

# **283 FC**

## True-RMS 1500 V Multimeter

### Users Manual

7/2024 (English)

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## Introduction

### Warning

**To prevent possible electrical shock, fire, or personal injury, read all safety information before you use the Product.**

The 283 FC True-RMS 1500 V Multimeter (the Meter or Product) is a True-RMS Digital Multimeter.

## Contact Fluke Corporation

Fluke Corporation operates worldwide. For local contact information, go to our website: [www.fluke.com](http://www.fluke.com).


To register your product, or to view, print, or download the latest manual or manual supplement, go to our website: [www.fluke.com/productinfo](http://www.fluke.com/productinfo).

## Safety Information

General Safety Information is in the printed Safety Information document that ships with the Product and at [www.fluke.com](http://www.fluke.com). More specific safety information is listed where applicable.

A **Warning** identifies hazardous conditions and procedures that are dangerous to the user. A **Caution** identifies conditions and procedures that can cause damage to the Product or the equipment under test.

## Hazardous Voltage

The hazardous voltage warning  shows on the display when the Product detects a voltage  $\geq 30$  V or voltage overload (OL).

## Features

This section has descriptions of all the features in the Meter.

### Auto Sleep Mode

To save battery power, the Meter goes to the Sleep Mode if there is no function change or button pushed for a set period of time:

- 5 Minutes
- 30 Minutes
- 45 Minutes
- 60 Minutes
- Never

When the Meter is in the Sleep Mode, turn the Control Knob to any position (except OFF), push any button, or use the FC App to wake up the Meter. This setting is persistent and remains set when you turn off the Meter. See [Setup Menu](#) to adjust the setting.

#### *Note*

*When you use the FC app, log, min/max, auto hold, and calibration functions, Sleep Mode is disabled.*

### Wireless Radio

The Product uses low-power wireless radio technology to send or receive measurements to other wireless test tools or the Fluke Connect® app on a mobile device such as a smartphone or tablet. You can set up to pair with:

- A mobile device. Use the Fluke Connect app to view measurements remotely, save to Fluke Cloud™ storage, and share the information with your team.
- a283 FC Wireless AC/DC Clamp to show the Clamp measurements on the Meter display.

The wireless radio does not cause interference with meter measurements.

See [Wireless Radio Setup](#) for instructions on how to set up and use the wireless radio in the Product.

### Radio Frequency Data

Changes or modifications to the wireless 2.4 GHz radio not expressly approved by Fluke Corporation could void the user's authority to operate the equipment.

For complete information about radio frequency data, go to [www.fluke.com/manuals](http://www.fluke.com/manuals) and search for "Radio Frequency Data Class A".

## MIN MAX AVG Record Mode

The MIN MAX AVG record mode records the minimum and maximum input values, and calculates a running average of all measurements during the recording session for the full function of the single display or dual display. The Product beeps when a new minimum or maximum is sensed.

### Note



*For dc functions, accuracy is the specified accuracy of the measurement function,  $\pm 12$  counts for changes longer than 350 ms in duration.*


*For ac functions, accuracy is the specified accuracy of the measurement function  $\pm 40$  counts for changes longer than 900 ms in duration.*



To start a MIN MAX AVG recording session:

1. Make sure the Product is set to the correct measurement function and on the correct range.

Autorange and manual range selection are disabled while MIN MAX AVG is active.

2. Push . **MIN MAX** and MAX show at the top of the display. The measurement that shows on the display is the maximum value measured. It changes only when a new maximum value is sensed.
3. To pause MIN MAX AVG record, push . **HOLD** shows on the display while record is paused.


Recorded values are not deleted. To continue the record session, push .

4. To exit and erase the MIN, MAX, and AVG values, push  for >2 seconds or turn the rotary switch.
5. To see the other recorded values (minimum and average), push . Each push of the button rotates through the maximum, minimum, average, and live values. The value on the display is identified with a MAX, MIN, or AVG label below the **MIN MAX** icon. No label below **MIN MAX** icon indicates that the live measurement shows on the display.

### Note

*Auto Sleep mode is disabled in MIN MAX AVG record mode.*

## Relative Mode

In Relative Mode, the Meter will zero the display and store the present reading as the reference for subsequent measurements. The Meter is locked into the selected manual range when you pushed **REL** .

The reading shown is always the difference between the present reading and the stored reference value. For example, if the stored reference value is 15.00 V and the live reading is 14.10 V, the display shows -0.90 V (delta).

The measurements show on the display in this order:


- Delta
- Reference
- Live


Push **REL**  again to exit the Relative Mode.

## Display Hold


### Warning

**To prevent possible electrical shock, fire, or personal injury, do not use the HOLD function to measure unknown potentials. When HOLD is turned on, the display does not change when a different potential is measured.**

In the Display Hold Mode, the Product captures the live reading on the display and does not update until you exit the Display Hold Mode. To hold a measurement on the display, push **HOLD** . The display shows **HOLD** when Display Hold is turned on.

Push **HOLD**  again to exit Display Hold Mode and show live measurements on the display.

## Auto Hold Mode

The Auto Hold Mode captures the present reading on the display. When a new, stable reading is detected, the Meter beeps and displays the new reading. To enter or exit the Auto Hold Mode, push **HOLD**  >2 s.

For V ac, V dc, VA, A ac, A dc, and resistance functions, the threshold is 1% of range and the fluctuation is 0.2 % of range.


For the capacitance function, the threshold is 5 % of range and the fluctuation is 1 % of range.

Auto Hold Mode for mV ac and mV dc functions is disabled.

Auto Hold Mode triggers when the measured value is greater than the threshold and the measured value is fluctuating within the fluctuation range and >2 s.



## Yellow Button

Push the yellow button (  ) to set the Product to a different measurement function. The different functions are shown in yellow around the rotary switch. Frequency, VA, mV ac, capacitance, and A ac with the optional a283 FC Clamp are functions of the Product set with the yellow button.

## Data Log

Push  >2 s. to enter the Data Log mode.

See [Setup Menu](#) to adjust the log interval and duration time.

## Display Backlight

Push :

- 1x to turn on the display backlight
- 2x to illuminate the keypad
- 3x to turn off the backlight and the keypad




By default, the backlight automatically turns off after 2 minutes. See [Setup Menu](#) to change the time interval.

## Manual and Auto Range

The Product can be set to manual or auto range. In auto range, the Product sets the range so the input is shown with the best resolution. Manual range lets you set the range.


When you turn on the Product, it is set to auto range.

To set a manual range:

1. Push  to go to manual range.
2. Push  again to cycle through the available manual ranges of 6 V, 60 V, 600 V, 1000 V.  
The display shows the selected manual range in the upper left corner.
3. To exit manual range, push  >2 s.

The display shows the auto range in the upper left corner.

