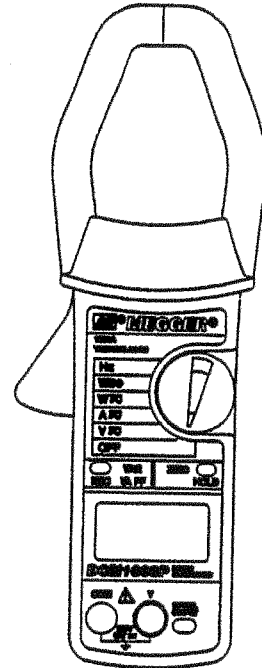


MEGGER

DCM 1000P



Power Clampmeter
Pince wattmétrique
Zangen-Leistungsmesser
Pinza per Misure di Potenza
Ergómetro de Inserción

User Guide
Guide Utilisateur
Gebrauchsanleitung
Guida d'Uso
Guía del Usuario

MEGGER®

International Electrical Symbols



Caution! Refer to this manual before using the meter



Meter is protected by Reinforced or Double Insulation

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1. ABOUT YOUR POWER CLAMP

The advanced design of the DCM 1000P ensures reliable and accurate measurements under a wide range of operating conditions. Power clamp features include:

- AC/DC voltage and current measurement
- True RMS for complex and distorted waveforms
- Watts, VA, VAR, PF and Hz
- Built in 3-phase power capability
- Bargraph for dual parameter display
- REC mode giving MIN, MAX, AVG readings
- Smart Hold function to save a complete data set for power measurements
- Autoranging and Autozeroing facility
- Digital output for data logging*

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
- Designed 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

*Requires optional accessory

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 VA, VAR and PF measurements in Watts mode. Press and hold for 2 seconds for REC mode (Min, Max, Av.)
- (5) Push button switch for HOLD, saves complete data set when in single phase Watts mode. Press and hold for 2 seconds for Amps ZERO.
- (6) Digital output for logging to a PC.
- (7) and (8) - Test lead input terminals

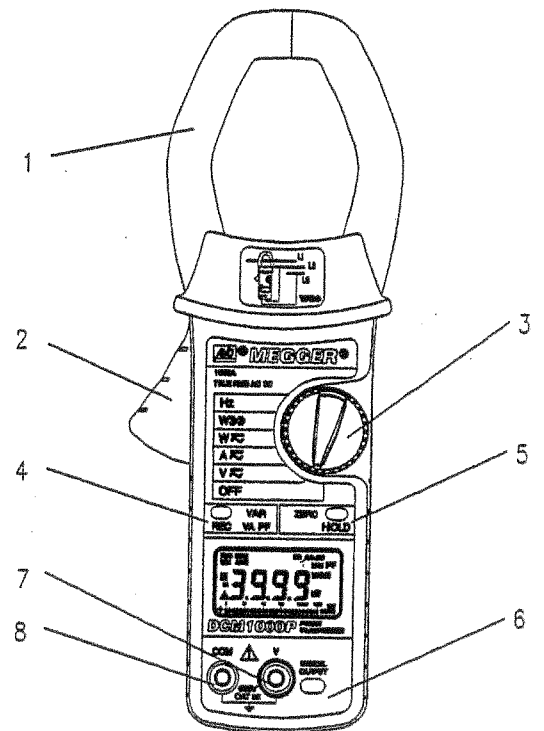


Fig. 1
Instrument Features

2. SPECIFICATION

2.1 Electrical data

(All accuracies stated at 23°C ± 1°C)

2.1.1 Current measurement

(DC, DCRMS, ACRMS)

Measuring range	0 -1000A DC or AC Pk
Autorange facility.....	400A / 1000A
Resolution	100mA in 400A range 1A in 1000A range
Accuracy I > 20A.....	± 1.5% rdg ± 5 digits
I ≤ 20A.....	± 1A

All measurements DC and 20Hz to 1kHz
Maximum overload 10,000A or RMS x frequency < 400,000
Amps RMS is a true RMS measurement

2.1.2 Voltage measurement

(DC, DCRMS, ACRMS)

Measuring range	0 - 600V DC or ACRMS
Autorange facility.....	400V / 600V
Resolution	100mV in 400V range 1V in 600V range
Accuracy V > 40V	± 1% rdg ± 5 dgts
V ≤ 40V	± 1V

