

UNI-T®

UNI-Trend International Ltd
ISO 9001
Certificate No. 956661

UT204A

Operating Manual



Digital Clamp Multimeter



P/N:110401102778

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I. INTRODUCTION

UT204A is a 3 3/4-bit AC/DC digital clamp meter (hereinafter referred to as “clamp meter”) with stable performance, safety and reliability. As a special electrician’s instrument with excellent performance, machine circuit is designed on the basis of large-scale integrated circuit double-integer A/D converter with full-range overload protection circuit and specific appearance design. Clamp meter can be used to measure AC/DC voltage, current, resistance, diode, circuit ON/OFF, capacitance, frequency and temperature, etc.

The usage manual includes related safety information and warning prompt, etc. Please read content carefully and abide by all warnings and notices strictly.

⚠ Warning: Please read “Rules for Safe Operation” carefully before usage of clamp meter.

II. UNPACKING INSPECTION

Please open the package box and take instrument out. Please check if following items are deficient or damaged or not.

1. Usage manual	1 book
2. Probe	1 pair
3. Temperature probe	1 probe
4. Guarantee certificate	1 sheet

Please contact your supplier instantly if any item is deficient or damaged.

III. RULES FOR SAFE OPERATION

Please pay attention to “Warning Sign **⚠** and Cautionary Words”. Warning refers to possible danger to user, instrument or measured equipment.

The instrument shall be designed and produced according to GB4793 Safety Requirements of Electronic Measuring Instrument, IEC 61010-1 and IEC 1010-2-032 Safety Standard to meet safety standards of duplex insulation, over-voltage CAT II 600V, CAT III 300V and pollution level

Protection ability may be weakened or lost if failing to use clamp meter according to related operation instructions.

1. Please inspect clamp meter and probe before use to avoid damage or abnormal use. Please do not use the clamp meter again if probe or shell insulation is damaged obviously with LCD display failure or clamp meter cannot operate normally.
2. It is strictly prohibited to use clamp meter before covering rear cover and battery cell to avoid electric shock.
3. Fingers cannot exceed probe forehead during measurement. Do not touch nude electric wires, connector, unused input end or circuits during measurement to avoid electric shock.
4. Function switch must be in correct position before measurement. It is strictly prohibited to change gears during measurement to avoid damage of clamp meter.
5. Do not exert at least 600V between terminal of clamp meter and grounding to avoid electric

- Shock or damage of clamp meter.
- To operate the instrument carefully under DC 60V or AC 30V to avoid electric shock.
 - Do not measure voltage or current which is more than permissible input value. Be sure to place function range switch to the maximum range position if scope of measured value cannot be determined. Be sure to cut off circuit power and discharge all capacitors before ON/OFF measurement of online resistance, diode or circuit. To disconnect probe and measured circuit then remove probe from input end of clamp meter and cut off power after measurement.
 - To replace battery in a timely manner during display of LCD display to guarantee high measurement precision. To take battery out if clamp meter has not been used for a long time.
 - Please do not alter internal wiring of clamp meter randomly to avoid instrument damage and safety danger.
 - Do not store or use clamp meter in environment in high-temperature, high-humidity, combustible, explosive and strong current magnetic environment.
 - Please clean the instrument shell by soft cloth and neutral detergent during maintenance. Do not use abrasive or solvent to avoid shell corrosion which may cause instrument damage and safety danger.

IV.ELECTRIC SYMBOLS

☐	Duplex insulation	⏏	Grounding
~	AC	≡	DC
➤	Diode	⚡	Deficient battery
⚠	Warning prompt	•••	Buzzing ON/OFF
~	AC or DC		
CE	To meet European Union standard.		

