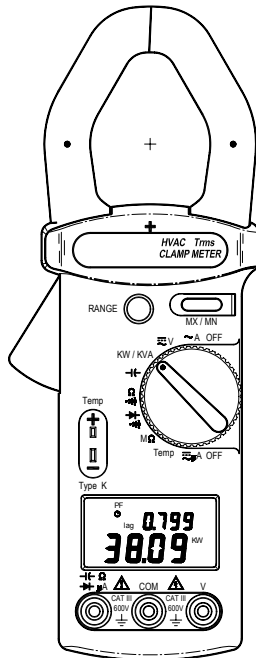


User's Guide



1000 Amp HVAC True RMS Power Clamp-On

Model 380975



Introduction

Congratulations on your purchase of the Extech 380975 Power Clamp-On Meter. This device measures Power (True & Apparent), Phase Angle, True RMS Current/Voltage, Resistance, Capacitance, Frequency, & Temperature. The Model 380975 offers a multitude of features; please read the entire manual to get the most from its capabilities. Careful use of this meter will provide years of reliable service.

Warranty

EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for one year from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website at www.extech.com (click on 'Contact Extech' and go to 'Service Department' to request an RA number). A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

Safety Information

- Read the following safety information carefully before attempting to operate or service the meter.
- To avoid damage to the instrument do not exceed the maximum input limits shown in the technical specifications.
- Do not use the meter or test leads if they appear damaged.
- Use extreme caution when working around bare conductors or bus bars. Accidental contact with the conductor could result in electric shock.
- Use the meter only as specified in this manual; otherwise, the protection provided by the meter may be impaired.
- Read the operating instructions before use and follow all safety information.
- Use caution when working with voltages above 60VDC or 30VAC RMS. Such voltages represent a shock hazard.
- Before taking resistance measurements or testing continuity, disconnect the circuit under test from the main power supply and remove all loads from the circuit.

Safety symbols



Caution! Refer to this manual before using the meter.



Dangerous voltages.



Meter is protected throughout by double insulation or reinforced insulation.

When servicing, use only specified replacement parts.



Complies with EN-61010-1, IEC 1010-2-32

Specifications

Environment Conditions

- Installation category III
- Pollution degree 2
- Altitude up to 2000 meters
- Indoor use only
- Relative Humidity: 80% max.
- Ambient temperature for operation: 32 to 122°F (0 to 50°C)

General Specifications

Display	Dual Display; 4-digit, 10,000 count LCD
Jaw Opening	1.57" (40mm)
Max. Input limit	Max. voltage between any terminal and ground: 600V
Sampling rate	2.5 times per second (once per second for KW and KVA)
Auto Power OFF	Approx. 30 minutes; can be defeated
Low battery indication	Battery symbol appears on the LCD
Power supply	9V Battery
Battery life	Approx. 80 hours with alkaline battery
Operating Temperature	32 to 122°F (0 to 50°C)
Operating Humidity	< 80% RH
Storage Temperature	14 to 140°F (-10 to 60°C)
Storage Humidity	< 80% RH
Temperature coefficient	0.1 x (specified accuracy / °C) at < 64°F (18°C) > 82°F (28°C)
Dimensions	9.0 x 3.0 x 1.5" (228 x 76 x 39mm)
Weight	Approx. 1.0 lb. (465g)

Measurement Specifications

Accuracy: \pm (% of rdg + number of digits) at 18°C to 28°C (64°F to 82°F) R.H. < 80%.

