

# HIOKI

POWER ANALYZER PW8001

**NEW** Preview



**Highest Accuracy.  
Largest Number of Channels.  
Maximum Flexibility.**



Release in 2021

## From R&D to shipping inspections – combine the input modules that suit your application



Input module **U7001**

For research evaluation and shipping inspections of solar inverters  
**1500 V CAT II measurement**



Basic accuracy for 50/60 Hz Power	±0.07%
Sampling frequency	2.5 MHz
ADC resolution	16-bit
Number of channels	Max. 8 ch
Measurement frequency band	DC, 0.1 Hz to 1 MHz
Maximum input voltage	1000 V AC, 1500 V DC
Maximum rated line-to-ground voltage	600 V AC, 1000 V DC CAT III 1000 V AC, 1500 V DC CAT II



Input module **U7005**

Release in 2022

High-accuracy measurement of SiC/GaN inverter efficiency and reactor/transformer loss  
**Basic accuracy: ±0.03%**  
**Accuracy for DC Power: ±0.05%**



Basic accuracy for 50/60 Hz Power	±0.03%
Sampling frequency	15 MHz
ADC resolution	18-bit
Number of channels	Max. 8 ch
Measurement frequency band	DC, 0.1 Hz to 5 MHz
Maximum input voltage	1000 V AC, 1000 V DC
Maximum rated line-to-ground voltage	600 V CAT III 1000 V CAT II

### ch. 8 ch. 7 ch. 6 ch. 5 ch. 4 ch. 3 ch. 2 ch. 1

Connect a BNC-type sensor such as a current probe or CT.

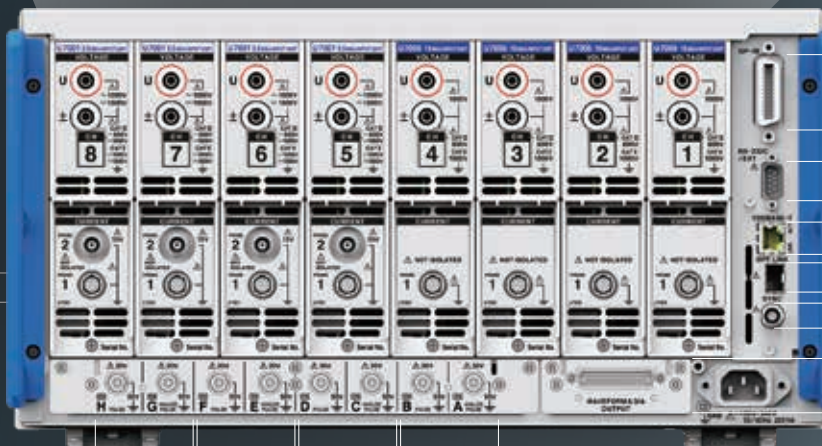
Current sensor terminals  
High-performance current sensor terminals



Connect an optional current sensor (p.7). The instrument will automatically identify and power the sensor.

High-performance current sensor terminals

USB interface (front)



GP-IB interface

RS-232C interface

Gigabit Ethernet interface

Optical link interface (option)

BNC sync. interface

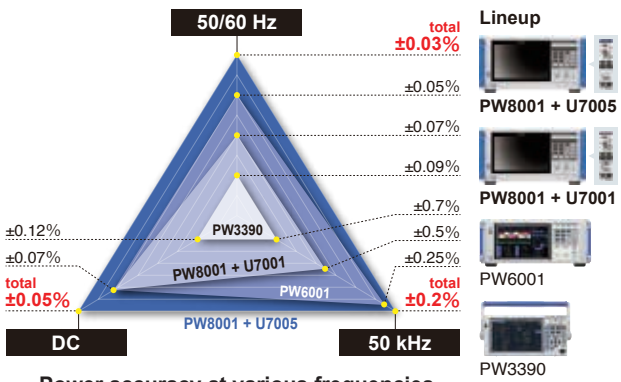
Waveform & D/A output (option)  
CAN or CAN FD interface (option)

Motor 4 Motor 3 Motor 2 Motor 1

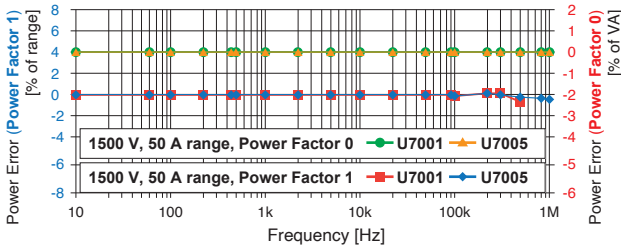
Analyze four motors simultaneously (option)

**Capture the slightest power loss with a wideband power measurement of world-class accuracy**

The PW8001 is engineered to help you accurately measure minuscule losses in today's increasingly efficient devices. In addition to 50/60 Hz fundamental frequencies, it delivers high-accuracy measurement performance in DC and low-power-factor switching frequency bands, which are important in power electronics devices.



