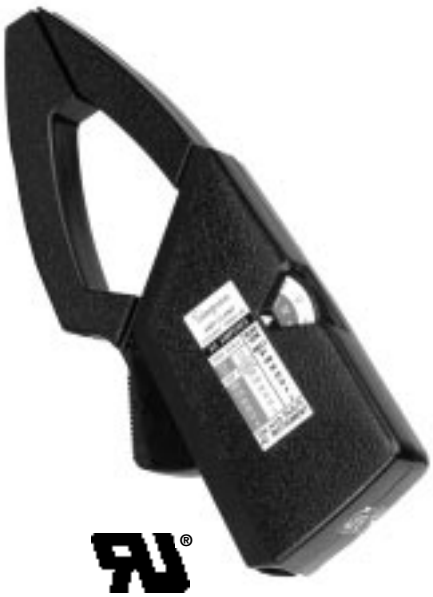
Simpson 153-2 & 154-2
Amp-Clamp
INSTRUCTION MANUAL



About this Manual

To the best of our knowledge and at the time written, the information contained in this document is technically correct and the procedures accurate and adequate to operate this instrument in compliance with its original advertised specifications.

Notes and Safety Information

This Operator's Manual contains warning symbols which alert the user to check for hazardous conditions. These appear throughout this manual where applicable, and are defined below. To ensure the safety of operating performance of this instrument, these instructions must be adhered to.


Warning, refer to accompanying documents.


Caution, risk of electric shock.

This instrument is designed to prevent accidental shock to the operator when properly used. However, no engineering design can render safe an instrument which is used carelessly. Therefore, this manual must be read carefully and completely before making any measurements. Failure to follow directions can result in serious or fatal accident.

Shock Hazard: As defined in American National Standard, C39.5, Safety Requirements for Electrical and Electronic Measuring and Controlling Instrumentation, a shock hazard shall be considered to exist at any part involving a potential in excess of 30 volts RMS (sine wave) or 42.4 volts DC or peak and where a leakage current from that part to ground exceeds 0.5 milliampere, when measured with an appropriate measuring instrument defined in Section 11.6.1 of ANSI C 39.5.

Technical Assistance

SIMPSON ELECTRIC COMPANY offers assistance Monday through Friday 7:30 am to 5:00 pm Central Time by contacting Technical Support or Customer Service at (847) 697-2260.
Internet: **http://www.simpsonelectric.com**

Warranty and Returns

SIMPSON ELECTRIC COMPANY warrants each instrument and other articles manufactured by it to be free from defects in material and workmanship under normal use and service, its obligation under this warranty being limited to making good at its factory or other article of equipment which shall within one (1) year after delivery of such instrument or other article of equipment to the original purchaser be returned intact to it, or to one of its authorized service centers, with transportation charges prepaid, and which its examination shall disclose to its satisfaction to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on its part, and SIMPSON ELECTRIC COMPANY neither assumes nor authorizes any other persons to assume for it any other liability in connection with the sales of its products.

This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside the SIMPSON ELECTRIC COMPANY factory or authorized service centers, nor which has been subject to misuse, negligence or accident, incorrect wiring by others, or installation or use not in accord with instructions furnished by the manufacturer.

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Contents

1. INTRODUCTION

The Simpson 153-2/154-2 Amp-Clamp (hereafter referred to as the 153-2/154-2 or the Instrument) is a rugged instrument, designed for general purpose electrical testing. The Instrument measures currents without disconnecting or breaking into the line being checked. Clamping the Instrument jaws around one of the current carrying lines guarantees quick accurate measurements. The Instrument jaws are shaped to allow easy insertion into crowded wire assemblies.

The 153-2 output voltage is proportional to the current being measured and is applied to a digital multimeter. The 154-2 is to be used with digital multimeters.

1.1 Items and Accessories

All items and accessories required for the operation of the 153-2/154-2 are furnished with the instrument and listed on table 1-2.

