

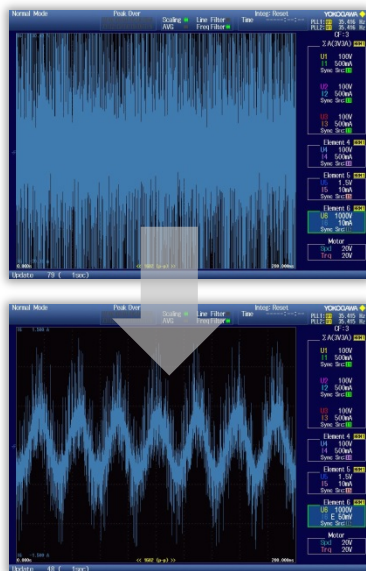
# Noise Reduction Ratio under Severe Environments

## Significantly increases the noise reduction ratio under severe environments

The WT1800E can be equipped with a DC power supply for the AC/DC current sensor CT series (/PD2 option). Large-current measurements can be performed with a single unit integrated with a sensor using the dedicated cable and shunt resistor box. By integrating the measuring device, its power supply, and the sensor into a single unit, improved noise resistance can be attained.

\*A cable for direct input to the current terminal is also available.

Example of current waveform comparison (when measuring microcurrents)



Connection of WT1800E and current sensor power supply

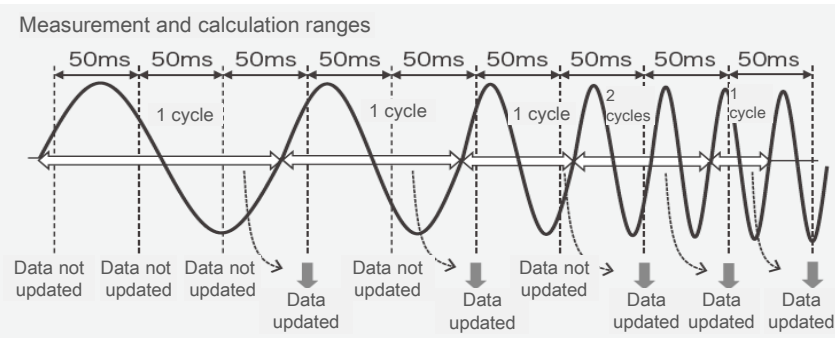
## Inverter and Motor Testing Labs



Precision Power Analyzer WT1800E

## Use of new data update rate that tracks low-speed to high-speed rotation

In addition to fixed data update cycles that can be set from 50ms to 20s, a new "Auto" setting has been added which updates data in sync with the cycle of input signal.



<http://tmi.yokogawa.com/>

YMI-KS-HMI-SE05

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## Test&Measurement

## Measurement Solutions in Inverter Development

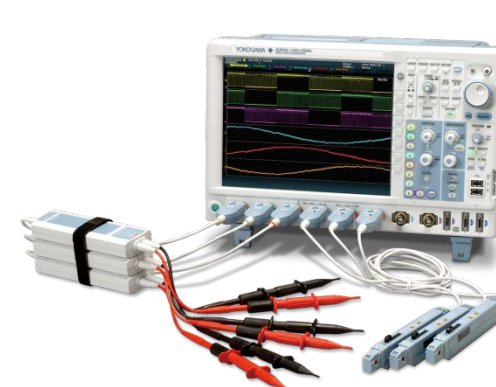
Using the DLM4000, DL850E, and WT1800E

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Recently, inverters featuring more precise control of motors have become widespread. Improvements and changes are continually being introduced into the switching devices of inverters to allow a more compact and efficient device design. Si devices, which have conventionally been used, have become faster, and the new SiC devices have been installed into equipment for practical applications. Since an inverter consists of six switching devices, simultaneous analysis of the switching device operations is not possible if a typical 4-channel oscilloscope is used to measure the waveforms.

