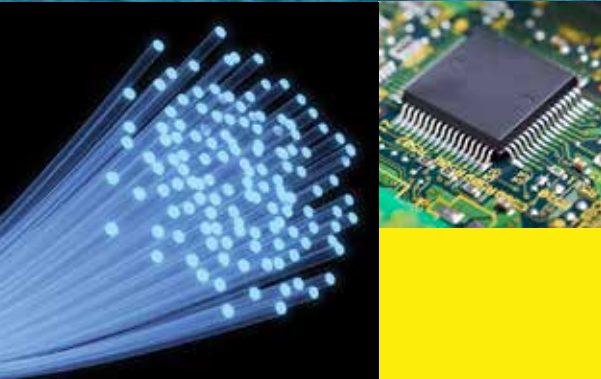


# Product Overview



**100 Years** of Precision Making

Bulletin 04A04A04-EN-E



# Trusted measurements

The Yokogawa Group's corporate philosophy has at its core, the goal, - 'to contribute to society through broad-ranging activities in the areas of measurement, control and information' and strives to carry out these activities in an environmentally friendly manner.

Yokogawa Electric Corporation was established in 1915 by Dr. Tamisuke Yokogawa to manufacture the first electric meters in Japan. As the foundation of our business, measurement remains a strong and important driver for our activities. Today, Yokogawa Test & Measurement is focused on the measurement challenges related to energy conservation, efficiency and sustainability, and providing high quality, highly reliable test and measurement solutions.

Measurement is important to us all. It is the ability to quantitatively express certain physical values that provide indications to the quality, performance and function of the item being measured. To ensure the quality and performance, the measured value must be reliable. It is not sufficient for a measuring instrument to measure only on given days.

It must obtain the same value over intervals of time, regardless of the environmental conditions it must endure. That is why the spirit of 'quality first' is an integral element in meeting our corporate philosophy goal.

With 100 years of experience, we have built our reputation on understanding the needs of scientists and engineers that require both the accuracy of a measurement system and its precision, where stability and reproducibility ensure that repeated measurements under unchanged conditions show the same results. A valid measurement needs to be both accurate and precise. Providing accuracy and precision is our business.

'Precision' is what we make and 'Precision Making' is what we do. We are the 'Precision Makers'.

That is why scientists and engineers see Yokogawa T&M as the world's most trusted measurement partner.

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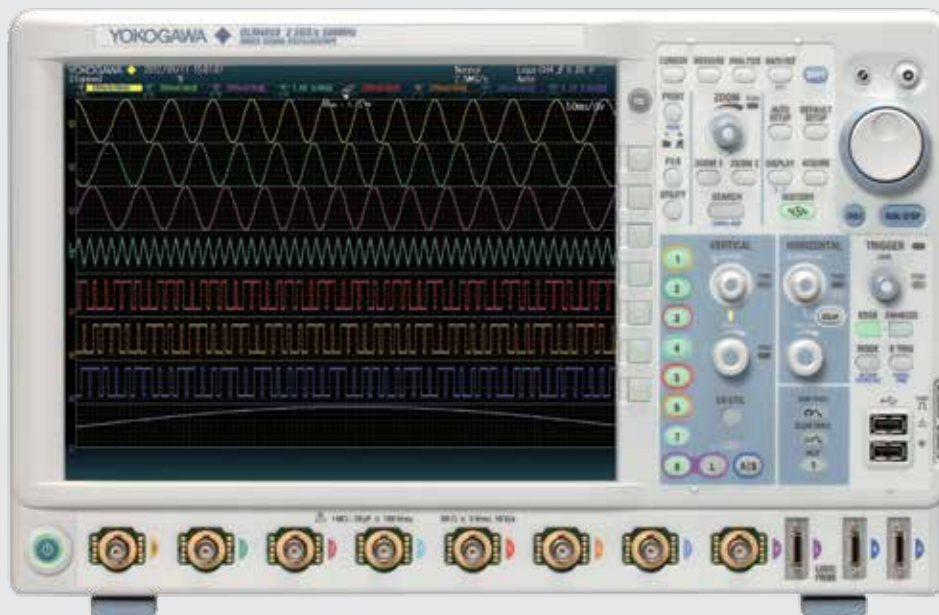
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# Oscilloscopes

## Flexible and dependable

Capture, display, analyse, save and export. Alongside 'ease-of-use', these are the principle duties required of any oscilloscope. Using high speed waveform acquisition, history memory and reliable triggering, Yokogawa's scopes are renowned for being able to capture the waveforms that matter to you. The flexible display configuration, dual window zooming and the wealth of high speed measurement features will help you to get the answers you need when you need them.



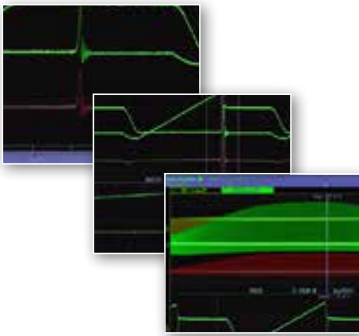
## DLM4000 Mixed signal oscilloscopes

The DLM4000 is a unique 8 channel MSO which provides comprehensive measurement and analysis capabilities for embedded, automotive, power and mechatronics applications. For example, when 3 voltages and 3 currents have to be measured simultaneously, clearly 4 channels are not enough. One analogue channel becomes 8 logic inputs with a press of a button, and 16 more logic inputs are optional.

