LH630
LH635
LH1035

AC/DC Clamp On Multimeters
Pinces Multimétriques AC/DC
AC/DC Zangen-Multimeter
Multimetri tenaglia c.a./c.c.
Multímetros de incerción de C.A./C.C.

Operating Instructions
Mode d'emploi
Bedienungsanleitung
Istruzioni per il funzionamento
Instrucciones de Funcionamiento

International Electrical Symbols	
⚠	Caution! Refer to this manual before using the meter
⧈	Meter is protected by Reinforced or Double Insulation

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CE

Issue 4. 14/01/97.

1. INTRODUCTION

The advanced design of the LH30 Series AC/DC Clamp On Multimeters ensure reliable and accurate measurements under a wide range of operating conditions. Measurement features include:

- Non-intrusive AC/DC current
- LH635/1035. True RMS for complex and distorted currents
- LH630. Average responding, RMS calibrated
- AC/DC current component analysis
- Autoranging and Autozeroing
- AC/DC Volts
- Ohms, Continuity and Diode Test
- Max RMS (surge) Current and Voltage (LH635/1035)
- Data Hold

The LH series of instruments conform to the latest international directives and standards concerning safety and electromagnetic compatibility.

- European Low Voltage Directives 73/23/EEC and 93/68/EEC
- European EMC Directives 89/336/EEC and 93/68/EEC
- Submitted for approval to UL 3111-1

Safety Standards

IEC 1010-1 : 1992-09 Safety requirements for electrical equipment for measurement, control and laboratory use.

Part 2-032 : 1994-12 Particular requirements for hand held current clamps for electrical measurement and test.

Part 2-031 : 1993-02 Particular requirements for hand held probe assemblies for electrical measurement and test.

600V Cat III Pollution degree 2

EMC Standards

RF Susceptibility

EN 50082-1 : 1992 3V/m Residential, Commercial and Light Industry

RF Emissions

EN 50081-1 : 1992 Residential, Commercial and Light Industry

FCC Part 15 Class B

1.1 Instrument Features

The main operating features of the instrument are as follows. See Fig. 1.

(1) Clamp-on jaws for current measurement

(2) Jaw opening lever

(3) Rotary switch for function selection

(4) Push button switch for MAX /))) selection.

(MAX: LH635/1035)

MAX holds the maximum RMS value when in the current or volts mode.

))) selects continuity buzzer when in Ohms mode

(5) Push button switch for display HOLD

(6) and (7) - Test lead input terminals

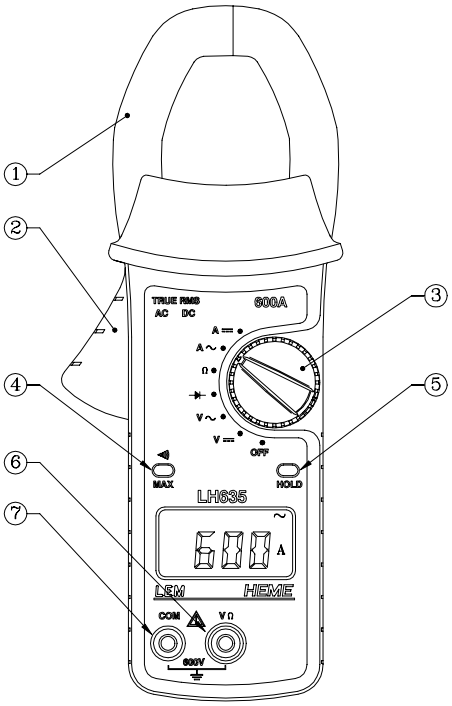


Fig. 1
Instrument Features

2. SPECIFICATION

2.1 Electrical data

(All accuracies stated at 23°C ± 1°C)

2.1.1 Current measurement

LH1035

(DC, ACRMS)

Measuring range	0 - 1500A DC 0 - 1000A AC RMS
Autorange facility	400A / 1500A
Resolution	100mA in 400A range 1A in 1500A range
Accuracy I > 10A	± 1.9% rdg ± 3 digits
I ≤ 10A	± 1A
Frequency range	DC in DC 15Hz to 1kHz in ACRMS

Frequency characteristics above 1kHz

Signal Amplitude	-3dB @ 5kHz -6dB @ 10kHz
Crest factor	6 maximum
Maximum overload	10,000A or ACRMS x frequency < 400,000

Amps ACRMS is a true RMS measurement.

