CERTIFICATE OF REGISTRATION

Australian Utilities Company Pty Ltd (AUC Solutions)

Unit 16, 492 Christine Avenue, Robina, QLD 4226, Australia

Has been assessed and certified by Compass Assurance Services to the following management systems, standards and guidelines:

ISO 9001:2015

QUALITY MANAGEMENT SYSTEMS

The scope of the certification covers the following activities:

Solutions for utility management, monitoring and metering; and embedded networking solutions.

Managing Director

CERTIFICATION DATE:	DATE OF ISSUE:	EXPIRY DATE:	CERTIFICATE #:
25 January 2019	16 December 2021	25 January 2025	3315-1594-01

COMPASS ASSURANCE SERVICES

Compass Assurance Services Pty Ltd
Level 1, 135 Queen Street, Cleveland, 4163 QLD
1300 495 855 | www.cas.com.au

National
Customer Code
Energy Brokers,
Consultants & Retailers
Proudly supported by the Energy Charter

15 February 2022

P.O. Box 497
Penrith NSW 2750

Dear Nancy, Patricia and Tracey,

Customer Code Council

I would like to congratulate each of you on your successful application to join the Customer Code Council (the CCC) for a period of two years. The CCC is an important vehicle to support, further develop and promote the benefits of the National Customer Code for Energy Brokers, Consultants and Retailers (the Customer Code).

Your application demonstrated that you have the skills, experience and commitment to help drive this important initiative and to participate in the strategic discussions on the Customer Code.

The Customer Code Administrator Anne Whitehouse will forward you the complete meeting pack and the invitation for the proposed meeting shortly. This will be an in-person meeting in Melbourne and via Zoom.

On the following pages, you will find the Memorandum of Understanding for the CCC.

I look forward to working with you over the next two years and for your help to encourage other signatories to join us. A public announcement on the CCC will be made this week.

Your sincerely

John A Smith

Chairman

National Customer Code

Energy Brokers, Consultants & Retailers

Memorandum of Understanding

The Customer Code was been put together through the collaboration of energy brokers, consultants, retailers and customer representatives supported by the Energy Charter: www.theenergycharter.com.au.

Memorandum of Understanding for the Customer Code Council

1. Purpose of this MoU

This memorandum of understanding (MOU) sets out arrangements to promote effective communication, collaboration and co-ordination between the Customer Code Council (the Council) and the Customer Code Administrator (the Administrator) in the performance of their different roles in supporting the National Customer Code for Energy Brokers, Consultants and Retailers (the Customer Code). These arrangements aim to enhance the governance, accountability and administration of the Customer Code.

This MOU is a public document and communicates, in a transparent way to all stakeholders, the administrative arrangements that operate between the Council and the Administrator.

2. Customer Code

The objective of the Customer Code is to give large energy customers confidence that energy brokers, consultants and retailers are working together in their best interests and delivering value. The Customer Code aims to raise standards of practice, strengthen trust and confidence and deliver better outcomes for large customers. The intention of the Customer Code is to address some of the concerns about third party intermediaries' selling practices raised in the Australian Competition and Consumer Commission (ACCC) Retail Electricity Pricing Inquiry Report 2018.

To achieve these objectives, it is agreed that there need to be clear and robust governance, accountability and administration arrangements for the Code in line with the ACCC Guidelines for developing effective voluntary, industry-based codes.

3. Customer Council

Role of the Council

The Council, with secretarial support from the Administrator, is a forum for co-operation in relation to the Customer Code and will ensure that the Customer Code achieves wide coverage and achieves its overall aims, as set out in Part A – Our Commitments (as amended from time to time), namely (where "you" is the customer):

1.1. **Customer centricity** – put you at the centre of our business and make decisions aligned with driving positive customer outcomes.
1.2. **Transparency** – provide clear, accurate and relevant information to help you make informed choices.
1.3. **Fit for purpose** – offer responsible and accurate products and services that are driven by your needs and preferences.
1.4. **Accountability** – be responsive to your needs and take prompt, appropriate action if you make a complaint and enquiries to ensure continuous improvement.

Council responsibilities

The Council's responsibilities are:

a. Promoting the benefits of the Customer Code, including encouraging signatories to the Customer Code
b. Agreeing to the branding of the Customer Code and its marketing and promotion to ensure widespread consumer and industry awareness
c. Appointing an Administrator for the Customer Code

d. Participating in the setting of the fees to be paid by signatories to the Customer Code
e. Review this Customer Code after the initial period of 12 months of operation, followed by every 3 years from then on with relevant stakeholders, including Customer Code signatories.

The Council members agree to comply with the Competition Law Protocol in the **Appendix.**

Appointment of Chair

An Independent Chair of Council will be appointed by the Council, together with an agreement for reasonable remuneration.

This will be a person of high standing and with an extensive understanding of energy and large customer issues. They must be able to demonstrate that they are:

a. Capable of reflecting the viewpoints and concerns of large customers
b. Have expertise in large customer issues and the confidence of large customers, customer organisations, industry and other key stakeholders
c. Have knowledge of the industry and the issues involved in the Code.

Members of the Council

The Council is a representative body of the Customer Code signatories and customer groups including:

- Between 3 to 5 individuals working for energy brokers and/or consultants
- Between 3 to 5 individuals working for energy retailers
- Between 1 to 2 individuals from customer representative organisations.

The inaugural Council is appointed based on Expressions of Interest issued publicly in November 2020 following consultation on the Customer Code. Individuals will be selected by the Independent Chair and the Energy Charter Executive Director on the basis that they have the necessary skills and experience to work with the Administrator to effectively manage the Customer Code's strategic priorities.

The inaugural Council will be appointed in their individual capacity for an initial twelve months prior to the end of 2020.

After an initial twelve months, the members of the inaugural Council will work with the Administrator to develop criteria for the Council. Where a Council member is unable to continue his or her duties for the remainder of the term, the Council may choose to call for expression of interest to replace that Council member.

The term of the appointee is to be not less than 12 months and no more than 3 years. Members can be reappointed after their initial term.

It is understood that the success of the Council depends on productive relationships and a shared commitment to the development of this industry, with a focus on good consumer outcomes.

Council meetings

The Council will meet at least once every three months or as otherwise agreed.

Members of the Council must be given at least two (2) weeks' notice of a meeting (although they may unanimously agree to short notice if there is urgent business to be considered). If a member of the Council is not able to attend, the appointing organisation is entitled to send an alternate in the person's place.

