

EMUTM

Energy Monitoring Unit



User Manual

Version 2.23
Sep 2012

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EMU™ – Energy Monitoring Unit

RFA-Z105
Version 2.23

User Manual

Table of Contents

Regulatory information	4
Quick Setup.....	5
Step 1: Check Contents of the box	5
Step 2: Register your EMU™	5
Step 3: Assemble your EMU™	5
Step 4: Wait for your EMU™ to join the smart meter	6
Features of Your EMU™	9
How to Use Your EMU™	10
Screen Navigation Flowchart.....	12
EMU™ Display Screens	13
Startup	13
Current Time	13
Meter Reading	13
Current Usage	14
Total to Date	14
Previous Totals	15
Current Price.....	15
Message	16
Confirm Message.....	16
EMU™ Configuration Screens.....	17
Select Language	17
Set Rate.....	17
Battery	18
Troubleshooting Guide	19
Step 1. Check the EMU™	19
Step 2. Check the Batteries	19
Step 3. Check the Smart Meter Connection.....	20
Technical Support.....	20

Regulatory information

FCC Notices

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC/IC RF Exposure Statement

This equipment complies with FCC and Industry Canada radiation exposure limits set forth for an uncontrolled environment. The antenna(s) used for this equipment must be installed to provide a separation distance of at least 8 inches (20cm) from all persons.

ICES-003 Compliance

This Class B digital apparatus complies with Canadian ICES-003.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Compliance Regulations For Australia and New Zealand

This equipment complies with the C-Tick labeling requirements for Australia and in New Zealand. As a radio transmitter, this device complies with the requirements of AS/NZS 4268:2008 as designated in the Radiocommunications (Short Range Devices) Standard 2004 for Australia and as required by the Radiocommunications Regulations (General Users Radio License for Short Range Devices) Notice 2011 for New Zealand. This device is a Category A device as defined in the Radiocommunications (Compliance Labeling - Electromagnetic Radiation) Notice 2003..

Quick Setup

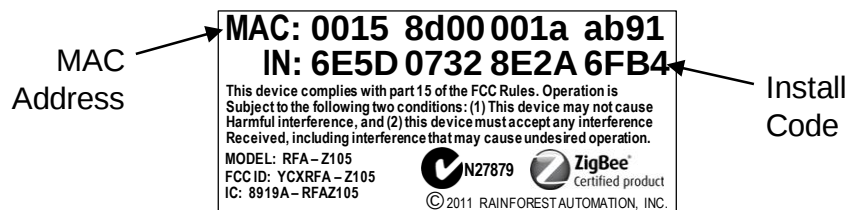
Step 1: Check Contents of the box

The box should contain the following items:

- a) 1 x **EMU™** Display unit
- b) 4 x AA Batteries

Step 2: Register your EMU™

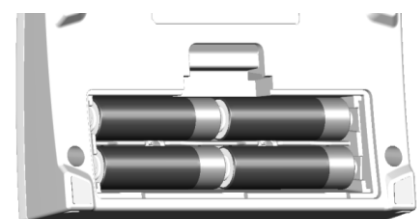
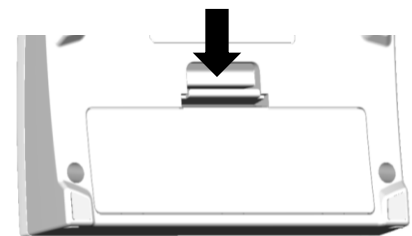
In order for your **EMU™** to connect to the smart meter, you will need to register your **EMU™** with your utility. Please follow the procedure provided by your utility. You will need the following information, which is found on the Information Label on the back of your **EMU™**:



Note that it may take some time for your utility to enable the smart meter to connect with your **EMU™**. You should be advised by your utility how long this will take. You must wait until this process is complete before proceeding; your **EMU™** will not function correctly until the smart meter is enabled.