The DLM4000 enables complex measurement challenges to be solved quickly and easily.

- 8 analogue channels (or 7 plus 8 logic)
- Up to 24 logic channels
- 350 MHz and 500 MHz bandwidths
- **NEW:** Up to 250 M points memory

# Oscilloscopes



## Power conversion device testing

To evaluate the switching loss inside high power devices, it's necessary to capture the actual voltage and current waveforms. A check of the surge voltages & currents, and monitoring of the timing of the gate signals is also essential.

### PBDH0150 – Differential probe

The PBDH0150 is a 150 MHz differential probe intended to satisfy the needs for high voltage floating signal measurements, particularly for power electronics and in the mechatronics market.

- DC to 150 MHz bandwidth
- 1400 V (DC + ACpeak) differential and common mode voltage
- 1m extension lead (maintains 100 MHz bandwidth)

### PBC050, PBC100 – Current probes

These probes use a Hall effect sensor, which senses the DC current, and a current transformer, which senses the AC current. The probe simply clips around a conductor, making it unnecessary to make any electrical connection to the circuit.

- 30 Arms continuous measurement
- DC to 50 MHz or 100 MHz
- Direct readout of current values

## Power measurement and power supply analysis

The DLM /G3 and /G4 options enable both power related measurements to be carried out and high frequency power devices and supplies to be analysed. The accuracy of switching loss and other power related measurements are maximised using Yokogawa voltage and current probes together with the automatic deskew feature and 701936 deskew signal source.

- Safe operating area (SOA) analysis
- I<sup>2</sup>t inrush current measurement
- Harmonic analysis for EMC emissions testing

## Software and accessories

### Xviewer PC software for DL series

Virtual instrument control, file transfer, waveform viewer and analysis. Support for Ethernet, USB and GPIB interfaces. Comprehensive analysis includes 6 types of FFT calculation for up to 2 M datapoints.

### Matlab® Toolkit

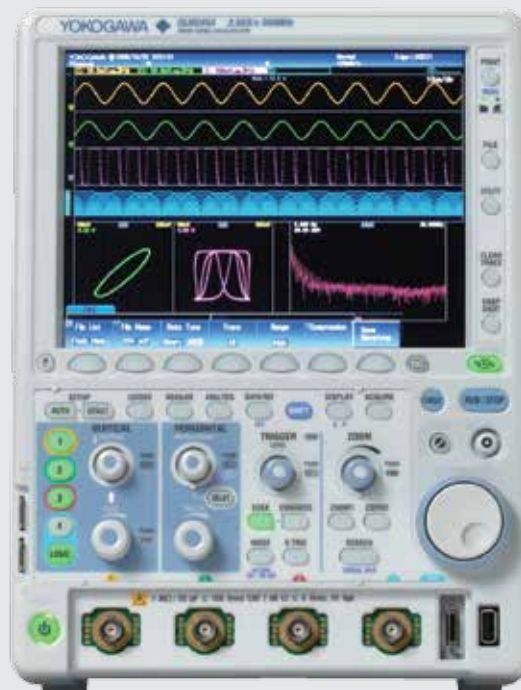
The tool kit enables instruments to easily interface with Matlab. The software can be used to control instruments from within Matlab or to transfer data from the instrument to Matlab via GP-IB, USB or Ethernet.

**Matlab®** is a registered trademark of ThMathworks

# Oscilloscopes

## Powerful performance and value

Yokogawa provides digital and mixed signal oscilloscopes with long flexible capture memories, which enable you to maintain high sample rates, and with extensive signal analysis capabilities. The integrated hardware enables serial buses, such as I<sup>2</sup>C, SPI, CAN, LIN and FlexRay, to be analysed in real time and multiple parameters to be measured without any reduction in waveform acquisition rate. Yokogawa scopes offer large clear displays, intuitive multi-language user interfaces, easy connectivity and especially, value for money.



## DLM2000 Mixed signal oscilloscopes

The DLM2000 combines long memory, fast waveform acquisition and up to 50,000 history memories. The input flexibility enables the 4<sup>th</sup> analogue channel to be converted to 8 logic inputs. They offer a wealth of measurement and analysis capabilities including digital filtering, serial bus analysis and histogram functions. These powerful compact

oscilloscopes are the solution to the widest range of applications and budgets

- 200 MHz, 350 MHz and 500 MHz bandwidths
- 2 or 4 analogue channels (or 3 analogue and 8 logic)
- Up to 2.5 GS/s sample rates
- **NEW:** Up to 250 M points memory



# Oscilloscopes

## Automotive and embedded systems testing

Yokogawa was the first manufacturer to provide triggering and analysis for serial buses in an oscilloscope. Support for automotive buses includes FlexRay, CAN and LIN as well as UART, I<sup>2</sup>C and SPI. The independent dual zoom windows and real time decoding mean that up to 4 different buses running at different speeds can be examined in detail and compared simultaneously.