A Council decision must be made at a meeting (whether in person or technology enabled) attended by 75% or more of members of the Council or their alternates. The decision must be supported by a majority of members attending that meeting. If there is a tied vote on any matter for decision by the Council, the Chair will have a casting vote.

Council members must pay any costs associated with their attendance at meetings.

4. The Administrator

Appointment

The Council will appoint an Administrator to be responsible for day to day administration and monitoring of the Customer Code, in line with the objectives of the Code. The initial Administrator will be appointed for an initial period of twelve (12) months. After twelve (12) months, the Council will appoint an Administrator for a 3-year term.

Responsibilities

The Administrator is independent of the signatories and Customer Code Council and is responsible for the day-to-day administration and monitoring of this Code.

The Administrator is responsible for developing application and renewal processes for signatories:

a. Where an application is made, the Administrator will assess whether to admit the applicant as a signatory, taking into account whether their approach, processes and documents are sufficient to support the signatory meeting the standards of this Customer Code.
b. Where a signatory applies to renew their status as a signatory, the Administrator may take into account any complaints that have been made about the signatory, whether the signatory has co-operated with the Administrator in carrying out its responsibilities and any other relevant factors.
c. In either case, acceptance of a signatory will not be unreasonably withheld.

The Administrator will review the fees payable by signatories yearly, with a view to cost recovery only. As part of its annual budgeting process, the Administrator will propose a schedule of fees and contributions to the Customer Code Council for approval, at least 3 months prior to the intended date of effect.

The Administrator will publish on its website:

a. Copies and accessible information about this Customer Code.
b. Easily accessible list of signatories on the Customer Code website.
c. Information to assist signatories to meet the expectations of this Customer Code. These may include consumer information, checklists, templates, guides or training material.
d. Customer Code brand mark guidelines for signatories.
e. Details of fees on the Customer Code website. Fees may vary by classes of signatories. A change in fees is not effective until at least 3 months after publication of the new fee on the Customer Code website.

Council updates

At Council meetings, the Administrator will update the Council on:

- Number and type of Customer Code signatories
- Day-to-day strategic management issues
- Marketing and promotions of the Customer Code

- Complaints where these could not be managed by individual signatories (details anonymised)
- Details of any systemic issues for example in Customer Code compliance
- Issues with behaviour of signatories where these could not be managed by the Administrator (details anonymised).

5. Information sharing

The Council and Administrator recognise the value of sharing information. Each also recognises that they each have obligations in relation to the protection of information.

Where appropriate, the Administrator will facilitate the exchange of information with the Council. Where this information is confidential:

a. The Administrator will identify the relevant part of the information that is confidential
b. The Council will only use or disclose that information to the extent permitted by law.

6. Dispute resolution

The Administrator is not a dispute resolution body and will refer any complaints received to the energy broker, consultant or retailer in the first instance for management within their internal complaints handling processes. If a customer advises the Administrator that they are unhappy with the outcome from the signatory, the Administrator may refer the complaint to the Council with the customer's consent.

7. Promotion of the Customer Code

The Council is responsible for the promotion of the Customer Code including to their own organisation's members (as appropriate), stakeholders and to consumers more broadly.

A Communications Strategy for the branding, marketing and promotion of the Customer Code will be jointly developed and agreed by the Council and the Administrator, with the final guidelines to be approved by the Council.

8. Management of MoU

In the event of any disagreement between the Council and the Administrator, the parties will seek to resolve the matter in accordance with the purposes of this MOU.

The Council and the Administrator will review this MOU within 12 months of its commencement and at subsequent intervals of no more than three years.

The Administrator will publish this MOU on the Code website.

Signed on behalf of the Customer Code Council

_____ _____

Chair Date

_____ _____

Code Administrator Date

Appendix: Competition Law Protocol

Competition law commitments

The Council and Code Signatories are committed to complying with the CCA. This Protocol seeks to further minimise the risk of the Council and Customer Code signatories engaging in conduct that breaches the CCA when participating in meetings or other activities facilitated by the Customer Code Administrator.

The Council and Customer Code Signatories agree to comply with this Protocol and ensure compliance with the CCA. Council members and other Signatories will arrange for their representatives to be briefed on competition law risks and provided with a copy of this Protocol before they attend and Customer Code related meetings or participate in activities.

Competition law obligations

The CCA prohibits anti-competitive conduct, including:

1. Cartel conduct: arrangements (whether implied or express) between competitors to:
    a. fix or maintain prices
    b. restrict the supply or acquisition of goods or services by parties to the arrangement
    c. allocate customers, suppliers or territories
    d. rig bids.
2. Concerted practices: other cooperation between competitors which has the purpose, effect or likely effect of substantially lessening competition, in particular sharing Competitively Sensitive Information with competitors such as future pricing intentions.
3. Any contract, arrangement or understanding which has the purpose, effect or likely effect of substantially lessening competition.
4. Any conduct by a company with market power which has the purpose, effect or likely effect of substantially lessening competition.
5. Collective boycotts: where a group of competitors agree not to acquire goods or services from, or not to supply goods or services to, a business with whom the group is negotiating, unless the business accepts the terms and conditions offered by the group.

A contravention of the CCA could result in significant penalties for the Code Administrator, the Council, Code Signatories and their respective employees. Cartel conduct may also result in criminal sanctions, including jail terms for individuals.

In this Protocol, “Competitively Sensitive Information” means confidential information relating to a Signatory which if disclosed to a competitor could affect its current or future commercial strategies, such as pricing information, customer terms and conditions, supply terms and conditions, sales, commercial, marketing or procurement strategies, bidding plans, product development, margins, costs, capacity, market shares, or production planning.

Anti-competitive arrangements do not need to be in writing. It does not matter that the contravener thought what they were doing was legal or did not intend to engage in the conduct.

Non-observance can mean severe penalties and fines in the order of $10 million. Criminal sanctions may also apply. Other disabling consequences may be damages actions, court injunctions, personal liability and loss of business reputation. The individual involved, the organisation which they represent, the Customer Code Administrator, the Customer Code Council and Code Signatories may all be implicated.

