

User's Manual

CT1000, CT200, CT60  
AC/DC Current Sensor

Thank you for purchasing the AC/DC Current Sensor (Model CT1000,CT200,CT60). To ensure correct use, please read this manual thoroughly before beginning operation. Please familiarize yourself with the functions and characteristics of the probe prior to operation.After reading this manual, keep it in a safe place.



YOKOGAWA

IM CT1000-01EN  
12th Edition

The AC/DC Current Sensors (CT1000, CT200, CT60) are products of Yokogawa Test & Measurement Corporation. Contact information of Yokogawa offices worldwide is provided on the following sheet.

| Document No. | Description                |
|--------------|----------------------------|
| PIM 113-01Z2 | List of worldwide contacts |

Safety Precautions

Make sure to observe the following safety precautions when handling the current sensor. YOKOGAWA assumes no liability for the customer's failure to comply with these safety precautions. Before you use the current sensor, read the measuring instrument's manual to fully acquaint yourself with its specifications and handling.

The following symbols are used on this instrument.

- Warning: handle with care. Refer to the user's manual or service manual. This symbol appears on dangerous locations on the instrument which require special instructions for proper handling or use. The same symbol appears in the corresponding place in the manual to identify those instructions.
- Risk of electric shock
- Hot surface

Make sure to observe the following safety precautions to prevent electric shock, personal injury, or damage to the instrument.



WARNING

- Beware of electric shock.**
  - Do not perform measurement if the case is damaged.
  - Do not operate the device with wet hands, in a rainy or humid environment, or if any water droplets are visible on it.
  - Condensation may appear if sudden changes in temperature occur. If this happens, let the device acclimatize to the new temperatures for at least one hour, then refrain from using the device until confirming that there is no condensation.
- Do not disassemble the device.**
  - The device should be disassembled by qualified personnel only.
- Use the correct power supply.**
  - Ensure that the source voltage matches the voltage of the power supply before turning the power ON.
- Do not use uninsulated measurement conductors or cables.**
  - Use conductors or cables with reinforced insulation.
- Make sure that the surface temperature of measurement conductors is within the device's operating temperature range.**
- Although it is well-insulated, do not touch the device or secondary output cable while voltage is being applied to the primary conductor.**
- Connect the secondary signal output before supplying power to the device.**
- Do not disconnect the secondary output while power is being supplied to the device to prevent electric shock or damage to the instrument.**
- Do not apply primary current before supplying power to the device to prevent electric shock or damage to the instrument.**
- Do not input excessive current as malfunction or damage may result.**
- Do not allow vibrations to disturb the device after it has been set in place as damage may result.**

The following symbols are used in this manual.



Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

WARNING

Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

CAUTION

Calls attention to actions or conditions that could cause light injury to the user or damage to the instrument or the user's data, and precautions that can be taken to prevent such occurrences.

Note

Calls attention to information that is important for proper operation of the instrument.

1. Description

This device is a current output type current sensor with a 1500: 1(for CT1000) 1000: 1(for CT200) or 600: 1(for CT60) current transformation ratio that performs transformation on the primary current. After familiarizing yourself with the performance and functions of this device, you will be able to use it in conjunction with measuring instruments from YOKOGAWA. When using a power supply other than those listed on our catalog, verify that this instrument works properly in advance.

2. Configuration

The current sensor consists of the following parts.

Standard parts

|    |                  |                                                                                                                                                                  |
|----|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. | Current sensor   |                                                                                                                                                                  |
| 2. | User's manual    |                                                                                                                                                                  |
|    | IM CT1000-01EN   | CT1000, CT200, CT60 AC/DC Current Sensor User's Manual This manual. This manual explains the handling precautions, basic usage, and specifications of the probe. |
|    | IM CT1000-01JA   | CT1000, CT200, CT60 AC/DC Current Sensor The Japanese version of the above manual                                                                                |
|    | IM 00C01C01-01Z1 | Safety Instruction Manual Safety manual (European languages)                                                                                                     |

The "EN" and "JA" in the manual numbers are the language code.

Contact information of Yokogawa offices worldwide is provided on the following sheet.

|              |           |                            |
|--------------|-----------|----------------------------|
| PIM 113-01Z2 | Inquiries | List of worldwide contacts |
|--------------|-----------|----------------------------|

Accessories (Sold Separately)

The optional accessories below are available for purchase separately. Use the accessories specified in this manual. Moreover, use the accessories of this product only with Yokogawa products that specify them as accessories.

|                  |         |
|------------------|---------|
| Output connector | B8200JQ |
| Load resistors   | B8200JR |

B8200JQ consists of a connector and attachment screws for connecting to the instrument. A separate cable is required for making the connection.

