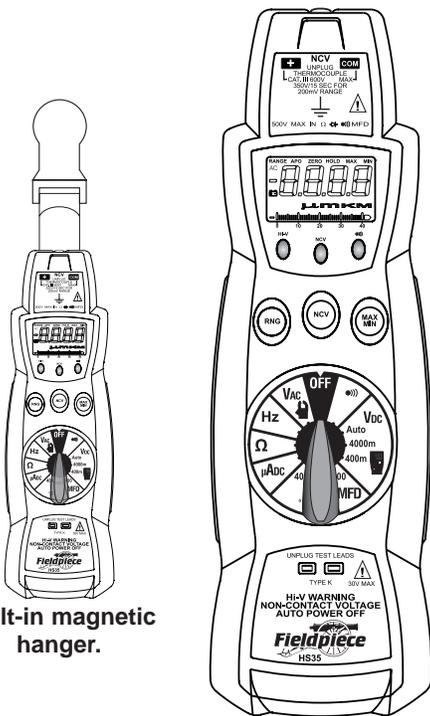


# AUTO-RANGING DIGITAL STICK METERS: HS35 AND HS36



Built-in magnetic hanger.



## OPERATOR'S MANUAL

### Non-contact voltage

With the red NCV tab on the tip of the meter close to an AC voltage, press and hold the NCV button. The NCV LED will light and the beeper will beep. The closer you get to AC voltage, the louder the beep. The NCV function is sensitive enough to detect 24VAC on thermostats.

### Hi voltage indicator

In any VAC/VDC range, when you touch a voltage greater than 30V, the beeper will beep and the red Hi-V LED will blink. BE CAREFUL!

### Microamps

For measuring the flame diode current in a heater control.

### Capacitance

For motor-start and motor-run capacitors. Disconnect the capacitor from power first. Short the terminals to discharge the capacitors. Disconnect any resistors that might be between the terminals of the capacitor.

### MIN/MAX

Press MIN/MAX once to begin recording MIN and MAX. Press MIN/MAX to select current reading's MIN or MAX. Hold down for 2 seconds to exit MIN/MAX function.

### Temperature

Plug any K-type thermocouple directly into the meter to measure temperature. Temperature measurement will be accurate even in fast changing environments because of excellent temperature compensation. One thermocouple is included. No adapter is required.

### Backlight (HS36)

Press the  button to activate the backlight for approximately 60 seconds.

### For your safety...

**General:** Disconnect the test leads before opening the case. Inspect the test leads for damage to the insulation or exposed metal. Replace if suspect. Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material. When disconnecting from a circuit, disconnect the "RED" lead first, then the common lead. Work with others. Use one hand for testing. Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Keep your fingers behind the finger guards on the probes. Do not measure resistance when circuit is powered. Do not apply more than rated voltage between input and ground.

**All voltage tests:** All voltage ranges will withstand up to 600V. Do not apply more than 600VDC or 600VAC.

**AC tests:** Disconnect the meter from the circuit before turning any inductor off, including motors, transformers, and solenoids. High voltage transients can damage the meter beyond repair. Do not use during electrical storms.

### Maintenance

Clean the exterior with clean dry cloth. Do not use liquid.

**Battery replacement:** When the multimeter displays  the battery must be replaced. Disconnect and unplug leads, turn meter off, and remove the battery cover. Replace the battery with a NEDA type 1604 9V battery.

**Fuse Check:** If your meter isn't reading  $\mu$ ADC or MFD, you may have a blown fuse.

1. Select function  $\mu$ ADC.
2. Remove battery cover.

### True RMS (HS36)

Digital multimeters use two different types of AC sensing. The most common is average sensing, normalized to a true RMS value of a sine wave. The other is true RMS sensing. The actual true RMS value is sensed for a wave form within the limits of the crest factor. Either sensing method will give the same results on a clean sine wave but they may differ on a non-sinusoidal waveform.