Power accuracy at various frequencies



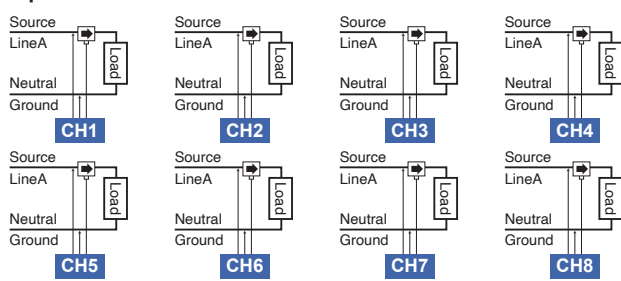
Example of active power-frequency characteristics

**Multi-circuit measurement of up to 8 channels of power data with a single instrument**

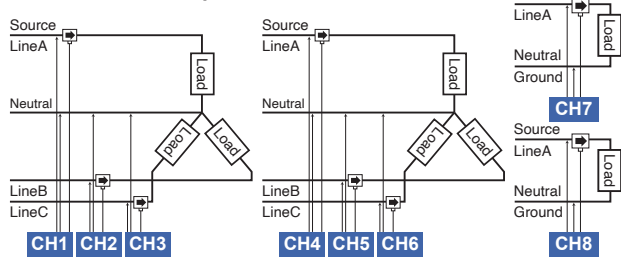
Mix and match two available unit types across one to eight channels to create a single-instrument measurement system that's ideally suited to your application.

Combine connections to implement a diverse range of measurement capabilities.

**Example combination: 1-phase/2-wire x 8 circuits**

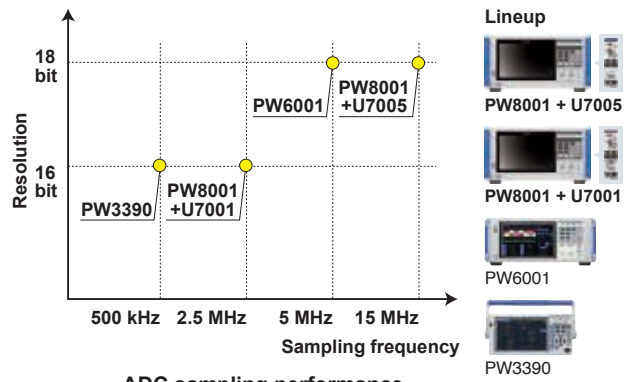


**Example combination: DC x 2 circuits + 3-phase/4-wire x 2 circuits**

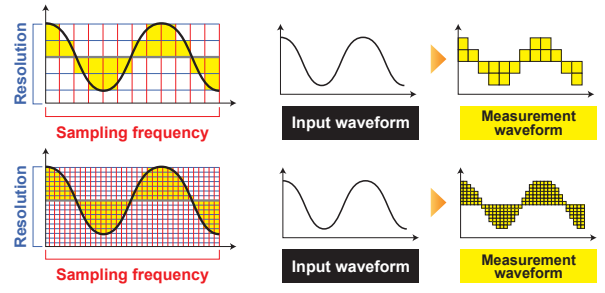


**Reliable reproduction of input waveforms with 15 MHz sampling and 18-bit resolution**

With up to 5-times better high-speed sampling and dynamic range performance, the PW8001 takes the flagship position in our lineup of high-accuracy power analyzers, setting new benchmarks to accurately analyze loads with large fluctuations from high to minuscule power levels.



ADC sampling performance



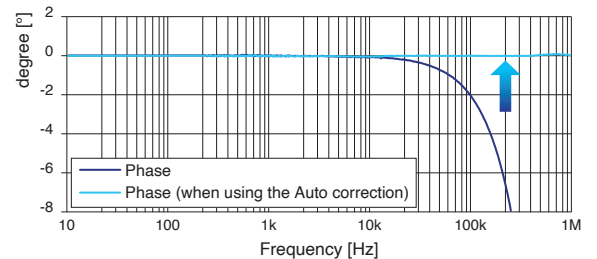
**Automatic sensor identification and phase compensation\* for more accurate and error-free measurements**

The PW8001 can automatically acquire information about connected sensors and perform phase correction. This capability significantly reduces time spent on pre-measurement configuration and provides robust support for accurate, error-free power measurement.

**Information stored in the current sensors' internal memory**



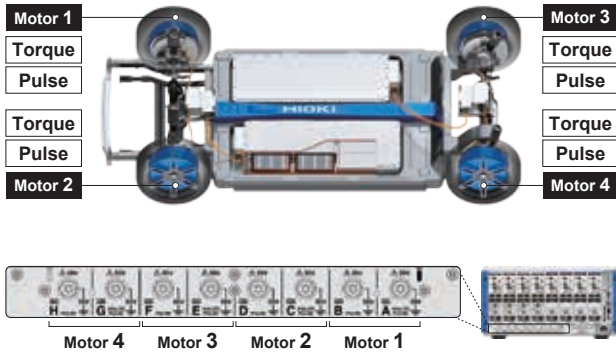
\*Hioki will launch a number of products that support the PW8001's automatic identification function. Please see p.7 for detailed information about the product line.