V.Appearance Structure (shown in Figure 1)

- Input end;
- LCD digit display;
- Function key: To select basic functions;
- Measurement function knob: White mark is initially set value; Blue mark is validated after selecting blue key;
- Clamp head trigger: To press the trigger to loosen clamp head. Clamp head will be tightened again locally if loosening the trigger;
- Hand protection: It is designed to guarantee safety when hand of users touching dangerous zone;
- Clamp head: It is a device to measure AC/DC current to convert current to voltage. Single conductor of measured current must pass through center of clamp head perpendicularly;

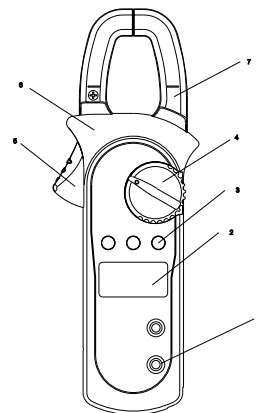


Figure 1

VI. DISPLAY SYMBOLS (SHOWN IN FIGURE 2)

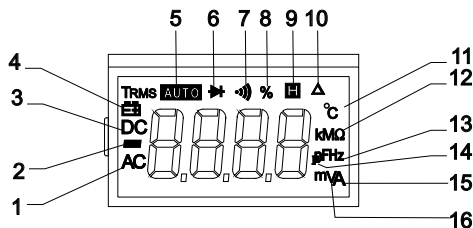


Figure 2

1. AC signal measurement instructions;
2. Negative polarity instructions;
3. DC signal measurement instructions;
4. Instructions of deficient battery charge;
5. Automatic range instructions;
6. Diode testing instructions;
7. ON/OFF detection instructions;
8. Measurement instructions of duty cycle;
9. Data maintenance instructions;
10. Measurement instructions of relative value;
11. Temperature measurement unit ($^{\circ}\text{C}$);
12. Resistance measurement unit (ohm, kilo-ohm and mega-ohm);
13. Frequency measurement unit (Hz);
14. Capacitance measurement unit (nF and μF);
15. Current measurement unit (A);
16. Voltage measurement unit (mV and V);

VII. KEY FUNCTIONS AND AUTOMATIC SHUTDOWN

1.HOLD

As reading maintenance key, it is to maintain displayed reading by triggering. Displayed value will be locked for constant display by pressing the key once. It can be pressed again to release locking status and return to common measurement status.

2.REL Δ

Current display value of clamp meter will be used as reference value after pressing the key. Display will be reset to "0" to minus reference value from measurement result automatically until exiting measurement function of relative value by pressing the key again. relative range can be switched over by pressing the key in $\sqrt{\text{~}}$ and Ω measurement gears.

3.SELECT

It is a function selection key for switchover of $\sqrt{\text{~}}$, Ω , $\sqrt{\text{~}}$, Ω , $\sqrt{\text{~}}$, Ω and measurement gears by triggering. Note: Automatic shutdown function will be cancelled if pressing SELECT key for bootstrap after automatic shutdown.

4.Automatic Shutdown

Clamp meter will "power off automatically" (under sleeping status) to save electric energy if function key and knob switch fail to operate within 15 minutes during measurement. Automatic shutdown function can be cancelled by pressing SELECT key for bootstrap. Clamp meter will "start up automatically" (under working status) by rotating function key under automatic shutdown status. (Please refer to Clause 6 for effective key operation.)

Note: Automatic shutdown function will be cancelled by pressing SELECT key for wake-up under sleeping status.

5. Buzzer

Buzzer will beep if pressing any effective function key under any measurement gear. It will not ring if the key is invalid. Buzzer will issue 5 warning voices continuously about 1 minute before automatic shutdown. It also will issue a long-term voice before shutdown.

6. Key validity

Note all key operations are valid for any gear. As shown in following form, corresponding operation functions cannot be selected or instruments under sleeping status cannot be wakened up until effective key operation.

Key	SELECT	REL	HOLD
$V \approx$	●	●	●
$\Omega \rightarrow \rightarrow \rightarrow \rightarrow$	●	●	●
Hz	N/A	N/A	●
°C	N/A	●	●
40A \approx	●	●	●
600A \approx	●	●	●

VIII. MEASUREMENT INSTRUCTIONS

1. DC voltage measurement (V_{DC}) (shown in Figure 3)

⚠ Warning: Clamp meter cannot be used for conductive article of which voltage exceeds AC/DC 600V.

- To set knob.
Please place function knob to “ $V \approx$ ” measurement gear.
- To select key functions.
To set measured DC voltage to initially set value. Initially set automatic range can be set to relative range by pressing REL Δ key.
- To connect load.