AC Current (50Hz to 400Hz) True RMS

Range	Resolution	Accuracy (of reading)	Sensitivity	Overload Protection
99.99A	10mA	\pm (2% + 20d) (50, 60Hz)	0.10A	1000A
999.9A	100mA	\pm (4% + 20d) (40~400Hz)	1.0A	

μ A True RMS (AC+DC)

Range	Resolution	Accuracy	Sensitivity	Overload Protection
99.99 μ A	10nA	\pm (1% + 20d)	0.20 μ A	600V
999.9 μ A	100nA		2.0 μ A	

Burden Voltage: 5mV/ μ A

AC Voltage (50Hz to 400Hz) True RMS

Range	Resolution	Accuracy	Sensitivity	Overload Protection
999.9mV	0.1mV	$\pm(1\% + 20d)$ (50, 60Hz) $\pm(2\% + 20d)$ (40~100Hz)	2.0mV	600V
9.999V	1mV	$\pm(1\% + 20d)$ (50, 60Hz) $\pm(2\% + 20d)$ (40~400Hz)	0.020V	
99.99V	10mV		0.20V	
600.0V	100mV		2V	

Input impedance: 3M Ω **DC Voltage**

Range	Resolution	Accuracy	Sensitivity	Overload Protection
999.9mV	0.1mV	$\pm(1.0\% + 20d)$	2.0mV	600V
9.999V	1mV		0.020V	
99.99V	10mV		0.20V	
600.0V	100mV		2V	

Input impedance: 3M Ω **Resistance (Audible Continuity on readings <40 Ω on the 999.9 Ω range)**

Range	Resolution	Accuracy	Overload Protection
999.9 Ω	100m Ω	$\pm(1\% + 10d)$	600V
9.999K Ω	1 Ω		
99.99K Ω	10 Ω		
999.9K Ω	100 Ω		

M Ω (Resistance)

Range	Resolution	Accuracy	Overload Protection
9.999M Ω	1K Ω	$\pm(5\% + 10d)$	600V
99.99M Ω	10K Ω		

Capacitance

Range	Resolution	Accuracy	Overload Protection
10.000 μ F	1nF	$\pm(1.5\% + 5d)$	600V
100.00 μ F	10nF		
1000.0 μ F	100nF		
7000 μ F	1 μ F	$\pm(2.5\% + 15d)$	

Diode (Continuity <40mV)

Range	Resolution	Accuracy	Overload Protection
2.000V	1mV	$\pm(2\% + 1d)$	600V

Temperature (K-Type thermocouple)

Range	Resolution	Accuracy	Overload Protection
-50 $^{\circ}$ C to 900 $^{\circ}$ C	0.1 $^{\circ}$ C	$\pm(1\% + 1^{\circ}$ C)	30V _{AC} or 60V _{DC}
-58 $^{\circ}$ F to 1000 $^{\circ}$ F	0.1 $^{\circ}$ F	$\pm(1\% + 2^{\circ}$ F)	

TRUE Power (PF > 0.7 or $\theta < 45^{\circ}$)

Range	Resolution	Accuracy	Overload Protection
60.00KW (<100A)	10W	$\pm(5\% + 20d)$ (50/60Hz)	600VAC/ 1000AAC
600.0KW (>100A)	100W		

Apparent Power

Range	Resolution	Accuracy	Overload Protection
60.00KVA (<100A)	10VA	±(2.5% + 20d)	600VAC/1000AAC
600.0KVA (>100A)	100VA		

Phase Angle (50/60Hz)

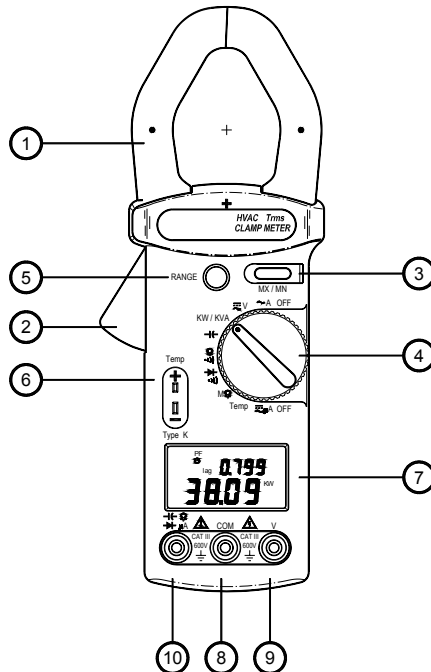
Range	Resolution	Accuracy	Sensitivity
-45° ~ 0° ~ +45°	0.1°	±3.0°	ACV>100V, ACA>10A

