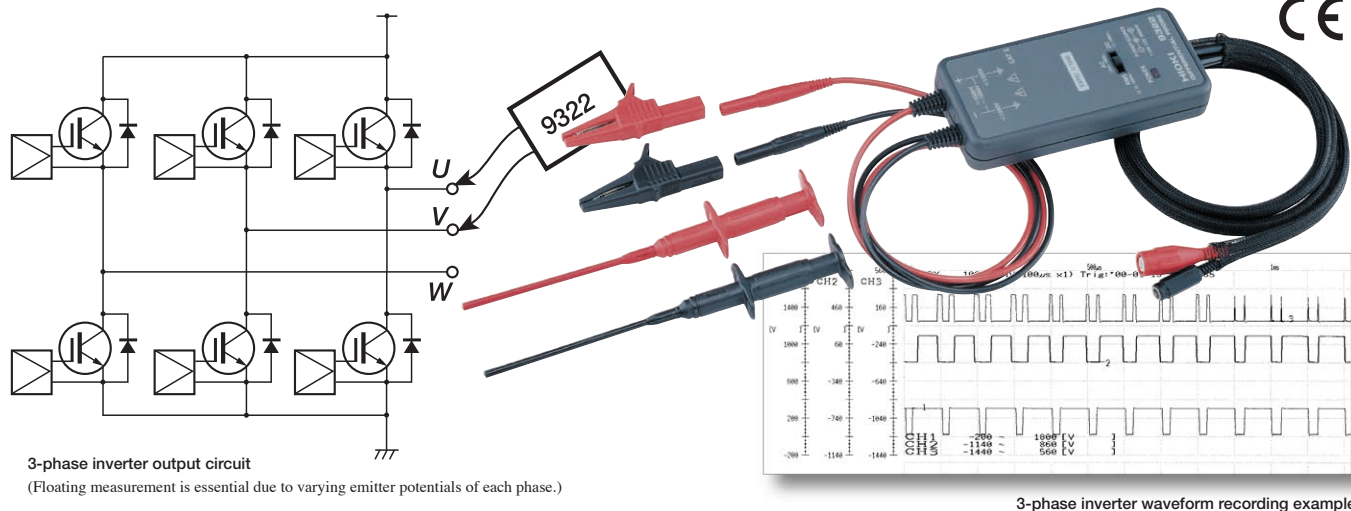


# HIOKI DIFFERENTIAL PROBE 9322

- Floating measurement of high-voltage waveforms
- Detection of power supply surge noise
- RMS rectified output

## Introducing a new 3-function universal probe



3-phase inverter output circuit  
(Floating measurement is essential due to varying emitter potentials of each phase.)

3-phase inverter waveform recording example

### Product outline and features

#### 3 kinds of measurement with a single probe

The DIFFERENTIAL PROBE 9322 provides floating measurement of high voltage waveforms, detection of surge noise on power supply lines, and true RMS rectified output of high voltage AC.

#### Works with a variety of power supplies, such as an AC adapter or logic terminal

For operation, convenience is the key. Operating power for the DIFFERENTIAL PROBE 9322 can be supplied from the standard logic terminals of a MEMORY HiCORDER or the clamp sensor input terminals of an F/V UNIT 8940, as well as from the probe's own AC ADAPTER 9418-15.

#### Floating measurement of high-voltage waveforms (DC mode)

When measuring the potential difference in signals containing a large common mode voltage component on commercial power lines, an electrocution hazard exists unless measurement is done using an instrument with fully isolated inputs, such as a MEMORY HiCORDER. When measuring signals carrying common mode voltages with a high frequency component (such as those produced by inverter control circuits and switching power supplies), measurements are greatly affected by the rate of common mode elimination at the isolated inputs. Although MEMORY HiCORDERs provide the greatest possible to-ground voltage rating (ordinarily 400V AC or DC), use of

the DIFFERENTIAL PROBE 9322 raises the rating level to 1500V AC (CAT II), 600V AC (CAT III), allowing measurement of circuits carrying even larger common mode voltages. Potential differences can be measured for input voltages of up to 2000V DC or 1000V AC (CAT II), 600V AC/DC (CAT III), producing a 1/1000 divided output.

#### Measurement of power line surge noise (AC mode)

Upon selecting the AC output mode, the AC coupled signal inside the probe is divided by 1000 for output. Since the probe's frequency range is from 1kHz to 10MHz, output waveforms are produced only when input voltages contain high frequency components, such as surge noise imposed on 50/60Hz commercial mains power. The probe can thus serve as either a noise detector or for measurement of wave peaks.

