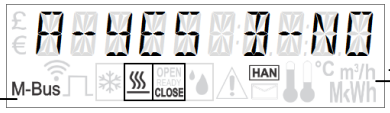
Followed by

If any increment in energy value

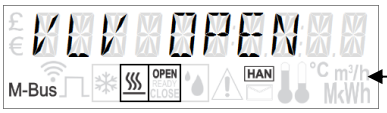


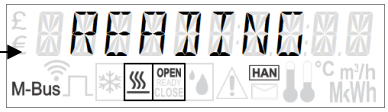
Else





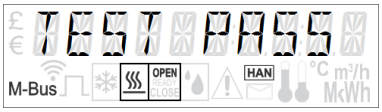
The display toggles between these two screens until key ‘A’ or ‘B’ is pressed.



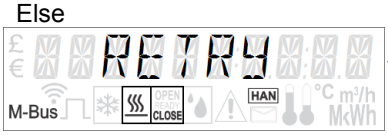


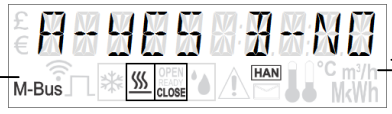
Note: ‘Reading’ will be displayed while the processing is done.

If any increment in energy value



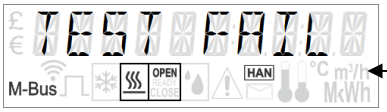
Else





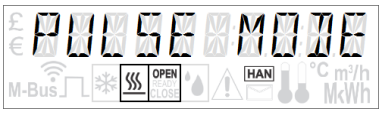
The display toggles between these two screens until key ‘A’ or ‘B’ is pressed.

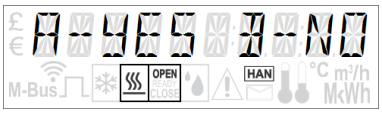
Test fail means “Exit from Commissioning Mode” and installer has to restart the commissioning process.



Step 9:

If key ‘B’ is pressed in **step 5** then the following is displayed.

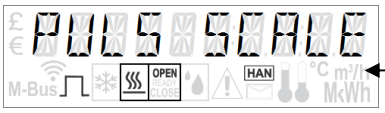


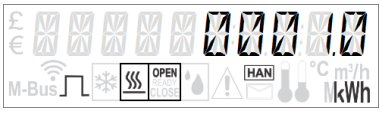


Press key ‘A’ to enter the Pulse mode or press key ‘B’ to exit the commissioning mode.

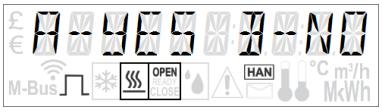
If key ‘A’ is pressed then the display prompts for entering the Pulse scaling.

Pulse icon will keep blinking until successful communication is established and will become stationary thereafter.

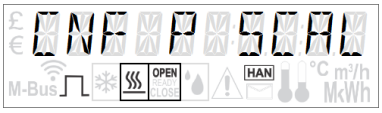


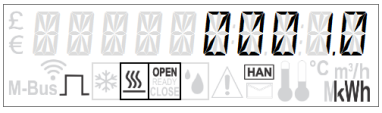


The default scaling value is displayed first.

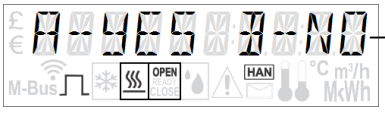


Press key ‘A’ to confirm the scaling value else press key ‘B’ go to **Step 9.1**.

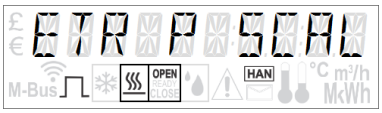




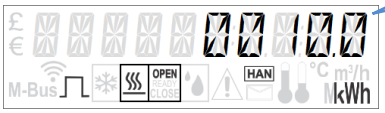
Press key ‘A’ to confirm the scaling value else press key ‘B’.



Step 9.1 If key ‘B’ is pressed then the following is displayed.

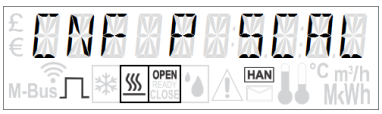


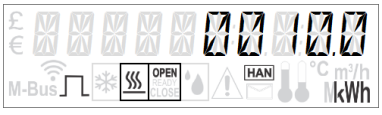
The first digit will appear after the decimal then it will start shifting left on entering subsequent digits.



For example, on entering 1, the display will show 0000.1

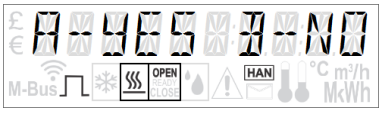
Further, on entering 0, the display will show 0001.0 and so on. The first entered digit will keep shifting to the left.



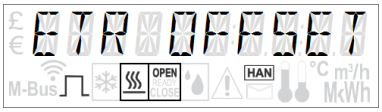


On pressing key ‘B’ the display will ask to confirm the scaling value.

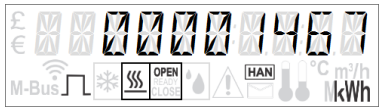
Press key ‘A’ to confirm or press key ‘B’ to re-enter the value.