The DLM4000 Digital Oscilloscope has 8 analog input channels and 1.25GS/s and 125 megapoints/channel memory, so it is capable of measuring the timing of each device operation in a single process for efficient measurement.

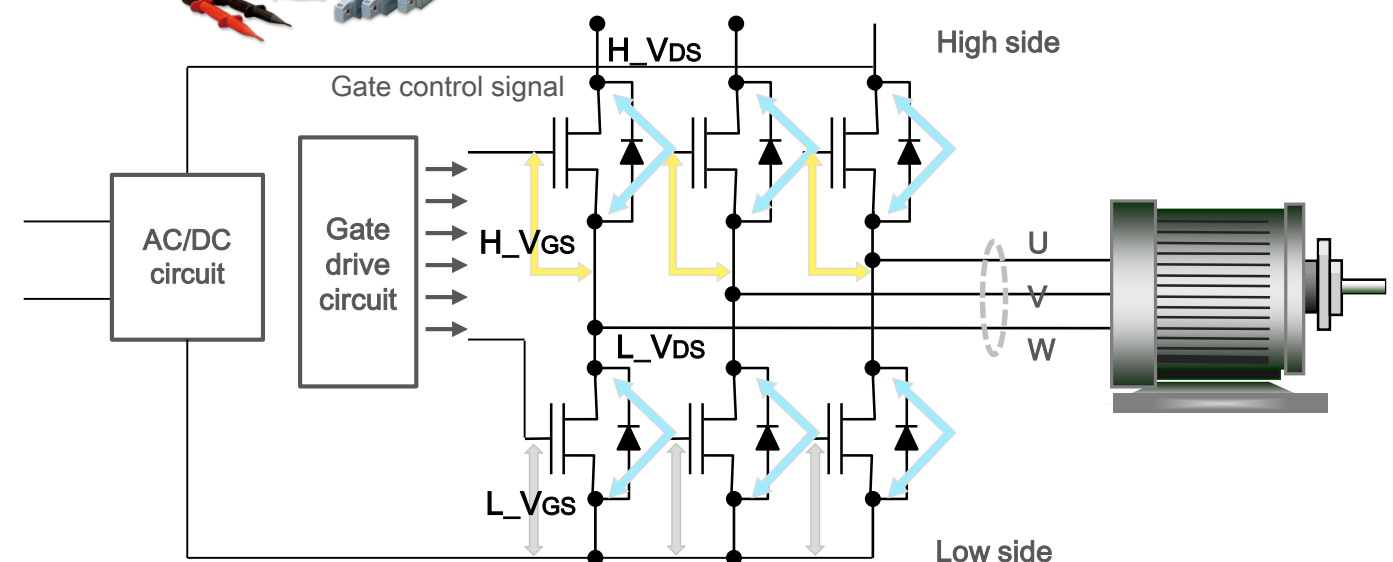
Also, when using the DL850E ScopeCorder, a 100MS/s, 12-bit, 1kV isolation module is available which supports up to 16 input channels enabling easy waveform observation of various devices. A wide range of modules are also available to perform simultaneous measurement of the rotational speed, vibrations, strain, and other physical quantities.



