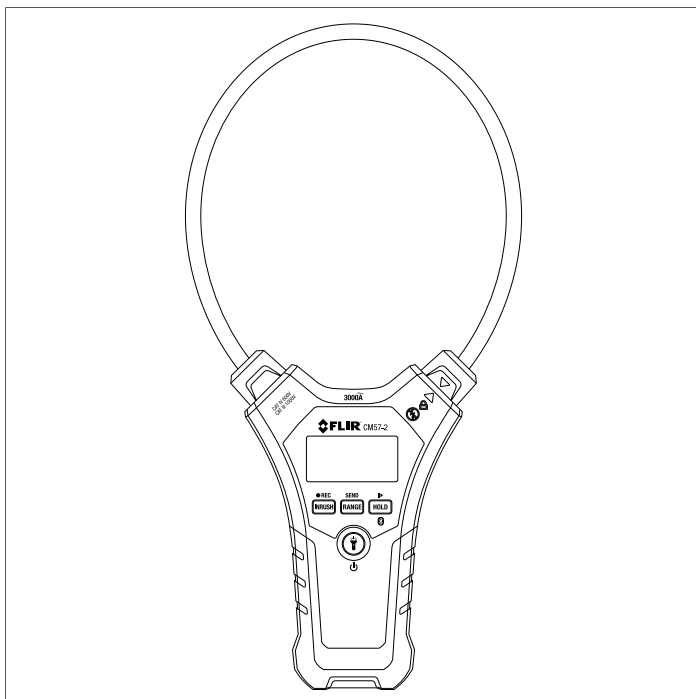




USER MANUAL

Flex Clamp Meter with Bluetooth®

MODEL CM57-2





USER MANUAL

Flex Clamp Meter with Bluetooth

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1 Advisories

1.1 Copyright

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1.2 Quality Assurance

The Quality Management System under which these products are developed and manufactured has been certified in accordance with the ISO 9001 standard. FLIR Systems, Inc. is committed to a policy of continuous development; therefore, we reserve the right to make changes and improvements on any of the products without prior notice.

1.3 Documentation

To access the latest manuals and notifications, go to the Download tab at: <https://support.flir.com>. It only takes a few minutes to register online. In the download area you will also find the latest releases of manuals for our other products, as well as manuals for our historical and obsolete products.

1.4 Disposal of Electronic Waste




As with most electronic products, this equipment must be disposed of in an environmentally friendly way, and in accordance with existing regulations for electronic waste. Please contact your FLIR representative for more details.

2 Safety

2.1 Safety Notes










- Before operating the device, you must read, understand, and follow all instructions, dangers, warnings, cautions, and notes.
- FLIR Systems reserves the right to discontinue models, parts or accessories, and other items, or to change specifications at any time without prior notice.
- Remove the batteries if the device is not used for an extended period.

2.2 Safety Warnings

	WARNING
WARNINGS identify hazardous conditions and actions that could cause BODILY HARM or DEATH.	

- Individual protective equipment should be used if HAZARDOUS LIVE parts in the installation where measurements are to be carried out could be accessible.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- To reduce the risk of fire or electric shock, do not expose this product to rain or moisture.
- Verify the meter operation by measuring a known current. If in doubt, have the meter serviced.
- Do not apply more than the rated voltage/current as marked on the meter.
- To avoid false readings that can lead to electric shock and injury, replace battery as soon as the low battery indicator appears.
- Do not use the meter in or around explosive gas or vapour.
- Do not use a flexible current sensor if the inner copper wire of the flexible cord is visible.
- De-energize the installation under test or wear suitable protective clothing when placing or removing the flexible current probe from a test setup.
- Do not apply/remove the flexible current probe to/from UNINSULATED HAZARDOUS LIVE conductors which may cause electric shock, electric burn, or arc flash.

2.3 Safety Cautions

	CAUTION
Do not use the device for a procedure that it is not made for. This can cause damage to the protection.	
	This symbol, adjacent to another symbol, indicates the user must refer to the manual for further information
	Do not apply or remove clamp from HAZARDOUS LIVE conductors
	Equipment protected by double or reinforced insulation
	Battery symbol
	Conforms to EU directives
	Do not discard this product in household trash
	AC measurement
	Earth ground


2.4 FCC Compliance


This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-
1. Reorient or relocate the receiving antenna.
 2. Increase the separation between the equipment and receiver.
 3. Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 4. Consult the dealer or an experienced radio/TV technician for help.