### Note

*You cannot change range when the Product is in the MIN MAX AVG record mode or in Display Hold mode. If you push  in one of these modes, the Product beeps twice to alert you to an invalid operation.*

## Limit Gauge

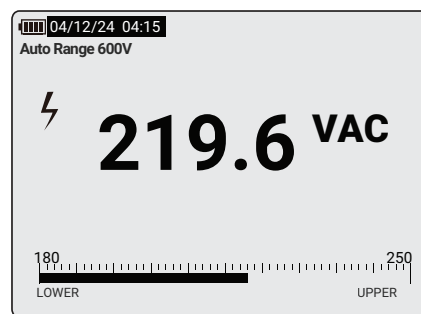
For high-volume and repetitive measurements of V ac, V dc, mV ac, mV dc, A dc, and A ac , you can use the Limit Gauge to monitor the measurements. After setup, a visual gauge shows on the display with the set range and where the present measurement is in that range. Any measurement outside a set percentage or range causes an audible and visible alarm.

### Note

*The measurement range is set to auto range when in the limit gauge function.*

As an example, in the V ac mode, set the limit gauge by digit to the range of 180 V to 250 V and apply an input signal of 220 V/50 Hz. See [Figure 1](#).

**Figure 1. Limit Gauge**



The Limit Gauge has setup options:

**Option 1.** set the expected value and acceptable deviation percentage. For example, 1000 V and a  $\pm 10\%$  has an acceptable range of 900 V to 1100 V. Any measurement above or below the set value causes an audible and visible alarm.

**Option 2.** Set a manual range. For example, set 900 V to 1100 V as acceptable range. Any measurement above or below the range causes an audible and visible alarm.

**Option 3.** Select a previous setup. Use this option for often-used setups or recurring site inspections.

To set up a gauge:

1. Push **LIMIT GAUGE** to open the Limit Gauge menu.
2. Use **▲ ▼** to highlight **New Settings**.
3. Push **OK** to open the New Setting menu.
4. Use **▲ ▼** to highlight the type of gauge, either **By Digit** or **By Percentage**.
5. Push **OK** to open the Adjustment menu.
6. Use **◀ ▶** to select a digit and **▲ ▼** to change a digit.
7. Push **OK** to save the setting in the Previous Setting list.

To use a saved setting:

1. Push **LIMIT GAUGE** to open the Limit Gauge menu.
2. Use **▲ ▼** to highlight **Previous Settings**.
3. Push **OK** to open the Previous Setting menu.
4. Use **▲ ▼** to select the gauge to use.
5. Push **OK** to go back to the Limit Gauge menu.

The selected Limit Gauge is enabled.

6. Push **Back** to exit the Limit Gauge menu and use the Limit Gauge.

To disable the gauge:

1. Push **LIMIT GAUGE** to open the Limit Gauge menu.
2. Use **▲ ▼** to highlight **Disable Limit Gauge**.
3. Push **OK**.
4. Push **Back** to exit the Limit Gauge menu and resume measurements without the Limit Gauge.

For a quick on/off, push **LIMIT GAUGE** >2 s to enable the last gauge setting that was used.

## Setup Menu

The Meter has a Setup menu to access the adjustable features:

- Log
- Beeper and Alert
- Clamp
- Auto Backlight Timeout
- Date/Time
- Auto Sleep
- Device Information
- Calibration Cycle

To access the menu:

1. Push **SETUP** to open the Setup menu.

In the menu, ▲ ▼ and ◀ ▶ buttons are active.

2. Use ▲ ▼ ◀ ▶ to highlight and change the selection.
3. Push **OK** to set the change.
4. Push **BACK** to exit a menu.

## Log

In the Log menu, you can set the log duration and interval, see how much memory is used, and clear the log memory.

### Note

*When the log duration is set to 0 days, 0 minutes, and 0 sec, the Meter continuously logs until you manually stop the log function or the memory is full.*

## Beeper and Alert

In the Beeper and Alert menu, set the beeper to on or off when you push any button.

You can also set the audible and visible warning on or off when the polarity feature is triggered. The Meter checks the polarity during a dc voltage measurement. When dc voltage is less than -10 V:

- Red LED blinks
- Beeper sounds
- **POLARITY** blinks on the display

To disable the red LED and beeper when polarity is triggered, set to off.

The limit gauge has an audible and visible warning when the live reading is outside of the limit gauge range:

- Red LED blinks
- Beeper sounds
- LOWER or UPPER limit highlighted

To disable the red LED and beeper when limit gauge is triggered, set to off. For more information, see [Limit Gauge](#).

## Clamp

At the first use of the Meter with a Clamp, the Meter can search for Clamps within range that are turned on.

When found, the Meter shows the Clamp serial number (maximum 5 clamps) in a list:

1. Use ▲ ▼ to select the Clamp to pair with the Meter.

When a Clamp is paired with the Meter, the displays shows the clamp icon in upper right corner.

2. Use **Disconnect** to temporarily unpair the Clamp.

When the control knob changes or the Meter power is turned on, the Clamp automatically pairs again.

3. Use **Clear** to permanently unpair the Clamp.

When the Meter power is turned on, you must pair the Clamp again.

## Auto Backlight Timeout

In the Auto Backlight Timeout menu, you can set a duration for how long the display backlight and keypad backlight stay on as:

- 2 minutes
- 15 minutes
- 30 minutes
- Never

## Date/Time

In the Date/Time menu, adjust the date and time. You can also select the date format as:

- DD/MM/YYYY
- MM/DD/YYYY
- YYYY/MM/DD

## Auto Sleep

In the Auto Sleep menu, set the time lapse for when the Meter goes to the Sleep Mode as:

- 5 mins
- 30 mins
- 45 mins
- 60 mins
- Never

## Device Information

The Device Information menu has details about:

- Model
- Serial number
- Firmware version
- Calibration Date
- TTBLE version
- FBLE Version

## Calibration Cycle

In the Calibration Cycle menu, set the cycle to:

- 1 year
- 2 years
- 3 years
- Never

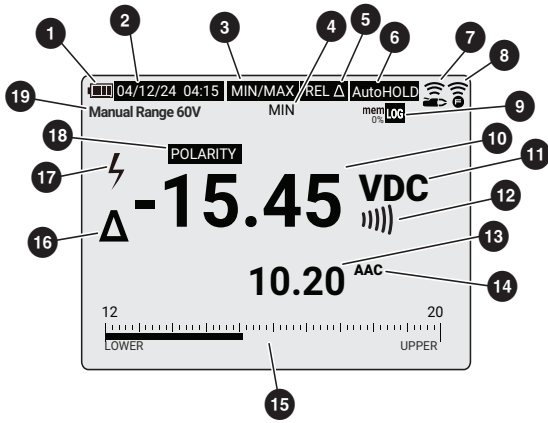
## Functions

This section has descriptions of all the functions in the Meter.

## Display

The display is large and bright to show all information on the screen. This display is for indoor and outdoor use. [Table 1](#) is a list of all the functions on the display.