Example of the automatic phase correction for the CT6904A AC/DC current sensor

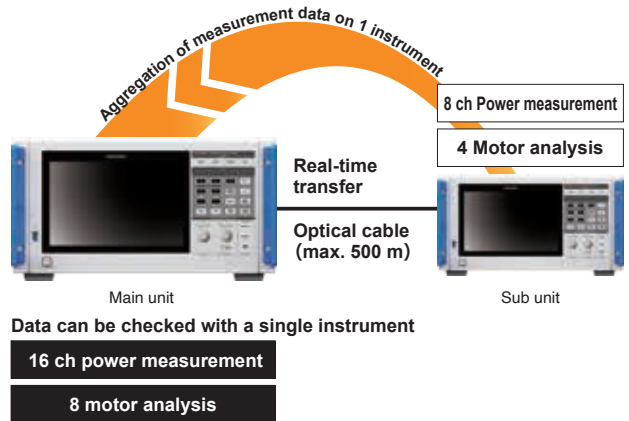
**Simultaneously analyze 4 motors with a single instrument<sup>\*1</sup>**

The PW8001 can simultaneously measure four torque values and four RPM values, allowing four motors to be analyzed with a single instrument. This capability is extremely useful when analyzing systems that use multiple motors, for example electric vehicles with four wheel-mounted motors.



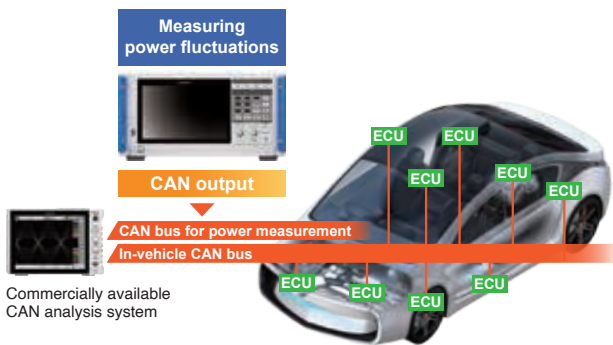
**Link two PW8001 units to double the number of channels via optical link<sup>\*1</sup>**

By connecting two PW8001s with an optical cable (of up to 500 m in length), you can aggregate measurement data in real time on one instrument. This setup can be used as a 16-channel power analyzer, allowing you to simultaneously analyze up to 16 channels of power data and eight motors while displaying and recording efficiency and loss calculations on a single instrument.



**CAN or CAN FD output enables to integrate measurement data into existing CAN networks<sup>\*1</sup>**

The PW8001 can output measurement data to a CAN bus as CAN or CAN FD signals in real time. By recording ECU data and measurement data on a CAN bus with a CAN bus data logger, you can integrate data without time shifts or degraded accuracy, enabling comprehensive evaluation.



Commercially available CAN analysis system

**Extensive lineup of accurate current sensors enables applications from HILS development to equipment evaluation**

Choose the right current sensors for your applications from an extensive selection that enables a wide range of optimal measurement solutions.



**High-accuracy pass-through types**

Pass-through sensors offer the ultimate level of accuracy, band, and stability. Broadband measurement of up to 10 MHz and the ability to measure large currents of up to 2000 A make these sensors ideal for use in state-of-the-art R&D.



**High-accuracy clamp types**

Clamp-type sensors can be affixed to the wire quickly and easily. Their exceptional environmental performance means they can be used in a broad range of settings, from HILS development to equipment evaluation.



**High-accuracy direct-wired types**

Our proprietary DCCT method allows our 50 A direct-wired sensor to deliver world-class accuracy and bandwidth.