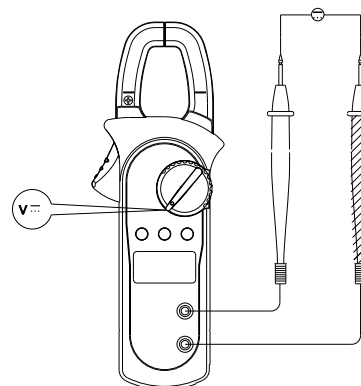


Figure 3

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

2. AC voltage measurement (V_{AC}) (shown in Figure 4)

⚠ Warning: Clamp meter cannot be used for conductive article of which voltage exceeds AC/DC 600V.

- To set knob.
Please place function knob to “ $V \approx$ ” measurement gear.

- To select key functions.
To set measured DC voltage to initially set value.
Initially set automatic range can be set to relative range by pressing REL△ key.
- To connect load.

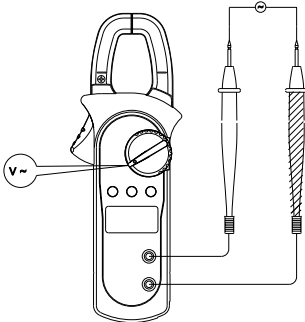


Figure 4

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

3. Resistance measurement (Ω) (shown in Figure 5)

⚠ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob.
Please place function knob to “ $\Omega \rightarrow \rightarrow \rightarrow$ ” measurement gear.
- To select key functions.
To set measured DC voltage to initially set value.
Initially set automatic range can be set to relative range by pressing REL△ key.
- To connect load.

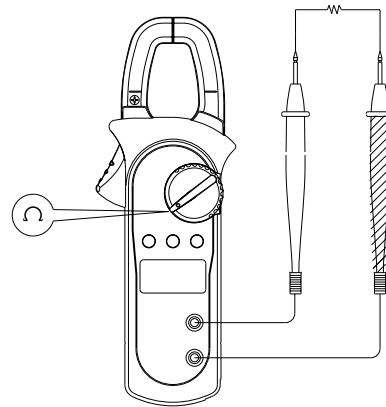


Figure 5

To gain excellent measured result by separating element from circuit.

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

4. Diode measurement (\rightarrow) (shown in Figure 6)

⚠ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob.
Please place function knob to “ $\Omega \rightarrow \rightarrow \rightarrow$ ” measurement gear.
- To select functions.
To select diode detection by pressing SELECT key;
- To connect load.

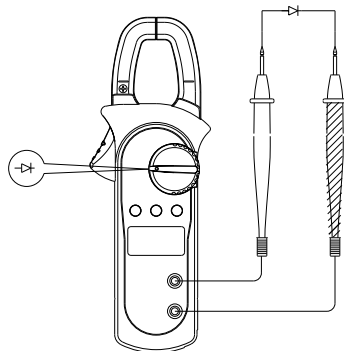


Figure 6

To gain excellent measured result by separating element from circuit.

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

5. Conductance detection (·)) (shown in Figure 7)

⚠ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob.
Please place function knob to “ $\Omega \rightarrow + \cdot)) \leftarrow$ ” measurement gear.
- To select functions.
To select conductance detection by pressing SELECT key;
- To connect load.

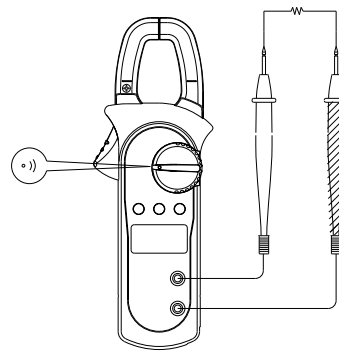


Figure 7

Buzzer will ring if measured resistance during conductance test is less than 10Ω . It can ring or not ring if measured resistance exceeds 10Ω . To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

6. Capacitance measurement (←) (shown in Figure 8)

⚠ Warning: Be sure to cut off circuit power and discharge residual charge of all capacitors before load connection.

