Various California W&M Jurisdiction submitted recommendations to WWMA S&T Agenda for Item OTH-16.1 Electric Watthour Meters Tentative Code	
Section excerpt as submitted by NCWM S&T Committee after the 2023 NCWM Annual Meeting	Proposed changes. Deletions are **~~bold with strikethrough~~**. Additions are **bold and underlined**. A clean, no mark-up version follows "Clean Version".
S.1.3.5. Multiple NUEMS, Single Indicating Element. – A primary indicating, or combination indicating-recording element coupled to two or more NUEMS shall be provided with a means to easily, clearly, and definitely display information from a selected NUEMS and shall automatically indicate which NUEMS is associated with the currently displayed information.	**S.1.3.5. Multiple Loads ~~NUEMS~~, Single Indicating Element**. – A primary indicating, or combination indicating-recording element coupled to two or more **loads** **~~NUEMS~~** shall be provided with a means to easily, clearly, and definitely display information from a selected **load** **~~NUEMS~~** and shall automatically indicate which **load** **~~NUEMS~~** is associated with the currently displayed information. **Clean Version** **S.1.3.5. Multiple Loads, Single Indicating Element**. – A primary indicating, or combination indicating-recording element coupled to two or more loads shall be provided with a means to easily, clearly, and definitely display information from a selected load and shall automatically indicate which load is associated with the currently displayed information.
S.3. Markings. – The following identification and marking requirements are in addition to the requirements of Section 1.10 General Code, paragraph G-S.1. Identification. S.3.1. Location of Marking Information. – The marking information may be placed either internally or externally (as specified in paragraphs S.3.2. Device Identification and Marking Requirements and S.3.3. External Sensor Identification and in the associated tables) provided: i. the information is permanent and easily read; and accessible for inspection; ii. the information is on a portion of the device that cannot be readily removed or interchanged (e.g., not on a service access panel). A readily removable cover is an acceptable location for the required information provided: (1) the information is permanently marked elsewhere on the device or is readily accessible through other means such as through an electronic display; or (2) a unique marking on the removable cover can be matched with what is programmed into or permanently marked on the meter, thus linking that marking (and any other markings) included on the cover with that specific device. iii. accessing the information does not require accessing an area with live exposed voltages greater than 40 V.	**S.3. Markings.** – The following identification and marking requirements are in addition to the requirements of Section 1.10 General Code, paragraph G-S.1. Identification. S.3.1. Location of Marking Information. – The marking information may be placed either internally or externally (as specified in paragraphs S.3.2. Device Identification and Marking Requirements and S.3.3. External Sensor Identification and in the associated tables) provided: i. the information is permanent and easily read; and accessible for inspection; ii. the information is on a portion of the device that cannot be readily removed or interchanged (e.g., not on a service access panel). A readily removable cover is an acceptable location for the required information provided: (1) the information is permanently marked elsewhere on the device or is readily accessible through other means such as through an electronic **marking** display; or (2) a unique marking on the removable cover can be matched with what is programmed into or permanently marked on the **NUEMS** **~~meter~~**, thus linking that marking (and any other markings) included on the cover with that specific device. iii. accessing the information does not require accessing an area with live exposed voltages greater than 40 V. **Clean Version** **S.3. Markings.** – The following identification and marking requirements are in addition to the requirements of Section 1.10 General Code, paragraph G-S.1. Identification. S.3.1. Location of Marking Information. – The marking information may be placed either internally or externally (as specified in paragraphs S.3.2. Device Identification and Marking Requirements and S.3.3.

	External Sensor Identification and in the associated tables) provided: i. the information is permanent and easily read; and accessible for inspection; ii. the information is on a portion of the device that cannot be readily removed or interchanged (e.g., not on a service access panel). A readily removable cover is an acceptable location for the required information provided: (1) the information is permanently marked elsewhere on the device or is readily accessible through other means such as through an electronic marking display; or (2) a unique marking on the removable cover can be matched with what is programmed into or permanently marked on the NUEMS, thus linking that marking (and any other markings) included on the cover with that specific device. iii. accessing the information does not require accessing an area with live exposed voltages greater than 40 V.
S.3.2.1. Device Identification and Marking Requirements of Meter with External Sensors – Sensor input connection with intended polarity shall be physically marked on the meter when direction-sensitive.	~~**S.3.2.1. Device Identification and Marking Requirements of Meter with External Sensors – Sensor input connection with intended polarity shall be physically marked on the meter when direction-sensitive.**~~ This requirement was moved to Table S.3.2.3.a. (14)
S.3.2.2. Device Identification and Marking Requirements, Internal Sensor (IS) NUEMS. – The following markings shall be physically marked on an Internal Sensor (IS) NUEMS: (a) AC voltage range or rating in VAC; (b) Watthour constant (K_h) or Watthour test constant (K_t); (c) Register ratio (R_r or K_r) for meters with a rotating disc and multiplier (if greater than one) preceded by "multiply by" or "mult by" or "K_r"; (d) Number of wires (W); (e) Form designation (FM) (for A-base and socket NUEMS only); and (f) Current Class (CL).	**S.3.2.2. Device Identification and Marking Requirements, Internal Sensor (IS) NUEMS**. – The following markings shall be physically marked on an Internal Sensor (IS) NUEMS: (a) AC voltage range or rating in VAC; (b) Watthour constant (K_h) or Watthour test constant (K_t); (c) Register ratio (R_r ~~**or K_r**~~) for ~~**meters**~~ **NUEMS** with a rotating disc and multiplier (if greater than one) preceded by "multiply by" or "mult by" ~~**or "K_r"**~~; (d) Number of wires (W); (e) Form designation (FM) (for A-base and socket NUEMS only); and (f) Current Class (CL). **Clean Version** **S.3.2.2. Device Identification and Marking Requirements, Internal Sensor (IS) NUEMS**. – The following markings shall be physically marked on an Internal Sensor (IS) NUEMS: (a) AC voltage range or rating in VAC; (b) Watthour constant (K_h) or Watthour test constant (K_t); (c) Register ratio (R_r) for NUEMS with a rotating disc and multiplier (if greater than one) preceded by "multiply by" or "mult by"; (d) Number of wires (W); (e) Form designation (FM) (for A-base and socket NUEMS only); and (f) Current Class (CL).
S.3.2.3. Device Identification and Marking Requirements of Meters, External Sensor (ES) NUEMS. – In addition to all the marking requirements of Section 1.10 General Code, paragraph G-S.1. Identification, External Sensor (ES) NUEMS shall have the following legibly, and indelibly marked on the meter as shown in:	**S.3.2.3. Device Identification and Marking Requirements of ~~Meters~~, External Sensor (ES) NUEMS.** – In addition to all the marking requirements of Section 1.10 General Code, paragraph G-S.1. Identification, External Sensor (ES) NUEMS shall have the following legibly, and indelibly marked on the **NUEMS** ~~**meter**~~ as shown in:

• Tables S.3.2.3.a. Device Identification and Marking Requirements of Meter – External Sensor (ES) NUEMS; and • Table S.3.2.3.b. Descriptors for Table S.3.2.3.a. Device Identification and Marking Requirements of Meter – External Sensor (ES) NUEMS. (a) service type or service configuration.	• Tables S.3.2.3.a. Device Identification and Marking Requirements ~~**of Meter**~~ – External Sensor (ES) NUEMS; and • Table S.3.2.3.b. Descriptors for Table S.3.2.3.a. Device Identification and Marking Requirements ~~**of Meter**~~ – External Sensor (ES) NUEMS. ~~**(a) service type or service configuration.**~~ **Clean Version** **S.3.2.3. Device Identification and Marking Requirements of, External Sensor (ES) NUEMS.** – In addition to all the marking requirements of Section 1.10 General Code, paragraph G-S.1. Identification, External Sensor (ES) NUEMS shall have the following legibly, and indelibly marked on the NUEMS as shown in: • Tables S.3.2.3.a. Device Identification and Marking Requirements– External Sensor (ES) NUEMS; and • Table S.3.2.3.b. Descriptors for Table S.3.2.3.a. Device Identification and Marking Requirements– External Sensor (ES) NUEMS.

