High-Frequency **Rogowski AC Current Probe**

HRCP Series User Manual



HRCP-XS Series

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If a separate written agreement between Micsig and the user includes warranty terms relating to the contents of this document, and such terms conflict with the provisions herein, the warranty terms in the separate agreement shall prevail.

Warranty

The current probe body is guaranteed for 3 year. During the warranty period of the product, the company will be responsible for providing free maintenance for any faults caused by the quality of the product itself under normal use and has not been dismantled or repaired.

The warranty is invalid in the following cases, but maintenance services are provided, labor costs are waived, and only spare parts are charged:
a. Damage to accessories due to improper use, maintenance, or storage.
b. Damage caused by force majeure factors, such as natural disasters.

In the following cases, the company will refuse to provide maintenance services or provide maintenance services for a fee:
a. Unable to provide product packaging or anti-counterfeiting labels on product packaging.
b. The content of the anti-counterfeiting label has been altered, or is blurred and unrecognizable.
c. It has been dismantled by unauthorized personnel by Micsig (eg: changing wires, dismantling internal components).
d. There is no sales voucher or the content of the sales voucher does not match the product.

Content

General Safety Summary 2
Maintenance Safety 3
Compliance Information 4
- Safety Compliance 4
- Environmental Considerations 5
- Certification complies with the standards 5

Main Functions 6
Probe Structure 6
Operating Instructions 7
Obtain Optimal Measurement 8
Technical Specifications 9
- Physical Characteristics 9
- Electrical Characteristics 10
- Environmental Characteristics 10

Precautions 11
Maintenance 12
- Troubleshooting 12
- Cleaning 13

General Safety Summary

Please read the following safety precautions carefully to avoid personal injury and prevent damage to this product or any product connected to this product.
To avoid possible danger, be sure to use this product as prescribed.
Only qualified personnel should perform repair procedures.

Avoid fire or personal injury

Connect and disconnect devices properly.

* Do not plug or unplug probes or test leads while they are connected to a voltage source.
* Power off the circuit under test before connecting or disconnecting the current probe.
* Before connecting the probe to the circuit under test, please connect the probe output to the measuring instrument.
* Before connecting the probe input, please connect the probe reference lead to the circuit under test.
* Before disconnecting the probe from the measuring instrument, please disconnect the probe input end and the probe reference lead from the circuit under test.

Observe all terminal ratings. To avoid fire or electric shock, observe all product ratings and markings. Before making connections to the product, please consult the product user manual for details on ratings. Do not connect the current probe to any wire with a voltage exceeding its rating.
Do not disassemble the instrument. Do not use the product for measurements with covers or panels open.
Do not operate the product when it is suspected that the product is malfunctioning.
Keep away from exposed circuits. Do not touch exposed wiring and components while the power is on.
Do not operate in wet environments.
Do not operate in flammable and explosive environments.
Please keep the product surface clean and dry.

Terms in this manual

⚠ WARNING: A "WARNING" statement identifies conditions or actions that could result in personal injury or life-threatening conditions.

⚠ CAUTION: A “CAUTION”statement identifies conditions or actions that could cause damage to this product or other property.

Maintenance Safety

Only qualified service personnel with relevant qualifications should perform service operations. Please read this "Maintenance Safety Summary" and "General Safety Summary" before performing any repair operations.

Do Not Serve Alone: Do not make internal repairs or adjustments to this product unless someone else is on site to provide first aid and resuscitation.

Disconnect Power: To avoid electrical shock, disconnect power to the instrument before disconnecting the main power cord.

Pay attention when repairing with electricity: Hazardous voltages or currents may be present in this product. Disconnect power and test leads before removing protective panels, soldering, or replacing components.

To avoid electric shock, do not touch exposed connectors.

Compliance Information

This section lists the EMC (Electromagnetic Compatibility), safety and environmental standards to which the instrument complies.

Safety Compliance

Equipment Type

Test and Measurement Equipment.

