

**SOCKET
& SEE™**

ENGINEER DMM

6000 count, true RMS
digital multimeter

Instruction Manual & Specification



1. Safety

1.1 Equipment Markings / Symbols

	Caution - refer to the instruction manual
	Danger of electric shock
	Construction is double insulated
	Product should be recycled as electronic waste
	Conforms to EU standards
CAT III 1000V	Measurement Category III is applicable to test and measuring circuits connected after the source of the building's low-voltage MAINS installation. This part of the installation is expected to have a minimum of two levels of over-current protective devices between the transformer and connecting points of the measuring circuit. Examples of CAT III are measurements on devices installed after the main fuse or circuit breaker fixed within the building installation. Such as distribution boards, switches and socket outlets. This tester's voltage rating for a CAT III location is 1000 Volts where the voltage is Phase (Line) to Earth.

1.2 Operational Safety

The ENGINEER DMM is designed to be used by skilled persons in accordance with safe methods of work. If the ENGINEER DMM is used in a manner not specified by Socket & See, the protection provided by it may be impaired.

Inspect the product before each use. If any damage is visible; such as cracks in the casing, damage to any accessories, leads or probes, the unit should not be used.

This tester has been designed to be used with suitable PPE, including insulated gloves if required.

To avoid electric shock do not touch the connections / measuring points to be measured. When in use always grip the test probes behind the finger guards.

Do not operate the ENGINEER DMM with the battery cover off as this will compromise the insulated safety barrier. Do not use the tester in unfavourable environments such as:

- Wet conditions or in high humidity
- Dust and flammable gasses, vapours or solvent
- Thunderstorms or similar conditions such as electrostatic fields

2. Description

The ENGINEER DMM is a 6000 count, True RMS Digital Multimeter featuring non contact voltage detection, temperature measurement and back lit LCD. Other functions include resistance, diode test, continuity check, capacitance and frequency.

2.1 Contents

- Digital Multimeter
- Test Leads
- 9v (DF22 / 6LR61 / 1604) battery (fitted)
- K type temperature Ni-Cr and Ni-Si sensor, temperature range measurable -40°C to 250°C
- Operating Manual

2.2 Features

- True RMS
- 6000 Count
- Digit 3 3/4
- Auto / Manual V (AC / DC) 1000V
- μA / mA / 10A (AC / DC) 6000 μA / 600mA / 10A
- AC / DC external clamp adaptor 600A, 1 mV = 1A
- Auto / Manual V(AC) with Hz / % selectable
- AC Current with Hz / % selectable
- Auto / Manual Ω up to 60 M Ω
- Continuity (<50 Ω Beep)
- Capacitance 10nF - 100mF
- Diode check (3.0V)
- 10 M Ω Input Impedance
- NCV Non Contact AC voltage detection (audible and visual) >100V
- NCF Non Contact Frequency 45 - 75 Hz (50 - 500 VAC)
- Freeze / Hold Reading
- Auto Power Off (5 mins)
- Relative Reading (REL)
- Frequency / Duty Cycle (Hz / %) (9.999Hz - 55.00KHz / 0.1 - 99.9%)
- Temperature measurement -40°C to 1000°C
- K Type thermocouple (-40°C to 250°C)

2.3 Indication

REL/Δ	Adjust reading to zero		Capacitor
	Alternating Current (AC)	nF / μF	Nanofarad / Microfarad
	Direct Current (DC)	mF	Millifarad
mV	Millivolt	Hz/kHz/MHz	Hertz / Kilohertz / Megahertz
V	Volt	%	Duty cycle
mA	Milliampere	AUTO	Auto range / Measurement
μA	Microampere	CAT IV	Overvoltage category 4
A	Ampere	CAT III	Overvoltage category 3
	Negative		Ground Potential
	Signal strength of NCV		Over range
	Freeze / Hold reading		Non Contact Voltage
Ω	Ohm	NCV	NCV function display active
KΩ	Kilohms	°C/°F	Celsius / Fahrenheit
MΩ	Megaohms		Low battery display
	Diode test	MAX/MIN MAX-MIN	Reading Recorded
	Continuity	NCF	Non-contact frequency



