

# FLUKE®

# Fluke 116

## HVAC Multimeter

with Temperature and Microamps

## Technical Data



### Compact true-rms meter for HVAC troubleshooting

The Fluke 116 was specifically designed for the HVAC professional. It has everything needed in an HVAC meter including temperature and microamp measurements to quickly troubleshoot problems with HVAC equipment and flame sensors.

#### Features include:

- Built in thermometer for HVAC applications
- Microamps to test flame sensors
- LoZ: helps prevent false readings due to ghost voltage
- Large white LED backlight to work in poorly lit areas
- Resistance, continuity, frequency and capacitance
- Min/Max/Average with elapsed time to record signal fluctuations
- Compact ergonomic design for one-handed operation
- Compatible with optional magnetic hanger (ToolPak™)
- CAT III 600 V safety rated

#### General 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 %.

The accuracy specifications take the form of:  
 $\pm ( [ \% \text{ of reading } ] + [ \text{ counts } ] )$

Maximum voltage between any terminal and earth ground	600 V
Surge protection	6 kV peak per IEC 61010-1 600 V CAT III, Pollution Degree 2
Display	Digital: 6,000 counts, updates 4/sec
Bar graph	33 segments, updates 32/sec
Operating temperature	-10 °C to + 50 °C
Storage temperature	-40 °C to + 60 °C
Battery	9 volt Alkaline, NEDA 1604A/IEC 6LR61
Battery life	400 hours typical, without backlight

Actual size



## Accuracy specifications

Measurement	Range	Resolution	Accuracy ± ([% of reading] + [counts])
DC millivolts	600.0 mV	0.1 mV	0.5 % + 2
DC volts	6.000 V	0.001 V	0.5 % + 2
	60.00 V	0.01 V	
	600.0 V	0.1 V	
Auto volts	600.0 V	0.1 V	2.0 % + 3 (dc, 45 Hz to 500 Hz) 4.0 % + 3 (500 Hz to 1 kHz)
AC millivolts <sup>1</sup> true-rms	600.0 mV	0.1 mV	1.0 % + 3 (dc, 45 Hz to 500 Hz) 2.0 % + 3 (500 Hz to 1 kHz)
AC volts <sup>1</sup> true-rms	6.000 V	0.001 V	1.0 % + 3 (45 Hz to 500 Hz) 2.0 % + 3 (500 Hz to 1 kHz)
	60.00 V	0.01 V	
	600.0 V	0.1 V	
Continuity	600 Ω	1 Ω	Beeper on < 20 Ω off > 250 Ω; detects opens or shorts of 500 μs or longer.
Ohms	600.0 Ω	0.1 Ω	0.9 % + 2
	6.000 kΩ	0.001 kΩ	
	60.00 kΩ	0.01 kΩ	
	600.0 kΩ	0.1 kΩ	
	6.000 MΩ	0.001 MΩ	
Ohms	40.00 MΩ	0.01 MΩ	1.5 % + 2
Diode test	2.000 V	0.001 V	0.9 % + 2
Capacitance	1000 nF	1 nF	1.9 % + 2
	10.00 μF	0.01 μF	
	100.0 μF	0.1 μF	
	9999 μF	1 μF	
	100 μF to 1000 μF		
Capacitance	> 1000 μF		5 % + 20
Lo-Z capacitance	1 nF to 500 μF		10 % + 2 typical
Temperature <sup>2</sup> (Type-K thermocouple)	-40 °C to 400 °C	0.1 °C	1 % + 10 <sup>2</sup>
	-40 °F to 752 °F	0.2 °F	1 % + 18 <sup>2</sup>
AC μamps true-rms (45 Hz to 500 Hz)	600.0 μA	0.1 μA	1.5 % + 3 (2.5 % + 3 > 500 Hz)
DC μamps	600.0 μA	0.1 μA	1.0 % + 2
Hz (V or A input) <sup>3</sup>	99.99 Hz	0.01 Hz	0.1 % + 2
	999.9 Hz	0.1 Hz	
	9.999 kHz	0.001 kHz	
	50.00 kHz	0.01 kHz	

