HIOKI

DIFFERENTIAL PROBE 9322

Introducing a new 3-function universal probe

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

- 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.

❑ 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.

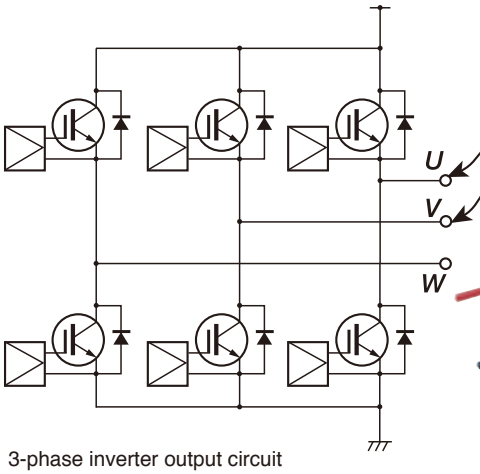
Measurement of power line surge noise (AC mode)

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.

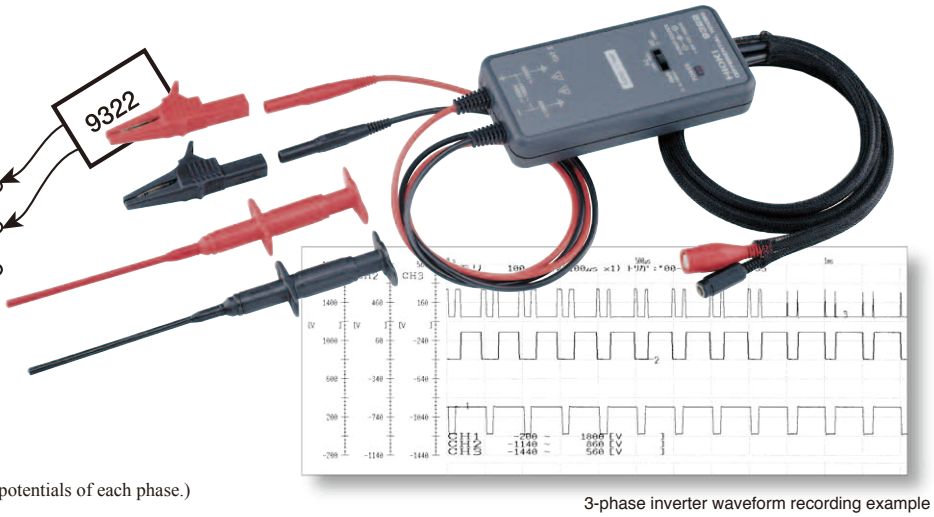
Provides output of true RMS rectified voltages (RMS mode)

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.

CE



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



3-phase inverter waveform recording example

■ Basic specifications (Accuracy guaranteed for 1 year)

Measurement functions	DC mode: Waveform monitor output, DC to 10 MHz ±3 dB AC mode: Detection of power line surge noise, 1 kHz to 10 MHz ±3 dB RMS mode: Rectified RMS output of DC and AC voltages, DC, 40 Hz to 100 kHz, Response speed: 200 ms or less (400 V AC)
Output	Voltage division ratio: 1/1000, BNC terminal (DC/AC/RMS 3-mode selectable output)
DC amplitude accuracy	±1 % f.s. (1000 V DC or less), ±3 % f.s. (2000 V DC or less) (f.s.=2000 V DC)
RMS amplitude accuracy	±1 % f.s. (DC, 40 Hz to 1 kHz), ±4 % f.s. (1 kHz to 100 kHz) (f.s.=1000 VAC)
Input resistance, capacity	H-L: 9 MΩ, approx 10 pF (C at 100 kHz) H-case, L-case: 4.5 MΩ, approx 20 pF (C at 100 kHz)
Max. allowable input	600V AC/DC (CAT III), 2000 VDC, 1000 VAC (CAT II)
Max. rated voltage to earth	When using grabber clip: 600 V AC/DC (CAT III), 1500 V AC/DC (CAT II) When using alligator clip: 600 V AC/DC (CAT III), 1000 V AC/DC (CAT II)
Power supply	(1) AC adapter 9418-15 (12 V DC ±10 %) * Operating voltage range: +5 to +12 V, less than 300 mA. DC jack OD 5.5 mm (0.22 in), ID 2.1 mm (0.08 in), (2) Power supply through Power cord 9324 connected to logic terminal on Memory HiCorder, or other method
Dimensions and mass	70 mm (2.76 in)W × 150 mm (5.91 in)H × 25 mm (0.98 in)D, 350 g (12.3 oz), Cord length: Input 46 cm (1.51 ft), Output 1.3 m (4.27 ft)
Accessories	Alligator clips ×2, Grabber clip 9243 ×1, Carrying case 3853 ×1, Instruction manual ×1

■ How to power the 9322 with a Hioki Memory HiCorder

	Logic terminal on Memory HiCorder			F/V Unit 8940's sensor terminal			PROBE POWER UNIT 9687 [For 8860 series]
Main unit	Required power cord (s)	Number of Max. connectable 9322s	Max. units the logic probes when simultaneously using the 9322	Required power cord	Number of max. connectable 9322s	Max. units the 9322s when simultaneously using clamp sensors	Use with the Power Cord 9248
MR8880-20	Power cannot be supplied from the logic terminals			N/A	N/A	N/A	N/A
MR8875	Power can not be supplied from logic and DC output terminals			N/A	N/A	N/A	N/A
MR8870-20	Power cannot be supplied from the logic terminals			N/A	N/A	N/A	N/A
8861-51 8861-50 *1 8861 *1	9324 + 9323	2	9322 ×2: N/A 9322 ×1: 3	9325	6	8	8 *2
8860-51 8860-50 *1 8860 *1	9324 + 9323	2	9322 ×2: N/A 9322 ×1: 3	9325	6	8	8 *2
MR8847-01/-51 *2 MR8847-02/-52 *2 MR8847-03/-53 *2 MR8827 *2	9324 + 9323	4 *2	9322 ×4: N/A 9322 ×3: N/A 9322 ×2: N/A 9322 ×1: 2	N/A	N/A	N/A	N/A

*1 Discontinued model
*2 Depends on the combination of Clamp-on probes connected to the 9687; number of connectable 9322 are different

Model No. (Order Code) **9322** (For the Memory HiCorder series)

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.
** For the latest information about how to power the 9322 with a Memory HiCorder, please visit the Hioki website.*

Power supply

PROBE POWER UNIT 9687
Factory-installed option - only use with the Memory HiCorder 8860-50/8861-50, built in on the bottom case. Simultaneously power up to 8 units of Differential Probe 9322. (Max. 3 A output)

POWER CORD 9248
Power supply to the 9322 through this cord from the Probe power unit 9687, 70 cm (2.30 ft) length

AC ADAPTER 9418-15
100 to 240V AC

Supplied Accessories

GRABBER CLIP 9243
Attaches to the tip of the banana plug cable, Red/ Black: 1 each, 196 mm (7.72 in) length, CAT III 1000 V

CARRYING CASE 3853
Store with peripherals cable

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