Guiding Principles

The Council and Customer Code Signatories must not:

1. Share Competitively Sensitive Information between Signatories
2. Discuss or agree on:
    a. the price or terms of any Signatories' customer contracts
    b. the customers or geographic areas to be supplied by a Signatory
    c. the price or terms on which a Signatory will bid or supply into wholesale energy markets
    d. suppliers or terms of supply contracts
    e. production planning.
3. Enter into an agreement or arrangement which could have an impact on competition, without first seeking legal advice.
4. Breach any confidentiality obligations owed to third parties.

A list of prohibited subjects is included as an **Annexure** to this Protocol.

Compliance procedures for meetings

1. The Customer Code Administrator will circulate an agenda to participants before meetings. Participants should consider their own legal review.
2. Discussions at meetings must be limited to those topics on the agenda.
3. A *competition caution* (see example included in the **Annexure**), will be the first point in each agenda. At the start of each meeting the Chairperson shall read aloud the *competition caution* and the minutes shall so record.
4. Depending on the nature of the topics that will be discussed at a meeting, a lawyer may be invited to attend as an observer.
5. A designated Council member will take formal minutes of meetings which will be circulated to participants for confirmation and legal review.
6. Whenever new participants are present, the Chair of the meeting or lawyer will remind them of the contents of this Protocol.
7. If a participant is uncertain whether a discussion or conduct raises competition law issues, the discussion on the subject should be stopped or suspended until clearance can be obtained from legal counsel, and that fact shall be recorded in the minutes.

If you have any concerns

If you have any concerns regarding the CCA implications of any issue being discussed at any meeting, please bring the matter to the immediate attention of the Chair for the meeting.

Annexure

Prohibited subjects

Prohibited subjects include, but are not limited to, the following:

- **Price information**: selling or purchasing prices, including not only actual prices charged but also the elements of pricing and pricing policy, for example - costs, discounts, rebates, formulae, promotional terms and trade terms
- Price changes or present or future trading conditions
- Capacity, costs or production output

- Plans relating to future business, investment, product, marketing and advertising strategies
- Purchasing or bidding plans or other commercial strategies
- Sales volumes or values, or sales quotas
- Market shares
- Proprietary technical development
- Individual dealings with customers or suppliers or buying associations including the status or content of yearly negotiations and
- Proposals for joint market conduct regarding specific companies, including customers, suppliers and other industry participants, including boycotts and blacklists.

Summary

Competition caution – to be read at the start of each meeting:

"Attendees at this meeting shall not enter into any discussion, activity or conduct that may infringe, on their part or on the part of other participants, any applicable competition laws. For example, participants shall not discuss, communicate or exchange any commercially sensitive information, including information relating to prices, marketing and advertising strategies, costs, production planning or revenues.

For any new attendees –please note that participating in these discussions is subject to you having read and understood the Protocols including the guiding principles. If you have not done so yet, please do so now."

Version 1.0 December 2020

Power of Choice in Australia

Country: **Australia**

Segment: **Residential**

Project Background

In 2011 the Australian Energy Market Commission (AEMC) was directed to undertake a review into demand side participation in the national electricity market. This review, later titled **"Power of Choice - giving consumers options in the way they use electricity"** has fundamentally transformed the supply, metering and demand side management of electricity in the Australian National Energy Market (NEM).

The AEMC described Power of Choice as being:

> *"… all **about opportunities for consumers to make informed choices** about how they use (and procure) energy; and incentives for efficient investment so community demand for energy services can be met by the lowest cost combination of demand and supply options."*

Key to the implementation of Power of Choice was the creation of a new market entity, the "Metering Coordinator", which would be responsible for the meter and meter data at each connection point; and the definition of a Minimum Services Specification, which sets the basic services any compliant metering end point must deliver.

Solution and Benefit

The key to the success of the Power of Choice program has been the focus on choice, and EDMI's unique mix of best-of-breed measurement and control capabilities has been perfect for Power of Choice. An EDMI solution provides greater flexibility for metering coordinators to innovate and deliver additional value over and above the Minimum Services Specification.

With Power of Choice, the AEMC was driving for a set of market regulations that would open the market and allow for an enhanced set of solutions and services to be made available to consumers. Additionally, Metering Coordinators (and by extension their Retailer customers) would be able to offer differentiated services to Australian consumers. Following implementation, Metering Coordinators can now also provide a greater scope of services to Distribution Networks to enable them to gain insights into the operation of their deployed assets.

Power of Choice in Australia

Solution and Benefit (continuation)

Major EDMI customers, including 9 of the top 10 (by Power of Choice coverage) registered Metering Coordinators, chose EDMI because the combination of EDMI meters, communications, head-end and fleet management systems to provide a platform on which EDMI customers can innovate to deliver differentiated services efficiently.

EDMI has achieved great success in the Power of Choice market because EDMI is the only solution that is both highly scalable and future proof. EDMI provides a reliable path to delivering new value well into the future.

Products and Services Provided

Smart Meter	Mk7A, Mk7C, Mk10D
Network Equipment	Cellular 3G, 4G, Cat-1/Cat-M1
Meter Systems	EDMI Energy Cloud

EDMI LIMITED
47 Yishun Industrial Park A, Singapore 768724

www.edmi-meters.com

Australian Government
Department of Industry, Innovation and Science

National Measurement Institute

Certificate of Approval

NMI 14/2/80

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Satec Model BFM136 Class 1 Electricity Meter

submitted by Satec (Australia) Pty Ltd
12 Marsh Road
Silverdale NSW 2752

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI M 6-1 *Electricity Meters. Part 1: Metrological and Technical Requirements*, July 2012.

This approval becomes subject to review on 1/02/20, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	19/01/15
1	Pattern amended (accuracy class) – interim certificate issued	19/06/15
2	Pattern approved – certificate issued	15/10/15
3	Pattern approved – amended Test Procedure reference to MPEs	10/02/17

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/2/80' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0B.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Mario Zamora

TECHNICAL SCHEDULE No 14/2/80

1. Description of Pattern approved on 19/01/15

A Satec model BFM136 class 1 (#) electronic current transformer (CT) operated static watt hour meter used to measure electrical energy when used with certain Satec HACS/current sensors (current transformers, CTs).

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

• Number of phases		1 to 36	
• Number of wires		1 to 36	
• Reference frequency		50 Hz	
• Reference ambient temperature ranges:			
specified range of operation		-10 to 60°C	
limit range of operation		-20 to 70°C	
• Rated voltage		230 V AC	
• Rated currents:	Rated current, I_n	50 A	(*)
	Maximum current, I_{max}	100 A	(*)
• Meter constants		5.4 Wh/imp 1000 imp/kWh	
• Accuracy class		1	(#)

(*) These current ratings relate to a particular set of current sensors. Other current sensors with different ratings may also be used.