**Table 1. Display**



The diagram shows a multimeter display with the following features labeled with callouts:

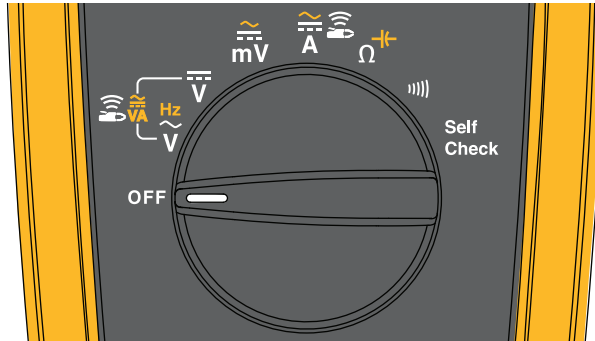
- 1: Battery status icon
- 2: Date/Time (04/12/24 04:15)
- 3: MIN/MAX Mode indicator
- 4: Active MIN/MAX selection icon
- 5: Relative Mode indicator
- 6: HOLD/AutoHold Mode indicator
- 7: Clamp paired icon
- 8: FC Connect icon
- 9: Logging Mode/Memory usage icon
- 10: Live measurement icon
- 11: Unit and function of measurement (VDC)
- 12: Continuity icon
- 13: Live measurement icon
- 14: Unit of and function measurement (AAC)
- 15: Limit Gauge indicator
- 16: Relative Mode measurement icon
- 17: Voltage >30 V or voltage overload (OL) icon
- 18: Polarity Mode is triggered icon
- 19: Auto/Manual Range indicator

Item	Function	Item	Function
1	Battery status	11	Unit and function of measurement
2	Date/Time	12	Continuity
3	MIN/MAX Mode is on	13	Live measurement
4	Active MIN/MAX selection	14	Unit of and function measurement
5	Relative Mode is on	15	Limit Gauge indicator
6	HOLD/AutoHold Mode is on	16	Relative Mode measurement
7	Clamp paired	17	Voltage >30 V or voltage overload (OL)
8	FC Connect is on	18	Polarity Mode is triggered
9	Logging Mode/Memory usage	19	Auto/Manual Range
10	Live measurement		

## Control Knob

Table 2 is a list of the Control Knob functions.

**Table 2. Control Knob Positions**



Position	Function
<b>OFF</b>	Turn off the Product.
<b>Hz V~</b>	AC voltage measurement from 60.0 mV to 1000 V. Push <span style="background-color: orange; color: black;">  </span> to measure frequency from 2 Hz to 99.99 kHz. Push <span style="background-color: orange; color: black;">  </span> again to measure VAC + AAC. Push <span style="background-color: orange; color: black;">  </span> again to measure VA + AAC.
<b>VA~</b>	Connect with a283 FC Clamp to measure dc power (VA) or ac VA. See <a href="#">Wireless Radio</a> .
<b>V-</b>	DC voltage from 1 mV to 1500 V. Push <span style="background-color: orange; color: black;">  </span> again to measure VDC + ADC. Push <span style="background-color: orange; color: black;">  </span> again to measure VA + ADC.
<b>mV</b>	DC voltage measurements from 0.1 mV to 600 mV. Push <span style="background-color: orange; color: black;">  </span> to measure ac voltage from 6 mV to 600 mV.
<b>A~</b>	Connect with a283 FC Clamp to measure ac or dc current ≤60 A. See <a href="#">Wireless Radio</a> .
<b>Ω+</b>	Resistance measurements from 0.1 Ω to 50 MΩ. Push <span style="background-color: orange; color: black;">  </span> to measure capacitance from 1 nF to 9999 μF.
<b>    )</b>	Continuity. Beeper turns on at <70 Ω.
Self Check <sup>[1]</sup>	Connect test leads to the Meter and short together and push <b>OK</b> to test the continuity of test leads, verify V dc and V ac measurement engine, calibration status, and battery status.










[1] In this position, only the backlight and display contrast is operable.















## Pushbuttons

Table 3 is a list of the pushbutton functions.

**Table 3. Pushbuttons**

Button	Control Knob Position	Function
	$\text{Hz}$ 	Selects Frequency, VAC + AAC, VA + AAC.
		Selects VDC + ADC, VA + ADC.
		Selects ac millivolts.
		Selects A ac.
		Selects capacitance.
	All positions	Starts the MIN MAX record function. Steps the display through MAX, MIN, AVG (average), and input signal measurement. Push for 2 second to stop MIN MAX record. ◀ is active for Contrast, Setup, and Limit Gauge.
	All positions	Sets the Product to manual range and scrolls through each range. Push for 2 second to set the Product to autorange. ▶ is active for Contrast, Setup, and Limit Gauge.
OK/AUTO 2 s 	All positions	Freezes the display. Auto Hold Mode, push >2 s. <b>OK</b> is active for Contrast, Setup, and Limit Gauge.

**Table 3. Pushbuttons (cont.)**

Button	Control Knob Position	Function
	Not related to switch position	Push  : <ul style="list-style-type: none"> <li>• 1x to turn on the display backlight</li> <li>• 2x to illuminate the keypad</li> <li>• 3x to turn off the backlight and the keypad</li> <li>• Data Log mode, push &gt;2 s.</li> </ul> By default, the backlight automatically turns off after 2 minutes. See <a href="#">Setup Menu</a> to the change the time interval.
	Not related to switch position	Display contrast, use ◀ ▶ to adjust. ▲ is active for Setup and Limit Gauge.
	All positions except Hz, VA, 	Relative Mode. Set the present reading as a reference for subsequent readings. The display reading is the difference between the live reading and the reference value. ▼ is active for Setup and Limit Gauge.
	Voltage and Current measurements only	Limit gauge is set as a high/low limit value or as a percentage deviation from the expected value. Press  >2 s to toggle quick enable/disable. Push  to go back in the menu structure.
	Not related to switch position	<ul style="list-style-type: none"> <li>• Turns on the radio.  shows on the display when the radio is on.</li> <li>• Push to save and send the measurement to the Fluke Connect App on mobile device.<sup>[1]</sup></li> <li>• Push &gt;2 s. to exit the FC function.</li> </ul>
	Not related to switch position	Connect to a283 FC clamp, set time, date, switch on/off beeper, interval and duration for logging, and view device info. Push  to go back in the menu structure.
<p>[1] This button is used when the Product is paired with a wireless radio. See <a href="#">Wireless Radio Setup</a> to learn more.</p>		

## Self Check

The Self Check feature tests the continuity of test leads and verifies the V dc and V ac measurement engine, calibration status, and battery status.

To do a Self Check:

1. Turn the control knob to **Self Check**.
2. Short the test leads and push **OK**.
3. Wait several seconds until the test results show on the screen.

The screen shows these results:

- Test Lead Check  
The result is **FAIL** if the test lead is open or poor contact.
- VDC 1500V  
The result is **PASS** if the V dc measurement circuit path or measurement is normal.  
The result is **FAIL** if the V dc measurement circuit path or measurement is abnormal.
- VAC 300V/50Hz  
The result is **PASS** if V ac measurement circuit path or measurement is normal.  
The result is **FAIL** if V ac measurement circuit path or measurement is abnormal.
- Battery  
The battery voltage shows.
- Calibration date  
Shows the date for the last calibration and the recommendation for the next calibration.  
If out of calibration cycle (see [Setup Menu](#)), the screen shows this message:

### **Calibration recommended**

For example, the Meter time is 2027/6/16 and in Setup Menu the calibration cycle is set to 1 year. The Self Check recommends calibration since the calibration date is 2024/5/10 and the current date is 2027/6/16, which is out of the cycle.

