Agilent U1583B Current Clamp
Operating Instructions

The U1583B current clamp is a dual range 40 A and 400 A clamp-on AC current clamp. This U1583B current clamp is designed for Agilent handheld digital multimeter (DMM) and Agilent handheld oscilloscope. A BNC-to-banana plug is required to connect the current clamp with the DMM. For the handheld oscilloscope, use a BNC connector to connect the clamp..

Assistance

For technical assistance, contact your nearest Agilent Sales Office or visit the Agilent website at www.agilent.com/find/assist for further information.

Regulatory Markings

ICES/NMB-001 ISM GRP.1 CLASS A

The CE mark is a registered trademark of the European Community. This CE mark shows that the product complies with all the relevant European Legal Directives. If it was accompanied by a year, it indicates the year the design was approved. This ISM device complies with Canadian ICES-001.

Product contains restricted substance(s) above the maximum value, with 40 year Environmental Protection Use Period.

The CSA mark is a registered trademark of the Canadian Standards Association.

N10149

The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australia EMC Framework regulations under the terms of the Radio Communication Act of 1992.

This instrument complies with the WEEE Directive (2002/96/EC) marking requirement. This affixed product label indicates that you must not discard this electrical/electronic product in domestic household waste.

Safety Information

Please use the Agilent U1583B current clamp only as specified in this manual. Otherwise, the protection provided may be impaired. A **WARNING** identifies conditions and actions that pose hazards to the user. A CAUTION identifies conditions and actions that may be damaging to the equipment under test. To avoid possible electric shock, personal injury or damage to this instrument, ensure that you use the current clamp safely, and refer to the guidelines below.

~	AC : Alternating Current		Range button in release mode. Range ~ 400 A, Output ~ 1 mV/A
	Caution, risk of danger (Refer to the user's and service guide for details)	⎓	DC : Direct Current
400A MAX	Maximum allowable current measurement is 400 A	⏚	Ground
CAT III 600V	Category III 600V over-voltage protection		Double Insulation
	Range button in lock mode. Range ~ 40 A, Output ~ 10 mV/A		Caution, risk of electric shock (Refer to the user's and service guide for detail)
	To be applied around or removed from un-insulated hazardous live conductors		

WARNING

- **Do not use the adapter if it is damaged. Inspect the case before you use the adapter. Look for cracks or missing plastic. Pay particular attention to the insulation surrounding the connectors.**
- **Inspect the clamp jaw before each use. It shall not have cracks or missing parts, or loose or weakened components. Be sure there is insulation surrounding the jaw.**

WARNING

- **Inspect the output cable without exposing the metal to ensure insulation.**
- **Do not operate the adapter around explosive gas, vapor, or dust.**
- **Do not exceed the rated voltage/current as marked on the adapter.**
- **Use with extreme caution when working around bare conductors or bus bars. Accidental contact with the conductors could result in electric shock.**
- **Always keep your hand behind the finger guard of the clamp jaw.**
- **When servicing the adapter, use only specified replacement parts.**
- **Use with caution when working above 30 V ac rms, 42 V peak, or 60 V dc. These voltages pose a shock hazard.**
- **Avoid working alone.**
- **Do not operate the adapter if the cover is removed or loosened.**
- **Use individual protective equipment if working in installations with accessible hazardous live parts.**
- **If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired**

CAUTION

- Do not connect to the BNC output or the banana plug to any power sources.
- Use the proper terminals, function, and range for your measurements.