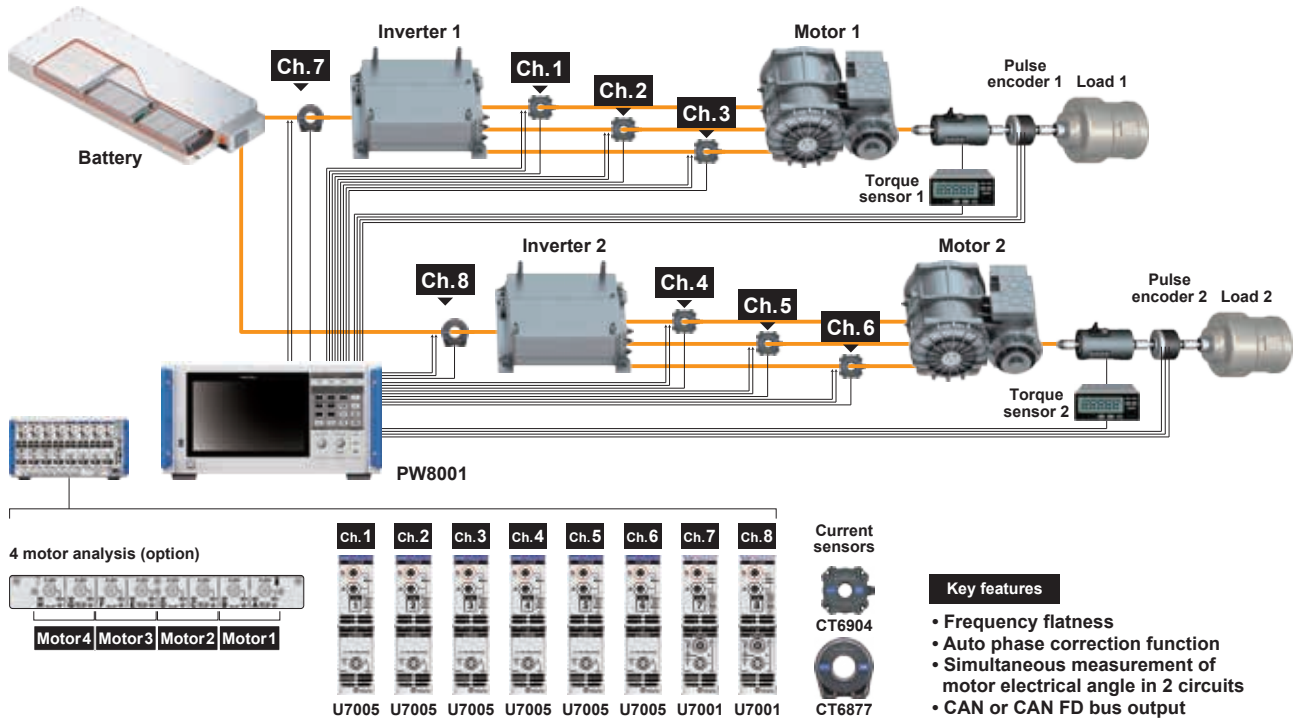
**Combination of Optional Functions**

Model (order code)	Motor analysis	Waveform and D/A output	CAN or CAN FD interface	Optical link interface
PW8001-01	-	-	-	-
PW8001-02	-	Yes	-	-
PW8001-03 <sup>*2</sup>	-	-	Yes	-
PW8001-04 <sup>*2</sup>	-	-	-	Yes
PW8001-05 <sup>*2</sup>	-	Yes	-	Yes
PW8001-06 <sup>*2</sup>	-	-	Yes	Yes
PW8001-11	Yes	-	-	-
PW8001-12	Yes	Yes	-	-
PW8001-13 <sup>*2</sup>	Yes	-	Yes	-
PW8001-14 <sup>*2</sup>	Yes	-	-	Yes
PW8001-15 <sup>*2</sup>	Yes	Yes	-	Yes
PW8001-16 <sup>*2</sup>	Yes	-	Yes	Yes

\*1: Optional \*2: Release in 2022

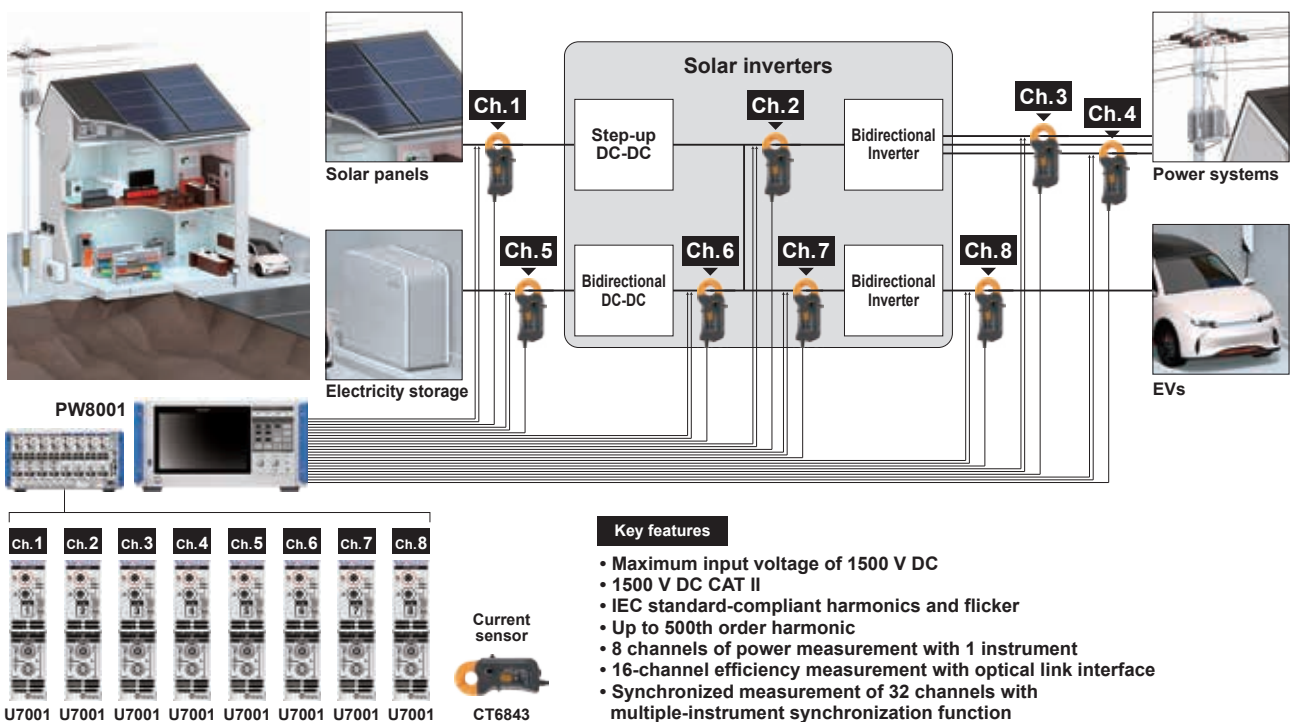
## Evaluation of dual-inverter drive system performance

Dual-inverter systems where each inverter drives a motor will increase reliability and efficiency. The PW8001's ability to measure eight channels of power data across a broad frequency band accurately and with excellent reproducibility is highly effective when evaluating the performance of dual-inverter systems.