The simultaneous sampling of up to 8 analogue and 24 logic channels mean that DLM oscilloscopes can comprehensively help in the development and debugging of automotive ECUs, their controller software and other embedded systems.



## PBDH1000 – 1 GHz differential probe

The PBDH1000 is a differential probe designed to meet the challenges of measuring signals in in-vehicle bus development and testing (CAN, FlexRay). Loading on the serial bus is reduced due to the higher input impedance and lower capacitance, and thus displayed signals will be closer to reality.

- 1 M ohm / 1.1 pF input
- +/- 25 V differential voltage input
- Compatible with the FlexRay standard



## 701920 and 701922 differential probes

These two differential probes enable any oscilloscope to perform day-to-day testing on low voltage differential serial buses.

- 500 MHz and 200 MHz bandwidths
- +/- 12 V and +/- 20 V differential voltage inputs
- Built-in DLM scope option provides probe power



## 701919 – Probe stand and positioner

- Hands-free circuit board testing
- Heavy base and flexible arm (1.5 kg)
- For 8 mm to 13 mm diameter probes

## Software and accessories

### CAN-db symbol file editor software

The free PC symbol editor software enables CAN-db files to be loaded and physical value (message, signal) symbol definitions to be created and installed in the DLM2000 and DLM4000.

### Complete range of probes

The scope is only half the solution. Different applications need different probes. Yokogawa's range includes active, differential, low capacitance, passive and current types, and a stand for hands-free probing.

# Scopecorders

Measure and analyse a wealth of signals in real-time and speed up development & fault finding

A ScopeCorder is a powerful portable data acquisition recorder that can capture and analyse both transient events and trends up to 200 days. Using flexible modular inputs it combines measurements of electrical signals, physical (sensors) and CAN / LIN serial buses and is able to trigger on electrical power related and other calculations in real-time.



## DL850E ScopeCorder

The DL850E has individually isolated and shielded input channels that provide high-resolution and high sample rates. This results in the precise measurement of fast switching signals even in the harshest environments. Trend calculations such as active power, power factor, integrated power and harmonics using the new power maths option. The DL850E ScopeCorder is the ideal tool to enable the real-time

evaluation of dynamic behaviour within application sectors such as mechatronics, transportation, power electronics and alternative energy.

- High-speed sample rates up to 100 MS/s
- 2 to 128 analogue or 128 logic channels
- Isolated inputs up to 1000 V



# Scopecorders



## DL850EV – ScopeCorder Vehicle Edition

The DL850EV introduces CAN and LIN bus monitoring, making it ideally suited for the analysis of physical data transmitted over the vehicle serial bus. The ScopeCorder Vehicle Edition is designed for engineers working in the automotive, railway and industrial automation industries for applications with incorporated CAN or LIN buses.

- Compare CAN and LIN bus data with analogue sensor outputs
- Decode up to 240 CAN sub channels
- Battery powered operation (10 V - 18 V) - /DC option



## SL1000 - High-speed data acquisition unit

The SL1000 is a PC-based high speed data acquisition unit and comes with intuitive logging and control software for quick start and easy set-up.

- Ethernet and USB interfaces
- 3.2 MByte/s data streaming rate (1.6 MS/s)
- Up to 128 channels by synchronising 8 SL1000 units



## Flexible and swappable input modules

Choose from 17 types of input modules, with built-in signal conditioning, and install up to 8 in a ScopeCorder or SL1000 at a time.

- High Voltage 100 MS/s, 12-bit, isolated
- Voltage 10 MS/s, 12-bit, isolated or non-isolated
- Voltage 1 MS/s, 16-bit, isolated
- High Voltage 100 kS/s, 16-bit, isolated with RMS
- Voltage Scanner 200 kS/s, 16-bit, 16 channel \*
- Temperature Scanner, 16-bit, 16 channel \*
- Temperature & High precision voltage
- Strain gauge
- Acceleration
- Frequency
- Logic data \*
- CAN bus monitor \*\*
- CAN and LIN bus monitor \*\*

\* only for DL850E series

\*\* only for DL850EV Vehicle Edition

## Software and accessories

### Xviewer - PC software

Display acquired waveforms, transfer files and control instruments remotely. In addition to simply displaying the waveform data, Xviewer features many of the same functions that the ScopeCorder offers; zoom display, cursor measurements, calculation of waveform parameters, and complex waveform maths.

### DL850E/DL850EV acquisition software

Especially for longer duration or surveillance testing the ScopeCorder comes with an easy-to-setup acquisition software that enables continuous data recording to a PC hard drive. When using the software in free run mode, there are virtually no restrictions in recording time and/or file size.

# Precision power measurement

## Where power meets precision

As more and more innovation focuses on the needs to reduce energy consumption, engineers require ever higher levels of precision and accuracy from their power measuring instruments. As the world's largest manufacturer of power analysers and meters, Yokogawa continually innovates and provides market leading solutions to support improvements in energy utilisation. This has led to the development of a new class of hybrid product for precision transient power measurement.