(#) The model BFM136 meter/HACS (CT) combinations are approved for Accuracy class 1.

1.2 Features/Functions

- Electronic (LCD) digital indicator
- Internal crystal clock
- Four quadrant energy metering
- Data logging
- Load profiling
- Event logging
- Time of use (TOU)
- Date/time stamping
- Communications, RS485 & Ethernet TCP/IP
- 36 single phase circuits
- 18 two phase circuits
- 12 three phase circuits
- Combination for up to 36 current inputs, from SATEC HACS/current sensors

1.3 HACS/Current Sensors (current transformers, CTs) (Figure 2)

The model BFM136 meter may be used with any of the following models (part numbers) of HACS/current sensors, namely CS1, CS1L, CS1S, CS2S, CS2SL, CS4, CS4S, CS8, CS8S, CS12S, CS20S, CS30S.

The HACS/current sensors may have some or all of the following features:

- HACS/current sensors up to 3000 A
- HACS/current sensors can be mounted up to 200 metres from BFM136
- HACS/current sensors incorporate shorting diodes (CT shorting switches not required)
- HACS/current sensor current ranges can be mixed per sub-meter

1.4 Remote Display (Figure 3)

The model BFM136 meter may be connected to a remote touch screen display (TFT) via serial or Ethernet communications.

1.5 Descriptive Markings

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's name or mark	...
Model designation	...
Serial number	...
Pattern approval mark	NMI 14/2/80
Number of phases	...
Number or wires	...
Reference frequency	... Hz
Meter constants	...
Rated voltage	... AC
Rated currents:	I_b ... A
	I_{max} ... A
Accuracy index	Class 1

1.6 Verification Provision

Provision is made for the application of a verification mark.

1.7 Sealing Provision

Provision is made for the instrument to be sealed by the application of one or more mechanical seals (Figure 1).

TEST PROCEDURE

Instruments tested for initial verification shall comply with the certificate of approval and technical schedule, and the maximum permissible errors for verifications at the operating conditions in effect at the time of verification.

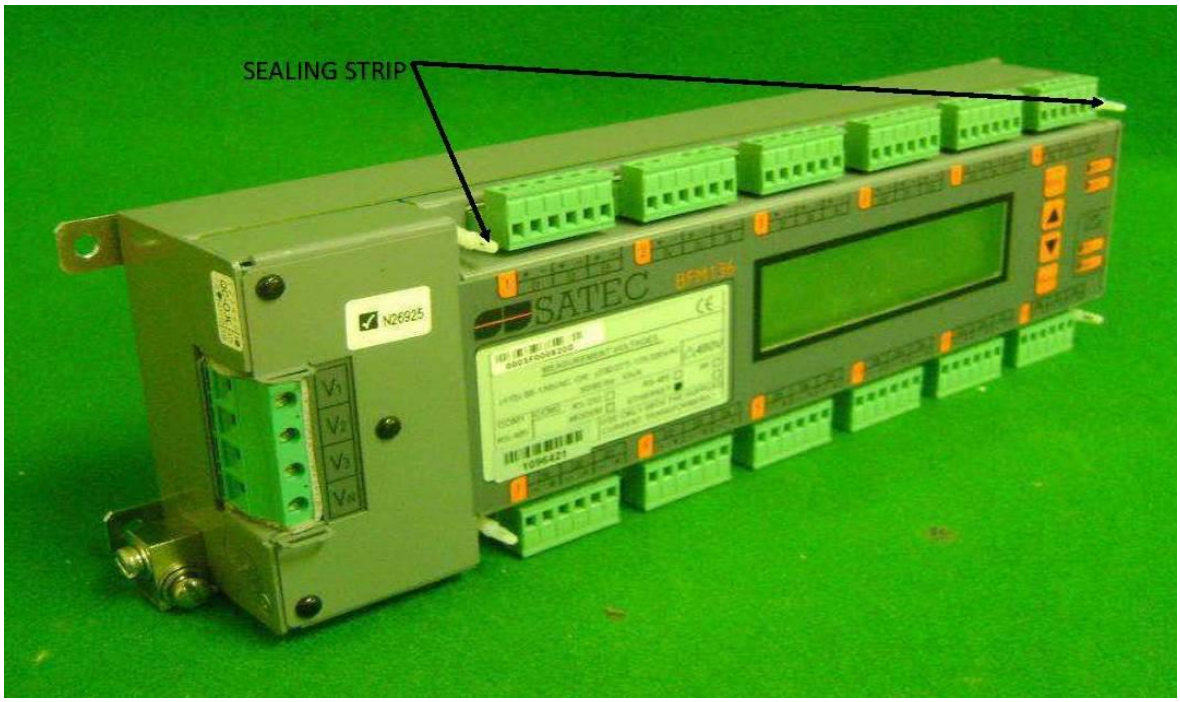
The maximum permissible errors are specified in the *National Trade Measurement Regulations 2009* (Cth).

Meters shall be verified in accordance with NITP 14 *National Instrument Test Procedures for Utility Meters*.

Evidence of verification shall be confirmed via the meter serial number and certificate of verification issued by a utility meter verifier in accordance with NITP 14.