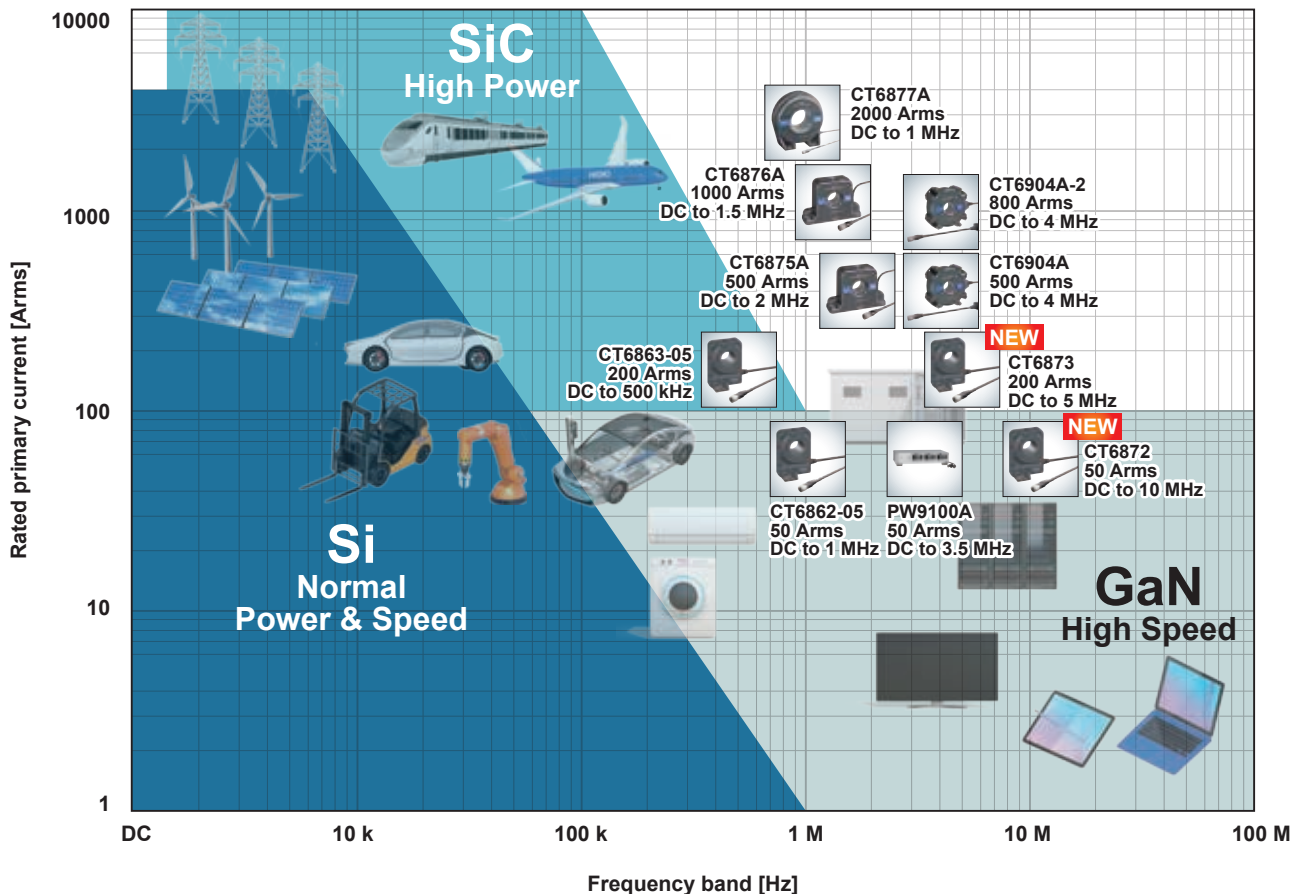


## Evaluation of solar inverter based power interchange systems

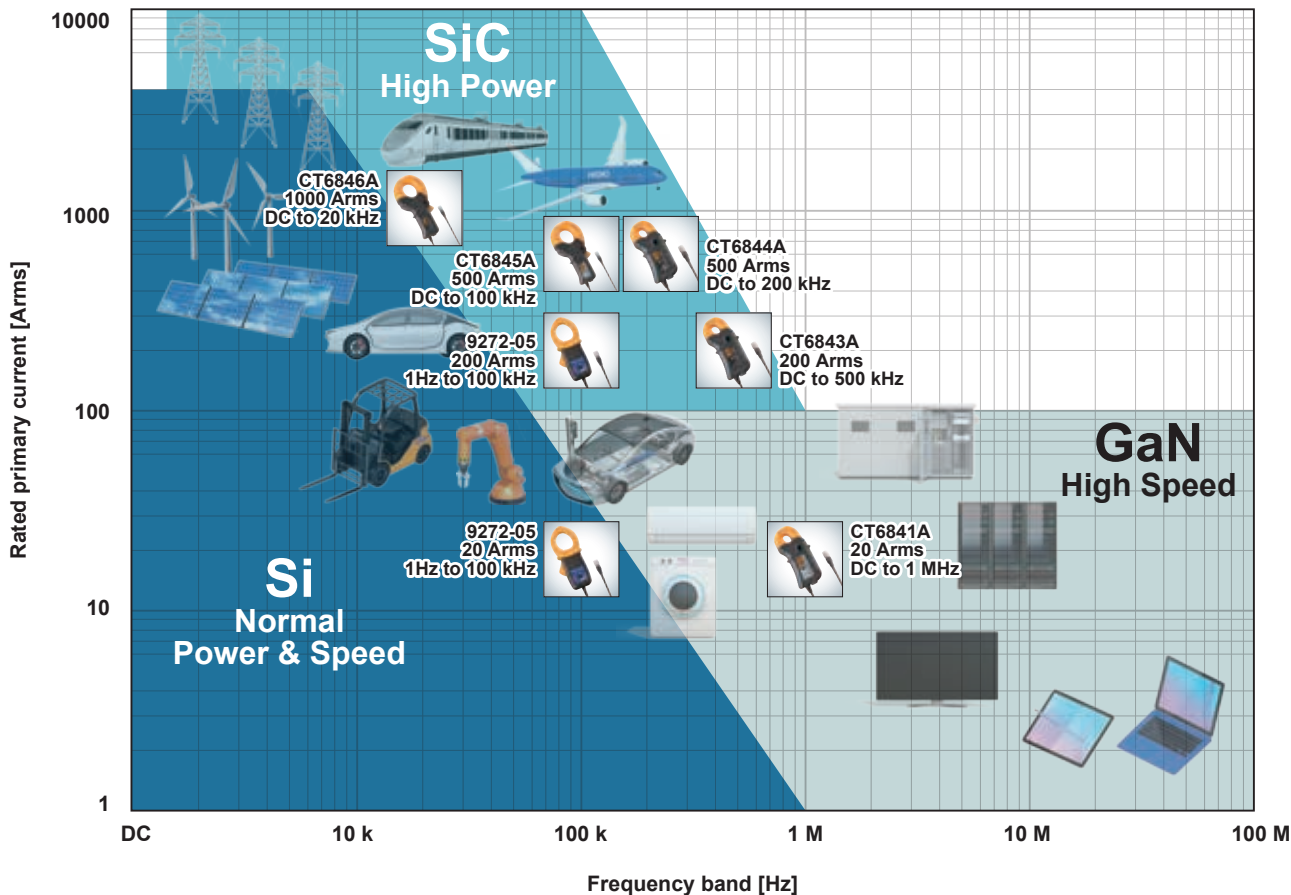
Power interchange systems that can accommodate both storage batteries and EVs will be a method to use energy more effectively. The PW8001's ability to accurately and simultaneously measure power at multiple points, for example at DC-DC converter, inverter, and storage battery inputs and outputs, is highly effective when evaluating solar inverter performance.



























