

STEELMAN™ *PRO*

HEAVY DUTY OPEN JAW CLAMP METER



Please read this manual before switching the unit on.
Important safety information inside.

BATTERY USE AND CARE

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INTRODUCTION

This clamp meter is a hand-held digital Clamp Meter for automotive and construction use, where high current measurement is required. The Clamp Meter can measure the following:

- AC/DC Voltage
- AC Current
- Resistance
- Capacitance
- Frequency
- Continuity
- Diode
- Temperature

The Heavy Duty Open Jaw Clamp Meter features:

- Auto Power OFF
- Data Hold
- Backlight LCD display

SAFETY

2-1. International Safety Symbols


 This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present.

 Double insulation

2-2. Safety Notes (see table in section 2-4).

- Do not exceed the maximum allowable input range of any function.
- Do not apply voltage to meter when resistance functions is selected.
- Set the function switch OFF when the meter is not in use.
- Remove the battery if meter is to be stored for longer than 60 days.

2-3. Warnings

- Set function switch to the appropriate position before measuring.
- When measuring voltage, do not switch to current/resistance modes.
- Do not measure current on a circuit whose voltage exceeds 600V.
- When changing ranges, always disconnect the test leads from the circuit under test.
- Replace the batteries as soon as the low battery indicator  appears.

SAFETY

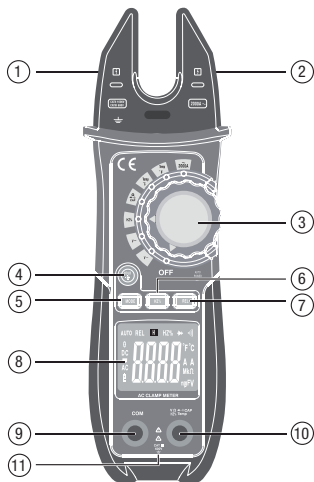
2-4. Cautions

- Improper use of this meter can cause damage, shock, injury or death. Read and understand this user manual before operating the meter.
- Always remove the test leads before replacing the battery.
- Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before use.
- Use great care when taking measurements if the voltages are greater than 25VAC rms or 35VDC. These voltages are considered a shock hazard.
- Always discharge capacitors and remove power from the device under test before performing Diode, Resistance, or Continuity tests.
- Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts. Other means should be used to ensure that the terminals are not "live".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Function	Maximum Input
A AC	200A AC
V DC, V AC	600V DC/AC
Frequency Resistance, Capacitance, Diode Test	300V DC/AC 250V DC/AC
Temperature	-20.0°C to 760.0°C (4°F to 1400°F)

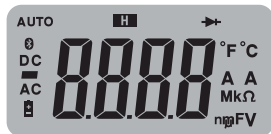
DESCRIPTION

No.	DESCRIPTION
1	CURRENT FORK
2	NCV INDICATOR LIGHT
3	ROTARY FUNCTION SWITCH
4	DATA/HOLD/BACKLIGHT BUTTON
5	MODE BUTTON
6	Hz/% BUTTON
7	REL BUTTON
8	LCD DISPLAY
9	COM INPUT JACK
10	V CAP TEMP Hz JACK
11	BATTERY COVER



3-2. Display Icons Description

HOLD	Data Hold
Minus sign	Negative reading display
0 to 3999	Measurement display digits
AUTO	Auto Range mode
DC/AC	Direct Voltage and Current/ Alternating Voltage and Current
	Low Battery
mV or V	Milli-Volts or Volts (Voltage)
Ω	Ohms (Resistance)
A	Amperes (Current)
Hz%	Hertz (Frequency) and Duty Cycle
$^{\circ}\text{F}/^{\circ}\text{C}$	Fahrenheit and Celsius units (Temperature)
n,m,W,M,k	Unit of measure prefixes: nano milli, micro, mega, and kilo
	Continuity test
	Diode test



SPECIFICATIONS

Function	Range	Accuracy (% of reading + digits)	Resolution
DC Voltage	4V	$\pm (1.5\% + 2d)$	1mV
	40V	$\pm (1.5\% + 2d)$	10mV
	400V	$\pm (1.5\% + 2d)$	100mV
	600V	$\pm (2\% + 2d)$	1V

Input Impedance: 10M Ω

Over range protection: 600V DC or 600V AC RMS

Function	Range	Accuracy (% of reading + digits)	Resolution
AC Voltage	4V	$\pm (2\% + 5d)$	1mV
	40V	$\pm (1.5\% + 2d)$	10mV
	400V	$\pm (1.5\% + 2d)$	100mV
	600V	$\pm (2\% + 2d)$	1V

Input Impedance: 10M Ω

Over range protection: 600V DC or 600V AC RMS

Frequency Response: 50Hz~400Hz

Function	Range	Accuracy (% of reading + digits)	Resolution
AC Current	200	$\pm (3\% + 5d)$	100mV