LH635

(DC, ACRMS)

Measuring range	0 - 1000A DC 0 - 600A AC RMS
Autorange facility	400A / 1000A
Resolution	100mA in 400A range 1A in 1000A range
Accuracy I > 10A	± 1.3% rdg ± 3 digits
I ≤ 10A	± 0.5A
Frequency range	DC in DC 15Hz to 1kHz in ACRMS

Frequency characteristics above 1kHz

Signal Amplitude	-3dB @ 5kHz -6dB @ 10kHz
Crest factor	6 maximum
Maximum overload	10,000A or ACRMS x frequency < 400,000

Amps ACRMS is a true RMS measurement.

LH630

(DC, AC)

Measuring range	0 - 1000A DC

		0 - 600A AC
Autorange facility	.....	400A / 1000A
Resolution	.....	100mA in 400A range
		1A in 1000A range
Accuracy I > 10A	.....	± 1.3% rdg ± 3 digits
I ≤ 10A	.....	± 0.5A
Frequency range	.....	DC in DC
		15Hz to 400Hz in AC
Maximum overload	.....	10,000A or AC x frequency < 400,000

Amps AC is average responding, sinewave calibrated.

2.1.2 Max RMS Current (LH635/1035)

This function is actuated by pressing MAX/))) when in DC or ACRMS. No polarity indication is given for DC readings.Typical acquisition time is 100ms

Accuracy... I > 10A	.....	± 2% rdg ± 4 digits
I ≤ 10A	.....	± 1A
Frequency Range	.....	DC and15 Hz to 1kHz in ACRMS
Crest Factor	.....	6 maximum

2.1.3 Voltage measurement

DC, AC (RMS on LH635/1035)

Measuring range	.....	0-600V
Autorange Facility	.....	400V / 600V
Resolution	.....	100mV in 400V range
		1V in 600V range
Accuracy AC/DC	.....	± 1% rdg ± 3 digits
AC ≤ 10V	.....	± 1% rdg ± 5 digits
Frequency Range	.....	DC in DC

AC: LH 630 AC 15Hz to 400Hz

LH 635/1035 ACRMS 15Hz to 1kHz

Maximum Overload	.....	1000V
Crest Factor	.....	6 maximum

2.1.4 Max RMS Voltage (LH635/1035)

This function is activated by pressing MAX/))) when in DC or ACRMS. No polarity indication is given in DC. Typical acquisition time is 100mS

Accuracy V > 10V	.....	± 2% rdg ± 4 d
V ≤ 10V	.....	± 0.5V
Frequency Range.	.....	DC and 15 Hz to 1kHz in ACRMS

Crest Factor.....	6 maximum

2.1.5 Diode Test

Measurement of the voltage drop across a forward biased diode.

Measuring range.....	0 - 2V
Resolution.....	1mV
Accuracy.....	± 1% rdg ± 2 digits
Input protection.....	600V (DC or sinewave RMS)

2.1.6 Resistance Measurement

Measuring range.....	0 - 4 kΩ
Autorange Facility.....	400Ω / 4kΩ
Resolution.....	100mΩ in 400Ω range 1Ω in 4kΩ range
Accuracy.....	± 1% rdg ± 3 digits
Input protection.....	600V (DC or sinewave RMS)

2.1.7 Continuity

This function is actuated by pressing the MAX /))) button when in Ω measurement. The buzzer will sound for values of resistance below approximately 50Ω.