Standard Items Purchase Checklist

The following items are included when you make a purchase:

- U1583B current clamp
- BNC-to-banana plug
- Operating Instructions (this sheet)

General Specifications

Specification	Current Clamp	Specification	Current Clamp
Specified Current Range	1 A to 400 A ac	Load impedance	> 1 M ohm, < 100 pF
Usable Current Range	0.5 A to 400 A	Operating Temperature	–40 °C to 55 °C (–40 °F to 131 °F)
AC crest factor	< 3	Storage Temperature	–40 °C to 70 °C (–40 °F to 158 °F)
Bandwidth	10 kHz	Measurement Category	CAT III 600 V; Pollution degree II
Weight	294 grams	Dimensions (HxWxL)	44 mm (H) x 92 mm (W) x 188 mm (L)
Cable length	1500 ± 20 mm	Maximum conductor size	30 mm or 16 mm x 2
Maximum Jaw Opening	32 mm	Warm-up time	Immediately upon power on
Altitude	Up to 2000 meters	Warranty	One year
Relative Humidity	Max 80% RH for temperature up to 35 °C decreasing linearly to 50% RH at 55 °C		
Pollution Degree	2		
Safety Compliance	Safety Compliance Certified by CSA (Canada & USA) for IEC/EN/UL 61010-1 2nd Edition & EN/IEC 61010-2-032		
EMC Compliance	Certified to IEC/EN 61326:2002, CISPR 11, and equivalents for Group 1, Class A		

Electrical Accuracy Specifications

Range	Output Resolution	Accuracy ± (% of reading + digit) at 23 °C ±5 °C, with relative humidity less than 80% RH			
		Span	48 Hz to 65 Hz	40 Hz to 48 Hz/ 65 Hz to 1 kHz	1 kHz to 10 kHz
40 A	10 mV/A	0.5 A ~ 40 A	2 % + 0.5 A	5 % + 0.5 A	10 % + 0.5 A
400 A	1 mV/A	0.5 A ~ 40 A	2.5 % + 0.5 A	4.5 % + 0.5 A	12.5 % + 0.5 A
		40 A ~ 200 A	2 % + 0.5 A	4 % + 0.5 A	12 % + 0.5 A
		200 A ~ 400 A	1.5 % + 0.5 A	3.5 % + 0.5 A	11.5 % + 0.5 A

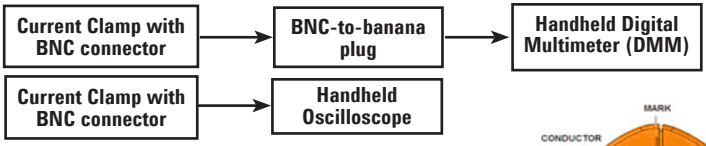
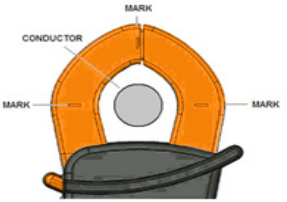


Figure 1: Connection Diagram

Alignment Marks

Put one conductor only within the jaws on the inside section of the indicated marks as much as possible in order to meet the accuracy of the specifications. Make sure the clamp is vertical to the conductor.



Current Range Selection

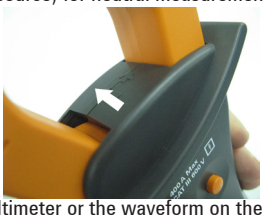
To push and release the yellow button for 40 A range and lock the button for 400 A range.

Button	Range	Output
Release	~ 40 A	~ 10 mV/A
Lock	~ 400 A	~ 1 mV/A

Operation

AC current can be measured without removing the conductor out of the circuit by following the procedure shown below:

1. Plug the BNC cable to the BNC with dual banana plugs, and then plug into the V/COM terminals on a multimeter. For a handheld oscilloscope, plug the BNC connector directly to the oscilloscope.
2. Set the ACV measurement and range on the multimeter.
3. Position the jaw to a single conductor and center it accordingly to the alignment marks.
4. Ensure that the arrow marked on the clamp jaw points towards the load for phase measurements or away from the load (toward the source) for neutral measurements.



5. Observe the AC value on the multimeter or the waveform on the handheld oscilloscope which is proportional to the current.
6. Select a lower range on the current clamp and set the corresponding sensitivity (mV/A setting) on the oscilloscope if required.

Calibration Equipment

The pre-calibration guidelines are shown as follows:

- Be sure you are a qualified person to perform the calibration
- The environment should be 23 °C ±2 °C, and the relative humidity (RH) shall be < 80%.