### Field °F calibration

For accuracies of  $\pm 1^\circ\text{F}$ , calibrate to a known temperature. A glass of stabilized ice water is very close to  $32^\circ\text{F}$  and is usually very convenient but any known temperature can be used.

1. Select the  $400^\circ\text{F}$  range.
2. Remove back case and hold the battery in place with a rubber band so terminals are touching.
3. Stabilize a large cup of ice water.
4. Immerse the thermocouple probe and let it stabilize.
5. Adjust VR3 (lower right corner of PCB) to get close to  $32^\circ\text{F}$  then adjust VR2 (left of VR3) to get within  $0.1^\circ\text{F}$  of  $32^\circ\text{F}$ .
6. To calibrate in  $^\circ\text{C}$ , close the jumper that is to the left of VR3.

### Disable auto off

Set to OFF position, press and hold RNG (HS35) or MIN/MAX (HS36) button while turning rotary dial to desired range position. Release the button when LCD displays normally. Note: "APO" annunciator will be missing from the display. The Auto Power Off mode is on when "APO" indicated on the display.

### Attach to Fieldpiece accessory head

Connect your Fieldpiece accessory head directly to the top of HS series and switch to range indicated by head. Visit [www.fieldpiece.com](http://www.fieldpiece.com) for more info.

3. Plug test lead into red V/Ohm jack, and touch the cathode of the 9V battery. If LCD shows "-OL" the fuse is fine. If LCD shows "000", the fuse is bad.

**Fuse replacement:** Remove the battery cover and back case. Replace fuse with 250mA 600V (6.3x32mm) fast blow fuse, part number RFM66.

### Limited warranty

This meter is warranted against defects in material or workmanship for one year from date of purchase. Fieldpiece will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the instrument.

Any implied warranties arising from the sale of a Fieldpiece 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 of such damage, expenses, or economic loss.

State laws vary. The above limitations or exclusions may not apply to you.

### Obtaining service

Send the meter freight prepaid to Fieldpiece Instruments. For warranty service also send proof of date and location of purchase. For out-of-warranty service send \$45, check or money order. The meter will be repaired or replaced, at the option of Fieldpiece, and returned via least cost transportation.



Fieldpiece Instruments, Inc.  
580 West Central Ave. Suite A  
Brea, CA 92821

[www.fieldpiece.com](http://www.fieldpiece.com)

Phone: (714) 257-9060 Fax: (714) 257-9069

### Symbols used:

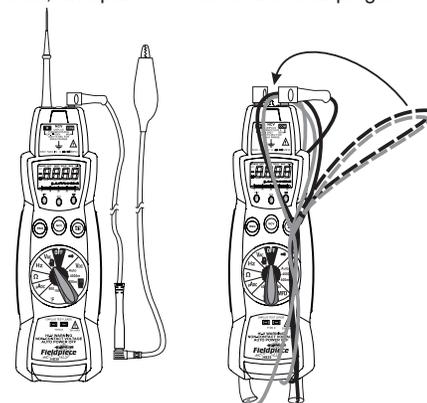
-  Caution, risk of electric shock
-  Caution, refer to manual.
-  Ground
-  Double insulation

### Using & storing test leads

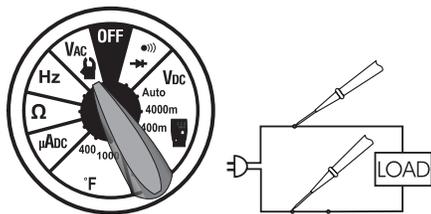
Because the wire insulation is silicone the leads will stay flexible in cold weather and will not melt if bumped by a soldering iron.

Disconnect top half of test lead and plug tip directly into meter to make voltage testing easy. Use with included alligator clip (ASA2) as shown for even easier operation.

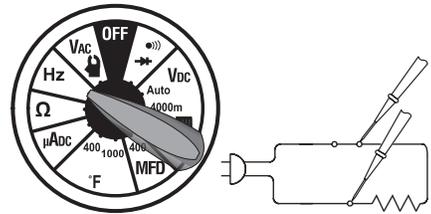
For convenient lead storage, wrap the leads as shown. Pull leads around front between overhanging tips, twist, and pull over one of the lead plugs.