	CAUTION
Exposure to Radio Frequency Radiation.	
To comply with FCC/IC RF exposure compliance requirements, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.	

	WARNING
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.	

2.5 Industry Canada Compliance

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

	CAUTION
Exposure to Radio Frequency Radiation.	
To comply with RSS 102 RF exposure compliance requirements, for mobile configurations, a separation distance of at least 20 cm must be maintained between the antenna of this device and all persons. This device must not be co-located or operating in conjunction with any other antenna or transmitter.	

3 Introduction

Thank you for choosing the FLIR Flex Clamp with Bluetooth that can measure up to 3000 A AC RMS. This device is a professional CAT IV 600 V CAT III 1000 V instrument that offers data recording, Bluetooth, auto power off (APO), data hold, display backlight, and worklights.

This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.

3.1 Key Features

- 3000 A AC true RMS current measurements
- Convenient flexible clamp with locking mechanism
- 7.5 mm (0.3 in.) coil diameter for measuring in tight spaces
- Auto ranging
- 3000 count large scale backlit LCD display
- Bluetooth communication and data recording
- Data hold
- Auto power off
- Battery status icon
- High power LED worklights
- Long life battery

4 Product Description

4.1 Meter Description

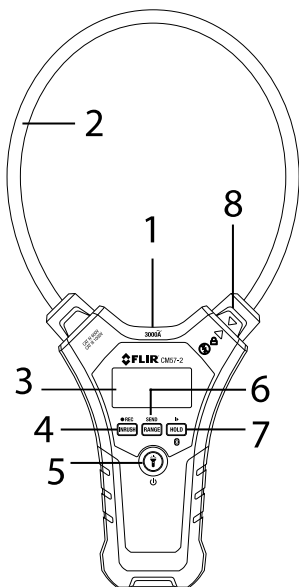











Figure 4.1 Meter Description (see numbered list below).





1. Worklights
2. Flexible current clamp coil
3. Display
4. INRUSH / REC (Record) button
5. Power / Worklight button
6. RANGE / SEND button
7. HOLD / Start-Stop Record / Bluetooth button
8. Clamp Lock mechanism

Note that battery compartment is located on the back of the meter.

4.2 Display Icons Description

	Bluetooth		Display hold		Amperes
	Battery status		Inrush current		Auto power off
	Bulk data transmission		Memory mode		Auto range

4.3 Control Buttons Description

	<ul style="list-style-type: none">• Short press to access INRUSH mode• Long press to access Record Memory mode
	<ul style="list-style-type: none">• Short presses step through the ranges manually• Long press (in manual mode) to return to Auto range• Long press to send data via Bluetooth
	<ul style="list-style-type: none">• Short press to access the Data Hold mode• Long press to activate/deactivate Bluetooth communication• In Record mode, short press to pause/resume
	<ul style="list-style-type: none">• Long press to switch power ON/OFF• Short press to switch worklights ON/OFF

5 Operation



CAUTION


Before operating the device, please read and understand all Warning and Caution statements and follow all instructions and notes.

5.1 Powering the Meter


The meter is powered by two (2) AAA 1.5 V batteries (located in the rear compartment). Long press the power button  to switch the device ON or OFF.

5.1.1 Auto Power Off (APO)


The meter switches OFF automatically after 10 minutes of inactivity. The meter beeps several times shortly before it switches OFF. To disable APO:

1. With the meter OFF, long press the Power and HOLD buttons.
2. The display shows 'AoFF' while it powers up.
3. The APO feature is now disabled, and the meter will not shut off automatically.
4. The next time the meter is powered, the APO function will be re-enabled, and the user must repeat the APO disable instructions to disable this function.
5. When APO is active, the APO icon appears on the display .
6. APO active is the default condition.

5.1.2 Low Battery Indication

When the displayed battery icon  appears empty and flashing, or if the meter does not power up, the batteries must be replaced immediately. Refer to the Maintenance section. Note that measurement accuracy is maintained even while low battery alerts are displayed.

5.2 Worklights

With the unit powered, press the Worklight button  to switch the worklights ON or OFF. Note that excessive use of the worklights will shorten battery life.

5.3 Data (Display) Hold

Press the HOLD button to freeze the displayed reading. The HOLD icon (H) will appear along with the held reading. Press the HOLD button again to release the HOLD feature. The HOLD icon will switch OFF and the meter will revert to displaying real time readings.

5.4 AC Current Measurements



WARNING

Ensure that power to the device under test is OFF before starting this procedure. Switch power to the device under test on only after the clamp has been safely attached to the device under test.