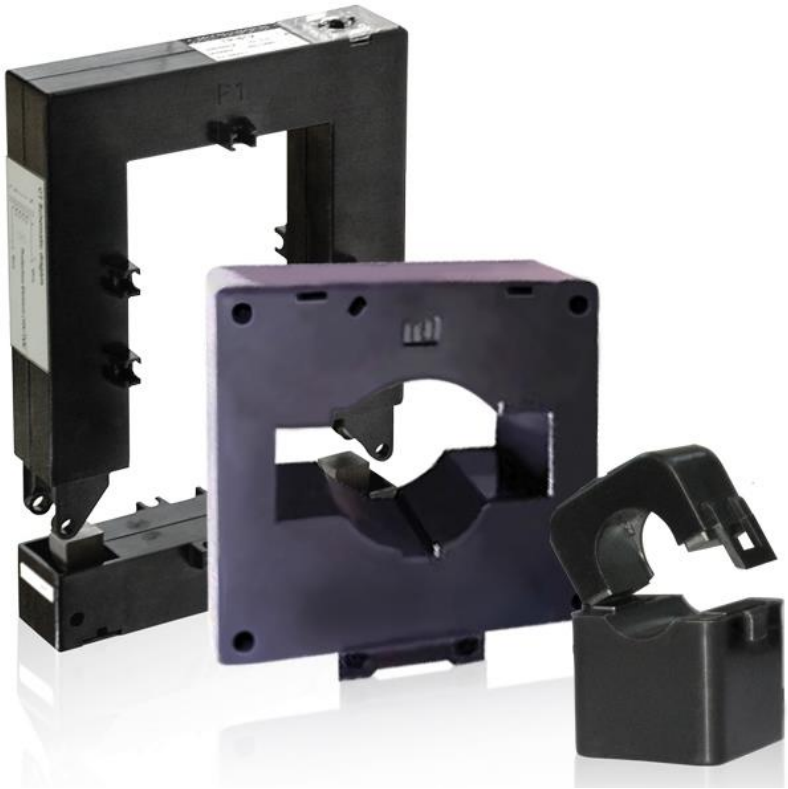
NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/2/80 – 1



Satec Model BFM136 Electricity Meter (Including Typical Mechanical Sealing)

FIGURE 14/2/80 – 2



Typical HACS/Current Sensors (CTs)

FIGURE 14/2/80 – 3

Typical Remote Touch Screen Display

~ End of Document ~

Australian Government
National Measurement Institute

Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

No 14/2/30A

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the

EDMI Model Mk7C Electricity Meter

submitted by EDMI Pty Ltd
162 South Pine Road
Brendale QLD 4500.

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI M 6, *Pattern Approval and Initial Verification of Electricity Meter and Associated Transformers: Definitions, Metrological and Technical Requirements*, July 2004.

CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 January 2019, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked with approval number ‘NMI 14/2/30A’ and only by persons authorised by the submittor.

It is the submittor’s responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

The National Measurement Institute reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

DESCRIPTIVE ADVICE

Pattern: approved 9 August 2010

- An EDMI model Mk7C electronic single phase Class 1 direct connect static watt hour meter used to measure electrical energy.

Variant: approved 9 August 2010

1. With certain other features/functions.

Technical Schedule No 14/2/30A describes the pattern and variant 1.

Variant: approved 06 December 2017

2. With certain other features/functions.
3. With the same features and function but with the addition of a plug-in base adaptor.

Technical Schedule No 14/2/30A describes the pattern, variant 1, variant 2 and variant 3.

FILING ADVICE

The documentation for this approval now comprises:

1. Certificate of Approval No 14/2/30A dated 16 August 2010
Technical Schedule No 14/2/30A dated 16 August 2010 (incl. Test Procedure)
Figures 1 and 2 dated 16 August 2010

2. Certificate of Approval No 14/2/30A Rev 1, with variants 2 & 3 dated 06 December 2017.

Figures 3, 4 and 5 dated 06 December 2017.

Signed by a person authorised by the Chief Metrologist to exercise his powers under Regulation 60 of the *National Measurement Regulations 1999*.

Darryl Hines

TECHNICAL SCHEDULE No 14/2/30A

Pattern: EDMI Model Mk7C Electricity Meter

Submittor: EDMI Pty Ltd
162 South Pine Road
Brendale QLD 4500

1. Description of Pattern

An EDMI model Mk7C (*) electronic single phase Class 1 direct connect static watt hour meter (Table 1 and Figure 1) used to measure electrical energy.

(* - the full model number may have additional alphanumeric characters, e.g. the full model number may be in the form '7C10-A212-20-C211-0A02-0000'. This number may also have a '2000-' prefix.)

1.1 Field of Operation

- Number of phases 1
- Number of wires 2
- Reference frequency 50 Hz
- Reference ambient temperature ranges:
  - specified range of operation -10 to 60°C
  - limit range of operation -25 to 70°C (#)
- Rated voltage 240 V AC
- Rated currents: Basic current, I_b 10 A
  Maximum current, I_{max} 100 A
- Accuracy index 1

(#) Instruments are approved for outdoor use.

1.2 Features/Functions

- One (1) element.
- ANSI Type 2 optical interface (AS1284.10 compliant).
- Liquid crystal digital indicator having a maximum display of 9999999.9 kW h.
- Export active energy measurement (Class 1).
- Eight (8) time-of-use registers.
- Load profiling memory (log intervals of from 1 to 60 minutes).
- Internal battery.
- 100 A disconnect relay.
- Bottom connect rectangular base.

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

Provision is made for the calibration adjustments to be sealed by the application of a mechanical seal (Figure 2).

1.5 Descriptive Markings

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's name or mark	...
Model designation	...
Serial number	...
Pattern approval mark	NMI 14/2/30A
Number of phases	...
Number or wires	...
Reference frequency	... Hz
Temperature limits (if other than -10 to 60^{o}C)	... to ...^{o}C
Meter constant	...
Rated voltage	... AC
Rated currents:	I_b ... A
	I_{max} ... A
Accuracy index	Class 1

2. Description of Variant 1

With certain other optional features/functions including:

- Flag protocol or ANSI protocol and port.
- RS 232, RS 485 and/or LON PLC communications.
- Various combinations of up to four input/output channels (active or passive when configured as input and S0 or Relay when configured as output).

3. Description of Variant 2 **approved on 06/12/2017**

An EDMI model Mk7C electronic single phase Class 1 direct connected static watt hour meter (Figure 3) used to measure electrical energy. This variant has the same Field of Operation and Features/Functions as the pattern except as listed below:

- Rated currents: Basic current, I_b 5 A or 10 A
- Rated voltage 220 - 240 V AC
- Reference ambient temperature ranges:
  - specified range of operation -25 to 60^{o}C
  - limit range of operation -40 to 70^{o}C
- First four characters of Manufacturing code 7C13
- Higher capacity modem supply
- Direct relay drive circuitry

3. Description of Variant 3 **approved on 06/12/2017**

An EDMI model Mk7C electronic single phase Class 1 direct connected static watt hour meter used to measure electrical energy. This variant has the same Field of Operation and Features/Functions as the pattern and its variants 1 and 2, with the addition of a plug-in base adaptor which allows the meter to be plugged in to a meter socket.

