

**FLUKE®**

# VR101

## Voltage Event Recorder

### Instruction Sheet

#### Safety

##### Attention

Carefully read the following safety information before using the recorder.

##### Safety Precautions

Specific warning and caution statements, where they apply, will be found throughout this Instruction Sheet.

**A Warning identifies conditions and actions that pose hazard(s) to the user.**

Symbols used on the VR101 and in this Instruction Sheet are explained in the next table.

	See explanation in the Instruction Sheet		Disposal information
	Recycling information		Double Insulation (Protection Class)

#### Warning

**The recorder is designed and certified to work only on single-phase systems. Attempting to modify the recorder or operating it improperly may cause circuit damage which can ultimately result in property damage, personal injury, or death.**

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#### **Plugging in a recorder**

The recorder is designed to plug into a standard convenience outlet. As a safety precaution, the unit should be in a place where it can be easily unplugged. This will also make it accessible for data retrieval. The recorder does not require a protective earth connection for safety since there are no exposed metal parts. The earth conductor is used to measure neutral to ground (N-G) events and to measure the recorder's polarity, indicated by the LED. Also see below under "Using an Ungrounded Outlet". The ground prong may be electrically disconnected (as long as it is not exposed). The recorder does not need special ventilation, however, its ambient temperature should not be allowed to rise above the operating limit. (See under "VR101 Specifications".)

#### **Using an Ungrounded Outlet**

Plugging the recorder into an ungrounded outlet has the following consequences:

1. Polarity indication by the LED is not valid.
2. Neutral to ground events captured are not valid.
3. If the recorder is plugged in improperly (improper polarity), hot to neutral events captured are shifted 180 degrees and indicated with the opposite polarity.

#### **Polarity Indication**

In some countries outlets are not polarized. This means that the recorder can be plugged in improperly (hot and neutral swapped). Improper polarity connection will not cause damage to the recorder but events will not be correctly recorded and the results may cause misinterpretation.

##### Note 1:

*When plugging in the recorder improperly (improper polarity connection), the LED will blink quickly during 8 to 16 seconds (also see Note 2). When plugging in correctly, the LED lights steadily during 8 to 16 seconds. Polarity indication starts from 0 to 8 seconds after plugging in.*

##### Note 2:

*The LED on the recorder also blinks when an event is captured, but then it blinks slowly.*

#### **Battery Care**

The recorder contains a lithium battery which will, under normal circumstances, allow it to operate for 7 years. Exposing the recorder to extreme temperatures for extended periods of time may reduce battery life by as much as 50%.

The recorder is designed for INDOOR USE. It should not be exposed to direct sunlight.

Do not store the recorder with the event indicator flashing. This consumes battery power and reduces battery life. (See the VR101S Users Manual for information on how to clear the recorder's events from memory.)

To extend battery life, keep the recorder plugged into a standard convenience outlet (even when not in use). This conserves battery power especially when frequently downloading stored events.

#### Warning

**Battery poses fire, explosion and severe burn hazard. Do not recharge, disassemble, heat above 100° C (212° F), incinerate, or expose contents to water**

##### Note:



*The VR101 contains a lithium battery. Do not dispose of the VR101 with other solid waste. The VR101 should be disposed of by a qualified recycler or hazardous materials handler. Contact your authorized FLUKE Service Center for recycling information.*

#### **Product Service**

The recorder has no user-serviceable parts inside. The fuse and battery inside the recorder are NOT REPLACEABLE. Opening the case, or attempting to do so, will void the warranty and safety certification. If you require service, please contact your local dealer or an authorized Fluke service center. (See under "Service Centers" )

# VR101 Specifications

## Equipment Ratings

Model number:	<b>VR101/xx3</b>	<b>/xx1, /xx4, /xx7</b>
Nominal Supply:	120V	240V
Operating Range:	70 to 140V	140 to 270V
Operating Frequency:	50/60Hz	50/60Hz
Power:	2W	3W