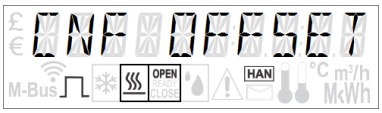
If key ‘A’ is pressed then the display prompts for entering the Offset which is the value of energy on the display of third party heat meter.

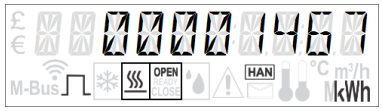


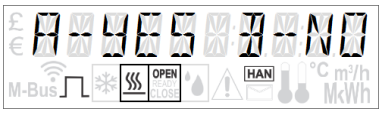
On pressing key ‘B’ the display will ask to confirm the offset.



Note: Entered value should match with the value of energy at the Heat meter side.







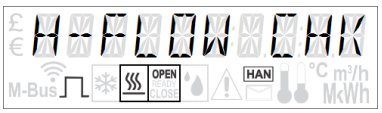
Press key ‘A’ to confirm or press key ‘B’ to re-enter the value.

Step 10: Heat flow check

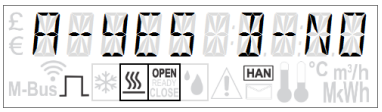
Press key ‘A’ to begin the heat flow check.

Note: During ‘Valve close’, water flow on the third party heat meter display should also be zero.

If this condition is not met during ‘valve close’ condition, the valve fitting should be properly checked.



Followed by

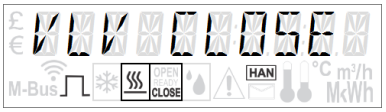


Note: Press key ‘B’ if heat flow check is not required.

If no key is pressed within the configured time-out period then the commissioning process will terminate and the display returns to the default display sequence.

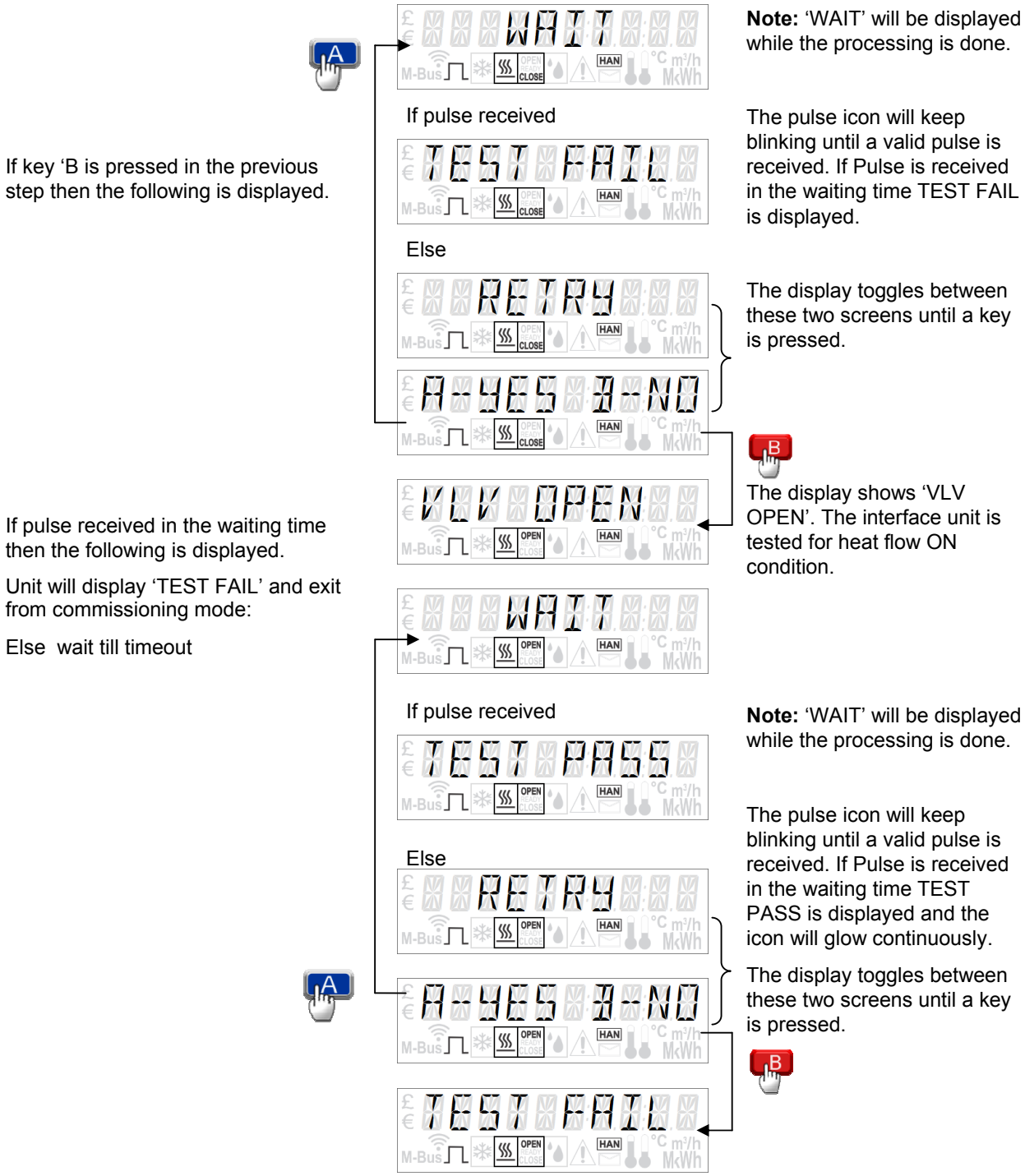
Step 11:

If key ‘A’ is pressed in the previous step then the following is displayed.



