Single Phase Single Element Electronic Meters: Installation and Use

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1 INTRODUCTION

This document specifies the installation and use of the Landis & Gyr EM1000 and Secure i-Credit 500B single phase single element electronic meters within the Essential Energy network. The meters are used to register single phase principal tariffs, such as time of use (TOU) and NET export.

Where there is an additional requirement for single phase controlled load, it will be necessary to fit a supplementary accumulation meter to record the controlled load energy use.

2 WHY THESE INSTRUCTIONS ARE IMPORTANT

This document forms an integral part of Essential Energy standard metering arrangements and ensures a common approach to the configuration and commissioning of electronic meters.

This document is relevant for Essential Energy staff, contractors, and authorised service providers.

3 CHALLENGES

To correctly identify the NET export register that may not have an associated register ID number.

4 USING THE METERS

4.1 Common Features

- Electronic, single phase, whole current meter
- 100 Amperes maximum current rating
- Bottom connected
- 1 phase, 2 wire configuration
- Class 1 accuracy
- Programmable.

The EM1000 and i-Credit 500B meters provide load profile data, support time of use (TOU) tariffs, as well as a flat rate tariff.

Both meters have retained similar bottom mounting holes as the traditional single phase disc meters, therefore limiting the effort when replacing existing meters.

4.2 Connection

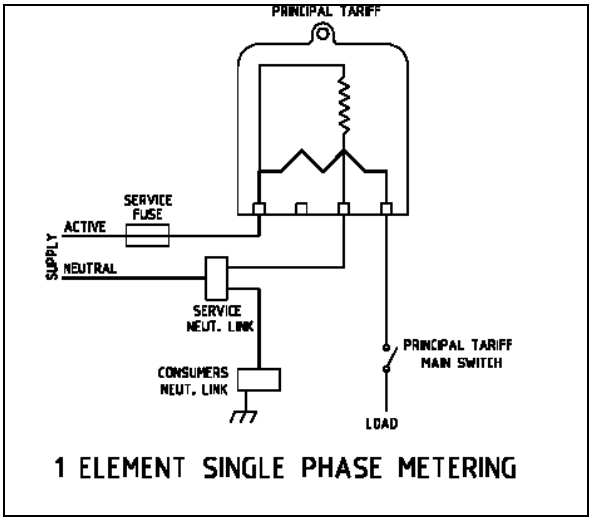


Figure 1: basic connection

4.3 Configuration

All meters supplied by Essential Energy shall be pre-programmed. The default programs provide load profile data and support either TOU plus flat rate, or TOU plus NET export.

The presence of a TOU program is identified by a white label endorsed with the letters TOU and mounted on the meter face. The presence of a "NET export" option is identified by the wording "NET Export" on the face of the meter.

4.4 Internal Battery

The meter contains an internal battery that is required to maintain time and calendar functions during outages. Should the battery voltage fall below acceptable limits and affect the time and/or calendar functions, an error will be displayed.

4.5 Documentation & Display Indicators

Each separate metering rate is identified by a display code along with relevant registration.

i-Credit 500B TOU meter:

- "01" indicates registration during "peak" periods
- "02" indicates registration during "shoulder" periods
- "03" indicates registration during "off-peak" periods.

i-Credit 500B NET export meter:

- "01" indicates registration during "peak" periods
- "02" indicates registration during "shoulder" periods
- "03" indicates registration during "off-peak" periods
- "15" indicates total "export" registration across all periods.

EM1000 TOU meter:

- "A" indicates registration during "peak" periods (mark paperwork as register "1")
- "B" indicates registration during "shoulder" periods (mark paperwork as register "2")
- "C" indicates registration during "off-peak" periods (mark paperwork as register "3").

EM1000 NET export meter

- "A" indicates registration during "peak" periods (mark paperwork as register "1")
- "B" indicates registration during "shoulder" periods (mark paperwork as register "2")
- "C" indicates registration during "off-peak" periods (mark paperwork as register "3")
- "--" indicates total export registration across all periods (paperwork as register "110").

The i-Credit & EM1000 meters must be identified in the tariff section on the NOSW form by selecting the appropriate code from the tariff schedule offered on the form.

The meter must also be identified as having 6 dials on any paperwork submitted.

Some documentation associated with meter installations / changes, will request a meter code to be recorded. This code will be clearly marked on the case of the meter:

- EM1000 TOU = 2Y
- EM1000 (Net Export) = 1N
- I-Credit 500B TOU = Z1
- I-Credit 500B Net Export = Z4

4.6 Installation

4.6.1 Drilling template

EM1000 drilling template is available on the website:
http://www.essentialenergy.com.au/content/approved-accredited-service-providers

Secure meters have a drilling template printed on the back of each packing carton.