2.2 General Data

2.2.1 Display

Display 4000 count 12mm high characters.

	Low battery indicator
Pk	Max RMS Amps or Volts (LH635/1035)

~	AC
⎓	DC
⊣◁	Diode
kΩ	Ohms
)))	Continuity
H	Hold

2.2.2 Power Supply

Battery Type 9V Alkaline PP3 ,NEDA1604 or IEC 6LR61

Battery life typically 40 hours continuous operation.

2.2.3 Environmental

FOR INDOOR USE ONLY

Reference conditions. All accuracies stated at 23°C ± 1°C

Temperature coeff. of current ± 0.1% of rdg per °C

Operating Temperature 0°C to 50°C (32°F to 122°F)

Maximum Relative Humidity 80% for temperatures up to 31°C (87°F) decreasing linearly to 50% Relative Humidity at 40°C (104°F)

Storage Temperature - 20°C to + 60°C (- 4°F to 140°F)

Maximum operating altitude 2000m.

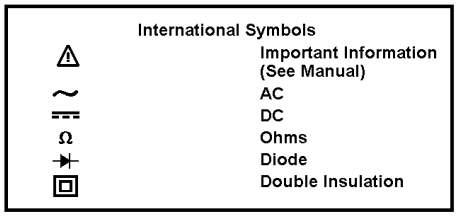
2.2.4 Mechanical

Dimensions	
Length LH630/635	230mm / 9.05”
Length LH1035	251mm / 9.88”
Width	98mm / 3.86”
Depth	52mm / 2.05”
Weight	500g / 1.1 lbs.
Case Material.....	Bayblend T85MN
Jaw Opening	
LH630/635	35mm / 1.37”
LH1035	55mm / 2.2”

Accessories	Voltage probes
	Carrying case
	Operators manual

Cleaning ..... The unit can be cleaned with an isopropanol impregnated cloth. Do not use abrasives or other solvents.

3. OPERATING INSTRUCTIONS



The instrument function is selected by a rotary switch with the following positions :-

OFF	Instrument off
V ⎓	Volts DC
V~	Volts AC (LH635/1035 - true RMS)
→|←	Diode measurement
Ω	Ohms measurement
A~	Amps AC (LH635/1035 - true RMS)
A ⎓	Amps DC

3.1 Measurement of AC or DC current

- **Remove any Voltage test leads from the instrument.**
- Move the rotary switch to Amps AC or DC
- Wait until the autozero operation has completed and the display reads 000.0
- Press the trigger to open the jaws and clamp them around the current carrying conductor as shown in Fig. 2
- Read the display
- Use the HOLD button to freeze the display.
- Use the))) / MAX button to measure the max RMS current (LH635/1035)
- Note that the Amps autozero is initiated by the movement of the rotary switch from the Ω position to the Amps measurement positions.
- If, after a high current measurement, the display does not return to zero, then a re-autozero can be initiated by the movement of the rotary switch into and out of the Ω selection position.

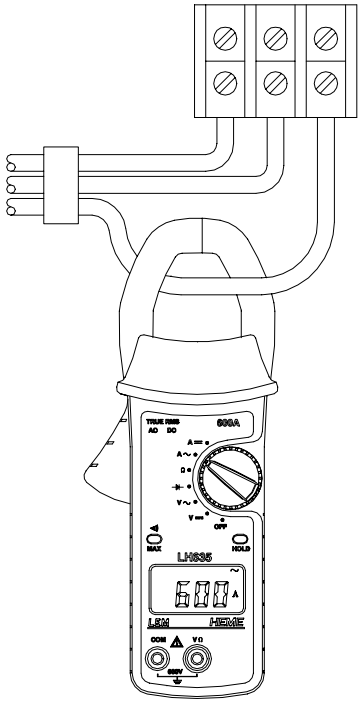


Fig. 2
Current Measurement

3.2 Resistance Measurement

- Insert the test leads into the sockets on the front of the instrument, the red lead to the VΩ terminal and the black lead to the COM terminal.
- Move the rotary switch to the Ω position.
- Apply the test leads across the component whose resistance is to be measured. Read the displayed value.
- Use the HOLD button to freeze the display. Use the))) / MAX button to select the continuity facility. The buzzer will sound for resistance measurements below approximately 50Ω.

