

MULTI

Let's Create
New Concepts of
Instruments

AC current clamp-on tester

M-1141/ M-1141X/ M-1141XR

Instruction Manual (English)

Thank you very much for selecting our digital AC current clamp-on tester.
This model is complex instrument and employ a very reliable mechanical design.
Before using your new instrument, read this Instruction Manual completely and
familiarize yourself thoroughly with all functions.
With proper use and care, your tester will give you years of satisfactory service.

MULTI MEASURING INSTRUMENTS CO., LTD.

Address; Akihabara Murai Building 7-F,

1-26 Kanda Sakuma-cho, Chiyoda-ku,

Tokyo, 101-0025, JAPAN

Tel; +81-3-3251-7016

Fax; +81-3-3253-4278

Webpage; www.multimic.com/e

AFTER-SALE SERVICE

When the instrument failed, contact your dealer or distributor.

When sending the instrument for repair, wrap the instrument in cushioning material, store it in a sturdy box, and send it to us with the following information.

1. Customer's name, address, and telephone number
2. Description of the failure
3. Model number
4. Product serial number (if available)
5. Date of purchase
6. Where you purchased the product

WARRANTY

This instrument is shipped after rigorous in-house inspection, but we will repair free of charge if the cause of the failure is determined to be our responsibility, such as a manufacturing defect. The warranty period for this product is 15 months from the date of purchase.

SAFETY PRECAUTIONS

Read these Safety Precautions carefully to use the instrument properly.

The following warning and precaution are intended to prevent danger and damage to the user and those around the user.

 **WARNING** identifies that incorrect handling may cause danger to the life and body of the user.

 **CAUTION** identifies that incorrect handling may cause damage of the instrument or insufficient performance.

For safe use, the following symbols are indicated on the instrument and in the instruction manual. This symbol indicates that you must handle with care. The symbols are indicated on the places where you must refer to the instruction manual to protect the human body and the instrument.

The following symbol indicates the standard applied.



The symbol indicates that the Bluetooth wireless technologies are employed.

Trademarks (TM, (R) mark, etc. are not specified in this manual.)

- Bluetooth is a trademark of Bluetooth SIG, Inc.

Multi Measuring Instruments Co., Ltd. uses it under a license agreement with the company.

- Android and Google Play are trademarks of Google LLC
- The iOS trademark is used under a license agreement with Cisco Systems, Inc.

USA.

- iPhone, iPad, iPad mini and iPod Touch are trademarks of Apple Inc., registered in the US and other countries.
- App Store is a service mark of Apple Inc.



WARNING: To prevent electric shock.

- For safety reasons, use the instrument under a low-voltage circuit of AC600V or less. Check the circuit voltage before measurement.
- Do not clamp any bare wire.
- Do not measure when the CT or the body is damaged nor the battery cover is removed.
- Do not operate with wet hands, including when battery replacement.

Also do not use in extremely humid places or when the instrument body is wet as well.

- Do not disassemble or modify the instrument.

 **CAUTION**

- Wipe the instrument gently with a soft cloth moistened with a small amount of water or neutral detergent, when it gets dirty. Do not use any abrasives or organic solvents.
- Do not use or leave the instrument in a place with excessive humidity, vapor, excessive dust, fine powder, gas containing salt / sulfur / ammonia, explosive gas, harmful smoke, or strong ultraviolet rays.
- Do not apply any input current exceeding the measuring range to the instrument.

OVERVIEW

This instrument is a high-accuracy clamp-type leakage current meter that greatly improved convenience using the latest technology.

Features

- Since the influence from the external magnetic field is slight, a minute current can be measured accurately even near a motor or other wiring.
- The iron core made of a special alloy that does not rust for a long time use provides less aging stable accuracy.
- The 1141 function allows you to know the amount of low/high frequency content in the leakage current.
- This instrument has a Bluetooth communication function. It communicates with a smartphone / tablet with the dedicated application "Multi-Tracer" installed, and can display measured values or save them on a server. (Only applicable with M-1141X and M-1141XR)

SPECIFICATION

PERFORMANCE SPECIFICATION

Current measurement Accuracy (23.5 °C, 85% RH or less, no condensation)

At 50Hz / 60Hz (Sine wave) *The conductor is positioned at the center of CT.