Over range protection: Maximum input 200A

Frequency Response: 50Hz~60Hz

Function	Range	Accuracy (% of reading + digits)	Resolution
Resistance	400 Ω	$\pm (1.0\% + 2d)$	0.1 Ω
	4k Ω	$\pm (1.2\% + 2d)$	1 Ω
	40k Ω	$\pm (1.2\% + 2d)$	10 Ω
	400k Ω	$\pm (1.2\% + 2d)$	100k Ω
	4M Ω	$\pm (1.2\% + 2d)$	1k Ω
	40M Ω	$\pm (1.2\% + 2d)$	10k Ω

Over range protection: 250V DC or 250V AC RMS

SPECIFICATIONS

Function	Range	Accuracy (% of reading + digits)	Resolution
Frequency	40Hz	$\pm (1.0\% + 2d)$	0.01Hz
	400Hz	$\pm (1.2\% + 2d)$	0.1Hz
	4KHz	$\pm (1.2\% + 2d)$	1Hz
	40KHz	$\pm (1.2\% + 2d)$	10Hz
	400KHz	$\pm (1.2\% + 2d)$	100Hz
	10MHz	$\pm (1.2\% + 2d)$	100Hz

Input sensitivity: 10mV rms

Over range protection: 300V DC or 300V AC RMS

Function	Range	Accuracy (% of reading + digits)	Resolution
Duty Cycle	0.1%~99.9%	$\pm 1.2\% \pm 2d$	0.1%

Sensitivity: <0.5V RMS

Pulse width: >100us, <100ms;

Overload protection: 300V DC or 300V AC RMS

Function	Range	Accuracy (% of reading + digits)	Resolution
Temperature	-200.0°C to 760.0°C	$\pm (3.0\% \pm 5^\circ\text{C})$	0.1°C
	4°F to 140°F	$\pm (3\% \pm 8^\circ\text{F})$	1°F


Sensor: K Type banana plug

Over range protection: 250V DC or 250V AC RMS

Function	Range	Accuracy (% of reading + digits)	Resolution
Capacitance	4nF	$\pm (5\% + 20d)$	0.1 nF
	40nF	$\pm (3.0\% + 5d)$	1 nF
	400nF	$\pm (3.0\% + 5d)$	10 nF
	4 μF	$\pm (3.0\% + 5d)$	100 nF
	40 μF	$\pm (3.0\% + 5d)$	1 μF
	100 μF	$\pm (5.0\% + 10d)$	10 μF

Over range protection: 250V DC or 250V AC RMS

GENERAL SPECIFICATIONS

Clamp jaw opening	1.2" (30 mm) approximately
Display	3-3/4 digits (4000 counts) backlit LCD
Continuity check	Buzzer sounds at less than 50 Ω
Diode Test	Test current of 0.5mA typical
Open circuit voltage	< 2VDC typical
Low battery indication	 is displayed
Over-range indication	"OL" display
Measurement rate	3 readings per second, nominal
Temperature sensor	Type K thermocouple
Input impedance	10M Ω (VDC and VAC)
Operating temperature	5°C to 40°C (41°F to 104°F)
Storage temperature	-20°C to 60°C (-4°F to 140°F)
Operating humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage humidity	< 80%
Operating altitude	7000 ft. (2000 meters) maximum
Battery	2*1.5V AAA battery
Auto power OFF	After approximately 30 minutes
Dimensions & weight	230 x 82 x 40 mm / 230 g
Safety	For indoor use and in accordance with the requirements for double insulation to IEC 1010-1 (2001) : EN61010-1 (2001) Over voltage category II1000V and category III 600V, pollution degree 2.

OPERATION


Note: Read and understand all Warning and Caution statements in this operation manual prior to using this meter. Set the function select switch to the OFF position when the meter is not in use.

6-1. AC Current Measurements


WARNING:

- Set the function switch to AC Current.
- Place the current fork around the middle of the test lead.
- The clamp meter LCD will display the reading.



6-2. AC Voltage Measurements

- Insert the black test lead into the negative COM terminal and the red test lead into the positive V Hz% Ω CAP  TEMP terminal.
- Set the function switch to AC Voltage.
- Connect the test leads in parallel to the circuit under test.
- Read the voltage measurement on the LCD display.

6-3. DC Voltage Measurements




- Insert the black test lead into the negative COM terminal and the red test lead into the positive V Hz% Ω CAP  TEMP terminal.
- Set the function switch to DC Voltage.
- Connect the test leads in parallel to the circuit under test.
- Read the voltage measurement on the LCD display.