The test equipment requirements listed in table below or equivalents are required to perform the calibration and performance verification test procedures. Alternative equipment may be used as long as the accuracy is as good as or better than the specifications listed.

Standard Source	Operating Range	Accuracy Required	Recommended Equipment
AC Current Calibrator	33 mA to 329.99 mA at 10 Hz to 3 kHz 0.33 A to 2.99999 A at 10 Hz to 3 kHz 3 A to 20.5 A at 10 Hz to 3 kHz	≤ ± 0.2 % ≤ ± 0.6 % ≤ ± 3.0 %	Wavetek 9100 or Fluke 5520A or 5101B or equivalent
Multimeter	AC 500.0 mV or 1000.0 mV	≤ ± 1.5 %	Agilent U1251A/B or U1252A/B or Agilent-34405A or equivalent
50 Turns Current Coil	0.2 A to 20.5 A	≤ ± 1.0 %	Fluke 5500A Coil or Wavetek 9100 Option 200 or equivalent

Adjustment Procedures

AC 40 A range

1. Lock the RANGE button of the U1583B current clamp to enable the 40 A mode.
2. Connect the output BNC of the U1583B to a BNC-to-dual banana converter plug and proceed to connect it to the output of the V (HI) and COM (LO) terminals of the multimeter.
3. Set the multimeter to AC 500.0 mV or 1000.0 mV.
4. Open the jaws of the current clamp and centrally place it around the 50 turns coil.
5. Set the calibrator output to 50 turns coil. Configure the calibrator to generate a current of 20 A with a 60 Hz frequency for the adjustment of the current clamp.
6. Remove two Phillips screws on the back of the current clamp and proceed to adjust VR1 until the display on the multimeter indicates AC 200 mV ± 0.2 mV. Please refer to the figure below for the position of VR1.

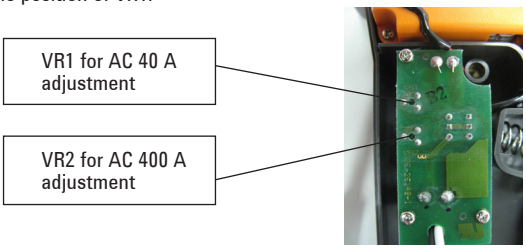


Figure: U1583B Current Clamp Circuit Board Diagram

AC 400 A range

1. Release the Range button of the U1583B current clamp to enable the 400 A mode.
2. Connect the output BNC of the U1583B to a BNC-to-dual banana converter plug and proceed to connect it to the output of the V (HI) and COM (LO) terminals of the multi-meter.
3. Set the multimeter to AC 500.0 mV or 1000.0 mV.
4. Open the jaws of the current clamp and centrally place it around the 50 turns coil.
5. Set the calibrator output to 50 turns coil. Configure the calibrator to generate a current of 20 A with a 60 Hz frequency for the adjustment of the current clamp.
6. Remove two Phillips screws on the back of the current clamp and proceed to adjust VR2 until the display on the multimeter indicates AC 200 mV ± 0.2 mV. Please refer to the earlier figure for the position of VR2.

NOTE Remember to replace the screws to their original position after performing the calibration adjustments.

Maintenance

Repair or service not covered in this sheet should be performed only by qualified personnel.

WARNING To avoid electrical shock or damage to the current clamp, do not allow moisture to get inside the case and remove all connections before opening the case.

Cleaning

- Periodically wipe the case with a damp cloth and mild detergent. Do not use cleaners or solvents.
- Open the jaws and wipe the metal areas of the jaws with a lightly oiled cloth, and then wipe the oil with a dry cloth. Do not allow rust or corrosion to form on the metal ends of the jaws.

Troubleshooting

If the current clamp does not perform properly, follow the steps below to identify the problem:

1. Inspect the mating surface of the jaws for cleanliness. If any external material is present, the jaws may not close properly and this affects the measurement results.
2. Verify that the function selection and range on the multimeter or oscilloscope are correct and the range is adjusted on the current clamp.

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