Frequency

Range	Resolution	Accuracy	Sensitivity
40Hz/1KHz	0.1Hz	±(0.5% + 2d)	ACV>0.2V, ACA>6A

Meter Description

1. Transformer Jaws
2. Jaw opening trigger
3. Data Hold & MX/MN button
4. Function Selector
5. Range button
6. Temperature input jack
7. LCD Display
8. 'COM' input jack
9. 'V' input jack
10. Ω \rightarrow μ A input jack



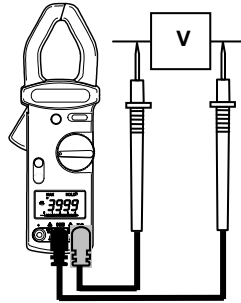
Measurement Details

AC and DC Voltage Measurements

WARNING

The max. input is 600V. Do not attempt to take a voltage measurement that exceeds this limit. Exceeding this limit could cause electrical shock and damage to the meter.

1. Set the rotary switch to the 'V' position.
2. Insert the test leads into the meter's input jacks. (Black to 'COM' and Red to 'V')
3. Connect the test leads to the measured circuit.
4. The meter will automatically detect and display AC or DC voltage and automatically select the appropriate range.
5. Read the voltage (main display) and frequency (upper, smaller display digits) on the LCD.



NOTE

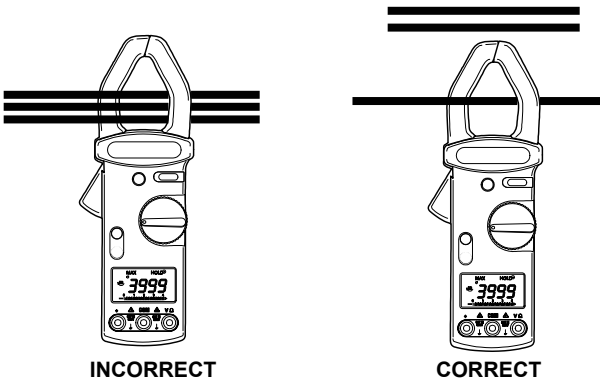
The sensitivity for voltage/frequency measurements is 0.2V and the frequency range is 40 to 1KHz. If the frequency is less than 40Hz the LCD may display '.Hz'.

AC Current Measurements

1. Set the rotary switch to the "~A" position.
2. Press the Trigger to open the jaw.
3. Fully enclose the conductor that is being measured in the jaw. No gap should exist between the two jaw halves. The conductor under test must be a single wire; if there are multiple wires in a cable the conductor must be isolated (see diagram below).
4. The meter selects the range automatically.
5. Read the measured current (main display) and frequency (upper display) on the LCD.

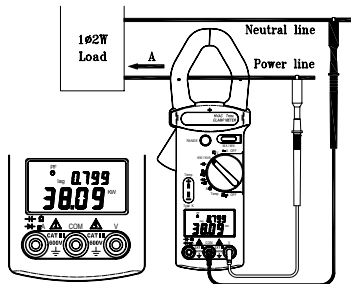
NOTE

The sensitivity for current/frequency measurements is 6A and the frequency range is 40 to 400Hz. If the frequency is less than 40Hz the LCD may display '.Hz'.