Table S.3.2.3.a.
Device Identification and Marking Requirements for External Sensor (ES) NUEMS

	Physical Marking	Electronic Display*, **
Manufacturer or Distributor name, initials, or trademark (1)	R	D
Model Prefix (2)	O	D
Model (3)	R	D
Serial Number Prefix (4)	O	D
Serial Number (5)	R	D
NTEP CC Number with Prefix (6)	R	D
NUEMS Voltage Input Rating (7) Nonretroactive as of January 1, 2024.	O	D
Voltage Sensor Rating (8) *Nonretroactive as of January 1, 2024.*	O	D
Voltage Sensor Ratio (9) *Nonretroactive as of January 1, 2024.*	O	D
NUEMS Current Input Rating (10) *Nonretroactive as of January 1, 2024.*	O	D
Sensor Primary Current Rating (11) *Nonretroactive as of January 1, 2024.*	O	D
Sensor True Ratio (12) *Nonretroactive as of January 1, 2024.*	O	D
K_h or K_t (13)	O	D
Bi-directional (14)	O	D
Temperature Range if narrower than −20 °C to + 50 °C (− 4 °F to + 122 °F) (15)	O	D

R Required to be marked on the NUEMS
O Required to be marked on the NUEMS only if information is not available on a display
D Alternate when information is not marked physically on the NUEMS. If device identification and marking is provided on an electronic display, then all fields must be provided.

*"Electronic Display" includes, but is not limited to, displays of the required marking information through a NUEMS display, a mobile device, or other electronic means as specified by the manufacturer and retrievable through the NUEMS. This may include providing access directly from the meter to a webpage. If the information is provided via a mechanism other than the NUEMS display, the mechanism must be provided by the device owner/operator as specified in UR.2.4.10. Devices for Viewing Marking Information Provided Via an Electronic Display, External Sensor (ES) NUEMS.

**Instructions on how to view required markings shall be marked on the device or provided in the NTEP CC.

General:

- Numbers appearing in parentheses (e.g., (1)) following each marking requirement above correspond to numbered descriptors in Table S.3.2.2.b. Descriptors for Table S.3.2.3.a. Device Identification and Marking Requirements of External Sensor (ES) NUEMS.
- For requirements and details on application, see Table S.3.2.3.b. Descriptors for Device Identification and Marking Requirements of External Sensor (ES) NUEMS.

Table S.3.2.3.a.
Device Identification and Marking Requirements for External Sensor (ES) NUEMS

	Physical Marking	Electronic **Marking** Display*, **
Manufacturer or Distributor name, initials, or trademark (1)	R	D
Model Prefix (2)	O	D
Model (3)	R	D
Serial Number Prefix (4)	O	D
Serial Number (5)	R	D
NTEP CC Number with Prefix (6)	R	D
NUEMS Voltage Input Rating *(7) Nonretroactive as of January 1, 2024.*	O	D
Voltage Sensor Rating (8) *Nonretroactive as of January 1, 2024.*	O	D
Voltage Sensor Ratio (9) *Nonretroactive as of January 1, 2024.*	O	D
NUEMS Current Input Rating (10) *Nonretroactive as of January 1, 2024.*	O	D
Sensor Primary Current Rating (11) *Nonretroactive as of January 1, 2024.*	O	D
Sensor True Ratio (12) *Nonretroactive as of January 1, 2024.*	O	D
K_h or K_t (13)	O	D
Sensor Input Polarity (14)	**R**	--
Bi-directional (**15**)	O	D
Temperature Range if narrower than −20 °C to + 50 °C (− 4 °F to + 122 °F) (**16**)	O	D

R Required to be marked on the NUEMS
O Required to be marked on the NUEMS only if information is not available on a display
D Alternate when information is not marked physically on the NUEMS. If device identification and markings are provided on an electronic marking display, then all fields must be provided.

*"Electronic Marking Display" includes, but is not limited to, displays of the required marking information through a NUEMS display, a mobile device, or other electronic means as specified by the manufacturer and retrievable through the NUEMS. This may include providing access directly from the NUEMS to a webpage. If the information is provided via a mechanism other than primary indicator, the mechanism must be provided by the device owner/operator as specified in UR.2.4.7. Devices for Viewing Marking Information Provided Via an Electronic Marking Display, External Sensor (ES) NUEMS. Also see S.3.4. Electronic Marking Display Security Protocol.

**Instructions on how to view required markings shall be marked on the device or provided in the NTEP CC.

General:

- Numbers appearing in parentheses (e.g., (1)) following each marking requirement above correspond to numbered descriptors in Table S.3.2.3.b. Descriptors for Table S.3.2.3.a. Device Identification and Marking Requirements of External Sensor (ES) NUEMS.
- For requirements and details on application, see Table S.3.2.3.b. Descriptors for Device Identification and Marking Requirements of External Sensor (ES) NUEMS.

Table S.3.2.3.b. 2. Manufacturer's Model Prefix. For an External Sensor (ES) NUEMS having its NTEP number clearly identified, conspicuously and indelibly marked on the meter, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings), the associated NUEMS is not required to meet General Code paragraph G-S.1. Identification (b)(1).	**Table S.3.2.3.b**. 2. Manufacturer's Model Prefix. For an External Sensor (ES) ~~**meter**~~**NUEMS** having its NTEP number clearly identified, conspicuously and indelibly marked on the NUEMS, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings), the associated NUEMS is not required to ~~**meet**~~**be physically marked per** General Code paragraph G-S.1. Identification (b)(1). **Clean Version** Table S.3.2.3.b. 2. Manufacturer's Model Prefix. For an External Sensor (ES) NUEMS having its NTEP number clearly identified, conspicuously and indelibly marked on the NUEMS, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings), the associated NUEMS is not required to be physically marked per General Code paragraph G-S.1. Identification (b)(1).
Table S.3.2.3.b. 3. Manufacturer's Model Identifier. Marked per General Code paragraph G-S.1. Identification.	**Table S.3.2.3.b.** 3. Manufacturer's Model Identifier. ~~**Marked**~~**Also see** General Code paragraph G-S.1. Identification. **Clean Version** Table S.3.2.3.b. 3. Manufacturer's Model Identifier. Also see General Code paragraph G-S.1. Identification.
Table S.3.2.3.b. 4. Serial Number Prefix. For an External Sensor (ES) NUEMS having its NTEP number clearly identified, conspicuously and indelibly marked on the meter, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings), the associated NUEMS is not required to meet General Code paragraph G-S.1. Identification (c)(1).	**Table S.3.2.3.b.** 4. Serial Number Prefix. For an External Sensor (ES) NUEMS having its NTEP number clearly identified, conspicuously and indelibly marked on the ~~**meter**~~**NUEMS**, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings), the associated NUEMS is not required to ~~**meet**~~**be physically marked per** General Code paragraph G-S.1. Identification (c)(1). **Clean Version** 4. Serial Number Prefix. For an External Sensor (ES) NUEMS having its NTEP number clearly identified, conspicuously and indelibly marked on the NUEMS, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings), the associated NUEMS is not required to be physically marked per General Code paragraph G-S.1. Identification (c)(1).
Table S.3.2.3.b. 6. NTEP Certificate of Conformance Number and Prefix. NUEMS electronics that has been evaluated by NTEP and has its own NTEP CC shall be marked per General Code paragraph G-S.1. Identification.	**Table S.3.2.3.b.** 6. ~~**NTEP Certificate of Conformance Number and Prefix. NUEMS electronics that has been evaluated by NTEP and has its own NTEP CC shall be m**~~**M**arked per General Code paragraph G-S.1. Identification. **Clean Version** NTEP Certificate of Conformance Number and Prefix. Marked per General Code paragraph G-S.1. Identification.