1.2 Safety Considerations

This Operator's Manual contains cautions and warnings alerting the user to hazardous operating and service conditions. This information is flagged by CAUTION or WARNING symbols through out this publication, where applicable, and is defined on the inside front cover under the heading SAFETY SYMBOLS. To ensure the safety of operating and servicing personnel and to retain the operating conditions of the instrument, please adhere to these instructions.

1.3 Technical Data

Table 1-1 lists the technical specifications for the 153-2/154-2 Amp Clamp.

Table 1.1 Technical Data

AC Current:	
Ranges:	0-2, 20 and 200 rms amperes
Output Sensitivity:	.1 volt per ampere
Accuracy:	±4% of full range at 60 Hz sine wave with conductor centered plus digital multimeter ACV accuracy
Temperature Influence:	
2 amp range:	Less than ±3% of full range error between 15°C and 35°C.
Frequency Influence	Less than ±0.5% of full range error between 15°C and 35°C
20 and 200 amp ranges:	50 to 1000 Hz ± 3% error 50 to 1000 Hz ± 4% error
Rated Circuit Ground to Ground Voltage:*	600 rms max. (850 Volt Peak)
Effect of Conductor Position:	The effect of moving current conductor from center to any position within core jaws: 3% of full range

Instrument Required:	The 153-2/154-2 is used in conjunction with digital multimeters. **NOTE:** The digital multimeter should conform to safety standards applicable to instruments with a rated circuit-to-ground voltage of 600V rms. The accuracy of the digital multimeter is a supplement to the accuracy of the 153-2/154-2.
Weight:	12 oz. (.34 kg)
Dimensions:	7.75" L x 3" W x 1.06" H (197mm x 76mm x 27mm)

*Per American National Standard, C39.5 (April 1974). Requirements for Electrical & Electronic Measuring & Controlling Instrumentation, RATED CIRCUIT-TO-GROUND VOLTAGE is defined to mean, "The specified voltage with respect to ground which may be safely and continuously applied to the circuits of an instrument.

Table 1-2. Items and Accessories included with this Instrument

Description	Part Number
153-2 Amp-Clamp	12494
154-2 Amp-Clamp	12495
Test Lead	00529
Operator's Manual	06-112418

2. INSTALLATION

This section contains instructions for the installation and shipping of the 153-2/154-2. Included are unpacking and inspection procedures, warranty, shipping and care.

2.1 Unpacking and Inspection

Examine the shipping carton for signs of damage. If the carton is in good condition, unpack the Instrument and inspect it for damage incurred during shipment. If damage is noted, contact the carrier and supplier and do not attempt to use the Instrument. If no damage is evident, check that all items are included (refer to Table 1-2). Become familiar with the Instrument by reading the Operator's Manual in its entirety then check the electrical performance of the Instrument as soon as possible. Save the shipping carton and packaging materials for future storing or shipping of the Instrument.

2.2 Warranty

The Simpson Electric Company warranty policy is printed on the inside front cover of this manual. Read it carefully before requesting a warranty repair.

NOTE: For assistance of any kind, including help with the Instrument under warranty, contact the nearest Authorized Service Center for instructions. If it is necessary to contact the factory directly, give full details of the problem and include the

Instrument model number and purchase date. Service data or shipping instructions will be mailed immediately. If an estimate of charges for non-warranty or other service work is required, a maximum charge estimate will be quoted. This charge will not be exceeded without prior approval.

2.3 Shipping

Pack the Instrument carefully and ship prepaid and insured to proper destination.

2.4 Care

Do not attempt to clean this Instrument with the test leads connected to a power source or with the test leads connected to the AC powerline.

Immediately remove any materials spilled on the Instrument. Use only a mild detergent in water or alcohol (wood grain, isopropyl or denatured) solvent. Other solvents may damage the plastic and/or reduce the effectiveness of the insulation. Dry the Instrument thoroughly before use.