DLM4000



DL850E



Precision Making

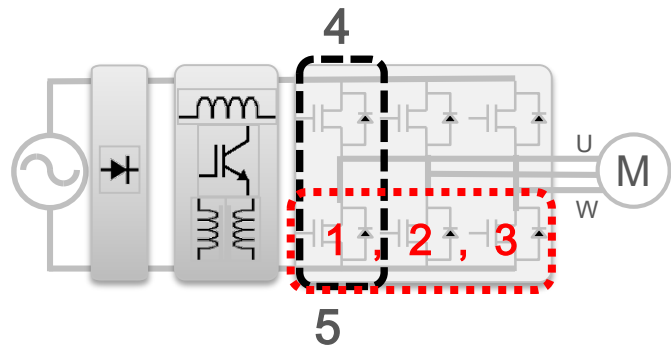


WT1800E



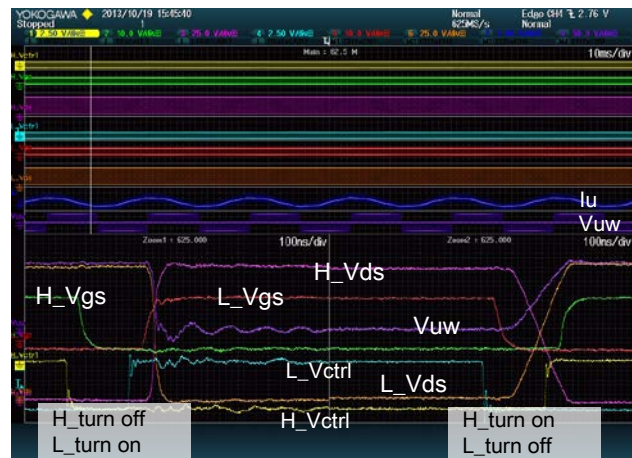
# Simultaneous Observation of the Waveforms of All Switching Devices

DLM4000 is capable of simultaneously capturing 8 analog signal channels, enabling simultaneous observation of the waveforms of all switching devices (generally 6 devices) used in an inverter.



1, 2, 3  
L(H) side arm  
SW Device  
Timing measurement

4,5  
H,L side arm  
SW device  
Timing measurement

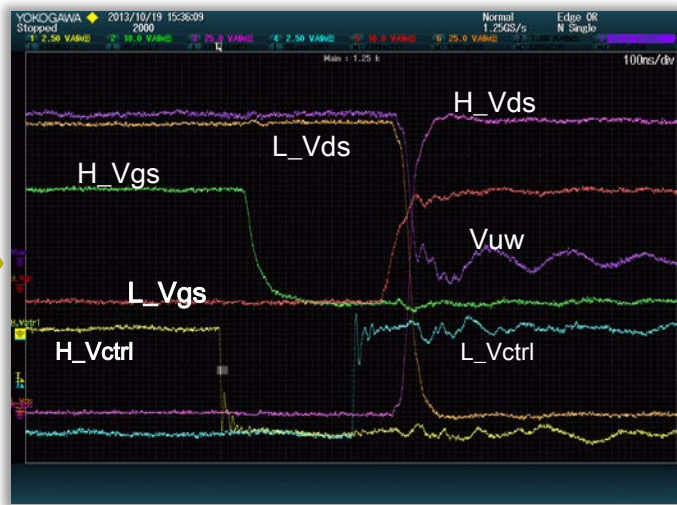
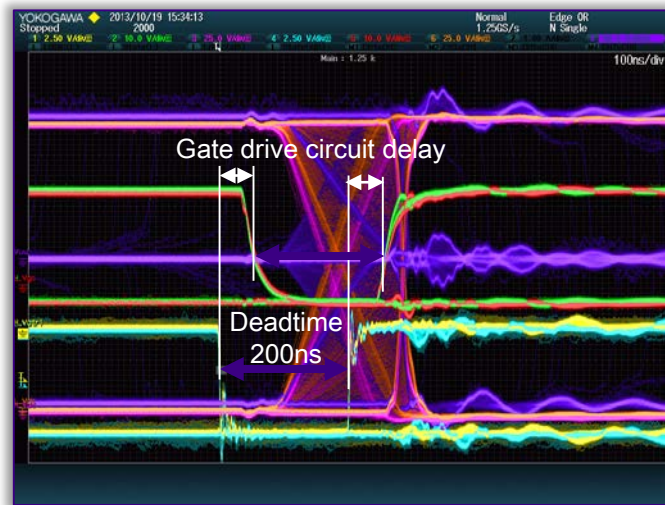


Example of measurement using installed long memory (Measurement time: 100ms 625MS/s)

# Deadtime Measurement where both Devices are OFF

If the devices at the high side and low side are turned on simultaneously, a pass-through current flows and damages the devices, and so a deadtime measurement where both devices are off is important. Since the high-side gate, in particular, may malfunction due to common mode noise, the waveform measurement is important.