1. NCV / NCF sensor
2. LC Display
3. Backlight / NCV detection LED
4. Range button (press once) Manual decimal point mode for voltage, resistance and current measuring.
5. Select button (press once).
 - a) V range: DCV / ACV / Hz% / NCF
 - b) Ohm range: Ohm / diode/ continuity / capacitance
 - c) Current (μA / mA / 10A) range: AC / DC
 - d) Wake up at auto power off mode
 - e) Continuous operation / data logging
 - f) NCV / Temp
6. MAX / MIN / MAX-MIN button (press once) For recorded voltage, current, resistance and temp reading.
7. REL (relative reading) button (press once) Adjust reading to zero, except NCV range.
8. Hold / ⏏ button (press once)
 - a) Hold / Freeze the reading except NCV range
 - b) Press >3 seconds to ON / OFF backlight
9. Hz / % button (press once) toggle between frequency and duty cycle
10. Rotary switch
11. Unfused test leads
12. Test Lead holder
13. Battery Cover
14. Folding stand
15. Fuse Holder a) 600mA 1000V Fast acting b) 10A 1000V Fast acting

3 Usage

Do not exceed the maximum input values. Extreme caution should be used when voltages higher than 25 VAC or 35 VDC could be present.

When testing is complete, turn the rotary dial to the off position.

To wake the tester from Auto Power Off (APO) mode press the select button >3 seconds.

3.1 Voltage

Turn the rotary dial to the voltage position. Ensure the test leads are connected to the correct meter terminals. Use the select button to toggle between VAC and VDC as required. Connect the two test probes to the object / circuit to be measured. The measured value is then displayed on the LC display.

When measuring VDC the red probe indicates the positive pole and the black probe the negative pole. If a minus is displayed on the LC display the measured voltage is negative polarity.

3.2. Non Contact Frequency (NCF) 50/60Hz

Turn the rotary dial to the voltage AC position. Press the Hz / % button, Hz will be shown on the LC display. Insert the red test lead into the positive terminal of the meter. Now move the NCV / NCF sensor towards the socket / cable to be tested. The measured value will be indicated on the LC display.

3.3 Resistance

Ensure that the component to be measured is safely isolated from any voltage source. Turn the rotary switch to the resistance setting. Ensure that the test leads are connected to the correct meter terminals. Check the test leads for continuity by touching the probe tips together. The value must be approximately 000.0Ω. If the reading is not zero press REL to adjust to zero. Connect the probes across the object to be measured ensuring a good clean contact, as long as the object to be measured is not high resistance or interrupted the measured value will be displayed on the display. If OL is displayed the measuring range has been exceeded or the measuring circuit has been interrupted.

3.4 Diode Test

Ensure that the diode to be measured is safely isolated from any voltage source. Turn the rotary switch to the diode setting. Ensure that the test leads are connected to the correct meter terminals. Connect the test probes to the diode to be tested. The display shows the forward voltage. If OL is displayed the diode may be being measured in the reverse direction or it may be faulty.

3.5 Continuity check

Ensure that the component to be measured is safely isolated from any voltage source. Turn the rotary switch to the continuity setting and press the select button. Ensure that the test leads are connected to the correct meter terminals. Check the test leads for

continuity by touching the probe tips together. The value must be approximately $<0.5\Omega$. If the reading is not zero press REL to adjust to zero. Connect the probes across the object to be measured ensuring a good clean contact. The LC display will show the measurement in Ohms and an audible tone will sound if the circuit is less than 50 ohms.

3.6 Capacitance

Ensure that the capacitor to be measured is safely isolated from any voltage source. Turn the rotary switch to the capacitance setting. Press select until the LC display will show either nF / μ F / mF. When showing nF, if the display is higher than 0.000 nF press the REL button to zero. Ensure the test leads are connected to the correct meter terminals. Connect the probes across the capacitor to be measured ensuring a good clean contact. The LC display will show the results.

3.7 Current

Current measurement is possible in three ranges μ A , mA or 10A. All ranges have fused protection to prevent overload. Turn the rotary switch to the current range required. Ensure the test leads are connected to the correct meter terminals for the range selected. Press the select button to choose AC or DC as required. Connect the test probes in series with the circuit to be measured. The display will indicate polarity along with the measurement.

Never measure >600 mA on the μ A / mA range or >10A on the 10A range as this will cause the fuse to blow. The voltage in the circuit being measured must not exceed 1000V AC or DC.