- To set knob.
Please place function knob to “ $\Omega \rightarrow + \cdot)) \leftarrow$ ” measurement gear.
- To select functions.
To select capacitance detection by pressing SELECT key;
- To connect load.

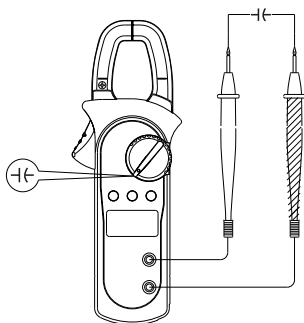


Figure 8

Measurement notice:

- 1) Be sure to reset by pressing REL key before measurement.
- 2) Instrument reading will delay for about 30 seconds normally when measuring large capacitance.

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

7. Frequency measurement (Hz) (shown in Figure 9)

⚠ Warning: Clamp meter cannot be used for conductive article of which voltage exceeds AC/DC 600V.

- To set knob.
Please place function knob to “Hz” measurement gear.
- To select key functions.
- To connect load.

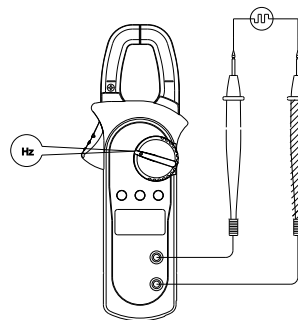


Figure 9

To disconnect probe and measured circuit then remove probe from input end after all measurement operations.

8. Temperature measurement (°C) (shown in Figure 10)

- To set knob.
To place function knob to “°C” measurement gear.
- To select functions.
- To connect

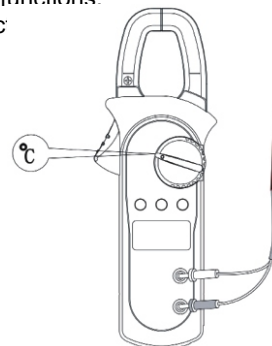


Figure 10

1) LCD will display “OL” if failing to insert temperature sensor into temperature gear. Clamp meter will display current indoor temperature after user inserting temperature sensor.

2) Temperature protection gear of the machine is plug-in resistance (R59) of $1K\Omega$. Electrified conductor cannot be inserted into input jack during temperature measurement to avoid resistance burnout.

9. DC current measurement (A \rightleftharpoons) (shown in Figure 11)

- To set knob.
To place function knob to “40A” or “600A” measurement gear.
- To select functions.
To set DC current measurement to initially set value.
- To connect load.

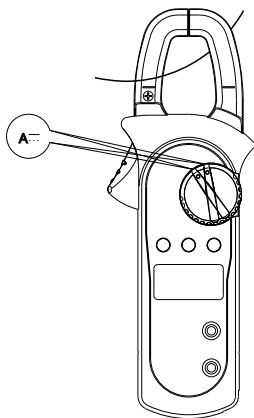


Figure 11

Please do not loosen trigger suddenly. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents except magnetic sensitivity. Collision will cause short-term reading variation. Please open the clamp head by pressing trigger then fetch measured conductor by clamp head and loosen trigger slowly until it is closed completely. Please check if measured conductor is in the middle of clamp head or not. Additional error may be caused if failing to place it in the middle of clamp head. Clamp meter can measure a current conductor once and measurement reading error may be caused if measuring two or more current conductors at the same time.

10. AC current measurement (A \sim) (shown in Figure 12)

- To set knob.
To place function knob to “40A” or “600A” measurement gear.
- To select functions.
To press SELECT key for AC current measurement;
- To connect load.

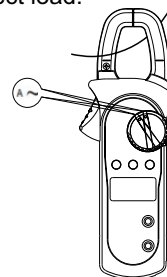


Figure 12

Please do not loosen trigger suddenly. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents except magnetic sensitivity. Collision will cause short-term reading variation.

Please open the clamp head by pressing trigger then fetch measured conductor by clamp head and loosen trigger slowly until it is closed completely. Please check if measured conductor is in the middle of clamp head or not. Additional error may be caused if failing to place it in the middle of clamp head. Clamp meter can measure a current conductor once and measurement reading error may be caused if measuring two or more current conductors at the same time.