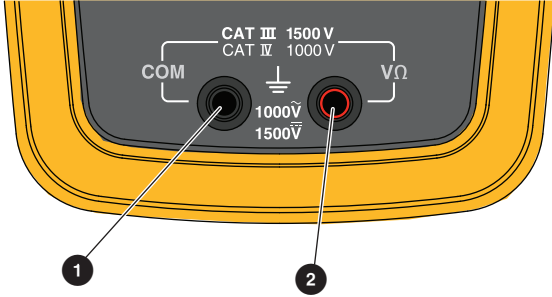
### *Note*

*Follow the instructions on the display.*

## Inputs

Table 4 is a list of the input functions.

**Table 4. Inputs**



Terminal	Description
1	COM - Return terminal for all measurements.
2	Input for voltage, resistance, capacitance, voltage frequency, and Self Check.

## AC Low Value Input Behavior of True-RMS Meters

Average responding meters can accurately measure only pure sinewaves. The 283 FC True-RMS Meter can accurately measure distorted waveform signals. A minimum input voltage is necessary for True-RMS converters to make a measurement. Because of this minimum input, True-RMS meter specifications are only good for 1 % to 100 % of range. Non-zero digits that are shown on a True-RMS meter when the test leads are open or are shorted are possible. This has no effect on the ac measurement accuracy of signals that are more than 1 % of range.

Unspecified input levels on the lowest ranges are:


- AC voltage less than 1 % of each V ac or mV ac range.
- AC current less than 1 % of 60 A ac or 0.6 A ac.

## Wireless Radio Setup

The Product uses wireless radio technology to send or receive measurements to the a283 FC Current Clamp or the Fluke Connect® app. The maximum distance between meter and clamp for operation is 10 m (33 ft).

The term "pair" in this manual refers to a procedure the Product does to look for compatible radio signals.


To turn on the radio:

1. Turn on the Product (the radio is off at the initial power on).
2. Push  to turn on the radio.



When you turn on the radio,  shows on the display.

### Pair with Fluke Connect App

To pair with the Fluke Connect app:

1. Turn on the Product (the radio is off at the initial power on).
2. Push  to turn on the radio.

When in the FC mode:

-  shows on the display
-  LED blinks at 4 to 5 second intervals

On your mobile device:

1. Go to **Settings > Bluetooth**. Verify that Bluetooth is turned on.
2. Go to the Fluke Connect app.
3. Select **look for Fluke Connect tools** and in the list of connected Fluke tools, select **283 FC**.

You can now take, save, and share measurements with the app. Go to [www.flukeconnect.com](http://www.flukeconnect.com) for more information about how to use the app.

#### Note

*Use the FC App to automatically synchronize the date and time of the Meter.*

### Pair with a283 FC Current Clamp





The first time you set up the Meter and Clamp you must pair the tools. See the *a283 FC Wireless AC/DC Current Clamp Instructions* for more information about how to operate the Clamp.



#### Note

*The Meter pairs with the Clamp for VA ac, VA dc, A ac, or A dc measurement functions.*

After the initial setup, the tools auto pair when you turn on power for both and are within the wireless range.

To pair the Meter with the Clamp for the first use:

1. Turn on the Meter (the radio is off at the initial power on) and select the VA ac, VA dc, A ac, or A dc measurement function.
2. Push  to turn on the Clamp.
3. On the Meter, select VA ac, VA dc, A ac, or A dc function and push  to open the Setup menu.
4. In the menu, use   to highlight **Clamp**.
5. Push **OK** to start the search.

When the search is complete, the Meter shows the serial number of the Clamp. Use   to select the serial number of the target Clamp to pair with the Meter.

6. After the target Clamp is paired, push **BACK** to exit the Setup menu.



shows at the right-top of the display.

The Meter is ready to show measurements from the Clamp. The maximum distance between meter and clamp for operation is 10 m (33 ft).

## Basic Measurements

### **Warning**

**To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, or capacitance.**


The figures that follow show how to make basic measurements with the Product.

When you connect the test leads to the circuit or device, connect the common (COM) test lead before the live lead. When you remove the test leads, remove the live lead before the common test lead.

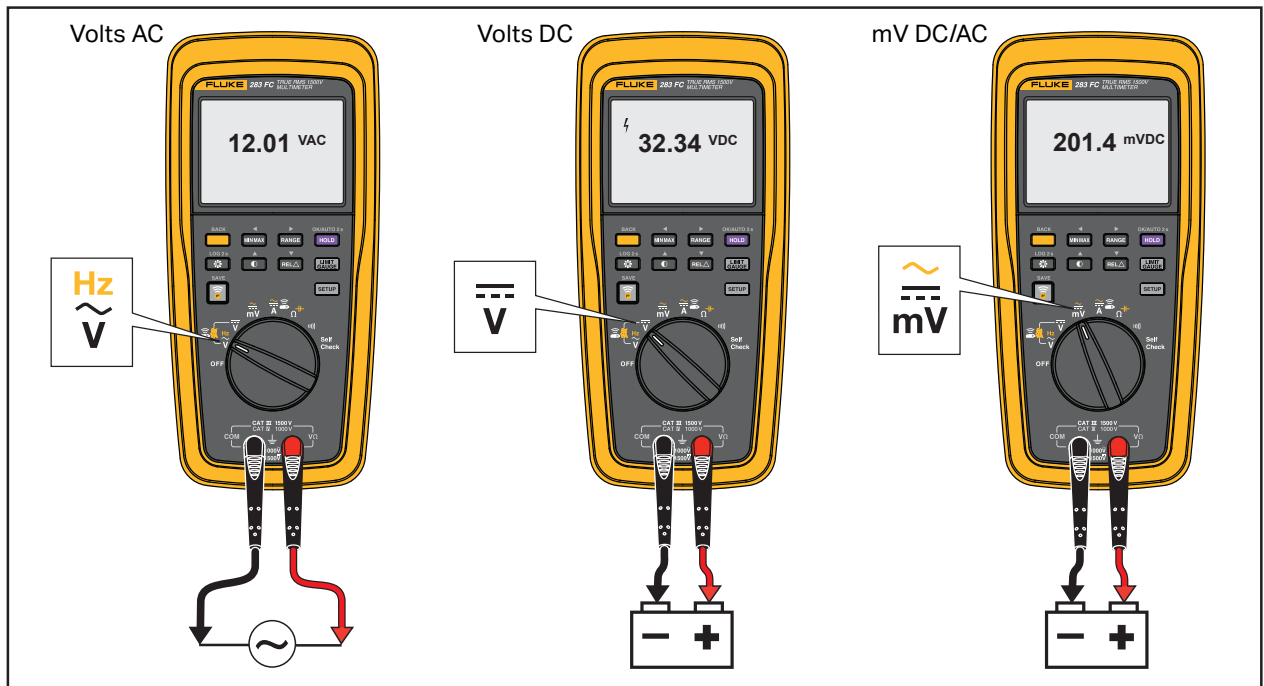
## AC and DC Voltage

The ac voltage ranges are 600.0 mV, 6.000 V, 60.00 V, 600.0 V, and 1000 V. The dc voltage ranges are 600.0 mV, 6.000 V, 60.00 V, 600.0 V, and 1500 V.