**Notes:**

<sup>1</sup> All ac voltage ranges except Auto-V/LoZ are specified from 1 % to 100 % of range. Auto-V/LoZ is specified from 0.0 V. Because inputs below 1 % of range are not specified, it is normal for this and other true-rms meters to display non-zero readings when the test leads are disconnected from a circuit or are shorted together. For volts, crest factor of ≤ 3 at 4000 counts, decreasing linearly to 1.5 at full scale. AC volts is ac-coupled. Auto-V LoZ, and ac mV are dc-coupled.

<sup>2</sup> Temperature uncertainty (accuracy) does not include the error of the thermocouple probe.

<sup>3</sup> Frequency is ac coupled, 5 Hz to 50 kHz for ac voltage. Frequency is dc coupled, 45 Hz to 5 kHz for ac current.

## Ordering information

**Fluke-116** HVAC Multimeter with Temperature and Microamps

**Included**

TL75 Test Leads, 80BK Integrated Temperature Probe, holster, User's manual and 9 V battery (installed).



*Fluke. Keeping your world up and running.™*

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TECHNICAL DATA

# Fluke 902 FC True-rms Wireless HVAC Clamp Meter



**If you are an HVAC technician, you need a reliable clamp meter to keep up with your demanding world.** The Fluke 902 FC delivers the features necessary to diagnose and repair HVAC systems. Additionally, with Fluke Connect® you can trend measurements, create and send reports right from the field, safely stay away from live equipment while taking measurements, and more.

### Measurement capability

- 600 A ac current measurement
- 600 V ac and dc voltage measurement
- Temperature measurement from -10 °C to 400 °C (14 °F to 752 °F)
- 1000 µF capacitance measurement
- DC Current measurement to 200 µA
- True-rms voltage and current for accurate measurements on non-linear signals
- Resistance measurement to 60 kΩ
- Min and max recording to capture variations automatically

### Features

- Get more done faster and safer than before by connecting your meter to Fluke Connect and capture measurements wirelessly. Save your measurement to Fluke Cloud™ storage for further analysis or comparison to earlier inspection data.
  - Read measurements on your phone at a safe distance, wearing less PPE while your meter takes the arc blast zone risks, not you.
  - Instantly trend and monitor measurements live on your phone screen for better troubleshooting results.



### LOG AND TREND MEASUREMENTS

Transmit results wirelessly via Fluke Connect®

### SAFETY RATING

CAT III 600V / CAT IV 300V

### BACKLIT DISPLAY

For working in low-lighting spaces

### HVAC SPECIFIC FEATURES

Extended resistance range to measure a broad set of thermistors, µA DC current range to measure flame sensor current, contact temperature, and capacitance

### WARRANTY

Three-years





### Features (continued)

- Create and email reports right from the field. When team collaboration is needed use Fluke Connect ShareLive™ video call to share live measurements and discuss next steps with colleagues.
- Don't risk transcription errors, save your measurements directly to your meter from your smartphone with the press of a button.
- CAT III 600V / CAT IV 300V safety rating
- TPAK magnetic hanging strap (optional) allows you to conveniently hang the meter while using the probes
- Ergonomic design fits in your hand and can be used while wearing personal protective equipment
- Large, easy-to-read backlit display
- Three-year warranty
- Soft carrying case
- Auto shut-off maximizes battery life so the meter works when you need it
- Measurement range feature automatically changes switch positions