Range	Resolution	Measuring Range	Accuracy
30mA	0.01mA	0.10mA~30mA	$\pm 1.2\%rdg \pm 5dgt$
300mA	0.1mA	30mA~300mA	$\pm 1.2\%rdg \pm 5dgt$
3A	0.001A	0.3A~3A	$\pm 1.2\%rdg \pm 5dgt$
30A	0.01A	3A~30A	$\pm 1.2\%rdg \pm 5dgt$
300A	0.1A	30A~300A	(30A~200A) $1.2\%rdg \pm 5dgt$ (200.1A~250A) $\pm 3.0\%rdg \pm 5dgt$ (250.1A~300A) $\pm 5.0\%rdg \pm 5dgt$

*0 (zero) is displayed for values of 10-counts or less of each range.

*Crest factor: <2

*Temperature and Humidity measurement accuracy; reference value

**Displayed by Multi Tracer (M 1141XR, M 1141X)*

GENERAL SPECIFICATIONs

Measurement;	AC leakage current (Io), AC load current (I)
Window Diameter;	φ40mm (CT clamp method)
Display;	*Liquid crystal display (2 lines, 4 digits, with unit symbol) *"AUTO": Auto range *"FL": Filter mode *"DH": Data hold *"MAX": MAX hold *Battery level display
Range;	Auto range Manual range (30mA / 300mA / 3A / 30A / 300A)
Detection Method;	(M-1141 / 1141X) RMS-converted mean value rectification (M-1141XR) True RMS values by the analog calculation

Sampling Rate; 2 times / second

Applicable Circuit Voltage; Low voltage circuit AC 600 V or less (insulated wires)

Operating Temperature and Humidity Range;
0°C~50°C, ≤85%RH (No condensation)

Storage Temperature and Humidity Range;
-10°C~60°C, ≤80%RH (No condensation)

Operating Conditions; Indoor only (Altitude ≤2,000m, Pollution Degree-II)

Overvoltage Category; CAT-III 1000V, CAT-IV 600V
Withstand Voltage; AC 7400V (RMS)/ 1-minute (CT to the body-case)

Applicable Standards; (EMC) IEC 61326-1
(Safety) IEC 61010-1, EN 61010
RoHS Directive

Battery; 1pc of coin-type lithium battery (CR2450)
Duration (continuous use) <between 23°C ± 5°C reference value only>
(M-1141) About 36-hours (backlight off)
(M-1141X/ M-1141XR) About 30-hours (backlights off/ Bluetooth off)
(M-1141X/ M-1141XR) About 16-hours (backlights off/ Bluetooth on)

Dimensions; 66(W) x206(H) x35(D) mm (excluding protrusions)
Weight; Approximately 260g (including battery and strap)

Accessories;
*Coin type lithium battery (CR2450); 1pc
*Instruction manual; 1set
*Carrying-case; 1pc
*Hand-strap; 1pc

*Limitation of continuous use: 8-hours /day (reference-time using Toshiba coin-battery)

FUNCTION SPECIFICATION

Backlight: (M-1141) “Light” switch

(M-1141X, M-1141XR) “Bluetooth / Light” switch

*Press and Hold the switch. The backlight lights for 1 minute (automatically turns off, after 1-minute). Turning it off, press and hold again.

*(While the backlight is on) The light goes off for about 0.3-seconds, when changing ranges of "3A → 30A" or of "300A → AUTO" due to relay operation.

Filter: Automatically starts when the power is turned on and display “FL” on the LCD.

The filter mode is set.

Press again for normal mode. (Filter characteristics: Band pass filter $f_0=55\text{Hz}$)

Data Hold: Press “DH/MAX” switch once (during both normal mode and filter mode) and display “DH” on LCD. It holds a displayed value. To release the held value press 2-times (or during auto-range, press once).