3.3 Measurement of AC or DC Voltage

SAFETY WARNING
To avoid possible electric shock and damage to the instrument, do not attempt to measure any voltage that might exceed the maximum range of the instrument - 600Vrms and 1kHz.

- Move the rotary switch to the VDC or VAC position
- Insert the test leads into the sockets on the front of the instrument. Connect the RED lead to the VΩ terminal and the black lead to the COM terminal.
- Apply the test leads to the circuit under test and read the displayed voltage. See Fig. 3
- Use the HOLD button to freeze the display.
- Use the))) / MAX button to measure the max RMS voltage (LH 635/1035)

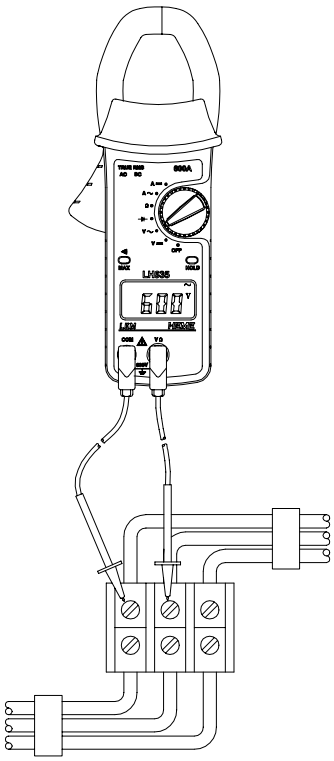


Fig. 3
Voltage Measurement

3.4 DiodeTest

10148

- Insert the test leads into the sockets on the front of the instrument, the red lead to the VΩ terminal and the black lead to the COM terminal.
- Move the rotary switch to the →|← position.
- Apply the test leads across the diode to be tested. Read the displayed value.
- Use the HOLD button to freeze the display.

4. SAFETY

The instrument has been designed to comply with IEC1010-2-032 Installation Category (Overvoltage Category) III 600V Pollution degree 2 and UL 3111-1. The product range conforms with the EEC Low Voltage Directive 73/23/EEC and 93/68/EEC. IEC 1010 is a safety standard which has the following features:

- Installation categories I to IV relate the maximum working voltage to overvoltage transients that can be expected in the measuring environment. For the LH range of instruments, 600V CATIII, the maximum expected transients must not exceed 6kV peak.
- In a pollution degree 2 environment the internal design of the instrument can cope with transient conductivities due to condensation.

Safe operation of the instrument is the responsibility of the operator who must be suitably qualified and/or authorised.

Users of this equipment and or their employees are reminded that Health and Safety Legislation require them to carry out valid risk assessments of all electrical work so as to identify potential sources of electrical danger and risk of electrical injury such as from inadvertent short circuits. Where the assessments show that the risk is significant then the use of fused test leads constructed in accordance with the HSE guidance note GS38 'Electrical Test Equipment for use by Electricians' is advised.

Maximum Safe Voltage
Current :- 600V MAXIMUM AC RMS or DC between uninsulated conductor and ground and maximum frequency of 1kHz. This limitation applies to bare conductors only.
Voltage:- 600V MAXIMUM AC RMS or DC between live conductor and ground. 600V MAXIMUM AC RMS or DC between VΩ and COM terminals and a maximum frequency of 1kHz.
Important Information

- The instrument is intended for indoor use only.

- Do not attempt to take any measurement of current or voltage higher than the maximum range of the instrument.
- The unit is not hermetically sealed and should NOT be brought into contact with surface water.
- Frequently inspect the test leads and the instrument for damage. If the instrument is physically damaged or does not function properly, it should not be used.