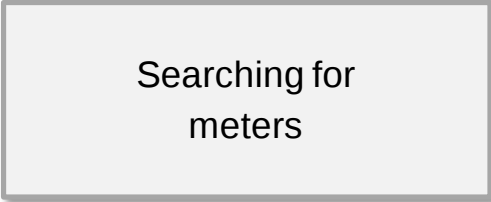
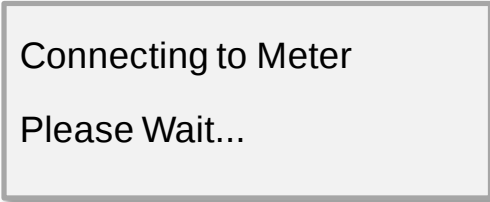
Step 3: Assemble your EMU™

- a. Open the battery cover on the back of your **EMU™** by pushing down on the catch at top of the door.
- b. Insert 4 AA batteries **exactly** as shown on inside of the battery compartment. Note that putting a battery in backwards can be hazardous, and may cause extensive damage to your **EMU™**. Always use alkaline batteries; never mix battery types. Replace all batteries at the same time.
- c. Replace the battery cover by inserting the bottom tabs first, then snapping the catch closed.

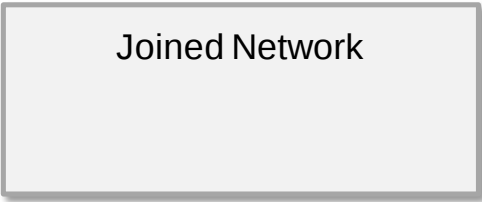


Step 4: Wait for your EMU™ to join the smart meter

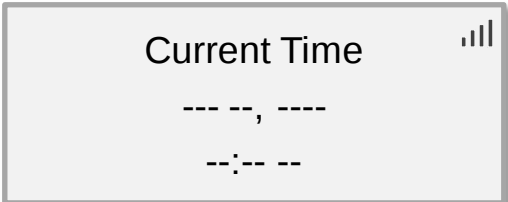
Your **EMU™** will attempt to connect to the smart meter. You will see these two screens:

Searching for
metersConnecting to Meter
Please Wait...

You may see these two screens a few times. This could take 1-2 minutes. When your **EMU™** finds the smart meter and successfully communicates with it, you will see this screen:

Joined Network

A short time later, the *Current Time* screen will appear, with dashes instead of digits:

Current Time 
--- --, --- --
--:-- --

As soon as the dashes are replaced with the current time and date, it means that your **EMU™** has successfully read the meter, and is ready for use.

Step 5: Configure your device

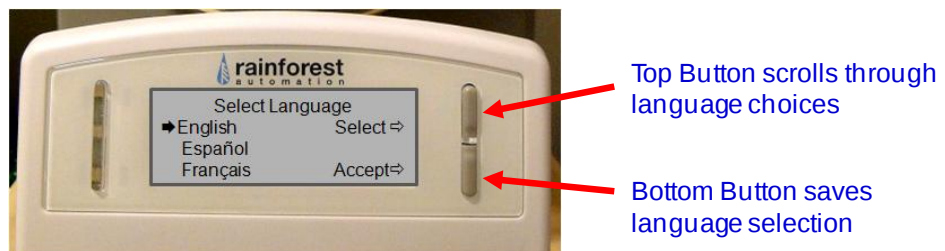
- a. Press both of the buttons on your **EMU™** simultaneously and release.



- b. Press the Bottom Button.



- c. Select the language you would like your **EMU™** to use.

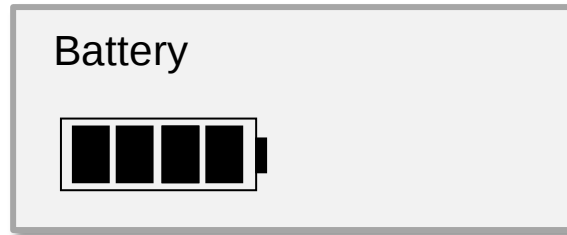


- d. If your meter does not provide pricing (ask your utility), you will need to set your energy price.



The digit to be modified will be flashing, starting on the right, and working left.