### Specifications

General specifications				
Function	Range	Resolution	Accuracy	Crest factor (50Hz or 60Hz)
A ac (via Jaw)	60/600 A	0.01/0.1 A	2.0 % ± 5 digit (45-65 Hz) 2.5 % ± 5 digit (65-400 Hz)	2.5 at 220 A 3.0 at 180 A >1.4 at 600 A Add 2 % kΩ for CF>2
V ac	600 V	0.1 V	1.5 % ± 5 digits (45-400Hz)	
V dc	600 V	0.1 V	1 % ± 5 digits	
Ohms	600/6,000/60,000 Ω	0.1/1/10	1 % ± 5 digits	
µA	200 µA	0.1 µA	1 % ± 4 digits	
Contact temperature	10 to 400 °C (14 °F to 752 °F)	0.1 C/F	1 % ± 8 digits	
Capacitance	100.0/1000 µF	0.1/1 µF	1% +/- 4 digits	
Continuity beeper				
Beeper volume	75 dBA nom. 15 cm from case front			
On threshold	<=30 Ω			

## Specifications (continued)

<b>Mechanical and general specifications</b>	
Maximum voltage between any terminal and earth ground	600 V
Battery type	2 AA alkaline batteries, NEDA 15A, IEC LR6
Temperature	Operating: -10 °C to +50 °C (14 °F to + 122 °F) Storage: -40 °C to +60 °C (-40 °F to + 140 °F)
Operating humidity	Non-condensing <10 °C (50 °F)
	≤90 % RH @ 10 °C to 30 °C (50 °F to 86 °F)
	≤75 % RH @ 30 °C to 40 °C (86 °F to 104 °F)
	≤45 % RH @ 40 °C to 50 °C (104 °F to 122 °F)
Altitude	Operating: 3,000 m (9,842 ft) Storage: 12,000 m (39,370 ft)
Dimensions	230 mm x 83.7 mm x 45.4 mm (9.06 in x 3.30 in x 1.39 in)
Weight (meter only)	419 g (14 oz)
Safety	IEC 61010-1, Pollution Degree 2 IEC 61010-2-032: CAT III 1000 V / CAT IV 600 V IEC 61010-2-033: CAT III 1000 V / CAT IV 600 V
IP Rating	IEC 60529: IP30, non-operating
Radio Frequency Certification	FCC ID:T68-FBLE IC:6627A-FBLE
Electromagnetic Compatibility (EMC)	International: IEC 61326-1: Portable, Electromagnetic Environment, IEC 61326-2-2 CISPR 11: Group 1, Class A  Korea (KCC): Class A Equipment (Industrial Broadcasting & Communication Equipment)  USA (FCC): 47 CFR 15 subpart B. This product is considered an exempt device per clause 15.103.
Temperature coefficients	Add 0.1 × specified accuracy for each degree C above 28 °C or below 18 °C

**Ordering information**

902 FC HVAC Clamp Meter

**Included**

- 902 FC HVAC Clamp Meter
- One pair TL75 Test leads
- One 80BK Integrated DMM Temperature Probe
- Two AA alkaline batteries
- Soft carrying case
- Users' manual
- Statement of Calibration Practices

**Optional accessories**

TPAK Magnetic Hanging Strap



**Set up and sustain preventive maintenance practices with ease to help you oversee your complex world with the Fluke Connect® system of software and over 40 wireless test tools.**

- Maximize uptime and make confident maintenance decisions with data you can trust and trace.
- Save measurements to the Fluke Cloud™ and associate with an asset so your team can consult both historical and current measurements from one location.
- Collaborate with ease by sharing your measurement data with team members with ShareLive™ video calls and emails.
- Wireless one-step measurement transfer with AutoRecord™ measurements eliminates transcription errors, clipboards, notebooks and multiple spreadsheets.
- Generate reports with multiple measurement types to provide status or next step recommendations.

Find out more at [flukeconnect.com](http://flukeconnect.com)



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Fluke Connect is not available in all countries, check with your local Fluke representative.