3.8 Non Contact Voltage (VAC)

Turn the rotary switch to NCV range. The LC display will display EF and NCV icon. Hold the meter and move the NCV sensor near to the live power source. On detection of an AC source the red LED will blink, an audible tone sounds and the bar graph on the LC display indicates the signal strength.

3.9 Temperature

Turn the rotary switch to Temp and press the select button to chose $^{\circ}$ C or $^{\circ}$ F. Insert the K type leads into the correct meter terminals. Make a good contact between the K type tip and the object to be measured. Allow at least 30 seconds before taking the reading.

3.10 Frequency

Select the Hz/% button to toggle between frequency and duty cycle. Results will be displayed on the LC display.

4. Maintenance and Service

4.1 Battery Replacement

Ensure the meter is disconnected from all live sources. Remove test leads and switch the tester off. Lift the tester stand and unscrew the battery cover screws. Lift the battery cover taking care to retain the screws. Replace the 9V battery ensuring correct polarity. Secure the battery cover with the two screws.

4.2 Fuse Replacement

Ensure the meter is disconnected from all live sources. Remove test leads and switch the tester off. Remove the tester rubber over mould. Unscrew the fuse holder screws and lift the fuse carrier. Replace fuses as required, refit the fuse carrier and secure with the screws. Fit rubber over mould.

4.2 Trouble Shooting

Error	Possible cause
The meter does not function	Check the battery status
No measuring value change	Check correct function is selected
Reading on the display hangs up	Turn the rotary switch to OFF and switch on again after 3 seconds
Fatal error or undefined reading	Turn the rotary switch to OFF and switch on again after 3 seconds

If required, clean with a damp cloth and mild detergent. Do not use abrasives or solvents.

With the exception of the batteries and fuses there are no user serviceable parts.

Contact Socket & See for parts and technical assistance.

Socket & See
Century Road
High Carr Business Park
Newcastle
Staffordshire
ST5 7UG
UK

Tel: +44 (0) 1782 567096
Fax: +44 (0) 1782 567095

Email: info@socketandsee.co.uk
Website: www.socketandsee.co.uk

5. Specification

AC Voltage manual range		
Range	Resolution	Accuracy
600.0mV	000.1mV	$\pm 0.6\% \pm 3$ digits
6.000V	0.001V	$\pm 0.6\% \pm 3$ digits
60.00V	00.01V	$\pm 0.6\% \pm 3$ digits
6000.0V	000.1V	$\pm 1.0\% \pm 3$ digits
1000V	1V	$\pm 1.0\% \pm 3$ digits

DC Voltage manual range		
Range	Resolution	Accuracy
600.0mV	000.1mV	$\pm 0.6\% \pm 2$ digits
6.000V	0.001V	$\pm 0.6\% \pm 2$ digits
60.00V	00.01V	$\pm 0.6\% \pm 2$ digits
6000.0V	000.1V	$\pm 1.0\% \pm 2$ digits
1000V	1V	$\pm 1.0\% \pm 2$ digits

AC Current μ A manual range		
Range	Resolution	Accuracy
600.0 μ A	000.1 μ A	$\pm 0.15\% \pm 5$ digits
6000 μ A	1 μ A	$\pm 0.15\% \pm 5$ digits

AC Current mA manual range		
Range	Resolution	Accuracy
60.00mA	00.01mA	$\pm 0.15\% \pm 5$ digits
600.0mA	000.1mA	$\pm 0.15\% \pm 5$ digits

AC Current 10A manual range		
Range	Resolution	Accuracy
6.000A	0.001A	$\pm 1.5\% \pm 5$ digits
10.00A	00.01A	$\pm 1.5\% \pm 5$ digits

DC Current μ A manual range		
Range	Resolution	Accuracy
600.0 μ A	000.1 μ A	$\pm 0.12\% \pm 3$ digits
6000 μ A	1 μ A	$\pm 0.12\% \pm 3$ digits

DC Current mA manual range		
Range	Resolution	Accuracy
60.00mA	00.01mA	$\pm 0.15\% \pm 5$ digits
600.0mA	000.1mA	$\pm 0.15\% \pm 5$ digits

DC Current 10A manual range		
Range	Resolution	Accuracy
6.000A	0.001A	$\pm 1.5\% \pm 5$ digits
10.00A	00.01A	$\pm 1.5\% \pm 5$ digits

Continuity		
Range	Resolution	Accuracy
600.0 Ω	000.1 Ω	$\pm 0.8\% \pm 6$ digits
Audible sound when < 50 Ω (approx)	0.001 Ω	$\pm 0.8\% \pm 6$ digits