Magnetic joint surfaces at the jaw locking area should be kept clean of residues of wire insulation, dust, dirt or any other particles. By keeping the jaws completely closed, the reluctance of the magnetic core is held to a minimum, assuring full and accurate current readings.

3 CONTROLS AND CONNECTORS

This section describes all operating controls and connectors for the 153-2/154-02. Become familiar with each item before operating the Instrument.

Table 3-1

Range Selector Switch	
Switch Position 2A, 20, 200A:	Selects the desired range setting for AC Current
Test Lead:	Connects the output of the Instrument to the input terminals of the AC Digital Voltmeter
Clamp Jaws:	The spring-loaded jaws are clamped around a single current-carrying conductor to measure current

4. OPERATION

This section contains information required to use and operate the Instrument in a safe and proper manner.

The 153-2/154-2 is insulated with high quality materials designed to withstand the stresses of normal use. The circuits to which the Instrument may be applied, however, have high energy capabilities and can be dangerous if approached carelessly. Use extreme caution, particularly where live voltage terminals are exposed and may be accidently touched while applying the instrument.

4.1 Safety Precautions

Before operating the 153-2/154-2, review the Shock Hazard definition on the inside front cover of this manual.

4.1.1 Operation

The 153-2/154-2 is designed to be used only by personnel qualified to recognize shock hazards and who are trained in the safety precautions required to avoid injury.

1. Do not work alone when measuring where a shock hazard can exist. Notify a person who can stay nearby when measuring in such an area.
2. Inspect the Instrument and test leads for damage or deteriorated wire insulation. Replace any defective item(s) immediately.
3. Do not use test leads which differ from the test leads originally furnished with the Instrument.
4. Do not attempt to measure current in any circuit in which the voltage, with respect to ground, exceeds the rated circuit-to-ground voltage (Refer to Table 1-1).

4.2 Connection Procedures

The Instrument test leads connect to the voltage input terminals of an AC digital multimeter to provide the current readout.

4.3 AC Current Measurements

1. Review the WARNING in Section 4.
2. Connect the test leads from the Instrument to the appropriate digital multimeter (refer to Section 1).
3. Set the range switch to the appropriate ampere range. If the magnitude of the current being measured is unknown, start with the 200 ampere range.
4. Set the range of the digital multimeter to correspond to the ampere range setting of the 153-2/154-2.

153-2/154-2 Range Reading	**Digital Multimeter Reading**
2 Amp	200 mV or .2 VAC
20 Amp	2 Volt AC
200 Amp	20 Volt AC

5. Clamp the jaws of the 153-2/154-2 around one (only) of the current-carrying wires to be measured, making certain the jaws are completely closed.

NOTE: There will be no meter indication the 153-2/154-2 jaws are clamped are around both conductors (as in a power cord) because the opposing magnetic fields will cancel each other out.

6. Reset the range selector switches, if necessary, to obtain maximum reading accuracy.
7. Read the value indicated on the digital multimeter. The current in amperes is ten times this value.

4.4 Application Information

4.4.1 Diagnosing Current

The 153-2/154-2 is a practical, valuable electrical testing tool used for tracing faults, diagnosing operating troubles and checking and /or balancing distribution circuits. It can be used to measure the running current of electric motors without the problem of bypassing the heavy starting current.

Because current can only be measured through a single conductor, a line splitter can be used with the instrument when checking equipment in which the conductors are encased in a single cord, or cannot be isolated.

5. THEORY OF OPERATION

Review the safety precautions in Paragraph 4.1 through 4.1.1

The 153-2/154-2 functions as a split-core transformer to measure current in a conductor under test. The current-carrying conductor acts as a transformer primary and a coil on the clamp core serves as the secondary. The magnetic field that surrounds the current-carrying conductor induces a voltage, proportional to the current, into the secondary coil. This voltage is applied to the AC digital multimeter.

These servicing instructions are for use by qualified personnel only. To avoid electrical shock do not perform any servicing other that contained in the operating instructions unless you are qualified to do so.

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