# User's Manual

# 751552 CLAMP-ON PROBE

Thank you for purchasing the CLAMP-ON PROBE (Model 751552). In order to take advantage of all the functions of the probe and to ensure proper use, please read this user's 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.

*IM 751552-01E/9*

YOKOGAWA ◆

**IM 751552-01E**
**9th Edition**

The Clamp-on Probe (751552) is a product 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

This product is designed to be used by a person with specialized knowledge.
Make sure to observe the following safety precautions when handling the probe. YOKOGAWA assumes no liability for the customer's failure to comply with these safety precautions. Before you use the probe, read the measuring instrument's manual to thoroughly familiarize yourself with the specifications and operations of the measuring instrument.
This manual is an essential part of the product; keep it in a safe place for future reference.

The following safety markings are used in this manual.

This instrument is protected by double-layer insulation or reinforced insulation that has the same level of protection as double-layer insulation. It is not necessary to connect the instrument to protective ground for safe use.

*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** Describes precautions that should be observed to prevent serious injury or death to the user.

**CAUTION** Describes precautions that should be observed to prevent minor or moderate injury, or damage to the instrument.

***Note*** Provides important information for the proper operation of the instrument.

**WARNING**

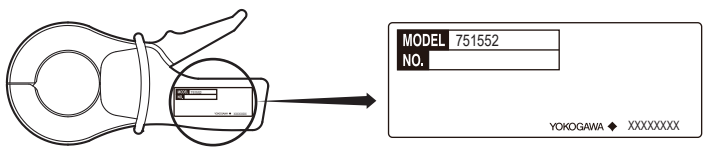
- Do not exceed the maximum current. Doing so can result in erroneous measurement or damage to the instrument.
- Beware of electric shock.
  - Do not exceed 600 V, and do not use with a non-isolated conductor with a surge exceeding measurement category III. Be sure to check the electric potential and voltage surge before measurement.
  - Do not perform measurement if the instrument is damaged.
  - Always use the instrument indoors. Do not use the instrument in a rainy or humid environment, or if water droplets form on its surface. Also, do not operate with wet hands. 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.
- Always operate the instrument in the environmental conditions described in this manual.
- Always keep the clamp lever clean.
- Do not disassemble the device
  The device should be disassembled by qualified personnel only.

## 1. Description

This device is a current output type clamp-on probe with a 1000:1 current transformation ratio that performs transformation on the primary current.

## 2. Contents of the Package

Check that the model name given on the name plate on the grip match those on your order.




**Standard Accessories**

Manuals

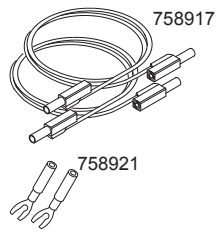
| Manual Title | Manual No. | Description |
|---|---|---|
| 751552 CLAMP-ON PROBE User's Manual | IM 751552-01E | This manual. This manual explains the handling precautions, basic usage, and specifications of the probe. |
| 751552 CLAMP-ON PROBE | IM 751552-01 | The Japanese version of the above manual |
| 751552 CLAMP-ON PROBE | IM 751552-92 | Document for China |
| 751552 CLAMP-ON PROBE | IM 751552-93Z2 | Document for Republic of Korea |
| Safety Instruction Manual | IM 00C01C01-01Z1 | Safety manual (European languages) |
| Inquiries | PIM 113-01Z2 | List of worldwide contacts |

The "E" in the manual number is the language code.

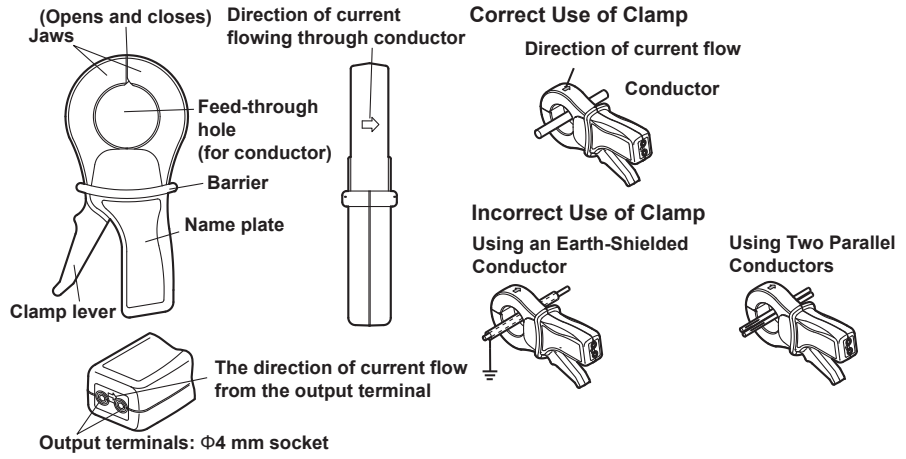
**Accessories (Sold Separately)**

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.