(“DH / MAX” switch is to change Normal→ Data-Hold→ MAX-Hold→ Normal→ and so on repeating, each time)

MAX Hold (Maximum Hold): Press “DH/MAX” switch twice (during both normal mode and filter mode) and display “MAX” on LCD.

It holds a maximum measured value after pressing on the upper LCD display. *While holding a maximum value, the auto power-off (APO) function delays to 30-minutes. To release MAX hold, press “DH/MAX” again. (MAX-hold works only on the manual-ranges, but not on auto-range mode)

Battery-level Indication: monitors the coin-battery level and displays its balance.

Auto power-Off: it power-off approximately 10-minutes after final operation.

It delays to 30-minutes (during MAX-hold/ Bluetooth is on)

Bluetooth communication (Bluetooth 4.2) *only on M-1141X and M-1141XR;

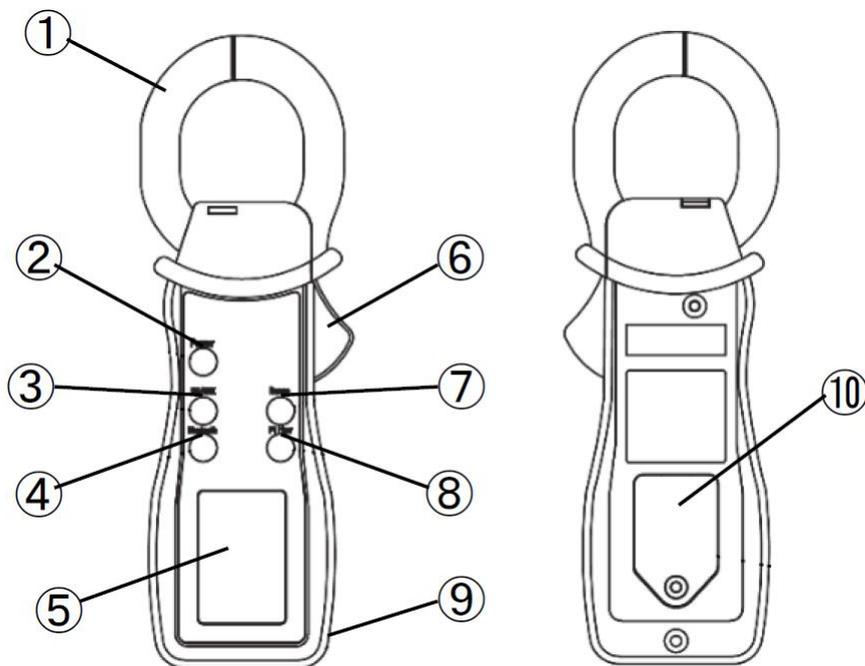
Press “Bluetooth” switch to transfer a displayed value to Multi-Tracer (smart-phone application)

Multi-Tracer displays simple waveform on the smartphone connected via Bluetooth.

