RCC Electronics Presents

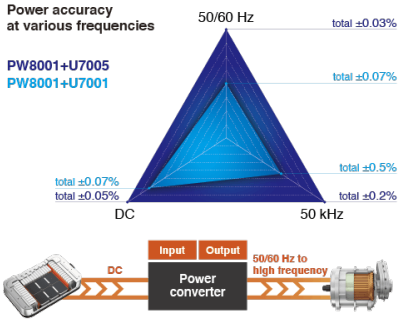
HIOKI PW8001

Highlighting some of the features

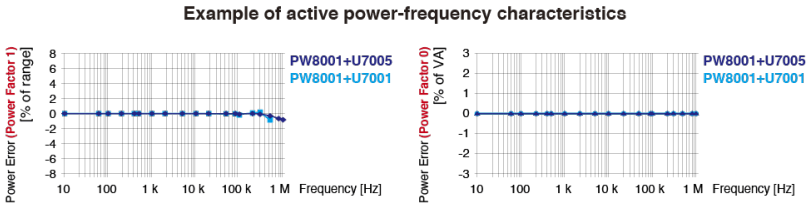
World-class measurement accuracy

- Basic accuracy ±0.03%, DC accuracy ±0.05%, 50 kHz accuracy 0.2% (*1)

Evaluating power conversion efficiency requires the ability to accurately measure power in every band, from DC to high frequencies. The PW8001 delivers exceptional measurement accuracy not only for 50/60 Hz, but also across a broad frequency band, including for DC and at 50 kHz. This allows it to accurately evaluate power conversion efficiency which often involves measuring multiple frequencies.



Accuracy in all bands, from DC to high frequencies, is important



The PW8001 measures even high-frequency and low-power-factor power with a high degree of accuracy

Accurate capture of power fluctuations caused by high-speed switching

- Sampling performance 18-bit, 15 MHz (*1)

- Noise Resistance (CMRR) 110 dB, 100 kHz* (*1)

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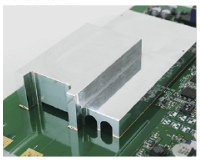
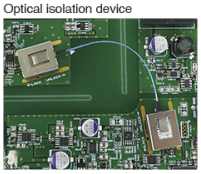
allows it to accurately evaluate power conversion efficiency which often involves measuring multiple frequencies.

Use of two key components (by the U7005) allows the instrument to deliver both exceptional sampling performance and noise resistance

Solid shield

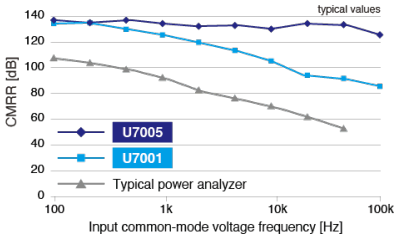


Optical isolation device



Model	Sampling performance	
	Frequency	Resolution
PW8001 +U7005	15 MHz	18-bit
PW8001 +U7001	2.5 MHz	16-bit

Common-mode voltage rejection ratio for voltage input



Unlocking efficiency in inverter systems: Introducing Power Spectrum Analysis (PSA)

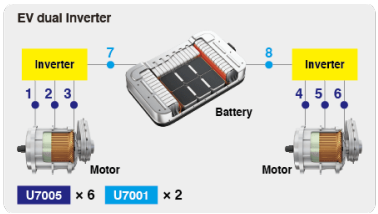
The Power Spectrum Analysis (PSA) function, enhanced by a powerful FFT (Fast Fourier Transform) feature, revolutionizes our approach to analyzing high-frequency power loss. This advanced FFT capability allows for in-depth analysis of voltage, current, and active power, providing detailed insights into power conversion dynamics. This is crucial for enhancing inverter efficiency and minimizing waste in power systems through targeted frequency analysis. The PSA function can provide a clearer picture of electrical issues and helping to pinpoint and reduce power losses more effectively.

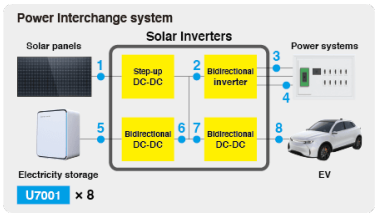
Up to 8 power channels optimizing your measurement

- 8-channel power measurement

Increasingly, hardware like electric vehicle (EV) drive systems that use dual inverters and electric power interchange systems in smart homes are adopting multi-circuit designs in order to utilize energy effectively. A single PW8001 can measure 8 channels of power data, allowing equipment with 8 measurement points for power such as dual motors as well as other equipment with multiple circuits to be evaluated in one stroke.