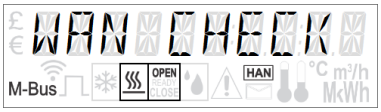
Followed by

The display shows ‘VLV CLOSE’. The interface unit is tested for heat flow Off condition.

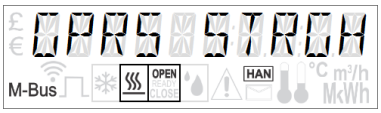


If the heat flow test is successful then after the 'TEST PASS' display time-out period the results of WAN registration process will be displayed.

If WAN registration is successful then the following will be displayed.

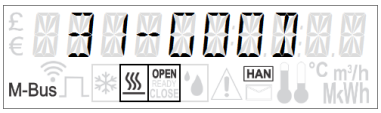


Followed by



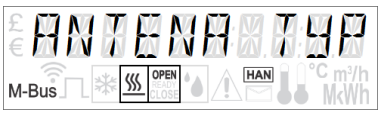
If WAN authorisation is unsuccessful then '**AUTH FAIL**' i.e. 'Authorisation Failed' will be displayed until any key is pressed to exit commissioning mode or the mains power is removed.

Followed by

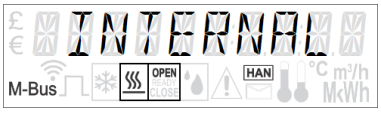


If WAN registration is unsuccessful then the displays '**GPRS STRENGTH**' followed by '**NO SIGNAL**' and '**WAN STATUS**' followed by '**01**' will cycle through until the WAN registration is successful and the HAN is formed. The unit will try WAN registration for 4 minutes before proceeding to **Step 12**.

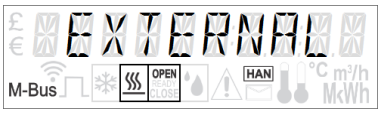
Followed by



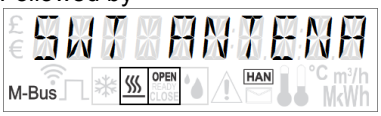
Followed by



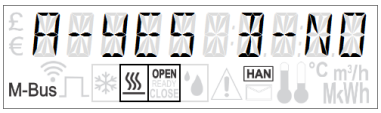
Or



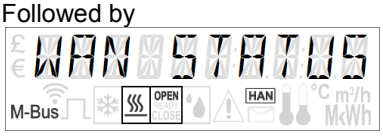
Followed by



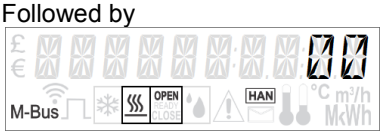
Followed by



Followed by



Followed by



Note: If the WAN setting is not configured in the hub then 'NO WAN SET' will be displayed until any key is pressed to exit commissioning mode or the mains power is removed.

The following are the four categories of signal strength:

(i) 00 to 05 – Poor signal;

(ii) 06 to 11 – Signal is OK;

(iii) 12 to 31 – Good signal strength;

(iv) Above 31 or unregistered means there is no GPRS signal available for the hub to communicate with HES.

'Antenna Type' shows the currently fitted antenna which by default will show 'Internal' and gives the option to change the antenna type.

Notes:

1) The display 'Switch Antenna' offers the option to change the antenna type.

2) You should always prefer switching to external antenna in case of No WAN or poor signal strength. Refer section 9.1.7 for installing an external antenna.

3) In case of metallic enclosure based installation, an external antenna should always be placed outside the enclosure for better connectivity.

Press key 'A' to change the antenna or press key 'B' to add another device to HAN as shown in the next step.

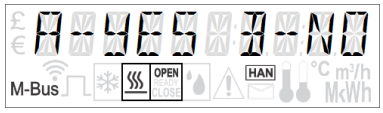
'WAN Status' shows the WAN authorisation status which will appear until key 'A' or key 'B' is pressed.

Step 12:  **Join devices to HAN**

If key ‘B’ is pressed in the previous step then the following two display sequence will appear prompting the user to press key ‘A’ to add HAN devices else press key ‘B’.

Note: Start paring the IHD for this process. Refer section 9.3.3 for pairing the IHD.

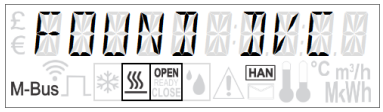
Followed by



Step 13: 

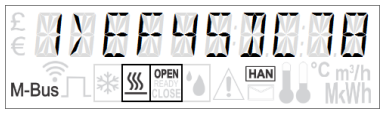
If key ‘A’ is pressed at the above prompt and an unbound device is detected then the following is displayed.