- e. After you have entered all 5 digits of the energy price, you will see the battery screen:

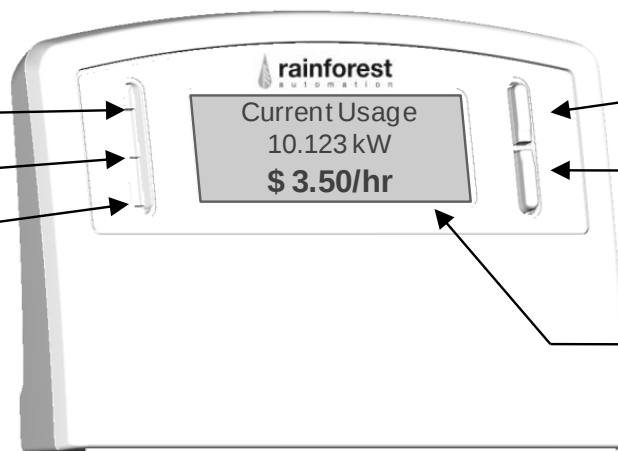


Press any button to return to regular monitor mode.

Features of Your EMU™

Indicator LED
Lights:

Red
Yellow
Green



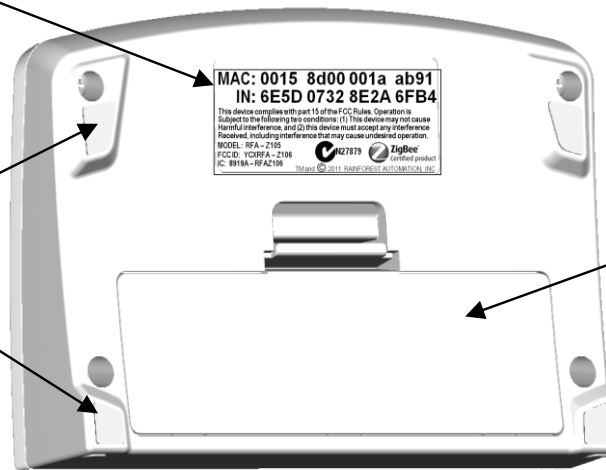
Top Button

Bottom Button

Display

Information
Label

Magnetic
Feet



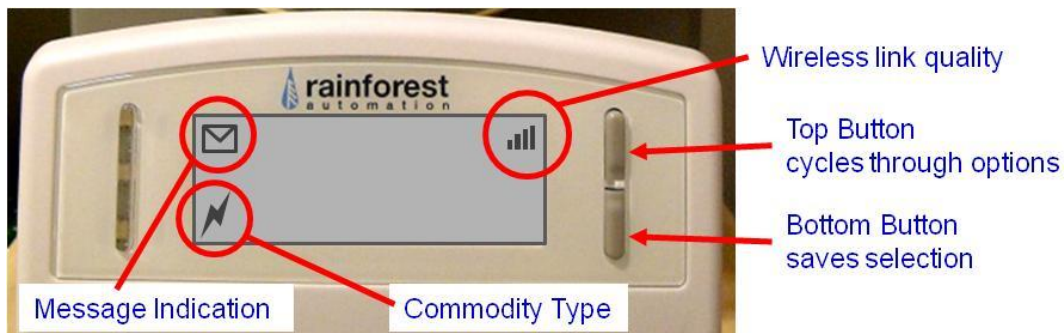
Battery
Cover

How to Use Your EMU™

Most of the time, your **EMU™** will be in Sleep Mode. The Display screen will be blank, but the Indicator LED Lights will flash as noted below in Table 1. To put the unit into Active Mode, simply press one of the buttons. After 4 minutes of inactivity, your **EMU™** will automatically return to Sleep Mode.

Your **EMU™** has two buttons that are used to make selections. By default, they are used to scroll through the different Display screens. The Top Button pages up, and the Bottom Button pages down. The screens are displayed in a circular sequence. Once you cycle through to the end of the sequence, the first screen is displayed again.