To set the 600.0 mV dc or ac range:

1. Turn the control knob to  $\overset{\sim}{mV}$ .
2. Push  to toggle the Product between millivolts dc and ac.
3. Refer to [Figure 2](#) to measure ac or dc voltage.

**Figure 2. AC and DC Voltage Measurements**



## AC or DC Current with a283 FC Current Clamp

See [Pair with a283 FC Current Clamp](#) for more information about how to measure dc or ac amps with the  function.

## AC VA and DC Power

The ac VA or dc power measurement is a calculation between a voltage (using test leads connected to the Meter) and an amperage input (from the Clamp):






Apparent Power (VA) = Voltage (V) × Current (A)

This calculated value shows on the display to save manual calculation and recording time. You can use the Fluke Connect feature to share the calculation on your mobile device.


### Note

*The Meter only calculates apparent power (S, measured in VA) and not reactive power (Q, measured in VAR) or True power (P, measured in Watts). For dc power there is no difference in Watts and VA. For ac power the readout shows AC VA.*

To measure dc power or ac VA:

1. Turn control knob to  or .
2. Push  to go to the  mode.
3. Make sure the Clamp is clear of any current carrying conductors.
4. On the Clamp, push  to compensate (zero) for outside influences for dc power.
5. Position the Clamp jaw around the conductor.
6. Connect the black test lead to the **COM** terminal and the red test lead to the **VΩ** terminal.
7. Touch the probes to the test points of the circuit.

The display shows the measurement of VA and current.

The display also shows  to indicate that the measurement is from the Clamp jaw.

### Note

Push  to toggle the readout between VA and voltage.



## Resistance Measurements

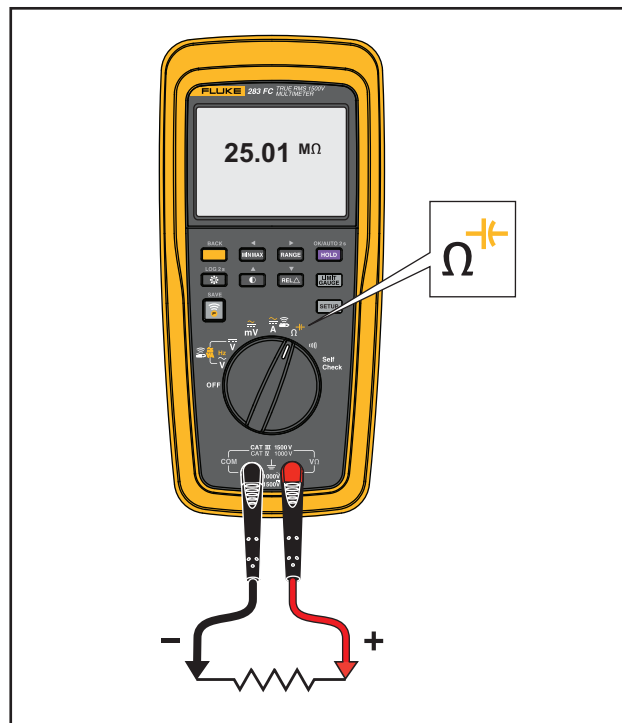
### ⚠️⚠️ Warning

**To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, or capacitance.**

The Product sends a small current through the circuit for resistance measurements. Because the current flows through all possible paths between the probes, the resistance measured is the total resistance of all paths between the probes.

The resistance ranges are 600.0  $\Omega$ , 6.000 k $\Omega$ , 60.00 k $\Omega$ , 600.0 k $\Omega$ , 6.000 M $\Omega$ , and 50.00 M $\Omega$ . Set the Product as shown in [Figure 3](#) to measure resistance.

**Figure 3. Resistance Measurements**



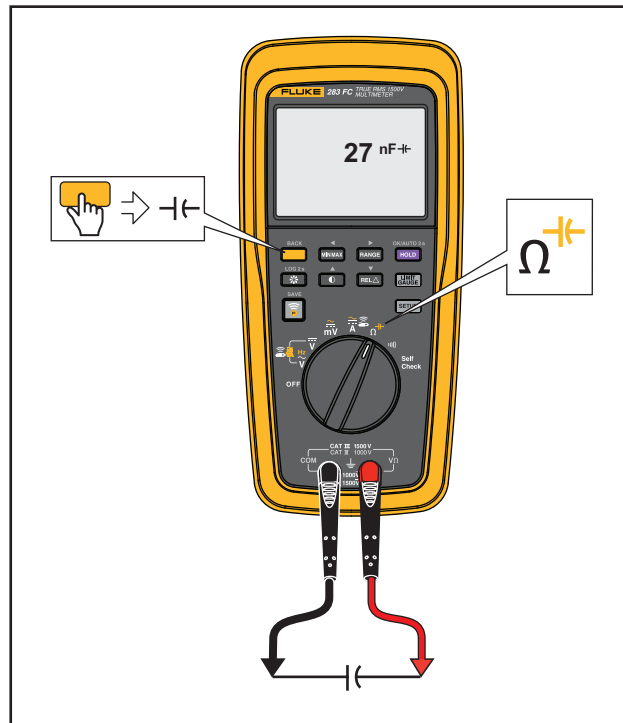
## Capacitance Measurements

### ⚠⚠ Warning

To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, or capacitance.

Capacitance ranges are 1000 nF, 10.00  $\mu$ F, 100.0  $\mu$ F, and 9999  $\mu$ F. To measure capacitance, set up the Product as shown in [Figure 4](#).

Figure 4. Capacitance Measurements



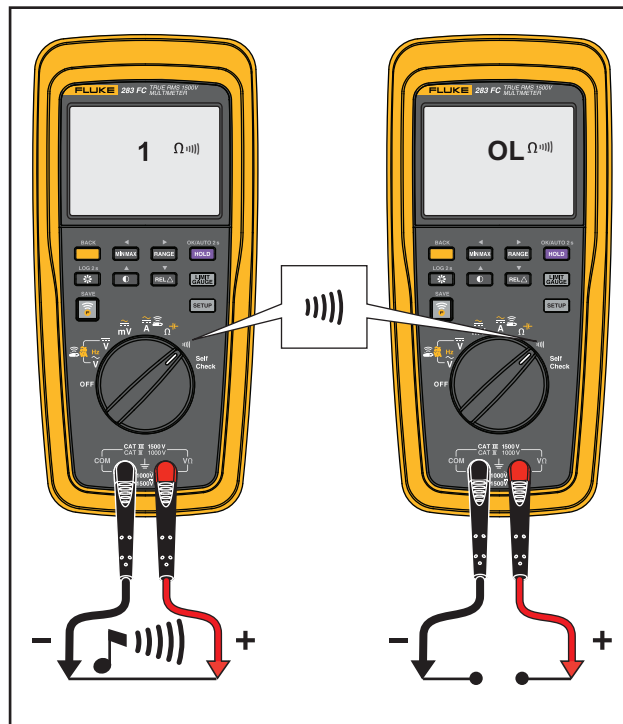
## Continuity Test

### ⚠️⚠️ Warning

To prevent possible electrical shock, fire, or personal injury, disconnect power and discharge all high-voltage capacitors before you measure resistance, continuity, or capacitance.