CAUTION

Do not move fingers above the LCD at any time during a test.

1. Switch the meter OFF and switch power to the device under test OFF.
2. Turn the clamp lock (1) counterclockwise to release the flexible clamp (2). Refer to Fig. 5.1.

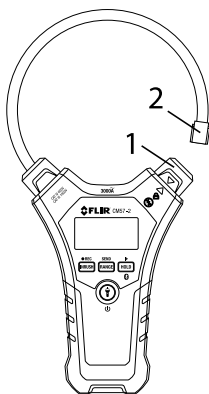


Figure 5.1 Opening the Flex clamp.

3. Fully enclose (and centre) only one conductor of the device under test with the flexible clamp probe (Fig. 5.2).

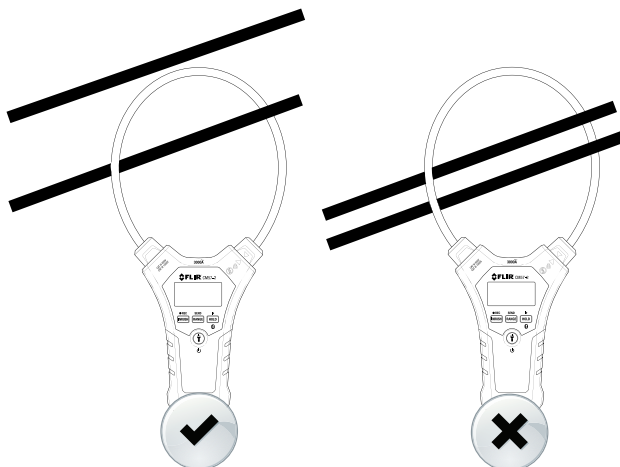


Figure 5.2 Correct (left) and incorrect (right) clamping.

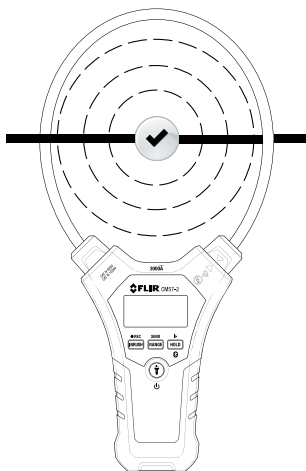



Figure 5.3 Centring the conductor in the clamp.

4. Re-secure the clamp lock (1) after clamping around a single conductor.

5. Do not attempt to measure current higher than the specified current limit.
6. Switch the meter ON and then switch power to the device under test ON. Never move fingers above the display area when running a test.
7. Read the current value in the display; '**OL**' will display if the measured signal exceeds the range. The meter defaults to the Auto Range mode; the Auto Range icon  is visible on the display. The meter will automatically select the appropriate range when in Auto Range mode.
8. To manually select the range, use the **RANGE** button to step through the available ranges (30.00 A / 300.0 A / 3000 A).

5.4.1 Inrush Current

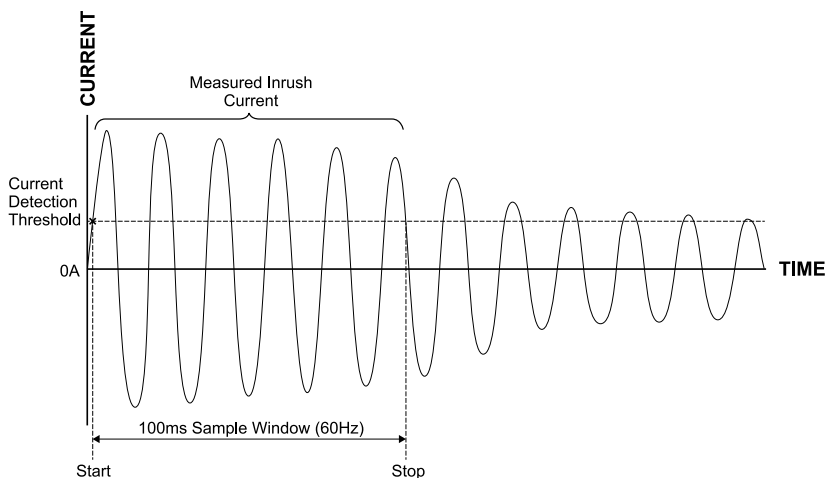



Figure 5.4 Inrush current operation.