On some screens, the **EMU™** may need a response from you. For these screens the buttons will behave differently. The button functions will be indicated on the right side of the screen. When the **EMU™** presents you with options to choose from, pressing the Top Button cycles through the different options to select, and pressing the Bottom Button saves the selected option and pages to the next screen.



Your **EMU™** communicates wirelessly with the smart meter to get price and usage information, and presents this information on the Display. The accumulated usage information is updated every minute while the unit is in Active Mode. You may have to manually enter the price per unit (kWh for electricity, or cubic foot for gas), but it can also be provided by the smart meter, and is checked every 2 minutes. The **EMU™** automatically detects whether the data from the meter is for electricity or gas, and the commodity type is indicated by an icon in the lower left corner: a lightning bolt icon indicates electricity; a flame icon indicates gas.

Your **EMU™** checks every 2 minutes for a new text message from your utility. An envelope icon is shown in the upper left hand corner of the screen if there is an active message stored on your **EMU™**.

The quality of the wireless signal from the smart meter is indicated by the small bar graph in the upper right hand corner of the Active Mode screens. Four bars are shown

for a good signal; fewer bars indicate a lower quality signal. If the connection to the smart meter is lost, a large “X” will replace the bar graph.

There are also a number of configuration screens. These are accessed by pressing and releasing both buttons simultaneously to put your **EMU™** into Configuration Mode. Note that your **EMU™** should have successfully connected to the smart meter before putting it into Configuration Mode.

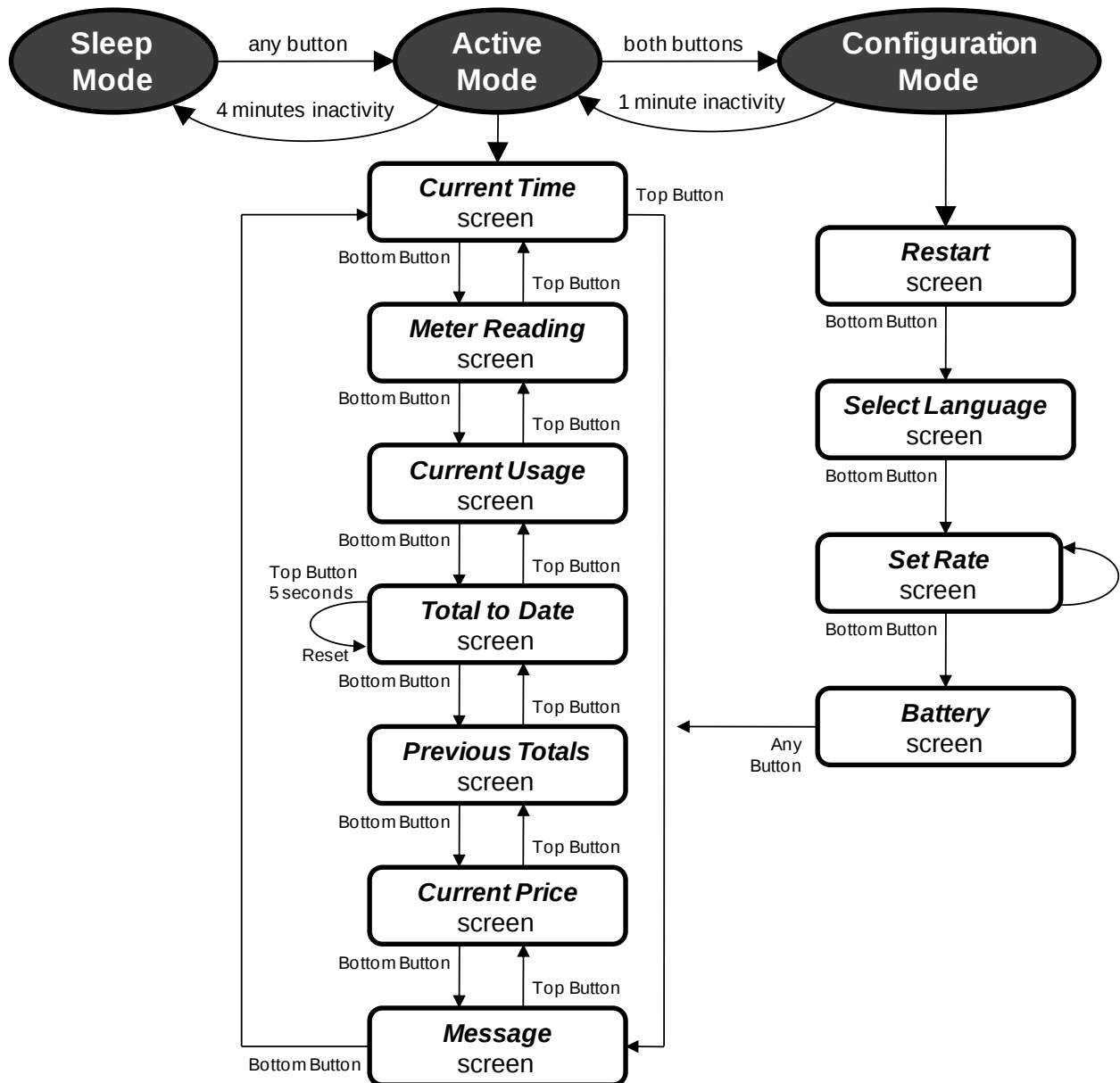
There are Indicator LED Lights that show pricing status from your utility. These lights flash in different sequences to alert you of the current pricing condition.