The continuity test uses a beeper that sounds when a closed circuit is sensed. The beeper lets you do continuity tests without the necessity to look at the display. To do a continuity test, set up the Product as shown in [Figure 5](#).

Figure 5. Continuity Tests



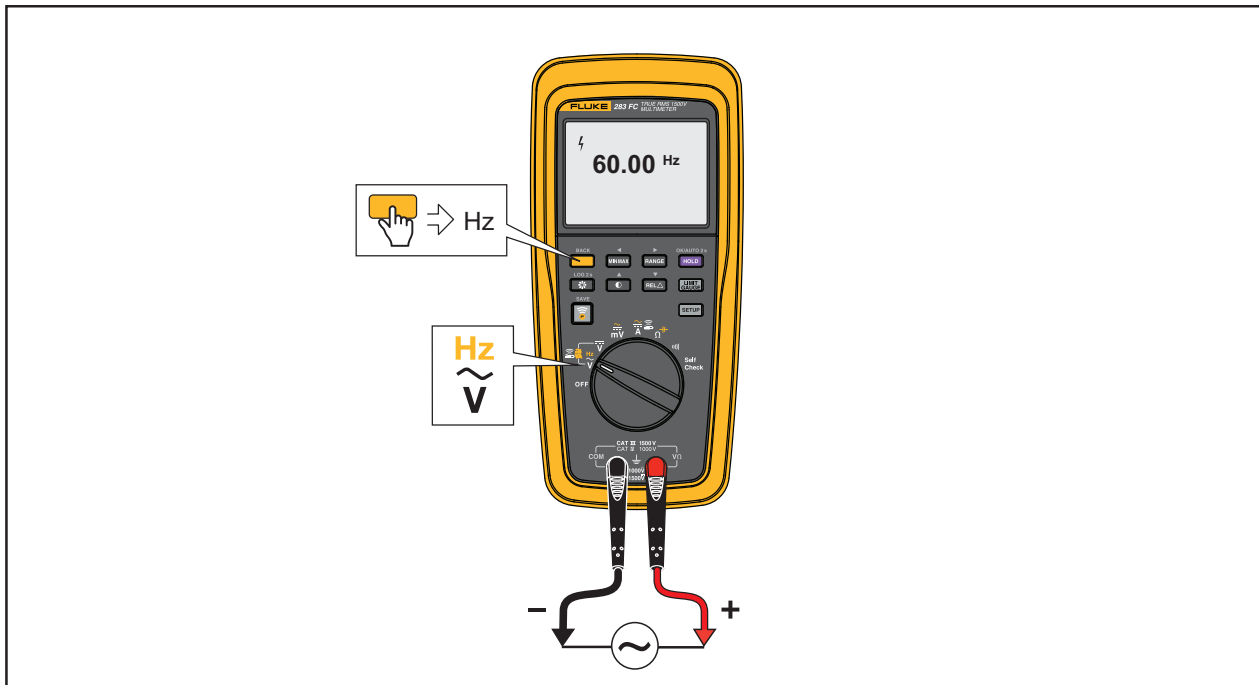
## Frequency Measurement

A frequency measurement is a count of the number of times an ac voltage signal passes through a threshold point each second.

The Product autoranges to one of four frequency ranges: 99.99 Hz, 999.9 Hz, 9.999 kHz, and 99.99 kHz. If a measurement shows 0 Hz or is not stable, the input signal can be below or near a trigger level.

Set up the Product as shown in [Figure 6](#) to measure frequency.

**Figure 6. Frequency Measurement**



## Firmware Update

Firmware updates are available with the Fluke Connect™ feature. The Fluke Connect mobile app shows a notification if a firmware update is available when the unit is connected to the app.

*Note*

*When you upgrade firmware, logged data will be destroyed.*

To update:

1. Make sure the Product has at least 4.0 V battery voltage available.
2. Make sure you download all the logged data before you update the firmware.
3. In the app, tap **Update** to start the firmware update to the Product.

*Note*

*Depending on the update, a firmware update may take up to 90 minutes or longer. Make sure you allow enough time before you begin the update.*

## Firmware Version

To find the installed firmware version for the Meter, see **Device Information** in [Setup Menu](#).

## Maintenance

**⚠⚠ Warning**

**To prevent a possible electrical shock or personal injury:**

- **Have an approved technician repair the Meter.**
- **Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.**
- **Use only specified replacement parts.**
- **Remove the input signals before you clean the Product.**

## General Maintenance

Clean the case with a damp cloth and weak detergent. Do not use a solvent or cleaners with abrasives. Dirt or moisture in the terminals can cause incorrect measurements.

To clean the terminals:

1. Turn off the Product and remove all test leads.
2. Shake out dirt that can possibly be in the terminals.
3. Soak a clean swab with weak detergent and water.
4. Move the swab around in each terminal.
5. Dry each terminal with canned air to push the water and detergent out of the terminals.

### Warning

**To prevent electrical shock or personal injury, remove the test leads and all input signals before you replace the batteries. To prevent damage or injury, install ONLY specified replacement parts shown in [Table 5](#).**

## Product Disposal

Dispose of the Product in a professional and environmentally sound manner:

- Delete personal data on the Product before disposal.
- Remove batteries that are not integrated into the electrical system before disposal and dispose of batteries separately.
- If this Product has an integral battery, put the entire Product in the electrical waste.

## Battery Replacement

### Warning

**To prevent possible electrical shock, fire, or personal injury:**

- **Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 °C. If the batteries are not removed, battery leakage can damage the Product.**
- **Repair the Product before use if the battery leaks.**
- **Be sure that the battery polarity is correct to prevent battery leakage.**
- **Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.**

To replace the batteries:

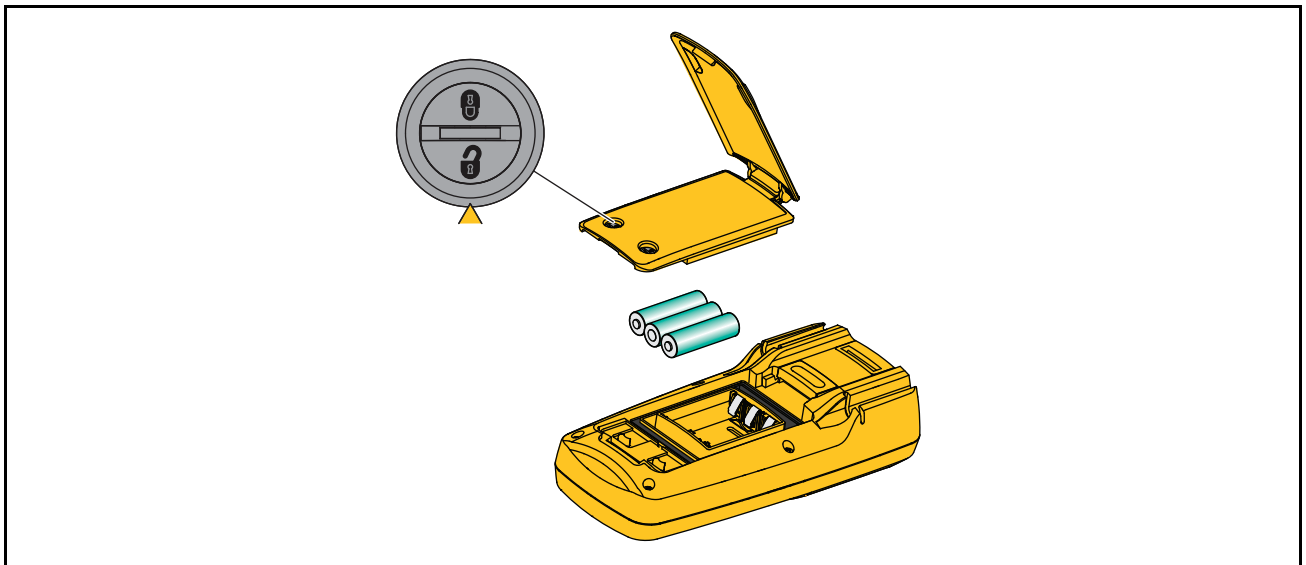
1. Turn off the Product and remove all test leads.
2. Lift the tilt stand up as shown in [Figure 7](#).
3. Turn each battery-door latch until the unlock symbol (🔓) aligns with the arrow.
4. Close the tilt stand and lift off the battery door assembly.
5. Remove the three AA batteries and replace them with new ones. Use the correct battery orientation.
6. With the tilt stand closed, replace the battery door assembly.

*Note*

*When fully open, the hinge on the tilt stand is locked and does not fit into place on the Meter.*

7. Lift the tilt stand up.
8. Turn both battery-door latches until the locked symbol (🔒) aligns with the arrow.

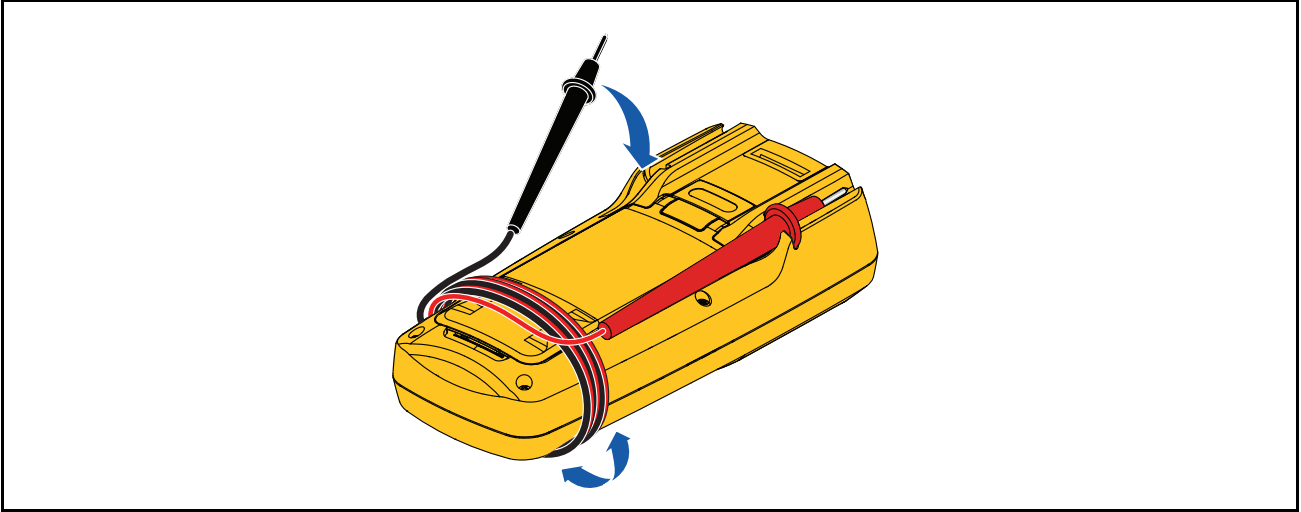
**Figure 7. Battery Replacement**



## Test Lead Storage

Figure 8 shows how to store the test leads with the Meter.

**Figure 8. Test Lead Storage**

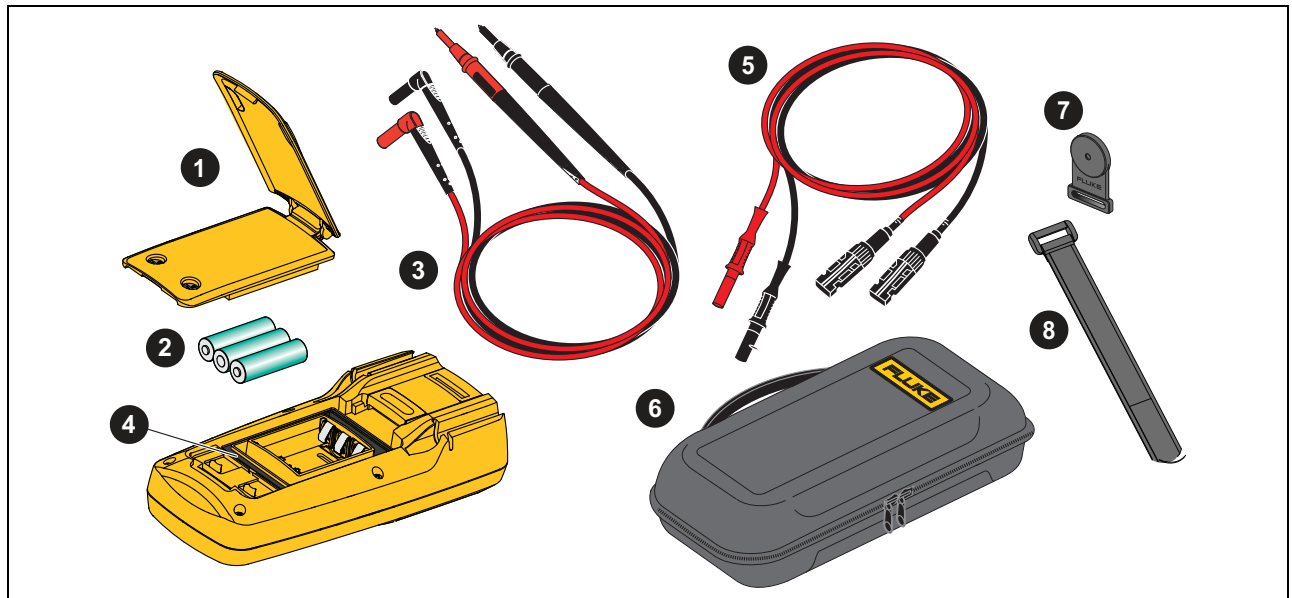




## Service and Parts

If the Product fails to turn on, replace the batteries. [Table 5](#) is a list of replacement parts. To get parts, see [Contact Fluke Corporation](#).