8-channel power measurement accommodates up to 8 channels with a mix of 2 types of input units





Seamlessly integrate power analysis: Dual units, single Control for up to 16 channels

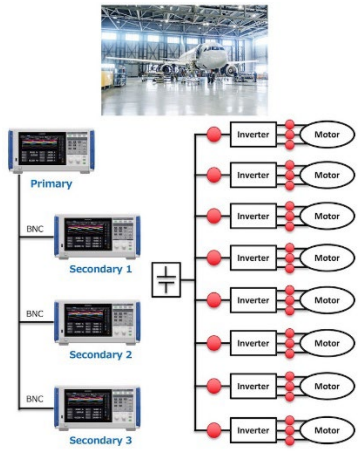
By connecting two PW8001 units with an optical cable, measured data can be consolidated in a single PW8001 in real time. The power of a maximum of 16 channels and 8 motors can be simultaneously analyzed and their efficiency and loss can be displayed and recorded with a single unit.

BNC synchronization

- Electrical angle measurement function

○ Synchronized power measurement across up to 4 instruments (up to 32 channels) using BNC synchronization

• For applications requiring up to 32 channels, time-synchronized measurement of 4 PW8001s can be done with BNC cables. (1 is the primary unit, and the 3 others are secondary.) Settings of each unit can be operated on the primary unit. Although the data is saved in each unit, they are time-synchronized for later analysis. Since the measurement-timing is synchronized, this function makes consolidation and analysis easy.



PMSM online parameter measurement (*2)

- Electrical angle measurement function

In order to implement fine control of a permanent magnet synchronous motor (PMSM), it's necessary to assess the motor's characteristics under actual operating conditions. The PW8001's electrical angle measurement function can perform voltage and current advance measurement, which is necessary in order to implement vector control of the dq coordinate system. The instrument can calculate Ld and Lq values from electrical angle measurements and ascertain motor parameters under actual operating conditions.

Fig.1

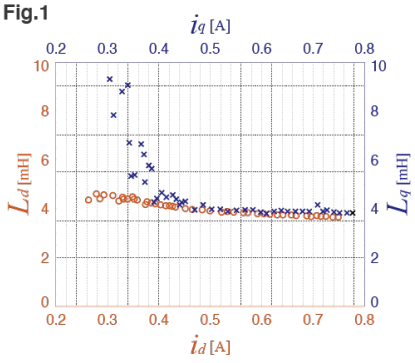
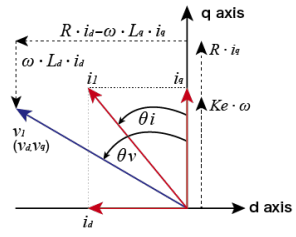


Fig.2



$$L_d = \frac{v_q - Ke \cdot \omega - R \cdot i_q}{\omega \cdot i_d} \qquad L_q = \frac{R \cdot i_d - v_d}{\omega \cdot i_q}$$

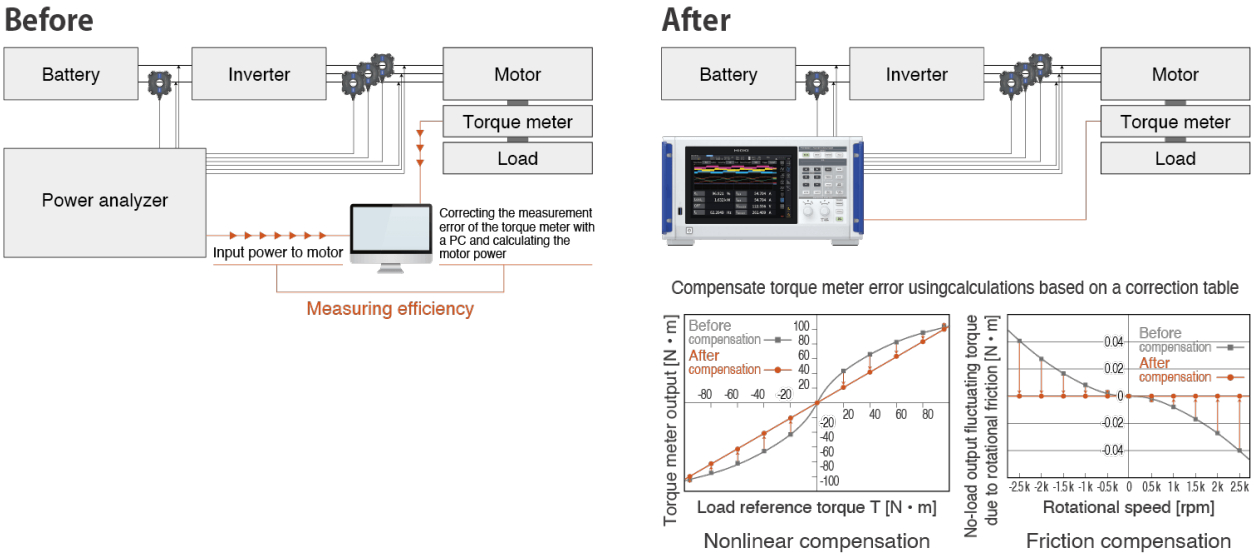
Fig.1
The characteristics of Ld and Lq are current dependent. It is necessary to measure the parameters under the actual operating condition of the motor.