Measurement using memory partitioning function (Captured by Vctrl OR trigger)



Individual waveform display screen for data containing 2000 triggers

Image of 2000 superimposed triggers (Accumulate function)

# Measurement of Control Signals and Output including IGBT Gate Signals of 3-phase PWM Inverters.

Isolation measurement for up to 16 channels at 100MS/s can be performed enabling measurement of various high-speed control signals and output including IGBT gate signals of 3-phase PWM inverters. The isolation input module features a high common mode noise removal performance, which allows stable measurement even under severe noise environments at inverter evaluation.



DL850E SiC device Vgs/Vds measurement (100MS/s)

U\_H\_Vgs  
U\_H\_Vds  
U\_L\_Vgs  
U\_L\_Vds  
Vu  
Vv  
Vw  
Encoderphase A: 1024/rot  
Speed (Realtime calculation)



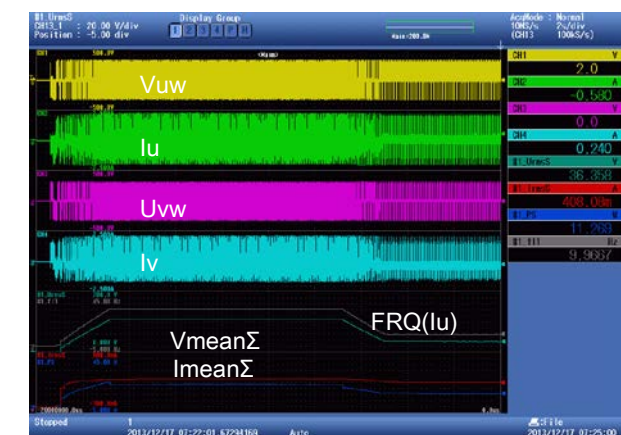
ScopeCorder  
DL850E/DL850EV

- 100MS/s, 12-bit, 1kV insulation
- Maximum 16 channels (when using 100 MS/s module)
- Maximum record length: 2 G points
- Realtime calculation and power calculation function
- Wide array of available input modules

# 3-phase Power Analysis

## Realtime power calculation function

The realtime power calculation function enables simultaneous observation of input/output measurement signals and power parameter calculation value trends. Power parameters can be calculated for each cycle of the basic frequency to easily capture transient phenomena. Vibration/temperature and other measurement data can also be measured simultaneously.



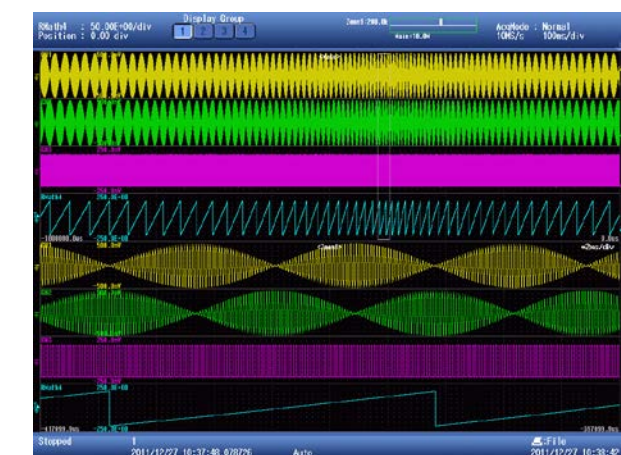
Example of realtime power calculation measurement

# IPM Motor Analysis

## Realtime calculation (Rotary angle calculation/Resolver calculation)

Since an IPM motor uses precise control of current based on the angle of rotor for providing high-efficiency operation, measurement of the position detection sensor by a measuring instrument is also important.

- Realtime calculation is supported for the two position detection sensors below.
- Rotary angle calculation: Phase A/B/Z encoder
  - Resolver calculation: Resolver



Example of resolver calculation measurement