Table S.3.2.3.b. 7. *NUEMS Voltage Input Rating (V_{nom}). The nominal voltage input(s) for the voltage channel of the NUEMS electronics (e.g., 120VAC, 600VAC, 120-480VAC, etc.). Multiple forms of the term such as "Rated Voltage," "Max Voltage," and "Reference Voltage" are permitted.* *[Nonretroactive as of January 1, 2024]*	**Table S.3.2.3.b.** 7. *NUEMS Voltage Input Rating (V_{nom}). The nominal voltage input(s) for the voltage channel of the **~~NUEMS electronics~~ES NUEMS body** (e.g., 120VAC, 600VAC, 120-480VAC, etc.). Multiple forms of the term such as "Rated Voltage," "Max Voltage," and "Reference Voltage" are permitted.* *[Nonretroactive as of January 1, 2024]* **Clean Version** 7. *NUEMS Voltage Input Rating (V). The nominal voltage input(s) for the voltage channel of the ES NUEMS body (e.g., 120VAC, 600VAC, 120-480VAC, etc.). Multiple forms of the term such as "Rated Voltage," "Max Voltage," and "Reference Voltage" are permitted.[Nonretroactive as of January 1, 2024]*
Table S.3.2.3.b. 8. *Voltage Sensor (V_{nom}). The nominal input at the voltage sensor. If a voltage sensor is not used this marking is not required. If a voltage sensor is used, a multiplier can be used in place of V_{nom} and voltage sensor ratio.* *[Nonretroactive as of January 1, 2024]*	**Table S.3.2.3.b.** 8. *Voltage Sensor **Rating** (V_{nom}). The nominal input at the voltage sensor. If a voltage sensor is not used this marking is not required. If a voltage sensor is used, a multiplier can be used in place of V_{nom} and voltage sensor ratio. **The Voltage Sensor Rating shall be prefaced with the abbreviation "V_{nom}".*** *[Nonretroactive as of January 1, 2024]* **Clean Version** 8. *Voltage Sensor Rating (V_{nom}). The nominal input at the voltage sensor. If a voltage sensor is not used this marking is not required. If a voltage sensor is used, a multiplier can be used in place of V_{nom} and voltage sensor ratio. The Voltage Sensor Rating shall be prefaced with the abbreviation "V_{nom}". [Nonretroactive as of January 1, 2024]*
Table S.3.2.3.b. 9. *Voltage Sensor Ratio. Ratio of sensor primary voltage to sensor output voltage. If a voltage sensor is not used this marking is not required. If a voltage sensor is used, a multiplier can be used in place of V_{nom} and voltage sensor ratio.* *[Nonretroactive as of January 1, 2024]*	**Table S.3.2.3.b.** 9. *Voltage Sensor Ratio **(V_{rat})**. Ratio of sensor primary voltage to sensor output voltage. If a voltage sensor is not used this marking is not required. If a voltage sensor is used, a multiplier can be used in place of V_{nom} and voltage sensor ratio. **The Voltage Sensor Ratio shall be prefaced with the abbreviation "V_{rat}".*** *[Nonretroactive as of January 1, 2024]* **Example of Voltage Sensor Ratio Marking:** **480V:120V** **Clean Version** 9. *Voltage Sensor Ratio (V_{rat}). Ratio of sensor primary voltage to sensor output voltage. If a voltage sensor is not used this marking is not required. If a voltage sensor is used, a multiplier can be used in place of V_{nom} and voltage sensor ratio. The Voltage Sensor Ratio shall be prefaced with the abbreviation "V_{rat}". [Nonretroactive as of January 1, 2024]* Example of Voltage Sensor Ratio Marking: 480V:120V
Table S.3.2.3.b. 10. *NUEMS Current Input (Input I_{nom} or I_{max}). The nominal current or voltage input for the current channel of the NUEMS electronics. The output of the current sensor must match the input configuration of the meter.* *[Nonretroactive as of January 1, 2024]*	**Table S.3.2.3.b.** 10. *NUEMS Current Input **Rating** (**~~Input~~** I_{nom} **~~or I_{max}~~**). The nominal current or voltage input for the current channel of the **~~NUEMS electronics~~ES NUEMS body. The NUEMS Current Input Rating shall be prefaced with the abbreviation "I_{nom}".~~The output of the current sensor must match the input configuration of the meter.~~***

	<u>The output of the current sensor must match the input configuration of the NUEMS. This is determined by dividing Sensor Primary Current Rating (11) by the True Ratio (12). The computed quotient must match the NUEMS Current Input Rating (10).</u> *[Nonretroactive as of January 1, 2024]* **<u>Example 1:</u>** **<u>Sensor Primary Current Rating = 200A</u>** **<u>True Ratio = 100A:5A</u>** **<u>Calculation: (200A) ÷ (100A/5A) = (200A) ÷ (20) = 10A</u>** **<u>Example 2:</u>** **<u>Sensor Primary Current Rating = 200A</u>** **<u>True Ratio = 400A:0.3V</u>** **<u>Calculation: (200A) ÷ (400A/0.3V) = (200A) * (0.3V/400A) = 60W/400A = 0.15V</u>** **<u>NOTE: W=Watts=Amperes*Volts</u>** **Clean Version** 10. *NUEMS Current Input Rating (I_{nom}). The nominal current or voltage input for the current channel of the ES NUEMS body. The NUEMS Current Input Rating shall be prefaced with the abbreviation "I_{nom}".* *The output of the current sensor must match the input configuration of the NUEMS. This is determined by dividing Sensor Primary Current Rating (11) by the True Ratio (12). The computed quotient must match the NUEMS Current Input Rating (10).* *[Nonretroactive as of January 1, 2024]* Example 1: Sensor Primary Current Rating = 200A True Ratio = 100A:5A Calculation: (200A) ÷ (100A/5A) = (200A) ÷ (20) = 10A Example 2: Sensor Primary Current Rating = 200A True Ratio = 400A:0.3V Calculation: (200A) ÷ (400A/0.3V) = (200A) * (0.3V/400A) = 60W/400A = 0.15V NOTE: W=Watts=Amperes*Volts
Table S.3.2.3.b. *11. Sensor Primary Current Rating (Sensor I_{nom}). The nominal current input through the sensor.* *[Nonretroactive as of January 1, 2024]*	**Table S.3.2.3.b.** *11. Sensor Primary Current Rating (~~**Sensor**~~ **<u>S</u>**I_{nom}). The nominal current input through the sensor.* ***<u>The Sensor Primary Current Rating shall be prefaced with the abbreviation "SI_{nom}".</u>*** *[Nonretroactive as of January 1, 2024]* **Clean Version** *11. Sensor Primary Current Rating (SI_{nom}). The nominal current input through the sensor. The Sensor Primary Current Rating shall be prefaced with the abbreviation "SI_{nom}".* *[Nonretroactive as of January 1, 2024]*
Table S.3.2.3.b. 12. *True Ratio – True Ratio. The True Ratio, in primary amperes or volts to secondary amperes or volts shall be physically marked on a meter unless it is contained in either*	**Table S.3.2.3.b.** ***~~12. True Ratio – True Ratio. The True Ratio, in primary amperes or volts to secondary amperes or volts shall be physically marked on a meter unless it is contained in either~~***