Fig.2
Ld and Lq impedance values in the d- and q-axis directions are calculated based on the results of analyzing the d-axis and q-axis voltage and current vectors.

Compensation of torque meter measurement error (*2)

- Dual torque value correction functions

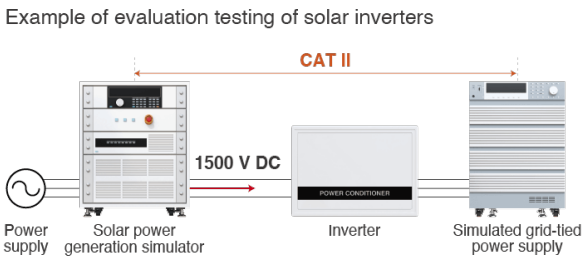
Torque meter measurement error has a substantial impact on motor analysis. The PW8001 can perform calculations using a correction table based on user-defined values for nonlinear compensation and friction compensation. The instrument can accurately analyze high-efficiency motors as well.

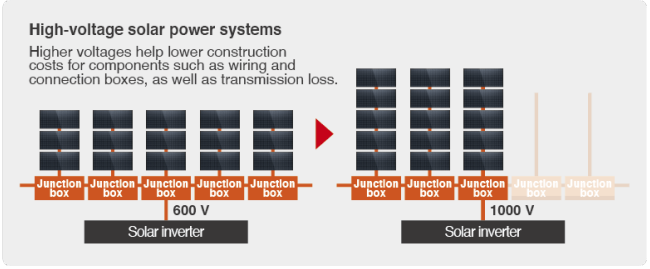


Safe evaluation of increasingly high-voltage power conditioners

- 1500 V DC CAT II, 1000 V DC CAT III (*3)

Renewable energy generation systems are being engineered to use increasingly high voltages in order to reduce equipment construction costs and transmission loss. Evaluating generation systems requires instruments that are capable of high-voltage measurement. The PW8001 Input Unit U7001 can safely measure directly input high voltages of up to 1500 V DC (CAT II) and 1000 V DC (CAT III). (The Voltage Cord L1025, which can accommodate 1500 V DC [CAT II] and 1000 V DC [CAT III], is also available.)

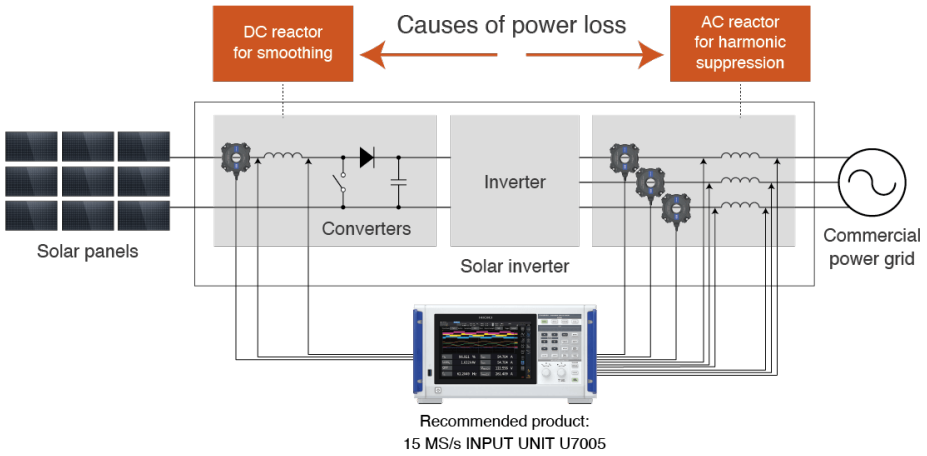




Analysis of power loss in reactors

- High-accuracy measurement of high-frequency, low-power-factor power

In order to improve power conversion efficiency, it's necessary to assess power loss in reactors. The lower the reactor's loss, the lower the power factor, making accurate measurement difficult. The U7005's outstanding high-frequency characteristics and noise resistance make it an extremely effective tool for analyzing power loss in high-frequency, low-power-factor reactors.



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