Resistance manual range		
Range	Resolution	Accuracy
600.0Ω	000.1Ω	$\pm 0.7\% \pm 5$ digits
6.000KΩ	0.001KΩ	$\pm 0.6\% \pm 2$ digits
60.00KΩ	00.01KΩ	$\pm 0.6\% \pm 2$ digits
600.0KΩ	000.1KΩ	$\pm 0.7\% \pm 2$ digits
6.000MΩ	0.001MΩ	$\pm 1.5\% \pm 5$ digits
60.00MΩ	00.01MΩ	$\pm 2.5\% \pm 6$ digits

Diode		
Range	Resolution	Accuracy
3.000V	0.001V	$\pm 10\% \pm 5$ digits

Non-Contact AC Voltage detect	
LC Displays EF and NCV	When >100 VAC LED blinks faster and buzzer sounds

Frequency for Electrical (Auto range) sensitivity 1.0V rms		
Range	Resolution	Accuracy
9.999Hz - 55.00KHz	0.001Hz - 0.01KHz	$\pm 0.15\% \pm 3$ digits

Capacitance Auto range		
Range	Resolution	Accuracy
9.999nF	0.001nF	$\pm 5\% \pm 7$ digits
9.999μF	0.001μF	$\pm 5\% \pm 5$ digits
99.99μF	0.01μF	$\pm 10\% \pm 10$ digits
9.999mF	0.001mF	$\pm 10\% \pm 10$ digits
99.99mF	0.01mF	$\pm 10\% \pm 10$ digits

Duty Cycle		
Range	Resolution	Accuracy
0.1 - 99.9%	0.1%	$\pm 1.2\% \pm 2$ digits

Non-contact Frequency (NCF) detection		
Range	Resolution	Accuracy
45Hz - 70Hz (50 - 500 VAC)	0.01Hz	± 2 Hz

AC / DC external clamp adaptor input		
Range	Resolution	Accuracy
600A @ 1mV / 1A	0.1A	$\pm 0.8\% \pm 5$ digits
Note: Accuracy does not include clamp meter error.		

Temperature measurement

Range		Resolution	Accuracy
-40°C to 1000°C	-40°C to 0°C	1°C	± (3% + 5°C)
	1°C to 250°C		± (2% + 2°C)
-40°F to 1832°F	-40°F to 32°F	1°F	± (3% + 5°F)
	33.8°F to 482°F		± (2% + 2°F)
Note: K type thermocouple probe (Ni-Cr and Ni-Si) is only applicable for the measurement of temperature range -40°C to 250°C. Accuracy does not include Type K thermocouple error.			

General Specification

Power Supply	1 x 9V (6F22 / 6LR61 / 1604) battery
Low battery Indication	2.6 V approx
Overvoltage category	CAT III 1000V (CAT IV 600V)
Operating Temperature	0 - 40°C
Storage Temperature	-10 to 60°C
Operating Humidity	80% @ 31°C to 50% @ 40°C
Safety Compliance	BSEN 61010-2-030:2010
EMC Compliance	BSEN 61326-2-2:2013
Test Leads	Dual insulated
Ceramic Fuses	1000V, F, 600mA (Ø6x32mm)
	1000V, F, 10A (Ø10x38mm)
Probes	GS38 Compliant
Dimensions (mm)	188 x 96 x 56
Weight (g)	415 Without battery

Ordering Information

SOC/ENGINEERDMM	TRMS Digital Multimeter
SOC/TECC6	Soft Carry Case
SOC/DLMPROLEAD	3 Wire Non-Fused Distribution Board Test Lead Set
SOC/DLMPRO	Combined DMM, Loop and Socket Tester
SOC/PDLPRO	High Resolution Loop Tester
SOC/IRCPRO	Insulation and Continuity Tester
SOC/IRCCHECK	Calibration Checkbox
SOC/CB400	Non Trip Installation Testing Calibration Checkbox
SOC/VIP150	Craftsman Voltage Tester
SOC/SP400	Proving Unit
SOC/VVDPRO	Vibrating Non Contact AC Voltage Detector
SOC/LOD10	Locking Off Device
SOC/TECC2	Soft Carry Case



tel 01782 567096 | fax 01782 567095
see everything at socketandsee.co.uk