AC Power - KW, KVA, PF (Power Factor) and θ (Phase Angle) Measurements

1. Set the rotary switch to the 'KW/KVA' position.
2. Insert the test leads to the meter as follows:
Black to 'COM' and Red to 'V'.
3. Connect the black lead to the neutral line.
4. Connect the red lead to the power line and clamp onto the same lead to which the red lead is connected.
5. The meter selects the best range automatically.
6. Select the desired display combination using the RANGE key. Press RANGE to scroll through kW/PF, KVA/Phase Angle, and V/A combination displays. Note that LEAD and LAG icons are also displayed on the LCD to inform the user that the voltage is leading or lagging the current with regards to phase. Allow 2 seconds after each RANGE key press for the meter to update the display.



$$PF = \frac{KW}{KVA} = \cos\theta$$

$$KVA \text{ (Apparent Power)} = (V \cdot A) / 1000$$

$$KVAR \text{ (Reactive Power)} = \sqrt{(KVA)^2 - (KW)^2} = KVA \cdot \sin\theta$$

NOTES

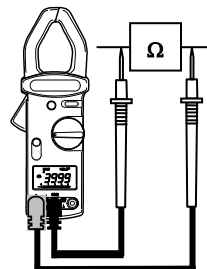
1. The '+' sign printed on the meter must face the power source for best accuracy.
2. If the device under test is a switching mode power supply, the KW, PF, and Phase angle measurements may be inaccurate.

Resistance and Continuity Measurements

WARNING

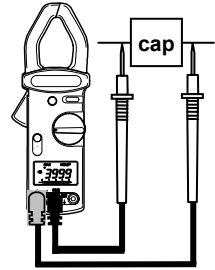
Before taking any in-circuit resistance measurements remove power from the circuit under test and discharge all capacitors.

1. Set the rotary switch to the ' Ω ', ' $\text{M}\Omega$ ', or ' $\text{K}\Omega$ ' position.
2. Insert the test leads into the input jacks. (Black to 'COM' and Red to ' Ω ')
3. Connect the test leads to the circuit or component under test.
4. Read the resistance value on the LCD.
5. For measurements $< 40\Omega$, the continuity beeper will sound.



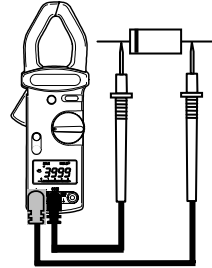
Capacitance Measurements

1. Fully discharge the capacitor under test before proceeding.
2. Insert the test leads into the input jacks. (Black to 'COM' and Red to $\text{---} \leftarrow$).
3. Set the rotary switch to the $\text{---} \leftarrow$ position.
4. Connect the red and black test leads to the capacitor. For Electrolytic (polarized) capacitors, connect the red test lead to the positive side and the black lead to the negative side.
5. Read the capacitance value displayed on the LCD.



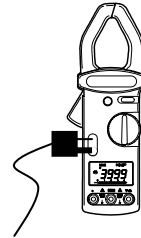
Diode (with Audible Continuity)

1. Set the rotary switch to the " $\text{---} \rightarrow \cdot \cdot \cdot$ " position.
2. Insert the test leads into the input jacks. (Black to 'COM' and Red to $\text{---} \rightarrow$).
3. Touch the test probe tips to the diode or semiconductor junction under test. Note the meter reading.
4. Reverse the test lead polarity by reversing the red and black leads. Note this reading.
5. The diode or junction can be evaluated as follows:
 - a. If one reading shows a value and the other reading shows 'OL' (overload), the diode is good.
 - b. If both readings show 'OL', the device is open.
 - c. If both readings are very small or zero, the device is shorted.
 - d. Note that the audible continuity function is operational in this mode (<40mV).



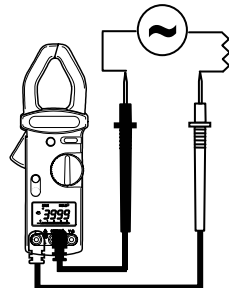
Temperature Measurements

1. Set the rotary switch to the "TEMP" position.
2. Press the RANGE button to select the desired unit of measure (degrees C or F).
3. Insert the Type K Thermocouple into the subminiature input jacks located to the lower left of the rotary selector switch.
4. Read the temperature value on the LCD.