IX. TECHNICAL INDICATORS

1.General specification

LCD display: 3 3/4-bit LCD display with the maximum display to 3,999;

Polarity display: Automatic positive/negative polarity display;

Overload display: To display “OL” or “-OL” ;

Under-voltage display: “ ” symbol can show that battery voltage is less than working voltage for battery replacement reference;

Sampling rate: 3 times/second;

Sensor category: Hall affect sensor for DC/AC measurement;

Error of testing position: $\pm 1.0\%$ of additional reading error may be caused if failing to place measured source to center of clamp head during current measurement;

Collision-resistance strength: To bear falling-off collision for 1m;
The maximum opening dimension of clamp head:
Diameter of 28mm;
The maximum forecast dimension of current conduits: Diameter of 26mm;
Influence of electromagnetic field: Device used near electromagnetic field may display unstable or incorrect reading;

2.Environment limitation

Indoor use

The altitude height: 2,000m

Safety rules: ICE 1010-1 CAT.II 600V

CAT.III300V

Hazard level: 2

Operation temperature & humidity: 0°C to 30°C
(not more than 80%R.H.)

30°C to 40°C (not more than 75%R.H.)

40°C to 50°C (not more than 45%R.H.)

Storage temperature & humidity: -20°C to +60°C
(not more than 80%R.H.)

3.Electrical specification

Accuracy: \pm (& of reading and bit quantity);

Correction period is 1 year;

Ambient temperature: 23°C \pm 5°C

Ambient humidity: Not more than 80% R.H.

Temperature coefficient: 0.1*precision/1°C

(1)DC voltage (V=)

Range	Resolution	Accuracy	Overload protection
400.0mV	0.1mV	$\pm(0.8\%+3)$	600V DC/AC
4.000V	1mV	$\pm(0.8\%+1)$	
40.00V	10mV		
400.0V	100mV		
600V	1V	$\pm(1\%+3)$	

Input impedance: 10M

(2) AC voltage ($\sqrt{\sim}$)

Range	Resolution	Accuracy	Overload protection
4.000V	1mV	±(1%+5)	600V DC/AC
40.00V	10mV		
400.0V	100mV		
600V	1V	±(1.2%+5)	

Input impedance: 10M Ω //not less than 100pF

Frequency response: 40Hz~400Hz

AC conversion type:

AC conversion is to guarantee consistency with valid value by sine wave input and correction reading by way of response mode of average value.

(3) Resistance (Ω)

Range	Resolution	Accuracy	Overload protection
400.0 Ω	100m Ω	±(1.2%+2)	600Vp
4.000K Ω	1 Ω	±(1%+2)	
40.00K Ω	10 Ω		
400.0K Ω	100 Ω		
4.000M Ω	1K Ω	±(1.2%+2)	
40.00M Ω	10K Ω	±(1.5%+2)	

(4) Diode test ($\rightarrow|$)

Range	Resolution	Accuracy	Overload protection
	1mV	To display approximate positive pressure drop. (Open circuit voltage is about 1.48V.)	600Vp

(5) Conductance test ($\bullet||$)

Range	Resolution	Accuracy	Overload protection
	0.1 Ω	Buzzer will ring if it is less than or equal to 10 Ω . (Open circuit voltage is about 0.45V.)	600Vp

Note: Buzzer will ring or not ring if measured resistance exceeds 10 Ω during conductance test.

(6) Capacitance ($-||-$)

Range	Resolution	Accuracy	Overload protection
4nF	0.001nF	±(4.0%+3)	600Vp
40nF	0.01nF		
400nF	0.1nF		
4 μ F	0.001 μ F		
40 μ F	0.01 μ F		
100 μ F	0.1 μ F	±(5.0%+10)	

To measure under RELATIVE measurement mode;

(7) Frequency (Hz)

Range	Resolution	Accuracy	Overload protection
10Hz	0.001Hz	±(0.5%+3)	600Vp
100Hz	0.01Hz		
1kHz	0.1Hz		
10kHz	1Hz		
100kHz	10Hz		
1MHz	100Hz		
10MHz	1kHz	(Reading is only for reference.)	