LED Light	Flash Sequence	Descriptions
Green LED	1 flash every 60 seconds	Price is normal
Yellow LED	1 flash every 10 seconds	Price increased; consider reducing usage
Red LED	1 flash every 5 seconds	Price is high; requested to reduce power usage
Red LED	2 flashes every 3 seconds	Price is critically high

Table 1: LED Flash Indications

If none of the Indicator LED Lights are flashing, this indicates that no price has been set, either by the meter, or manually. The Indicator LED Lights also flash in a special red-yellow sequence (which replaces the price sequence) when there is a new text message waiting to be read.

Screen Navigation Flowchart



EMU™ Display Screens

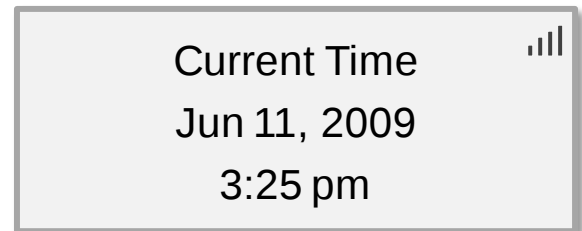
Startup

The *Startup* screen is shown when your **EMU™** is powering up for the first time.



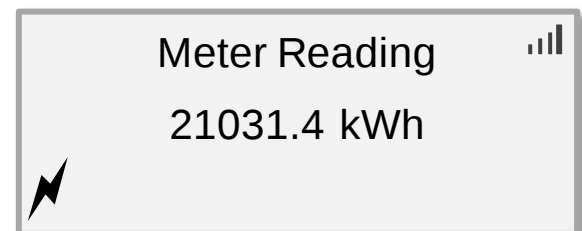
Current Time

The *Current Time* screen shows the present time and date, as read from the smart meter. Your **EMU™** synchronizes its clock with the smart meter every 15 minutes.

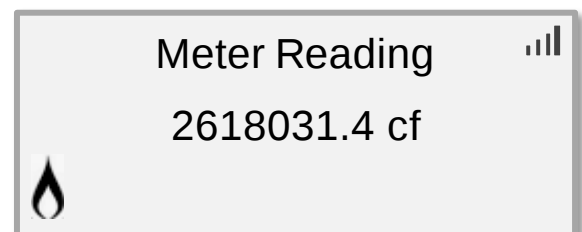


Meter Reading

The *Meter Reading* screen shows the raw total accumulated usage reading from the smart meter. For an electricity meter, the total shown is in kilowatt-hours, and a lightning bolt icon is shown in the lower left corner.