Multi-Tracer also displays the ambivalent temperature and humidity on the

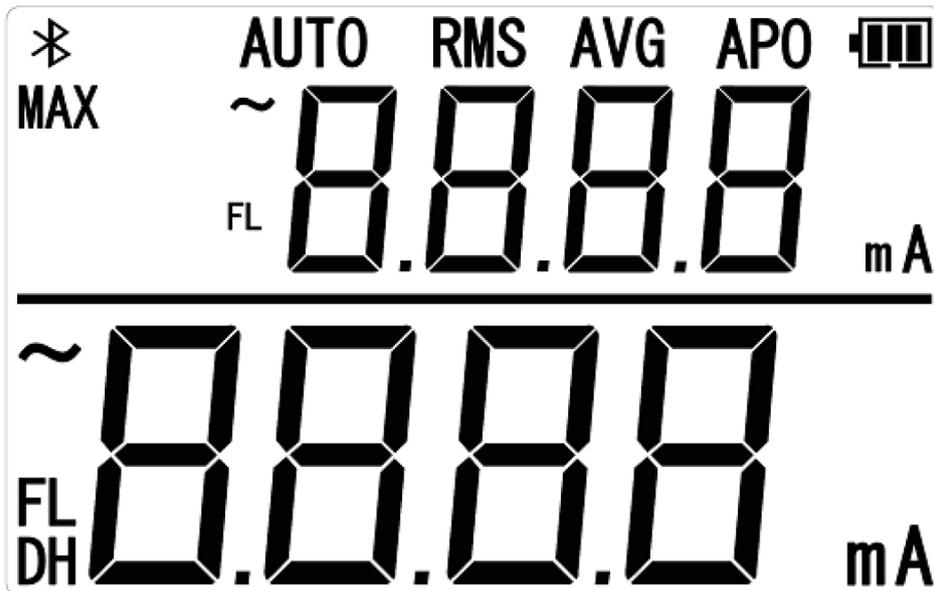
smartphone connected via Bluetooth.

NAME of EACH PARTS and FUNCTIONS



- (1) Clamp-type ZCT; Clamp-type sensor for current detection
- (2) Power button; To turn the power ON / OFF.
- (3) DH/ MAX button; To turn the data hold function and MAX hold function ON / OFF.
 *It changes Normal→ Data-Hold→ MAX-Hold→ Normal→repeating)
- (4) Bluetooth/ Light button;
 (While Bluetooth is off, M-1141X/ M-1141XR) To perform pairing with the dedicated application "Multi-Tracer".
 (While waiting for Bluetooth pairing, M-1141X/ M-1141XR) To cut-off the pairing.
 (While Bluetooth is on) To transfer a displayed value to the dedicated "Multi-Tracer"
 By pressing and holding for 1-second, it turns on/off the backlight.
- (5) Liquid Crystal Display (LCD);
 To display measurements, units, symbols, and the battery status.
- (6) Handle Open/ Close; To open/ close clamp-type ZCT
- (7) Range button; To switch the measurement range.
 Each time the button is pressed, the range setting changes in the order of
 *AUTO→ 20mA→ 200mA→ 2A→ 20A→ 200A→ 1000A→ AUTO.... repeating.
- (8) Filter button; To turn the filter function ON /OFF.
- (9) Hand strap; To prevent dropping the instrument down.
- (10) Battery cover; To cover the battery case.
 *Remove the screw and the battery cover when you replace the batteries