**Table 5. Replacement Parts**



Item	Description	Qty.	Fluke Part or Model Number
1	Battery Door Assembly (includes battery door, tilt stand, and two latches)	1	(APAC) 5595070 + 5595096 + (2) 4320574 or (AMER/EMEA) 6006667 + 5595096 + (2) 4320574
2	Battery, AA 1.5 V	3	376756
3	TL175-HV Test Lead Set	1	6002514
4	Gasket, Battery Door	1	5595129
5	MC4 Test Lead Set	1	5584869/5584878
6	Soft Case	1	5593525
7	TPAK80 Magnet	1	4329190
8	TPAK80 9 in Strap	1	5386922
not shown	Quick Reference Guide	1	5593482
not shown	Safety Information	1	5593502

## Specifications

### General Specifications

#### Display

Update rate.....	4/sec
Volts/amps/ohms .....	6000 counts
Frequency .....	9999 counts
Capacitance .....	9999 counts

#### Battery

Type .....	3 AA, IEC LR6
Life.....	>150 hr typical without backlight >100 hr typical when connected to the wireless current clamp

Temperature Coefficient..... 0.1 X (specified accuracy) /°C (<18 °C or >28 °C)

Wireless Frequency .....

2.4 GHz Band, 10 meter range

Size (HxWxL)..... 22.5 cm x 10.5 cm x 5.7 cm (8.9 in x 4.1 in x 2.2 in)

Weight (with batteries)..... 0.7 kg (1.5 lb)

### Detailed Specifications

For all specifications:

Accuracy is specified for 1 year after calibration, at operating temperatures of 18 °C to 28 °C, with relative humidity at 0 % to 90 %. Accuracy specifications take the form of ±[(% of Reading) + [Number of least significant digits]].

#### AC Voltage

Range <sup>[1]</sup>	Resolution	Accuracy <sup>[2][3][4]</sup>	
		45 Hz to 500 Hz	500 Hz to 1 kHz
6.000 V	0.001 V	1.0 % + 3	2.0 % + 3
60.00 V	0.01 V		
600.0 V	0.1 V		
1000 V	1 V		
600.0 mV	0.1 mV		

[1] All ac voltage ranges are specified from 1 % of range to 100 % of range.

[2] Crest factor of ≤3 at 4000 counts, decreasing linearly to 1.5 at full scale.

[3] For non-sinusoidal waveforms, add (2 % of reading + 2 % full scale) typical, for crest factor up to 3.

[4] Do not exceed 10<sup>7</sup> V-Hz

### DC Voltage, Continuity, Resistance, and Capacitance

Function	Range	Resolution	Accuracy
$\overline{mV}$	600.0 mV	0.1 mV	0.09 % + 2
$\overline{V}$	6.000 V	0.001 V	0.09 % + 3
	60.00 V	0.01 V	
	600.0 V	0.1 V	
	1500 V	1 V	0.15 % + 2
$\overline{   )}$	600 $\Omega$	1 $\Omega$	Meter beeps at <70 $\Omega$ , beeper detects opens or shorts of 250 $\mu$ s or longer.
$\Omega$	600.0 $\Omega$	0.1 $\Omega$	0.5 % + 4
	6.000 k $\Omega$	0.001 k $\Omega$	0.5 % + 4
	60.00 k $\Omega$	0.01 k $\Omega$	
	600.00 k $\Omega$	0.1 k $\Omega$	
	6.000 M $\Omega$	0.001 M $\Omega$	
	50.00 M $\Omega$	0.01 M $\Omega$	1.5 % + 4
$\overline{+}$	1000 nF	1 nF	1.2 % + 2
	10.00 $\mu$ F	0.01 $\mu$ F	
	100.0 $\mu$ F	0.1 $\mu$ F	
	9999 $\mu$ F <sup>[1]</sup>	1 $\mu$ F	10 % typical

[1] In the 9999  $\mu$ F range for measurements to 1000  $\mu$ F, the measurement accuracy is 1.2 % + 2.

### AC and DC Current

Current measurement only with optional accessory, *a283 FC Wireless AC/DC Current Clamp*. For more information, see the *a283 FC Wireless AC/DC Current Clamp Instructions*. This accessory is included in the 283 FC/PV kit. Current measurement up to 60 A.

### Frequency

Range	Resolution	Accuracy <sup>[1]</sup>
99.99 Hz	0.01 Hz	0.1 % + 2
999.9 Hz	0.1 Hz	
9.999 kHz	0.001 kHz	
99.99 kHz	0.01 kHz	

[1] Frequency is specified up to 99.99 kHz in volts.

### AC VA and DC Power

Function	Range	Resolution	Accuracy
AC VA	360.0 VA	0.1 VA	2 % + 1.0 VA
	3.600 kVA	0.001 kVA	2 % + 0.01 kVA
	36.00 kVA	0.01 kVA	2 % + 0.1 kVA
	60.00 kVA	0.01 kVA	2 % + 0.15 kVA
DC Power	360.0 VA	0.1 VA	2 % + 1.0 VA
	3.600 kVA	0.001 kVA	2 % + 0.01 kVA
	36.00 kVA	0.01 kVA	2 % + 0.1 kVA
	90.00 kVA	0.01 kVA	2 % + 0.25 kVA

## Frequency Counter Sensitivity

Input Range <sup>[1][2]</sup>	Typical Sensitivity (RMS Sine Wave)				
	2 Hz to 45 Hz	45 Hz to 10 kHz	10 kHz to 20 kHz	20 kHz to 50 kHz	50 kHz to 100 kHz
$\tilde{V}$	0.5 V	0.6 V	1.0 V	2.8 V	Unspecified <sup>[3]</sup>

[1] Maximum input for specified accuracy = 10X Range or 1000 V.  
 [2] Noise at low frequency and amplitude may exceed the frequency accuracy specification.  
 [3] Unspecified but usable depending on quality and amplitude of signal.

## Input Characteristics

Function	Overload Protection	Input Impedance (nominal)	Common Mode Rejection Ratio (1 k $\Omega$ unbalance)		Normal Mode Rejection
$\tilde{V}$	1100 V rms	>10 M $\Omega$ <100 pF	>120 dB at dc, 50 Hz or 60 Hz		>60 dB at 50 Hz or 60 Hz
$\tilde{V}$	1100 V rms	>10 M $\Omega$ <100 pF	>60 dB, dc to 60 Hz		NA
$\hat{mV}$ dc	1100 V rms	>1 M $\Omega$ <100 pF	>120 dB at dc, 50 Hz or 60 Hz		>60 dB at 50 Hz or 60 Hz
$\hat{mV}$ ac	1100 V rms	>1 M $\Omega$ <100 pF	>60 dB, dc to 60 Hz		NA
		Open Circuit Test Voltage	Full Scale Voltage		Typical Short Circuit Current
			to 6 M $\Omega$	50 M $\Omega$	
$\Omega / \text{Hz}$	1100 V rms	<2.7 V dc	<0.7 V dc	<0.9 V dc	<350 $\mu$ A
$\Omega$	1100 V rms	<2.7 V dc	2.000 V dc		<350 $\mu$ A

## MIN MAX Recording

Function	Accuracy
DC Functions	The specified accuracy of the measurement function $\pm 12$ counts for changes >350 ms in duration.
AC Functions	The specified accuracy of the measurement function $\pm 40$ counts for changes >900 ms in duration.