TEST PROCEDURE No 14/2/30A

Instruments tested for initial verification shall comply with the certificate of approval and technical schedule, and the maximum permissible errors for verifications at the operating conditions in effect at the time of verification.

Meters shall be verified in accordance with NITP 14 *National Instrument Test Procedures for Utility Meters*.

Evidence of verification shall be confirmed via the meter serial number and certificate of verification issued by a utility meter verifier in accordance with NITP 14.

NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/2/30A – 1

EDMI Model Mk7C Electricity Meter

FIGURE 14/2/30A – 2

Showing Typical Sealing

FIGURE 14/2/30A – 3

Variant 2 of EDMI model Mk7C Class 1 Electricity Meters

FIGURE 14/2/30A – 4

Variant 2 of EDMI model Mk7C Class 1 Electricity Meters
showing the manufacturing code ‘7C13’

FIGURE 14/2/30A – 4

Variant 3 of EDMI model Mk7C Class 1 Electricity Meters
with the plug-in base adaptor

Australian Government
National Measurement Institute
Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 14/2/66

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

EDMI Model Mk10D Electricity Meter

submitted by EDMI Pty Ltd
162 South Pine Road
Brendale QLD 4500

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use as a legal measuring instrument only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI M 6-1 *Electricity Meters. Part 1: Metrological and Technical Requirements*, July 2012.

This approval becomes subject to review on 1/10/18, and then every 5 years thereafter.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – certificate issued	6/09/13
1	Variant 1 approved – certificate issued	15/11/17

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/2/66' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0B.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

D Hines

TECHNICAL SCHEDULE No 14/2/66

1. Description of Pattern approved on 6/09/13

An EDMI model Mk10D electronic polyphase direct connect static watt hour meter (Figure 1) used to measure electrical energy.

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

• Number of phases		3
• Number of wires		4
• Reference frequency		50 or 60 Hz
• Reference ambient temperature ranges:		
specified range of operation		-25 to 60°C
limit range of operation		-40 to 70°C
• Rated voltage		240 V AC
• Rated currents:	Rated current, I_b	10 A
	Maximum current, I_{max}	100 A
• Meter constant		1 Wh/imp
• Accuracy class		1

1.2 Features/Functions

- Three (3) elements
- ANSI or FLAG optical interface
- Liquid crystal digital indicator having a maximum display of 9999999.9 kW h
- Active energy measurement (Class 1)
- Two (2) pulse outputs for Wh and VArh
- RJ45, RS 232, RS 485 and/or LON PLC communications
- Load survey/profile and time of use data capabilities
- High capacity modem power supply
- With synchronous and crystal clocks
- Bottom connect rectangular base

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

Provision is made for the instrument to be sealed by the application of one or more mechanical seals (Figure 1).

1.5 Descriptive Markings and Notices

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's name or mark	...
Model designation	...
Serial number	...
Pattern approval mark	NMI 14/2/66
Number of phases	...
Number or wires	...
Reference frequency	... Hz
Meter constant	...
Rated voltage	... AC
Rated currents:	I_b ... A
	I_{max} ... A
Accuracy index	Class …

2. Description of Variant 1 **approved on 15/11/17**

An EDMI model Mk10D electronic polyphase direct connect static watt hour meter (Figure 2) used to measure electrical energy. This variant has the same Field of Operation and Features as the pattern except as listed below:

- Rated currents: Rated current, I_b 5 A or 10 A
- Reference frequency: 50 Hz
- Rated Voltage: 220 – 240 V
- First four characters of Manufacturing code 1D13
- LON PLC Communications not present
- Higher capacity modem supply
- LCD with extended number segments
- Direct relay drive circuitry

TEST PROCEDURE No 14/2/66

Instruments tested for initial verification shall comply with the certificate of approval and technical schedule, and the maximum permissible errors for verifications at the operating conditions in effect at the time of verification.

Meters shall be verified in accordance with NITP 14 *National Instrument Test Procedures for Utility Meters*.

Evidence of verification shall be confirmed via the meter serial number and certificate of verification issued by a utility meter verifier in accordance with NITP 14.

NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/2/66 – 1

EDMI Model Mk10D Class 1 Electricity Meter
(Including Typical Mechanical Sealing)

FIGURE 14/2/66 – 2

Variant 1of EDMI Model Mk10D Class 1 Electricity Meter
(Including Typical Mechanical Sealing)

FIGURE 14/2/66 – 3

Variant 1of EDMI Model Mk10D Class 1 Electricity Meter
Showing the manufacturing code ‘1D13’

~ End of Document ~

Australian Government

Department of Industry, Science, Energy and Resources

National Measurement Institute

36 Bradfield Road, West Lindfield NSW 2070

Certificate of Approval

NMI 14/2/72

Issued by the Chief Metrologist under Regulation 60
of the
National Measurement Regulations 1999

This is to certify that an approval for use for trade has been granted in respect of the instruments herein described.

Satec Model EM133 Class 0.5 Electricity Meter

submitted by Satec (Australia) Pty Ltd
12 Marsh Road
Silverdale NSW 2752

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

This approval has been granted with reference to document NMI M 6-1 *Electricity Meters. Part 1: Metrological and Technical Requirements*, July 2012.

This approval is subject to review at the decision of the Chief Metrologist in accordance with the conditions specified in the document NMI P 106.

DOCUMENT HISTORY

Rev	Reason/Details	Date
0	Pattern approved – interim certificate issued	14/04/14
1	Pattern amended (validity) – interim certificate issued	10/10/14
2	Pattern amended (validity) – variant 1 approved – interim certificate issued	04/12/14
3	Pattern & variant 1 approved – certificate issued	13/05/15
4	Pattern amended (bi-directional flow) - variant 2 & 3 approved – certificate issued	09/11/18

Rev	Reason/Details	Date
5	Variant 4,5 & 6 approved – certificate issued	01/05/20
6	Variant 7 to 15 approved – certificate issued	13/04/21

CONDITIONS OF APPROVAL

General

Instruments purporting to comply with this approval shall be marked with pattern approval number 'NMI 14/2/72' and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the National Measurement Institute (NMI) and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with document NMI P 106.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0B.

Signed by a person authorised by the Chief Metrologist to exercise their powers under Regulation 60 of the *National Measurement Regulations 1999*.

