

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. The BNC-to-banana plug is required to connect the current clamp with DMM. While for handheld oscilloscope, it needs to use with BNC connector.



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



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 yr Environmental Protection Use Period.



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



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 U1583A 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 adapter 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, loose or weakened components. Be sure there is insulation surrounding the jaw.

WARNING

- Inspect 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. It could result in electric shock if have accidentally contact to the conductors.
- Always keep your hand behind the finger guard of 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. Such voltage poses a shock hazard.
- Avoid working alone.
- Do not operate the adapter if the cover is removed or loosened.

CAUTION

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

Standard Item Purchased Checklist

The following items are included when you make a purchase:

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

General Specifications

Specifications	Current Clamp	Specifications	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	-10 °C to 55 °C (14 °F to 131 °F)
AC crest factor	< 3	Storage Temperature	-20 °C to 70 °C (-4 °F to 158 °F)
Bandwidth	10 kHz	Measurement Category	CAT III 600 V; Pollution degree II
Weight	294 grams	Dimensions (HxWxD)	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		
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% R.H.			
		Span	48 Hz ~ 65 Hz	40 ~ 48 Hz/ 65 Hz ~ 1 kHz	1 kHz ~ 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

NOTE

- The current conductor must be centered within the jaw aperture and no influence from adjacent currents.
- Connect to load impedance > 1 MW | | 100 pF.
- Crest factor < 3.

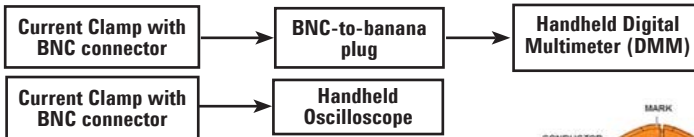


Figure 1: Connection Diagram





Alignment Marks

Put one conductor only within the jaws on inside section of the indicated marks as much as possible in order to meet the accuracy of 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 procedures as shown below:

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



5. Observe the AC value on a multimeter or the waveform on an oscilloscope which is proportional to the current.
6. Select a lower range on the Clamp-on adapter 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 $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ 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 – 329.99 mA at 10 Hz to 3 kHz 0.33 A – 2.99999 A at 10 Hz to 3 kHz 3 A – 20.5 A at 10 Hz to 3 kHz	$\leq \pm 0.2\%$ $\leq \pm 0.6\%$ $\leq \pm 3.0\%$	Wavetek 9100 or Fluke 5520A or 5101B or equivalent
Multimeter	AC 500.0 mV or 1000.0 mV	$\leq \pm 1.5\%$	Agilent U1251A or U1252A or Agilent-34405A or equivalent
50 Turns Current Coil	0.2 A – 20.5 A	$\leq \pm 1.0\%$	Fluke 5500A Coil or Wavetek 9100 Option 200 or equivalent

Adjustment Procedures

AC 40 A range

1. Lock RANGE button of U1583B current clamp to 40 A mode.
2. Connect the output BNC of 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 multi-meter 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 20 A with 60 Hz frequency for adjustment of the current clamp.
6. Remove two Phillips screws on the back of the current clamp and proceed to adjust the VR1 until the display on multimeter indicates AC 200 mV \pm 0.2 mV. Please refer to below figure for the position of VR1.

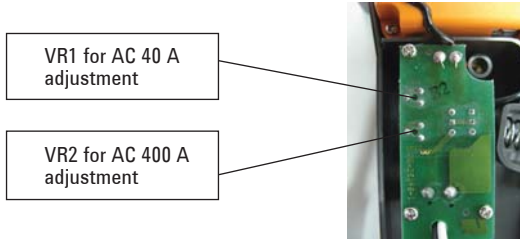


Figure 2: U1583B Current Clamp Circuit Board Diagram

AC 400 A range

1. Release the Range button of U1583B current clamp to 400 A mode.
2. Connect the output BNC of 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 Multi-meter 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 20 A with 60 Hz frequency for adjustment of the current clamp.
6. Remove two Phillips screws on the back of the current clamp and proceed to adjust the VR2 until the display on multimeter indicates AC 200 mV \pm 0.2 mV. Please refer to Figure 2 for the position of VR2.

NOTE

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

Maintenance

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

WARNING

To avoid electrical shock or damage to the Clamp-on adapter, do not get water inside the case .

Cleaning

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

Troubleshooting

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

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

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