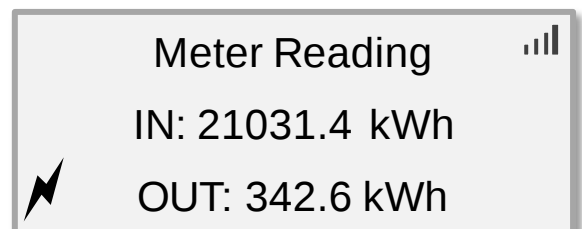


For a gas meter, the total shown is usually in cubic feet, and a flame icon is shown in the lower left corner.



Your **EMU™** updates this data every 60 seconds while it is in Active Mode.

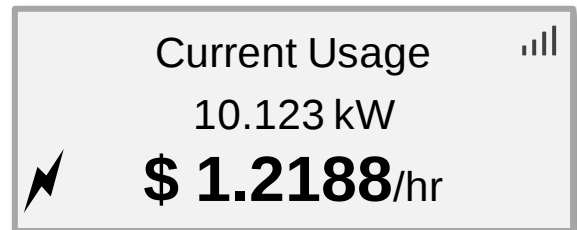
If you are generating your own electricity, and have a Net Metering agreement with your utility, then there may be times when you will be producing more energy than you are using, and electricity will flow out to the grid. In this case, the *Meter Reading* screen will show two totals: the amount of electricity delivered from the



grid into your home (labeled “IN”), and the amount of surplus electricity you have delivered out to the grid (labeled “OUT”).

Current Usage

The *Current Usage* screen shows the rate of energy consumption and the estimated cost per hour in dollars (or cents, if it is less than one dollar). The estimated cost is calculated from the current price per unit multiplied by the current rate of energy consumption. The data is updated from the meter every 8 seconds while this screen is shown.



This is like the speedometer in your car; it shows you how fast you are consuming energy.

Total to Date

The *Total to Date* screen shows your accumulated totals for energy consumption and estimated cost for the current time period. The start date of the current time period is shown at the top of the screen. The number of elapsed days so far in this time period is shown in the upper right of the screen. The number of days is shown to the nearest one-tenth of a day. The cumulative energy consumption for the time period is shown as recorded by the smart meter. The estimated cost for the recorded energy consumption is shown in dollars (or cents, if it is less than one dollar), and is based on the current price value during the period. The average cost per day for the current time period is shown in the lower right of the screen.



This is like the odometer in your car; it shows you the total energy used so far.

The current time period can be restarted by pressing and holding the Top Button for 5 seconds. This will save all of the accumulated totals in the *Previous Totals* screen, and restart all of the current counters to zero.

IMPORTANT: The **EMU™** displays the usage and cost as recorded by the smart meter; these numbers may differ from what is shown on your actual utility bill.

Previous Totals

The *Previous Totals* screen shows your accumulated totals for energy consumption and estimated cost for the previous time period. The start and end dates of the previous time period are shown at the top of the screen. The number of days in the previous time period (to the nearest one-tenth of a day) is shown in the upper right of the screen. The average cost per pay for the previous time period is shown in the lower right of the screen

Apr 27 to May 26		
1987 kWh	30.0 days	
\$246.85	\$8.23/day	

This screen is overwritten with the values from the *Total to Date* screen each time the current time period is restarted. If the current time period has not been restarted at least once, then there will be no data values for this screen and it will not be displayed.

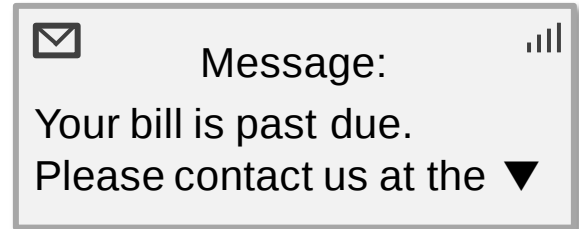
Current Price

The *Current Price* screen shows the price for electricity or gas that is currently in effect. The rate is shown in cents per unit. The current price may be obtained from the value you manually set in the *Set Rate* screen. To manually set the current price value, simply press and release both buttons simultaneously. This will put you in Configuration Mode. Move through the *Restart* screen and *Select Language* screen to get to the *Set Rate* screen, where you can change the current price value. This new value will become the current price, and the Rate Label will be displayed as “Set by User”. It is also possible to read the price directly from the smart meter. If the meter supports this feature, then the **EMU™** will check the price with the meter every 2 minutes, and the current price value from the meter will override any value that has been entered manually. If no price value has been set – either by the smart meter or manually – then dashes are shown for the price digits. For some utilities, the price can also be set by a special message sent to the meter by the utility. This message will be displayed as a text message on the *Message* screen, and the price will be automatically set. This will override any price value that has been set manually.