Darryl Hines
Manager
Policy and Regulatory Services

TECHNICAL SCHEDULE No 14/2/72

1. Description of Pattern **approved on 14/04/14**

A Satec model EM133 class 0.5 electronic polyphase direct connect static watt hour meter (Figure 1) used to measure electrical energy.

1.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

• Number of phases		3
• Number of wires		4
• Reference frequency		50 Hz
• Reference ambient temperature ranges:		
specified range of operation		-20 to 60°C
limit range of operation		-25 to 60°C
• Rated voltage		3 × 230/400 V AC
• Rated currents:	Basic current, I_b	50 A
	Maximum current, I_{max}	100 A
• Meter constant		100 imp/kWh
• Accuracy class		0.5

1.2 Features/Functions

- Three (3) elements
- Electronic (LCD) digital indicator
- Din rail mounted
- Time of Use (TOU tariff functions)
- Data Logging
- Event Logging
- Three (3) × single phase configuration
- Internal crystal clock
- RS485 Communication module
- 8MB Memory
- Measurement in both positive and negative directions (export and import)
- Measurement of single phase loads in both positive and negative directions (export and import)
- Power quality measurements

1.3 Verification Provision

Provision is made for the application of a verification mark.

1.4 Sealing Provision

Provision is made for the instrument to be sealed by the application of one or more mechanical seals (Figure 1).

1.5 Descriptive Markings

Instruments are marked with the following data, together in one location, in the form shown at right:

Manufacturer's name or mark	...
Model designation	...
Serial number	...
Pattern approval mark	NMI 14/2/72
Number of phases	...
Number or wires	...
Reference frequency	... Hz
Meter constant	...
Rated voltage	... AC
Rated currents:	I_b ... A
	I_{max} ... A
Accuracy index	Class 0.5

1.6 Expansion Modules (Figure 2)

- Communication: Ethernet module (tcp/ip)
  Ethernet module with 12 digital inputs/4 relay output
  RS485 module with 12 digital inputs/4 relay output
  RS232/422/485
- Input/Output: 4 digital inputs/2 relay output
  12 digital inputs/4 relay output
- Analogue: 4 analogue outputs

1.7 Remote Display (Figure 3)

Remote touch screen display (TFT) for use with multiple model EM133 meters via serial or Ethernet communications, for panel mounted option.

2. Description of Variant 1 — approved on 4/12/14

A Satec model EM133 class 0.5 electronic polyphase current transformer (CT) operated static watt hour meter used to measure electrical energy.

This variant has the same features/functions as described for the pattern.

2.1 Field of Operation

The field of operation of the measuring system is determined by the following characteristics:

- Number of phases: 3
- Number of wires: 4
- Reference frequency: 50 Hz
- Reference ambient temperature ranges:
  - specified range of operation: -20 to 60°C
  - limit range of operation: -25 to 60°C
- Rated voltage: 3×230/400 V AC
- Rated currents: Rated current, I_n: 5 A; Maximum current, I_{max}: 10 A
- Meter constant: 1000 imp/kWh
- Accuracy class: 0.5

3. Description of Variant 2 — approved on 9/11/18

A Satec model EM133-XM-100A class 0.5 electronic polyphase direct connect static watt hour meter (Figure 4) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Three (3) × single phase configuration

4. Description of Variant 3 — approved on 9/11/18

A Satec model EM133-XM-5A class 0.5 electronic polyphase current transformer (CT) operated static watt hour meter (Figure 5) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, I_n: 5 A; Maximum current, I_{max}: 10 A
- Three (3) × single phase configuration

5. Description of Variant 4 — approved on 01/05/20

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS1 (Figure 6) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, I_n 50 A
  Maximum current, I_{max} 100 A
- Accuracy class: 1
- The HACS CS1 is solid core.
- Three (3) × single phase configuration

6. Description of Variant 5 **approved on 01/05/20**

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS1L (Figure 7) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, I_n 50 A
  Maximum current, I_{max} 100 A
- Accuracy class: 1
- The HACS CS1L is solid core.
- Three (3) × single phase configuration

7. Description of Variant 6 **approved on 01/05/20**

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer CS1S (Figure 8) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, I_n 50 A
  Maximum current, I_{max} 100 A
- Accuracy class: 1
- The HACS CS1S is split core.
- Three (3) × single phase configuration

8. Description of Variant 7 **approved on 13/04/21**

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS2 (Figure 9) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 100 A
  Maximum current, Imax 200 A
- Accuracy class: 1
- The HACS CS2 is solid core.

- Three (3) × single phase configuration

9. Description of Variant 8 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS2S (Figure 10) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 100 A
  Maximum current, Imax 200 A
- Accuracy class: 1
- The HACS CS2S is split core.
- Three (3) × single phase configuration

10. Description of Variant 9 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS4 (Figure 11) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 200 A
  Maximum current, Imax 400 A
- Accuracy class: 1
- The HACS CS4 is solid core.
- Three (3) × single phase configuration

11. Description of Variant 10 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS4S (Figure 12) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 200 A
  Maximum current, Imax 400 A
- Accuracy class: 1
- The HACS CS4S is split core.
- Three (3) × single phase configuration

12. Description of Variant 11 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS4L (Figure 13) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 200 A
  Maximum current, Imax 400 A
- Accuracy class: 1
- The HACS CS4L is solid core.
- Three (3) × single phase configuration

13. Description of Variant 12 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS8 (Figure 14) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 400 A
  Maximum current, Imax 800 A
- Accuracy class: 1
- The HACS CS8 is solid core.
- Three (3) × single phase configuration

14. Description of Variant 13 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS8S (Figure 15) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 400A
  Maximum current, Imax 800 A
- Accuracy class: 1
- The HACS CS8S is split core.
- Three (3) × single phase configuration

15. Description of Variant 14 — approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS12S (Figure 16) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 600 A
  Maximum current, Imax 1200 A
- Accuracy class: 1
- The HACS CS12S is split core.
- Three (3) × single phase configuration

16. Description of Variant 15 approved on 13/04/21

A Satec model EM133 HACS, class 1 electronic polyphase current transformer (CT) operated static watt hour meter with current transformer HACS CS30S (Figure 17) used to measure electrical energy.

This variant has the same Field of Operation, Features and Functions as described for the pattern except for the following:

- Rated currents: Rated current, In 1500 A
  Maximum current, Imax 3000 A
- Accuracy class: 1
- The HACS CS30S is split core.
- Three (3) × single phase configuration

TEST PROCEDURE

Instruments tested for initial verification shall comply with the certificate of approval and technical schedule, and the maximum permissible errors for verifications at the operating conditions in effect at the time of verification.