6-4. Resistance Measurements

- Insert the black test lead into the negative COM terminal and the red test lead into the positive V Hz% Ω CAP  TEMP terminal.
- Set the function switch to Ω CAP  position.
- Use the MODE button to select Resistance Measurement.
- Touch the test probe tips across the circuit or component under test.
- Read the resistance on the LCD display.

Note: When set to this position, Data Hold and backlight function cannot be used.

6-5. Continuity Measurements

- Insert the black test lead into the negative COM terminal and the red test lead into the V Hz% Ω CAP  TEMP positive terminal.
- Set the function switch to Ω CAP  position.
- Use the MODE button to select continuity "". The display icons will change when the MODE button is pressed.



OPERATION

- Touch the test probe tips across the circuit or component under test.
- If the resistance is at less than 50Ω , a tone will sound.

6-6. Capacitance Measurements



WARNING:

To avoid electric shock, discharge the capacitor under test before measuring.

- Set the function switch to Ω CAP  position.
- Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the V Hz% Ω  TEMP positive jack.
- Use the MODE button to select CAP measurements.
- Touch the test probe tips across the part number under test.
- Read the capacitance value in the display.
- The display will indicate the proper decimal point and value.

Note: When set to this position, Data Hold and backlight function cannot be used. For very large values of capacitance measurement, it can take several minutes before the final reading stabilizes.

6-7. Diode Measurements

- Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the V Hz% Ω CAP  positive jack.
- Turn the function switch to Ω CAP  position. Use the MODE button to select the diode function if necessary (diode symbol will appear on the LCD when in Diode test mode).
- Touch the test probe tips to the diode or semiconductor junction under test. Note the meter reading.
- Reverse the test lead polarity by reversing the red and black leads. Note this reading.
- The diode or junction can be evaluated as follows:
 1. If one reading displays a value (typically 0.400V to 0.900V) and the other reading displays "OL", the diode is good.
 2. If both readings display "OL" the device is open.
 3. If both readings are very small or "0", the device is shorted.

Note: When set to this position, Data Hold and backlight function cannot be used.

OPERATION

6-8. Frequency Test

- Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the V Hz% Ω CAP \rightarrow \bullet \bullet \bullet TEMP positive jack.
- Set the function switch to the Hz position.
- Read the frequency value on the display.
- Select Hz or % with the Hz / % button.
- The display will indicate the proper decimal point and value.

6-9. Temperature Measurements

- Set the function switch to the TEMP position.
- Insert the Temperature Probe into the negative COM and the V HZ% Ω CAP \rightarrow \bullet \bullet \bullet TEMP positive jacks, observing polarity.
- Touch the Temperature Probe head to the device under test. Continue to touch the part under test with the probe until the reading stabilizes.
- Select °C or °F with the function switch.
- Read the temperature on the display. The digital reading will indicate the proper decimal point and value.

WARNING:

To avoid electric shock, be sure the thermocouple probe has been removed before changing to another measuring function.

6-10. Non-Contact Voltage

The NCV function works on any rotary switch position.

- Test the detector on a known live circuit before use.
- Hold the top of the meter very close to the voltage source as shown.
- If voltage is present, the red light will illuminate.

Note: Do not touch the top of the meter when using this function.

6-11. Button Function

MODE Button

- Toggles between OHM / Diode / Continuity / CAP modes.

Hz / % Button

- With rotary switch on Hz / %, Voltage, Current, positions, the Hz / % button permits to selection of the frequency test (Hz) or the duty cycle test (%).

REL Button

1. Press the REL button to zero the display. "Δ" will appear in the display. The displayed reading is now the actual value less the stored "zero" value.

OPERATION

2. To exit this mode, press and hold the REL button until “Δ” is no longer in the display.

DATA HOLD Button

To freeze the LCD reading, press the HOLD button. While data hold is active, the icon appears on the LCD. Press the HOLD button again to return to normal operation.

LCD Backlight Button

The LCD is equipped with backlighting for easier viewing, especially in dimly lit areas. Press the HOLD button for over 1 second to turn the backlight on. Press again for over 1 second to turn the backlight off.

Automatic Power OFF

In order to conserve battery life, the meter will automatically turn off after approximately 30 minutes. To turn the meter on again, turn the function switch to the OFF position and then to the desired function position.

7. Maintenance

WARNING:

To avoid electric shock, disconnect the meter from any circuit, remove the test leads from the input terminals, and turn OFF the meter before opening the case. Do not operate the meter with an open case.

• Cleaning and Storage

Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for 60 days or more, remove the battery and store it separately.

• Battery Replacement

1. Remove the Phillips head screw that secures the rear battery door.
2. Open the battery compartment.
3. Replace the 1.5V* 2 AAA batteries.
4. Replace battery door and Phillips head screw.



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90 DAY LIMITED WARRANTY

This product is backed by a 90 day limited warranty. This warranty covers manufacturer defects and workmanship. The warranty excludes misuse or abuse and normal wear and tear.