electronic or printed documentation. This is to be expressed as xxxA:yyyA; or xxxA:yyyV; or xxxV:yyyV. The number of digits is the number needed to express the values. *[Nonretroactive as of January 1, 2024]* Examples of sensor ratio markings include: 200A:5A 400A:0.3V 480V:120V	***~~electronic or printed documentation. This is to be expressed as xxxA:yyyA; or xxxA:yyyV; or xxxV:yyyV. The number of digits is the number needed to express the values.~~*** ***12. Current Sensor Ratio. The ratio of sensor primary amperes to sensor output amperes or volts shall be physically marked on a NUEMS unless it is displayed electronically. This is to be expressed as xxxA:yyyA or xxxA:yyyV. The number of digits is the number needed to express the values. The Current Sensor Ratio must match the marked ratio of the sensor as required in Table S.3.3.a*** *[Nonretroactive as of January 1, 2024]* Examples of sensor ratio markings include: 200A:5A 400A:0.3V **~~480V:120V~~** **Clean Version** *12. Current Sensor Ratio. The ratio of sensor primary amperes to sensor output amperes or volts shall be physically marked on a NUEMS unless it is displayed electronically. This is to be expressed as xxxA:yyyA or xxxA:yyyV. The number of digits is the number needed to express the values. The Current Sensor Ratio must match the marked ratio of the sensor as required in Table S.3.3.a. [Nonretroactive as of January 1, 2024]* Examples of current sensor ratio markings include: 200A:5A 400A:0.3V
Table S.3.2.3.b. 13. Kh or Kt. Watthour test constant.	**Table S.3.2.3.b.** 13. Kh or Kt. W**atthour constant or w**atthour test constant. **Clean Version** 13. Kh or Kt. Watthour constant or watthour test constant.
	14. Sensor Input Polarity. Sensor input connection with intended polarity shall be physically marked on the NUEMS when direction-sensitive. **Clean Version** 14. Sensor Input Polarity. Sensor input connection with intended polarity shall be physically marked on the NUEMS when direction-sensitive.
Table S.3.2.3.b. 14. Bi-Directional. Marking via a "Separate Document" is permissible only if instructions for accessing that information is described in an accompanying NTEP Certificate of Conformance.	**Table S.3.2.3.b.** **~~14~~15**. Bi-Directional. **~~Marking via a "Separate Document" is permissible only if instructions for accessing that information is described in an accompanying NTEP Certificate of Conformance.~~ A NUEMS equipped to register the accumulation of energy in both directions (i.e., for delivered and received energy** **Clean Version** **Table S.3.2.3.b.** **15**. Bi-Directional. A NUEMS equipped to register the accumulation of energy in both directions (i.e., for delivered and received energy)
Table S.3.2.3.b.	**Table S.3.2.3.b.**

15. Temperature Range if Narrower Than − 20 °C to + 50 °C (− 4 °F to + 122 °F): If the device is rated for use over a range that is narrower than and within − 20 °C to + 50 °C (− 4 °F to + 122 °F), this must be physically and/or electronically marked.	~~15~~**16**. Temperature Range if Narrower Than − 20 °C to + 50 °C (− 4 °F to + 122 °F): If the device is rated for use over a range that is narrower than and within − 20 °C to + 50 °C (− 4 °F to + 122 °F), this must be physically and/or electronically marked. **Clean Version** **Table S.3.2.3.b.** 16. Temperature Range if Narrower Than − 20 °C to + 50 °C (− 4 °F to + 122 °F): If the device is rated for use over a range that is narrower than and within − 20 °C to + 50 °C (− 4 °F to + 122 °F), this must be physically and/or electronically marked.
S.3.3. Device Identification and Marking Requirements – External Sensors. – In addition to all the marking requirements of Section 1.10 General Code, paragraph G-S.1. Identification, each external sensor that is non-integral with the meter shall have the following conspicuously, legibly, and indelibly marked as shown in Table S.3.3.a. Device Identification and Marking Requirements – External Sensors and in Table S.3.3.b. Descriptors for Table S.3.3.a. Device Identification and Marking Requirements – External Sensors.	**S.3.3. Device Identification and Marking Requirements – External Sensors.** – In addition to all the marking requirements of Section 1.10 General Code, paragraph G-S.1. Identification, each external sensor that is non-integral with the ~~**meter**~~**NUEMS** shall have the following conspicuously, legibly, and indelibly marked as shown in Table S.3.3.a. Device Identification and Marking Requirements – External Sensors and in Table S.3.3.b. Descriptors for Table S.3.3.a. Device Identification and Marking Requirements – External Sensors. **Clean Version** S**.3.3. Device Identification and Marking Requirements – External Sensors.** – In addition to all the marking requirements of Section 1.10 General Code, paragraph G-S.1. Identification, each external sensor that is non-integral with the NUEMS shall have the following conspicuously, legibly, and indelibly marked as shown in Table S.3.3.a. Device Identification and Marking Requirements – External Sensors and in Table S.3.3.b. Descriptors for Table S.3.3.a. Device Identification and Marking Requirements – External Sensors.

Table S.3.3a.
Device Identification and Marking Requirements - External Sensors

	Physical Marking on Sensor	Electronic Display	Separate Document (Hard Copy or Electronic)
Manufacturer name, initials, trademark (1)	R	D	D
Model Prefix (2)	O	D	D
Model (3)	R	D	D
Serial Number Prefix "S/N" (4)	O ‡	D ‡	D ‡
Serial Number (5)	O ‡	D ‡	D ‡
NTEP CC Prefix and Number (6)	O †	D †	D †
True Ratio (7) *[Nonretroactive as of January 1, 2024]*	O	D	D
Maximum Primary Current (8)	O	D	D
Rated Frequency (Hz) (9)	O	D	D
Maximum Safety Voltage Rating (10)	O	D	D
Polarity (11)	O	D	D

R Required to be marked on the device
O Required to be marked on the device if information is not available on a display or in printed form
D Required when data is displayed on an electronic display or printed document
‡ Required only when a specific sensor must be matched to a specific meter input to meet accuracy specifications
† Required only when a sensor has separate approval from the metering system as a whole.