Hereafter, seethe table in Section 9.3.1 for binding devices in ‘with WAN’ scenario or Section 9.3.2 for binding devices in ‘without WAN’ scenario.



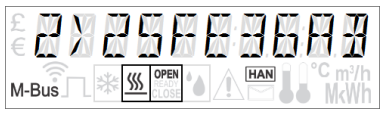
If an unbound device is detected then the unit will display ‘Found Device’ followed by the device MAC address spread over two sets of display as shown here.

Followed by

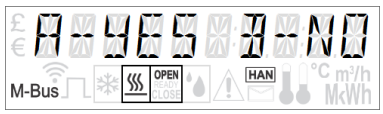


If no unbound device is found then ‘**Found None**’ will be displayed followed by ‘**Retrying**’. After a set number of retries for 3 minutes ‘**No Device**’ will be displayed.

Followed by



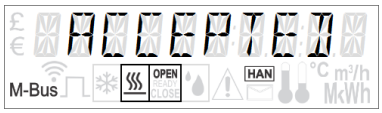
Followed by



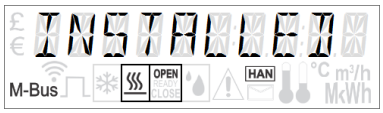
9.3.1 Binding Devices in ‘with WAN’ Scenario

Step 1: 

If the MAC ID matches the binding device then press key ‘A’ to bind it.



Followed by

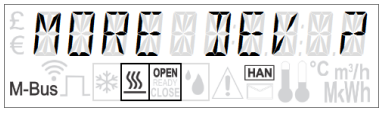


‘Rejected’ will be displayed here if key ‘B’ is pressed.

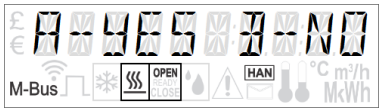
Step 2: 

Press key ‘A’ at the ‘**More Device?**’ display to bind another device to HAN, then repeat step 13 of the table in Section 9.3 and step 1 of this table. For ‘Binding or Pairing an IHD’ see Section 9.3.3.

Press key ‘B’ here if there are no more devices to bind.

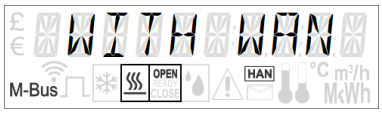


Followed by

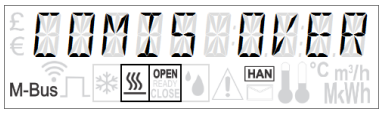


Step 3:  or 

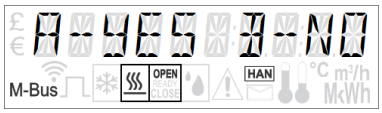
If there are more devices to bind then press key ‘A’ to return to step 2 or press key ‘B’ to end the commissioning process.



Followed by



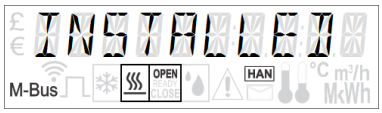
Followed by



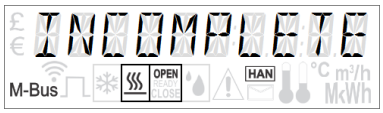
Step 4:  or 

Press key ‘A’ if the commissioning process is successfully completed or press key ‘B’ if the commissioning process is left incomplete.

Pressing key ‘A’ or key ‘B’ will exit the commissioning mode and return the default auto scroll display cycle.



Or



‘Installed’ is displayed for 20 seconds or until a key is pressed; the display implies that the commissioning process is successful and complete.

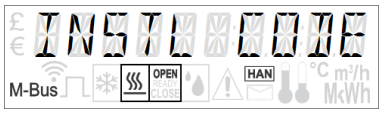
‘Incomplete’ will be displayed if key ‘B’ is pressed.

9.3.2 Binding Devices in ‘without WAN’ Scenario

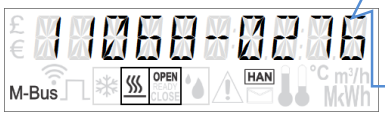
Step 1: 

If the MAC ID matches the binding device then press key ‘A’ to accept it and then enter the 20-digit install code (Refer info screen on the paired pipit and note the numeric value of Install code) at the following prompt.

Press key ‘B’ to submit the code.

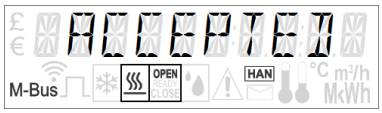


Followed by

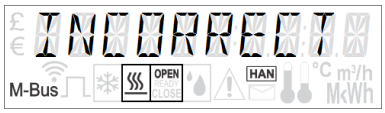


 Use key ‘A’ for deleting the digit to the left.

Followed by



Or

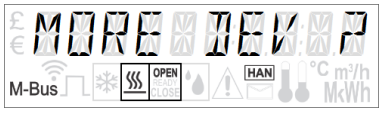


Note: During the code entry, time-out period between key presses is 20 seconds, which if exceeded, will display ‘Incorrect’ followed by the ‘**Install Code**’ allowing the installer to enter the correct code.