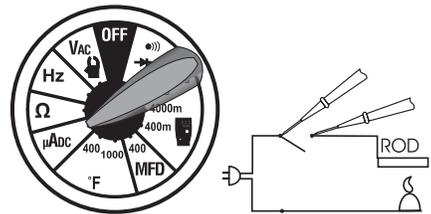
## Voltage



## Frequency



## DC Current < 200µADC



## Selecting Ranges

For DC voltage, set the meter to the VDC parameter instead of VAC as shown above.

For all ranges choose a range just above the value you expect. If display reads "OL" (overload), select a higher range. If display shows less than three numbers, select a lower range for better resolution.

## SPECIFICATIONS

**Display:** 3¾ digit liquid crystal display (LCD) with a maximum reading of 3999.

**Analog bar graph:** 41 segments with measurements 20 times per second.

**Range (RNG):** Manual ranging mode (HS35)

**Overrange:** "OL" mark indication.

**Auto power off:** 30 minutes.

**Operating environment:** 32°F to 122°F at <70% R.H.

**Storage temperature:** -4°F to 140°F, 0 to 80% R.H. with battery removed.

**Accuracy:** Specifications good in ambient conditions of 73°F ±9°F, <75% relative humidity.

**Temperature coefficient:** 0.1×(specified accuracy) per °F. (32°F to 64°F, 82°F to 122°F).

**Power:** Single standard 9-volt battery, NEDA 1604, JIS 006P, IEC 6F22.

**Battery life:** 300 hours typical with alkaline.

**Accessories:** One pair test leads, one pair alligator clips, k-type thermocouple, 9V battery (installed), and operating instructions.

**Safety:** UL, CE, Cat III 600V, UL3111, IEC1010-1.

## Temperature

**Range:** -30°F ~ 1000°F

**Resolution:** 0.1°F

**Accuracy:**

- ±(1°F) 32°F ~ 120°F,
- ±(1% + 1.5°F) -4°F ~ 750°F,
- ±(2% + 4°F) -30°F ~ -4°F,
- ±(2% + 4°F) 750°F ~ 1000°F

**Sensor type:** K-type thermocouple

**Overload protection:** 60 VDC or 30 VAC rms

## Continuity

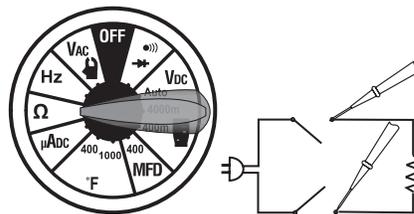
**Audible indication:** Less than 40Ω

**Response time:** 500ms

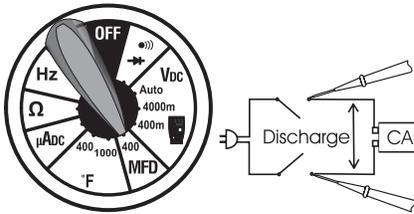
**Green LED will be on continuously.**

**Overload protection:** 500VDC or AC rms

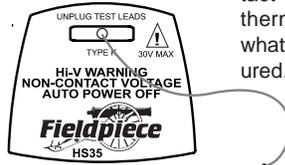
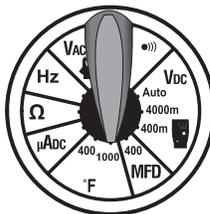
## Resistance



## Capacitance



## Temperature



**Disconnect test leads from voltage before plugging in thermocouple!**

Ensure the temperature being measured is stable. Maintain good contact between the thermocouple and what's being measured.