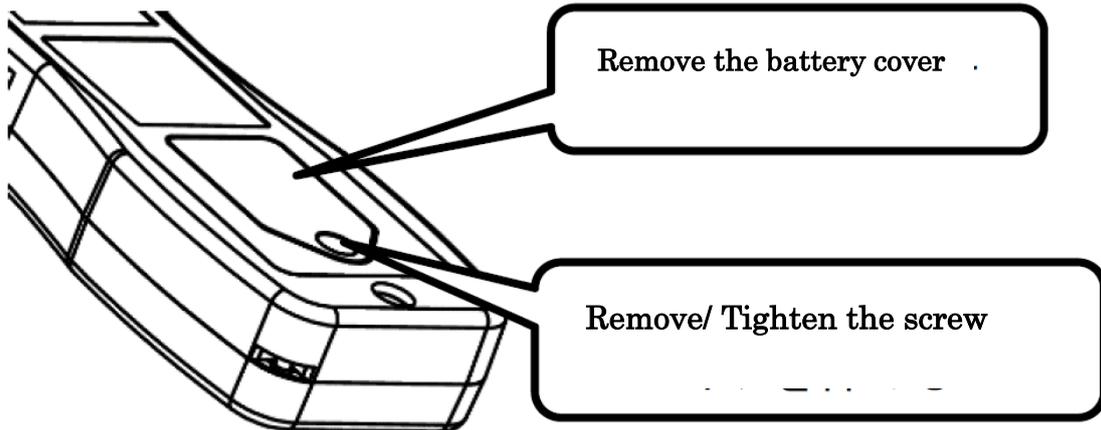
DESCRIPTION of DISPLAY



- ✧ MAX/ maximum hold indicator; Lights up when the MAX hold function is enabled.
- ✧ Battery indicator; indicate the battery voltage levels by 4-steps.
- ✧ AUTO range indicator; Lights up while the auto range is set.
- ✧ FL/ Filter function indicator; Lights up when the filter function is enabled.
- ✧ DH/ Data hold indicator; Lights up when the measured value is held.
- ✧ Bluetooth communication indicator; for the pairing functions
 - *Blinks while for pairing with the dedicated application, "Multi-Tracer"
 - *Lights-up while the instrument is paired with "Multi-Tracer"
 - *Off while Bluetooth pairing is not functioning
- ✧ APO/ auto power-off; Lights up when the auto power off function is enabled.
 - *functions automatically approximately 10-minutes after final operation.
 - *It delays to 30-minutes during MAX-hold/ Bluetooth is on
- ✧ ~/ AC mark; (upper LCD) blinks during MAX-hold
(lower LCD) lights always while power-on
- ✧ RMS mark (M-1141XR)/ True-RMS indicator; lights always on while power-on
- ✧ AVG mark (M-1141/ M-1141X)/ average value rectification; lights always on

Battery Replacement

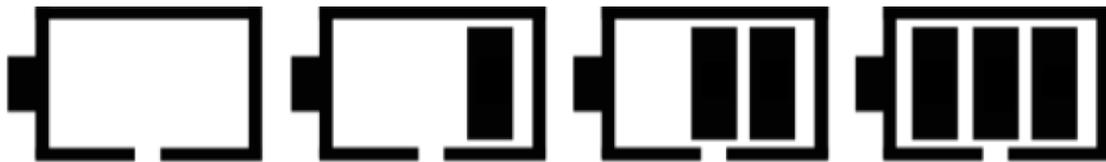
- (1) Make sure the power is turned off, then remove the battery-cover screw on the back with a Phillips screwdriver, and remove the battery cover.
- (2) Pull the coin-battery out, and insert new battery. *Check the battery polarity marks displayed on the battery case.
- (3) Attach the battery cover and tighten the screw with a Phillips screwdriver.



 **WARNING!** To prevent electric shock.

- The battery cover must be reinstalled after replacing the batteries. Do not use the instrument with the battery cover removed.
- Do not replace the batteries with clamping any wire.

Battery Voltage Level Indicator;



Replace the battery → *Low battery* → *Lower battery* → *Enough battery*

Check the battery level before operation. At “low battery”, replace the coin-battery because it might power-off by using the backlight or by changing measurement ranges.

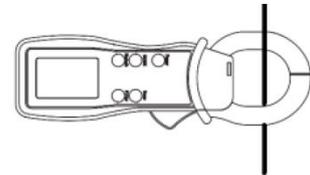
MEASUREMENTS

- (1) Press "Power" button② to power-on
- (2) It starts with AUTO-range. To change the range to manual, press "Range" button⑦
*Ranges change as AUTO→ 30mA→ 300mA→ 3A→ 30A→ 300A→ AUTO→
- (3) Open CT and clamp a target conductor wire. Close the clamp properly.

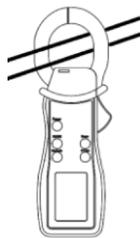


For AC load currents measurements; clamp only the target conductor wire

*For AC leakage current measurements;
clamp only the grounding conductor*

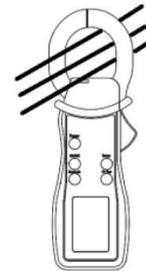


*For AC leakage current measurements; *Not at grounding conductor;*



for single-phase
two-wire system;
clamp 2-wires together

for single-phase three-wire
and three-phase three-wire systems;
clamp three wires all together.