| Name | Model | Lot Qty. | Notes |
|---|---|---|---|
| Measuring Lead | 758917 | 1 | 2 pcs. per unit<br>Used in conjunction with the adapter, model 758921, sold separately<br>Length: 0.75 m, Rated Current: 32 A |
| Fork Terminal Adapter Set | 758921 | 1 | 2 pcs. per unit<br>For measuring leads, model 758917, sold separately<br>Rated Current: 25 A |




## 3. Names of Parts




## 4. Performing Measurement

**WARNING**

Keep your fingers and hands behind the barrier.

**CAUTION**

Ensure that the current flowing through the conductor being measured is within the current range. If the current range is exceeded, the device may overheat and become damaged.

**Operating Procedure**

1. Enter the appropriate settings on the measuring instrument being used to accommodate the output from the probe.
2. Connect measuring leads (758917, sold separately) to the probe's output terminals and the measuring instrument. The connection method differs depending on the measuring instrument being used. See your instrument's user's manual for the procedure. If the connector on the measuring leads cannot be connected to the input terminals on the measuring instrument, use a fork terminal (758921: sold separately) or other adapter.
   Example
   - For a digital power meter, connect a lead from the red output terminal (+) to the current input I terminal, and from the black output terminal (-) to the current ± terminal.
   - For a digital multimeter, connect a lead from the red output terminal (+) to the A terminal, and from the black output terminal (-) to the Lo terminal.
3. Squeeze the jaws to open the clamps, then position the conductor inside the feed-through hole. Hold the probe so that the conductor is as closely in the center of the feed through hole as possible.
4. Release the clamp lever to close the clamps. Steps 3 and 4 is called clamping.
5. Read the measured values on the measuring instrument. Calculate the current flowing through the conductor using an input/output ratio of 1000:1.
   Example: Given that 150.0 mA is flowing from the probe's output terminal,
   current = 150.0 mA × 1000 = 150.0 A.

***Note***

- Close the clamp completely before taking measurements. Errors can occur If any foreign objects or particles become trapped between the jaws.
- Only perform measurements on conductors in which the current is flowing in only one direction. The device cannot correctly measure earth-shielded conductors or parallel conductors with current flowing in both directions.
- To reduce errors, use a measuring instrument with an internal impedance less than or equal to 1Ω.
- If DC current is superimposed on an AC current being measured, the output signal from the clamp will become distorted and measurements will be inaccurate.
- When measuring phase difference in voltage and current using an instrument such as a digital power meter, make sure that the current flows in the same direction as the arrows on the probe. The phase difference can be correctly measured by positioning the clamp so that current flows from the front side (name plate) to the reverse side (in the direction shown by the arrows on the jaws).
- Avoid locations with extremely strong external magnetic fields (other than the conductor under test) as they may cause measurement errors.

## 5. Specifications

Safety Standards: Complying standard: EN61010-1 & EN61010-2-032
Instrument with double insulation or reinforced insulation between primary, secondary and outer case parts.
Operating voltage: 600 V Measurement category III[1], Pollution degree 2[2].
Operating voltage: 300 V Measurement category IV[1], Pollution degree 2[2].

Electromagnetic compatibility: Complying standard: EN61326-1

Environmental standards[3]: EU RoHS Directive compliant

Current Range: AC 0.001 to 1200 Arms. However, for 1000 to 1200 Arms, refer to the Maximum Current

Current Transformation Ratio: 1000:1

Output Signal: AC 1 mA/A (or 1 A/1000 A)

Accuracy and Phase shift (at Reference Conditions[4])

| **Primary Current I** | **1 ≤ I < 100 mA** | **0.1 ≤ I < 1 A** | **1 ≤ I < 10 A** | **10 ≤ I < 100 A** | **100 ≤ I ≤ 1200 A** |
|---|---|---|---|---|---|
| **% accuracy of output signal** | **≤ 3% of rdg + 5 µA (rdg: reading of output signal)** | **≤ 2% of rdg + 3 µA** | **≤ 1% of rdg** | **≤ 0.5% of rdg** | **≤ 0.3% of rdg** |
| **Phase shift** | **Not specified** | **Not specified** | **≤ 2 deg** | **≤ 1 deg** | **≤ 0.7 deg** |

Bandwidth: 30 Hz to 5 kHz (error in frequency influence is added to Accuracy at Reference Conditions).