	Current Price	
	12.04 ¢/kWh	
⚡	mid-peak	

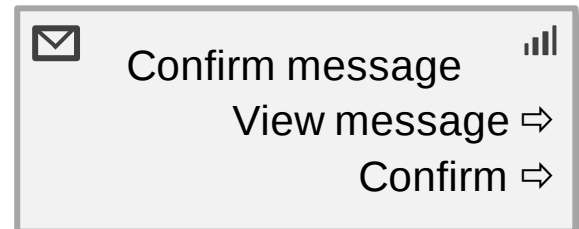
Message

The *Message* screen will display a text message when there is a message from your utility. Your **EMU™** checks every minute for a new message. When a new message is received, the Indicator LED Lights will flash in a special red-yellow sequence to show that a new message is waiting for you to see. The envelope icon will also appear in the upper left hand corner of the screen to indicate that there is an active message. To see the message, use the buttons to go to the *Message* screen, and the message will be displayed. A message can be up to 100 characters long. If the message is longer than two lines, a continuation character (“▼”) will be shown at the end of the bottom line, and the message will automatically scroll up until the whole message has been displayed. Once the end of the message is reached, it will start again after a short pause. If the message requires an acknowledgment, you will automatically be sent to the *Confirm Message* screen. Viewing the message resets the Indicator LED Lights back to the usual flashing sequence for the current pricing status. However, the envelope icon will remain on until the message has expired.



Confirm Message

The *Confirm Message* screen allows you to send a confirmation to your utility, telling them that you have read the latest text message that they have sent to you. If you wish to view the message again, press the Top Button, and you will be sent back to the *Message* screen. Once the message has been displayed, you will be returned to the *Confirm Message* screen. To send your confirmation, press the Bottom Button. You will then be sent to the *Meter Reading* screen.

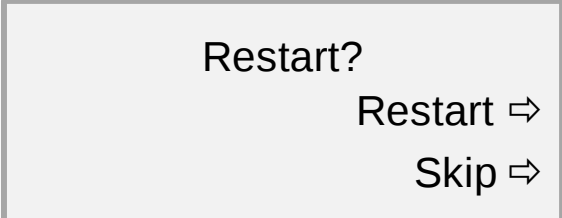


EMU™ Configuration Screens

Restart

The *Restart* screen allows you to perform a device restart by pressing the Top Button. This will reboot your **EMU™** without losing the connection to the smart meter. To access this screen, press both buttons simultaneously, then release.

Pressing the Bottom Button sends you to the *Select Language* screen.



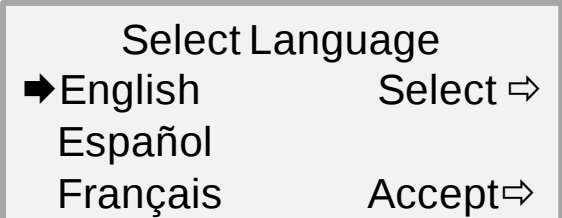
Restart?

Restart ⇨

Skip ⇨

Select Language

The *Select Language* screen is used to change the language displayed by your **EMU™**. This screen can only be accessed in Configuration Mode, after going through the *Restart* screen. To enter Configuration Mode, press and release both buttons simultaneously. Then press the Bottom Button to get to the *Select Language* screen. The currently selected language will have an arrow beside it. Press the Top Button to cycle between the different languages. Press the Bottom Button to save the selected language. You will then be sent to the *Set Rate* screen.