Notes:

- Numbers appearing in parentheses (e.g., (1)) following each marking requirement above correspond to numbered descriptors in Table S.3.3.b. Descriptors for External Sensor Marking Requirements.
- For requirements and details on application, see Table S.3.3.b. Descriptors for External Sensor Marking Requirements.
- "Electronic" includes, but is not limited to, displays of the required marking information through a NUEMS display, a mobile device, or other electronic means as specified by the manufacturer.

Summary:
When a NUEMS system is approved as a system, then the only hard marking required on sensors is the Manufacturer's name and the Model Number, unless pairing a specific sensor to a specific NUEMS input is required, then the serial number is required.

Table S.3.3a.
Device Identification and Marking Requirements - External Sensors

	Physical Marking on Sensor	Electronic **Marking** Display*
Manufacturer name, initials, trademark (1)	R	D
Model Prefix (2)	O	D
Model (3)	R	D
Serial Number Prefix "S/N" (4)	O	D
Serial Number (5)	R	D
True Ratio (**6**) *[Nonretroactive as of January 1, 2024]*	R	D
Maximum Primary Current (**7**)	O	D
Rated Frequency (Hz) (**8**)	O	D
Maximum Safety Voltage Rating (**9**)	O	D
Polarity (**10**)	R	--

R Required to be marked on the device
O Required to be marked on the device if information is not available on an electronic display
D Required when data is displayed on an electronic marking display

***"Electronic Marking Display" includes, but is not limited to, displays of the required marking information through a NUEMS display, a mobile device, or other electronic means as specified by the manufacturer and retrievable through the NUEMS. This may include providing access directly from the NUEMS to a webpage. If the information is provided via a mechanism other than a dedicated display, the mechanism must be provided by the device owner/operator as specified in UR.2.4.7. Devices for Viewing Marking Information Provided Via an Electronic Display, External Sensor (ES) NUEMS. Also see S.3.4. Electronic Display Security Protocol.**

Notes:

- Numbers appearing in parentheses (e.g., (1)) following each marking requirement above correspond to numbered descriptors in Table S.3.3.b. Descriptors for External Sensor Marking Requirements.
- For requirements and details on application, see Table S.3.3.b. Descriptors for External Sensor Marking Requirements.

Table S.3.3.b.
2. Manufacturer's Model Prefix. The General Code paragraph G-S.1. Identification (b)(1) model prefix marking requirement for the sensor(s) may be met with a physical marking. Alternatively, the marking requirement may be satisfied through an electronic display or in a separate document accompanying the NUEMS provided that the NUEMS has its NTEP number clearly identified, conspicuously and indelibly marked on the meter, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings).

Table S.3.3.b.
2. Manufacturer's Model Prefix. The General Code paragraph G-S.1. Identification (b)(1) model prefix marking requirement for the sensor(s) may be met with a physical marking. Alternatively, the marking requirement may be satisfied through an electronic display or in a separate document accompanying the NUEMS provided that the NUEMS has its NTEP number clearly identified, conspicuously and indelibly marked on the ~~**meter**~~**NUEMS**, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings).

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	2. Manufacturer's Model Prefix. The General Code paragraph G-S.1. Identification (b)(1) model prefix marking requirement for the sensor(s) may be met with a physical marking. Alternatively, the marking requirement may be satisfied through an electronic display or in a separate document accompanying the NUEMS provided that the NUEMS has its NTEP number clearly identified, conspicuously and indelibly marked on the NUEMS, where the NTEP certificate contains the complete marking details (including a description of the location and purpose of specific markings).
Table S.3.3.b. 3. Manufacturer's Model. Marked per General Code paragraph G-S.1. Identification.	**Table S.3.3.b.** 3. Manufacturer's Model. ~~**Marked per**~~ **Also see** General Code paragraph G-S.1. Identification. **Clean Version** 3. Manufacturer's Model. Also see General Code paragraph G-S.1. Identification.
Table S.3.3.b. 6. NTEP Certificate of Conformance Prefix and Number. A current sensor that has been evaluated separately by NTEP and has its own NTEP CC shall be marked per General Code paragraph G-S.1. Identification.	**Table S.3.3.b.** ~~**6. NTEP Certificate of Conformance Prefix and Number. A current sensor that has been evaluated separately by NTEP and has its own NTEP CC shall be marked per General Code paragraph G-S.1. Identification**~~ This item should be deleted in its entirety.
Table S.3.3.b. *7. True Ratio. The True Ratio, in primary amperes or volts to secondary amperes or volts shall be physically marked on a sensor unless it is contained in either electronic or printed documentation. This is to be expressed as xxxA:yyyA; or xxxA:yyyV; or xxxV:yyyV. The number of digits is the number needed to express the values.* *[Nonretroactive as of January 1, 2024]* Examples of sensor ratio markings include: 200A:5A 400A:0.3V 480V:120V	**Table S.3.3.b.** *7.* ~~***True Ratio***~~***Voltage Sensor Ratio or Current Sensor Ratio***. *The* ~~***True R***~~*ratio, in primary amperes or volts to secondary amperes or volts shall be physically marked on* ~~***a***~~***each*** *sensor* ~~***unless it is contained in either electronic or printed documentation***~~. *This is to be expressed as xxxA:yyyA; or xxxA:yyyV; or xxxV:yyyV. The number of digits is the number needed to express the values.* *[Nonretroactive as of January 1, 2024]* ~~**Examples of sensor ratio markings include:**~~ ~~**200A:5A**~~ ~~**400A:0.3V**~~ ~~**480V:120V**~~ **Examples of current sensor ratio markings include:** **200A:5A** **400A:0.3V** **Examples of voltage sensor ratio markings include:** **480V:120V** **Clean Version** *7. Voltage Sensor Ratio or Current Sensor Ratio. The ratio, in primary amperes or volts to secondary amperes or volts shall be physically marked on each sensor. This is to be expressed as xxxA:yyyA; or xxxA:yyyV; or xxxV:yyyV. The number of digits is the number needed to express the values.* *[Nonretroactive as of January 1, 2024]* Examples of current sensor ratio markings include: 200A:5A 400A:0.3V Examples of voltage sensor ratio markings include:

480V:120V

S.3.4. Electronic Marking Display Security Protocol – If an Electronic Marking Display is used as described in Table S.3.2.3.a. and Table S.3.3.a. protocols shall be in place to prevent tampering with the displayed markings and/or data.

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S.3.4. Electronic Marking Display Security Protocol – If an Electronic Marking Display is used as described in Table S.3.2.3.a. and Table S.3.3.a. protocols shall be in place to prevent tampering with the displayed markings and/or data.

S.3.4. Abbreviations and Symbols. – When using abbreviations or symbols on a meter , sensor, or indicator, the following shall be used.