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**TECHNICAL DATA**

# 1AC-II/1LAC-II VoltAlert

## The pocket-sized voltage detector



The next generation VoltAlert™ ac voltage testers from Fluke are easy to use—just touch the tip to a terminal strip, outlet, or cord. When the tip glows red and the unit beeps, you know there’s voltage in the line. Electricians, maintenance, service, safety personnel, and homeowners can quickly test for energized circuits and defective grounds on the factory floor, in the shop, or at home.

- Accurately identify incorrectly wired outlets
- The 1AC-II continually tests its battery and its circuit integrity with a periodic double flash visual indication using Fluke Volt-beat™ technology.
- Voltage detection of 90 V to 1000 V ac or 200 V to 1000 V ac depending on model, as well as a 24 V to 1000 V ac control circuit model.
- The VoltAlert™ Tester (1AC-II and 1LAC-II) is a Category IV –1000 V overvoltage rated product for added user protection, the highest rated of its kind.
- It is rugged, reliable, and has a two-year warranty.

### Specifications

#### OPERATING PRINCIPLE

Senses the steady state electrostatic field produced by ac voltage through insulation without requiring contact to the bare conductor. A red glow at the tip and a beeping noise (if not switched OFF) indicates the presence of voltage. *Note: Does not respond to random electrostatic discharge.*

#### VOLTAGE SENSING RANGES

Nominally, 90 V AC to 1000 V AC or 200 V AC to 1000 V AC depending on model, 45 Hz to 405 Hz; also a 20 V to 90 V control circuit model

#### DETECTOR TIP STYLE

Blade or round, depending on model

#### LIGHT SOURCE

One high intensity red LED

#### SAFETY RATING

1000 V, CAT IV

#### IP RATING

IP 40

#### OPERATING TEMPERATURE RANGE

-10 °C to 50 °C

#### OPERATING HUMIDITY RANGES

0 % to 95 % (0 °C to 30 °C)

0 % to 75 % (30 °C to 40 °C)

0 % to 45 % (40 °C to 55 °C)

#### OPERATING ALTITUDE

3000 meters

#### BATTERIES

2 AAA alkaline batteries included



**Related standards and regulations for:**

**Safety**

Europe and ROW: Low voltage directive and related standards as: EN61010 respectively IEC61010 for international requirements

**EMC**

Europe and ROW: EMC directive and related standards as: EN61326 respectively IEC61326 and their subset for ESD. Not all EMC standards are necessary due to no contact to mains voltage.

**Environmental**

Especially in European markets with relations to WEEE and RoHs directive for the used materials and information in the user documetation (manual)

**Ordering Information**

**Fluke-1AC-A1-II** ACV Detector 90-1000V, ENGL/LASPN/CFR  
Part Number 2432932

**Fluke-1AC-A2-II** ACV Detector 90-1000V, BRPORT/JAP/CHIN-T  
Part # 2432944

**Fluke-1AC-E1-II** ACV Detector 200-1000V, ENGL/GER/FREN/DUTCH  
Part # 2432967

**Fluke-1AC-E2-II** ACV Detector 200-1000V, DANSH/NORW/SWED  
Part # 2432971

**Fluke-1LAC-A-II** Low Voltage Detector 20-90 VAC AMERICAS PACIFIC  
Part # 2433021

**FLK-1AC-A1-II-5PK** Volt Alert, 5 Pack For USA  
Part # 2433042

**FLK-1AC-E1-II-5PK** Volt Alert, 5 Pack For EUROPE  
Part # 2433056



Americas version



European version



Low volt version

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**FLUKE®**

## Fluke Pack30 Professional tool backpack



### Features:

- Built with durable high-quality polyester and injection molded plastic bottom base
- Six storage compartments for storing test tools, hand tools, laptop or tablet, and other small items
- Over 30 pockets for storing and carrying your tools to the next job
- Rugged waterproof molded bottom base offers protection from the elements and keeping the backpack standing for convenient access to tools
- Molded EVA covers for the front and top of the backpack for added protection
- Adjustable chest strap for ergonomic attachment and even weight distribution