Maximum overload..... 1000V RMS

All measurements DC and 20Hz to 1kHz

2.1.3 Watts measurement (Single and 3 Phase)

(DC, DCRMS, ACRMS)

Measuring range	0 - 600kW DC or 425kW in AC
Autoranging facility.....	40kW, 400kW 600kW
Resolution	10W in 40kW 100W in 400kW 1kW in 600kW
Accuracy	2.5% rdg ± 5 dgts
W 1Ø < 2kW....	± 0.08kW
W 3Ø < 4kW....	± 0.25kW
Frequency range	DC and 20Hz to 1kHz
Current Range.....	20A to 700A rms
Voltage Range	40V to 600V RMS
Maximum input.....	600VRMS / 1000A Pk
Maximum overload.....	1000V RMS / 10,000A

2.1.4 VA measurement (Single and 3 Phase)

(DC, DCRMS, ACRMS)

Measuring range	0-600kVA DC or 425kVA in AC
Autorange Facility	40kVA, 400kVA, 600kVA
Resolution	10VA in 40kVA 100VA in 400kVA 1kVA in 600kVA
Accuracy VA > 2kVA.....	± 2.5% rdg ± 5 dgts
VA < 2kVA.....	± 0.08kVA
Frequency Range.....	DC and 20Hz to 1kHz
Current Range	20A to 700A RMS
Voltage Range	40V to 600V RMS
Maximum input.....	600V RMS / 1000A Pk
Maximum Overload.....	1000V RMS / 10,000A

2.1.5 VAR measurement (Single and 3 Phase)

(ACRMS)

Measuring range	0-425kVAR
Autorange Facility	40kVAR, 400kVAR, 600kVAR
Resolution.....	10VAR in 40kVAR 100VAR in 400kVAR 1kVAR in 600kVAR
Accuracy VAR > 4kVAR..	± 2.5% rdg ± 5 dgts
VAR < 4kVAR..	± 0.25kVAR
Frequency Range.....	20Hz to 1kHz
Current Range	20A to 700A RMS
Voltage Range	40V to 600V RMS
Power Factor Range	0.99 > PF > 0.3
Maximum input.....	600V RMS / 1000A Pk
Maximum Overload	1000V RMS / 10,000A

2.1.6 Power Factor (Single Phase)

Measuring range 0.3cap... 1.0 ... 0.3 ind (72.5° cap ... 0° ... 72.5° ind)	
Resolution.....	0.01
Accuracy.....	± 3°
Frequency range	20Hz to 1kHz
Voltage range.....	40V to 600V RMS
Current range.....	20A to 700A RMS
Measurement overload	1000V / 10,000A

2.1.7 Frequency measurement

(From Current or Voltage sources)

Measuring range	20Hz to 1kHz
Resolution	0.1Hz
Accuracy 40 - 70Hz.....	± 0.5% rdg
20 - 1000Hz.....	± 1% rdg
Current Range	
40-70Hz.....	10A to 700A RMS
20 - 1000Hz.....	20A to 700A RMS
Voltage Range	10V to 600V RMS

2.1.8 Digital output

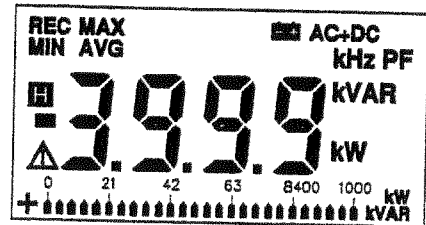
A digital interface for connection to a PC serial port is available as an optional accessory for data logging. The instrument outputs the displayed value. Additional data is sent when in Watts and Hz settings:

Function	Output
Watts.....	Watts, VA, VAR, PF
Hz	Hertz, Volts or Amps
Output rate	9600 baud

2.2 General Data

2.2.1 Display

Display 4000 count 10mm high characters.