3. Part Names

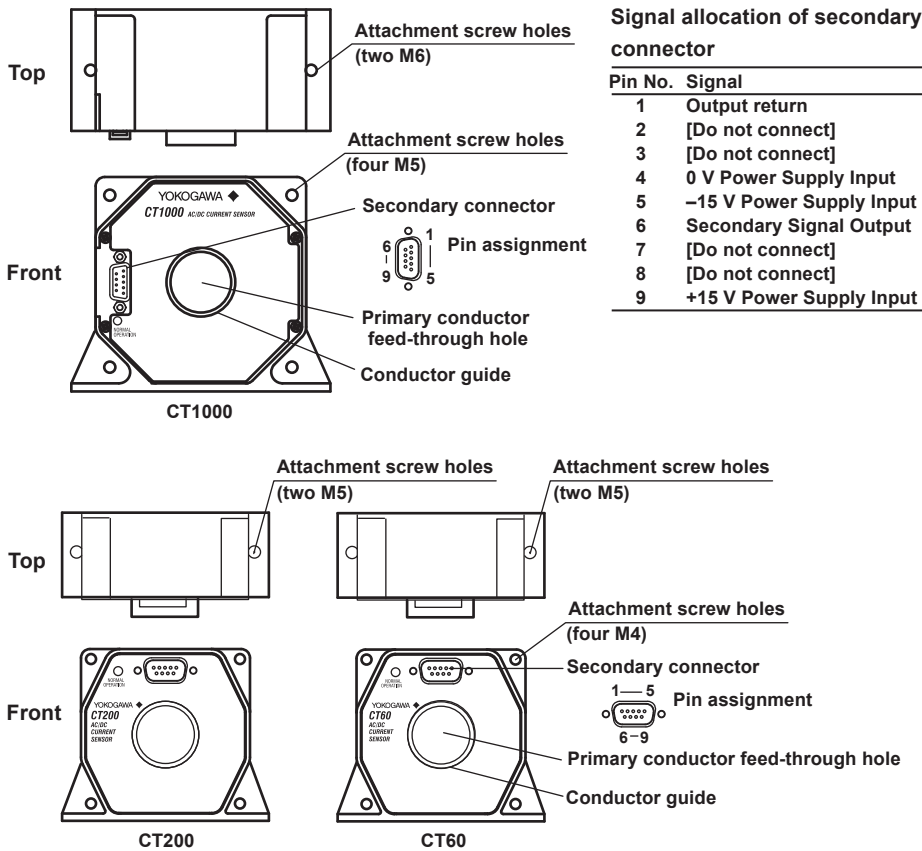


Figure 1. Names of Parts and Pin Assignments

4. Operating Procedure



CAUTION

Ensure that the current flowing to the conductor of the object to be measured is within the measuring range. If the current exceeds the measuring range, the device may overheat and get damaged.

- Connect the secondary connector on the device to the current input terminal on the measuring instrument, and connect to 0 V (common) and  $\pm 15$  V on the power supply.
- Set up the measuring instrument and power supply to match the specifications of the current transducer. Carefully read the user's manuals for your measuring instrument and power supply to perform the correct procedure for making the connections.

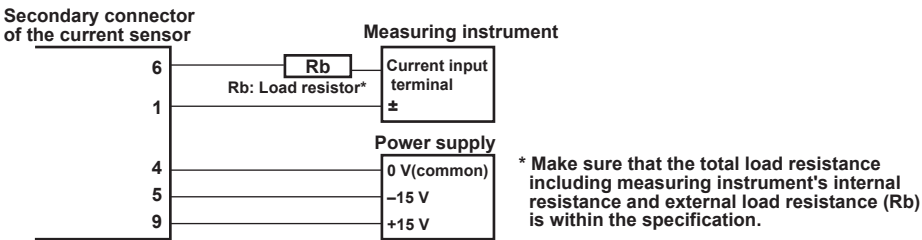


Figure 2. Connection Example

- Insert the primary conductor into the primary conductor feed-through hole on the device. Make sure that the direction of current flow matches the arrow on the device. Figure 3 is for the examples in use with CT200 and CT60. The same idea is applied to CT1000 as well.