4.6.2 Sealing

The terminal cover has a single sealing point to be sealed when installation is complete.

4.6.3 Consumption indicator

Both the L&G and Secure meters have a pulsing LED positioned toward the top right hand corner of the meter to indicate energy consumption. This LED will flash when the customer is importing energy (consuming).

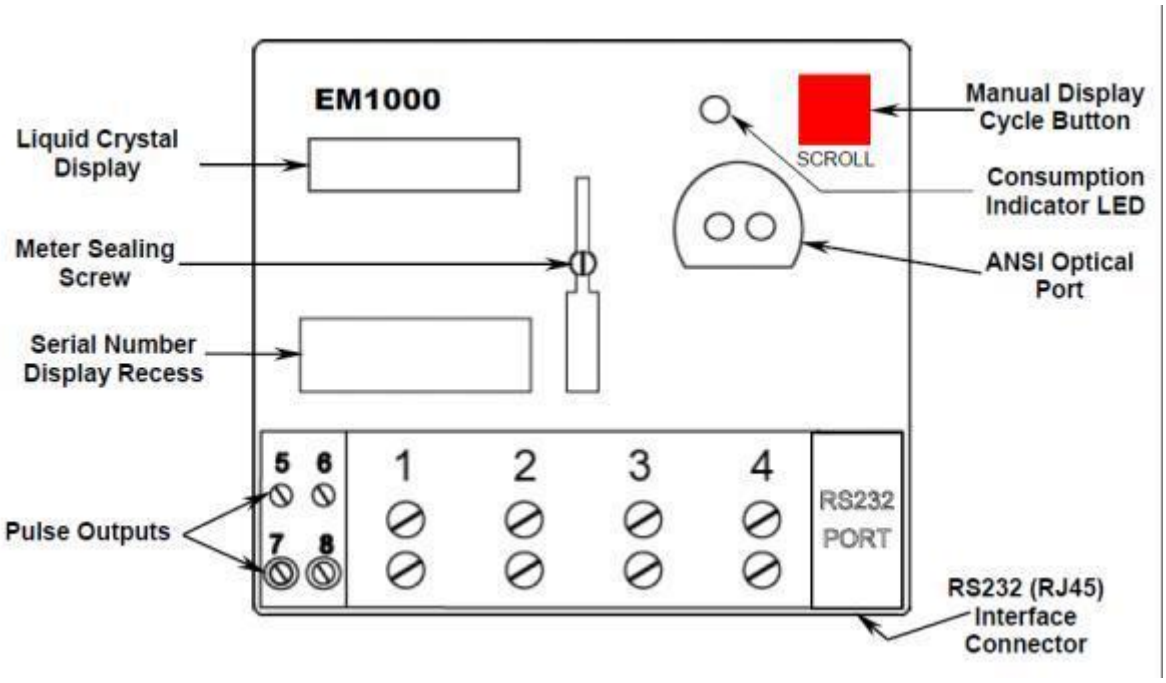


Figure 2: EM1000

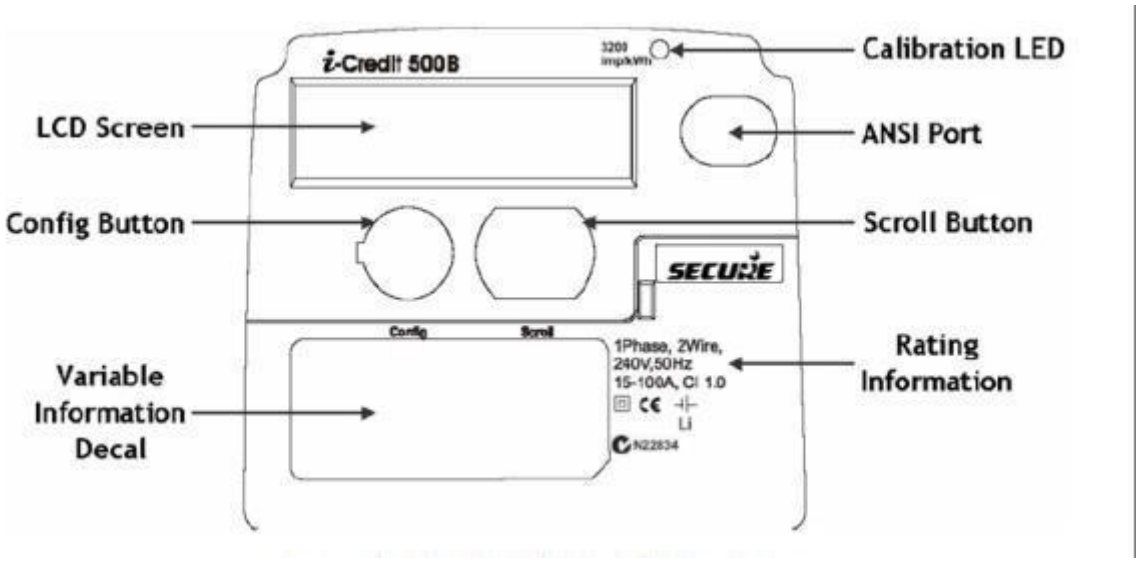


Figure 3: i-Credit 500B

4.7 Errors and Warnings

4.7.1 Error monitoring

The electronic meters continuously check their internal operation and display a message should an error be detected. If an error message is displayed, it must be reported to Essential Energy: a replacement unit will be fitted by Essential Energy staff.

Error codes are identified by register indication **Err** with the EM1000, or with the icon on the i-Credit 500B.

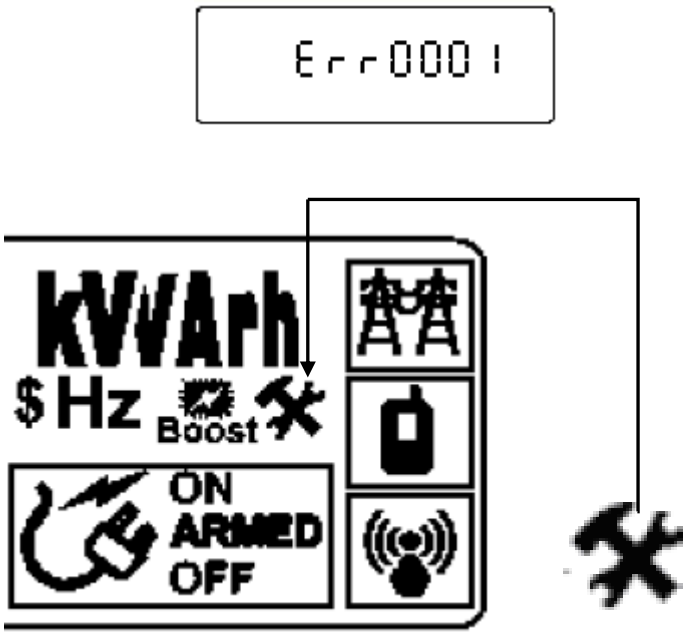


Figure 4: error display examples

4.7.2 Reverse energy flow

If energy greater than 10 Wh flows through the meter in the reverse direction on an EM1000 TOU programmed meter, a reverse energy warning display will be activated. To clear this warning display requires a service call by Essential Energy. If the EM1000 meter shows the "F000100" warning code during commissioning, ensure wiring is correct and report the warning.

These warnings are not activated on meters programmed for NET applications.