The meter can capture inrush current using a 100 ms sampling window. The sampling window opens only when the threshold current (see below) is detected. When detecting an input current, ± 50 digits of the selected range, the meter will calculate the RMS values for a 100 mS period and display this value. Refer to illustration below.

- For the 30 A range the minimum triggering current threshold is 0.5 A
- For the 300 A range the minimum triggering current threshold is 5.0 A
- For the 3000 A range the minimum triggering current threshold is 50 A

1. Press the **INRUSH** button to access the Inrush Current mode.

2. The display will show the Inrush icon  and the display digits will switch to dashes.
3. The meter then waits for a current signal that exceeds the threshold.
4. When ready, turn on power to the device under test. The meter will capture the highest reading detected during a 100 ms window. Note that the 100 ms window does not open until the minimum triggering current is detected.
5. To exit the Inrush mode at any time, press any button. The Inrush icon will switch OFF.


5.5 Data Recording and Data Transfer



5.5.1 Data Recording

When prompted, this meter can store readings to its internal memory, automatically, for later transfer via Bluetooth (real-time data streaming with Bluetooth is also possible as explained below) using the **METERLINK®** application. The maximum number of records that can be stored is 20,000 and the fixed sampling (recording) interval is 1 minute.




CAUTION

Please enable Bluetooth by long pressing the Bluetooth button  until the Bluetooth icon appears flashing, before starting the procedure below.

1. Long press the **REC** button to enter the Data Record Mode. The display will show the Memory icon .
2. Use the Start/Stop button  to Start/Stop Recording. The Memory icon will flash when the meter is recording and will stop flashing when recording is stopped. The display digits will show the measured reading.
3. Note that after one start and stop cycle, stored data is erased when a new data recording session is started.
4. To transfer all the stored readings at once, or to data stream in real-time via Bluetooth, please refer to the following sections.
5. Long press the REC button to exit the Data Recording Mode.
6. Note that Data Recording cannot be accessed while the meter is in the Inrush mode.
7. Disable the APO utility when data recording.


5.5.2 Meter Identification (ID) Number

A unique numerical ID (00-20) can be assigned to the meter. When multiple meters are used with Bluetooth, each can be specifically addressed. Do not use the same ID number for multiple meters.

-
1. With the meter OFF, press both the **POWER** and **RANGE** buttons simultaneously to access the ID number. The display will show 'ldxx'.
 2. Use the **RANGE** button to increment the ID number.
 3. When the desired number is shown, short press the  button to save the ID.
 4. Cycle meter power OFF then ON.
 5. The meter will now be recognized by its unique ID on Bluetooth receiving devices.

5.5.3 Transferring Recorded Readings with Bluetooth

To transfer bulk logged readings from the meter's internal memory to a Bluetooth paired device (running the METERLiNK application) please read the steps below. Note that the Bluetooth range is 10 m (32 ft.) maximum.

1. Long press the Bluetooth button  until the Bluetooth icon appears flashing.
2. Press and hold the **SEND** button until the percent (%) symbol appears.
3. The data is now being transmitted.
4. The percentage shown is the percentage of data transmitted. Press the **SEND** button at any time to cancel the transmission. RANGE mode is inactive during data transmission.
5. Once all data is transferred (100% displayed), press the **SEND** button to return to the main display.

5.5.4 Streaming Bluetooth Communication

To stream real-time readings using Bluetooth:

1. Long press the Bluetooth button until the Bluetooth icon appears flashing.
2. Connect with the METERLiNK application.
3. When connected, the Bluetooth icon stops flashing and appears solid.
4. The readings are now automatically transmitted over Bluetooth as they are taken.
5. See the separate METERLiNK user manual for additional information. User manuals can be downloaded from the support site (see the Customer Support section).

6 Maintenance

6.1 Cleaning and Storage

Clean the meter with a damp cloth and mild detergent; do not use abrasives or solvents.

If the meter is not to be used for an extended period, remove the batteries, and store them separately.

6.2 Battery Replacement



CAUTION

Remove the meter from the conductor under test, and switch the meter OFF, before opening the battery compartment.

1. With a Phillips screwdriver, remove the battery compartment screw on the back of the meter.
2. Remove the battery compartment cover.
3. Replace the 2 'AAA' 1.5V batteries, observing correct polarity.
4. Re-attach the battery compartment cover.
5. Secure the compartment cover with the Phillips screw.

6.3 Disposal of Electronic Waste

As with most electronic products, this equipment must be disposed of in an environmentally friendly way, and in accordance with existing regulations for electronic waste.

Please contact your FLIR Systems representative for more details.