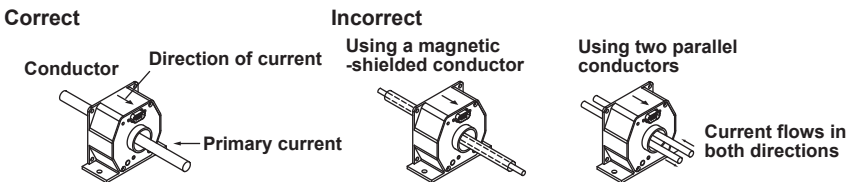


Figure 3. Insertion of a Conductor

- Check that power is being supplied to the device, and then apply the primary current.
- Read the measured values. The following calculation is used to determine the current flowing through the primary conductor.  
Example: When the output current from the device's secondary connector (pin 6) is 100 mA.  
CT1000:  $100 \text{ mA} \times 1500 = 150 \text{ A}$ .  
CT200:  $100 \text{ mA} \times 1000 = 100 \text{ A}$ .  
CT60:  $100 \text{ mA} \times 600 = 60 \text{ A}$ .

Note

- If the NORMAL OPERATION LED is off even when power is being supplied to the device, the protection function may be activated. Immediately stop the primary current.
- Only pass conductors through the primary conductor feed-through hole if the current that you want to measure is flowing through the conductors and their current directions are the same. Correct measurements cannot be taken if you pass conductors with magnetic shielding or conductors whose current directions are opposite of each other through the feed-through hole.
- Make sure the primary wiring and secondary wiring do not interfere with each other. The secondary wiring may be affected by the primary wiring because it uses a very small current. Make the secondary wiring as short as possible and maintain its distance from the primary wiring, without allowing them to be parallel to each other. We recommend AWG24 or higher for the secondary wiring material. Twisted-pair may be better than shielded cable for measurement applications such as inverters.
- The device outputs current. Connect the device to a measuring instrument with current input. To connect the device to a measuring instrument with voltage input, use an appropriate shunt resistor to connect the device to the voltage input terminals.
- Configure your setup so that the load resistance of the measuring instrument connected to the secondary signal output is within the specification range.
- Correct measurements may not be possible in places where there is an extremely strong external magnetic field besides the magnetic fields produced by the primary current of the object to be measured or where there is a strong electric field.
- When using a power supply other than the power supply on the YOKOGAWA measuring instrument or a power supply other than those listed on our catalog, if there is a deviation of 5 ms or more in the rise time between the positive and negative sides, a large current may continue to flow on the secondary side even when no current is flowing on the primary side. In such cases, immediately stop supplying power to the instrument, and quit using the power supply.