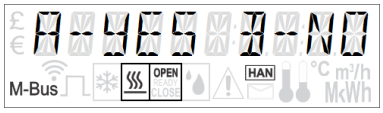
Step 2: 

Press key ‘A’ at the ‘**More Device?**’ display to bind another device to HAN, then repeat step 13 of the table in Section 9.3 and step 1 of this table. For ‘Binding or Pairing an IHD’ see Section 9.3.3.

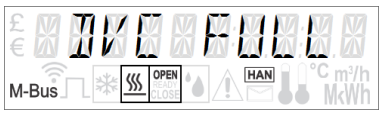
Press key ‘B’ here if there are no more devices to bind.



Followed by



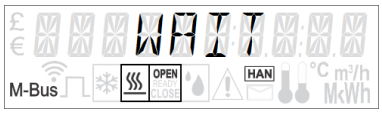
Or



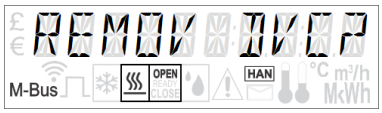
If the unit cannot accommodate any more HAN devices once its limit exceeds, the unit will display ‘DEVICE FULL’. Maximum six devices can be defined for pairing.

Step 3:  or 

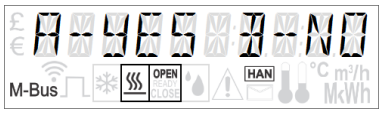
If key ‘B’ is pressed in the previous step the unit will display ‘WAIT’ for 2 minutes until the last HAN device binding is over and then displays ‘Remove Device’ which allows to remove any unbound device in ‘without WAN’ scenario.



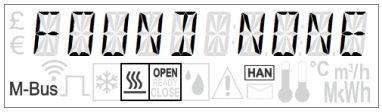
Followed by



Followed by

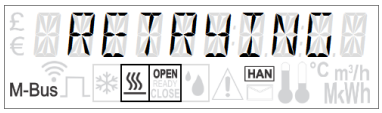


Press key ‘B’ to end the commissioning process. Pressing key ‘A’ will search for all unbound devices failed to pair with the unit.

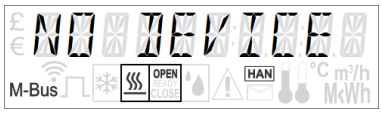


The unit will display ‘**Found None**’ followed by ‘**Retrying**’ and continues the search for 2 minutes until it detects an unbound HAN device.

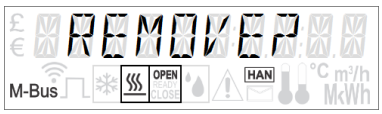
Followed by



Followed by

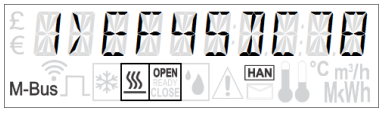


Or

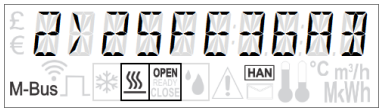


Once an unbound HAN device is detected ‘**Remove?**’ followed by the device MAC address will be displayed.

Followed by

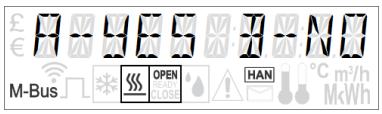


Followed by



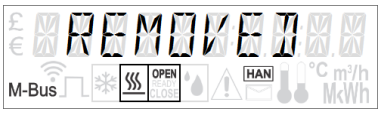
Press key ‘A’ to remove the device or press key ‘B’ to leave the device connected to the network.

Followed by



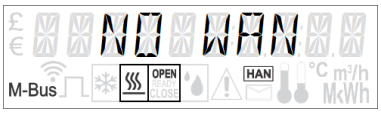
The unit continues searching for other unbound HAN devices until it detects all on the current network.

Followed by

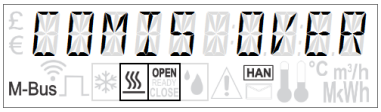


Step 4:  or 

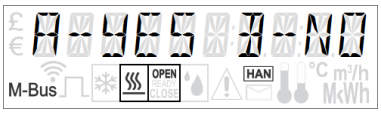
If there are more devices to bind then press key ‘A’ to return to **step 2** of the table or press key ‘B’ to end the commissioning process.



Followed by



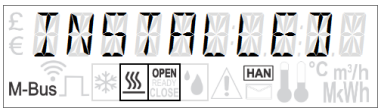
Followed by



Step 5:  or 

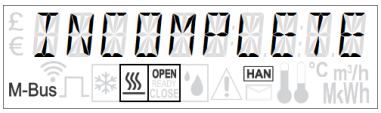
Press key ‘A’ if the commissioning process is successfully completed or press key ‘B’ if the commissioning process is left incomplete.

Pressing key ‘A’ or key ‘B’ will exit the commissioning mode and return the default auto scroll display cycle.



‘Installed’ is displayed for 20 seconds or until a key is pressed; the display implies that the commissioning process is successful and complete.

Or

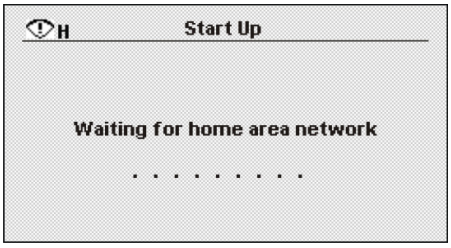


‘Incomplete’ will be displayed if key ‘B’ is pressed.