(a) FM = Form
(b) CL = Class
(c) V = Volts
(d) Hz = Hertz, Frequency or Cycles Per Second
(e) TA = Test Amperes
(f) Kh = Watthour Constant; Revolution or Pulse
(g) Rr = Register Ratio
(h) CSR = Current Sensor Ratio (may also be referred to as "current transformer ratio" or "CTR")
(i) VTR or PTR = Voltage or Potential Transformer Ratio
(j) MULT BY = Multiply By
(k) W = wire (example: 240V 3W)
(l) Y = WYE Power Supply
(m) IEEE = Institute of Electrical and Electronics Engineers
(n) B = Burden
(o) BIL = Basic Lightning Impulse Insulation Factor
(p) Kt = Watthour Test Constant
(q) AC = Alternating Current (i.e., VAC)
(r) J = Joule
(s) Wh = Watthour
(t) kWh = Kilowatt-hour
(u) Δ = Delta Power Supply
(v) SD = Soft Data
(w) PD = Printable Data

S.3.5. Abbreviations and Symbols. – When using abbreviations or symbols on a ~~meter~~**NUEMS**, sensor, or indicator, the following shall be used.

Symbol	Description
AC	Alternating Current (i.e., VAC)
Cl	Class
FM	Form
Hz	Hertz, Frequency or Cycles Per Second
I_{nom}	NUEMS Current Input Rating
K_h	Watthour Constant; Revolution or Pulse
K_t	Watthour Test Constant
kWh	Kilowatt-hour
Rr	Register Ratio
SI_{nom}	Sensor Primary Current Rating
TA	Test Amperes
V	Volts
V_{nom}	Voltage Sensor Rating
V_{rat}	Voltage Sensor Ratio
W	Wire (example 240V 3W)
Wh	Watthour

Clean Version

S.3.5. Abbreviations and Symbols. – When using abbreviations or symbols on a NUEMS, sensor, or indicator, the following shall be used.

Symbol	Description
AC	Alternating Current (i.e., VAC)
Cl	Class
FM	Form
Hz	Hertz, Frequency or Cycles Per Second
I_{nom}	NUEMS Current Input Rating
K_h	Watthour Constant; Revolution or Pulse
K_t	Watthour Test Constant
kWh	Kilowatt-hour
Rr	Register Ratio
SI_{nom}	Sensor Primary Current Rating
TA	Test Amperes
V	Volts
V_{nom}	Voltage Sensor Rating
V_{rat}	Voltage Sensor Ratio
W	Wire (example 240V 3W)
Wh	Watthour

S.3.6 Abbreviations and Symbols – These are abbreviations that may occur but are not required to be used or limited to the listed abbreviations.

	Symbol | Description Δ | Delta Power Supply B | Burden BIL | Basic Lightning Impulse Insulation Factor IEEE | Institute of Electrical and Electronics Engineers Mult By | Multiply By PD | Printable Data PTR | Potential Transformer Ratio (Same as VTR) SD | Soft Data VTR | Voltage Transformer Ratio Y | WYE Power Supply **Clean Version** **S.3.6 Abbreviations and Symbols** – These are abbreviations that may occur but are not required to be used or limited to the listed abbreviations. Symbol | Description Δ | Delta Power Supply B | Burden BIL | Basic Lightning Impulse Insulation Factor IEEE | Institute of Electrical and Electronics Engineers Mult By | Multiply By PD | Printable Data PTR | Potential Transformer Ratio (Same as VTR) SD | Soft Data VTR | Voltage Transformer Ratio Y | WYE Power Supply
N.2. NUEMS Starting Load Test. – A NUEMS starting load test shall be conducted by applying rated voltage at a load of 0.25% of the Current Class (CL) or the Sensor Primary Current Rating at unity power factor. The rated voltage. The test shall be conducted during type evaluation and may be conducted during field testing as deemed necessary.	**N.2. NUEMS Starting Load Test.** – A NUEMS starting load test shall be conducted by applying rated voltage at a load of 0.25% of the Current Class (CL) or the Sensor Primary Current Rating at unity power factor. ~~**The rated voltage.**~~ The test shall be conducted during type evaluation and may be conducted during field testing as deemed necessary. **Clean Version** **N.2. NUEMS Starting Load Test.** – A NUEMS starting load test shall be conducted by applying rated voltage at a load of 0.25% of the Current Class (CL) or the Sensor Primary Current Rating at unity power factor. The test shall be conducted during type evaluation and may be conducted during field testing as deemed necessary.
N.3. NUEMS Minimum Test Duration. – A NUEMS full load test shall consist of a minimum of 10 watthour test constants and a light load test shall consist of a minimum of one watthour test constant.	**N.3. NUEMS Minimum Test Duration.** – A NUEMS full load test shall consist of a minimum of 10 ~~**watthour test constants**~~ **K_t or K_h output indications** and a light load test shall consist of a minimum of one ~~**watthour test constant**~~ **Kh or Kt output indication.** **Clean Version**

	N.3. NUEMS Minimum Test Duration. – A NUEMS full load test shall consist of a minimum of 10 K_t or K_h output indications and a light load test shall consist of a minimum of one Kh or Kt output indication.
N.5. Test of a NUEMS. (a) Each NUEMS submitted for test shall have the necessary components required to test such as meter, sensor(s), indicators(s), system software, etc. Testing may be performed in the field. (b) The test load applied for a full load test shall be 15 % of either the Current Class (CL) or the Sensor Primary Current Rating. (c) The test load applied for a light load test shall be conducted at 1.5 % to 3 % of either the Current Class (CL) or the Sensor Primary Current Rating. (d) The test load applied for a full load test of a NUEMS for a 0.5 power factor lagging setting shall be 15 % of either the Current Class (CL) or the Sensor Primary Current Rating. This test shall be conducted during type evaluation and may be conducted during in-service (field) or laboratory testing as deemed necessary. (e) The test load applied for a light load test for a 0.5 power factor lagging setting shall be conducted at 3 % to 6 % of either the Class (CL) or the Sensor Primary Current Rating. This test shall be conducted during type evaluation and may be conducted during in-service (field) or laboratory testing as deemed necessary. (f) All tests shall be made at the rated voltage ± 10 %.	**N.5. Test of a NUEMS.** ~~**(a) Each NUEMS submitted for test shall have the necessary components required to test such as meter, sensor(s), indicators(s), system software, etc. Testing may be performed in the field.**~~ (b) The test load applied for a full load test shall be 15 % of either the Current Class (CL) or the Sensor Primary Current Rating. (c) The test load applied for a light load test shall be conducted at 1.5 % to 3 % of either the Current Class (CL) or the Sensor Primary Current Rating. (d) The test load applied for a full load test of a NUEMS for a 0.5 power factor lagging setting shall be 15 % of either the Current Class (CL) or the Sensor Primary Current Rating. This test shall be conducted during type evaluation and may be conducted during in-service (field) or laboratory testing as deemed necessary. (e) The test load applied for a light load test for a 0.5 power factor lagging setting shall be conducted at 3 % to 6 % of either the Class (CL) or the Sensor Primary Current Rating. This test shall be conducted during type evaluation and may be conducted during in-service (field) or laboratory testing as deemed necessary. (f) All tests shall be made at the rated voltage ± 10 %. **Clean Version** **N.5. Test of a NUEMS.** (a) The test load applied for a full load test shall be 15 % of either the Current Class (CL) or the Sensor Primary Current Rating. (b) The test load applied for a light load test shall be conducted at 1.5 % to 3 % of either the Current Class (CL) or the Sensor Primary Current Rating. (c) The test load applied for a full load test of a NUEMS for a 0.5 power factor lagging setting shall be 15 % of either the Current Class (CL) or the Sensor Primary Current Rating. This test shall be conducted during type evaluation and may be conducted during in-service (field) or laboratory testing as deemed necessary. (d) The test load applied for a light load test for a 0.5 power factor lagging setting shall be conducted at 3 % to 6 % of either the Class (CL) or the Sensor Primary Current Rating. This test shall be conducted during type evaluation and may be conducted during in-service (field) or laboratory testing as deemed necessary. (e) All tests shall be made at the rated voltage ± 10 %.