Low battery indicator

MIN
MAX
AVG



REC Mode minimum,
maximum or average
readings



Hold



WARNING (See Manual)

AC+DC

Identifies AC, DC or AC + DC



25 Segment bargraph display

2.2.2 Power Supply

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

Battery life typically 12 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

Temperature coeff. of voltage ±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	251mm / 9.88"
	Width	98mm / 3.86"
	Depth	52mm / 2.05"

Weight	500g / 1.1 lbs.
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Case Material.....	Bayblend T85MN
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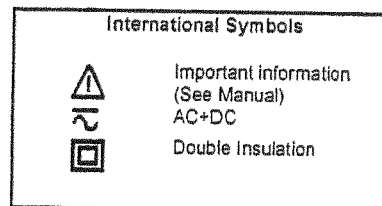
Jaw Opening.....	55mm / 2.2"
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Accessories	Voltage probes
	Digital Interface lead *
	Carrying case
	Operators manual

Cleaning.....	The unit can be cleaned with an Isopropanol impregnated cloth. Do not use abrasives or other solvents.
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* Optional accessory

3. OPERATING INSTRUCTIONS



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

OFF	Instrument off
$\sqrt{\sim}$	Volts TRMS
$A\sqrt{\sim}$	Amps TRMS
$W\sqrt{\sim}$	Watts TRMS
W3Ø	3 Phase Watts
Hz	Frequency

On power up the instrument enters a calibration mode in which CAL is displayed. During this period the instrument must not be clamped on any current carrying conductors.

3.1 Current Measurement

- Remove any Voltage test leads from the instrument.
- Move the rotary switch to the Amps position
- Press the trigger to open the jaws and clamp them around the current carrying conductor as shown in Fig. 2
- Read the display. Press the HOLD / ZERO button to freeze the display. Press and hold (2 seconds) to zero the display. Press and hold the REC button (2 seconds) to activate the REC mode. Press the REC button again to cycle through Min, Max, Average readings. Press and hold the REC button (2 seconds) to exit the REC mode.

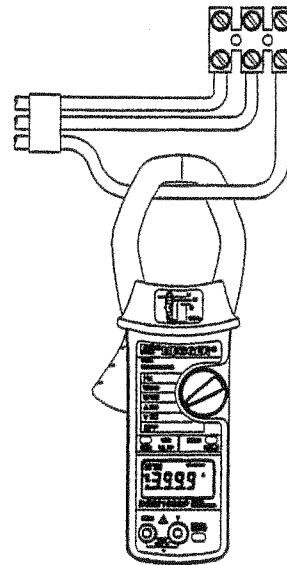


Fig. 2
Current Measurement

3.2 Voltage Measurement

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 Volts position.
- Insert the test leads into the sockets on the front of the instrument, the red lead to the V Ω terminal and the black lead to the COM terminal, as shown in Fig. 3.
- Apply the test leads across the component whose voltage is to be measured. Read the displayed value.
- Press the HOLD / ZERO button to freeze the display.
- Press and hold the REC button (2 seconds) to activate the REC mode.
- Press the REC button again to cycle through Min, Max, Average readings. Press and hold the REC button (2 seconds) to exit REC mode.

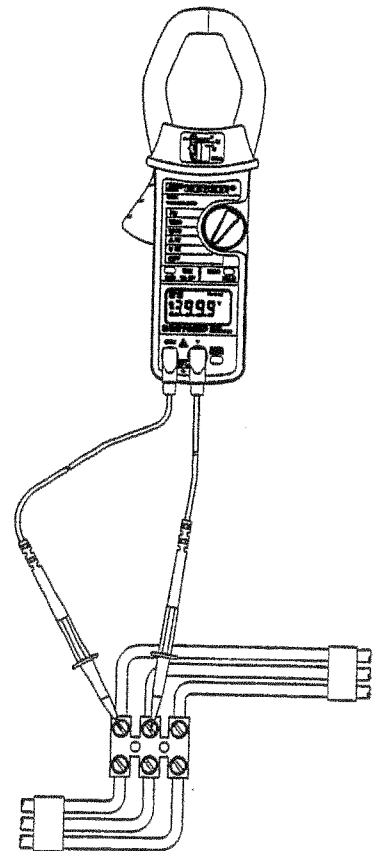


Fig. 3
Voltage Measurement

3.3 Power Measurement (Single phase)

- Move the rotary switch to the W position
- Insert the test leads into the sockets on the front of the instrument. Connect the red lead to the V terminal, and the black lead to the COM terminal
- Press the trigger to open the jaws, and clamp them on the current carrying conductor, as shown in Fig. 4
- Apply the test leads to the circuit under test. Read the displayed value. A negative Watts reading indicates that energy flow is in the opposite direction to the arrow on the instrument case
- Use the VAR VA PF/REC button to cycle through the W, VA, VAR, PF measurements. In PF mode the bargraph displays the corresponding Watts value. A negative PF reading indicates the current lags the voltage (inductive load).