#### Provides output of true RMS rectified voltages (RMS mode)

Upon selecting the RMS output mode, the input signal is divided by 1000, rectified to obtain the true RMS value, then output as a direct current voltage. True RMS rectification is performed by an analog circuit with a bandwidth of 40Hz to 100kHz, allowing true RMS conversion of signals containing high frequency components, such as inverter output waveforms, as well as 50/60Hz commercial mains.

### Main Applications

- Measurement of potential differences included in common mode voltages, such as IGBT
- Measurement of commercial power line waveforms, such as on 400V power lines
- Measurement of high voltage surge noise waveforms
- Measurement of the RMS value of inverter outputs, etc.



ISO 9001  
JMI-0216



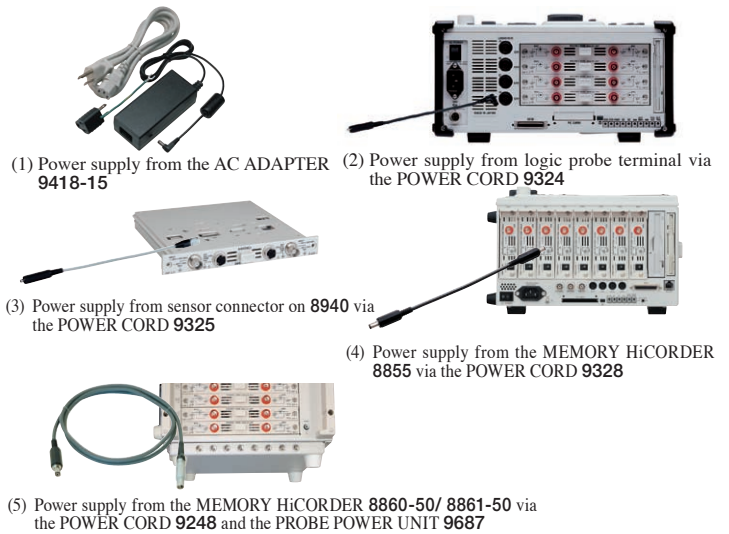
ISO 14001  
JQA-E-90091

Dimensions and mass: approx. 70 (2.76in) W × 150 (5.91in) H × 25 (0.98in) D mm,  
approx. 350g (12.3oz)  
Cable length: Main unit cable 1.3 m (4.27 ft), input section cable 46 cm (1.51 ft)



Basic specifications <small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh, after 30 minutes of warm-up time; accuracy guaranteed for 1 year)</small>	
Measurement functions	(1) DC mode, (2) AC mode, (3) RMS mode
Input type	Balanced differential input
Voltage division ratio	1/1000
Input resistance, capacity	H-L: 9 MΩ, approx 10 pF (C at 100 kHz) H, L-case: 4.5 MΩ, approx 20 pF (C at 100 kHz)
Output	BNC terminal (DC/AC/RMS 3-mode selectable output)
Maximum input voltage	2000 V DC, 1000 V AC (CAT II), 600 V AC/DC (CAT III)
Maximum rated voltage to earth	When using grabber clip: 1500V AC/DC (CAT II), 600V AC/DC (CAT III) When using alligator clip: 1000V AC/DC (CAT II), 600V AC/DC (CAT III)
Common mode elimination ratio	10000:1 or better (input/output ratio at 50/60 Hz with input shorted) 1000:1 or better (input/output ratio at 100 kHz or 1 MHz with input shorted)
Power supply	<p>(1) AC ADAPTER 9418-15 (DC 12 V ±10%)*<sup>1</sup></p> <p>(2) Power supply through POWER CORD 9324 connected to logic connector on MEMORY HiCORDER.*<sup>2</sup></p> <p>(3) Power supply through POWER CORD 9325 connected to sensor connector on F/V UNIT 8940.*<sup>3</sup></p> <p>(4) Power supply through POWER CORD 9328 connected to DC jack on Input UNIT 8950/ 8952/ 8953/ 8955, for the MEMORY HiCORDER 8855.</p> <p>(5) Power supply through POWER CORD 9248 connected to the PROBE POWER UNIT 9687, for MEMORY HiCORDER 8860-50/ 8861-50.</p> <p>*<sup>1</sup> Operating voltage range: +5 to +12V, less than 300mA. DC jack OD 5.5 mm, ID 2.1 mm</p> <p>*<sup>2</sup> Power jack on probe connects to logic connector on MEMORY HiCORDER through the POWER CORD 9324. Up to "4 power cords" can be connected to the MEMORY HiCORDER 8826. Only "1 cord" can be connected to the MEMORY HiCORDER 8841, 8842, 8835 or 8835-01. With the 8841, 8842, 8835, and 8835-01, the DIFFERENTIAL PROBE 9322 cannot be used in combination with the LOGIC PROBES 9320 and 9321. With the 8826, the 9322 can be used with the 9320/9321 in the following combinations. "9324 × 4 with no 9320/9321" "9324 × 3 and 9320/9321 × 4" "9324 × 2 and 9320/9321 × 6" "9324 × 1 and 9320/9321 × 7"</p> <p>*<sup>3</sup> Power jack on probe connects to sensor connector on the F/V UNIT 8940 through the POWER CORD 9325. Up to "6 power cords" 9325 can be used with the MEMORY HiCORDERs 8826, 8841, and 8842. and up to "4 power cords" can be used with the MEMORY HiCORDER 8835-01. When used in combination with the CLAMP SENSORS 3273 or 9270 series, up to "6 power cords" can be used in combination with the 8826 and up to "4 power cords" can be used in combination with the 8841, 8842, and 8835-01.</p>