USE ONLY SUITABLY RATED VOLTAGE TEST LEADS TO IEC 1010-2-031. (600V CAT III Pollution Degree 2).

5. BATTERY REPLACEMENT

Replacement with other than the specified battery will invalidate the warranty.
Fit only Battery Type 9V Alkaline MN1604, IEC 6LR61 or equivalent.
- will appear on the top row of the LCD display to indicate that the minimum operating battery voltage has been reached.

SAFETY WARNING
Before removing the battery cover, make sure that all external voltages are disconnected from the instrument. For certainty remove the leads.

To change the battery, see Fig. 4
- Switch off the instrument
- Undo the retaining screw on the battery cover and lift the cover clear of the unit.
- Replace the used battery
  Ensure the battery cover is replaced and the locking screw tightened, before further use.

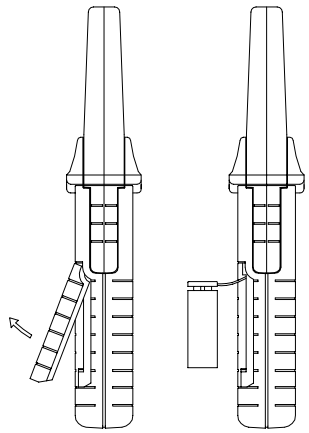


Fig. 4

6. WARRANTY

Your LEM HEME clamp on multimeter is guaranteed for one year from the date of purchase against defective material or workmanship. If the meter fails during the warranty period, we shall at our discretion, repair or replace it with a new or reconditioned unit provided we are satisfied that the failure is due to defective material or workmanship. To make a claim under warranty, the meter should be returned to us, postage prepaid, with a description of the defect. The use of a battery, other than that specified invalidates this warranty.

Goods alleged by the buyer to be defective shall not form the subject of any claim for injury, loss, damage, or any expense howsoever incurred whether arising directly or indirectly from such alleged defects other than death or personal injury resulting from the seller's negligence.

No condition is made or to be implied nor is any warranty given or to be implied as to the life or wear of goods supplied or that they will be suitable for any particular purpose or for use under specific conditions, notwithstanding that such purpose or conditions may be made known to the seller.

7. OTHER PRODUCTS

The LEM group offer a wide range of non-invasive transducers, probes and instrumentation for the measurement and analysis of current, voltage and power.

Since the introduction of the world's first digital AC/DC clamp-on ammeter in 1982, LEM HEME has continued to provide innovative test and measurement solutions encompassing current measurement from 5mA to 2000A.

LEM HEME policy is one of the continuous product improvement and the company reserves the right to revise the above specifications without notice

DECLARATION OF CONFORMITY

Equipment Name/Type Number:
LH630 / LH635 / LH1035
Manufacturer: LEM HEME LIMITED
Address: 1 Penketh Place, West Pimbo,
Skelmersdale,
Lancashire, WN8 9QX. United Kingdom.

European Standards: -

EMC EN50082-1 : 1992 Generic Immunity Standard.
Part 1. Residential, commercial and light industry.

EN50081-1 : 1992 Generic Emission Standard.
Part 1. Residential, commercial and light industry.

Safety EN61010-1 : 1993. General Requirements. Safety requirements for electrical equipment for measurement, control and laboratory use:-

IEC1010-2-032 : 1994-12. Particular requirements for hand held current clamps for electrical measurement and test.

IEC1010-2-031 : 1993-12. Particular requirements for hand held
probe assemblies for electrical measurement and test.

Description of Equipment: AC/DC Clamp On Multimeter.

I certify that the apparatus identified above conforms to the requirements of Council Directives:-
(1) Electromagnetic Compatibility Directive 89/336/EEC
(2) Low Voltage Directive 73/23/EEC
(3) CE Marking Directive 93/68/EEC

Signed:

Name : BRIAN M. HOPKINS
OPERATIONS DIRECTOR
Date : 20/2/97