Press and hold for more than 2 seconds to enter or exit from the REC mode. Single pushes will then allow movement through the MIN, MAX, AVG and present readings. Press the HOLD / ZERO button to freeze the display. When in Watts single phase mode the Hold function saves all parameters which can then be viewed by pressing the VA, VAR, PF button or moving the rotary switch to the required setting.

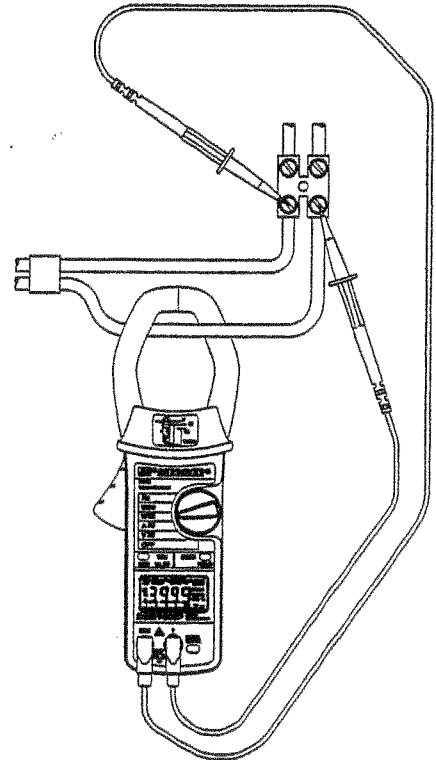


Fig. 4
Power Measurement

3.4 Power Measurement (3 ϕ , 3 phase)

- Move the rotary switch to the W3 ϕ position
- Insert the test leads into the sockets on the front of the instrument. Connect the red lead to the V terminal, and the black lead to the COM terminal
- Press the trigger to open the jaws, and clamp them on the phase L1 current carrying conductor as shown Fig. 5
- Apply the test leads to the circuit under test, the positive lead to L2 and the negative lead to L3.
- Read the displayed value. Use the VAR VA PF/REC button to cycle through the W, VA, VAR, PF measurements. In PF mode the bargraph displays the corresponding Watts value. Press and hold for more than 2 seconds to enter or exit from the REC mode. Single pushes will then allow movement through the MIN, MAX, AVG and present readings. Press the HOLD / ZERO button to freeze the display. When in Watts 3 phase mode the Hold function saves all other power parameters which can then be cycled through using the VA VAR PF button

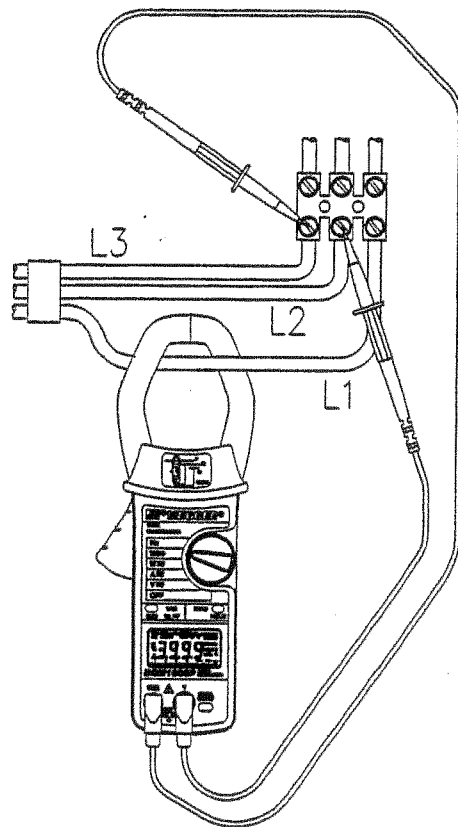


Fig. 5
3 ϕ Power Measurement

3.5 Frequency Measurement

- Move the rotary switch to the Hz position
- Insert the test leads into the sockets on the front of the instrument. Connect the red lead to the V terminal, and the black lead to the COM terminal
- To measure the frequency of the voltage supply apply the test leads to the circuit as shown in Fig. 3 and read the display
- To measure the frequency of the current press the trigger to open the jaws, and clamp them on the current carrying conductor, as shown in Fig. 2 and read the display
- When configured to measure power (Fig. 4) with the test leads connected and the jaws clamped around a current carrying conductor, the instrument displays the frequency of the current source (providing ARMS > 10A). If ARMS < 10.0A, a volts frequency measurement will be made (providing VRMS > 10V), otherwise ---.- will be displayed
- Press the HOLD / ZERO button to freeze the display.
- The bargraph displays the corresponding current or voltage value
- Press and hold the VAR VA PF REC button for more than 2 seconds to enter or exit from the REC mode. Single pushes will then allow movement through the MIN, MAX, AVG and present readings

3.6 Logging

A slider switch located in the battery compartment enables the data output. When the data output is enabled the autopower off is disabled to allow continuous data logging.