## DC volts

**Ranges:** 400mV, 4000mV, 40V, 400V, 600V

**Resolution:** 0.1mV

**Accuracy:** ±(0.5% rdg + 2 dgts)

**Input impedance:** 560kΩ on V inputs, 10MΩ on mV input

**Overload protection:** 600VDC or AC rms

**Transient protection:** 6kV for 10µ sec

## AC volts (50Hz - 500Hz)

**Ranges:** 400mV, 4V, 40V, 400V, 600V

**Conversion:** True RMS (HS36), average (HS35)

**Crest factor:** Less than or equal to 3 (HS36)

**Resolution:** 0.1mV

**Accuracy:**

- ±(1.2% rdg + 5 dgts) 50Hz ~ 60Hz on 400mV range
- ±(1.5% rdg + 5 dgts)
- ±(2% rdg + 5 dgts) on 600V range

**Input impedance:** 560kΩ

**Overload protection:** 600V DC or AC rms

**Transient protection:** 6kV for 10µ sec

## DC current

**Ranges:** 400µA, 4000µA

**Resolution:** 0.1µA

**Accuracy:** ±(1.0% rdg + 2 dgts)

**Voltage burden:** 200mV, (2V on 4000µA range)

**Input protection:** 250mA/600V (6.3×32 mm fast blow ceramic fuse), part number RFM66

## Resistance

**Ranges:** 400Ω, 4kΩ, 40kΩ, 400kΩ, 4MΩ, 40MΩ

**Resolution:** 0.1Ω

**Accuracy:**

- ±(1.0% rdg + 4 dgts) on 400Ω to 400kΩ ranges
- ±(1.5% rdg + 4 dgts) on 4MΩ range
- ±(3.0% rdg + 5 dgts) on 40MΩ range

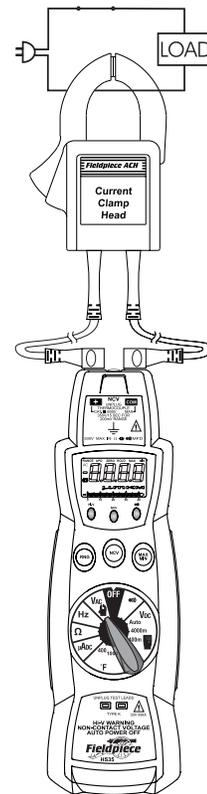
**Open circuit volts:** -0.45VDC typical, (-1.2VDC on 400Ω range)

**Overload protection:** 500VDC or AC rms

## Works with Fieldpiece accessory heads!



(1)



(2)

Connect to Fieldpiece accessory heads by simply attaching them to the top of meter (1) or attach remotely through leads (2). For most heads, move dial to range shown (1). For the AAC clamp (ACH), move dial to VAC range (2).

## Capacitance

**Range:** 400µF

**Resolution:** 0.1µF

**Accuracy:** ±(3% rdg + 5 dgts)

**Input protection:** 250mA/600V (6.3×32 mm fast blow ceramic fuse), part number RFM66

## Frequency

**Ranges:** 4k, 40k, 400k, 4M, 40MHz

**Resolution:** 1Hz

**Accuracy:** ±(0.1% rdg + 3 dgts)

**Sensitivity:** 10Hz ~ 4MHz: > 1Vrms, 4MHz ~ 40MHz: > 2Vrms, <5Vrms

**Minimum pulse width:** > 25ns

**Duty cycle limits:** > 30% and < 70%

**Overload protection:** 500VDC or AC rms



## WARNINGS

**DISCONNECT AND UNPLUG TEST LEADS** before opening case.

**TEST NCV FUNCTION ON KNOWN LIVE WIRE** before using.

**DO NOT APPLY VOLTAGE** greater than 30VAC or 60VDC to the thermocouple or the jacks when the rotary dial is on OF.

**REMOVE THE THERMOCOUPLE** when taking voltage measurements.

**DISCONNECT THE TEST LEADS** when taking temperature measurements.

**DO NOT APPLY VOLTAGE TO THE JACKS** when the rotary dial is on microamps. Even low voltages can cause a current overload and blow the fuse. Replace blown fuse to regain function.