5. Specifications

| Item                                                                   |                  | Model                                                                                                                                                                                                                                                                                        |                                             |                                            |
|------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------------------------|
|                                                                        |                  | CT1000                                                                                                                                                                                                                                                                                       | CT200                                       | CT60                                       |
| Current Rating                                                         |                  | DC: 0 to 1000 A                                                                                                                                                                                                                                                                              | DC: 0 to 200 A                              | DC: 0 to 60 A                              |
|                                                                        |                  | AC: 1000 Apeak                                                                                                                                                                                                                                                                               | AC: 200 Apeak                               | AC: 60 Apeak                               |
| Output Current                                                         |                  | Primary rated current at 1000 A is 666.6 mA.                                                                                                                                                                                                                                                 | Primary rated current at 200 A is 200.0 mA. | Primary rated current at 60 A is 100.0 mA. |
| Current Transformation Ratio                                           |                  | 1500: 1                                                                                                                                                                                                                                                                                      | 1000: 1                                     | 600: 1                                     |
| Direction of Current                                                   |                  | Per the arrow printed on the main unit.                                                                                                                                                                                                                                                      |                                             |                                            |
| Accuracy                                                               |                  | DC: ±(0.05 % of reading+30 μA)<br>50/60 Hz: ±(0.05 % of reading+30 μA) sine wave<br>Standard Conditions<br>23±5 °C<br>Common mode voltage: 0 V<br>Conductor: φ25 mm; length,300 mm or more; straight                                                                                         |                                             |                                            |
| Accuracy warranty period                                               |                  | 12 months                                                                                                                                                                                                                                                                                    |                                             |                                            |
| Effect of Position of Conductor                                        |                  | Add ±(0.01 % of reading)                                                                                                                                                                                                                                                                     |                                             |                                            |
| Measurement Band (-3dB)                                                |                  | DC to 300 kHz                                                                                                                                                                                                                                                                                | DC to 500 kHz                               | DC to 800 kHz                              |
| Temperature Coefficient                                                |                  | In the 10 to 18 °C, 28 to 50 °C ranges: 0.01 %/°C                                                                                                                                                                                                                                            |                                             |                                            |
| Max. Allowable Continuous Input                                        |                  | 1000 Apeak                                                                                                                                                                                                                                                                                   | 200 Apeak                                   | 60 Apeak                                   |
| Derating of Max. Allowable Input                                       |                  | For the maximum allowable continuous current with respect to frequency, see figure 4.                                                                                                                                                                                                        |                                             |                                            |
| Instantaneous Max. Allowable Input (0.1 sec. or less, reference value) |                  | 4500 Apeak                                                                                                                                                                                                                                                                                   | 1000 Apeak                                  | 300 Apeak                                  |
| Maximum Rated Voltage                                                  |                  | 1000 Vrms CAT III*1                                                                                                                                                                                                                                                                          |                                             |                                            |
| Load Resistance                                                        |                  | 2.5 to 5 Ω                                                                                                                                                                                                                                                                                   | 0 to 30 Ω                                   | 0 to 20 Ω                                  |
| Operating environment                                                  | Temperature      | 10 to 50 °C                                                                                                                                                                                                                                                                                  |                                             |                                            |
|                                                                        | Humidity         | 20 to 80 %RH (no condensation)                                                                                                                                                                                                                                                               |                                             |                                            |
|                                                                        | Altitude         | 2000 m or less                                                                                                                                                                                                                                                                               |                                             |                                            |
|                                                                        | Location for use | Indoor use                                                                                                                                                                                                                                                                                   |                                             |                                            |
| Storage environment                                                    | Temperature      | -20 to 60 °C                                                                                                                                                                                                                                                                                 |                                             |                                            |
|                                                                        | Humidity         | 20 to 80 % RH (No condensation)                                                                                                                                                                                                                                                              |                                             |                                            |
|                                                                        | Altitude         | 3000 m or less                                                                                                                                                                                                                                                                               |                                             |                                            |
| External Dimensions                                                    |                  | Approx. 128(W) x 106(H) x 60(D) mm                                                                                                                                                                                                                                                           | Approx. 93(W) x 77(H) x 38(D) mm            |                                            |
|                                                                        |                  | (excluding the connector and conductor guide)                                                                                                                                                                                                                                                |                                             |                                            |
| Diameter of Primary Current Hole                                       |                  | φ30 mm                                                                                                                                                                                                                                                                                       | φ26 mm                                      |                                            |
| Secondary Connector                                                    |                  | D-Sub 9 pin                                                                                                                                                                                                                                                                                  |                                             |                                            |
| Weight                                                                 |                  | Approx. 0.8 kg.                                                                                                                                                                                                                                                                              | Approx. 0.3 kg.                             |                                            |
| Power Supply Voltage                                                   |                  | ±(15 V ± 5 %)                                                                                                                                                                                                                                                                                |                                             |                                            |
| Maximum Rated Power Consumption                                        |                  | 30 VA                                                                                                                                                                                                                                                                                        | 11 VA                                       | 7 VA                                       |
| Current Consumption (at Power Supply Voltage)                          |                  | Approx. (150 mA + output current)                                                                                                                                                                                                                                                            | Approx. (80 mA + output current)            |                                            |
| Recommended fastening torque                                           |                  |                                                                                                                                                                                                                                                                                              |                                             |                                            |
| •Flat mounting                                                         |                  | M5×4 steel screws<br>3.7 N•m                                                                                                                                                                                                                                                                 | M4×4 steel screws<br>2.8 N•m                |                                            |
| •Straight mounting                                                     |                  | M6×2 steel screws<br>4.4 N•m                                                                                                                                                                                                                                                                 | M5×2 steel screws<br>3.7 N•m                |                                            |
| Safety standard                                                        |                  | Compliant standards<br>EN61010-1, Pollution degree 2*2                                                                                                                                                                                                                                       |                                             |                                            |
| Emissions                                                              |                  | Compliant standards<br>EN61326-1 ClassB, EN55011 ClassB, Group1<br>EMC Regulatory Arrangement in Australia and New Zealand<br>EN55011 ClassB, Group1                                                                                                                                         |                                             |                                            |
| Immunity                                                               |                  | Compliant standards<br>EN61326-1 Table 2 (for industrial locations)                                                                                                                                                                                                                          |                                             |                                            |
| Environmental standards*3                                              |                  | EU RoHS Directive compliant                                                                                                                                                                                                                                                                  |                                             |                                            |
| Accessories                                                            |                  | User's manual: 1 pc.                                                                                                                                                                                                                                                                         |                                             |                                            |
| Opt. Accessories (Sold Separately)                                     |                  | •D-Sub 9 pin connector (plug, part number B8200JQ): 1 pc.<br>•Load resistor (four 10-Ω resistors, part number B8200JR, accuracy of resistance value ±0.1%, temp. coefficient 25 ppm/°C): 1 group.<br>Example: To apply a 2.5 Ω load resistance, connect the four 10 Ω resistors in parallel. |                                             |                                            |

