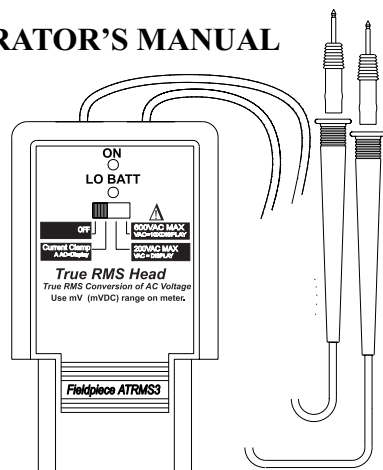


**TRUE RMS
ACCESSORY HEAD
Model ATRMS3**

OPERATOR'S MANUAL



Description

The ATRMS3 converts an "average sensing" meter to a true RMS meter. It converts AC voltage to a DC voltage proportional to the true RMS value. When used with a current clamp, it can measure true RMS AC current.

Range settings

The meter should be set to a mVDC range. A "1.0" on the display means 1mVDC.

The ATRMS3 switch must be set to correspond to the maximum VAC being input. The 200VAC range should be used for voltages up to 200VAC, the 600VAC should be used for voltages up to 600VAC. The current clamp switch position is used for input voltages up to 200mVAC. (The current clamp converts current going through the jaws to a AC voltage at the rate of 1A/1mVAC.)

Interpreting the display

With the meter set on the mVDC range and the ATRMS3 set on 200VAC, "1.0" on the meter means 1VAC True RMS.

For the current clamp, "1.0" means 1AAC.

On the 600VAC position, "1.0" on the meter means 10VAC. For example, "44.1" displayed on the meter means 441VAC.

averages the volts or current over time; to get the true RMS value, you must average power over time and then calculate current or voltage. Power is proportional to the square of either voltage or current. To get average power, you must average the square of voltage or current. The "true RMS" value is proportional to the square root of that. "RMS" means "root mean square". In other words, the square root of the average of the squared values.

Here are the waveforms of a lamp dimmer fully on and half on (assuming the bulb resistance is constant).

	AVERAGE	TRUE RMS
	120V	120V
	$\frac{120V}{2} = 60V$	$\sqrt{\left(\frac{120V}{2}\right)^2} = 85V$

Why True RMS?

When you have a value that is varying, how do you express it in one number? It's common to express it so that you can use the number when calculating power. That's the true RMS value. It's the "equivalent" DC value.

The measurement circuit in most multimeters measures the average value. For AC, the meter multiplies the actual average by a constant to give the true rms value for a sine wave. This value has been referred to as "average sensing, true RMS indicating" or just "average". For a sinusoidal waveform (like the voltage delivered by the power companies), the true RMS and average are the same. AC motors, resistance heaters, and other linear loads cause little if any change in the shape of the waveform and therefore true RMS and average measurements will be the same.

For non-sinusoidal waveforms, the constant may be incorrect. The more different from a sine wave, the further from the true RMS value the reading may be. Phase controlled variable speed motor drives and other nonlinear loads can cause the waveform to be different from a sine wave. Average and true RMS may be different.

Here's the reason: the average reading

Features

- Measures true RMS AC voltages up to 600VAC
- With current clamp, measures true RMS values of AC current up to 300A
- Works with most digital multimeters, Requires 0.1 mVDC resolution and Fieldpiece ADL2 test leads.

How to use

1. Connect head to COM and V/w jacks on meter. Slide on Fieldpiece "stick" meter. Use Fieldpiece ADL2 leads for most other meters.
2. Select mV (mVDC) range on meter.
3. Select switch position on accessory head.
4. For AC current measurements, connect leads to current clamp.
5. Interpret LCD (liquid crystal display on meter) as follows:

Switch position	Reading
Current clamp	Amps AC=display on meter
200VAC	Volts AC=display on meter
600VAC	Volts AC =10 X display on meter

W WARNING
On 600VAC position, the number displayed on the meter must be multiplied by 10. For example, a display of "44.0" means 440VAC.

One Year Limited Warranty

This head is warranted to the original purchaser against defects in material and workmanship for a period of one year from the date of purchase. During the warranty period, Fieldpiece will replace or repair the defective unit, subject to verification of the defect. This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use.