## PX8000 Precision power scope

The PX8000 brings together Yokogawa's expertise in power measurement and long heritage in oscilloscope design to deliver the revolutionary PX8000, the world's first precision power scope. Traditional power measuring instruments cannot provide accurate time measurements and oscilloscopes are not designed to measure power with precision. Compromise is no longer needed.

The PX8000 provides the versatility to make accurate time based power measurements on everything from renewable power to advanced robotics.

- Transient power measurements
- Cycle-by-cycle analysis
- Simultaneous high precision harmonic analysis

# Precision power measurement



## WT3000T – Precision power analyser - Transformer test version

The WT3000T (T for Transformer) is specifically designed to meet the measurement requirements of the transformer industry. Based on the WT3000, the world's most accurate power meter, it provides the required accredited high accuracy at low power factors and under no-load conditions.

- For transformer loss testing to IEC60076-8
- Accuracy better than 0.6% at power factor 0.01
- Accredited calibration certificate



## WT1800 – Precision power analyser

With up to 6 input elements the WT1800 is typically used for efficiency measurements on three-phase motors and drives, power supplies with multiple inputs/outputs and LED lighting applications etc. The WT1800 is a universal meter for power electronic and energy analysis.

- Basic power accuracy of 0.1%
- Input power frequency range of DC, 0.1 Hz to 1 MHz
- Simultaneous power measurements and dual channel harmonic measurements up to the 500th order



## WT500 – Compact power analyser

Specifically designed for evaluating the power conditioning technologies used in renewable energy applications, such as inverters, drives & transformers, the WT500 is available with one, two or three input elements for single and three phase applications.

- Basic power accuracy of 0.1%
- Measurement of bought & sold watt hours
- Frequency range: DC, 0.5 Hz to 100 kHz

## Calibration

The control of product quality is essential and can make a huge difference to the success or failure of a business. Yokogawa Europe, with its own world class standards laboratory for power meters and current sensors, is the only industrial (i.e. non-government or national) organisation to offer traceable power calibration,

to national and international standards, at frequencies up to 100 kHz. The exceptional capabilities at high frequencies and low power factors ensure that customers can trust their measurements and meet the requirements of quality standards such as ISO9000.

# Precision power measurement

## Trustworthy power measurements

To support the development of alternative energy sources and to validate improvements in efficiency and power consumption, Yokogawa provides trustworthy measurements for both low and high frequency applications. These range from traditional production line testing of domestic appliances and the measurement of highly distorted power waveforms in lighting circuits and inverters, to the measurement of very small improvements in the efficiency of solar inverters and tests on hybrid and electric vehicles.



## WT3000 Power analyser

Meet the world's most stable and accurate power analyser, offering high bandwidth and unbeatable performance. The WT3000 is the benchmark for energy efficiency measurements and enables products with standby power modes to be tested according to IEC 62301 Ed 2.0 and EN 50564. It supports 50/60 Hz (10/12 cycles) harmonic, inter-harmonic and flicker measurement and analysis, as required by IEC61000 standards.

For the evaluation of motors and inverters, a special version is available that enables the motor and total efficiencies to be measured simultaneously.

- Basic power accuracy of 0.02%
- Bandwidth DC, 0.1 Hz to 1 MHz
- Harmonic and flicker analysis according to IEC 61000 standards



# Precision power measurement



## WT310/WT330 Digital power meters

The 5<sup>th</sup> generation of the world's bestselling power meter provides accurate and reliable power measurements. It helps developers and manufacturers in fields such as domestic "white goods", lighting systems and air conditioning equipment to ensure that their products comply with emerging IEC/EN standards.

- Connect currents from 50 mA to 40 Arms
- Bandwidth DC, 0.5 Hz to 100 kHz
- Standby power testing to IEC 62301 and EN50564



## CW120/CW240 – Clamp-on power meters

Small-sized and battery powered electric energy and power meters for power quality management.

- Ideal for field applications
- Energy consumption measurement
- Wiring check function minimises connection errors



## Current sensors

External current sensors are required to measure currents above 50 Arms. The precision sensors from PM Special Measuring Systems and SIGNALTEC complement Yokogawa's high precision power analysers to ensure that measurements from milliwatts to Megawatts are accurate and reliable.

### MACC2<sup>Plus</sup> - External current sensor

The accuracy and cost effectiveness of the MACC2plus makes it a very popular sensor with a 1000:1 ratio and is suitable for currents up to 850 Apeak (600 Arms).



### SC1000 - Zero-Flux™ split core current sensor

The unique split core principle enables it to be easily installed when power cables cannot be disconnected. Primary currents up to 1000 Apeak (700 Arms) can be measured.



### CURACC - Zero-Flux™ external current sensor

When currents above 1000 Apeak (700 Arms) need to be measured, the CURACC offers high accuracy measurements up to 6000 Apeak (4240 Arms).

## Software and accessories

### WT-viewer & PowerViewerPlus

Display numerical and waveform data on a PC, perform harmonic analyses and use trend view to monitor power supply voltage fluctuations, changes in current consumption and other time-based variations.

### 761922 Harmonic software

This software enables harmonic analysis, voltage fluctuation and flicker measurement, compliant to IEC61000-3-12 & IEC 61000-3-3, to be carried out using measurement data from the WT3000.