9.3.3 Binding or Pairing an IHD

Press the **Network** button from the **Settings** screen of the IHD, select the Heat icon and then press **OK** to initiate pairing of the IHD when the following message is displayed.

While the network is searching for the IHD to pair, the following message will be displayed. Check if the unit's LCD is displaying the MAC address of the IHD you are trying to pair (note down the MAC ID of the IHD from the **Info** page before commencing the IHD pairing).



If paired successfully then the HAN symbol on the top left of the IHD will appear and the message on the display will read "IHD paired successfully". Press **OK** to acknowledge.

Seal the product with the terminal cover after completion of commissioning and pairing with an IHD

10 Maintenance

This section explains the various steps involved in replacing the pulse/M-Bus cable, SIM card in the Liberty Connect 100 unit, putting batteries in Pipit 500, replacing and re-pairing each device.

10.1 Replacing the pulse/M-Bus cable

The new pulse/M-bus cable must meet the specifications described in Annexe A – Liberty Connect 100 Specifications. Follow the below mentioned steps thereafter:

1. Switch off the mains supply.
2. Remove the terminal block cover by breaking the seal first followed by unscrewing the terminal block cover screw.
3. Replace the pulse/M-Bus cable with the new one. Connections should be as per the diagrams (heat meter's side) shown in section 7.2.
4. Close the terminal block cover and tighten the screw.
5. Repeat the commissioning process as described in section 9.3. (Steps which are not required can be skipped).
6. After completion of commissioning, seal the product.

10.2 Replacing the heat meter

Follow the below mentioned steps:

1. Switch off the mains supply.
2. Replace the heat meter with new one. Connections should be as per the diagrams (heat meter's side) shown in section 7.2.

   Note: Use cables which meet the specifications described in Annexe A – Liberty Connect 100 Specifications.
3. In case a pulse type heat meter is replaced by an M-Bus type Heat meter or vice versa then installer must choose the cable appropriately.
4. Repeat the commissioning process as described in section 9.3. (Steps which are not required can be skipped)

10.3 Replacing the SIM Card in Liberty Connect 100

The unit maintains a record of the number of times the terminal block cover is opened. The process for fitting or replacing a SIM card is explained below:

1. Power off the unit.
2. Remove seal from the terminal cover and then unscrew the terminal screw.

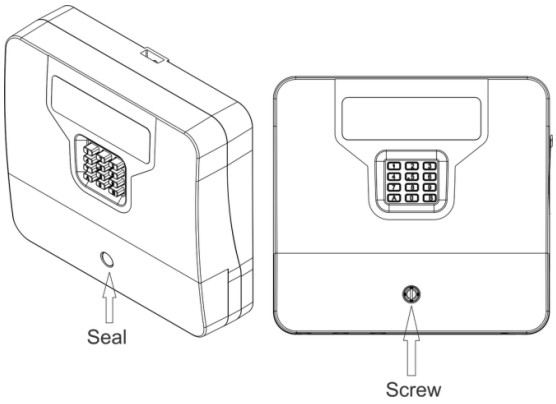


Figure 27: Removing the seal and screw

3. Hold and gently pull the terminal cover upwards to separate it from the unit.

Figure 28: Opening the terminal cover

4. Remove the external antenna first from SMA connector in case the unit is installed with an external antenna. Further, remove the SIM cover and keep aside safely

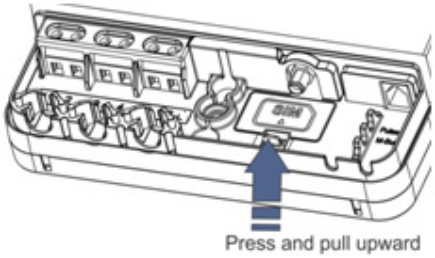


Figure 29: Opening the SIM cover

5. Open the SIM holder lock by sliding it to the left as shown in the diagram below until a click is heard:

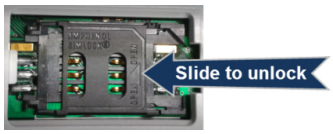


Figure 30: Opening the SIM holder

6. Remove the SIM card by sliding it out of the holder and/or insert SIM card in the SIM holder with the gold coloured contacts facing down.
7. Close and slide the SIM holder to right to lock it in place as shown in the diagram below:

Figure 31: Closing the SIM holder

8. A click sound will confirm the SIM holder lock. Replace the SIM cover.
9. Put the terminal cover, tighten the screw on the terminal cover and then seal it.
10. Confirm that the replaced SIM is working.

Note: New SIM should be registered with the WSE and its configuration should be available in the unit before it is inserted in the unit. Configuration needn't be changed if service provider is same. It is advisable to keep the service provider same for smooth functioning of the unit.

10.4 Replacing the Liberty Connect 100 unit

The Liberty Connect 100 unit will need replacing if something goes wrong in it. Following are the steps for replacing Liberty Connect 100 in field:

1. Before removing the unit the installer must send the following information to the energy supplier (or unit operator):
   - Device serial numbers of the Liberty Connect100 unit.
   - Service point numbers (HMPRN and the IHD MAC address).
   - Cumulative reading from the Liberty Connect 100 unit.