### Pass-through type current sensor lineup







### Clamp type current sensor lineup



## Current sensor lineup

Current sensor types	Image	Automatic sensor detection <b>NEW</b>	Model	Rated primary current	Frequency range	Basic accuracy (amplitude)	Conductor diameter	No. of channels / Cable length	Operating temperature range
High accuracy direct connection		Yes	PW9100A-3	50 Arms	DC to 3.5 MHz	±0.02% rdg ±0.005% f.s.	M6 screw terminals	3 ch	0 °C to 40 °C (32 °F to 104 °F)
		Yes	PW9100A-4	50 Arms	DC to 3.5 MHz	±0.02% rdg ±0.005% f.s.	M6 screw terminals	4 ch	0 °C to 40 °C (32 °F to 104 °F)
Ultra-high accuracy pass-through		Yes	CT6904A	500 Arms	DC to 4 MHz	±0.02% rdg ±0.007% f.s.	32 mm (1.25 in.)	3 m (9.84 ft)	-10 °C to 50 °C (14 °F to 122 °F)
		Yes	CT6904A-1	500 Arms	DC to 2 MHz	±0.02% rdg ±0.007% f.s.	32 mm (1.25 in.)	10 m (32.80 ft)	-10 °C to 50 °C (14 °F to 122 °F)
		Yes	CT6904A-2	800 Arms	DC to 4 MHz	±0.025% rdg ±0.009% f.s.	32 mm (1.25 in.)	3 m (9.84 ft)	-10 °C to 50 °C (14 °F to 122 °F)
		Yes	CT6904A-3	800 Arms	DC to 2 MHz	±0.025% rdg ±0.009% f.s.	32 mm (1.25 in.)	10 m (32.80 ft)	-10 °C to 50 °C (14 °F to 122 °F)
High accuracy pass-through		-	CT6862-05	50 Arms	DC to 1 MHz	±0.05% rdg ±0.01% f.s.	32 mm (1.25 in.)	3 m (9.84 ft)	-30 °C to 85 °C
	 <b>NEW</b>	Yes	CT6872	50 Arms	DC to 10 MHz	±0.04% rdg ±0.008% f.s.	24 mm (0.94 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
	 <b>NEW</b>	Yes	CT6872-01	50 Arms	DC to 2 MHz	±0.04% rdg ±0.008% f.s.	24 mm (0.94 in.)	10 m (32.80 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		-	CT6863-05	200 Arms	DC to 500 kHz	±0.05% rdg. ±0.01% f.s.	24 mm (0.94 in.)	3 m (9.84 ft)	-30 °C to 85 °C (-22 °F to 185 °F)
	 <b>NEW</b>	Yes	CT6873	200 Arms	DC to 5 MHz	±0.04% rdg ±0.008% f.s.	24 mm (0.94 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
	 <b>NEW</b>	Yes	CT6873-01	200 Arms	DC to 1 MHz	±0.04% rdg ±0.008% f.s.	24 mm (0.94 in.)	10 m (32.80 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6875A	500 Arms	DC to 2 MHz	±0.04% rdg ±0.008% f.s.	36 mm (1.41 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6875A-1	500 Arms	DC to 1.5 MHz	±0.04% rdg ±0.008% f.s.	36 mm (1.41 in.)	10 m (32.80 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6876A	1000 Arms	DC to 1.5 MHz	±0.04% rdg ±0.008% f.s.	36 mm (1.41 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6876A-1	1000 Arms	DC to 1.2 MHz	±0.04% rdg ±0.008% f.s.	36 mm (1.41 in.)	10 m (32.80 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6877A	2000 Arms	DC to 1 MHz	±0.04% rdg ±0.008% f.s.	80 mm (3.14 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6877A-1	2000 Arms	DC to 700 kHz	±0.04% rdg ±0.008% f.s.	80 mm (3.14 in.)	10 m (32.80 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
High accuracy clamp		Yes	CT6841A	20 Arms	DC to 1 MHz	±0.3% rdg ±0.01% f.s.	20 mm (0.78 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6843A	200 Arms	DC to 500 kHz	±0.3% rdg ±0.01% f.s.	20 mm (0.78 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6844A	500 Arms	DC to 200 kHz	±0.3% rdg ±0.01% f.s.	20 mm (0.78 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6845A	500 Arms	DC to 100 kHz	±0.3% rdg ±0.01% f.s.	50 mm (1.96 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
		Yes	CT6846A	1000 Arms	DC to 20 kHz	±0.3% rdg ±0.01% f.s.	50 mm (1.96 in.)	3 m (9.84 ft)	-40 °C to 85 °C (-40 °F to 185 °F)
General clamp		-	9272-05	20 Arms, 200 Arms	1 Hz to 100 kHz	±0.3% rdg ±0.01% f.s.	46 mm (1.81 in.)	3 m (9.84 ft)	0 °C to 50 °C (32 °F to 122 °F)