# Optical spectrum analysers

## Leading solutions for R&D and industrial applications

In 2002 Yokogawa became a leading supplier of optical spectrum analysers following the acquisition of ANDO Electric. With more than 30 years of experience in optical testing, Yokogawa offers a full range of OSAs, each one specifically designed to accurately and quickly measure the performance of photonic devices and systems used in diverse applications. These include data communications, industrial manufacturing, biological studies, healthcare, lighting, imaging and sensing for safety, security and environmental pollution control.



## AQ6370 series Optical spectrum analysers

AQ6370 OSAs are the most advanced and trusted on the market. Covering wavelengths from 350 to 2400 nm, they offer a unique combination of excellent performance, long term reliability and ease of operation. They adopt the versatile and reliable Free Space Optical Input, which allows them to accept single-mode, multi-mode and large-core (up to 800 $\mu$ m) fibres. Moreover, the Free Space structure is the most effective to guarantee high coupling efficiency,

measurement repeatability and zero maintenance. They are the instruments of choice in demanding R&D application and in many industrial process and quality control applications.

- High-speed measurement and real-time analysis
- 20 pm max. wavelength resolution
- 110 dB (from -90 dBm to +20 dBm) max. dynamic range

# Optical spectrum analysers



## AQ6373B – Short wavelength range OSA

The AQ6373B offers extremely high resolution measurement of visible wavelengths and part of the near-infrared region. Advanced auto-analysis features include laser testing and light colour determination as perceived by the human eye (CIE 1931 XYZ).

- Uniquely covering the wavelength area 350 to 1200 nm
- Up to 20 pm resolution (10 pm between 400 and 470 nm)
- Laser development, visible wavelength communication, LED testing



## AQ6370D – Mid wavelength range OSA

The AQ6370D is the ideal spectrum analyser for telecommunication applications. A complete set of automatic analysis functions are available for the evaluation of lasers, filters, DWDM signals and fibre amplifiers. Standard and high performance models are available to satisfy the most demanding applications.

- Wavelength range from 600 to 1700 nm
- Up to 20 pm resolution
- Telecom R&D, scientific research, quality control in component manufacturing



## AQ6375 – Long wavelength range OSA

Uniquely covering the wavelength area 1200 to 2400 nm, the AQ6375 produces high sensitivity measurements using thermo-electric cooling of the internal photodetector.

- Wavelength range from 1200 to 2400 nm
- Up to 50 pm resolution
- Analysis of laser diodes, fibre lasers and super-continuum sources
- Fibre Bragg Grating manufacturing and absorption spectroscopy

## Software and accessories

### Real-time remote control software

The AQ6370 Viewer software provides real-time monitoring of measurement results and complete instrument control from a remote PC. Using the same software, previously stored measurement results can also be transferred and analysed off-line.

### NA conversion adapter

The Numerical Aperture (NA) Conversion Adapter is a unique accessory that halves the numerical aperture of a connected multimode fibre. This improves the signal-to-noise ratio when measuring passive components and the level stability when measuring active devices.

# Optical test equipment

## Laboratory and production line testing

Applications that are based on the propagation of light are now all around us. Varying from applications in telecommunication, automotive, aerospace, consumer electronics and life science research, each one requires its dedicated optical components and transmission systems to be thoroughly and quickly tested. Yokogawa optical test systems offer the flexibility, speed and functionality to meet these requirements.



## AQ6150 Optical wavelength meter

The AQ6150 and AQ6151 optical wavelength meters are fast, accurate and cost-effective instruments for carrying out measurements in the telecommunications wavelength range from 1270 to 1650 nm. Their high data acquisition rate and component characterisation speed make them particularly suited to the production testing of active optical devices such as tunable lasers.

Up to five measurements per second can be carried out in the repeat mode.

- High wavelength accuracy to 0.3 pm
- Simultaneous measurement of up to 1024 wavelengths
- Acquire, analyse and transfer a measurement within 0.3 sec



# Optical test equipment



## AQ2200 - Multi application test system

The modular platform of the AQ2200 offers a solution for many optical test applications. With the broad range of available plug-in modules, complex measurement setups are simplified, with a single-box solution. A single MATS frame can handle multiple applications simultaneously, allowing different users to control the modules thus saving cost. The fast response of the instrument makes it an ideal tool in a manufacturing environment.

- 3 and 9-slot frames allow hot-swapping of modules
- Fast command processing and programming capabilities
- Ethernet, GP-IB and USB interfaces

## AQ2200 series – Plug-in modules

Particularly suitable for the evaluation of the gain, noise and insertion loss of optical filters, optical amplifiers and fibre components, a broad range of modules is offered to satisfy the extensive range of potential applications.

- Optical power / sensor modules
- Grid tunable laser source (TLS) modules
- Optical attenuator modules
- Optical switch modules
- Optical transceiver test modules



## SLD-series – High-power, broadband light source

The combination of a broad spectral range and a high power level is achieved by spectral combination of multiple super-luminescent diodes (SLD).