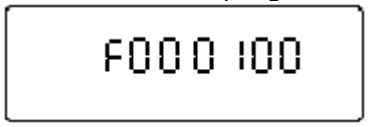
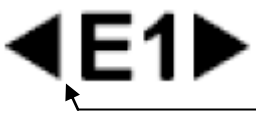


Figure 5: EM1000 reverse energy warning

Reverse energy flow through i-Credit 500B is indicated by a chevron on the LCD. If the left hand chevron is pulsing on a TOU meter during commissioning, ensure all wiring is correct and report the error.



Flashing left pointing chevron indicates reverse

4.7.3 Commissioning checks

a Ensure there are no loose connections and wiring is correct

b Apply voltage to the meter

c Check the meter display and ensure it illuminates

d Ensure the date and time are correct (Eastern Standard Time)

e Attach a suitable load to the meter (e.g. household load or a 100W lamp)

f View the LED consumption indicator; this should pulse at a rate reflecting the load attached (e.g. 1–4 pulses / minute for a 100W load, depending on model / program)

g Check for "reverse energy" warning – if active, either line and load conductors have been reversed on a TOU meter or an incorrect meter has been used for a NET export installation)

h Correct any wiring anomalies and /or report any errors

i Seal the terminal cover in accordance with established work practice

j Complete and lodge paperwork as appropriate.

4.8 Removal and Return

4.8.1 Removal

It is not possible to retrieve data or meter readings while the meter is de-energised. Therefore service providers must document the information prior to disconnection.