Crest Factor: 6 or less for a 2000 A peak (333 Arms) current or less

Maximum Current: For a continuous frequency f of 1 kHz or less, I ≤ 1000 A
For frequencies exceeding 1 kHz, the current that can be allowed to flow continuously (Ipermanent) is calculated as follows:

$$I_{permanent} = 1000A/f(kHz)$$

For an input signal of 1000 A < I ≤ 1200 A at 1 kHz, the probe can be used continuously for a maximum of 40 minutes. Do not perform measurements 20 minutes thereafter

| | |
|---|---|
| Load Impedance | 1 Ω or less |
| Max. Output Voltage | 30 V peak or less (restricted by the output protection circuit). |
| Working Voltage | Max. 600 Vrms |
| Influence of Adjacent Conductor | When the frequency of the current in an adjacent conductor is 50 Hz, the influence on the primary current is 0.5 mA/A or less. |
| Influence of Conductor Position in the Jaws | 0.1% or less in the output signal for a frequency of 400 Hz or less. |
| Influence of Load Impedance r | When 1 Ω < r ≤ 5 Ω, under 0.1% of output signal, and phase shift under 0.2 degrees |
| Influence of Frequency f[5] | 30 Hz ≤ f < 48 Hz: under 0.5% of output signal<br>65 Hz < f ≤ 1 kHz: under 1% of output signal<br>1 kHz < f ≤ 5 kHz: under 2% of output signal |
| Influence of Crest Factor | Under 1% of output signal, given a crest factor of 6 or less for a 2000 A peak (333 Arms) current or less |
| Influence of DC Current Superimposed on Nominal Current | Under 1% of the output signal, assuming a current of DC 15 A or less. |
| Operating Temperature | –10°C to +50°C |
| Storage Temperature | –40°C to +70°C |
| Temperature Influence | 0.02%/°C or less of the output signal |
| Operating Humidity | 0 to 90% RH (no condensation) However, if 35°C is exceeded, humidity will impair the primary functionality (by a factor of 0.5% RH/°C) |
| Influence of Humidity | Under 0.1% of the output signal given 10% RH ≤ Humidity < 20% RH or 75% RH < Humidity ≤ 90% RH |
| Operating Altitude | 2000 m or less above sea level |
| Installation | Indoor use |
| Max. Jaws Opening | 53 mm (open jaws height: 139 mm (W)) |
| External Dimensions | Approx. 111(W) x 216(H) x 45(D) mm |
| Weight | Approx. 620g. |
| Output | Safety jacks (Φ4 mm) |

1 This instrument is a measurement category III (600V) product. In this case do not use it for measurement category IV measurements. This instrument is a measurement category IV (300V) product.
Measurement category O applies to measurement of other types of circuits that are not directly connected to a main power source.
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 cable systems, for low-voltage installations.

2 Pollution degree describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering.
Pollution Degree 2 applies to the normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.

3 For conformity to environmental regulations and/or standards other than EU, contact your nearest YOKOGAWA office (PIM 113-01Z2).

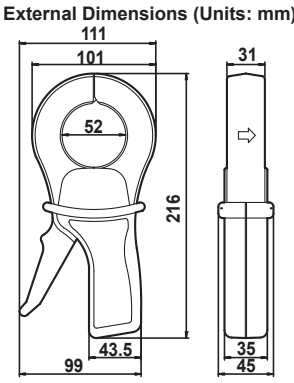
4 Reference Conditions

| | | |
|---|---|---|
| Temperature: 23 °C±3°C | Humidity: 20 to 75% RH | External magnetic field < 40 A/m |
| No AC magnetic field | Conductor centered in jaws | Load impedance ≤ 1 Ω (≤ 1 VA) |

No influence of current flowing in adjacent conductors
When the primary current is sinusoidal, the sinusoidal conditions are: frequency; 48 to 65 Hz, distortion factor < 1%, no DC component

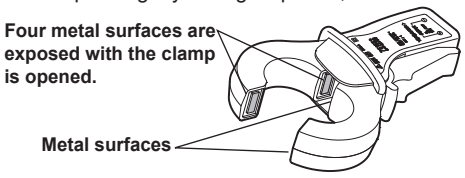
5 There is no frequency influence in the range 48 Hz ≤ f ≤ 65 Hz.

**External Dimensions (Units: mm)**




## 6. Maintenance

- Note the following when cleaning the probe.
  - Do not clean the probe while clamped to a conductor. Likewise, do not clean while connected to a measuring instrument.
  - Do not allow water to contact the jaws.
- When opening the jaws, keep the exposed metal areas clean. If dust accumulates, wipe with a clean dry cloth. To prevent rust, wipe metal surfaces with oil from time to time. Avoid getting oil on non-metallic surfaces. Use only high quality, low-viscosity machine oil such as sewing machine oil.
- This product undergoes a 100% inspection at the time of shipment. If any layers of the core come apart slightly during shipment, this will not affect the functioning of the product.




## 7. Servicing

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

## 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.