- 3 models with output spectrum ranges up to 1250 - 1650 nm
- Total output power up to 16 dBm (40 mW)
- Spectral power density  $> -30$  dBm/nm
- Power stability  $\pm 20$  m dB @ 15 min



## Software and accessories

### Remote viewer software for the AQ2200

Viewer software for the AQ2200 provides real-time monitoring of measurement results and complete system control from a PC via Ethernet. Remote users can therefore easily access the instrument even when it is integrated into a production line or another machine.

# Optical field testers

## Fibre-optic network testing

Driven by the increasing demand for fast internet access, fibre-optic networks are rapidly expanding around the world. These networks need to be tested during both installation and maintenance. Yokogawa's rugged field testers are simple to operate and reliable, and allow accurate measurements to be performed under the most difficult conditions.



## AQ7280 Optical time domain reflectometers

The portable AQ7280 is a modular test platform consisting of a mainframe and selectable OTDR and OPM/VLS modules. Its 8.4" multi-touch capacitive touchscreen, multitasking capability, lightning startup time, stable operating system and extraordinary battery life enable users to enhance their productivity when testing optical fibres. With the fully-automatic icon-based event search function anyone will become an OTDR

measurement expert. The range of AQ7280 OTDR modules are optimised for analysing optical networks from access to core.

- 9 OTDR plug-in modules, dynamic ranges up to 50 dB
- 2, 3 and 4 wavelengths, for single- and multi-mode fibres
- 5 OPM/VLS plug-in modules
- PON optimised

# Optical field testers



## AQ1200 - Optical time domain reflectometers

An AQ1200 series handheld OTDR is a compact, lightweight and easy-to-use testing tool for optical fibre network. Its all-in-one design offers automatic fault finding, automatic event analysis, optical loss testing, visual fault location, fibre scope support, USB data storage and remote control. The PON (passive optical network) measurement mode enables faults in drop cables in FTTH (fibre to the home) installations to be correctly identified also where high-port-count optical splitters are installed.

- 7 models, 4 wavelengths, 1 or 2 optical ports
- 1, 2 and 3 wavelength models for installation and maintenance
- Optional power meter and visible light source ports
- Event dead zone down to 0.75 m



## AQ1100 - Optical loss test set

The AQ1100 OLTS provides a power meter and light source(s) in one very portable unit for testing optical fibre networks such as FTTH (fibre to the home) and LAN (local area network). Choices of power meter and light source(s), including support for both single mode and multimode fibres, mean that the AQ1100 is a versatile and cost effective field tester.

- Power measurement up to +27 dBm
- PON (1490/1550 nm) parallel measurement
- Optional visible light source for fault finding

## Software and accessories

### AQ7932 - OTDR emulation software

This Windows-based software can analyse trace data obtained with AQ1200 and AQ7280 OTDRs on the PC. With its “Wizard” function it can easily generate comprehensive test reports from the collected data. Report data can also be exported in Excel format.

### AQ7940 - Intermittent disconnection monitoring software

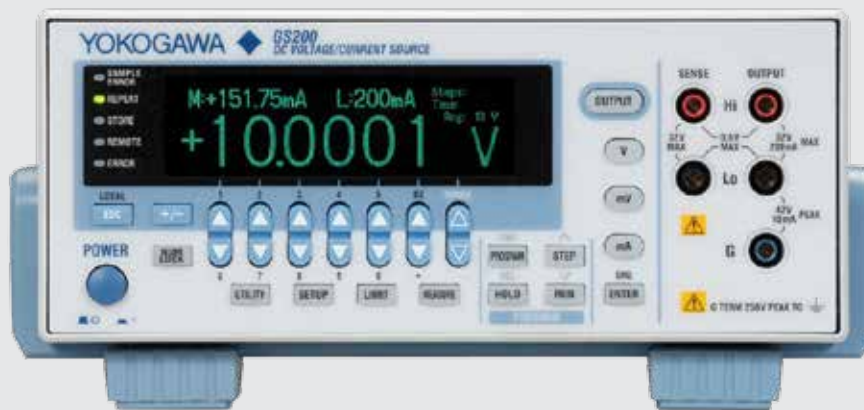
The AQ7940 is a PC software for detecting and monitoring intermittent\* disconnections of an optical fibre connected to the OTDR, which is controlled via Ethernet or USB interface. Disconnections as short as 100 ms can be detected.

\*Occuring occasionally or at regular or irregular intervals

# Signal sources & generators

## Fast, flexible and precise

For general purpose standalone applications or as core components in a high speed test and measurement system, Yokogawa sources and signal generators are highly accurate and functional. The integration of source and measurement into a single unit greatly simplifies the test process. Semiconductor devices, sensors, displays or batteries etc can therefore be quickly and easily characterised.



## GS200 DC voltage/current source

The GS200 is a programmable DC voltage/current source/sink that combines high accuracy, high stability, and 5 1/2-digit resolution. It is thus able to generate extremely low-noise DC voltage and current signals that are required for a wide range of applications. As the GS200 can perform four quadrant operation, it can also be used as a highly accurate constant current load.

Additionally, the optional monitor feature allows variations in the load voltage or current to be monitored and logged.