DC mode	
Application	Waveform monitor output
Frequency characteristic	DC to 10 MHz, ±3 dB
DC amplitude accuracy	±1 % f.s. (1000 V DC or less) ±3 % f.s. (2000 V DC or less) f.s.=2000 V DC
AC mode	
Application	Detection of power line surge noise
Frequency response	1 kHz to 10 MHz ±3 dB
RMS mode	
Application	Rectified RMS output of DC and AC voltages
Frequency response	DC, 40 Hz to 1 kHz : ±1 % f.s.
Output accuracy	1 kHz to 100 kHz : ±4 % f.s. f.s.=1000 V AC
Response speed	200 ms or less (400 V AC)
Other	
CE mark compliance	Safety: EN61010, EMC: EN61326
Supplied accessories	Alligator clips (2), Grabber clips (2), CARRYING CASE 3853 (1)



## Ordering information

### DIFFERENTIAL PROBE 9322 (up to 2kV DC, 1kV AC)

#### ● Usable HiCORDERs

MEMORY HiCORDER	Usable Input Units
MEMORY HiCORDER 8860-50/8861-50 (Input unit sold separately)	8956, 8957, 8959, 8936, 8938
MEMORY HiCORDER 8860/8861 (Input unit sold separately)	8956, 8957, 8959, 8936, 8938
MEMORY HiCORDER 8855 (Input unit sold separately)	8950, 8952, 8953-10, 8955
MEMORY HiCORDER 8841/8842 (Input unit sold separately)	8936, 8938
MEMORY HiCORDER 8835-01/8835 (Input unit sold separately)	8936, 8938
MEMORY HiCORDER 8826 (Input unit sold separately)	8936, 8938

#### ● Options

**POWER POWER UNIT 9687** (Factory-installed option, built in on the bottom case of the MEMORY HiCORDER 8860-50/ 8861-50.) Simultaneously power up to 8 units of the 9322. (Max. 3A output)

**POWER CORD 9248** (Power supply from the PROBE POWER UNIT 9687 for the MEMORY HiCORDER 8860-50/ 8861-50)

**AC ADAPTER 9418-15** (Universal power supply for AC 100 to 200 V commercial mains; outputs DC 12V/ 2.5A.)

- The DIFFERENTIAL PROBE 9322 cannot be used by itself. Please use it in combination with a HIOKI MEMORY HiCORDER.
- The DIFFERENTIAL PROBE 9322 requires a power supply.

MEMORY HiCORDER 8807/8808	(Equipped with input section as standard)
MEMORY HiCORDER 8807-50/8808-50	(Equipped with input section as standard)
POWER HiCORDER 8714/8715	(Equipped with input section as standard)

**POWER CORD 9324** (Power supply from large type logic connector)

**POWER CORD 9325** (Power supply from 8940 sensor connector)

**POWER CORD 9328** (Power supply from 8950, 8952, 8953-10, 8955 input units for the MEMORY HiCORDER 8855)

**HIOKI**  
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