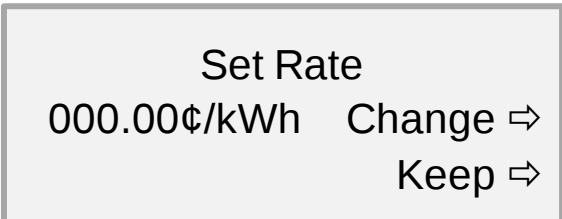


Select Language

➔ English	Select ⇨
Español	
Français	Accept ⇨

Set Rate

The *Set Rate* screen allows you to manually set the current price for electricity or gas in cents per unit. This screen can only be accessed in Configuration Mode, after going through the *Restart* and *Select Language* screens. The price shown will zero, unless it has been previously set in this screen. The rightmost digit of the price will be flashing. To change this digit, press the Top Button and cycle through the numbers 0-9 until the desired value is displayed. Then press the Bottom Button to save



Set Rate

000.00¢/kWh Change ⇨

Keep ⇨

this digit. The next digit to the left will then be flashing. Repeat the process until all five digits show the desired values. After the last digit is saved, your **EMU™** will go to the *Battery* screen.

The Green Indicator LED Light will flash once every 60 seconds, and the Rate Label will read “Set by User”, while the manually set price is in effect. Note that using the *Set Rate* screen to change the current price will have no effect if a current price value is set by the smart meter.

Battery

The *Battery* screen indicates the charge level of the batteries. Four bars indicates the batteries have a good charge. Fewer bars indicate the battery charge is reduced. The batteries should be replaced if the *Battery* screen shows only one bar.



Troubleshooting Guide

Generally, there are only 3 things that can go wrong with your **EMU™**:

1. The **EMU™** stops working, or
2. The batteries are depleted,
3. The **EMU™** cannot connect to the smart meter.

If the screen is dark and the unit does not respond to button presses, then either the batteries are depleted (see Step 2 below) or the unit requires a restart (see Step 1).

If the bar graph in the upper right corner has been replaced by an “X”, then your **EMU™** has lost connection to the smart meter (see Step 3).

Step 1. Check the EMU™

If the **EMU™** screen is not displaying anything, and the **EMU™** does not respond to button presses, then try restarting the unit.

To restart your **EMU™**:

- a) Open the battery cover
- b) Remove **all** of the batteries (removing just one battery is not sufficient)
- c) Wait 10 seconds
- d) Replace the batteries and cover
- e) Check the display to verify **EMU™** is working

Step 2. Check the Batteries

If restarting the **EMU™** does not resolve the problem, confirm that the batteries are in good working order and installed properly.

- a) Check to make sure the batteries are installed in the same orientation as indicated in the diagram of the battery compartment.
- b) If the batteries are installed correctly and the **EMU™** is not functioning, get 4 new AA alkaline batteries and install them as indicated.
- c) Check that the **EMU™** is functioning correctly.

Battery Replacement

Your **EMU™** uses 4 AA batteries for power. To ensure a trouble-free experience with your **EMU™**:

- a) Replace the batteries when the battery indicator shows 1 bar.
- b) Replace all batteries at the same time with **new** batteries.
- c) Use new batteries with a current **best before date**.
- d) Do not use rechargeable batteries unless they are marked as 'rechargeable alkaline' and have a rating of 1.5V.

If your **EMU™** is still not working after replacing the batteries, contact Technical Support (see below).

Step 3. Check the Smart Meter Connection

The wireless connection between your **EMU™** and the smart meter can be disrupted for a variety of reasons.

Try the following:

- a) Move the **EMU™** to a different location that is closer to the smart meter.
- b) Move the **EMU™** away from wireless routers, cordless phones, microwave ovens, or large metal objects.
- c) Try different areas of your house and different orientations in each room until you find one that works.

If there is a power outage in your neighborhood at the moment, please wait until power is restored and try again.

Technical Support

Contact us at: 34 West 7th Avenue, Vancouver, BC, Canada V5Y 1L6

Email: support@rainforestautomation.com

Web: www.rainforestautomation.com/emu_support