****During measurements of large load currents, occasionally it has vibrating noises.
However, it does not cause any troubles or problems of its safety.*

- (4) Read the displayed value
(Each manual-range displays "OL" at 3300-counts or above. At 300A-range, LCD displays "OL" at 300.0 or above. At auto-range, it shifts to an upper-range 3000-counts or above.) *Functioning the auto power-off, press "Power"② switch again to power-on.

(5) Using the filter function; Automatically starts when the power is turned on and display FL on the LCD to activate filter-mode. Press it again to turn-off. (Filter specification; Band pass filter $f_0=55\text{Hz}$)

(6) Using the data hold function; Press "DH / MAX" button③ once and display DH on the LCD. LCD holds a displayed measuring value of pressing. *While the auto-range mode, it is canceled each time it is pressed. *While the manual-range mode, press twice to turn-off.

(7) Using the MAX/ maximum hold function (Manual range only);

Press "Range" button⑦ and set to the manual-range mode.

Press "DH / MAX" button③ twice to activate.

While "MAX" is displayed on the LCD, it holds a maximum reading value.

Press "DH / MAX" button again to release. *While MAX hold mode, the auto power-off function delays (from 10-minutes) to 30-minutes after a last switch operation.

(8) After measurements, be sure to turn-off the power with pressing "Power" button②.

 **CAUTION**

*If an excessive current is applied to CT, it may generate heat and damage to the instrument.

*This instrument is a precision instrument. For handling, do not shock or shake. Take care not to apply motion or excessive force.

*M-1141XR (True RMS model) takes about 10 seconds to be set to 0, with 0A primary.

BLUETOOTH FUNCTION

*M-1141X and M-1141XR have Bluetooth communication function (Bluetooth-4.2 Class2)

*With the dedicated application "Multi-Tracer" on the smartphone side, it is able to check measuring data and save the measurement results.

*At the power-on, the Bluetooth function is off. For the communication, press "Bluetooth/ Light" button to activate the Bluetooth connection. (If it took more than 3-minutes to pair with "Multi-Tracer", the Bluetooth function is automatically turns-off. After about 30-minutes with no switch operation, the auto power-off function works.)

*If your mobile device is an iPhone, iPad, etc., download "Multi-Tracer" from the App Store, and install. For Android devices, download "Multi-Tracer" from Google Play and install. App-Store requires Apple ID. Google-Play requires Google account.

*For information of each account, communicate with a dedicated supplier of each mobile device.

ATTENTION

*This product has a low power data communication system based on the Radio Law. (Built-in equipment: EYSHCN: 001-A10745)

*The communication range depends on the surrounding environment such as other radio waves and devices.

*This product uses communication frequencies of the 2.4 GHz band. If another wireless devices are using similar communication frequencies near this product, it may disturb wireless communication of both devices. Radio-wave interference may occur. In this case, stop other wireless devices or change the place where this product is used to avoid radio-wave interference.

**"Multi-Tracer" is free of charge. However, the internet connection fee is different for downloading or using the apps.

*The Bluetooth communication function may not works on all mobile terminals.

**"Multi-Tracer" may not work on all mobile devices.

**Use of devices with radio-communication requires approval in the country of use, and use of the instrument in a country or a region may be subject to penalty as a violation of their laws.



Let's Create
New Concepts of
Instruments

Test Certificate

To Whom It May Concern

We hereby certify that the instrument undermentioned has been certainly calibrated, according to our calibration standard and the testing results in the calibration procedure has been good enough within the tolerance regulated in our specification below.

Name of Model; AC currents clamp tester

Model Number; M-1141/ M-1141X/ M-1141XR

Confirmed Accuracy;

Range: Accuracy (23.5 °C, 85% RH or less, no condensation)

30mA $\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$

300mA $\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$

3A $\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$

30A $\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$

300A $\pm 1.2\% \text{rdg} \pm 5 \text{dgt}$ (30A~200A)

$\pm 3.0\% \text{rdg} \pm 5 \text{dgt}$ (200.1A~250A)

$\pm 5.0\% \text{rdg} \pm 5 \text{dgt}$ (250.1A~300A)