Pollution Degree

The micro-environmental pollution levels used to determine clearances or creepage distances can be classified into 4 levels.

* Pollution degree 1: no pollution or only dry non-conductive pollution.
* Pollution degree 2: In general, there is only non-conductive pollution, and occasional temporary conduction caused by condensation occurs. typical office/home environment. Temporary condensation occurs only when the product is not in use.
* Pollution degree 3: There is conductive pollution, or dry non-conductive pollution becomes conductive due to expected condensation.
* Pollution degree 4: Causes persistent conductive pollution, such as pollution caused by conductive dust or rain and snow.

Pollution Degree

Pollution Degree 2

Overvoltage Class Description

The overvoltage level is divided according to the IEC60664 standard, which is divided into four levels: CAT I, CAT II, CAT III, and CAT IV.

* CAT I is a low-voltage low-energy class with protective devices, generally referring to the internal voltage of electronic equipment.
* CAT II is a low-voltage high-energy level, branched from the main power supply circuit, and the 220V voltage of the home lighting circuit belongs to this category.
* CAT III refers to the high voltage and high energy level, refers to the fixed installation of the main power supply circuit, generally refers to 380V three-phase voltage.
* CAT IV refers to three-phase lines at utility power connections, any outdoor conductors.

Overvoltage Category

CAT II

Environmental Considerations

This section provides information about the environmental impact of the product.

Product End-of-Life Handling

Observe the following guidelines when recycling an instrument or component:

Equipment Recycling: Production of this equipment requires the extraction and use of natural resources. The equipment may contain substances that could be harmful to the environment or human health if improperly handled at the product's end of life. In order to avoid release of such substances into the environment and to reduce the use of natural resources, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately.



This symbol indicates that this product complies with the relevant requirements of European Union Directives 2002/96/EC and 2006/66/EC on Waste Electronic and Electrical Equipment (WEEE) and Batteries.

Certification complies with the standards

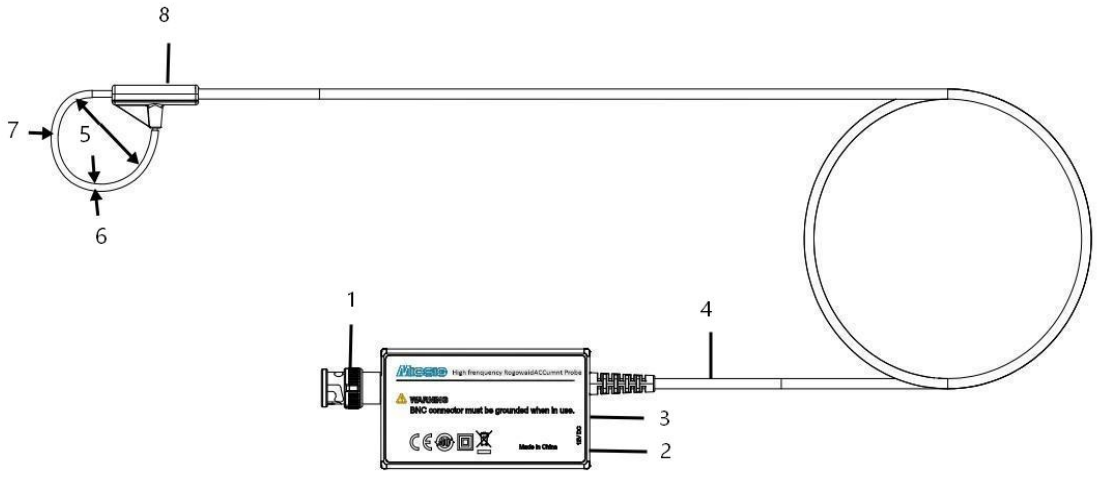
EC Conformity Declaration - Low Voltage:
Low Voltage Directive 2014/35/EU
EN 61010-1:2010 /A1:2019
Safety requirements of electrical equipment for measurement, control, and laboratory use.
EN 61010-2-032:2023
Specific provisions for hand-held current clamps for electrical measurement and test equipment.