- Voltage source up to  $\pm 32$  V. Current source up to  $\pm 200$  mA
- Programmable output up to 10,000 points
- Built-in USB mass storage device



# Signal sources & generators



## GS610 - Source measure unit

The GS610 is a high accuracy, high speed programmable voltage and current source that incorporates both generation and measurement functions as well as USB storage and an Ethernet interface. As the GS610 can operate as a current source or a current sink, a wide range of electrical characteristics can be evaluated.

- Wide range sink and source operation (3.2 A, 110 V, 60 W)
- Precise pulse generation (down to 100  $\mu$ s width with 1  $\mu$ s resolution)
- Battery simulator version available



## GS820 - Multi channel source measure unit

The GS820 is a highly accurate multi channel voltage/current source measure unit that incorporates voltage generation/current generation as well as USB storage and an Ethernet interface. Since the two source channels and two measuring channels can be operated arbitrarily, almost all electrical characteristics can be evaluated.

- Dual sink and source operation: 7 V and 3.2 A or 18 V and 1.2 A
- Precise pulse generation (down to 100  $\mu$ sec width with 0.1  $\mu$ sec res.)
- 50 V version available, 50 V and 0.6 A or 20 V and 1.2 A



## FG400 - Arbitrary/function generators

The FG400 provides basic and 25 types of application specific waveforms as standard and generates signals quickly and easily. Acquire signals using a Yokogawa Oscilloscope or ScopeCorder and use the 16 bit arbitrary waveform capabilities to reproduce them or add them to other signals.

- 1 or 2 independent or synchronised channels
- 0.01  $\mu$ Hz to 30 MHz
- Precise phase and frequency control between channels
- 20 V peak to peak and 42 V isolation between outputs

## Software and accessories

### Multi-channel capability

Use the external input/output connectors to source or generate multiple synchronised channels and make test systems scalable.

### Full connectivity

As well as GPIB, the GS610 supports Ethernet, which allows remote control using a web browser, and FTP file transfers. By using USB, the memories in the instrument appear as storage devices on the PC.

# Calibrators

## High precision production and maintenance solutions

Yokogawa provides a range of electrical and process calibrators to help ensure the quality of customers' products. The 2558A and 2553A are the latest generation of high compliance bench top AC and DC calibrators which are found in analogue meter laboratories and on production lines around the world. The handheld calibrators complement Yokogawa's expertise in providing and maintaining process and industrial automation equipment in the field and in the laboratory.



## 2558A – AC voltage current standard

The 2558A is a simple standalone solution for calibrating meters, clamps and CTs. With ranges up to 1200.0 V AC and 60.00 A AC mean that the 2558A is the instrument of choice for the cost effective calibration of AC analogue meters. The unit can be intuitively operated via the front panel or controlled by an ATE system.

- 1.00 mV to 1440 V AC
- 1.00 mA to 72 A AC
- Sweep, output divider and deviation functions

# Calibrators



## 2553A – Precision DC Calibrator

The 2553A combines precision performance and ease of use for the calibration of measuring instruments including analogue meters, thermometers, temperature transmitters and data loggers. It offers both high accuracy, 75 ppm on the 1V range and 120 ppm on the 1 mA range, and high stability to provide long term confidence.

- 1.00 mV to 32.000 V DC
- 10 nA to 120.000 mA DC
- 10 types of thermocouple and Pt100 + user defined



## CA450 - Process multimeter

The CA450 is the ideal all-in-one tool for the installation and maintenance of process instrumentation such as transmitters, flow meters, signal conditioners and valve positioners. It uniquely combines the functionality of a true rms digital multimeter and those of a calibrator and can be used for electrical and process measurements.

- 2-wire transmitter simulator (20 mA SINK)
- Loop check – Simultaneously provides 24V transmitter power and precisely measures DC mA signals
- HART mode setting with loop power (250  $\Omega$  resistance)
- Step or sweep response test of valve positioners



## CA51 – Handheld multifunction calibrator

- Source: DCV, DCA, Resistance, RTD, TC, Frequency, Pulse
- Measure: DCV, DCA, ACV, Resistance, Frequency, Pulse
- Simultaneous source and measure, Automatic step and sweep

## CA71 – Handheld multifunction calibrator

- Source: DCV, DCA, Resistance, RTD, TC, Frequency, Pulse
- Measure: DCV, DCA, ACV, Resistance, RTD, TC, Frequency, Pulse
- Simultaneous source and measure, Automatic step and sweep
- PC communication interface



## CA150 - Handheld multifunction process calibrator

- Source: DCV, DCA, Resistance, RTD, TC, Frequency, Pulse
- Measure: DCV, DCA, Resistance, RTD, TC, Frequency, Pulse
- Simultaneous source and measure, Automatic step and sweep
- 24V transmitter loop power supply and current measurement (SINK)
- Internal memory for data and settings

# Data acquisition & logging systems

## Network-based data acquisition systems

Yokogawa's wide range of data acquisition and logging systems meets all kind of application requirements. Ethernet communication interfaces support fast and easy connection to LAN environments, enabling remote monitoring applications and centralised back up services. Standard software for the configuration of measurement devices and applications offer easy set-up and minimises preparation time. Advanced software packages can be used with Yokogawa recorders, data acquisition instruments and other measuring equipment to build an integrated PC-based data acquisition system.



