# 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.

3rd Edition : June 2004 (YK)


YOKOGAWA

**IM 751552-01E**
**3rd Edition**

## 1. Safety Precautions

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.

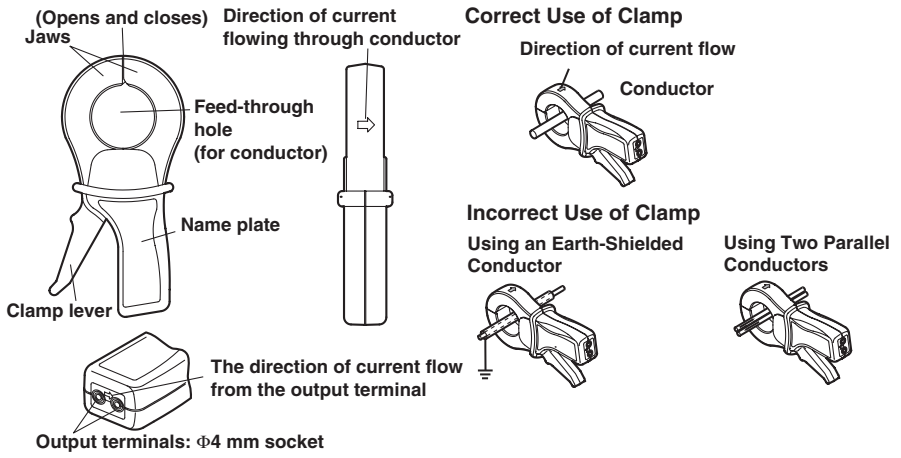
**CAUTION** Describes precautions that should be observed to prevent minor or moderate injury, or damage to the instrument.

***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.

## 2. Names of Parts




## 3. Performing Measurement

**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.

## 4. Specifications

| | |
|---|---|
| Safety Standards | Complying starndard: EN61010-1 & EN61010-2-032<br>Instrument with double insulation or reinforced insulation between primary, secondary and outer case parts.<br>Operating voltage: 600 V Measurement category III*, Pollution degree 2†.<br>Operating voltage: 300 V Measurement category IV*, Pollution degree 2†. |
| Electromagnetic compatibility | Complying standard: EN61326, Emissions Class B, Immunity Annex A industrial locations |
| 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‡)

| **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<br>For frequencies exceeding 1 kHz, the current that can be allowed to flow continuously (Ipermanent) is calculated as follows:<br>$I_{permanent} = \frac{1000A}{f(kHz)}$<br>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§ | 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 |
| 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) |

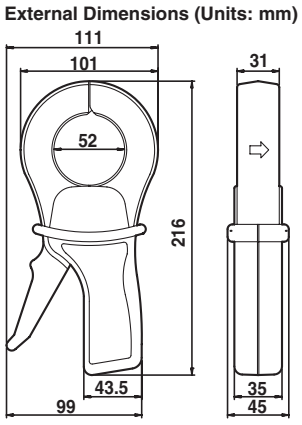
* *Measurement category* describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand voltage.
Measurement category III applies to measurement of the distribution level, that is , building wiring, fixed installations.
Measurement category IV applies to measurement of the primary supply level, that is, overhead lines, cable systems, and so on.

† *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 occures. Occasionally, however, temporary conductivity caused by condensation must be expected.

‡ 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

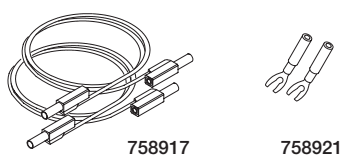
§ There is no frequency influence in the range 48 Hz ≤ f ≤ 65 Hz.

**External Dimensions (Units: mm)**



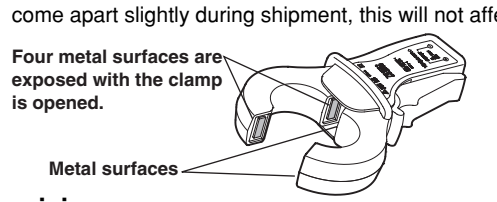

**Accessories (Sold Separately)**

| 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 |




## 5. 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.




## 6. 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.