Memory Size:	32kB, 4000 events
Storage Method:	First-in First-out, or Fill-then-stop
Sampling Method:	Continuous (half cycle integrated)
Alarm Type:	Optical; red LED
Polarity Detection:	Within 8 s after plugging in.
Polarity Indication:	Red LED lights steadily during 8 to 16 seconds if polarity is OK. Red LED quickly blinks during 8 to 16 seconds if improper polarity.
Size:	85mm x 68mm x 35mm (3.35 in x 2.65 in x 1.35 in)
Weight:	120g (4 oz)
Operating Limits:	-40 to 160 °F (-40 to 70 °C) 0 to 95% RH (non-condensing) 15000 feet (4.57 km) altitude
Battery:	3.6V Lithium (non-replaceable)
Expected Battery Life:	7 years (provided that maximum battery care is taken, see under "Battery Care")
Fuse:	1/16A Fast-blow (non-replaceable)

## Sag, Swell & Outage Measurement

### Hot to Neutral

Models	<b>VR101/xx3</b>	<b>/xx1, /xx4, /xx7</b>
Range:	0 to 200Vrms	0 to 270Vrms
Accuracy:	±2Vrms	±4Vrms
Resolution:	1Vrms	2Vrms

### Neutral to ground

Models	<b>VR101/xx3</b>	<b>/xx1, /xx4, /xx7</b>
Range:	3 to 200Vrms	3 to 150Vrms
Accuracy:	±2Vrms	±2Vrms
Resolution:	1Vrms	1Vrms

## Transient Measurement

### Range

Hot to Neutral:	100 to 2500Vpeak
Neutral to Ground:	50 to 2500Vpeak
Accuracy:	±10% of reading + 10V
Resolution:	10V
Width Detection:	1 µs minimum

### Phase Angle

Range:	20° to 180°, 200° to 360°
Accuracy:	±1°
Resolution:	1°

## Frequency Measurement

Range:	45 to 65Hz
Accuracy:	±0.1Hz (3 cycles minimum)
Resolution:	0.1Hz

## Time Measurement

### Events <1 s(second)

Accuracy	
Hot to Neutral:	±0.5 cycle
Neutral to Ground:	±1 cycle
Resolution	
Hot to Neutral:	0.5 cycle
Neutral to Ground:	1 cycle

### Events ≥ 1 s (Time Stamp)

Accuracy:	±2 s/day + 8 s
Resolution:	8 s

**Timer counter capacity:** 4.25 year (24 bit counter, resolution 8 seconds)

## Approvals

 Safety:	This device is safety approved by CSA and CSA(NRTL/C) for measurements on 300V CAT III, Pollution Degree 2, double insulation, per: UL3111-1 (1994) IEC1010-1 (1990) CSA C22.2 No. 1010.1 (1992) EN61010-1 (1993)
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Environmental: MIL-T-28800E, Type III, Class 3

EMC:	FCC rules part 15. 89/336/EEC Emission: EN50081.1 Immunity: EN50082.2 (IEC1000-4-2, -3, -4, -5)
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## LIMITED WARRANTY & LIMITATION OF LIABILITY

This Fluke product will be free from defects in material and workmanship for one year from the date of purchase. This warranty does not cover fuses, disposable batteries or damage from accident, neglect, misuse or abnormal conditions of operation or handling. Resellers are not authorized to extend any other warranty on Fluke's behalf. To obtain service during the warranty period, send your defective product to the nearest Fluke Authorized Service Center with a description of the problem.

THIS WARRANTY IS YOUR ONLY REMEDY. NO OTHER WARRANTIES, SUCH AS FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSED OR IMPLIED. FLUKE IS NOT LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, ARISING FROM ANY CAUSE OR THEORY.

Since some states or countries do not allow the exclusion or limitation of an implied warranty or of incidental or consequential damages, this limitation of liability may not apply to you.

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## SERVICE CENTERS

To locate an authorized service center, visit us on the World Wide Web:

<http://www.fluke.com>

or call Fluke using any of the phone numbers listed below:

- +1-888-993-5853 in U.S.A. and Canada
- +31-402-678-200 in Europe
- +1-425-356-5500 from other countries