PF3000M电功率分析仪
PF3000M electric power analyzer

PF3000M电功率分析仪是一款便携式、高性能、多功能的功率分析仪，功率测量精度达到0.05%。可为电动汽车、轨道交通、光伏、风电、电机、变频器、燃料电池和开关电源等多种产品的开发和测试提供帮助，提高产品研发和生产测试效率。同时内置锂电池，可实现长达3~4小时的移动测量，方便现场高效测试。

PF3000M electric power analyzer is a portable, high-performance and multi-functional power analyzer, with power measurement accuracy of 0.05%. It can help the development and testing of electric vehicles, rail transit, photovoltaic, wind power, motors, frequency converters, fuel cells, switching power supplies and other products, and improve the efficiency of product development and production testing. At the same time, the built-in lithium battery can realize mobile measurement for up to 3-4 hours, which is convenient for on-site efficient testing.

最多支持4+1 通道输入协同测量

- 内置锂电池供电、方便现场测试
  Built in lithium battery for power supply, convenient for on-site testing
- 内置大容量锂电池，可维持长达3~4小时的移动测量。电池模块可快速更换，实现更长时间续航。
  Built in large capacity lithium battery, which can maintain up to 3-4 hours of mobile measurement. The battery module can be replaced quickly for longer life.

特点与优势 Characteristics and advantage

● **最多支持4+1个输入通道，可独立或同步测量**

最多支持4个功率通道和1个电机通道，可测量电压、电流、频率、功率、扭矩/转速等参数，同时可实现输入输出同步测量以进行效率评估。内置FPGA处理器，控制多路ADC对电压电流进行完全同步控制，以保证采样相位的同步性，降低测量电压与电流相位差所引入的误差。采用同步时钟，保证各测量单元实现同步采样。

It supports up to 4 power channels and 1 motor channel, which can measure parameters such as voltage, current, frequency, power, torque/speed, and can simultaneously measure input and output for efficiency evaluation. Built in FPGA processor controls multi-channel ADC to fully synchronize the voltage and current, so as to ensure the synchronization of sampling phase and reduce the error caused by the phase difference between measured voltage and current. Synchronous clock is adopted to ensure synchronous sampling of each measuring unit.

● **宽带宽，高稳定性**

带宽高达2MHz，满足高速开关信号的测量。高速测量模块采用高频高稳定度的传感器，有效保证电流高频性能。同时应用电压电流自动频响补偿技术，增强并保证高频信号测量时电压、电流的高精度测量。

The bandwidth is up to 2MHz, meeting the measurement of high-speed switching signals. High speed measurement module adopts high frequency and high stability sensor to effectively ensure the high frequency performance of current. At the same time, the automatic frequency response compensation technology of voltage and current is applied to enhance and ensure the high-precision measurement of voltage and current when measuring high-frequency signals.

● **最高256次谐波测量**

采用锁相环（PLL）同步技术，在谐波模式下可同时分析两组基波频率0.5Hz~20kHz的电压基波、电流基波、谐波成分和总谐波失真（THD），可实现最高256次的谐波分析。

With the phase-locked loop (PLL) synchronization technology, the voltage fundamental wave, current fundamental wave, harmonic component and total harmonic distortion (THD) of two groups of fundamental wave frequencies 0.5Hz~20kHz can be analyzed simultaneously in harmonic mode, and the harmonic analysis of up to 256 times can be realized.

● **电流传感器相位补偿功能**

由于传感器本身存在的延时，会增加电压与电流之间的相位误差，相位补偿功能可通过运算修正电流传感器的相位误差，提升高频及低功率因数下的功率测量精度。

The delay of the sensor itself will increase the phase error between the voltage and current. The phase compensation function can correct the phase error of the current sensor through calculation, and improve the power measurement accuracy at high frequency and low power factor.
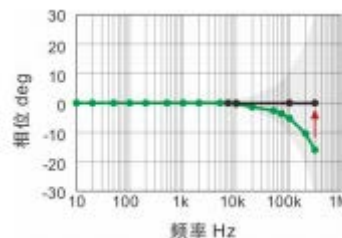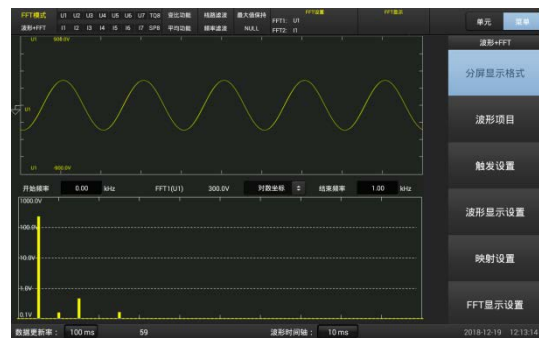
特点与优势 Characteristics and advantage

● FFT频谱分析功能

可同时执行2路FFT分析，并可在FFT功能中设置FFT运算点数以决定FFT测量区间，和选择时间窗口以减少频谱能量泄露。

It can simultaneously perform 2-channel FFT analysis, set FFT operation points in FFT function to determine FFT measurement interval, and select time window to reduce spectrum energy leakage.