Sensitivity: ≥ 300 mV rms if ≤ 100 kHz;

≥ 600 mV rms if > 100 kHz;

≥ 800 mV rms if > 1 MHz;

(8) Temperature ($^{\circ}$ C)

Range	Accuracy	Overload protection	
-40 $^{\circ}$ C~1,000 $^{\circ}$ C	-40 $^{\circ}$ C~0 $^{\circ}$ C	±(8%+5)	Plug-in resistance of 1K Ω
	0 $^{\circ}$ C~400 $^{\circ}$ C	±(2.5%+3)	
	400 $^{\circ}$ C~1,000 $^{\circ}$ C	±(3.0%+3)	

Note:

1) There is no voltage protection for temperature gear. It is not allowed to insert electrified conductor into jack to avoid burnout of 1K Ω resistance;

2) Spot K type thermocouple (Ni-Cr~Ni-Si) is only suitable to temperature measurement of less than 230°C. Rod type temperature sensor shall be used for temperature measurement of more than 230°C.

(9) DC current (A $\overline{=}$)

Range	Resolution	Accuracy	Overload protection
40.00A	0.01A	$\pm(2\%+5)$	600A DC/AC
600A	1A		

Note:

Current measurement function must be between 0°C and 40°C. Current direction is from bottom to top for positive reading during DC current measurement. (As shown in Figure 11, panel is on the top and bottom cover is on the bottom.) Please do not loosen the trigger suddenly after pressing. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents except magnetic sensitivity. Collision will cause short-term reading variation. More correct $\overline{=}$ measurement can be guaranteed by following operation methods:

- ① Press the trigger and open clamp head to fetch measured conductor by clamp head then loosen trigger slowly until clamp head is closed completely. Please check if measured conductor is in the middle of clamp head or not. Additional reading error of $\pm 1.0\%$ may be caused if failing to place it in the middle of clamp head;
- ② To remove clamp head on the current conductor;
- ③ To press REL \triangle key for display resetting;
- ④ To repeat step ①;
- ⑤ To gain more correct reading by above measurement steps;

(9) AC current (A \sim)

Range	Resolution	Accuracy	Frequency response	Overload protection
40.00A	0.01A	$\pm(2.5\%+8)$	50Hz~60Hz	600A DC/AC
600A	1A	$\pm(2.5\%+5)$		

Note:

Current measurement function must be fulfilled between 0°C and 40°C. Frequency response: 50Hz~60Hz;

Instable or incorrect inductive reading with less than 10 words may be displayed in AC current gear and it will not influence measurement result. Please do not loosen trigger suddenly. As a sensitive device, Hall element will be sensitive to heat and mechanical stress to different extents except magnetic sensitivity. Collision will cause short-term reading variation.

AC conversion type:

AC conversion is to guarantee consistence with valid value by sine wave input and correction reading by way of response mode of average value.

X. Maintenance(shown in Figure 13)

\triangle Warning: Please remove testing rod before opening bottom cover to avoid electric shock.

1. General maintenance

- A. The clamp meter must be repaired and served by qualified professional repair personnel or designated repair department.
- B. To clean the shell periodically by dry cloth. However, it is not allowed to use detergent with abrasive or solvent components

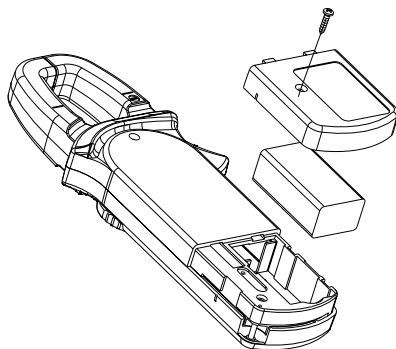


Figure 13

2: Battery installation or replacement

1 6F22 9V battery shall be supplied for the product. Please install or replace the battery by following sequence:

- a. Please remove testing rod in the input end during shutdown.
- b. To let panel face downwardly, loosen screws on the cell box, extract cell cover then remove cell box.
- c. To remove old battery from cell box for installation of new battery according to polarity instructions.
- d. Please use the same model of battery. Please do not install improper battery.
- e. To install cell cover and lock screws after installation of new battery.

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