## GM10 SMARTDAC+ Data acquisition system

Building upon the SMARTDAC+ product family, the GM10 is the new generation of data acquisition and logging systems. The GM system architecture is modular and flexible and does not use base plates. All existing SMARTDAC+ I/O modules are installed in module bases, which can be easily mounted side-by-side. The logging module includes a large memory for long term data storage as well as an Ethernet interface for connection to a computer system.

Powerful options like mathematical functions and event/actions can be used for customisation.

- Modular design with various input/output modules and up to 420 channels
- SD card memory support up to 32 GB
- Bluetooth interface for easy connection to laptops or Smart Devices

# Data acquisition & logging systems



## MX100 - MODULAR DATA ACQUISITION SYSTEM

PC based, data acquisition system that meets requirements for R&D, durability testing, quality assurance, and facilities monitoring.

- High scanning speed: 10 or 100 ms
- Wide range of inputs (mV, V, mA, TC, RTD, strain, digital) and outputs (digital, V, mA)
- Scalable from 4 to 1200 channels



## MW100 - Web-enabled datalogger

The web-enabled datalogging system allows data to be accessed from multiple locations using a standard web browser.

- Datalogging system for standalone and network applications
- Advanced network functions including e-mail, FTP, SNMP, DHCP
- Strong mathematical and event action functions for custom applications



## GA10 Data logging software

Integrates a wide range of recorders, data loggers and measuring devices into one software solution for data logging and monitoring.

- Supports multiple connections to 100 devices and 2000 tags
- Remote monitoring from 50 client PCs
- Data analysis and reporting



## MCPS – Multi channel process system

Brings a complete software studio for data acquisition and evaluation.

- Advanced alarm monitoring and logging functions
- Powerful mathematical functions for on-line and off-line computations
- Customer specific reports
- Powerful custom scripting functions for performing complex data analysis, transfer data online to Excel or to send commands to devices and enabling control of automated test standwvs



# Recorders



## GP10/GP20 SMARTDAC+

### Portable paperless recorders

Measurement environments can be complex and fast changing which requires systems to be smart, powerful and adaptable to specific processes. SMARTDAC+ features a unique touchscreen using swipe technology and pinch operations for fast and easy access to all recorder functions. The SMARTDAC+ paperless recorders facilitate full integration with WT power analysers for continuous monitoring and recording of precision power, date and temperatures. Measure, display and archive process data with greater levels of clarity, intelligence and accessibility.

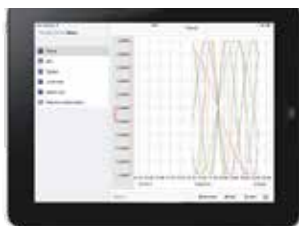
- Bright multi-touch colour display
- 10 to 100 universal input channels
- SD card and USB memory storage
- Report and printer output functions



## GX90 and GX60 - Hardware modules

The smart architecture of GP10/GP20 recorders allows a wide variety of input/output modules and extension boxes to be added or removed at any time in the future.

- GX90 series input/ output modules support DC voltage, Thermocouple, RTD, Contact Input, Relay Output
- GX60 series for expandability of the system with external boxes up to 450 input channels



## Mobile applications

Modern network technologies offer remote access to SMARTDAC+ recorders from a tablet or smart phone, at any place, at any time.

- SMARTDAC+ App for iPad and iPhone downloadable from the App store
- Downloadable application for standard web browsers from [www.smartdacplus.com](http://www.smartdacplus.com)

## Software and accessories

### Solid state relays with high breakdown voltage (SSR)

Offer long operation life and accurate measurement.

### Data viewer software

Displays and prints data from measurement files. Data can be viewed in trend, digital and circular forms, and converted to ASCII or Excel.

# Electrical test tools



## Digital multimeters

Yokogawa's family of handheld DMMs is packed with advanced functionality, such as frequency, pulse width, duty cycle, temperature, capacitance and dB measurements. The TY series offers memory and USB communication functions, true RMS and mean value measurements, closed case calibration, a low pass filter and safety shutters. Features and functions like these allow the technician to test, troubleshoot and calibrate equipment, regardless of whether it is on the bench or in the field.

- TY700-series: 4.5 digit with 0.02% basic accuracy, 50000-count dual display and 51-segment bar graph
- TY500-series: 3.5 digit with 0.09% basic accuracy, 6000-count dual display and 31-segment bar graph
- 73101: 3.5 digit, 4300 count pocket DMM



## Clamp-on testers

The wide range of Yokogawa clamp-on testers enables electric currents in conductors to be measured, without making physical contact or breaking circuits. The CL Series consists of AC, AC/DC, and leakage current clamps with assorted ranges and dimensions. The multiple options include RMS, mean, temperature and frequency measurements, and a recorder output.

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# YOKOGAWA

Yokogawa's global network of 88 companies spans 55 countries. Founded in 1915, the US\$4 billion company conducts cutting-edge research and innovation. The core-businesses of Yokogawa are Industrial Automation and Control, and Test & Measurement. For more information about Yokogawa Test & Measurement, please visit the company's website [tmi.yokogawa.com](http://tmi.yokogawa.com)

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