Main Functions

The Micsig H RCP series Rogowski current probe measures AC currents up to 12000Apk, offers a maximum bandwidth of 100MHz.With nearly zero insertion impedance, the probes minimize interference to the circuit under test. The coil features extremely high voltage resistance (up to 3 kVpk)。Customization is available for cable length, coil circumference, coil cross-sectional diameter, coil voltage withstand rating, and coil operating temperature, enabling the probe to be adapted to complex measurement setups .

It features a standard BNC interface for use with any oscilloscope. Its compact, flexible design easily solves the hard-toreach part issue。

Probe Structure



The image is shown using the standard HRCP-XS model.

1) Output: Standard BNC, compatible with all BNC oscilloscopes.
2) Power supply: DC 12V, adapter
3) Power indicator: Turn Green after powered on.
4) Cable length: 1.5m, from integrator to coil.
5) Rogowski coil inner diameter .
6) Rogowski coil cross-section diameter .
7) Rogowski coil lead length.
8) Current direction.

Operating Instructions

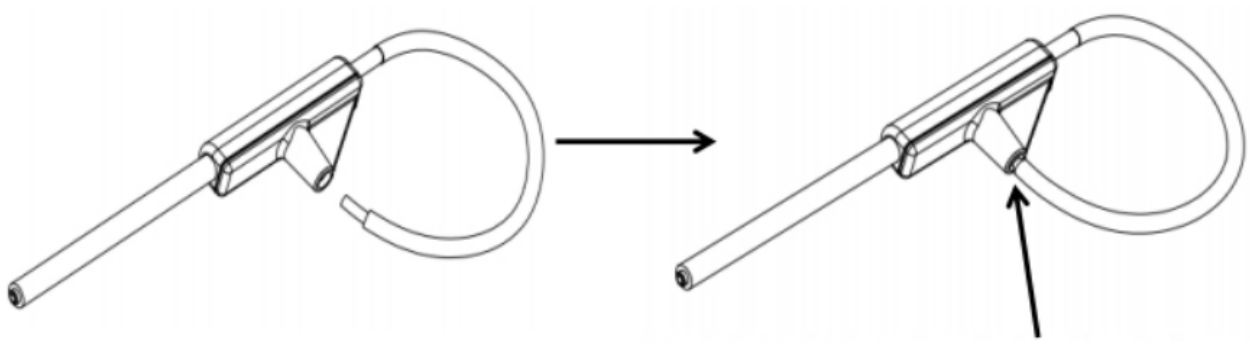
Connecting to an oscilloscope

1. Connect the probe BNC cable to the channel interface of the oscilloscope.
2. Power the probe control module with the standard 12V power adapter provided with the probe.

⚠ **CAUTION:** Must use the adapter provided with the probe for power supply, DO NOT use USB port on the oscilloscope.

Operation steps

1. Connect the probe to any channel of the oscilloscope.
2. Set the oscilloscope input impedance to 1 MΩ.
3. Power the current probe using the supplied adapter. After power-on, the power indicator will light green.
4. Connect the current probe to the device under test (DUT) to begin measurement. Make sure the coil plug is fully inserted.
5. Adjust the oscilloscope settings or use the oscilloscope's auto-setup function to display a stable waveform.



① Insert the coil

The image is shown using the standard RCP-M model.

When noticeable resistance is felt at the free end of the coil, the coil is fully inserted.

⚠ WARNING: The probe does not protect against electric shock when connecting to or removing it from hazardous live conductors

⚠ WARNING: The probe can only be installed or removed when the circuit is power off.

⚠ WARNING: Do not drop the probe or subject it to strong shocks, as this may result in damage to the probe.

⚠ WARNING: Do not connect the current probe to any conductor carrying current exceeding the probe's rated value.