Maximum Permissible Errors (MPEs)

The MPEs for the pattern and variants 1, 2 & 3 are the same as specified in the *National Trade Measurement Regulations 2009* (Cth) for a class 0.5 transformer-operated electricity meter, with basic current substituted for nominal current for direct connected meter.

The MPEs for the variants 4, 5 & 6 are those specified in the *National Trade Measurement Regulations 2009* (Cth) for a class 1 direct connected electricity meter.

Meters shall be verified in accordance with NITP 14 *National Instrument Test Procedures for Utility Meters*.

Evidence of verification shall be confirmed via a verification mark, or equivalently via a certificate of verification identifying meters by serial number issued by a utility meter verifier in accordance with NITP 14.

NOTE: NMI reserves the right to vary this procedure. Any such variation shall be notified in writing by NMI.

FIGURE 14/2/72 – 1

Satec Model EM133 Electricity Meter (Including Typical Mechanical Sealing)

FIGURE 14/2/72 – 2

Expansion Modules

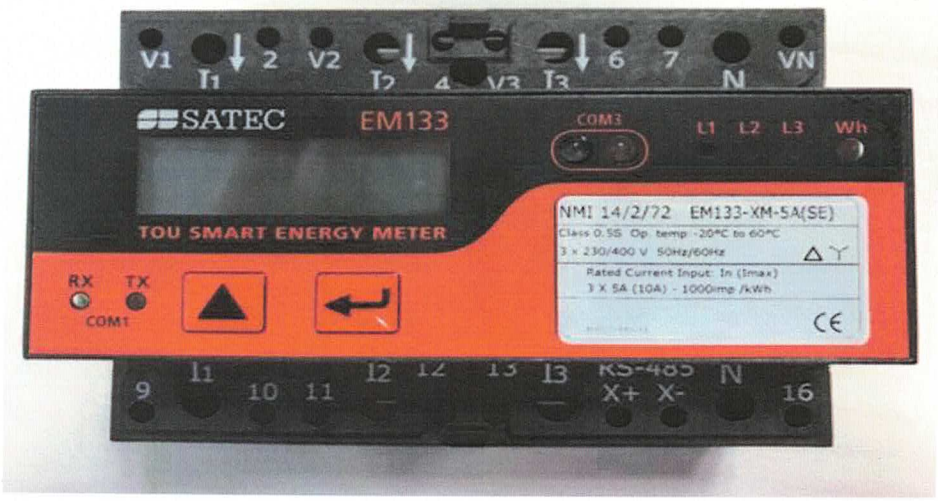
FIGURE 14/2/72 – 3

Optional Remote Display for Panel Mounted Option

FIGURE 14/2/72 – 4

Variant 2 - Satec Model EM133 -XM-100A Electricity Meter

FIGURE 14/2/72 – 5

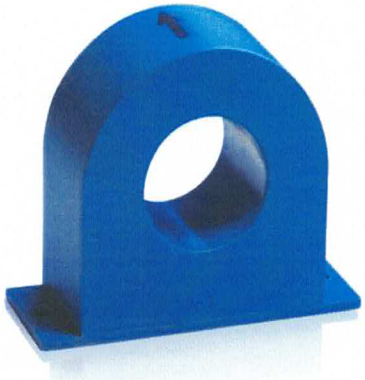


Variant 3 - Satec Model EM133 -XM-5A Electricity Meter

FIGURE 14/2/72 – 6

Variant 4 – Satec Model EM-133-XM-HACS meter with CS1 HACS

Figure 14/2/72 – 7

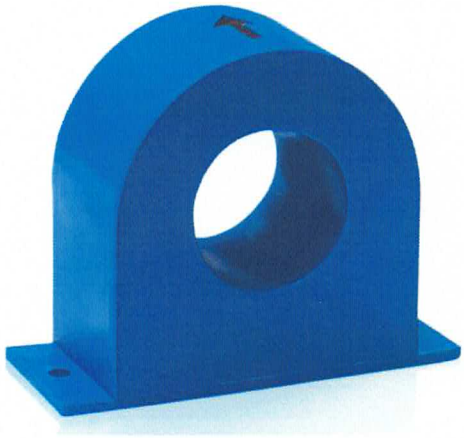


Variant 5 – Satec Model EM-133-XM-HACS meter with CS1L HACS

Figure 14/2/72 – 8

Variant 6 – Satec Model EM-133-XM-HACS meter with CS1S HACS

Figure 14/2/72 – 9



Variant 7 – Satec Model EM-133-XM-HACS meter with CS2 HACS

Figure 14/2/72 – 10

Variant 8 – Satec Model EM-133-XM-HACS meter with CS2S HACS

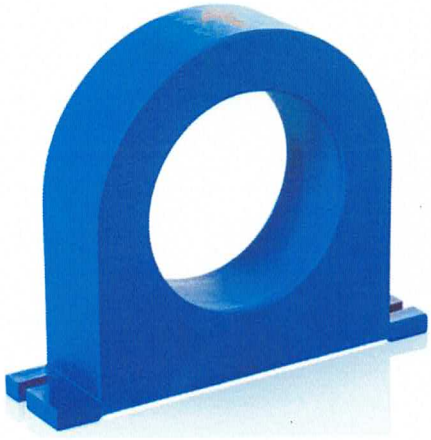
Figure 14/2/72 – 11

Variant 9 – Satec Model EM-133-XM-HACS meter with CS4 HACS

Figure 14/2/72 – 12

Variant 10 – Satec Model EM-133-XM-HACS meter with CS4S HACS

Figure 14/2/72 – 13



Variant 11 – Satec Model EM-133-XM-HACS meter with CS4L HACS

Figure 14/2/72 – 14

Variant 12 – Satec Model EM-133-XM-HACS meter with CS8 HACS

Figure 14/2/72 – 15

Variant 13 – Satec Model EM-133-XM-HACS meter with CS8S HACS

Figure 14/2/72 – 16

Variant 14 – Satec Model EM-133-XM-HACS meter with CS12S HACS

Figure 14/2/72 – 17

Variant 15 – Satec Model EM-133-XM-HACS meter with CS30S HACS

~ End of Document ~