T.2. No-Load Test. – A NUEMS shall not emit more than one test pulse output.	**T.2. No-Load Test.** – A NUEMS shall not ~~emit~~**indicate** more than one ~~test pulse output~~**K_t or K_h**. **Clean Version** **T.2. No-Load Test.** – A NUEMS shall not indicate more than one K_t or K_h.
UR.1.1. Customer Indicating Element, Accessibility. – For systems in which the primary indicating element is not reasonably accessible to the customer, such as one of the following shall be provided. (a) Console display which is accessible to the customer on which the customer can unambiguously select the NUEMS output associated with this load. (b) Remote display which is provided to customer as a part of the system. (c) At the option of the customer, through an application that provides readings in real time.	**UR.1.1. Customer Indicating Element, Accessibility.** – For systems in which the primary indicating element is not reasonably accessible to the customer, ~~such as~~ one of the following shall be provided. (a) Console display which is accessible to the customer on which the customer can unambiguously select the NUEMS output associated with this load. (b) Remote display which is provided to customer as a part of the system. (c) At the option of the customer, ~~through~~ an application that provides readings in real time. **Clean Version** **UR.1.1. Customer Indicating Element, Accessibility.** – For systems in which the primary indicating element is not reasonably accessible to the customer, one of the following shall be provided. (a) Console display which is accessible to the customer on which the customer can unambiguously select the NUEMS output associated with this load. (b) Remote display which is provided to customer as a part of the system. (c) At the option of the customer, an application that provides readings in real time.
UR.1.2. Submeter Required. – When a tenant is not directly served by the serving utility, and charges for electric energy are not included in the fixed periodic rent charges, a dedicated NUEMS that measures only the energy used at the discretion of the tenant shall be used.	**UR.1.2. ~~Submeter~~NUEMS Required**. – When a tenant is not directly served by the serving utility, and charges for electric energy are not included in the fixed periodic rent charges, a dedicated NUEMS that measures only the energy used at the discretion of the tenant shall be used. **Clean Version** **UR.1.2. NUEMS Required.** – When a tenant is not directly served by the serving utility, and charges for electric energy are not included in the fixed periodic rent charges, a dedicated NUEMS that measures only the energy used at the discretion of the tenant shall be used.
$$Annual\ Max = \sum_{phases} [(Phase\ Voltage * Current\ Class)/1000] * HoursPerYear$$	
$$Annual\ Max = \sum_{phases} [(Phase\ Voltage * Current\ Class)/1000] * HoursPerYear$$ **NOTE: Current Class is equivalent to Sensor Primary Current Rating**	
UR.1.3.2. Maximum Quantity-Value Division. - The maximum quantity-value division shall not exceed the minimum increment to be used in billing.	**UR.1.3.2. ~~Maximum~~ Quantity-Value Division.** - The ~~maximum~~**configured** quantity-value division shall not exceed the minimum increment to be used in billing.

	Clean Version **UR.1.3.2. Quantity-Value Division.** - The configured quantity-value division shall not exceed the minimum increment to be used in billing.
UR.1.4. Current Sensor. – The current sensor output shall be correctly matched to the meter current input.	**UR.1.4. ~~Current~~ Sensor<u>s</u>.** – **~~The current~~ <u>Each</u>** sensor output shall be correctly matched to the **<u>corresponding</u> ~~meter current~~<u>ES NUEMS body</u>** input. **Clean Version** **UR.1.4. Sensors.** –Each sensor output shall be correctly matched to the corresponding ES NUEMS body input.
UR.2.2. Load Range. – A device shall be installed so that the current and voltage will not exceed the maximum continuous ratings of the NUEMS. Means to limit current and/or voltage shall be incorporated in the installation if necessary.	**UR.2.2. Load Range.** – A device shall be installed so that the current and voltage will not exceed the maximum continuous ratings of the NUEMS. **<u>If necessary, </u>~~M~~<u>m</u>**eans to limit current and/or voltage shall be incorporated in the installation **~~if necessary~~**. **Clean Version** **UR.2.2. Load Range.** – A device shall be installed so that the current and voltage will not exceed the maximum continuous ratings of the NUEMS. If necessary, means to limit current and/or voltage shall be incorporated in the installation.
UR.2.4.1. Certification. – It is the responsibility of the owner of a NUEMS to obtain written certification for each device from the appropriate regulatory agency. The required certification shall meet the requirements of that agency and should identify the address, space, or number, of the premise served by the NUEMS connection; be signed by an agency representative; and shall clearly state the: • installation is on a tariff schedule that qualifies for NUEMS use, • billing format, rates, and charges conform to all applicable tariff rules, • date of such determination, and • designee's name and title if performed by a designee, and The certification shall be provided prior to a NUEMS being used for commercial purposes.	**UR.2.4.1. Certification.** – It is the responsibility of the owner of a NUEMS to obtain written **~~certification~~<u>approval</u>** for each **~~device~~<u>metered load service</u>** from the **~~appropriate regulatory agency~~<u>serving utility, public utility commission, or other entity with jurisdiction over electric utilities in the location the NUEMS is to be installed</u>**. The required **~~certification~~<u>approval</u>** shall meet the requirements of that **~~agency~~<u>entity</u>** and **~~should~~shall** identify the address, space, or number, of the premise served by the NUEMS connection; be signed by an agency representative; and shall clearly state the: • **<u>the installation meets all installation and accessibility requirements for similar installation governed by the presiding entity.</u>** • installation is on a tariff schedule that qualifies for **~~NUEMS~~<u>electric meter</u>** use, • billing format, rates, and charges conform to all applicable tariff rules, • date of such determination, and • designee's name and title if performed by a designee, and **<u>the name and title of the presiding entity authorizing the designee to make the determination</u>** The **~~certification~~<u>approval</u>** shall be provided **<u>to the local Weights & Measures authority</u>** prior to a NUEMS being used for commercial purposes. **Clean Version**