- \*1 This instrument is a measurement category (CAT) III product. Do not use it for measurement category IV measurements.  
Measurement category O applies to measurement of other types of circuits that are not directly connected to a main powersource.  
Measurement Category II applies to electrical equipment that is powered through a fixed installation, such as a wall outlet wired to a distribution board, and to measurement performed on such wiring.  
Measurement category III applies to measurement of facility circuits, such as distribution boards and circuit breakers.  
Measurement category IV applies to measurement of power source circuits, such as entrance cables to buildings and cablesystems, for low-voltage installations.
- \*2 Pollution Degree applies to the degree of adhesion of a solid, liquid, or gas that deteriorates withstand voltage or surface resistivity. Pollution Degree 2 applies to normal indoor atmospheres (with only non-conductive pollution).
- \*3 For conformity to environmental regulations and/or standards other than EU, contact your nearest YOKOGAWA office (PIM 113-01Z2).

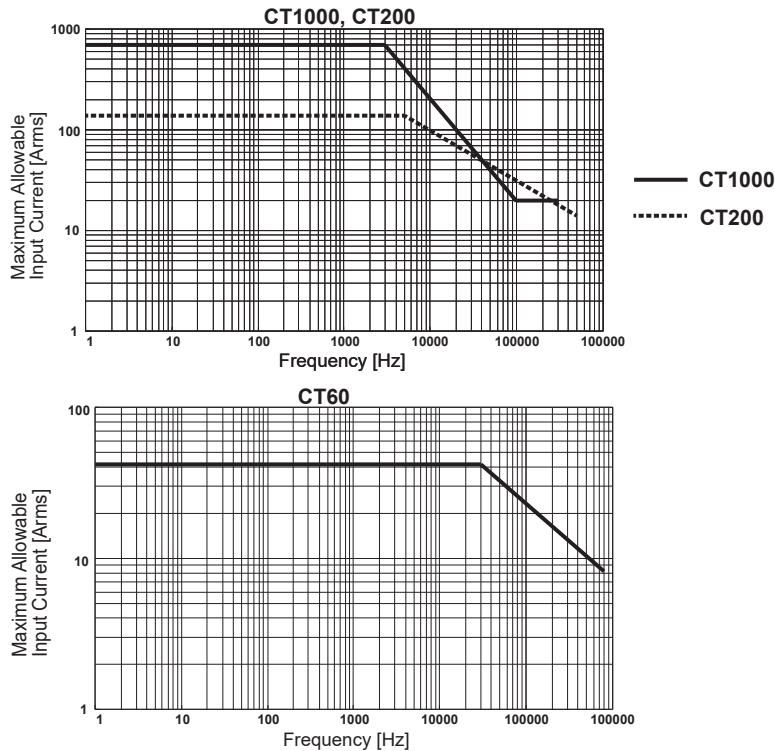


Figure 4. Derating of Primary Current by Frequency

CT1000

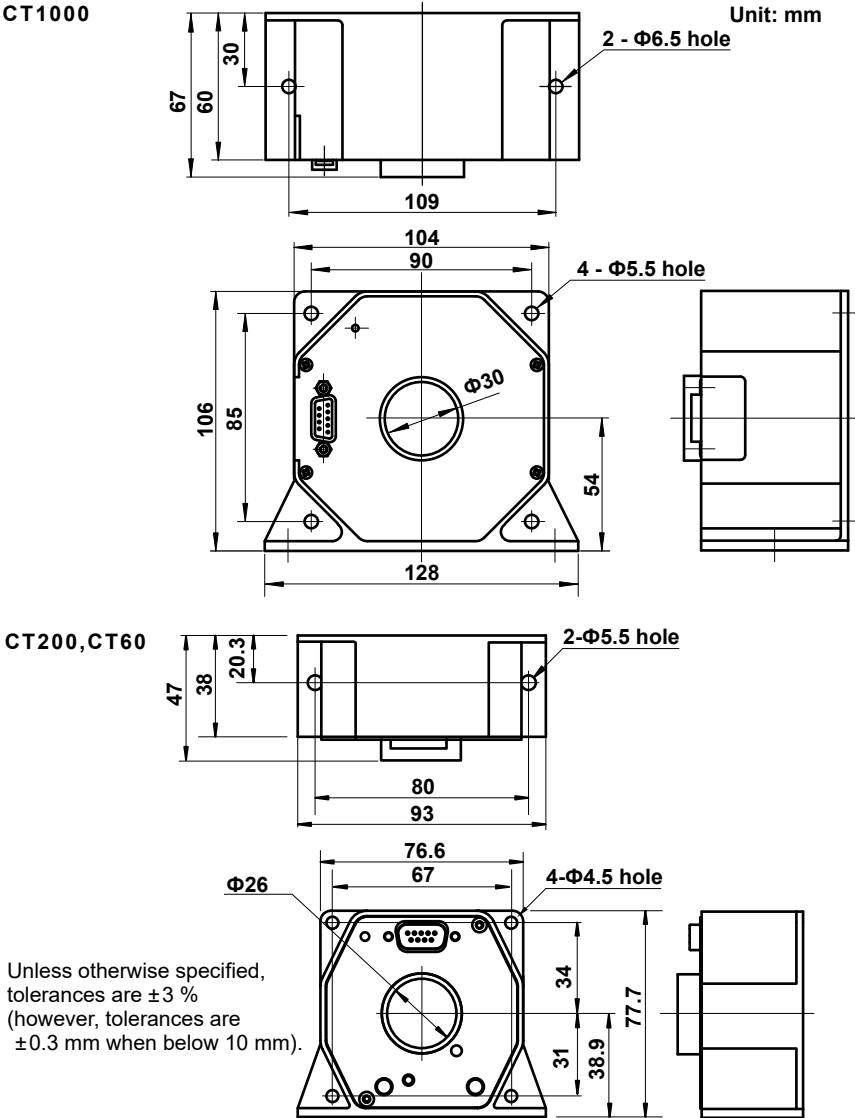


Figure 5. External Dimensions

6. Servicing

If you encounter any problems during use, or if the device does not appear to be operating normally, contact your nearest YOKOGAWA dealer.

7. Warranty

If you experience a breakdown in the device due to faulty manufacturing or accidents during shipping, contact your nearest YOKOGAWA dealer.

8. Appendix

Waste Electrical and Electronic Equipment (WEEE)



(EU WEEE Directive valid only in the EEA\* and UK WEEE Regulation in the UK)  