Precautions

* Visually inspect the insulation around the Rogowski coil before use and do not use it if any damage is found.
* Avoid sharp bends or overly tight loops when winding the flexible coil around a conductor to prevent damage.
* Do not use the coil in environments exceeding its rated voltage.
* The detachable silicone sleeve provides additional mechanical protection.
* Do not touch the measured conductor or the probe sensor head during measurement.
* Use the Rogowski coil only with oscilloscopes or monitoring devices whose BNC input is properly grounded.

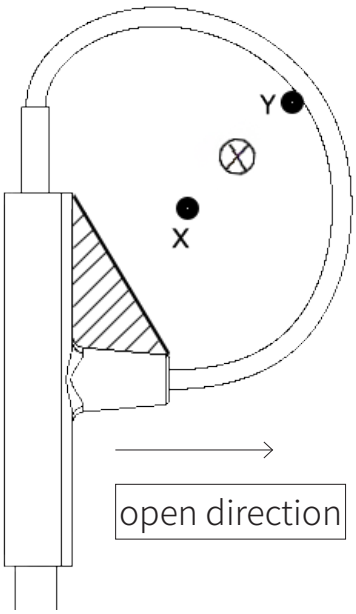
Obtain Optimal Measurement

⚠ **Caution:** The probe head is a precision part. Do not drop the probe or physically shock it, twist it, or drastically alter its surroundings. Do not insert wires larger than jaw diameter into the probe grip, as this may damage the probe.

※ to ensure accuracy, the wire being measured should be positionedas much as possible between X and Y in the right diagram, where X is the center of coil and Y is the midpoint of the coil length.

※ try to stay away from strong magnetic field interference sources asmuch as possible to avoid measurement errors.

※ the coil can be placed around the wire being measured to measurethe interference signals in the surrounding area, to determinewhether there is strong interference nearby.



Technical Specifications

The technical specifications in the tables in this section are valid under the following conditions:

* The probe has been calibrated at an ambient temperature of 23° C ±5° C.
* The probe is connected to the host instrument using an input resistance of 1 MΩ.

Specifications for the Rogowski AC Current Probe are divided into three categories: Physical characteristics, Electrical characteristics, Environmental characteristics.

Physical Characteristics

Table 1: Mechanical Characteristics

Typical Characteristics describe typical performance.

Coil inner diameter, coil circumference, cable length, coil operating temperature, and coil voltage withstand rating are customizable.

Model	HRCP-XS Series
Coil length (Typical)	80mm（customizable）
Measurable conductor diameter	20mm
Coil cross-section diameter (Typical)	1.6mm
Accuracy (typical)	2%
Power supply	DC 12V
Integrator size	70*40*17mm
Wire length (integrator to Rogowski coil)	1.5m（customizable）
Output impedance	1MΩ
Interface	Universal BNC

Electrical Characteristics

Table 2: Typical Electrical Characteristics of the HRCP-XS Series

Model	Bandwidth	Peak current	Output sensitivity	Output noise	Peak di/dt	Droop (%/ms)	Accuracy (typical)	Peak coil isolation voltage
HRCP60XS-80	150Hz-100MHz	60Apk	50mV/A (20x)	< 1.5 mV-rms	8kA/μs	85%/ms	2%	3kVpk
HRCP120XS-80	80Hz-100MHz	120Apk	20mV/A (50x)	< 1.5 mV-rms	20kA/μs	50%/ms		
HRCP300XS-80	40Hz-100MHz	300Apk	10mV/A (100X)	< 1.5 mV-rms	40kA/μs	25%/ms		
HRCP600XS-80	20Hz-100MHz	600Apk	5mV/A (200X)	< 1.5 mV-rms	80kA/μs	15%/ms		
HRCP1200XS-80	10Hz-100MHz	1200Apk	2mV/A (500X)	< 1.5 mV-rms	100kA/μs	8%/ms		
HRCP3000X-80	5Hz-100MHz	3000Apk	1mV/A (1000X)	< 1.5 mV-rms	100kA/μs	5%/ms		
HRCP6000X-80	3Hz-100MHz	6000Apk	0.5mV/A (2000X)	< 1.5 mV-rms	100kA/μs	2%/ms		
HRCP12000X-80	3Hz-100MHz	12000Apk	0.2mV/A (5000X)	< 1.5 mV-rms	100kA/μs	2%/ms		