   The device serial numbers, service point numbers and IHD MAC address may be obtained from the **Info** screen of the IHD.
2. Remove the existing Liberty Connect 100 unit and then fit and power up the new unit. The energy supplier must contact the HES to initiate the replacement process. The HES requests the WSE to generate and send the PIN code for the IHD to the installer to remove it from the old HAN.
3. At the IHD press the **Network** button from the **Settings** screen. Select Heat icon, enter the received PIN code correctly and then press **Re-Bind** in the following screen.

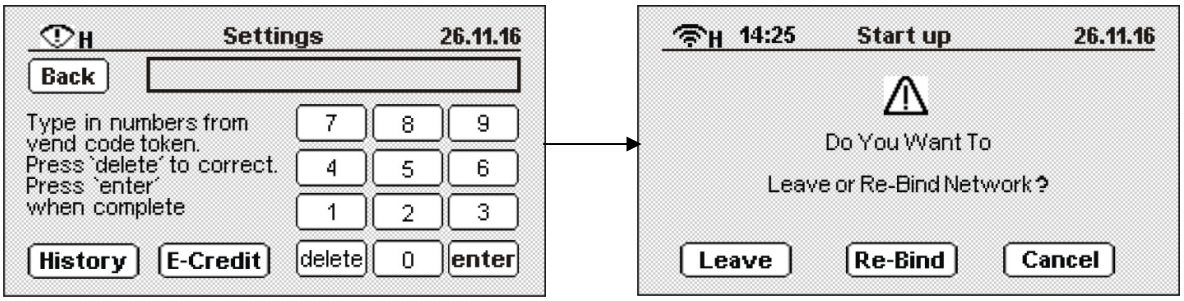


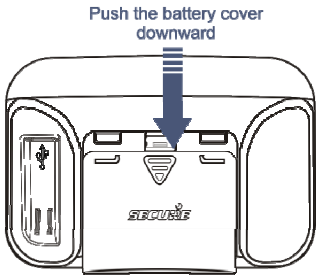
Figure 32: PIN code entry and Leave/Re-Bind screen

4. Follow the Liberty Connect 100 commissioning steps from the table in Section 9.3 for registering and joining the new Liberty Connect 100 to the HAN.

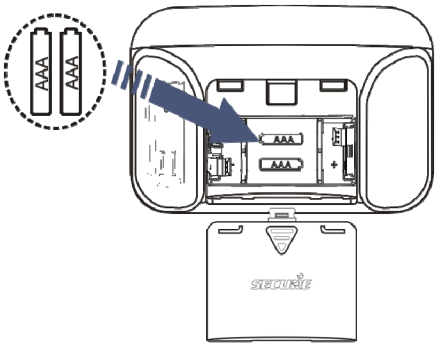
10.5 Replacing Batteries in Pipit 500

Replacing the batteries in the Pipit display is a three-step process. The battery compartment is located at the rear of the unit.

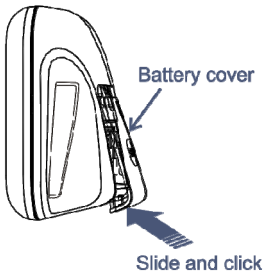
Step 1: Open the battery cover.



Step 2: Remove old batteries (if applicable) and place a pair of non-rechargeable AAA battery making sure of the correct polarity.



Step 3: Slide the battery cover back on to Pipit.



Note: Old batteries must be disposed of in a suitable manner as per the local legislation.

10.6 Replacing Pipit 500 IHD

This process can be carried out by the IHD user.

1. The user should send serial numbers and service point number (HMPRN) of existing Liberty Connect 100 unit and MAC address of the new IHD to the energy supplier (or operator). The MAC address of the new IHD appears on the **Info** screen as shown below which can be accessed by pressing the **Info** button from the **Settings** screen of the IHD.

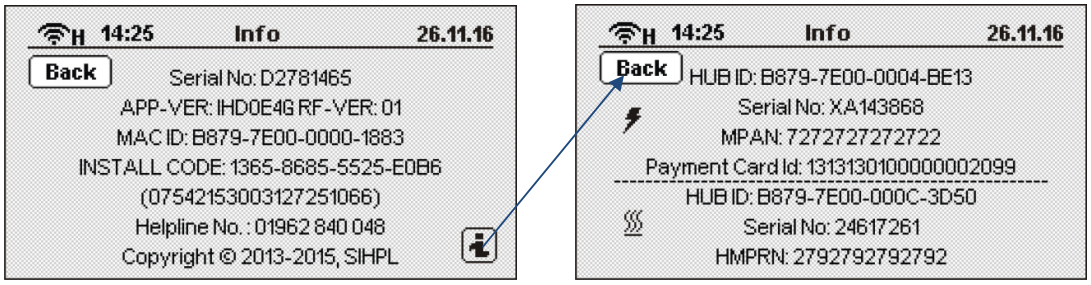


Figure 33: Info screen on the IHD

2. The energy supplier contacts the HES to initiate the IHD replacement process. The HES requests the WSE (back-end system) to enable HAN joining mode on the Liberty Connect 100 unit so that the new IHD can be added to HAN.
3. On receiving the request from WSE the Liberty Connect 100 unit enters into “Allow HAN” joining mode. The user should power up the new IHD and then follow the IHD installation process.