This product complies with the WEEE marking requirement. This marking indicates that you must not discard this electrical/electronic product in domestic household waste. When disposing of products in the EEA or UK, contact your local Yokogawa office in the EEA or UK respectively.  
\* EEA: European Economic Area

Authorized Representative in the EEA

Yokogawa Europe B. V. is Authorized Representative of Yokogawa Test & Measurement Corporation in the EEA for this Product. To contact Yokogawa Europe B. V., see the separate list of worldwide contacts, PIM 113-01Z2.

Disposing of the Instrument

When disposing of the instrument, follow the laws and ordinances of your country or region.

Compliance with the Radio Waves Act (Republic of Korea)

This product complies with the Radio Waves Act (Republic of Korea).  
Note the following when using the product in Republic of Korea.

이 기기는가정용 (B 급 ) 전자파 적합 기기입니다

The product is for home use (Class B) and meets the electromagnetic compatibility requirements.

|                    |                                         |
|--------------------|-----------------------------------------|
| Registration No:   | KCC-REM-IMY-EEN314                      |
| Equipment Name:    | Current Sensor                          |
| Trade Name:        | Yokogawa Test & Measurement Corporation |
| Manufacturer:      | Yokogawa Test & Measurement Corporation |
| Country of Origin: | Bulgaria                                |

环保使用期限

This section is valid in China only.



该标识适用于国家标准中所述，在中华人民共和国销售的电器电子产品的环保使用期限。只要您遵守该产品相关的安全及使用注意事项，在自制造日起算的年限内，则不会因产品中有害物质泄漏或突发变异，而造成对环境的污染或对人体及财产产生恶劣影响。  
注）该年数为“环保使用期限”，并非产品的质量保质期。零件更换的推荐周期，请参照使用说明书。

产品中有害物质的名称及含有的信息表

This section is valid in China only.

“限用物质含有情况” 标示内容， 请至下列网址查询。

<https://tmi.yokogawa.com/support/service-warranty-quality/product-compliance/>