AC and DC μA Measurements

1. Set the rotary switch to the " $\text{---} \sim \mu\text{A}$ " position.
2. Insert the test leads into the input jacks. (Black to 'COM' and Red to μA).
3. Connect the test leads in series with the circuit or device under test.
4. The meter will automatically select AC or DC and the appropriate range.
5. Read the current value on the LCD.



Meter Control Keys

HOLD - MX/MN Key

Data Hold Function

Press this key momentarily to put the meter into Data Hold mode (HOLD will appear on the LCD). In this mode, the meter freezes the displayed reading. To exit the Data Hold mode, press the key again (the HOLD icon will switch off). Note that the Data Hold mode is not available for Capacitance measurements.

MX/MN (Maximum and Minimum reading mode)

The MX/MN mode permits the user to record and recall the highest and lowest readings while taking measurements. The MX/MN feature is available for ACA, ACV, DCV, TEMP, and uA functions only. The following steps outline the MX/MN feature:

1. Take an ACA, ACV, DCV, TEMP, or uA measurement as described earlier.
2. Press and hold the MX/MN key for 2 seconds.
3. The Elapsed Timer and the MX/MN & ® indicators will appear on the LCD.
4. The Elapsed Timer shows the duration of the measurement session in Minutes and Seconds (the Elapsed Timer switches to Hours and Minutes after 60 minutes). The maximum recording time is 100 hours.
5. The ® indicator informs the user that the measurement range is being held. Note that the AUTO POWER OFF feature is disabled in the MX/MN mode.
6. Press the MX/MN key again to view the highest reading and the time (shown on the Elapsed Timer) that the reading was taken. The 'MX' icon will appear on the LCD.
7. Press the MX/MN key again to view the lowest reading and the time (shown on the Elapsed Timer) that the reading was taken. The 'MN' icon will appear on the LCD.
8. Press again to view the current elapsed time and measurement.
9. To exit this mode, press and hold the MX/MN key until MX/MN indicators switch off.

RANGE Key

The RANGE Key operation varies from mode to mode. Refer to the information below:

In ACA, ACV, DCV, μ A, Capacitance, and Resistance modes:

1. Press RANGE to enter the Manual Range mode (the ® indicator will appear).
2. Press RANGE again to select the desired range manually.
3. Press and hold the RANGE key to exit this mode (the ® indicator switches off).

In KW/kVA mode:

As described earlier, use the RANGE key to select the desired display combination: KW & PF, KVA & Phase angle, or Current / Voltage.

In TEMP mode:

Use the RANGE key to select the desired unit of measure ($^{\circ}$ C or $^{\circ}$ F).

Automatic Power OFF and Battery Replacement

The Meter is powered by a 9V battery. An AUTO POWER OFF feature is included (discussed below) to preserve battery life. Instructions on defeating the AUTO POWER OFF feature and battery replacement are also detailed below.

Auto Power OFF


The meter automatically turns off after 30 minutes to conserve battery energy. To defeat this feature:

1. Turn the meter OFF.
2. Press and hold the HOLD key while turning the selector switch to the AC Amps position.
3. Release HOLD when the clock icon appears on the LCD.
4. Note that the Auto Power OFF feature is disabled when the meter is in the MIN/MAX mode (by pressing the MN/MX button).

Battery Replacement

WARNING

To prevent electrical hazard or shock, turn off the meter and disconnect test leads before removing back cover.

When the battery power falls low, the LCD will display . Replace the 9V battery as described below:

1. Set the Range switch to the OFF position.
2. Remove the back cover by first removing the rear screw and then prying open the housing.
3. Replace the 9V battery.
4. Reassemble the meter housing.

Calibration and Repair Services

Extech offers complete repair and calibration services for all of the products we sell. For periodic calibration, NIST certification on most products or repair of any Extech product, call customer service for details on services available. Extech recommends that calibration be performed on an annual basis to ensure calibration integrity.



Support Hotline (781) 890-7440

Tech support: Ext. 200; Email: support@extech.com

Repair>Returns: Ext. 210; Email: repair@extech.com

Website: www.extech.com

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