7 Specifications

7.1 General Specifications

Clamp Jaw	Flexible type with locking mechanism
Coil diameter	7.5 mm (0.3 in.) Coil tip: 13 mm (0.5 in.)
Coil bend radius	80 mm (3.1 in.)
Display	3000 count LCD with backlight and multifunction indicators
Low Battery indication	Battery symbol appears empty and flashing
Over-range indication	'OL' display
Worklights	Two (2) white LED lamps
Measurement rate	3 readings per second
Data Recording Rate	1 reading per minute
AC bandwidth	45 to 500 Hz (sine wave)
AC response	True RMS
Inrush	Min. trigger current 0.50 A @ 30.00 A, 5.00 A @ 300.0 A, 50 A @ 3000 A; Sampling period 100 ms
Operating Temperature	0 to 50°C (32 to 122°F)
Operating Humidity	Max 80% up to 35°C (95°F) decreasing linearly to 60% at 45°C (113°F)
Storage Temperature	-20 to 60°C (-4 to 140°F) without batteries
Storage Humidity	80% RH maximum
Temperature Coefficient	0.2 x specified accuracy / °C, < 18°C (64.5°F), > 28°C (82.4°F)
Altitude	Maximum operating altitude 2000 m (6562 ft.)
Battery	Two "AAA" 1.5V batteries
Battery life	100 hours with alkaline batteries
Auto power OFF	After approx. 10 minutes of inactivity
Dimensions	330 x 175 x 28 mm (13.0 x 6.9 x 1.1 in.)
Weight	233 g (0.5 lbs.) with batteries
Drop Test	3 m (9.8 ft.)

Agency Approvals	CE, UL, RCM
Safety Standards	IP54
	For indoor use and in accordance with the requirements for double insulation to EN61010-1, EN61010-2-032, EN61326-1; CAT IV 600 V, CAT III 1000 V, Pollution Degree 2, CE

7.2 AC Current Electrical Specifications

Function	Range	Overload (OL)	Resolution	Accuracy (of reading) 45 to 500 Hz
AC Current	30.00 A AC	33.00 A AC	0.01 A	$\pm (3.0\% + 5 \text{ digits})$
	300.0 A AC	330.0 A AC	0.1 A	$\pm (3.0\% + 5 \text{ digits})$
	3000 A AC	3300 A AC	1 A	$\pm (3.0\% + 5 \text{ digits})$

Notes:

Accuracy is given as \pm (% of reading + least significant counts) at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ with relative humidity $< 80\%$. Accuracy is specified for a period of one year after calibration.

LCD displays '0' counts when the reading is < 10 counts.

AC A specifications are AC Coupled, true RMS.

For non-sinusoidal waveforms, additional accuracy Crest Factor (C.F.) considerations exist as detailed below:

- Add 3.0% for C.F. 1.0 to 2.0
- Add 5.0% for C.F. 2.0 to 2.5
- Add 7.0% for C.F. 2.5 to 3.0

Position error of clamp: Accuracy and position error assumes centralized primary conductor at optimum position (centre of clamp jaw), no external electrical or magnetic field, and within operating temperature range.

Distance from optimum position	Error	Position *
35 mm (1.4 in.)	1.0%	A
50 mm (2.0 in.)	1.5%	B
60 mm (2.4 in.)	2.0%	C

* See position examples in figure below.

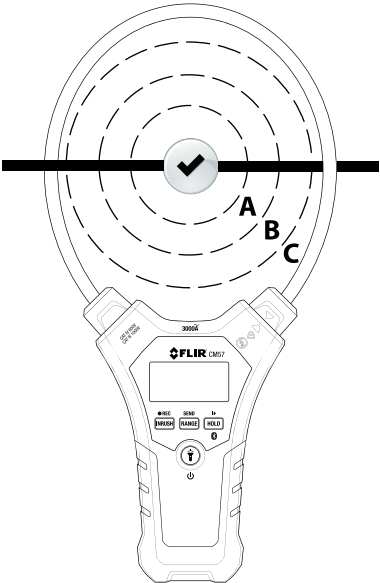


Figure 7.1 Positioning errors (see table above).

8 CUSTOMER SUPPORT

Customer support and documentation downloads are available at the link below.

<https://support.flir.com>

9 Warranty

This device is protected by the FLIR Limited Lifetime Warranty. Read the warranty document at the link below.

<https://flir.com/testwarranty>



Website

<http://www.flir.com>

Customer support

<http://support.flir.com>

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