Environmental Characteristics

Table 3: Environmental Characteristics

Characteristics	Parameters
Working temperature	Probe body: Temperature range 0℃-40℃, customizable.
Storage temperature	-30℃ -70℃
Working humidity	≤ 85%RH
Storage humidity	≤ 90%RH
Working height	≤ 3000m
Storage height	≤ 12000m

Precautions

This section includes common problems need attention during the use of the probe.

* Ensure that the oscilloscope input impedance is set to 1 MΩ rather than 50 Ω; otherwise, accurate measurements cannot be obtained.

* The measured current must not exceed the probe's maximum rated current.

* Before connecting to the circuit under test, avoid sharp spikes or edges, as they may damage the probe loop.

* When measuring signals, keep the probe as far as possible from fast-changing high-voltage interference sources (e.g., signals above 100 V/μs) or high-frequency interference (MHz range or higher) to prevent measurement errors.

* Strong magnetic fields (e.g., near transformers or high-current conductors) or strong electromagnetic fields (e.g., near radio transmitters) can affect measurement results.

* At high frequencies, common-mode noise may affect measurements on the high-voltage side of the circuit; in such cases, connect the probe to the low-voltage side or reduce the signal frequency.

* To detect strong nearby interference sources, place the probe loop around the conductor without clamping it and measure the ambient interference signal strength.

* Avoid excessive bending, stretching, or twisting of the probe loop during use to prevent damage to the internal coil.

* Before measurement, ensure that the Rogowski coil is fully closed and securely connected; incomplete closure may result in measurement errors or reduced sensitivity.

Maintenance

This section provides maintenance information for the probe.

Troubleshooting

If some function of the probe is not working properly, there may be an error. See the table below.

Table 4: Probe Troubleshooting

Malfunctions	Possible Cause
Excessive waveform jitter or noise	The measured waveform shows excessive jitter or noise. Check for strong magnetic or electromagnetic interference near the probe. The probe loop is not properly secured and may have shifted position. The signal frequency may be too high and exceed the probe's effective bandwidth.
Inaccurate measurement results	Check whether the oscilloscope input impedance is set to 1 MΩ.
Zero offset in the measured value	Large changes in ambient temperature may cause probe zero drift. The probe may not have reached a stable operating state after a long period of inactivity. External magnetic field interference may be present near the probe.
The probe cannot measure the signal.	The oscilloscope channel may be damaged, please try to replace other channels or other oscilloscopes. if the probe works normally on other channels or oscilloscopes, it is considered to be caused by the oscilloscope channel and has nothing to do with the probe; If the probe does not work on other channels or on the oscilloscope, the probe may be defective, please contact the Micsig after-sales department for repair.

Cleaning

Do not expose the probe to harsh weather conditions, the probe is not waterproof.

⚠ **CAUTION:** To prevent damage to the probe, do not expose it to sprays, liquids or solvents. When cleaning the outside of the probe, avoid wetting the inside, the probe is not waterproof.

Do not wipe the probe with chemical cleaners, they may damage the probe. Avoid chemicals containing gasoline, benzene, toluene, xylene, acetone, or similar solvents.

Clean the outside of the probe with a soft, dry, lint-free cloth or a soft bristle brush. If dirt remains, clean with a soft cloth or cotton swab dipped in 75% isopropyl alcohol solution and rinse with deionized water. Cotton swabs can be used to clean the tight spaces of the probe with any solution that can dampen the swab or soft cloth.

Do not use abrasives on any part of the probe.

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