● 电机测试功能

使用电机测最功能,可直测电机的转速、扭矩及机械功率。通过设定电机极数,可计算电机的电相角、同步速度和滑差；并且可利用本仪器测得的有功功率、频率和电机输出，计算电机效率和总效率。

Use the motor measurement function to directly measure the speed, torque and mechanical power of the motor. By setting the number of motor poles, the electrical phase angle, synchronous speed and slip of the motor can be calculated; The active power, frequency and motor output measured by the instrument can be used to calculate the motor efficiency and total efficiency.
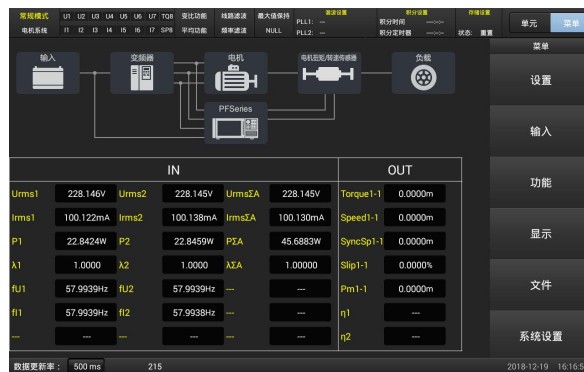
特点与优势 Characteristics and advantage

● **Delta运算及双矢量图分析**

根据已测各单元电压电流瞬时测量值之和及之差，采用Delta运算功能，获得线电压和相电流等。同时显示三相矢量图。并可测悬并显示变频器输入与输出三相的矢量图，对输入、编出各相间的相角关系进行分析，准确评估输入信号对输出 信号的角差影响。

According to the sum and difference of instantaneous measured values of voltage and current of each unit, the Delta operation function is used to obtain line voltage and phase current. The three-phase vector diagram is also displayed. It can also measure and display the vector diagram of the input and output three-phase of the converter, analyze the phase angle relationship between the input and output phases, and accurately evaluate the impact of the input signal on the angle difference of the output signal.

技术参数 Specifications

项目	规格
输入单元	最多支持 4+1 个输入通道
测量量程	电压： CF3：1.5 / 3 / 6 / 10 /15 / 30 / 60 / 100 / 150 / 300 / 600 / 1000 / 1500 [V] CF6：0.75 / 1.5 / 3 / 5 / 7.5 / 15 / 30 / 50 / 75 / 150 / 300 / 500 / 750 [V] 电流： （1）直接输入： CF3：10m / 20m / 50m / 100m / 200m / 500m / 1 / 2 / 5 [A] CF6：5m / 10m / 25m / 50m / 100m / 250m / 500m / 1 / 2.5 [A] （2）外部电流传感器输入： CF3：50m / 100m / 200m / 500m / 1 / 2 / 5 / 10 [V] CF6：25m / 50m / 100m / 250m / 500m / 1 / 2.5 / 5 [V]
频率范围	DC，0.1Hz~500kHz，带宽：2MHz（-3dB，典型值）
量程切换	固定/自动量程可选；各输入单元可独立设置量程
瞬时最大允许输入值 （≤1s）	电压：4.5kVpk 和 3kVrms 中取较小值 • 电流：直接输入：15Apk 和 10Arms 中取较小值 外部输入：峰值电压不超过量程的 10 倍或 30V 中取较小值
连续最大允许输入值	电压：3kVpk 和 2kVrms 中取较小值； 若输入电压的频率超过 100kHz，则为（1200-f）Vrms 或更小（f 表示输入电压的频率，单位 kHz）。 • 电流：直接输入：10Apk 和 7Arms 中取较小值 外部输入：峰值电压不超过量程的 5 倍或 30V 中取较小值。
滤波器	线路滤波器：OFF，500Hz，5.5kHz、50kHz、0.1kHz~100kHz 步进为 0.1Hz。 频率滤波器：OFF、ON
A/D 转换器	分辨率：16bit；电压、电流输入同时转换
采样率	1Ms/s