Three separate readings to be taken for TOU programmed meters, namely: registers 1, 2 and 3. Hence three separate lines are required for each meter removed.

For meters programmed for NET export the three TOU registers will be required plus an additional reading for the NET export component. For the EM1000 this will be displayed on the meter display with a negative sign as a prefix, e.g. "–000346". This register is to be given an ID of "110" when completing any paperwork. "15" is used as net export register in the I-Credit 500B. This must be recorded when completing the paperwork.

Where insufficient space is available on the Notification of Service Work or Essential Energy internal meter change sheet, a second or third form must be submitted and endorsed accordingly.

Where a meter cannot be read due to meter errors or defective display, a note stating "unable to read" must be recorded on the Meter Change Notice.

4.8.2 Return

Methods of return are not within the scope of this document. However, please be aware that electronic meters contain batteries that discharge while disconnected, so their prompt return is desirable.

5 READING THE METER

Figure 6: i-Credit display

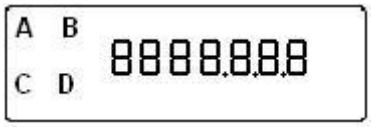


Figure 7: EM1000 display

Registration is displayed in whole kWh.

The meter will cycle between different registers, at a rate of approximately 6 seconds per register. These displays are as follows, and are shown in the sequence in which they will be displayed on the meter.

5.1 Energy – Peak

This register is identified by "01" or "A". The display indicates the kWh registration for the principal tariff (e.g. domestic or non-urban) between the times of 07:00 – 09:00 plus 17:00 – 20:00 weekdays.

Figure 8: 2841 kWh (peak - principal)

5.2 Energy – Shoulder

This register is identified by "02" or "B". The display indicates the kWh registration for the principal tariff (eg Domestic or Non Urban) between the Times of 09:00-17:00 plus 20:00-22:00 weekdays.

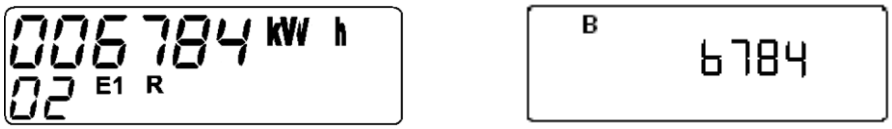


Figure 9: 6784 kWh (shoulder - principal)

5.3 Energy – Off Peak

This register is identified by "03" or "C". The display indicates the kWh registration for the principal tariff (eg Domestic or Non Urban) between the Times of 22:00 – 07:00 weekdays and all weekends.

Figure 10: 4127 kWh (off peak - principal)

5.4 Energy – Total NET Export

This display is only active on meters configured and programmed for NET export and indicates the kWh registration for all energy exported to the grid. The register is identified by "15" on i-Credit; EM1000 identifies the NET export with a minus symbol prefix (110 for paperwork).

Figure 11: 346 kWh (total – exported)

5.5 Date

The date is displayed in the format DD:MM:YY (i-Credit) or DDMMYY (EM1000).

Figure 12: June 1st, 2003

5.6 Time

The time (Eastern Standard Time ALWAYS) will be displayed in 24h format.

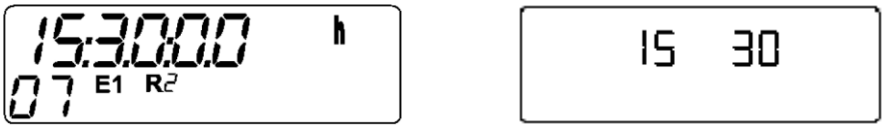


Figure 13: 3:30 pm

5.7 Display Test

This display enables the user to confirm that all parts of the display are operational. It is essential for validating readings.

Figure 14: Display test

5.8 Errors

This display is identified by register indication Err (EM1000) or the service symbol (i-Credit 500B). This display reports internal errors associated with the meter and is shown only if there are errors to be reported. A service call is required to clear these errors; the error codes assist maintenance officers to identify the error.

Figure 15: Error display examples

6 REFERENCES

Not applicable

7 REVISIONS

Issue Number	Section	Details of Changes in this Revision
2	1, 3.7	Add reference to controlled load meter
	4.8	Add section re control load
	Attachment A	Add drawing M1-16
3	All	Updated to new format; added reference to EM1000, and added Attachment B.
		Update further for EM1000 & add references to Net Export metering
4	All sections	Rebranding template
5	All	Included i-Credit 500B; excluded CM170 and P1 meters Removal of attachments