	UR.2.4.1. Certification. – It is the responsibility of the owner of a NUEMS to obtain written approval for each metered load service from the serving utility, public utility commission, or other entity with jurisdiction over electric utilities in the location the NUEMS is to be installed. The required approval shall meet the requirements of that entity and shall identify the address, space, or number, of the premise served by the NUEMS connection; be signed by an agency representative; and shall clearly state the: • the installation meets all installation and accessibility requirements for similar installation governed by the presiding entity. • installation is on a tariff schedule that qualifies for electric meter use, • billing format, rates, and charges conform to all applicable tariff rules, • date of such determination, and • designee's name and title if performed by a designee, and the name and title of the presiding entity authorizing the designee to make the determination. The approval shall be provided to the local Weights & Measures authority prior to a NUEMS being used for commercial purposes.
UR.2.4.3. Safety Mechanism. – NUEMS installations that are equipped with current transformers with a current output that is not self-limiting shall have a mechanism installed to allow the meter to be connected to or removed for safe testing without the risk of dangerous voltages that can result from secondary open circuit CTs.	**UR.2.4.3. Safety Mechanism.** – NUEMS installations that are equipped with current ~~transformers~~**sensors** with a current output that is not self-limiting shall have a mechanism installed to allow the ~~meter~~**NUEMS, or its components,** to be connected to or removed for safe testing without the risk of dangerous voltages that can result from secondary open circuit ~~CTs~~**current sensors**. **Clean Version** **UR.2.4.3. Safety Mechanism.** – NUEMS installations that are equipped with current sensors with a current output that is not self-limiting shall have a mechanism installed to allow the NUEMS, or its components, to be connected to or removed for safe testing without the risk of dangerous voltages that can result from secondary open circuit current sensors.
UR.2.4.5. Dedicated Tenant NUEMS Service. – A NUEMS shall serve only the space, lot, building, room, suite, stall, slip, or premise occupied by the tenant.	**UR.2.4.5. Dedicated Tenant NUEMS Service.** – A NUEMS shall serve only the space, lot, building, room, suite, stall, slip, or ~~premise occupied~~**any other termed premise occupied and/or used** by the tenant. **Clean Version** **UR.2.4.5. Dedicated Tenant NUEMS Service.** – A NUEMS shall serve only the space, lot, building, room,

	suite, stall, slip, or any other termed premise occupied and/or used by the tenant
UR.2.4.7. Devices for Viewing Marking Information Provided Via an Electronic Display, External Sensor (ES) NUEMS. – When required markings are provided via an electronic display the owner/operator of the NUEMS is responsible for providing means for viewing this information on the site at the time of inspection or on request. See also Table S.3.2.3.a. Device Identification and Marking Requirements for External Sensor (ES) NUEMS.	**UR.2.4.7. Devices for Viewing Marking Information Provided Via an Electronic <u>Marking</u> Display, External Sensor (ES) NUEMS.** – When required markings are provided via an electronic display the owner/operator of the NUEMS is responsible for providing means for viewing this information on the site at the time of inspection or on request. See also Table S.3.2.3.a. Device Identification and Marking Requirements for External Sensor (ES) NUEMS. **Clean Version** **UR.2.4.7. Devices for Viewing Marking Information Provided Via an Electronic Marking Display, External Sensor (ES) NUEMS.** – When required markings are provided via an electronic display the owner/operator of the NUEMS is responsible for providing means for viewing this information on the site at the time of inspection or on request. See also Table S.3.2.3.a. Device Identification and Marking Requirements for External Sensor (ES) NUEMS.
UR.2.4.8. External Sensors Located Remotely From the Pulse Output or Display. – If the NUEMS is installed in such a way that testing cannot be conducted by a single inspector from a reasonable testing position, then means shall be provided to allow the pulse output or display to be remotely used at the sensor location. For example, a portable device that receives the pulse by radio/WiFi and provides the pulse as a dry contact closure to the test equipment.	**UR.2.4.8. External Sensors Located Remotely From the Pulse Output ~~or Display~~.** – If the NUEMS is installed in such a way that testing cannot be conducted by a single inspector from a reasonable testing position, then means shall be provided to allow the pulse output ~~**or display**~~ to be remotely used at the sensor location. For example, a portable device that receives the pulse by radio/WiFi and provides the pulse ~~**as a dry contact closure**~~ to the test equipment. **Clean Version** **UR.2.4.8. External Sensors Located Remotely From the Pulse Output.** – If the NUEMS is installed in such a way that testing cannot be conducted by a single inspector from a reasonable testing position, then means shall be provided to allow the pulse output to be remotely used at the sensor location. For example, a portable device that receives the pulse by radio/WiFi and provides the pulse to the test equipment.
	<u>UR.4. Submitting a NUEMS for Testing. – Each NUEMS Submitted for inspection shall have all necessary components assembled, connected, and configured as intended for use. Components may include, but are not limited to, the ES NUEMS body, sensor(s), indicator(s), etc.”</u> **Clean Version** UR.4. Submitting a NUEMS for Testing. – Each NUEMS Submitted for inspection shall have all necessary components assembled, connected, and configured as intended for use. Components may include, but are not limited to, the ES NUEMS body, sensor(s), indicator(s), etc.”

current class (CL). – For self-contained meters, the manufacturer's designated maximum rated current a NUEMS can measure continuously without damage and without exceeding limits of accuracy. (Example: CL 200) [3.XX]	current class (CL). – For ~~self-contained meters~~**Internal Sensor (IS) NUEMS**, the manufacturer's designated maximum rated current a NUEMS can measure continuously without damage and without exceeding limits of accuracy. (Example: CL 200) [3.XX] **Clean Version** current class (CL). – For Internal Sensor (IS) NUEMS, the manufacturer's designated maximum rated current a NUEMS can measure continuously without damage and without exceeding limits of accuracy. (Example: CL 200) [3.XX]
	Electronic Marking Display – A device used for the electronic visual presentation of marking requirements.
element. – A combination of a voltage-sensing unit and a current-sensing unit, which provides an output proportional to the quantities measured. Meters can include multiple elements based on service type. For mechanical meters, this is also referred to as a "stator." *(OWM is seeking written permission from National Electrical Manufacturers Association (NEMA) to reprint. Oral permission was received.)* [3.XX]	element. – A combination of a voltage-sensing unit and a current-sensing unit, which provides an output proportional to the quantities measured. ~~Meters~~**NUEMS** can include multiple elements based on service type. For ~~mechanical meters~~**IS NUEMS**, this is also referred to as a "stator." *(OWM is seeking written permission from National Electrical Manufacturers Association (NEMA) to reprint. Oral permission was received.)* [3.XX] **Clean Version** element. – A combination of a voltage-sensing unit and a current-sensing unit, which provides an output proportional to the quantities measured. NUEMS can include multiple elements based on service type. For some IS NUEMS, this is also referred to as a "stator." *(OWM is seeking written permission from National Electrical Manufacturers Association (NEMA) to reprint . Oral permission was received.)* [3.XX]
	ES NUEMS body – The element of the NUEMS that calculates the electricity usage using the signals from the external sensors. **Clean Version** ES NUEMS body – The element of the NUEMS that calculates the electricity usage using the signals from the external sensors.
	nominal current – The manufacturer's designated maximum rated current a NUEMS can measure continuously without damage and without exceeding limits of accuracy. **Clean Version** nominal current – The manufacturer's designated maximum rated current a NUEMS can measure continuously without damage and without exceeding limits of accuracy.

	nominal voltage – The manufacturer's designated maximum rated voltage a NUEMS can measure continuously without damage and without exceeding limits of accuracy. **Clean Version** nominal voltage – The manufacturer's designated maximum rated voltage a NUEMS can measure continuously without damage and without exceeding limits of accuracy.