# Power analyzer lineup

Model	PW8001+U7005 <b>NEW</b>	PW8001+U7001 <b>NEW</b>	PW6001	PW3390	
Image					
Applications	For research evaluation of SiC/GaN inverter efficiency and reactor/transformer loss	For research evaluation and shipping inspections of IGBT inverters and solar inverters	For research evaluation of SiC inverter efficiency and reactor/transformer loss	For field evaluation of IGBT inverters and solar inverters	
Measurement parameters	Measurement lines	1-phase/2-wire (1P2W) 1-phase/3-wire (1P3W) 3-phase/3-wire (3P3W2M, 3V3A, 3P3W3M) 3-phase/4-wire (3P4W)	1-phase/2-wire (1P2W) 1-phase/3-wire (1P3W) 3-phase/3-wire (3P3W2M, 3V3A, 3P3W3M) 3-phase/4-wire (3P4W)	1-phase/2-wire (1P2W) 1-phase/3-wire (1P3W) 3-phase/3-wire (3P3W2M, 3V3A, 3P3W3M) 3-phase/4-wire (3P4W)	
	Number of power measurement channels	1 to 8 channels Specify U7001 or U7005 when placing an order (Mixed available)		1 to 6 channels Specify when ordering	
	Measurement frequency band	DC, 0.1 Hz to 5 MHz	DC, 0.1 Hz to 1 MHz	DC, 0.1 Hz to 2 MHz	DC, 0.5 Hz to 200 kHz
	Voltage, current ADC sampling frequency	15 MHz	2.5 MHz	5 MHz	500 kHz
	Voltage, current ADC resolution	18-bit	16-bit	18-bit	16-bit
	Basic accuracy for 50/60 Hz power	±(0.01% of reading + 0.02% of range)	±(0.02% of reading + 0.05% of range)	±(0.02% of reading + 0.03% of range)	±(0.04% of reading + 0.05% of range)
	Accuracy for DC power	±(0.02% of reading + 0.03% of range)	±(0.02% of reading + 0.05% of range)	±(0.02% of reading + 0.05% of range)	±(0.05% of reading + 0.07% of range)
	Accuracy for 10 kHz power	±(0.05% of reading + 0.05% of range)	±(0.2% of reading + 0.05% of range)	±(0.15% of reading + 0.1% of range)	±(0.2% of reading + 0.1% of range)
	Accuracy for 50 kHz power	±(0.15% of reading + 0.05% of range)	±(0.4% of reading + 0.1% of range)	±(0.15% of reading + 0.1% of range)	±(0.4% of reading + 0.3% of range)
	Voltage range	6 V, 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1500 V		6 V, 15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1500 V	15 V, 30 V, 60 V, 150 V, 300 V, 600 V, 1500 V
	Current range	100 mA to 2000 A (6 ranges, based on sensor)	probe 1: 100 mA to 2000 A (6 ranges, based on sensor) probe 2: 100 mV, 200 mV, 500 mV, 1 V, 2 V, 5 V	probe 1: 100 mA to 2000 A (6 ranges, based on sensor) probe 2: 100 mV, 200 mV, 500 mV, 1 V, 2 V, 5 V	100 mA to 8000 A (6 ranges, based on sensor)
	Common-mode voltage rejection ratio	50/60 Hz: 120 dB or greater 100 kHz: 110 dB or greater	50/60 Hz: 100 dB or greater 100 kHz: 80 dB typical	50/60 Hz: 100 dB or greater 100 kHz: 80 dB or greater	50/60 Hz: 80 dB or greater
	Temperature coefficient	0.01%/°C		0.01%/°C	0.01%/°C
	Voltage input method	Photoisolated input, resistor voltage division	Isolated input, resistor voltage division	Photoisolated input, resistor voltage division	Isolated input, resistor voltage division
	Current input method	Isolated input from current sensor		Isolated input from current sensor	Isolated input from current sensor
	External current sensor input	Yes (ME15W)	Yes (ME15W, BNC)	Yes (ME15W, BNC)	Yes (ME15W)
	Power supplied to external current sensor	Yes		Yes	Yes
	Data update rate	10 ms, 50 ms, 200 ms		10 ms, 50 ms, 200 ms	50 ms
	Voltage input	Maximum input voltage	1000 V	1000 V AC, 1500 V DC	1500 V
Maximum rated line-to-ground voltage		600 V CAT III 1000 V CAT II	600 V AC, 1000 V DC CAT III 1000 V AC, 1500 V DC CAT II	600 V CAT III 1000 V CAT II	
Analysis	Number of motor analysis channels	Maximum 4 motors <sup>*1</sup>		1 motor <sup>*1</sup>	
	Motor analysis input format	Analog DC, frequency, pulse		Analog DC, frequency, pulse	
Function	Current sensor phase shift calculation	Yes (auto)		Yes	
	Harmonics measurement	Yes (8, for each channel)		Yes (6, for each channel)	
	Maximum harmonics analysis order	500th		100th	
	Harmonics synchronization frequency range	0.1 Hz to 1.5 MHz	0.1 Hz to 1 MHz	0.1 Hz to 300 kHz	0.5 Hz to 5 kHz
	IEC harmonics measurement	Yes <sup>*2</sup>		Yes	-
	IEC flicker measurement	Yes <sup>*2</sup>		-	-
	FFT spectrum analysis	Yes <sup>*2</sup> (DC to 4 MHz)	Yes <sup>*2</sup> (DC to 1 MHz)	Yes (DC to 2 MHz)	Yes (DC to 200 kHz)
	User-defined calculations	Yes <sup>*2</sup>		Yes	-
	Delta conversion	Yes (Δ-Y, Y-Δ)		Yes (Δ-Y, Y-Δ)	Yes (Δ-Y)
D/A output	Yes <sup>*1</sup> 20ch (waveform output, analog output)		Yes <sup>*1</sup> 20ch (waveform output, analog output)	Yes <sup>*1</sup> 16ch (waveform output, analog output)	
Display	Display	10.1" WVGA TFT color LCD		9" WVGA TFT color LCD	
	Touch screen	Yes		Yes	
Interface	External storage media	USB 3.0		USB 2.0	
	LAN (100BASE-TX, 1000BASE-T)	Yes		Yes	
	GP-IB	Yes		Yes	
	RS-232C	Yes (maximum 115,200 bps)		Yes (maximum 230,400 bps)	
	External control	Yes		Yes	
	Synchronization of multiple instruments	Yes <sup>*2</sup> (up to 4 instruments)		-	
	Optical link	Yes <sup>*1,2</sup>		Yes	
	CAN or CAN FD	Yes <sup>*1,2</sup>		-	
Power supply	100 V AC to 240 V AC (50/60 Hz)		100 V AC to 240 V AC (50/60 Hz)	100 V AC to 240 V AC (50/60 Hz)	
Dimensions · Weight (WxHxD)	430 mm (16.93 in.) × 221 mm (8.70 in.) × 362 mm (14.25 in.) 14 kg (493.84 oz.)		430 mm (16.93 in.) × 177 mm (6.97 in.) × 450 mm (17.72 in.) 14 kg (493.84 oz.)	340 mm (13.39 in.) × 170 mm (6.69 in.) × 156 mm (6.14 in.) 4.6 kg (10.14 lb)	

\*1: Optional \*2: Release in 2022

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