11 Annexe A – Liberty Connect 100 Specifications

Specifi-cations	Description			
Mechanical	Dimension (in mm)			145 x 155 x 46 (L * W * H)
	Weight (in kg)			0.55 (±0.05) Approx.
	Front cover			Fire-retardant polycarbonate material – V0 grade, off white colour with transparent display window
	Base			Fire-retardant polycarbonate material – V0 grade, off white colour
	Terminal cover			Fire-retardant polycarbonate material – V0 grade, off white colour
	Sealing provisions			2 seals on the back side and 1 seal on the terminal block cover
	Display			150 Segment Transflective STN LCD with backlight 10 alphanumeric characters (9 mm high and 2.4 mm wide) with icons Display visibility angles: 15 degrees from all the sides Display operating temperature range from -25^{0}C to +55^{0}C.
	Keypad			12 keys, Silicon rubber material
Electrical	Rated voltage			230 V AC, + 30% and - 20%
	Frequency			50 Hz ± 5%
	Insulation category			CAT II
	High ac voltage withstanding			Up to 3.2 kV
	Transient overvoltage			Up to 2.5 kV
	Pollution degree			2
	Relay input voltage			12V DC / 24V DC / 110V AC / 230V AC Maximum : 26V DC / 250V AC
	Relay input/output current rating			2A maximum
	High ac voltage withstanding for relay contacts			1 kV maximum
Compliance	R&TTE	Radio characteristics	EN 300 328-1	Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques
			EN 300 511	GSM/GPRS radio requirement
		LVD	EN 61010-1	Safety requirements for electrical equipments for measurement, control and laboratory use
		EMC	EN 301 489-1	EMC standard for radio equipment and services
			EN 301 489-7	Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio

				telecommunications systems (GSM and DCS)
			EN 301 489-17	Specific conditions for 2,4 GHz wideband transmission systems, 5 GHz high performance RLAN equipment and 5,8 GHz Broadband Data Transmitting Systems
			EN 61326	General EMC requirement for measuring device
	Wired M-Bus		EN 13757-2	Physical and link layer (Master)
			EN 13757-3	Application layer (Master)
	RoHS		2002/95/EC	Restriction of the use of hazardous substances
	WEEE		2012/19/EU	Waste Electrical and Electronic Equipment Directive
	Battery Directive		2006/66/EC	Regulates the manufacture and disposal of batteries in the European Union
Communication	Pulse Input	Supply		4.5V DC maximum
		Type		Potential Free Contact (Open collector) – OB type
		Pulse width		20mS to 800mS
		Electrical Isolation		3kV
	Wired M-Bus (Supports single slave)	Supply		36V DC
		Load		20mA
		Electrical Isolation		3kV
Others	Power source			Mains supply
	RTC backup source			Lithium battery
	Battery life (typical)			20 years
	Minimum shelf-life (typical)			2 years
	Data retention Unpowered			20 years
	Life expectancy			10 years as per the SIEMENS model
Valve	Nominal voltage			AC : 230V, 50Hz or 110V, 50Hz DC : 12V, 24V
	Power consumption			20W(DC) maximum or 35VA (AC) maximum
	Type			Ball valves, Solenoid valves, Actuator with valve which are open when energized
	Recommended valve type			Belimo make LRF actuator with R20 valve Shako make PU220 valve
Environmental	Operating temperature			- 25 °C to + 55 °C
	Storage temperature			- 25 °C to + 70 °C
	Operating humidity			Up to 95% non-condensing
	Ingress protection			IP53
	Impact energy level			1J (IK06) , IEC 61010-1
	Altitude level			Up to 2000 meters

12 Annexe B – Pipit 500 In-Home-Display Specifications

Specification	Description
Dimension:	115 x 80 x 40 mm
Weight:	0.2 kg Approx.
Power consumption:	< 0.6 W
Display area:	76 x 40 mm
Display resolution:	240 x 128 pixels
Touch screen:	Resistive type
Material:	ABS (Acrylonitrile Butadiene Styrene) / PC FR (Polycarbonate Flame Retardant)
Colour:	White
Replaceable battery:	A pair of AAA alkaline non-rechargeable batteries
Memory size:	2 MB
Operating temperature:	0 ^{0}C to +50 ^{0}C
Storage temperature:	-20 ^{0}C to +70 ^{0}C
Relative humidity:	0 to 95%
Ingress protection:	IP40
Operating life:	5 years

13 Glossary

HAN	:	Home Area Network.
HES	:	Head-end System
Liberty Connect 100	:	ZigBee certified smart metering device with a display and a keypad.
MID	:	Measurement Instrument Directive.
HMPRN	:	Heat Meter Point Reference Number
MPRN	:	Meter Point Registration Number
Pipit 500	:	ZigBee certified In-Home Display unit that gives real-time feedback of energy consumption to consumers.
WAN	:	Wide Area Network.
WSE	:	WAN Service Engine.

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