Slide switch Position	Autopower off	Data output
OFF	Enabled	Disabled
ON	Disabled	Enabled

An interface cable for connecting the instrument to the serial port of a PC together with Windows runnable software is available as an optional accessory.

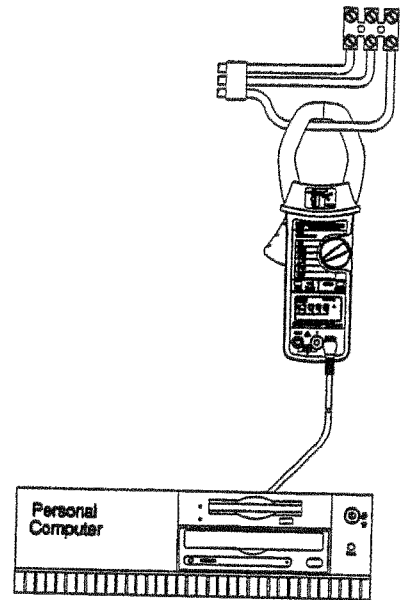


Fig. 6
Current Measurement / Logging

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 CAT III, 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.

If the Instrument is used in a manner not specified by the manufacturer, then the protection provided by the equipment may be impaired.

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 V Ω 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 all leads.

To change the battery, see Fig. 7

- 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.

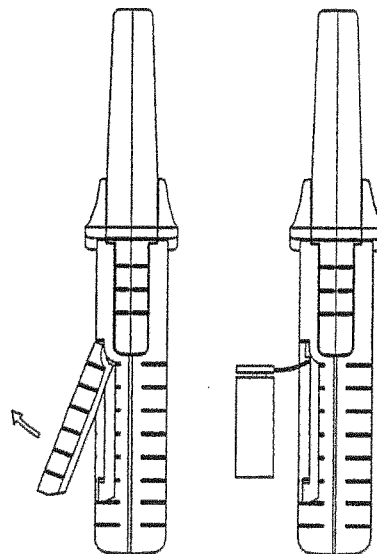


Fig. 7
Battery Replacement

6. WARRANTY

The circuit of the instruments contains static sensitive devices, and care must be taken in handling the printed circuit board. If the protection of an instrument has been impaired it should not be used, and be sent for repair by suitably trained and qualified personnel. The protection is likely to be impaired if, for example, the instrument shows visible damage, fails to perform the intended measurements, has been subjected to prolonged storage under unfavourable conditions, or has been exposed to severe transport stresses.

New Instruments are guaranteed for 1 Year from the Date of Purchase by the User.

Note: Any unauthorised prior repair or adjustment will automatically invalidate the Warranty.

7. REPAIR AND SPARE PARTS.

For service requirements for **MEGGER®** Instruments contact:-

AVO INTERNATIONAL

Archcliffe Road,
Dover Kent,
CT17 9EN,
England.

Tel: +44 (0)1304 502100

Fax: +44 (0)1304 207342

or

AVO INTERNATIONAL

510 Township Line Road,
Bluebell,
PA 19422-2795,
U.S.A.

Tel: +1 (215) 646-9200

Fax: +1 (215) 643-7215

or an approved repair company.

Approved Repair Companies

A number of independent instrument repair companies have been approved for repair work on most **MEGGER®** instruments, using genuine **MEGGER®** spare parts. Consult the Appointed Distributor / Agent regarding spare parts, repair facilities and advice on the best course of action to take.

Returning an Instrument for Repair

If returning an instrument to the manufacturer for repair, it should be sent freight pre-paid to the appropriate address. A copy of the Invoice and of the packing note should be sent simultaneously by airmail to expedite clearance through Customs. A repair estimate showing freight return and other charges will be submitted to the sender, if required, before work on the instrument commences.