ANY IMPLIED WARRANTIES ARISING OUT OF THE SALE OF A FIELDPIECE INSTRUMENT PRODUCT, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE ABOVE. FIELDPIECE SHALL NOT BE LIABLE FOR LOSS OF USE OF THE INSTRUMENT OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES, EXPENSES, OR ECONOMIC LOSS, OR FOR ANY CLAIM OR CLAIMS FOR SUCH DAMAGE, EXPENSES, OR ECONOMIC LOSS.

State laws vary. The above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Specifications

Operating: 0°F to 120°F at <70%RH
Storage: 0°F to 140°F, <80%RH with battery removed

Input/output:	SWITCH POSITION		
	Current clamp**	200VAC	600VAC
Max input	200mVAC	200VAC	600VAC
Resolution*	0.1A	0.1VAC	1VAC
Output/input	1mVDC /1AAC	1mVDC /1VAC	1mVDC /10VAC

* Meter must have 0.1mVDC resolution, 10M ohm input impedance.

** With optional current clamp model ACH or other 1AAC/1mVAC clamp.

Accuracy(75°F±10°F): 1.2%±3, 50Hz to 500Hz
Input impedance: 10MOhms
Overload protection: 600VAC rms on all ranges.
Crest factor: <3, <6 at half range.
Temperature coefficient: 0.05x(specified accuracy)/1°F <65°F or >85°F

Power: 9V battery
Battery life: 200 hours typical in "ON" position.
Auto battery off after 30 minutes.
Power-on & Low Battery LEDs.

Obtaining service

Call Fieldpiece (714-992-1239) for an RMA# and send freight prepaid to:

Fieldpiece Instruments
231 East Imperial Highway #250
Fullerton, CA 92835

For warranty service, include proof of purchase date. For out of warranty service, include a check or money order for \$20. We will send you a reconditioned and calibrated accessory head.



Fieldpiece Instruments, Inc.
580 West Central Ave. Suite A
Brea, CA 92835
Phone: (714) 257-9060
Fax: (714) 257-9069
www.fieldpiece.com

HOW TO USE THE ATRMS3

Meter settings

Set the meter to display mVDC.

figure 1.

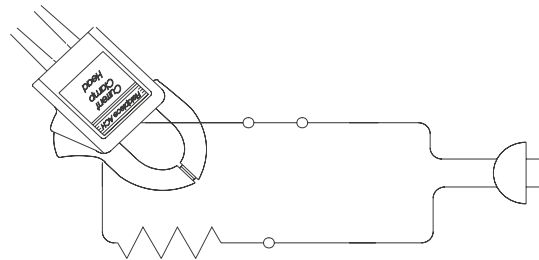


figure 2.

AC amps

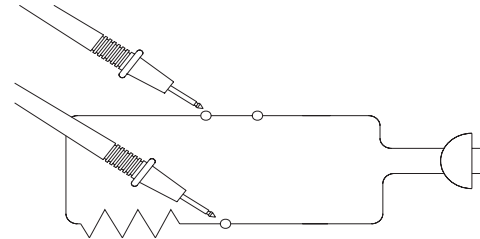
Select the first switch position labeled "current clamp" and attach a Fieldpiece ACH (or any other current clamp which converts 1AAC to 1mV AC) to the leads of the ATRMS3 (figure 3.). Current will be displayed directly on multimeter.

Attach directly to the HS series stick meter (figure 1.), attach it to the HB series meter (figure 2.), or most other multimeters that can read DC mV.

figure 3.

=6.8AAC

figure 4.



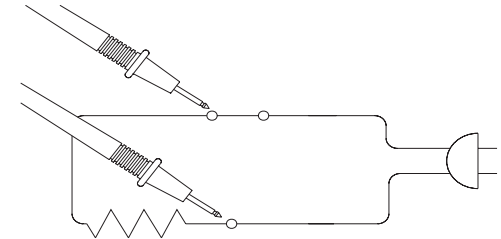
AC volts <200VAC

Select the second switch position marked 200V MAX (figure 4.). The voltage value will appear on the multimeter display.

CAUTION: The high voltage warning in the Fieldpiece meters will not sound when the ATRMS3 is in use.

=120.8VAC

figure 5.



AC volts <600VAC

Place the ATRMS3 switch in the final position marked 600VMAX (figure 5.). The voltage being measured will be 10 times the value of that shown on the multimeter.

D
Multiply display times 10!
=440VAC